

EK70 series

All-in-One Energy Storage System

EK70 HS5-(5K-10K)-(S3,S4)-X

User Manual



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Warranty

Check the product warranty conditions and terms on the SAJ website: <https://au.saj-electric.com/en-au/services-support-warranty>.

About this document

This user manual provides introductions and instructions of operating, maintaining, and troubleshooting the following SAJ product:

- EK70 HS5-(5K-10K)-(S3,S4)-X

You can find the latest version of this document as eManual at <https://www.saj-electric.com/>, or scan the QR code below.



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

Target Audience

This document is applicable to the personnel that transport, install, and operate on the product. The personnel are required to have the following qualifications:

- A certain level of expertise in electronics, electrical wiring, and mechanical knowledge in electrical and mechanical schematics.
- Being familiar with the composition and working principles of the product and its upstream and downstream equipment.
- Professional training related to the installation and commissioning of electrical equipment.
- The ability to respond urgently to dangers or emergencies that may arise during installation or commissioning.
- Being familiar with relevant standards and regulations in the country or region where the project is located.
- Being familiar with the contents in this manual.

Use of the Manual

Read the user manual carefully before any installation, operation and maintenance and follow the instructions during installation and operation. Always keep the printed manual available for future reference.

Levels of Warning Messages



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



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



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



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

Revision history

Version	Date	Changes
V0.3	2026-09-20	Optimized the product image on the front cover.
V0.2	2026-06-23	11.3. Battery (on page 135)
V0.1	2026-06-10	Editorial changes only.
V0.0	2026-04-28	First version.

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1. Safety instructions

1.1. Safety symbols

Symbol	Description
	Danger: Electrical shock hazard This device is directly connected to public grid and thus all work to the system shall only be carried out by qualified personnel.
	Danger: Hot surface The components inside the battery will release a lot of heat during operation. Do not touch metal plate housing during operating.
	Danger: Risk of electric shock from energy stored in capacitor. Do not open the cabinet door until 5 minutes after disconnecting all sources of supply.
	Warning: No open flames Do not place or install near flammable or explosive materials.
	Caution Keep the product out of reach of children.
	Caution: Check the user manual before service If an error has occurred, refer to the troubleshooting instructions to remedy the error.
	Caution This device shall NOT be disposed of in residential waste.
	Caution This battery module shall NOT be disposed of in residential waste.
	CE Mark Equipment with the CE mark fulfills the requirements of the Low Voltage Directive and Electro Magnetic Compatibility.
	RoHS compliant mark Equipment with the RoHS mark does not exceed the allowable amounts of the restricted substances defined in Restriction of Hazardous Substances in Electrical and Electronic Equipment.
	RCM compliant mark Equipment with the RCM mark is in compliance with AS/NZS 4417.1 & 2 and the EESS.
	Recyclable

1.2. Inverter safety instructions

Personal Safety

DANGER

Risk of personnel hazard or equipment damage due to improper operations

Improper operations performed on energized equipment by unqualified personnel may lead to equipment failure or safety hazards.

- Only qualified and trained professionals who are familiar with electrical installation and local codes may install, maintain, or repair the equipment.
- Before any operation, read the safety precautions thoroughly and always follow the standard procedures during operation. Non-standard and improper operations on the energized equipment may cause fire, electric shocks, or explosion.
- Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission. Any unauthorized operation including modification of product functionality of any form may cause lethal hazard to the operator, third parties, the units or their property.
- Before any operation, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.
- During operation, do not open the housing or touch electrical terminals.

WARNING

Risk of personal injury due to direct contact with the components or housing

Direct contact with hazardous moving or hot components during the inverter's operation may lead to personal injury.

- Do not touch a running fan with your hands, components, screws, or any other tools.
- During operation, do not touch heat sink area with bare hands as the inverter surface may become hot.

CAUTION

Risk of equipment damage and personal injury

If you detect any unusual odors, hear abnormal noises, or notice smoke during operation, immediately shut down the unit and disconnect all power sources.

NOTICE

Risk of equipment malfunction and safety hazards

Failure to follow proper guidance and neglect of regular monitoring prevents the timely identification and prevention of potential issues.

- Read the entire user manual before installation and keep it at hand for future reference.
- Regularly check the status via the monitoring interface to promptly detect any abnormalities.

Electrical Safety

DANGER

Risk of high voltage and electric shock

Before any operation, disconnect the inverter from all AC and DC power sources and wait at least 5 minutes to allow internal capacitors to discharge.

WARNING

Risk of overheat, fire and equipment damage

Obstructing ventilation or allowing foreign objects to enter the equipment may lead to fire hazards.

- During operation, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects to prevent fire due to high temperature.
- During operation, prevent foreign matter from entering the equipment. Otherwise, equipment short-circuits or damage, load power derating, power failure, or personal injury may occur.
- Do not place any foreign objects or liquid containers on the inverter.

Environment Requirements

DANGER

Risk of severe electrical shock

- A lightning strike can induce a sudden and massive power surge, which poses severe hazard to both personnel and equipment.
- Installation, operation, and maintenance is prohibited during thunderstorms.

Mechanical Safety

NOTICE

Risk of equipment failure or physical injury

Installing or operating an inverter with pre-existing physical damage compromises safety and functionality.

- Before unpacking the inverter, check the outer packing materials for damage, such as holes and cracks, and check the inverter model. If any damage is found or the inverter model is not what you requested, do not unpack the package and contact your supplier as soon as possible.
- Before installation, inspect the equipment for any visible damage or signs of transportation damage. If damage is found, do not install or use the equipment.

1.3. Battery safety instructions

DANGER

Risk of electric shock, short circuit, or equipment damage

Performing operations on live / defective equipment or improper grounding connection cause electric shock.

- Do not use the battery or the battery control unit if it is defective, broken or damaged.
- Do not subject the battery to any strong force.
- Keep the power off prior to any operations.
- Make sure that the battery is grounded prior to use.
- Do not pull out any cables or open the battery enclosure when the battery is powered on.
- Maintenance and installation at the battery cell assembly level are not required, and on-site repair or replacement of cell-level components is strictly prohibited. Any such operations shall be carried out by returning the battery module to SAJ or the service provider.

DANGER

Risk of reduced life cycle, fire, or explosion

Excessive heat or direct exposure to heat sources destabilizes the battery chemistry.

- Do not expose the battery to temperatures more than 50°C.
- Do not place the battery near a heat source, such as direct sunlight, a fireplace.
- Keep inflammable and explosive dangerous items or flames away from the battery.

DANGER

Risk of short circuit, corrosion, internal damage, or malfunction

Water, moisture, or specific corrosive gases can damage electronics and battery components.

- Do not soak the battery in water or expose it to moisture or liquids.
- Do not use the battery in areas where the ammonia content of the air exceeds 20 ppm.

WARNING

Severe injury, death, equipment damage, system failure, and voided warranty

Improper handling by unqualified individuals can lead to electrical hazards.

- Only qualified personnel with a thorough understanding of local safety regulations and battery standards may install, maintain, remove, or dispose of this product.
- **SAJ** shall not be held liable for any loss or warranty claims resulting from unauthorized product modifications that could lead to fatal injury, harm to third parties, or impaired equipment performance.
- The battery cannot be disposed of as household refuse. When the service life of the battery reaches its limit, it is not required to return it to the dealer or **SAJ**, but it must be recycled to the special waste lithium battery recycling station in the area.

 WARNING**Risk of fire, explosion, severe burns, equipment destruction**

Short circuit allows high current to flow and generate intense heat.

- To ensure personal and property safety, never short-circuit the positive (+) and negative (-) terminals.
- Connect the batteries in parallel. Do not connect them in series.
- The battery can start only when connected to the inverter. Once disconnected from the inverter, there is no voltage output at the positive and negative terminals. Do not forcibly activate the battery to output voltage by other means.

 CAUTION**System malfunction, accelerated battery degradation, risk of overheating, and potential safety hazards**

Incompatible components or mixed battery types can lead to improper charging/discharging, voltage imbalance, and communication failures.

- Use this battery only with inverters specified as compatible by the manufacturer.
- Do not mix batteries of different models or specifications in a single energy storage system.

 NOTICE

For optimal performance and safety, use batteries from the same production batch to minimize the risk of operational abnormalities.

1.4. Recycling and disposal

 NOTICE

This product should not be disposed as a residential waste.

Some components inside the equipment can be recycled and reused, while others may pose a pollution risk to the environment. Please contact a locally authorized professional recycling agency for the proper handling of the product and its internal components.

2. Product information

2.1. Product introduction

2.1.1. EK70 product models

Model description

Take EK70-HS5-6K-S3-X-IE as an example.

EK70
HS5
-6K-
S3-
X-
IE

①
②
③
④
⑤

- ① The product series.
- ② It means the rated power of the system is 6 kW.
- ③ It means single phase with 3 MPPT.
- ④ It means the rated capacity in kWh of battery packs.
- ⑤ It can be blank or IE. IE means the Ireland model.

Product models

System	EK70 HS5-5K-S3-X ¹
	EK70 HS5-6K-S3-X
	EK70 HS5-6K-S3-X-IE
	EK70 HS5-8K-S3-X
	EK70 HS5-10K-S4-X
Inverter	EK70 HS5-5K-S3
	EK70 HS5-6K-S3
	EK70 HS5-6K-S3-IE
	EK70 HS5-8K-S3
	EK70 HS5-10K-S4
Battery	EK70 BU5-6.0-TV
	EK70 BU5-7.0-TV
	EK70 BU5-9.0-TV
Battery base	BE5-TV
Wall-mounting bracket	BT5-TV

1. The value of x includes 6, 7, 9, 12, 14, 15, 16, 18, 21, 24, 25, 27, 28, 30, 35, 36, 40, 42, 45, 50, and 54.

2.1.2. Dimension

Use one stack with six battery modules as an example:

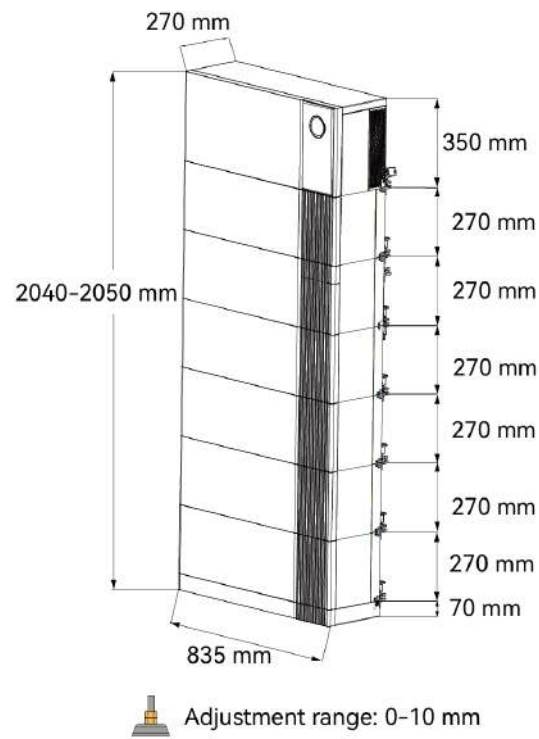
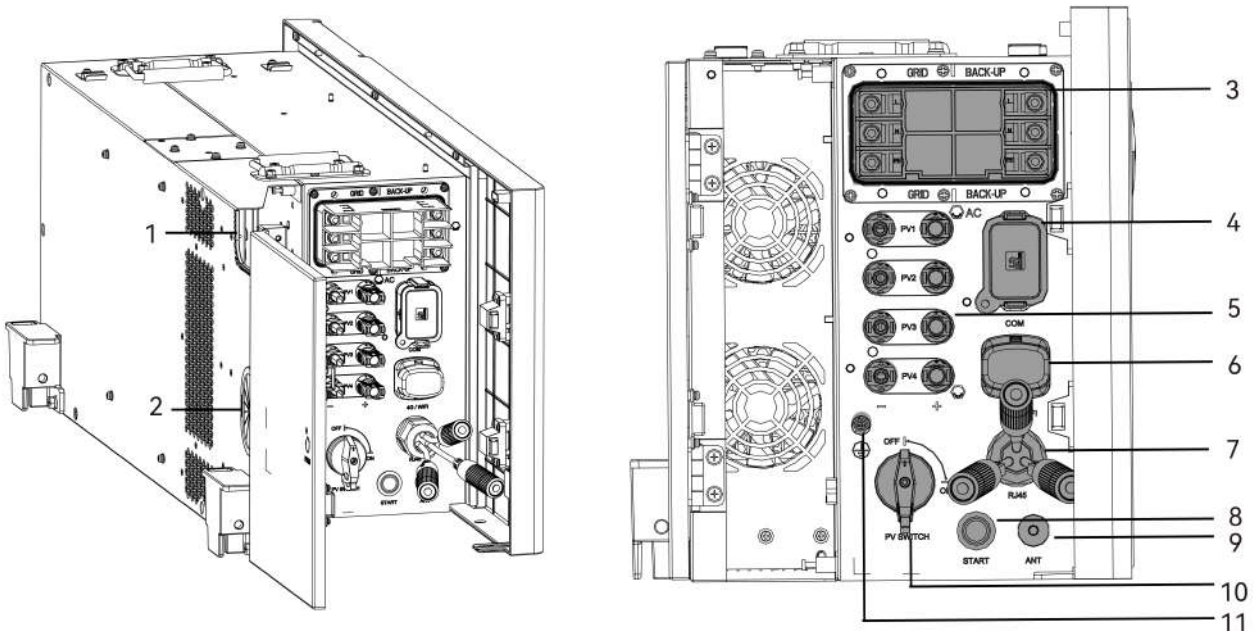


Figure 2.1. Dimensions

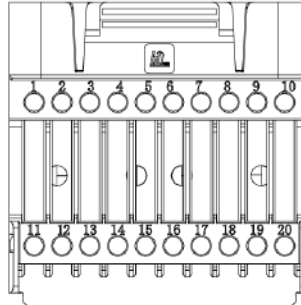
2.1.3. Inverter ports and switches



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"> • The grounding cable • The DC power cables • The communication cables
3	AC <ul style="list-style-type: none"> • GRID • BACK-UP 	The connection ports for AC power cables. <ul style="list-style-type: none"> • GRID: for connecting to the public grid. • BACK-UP: for connecting to the home backup load.
4	COM	The connection port for communication cables from external devices like DI/DO devices.
5	PV1, PV2, PV3, PV4	The negative and positive PV input connection ports.
6	4G/WIFI	The connection port of the eSolar AIO3 Pro and 4G Pro communication modules.
7	RJ45	The RJ45 connection ports for LAN1 , LAN2 , and DRMs connections as labelled on the ports. LAN1 and LAN2 ports are reserved for future use.
8	START	For starting up the energy storage system.
9	ANT	The LoRa antenna connection port.
10	PV SWITCH	The PV switch that controls the connection to the PV array.

Callout	Silkscreen	Description
11		The grounding cable connection port.

Table 2.1. Inverter electrical ports



Number	Silkscreen	Description
1-6	/	Reserved for future use.
7	DO1+	Output connection for dry contact device 1.
8	DO1-	Output connection for dry contact device 1.
9	DO2+	Output connection for dry contact device 2.
10	DO2-	Output connection for dry contact device 2.
11	PC 485A	Reserved RS485 connection ports.
12	PC 485B	The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by SW2 DIP switch.
13	Meter 485A	For RS485 connections with the meter.
14	Meter 485B	The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by SW3 DIP switch.
15	DI1+	Input connection for dry contact device 1.
16	DI1-	Input connection for dry contact device 1.
17	DI2+	Input connection for dry contact device 2.
18	DI2-	Input connection for dry contact device 2.
19	12V	Port for providing 12V DC power supply to the external device.
20	GND	Port for grounding connection.

Table 2.2. 20-pin definition for COM port

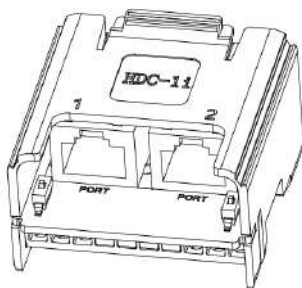


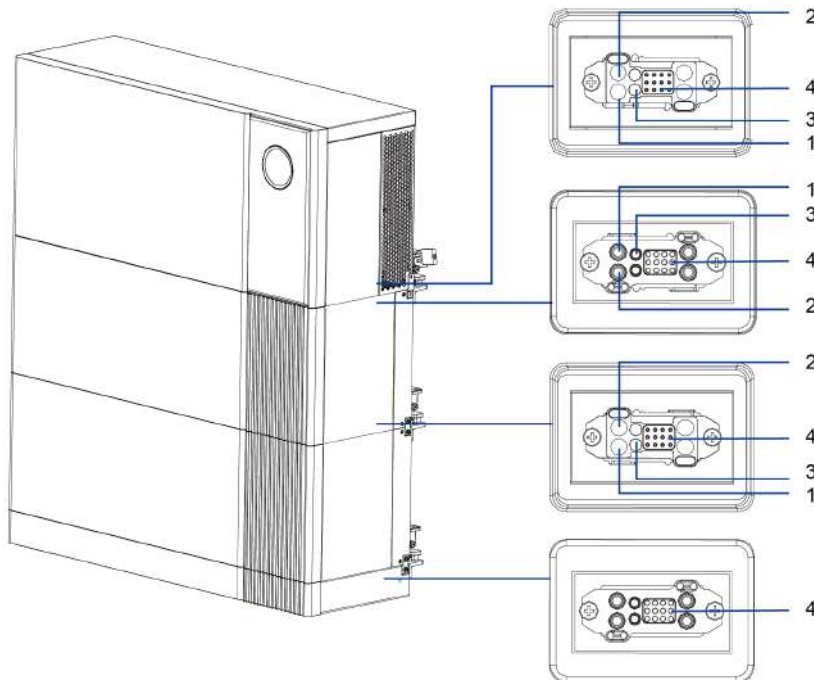
Figure 2.2. RJ45 ports for communication connector

Number	Silkscreen	Description
1	PORT CAN	Reserved port.

Number	Silkscreen	Description
2	DSP CAN	Reserved port.

2.1.4. Blind-mate connectors

The EK70 system is equipped with blind-mate connectors on the inverter, batteries, and battery base, ensuring quick electrical connection and communication among these components. The following figure shows the positions and ports of the connectors.



Number	Designation
1	The positive pole port of the blind-mate connector.
2	The negative pole port of the blind-mate connector.
3	The protective earth (PE) port of the blind-mate connector.
4	The communication ports of the blind-mate connector.
Non-labeled ports	Reserved for future use.

2.1.5. LED on the inverter



Figure 2.3. 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 2.3. LED light

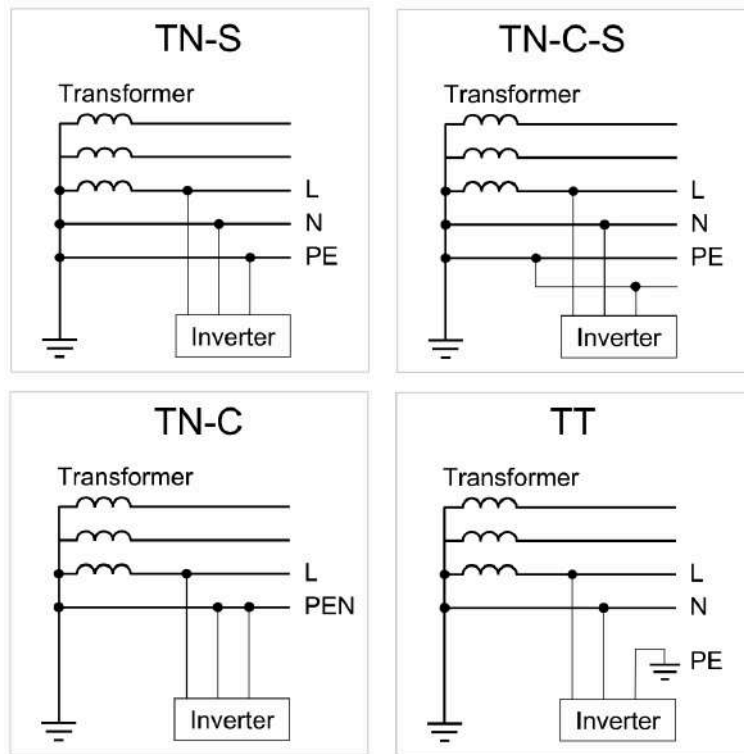
Display	Color	Status	Description
	White	Integer (example, 50)	Battery state of charge (SOC). For example, 50%.
		--	The battery communication is lost.
	White	Solid on	The PV array is working.
		Off	The PV array is not connected.
	Red	Solid on	The PV array is faulty.
		Solid on	The battery is charging.
		Breath, on 1s, off 1s	The battery is discharging.
	Off	Off	The battery is disconnected or inactive.
	Red	Solid on	The battery is faulty.
		Solid on	The inverter is working with grid connection.
		Breath, on 3s, off 3s	The inverter is working off-grid.
	Off	Off	No grid is detected.
	Red	Solid on	AC connection point is faulty.

Display	Color	Status	Description
 COM	White	Solid on	In good communication with the meter, BMS, and cloud.
	Red	Breath, on 1s, off 1s	Lost communication with the meter, BMS, or cloud.
	Red	Solid on	Lost communication with all the meter, the BMS, and cloud.

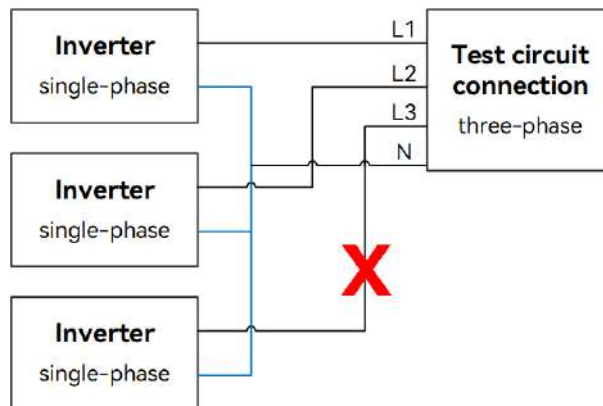
Table 2.4. LED indicators

2.2. Grid integration types

EK70 series systems support integrating with the following grid configurations:



Multi-phase combinations (Australia)



The inverter should not be installed in multiple phase combinations. If any such multiple inverter combination is not tested, it should not be used, or external devices should be used in accordance with the requirements of AS/NZS 4777.1.

2.3. Work mode

The EK70 system supports the following working modes:

AI Mode

The working mode with AI Saving enabled. The system leverages AI-powered intelligent scheduling based on forecasts of PV generation, load demand, and electricity pricing to optimally allocate energy sources and usage, minimizing electricity bills and maximizing grid-export revenue.

Self-consumption Mode

The self-consumption mode maximizes the use of electricity generated by PV and minimizes the electricity purchased from the grid to reduce costs.

Period	Working logic
PV power is sufficient	[PV → Loads > Battery > Grid] Any PV power will first supply the loads, with any surplus being used to charge the battery. Any excess power can then be exported to the grid.
PV power is insufficient	[Battery + Grid → Loads] Both the battery and the grid power the loads. The battery discharges power to the loads first. Once the battery reaches its minimum SOC, it stops discharging, and the grid supplies power to the loads.

Time-of-use Mode

The time-of-use mode allows the users to set the battery charging and discharging time according to the local peak and valley electricity prices.

Period	Working logic
Charging period (with lower electricity price)	[Grid → Battery] The battery charges from the grid at a preset charging power until reaching the preset stop-charging SOC (%).
Discharging period (with higher electricity price)	[Battery → Loads] The battery discharges to loads at a preset discharging power until reaching the preset stop-discharging SOC (%).
Other period	The working logic is the same as self-consumption mode.

Back-up Mode

The back-up mode is suitable for areas with frequent power outages. In this mode, the battery capacity is maintained at a relatively high level to ensure that loads work normally when the grid is off. The battery will not be discharged until a grid outage occurs.

Period	Working logic
Grid outage occurs	[PV → Loads > Battery] The PV power will first supply the loads, with any surplus being used to charge the battery.

Period	Working logic
No grid outage	[PV → Loads > Battery > Grid] The PV power will supply the loads first and any surplus will be used to charge the battery. Excess power can then be exported to the grid.

Table 2.5. With sufficient PV power

Period	Working logic
Battery SOC > preset capacity	[Battery → Loads] Grid outage occurs The battery discharges power to the loads until the battery reaches its minimum SOC.
	[Grid → Loads] No grid outage The grid powers the loads.
Battery SOC ≤ preset capacity	[Insufficient PV → Loads] Grid outage occurs Only the insufficient PV supplies power to the loads. The battery will not be discharged until its SOC becomes higher than the preset capacity.
	[Grid → Loads] No grid outage Only the grid powers the loads.

Table 2.6. With insufficient PV power

2.4. System overview

This section shows the typical integration solutions of system.

Whole home backup solution

In the whole home backup solution, the system supports integrating with a manual transfer switch that allows the whole home load to connect to and switch between the inverter AC backup output and the public grid. If the grid goes off, the whole home load can be manually switched to the system immediately, and vise versa.

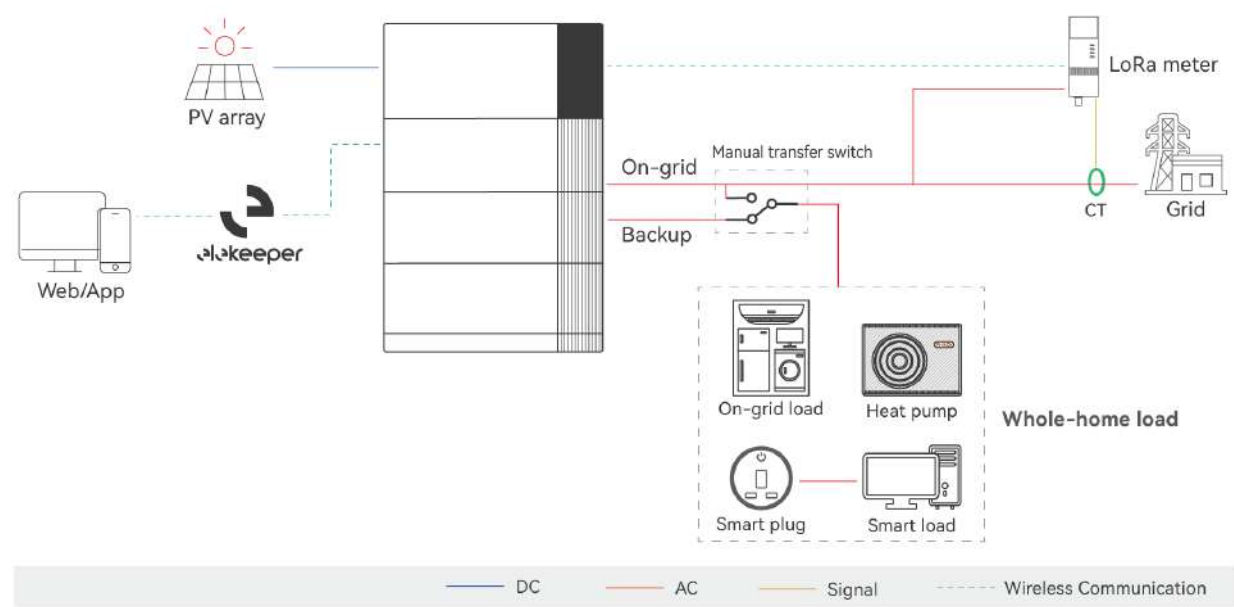


Figure 2.4. Whole home backup solution

Brand	Specification
Lazzen	<ul style="list-style-type: none"> Single-phase: NDQ2S-63/1P Three-phase: NDQ2S-63/3P

Table 2.7. Manual transfer switch specification

Partial backup solution

In the partial backup solution, the on-grid load can be connected to the grid AC output of the system, and the off-grid load can be connected to the AC backup output of the system.

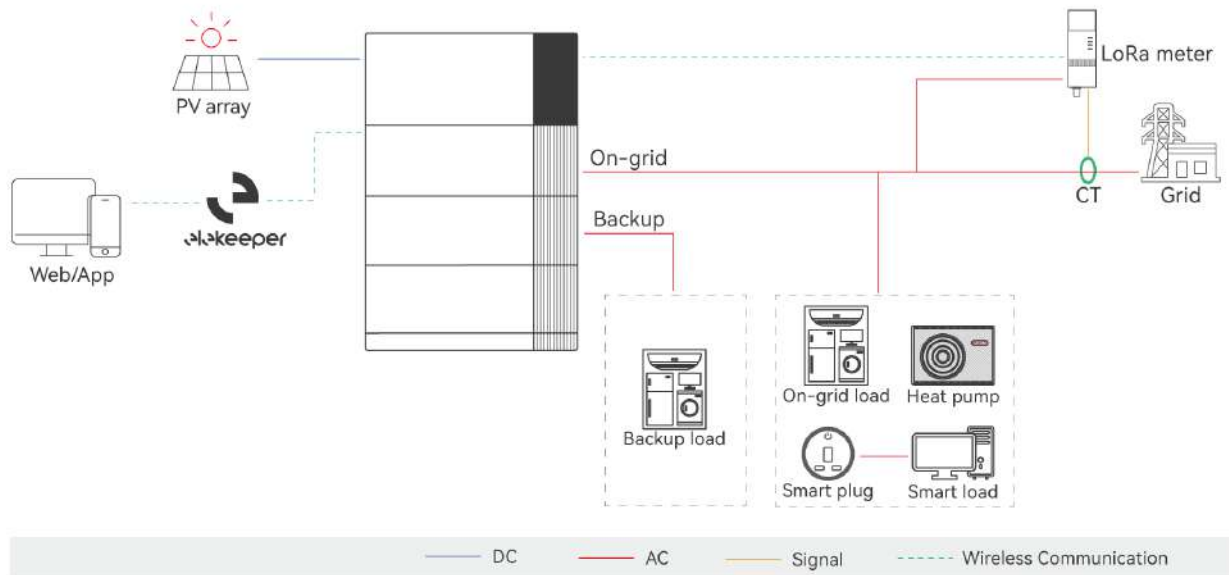


Figure 2.5. Partial Backup Solution

In both solutions, the system provides a dual-channel wireless meter. The meter supports wireless communication with the system at an optimal distance of 150 meters when penetrating walls.

The system also support integrating with wired meter connections through RS485 communication.

3. Transportation and storage

3.1. Battery transportation and storage

Transportation

WARNING

- The product has passed the UN38.3 test and meets the transportation requirements for dangerous goods, including lithium-ion batteries.
- The transportation service provider must be qualified to transport dangerous goods.
- Before transportation, check that the battery package is intact and that there are no abnormal odour, leakage, smoke or signs of burning. Otherwise, the batteries must not be transported.
- Keep no more than **6** cartons of batteries in one stack.
- Load or unload batteries with caution. Otherwise, the batteries may short circuit or become damaged like leakage or cracking, catch fire or explode.

NOTICE

After installing the battery on site, keep the original packaging containing the lithium-ion battery identification. When the battery needs to be returned to the factory for repair, use the original packaging to transport it.

Storage

NOTICE

- The battery remains 50% power when it is sent from the factory.
- The longer the battery is stored, the lower the SOC. If the battery remaining voltage fails to reach the startup voltage requirement, the battery may be damaged.

The battery should be installed within 6 months since delivered from the factory and used with compatible inverters.

Environment requirements for storage within one month:

- Temperature range: -20 °C to +45 °C
- Relative humidity: 5% to 95% RH

Environment requirements for storage within one year:

- Temperature range: 0°C to 35 °C
- Relative humidity: < 85% RH

3.2. Inverter transportation and storage

DANGER

- Observe all safety symbols displayed on the packaging prior to transportation.
- Maintain stable driving conditions throughout transportation to prevent the inverter from colliding or dropping, as internal power components may be damaged, potentially causing short circuits or explosions upon subsequent power-up.
- Ensure that transport vehicles are not overloaded and that weight is distributed evenly.
- Do not drill holes into the product or its housing for any transportation-related purpose. Such modifications can damage the structural integrity and functionality of the device.
- Do not store or transport the equipment in damp, flammable, or explosive environments.

WARNING

- When moving the equipment, use the original packaging or dedicated handling tools to avoid muscle strain from lifting heavy objects alone.
- Wear suitable protective gloves when manually handling equipment.
- When lifting the inverter, grip it firmly at the designated handles and support the base. Keep the unit level to avoid dropping.
- Do not unpack the inverter packaging if it is not used immediately.
- Do not store the inverter in areas exposed to direct sunlight, rain, strong electric fields, or high humidity. Such conditions can cause overheating, electrical failure, or corrosion.
- Do not store inverters near chemically corrosive substances or in locations prone to pests or rodents. These can cause irreversible damage to housing and internal components.
- Do not stack heavy objects on top of the inverter enclosure during storage.
- Do not tilt or invert the packaging. Maintain the upright orientation as indicated on the carton to prevent internal displacement or component stress.

CAUTION

- Store inverters in a clean, dry, and well-ventilated area to avoid moisture buildup and overheating.
- Promptly replace any packaging materials that have been damaged by insects or rodents.

NOTICE

- It is recommended to retain the original packaging for future relocation or return for repair.
- Before long-term storage (exceeding 6 months), ensure the storage environment meets requirements and periodically inspect the packaging integrity. Check for environmental damage, pest intrusion, or packaging degradation.

Storage environment requirements:

- Temperature range: -40 °C to +60 °C
- Relative humidity: 5% to 95% RH
- Corrosion protection level: C4

4. Installation

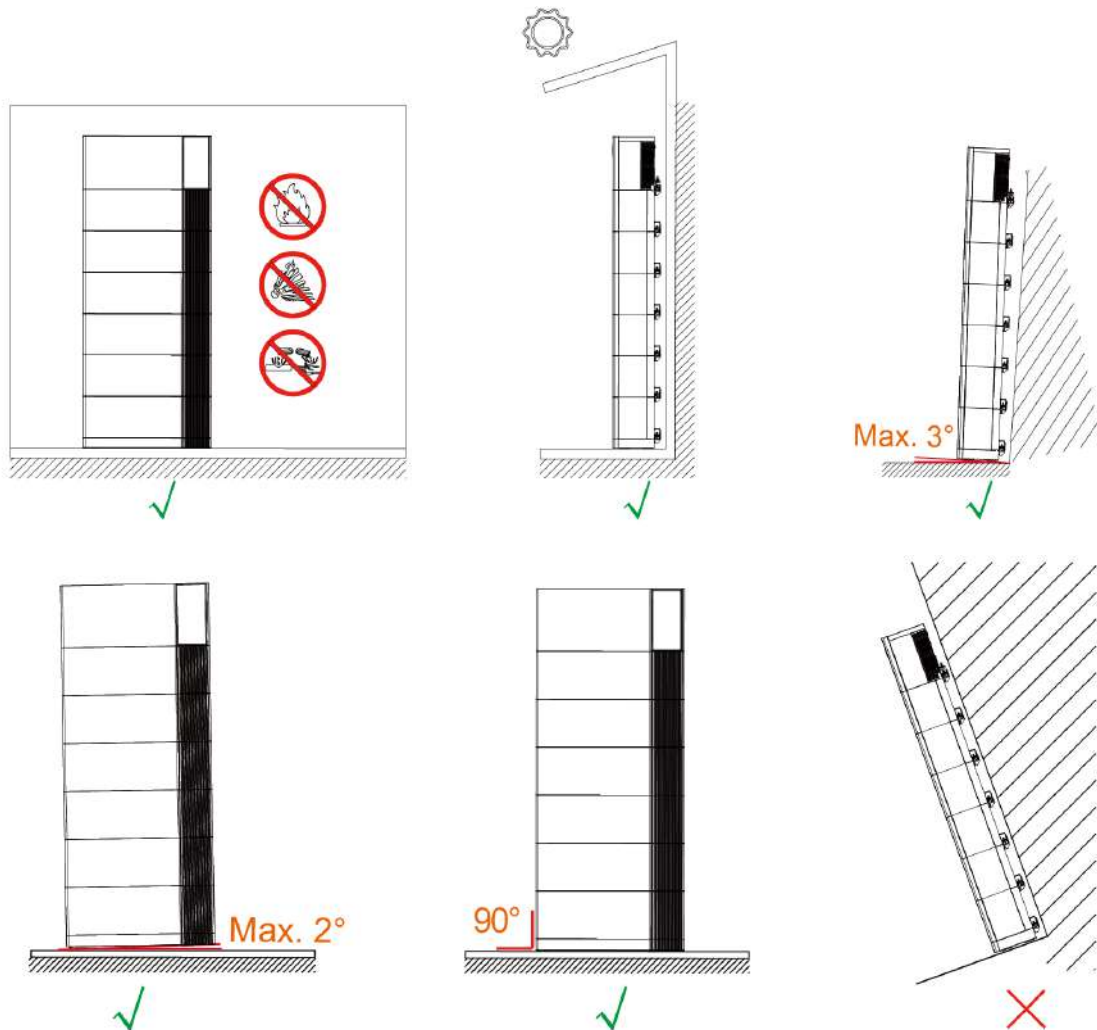
4.1. Installation environment requirements

- 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 at least 900mm away from any heat source.
- Do not install the device at a place where the temperature changes extremely. The ambient temperature of the installation site must not exceed 50°C.
- Keep the device away from children.
- Do not install the device in the bedroom, toilet, or bathroom. The installation site must be at least 1.2 meters away from the emergency exit.
- 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.
- For outdoor installation, keep the device away from direct sunlight, rain and snow.
- For outdoor installation in salt-laden environments, check with the equipment manufacturer to verify site suitability. Salt-corrosive areas are generally within 1,000 metres of the coastline. Salt exposure level varies by site conditions such as onshore wind, rainfall and local topography.
- Ensure the inverter is installed in a well-observed area where the LED display panel can be easily read for real-time status checks.

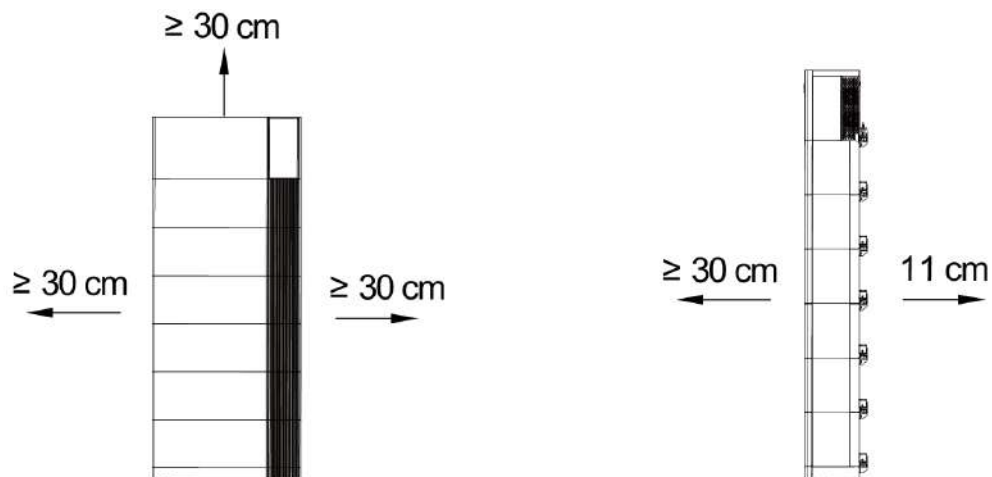


4.2. Plan the installation site

Install the product vertically.



Keep enough clearance around the product to ensure proper ventilation.



4.3. Installation tools

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

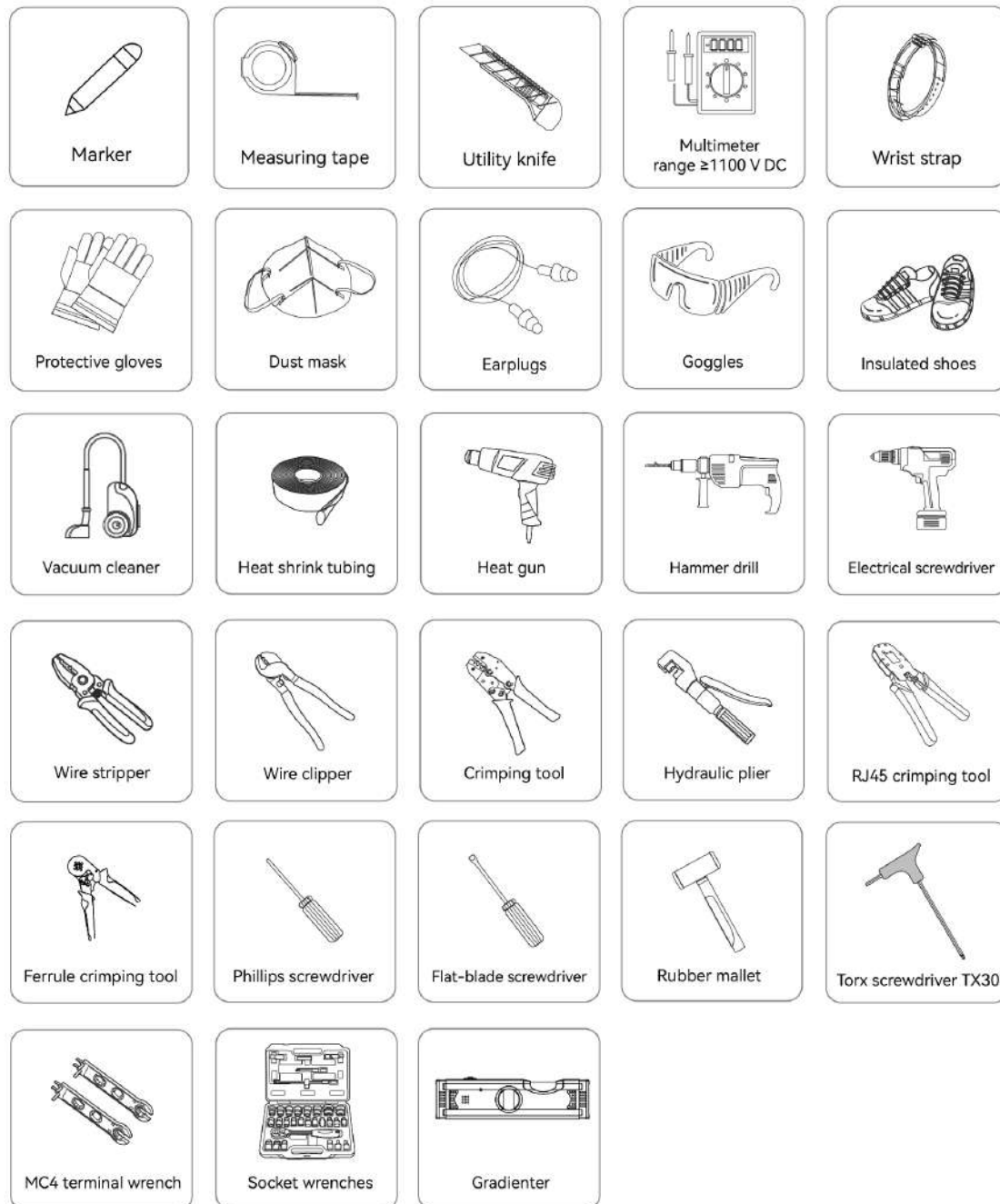
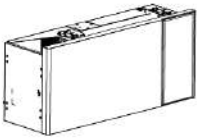


Figure 4.1. Suggested installation tools

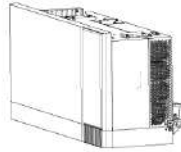
4.4. Packing list

Inverter

A1*



A2*



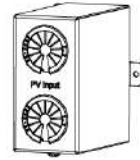
B



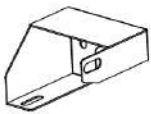
C



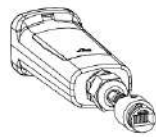
D



E



F



Z



Accessory package



G



H



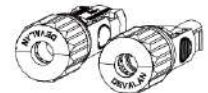
I



J



K



L



M



N



O*



P*



Q

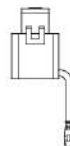


Meter package

R



S



T

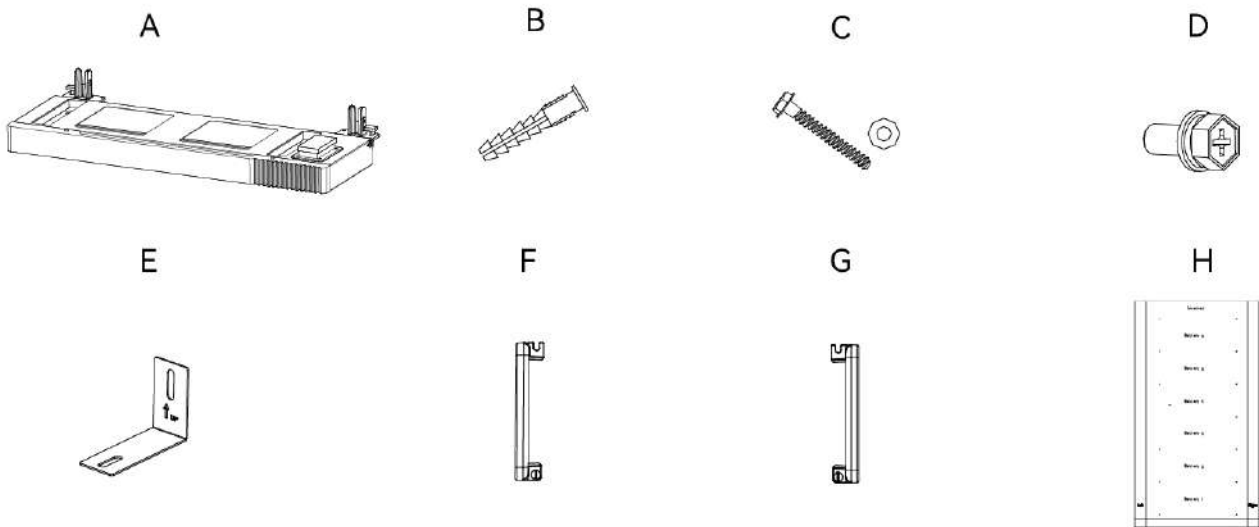


Number	Quantity	Designation
A1*/A2*	1	Depending on different shipments, either A1 or A2 is included in this package. Refer to the actual product you received. <ul style="list-style-type: none"> A1: Inverter without battery base. The battery base and its related accessories are delivered in a separate package. A2: Inverter with battery base. The inverter is pre-secured beneath the inverter with the screws. Before installation, remove the screws to detach the battery base from the inverter.
B	1	Protective cover of inverter
C	1	AC protective cover
D	1	PV protective cover
E	1	Anti-theft bracket
F	1	Communication module
G	1	Manual transfer switch
H	1	Bolts and gaskets for anti-theft bracket
I	1	Hand-tighten screw
J	SC10-5-90: 3 SC16-5-90: 6	AC cable terminals: <ul style="list-style-type: none"> SC10-5-90: For 6-8 mm² cables SC16-5-90: For 10-16 mm² cables
K	3 or 4	PV connector. The quantity varies depending on different machine models.
L	1	20-pin communication connector. <p>Note: For some units, the communication connector is pre-installed on the COM port.</p>
M	3	M6*16 screw
N	6 or 4	M4*10 screw. <ul style="list-style-type: none"> With grounding plate: 6 Without grounding plate: 4
O*	1	Grounding plate
P*	1	Wrench for securing the AC cover
Q	1	Antenna to be connected to the inverter.
R	1	Meter
S	1	Current transformer (CT)
T	1	Antenna to be connected to the meter.
Z	1	Documentation

Note: Depending on different shipments, the components marked with * may not be included in this package. Refer to the actual product you received.

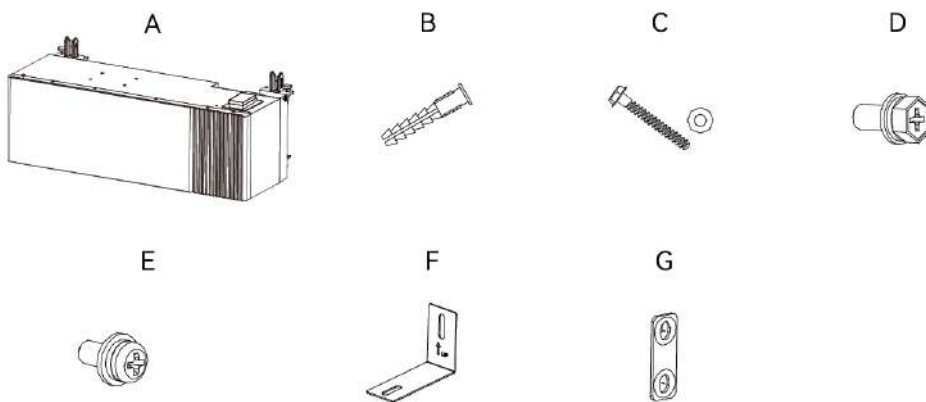
The following figure and table show the components for installing the battery base.

Depending on different shipments, these components are either included in the inverter's package or delivered in a separate package. Refer to the actual product you received.



Number	Quantity	Designation
A	1	Battery base. Depending on different shipments, the battery base can be pre-secured beneath the inverter with the screws.
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

Battery pack

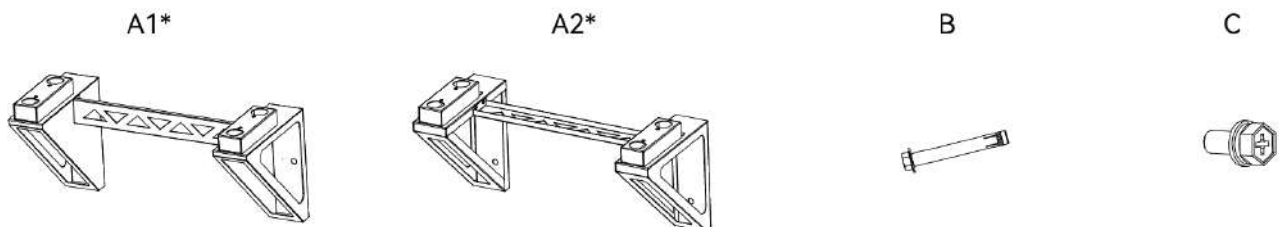


Number	Quantity	Designation
A	1	Battery pack
B	2	M6*80 expansion bolt
C	2	ST6*50 screw and gasket set
D	4	M6*16 screw
E*	2	M4*10 screw
F	2	Locking bracket

Number	Quantity	Designation
G*	1	Grounding plate

Note: Depending on different shipments, the components marked with * may be not included in the package. Refer to the actual product you received.

Wall bracket



Number	Quantity	Designation
A1/A2	1	Wall bracket. Depending on different shipments, either A1 or A2 is included in this package. Refer to the actual product you received. <ul style="list-style-type: none"> . A1: 3 installation holes are equipped. . A2: 2 installation holes are equipped.
B	4 or 6	M12*100 expansion bolt. <ul style="list-style-type: none"> . For the wall bracket with 3 installation holes, 6 bolts are provided. . For the wall bracket with 2 installation holes, 4 bolts are provided.
C	2	M6*16 screw

4.5. Dimension

Use one stack with six battery modules as an example:

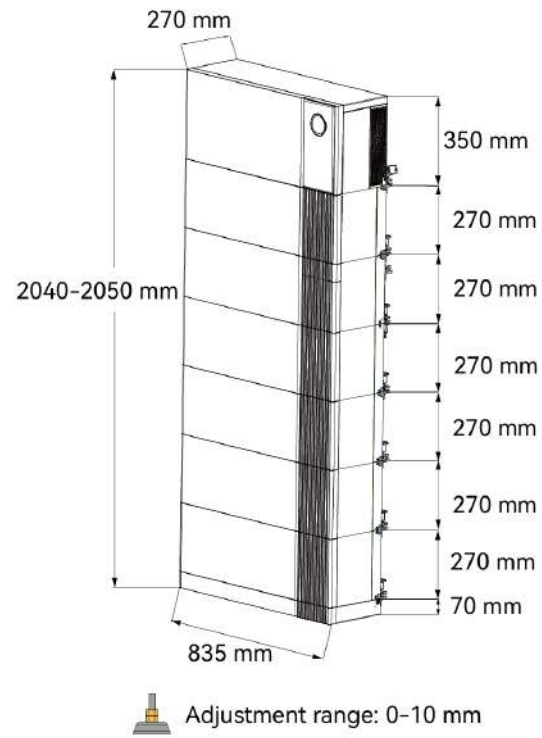


Figure 4.2. Dimensions

4.6. Ground mounting

Note:

- For ground mounting, a maximum of 6 batteries is supported.
- Depending on the shipments, some packages do not include the grounding plates and its screws. In this case, skip the related steps for installing them in this procedure.

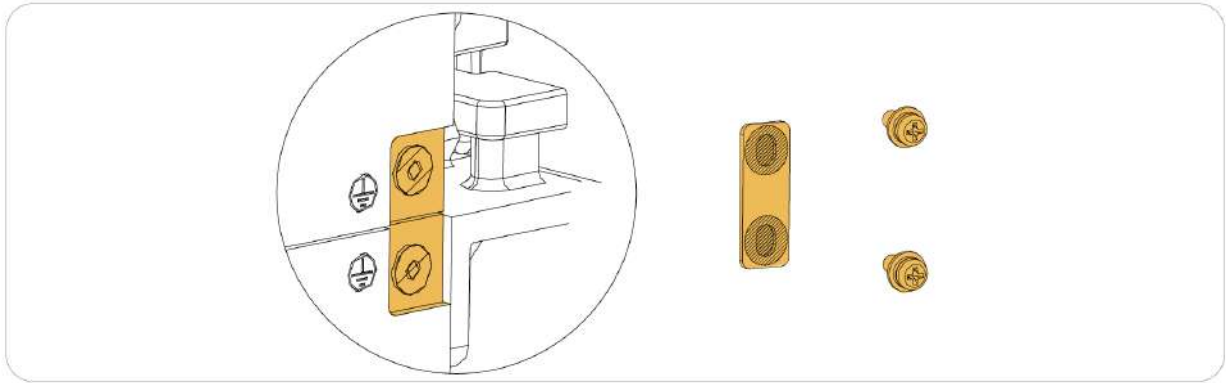
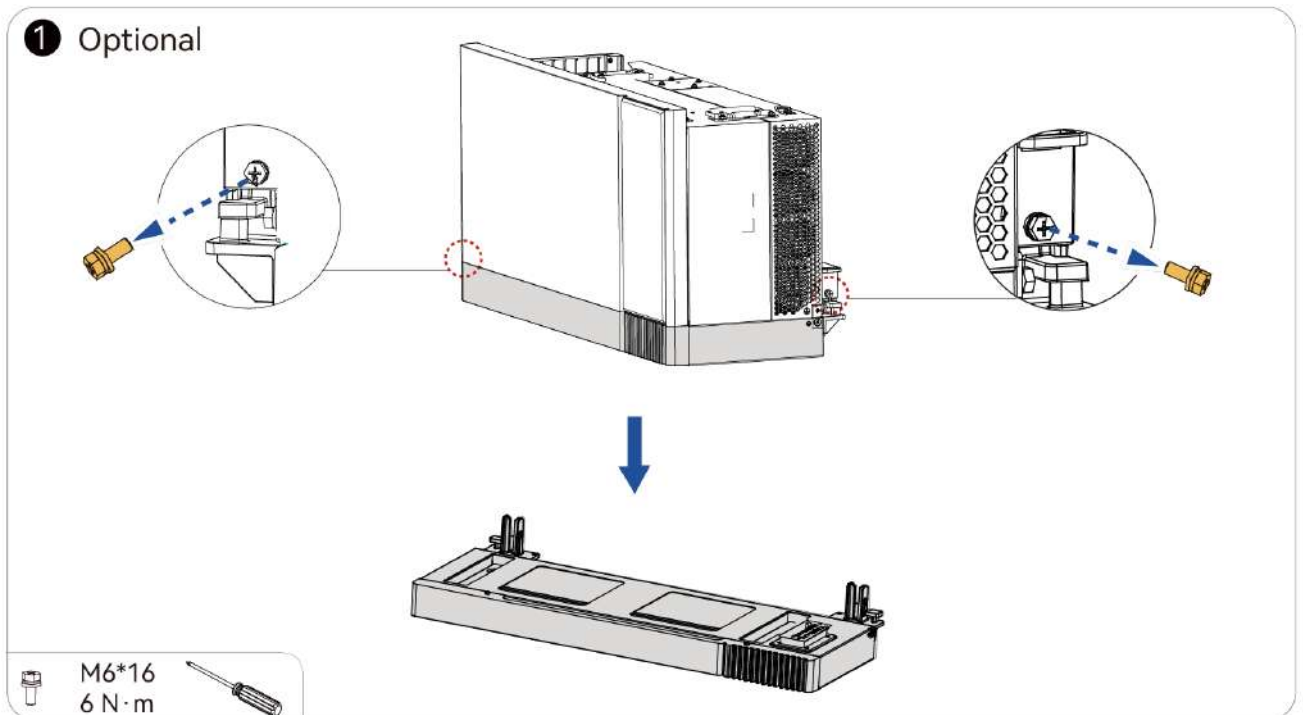
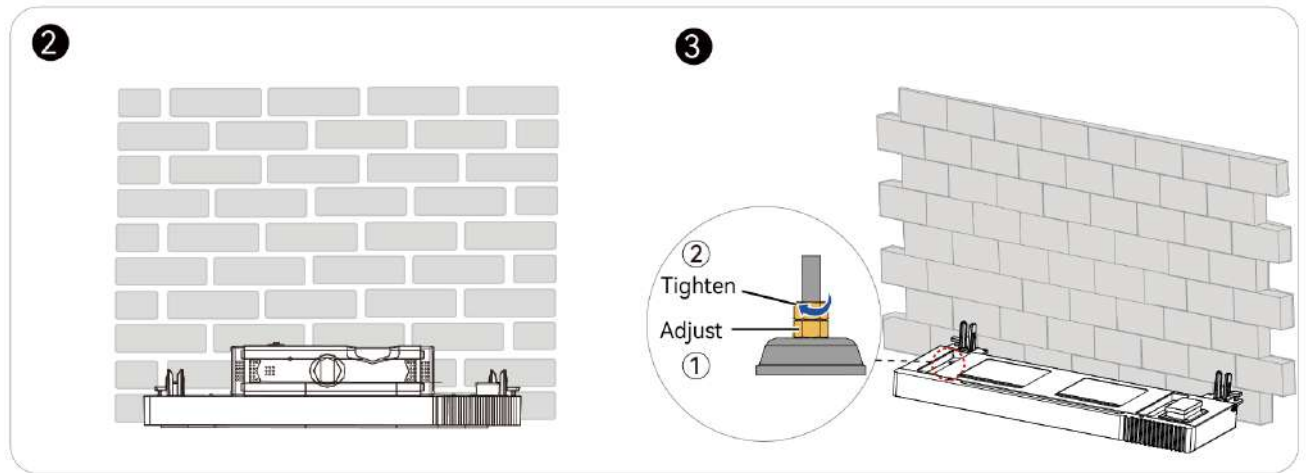
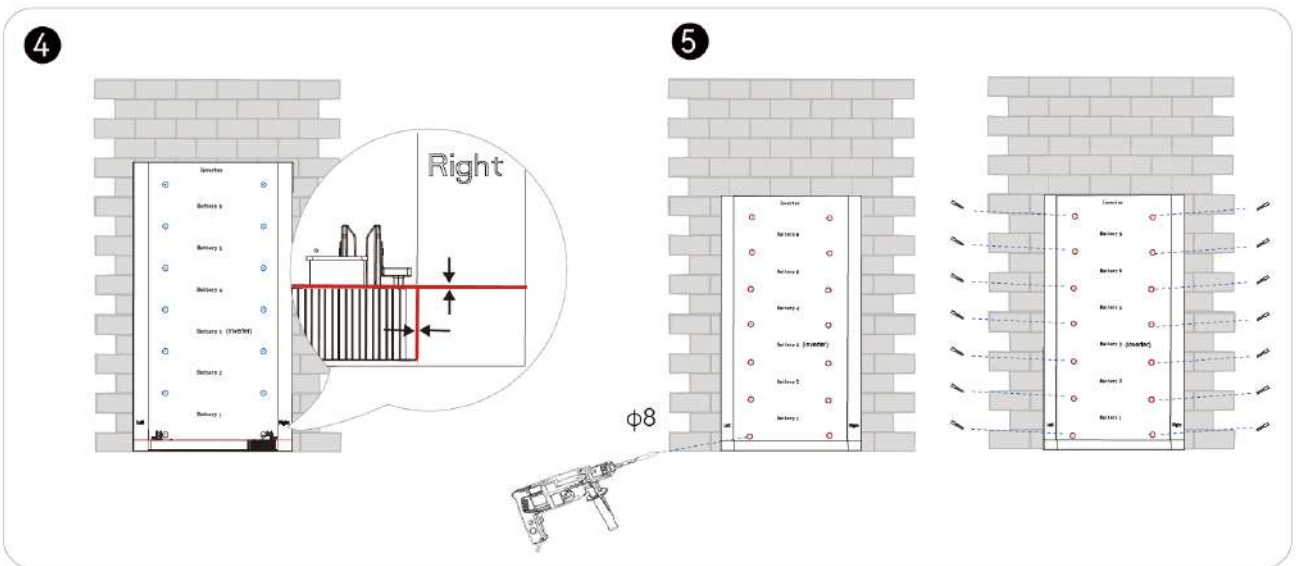


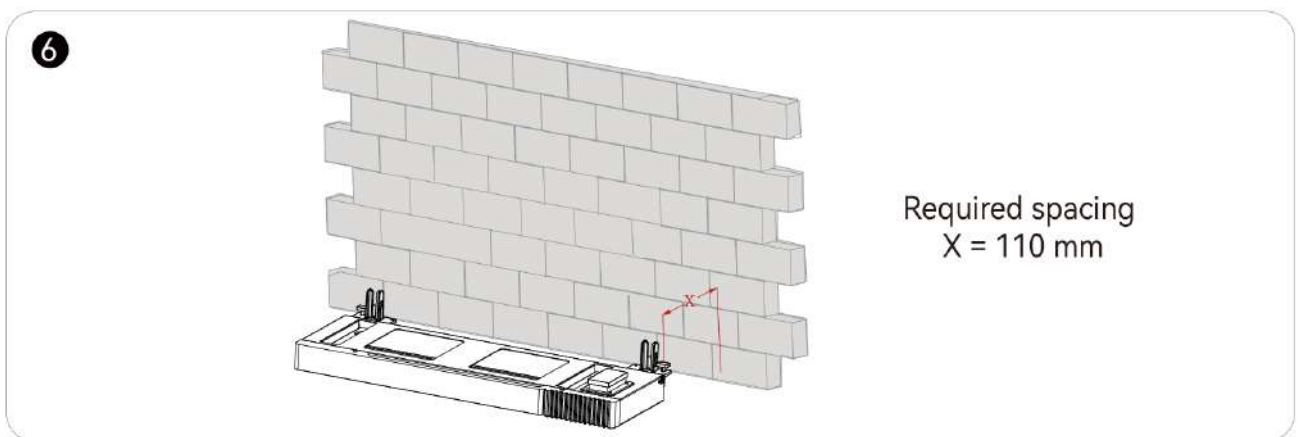
Figure 4.3. Grounding plate and its screws (optional)

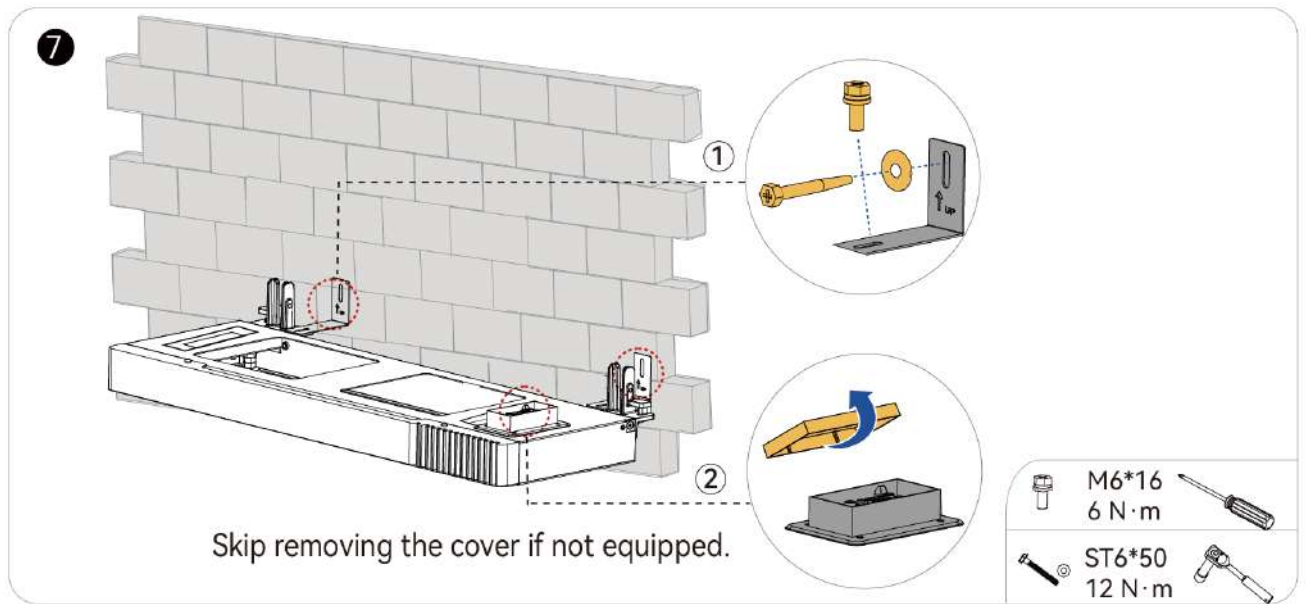
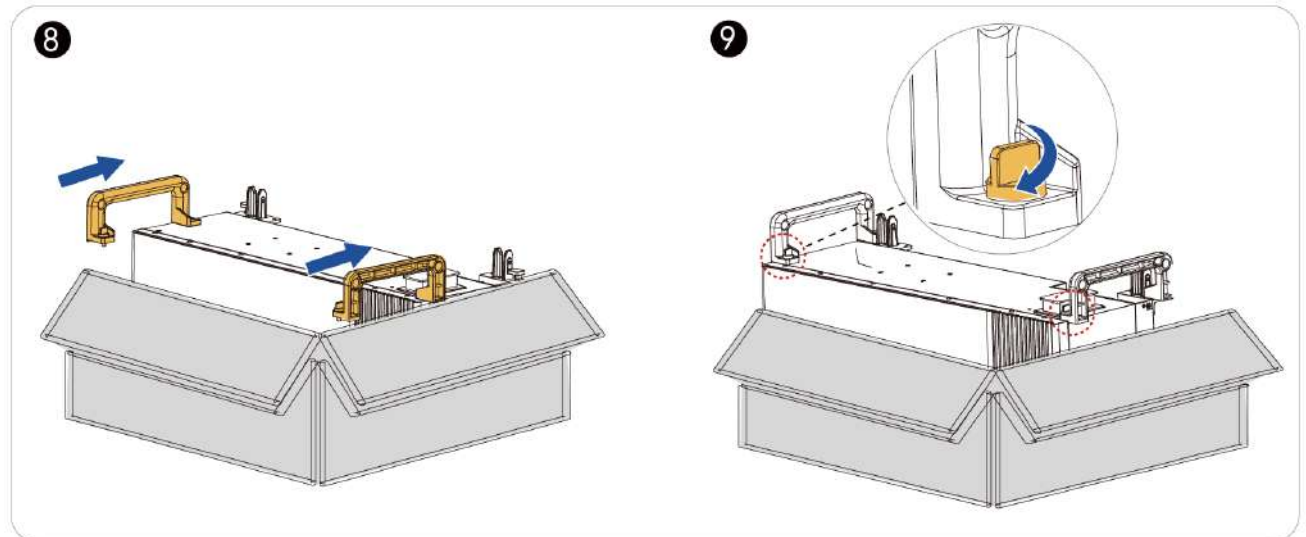
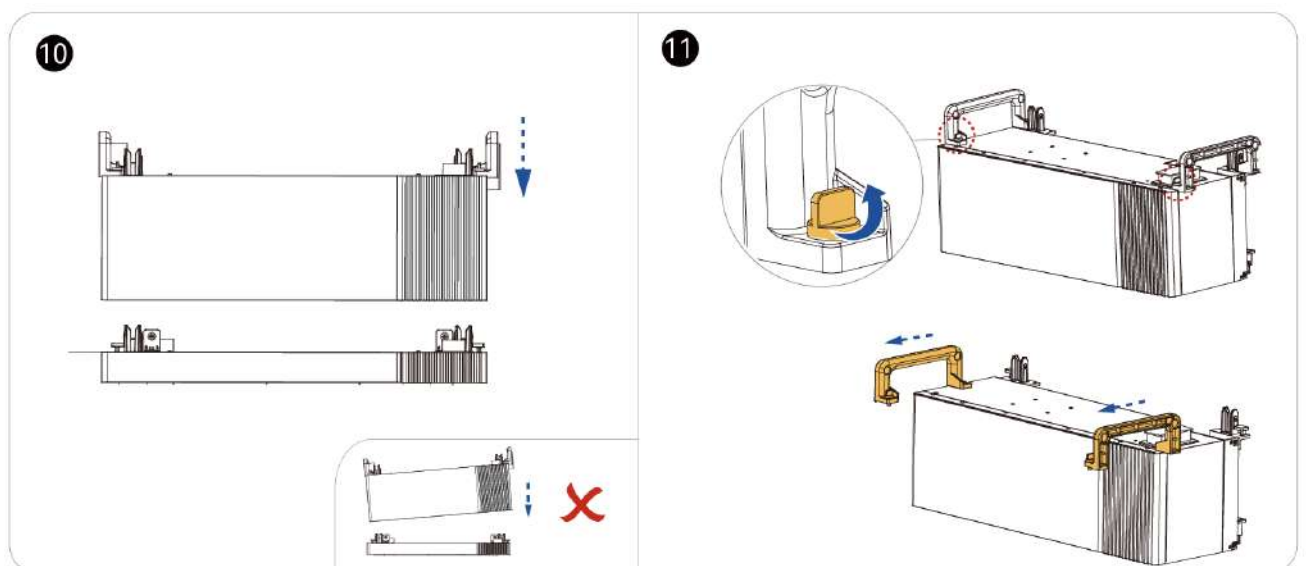
(Optional) Step 1: Detach the battery base from the inverter. If the battery base you received is not included in the inverter package and is instead included in a separate package, skip step 1.

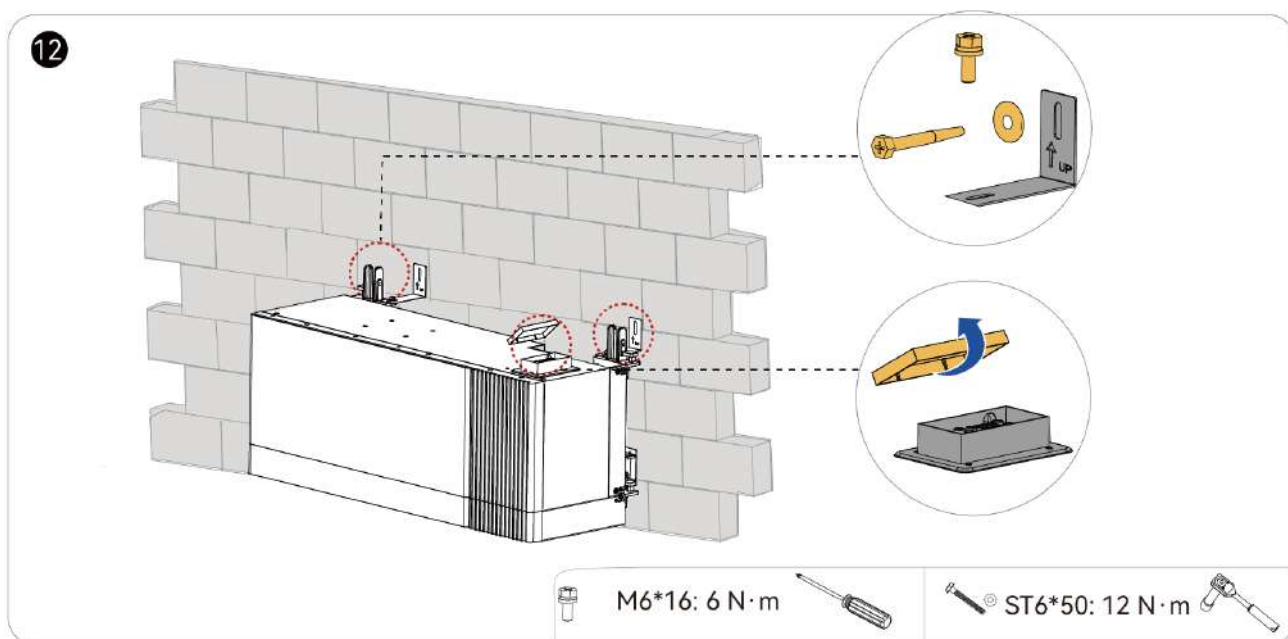
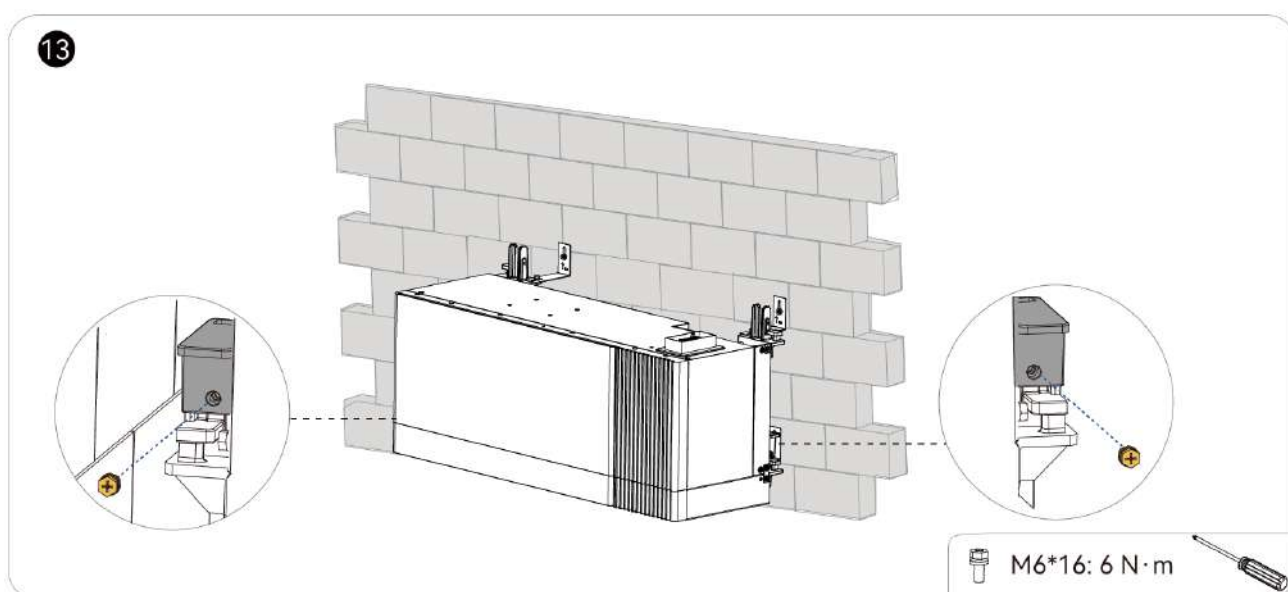
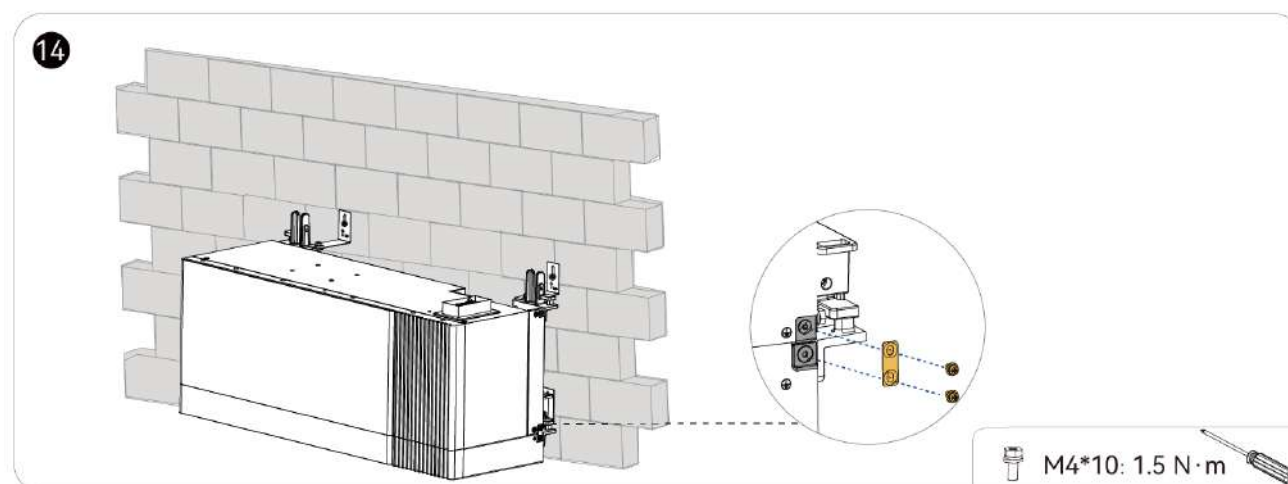




Note: Before drilling, put the battery base aside to keep the blind-mate ports dust-free.

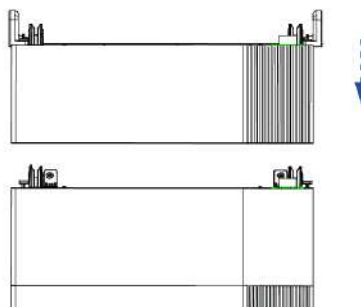






Note: If the product package you received does not include the grounding plate and corresponding screws, skip the above step.

15

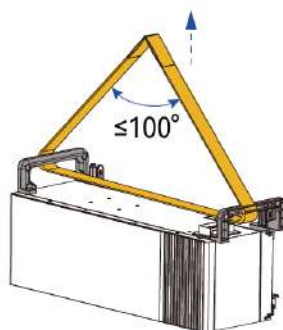


16

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

17

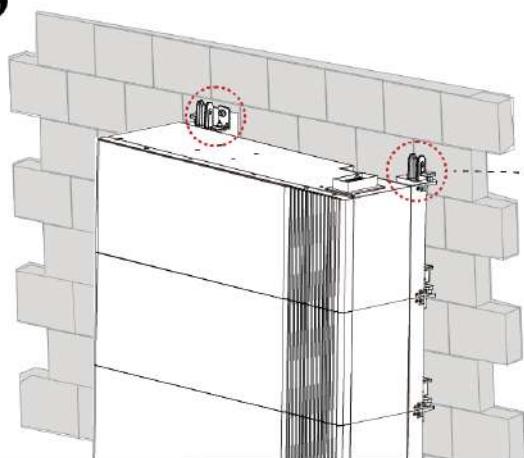
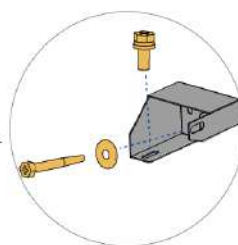
≥4 batteries: recommend using a lifting device.



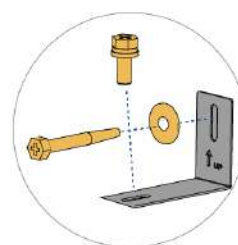
NOTICE

The apex angle of the lifting slings should not exceed 100° to ensure safe lifting and transport.

18



With lock

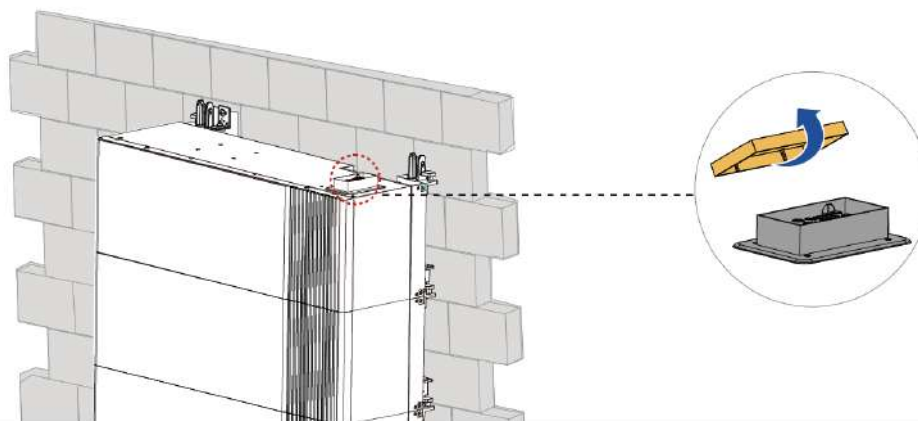


Without lock

M6*16: 6 N·m 

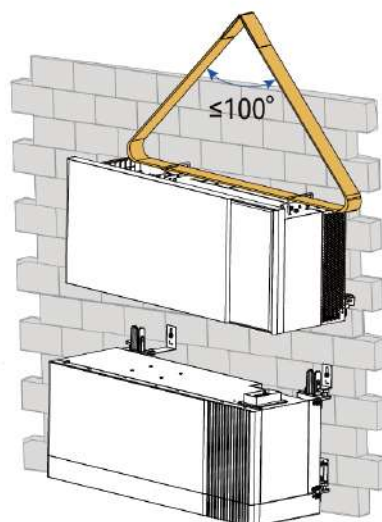
ST6*50: 12 N·m 

19



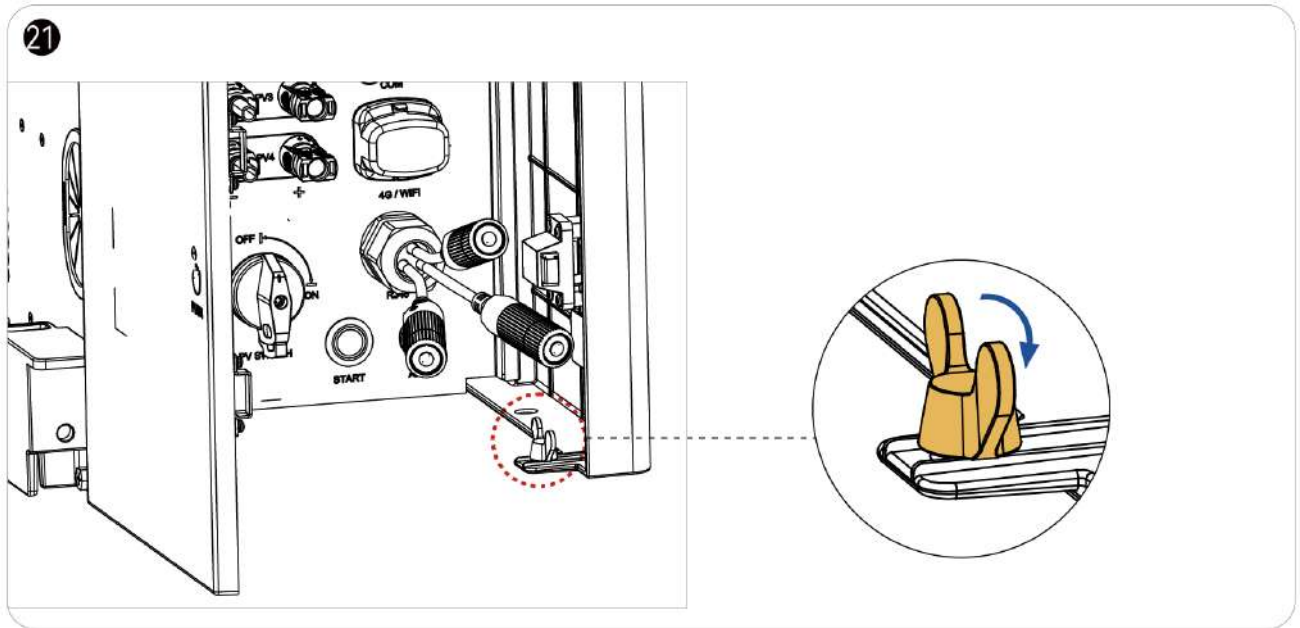
20

≥4 batteries: recommend
using a lifting device.

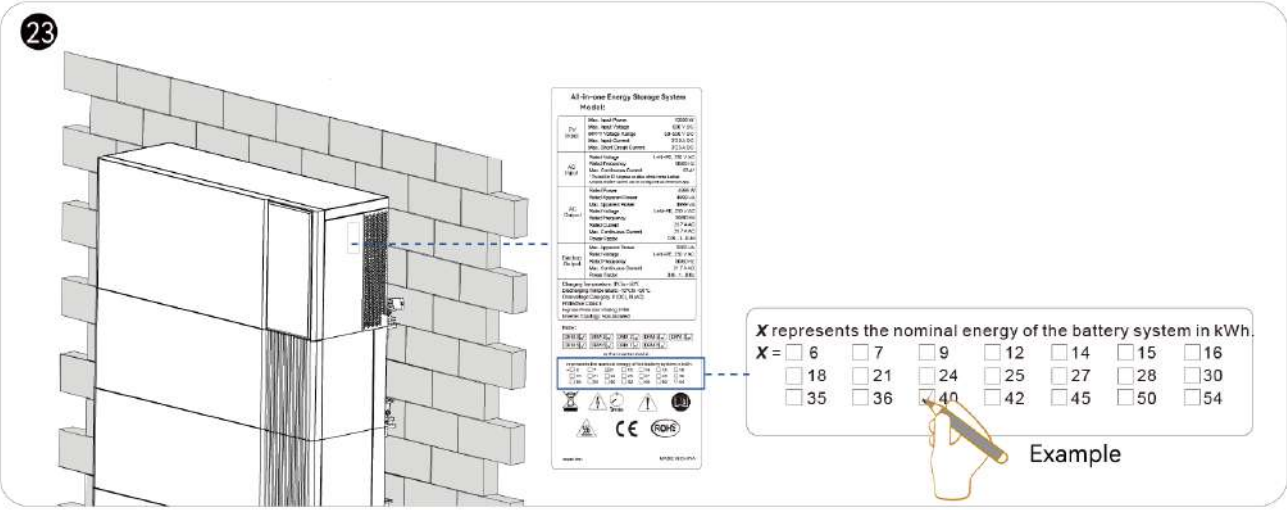


 NOTICE

The apex angle of the lifting slings should not exceed 100° to ensure safe lifting and transport.



Note: If the product package you received does not include the grounding plate and corresponding screws, skip installing them.



4.7. Wall mounting

Note:

- For wall mounting, a maximum of 2 batteries is supported.
- Depending on the shipments, some packages do not include the grounding plates and its screws. In this case, skip the related steps for installing them in this procedure.

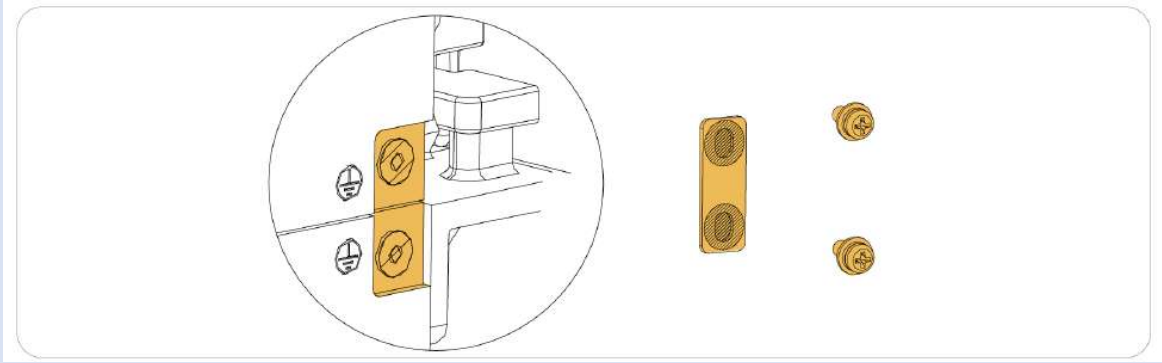
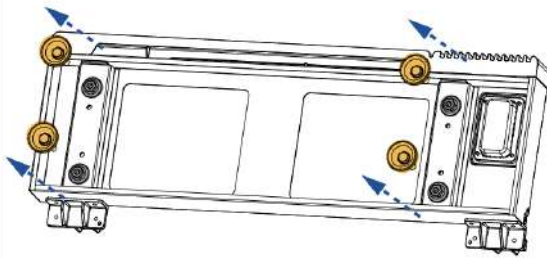
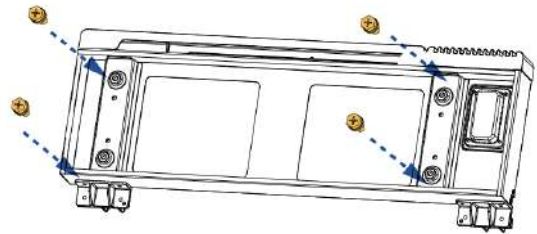


Figure 4.4. Grounding plate and its screws (optional)

1 Remove the bumper feet.



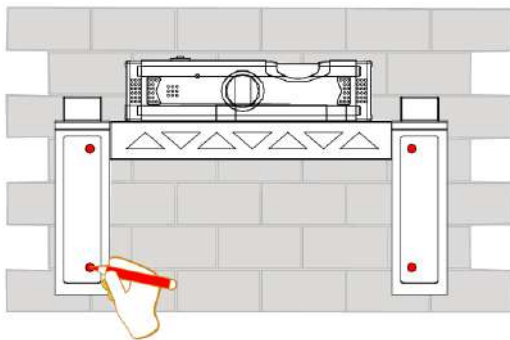
2



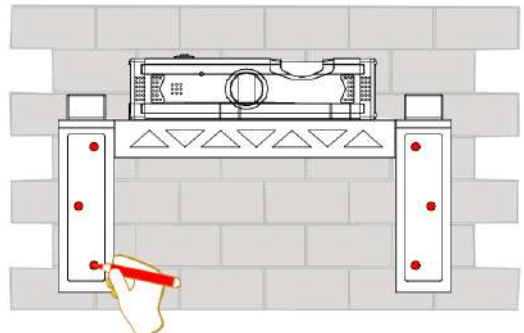
M6*16 6 N·m



3 For wall bracket with 2 installation holes

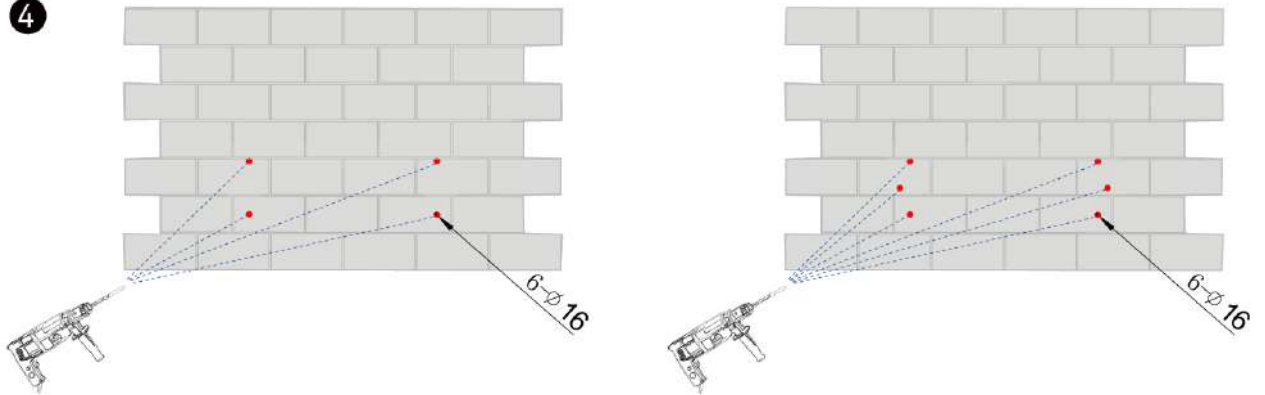


For wall bracket with 3 installation holes



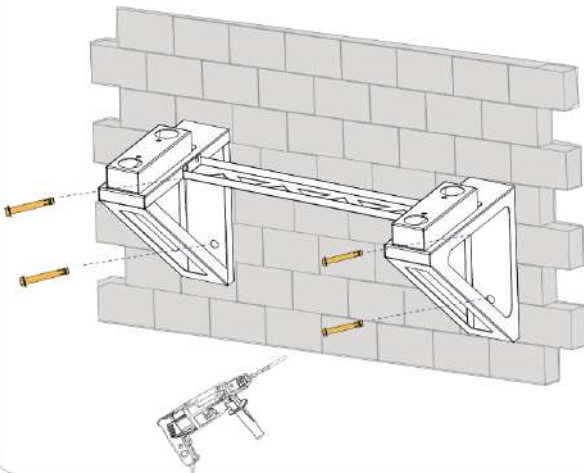
Note: The installation height of the wall bracket can be decided according to the actual condition and local regulations of the installation site.

4

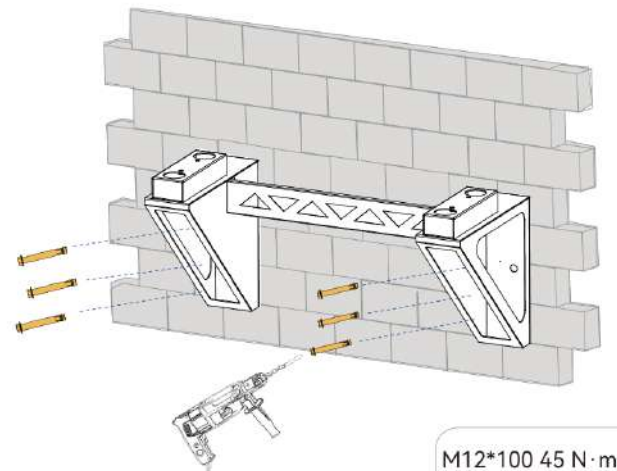


5

For wall bracket with 2 installation holes

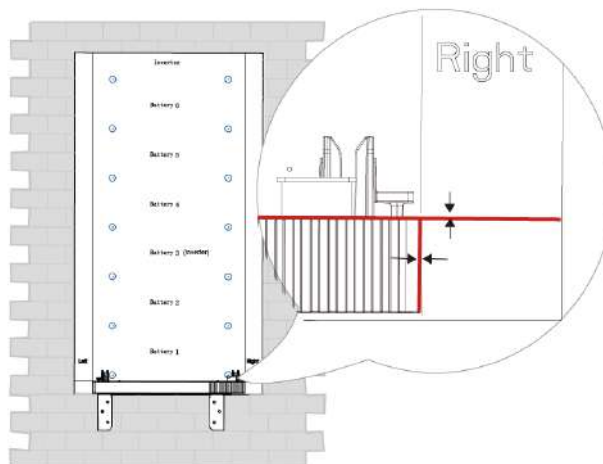


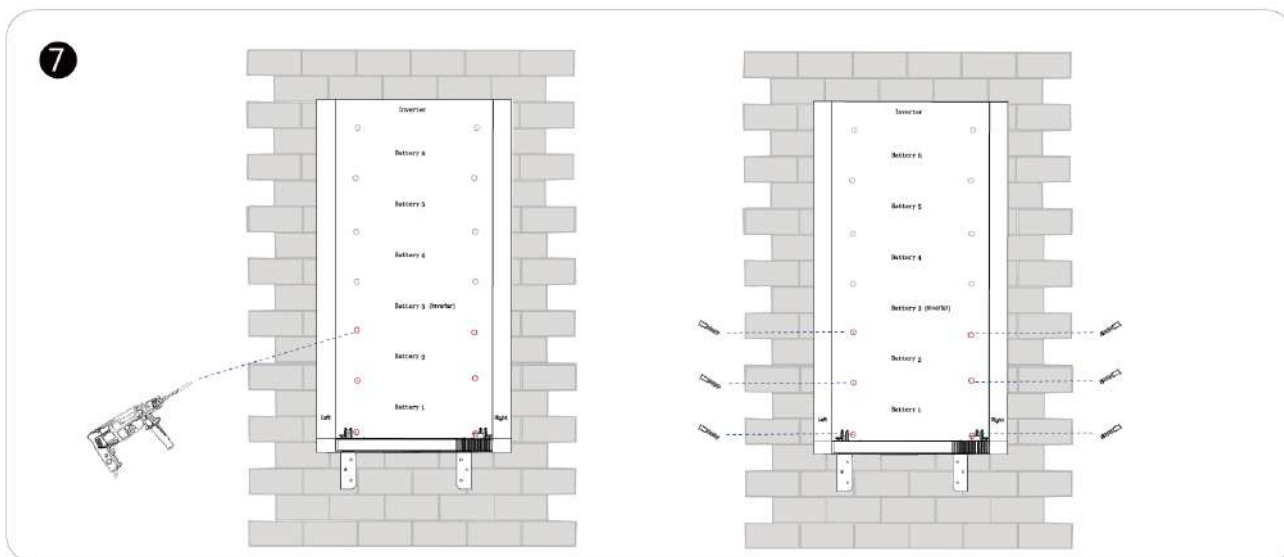
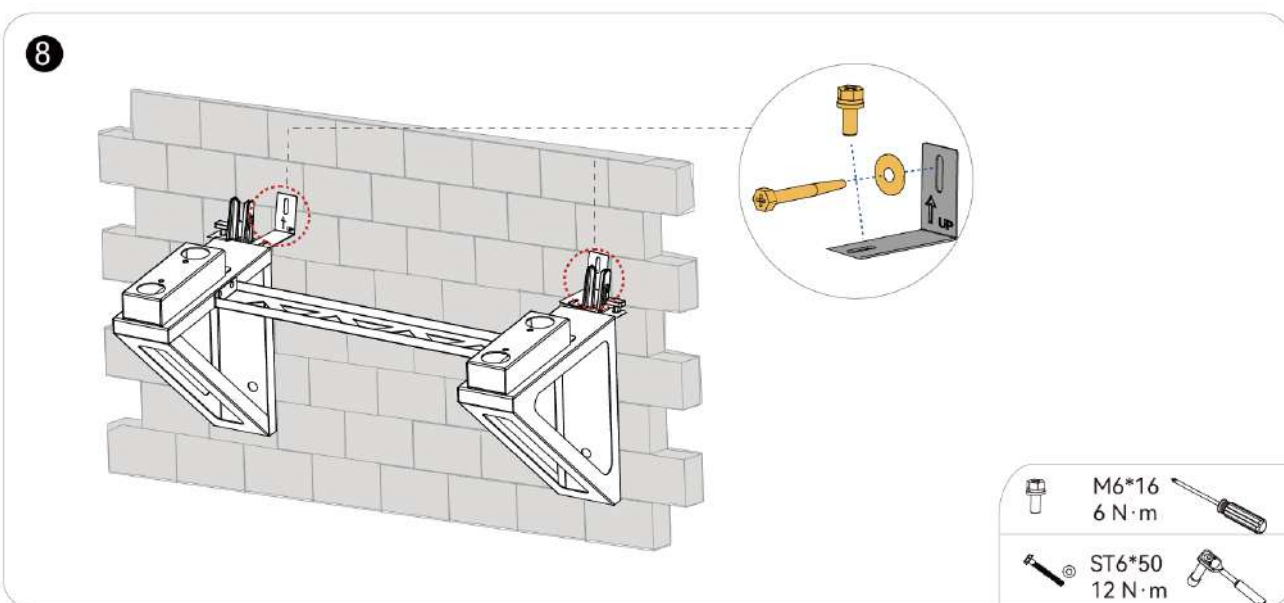
For wall bracket with 3 installation holes



M12*100 45 N·m

6





5. Electrical connection safety

Electrical connection must only be operated by professional technicians. Before the operation, the technicians must wear necessary personal protective equipment (PPE) including insulating gloves, insulating shoes, and a safety helmet.



DANGER

Danger to life due to potential fire or electricity shock.

- Do not install the cabinet near any inflammable or explosive items.
- When it is powered on, the equipment should comply with national rules and regulations.



WARNING

Any improper operation during cable connection can cause device damage or personal injury.

5.1. Wiring guidelines

- The selection, installation, and routing of cables must comply with local laws, regulations, and standards.
- During the placement of power cables, avoid coiling or twisting. If a power cable is found to be too short, replace it entirely; do not create splices or weld joints within the cable.
- Ensure that all cables are firmly connected, have good insulation, and are appropriately sized for their application.
- Cable trays and pass-through holes should not have sharp edges. Use protective measures at conduit entrances or pass-through holes to prevent damage to cables from sharp edges or burrs.
- Group similar types of cables together and secure them neatly, ensuring they lie flat and straight without damage to the outer jacket. Different types of cables should be laid separately to avoid entanglement or crossing.
- For buried cables, use cable supports and clamps to securely fix them in place. Ensure that backfilled soil around underground cables is compacted to prevent deformation or damage during the backfilling process.
- When external conditions like installation methods or ambient temperatures change, verify the cable selection according to local regulations to ensure parameters like current-carrying capacity.
- To prevent insulation aging or damage due to high temperatures, maintain a minimum distance of 30 mm between cables and heat-generating components or heat source peripheries.

5.2. Ground protection

- Follow the grounding guidelines below for the equipment which is critical to ensure electrical safety and compliance with local standards:
- The impedance of the equipment's grounding system must meet the requirements specified by local electrical standards.
- The equipment must be permanently connected to a protective ground. Before operating the equipment, always check the electrical connections to ensure that the equipment is reliably grounded.
- It is strictly prohibited to operate the equipment if the grounding conductor has not been installed.
- Do not damage or tamper with the grounding conductor in any way.

5.3. AC- and DC-side handling

- Before installing or removing power cables, turn off all switches on both the AC and DC sides to ensure that no electrical flows through the system during the operation.
- Prior to connecting the AC side cables, verify that the phase sequence of the three-phase cables matches the silk-screen markings on the cable connectors.
- If the equipment has multiple input and output paths, disconnect all inputs and outputs before proceeding. After ensuring all power sources are disconnected, wait for at least 5 minutes to allow any residual charge in capacitors or other components to dissipate. Only then should you perform any operations on the equipment.

5.4. Electrostatic Discharge (ESD) Protection



CAUTION

Contact with or improper handling of printed circuit boards or other electrostatic discharge sensitive components can lead to device damage.

- Avoid unnecessary contact with circuit boards.
- Adhere to ESD protection standards, such as wearing an anti-static wrist strap.

5.5. Earth fault alarm monitoring

This inverter is of transformer-less design and therefore does not provide galvanic isolation between the DC and AC sides. To comply with safety requirements, it incorporates earth fault alarm monitoring function in accordance with IEC 62109-2, *clause 13.9*. This function continuously checks the insulation resistance of the PV array to earth.

If an earth fault is detected due to damaged cables, moisture ingress or similar reasons, the inverter responds as follows:

- The LED light illuminates **red**.
- An error code **<31>** is displayed in the elekeeper App.

When error code **<31>** is reported, the technical support engineer can take the following actions:

1. Disconnect all the AC and DC power sources.
2. Check whether the grounding cable and all the AC power cables are connected securely.
3. Check whether all the AC and DC power cables are broken or soaked in water.
4. Check whether the battery packs are soaked in water.
5. When all the above items are normal, restart the system.
6. If the error is still active, contact SAJ for further support.



NOTICE

This inverter **must not be connected to functionally earthed PV arrays**, where either the positive or negative pole is permanently connected to earth. Such installations would be interpreted as a permanent earth fault, causing continuous false alarms and potentially damaging the inverter's internal circuitry.

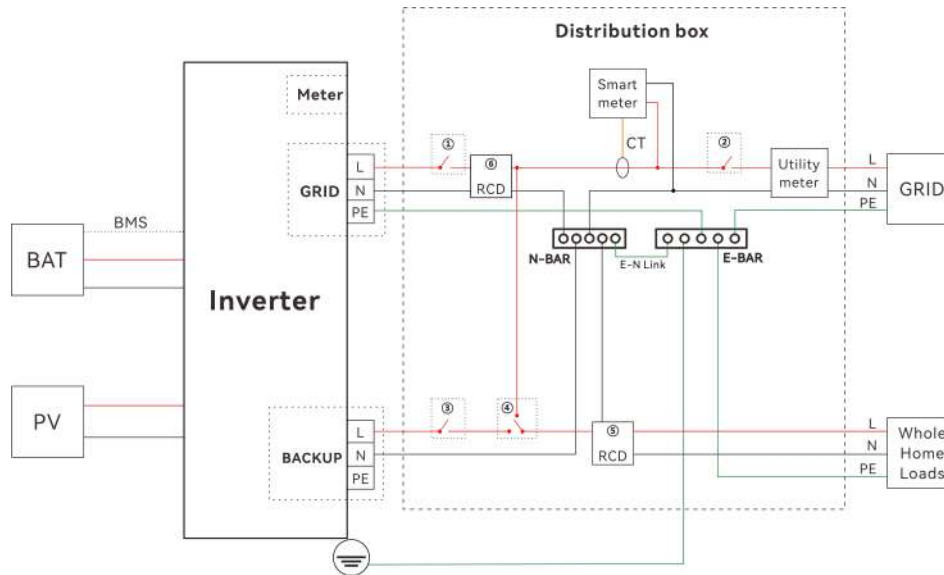
6. Electrical connection

6.1. 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



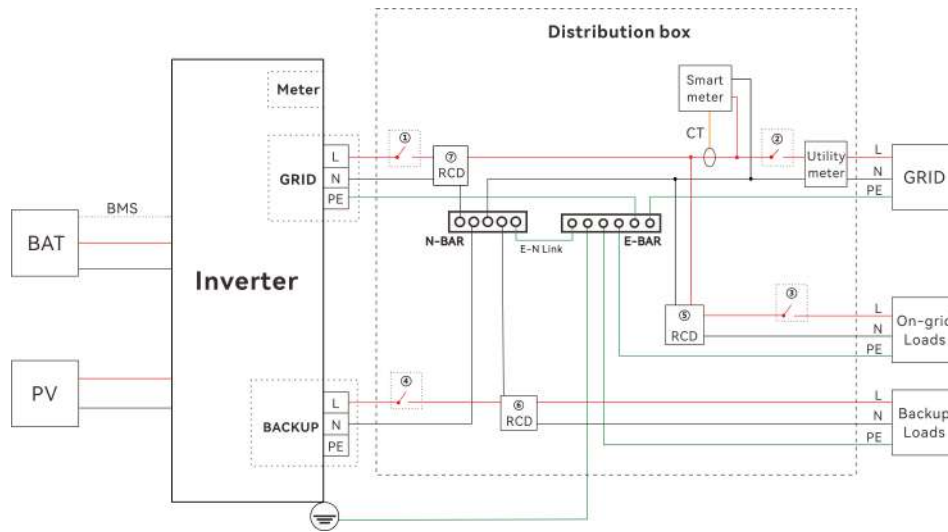
Product model	① AC breaker (grid)	③ AC breaker (backup loads)	② AC breaker (utility meter)	④ Manual transfer switch	⑤⑥ RCD (on-grid/backup loads) ¹
EK70 HS5-5K-S3-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK70 HS5-6K-S3-X (-IE)	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK70 HS5-8K-S3-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA
EK70 HS5-10K-S4-X	63 A/230 V	63 A/230 V	Main breaker	63 A/230 V	30 mA

Table 6.1. 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



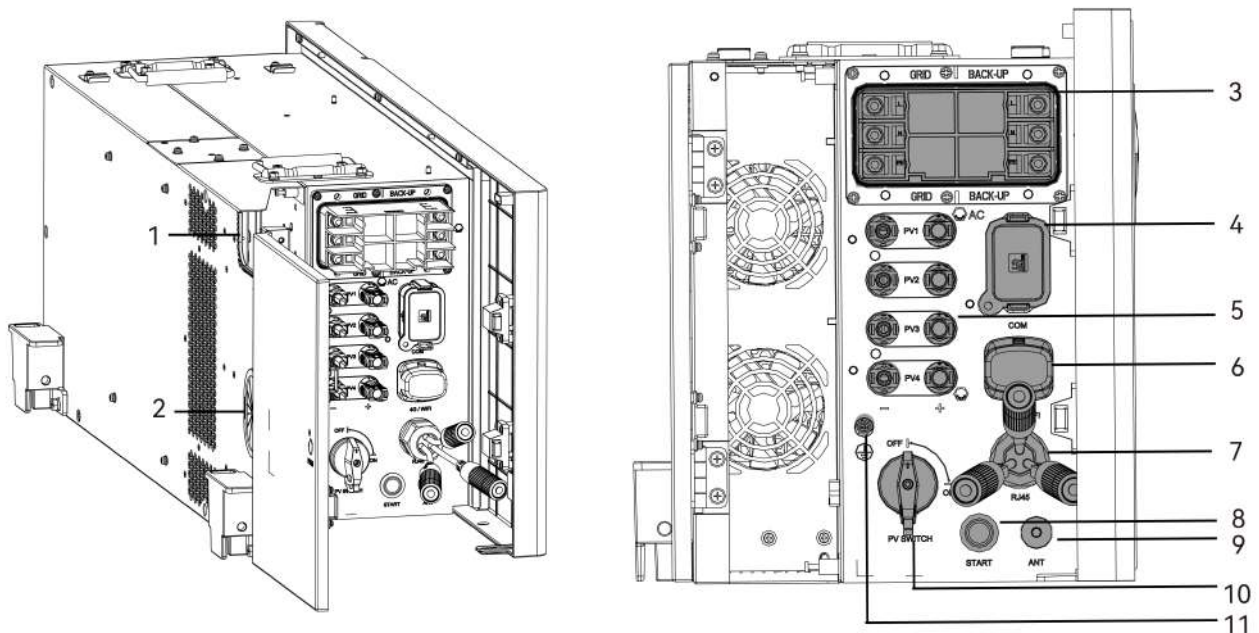
Product model	① AC breaker (grid)	④ AC breaker (backup loads)	② AC breaker (utility meter)	③ AC breaker (on-grid loads)	⑤⑥ RCD (on-grid/backup loads) ¹
EK70 HS5-5K-S3-X	32 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK70 HS5-6K-S3-X (-IE)	40 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK70 HS5-8K-S3-X	50 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA
EK70 HS5-10K-S4-X	63 A/230 V	Depend on loads	Main breaker	Depend on loads	30 mA

Table 6.2. 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.

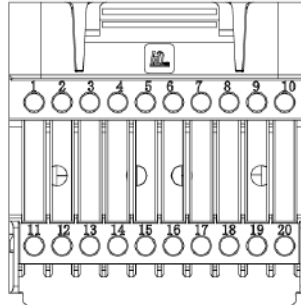
6.2. Inverter ports and switches



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"> • The grounding cable • The DC power cables • The communication cables
3	AC <ul style="list-style-type: none"> • GRID • BACK-UP 	The connection ports for AC power cables. <ul style="list-style-type: none"> • GRID: for connecting to the public grid. • BACK-UP: for connecting to the home backup load.
4	COM	The connection port for communication cables from external devices like DI/DO devices.
5	PV1, PV2, PV3, PV4	The negative and positive PV input connection ports.
6	4G/WIFI	The connection port of the eSolar AIO3 Pro and 4G Pro communication modules.
7	RJ45	The RJ45 connection ports for LAN1 , LAN2 , and DRMs connections as labelled on the ports. LAN1 and LAN2 ports are reserved for future use.
8	START	For starting up the energy storage system.
9	ANT	The LoRa antenna connection port.
10	PV SWITCH	The PV switch that controls the connection to the PV array.

Callout	Silkscreen	Description
11		The grounding cable connection port.

Table 6.3. Inverter electrical ports



Number	Silkscreen	Description
1-6	/	Reserved for future use.
7	DO1+	Output connection for dry contact device 1.
8	DO1-	Output connection for dry contact device 1.
9	DO2+	Output connection for dry contact device 2.
10	DO2-	Output connection for dry contact device 2.
11	PC 485A	Reserved RS485 connection ports.
12	PC 485B	The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by SW2 DIP switch.
13	Meter 485A	For RS485 connections with the meter.
14	Meter 485B	The RS485 communication can be adjusted with the provided 120 Ω resistor controlled by SW3 DIP switch.
15	DI1+	Input connection for dry contact device 1.
16	DI1-	Input connection for dry contact device 1.
17	DI2+	Input connection for dry contact device 2.
18	DI2-	Input connection for dry contact device 2.
19	12V	Port for providing 12V DC power supply to the external device.
20	GND	Port for grounding connection.

Table 6.4. 20-pin definition for COM port

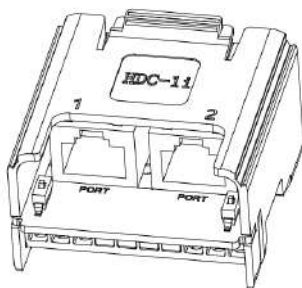


Figure 6.1. RJ45 ports for communication connector

Number	Silkscreen	Description
1	PORT CAN	Reserved port.

Number	Silkscreen	Description
2	DSP CAN	Reserved port.

6.3. Prepare the cables

Grounding cable specification

Cable type	Recommended cross-sectional area range (mm ²)
Grounding cable	6

AC grid and backup cable specification

Prepare the following outdoor high-temperature ($\geq 105^{\circ}\text{C}$) cables for AC grid and backup load connections:

Solution	AC grid cable type	Recommended cross-sectional area (mm ²)	Recommended conductor material
Whole home backup	One three-wire cable	16	Copper
Partial backup	Three separated cables	16	Copper

Table 6.5. AC grid cable specification

Solution	AC backup cable type	Cross-sectional area (mm ²)		Recommended conductor material
		Range	Recommended value	
Whole home backup	One three-wire cable	10-16	16	Copper
	Three separated cables	/	16	Copper

Table 6.6. AC backup cable specification for whole home backup

Solution	Model	AC backup cable type	Cross-sectional area range (mm ²)		Recommended conductor material
			Range	Recommended value	
Partial backup	HS5-5K-S3-X HS5-6K-S3-X HS5-6K-S3-X-IE	One three-wire cable	6-8	8	Copper
		Three separated cables	/	8	Copper
	HS5-8K-S3-X HS5-10K-S4-X	One three-wire cable	8-10	10	Copper
		Three separated cables	/	10	Copper

Table 6.7. AC backup cable specification for partial backup

PV cable specification

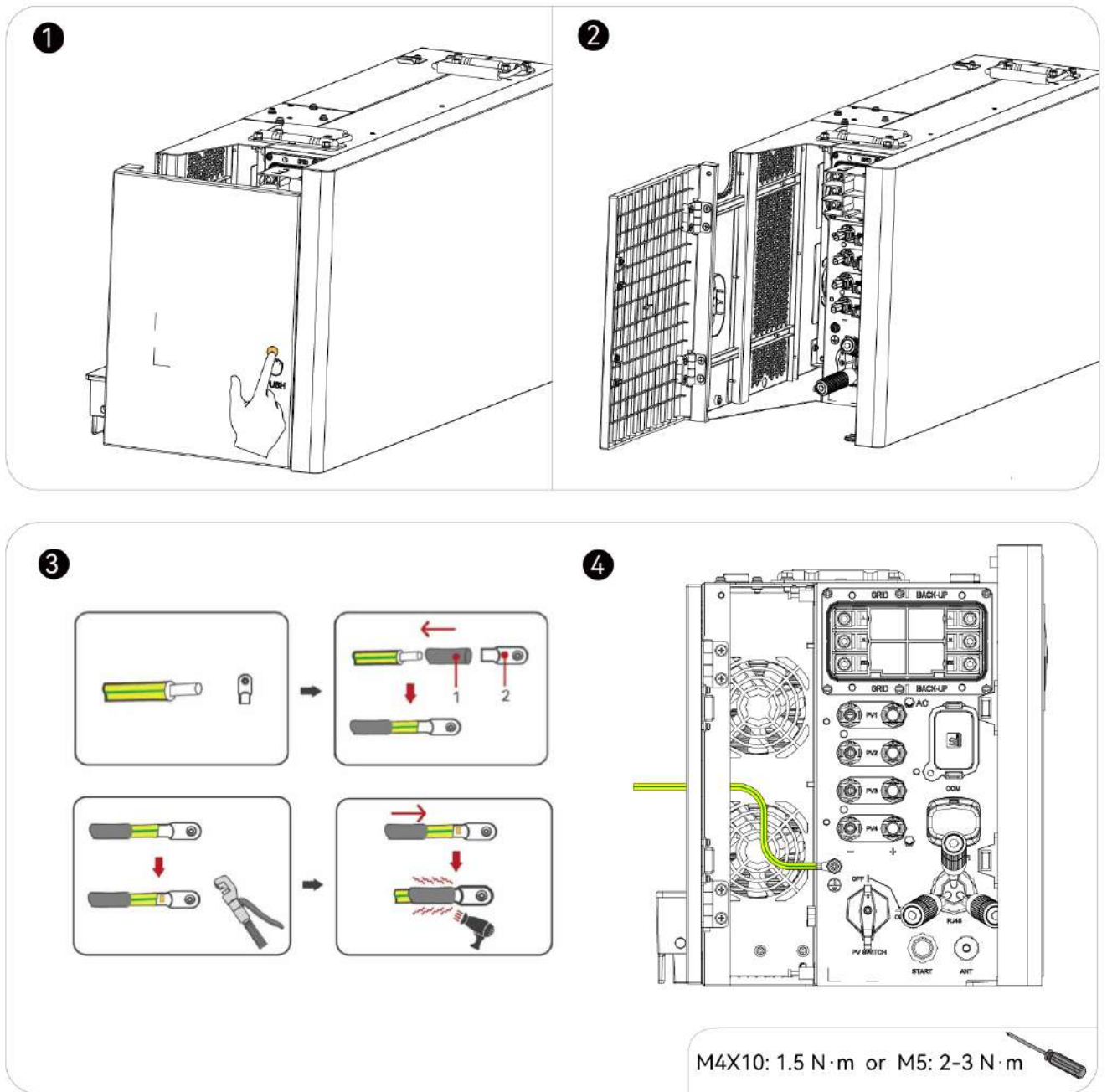
Cross-sectional area range (mm ²)		Recommended conductor material
Range	Recommended value	
5.0-6.0	6.0	Outdoor copper wire cable, complying with 600 V DC

Communication cable specification

Terminals	Cable cross-sectional area (mm ²)	Cable outer diameter (mm)	Insulation off (mm)	
			External protective layer	Wire insulation
1 - 10	0.5 - 0.75	4.5 - 6.5	55	7.5

Terminals	Cable cross-sectional area(mm ²)	Cable outer diameter (mm)	Insulation off (mm)	
			External protective layer	Wire insulation
11 - 20	0.2 - 0.5		33	7.5

6.4. Connect the grounding cable

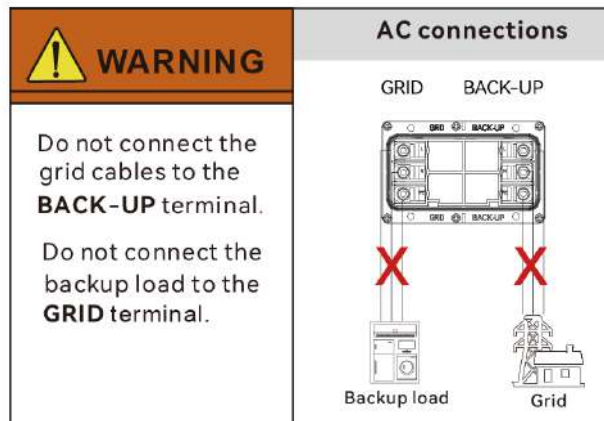
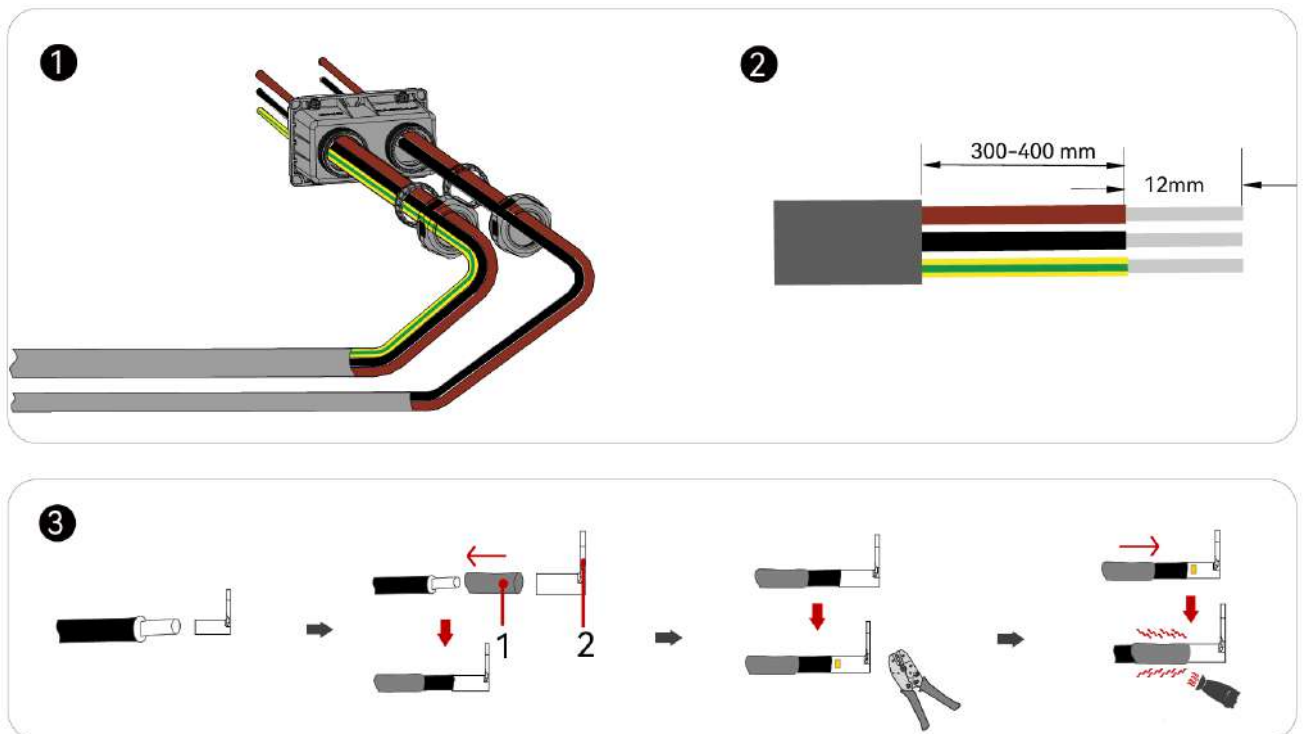


Note: The screw can be M4 or M5 depending on shipments. Confirm the screw specification before installation and tighten it to the corresponding torque.

6.5. Connect the AC power cables

NOTICE

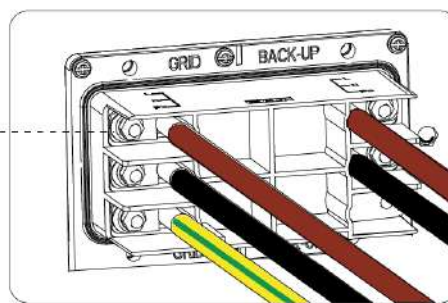
- Secure the corrugated pipe on the wall after finishing all wiring connections.
- When fixing the corrugated pipe at the upper left of the machine on the wall, leave an extra cable length of 300 to 400 mm. If it is fixed in other directions, reserve a longer length as needed.
- Products are subject to continuous updates. The printed guide may not reflect the latest changes. If there is any inconsistency between the received product and the printed guide, see the latest electronic Quick Guide or User Manual.



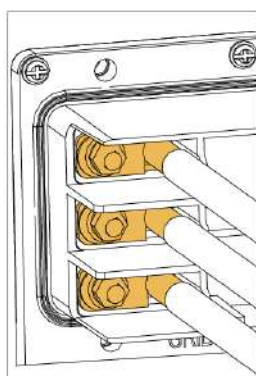
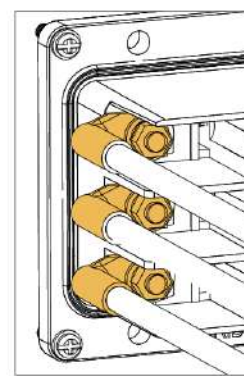
Note:

Use cold-pressed terminal crimping plier to crimp the AC cables.

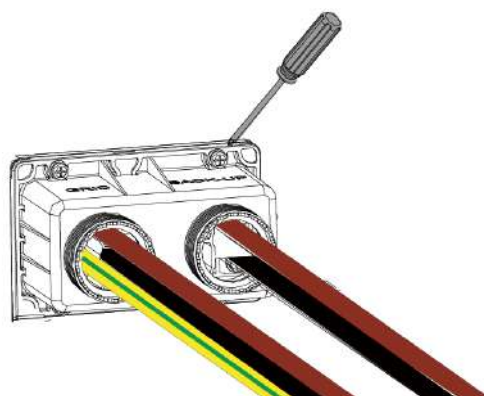
4



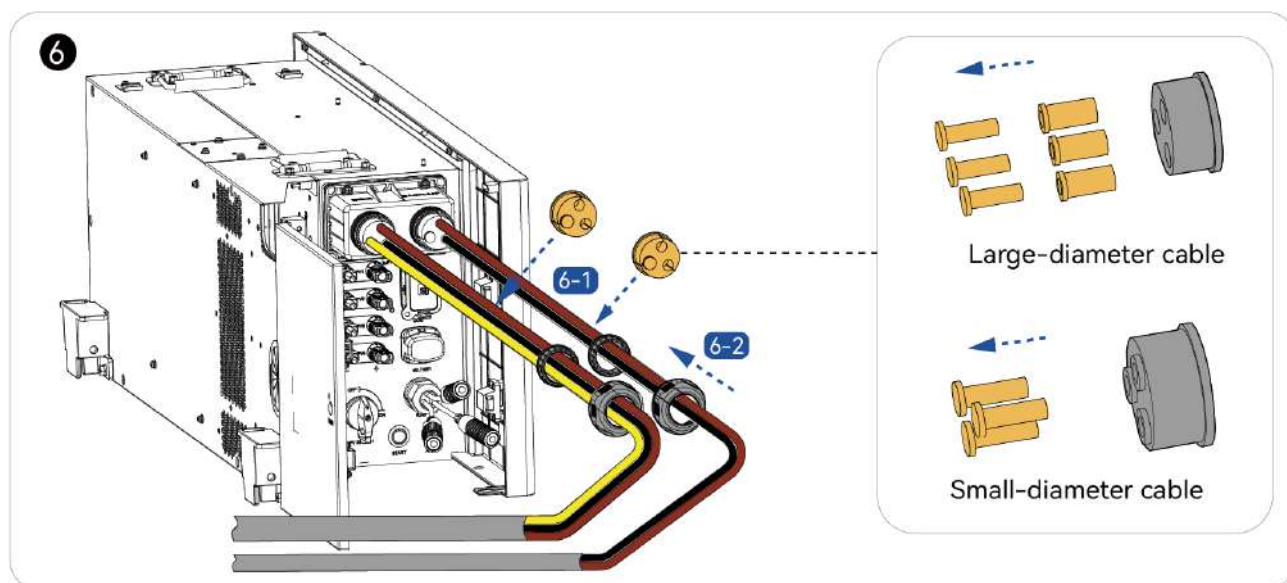
M5: 2-3 N·m



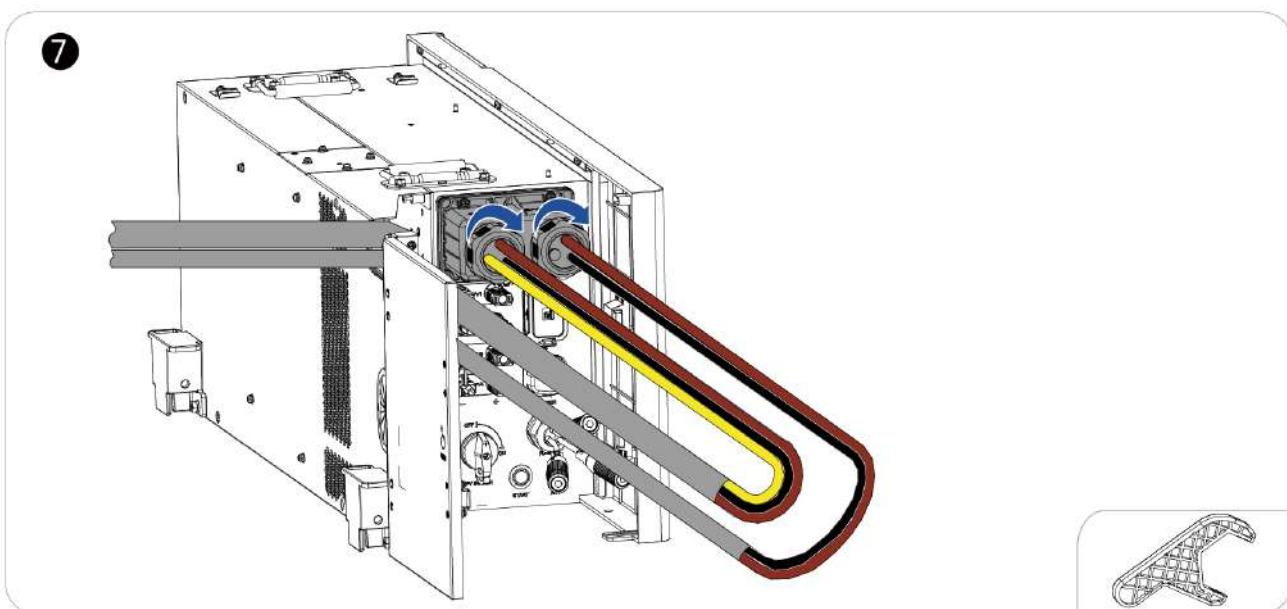
5



M5: 2-3 N·m



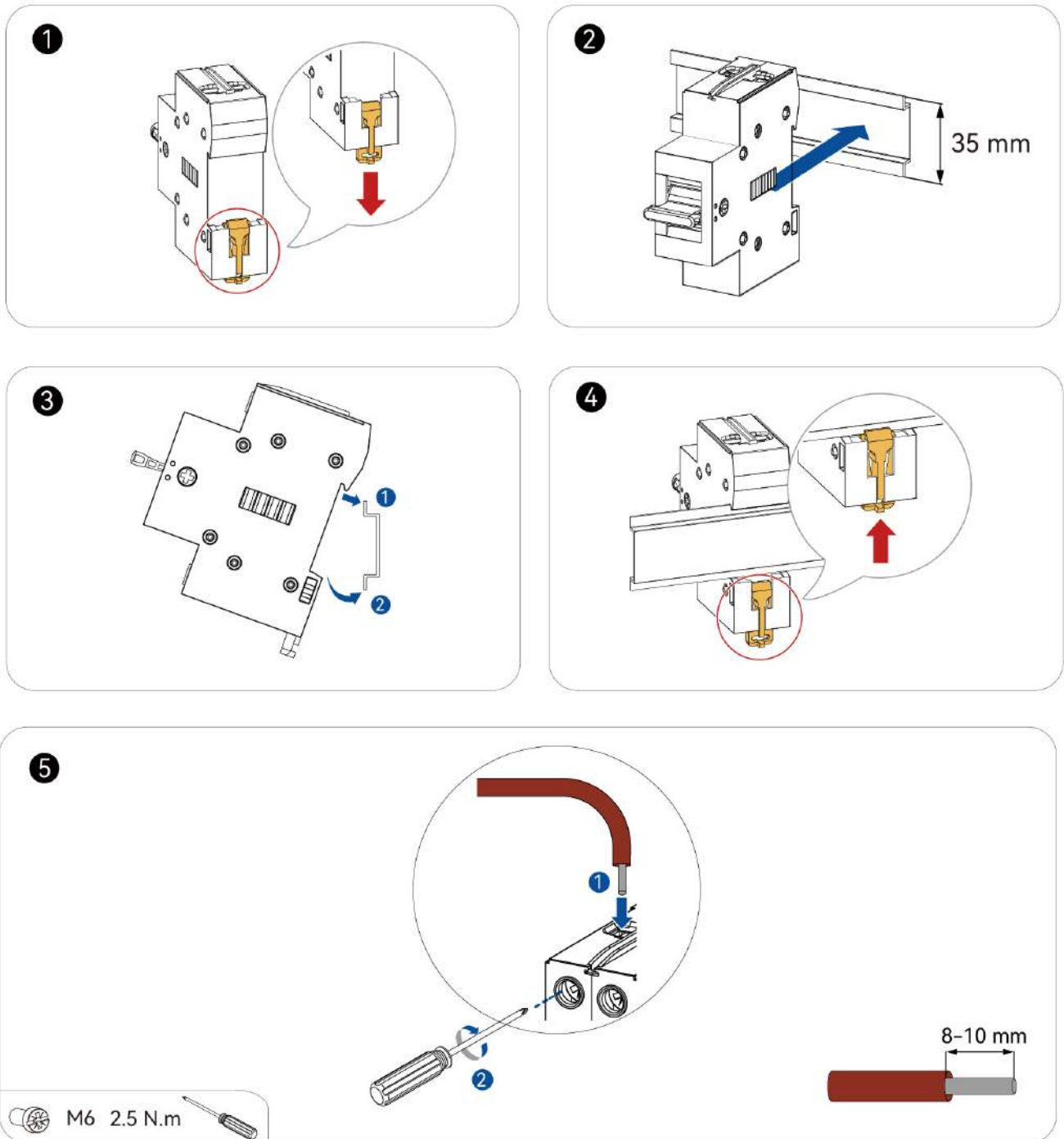
Rubber type	Cross-sectional area range of cable (mm ²)
Large-diameter rubber	10-16
Small-diameter rubber	6-8

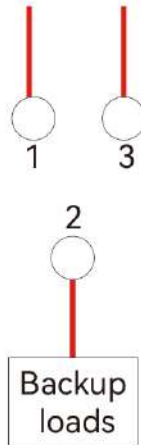


6.6. Connect the manual transfer switch (option A)

NOTICE

- The illustrations are provided for reference only. The component appearance is subject to the actual product you have received.
- The manual transfer switch may vary depending on the shipments. If the product received differs from the one in the printed document, see the latest electronic User Manual or Quick Guide.



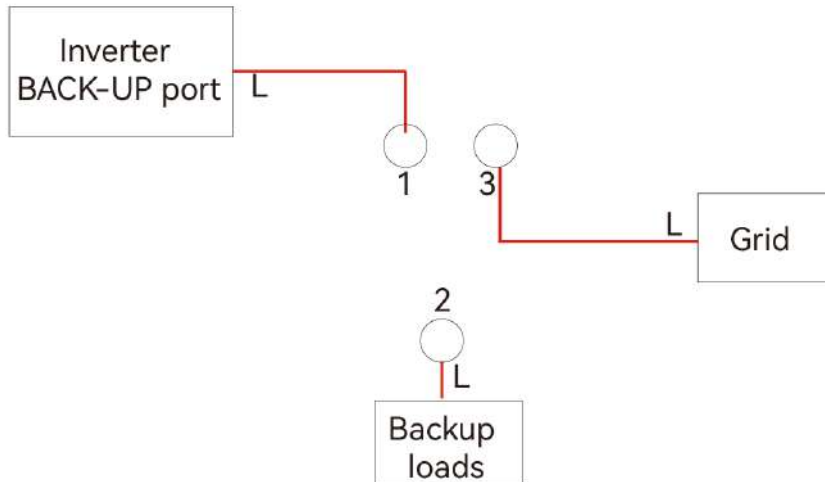


Input 1 to inverter BACK-UP port
Input 3 to grid

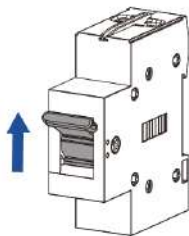
Or

Input 1 to grid
Input 3 to inverter BACK-UP port

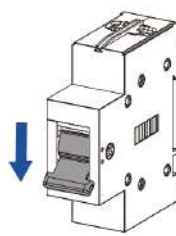
Example



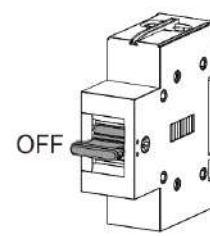
6



ON: **1** connected



ON: **3** connected

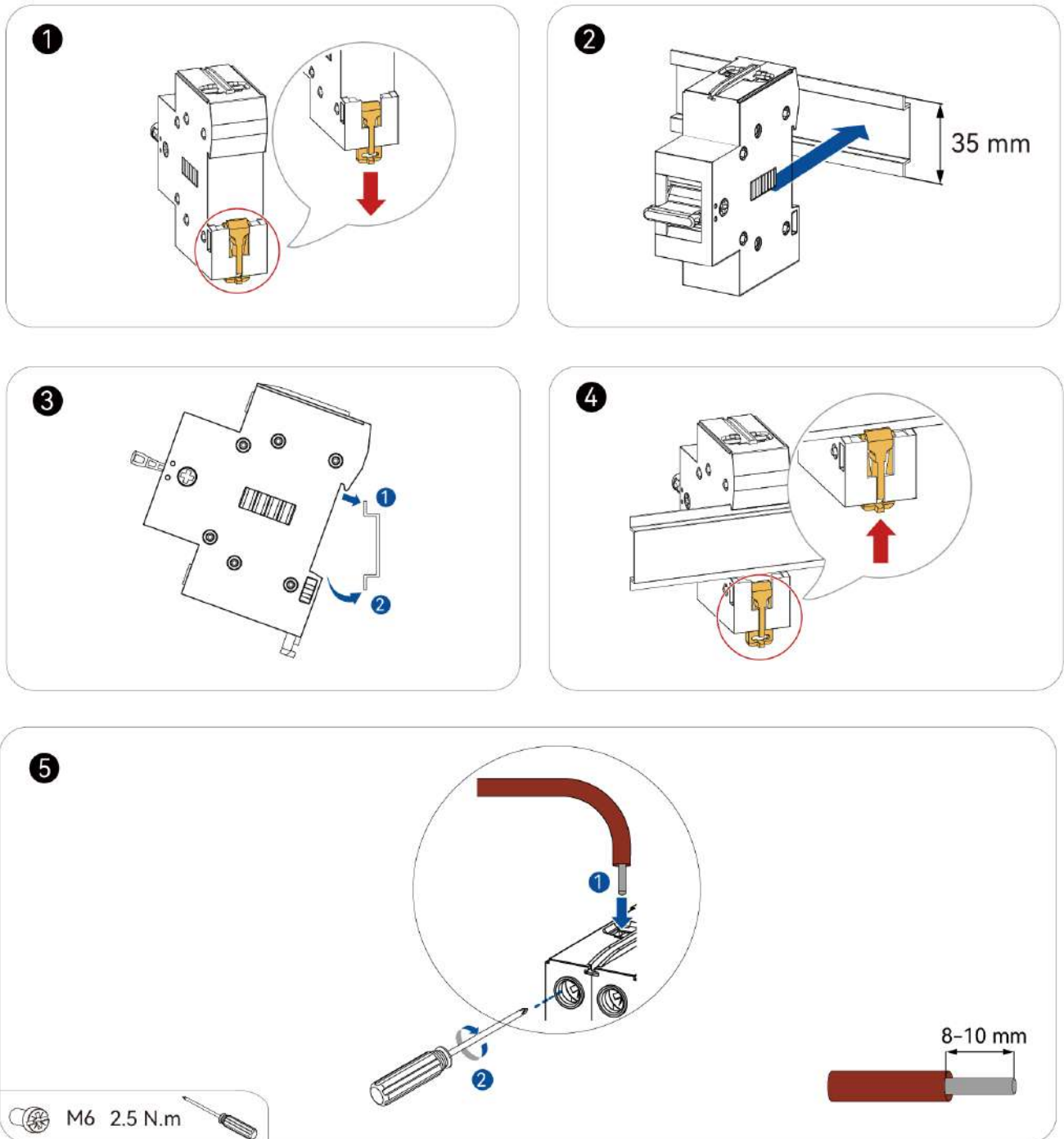


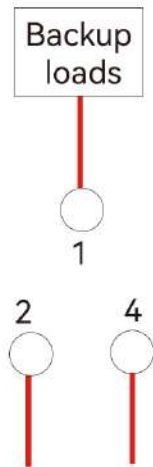
OFF: BACK-UP port and
Grid disconnected

6.7. Connect the manual transfer switch (option B)

NOTICE

- The illustrations are provided for reference only. The component appearance is subject to the actual product you have received.
- The manual transfer switch may vary depending on the shipments. If the product received differs from the one in the printed document, see the latest electronic User Manual or Quick Guide.



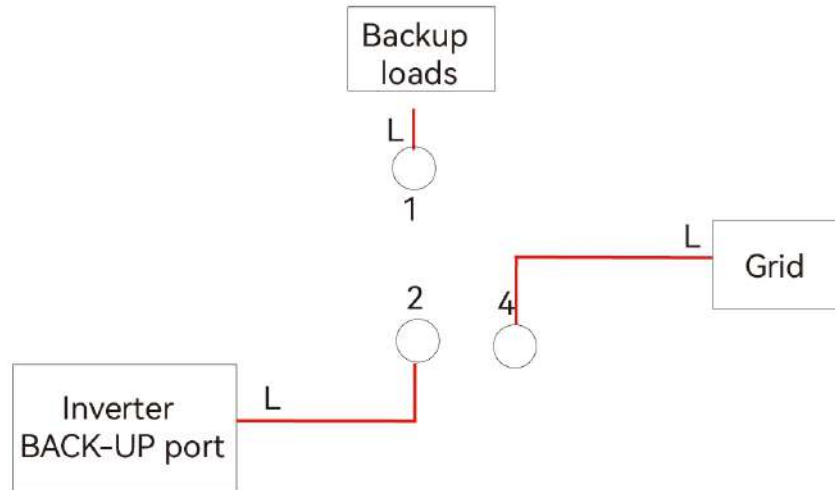


Input 2 to inverter BACK-UP port
Input 4 to grid

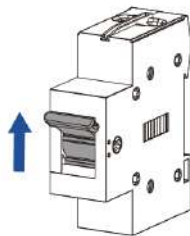
Or

Input 2 to grid
Input 4 to inverter BACK-UP port

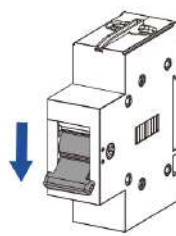
Example



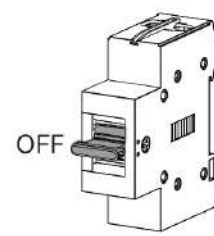
6



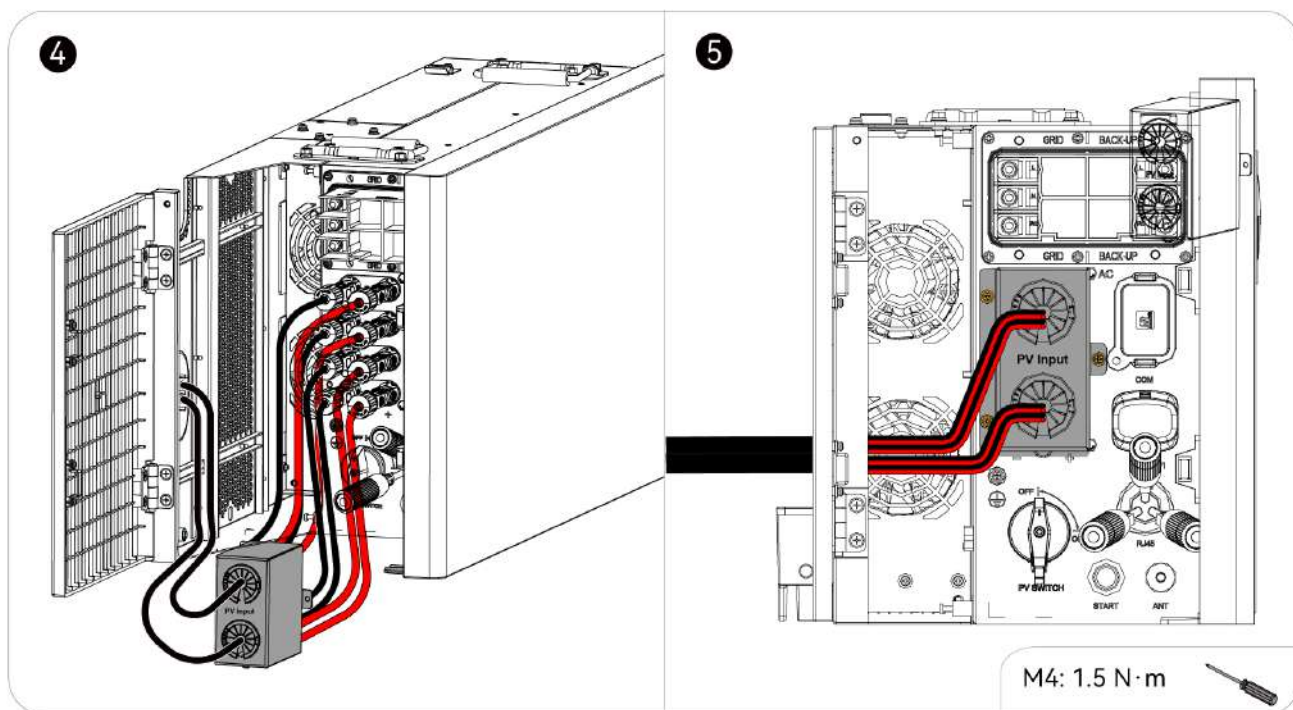
ON: 4 connected



ON: 2 connected



OFF: BACK-UP port and
Grid disconnected

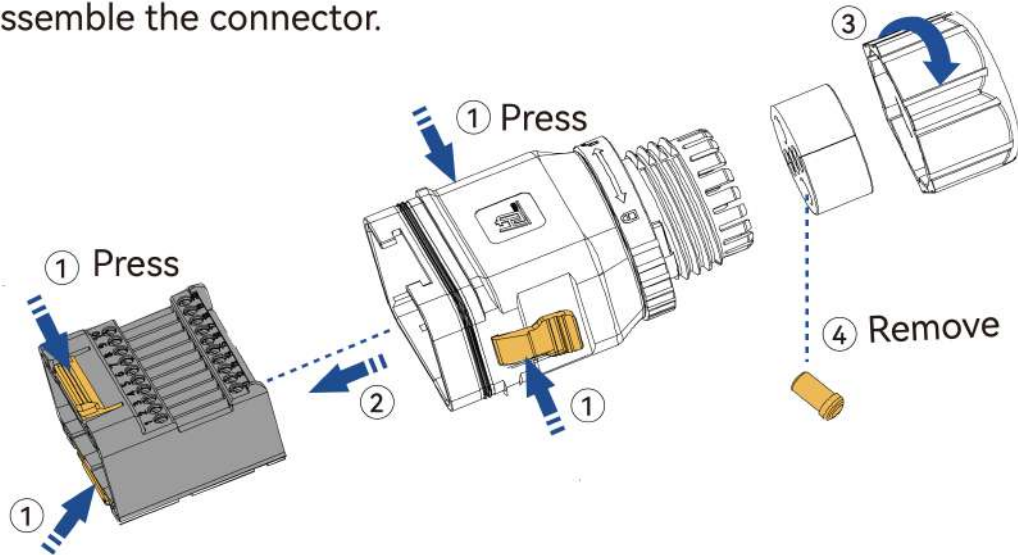


6.9. Connect the communication cables to COM port

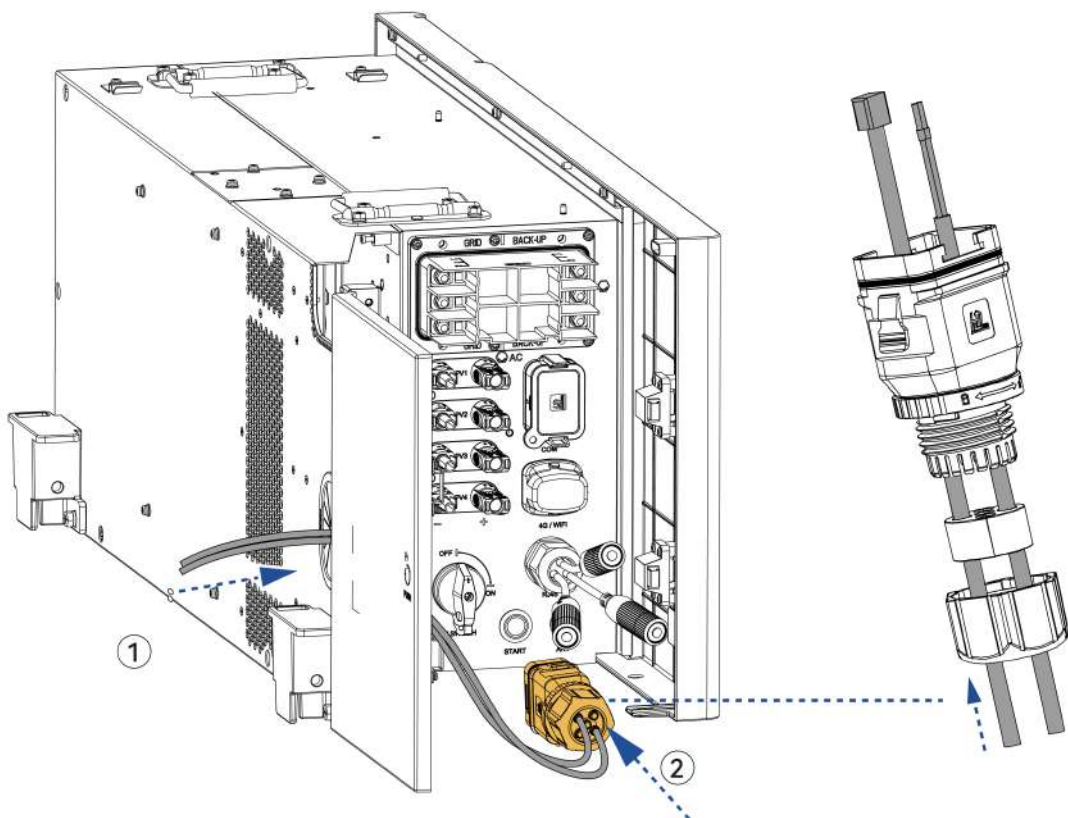
NOTICE

Even if no cables are connected, the communication connector must be installed onto the **COM** port. Otherwise, an internal communication loss alarm will be triggered.

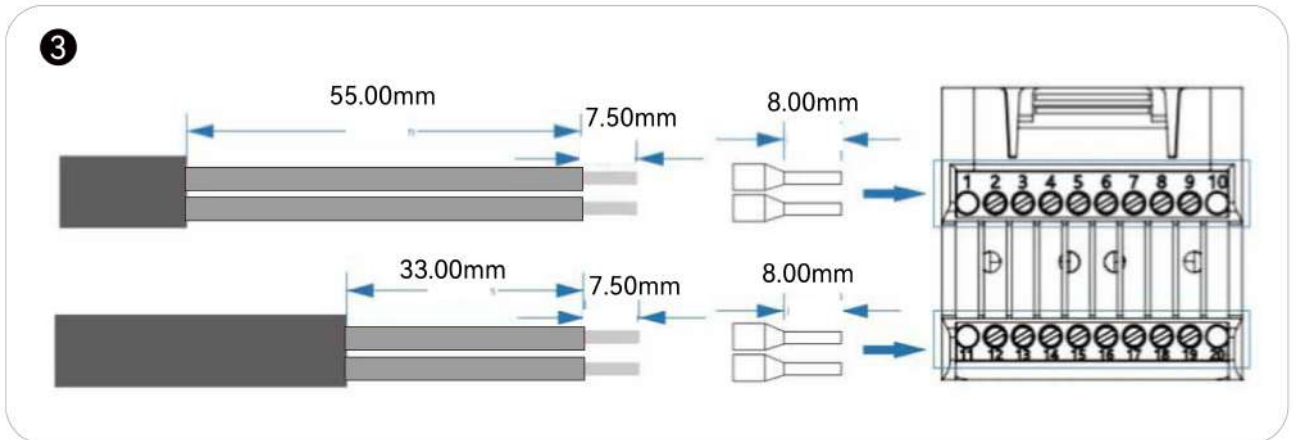
① Disassemble the connector.



②



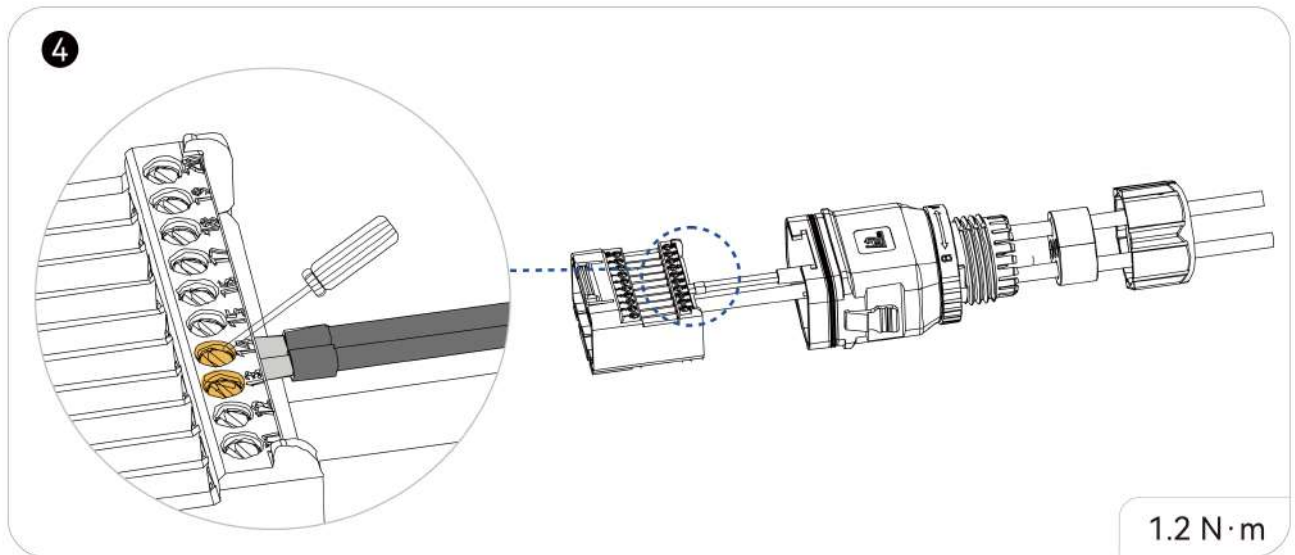
Step 3: Connect and secure the cables to the corresponding terminals based on your needs.



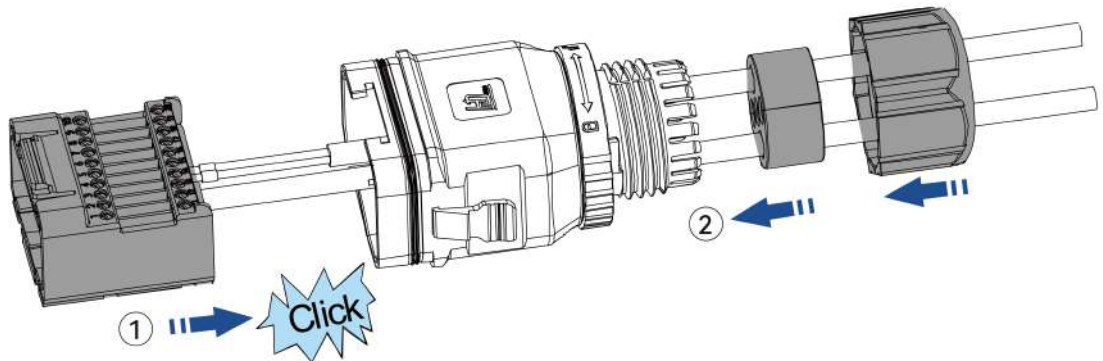
(Optional) Step 4: This step is only required for wired communication between inverter and meter. Connect the cables to terminals **13** (RS485 A) and **14** (RS485 B).

Note:

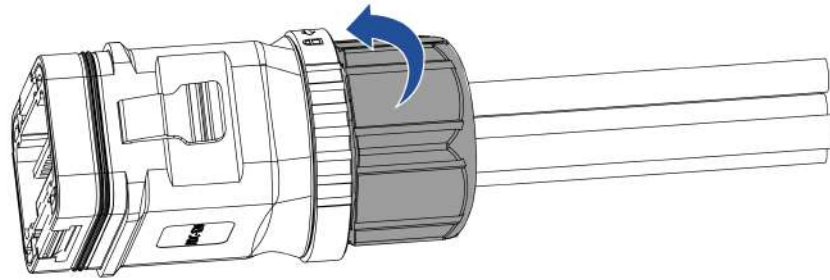
- The inverter is wirelessly pre-paired with the meter at the factory. For wireless communication, no wiring is required at the communication connector. Skip this step and install the antennas instead.
- For any terminal equipped with a 120 Ω resistor, such as METER-A, switch the resistor to **ON** if the cable exceeds 20 meters.



5

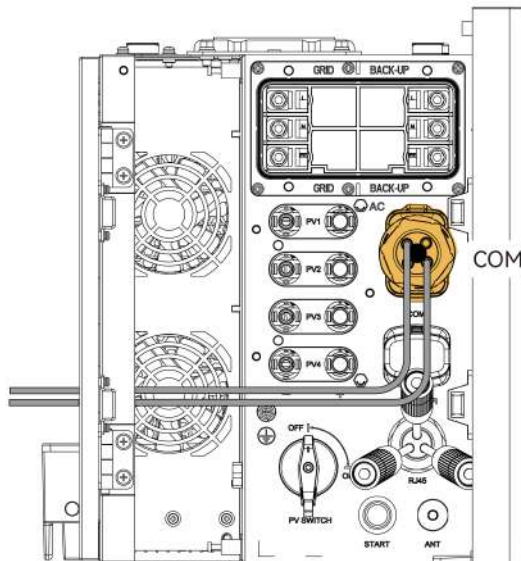


6



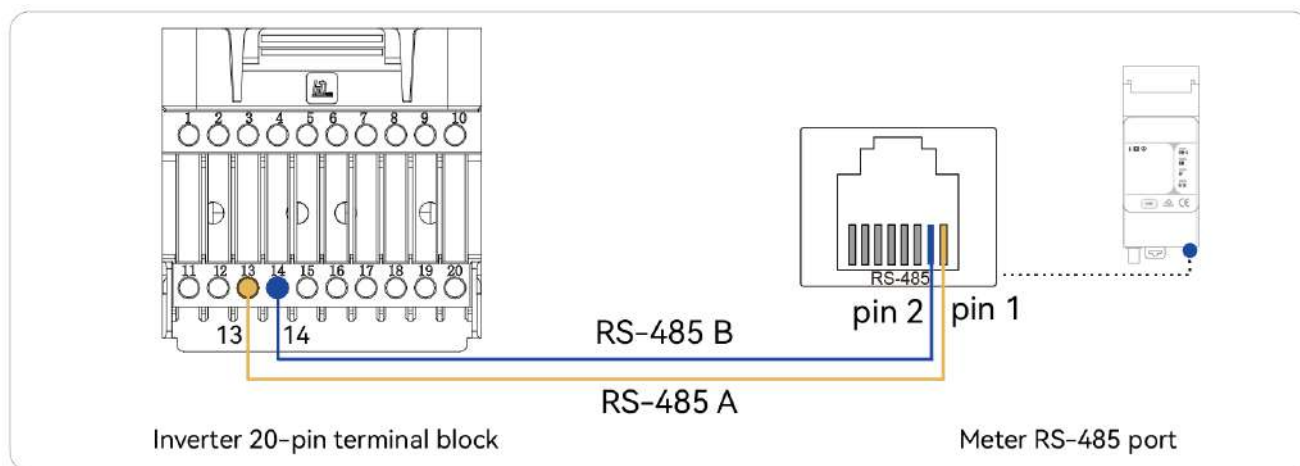
2.5 N·m

7



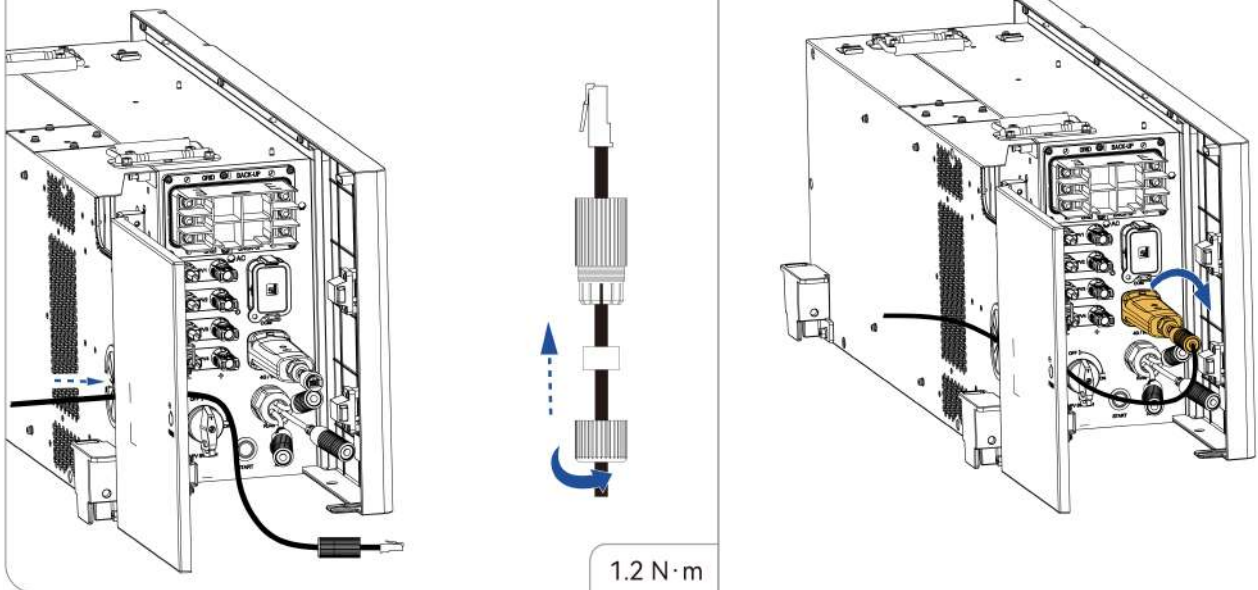
Step 8: Connect the other end of the cables to external devices, such as the meter.

Note: The inverter is wirelessly pre-paired with the meter at the factory. For wireless communication, no wiring is required at the communication connector. Skip this step and install the antennas instead.

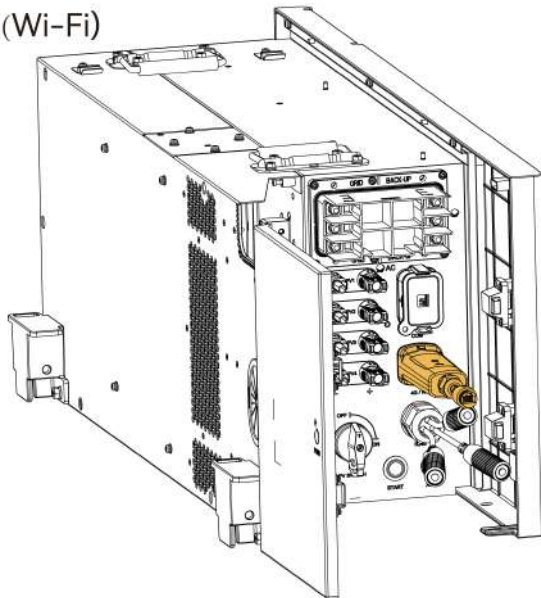


6.10. Connect the communication module

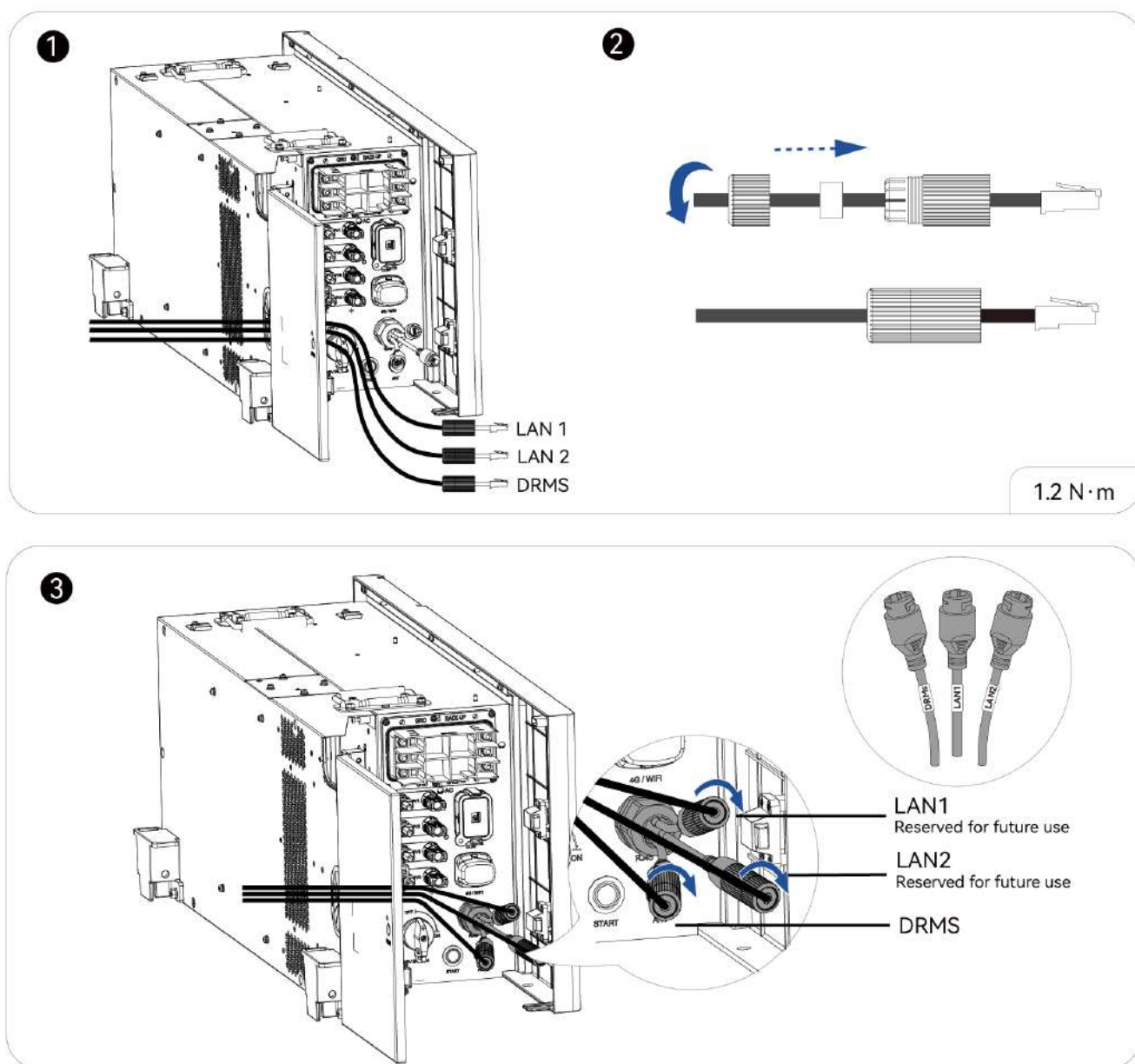
eSolar AIO3 Pro module (Ethernet)



eSolar AIO3 Pro module (Wi-Fi)



6.11. Connect the LAN and DRMS cables



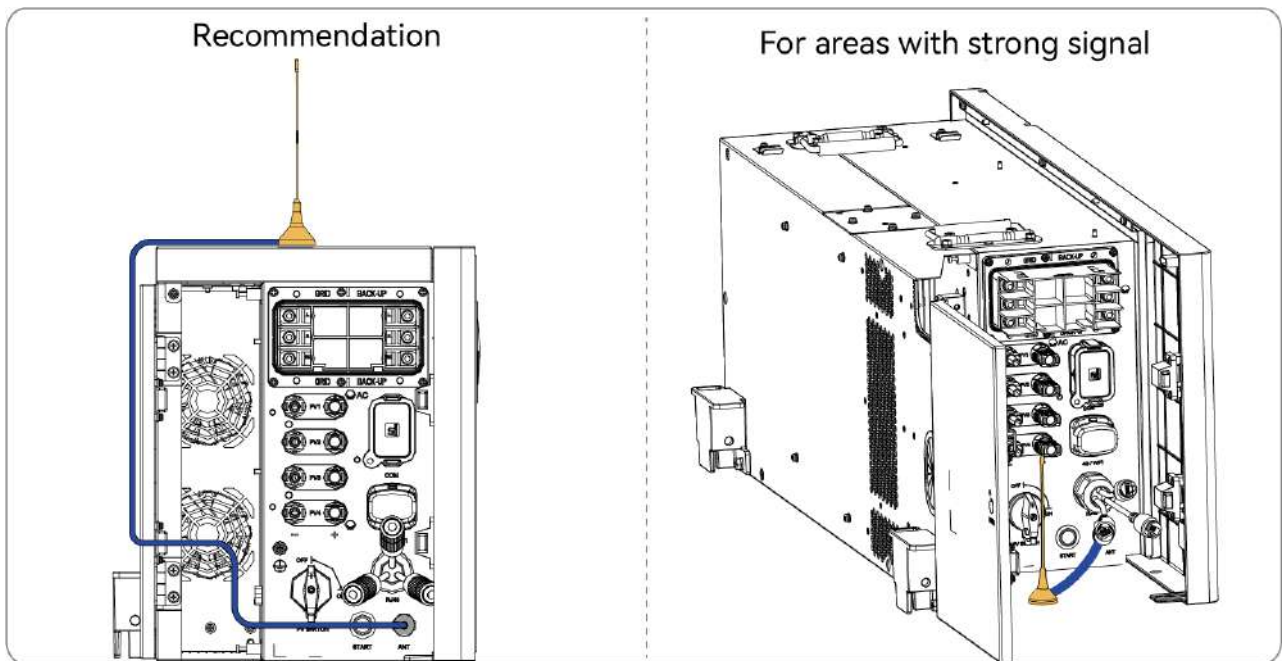
6.12. Connect the antenna

This procedure provides the instructions for installing the antennas used to establish wireless communication between the inverter and the meter.

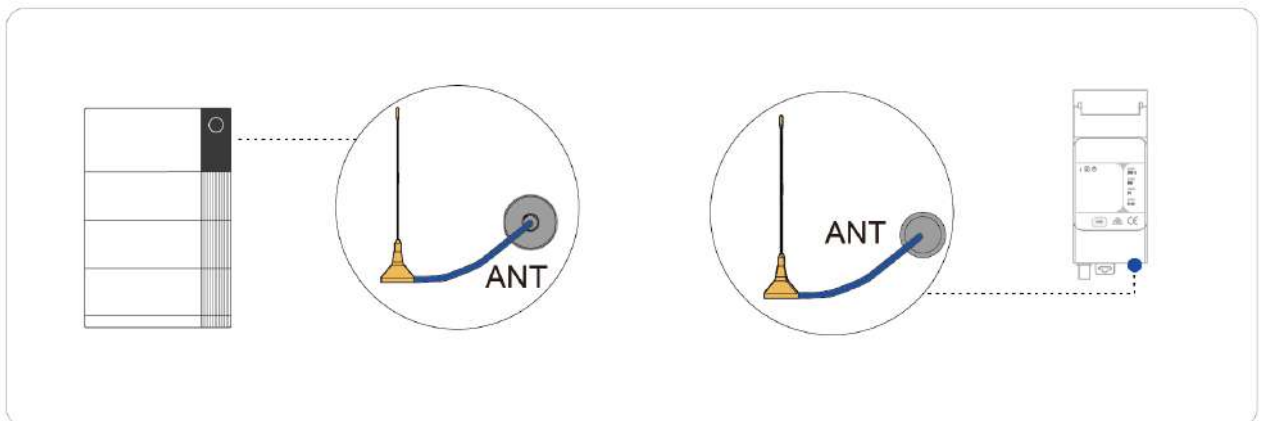
NOTICE

- If the RS-485 wired communication is used, skip this step.
- For better signal reception, install the antennas vertically on top of the inverter and the distribution box where the meter is installed. Otherwise, signal loss may occur.
- With the antennas installed, the inverter is pre-paired wireless with the meter included in delivery. If you want to replace or add a meter, pair the meter and inverter through elekeeper app as instructed in the digital User Manual.

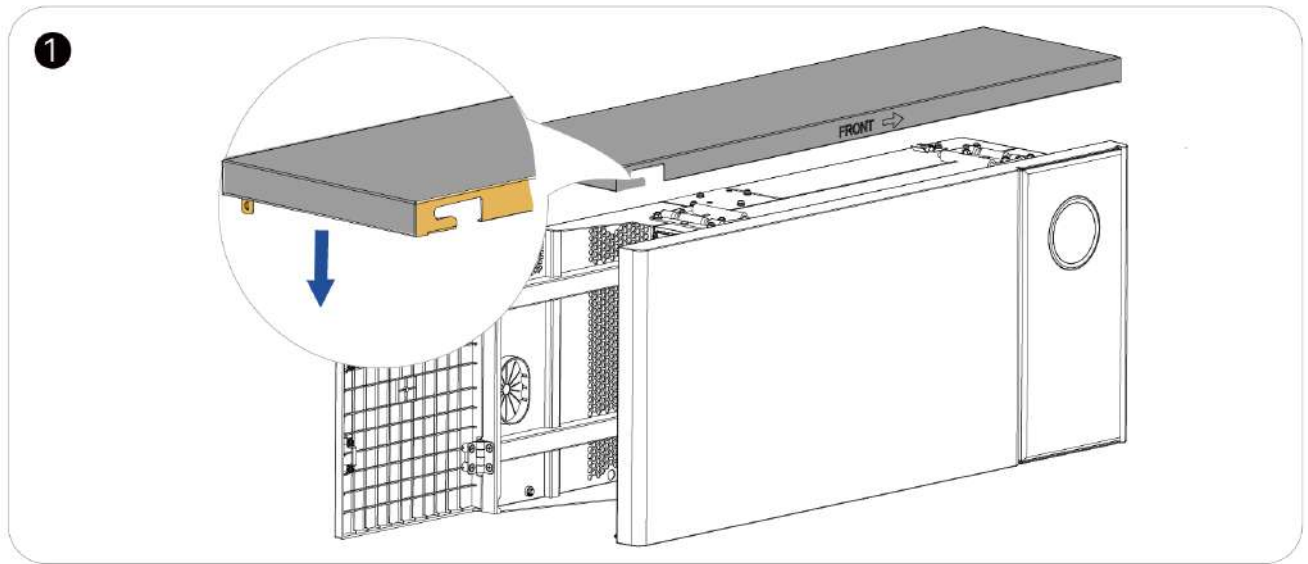
1. Connect the antenna on the inverter.



2. Connect the antenna on the meter.

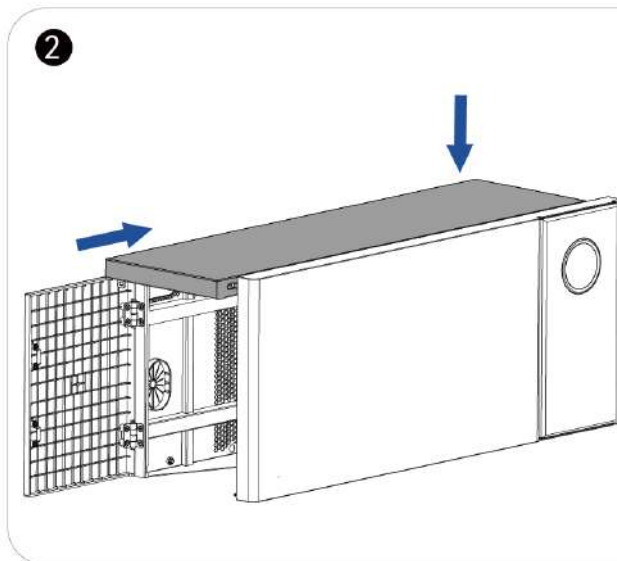
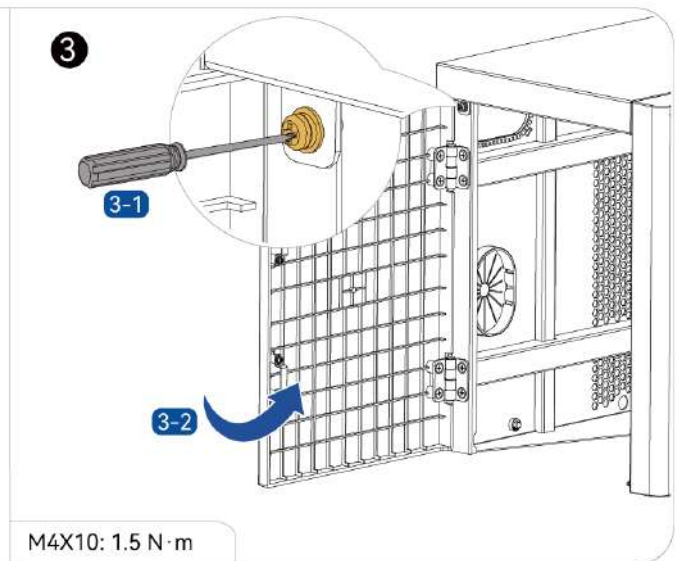


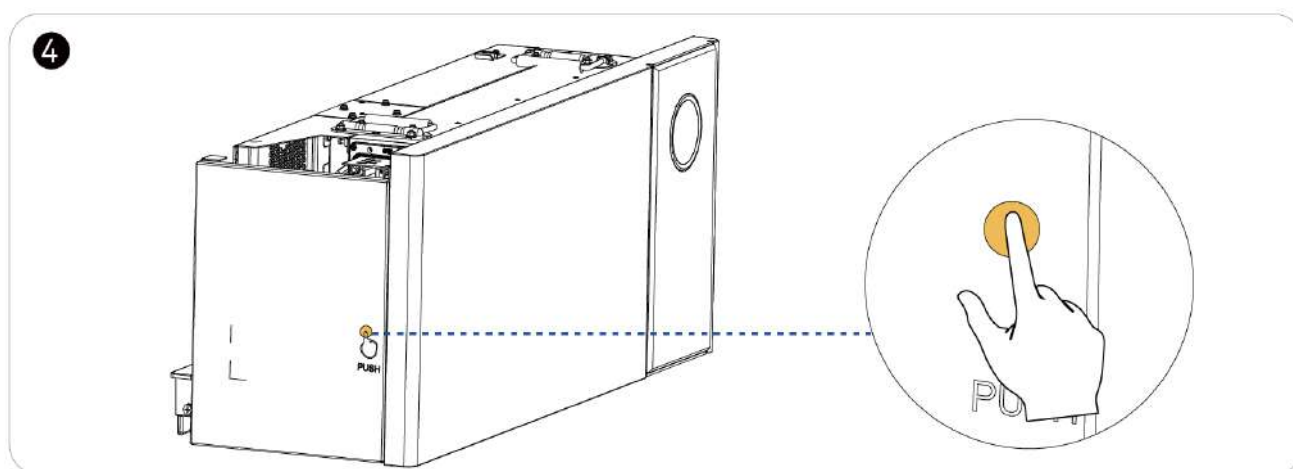
6.13. Install the inverter cover



Note:

Ensure that the removable top cover is securely fixed to prevent internal damage. Protective bonding continuity is verified at the fully assembled system level; the cover must be fitted as part of the system during this test.





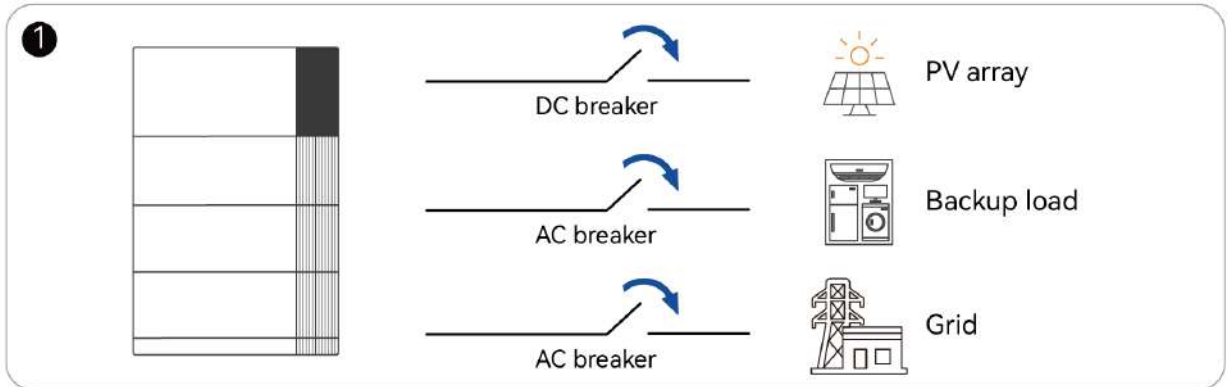
7. Start up the system

Before you begin

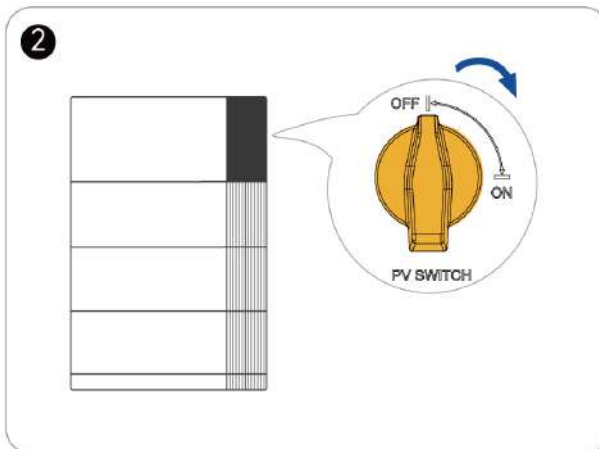
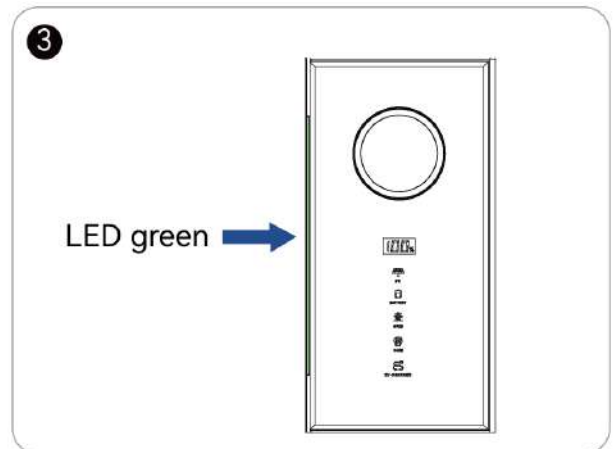
Verify that all the electrical connections are properly wired and secured before starting up the system.

• Method 1 for starting up the system

1. Open the AC distribution box, turn on the following circuit breakers in sequence.
 - a. The backup loads
 - b. The grid



2. On the inverter, turn on the **PV SWITCH** to enable the connection to the PV arrays.
3. Check the LED indicator status on the inverter panel to ensure that the inverter is running properly.

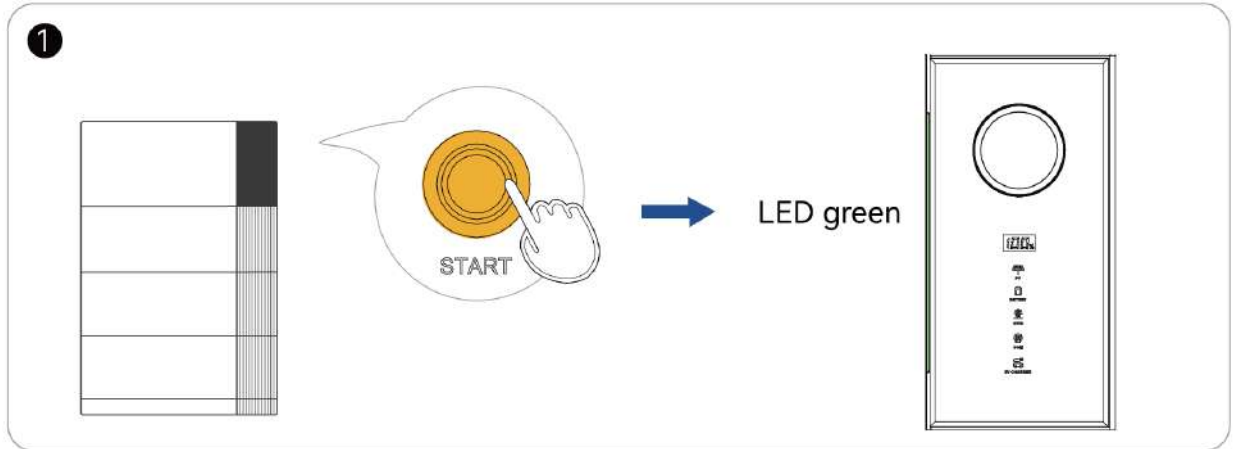


4. Download the elekeeper App and perform the system commissioning.

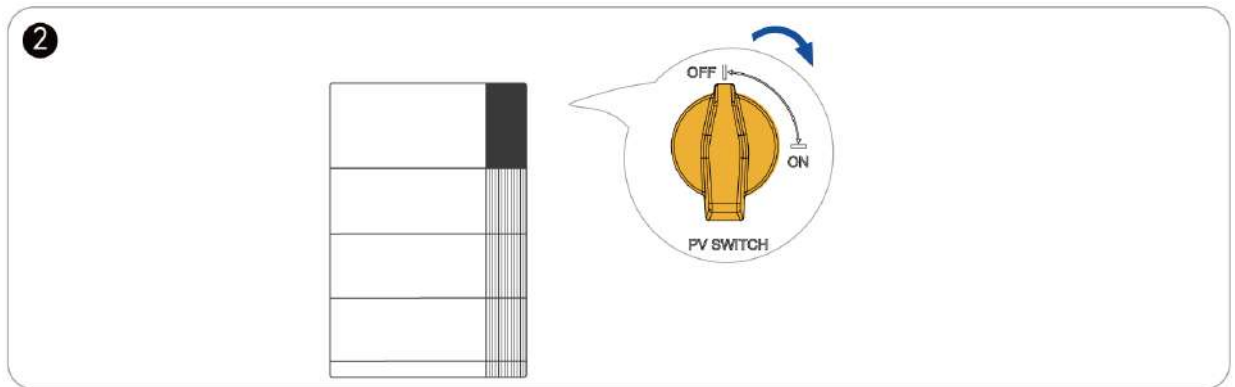


• Method 2 for starting up the system

1. On the left side of the inverter, press and hold the **START** button for 5 seconds until the LED indicator on the front panel is on.

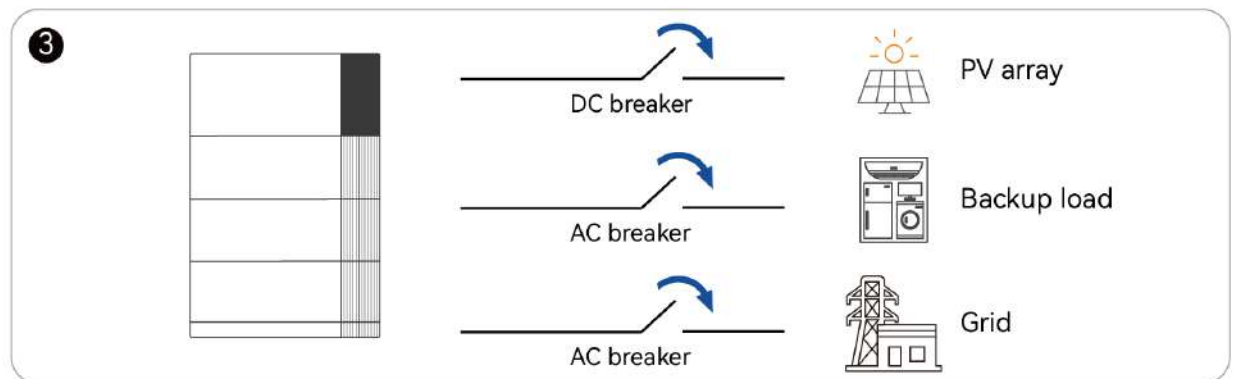


2. On the inverter, turn on the **PV SWITCH** to enable the connection to the PV arrays.



3. Open the AC distribution box, turn on the following circuit breakers in sequence.

- a. The backup loads
- b. The grid

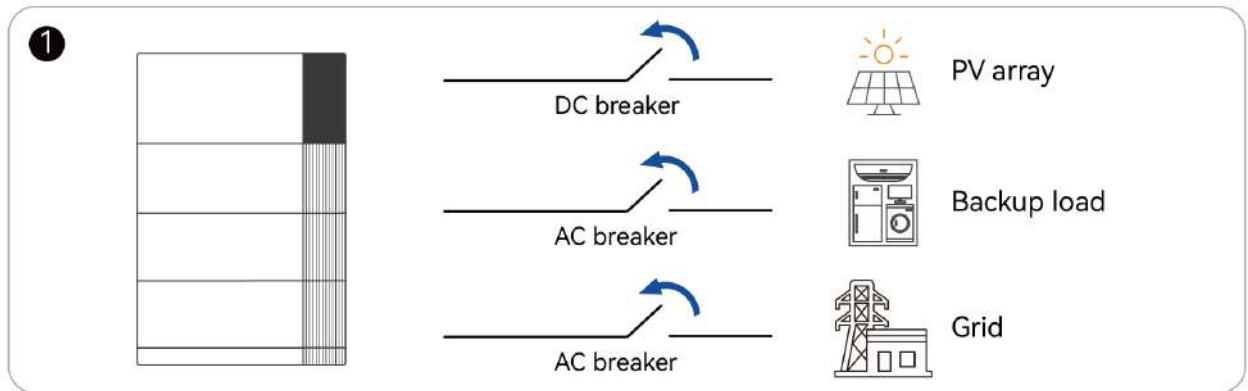


4. Download and elekeeper App and perform the system commissioning.

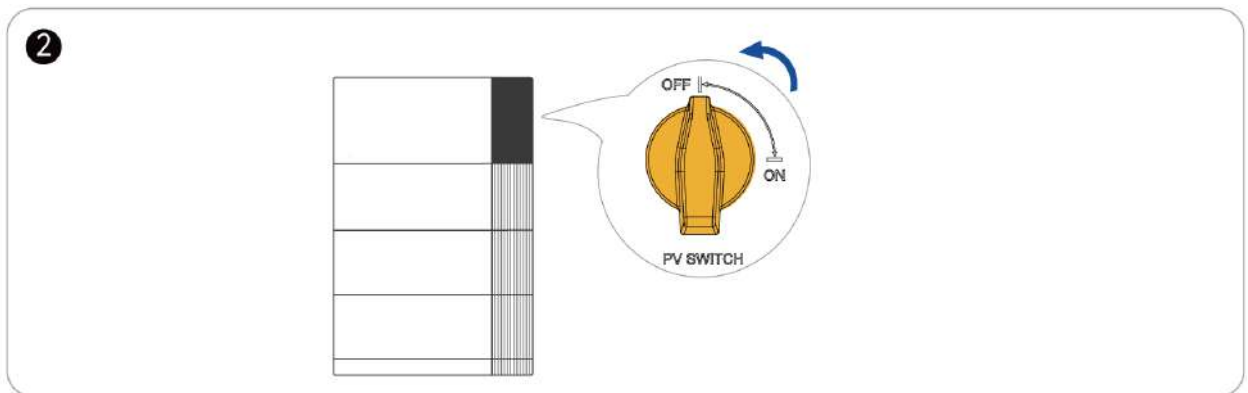


8. Shut down the system

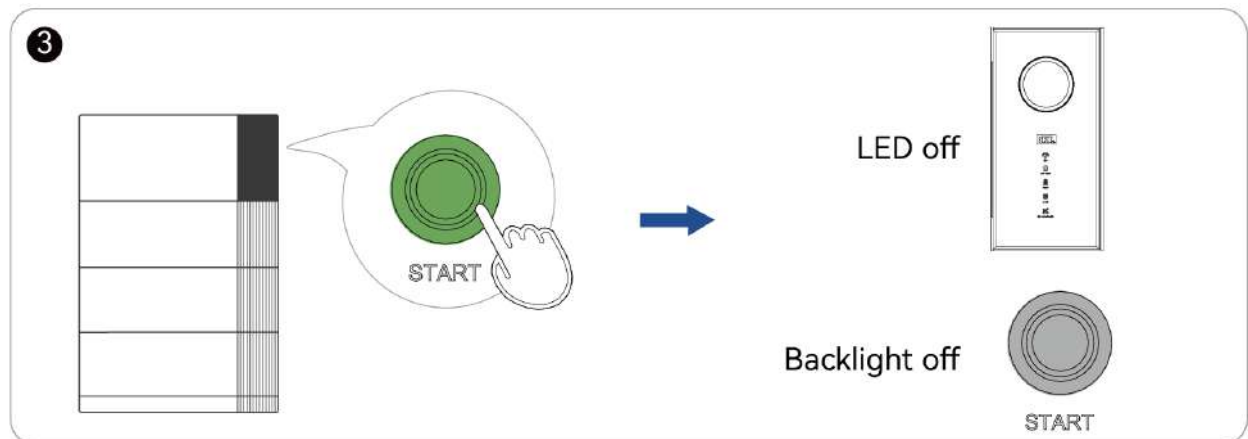
1. Open the AC distribution box, turn off the following circuit breakers:
 - a. The backup loads
 - b. The grid



2. On the left side of the inverter, turn off the **PV SWITCH** to disconnect from the PV arrays.



3. On the inverter, press and hold the **START** button for 5 seconds, and then release the button. Wait until both the button backlight and the LED indicator turn off.



Note: 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.

Note:

Battery module disconnection: Electronic switch. To disconnect the output, press and hold the **START** button for 5 seconds. This causes the battery module to shut down automatically and the main positive contactor to open.

9. System maintenance

9.1. Routine maintenance

To ensure that the system lifespan, perform the suggested routine maintenance operations.



Danger of electric shock

Before operating on the system for cleaning, cable inspection, component maintaining, power off the whole system. Do not open any product cover until 5 minutes after disconnecting all sources of supply.

Note:

To purchase the routine maintenance service, contact the installer, distributor, or **SAJ** product support.

System routine maintenance

Check item	Check method	Maintenance interval
System cleanliness	Check periodically whether the heat sinks are blocked or dirty.	Once every 6 to 12 months
Cleanness of air intake and exhaust vents	Check periodically whether there is dust or foreign objects at the air intake and exhaust vents: <ol style="list-style-type: none"> 1. Power off the whole system. 2. Remove dust and foreign objects. 3. If necessary, remove the baffle plates from the air intake and exhaust vents for cleaning. 	Once every 6 to 12 months (or once every 3 to 6 months based on the actual dust conditions in the environment)
Fan	Check whether the fan generates abnormal noise during operation. Check for and remove any foreign objects from the fan. If the abnormal noise persists, replace the fan.	Once every 6 to 12 months
System running status	<ol style="list-style-type: none"> 1. Check whether the inverter is damaged or deformed. 2. Check whether the inverter generates abnormal sound during operation. 3. Check whether all inverter parameters are correctly set during operation. 	Once every 6 months
Electrical connection	<ol style="list-style-type: none"> 1. Check whether cables are disconnected or loose. 2. Check whether cables are damaged, especially whether the cable sheath that contacts a metal surface is damaged. 	6 months after the first commissioning and once every 6 to 12 months after that
Grounding reliability	Check whether the PE cable is securely connected.	6 months after the first commissioning and once every 6 to 12 months after that
Sealing	Check whether all terminals and ports are properly sealed.	Once a year

Battery-specific routine maintenance

Check item	Check method	Maintenance interval
Battery routine maintenance (tool requirement)	<ol style="list-style-type: none"> 1. Use only manufacturer-provided professional tools to inspect, test, or service the battery pack. 2. Do not disassemble, modify, or perform maintenance on the battery pack without proper training and approved tools. 	Applicable to all battery maintenance activities
Battery module appearance	<ol style="list-style-type: none"> 1. Check the battery modules for swelling, deformation, cracks, liquid leakage, corrosion, or abnormal odor. 2. Check the battery enclosure for damage, deformation, or signs of overheating. 	Once every 6 to 12 months
Battery terminal and connection check	<ol style="list-style-type: none"> 1. Power off the entire system before performing any checks. 2. Inspect all battery terminals and connectors for looseness, oxidation, or signs of overheating. 3. Verify that all cable connections are tight and properly torqued to the specified value using manufacturer-approved tools. 	6 months after the first commissioning and once every 6 to 12 months after that
Battery operating status & parameters	<ol style="list-style-type: none"> 1. Check the battery pack status such as SOC, voltage, current, and temperature. 2. Ensure no cell voltage imbalance, over-temperature, or other alarms are reported. 3. Verify the battery communicates normally with the inverter/BMS. 	Once every 6 months
Battery ventilation and environment	<ol style="list-style-type: none"> 1. Check that the battery compartment and ventilation openings are free of dust, debris, or blockages. 2. Ensure the battery is installed in a well-ventilated, cool, and dry environment away from heat sources or direct sunlight. 	Once every 6 to 12 months (or once every 3 to 6 months in dusty environments)

9.2. Troubleshooting

For the errors reported as below, contact the service support for further assistance.

The troubleshooting operations must be performed by authorized technicians only.

Error code	Error message	Possible cause	Solution
1	Master Relay Error	<ol style="list-style-type: none"> 1. Live cable grounding occurred on the grid side. 2. The grid voltage is too low. 3. Inverter relay circuit is faulty. 	<ol style="list-style-type: none"> 1. Measure if the voltage between the ground cable and the neutral cable is greater than 10V. 2. Measure if the grid voltage is too low. 3. If the fault persists, please contact your installer.
2	Master EEPROM Error	The internal memory of the inverter is faulty.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. Check if any firmware upgrade is available and the selected firmware version is correct. 3. If the fault persists, please contact your installer.
3	Master Temperature High Error	Inverter over-temperature	<ol style="list-style-type: none"> 1. Check if the inverter's cooling duct is blocked. 2. Check if the inverter is installed in a direct sunlight location. 3. Check if the installation environment has adequate ventilation. 4. If the fault persists, please contact your installer.
4	Master Temperature Low Error	Inverter under-temperature	Check if the ambient temperature at the inverter installation location is too low. If not, please contact your installer.
5	Lost Communication M<->S	The internal communication of the inverter is lost.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
6	GFCI Device Error	The residual current detection device of the inverter is faulty.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
7	DCI Device Error	The DC component detection device of the inverter is faulty.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
8	Current Sensor Error	The current detection device of the inverter is faulty.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. Check if positive and negative terminals of the string MC4 connector are reversely connected. 3. If the fault persists, please contact your installer.
9	Master Phase1 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
10	Master Phase1 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the inverter AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
11	Master Phase2 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
12	Master Phase2 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the inverter AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
13	Master Phase3 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
14	Master Phase3 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
15	Grid Voltage 10Min High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
16	OffGrid Output Voltage Low	The battery derates its output power due to excessive load power at the off-grid port, low battery state of charge, or excessively high or low battery temperature.	<ol style="list-style-type: none"> 1. Reduce the load connected to the off-grid port. 2. Check if the battery state of charge is too low. 3. Check if the ambient temperature of the battery is too high or too low. 4. If the fault persists, please contact your installer.
17	OffGrid Output Short Circuit	The external wiring of the back-up port is short-circuited.	Correct the external wiring at the back-up port.
18	Master Grid Frequency High	The grid frequency exceeds the upper limit specified by the local grid code.	<ol style="list-style-type: none"> 1. Check if the selected inverter grid compliance is correct. 2. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 3. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
19	Master Grid Frequency Low	The grid frequency is below the lower limit specified by the local grid code.	<ol style="list-style-type: none"> 1. Check if the selected inverter grid compliance is correct. 2. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 3. If the fault persists, please contact your installer.
20	BATInputMode Error	The battery is connected in a non-parallel configuration.	<ol style="list-style-type: none"> 1. Check if the battery input configuration is correct. 2. If the battery input is in parallel mode, check if all battery connections are secure.
21	Phase1 DCV High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
22	Phase2 DCV High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
23	Phase3 DCV High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
24	Master No Grid Error	The inverter fails to detect the grid voltage.	<ol style="list-style-type: none"> 1. Check if the grid is available, the switch of the grid-connection box has tripped, or the inverter AC cables are securely connected. 2. If no problems are found, close the AC switch and reconnect to the grid. 3. If this fault persists, please contact your installer.
25	DC ReverseConnect Error	Reverse polarity exists at the PV or battery port.	Check the DC port wirings.
26	Parallel machine CAN Com Error	Parallel CAN communication fails.	Check the parallel CAN communication wirings.

Error code	Error message	Possible cause	Solution
27	GFCI Error	A ground residual current fault is detected at the plant.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches. Then Check if the AC output ground cable is secure and the AC wirings are correct. 2. Check the AC/DC cables and PV panels for damages and water ingress. 3. If no problems are found, restart the inverter. If this fault persists, please contact your installer.
28	Phase1 DCI High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
29	Phase2 DCI High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
30	Phase3 DCI High	The DCI of the AC output exceeds the limit.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
31	ISO Error	The insulation resistance of PV strings to ground is lower than the set value.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, check if the AC output ground wire is secure and the AC wirings are correct. 2. Check the AC/DC cables and PV panels for damages and water ingress. 3. If no problems are found, close the AC switch, then restart the inverter. If this fault persists, please contact your installer.
32	Bus Voltage Imbalance	The bus voltage is unbalanced.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
33	Master Bus Voltage High	The DC input voltage exceeds the allowable input limit of the inverter.	<ol style="list-style-type: none"> 1. Check the PV panel quantities in each string and calculate the open circuit voltage in each string to make sure they are lower than the maximum input voltage of the inverter. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer or the manufacturer's service center.
34	Master Bus Voltage Low	The inverter bus voltage is too low.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
35	Master Grid Phase Error	The rotation direction of three-phase grid sequence (L1/L2/L3) is incorrect.	<ol style="list-style-type: none"> 1. Verify and adjust the grid-side L1/L2/L3 phase sequence (normally clockwise L1-L2-L3), and adjust the phase sequence on the meter side accordingly. 2. If the measured voltage is normal and this fault persists, please contact your installer.
36	Master PV Voltage High	The inverter DC input voltage is too high.	<ol style="list-style-type: none"> 1. Check the PV panel quantities in each string and calculate the open circuit voltage in each string to make sure they are lower than the maximum input voltage of the inverter. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
37	Master Islanding Error	Islanding effect occurs due to grid loss.	<ol style="list-style-type: none"> 1. Check if the grid is available, the switch of the grid-connection box has tripped, or the inverter AC cables are securely connected. 2. If no problems are found, close the AC switch and reconnect to the grid. 3. If this fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
38	Master HW Bus Voltage High	The DC input voltage exceeds the allowable input limit of the inverter.	<ol style="list-style-type: none"> 1. Check the PV panel quantities in each string and calculate the open circuit voltage in each string to make sure they are lower than the maximum input voltage of the inverter. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
39	Master HW PV Current High	<ol style="list-style-type: none"> 1. The positive and negative poles of the string are reversed. 2. The inverter has internal damage. 	<ol style="list-style-type: none"> 1. Check if the positive and negative terminals of the string are reversed. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
40	Master Self-Test Failed	The power-on self-test of the inverter is abnormal.	Please contact your installer.
41	HW Inv Current High	The internal hardware protection circuit of the inverter detects that the current exceeds the safety threshold.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches and check if the AC cables are firmly connected. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
42	Master AC SPD Error	The AC lightning protection circuit is abnormal.	Please contact your installer.
43	Master DC SPD Error	The DC lightning protection circuit is abnormal.	Please contact your installer.
44	Master Grid NE Voltage Error	The L/N wires are reversed or the ground wire connection is abnormal.	<ol style="list-style-type: none"> 1. Measure if the voltage between the ground cable and the neutral cable is greater than 10V. If greater than 10V, it indicates the live cable is grounded. 2. If the above check is normal, please contact your installer.
45	Master Fan1 Error	The fan blade is stuck or damaged.	<ol style="list-style-type: none"> 1. Check if the external fan (if any) is working properly. 2. If the fan is working properly but this fault still persists, turn off the AC and DC switches for 5 minutes, then restart the inverter. 3. If this fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
46	Master Fan2 Error	The fan blade is stuck or damaged.	<ol style="list-style-type: none"> 1. Check if the external fan (if any) is working properly. 2. If the fan is working properly but this fault still persists, turn off the AC and DC switches for 5 minutes, then restart the inverter. 3. If this fault persists, please contact your installer.
47	Master Fan3 Error	The fan blade is stuck or damaged.	<ol style="list-style-type: none"> 1. Check if the external fan (if any) is working properly. 2. If the fan is working properly but this fault still persists, turn off the AC and DC switches for 5 minutes, then restart the inverter. 3. If this fault persists, please contact your installer.
48	Master Fan4 Error	The fan blade is stuck or damaged.	<ol style="list-style-type: none"> 1. Check if the external fan (if any) is working properly. 2. If the fan is working properly but this fault still persists, turn off the AC and DC switches for 5 minutes, then restart the inverter. 3. If this fault persists, please contact your installer.
49	Lost Communication between Master and Meter	The communication between the inverter and the meter is abnormal.	<ol style="list-style-type: none"> 1. Check if the meter is working properly. 2. Check if the communication cable between the inverter and meter is securely connected. 3. Check if the parameters for inverter-meter communication are correctly set, including communication address, baud rate, and so on. 4. If this fault persists, please contact your installer.
50	Lost Communication between M<->S	The internal communication of the inverter is lost.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
51	Lost Communication between inverter and Grid Meter	The communication between the inverter and the grid meter is abnormal.	<ol style="list-style-type: none"> 1. Check if the meter is working properly. 2. Check if the communication cable between the inverter and meter is securely connected. 3. Check if the parameters for inverter-meter communication are correctly set, including communication address, baud rate, and so on. 4. If this fault persists, please contact your installer.
52	HMI EEPROM Error	The internal memory of the inverter is faulty.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. Check if any firmware upgrade is available and the selected firmware version is correct 3. If the fault persists, please contact your installer.
53	HMI RTC Error	RTC fault.	Please contact your installer.
54	BMS Device Error	The battery is faulty.	Please contact your installer.
55	BMS Lost.Conn	The BMS fails to start properly.	<ol style="list-style-type: none"> 1. Check if the BMS button is enabled. 2. Check if the BMS button is lighted. 3. If the fault persists, please contact your installer.
56	CT Device Err	The CT device is faulty.	Please contact your installer.
57	AFCI Lost Com.Err	The communication of the AFCI board is interrupted.	Please contact your installer.
58	Lost Com.H<->S Err	The internal communication of the inverter is lost.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
59	Lost Communication between inverter and PV Meter	The communication between the inverter and the PV meter is lost.	<ol style="list-style-type: none"> 1. Check if the meter is working properly. 2. Check if the communication cable between the inverter and meter is securely connected. 3. Check if the parameters for inverter-meter communication are correctly set, including communication address, baud rate, and so on. 4. If this fault persists, please contact your installer.
60	EV_Lost.Conn Warn	The communication between the charger and the inverter is lost.	Please contact your installer.

Error code	Error message	Possible cause	Solution
61	Slave Phase1 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
62	Slave Phase1 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the inverter AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
63	Slave Phase2 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
64	Slave Phase2 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
65	Slave Phase3 Voltage High	The grid voltage exceeds the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too high. 2. Check if the inverter AC output cables are securely connected and if the grid connection cables are too thin. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
66	Slave Phase3 Voltage Low	The grid voltage is below the limit permitted by the inverter grid compliance.	<ol style="list-style-type: none"> 1. Check if the grid voltage is too low. 2. Check if the AC output cables are securely connected. 3. Check if the selected inverter grid compliance is correct. 4. If the fault persists, please contact your installer.
67	Slave Frequency High	The grid frequency exceeds the upper limit specified by the local grid.	<ol style="list-style-type: none"> 1. Check if the selected inverter grid compliance is correct. 2. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 3. If the fault persists, please contact your installer.
68	Slave Frequency Low	The grid frequency is lower than the lower limit specified by the local grid.	<ol style="list-style-type: none"> 1. Check if the selected inverter grid compliance is correct. 2. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 3. If the fault persists, please contact your installer.
69	DCDC_Lost.Conn Warn	The communication between the DCDC device and the inverter is lost.	Please contact your installer.
70	DCDC_ Device Error	The DCDC device is faulty.	Please contact your installer.
71	Parall CAN Lost Com. Err	The number of online parallel units read by the parallel master is inconsistent with the configured parallel quantity.	<ol style="list-style-type: none"> 1. Check if the configured ID of the secondary unit is correct. 2. Check if the CAN communication cable for parallel connection is properly plugged in. 3. If the fault persists, please contact your installer.
72	LCD Lost comm.Err	The inverter fails to receive communication data from the LCD.	<ol style="list-style-type: none"> 1. Check if the communication cable between the LCD and the inverter is securely connected. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
73	Slave No Grid Error	The inverter cannot detect the grid voltage.	<ol style="list-style-type: none"> 1. Check if the grid is available, the switch of the grid-connection box has tripped, or the inverter AC cables are securely connected. 2. If no problems are found, close the AC switch and reconnect to the grid. 3. If this fault persists, please contact your installer.
74	Slave PV Input Mode Error	The PV mode selection is incorrect.	<ol style="list-style-type: none"> 1. Check if the inverter's string mode is set correctly. 2. If the fault persists, please contact your installer.
75	Slave HW PV Curr High	<ol style="list-style-type: none"> 1. The positive and negative terminals of the string are connected inversely. 2. The inverter has internal damage. 	<ol style="list-style-type: none"> 1. Check if the positive and negative terminals of the string are reversed. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
76	Slave PV Voltage High	The DC input voltage of the inverter is too high.	<ol style="list-style-type: none"> 1. Check the PV panel quantities in each string and calculate the open circuit voltage in each string to make sure they are lower than the maximum input voltage of the inverter. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
77	Slave HW Bus Volt High	The DC input voltage exceeds the allowable input limit of the inverter.	<ol style="list-style-type: none"> 1. Check the PV panel quantities in each string and calculate the open circuit voltage in each string to make sure they are lower than the maximum input voltage of the inverter. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
78	Grid Power Emergency Disconnect	The grid AC relay disconnects according to the command from the external device.	Please contact your installer.
80	Software version mismatch	The software versions of parallel devices are inconsistent.	Perform unified upgrade via the cloud platform or manually upgrade to the same version.

Error code	Error message	Possible cause	Solution
81	Lost Communication D<->C	The internal communication of the inverter is lost.	<ol style="list-style-type: none"> 1. Turn off the AC and DC switches, wait for 5 minutes, then restart the inverter. 2. If the fault persists, please contact your installer.
83	Master Arc Device Error	The arc fault device is faulty.	Please contact your installer.
84	Master PV Mode Error	Incorrect PV mode is selected.	<ol style="list-style-type: none"> 1. Check if the inverter's string mode is set correctly. 2. If the fault persists, please contact your installer.
85	Authority expires	The authorization has expired.	Please contact your installer.
86	DRMO Error	The DRMO is faulty.	Please contact your installer.
87	Master Arc Error	DC arcing is caused by DC short circuit or poor terminal contact.	<ol style="list-style-type: none"> 1. Check if the terminals are in good contact and if the PV positive/negative to ground insulation is normal. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
88	Master SW PV Current High	1. The positive and negative terminals of the string are connected inversely. 2. The inverter has internal damage.	<ol style="list-style-type: none"> 1. Check if the positive and negative terminals of the string are reversed. 2. If no problems are found, close the AC switch and restart the inverter. 3. If the fault persists, please contact your installer.
89	Battery Voltage High	The battery voltage is too high.	<ol style="list-style-type: none"> 1. The battery voltage is higher than the maximum voltage of the inverter. 2. If the fault persists, please contact your installer.
90	Battery Current High	The battery cannot output power due to low battery SOC or excessive load.	<ol style="list-style-type: none"> 1. Reduce the back-up load. 2. Charge the battery or stop using the battery. 3. If the remaining battery capacity and load are normal, but the fault persists, contact your installer.
91	Battery Charge Voltage High	The battery voltage is too high during charging.	<ol style="list-style-type: none"> 1. Do not power off the battery during charging. 2. Restart the battery and the inverter. 3. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
92	Battery OverLoad	The battery cannot output power due to low battery SOC or excessive load.	<ol style="list-style-type: none"> 1. Reduce the back-up load. 2. Charge the battery or stop using the battery. 3. If the remaining battery capacity and load are normal, but the fault persists, please contact your installer.
93	Battery SoftConnet TimeOut	The battery failed to pre-charge the bus.	Please contact your installer.
94	Output OverLoad	The connected load exceeds the maximum output power of H2.	<ol style="list-style-type: none"> 1. Reduce the connected load. 2. If this fault persists, please contact your installer.
95	Battery Open Circuit	The inverter cannot detect the battery voltage.	<ol style="list-style-type: none"> 1. Check if the battery breaker is turned on. 2. Check if the battery power cable is securely connected. 3. If the fault persists, please contact your installer.
96	Battery Discharge Voltage Low	Low voltage is detected during battery discharge overload.	<ol style="list-style-type: none"> 1. Do not turn off the battery during discharging. 2. The battery voltage is too low, which leads to system protection.
97	BMS Internal Communication Error	<ol style="list-style-type: none"> 1. The communication between the battery high-voltage box and the battery pack is abnormal. 2. The last battery pack is not equipped with a resistor plug, causing the high-voltage box to identify an abnormal number of battery packs. 	<ol style="list-style-type: none"> 1. Check if the communication cable is correctly connected. 2. Check if the last battery pack has a plug. 3. If the fault persists, please contact your installer.
97	BMS Internal Communication Error	Internal BMS communication is lost.	<ol style="list-style-type: none"> 1. Check if the communication cable is correctly connected. 2. Check if the last battery pack has a plug. 3. Check if the communication cable is abnormal. 4. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
98	Bat Sequence Error	Battery pack communication is abnormal.	<ol style="list-style-type: none"> 1. Check if the communication cable is correctly connected. 2. Check if the last battery pack has a plug. 3. Check if the communication cable is abnormal. 4. If the fault persists, please contact your installer.
99	Discharge Over Current Protection	The discharge current exceeds the set threshold.	<ol style="list-style-type: none"> 1. Wait for the fault to clear or restart the system. 2. If the fault persists, please contact your installer.
100	Charge Over Current Protection	The charge current exceeds the set threshold.	<ol style="list-style-type: none"> 1. Wait for the fault to clear or restart the system 2. If the fault persists, please contact your installer.
101	Module Under Voltage Protection	The total voltage is lower than the set threshold.	<ol style="list-style-type: none"> 1. Force-charge the battery. 2. If the fault persists, please contact your installer.
102	Module Over Voltage Protection	The total voltage is higher than the set threshold.	<ol style="list-style-type: none"> 1. Wait for the fault to clear or restart the system. 2. If the fault persists, please contact your installer.
103	Single Cell Under Voltage Protection	The cell voltage is lower than the set minimum value.	<ol style="list-style-type: none"> 1. Force-charge the battery. 2. If the fault persists, please contact your installer.
104	Single Cell Over Voltage Protection	The cell voltage is higher than the set threshold.	<ol style="list-style-type: none"> 1. Wait for the fault to clear or restart the system. 2. If the fault persists, please contact your installer.
105	BMS Hardware Error	<ol style="list-style-type: none"> 1. The cell voltage detection module is faulty. 2. The temperature detection module is faulty. 3. The current detection module is faulty. 	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
106	Charging temperature low protection	The battery is charged below 0°C.	<ol style="list-style-type: none"> 1. Wait for the battery to warm up until the fault clears. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
107	Charging temperature high protection	The battery temperature is too high.	<ol style="list-style-type: none"> 1. Wait for the battery to cool down until the fault clears. 2. If the fault persists, please contact your installer.
108	Discharging temperature low protection	The relay is opened to stop discharge as the battery temperature is too low.	<ol style="list-style-type: none"> 1. Wait for the battery to warm up until the fault clears. 2. If the fault persists, please contact your installer.
109	Discharging temperature high protection	The battery temperature is too high.	<ol style="list-style-type: none"> 1. Wait for the battery to cool down until the fault clears. 2. If the fault persists, please contact your installer.
110	BMS Relay Error	1. The negative or positive relay is welded. 2. The negative or positive relay fails to close.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
111	Pre-charge Error	1. The precharge relay is damaged. 2. The precharge resistor is open-circuited. 3. The BMS is damaged.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
112	BMS Insulation Error	The battery pack may have leakage.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
113	BMS supplier Incompatibility	The BMS used by the battery pack is incompatible with that of the high-voltage box.	Please contact your installer.
114	Battery cell supplier incompatibility	The cell manufacturers of battery packs are inconsistent.	Please contact your installer.
115	Battery cell incompatibility	The cell grades of battery packs are inconsistent.	Please contact your installer.
116	Battery pack models or grades are inconsistent	The model or grade of the battery pack is mismatched.	Please contact your installer.
117	Circuit Breaker Is Open	1. The battery circuit breaker is not closed. 2. The auxiliary contact of the battery circuit breaker is abnormal.	<ol style="list-style-type: none"> 1. Close the battery circuit breaker. 2. If the fault persists, please contact your installer.
118	Temperature Difference Is Too Wide	The temperature detection module is faulty.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
119	Voltage Difference Is Too Wide (Class II)	The sampling wire is loose.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.

Error code	Error message	Possible cause	Solution
120	Voltage Difference Is Too Wide (Class I)	The sampling wire is loose.	<ol style="list-style-type: none"> 1. Restart the system. 2. If the fault persists, please contact your installer.
121	BMS Over Temperature Protect	1. The ambient temperature is too high. 2. The battery is overloaded.	<ol style="list-style-type: none"> 1. Check if the ambient temperature of the battery is too high. 2. If the temperature is normal, leave the battery for 30 minutes, then restart it. 3. If the fault persists, please contact your installer.
122	Short Circuit Protect	The positive and negative terminals of the battery are short-circuited.	<ol style="list-style-type: none"> 1. Check if the battery's wiring is correct. 2. If the fault persists, please contact your installer.
123	Total voltage match failed	Contact technical support for troubleshooting.	Please contact your installer.
124	The system is locked	Contact technical support for troubleshooting.	Please contact your installer.
125	FUSE error protection	Contact technical support for troubleshooting.	Please contact your installer.
126	Voltage on charging port is high protection	Contact technical support for troubleshooting.	Please contact your installer.
127	Heating film overtemperature protection	Contact technical support for troubleshooting.	Please contact your installer.
128	Abnormal temperature increases	Contact technical support for troubleshooting.	Please contact your installer.
129	Heating-Film Detect Fault	No heating film is detected by the BMS.	Please contact your installer.
130	DCDC-BMS Comm Lost	The communication between the battery module DCDC and the BMS is abnormal.	Please contact your installer.
131	Auxiliary Supply Voltage Abnormal Fault	The circuit of the auxiliary supply is not functioning properly.	Please contact your installer.
132	Heatsink High Temperature Fault	The temperature of the heat sink in the DCDC exceeds the upper threshold.	Please contact your installer.
133	PCB High Temperature Fault	The temperature of the PCB in the DCDC exceeds the upper threshold.	Please contact your installer.
134	SOH Low Fault	The battery has poor state of health (SOH).	Please contact your installer.
135	Heating-Film Short-Circuit Fault	The battery module's heating film short-circuited.	Please contact your installer.

Error code	Error message	Possible cause	Solution
136	Heating-Film Open-Circuit Fault	The circuit of the battery module's heating film is open.	Please contact your installer.
137	Heating-Film Over-Current Fault	The resistance of the battery module's heating film is abnormal.	Please contact your installer.
138	Aerosol Abnormal Fault	The aerosol density of the battery module's heating film is abnormal.	Please contact your installer.
139	Button Stuck Fault	The button sends abnormal signals or the button is stuck.	Please contact your installer.
140	Fan Fault	The fan of the DCDC is not functioning properly.	Please contact your installer.
141	Inverter-BMS Comm Lost	The communication between the BMS and the inverter is abnormal.	Please contact your installer.
162	Gen Start or Stop Error	Check the connection cable between the diesel generator and the inverter.	Please contact your installer.
225	Battery Software Overvoltage Fault	The voltage is too high during battery charging.	Please contact your installer.
226	Battery Software Undervoltage Fault	Low voltage is detected during battery discharge overload.	Please contact your installer.
227	Battery Discharge Software Overcurrent Fault	The battery cannot output power due to excessive load.	Please contact your installer.
228	Battery Charge Software Overcurrent Fault	The battery cannot output power due to excessive charge current.	Please contact your installer.
229	Battery Discharge Overpower Fault	The battery cannot output power due to excessive discharge power.	Please contact your installer.
230	Battery Charge Overpower Fault	The battery cannot output power due to excessive charge power.	Please contact your installer.
233	Battery Hardware Overvoltage Fault	Protection is triggered because the battery voltage exceeds the hardware protection point.	Please contact your installer.
234	Battery Hardware Overcurrent Fault	Protection is triggered because the battery current exceeds the hardware protection point.	Please contact your installer.
237	Battery Voltage Exceeds BMS Upper Limit Fault	The battery voltage exceeds the BMS over-voltage protection limit.	Please contact your installer.
238	Battery Voltage Exceeds BMS Lower Limit Fault	The battery voltage is below the BMS under-voltage protection limit.	Please contact your installer.
239	Battery Side Precharge Fault	The DCDC precharge MOS precharge times out.	Please contact your installer.

Error code	Error message	Possible cause	Solution
241	Bus Voltage Overvoltage Fault	The output voltage on the high-voltage side of the battery pack DCDC exceeds the software overvoltage limit.	Please contact your installer.
242	Bus Voltage Undervoltage Fault	The output voltage on the high-voltage side of the battery pack DCDC is below the software undervoltage limit.	Please contact your installer.
243	Bus Discharge Overcurrent Fault	The discharge current on the high-voltage side of the battery pack DCDC exceeds the software current limit.	Please contact your installer.
244	Bus Charge Overcurrent Fault	The charge current on the high-voltage side of the battery pack DCDC exceeds the software current limit.	Please contact your installer.
245	Bus Discharge Overpower Fault	The discharge power on the high-voltage side of the battery pack DCDC exceeds the software power limit.	Please contact your installer.
246	Bus Charge Overpower Fault	The charge power on the high-voltage side of the battery pack DCDC exceeds the software power limit.	Please contact your installer.
247	Bus Hardware Overvoltage Fault	The output voltage on the high-voltage side of the battery pack DCDC exceeds the hardware overvoltage limit.	Please contact your installer.
248	Bus Hardware Overcurrent Fault	The charge and discharge current on the high-voltage side of the battery pack DCDC exceeds the hardware overcurrent limit.	Please contact your installer.
249	Hardware Resonant Chamber Overcurrent Fault	The resonant tank current on the high-voltage side of the battery pack DCDC exceeds the hardware overcurrent limit.	Please contact your installer.
250	Auxiliary Power Source Fault	The internal auxiliary power supply of the battery pack is abnormal.	Please contact your installer.
251	Hardware Protection Signal Fault	A hardware protection fault is triggered by any of the following: battery overcurrent, battery overvoltage, bus overvoltage, or bus overcurrent.	Please contact your installer.
252	Bus Voltage Differential Fault	A fault occurs when the deviation of detected bus voltage among battery packs exceeds the limit.	Please contact your installer.
253	BMS Protection Signal Fault	BMS asserts the DCDC protection pin.	Please contact your installer.

Error code	Error message	Possible cause	Solution
254	Software Resonant Chamber Overcurrent Fault	Overcurrent occurs in the resonant tank on the high-voltage side of DCDC.	Please contact your installer.
255	Soft Start Abnormal Fault	Soft-start timeout of the DCDC bus voltage.	Please contact your installer.
257	Heatsink High Temperature Fault	The temperature of the internal DCDC heat sink exceeds the high-temperature limit.	Please contact your installer.
258	Heatsink Low Temperature Fault	The temperature of the internal DCDC heat sink is below the low-temperature limit.	Please contact your installer.
259	PCB High Temperature Fault	The temperature of the internal DCDC PCB exceeds the high-temperature limit.	Please contact your installer.
260	PCB Low Temperature Fault	The temperature of the internal DCDC PCB is below the low-temperature limit.	Please contact your installer.
261	Fan Fault	The internal DCDC fan fails to operate properly.	Please contact your installer.
262	Heating Film Fault	The heating film switch on the DCDC side cannot be turned off.	Please contact your installer.
263	Heatsink Temperature Sensor Line Faulty	The temperature sensing wire of the internal DCDC heat sink is open-circuited.	Please contact your installer.
264	PCB Temperature Sensor Line Faulty	The temperature sensing wire of the internal DCDC PCB is open-circuited.	Please contact your installer.

10. Commissioning on App

10.1. Download and log in to the elekeeper App

10.1.1. About elekeeper

The SAJ elekeeper Application Version 5.0 is an easy-to-use, AI-powered energy management platform designed for homeowners and businesses with full ecosystem autonomous AI control. It gives the Owner full control over their energy - from generation and storage to consumption and selling - through a single App that works on phones, tablets, and computers. The platform provides the following AI-powered modules:

- **AI Care:** provides six-dimensional system diagnosis and 24/7 system protection.
- **AI Saving:** provides AI-powered working strategy adaptation for various scenarios to maximize user revenue.
- **AI Keeper:** provides intelligent functions including full voice autonomous control, user intent recognition, , electricity data analysis, and autonomous task planning.

10.1.2. Download the elekeeper App

Search for "elekeeper" in the App store and download the App.

Alternatively, scan the below QR code to download the App.



10.1.3. Sign up at the elekeeper App

The end user, installer, or distributor can follow this procedure to sign up at the elekeeper App. The installer can also follow this procedure to create an account for the end user.

Note: Recommend activating the Location Services on the phone for optimum utilization of the functions.

1. Open the App and tap **Sign Up** on the login page.



2. Select the country of the installation site and the user role.

The 'Sign Up' screen displays a 'Please select your country' dropdown menu with 'Algeria' selected. Below it, the 'Corresponding Server' is set to 'International Node'. The 'Please select your role' section offers three options: 'End User' (End Product User), 'Installer' (Retail/Installation/Service), and 'Distributor' (Product & End User services only). A 'Next' button is at the bottom.

Parameter	Description
Corresponding Server	The server is set automatically depending on the selected country.
Please select your role	<ul style="list-style-type: none"> • End User: The owner of the power plant. Select this option when the installer is signing up for the end user. • Installer: The installation and retail service providers. • Distributor: The distribution service provider.

Table 10.1. Signup parameters

- For the **End User** role, fill in the user information accordingly.

The 'Register the owner's account' screen is split into two parts. The left part contains fields for 'User Name', 'Email' (with a 'Send Code' button), 'Password', and 'Confirm Password'. The right part contains fields for 'Supervisor Installer', 'Country' (set to Belgium), 'Time Zone' (set to UTC+01:00), 'Town/City', 'Postal Code', and 'Detailed address'. At the bottom right, there is a checkbox for 'I Agree (Owner Privacy Policy) And (User Registration Agreement)' and a 'Sign Up' button.

- For the **Installer** role, either create a company or join an existing company to provide the information accordingly.
To create a company:

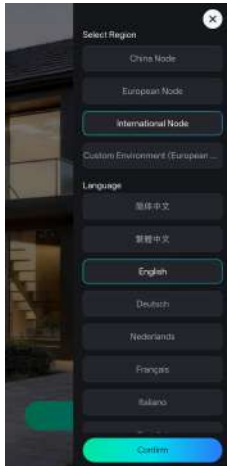
To join a company:

To check an existing user's company code, open page **My**:

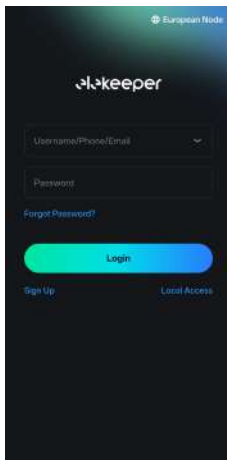
- For the **Distributor** role, provide similar information as the **Installer** role.

10.1.4. Log in to the elekeeper App

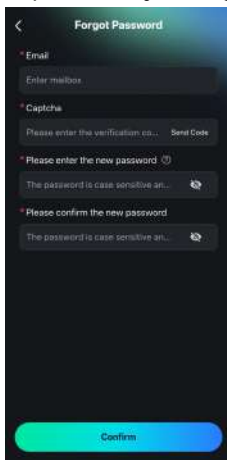
1. Open the App and tap the globe icon  on the top right corner.
2. Select the **Region** and **Language** depending on the installation site of the system.



3. Log in with the username, phone number, or email.



4. (Optional) If you forgot your password, reset your password with email verification.



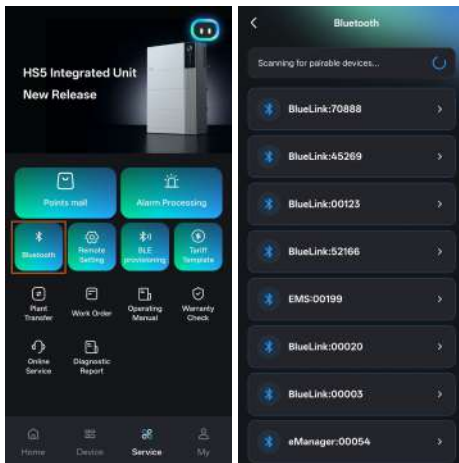
10.2. Initialization and installation diagnosis

10.2.1. Perform one-click initialization

1. On page **Service**, tap **Bluetooth**. Select the communication module, inverter or EMS according to the last five digits of the serial number (SN).

Example:

- **BlueLink: 45269** for a communication module or inverter.
- **EMS: 00199** for EMS units.



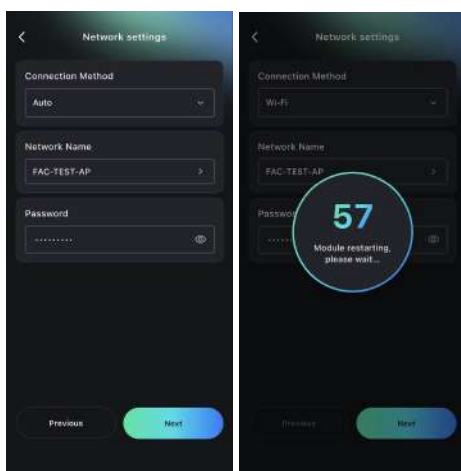
2. Tap **One-Click Initialize** to start initialization.

Example:



3. Configure the network parameters.

Example:



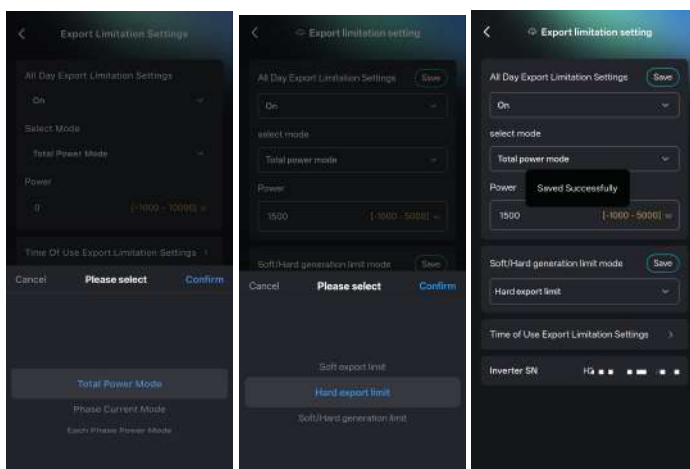
Example:

Parameter	Description
Connection Method	The network connection type. <ul style="list-style-type: none"> • Auto • Wi-Fi • Ethernet: ensure that the Ethernet cable is connected to the router.
Network Name	The Wi-Fi network to connect to.
Password	The password for the selected Wi-Fi network.

4. Configure the export limitation function.

The export limitation function controls the maximum power that the inverter exports to the grid.

Example:

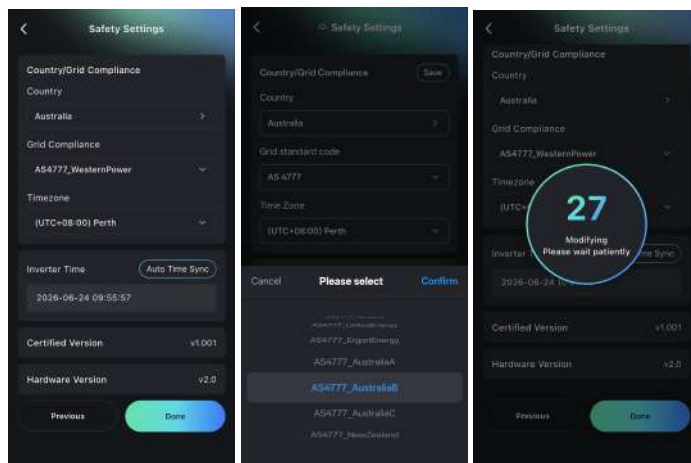


Parameter	Description
All Day Export Limitation Settings	Enable or disable the export power limitation function that runs continuously throughout the entire day.

Parameter	Description
Select Mode	<p>The modes for the export power limitation function.</p> <ul style="list-style-type: none"> • Total Power Mode • Phase Current Mode • Each Phase Power Mode <p>Phase Current Mode and Each Phase Power Mode are only applicable for three-phase inverters.</p>
Power	The export power limit value.
Soft/Hard generation limit mode	<ul style="list-style-type: none"> • Soft export limit: enable software limit control only, and the export limit is the user-defined power limit value. <ul style="list-style-type: none"> – In case of communication loss, the inverter exports power within the AC grid output power limit. – In 60 seconds after communication recovery, the export limit is controlled by the user-defined power limit value again. • Hard export limit: enable both software and hardware limit controls. <ul style="list-style-type: none"> – When the export power exceeds the user-defined limit for 5 seconds, the inverter enters standby mode. The inverter restarts automatically in 60 seconds, gradually ramping up its output power. – In case of communication loss for 5 seconds, the inverter stops working. • Soft/Hard generation limit: the control mode is similar to Hard export limit. Only that the inverter enters standby mode when the export power exceeds the user-defined limit for 15-20 seconds. <p>Note: This parameter is only applicable for specific grid code according to local regulations.</p>
Time Of Use Export Limitation Settings	<p>The time-specific settings that take priority over the All Day Export Limitation Settings. The settings can be executed once on specific time and date or repeatedly as a loop.</p>

5. Configure the safety parameters.

Example:



Parameter	Description
Country	The equipment installation location.

Parameter	Description
Grid Compliance	<p>Select the grid compliance according to your installation location.</p> <p>Taking Australia as an example, select the specific type of compliance according to the owner's grid configuration.</p> <ul style="list-style-type: none"> . AS4777_AustraliaA: For large interconnected power system. . AS4777_AustraliaB: For small interconnected power systems. For example, Western Power. . AS4777_AustraliaC: For isolated or remote power systems. For example, Horizon Power and TasNetworks.
Inverter Time	Tap Auto Time Sync to sync the inverter time to the time of the device running the App.

10.2.2. Perform installation diagnosis

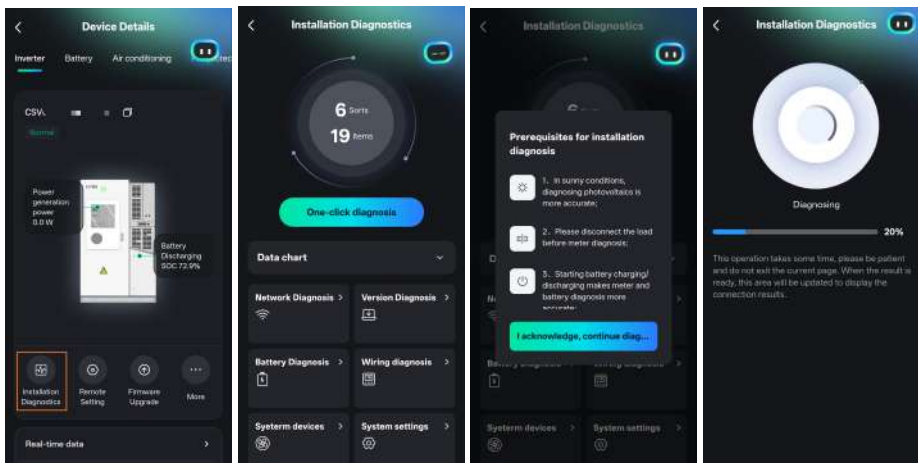
After the inverter initialization is completed, perform one-click installation diagnosis to verify the installation status of the system, including the network connection, battery settings, wiring status, and so on.

1. On the **Home** page, tap the device name to open the **Device Details** page.

Example:



2. Tap **Installation Diagnostics** to start one-click diagnosis.



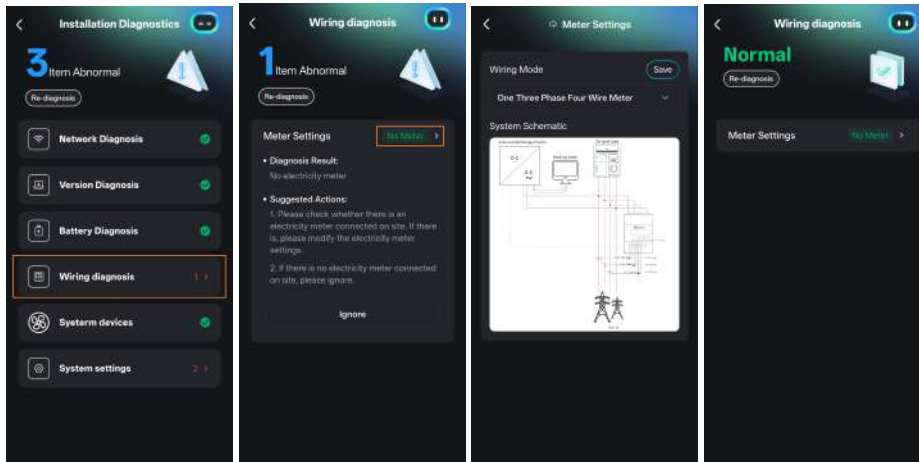
Note: If the software versions of the product are too low, follow the prompt-up to upgrade the system version first.

3. Check the faulty diagnostics results and take the suggested actions.

Example:

- a. Tap **Wiring diagnosis** to check the detailed issue and suggested actions.
- b. Tap **No Meter** to change the meter settings where applicable or ignore this issue.

- c. Tap **Re-diagnosis** to run the check again.
- d. Take necessary actions until the issue is resolved.



10.3. Plant management

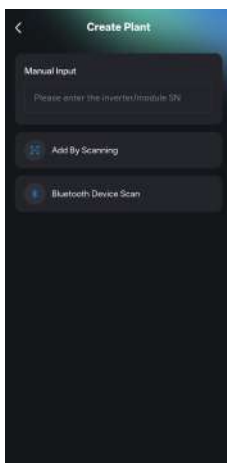
10.3.1. Create a power plant

Follow this procedure to create a power plant.

1. On the **Home** page, tap **Create Plant**.



2. Provide the product serial number (SN) to add the devices in the plant.
 - **Manual Input:** Enter the SN of the inverter or the communication module.
 - **Add By Scanning:** Scan the SN.
 - **Bluetooth Device Scan:** Connect to the inverter or communication module through Bluetooth connection.



3. Configure the plant details based on the owner's actual information.

The 'Create Plant' form consists of two main sections. The first section, 'Station Information', includes fields for Plant Name, Country, Time Zone, City, Detailed address, and Post Code. The second section, 'LPR Installer', includes a toggle for 'Is photovoltaic installed', and input fields for Plant capacity, Number of PV Panels, PV Panel Azimuth, and PV Panel Inclination. Both sections have 'Previous' and 'Next' buttons at the bottom.

- Provide the end user and installer information for future maintenance and support purposes.
The installer company code is created when the installed signs up at the App. For example, 19067G.

The 'Create Plant' form, 'Customer' step, includes fields for End User (Username / Phone Number) and Installer (Username / Phone Number / Company). There are 'Search' buttons for both fields and an 'Ignore' button for the installer field. 'Previous' and 'Save' buttons are at the bottom.

- After the plant is created successfully, check the plant status as needed.

The plant status and device details are shown in three screenshots. The first screenshot shows the 'Plant' overview with a diagram of the plant components and a 'Revenue' section. The second screenshot shows the 'Device' list with associated devices like EMS Module, Grid Meter, Energy Storage, and PV Meter. The third screenshot shows the 'Device Details' for the Inverter, displaying power generation and battery status.

10.3.2. View the power plant details

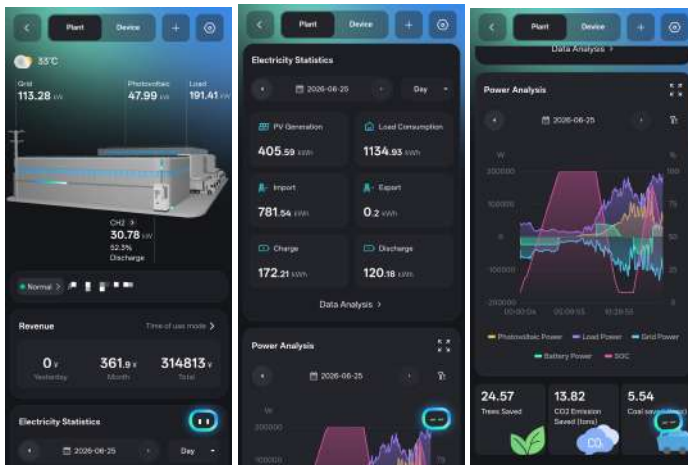
Follow this procedure to check detailed power plant information.

1. On the **Home** page, select and tap the target power plant.

Example:



2. Check the following plant information.



Information	Description
Live energy information	<ul style="list-style-type: none"> • Grid: The power that the device is importing from or exporting to the grid. • Photovoltaic: The current power generated by the PV array. • Load: The overall power consumption by the load. • Discharge: The current SOC of the battery system.
Revenue	The daily, monthly, and total revenue of the power plant.
Electricity Statistics	The energy statistics of the power plant. Daily, weekly, monthly, yearly, and total statistics are available for detailed data analysis.
Power Analysis	The power statistics of the power plant.

Table 10.2. Power plant information

3. Tap each highlighted area for further information or operation.



Number	Description
①	Tap to check the weather forecast.
②	Tap to open the Device Details page for detailed device status and operations like remote settings.
③	Tap to open the alarm messages list.
④	Tap to check or modify the working strategy of the device.

10.4. View product information

10.4.1. Check alarm messages

On the elekeeper App, monitor the system and check the real-time alarm messages.

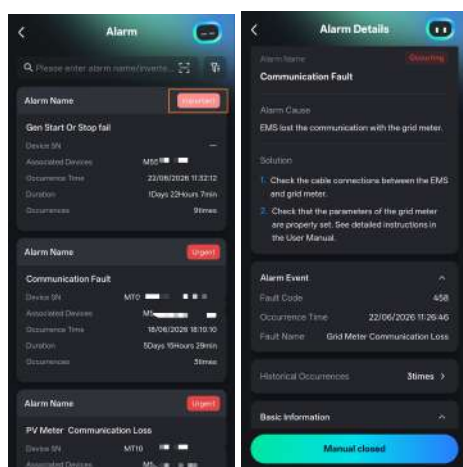
1. Open the alarm message list with one of the options:
 - On the **Home** page, tap the plant status icon in the middle. For example:



- On the **Service** page, tap **Alarm Processing**.



2. On the **Alarm** page, tap the alarm severity to open the alarm details.



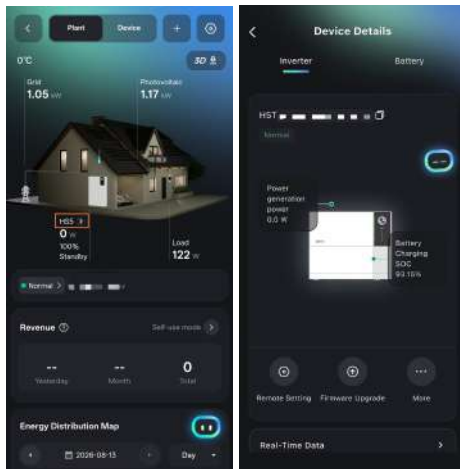
3. Take the suggested troubleshooting actions. Or close the alarm manually if applicable.

10.4.2. Check battery status

The installation engineer or the owner can follow this procedure to check the battery status on the elekeeper App.

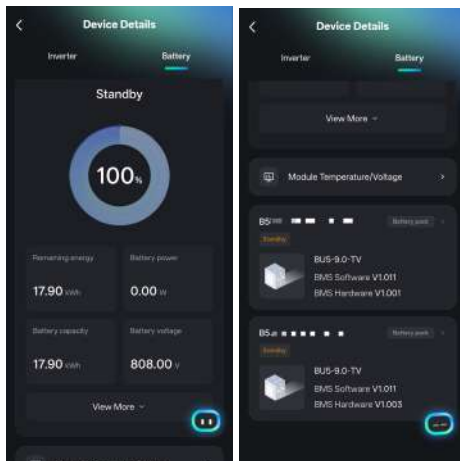
1. On the **Home** page, tap the plant to open the plant details page. Then tap the product name to open page **Device Details**.

Example:



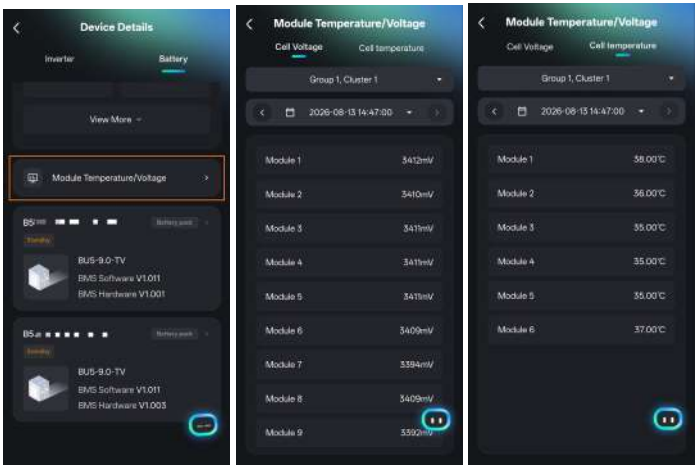
2. Tap page **Battery** to open the battery details page.

Example: View the SoC and remaining energy of the battery system:



3. Check the battery module temperature and voltage as needed.

Example:



10.4.3. View the inverter firmware version

(For Installer role only) Follow this procedure to view the following inverter firmware versions:

- **Display Board Version:** advanced RISC machine (ARM) version
- **Control Board Version:** digital signal processor (DSP) version

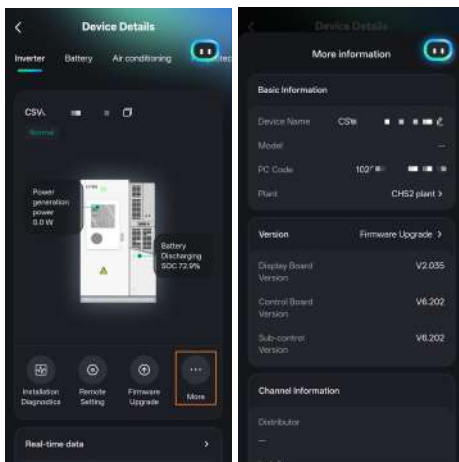
1. On the **Home** page, tap the device name to open the **Device Details** page.

Example:



2. Tap **More**.

Example:



3. On the **Device Details** page, tap **Firmware Upgrade** to upgrade the software versions as needed.



10.4.4. View the V-Watt and V-Var settings

This inverter complies with AS/NZS 4777.2: 2020 for power quality response modes. It meets DNSPs' grid connection rules and requirements for the volt-watt and volt-var settings in different regions.

Note:

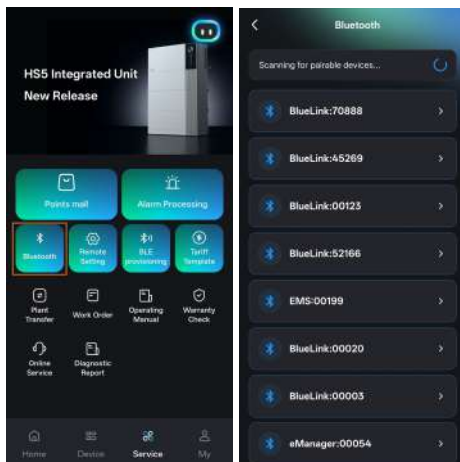
With regard to the power rate limit mode, SAJ product sets the product WGr to 16.67% Pn by default in the following cases according to the requirements of 3.3.5.2 as 4777.2: 2020.

- Soft ramp up after connection.
- Reconnect or soft ramp up/down following a response to frequency disturbance.

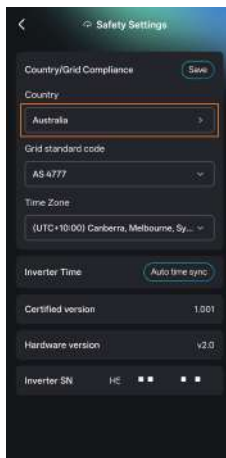
1. On page **Service**, tap **Bluetooth**. Select the communication module, inverter or EMS according to the last five digits of the serial number (SN).

Example:

- **BlueLink: 45269** for a communication module or inverter.
- **EMS: 00199** for EMS units.



2. On the **Remote Setting** page, tap **Safety Settings** and check whether the grid compliance is set to **Australia** grid codes. Change the settings if needed.



- On the **Remote Setting** page, select **V-Watt/V-Var** to view the parameter values.

For **V-Watt** response mode:

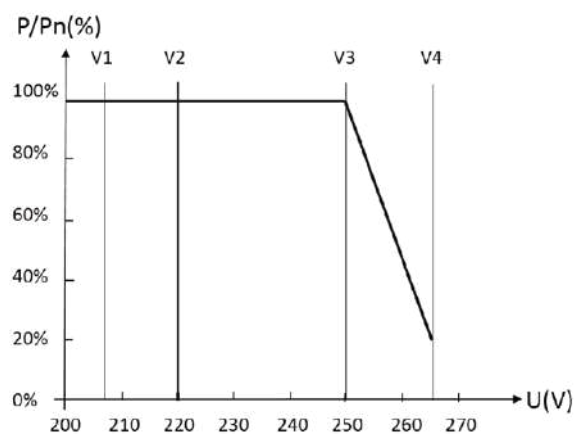


Figure 10.1. Curve for a Volt-Watt response mode (AS4777 Series)

V-Watt/V-Var	
V-Watt	Enabled
V1	207.0V
V1	220.0V
V3	255.0V
V4	260.0V
%P1	100.0%
%P2	100.0%
%P3	100.0%
%P4	20.0%
V-Var	Disabled
V1	207.0V
V1	220.0V

Parameters:

For **Volt-Var** control mode:

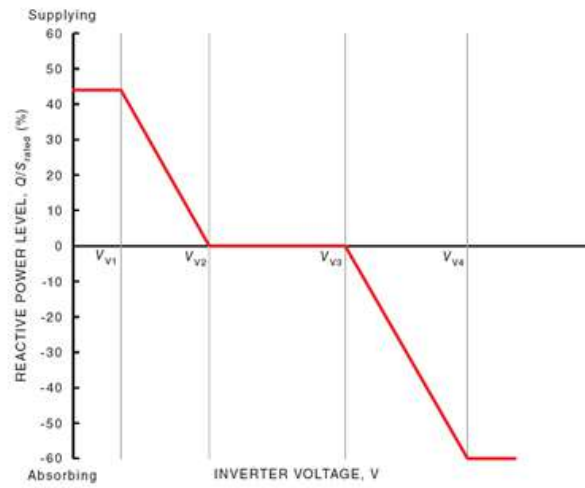


Figure 10.2. Curve for a Volt-Var control mode (AS4777 Series)

V-Watt/V-Var	
%P2	100.0%
%P3	100.0%
%P4	20.0%
V-Var	Enabled
V1	307.0V
V2	220.0V
V3	240.0V
V4	258.0V
%VAR1	44.0%
%VAR2	0%
%VAR3	0%
%VAR4	-60.0%

Parameters:

10.5. System function configurations

10.5.1. Configure working strategy

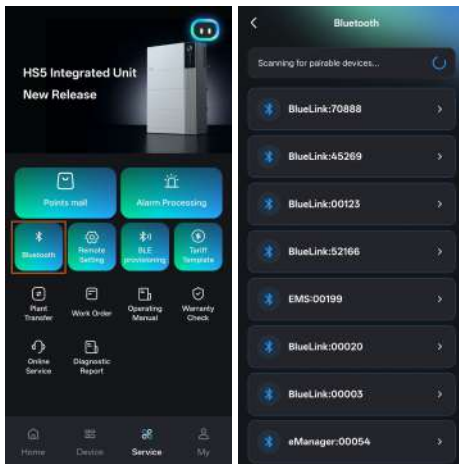
Follow this procedure to configure the device working strategy.

Note: The working strategy options and parameters may vary for different devices. Configure the parameters based on the actual App.

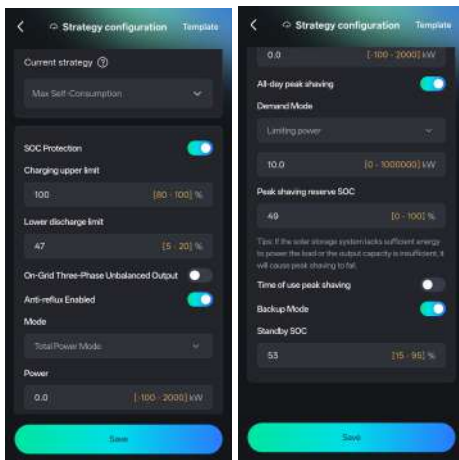
- On page **Service**, tap **Bluetooth**. Select the communication module, inverter or EMS according to the last five digits of the serial number (SN).

Example:

- **BlueLink: 45269** for a communication module or inverter.
- **EMS: 00199** for EMS units.



- Select **Strategy Configuration** or **Working Modes** (depending on the device) to configure the parameters as needed.
- For mode **Max Self-Consumption**, configure the following parameters:

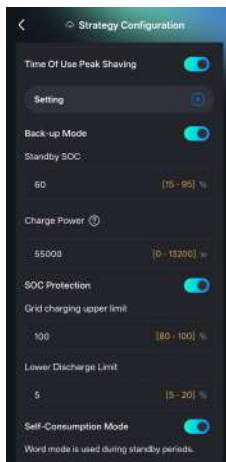


Parameter	Description
Current strategy	The active working strategy for the device.
SOC Protection	Whether to enable battery state of charge (SOC) protection to help prevent excessive charging or discharging.
Charging upper limit	The maximum battery SOC allowed during charging. Once reached, the battery stops charging.

Parameter	Description
Lower discharge limit	The minimum battery SOC allowed during discharging to protect the battery from over-discharge. Once reached, the battery stops discharging.
On-Grid Three-Phase Unbalanced Output	Whether to enable three-phase unbalanced output when the system is operating on-grid. This parameter is applicable for three-phase inverters only.
Anti-reflux Enabled	Enables or disables export limit control function to prevent power from feeding back to the grid.
Mode	Selects the export limit control mode used by the system.
Power	The power limit value used in the selected control mode.
All-day peak shaving	Enables or disables peak shaving throughout the entire day.
Demand Mode	Selects the demand control method used for peak shaving.
Demand Mode power	Sets the target power limit used when the selected demand mode requires a power threshold.
Peak shaving reserve SOC	Sets the battery SOC reserved for peak shaving operation.
Time of use peak shaving	Enables or disables peak shaving based on configured time periods.
Backup Mode	Enables or disables backup power operation so the battery can reserve energy for backup loads.
Standby SOC	Sets the battery SOC to be maintained in standby for backup or reserve purposes.

Table 10.3. Max Self-Consumption parameters

4. For **Time of Use Peaking Shaving** mode, configure the following parameters:

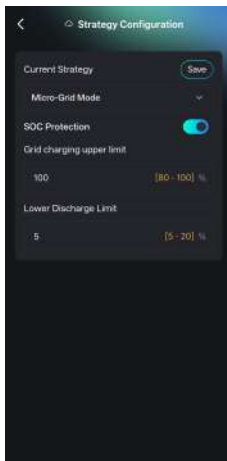


Parameter	Description
Time Of Use Peak Shaving	Enables or disables peak shaving based on configured time-of-use periods.
Setting	The time-of-use setting area where you can add and configure the charging and discharging schedules at configured charging power limit.
Back-up Mode	Whether to enable the backup power operation so the battery can reserve energy for backup loads.
Standby SOC	The battery SOC to be maintained in standby for backup or reserve purposes.
Charge Power	The charging power used when backup mode charging is active.

Parameter	Description
SOC Protection	Whether to enable battery state of charge (SOC) protection to help prevent excessive charging or discharging.
Grid charging upper limit	The maximum battery SOC allowed when charging from the grid.
Lower Discharge Limit	The minimum battery SOC allowed during discharging to protect the battery from over-discharge.
Self-Consumption Mode	Whether to enable self-consumption mode during standby periods. <ul style="list-style-type: none"> For CHS2 series, enable this option of Self-Consumption Mode for the non-charging or non-discharging periods so that the system can work in self-consumption mode when the system is not charging or discharging. If this option is disabled during these periods, the system will be at the bypass status and provides no power to the backup loads.

Table 10.4. TOU mode parameters

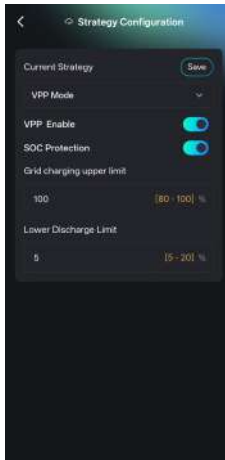
5. For **Micro-Grid Mode**, configure the following parameters:



Parameter	Description
Current Strategy	The active working strategy for the device.
SOC Protection	Enables or disables battery SOC protection to help prevent excessive charging or discharging in micro-grid mode.
Grid charging upper limit	The maximum battery SOC allowed when charging from the grid.
Lower Discharge Limit	Sets the minimum battery SOC allowed during discharging to protect the battery from over-discharge.

Table 10.5. Micro-Grid mode parameters

6. For **VPP Mode**, configure the following parameters:



Parameter	Description
VPP Enable	Enables or disables VPP mode for the device.
SOC Protection	Enables or disables battery SOC protection to help prevent excessive charging or discharging in VPP mode.
Grid charging upper limit	The maximum battery SOC allowed when charging from the grid.
Lower Discharge Limit	Sets the minimum battery SOC allowed during discharging to protect the battery from over-discharge.

Table 10.6. VPP mode parameters

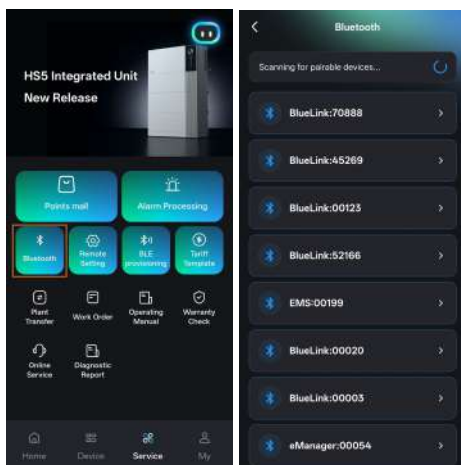
10.5.2. Set the battery parameters

The installation technicians can configure the **Battery Settings** during the initialization of the inverter on the elekeeper App or set the parameters after installation through remote connection.

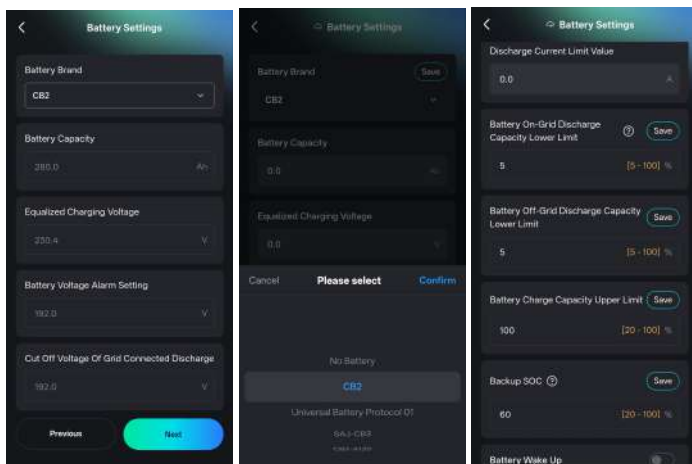
1. On page **Service**, tap **Bluetooth**. Select the communication module, inverter or EMS according to the last five digits of the serial number (SN).

Example:

- **BlueLink: 45269** for a communication module or inverter.
- **EMS: 00199** for EMS units.



2. Select **Battery Settings** and configure the parameters as needed.



Parameter	Description
Battery Brand	The brand of the battery currently adapted for match the corresponding BMS communication protocol.
Battery Capacity	The rated ampere-hour capacity (Ah) of the battery pack, used by the system to estimate total energy (kWh) and remaining runtime.
Equalized Charging Voltage	The maximum charging voltage limit for the battery. When reached, charging stops or switches to constant voltage to prevent overcharging and cell damage.
Battery Voltage Alarm Setting	The voltage threshold at which a low-voltage alarm is triggered. It reminds the user to monitor battery level.

Parameter	Description
Cut Off Voltage Of Grid Connected Discharge	The voltage at which the battery hard-stops discharging during grid-tied operation and switches to grid power, serving as the final physical protection.
Charge Current Limit Value	The maximum charging current (A) allowed by the battery. The system limits the input power beyond this current to protect cells from high current stress.
Discharge Current Limit Value	The maximum discharging current (A) allowed. The load power is limited beyond this current to avoid overcurrent damage to the battery.
Battery On-Grid Discharge Capacity Lower Limit	The SOC percentage at which discharging stops during grid-tied operation, switching to grid power to reserve energy for unexpected outages.
Battery Off-Grid Discharge Capacity Lower Limit	The lower SOC percentage (typically lower than the grid-tied value) allowed during off-grid/power outage situations to extend emergency backup duration.
Battery Charge Capacity Upper Limit	The SOC percentage at which charging stops. Reducing this value can prolong battery life.
Backup SOC	The target SOC threshold maintained by the system (higher than the grid-tied discharge limit). When SOC falls below this, the system prioritizes PV or grid charging to ensure sufficient backup power.
Battery Wake Up	A function to force a wake-up voltage or restart communication when the battery enters sleep state due to undervoltage, overtemperature, or BMS protection, allowing reconnection without physical rewiring.

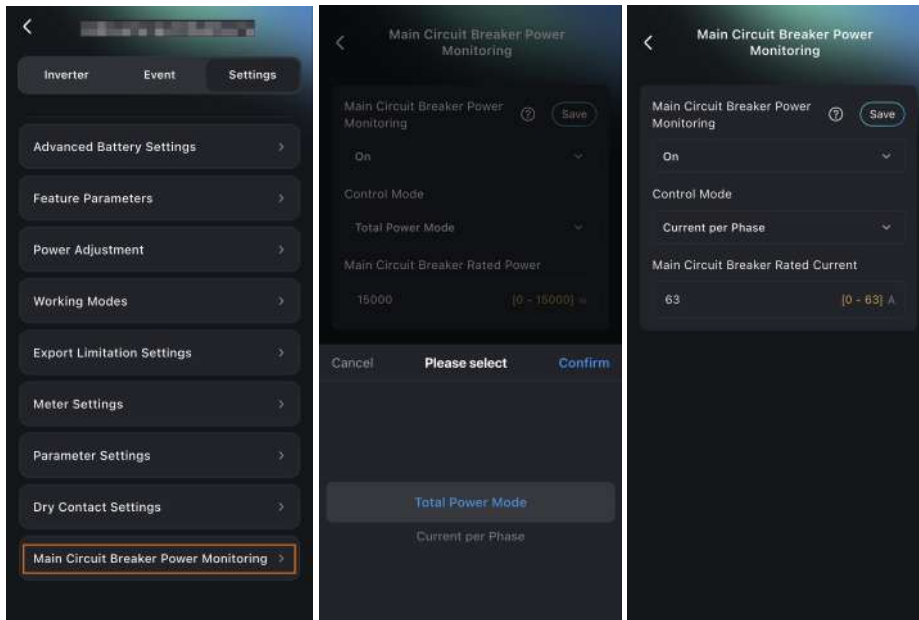
Table 10.7. Battery parameters

10.5.3. Configure main circuit breaker power monitoring

The main circuit breaker power monitoring function dynamically restricts power drawn from and fed to the grid, avoiding over-current tripping of your main circuit breaker.

1. Under the **Settings** tab on the device page, tap **Main Circuit Breaker Power Monitoring**.
2. From the drop down list of **Main Circuit Breaker Power Monitoring**, select **On** to enable this function.
3. Select the power monitoring mode and configure the corresponding parameters.

Example:



Mode	Mode description	Steps
Total Power Mode	The inverter monitors the total import and export power in real time. When it exceeds the configured rated power of the main circuit breaker, the inverter restricts the import and export power to prevent overload tripping.	<ol style="list-style-type: none"> For Control Mode, select Total Power Mode. Configure a value for Main Circuit Breaker Rated Power.
Current per Phase Mode	The inverter monitors the current of each individual phase in real time. When it exceeds the configured rated current of main circuit breaker, the inverter dynamically restricts import and export power to prevent overload tripping.	<ol style="list-style-type: none"> For Control Mode, select Current per Phase. Configure a value for Main Circuit Breaker Rated Current.

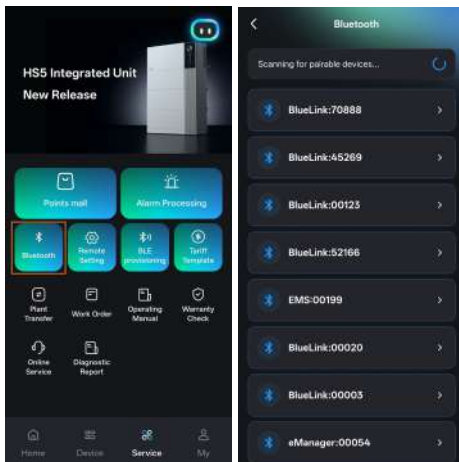
10.5.4. Configure power adjustment function

The power adjustment function allows the inverter to regulate and optimize the output power according to grid requirements and operational conditions. This function enables the inverter to adjust active and reactive power dynamically to improve grid stability, comply with local regulations, and enhance energy efficiency.

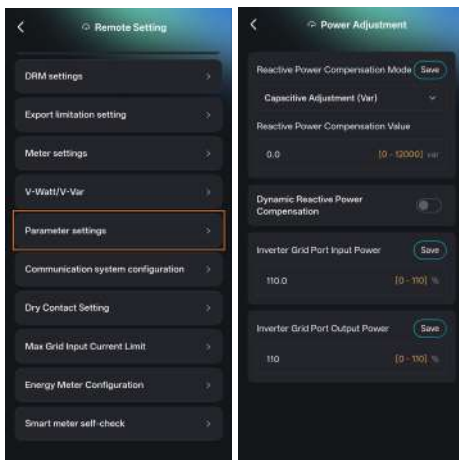
1. On page **Service**, tap **Bluetooth**. Select the communication module, inverter or EMS according to the last five digits of the serial number (SN).

Example:

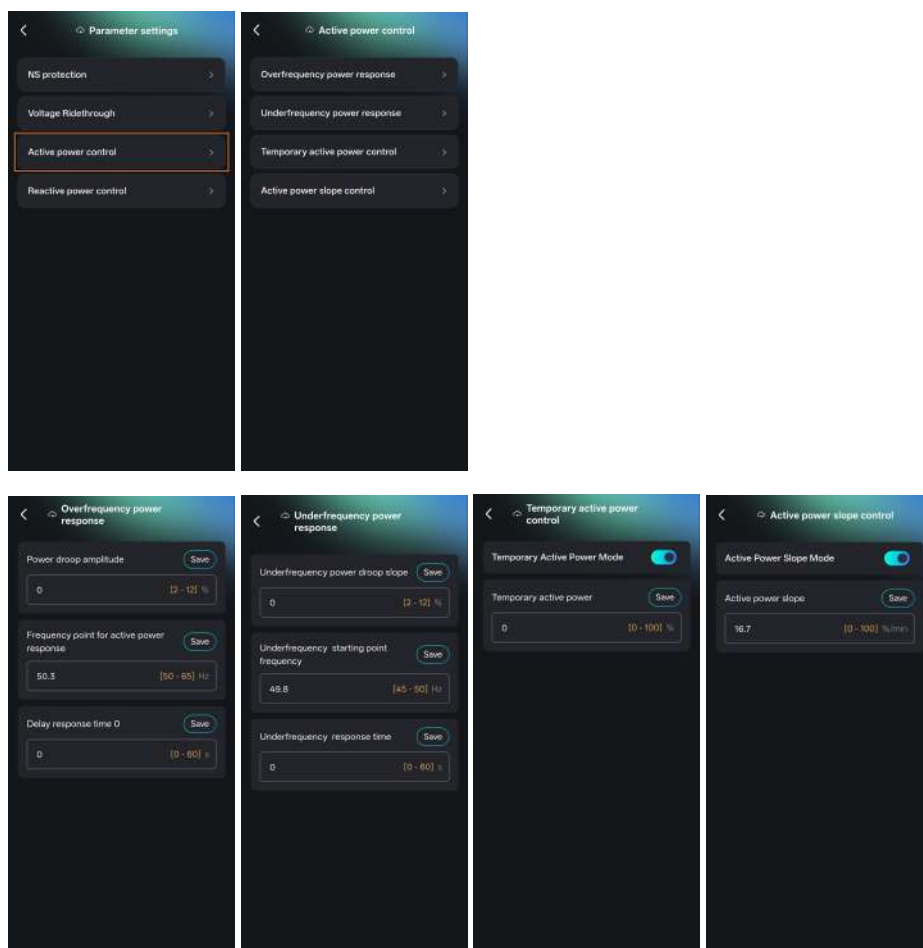
- **BlueLink: 45269** for a communication module or inverter.
- **EMS: 00199** for EMS units.



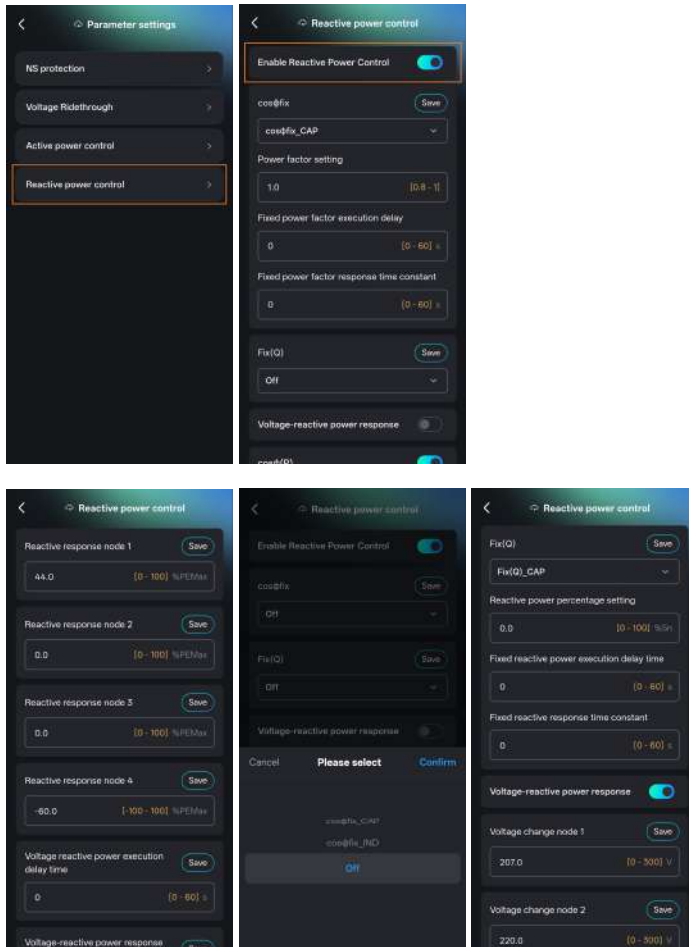
2. Select **Parameter settings**, and configure the power adjustment parameters as needed.



- For **Active power control**, select the corresponding parameter groups and configure the corresponding parameters as needed:



- For **Reactive power control**, enable the control function first and then configure the corresponding parameters as needed:



10.5.5. Configure the DRM settings

When the **Country** is set to Australia on page **Safety Settings**, set the demand response mode (DRM) according to local regulations as needed.

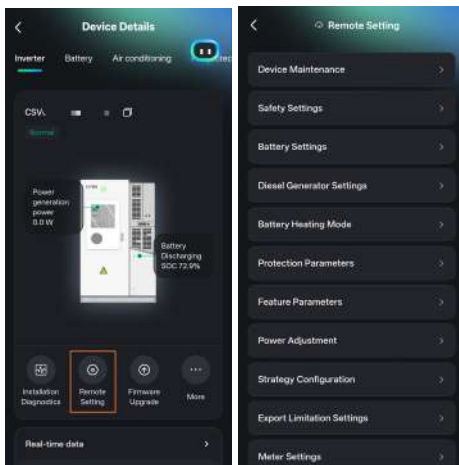
1. On the **Home** page, tap the device name to open the **Device Details** page.

Example:



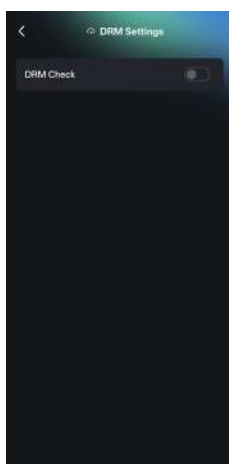
2. On page **Device Details**, tap **Remote Setting** to open the device settings.

Example:



Note: The settings menu and parameter list may vary for different devices and user roles.

3. Select **DRM Settings**, and enable the **DRM Check** function.



11. Product specification

11.1. EK70 HS5-(5K-10K)-(S3,S4)-X

Model	EK70 HS5-5K-S3- X ¹	EK70 HS5-6K-S3- X	EK70 HS5-6K-S3- X-IE	EK70 HS5-8K-S3- X	EK70 HS5-10K- S4-X	
PV DC Input						
Recommended max. PV power (W)	10000	12000	12000	16000	20000	
Max. Input Voltage (V)	600					
MPPT Voltage Range (V)	50-550					
Operating Voltage Range (V)	50-600					
Start-up Voltage (V)	80					
Nominal DC Input Voltage (V)	360					
Max. Input Current per MPPT (A)	20					
Max. Short-circuit Current per MPPT (A)	25					
Number of MPP Trackers	3	3	3	3	4	
No. of Strings per MPP Tracker	3	3	3	3	4	
Battery DC Input						
Battery Type	LiFePO4					
Battery Voltage Range [V]	350-600					
BAT Communication Interface	CAN					
Max. Battery Quantity per System	6					
AC Output/Input (On-Grid)						
AC Output (On-Grid)	Rated Output Power (W)	4999	6000	5750	8000	9999
	Rated Apparent Power (VA)	4999	6000	5750	8000	9999
	Max. Apparent Power (VA)	4999	6600	5750	8800	9999
	Rated Output Voltage (V)	L+N+PE, 230				
	Rated Output Current (A)	21.7	26.1	25	34.8	43.5
	Max. Output Current (A)	21.7	28.7	25	38.3	43.5
	Adjustable Power Factor	0.8 leading-0.8 lagging				
AC Input (On-Grid)	Rated Input Voltage (V)	L+N+PE, 230				
	Max. Input Current (A)	63 ²				
Rated AC Grid Frequency (Hz)		50/60				
Total Current Harmonic Distortion		< 3%				
AC Output (Backup)						
Max. Output Apparent Power (VA)		5000	6000	6000	8000	10000

Model	EK70 HS5-5K-S3- X ¹	EK70 HS5-6K-S3- X	EK70 HS5-6K-S3- X-IE	EK70 HS5-8K-S3- X	EK70 HS5-10K- S4-X
Peak Output Apparent Power (VA 10s)	10000	12000	12000	16000	20000
Rated Output Voltage (V)	L+N+PE, 230				
Max. Output Current (A)	21.7	26.1	26.1	34.8	43.5
Rated AC Grid Frequency (Hz)	50/60				
Adjustable Power Factor	0.8 leading-0.8 lagging				
Total Current Harmonic Distortion	< 3%				
Switch Time (ms)	≤10				
Efficiency					
Euro Efficiency	97.6%				
Max. Efficiency	98.0%				
Protection					
Insulation Monitoring	Integrated				
Residual Current Monitoring	Integrated				
DC Reverse Polarity Protection	Integrated				
Anti-islanding Protection	AFD				
AC Short-circuit Protection	Integrated				
AC Overcurrent/Overvoltage Protection	Integrated				
AC Overvoltage Category	III				
DC Overvoltage Category	II				
DVC Class	DVC-A for communication terminals; DVC-C for PV terminals, Battery terminals and all AC terminals				
I _{cw} [kA]	≤10 kA (<10s) for all terminals				
I _{cc} [kA]	≤10 kA (<10s) for all terminals				
Current Inrush [A] (Peak value)	52 for all AC terminals				
Max. AC Fault Current [A] (Peak value)	120 for all AC terminals				
Max. AC Overcurrent Protection [A] (RMS value)	63 for all AC terminals				
Max. DC Fault Current [A] (Peak value)	13.5 for battery terminals				
Max. DC Overcurrent Protection [A] (RMS value)	12 for battery terminals				
Feedback Current [A]	0				
DC Switch	Integrated				
DC Surge Protection	Type II				
AC Surge Protection	Type II				
AFCI	Integrated				
Inverter Topology	Non-isolation				
Protective Class	I				
Pollution Degree	II				

Model	EK70 HS5-5K-S3- X ¹	EK70 HS5-6K-S3- X	EK70 HS5-6K-S3- X-IE	EK70 HS5-8K-S3- X	EK70 HS5-10K- S4-X
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General Data

Dimensions (W / H / D) (mm)	835 / 690 – 2050 / 270 <ul style="list-style-type: none"> • Inverter: 835 / 350 / 270 • Battery pack: 835 / 270 / 270 • Battery base: 835 / 70 – 80 / 270
Weight (kg)	<ul style="list-style-type: none"> • Inverter: 39.5 • Battery pack: <ul style="list-style-type: none"> – EK70 BU5-6.0-TV: 60.4 – EK70 BU5-7.0-TV: 71.7 – EK70 BU5-9.0-TV: 79.2 • Battery base: 8
Charging Temperature Range	0°C to +50 °C
Discharging Temperature Range	-10°C to +50 °C
Relative humidity range	5%-95% Non-condensing
Corrosion resistance grade	C4
Max. Operating Altitude (m)	3000
Cooling	Smart air cooling
Ingress Protection Rating	IP66
Communication	WLAN / Fast Ethernet / RS485
Communication Module	eSolar AIO3 Pro / eSolar 4G Pro
Warranty	Refer to the warranty policy

1. X stands for the battery system configuration. The value of x can be 6, 7, 9, 12, 14, 15, 16, 18, 21, 24, 25, 27, 28, 30, 35, 36, 40, 42, 45, 50, and 54. Each number presents the energy storage capacity for different models. For battery combinations and ratings, refer to the battery combination datasheet.

2. The built-in 63A bypass function enables the whole-house backup power, and the current can be configured on the elekeeper App.

11.2. EK70 battery and battery system designations

This section provides the battery and battery system designations by SAJ battery code. The SAJ battery code indicates the manufacturer of the battery cell, which is determined by the 6th character of the serial number (SN) code. The SN is located on the power label attached to the battery. For example, in SN code B5UB4M0Y2552E00002, the 6th character **M** indicates the manufacturer.

The following table lists the battery and battery system designations.

SAJ battery code	Battery designation	Battery system designation
M	IFpP74/176/209/[(1P6S)]M/-10+50/95 IFpP74/176/209/[(1P7S)]M/-10+50/95 IFpP74/176/209/[(1P9S)]M/-10+50/95	IFpP74/176/209/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)
N	IFpP73/175/208/[(1P6S)]M/-10+50/95 IFpP73/175/208/[(1P7S)]M/-10+50/95 IFpP73/175/208/[(1P9S)]M/-10+50/95	IFpP73/175/208/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/175/208/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/175/208/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)

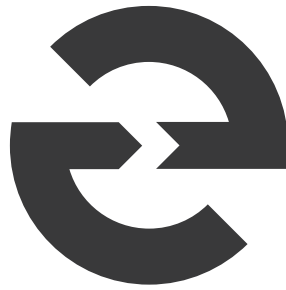
SAJ battery code	Battery designation	Battery system designation
O	IFpP73/176/208/[(1P6S)]M/-10+50/95 IFpP73/176/208/[(1P7S)]M/-10+50/95 IFpP73/176/208/[(1P9S)]M/-10+50/95	IFpP73/176/208/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/176/208/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/176/208/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)
I	IFpP74/176/209/[(1P6S)]M/-10+50/95 IFpP74/176/209/[(1P7S)]M/-10+50/95 IFpP74/176/209/[(1P9S)]M/-10+50/95	IFpP74/176/209/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)
K	IFpP74/176/209/[(1P6S)]M/-10+50/95 IFpP74/176/209/[(1P7S)]M/-10+50/95 IFpP74/176/209/[(1P9S)]M/-10+50/95	IFpP74/176/209/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP74/176/209/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)
J	IFpP73/175/209/[(1P6S)]M/-10+50/95 IFpP73/175/209/[(1P7S)]M/-10+50/95 IFpP73/175/209/[(1P9S)]M/-10+50/95	IFpP73/175/209/[(1P6S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/175/209/[(1P7S)YP]M/-10+50/95(Y=1,2,3,4,5,6) IFpP73/175/209/[(1P9S)YP]M/-10+50/95(Y=1,2,3,4,5,6)

11.3. Battery

Model	EK70 BU5-6.0-TV	EK70 BU5-7.0-TV	EK70 BU5-9.0-TV
Performance Specification			
Battery Type	LiFePO ₄		
Cell Capacity (Ah)	314		
Cycle Life ¹	10000		
Total Energy Capacity (kWh)	6	7	9
Usable Energy Capacity (kWh) ²	6	7	9
Depth of Discharge	100%		
Max. Charging / Discharging Power (W)	3000	3500	4600
Rated Voltage (V)	390		
Max. Charging / Discharging Current (A)	7.7	9.0	11.8
Recommended Charging Method	Charge at constant current of 7.7 A until reaching the maximum voltage of 390 V.	Charge at constant current of 9.0 A until reaching the maximum voltage of 390 V.	Charge at constant current of 11.8 A until reaching the maximum voltage of 390 V.
General Data			
Weight (kg)	60.4	71.7	79.2
Dimensions (W / H / D) (mm)	835 / 270 / 270		
Storage Temperature Range	-10 °C to +40°C		
Charging Temperature Range	-30°C to +50°C ³		
Discharging Temperature Range	-30°C to +50°C ⁴		
Relative Humidity Range	5%-95%		
Max. Operating Altitude (m)	3000		
Cooling Methods	Natural convection		
Ingress Protection Rating	IP66		
Installation Method	Ground mounting / Wall mounting		

Model	EK70 BU5-6.0-TV	EK70 BU5-7.0-TV	EK70 BU5-9.0-TV
Number of Modules per Controller (PCS)	1-6		
Compatible Inverters	EK70 series		

1. Provided by the battery manufacturer. Test conditions: 25±2°C, 0.5C charge and discharge rate, SOH 60%.
2. Provided by the battery manufacturer. Test conditions: 100% depth of discharge, 0.2C charge and discharge rate at 25°C, at the beginning of life.
3. For models without heating function, the charging temperature range is 0°C to +50°C. The 7th character of the battery SN code identifies the heating function: 0 = without heating function; 1 = with heating function. For example, B5UB4M0Y2552E00002 indicates the model does not support the heating function.
4. For models without heating function, the discharging temperature range is -10°C to +50°C.



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