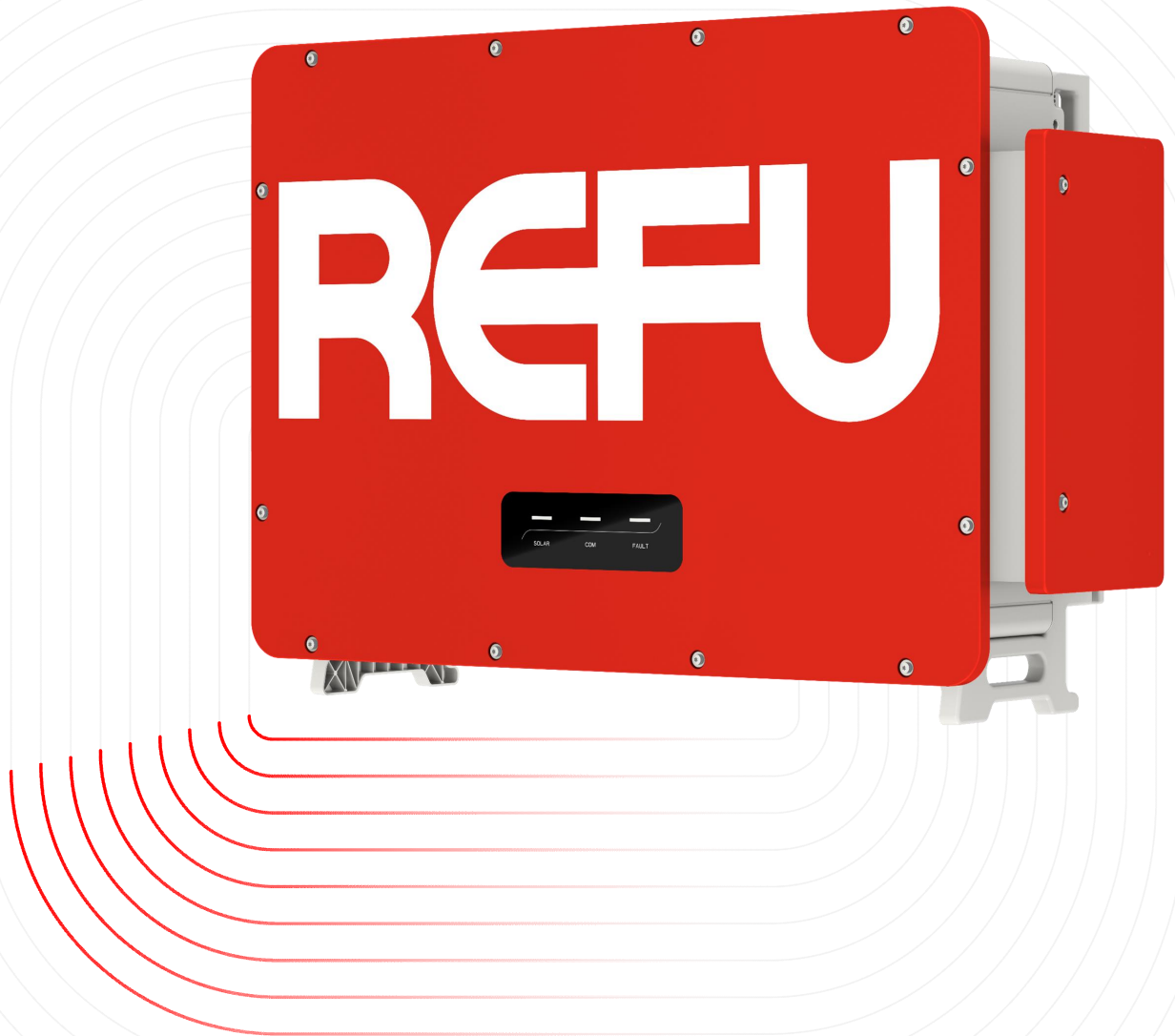


User Manual



REFU^{sol} 250K-5T 890P250
REFU^{sol} 360K-6T 890P360

Issue Date: 2026-06 | EN | P01



WARNING: Installation must be performed only by qualified electricians or trained personnel. Please read the product user manual before installation. Please follow the safety instructions provided in the manual.

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Reservation of rights

All information in this documentation has been compiled and checked with the utmost care. Nevertheless, errors or deviations due to technical progress cannot completely be ruled out. No guarantee is given for completeness.

The latest version is available at www.refu.com

Liability

The data specified is only used to describe the product and should not be interpreted as warranted characteristics in the legal sense. The right to change the content of this documentation and the availability of the products are reserved.

Terminology

In this manual, the terms "REFU^{sol}", "inverter", "grid-tied PV inverter", and "product" refer to the same device and may be used interchangeably unless otherwise specified.

Change history

The following table documents all changes to this document. If you any questions about a specific version, please contact REFU's service support at service@refu.com or you also can also raise a service support ticket on REFU's support page - [Support english - Refu Elektronik](#)

<u>Version</u>	<u>Date</u>	<u>Change</u>	<u>Description</u>	<u>Approval</u>
01	10.06.2026	All chapters	First release	[K.K]

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1 General information

1.1 About this document

This user manual provides instructions for the mounting, installation, commissioning, configuration, operation, troubleshooting, and decommissioning of the REFU^{sol} 800Vac PV inverter family, including the REFU^{sol} 250K-5T and REFU^{sol} 360K-6T.

As part of ongoing product development and continuous improvement, the contents of this manual may be updated or revised without prior notice. Consequently, the information contained herein is subject to change.

The latest version of this user manual, the Quick Installation Guide, and additional product documentation are available in PDF format at www.refu.com.

It is recommended that this manual be stored in a safe and easily accessible location to ensure it is available whenever required.

1.2 Target group

This document is intended exclusively for qualified personnel responsible for the installation, commissioning, operation, maintenance, troubleshooting, and decommissioning of the inverter. All tasks described in this user manual shall be performed only by appropriately trained and qualified personnel and in accordance with the instructions provided herein.

Qualified personnel shall possess the following knowledge and competencies:

- A thorough understanding of the operating principles and functions of PV inverters.
- Appropriate training in identifying and mitigating the hazards and risks associated with the installation, operation, maintenance, and repair of electrical equipment and systems.
- Experience and training in the installation and commissioning of electrical devices and installations.
- Knowledge of all applicable local laws, regulations, standards, and directives relevant to the installation and operation of the equipment.
- Familiarity with, and strict adherence to, the instructions and safety information contained in this user manual and all associated product documentation.

1.3 Safety warning symbols guide



DANGER

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



WARNING

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



CAUTION

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

NOTE

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



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

2 Safety

2.1 Intended use

- The REFU_{sol} 250K–360K PV inverter is a transformer less photovoltaic (PV) inverter equipped with 5/6 Maximum Power Point (MPP) trackers. It converts the direct current (DC) generated by PV modules into grid-compliant alternating current (AC) and feeds the energy into the utility grid.
- The inverter is designed for both indoor and outdoor installations when installed in accordance with the requirements specified in this manual.
- The inverter shall be operated only with PV modules that comply with Protection Class II in accordance with IEC 61730, Application Class A. Connected PV modules must be electrically compatible with the inverter and operated within the specified input limits.
- As the inverter does not incorporate an isolation transformer, it provides no galvanic isolation between the DC and AC sides. Therefore, it shall not be connected to grounded DC conductors or to PV modules with grounded DC outputs, as this may result in irreversible damage to the inverter. PV modules with grounded frames may be used, provided all applicable installation requirements are met.
- When designing the PV system, ensure that all system components operate within their specified electrical, mechanical, and environmental limits and comply with their respective installation requirements under all operating conditions.
- The inverter shall only be installed and operated in countries and regions where it has been approved or authorized by REFU and where its use complies with the requirements of the applicable utility grid operator.
- The inverter shall be used solely in accordance with the instructions provided in this documentation and all applicable local laws, regulations, codes, standards, and directives. Any use outside the specified intended purpose may result in personal injury, equipment damage, or property damage.
- The product type label and all safety markings shall remain permanently affixed to the inverter and must not be removed, obscured, or altered.
- This documentation supplements, but does not replace, applicable regional, state, provincial, federal, or national laws, regulations, codes, and standards governing the installation, electrical safety, operation, and maintenance of the inverter.

2.2 Important safety instructions

The REFU_{sol} 250K–360K PV inverter has been designed, manufactured, and tested in accordance with applicable international safety standards and requirements. However, as with all electrical and electronic equipment, residual risks cannot be completely eliminated despite careful design and engineering.

To minimize the risk of personal injury, electric shock, fire, equipment damage, or property damage, and to ensure the safe and reliable long-term operation of the inverter, carefully read and understand this user manual before installation, commissioning, operation, maintenance, or servicing. All safety instructions, warnings, and precautions provided in this documentation shall be observed at all times.

DANGER

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

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the product. Touching the DC conductors or the live components can cause to lethal electric shocks. If the DC connectors are disconnected from the product under load, an electric arc may occur leading to electric shock and burns.

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

DANGER

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

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

- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- The DC switch may be operated whilst the inverter is in operation.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the product.

WARNING

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

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

- Only use measuring devices with a DC input voltage range of 500 Vdc or higher.

⚠ WARNING

Risk of burns due to hot enclosure parts!

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

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

⚠ WARNING

Risk of injury due to weight of product!

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

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

NOTE

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 must be set correctly.

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

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

2.3 Symbols on the label



Beware of a danger zone

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



Beware of high voltage and operating current

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



Beware of hot surfaces

The inverter may become hot during operation. Avoid contact during operation.



WEEE designation

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



CE marking

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



Certification mark

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



RCM Mark

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



Capacitor discharge

Danger to life due to high voltages in the inverter. Do not touch live parts for 25 minutes after disconnection from the power sources.



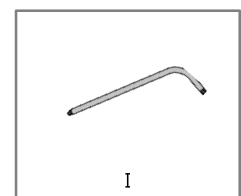
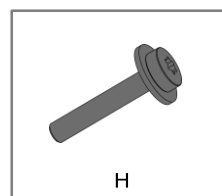
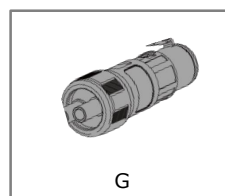
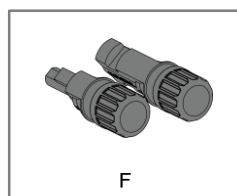
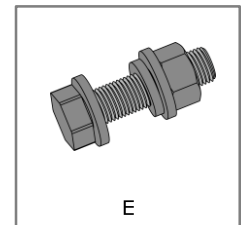
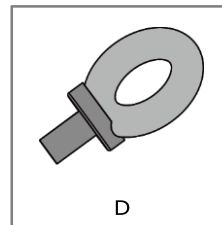
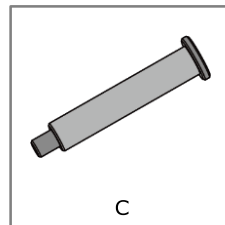
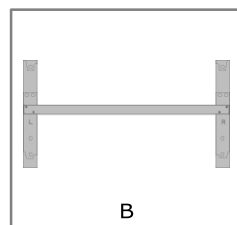
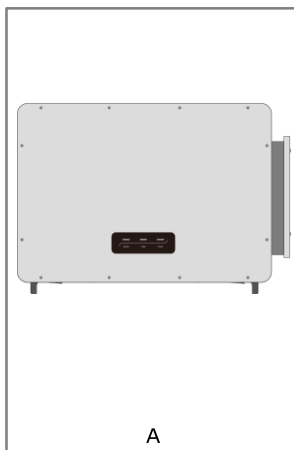
Observe the documentation

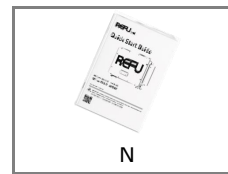
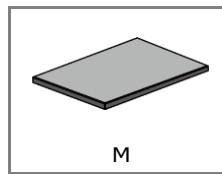
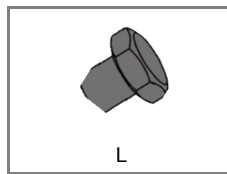
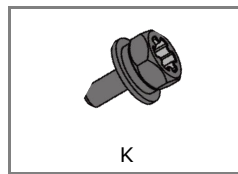
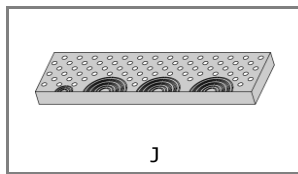
Observe all documentation supplied with the product.

3 Unpacking and storage

3.1 Scope of delivery

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





NO.	Name	Quantity
A	Inverter	1
B	Mounting-bracket	1
C	Handle (Optional)	4
D	Lifting ring (Optional)	2
E	Combination bolt	4
F	DC connector (pair)	25/30
G	RS485 COM plug	1
H	M6×35 Screws	2
I	T30 plum blossom wrench	1
J	Three-core protective coil	2
K	M4×10 Screws	4
L	M10×20 Bolt	2
M	Document package	1
N	Quick start guide	1

*There are 25 pairs of DC terminals for REFU^{sol} 250K-5T and 30 pairs for REFU^{sol} 360K-6T.

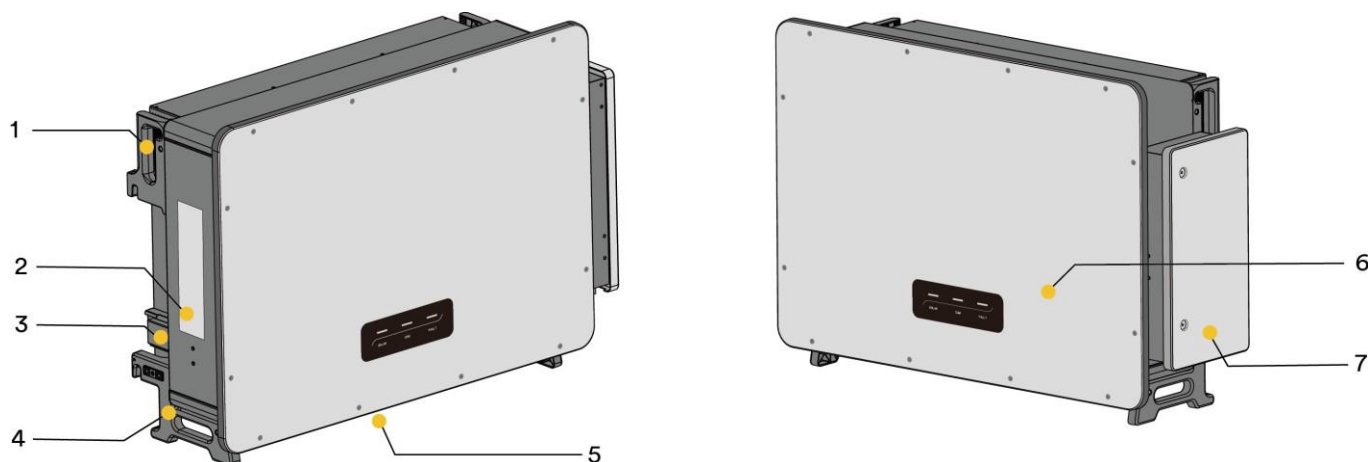
3.2 Storage requirements

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

- Store the inverter in the original package.
- The storage temperature must be between -40°C to +70°C, and the storage relative humidity must be between 0 and 100%, non-condensing.
- The packing with the inverter shall not be tilted or inverted.
- The product must be fully inspected and tested by professionals before it can be put into operation, if it has been stored for six months or more.

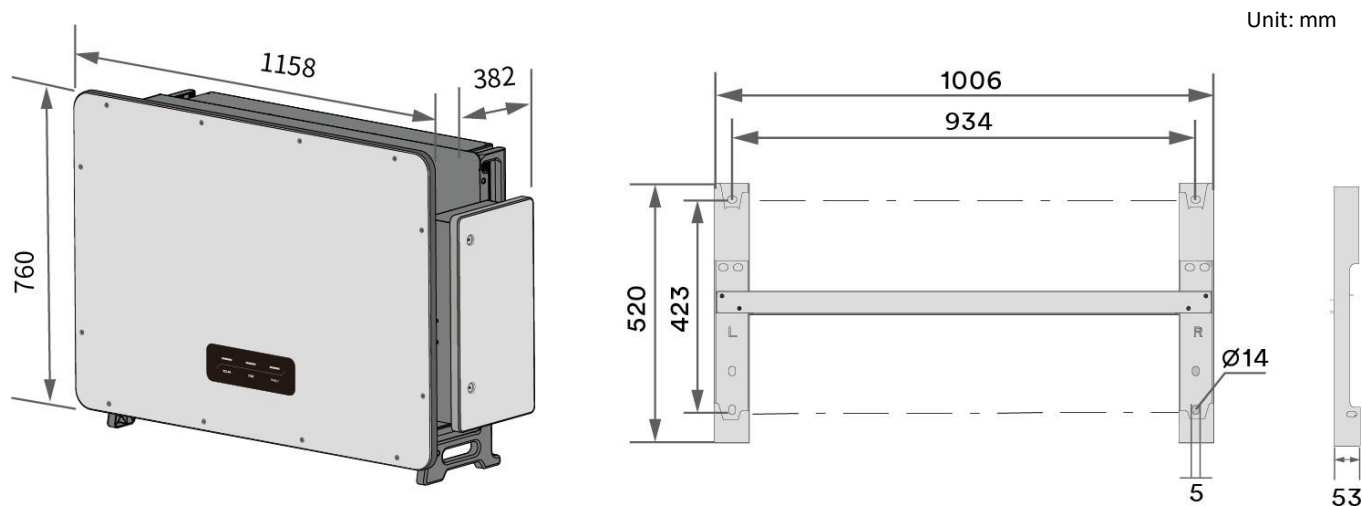
4 Inverter overview

4.1 Description



NO.	Name	Description
1	Top lug	One left and one right for inverter mounting on a pegboard.
2	Labels	Warning symbols, nameplate, and QR code.
3	Fan assembly	Maintain and replace the fan.
4	Bottom handles	One left and one right for inverter handling and installation.
5	DC wiring area	DC switches, DC terminals and communication terminals.
6	LED indicator	Indicate the present working state of the inverter.
7	AC Wiring area	Connect the AC side cables.

4.2 Dimensions



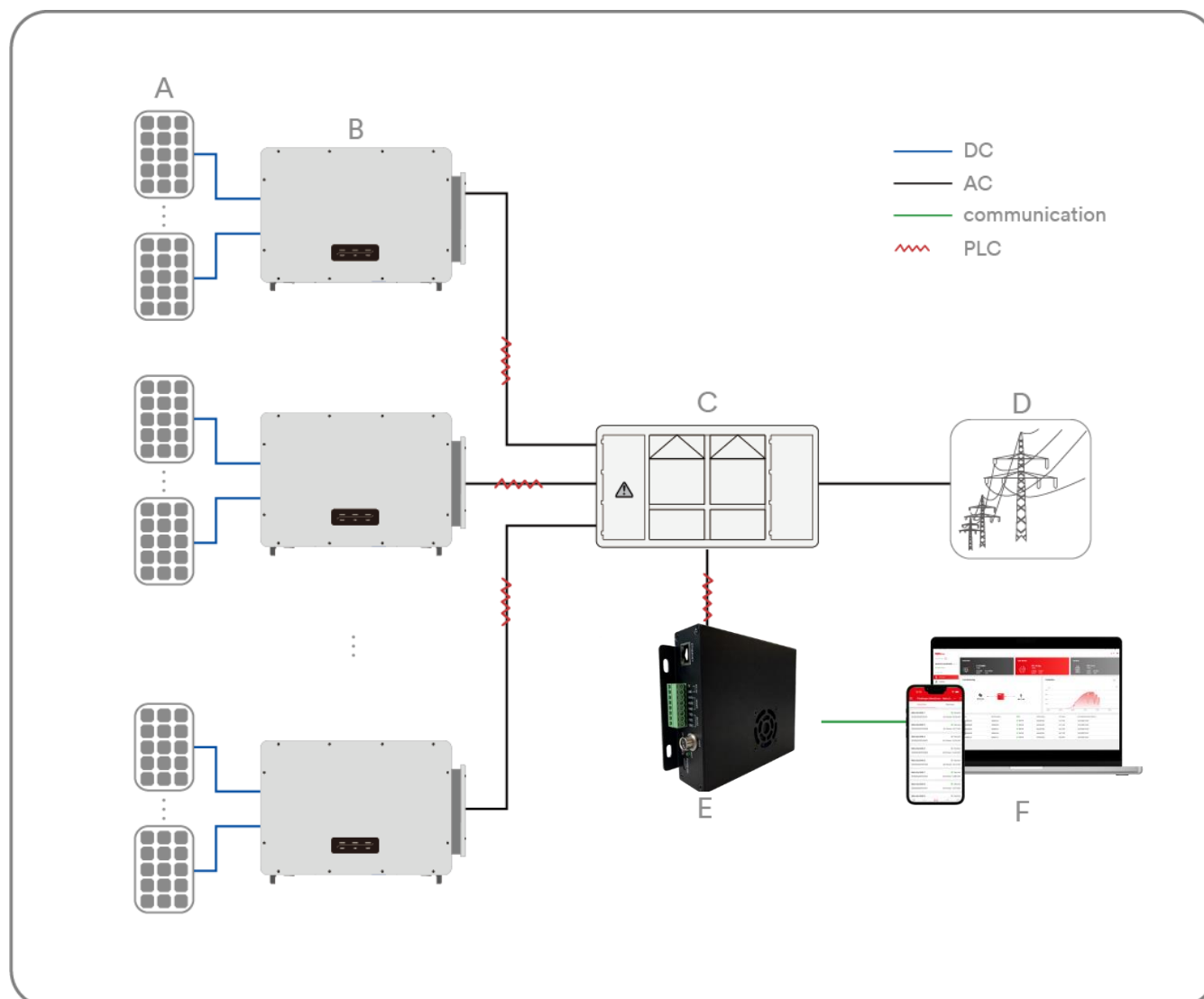
4.3 LED indicator

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

LED indicator	LED state		Description
SOLAR (White)	Continuously ON		When the inverter is in normal grid-connected operation, the white LED is always on.
	Blinking fast (400ms)		When the inverter has DC power but not grid-connected operation, the white LED flashes fast.
	Blinking slowly (1400ms)		When the inverter has AC power and no DC power is available, the white LED flashes slowly.
	OFF		When the inverter is powered, the white LED is off.
COM (White)	When no USB flash drive is connected	Blinking slowly (1400ms)	When communication is normal, the white LED blinks slowly.
		OFF	The white LED turns off when the communication timeout occurs.
	When connecting USB flash drive	Continuously ON	When the upgrade is successful or the log export is successful, the white LED is always on.
		Blinking fast (400ms)	When the upgrade or log export is in progress, the white LED blinks rapidly.
		Blinking slowly (1400ms)	When the upgrade fails, the white LED blinks slowly.
FAULT (Red)	Continuously ON		When there is a device failure, the red LED is always on.
	Blinking fast (400ms)		When there is an alarm on the inverter, the red LED blinks rapidly.
	OFF		When there is no fault or alarm, the red LED is off.

4.4 Communication overview

Schematic diagram of **RBUS networking application**:



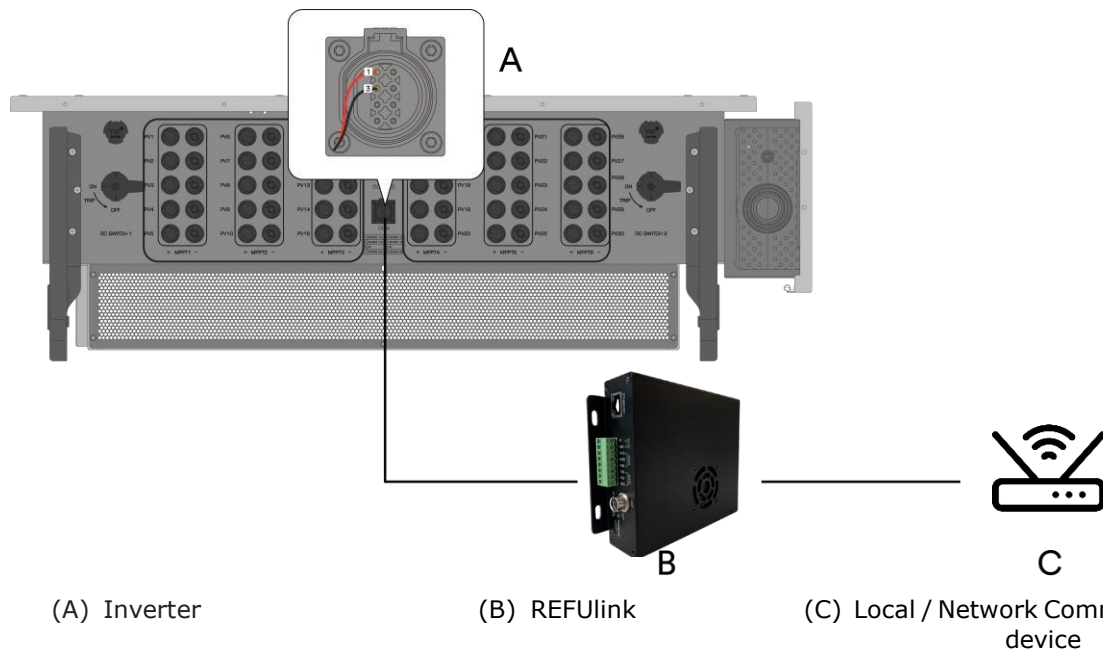
NO.	Name	NO.	Description
A	PV strings	B	Inverter
C	Transformer substation	D	Grid
E	Comm. Box (REFUlink with PLC)	F	Local / network communication device

Schematic diagram of **RS485 networking application**:

For reliable RS485 communication, ensure that appropriate cables are selected with respect to impedance, shielding, and twisted-pair construction.

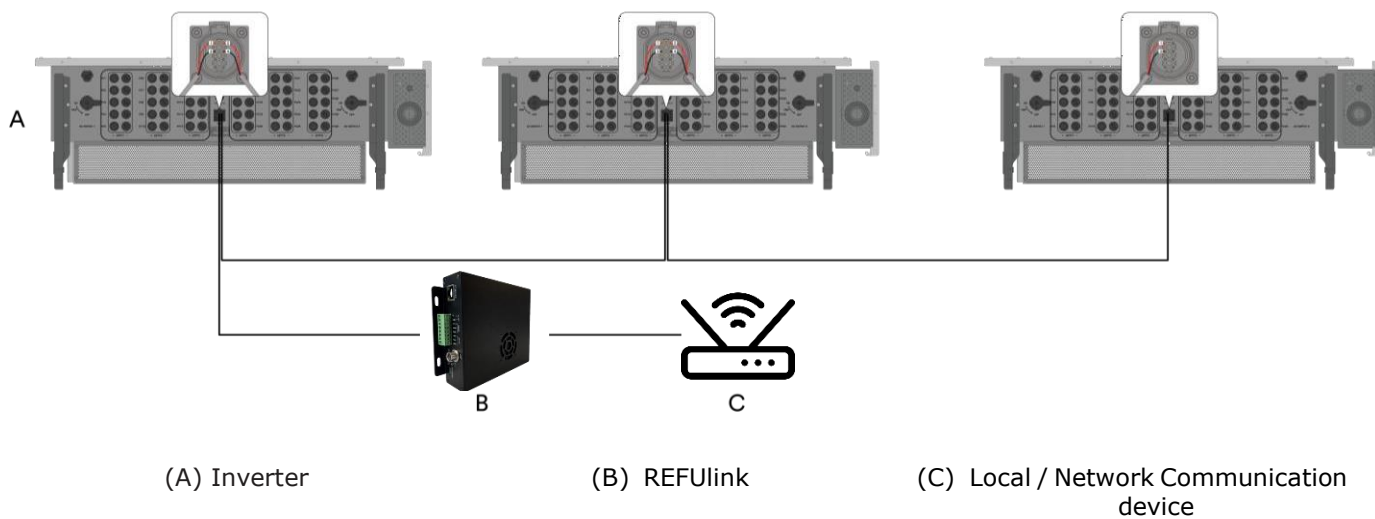
Using unsuitable cables may lead to signal degradation, communication errors, or reduced network performance.

For **single inverter applications**, a single RS485 communication cable can be used to realise the communication connection. The following is an illustration of this system.



Multiple inverters connected to the State Grid dispatching device (optional)

For multiple inverters, all inverters can be daisy-chained with RS485 cables. The details are as follows.



The length of the RS485 communication cable between the collector and the final inverter should not exceed 1000m.

If multiple inverters communicate and are connected through the data collector, the maximum number of daisy chains supported and the total number of devices allowed to be connected need to meet the equipment requirements (see the user manual for **REFULink** for more details).

4.5 Interfaces and functions

The **REFU^{sol} 250K~360K** is equipped with the following interfaces and functions:

RS485 Interface

The inverter is equipped with multiple RS485 interfaces, which can be configured according to customer requirements. The inverter can communicate with REFU's communication products family or third-party devices via the RS485 interface. For more information regarding third party devices, please contact the local REFU service support or you can reach out to service@refu.com.

Modbus RTU

The Modbus of the supported REFU products is designed for industrial use and allows:

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

USB interface

The product is equipped with a USB port, which allows you to insert a USB stick into the USB port for software upgrade or log export operations.

5 Installation

5.1 Requirements for mounting

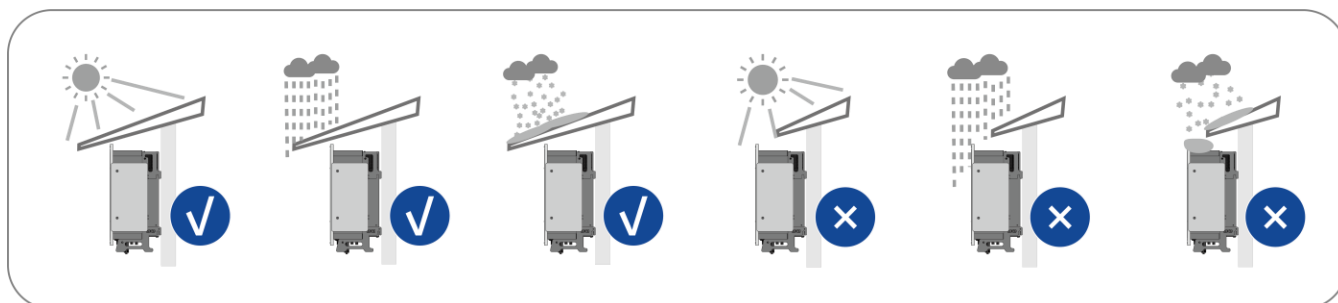
⚠ DANGER

Danger to life due to fire or explosion !

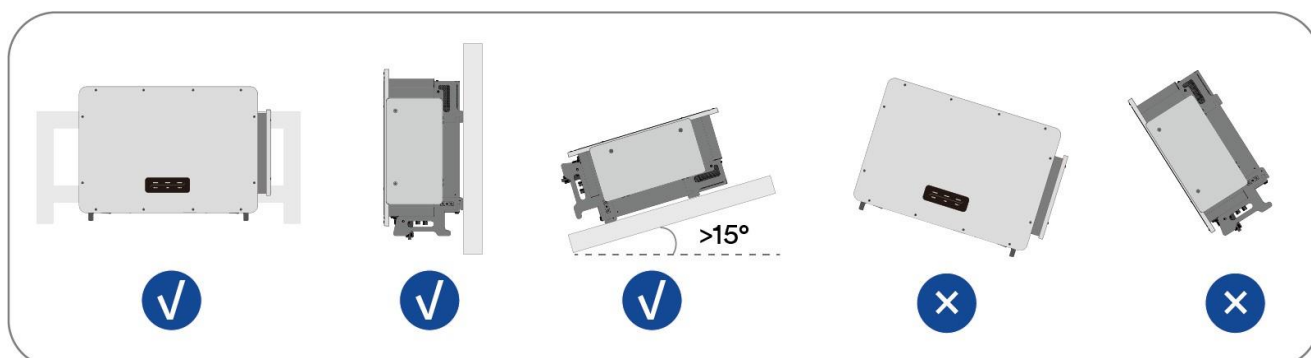
Despite careful construction, electrical devices can cause fires. This can result in death or serious injury.

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

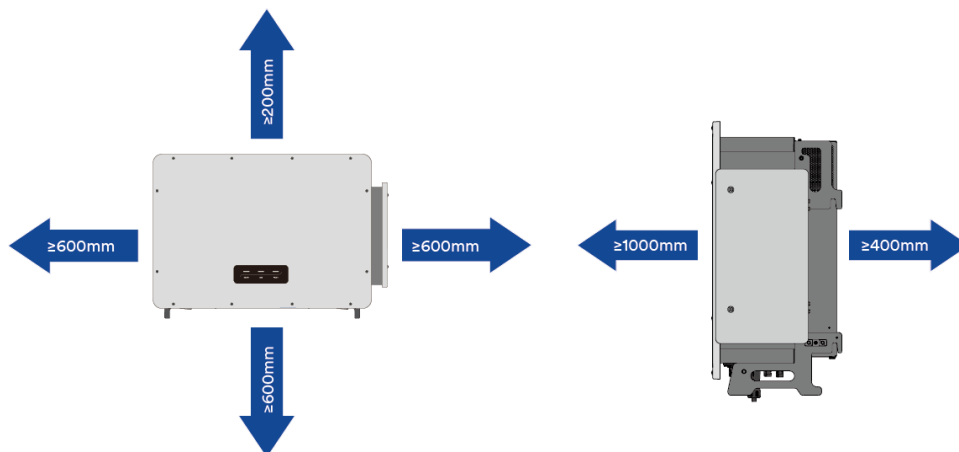
- An ambient temperature below 40°C is recommended to achieve optimal operating performance.
- A solid and stable mounting surface (e.g., concrete or masonry) shall be provided. Ensure that the installation surface is capable of supporting at least four times the weight of the inverter. If the inverter is mounted on drywall or similar lightweight materials, audible vibrations or noise may occur during operation.
- Ensure that the mounting location is not accessible 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 restrict operation and maintenance activities.
- The mounting location must not be exposed to direct solar irradiation. If the product is exposed to direct solar irradiation, the exterior components may age prematurely, and overheating might occur. When becoming too hot, the product reduces its power output to avoid overheating.



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



- Maintain / keep the recommended distance to other inverters or objects.



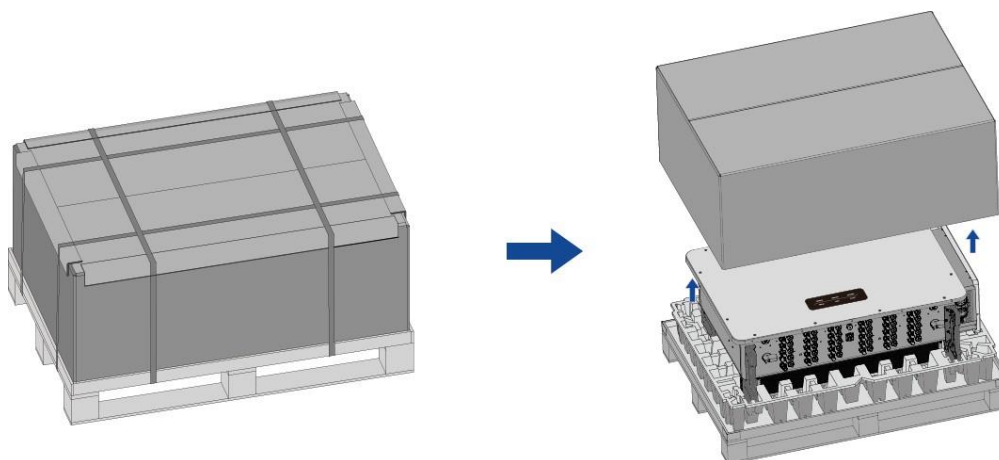
- In case of multiple inverters, ensure the appropriate distance is maintained between the inverters.



- The inverter should be mounted such that the LED indicators can be viewed without difficulty.
- The DC switch of the inverter must always be readily accessible.

5.2 Unpacking the inverter

Open the packaging and attach the four lifting handles to the inverter. Once all four handles are securely installed, carefully remove the inverter from the packaging.



The carrying handle is optional and facilitates manual handling of the inverter.

5.3 Installing the inverter

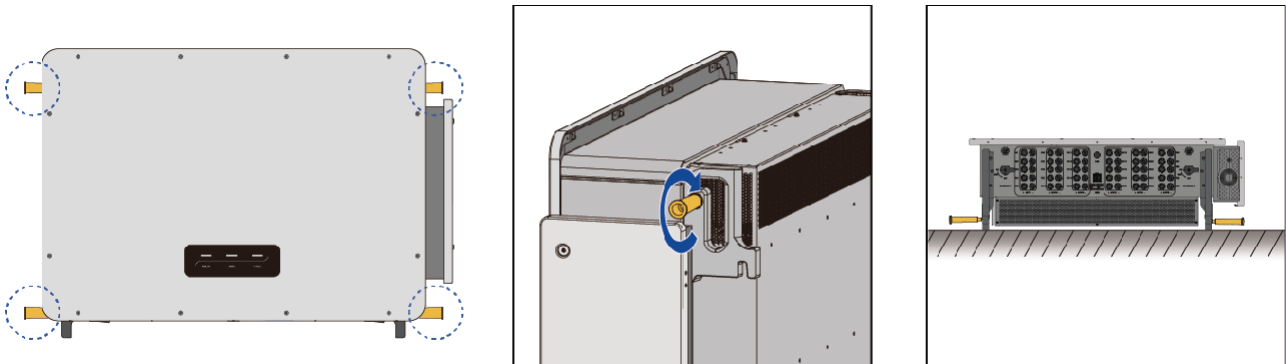
⚠ CAUTION

Dropping the inverter can result in a risk of personal injury!

- The inverter weighs 117 kg. Improper lifting, handling, or dropping during transport or installation may result in personal injury or equipment damage.
- For safety, consider the weight of the product during handling and lifting, and ensure that qualified personnel wear appropriate personal protective equipment (PPE).

5.3.1 Manual transport

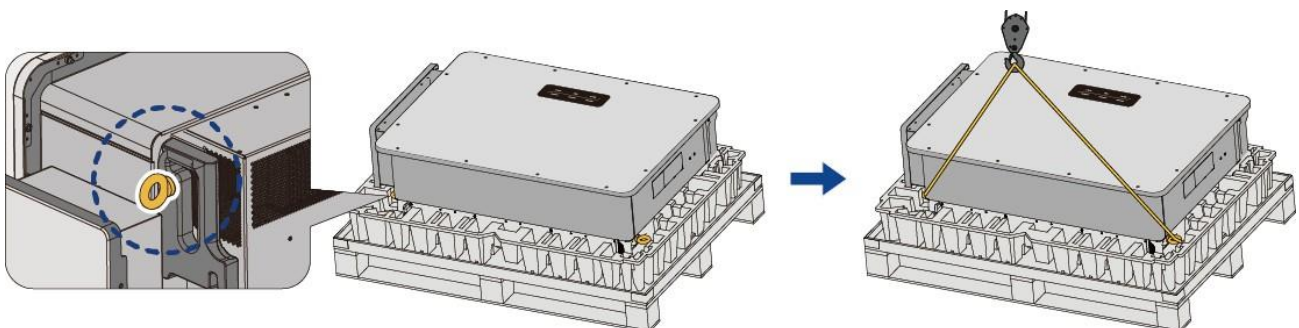
Use the handles on the top and base to carry the inverter to its destination.



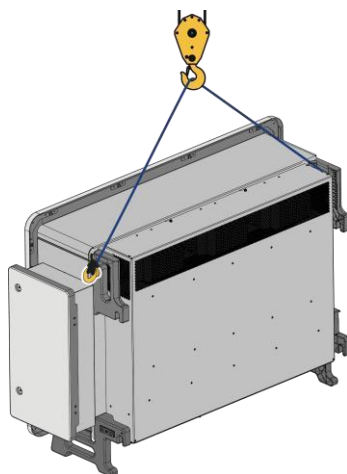
The carrying handle is optional and facilitates manual handling of the inverter.

5.3.2 Lifting rings

Step 1: Screw the two lifting rings onto the back plate of the inverter and pass the rope through the two lifting rings in turn and tie them tightly.



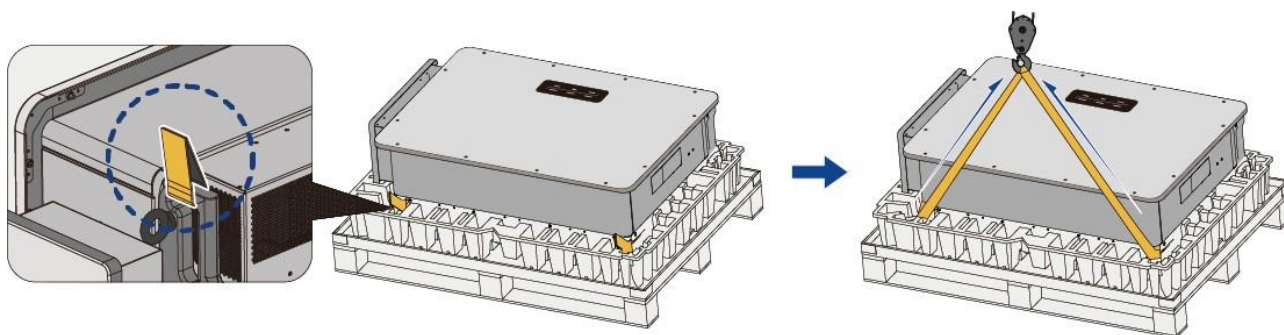
Step 2: Use lifting equipment to lift the inverter 100mm off the ground and pause to check the tightness of the lifting rings and ropes. Make sure the connection is firm and then lift the inverter to the destination.



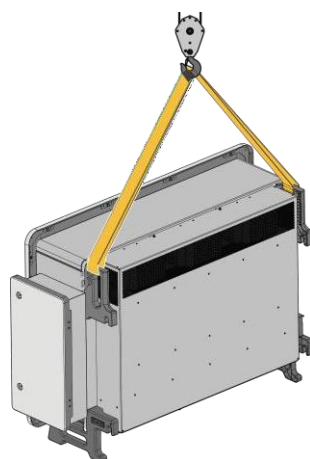
Step 3: Remove the lifting ring and finish.

5.3.3 Sling Handling

Step 1: Tie the two slings to the back plate of the inverter and stretch the slings through the two lifting loops in turn and fasten them.



Step 2: Use the lifting equipment to lift the inverter 100mm off the ground and pause to check the tightness of the lifting rings and ropes. Make sure the connection is firm and then lift the inverter to the destination.



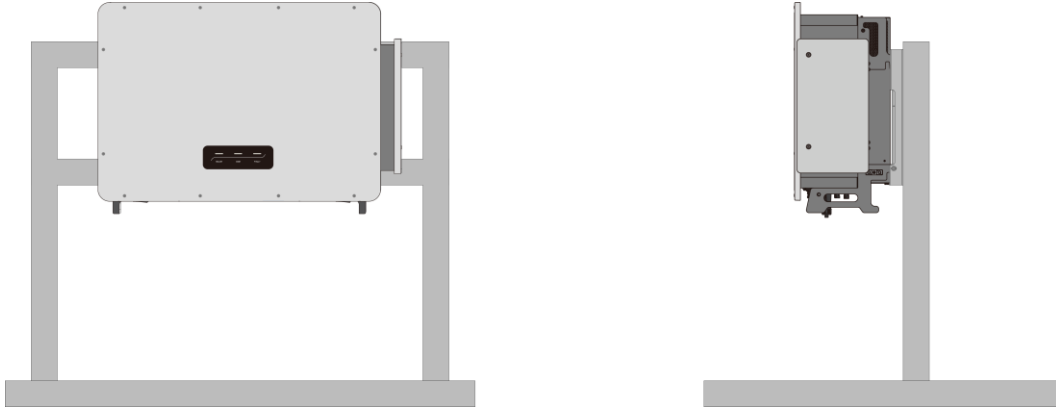
Handle and lifting ring are optional, sling and rope are not included in the scope of supply.

5.4 Mounting

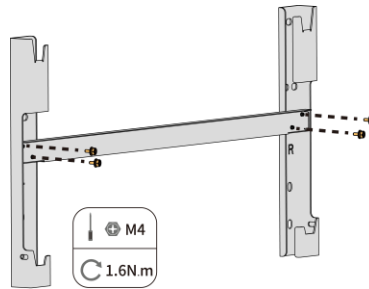
5.4.1 Mounting the back plate



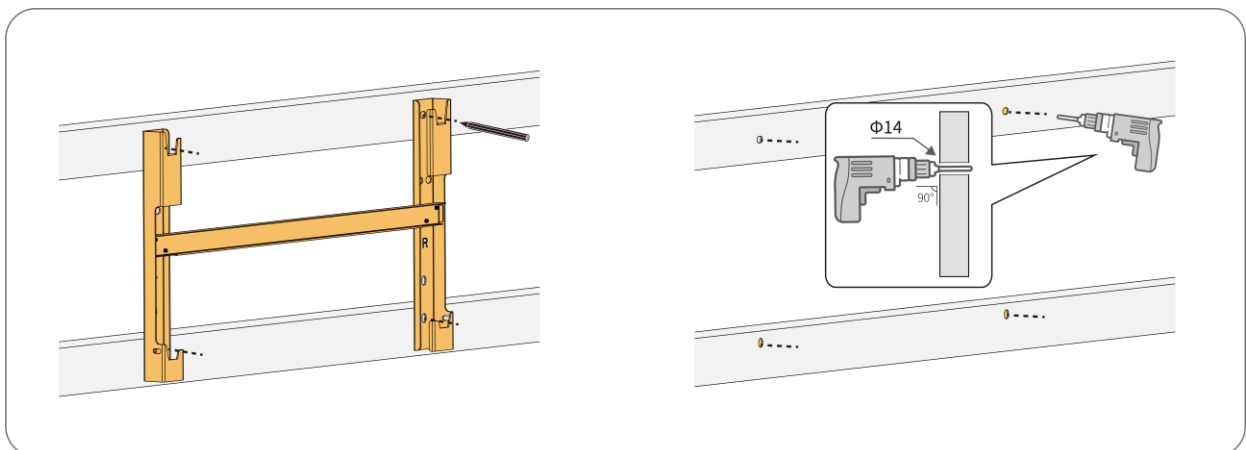
Ensure adequate space behind the back plate is provided, for proper air circulation.



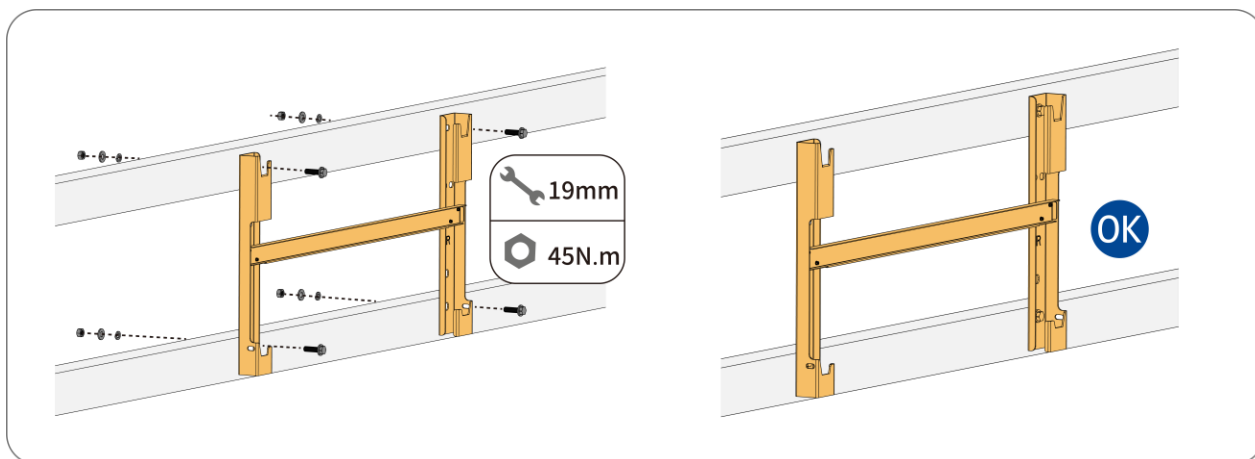
Step 1: Fix the two components together with the connecting rods.



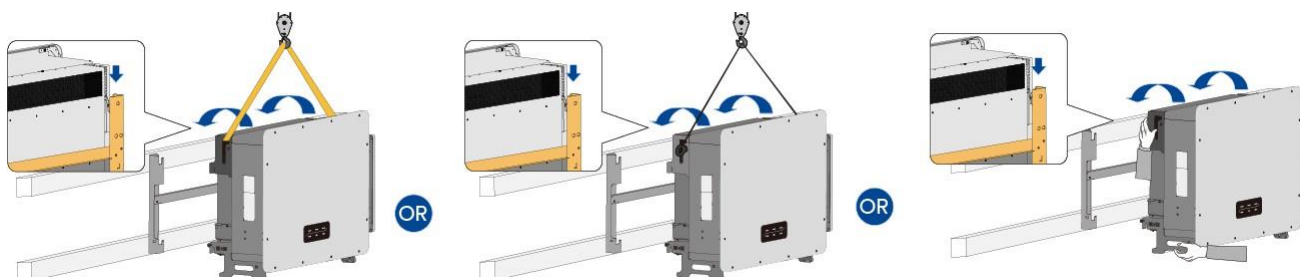
Step 2: Place the assembled panel on the mounting point, adjust the angle with a levelling tape, mark the position of the holes with a pencil and drill 4 holes with a Ø14mm drill bit.



Step 3: Fix the plate using the combination bolts.

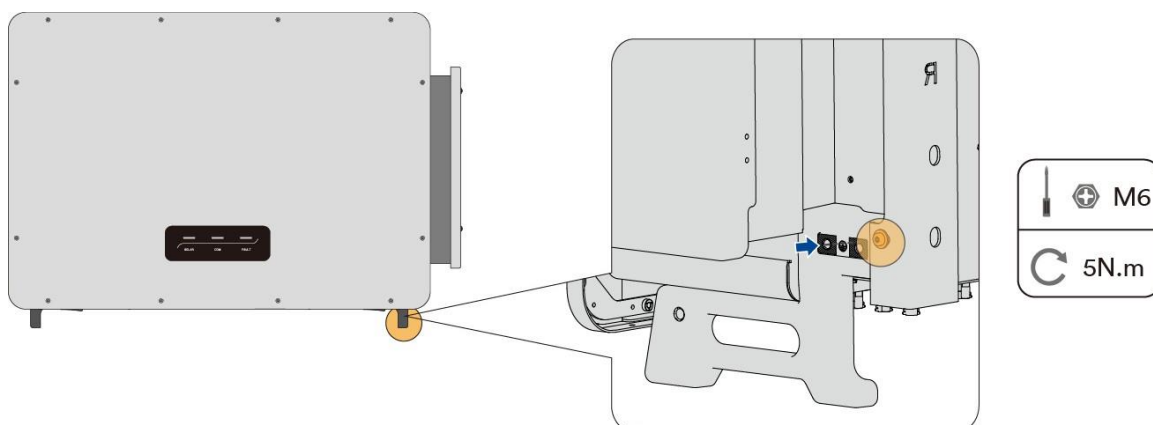


Step 4: If the mounting position is high, you need to lift the inverter to the hanging plate (see '5.3.2 Lifting Ring Handling' / '5.3.3 Lifting Strap Handling' for details), otherwise, please ignore this step and choose to lift the inverter manually; hang the lugs on the back of the inverter to the hanging plate; use a pencil to mark the holes. Hang the lugs on the back of the inverter above the grooves on the top and bottom of the hanger plate.



Make sure that all four lugs fit well into the grooves.

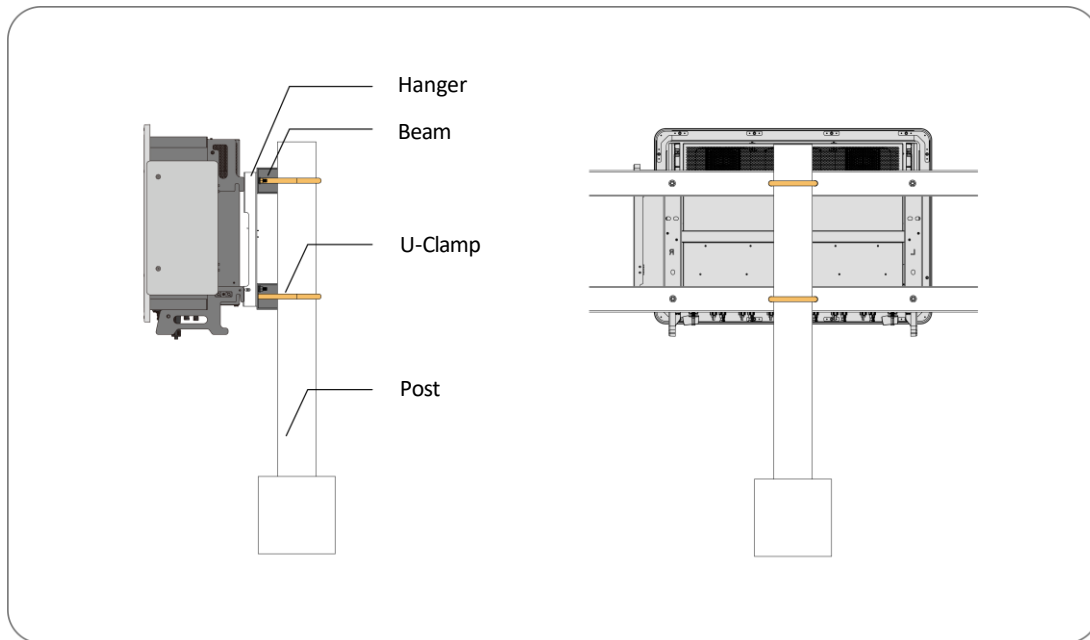
Step 5: Secure the inverter with two M6 x 12 screws.



Step 6: Installation is complete.

5.4.2 Hoop Installation

*The crossbar and U-shaped clamps must be provided by the customer.



5.4.3 Wall mounting (not recommended)

CAUTION

Risk of injury due to the weight of the inverter!

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

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

CAUTION

Damage to cable lines can cause personal injury!

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

- Make sure that no cables on the wall or inside the wall cavity are damaged when drilling.

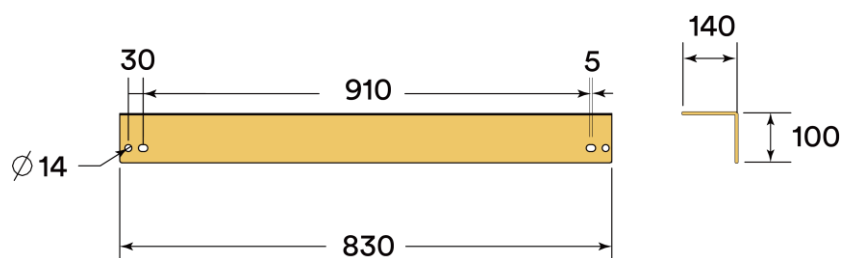


Close to the wall installation, you need to reserve space for air ducts, and in order to avoid the formation of air inlet and outlet reflux, you need to increase the L-shaped windbreak. When the distance from the wall to the wall is more than 600mm, the windshield can not be installed.

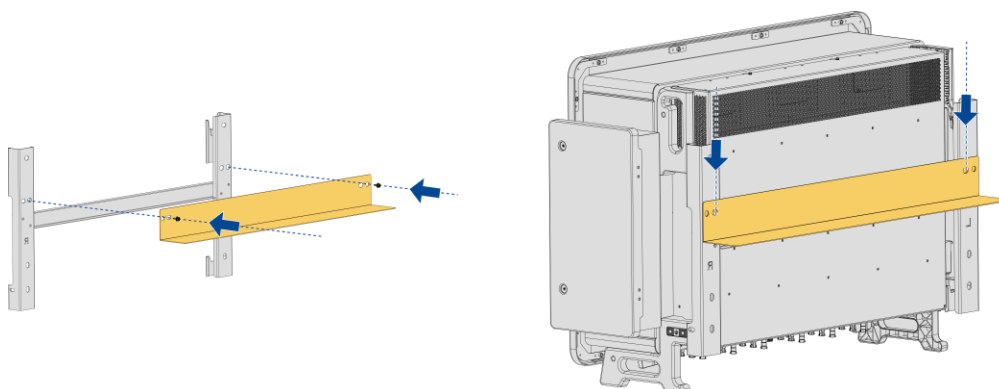
L-shaped windshield recommended use of aluminium, thickness > 2mm, width recommended d-10mm (d is the distance from the hanging plate to the wall).

When the distance from the hanging plate to the wall is 120mm, the recommended dimensions of the windbreak are as follows:

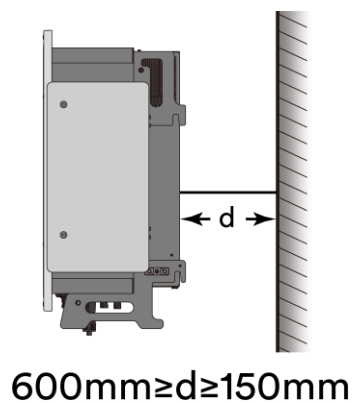
Unit: mm



The windbreak is first pre-installed on the wall plate and then installed on the wall bracket with the wall plate. The specific operation is as follows:

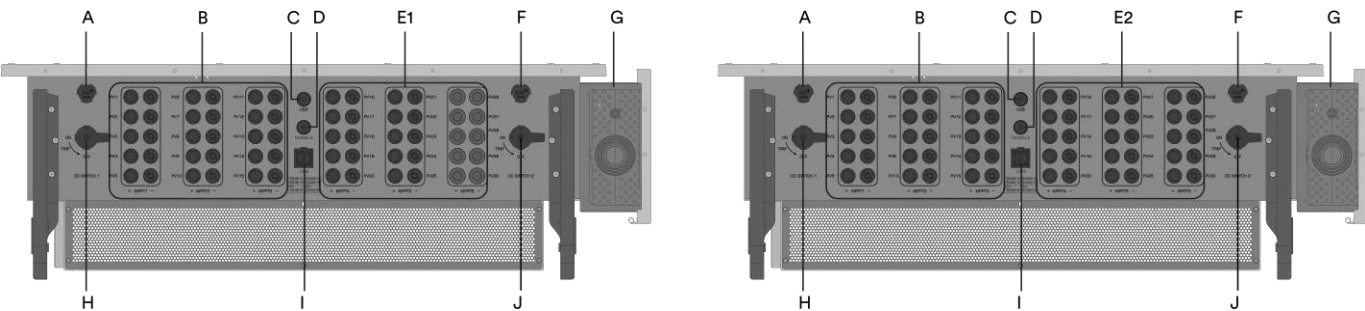


The distance between the machine and the wall is shown as follows:



6 Electrical connection

6.1 Overview of the connection area



NO.	Name
A	Air vent
B	DC connector inputs 1-15 (connected to DC switch 1)
C	USB port
D	Communication device port
E1	REFUsol 250K-5T series: DC connector inputs 16-30 (connected to DC switch 2)
E2	REFUsol 360K-6T series: DC connector inputs 16-30 (connected to DC switch 2)
F	Air vent 2
G	AC cable - knockout seal
H	DC switch 1
I	RS485 Communication port
J	DC switch 2

6.2 Connecting additional grounding

The inverter is equipped with a grounding fault monitoring device. The grounding fault monitoring device will disconnect the inverter from utility grid when it detects there is no ground conductor connected. Hence the product does not require additional grounding or equipotential bonding when operating.

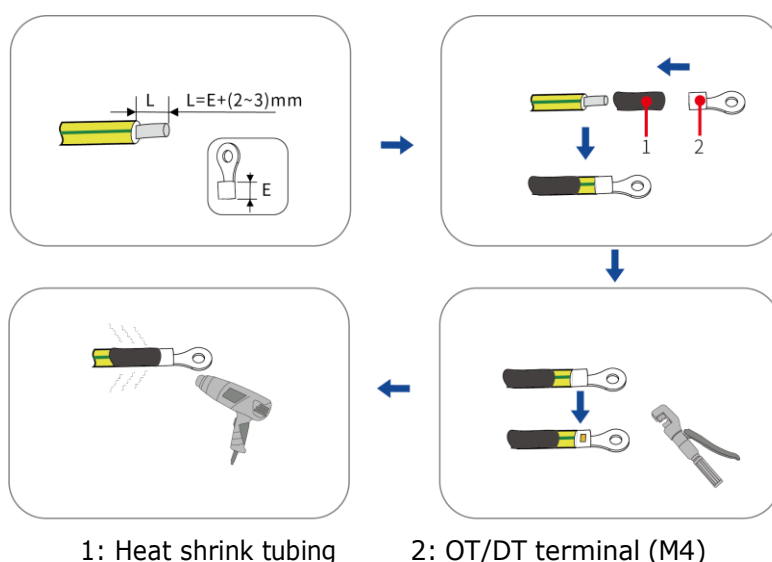
If the ground fault monitoring function is deactivated or the additional grounding is required by local installation standards, then additional grounding can be connected to the inverter.

Requirements for secondary protection ground cable:

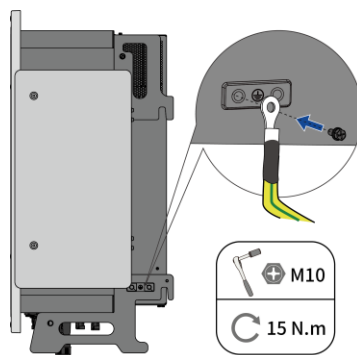
Item	Description	Note
1	Screw	Specifications M10, supplied
2	OT/DT terminal	Specifications M10, provided by the customer
3	Yellow and green ground cable	Same cross-sectional area as the PE wire of the AC cable

Procedure:

Step 1: Strip the grounding cable insulation. Insert the stripped part of the ground cable into the ring terminal and crimp using a crimping tool. Insert the stripped part of the grounding cable into the ring terminal 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. Apply paint to the grounding terminal to ensure corrosion resistance.



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



The inverter provides multiple secondary earth protection points, at least one of which is selected for earthing.

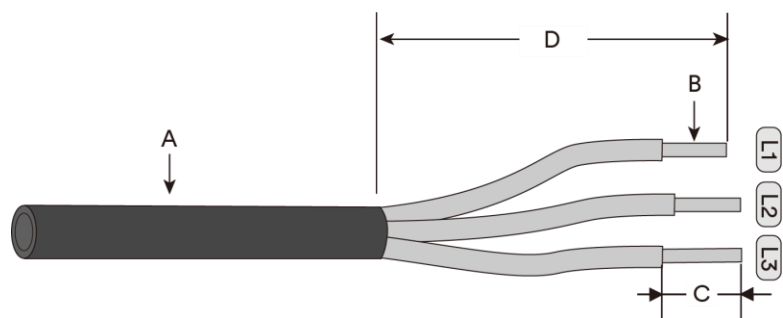
6.3 AC connection

6.3.1 Requirements for the AC connection

Cable Requirements

Multi-core cable specification requirements

The cables are recommended to be 3 or 4 core flexible cables (L1, L2, L3 and PE), depending on the grid type, if the cable is not configured, please omit this step, the recommended standard cables are as follows:



Item	Description	Value
A	External diameter of outer sheath	32...72 mm
B	Copper cable conductor cross-section	120~185 mm ²
	Aluminium cable conductor cross-section	150~500 mm ²
	Recommended cross-sectional area of PE line	≥1/2 cross-sectional area of phase line
C	Insulation stripping length	Matching terminal
D	Sheath stripping length	200~220 mm



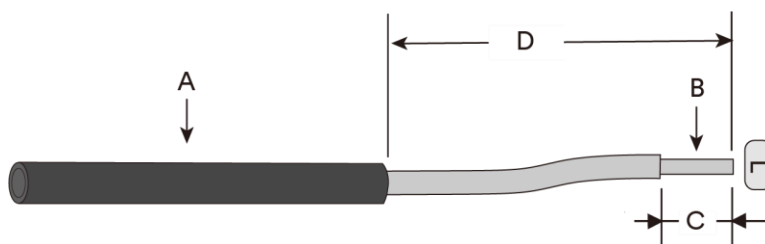
Note: The longer the cable, the larger the wire gauge required.

The cross-sectional area of the conductor depends on the current level of the inverter, the ambient temperature, the wiring method, the cable type, the cable loss, the regulatory requirements of the respective country or region, etc.

For aluminium conductors with a cross-sectional area of ≥ 400 mm², use DIN 46329 type terminals.

Single-core cable specification requirements

Depending on the grid type, please omit this step if the cable is not configured, the recommended standard cables are as follows:



Item	Description	Value
A	External diameter of outer sheath	10...44 mm
B	Copper cable conductor cross-section	120~185 mm ²
	Aluminium cable conductor cross-section	150~500 mm ²
	Recommended cross-sectional area of PE line	≥ 1/2 cross-sectional area of phase line
C	Insulation stripping length	Matching terminal
D	Sheath stripping length	200~220 mm

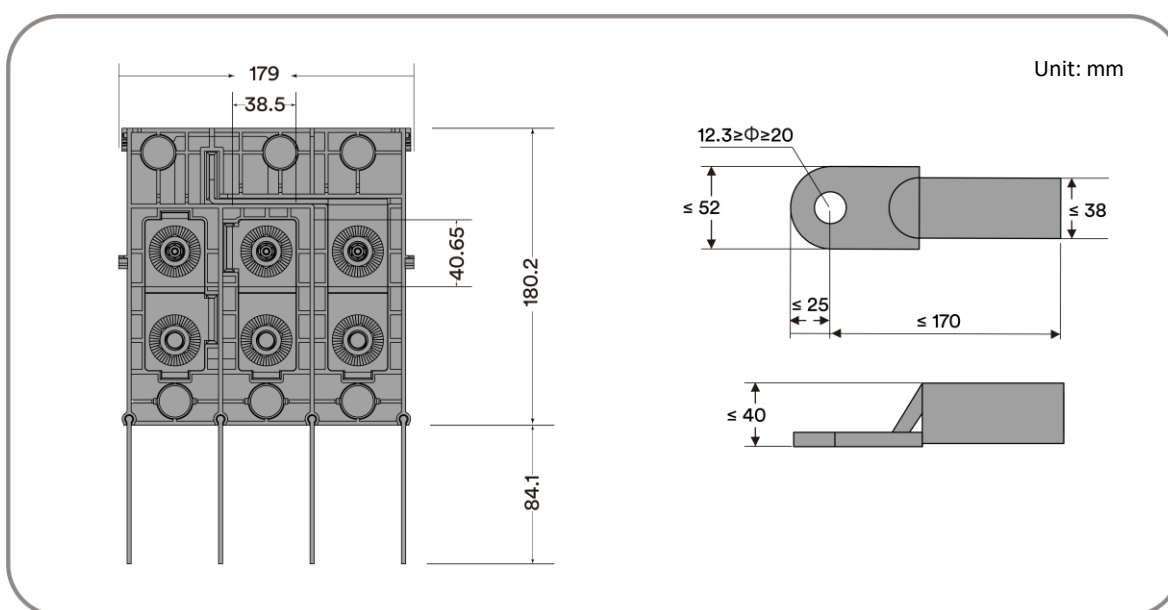


Note: The longer the cable, the larger the wire gauge required.

The cross-sectional area of the conductor depends on the current level of the inverter, the ambient temperature, the wiring method, the cable type, the cable loss, the regulatory requirements of the respective country or region, etc.

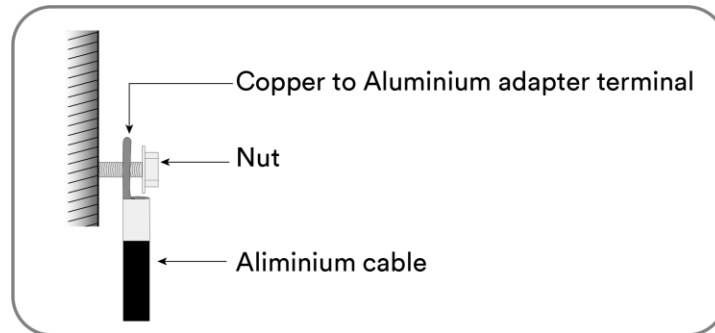
Requirements for AC side OT/DT terminals

Fixing the AC cable to the terminal block requires the use of OT/DT terminals with M12 mounting (not included in the scope of supply), which should be selected according to the following requirements:



Aluminum Cable Requirements

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



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

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

Overvoltage category

The inverter can be used under grid conditions of overvoltage category III or lower. For the definition of overvoltage category, please see standard GB/T 16935.1, The inverter is capable of connecting directly to grid connection points inside buildings. If the installation of the inverter involves long outdoor cable routing, consideration should be given to reducing the overvoltage category of the grid connection point from Class IV to Class III through additional measures.

AC circuit breaker

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

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

The selection of the AC circuit breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating, etc. Derating of the AC circuit breaker rating may be necessary due to self-heating or if exposed to heat.

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

6.3.2 AC cable connection

WARNING

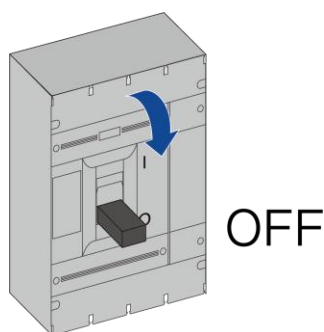
Risk of injury due to electric shock by high leakage current.

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

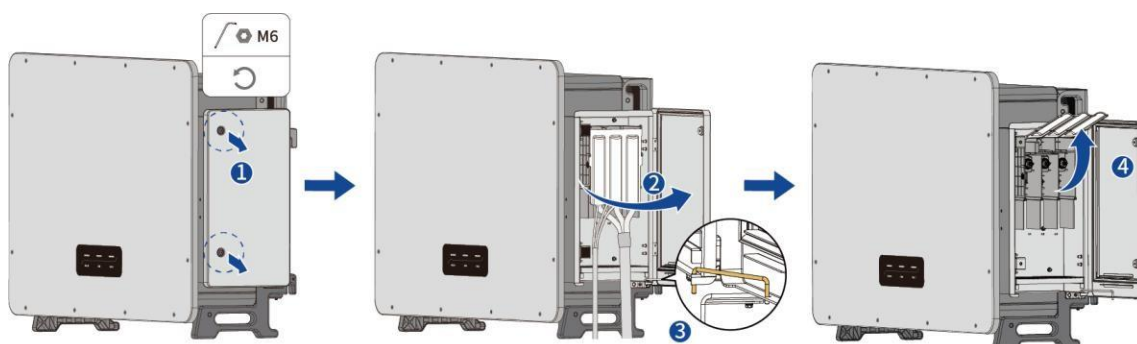
- The product must be grounded correctly in order to protect property and personal safety.

Procedure:

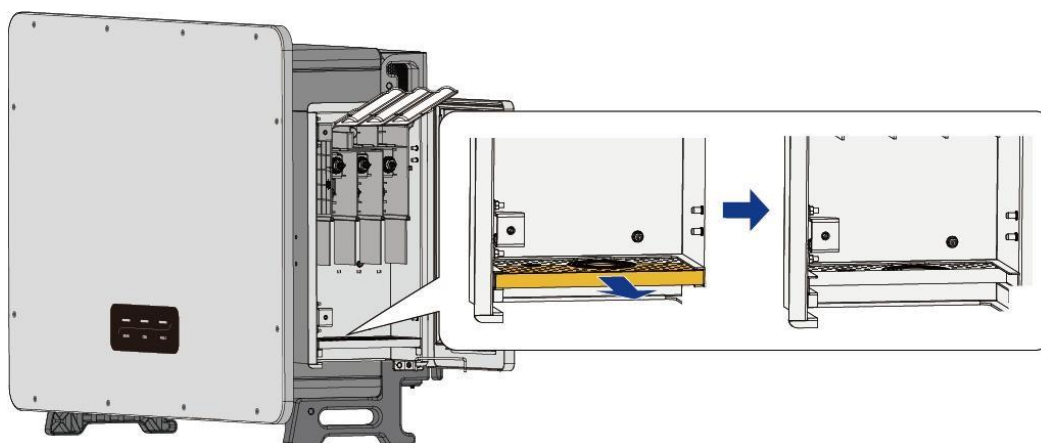
Step 1: Switch off the AC circuit breaker and lock it to avoid it from being inadvertently switched on.



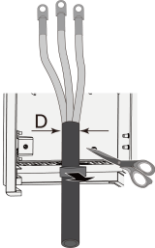
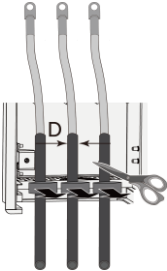
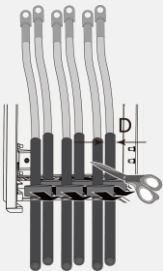
Step 2: Remove the two screws on the junction box with a plum-shaped screwdriver, open the junction box, use the limit lever on the junction box to fix its position for wiring operation, and open the transparent dust cover upwards.



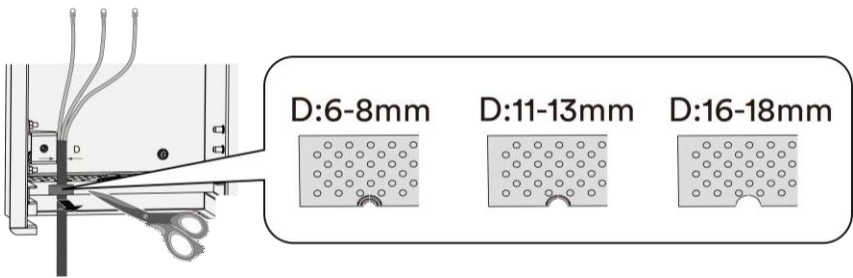
Step 3: Remove the top half of the coil guard from the bottom of the junction box by hand from the slot and store it in a safe place.



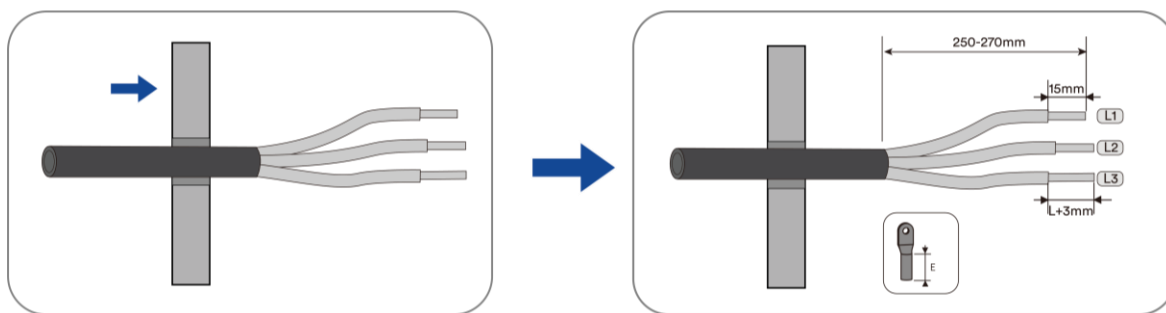
Step 4: Cut suitable holes in the coil guard according to the type of coil selected and the AC wire O.D. specification.

Coil type	Core type	Cable O.D.		
Standard		D:32-34mm	D:40-42mm	D:46-48mm
		D:50-52mm	D:56-58mm	D:60-62mm
		D:66-68mm	D:70-72mm	
Standard		D:10-12mm	D:16-18mm	D:22-24mm
		D:26-28mm	D:32-34mm	D:36-38mm
		D:42-44mm		
(Option)		D:8-10mm	D:12-14mm	D:16-18mm
		D:20-22mm	D:24-26mm	

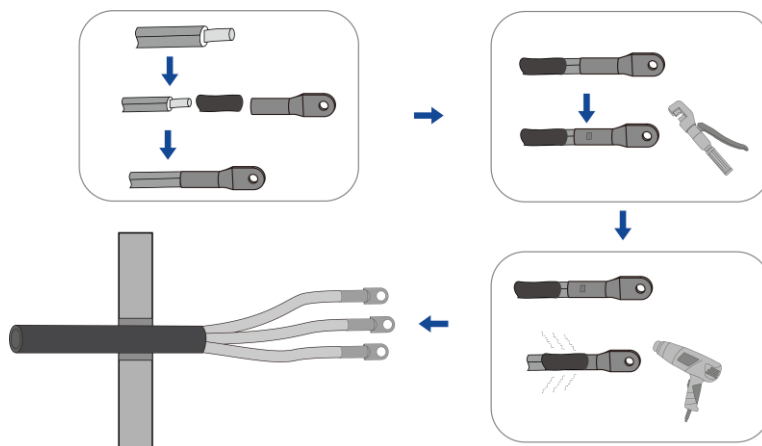
Step 5: According to the wire diameter specification of the tracking bracket, cut the appropriate hole in the corresponding position of the guard coil.



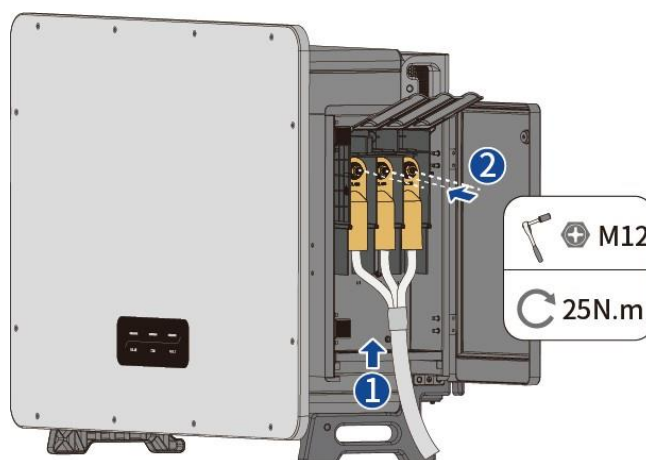
Step 6: Thread the cable into the waterproof ring in sequence, and strip off a certain length of the protective layer and insulation according to the requirements shown in the diagram.



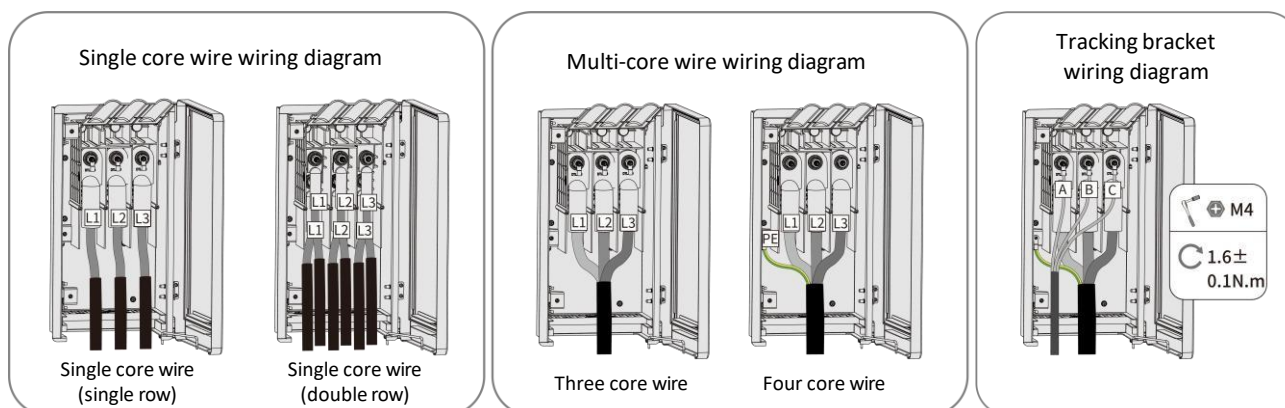
Step 7: Make the cable and crimp the OT/DT terminals.



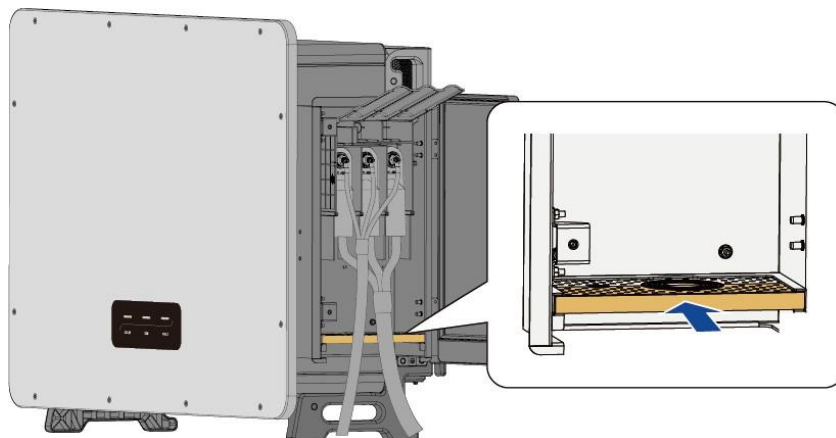
Step 8: Fix the cable to the corresponding terminal.



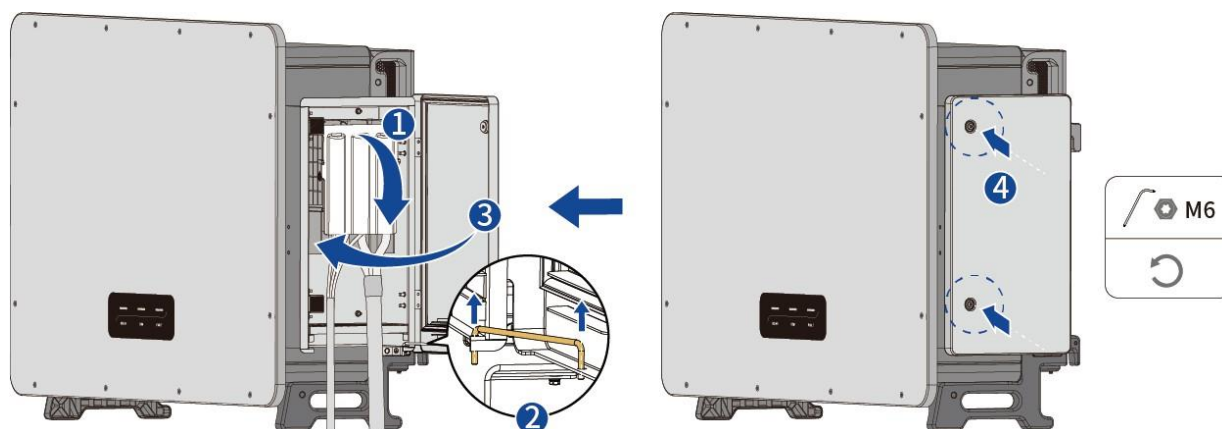
Step 9: The final wiring diagram is shown in the figure.



Step 10: Put the upper part of the protective coil removed in step 3 back into the original slot.



Step 11: Place the transparent dust cover downwards, retract the limit lever to its original position, close the terminal box and lock the screws.



6.4 DC connection

6.4.1 Requirements for the DC connection

Requirements for the connection of PV modules per MPPT input

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

Cable requirements:

Item	Description	Value
1	Cable type	PV1-F, UL-ZKLA/USE2
2	External diameter	5-8 mm
3	Conductor cross-section	4-6 mm ²
4	Number of copper strands	At least 7
5	The rated voltage	≥ 1500 V

6.4.2 Assembling the DC connectors

DANGER

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

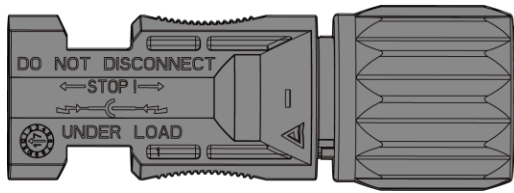
When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching exposed live DC cables may result in death or lethal injuries due to electric shock.

- 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.

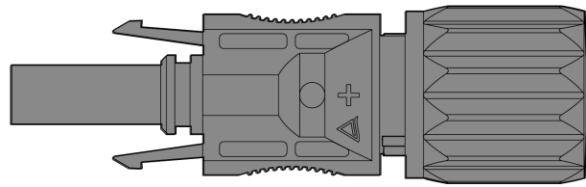
For connection to the inverter, all PV module cables must be fitted with the DC connectors provided.

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

A

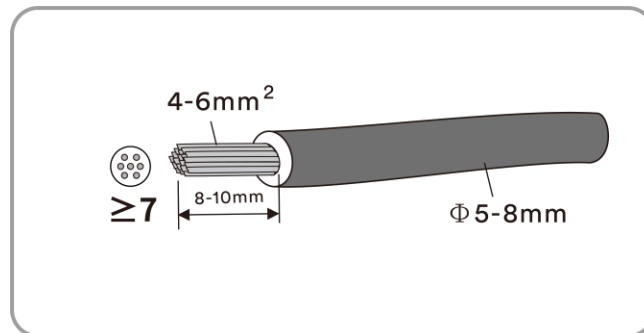


B

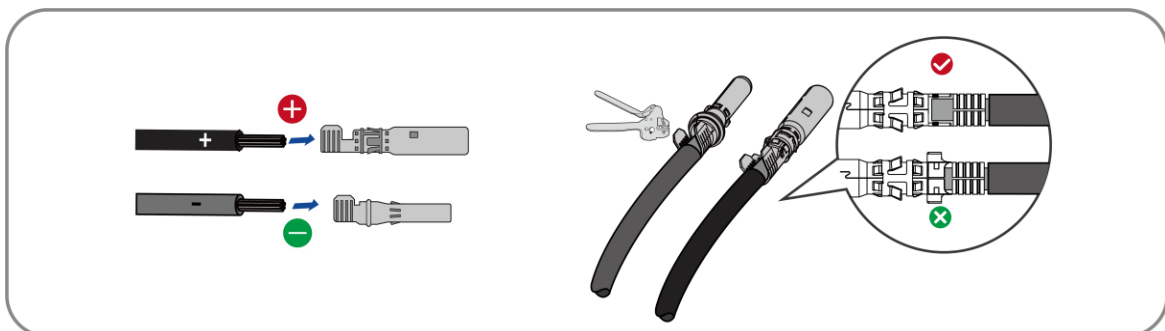


Procedure:

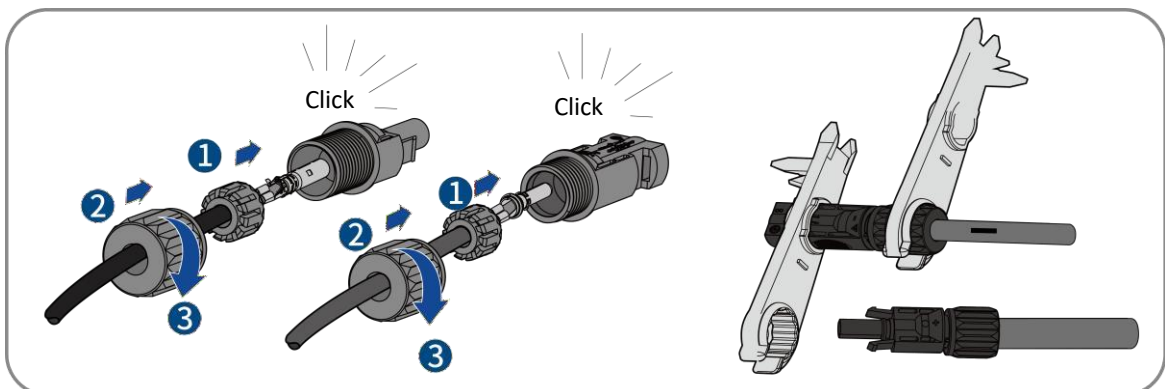
Step 1: Strip 12 mm off the cable insulation.



Step 2: Slip the positive and negative metal terminals over the cable that has been stripped of its outer jacket and crimp it tightly with crimping pliers.



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



Step 4: Ensure that the cable is correctly positioned.

6.4.3 Connecting the PV array

DANGER

Danger to life due to high voltages in the inverter!

When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables may result 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 turned on.
- Do not disconnect the DC connectors under load.

NOTE

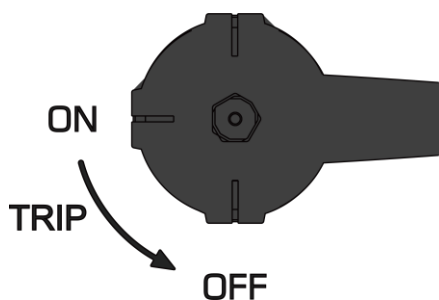
The inverter can be destroyed by overvoltage.

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

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

Step 1: Ensure that the inverter AC circuit breaker is switched off and ensure that it cannot be accidentally turned on.

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

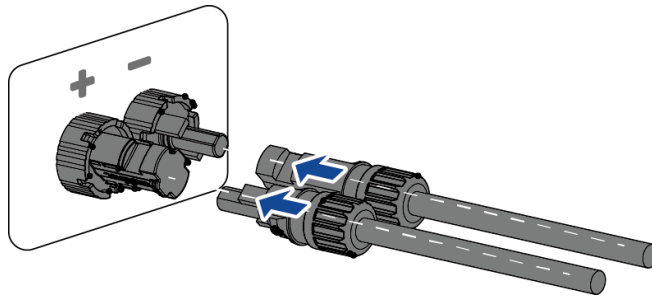


Step 3: Ensure that there is no ground fault in the PV array.

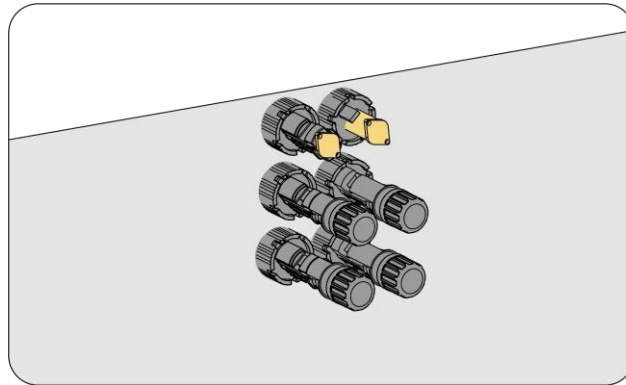
Step 4: Check whether the DC connector has the correct polarity. If the DC connector is equipped with a DC cable having the wrong polarity, the DC connector must be reassembled. The DC cable must always have the same polarity as the DC connector.

Step 5: Ensure that the open-circuit voltage of the PV array does not exceed the maximum DC input voltage of the inverter. Connect the assembled DC connectors to the inverter until they audibly snap into place.

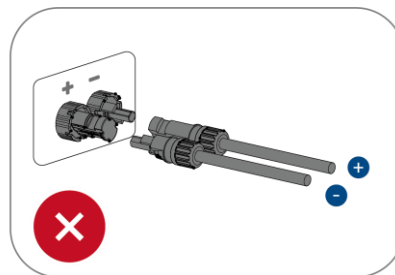
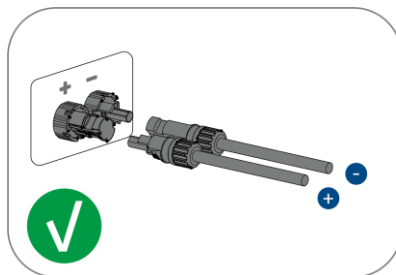
Step 6: Insert the DC connectors into the corresponding DC inputs on the inverter.



Step 7: Do not remove the sealing plug from the input of the DC connector on the empty side of the inverter.



Check the positive and negative polarity of the PV strings and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.



Step 8: Ensure that all DC connectors and the DC connectors with sealing plugs are securely in place.

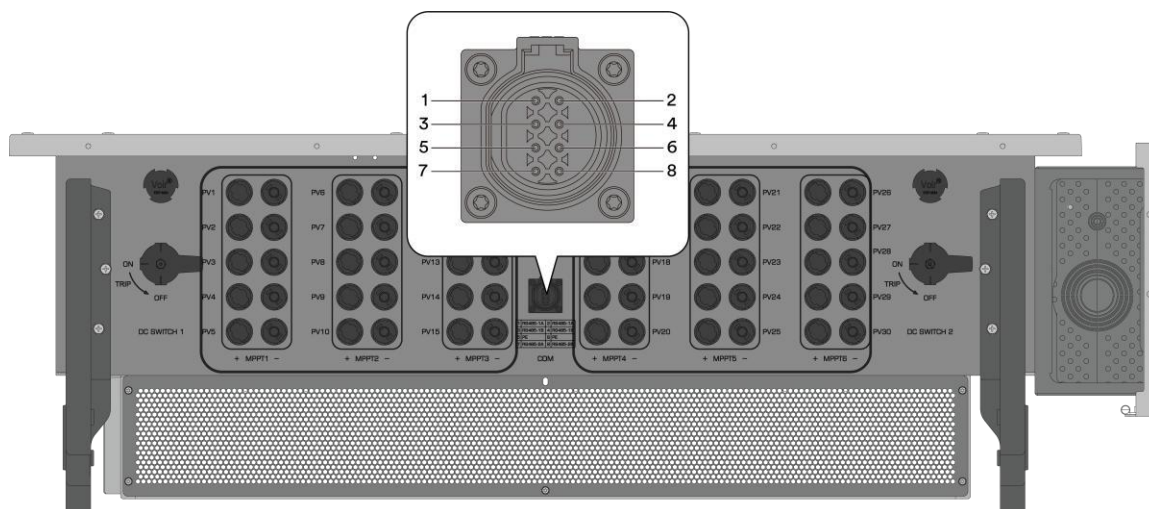
6.5 Communication device connection

6.5.1 Communication interface



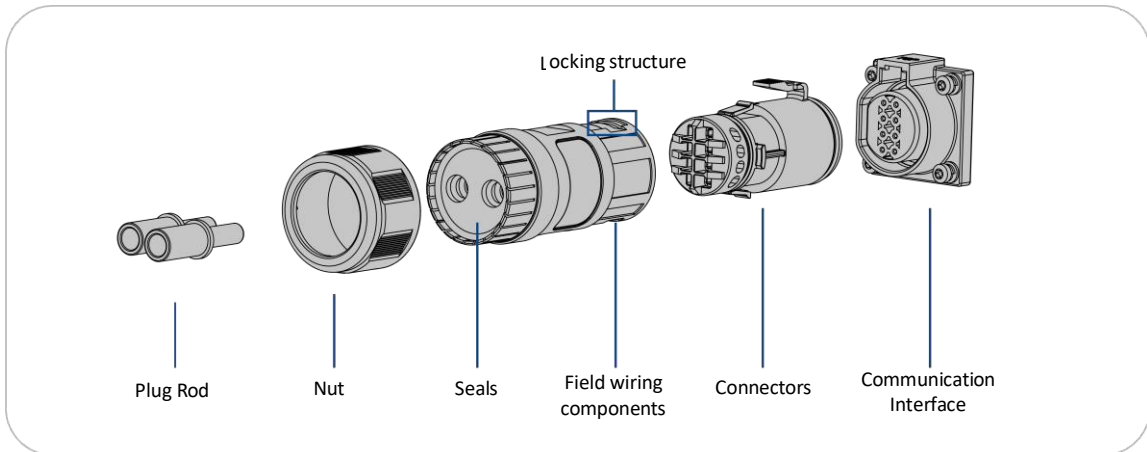
When connecting the communication cable, please make sure that the wiring port definition matches exactly with the device, and the communication cable must be separated from other power cables to avoid communication interference.

The communication interface signal definition is shown in the figure:

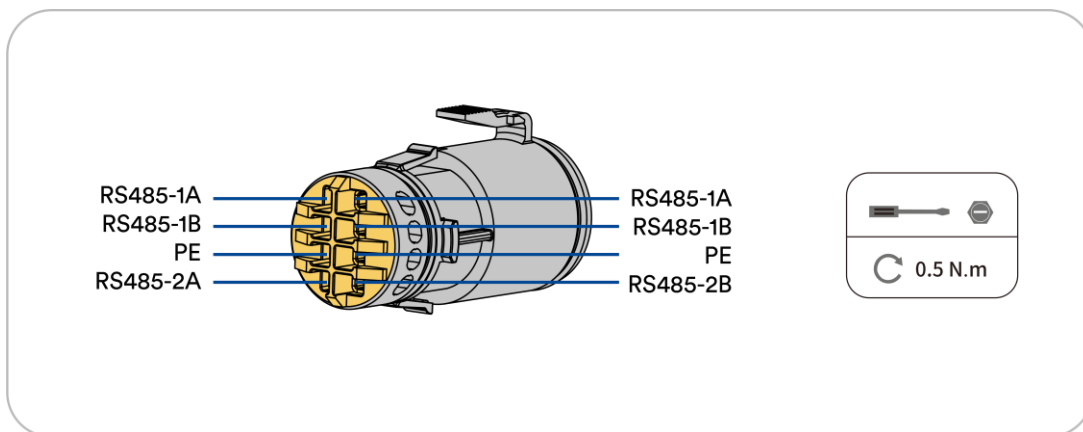
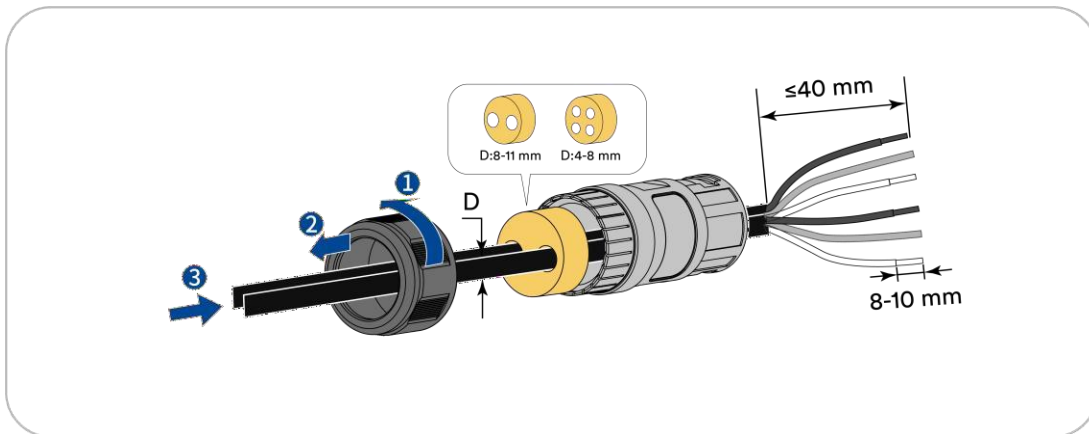


Port	PIN	Definition	Description
RS485-1	1	RS485-1A	For cascading inverters or connecting to REFUlink and third-party monitor devices
	2	RS485-1A	
	3	RS485-1B	
	4	RS485-1B	
Shield	5	PE	Communication shield grounding
	6	PE	Communication shield grounding
RS485-2	7	RS485-2A	For connection to tracking bracket or third party monitor
	8	RS485-2B	

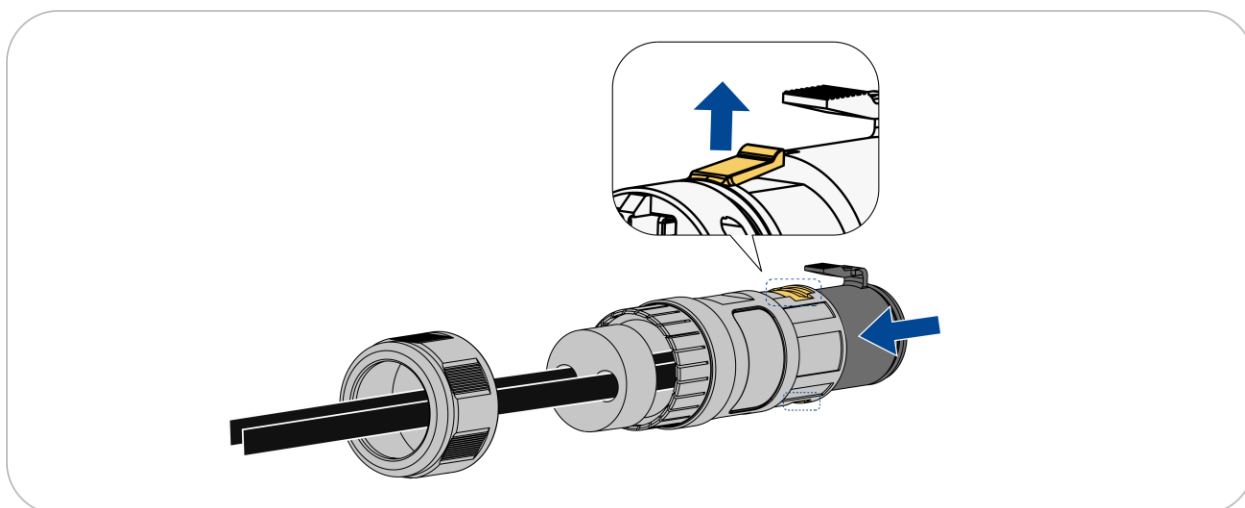
6.5.2 RS485 communication line installation



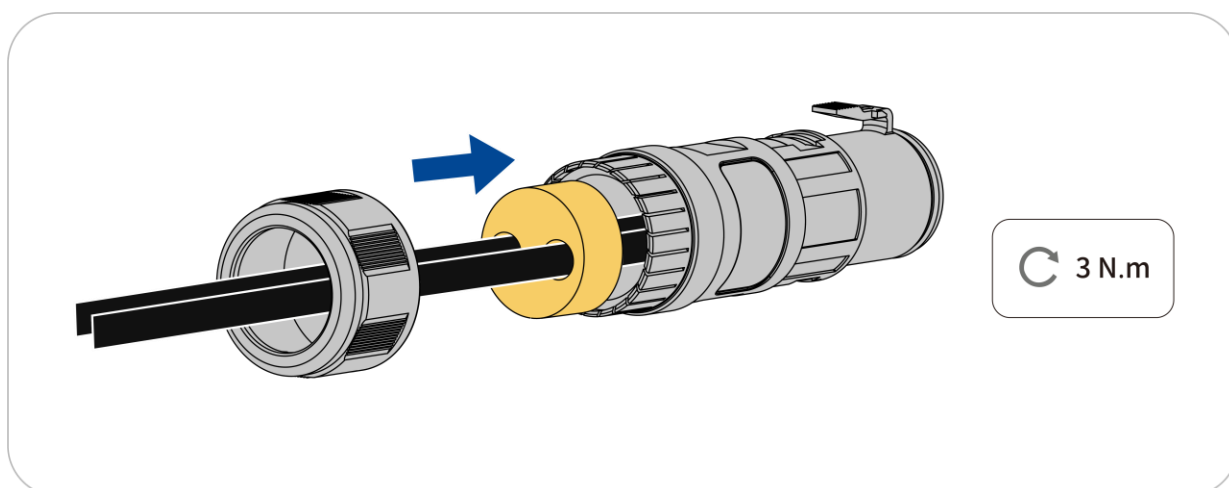
Step 1: Remove the plug bar and turn the nut counterclockwise to remove the seal. Select the sealing ring according to the cable OD D. Thread the cable into the locknut, sealing ring and field assembly in turn.



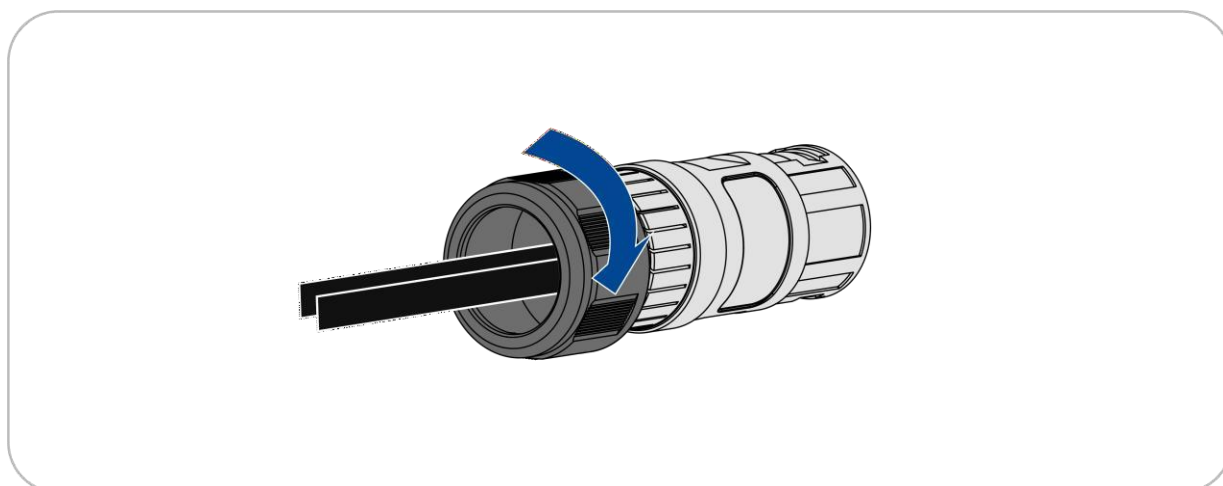
Step 2: Insert the connector into the field wiring component and the connector snap pops out indicating success.



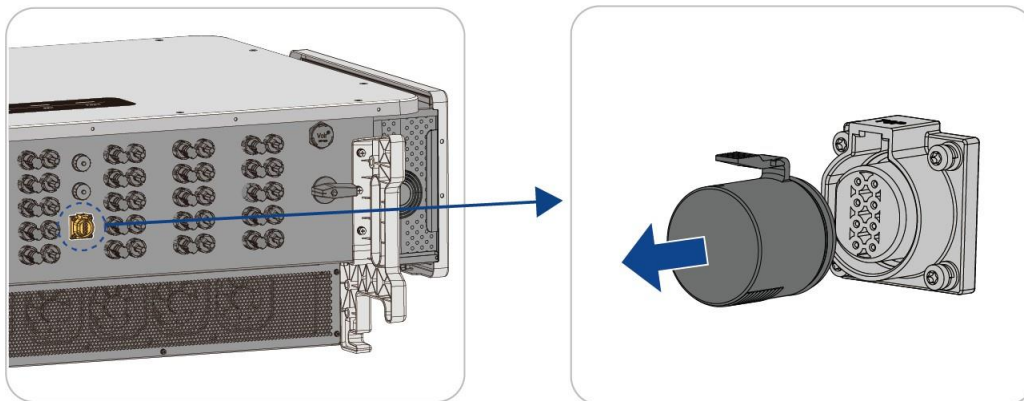
Step 3: Insert the cable into the lock nut, sealing ring and field assembly in turn.



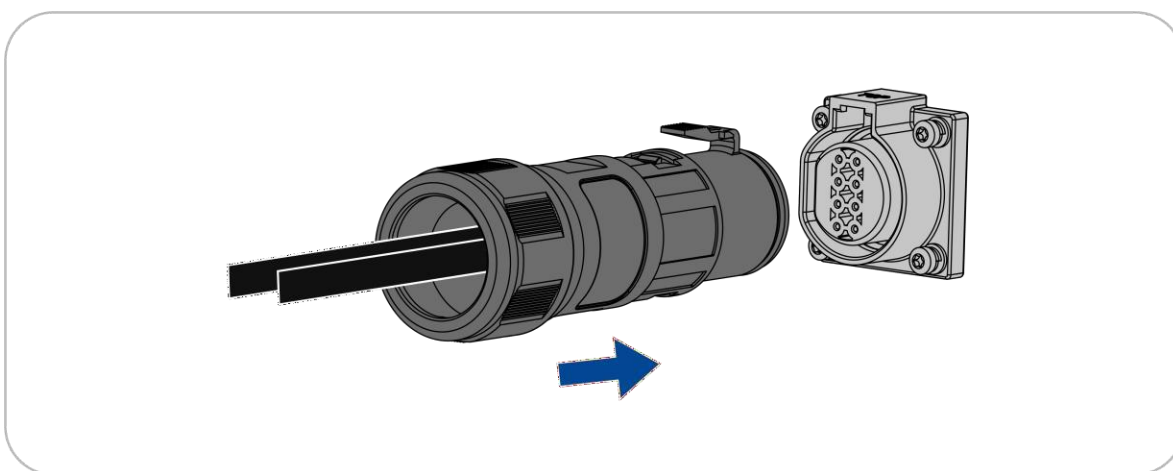
Step 4: Gently pull back the cable and tighten the lock nut clockwise.



Step 5: : Remove the waterproof cover of RS485 communication interface on the inverter.



Step 6: Insert the connector into the communication interface to complete the installation.



6.5.3 Software Upgrade/Log Export

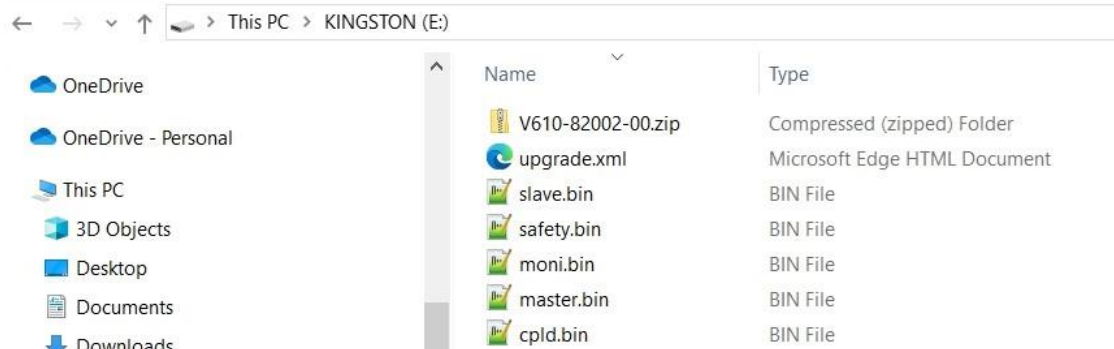


The USB stick format must be FAT32.



The upgrade script is upgrade.xml and the log export script is log.xml.

Upgrade: There must be upgrade.xml file and upgrade package. In file in the USB flash drive to perform the upgrade operation.



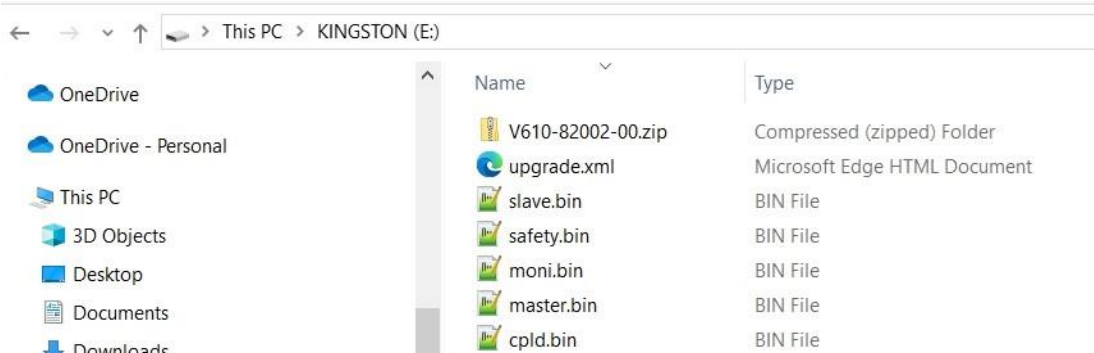
Log export: There must be a log.xml file on the USB flash drive to perform the log export operation.



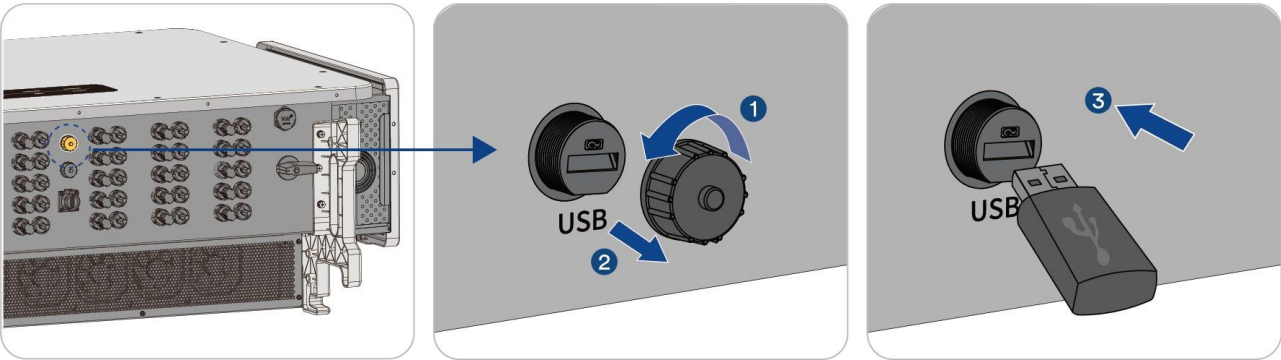
*For upgrade.xml, log.xml script file and upgrade package.bin file, please contact the after-sales personnel of REFU Elektronik GmbH.

6.5.3.1 Software Upgrade

Step 1: Unzip the upgrade package and put it in the root directory of the USB memory stick.



Step 2: After the machine is powered on, wait for 10s and insert the USB flash drive. Do not plug and unplug the USB flash drive during the upgrade process, otherwise the software upgrade may fail.



The upgrade operation will not be performed when the software version in the USB flash drive and the software version in the inverter is the same.

Step 3: When the USB flash drive is inserted, the software upgrade status can be monitored according to the indicator status.

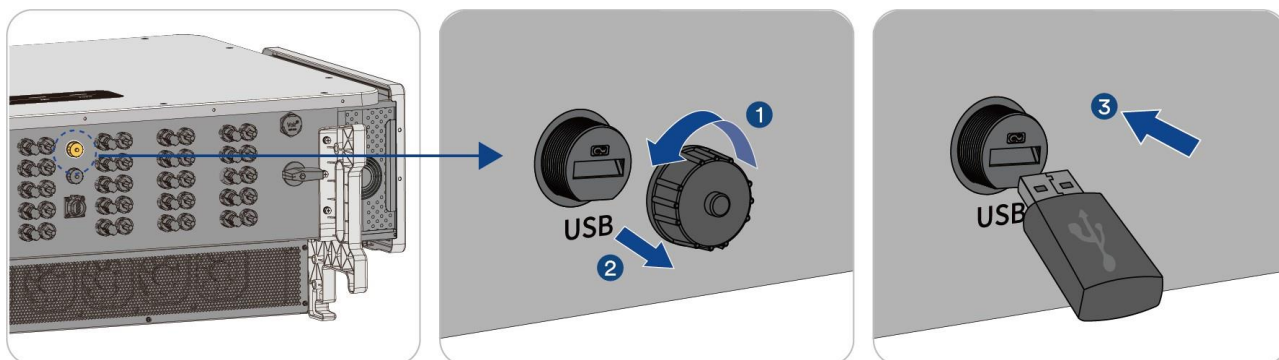
Upgrade Status	Indicator status description
Upgrading	COM light is flashing fast (period 400ms)
Upgrade failed	COM light flashes slowly (period 1600ms)
Upgrade successful	COM light is always on
Upgrade completed	The system will reboot automatically, and all LEDs will be off during the reboot process; after the reboot is completed, the COM light is always on, indicating that the upgrade operation is successful.

6.5.3.2 Log Export

Step 1: Put the log export script log.xml into the root directory of the USB memory stick.

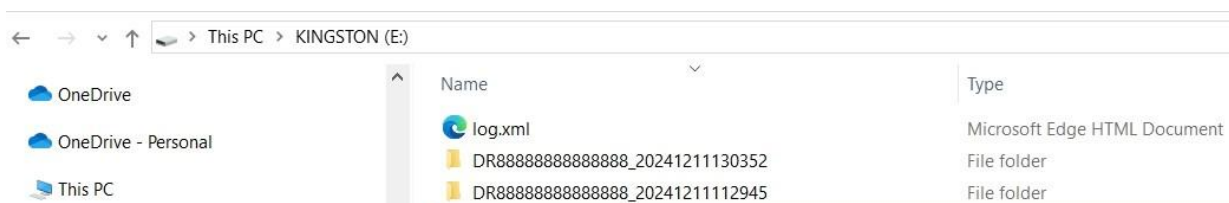


Step 2: Insert the USB flash drive into the machine; when the USB flash drive is inserted, you can monitor the log export status according to the indicator status:



Log export status	Indicator lamp status description
Exporting	COM light flashes fast (period 400ms)
Successful export	COM light is always on

Step 3: After the log is successfully exported, you can view the log, log name: inverter serial number + log export time.



7 Commissioning

7.1 Inspection before commissioning

WARNING

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:

- Ensure the inverter DC switch inverter AC circuit breaker are OFF.
- Ensure the inverter has been correctly mounted onto the mounting bracket.
- Ensure there are no objects lying on top of the inverter.
- Ensure the communication cable and AC connector have been correctly wired and tightened.
- Ensure the inverter's exposed metal surface has a ground connection.
- Ensure the DC voltage of the strings does not exceed the permitted limits of the inverter.
- Ensure the DC voltage has the correct polarity.
- Ensure that the insulation resistance to ground is greater than the insulation resistance protection value.
- Ensure the grid voltage at the point of connection of the inverter complies with the permitted value of the inverter.
- Ensure the AC circuit breaker complies with this manual and all applicable local standards.

7.2 Commissioning procedure

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

1. Close the AC circuit breaker, wait for the inverter indicator light to light up, and the SOLAR light to flash slowly.
2. Turn the DC switch of the inverter to the "ON" position, wait for 1 minute to observe whether the DC switch is tripped. If it is tripped, check whether the PV wiring is reversed, short-circuited, or the PV components are seriously mismatched to cause backflow.
3. If there is sufficient sunlight, wait for the inverter SOLAR indicator to flash quickly until it is connected to the grid, which is successful.
4. Observe the LED indicator to ensure that the inverter operates normally, the SOLAR indicator is always on, and no fault occurs.



When the light is weak, the inverter may start and shut down frequently. This is because the input voltage and power are too low, which is a normal state of the inverter. When the light is stronger, the voltage and input power are increased enough to start the inverter, but the inverter still restarts frequently, please call the customer service hotline.

8 Decommissioning the PV Inverter

8.1 Disconnecting the inverter from voltage sources

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

WARNING

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

- Only use measuring devices with a DC input voltage range of 500 Vdc or higher.

Procedure:

- Step 1:** Turn OFF the AC circuit breaker connected downstream of the AC output of the inverter and lock and secure it to avoid inadvertent reconnection.
- Step 2:** Turn OFF the DC switch and lock and secure it to avoid inadvertent 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

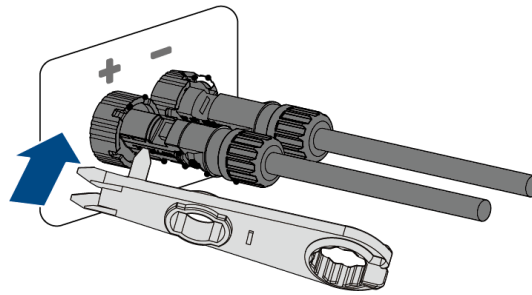
Danger to life due to electric shock when touching exposed DC conductors or DC plug contacts if the DC connectors are damaged or loose!

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 exposed live DC conductors or DC plug connectors will result in death or serious injury due to electric shock.

- Wear appropriately insulated gloves and use appropriately 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: Ensure that no voltage is present between the positive terminal and negative terminal at the DC inputs using a suitable measuring device.

Step 6: To remove DC plug connectors, insert the appropriate tool into the slots and press the tool with an appropriate force.



Step 7: Open the AC/COM cover junction box and use a mustimeter to ensure that the AC wiring terminals isolated from an AC power source.

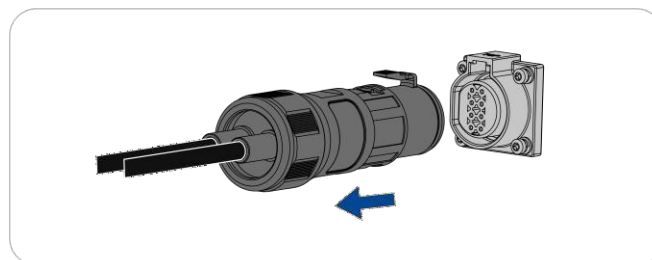
⚠ **DANGER**

Danger to life due to electric shock when touching exposed AC conductors if the AC connectors are damaged or loose!

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

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

Step 8: Press and hold the RS485 communication terminal side snap, and then pull out the RS485 communication terminal outward.



8.2 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 wall-mounting bracket from the wall.

Step 3: If the inverter will be reinstalled in the future, please refer to "3.2 Inverter Storage".

9 Technical data

9.1 AC/DC

DC Input		
	REFU <i>sol</i> 250K-5T (890P250)	REFU <i>sol</i> 360K-6T (890P360)
Maximum input voltage	1500 V	
MPP voltage range / rated input voltage	550V - 1500 V / 1080 V	
Min. input voltage	550 V	
Startup input voltage	550 V	
Max. operating input current per MPP	75 A	
Max. short circuit current per MPP	113 A	113 A
No. of independent MPPT inputs / strings per MPPT input	5 / 5	6 / 5
AC output		
AC output power		
Max. apparent power	250000 VA @ 50°C	363000 VA @ 40°C
AC nominal voltage	800 V	
AC voltage range	640 V - 920 V	
AC grid frequency / range	50 Hz / 45 Hz - 55 Hz	
	60 Hz / 55 Hz - 65 Hz	
Max. output current	198.5 A	262.0 A
Adjustable power factor range	0.8 leading - 0.8 lagging	
Feed-in phases	3 / 3 - PE	
THD	<3%	
Efficiency		
Max. efficiency / European efficiency	99.01 % / 98.8 %	

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.

9.2 General data

General data	REFU <i>sol</i> 250K-5T (890P250)	REFU <i>sol</i> 360K-6T (890P360)
Dimensions (W / H / D)	1158 mm × 760 mm × 382 mm	
Weight	≤ 116.0 kg	≤ 117.0 kg
Operating temperature range	-30 °C ... +60 °C	
Self-consumption (at night)	< 5 W	
Topology	Non-isolated	
Cooling concept	Smart forced cooling	
Protection degree	IP66	
Relative humidity	0~100% (non-condensing)	
Max. operating altitude	5000 m(> 4000m with derating)	

Features	
DC Connector	DC Plug-in connector
AC Connector	OT/DT Terminal (Max.500mm ²)
Display	LED, Bluetooth+APP
USB	•
Communication	RS485 / ABUS
Compliance	
Certificates and approvals (more available on request)	IEC 62109-1/2, IEC 61727, IEC 62116, IEC 61683, IEC 60068, EN 50549-2, VDE 4110, VDE4120

9.3 Protective device

Protective devices	REFU _{sol} 250K-5T (890P250)	REFU _{sol} 360K-6T (890P360)
Smart DC switch	•	
AC / DC temperature detection	•	
Anti-islanding protection	•	
AC overcurrent protection	•	
DC reverse-polarity protection	•	
AC short circuit protection	•	
PV string monitoring	•	
DC surge protection	Type II	
AC surge protection	Type II	
Residual Current Monitoring Unit (RCMU)	•	
Ground fault monitoring	•	
Grid monitoring	•	
Anti-PID	○	

• Standard features ○ Optional features

10 Troubleshooting

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If a fault condition occurs, the red LED will turn solid ON. Some pre-checks can be performed as described in the table below, the error messages can also be read from the REFUview platform.

Fault Condition	Corrective measures
Self-test fault	Disconnect the inverter from the mains and the PV module, wait for the LED to go out and then reconnect it. If the problem persists, contact service.
High bus voltage	- Check the open-circuit voltage of the PV string to ensure that it is below the maximum DC input voltage of the inverter. - If the input voltage is within the permitted range and the fault still occurs, it might be that the internal circuit has been damaged. Contact service.
Grid frequency fault	- Check the grid frequency and observe how often major fluctuations occur. - If this fault is caused by recurring frequency fluctuations, please try to modify the operating parameters, but only after obtaining permission from the power supply unit. Please call the service hotline and we will recommend reasonable parameters.
Grid voltage fault	- Check the voltage and wiring on the AC terminal block in the inverter. - Check the grid voltage at the inverter grid connection point. - If the grid voltage exceeds the permissible range due to local grid conditions, try to modify this operating parameter, but only after obtaining permission from the power supply unit. Please contact service and we will recommend a reasonable parameter for you. If the grid voltage is within the permissible range and the fault persists, please contact service.
No grid voltage	- Check the fuses in the distribution box, the AC circuit breakers. - Check the grid voltage as well as the availability of the grid, the AC cables and the connections. If the fault persists, contact service.
Residual current fault	- Check to ensure that the inverter is grounded reliably. - Check all PV modules, cables and connections between them. If the fault persists, contact service.
DC input voltage too high	- Check the open circuit voltage of the PV strings to ensure that it is below the maximum DC input voltage of the inverter. - If the input voltage is within the permissible range and the fault persists, the internal circuit may be damaged, contact service. 2-7 correspond to MPPT circuits 1 to 6.
Insulation resistance fault	- Check that the insulation impedance of the PV string to ground is greater than 70kohm. - If it does not match, check all PV modules, cables and connections between them. - Check to ensure that the inverter earth is reliable. If this fault persists, contact service.
High temperature fault	- Check that the fan inlet or radiator outlet is not obstructed. - Check that the ring temperature around the inverter or the fan inlet is not too hot. - Check the fan for blocked rotation and strange noises. If the problem persists, contact service.
PV reverse connection	Please check whether the positive and negative polarity of the corresponding string on the device is reversed; if so, wait until the current

	of the PV string is reduced to less than 0.5A, and then adjust the polarity of the string by putting the 'DC SWITCH' in the 'OFF' position. • After confirming that the string polarity is correctly adjusted, please contact service if the equipment fault still exists. • 0-29 corresponds to PV 1 to 30.
Self-test fault	• Disconnect the inverter from the mains and the PV module, wait for the LEDs to go out and then reconnect. If the problem persists, contact service.
DC overcurrent	• Disconnect the inverter from the mains and PV modules, wait until the LEDs go out and then reconnect. If the problem persists, please contact service. • 0-1 corresponds to MPPT 1st circuit, 2-3 corresponds to MPPT 2nd circuit, 4-5 corresponds to MPPT 3rd circuit, 6-7 corresponds to MPPT 4th circuit, 8-9 corresponds to MPPT 5th circuit, 10-11 corresponds to MPPT 6th circuit.
AC overcurrent	• Disconnect the inverter from the mains and the PV module, wait for the LEDs to go out and then reconnect them. If the problem persists, contact service.
Lightning protection device alarm	• Disconnect the inverter from the mains and PV modules, wait until the LEDs go out and then reconnect. If the problem still exists, please contact service. • 1 corresponds to the DC side lightning protection device, 2 corresponds to the AC side lightning protection device.
String Loss Alarm	• Check if the string terminal wiring is normal. • If you confirm that the problem is not caused by the above reasons and the alarm still exists, please contact the service. • 0-29 corresponds to PV string 1-30.
External Fan Alarm	• Disconnect the AC-side switch, DC-side switch, clean the foreign matter around the fan, and check whether the fan body is damaged. • Reinstall the fan, close the AC-side switch, DC-side switch, and after the equipment resumes grid-connected operation for 15 minutes, if the fault is reported again, replace the fan. 3-9 corresponds to external fans FAN1-FAN7.
Internal fan alarm	Disconnect the AC side switch, DC side switch, and close the AC side switch, DC side switch after 5 minutes. • After the unit has resumed grid-connected operation for 5 minutes, if the fault is reported again, contact service. • 12-14 corresponds to internal fans FAN1-FAN3.

It is advised to contact our service / technical support team to seek any help in troubleshooting if required.

11 Maintenance

11.1 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, an electric arc may occur causing electric shock and burns. Wear appropriately insulated gloves and use appropriately insulated tools when working on the DC connectors.

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

DANGER

Danger to life due to high voltages in the inverter.

Do not touch live parts for 5 minutes after disconnection from the power sources.

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

Procedure:

- Step 1:** Turn OFF the AC circuit breaker downstream of the inverter AC output and lock and secure it to avoid inadvertent reconnection.
- Step 2:** Rotate the DC switch handle from the "ON" position to the "OFF" position and repeat five times.

11.2 Cleaning air inlet and outlet

WARNING

Hot enclosure or heat sink may cause personal injury!

When the inverter is operating, the temperature of the enclosure or heat sink may be higher than 70°C.

Physical contact may cause burns.

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

A considerable amount of heat is generated as the inverter is feeding power into the grid. 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:** Turn OFF the AC circuit breaker downstream of the AC output of the inverter and ensure that it cannot be inadvertently reconnected.
- Step 2:** Turn OFF 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.

11.3 Fan maintenance

WARNING

Hot enclosure or heat sink may cause personal injury!

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

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

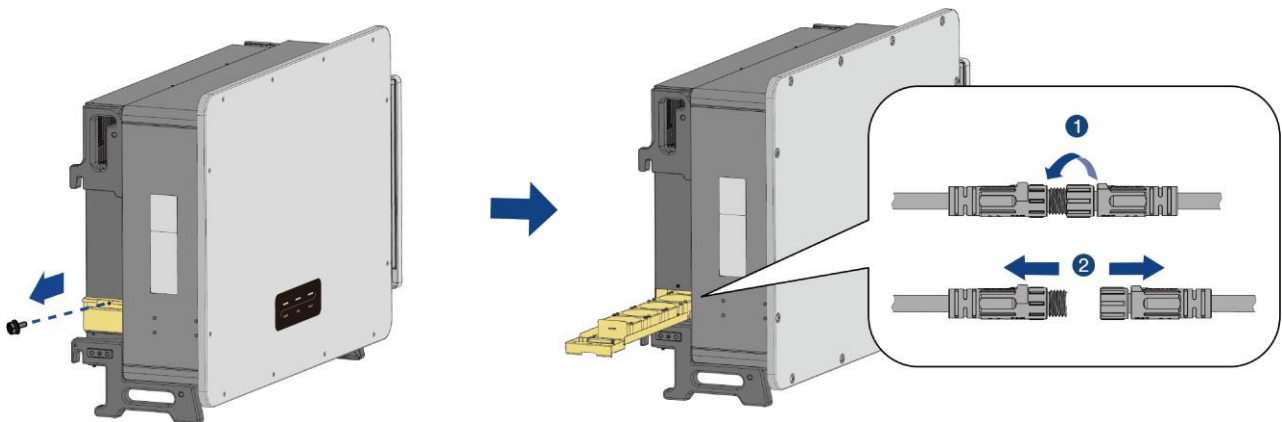
Fans inside the inverter are used to cool the inverter during operation. If the fans do not operate normally, the inverter may not be cooled down, and inverter efficiency may decrease. Therefore, it is necessary to clean the dirty fans and replace the broken fans in time.

Procedure:

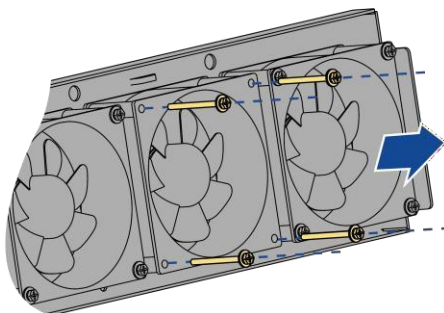
Step 1: Turn OFF the AC circuit breaker downstream of the AC output of the inverter and ensure that it cannot be inadvertently turned ON.

Step 2: Disconnect the DC switch and rotate the DC switch handle from the "ON" position to the "OFF" position. Wait for approximately 30 minutes until the heatsink temperature is reduced to normal temperature.

Step 3: Remove the screws on the fan module cover plate, pull the fan holder outwards flush with the inverter, pull it out until the connector leaks out, unscrew the connector and disconnect the fan power connector.



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



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

12 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.

13 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)



REFU Elektronik GmbH 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.refu.com.

14 Service and warranty

If you have any technical problems concerning our products, please contact our service team at service@refu.com. 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.refu.com

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, refu has the right to refuse to provide with the relevant warranty service.

You can also visit our support page by scanning the QR code below:

15 Contact

Please contact our Service Department if you have any technical questions about our products.

The following information is needed to provide necessary assistance:

- Inverter model
- Inverter serial number
- Photovoltaic module model
- Photovoltaic modules number and strings number connected to each MPPT
- Fault code
- Installation location

REFU Elektronik GmbH

Hotline : +49(0)7121 145 1888

Web : www.refu.com

Add : Marktstraße 185, D-72793 Pfullingen, Germany



REFU*sol*