SP Series PV Inverter

User Manual

SP-110K-L
SP-120K-L
SP-120K-BL
SP-136K

SINENG Electric Co., Ltd.

Version V1.1
Revision Date
BOM Code

This manual is applicable for the PV inverter of the following model provided by SINENG:

User Model	Rated Capacity
SP-110K-L	100kWp
SP-120K-L	121kWp
SP-120K-BL	121kWp
SP-136K	136kWp

This manual uses the instructions listed below for different purposes, and different logos can be used in combination.

Identification symbol	Identification definition
	**Warning symbol that needs to be paid attention**
	**There is a danger of electric shock, which may cause personal injury.**
	**Highly dangerous, need special attention!**

This manual may be upgraded from time to time due to product upgrades and other reasons without prior notice.

Safety Cautions

This manual contains the important safety precautions and instructions information concerning the installation, operation and maintenance of the SP series PV inverter. This manual must be read prior to installation.


Warning

- Please install the PV inverter strictly according to this manual, otherwise the equipment may be damaged and the human safety may be endangered!
- The PV inverter must be installed, commissioned and serviced by engineers designated by the manufacturer or its agent. Failure to do so could result in personnel safety risk, equipment malfunction and invalidation of warranty.
- The operating personnel should be very familiar with the regional / local standards and safety regulations, and should operate according to the relevant regulations.
- SP series PV inverter complies with EMC Class A limits, and it is applicable to common industrial environment.
- Before installing and using the PV inverter, read the user manual and all the instructions and cautionary markings on the PV inverter.


Danger

- The PV inverter must be reliably grounded. The grounding must comply with the local electric codes. Otherwise the safety of the operator will be endangered!
- The PV array terminals have high DC voltage under sun-shine condition, please do not directly touch the terminals or the terminal that is electrically connected to the PV array terminals when there are no protection measures taken or when the DC terminal voltage is not confirmed!
- The PV inverter has hazardous voltage inside during normal operation and within some time after the PV inverter has been powered off safely, please be sure to observe the hazardous symbols and instructions on the convertor cabinet.
- The convertor has energy storage component inside, after the convertor is fully powered off, do not operate the convertor until you have waited for at least 20 minutes.

Contents

Introduction

Prior to unpacking and installing this product, please read the entire manual that includes the following chapters:

Description of symbols—This chapter summarizes all the signs and symbols used in this manual, and describes them to make it easier for the user to read the manual.

Safety cautions—Important safety cautions before operations.

Chapter 1 Product Introduction—This chapter briefly introduces PV inverter and PV Power Generating System.

Chapter 2 Installation of Inverter—This chapter describes the storage conditions, handling instructions, and inverter installation instructions required for reliable operation of the inverter.

Chapter 3 Inverter Cable Connection—This chapter describes the wiring method of external power cables and communication cables.

Chapter 4 Inverter Operation—This chapter describes the inverter man-machine interface, on/off operation, and disconnection operation.

Chapter 5 Event and Alarm—This chapter provides the event and alarm information list of the inverter.

Chapter 6 Product Specifications—This chapter provides the specifications of SP series PV inverter.

Chapter 7 Product Maintenance—This chapter introduces the maintenance of the PV inverter, including the periodic maintenance and daily maintenance.

Service after Sales Information—This chapter provides the contact method for service after sales.

Chapter I Product Introduction

1.1 PV Power Generating System

The SP series inverter is a kind of string type inverter without transformer. It converts the DC energy from PV panels into AC power and feeds the AC power through an external grid-tied transformer. The PV system structure is shown in Figure 1-1:

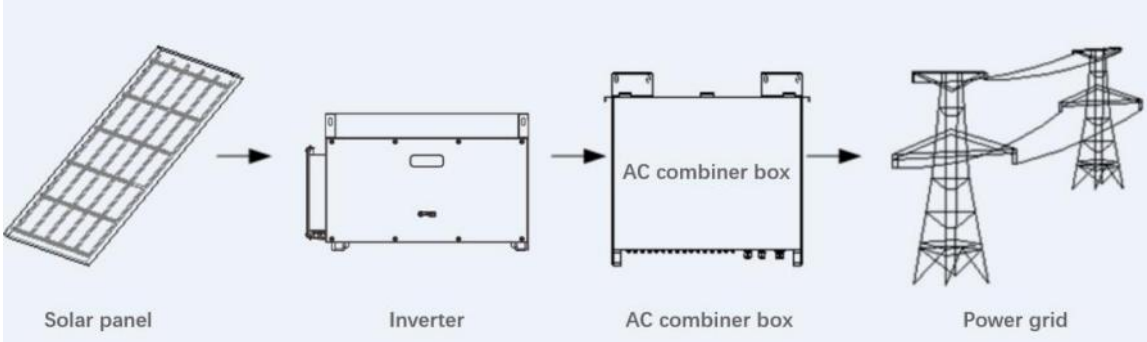
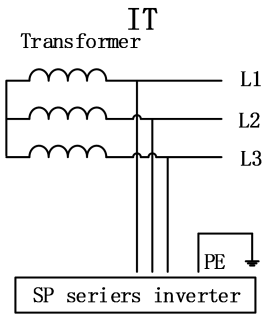


Figure 1-1 Components of PV power generating system

The power grid supported by the SP-136K is in the form of IT, as shown in Figure 1-2.



ıre 1-2 Power grid supported by the SP136K

The power grid supported by the SP-110K-L/SP-120K-L/SP-120K-BL is in the form of TN-S、TN-C、TN-C-S、TT and IT, as shown in Figure 1-3:

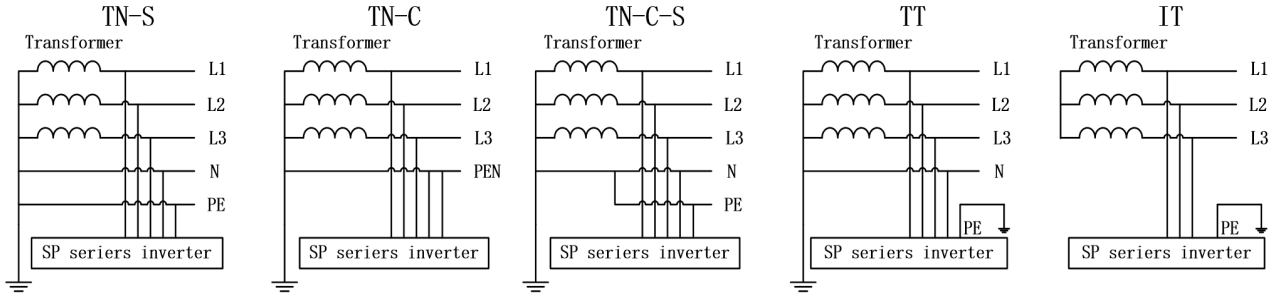


Figure 1-3 Power grid supported by the SP-110K-L/ SP-120K-L/ SP-120K-BL

1.2 Introduction to the Appearance of the Inverter

1.2.1 Introduction to Dimensions and Appearance

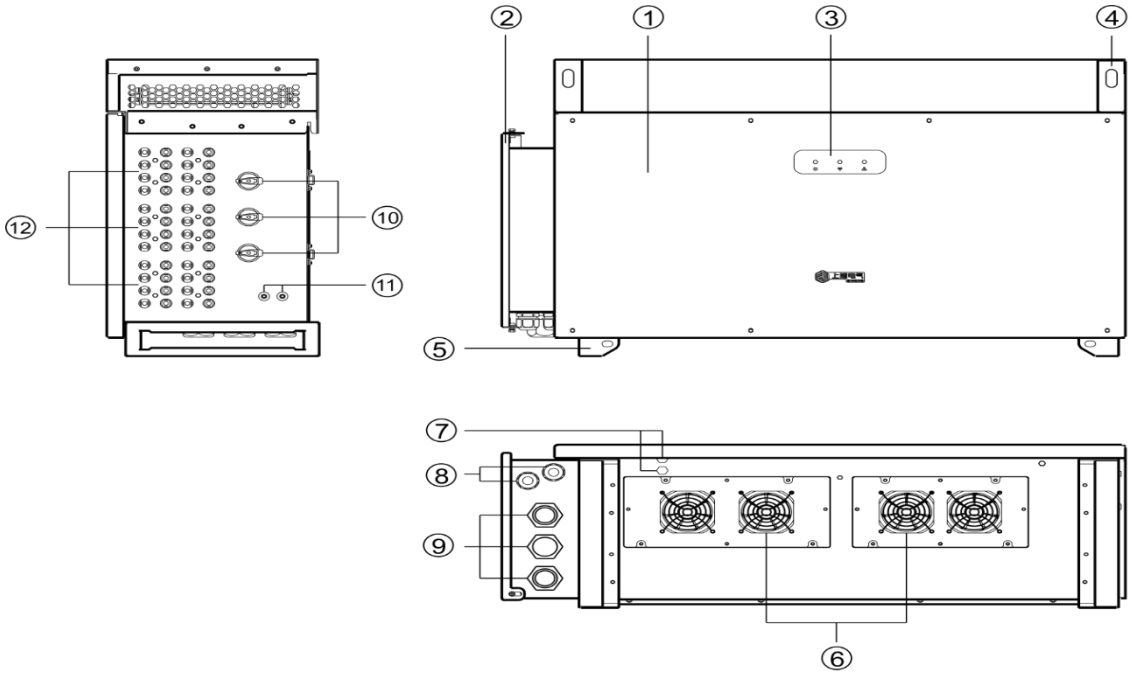


Figure 1-4 Dimensions and appearance（SP136K）

Table 1-1 Inverter outline structure description

No.	Name	No.	Name	No.	Name
①	Main compartment upper cover	②	Auxiliary compartment upper cover	③	Indicator area
④	Equipment handle	⑤	Equipment support foot	⑥	External fan
⑦	Breathable valve	⑧	Communication cable lock	⑨	AC output cable lock
⑩	DC switch	⑪	Grounding screw	⑫	DC input terminal

1.2.2 Panel Indicator Description

Table 1-2 Panel indicator description

Symbol	Color	State	Meanings
	Green	Constant on	Grid connected
		Blinking	Standby
		Off	Disconnected from grid
	Blue	Blinking	Normal communication
		Off	No communication
	Red	Blinking	Equipment abnormal
		Off	Abnormal DC or AC side
		Blinking	No abnormality

1.2.3 Nameplate and Labels

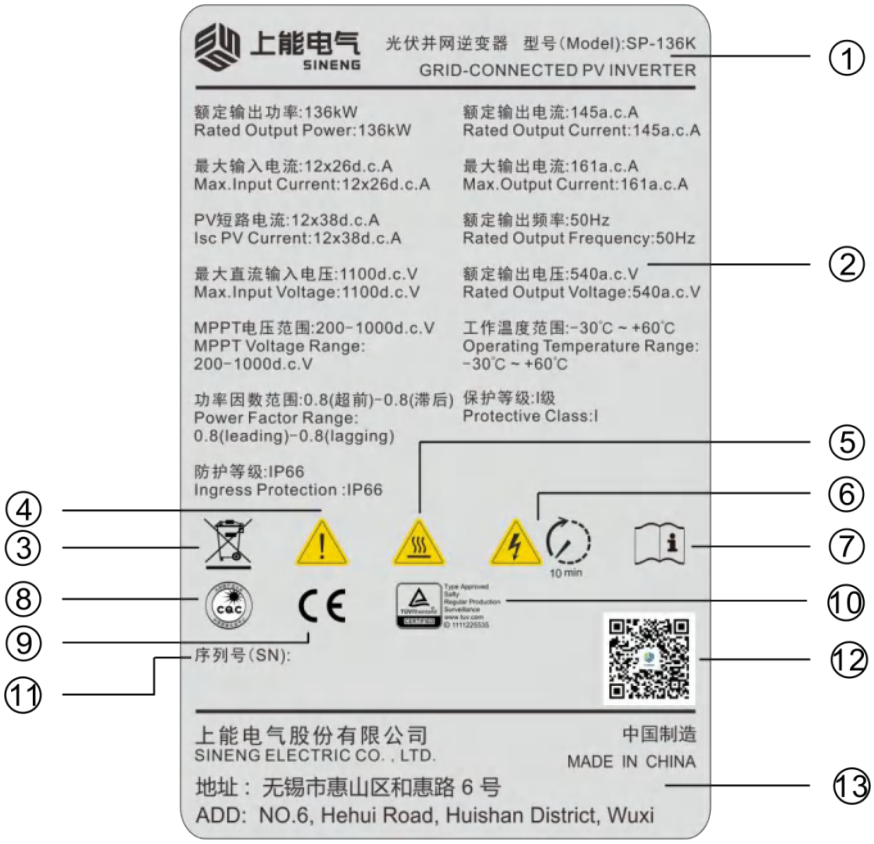


Figure 1-5 Nameplate and labels

Table 1-3 Description of indicated symbols

No.	Symbol	Name	Meaning
①		Inverter model	
②		Main parameters	
③		EU WEEE symbol	If the user intends to discard this product, he must select an appropriate location for recycling, and should dispose it as domestic waste.
④		Hazard warning	Inverters are power electronics products, so there are potential risks especially after power-on, they must be operated by professionals under protection.
⑤		Anti-scalding warning	When the inverter is running, the surface (especially the heat sink part) has a high temperature. Do not touch it directly to avoid burns.
⑥	10 min	Delay discharge	Only after the inverter has been powered off for 10 minutes, can it be discharged to a safe voltage, and can the professional operate it.
⑦		Read user manual	Professionals should refer to the user manual to operate when installing or maintaining the inverter.
⑧		CQC certified	
⑨	CE		
⑩	Type Approved Safty Regular Production Surveillance www.tuv.com ID 1111225535	TUV certified	

No.	Symbol	Name	Meaning
⑪		Serial number	Inverter serial number information
⑫		QR code	Scan the QR code to pay attention to the SINENG Electric Public Wetchat Number
⑬		Manufacturer information	Manufacturer name and address

1.3 Structure of Main Circuit

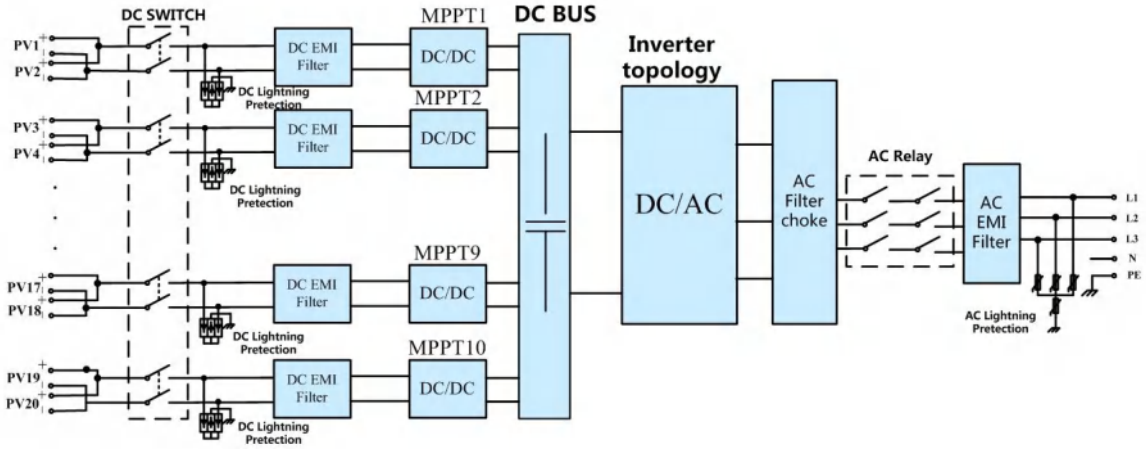


Figure 1-6 SP-110K-L /SP-120K-L / SP-120K-BL main circuit

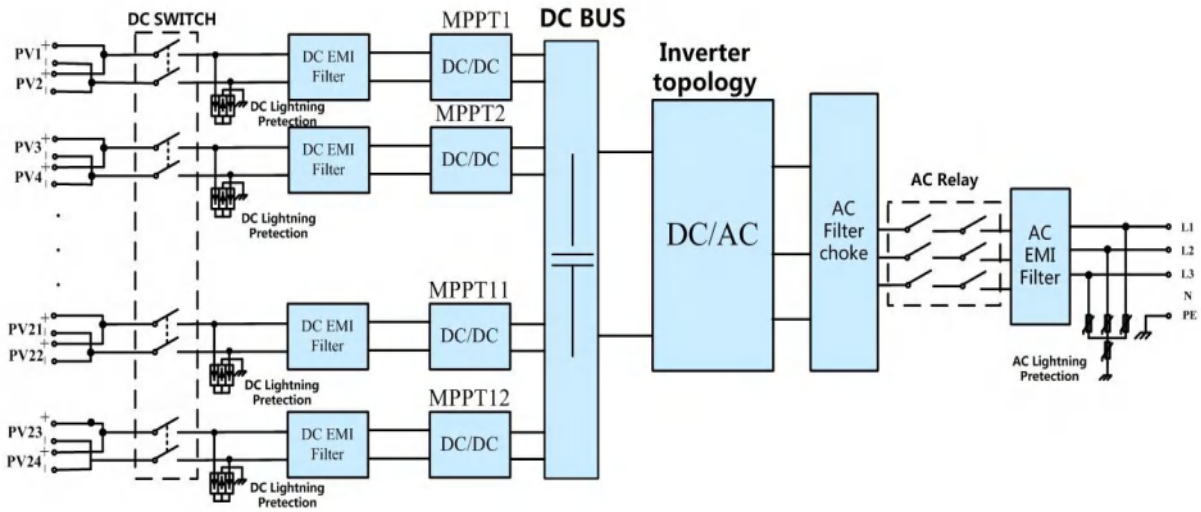


Figure 1-7 SP-136K main circuit

Chapter II Installation of Inverter

This chapter describes the on-site environmental conditions that the inverter needs to meet for storage and reliable operation, inverter installation steps and other related instructions.

2.1 Pre-installation Storage

Warning

- The inverter needs to be stored indoors and the inverter package should be complete. It is strictly forbidden to store the inverter without packaging, otherwise SINENG will not be responsible for the inverter damage, service life reduction or other losses caused by this.
- Do not stack more than 2 units! It is strictly forbidden to store the inverter in a horizontal or upside-down manner!
- The inverter storage environment should be in the temperature range of -40 to 70 °C, relative humidity is 0 to 100%, and there is no condensation.

2.2 Inverter Handling and Unpackaging

Warning

- Confirm that the inverter package is intact and free of damage before moving it! If the package is damaged, please stop the follow-up work! And contact SINENG or shipping company.
- Please carefully observe the instructions on the inverter package and the Warning logo before the operation!
- The inverter is heavy, so professional equipment is required to carry the inverter. Manual handling should not be conducted by less than 4 people. Please pay attention to balance when disassembling and moving the inverter so as to avoid injury caused by the inverter falling.
- When moving the inverter, please attach the lifting ring. When handling by hand, please hold the bottom handle position of the inverter and the side position handle near the top. Prevent the top or bottom heatsink from bumping other objects, so as not to damage the inverter casing and internal components while avoiding crushing and scratching the operator, remember not to grasp the top heatsink when moving the inverter!
- When the inverter is placed on the ground, cushioning materials such as foam or paper should be placed at the bottom of the inverter to avoid damage to the casing.

Disassemble the inverter package according to the procedures in Figure 2-1, and place the inverter in a flat environment to avoid tilting the inverter or impacting the heat sink.

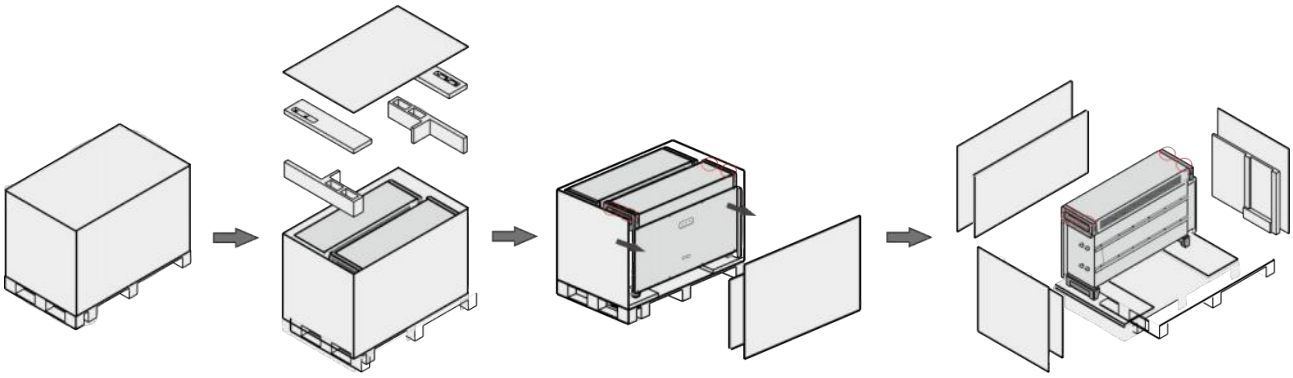


Figure 2-1 Illustrations for removing the packages of SP series inverter

2.3 Inverter installation

Warning

- Confirm that the inverter package is intact and free of damage before installation!
- During the normal operation of the inverter, the temperature of the chassis and the heat sink will be relatively high. Do not install the inverter in a crowded place or a location that is not easily accessible to non-professionals!

2.3.1 Installation Tools

No.	Name	No.	Name	No.	Name
①	Utility knife	②	Tape measure or level	③	Marker
④	Electric drill (drill bit Φ12/Φ14)	⑤	Inner hex wrench M6	⑥	Phillips screwdriver: M3, M5, M6, M8
⑦	Hex socket wrench M8, M10	⑧	Cutting pliers	⑨	Wire stripper
⑩	Crimping pliers (H4TC0001-AMPHENOL)	⑪	DC plug terminal removal wrench (H4TC0001-AMPHENOL)	⑫	Multimeter (range ≥1500V)
⑬	Crimping pliers (output cable terminals, etc.)	⑭	Heat shrink tube	⑮	Hot air gun
Note: Operators need to bring their own insulated shoes, insulated gloves, dust masks and protective glasses.					

2.3.2 Installation Environment Requirements

- The inverter is IP65 rated and can be installed indoors or outdoors. It is recommended to be installed in a place with obstructions to avoid direct sunlight, such as the rear side of the PV panel or under the eaves.
- The inverter should be installed in a well ventilated area to prevent its performance from being affected due to poor heat dissipation.
- During the operation of the inverter, the temperature of the inverter surface (especially the heatsink) is high. Please be sure to install it in a position that is not easy to touch. Be sure to keep away from children and special people.
- The installation area of the inverter should be away from flammable and explosive materials, and the equipment with strong electrical interference.
- The mounting bracket or wall of the inverter should have certain fire-proof performance.

2.3.3 Installation Angle

When installing the inverter, please keep the inverter perpendicular to the ground and install it in the forward direction; if there is inclination, please ensure that the inclination and inclination direction meet the installation requirements.

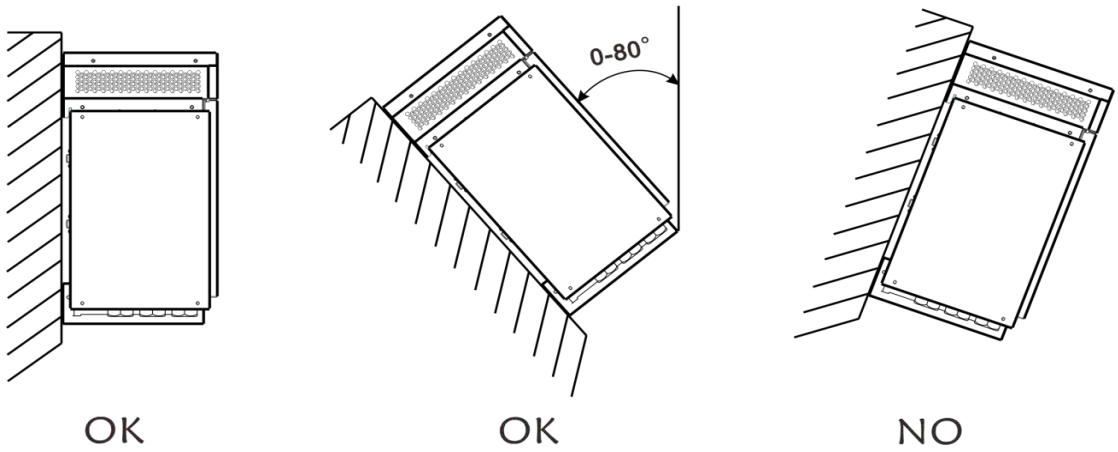


Figure 2-2 Inverter installation angle diagram

Note: 1. It is recommended to install the inverter at a vertical or backward tilt Angle less than 80°. If the inverter is not installed in the way recommended by our company, it will not be covered by our company's warranty.

2. Make sure that the air inlet position (bottom cooling fan) and the air outlet position (air outlet on

both sides of the case and the air outlet behind the case) are free of obstructions during installation to ensure that the air duct is unobstructed.

2.3.4 Installation Space

2.3.3.1 Installation of Single Inverter

When installing a single inverter, sufficient space should be reserved around for the installation, maintenance and heat dissipation of the inverter. It is recommended that the size of the bottom of the inverter from the ground is 500-1000mm after installation. The installation space of single inverter is shown in Figure 2-3.

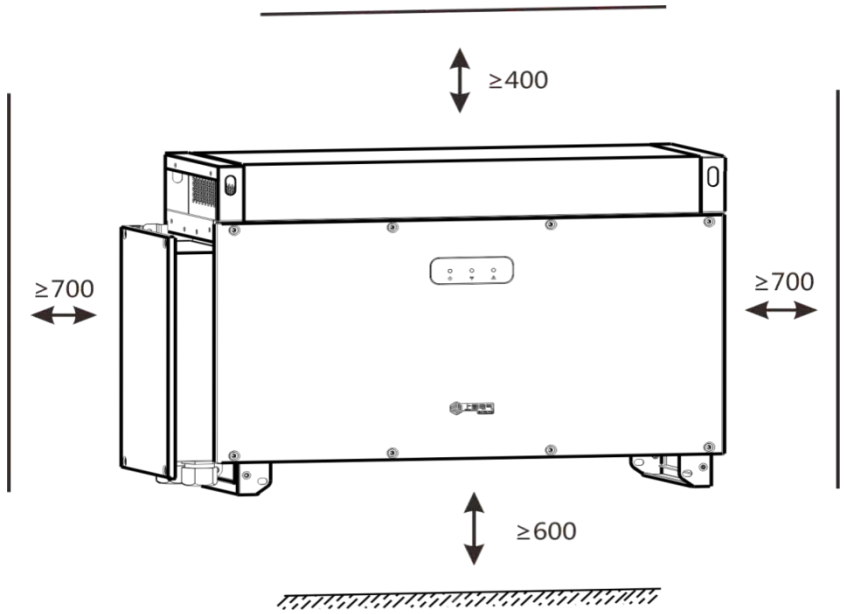


Figure 2-3 Installation space of single inverter

2.3.3.2 Installation of Multiple Inverters

In order to ensure good heat dissipation and easy maintenance of the inverter, when installing multiple inverters, they should maintain a proper clearance from each other. Generally, the recommended installation forms are single-row parallel installation and multi-row staggered installation. The specific installation requirements are as follows.

- Single row side by side installation

When using the single row side by side installation, the spacing between the inverters is not less than 800mm, as shown in Figure 2-4. The clearance of the inverter to surrounding entities (such as the wall) should meet the installation requirements of a single inverter. See Figure 2-3 for details.

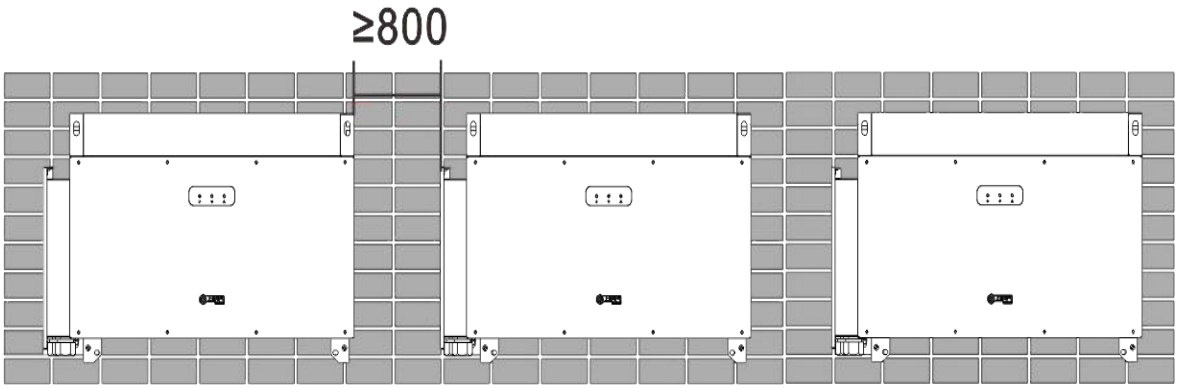


Figure 2-4 Single row side by side installation (unit: mm)

- Multi-row staggered installation

When using the multi-row staggered installation, in order to facilitate the heat dissipation of the inverter, the adjacent two rows of inverters are not allowed to cross in the upper and lower spaces, and the lateral distance between the two inverters should not be less than 200 mm, and the line spacing should not be less than 500 mm, as shown in Figure 2-5. The clearance of the inverter to surrounding entities (such as the wall) should meet the installation requirements of a single inverter. See Figure 2-3 for details.

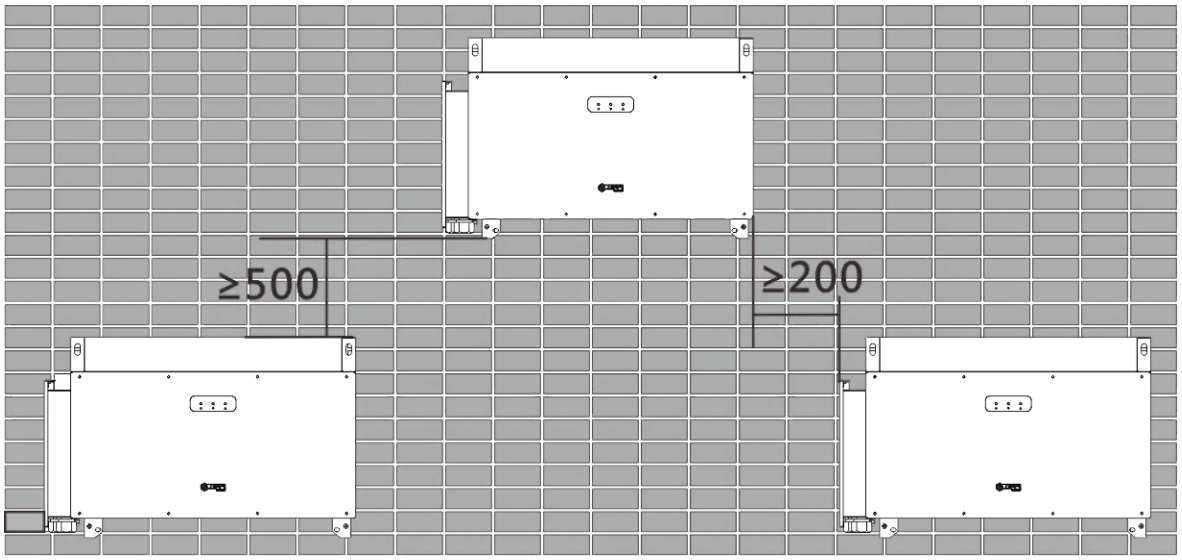


Figure 2-5 Multi-row staggered installation (unit: mm)

2.3.5 Installation Requirements

2.3.5.1 Installation Requirements

The installation dimension of inverter is shown in Fig. 2-6：

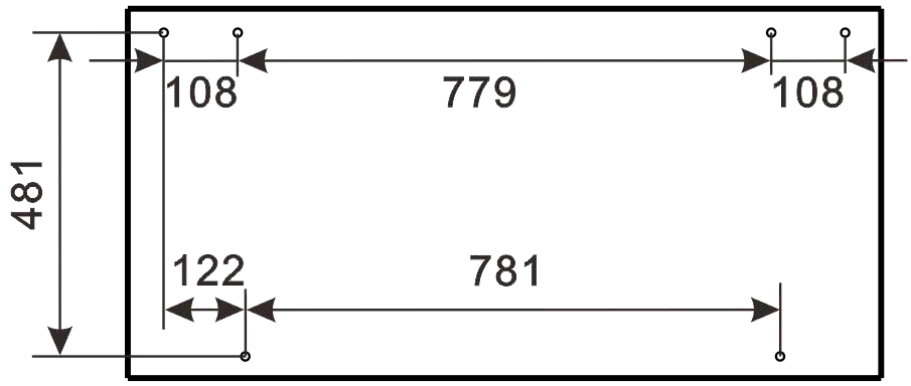


Figure 2-6 Dimensions of the inverter mounting backplane (unit: mm)

2.3.5.2 Installation Requirements

Step 1 Determine the punching position according to the inverter installation size diagram shown in Figure 2-7, measure the size with a horizontal ruler, and mark the punching position with a marker pen.

Step 2 Drill holes with a percussion drill, and suggest anti-rust treatments for the hole locations.

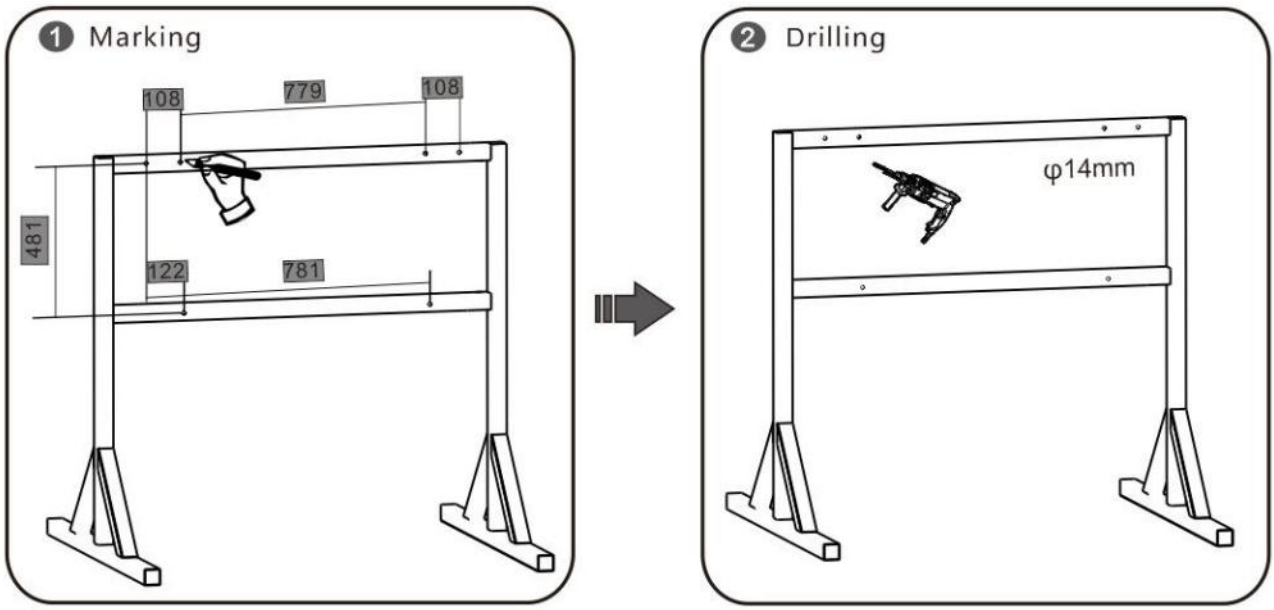


Figure 2-7 Marking and drilling

Step 3 Fix and install the haugers.

Step 4 Remove the inverter from the wooden box. The handle of the chassis (shown in the red circle) is the recommended force point. Shift the inverter out of the wooden box and place it on the flat ground.

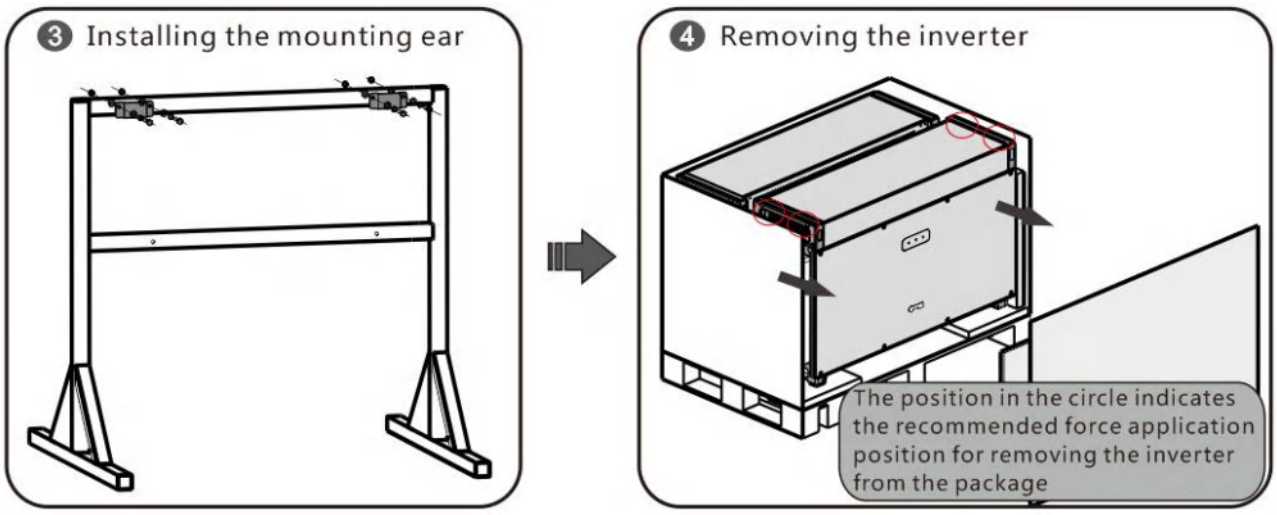


Figure 2-8 Install hangers and take out the inverter

Step 5 Lift the inverter onto the mounting hangers to ensure that the groove of the top handle fits well with the mounting lug.

Step 6 Fasten the chassis support feet to the brackets with M12 combination bolts.

The installation is complete.

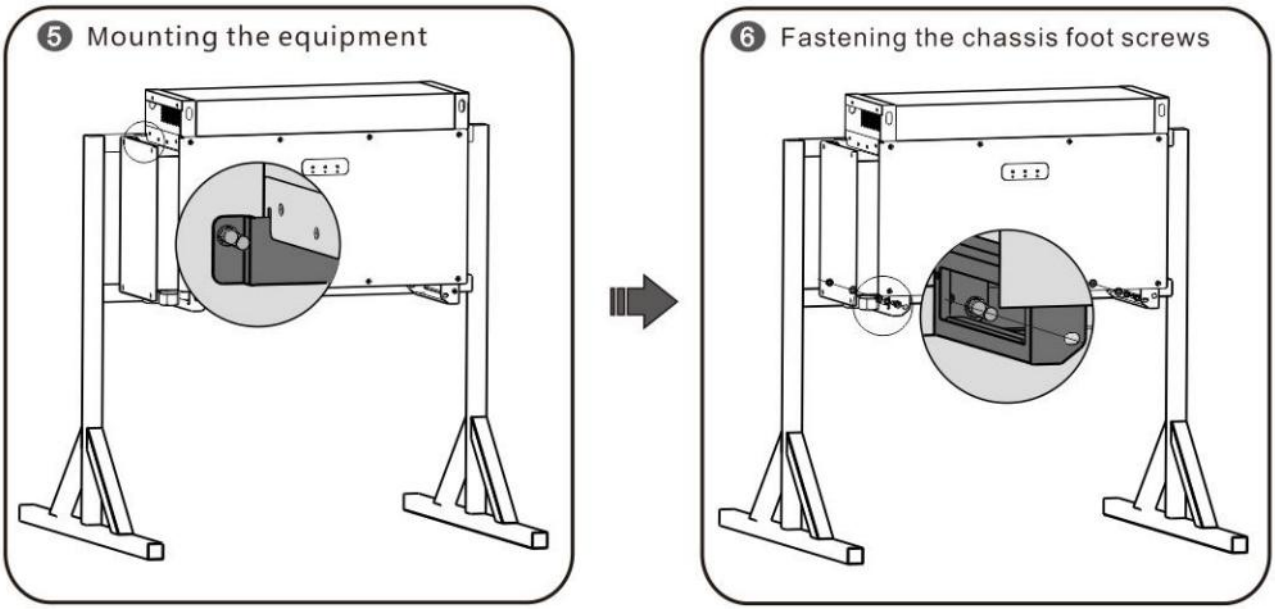


Figure 2-9 Hang up and fix

If the installation position is high, it is necessary to lift the inverter to the installation lug position, as shown in Fig. 2-10. The hoisting rope should meet the load-bearing requirements of the product. During the hoisting process, please keep balance to avoid collision between inverter and bracket and damage the machine shell.

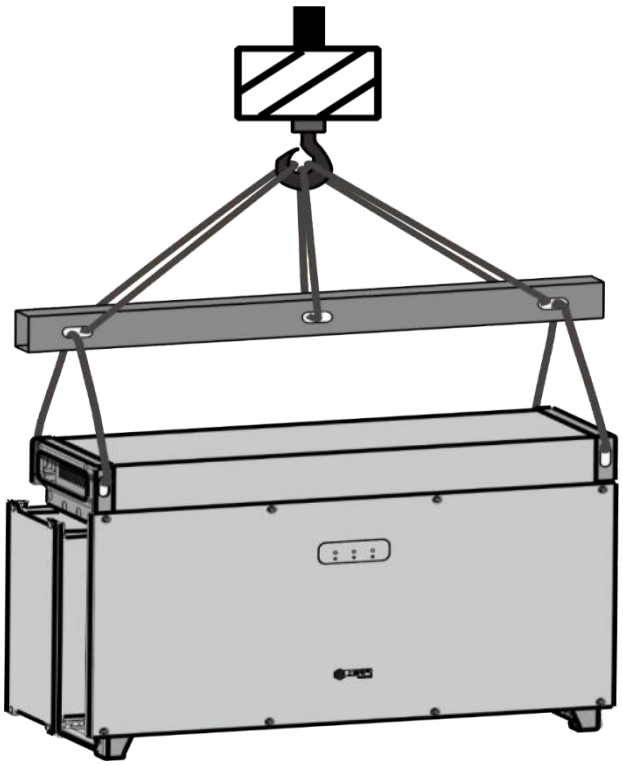


Figure 2-10 Hoisting diagram

Note: 1. Please pay attention to personal safety when handling; When the installation position is higher, hoisting is recommended.

2. The accessory package of the product is equipped with M12×80 combination bolts. If the length cannot meet the on-site installation requirements, the user shall provide M12 bolts.

3. The combination bolt needs two flat cushions and one spring cushion, and a flat cushion is placed in front of the nut to increase the contact area and thus increase the fastening reliability.

4. One M12 combination bolt is fixed on the left and right sides of the chassis support feet.

5. Anti-rust treatment is recommended at the hole punching place.

6. If wall mounting is adopted, the user shall provide M12 expansion bolts.

7. The bearing capacity of the support is ⩾400Kg.

2.3.5.2 Pole mounting

The pole mounting is suitable for mounting on a battery panel pole or a single independent pole, and the completed installation is as shown in Figure 2-11. The customer fixes two channel steels with 4 φ14×20 holes reserved on the pole by U-bolts. The center distance between the two beams is 481mm. Use four M12×80 bolt combinations (two flat washer and one spring washer) to fix the hangers on the two beams. Finally, hang the inverter and lock the M12 screws on both sides of the equipment support foot, and then the installation is completed.

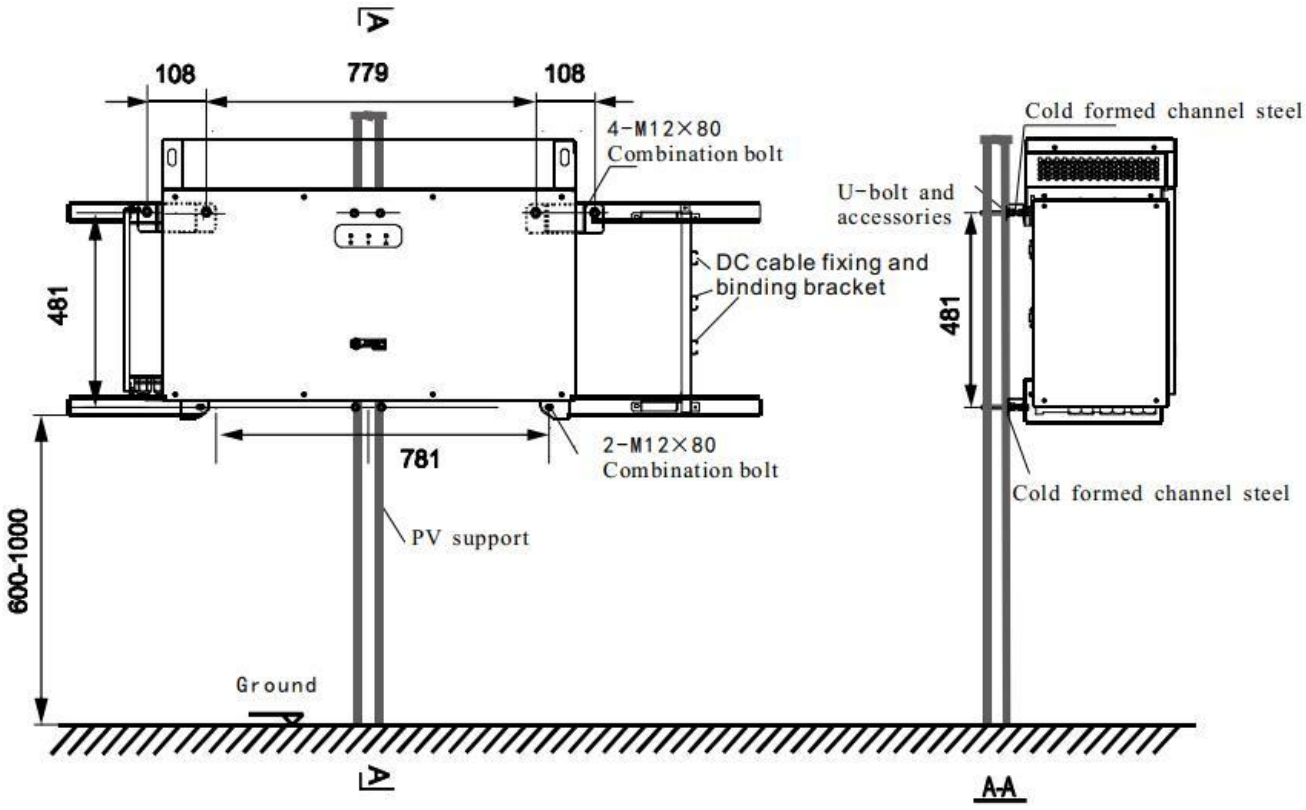


Figure 2-11 Illustration for pole-mounting of inverter

Note: 1. The customer needs to prepare two channel steels by himself, two U-bolts (with spring washer and flat washer, stainless steel), and the bolt specifications should be selected according to the size of the pole on-site.

2. It is recommended that the combined weight of the pole and beam should be ≥400KG.

Chapter III Electrical Connection

Danger

- When there is sunlight, the battery port has DC high voltage that endangers the personal safety of the operator!
- The insulation of the power cable must be intact, without damage or scratches. Otherwise a short circuit and fire may be caused!
- Prior to wiring the inverter, you must check and confirm that all the connecting cables of the equipment have no hazardous voltage, and you must set an obvious Warning logo at the external power distribution switch of the equipment to prevent others from mishandling the external switch of the equipment and threaten the personal safety of the operators!
- Prior to wiring the inverter, confirm that the AC wiring port is disconnected from the grid, and the AC port has no voltage!

Warning

- Carry out the cable connection in strict accordance with the label inside the inverter, otherwise the equipment will be damaged.
- The inverter cable connection must be safe and reliable. The cable selection and tightening torque must comply with the requirements of this manual, otherwise it may cause fire and inverter damage.
- The operator should not open the cover of the main compartment privately. If the tamper-evident label is torn and the inverter is damaged, it will not be covered by our warranty.
- When the operator opens the top cover of the wiring compartment, please pay attention to the foaming of the protective upper cover. Do not scratch or damage, otherwise water will enter the inverter.
- Try not to open the inverter wiring compartment in rain or snow to avoid the risk of water ingress.

SP series PV inverter external cable includes protective grounding cable, DC input cable, AC output cable and communication cable. For cable description, see Table 3-1. Table 3-2 shows the cables need to be prepared by the customers themselves.

Table 3-1 List of inverter user operating cables

User cable classification	Cable function description	Remarks
Grounding cable	Grounding cable	Grounding at the nearest point
AC output cable	Connect the AC combiner box to the AC output side of the inverter	Armored multi-strand cable
DC input cable	Connect the PV panel to the DC input side of the inverter	Multi-strand input power cable
Communication cable	RS485 communication signal cable	Shielded cable

Table 3-2 Cable specification recommendation form

Cable type	Conductor property	Conductor cross-sectional area (mm^2)	Cable outer diameter (mm)	Terminal specification	Terminal width(mm)	Tightening torque (N.m)
Grounding cable	1.Copper wire 2.Copper clad Aluminum or Aluminum alloy wire)	AC power cable *1/2	\	OT terminal:M6	\	10
AC power cable	Copper wire	L1\L2\L3: 70~120 N\PE: 10-25 (Recommendation: 16)	22-32	OT terminal:M8~M12	≤36	20
	Copper clad Aluminum or Aluminum alloy wire	L1\L2\L3: 70~120 N\PE: 25				

Cable type	Conductor property	Conductor cross-sectional area (mm^2)	Cable outer diameter (mm)	Terminal specification	Terminal width(mm)	Tightening torque (N.m)
DC power cable	Copper wire	4 to 6(Recommendation: 4) 12AWG to 10AWG(Recommendation: 12AWG)	4.5～7.8	\	\	\
Communication cables	Dual-conductor copper wire	1 to 1.5(Recommendation: 1)	8-14	Plugging terminal		0.8

Note: (1) All copper core wires, copper clad aluminum or aluminum alloy wire are multi-stranded. Recommended communication cable: Use double-core reinforced insulated cable with shielding layer.
(2) The single-hole cable lock structure is adopted on the AC output side. If the output adopts the armored cable, the outer diameter of the armored cable is required to be within this range. If the output is connected by a single wire, the total outer diameter of the wire harness is required to be within this range.
(3) It is recommended that the output and communication on the AC side use armored cables and dual-core cables. If a single cable is used at the user site, fire mud should be used at the end of the cable lock. Otherwise, the inverter has a risk of water ingression.
(4) DC power cable dielectric strength≥1100V; AC output cable dielectric strength ≥750V:
(5) Users need to bring their own OT terminals.

3.1 Connecting PE (Protective Earth) Cables

Warning

- The inverter must be grounded reliably, otherwise it will cause personal injury or abnormal operation of the inverter!

The inverter needs to be grounded nearby. For multiple inverters connected in parallel in the same system, you need to connect the PE cables of all inverters to the same PE line. The PE cable connection procedures are as follows:

(1) Prior to installing the inverter, lead the PE cable from the PE bus to the inverter installation position;

(2) Using a wire stripper to strip a corresponding piece of ground wire out of a bare copper core, and the length of the bare copper core is 3 mm longer than the OT terminal;

(3) Crimp the OT terminal to the bare copper core using a crimping tool;

(4) Mount the heat shrinkable sleeve of the appropriate size to the OT terminal, and the recommended length of the heat shrinkable sleeve (dielectric strength value ≥ 600V) is generally: 1.5-2 times of the terminal;

(5) Heat the heat shrinkable sleeve with a hot air gun to wrap the terminal and cable, and now the cable-processing is completed (the process is shown in Figure 3-2);

(6) Fasten the grounding wire OT terminal with the M8 screw at the grounding interface. Refer to Table 3-2 for the tightening torque.

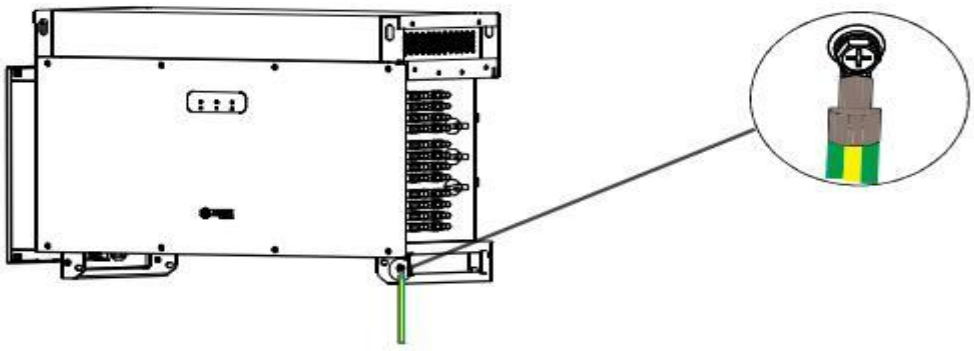


Figure 3-1 PE cable connection diagram

Note: After the PE terminal is tightened, it is recommended to apply silicone or apply outdoor paint to the outside of the terminal to improve the corrosion resistance of the terminal.

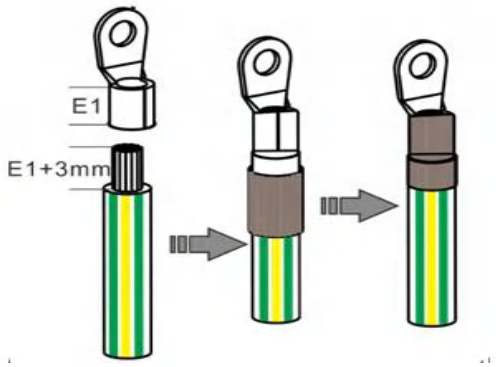


Figure 3-2 Illustration for making cables (OT terminal)

Note: 1. Users need to prepare the OT terminal, cable and heat shrinkable sleeve for the PE cable.

2. Users need to use the following tools - cutting pliers, wire strippers, crimping pliers, hot air gun, M8 Phillips screwdriver.

3.2 Connecting AC Cables

Warning

- An AC circuit breaker matching the inverter power must be connected between the inverter output and the grid, and each inverter corresponds to an independent circuit breaker!
- The AC cable lock and fixing screws must be tightened, otherwise there is a risk of damage or fire of the inverter!
- When connecting the AC cable, make sure that the AC breaker is disconnected!
- Inverter and AC circuit breaker are forbidden to connect the load!

3.2.1 Selection of AC Breakers

In order to ensure that the SP series inverter is disconnected from the grid under abnormal conditions, please select the appropriate AC circuit breaker, The recommended specifications are shown in Table 3-3.

Table 3-3 Recommended specifications of AC breaker

Inverter Model	Specifications of AC breaker
SP-110K-L	250A
SP-120K-L	250A
SP-120K-BL	250A
SP-136K	250A

The SP series inverter integrates a leakage current protection circuit. When the leakage current is greater than the protection value required by the safety regulations, the inverter will automatically disconnect from the grid. If the AC circuit breaker has a leakage current detection function, please select the appropriate device according to Table 3-4.

Table 3-4 Recommended specifications of RCCB (residual current circuit breaker)

Inverter Model	Leakage current trip value
SP-110K-L	>1100mA
SP-120K-L	>1100mA
SP-120K-BL	>1100mA
SP-136K	>1500mA

3.2.2 Selection of OT Terminal

The AC cables have different types of connection terminals due to different conductor properties. The recommended OT terminals are as shown in Table 3-5. Users should pay special attention that it is strictly forbidden to directly crimp the aluminum cable to the copper terminal or directly lock the aluminum terminal to the copper terminal block. Due to the different potentials of copper and aluminum, the contact between copper and aluminum will accelerate the oxidation of the aluminum wire, which is caused by the reaction of the primary battery, resulting in an increase in the contact resistance of the aluminum joint, and the copper-aluminum joint will be in poor contact for a long time. Recommended copper alloy cable connection: copper to Aluminum terminal connection and copper to aluminum gasket + aluminum terminal, as shown in Figure 3-3.

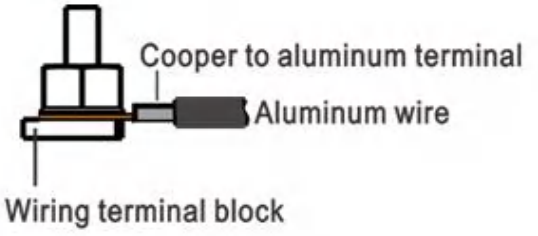


Figure 3-3 Aluminum alloy cable connection

Table 3-5 Recommended OT terminal

Conductor property	OT terminal type	Connection type
Copper cable	M12 copper terminal	Fixed by screws
Copper clad Aluminum cable	M12 copper terminal	
Aluminum alloy cable	M12 copper to aluminum terminal connection and copper to aluminum gasket + aluminum terminal	

3.2.3 AC Cable Connection

Please select the appropriate AC cable according to the application scenario. The recommended specifications are as follows.

Table 3-6 Recommended AC cables

Application scenario	Recommended cables
Unit chassis grounded without N line	Three-core cable (L1, L2, L3)
Chamber chassis grounded without N line	Four-core cable (L1, L2, L3, PE)
Unit chassis grounded with N line	Four-core cable (L1, L2, L3, N)
Chamber chassis grounded with N line	Five-core cable (L1, L2, L3, N, PE)

The SP series inverters have phase sequence adaptive function. The specific connection procedures of the cables are as follows:

(1) Remove the AC side cable lock and remove the end plug;

(2) Lead the cable through the waterproof cable lock, as shown in Figure 3-5.

(3) Use a wire stripper, strip the insulation layer and cable jacket according to the dimensions shown in Figure 3-4, and select the corresponding terminal according to the cable to make the AC output cable. Use two layers of heat shrink sleeves (withstand voltage ≥ 750V), refer to Figure 3-2 for cable manufacturing process;

(4) Connect the AC cable to the terminal block. Refer to Table 3-2 for the tightening torque of the terminal fastening screw.

(5) After the connection is completed, tighten the plastic nut at the end of the cable lock to ensure waterproof.

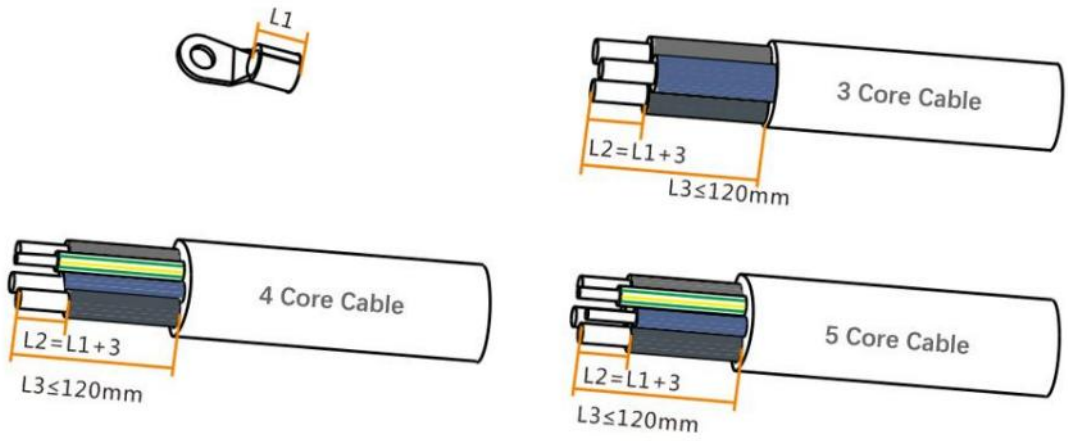


Figure 3-4 Length of stripped AC cable

Note: 1. The cable terminals should be installed along the direction of the terminal block;

2. Users choose a three-core cable, a four-core cable or a five-core cable according to the requirements. The color of the cable in the figure is for reference only, and the cable selection should be in accordance with the local cable standard;

3. Users need to bring their own OT terminals, cable and heat shrinkable sleeve for AC output line.

4. Users need to use the following tools - cutting pliers, wire strippers, crimping pliers, hot air gun, screwdriver and hex socket.

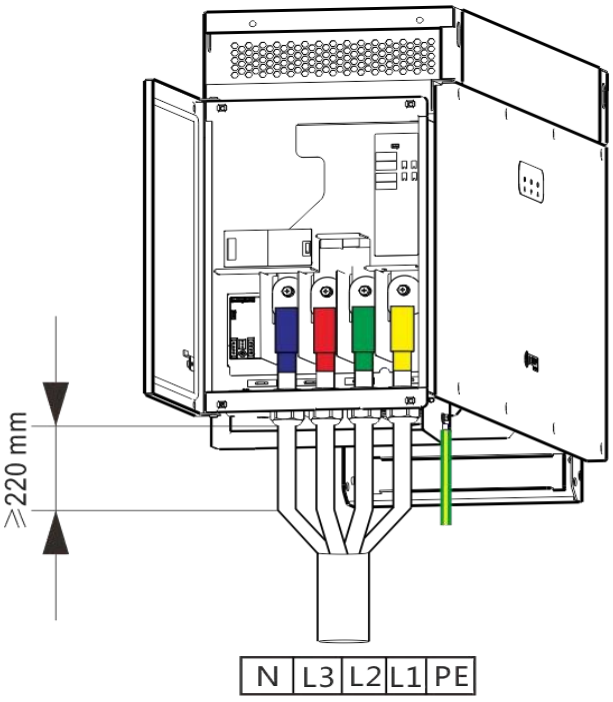


Figure 3-5 AC side cable lock

Note: 1. After installation, please tighten the gland to ensure good sealing.

2. Please crimp the OT terminal after the cable passes through the cable lock, otherwise it cannot pass through or damage the rubber lining;

3. Ensure that the protective sleeve of the armored cable is located in the maintenance chamber;

4. Do not adjust the cable when the nut of the cable lock is locked. The position of the rubber lining will affect the protection level of the inverter.

3.3 Connecting DC Cables

Warning

- Under the condition of sunlight, the PV panel has high voltage output, which endangers the operator's life!
- Prior to wiring, ensure that the PV panel side should be completely shielded from the sunlight by using an opaque cloth;
- The inverter DC SWITCH must be in the "OFF" state!
- The parameter configuration of the PV panel string should match the DC input parameters of the inverter.
- If the inverter is directly connected to the grid, the positive and negative poles of the panel cannot be directly grounded.
- If multiple inverters are connected in parallel through the transformer, the positive and negative poles of the PV panel cannot be directly grounded.
- It is forbidden to use the DC terminals that are not provided by SINENG!
- Prior to connecting the PV string to the inverter, ensure that the PV string is well insulated from the ground!
- In order to increase the amount of power generated by the system, it is recommended to connect the same number, the same size, and the same orientation of PV strings in each group!

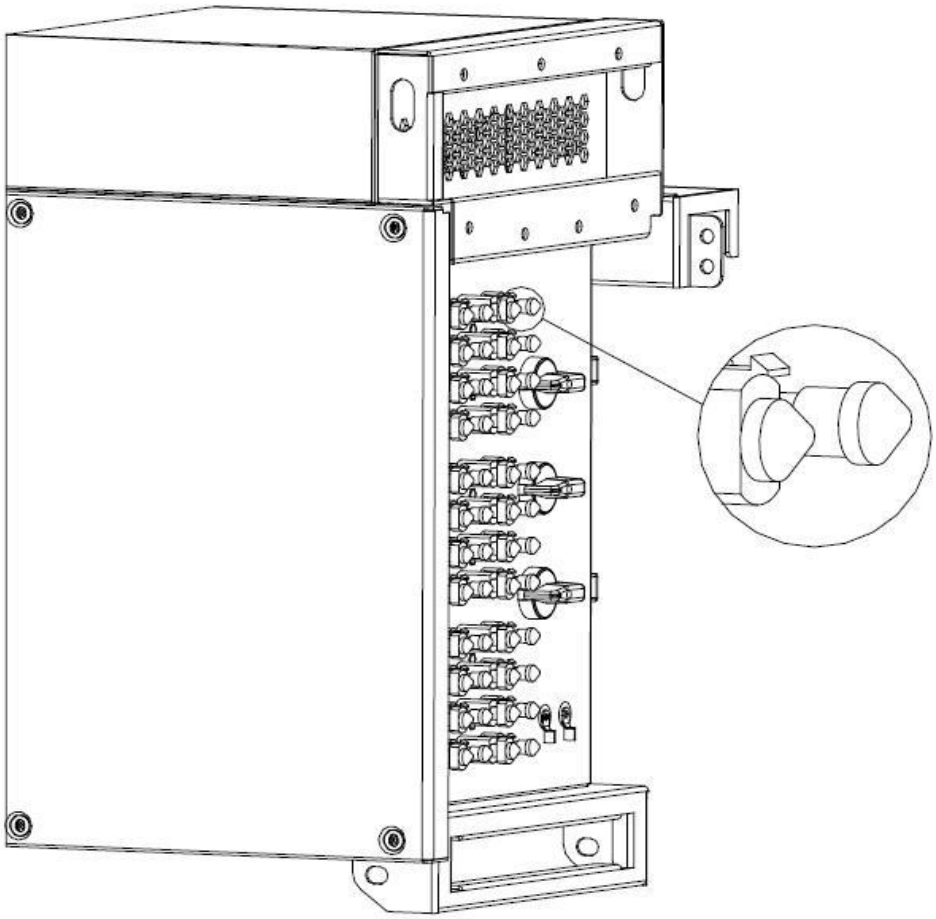


Figure 3-6 DC side input terminals

The DC side uses dedicated plug-in terminals for PV panels, and the DC cable connection procedures are as follows:

(1) Use the wire stripper to strip the insulation of the positive and negative cables, and then put them into the corresponding metal terminals and crimp them with a crimping tool;

(2) Insert the crimped positive and negative cables into the corresponding insulative housings until you hear a click, indicating that they are stuck in place;

(3) Tighten the plastic nut at the end of the insulation shell of the positive and negative connectors;

(4) Use a multimeter to measure the voltage of the positive and negative DC terminals to ensure that the polarity of the panel is correct and less than the maximum input voltage the system can withstand.

(5) Remove the dust plug on the DC input side and insert the positive and negative connectors into the positive and negative terminals of the DC input terminal of the inverter until you hear a “click”, indicating that it is installed.

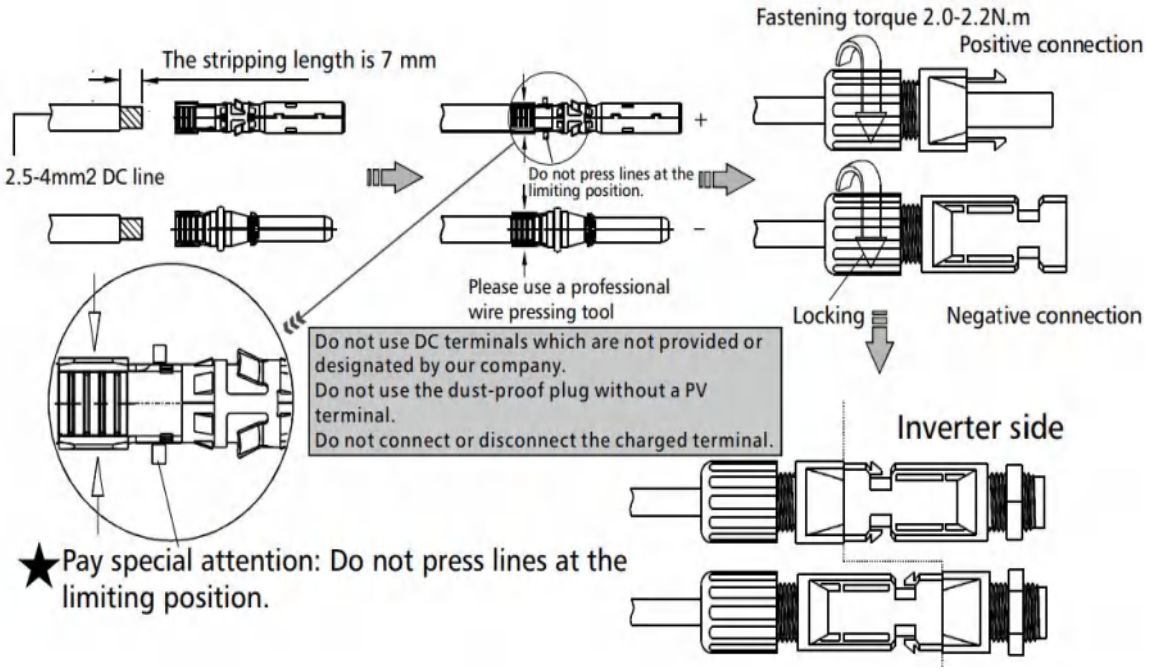


Figure 3-7 Illustration for DC cable connection

Note: 1. The metal terminal used to connect the positive cable has a position-limit buckle (as shown in the special notes in 3-7). Do not bend it when crimping the cable, otherwise the terminal may break away.

2. After inserting the positive and negative terminals into the insulating case, please use a hand to check if there is any condition that the connection is not tightened or broken away.

3. When using a multimeter to measure voltage, if the measured value is negative, the DC input polarity is wrong. Please correct the polarity.

4. When using a multimeter to measure voltage, if the measured value is greater than 1500V, the operating voltage of the inverter has been exceeded. Please reconfigure.

3.4 Connecting Communication (RS485) Cables

Warning

- Please connect the inverter communication cable strictly according to the inverter communication port label!

If PLC communication mode is selected, the PLC module of the inverter side does not need communication cable connection operation.

The SP series inverter provides RS485 communication port. The communication adopts RS485 bus mode. It is cascaded through 4-bit terminals. It is recommended to use double-core reinforced insulated cable with shielding layer for communication cable. The shielding layer needs to be grounded at a single point. The procedures to connect the communication cable are as follows:

(1) Remove the communication cable lock and remove the end plug;

(2) Lead the communication cable through the cable lock;

(3) Use the wire stripper to strip the insulation and protective layer of the cable as shown in Figure 3-8; select the appropriate size terminal to make the communication cable (refer to Figure 3-2);

(4) There is a 4-bit terminal block on the side of the communication board near the cable inlet. RS485B-, RS485B+, RS485A-, RS485A+ are shown from top to bottom respectively (as shown in Figure 3-9).

(5) Connect the completed communication cable to the corresponding terminal and fasten it with M3 Phillips screwdriver. Refer to Table 3-2 for the tightening torque.

(6) After the connection is completed, tighten the plastic nut at the end of the cable lock to ensure waterproof.

Note: 1. Users need to prepare the communication cable, OT terminal, and heat shrinkable sleeve.

2. Users need to use the following tools - cutting pliers, wire strippers, crimping pliers, hot air gun, M3 Phillips screwdriver.

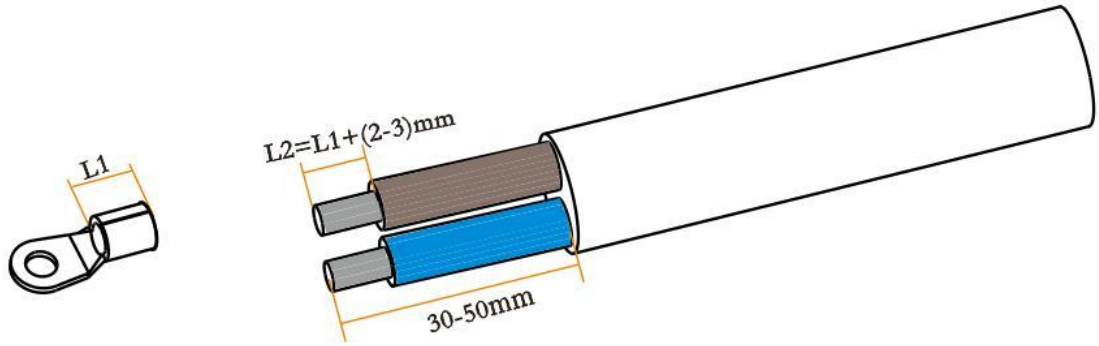


Figure 3-8 Length of stripped communication cable

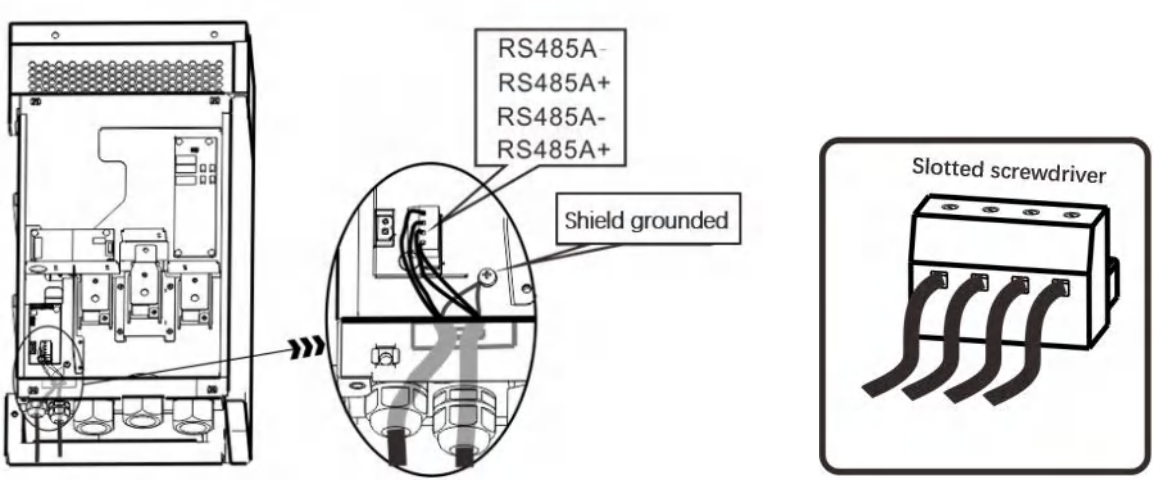


Figure 3-9 Installation of communication cable

Note: 1. Connect the communication line to the terminal seat, and tie the cable to the corresponding cable bridge;

2. It is recommended to use a double-core reinforced insulated cable with a shielding layer, with the cable terminal fixed on the terminal seat and the shielding layer fixed on the connection point (15mm is reserved at the copper wire end or the pressure OT copper terminal for screw locking when wrapping the insulating tape);

3. If the user USES a single core cable on site or the outside diameter of the cable is small, please hit fireproof mud at the cable lock end, otherwise there will be the risk of water inlet.

3.5 Installation of WiFi module

Warning

Please install the communication modules in strict accordance with the user manual!

WIFI communication is only for SP-110K-L/SP-120K-L/ SP-120K-BL models .The installation flow of the WIFI modules is shown as follows:

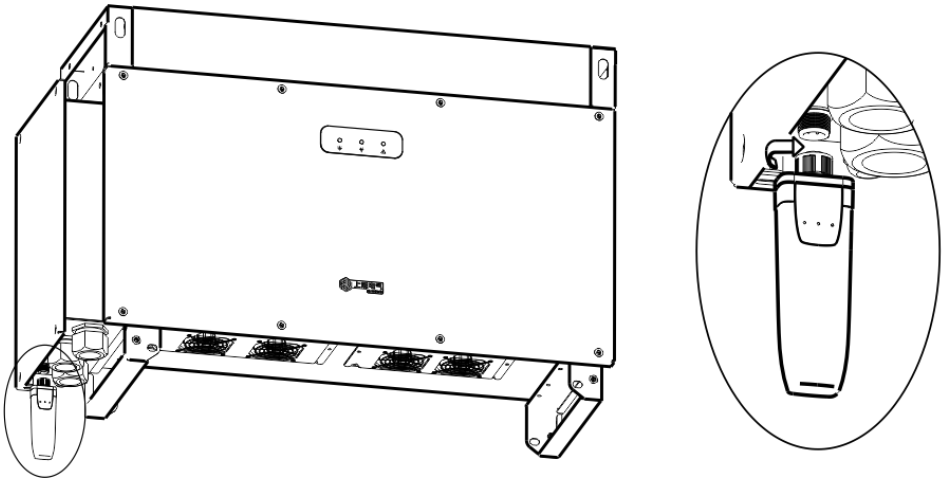


Figure 3-10 Installation of communication cable

(1) Before installation of the modules, the user shall read the WIFI instructions carefully, If you use DIN-Rail Logger, please refer to the LDW user manual.

(2) Unscrew the dustproof covers of the aviation plugs, insert the WIFI modules onto the navigation plugs and rotate the plastic nuts clockwise.

Note: 1. This step is only for users with WIFI, and the installation location is shown in Figure 3-10.

2. When installing WIFI module, the three indicator lights face outwards;

3. When installing THE WIFI module, do not rotate the WIFI module, which will cause the plate end terminals to become loose and lead to water inlet of the inverter;

4. To install WIFI module, please tighten the plastic nut clockwise, otherwise there will be the risk of abnormal communication or water inflow.

3.6 Check after installation

No.	Inspection items	Results: Yes√ / No×
1	Check if the DC side switch is in the "OFF" state.	☐
2	Check that the inverter is installed securely and that the screws on both sides of the mounting backplane are tight.	☐
3	Check if there are any operating tools and unused screws in the cabin.	☐
4	Check if the external grounding wire is connected correctly, the terminal is tight, and the grounding is reliable, ensuring no open circuit or short circuit.	☐
5	Check that the AC output cable is connected correctly and the terminals are tight to ensure no open circuit or short circuit.	☐
6	Check that the polarity of the DC input cable is correct, and that the positive and negative poles are plugged firmly to ensure no open circuit or short circuit.	☐
7	Check if the communication cable is connected correctly and the terminals are tight to ensure no open circuit or short circuit.	☐
8	Check that the unused PV terminals on the DC side are equipped with a dust plug.	☐
9	Check that the plastic nut on the AC side and the RS485 cable lock end is tightened. If the single cable cannot be tightened, seal it (for example, use fire-proof mud to seal).	☐
10	Check if the unneeded waterproof plug at cable plug end is plugged in and the nut at the end is locked.	☐
11	Check if the WIFI module is installed correctly and the plastic nut is tightened (only for products with optional WIFI).	☐
12	Check that the top cover of the wiring compartment is in place and the screws are tight.	☐

Chapter IV Inverter Operation

Danger

- Non-professionals should not open the front panel of the inverter, there is a danger of high voltage!
- When the inverter is working normally, there is hazardous voltage in the device! Be sure to operate the inverter as described in this manual!
- Only professionals can operate the inverter, and others cannot operate without authorization!

4.1 On/Off Operation of Inverter

4.1.1 Power On

Please confirm the following items before the inverter is powered on for the first time:

(1) The installation site environment complies with the relevant requirements of Chapter 2 of this manual;

(2) The input and output power cables, signal cables, ground cable connection meet the requirements of Chapter 3 of this manual;

(3) The combiner box circuit breaker connected to the AC side of the inverter is in the off state;

(4) Check if the positive and negative polarity of the input cable on the DC side, and the phase sequence of the output cable on the AC side meet the requirements of Chapter 3;

(5) Turn the DC knob switch “DC SWITCH” to the “OFF” position;

(6) Prior to connecting to the grid, measure the voltage and frequency of the grid connection point to ensure that the inverter grid connection specifications meet the requirements of Chapter 6.

After the above conditions are met, follow the steps below to power on the inverter:

(1) Close the circuit breaker connected to the inverter in the AC combiner box;

(2) Turn the DC knob switch “DC SWITCH” to the “ON” position;

(3) Establish connection with the inverter through RS485 communication or other communication methods. If the inverter has no faults and alarm information, the inverter will automatically start up and connect to the network without human intervention; if the inverter has faults and alarm information, please refer to the relevant information in Chapter 5, or contact the customer service staff.

4.1.2 Power Off

Follow the steps below to shut down the inverter:

(1) Perform shutdown operation through RS485 communication or other communication methods;

(2) Disconnect the circuit breaker connected to the inverter in the AC combiner box;

(3) The inverter DC switch DC SWITCH must be in the "OFF" state.

4.2 Removing Cables

Danger

- After completing the disassembly procedures to the inverter, please wait for 30 minutes until the energy storage components in the inverter are discharged!
- When maintaining the PV panel, be sure to disconnect the DC switch of the corresponding inverter and the switch in the AC combiner box corresponding to the inverter. Otherwise, there is a danger of electric shock!

Prior to removing the cables of the inverter, ensure that the inverter is fully powered off. The operation procedures are as follows:

(1) Disconnect the branch switch corresponding to the inverter in the AC combiner box and set up the Warning logo to prevent other personnel from mishandling!

(2) Use DC special tools to remove the DC side plug-in terminal, as shown below.

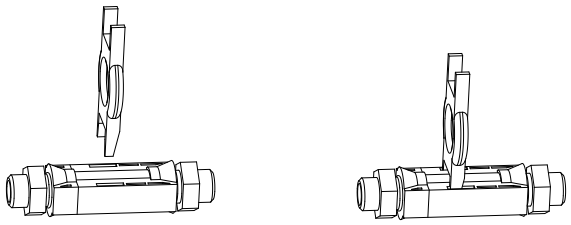


Figure 4-1 Removing DC terminals

(3) Remove the waterproof parts with the words “AC OUT” on the AC side, remove the AC power cables, and properly dispose of the removed power cables.

(4) Remove the waterproof parts of the communication port, remove the communication cables, and properly dispose of the removed communication cables.

(5) Remove the PE cables.

Chapter V Bluetooth Operations

5.1 Installing the Bluetooth Module

The inverter can be equipped with a Bluetooth module for communication. After the Bluetooth module is configured, the Bluetooth interface is led to the outside of the inverter, which is convenient for you to plug and unplug the Bluetooth module. By leveraging Sineng PowerInsight app, you can easily access the running information of the inverter, understand the inverter working status, and setting running parameters.

Note: The Bluetooth module and RS485A module share the same channel of communication signals. Therefore, they cannot be used at the same time.

The procedure for installing the Bluetooth module is as follows:

(1) Unscrew the dust-proof cover.

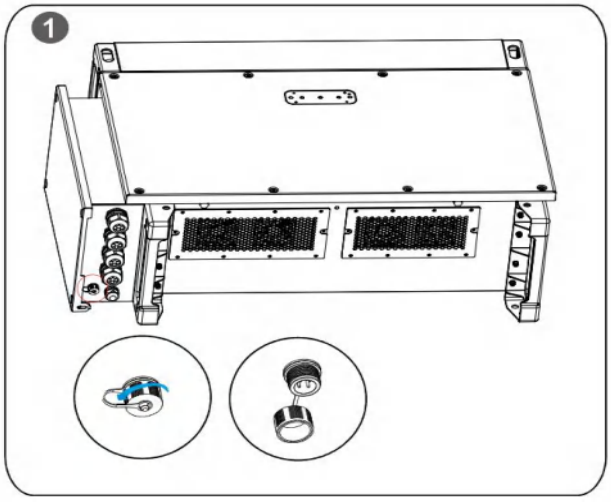


Figure 5-1 Unscrewing the dust-proof cover of the Bluetooth interface

(2) Insert the Bluetooth module.

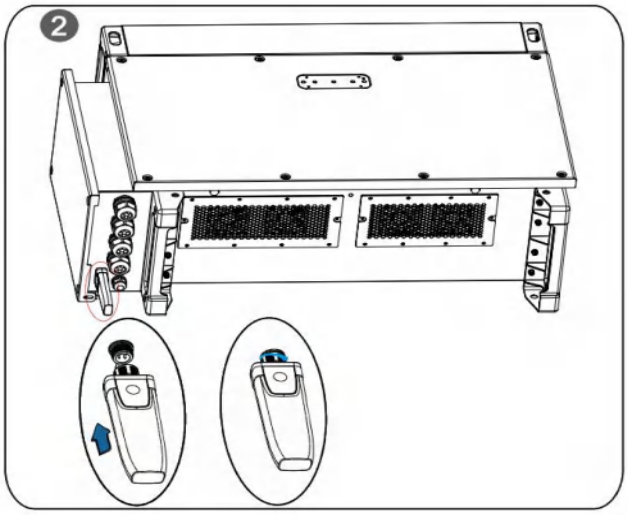


Figure 5-2 Inserting the Bluetooth module

After using the Bluetooth communication, if the Bluetooth module is removed, you need to tighten the dust-proof cover to prevent oxidation or corrosion of the terminal, which will affect the communication quality.

5.2 Overview of the PowerInsight App

This section mainly introduces PowerInsight app, applicable systems and installation methods.

5.2.1 Product Overview

The PowerInsight app is used to interconnect the PV inverter with Android phones. According to different device models, you can use standard functions such as viewing the running information and alarms, setting running parameters, and sharing and exporting data, as well as some auxiliary functions

5.2.2 Application System

The PowerInsight app is applicable to Android 8.1.0 and later versions. The mobile phone hardware is required to support the BLE.

5.2.3 Installation Method

Download the installation file from the following address or by scanning the QR code.

http://www.wandoujia.com/apps/com.sinengpower.android.powerinsight

Figure 5-3 PowerInsight QR code

Note:

1. Some mobile phones may prohibit the installation of apps downloaded from the informal app store. Therefore, allow the installation in security settings of your mobile phones.

2. PowerInsight requires the following permissions: "Pair with Bluetooth device", "Access location information", "Access storage device", and "Access Bluetooth settings". These permissions must be granted to install the software on the mobile phones.

5.3 Login and Searching for a Device

This section describes how to use the PowerInsight app. Before using the app, check whether Bluetooth is enabled on your mobile phone.

5.3.1 Login

(1) Turn on Bluetooth on the mobile phone.

(2) If you open the app without turning on Bluetooth, the system prompts that PowerInsight intends to enable Bluetooth. Select **Allow**, as shown in Figure 5-4.

Figure 5-4 Bluetooth connection

(3) On the main UI, enter the user name and password to log in as prompted. If you do not have a user name and password, you can select login without registration, as shown in Figure 5-5.

Figure 5-5 Main UI

5.3.2 Search for nearby device using the mobile phone to log in.

(1) After the app is started, it automatically searches for nearby devices, as shown in Figure 5-6.

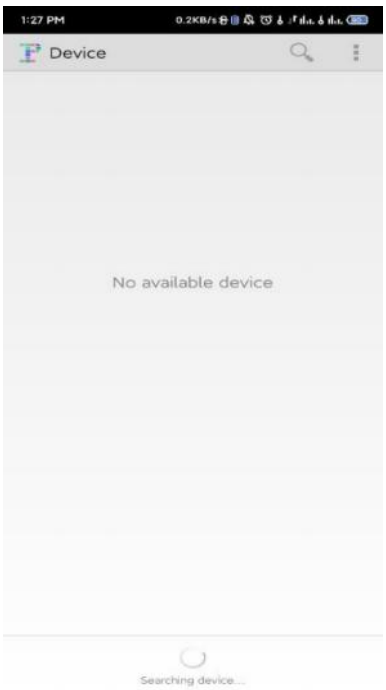


Figure 5-6 Automatically searching for nearby devices

(2) If no nearby devices are found, the software prompts "No Bluetooth device found". At this time, you can tap in the upper right corner or the "Tap to start device search" button to re-search the devices, as shown in Figure 5-7.

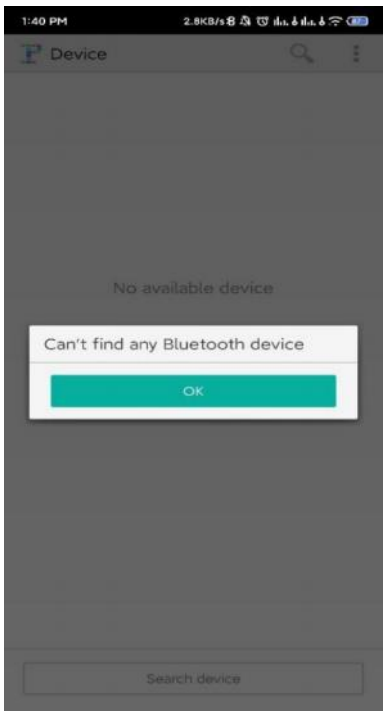


Figure 5-7 No Bluetooth devices found

(3) After a nearby device is found, you can tap the device to view its details, as shown in Figure 5-8.

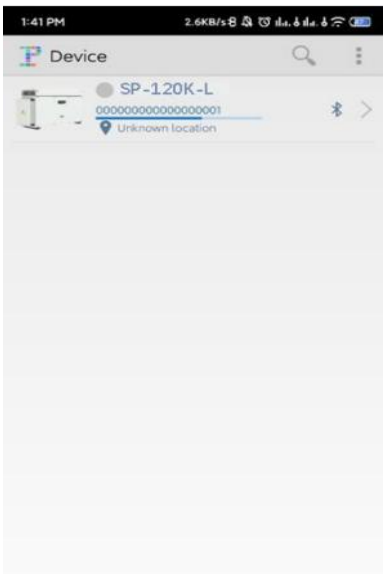


Figure 5-8 Device list

Note: In the preceding figure, the device list contains current status indication of the device (red: critical alarm; yellow: general alarm; green: no alarm and grid-connected power generation in progress; gray: no alarm and grid-connected power generation not in progress), device model, device SN, and device location information.

5.4 Detailed Operations

This section introduces how to view and share device information, set device running parameters, view power generation capacity and export the data.

5.4.1 Viewing Basic Running Information and Current Alarms

(1) View the details of the device, including the current status indication of the device (red: critical alarm; yellow: general alarm; green: no alarm and grid-connected power generation in progress; gray: no alarm and grid-connected power generation not in progress), device model, device SN, device location information, output active power, daily power generation capacity, and total power generation capacity, as shown in Figure 5-9.

Figure 5-9 Main UI of the device information

(2) Select the tab to check the current running data, alarm information and other information, as shown in Figure 5-10, Figure 5-11, and Figure 5-12.

Figure 5-10 Input data of the device

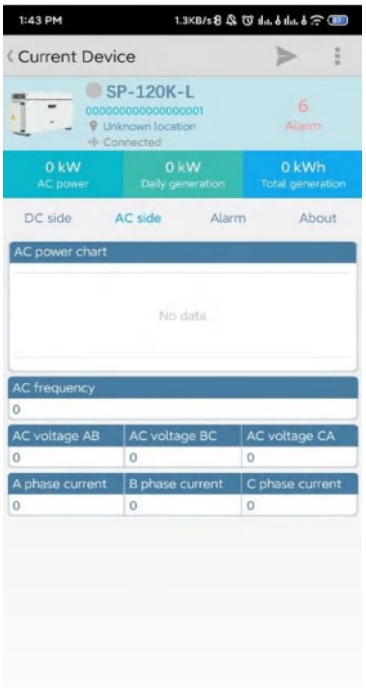


Figure 5-11 Output data of the device

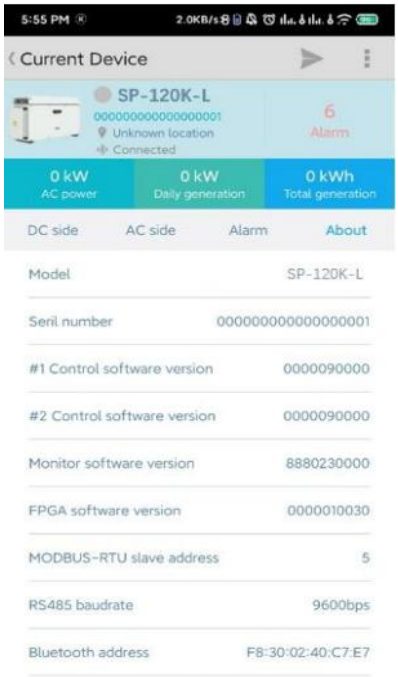


Figure 5-12 Other information of the device

5.4.2 Sending Control Commands to Device

(1) To send a command to the device, you can tap ▶ in the upper right corner to select the power-on command or power-off command to be sent, as shown in Figure 5-13.

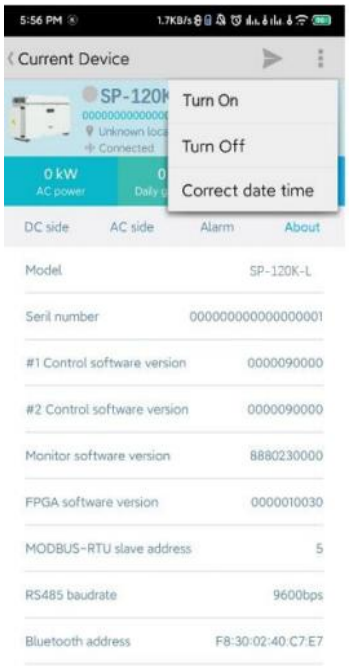


Figure 5-13 Power-on/off command menu

(2) Confirm the selected command to be sent and tap **OK**. Otherwise, tap **Cancel**, as shown in Figure 5-14.

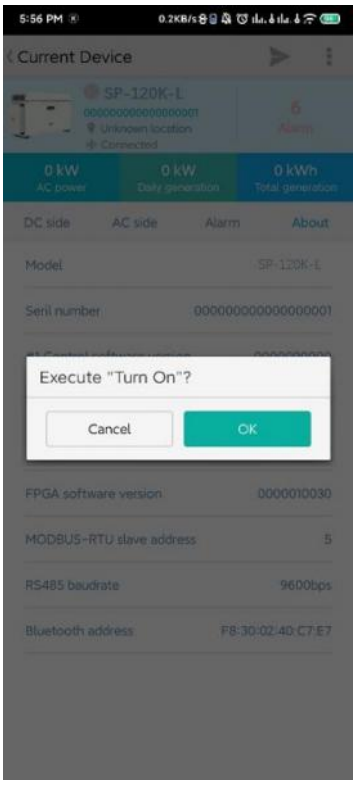


Figure 5-14 Sending the power-on/off command

(3) After the command is sent, the software prompts for the command sending result, as shown in Figure 5-15.

Figure 5-15 Prompt for successfully sent the power-on/off command

5.4.3 Share the basic running information of the device.

(1) Tap ⋮ in the upper right corner and select the **Share** menu, as shown in Figure 5-16.

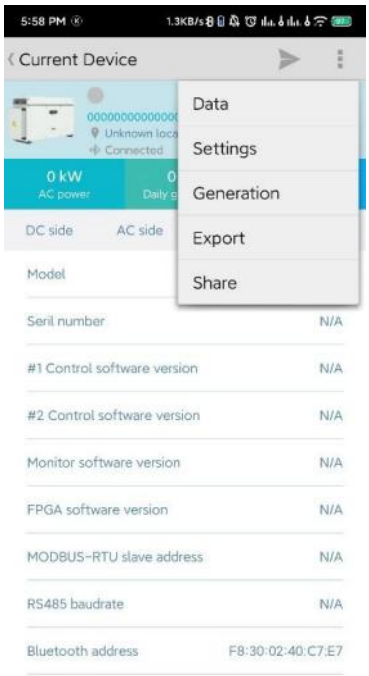


Figure 5-16 Menu item

(2) Select the app used for sharing. You can tap **View all** to display all software that can be used for sharing, as shown in Figure 5-17.

Figure 5-17 Sharing mode

(3) Figure 5-18 shows the effect of sharing via SMS.

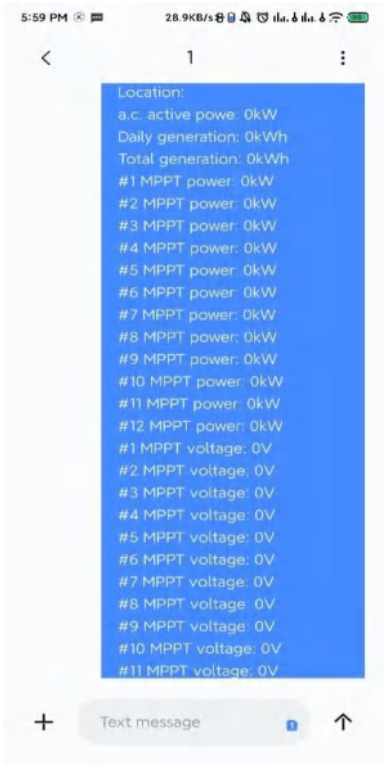


Figure 5-18 Sharing effect

5.4.4 Power Generation Capacity Data

(1) On the device page, tap ⋮ in the upper right corner and select the power generation capacity to open the page, as shown in Figure 5-19.

Figure 5-19 Menu item

(2) In the date bar, tap the button to edit the year and month, as shown in Figure 5-20.

Figure 5-20 Power generation capacity data

(3) Tap in the upper right corner and select **Save to file**. The power generation capacity record will be saved to the selected directory. Taking the Android system as an example, it is saved to the **PowerInsight** folder under the **Sineng** folder in the internal memory storage. Select the share mode to share the power generation capacity record, as shown in Figure 5-21.

Figure 5-21 Power generation capacity menu item

Chapter VI Event and Alarm

Warning

- Non-professionals cannot handle inverter alarms or faults!
- When handling inverter events, strictly follow the instructions in this manual!

6.1 Event Information

Table 6-1 Event information comparison table

Event type	Event explanation
Inverter grid-connected power generation	When the grid-connected state is switched, "inverter on" or "inverter off" is displayed.
Inverter alarm operation	When the inverter is connected to the grid, and when an alarm message appears, "Inverter Alarm Operation" is displayed
Remote startup	When remote power-on occurs, “remote power on” is displayed
Remote shutdown	When remote power-off occurs, “remote power off” is displayed

6.2 Alarm Information

When the inverter is running, if the grid, PV panel or inverter status is abnormal, intelligent judgment will be made and the fault will be displayed on the panel or mobile APP. The following table lists the fault alarms, definitions, and handling suggestions.

Table 6-2 Fault alarm list

Alarm	Description	Event Handling
Grid abnormal	Power grid is abnormal	Check the grid status of the inverter port, including the voltage, frequency, phase sequence, and impedance to ground of each phase.
Grid voltage abnormal	The grid voltage is lower than the set lower limit or higher than the set upper limit	Check the grid voltage and frequency; If the grid voltage and frequency are outside the allowable range, please seek a solution from your local power company; If the grid voltage and frequency are within the allowable range, please contact SINENG customer service center.
Grid frequency abnormal	The grid frequency is lower than the set lower limit or higher than the set upper limit	
System fault	Inverter system failure	The input and output are powered off and restarted, waiting for the inverter to return to normal. If this fault occurs repetitively, please contact SINENG customer service center.
AC side lightning protection	AC SPD fault	Replace SPD, contact SINENG customer service center.
System alarm	Inverter system abnormal	The input and output are powered off and restarted, waiting for the inverter to return to normal. If this fault occurs repetitively, please contact SINENG customer service center.
Inverter over temperature operation	Inverter high temperature	The inverter will generate electricity normally without intervention; if this fault occurs in the morning or evening or at the time with low temperatures, please contact SINENG customer service center.
Internal communication abnormal	Abnormal communication between internal modules of the inverter	The input and output are powered off and restarted, waiting for the inverter to return to normal. If this fault occurs repetitively, please contact SINENG customer service center.

Alarm	Description	Event Handling
Residual over current	PV panel is abnormally insulated from the ground	Check if there is a ground fault on the PV panel to the ground, contact SINENG customer service center.
PV input abnormal	PV panel configuration, wiring, etc. are abnormal	Check if the PV panel is over-configured, if there is no over-configuration, please contact SINENG customer service center.
PV 1 string is reversely connected	PV1 DC input is reversely connected	Shut down the inverter and check if the string 1 is reversely connected
PV 2 string is reversely connected	PV2 DC input is reversely connected	Shut down the inverter and check if the string 2 is reversely connected
PV 3 string is reversely connected	PV3 DC input is reversely connected	Shut down the inverter and check if the string 3 is reversely connected
PV 4 string is reversely connected	PV4 DC input is reversely connected	Shut down the inverter and check if the string 4 is reversely connected
PV 5 string is reversely connected	PV5 DC input is reversely connected	Shut down the inverter and check if the string 5 is reversely connected
PV 6 string is reversely connected	PV6 DC input is reversely connected	Shut down the inverter and check if the string 6 is reversely connected
PV 7 string is reversely connected	PV7 DC input is reversely connected	Shut down the inverter and check if the string 7 is reversely connected
PV 8 string is reversely connected	PV8 DC input is reversely connected	Shut down the inverter and check if the string 8 is reversely connected
PV 9 string is reversely connected	PV9 DC input is reversely connected	Shut down the inverter and check if the string 9 is reversely connected
PV 10 string is reversely connected	PV10 DC input is reversely connected	Shut down the inverter and check if the string 10 is reversely connected
PV 11 string is reversely connected	PV11 DC input is reversely connected	Shut down the inverter and check if the string 11 is reversely connected
PV 12 string is reversely connected	PV12 DC input is reversely connected	Shut down the inverter and check if the string 12 is reversely connected
PV1 string over voltage	PV1 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV2 string over voltage	PV2 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV3 string over voltage	PV3 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV4 string over voltage	PV4 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV5 string over voltage	PV5 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV6 string over voltage	PV6 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV7 string over voltage	PV7 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV8 string over voltage	PV8 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV9 string over voltage	PV9 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV10 string over voltage	PV10 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV11 string over voltage	PV11 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
PV12 string over voltage	PV12 input voltage is higher than permitted value	Shut down the inverter and check if the PV panel configuration is correct
Insulation resistance abnormal	Component insulation resistance to ground exceeds the set value	Check if the component has a ground fault, contact SINENG customer service center.

Alarm	Description	Event Handling
PV to ground voltage abnormal	PV to ground voltage exceeds the set value	Check whether the component has a ground fault. After the check, the input and output are powered off and restarted. If there is still a fault, contact SINENG customer service center.
Fan abnormal	Internal and external fans are abnormal	Check if the fan is abnormal. If there is any abnormality, contact SINENG customer service center.

Chapter VII Product Specifications

7.1 Applicable Standards

The inverter design shall meet the domestic and international standards:

NB/T 32004-2018 Technical specification of PV grid-connected inverter

IEC 61000-6-4/IEC 61000-6-2 Inverter EMC requirements;

IEC62109-1 Generic safety requirements for PV inverter;

IEC62109-2 Generic safety requirements for PV inverter;

GB/T19939-2005 Confirmation method and test requirements for inverter performances

7.2 General Parameters

Table 7-1 General parameters

Items	Specifications			
Unit model	SP-110K-L	SP-120K-L	SP-120K-BL	SP-136K
Dimensions (mm)	1018×630×339			
Net weight (kg)	85			95
Operating temperature	-30 to 60℃			
Storage temperature	-40 to 70℃			
Relative humidity	0 to 100%, no condensation			
Altitude	4000m(>3000m derating)			

7.3 Electrical Characteristics (DC Input)

Table 7-2 DC Input

Items	Specifications			
Model number	SP-110K-L	SP-120K-L	SP-120K-BL	SP-136K
Max PV array open circuit voltage (Vdc)	1100			
Max PV array input current (A)	26*10	26*10	30*10	26*12
Inverter startup voltage (Vdc)	500			
Overvoltage level at the DC input of the device	II			
MPPT voltage range (Vdc)	200~1000			
DC Input branch number	20			24
MPPT number	10			12
Maximum back-feed current (A)	0			0

7.4 Electrical Characteristics (AC Output)

Table 7-3 AC Output

Items	Specifications			
Model number	SP-110K-L	SP-120K-L	SP-120K-BL	SP-136K
Grid system	IT/TN/TT			IT
Output rated power (kW)	100	110	110	136
Output maximum power (kW)	110	121	121	150
Output rated voltage (Vac)	400/380	400/380	400/380	540
Output operating voltage range (V±%)	-15%~+10%(adjustable)			
Rated output current (A)	145	161	161	145

Maximum output current (A)	161	184	184	161
Rated frequency (Hz)	50/60	50/60	50/60	50/60
Overvoltage level at the AC output of the device	III			
Output current waveform distortion	THDi＜3%(when the output is full load)			
Output power factor	＞0.99(>50% load) (power factor adjustable -0.8~0.8)			
Output DC component	< Output current rating × 0.5%			

7.5 Electrical Characteristics (Protection Characteristics)

Table 7-4 Protection Characteristics

Items	Specifications			
Model number	SP-110K-L	SP-120K-L	SP-120K-BL	SP-136K
DC reverse connection protection	Yes			
Leakage current protection	Yes			
Islanding protection	Yes			
DC switch	Yes			
Insulation resistance detection	Yes			
String detection	Yes			
Lightning protection	DC Type II / AC Type II			
PID protection	Optional			

7.6 Electrical Characteristics (System Characteristics)

Table 7-5 System Characteristics

Items	Specifications			
Model number	SP-110K-L	SP-120K-L	SP-120K-BL	SP-136K
Maximum inverter efficiency (%)	98.7	98.7	98.7	99
Chinese efficiency	98.3	98.3	98.3	98.5
Standby power consumption (W)	<20			
Self-consumption at night (W)	<3.5			
Display operation interface	Indicator light			
Insulation resistance (MΩ)	＞10（1000Vdc）			
Dielectric strength	2120Vdc, leakage current less than 10mA, no arcing or breakdown			
Protection level	IP66			
Cable entry method	Inlet from side and outlet at bottom			
Cooling method	Intelligent air cooling			

Chapter VIII Product Maintenance

This chapter describes the maintenance of the inverter, including the inverter maintenance cycle and the inverter maintenance method. Be sure to read the instructions in this chapter carefully before operating the inverter.

Danger

- Only professionals can maintain the inverter, others must not operate it!
- In order to ensure the safety of maintenance personnel, it is not allowed to touch any live parts of the inverter while the inverter is running, and always check whether the grounding point of the product is reliable.
- After the inverter is completely powered off, the hazardous voltage still exists in the unit! Please wait 20 minutes before the inverter can be maintained!
- Do not plug or unplug the DC connector while the inverter is in operation!
- Be sure to use qualified spare parts provided by SINENG. If the use of spare parts that are not supplied by SINENG causes damage to the equipment, it has nothing to do with SINENG.
- Unauthorized removal of the inverter may result in equipment damage. This type of equipment damage has nothing to do with SINENG!

The periodic inspection and maintenance of the inverter can confirm the inverter status in time and improve the operational reliability of the inverter. The periodic check list is shown in Table 7-1.

Table 8-1 Periodic check list

Inspection contents	Method	Inspection cycle
Heatsink	Check the heatsink for alien matter or dust	Once half a year
Fan	Check the fan for dust or obstruction by alien object	Once half a year
Cable connection	Check if the AC/DC cable is connected reliably, if there is any damage, and if the waterproof lock is tightened. Check if the ground wire is connected reliably	Once half a year

Service After Sales Information

SINENG ELECTRIC CO.,LTD provides customers with technical support. Users may contact the nearest SINENG local sales office or service center, or SINENG headquarter.

SINENG ELECTRIC CO., LTD.

Address: #6 Hehui Road, Huishan Economic Development Zone, Wuxi, Jiangsu

Post Code: **214174**

Customer service hotline: **0510-88888118**

Fax: **0510-85161899**

Product Warranty Card

Thank you for selecting our energy storage convertor!

Product Model:_____

Product Serial Number:_____

Please refer to the descriptions in the *User Manual* for the product specifications, standards and technical conditions.

This product has a warranty of years. Within the warranty period, SINENG will provide free repair or replacement services for any faults that are not caused by human error or force majeure (including but not limited to earthquake, mudslides, flood, typhoon and war).

User Name:_____

User Address:_____

_____

Contact Person:_____

Telephone:_____

E-Mail:_____

SINENG Electric Co., Ltd.

Address: #6 Hehui Road, Huishan Economic Development Zone, Wuxi, Jiangsu

Post Code: 214174

Customer service hotline: 0510-88888118

Fax: 0510-85161899

Website: www.si-neng.com