User Manual

SG125HV
SG125HV-20
PV Grid-connected Inverter

SG125HV-V1-UEN-Ver16-202202 Version: 1.6

1 About This Manual

Validity

This manual is for the SG125HV/SG125HV-20, a three-phase PV grid-connected transformerless inverter, (hereinafter referred to as inverter unless otherwise specified). The inverter is grid-connected, transformer-less, robust and of high conversion efficiency.

Aim

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

Related Documents

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

Target Group

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

How to Use This Manual

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

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. 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

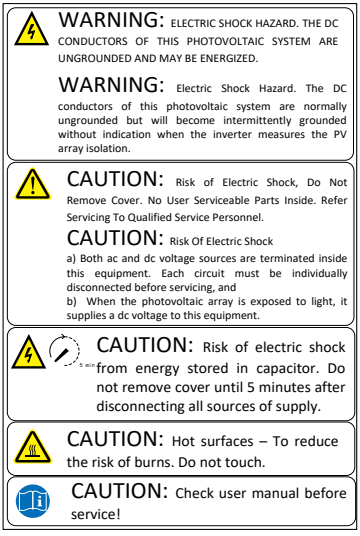
CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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



WARNING: ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.
WARNING: Electric Shock Hazard. The DC conductors of this photovoltaic system are normally ungrounded but will become intermittently grounded without indication when the inverter measures the PV array isolation.
CAUTION: Risk of Electric Shock,Do Not Remove Cover. No User Serviceable Parts Inside. Refer Servicing To Qualified Service Personnel.
CAUTION: Risk Of Electric Shock a) Both AC and DC voltage sources are terminated inside this equipment. Each circuit must be individually disconnected before servicing. b) When the photovoltaic array is exposed to light, it supplies a DC voltage to this equipment.
CAUTION: Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.
CAUTION： Hot surfaces – To reduce the risk of burns. Do not touch.
CAUTION: Check user manual before service.

Contents

1 Safety Instructions

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

- The property safety of the operator or a third party
- The inverter and other properties that belong to the operator or a third party

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

⚠ WARNING

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

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

Technical personnel mentioned above may perform the following work:

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

Before Installation

NOTICE

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

If there is visible damage to the packing case or the inner contents, or if there is something missing, contact SUNGROW or the forwarding company.

⚠ CAUTION

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

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

During Mechanical Installation

⚠ DANGER

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

⚠ CAUTION

System performance loss due to bad ventilation!

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

During Electrical Connection

NOTICE

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

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

⚠ DANGER

Lethal voltage exists!

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

⚠ WARNING

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

During Inverter Operation

⚠ WARNING

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

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

⚠ CAUTION

There is a risk of burn!

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

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

⚠ WARNING

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

- **Plugging in and unplugging the DC side HV fuse when it is alive;**
- **Touching the end of the cables that have no insulation and may still be alive;**
- **Touching the connection copper bus bar, terminal or other spare parts inside the device that may be alive;**
- **The power cable connection is loose;**

- **Spare parts, such as bolts, are falling inside the inverter;**
- **Incorrect operation by unqualified persons that have not received training;**

⚠ WARNING

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

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

Maintenance and Service

⚠ DANGER

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

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

⚠ CAUTION

Keep unqualified persons away!

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

NOTICE

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

NOTICE

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

NOTICE

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

The printed circuit boards contain components sensitive to electrostatic discharge.

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

Others

NOTICE

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

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

WARNING

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

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

WARNING

Respect the following regulations:

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

WARNING: ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.
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2 Product Description

2.1 Intended Usage

SG125HV/SG125HV-20; a transformerless three-phase PV grid-connected inverter, is an integral component in the PV power system.

The inverter is designed to convert the direct current power generated from the PV modules into grid-compatible AC current and feeds the AC current to the utility grid. The intended usage of the inverter is illustrated in Fig. 2-1.

WARNING

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

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

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

During the installation and operation of the inverter, please ensure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.

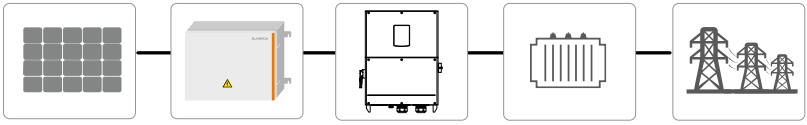
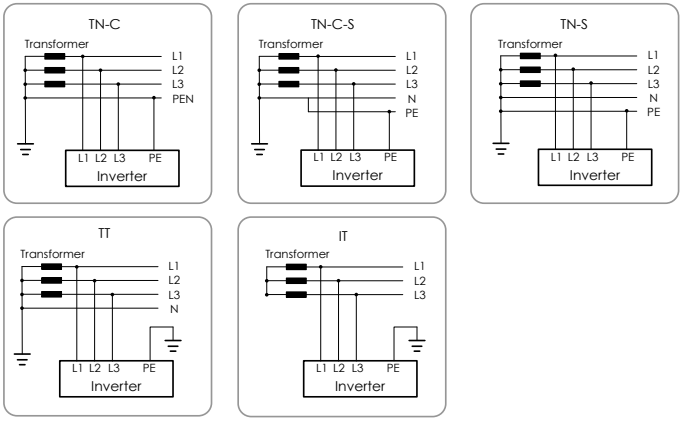


Fig. 2-1 Inverter application in PV power system

Item	Description	Note
A	PV strings	Monocrystalline silicon, polycrystalline silicon, and thin-film without grounding
B	Combiner Box	Combine the DC current of several PV string inputs

Item	Description	Note
C	Inverter	SG125HV/SG125HV-20
D	Transformer	Boost the low voltage from inverter to grid-compatible medium voltage.
E	Utility grid	TN-C, TN-S, TN-C-S, TT, IT

The following figure shows the common grid configurations.



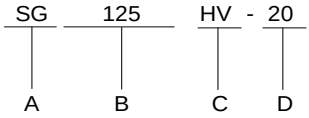
If the Anti-PID function is to be enabled, ensure that:

- The inverter is applied in the IT system.
- The downstream transformer meets the requirements described in 6.2.1 Medium-voltage Transformers.
- The AC cables meet the requirements described in 6.2.2 AC Cable Requirements.

2.2 Product Introduction

2.2.1 Model Description

The model description is as follows:



- A: Code of PV grid-connected inverter
- B: Code of power level
- C: High voltage input (1500Vdc)
- D: Code of product version

Tab. 2-1 Version difference

Model	PID function	Night SVG function
SG125HV	Optional	No
SG125HV-20	Yes	Yes

2.2.2 Appearance

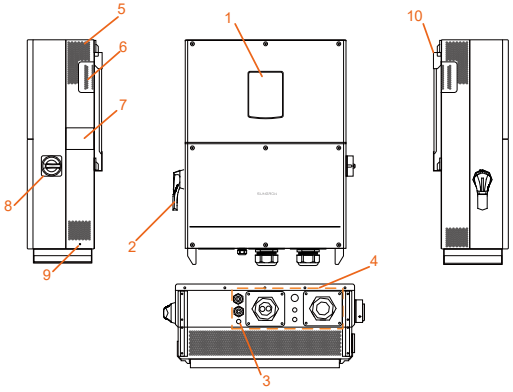


Fig. 2-2 Appearance

* Pictures are indicative only. Product in kind prevail.

No.	Name	Description
1	LED indicator panel	HMI interface to indicate the present working state of the inverter.
2	DC switch	Protective components to safely disconnect DC side current.
3	Waterproof air valve	-
4	Electrical connection area	Includes DC terminal, AC terminal and RS485 communication terminal.

No.	Name	Description
5	Air outlet	Controlled forced-air cooling method. Ensures proper ventilation.
6	Handles	Handles are designed for transporting, installing and disassembling the inverter
7	Cover plate of the fan	The fan is located on the back of the cover plate and used for the forced cooling of the inverter
8	AC switch	Serviced as an automatic overcurrent device
9	PE second terminal	User can connect this terminal as per requirements.
10	Mounting ear	Hang the inverter on the bracket.

2.2.3 Dimensions

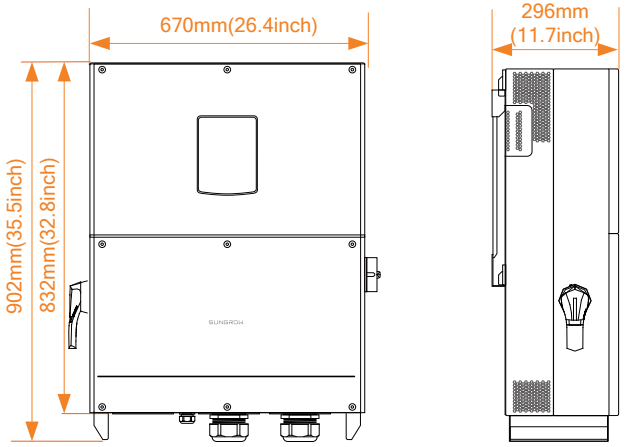


Fig. 2-3 Dimensions of the inverter

2.2.4 LED Indicator Panel

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

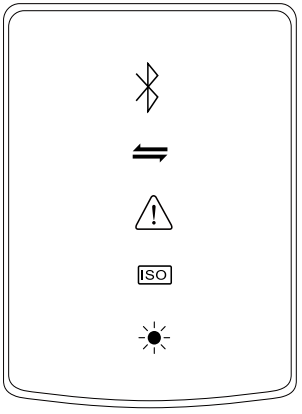


Fig. 2-4 LED indicator panel

Tab. 2-2 LED indicator description

LED indicator	LED color	LED state	Definition
Bluetooth	Blue	ON	The Bluetooth communication is connected, the communication channel has no data interaction
		OFF	No device connected to the inverter through the Bluetooth.
		Periodical flash	The Bluetooth communication is connected and there is data communication
Communication	Blue	OFF	The RS485 communication cable is not connected or the communication channel has no data interaction
		Periodical flash	The RS485 communication cable is connected and the communication channel has data interaction
Fault/PID	-	OFF	No alarm or fault has occurred and PID function is not enabled
	Red	ON	A fault occurred and the device cannot connect to the gird
		Periodical flash	Fault recovery

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

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. Turn 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.

2.2.6 AC Switch

The AC switch is used to disconnect the inverter from the AC grid. Turn the switch to the OFF position and the inverter disconnects from the AC grid.

Turn the AC switch to the ON position before restarting the inverter.

2.3 Technical Description

2.3.1 Circuit Diagram

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

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

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

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

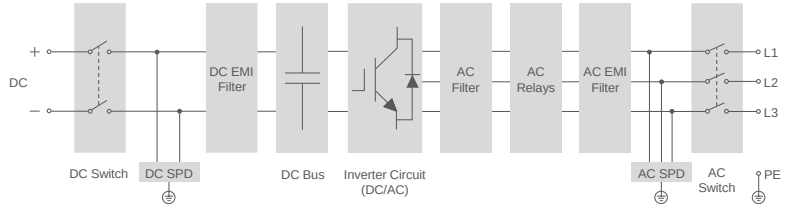


Fig. 2-5 Circuit diagram of SG125HV/SG125HV-20

2.3.2 Function Description

- Inversion function

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

- Data storage

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

- Parameter Configuration

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

- Communication Interface

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

- Protection Function
  - AC short circuit protection
  - Ground insulation resistance monitoring
  - Grid voltage monitoring

- Grid frequency monitoring
- Residual current protection
- DC injection of AC output current monitoring
- Internal temperature monitoring
- Anti-islanding protection
- DC over-voltage protection
- Over-current protection
- Power module over-temperature protection
- Anti-PID function (Optional)
- PID recovery function (Optional)
- Night SVG function (Optional)

2.3.3 Derating

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

- Ambient temperature is too high
- Gird voltage is too low
- Fluctuations of external power level
- Input voltage is too high
- Grid frequency* is too high

Note: *The over-frequency curve may vary with the country setting.

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, a broken fan or poor ventilation will lead to inverter power derating.

- When the IGBT 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.

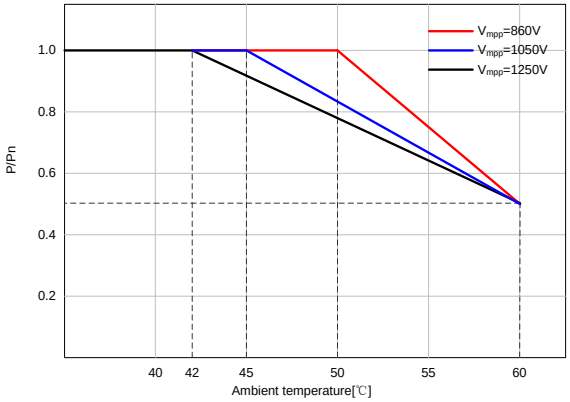


Fig. 2-6 Over-temperature Derating(Pf=1)

Lower limit of the over-temperature derating: about 50% of the nominal power.

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…600V, the inverter will derate the output power.

$$\begin{cases} P_o = \dfrac{V_{grid}{}^2}{600^2} \times 125kVA & V_{\min} \le V_{grid} < 570\text{V} \\ P_o = \dfrac{V_{grid}}{600} \times 125kVA & 570\text{V} \le V_{grid} \le 600\text{V} \\ P_o = 125kVA & 600\text{V} \le V_{grid} \le V_{\max} \end{cases}$$

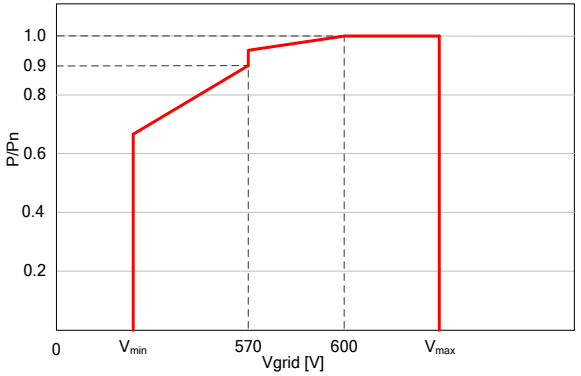


Fig. 2-7 Grid under-voltage derating(Pf=1)

High input voltage derating

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

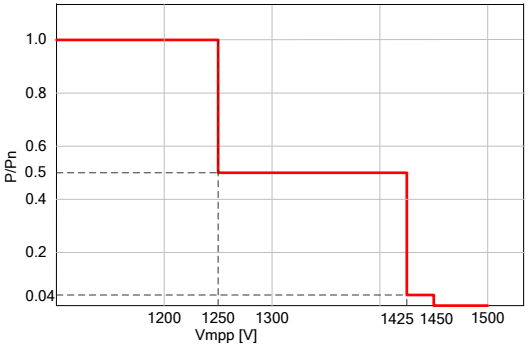
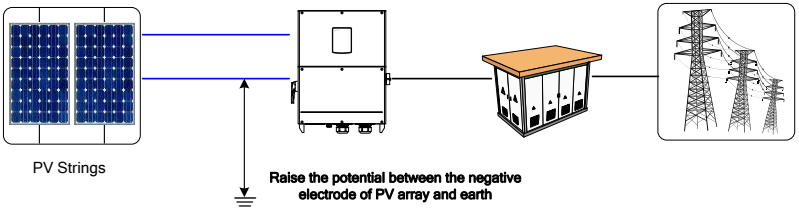


Fig. 2-8 Input voltage and the power derating(Pf=1)

2.3.4 PID Function

SG125HV/SG125HV-20 provides Anti-PID function and PID Recovery function, and achieves raising the potential between the negative electrode of PV array and earth by using internal PID function module.



Anti-PID Function

When the inverter is running, the PID function module suppresses the PID effect by raising the potential between the negative electrode of PV array and earth to a positive value.

PID Recovery Function

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.

If the PID function is to be enabled, ensure that all PV modules in the array of power station to which SG125HV/SG125HV-20 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.

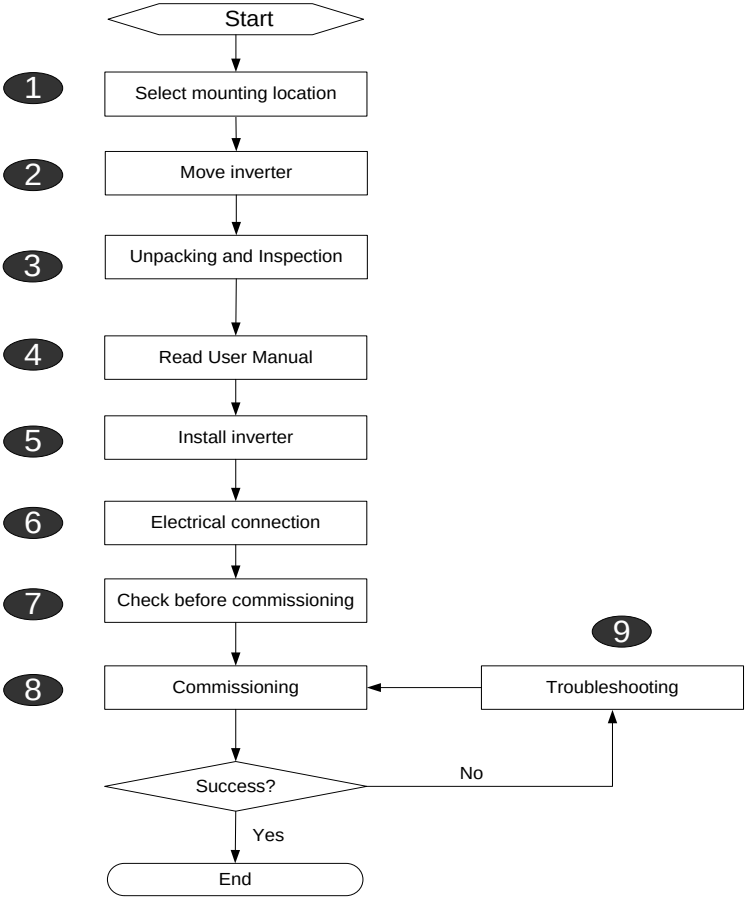


Fig. 3-1 Installation flowchart

Tab. 3-1 Description of installation flow

Procedure	Description	Reference
1	Select optimal installation site	5.1
2	Move the inverter to the installation site	5.2
3	Unpacking and inspection	4.1
4	Read the User Manual, especially the section on "Safety Instruction"	1
5	Install the inverter to the selected installation site	5.3
6	Electrical connection; DC side connection; AC side connection; Ground connection; Communication connection.	6.3~6.7
7	Inspection before commissioning	7.1
8	Start up the inverter and configure corresponding parameters.	7.2
9	Troubleshooting	9.1

4 Unpacking and Storage

4.1 Unpacking and Inspection

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

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

In case any damage is found, please contact SUNGROW or the forwarding company.

Do not dispose of the original packing case. It is recommended to store the inverter in it.

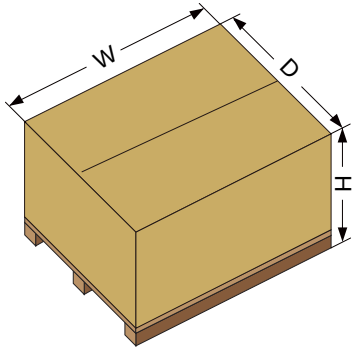


Fig. 4-1 Inverter paper packing case

Dimensions	W	H	D
In mm	1098	608	848
in inch	43.2	23.9	33.4

4.2 Identifying Inverter

The nameplate is attached to one side of the inverter and the packing case carton separately. It provides information on type of inverter, important specifications, marks of certification institutions, and serial number which are available and identified by SUNGROW. Take SG125HV as an example:

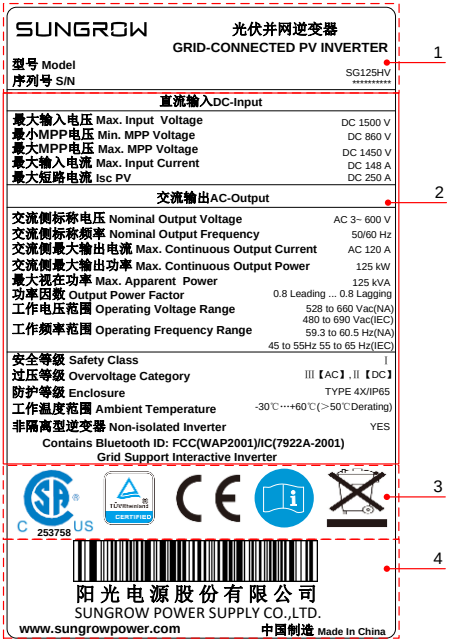


Fig. 4-2 Inverter nameplate

*Image shown here is indicative only. Product in kind prevail.

Item	Description
1	SUNGROW logo and product type
2	Technical data of inverter
3	Instructions and marks of conformity
4	Company name, website and origin

Tab. 4-1 Description of Icons on the Nameplate

Icon	Description
	CSA mark of conformity. The inverter is in compliance with directives of US and CAN.
	TUV mark of conformity. The inverter is in compliance with directives of TUV.
	CE mark of conformity. The inverter is in compliance with directives of CE. EU/EEA Importer.
	Refer to the corresponding instructions.
	Don't dispose of the inverter with the household waste.

4.3 Scope of Delivery

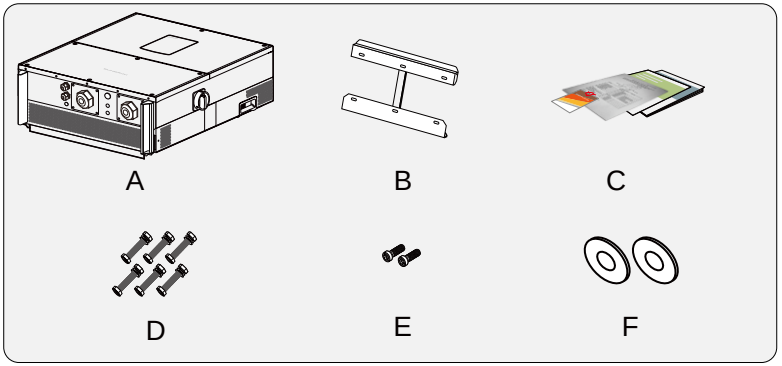


Fig. 4-3 Scope of delivery

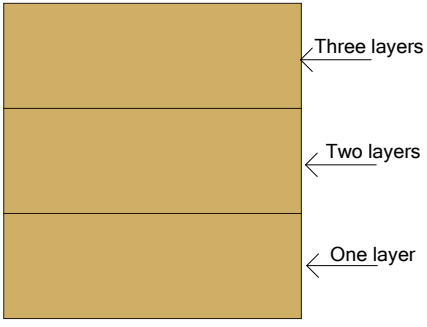
Item	Name	Description
A	Inverter	---
B	Bracket	Used to connect the inverter to the installation site.
C	Documents	Quality certificate, packing list, Test Report and quick user manual
D	Fasten set	Six units to fasten bracket to metal frame.

E	Fix screw	Two M4×16 screws to connect the inverter to the bracket.
F	Big flat washer	Two additional big flat washers are within the scope of the delivery for future use if needed.

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 against dust and moisture.
- Relative storage temperature: -40℃~70℃(-40°F~158°F); Relative humidity: 0-95%.
- Stack the inverters in at most three layers. Do not store the inverters in stack for more than half a year if the stack layer is more than three.



- Keep the inverter away from the chemical corrosive materials to avoid possible corrosion.

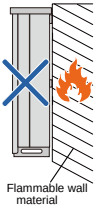
- Periodically (recommended: six months) check for any visible damages during the storage period. Replace the packing material during the storage period as necessary.
- The packing should be upright.
- If the inverter has been stored more than half a year, the qualified persons should thoroughly check and test it before using.

5 Mechanical Installation

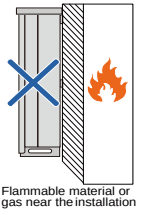
5.1 Installation Site Selection

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

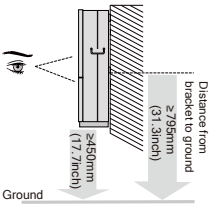
- Take the load capacity of the wall into account. The wall (concrete wall or metal frame) should be strong enough for the weight of the inverter over a long period.
- Install the inverter in a convenient location for electrical connection, operation and maintenance.
- Do not install the inverter on the wall made up of flammable materials.



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

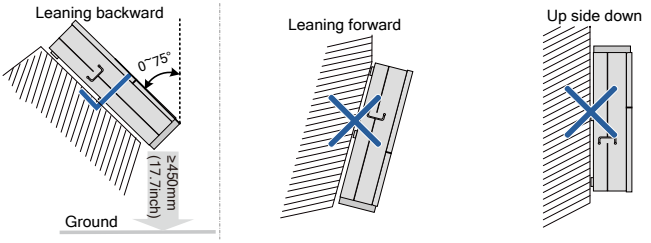


- Place the inverter at eye level for easy viewing and operation.

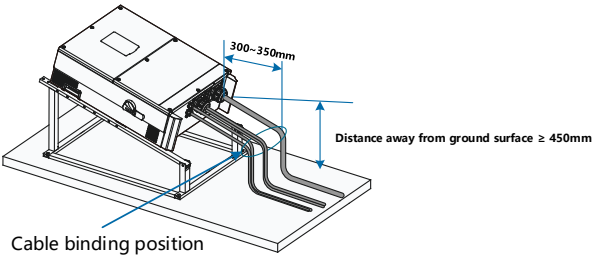


- Install the inverter vertically or at a maximum back tilt of 75 degrees. Do not install the inverter leaning forward or upside down.

  Please consult SUNGROW before tilting backwards the inverter and install it in floating power plants.



In case the installation site is a level surface, mount the inverter to the horizontal-mounting bracket to meet the mounting angle requirements, as shown in the figure below.



Take the following items into account when designing the bracket scheme:

- Consider onsite climate conditions and take anti-snow and anti-rain measures if necessary.
- Ensure that the waterproof connectors are at least 450mm higher than the ground surface.
- Bind the cables at the positions 300~350mm away from the DC connector, AC waterproof terminal, and communication waterproof terminal.
- The various waterproof terminals should be tightened in accordance with the torque requirements in this manual to ensure that they are tight and sealed.

Contact SUNGORW if you have any question.

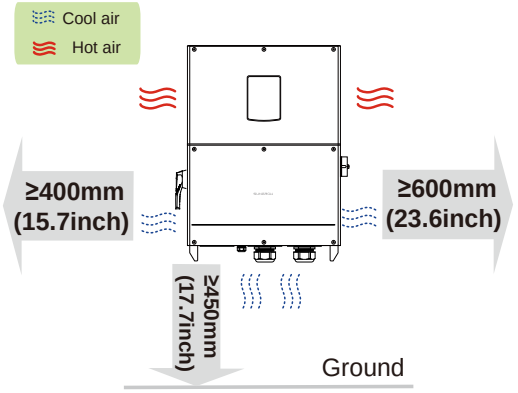
- With an IP65/NEMA 4X protection rating, the inverter can be installed both outdoors and indoors.
- To achieve better running effect. The ambient temperature should be within -30℃...60℃(-22°F to 140°F). The inverter will operate with power derating if the temperature is too high.
- The relative humidity range of the installation site is 0-100%.

Max. ambient temperature: 60℃(**+140°F)**

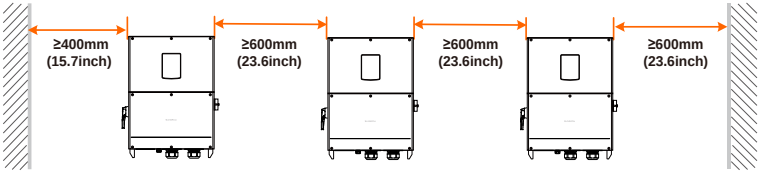
Min. ambient temperature: **-30℃(-22°F)**

Relative humidity: **0-100%**

- Please consult SUNGROW before installing inverters outdoors in salt stress areas. Salt stress areas mainly refer to coastal areas that are within 500 meters from the coast. The deposition of salt fog varies largely with nearby seawater characteristics, sea wind, precipitation, relative humidity, terrain, and forest coverage.
- Ensure there is enough space for convection (The fans are maintained on the left side of the inverter, and a larger clearance is required.)

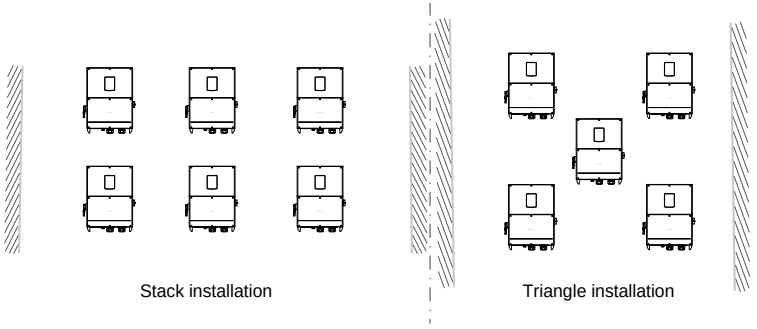


- When installing multiple inverters, it is recommended to install multiple devices side by side.

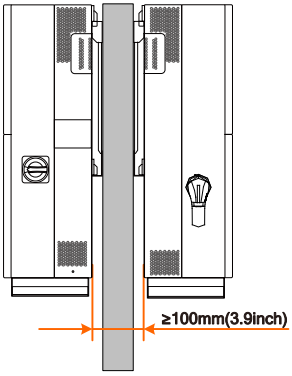


Side by side installation (Recommended)

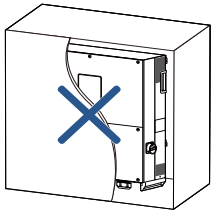
- Stack installation or triangle installation is not recommended.



- When the devices are installed back to back, make sure the clearance in between is greater than or equal to 100mm (3.9inch).



- Do not install the inverter in a confined space. The inverter will not work normally if otherwise.
- Install the inverter where children cannot reach.
- Do not install the inverter near residential areas. Noise can be produced during inverter operation which may affect the daily life.



5.2 Moving Inverter to Installation Site

To install the inverter, remove the inverter from the packing case and move it to

the installation site. Follow the instructions below as you move the inverter:

- Always be aware of the weight of the inverter.
- Lift the inverter by grasping the handles on both sides of the inverter.
- A minimum of two people or proper moving devices should be used to move the inverter.
- Do not release the equipment unless it has been secured firmly.

5.3 Installation Tools

Gather the following tools before installation:

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

5.4 Installing the Inverter

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

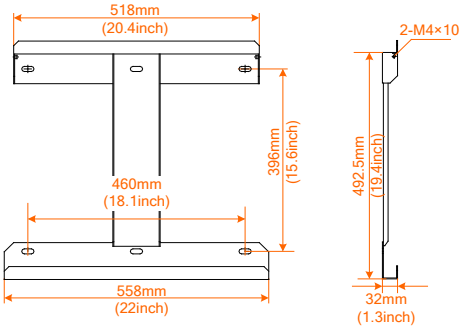


Fig. 5-1 Dimensions of the bracket (figures in inch)

The stainless fasteners are supplied for attaching the bracket to metal frame.

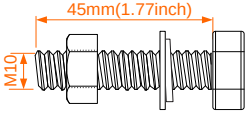


Fig. 5-2 Dimensions of fastener for metal frame (figures in mm)

To install the inverter to concrete walls, the user needs to purchase expansion bolts with proper size (recommended: M10*65) to attach the bracket to concrete walls.

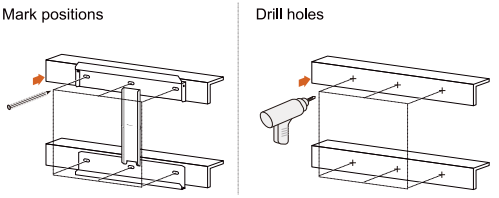
5.4.1 Installing to Metal Frame

Step 1 Remove the bracket and fasteners from the packing case.

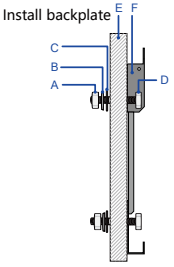
Step 2 Place the bracket to the chosen metal frame and adjust it to proper position and height.

Step 3 Mark the position for holes, drilling according to the hole positions of the bracket.

Step 4 Drill holes according to the marks made before. If the shape of the metal frame does not match the bracket, re-drill holes on the bracket according to the metal frame.



Step 5 Secure the bracket to the metal frame firmly with the supplied fastener. The torque of the fasten nut is 35 N·m.

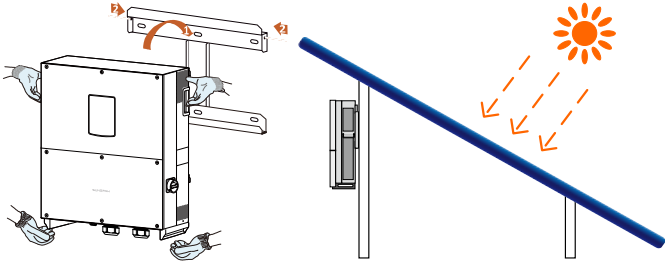


No.	Name	Description
A	Hexagon nut	M10
B	Spring washer	-
C	Flat washer	-
D	Screw bolt	M10*45
E	Metal frame	-
F	Bracket	-

Step 6 Lift the inverter above the bracket and then slide down to make sure they match perfectly.

Step 7 After putting the inverter on the bracket, secure the inverter to the bracket with two M4×16 screws (tighten the screw with its own nut).

Mount the inverter



5.4.2 Installing to Concrete Wall

Step 1 Remove the bracket and corresponding fasteners from the packing case.

Step 2 Place the bracket on the chosen concrete wall and adjust it to proper

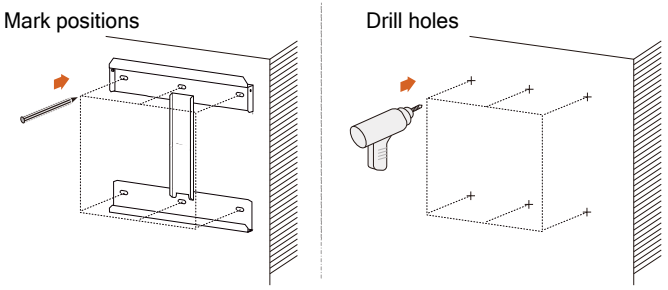
position and height.

Step 3 Mark the position for holes, drilling according to the hole positions of the bracket.

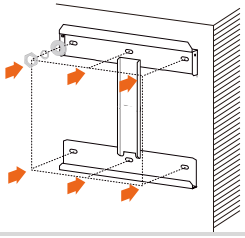
Step 4 Drill holes according to the marks made before.

DANGER

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



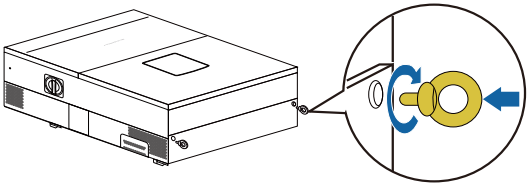
Step 5 Secure the bracket to the wall firmly by the supplied expansion bolt sets. Torque of the fasten nut is 35 N·m.



- If the installation location is lower, the inverter can be directly linked to the bracket, please follow step 6 and then jump to Step 10.
- If the installation location is higher, the inverter can not be directly linked to the bracket, please perform steps 7 to 10.

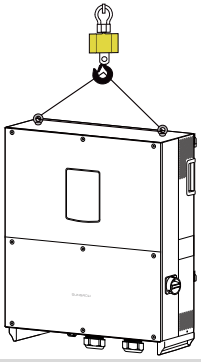
Step 6 Lift up inverter above the bracket and then slide down to make sure that the recesses on the back of the inverter fit perfectly together with the bracket.

Step 7 Screw two M12-screwed, lifting rings to the screw holes on top of the inverter.



M12-screwed lifting ring is a standard component. It is not within the scope of delivery. Please purchase from the market if needed.

Step 8 Thread a rope (with sufficient load-carrying capacity) prepared beforehand through the two lifting rings to lift the inverter and lift the inverter to the level of the attached bracket or adjacent location.



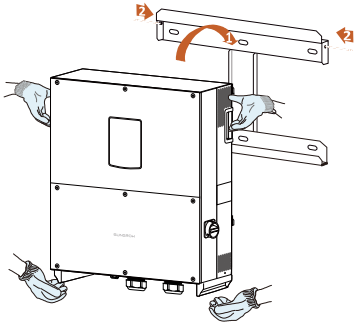
NOTICE

Please keep the inverter balanced during the whole process of inverter lifting. Inverter may hit the wall or other obstacles if you're not careful.

Step 9 Fit the inverter to the bracket, refer to step 6.

Step 10 After you fit the inverter to the bracket, fasten the inverter to the bracket with two M4×16 screws.

Mount the inverter



6 Electrical Connection

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

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

WARNING

Improper cable connection may lead to a fatal injury or permanent damage to the device.

Cable connections should only be done by qualified professional personnel.

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

6.1 Terminal Description

6.1.1 Appearance

Inverter electrical connection terminals and cable entries are all at the inverter junction box as shown in Fig. 6-1.

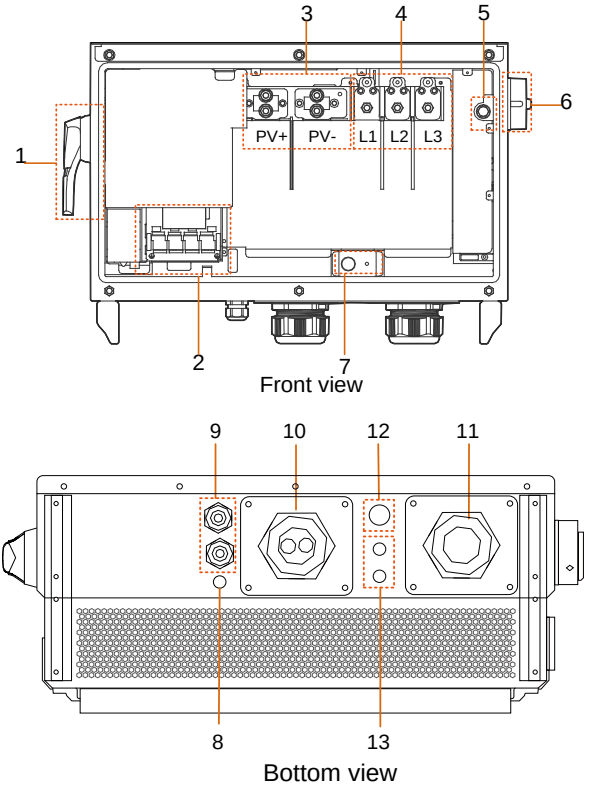


Fig. 6-1 Cable connection area

*Pictures are indicative only. Please in kind prevail.

No.	Name	Description
1	DC switch	Protective components to safely disconnect DC side current.
2	Configuration circuit board	Communication cable connection and configuration
3	DC crimping terminal	DC input cable access
4	AC crimping terminal	AC output cable access
5	AC PE terminal	AC PE cable access, M10X30 fastening screws
6	AC switch	Serviced as an automatic overcurrent device

No.	Name	Description
7	DC PE terminal	DC PE cable access, M6 × 16 (right) or M10X30 (left)fastening screws
8	Waterproof air valve	-
9	Communication cable gland	For Communication cable connection Knockout diameter for communication cable is 28.5mm.
10*	DC cable gland	For DC cable connection Knockout diameter for DC cable is 75.8mm. (The proper range of DC cable external diameter is 20~26mm)
11*	AC cable gland	For AC cable connection Knockout diameter for AC cable is 75.8mm. (The proper range of AC cable external diameter is 38~56mm)
12	AC cable gland for connecting Tracker control cabinet	Reseved
13	DC input plug-in terminal for connecting Tracker control cabinet	Reseved

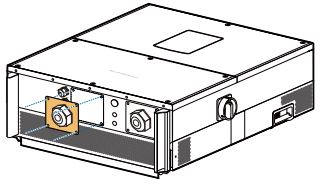
NOTICE

Connect the cable through the corresponding interfaces on the bottom of the inverter during power cable and communication cable connection;

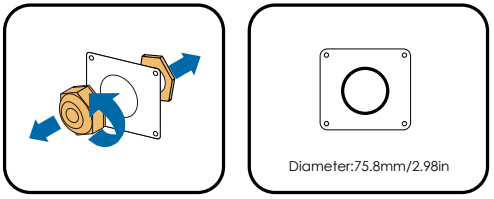
Tie the communication cables (e.g. RS485 and the dry contact) to prevent interference with the power cables.

*On site, wire conduit can be used as a substitute for the gland. Take replacing AC gland as an example, operation steps are as follows:

Step 1 Remove the sealing plate (M6 Allen driver).

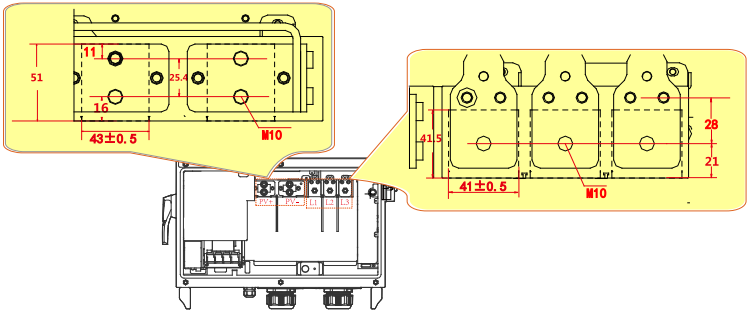


Step 2 Unscrew the gland (wrench *2, opening: 86mm)



6.1.2 Dimensions of Terminal

Before selecting the cable side terminals, please notice the dimensions of the AC & DC terminals specified in the figure to make sure the selected terminals are proper.



We provide the socket head cap screw whose matching flat washer can enhance the fastening function of the nuts.

The maximum permitted temperature for the DC and AC crimping terminal is 90℃(+194°F).

6.2 AC Side Cable Connection

6.2.1 AC side requirements

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

Before grid-connection, verify to make sure the grid voltage and frequency meet the requirements of the inverter. Contact the local utility grid company with any connectivity issues. For detailed parameters, please refer to 11.1 Technical Data.

AC Circuit Breaker

WARNING

Over-current protection devices, such as AC circuit breakers and fuses, must be installed on the AC side of the inverter and the grid side to ensure safe disconnection between the inverter and the grid.

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

Multiple inverters cannot share one AC circuit breaker.

Recommended specifications of AC circuit breaker:

Standard	Recommended rated voltage	Recommended rated current
UL	600V	150A
IEC	690V	160A

NOTICE

- **It is not allowed to install more than one inverter per fuse or circuit breaker.**
- **It is not allowed to connect loads between inverter and circuit breaker.**

Multiple Inverters in parallel Connection

If multiple inverters are connected to the LV side of the MV transformer in parallel, and the HV side is connected to the MV grid, please respect following requirement:

When more than 25 inverters are connected to a single winding of the transformer, please contact SUNGROW to confirm the technical solution.

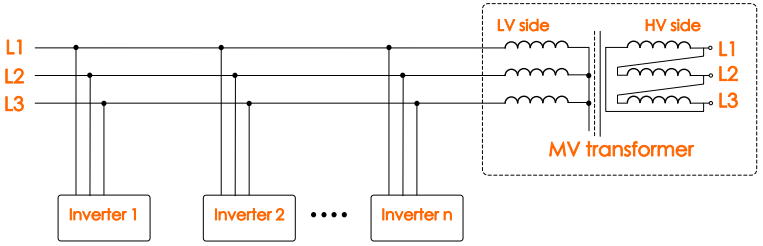
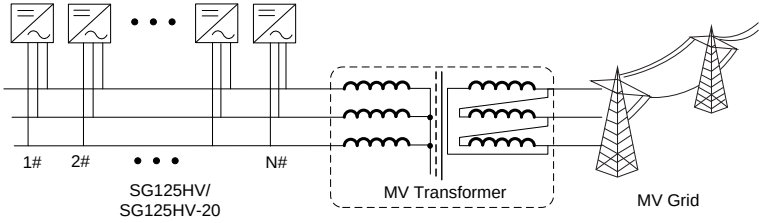


Fig. 6-2 Multiple Inverters in parallel Connection

Medium-voltage Transformers

SG125HV/SG125HV-20 Transformer Technical Requirements

- Nominal Frequency: 50Hz/60Hz
- Primary Voltage: According to the grid-connection point voltage
- Secondary Voltage: 600Vac (Line to Line, allowed range:480~690Vac)



Note: Additional phase monitoring devices may be required for grounded primary (utility side) transformers. Engineers should confirm the protection requirement prior to selecting the transformer.

- When the utility side phase monitoring devices are absence, and the system fully relies on inverter protection to shut down during the loss of phase fault

at the utility side, SUNGROW recommends a transformer with a DELTA connection on the utility side.

- The transformer must be suitable for operation with inverters which work with PWM modulation.
- Short Circuit Impedance Z(%) of the transformer should be 6%(the impedance allows 10% error margins.).
- The transformer should be capable of withstanding a certain level of harmonic current. The maximum total harmonic current is 3% of the fundamental current at nominal power output.
- The transformer should be capable of withstanding a certain level of DC current injection 0.5% of the fundamental current at nominal power.
- The transformer should be capable of withstanding a certain degree of phase imbalance 5% of the current at nominal power.
- The protection degree of the transformer should be taken into account to coordinate with the inverters.
- For thermal rating, the load curve of the transformer and the ambient conditions at the respective installation site should be taken into account.
- The applicable country-specific standards should be taken into account.
- The short-circuit apparent power of the transformer at grid-tied point should be no less than 10 times of its rated power
- If the Anti-PID function is to be enabled,

1) Neutral line grounding is strictly prohibited at the LV side of transformer.

2)The transformer's secondary windings shall be able to handle Vrms=842V phase to ground voltage, which must also be considered when selecting the cables and devices connected with the LV side of the transformer, including the SPDs, any meters, etc.

3) The maximum continuous working voltage and action voltage of the low-voltage side lightning protection device of the grid-connected transformer must meet the requirements. The "3+1" method is recommended as shown in Fig. 6-3, where the maximum continuous working voltage of M1-M3 are 500V, M4 is more than 750V.

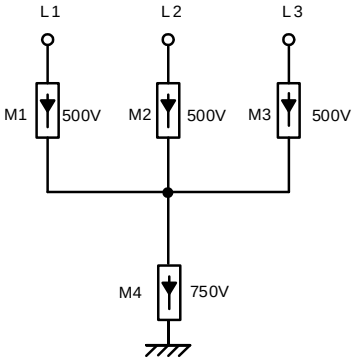


Fig. 6-3 The schematic diagram of AC SPD

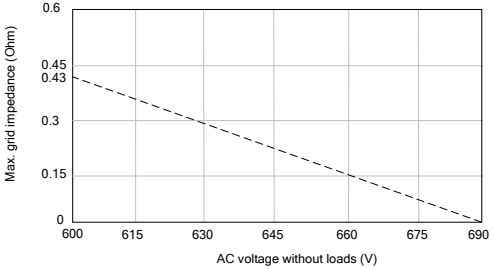
6.2.2 Grid Connection

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

AC Cable Requirements

Select AC cables according to the following factors:

- Grid impedance complies with the specifications below to avoid accidental shortcircuit or output power derating.

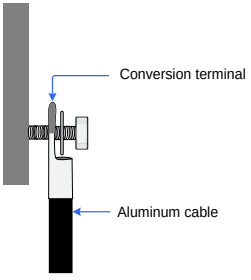


- Considering the voltage drop and other conditions, please enlarge the cable dimension. Power loss of the cable should be less than 1% of the nominal power.
- Withstand ambient temperature.
- Cable layout and installation conditions (inside wall, underground, free air, etc.)
- UV resistance and so on.

- The maximum operation temperature of the cable should no less than 90° C(+194°F).
- The current rating of the cable should be selected in accordance with the maximum AC output current of the inverter.
- The voltage rating of the cable should be no less than 600Vac.

(*If the Anti-PID function is to be enabled, the rating should be no less than 1000Vac)

- The Conductor type can be copper wire or aluminum wire.
- The AC cable must be designed in accordance with the local installation requirements.
- If the aluminum cable is selected, in order to ensure a reliable electrical connection, use the the copper and aluminum conversion terminal to avoid direct contact between the AC copper bar and the aluminum cable.



NOTICE

Directly connecting the aluminum cable to the copper bar will cause abnormal operation or even device damage.

6.2.3 Requirements for OT/DT Terminal (AC)

OT/DT terminals (not included in the delivery scope) are required for fixing AC cables to the terminal block. Purchase the OT/DT terminals according to the following requirements.

- Specification: M10;
- Dimensions: a≤41mm / 10.5mm≤b≤12.5mm / c≤20mm

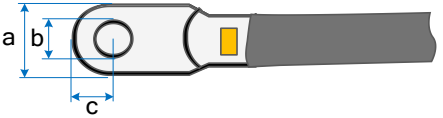


Fig. 6-4 Dimensions of Terminal

6.2.4 Connecting the Inverter to Grid

DANGER

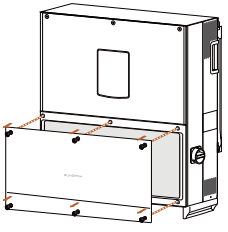
High voltage inside the inverter!

Ensure all cables are voltage-free before electrical connection.

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

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

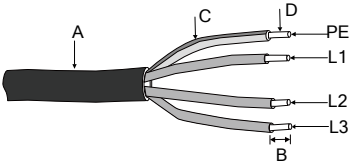
Step 2 Loosen the six screws (M6×16) on the lower connection cabinet.



Step 3 Strip off AC cables as shown below.

For flexible cables (stranded wires), use crimping lugs.

The cross section of the AC cable conductor must be sized in order to prevent accidental disconnections of the inverter from the grid due to high impedance of the cable that connects the inverter to the power supply point.



No.	Description	Remark
A*	Protective layer /Conduit	-
B	Length of insulation to be stripped off	Refer to Fig. 6-5Crimping the lugs
C	Insulation layer	-
D	Cross section of AC cables	Range: 70mm^2-185 mm^2(AWG2/0-350Kcmil)

Step 4 Insert the end of the AC cable into the crimping lug that matches with the M10 bolt and tighten it with proper tool.

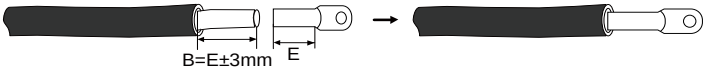
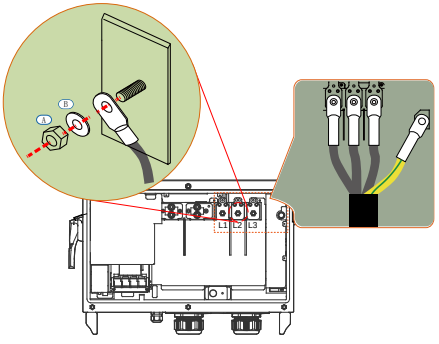


Fig. 6-5 Crimping the lugs

Step 5 Install the heat-shrinkable tubing.

Step 6 Connect the AC cable to the corresponding terminals.

* For torque specifications, refer to 11.2 Tightening Torques.

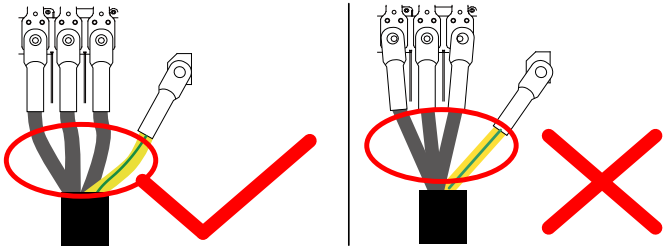


Item	Name
A	Nut
B	Disc spring

*Images shown here are for reference only! Actual product you receive may differ.

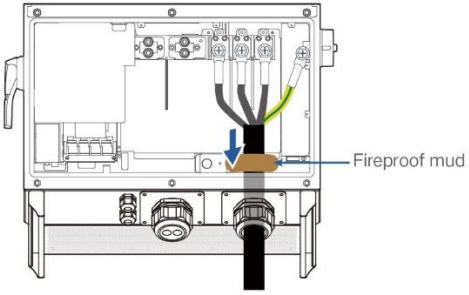
NOTICE

- **It is unnecessary to distinguish between phases during AC cable connection for the inverter has self-adaptive capacity.**
- **Observe the pin assignment of AC terminal block. If a phase wire is connected to the "PE" terminal, it may permanently damage the inverter.**
- **Please avoid squeezing the cable insulation layer into the AC terminal. Improper connection may affect the normal operation of the inverter.**
- **During AC cable connection, the cables inside the lower part of the device should be bent to be surplus in length. In this way, cable dropping or loosening, which can cause arc or other problems impairing functionality of the device, due to self-weight of the cables in case of land subsidence is avoided.**



Step 7 Screw cap-nut tightly onto the cable.

Step 8 Seal the gaps between the AC cable and the gland inside the lower part of the cabinet with duct seal or fireproof mud.



NOTICE

Seal the gap between the cable and the gland/conduit with duct seal or other suitable materials to prevent the entry of foreign bodies or moisture and ensure long-term and normal operation of the inverter.

6.3 Connecting Inverter to PV Arrays

DANGER

Lethal voltage exists!

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

WARNING

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

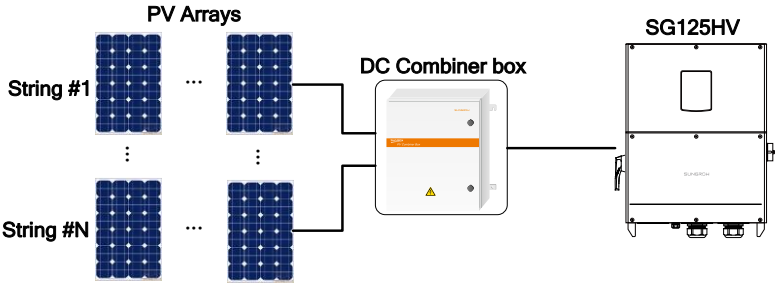
During the installation and operation of the inverter, please ensure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.

6.3.1 PV Input Configuration

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 1500V 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.**



NOTICE

The SG125HV/SG125HV-20 is a single stage inverter with only one MPPT. To make full use of the DC input power and reduce the power loss caused by mismatch, the type and rating of the PV modules connected to one inverter should be the same, including:

- **the same PV module model;**
- **the same number of PV modules;**
- **the same angle of tilt of the PV modules;**

6.3.2 Requirements for OT/DT Terminal (DC)

OT/DT terminals (not included in the delivery scope) are required for fixing AC cables to the terminal block. Purchase the OT/DT terminals according to the following requirements.

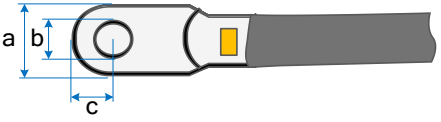
- Specification: M10;
- (Single-hole terminal) Dimensions: a≤43mm / 10.5mm≤b≤12.5mm / c≤13mm
- 

Fig. 6-6 Dimensions of Terminal (Single-hole terminal)

- (Double-hole terminal) Dimensions: a≤43mm / 10.5mm≤b≤12.5mm / c≤16mm / d=25.4mm

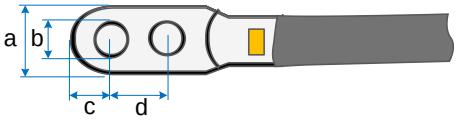


Fig. 6-7 Dimensions of Terminal (Double-hole terminal)

6.3.3 PV Input Connection

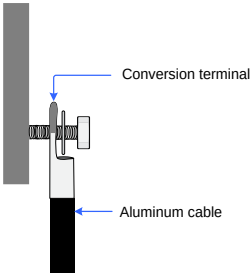
NOTICE

During the PV string input connection, the DC current of each string should be gathered together by a combiner box (or other combining devices) and then connected to the inverter.

DC Cable Requirements

Select DC cables according to the following factors:

- The maximum operating temperature of the cable should no less than 90° C(+194°F).
- The current rating of the cable should be selected in accordance with the maximum short circuit current of the PV arrays connected to the inverter.
- The voltage rating of the cable should no less than 1500V.
- The Conductor type can be copper wire or aluminum wire.
- If the aluminum cable is selected, in order to ensure a reliable electrical connection, use the copper and aluminum conversion terminal to avoid direct contact between the DC copper bar and the aluminum cable.



NOTICE

The device may be damaged or operate abnormally if the aluminum cable is directly connected to the copper bar.

- The DC cable must be selected in accordance with the local installation requirements.
- The range of DC cables is: 70mm^2-185 mm^2(AWG2/0-350Kcmil).

DC Cable Connection

DANGER

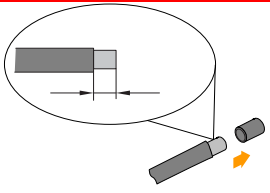
High voltage inside the inverter!

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

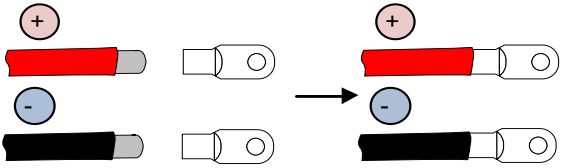
Do not connect the AC circuit breaker before electrical connection is completed.

Step 1 Rotate the DC switch to the "OFF" position.

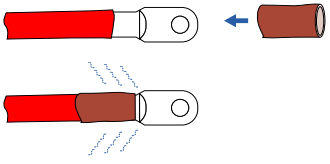
Step 2 Strip the insulation layer of the DC cable to proper length according to the DC cable specification.



Step 3 Insert the end of the DC cable to the cable socket that matches with the M10 bolt and tighten it with the proper tool.

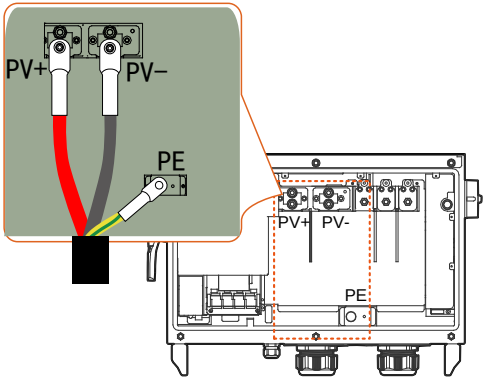


Step 4 Install the heat-shrinkable tubing, shrink the tubing with hot air blower.



Step 5 Connect the positive and negative polarity of the DC cable to the corresponding positive and negative cable connection terminals.

* For torque specifications, refer to 11.2 Tightening Torques.



WARNING

- **When accessing the positive and negative cable, it is necessary to ensure the insulation requirements between the positive access and the negative access. Once positive and negative inputs are short-circuited, it can cause unrecoverable damage to the inverter. SUNGROW shall hold no liability for any possible consequences caused by ignorance of this warning.**

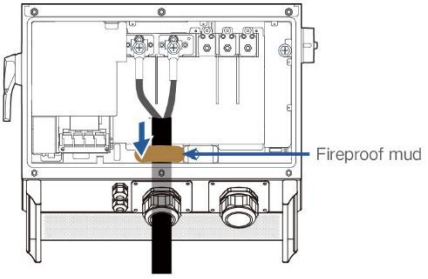
NOTICE

- **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.**
- **For the connection to the same MPPT, reversing the polarity of a single string is prohibited. A permanent failure of the system or inverter may occur.**

Step 6 Pull the cable gently to make sure it is secured.

Step 7 Screw cap-nut tightly onto the cable.

Step 8 Seal the gaps between the DC cable and the gland inside the lower part of the cabinet with duct seal or fireproof mud.



NOTICE

Seal the gap between the cable and the gland/conduit with duct seal or other suitable materials to prevent the entry of foreign bodies or moisture and ensure long-term and normal operation of the inverter.

6.4 Additional Grounding Connection

WARNING

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

6.4.1 Grounding System Overview

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

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

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

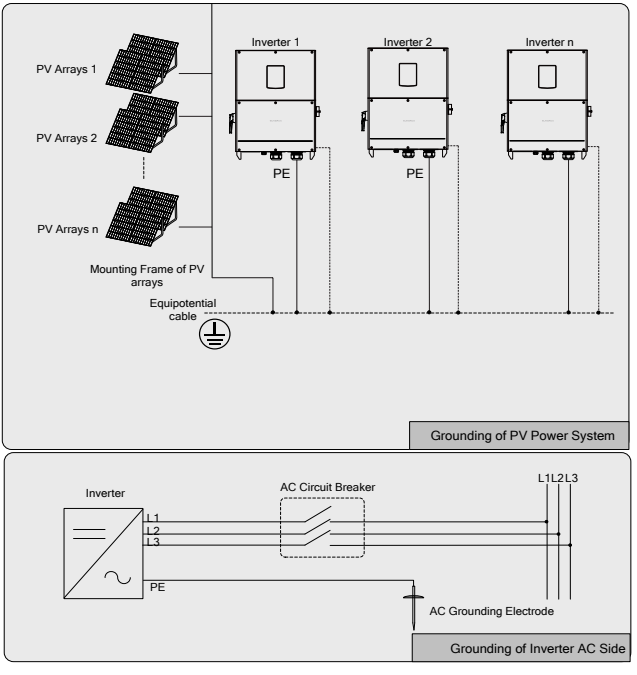


Fig. 6-8 Grounding of inverter

6.4.2 Additional Grounding Terminal

Position of Additional Grounding Terminal

The terminal is on one side of the inverter and it should be grounded.

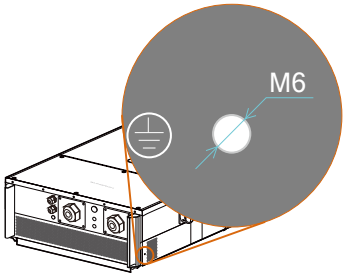


Fig. 6-9 Second PE terminal

WARNING

The connection of additional grounding terminal is optional. Whether to connect the terminal is determined according to local standards or regulations, but connection is recommended.

Cable Connection

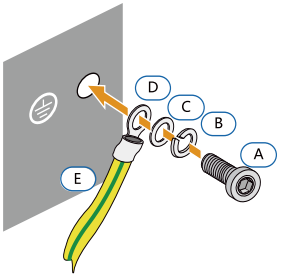


Fig. 6-10 Additional grounding connection

Item	Name	Description
A	Screw	M6×12mm
B	Lock washer	-
C	Washer	-
D	Cable socket	-
E	Grounding cable*	-

*the cross section of the grounding cable should not be less than half of the PE cable of the AC cable.

* Connection parts are not within the scope of delivery

* For torque specifications, refer to 11.2 Tightening Torques.

6.5 RS485 Communication Connection

6.5.1 Communication Overview

There are two communication waterproof connection terminals on the bottom of the inverter. RS485 A/B terminals and RS485 interface are provided on the configuration circuit board of the junction box. A 120Ω terminating resistor can be connected between the A and B communication cable through the dip switch.

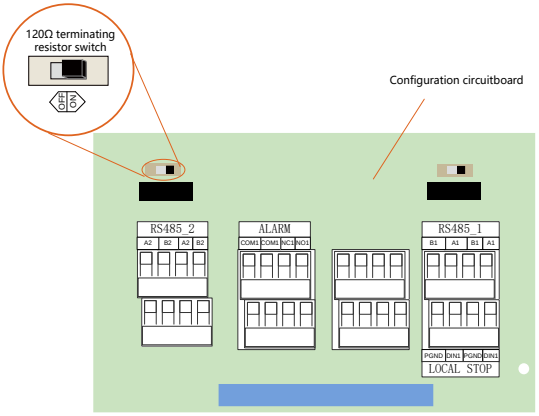


Fig. 6-11 Communication configuration

The inverter operation information can be transferred to the PC of the installed monitoring software or to a local data collector through RS485 communication connection.

Prepare communication cable before communication connection.

NOTICE

RS485 communication cables should be:

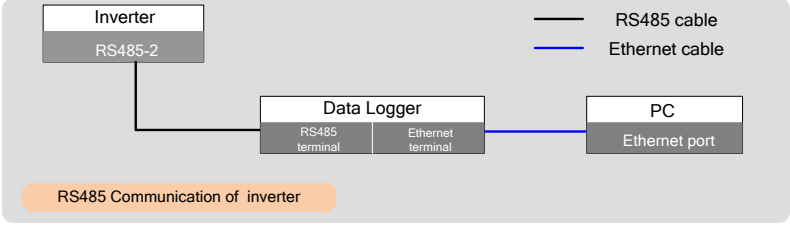
Shielded twisted pair cables or Shielded twisted pair Ethernet cable.

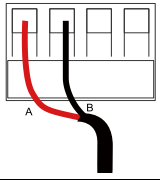
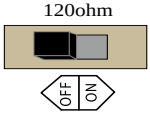
A converter such as data collector is needed to convert signal between inverter and PC.

6.5.2 RS485 Communication System

For Single Inverter

Where there is only one inverter, an RS485 cable can guarantee the communication connection.

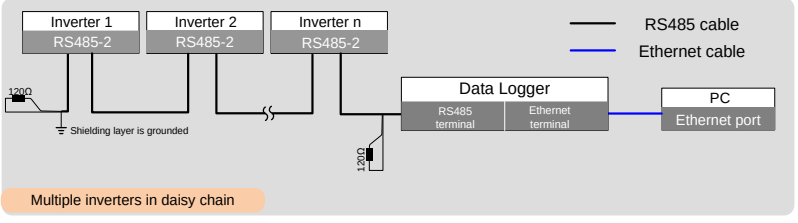


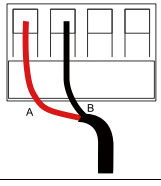
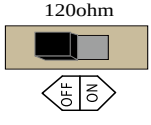
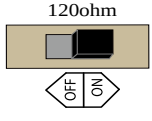
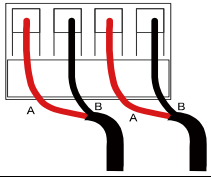
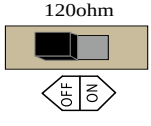
Inverter	Communication connection (RS485 bus connection)	Terminating Resistor
Single inverter	Only out 	No 

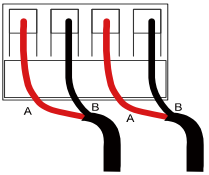
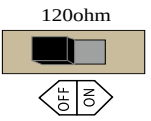
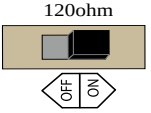
For Multiple Inverters

Where there is more than one inverter, all inverters can be connected in a daisy chain through an RS485 communication cable. The shielding layer of the RS485 cable should be single-point grounded.

- The length of an RS485 communication cable should be less than 1200m.
- If several inverters communicate with each other and connect to the Logger 3000, at most 4 daisy chains are supported and 60 devices in total can be connected (i.e. 4 daisy chains can be connected with at most 15 devices connected to one chain or 3 daisy chains are connected with at most 20 devices connected to one chain).



Inverter	Communication connection (RS485 bus connection)	Terminating Resistor	
		n≤15	n>15
Inverter 1	Only out 	No 	Yes 
Inverter 2~n-1	In and Out 	No 	

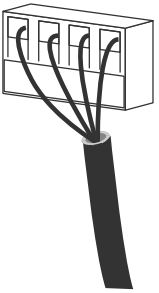
Inverter	Communication connection (RS485 bus connection)	Terminating Resistor	
		n≤15	n>15
Inverter n	In and Out 	No 	Yes 

6.5.3 RS485 Communication Connection

RS485A/B Bus Connection

Step 1 Thread the Network cable through communication cable gland to the configuration circuit board.

Step 2 Strip off the insulation layer of the communication cable. Connect the A and B of RS485 communication cable to corresponding terminals according to the marks on the configuration circuit board.



Step 3 According to the position of the inverter (refer to the prior section), repeat step 1...2 to connect the other RS485 cables.

Step 4 Lightly pull on cables to confirm whether they are fastened firmly.

Step 5 According to the position of the inverter (refer to the prior section), switch the terminating resistor ON or OFF.

Step 6 Tighten the thread-lock sealing lock. Block off the vacant terminals to protect from dust and moisture penetrating inside the inverter.

Step 7 Seal the gaps between the cable and the gland inside the lower part of the cabinet with duct seal. If there is no other connection procedure,

reassemble and connect the front cover of the connection cabinet.

NOTICE

Seal the gap between the cable and the gland with duct seal or other suitable materials to prevent the entry of foreign bodies or moisture and ensure long-term and normal operation of the inverter.

Step 8 Connect the communication devices. Refer to other manuals and documents if there are other devices.

Step 9 Confirm the communication connection and set the communication parameters.

If more than one inverter is connected to PC or Logger, please set the communication parameters from the APP interface.

Logger 3000 is optional parts and can be ordered from SUNGROW.

6.6 Configurable Dry Contact

There are Fault Alarm dry contacts and Local Stop dry contacts located on the configurable circuit board.

Fault Alarm dry contacts

The dry contacts can be configured as fault alarm. When the inverter is running normally, the two terminals NC&COM are short-circuited. when a fault occurs, the two terminals NC&COM are break out. The two terminals NO&COM are opposite.

NOTICE

The cross section area range of dry contact's cable is 28AWG...16AWG.

The devices to be connected to the dry contacts must comply with the related requirements:

AC Requirements	DC Requirements
Max. Voltage: 250Vac Max. Current: 5A	Max. Voltage: 30Vdc Max. Current: 5A

Local Stop dry contacts

The dry contacts can be configured as Local Stop. When the two terminals PGND &DIN1 are short-circuited, the inverter will stop running immediately. In this case, if the two terminals PGND &DIN1 are disconnected, the inverter will return to the previous state.

The dry contacts only support passive switch signal input.

- Multiple inverters connected in a daisy chain topology

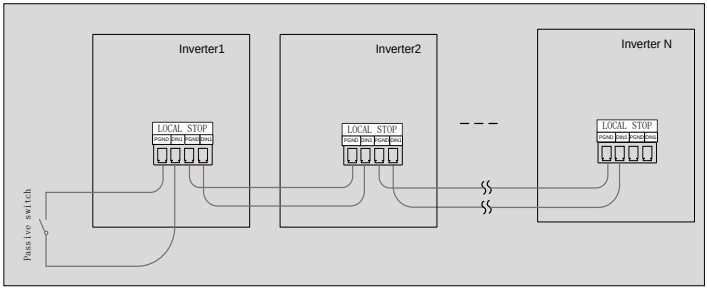


Fig. 6-12 Multiple inverters connected in a daisy chain topology

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 items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

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

Step 2 Close the external AC circuit breaker.

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

Step 4 Use the iSolarCloud App to establish the communication connection with the inverter through Bluetooth to set the initial parameters. When the device is initialized, send start instructions via the App For details, please refer to "10.4 Login".

Provided there is sufficient sunlight:

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

Step 5 Observe the status of LED indicator panel (Refer to Tab. 2-2LED indicator description).

8 Disconnecting, Dismantling and Disposing the Inverter

8.1 Disconnecting the Inverter

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

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

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

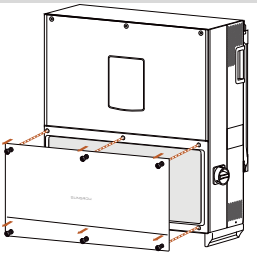
Step 2 Rotate the DC switch to the "OFF" position and then disconnect all of the PV string inputs

NOTICE

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

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

Step 4 Loosen the six screws on the lower connection cabinet and then remove the lid.



Step 5 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 6 Remove the AC cables.

Step 7 Remove the DC cables.

8.2 Dismantling the Inverter

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

NOTICE

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

8.3 Disposal of the Inverter

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

NOTICE

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

9 Troubleshooting and Maintenance

9.1 Troubleshooting

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	Grid 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	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.
005	Grid low voltage, 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.
007	AC instantaneous overcurrent, 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

Fault code	Description	Check method
009	Grid underfrequency, Grid frequency is lower than the lower limit of the inverter.	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.
010	Grid power outage, 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	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.
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.

Fault code	Description	Check method
013	Grid abnormal, 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.
014	10-minute grid overvoltage, 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.

Fault code	Description	Check method
017	Grid voltage unbalance, 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: 1. Measure the actual grid voltage. If grid phase voltages differ greatly, contact the power company for solutions. 2. If the voltage difference between the three phases is within the permissible range of the local power company, modify the grid voltage imbalance parameter through the APP or LCD screen. 3. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service.
019-020	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.
021-022	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.
024-025 030-034	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.

Fault code	Description	Check method
036	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.
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 system 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	Low ambient temperature, 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.
044-046	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 configuration abnormal, PV input mode error	Stop and disconnect the inverter. Reset the input mode of the PV array.
048-050 053-056 059-060	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 alarm	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-side SPD alarm	Check the SPD, and replace it if necessary.
072	DC-side SPD alarm	

Fault code	Description	Check method
076	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	PVx abnormal	1. Check if the x^{th} PV string needs to be connected. If not, ignore the alarm; and If so, check the connection status and make sure it is connected reliably. 2. Check if the xth DC fuse is damaged. If so, replace the fuse. 3.If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 078 to code 081 are corresponding to PV 1 to PV 4 respectively.
087	Electric arc detection module abnormal	The inverter can operate normally. 1. Check whether the related cable connection and terminals are abnormal, and check whether the ambient environment is abnormal. If so, remove the corresponding abnormity. 2. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service.

Fault code	Description	Check method
088	Electric arc fault	1. Disconnect the DC inputs and check whether DC cables are damaged, whether the wiring terminals or fuses are loose or in poor contact, and whether component parts are burnt. If so, take corresponding corrective measures. 2. After taking corresponding measures in step 1, reconnect the DC inputs. Remove the arc fault through the APP or LCD screen so that the inverter will recover to be normal. 3. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service.
089	Electric arc detection disabled	1. Enable the AFD function through the APP or the LCD screen so that the inverter will recover to be normal. 2. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service.
105	Protection self-check failure on grid side	Restart the inverter or clear the fault through the App. If the fault still exists, contact Sungrow Service.
106	Grounding cable fault	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
220~227	PVx abnormal	1. Check if the x^{th} PV string needs to be connected. If not, ignore the alarm; and If so, check the connection status and make sure it is connected reliably. 2. Check if the xth DC fuse is damaged. If so, replace the fuse. 3.If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 220 to code 227 are corresponding to PV 5 to PV 12 respectively.
448~471	String x reverse connection fault	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 0.5A. 2. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 448 to code 471 are corresponding to string 1 to string 24 respectively.
532-547	String x reverse connection alarm	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 0.5A. 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.

Fault code	Description	Check method
548-563	String x 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.
564-571	String x reverse connection alarm	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 0.5A. 2. If the fault is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 564 to code 571 are corresponding to string 17 to string 24 respectively.
580-587	String x 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 587 are corresponding to string 17 and string 24 respectively.

9.2 Maintenance

9.2.1 Routine Maintenance

Item	Method	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. Check if the air inlet and outlet are normal. Clean the air inlet and outlet, if necessary.	Six months to a year (depend on the dust contents in air.)
Fans	Check whether there is fan warning using APP. Check whether there is any abnormal noise when the fan is turning. Clean or replace the fans if necessary (see the following section).	Once a year
SPD	Check whether there is SPD waring using APP. Replace the AC SPD and DC SPD (contact SUNGROW) whenever necessary.	Every six months

9.2.2 Maintenance Instruction

Fan Maintenance

Fans inside the inverter are used to cool the inverter during operation. If the fans do not operate normally, the inverter may not be cooled down and inverter efficiency may decrease. Therefore, it is necessary to clean the dirty fans and replace the broken fans in time.

DANGER

Stop the inverter and disconnect it from all power supplies before maintenance.

Lethal voltage still exists in the inverter even after the inverter has been switched off and disconnected. Please wait for at least ten minutes and then perform maintenance work.

Only qualified electricians can maintain the fans.

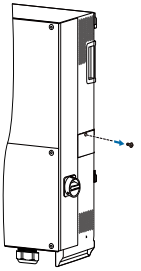
Step 1 Disconnect the AC Switch.

Step 2 Rotate the DC switch to the "OFF" position.

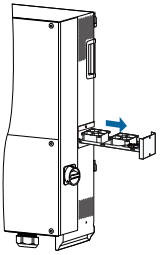
Step 3 Wait for at least ten minutes.

Step 4 Disconnect all electrical connection in the reverse procedures in the "6 Electrical Connection".

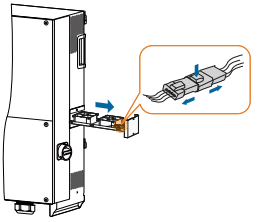
Step 5 Unscrew the bolts as shown in the right picture.



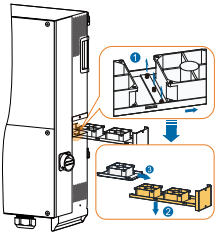
Step 6 Clasp the groove (near the cover plate of the fan) on the back of the inverter by your fingers and pull out the slot of the fan.



Step 7 Press the hump of the latch hook and unplug the cable connection joint outwards.



Step 8 When the side clearance is restricted, loosen screws in the middle of the fan guide rail to remove the first fan.



Step 9 Remove all the fans from the inverter.

Step 10 Clean the fan with soft brush or vacuum cleaner, or replace the broken fans.

Step 11 Reassemble the fans back into the inverter and restart the inverter.

Cleaning Air Inlet and Outlet

A huge amount of heat is generated in the process of running the inverter. The inverter adopts a controlled forced-air cooling method.

In order to maintain good ventilation, please check to make sure the air inlet and outlet are not blocked.

Clean the air inlet and outlet with soft brush or vacuum cleaner if necessary.

10 iSolarCloud APP

10.1 Brief Introduction

The iSolarCloud APP can establish communication connection to the inverter via the Bluetooth, thereby achieving near-end maintenance on the inverter. Users can use the APP to view basic information, alarms, and events, set parameters, or download logs, etc.

*In case the communication module Eye or WiFi is available, the iSolarCloud APP can also establish communication connection to the inverter via the mobile data or WiFi, thereby achieving remote maintenance on the inverter.

- This manual describes only how to achieve near-end maintenance via the Bluetooth connection. For remote maintenance through the Eye or WiFi, refer to the related manuals in the delivery scope.
- Screenshots in this manual are based on the Android system V2.1.5, and the actual interfaces may differ.

10.2 Download and Install

Method 1

Download and install the APP through the following application stores:

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

Method 2

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

The APP icon appears on the home screen after installation.

10.3 Menu

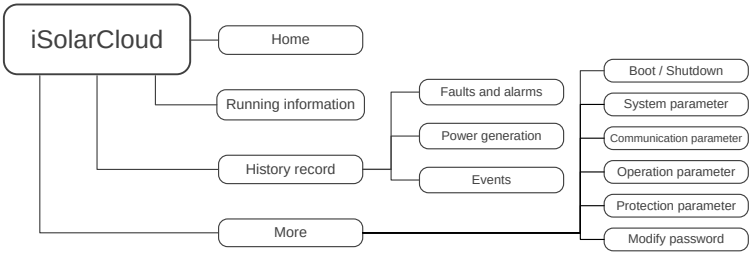


Fig. 10-1 Menu tree

10.4 Login

10.4.1 Requirements

The following items should meet requirements:

- The AC and DC sides or the AC side of the inverter is powered-on.

- The mobile phone is within 5m away from the inverter and there are no obstructions in between.
- The Bluetooth function of the mobile phone is enabled.

10.4.2 Login Steps

Step 1 Open the APP to enter the login interface, and click "Direct Login" to enter the next screen.

Step 2 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 gets on once the connection is established. Alternatively, tap "" to scan the QR code on the side of the inverter to establish Bluetooth connection.

Fig. 10-2 Bluetooth connection

Step 3 Enter the login screen after the Bluetooth connection is established.

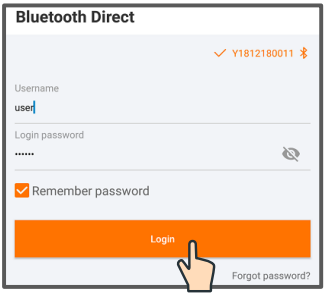


Fig. 10-3 Login

- The username is "user", the initial password is "pw1111" which should be changed for the consideration of account security.
- To set inverter parameters related to grid protection and grid support, contact SUNGROW to obtain the advanced account and corresponding password.

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

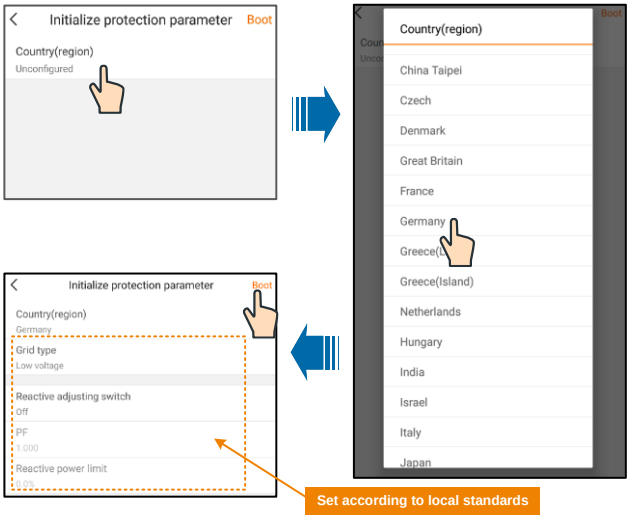


Fig. 10-4 Initialization protection parameter

NOTICE

Reset the protection parameters if the country setting is incorrect. Otherwise, fault may occur.

Step 5 If the inverter is initialized, the APP automatically turns to its home page.

10.5 Home page

After login, the home page is as follows:

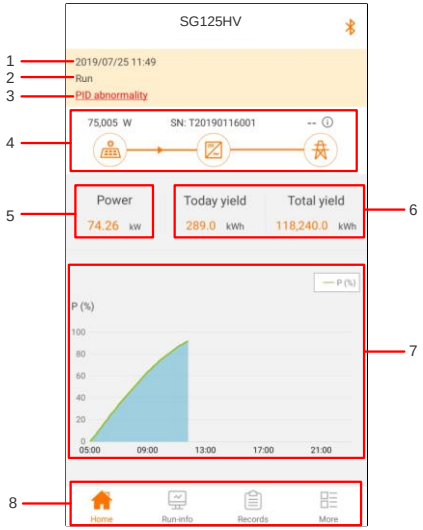


Fig. 10-5 Home page

Tab. 10-1 Home page description

No.	Designation	Description
1	Date and time	System date and time of the inverter
2	Inverter state	Present operation state of the inverter For details, refer to Tab. 10-2Description of inverter state.
3	PID function state	Present state of the PID function For details, refer to Tab. 10-3Description of PID function state
4	Power flow chart	Display the PV power generation power, feed-in power, etc. The line with an arrow indicates energy flow between connected devices, and the arrow pointing indicates energy flow direction.
5	Power generation	Today power yield and accumulative power yield of the inverter
6	Real-time power	Output power of the inverter

No.	Designation	Description
7	Power curve	Curve showing change of power between 5 am and 23 pm every day (Each point on the curve represents the percentage of present inverter power to rated power)
8	Navigation bar	Including "Home", "Run-info", "His-record", and "More"

Tab. 10-2 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 ISolarCloud app. In this way, inverter internal DSP stops. To restart the inverter, manually start via ISolarCloud 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 ISolarCloud 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. 10-3 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.

If the inverter is running abnormally, the alarm or fault icon will be displayed in the lower right corner of the inverter icon in power flow chart. The user can tap this icon to enter the alarm or fault screen to view detailed information and

corrective measures.

10.6 Running Information

Tap "Run-info" on the navigation bar to enter the running information screen, as shown in the following figure.

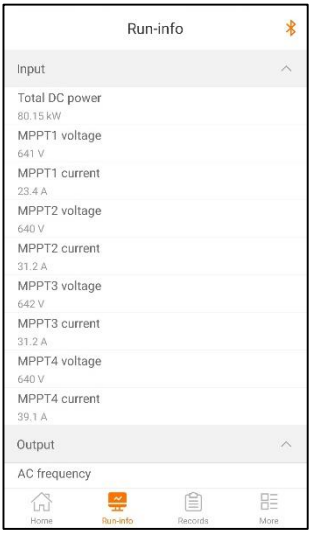


Fig. 10-6 Running Information

The run info includes the input, output, string, grid voltage, grid current, environment, and other information.

Tab. 10-4 Run info

Parameter		Description
Input	Total DC power (kW)	the total PV input power
	MPPTx voltage(V)	the input voltage
	MPPTx current(A)	the input current
Output	AC frequency (Hz)	-
	Total active power (kW)	-
	Apparent power(kVA)	-

Parameter		Description
	Monthly generating capacity(kWh)	The energy generated in this month
Grid voltage	A-B line voltage (V)	Line voltage
	B-C line voltage (V)	
	C-A line 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
Other	In parallel resistance to ground (kΩ)	-
	Countries info	Inverter selected country code
	Command info	Inverter selected command information

10.7 History Record

Tap "His-record" on the navigation bar to enter the history record screen, as shown in the following figure.

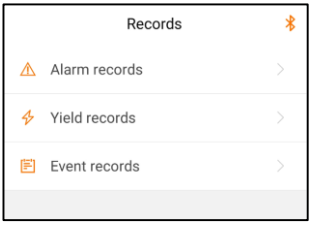


Fig. 10-7 History record

On "history record" screen, users can check the alarm records, yield records and event records.

10.7.1 Fault Alarm Records

Tap " Alarm records " to view fault and alarm records, as shown in the following

figure.

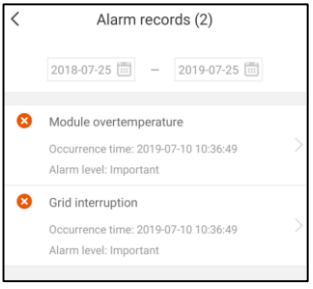


Fig. 10-8 Fault and alarm records

- Click "" to select a time segment and view corresponding records.
- The inverter can record up to 100 latest entries.

Select one of the records in the list and click the record, to view the detailed fault info as shown in following figure.

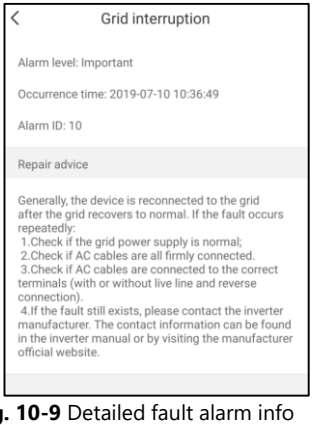


Fig. 10-9 Detailed fault alarm info

10.7.2 Yields Records

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

Tab. 10-5 Explanation of power yields records

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

Click the "Energy records" to view the power curve page as shown in following figure.

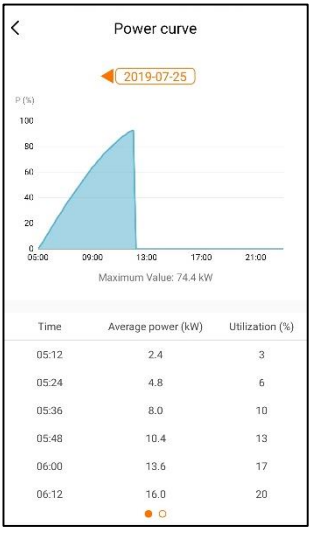


Fig. 10-10 Power curve

Tap the time bar 2019-07-25 on the top of the screen to select a time segment and view the corresponding power curve.

Step 2 Swipe left to check the power yields histogram

10.7.3 Event Records

Click " Event record " to view event record list.

- Click " " to select a time segment and view corresponding event records.
- The inverter can at most record the latest 100 events

10.8 More

Tap " More " on the navigation bar to enter the "More" screen, as shown in the following figure.

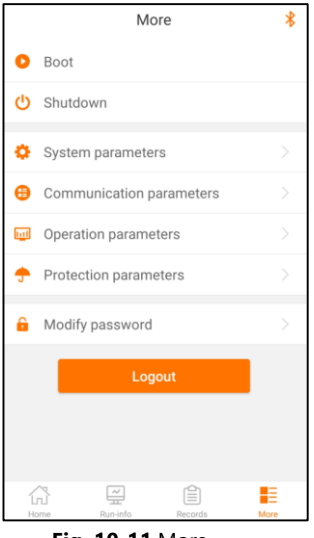


Fig. 10-11 More

10.8.1 Power On/Power Off

Click " Boot " or " Shutdown" and click " Confirm " in the dialog box popped out to start or stop the inverter as shown in the following figure.

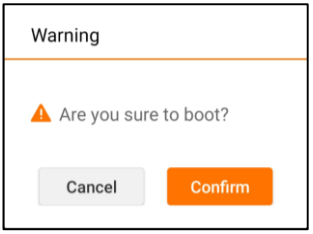


Fig. 10-12 Power on

10.8.2 System Parameters

Click the "System parameters" to check the system parameter info and set the related parameters as shown in the following figure.

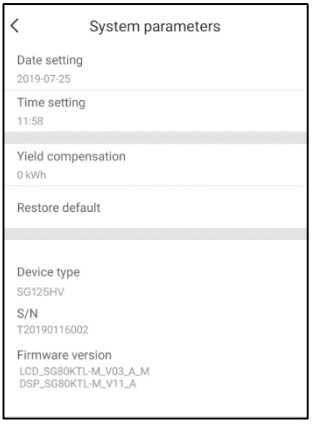


Fig. 10-13 System parameter

Tab. 10-6 Explanation of system parameters

Parameter	Description
Date Setting	Time deviation between the time on the inverter and the local time of the installation site may cause data logging failure. Please adjust inverter time according to the local time.
Time Setting	
Total power yields compensation	If the accumulative value "E-total" in the inverter is different from the value in the external metering device, you should adjust energy by "Total power yields compensation" setting.

Reset to Factory Defaults	All history information will be unrecoverable cleared and all parameters will return to the default value except the protective parameters and time once the "Reset to Factory Defaults" operation is performed.
Device restart	Restart the device.
Device information	You can check: Device type, Serial number and Firmware version

10.8.3 Communication Parameters

Click the "Communication parameters" to check the communication parameters and set the related parameters as shown in the following figure.

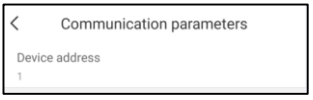


Fig. 10-14 Communication parameters

Tab. 10-7 Explanation of communication parameters

Parameter	Setting Range
Device address	1-247

10.8.4 Operation Parameters

Click the "Operation parameters" to check the operation parameters and set the related parameters as shown in the following figure.

The operation parameters include the active & reactive power parameters.

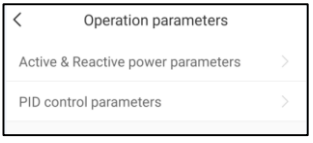


Fig. 10-15 Operation parameters

Active & reactive power parameters

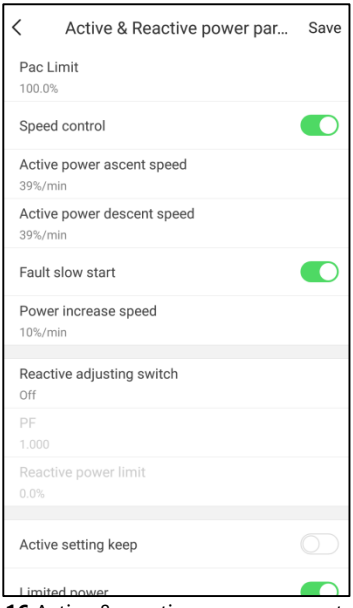


Fig. 10-16 Active & reactive power parameters

Tab. 10-8 Description of Active & reactive power parameters

Parameter	Description	Default	Range
Active power limit	Inverter active power limitation	100.0%	0~100%
Speed control	Set the active power change rate. When it is set to [ON], user can set the raise and decline rate.	[OFF]	[OFF]/ [ON]
Active power ascend speed	When Rate limit is ON, set the active power rise rate.	100%/min	8~6000%/min
Active power descend speed	When Rate limit is ON, set the active power decline rate.	6000%/min	8~6000%/min

Parameter	Description	Default	Range
Power increase enable	Set the power rise rate when a fault is removed. When it is ON, the active power raise rate can be set.	[OFF]	[OFF]/ [ON]
Power increase speed	Set the active power raise rate.	100%/min	8~6000%/min
Fault slow start		[ON]	[OFF]/ [ON]
Power increase speed		10%/min	8~6000%/min
Reactive adjusting option switch	Set the reactive power regulation function	[OFF]	[OFF]/ [ON]
Power factor	Inverter output power factor	+1.000	-1.000~-0.800/ +0.800~+1.000
Reactive power limit	Inverter reactive power limitation	0.0%	0~+100%/ 0~-100%
Active setting keep		[OFF]	[OFF]/ [ON]
Limited power		[ON]	[OFF]/ [ON]
Reactive setting keep		[ON]	[OFF]/ [ON]

PID control parameter

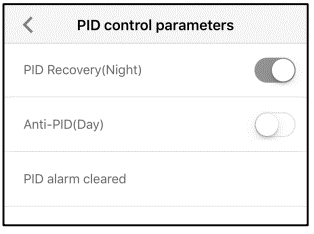


Fig. 10-17 PID control parameters

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
Anti-PID(Day)	Set enabling/disabling of the PID day protection function. PID day protection functions only when the inverter is in grid-connected state.
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 Recovery(Night) / Anti-PID(Day) function is enabled, the fault indicator on the inverter main panel turns green.
- The PID night recovery function and the PID day protection function cannot be enabled at the same time.

10.8.5 Protection Parameters

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

User can only check the parameter in this interface. The default values of the protection parameters have been preset as per grid code of corresponding countries.

To set the protection parameter, please contact SUNGROW to acquire advanced password.

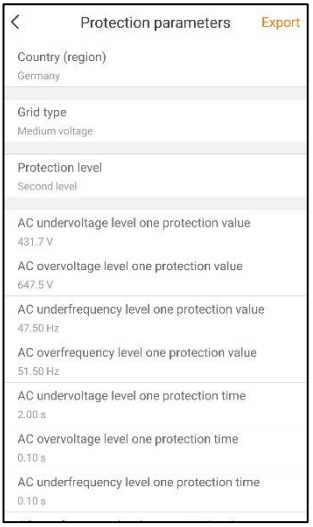


Fig. 10-18 Protection parameter

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. 10-9 Single-stage Protection Parameters Explanation

Parameter	Default	Range
AC under-voltage single-stage protection value	528.0V	60V-600V
AC over-voltage single-stage protection value	660.0V	600 -840V
AC under-frequency single-stage protection value	58.50Hz	50Hz -59.88Hz
AC over-frequency single-stage protection value	60.50Hz	60.12Hz -65Hz

Tab. 10-10 Multi-stage Protection Parameters Explanation

Parameter	Default	Range
AC under-voltage level 1 protection value	528.0V	60V-600V
AC over-voltage level 1 protection value	660.0V	600 -840V
AC under-frequency level 1 protection value	58.50Hz	53Hz -59.88Hz
AC over-frequency level 1 protection value	60.50Hz	60.12Hz -65Hz
AC under-voltage level 1 protection time	21.00s	0.05s-600s
AC over-voltage level 1 protection time	13.00s	0.05s-600s
AC under-frequency level 1 protection time	300.00s	0.05s-600s

Parameter	Default	Range
AC over-frequency level 1 protection time	300.00s	0.05s-600s
AC under-voltage level 2 protection value	420V	60V-600V
AC over-voltage level 2 protection value	720.0V	600 -840V
AC under-frequency level 2 protection value	57Hz	53Hz -59.88Hz
AC over-frequency level 2 protection value	62Hz	60.12Hz -65Hz
AC under-voltage level 2 protection time	11.00s	0.05s-600s
AC over-voltage level 2 protection time	0.16s	0.05s-600s
AC under-frequency level 2 protection time	0.16s	0.05s-600s
AC over-frequency level 2 protection time	0.16s	0.05s-600s
AC under-voltage level 3 protection value	300V	60V-600V
AC over-voltage level 3 protection value	720V	600 -840V
AC under-frequency level 3 protection value	57Hz	53Hz -59.88Hz
AC over-frequency level 3 protection value	62Hz	60.12Hz -65Hz
AC under-voltage level 3 protection time	1.5s	0.05s-600s
AC over-voltage level 3 protection time	0.16s	0.05s-600s
AC under-frequency level 3 protection time	0.16s	0.05s-600s
AC over-frequency level 3 protection time	0.16s	0.05s-600s
AC under-voltage level 4 protection value	300V	60V-600V
AC over-voltage level 4 protection value	720V	600 -840V
AC under-frequency level 4 protection value	57Hz	53Hz -59.88Hz
AC over-frequency level 4 protection value	62Hz	60.12Hz -65Hz
AC under-voltage level 4 protection time	1.5s	0.05s-600s
AC over-voltage level 4 protection time	0.16s	0.05s-600s
AC under-frequency level 4 protection time	0.16s	0.05s-600s
AC over-frequency level 4 protection time	0.16s	0.05s-600s
AC under-voltage level 5 protection value	300V	60V-600V
AC over-voltage level 5 protection value	720V	600 -840V
AC under-frequency level 5 protection value	57Hz	53Hz -59.88Hz
AC over-frequency level 5 protection value	62Hz	60.12Hz -65Hz
AC under-voltage level 5 protection time	1.5s	0.05s-600s
AC over-voltage level 5 protection time	0.16s	0.05s-600s
AC under-frequency level 5 protection time	0.16s	0.05s-600s
AC over-frequency level 5 protection time	0.16s	0.05s-600s

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

Tab. 10-11 Description of protection recovery parameters

Parameter	Explanation	Default	Range
Vmax-recover	Max. protection recovery voltage	657.0V	600V-738V
Vmin-recover	Min. protection recovery voltage	531.0V	60 -600V
Fmax-recover	Max. protection recovery frequency	60.49Hz	60.11Hz - 64.99Hz
Fmin-recover	Min. protection recovery frequency	58.51Hz	50.01Hz - 59.89Hz

* Please follow the rules below to set parameters:

- AC under-voltage level 1 protection value ≥ AC under-voltage level 2 protection value≥AC under-voltage level 3 protection value;
- AC over-voltage level 1 protection value≤AC over-voltage level 2 protection value≤AC over-voltage level 3 protection value;
- AC under-frequency level 1 protection value≥AC under-frequency level 2 protection value≥AC under-frequency level 3 protection value;
- AC over-frequency level 1 protection value ≤ AC over-frequency level 2 protection value≤AC over-frequency level 3 protection value;
- AC under-voltage level 1 protection time ≥ AC under-voltage level 2 protection time≥AC under-voltage level 3 protection time;
- AC over-voltage level 1 protection time≥AC over-voltage level 2 protection time≥AC over-voltage level 3 protection time;
- AC under-frequency level 1 protection time≥AC under-frequency level 2 protection time≥AC under-frequency level 3 protection time;
- AC over-frequency level 1 protection time ≥ AC over-frequency level 2 protection time≥AC over-frequency level 3 protection time;
- AC under-voltage recovery value≥AC under-voltage level 1 protection value + 3V;
- AC over-voltage recovery value≤AC over-voltage level 1 protection value - 3V;
- AC under-frequency recovery value≥AC under-frequency level 1 protection value + 0.01Hz;

- AC over-frequency recovery value≤AC over-frequency level 1 protection value - 0.01Hz.

NOTICE

- **The range and default value in the table above is indicative only.**
- **The protection parameter varies in different countries. Please refer to**
- **the standards of each country for details.**

10.8.6 Password Changing

Tap " Modify password" to enter the modify password screen, as shown in the following figure.

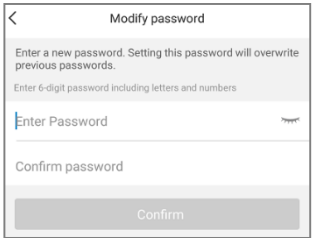


Fig. 10-19 Change password

The new password should consist of 6 characters, a combination of letters and digits.

11 Appendix

11.1 Technical Data

Parameters	SG125HV	SG125HV-20
Input (DC)		
Max. PV input voltage	1500V	
Min.PV input voltage/Startup input voltage	860V/920V	
Nominal input voltage	1050V	
MPP voltage range	860-1450V	
MPP voltage range for nominal power	860-1250V	
No. of independent MPP inputs	1	
No. of DC inputs	1	
Max. PV input current	148A	
Max.DC Short-circuit current	250A	
Max. inverter backfeed current to the array	0A	
Output (AC)		
AC output power	125000 VA @ 50 ℃	
Max. AC output current	120 A	
Nominal AC voltage	3 / PE, 600 V	
AC voltage range	528~660 V(NA) 480~690 V(IEC)	
Nominal grid frequency	50 / 60 Hz	
Grid frequency range	59.3~60.5Hz(NA) 45~55Hz 55~65Hz(IEC)	
THD	< 3 % (at nominal power)	
DC current injection	< 0.5 % In	
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading – 0.8 lagging	
Feed-in phases / Connection phases	3 / 3	
Efficiency		
Max. efficiency / Euro. efficiency / CEC effciency	98.9 % / 98.7 % / 98.5 %	

Parameters	SG125HV	SG125HV-20
Protection		
DC reverse connection protection	Yes	
AC short-circuit protection	Yes	
Leakage current protection	Yes	
Grid monitoring	Yes	
DC switch / AC switch	Yes / Yes	
Anti-PID function	Optional	Yes
PID recovery function	Optional	Yes
Overvoltage protection	DC Type II / AC Type II	
Night SVG function	No	Yes
General Data		
Dimensions (W*H*D)	670*902*296 mm/26.4''*35.5''*11.7''	
Weight	76 kg/167.6 lb	
Isolation method	Transformerless	
Degree of protection	IP65/NEMA 4X	
Night power consumption	< 4 W	
Operating ambient temperature range	-30 to 60 ℃ (> 50 ℃ derating)	
Allowable relative humidity range (non-condensing)	0 – 100 %	
Cooling method	Smart forced air cooling	
Max. operating altitude	4000 m (> 3000 m derating)/ 13123 ft (> 9843 ft derating)	
Display / Communication	LED, Bluetooth+APP / RS485	
DC connection type	OT or DT terminal (Max. 185mm^2/350 Kcmil)	
AC connection type	OT or DT terminal (Max. 185mm^2/350 Kcmil)	
Compliance	CE, IEC 62109-1/-2, IEC 61000-6-2/-4, IEC 61727, IEC 62116, IEC 61000-3-11/-12, UL 1741, UL 1741 SA, IEEE 1547, IEEE 1547.1, CSA C22.2 107.1-16 and California Rule 21	
Grid support	LVRT, HVRT, active & reactive power control and power ramp rate control	

11.2 Tightening Torques

Bolt location	Specification	Torque	
		Nm	ft-lb
Enclosure	M6	4.2-4.5	3.1~3.3
PC protection plate	M4	1.2-1.4	0.9~1.0
AC cable connection terminal	M10	34-40	25.1~29.5
AC ground terminal	M10	12-14	8.8~10.3
DC cable connection terminal	M10	34-40	25.1~29.5
DC ground terminal	M10 (Left)	12-14	8.8~10.3
	M6 (Right)	4.2-4.5	3.1~3.3
Second PE terminal	M6	4.2-4.5	3.1~3.3

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

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