KEHUA TECH

PV Grid-tied Inverter

SPI-B X2 Series (8K-25K)

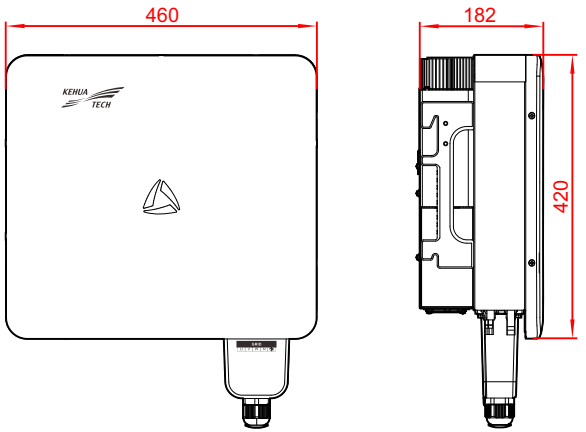
Installation Guide

1 Product Intro

Suitable model:

- SPI8K-B X2
- SPI10K-B X2
- SPI12K-B X2
- SPI15K-B X2
- SPI17K-B X2
- SPI20K-B X2
- SPI23K-B X2
- SPI25K-B X2
- SPI25K-B X2P

1.1 Appearance



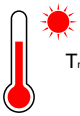
Unit: mm

1.2 LED Indicator

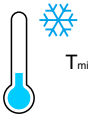
Indicator	Status	Meaning
	Green indicator is on.	Inverter running.
	Green indicator flashes.	Inverter standby.
	Green indicator and red indicator flash alternately.	Inverter fault (not off-grid)
	Red indicator is on.	Inverter fault (off-grid)
	Red indicator flashes.	DC has no input.
	Indicator is off.	AC and DC are powered off.

2 Installation Preparation

2.1 Installation Environment

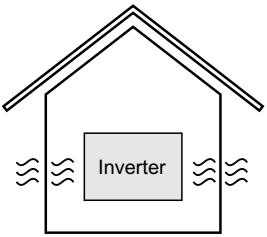


T_{max}:60°C



T_{min}:-35°C

RH:0%~95%



With good ventilation

No flammable or explosive materials

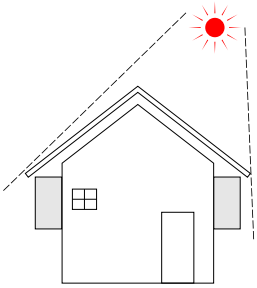
No dust

No corrosive substances, salinity

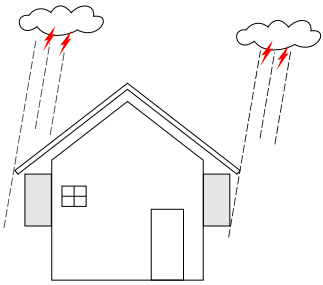
NOTE

Installation place will affect the safety operation, service life, performance guarantee of inverter. Therefore, avoid installing the inverter under direct sunlight, rain and snow, as below.

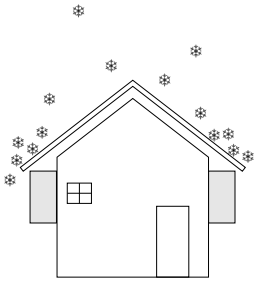
Avoid direct sunlight



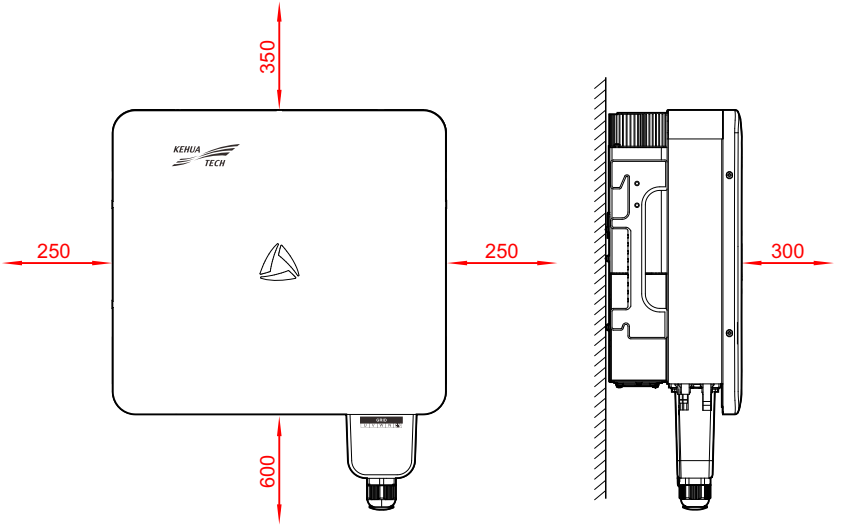
Avoid rain



Avoid snow

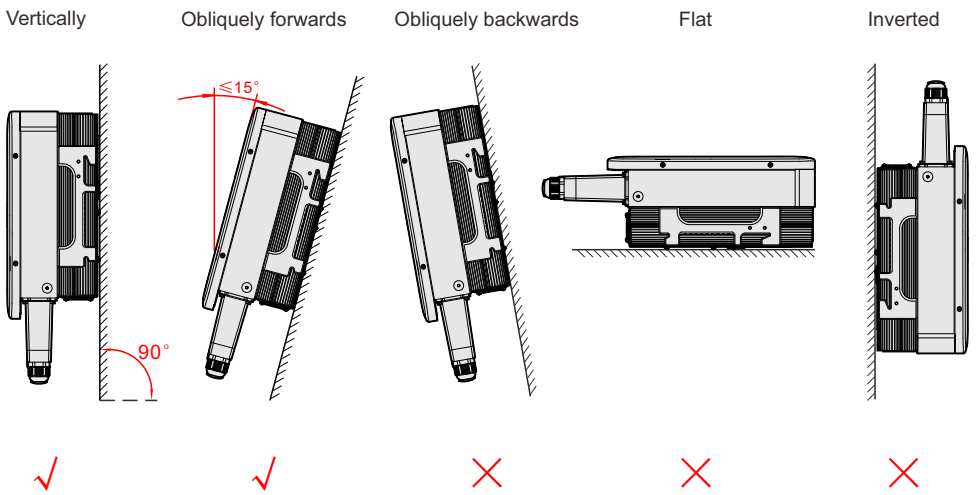


2.2 Installation Clearance



Unit: mm

2.3 Installation Method

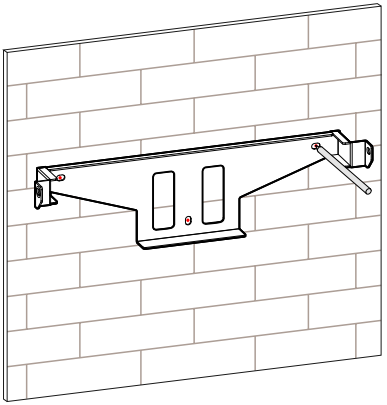


3 Inverter Installation

The inverter can be installed on the wall or metal bracket via equipped installation holder. In this section, we take wall installation as example to illustrate.

Step1 Determine the installation site based on the inverter size and installation clearance.

Step2 Mark the drilling position.

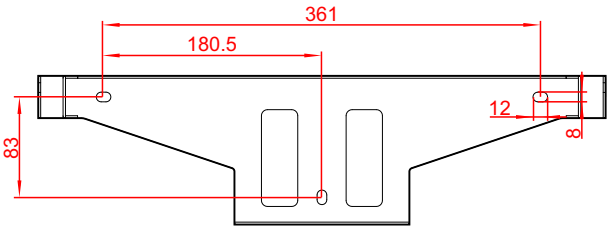


CAUTION

When installation, please keep the installation holder horizontal and the installation holes aligned.

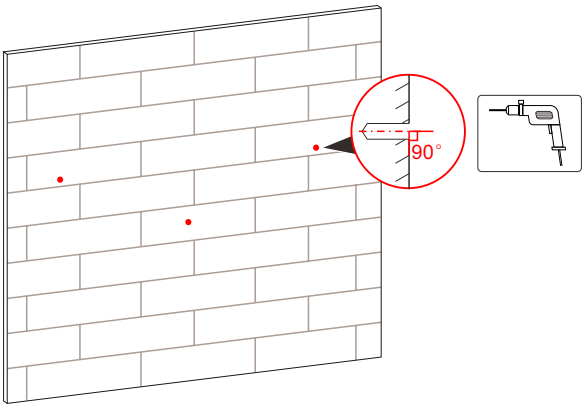
NOTE

It also can mark the position of installation holes according to the dimensions of the fixing holes of the installation holder.



Unit: mm

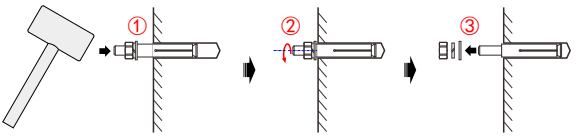
Step3 Drill hole (Diameter：Φ10.5mm, depth：40mm) .



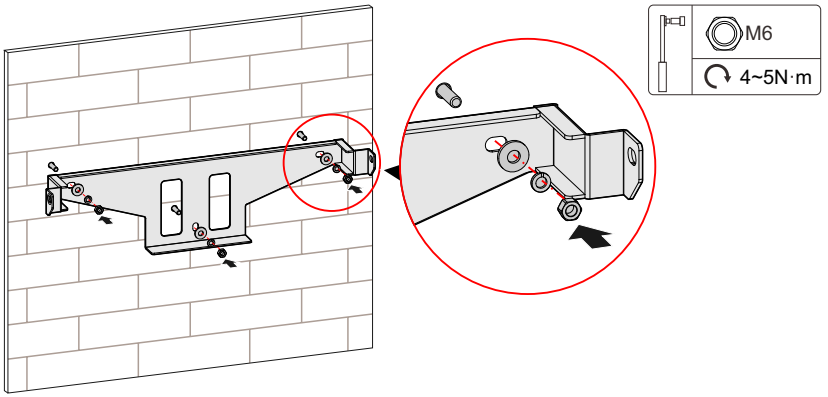
NOTE

lear the dust and measure the net depth. Ensure that the depth of three holes is the same.

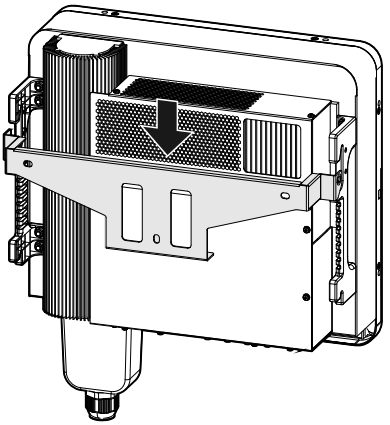
Step4 Install the equipped three expansion bolts M6*60.



Step5 Install the installation holder to wall.



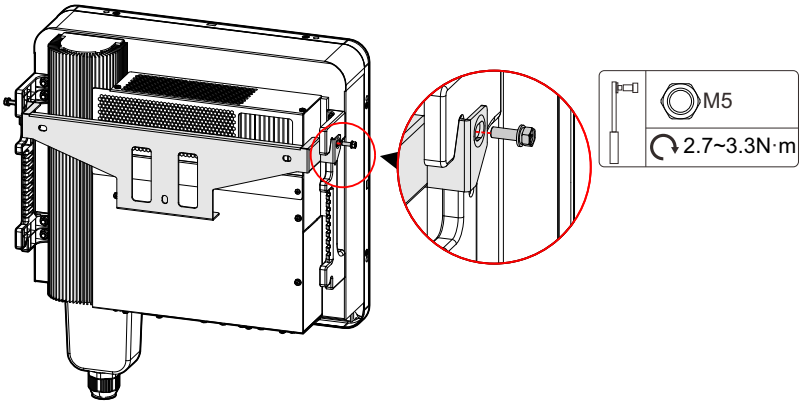
Step6 Hang the inverter to installation holder.



CAUTION

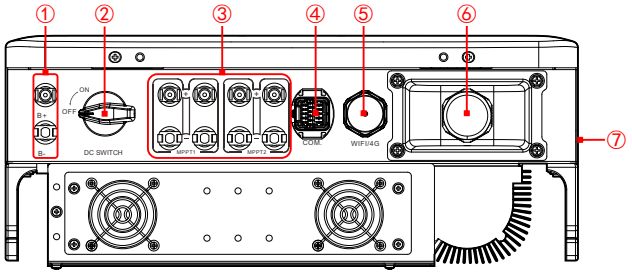
Do not loosen the inverter until the inverter has been hung in the installation holder completely.

Step7 Fasten the inverter.



4 Electrical Connection

4.1 Bottom layout



① Energy storage
② DC switch
③ PV string terminal
④ COM. interface
⑤ WIFI/4G (optional) interface
⑥ AC output wiring hole
⑦ External grounding terminal

NOTE

SPI8K-B X2, SPI10K-B X2 and SPI12K-B X2 have no external fan. This document takes SPI23K-B X2 as an example, for details please see the actual product.

4.2 Wire Specification

Wire name	Recommended cross-sectional area of wire
Battery wire	10mm²
PV string input wire	4mm²~6mm²
AC output wire	• 5*4mm² and above multi-core wire(SPI8K-B X2, SPI10K-B X2, SPI12K-B X2) • 5*6mm² and above multi-core wire (SPI15K-B X2, SPI17K-B X2, SPI20K-B X2) • 5*10mm² and above multi-core wire (SPI23K-B X2, SPI25K-B X2, SPI25K-B X2P) Note: the outer diameter of multi-core wire should be less than 25mm.
COM. comm. wire	4*2-core twisted pair
Grounding wire	4mm²~6mm²

NOTE

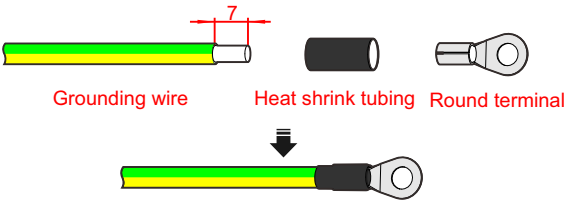
- The wires in above table are based on UL copper wire. If other wires are used, please replace them according to the standard. The wire materials selected by our company have passed the national standard certification or UL certification.
- If the recommended cross-sectional area of wire is not adopted, please confirm with our company.
- If using the aluminum wire, it should adopt copper-aluminum transition terminal.

4.3 External Grounding Connection

WARNING

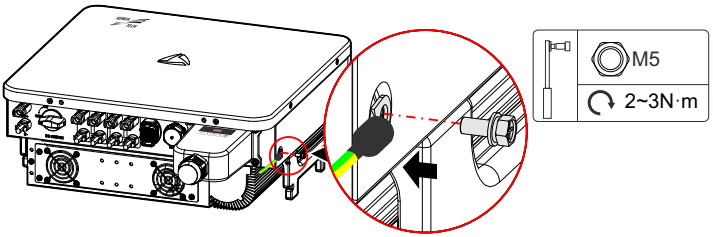
The grounding connection of the external grounding terminal cannot replace the connection of the PE terminal of AC output wire. Make sure that both of them are grounded reliably.

Step1 Crimp the grounding wire.



Unit: mm

Step2 Connect the crimped grounding wire to the external grounding terminal.

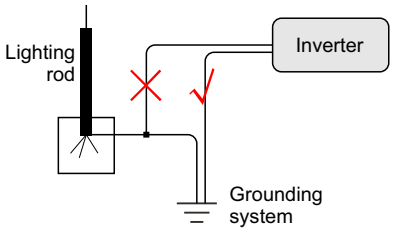


NOTE

In order to improve the anti-corrosion performance of the external grounding terminal, it is recommended to paint anti-rust paint on the external grounding terminal after finishing the external grounding connection.

CAUTION

- The grounding of inverter mustn't connect with the grounding of the lighting rod of the building where the inverter installs. It should separate them (as below) , or the lightning stroke will damage inverter.
- The grounding of the inverter should be directly connected to the grounding system, and the impedance should be less than 20mΩ.



4.4 PV String Input Connection

CAUTION

- When installing, use the equipped DC terminals and PV connectors to avoid inverter damage.
- Switch off the DC switch before connecting the PV string.
- Ensure that the connection between PV string and inverter at positive pole and negative pole is correct.
- The DC input voltage should be less than the max. input voltage of the inverter.
- It's forbidden to connect the positive pole or negative pole of PV string with the grounding wire, or it will cause inverter damage.
- The PV string terminal not connected must take waterproof and shockproof measures.

NOTE

The inverter has two groups of MPPT. The model, quantity, installation angle and direction of the PV strings connected with PV string terminals must be the same. If the system just has two groups of PV strings, the larger power one should be prior to connect with PV1, the other should be connected with PV2.

CAUTION

During the connection of the PV strings, the following requirements need to be met, otherwise the inverter may be irreversibly damaged, and such damage would be excluded from the warranty.

- The max. operation voltage and max. short-circuit current of each string shall be within the allowable range of the inverter.
- The number, size, orientation and tilt angle of the PV strings connected in each branch under the same MPPT should be the same.
- In any case, the PV string open-circuit voltage shall not exceed the max. input voltage 1100Vdc of the inverter. When the PV string input voltage is in the range of 1000~1100Vdc, the inverter will enter the standby mode, and when the string voltage returns to the MPPT operation voltage range of 180~1000Vdc, the inverter will resume normal operation.

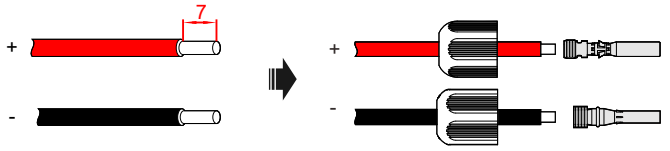
NOTE

Considering the local ultimate low temperature condition of the project and the temperature factor of PV string, it is recommended that the string operation voltage should be kept at the rated operation voltage of inverter around 600Vdc as possible, which can make the inverter power generation efficiency optimal on the one hand, and prevent the string open circuit voltage from exceeding the protection point of inverter or less than the normal startup voltage point under the ultimate low temperature on the other hand.

The inverter is configured with multiple MPPT routes and DC input branches, which should be used to each MPPT route as much as possible, and the PV capacity accessed by each MPPT route should be distributed as equally as possible to enhance the MPPT particle density of the power station, so that the equipment works in the best condition and ensure the optimal power generation under complex environment, take SPI23K-B X2 as an example, as below.

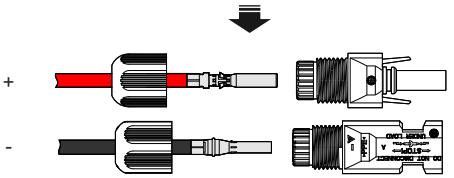
PV input / Item	MPPT1		MPPT2	
	PV1	PV2	PV3	PV4
Two route string access	Yes	No	Yes	No
Three route string access	Yes	Yes	Yes	No
Four route string access	Yes	Yes	Yes	Yes

Step1 Prepare PV connector.

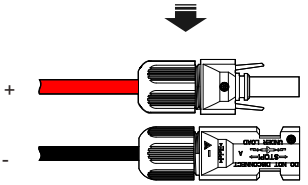


Strip wires (unit: mm)

Crimp the metal terminals

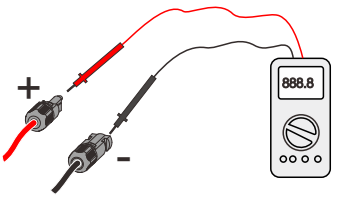


Fix the metal terminals



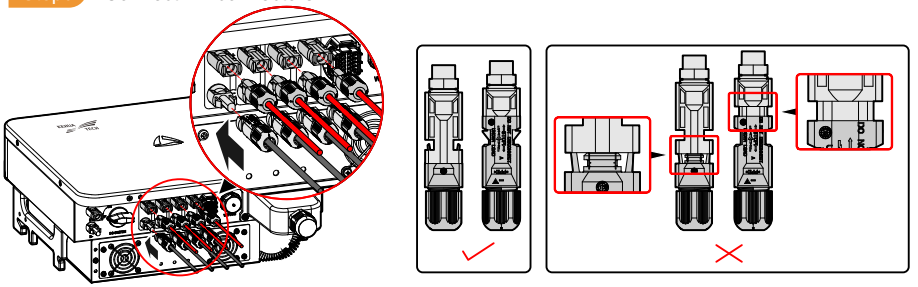
Tighten the lock nut

Step2 Measure the open-circuit voltage.



Measure the open-circuit voltage of PV string＜1100V

Step3 Connect PV connectors.



4.5 AC Output Connection

To ensure the inverter can be disconnected with load safely, we suggest equipping an independent tripolar or quadrupole switch for each inverter to protect the inverter, the specification is as below.

CAUTION

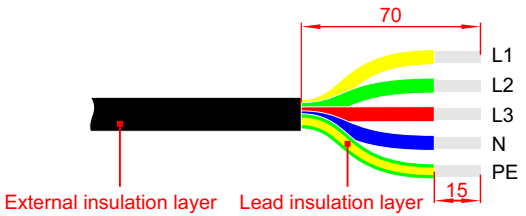
It's forbidden that several inverters share an AC switch.
It's forbidden to connect with load between inverter and the AC switch.

Model	Specification	Model	Specification
SPI8K-B X2	25A	SPI20K-B X2	63A
SPI10K-B X2	32A	SPI23K-B X2	63A
SPI12K-B X2	32A	SPI25K-B X2	63A
SPI15K-B X2	63A	SPI25K-B X2P	63A
SPI17K-B X2	63A	/	/

CAUTION

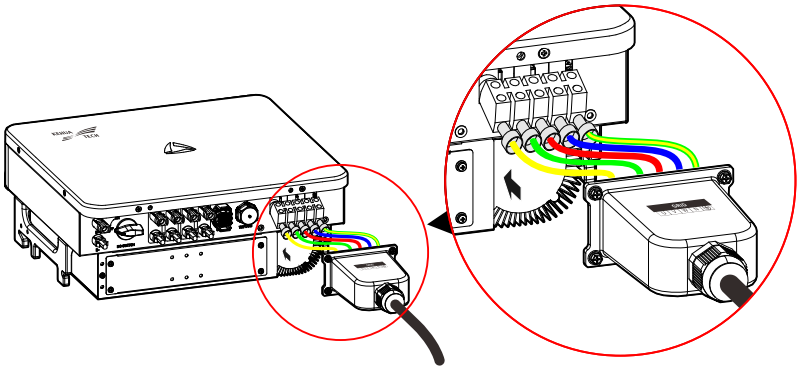
During wiring, please pay attention to distinguish the AC live wire, neutral wire and grounding wire.

Step1 Strip the AC output wire.

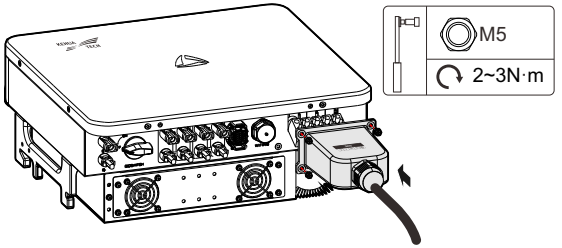


Unit: mm

Step2 Connect the AC output wire.



Step3 Fasten the AC output waterproof cover.



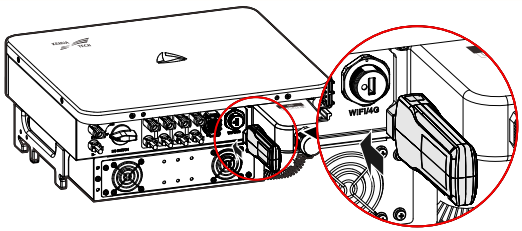
CAUTION

When several inverters are parallel connected, it needs to equip the switch with impact tripping function at the rear end of the AC output of the inverter.

4.6 WIFI/4G (Optional) Communication Connection

CAUTION

When installing the WIF/4G (optional) stick, pay attention to the limiting position, and don't wrongly insert it. When tightening, do not use excessive force (torque: 1.5~2.0N·m), so as not to damage the interface.



NOTE

WiseSolar Plus APP can communicate with inverter through WIFI /4G (optional) stick to realize the local and remote maintenance. User can perform the information query, alarm query, event query, parameter setting, etc. of inverter through WiseSolar Plus APP.

Download and install WiseSolar Plus APP:

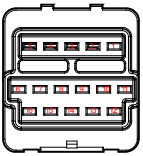
- Method 1: search WiseSolar Plus and download the WiseSolar Plus APP through the following application market, and install the WiseSolar Plus APP.

1. Application market (Android Chinese user), Google Play (Android overseas user) .
2. APP store (iOS)

- Method 2: scan the QR code below to download and install the WiseSolar Plus APP according to prompting.

4.7 COM. Communication Connection

COM. communication interface can be set to DRM or RS485 communication interface, the pin definition of the COM. communication interface is as below.



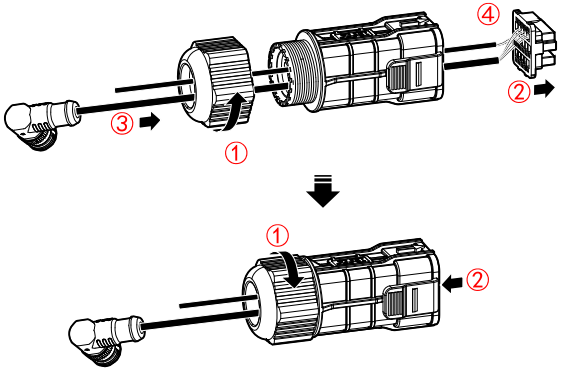
Pin definition of the COM. communication interface:

Pin1：CANH(battery)	Pin5：RS485-A(zero-export for multi unit)	Pin9：Reserved	Pin13：DRM7
Pin2：CANL(battery)	Pin6：RS485-B(zero-export for multi unit)	Pin10：Reserved	Pin14：DRM8
Pin3：RS485-A(meter)	Pin7：RS485-A(battery)	Pin11：DRM5	Pin15：RefGen
Pin4：RS485-B(meter)	Pin8：RS485-B(battery)	Pin12：DRM6	Pin16：DRM0

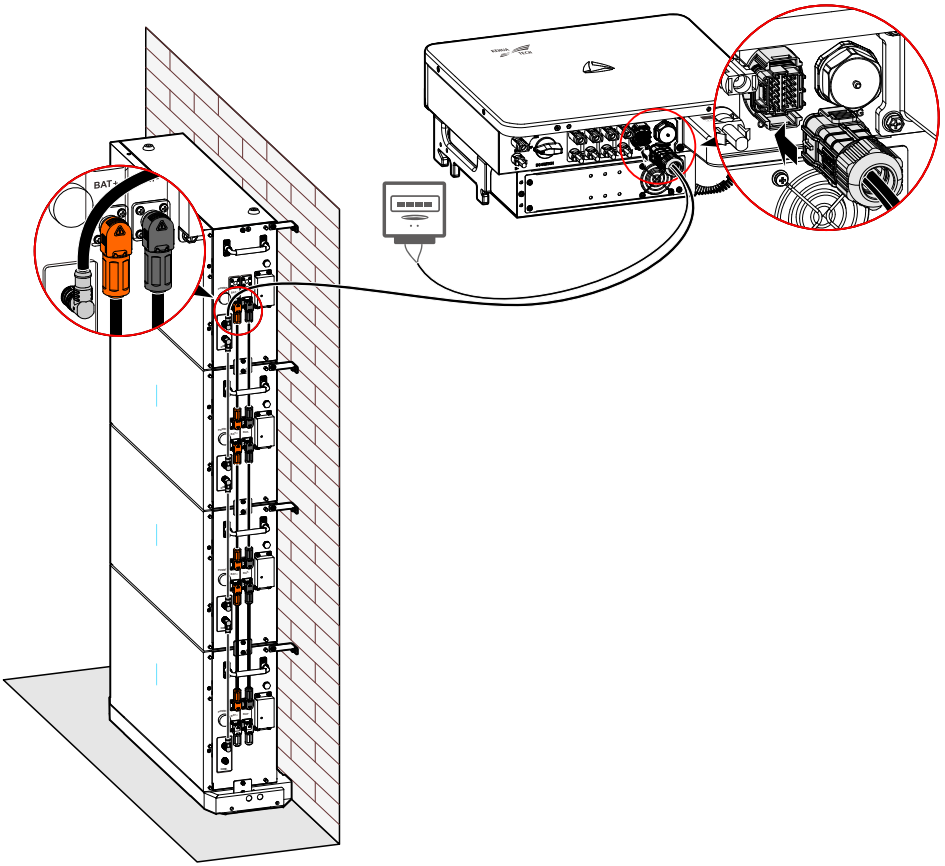
CAUTION

When the COM. communication interface set to DRM communication interface, the pin13 and pin14 of the COM. communication interface cannot connect wires. The pin13 and pin14 of the external DRM adapter must be short connected.

Step1 Prepare the COM. communication wire.



Step2 Connect COM. communication wire.



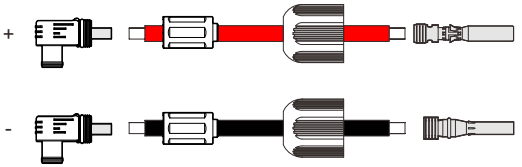
4.8 Energy Storage Connection (Optional)

CAUTION

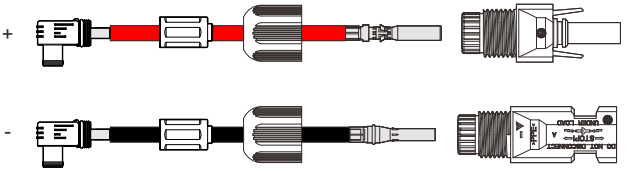
- When installing, use the equipped terminals and connectors to avoid inverter damage.
- Switch off the DC switch before connecting the battery box.
- Ensure that the connection between the battery box and inverter at positive pole and negative pole is correct.
- The energy storage terminal not connected must take waterproof and shockproof measures.

Step1 Prepare battery wire.

Strip the battery wires (unit: mm)



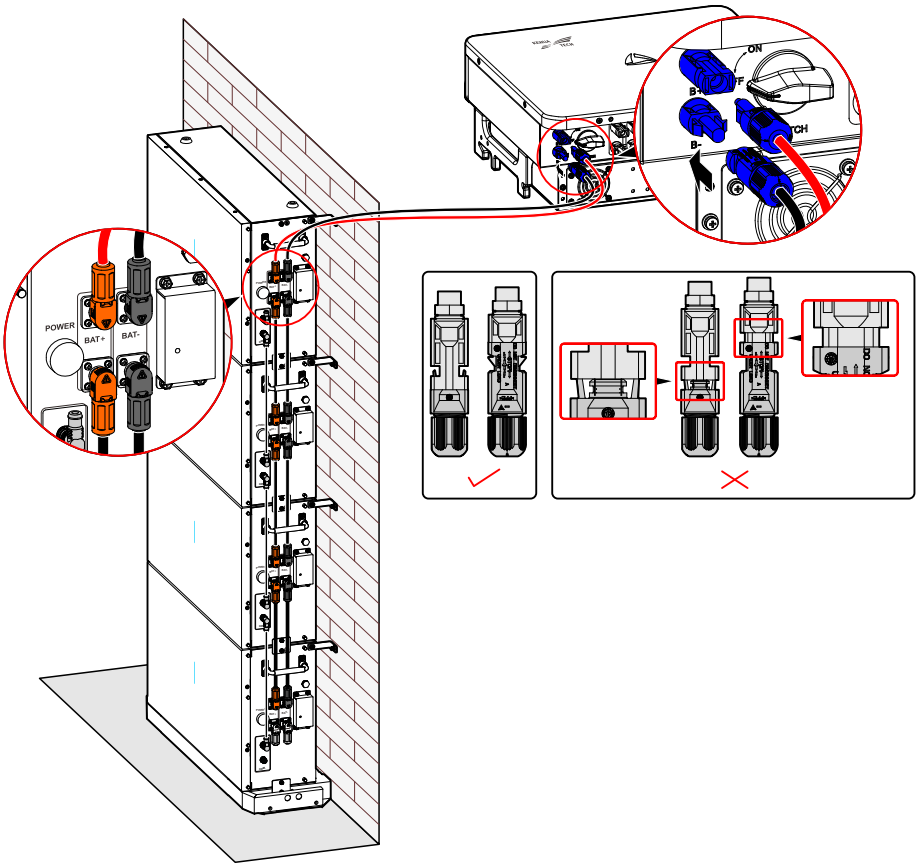
Crimp the metal terminals



Fix the metal terminals

Tighten the lock nut

Step2 Connect the battery wire.



NOTE

Please see the battery documents to get detailed battery information.

5 Startup Operation

5.1 Check Before Startup

Before starting inverter at the first time, please check the following items.

- Ensure that the inverter is properly installed and fastened.
- Ensure that the DC switch and external AC switches are all in the OFF position.
- Ensure that the polarity of PV strings are correct.
- Ensure that all wires are fastened and the insulation layer of wires are good.
- Ensure the gap between the nylon cable gland and wires and the unconnected connectors are sealed well.
- Ensure that the grid voltage meets the AC voltage requirement of the inverter.
- Ensure that the cross-sectional area of the input wire meets the max. load current of inverter.
- Ensure the wiring holes of inverter are blocked by fireproofing mud.
- Ensure that the distance among AC terminals meets the requirements of safety standard.
- Ensure that the input voltage of each PV string is same.

5.2 Start Inverter

DANGER

Damaged device or device fault may cause electric shock or fire!

- Before operation, please check if the inverter is damaged or has other danger.
- Check if the external device or circuit connection is safe.

Step1 Switch on the DC switches on the inverter and the project site. When the PV string provides enough startup voltage, the inverter will start and the indicator will be on.

Step2 Switch on the AC switch between inverter and grid, if the indicator is not red, that is there is no fault.

Step3 When the DC and AC power are all normal, the inverter will prepare to start grid-tied. Check the inverter parameters and the grid parameters, if they are in the normal range, a moment later, the inverter will perform the insulation impendence detection.

Step4 A moment later, the inverter will generate power normally.

NOTE

If it needs to use battery to start inverter (when starting inverter for the first time, it doesn't support using battery to start inverter), please do as follows.

1. When PV has no input or the input voltage is less than 180V, press the “POWER” button of each battery for 10s, and the indicator will be on.
2. When the DC and AC power are all normal, the inverter will prepare to start grid-tied. Check the inverter parameters and the grid parameters, if they are in the normal range, a moment later, the inverter will perform the insulation impendence detection.
3. A moment later, the inverter will generate power normally.

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