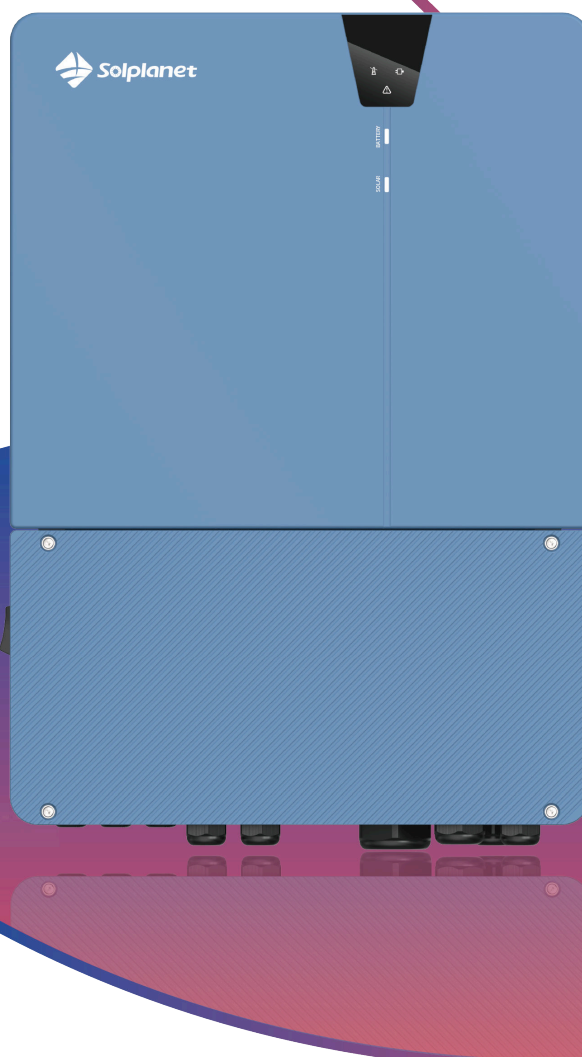




# Single phase hybrid inverter

## User Manual

ASW008K-SH/ASW010K-SH

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# 1 General information

## 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.

The contents of this user manual may be updated or revised due to on-going product development and continuous improvement. The information in this guide is subject to change without notice. The latest version of this document, the quick installation guide and further information are to be found 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 Product validity

This document is valid for the following models:

- ASW008K-SH
- ASW010K-SH

## 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.
- Knowledge of how batteries work and are operated.
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices, batteries 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.

Not adhering to the prescribed instructions may potentially void the manufacturer's warranty. If in doubt please contact the local Solplanet service team.

## 1.4 Symbols



### ***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, however not related to safety.

## 2 Safety

### 2.1 Intended use

The product is a transformerless hybrid inverter with three MPP trackers and one battery connection that feeds the direct current of the PV array into the connected battery or converts it to grid-compliant single-phase current and feeds it into onsite loads and the utility grid. The product can also convert the DC current supplied by the battery into grid-compliant single-phase current. The product supports bi-directional AC power flow which allows the batteries to be charged by grid supplied AC current.

The product has a backup function that can continue to supply selected circuits with power from the battery or PV system in the event of a grid fault.

The product is intended for indoor and outdoor applications.

The product must only be connected with PV modules of protection class II (in accordance with IEC 61730, application class A). Do not connect any sources of energy other than PV modules and officially compatible batteries to the product.

PV modules with a high capacitance to ground must only be used if their coupling capacitance is less than 2  $\mu\text{F}$ .

The product is not equipped with an integrated transformer and therefore has no galvanic isolation. The product must not be operated with PV modules which require functional grounding of either the positive or negative PV conductors. This can cause the product to be irreparably damaged. The product may be operated with PV modules with frames that require protective earthing.

The inverters shall not be used in multiple phase combinations.

All components must remain within their permitted operating ranges and their installation requirements at all times.

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

- The product must only be operated in connection with an intrinsically safe lithium-ion and lead-acid battery approved by Solplanet. The entire battery voltage range must be completely within the permissible input voltage range of the product. The latest version of the Solplanet battery compatibility list can be found in PDF format at [www.solplanet.net](http://www.solplanet.net).

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

Knowledge of all applicable laws, standards and directives.

Knowledge of and compliance with this document and all safety information.

The type label must be permanently attached to the product and must be in a legible condition.

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.

### 2.2 Important safety instructions

The product has been designed and tested strictly according to the 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 to life due to live voltage on EPS port when inverter is without load !**

Even when the inverter is not connected to any load while powered on, the EPS port may still have live voltage present.

To avoid electric shock:

- Strictly follow the wiring instructions.
- Ensure all system switches are turned off and that all sources of energy are isolated during installation or removal of EPS loads.
- Use insulated tools.
- Verify that voltage is not present on the EPS port using a voltage tester or multimeter before handling the EPS port.
- Wear appropriate personal protective equipment (PPE).

## **DANGER**

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

The DC cables connected to the battery or the PV array may be live. Touching the DC conductors or associated live components can cause lethal electric shocks. Disconnecting the DC connectors from the product under load may expose the user to an electric arc causing electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the product.
- Do not open the product.
- Observe all safety information of the battery manufacturer.
- 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 and the user manual.
- Disconnect the product from all voltage and energy 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 components in EPS mode !**

Regardless of the AC breaker and the PV switch of the inverter being switched off or disconnected, the parts of the system may still be live when the battery is providing power during EPS mode.

- Do not open the product.
- Disconnect the product from all voltage and energy sources and ensure it can not be reconnected before working on the product.

## **DANGER**

### **Danger to life due to fire or explosion when batteries are fully discharged !**

Danger to life due to fire or explosion when batteries are fully discharged.

- Make sure that the battery is not fully discharged before commissioning the system.
- Contact the battery manufacturer for before proceeding if the battery is fully discharged.

## **DANGER**

### **Danger to life due to burns caused by electric arcs through short-circuit currents !**

Short-circuit currents in the battery can cause heat accumulation and electric arcs if the battery is short circuited or wrongly installed. Heat accumulation and electric arcs may result in lethal injuries due to burns.

- Disconnect the battery from all voltages sources prior to performing any work on the battery.
- Only use properly insulated tools to prevent accidental electric shock or short circuits during installation.
- Observe all safety information of the battery manufacturer.

## ***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 may result in death or lethal injuries due to electric shock.

- Disconnect the product from voltage and energy sources and ensure it cannot be reconnected before working on the device.
- Handle PV module cables only by its 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 risk of fatal electric shock from damages to the measuring device caused by 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 measurement span higher than the DC input voltage range of the devices.



## ***CAUTION***

### **Risk of burns due to high temperature!**

Some parts of the enclosure can become hot during operation.

- During operation, do not touch any parts other than the enclosure lid of the product.



## ***CAUTION***

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

- Injuries may result if the product is incorrectly handled 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.

## ***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 grid code set must be set correctly.**

Setting a country grid code set which is not valid for your country and purpose, can cause a disturbance in the PV system

and lead to problems with the grid operator. When selecting the country grid code set, please 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



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.



Beware of high voltage and operating current!

The product operates at a high voltage and current. Work on the product must only be carried out by skilled and authorized personnel.



Beware of hot surfaces!

The product can become hot during operation. Avoid contact during operation.



WEEE Designation

Do not dispose of the product together with household waste. Dispose the product in accordance with local disposal regulations for electronic waste applicable in the country of installation.



CE marking

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



Certification mark

The product has been tested by TÜV and obtained the quality certification mark.



CE marking

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



Capacitor discharge

Danger to life due to high voltages in the inverter. Do not touch live parts for 5 minutes after disconnection from the power sources.



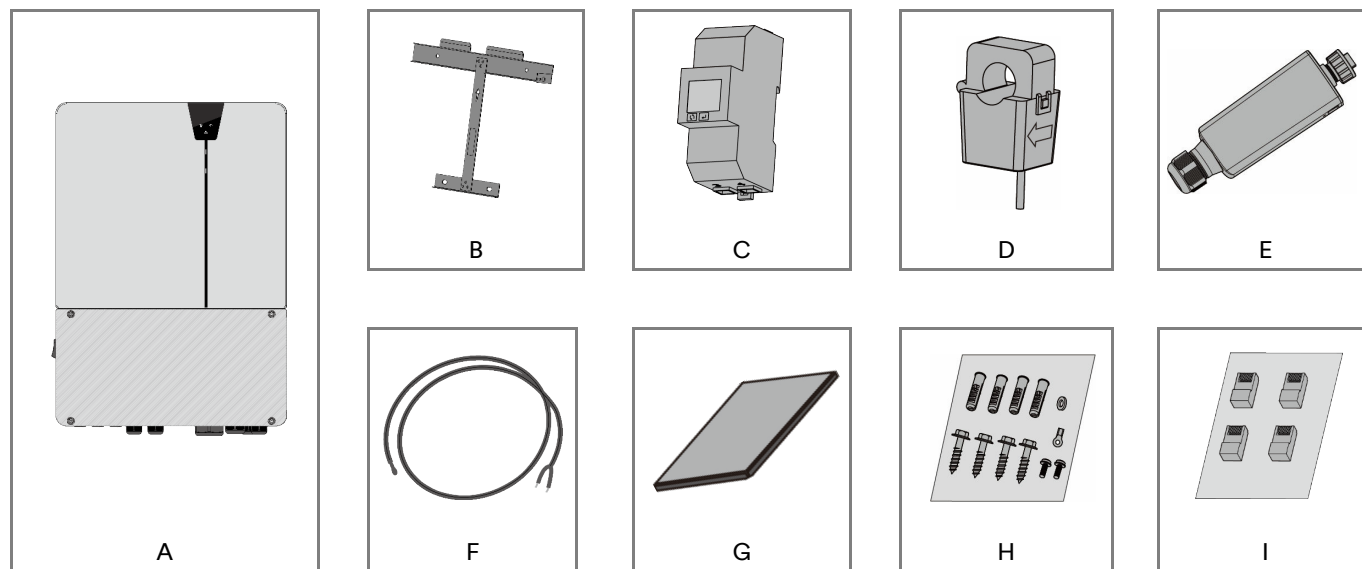
Observe the documentation

Read and understand all documentation supplied with the product.

## 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.



| Object | Description                                                  | Quantity |
|--------|--------------------------------------------------------------|----------|
| A      | Inverter                                                     | 1        |
| B      | Mounting Bracket                                             | 1        |
| C      | Smart Meter (optional)                                       | 1        |
| D      | External CT                                                  | 1        |
| E      | Ai-Dongle                                                    | 1        |
| F      | NTC cable (optional, only for lead-acid battery)             | 1        |
| G      | Document Package                                             | 1        |
| H      | Fastener Package                                             | 1        |
| I      | Communication and Resistance terminal<br>(only for parallel) | 1        |

### 3.2 Product storage

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

- Store the inverter in the original packaging.
- The storage temperature must be between -40°C to +60°C, and the storage relative humidity must be between 0 and 100%, non-condensing.
- The packaging with the inverter shall not be tilted or inverted when stored.
- The product must be fully inspected and tested by professionals (Refer to section 1.3) 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

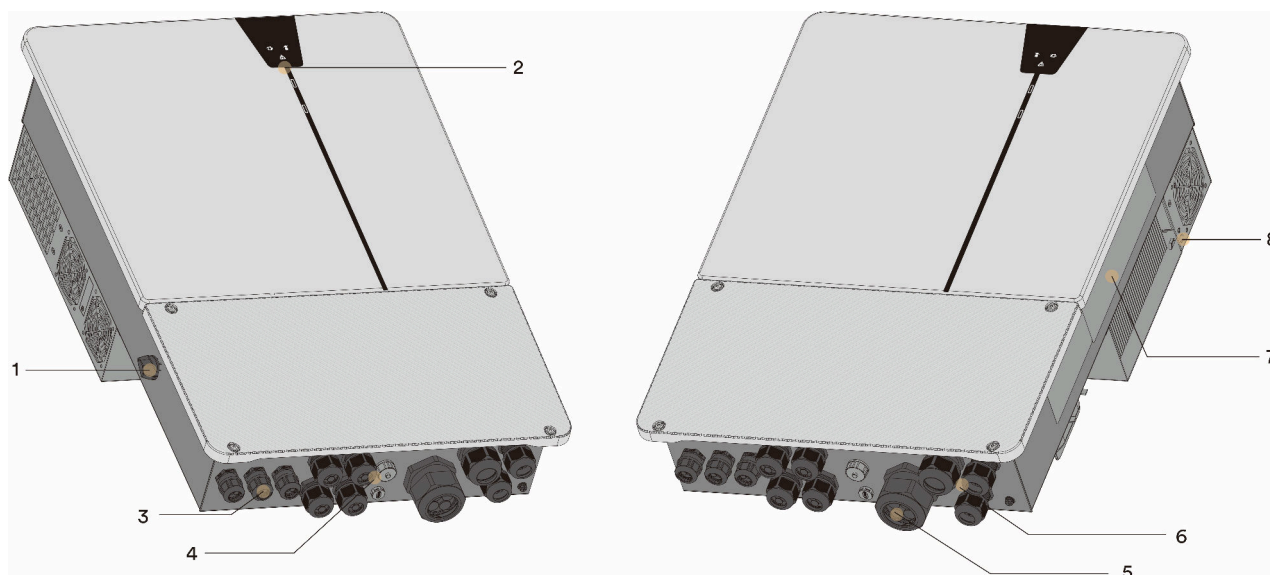
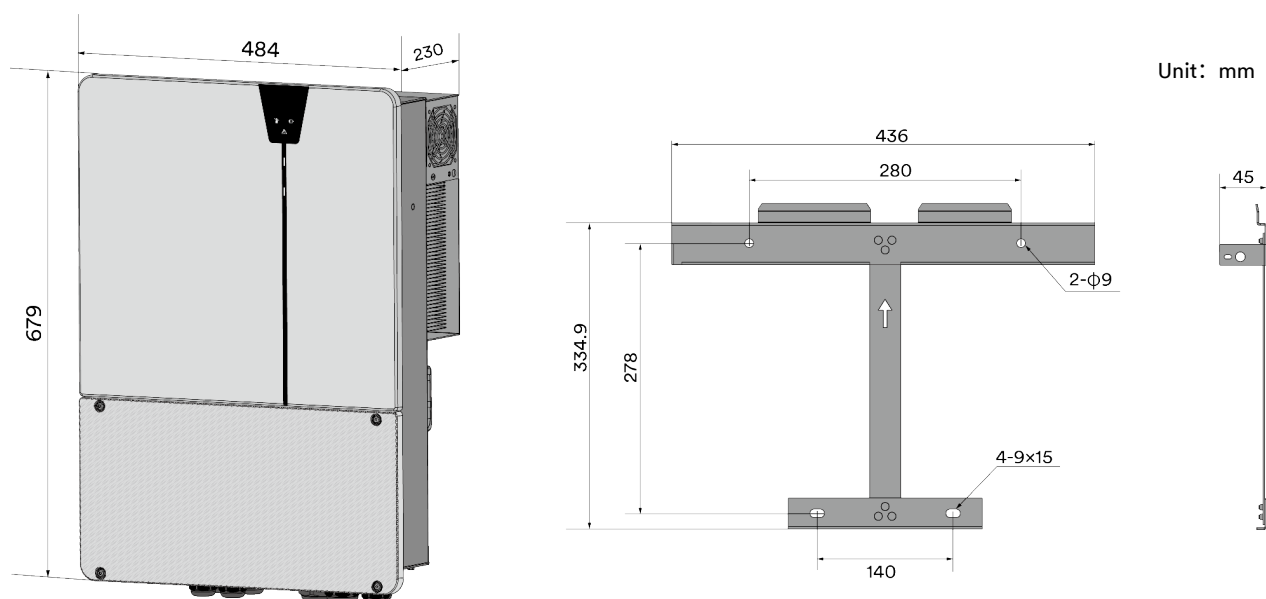


Figure shown here is for reference only. The actual product received may differ!

| Object | Name                       | Description                                                        |
|--------|----------------------------|--------------------------------------------------------------------|
| 1      | DC Switch                  | Used to isolate the inverter from a DC input source. e.g. PV array |
| 2      | LED indicator panel        | Indicates the current working state of the inverter.               |
| 3      | DC cable entry glands      | For connection of PV module strings                                |
| 4      | Communication interface    | For Ai-Dongle terminal and communication ports.                    |
| 5      | Battery cable entry glands | For connection of battery.                                         |
| 6      | AC cabling entry glands    | For grid connection, EPS Load connection and generator connection. |
| 7      | Labels                     | Warning symbols, nameplate, and QR code.                           |
| 8      | Inverter fixing point      | Used for fixing the inverter onto the mounting bracket.            |

### 4.2 Dimensions





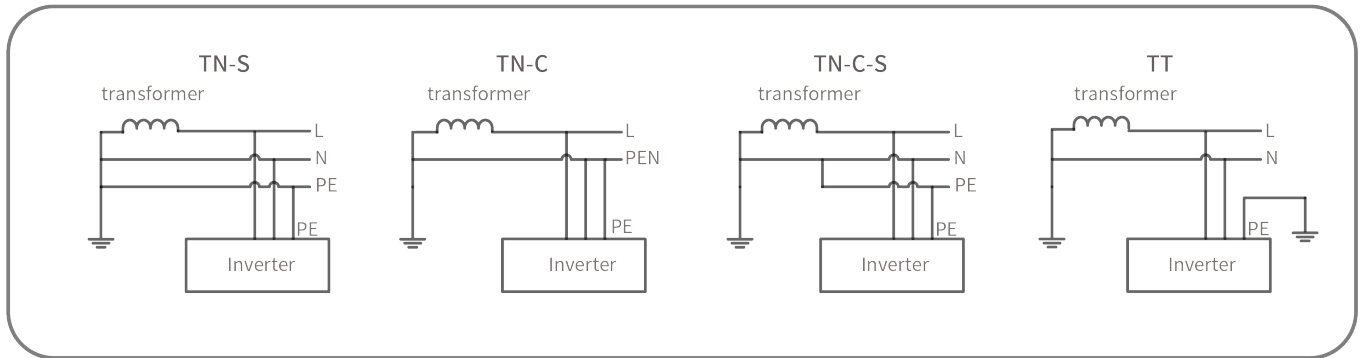
### 4.3 LED indicator

| Function | LED                                                                                               | Description                                                                                                                                                                                                      |
|----------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOLAR    |  Glowing         | The product operates normally, and the PV array is available.                                                                                                                                                    |
|          |  Blinking        | The product is self-checking automatically, or the firmware is being updated.                                                                                                                                    |
|          |  Off             | Power from the PV array is not available.                                                                                                                                                                        |
| BAT      |  Glowing         | The product operates normally, and the battery energy is available.                                                                                                                                              |
|          |  Blinking        | The product is self-checking automatically, or the firmware is being updated.                                                                                                                                    |
|          |  Off             | Power from the battery is not available.                                                                                                                                                                         |
| ERROR    |  Yellow Glowing  | There is a warning fault, the communication between Ai-Dongle and inverter has failed, or the other warning fault. The warning message and the corresponding event number will be displayed on the APP or Cloud. |
|          |  Red Glowing     | There is an error fault. The Error message and the corresponding event number will be displayed on the APP or Cloud.                                                                                             |
|          |  Off             | The product is operating normally.                                                                                                                                                                               |
| EPS      |  White Glowing   | The EPS port of the product is available and operates normally.                                                                                                                                                  |
|          |  Red Glowing   | The EPS port operates abnormally.                                                                                                                                                                                |
|          |  Off           | The EPS port of the product stops operation.                                                                                                                                                                     |
| GRID     |  White Glowing | The product is connected and operates normally in non-off-grid mode, or the grid voltage is greater than the safety voltage(36V) in off-grid mode.                                                               |
|          |  Red Glowing   | The GRID port operates abnormally without a battery.                                                                                                                                                             |
|          |  Off           | The GRID port is disconnected, or the grid operates abnormally with a battery, or the grid voltage is less than the safety voltage(36V) in off-grid mode, or the product stops operation.                        |

For safety reasons, the EPS LED will blink white when there is no load or when the load power is low, indicating potential live voltage on the EPS port, which could pose a danger to life.

## 4.4 Supported grid types

The grid structures supported by the product 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.

## 4.5 Interfaces and functions

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, which can locally or remotely connect to the Solplanet App, for configuring and monitoring the product. The Ai-Dongle can connect to the internet via WLAN or an ethernet cable. Solplanet communication products or a third-party monitoring device can be used if the Ai-Dongle is not connected.

### Parallel Interface

The Parallel Interface (CN709 and CN710, refer to Interface Pinout Table) enables up to three inverters to connect and operate as a unified system. This interface uses both RS485 and CAN communication protocols to ensure synchronized power output, voltage, and frequency across all connected inverters. It is ideal for expanding system capacity in high-power applications and supports both grid-connected and off-grid configurations via COM1 or COM4.

### Third-party Monitoring device Interface

The RS485 Monitor Interface (CN707: RS485A and RS485B pins, refer to Interface Pinout Table) is specifically designed to connect the inverter to third-party monitoring systems. This interface enables real-time data communication between the inverter and external monitoring devices, allowing users to monitor system performance remotely.

### Meter Interface

This interface supports real-time data exchange to optimize system performance and ensure compliance with export control requirements. The meter Interface connects to the designated RS485 pins (RS485D A and RS485D B, refer to Interface Pinout Table) on the terminal block. Only one device (CTs or a smart meter) can be connected to the inverter at a time for export power monitoring.

### Ethernet Interface

With support of Modbus TCP/IP , the ethernet interface enables integration with third-party systems for advanced monitoring

and control.

### **BMS Interface**

The BMS Interface (CN708) connects the inverter to the Battery Management System (BMS) to enable efficient battery monitoring and management. This interface supports communication protocols such as RS485 or CAN, allowing real-time exchange of battery parameters, including State of Charge (SOC), voltage, and current. By ensuring seamless communication between the inverter and the BMS, the interface optimizes battery performance, enhances safety, and enables precise control of charging and discharging processes. The connection is established via RS485A/B or CANH/L pins on COM2, refer to the *Interface Pinout Table*.

### **Export power control**

The product is equipped with an export power limit function, so as to meet the requirements of various national standards or grid standards for limiting the output power at the grid connection point. The export power control solution measures the active power at the grid connection point and uses this information to control the inverter's active power output, preventing it from exceeding the agreed export power limit.

To measure the export active power, the product supports either current transformers (CTs) or a smart meter (not both simultaneously). Users can choose their preferred method based on installation requirements.

The smart meter used with this product must be approved by Solplanet. For more information about compatible smart meters, please contact Solplanet service.

### **NS Protection**

The product is equipped with an NS Protection (Network and System Protection) interface that allows external signals to trigger the inverter to shut down under certain conditions. This feature ensures compliance with grid safety standards and when required provides an additional layer of system protection.

### **Inverter demand response modes (DRED)**

The product shall detect and initiate a response to all supported demand response commands according to the AS/NZS 4777.2 standard. The product only supports the demand response mode DRM 0.

### **Ripple control receiver interface**

An interface for connecting to a ripple control receiver which can allow, for example, for multi-stage control of the inverters active power.

### **Multifunction Relay**

The product is equipped with two multifunction relays as standard. One of the relays can serve as a dry contact signal for controlling a diesel generator. When the diesel generator function in the Solplanet App is enabled and the diesel generator connection conditions are met, the open contact will switch to on (voltage-free output). The second multifunction relay can be configured to operate in a specific system mode. For more information, please contact Solplanet service.

### **Temperature Sensor Interface**

The product is equipped with one temperature sensor interface. If the temperature of the battery needs to be monitored, the external sensor can be connected.

### **Current Transformer Interface**

The product is equipped with a dedicated current transformer (CT) interface for directly connecting current transformers to the inverter. This interface allows the inverter to monitor export power by directly measuring current at the grid connection point.

For additional export power control, the RS485 communication interface can connect to a smart meter. Users can select either CTs or a smart meter, but not both simultaneously.

### **EPS Function**

The inverter features a EPS function, forming a single-phase EPS grid using energy from the battery and PV system. During grid failures, the inverter disconnects from the grid and supplies critical loads through the EPS connector. When grid power returns, the inverter automatically reconnects to the grid.

### **Generator Function**

The inverter can connect to a diesel generator which serves as an auxiliary power source to power the Emergency Power Supply (EPS) loads and charge the battery. In case of a power outage, the inverter will automatically start the diesel generator. The generator can also be manually controlled via the app, where users can set the conditions for its activation. Users can configure the generator port (GEN port) based on their needs. It can be set to supply power to EPS loads and the battery, or it can be configured as an intelligent load port.

### **Parallel Function**

Up to three inverters can be connected in parallel to form a system that supplies power to the loads collectively. The parallel system enables communication and electrical connections among the inverters to synchronize their output for enhanced power supply capability. Two main usage scenarios are supported:

- Scenario 1: The inverters operate in a grid-tied setup, supplying power to both normal and EPS loads, with support for battery charging and discharging.
- Scenario 2: The inverters support only the EPS load in a grid-connected configuration, without battery connection, and are not suitable for off-grid operation.

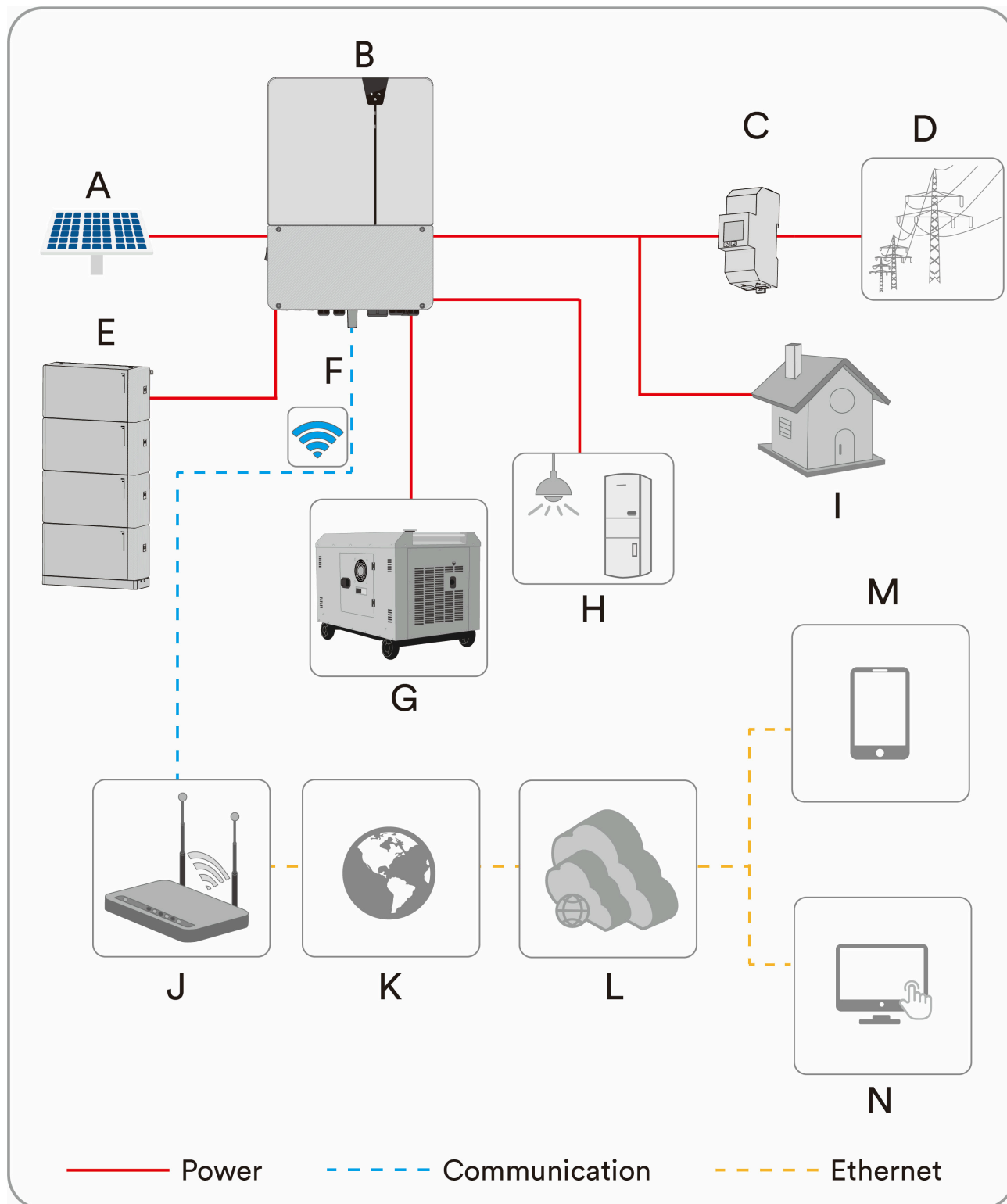
### **Earth fault alarm**

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.

## 4.6 Basic system solution

The product is a high-quality inverter that converts solar energy to AC power and stores excess energy production in a battery. It optimizes self-consumption, enables energy storage for future use, and supports grid feed-in.

The basic application of this product as follow:

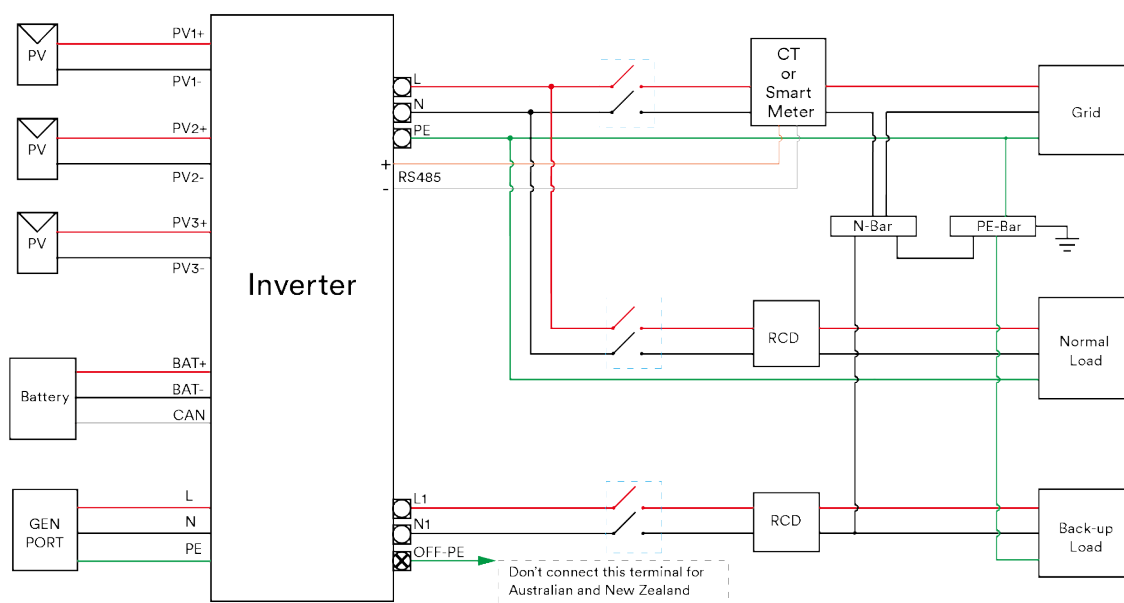


| Object | Description         | Remark                                                                                                                                                                |
|--------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A      | PV array            | The product can connect to monocrystalline and polycrystalline silicon based PV modules and thin-film modules that require no functional grounding.                   |
| B      | Hybrid inverter     | ASW SH series products have an EPS port.                                                                                                                              |
| C      | Smart meter or CT   | The smart meter measures the power at the point of connection. The smart meter also can be replaced by three current transformers which connect directly to inverter. |
| D      | Utility grid        | The product can connect to TN and TT grid network types.                                                                                                              |
| E      | Battery system      | The product must only be operated in connection with an intrinsically safe lithium-ion battery system or a lead-acid battery approved by Solplanet.                   |
| F      | Ai-Dongle           | The Ai-Dongle supports ethernet and WLAN communication. It is not recommended to use both communication methods at the same time.                                     |
| G      | Diesel generator    | The product can connect to diesel generator. Batteries can be charged and EPS loads can be supplied by the diesel generator.                                          |
| H      | EPS Load            | The EPS loads directly connect to the EPS port of the inverter. The EPS loads can be supplied with power from the inverter when there is a grid failure.              |
| I      | Normal load         | The loads which are directly connected to the utility grid. The normal load will not be supplied with power when there is a grid failure.                             |
| J      | Router              | The product can connect to a router via Wi-Fi or an ethernet cable.                                                                                                   |
| K      | Internet            | The inverter and battery data is sent to the Solplanet Cloud via the Internet.                                                                                        |
| L      | Cloud server        | The inverter and battery data is stored on the Solplanet cloud server.                                                                                                |
| M      | Smart Mobile Device | The Solplanet app can be installed on a smart mobile device to view the PV plant information.                                                                         |
| N      | Computer            | The inverter and battery data can also be viewed via a computer which is logged into the Solplanet cloud desktop web application.                                     |

The system diagram of this product is as follows:

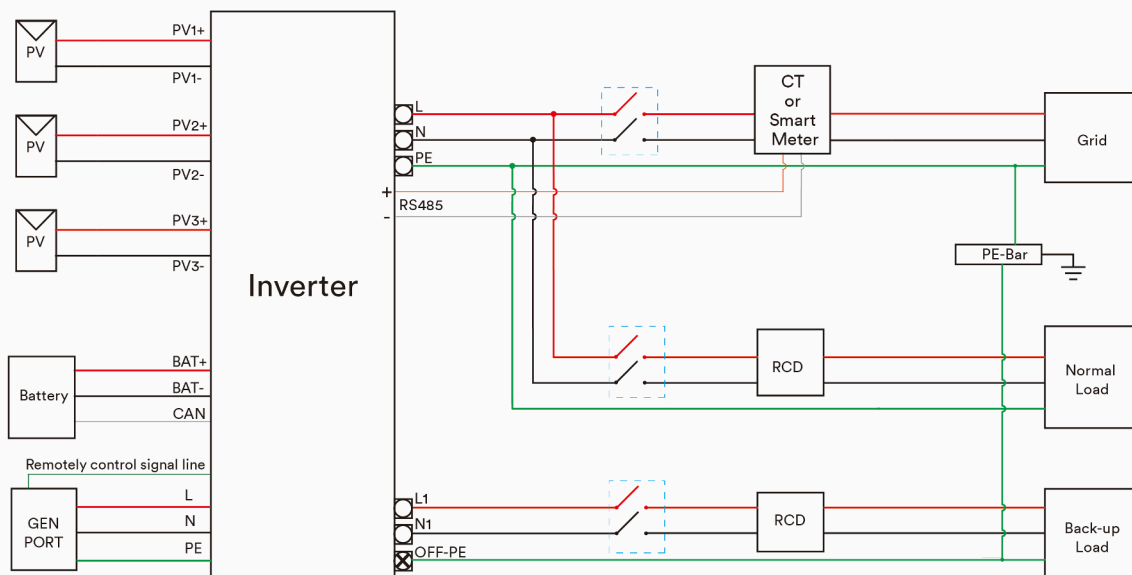
For Australia and New Zealand, the neutral cable of On-grid side and EPS side must be connected together according to the wiring rules AS/NZS 3000. Otherwise the EPS function will not work.

## Australia



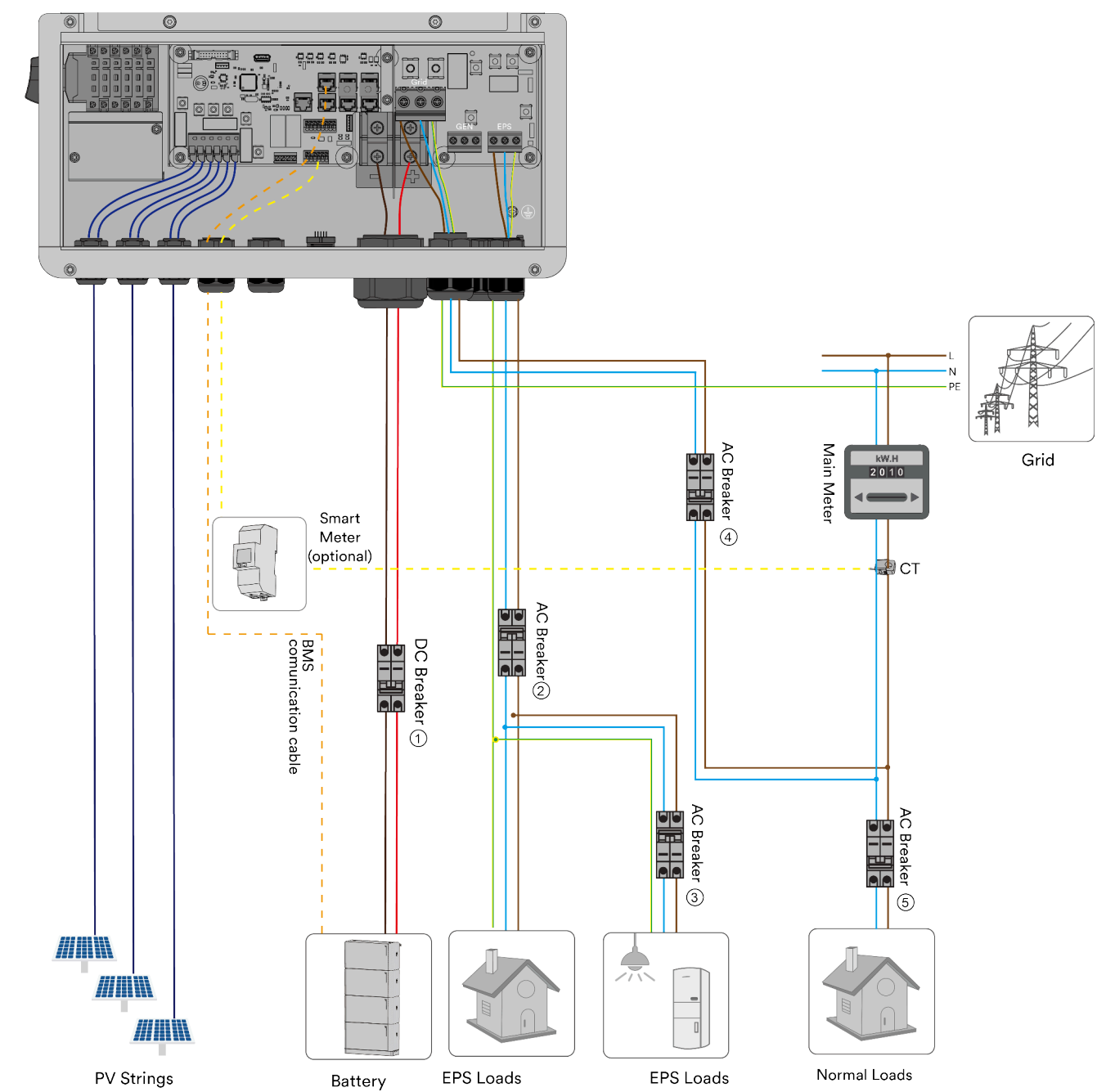
For other countries, the following diagram is an example for grid systems without special requirement on wiring connection.

## Europe



Smart meter connection refer to 6.8.6.

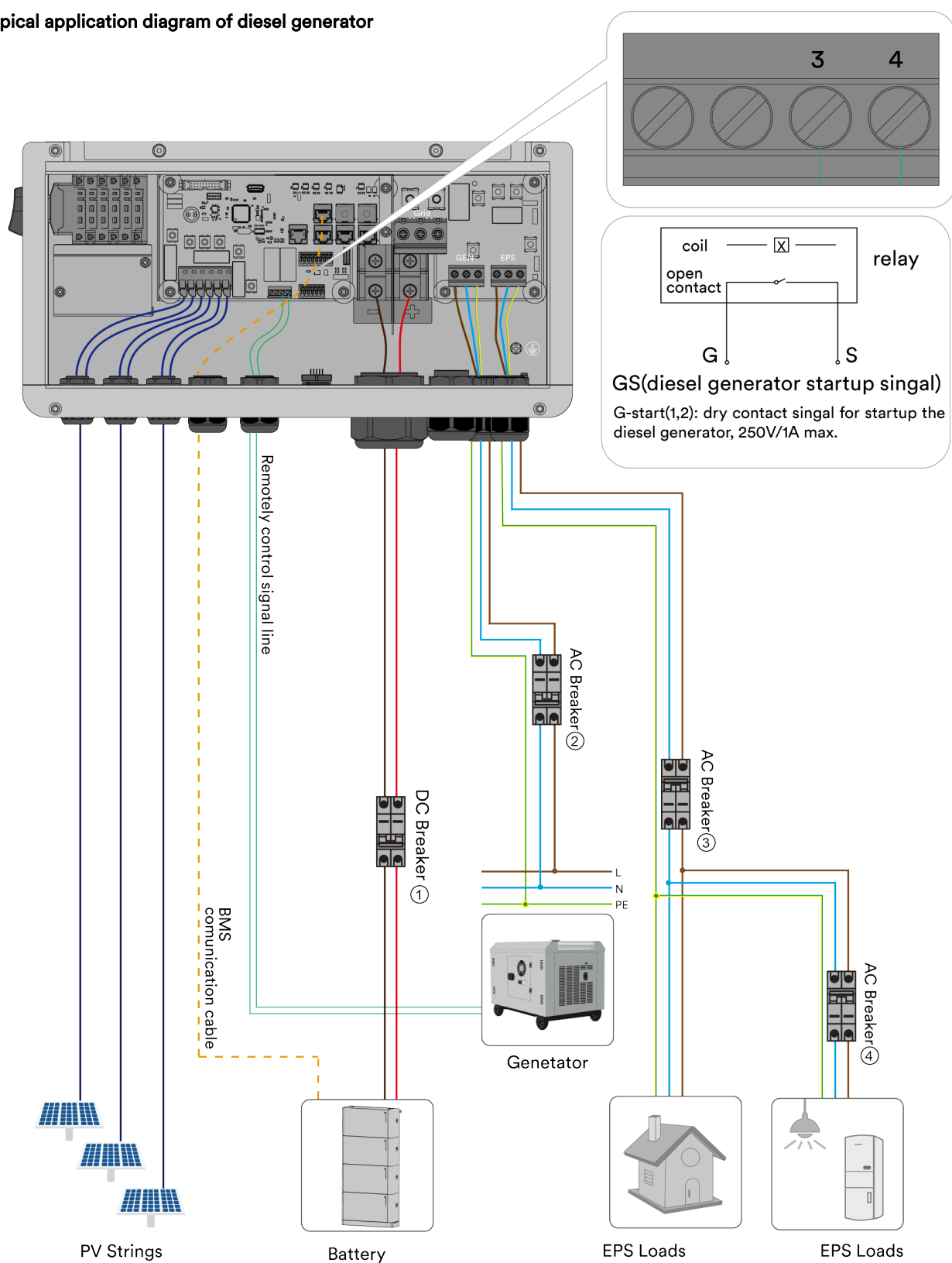
Typical application diagram of grid



|   | 08k                         | 10kW |
|---|-----------------------------|------|
| 1 | 250A/Abo ve 100V DC Breaker |      |
| 2 | 100A/300V AC Breaker        |      |
| 3 |                             |      |
| 4 | 63A/300V AC Breaker         |      |
| 5 | Depends on household        |      |



## Typical application diagram of diesel generator



|   | 08k                        | 10kW |
|---|----------------------------|------|
| 1 | 250A/Above 100V DC Breaker |      |
| 2 | 63A/300V AC Breaker        |      |
| 3 | 100A/300V AC Breaker       |      |
| 4 | Depends on household       |      |

## 4.7 Energy Management

The energy management mode selected should be based on the user's application and preference. There are five energy management mode that can be chosen.

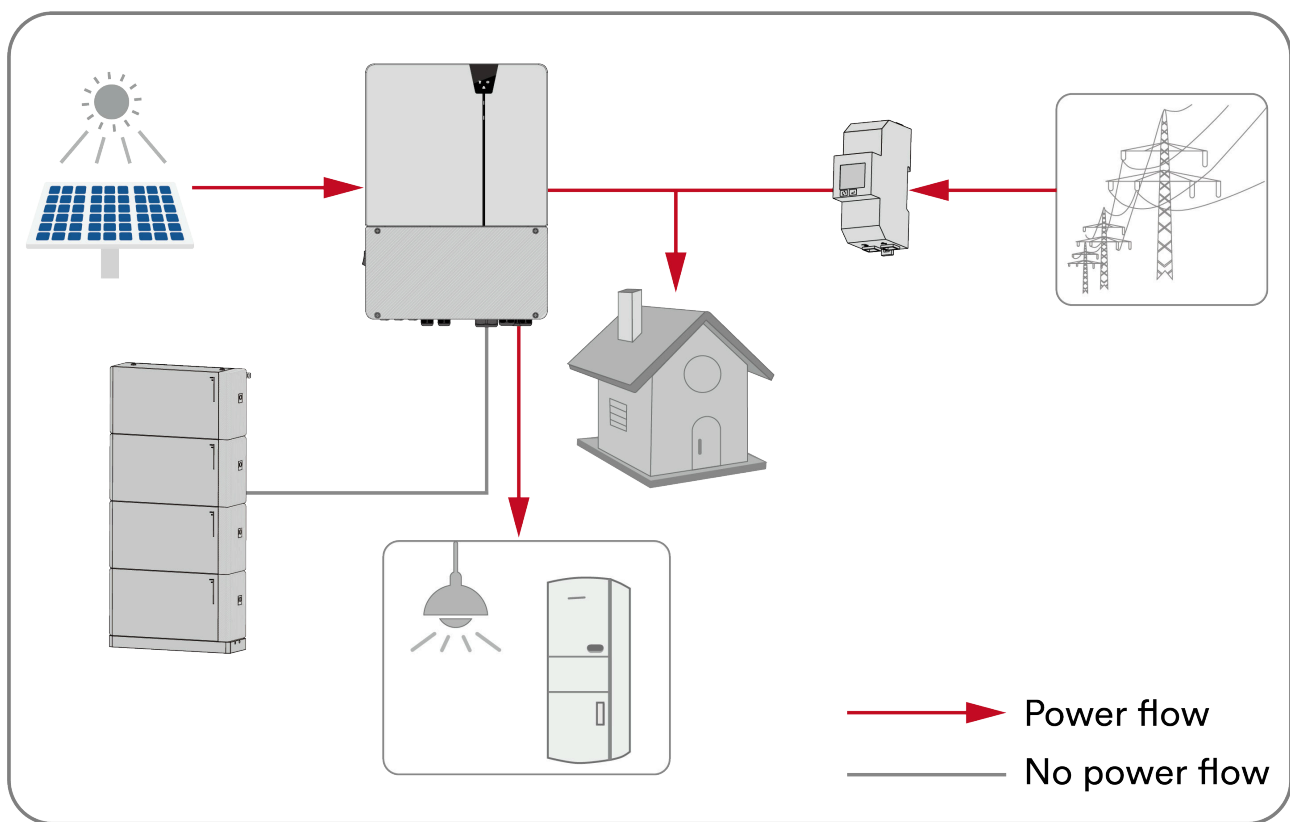
### 4.7.1 Self-Consumption mode

Self-consumption prioritises the supply of the load with PV and battery energy resulting in an increase of the self- consumption and self-sufficiency rates.

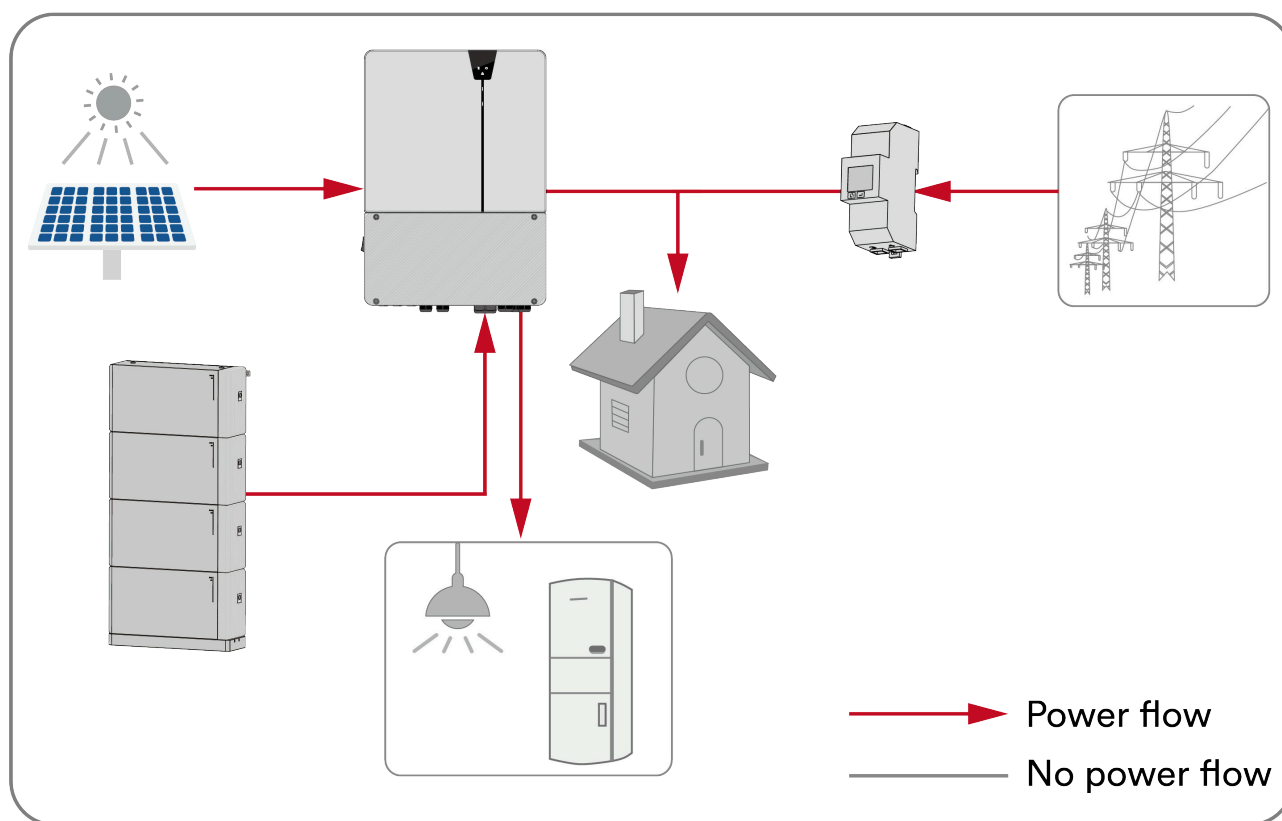
The energy management during daytime:

Case 1:

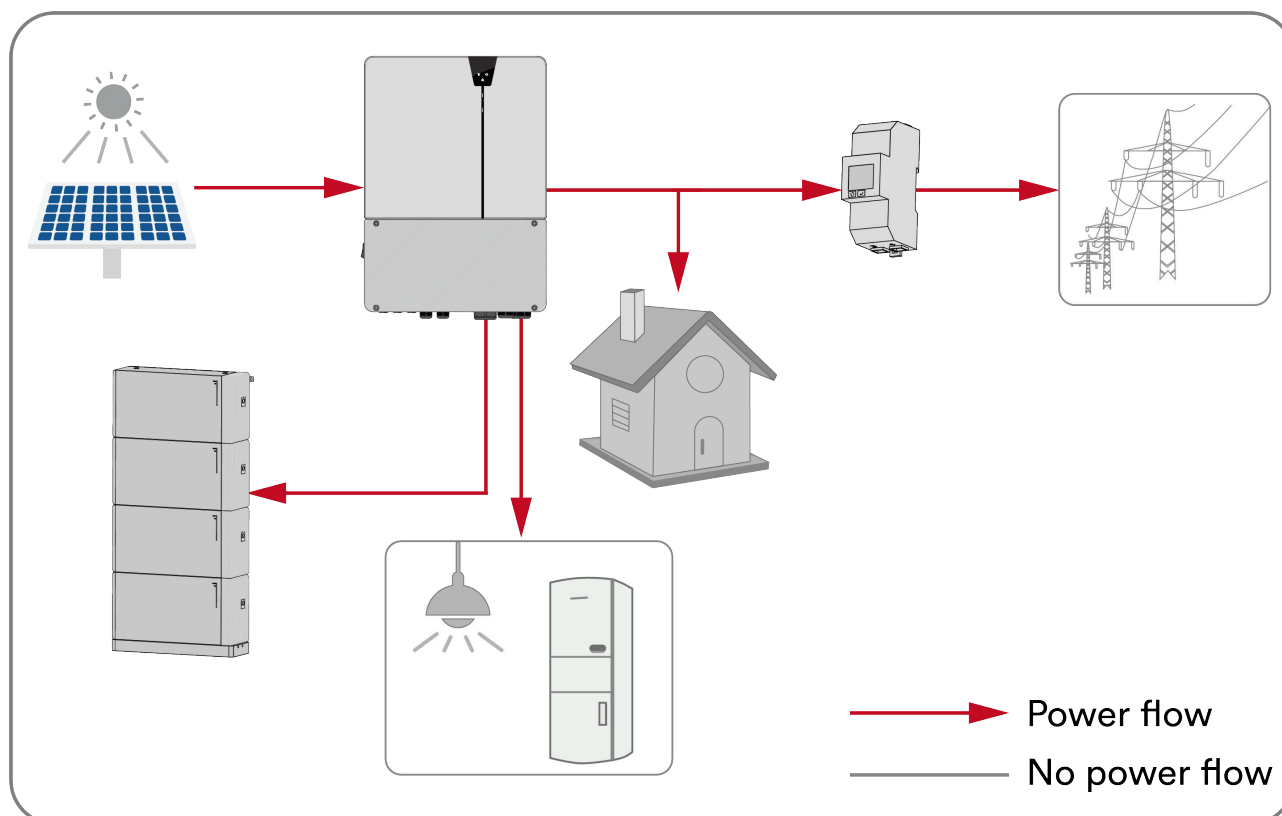
PV power generation is lower than the power consumption and there is no battery energy available. The balance of load power, if any, is supplied from the utility grid.



Case 2: PV power generation is lower than the power consumption and there is available battery energy. The balance of load power, is supplied from the battery and if needed from the utility grid.

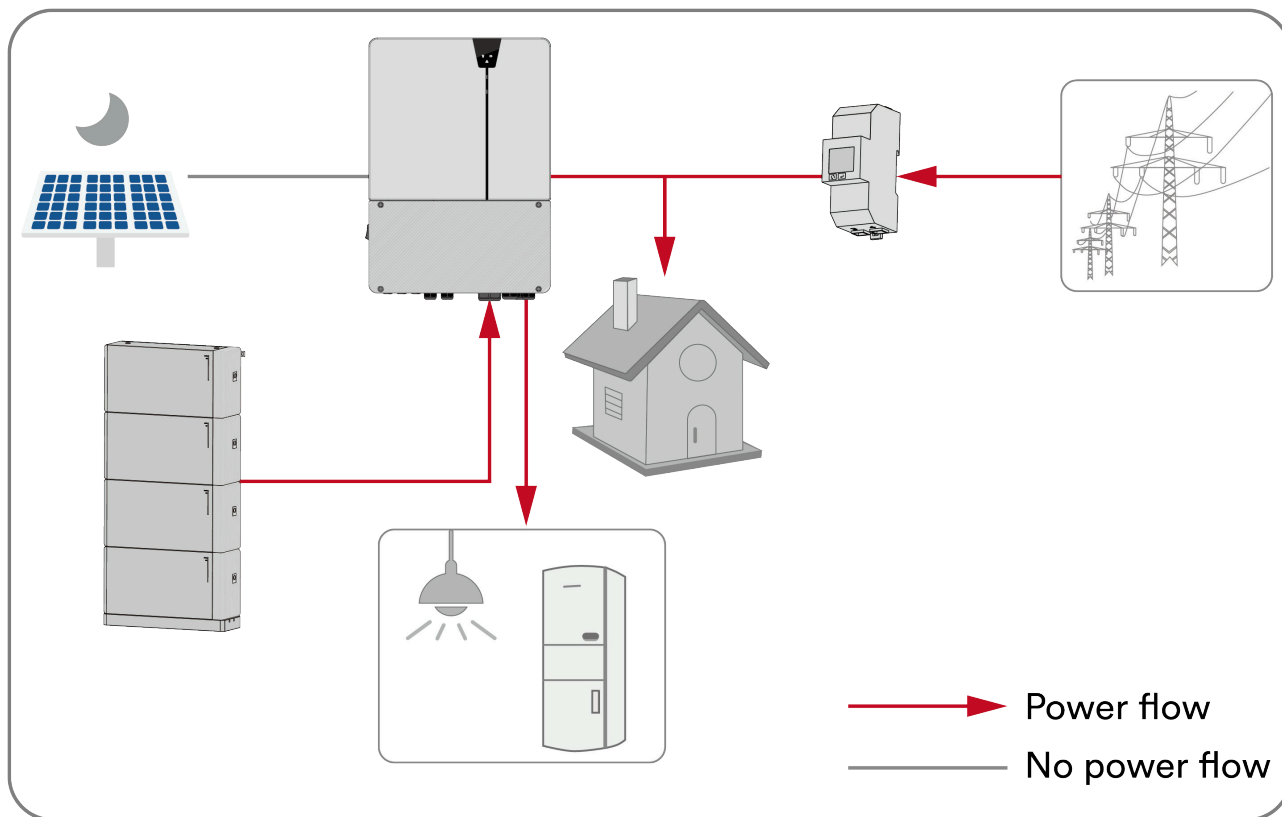


Case 3: PV power generation is larger than the power consumption. Battery charging via PV energy is prioritised. PV energy is exported to the utility grid if it is greater than the load and when the battery is completely charged.

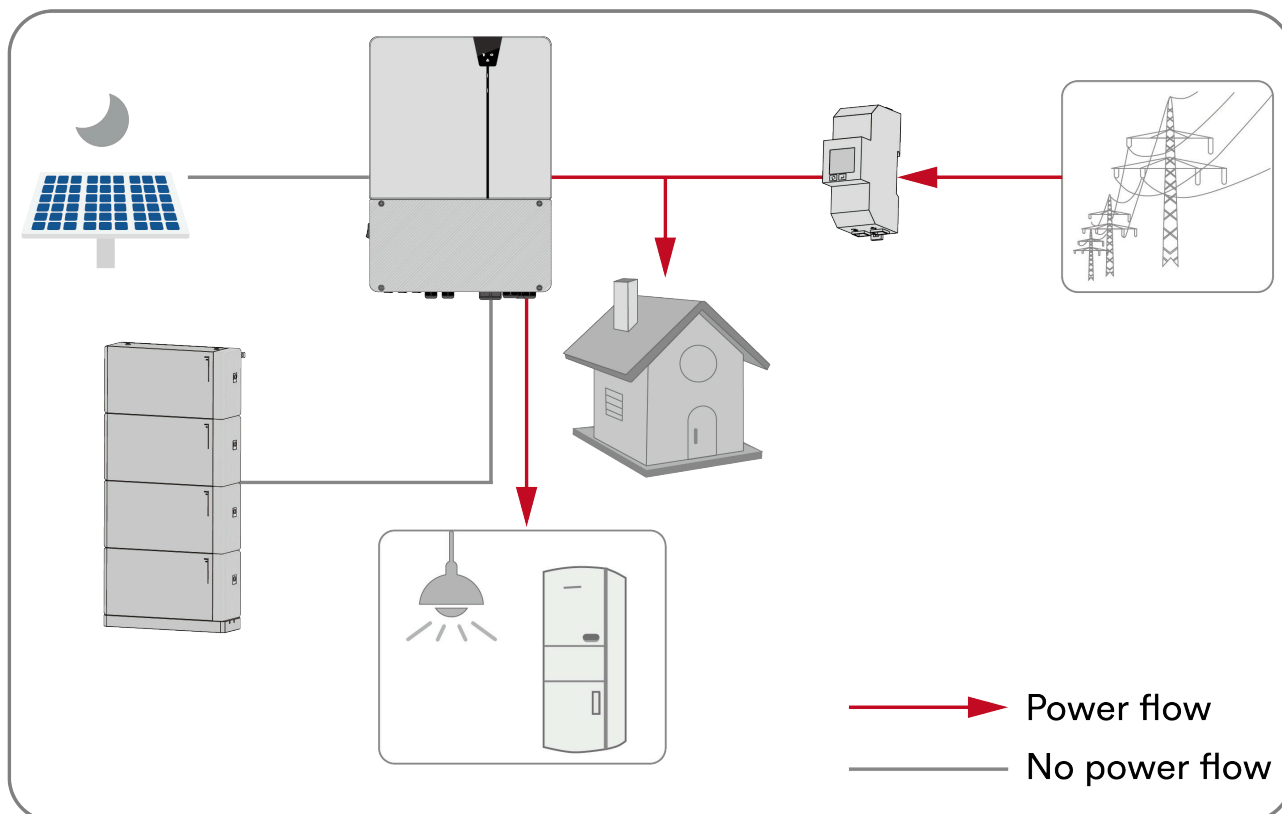


The energy management during night:

Case 1: Battery energy is available. The power consumption will be supplied by the battery and the balance, if required, will be supplied by the utility grid.



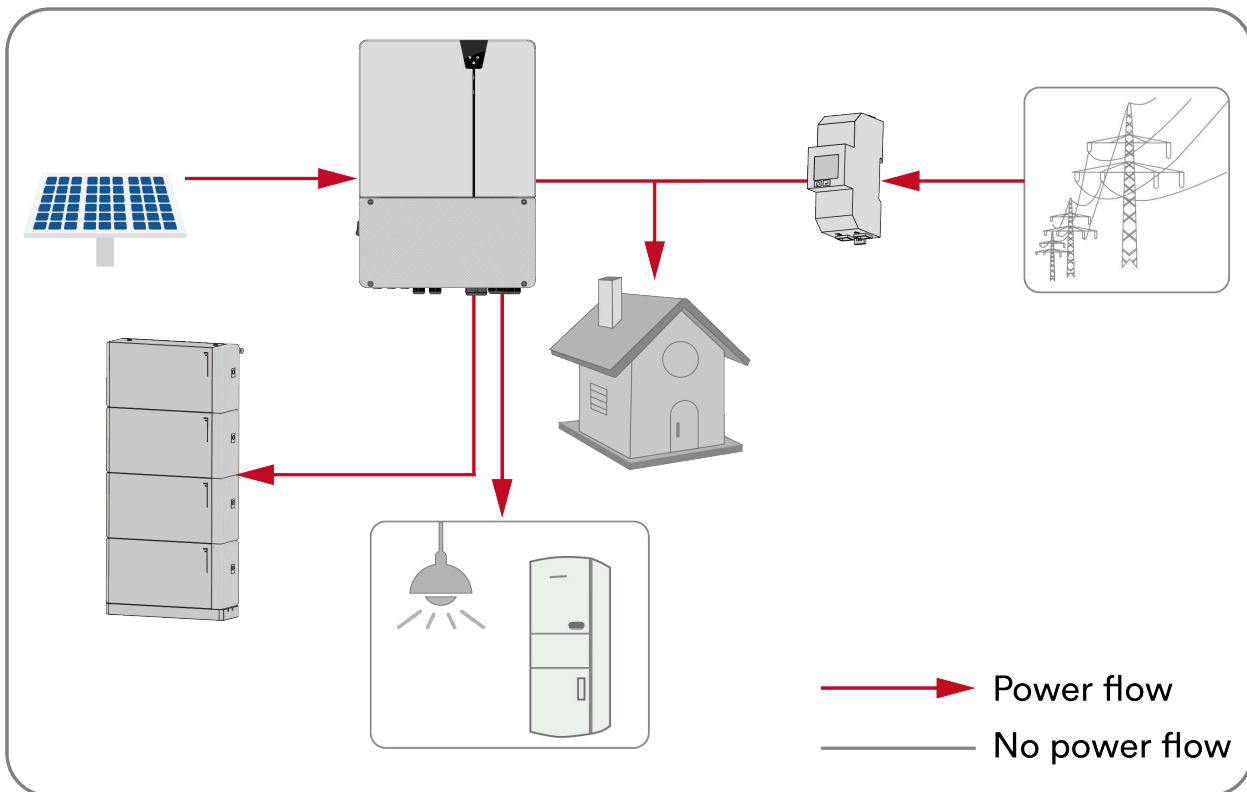
Case 2: Battery energy not available. The load power consumption will be supplied by the utility grid.



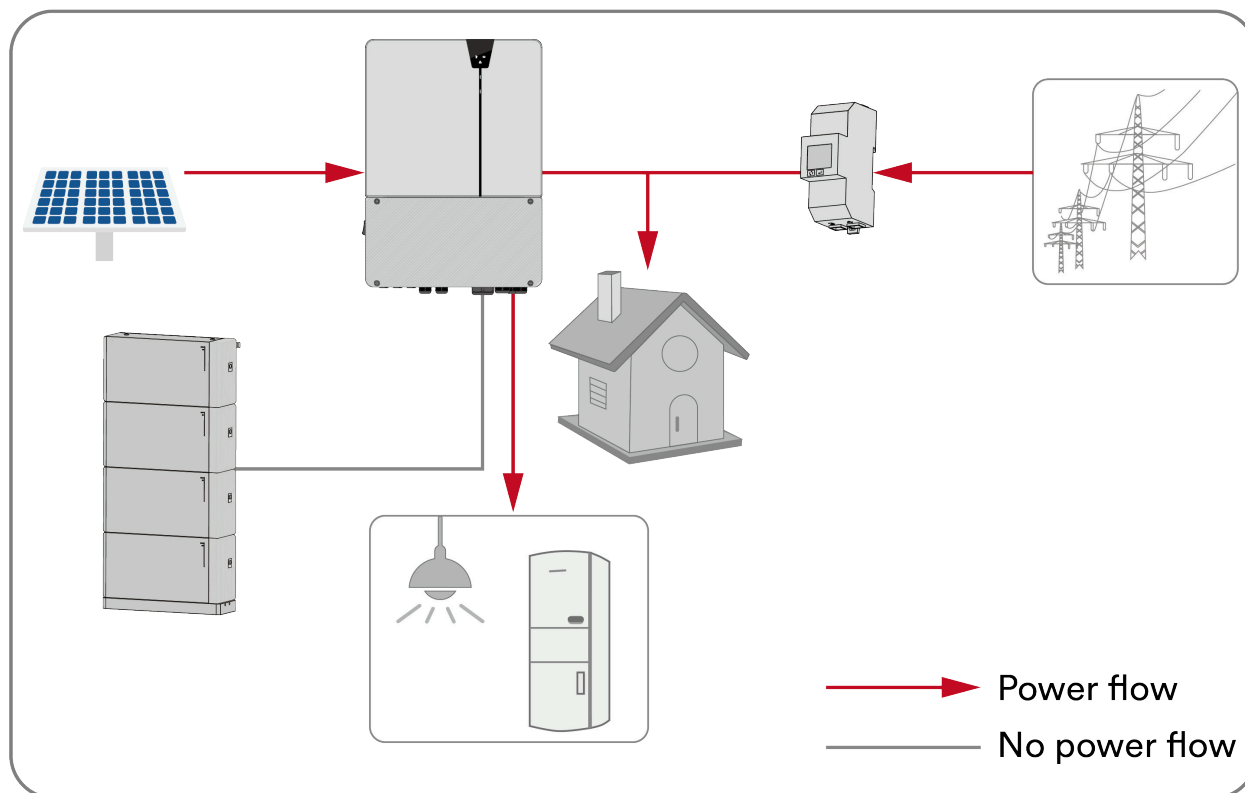
#### 4.7.2 Reserve power mode

The battery is considered as a back-up energy storage device. PV power prioritises the charging of the battery if it is not completely charged. The battery discharges only during a loss of the utility grid.

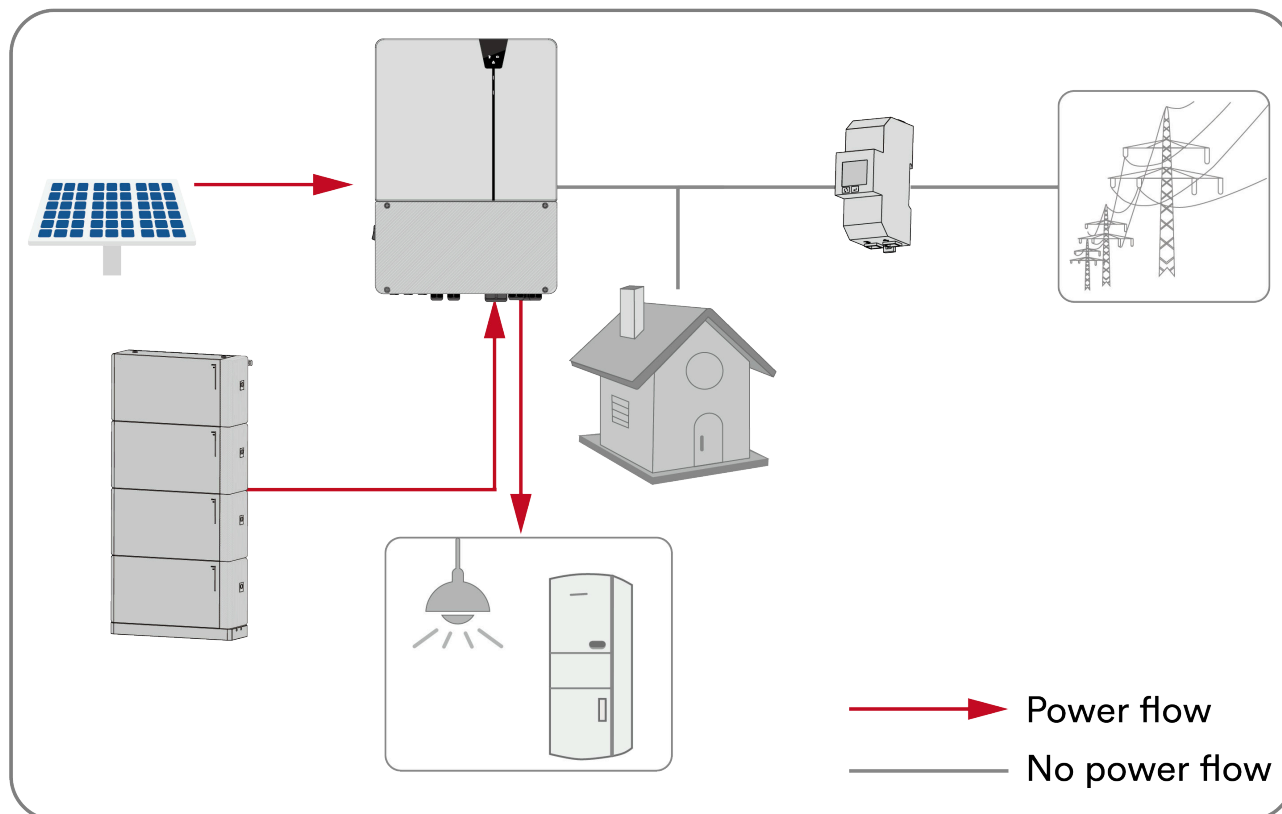
Case 1: The battery is not completely charged. PV power will prioritise the charging of the battery. The balance of load power, if required, is supplied from the utility grid.



Case 2: The battery is completely charged, the load power consumption is supplied by excess PV power and the balance, if required, is supplied by the utility grid.



Case 3: The battery discharges when there is a loss of the utility grid.



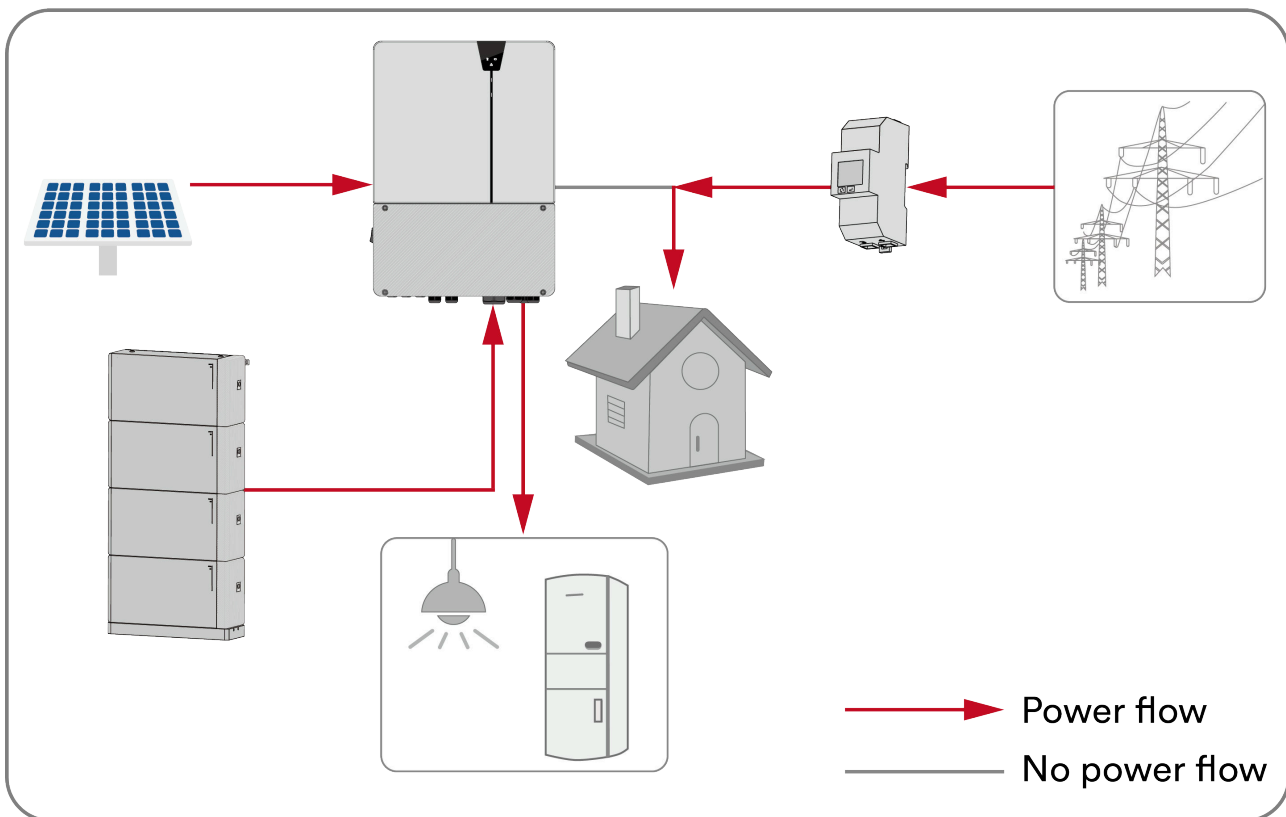
### 4.7.3 Custom Mode

Users can manage the energy according to their own needs, and set the daily regular charging and discharging on the app. Outside of these times the inverter operates in self-consumption mode.

This mode requires Ai-Dongle to connect to the network normally in order to function properly.

### 4.7.4 Off-grid mode

The product operates as a stand-alone inverter. Power is only supplied via the EPS port. No loads shall be connected to the normal AC output terminal.



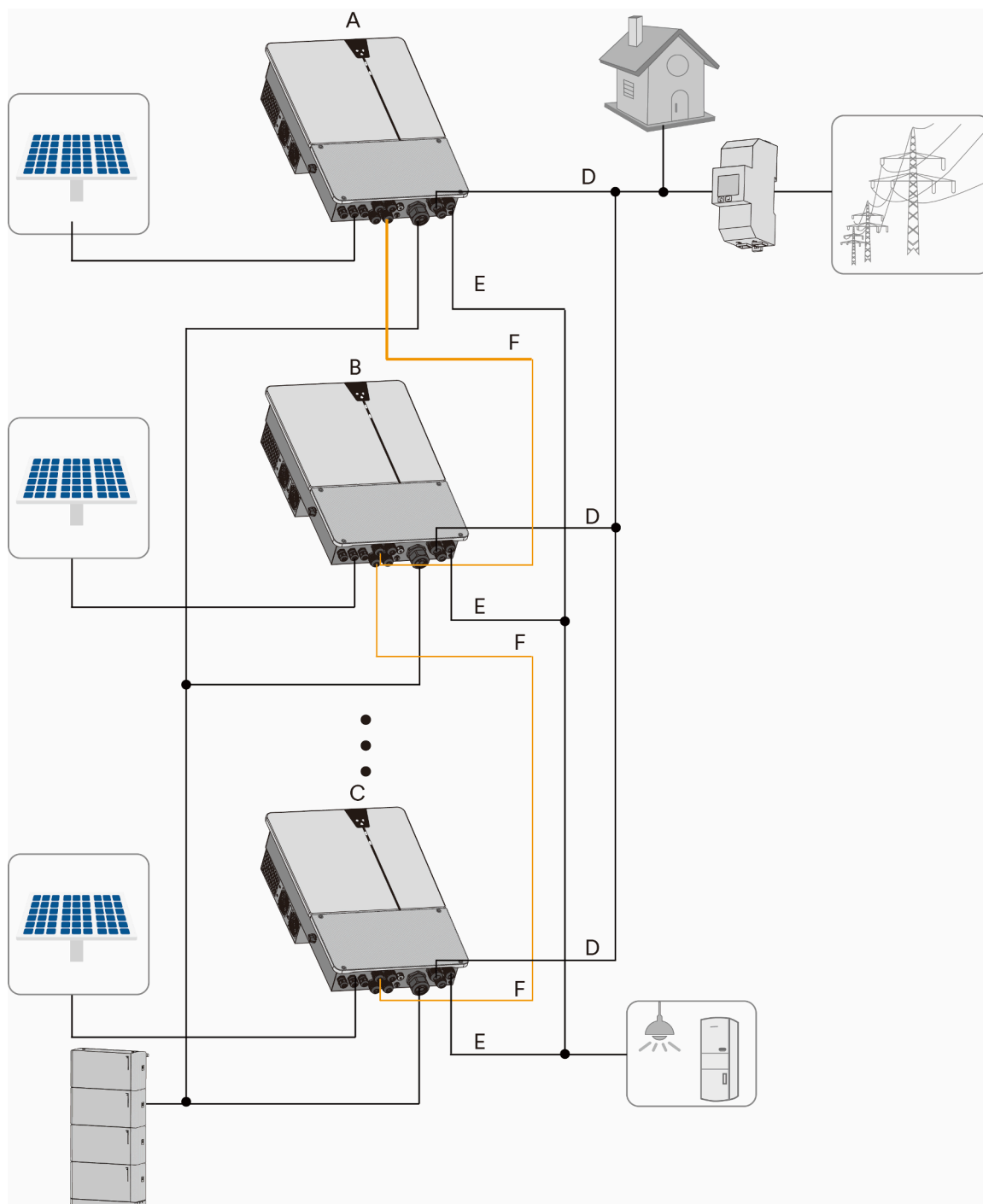
### 4.7.5 Time of use Mode

If the user chooses load first, then the inverter will operate in self-consumption mode when the grid charge is disabled. If grid charge is enabled, then the inverter will operate in back-up mode (battery SOC below the set point) or self-consumption mode (battery SOC above the set point.)

If the user chooses battery first, the PV power will first charge the battery when grid charge is disabled. If grid charge is enabled, the inverter will operate in back-up mode (when battery SOC is below the set point) or self-consumption mode (when battery SOC is above the set point).

## 4.8 Parallel System

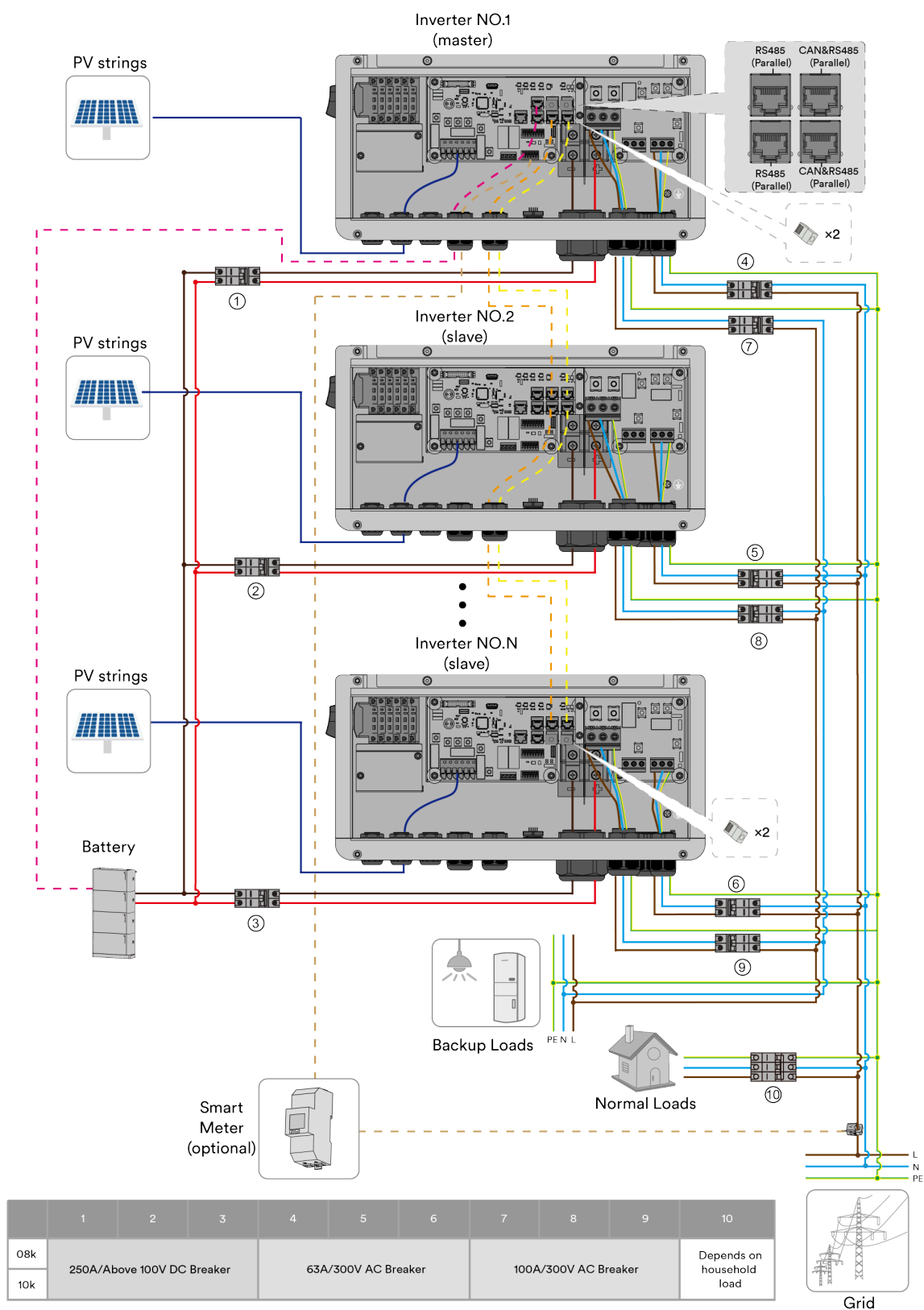
The hybrid inverter can operate in parallel with hybrid inverters of the same type. The system will also operate when there is a loss of the utility grid.



|                   |                    |                       |
|-------------------|--------------------|-----------------------|
| A Master Inverter | B Slave Inverter 1 | C Slave Inverter 2    |
| D Grid port       | E EPS load port    | F Communication cable |

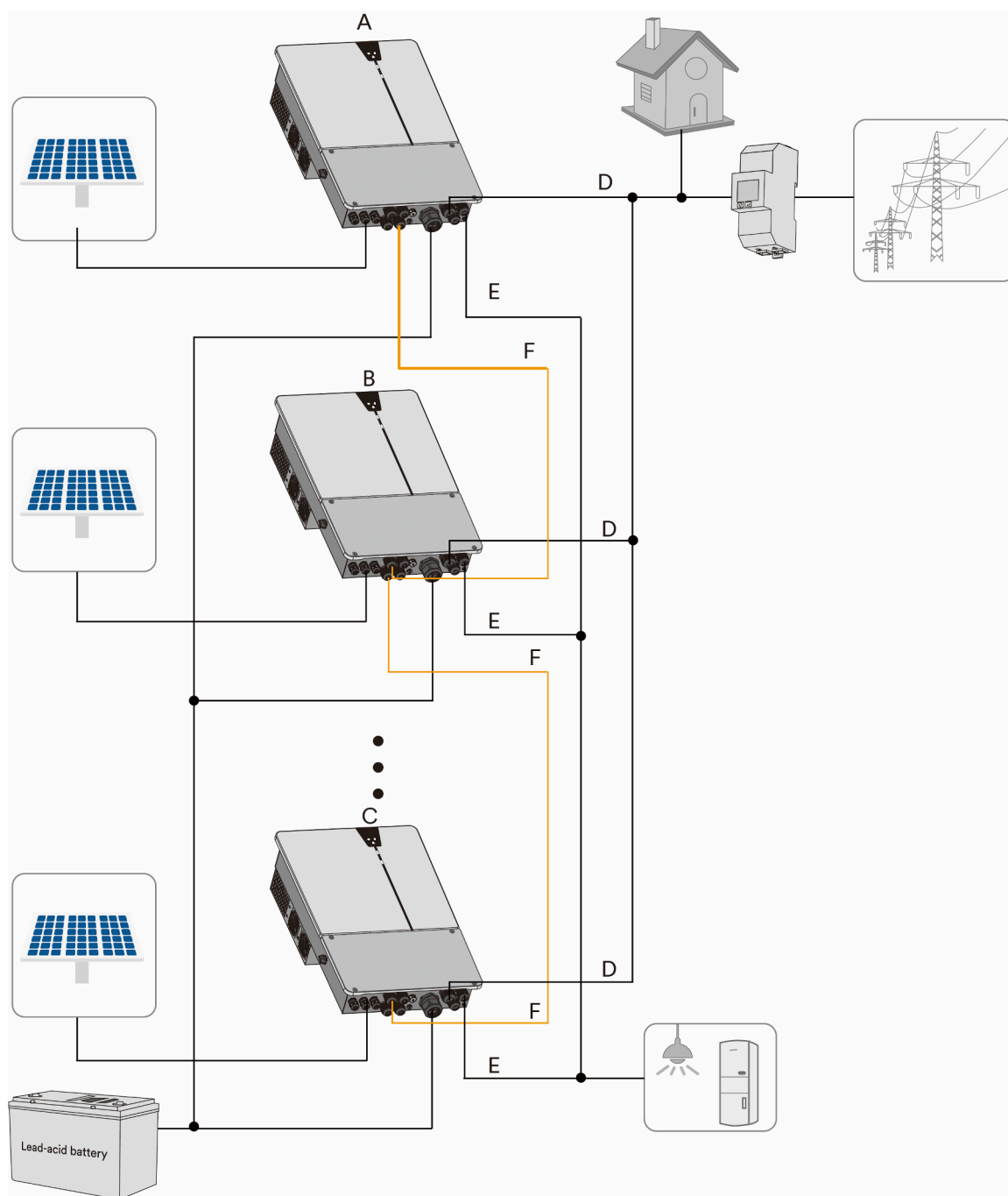


Hybrid inverters with the same model can be connected in parallel in grid port. the EPS load should be independent of each inverter and the battery should be same model, show as follows.



If parallel operation is required, please contact Solplanet or installer to purchase new accessories, specified meters and CT.

## 4.9 Lead-acid battery



|                   |                    |                       |
|-------------------|--------------------|-----------------------|
| A Master Inverter | B Slave Inverter 1 | C Slave Inverter N    |
| D Grid port       | E EPS load port    | F Communication cable |

## 5 Mounting

### 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.

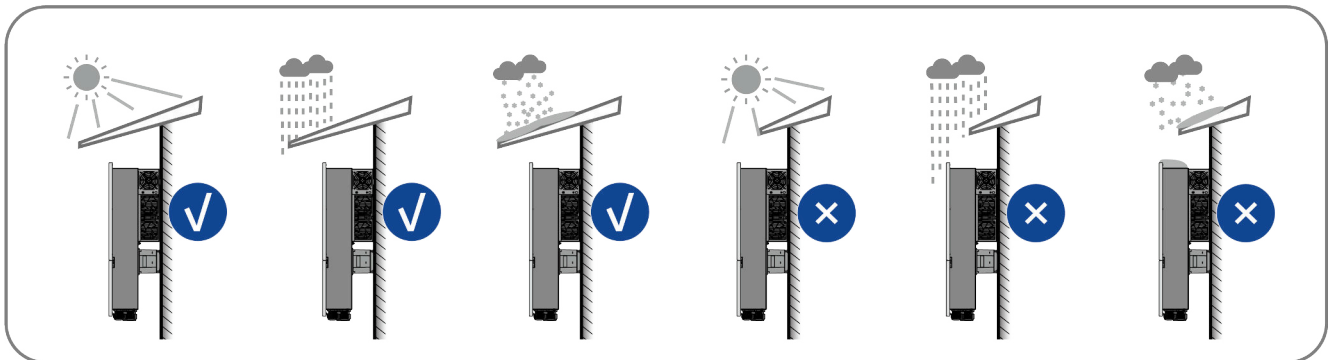
- Do not mount the product in areas containing highly flammable materials or gases.
- Do not mount the inverter in areas where there is a risk of explosion.

- To ensure optimal operation, an ambient temperature below 40°C is recommended.

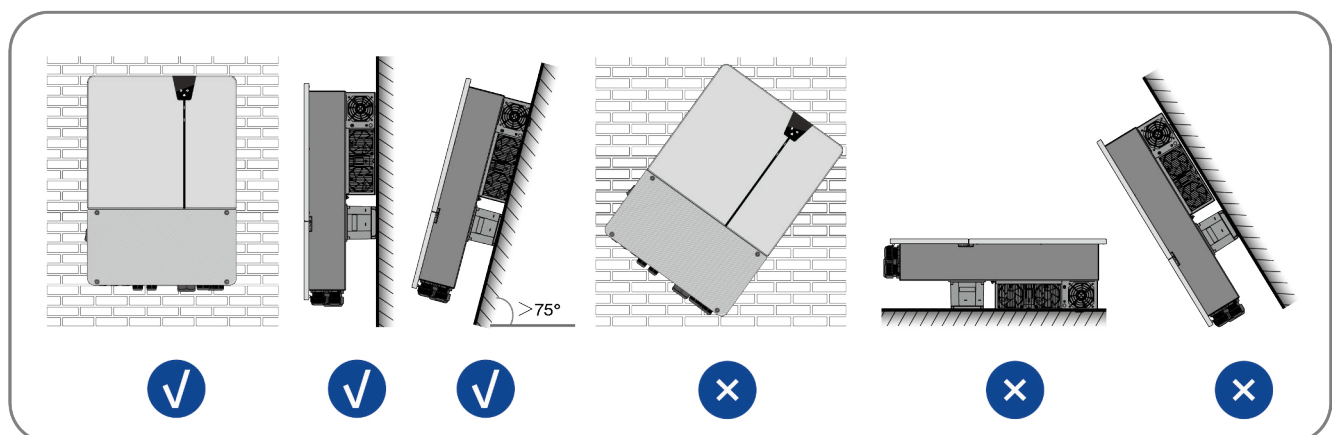
A solid support surface must be available (e.g., concrete or masonry). Ensure that the installation surface is solid enough to bear four times the weight of the inverter. When mounted on drywall or similar materials, the product may emit audible vibrations during operation.

The mounting location must be inaccessible to children.

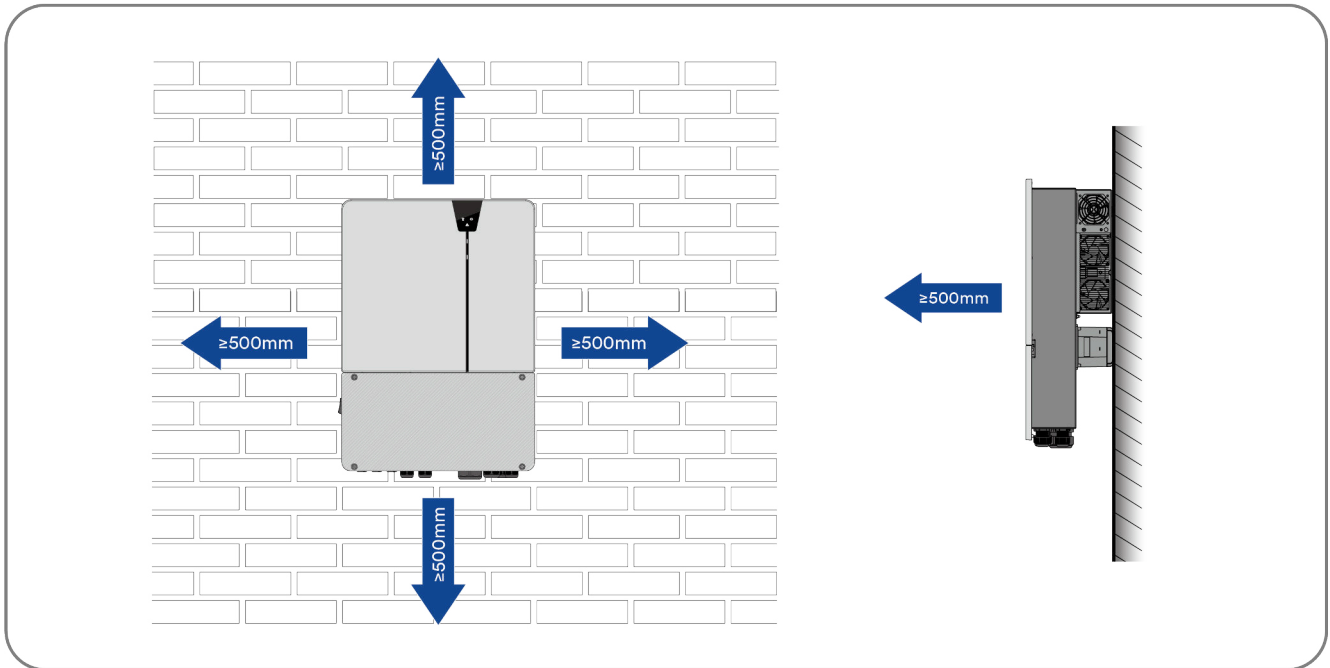
- The mounting location should be freely and safely accessible to authorised personnel at all times without the need for any auxiliary equipment (such as scaffolding or lifting platforms). Non-fulfilment of these criteria may impede servicing and system troubleshooting.
- Do not expose the mounting location to direct solar irradiation. Exposure to direct solar irradiation can cause the exterior plastic components to age prematurely and may result in overheating. Under high temperatures, the product will reduce its power output accordingly to avoid overheating.



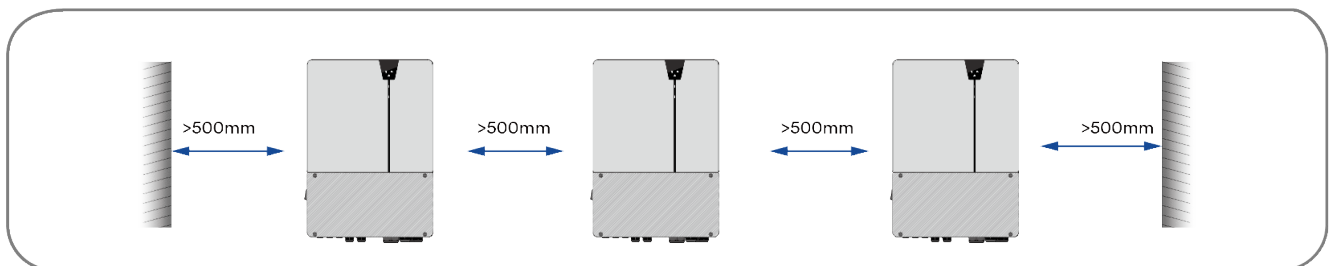
- Never install the inverter horizontally, or with a forward-tilt or upside down. Horizontal installation can lead to damage to the inverter.



- Maintain the recommended clearances to other walls and to other inverters or objects.



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



- Mount the product in a way that allows for easy recognition and reading of the LED signals.
- The DC switch of the product must always be readily accessible.

## 5.2 Taking out and moving the product

Open and remove the inverter out of the packaging, and place at the designated installation location.

### CAUTION

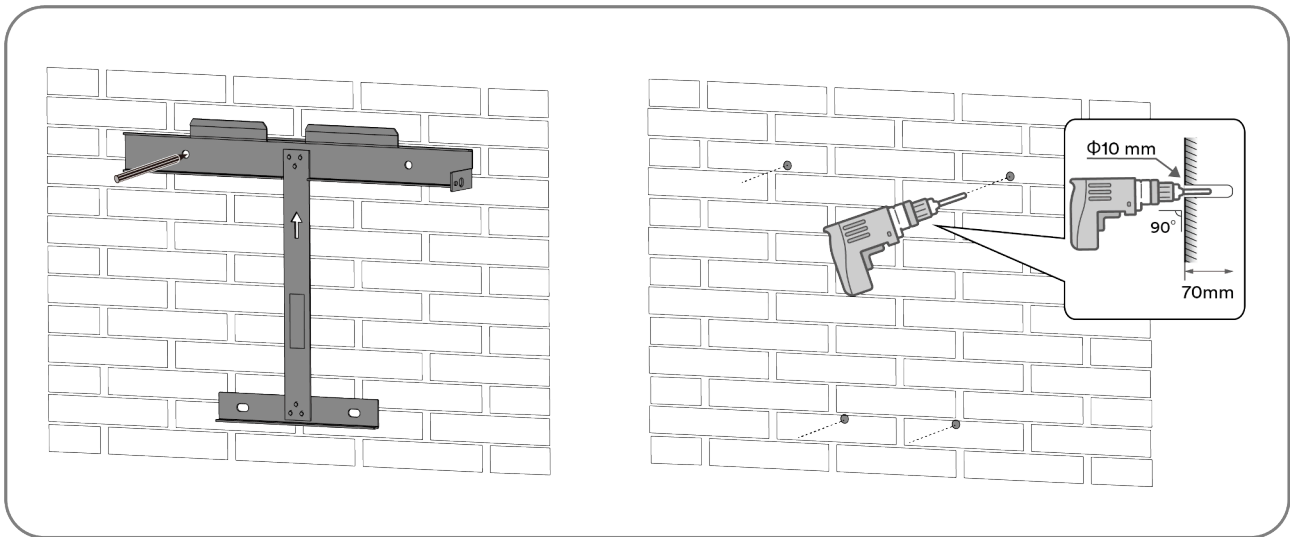
#### **Risk of injury due to the weight of the product!**

The net weight of this product is 34.5 kg. Incorrectly lifting the inverter during installation could cause it to fall, leading to injury or equipment damage.

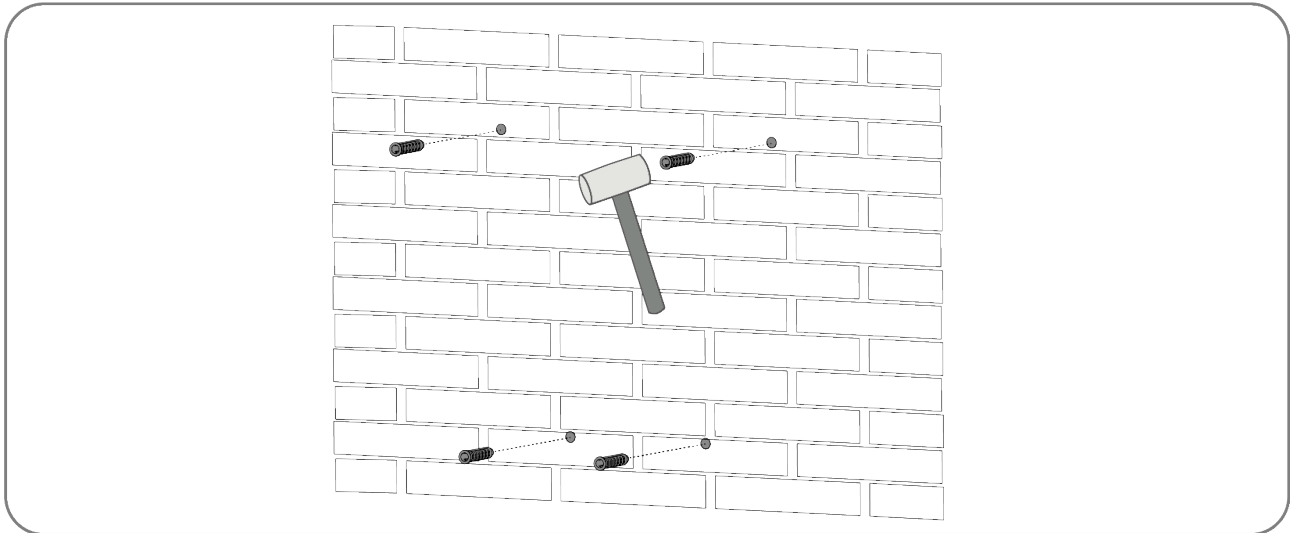
- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.

## 5.3 Mounting

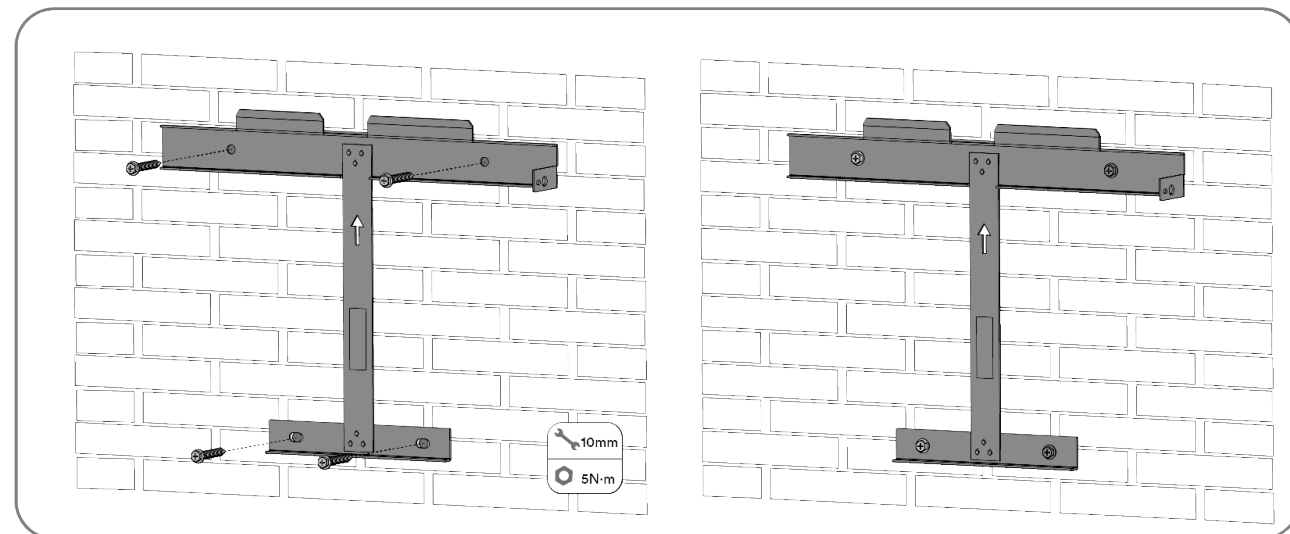
**Step 1:** Align the mounting-bracket horizontally on the wall with the arrow facing up. Mark the position of the drill holes. Set the wall mounting bracket aside and drill the marked holes with a diameter of 10mm. Drill to a depth of approximately 70 mm. Maintain the hammer drill perpendicular to the wall during drilling.



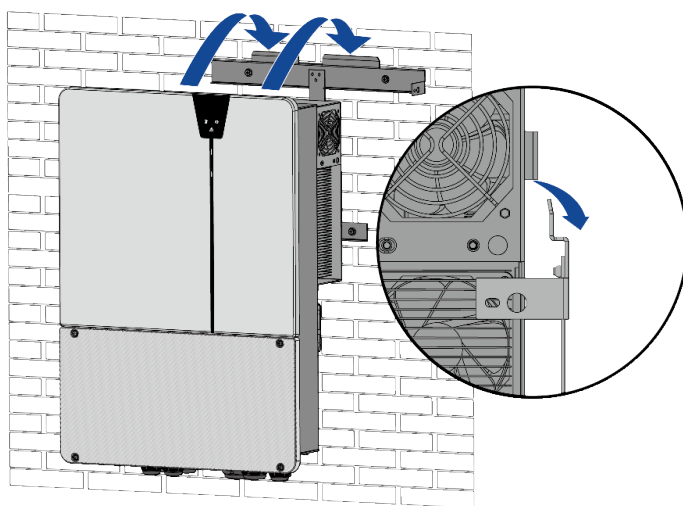
**Step 2:** Remove any dust from the hole, insert four expansion bolts into the holes, gently tap them into the hole with a rubber hammer.



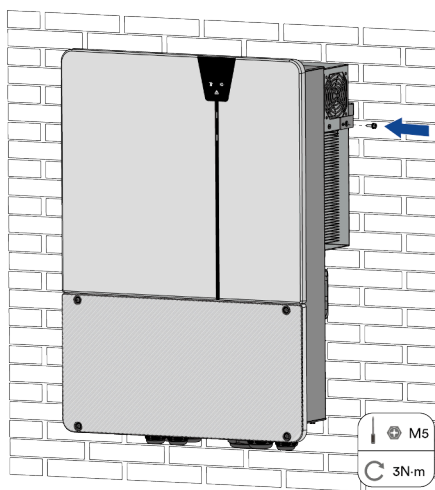
**Step 3:** Align the mounting-bracket with the holes and fix using the expansion bolts.



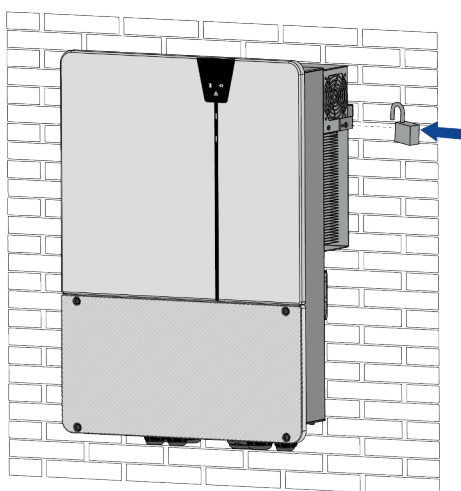
**Step 4:** Lift and place the inverter onto the mounting-bracket and ensure that the mounting flanges perfectly align with the mounting bracket.



**Step 5:** Secure the inverter by inserting screws into the threaded hole.



**Step 6:** To protect the inverter from theft, attach the padlock provided by customer through the wall mounting bracket and the inverter.



## 6 Electrical connection

### 6.1 Connection Interface Description

#### 6.1.1 Bottom cable entry

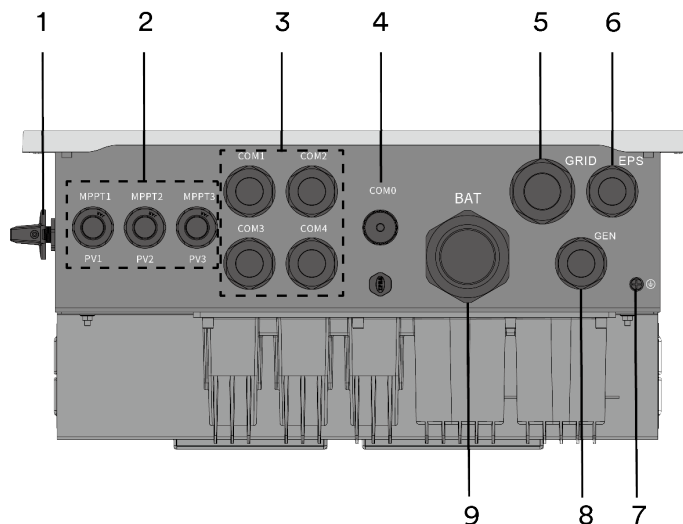


Figure shown here is for reference only. The actual product received may differ!

| Item | Description                                                 |
|------|-------------------------------------------------------------|
| 1    | DC-switch                                                   |
| 2    | DC cable entry glands for PV string connection              |
| 3    | Communication Ports (refer to 6.1.3 Interface Pinout Table) |
| 4    | Communication port for Ai-Dongle                            |
| 5    | AC cable entry gland for grid connection                    |
| 6    | AC cable entry gland for EPS load connection                |
| 7    | Additional grounding screw                                  |
| 8    | AC cable entry gland for generator connection               |
| 9    | DC cable entry gland for battery connection                 |

#### 6.1.2 Internal wiring terminal

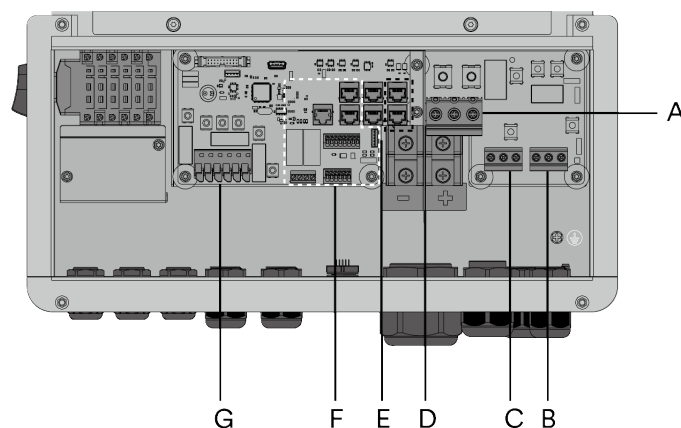
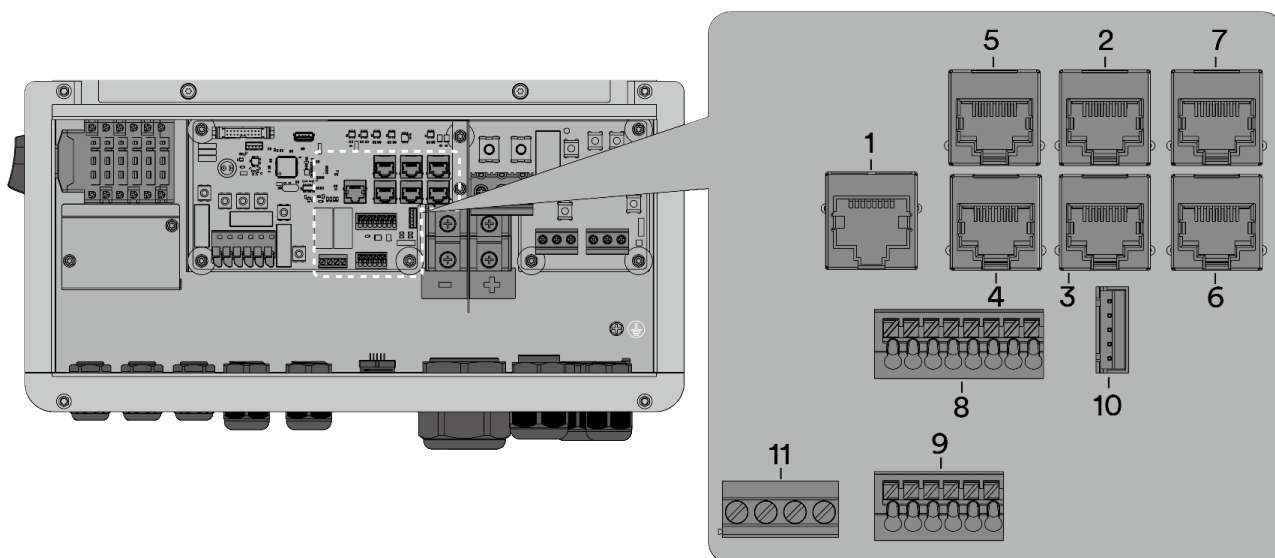


Figure shown here is for reference only. The actual product received may differ!

| Item | Description                                                                      |
|------|----------------------------------------------------------------------------------|
| A    | Terminal block for grid connection                                               |
| B    | Terminal block for EPS load connection                                           |
| C    | Terminal block for generator connection                                          |
| D    | Terminal block for battery connection                                            |
| E    | RJ45 ports used for parallel connection (refer to 6.1.3 Communication Interface) |
| F    | Communication interface (refer to 6.1.3 Communication Interface)                 |
| G    | Terminal block for PV string connection                                          |

### 6.1.3 Communication Interface

The inverter features a communication board with multiple interfaces, supporting connections such as LFP battery BMS, smart meter, and parallel inverters. The interface layout is shown below.



**Interface Pinout Table**

| Num. | Label | Description            | Terminal | PIN Definition |         |     |       |         |         |               |           |
|------|-------|------------------------|----------|----------------|---------|-----|-------|---------|---------|---------------|-----------|
|      |       |                        |          | 1              | 2       | 3   | 4     | 5       | 6       | 7             | 8         |
| 1    | CN704 | Ethernet               | COM2     | TXP            | TXN     | RXP | 3V3   | 3V3     | RXN     | X             | GND       |
| 2    | CN705 | RS485 (reserved)       | COM2     | RS485A         | RS485B  | GND | X     | X       | X       | X             | X         |
| 3    | CN706 | RS485 (reserved)       | COM1     | RS485A         | RS485B  | GND | X     | X       | X       | X             | X         |
| 4    | CN707 | Monitor (RS485)        | COM1     | RS485BA        | RS485BB | GND | X     | X       | X       | RS485A        | RS485B    |
| 5    | CN708 | BMS                    | COM2     | X              | GND     | X   | CAN H | CANL    | X       | RS485EA       | RS485EB   |
| 6    | CN709 | CAN & RS485 (Parallel) | COM4     | CANBH          | CANBL   | GND | GND   | RS485AA | RS485AB | RS485B_I<br>O | RS485A_IO |
| 7    | CN710 | CAN & RS485 (Parallel) | COM1     | CANBH          | CANBL   | GND | GND   | RS485AA | RS485AB | RS485B_I<br>O | RS485A_IO |



| Num. | Label | Description                             | Terminal | PIN Definition |          |       |          |          |          |     |        |
|------|-------|-----------------------------------------|----------|----------------|----------|-------|----------|----------|----------|-----|--------|
|      |       |                                         |          | 1              | 2        | 3     | 4        | 5        | 6        | 7   | 8      |
| 8    | CN701 | DRM/<br>NS protection                   | COM3     | DI_1           | DI_2     | DI_3  | DI_4     | DRM0     | GND      | GND | ON/OFF |
| 9    | CN702 | PT100(1,2)/<br>CT (3,4)/ METER<br>(5,6) | COM3     | 3V3            | PT100_IN | CT+   | CT-      | RS485D A | RS485D B |     |        |
| 10   | CN703 | Ai-Dongle*                              | COM0     | 5V0            | GND      | GND   | RS485C A | RS485CB  |          |     |        |
| 11   | CN711 | DO1/DO2                                 | COM4     | DO2_A          | DO2_B    | DO1_A | DO1_B    |          |          |     |        |

\*It is wired internally before delivery.

| Com port | Description                                     | Function                                                                                                                                                                                                                                                                                                                                                  |
|----------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Ethernet                                        | Used for Ethernet communication, supporting Modbus TCP/IP protocol and API integration for advanced monitoring and control.                                                                                                                                                                                                                               |
| 2        | RS485 port                                      | Reserved for future RS485 communication applications.                                                                                                                                                                                                                                                                                                     |
| 3        | RS485 port                                      | Reserved for future RS485 communication applications.                                                                                                                                                                                                                                                                                                     |
| 4        | Monitor device                                  | The RS485 interface (PIN 1, PIN 2) is used to connect the product to a third-party monitoring device, supporting Modbus RTU communication.                                                                                                                                                                                                                |
| 5        | BMS communication port                          | The RS485/CAN interface is used to connect the Battery Management System (BMS). Depending on the BMS communication interface, the corresponding pins (RS485 or CAN) can be selected for connection.                                                                                                                                                       |
| 6        | Parallel interface                              | RS485 interface used for inverter parallel operation. Ensures synchronization between inverters when multiple units are connected in parallel.                                                                                                                                                                                                            |
| 7        | Parallel interface                              | CAN interface used for inverter parallel operation. Ensures synchronization between inverters when multiple units are connected in parallel.                                                                                                                                                                                                              |
| 8        | Ripple control receiver/DRMs port/NS protection | Used to connect the ripple control receiver or DRM (Demand Response Mode) devices. Supports external control for load management and grid compliance.<br><br>NS protection (between 12V to 24V): The product is equipped with one communication interface to connect an external central grid protection device. Choose either one of the two interfaces. |
| 9        | Smart Meter/CT/PT100 Interface                  | Used to connect a smart meter, current transformer (CT), or PT100 temperature sensor. Allows measurement of export power and monitoring of battery temperature.                                                                                                                                                                                           |
| 10       | Ai-Dongle internal connector                    | The port for connecting an Ai-Dongle to enable wireless communication and remote monitoring. Do not connect any other device to the USB port.                                                                                                                                                                                                             |
| 11       | DO1/DO2                                         | Provides two digital outputs (DO1 and DO2) for external device control, such as starting/stopping a diesel generator or controlling intelligent loads like heat pumps or EV chargers.                                                                                                                                                                     |

## 6.2 Connecting additional grounding

The inverter is equipped with a residual current monitoring unit (RCMU). The RCMU 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.

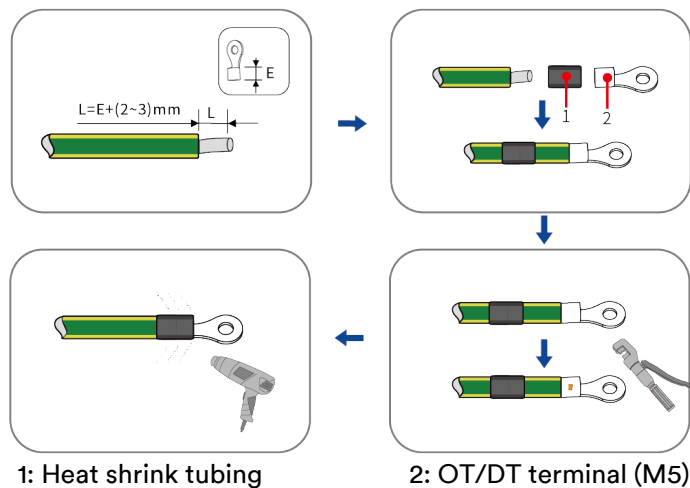
If the grounding conductor monitoring function is deactivated or the additional grounding is required by locally standard, you can connect additional grounding to the inverter.

### Requirements for the secondary protection ground cable:

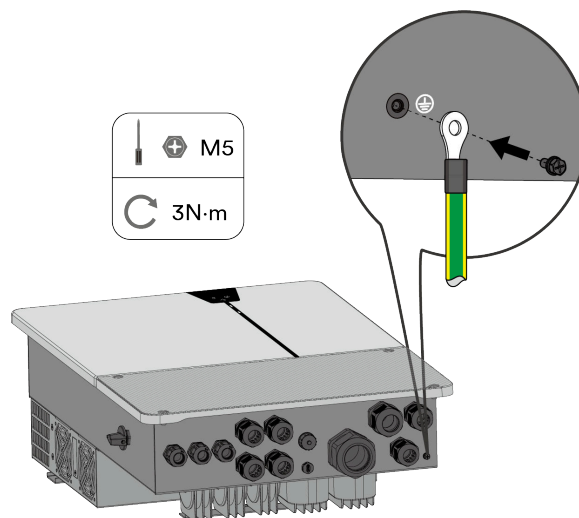
| Item | Description                   | Note                                        |
|------|-------------------------------|---------------------------------------------|
| 1    | Screw                         | M5, supplied                                |
| 2    | OT/DT terminal                | Specifications M5, provided by the customer |
| 3    | Yellow and green ground cable | Same as the PE wire in the AC cable.        |

### Procedure:

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



**Step 2:** Remove the screw on the ground terminal, insert the screw through the OT/DT terminal and tighten the screw into the threaded ground terminal using a screwdriver.



**Step 3:** Apply a corrosion resistant coating to the grounding terminal to prevent corrosion.

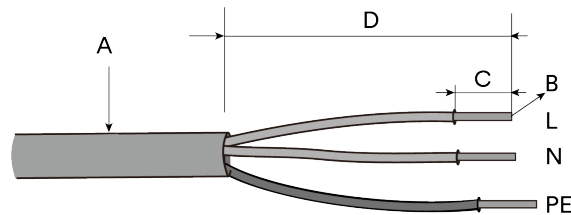
**Installation complete**

## 6.3 AC Grid Connection

### 6.3.1 Requirements for AC Grid 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                    | 18-25 mm               |
| B    | Copper cable conductor cross-section | $\leq 16 \text{ mm}^2$ |
| C    | Insulation stripping length          | 18-20 mm               |
| D    | Sheath stripping length              | approx. 80 mm          |

#### 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 (RCD) when operating.



If local regulations require the use of an RCD, please install a type A RCD with a protection limit of not less than 300 mA.

#### Overvoltage category

The inverter can be used in grids of overvoltage category III or lower in accordance with IEC 60664-1. This means that the product can be permanently connected to the grid-connection point of a building. In case of installations with a 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 circuit with a dedicated circuit breaker. The circuit breaker will also provide a point of isolation to allow electrical work to be carried out during installation or maintenance. Please refer to the local electrical regulations for further information.

Avoid connecting any consumer load between the 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.

\* It can be set on the APP according to customer requirements.



#### 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 cable 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.

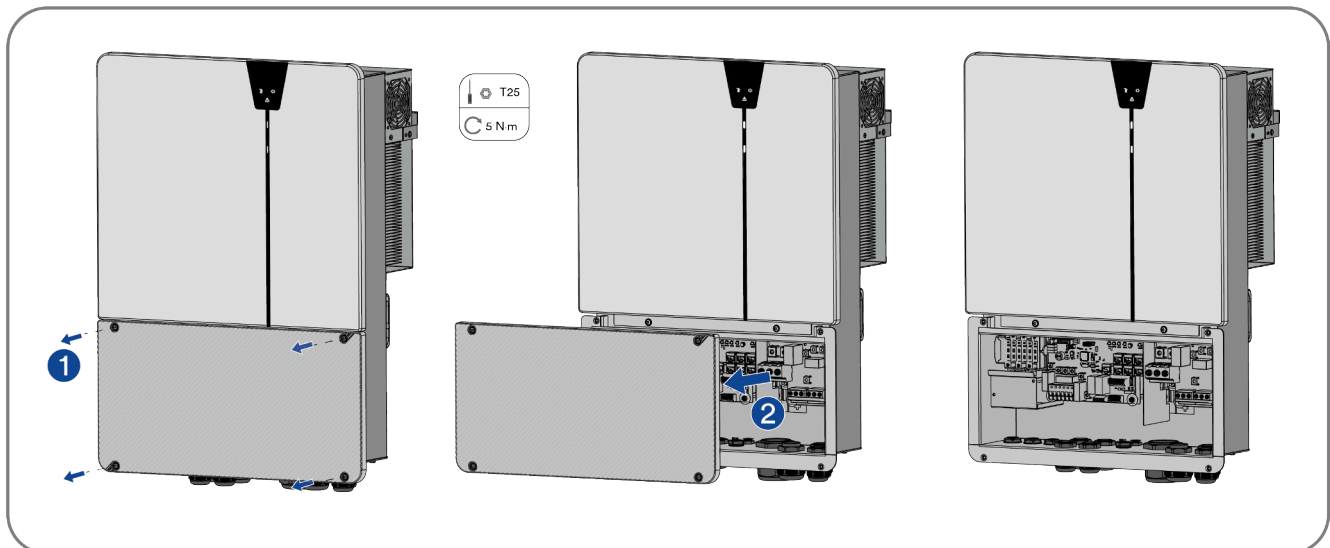
## 6.3.2 AC Grid Cable Connection

### Procedure:

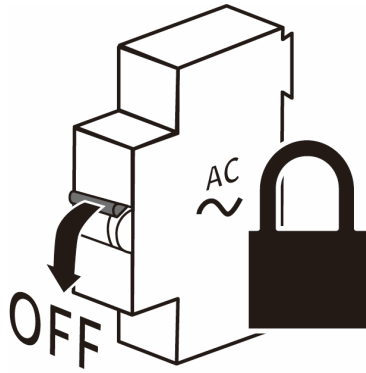
**Step 1:** Remove the cover of the lower wiring enclosure.



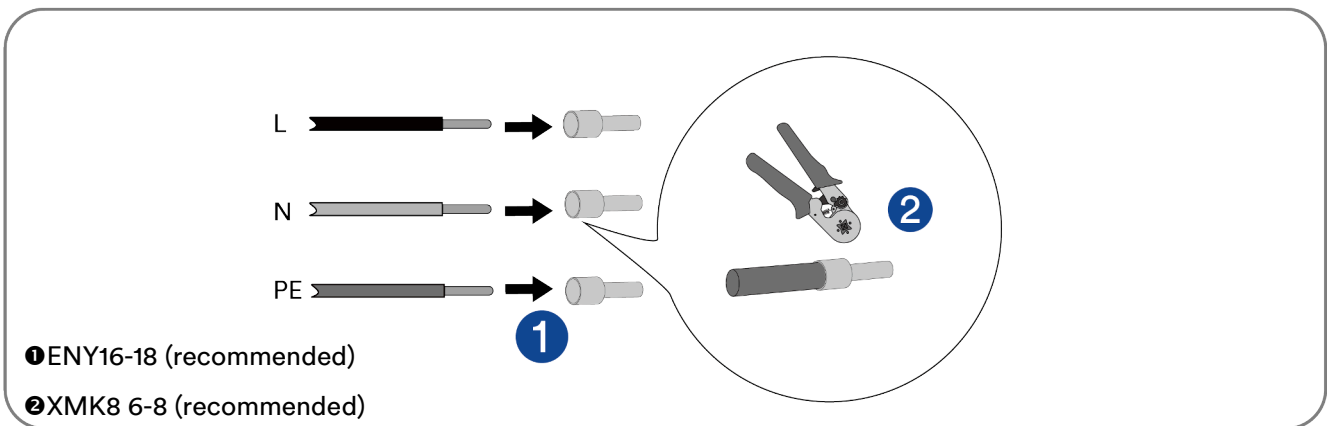
- The tool for opening the wiring enclosure is supplied with the inverter. After removing the cover, please put aside the tool and screws properly for later use. Do not dispose the tool and screws!
- Remove the cover in dry conditions and take the appropriate measures to ensure that the inverter remains dry during installation or maintenance. Avoid performing electrical work in outdoor areas under wet conditions at all times!
- Under no circumstances should the upper cover of the enclosure be removed. Removal will void the manufacture's warranty



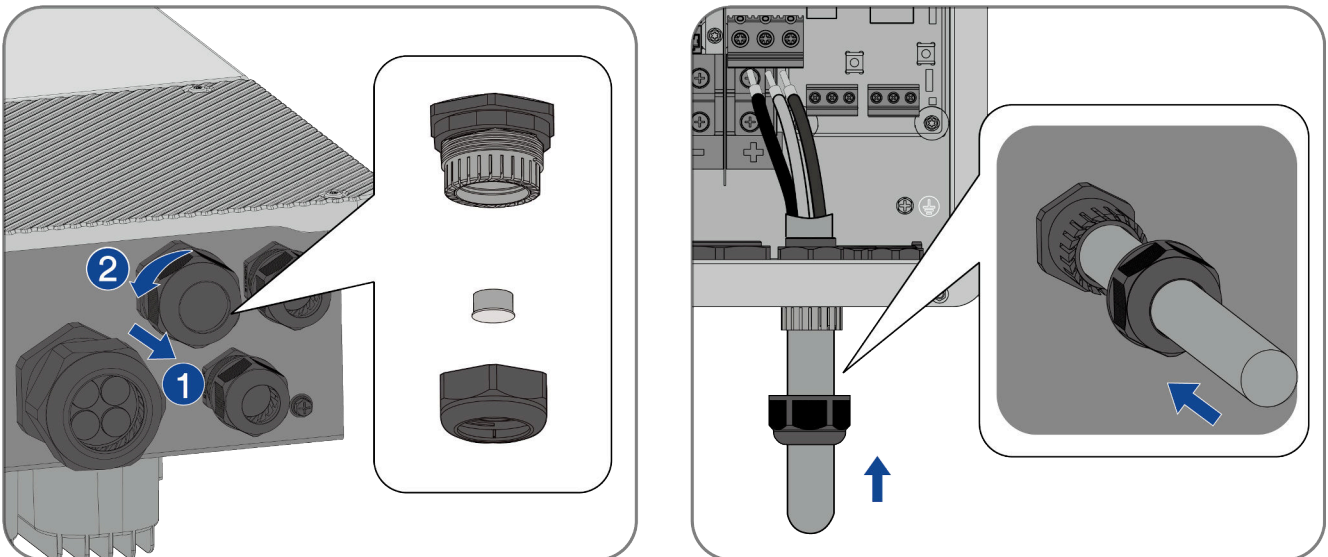
**Step 2:** Switch off the circuit breaker protecting the inverter circuit and switch off and isolate all energy sources up stream and down stream of the circuit breaker and secure it against inadvertent energisation. Use an appropriately rated multimeter to ensure there is no AC voltage present on each of the terminals on the circuit breaker.



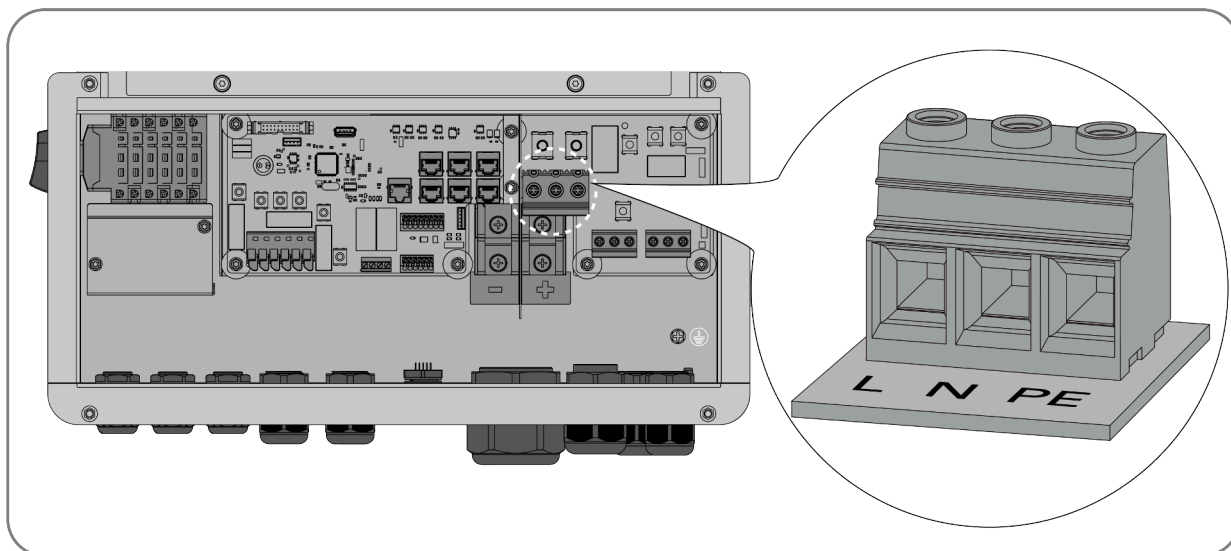
**Step 3:** Crimp appropriately sized bootlace ferrules onto the exposed wires of the cable using a suitable crimping tool.



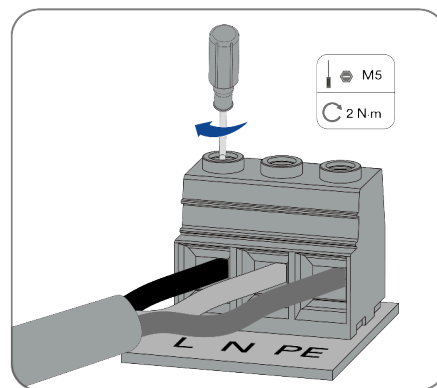
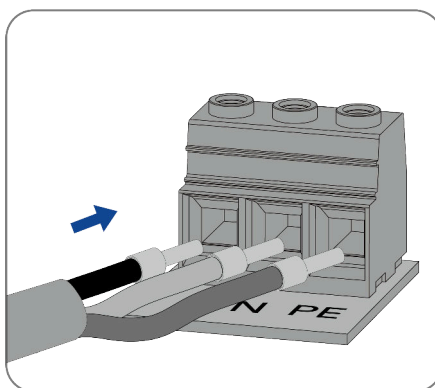
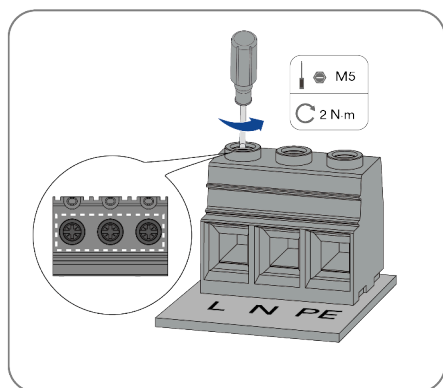
**Step 4:** Remove the AC grid cable gland nut and feed the AC cable into the wiring enclosure.



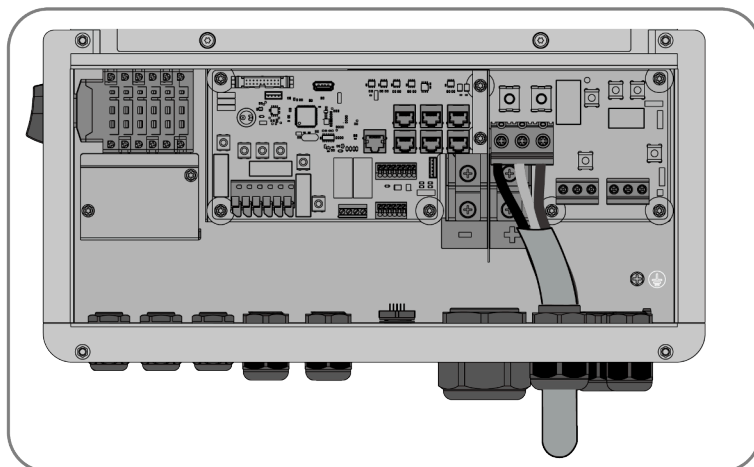
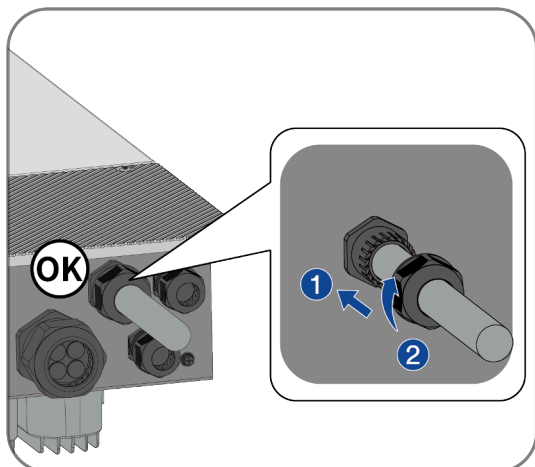
**Step 5:** Locate the AC grid terminal block.



**Step 6:** Loosen the screws on the AC grid terminal block, insert the AC cable into the terminal, and tighten the screw in accordance with the specified torque settings shown in the image below.



**Step 7:** Tighten the AC grid cable gland nut onto the threaded gland body.



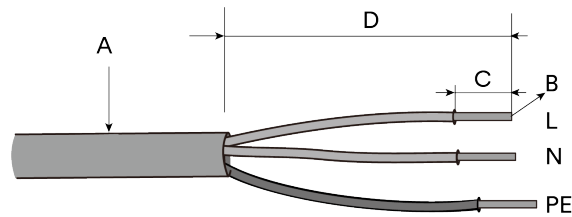
## 6.4 EPS Load cable connection

### 6.4.1 Requirements for the EPS Load 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                    | 18-25 mm                                          |
| B    | Copper cable conductor cross-section | 8kW: 8 mm <sup>2</sup> / 10kW: 10 mm <sup>2</sup> |
| C    | Insulation stripping length          | 12-14 mm                                          |
| D    | Sheath stripping length              | approx. 80 mm                                     |

## 6.4.2 EPS Cable Connection

### **DANGER**

**Danger to life due to live voltage on EPS port when inverter is without load !**

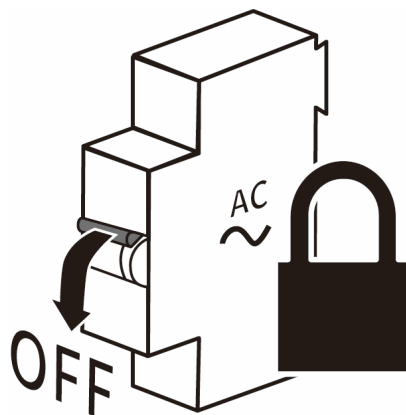
Even when the inverter is not connected to any load while powered on, the EPS port may still carry live voltage.

To avoid electric shock:

- Strictly follow the wiring instructions
- Ensure all system switches are turned off and that all sources of energy are isolated during installation or removal of EPS loads
- Use insulated tools
- Verify that voltage is not present on the EPS port is zero using a voltage tester before handling the EPS port
- Wear appropriate personal protective equipment (PPE)

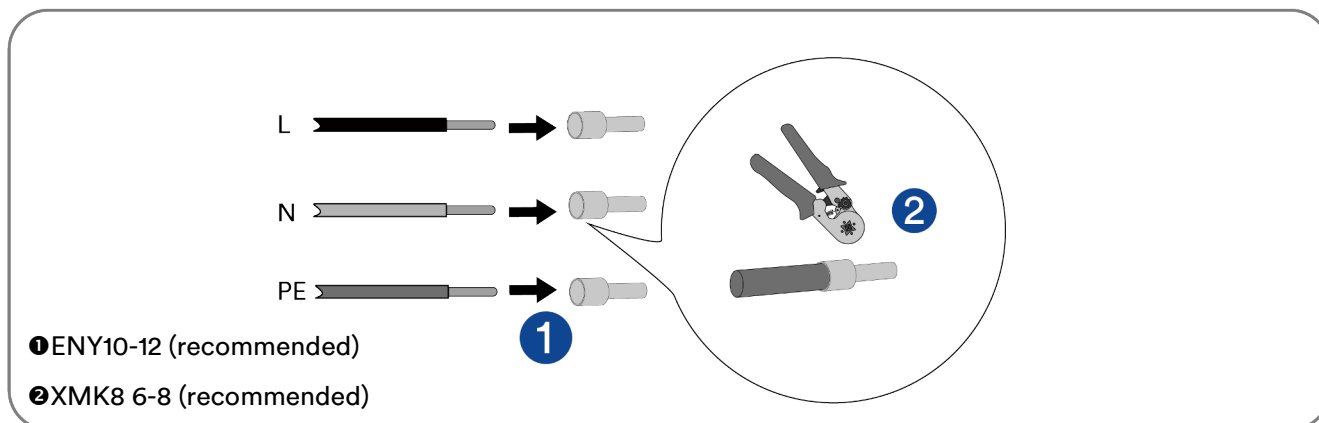
### Procedure:

**Step 1:** Switch off the circuit breaker protecting the inverter circuit and and switch off and isolate all energy sources up stream and down stream of the circuit breaker and secure it against inadvertent energisation. Use an appropriately rated multimeter to ensure there is no AC voltage present on each of the terminals on the circuit breaker.

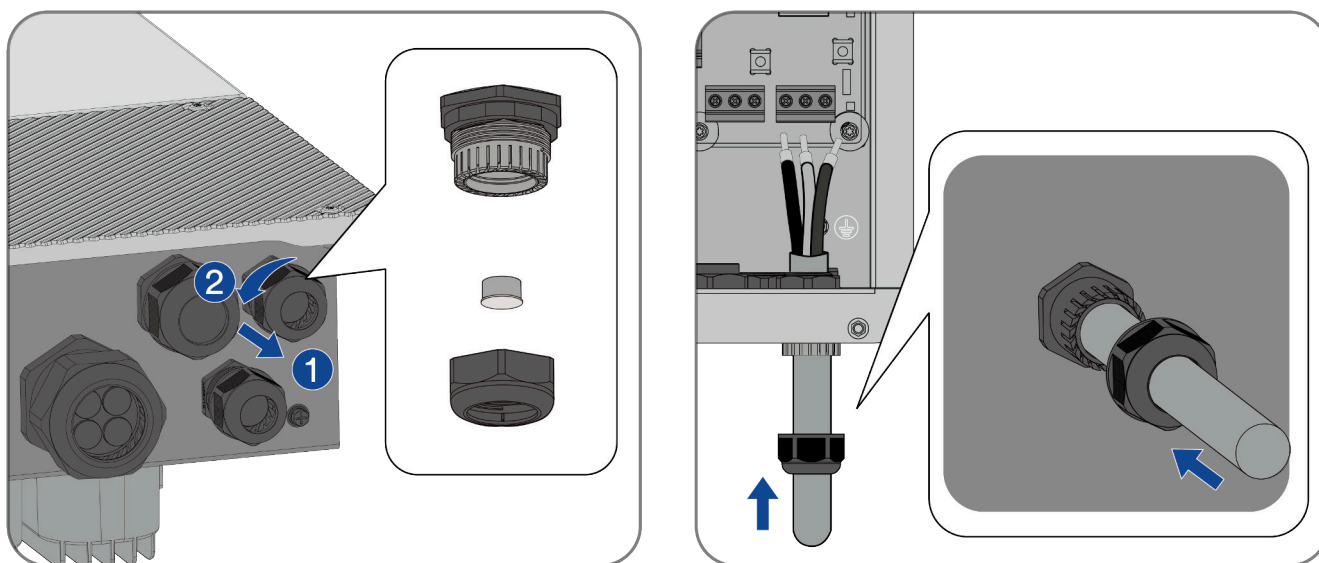




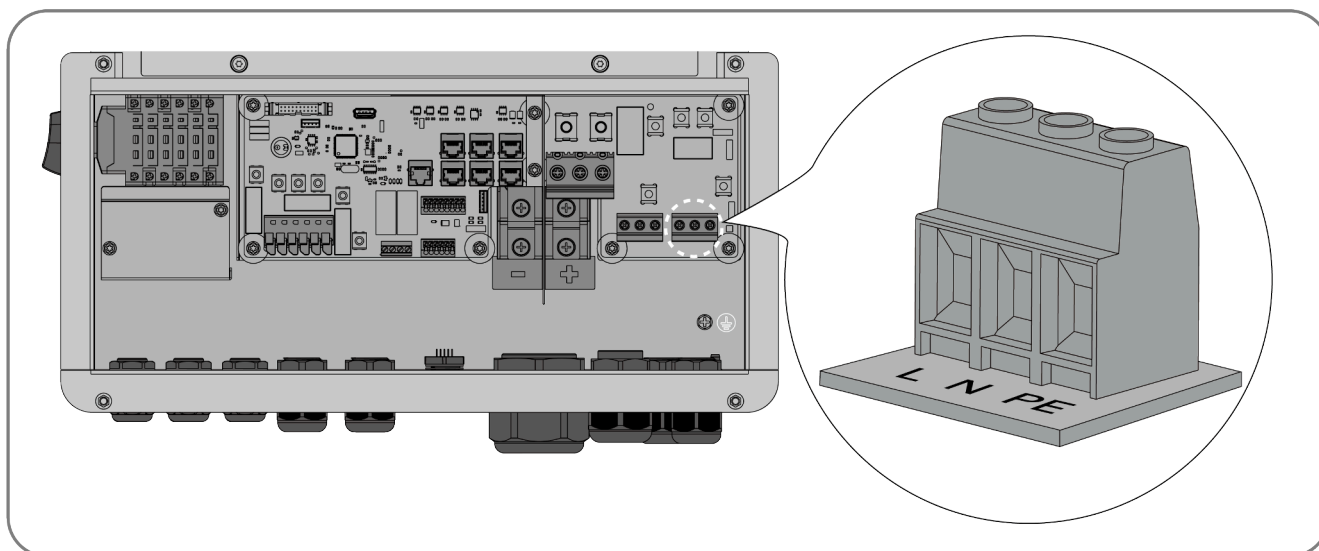
**Step 2:** Crimp appropriately sized bootlace ferrules onto the exposed wires of the cable using a suitable crimping tool.



**Step 3:** Remove the EPS load cable gland nut and feed the EPS AC cable into the wiring enclosure.

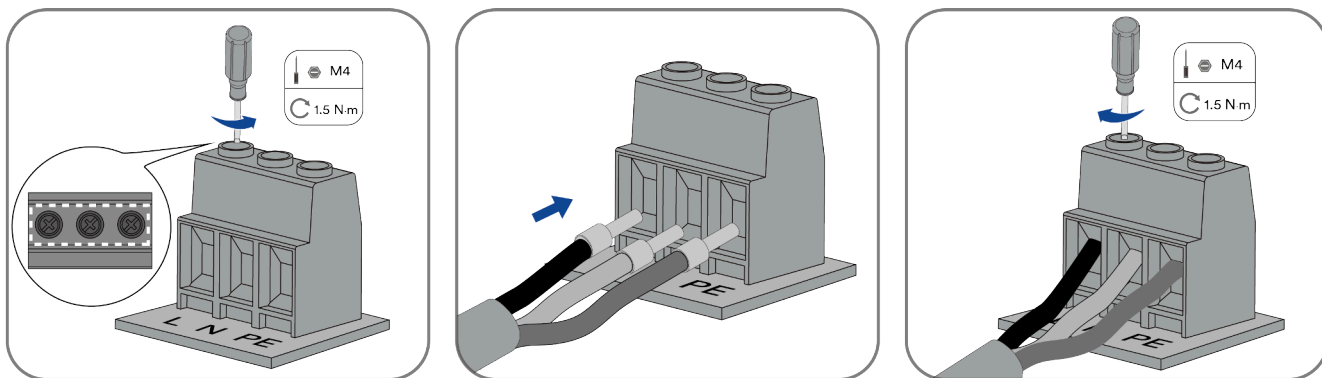


**Step 4:** Locate the EPS load terminal block

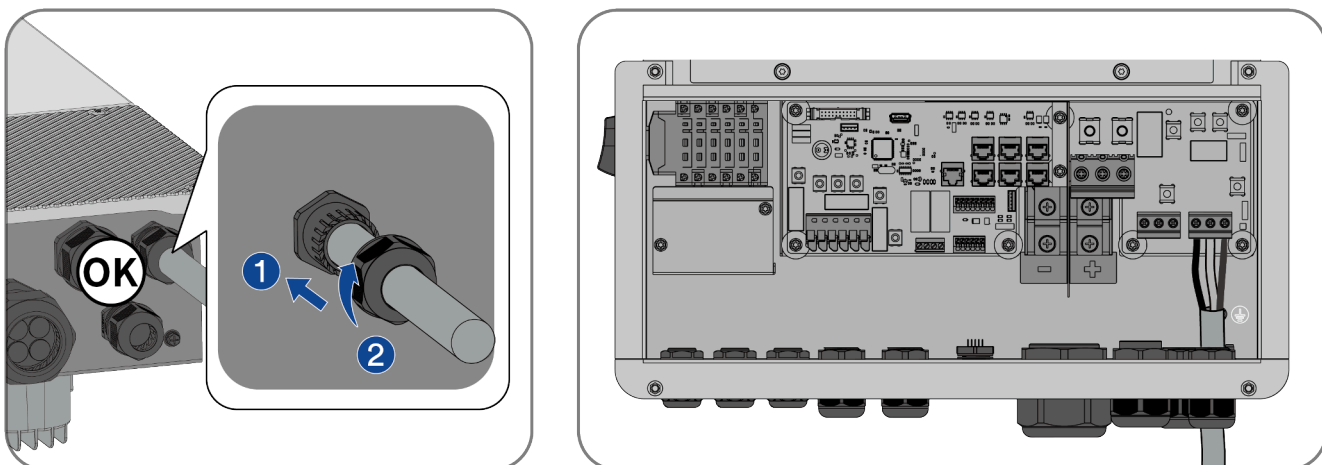


**Step 5:** Loosen the screws on the EPS load terminal block, insert the AC cable into the terminal block, and tighten the screw in accordance with the specified torque settings shown in the image below.





**Step 6:** Tighten the EPS load cable gland nut onto the threaded gland body.



**Complete the installation.**

## 6.5 Generator cable connection

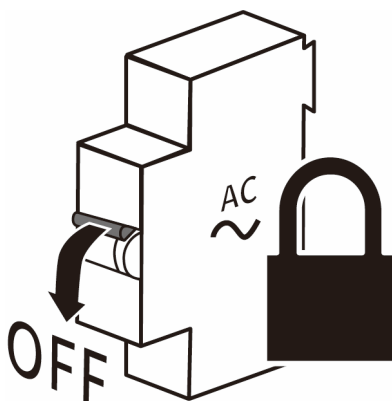
### 6.5.1 Requirements for the Generator connection

For Generator connection requirements, refer to “6.4.1 Requirements for the EPS Load connection” for details.

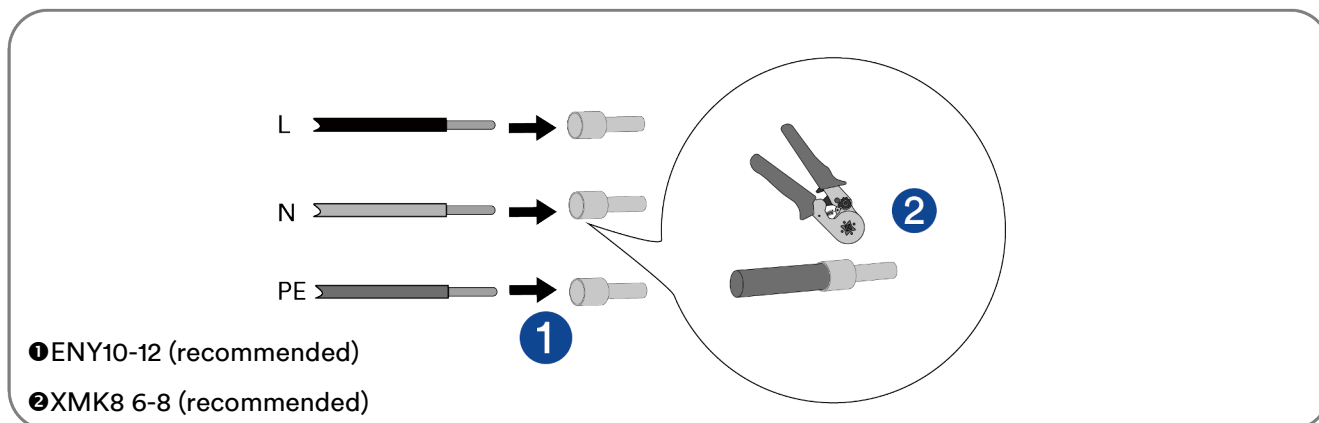
### 6.5.2 Assembling the Generator connectors

#### Procedure:

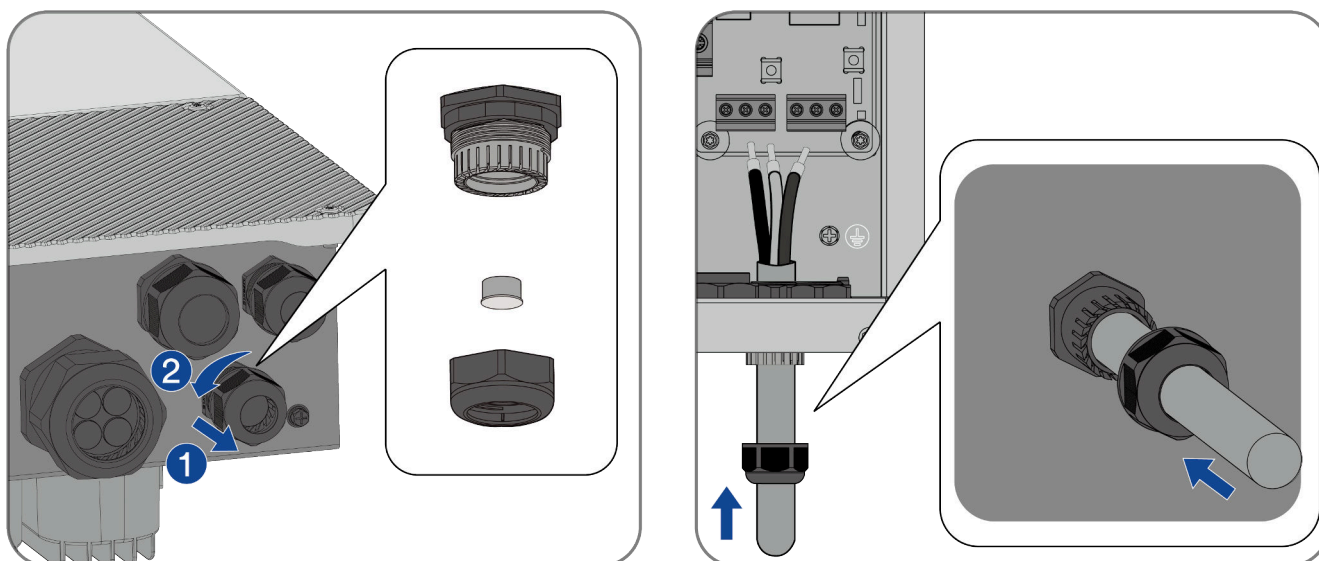
**Step 1:** Switch off the circuit breaker protecting the inverter circuit and switch off and isolate all energy sources up stream and down stream of the circuit breaker and secure it against inadvertent energisation. Use an appropriately rated multimeter to ensure there is no AC voltage present on each of the terminals on the circuit breaker.



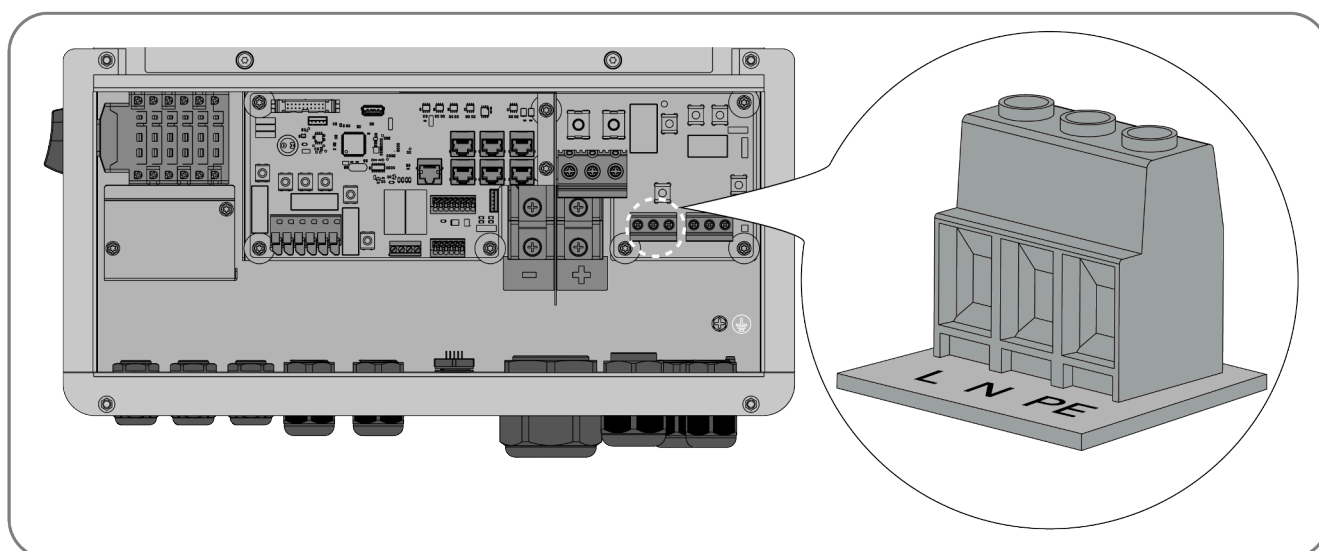
**Step 2:** Crimp appropriately sized bootlace ferrules onto the exposed wires of the cable using a suitable crimping tool.



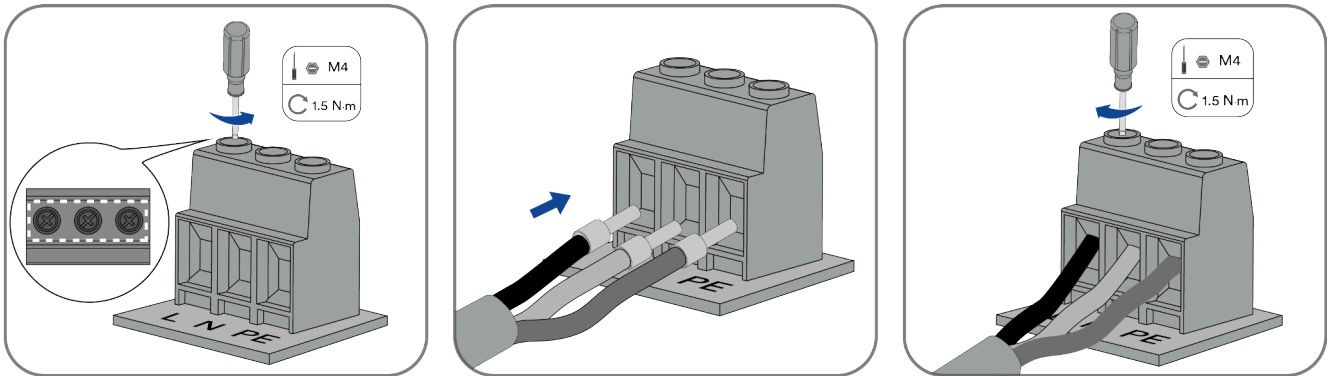
**Step 3:** Remove the EPS load cable gland nut and feed the EPS AC cable into the wiring enclosure.



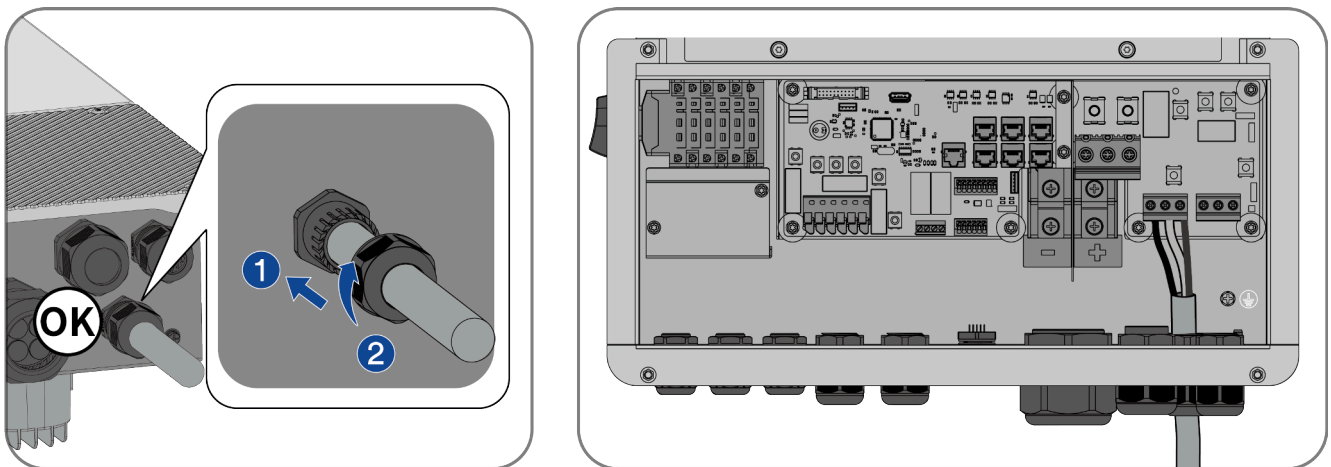
**Step 4:** Locate the generator terminal block



**Step 5:** Loosen the screws on the generator terminal block, insert the AC cable into the terminal block, and tighten the screw in accordance with the specified torque settings shown in the image below.



**Step 6:** Tighten the generator cable gland nut onto the threaded gland body.



**Complete the installation.**

## 6.6 DC connection

### 6.6.1 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 modules must never exceed the maximum input voltage of the inverter.
- The maximum input current per PV module 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.
- Ensure correct polarity when terminating the PV strings into the PV terminal block.

### 6.6.2 Assembling the DC Cable

#### **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.

#### **Cable requirements:**

| Item | Description              | Value                                            |
|------|--------------------------|--------------------------------------------------|
| 1    | Cable type               | PV cable                                         |
| 2    | External diameter        | $\leq 6$ mm                                      |
| 3    | Conductor cross-section  | 8kW: 4 mm <sup>2</sup> / 10kW: 6 mm <sup>2</sup> |
| 4    | Number of copper strands | At least 7                                       |
| 5    | The rated voltage        | $\geq 1100$ v                                    |

### 6.6.3 Connecting the PV module

#### **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**

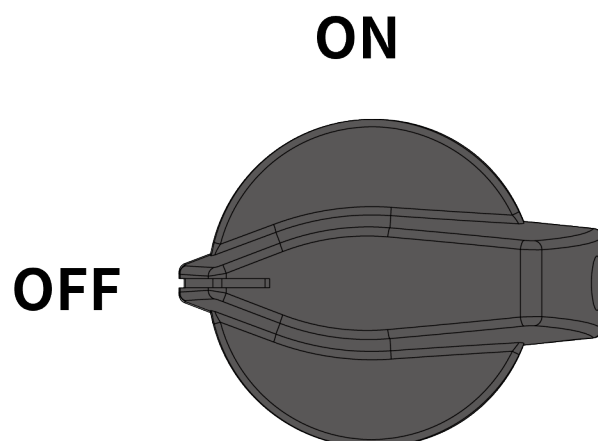
##### **The inverter can be damaged by overvoltage!**

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

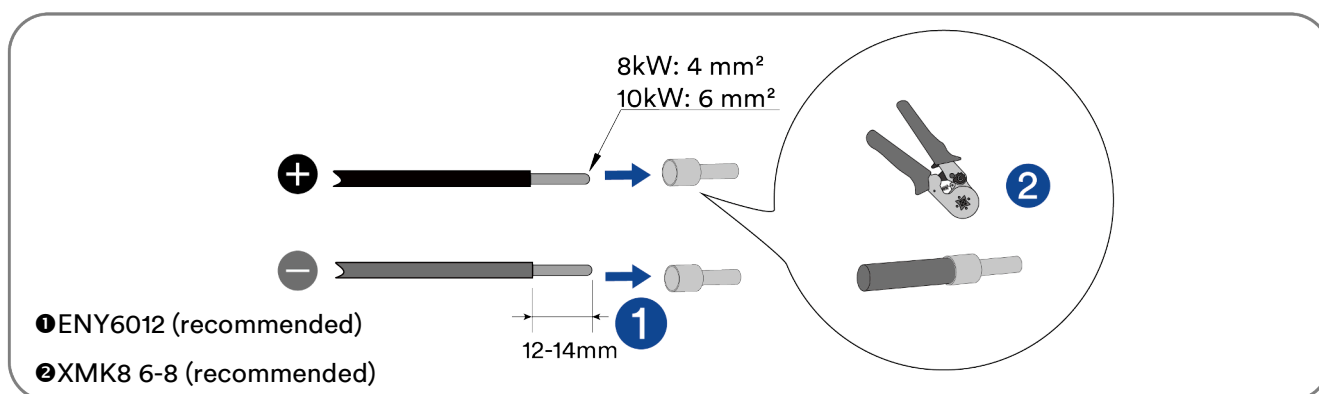
- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system.

#### **Procedure:**

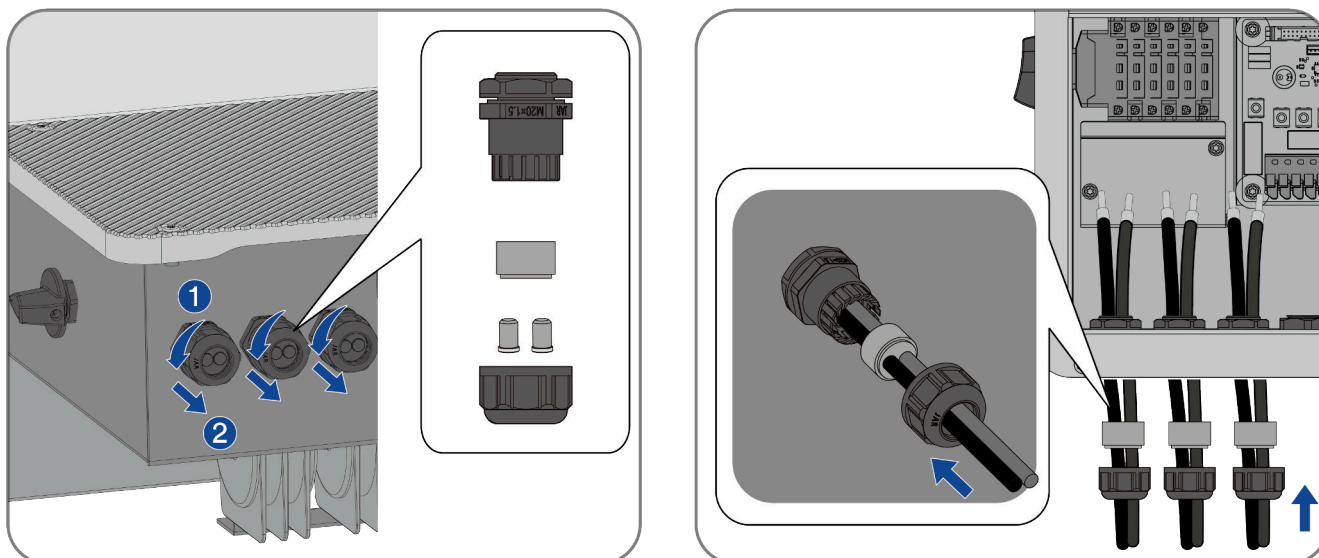
**Step 1:** Ensure that the individual miniature circuit-breaker is switched off and ensure that it cannot be accidentally reconnected.



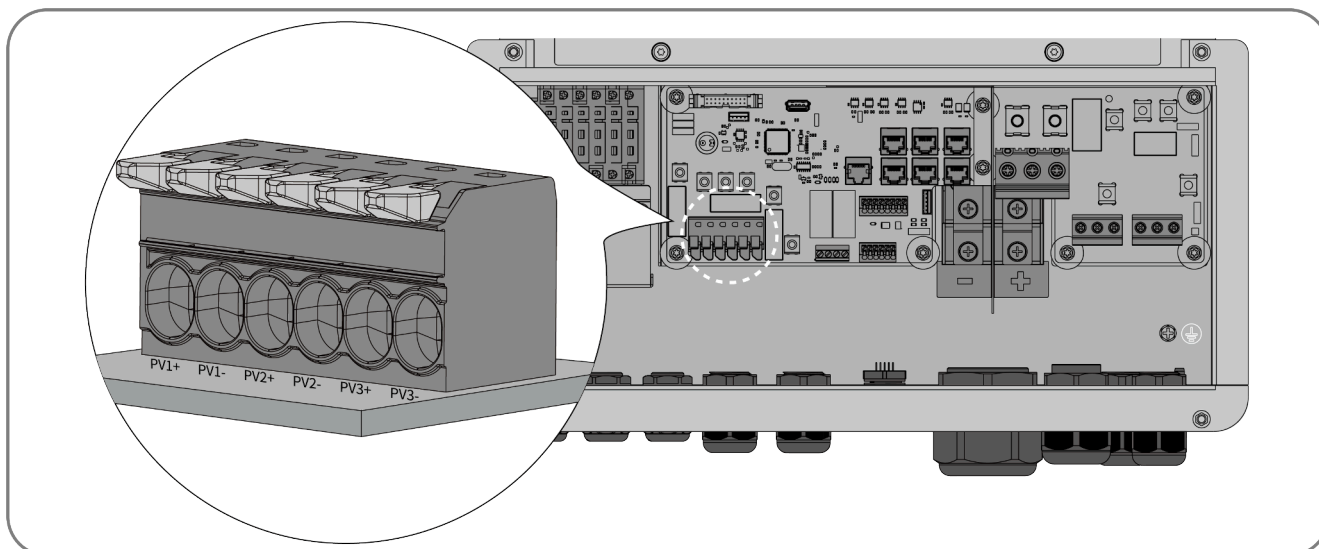
**Step 2:** Prepare the DC PV cable using by stripping off the wire and crimping bootlace ferrules in accordance with the image below.



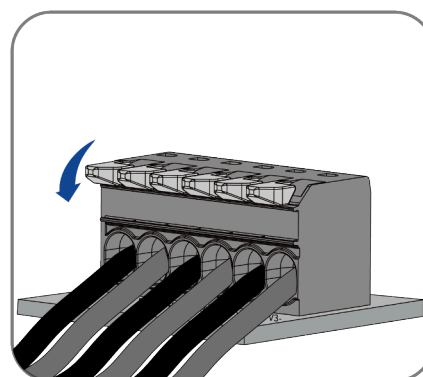
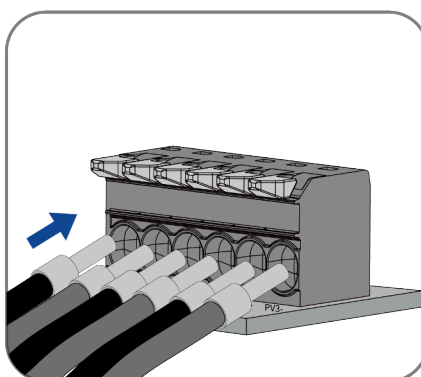
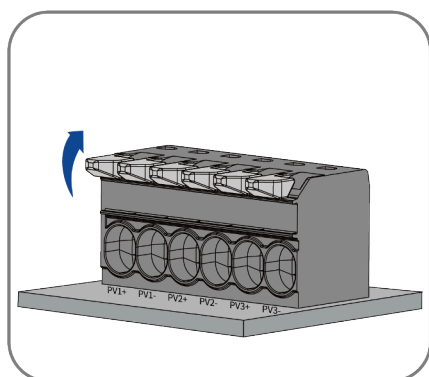
**Step 3:** Remove the PV cable gland nut and feed the DC cable into the wiring enclosure.



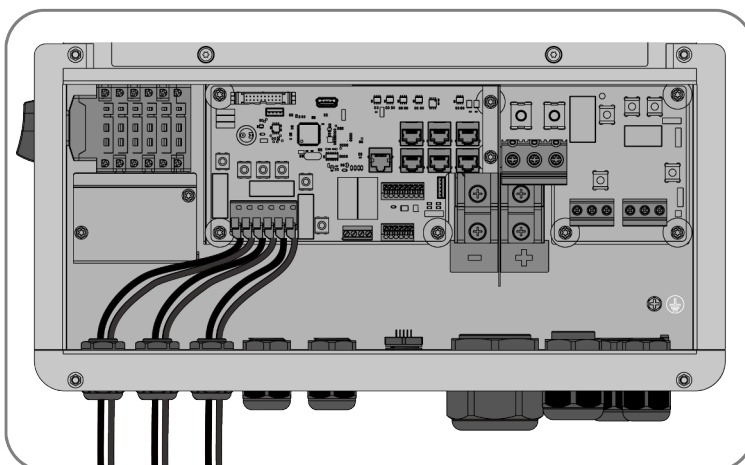
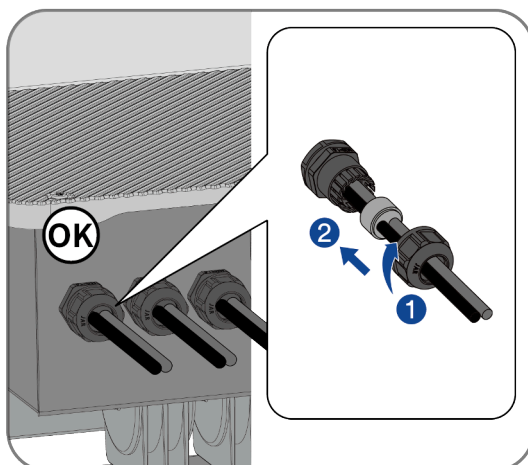
**Step 4:** Locate the PV terminal block.



**Step 5:** Raise the clamps of the PV terminal block and insert the DC cable. Push the clamps down to secure the DC cable into the PV terminal block.



**Step 6:** Tighten the PV cable gland nut onto the threaded gland body.



**Complete the installation.**

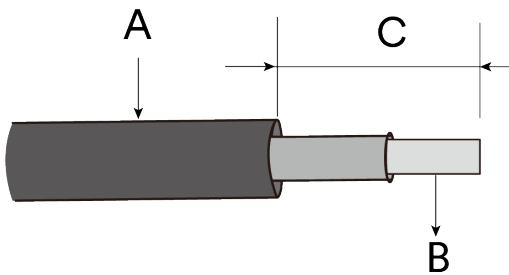
# 6.7 Battery connection

## 6.7.1 Requirements for the Battery Connection

### Type 1: Lithium battery

#### Cable Requirements

Prepare the DC battery cable by stripping off the insulation on one end of the in accordance with the image below.

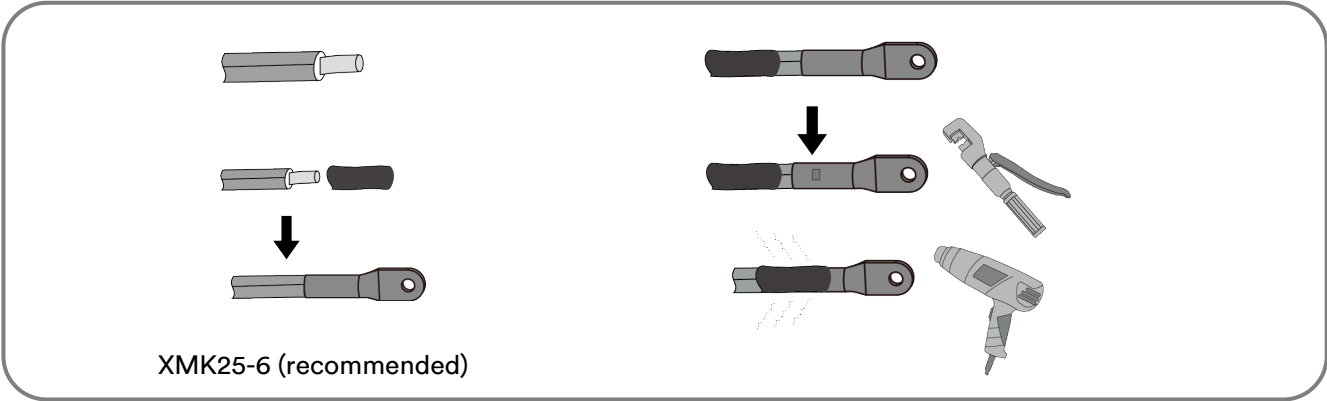


| Item | Description                          | Value     |
|------|--------------------------------------|-----------|
| A    | External diameter                    | 10-12 mm  |
| B    | Copper cable conductor cross-section | 20~25 mm² |
| C    | Sheath stripping length              | ≤ 55 mm   |

## 6.7.2 Assembling the Battery Connectors

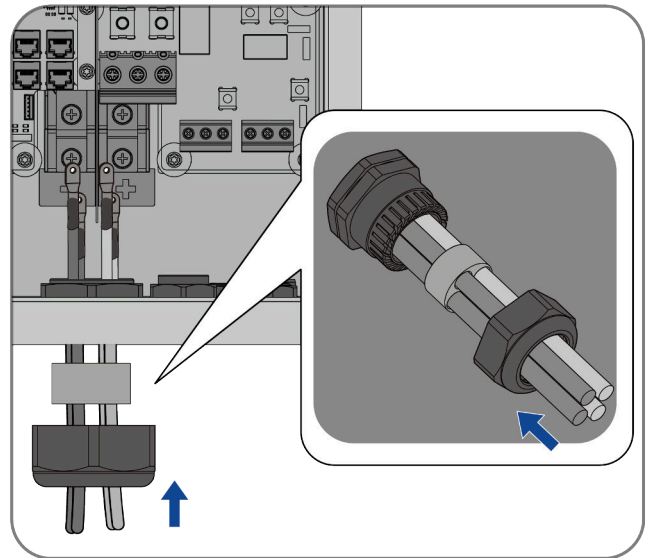
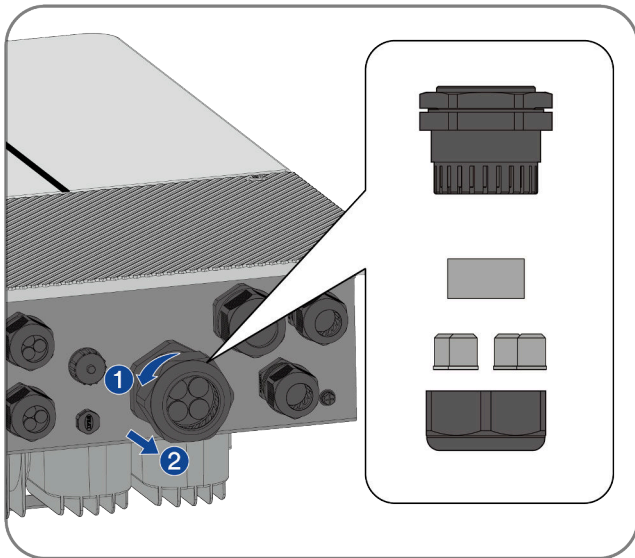
#### Procedure:

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

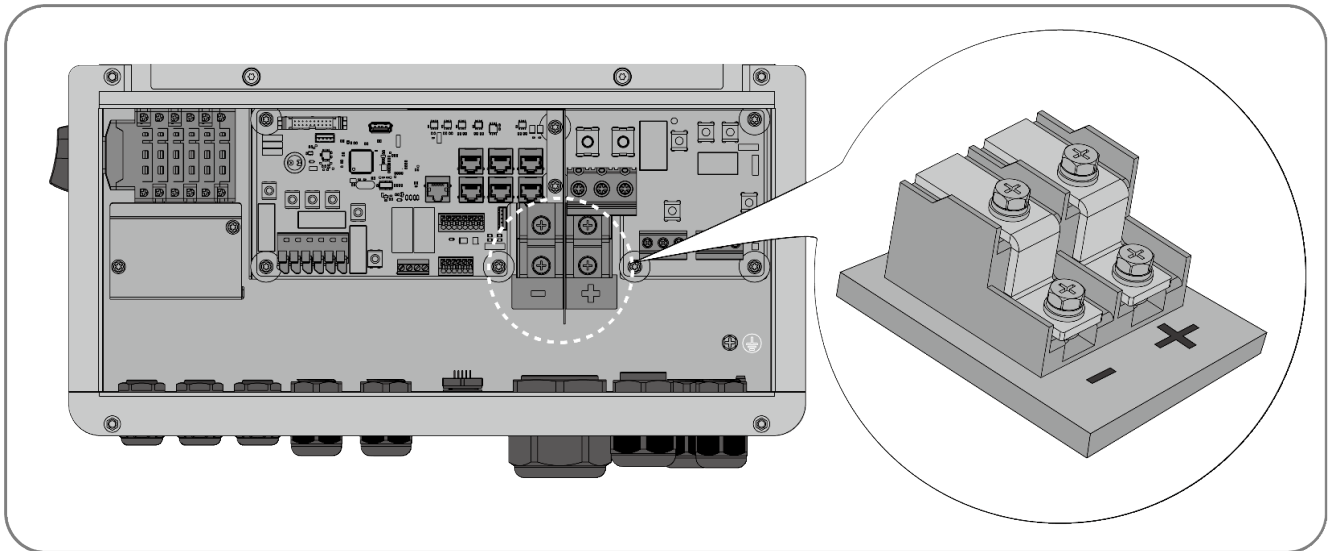


**Step 2:** Remove the battery cable gland nut and feed the battery DC cable into the wiring enclosure.

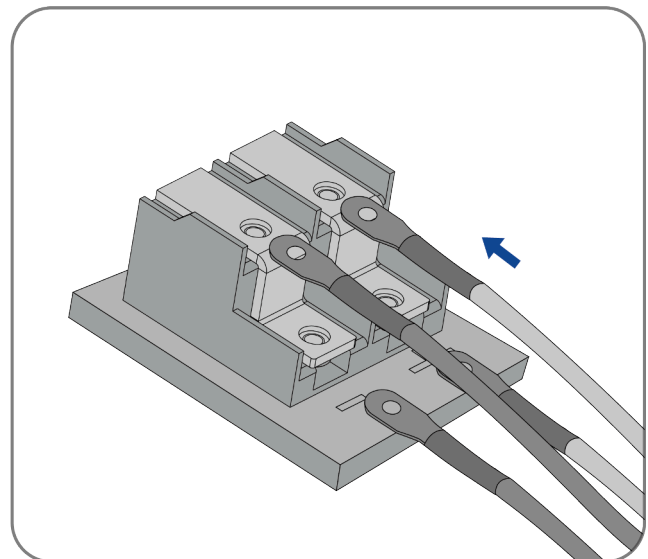
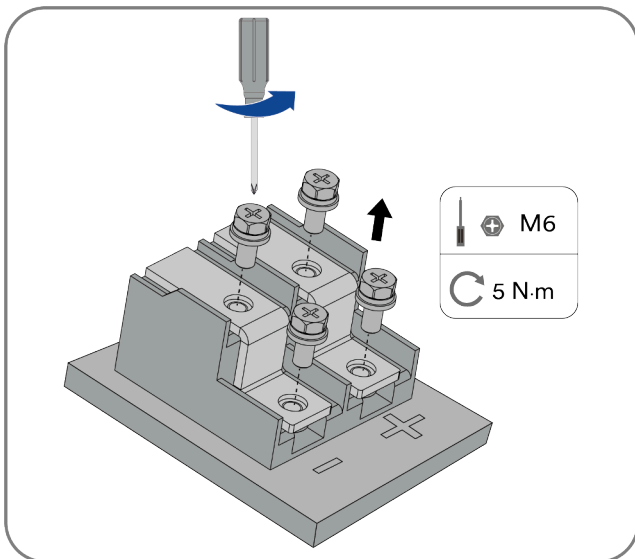




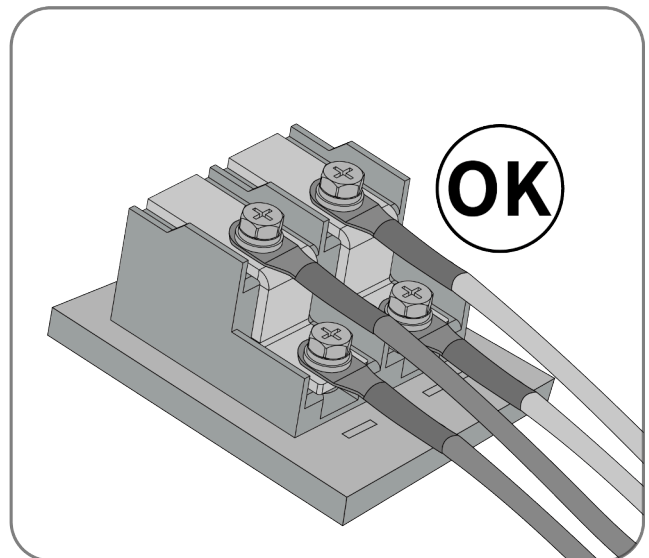
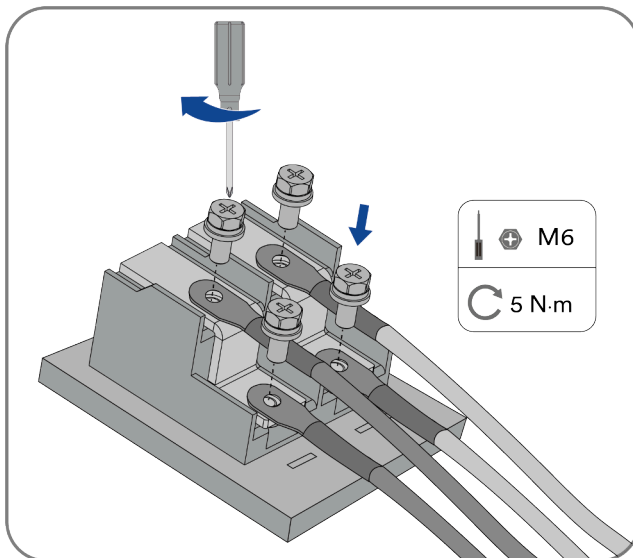
**Step 3:** Locate the battery terminal block.



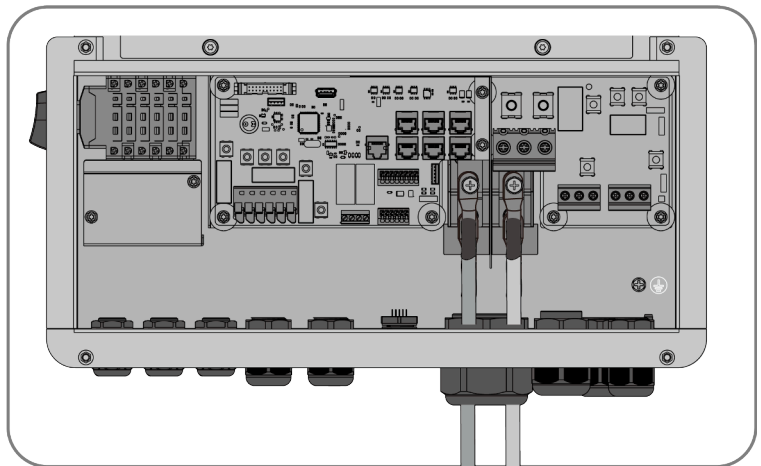
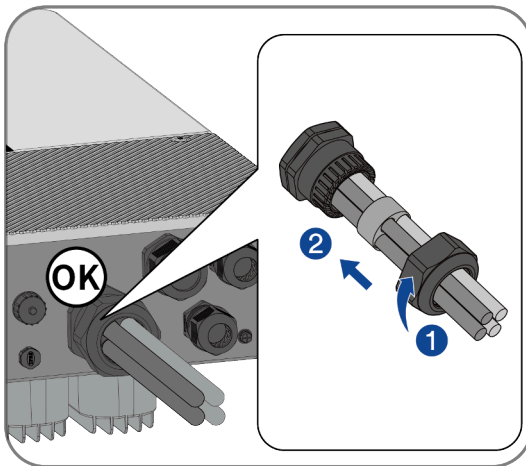
**Step 4:** Loosen the screws on the generator terminal block, insert the AC cable into the terminal block, and tighten the screw in accordance with the specified torque settings shown in the image below.







**Step 5:** Tighten the battery cable gland nut onto the threaded gland body.

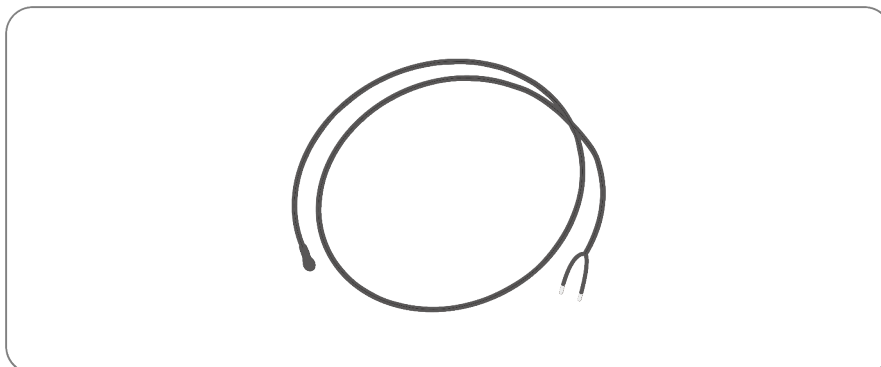


**Complete the installation.**

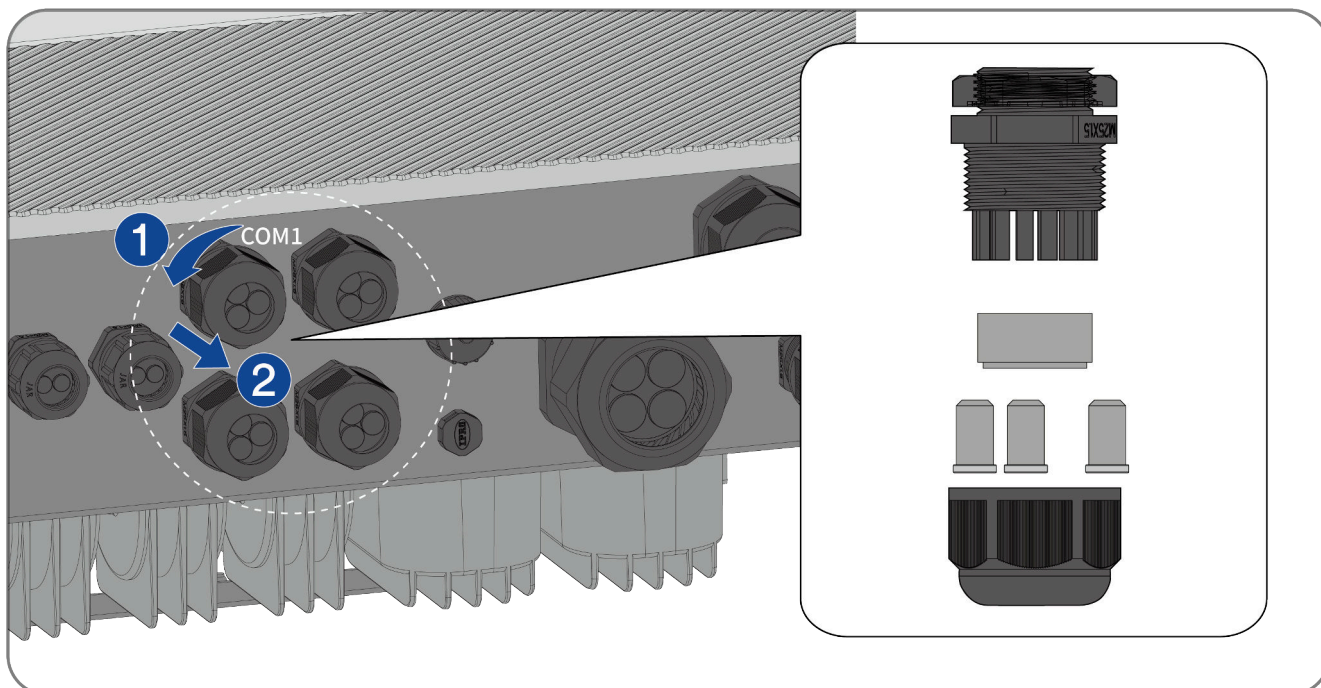
## Type 2: Lead-acid battery

### Procedure:

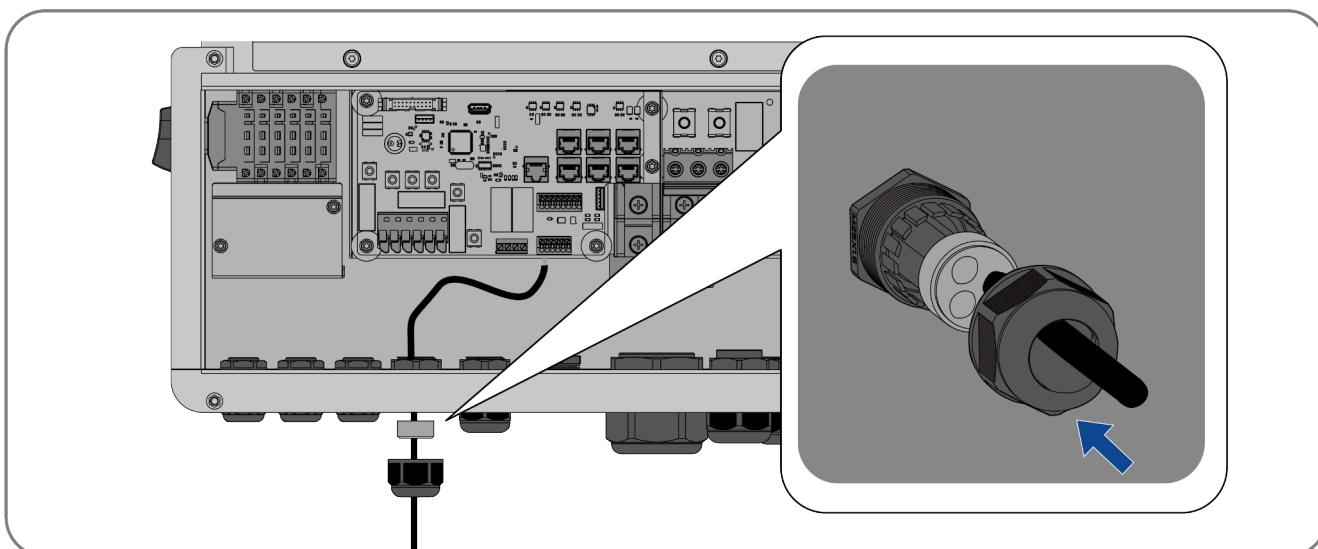
**Step 1:** Locate and remove NTC cable from the accessory package . The NTC cable is approximately 3 m in length



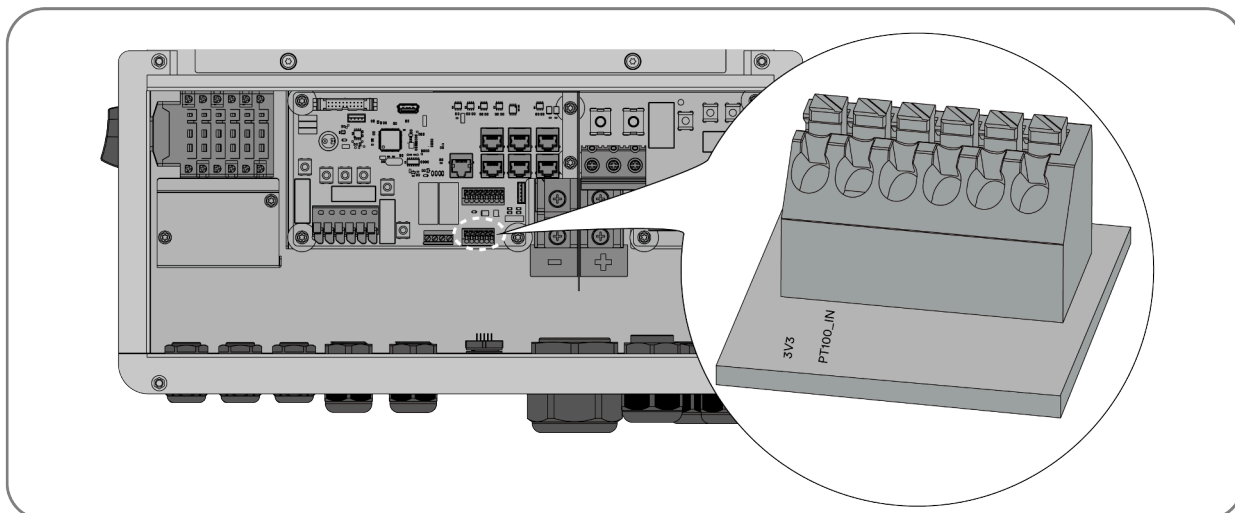
**Step 2:** Remove a COM 1 cable gland nut



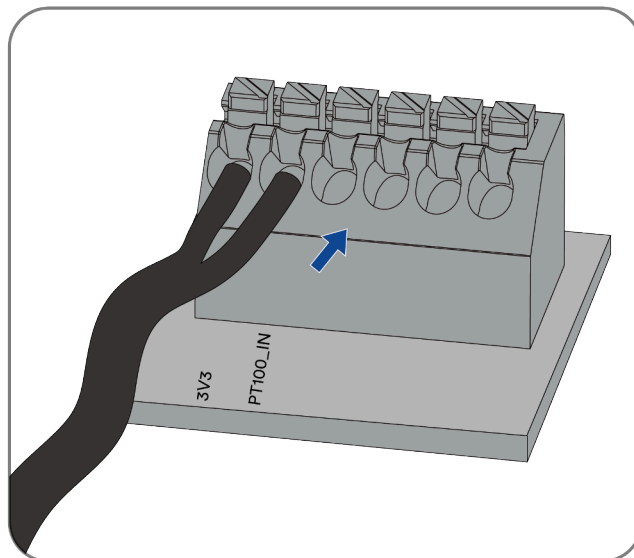
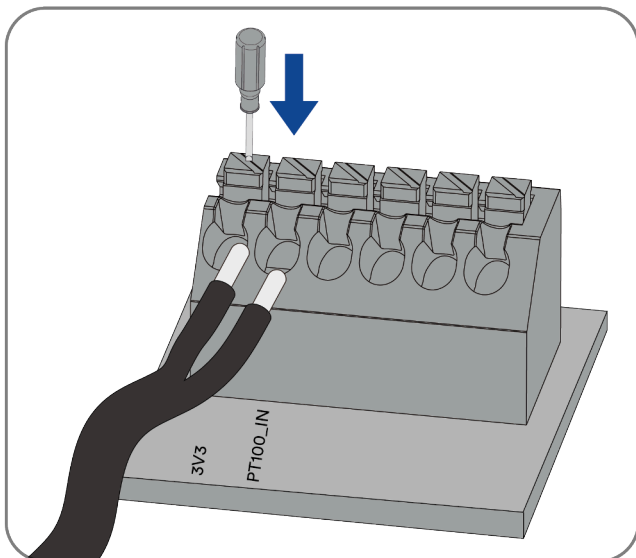
**Step 3:** Feed the NTC cable into the wiring enclosure.



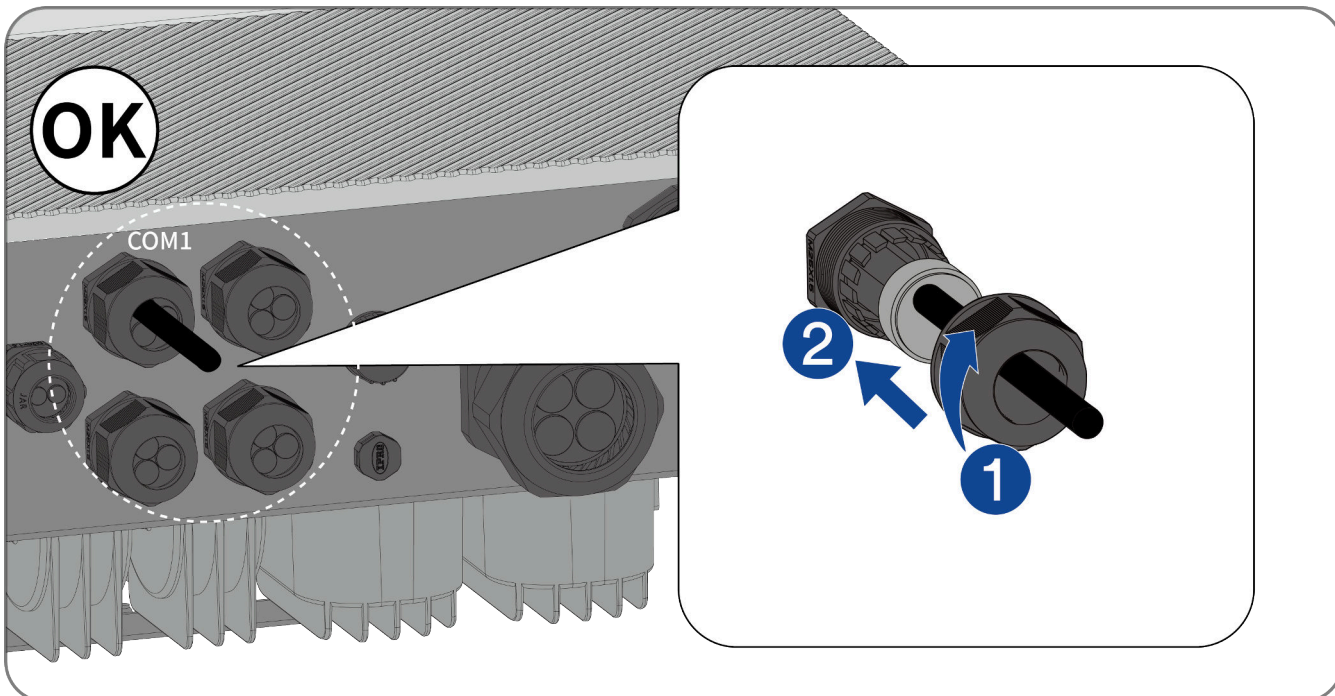
**Step 4:** Locate Pins 1 (3V3) and 2 (PT100\_IN) on COM 9 terminal block



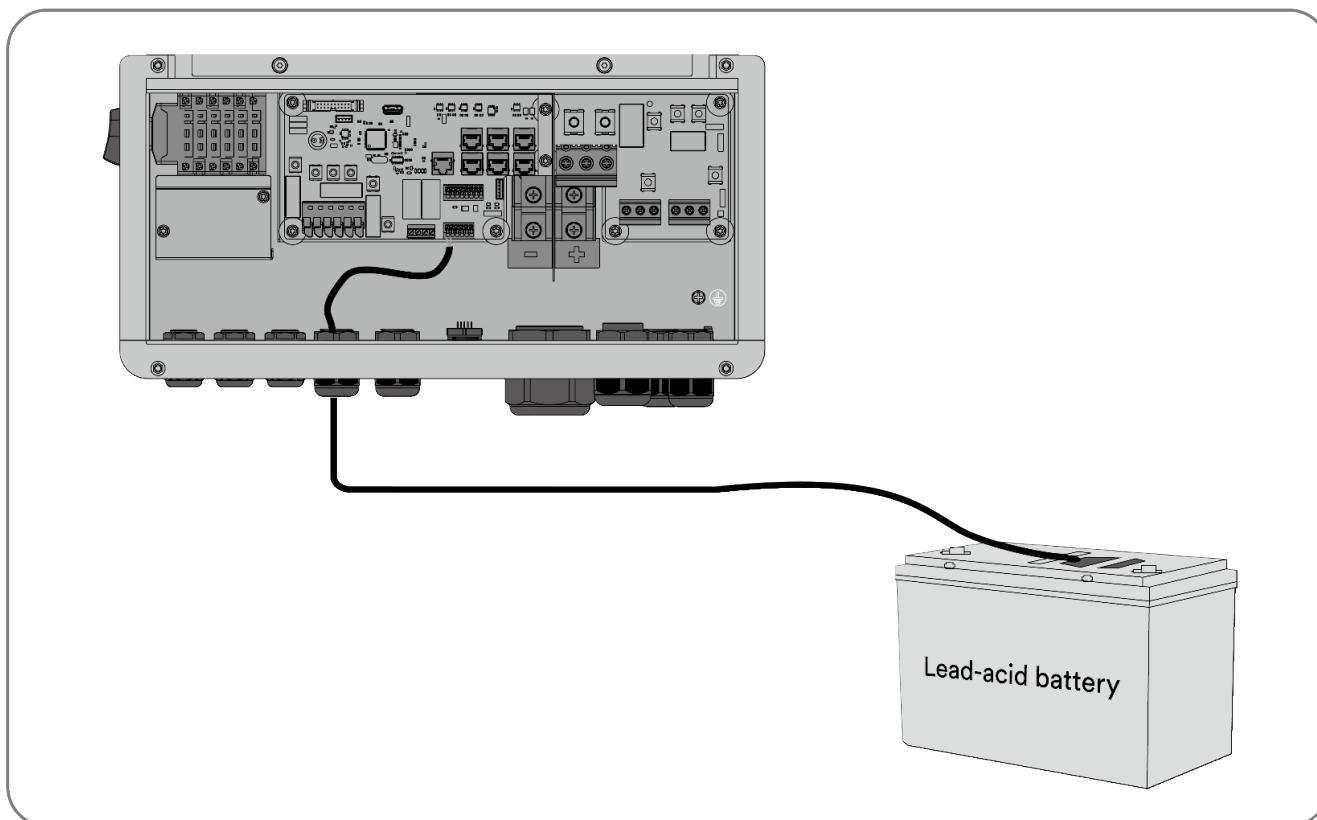
**Step 5:** Push down on the pin 1 terminal and insert the one of the NTC cable wires. Repeat for Pin 2 for the other NTC cable wire.



**Step 6:** Tighten the COM 1 cable gland nut onto the threaded gland body.



**Step 7:** Connect the other end of the battery cable to the lead-acid battery in accordance to the battery manufacturers instructions.



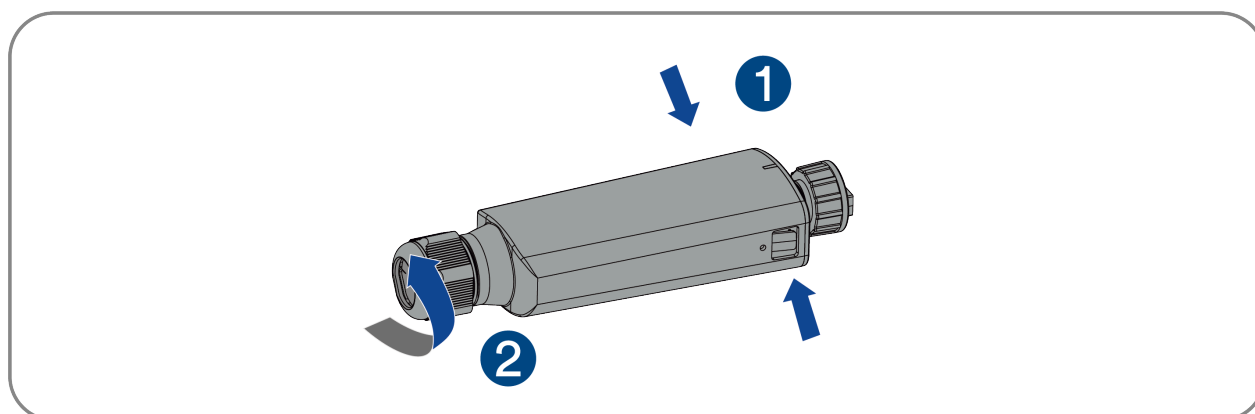
**Complete the installation.**

## 6.8 Communication equipment connection

### 6.8.1 Ai-Dongle connection

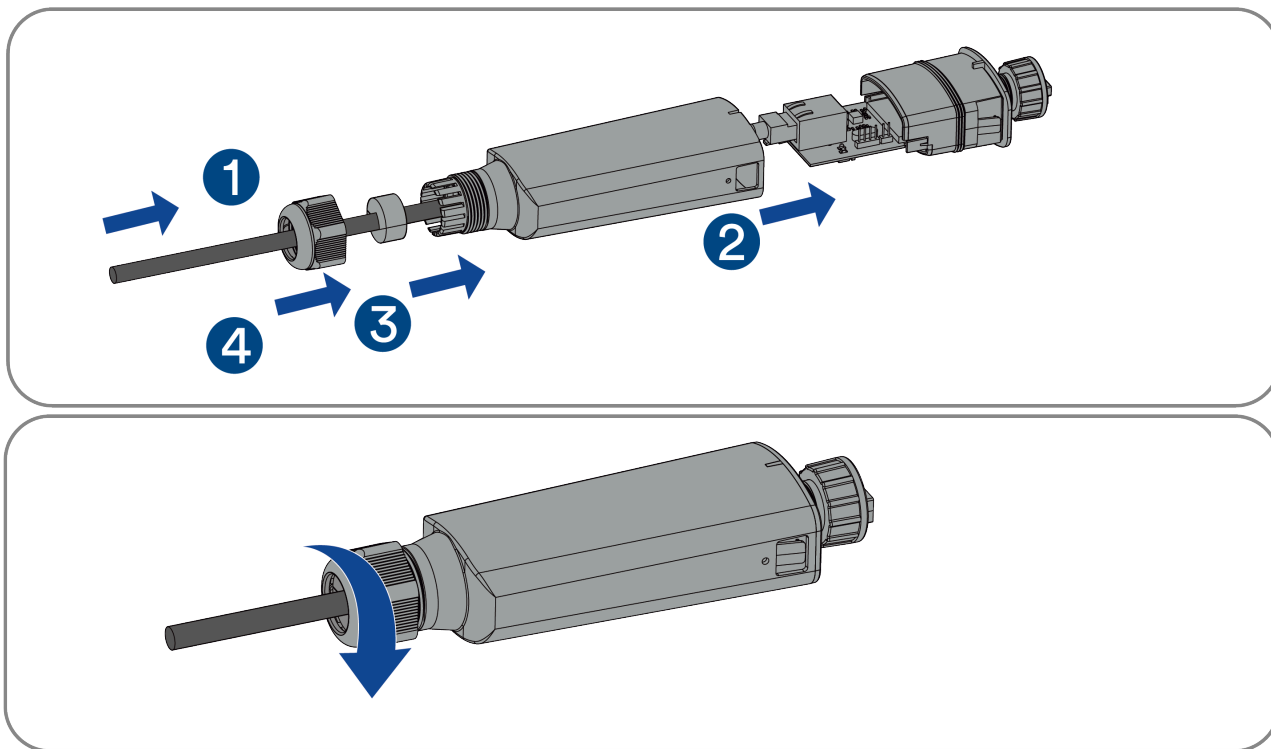
#### Procedure:

**Step 1:** Rotate the sealing nut, remove the sealing ring, Press the snaps on both sides of the stick to open the casing (Note: try not to touch the PCBA component).

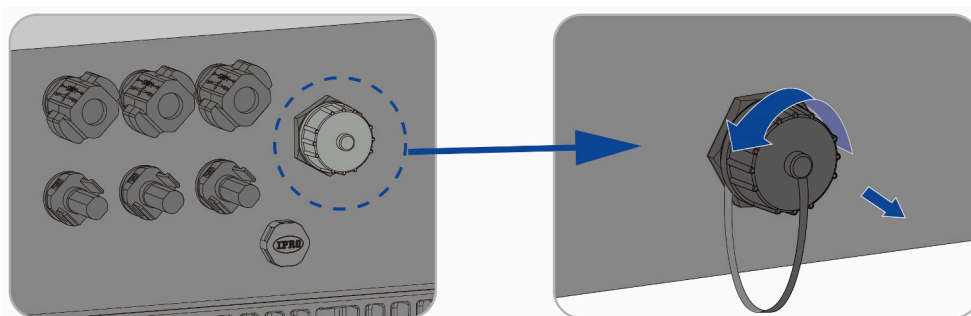


**Step 2:** Connect the communication cable to the wiring terminal according to the sequence shown in the following figure.

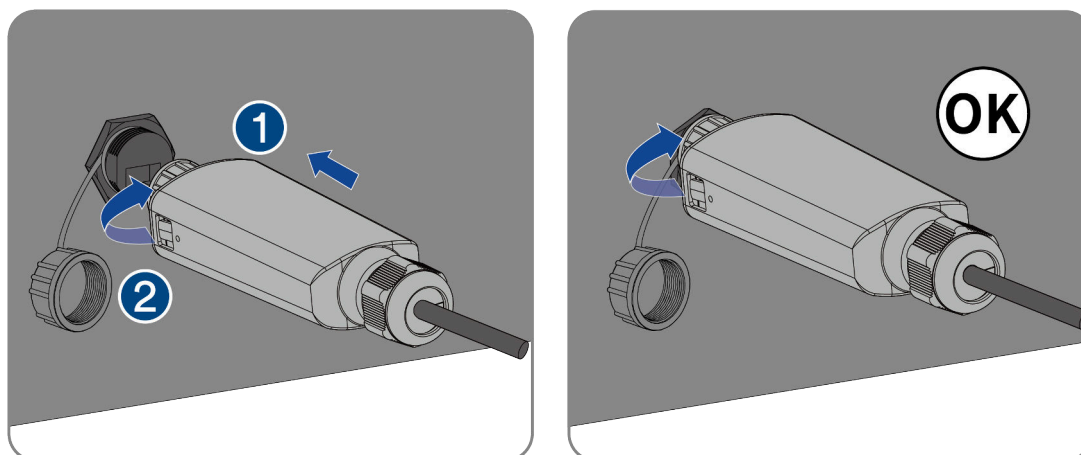
**Step 3:** Insert the wiring terminal into the Ai-Dongle body, adjust the communication cable, insert the sealing ring, and lock nut.



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



**Step 5:** Insert the Ai-Dongle into the connection port, hand-tighten the nut clockwise, ensure it's secure and the label is facing forward.





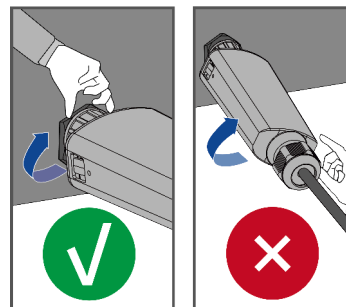
## NOTICE

**Rotating the communication modular will damage the communication modular!**

The Ai-Dongle is secured by locking the nut for reliable connection. Avoid rotating the dongle body, as this may cause damage.

Lock only with the nut.

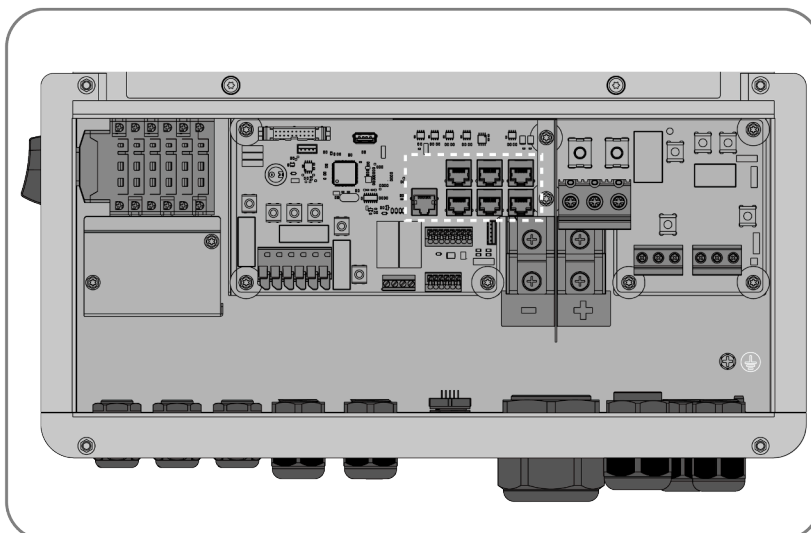
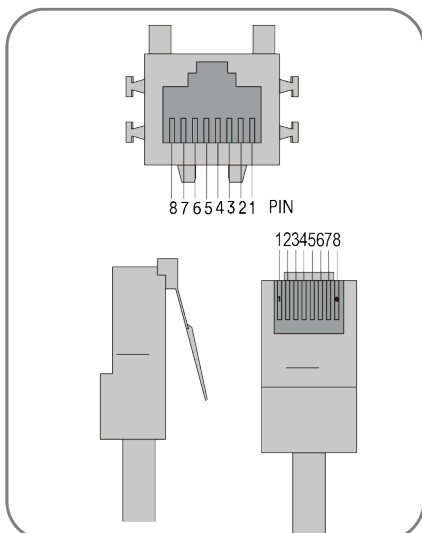
- Do not rotate the body of the Ai-dongle.



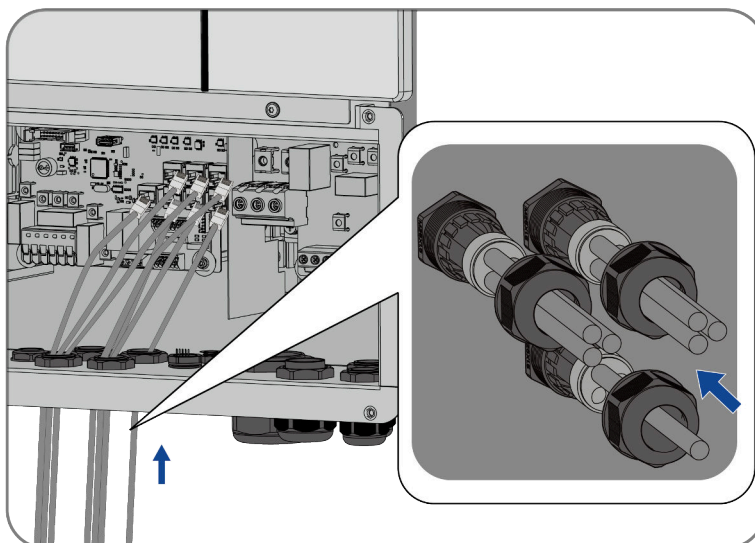
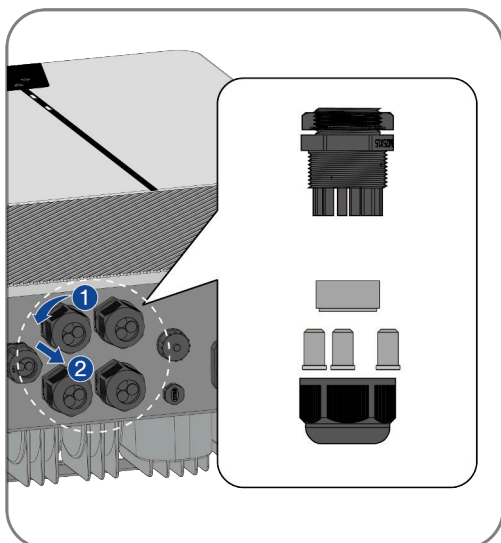
### 6.8.2 RJ45 connection

#### Procedure:

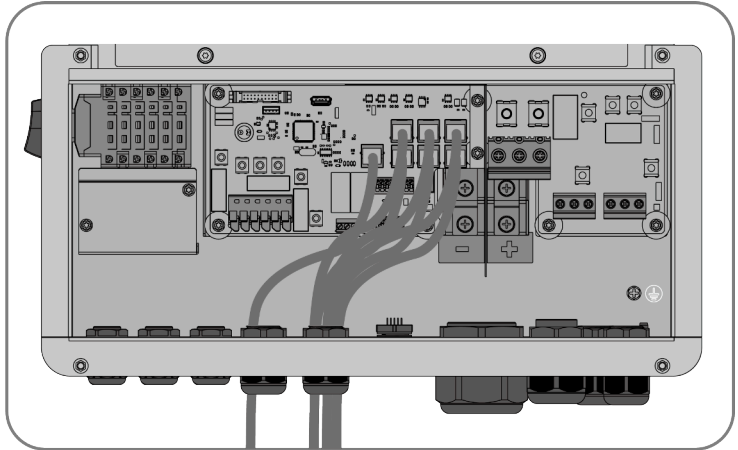
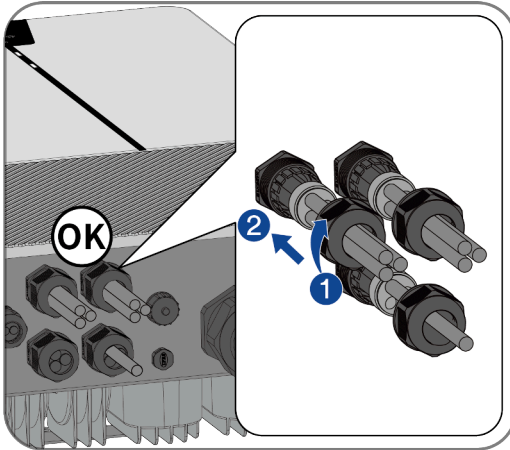
**Step 1:** Make the RJ45 cable and find the port of the RJ45 connection. Refer to 6.1.3 Interface Pinout Table.



**Step 2:** Remove a COM 1/2/4 cable gland nut, insert the cable into the terminal, and insert the RJ45 connector into the port.



**Step 3:** Tighten the COM 1/2/4 cable gland nut onto the threaded gland body.

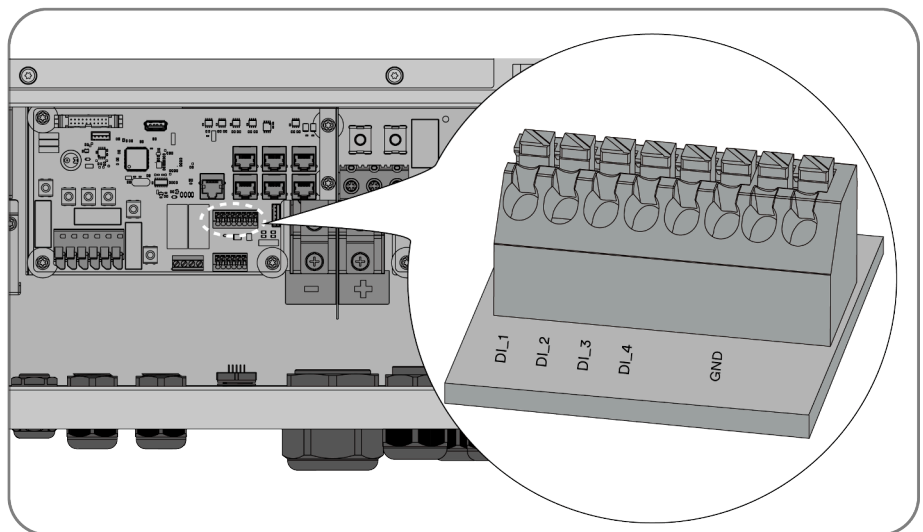
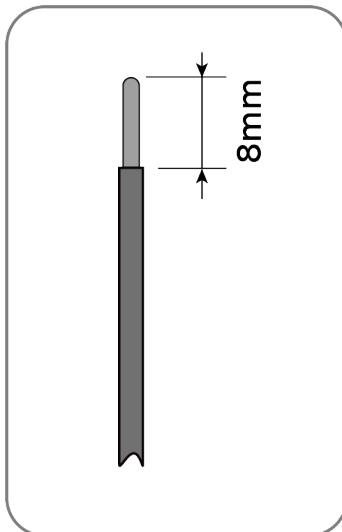


Complete the installation.

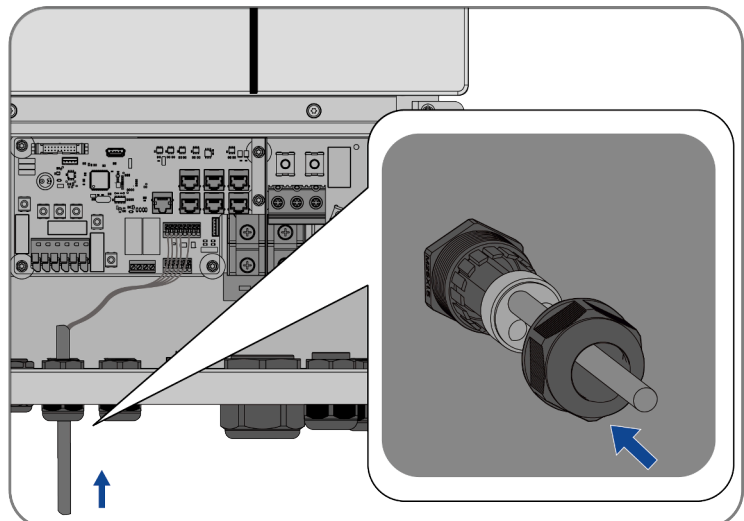
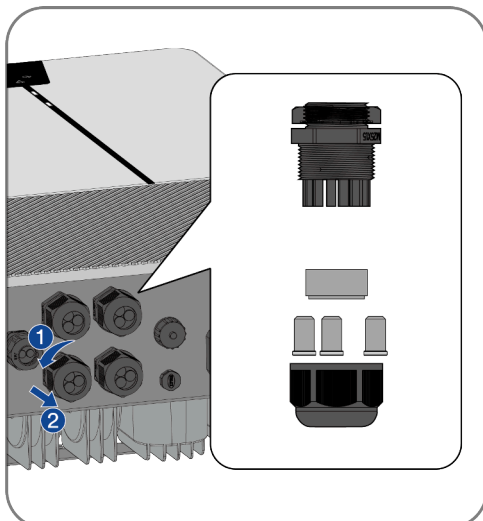
### 6.8.3 Ripple control connection

**Procedure:**

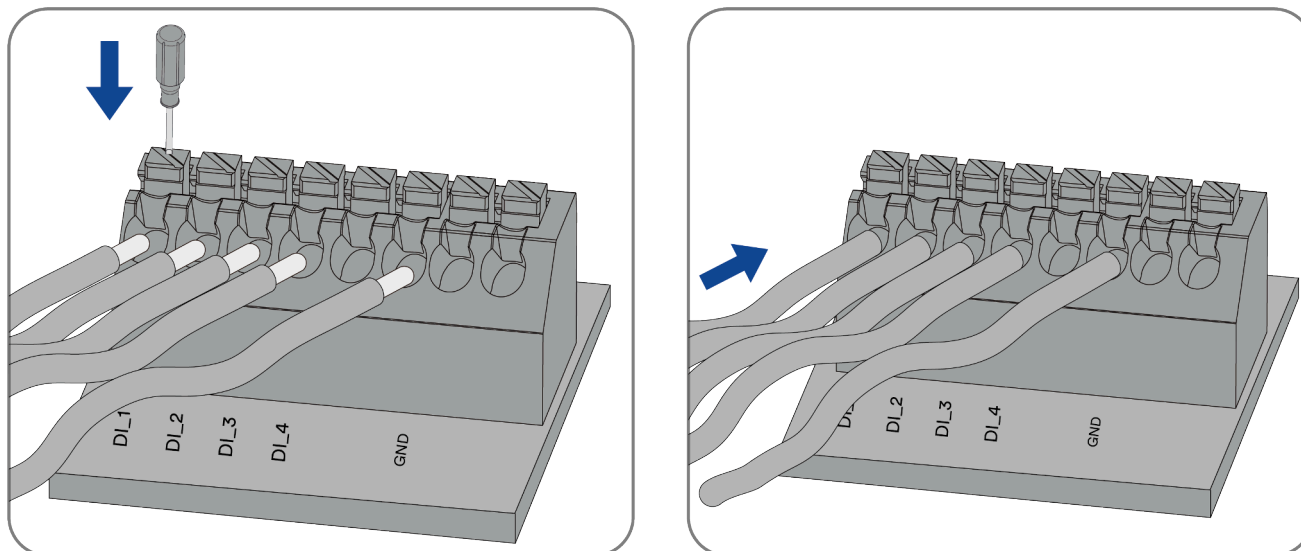
**Step 1:** Prepare the cable by stripping off the insulation on one end of the in accordance with the image below. Locate the DI pins on the Num.8 terminal block.



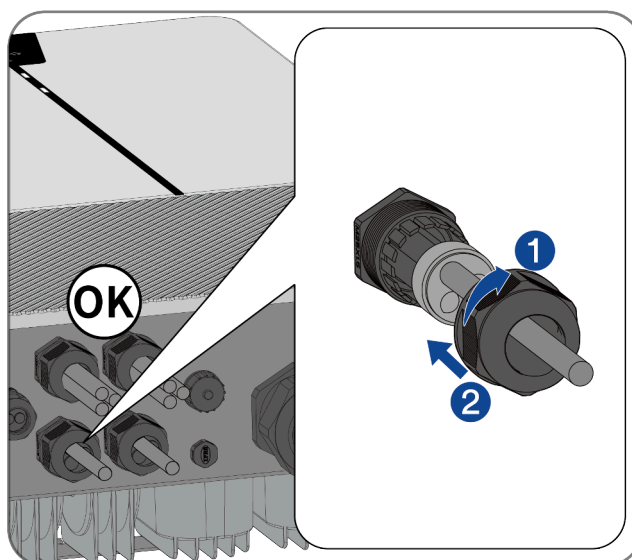
**Step 2:** Remove a COM 3 cable gland nut and insert the cable into the terminal.



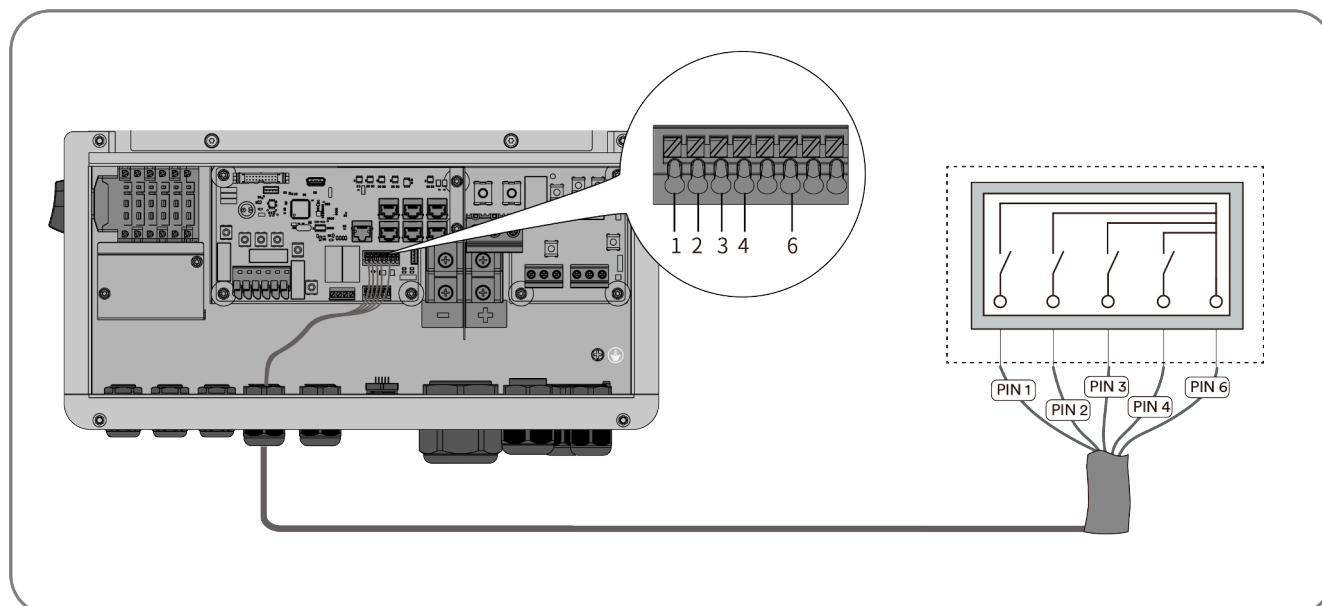
**Step 3:** Push down on the pin terminal and insert one of the cable wires. Repeat for the other pins as needed.



**Step 4:** Tighten the COM 3 cable gland nut onto the threaded gland body.



- **Connect the network cable to ripple control receiver**

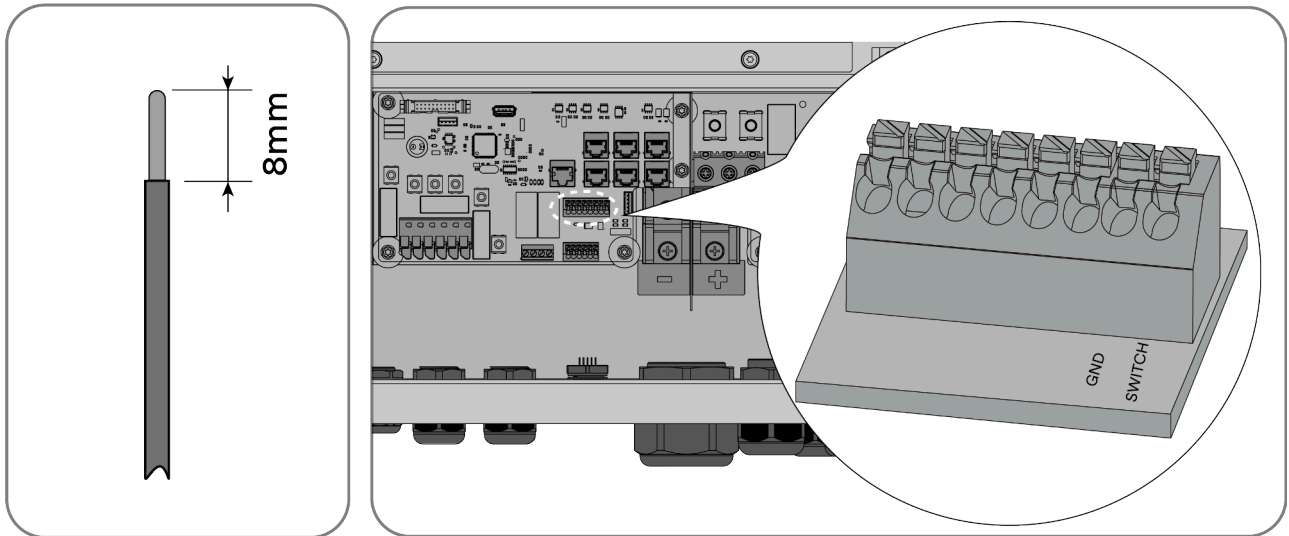




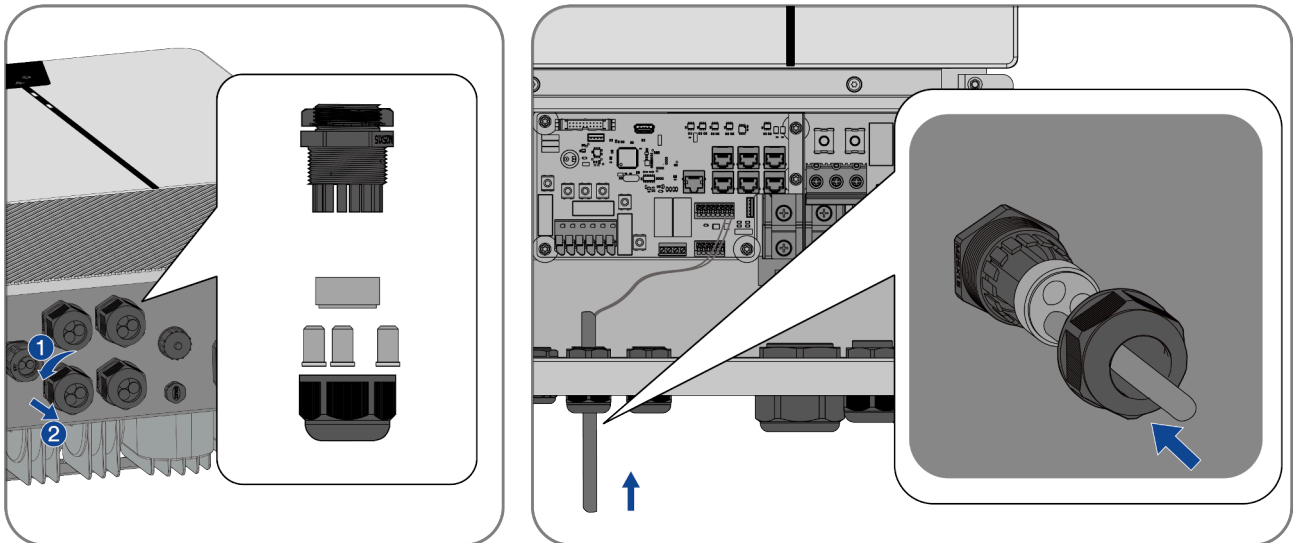
## 6.8.4 NS Protection Connection

### Procedure:

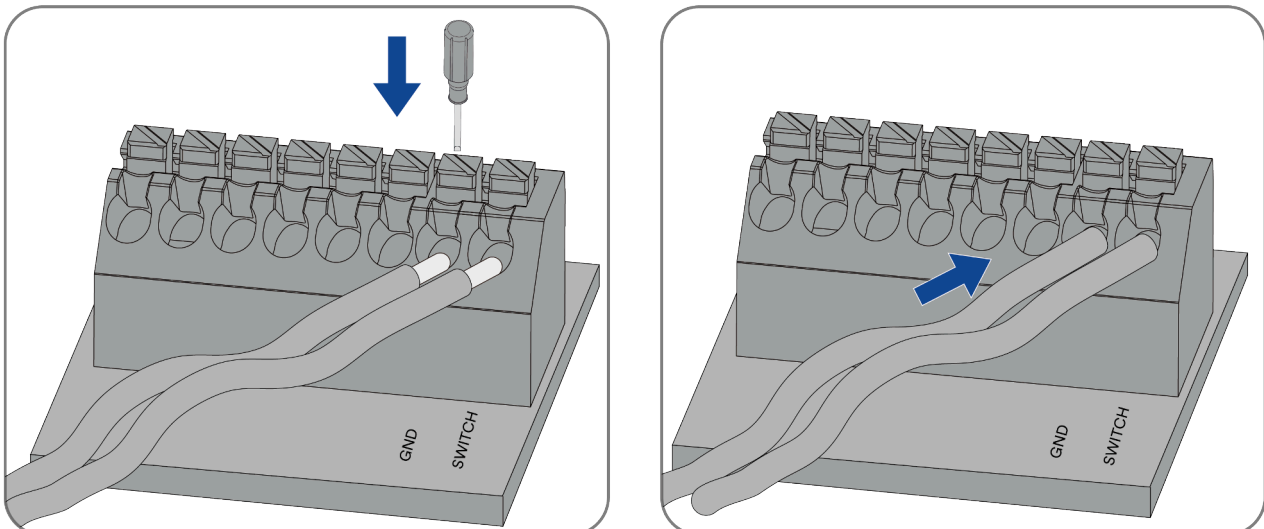
**Step 1:** Prepare the cable by stripping off the insulation on one end of the in accordance with the image below. Locate the pins on the Num.8 terminal block.



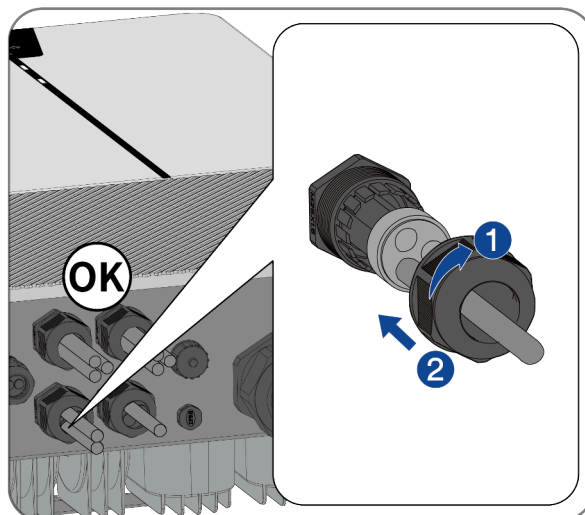
**Step 2:** Remove a COM 3 cable gland nut and insert the cable into the terminal.



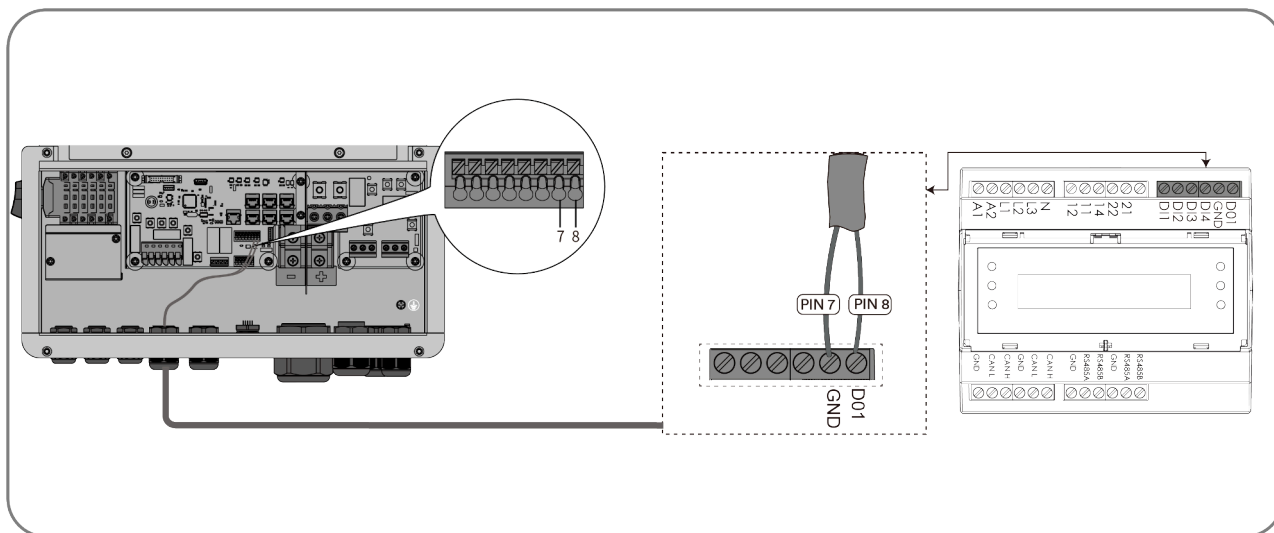
**Step 3:** Push down on the pin terminal and insert one of the cable wires. Repeat for the other pins as needed.



**Step 4:** Tighten the COM 3 cable gland nut onto the threaded gland body.



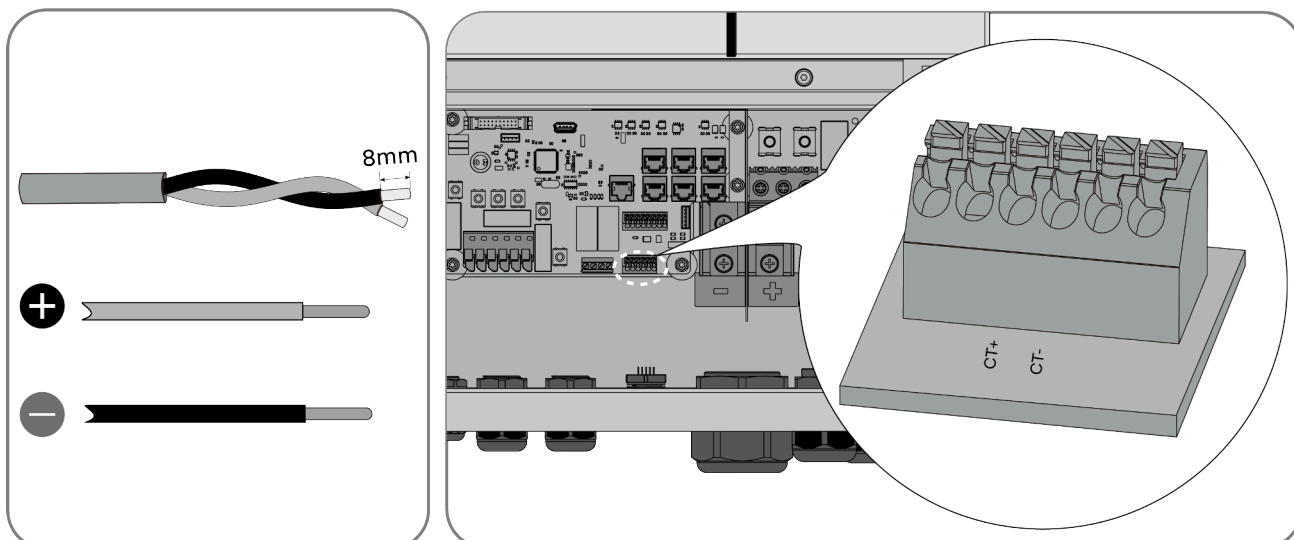
- Connect the network cable to NS protection device



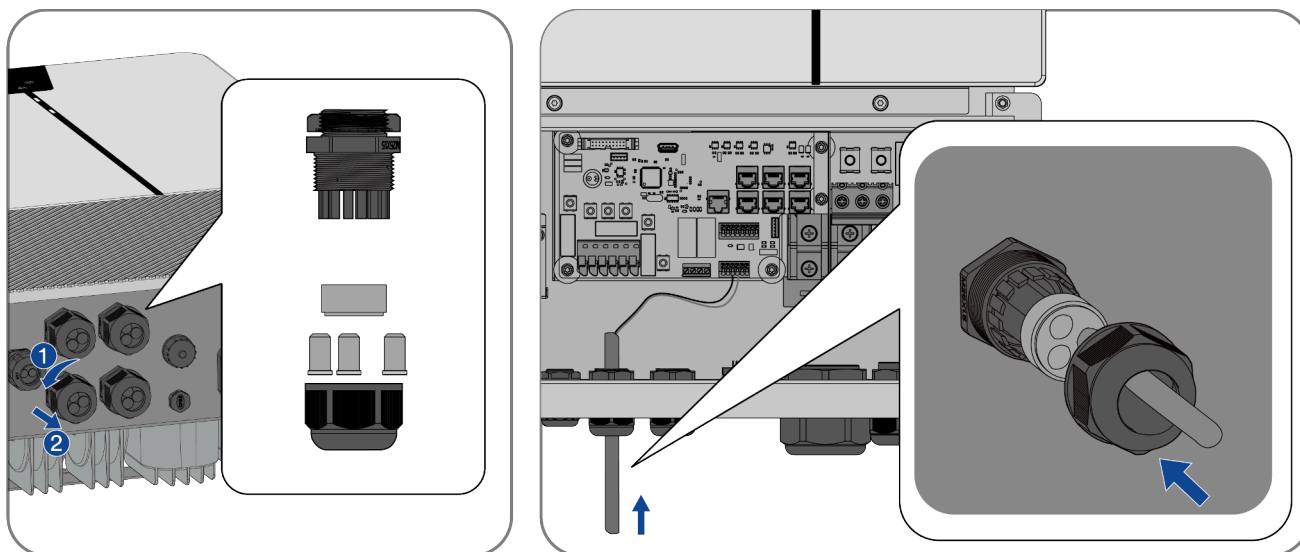
### 6.8.5 Current Transformer Connection

#### Procedure:

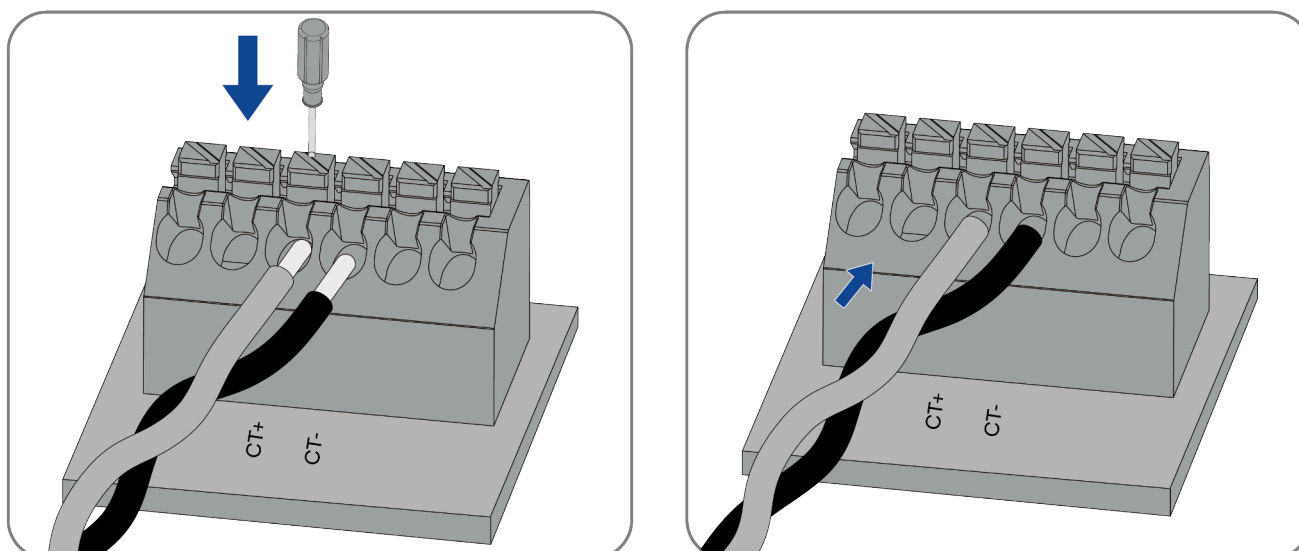
**Step 1:** Prepare the cable by stripping off the insulation on one end of the in accordance with the image below. Locate the CT pins on the Num.9 terminal block.



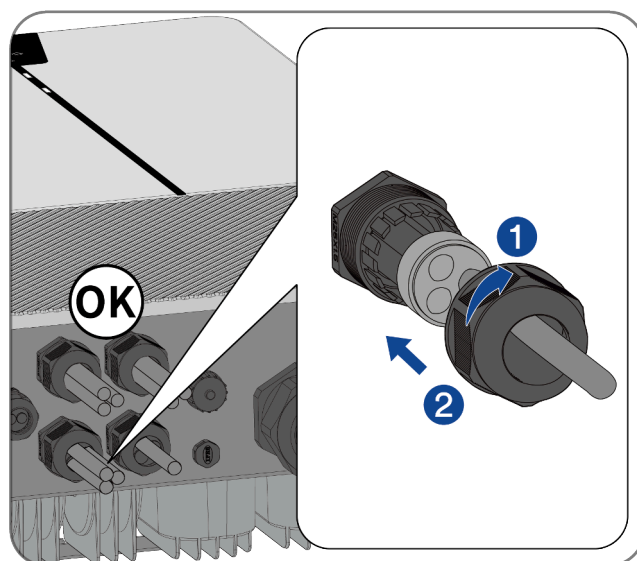
**Step 2:** Remove a COM 3 cable gland nut and feed cable into wiring enclosure.



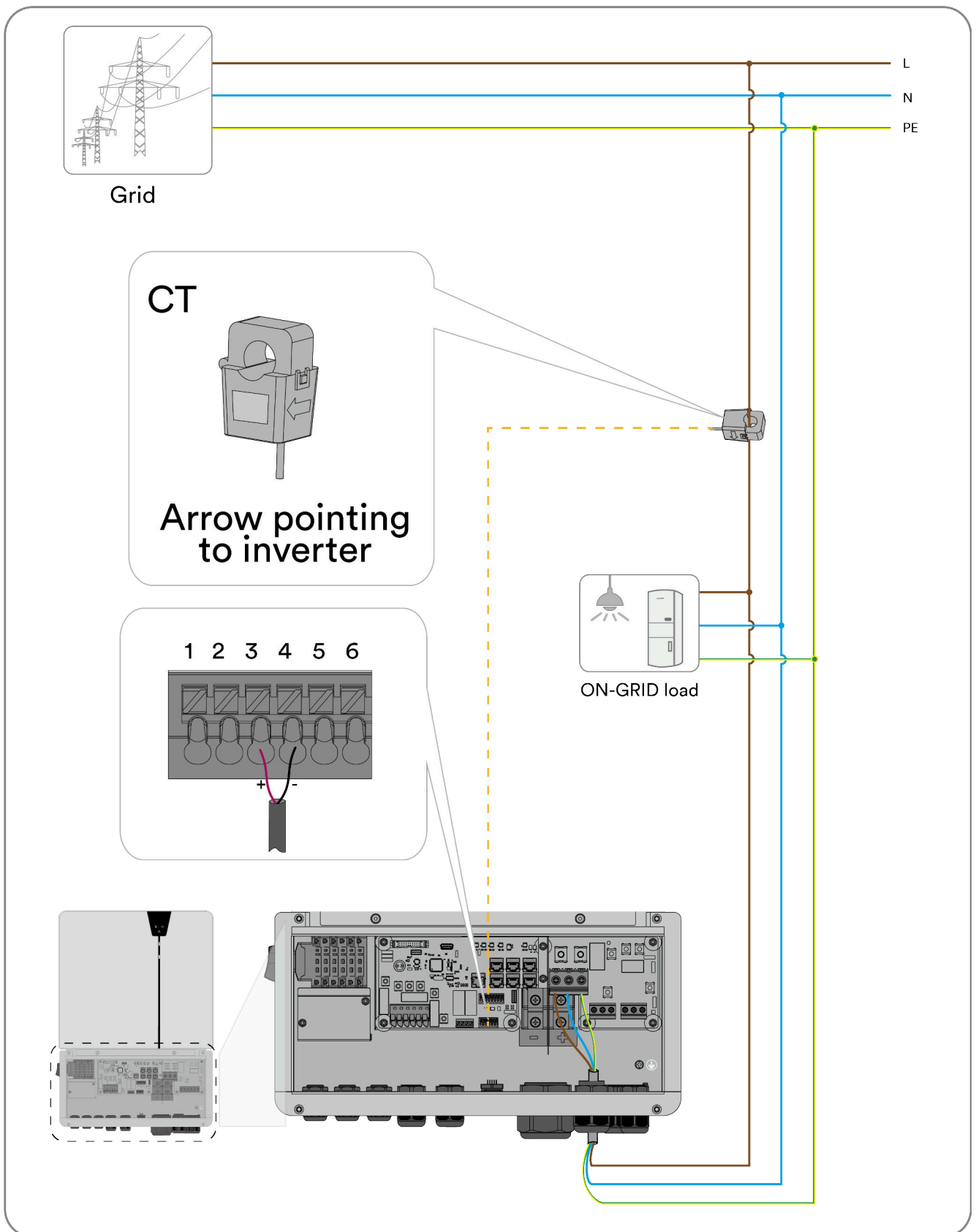
**Step 3:** Push down on the pin terminal and insert one of the cable wires. Repeat for the other pins as needed.



**Step 4:** Tighten the COM 1 cable gland nut onto the threaded gland body.



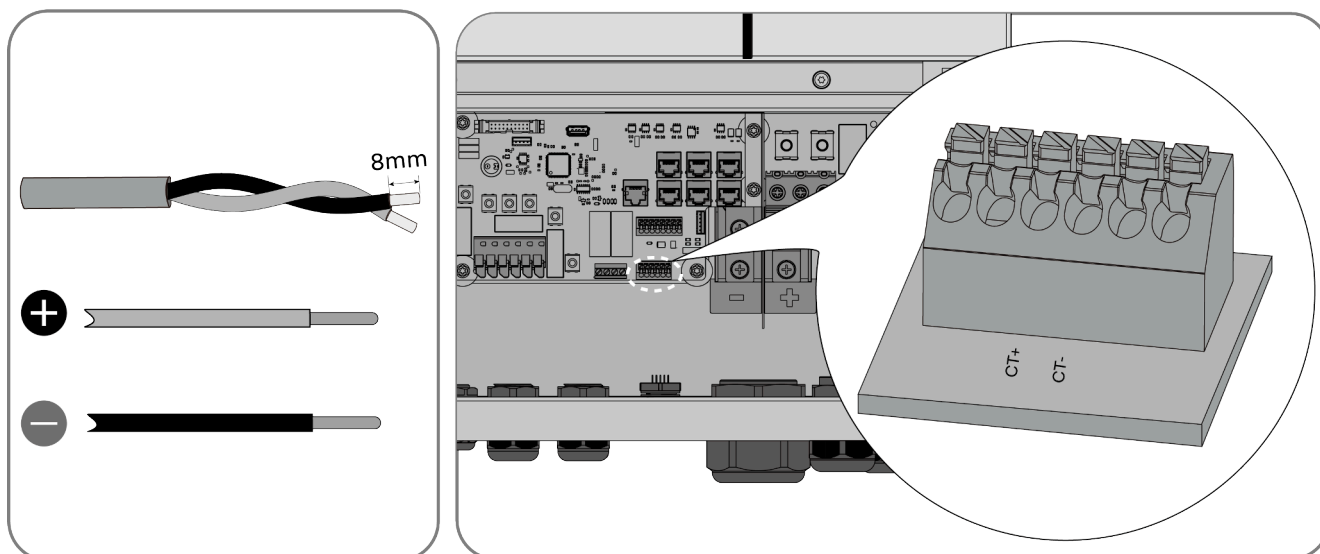
- **Connect current transformer**



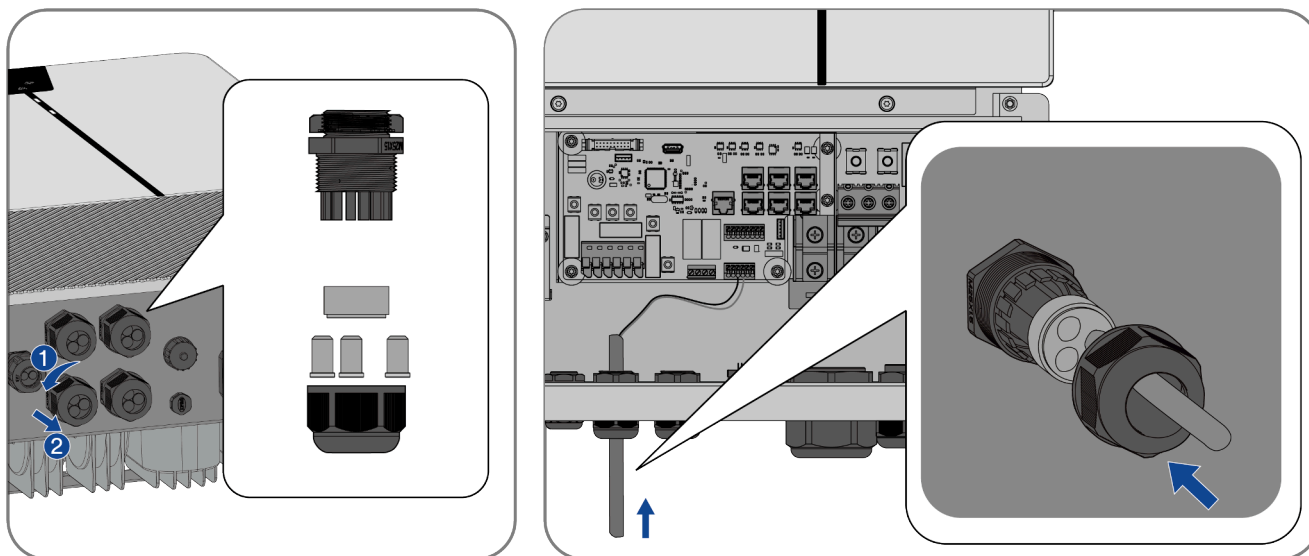
## 6.8.6 Smart Meter Connection

### Procedure:

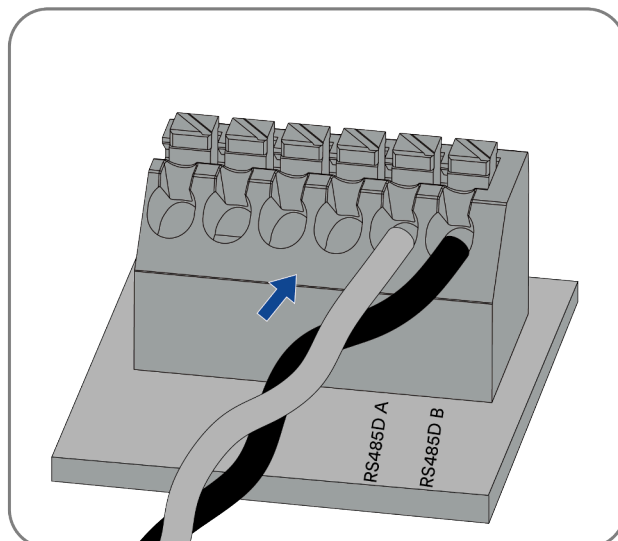
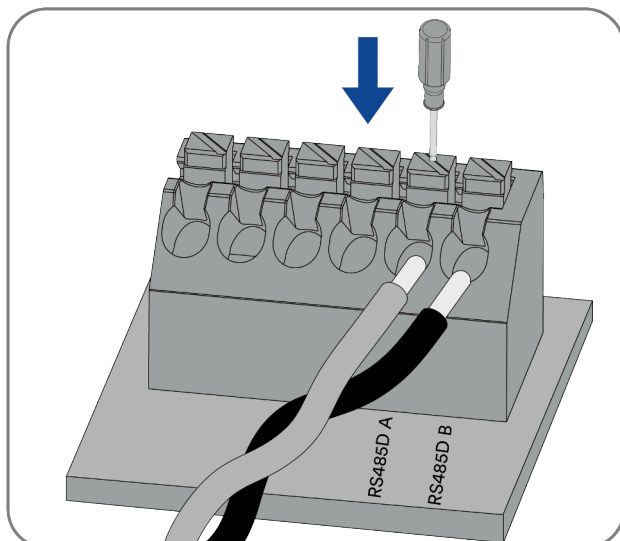
**Step 1:** Prepare the cable by stripping off the insulation on one end of the in accordance with the image below. Locate the RS485 pins on the Num.9 terminal block.



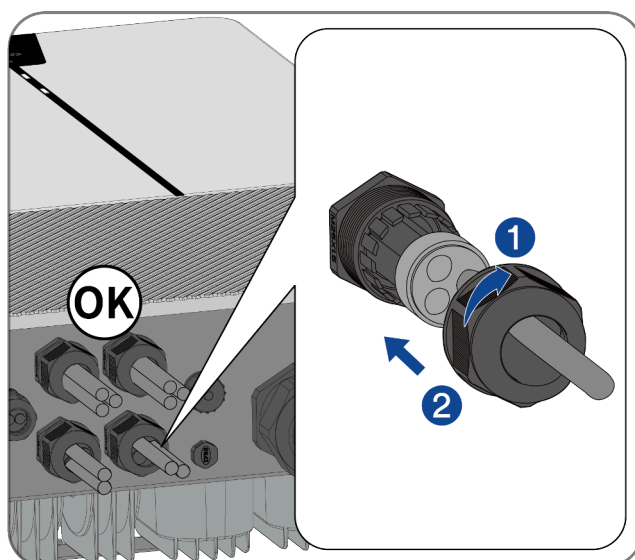
**Step 2:** Remove a COM 4 cable gland nut and feed cable into wiring enclosure.



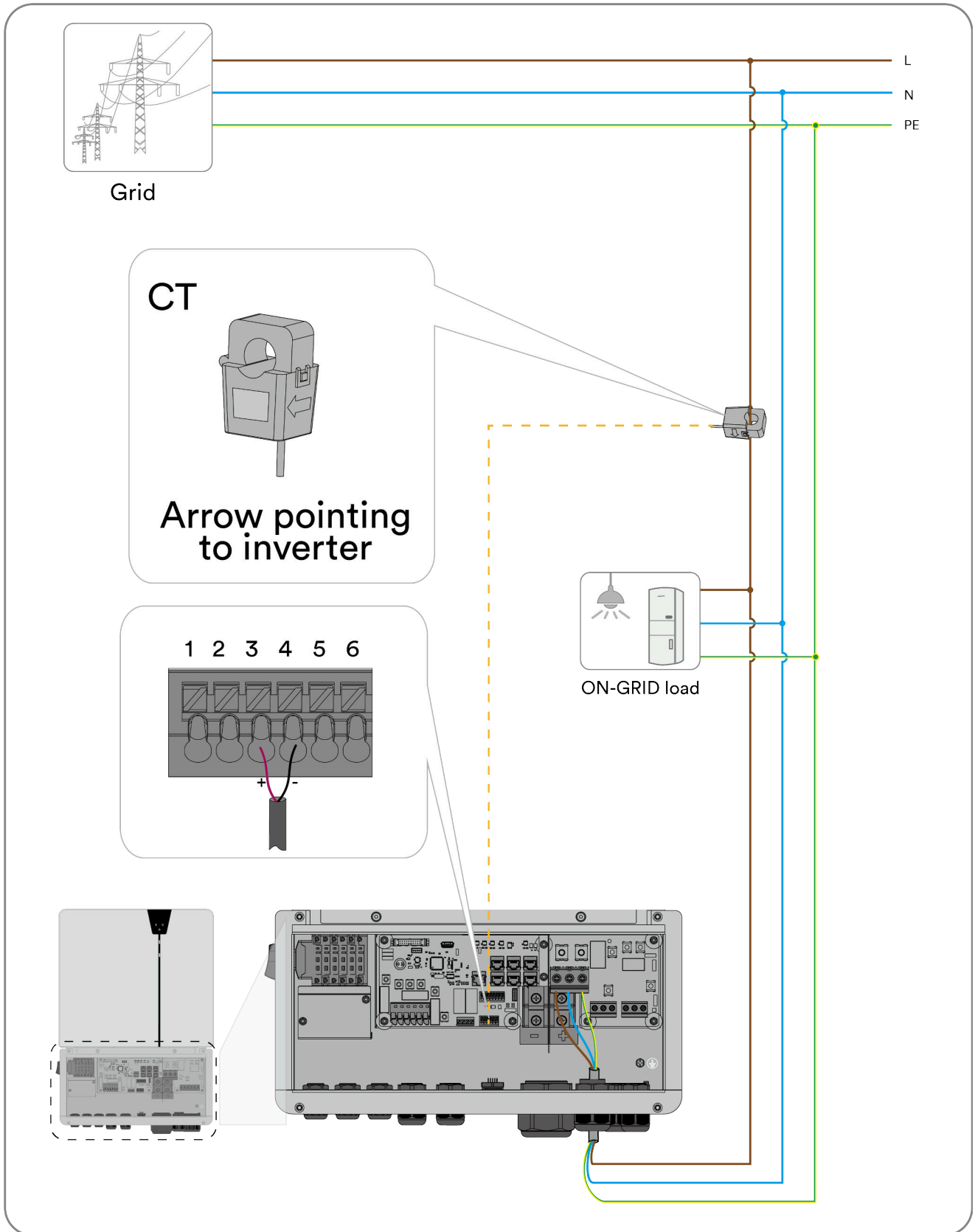
**Step 3:** Push down on the pin terminal and insert one of the cable wires. Repeat for the other pins as needed.



**Step 4:** Tighten the COM 4 cable gland nut onto the threaded gland body.



- **Connect smart meter**

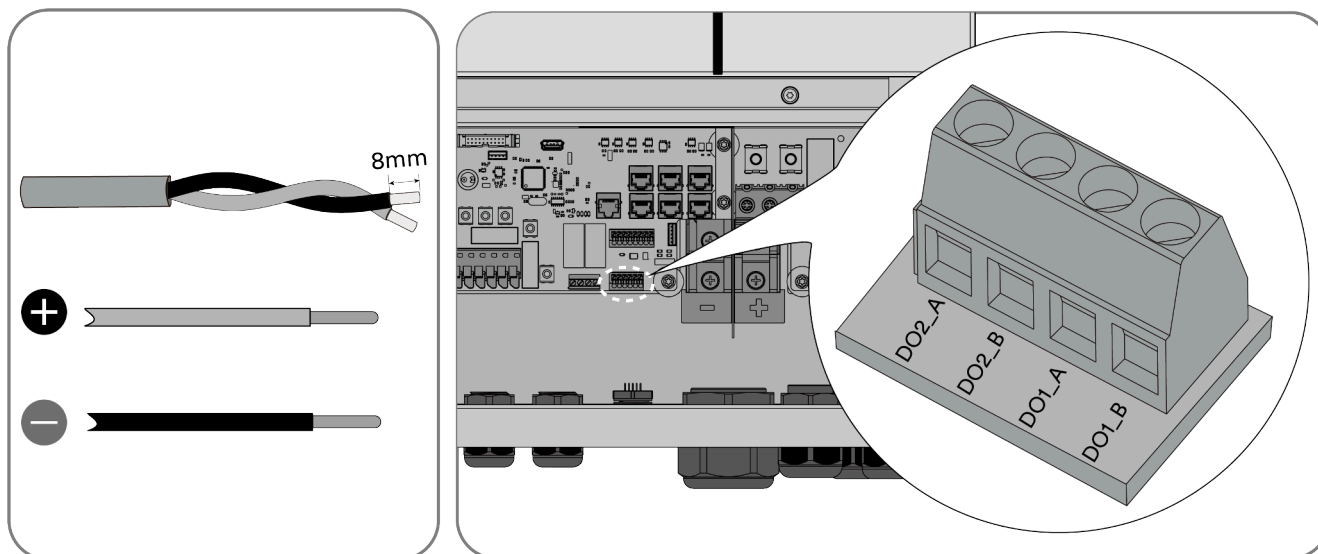




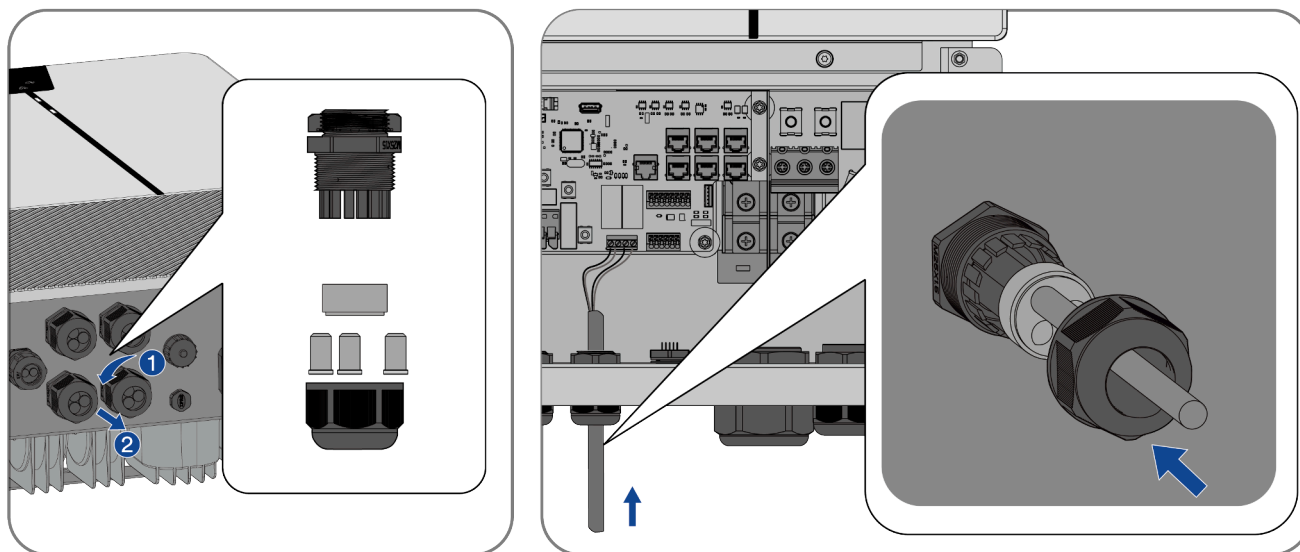
## 6.8.7 DO connection

### Procedure:

**Step 1:** Prepare the cable by stripping off the insulation on one end of the DO cable in accordance with the image below. Locate the DO pins on the Num.11 terminal block.

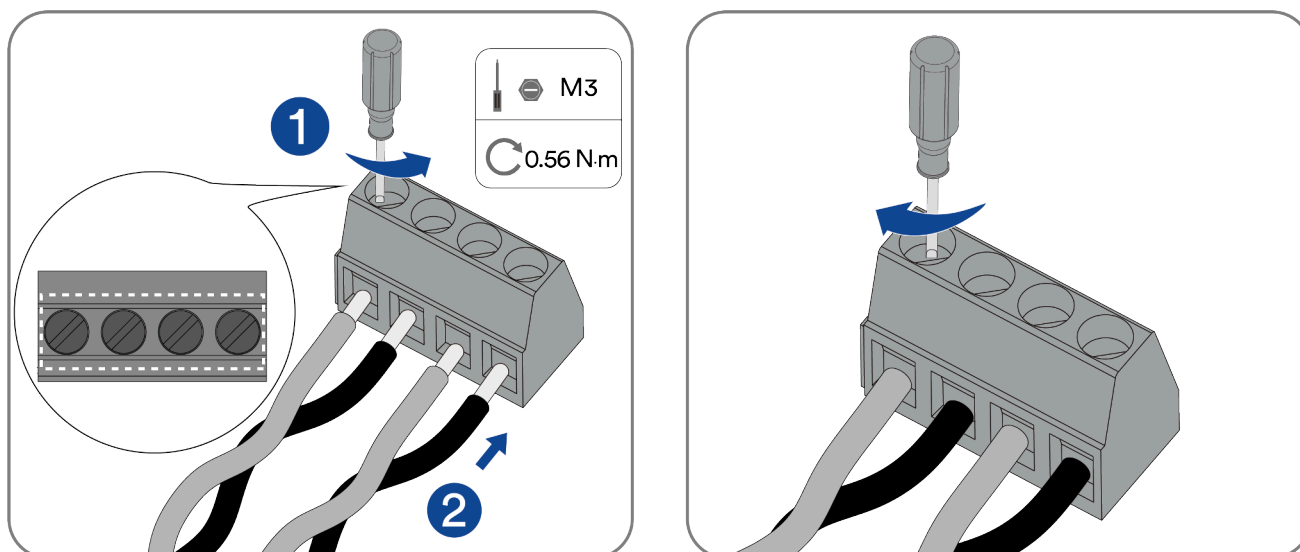


**Step 2:** Remove a COM 4 cable gland nut and feed cable into wiring enclosure.

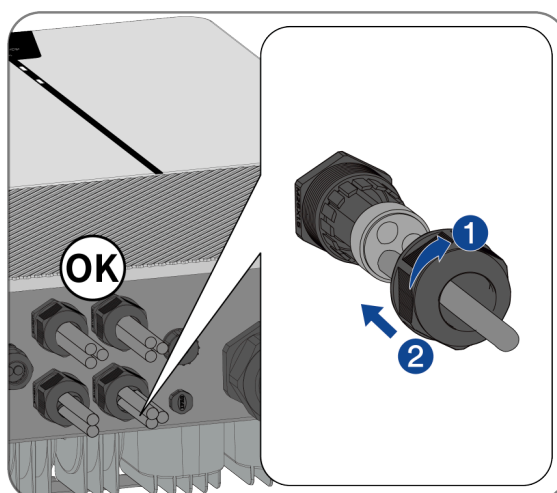




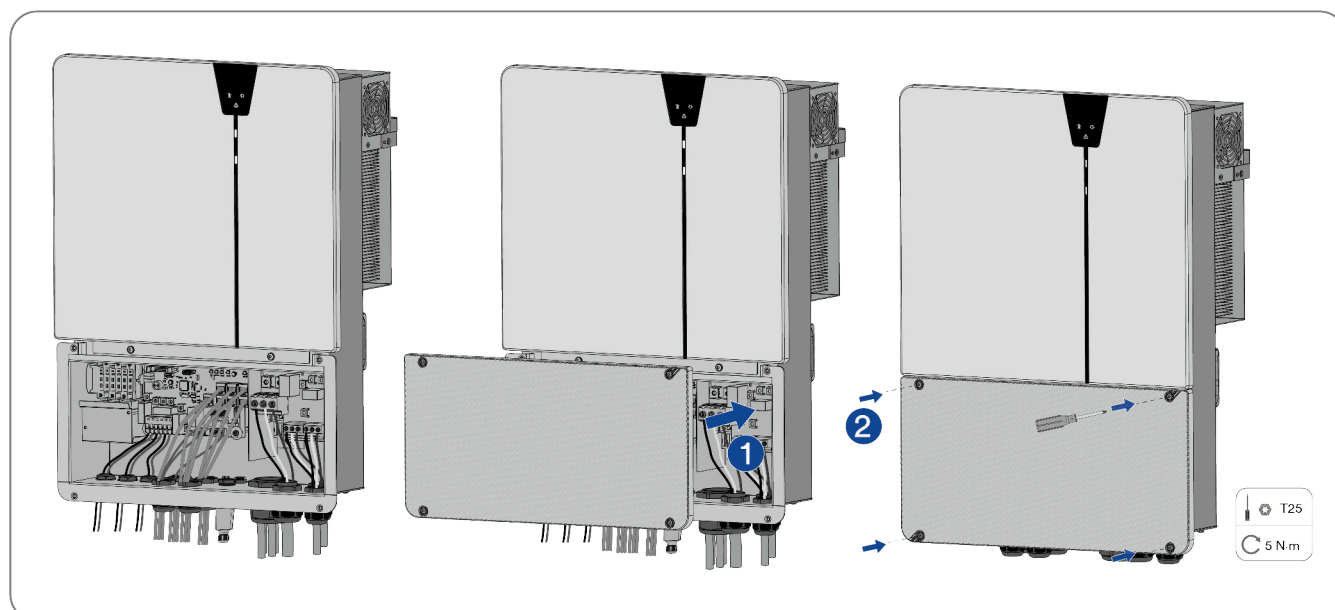
**Step 3:** Loosen the screws on the DO terminal block, insert the cable into the terminal block, and tighten the screw in accordance with the specified torque settings shown in the image below.



**Step 4:** Tighten the COM 4 cable gland nut onto the threaded gland body.



**Step 5:** Re-attach the lower wiring enclosure in accordance with the specified torque settings shown in the image below.



## 7 Commissioning and operation

### 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 OFF.
- Make sure the inverter has been correctly mounted on the mounting bracket.
- Make sure the top side of the inverter is free of objects.
- 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.

**Step 1:** Turn the DC switch of the inverter to "ON" position, switch the circuit breakers on the EPS (if used) and grid terminals to the "OFF" position.

**Step 2:** Connect to the inverter via the Soplanet APP, For details, please refer to 8.4. Then set grid code, operation mode(refer to 4.7), merter or CT type, battery model and SOC limit refer to 8.4.

**Step 3:** Turn the circuit breakers on the EPS and grid terminals to the "ON" position If the start-up conditions are met, the inverter will operate normally.

**Step 4:** Observe the LED indicator to ensure inverter operates normally, check the inverter and battery parameters in the Solplanet APP.

## 8 Solplanet APP

### 8.1 Download and install

The corresponding, free Solplanet app can be downloaded from the relevant app store and installed on a mobile device (smartphone or tablet) with an Android operating system (version 9.0 or newer) or iOS operating system (version 11.0 or newer).

Alternatively, scan the QR code below to download and install the app, following the on-screen instructions.



Android



iOS

### 8.2 Revision history

The revision log provides a description of each document update. The latest version includes all updates from previous versions.

The Solplanet app manual is subject to update without notice. For more product details and latest documents, please visit [www.solplanet.net](http://www.solplanet.net).

| Version | Change Description                                                                  | APP software version | Date    |
|---------|-------------------------------------------------------------------------------------|----------------------|---------|
| V01     | /                                                                                   | 4.5.0                | 2025.01 |
| V02     | 5.1 Chapter Configuration Parameter Sweep Chart (Add Ground Builder Sweep Function) | 4.6.0                | 2025.02 |
|         | Remove home page headings related to “Plants”, “Fault” and “Service”.               | 4.7.0                |         |
|         |                                                                                     |                      |         |

## 9 Decommissioning the product

### 9.1 Disconnecting the inverter from energy sources

Prior to performing any work on the product, always disconnect it from all energy 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:** Turn off the miniature circuit breaker and secure against reconnection.

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

**Step 3:** Wait until the LEDs are off.

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

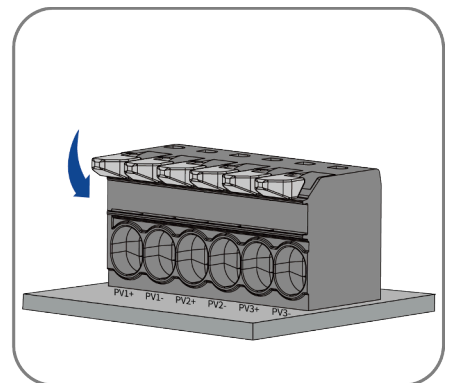
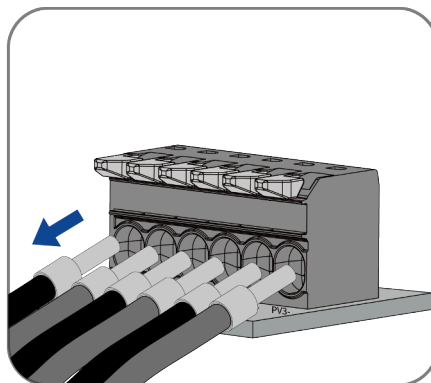
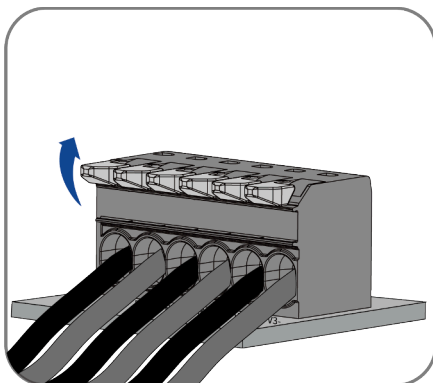
#### **DANGER**

**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.

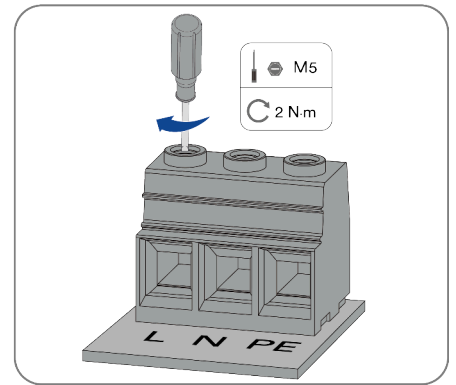
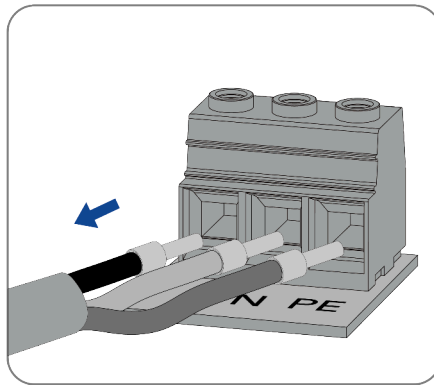
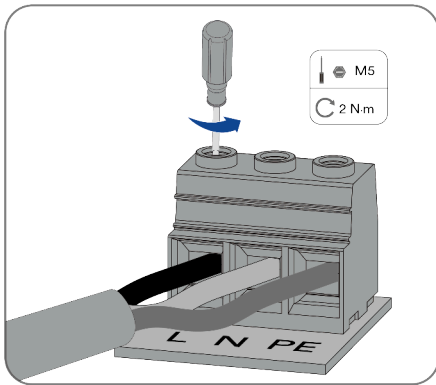
- Wear insulated gloves and use insulated tools when working on the DC connectors.
- Ensure that the DC connectors are in perfect condition and that none of the DC conductors or DC plug contacts are exposed.
- Carefully release and remove the DC connectors as described in the following.

**Step 5:** Loosen and remove the DC connector. Remove the DC cable in reverse order by referring to 6.6 DC connection.

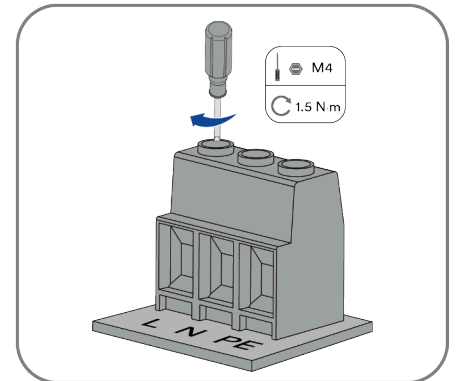
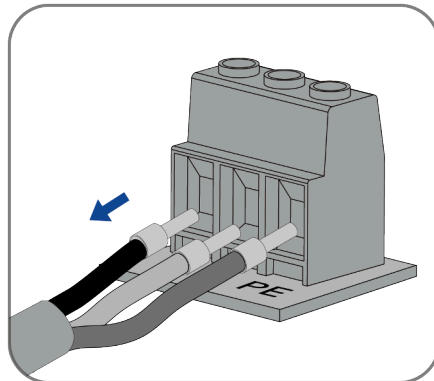
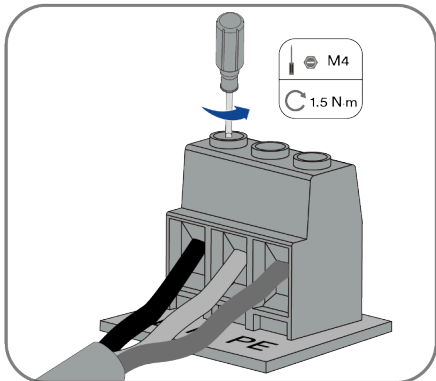


**Step 6:** Ensure that no voltage is present between the positive terminal and negative terminal at the DC inputs using a suitable measuring device.

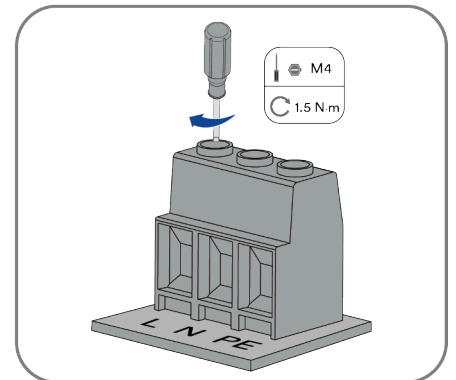
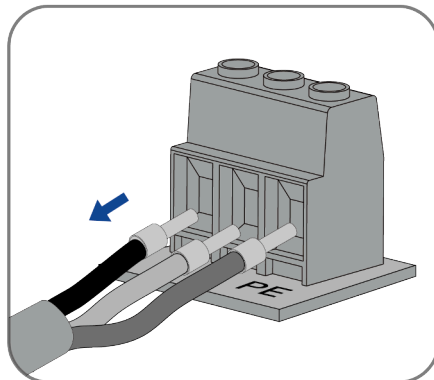
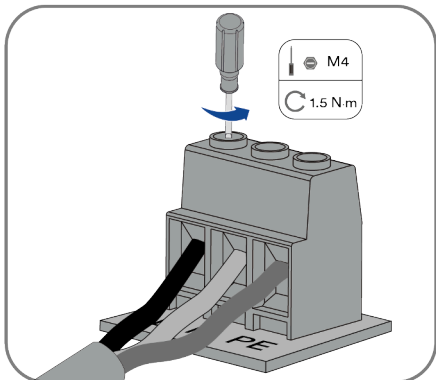
**Step 7:** Disconnect and remove the AC Grid cable in reverse order by referring to 6.3 Grid cable connection.



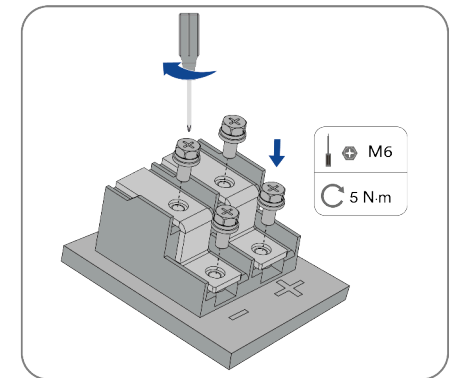
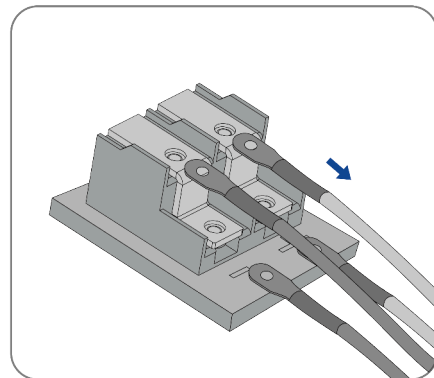
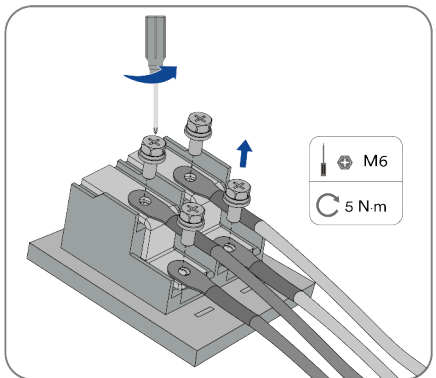
**Step 8:** Disconnect and remove the EPS cable in reverse order by referring to 6.4 EPS Load cable connection.



**Step 9:** Disconnect and remove the Generator cable reverse order by referring to 6.5 GEN Load cable connection.

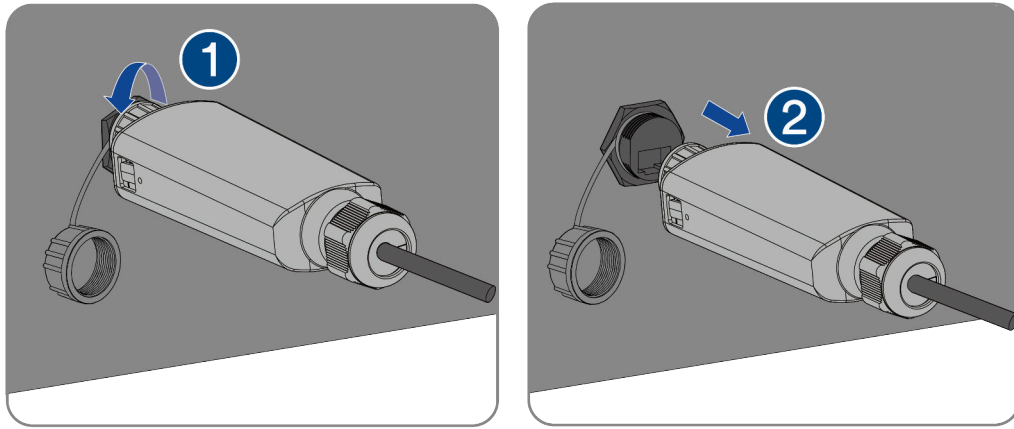


**Step 10** Disconnect and remove the battery cable in reverse order by referring to 6.7 Battery connection.



**Step 11:** Disconnect and remove the communication cables in reverse order by referring to 6.7 Communication equipment connection.

**Step 12:** First the lock nut needs to be unscrewed before the dongle can be removed. Hold down the buckle on the side of the Ai-Dongle and pull out the Ai-Dongle terminal.



## 9.2 Dismantling the inverter

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 mounting bracket from the wall.
- Step 3:** If the inverter will be reinstalled in the future, please refer to “3.2 Inverter Storage” for proper preservation.

## 10 Technical data

### 10.1 ASW008K-SH/ ASW010K-SH

| Type                                                                                                                                       | ASW008K-SH                                       | ASW010K-SH |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------|
| DC Input                                                                                                                                   |                                                  |            |
| Maximum power of PV array                                                                                                                  | 16000 Wp                                         | 20000 Wp   |
| Max. power per MPP tracker                                                                                                                 | 10000 W                                          | 10000 W    |
| Maximum input voltage                                                                                                                      | 550 V                                            |            |
| Rated input voltage                                                                                                                        | 380 V                                            |            |
| Minimum input voltage                                                                                                                      | 40 V                                             |            |
| Start voltage                                                                                                                              | 50 V                                             |            |
| MPP voltage range                                                                                                                          | 40~530 V                                         |            |
| MPP voltage range at Pnom                                                                                                                  | 150~500 V                                        | 180~500 V  |
| Max. input current                                                                                                                         | 20 A                                             |            |
| Isc PV (absolute maximum)                                                                                                                  | 25 A                                             |            |
| Maximum reverse current into the PV modules                                                                                                | 0 A                                              |            |
| Number of independent MPP inputs                                                                                                           | 3                                                |            |
| Strings per MPP input                                                                                                                      | 1                                                |            |
| Overvoltage category in accordance with ICE 60664-1                                                                                        | II                                               |            |
| AC Input and Output                                                                                                                        |                                                  |            |
| Rated output power at 230 V                                                                                                                | 8000 VA                                          | 10000 VA   |
| Rated apparent power at cosφ = 1                                                                                                           | 8000 VA                                          | 10000 VA   |
| Maximum apparent power at cos φ = 1                                                                                                        | 8800 VA                                          | 11000 VA   |
| Rated grid voltage                                                                                                                         | 154 V ~ 276 V                                    |            |
| Grid voltage range                                                                                                                         | 220 V [1/N/PE]                                   |            |
|                                                                                                                                            | 230 V [1/N/PE]                                   |            |
|                                                                                                                                            | 240 V [1/N/PE]                                   |            |
| Rated grid frequency                                                                                                                       | 50 Hz / 60 Hz                                    |            |
| Grid frequency range                                                                                                                       | 45~55 Hz / 55~65 Hz                              |            |
| Rated output current at 220 V                                                                                                              | 36.4 A                                           | 45.5 A     |
| Rated output current at 230 V                                                                                                              | 34.8 A                                           | 43.5 A     |
| Rated output current at 240 V                                                                                                              | 33.3 A                                           | 41.7 A     |
| Maximum output current                                                                                                                     | 38.3 A                                           | 47.8 A     |
| Max. input power from grid                                                                                                                 | 16000 W                                          | 18000 W    |
| Max. input current from grid                                                                                                               | 69.6 A                                           | 78.3 A     |
| Inrush current                                                                                                                             | <20% of nominal AC current for a maximum of 10ms |            |
| Contribution to peak short-circuit current ip                                                                                              | 145A                                             | 145A       |
| Initial short-circuit alternating current (Ik" first single period effective value)                                                        | 130A                                             | 130A       |
| Short circuit current continuous [ms] (max output fault current)                                                                           | 50ms                                             | 50ms       |
| Recommended rated current of AC circuit Breaker                                                                                            | 100A                                             | 100A       |
| 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% (of nominal power)                           |            |

|                                                     |                                                    |             |
|-----------------------------------------------------|----------------------------------------------------|-------------|
| Adjustable displacement power factor                | 0.8 leading to 0.8 lagging                         |             |
| Overvoltage category in accordance with IEC 60664-1 | III                                                |             |
| Efficiency                                          |                                                    |             |
| Maximum efficiency                                  | 97 % / 97.6 %                                      |             |
| European weighted efficiency                        | 99.9 %                                             |             |
| Battery data                                        |                                                    |             |
| Max charging power                                  | 8000 W                                             | 10000 W     |
| Max discharging power                               | 8000 W                                             | 10000 W     |
| Battery voltage range                               | 40 V to 60V                                        |             |
| Max charging current                                | 190 A                                              | 210 A       |
| Max discharging current                             | 190 A                                              | 210 A       |
| Rated charging current                              | 190 A                                              | 210 A       |
| Rated discharging current                           | 190 A                                              | 210 A       |
| Battery type                                        | LiFePO4 / Lead-acid                                |             |
| EPS load data                                       |                                                    |             |
| Rated apparent power at 230V                        | 8000 VA                                            | 10000 VA    |
| Max. apparent power at 230V, continuous on-grid     | 34.8 A                                             | 43.5 A      |
| Max. apparent power at 230V continuous off-grid     | 34.8 A                                             | 43.5 A      |
| Max. apparent power at at 230V, off-grid <10s       | 69.6 A                                             | 78.3 A      |
| Nominal output voltage                              | 220 V [1/N/PE]<br>230 V [1/N/PE]<br>240 V [1/N/PE] |             |
| AC grid frequency                                   | 50 Hz / 60 Hz                                      |             |
| Max. continuous output current                      | 34.8 A                                             | 43.5 A      |
| Max. output current < 10s                           | 69.6 A                                             | 78.3 A      |
| Rated current at 230V                               | 34.8 A                                             | 43.5 A      |
| Max. current at 230V, continuous on-grid            | 34.8 A                                             | 43.5 A      |
| Max. current at 230V, continuous off-grid           | 34.8 A                                             | 43.5 A      |
| Total harmonic distortion (THDv, linear load)       | 2 %                                                |             |
| Switching time to battery-backup operation          | < 10 ms                                            |             |
| Generator side data                                 |                                                    |             |
| Rated voltage                                       | 220 V [1/N/PE]<br>230 V [1/N/PE]<br>240 V [1/N/PE] |             |
| Nominal frequency                                   | 50/60 Hz                                           |             |
| Max. input apparent power (off-grid)                | 8000 VA                                            | 10000 VA    |
| Max. continuous input current (off-grid)            | 34.8 A                                             | a.c. 43.5 A |
| Power factor range (off-grid)                       | 0.8 ind ... 0.8 cap                                |             |

(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

| Type                                                              | ASW008K-SH/ ASW010K-SH           |
|-------------------------------------------------------------------|----------------------------------|
| Width × height × depth                                            | 484 mm × 679 mm × 230 mm         |
| Weight                                                            | 34.5 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/II(DC), III(AC)                |
| Pollution degree outside the enclosure                            | 3                                |
| Pollution degree inside the enclosure                             | 2                                |
| Max. operating altitude above mean sea level                      | 3000 m                           |
| Self-consumption (night)                                          | <20 W                            |
| Cooling method                                                    | Smart cooling                    |
| Typical noise emission                                            | < 45 dB(A)@1m                    |
| Display                                                           | LED indicator, App               |
| Demand response mode in accordance with AS/NZS 4777.2             | DRM0                             |
| Export active power output                                        | Via connecting CT or Smart meter |
| Earth Fault Alarm                                                 | cloud based, Visible             |
| Interfaces                                                        | LED, APP, Cloud                  |
| Communication                                                     | RS485, CAN, Wifi, LAN            |
| Mounting information                                              | Wall mounting bracket            |
| Radio technology                                                  | WLAN 802.11 b/g/n                |
| Radio spectrum                                                    | WLAN with 2412 – 2472MHz band    |
| Maximum transmission power                                        | 100 mW                           |

## 10.3 Protective device

| Protective devices                   | ASW008K-SH/ ASW010K-SH   |
|--------------------------------------|--------------------------|
| DC reverse polarity protection       | Integrated               |
| DC isolator                          | Integrated               |
| Ground fault monitoring              | Integrated               |
| AC short- circuit current capability | Integrated               |
| Active anti-islanding protection     | Integrated               |
| DC current injection monitoring      | Integrated               |
| Low voltage ride through             | Integrated               |
| High voltage ride through            | Integrated               |
| Overvoltage protection               | DC Type II / AC Type III |

## 11 Troubleshooting

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If an error or warning occurs, there will have "Event Messages" display in the monitor tools. The corresponding corrective measures are as follows:

| Error code | Message                                  | Corrective measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3          | Relay check Fail                         | <ul style="list-style-type: none"> <li>• Check the DC side condition (e.g. input voltage, poor contact, etc.) and remove any abnormality.</li> <li>• Disconnect EPS to check grid condition(e.g. voltage, frequency, poor condition,etc) and remove any abnormality, then restart it to check if the fault is disappear;</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                               |
| 4          | DC Injection High                        | <ul style="list-style-type: none"> <li>• Check DCI protection limit and adjust it to be 2A to observe is the fault disappear?</li> <li>• If the fault is still there, Check the grid condition(e.g., voltage, frequency, poor contact, etc.)</li> <li>• Test the surrounding environment for the presence of high-power equipment (e.g., generators, cranes, etc.), this fault may be related to the start and stop of this equipment.</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul> |
| 5          | The result of Auto Test Function is fail | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module and battery and reconnect after 5 minutes.</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                |
| 8          | AC HCT Failure                           | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module and battery and reconnect after 5 minutes.</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                |
| 9          | GFCI Device Failure                      | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module and battery and reconnect after 5 minutes.</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                |
| 10         | Device fault                             | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module and battery and reconnect after 5 minutes.</li> <li>• If this fault is still being shown, contact the service.</li> <li>• The inverter temperature should be above -40°C</li> </ul>                                                                                                                                                                                                                                                                  |
| 12         | HW output over current                   | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module, battery and reconnect after 5 minutes, check is it solved?</li> <li>• If not, disconnect the load, and restart the inverter to check is it solved?</li> <li>• If the fault disappear, then connect the load one by one to check which load</li> </ul>                                                                                                                                                                                               |

|    |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                   | <p>result this fault?</p> <ul style="list-style-type: none"> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                          |
| 33 | Fac Failure:Fac Out of Range      | <ul style="list-style-type: none"> <li>Check the grid and EPS frequency and observe how often major fluctuations occur.</li> <li>Contact customer service if EPS frequency abnormal.</li> </ul> <p>If this fault is caused by frequent fluctuations, try to modify the operating parameters after informing the grid operator first.</p>                                                                                                                                                                  |
| 34 | AC Voltage Out of Range           | <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.</p> <p>If the grid voltage lies within the permitted range and this fault still occurs, please call service.</p> |
| 36 | GFCI Failure                      | <p>Make sure the inverter is reliably grounded.</p> <ul style="list-style-type: none"> <li>Only Disconnect PV module and restart it to check is the fault on? Remove any abnormality.</li> <li>Only Disconnect battery to check is the fault on? Remove any abnormality.</li> <li>Only Disconnect Grid side to check is fault on? Remove any abnormality.</li> <li>Disconnect EPS to check is fault on? Remove any abnormality.</li> </ul>                                                                |
| 37 | PV Over Voltage                   | <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>Make exchange of the inverter if the input voltage lies within the permitted range and the fault still occurs.</li> </ul>                                                                                                                                                                                                          |
| 38 | Isolation Fault                   | <p>Make sure the inverter is reliably grounded.</p> <ul style="list-style-type: none"> <li>Only Disconnect PV module and restart it to check is the fault on? Remove any abnormality.</li> <li>Only Disconnect battery to check is the fault on? remove any abnormality.</li> <li>Only Disconnect Grid side to check is fault on? remove any abnormality.</li> <li>Disconnect EPS to check is fault on? remove any abnormality.</li> </ul>                                                                |
| 40 | Over temperature in inverter      | <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>                                                                                                                                                                                                                                                                                                               |
| 48 | Average volt of ten minutes Fault | <ul style="list-style-type: none"> <li>Check the grid voltage at the point of connection of inverter.</li> <li>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.</li> <li>If the grid voltage lies within the permitted range and this fault still occurs, please call service.</li> </ul>                                                              |

| Warning Code | Message                 | Corrective measures                                                                                                    |
|--------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| 34           | PV1 input over current- | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and</li> </ul> |

|    |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | software                                        | <p>reconnect after 5 minutes to check is the problem solved?</p> <ul style="list-style-type: none"> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 35 | PV1 input over current-hardware                 | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and reconnect after 5 minutes to check is the problem solved?</li> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 36 | PV2 input over current-software                 | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and reconnect after 5 minutes to check is the problem solved?</li> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 37 | PV2 input over current-hardware                 | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and reconnect after 5 minutes to check is the problem solved?</li> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 38 | PV3 input over current-software                 | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and reconnect after 5 minutes to check is the problem solved?</li> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 39 | PV3 input over current-hardware                 | <ul style="list-style-type: none"> <li>Disconnect the inverter from the AC grid, PV module and battery, and reconnect after 5 minutes to check is the problem solved?</li> <li>Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 40 | BUS over voltage-software                       | <ul style="list-style-type: none"> <li>Check actual PV input voltage &amp; AC voltage to make sure the voltage within the voltage range when installing the inverter;</li> <li>If the fault reports during the inverter first installation, and also doesn't work for more than 6 months after production, then the fault may be caused by energy lack of capacitance. Then close the DC switch to charge the capacitor for one day to check is the problem solved? Make exchange of the inverter if it is not solved.</li> <li>Go to next steps to check when it is not new installation</li> <li>Check BUS voltage in cloud;</li> <li>If BUS voltage is over 1050V when PV input voltage is most same with 1000V, please decrease input voltage to check is the fault disappear?</li> <li>If BUS voltage is over 1050V when PV input voltage is most less than 1000V, Make exchange of the inverter.</li> </ul> |
| 42 | BUS voltage unbalance(for three phase inverter) | <ul style="list-style-type: none"> <li>Check actual PV input voltage &amp; AC voltage to make sure the voltage within the voltage range when installing the inverter;</li> <li>If the fault reports during the inverter first installation, and also doesn't work for more than 6 months after production, then the fault may be caused by energy lack of capacitance. Then close the DC switch to charge the capacitor for one day to check is the problem solved? Make exchange of the inverter if it is not solved.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                 |

|     |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                              | <p>Go to next steps to check when it is not new installation</p> <ul style="list-style-type: none"> <li>• Check BUS voltage in cloud;</li> <li>• If BUS voltage is over 1050V when PV input voltage is most same with 1000V, please decrease input voltage to check is the fault disappear?</li> <li>• If BUS voltage is over 1050V when PV input voltage is most less than 1000V, Make exchange of the inverter.</li> </ul>                                                                                                                        |
| 46  | output over current-hardware | <ul style="list-style-type: none"> <li>• Disconnect load to check is the warning still on? and remove any abnormality</li> <li>• Disconnect battery to chek is the warning still on? and remove any abnormality</li> <li>• Disconnect PV module to chek is the warning still on? and remove any abnormality</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                              |
| 47  | Anti-islanding               | <ul style="list-style-type: none"> <li>• This warning may occurs when grid frequency or voltage instant un-stable or grid blackout occasionally.</li> <li>• If this warning occurs frequently, contact service.</li> </ul>                                                                                                                                                                                                                                                                                                                          |
| 150 | SPD Damaged                  | <ul style="list-style-type: none"> <li>• Not Applicable now, depends on IBC requirement</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 162 | DC offset current abnormal   | <ul style="list-style-type: none"> <li>• Disconnect the inverter from the AC grid, PV module and battery and reconnect after 5 minutes.</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                                                                                  |
| 175 | Battery Soc Low              | <ul style="list-style-type: none"> <li>• Timely charge the battery, observe SOC value, it is normal if SOC value increases steably.</li> <li>• if SOC value increases uneven, first charge the battery to be full, then make discharge of battery, it can explain battery package is normal when SOC value changing is even, or please make at least one time cycle of full charge and full discharge everyday to observe whether SOC value display is improved.</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul> |
| 176 | Battery Fault Status         | <ul style="list-style-type: none"> <li>• Check battery status in App;</li> <li>• Follow battery status to find battery fault troubleshooting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                            |
| 178 | EPS Output Over              | <ul style="list-style-type: none"> <li>• Decrease the load connection to check is this fault disappear?</li> <li>• Stop the inverter and restart with no EPS to check is this fault disappear?</li> <li>• Make exchange of the inverter if complete the above guide with fault is still there.</li> </ul>                                                                                                                                                                                                                                           |
| 180 | PV string inverse            | <ul style="list-style-type: none"> <li>• Check PV string/Battery positive and negative connection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Warning Code | Battery error status details in App | Corrective measures                                                                                                                                                                              |
|--------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W176         | Communication data                  | <ul style="list-style-type: none"> <li>• Make inspection of the communication wiring loosen or abnormal between battery package and inverter. To supply power to the inverter through</li> </ul> |

|               |                                          |                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Battery Error |                                          | <p>connecting inverter with the grid or PV.</p> <ul style="list-style-type: none"> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                                                                                                                                                                |
|               | Cell or module overvoltage               | <ul style="list-style-type: none"> <li>• Stop charging;</li> <li>• Make discharging of battery;</li> <li>• Observe after multiple cycles of charging&amp;discharging;</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                                                                        |
|               | Undervoltage of battery cells or modules | <ul style="list-style-type: none"> <li>• Stop discharging;</li> <li>• Make charging of battery;</li> <li>• Observe after multiple cycles of charging&amp;discharging;</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                                                                        |
|               | Cell temperature too high                | <ul style="list-style-type: none"> <li>• Stop working;</li> <li>• Observe site ambience, is ambience temperature high?</li> <li>• Check recent running condition, whether put it in rather high temperature ambience when not put it to work.</li> <li>• Wait to recover automatically.</li> </ul>                                                                                              |
|               | Cell temperature too low                 | <ul style="list-style-type: none"> <li>• Stop working;</li> <li>• Observe site ambience, is ambience temperature too low?</li> <li>• Check recent running condition, whether put it in rather low temperature ambience when not put it to work.</li> <li>• Wait it to recover automatically.</li> </ul>                                                                                         |
|               | Discharge overcurrent                    | <ul style="list-style-type: none"> <li>• Wait it to recover automatically.</li> <li>• Check external load connection status of battery package, check does the inverter work normally when only connects with inverter?</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                      |
|               | Charging overcurrent                     | <ul style="list-style-type: none"> <li>• Wait it to recover automatically.</li> <li>• Check charging status of battery package, check does the inverter work normally when only connects with one inverter?</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                                  |
|               | Internal communication error             | <ul style="list-style-type: none"> <li>• Restart battery equipment, check whether connection plug loosen, whether the connection screw is tighten between the pile battery package and control box;</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                                          |
|               | Cell imbalance                           | <ul style="list-style-type: none"> <li>• Make at least one time cycle of charge&amp;discharge everyday to make battery package balance mechanism.</li> <li>• If the failure cannot be solved or improved after one week, please contact the service.</li> </ul>                                                                                                                                 |
|               | Low system insulation                    | <ul style="list-style-type: none"> <li>• Confirm if there is any leakage or short circuit between the positive and negative terminals of the battery;</li> <li>• When insulation failure occurs, it is generally necessary to replace the faulty battery pack inside the battery;</li> <li>• If multiple insulation faults occur, it may be necessary to replace the entire battery.</li> </ul> |

|                            |                                                                                                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage sensor failure     | <ul style="list-style-type: none"> <li>• Test is the connection screw tighten between battery pack and control box? restart battery pack.</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul> |
| Temperature sensor failure | <ul style="list-style-type: none"> <li>• Test is the connection screw tighten between battery pack and control box? restart battery pack.</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul> |
| Contactor failure          | <ul style="list-style-type: none"> <li>• Hardware is defective, restart battery and check is the wiring cable loosen?</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                     |
| Power-on self-test failure | <ul style="list-style-type: none"> <li>• Restart Battery;</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                 |
| IC self test failure       | <ul style="list-style-type: none"> <li>• Restart Battery;</li> <li>• If the failure cannot be solved, please contact the service.</li> </ul>                                                                                 |

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

## 12 Maintenance

### 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.



## 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).

## 15 Service and warranty

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.

## 16 Contact

### EMEA

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

### APAC

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

### LATAM

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

### AISWEI Pty Ltd.

Hotline: +61 390 988 674

Add.: Level 40, 140 William Street, Melbourne VIC 3000, Australia

### AISWEI B.V.

Hotline: +31 208 004 844 (Netherlands)

+48 134 926 109 (Poland)

Add.: Barbara Strozilaan 101,5e etage,kantoornummer 5.12,1083HN Amsterdam,the Netherlands

### AISWEI Technology Co., Ltd

Hotline: +86 400 801 9996

Add.: No. 18, Alley 600, Nanchezhan Road, Huangpu District, Shanghai, China

<https://solplanet.net/contact-us/>

Scan QR code:



Android

Scan QR code:



iOS

