M-ELV BattBank

MS-16K-U User Manual

ATMOCE

Preliminary

About This Document

Corporate Contact Information

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Disclaimer

- Product information is subject to change without prior notice. Every effort has been made in the preparation of this document to ensure accuracy of the content, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.
- For optimum reliability and to meet warranty requirements, this product must be installed in accordance with the instructions in this manual.

Applicable Scope

- This manual is intended for professional installation and maintenance personnel only.
- This manual mainly introduces the assembly, installation, configuration, maintenance, and troubleshooting methods of the following types of Battbank: MS-16K-U

Preliminary

Revision History

	Date	Version	Description
1	20/01/2026	Preliminary	1. Available to specific customers only

Preliminary

Contents

Contents

Preliminary

Safety Information

1.1 Statement

- Before installing or using the M-ELV Battbank , please carefully read the user manual, all instructions, safety labels on the product, and any available safety manuals. Failure to follow these safety instructions may result in personal injury, damage to the equipment, or invalidation of the warranty.
- DANGER, WARNING, CAUTION, and NOTE in this manual must be adhered to. You must also comply with relevant international, national, or regional standards and industry practices. M-ELV Battbank assumes no responsibility for any violation of safe operation requirements or safety standards regarding the design, manufacture, and use of the equipment.
- This equipment should only be used in environments that meet its design specifications; any failure, abnormal operation, or damage to components arising from non-compliance will not be covered by the warranty.
- All operations including transportation, storage, installation, operation, use, maintenance, etc., should comply with applicable laws, regulations, standards, and specifications.

1.2 Safety Labels

To reduce the risk of electric shock and ensure the safe installation and operation of the M-ELV Battbank system, the following safety symbols are used throughout this manual to indicate hazardous conditions and important safety instructions:

Danger	**A label indicates a hazard with a high level of risk. Failure to avoid this hazard may result in serious personal injury or death.**
Warning	**A label indicates a hazard with a medium level of risk. Failure to avoid this hazard may result in serious personal injury or death.**
Caution	**A label indicates a hazard with a low level of risk. Failure to avoid this hazard may result in serious personal injury or death.**
Note	**A label indicates a safety hazard or risk of device damage. Failure to avoid this hazard may result in equipment damage, data loss, reduced performance, or other consequences, but does not involve personal injury.**

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1.3 Personal safety instructions

Danger

- **No live electrical work:** The installation process must never be performed with live electricity. It is prohibited to install or remove cables while the system is energized. If the cable core comes into contact with the conductor, it can cause electric arcs or sparks, which can lead to fire or personal injury.
- **Risk of Fire or Electric Shock:** When the equipment is powered on, improper or unregulated operation can result in fire, electric shock, or explosion, potentially causing injury, death, or property damage.
- **Work with Assistance:** Always have someone nearby when working with electrical equipment. They should be within earshot or close enough to assist in case of emergency. Remove any metal jewelry (rings, bracelets, necklaces, watches) when working with the M-ELV Battbank or any electrical components.
- **Power Off Before Installation:** Do not apply power to the equipment until installation is fully completed and verified by a qualified person.

Warning

- **Use Personal Protective Equipment (PPE):** Ensure that all workers use appropriate protective gear, such as protective clothing, insulated footwear, goggles, helmets, and insulated gloves, during installation or maintenance operations.
- **Adhere to Warnings and Precautions:** Never ignore warnings, cautions, or precautionary measures indicated in the manuals or on the equipment itself.
- **Take Immediate Action in Case of Malfunction:** If any malfunction is detected during operation that could lead to personal injury or equipment damage, immediately stop the operation, report it to the supervisor, and implement the necessary safety measures.

Note

- **Proper Installation by Qualified Personnel Only:** Installation and maintenance must only be performed by trained professionals. M-ELV Battbank is not liable for any loss or damage caused by improper use, installation, or misuse of the product.
- **Training Requirements:** Personnel responsible for the installation and maintenance of the M-ELV Battbank must undergo proper training to ensure they understand safe operation methods, relevant safety precautions, and local standards and regulations.

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1.4 Battery Safety Instructions

Danger

- **Unauthorized Repair Prohibited:** Do not attempt to repair the M-ELV Battbank without authorization, as it contains no user-repairable components. Unauthorized disassembly, repair, or destruction of the device will void the warranty. In case of malfunction, please contact Atmoce for technical assistance.
- **Authorized Use Only:** Only use the M-ELV Battbank as specified by Atmoce. Unauthorized use may result in equipment damage or personal injury.
- **Use Approved Accessories Only:** Only use accessories approved by Atmoce. The use of unauthorized accessories may cause equipment damage or personal injury.
- **Power Off Before Work:** Since the M-ELV Battbank is powered by multiple sources, ensure all circuit breakers are turned off before starting any installation, maintenance, or cleaning work.
- **Do Not Operate If Damaged:** Do not operate the M-ELV Battbank if its appearance or internal components are damaged. Ensure the device is intact before use.

Warning

- **Inspect Cables and Connectors:** Regularly inspect cables and connectors to ensure they are in good condition. Do not operate the M-ELV Battbank with damaged or non-compliant cables or connectors.
- **Do Not Disassemble the Enclosure:** Do not disassemble the M-ELV Battbank enclosure or protective panels unless necessary for maintenance.

Note

- **Compliance with Installation Regulations:** When installing the M-ELV Battbank , ensure compliance with all applicable installation standards and local electrical regulations.
- **Temperature Limitations:** The M-ELV Battbank is suitable for use in environments with a maximum ambient temperature of 55°C. Ensure the installation environment meets this temperature limit.
- **Use of Suitable Wiring:** When installing the M-ELV Battbank , use copper wiring with a temperature resistance of 90°C or higher. Ensure the wiring meets local electrical standards.
- **Cable and Connector Safety:** Choose cables that meet safety requirements based on circuit breaker parameters. Ensure cables and connectors are in good condition and operate within rated specifications.
- **Grid Connection:** Do not connect the M-ELV Battbank to the grid or AC circuit until all installation steps are completed and approval has been obtained from the utility company.

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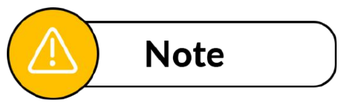
1.5 Cable Safety Instructions

- **Disconnect Power Before Installation:** Do not attempt to install or work with cables unless the circuit is disconnected. Always ensure the power is off before working on any electrical connections.
- **Avoid Damaging the Cable:** Take care not to damage the copper conductor of the cable when stripping the sheath. Damaged wires may result in improper system functionality or failure.

- **Check AC and DC Wiring:** Ensure that all AC wiring are correct and free of any pinches, shorts, or damage. Verify that all AC junction boxes are properly closed and secured.
- **Ensure Proper Cable Connections:** All cables must be securely connected, well-insulated, and meet the appropriate specifications for the system.



- **Compliance with Local Standards:** Cable selection and routing must comply with local laws, regulations, and industry standards.
- **Respect Cable Bending Radius:** When routing cables, ensure the minimum bending radius is 8x the cable's outer diameter (8xOD).
- **Replace Insufficient Cable Length:** If the power cable length is found to be insufficient, replace it with a properly sized cable. Joints or welding points in the power cable are strictly prohibited.
- **Avoid Tension on Cable Terminal:** Do not expose cable terminals to continuous tension. Avoid pulling or bending the cable at the connection points.
- **Smooth Cable Crossing Holes:** Ensure that cable crossing holes are free of sharp edges to prevent damage from burrs or other sharp objects.
- **Keep the Wire Cabinet Clean:** Always keep the wire cabinet free from dirt, debris, and contaminants. Prevent dirt or debris from entering the connectors during installation and operation.
- **Compliance with Local Regulations:** Ensure all installations and maintenance comply with national and local electrical regulations.

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1.6 Environment Instructions

Danger

- **Avoid Hazardous Environments:** Do not place the M-ELV Battbank in environments with flammable or explosive gases, vapors, or fumes. Never perform any operations in such environments.
- **Explosion Risk:** Do not install or use the M-ELV Battbank in a potentially explosive environment. Ensure the equipment is not exposed to conditions that could lead to combustion or detonation.
- **Heat and Ignition Sources:** Avoid placing the equipment near heat sources, such as fireworks, candles, heaters, or other devices that generate heat. The heat produced by the equipment may cause damage or create a fire hazard.
- **Avoid Direct Sunlight Exposure:** Do not expose terminals or connectors to direct sunlight, as this may lead to overheating or degradation of materials.

Warning

- **Weather Conditions:** Do not attempt to install or use the M-ELV Battbank in adverse weather conditions, including rain, snow, or extreme temperatures. Ensure the equipment is installed in dry, stable conditions.
- **Protect from Pressurized Liquids:** Do not expose terminals or connectors to directed pressurized liquids (e.g., water jets). Ensure the equipment is shielded from water or other liquids.
- **Avoid Immersion in Liquids:** Never immerse the terminals, connectors, or any part of the M-ELV Battbank in liquid, as this could cause malfunction or permanent damage.
- **Corrosive and Volatile Environments:** Do not install the M-ELV Battbank in areas with volatile gases, corrosive substances, or organic solvents. Such environments could degrade the equipment or create safety hazards.
- **Avoid Harsh Environmental Factors:** Do not install the M-ELV Battbank in areas subject to strong vibrations, excessive noise, or strong electromagnetic field interference.
- **Sturdy Mounting Surface:** Ensure that the mounting surface for the M-ELV Battbank is stable and capable of bearing the equipment's weight. Proper installation on a secure surface prevents equipment malfunction or damage.
- **Remove Packing Materials:** After installation, ensure that all packaging materials such as cardboard boxes, foam, plastic, and cable ties are removed from the equipment area to maintain a clean and safe environment.

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Product Information

2.1 M-ELV Battbank Introduction

2.1.1 Overview

The ATMOCE Battbank MS-16K-U is a modular, AC-coupled, stackable energy storage system with a usable energy capacity of 16.0 kWh per unit, scalable up to 112 kWh per cluster, and designed for C&I applications.

It supports on-grid systems and enables operating modes such as **self-consumption optimization, TOU arbitrage, and grid ancillary services**, helping businesses reduce energy costs, enhance energy resilience, and actively participate in grid services.

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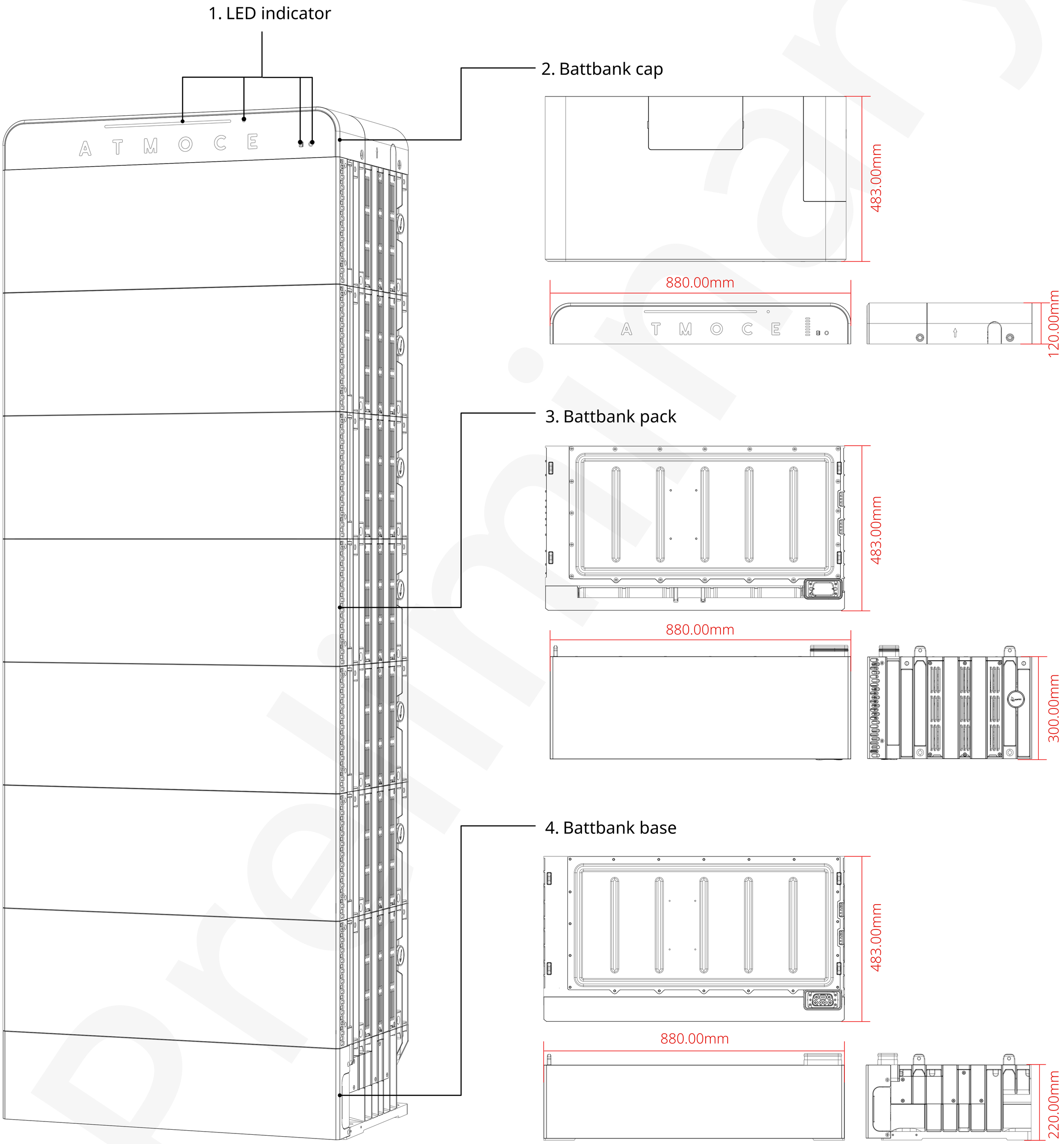
2.1.2 Structure dimension



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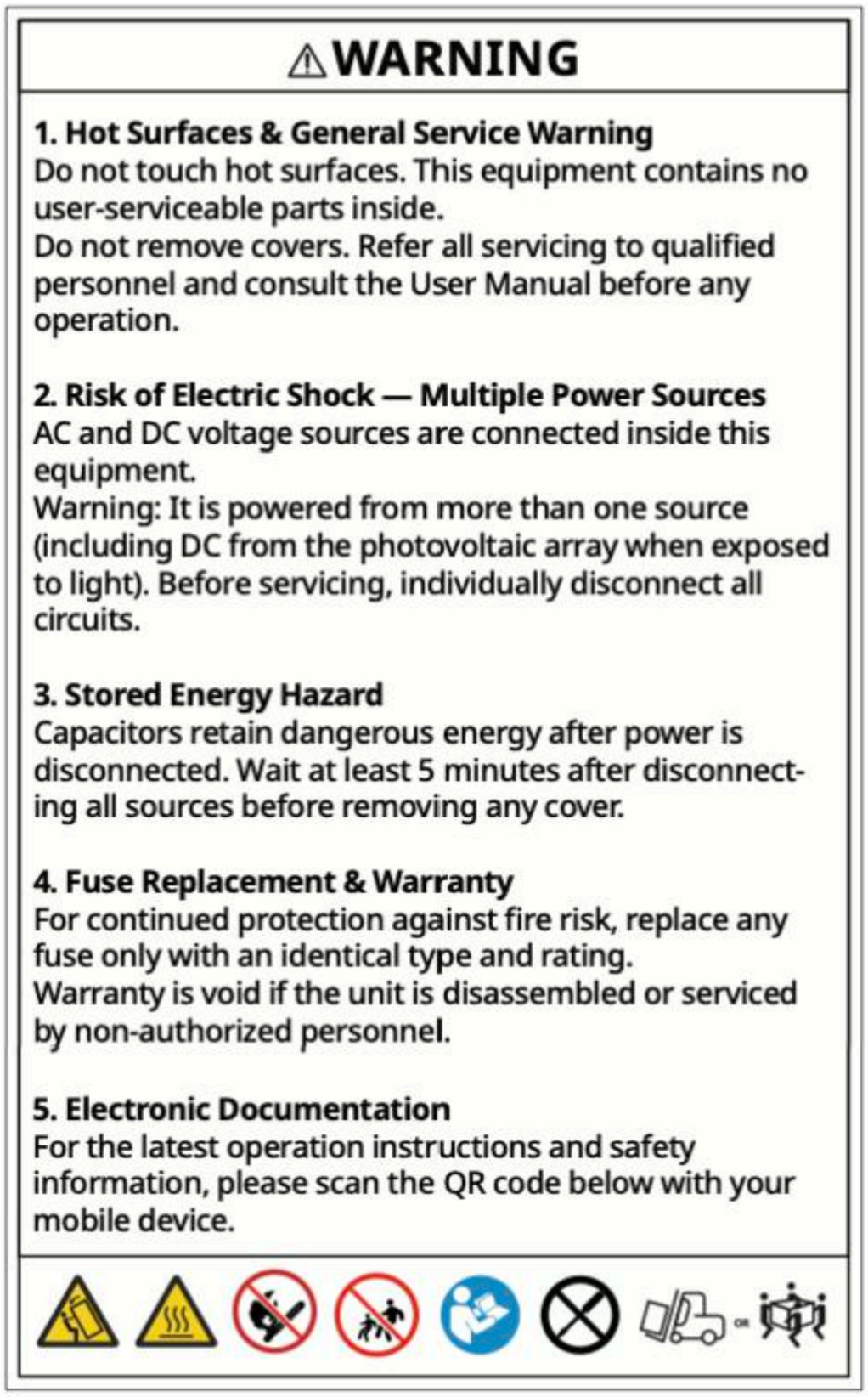
2.1.3 Label introduction

a. Warning label



⚠WARNING

1. Hot Surfaces & General Service Warning
Do not touch hot surfaces. This equipment contains no user-serviceable parts inside.
Do not remove covers. Refer all servicing to qualified personnel and consult the User Manual before any operation.

2. Risk of Electric Shock — Multiple Power Sources
AC and DC voltage sources are connected inside this equipment.
Warning: It is powered from more than one source (including DC from the photovoltaic array when exposed to light). Before servicing, individually disconnect all circuits.

3. Stored Energy Hazard
Capacitors retain dangerous energy after power is disconnected. Wait at least 5 minutes after disconnecting all sources before removing any cover.

4. Fuse Replacement & Warranty
For continued protection against fire risk, replace any fuse only with an identical type and rating.
Warranty is void if the unit is disassembled or serviced by non-authorized personnel.

5. Electronic Documentation
For the latest operation instructions and safety information, please scan the QR code below with your mobile device.

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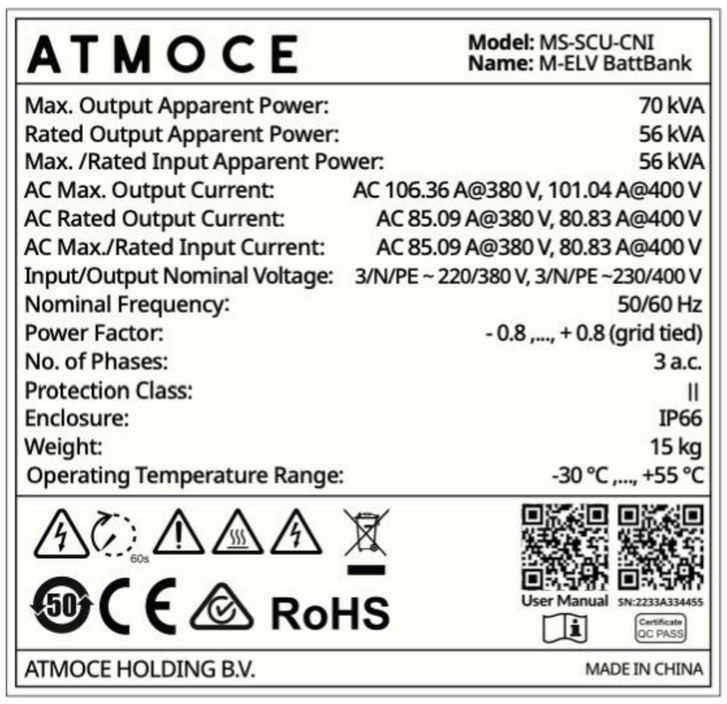
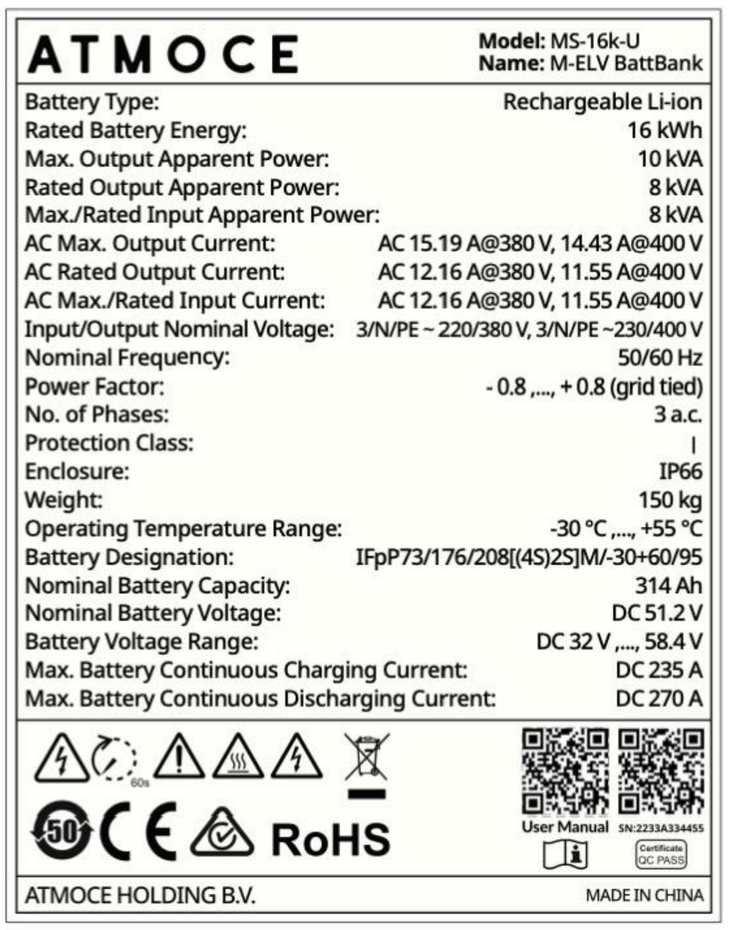
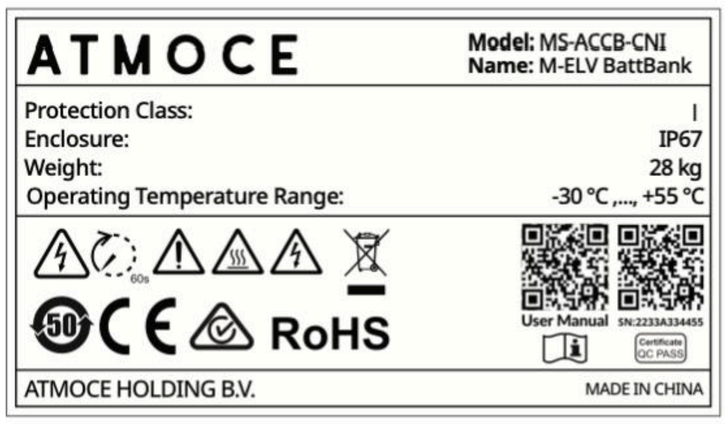
b. Nameplate







Nameplate Label Instruction

Lable	Description
CE	The product has passed CE related certification.
	Waste electrical and electronic equipment (WEEE), which cannot be treated as household waste and should be returned to ATMOCE or disposed of in accordance with local regulations.
RoHS	Restriction of Hazardous Substances (ROHS)-compliant.
	Please read the user manual before using the equipment.
60s	Delayed discharge. Wait 60 seconds for the unit to fully discharge after it is powered off.
	Risk of burn. Do not touch the enclosure of the microinverter, as its temperature will become high during operation.
	Risk of electric shock. Switch off the power to the circuit breaker(s) you’re working with.
50	Exceeding this period may pollute the environment
	Caution.

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Storage Requirements

If the product is not to be used and installed immediately, it must be stored in accordance with the following requirements:

- Do not remove the outer packaging of the product.
- The storage temperature should be maintained within –30 ℃ to +60 ℃.
- The relative humidity should be maintained between 4% RH and 100% RH.
- Store the product in a clean and dry place, away from dust and moisture.
- Stack no more than 7 layers high. When stacking, please be careful when placing the packaging box to avoid personal injury or equipment damage caused by equipment tipping over.
- Regular inspections are required during storage (once every three months recommended). If the product has been placed in storage for two years or longer, it must be inspected and tested by qualified personnel before use.
- Regular recharging are required during storage as the table below.

Storage temperature	Storage time
-20℃<T≤25℃	10 months
25℃<T≤35℃	6 months
35℃<T≤45℃	4 months
45℃<T≤55℃	2 months

NOTE:

- **If it is within the storage time, the battery does not need to be recharged.**
- **If it has exceeded the storage time, the battery should be recharged as soon as possible.**
- **The maximum number of recharging is 3. If the maximum number of times is exceeded, it is recommended to discard the battery.**
- **The battery power must be recharged to 30% SOC.**

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Installation

4.1 Pre-installation Requirements

4.1.1 Grid requirements

ATMOCE Battbank should connect to a single–phase or a three-phase grid. Measure AC line voltages at the point of connection to confirm that they are within the ranges.

Phase setup		Voltage range
Three–phase	L1, L2, L3 to N	176 to 276 Vac

4.1.2. Cable requirements

To properly set up the system, it is necessary to select the appropriate cables. The table below shows the recommended cable requirements.

Function	Recommendation	
Power cable	16 to 25 mm^2, 1–core (PE) 35 to 50 mm^2, 4–core (3*L+N)	Rated Voltage to Earth / Ground, U_0=450V, Rated Voltage Between L lines, U=750V, Copper core wire with a maximum allowable operating temperature of not less than 90℃
Communication cable	4 to 5 mm^2	Rated Voltage to Earth / Ground U=300V, Three-core + shielded

NOTE:

- When connecting the cables to the M-ELV Battbank, you must cover the cable ends by using the proper cold–press terminal provided in the package.
- When stripping the cable, remove approximately 12 mm of the insulation layer from the power cable and 8mm of insulation layer from the communication cable.
- Depending on the quantity and installation method of the batteries, the recommended wire diameter for the power cables can be found in the Appendix 1.

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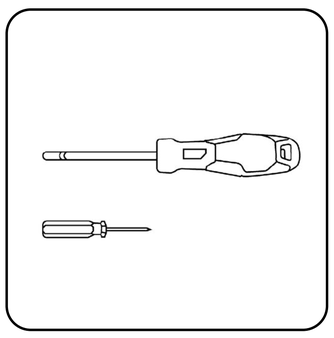
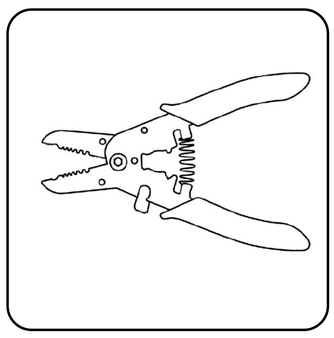
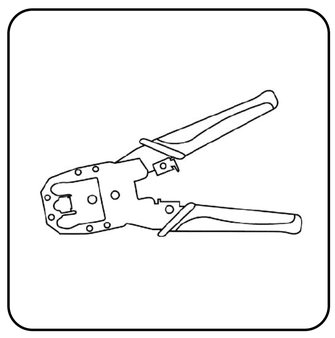
4.1.3 Prepare the Tools and Materials



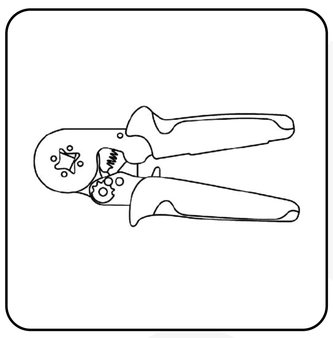
Screwdriver



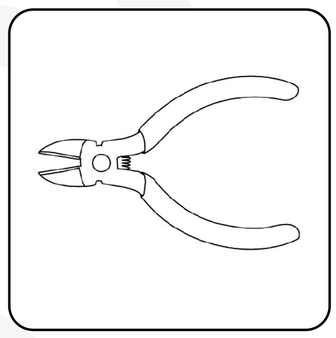
Wire stripper



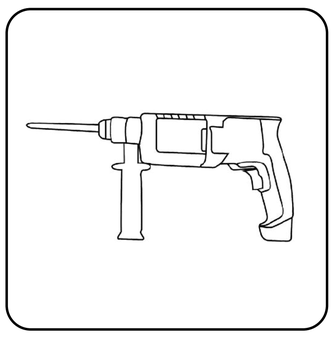
Power line crimper



Communication line crimper

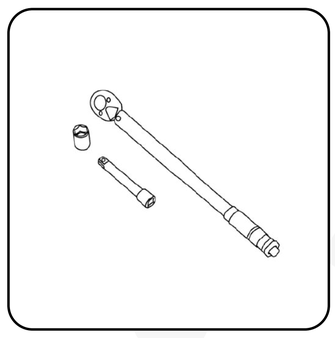


Diagonal cutter

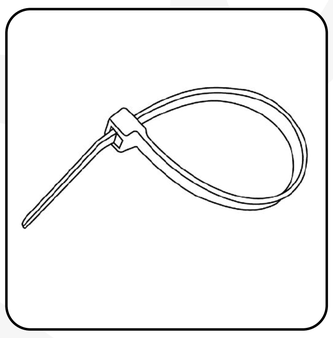


Drill

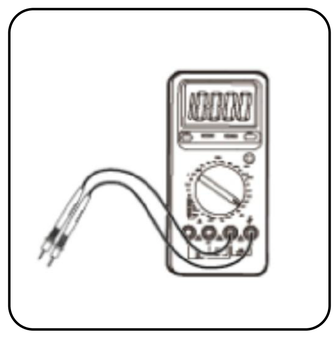
Hammer



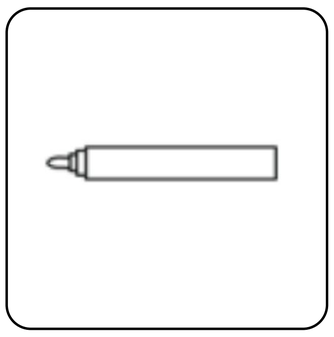
Torque wrench



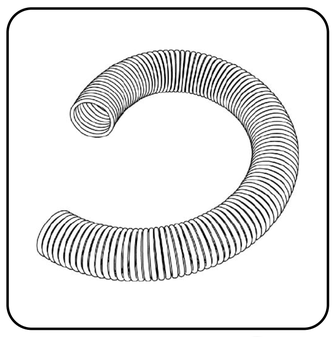
Tie wrap



Multimeter

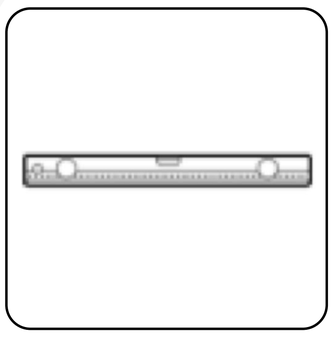


Marking pen



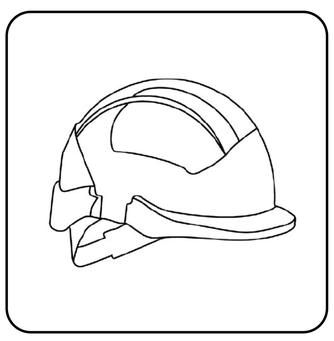
Corrugated protective pipe

Tape measure

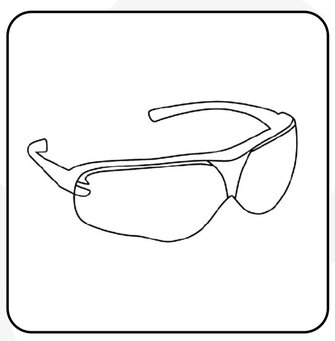


Spirit level

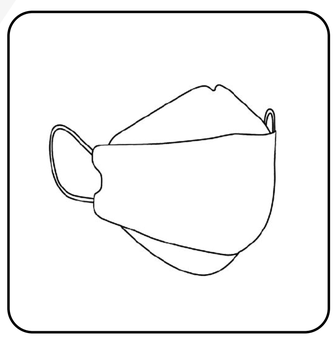
4.1.4 Prepare the Safety Equipment



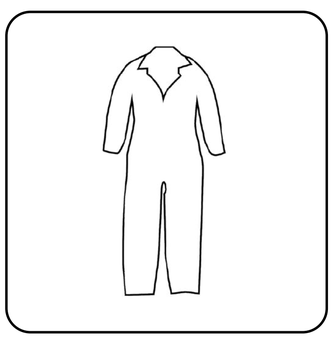
Safety helmet



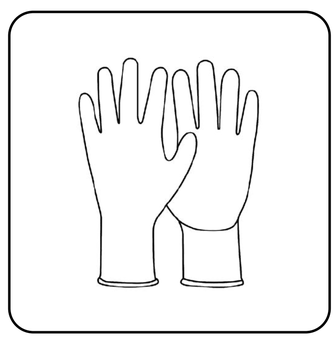
Protective goggles



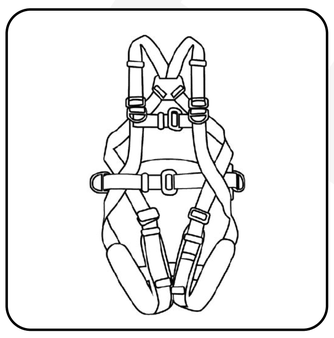
Mask



Safety clothing



Safety gloves



Safety belt

Safety shoes

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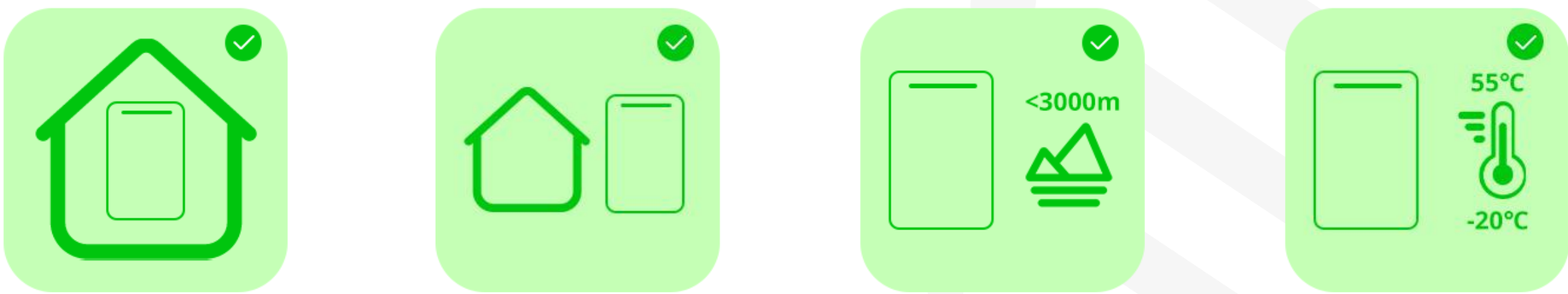
4.1.5 Download the Atmozen App

Download the latest version of the Atmozen app. Open and log in to your account. You can track the progress of system installation with this app.

4.1.6. Recommended installation environment and space

a. The installation environment should be:



Install indoors | Install outdoors | Install under 3000m | Install from -20 to 55

b. The installation environment should not be:

No sunlight directly | No flame | No crowded areas | No dust | No immersion > 50cm

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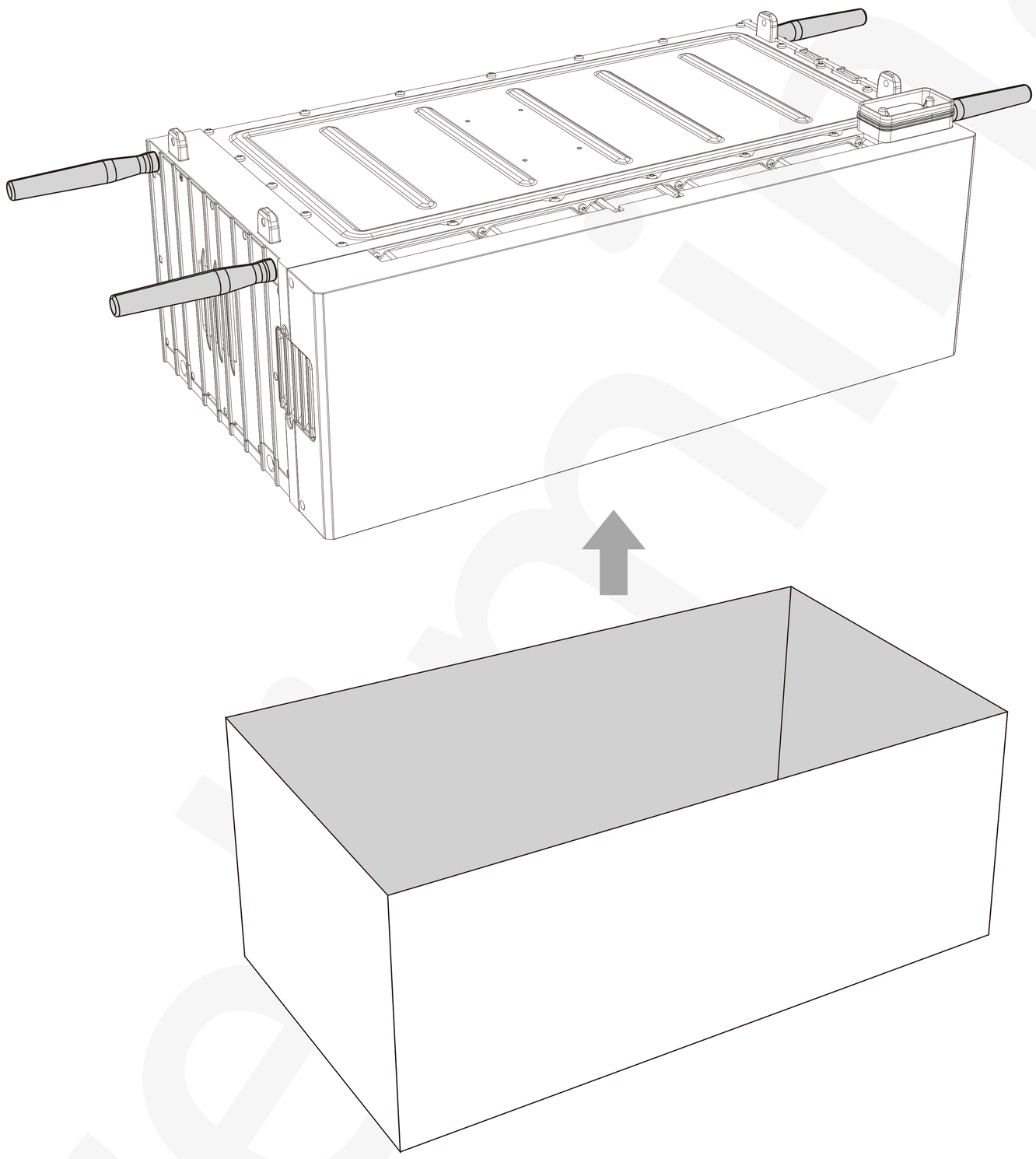
4.2 Take out the M-ELV Battbank

a. Take out the handlebars and insert them into the holes on the both sides of the battery.

b. Remove the battery out of the box.



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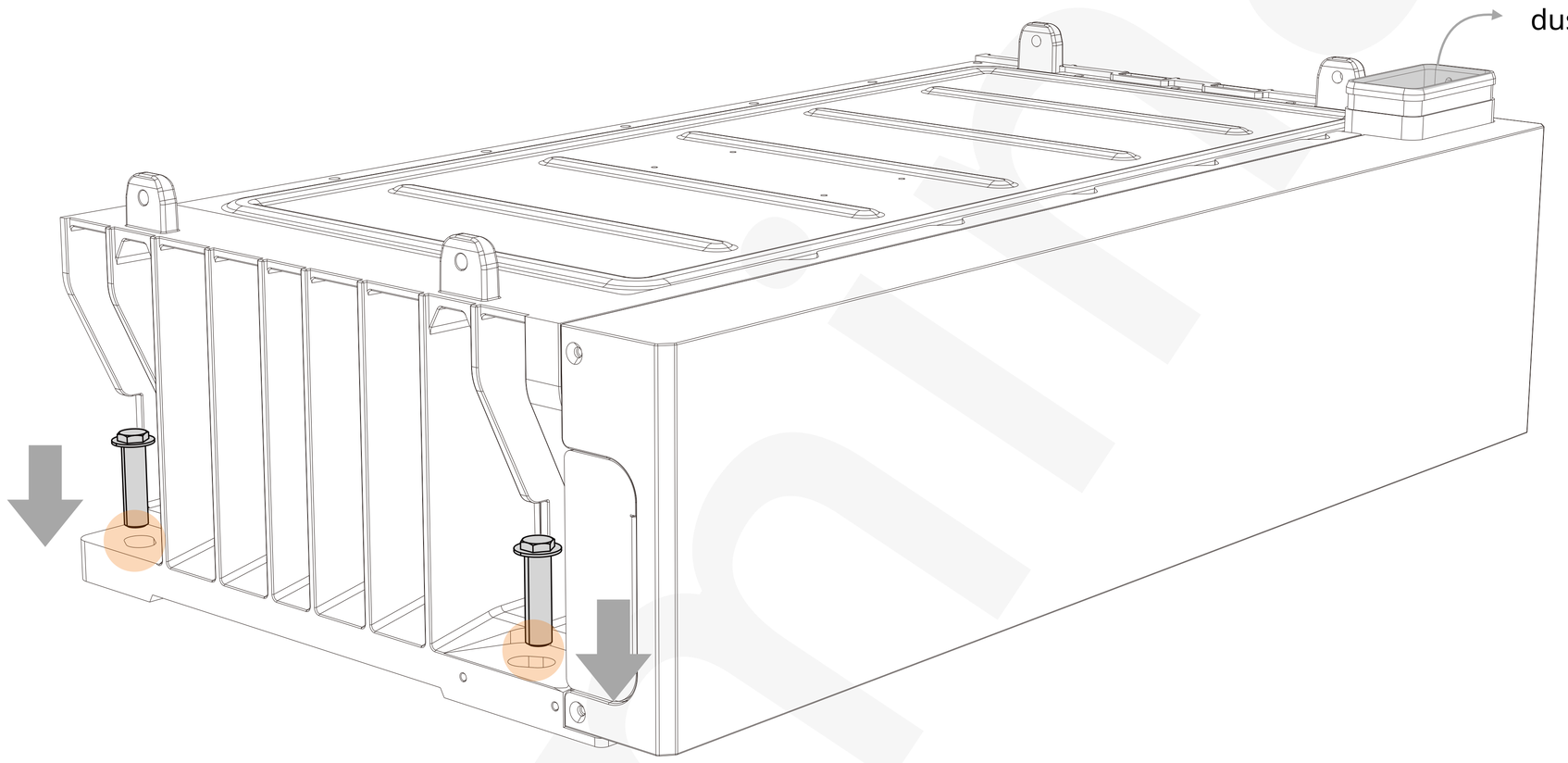
4.3 Mount the Battbank base on the floor

a. Take out the marking plate and place it on the floor. Use the spirit level to check that the plate is level, then make the marks.
b. Drill at the four marks by using an electric drill with a bit (Φ14).



c. Take out the expansion screws and align them with the holes. Knock them into the floor with a hammer and tighten the screws with a torque of 9–14 N·m.
d. Remove the dust cap from the plug before connection.

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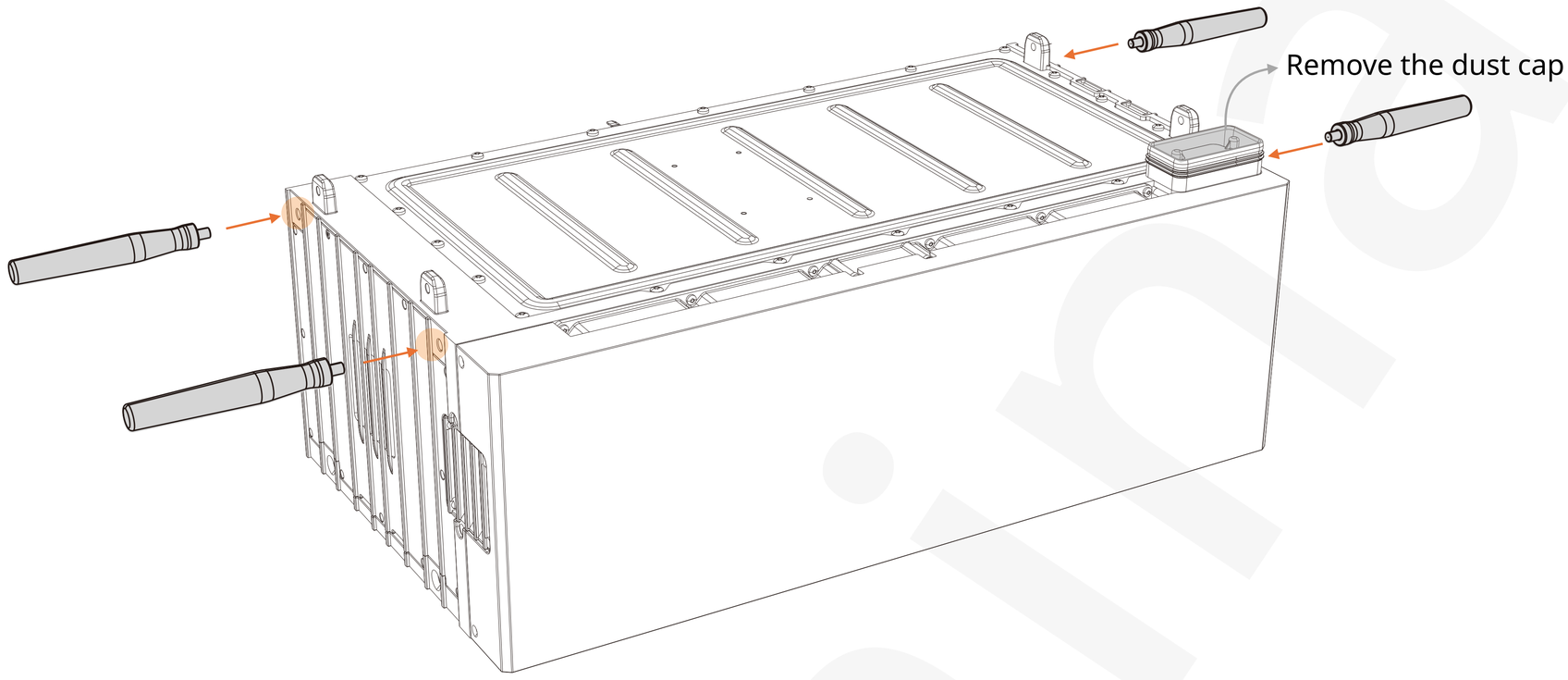
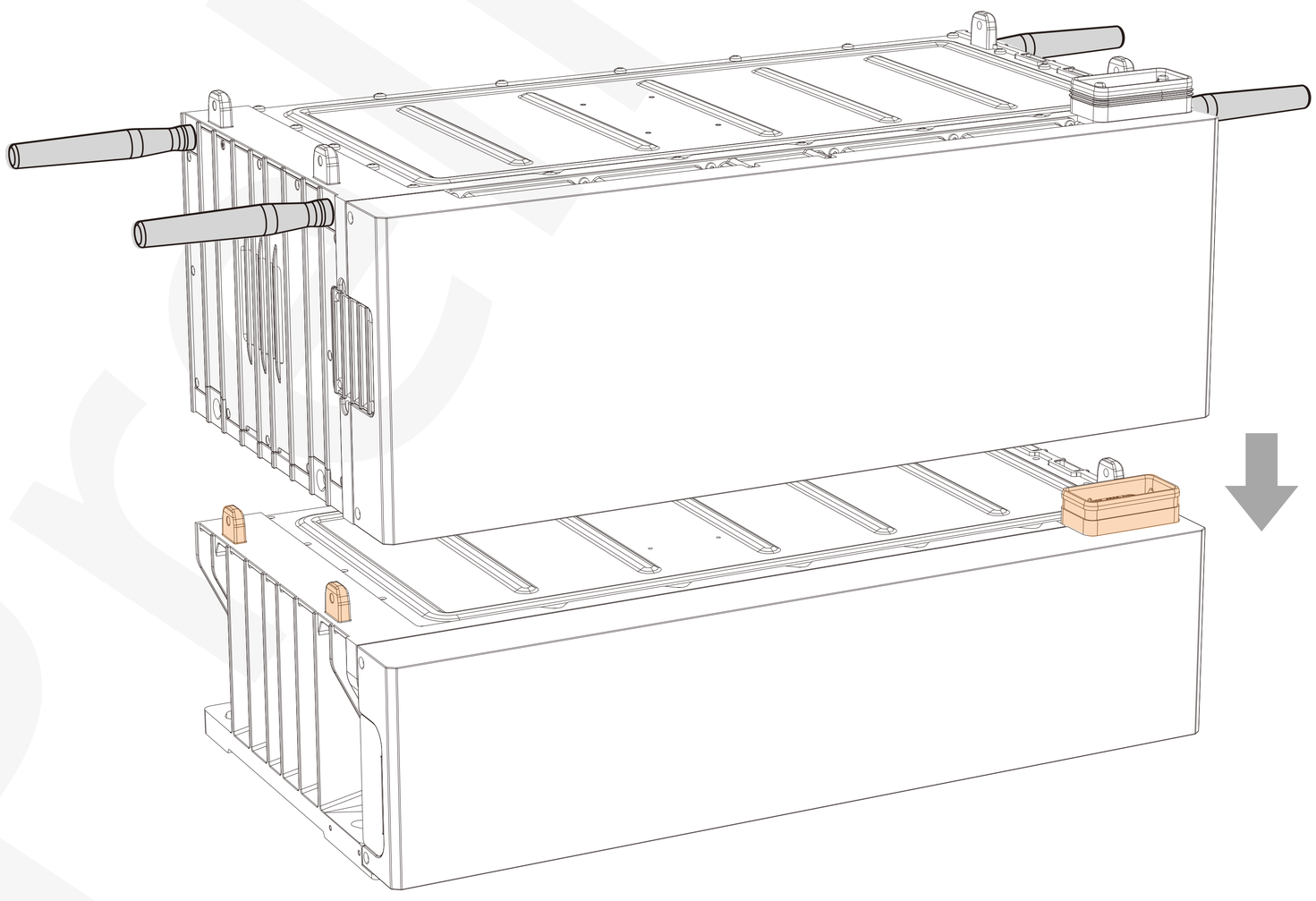
4.4 Mount the pack and cap

a. Insert the four lifting handles into the designated slots.

b. Remove the dust cap from the plug before connection.



c. Use a forklift or other lifting equipment to lift the pack and place it onto the base.



NOTE:

- **Ensure the pack is correctly oriented to allow proper plug connection.**

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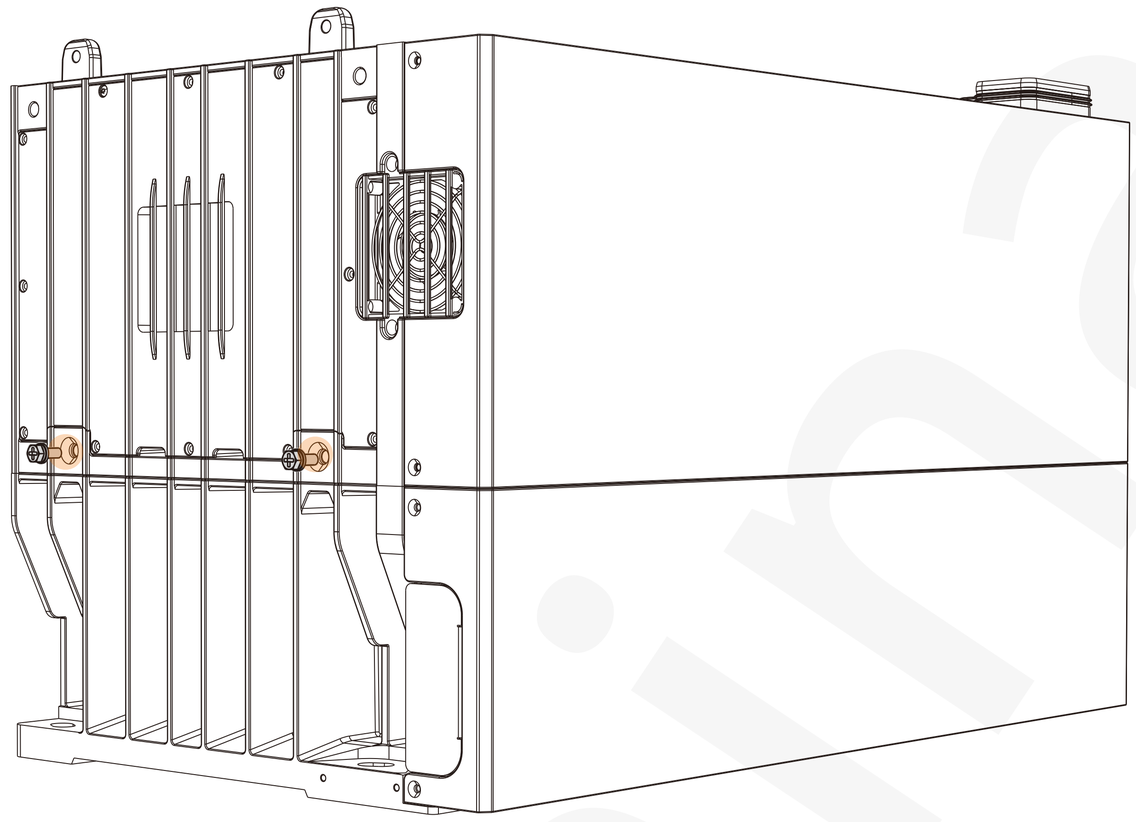
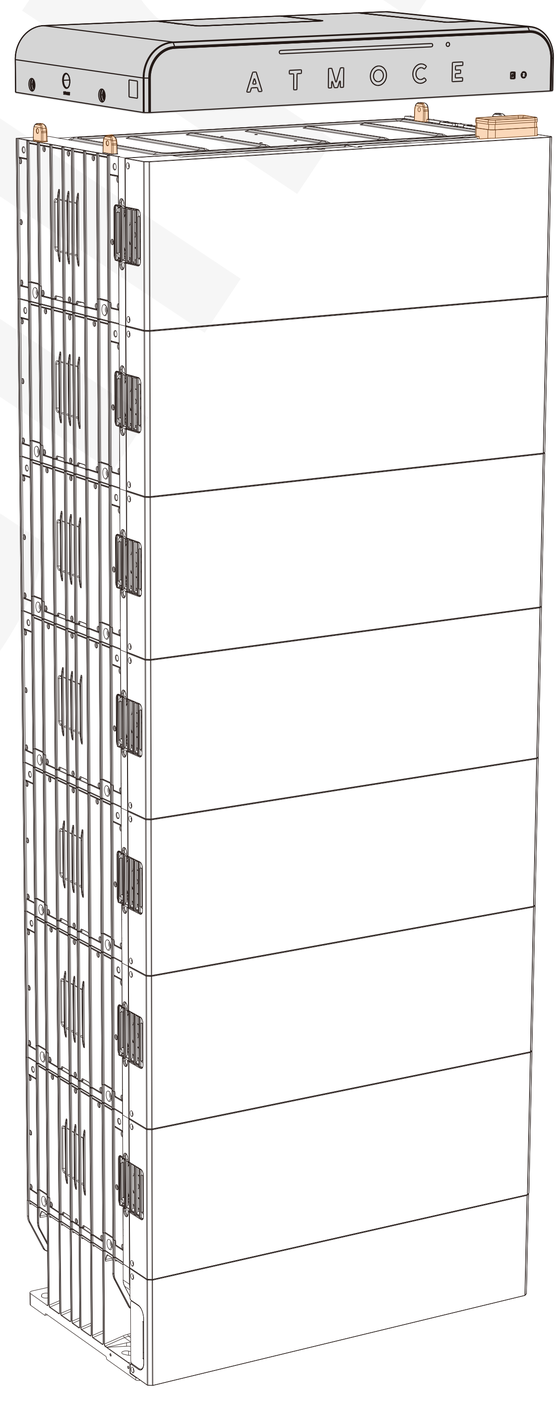
d. Install the screws at the locations shown in the figure, and tighten the screws with a torque of 9–14 N·m.



e. After stacking all required packs according to the installation requirements, install the cap on the top.



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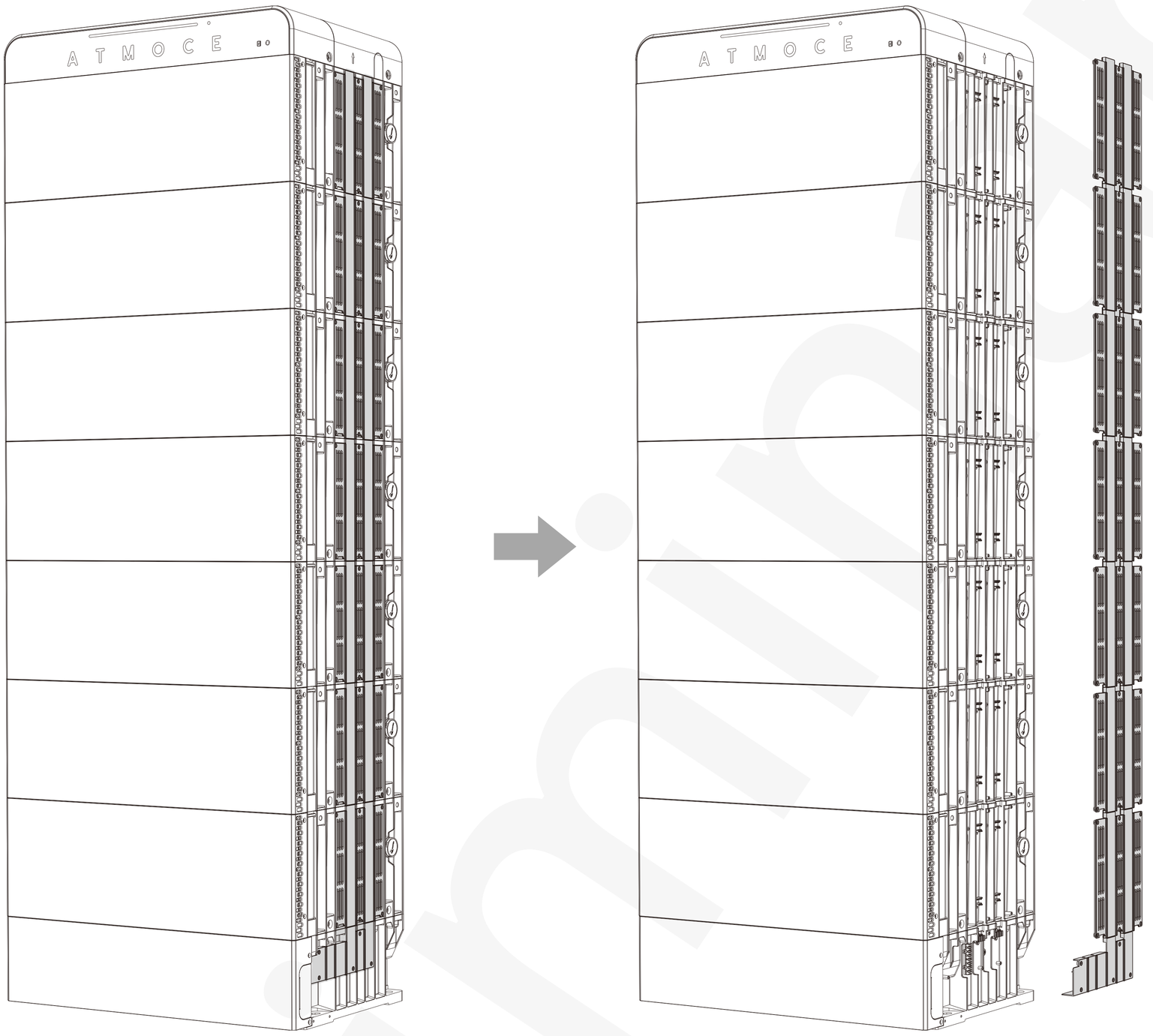
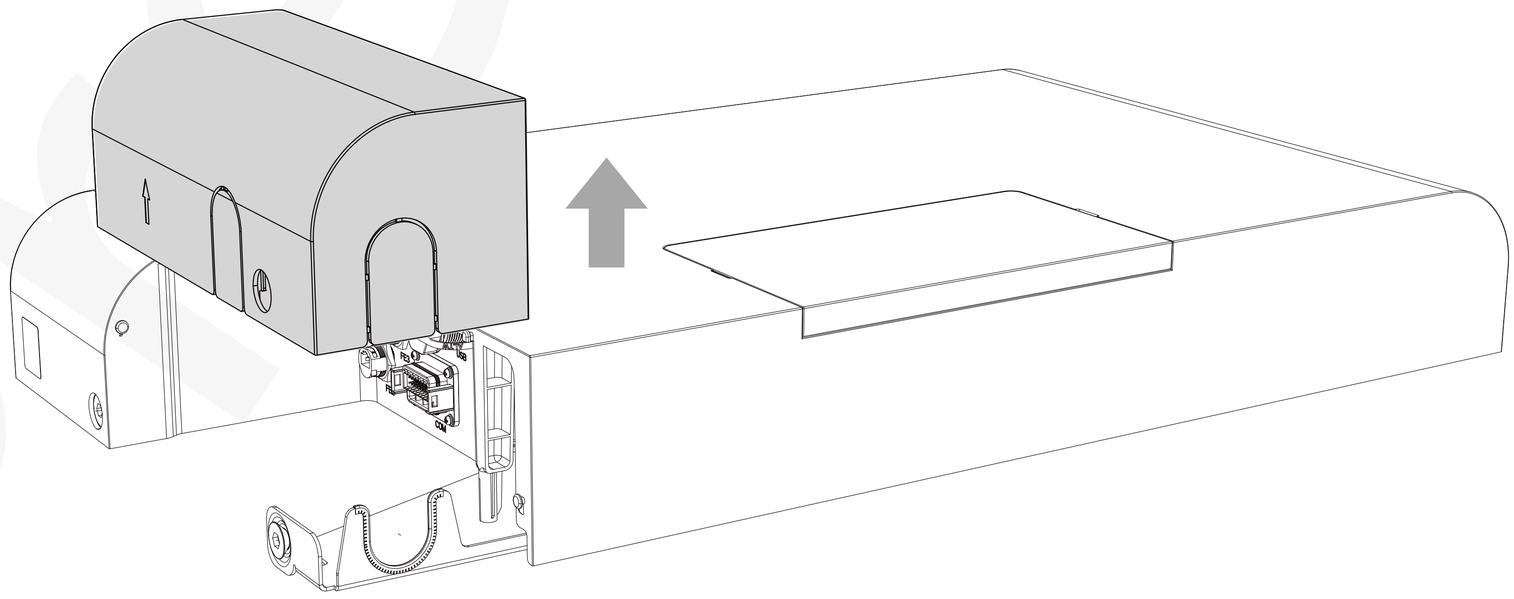
4.5 Wire the communication cable

a. Remove the side wiring cover before wiring.



b. Remove the cover plate of the cap.



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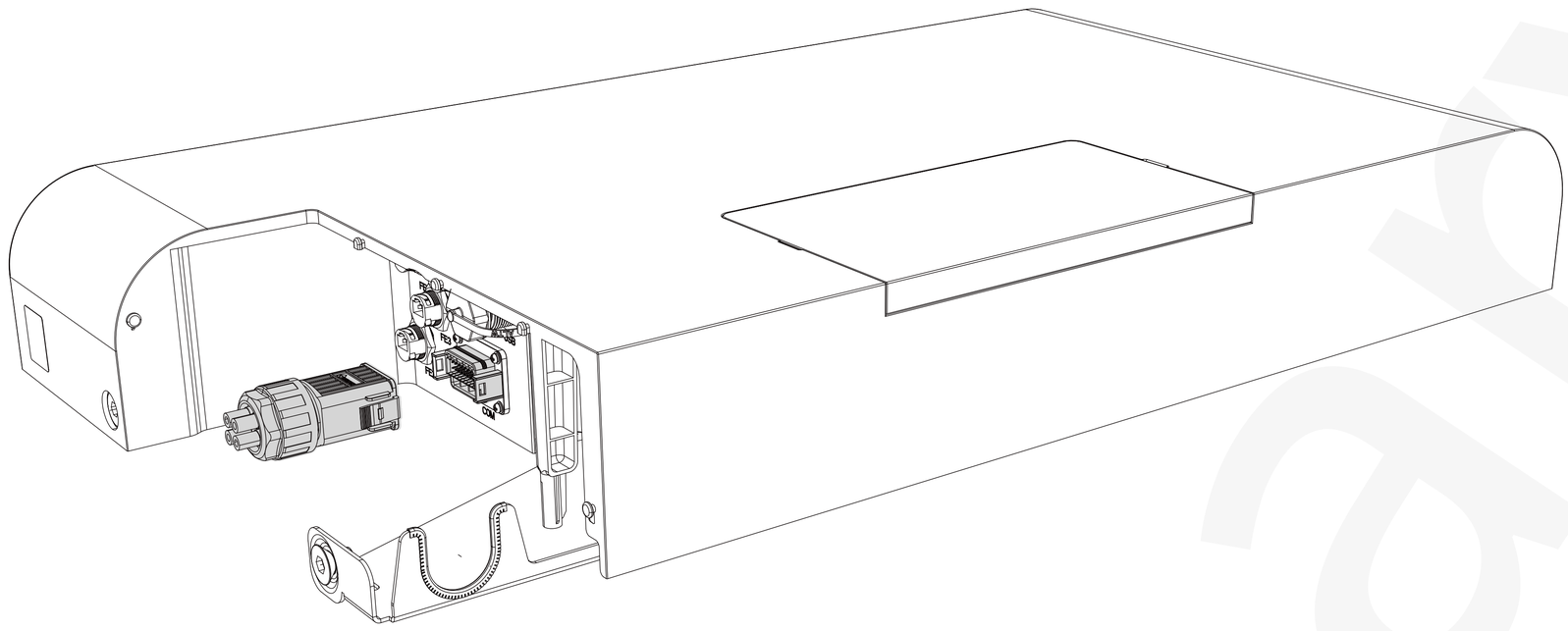
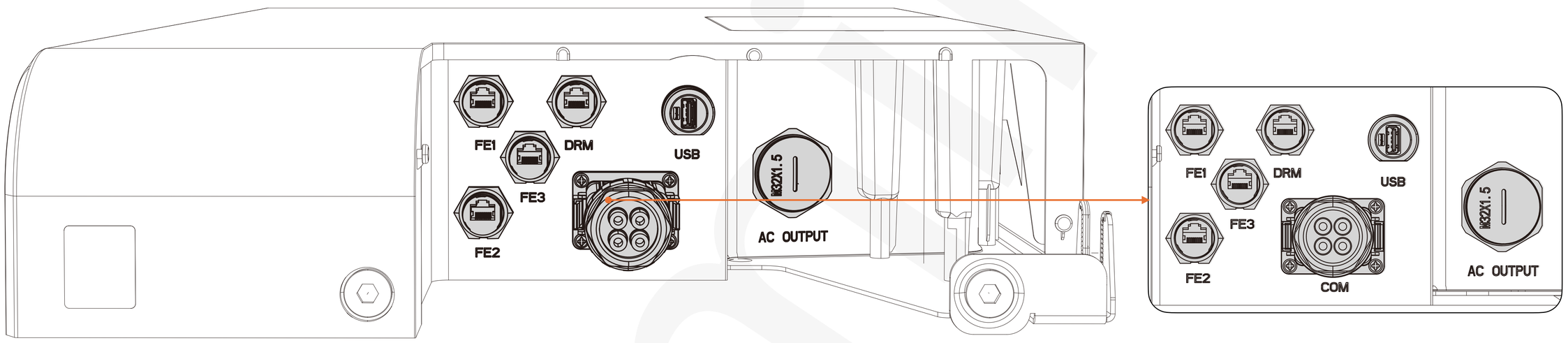
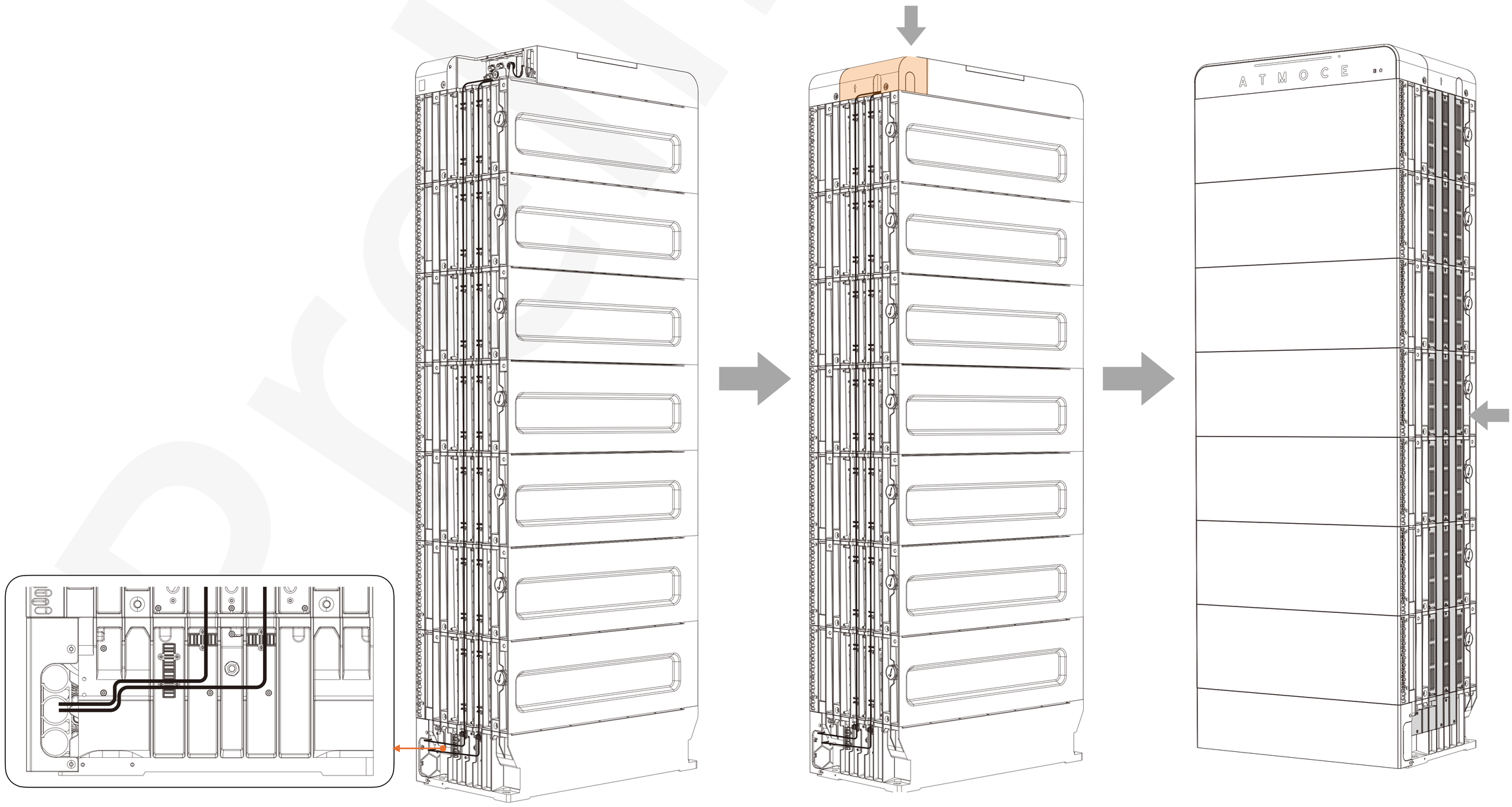
c. Disconnect the COM connector.



d. Assemble the wiring harness and attach the corresponding connectors.



e. Secure the cables along the sliding channel and reinstall the cover plate.



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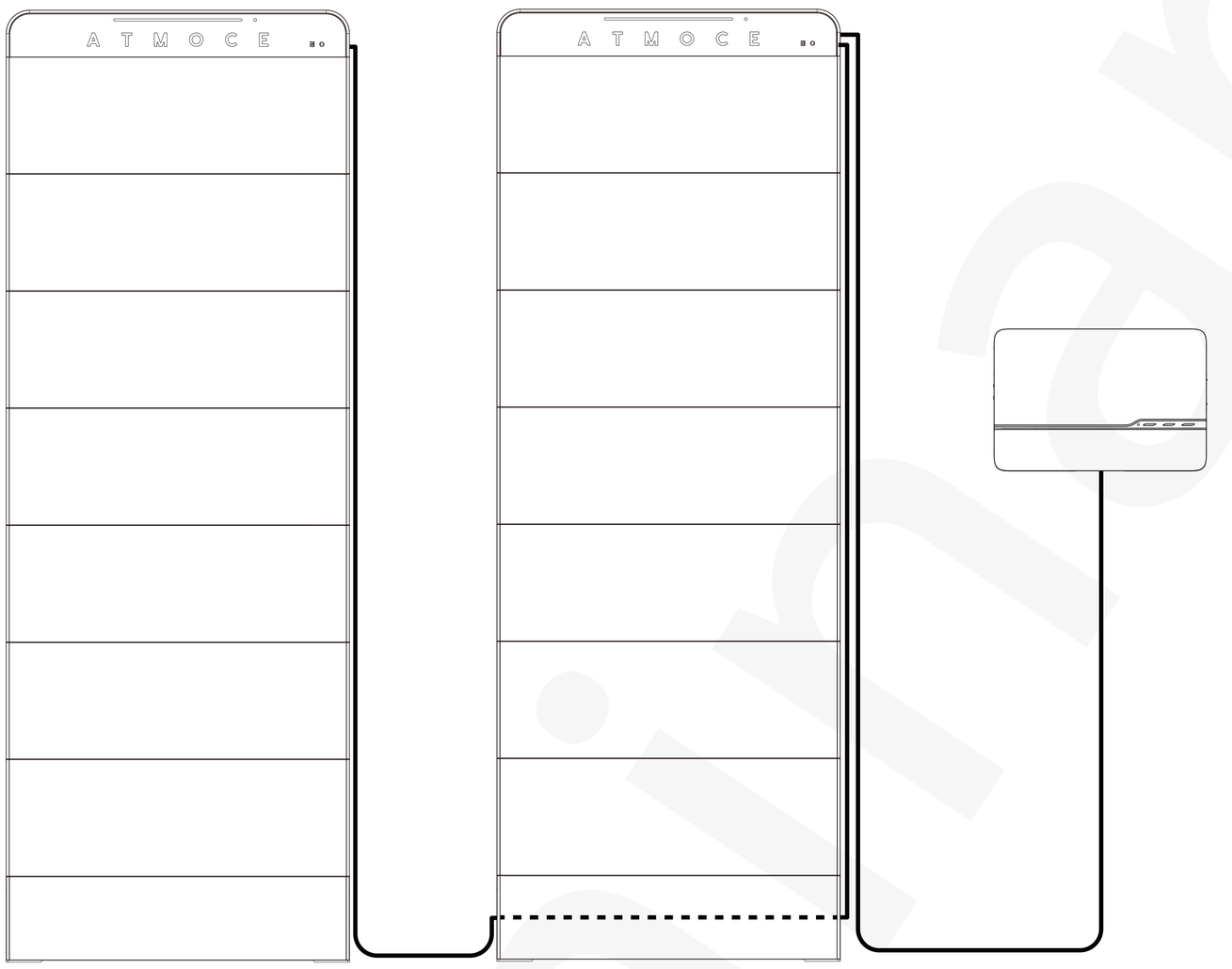
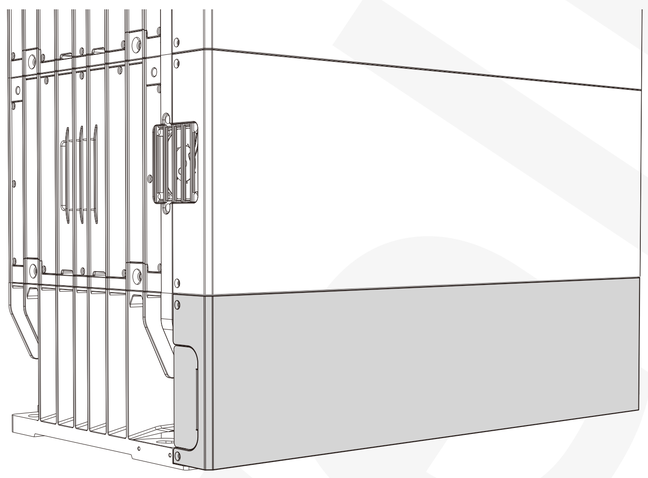
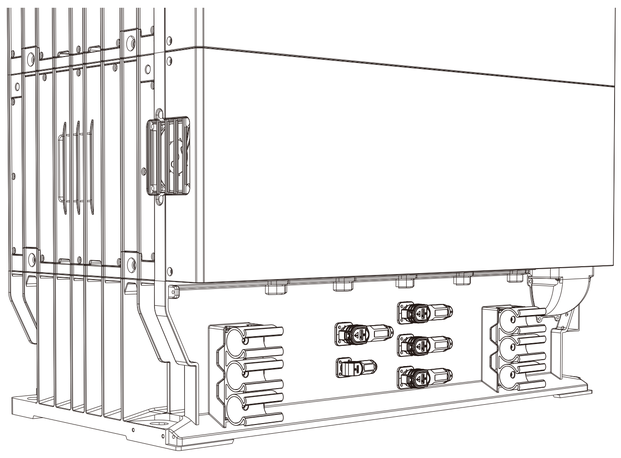
f. Connect the communication line to the gateway, a third-party EMS, or another Battbank to establish a master-slave configuration.



4.6 Wire the power cables

a. Unfasten and remove the base front cover.



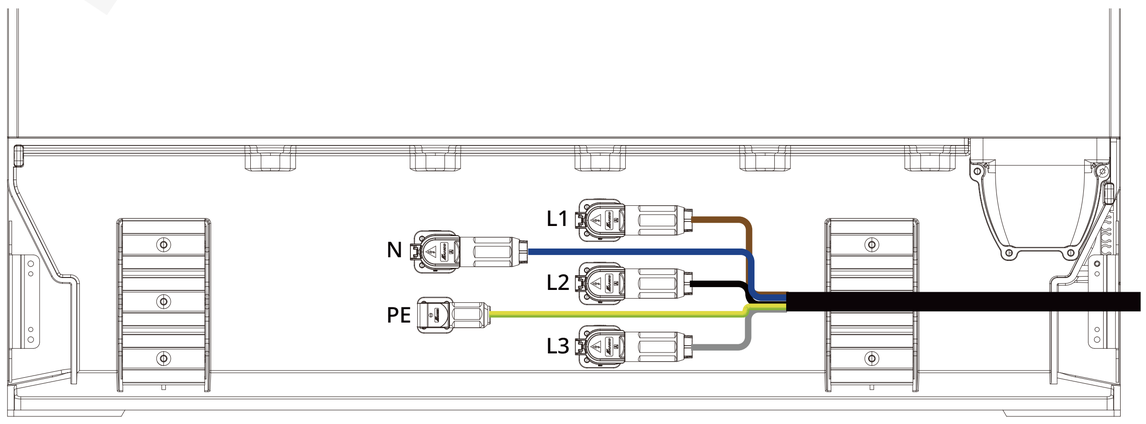


b. Assemble the power cables and connections according to the following steps in **Section 4.7.**

c. Connect the assembled connectors to the Battbank terminals:

L1, L2, L3 – Phase lines / **N** – Neutral / **Ground** – Ground line

d.



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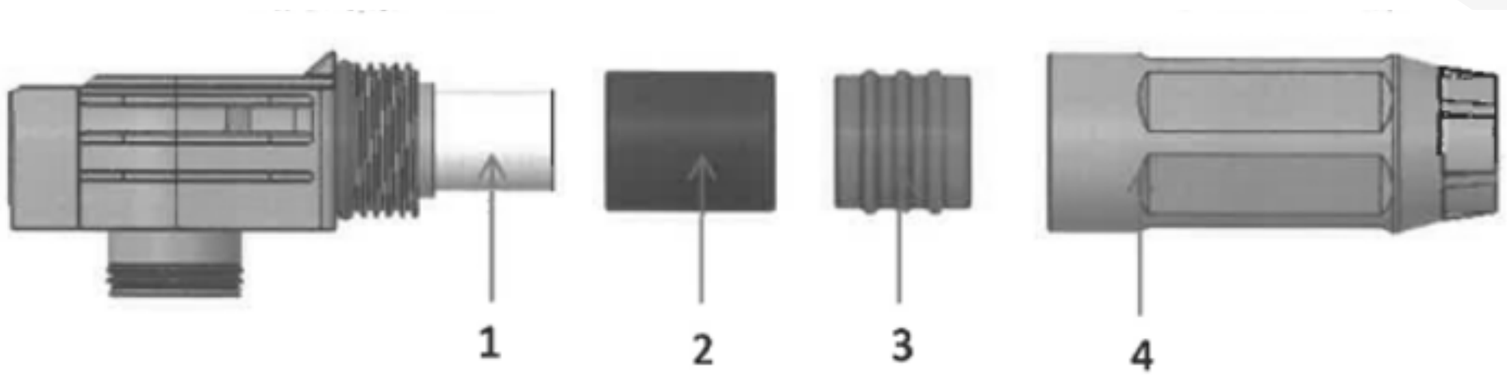
4.7 Assemble the power connector

4.7.1. Overview

a. The connector assembly consists of the following components:



No.	Component Description	Quantity
1	Connector Body	1 SET
2	Support Sleeve	1 PCS
3	Sealing Sleeve	1 PCS
4	Terminal Cap	1 PCS

4.7.2. Strip the Cable

a. Strip the cable to a length of **17.0 ± 2 mm.**

NOTE:

- **Ensure that the stripped conductor remains exposed on the wire.**

4.7.3. Assemble the connector

a. Slide the conductor through the following components in sequence: Terminal Cap → Sealing Sleeve → Support Sleeve.

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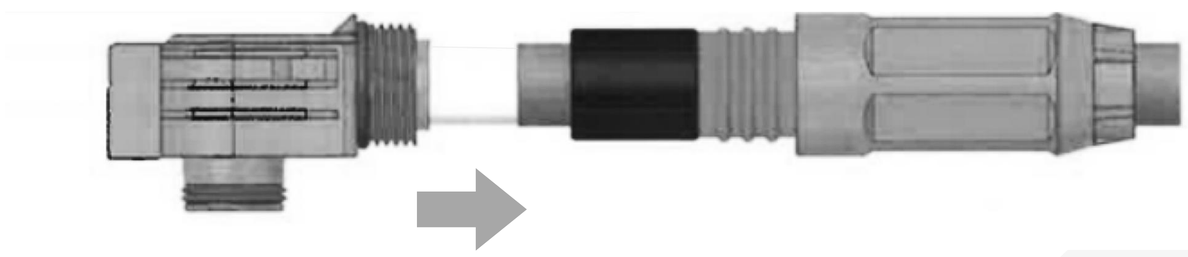
b. Remove **17.0 ± 2 mm** of insulation from the conductor and insert it into the connector body's terminal.



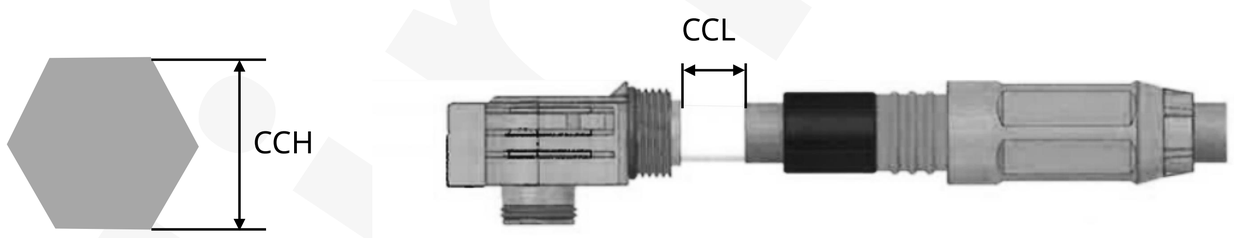
4.7.4. Crimp the Conductor

a. Crimp the conductor to the connector according to the following specifications:

Cable Size	Cable Insulation OD	CCH	CCL	Crimp Ratio	Pull Force
50 mm^2	13.5–14 mm	9.5±0.15 mm	10.0±0.5 mm	72.3±2%	≥2800 N
35 mm^2	11.5–12 mm	8.6±0.15 mm	10.0±0.5 mm	77.3±2%	≥2300 N

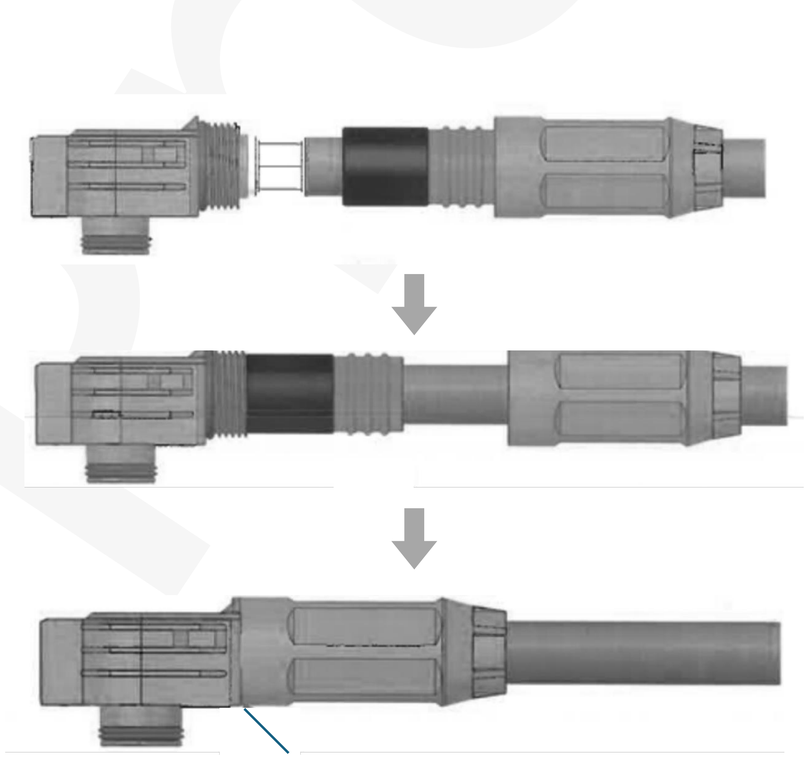
NOTE:

- **Recommended crimping dimensions are for reference only. Adjust according to cable specifications, crimping tools, and testing results.**



4.7.5. Push onto Connector Body

a. Slide the support sleeve and sealing sleeve fully onto the connector body.
b. Use a torque wrench to tighten the terminal cap to the connector body. Recommended Torque: 2 N·m.



NOTE:

- **Ensure the terminal cap fits flush with the connector body.**

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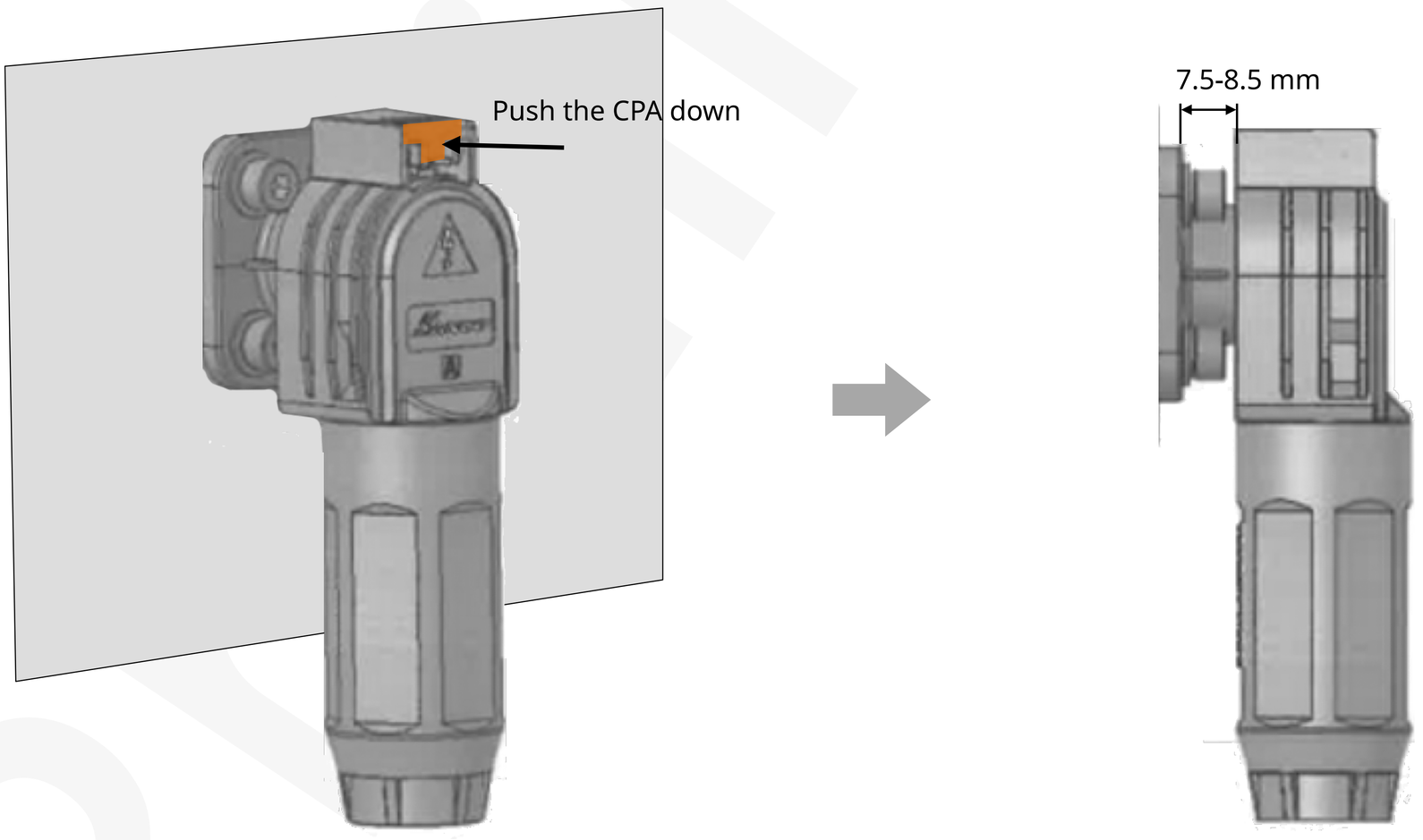
4.7.6. Power Connector Mating

a. Align the key position of the plug with the key slot of the socket.
b. Insert the plug and socket into the position shown in the figure.

c. Push the plug fully into the socket until the distance between the plug and socket is **7.5–8.5 mm**.
d. Listen for a clicking sound indicating the CPA has engaged.
e. Push the CPA down to lock the plug in place.
f. Verify the plug and socket are fully assembled.



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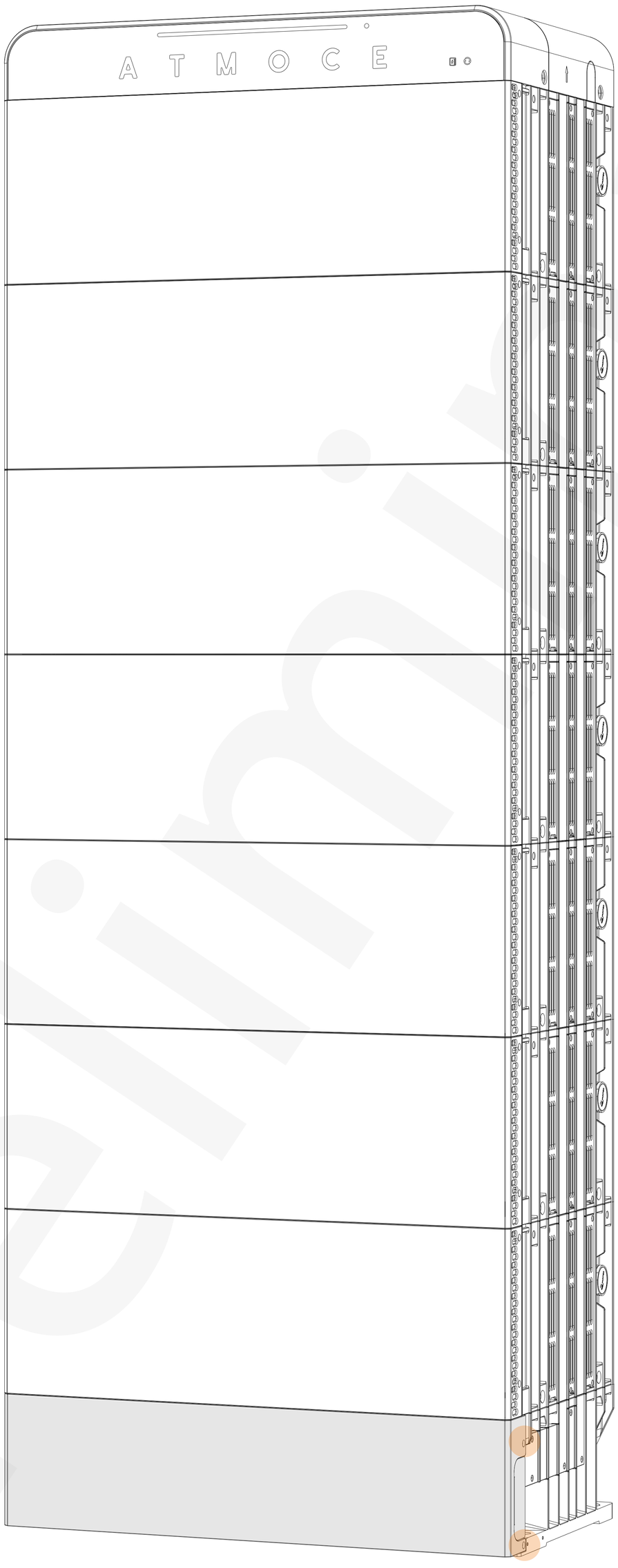
4.8 Reinstall the front cover of the base and the side panels

a. Use a Phillips screwdriver to securely install the base front cover and the side cover panels.



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4.9 Power on the system

a. Use the multimeter to measure the voltage between the N pole and L1 pole (and/or L2 pole, L3 pole) of the grid connection point. The voltage value should be approximately the nominal phase voltage
b. Switch on the battery breaker in the combiner and power on the system.

4.10 Activate the system

a. Log in to the ATMOZEN APP on your mobile phone and follow the deployment guide in the app to activate the system.
b. After the system is activated, the SOC status LED will be solid blue.

Preliminary

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Operation and Maintenance

5.1 M-ELV Battbank Working Mode

Self-consumption mode

Description:

This system prioritizes the consumption of green energy generated by household photovoltaic (PV) panels to reduce dependence on the grid. The M-ELV batteries store only excess solar power and discharge to supply the household when solar generation is insufficient. This solution is ideal for regions with high electricity prices and low or no feed-in tariff (FIT) subsidies.

Function:

a. **During periods of high solar generation:** The household loads consume solar power directly. Surplus energy is first used to charge the battery; any remaining energy is then exported to the grid.
b. **During periods of low solar generation (e.g., at night):** The system prioritizes battery discharge to power the home. If the household demand exceeds the battery's discharge power, the grid will supply the additional power required.

TOU (Time of use) mode

Description:

Based on the grid's time-of-use electricity rates, the system automatically adjusts the charging and discharging strategy to utilise price differentials and reduce electricity costs. The electricity rate periods must be pre-set. This is suitable for scenarios with significant differences between peak and off-peak electricity rates.

Function:

a. **Charging period:** Prioritise charging the M-ELV battery from the grid and excess solar power generation, with the M-ELV battery not discharging.
b. **Discharging period:** Excess solar power generation can be used to charge the M-ELV battery, which can supply power to the load.
c. **Other period:** Excess solar power generation can be used to charge the M-ELV battery, which does not discharge.

NOTE:

- **In some countries, grid charging of energy storage systems is not permitted, and this mode is prohibited.**
- **This mode requires at least one set of charging time periods or discharging time periods. (In off-grid mode, when the grid power fails, the energy storage system can discharge at any time.)**

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Demand Charge Management Mode

Description:

This mode limits the maximum power drawn from the grid by discharging the battery during peak demand periods. It helps commercial and industrial users reduce demand charges and optimize electricity costs under demand-based tariff mechanisms.

Function:

a. **During peak demand periods:** The battery discharges to supplement facility loads, ensuring grid import power does not exceed the configured demand limit.
b. **During low-load periods:** The battery is charged using surplus PV generation or grid power, preparing for the next peak demand event.

Electricity Arbitrage Mode

Description:

This mode charges the battery during low electricity price periods and discharges during high price periods, enabling users to benefit from time-of-use (TOU) electricity pricing and reduce overall energy costs.

Function:

a. **During low electricity price periods:** The battery is charged from the grid or surplus PV power.
b. **During high electricity price periods:** The battery discharges to supply loads, minimizing grid import during expensive tariff windows.

Demand Response Mode

Description:

This mode enables the system to respond to grid or utility demand response signals by adjusting battery operation and grid consumption. It allows users to participate in demand response programs while supporting grid stability.

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Function:

a. **Upon demand response event signals:** The battery discharges to reduce grid power consumption or support local loads as required.
b. **Outside demand response events:** The system operates in normal optimization modes and maintains readiness for future events.

Ancillary Service Mode

Description:

This mode allows the energy storage system to provide ancillary grid services, such as frequency regulation or reserve capacity, contributing to grid stability and enabling additional revenue opportunities.

Function:

a. **During ancillary service activation:** The battery rapidly charges or discharges according to grid control signals.
b. **During standby periods:** The system maintains a predefined state of charge to ensure service availability.

EV Supports Facility Mode

Description:

This mode is designed for facilities equipped with EV charging infrastructure. The battery buffers charging power demand, reduces grid impact, and improves the utilization of renewable energy.

Function:

a. **During EV charging peak periods:** The battery discharges to support charging loads, preventing excessive grid demand or demand charge spikes.
b. **During low charging demand or high PV generation:** The battery is charged using surplus solar energy or off-peak grid power.

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5.2 Preconditioning

When temperatures are low, the charging capacity of the M-ELV Battbank decreases. To help the M-ELV Battbank address this issue, ATMOCE has implemented Preconditioning technology, which enables the M-ELV Battbank to operate at temperatures as low as -20°C.

When temperatures drop below freezing, Preconditioning activates and heats the battery to enhance operational and charging performance. To heat itself, the M-ELV Battbank consumes a small amount of energy, enabling higher-power charging.

NOTE:

- **This mode cannot be customised, as the M-ELV Battbank detects internal temperature and automatically activates preconditioning.**
- **During preconditioning, the ATMOZEN APP and ATMOCE Cloud may display the amount of electricity flowing from solar or the grid to the M-ELV Battbank, but the battery is not in charging status. This is normal and this energy is used for heating.**
- **The battery will reserves 10% capacity in default value to protect the battery itself.**

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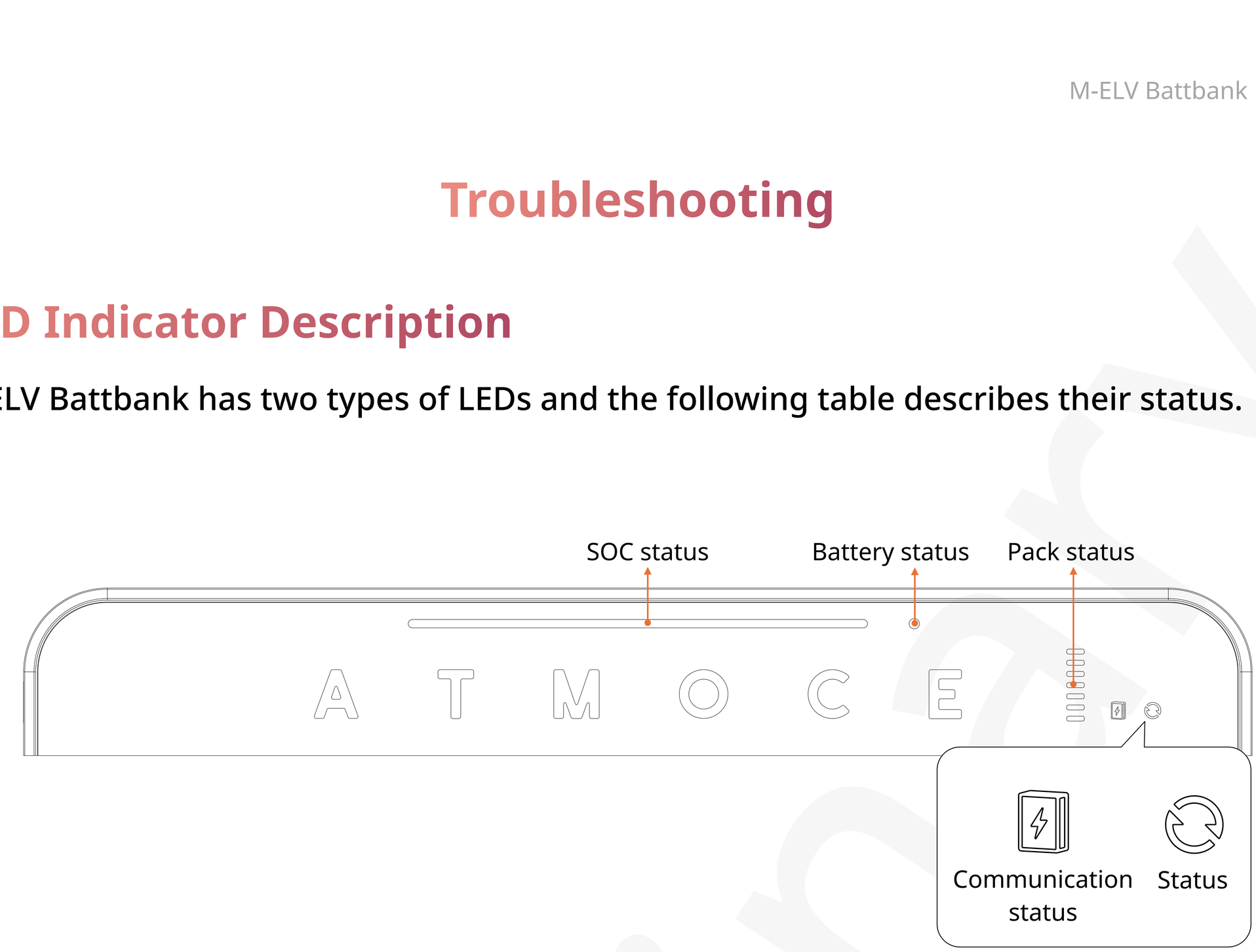
Troubleshooting

6.1 LED Indicator Description

The M-ELV Battbank has two types of LEDs and the following table describes their status.



Function	Colour	Description
SOC status	Solid blue	Remaining battery energy percentage
Alarm	Quick flash red	The battery has an environmental fault
	Solid red	The battery has an internal fault
	Quick flash orange	Upgrading
	Dim	Normal operation
Pack status	Solid green	Normal operation
	Solid red	Fault
	Dim	Normal operation
Communication status	Solid green	Normal operation
	Slow flash red	Fault
Status	Solid green	Standby
	Slow flash green	Charging or Discharging

NOTE:

- The state of charge (SOC) accuracy may deviate if the battery is used for the first time, activated after long-term storage, or left in standby mode for a prolonged period. For calibration, please perform a full charge (to 100% SOC) at least once.

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6.2 Alert Codes List

Code	Issue	Cause	Solution
2	Grid Power Outage	Grid power outage occurred.	• Check whether the grid is normally powered. • Check whether the alternating current cable or breaker is disconnected.
3	Grid Undervoltage	The grid voltage is lower than the lower limit.	• Check whether the grid voltage is within the allowed range. If not, contact your local electric system operator. If so, modify the grid undervoltage protection threshold after obtaining consent from your local electric system operator. • If the fault persists, check whether the alternating current breaker and cable are connected properly.
4	Grid Overvoltage	The grid voltage is higher than the upper limit.	• Check whether the grid voltage is within the allowed range. If not, contact your local electric system operator. If so, modify the grid overvoltage protection threshold after obtaining consent from your local electric system operator. • If the fault persists, check whether the alternating current breaker and cable are connected properly, or whether the cable complies with the recommended specifications.
5	Grid Underfrequency	The grid frequency is lower than the lower limit.	• Check whether the grid frequency is within the allowed range. If not, contact your local electric system operator. If so, modify the grid underfrequency protection threshold after obtaining consent from your local electric system operator.
6	Grid Overfrequency	The grid frequency is higher than the upper limit.	• Check whether the grid frequency is within the allowed range. If not, contact your local electric system operator. If so, modify the grid overfrequency protection threshold after obtaining consent from your local electric system operator.
7	High Output Direct Current Component	The output direct current component is higher than the upper limit.	• The device automatically monitors external working conditions in real time and returns to normal after the fault is resolved. • If the fault occurs frequently, contact your distributor or Customer Service.

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Code	Issue	Cause	Solution
13	Distribution error occurred.	1. Abnormal phase in the single-phase system. 2. Phase loss in the three-phase system. 3. Reversed phase sequence in the three-phase system. 4. Short circuit in the three-phase system.	• For single-phase battery, check for a short circuit in the AC input. • For three-phase battery, check for phase loss, reversed phase sequence, or short circuits in the AC wiring. • If the alert persists, contact your distributor or Customer Service.
		The single-/three-phase wiring in the battery is inconsistent with the single-/three-phase configuration in the combiner.	• Please check whether the AC distribution wiring of the battery is consistent with the single/three-phase configuration in the combiner. • If the alert persists, contact your distributor or Customer Service.
18	High Output DC Voltage Component	The output DC voltage component is higher than the upper limit.	• The device automatically monitors external working conditions in real time and returns to normal after the fault is resolved. • If the fault occurs frequently, contact your distributor or Customer Service.
50	Battery Overvoltage	The total battery voltage or battery cell voltage exceeds the alert threshold.	• In the app, shut down the battery and then power it on again; • Reset the system in the app; • If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input; • If the alert persists, contact your distributor or Customer Service.
51	Battery Undervoltage	The total battery voltage is below the alert threshold.	• If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input; • Reset the system in the app; • If the alert persists, contact your distributor or Customer Service.
		The voltage of a battery cell is too low.	• If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input; • Reset the system in the app; • If the alert persists, contact your distributor or Customer Service.
52	Large Battery Cell Voltage Difference	The voltage difference between battery cells exceeds the alert threshold.	• If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input. • Reset the system in the app. • If the alert persists, contact your distributor or Customer Service.
53	Battery Overtemperature	1. The battery temperature exceeds the alert threshold 2. The ambient temperature is too high. 3. The fan is not working normally.	• Wait for a while and check if the alert disappears automatically. • If the alert is reported frequently, please ensure that the working conditions of the device are within the allowed range. • If the alert persists, contact your distributor or Customer Service.

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Code	Issue	Cause	Solution
54	Low Battery Temperature	1. The battery temperature is below the alert threshold. 2. The ambient temperature is too low. 3. The heating system is not working normally.	• Please ensure that the working conditions of the device are within the allowed range. • If the alert persists, contact your distributor or Customer Service.
55	Large Battery Cell Temperature Difference	1. The temperature difference between battery cells exceeds the alert threshold. 2. The fan is not working normally.	• Shut down the battery and then power it on again. • Reset the system. • If the alert is reported frequently, contact your distributor or Customer Service.
56	Battery Overcurrent	The battery current exceeds the alert threshold.	• Wait for a while and check if the alert disappears automatically. • If the alert is reported frequently, reset the system in the app. • If the alert persists, contact your distributor or Customer Service.
57	Low Battery SOH	The battery health metric is below the alert threshold.	• The battery lifespan has reached its end. Please stop using the battery. • Please follow the legal regulations in your country/region and contact local battery recycling services for disposal.
58	Battery Life Terminated	The battery lifespan has reached its end.	• The battery lifespan has reached its end. Please stop using the battery. • Please follow the legal regulations in your country/region and contact local battery recycling services for disposal.
59	Battery Micro-Short Circuit	The battery micro-short circuit fault occurred.	• Please contact your distributor or Customer Service.
60	Battery Thermal Runaway	The battery thermal runaway fault occurred.	• Please immediately disconnect the battery AC input and stop using the battery. • Please contact your distributor or Customer Service.
62	Internal Device Error	The internal circuit fault protection of the battery is triggered. The internal circuit of the battery failed.	• In the app, shut down the battery and then power it on again; • Reset the system in the app; • If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input; • If the alert persists, contact your distributor or Customer Service. • In the app, shut down the battery and then power it on again; • Reset the system in the app; • If the battery is connected to the grid, disconnect the AC input, wait for the battery indicator to go out, and then restore the AC input; • If the alert persists, contact your distributor or Customer Service.
63	Abnormal Communication Between Battery and Gateway	1. The device is shut down. 2. The CAN bus cable between the device and the gateway is abnormal.	• Please ensure that the CAN bus cable between the gateway and battery module is reliably connected. • Reset the system. • If the alert persists, contact your distributor or Customer Serv
64	Active Device Protection	The operating environment of the battery is abnormal.	• The device automatically monitors external working conditions and returns to normal after the fault is resolved. • If the alert is reported frequently, contact your distributor or Customer Service.

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Technical Data

7.1 M-ELV Battbank Data Sheet

Items	Unit	MS-16K-U
Electrical Parameters		
Continuous Output Power	kVA	8
Max. Output Power	kVA	10
Peak Output Power (10s)	kVA	12
Continuous Input Power	kVA	8
Nominal Voltage	$V_{a.c.}$	3/(N)/PE~220/380, 230/400, 240/415.254/440, 277/480
Operating Voltage Range (L to N)	$V_{a.c.}$	176 - 305
Nominal Frequency	Hz	50 / 60
Frequency Range	Hz	45-55 @50 Hz, 55-65 @60 Hz
Max. Intput Current	A	12.12
Max. Output Current	A	15.15
Power Factor (On grid)		0.8 leading…0.8 lagging
Power Factor (Off grid)		1leading…1 lagging
AC Round-Trip Efficiency	%	>90%
THDi	%	<1.5%
Battery		
Rated Battery Energy	kWh	16
Nominal Battery Capacity	Ah	314
Nominal DC Voltage	V	51.2
Max. DC Voltage	V	57.6
Chemistry		Lithium Iron Phosphate (LFP)
Number of Cycles		10,000
DC Round-Trip Efficiency	%	96
BMS		YES
Mechanical data		
Stack Dimensions	mm	880 × 300 × 483(W x H x D)
SCU Dimensions	mm	880 × 120 × 483(W x H x D)
Base Dimensions	mm	880 × 220 × 483(W x H x D)
Lifting Weight (without Bracket)	kg	148[a]
Mounting		Floor
Max Stackbale Amount		7
Ambient Operating Temperature Range	℃	-30 to 55
Optimum Operating Temperature Range	℃	0 to 30
Storage Temperature	℃	-30 to 60
Protection Class		I
Ingress Rating		IP66
Cooling		Intelligent Air Cooling
Operating Humidity (RH)	%	4 to 100, Condensing

a. The tolerance will be ±10%.

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Items	Unit	MS-16K-U
Altitude	m	Up to 3,000
Pollution Rating		PD3
Protection		
AC Port Overvoltage Class	$V_{a.c.}$	III
AC Surge Protection	$V_{a.c.}$	TYP II
Galvanic Isolation	Hz	YES
Insulation Resistance Monitor	Hz	YES
Anti-Islanding Protection	A	YES
Features and Compliance		
Indicator		LEDs for SOC & Status
Communication		FE, RS485, Wlan, Bluetooth, DI/DO
Cloud Service		ATMOCE Cloud & ATMOZEN APP
Compliance		UN38.3，IEC 62619, IEC 61000-6-1/-2/-3/-4，IEC 63056, IEC 62477-1, IEC 62040-1，VDE-AR-E 2510-50，ISO 13849, DIN VDEV0124-100;VDE-AR-N 4105/4110，EN 50549-1，AS4777

Preliminary

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Appendix 1: Terms and Abbreviations

AC	Alternating current
APP	Application
CAT 6	Category 6
DC	Direct current
DI	Digital input
DO	Digital output
EMC	Udcstart, V
ETH	Idcmax, A
MPPT	Maximum power point tracking
PE	Protective earthing
PV	Photovoltaic
RH	Relative humidity
SN	Serial number
WEEE	Waste electrical and electronic equipment

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ATMOCE

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