

ASW75K-LT/ASW80K-LT

ASW100K-LT/ASW110K-LT

# PV Grid-Connected Inverter User Manual

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## 1.1 About this document

This document describes the mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning of the product as well as the operation of the product user interface.

You will find the latest version of this document and further information on the product in PDF format at [www.solplanet.net](http://www.solplanet.net).

It is recommended that this document is stored in an appropriate location and be available at all times.

## 1.2 Area of the validity

This document is valid for the following models:

- ASW75K-LT
- ASW80K-LT
- ASW100K-LT
- ASW110K-LT

## 1.3 Target group

This document is intended for qualified persons who must perform the tasks exactly as described in this user manual.

All installation work must be performed by appropriately trained and qualified persons.

Qualified persons must possess the following skills:

- Knowledge of how an inverter works and is operated.
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations.
- Training in the installation and commissioning of electrical devices .
- Knowledge of all applicable laws, standards and directives.
- Knowledge of and compliance with this document and all safety information.

## 1.4 Safety warning symbols guide



### **DANGER**

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



### **WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



### **CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

### **NOTICE**

Indicates a situation which, if not avoided, can result in property damage.



Information that is important for a specific topic or goal, but is not safety-relevant.

## 2.1 Intended use

The product is a transformerless PV inverter with 10 MPP trackers, which converts the direct current of the PV modules into grid-compliant alternating current and feeds it into the utility grid.

The product is suitable for indoor and outdoor use.

The product must only be operated with PV modules of protection class II in accordance with IEC 61730, application class A. The PV modules must be compatible with this product.

The product is not equipped with an integrated transformer and therefore has no galvanic isolation. The product must not be operated with either grounded DC conductors or PV modules whose outputs are grounded. This can cause the product to be destroyed. The product may be operated with PV modules whose frame is grounded.

When designing the PV system, ensure that all components remain within their permitted operating ranges and their installation requirements at all times.

The product must only be used in countries for which it is approved or released by Solplanet and the grid operator.

Use this product only in accordance with the information provided in this documentation and with the locally applicable standards and directives. Any other application may cause personal injury or property damage.

The type label must remain permanently attached to the product.

This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product.



In Australia, these models are for industrial and Commercial applications only, not for residential applications.

## 2.2 Important safety instructions

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronic devices, there are residual risks despite careful construction. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.



### **DANGER**

#### **Danger to life due to high voltages of the PV array!**

When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Do not touch the DC conductors.
- Do not touch any live components of the product.
- Do not open the product.
- All work on the product must only be carried out by qualified personnel who have read and fully understood all safety information contained in this document.
- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the product.
- Wear suitable personal protective equipment for all work on the product.



### **DANGER**

#### **Danger to life due to electric shock when touching live system components in case of a ground fault !**

If a ground fault occurs, parts of the system may still be live. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.



- Only touch the cables of the PV modules on their insulation.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the product.



## **WARNING**

### **Danger to life due to electric shock from destruction of the measuring device due to overvoltage!**

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

- Only use measuring devices with a DC input voltage range of or higher.



## **WARNING**

### **Risk of burns due to hot enclosure parts!**

Some parts of the enclosure can get hot during operation, touching these parts may cause burns.

- Only touch the DC switch when the inverter is running.
- Do not touch any parts other than the enclosure lid of the product during operation.



## **WARNING**

### **Risk of injury due to weight of product!**

Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Qualified person wear appropriate personal protective equipment.

## NOTICE

### Damage to the inverter due to electrostatic discharge

Internal components of the inverter can be irreparably damaged by electrostatic discharge.

- Ground yourself before touching any component.



### The country data set must be set correctly.

If you select a country data set which is not valid for your country and purpose, it can cause a disturbance in the PV system and lead to problems with the grid operator. When selecting the country data set, you must always observe the locally applicable standards and directives as well as the properties of the PV system (e.g. PV system size, grid-connection point).

- If you are not sure which standards and directives are valid for your country or purpose, contact the grid operator.

## 2.3 Symbols on the label

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Beware of a danger zone!

This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.

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Beware of high voltage and operating current!

The inverter operates at high voltage and current. Work on the inverter must only be carried out by skilled and authorized electricians.

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Beware of hot surfaces!

The inverter can get hot during operation. Avoid contact during operation.

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WEEE designation

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

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CE marking

The product complies with the requirements of the applicable EU directives.

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Certification mark

The product has been tested by TUV and got the quality certification mark.

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RCM Mark

The product complies with the requirements of the applicable Australian standards.

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Capacitors discharge

Before opening the covers, the inverter must be disconnected from the grid and PV array. Wait at least 25 minutes to allow the energy storage capacitors to fully discharge.

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Observe the documentation

Observe all documentation supplied with the product.

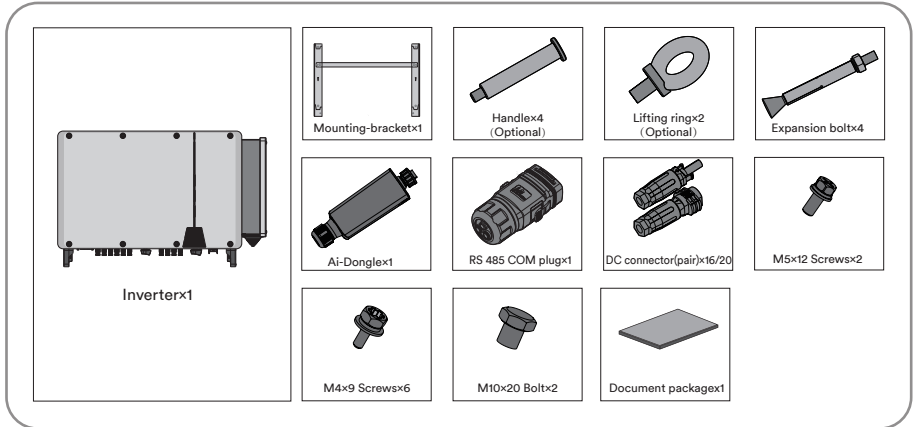
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# 3

## Unpacking and storage

### 3.1 Scope of delivery

Check the scope of delivery for completeness and any visible external damage. Contact your distributor if the scope of delivery is incomplete or damaged.



### 3.2 Product storage

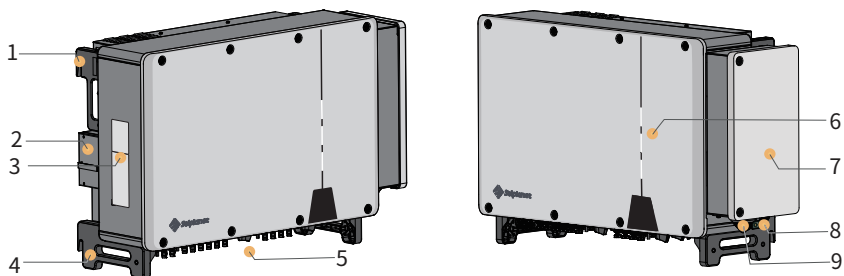
Suitable storage is required if the inverter is not installed immediately:

- Store the inverter in the original packing case.
- The storage temperature must be between  $-30^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , and the storage relative humidity must be between 0 and 100%, non-condensing.
- The packing with the inverter shall not be tilted or inverted.
- The product must be fully inspected and tested by professionals before it can be put into operation, if it has been stored for half a year or more.

# 4

## Inverter overview

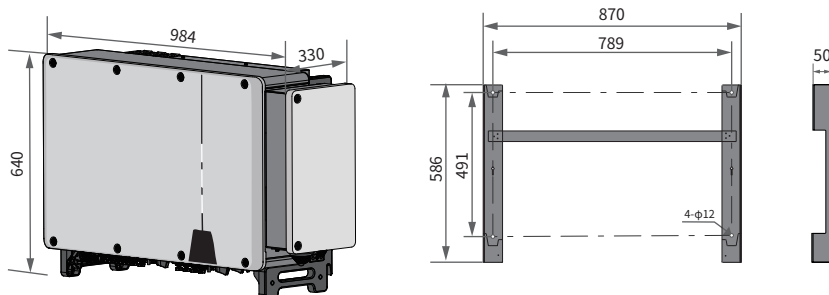
### 4.1 Product description



NO.	Name	Description
1	Mounting ears	Two ears hang the inverter onto the mounting-bracket.
2	Fan assembly	Maintain and replace the fan.
3	Labels	Warning symbols,nameplate,and QR code.
4	Bottom handles	Two handles, move the product and hang the inverter onto the mounting-bracket.
5	DC wiring area	DC switches, DC terminals and communication terminals.
6	LED indicator	Indicate the present working state of the inverter.
7	AC wiring box	Connect the AC side cables.
8	Additional grounding terminal	Two terminals, at least one of them to ground the inverter.
9	Cable inlet	Seal AC cables after installation.

## 4.2 Dimensions

Unit:mm



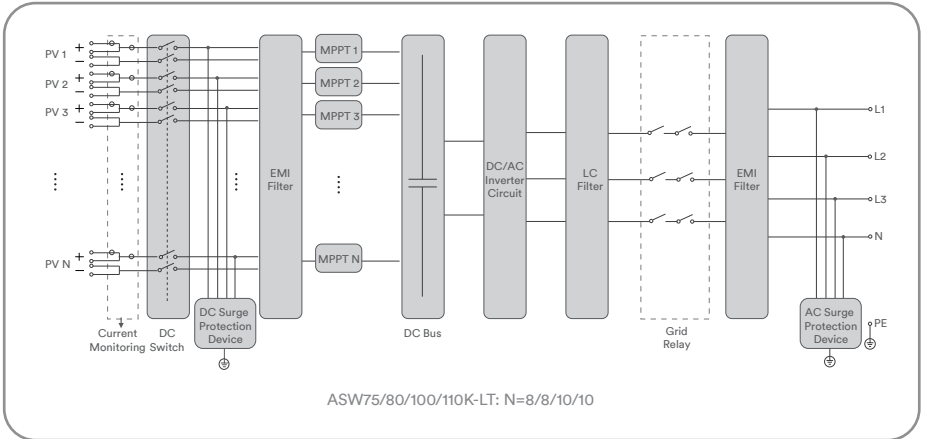
## 4.3 LED indicator

The LED indicator can indicate the operation state of the product.

LED indicator	LED state	Description
SOLAR (White)	Glowing	The white LED is glowing when the product is operating normally.
	Flashing	The white LED is flashing when the product is self-checking automatically.
	OFF	The white LED is off when the product is not feeding into the utility grid.
COM (White)	Pulsing	The white LED is pulsing when the product is communicating with other devices e.g. Ai-Dongle. Depending on the data transfer speed, the white LED pulses fast or slow.
	OFF	When the communication is abnormal or there is no data transmission, the white LED is off.
FAULT (Red)	Glowing	When the product stops supplying power to the power grid due to a fault, the red LED is glowing.
	OFF	When the grid fault is cleared, the red LED is off.

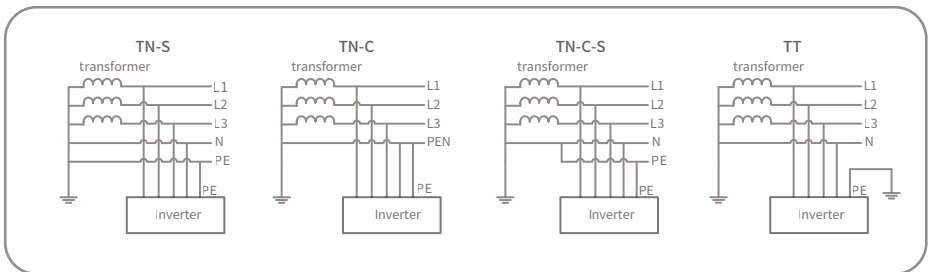
## 4.4 Circuit diagram

The circuit diagram of ASW75/80/100/110K-LT is as follows.



## 4.5 Supported grid types

The grid structures supported by Solplanet is TN-S, TN-C, TN-C-S, TT, as shown in the figure below:



For the TT grid structure, the effective value of the voltage between the neutral wire and the ground wire must be less than 20V.

## 4.6 Interfaces and functions

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The product is equipped with the following interfaces and functions:

### Ai-Dongle

The product is equipped with an Ai-Dongle as standard, which provides a user interface for configuring and monitoring the product. The Ai-Dongle can connect to the Internet via WLAN or the Ethernet cable. If you don't want to use Ai-Dongle, the Solplanet communication products or the third-party monitor device can be chosen.

### RS485 Interface

Depending on availability, the product is or not equipped with two RS485 interfaces. The product can communicate via cables with Solplanet communication products or the third party device via the RS485 interface. For more information about the third party device, please contact the service department.

### Modbus RTU

The product is equipped with a Modbus interface. The Modbus interface of the supported Solplanet products is designed for industrial use and has the following tasks:

- Remote query of measured values
- Remote setting of operating parameters
- Setpoint specifications for system control

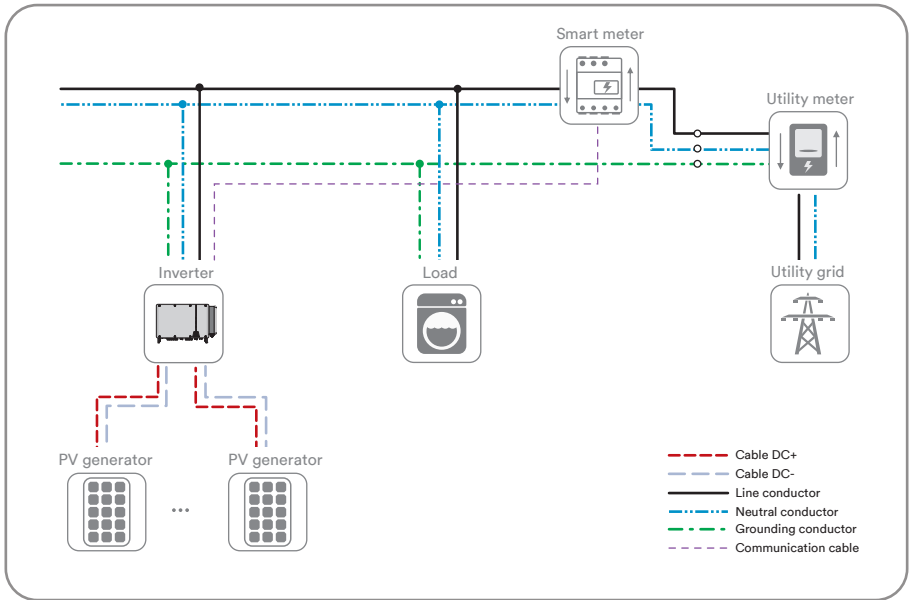
### Export active power control

The product is equipped with the export active power limit function, so as to meet the requirements of some national standards or grid standards for limiting the output power at the grid connection point.

The export active power control solution measures the active power at the point where the customer's installation is connected to the distribution system (point of grid connection) and then uses this information to control the inverter's output active power in order to prevent the export active power to the distribution system from exceeding the agreed export capacity.

The smart meter that can be used with this product must be approved by AISWEI. For more information about the smart meter, please contact the service.





## Inverter demand response modes (DRED)

The product shall detect and initiate a response to all supported demand response commands according to the standard AS/NZS 4777.2.

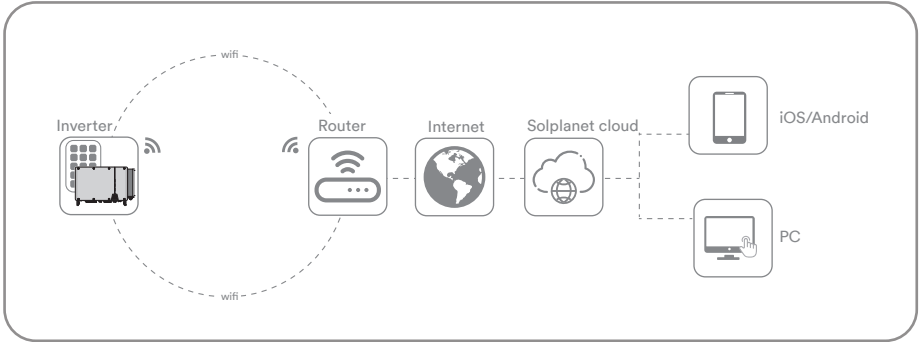
If DRMs support is required, the inverter should be used in conjunction with Ai-Logger. The Demand Response Enabling Device (DRED) can be connected to the DRED port on Ai-Logger via RS-485 cable. You can visit the website ([www.solplanet.net](http://www.solplanet.net)) for more information and download the user manual for the Ai-Logger.

## Earth fault alarm

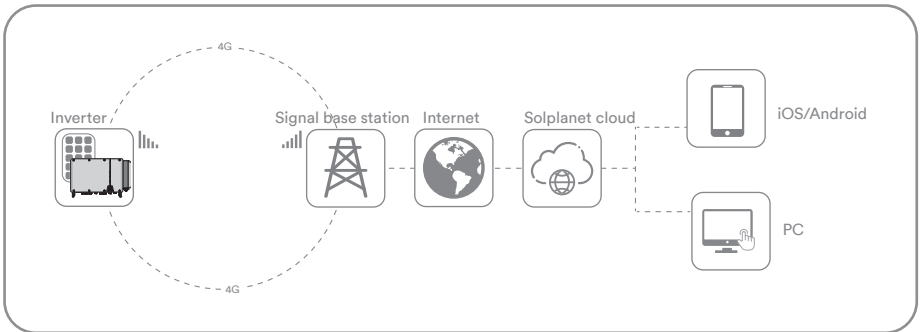
This product complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. If an Earth Fault Alarm occurs, the red color LED indicator will light up. At the same time, the error code 38 will be sent to the Solplanet Cloud. (This function is only available in Australia and New Zealand).

## 4.7 Communication overview

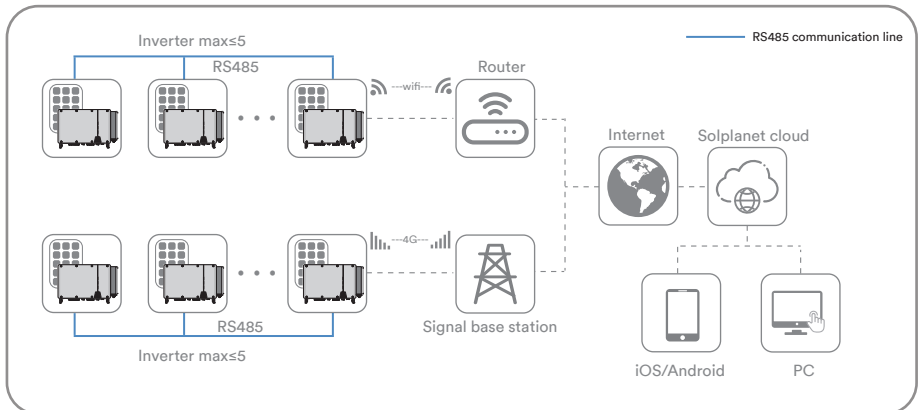
The communication overview with a Ai-Dongle:



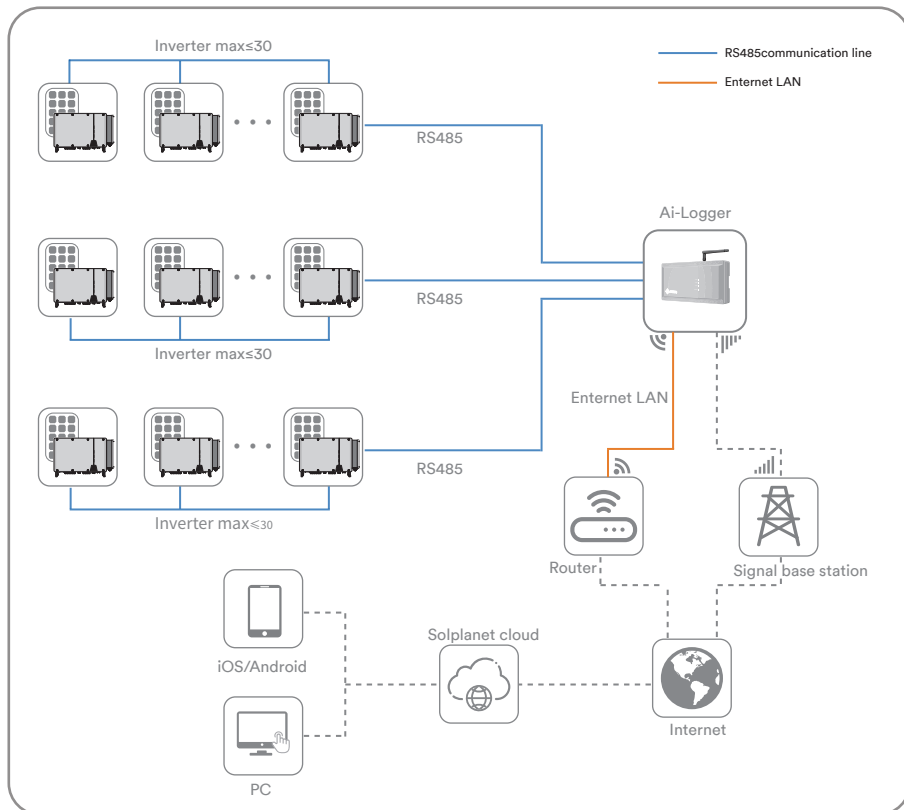
The communication overview with a LTE Cat-1 stick:



One Ai-Dongle or LTE CAT-1 stick can connect with more than one product:



### The communication overview with Ai-Logger for large PV plant:



### 5.1 Requirements for mounting

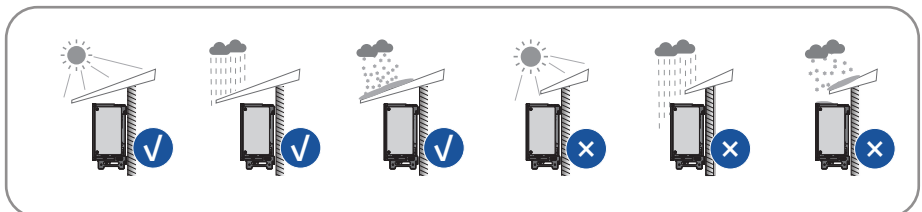


## DANGER

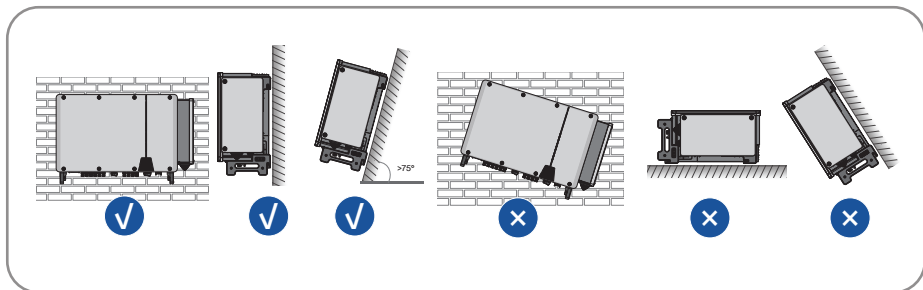
### Danger to life due to fire or explosion!

Despite careful construction, electrical devices can cause fires. This can result in death or serious injury.

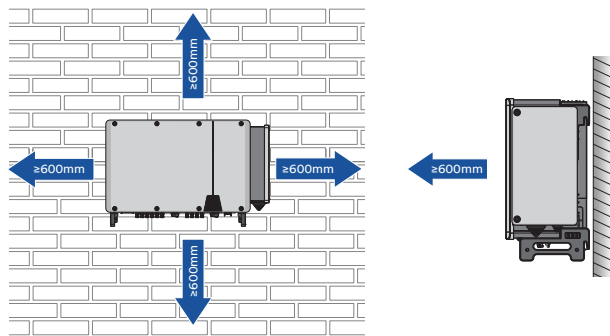
- Do not mount the product in areas containing highly flammable materials or gases.
  - Do not mount the inverter in areas where there is a risk of explosion.
- The ambient temperature is recommended below 40°C to ensure optimal operation.
  - A solid support surface must be available (e.g. concrete or masonry). Ensure that the installation surface is solid enough to bear four times the weight. When mounted on drywall or similar materials, the product emits audible vibrations during operation which could be perceived as annoying.
  - The mounting location must be inaccessible to children.
  - The mounting location should be freely and safely accessible at all times without the need for any auxiliary equipment (such as scaffolding or lifting platforms). Non-fulfillment of these criteria may restrict servicing.
  - The mounting location must not be exposed to direct solar irradiation. If the product is exposed to direct solar irradiation, the exterior plastic parts might age prematurely and overheating might occur. When becoming too hot, the product reduces its power output to avoid overheating.



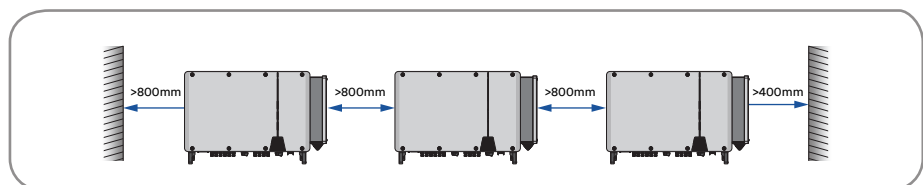
- Never install the inverter horizontally, or with a forward / backward tilt or even upside down. The horizontal installation can result in damage to the inverter.



- Maintain the recommended clearances to wall as well as to other inverters or objects.



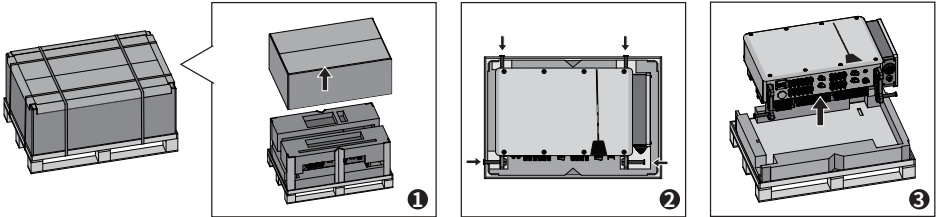
- In case of multiple inverters, reserve specific clearance between the inverters.



- The product should be mounted such that the LED signals can be read off without difficulty.
- The DC load-break switch of the product must always be freely accessible.

## 5.2 Take out the product

Open the box, install the four handles in sequence, and take out the inverter.



## 5.3 Handling the product

### CAUTION

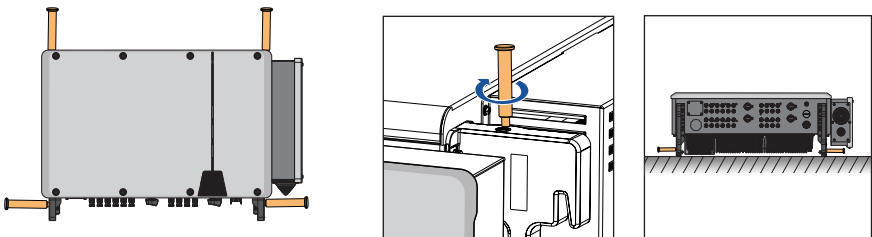
#### Risk of injury due to the weight of the product!

Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.

### 5.3.1 Manual transport

**Step 1:** Use the handles on the top and bottom of the enclosure to transport the inverter to the destination.

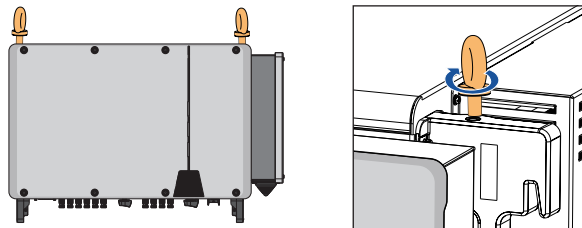




Screw-in handles are optional. The product can be moved by them.

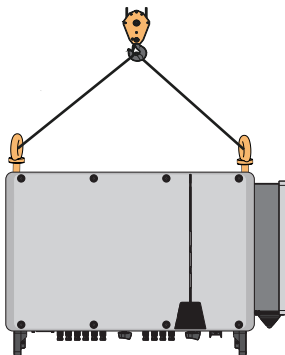
### 5.3.2 Hoisting transport

**Step 1:** Screw the two lifting rings into the hangers of the inverter.



**Step 2:** Lead the sling through the two lifting rings and fasten the tie-down strap.

**Step 3:** Use the lifting device to lift the inverter 100mm above the ground, and then pause to check the fastening of the lifting ring and sling. After confirming that the connection is safe, lift the inverter to the destination.



**Step 4:** Remove the lifting ring.



The lifting rings and the sling are not within the delivery scope.

## 5.4 Mounting



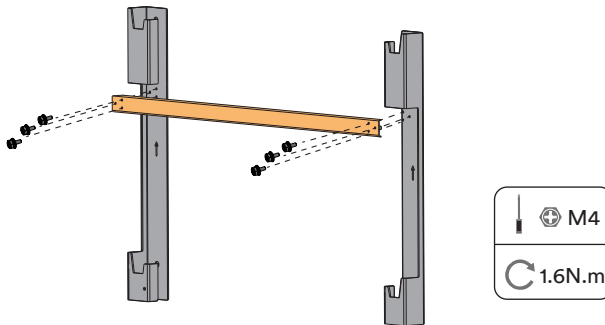
### CAUTION

#### Damage to cable lines can cause personal injury.

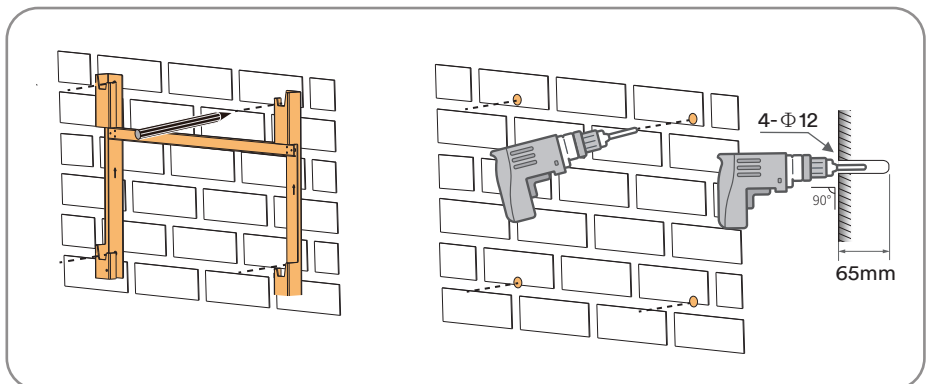
The walls may be covered with power cords or other lines (for example, gas or water).

- Make sure that no lines on the wall are damaged when drilling.

**Step 1:** Assemble the mounting-bracket by using the connecting bar.



**Step 2:** Align the wall mounting bracket horizontally on the wall with the arrow upwards. Mark the position of the drill holes. Set the wall mounting bracket aside and drill the marked holes with the diameter of 12mm. The depth of the holes should be about 65 mm. Keep the hammer drill bit perpendicular to the wall to avoid drilling inclined.







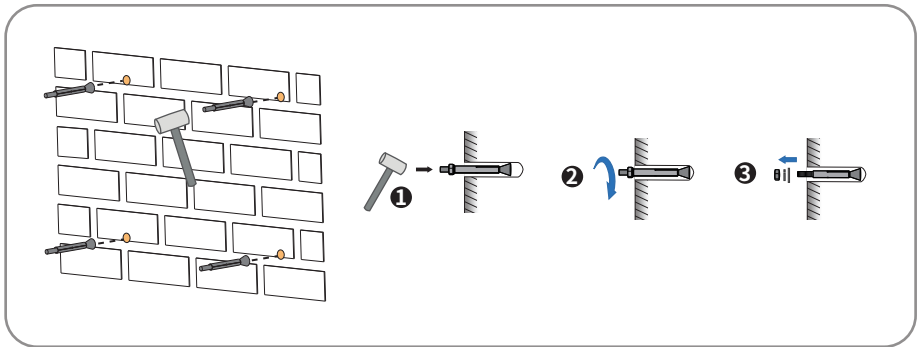
## CAUTION

### Danger of personal injury due to falling inverter.

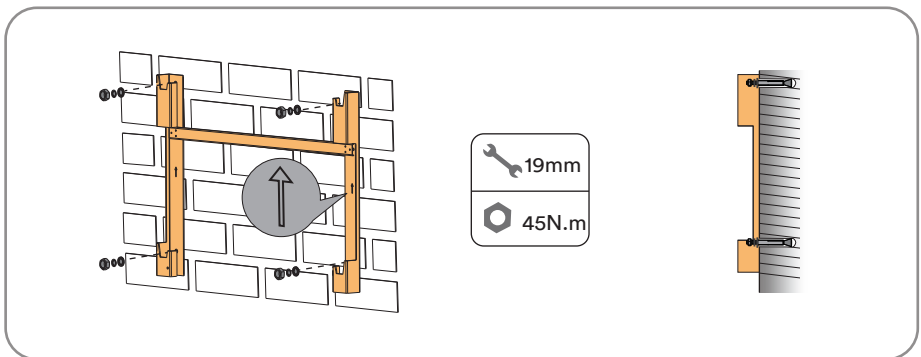
If the hole depth and distance are not correct, the inverter may fall off the wall.

- Before inserting into the wall, measure the depth and distance of the hole.

**Step 3:** Clean the dust in the hole, plug 4 expansion bolts into the hole, fix them with a rubber hammer, and tighten the nuts with a wrench, fix the bolt tail, and remove the nut, spring washer and flat washer and reserve them for the next step.

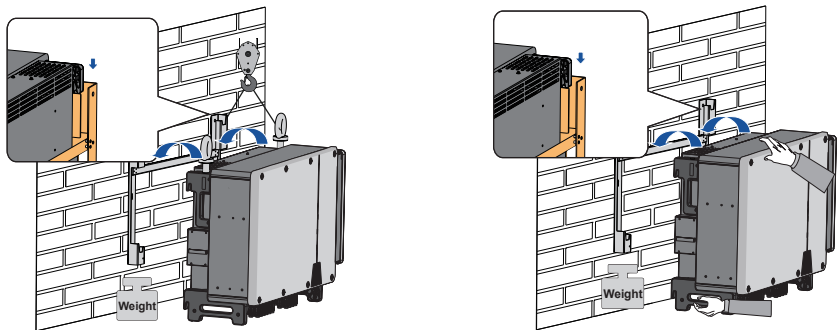


**Step 4:** Fix the mounting-bracket with the expansion bolts.



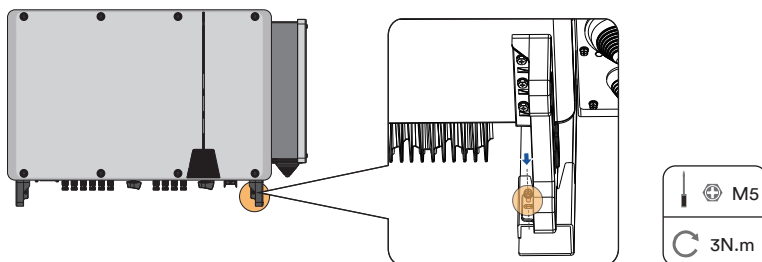
**Step 5:** Hoist the inverter to the installation position when necessary (refer to “5.5.2 Hoisting transport”). If the installation position is not too high, skip performing this step.

**Step 6:** Hang the inverter to the mounting-bracket and ensure that the mounting ears perfectly engage with the mounting-bracket.



Make sure that the four ears fit well with the groove.

**Step 7:** Fix the inverter with screws.



# 6

## Electrical connection

### 6.1 Overview of the connection area

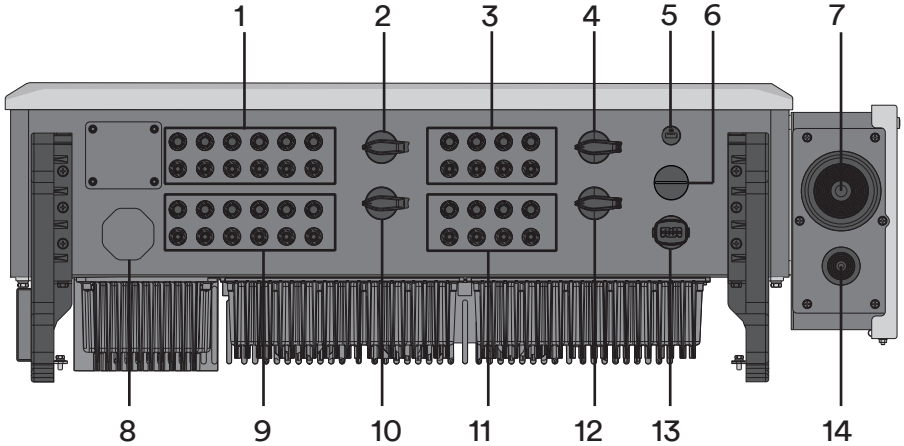


Figure shown here is for reference only. The actual product received may differ!

- |  |   |
|--|---|
| 1 DC connector inputs 1-6 (connected to DC switch 1)   | 8 Lock valve  |
| 2 DC switch 1  | 9 DC connector inputs 7-12 (Connected to DC switch 2)   |
| 3 DC connector inputs 13-16 (connected to DC switch 3) | 10 DC switch 2  |
| 4 DC switch 3  | 11 DC connector inputs 17-20 (Connected to DC switch 4) |
| 5 Ai-Dongle port                                       | 12 DC switch 4  |
| 6 Reserved terminal                                    | 13 RS485 Communication port                             |
| 7 AC cable - knockout seal                             | 14 Reserved grounding - knockout seal                   |

## 6.2 Connecting additional grounding

The inverter is equipped with a grounding conductor monitoring device. This grounding conductor monitoring device detects when there is no grounding conductor connected and disconnects the inverter from the utility grid if this is the case. Hence the product does not require an additional grounding or equipotential bonding when operating.

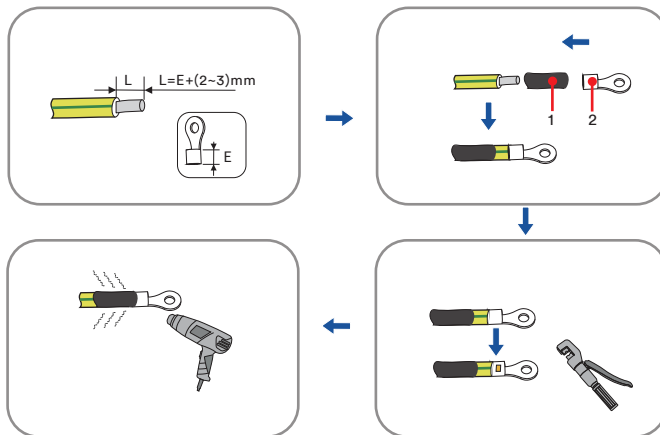
If the grounding conductor monitoring function is deactivate or the additional grounding is required locally standard, you can connect additional grounding to the inverter.

### Requirements for the secondary protection ground cable:

Item	Description	Note
1	Screw	Specifications M10, complimentary.
2	OT/DT terminal	Specifications M10, provided by the customer.
3	Yellow and green ground cable	The same as that of the PE wire in the AC cable.

### Procedure:

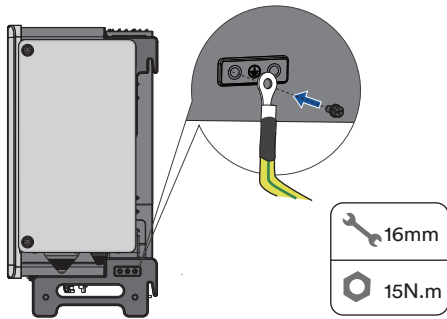
**Step 1:** Strip the grounding cable insulation. Insert the stripped part of the grounding cable into the ring terminal lug and crimp using a crimping tool.



1:Heat shrink tubing

2:OT/DT terminal (M10)

**Step 2:** Remove the screw on the ground terminal, insert the screw through the OT/DT terminal, and lock the terminal using a wrench.



**Step 3:** Apply paint to the grounding terminal to ensure corrosion resistance.



The grounding screws have been anchored to the side of the inverter before delivery, and do not need to be prepared.

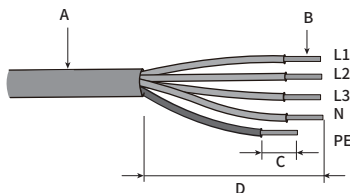
There are two grounding terminals. Use at least one of them to ground the inverter.

## 6.3 AC connection

### 6.3.1 Requirements for the AC connection

#### Cable Requirements

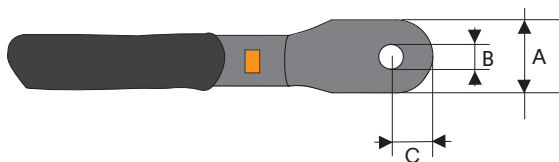
The cable must be dimensioned in accordance with the local and national directives for the dimensioning of cables. The requirements for the minimum wire size derive from these directives. Examples of factors influencing cable dimensioning are: nominal AC current, type of cable, routing method, cable bundling, ambient temperature and maximum desired line losses.



Item	Description	Value
A	External diameter	25...65 mm
B	Copper cable conductor cross-section	95...185mm <sup>2</sup>
	Aluminum cable conductor cross-section	120...240mm <sup>2</sup>
C	Insulation stripping length	Matching terminal
D	Sheath stripping length	260 mm

## Requirements for M12 OT/DT Terminal

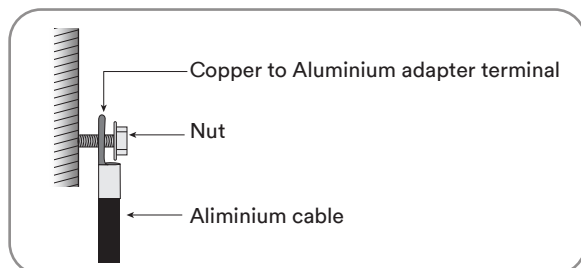
OT/DT terminals (not included in the delivery scope) are required for fixing AC cables to the terminal block. Purchase the OT/DT terminals according to the following requirements.



Item	Description
A	$a \leq 44\text{mm}$
B	$12.5\text{mm} \leq b \leq 15.5\text{mm}$
C	$c \leq 25\text{mm}$

## Aluminium Cable Requirements

If an aluminium cable is selected, use a copper to aluminium adapter terminal to avoid direct contact between the copper bar and the aluminium cable.





Ensure that the selected terminal can directly contact with the copper bar. If there are any problems, contact the manufacturer of terminal.

Direct contact between the copper bar and the aluminium cable will cause electrochemical corrosion and impair the reliability of electrical connection.

## Residual current protection

The product is equipped with an integrated universal current-sensitive residual current monitoring unit inside. Hence the product does not require an external residual-current device when operating.



If local regulations require the use of a residual-current device, please install a type A residual-current protection device with a protection limit of not less than 300mA.

## Overvoltage category

The inverter can be used in grids of overvoltage category III or lower in accordance with IEC 60664-1. That means that the product can be permanently connected to the grid-connection point of a building. In case of installations with long outdoor cable route, additional measures to reduce overvoltage category IV to overvoltage category III are required.

## AC circuit breaker

In PV systems with multiple inverters, protect each inverter with a separate circuit breaker. This will prevent residual voltage being present at the corresponding cable after disconnection.

No consumer load should be applied between AC circuit breaker and the inverter.

The selection of the AC circuit breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating, etc. Derating of

the AC circuit breaker rating may be necessary due to self-heating or if exposed to heat.

The maximum output current and the maximum output overcurrent protection of the inverters can be found in section 10 “Technical data”.

## Grounding conductor monitoring

The inverter is equipped with a grounding conductor monitoring device. This grounding conductor monitoring device detects when there is no grounding conductor connected and disconnects the inverter from the utility grid if this is the case. Depending on the installation site and grid configuration, it may be advisable to deactivate the grounding conductor monitoring. This is necessary, for example, in an IT system if there is no neutral conductor present and you intend to install the inverter between two line conductors. If you are uncertain about this, contact your grid operator or Solplanet.



Safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated.

In order to guarantee safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated, carry out the following measure:

- Connect an additional grounding that has at least the same cross-section as the connected grounding conductor to the AC cable. This prevents touch current in the event of the grounding conductor on the AC cable failing.



### 6.3.2 AC cable connection

#### **WARNING**

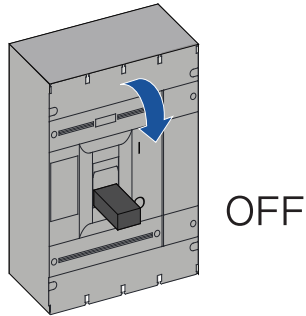
#### **Risk of injury due to electric shock by high leakage current.**

If the ground wire is disconnected touching, touch the product may result in death or lethal injuries due to the high leakage current.

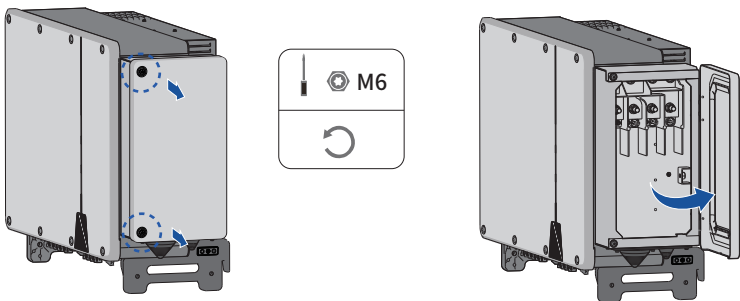
- The product must be reliably grounded in order to protect property and personal safety.

#### Procedure:

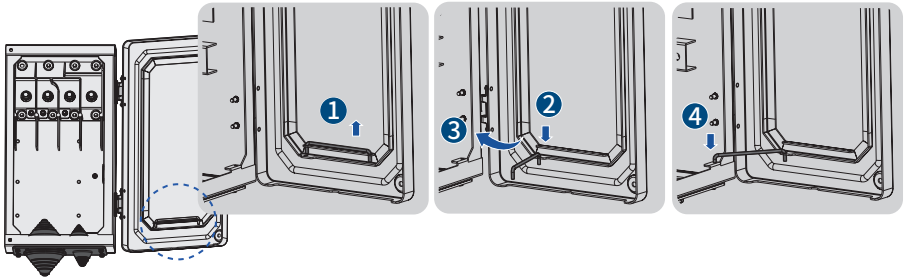
**Step 1:** Switch off the miniature circuit-breaker and secure it against being inadvertently switched back on.



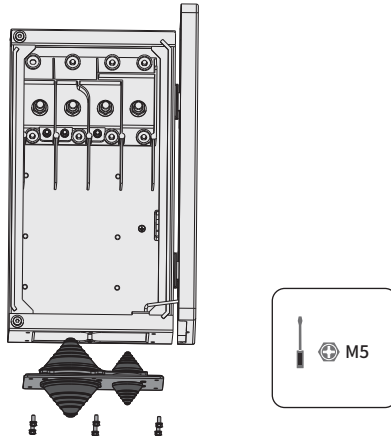
**Step 2:** Remove the two screws from the wiring compartment using a torx screwdriver and open the wiring compartment.



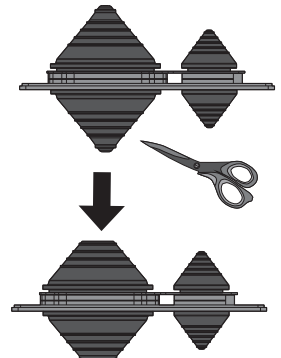
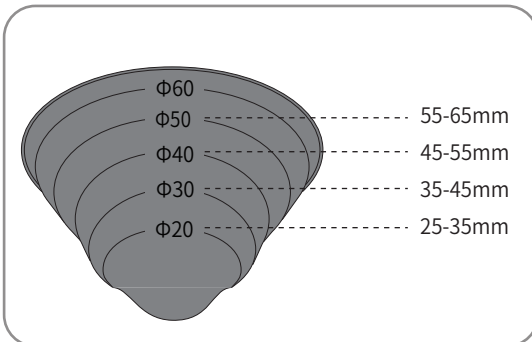
**Step 3:** Keep the wiring compartment opened during wiring through the limit lever attached to the cover.



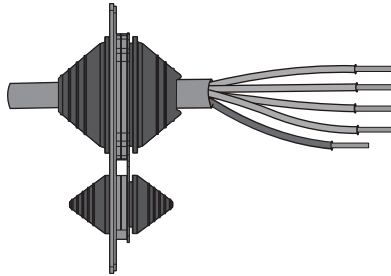
**Step 4:** Use a screwdriver to remove the waterproof ring at the bottom of the wiring compartment and store the removed screws properly.



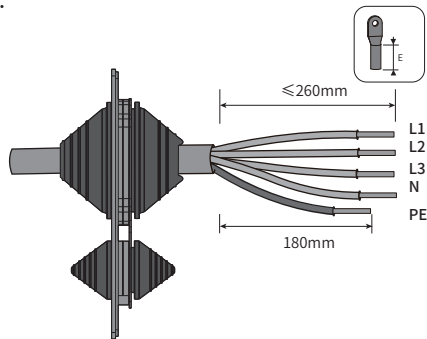
**Step 5:** Cut the appropriate hole in the tower guard coil according to the selected AC wire outer diameter specification.



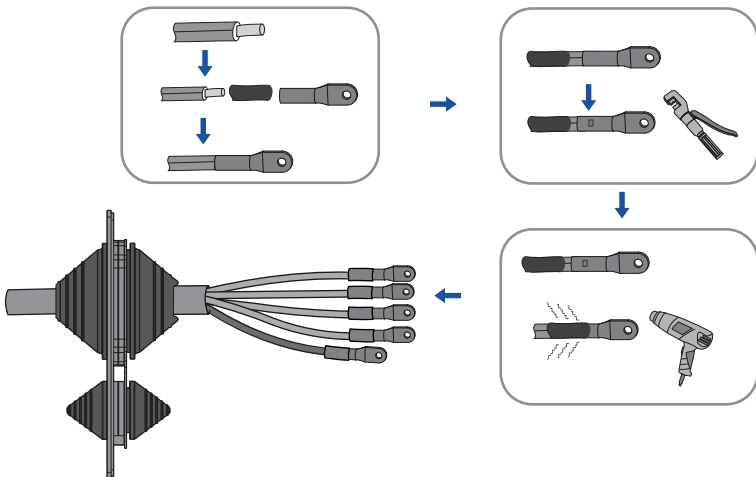
**Step 6:** Lead the cable with the protective layer stripped through the waterproof ring.



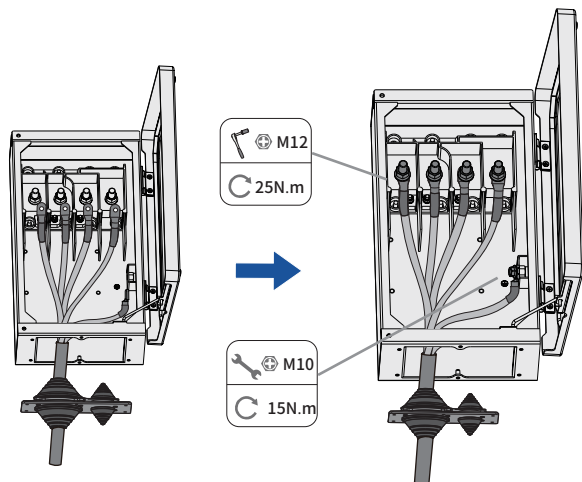
**Step 7:** Strip the protection layer and insulation layer by specific length, as described in the figure below.



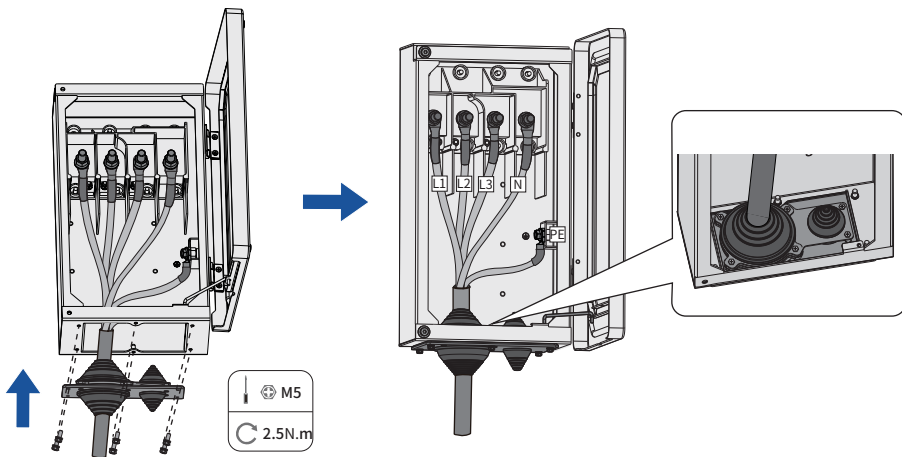
**Step 8:** Make the cable and crimp OT/DT terminal.



**Step 9:** Secure the wires to corresponding terminals.

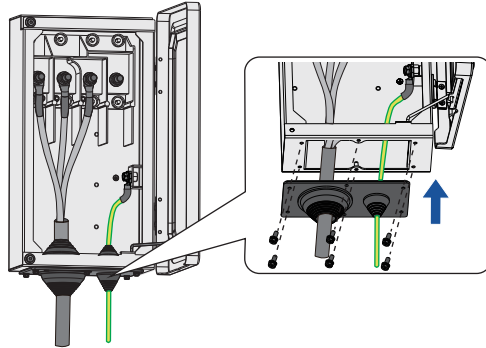


**Step 10:** Reinstall the waterproof ring.

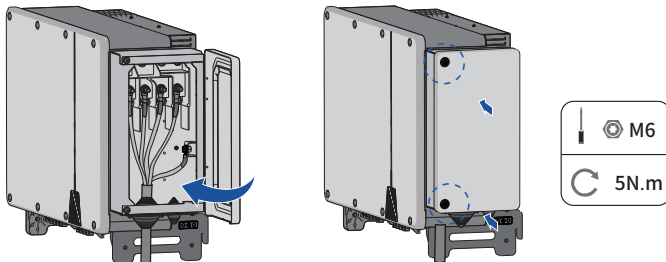




If the PE cable is an independent single-core cable, inserted into the cabinet through the reserved grounding port.



**Step 11:** Close the wiring compartment and tighten the two screws on the wiring compartment with a torx screwdriver.



## 6.4 DC connection

### 6.4.1 Requirements for the DC connection

#### Requirements for the PV modules per input:

- All PV modules should be of the same type.
- All PV modules should be aligned and tilted identically.
- On the coldest day based on statistical records, the open-circuit voltage of the PV array must never exceed the maximum input voltage of the inverter.
- The same number of series-connected PV modules must be connected to each string.
- The maximum input current per string must be maintained and must not exceed the through fault current of the DC connectors.
- The connection cables to the inverter must be equipped with the connectors included in the scope of delivery.
- The thresholds for the input voltage and the input current of the inverter must be adhered to.
- The positive connection cables of the PV modules must be equipped with the positive DC connectors. The negative connection cables of the PV modules must be equipped with the negative DC connectors.

### 6.4.2 Assembling the DC connectors



#### **DANGER**

#### **Danger to life due to electric shock when live components or DC cables are touched!**

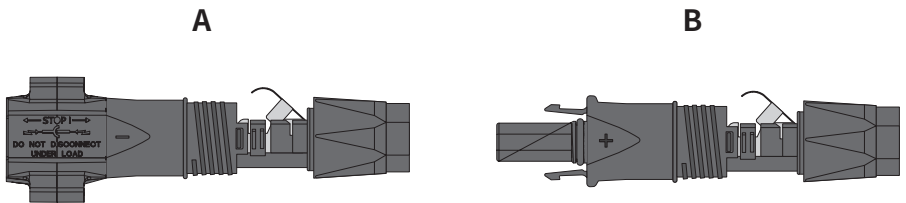
When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- Wear suitable personal protective equipment for all work on the product.

For connection to the inverter, all PV module connection cables must be fitted with the DC connectors provided. There may be two different type DC connector shipped randomly. Assemble the DC connectors as described in the following.

### Type 1 DC connector:

Assemble the DC connectors as described below. Be sure to observe the correct polarity. The DC connectors are marked with the symbols “+” and “-”.

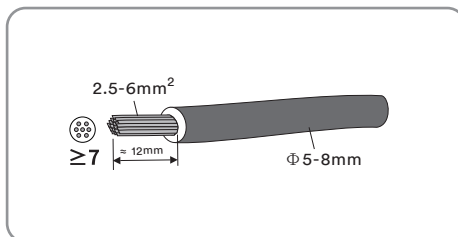


### Cable requirements:

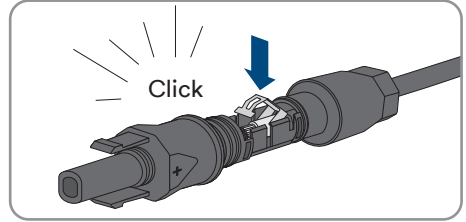
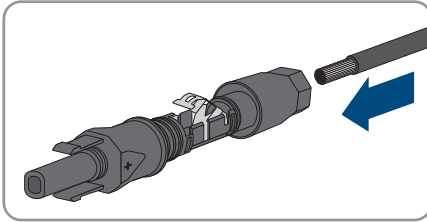
Item	Description	Value
1	Cable type	PV cable
2	External diameter	5-8 mm
3	Conductor cross-section	2.5-6 mm <sup>2</sup>
4	Number of copper wires	At least 7
5	The rated voltage	≥1100 v

### Procedure:

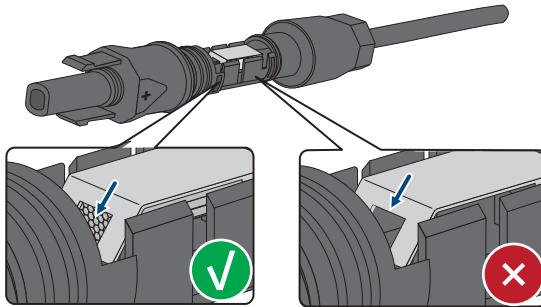
**Step 1:** Strip 12 mm off the cable insulation.



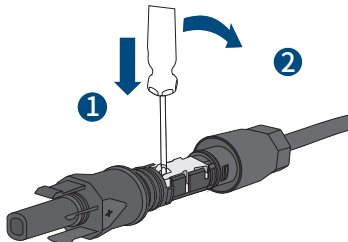
**Step 2:** Insert the stripped cable into the DC connector up to the stop. Press the clamping bracket down until it audibly snaps into place. The stranded wire can be seen inside the clamping bracket chamber.



If the stranded wire is not visible in the chamber, the cable is not correctly inserted and the connector must be reassembled. To do this, the cable must be removed from the connector.



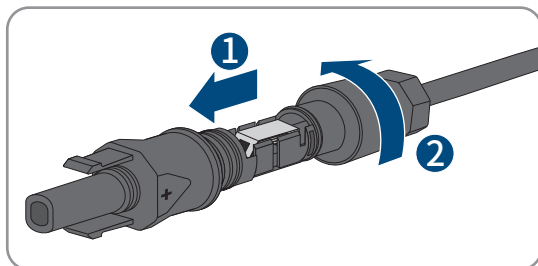
Release the clamping bracket. To do so, insert a screwdriver (blade width: 3.5 mm) into the clamping bracket and pry the clamping bracket open.



Remove the cable and go back to Step 2.



**Step 3:** Push the swivel nut up to the thread and tighten the swivel nut.(SW15, Torque: 2.0Nm).

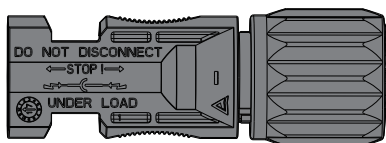


### Type 2 DC connector:

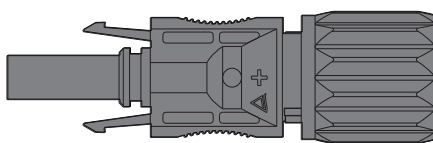
Assemble the DC connectors as described in the following.

Assemble the DC connectors as described below. Be sure to observe the correct polarity. The DC connectors are marked with the symbols “+” and “-”.

**A**



**B**

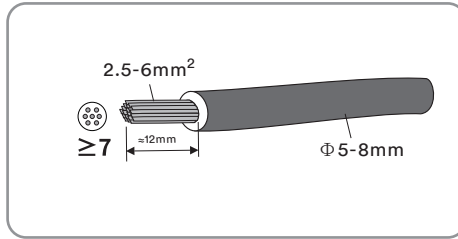


### Cable requirements:

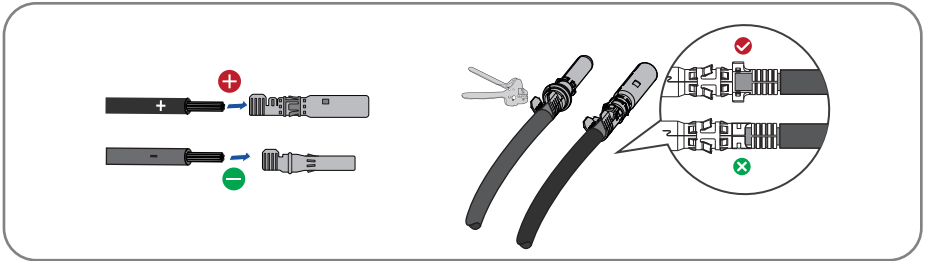
Item	Description	Value
1	Cable type	PV1-F, UL-ZKLA or USE2
2	External diameter	5-8 mm
3	Conductor cross-section	2.5-6 mm <sup>2</sup>
4	Number of copper wires	At least 7
5	The rated voltage	≥1100 v

Proceed as follows to assemble each DC connector.

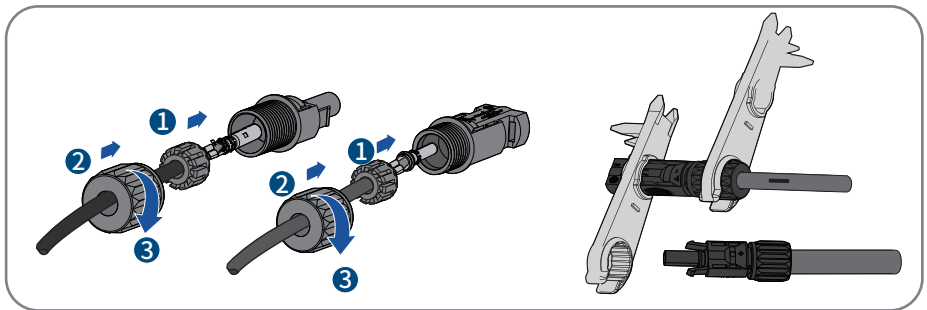
**Step 1:** Strip 12 mm off the cable insulation.



**Step 2:** Assemble the cable ends with the crimping pliers.



**Step 3:** Lead the cable through cable gland, and insert into the insulator until it snaps into place. Gently pull the cable backward to ensure firm connection. Tighten the cable gland and the insulator (Torque 2.5-3Nm).



**Step 4:** Ensure that the cable is correctly positioned.

### 6.4.3 Connecting the PV array



## **DANGER**

### **Danger to life due to high voltages in the inverter!**

When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.

- Before connecting the PV array, ensure that the DC switch is switched off and that it cannot be reactivated.
- Do not disconnect the DC connectors under load.

## **NOTICE**

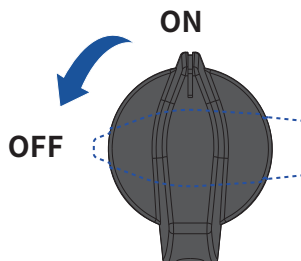
### **The inverter can be destroyed by overvoltage.**

If the voltage of the strings exceeds the maximum DC input voltage of the inverter, it can be destroyed due to overvoltage. All warranty claims become void.

- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system.

**Step 1:** Ensure that the individual miniature circuit-breaker is switched off and ensure that it cannot be accidentally reconnected.

**Step 2:** Ensure that the DC switch is switched off and ensure that it cannot be accidentally reconnected.



**Step 3:** Ensure that there is no ground fault in the PV array.

**Step 4:** Check whether the DC connector has the correct polarity.

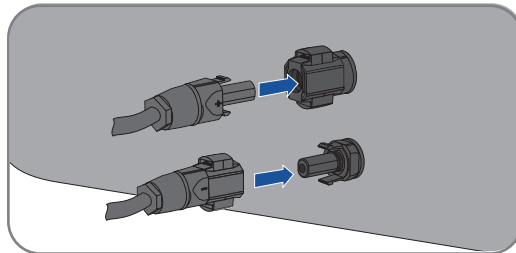
If the DC connector is equipped with a DC cable having the wrong polarity, the DC connector must be reassembled. The DC cable must always have the same polarity as the DC connector.

**Step 5:** Ensure that the open-circuit voltage of the PV array does not exceed the maximum DC input voltage of the inverter.

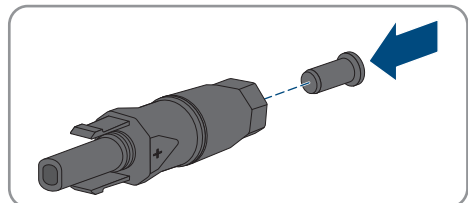
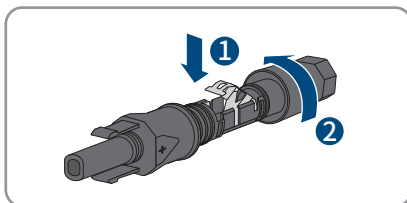
**Step 6:** Connect the assembled DC connectors to the inverter until they audibly snap into place.

### Type 1 DC connector:

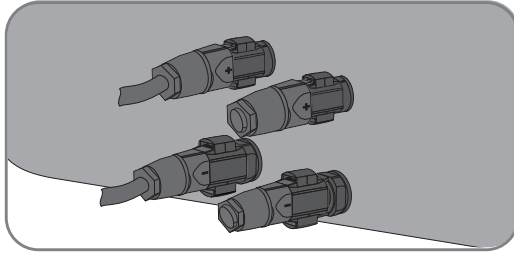
- Connect the assembled DC connectors to the inverter.



- For unused DC connectors, push down the clamping bracket and push the swivel nut up to the thread. Insert the DC connectors with sealing plugs into the corresponding DC inputs on the inverter.

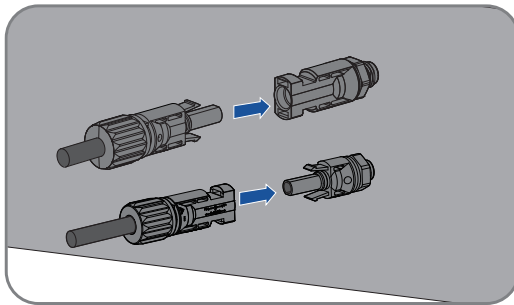


- Insert the DC connectors with sealing plugs into the corresponding DC inputs on the inverter.

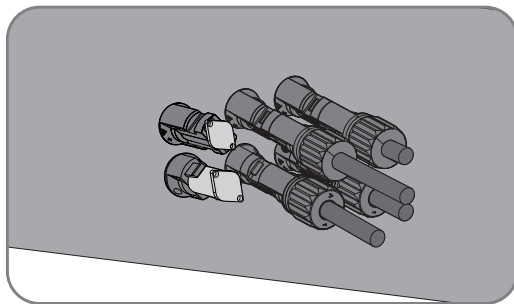


### Type 2 DC connector:

- Connect the assembled DC connectors to the inverter.

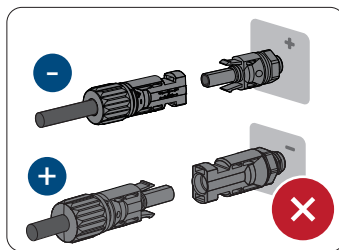
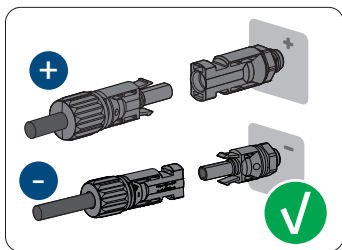


- Don't pull out dustproof caps from unused DC input connectors.





Check the positive and negative polarity of the PV strings, and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.(The graph uses the type 2 connector as an example only).



**Step 7:** Ensure that all DC connectors and the DC connectors with sealing plugs are securely in place.

## 6.5 RS485 cable connection

### NOTICE

#### Damage to the inverter due to electrostatic discharge.

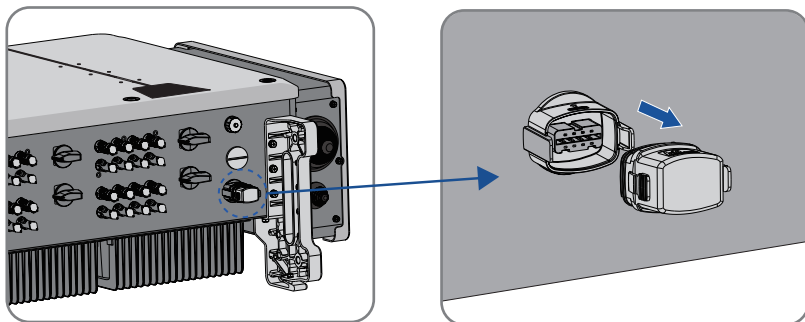
Internal components of the inverter can be irreparably damaged by electrostatic discharge

- Ground yourself before touching any component.

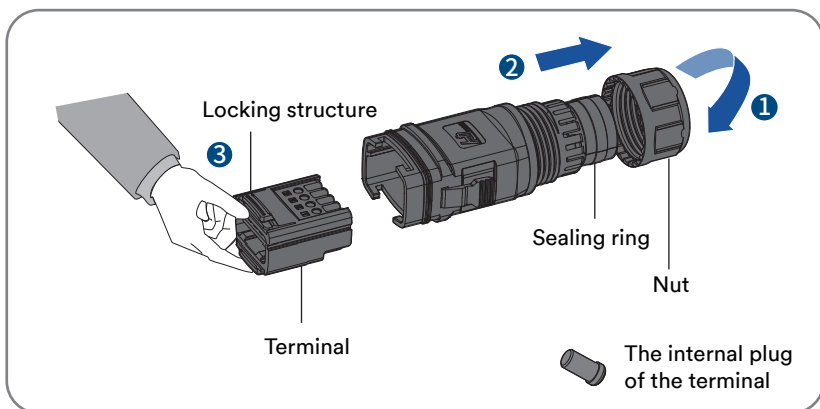
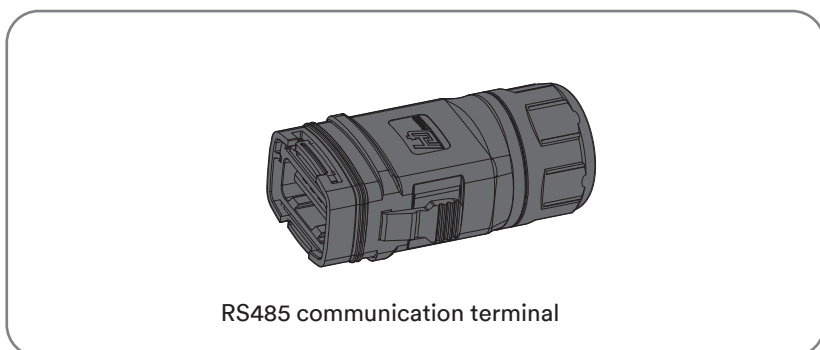
### 6.5.1 Connection Procedure

**Step 1:** Take out the cable fixing accessory from the package.

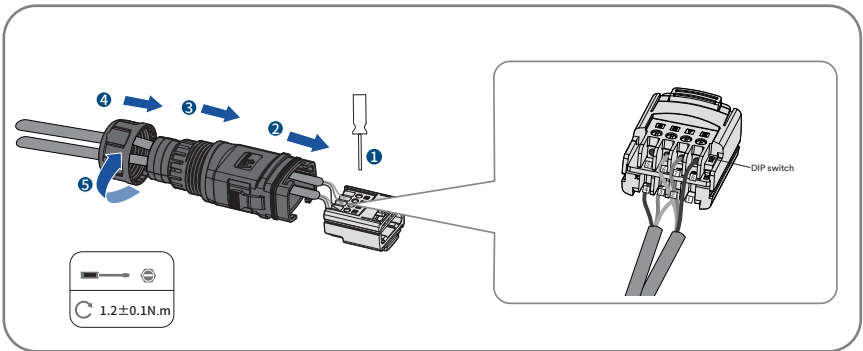
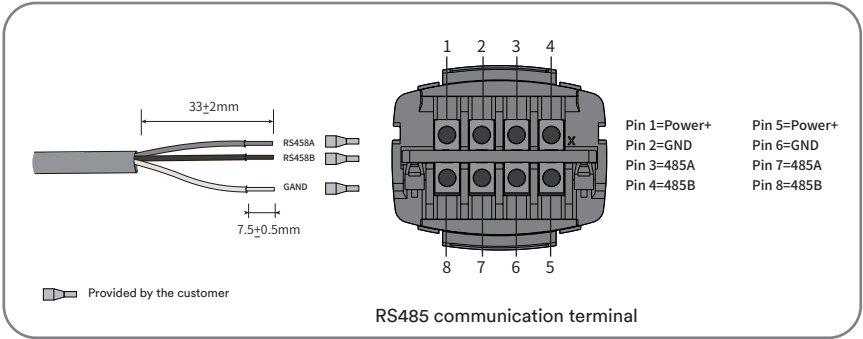
**Step 2:** Remove the dust and waterproof cover of the RS485 communication on the inverter and retain it.



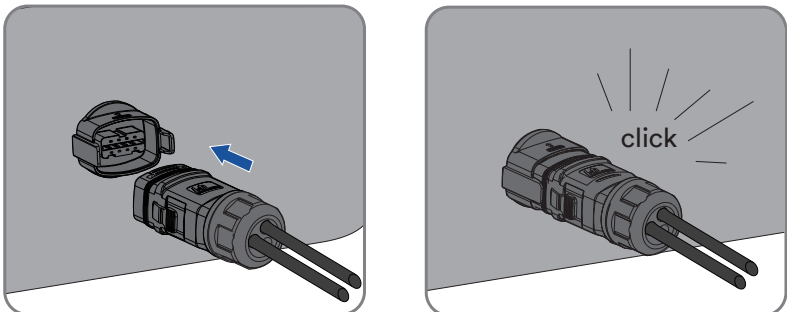
**Step 3:** Rotate the nut, take out the sealing ring, take out the plug, hold the locking structure, and take out the wiring terminal.



**Step 4:** Strip the protection layer and insulation layer by specific length. Lock the shielded twisted-pair communication cable to the wiring terminal according to the sequence shown in the following figure, insert the wiring terminal into the sealing head, adjust the communication cable, insert the sealing ring, and lock the nut.



**Step 5:** Insert the completed RS485 communication terminal plug into the port, until it audibly snaps into place and confirm it is installed firmly.



**Disassemble the network cable in reverse order.**

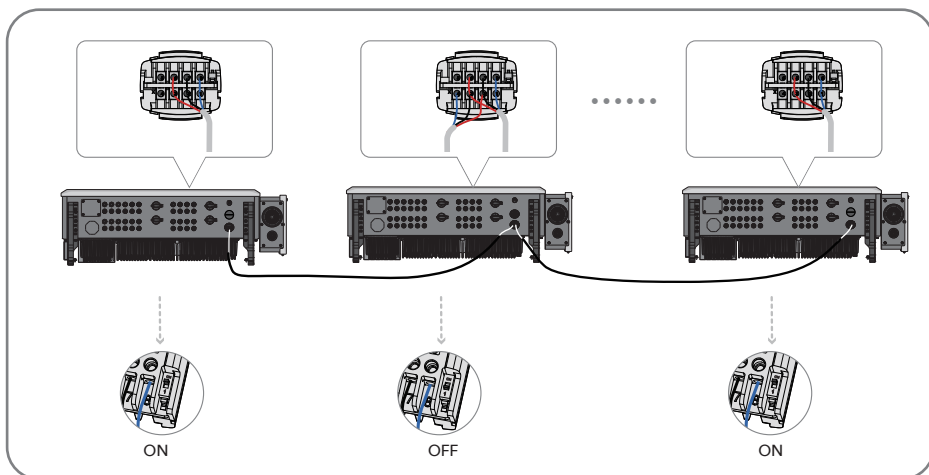


## 6.5.2 Multi-inverter connection

In case of multiple inverters, all the inverters can be connected via RS485 cables in a daisy chain configuration.

The inverter has an impedance matching function of the 485 communication bus. If the communication bus needs to match the impedance, turn the DIP switch to the ON position. If the communication bus does not need to match the impedance, turn the DIP switch to the OFF position.

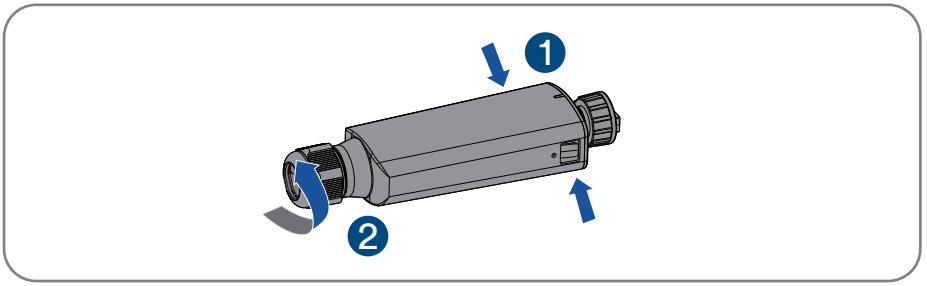
If multiple inverters are connected in a daisy chain communication configuration, the the DIP switch settings are as follows:



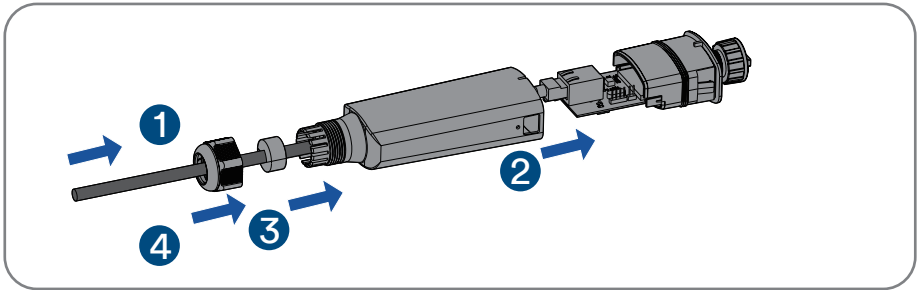
It is recommended to choose 3-core twisted wire to improve the anti-interference ability of RS485 communication. The ground wire of the 3-core twisted wire can be connected to terminal G.

## 6.6 Ai-Dongle connection

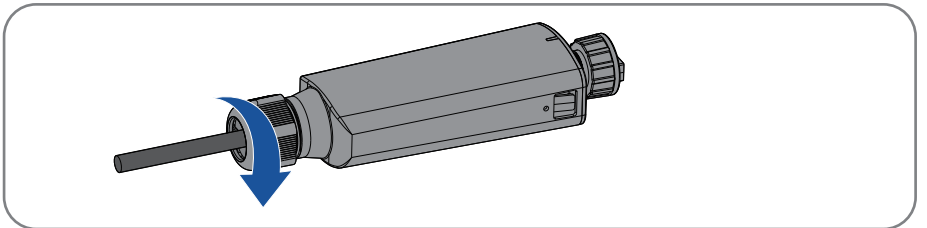
**Step 1:** Rotate the nut, take out the sealing ring, hold the locking structure, and take out the wiring terminal.



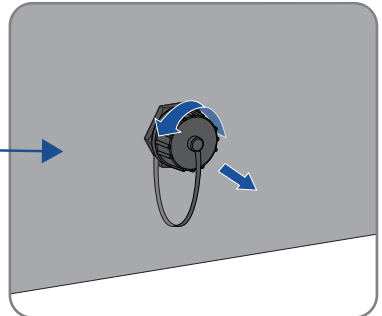
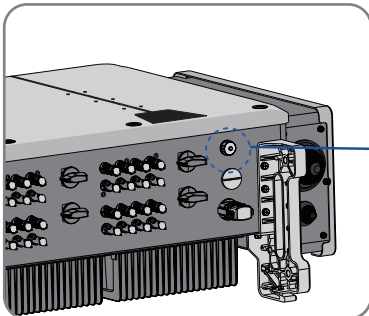
**Step 2:** Lock the communication cable to the wiring terminal according to the sequence shown in the following figure.



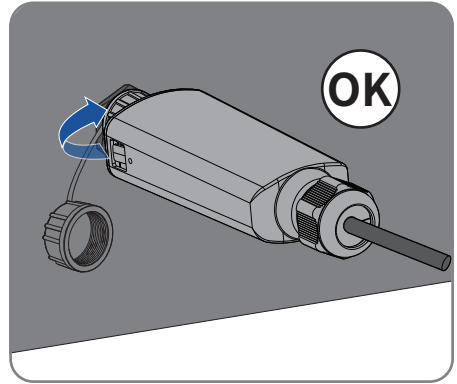
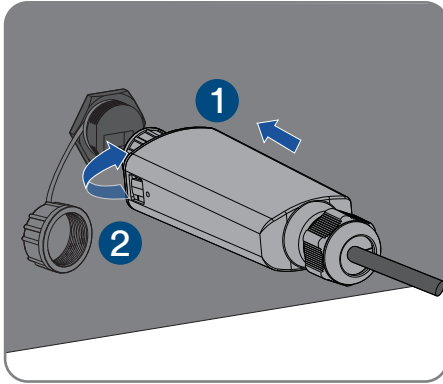
**Step 3:** Insert the wiring terminal into the sealing head, adjust the communication cable, insert the sealing ring, and lock nut.



**Step 4:** Remove the dust and waterproof cover of the Ai-Dongle on the inverter and retain it.



**Step 5:** Attach the Ai-Dongle to the connection port in place and tighten it into the port by hand with the nut in the modular. Make sure the modular is securely connected and the label on the modular can be seen.



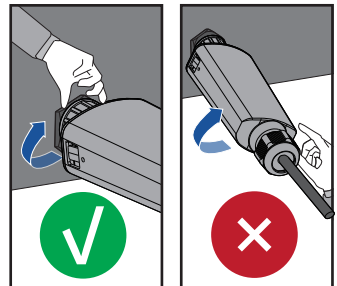
## NOTICE

### Rotating the communication modular will damage the communication modular!

The communication modular is protected by locking nuts to protect the reliability of the connection. If the body of the communication modular is rotated, the communication modular will be damaged.

It can only be locked by a nut.

- Do not rotate the communication modular body.



**Complete the installation.**

## 7.1 Inspection before commissioning



### CAUTION

#### Danger to life due to high voltages on DC conductors!

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC and AC conductors can lead to lethal electric shocks.

- Only touch the insulation of the DC cables.
- Only touch the insulation of the AC cables.
- Do not touch ungrounded PV modules and brackets.
- Wear personal protective equipment, such as insulating gloves.

Check the following items before starting the inverter:

Make sure the inverter DC switch and external circuit breaker are disconnected.

Make sure the inverter has been correctly mounted with wall bracket.

Make sure nothing is left on the top of the inverter.

Make sure the communication cable and AC connector have been correctly wired and tightened.

Make sure the inverter's exposed metal surface has a ground connection.

Make sure the DC voltage of the strings does not exceed the permitted limits of the inverter.

Make sure the DC voltage has the correct polarity.

Make sure that the insulation resistance to ground is greater than the insulation resistance protection value.

Make sure the grid voltage at the point of connection of the inverter complies with the permitted value of the inverter.

Make sure the AC circuit breaker complies with this manual and all applicable local standards.

## 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.

1. Turn the DC switch of the inverter to “ON” position.
2. Set initial protection parameters via the Solplanet App. For details, please refer to “8.4 Create a plant”.
3. Switch on the AC circuit breaker. If the irradiation and grid conditions meet requirements, the inverter will operate normally.
4. Observe the LED indicator to ensure that the inverter operates normally.

### 8.1 Brief introduction

The Solplanet App can establish communication connection to the inverter via the WLAN, there by achieving near-end maintenance on the inverter. Users can view inverter information and set parameters through the App.

### 8.2 Download and install

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



Android



iOS

### 8.3 Create an account

If you do not have an account, you need to register a new account first.

Procedure:

**Step 1:** Open Solplanet App to enter the login screen, and tap “Don’t have an account” to enter the next screen.

**Step 2:** The user groups “Business users” and “End user” need be selected according to your identity, and tap “Next step”.

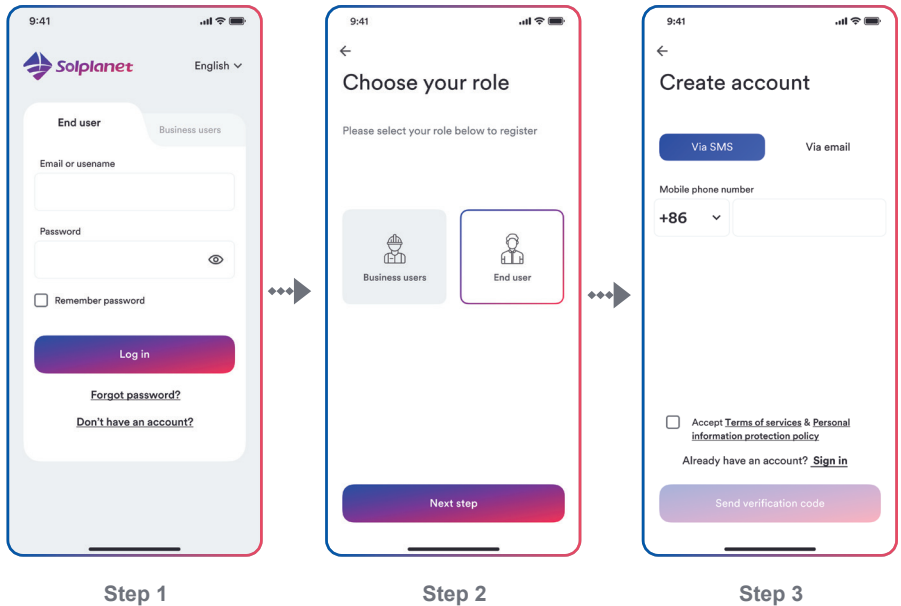


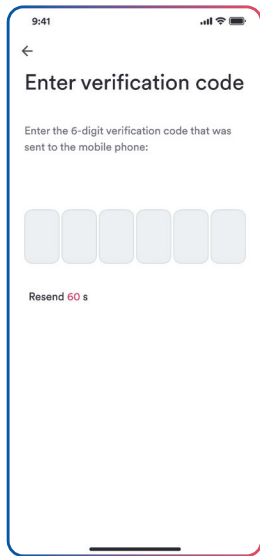
The end user and the business user have the different permissions for setting parameters. The end user only can set the parameter during commissioning. The business user has more permissions, but they need submit more identity authentication documents.

**Step 3:** Enter the right mobile phone number (Via SMS) or E-mail address (Via mail). And tap the “Send verification code”.

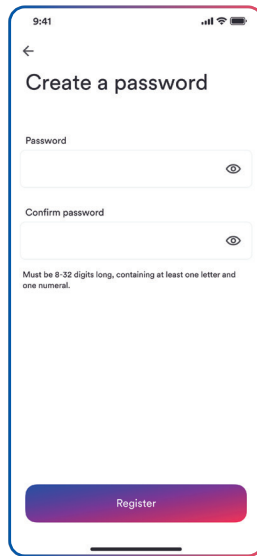
**Step 4:** Enter the correct verification code to automatically enter the next page.

**Step 5:** Set the password and click “Register” to complete the registration.





Step 4



Step 5

## 8.4 Create a plant

---

Procedure:

- Step 1:** Open Solplanet App to enter the login screen, enter the account name and password, and tap “Log in” to enter the next screen.
- Step 2:** Tap the symbol “+” to enter the next screen, and tap “Create or Modify Plant”, then the camera of the mobile automatically turns on, and scan the QR code of the Ai-Dongle to enter the next screen, tap “Create new plant” to the next screen.
- Step 3:** Enter the PV plant information in all fields marked with a red asterisk, and tap “Create” to enter the next screen.
- Step 4:** After the planet created, tap “Add dongle to the plant” , and tap “Add to plant” to the next screen.
- Step 5:** Tap “Connect to dongle access point” , the smart mobile will connect to Ai-Dongle hotspot automatically. The inverter list can be found after the connection successful.



**Step 6:** Tap the inverter serial number that matches your inverter, then the setting parameter can be set. The detail description can be found at section 8.5.



The grid code should be chosen at this step. And the parameters also should be set if the grid company has the different requirements.

**Step 7:** After the parameter configuration, tap the left arrow to go back the inverter list page. Then tap “Next step” to enter the next page.

**Step 8:** The parameter of the “Export Power Control” can be set, and tap “Save” after the parameter configuration. Then tap “Next step” to enter the next page.

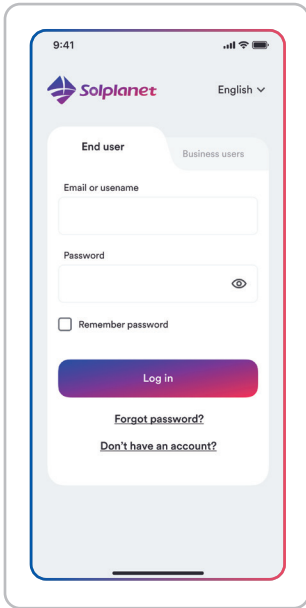


If “Export Power Control” don’t need be set, tap “Next step” directly to skip this step.

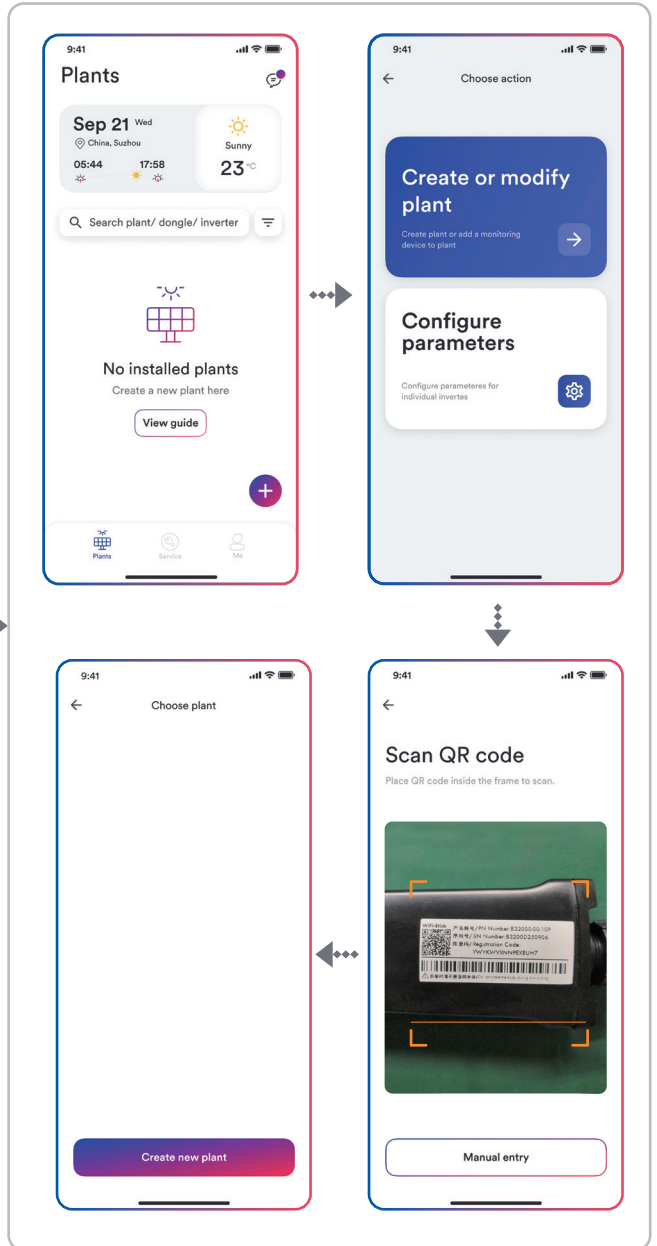
**Step 9:** Tap “Continue”, and choose WiFi network from the list, and enter WiFi network password. Then tap “Continue” to enter the next step.

**Step 10:** Observe whether the Led blue light of the dongle stays on. If it is always on, it means that the network configuration is successful, and you can tap "complete" to complete the configuration. Otherwise, you need to go back to the previous step and re-enter the WiFi password.

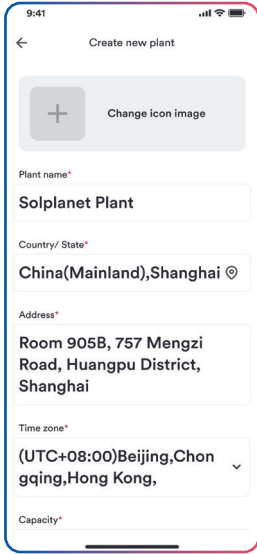
**Step 11:** Now the new plant have been created. Tap the plant to review the information of the plant.



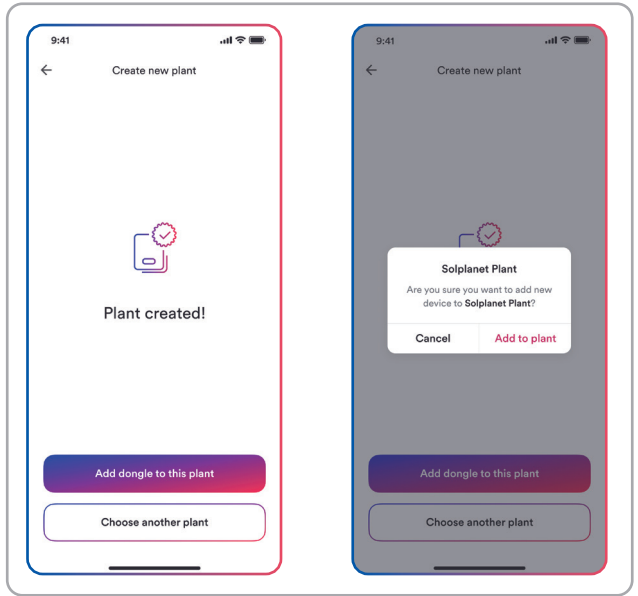
Step 1



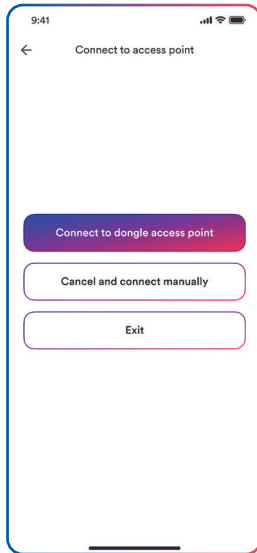
Step 2



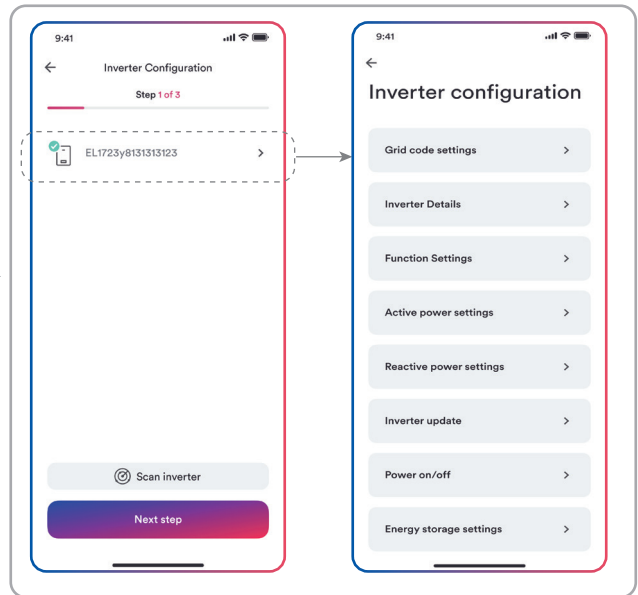
Step 3



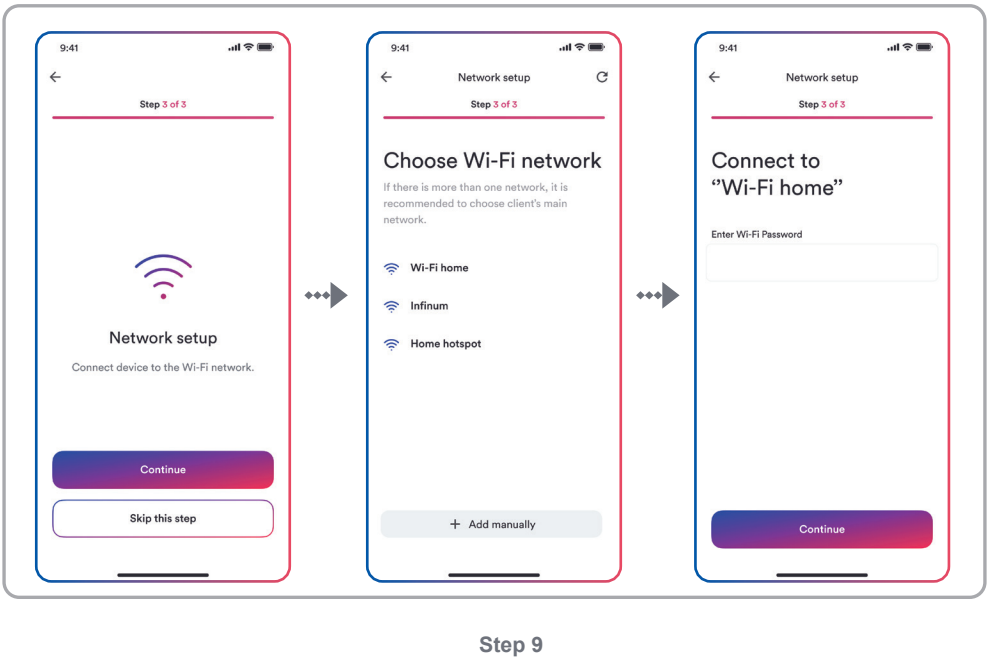
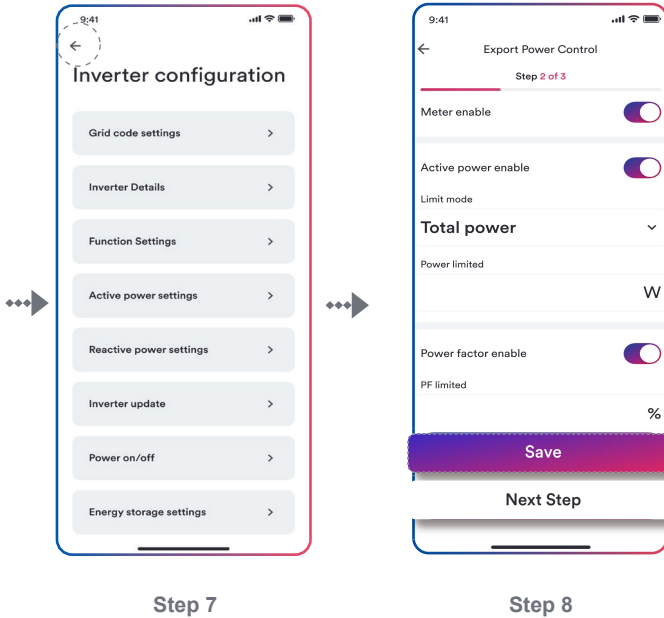
Step 4

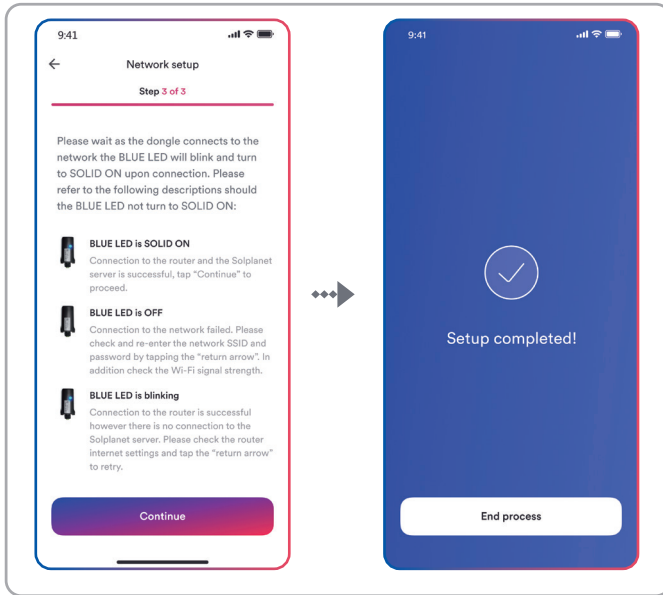


Step 5

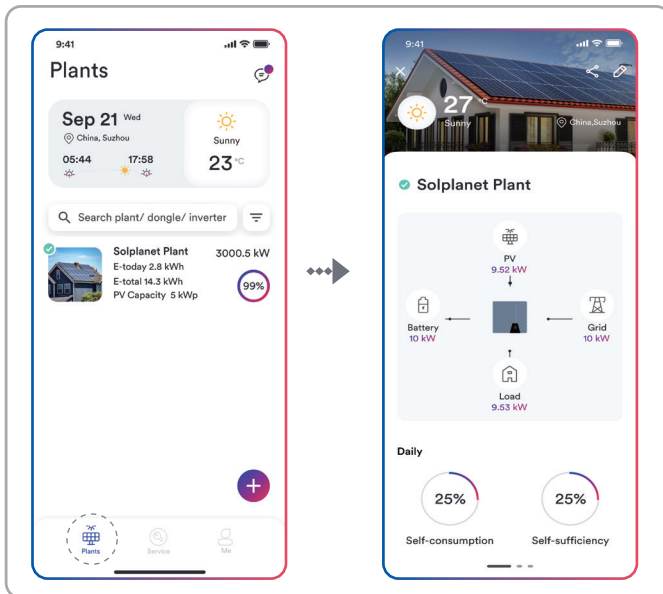


Step 6





### Step 10



### Step 11

## 8.5 Setting parameters

### 8.5.1 Inverter configuration

The Solplanet's products comply with local grid code when leaving the factory. But you still should check the grid code and the parameters according to the requirements of the installation site. Once configuration of the product is completed, the product will start operating automatically.

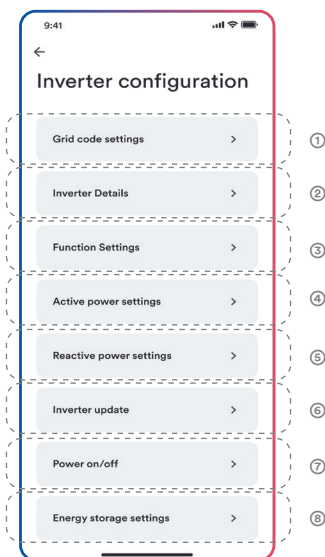


Table description

No.	Function	Description
①	Grid code settings	Choose a safety code. Configure the protection parameters. Configure the start operation parameters and automatic reconnection parameters.
②	Inverter Details	Show the general information of the inverter. Show the present operation value of the inverter.
③	Function settings	Active the general function. Active some special function.

④	Active power settings	Configure the parameters of the P(U) curve. Configure the parameters of the P(f) curve. Configure the parameters of the active power limited. Configure the parameters of the active power increasing and decreasing speed.
⑤	Reactive power settings	Choose the reactive power control mode. Configure the parameters of the Q (U) curve. Configure the parameters of the $\cos \varphi$ (P) curve. Configure the parameters of the fix Q value or fix $\cos \varphi$ value.
⑥	Inverter update	Update the firmware of the inverter and monitor device. Update the safety package.
⑦	Power on/off	Remote turn on/off the inverter on the App.
⑧	Energy storage settings	Configure the parameters of the Hybrid inverter. Configure the parameters of the battery.

## 8.5.2 Grid code settings



For the Australia market, the inverter cannot be connected to the grid before the safety related area is set. Please select from Australia Region A/B/C to comply with AS/NZS 4777.2:2020, and contact your local electricity grid operator on which Region to select.

Normally you only need choose the grid code from the support grid code list. The product has fully complied with the standards that are added in the list. If the local grid operator has the other requirement, you can set the parameter according to the requirement after you get the approval.

Procedure:

**Step 1:** Tap “Grid code setting” to enter to the next page.

**Step 2:** Swipe the smartphone screen to choose the right grid code, then tap “Save” and go back the previous page.



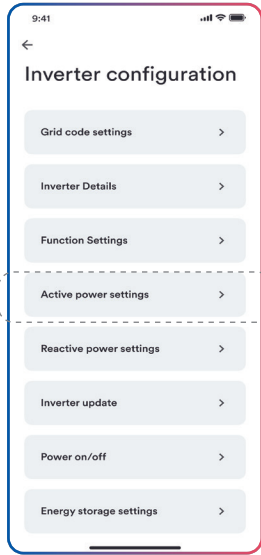
### 8.5.3 Active power reduction at overfrequency P(f)

There are four modes (Please refer to the following table) can be chosen for this function and many parameters can be configured according to the requirement of the local grid company.

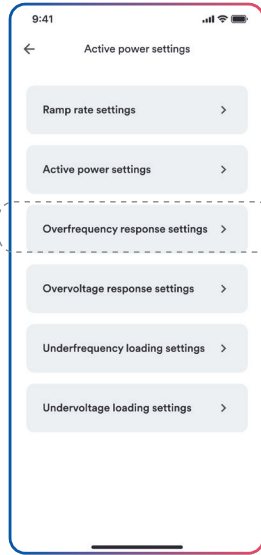
Procedure:

- Step 1:** Tap “Active power settings” to enter to the next page.
- Step 2:** Tap “Overfrequency response settings” to enter to the next page.
- Step 3:** Tap the drop-down menu to choose the mode of this function.
- Step 4:** Configure the parameters and tap “Save”.

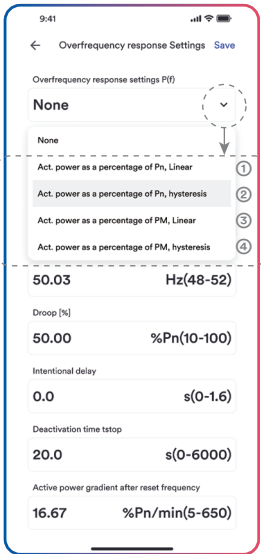




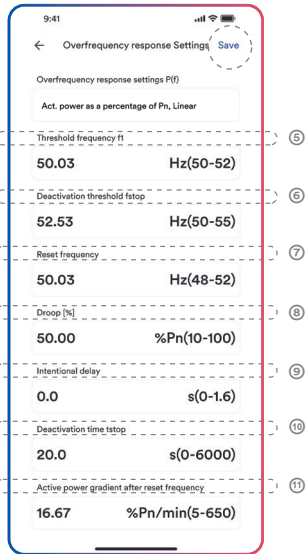
Step 1



Step 2



Step 3



Step 4

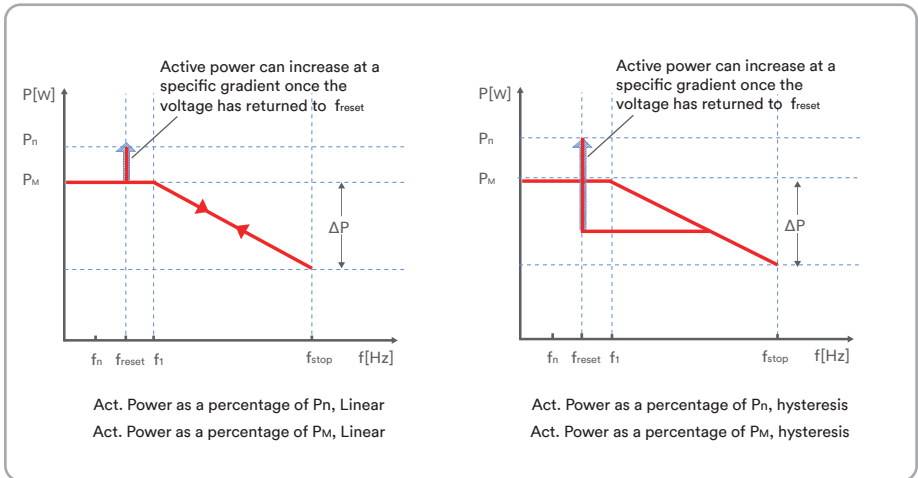


Table description

No.	Name	Description
①	Act. Power as a percentage of $P_n$ , Linear	Droop is defined as the active power as a percentage of $P_n$ . The active power will continuously move up and down the frequency characteristic curve in the frequency range of $f_1$ to $f_{stop}$ .
②	Act. Power as a percentage of $P_n$ , hysteresis	Droop is defined as the active power as a percentage of $P_n$ . The active power shall remain at or below the lowest power output level reached in response to the increase in frequency between $f_1$ to $f_{stop}$ .
③	Act. Power as a percentage of $P_M$ , Linear	Droop is defined as the active power as a percentage of $P_M$ . The active power will continuously move up and down the frequency characteristic curve in the frequency range of $f_1$ to $f_{stop}$ .
④	Act. Power as a percentage of $P_M$ , hysteresis	Droop is defined as the active power as a percentage of $P_M$ . The active power shall remain at or below the lowest power output level reached in response to the increase in frequency between $f_1$ to $f_{stop}$ .
⑤	Threshold frequency $f_1$	The threshold frequency for activating active power response to overfrequency.

⑥	Deactivation threshold $f_{stop}$	The threshold frequency for deactivating the active power response to overfrequency or disconnecting the inverter from the grid.
⑦	Reset frequency $f_{reset}$	The threshold frequency for deactivating the active power response to overfrequency after the frequency reducing.
⑧	Droop $\Delta P$	Reducing the active power in percentage of $P_n$ or $P_M$ when the frequency rise to $f_{stop}$ .
⑨	Intentional delay time	The delay time for activating active power response to overfrequency after the frequency over $f_1$ . An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2s.
⑩	Deactivation time $t_{stop}$	The delay time that the active power can increase after the frequency below $f_{reset}$ .
⑪	Active power gradient	The active power increasing gradient as a percent of $P_n$ per minutes after the frequency reducing to $f_{reset}$ .



Here, the Droop is different from the Droop S in section 3.7.2 of the standard EN 50549-1. If you want to configure the Droop S, the formula as below should be used to configure.

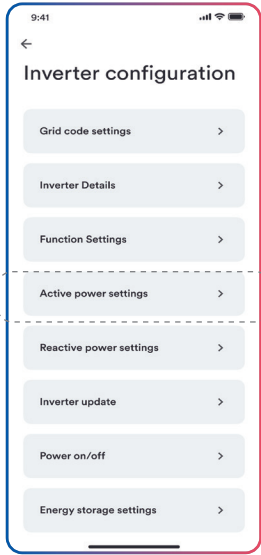
$$\Delta P = \frac{(f_{stop}-f_1)/f_n}{\text{Droop S}} \times 100$$

### 8.5.4 Active power reduction at overvoltage P(U)

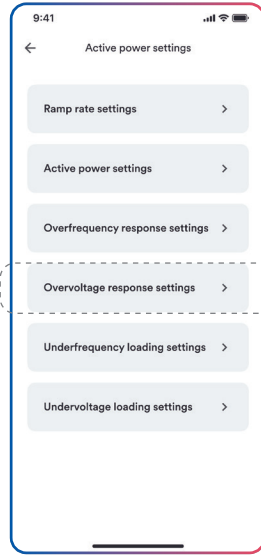
There are five modes(Please refer to the following table)can be chosen for this function and many parameters can be configured according to the requirement of the local grid company.

Procedure:

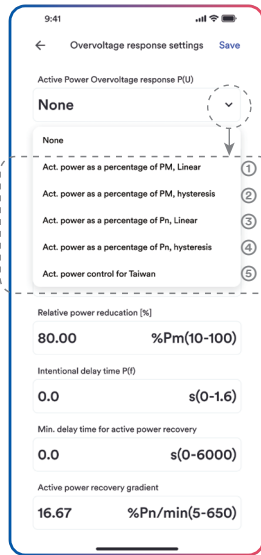
- Step 1:** Tap “Active power settings” to enter to the next page.
- Step 2:** Tap “Overvoltage response settings” to enter to the next page.
- Step 3:** Tap the drop-down menu to choose the mode of this function.
- Step 4:** Configure the parameters and tap “Save”.



Step 1



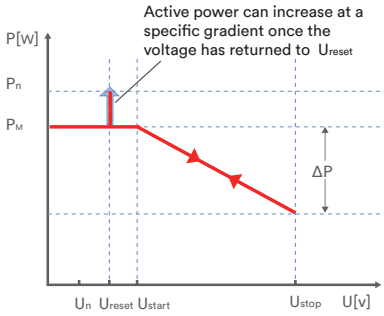
Step 2



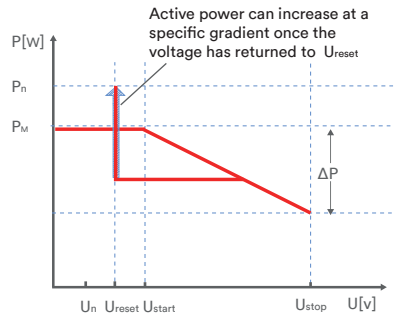
Step 3



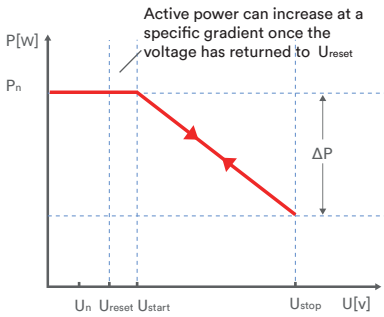
Step 4



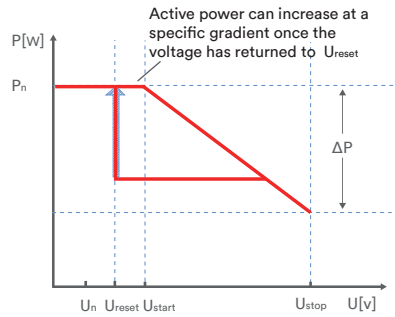
Act. Power as a percentage of  $P_M$ , Linear



Act. Power as a percentage of  $P_M$ , hysteresis



Act. Power as a percentage of  $P_n$ , Linear



Act. Power as a percentage of  $P_n$ , hysteresis

Table description

No.	Parameter	Description
①	Act. Power as a percentage of $P_M$ , Linear	<p>Droop is defined as the active power as a percentage of <math>P_M</math>.</p> <p>The active power will continuously move up and down the voltage characteristic curve in the voltage range of <math>U_{start}</math> to <math>U_{stop}</math>.</p> <p>The active power reduce from the <math>P_M</math> that is the instantaneous active power at the time of exceeding Start voltage <math>U_{start}</math>.</p>
②	Act. Power as a percentage of $P_M$ , hysteresis	<p>Droop is defined as the active power as a percentage of <math>P_M</math>.</p> <p>The active power shall remain at or below the lowest power output level reached in response to the increase in voltage between <math>U_{start}</math> to <math>U_{stop}</math>.</p> <p>The active power reduce from the <math>P_M</math> that is the instantaneous active power at the time of exceeding Start voltage <math>U_{start}</math>.</p>
③	Act. Power as a percentage of $P_N$ , Linear	<p>Droop is defined as the active power as a percentage of <math>P_N</math>.</p> <p>The active power will continuously move up and down the voltage characteristic curve in the voltage range of <math>U_{start}</math> to <math>U_{stop}</math>.</p> <p>The active power reduce from the rated active power <math>P_n</math> at all time. The active power maybe don't reduce if the limited value of the curve is lower than the instantaneous active power at the time of exceeding Start voltage <math>U_{start}</math>.</p>
④	Act. Power as a percentage of $P_N$ , hysteresis	<p>Droop is defined as the active power as a percentage of <math>P_N</math>.</p> <p>The active power shall remain at or below the lowest power output level reached in response to the increase in the voltage range of <math>U_{start}</math> to <math>U_{stop}</math>.</p> <p>The active power reduce from the rated active power <math>P_n</math> at all time. The active power maybe don't reduce if the limited value of the curve is lower than the instantaneous active power at the time of exceeding Start voltage <math>U_{start}</math>.</p>
⑤	Act. Power control for Taiwan	Special control mode for Chinese Taiwan market.
⑥	Start voltage $U_{start}$	The threshold voltage for activating active power response to overvoltage.

⑦	Stop voltage $U_{stop}$	The threshold voltage for deactivating the active power response to overvoltage or disconnecting the inverter from the grid.
⑧	Reset voltage $U_{reset}$	The threshold voltage for deactivating the active power response to overvoltage after the voltage reducing. Reset voltage does not work in the mode “Act. Power as a percentage of $P_N$ , Linear”.
⑨	Droop $\Delta P$	Reducing the active power in percentage of $P_N$ or $P_M$ when the voltage rise to $U_{stop}$ .
⑩	Intentional delay time	The delay time for activating active power response to overvoltage after the voltage over $U_{start}$ . An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2s.
⑪	Deactivation time $t_{stop}$	The delay time that the active power can increase after the voltage below $U_{reset}$ .
⑫	Active power gradient	The active power increasing gradient as a percent of $P_n$ per minutes after the frequency reducing to $f_{reset}$ .

### 8.5.5 $\cos\phi(P)$ curve configuration

The power related control mode  $\cos\phi(P)$  controls the  $\cos\phi$  of the output as a function of the active power output.

There are four coordinate points that can be configured. The coordinate points are the active power as a percentage of  $P_n$  and the displacement factor  $\cos\phi$ .

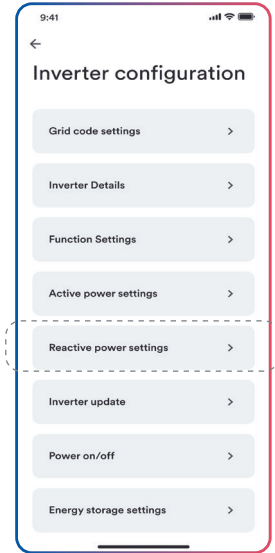
Procedure:

**Step 1:** Tap “Reactive power settings” to enter to the next page.

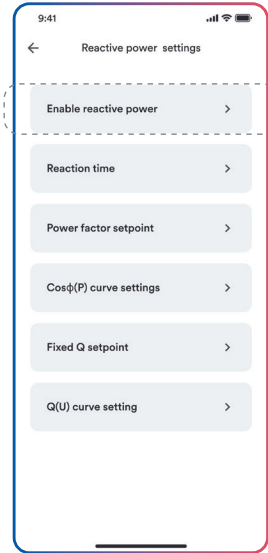
**Step 2:** Tap “Enable reactive power” to choose the reactive power control mode and tap the left arrow to go back.

**Step 3:** Tap “ $\cos\phi(P)$  curve settings” to enter to the next page.

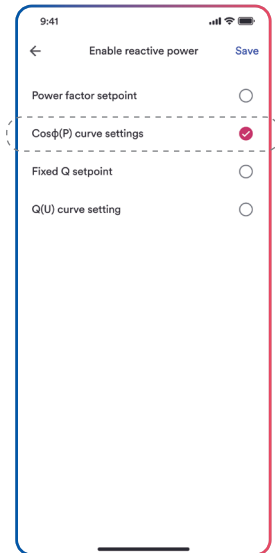
**Step 4:** Configure the parameters and tap “Save”.



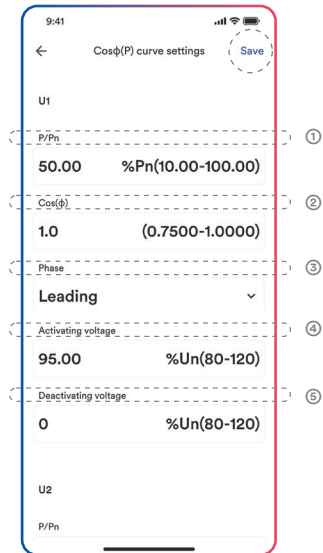
Step 1



Step 2



Step 3



Step 4



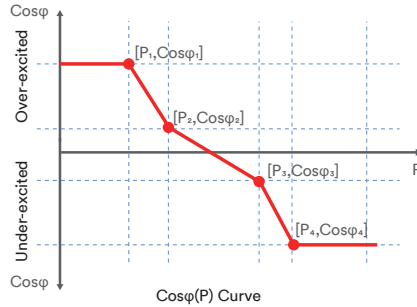


Table description

No.	Parameter	Description
①	P/P <sub>N</sub>	The active power as a percentage of P <sub>N</sub> .
②	Cosφ	The displacement factor that is cosine of the phase angle between the fundamental components of the line to neutral point voltage and the respective current.
③	Phase	Choose the over-excited or under-excited.
④	Activating voltage	The lock-in voltage value that enables the automatic reactive power delivery mode. Activation threshold as a percentage of U <sub>n</sub> corresponds to 'lock-in' voltage.
⑤	Deactivating voltage	The lock-out voltage value that disables the automatic reactive power delivery mode. Deactivation threshold as a percentage of U <sub>n</sub> corresponds to 'lock-out' voltage.



Some grid companies maybe requires two voltage thresholds as a percentage of U<sub>n</sub> to activate or deactivate the function. The voltage thresholds normally call 'lock-in' and 'lock-out' voltage.

## 8.5.6 Q(U) curve configuration

The voltage related control mode Q(U) controls the reactive power output as a function of the voltage.

There are four coordinate points that can be configured. The coordinate points are the voltage as a percentage of  $U_n$  and the reactive power as a percentage of  $P_n$ .

Procedure:

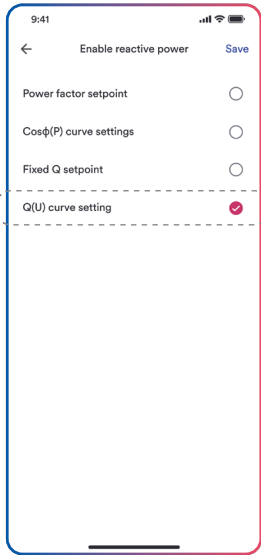
**Step 1:** Tap “Reactive power settings” to enter to the next page.

**Step 2:** Tap “Enable reactive power” to choose the reactive power control mode and tap the left arrow to go back.

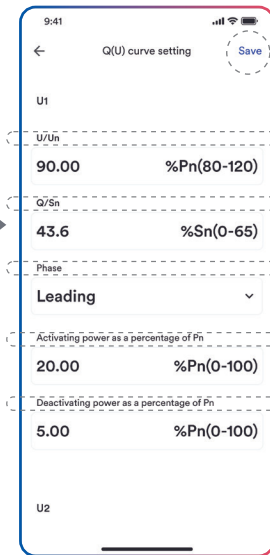
**Step 3:** Tap “Q(U) curve settings” to enter to the next page.

**Step 4:** Configure the parameters and tap “Save”.





Step 3



Step 4

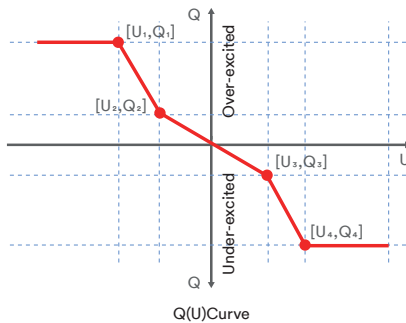


Table description

No.	Parameter	Description
①	$U/U_n$	The voltage as a percentage of $U_n$ .
②	$Q/P_n$	The reactive power as a percentage of $P_n$ .
③	Phase	Choose the over-excited or under-excited.
④	Activating power as a percentage of $P_n$	The lock-in active power value that enables the automatic reactive power delivery mode. Activation threshold as a percentage of $P_n$ corresponds to 'lock-in' power.
⑤	Deactivating power as a percentage of $P_n$	The lock-out active power value that disables the automatic reactive power delivery mode. Deactivation threshold as a percentage of $P_n$ corresponds to 'lock-out' power.



Some grid companies may require two active power thresholds as a percentage of  $P_n$  to activate or deactivate the function. The active power thresholds normally call 'lock-in' and 'lock-out' active power.

## 9.1 Disconnecting the inverter from voltage sources

Prior to performing any work on the product, always disconnect it from all voltage sources as described in this section. Always adhere to the prescribed sequence.



### **WARNING**

#### **Danger to life due to electric shock from destruction of the measuring device due to overvoltage.**

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

- Only use measuring devices with a DC input voltage range of 1100 V or higher.

#### Procedure:

**Step 1:** Disconnect the miniature circuit breaker and secure against reconnection.

**Step 2:** Disconnect the DC switch and secure against reconnection.

**Step 3:** Wait until the LEDs have gone out.

**Step 4:** Use a current clamp meter to ensure that no current is present in the DC cables.



## **DANGER**

**Danger to life due to electric shock when touching exposed DC conductors or DC plug contacts if the DC connectors are damaged or loose!**

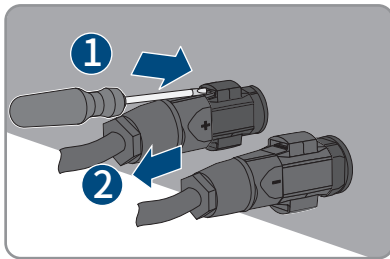
The DC connectors can break or become damaged, become free of the DC cables, or no longer be connected correctly if the DC connectors are released and disconnected incorrectly. This can result in the DC conductors or DC plug contacts being exposed. Touching live DC conductors or DC plug connectors will result in death or serious injury due to electric shock.

- Wear insulated gloves and use insulated tools when working on the DC connectors.
- Ensure that the DC connectors are in perfect condition and that none of the DC conductors or DC plug contacts are exposed.
- Carefully release and remove the DC connectors as described in the following.

**Step 5:** Loosen and remove the DC connector.

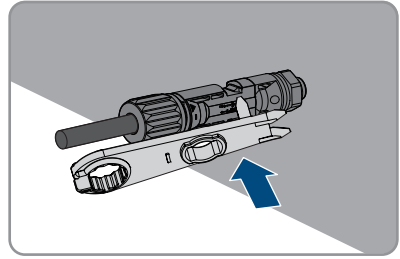
### Type 1 DC connector

Release and remove the DC connectors.  
To do so, insert a flat-blade screwdriver or an angled screwdriver (blade width: 3.5 mm) into one of the side slots and pull the DC connectors out.

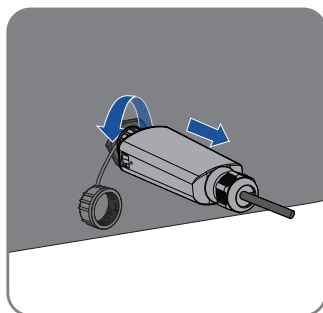
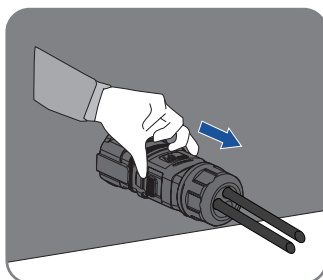


### Type 2 DC connector

To remove DC plug connectors, insert a wrench tool into the slots and press the wrench tool with an appropriate force.



- Step 6:** Ensure that no voltage is present between the positive terminal and negative terminal at the DC inputs using a suitable measuring device.
- Step 7:** Open the AC junction box and use a multimeter to ensure that the AC wiring terminals are not powered on. Remove the AC cables in reverse order by referring to 6.3.2 AC Wiring Procedure.
- Step 8:** Hold down the buckle on the side of the RS485 terminal and pull out the RS485 terminal.
- Step 9:** Hold down the buckle on the side of the Ai-Dongle and pull out the Ai-Dongle terminal.



## 9.2 Dismantling the inverter

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After disconnecting all electrical connections as described in Section 9.1, the inverter can be removed as follows.

**Procedure:**

**Step 1:** Dismantle the inverter referring to “5.3 Mounting” in reverse steps.

**Step 2:** If necessary, remove the wall-mounting bracket from the wall.

**Step 3:** If the inverter will be reinstalled in the future, please refer to “3.2 Inverter Storage” for a proper conservation.



## 10

## Technical data

## 10.1 AC/DC

## 10.1.1 ASW75K-LT/ASW80K-LT

DC Input		
Type	ASW75K-LT	ASW80K-LT
Maximum power of PV array	112500 Wp	120000 Wp
Maximum input voltage	1100 V	
MPP voltage range	200-1000 V	
MPP voltage range at P <sub>nom</sub>	460-850 V	
Rated input voltage	630 V	
Minimum input voltage	200 V	
Initial input voltage	250 V	
Max. input current	32 A	
I <sub>sc</sub> PV (absolute maximum)	48 A	
Maximum reverse current into the PV modules	0 A	
Number of independent MPP inputs	8	8
Strings per MPP input	2	
Overvoltage category in accordance with ICE 60664-1	II	

## AC output

Rated power at 230V	75000 W	80000 W
Rated apparent power at $\cos \varphi = 1$	75000 W	88000 W
Maximum apparent power at $\cos \varphi = 1$	75000 VA	88000 VA
Nominal grid voltage	220 V / 380 V [3/N/PE] 230 V / 400 V [3/N/PE] 240 V / 415 V [3/N/PE]	
Grid voltage range	312-528 V(Phase to Phase)	
Nominal grid frequency	50 Hz/60 Hz	
Grid frequency range	45-55 Hz/55-65 Hz	
Rated current at 220 V	113.7 A	121.3 A
Rated current at 230V	108.7 A	116.0 A
Rated current at 240V	104.2 A	111.2 A
Maximum output current	114 A	127 A
Inrush current	<20% of nominal AC current for a maximum of 10ms	
Contribution to peak short-circuit current $i_p$	330 A	
Initial short-circuit alternating current ( $I_{k''}$ first single period effective value)	114 A	127 A
Short circuit current continuous [ms] (max output fault current)	114 A	127 A
Recommended rated current of AC circuit breaker	125 A	160 A

Total harmonic distortion of the output current with total harmonic distortion of the AC voltage <2%, and AC power >50% of the rated power	<3%
Power factor at rated power	1
Adjustable displacement power factor	0.8 inductive.... 0.8 capacitive
Feed-in phase	3
Connection phase	3
Overvoltage category in accordance with IEC 60664-1	III
<b>Efficiency</b>	
Maximum efficiency	98.6%
European weighted efficiency	98.1%

- (1) The voltage range meets the requirements of the corresponding national grid code.
- (2) The frequency range meets the requirements of the corresponding national grid code.

## 10.1.2 ASW100K-LT/ASW110K-LT

DC Input		
Type	ASW100K-LT	ASW110K-LT
Maximum power of PV array	150000 W <sub>p</sub>	165000 W <sub>p</sub>
Maximum input voltage	1100 V	
MPP voltage range	200-1000 V	
MPP voltage range at P <sub>nom</sub>	460-850 V	
Rated input voltage	630 V	
Minimum input voltage	200 V	
Initial input voltage	250 V	
Max. input current	32 A	
Isc PV (absolute maximum)	48 A	
Maximum reverse current into the PV modules	0 A	
Number of independent MPP inputs	10	10
Strings per MPP input	2	
Overvoltage category in accordance with ICE 60664-1	II	

## AC output

Rated power at 230V	100000 W	110000 W
Rated apparent power at $\cos\varphi = 1$	110000 W	121000 W
Maximum apparent power at $\cos\varphi = 1$	110000 VA	121000 VA
Nominal grid voltage	220 V / 380 V [3/N/PE] 230 V / 400 V [3/N/PE] 240 V / 415 V [3/N/PE]	
Grid voltage range	312-528 V	
Nominal grid frequency	50 Hz/60 Hz	
Grid frequency range	45-55 Hz/55-65 Hz	
Rated current at 220 V	151.6 A	166.7 A
Rated current at 230V	145.0 A	159.5 A
Rated current at 240V	138.9 A	152.8 A
Maximum output current	158.8 A	174.7 A
Inrush current	<20% of nominal AC current for a maximum of 10ms	
Contribution to peak short-circuit current $i_p$	330 A	
Initial short-circuit alternating current ( $I_{k1}$ first single period effective value)	158.8 A	174.7 A
Short circuit current continuous [ms] (max output fault current)	158.8 A	174.7 A
Recommended rated current of AC circuit breaker	160 A	200 A

Total harmonic distortion of the output current with total harmonic distortion of the AC voltage <2%, and AC power >50% of the rated power	<3%
Power factor at rated power	1
Adjustable displacement power factor	0.8 inductive.... 0.8 capacitive
Feed-in phase	3
Connection phase	3
Overvoltage category in accordance with IEC 60664-1	III
<b>Efficiency</b>	
Maximum efficiency	98.6%
European weighted efficiency	98.1%

- (1) The voltage range meets the requirements of the corresponding national grid code.
- (2) The frequency range meets the requirements of the corresponding national grid code.

## 10.2 General data

General data	ASW75K/80K/100K/110K-LT
Width × height × depth	984 mm × 640 mm × 330 mm
Weight	85 Kg
Topology	Non-isolated
Operating temperature range	-25°C...+60°C
Allowable relative humidity range (non-condensing)	0% ... 100%
Degree of protection for electronics in accordance with IEC 60529	IP66
Climatic category in accordance with IEC 60721 -3-4	4K4H
Protection class (according to IEC 62103)	I
Pollution degree outside the enclosure	3
Pollution degree inside the enclosure	2
Maximum operating altitude above mean sea level	4000m(>3000m derating)
Self-consumption (night)	<3 W
Cooling method	Active cooling
Typical noise emission	< 65 dB(A)@1m
Display	LED indicator, App

Demand response mode in accordance with AS/NZS 4777.2	DRM0
Export active power output	Via connecting Smart meter
Earth Fault Alarm	Audible (AU)
Interfaces	2 x RS485 port, 1 x Ai-Dongle port
Communication	Modbus RTU
Mounting information	Wall mounting bracket
DC connection technology	Phenix contact
AC connection technology	Terminal block
Radio technology	WLAN 802.11 b/g/n
Radio spectrum	2.4 GHz
Maximum transmission power	100 mW



### 10.3 Protective device

Protective devices	ASW75K/80K/100K/110K-LT
DC reverse polarity protection	Integrated
DC isolator	Integrated
Ground fault monitoring	Integrated
AC short- circuit current capability	Integrated
All-pole sensitive residual-current monitoring unit	Integrated
Active anti-islanding protection	Integrated
PV string current monitoring	Integrated
DC current injection monitoring	Integrated
Low voltage ride through	Integrated
High voltage ride through	Integrated
Oversvoltage protection	DC Type II / AC Type III

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If an error occurs, the red LED will light up. The error code can be found on APP.

Error code	Message	Corrective measures
1-5 8-10	Self-diagnosis fault	<ul style="list-style-type: none"> <li>● Disconnect the inverter from the utility grid and the PV array and reconnect it after LED turn off. If this fault is still being displayed, contact the service.</li> </ul>
6	Bus over voltage fault	<ul style="list-style-type: none"> <li>● Check the open-circuit voltages of the strings and make sure it is below the maximum DC input voltage of the inverter.</li> <li>● If the input voltage is within the permitted range and the fault still occurs, it might be that the internal circuit has broken. Contact the service.</li> </ul>
32	RoCoF fault	<ul style="list-style-type: none"> <li>● Check the grid frequency and observe how often major fluctuations occur. If this fault is caused by frequent fluctuations, try to modify the operating parameters after informing the grid operator first.</li> </ul>
33	Grid frequency fault	<ul style="list-style-type: none"> <li>● Check the grid frequency and observe how often major fluctuations occur. If this fault is caused by frequent fluctuations, try to modify the operating parameters after informing the grid operator first.</li> </ul>
34	Grid voltage fault	<ul style="list-style-type: none"> <li>● Check the grid voltage and grid connection on inverter.</li> <li>● Check the grid voltage at the point of connection of inverter.</li> </ul> <p>If the grid voltage is outside the permissible range due to local grid conditions, try to modify the values of the monitored operational limits after informing the electric utility company first. If the grid voltage lies within the permitted range and this fault still occurs, please call service.</p>

35	Grid loss	<ul style="list-style-type: none"> <li>• Check the fuse and the triggering of the circuit breaker in the distribution box.</li> <li>• Check the grid voltage, grid usability.</li> <li>• Check the AC cable, grid connection on the inverter.</li> </ul> <p>If this fault is still being shown, contact the service.</p>
36 56-58	GFCI fault	<ul style="list-style-type: none"> <li>• Make sure the grounding connection of the inverter is reliable.</li> <li>• Make a visual inspection of all PV cables and modules.</li> </ul> <p>If this fault is still shown, contact the service.</p>
37	PV over voltage fault	<ul style="list-style-type: none"> <li>• Check the open-circuit voltages of the strings and make sure it is below the maximum DC input voltage of the inverter.</li> </ul> <p>If the input voltage lies within the permitted range and the fault still occurs, please call service.</p>
38	Isolation fault	<ul style="list-style-type: none"> <li>• Check the PV array's insulation to ground and make sure that the insulation resistance to ground is greater than 1 MΩ. Otherwise, make a visual inspection of all PV cables and modules.</li> <li>• Make sure the grounding connection of the inverter is reliable.</li> </ul> <p>If this fault occurs often, contact the service.</p>
40	Over temperature fault	<ul style="list-style-type: none"> <li>• Check whether the airflow to the heat sink is obstructed.</li> <li>• Check whether the ambient temperature around the inverter is too high.</li> </ul>
41-45 47	Self-diagnosis fault	<ul style="list-style-type: none"> <li>• Disconnect the inverter from the grid and the PV array and reconnect after 3 minutes.</li> </ul> <p>If this fault is still being shown, contact the service.</p>
48	10 minutes average over voltage fault	<ul style="list-style-type: none"> <li>• Check the grid voltage at the point of connection of inverter.</li> </ul> <p>If the grid voltage is outside the permissible range due to local grid conditions, try to modify the values of the monitored operational limits after informing the electric utility company first.</p> <p>If the grid voltage lies within the permitted range and this fault still occurs, please call service.</p>

61,62	DRMs device fault	Check the DRED device communication or operation.
65	PE wire connection fault	<ul style="list-style-type: none"> <li>• Check if the ground line is connected with the inverter ;</li> <li>• Make sure the grounding connection of the inverter is connected and reliable.</li> </ul> If this fault occurs often, contact the service.

Contact the service if you meet other problems not in the table.

### 12.1 Cleaning the contacts of the DC switch



#### **DANGER**

#### High voltage of PV string may cause life danger!

If the DC connector is disconnected while the PV inverter is working, electric arc may occur, causing electric shock and burns.

- Please disconnect the circuit breaker on the AC side first, and then disconnect the DC switch.

To ensure the normal operation of the DC input switch, it is necessary to clean the DC switch contacts every year.

Procedure:

**Step 1:** Disconnect the AC disconnecter and prevent accidental restart.

**Step 2:** Rotate the DC switch handle from the “ON” position to the “OFF” position for 5 times.

### 12.2 Cleaning air inlet and outlet



#### **CAUTION**

#### Hot enclosure or heat sink may cause personal injury!

When the inverter is working, the temperature of the enclosure or heat sink will be higher than 70°C, and the contact may cause burns.

- Before cleaning the air outlet, shut down the machine and wait for about 30 minutes until the temperature of the enclosure decreases to normal temperature.

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.

Procedure:

**Step 1:** Disconnect the AC side circuit breaker and ensure that it cannot be accidentally reconnected.

**Step 2:** Disconnect the DC switch, rotate the DC switch handle from the “ON” position to the “OFF” position.

**Step 3:** Clean the air inlet and outlet of the inverter with a soft brush.

### 12.3 Fan maintenance

#### CAUTION

#### Hot enclosure or heat sink may cause personal injury!

When the inverter is working, the temperature of the enclosure or heat sink will be higher than 70°C, and the contact may cause burns.

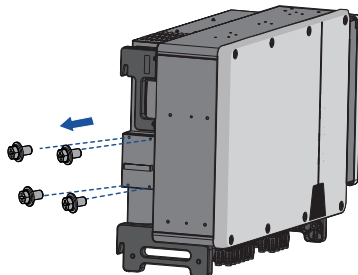
- Before cleaning the fan, power off the fan and wait for about 30 minutes until the heatsink temperature is reduced to normal temperature.
- Cleaning the fan with a high pressure air gun may cause damage to the fan.

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.

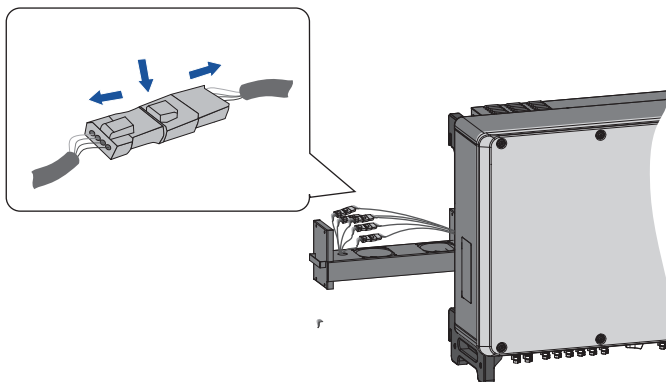
Procedure:

**Step 1:** Disconnect the AC side circuit breaker to prevent accidental reconnection. Disconnect the DC switch and rotate the DC switch handle from the “ON” position to the “OFF” position. Wait for about 30 minutes until the heatsink temperature is reduced to normal temperature.

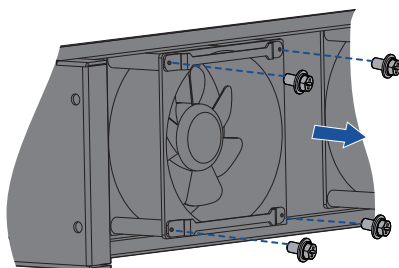
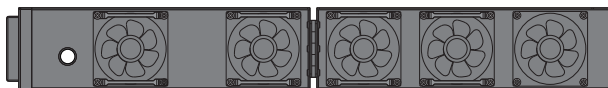
**Step 2:** Loosen the screw on the sealing plate of the fan module.



**Step 3:** Press the hump of the latch hook, disconnect the fan power connector, and pull out the fan tray.



**Step 4:** Remove the screws at the bottom of the fan. Use a clean cloth, brush, or vacuum cleaner to clean the fan, or replace the faulty fan directly.



**Step 5:** Reinstall the fan back to the inverter in reverse order and restart the inverter.

## 13

## Recycling and disposal

Dispose of the packaging and replaced parts according to the rules applicable in the country where the device is installed.



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

## 14

## EU declaration of conformity

Within the scope of the EU directives

- Radio Equipment Directive 2014/53/EU

(L 153/62-106. May 22. 2014) (RED)

- Restriction of the use of certain hazardous substances 2011/65/EU (L 174/88, June 8, 2011) and 2015/863/EU (L 137/10, March 31, 2015) (RoHS)

AISWEI Technology Co., Ltd. confirms herewith that the inverters described in this manual are in compliance with the fundamental requirements and other relevant provisions of the above mentioned directives.

The entire EU Declaration of Conformity can be found at [www.solplanet.net](http://www.solplanet.net).





If you have any technical problems concerning our products, please contact Solplanet service.

We require the following information in order to provide you with the necessary assistance:

- Inverter device type
- Inverter serial number
- Type and number of connected PV modules
- Error code
- Mounting location
- Installation date
- Warranty card

Warranty terms and conditions can be downloaded at [www.solplanet.net](http://www.solplanet.net).

When the customer needs warranty service during the warranty period, the customer must provide a copy of the invoice, factory warranty card, and ensure the electrical label of the inverter is legible. If these conditions are not met, Solplanet has the right to refuse to provide with the relevant warranty service.

## EMEA

Service email: [service.EMEA@solplanet.net](mailto:service.EMEA@solplanet.net)

## APAC

Service email: [service.APAC@solplanet.net](mailto:service.APAC@solplanet.net)

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