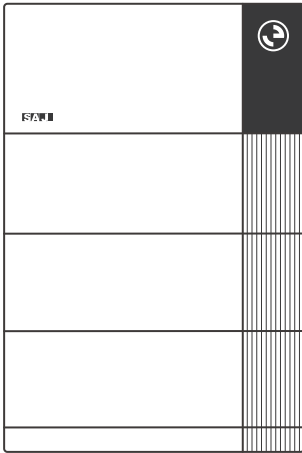


# EK90 series

All-in-One Energy Storage System

EK90 HS5-(5K-10K)-(S3,S4)-X

## Quick Installation Guide



## About this document

This quick installation guide provides the installation and electrical connection instructions of the SAJ product.

Scan the following QR code to obtain the latest eManuals:

Scan for eManuals



### Note:

Illustrations in this document show only essential details and may differ from the actual product.



## NOTICE

- This document may be updated without notice and is for guidance only. No warranties are implied.
- Read the product *User Manual* before installation for product details and safety instructions.
- Only qualified electrical professionals familiar with grid-connected PV systems and local standards may perform installation or servicing.
- Check the *Packing List* before installation; report any missing or damaged items to your dealer.
- Damage from improper installation or operation not following this document or the *User Manual* is not covered by warranty.











## WARNING

### Risk of High Voltage and Electric Shock

- This device is directly connected to public grid.
- Before operation, ensure the inverter is completely disconnected from all the power sources.
- During operation, wear appropriate personal protective equipment and use insulated tools.
- Failure to follow these instructions will result in serious injury or death.

**Safety symbols**

Symbol	Description	Symbol	Description
	<b>Danger:</b> Electrical shock hazard		<b>Caution:</b> No disposal in residential waste
	<b>Danger:</b> Hot surface Do not touch metal plate housing during operating.		<b>CE Mark</b>
	<b>Danger:</b> Do not open the cabinet door until 5 minutes after disconnecting all power sources.		<b>RoHS compliant mark</b>
	<b>Warning:</b> No open flames		<b>Caution:</b> Check the user manual before service

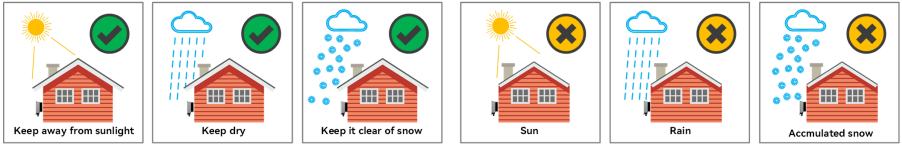
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# 1. Installation

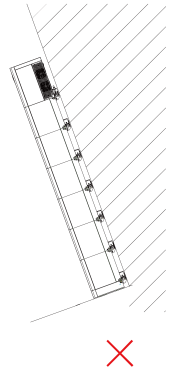
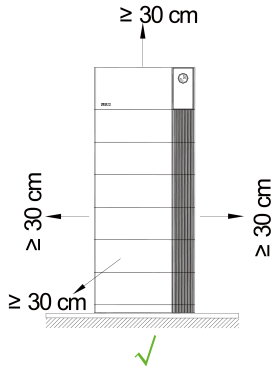
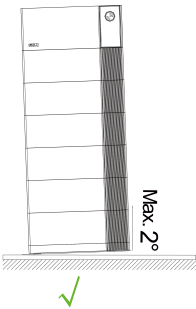
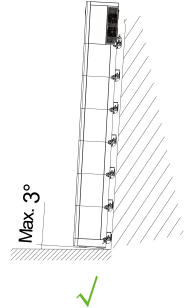
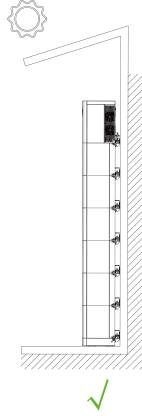
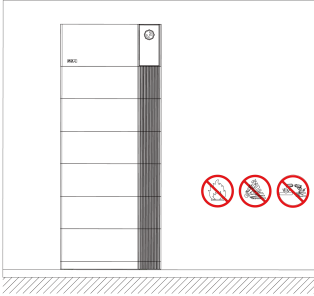
## 1.1. Installation preparation

### 1.1.1. Environment requirements



- Do not expose the device to direct solar irradiation as this could cause power derating due to overheating.
- The installation environment must be free of inflammable or explosive materials.
- The device must be installed in a place away from any heat source.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device in the bedroom, toilet, or bathroom.
- When installing the device at the garage, keep it away from the driveway.
- Keep the device from water sources such as taps, sewer pipes and sprinklers to prevent water seepage.
- Ensure the inverter is installed in a well-observed area where the LED display panel can be easily read for real-time status checks.

### 1.1.2. Plan the installation site



### 1.1.3. Installation tools

Installation tools include but are not limited to the following recommended ones. Use other auxiliary tools on site if necessary.

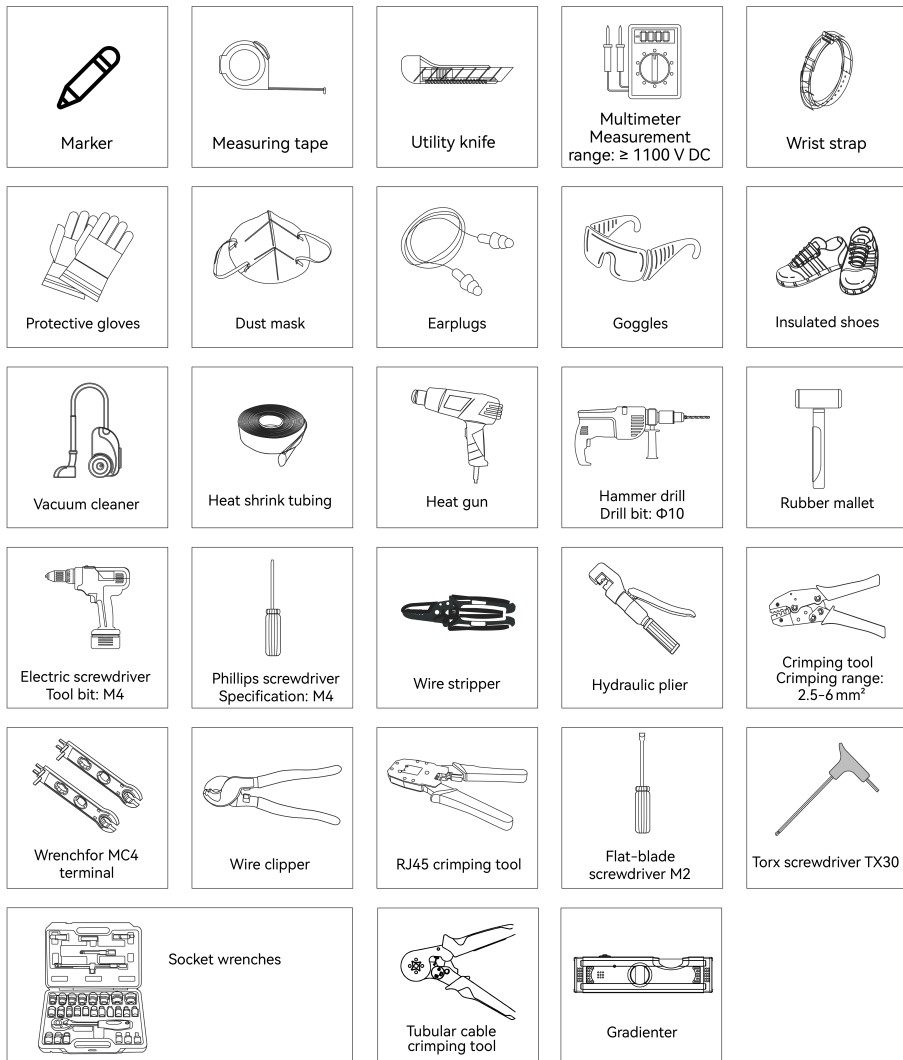
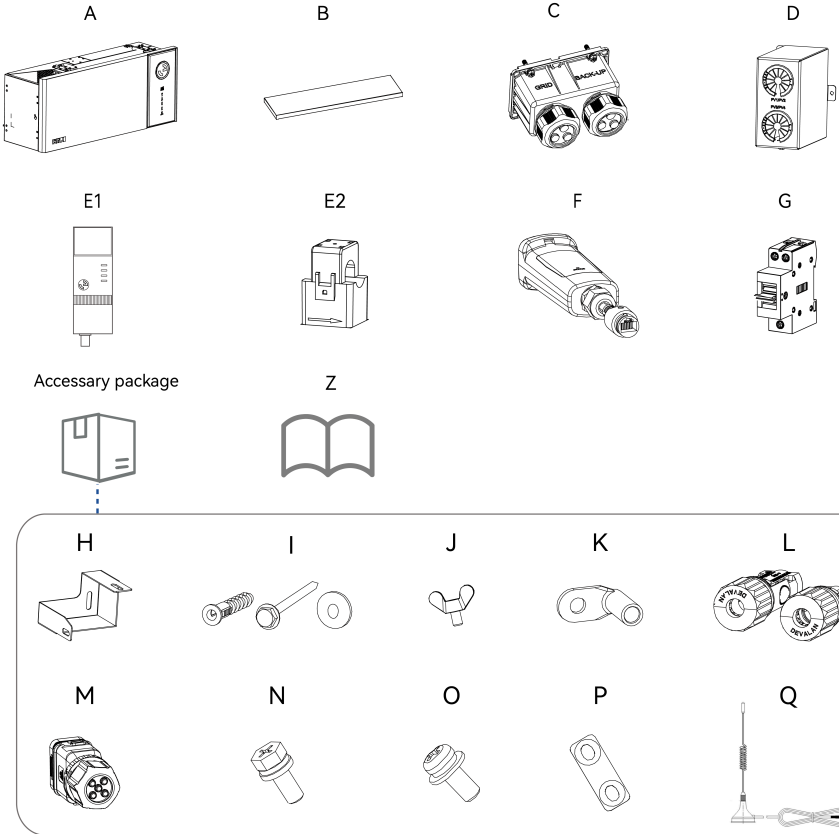


Figure 1.1. Suggested installation tools

## 1.2. Packing list

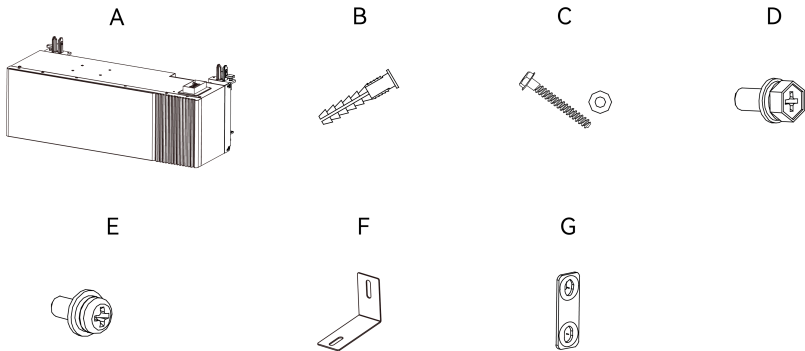
### Inverter



Number	Quantity	Designation
A	1	Inverter
B	1	Protective cover of inverter
C	1	AC protective cover
D	1	PV protective cover
E1	1	Meter
E2	1	Current transformer (CT)
F	1	Communication module

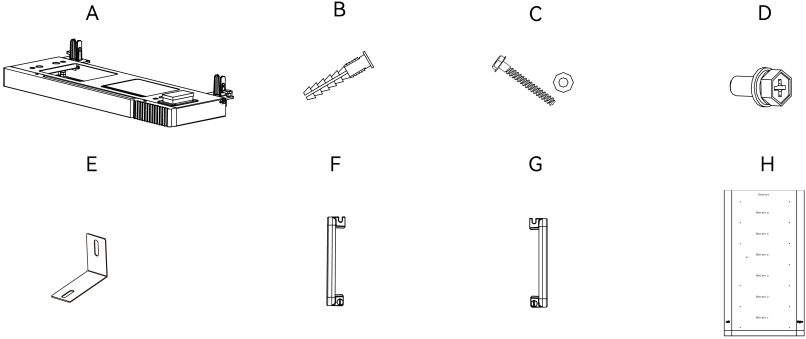
Number	Quantity	Designation
G	1	Manual transfer switch
Z	1	Documentation
H	1	Anti-theft bracket
I	1	Bolts and gaskets for anti-theft bracket
J	1	Hand-tighten screw
K	9	AC cable terminal
L	4	PV connector
M	1	20-pin connector
N	3	M6*16 screw
O	6	M4*10 screw
P	1	Grounding plate
Q	1	Antenna

## Battery pack



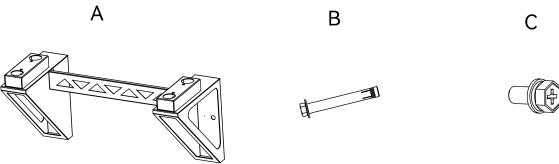
Number	Quantity	Designation
A	1	Battery pack
B	2	M6*80 expansion bolt
C	2	ST6*50 screw and gasket set
D	4	M6*16 screw
E	2	M4*10 screw
F	2	Locking bracket
G	1	Grounding plate

**Battery base**



Number	Quantity	Designation
A	1	Battery base
B	2	M6*80 expansion bolt
C	2	ST6*50 screw and gasket set
D	2	M6*16 screw
E	2	Locking bracket
F	1	Left handle
G	1	Right handle
H	1	Positioning cardboard

**Wall bracket**



Number	Quantity	Designation
A	1	wall bracket
B	6	M12*100 expansion bolt
C	2	M6*16 screw

### 1.3. Dimension

Use one stack with six battery modules as an example:

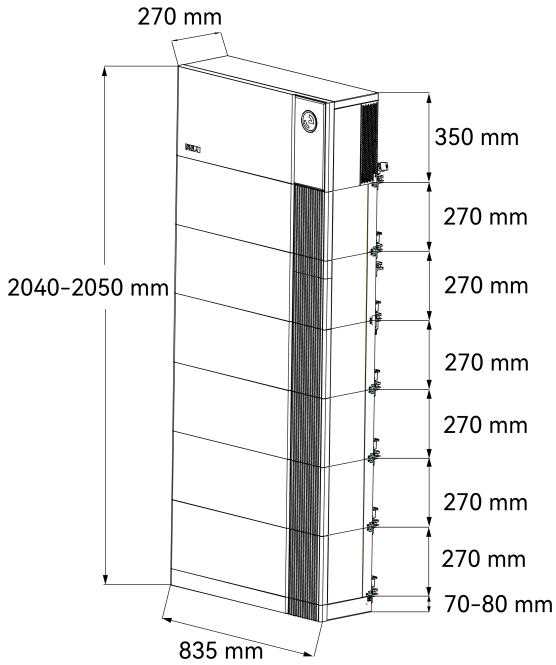
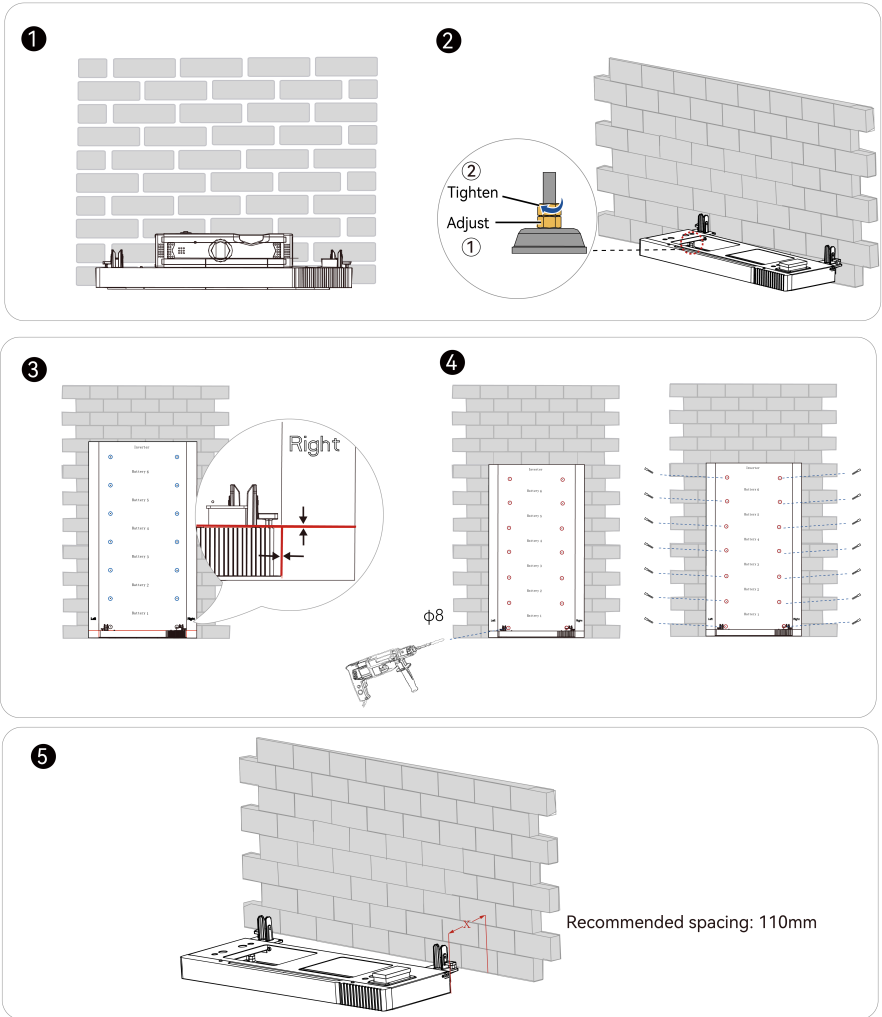
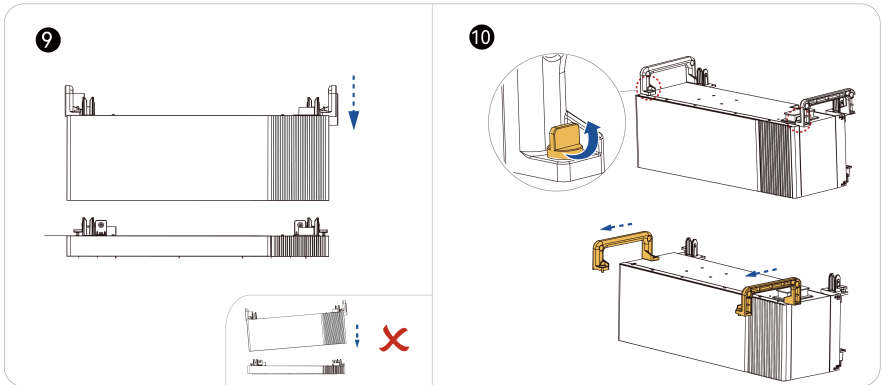
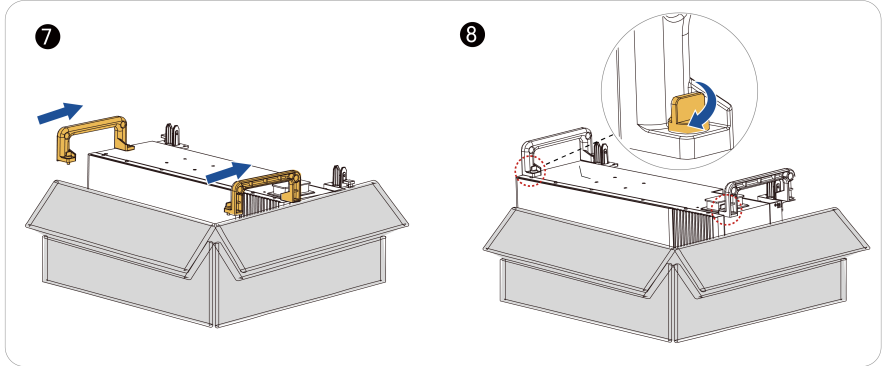
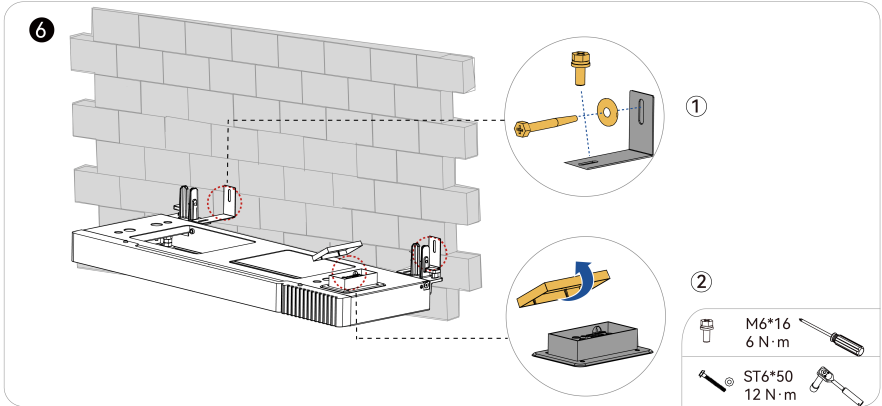


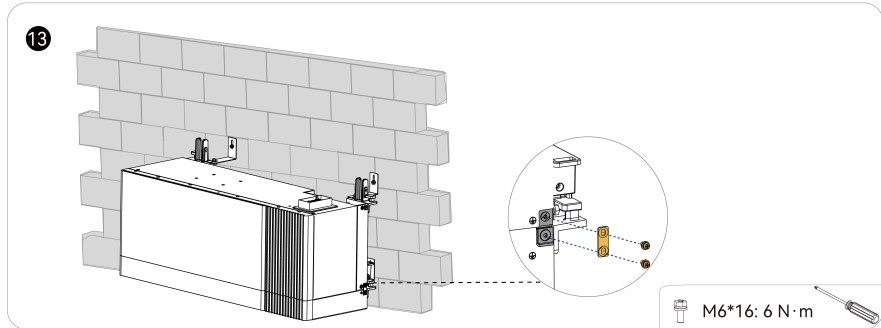
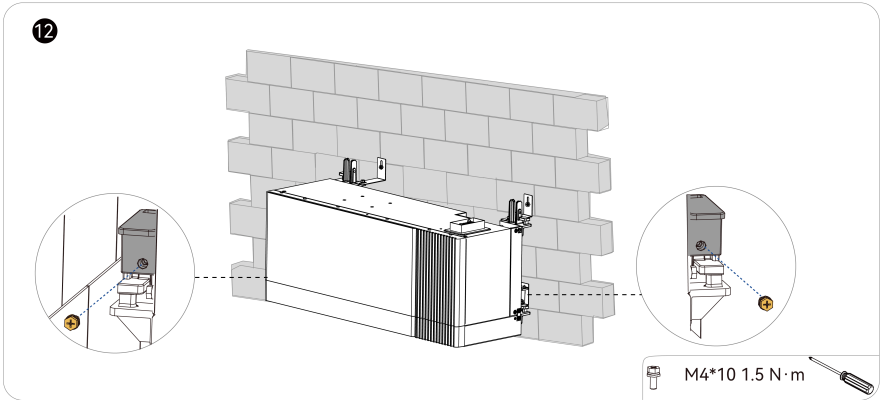
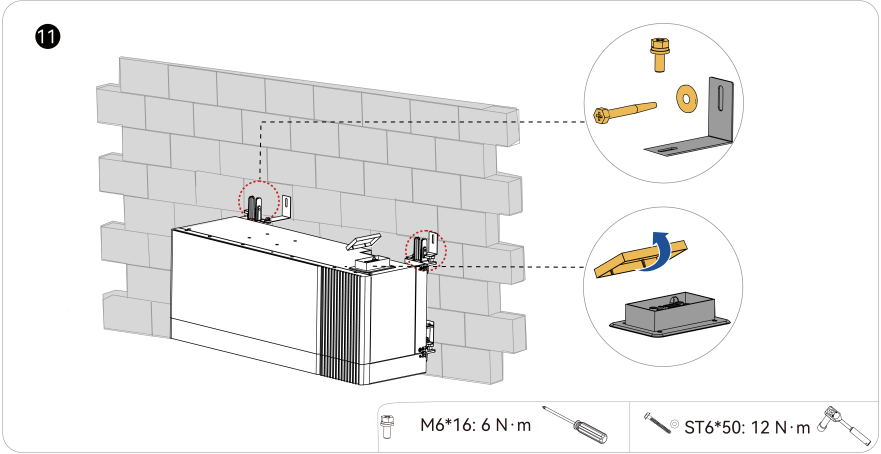
Figure 1.2. Dimensions

## 1.4. Ground mounting

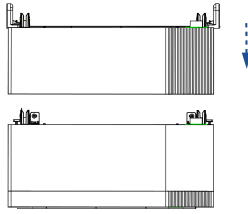
**Note:** For ground mounting, a maximum of 6 batteries is supported.







14

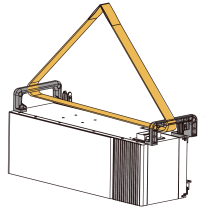


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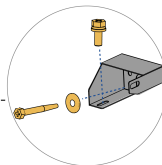
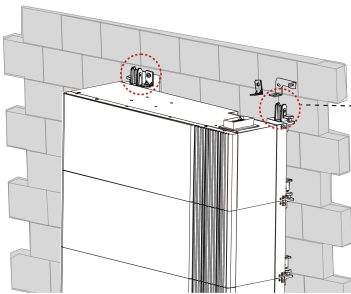
Install more batteries by taking the same steps as the first one.

16

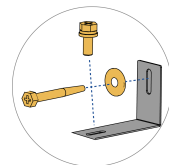
≥4 batteries: recommend using a lifting device.



17



With lock

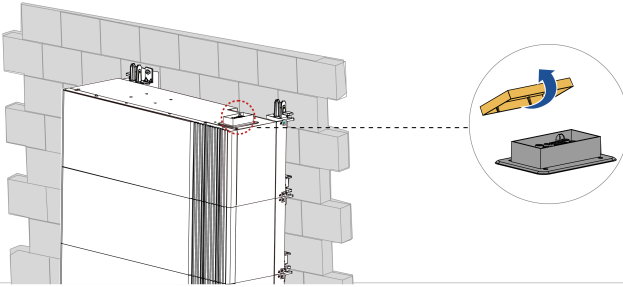


Without lock

M6\*16: 6 N·m

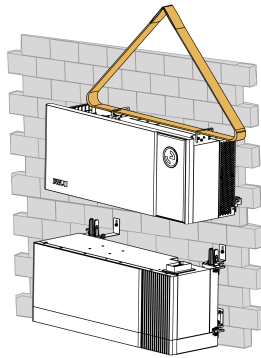
ST6\*50: 12 N·m

18



19

≥4 batteries: recommend using a lifting device.

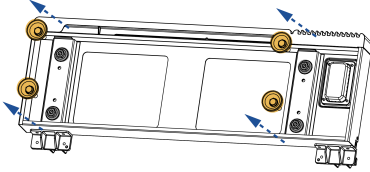




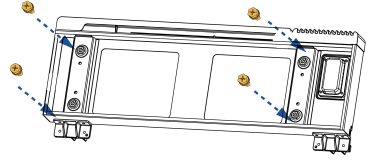
## 1.5. Wall mounting

**Note:** For wall mounting, a maximum of 2 batteries is supported.

**1** Remove the bumper feet.



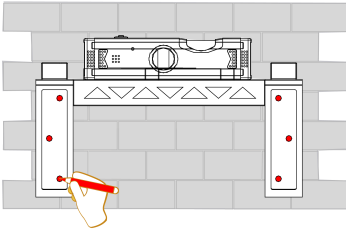
**2**



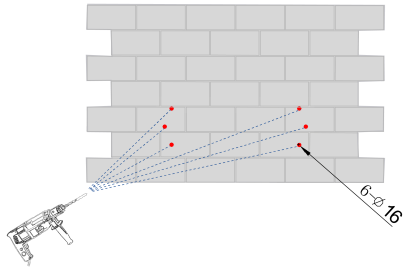
M6\*16 6 N·m



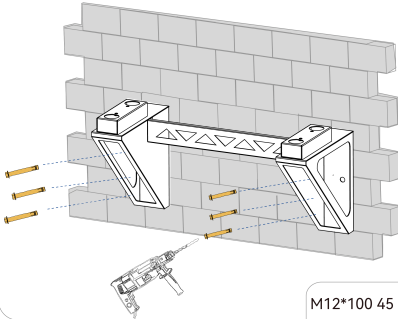
**3**



**4**

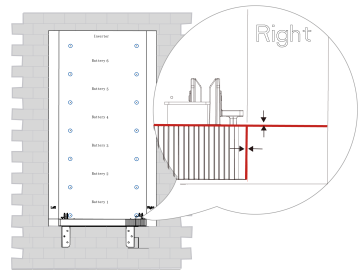


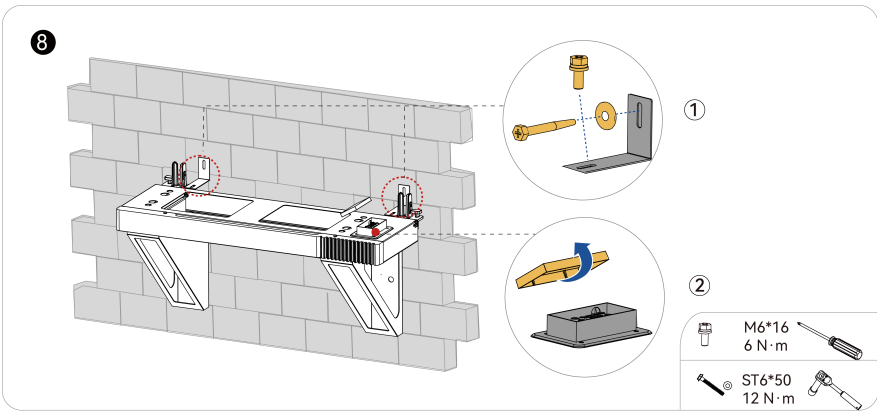
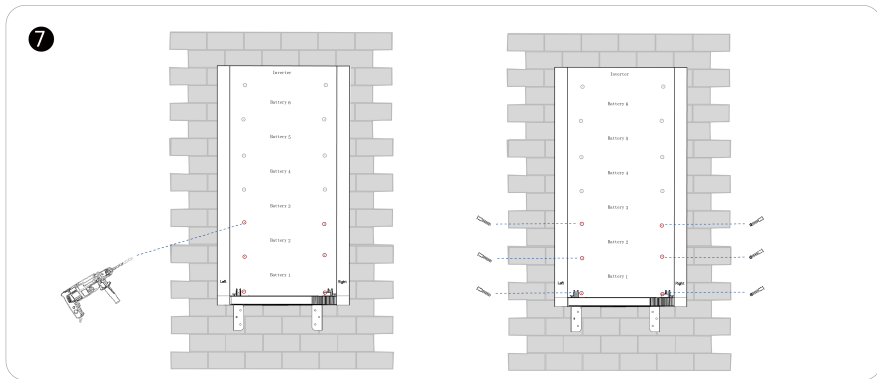
**5**



M12\*100 45 N·m

**6**





**9** Install the batteries and inverter by taking the same steps as the ground mounting.

**10**

X represents the nominal energy of the battery system in kWh

X =	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 9	<input type="checkbox"/> 12	<input type="checkbox"/> 14	<input type="checkbox"/> 15	<input type="checkbox"/> 16
	<input type="checkbox"/> 18	<input type="checkbox"/> 21	<input type="checkbox"/> 24	<input type="checkbox"/> 25	<input type="checkbox"/> 27	<input type="checkbox"/> 28	<input type="checkbox"/> 30
	<input type="checkbox"/> 35	<input type="checkbox"/> 36	<input checked="" type="checkbox"/> 40	<input type="checkbox"/> 42	<input type="checkbox"/> 45	<input type="checkbox"/> 50	<input type="checkbox"/> 54

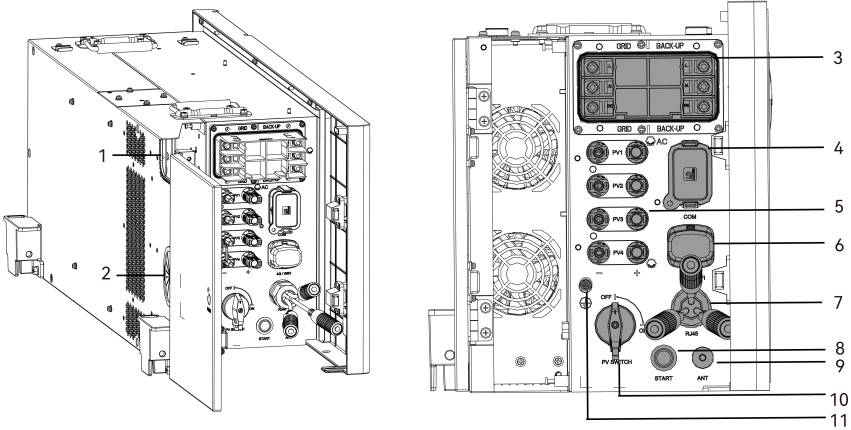
Example

Model	Nominal Energy	Power	Dimensions (H x W x D)
SAJ 6	6 kWh	3000 W	100 x 400 x 150 mm
SAJ 7	7 kWh	3000 W	100 x 400 x 150 mm
SAJ 9	9 kWh	3000 W	100 x 400 x 150 mm
SAJ 12	12 kWh	3000 W	100 x 400 x 150 mm
SAJ 14	14 kWh	3000 W	100 x 400 x 150 mm
SAJ 15	15 kWh	3000 W	100 x 400 x 150 mm
SAJ 16	16 kWh	3000 W	100 x 400 x 150 mm
SAJ 18	18 kWh	3000 W	100 x 400 x 150 mm
SAJ 21	21 kWh	3000 W	100 x 400 x 150 mm
SAJ 24	24 kWh	3000 W	100 x 400 x 150 mm
SAJ 25	25 kWh	3000 W	100 x 400 x 150 mm
SAJ 27	27 kWh	3000 W	100 x 400 x 150 mm
SAJ 28	28 kWh	3000 W	100 x 400 x 150 mm
SAJ 30	30 kWh	3000 W	100 x 400 x 150 mm
SAJ 35	35 kWh	3000 W	100 x 400 x 150 mm
SAJ 36	36 kWh	3000 W	100 x 400 x 150 mm
SAJ 40	40 kWh	3000 W	100 x 400 x 150 mm
SAJ 42	42 kWh	3000 W	100 x 400 x 150 mm
SAJ 45	45 kWh	3000 W	100 x 400 x 150 mm
SAJ 50	50 kWh	3000 W	100 x 400 x 150 mm
SAJ 54	54 kWh	3000 W	100 x 400 x 150 mm

## 2. Electrical connection

### 2.1. Electrical connection diagram

#### 2.1.1. Inverter ports and switches



Callout	Silkscreen	Description
1	/	The cable entry hole 1 for routing AC power cables.
2	/	The cable entry hole 2 for routing the following cables: <ul style="list-style-type: none"> <li>• The grounding cable</li> <li>• The DC power cables</li> <li>• The communication cables</li> </ul>
3	<b>AC</b> • <b>GRID</b> • <b>BACK-UP</b>	The connection ports for AC power cables. <ul style="list-style-type: none"> <li>• <b>GRID</b>: for connecting to the public grid.</li> <li>• <b>BACK-UP</b>: for connecting to the home backup load.</li> </ul>
4	<b>COM</b>	The connection port for communication cables from external devices like DI/DO devices.
5	<b>PV1, PV2, PV3, PV4</b>	The negative and positive PV input connection ports.
6	<b>4G/WIFI</b>	The connection port of the eSolar AIO3 Pro and 4G Pro communication modules.


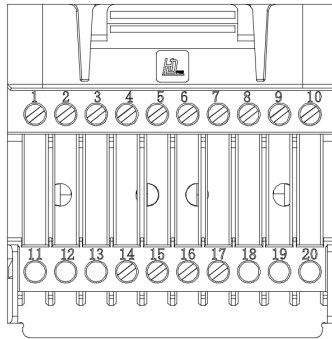
Callout	Silkscreen	Description
7	<b>RJ45</b>	The RJ45 connection ports for LAN1, LAN2, and DRMS connections. LAN1 and LAN2 are reserved for future use.
8	<b>START</b>	For starting up the energy storage system.
9	<b>ANT</b>	The LoRa antenna connection port.
10	<b>DC SWITCH</b>	The DC switch that controls the connection to the PV array.
11		The grounding cable connection port.

Table 2.1. Inverter electrical ports



Number	Silkscreen	Description
1-6	/	Reserved for future use.
7	<b>DO1+</b>	Output connection for dry contact device 1.
8	<b>DO1-</b>	Output connection for dry contact device 1.
9	<b>DO2+</b>	Output connection for dry contact device 2.
10	<b>DO2-</b>	Output connection for dry contact device 2.
11	<b>PC 485A</b>	Reserved RS485 connection ports.
12	<b>PC 485B</b>	The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by <b>SW2</b> DIP switch.
13	<b>Meter 485A</b>	For RS485 connections with the meter. The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by <b>SW3</b> DIP switch.
14	<b>Meter 485B</b>	
15	<b>DI1+</b>	Input connection for dry contact device 1.

Number	Silkscreen	Description
16	<b>D11-</b>	Input connection for dry contact device 1.
17	<b>D12+</b>	Input connection for dry contact device 2.
18	<b>D12-</b>	Input connection for dry contact device 2.
19	<b>12V</b>	Port for providing 12V DC power supply to the external device.
20	<b>GND</b>	Port for grounding connection.

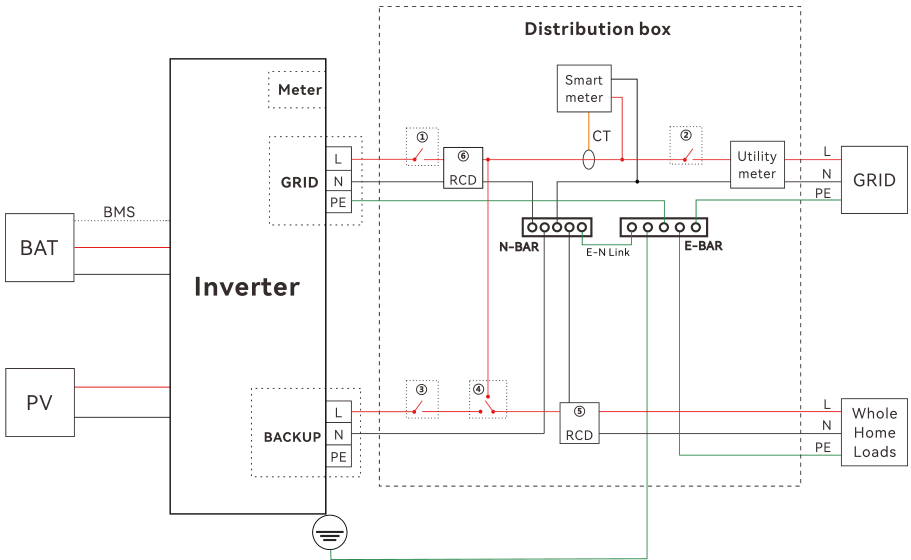
Table 2.2. 20-pin definition

### 2.1.2. Australia and New Zealand

This section shows the system connection diagrams applicable to Australia and New Zealand.

- To comply with AS/NZS3000, the neutral (N) cables of the grid and backup-load sides (where applicable) must be connected together.
- Do not connect the PE terminal of the **BACKUP** port.
- The E-BAR and the N-BAR must be connected as illustrated.

### Whole home backup solution



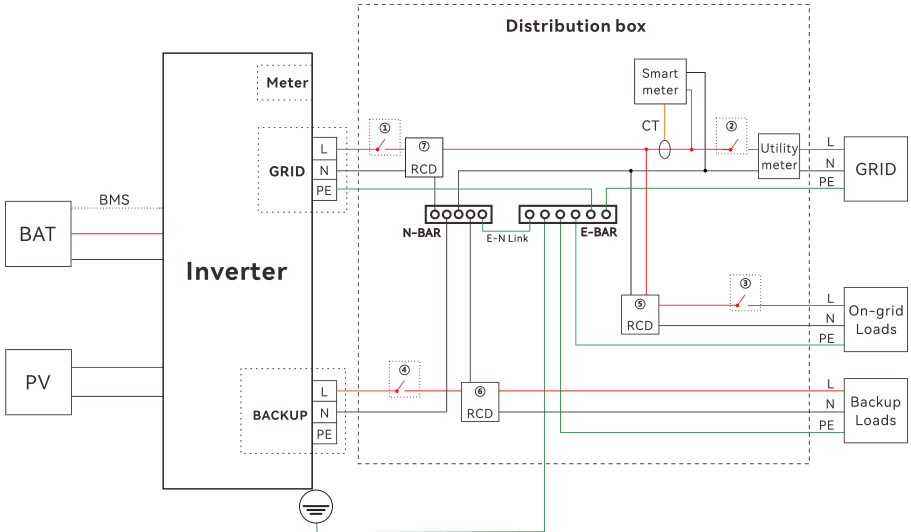
Product model	① AC breaker (grid)	③ AC breaker (backup loads)	② AC breaker (utility meter)	④ Manual transfer switch	⑤⑥ RCD (on-grid/ backup loads) <sup>1</sup>
EK90 HS5-5K-S3-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK90 HS5-6K-S3-X (-IE)	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK90 HS5-8K-S3-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK90 HS5-10K-S4-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA

Table 2.3. Recommended AC breaker and RCD specifications

1. The on-grid RCD is optional since the inverter is integrated with a residential current monitoring unit (RCMU). However, if the external RCD must be installed according to the local regulations, install a type A RCD of action current 30 mA or higher.

**Note:** The values in the above table are recommendations only and can be set to other values based on the actual conditions.

**Partial backup solution**



Product model	① AC breaker (grid)	④ AC breaker (backup loads)	② AC breaker (utility meter)	③ AC breaker (on-grid loads)	⑤⑥ RCD (on-grid/ backup loads) <sup>1</sup>
EK90 HS5-5K-S3-X	32 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK90 HS5-6K-S3-X (-IE)	40 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK90 HS5-8K-S3-X	50 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK90 HS5-10K-S4-X	63 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA

Table 2.4. Recommended AC breaker and RCD specifications

1. The on-grid RCD is optional since the inverter is integrated with a residential current monitoring unit (RCMU). However, if the external RCD must be installed according to the local regulations, install a type A RCD of action current 30 mA or higher.

**Note:** The values in the above table are recommendations only and can be set to other values based on the actual conditions.

## 2.2. Prepare the cables

Cable type	Recommended cross-sectional area range (mm <sup>2</sup> )
Grounding cable	6

Table 2.5. Grounding cable specification

Solution	Cable type	Cross-sectional area range (mm <sup>2</sup> )		Recommended conductor material
		Range	Recommended	
Whole home backup	One three-wire cable	10-16	16	Copper
	Three separated cables	/	16	Copper
Partial backup	One three-wire cable	6-8	8	Copper
	Three separated cables	/	8	Copper

Table 2.6. AC grid and backup cable specification

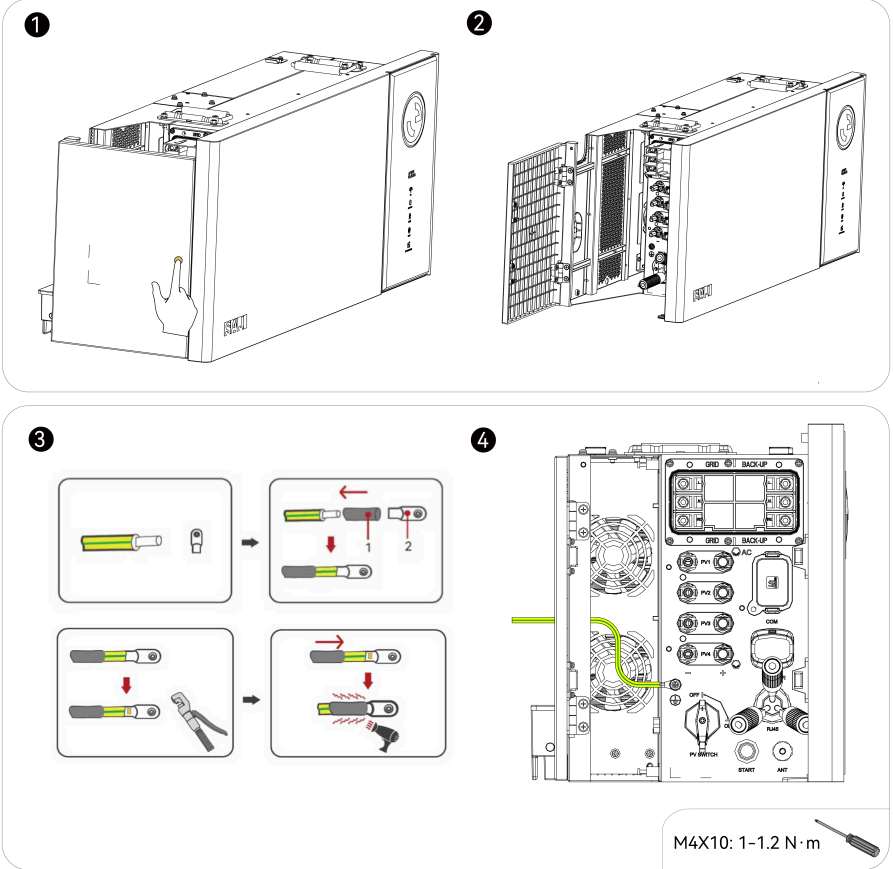
Cross-sectional area range (mm <sup>2</sup> )		Recommended conductor material
Range	Recommended value	
5.0-6.0	6.0	Outdoor copper wire cable, complying with 600 V DC

Table 2.7. PV cable specification

Terminals	Cable diameter(mm <sup>2</sup> )
1-10	0.5-0.75
11-20	0.2-0.5

Table 2.8. Communication cable specification


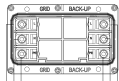


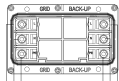


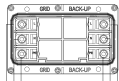


### 2.3. Connect the grounding cable

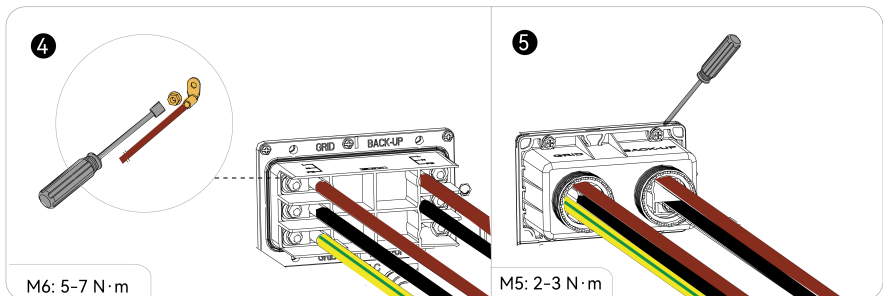
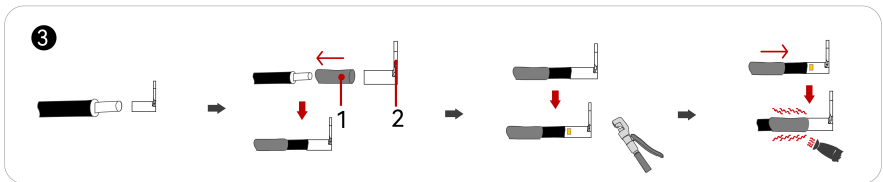
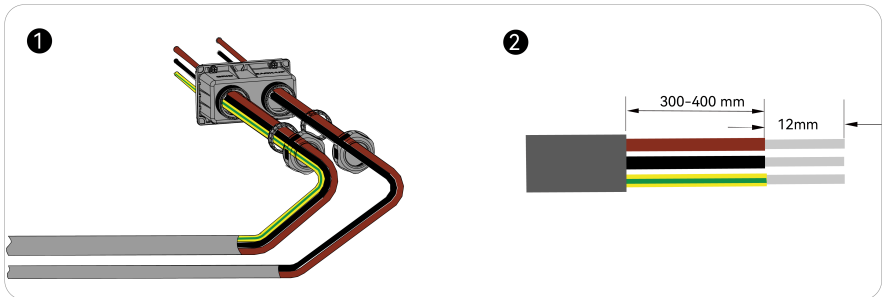


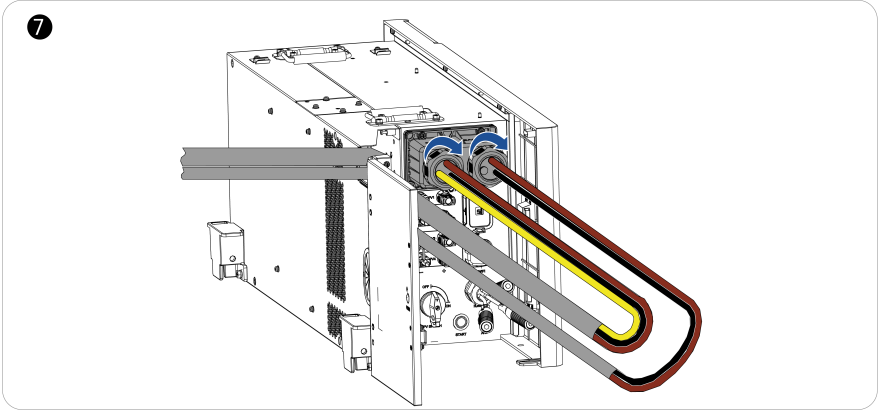
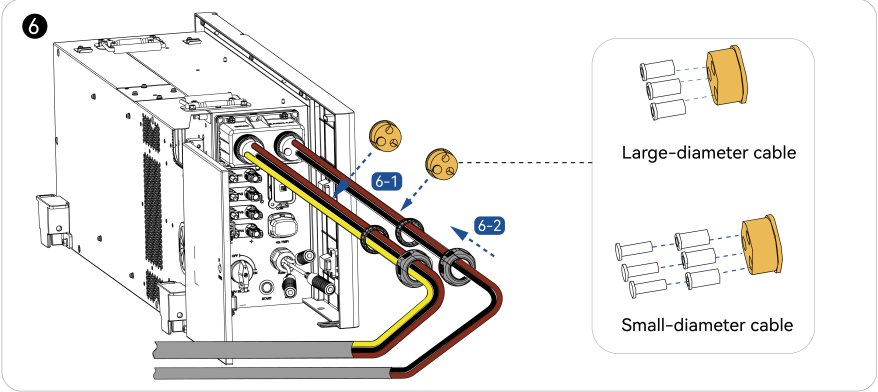
## 2.4. Connect the AC power cables

### Note:

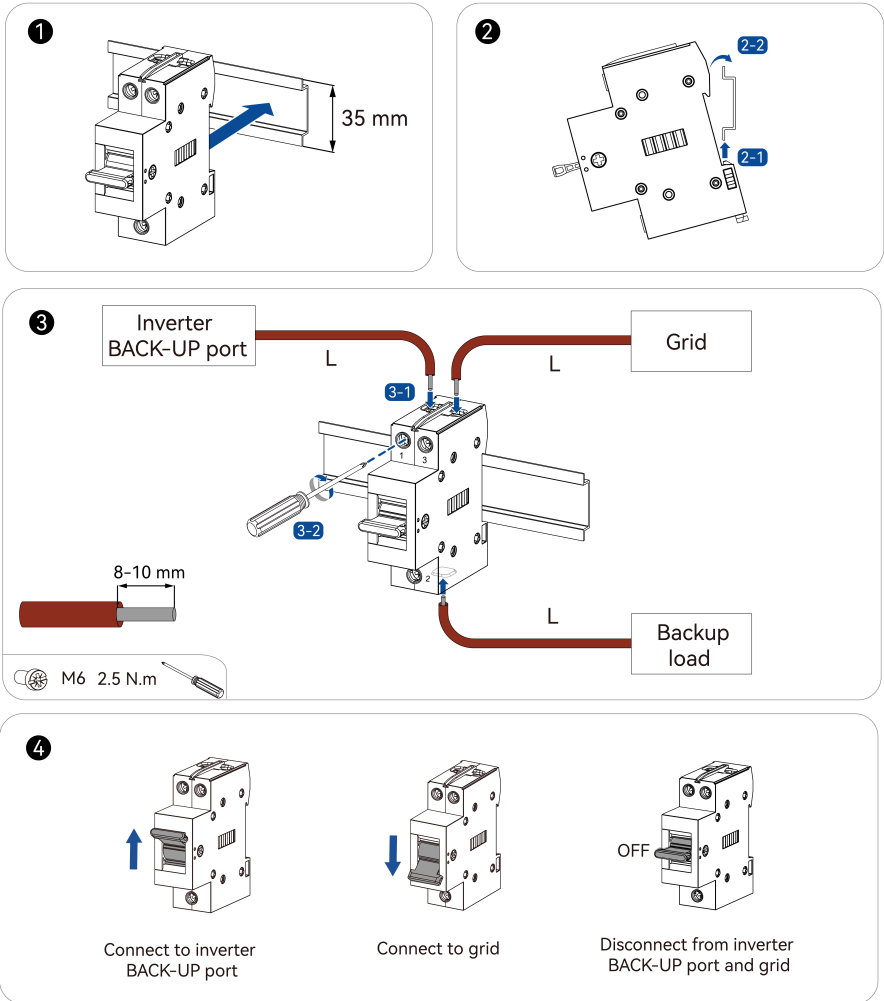
- Secure the corrugated pipe on the wall after finishing all wiring connections.
- When fixing the corrugated pipe at the upper left of the machine on the wall, leave an extra cable length of 300 to 400 mm. If it is fixed in other directions, reserve a longer length as needed.

 <b>WARNING</b>	AC connections								
<p>Do not connect the grid cables to the <b>BACK-UP</b> terminal.</p> <p>Do not connect the backup load to the <b>GRID</b> terminal.</p>	<table border="0"> <tr> <td style="text-align: center;">GRID</td> <td style="text-align: center;">BACK-UP</td> </tr> <tr> <td colspan="2" style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center; color: red; font-size: 2em;">X</td> <td style="text-align: center; color: red; font-size: 2em;">X</td> </tr> <tr> <td style="text-align: center;">  Backup load         </td> <td style="text-align: center;">  Grid         </td> </tr> </table>	GRID	BACK-UP			X	X	 Backup load	 Grid
GRID	BACK-UP								
									
X	X								
 Backup load	 Grid								

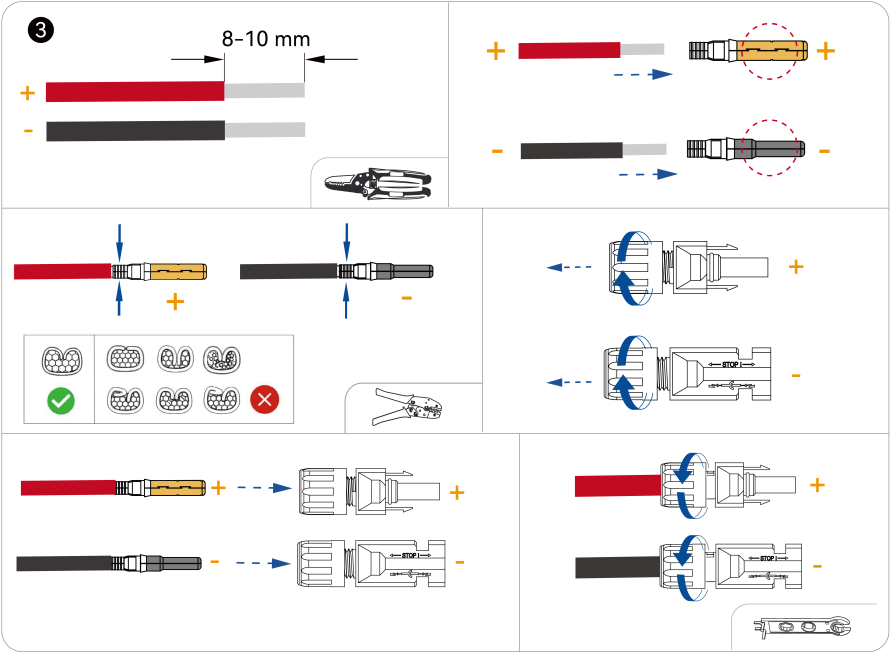
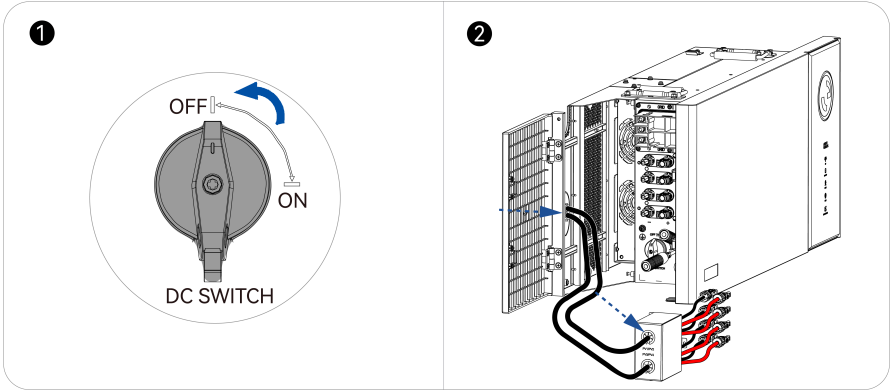




## 2.5. Connect the manual transfer switch



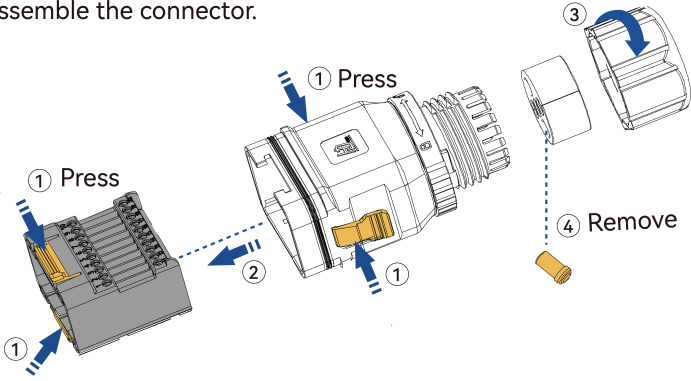
## 2.6. Connect the DC power cables



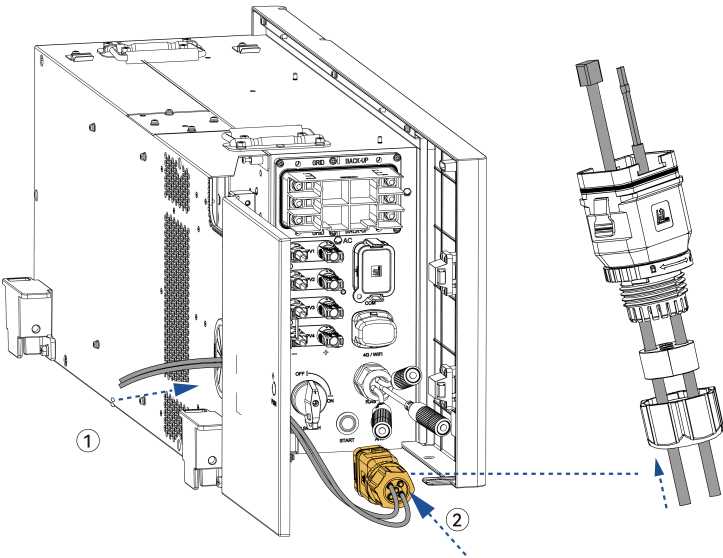


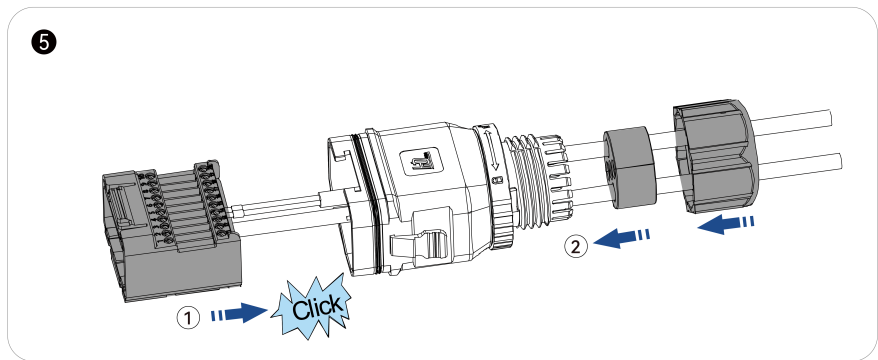
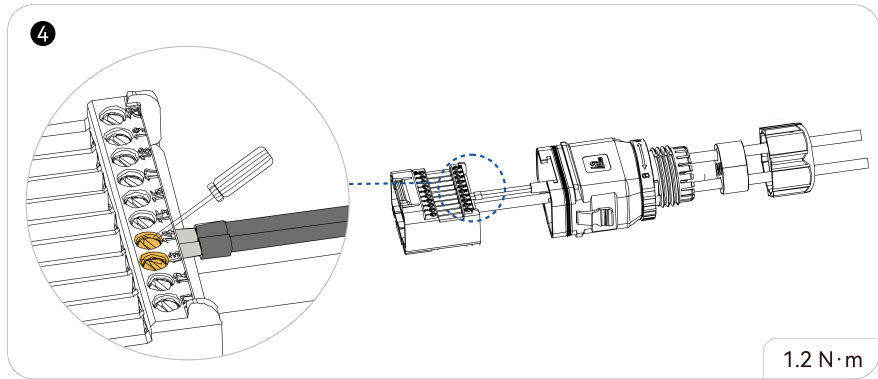
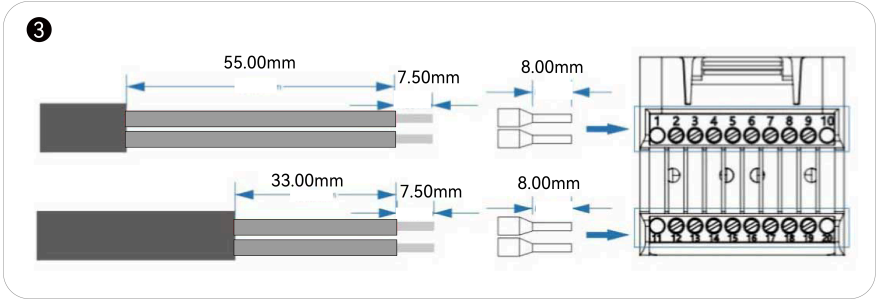
## 2.7. Connect the communication cables to COM port

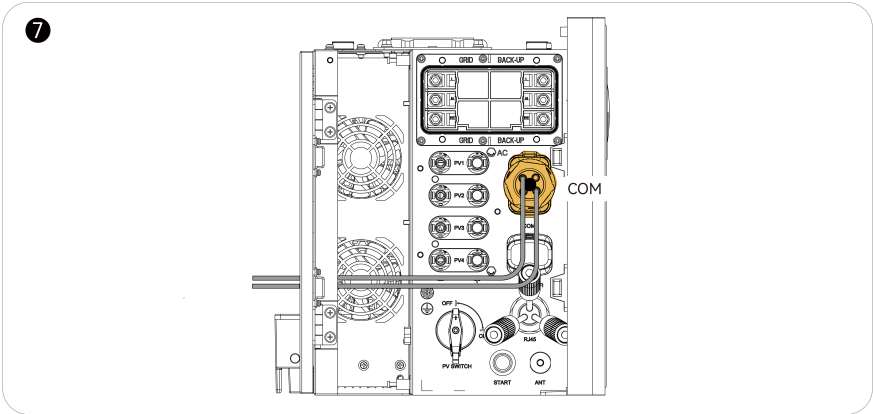
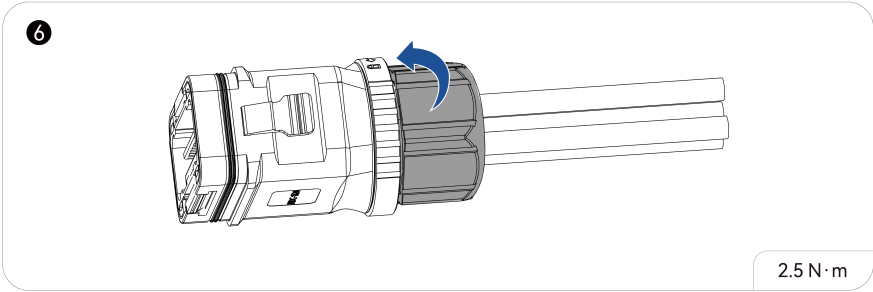
① Disassemble the connector.



②

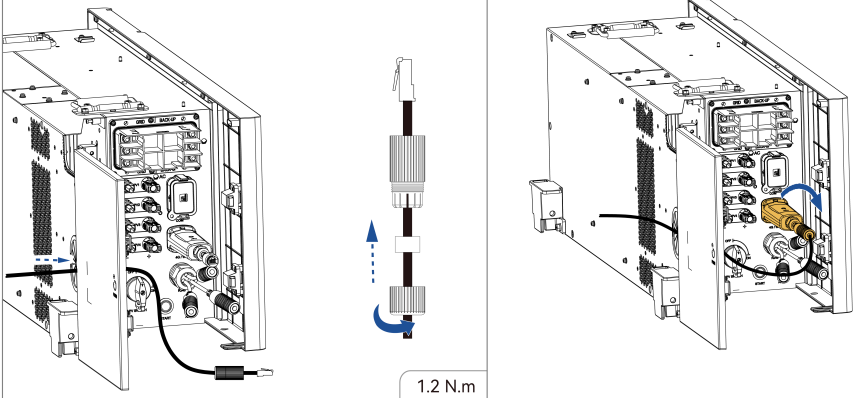




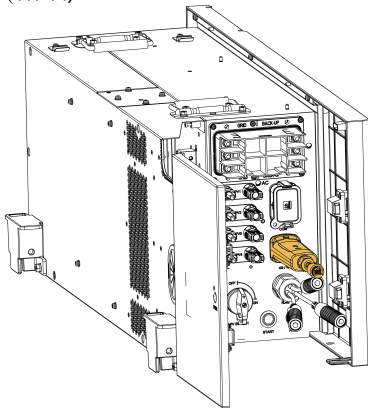


## 2.8. Connect the communication module

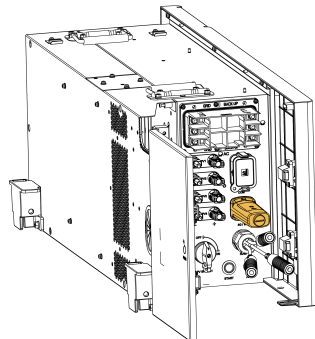
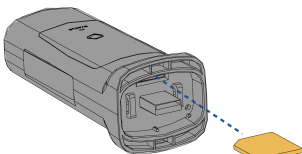
eSolar AIO3 Pro module (Ethernet)



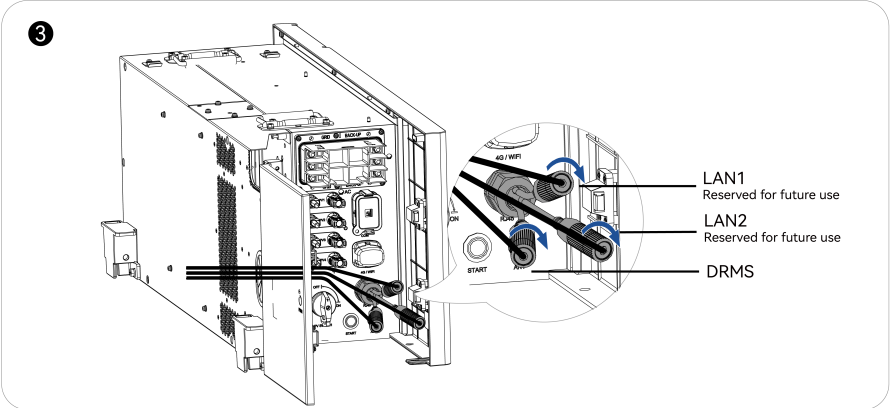
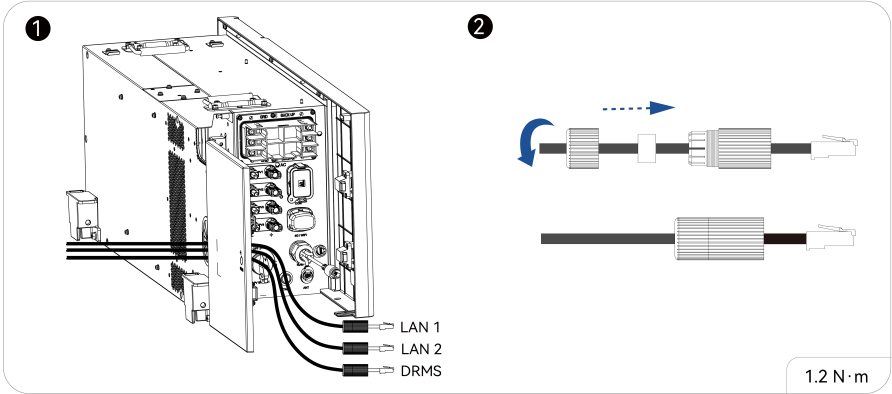
eSolar AIO3 Pro module (Wi-Fi)



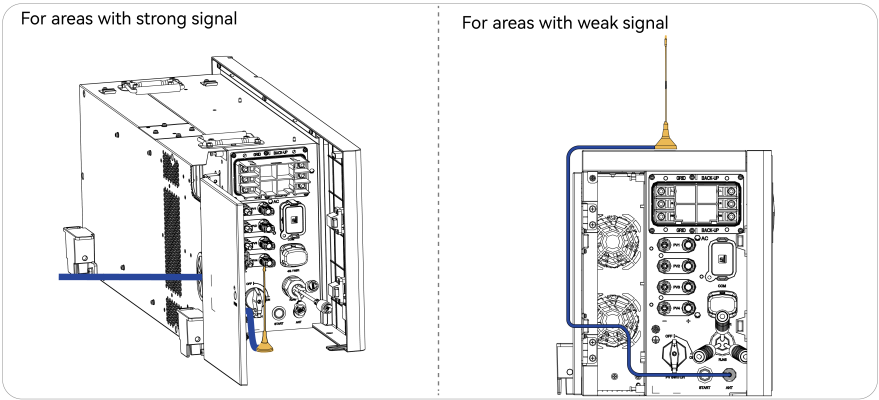
eSolar 4G Pro module



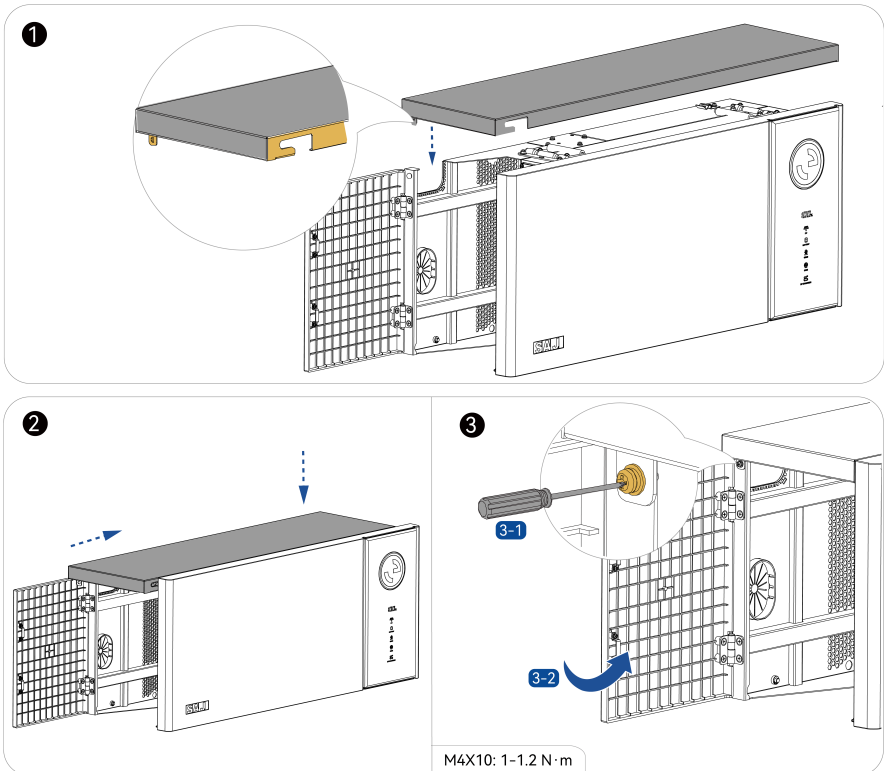
## 2.9. Connect the LAN and DRMS cables



## 2.10. Connect the antenna



## 2.11. Install the inverter cover



### 3. Start up the system

#### Before you begin

Verify that all the electrical connections are properly wired and secured before starting up the system.

1. Open the AC distribution box.
2. Turn on the following circuit breakers in sequence.
  - a. The backup loads
  - b. The grid
3. On the left side of the inverter, perform the following steps:
  - a. Turn on the DC switch to enable the connection to the PV arrays.
  - b. Press and hold the **START** button for five seconds until the LED indicator on the front panel is on.
  - c. Check the LED indicator status on the inverter panel to ensure that the inverter is running properly.

## 4. LED on the inverter



Figure 4.1. Inverter LED panel


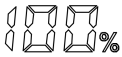
Display	Color	Status	Description
	Green	Solid on	The inverter is working properly with grid connection.
		Breath, on 1.5s, off 1.5s	The inverter is in initialization or standby state.
		Breath, on 3s, off 3s	The inverter is working properly off-grid.
		Breath, on 0.5s, off 0.5s	The inverter is working off-grid with SOC lower than 20%.
	Red	Solid on	The inverter is faulty.
	Yellow	Breath, on 3.5s, off 3.5s	The inverter is upgrading.
Gray	Off	The inverter is powered off.	

Table 4.1. LED light

Display	Color	Status	Description
	White	<i>Integer</i> (example, 50)	Battery state of charge (SOC). For example, 50%.
		--	The battery communication is lost.





Display	Color	Status	Description
 <b>PV</b>	White	Solid on	The PV array is working.
		Off	The PV array is not connected.
	Red	Solid on	The PV array is faulty.
 <b>BATTERY</b>	White	Solid on	The battery is charging.
		Breath, on 1s, off 1s	The battery is discharging.
		Off	The battery is disconnected or inactive.
 <b>GRID</b>	White	Solid on	The inverter is working with grid connection.
		Breath, on 3s, off 3s	The inverter is working off-grid.
		Off	No grid is detected.
 <b>COM</b>	White	Solid on	In good communication with the meter, BMS, and cloud.
		Breath, on 1s, off 1s	Lost communication with the meter, BMS, or cloud.
	Red	Off	Lost communication with all the meter, the BMS, and cloud.

Table 4.2. LED indicators

## 5. Shut down the system

1. Open the AC distribution box.
2. Turn off the following circuit breakers:
  - a. The backup loads
  - b. The grid
3. On the left side of the inverter, perform the following steps:
  - a. Turn off the DC switch to disconnect from the PV arrays.
  - b. Press and hold the **START** button for five seconds, and then release the button and wait until the LED indicator on the front panel is off.  
Once the system is shut down, there is no voltage output at the positive and negative terminals. Do not forcibly activate the system to output voltage by other means.



**SJ** | 守护者

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