SERIE SMART

ALL IN ONE

Three Phase version 8-15kW

Legal Notice

Disclaimer

The contract stipulated between WeCo S.r.l. and the customer regulates the purchase and use of the agreed products, services and features. Some or all of the items described in this document may not be within the scope of the customer's purchase or use. Unless otherwise specified in the agreement, all representations, information and recommendations contained in this document are provided "AS IS", without warranty of any kind, either express or implied.

The information contained in this document is subject to change without notice. Although every effort has been made to ensure the accuracy of the contents, WeCo S.r.l. does not provide any warranty, explicit or implicit, as to their completeness, reliability or suitability for a particular purpose.

WeCo S.r.l. always recommends consulting an experienced technician or professional before purchasing, requesting the most recent version of the manual and technical data sheets from WeCo. Purchase and installation should only be made after careful evaluation of the product, its warranties, and technical documentation.

Although WeCo batteries and inverters do not require constant maintenance, they still need to be monitored and checked on a weekly basis. This allows you to prevent any alarms or malfunctions which, if neglected, could cause greater damage. In addition, batteries and inverters should be inspected regularly, ensuring that the dissipation areas are clean, that the system is functioning properly, and that the installation, connections, and water tightness are adequate.

In the event of an alarm or error that does not self-reset within 24 hours, no manual restart should be attempted. In these cases, the system should be shut down immediately and a specialist technician should be contacted for diagnosis and intervention. Restarting manually is not a solution – it may temporarily clear the error memory without fixing the underlying problem, potentially making the situation worse and increasing the risk of future damage.

Warning

Mandatory Reading of the Entire Manual

Failure to review the manual in its entirety may lead to installation errors, improper use, and potential risks to people and property. For correct installation, maintenance, and safe operation of the batteries, always follow all instructions contained in this manual.

Preface and Disclaimer

Thank you for choosing our product. Our goal is to offer you a high-quality product and reliable after-sales service.

Before purchasing, installing, operating, or maintaining the **Smart All-In-One**, please read this manual carefully to prevent accidents and protect the product, operators, and users from damage.

This manual contains detailed information on the operation, maintenance, troubleshooting, and safety rules of the product.

Disclaimer

WECO shall not be liable for any damage, malfunction, or injury resulting from installation, use, or maintenance not in accordance with the instructions contained in this manual, including but not limited to the following:

- Installation or use in environments that do not comply with local regulations.
- Installing, using, or maintaining the battery under conditions inconsistent with those described in the manual.
- Disassembly of the product or modification of software code without permission from WECO.
- Failure to follow the safety instructions in this manual.
- Use of unauthorized or unqualified parts or modules for the system.
- Damage caused by abnormal natural conditions (force majeure, such as lightning, earthquakes, fires, storms, etc.).
- Damage caused by the transport of the product if the shipment has been arranged by the customer, including unloading by the customer.
- Damage due to storage conditions that do not comply with the requirements of the product documentation.
- Hardware damage resulting from customer misuse.

Capacity and performance notes

The rated capacity of the battery module is **5.12 kWh** with 100% to 0% SOC discharge under the control of the BMS, measured when new and within three (3) months from the date of manufacture, provided that the storage conditions are in accordance with the provisions of this manual.

The capacity is not constant for each cycle and can vary depending on several factors.

The degradation of battery energy is typical of any accumulator and is irreversible, in addition the degradation of a battery is not linear in time and/or cycles and is strongly affected by factors such as temperature, C-Rate and Depth of Discharge (DoD) and frequency of charge and discharge.

Residential models are designed to perform about 1 maximum two cycles per day and the charging and discharging process must normally be spaced out by about 30-40 minutes of waiting in order to allow proper temperature dissipation and limit thermal degradation

The **Limited Performance Warranty document** defines the parameters to get the best performance out of the battery.

Intellectual Property Rights Notice

All trademarks mentioned in this manual are the property of their respective owners. Any third-party trademarks, product names, trade names, company names, and company names mentioned are trademarks or registered trademarks of other companies, used solely for descriptive purposes and in the interest of the present manual and interactions with it, without any intent to violate copyright laws.

The following are strictly prohibited:

- Reverse engineering or decompiling the battery software.
- Removing or replacing the BMS
- Turn around BMS protection functions to achieve performance or to bypass safety actions or BMS lock
- Deletion of historical data and BMS alarms
- Repairs not authorized by WeCo
- Fraudulently obtaining the source code or functions of the software to change its battery thresholds and/or limits

Product specifications may be changed without notice

ATTENTION

THIS MANUAL MUST BE READ IN ITS ENTIRETY

WARNING: The battery may explode and/or catch fire if subjected to strong impacts or punctures and/or if used outside of operating conditions.

WARNING: Use suitable lifting systems to install the battery, as it weighs over 50 kg. The use of mechanical systems is required.

WARNING: The battery may explode or catch fire if exposed to flames, sparks, and/or heat. The technical room must be suitable for the type of battery and must be equipped with appropriate safety systems.

CAUTION: Verify that the voltage at the low voltage terminals is 0 VDC before working on the terminals.

CAUTION: The high voltage terminals (WECO 150A fast connectors) have no circuit breakers.

CAUTION: The battery may accumulate stray currents. After switching it off, always wait at least 5 minutes before working on the terminals.

Ensure that the voltage on the low voltage terminals is always 0Vdc.

The high voltage terminals must always be protected by the rubber covers provided during operation and must only be removed immediately before connecting the HV cable.

CAUTION: Always use mandatory PPE when working on the battery.

At the end of its life, this battery must be recycled in accordance with current regulations.

Contact your nearest COBAT center to arrange delivery of your end-of-life product. The product must be delivered by a company that meets the legal requirements, and the customer is always responsible for the cost of return delivery.

Do not open the battery cover for any reason.
Opening the battery is prohibited and potentially dangerous.
Do not short-circuit the battery terminals as this may cause fire or explosion.
Do not use charging devices, cables, connectors, fuses, or switches that are not approved by WeCo.
The battery and its connections, such as cables, switches, fuses, bars, etc., must be inspected, cleaned, and tightened every three months or when necessary, taking into account the environmental conditions and/or stress of use of the system.

IMPORTANT SAFETY NOTICE

System Lock Condition

The battery is equipped with an automatic protection function that stops operation in case of out-of-specification parameters.

In this condition, the system opens the power circuit (technical block).

- The status LED and LED bar will show alternating red light with other operating statuses.
- In this condition, the battery cannot be used and must be isolated from the rest of the system.
- Restoration of operation may only be carried out by qualified personnel and verification of the operating parameters.
- An unauthorized or unverified restart attempt on the BMS and inverter may cause risk to people and property, as well as void the warranty.

Safety disclaimer — Abuse / out-of-spec use

If battery has been abused, over-discharged, over-charged, damaged, tampered with, or operated outside the limits in this manual, **stop using it immediately**. Isolate it on a non-combustible surface in a ventilated area, keep people away, and **contact an authorized installer** to handle, inspect, and—if necessary—dispose of it under local regulations. **Do not attempt to charge or "revive"** any pack or cell at extreme under-voltage; recharging LFP from deep low voltage can cause irreversible damage, venting, or fire. **Do not reuse, repair, or harvest parts** from a damaged pack. Use contrary to these instructions **voids the warranty** and releases the manufacturer from liability.

Safety Disclaimer

Trigger conditions (examples, not exhaustive): any suspected abuse, over-discharge, over-charge, physical damage, liquid ingress, puncture/impact, corrosion, tampering/bypass of BMS, or operation outside the published environmental, electrical, or mechanical limits in the Technical Data Sheet and this Manual.

Stop all use immediately. Power down associated equipment and open the DC disconnect/breakers to isolate the battery from inverters or other batteries.

Isolate and quarantine the battery on a non-combustible surface in a well-ventilated area, away from flammables and out of reach of people and animals.

Do not charge, discharge, or "revive" the battery. Do not reconnect to any charger/inverter.

Contact a qualified/authorized installer or service center to handle, inspect, and—if required—dispose of the battery in accordance with local laws and the manufacturer's instructions.

Mark the unit clearly: **"DANGER DO NOT USE ONLY FOR QUALIFIED PERSONNEL".**

Prohibitions

Do not attempt to reuse, repair, recondition, or recycle cells/parts from a battery that has been abused, damaged, or driven into extreme under-voltage, do not remove change BMS or exchange and or reuse parts or an out of spec used battery.

Do not attempt "forced charging" or jump-starting of a battery whose pack voltage or any cell voltage is below the minimum allowable limits specified for the product.

Recharging a lithium-iron-phosphate (LFP) battery from an extreme low-voltage state can cause irreversible internal damage and presents serious safety risks (internal shorting, gas generation, thermal runaway, smoke/fire).

Do not open, disassemble, or bypass the BMS. No user-serviceable parts inside.

Do not transport a damaged/abused battery except if conducted by a qualified professional and in compliance with dangerous-goods rules.

IMPORTANT INFORMATION

In the event of product updates or other reasons, this document will be adjusted accordingly without prior notice or publicity, it will be made available on the WECO website in the download section.
Unless otherwise agreed, this document is to be used as a guide only and never supersedes the Laws of your State. All statements, information and advice in the documentation do not constitute any express or implied action that contradicts local regulations or standards.
For further information or clarification, please contact us before installing the product.
Official information and the latest data sheet can be found on www.wecobatteries.com.
It is essential that the battery module is equipped with the latest firmware version available. New batteries are always shipped with the latest firmware version available at the time.
From time to time, the firmware will be updated to improve the functionality and performance of the battery.
Firmware is always available on the www.wecobatteries.com/download-area website. Check the website or monitor the APP, in case of critical updates will be sent to WeCo customers by e-mail.
The latest firmware version is always available for free and can be updated by your local installer. You can always contact service@wecobatteries.com for more information on the upgrade process.

CAUTION CRITICAL RELEASE FIRMWARE INSTALLATION REQUIREMENT

Firmware & Connectivity Policy, integral part of the Warranty Document

Critical Firmware Updates. "Critical" releases are **mandatory** and must be installed **within 60 days** of release to keep the product safe and the **Limited Warranty** in force. Critical updates may include safety and performance improvements; adoption is required. Non-installation within 60 days may suspend or void warranty coverage for related failures.
Smart and PRO systems includes built-in **Bluetooth and Wi-Fi**. Updates can be performed directly from a phone via the **WeCo Noor Bluetooth App**
If you cannot complete the update or need help, **contact WeCo Support**.
If an update cannot be completed promptly, it is **advisable to power the battery off** during the transitional period until the update is installed.
Online requirement for 10-year performance warranty.

To benefit from the 10-year performance warranty, the battery must remain **continuously online via the WeCo App** throughout the warranty term. A cumulative **offline allowance of up to 60 days** per year is permitted.
If a claim arises while the unit is offline and required telemetry/logs are unavailable either on the cloud or BMS, **WeCo may reject the claim** due to lack of evidence, per the Limited Warranty.
Ensure your battery is constantly online, this will grant you the latest firmware upgrade, and remote intervention of the tech. Support

WARNING

WARNING — ENVIRONMENT & LOCATION LIMITS

Protect against dripping/splashing water, high humidity, condensation, and standing water.

Do not install in locations with aggressive vapors (e.g., chlorine, ammonia, acid/base fumes, solvents, salt-spray/coastal air) or in agricultural/industrial washdown areas.

Operate and store only within the ambient temperature range specified in the Technical Data section. Provide ventilation/thermal management to keep the product within limits at all times.

Shield from direct solar radiation and other heat sources that could elevate enclosure temperature beyond specified limits.

Although the enclosure is rated IP66 for dust/water ingress, this does not make the product suitable for unsheltered outdoor installation.

Installation must be performed by qualified personnel and must comply with applicable codes and the instructions in this manual and in the Country that shall prevail.

Use outside the intended environment constitutes misuse and may void warranty and shift all risks and liabilities to the installer/owner.

If installation in an outdoor area is unavoidable, the product must be placed in sheltered area that maintains the environmental conditions specified in this manual (temperature, humidity, condensation control, and protection from UV, chemicals, and weather).

About this document

Preliminary notes

Declaration

The manufacturer reserves the right to final explanation of any contents of this manual.
These batteries cannot be used to power life-saving devices or for UPS or Back-up use to power or support life-saving medical devices.
The battery capacity is intended to be 5.12kWh in the 100-0% range of the BMS.
Capacity is not constant with each cycle and can vary based on many factors, energy degradation is not constant over time or cycles, and is strongly influenced by temperature, C-Rate, and DoD (Depth of Discharge).
The first 500 cycles are typically affected by a greater decrease in capacity than subsequent cycles.
Before purchasing this product, please read the warranty terms available on our website.
Always check the latest technical data on our website as it may be changed.
If this manual is not clear to you, do not purchase or install the battery, ask for a technical meeting by writing to service@wecobatteries.com.
Limited Performance Warranty Documents set parameters to get the best performance out of the battery based on the standard test condition used by WeCo.
Any additional details about this battery, its BMS and compatibility with inverters can be requested by writing to service@wecobatteries.com.
This battery and its accessories are intended to be installed, maintained, and supervised only by experienced and qualified installers.
All trademarks in this manual belong to their legitimate owners; Third party trademarks, product names, trade names, company names and companies mentioned may be trademarks owned by their respective owners or registered trademarks of other companies and are used for explanatory purposes only and for the benefit of the owner, without any purpose of infringing applicable copyright.
The evaluation of the product is an important and necessary phase and must precede the purchase, it is advisable to evaluate the latest technical data sheets made available on the www.wecobatteries.com website or request a copy directly from sales@wecobatteries.com.
Our products and manuals are mainly dedicated to installers and technicians who are experts in the sector with specific qualifications for electrical systems.
The manual, the system certification and the "first start-up" test certificate or system conformity, of the entire system carried out according to the national standards of your country, must be given to the end user after adequate training on the use and maintenance of the battery and the system in general.
These batteries are intended to be marketed for integration into more complex systems installed only by professional operators.
After reading the manual in full, we hope you can purchase our products.
Before purchasing, please carefully evaluate the technical characteristics with the data provided on our website or by requesting the updated version of the battery model currently in production.
Pay attention to the distinction between BMS temperatures and the operating temperatures of the battery as a lithium accumulator, i.e. the temperatures to which the BMS can be exposed without being damaged, malfunctioning or being affected in the reading of data such as temperatures voltage current (an incorrect reading of the data for exposure to out-of-range temperatures could affect the control and safety logic).
The lithium battery, on the other hand, should not be exposed to temperatures that are too low or too low, while the temperature excursions of the environment in which they will be installed should remain as constant as possible. Below you will find correct instructions on the use of the battery and the permissible and recommended temperatures.
The technical data sheets may be subject to change due to market or industrial needs, therefore, the technical data sheets present on third-party websites or in any case distributed in the past may not be updated and in any case correct. Get the latest official releases

from sales@wecobatteries.com.

The pre-purchase evaluation is an important phase and for this reason it must be conducted carefully and perhaps with the help of qualified and experienced technicians if your knowledge of the subject is not sufficient.

WeCo batteries are developed for domestic and industrial applications and can only be installed and maintained by experienced and qualified personnel; they are not produced for direct sale to private individuals.

ESS (Energy Storage Systems) batteries for domestic applications are designed to maximize the self-consumption of energy from renewable sources. Use for backup systems, or for UPS systems, is possible within the charge/discharge current limits of the ESS.

This manual provides detailed information on the operation, maintenance, and troubleshooting of the product, as well as health and safety advice; the information contained in this manual may not be sufficient to cover specific applications, so, if your specific case is not mentioned, please do not purchase our batteries until every technical and safety aspect of your specific application has been clarified. You can request technical support from service@wecobatteries.com.

End of life, end of use and disposal

The Product (battery) is designed for a maximum service life of the first of:

a) 10 (ten) years from the Production Date indicated on the label

b) 7,000 equivalent charge/discharge cycles (DoD 90% at 25°C and C-rate 0.5C)

Upon reaching the first of the aforementioned limits, the User is required to cease using the battery.

Within a reasonable period of time from reaching the limit (point 1), the User must start the end-of-life management according to the applicable legislation in the country of installation, delivering the battery to the collection systems indicated by the manufacturer or to operators authorized to transport, treat, recycle and/or recover. The instructions and delivery channels are shown on the label/manual and in the official references of the manufacturer. Abandonment or improper disposal is prohibited.

Any overhaul/regeneration of the battery after the limit specified in point 1 has been reached may only be carried out by a qualified and legally authorized third-party company. This company assumes all responsibility for compliance, safety, and post-intervention performance. The original manufacturer does not warrant or assume responsibility for products that are used beyond limits or remanufactured/tampered without its written permission.

Use of the battery beyond the limit indicated in point 1 or in violation of the instructions will result in the forfeiture of any conventional warranty and is at the User's sole risk.

Determining Limit Reach

The achievement of the useful life limits is determined by means of BMS logs and/or other objective technical evidence (diagnostic reports, cycle counters, maintenance logs).

WeCo offers two types of warranty on its products, the warranty on manufacturing defects also known as the European warranty and in addition the warranty on performance, this subject to compliance with installation requirements well defined in the warranty document. More information can be found in this manual and on the specific warranty document available for each battery model.

SYSTEM DESIGN BY EXPERIENCED TECHNICIANS

Systems Design is the process of defining the architecture, components, modules, interfaces, and load data for a system by the customer in order to meet the specified requirements

For a solar system, these components are the PV modules, the inverter/charge controller, and the batteries, as well as the different interfaces of these components.

These systems must be integrated with each other following the respective technical rules and must be compatible with each other.

The design must take into account functional guarantees and performance guarantees in order to guarantee the end customer full satisfaction of the product he will use.

For safety reasons, if the battery is not operating at the temperatures, currents and DODs specified in the performance warranty requirements, it should be inspected frequently according to the conditions of use applied.

WeCo bases warranty and safety on the standard conditions of use described above; Heavier uses and at suboptimal temperatures will have direct effects on premature battery aging and intrinsic safety.

With System Design, the designer, based on the prescriptions of this manual and on his own experience, must guarantee some important steps:

System longevity: Establishing an appropriate frequency for maintenance and inspections can extend the useful life of the system, prevent premature failures, and ensure that the system operates at optimal levels for as long as possible.

Safety: Regular maintenance and inspections help identify and fix potential safety issues before they can cause accidents or malfunctions.

Operational efficiency: A well-maintained system tends to operate more efficiently, with fewer interruptions due to failures or malfunctions, thus ensuring better performance and reliability.

Cost Consideration: While regular maintenance incurs additional costs, it can actually help reduce overall costs in the long run, preventing costly failures and extending the life of the system.

Breakdowns and rapid intervention: in the event of a battery failure and/or alarm, it is mandatory to immediately disconnect the battery from the inverter and keep it off until the technician arrives.

To ensure that these maintenance practices are followed correctly, it is essential that they are well documented and passed on to the end of customer or maintenance person. This includes preparing a detailed maintenance plan, specifying the frequency of various maintenance and inspection activities, based on the specific characteristics of the site and application where the system is installed.

BATTERY OPERATION

There are several factors that affect the operation of the battery in terms of its ability to provide capacity and life expectancy.

If you respect the battery, it will work safely and efficiently for many years.

Storage

The battery module should be stored in its original packaging, in a clean, level, dry, cool place, and indoors.

The recommended storage temperature is 25°C +/-5 (case b.), but different storage ranges are acceptable:

14°F to +32°F / -10°C to +0°C range: Inspection and recharge required every three months, SOC required at 40-60%

32°F to +86°F range / +0°C to +30°C: Inspection and recharging every six months required. SOC required at such ranges 40-70%

86°F to +113°F / +30°C to +45°C range: Inspection and refilling every three months required. SOC required at such ranges 25-30%

NOTE: Maximum charge is 0.2C at an ambient temperature below 11°C and maximum 0.5C in the range of 12°C to 35°C.

The maximum SoC for maritime transport is regulated by the UN directives or by the transport companies, so it may vary over time.

Inspection parameters: Identify the state of charge, search for alarms and act accordingly, and look for physical damage to the battery module.

For trickle charging, charging between 0.1C and 0.2C up to 50%-70% SOC is suggested and then discharging to the SOC limit allowed by local regulations.

SOC suggested 30%~50% if stored in stock.

Do not recharge below +10°C

If shipped by sea, you must refer to the UN38.3 standard; for road, rail or air handling, refer to the local ADR codes or similar.

Operating Temperature and Thresholds (even outside the thresholds allowed by the performance warranty)

Many chemical reactions are affected by temperature, and this is also true for the reaction that occurs in a WeCo storage battery.

The chemical reaction of a lithium ion is slowed down by the lowering of the temperature of the electrolyte contained in the battery, which results in a lower capacity and a higher long-term performance decay index in direct proportion to the departure from the optimal temperature prescribed by WeCo.

A new battery that provides 100% of the rated capacity at 25°C will only provide about 75% of the rated capacity when deployed at 10°C.

At 0°C charging is not normally allowed by the BMS, except for the emergency condition managed by the BMS.

At temperatures below -7°C, the BMS will only allow 0.03C of charging current for emergency situations; at temperatures below -10°C, charging is prohibited.

Although it is possible to discharge the battery down to -20°C, it will then be impossible to recharge it as the charging phase is prohibited at 0°C.

These thresholds do not mean that the battery warranty applies even under such conditions, even if allowed by the BMS as extreme values.

The logic of the BMS does not coincide with the thresholds to be respected in order to benefit from the performance warranty, as compliance or non-compliance with the latter is up to the end customer, while the limitations inherent in the battery safety thresholds are set by the BMS as factory data.

The warranty conditions (Functional and Performance) are well described in the "Limited Warranty" document and should be read before purchasing the product.

For the performance warranty, WeCo requires that the batteries are installed in a closed environment that allows the maintenance of a temperature in the range of +11°C and +35°C, (thermoregulated) that does not allow condensation or humidity formation above 80%, ventilated and healthy.

For example, the functional guarantee (pursuant to European Regulations) prescribes that the installation of batteries with IP20 must be indoors, i.e. indoors, with controlled humidity and temperatures, while the performance warranty prescribes that charging and discharging must be carried out between 11°C and 35°C at 0.5C and DoD 80%; any use outside these requirements is not covered by the performance warranty.

For the warranty against manufacturing defects, higher temperatures are allowed, i.e. +0°C + 40°C, always indoors, ventilated room and without condensation formation in order not to lose the right to the warranty for manufacturing defects (European warranty).

Most battery capacity/life issues can be traced back to improper charging. Incorrect charging settings can lead to overcharging or undercharging conditions; any incorrect charging process will affect the battery's life or its ability to retain power.

The lower the C-Rate of the charge/discharge process, the more the battery will benefit from long-term performance.

Depth of Discharge (DoD %)

The depth of discharge is a function that is implemented through the setting of the hybrid inverter, compatible with WeCo.

The deeper the discharge, (e.g. DoD 100% means completely discharging the battery), the shorter the battery life over its estimated useful life.

The number of cycles and the DoD specification will affect the expected life in years that the battery/battery system will provide prior to replacement.

To maximize the remaining capacity over the battery's useful life, set the inverter's DoD to 20%, this will help maintain health (SoH) for longer.

The functional warranty indicates the maximum DoD at 100% because both the logic and the hardware of the battery have been verified and tested to achieve it, while the performance guarantee establishes that the maximum value of the DoD % (to be set in the inverter) must not exceed the value of 90% at 25°C 0.5C, without prejudice to the previous requirements.

For safety reasons, if the battery is not operating at the temperatures, currents and DODs specified in the performance warranty requirements, it should be inspected frequently according to the conditions of use applied.

WeCo bases warranty and safety on the standard conditions of use described above; heavier use and at suboptimal temperatures will have direct effects on the premature aging of the battery and with its intrinsic safety.

C-Rate

The value of the current used to charge and discharge the battery is expressed in C (1C = 100A, 0.1C = 10A in the case of the SMART-100Ah battery).

Charge/Discharge

Most battery capacity/life issues can be traced back to improper charging also due to improper location. Improper charging settings can lead to an overcharge or over-discharge condition or out-of-range current for the temperature condition and SOC%.

WeCo only guarantees batteries connected via CAN/BMS line to the compatible inverter (see compatibility list on the www.wecobatteries.com website) and used according to the warranty instructions published on the website.

CAN/BMS communication is essential both for active and passive safety reasons and in order to be able to conduct all active control interactions with the inverter. The BMS has dynamic algorithms that vary according to current or previous conditions stored during the charge-discharge or stand-by phases.

Modern inverters/charge controllers are equipped with a CAN/BMS interface and no special settings are required to charge and discharge the battery, except for the setting of the charge/discharge power and the DoD% (if the customer wants to comply with the STC requirements, he must read and comply with the warranty conditions defined as STC and set them on the inverter).

Maintenance at optimal temperature, on the other hand, must be guaranteed by the technical room and the air conditioning equipment installed in it, the inverter is not able to interact with the settings with reference to the temperature of the environment in which it is installed, also because the inverter and battery could be exposed to different environmental factors in different environments.

Warranty (Functional Warranty Against Manufacturing Defects) and Performance Warranty

Although the battery BMS allows a wide range of use both in terms of temperature and charging currents, this should not be interpreted as an implicit authorization to use the battery at these levels with reference to the performance warranty.

For the purposes of the performance warranty, it is mandatory that the battery is used within the range of temperature and charge/discharge current and depth of discharge indicated in the warranty itself and also reported in these paragraphs.

Any other use, even if permitted by the BMS thresholds, is not covered by the performance guarantee.

Firmware Updates

In the event of BMS firmware updates as a result of improvements, corrections, or other reasons, this manual and warranties may be updated accordingly. Check the release notes for critical firmware on the site www.wecobatteries.com at your distributors. **Critical Release Firmware must be installed as per warranty requirements.**

To obtain support if your system is not equipped with a Wi-Fi module, please contact service@wecobatteries.com.

All WeCo batteries produced since the beginning of 2019 can be equipped with a Wi-Fi system for connection to the WeCo Cloud if they are not directly equipped with it, this solution ensures that you are always updated to the latest firmware version notified in the APP, the Upgrade function must still be piloted by the user as during the update the battery will have to turn off for safety reasons and it is therefore necessary to plan this action in such a way that no inconvenience is created for the users of the system.

The firmware update can also be carried out locally via Bluetooth App, even in the absence of Wi-Fi; you must have a 4G connection and keep the Bluetooth App open until the App displays: ''NEW FIRMWARE AVAILABLE'' after which you can reach the battery in an area not covered by data signal and/or Wi-Fi and perform the firmware update via the BT connection.

The customer has the right to subscribe to the newsletter to obtain information regarding the firmware release and any other communication regarding the products and their use.

Any security enhancement update is released as critical and must be installed by the customer or their designee within the deadline

Sign up for the WeCo newsletter to receive emails with your battery's technical updates and critical firmware update

ERRORS

In the event of a permanent error with red LED on **the LED bar, do not restart or reset the battery and contact the after-sales service**, incorrect manoeuvres could cause damage to people or property, isolate the battery from the inverter immediately if such errors are detected.

BMS

acronym for Battery Management System, which is a combination of sensors and processors assembled in PCBs in order to monitor and control cells under various aspects such as: Temperature, Current, Voltage.

The logical part, on the other hand, has multiple functions of processing all this data and controlling the battery to stay within defined thresholds.

The BMS also serves as an external communication interface with the inverter or charger controller to actively set the operating parameter that the battery can withstand at that particular time.

The BMS logic part is also responsible for calculating the SOH SOC and storing real-time battery data, warnings, alarms, operating time and various other useful parameters

SOC

The soc is not measured; it is a calculation derived from quantities such as voltage, current, and temperature.

State of charge (SOC) calculation in lithium batteries is a method used to estimate the percentage of charge remaining in a battery. The calculation is based on voltage, current, and temperature, and can also be used with algorithms to account for age and battery usage history.

The SOC value is an estimate and is not accurate as many factors may affect the daily calculation, for this reason it is important to reset the SOC calculation by fully charging a battery to the maximum, **to reach 100%, at least once a month**, the user is responsible for charging the battery at least once a month to 100%, Reaching 99% is not enough.

This will reach the upper limit of the battery and the SOC can be reset to a known point.

SOH

SOH is an estimate expressed as a percentage, which indicates the current capacity of a battery compared to its initial condition when it was new.

It reflects the battery's ability to store and provide energy during aging, SOH is not a reliable value and has no contractual value, it serves as a statistical approximation of battery use.

It is an indicative and statistical figure with no contractual value

Optimal chemical reactions: Chemical reactions within the battery occur efficiently within the cell temperature of +15 °C +30 °C, providing a balance between performance, longevity and safety

Optimal temperatures: For any lithium-ion battery the best operating cell temperature is between 20 °C and +30 °C, which means staying within an ambient temperature of +15 °C + 25 °C

Optimal temperatures for improved safety and performance: Optimal capacity, charging speed, and cycle time are guaranteed within the temperature ranges stated above. Installing batteries in air-conditioned environments such as cabinets or technical rooms is always the best solution for their safety and longevity.

Reduced capacity: caused by the temporary effect of temperature on chemical reactions but it is also an irreversible effect caused by the three factors: Use/current ratio – Temperature of use -Aging

Slower charging: This is typically a reaction of the BMS to impose a slow current due to low temperature; this leads to an irreversible effect in addition to the reduced capacity effects explained above. Slow charging is also a good practice when the battery is at its optimal temperature, in fact using the battery at 0.2/0.5C will ensure greater capacity/safety/longevity

Plating effect: In low-temperature operations, so charging and discharging at very low temperatures, lithium deposits on the anode can lead to internal battery damage, early loss of capacity, and reduced safety.

Higher capacity and conductivity: High cell temperatures (above 30-35°C) can increase the relative capacity and conductivity of the battery. Giving a false effect of 'better performance'. This is a short-term benefit as battery degradation accelerates to high temperatures. **Accelerated** aging**/degradation**: Exposure to high temperatures leads to accelerated aging of the battery. It can cause electrolyte degradation, separator damage, and increased internal resistance, especially under low voltage and persistent low

temperature conditions. **Thermal runaway**: The cell exposed to high temperatures can overheat and potentially lead to a cell valve vent and/or fire due to electrolyte gasification.
Thermal runaway due to plating and dendrites: a "sneaky" consequence due to misuse of a lithium battery, e.g. exposure to low or high temperatures, excess discharge, excess exposure to low voltage in a cold environment, thermal runaway, cell venting due to an internal short circuit, and increased resistance that will cause persistent short circuit and cell deformation.

The galvanic effect is also a consequence of extreme undervoltage and subsequent reuse of the battery and in the long term could cause cell malfunction and possible short circuits, which is why a lithium battery found in extreme undervoltage conditions must never be reused and must be disposed of at a center authorized by a qualified company.

Temperature Management Systems:

The fact that the battery Smart All-In-One is equipped with a heating system should not be understood as an implicit authorization to install the product in cold and/or unhealthy places, the heating system serves as an aid in the event that the temperature of the room falls below the permissible value for recharging.

ATTENTION

External protection switches between inverters and batteries

External protection switches. Switches and external protections **must be sized, selected and installed according to the indication of the system designer** according to the wiring diagram, the available short-circuit currents, the installation environment and the safety requirements of the site.

These devices (e.g. switches-disconnectors, MCB/MCCB, RCD/RCCB, SPD, DC/AC disconnectors, emergency stops) **must guarantee visible disconnection, adequate breaking capacity, selectivity and coordination** with the internal protections of the inverter and batteries. Additional **safety systems** (e.g., fire, barriers, ventilation/extraction, monitoring) may be required depending on site characteristics and applicable regulations. Compliance with local standards and regulations remains **the responsibility of the designer/installer**.

Legal Information

Unless otherwise agreed, this document is intended to be used only as a guide to the installation, maintenance and management of the product, all statements, information and advice contained in the documentation do not constitute any express action or implied statement in contradiction with local regulations or standards.

For more information, please contact us.

Official information and the latest data sheet are available on www.wecobatteries.com; however, they can be requested in real time at service@wecobatteires.com. Hyperlinks, third-party links, digital datasheets published on web social media or even printed in print media may not be updated to the current version of the product. Before purchasing the product, check the website for technical data and warranties updated to the current date.

It is essential that the battery unit is equipped with the latest firmware version available on the www.wecobatteries.com site or WeCo APPs.

From time to time, WeCo will release a new firmware to improve the functionality of the battery, if your battery is equipped with Wi-Fi (paid accessory) and you are registered on our APP, the new firmware will be visible in the APP and can be updated with a simple click from your phone.

The latest firmware version is always available for free; the battery firmware can be updated by the local installer via RS232/USB and Windows PC (reserved for installation technicians) or via APP for batteries equipped with Wi-Fi dongles.

You can also write an email to service@wecobatteries.com to understand and be supported in the upgrade process.

To benefit from the guarantee, **the request must be received within 10 days of the event**, by sending a request via email to service@wecobatteires.com or by filling out the RMA ticket

The SMART SYSTEM is designed to be used only in sheltered and restricted access environments.

The IP rating should not be understood as implicit authorization for outdoor installation without any cover.

In any case, installation must be provided in protected and sheltered environments from the weather

The place must be ventilated and dry, sheltered from extreme temperatures, which are harmful to the life and safety of the battery.

Use in an outdoor environment or not compliant with the IP degree is prohibited and potentially dangerous to the health of people and/or property

Production guarantee

Although the battery BMS allows for a wide range of use, both in terms of temperature and charging currents and DOD, this should not be interpreted as an implied authorization to use the battery at these levels.
For purposes of the Performance Warranty, it is mandatory that the battery be used in the range of temperature and charge/discharge current and depth of discharge indicated in the Performance Warranty.

The capacity is understood to be of the new product, within 3 months of production and stored as prescribed, the capacity test must be carried out at a base temperature of 25°C with saturation charge of the cells and then discharge test at 0.2C as prescribed by the warranty conditions. Write to service@wecobatteires.com for more information.
See the Limited Warranty Document for more details

Performance guarantees

This is an additional warranty and applies to the performance warranty expressed in cycles, provided that the battery has been used in accordance with the performance warranty usage criteria and only to batteries connected via a BMS line to an approved inverter. The battery's operating parameters must remain within the performance warranty terms throughout its useful life, otherwise the performance warranty will not apply.
Any other use, even if permitted by the BMS ranges such as limits exceeding the values indicated by the performance warranty, is not covered by the performance warranty, but the legal warranties remain valid.
See the limited warranty document available on the website www.wecobatteries.com in the download and warranty area.

Important Battery Safety Information

Knowing a lithium battery is important for good and optimal storage. An additional information guide to the manual is available and you can request it from WeCo by writing to service@wecobatteries.com

MISUSE

It is not allowed to use a battery that has been affected by:
-Overvoltage
-Under voltage (excess discharge beyond the safe limit)
-Overtemperature
-Under temperature
-Overcurrent.
It is forbidden to use a battery that exceeds the operating limits of the BMS and the storage and use limits indicated in this manual
Nor is it prohibited, as it is absolutely dangerous, the battery must be disposed of in an authorized landfill
The use of batteries that have been used outside the operating parameters is dangerous and must be avoided at all costs.
It is absolutely forbidden to remove the BMS and replace it in order to continue using the battery.
Do not attempt to restart or re-operate the battery after such events by acting on the BMS or changing the functions of the BMS

Maintenance and Inspection Procedure – WeCo Smart All-In-One

1. Purpose and Responsibility

This procedure defines **activities, frequencies, acceptance criteria** and **records** for the routine maintenance of the Smart All-In-One system.

The execution is **reserved for qualified and authorized personnel**. The **designer/installer/operator** is responsible for compliance with applicable standards and for maintaining the required environmental conditions.

2. Preliminary safety (mandatory)

PPE: Insulated gloves, goggles/visor, anti-static shoes; DPI arc-flash when appropriate.

LOTO: Apply **Lock-Out/Tag-Out** on all sources (AC network, PV/DC, groups).

No voltage: Check with a CAT III/IV multimeter that the terminals are **≈ 0 V** before operating.

Work area: forbidden to non-professionals; ensure adequate ventilation and lighting.

Prohibitions: no DC hot plug, no live parts, no use of non-approved spare parts.

3. Conditions and tools

Environment: site **sheltered** from precipitation/splash/dust; no persistent condensation.

Minimum tools: calibrated multimeter, torque wrenches with certificate, suitable anti-oxidation protective spray, non-conductive cleaning kit, smartphone with **WeCo APP**.

Tightening torques: Only follow the official table in the Smart All-In-One manual.

4. Frequencies

Monthly (30 days): 100% SOC verification via APP; alarm/log check, the system must be 100% calibrated with a forced charge if necessary

Quarterly (3 months): general cleaning/inspection; electrical checks; APP/SOC-SOH verification.

Six-monthly (6 months): in-depth HV **BOX checks**, breakers, contactors, fast-plug, RJ45; tightening and mechanical status recheck.

5. Activities and acceptance criteria

5.1 Monthly verification (30 days)

Activity

Check via **WeCo APP**: SOC, SOH, voltages/currents, temperatures, events/alarms.

Confirm **SOC achievement = 100%** at least 1 time/month (full equalization cycle, if expected).

Acceptance criteria

No active/pending alarm; SOC 100% achieved; deviations readings consistent with specifications.

Corrective

In case of repeated alarms or failure to reach 100% SOC for 2 consecutive cycles: open tickets to **WeCo Service**, register Case ID and follow instructions.

5.2 Quarterly Audit (3 months)

Activity

Cleaning/visual inspection: Remove dust and foreign bodies; check for **oxidation/rust on** terminals, BUS BARS, connectors, body.

Electrical connections: check **tightness** (see torque table in the manual); check the integrity of the DC/AC cable insulation and correct installation (no crushing/radius < minimum).

APP & monitoring: analyze SOC/SOH **graphs**; check **V/I consistency between** modules.

Acceptance criteria

Dry and clean surfaces; no visible oxidation; tightening within tolerance; no sheath damage; regular SOC/SOH trends; Differences in module voltages within manual limits.

Corrective

Cleaning with a suitable product; restoration of rubber/silicone protections; restoration of tightening; replacement of damaged components/kits only with **WeCo spare parts**.

5.3 Semester Verification (6 months)

Activity

HV BOX: check power and communication wiring; inspect power and CAN terminals; open/close test breaker; contactor test with emergency stop simulation.

Fast-Plug: check for play/wear/deformation; check for **water tightness** (gaskets, contact surfaces).

RJ45/CAN: check cables free of crushing/cuts; inspect plugs/ports for absence of oxide/corrosion; check firm hooks and correct **120 Ω termination** where provided.

Mechanical checks: recheck **tightening** with a torque wrench; check brackets, screws and anchors.

Advanced cleaning: remove any deposits, use **anti-oxidation spray** where necessary.

Acceptance Criteria

Breakers/contactors with smooth functionality (no gluing/delays); stable CAN continuity (no errors/CRC in log); undamaged fast-plugs; RJ45 oxide-free; compliant couples; no cracking, no foreign body.

Corrective Action

Replacement of faulty/worn components; gasket restoration; oxidation restoration; firmware update when requested by WeCo.

6. Records and traceability (mandatory)

Fill in **maintenance checklists** with **date, time, operator, serial numbers** and **results**.

Store APP **logs/screenshots** (SOC/SOH/ALARMS) and tightening reports (applied values).

Open **tickets** to WeCo in case of anomalies and write the case ID on the checklist.

Keep records for at least **5 years** (or period required by local law/contract).

7. Non-conformity and warranty

Failure to carry out the planned activities, the use of non-approved spare parts or environmental non-compliance may result in **warranty limitations/exclusions** within the limits of the law and the **WeCo Warranty Terms**.

Any non-conformity must be **removed before** recommissioning; commissioning with open defects on safety/insulation/tightening is prohibited.

8. Operational annexes

Maintenance checklist (monthly/quarterly/half-yearly) with signature fields and notes.

Tightening torque report (official manual table Smart All-In-One)

Intervention report form and attachments with "before/after" photos.

This document introduces the main features, component composition, installation and use, maintenance and maintenance of the hybrid bidirectional inverter The All-in-One Solar Storage System (hereinafter referred to as 5K0 Smart).

Maintenance Checklist

Operator Name Surname		Data	
Company		Site/Plant	
Verification Type	□ Monthly (30 days) □ Quarterly (3 months) □ Half-yearly (6 months)	APP saved logs	□ Yes □ No
SERIAL BATTERIES	HV BOX SERIES	INVERTER MODEL	SERIAL INVERTER

Activity	Outcome (□ OK / □ N.C.)	Note
APP – 100% SOC Achievement Verification (at least 1x/month)	□ OK □ N.C.	
APP – No Alarms/Warnings and SOC/SOH Reading Consistency	□ OK □ N.C.	
Cleaning – No dust/deposits/moisture	□ OK □ N.C.	
Visual inspection – No oxidation/rust on the body, clamps, connectors	□ OK □ N.C.	
Electrical connections – Tightening according to WeCo manual table	□ OK □ N.C.	
DC/AC Cables – Integrity, Insulation and Proper Routing	□ OK □ N.C.	
HVBOX – Intact power/COM wiring	□ OK □ N.C.	
HVBOX – Breaker: open/close test	□ OK □ N.C.	
HVBOX – Tripping contactors: emergency stop simulation test	□ OK □ N.C.	

Fast Plug – Mechanical integrity (no play/wear/deformation)	□ OK □ N.C.	
Fast Plug – Tenuta acqua: guarnizioni integre e sedi pulite	□ OK □ N.C.	
RJ45 – Cables without abnormal crushing/cuts/bends	□ OK □ N.C.	
RJ45 – Oxide/Corrosion Free Plugs and Interior Doors	□ OK □ N.C.	
RJ45 – Firm hooks, no false contacts	□ OK □ N.C.	
Mechanical Fixings – Brackets and screws intact, no cracks	□ OK □ N.C.	
Advanced Cleaning – Contacts treated with anti-oxide protective (if necessary)	□ OK □ N.C.	
Notes/Anomalies found	□ OK □ N.C.	

Operator Declaration:

The activities listed above have been carried out according to procedure and in compliance with safety regulations.

- THERE ARE NO DISCREPANCIES □
- DISCREPANCIES FOUND, THE SYSTEM IS ISOLATED AND MADE SAFE □

Operator signature		Time and data

Content

1 About this document

1.1 Validity and acquisition of information

This manual applies to the WECO 5K0 Smart 1PH all in one system. Only qualified personnel authorized under the laws of their country may install, troubleshoot, and maintain battery modules.

In the event of a product revision, this manual will be modified accordingly. Unless otherwise agreed, this document is intended solely as a guide, and all statements and information contained in the documentation must not contain any express contradiction with local regulations or standards.

For further information, please do not hesitate to contact us.

Official information and the latest technical data sheet are available at *www.wecobatteries.com.*

1.2 Subject matter

The instructions contained in this document may only be carried out by qualified persons within the meaning of applicable laws:

- Installation and maintenance person (authorized supplier or installer)
- Owner or User trained and informed by the installer

Failure to do so shall result in any warranty or liability of the manufacturer being disclaimed.

1.3 Contents of the manual

This manual contains information and instructions on safety, battery module overview, installation, electrical connection, maintenance and storage, battery module disposal, technical parameters. Please finish reading this manual carefully before performing any operation on the battery module.

1.4 Firmware and software

It is essential that the battery module is equipped with the latest firmware version available. The new batteries are equipped with the latest firmware version, however before commissioning please check via Bluetooth or WiFi APP for the latest available FW version or search for it on *https://wecobatteries.com/download-area/.*

From time to time, the firmware will be updated to improve the features and capabilities of the battery.

The latest firmware version is always available for free and can be updated by your local installer. You can always contact *service@wecobatteries.com* for more information about the upgrade process.

In the case of a critical update release, the user must install the firmware within 60 days of release.

To stay up to date on firmware releases, please register for the newsletter, check the APP for new firmware notifications and/or check the weco website download area for your battery model.

1.5 Symbolic conventions

Etichetta	Detail
 Warning	WARNING provides information that should be noticed and taken care of.tag.
 ATTENTION!	CAUTION represents situations that may cause property damage if not avoided.
 Danger	DANGER represents hazardous situations that can cause injury if not avoided.
 Information	Used to highlight important/critical information, best practices, tips, etc. "Instructions" are not safety information and do not include information about people, equipment, and environmental injuries.
 Electric Shock Warning	This label indicates that there is high voltage inside the product and touching it may cause an electric shock.

 Class 9 Miscellaneous Hazardous Substances and Objects	Substances and objects which, during transport, present a hazard that is not included in any of the other classes are classified in class 9.
 The battery must be recycled.	The battery must be recycled
 No fire symbol	Fire is strictly forbidden within 40mt
 Dangerous goods	This label indicates that there is a hazardous risk of explosion that could be induced by the product
 Limit temperature mark	This label indicates that there is a temperature limit of the product.
 Keep dry	This label indicates that the product is capable of continuing to do so.
 Caution: may generate flames	This label indicates to avoid fire to the product.
 UN Mark 3480	Follow the UN regulations in place to ensure the safety of those transporting for lithium battery products.

Description of the certification mark

Icon	Name	Meaning
	Follow current UN regulations to ensure the safety of those transporting products with lithium batteries	This product meets CE certification standards
	EU WEEE logo	EU WEEE logoLogo RAEE dell'UE
	RoHS Mark	This product is RoHS compliant.
	Recycle Mark	The battery is recyclable

The battery is recyclable and must be recycled by a specialized company in accordance with the directives of your municipality or country of residence.

1.6 Acronyms of this manual

No.	Term	Explanation
1	SoC	State of charge
2	DoD	Depth of Discharge
3	Charge	Charged energy
4	Discharge	Discharged energy
5	BMS	Battery Management System
6	Firmware	BMS Logic Control Software

2 Safety Information

WARNING: Safety

Before transporting, storing, installing, operating, operating, and maintaining the equipment, please read this document, strictly follow the instructions provided herein, and follow all safety instructions on the equipment and in this document. In this document, the term "equipment" refers to the products, software, components, spare parts, and services related hereto; "the Company" refers to the manufacturer (manufacturer), seller and service provider of the equipment; "You" refers to the entity that transports, stores, installs, manages, uses, and maintains the Equipment.

The **hazard**, **warning**, **caution,** and **notice** statements described in this document do not cover all safety precautions. You must also comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences arising from violations of safety requirements or standards relating to the design, manufacture and use of the equipment**.

The equipment must be used in an environment that meets the design specifications. Failure to do so may result in the equipment being defective, malfunctioning, or damaged and not covered by the warranty. The Company shall not be liable for any loss of property, personal injury, or even death caused by this.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not reverse engineer, decompile, disassemble, adapt, plant, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, infringe intellectual property rights, or disclose the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- The equipment is damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- The equipment operates beyond the conditions specified herein.
- The equipment is installed or operated in environments that do not comply with international, national, or regional standards.
- The equipment is installed or operated by unqualified personnel.
- The operating instructions and safety precautions stated on the product and in the document are not observed.
- You remove or modify the product or software code without authorization.
- You or a third party authorized by you may cause damage to the equipment during transportation.
- The equipment is damaged due to storage conditions that do not meet the requirements specified in the product document.
- Materials and tools that comply with local laws, regulations, and standards are not prepared.
- The equipment is damaged due to negligence, intentional breach, gross negligence, improper operation, or other reasons unrelated to the Company by you or any third party.

2.1 Personal safety

DANGER

- Ensure that the power supply to each source is turned off and/or isolated during installation. Do not install or remove a cord with the power on. Transient contact between the cable core and the conductor or frame will cause arcing, sparks, loose or explosion, which may cause personal injury, even indirect, due to damage caused to batteries and other objects forming part of the system or installation.
- Non-standard and/or improper operations on live equipment may cause fire, electric shock, or explosion, resulting in property damage, personal injury, or even death.
- Before operations, remove conductive objects such as watches, bracelets, bracelets, rings, and necklaces to avoid electric shock.
- During operations, use dedicated insulated tools to prevent electric shock or short circuits. The dielectric strength voltage level must comply with local laws, regulations, standards, and specifications.
- During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and gloves.

General requirements

- Do not remove protective equipment. Heed the warnings, cautions, and related preventive measures contained in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, stop immediately, report the case to the supervisor, and take actionable protective measures.
- Do not turn on the equipment before it has been installed or confirmed by professionals.
- Do not touch the power equipment directly or with conductors such as damp objects. Before touching any surface of the conductor or terminal, measure the voltage at the point of contact to ensure that there is no risk of electric shock.
- Do not touch the operating equipment because the casing is hot.
- In the event of a fire in the building or parts of the system even if not caused by the batteries or inverters themselves, leave the building or equipment area immediately and trigger the alarm if present or call emergency services. Do not enter the building or area of the affected equipment under any circumstances.
- If the fire can be extinguished with the suppression tools present in the building and if you are trained in fire protection/prevention/suppression, do your best to extinguish the fire

Staff requirements

- Only professionals and trained personnel are allowed to operate the equipment.
- Professionals: Personnel who are familiar with the principles of operation and structure of the equipment, trained or experienced in the operation of the equipment, and who are clear of the sources and degree of various potential hazards in the installation, operation, and maintenance of the equipment
- Personnel trained according to the Laws of the Country: personnel trained in technology and safety, with required experience, aware of the possible dangers to themselves in certain operations and able to take protective measures to minimize the dangers to themselves and other people.
- Personnel planning to install or maintain the equipment must receive appropriate training, perform all operations correctly, and understand all necessary safety precautions and relevant local standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals can remove safety structures and inspect the equipment.
- Personnel performing particular tasks, such as electrical operations, work at height, and operations with special equipment, must possess the required local qualifications.
- Only authorized professionals may replace the equipment or components (including software).
- Only personnel who are required to work on the equipment are allowed to access the equipment.

2.2 Electrical safety

DANGER

- Before connecting the cables, make sure that the equipment is intact. Failure to do so may result in electric shock, DO NOT OPERATE ON EQUIPMENT THAT IS DAMAGED or HAS SUFFERED SHOCK/IMPACT
- Non-standard and improper operation may result in electric or loose shock.
- Do not allow foreign objects to enter the equipment during operations. Failure to do so may result in equipment damage, load power derating, failure, or personal injury.

ATTENTION

The equipment that needs to be grounded, install the grounding wire first when installing the equipment, and remove the grounding wire last when removing the equipment.

General requirements

- Follow the procedures outlined in the document for installation, operation, and maintenance. Do not rebuild or modify the equipment, add components, or change the installation sequence without authorization.
- Obtain approval from your national or local electric utility company before connecting equipment to the grid.
- Comply with the safety regulations of the country regulations
- Install temporary fencing or warning ropes and hang "No Entry" signs around the operating area to keep unauthorized personnel away from the area.
- Before installing or removing power cords, turn off the equipment's breakers and their upstream and downstream switches.
- If liquid is detected inside the equipment, disconnect the power immediately and do not use the equipment.
- Before performing operations on the equipment, verify that all tools meet the requirements and record the tools. After completing the operations, gather all the tools to prevent them from remaining inside the equipment.
- Before installing power cords, verify that the wire labels are correct and that the wire terminals are insulated.
- When installing the equipment, use a torque tool with a suitable measurement range to tighten the screws. When using a wrench to tighten screws, make sure that the wrench does not tilt and that the torque error does not exceed 10% of the specified value.
- Make sure the bolts are tightened with a torque tool and marked red and blue after a double check. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm that the bolts are tightened and then mark them in red. (The markings must go through the edges of the bolts.)
- After installation, make sure that the protective enclosures, insulating tubes, and other items required for all electrical components are in place to prevent electric shock.
- If the equipment has multiple inputs, disconnect all inputs before using the equipment.
- Before servicing an electrical or downstream power distribution device, turn off the output switch on the power equipment.
- When servicing the equipment, apply "Do Not Turn On" labels near the upstream and downstream switches or circuit breakers and warning signs to prevent accidental connections. The equipment can only be turned on after troubleshooting has been completed.
- If fault diagnosis and troubleshooting are required after power, take the following safety measures: Disconnect the power supply. Check if the equipment is live. Install a ground wire. Hang warning signs and install fences.
- Do not open the equipment panels. Periodically check the equipment connections on a weekly basis for the first 6 months and then every 6 months, making sure that all screws are securely tightened and that the cables are securely connected and tight
- Only qualified professionals can replace a cable or part of the system

- Do not damage or scratch the labels or nameplates on the equipment. An illegible label results in the loss of the warranty
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside the equipment.

Grounding

- Make sure that the grounding impedance of the equipment complies with local electrical standards.
- Make sure the equipment is permanently connected to the protective ground. Before using the equipment, check its electrical connection to ensure that it is reliably grounded.
- Ground testing must be carried out before and after the system is connected and before testing.
- The grounding check and issuance of the certificate must be carried out after the system has been started up with the inverter and batteries on and with the inverter and batteries switched off
- Do not touch and/or work on the equipment without a properly installed ground conductor.
- Do not damage or disconnect the ground conductor.
- For equipment using a three-pin receptacle, make sure the ground terminal in the receptacle is connected to the protective grounding point.
- If high contact current may occur on the equipment, ground the protective grounding terminal on the enclosure before connecting power; Otherwise, an electric shock may occur due to the contact current and damage the inverter and batteries

Wiring requirements

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cords, make sure they do not twist or kink. Do not splice or solder power cords. If necessary, use a longer cable.
- Make sure all cables are properly connected and insulated and meet specifications.
- Make sure that cable routing slots and holes are free of sharp edges, and that locations where cables are routed through pipes or cable holes are equipped with cushioning materials to prevent wires from being damaged by sharp edges or burrs.
- Make sure that cables of the same type are tied together neatly and straight, and that the cable sheath is intact. When routing cables of different types, make sure they are far away from each other without getting tangled and overlapping.
- When the cable connection is completed or paused for a short time, immediately seal the cable holes with sealing putty to prevent small animals or moisture from entering.
- Secure underground cables using cable holders and cable clips. Make sure that the wires in the filling area are in close contact with the ground to prevent deformation or damage to the cables during filling.
- If external conditions (such as cable layout or ambient temperature) change, check for cable usage according to IEC-60364-5-52 or local laws and regulations. For example, verify that the current load capacity meets the requirements.
- When routing cables, reserve a gap of at least 30 mm between wires and heat-generating components or areas. This prevents deterioration or damage to the cable's insulating layer.
- When the temperature is low, violent shocks or vibrations can damage the plastic cable sheath. To ensure safety, please comply with the following requirements:
- Cables may only be laid or installed when the temperature is above 0°C. Handle cables with caution, especially at low temperatures.
- Cables below 0°C should be stored at room temperature for more than 24 hours before being laid down.
- Do not perform improper operations, such as dropping cables directly from a vehicle. Otherwise, the cable's performance may deteriorate due to damage to the cable, which affects the current-carrying capacity and temperature rise.

Environmental requirements

DANGER

- Do not expose the equipment to flammable or explosive gases or smoke. Do not perform any operation on the equipment in such environments.
- Do not store flammable or explosive materials in the area of the equipment.
- Do not place the equipment near heat or fire sources, such as smoke, candles, stoves, or other heating devices. Overheating may damage the equipment or cause a fire.
- Do not install in areas where flammable materials, gases or combustibles are or may be present

ATTENTION

- Install the equipment in an area away from liquids or possible flooding.
- Do not install in areas prone to condensation or near water pipes and exhaust air vents, or areas prone to water leakage, such as air conditioner vents, vents, or machine room to supply window. Make sure that no liquid enters the equipment to prevent failure or short circuits.
- To avoid damage or fire due to high temperatures, make sure that air vents or heat dissipation systems are not blocked or covered by other objects while the equipment is operating.

General requirements

- The installation and use environment must meet relevant international, national, and local standards for lithium batteries, and must comply with local laws and regulations. The user is responsible for protecting the ESS from fire or other hazards.
- Keep the ESS out of the reach of children and away from daily work or living areas, including but not limited to the following areas: study, bedroom, living room, living room, music room, kitchen, study, game room, home theater, porch, toilet, bathroom, laundry room, and attic.
- When installing the ESS in a garage, keep it away from the unit's path. It is recommended to mount the ESS on the topmost wall of the bumper to avoid collisions.
- Do not install the ESS in indoors, unventilated locations that lack proper combat facilities or are difficult for firefighters to access. Do not place flammable or explosive materials around the ESS. It is recommended to mount the ESS on a wall to prevent contact with water.
- Install the ESS in a sheltered place or install an awning to avoid direct sunlight or rain.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons, please take the corresponding precautions for installation.
- Do not install the ESS in an easily accessible location because the temperature of the enclosure and heat sink is high when the ESS is operating.
- Do not install the ESS on a moving object, such as a ship, train, or car.
- Ensure that the equipment is stored in a clean, dry, and well-ventilated area with adequate temperature and humidity, and protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the permissible ranges. Otherwise, its performance and safety will be compromised.
- Do not install, operate, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting or removing connectors from signal ports connected to outdoor structures, working at height, installing outdoors, and opening doors) in severe weather conditions such as lightning, rain, snow, and level 6 or stronger wind.

- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiation, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area that promotes the growth of microorganisms such as fungi or mold.
- Do not install the equipment in an area with solid vibration, noise, or electromagnetic interference.
- Make sure that the site complies with local laws, regulations, and standards.
- Ensure that the soil in the installation environment is solid, free of spongy or soft soil, and not prone to sagging. The site must not be located on flat ground subject to water or snow accumulation, and the horizontal level of the site must be higher than the highest water level in the history of that area.
- Do not install the equipment in a location that may be submerged in water.
- If the equipment is installed in a location with abundant vegetation, in addition to routine weeding, harden the soil underneath the equipment using concrete or gravel.
- Do not install the equipment outdoors in areas affected by salt because it may be damaged. An area affected by salt is located less than 500 m from the coast or subject to sea breezes. Regions subject to sea breezes vary according to weather conditions (such as typhoons and monsoons) or terrain (such as dams and hills).
- Before installation, operation, and maintenance, clean water, ice, snow, or other foreign objects on the top of the equipment.
- When installing the equipment, make sure that the installation surface is solid enough to withstand the weight of the equipment.
- After installing the equipment, remove packaging materials such as cartons, foam, plastic, and cable ties from the equipment area.
- Store the equipment according to storage needs. Damage to equipment caused by unqualified storage conditions is not covered by the warranty.
- The operating temperature range provided in the technical specifications of the equipment refers to the ambient temperature in the installation environment.
-

2.3 Mechanical safety

⚠ ATTENTION

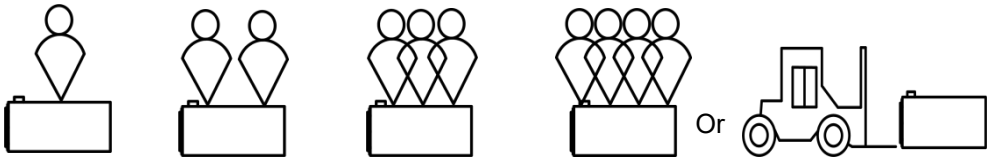
- Make sure that a professional organization prepares and inspects all the necessary tools. Do not use tools with
- scratch marks, do not exceed the inspection or whose inspection validity period has expired. Make sure the tools are secure and not overloaded.
- Do not drill holes in the equipment. This could affect the holding performance of the equipment, electromagnetic containment, and damaged components or cables inside. Metal chips from drilling can short-circuit the boards inside the equipment.

General requirements

- Promptly repaint any paint scratches caused during transportation or installation of the equipment. Equipment with scratches should not be exposed for an extended period.
- Do not perform operations such as arc welding and cutting on the equipment without the Company's evaluation.
- Do not install other devices on top of the equipment without an evaluation by the Company.
- When performing operations on top of the equipment, take steps to protect the equipment from damage.
- Use the correct tools and use them correctly.

Moving heavy objects

- Use caution to avoid injury when moving heavy objects.
- If multiple people are to move a heavy object together, determine the labor force and division of labor by taking into account height and other conditions to ensure that the weight is distributed equally.



< 18 kg	18-32 kg	32-55 kg	> 55 kg
(<40 lbs)	(40-70 lbs)	(70-121 lbs)	(> 121 lbs)

- If two or more people move a heavy object together, make sure that the object is lifted and landed at the same time and moved at an even speed under the supervision of one person.
- Wear personal protective equipment such as gloves and protective shoes when manually moving equipment.
- To move an object with your hands, approach the object, squat, and then lift the object gently and steadily with the strength of your legs instead of your back. Do not lift it suddenly or turn your body around.
- Do not quickly lift a heavy object above your waist. Place the object on a half-waist-high workbench or any other appropriate location, adjust the positions of your palms, and then lift it up.
- Move a heavy object stably with balanced force at an even, low speed. Lay the object down stably and loosely to avoid collision or falling due to scratching the surface of the equipment or damaging components and cables.
- When moving a heavy object, pay attention to the workbench, slope, stairs, and slippery spots. When moving a heavy object through a door, make sure the door is wide enough to move the object and avoid impact or injury.
- When transferring a heavy object, move your feet instead of turning your waist. When lifting and transferring a heavy object, make sure your feet are facing the desired direction of movement.
- When transporting equipment using a pallet jack or forklift, make sure the straps are properly positioned so that the equipment does not tip over. Before moving the equipment, attach it to the pallet truck or forklift using ropes. When moving equipment, assign dedicated personnel to take care of it.
- Choose the sea or roads in good condition for transportation. Do not transport the equipment by rail or air. Avoid tilting or jolting during transport.

Using Stairs

- Use insulated and certified ladders when carrying out live line work at height.
- Platform ladders with protective railings are preferred. The use of single ladders is not recommended,
- Follow the instructions of the safety officer for the planning and execution of the installation
- Before using a ladder, make sure it is intact and check its load capacity.
- Make sure the ladder is securely positioned and held securely as per the ladder manufacturer's manual.
- When using a stepladder, make sure that the pull ropes are secured.
- If using a single ladder, make sure the wider end is at the bottom and take protective measures to prevent the ladder from slipping.
- If using a single ladder, do not climb higher than the fourth rung of the ladder from the top.
- If you are using a single ladder to climb a platform, make sure that the ladder is at least 1 m higher than the platform and that it is constrained.
- Use fall-restraints if you exceed 180 cm in height above the ground

Holes

- Obtain consent from the client and contractor before drilling holes.

- Wear protective equipment such as safety glasses and protective gloves during practice.
- To avoid short circuits or other hazards, do not drill holes in buried pipes or cables.
- When drilling holes, protect the equipment from chips. After drilling, clean any chips.

2.4 Battery Safety

DANGER

- Do not connect the positive and negative terminals of a battery. Otherwise, the battery may be short-circuited. Battery shorts can generate high instantaneous current and release a lot of energy, which can cause battery leakage, smoke, release of flammable gases, thermal runaway, freedom, or explosion. To avoid battery short-circuits, do not service batteries with batteries switched on.
- Do not expose batteries to high temperatures or near heat sources, such as scorching sunlight, accessible sources, transformers, and heaters. Overheating the battery may cause leakage, smoke, release of flammable gases, thermal runaway, fire, or explosion.
- Protect batteries from mechanical vibrations, drops, collisions, punctures, and strong shocks. Otherwise, the batteries may be damaged or catch fire.
- To avoid leakage, smoke, release of flammable gases, thermal runaway, absence or explosion, do not disassemble, alter or damage batteries; For example, insert foreign objects into batteries, squeeze batteries, or immerse batteries in water or other liquids.
- Do not touch the battery terminals with other metal objects, which may cause heat or electrolyte leakage.
- There is a risk of fire or explosion if the battery model being used or used for replacement is incorrect. Use a battery model recommended by the manufacturer.
- The electrolyte of the battery is toxic and volatile. Do not come into contact with spilled liquids or inhale gas if the battery leaks or smells. In such cases, stay away from the battery and contact professionals immediately. Professionals should wear safety goggles, rubber gloves, gas masks, and protective clothing, turn off the equipment, remove the battery, and contact technical engineers.
- A battery is a closed system and does not release gases during normal operation. Suppose a battery is improperly treated, such as burned, punctured, crushed, struck by lightning, overcharged, or subjected to other adverse conditions that can cause the battery to become thermally unstable. If this occurs, the battery may be damaged, or an abnormal chemical reaction may occur inside the battery, resulting in loss of electrolyte or production of gases such as CO and H2. Ensure that the flammable gas is properly discharged to prevent fire or corrosion of the device.
- The gas generated by a burning battery can irritate the eyes, skin, and throat. Take protective measures promptly.

ATTENTION

- Install the batteries in a dry place. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, machine room to supply windows, or water pipes. Make sure that no liquid enters the equipment to prevent failure or short circuits.
- Before unpacking, storing, and transporting, make sure that the packing crates are intact and that the batteries are correctly positioned according to the labels on the packing cases. Do not place the battery upside down or vertically; Lay it on its side or tilt it. Stack the batteries according to the stacking requirements on the packaging cases. Make sure the batteries do not fall or become damaged. Otherwise, they will have to be scrapped.
- After unpacking the batteries, place them in the desired direction. Do not place the battery upside down or vertically. Lay it on its side, tilt or stack it. Make sure the batteries do not fall or become damaged. Otherwise, they will have to be scrapped.

- Tighten the screws on copper bars or cables to the torque specified in this document. Periodically check if the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them if present. Loose screw connections will cause excessive voltage drops, and batteries can catch fire when the current is high.
- After the batteries are discharged, charge them in time to avoid damage due to over-discharge.

2.5 Information

The Company shall not be liable for any damage to the battery, personal injury, death, loss of property, and other consequences caused by the following reasons:

- Force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions
- The battery warranty period has expired. It is recommended that you do not use a battery with an expired warranty period, as this poses safety risks.
- Actions that do not follow the instructions in the user manual or the Company's direct advice, including but not limited to the following scenarios:
  - The operating environment of the on-site equipment or the external power supply parameters do not meet the environmental requirements for smooth operation; For example, the actual operating temperature of the batteries is too high or too low, or the power grid is unstable and experiences frequent outages.
  - The batteries have been dropped or have not been used or connected properly.
  - Batteries are overcharged due to a delay in acceptance or ignition after the battery is installed.
  - The battery operating parameters are set incorrectly.
  - Different types of batteries, such as batteries of different brands or capacities or old and new batteries, are used together without prior approval from the Company.
  - Do not use batteries other than the WeCo SMART model, there is no other compatibility except for the WeCo SMART SERIES batteries with DCDC 450Vdc
  - Batteries are often damaged due to improper maintenance.
  - Battery usage scenarios are changed without prior approval from the Company.
  - Battery maintenance is not carried out according to the instructions in the user manual, such as not checking the battery terminals regularly.
  - Batteries are not transported, stored, or charged in accordance with the instructions in the user manual.
  - The company's instructions are not followed when repositioning or reinstalling the battery.
    It is recommended to purchase a battery with an expired product warranty period.

General requirements

To ensure battery safety and accurate battery handling, use batteries provided by the Company. The Company is not responsible for any failure of batteries not supplied by it.

- Before installing, operating, and maintaining batteries, read the manufacturer's instructions and comply with the relevant requirements. The safety precautions specified in this document are essential and require special attention. For additional safety precautions, please refer to the instructions provided by the battery manufacturer.
- Use batteries within the specified temperature range. When the ambient temperature of the batteries is lower than the permissible range, do not charge the batteries to avoid internal short circuits caused during low-temperature charging.
- Although the battery is equipped with a heating system, it is always advisable to install the battery in a temperate place in order to ensure a longer period of operation and efficiency over time.
- Before unpacking the batteries, check that the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.
- Turn on the newly installed batteries and check that they are working properly.

- If the batteries cannot be activated, place them in the original packaging and store them in a dry indoor environment free of corrosive gases.
- Do not clean the storage system with solvents or fuels, gases may ignite
- Do not store fuels or gases in or near the storage system
- Do not use a damaged battery (e.g. damage caused by a battery falling, bumping, swelling, or denting on the casing) because damage may cause electrolyte leakage or release of flammable gases. In the event of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other flammable devices or materials; Keep it out of the reach of non-professionals.
- Before working on a battery, make sure there are no irritating or burnt odors around the battery.
- When installing batteries, do not place installation tools, metal parts, or miscellaneous items on the batteries. After installation, clean the items on the batteries and the surrounding area.
- If the batteries are accidentally exposed to water, do not install them. Instead, transport the batteries to a safe isolation point and dispose of them promptly.
- Before installing a battery pack, make sure that the enclosure is not deformed or damaged.
- Check whether the positive and negative terminals of the battery are grounded unexpectedly. If this occurs, disconnect the battery terminals from the ground.
- Do not perform welding or grinding work around the batteries to avoid fire caused by electric sparks or arcing.
- If batteries are left unused for an extended period, store and charge according to battery requirements and follow the manufacturer's instructions, batteries stored at low or high temperature may have suffered damage, consult the manufacturer before using or recharging
- Do not charge or discharge batteries using a device that does not comply with WeCo requirements and/or local laws and/or regulations.
- Keep the battery circuit disconnected/open during installation and maintenance.
- Monitor batteries damaged during storage for signs of smoke, flame, electrolyte leakage, or heat.
- If a battery is defective, its surface temperature may be high. Do not touch the battery to avoid scalding.
- Do not stand on, lean on, or sit on the equipment.
- In backup power layouts, do not use batteries for the following situations:
  - Medical devices that are essentially crucial for human life
  - Control equipment such as trains and elevators, as this can cause personal injury
  - Information systems of social and public importance
  - Medical and/or life-saving devices
  - Other devices similar to those described above

Short circuit protection

- When installing and servicing batteries, wrap the exposed cable terminals in the batteries with electrical tape.
- Do not allow foreign objects (such as conductive objects, screws, and liquids) to enter a battery, as this may cause short circuits.

Recycling

- Dispose of used batteries according to local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries may result in environmental pollution or explosion.
- If a battery leaks or is damaged, contact technical support or a battery recycling company for disposal.
- Do not incinerate.
- Do not discard in generic battery baskets.
- Do not dispose of or submerge batteries in water or liquid.
- If batteries are out of use, contact a recycling company for disposal.

- Do not expose used batteries to high temperatures or direct sunlight.
- Do not place used batteries in environments with high humidity or corrosive substances.
- Do not use defective batteries. Contact a battery recycling company to scrap them as soon as possible to avoid environmental pollution.

Guide

- This document describes the user manual of The Storage System for the convenience of users.
- This document focuses on product features, configuration, component introduction, and maintenance guidance for the SMART Series inverter and battery
- Before using and maintaining the product, read and remember the instructions and notes in the document.
- SMART batteries and inverters cannot be used with other inverters or batteries. The Sete Smart Inverter should only be used with WeCo-approved batteries.
- Before using this document, collect data on each component for future use.
- The graphics in this document are for illustration purposes only. Please refer to the actual product on site for the specific appearance of the product.
- The relevant precautions in this document only supplement the laws and regulations in force in the country

This manual must be left with the end user, and the latter must be trained and informed about the maintenance, supervision, risks and obligations arising from the installation of this system

3 Product Introduction

3.1 Overview

The energy storage system, including inverters and battery expansion modules, can store and release electricity according to the high-performance energy management system for solar energy, battery, load, and grid system management.

The Storage System conveniently and intuitively displays the operating status and parameter change via the app and supports various working modes for greater ease of use.

The system The Storage System supports power and capacity expansion, supports 4 inverter modules in parallel, and one inverter module supports up to 4 battery expansion modules.

3.2 Model

System

The identification of the product model is as follows.

Table 2-1 System model descriptions

No.	Meaning	Description
1	Product series	Smart Series
2	AC Type	S3: Three-phase
3	Inverter power	8K：8 kW 10K：10 kW 12K：12 kW 15K：15 kW
4	Usable energy	B30：20 kWh B35：25 kWh B30：30 kWh B35：35 kWh B40：40 kWh B45：45 kWh B50：50 kWh B55：55 kWh B60：60 kWh

3.3 Appearance

Product appearance is shown as follows (SMART-S3-8K-B20).

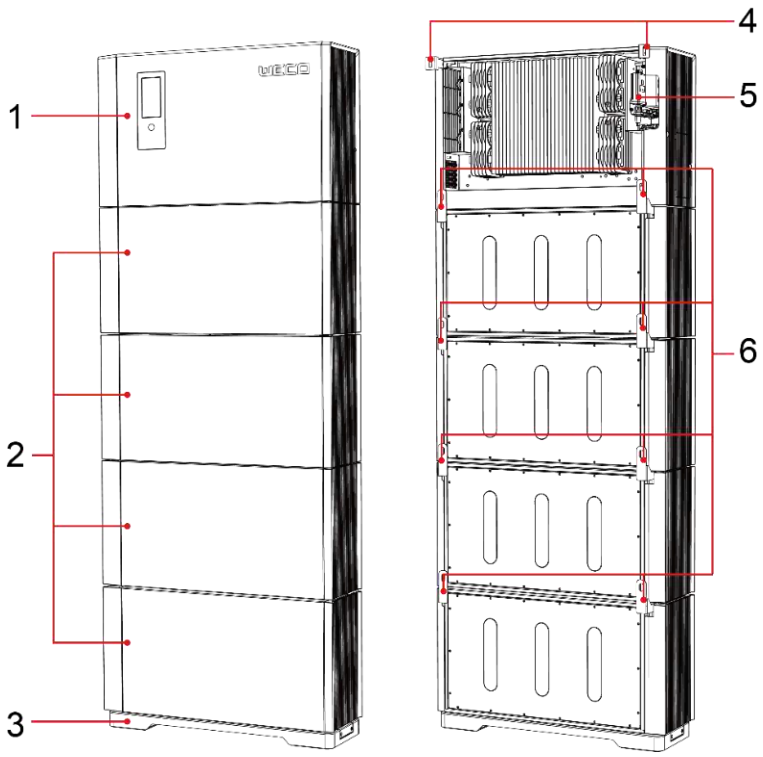


Figure 2-3 Overall system appearance

1: Inverter module
2: Battery Extension Module
3: Battery Base
4: L-shaped bracket for inverter fixing
5: Wi-Fi Module
6: Battery Wall Mounting

3.4 Nameplate

The nameplate mainly contains information such as the trademark and product model, important technical parameters, the logo of the certification system to which it complies, the name of the company, and the place of origin.

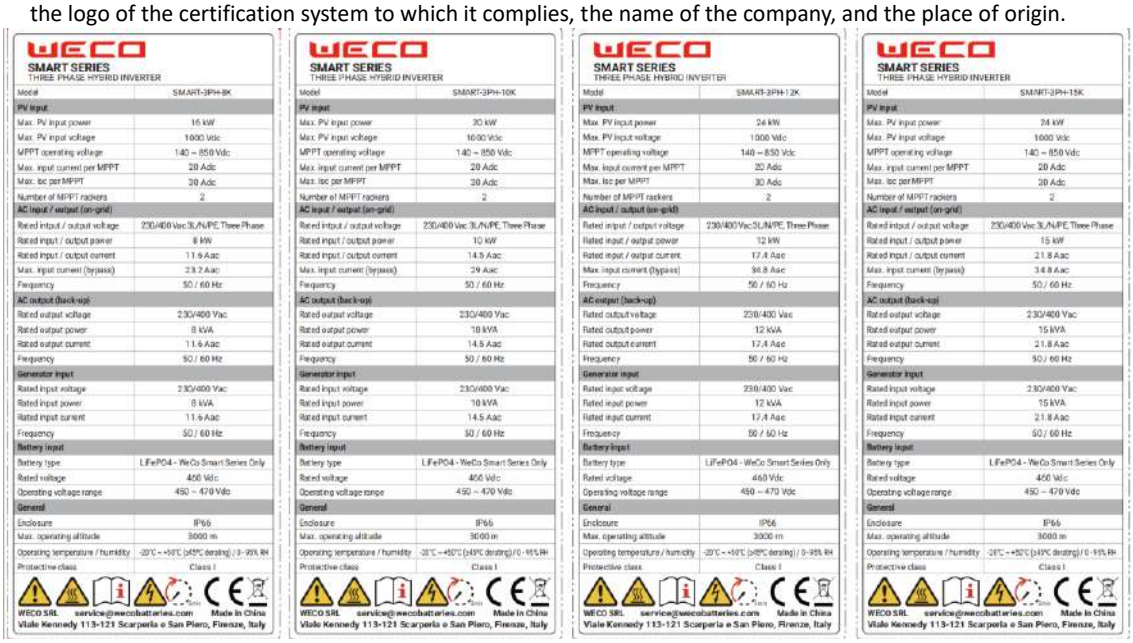


Figure 2-4 System nameplate schematic

3.5 Technical Specification

System

- The SMART-3PH-8K specification parameters are shown as follows.

Table 2-3 SMART-3PH-8K specification parameters

Inverter model	**SMART-3PH-8K**
Battery numbers(full power output)	4pcs to 12pcs 5k0 battery modules
Scalability	Up to 12 battery modules per inverter, up to 4 inverters in one system in parallel.
Battery（Build-in DCDC）	
Battery Type	LiFePO4 (LFP)
Rated charge/discharge voltage	460V
Operating voltage range	450V-470V
Max. Charge current	33.5Amp (6pcs to 12pcs battery modules connected)
Max. discharge current	17.8Amp (4pcs to 12pcs battery modules connected)
Max. charge power	15kW (6pcs to 12pcs battery modules connected)
Max. discharge power	8kW (4pcs to 12pcs battery modules connected)
Max. charging voltage	470V
PV	
Max. PV input power	16kW
Max. DC input voltage	1000V
MPPT voltage range	140V-850V
Rated input voltage	600V
Number of MPPT trackers	2
Single MPPT string	1/1
Max. current per MPPT	20A/20A
Max. short-circuit current Isc	30A/30A
Start-up voltage/Min. starting voltage	160V
AC Input/Output (On-grid)	
Rated input and output power	8KW
Max. input/output apparent power	8.8KVA
AC input/output voltage	230V/400V (310~476V)
AC input/output frequency	50/60 Hz ± 5 Hz

Rated input/output current	11.6A
Power factor	±0.8
Harmonic current	<2%
Grid system	3L+N+PE
Max. input apparent power (Bypass)	16KVA
Max. input current (Bypass)	23.2A
AC output (Back-up)	
Max. output peak apparent power	12KVA for 10s(150%)
Rated output apparent power	8KVA
Rated output voltage	230V/400V (310~476V)
Rated output frequency	50/60Hz(+/-0.2%)
THDi	< 2% (rated power)
Automatic switching time	<20ms
GEN input	
Input voltage	230V/400V (310~476V)
Input frequency	50/60 Hz ± 5 Hz
Max. input apparent power	16KVA
Max. input current	23.2A
General Parameter	
European efficiency	97.0%
Max. efficiency	97.3%
Enclosure	IP66
Protective class	Class I
Noise	<50 dB @1m
Inverter dimensions (WxHxD)/Weight	701x420x218mm/30kg
Battery dimensions (WxHxD)/Weight	701x381x210mm/54kg
Mounting options	wall
Max. elevation	9,843 ft / 3,000 m
Ambient operating temperature	-20~50ºC/-4~122ºF
Operating humidity	0 - 95% RH (non-condensing)
Communication interface	WiFi/RS485/USB/CAN
User interface	App

Safety & compliance	
Safety	IEC / EU 62109-1, IEC / EU 62109-2, IEC / EU 62477-1, IEC / EU 62040-1
EMC	IEC 61000-6-3, IEC / EU 61000-6-1, IEC 61000-6-2, IEC 61000-6-4
Grid Standards	CEI 0-21, G99, G98, NTS 2.1 Type A, EN 50549-1, EN 50549-10, R 25, VDE 4105

4 Components Introduction

4.1 Inverter Module

4.1.1 Appearance

The appearance of the inverter module without the decorative cover is shown as follows.
615mm*218mm*420mm

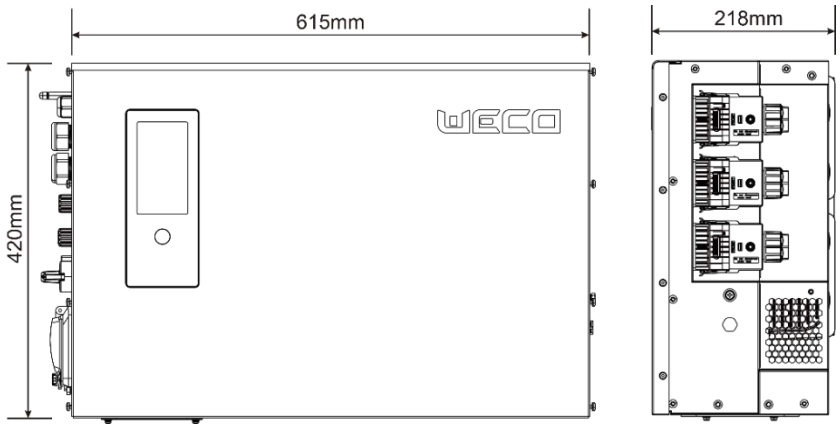


Figure 2-5 The appearance of the inverter module without decorative covers

4.2 Operation Panel

The inverter module operation panel is shown as follows.

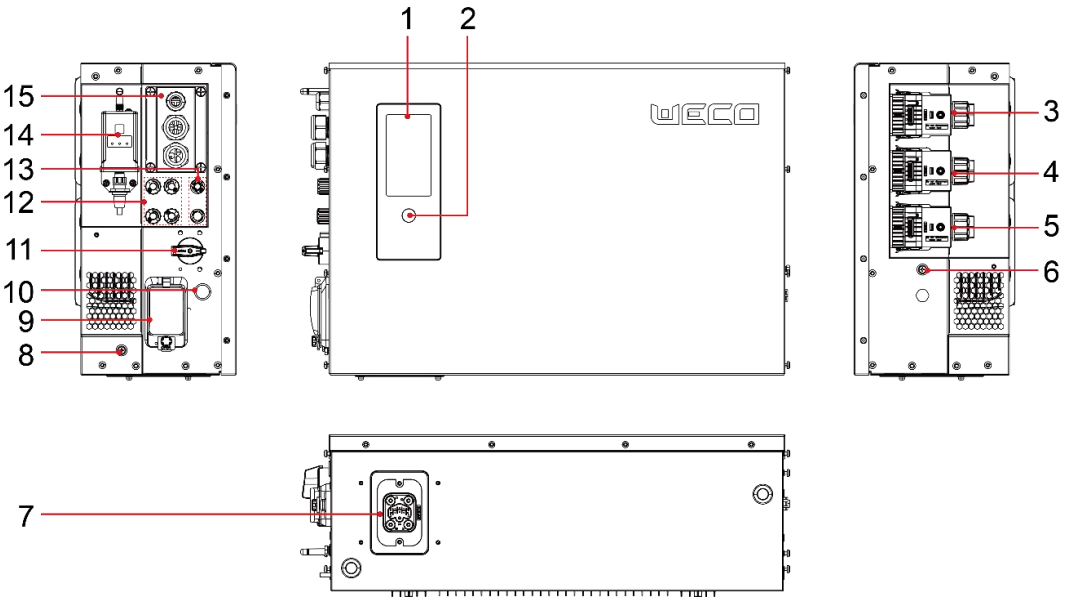


Figure 2-7 Inverter module operation panel

NO.	Items	Discription
1	Display	Display the energy flow and status

NO.	Items	Discription
2	Work indicator & off button	Constant light when device running, touch to lighten display
3	BACK UP (standby power load interface)	Backup load port
4	GEN (generator interface)	Generator port
5	GRID (utility interface)	Grid port
6	PE	Grounding Port
7	Battery stack terminal	Battery connection port
8	PE	Internal grounding port(Reserve)
9	BAT SWITCH	Battery startup switch
10	Power	Power switch
11	PV SWITCH	PV input switch
12	PV1+/-, PV2+/-	PV connection
13	BAT+/-	Slave battery connection
14	WiFi module	For device and network communication
15	Communication port	Communication

The inverter module communication interface operation panel is shown as follows.

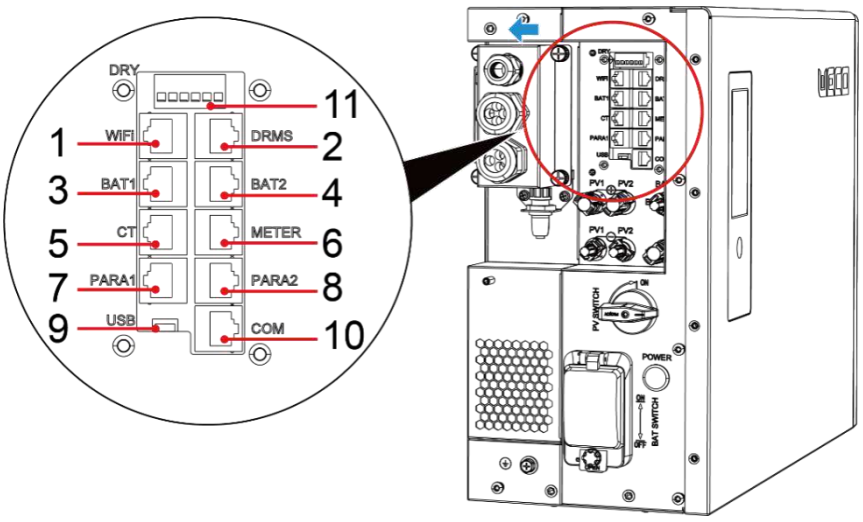


Figure 2-8 Inverter module communication interface operation panel

The ports of the inverter module communication interface are as follows.

NO.	Items	Parameter
1	WiFi	RS485 / RS232S (upgrade port)
2	DRMS	Grid Parallel Port
3	BAT1	Battery parallel port 1 / CAN
4	BAT2	Battery parallel port 2 / CAN
5	CT	Current transformer port 1 / Meter communication port
6	METER	Smart meter communication port
7	PARA1	Inverter parallel signal input port
8	PARA2	Inverter parallel signal output port
9	USB	Upgrade firmware program port
10	COM	Battery master communication port (for parallel operation)
11	DRY	Dry node input/output port

4.3 Battery Module

The appearance of the battery extension module without the decorative cover is shown as follows.
Dimensions: 670.6*381*212mm

Front & Back View

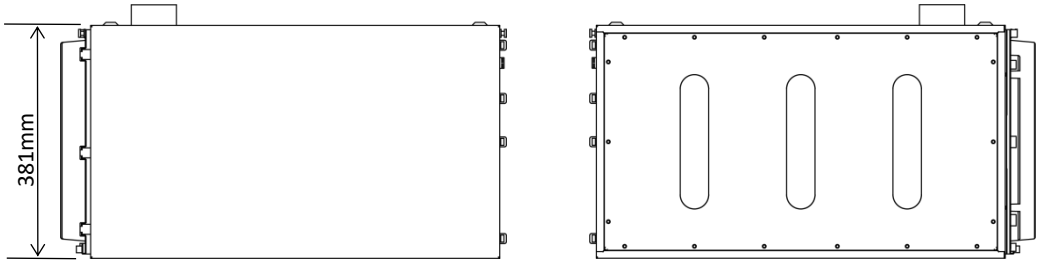


Figure 2-9

Top & Bottom View

The appearance of the battery extension module with a decorative cover is shown as follows.

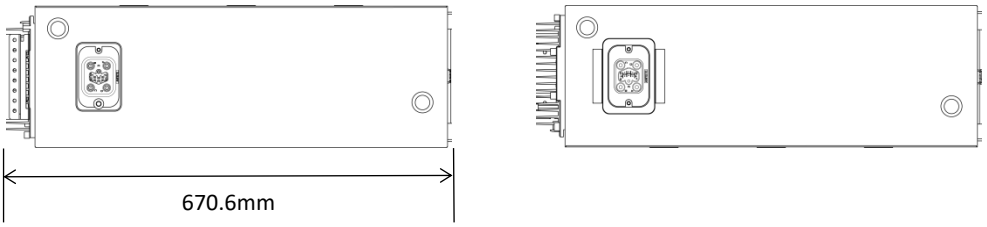


Figure 2-10

Left & Right View

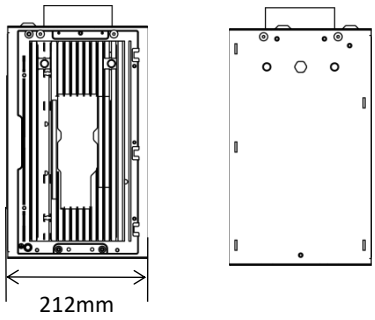
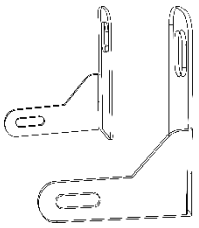


Figure 2-11



Bracket for fixing the battery to the wall

4.4 Battery Base

The appearance of the battery base is shown as follows.

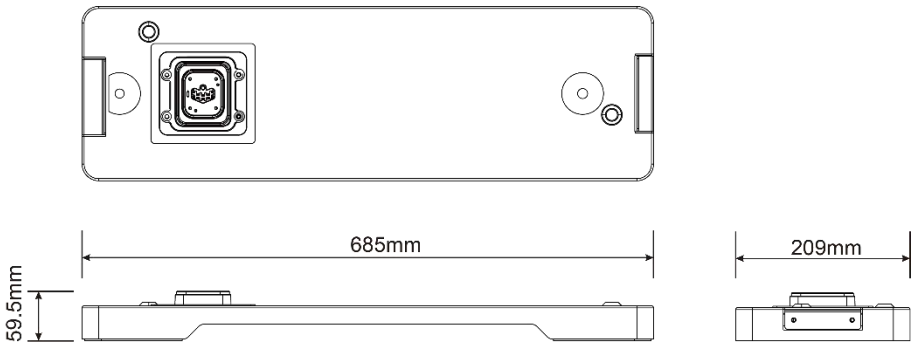


Figure 2-12 Appearance of battery base

5 System Installation

5.1 Preparing for Installation

5.1.1 Product Acceptance

After receiving the goods on-site, please check whether the packing box is intact and inspect the goods in time. If the packing box is damaged, please sign with the carrier to confirm on the packing list and indicate the degree of damage; please refuse to sign if the damage is severe.

Please unpack and inspect the goods after receiving all the goods from a set of systems; if you find that the goods received do not conform with those listed in the packing list, please get in touch with your dealer to solve the problem.

5.1.2 Packing List

After unpacking the battery, ensure the deliverables are intact, complete, and free from any apparent damage. If any item is missing or damaged, contact your dealer.

The packing list of the inverter module is as follows.

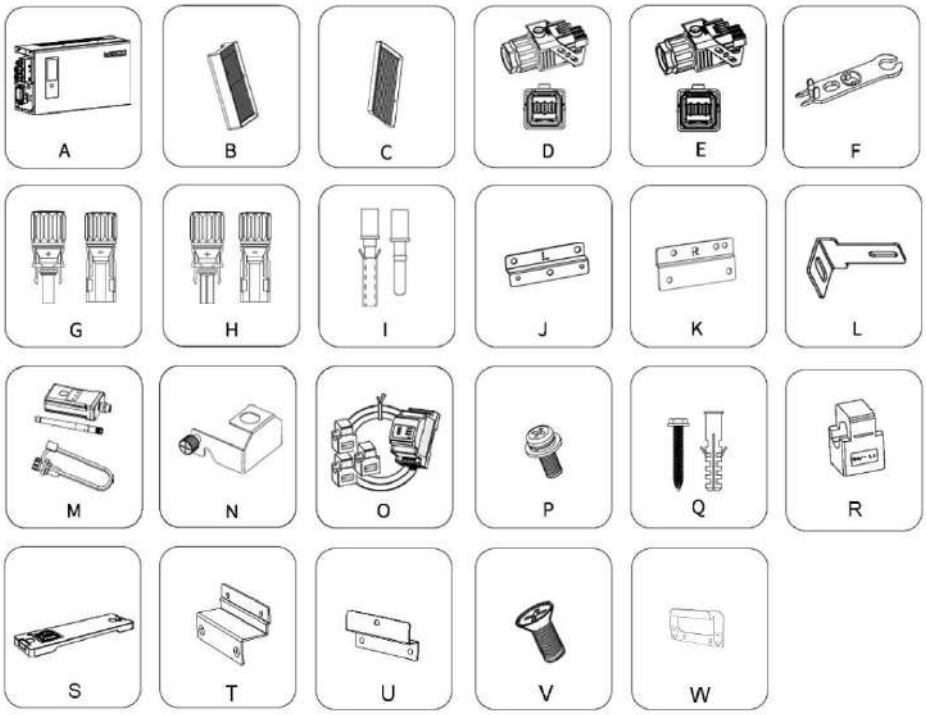


Figure 2-13 Inverter module packing list

No.	Description	Quantity
A	Inverter module	1
B	Left cover	1
C	Right cover	1

No.	Description	Quantity
D	AC connector(backup)	1
E	AC connector	2
F	MC4 snap removal tool	1
G	MC4 connector(black color)	2
H	PV connector(blue color)	1
I	MC4 connector (plug pin + plug hole)	3
J	Inverter and battery connection plate (left)	1
K	Inverter and battery connection plate (right)	1
L	Inverter L shape wall fixing bracket	2
M	WiFi module	1
N	WiFi fixing	1
O	Smart meter	1
P	M5 * 12 cross groove recess external hexagonal three combination screw	13
Q	D10 * 50mm plastic expansion tube+M8 * 60mm external hexagonal combination self tapping expansion screw	4
R	CT (*Optional)	1
S	Base	1
T	Stacking bracket (left)	1
U	Stacking bracket (right)	1
V	M4 * 10 cross groove countersunk head screw	4
W	Hand stick	2

The packing list for the battery expansion module is as follows.

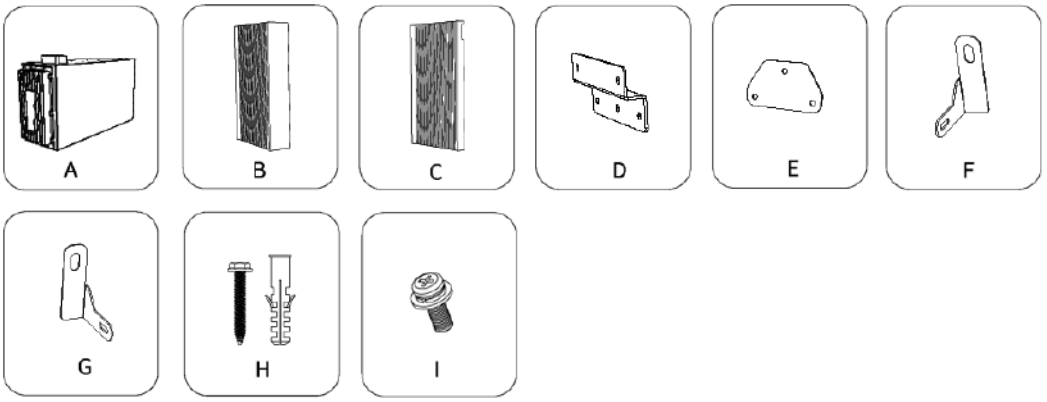


Figure 2-14 Battery expansion module packing list

No.	Description	Quantity
A	Expansion battery module	1
B	Left cover	1
C	Right cover	1
D	Stack bracket(left)	1
E	Stack bracket(right)	1
F	Wall fixing bracket(left)	1
G	Wall fixing bracket(right)	1
H	D10 * 50mm plastic expansion tube+M8 * 60mm external hexagonal combination self tapping expansion screw	2
I	M5 * 12 cross groove recess external hexagonal three combination screw	8

5.1.3 Installation Tool Preparation

When installing, it is recommended to use the following installation tools. If necessary, other auxiliary tools can be used on site.

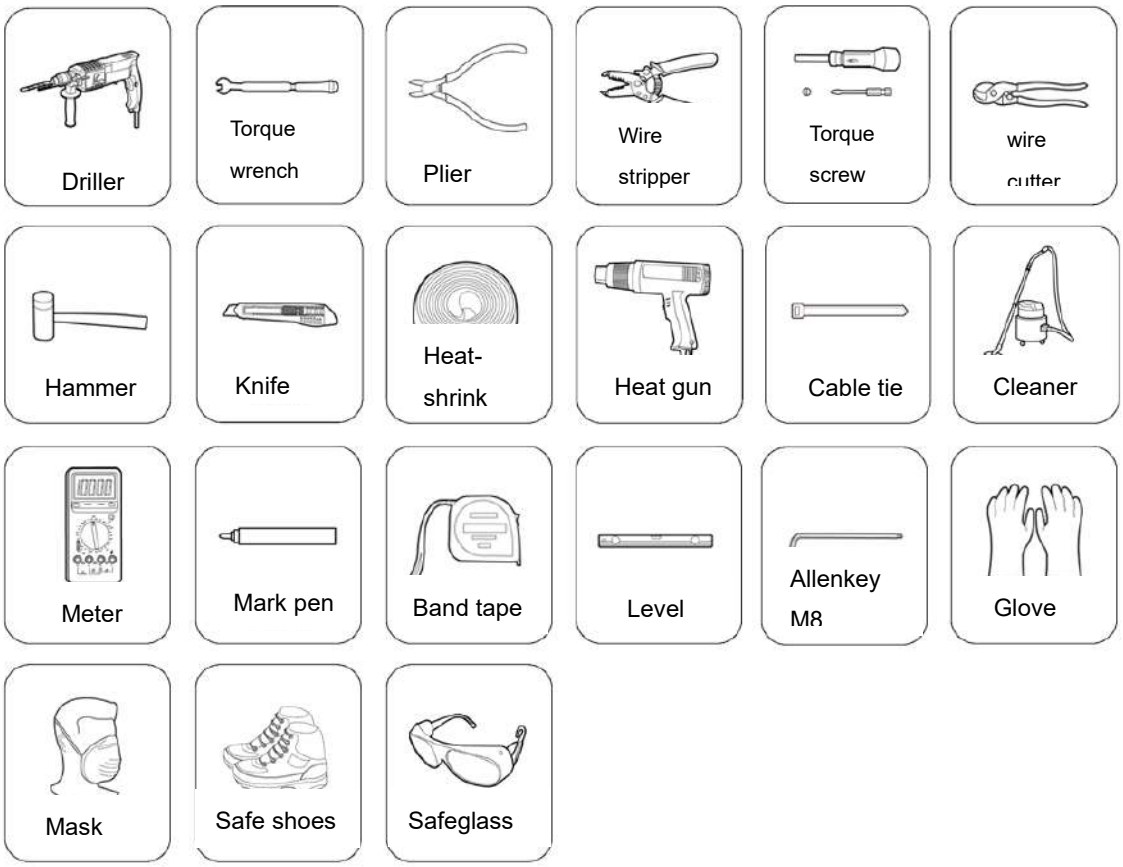


Figure 2-15 Tool list

5.2 Installation environment, space & safety requirement

5.2.1 Installation Environment Requirements

⚠ CAUTION

Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.

- Selecting an appropriate location for the installation of the Storage System is essential to ensure correct and efficient operation. When choosing the mounting location, the following factors should be considered:
- The Storage System has IP65 degree of protection and can be used both indoors and outdoors. It is important that the ambient temperature remains below 40°C to ensure optimal operating conditions and extend the life of the device.
- The mounting method and location must be appropriate for the weight and size of the 5K0 Smart. Ensure that the walls are strong enough to meet the load requirements needed for the installation of the 5K0 Smart.
- The installation floor should be level, free of significant drop-offs or holes, to provide a stable foundation. The ground level must be 5 mm or less.
- Avoid installing the Storage System on drywall or similar walls that are poorly soundproofed and not solid, or in areas where it may cause obstruction or noise, as the noise emitted during operation may disturb residents.
- It is essential to install it in a well-ventilated environment to ensure proper heat dissipation. Also, do not expose the Storage System to direct sunlight, rain, or snow.

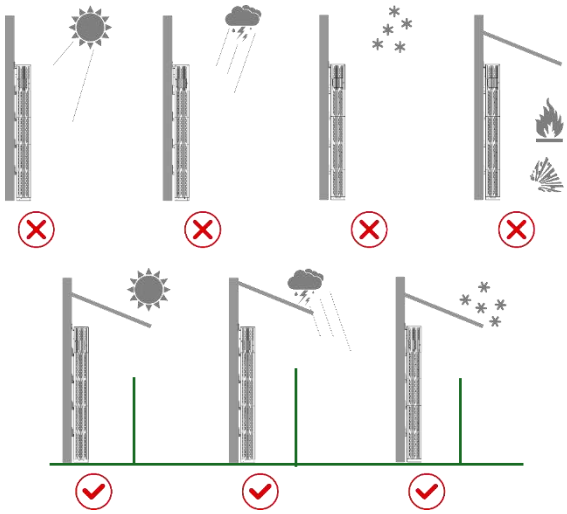


Figure 5-4 Installation Environment Requirements

5.2.2 Installation Space Requirements

During installation, ensure that there are no other devices (except awnings, etc.) or explosive materials around the batteries. Reserve adequate space for heat dissipation and safety isolation.

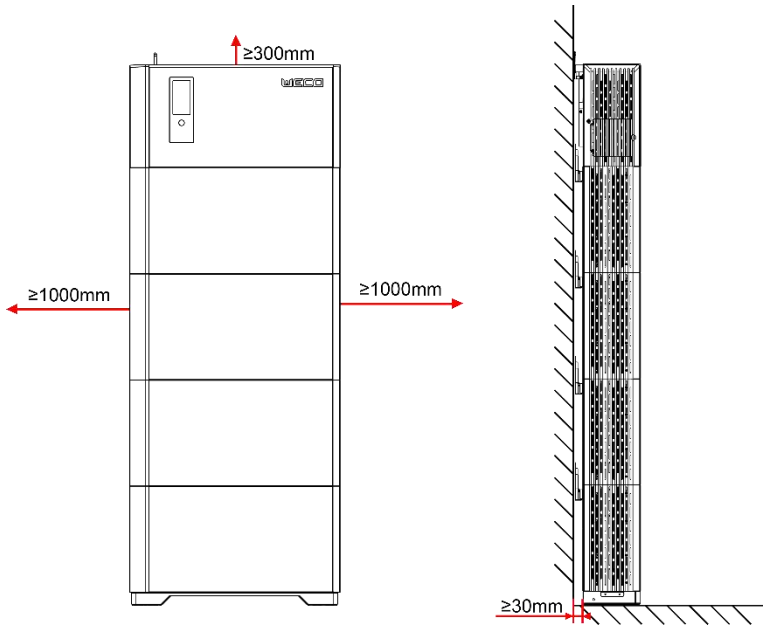


Figure 2-17 Installation space requirements

5.2.3 Safety requirements for installation

DANGER

Avoid drilling holes in water pipes or power cables buried in the wall.

CAUTION

- When installing the equipment, it is crucial to ensure that the installation surface is flat and solid enough to support the weight of the equipment. It is recommended that you avoid over-adjusting the adjustable leveling nuts of the floor mounting bracket. It is important to ensure that the nuts are engaged at least half the depth of the thread, so as to provide adequate stability. Over- or under-tightening could damage the screw threads, considering the significant weight of the energy storage module.
- Installation floor requirements: concrete floor. Requirements for wall installation: Please contact the installer for information regarding load-bearing walls with concrete and brick surfaces, with the exception of walls.
- The equipment is heavy; Therefore, it is advisable to keep the handles raised vertically during handling and to be careful not to drop/slip/lower the handles quickly, to prevent the equipment from falling and injuring the operator.

NOTICE

- To avoid dust inhalation or eye contact, wear safety goggles and a dust mask when drilling holes.
- Use a vacuum cleaner to clean the dust in and around the holes and measure the distance. If the holes are positioned incorrectly, drill the holes again.

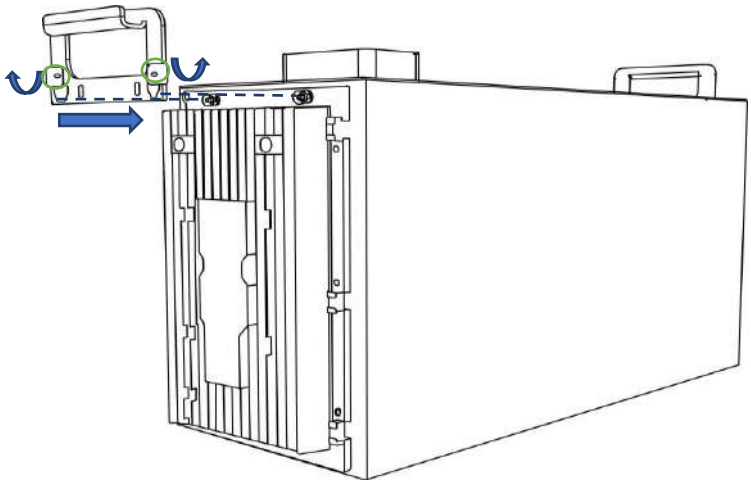
- Level the expansion sleeve head with the concrete wall or floor after removing the nut, spring washer, and flat washer. Otherwise, the mounting kit will not be securely installed on the wall or ground.
- Before installing an energy storage module, clean the ports on the base. In any case, make sure that both the upper and lower ports are dry and free of dust and foreign objects. Otherwise, the equipment may be damaged or short-circuit the battery and/or inverter

Before tightening the screws on both sides of each module, make sure that the front panels of the modules are flush with each other.

5.2.4 Battery modules movimentation

DANGER

- **When carrying heavy objects, preparation should be made for bearing weight to avoid being crushed or twisted by heavy objects.**
- **Please use the handle to transport the battery module, and it is forbidden to directly transport the battery module by hand.**
- **Please flip up the handle nut to ensure that the handle hole can go through the support nut of battery and flip down the handle nut to lock the handle to ensure a reliable connection between the handle and the battery module. Lifting without tightening is prohibited.**
- **The handle is an auxiliary handling tool and is not suitable for long-distance transportation.**



5.3 Installation Steps

Physical installation

1. Install base: fix the base to the ground with suitable dowels
2. Stack* the first battery and fix it to the wall with the supplied brackets
3. Stack* any other batteries and fix them to the wall with the supplied brackets
4. Install* the inverter and secure it with the inverter brackets

"*" the batteries must be secured together with their side brackets in addition to the wall mounting brackets

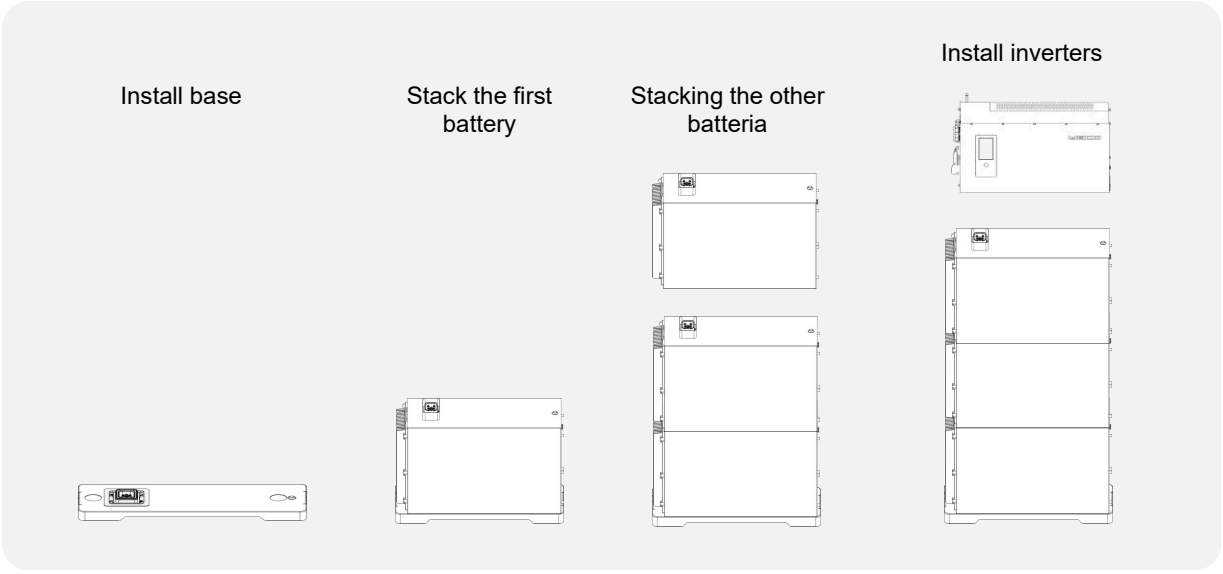


Figure 5-6 Installation Steps

Step 1. Install the base

1. Place the base parallel to the wall
2. Leave the base with 30mm away from the wall.
3. Level the holes with a leveling tool, mark the base mounting holes with a marker, and punch the holes with an impact drill.

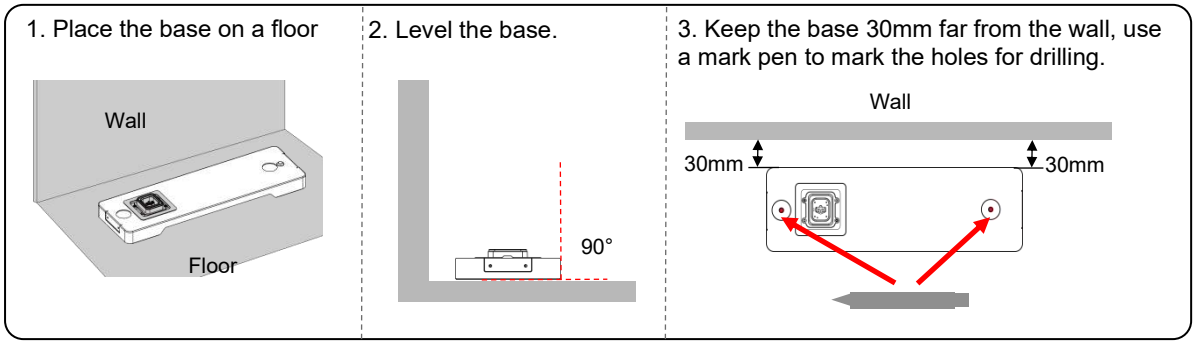


Figure 3-1 Installing the base module

4. After leveling the battery base with a tool, fix it with expansion bolts.

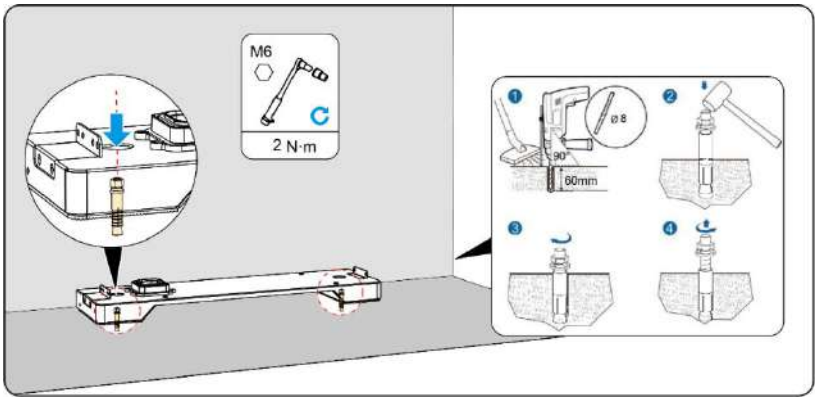


Figure 3-2 Fix the base on the floor

Step 2. Stack the first battery module on the Base

A. Take the handle out of the battery pack, insert the handles on the sides of the battery module.

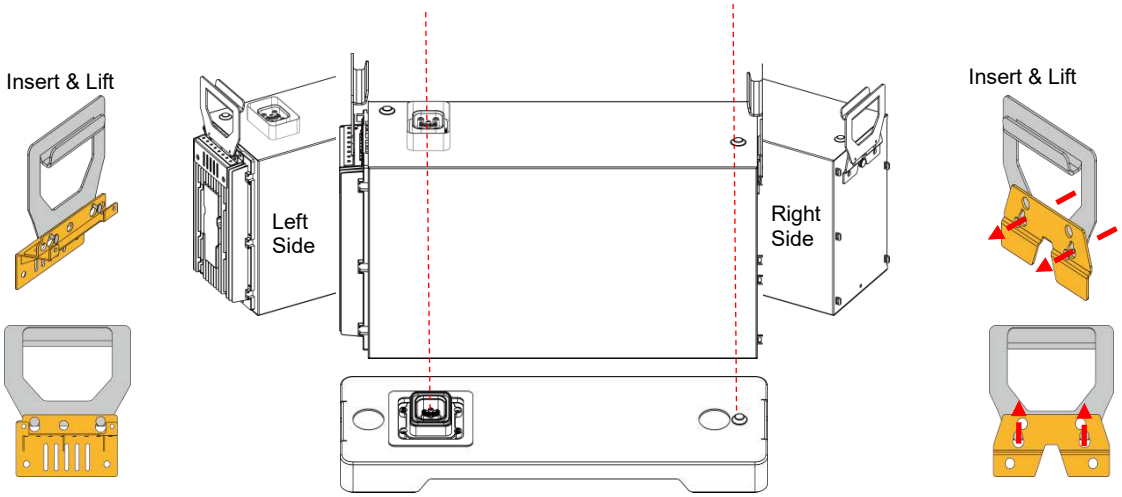


Figure 3-3 Installing the battery module

B. Align the battery with the base module, place the battery on top of the base, make sure the socket connects to the head, the female socket -connects to the male plug, and then pull out the handles.

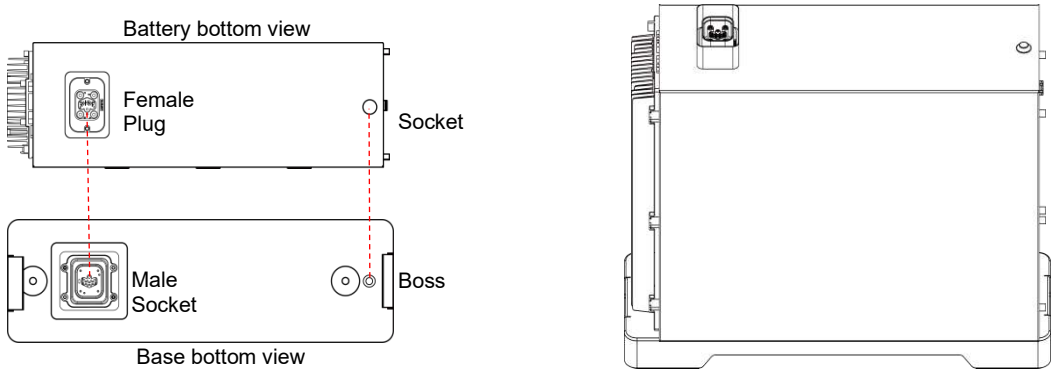


Figure 3-5 Pull ou the handles

C. Take the brackets from the base package. Fasten the Base Left bracket at left side between the battery module and the base module.

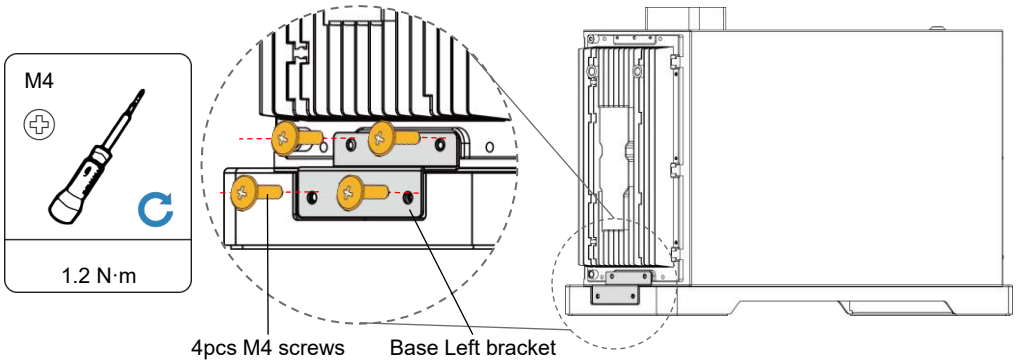


Figure 3-6 install the battery left side bracket

D. Fasten the Base Right bracket at left side between the battery module and the base module.

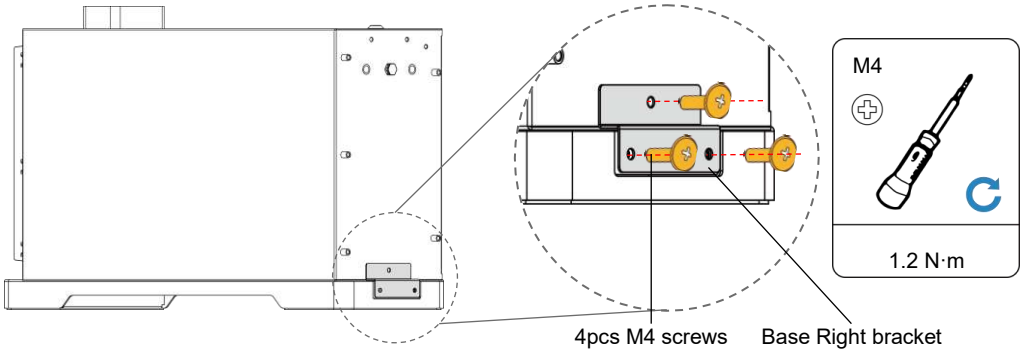


Figure 3-7 install the battery right side bracket

E. Take the bracket from the battery package, put the Left wall bracket on the correct position, then use a mark pen make the marks for holes drilling.

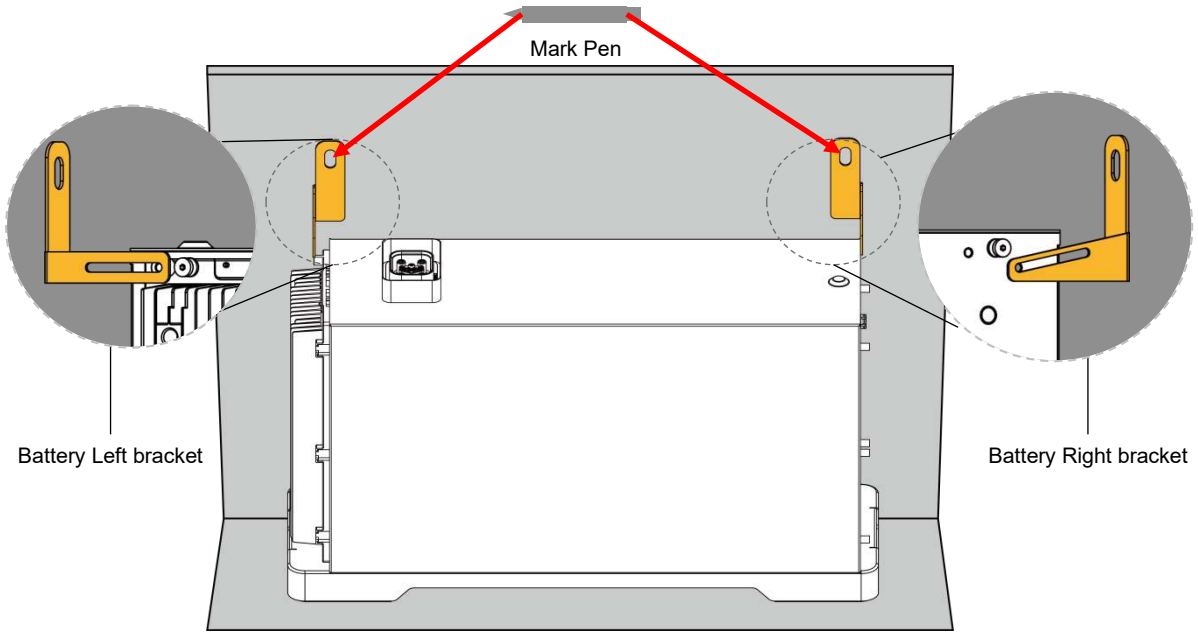


Figure 3-8 install the battery right side bracket

F. Drilling holes for wall brackets, install the bolts, take the nuts out.

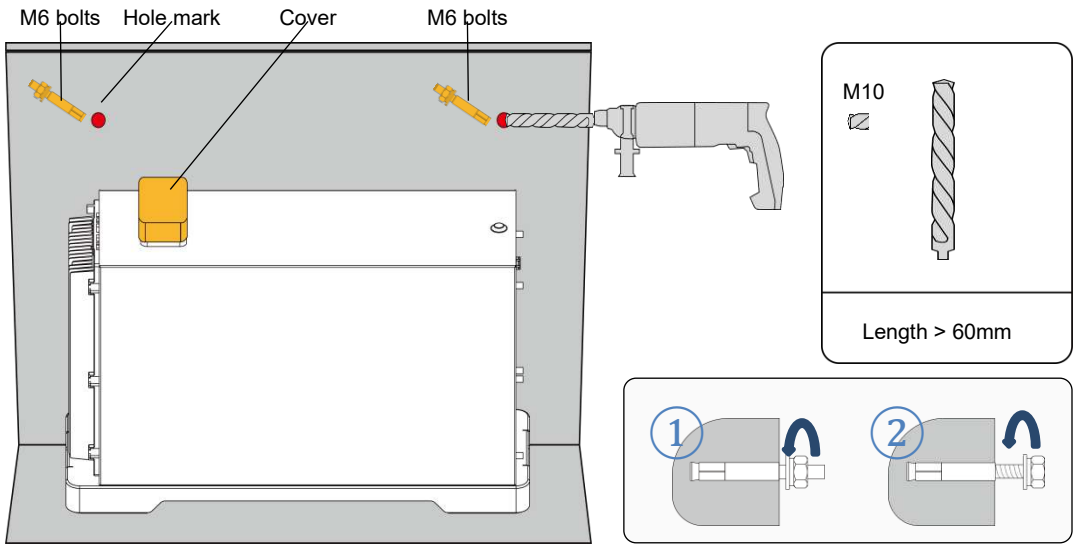


Figure 3-9 Drilling holes for wall bracket

G. Put the wall bracket on the wall and bolts, fasten the nuts to fix the bracket on the wall and inverter.

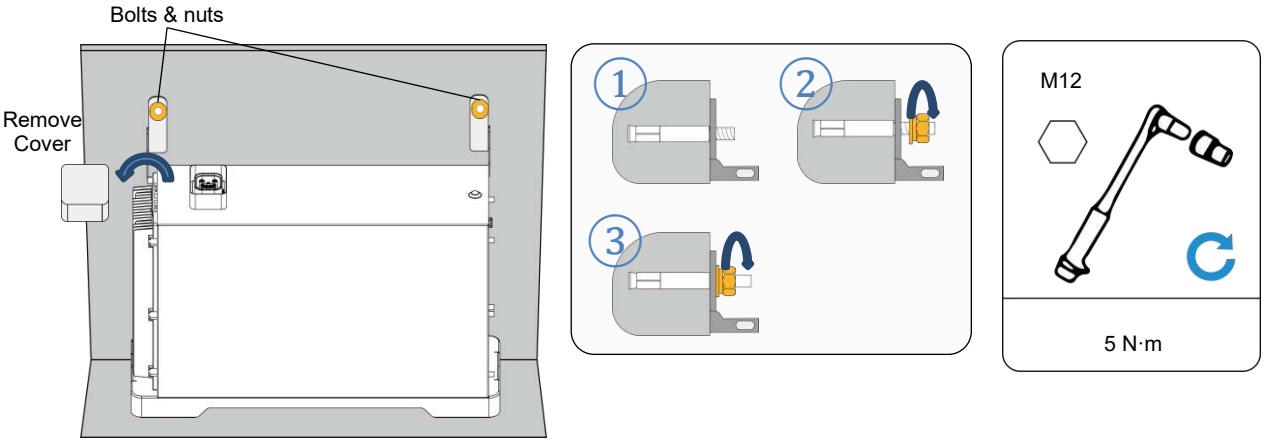


Figure 3-10 Fix the wall brackets

Step 3. Stack the second and rest battery module.

A. Some steps with “Step 2-A”, take the handles from the package--insert the handles on sides of the battery module, stack the second battery on top of the first battery--pull out the handles.

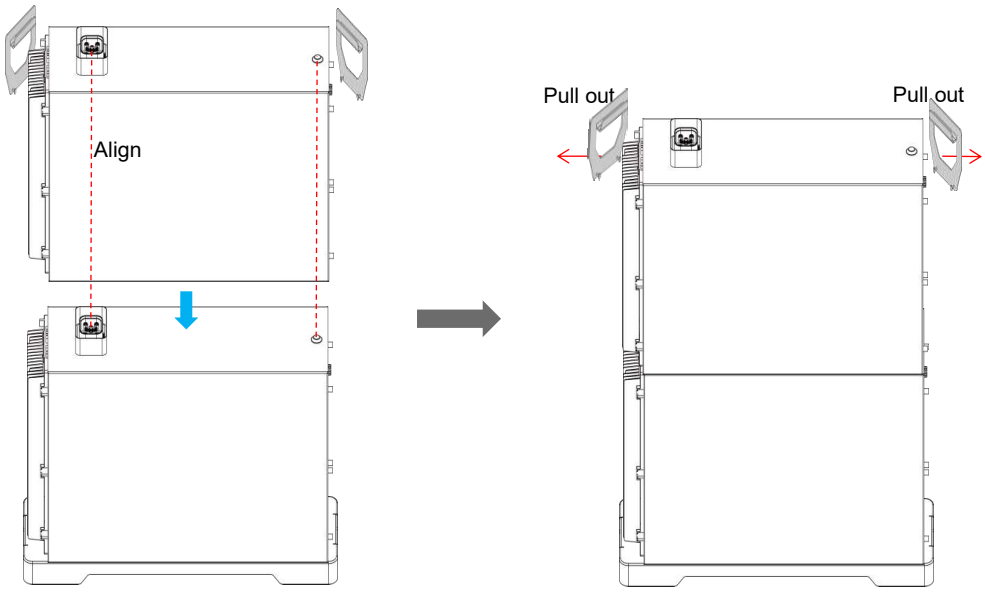


Figure 3-11 Stack the inverter module

B. Take the brackets from the battery package. Fasten the Battery Left bracket at left side between the battery module and the battery module.

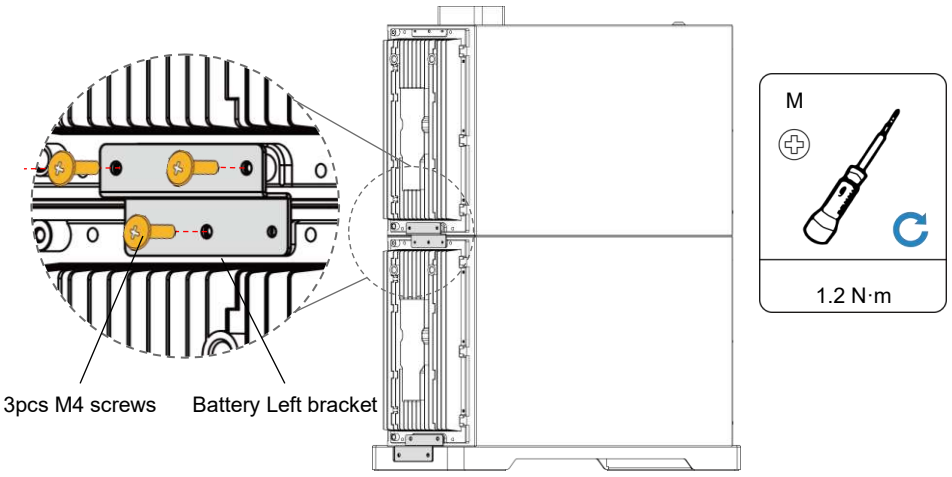


Figure 3-12 Install the battery to battery left side bracket

C. Fasten the Battery Right bracket at Right side between the battery module and the battery module.

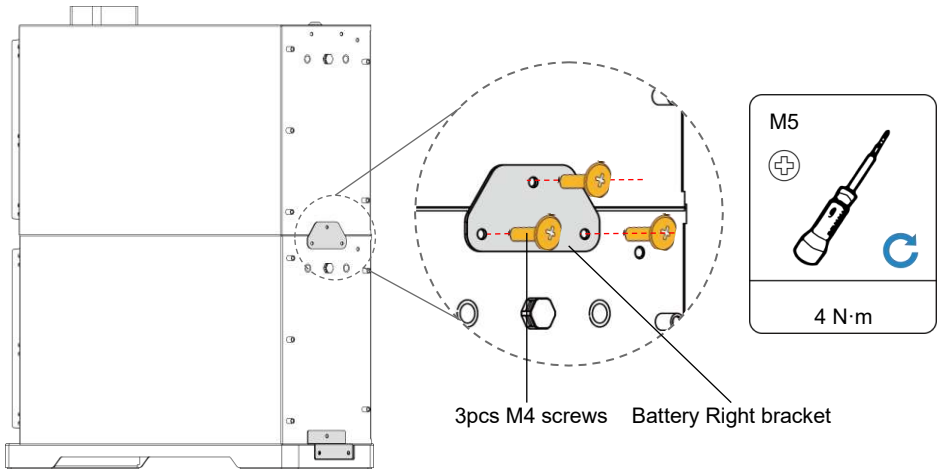


Figure 3-13 Install the battery to battery Right side bracket

D. Some steps with Step 2-E and Step 2-F to install the wall brackets of the second battery.

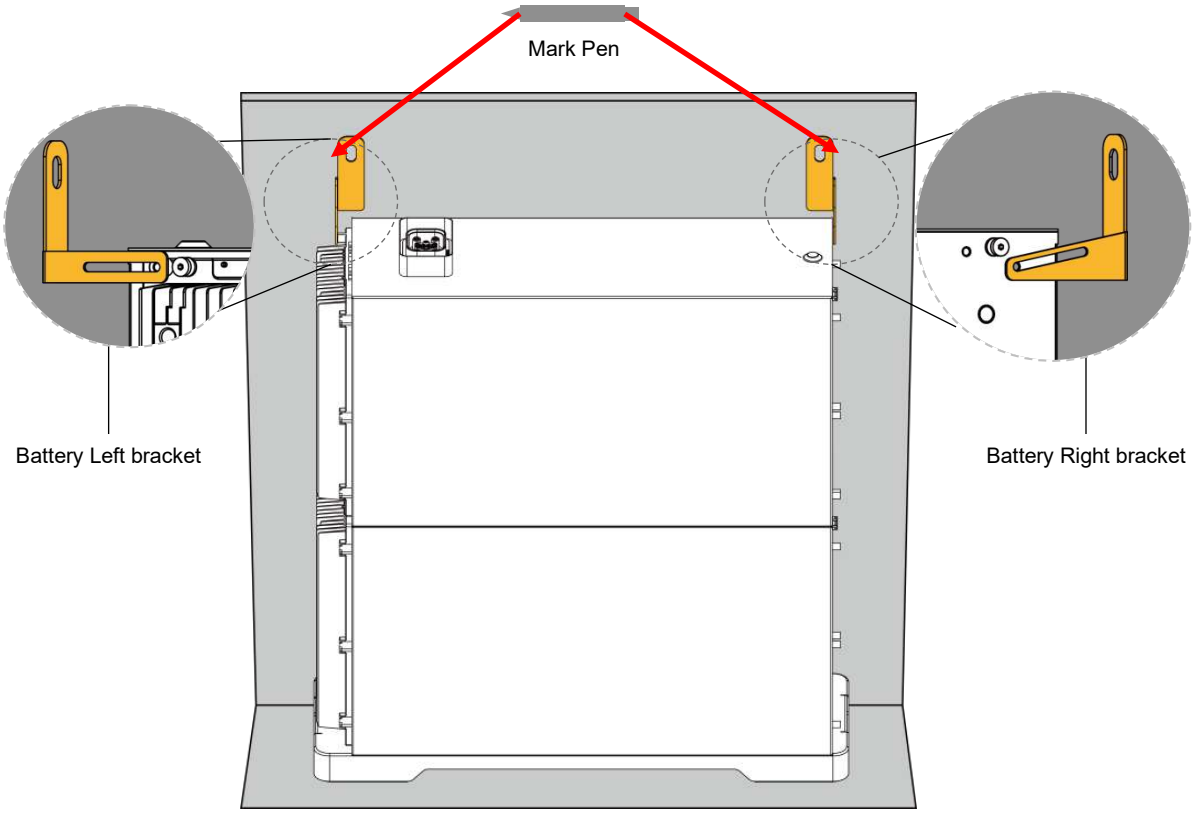


Figure 3-14 Install the wall bracket for second batter

1. Install the remaining battery modules from bottom to top, install the left and right fasteners, and tighten the screws on both sides. (If installing the fourth or more modules, please use ladder tools.)

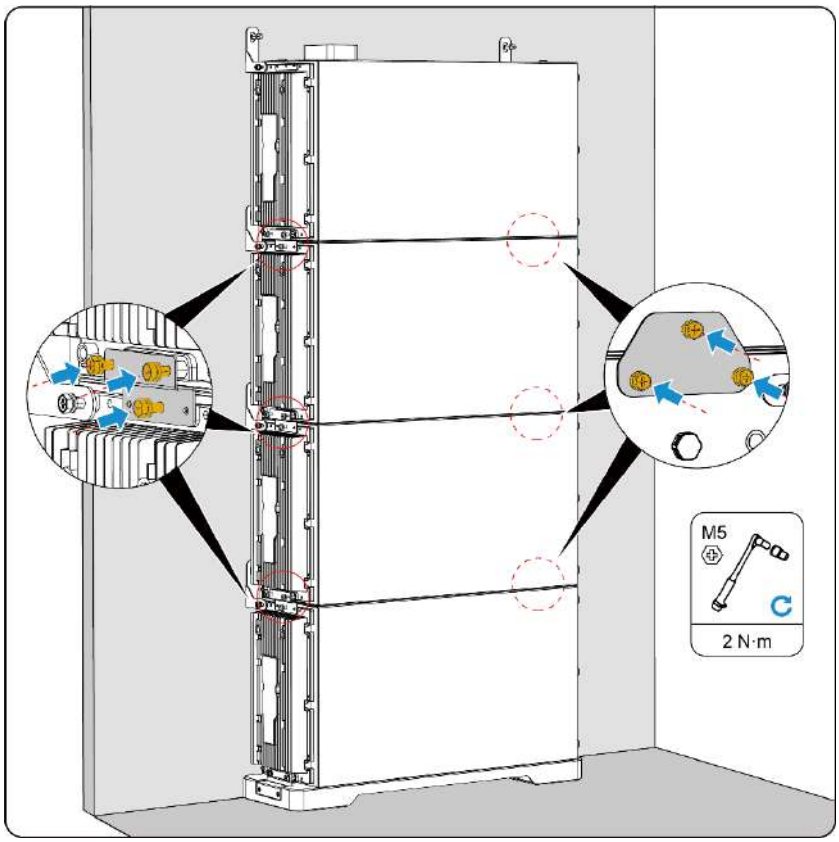


Figure 3-15 Installing the balance modules

Step 3. Install the inverter module.

1. Unscrew the waterproof cover at the bottom of the inverter module, remove the cascade port protection cover inside, and transport it onto the battery expansion module.

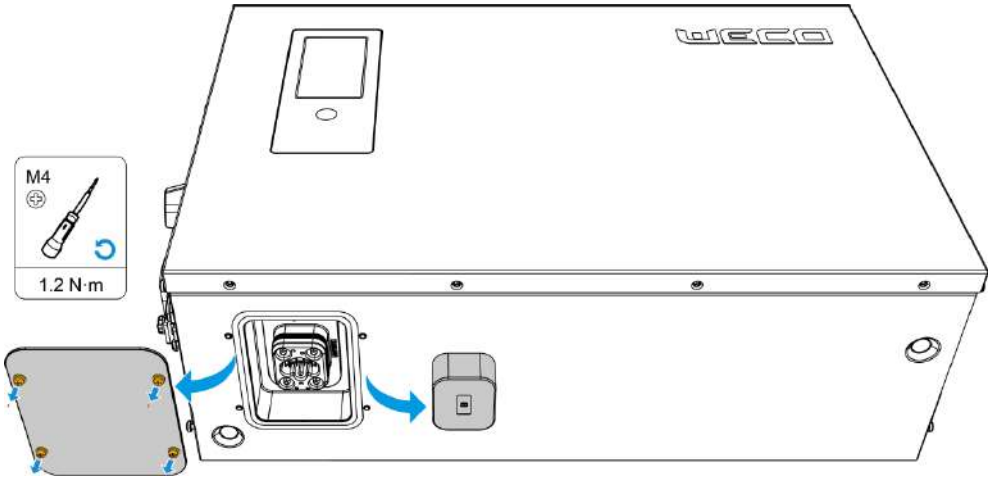


Figure 3-16 Remove the waterproof cover

2. Install L-shaped wall mounted fasteners for inverters, aligning the long side of the fasteners with the screw holes of the inverter module and the short side with the wall surface. Mark the installation holes of the fasteners with a

marker pen, drill holes with an impact drill, and fix them with expansion bolts; Tighten the screws between the L-shaped wall mounting fixture and the inverter module.

3. Install the fasteners between the inverter module and the battery expansion module, and tighten the screws on both sides.

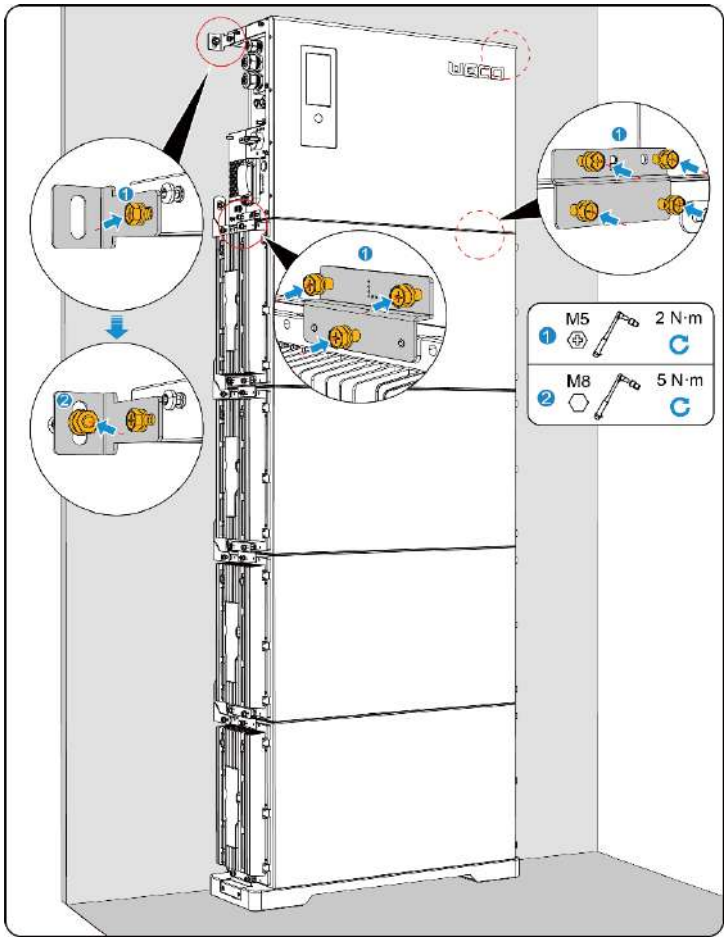


Figure 3-17 Install the inverter module

5.4 Electrical Connection

5.4.1 System Connection Diagram

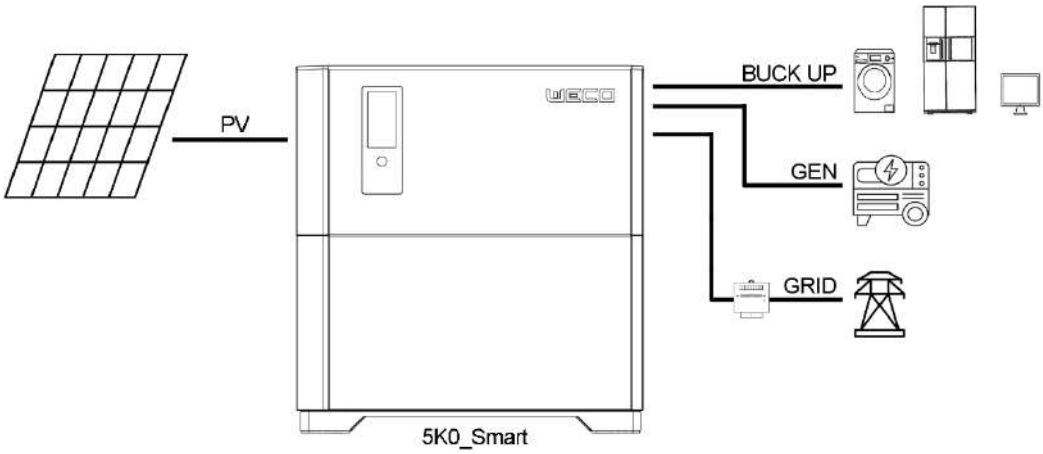


Figure 3-18 System connection diagram

5.4.2 Install PE Cables

At the same time as installing the equipment, a protective grounding wire must be connected. There is a protective grounding connection hole on the SMART Series side, which can be adjusted according to the site conditions, it is recommended to ground the near end.

DANGER

- **Please confirm that the protective grounding wire is reliably connected. If it is not connected or loose, it may pose a risk of electric shock.**

NOTICE

- **When stripping the wire, do not scratch the wire core.**
- **The cavity formed by the crimping of the conductor of the OT terminal should completely cover the wire core, and the wire core should be tightly bonded to the OT terminal without looseness.**
- **Heat shrink tubing or insulating tape can be used to wrap the pressure line. Taking heat shrink tubing as an example for introduction.**
- **During the use of the hot air gun, please pay attention to protection to prevent equipment from being burned.**

Installation Steps

Step 1. Crimp the OT terminal

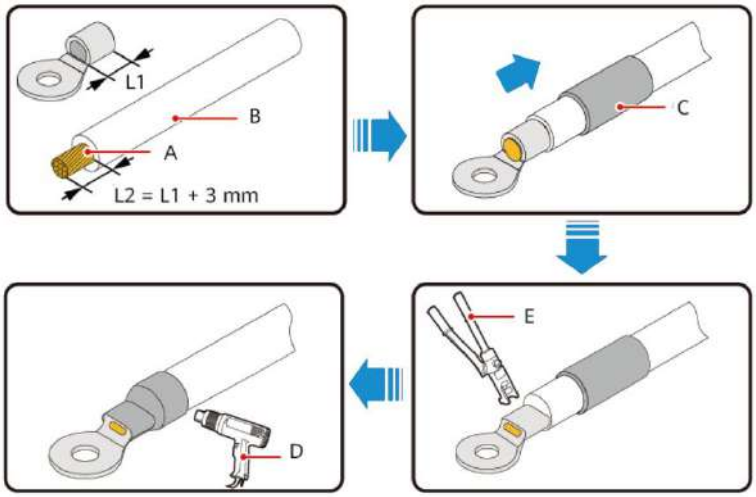


Figure 3-19 Crimp the OT terminal

A:conductor	B:Insulation layer	C:Heat shrinkable sleeve
D:HOT AIR GUN	E:hydraulic tongs	

Step 2. Connect the grounding point of the inverter module to the external grounding point.

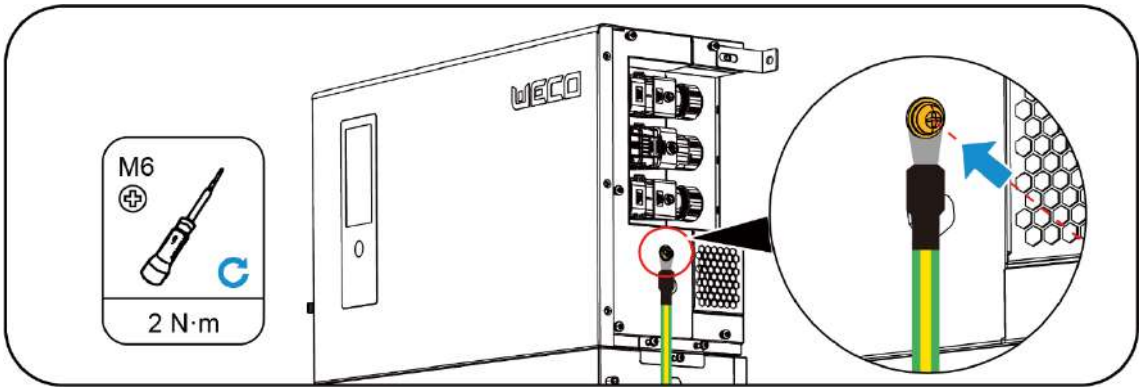


Figure 3-20 Connect PE cable

5.4.3 Installing DC Input Power Cables

Connect the SMART Series to the PV string via the DC input line.

DANGER

- **Before connecting the DC input cable, please make sure that the DC side voltage is within the safe voltage range (i.e., below 60 VDC) and the "DC switch" of SMART Series is turned "OFF". Otherwise, the high voltage generated may be life-threatening.**
- **During the operation of the inverter, maintenance operations on the DC input line are prohibited, such as connecting or disconnecting a certain string or component within a string. Otherwise, it may pose a risk of electric shock**
- **If the DC input terminal of the inverter is not connected to the photovoltaic string, do not remove the waterproof cover of the DC input terminal, otherwise it will affect the equipment protection level.**

NOTICE

- **The output power of each PV string shall not exceed the maximum input power of SMART Series and shall not exceed the maximum open circuit voltage.**
- **Before assembling DC connectors, label the cable polarities correctly to ensure correct cable connections.**
- **If you find that the positive and negative polarity of the DC input is reversed, wait until the current of the PV string is reduced to less than 0.5A, and then put the "DC switch" in the "OFF" position to adjust the polarity of the string.**
- **After crimping the positive and negative metal terminals, pull the DC input power cables back to ensure they are connected securely.**
- **Insert the crimped metal terminals of the positive and negative power cables into the appropriate positive and negative connectors. Then, pull back the DC input power cables to ensure that they are connected securely**

Procedure

1 Assemble the DC connector and insert the positive and negative connectors into the corresponding DC input terminals of the inverter until a "click" sound is heard, indicating that they are securely engaged.

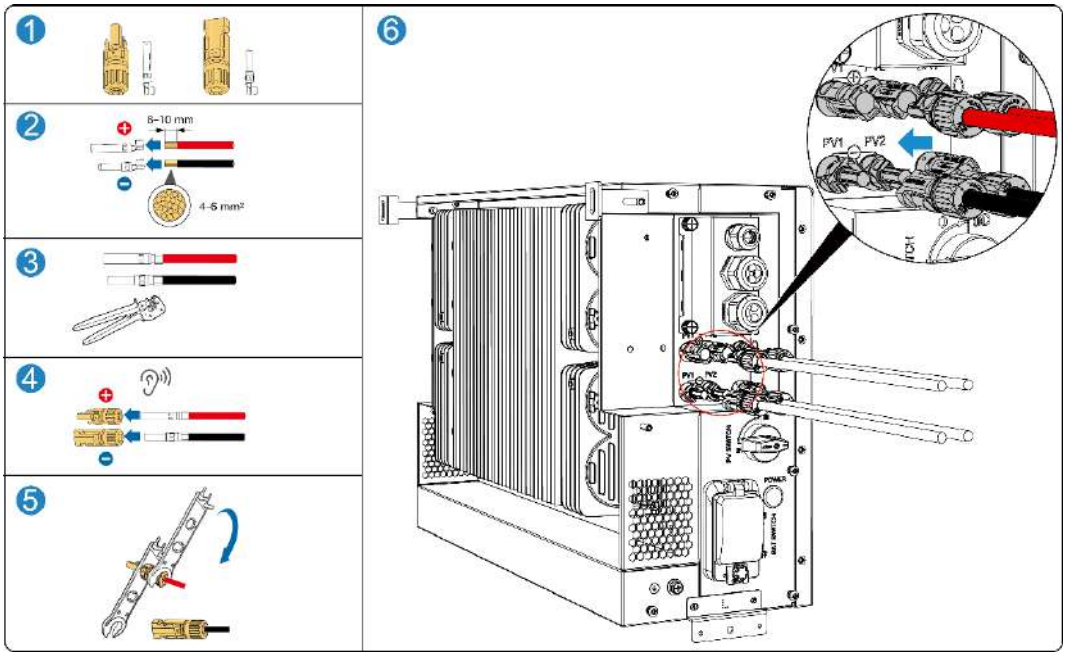


Figure 4-1 Installing DC input power cables

Disassemble the DC connector

WARNING

Before removing the positive and negative connectors, please ensure that the "PV SWITCH" is turned off.

If it is necessary to remove the positive and negative connectors from the inverter, a disassembly tool can be used to insert them into the fixed clips and press them down with force, carefully removing the DC connector.

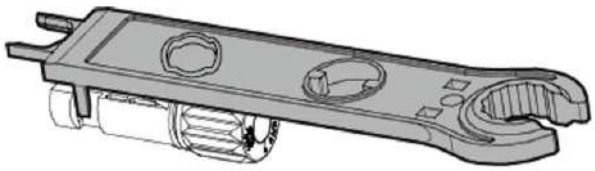


Figure 4-2 Disassemble the DC connector

5.4.4 Installing the Grid/Load Connection Cable

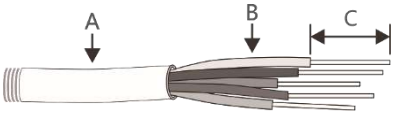
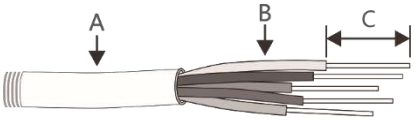
NOTICE

- **Make sure the SMART Series is completely isolated from any DC or AC power source before connecting the AC cable.**
- **Please wire the machine strictly in phase sequence; otherwise, the machine will not work correctly.**
- **The grid connection requires an external AC switch to allow isolation from the grid if necessary.**

Procedure

1 Select the appropriate wire and strip the wire to the recommended size.

Table 4-1 Description of stripping dimensions

Diagram	No.	Item	Description
Grid-connected side (GRID/GEN interface)			
	A	Diameter	21 ~ 26mm
	B	Size	10mm² or 6AWG
	C	Length	11mm
Load side (BACK UP interface)			
	A	Diameter	10 ~ 14mm
	B	Size	6mm² or 10AWG
	C	Length	10mm

2 Insert the connected grid/load connector into the SMART Series connection port and tighten the screws. The load connection port and connector side are engraved with the words' BACK UP '

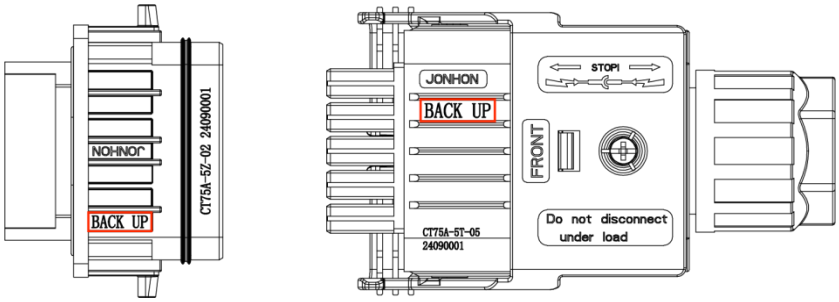


Figure 4-4 Load connector back up marks

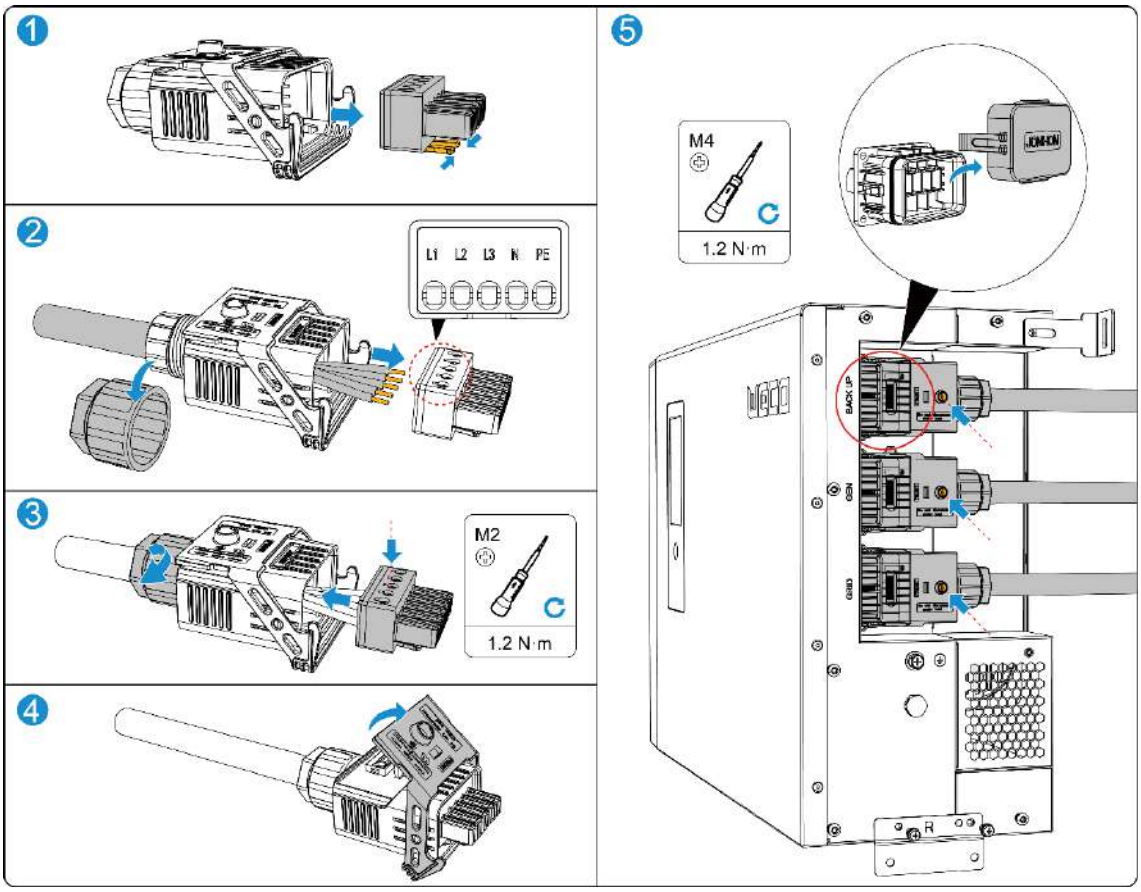


Figure 4-5 Installing the grid/load connection cable

5.4.5 Connecting Communication

Communication Port Definition

Make sure to use a standard RJ45 cable, and the plug is shown as follows.

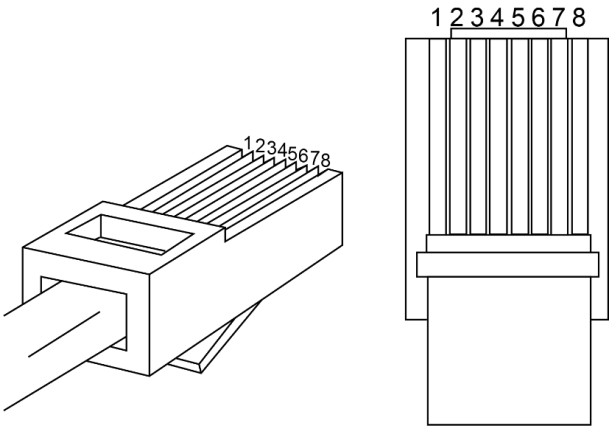


Figure 4-6 Communication interfaces definition

- The pin out of the Wi-Fi /DRMS/METE1 ports is defined as follows.

Table 5-2 Pin Definitions for Wi-Fi/DRMS/METE1 Ports

PIN	Wi-Fi connection	DRMS	METE1
1	RS485_A4_Wi-Fi/GPRS	DRM1/5	EXT-CT4_P
2	RS485_B4_Wi-Fi/GPRS	DRM2/6	EXT-CT4_N
3	RS-232-TX	DRM3/7	RS485_A1_Mete1
4	GND_S	DRM4/8	RS485_A3_Mete2/NTC_CT+
5	GND_S	DRM_REF	RS485_B3_Mete2/NTC_CT-
6	RS-232-RX	DRM_COM	RS485_B1_Mete1
7	VCC_10V	VCC_10V	CT4_ON+
8	VCC_10V	GND_S	GND_S

- The pin out of the CT1/COMS/ PARA1/PARA2 ports is defined as follows.

Table 5-3 Pin Definitions for CT1/COMS/ PARA1/PARA2 Ports

PIN	CT1	COMS	PARA1/PARA2
1	EXT-CT1_P	RS485_A2_BAT	CANL1_PARAL1_EXT
2	EXT-CT1_N	RS485_B2_BAT	CANH1_PARAL1_EXT
3	EXT-CT2_P	GND_S	CANL2_PARAL2_EXT
4	EXT-CT3_P	CANH1_BAT	PAR_50HZ
5	EXT-CT3_N	CANL1_BAT	PAR_100HZ
6	EXT-CT2_N	WAKEUP_TOBAT	CANH2_PARAL2_EXT
7	CT1_ON+	DI1+	PAR_MASTER
8	GND_S	DI1-	GND_S

- The pin out of the BAT1/ BAT2/ DRY ports is defined as follows.

Table 5-4 Pin Definitions for BAT1/ BAT2/ DRY Ports

ID	BATT1	BATT2	DRY	
1	CANH_Tower2	CANH_Tower3	NO1	Out Dry contact
2	CANL_Tower2	CANL_Tower3	NC1	
3	24V_BUS+	24V_BUS+	NO2	Out Dry contact
4	100K_Tower2_Downer	100K_Tower3_Downer	NC2	
5	Empty	Empty	DI2-	In Dry contact
6	24V_GND	24V_GND	DI2+	
7	StartON+	StartON+	/	/
8	StartON-	StartON-	/	/

5.4.6 Connecting the WiFi Module

NOTE

After installing and fixing the WiFi module, when threading the wires, you need to pay attention to threading the waterproof connector first.

Procedure

1 Attach the WiFi bracket to the WiFi module and secure it to the inverter module.

2 Insert the WiFi cable with RJ45 plug through the waterproof cable connector and into the "WiFi" port on the SMART Series .

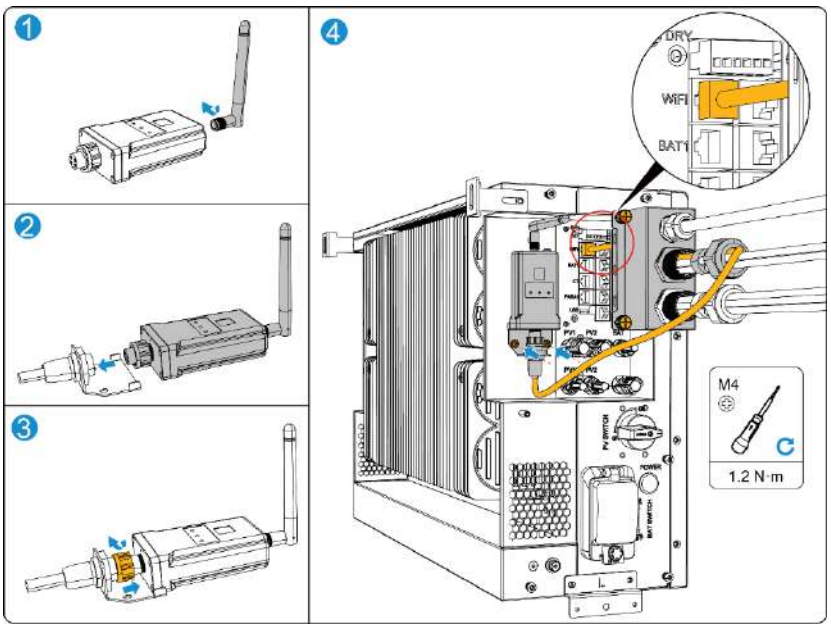


Figure 4-7 Connecting the WiFi module

5.4.7 Connecting the Meter/CT

Introduction

The inverter supports three monitoring configurations: standalone CT, direct-insertion RS485 meter, or an RS485 meter with external CTs.

The base kit is supplied with the Meter+CT, other solution are available as sperate accessory.

5.4.7.1 Meter + CT

NOTICE

The direction of the electricity meter cannot be reversed. The input port of the electricity meter is connected to the grid, and the output port is connected to the inverter.

The electric meter is used to detect the voltage, current direction, and magnitude of the power grid, and further monitor the operating status of the SMART Series through RS485 communication. The connection diagram of the electricity meter is shown below:

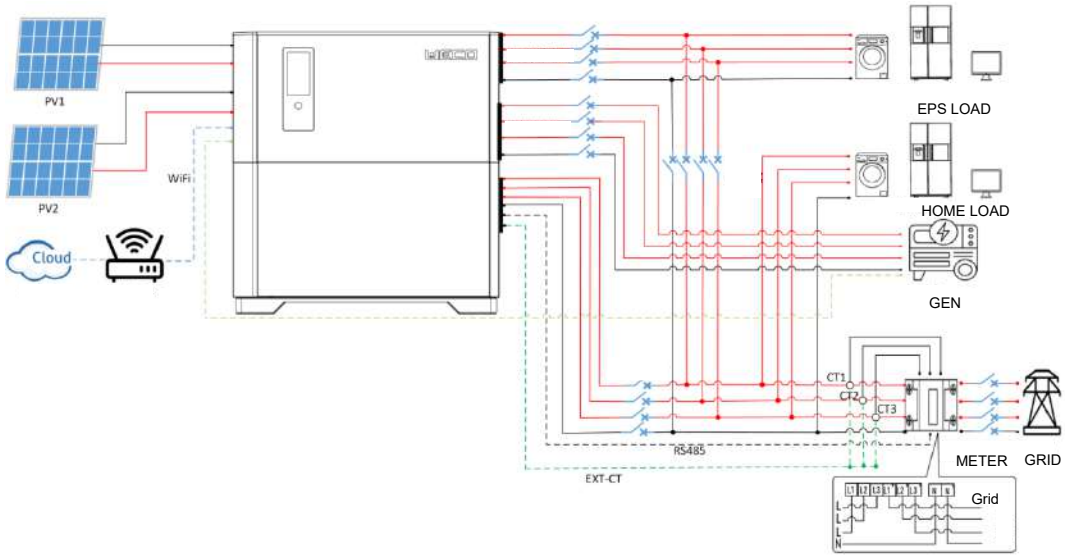


Figure 4-8 Partial power distribution connection diagram

Eastron SEM3-M-2 Meter (120A(40mA) CTs * 3pcs)

Procedure

1. Thread the electric meter cable with RJ45 plug through the waterproof cable connector and insert it into the "METER" interface on the SMART Series . The another end to Meter’s RS485 connection terminal.
2. Connect the CTs output end to Meter’s RJ12 port, connect body of CT1 to L1, CT2 to L2, CT3 to L3. The CTs’ arrows point to Grid.
3. Connect the Meter’s L1 to Grid L1, L2 to Grid L2, L3 to Grid L3,and N to Grid N.

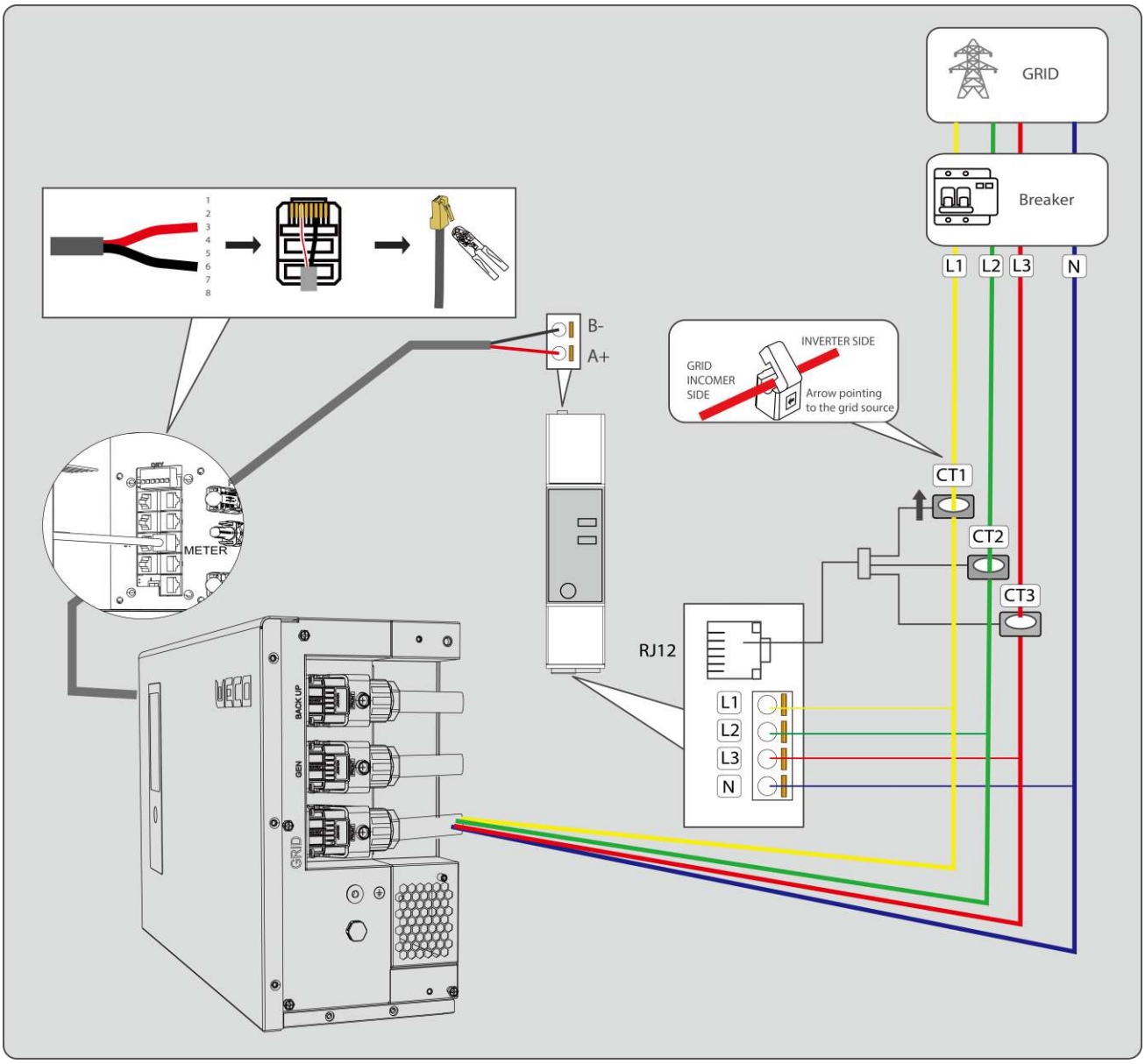


Figure 4-9 Connect power meter

5.4.7.2 Connecting the CT (*Optional)

The CT in the accessory bag in the box is a necessary device for installing the SMART Series system, which is used to detect the voltage and current direction and magnitude of the power grid and further monitor the operation of the SMART Series via RS485 communication.

⚠ CAUTION

- **Ensure that the SMART Series is completely isolated from any DC or AC power source before connecting the AC cable.**

NOTICE

- **The signal wire needs to be threaded into the ro screw cap before threading into the sealing box.**
- **When the length of the CT wire can not meet the usage requirement, the CT communication wire can be extended by an RJ45 connector.**
- **The direction of CT cannot be connected in reverse. Please follow the directions of K-L. Ensure the CT is connected between the load and the power grid.**
- **It is recommended that the CT be installed inside the distribution box.**

The CT connection diagram is shown as follows.

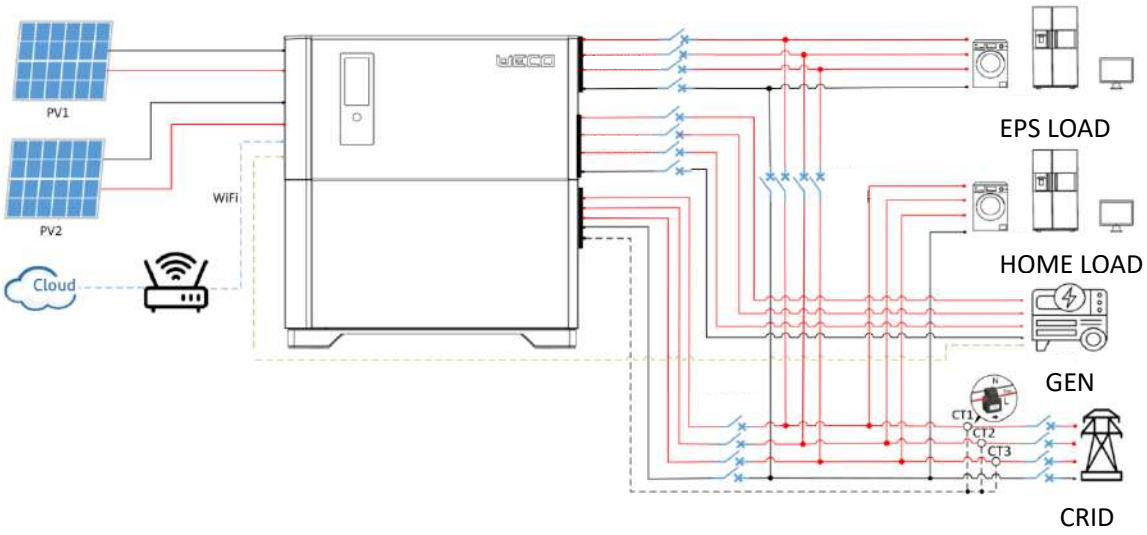


Figure 4-10 CT connection diagram

Procedure

1 Remove the CT with cable from the accessory pouch.

2 Insert the CT cable with RJ45 plug through the waterproof cable connector into the "CT" socket on the SMART Series .

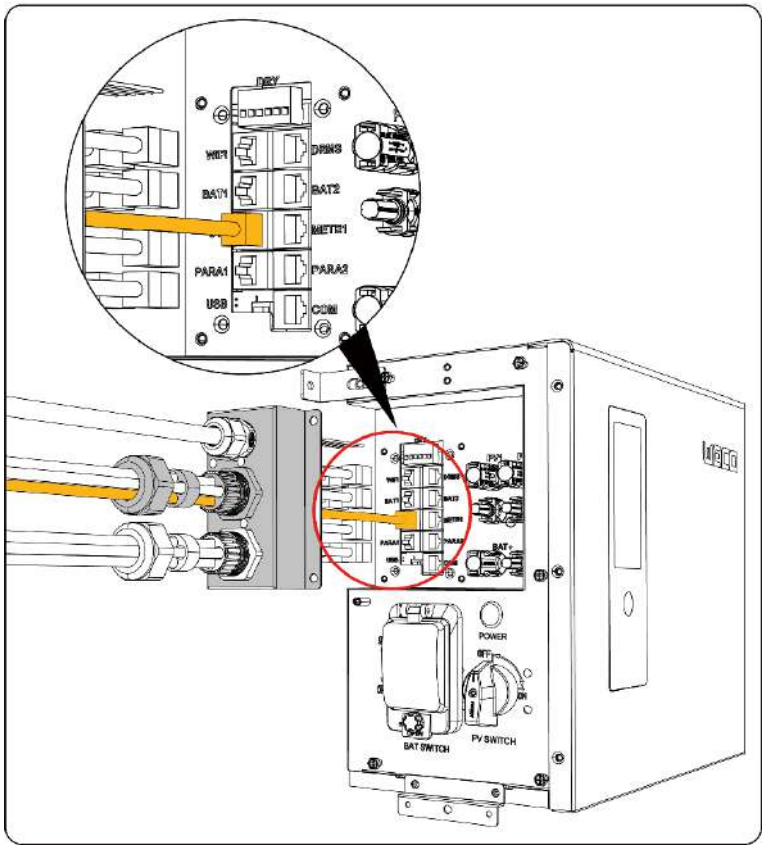


Figure 4-11 Connecting the CT

5.4.8 Connecting the DRMS

The DRMS is only suitable for Australian and New Zealand installations and complies with Australian and New Zealand safety requirements.

Procedure

1 Prepare the communication cable.

2 Insert the DRMS cable with RJ45 plug through the waterproof cable connector and into the "DRMS" socket on the SMART Series .

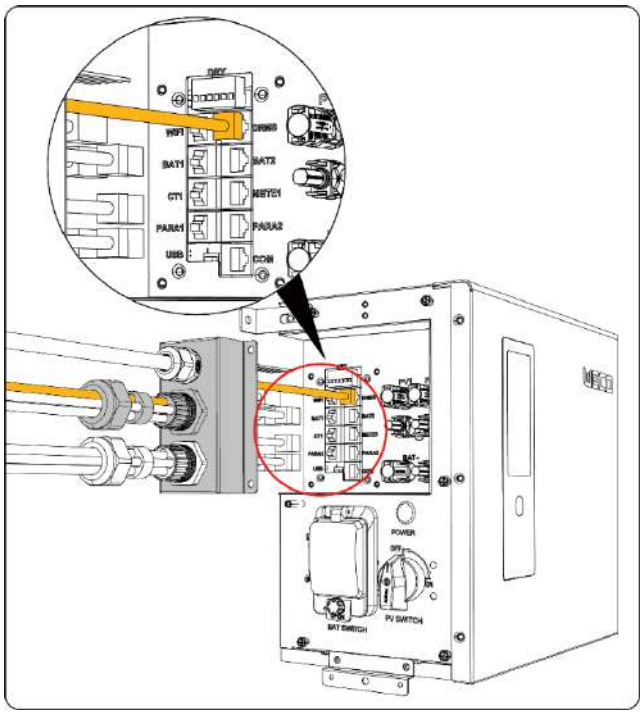


Figure 4-12 Connecting the DRMS

5.4.9 Installing the Cover

After electrical connections are complete, check that cables are correctly and securely connected and install the external protective cover.

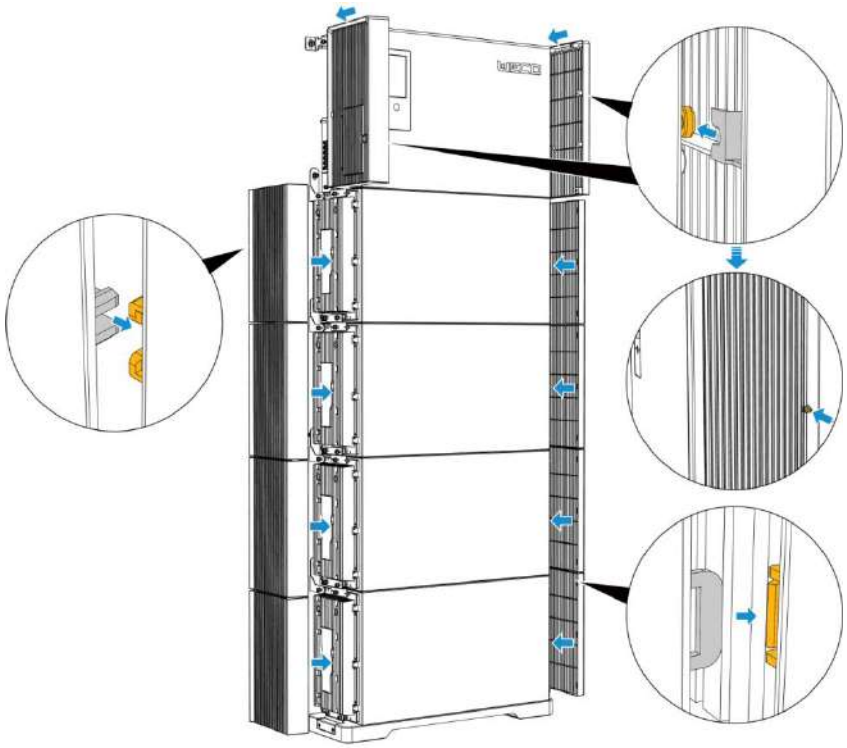


Figure 4-13 Installing the cover

6 System commissioning

6.1 Starting the All-in-One

NOTICE

Before turning on the AC switch between the SMART Series and the power grid, it is necessary to set the multimeter to AC and check that the AC voltage is within the specified range.

Procedure

1. Place the "BAT SWITCH" DC switch on the inverter in the "ON" position.
2. Press the "POWER" button until the LED lights up.
3. Place the "PV Switch" start switch on the inverter in the "ON" position.
4. Close the breaker of the grid.

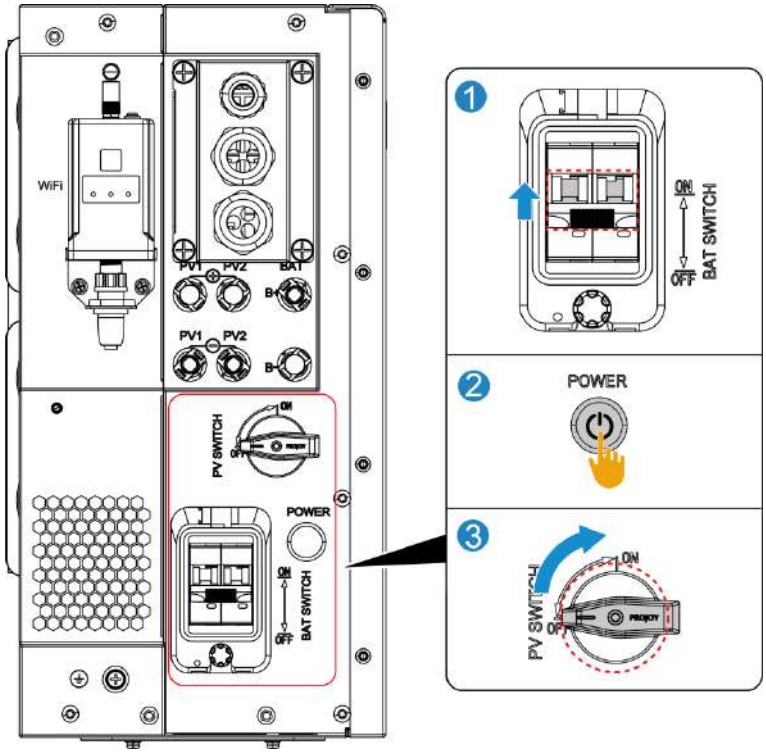


Figure 6-1 Starting the All-in-One

5. Observe the LED display and check the operating status of SMART Series .

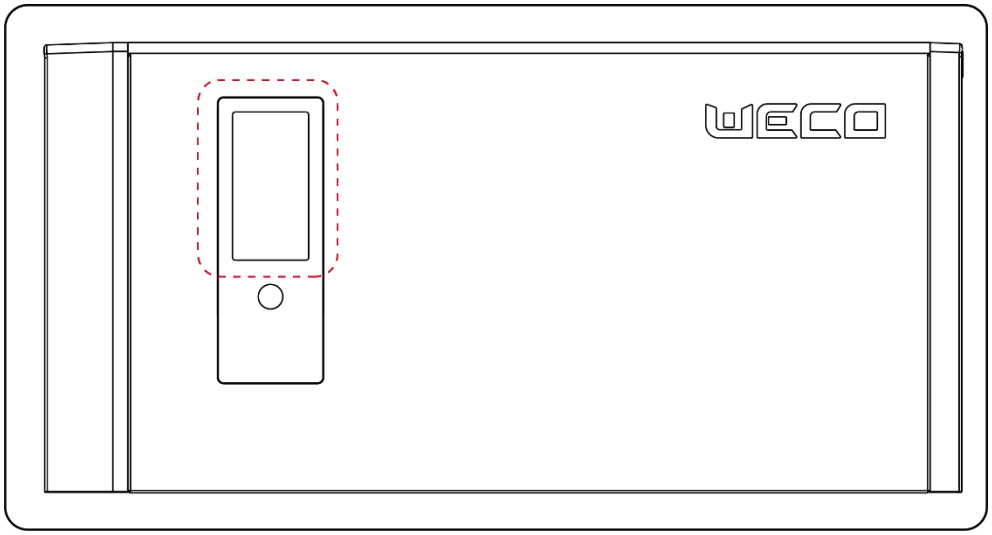


Figure 6-2 Display lights up

6.2 Turning Off the System Power

NOTICE

Do not disconnect the DC connector under load.

Procedure

1. Open the breaker of the grid.
2. Place the "PV Switch" start switch on the inverter in the "OFF" position.
3. Place the "BAT SWITCH" DC switch on the inverter in the "ON" position.
4. Press the "POWER" button until the LED lights up.

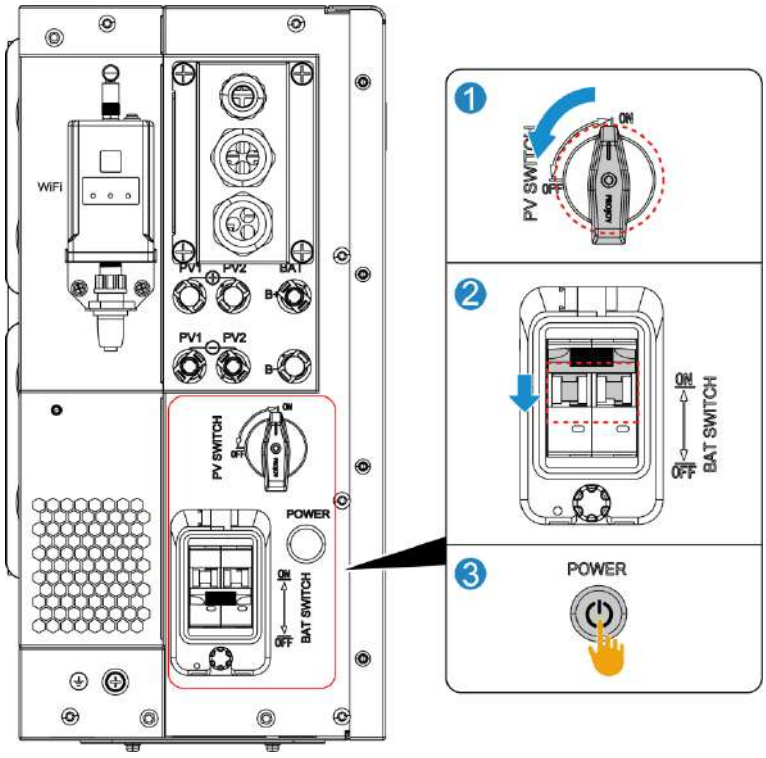


Figure 6-3 Turning off system power

5 Observe the LED display and check the SMART Series operation status. Wait for the LCD to turn off and the SMART Series to turn off.

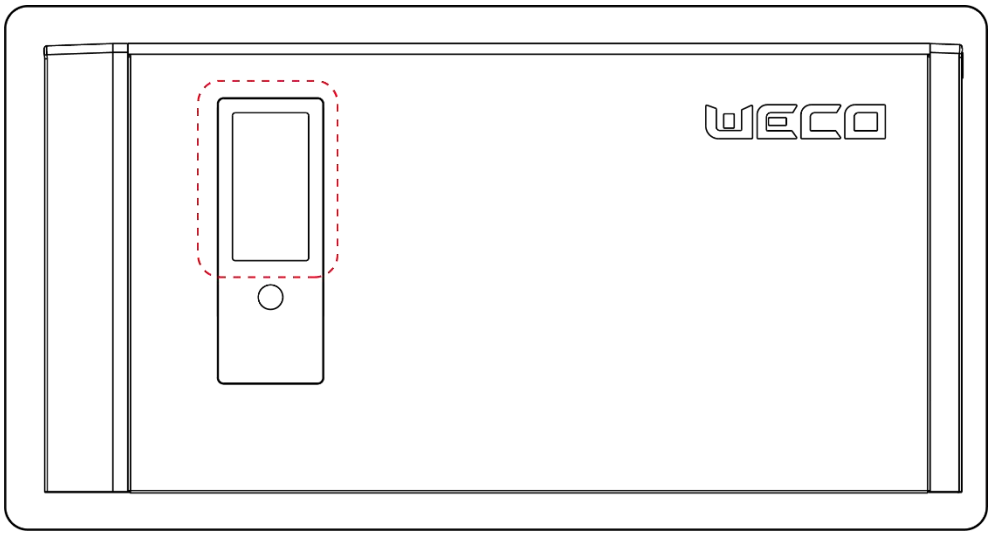


Figure 6-4 Display goes off

7 Display

7.1 System Interface

Under normal conditions, the display only shows the power flow and operating status of the device. All system settings must be managed using the supplied mobile app.

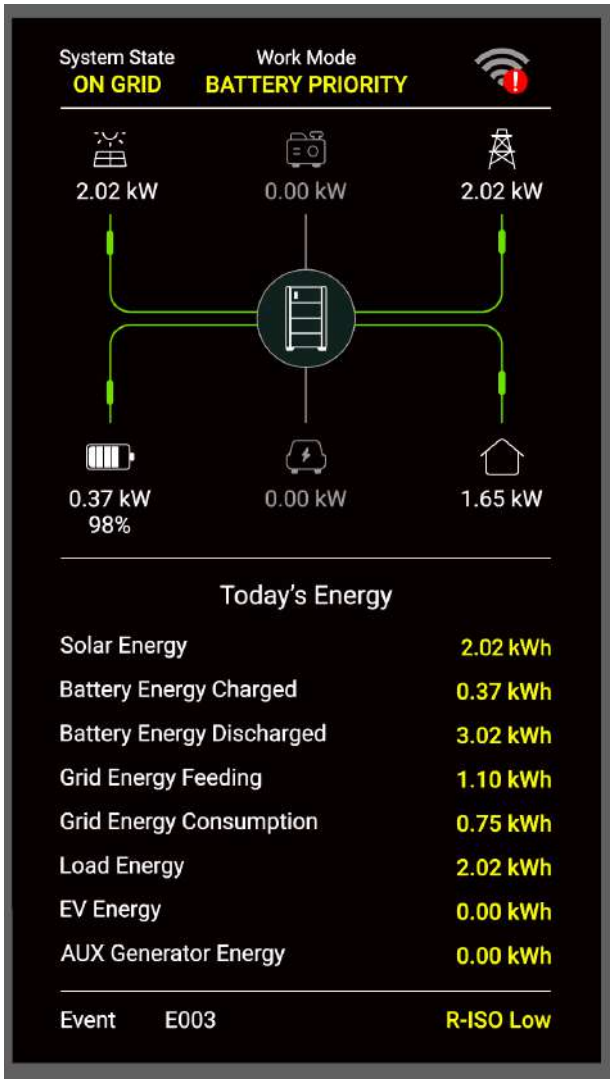
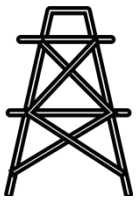


Figure 7-1 Display Interface

7.2 Standby interface

The standby interface contains four main menu screens, as shown in the following table.

Table 7-1 Description of the Standby Interface

Menu screen	Description
	This screen displays the status of the system. ● Energy: state of energy flow in all four directions ● Dotted lines indicate power flow
	The icon displayed on this screen is the photovoltaic panel. ● Icon: Always on when PV is connected, off when not connected. ● Power flow: When the PV is charging, the green dotted line runs from the PV panel to the energy storage system; when there is no PV charging, the dotted line of the power flow is not displayed.
	The icon displayed on this screen is the power grid. ● Icon: Always on when the network is connected, off when not connected. ● Energy flow: at the time of discharge to the grid (energy sale), the green dotted line runs from the energy storage system to the grid; When drawing energy from the grid (purchasing), the red dotted line runs from the grid to the energy storage system; When you are not discharging into the grid or drawing power from the grid, the dashed line of the energy flow is not displayed.
	This screen shows the icon of the energy storage system. ● Icon: Normally lit, displays the SOC value of the system.
	The icon displayed on this screen is the household load. ● Icon: Always on when the home load switch is on, off when off. ● Power flow: When discharging to the household load, the red dotted line flows from the energy storage system to the household load; When there is no discharge on the household load, the dashed line of the energy flow is not displayed.

	The icon displayed on this screen is of the EV charger ● Icon: Always on when the charging plug is connected to the vehicle, off when not connected. ● Energy flow: When charging is in progress, the red dotted line runs from the energy storage system.

7.3 Operation Information Menu

Table 7-2 Today's energy data from the LCD display

NO.	Name	Description
1	Panel power	PV energy, the progress bar is green, and the PV power is indicated in real time.
2	Mains power supply	For grid power, the progress bar is green when discharging into the grid (energy sales) and red when drawing energy from the grid (energy sales). The length of the progress bar is displayed according to the proportion of the power to the full scale value, and the color depth increases from left to right. The number on the right side is also green (red when you take power) and is the current discharge power (power outlet) in real time.
3	Consumption	Accumulated energy consumption per day, automatically deleted at 23:59 each day. The color of the progress bar is blue, and the color depth increases as the value increases; When the power consumption exceeds the nominal range, the progress bar is incremented to red. The number on the right side is the cumulative energy consumption kwh; The color is blue when it is below the nominal range and red when it is greater than or equal to the nominal range.
4	Self-sufficiency	PV production as a percentage of total electricity consumption (tram charging plus household load consumption).
5	Event	Error and warning codes.
6	ERROR	The fault alarm icon has a white triangular background and a red exclamation mark; the red exclamation mark flashes once every 1 second to be displayed when a fault occurs, and the Corresponding Event column shows the corresponding error code.
7	CAUTION	In the critical alert indicator, the yellow icon is displayed in case of malfunction, and the Corresponding Event column shows the corresponding alert code.
8	BLUETOOTH	The Bluetooth connection logo will be blue when the connection is successful.
9	Wi-Fi connection	Wi-Fi signal connection logo, blue color when the connection is successful; flashing icon during pairing.

8 System Configuration

8.1 App Downloading

Download from the App Store

- iPhone users: Search for "Noor BT" in the App Store.
- Android users: Search for "Noor BT" on Google Play.

User access

After completing the download and installation, open the app, enter your password, and click "Sign In."

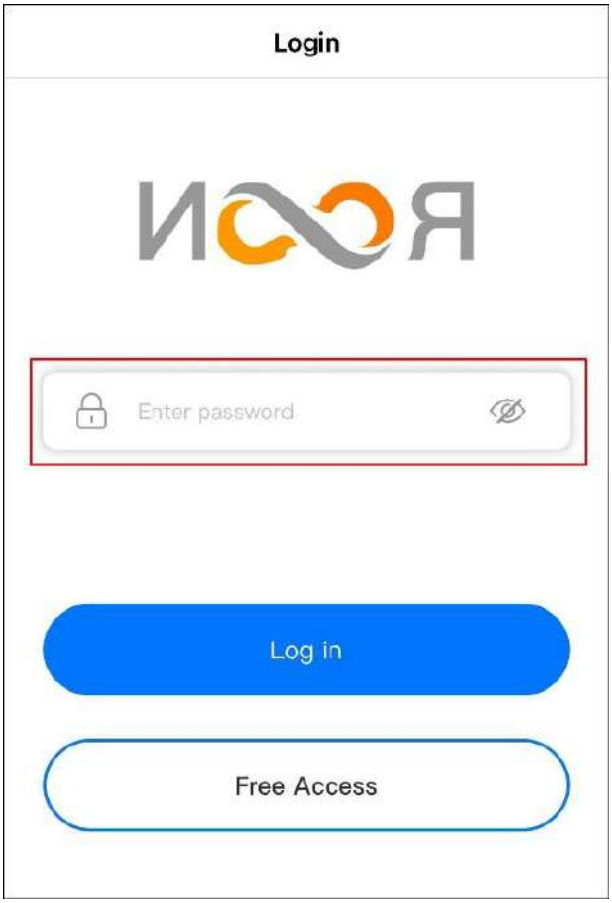


Figure 7-3 User Access

NOTE

The app needs to get the corresponding permissions for the phone, and then accepts all the requested permissions.

8.2 Connecting the Wi-Fi Module

Procedure

After logging in to the app, the scanning interface will be displayed, and the QR code of the Wi-Fi module will be scanned or recognized for access by selecting it from the photo album to enter the device information interface.

If the QR code is damaged or scanned abnormally, you can tap the " " icon to manually enter the numbers under the QR code.

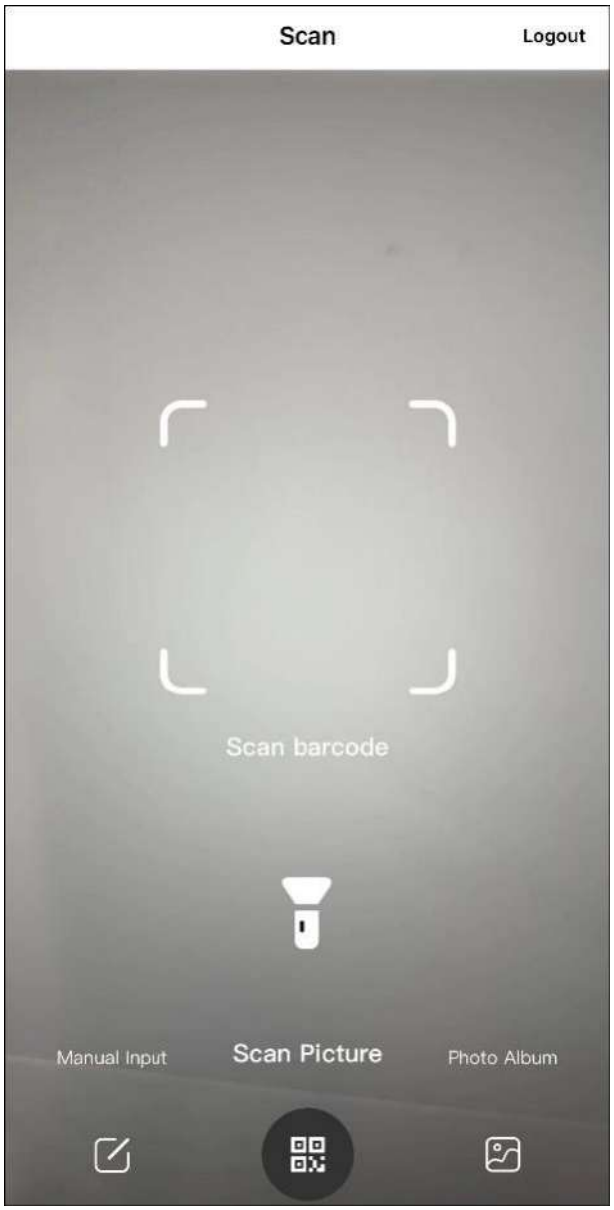


Figure 7-4 Scanning the QR code of the Wi-Fi module

1 Enter the device information interface, click "Setup" on the right side of Wi-Fi networks, enter the account password, connect to Wi-Fi, and click "Send Data".

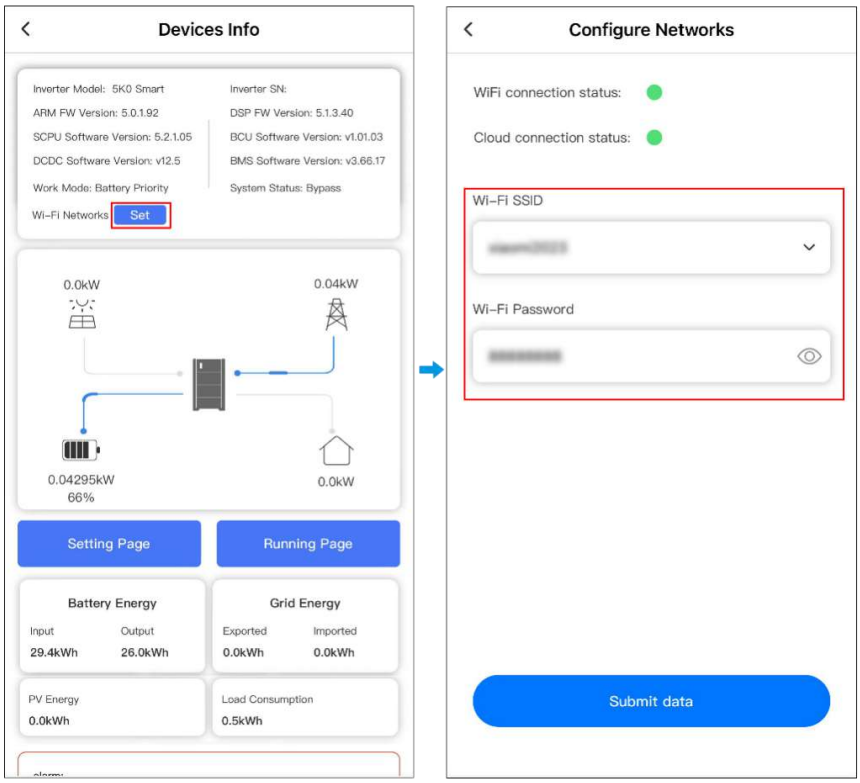
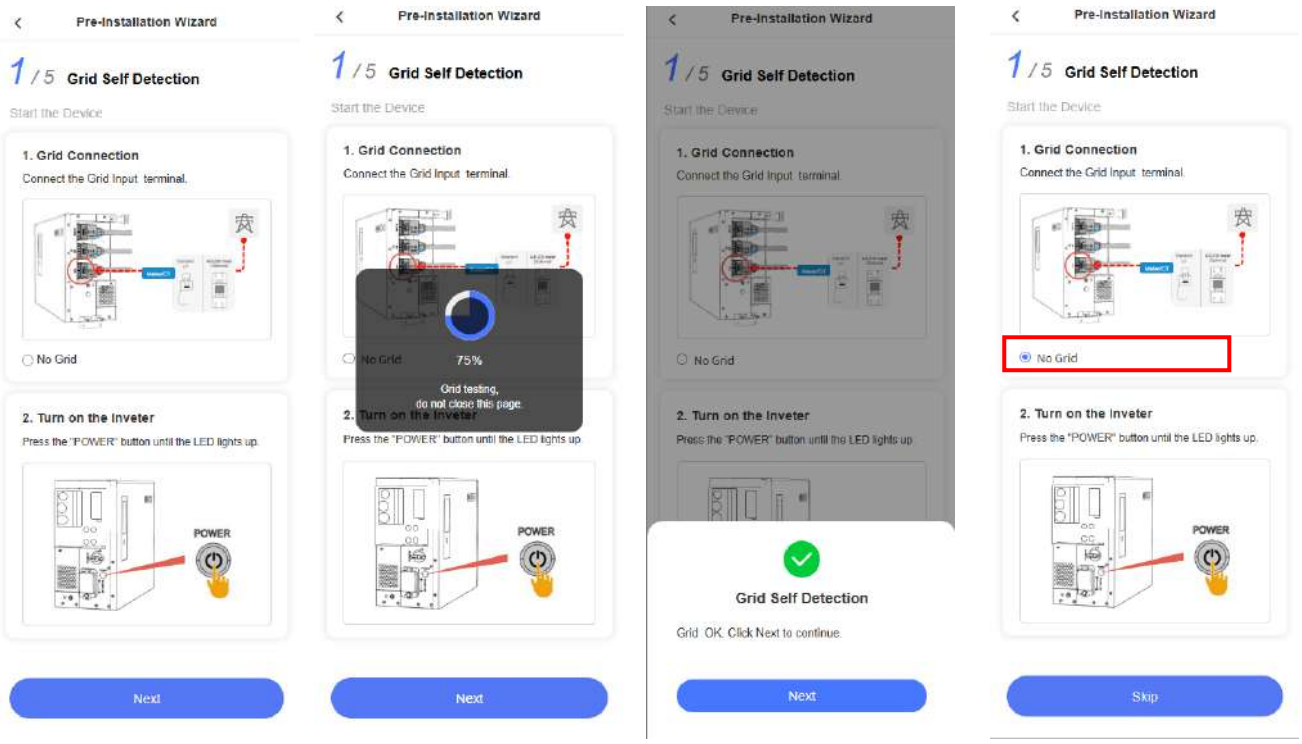


Figure 7-5 Device Information Screen

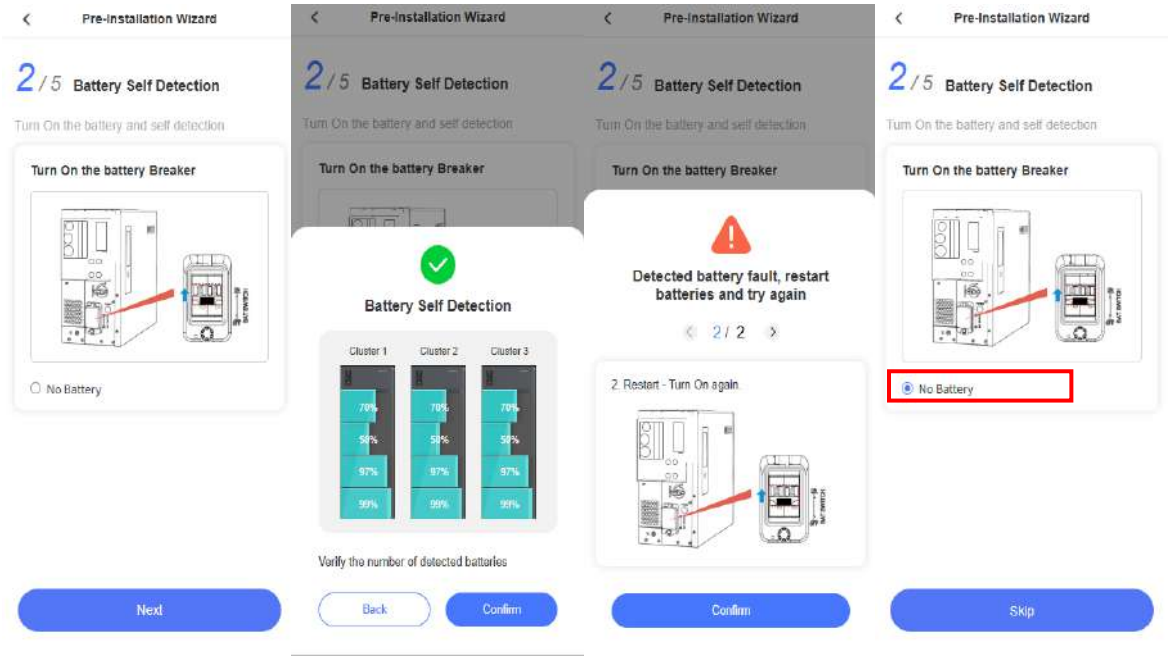
8.3 Wizard

The new Noor app introduces a step-by-step wizard for the initial installation. Launch the setup wizard and follow the guided instructions to properly configure the system and ensure that everything is functioning correctly.

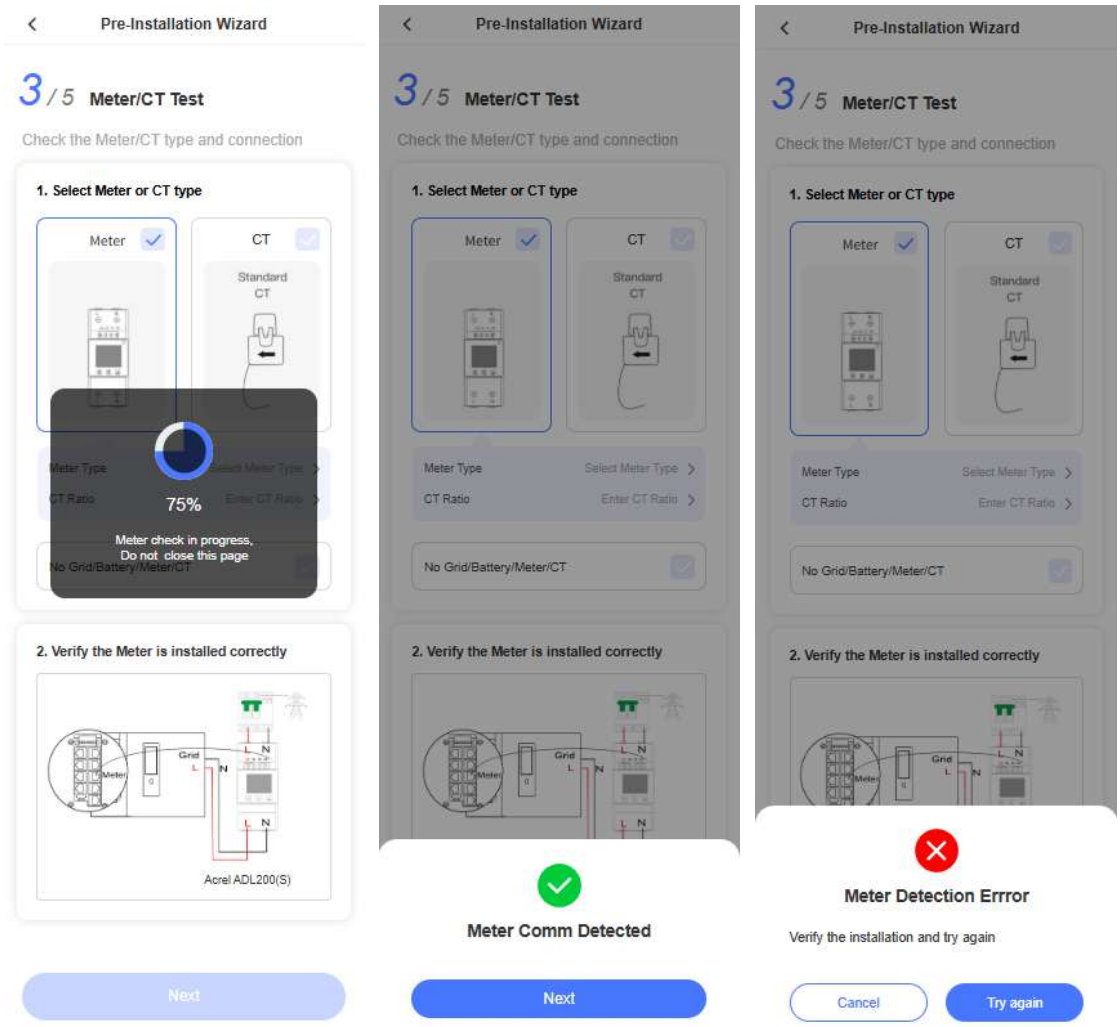
Step1: **Grid check**



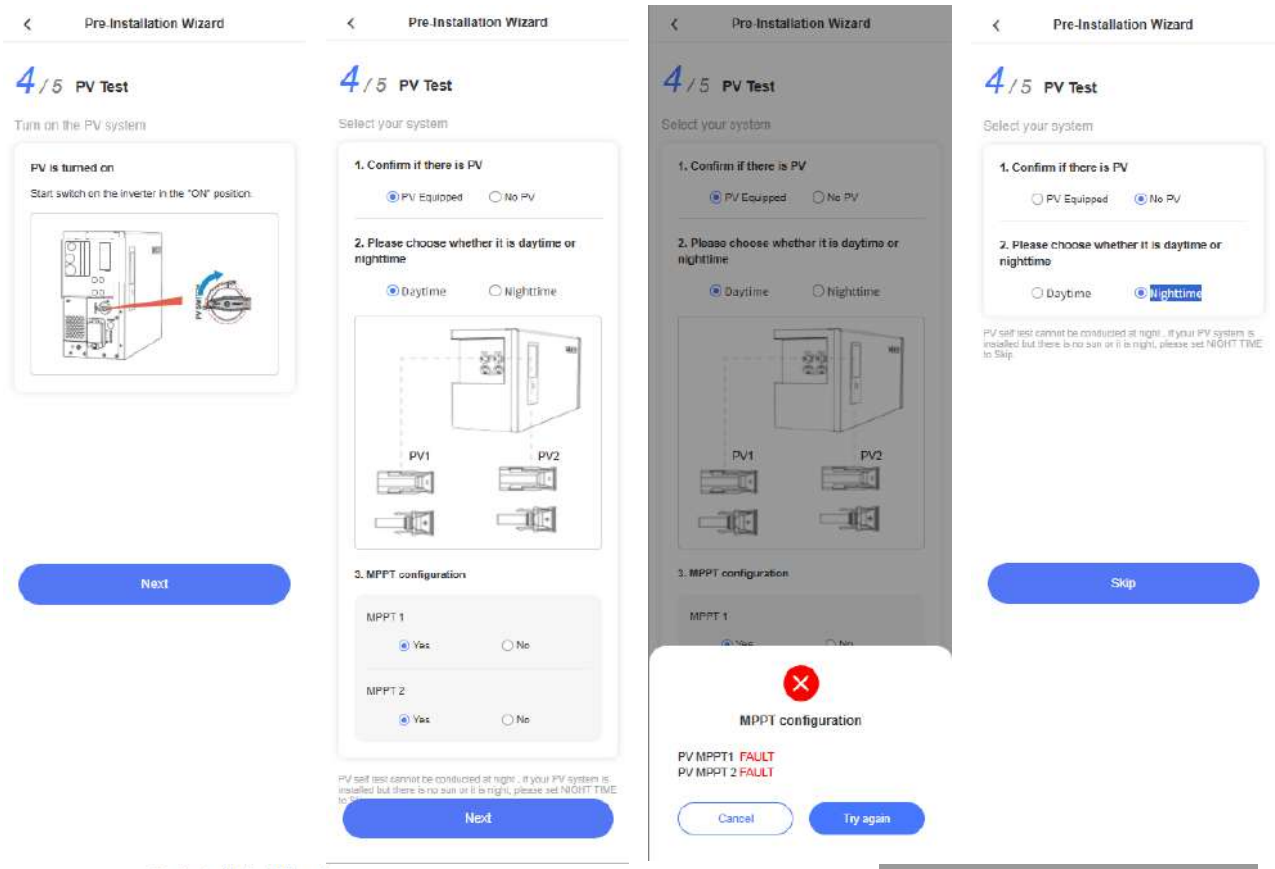
Step2: **Battery check**

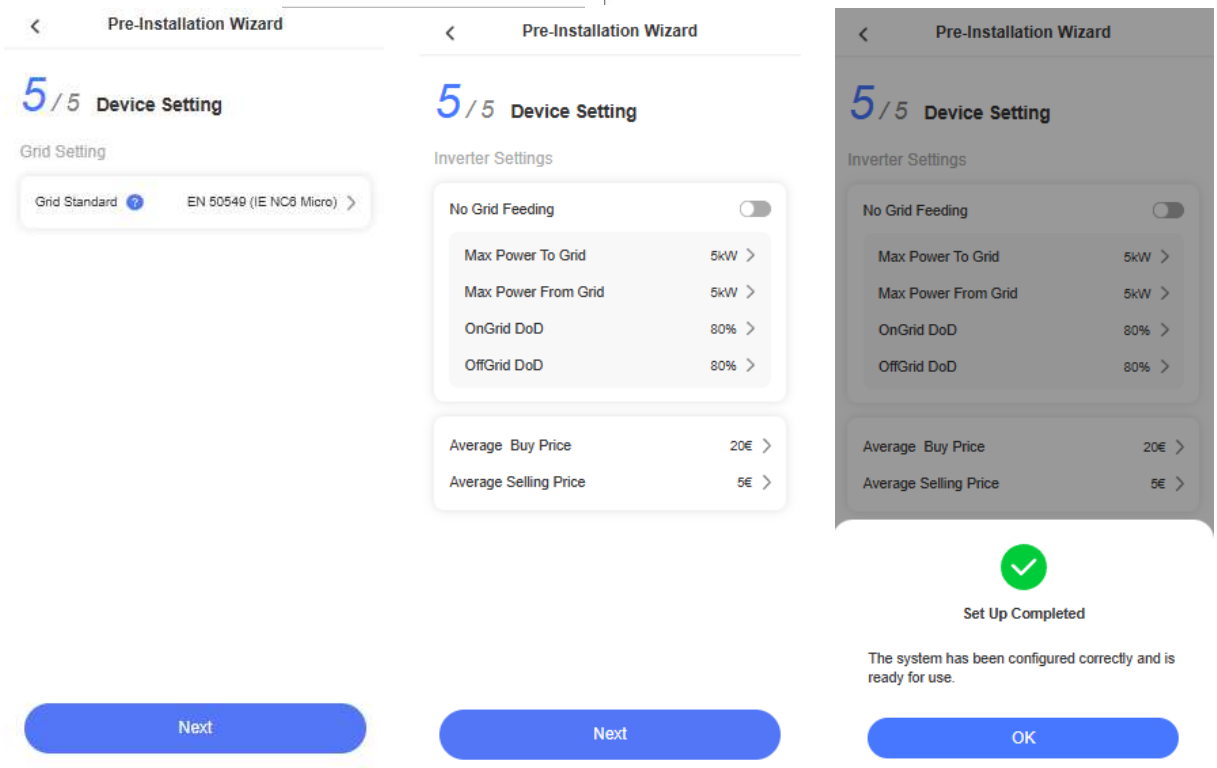


Step2: **Meter check**



Step4: **PV check**





8.4 Data visualization

By entering the device information interface of the app, you can view basic device information, device operation mode, device input/output energy data, and other information. Click "Running Page" to enter the running information interface, and swipe left to view the real-time operation details of the inverter, grid, load, PV, and battery.

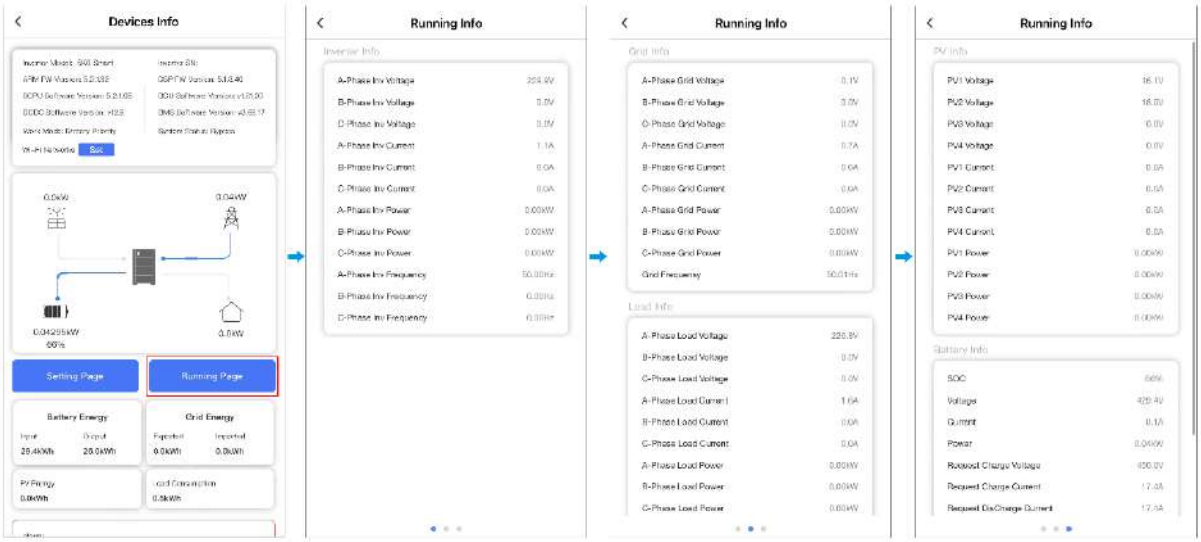


Figure 7-6 Real-Time Ride Information

8.5 Parameter Settings

Enter the device information interface of the app and click "Settings Page" to enter the primary settings interface; According to the instructions on the page, you can set the date and time, operation mode, inverter settings, and battery settings, and swipe left to turn the page, which can also set other parameters.

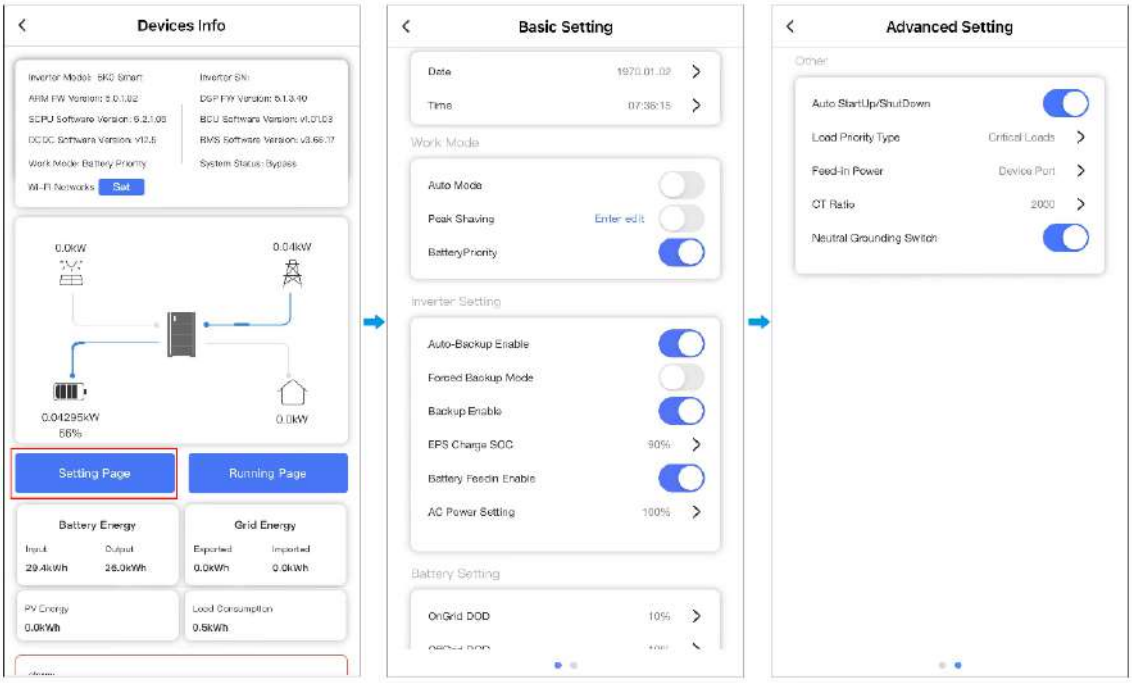


Figure 7-7 Parameter Settings

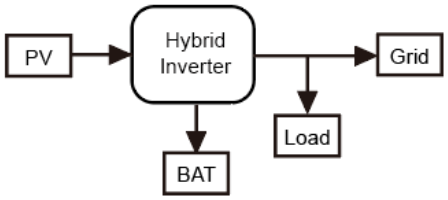
8.6 Working Mode

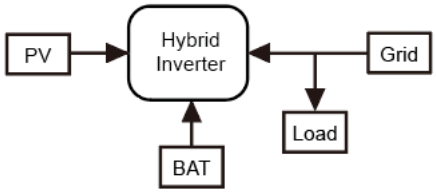
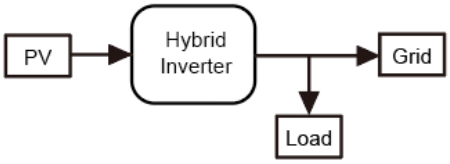
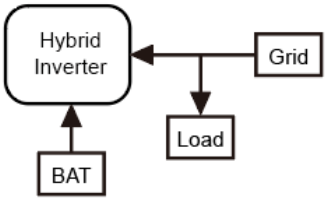
The working mode of the system is classified into three: automatic mode, peak shaving and battery priority, and the system can be set by the following operations via the display.

8.6.1 Auto Mode

In this mode, the energy generated by the PV first satisfies the local load, then charges the battery, and the excess energy is fed into the grid; when the photovoltaic energy is insufficient, the photovoltaic and the battery jointly discharge the load; When the sum of battery power and PV is not enough to operate the load, the insufficient power is supplied by the grid.

Table 7-3 Auto Mode

NO.	Diagram	Description
Mains, PV, battery available		
1		**PV Power > Load Power** ● If the PV power exceeds the load power, the excess power charges the battery. ● If the PV power is greater than the load power plus the battery power, the excess power is fed back into

NO.	Diagram	Description
		the grid when power sales are enabled, and PV limits the power output when power sales are disabled.
2		**Photovoltaic power < Load power** ● If the PV power plus the battery power exceeds the load power, the PV feeds the load and the battery integrates the deficiency. ● If the PV power plus the battery power is less than the load power, the PV and battery feed the load and the deficiency is supplemented by the grid.
Grid, PV available, battery not available		
3		● If the PV power is lower than the load power, the PV provides power to the load, and the grid integrates the shortage. ● If the PV power is greater than the load power, the PV provides power to the load, and the excess energy is fed back into the grid when power sales are enabled, and PV limits the power output when power sales are disabled.
Grid, PV not available, battery available		
4		● The power of the battery is greater than the power of the load, which is powered by the battery. ● The battery power is lower than the load power, so the load is powered by the battery, and the grid integrates the shortage.

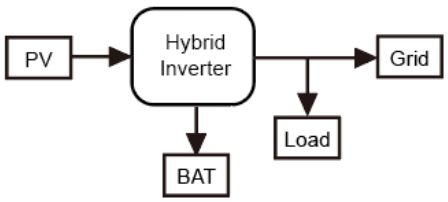
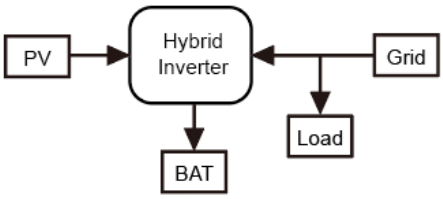
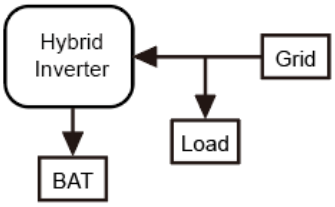
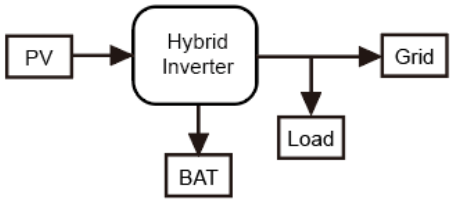
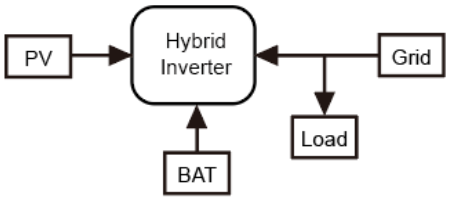
8.6.2 Peak Shaving

In this mode, in the set charging period, the energy generated by the photovoltaic system is prioritized to meet the battery charge, the excess is supplied to the load and, if there is still energy left, it is fed back into the grid; When the PV energy does not reach the maximum charging power, the grid provides the excess energy to charge the battery, and the grid also provides the load.

Users can realize it through the three parts of parameter setting, charging setting, and discharging setting. The charging and discharging time settings must not overlap and the time must be within 24 hours.

Table 7-4 Flush Shaving

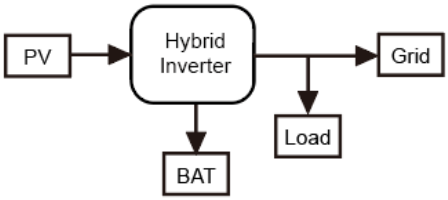
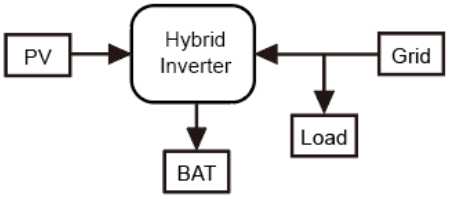
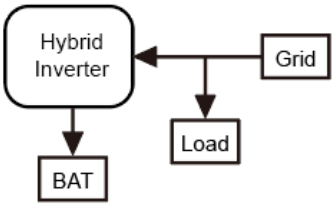
NO.	Diagram	Description
Accusation		
1		**Photovoltaic energy > Battery power**

NO.	Diagram	Description
		● If the PV power is greater than the load power plus the battery power, the PV charges the battery and supplies power to the load. Excess energy is fed back into the grid when it is enabled to sell energy, and photovoltaics limit the power output if it is disabled. ● If the PV power is less than the load power plus the battery power, the PV charges the battery, and the excess provides power to the load.
2		**Photovoltaic energy < Battery power** ● The SOC of the battery is lower than the set target SOC, PV, and mains charge of the battery. ● If the battery SOC exceeds the set target SOC, only the PV charges the battery.
3		**Grid, PV not available, battery available** Mains power supply to charge the battery.
Discharge		
4		**PV Power > Load Power** ● If the PV power is more significant than the load power, the excess power charges the battery. ● If the PV power is greater than the load power plus the battery power, the excess power is fed back into the grid when power sales are enabled, and PV limits the power output when power sales are disabled.
5		**Photovoltaic power < Load power** ● If the PV power plus the battery power is greater than the load power, the PV powers the load and the battery integrates the deficiency. ● If the PV power plus the battery power is less than the load power, the PV and battery feed the load and the grid makes up for the shortage.

8.6.3 Battery priority

In this mode, when there is a power grid, the energy generated by the PV is prioritized to meet the battery charge. If the photovoltaic energy is insufficient, it will be supplied by the electricity grid. When the power grid is disconnected, the system immediately switches to off-grid mode to supply power to the load; When the power grid is restored, the system operation mode switches to grid connection mode to prioritize battery charging.

Table 7-5 Battery Priority

NO.	Diagram	Description
Mains, PV, battery available		
1		**Photovoltaic energy > Battery power** ● If the PV power exceeds the load and power of the battery, the PV charges the battery to power the load. Excess energy is fed back into the grid when energy sales are enabled, and photovoltaics limit the power output if it is disabled. ● If the PV power is less than the load power plus the battery power, the PV charges the battery, and the excess provides power to the load.
2		**Photovoltaic energy < Battery power** ● The SOC of the battery is lower than the set target SOC, PV, and mains charge of the battery. ● If the battery SOC exceeds the set target SOC, only the PV charges the battery.
Grid, PV not available, battery available		
3		Mains power supply to charge the battery.

9 Maintenance

9.1 Routine maintenance

Table 8-1 Routine Maintenance

Article	Inspection criteria	Abnormal handling
Heat dissipation	Gently wipe the surface of the cabinet with white paper without visible discoloration.	If this product periodically reduces the output power due to high temperatures, check the environment around the product for moisture and dust, and clean the product if necessary.
DC Switch	Periodically inspect DC circuit breakers and cables for externally visible damage and discoloration.	Contact the installer if there is any visible damage to the DC breaker, discoloration, or cord.
Cleaning	Gently wipe the surface of the cabinet with white paper with no visible darkening.	Dirt on the surfaces, turn off the AC circuit breaker and DC circuit breaker, wait for this product to turn off, and then wipe it with a cloth or compressed air. Do not use cleaning agents (such as solvents or abrasives).

9.2 Troubleshooting

Our quality control program ensures that every Storage System is built to specification and thoroughly tested before leaving the factory. If standard fault alarms and troubleshooting methods are used, as shown in the table below.

Table 8-2 Troubleshooting

Error code	Alarm Name	Opinion
F001	Inverter failure	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F002	Caveau relè inverter	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F003	Inverter overload alarm	1. Reduce the output load.
F004	Inverter overload fault	1. Reduce the output load. 2. Restart 5K0 Smart.
F005	Meter/CT fault	1. Check that the meter complies with the 5K0 Smart protocol. 2. Check that the wiring is correct between the tool and 5K0 Smart. 3. Check that the CT wiring and Storage System are good.
F006	Error communicating with Wi-Fi	1. Check if the Wi-Fi module complies with the 5K0 Smart protocol. 2. Check if the wiring between the Wi-Fi module and the Storage System is good.
F007	Inverter overtemperature	1. Check if the temperature is within specifications. 2. Restart 5K0 Smart.
F008	Leakage current failure	1. Check that the leakage current sensor is installed correctly. 2. Check whether the PE cable is well connected.

Error code	Alarm Name	Opinion
F009	Arc fault	1. Check if the arc pull sensor is installed correctly.
F010	Leakage Current Sensor Failure	1. Check that the leakage current sensor is installed correctly. 2. Check whether the leakage current sensor connection cable is insufficient contact or disconnected.
F011	Arc Absorption Sensor Failure	1. Check if the arc pull sensor is commonly installed. 2. Detect if the arc pull sensor connection cable is in bad contact or disconnected.
F012	Reverse connection of the external sensor	1. Detect if the outdoor sensor is inverted.
F013	Low PV insulation impedance	1. Check that the connection between the photovoltaic panel and the storage system is good. 2. Check if the PE of the Storage System is good.
F014	PV1 Fault	1. Check that the PV parameters are within the specifications and restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F015	PV1 Reverse Connection	1. Check whether the positive and negative wires of the PV panel appear to be reversed.
F016	PV2 Fault	1. Check that the PV parameters are within the specifications and restart 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F017	PV2 Reverse Connection	1. Check whether the positive and negative wires of the PV panel appear to be reversed.
F018	PV3 Fault	1. Check that the PV parameters are within the specifications and restart 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F019	PV3 Reverse Connection	1. Check whether the positive and negative wires of the PV panel appear to be reversed.
F020	PV4 Fault	1. Check that the PV parameters are within the specifications and restart 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F021	PV4 Reverse Connection	1. Check whether the positive and negative wires of the PV panel appear to be reversed.
F022	DC Fault	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F023	Inverter output short circuit	1. Check for a short circuit in the backup load. 2. Check the output of the Storage System in Off-Grid mode for a short circuit.
F024	Network Failure	1. Check that the grid parameters are within the regulated standard voltage range. 2. Check that the network connection is good. 3. Check that the switch on the cable is open. 4. Restart the 5K0 Smart. 5. If restarting does not resolve the issue, contact the manufacturer.

Error code	Alarm Name	Opinion
F025	Generator failure	1. Verify that the generator parameters are within the regulated standard voltage range. 2. Check that the network connection is good. 3. Check that the switch on the cable is open. 4. Restart the 5K0 Smart. 5. If restarting does not resolve the issue, contact the manufacturer.
F049	Slave Error 1	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F050	Slave Failure 2	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F051	Slave Failure 3	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F052	Slave Error 4	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F053	Slave Failure 5	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F054	Slave Failure 6	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F055	Slave Failure 7	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F056	Slave failure 8	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F057	Slave Failure 9	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F058	Slave Error 10	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F059	Slave failure 11	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F060	Slave Error 12	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F061	Slave Error 13	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F062	Slave Error 14	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F063	Slave failure 15	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.
F064	Slave failure 16	1. Restart the 5K0 Smart. 2. If restarting does not resolve the issue, contact the manufacturer.

10 Disposal out of service

At the end of the 5K0 Smart's service life, dispose of it using the Electrical Waste Disposal Act applicable at the installation location.

The battery and inverter must be delivered at its onw cost by the owner to the most near collection point for Battey or Electronic Waste, the cost for dismantling, packaging and shipping to the collection point is an exclusive cost of the battery owner. Contact your supplier to know the most closest delivery point and company name

If the Storage System will not be used in the future, the following steps are required for proper disposal.

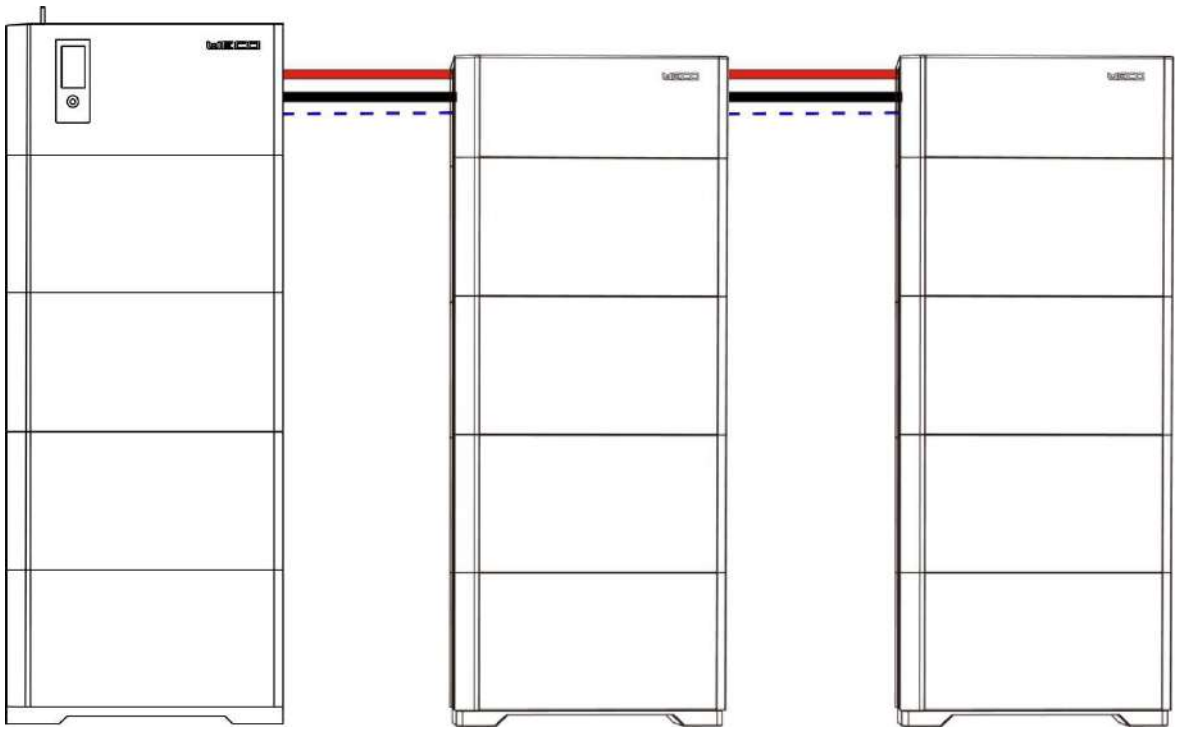
Procedure

1. Disconnect the external AC switch "BAT SWITCH" and prevent it from being reconnected by mistake.
2. Turn the DC switch to the "OFF" position.
3. Wait about 10 minutes until the internal capacitor discharges.
4. Remove the AC cord.
5. Remove the DC cable.
6. Remove the Storage System from the wall.
7. Dispose of the 5K0 Smart.
8. Dispose of the battery according to local requirements.

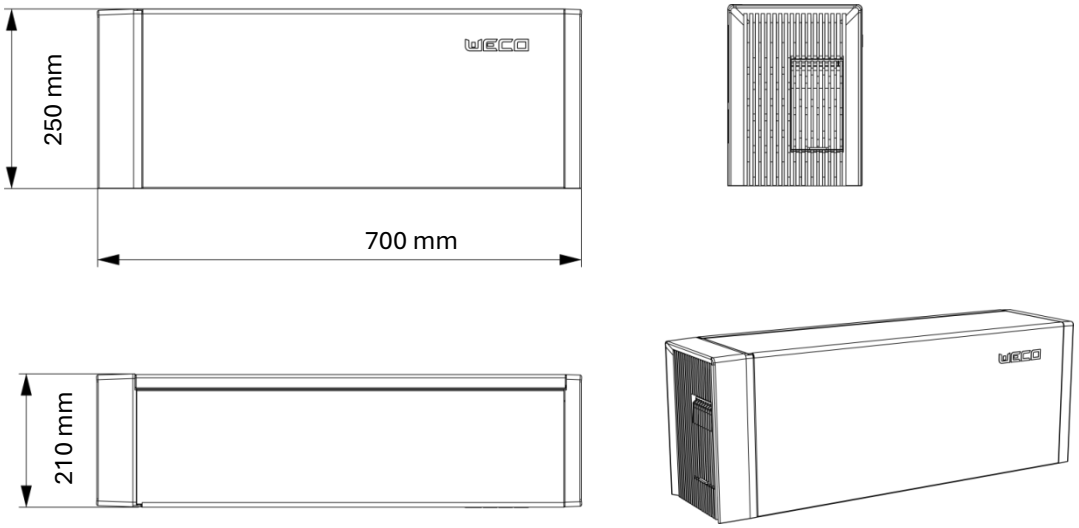
Appendix-Battery Expansion

Overview

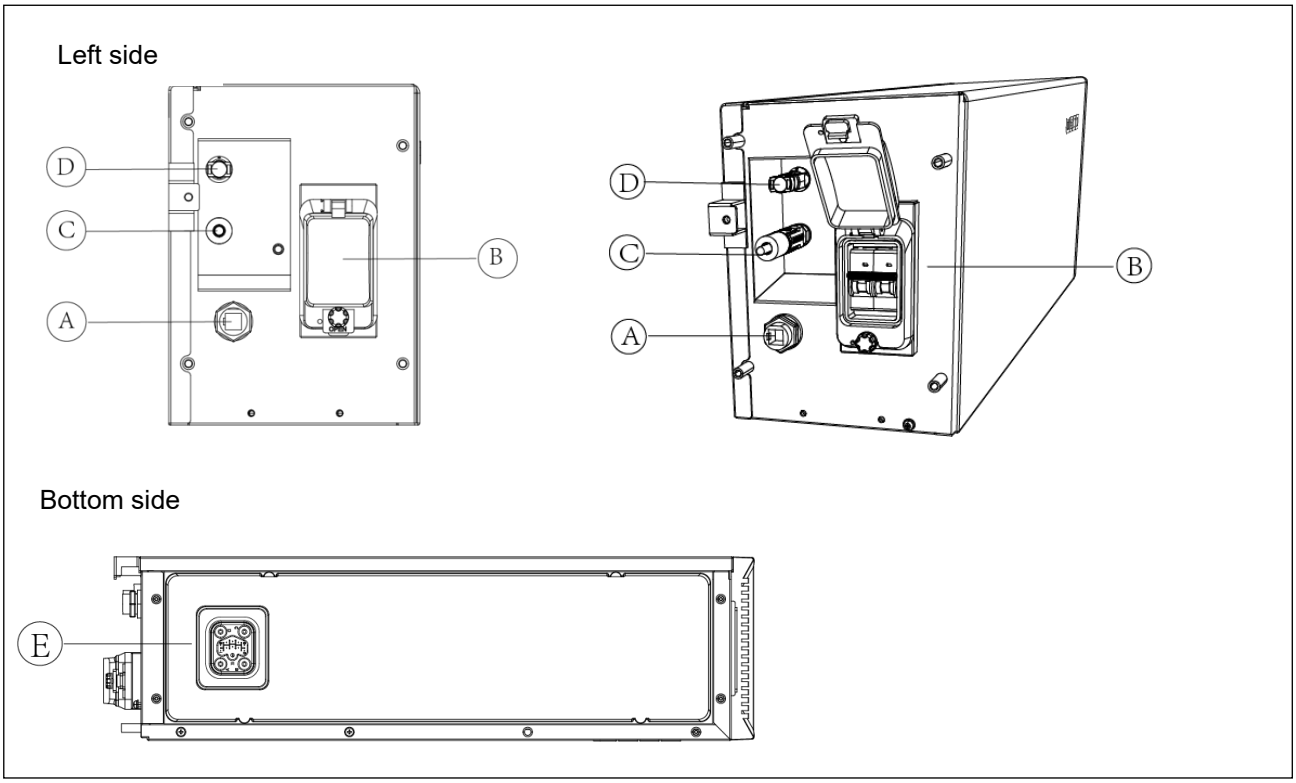
The 5K0 smart system is designed to support expanded battery capacity through the addition of auxiliary battery clusters. Each cluster can accommodate up to four battery packs, and up to two auxiliary clusters can be added. In this configuration, a single inverter can support up to twelve batteries, providing a maximum storage capacity of 60 kWh.



Cluster Expansion Module

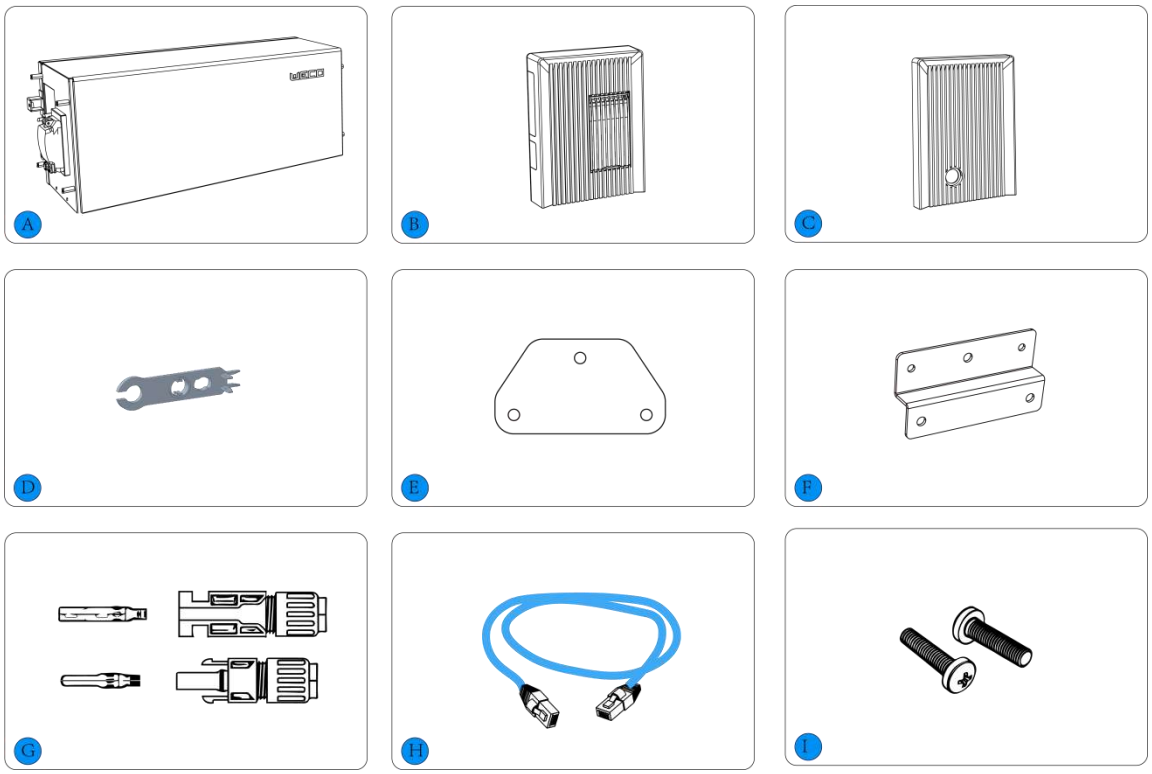


Cluster Expansion Module Terminal Definition



Item	Name	Function
A	Can Port	Communication connection to master control module
B	Switch	Power switch/Breaker
C	Positive Terminal	Positive power cable connection to master control module
D	Negative Terminal	Negative power cable connection to master control module
I	Stack connection Terminal	Used for stacking connection to battery module

Packing List of cluster control module

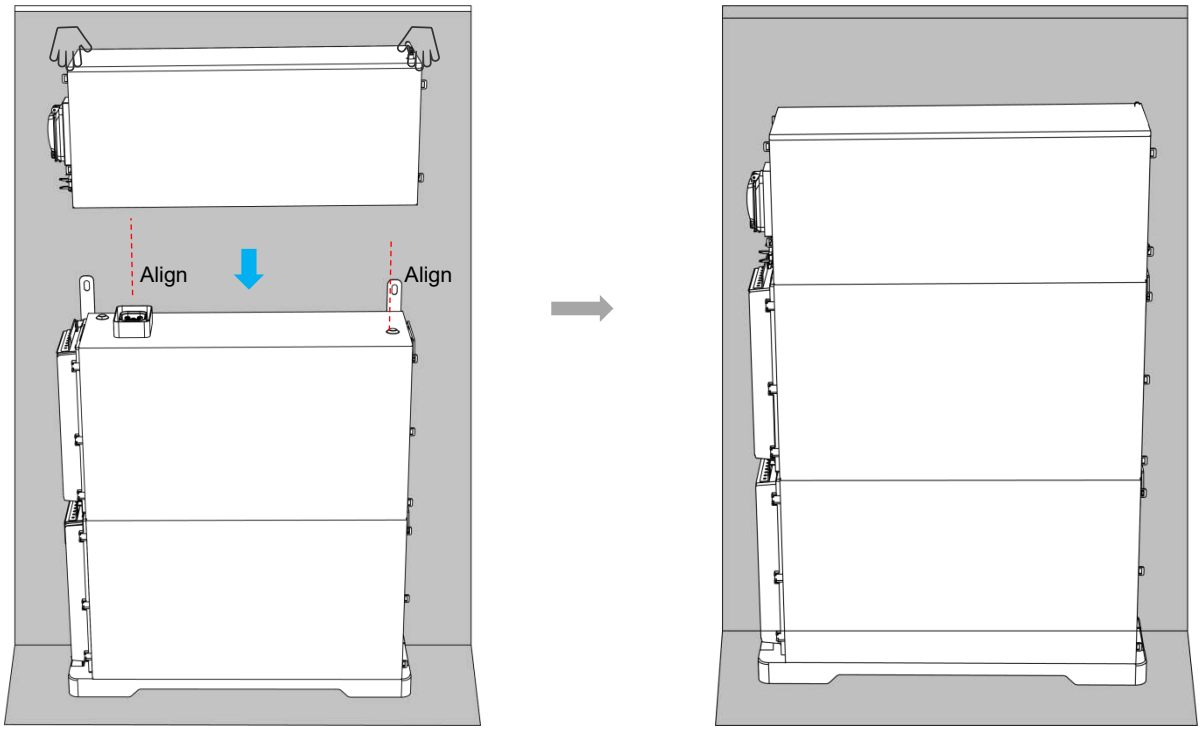


Item	Name	Function &Description	QTY
A	Slave control module	Slave control box connected to inverter	1
B	Left decorative cover	Installed on the left side of the master control module	1
C	Right decorative cover	Installed on the right side of the master control module	1
D	Aux mc4 connector tool	Tool for disassemble MC4 connectors	1
E	Module lock plate right	Use to fix the modules	1
F	Module lock plate left	Use to fix the modules	1
G	Battery connector accessories	For battery cables connections	2
H	Parallel communication cable	Used to communication with master control module	1
I	Screws	Spec:M5*12, lock batteries and base fix plates	6

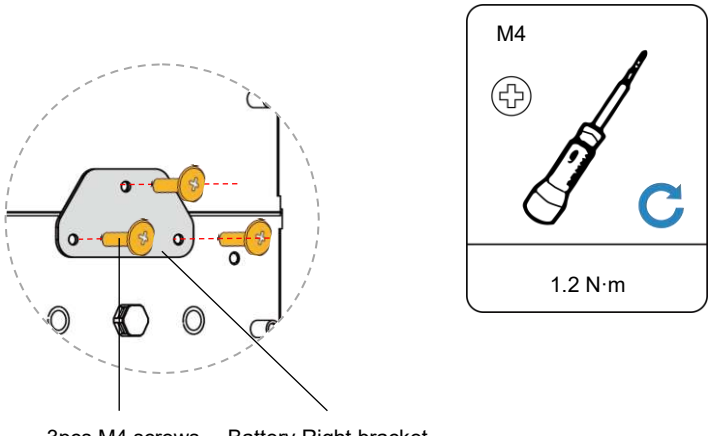
Install the cluster battery and control module

Proceed with the installation of the battery modules using the same procedure as for the Smart model, then complete the tower by installing the cluster control module.

A. Stack the control box on top of the battery. Align it with the battery module, and then place it carefully on top.



B. Fasten the left control-box bracket on the left side, positioning it between the battery module and the cluster control box module.



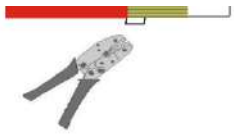
Wiring of the cluster control module and inverter

Make the power + and power - cable connector, then connect the power cable between the inverter stacking tower and the cluster expansion stacking tower. Then connect the communication cable between the inverter module and the cluster expansion control module.

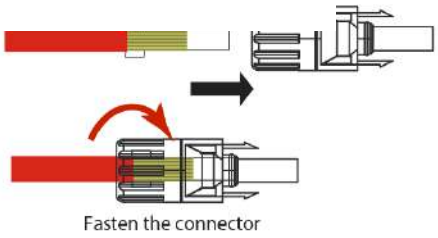
1. Make the power cables for stacking tower connection

a. put the power + to male pin

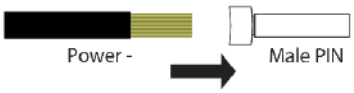
b. crimp the power +



c. make the power + connector

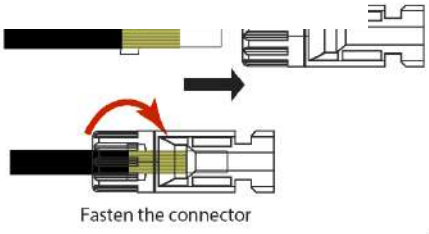


a. put the power - to male pin



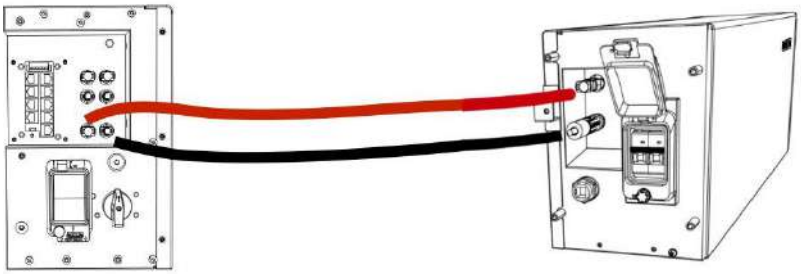
b. crimp the power -

c. make the power - connector



Cable Size	8 AWG

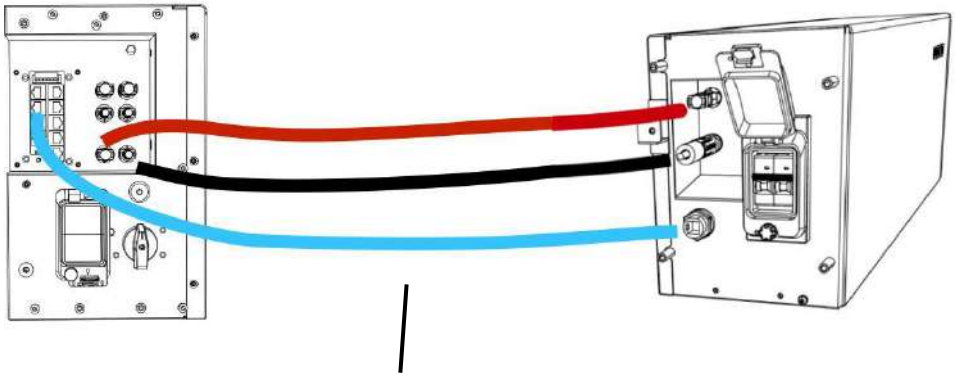
2. Connect the power cables between the inverter module and cluster expansion module.



Inverter module left side

Cluster expansion module left side

3. Connect the communication cables between the inverter module and cluster expansion module.



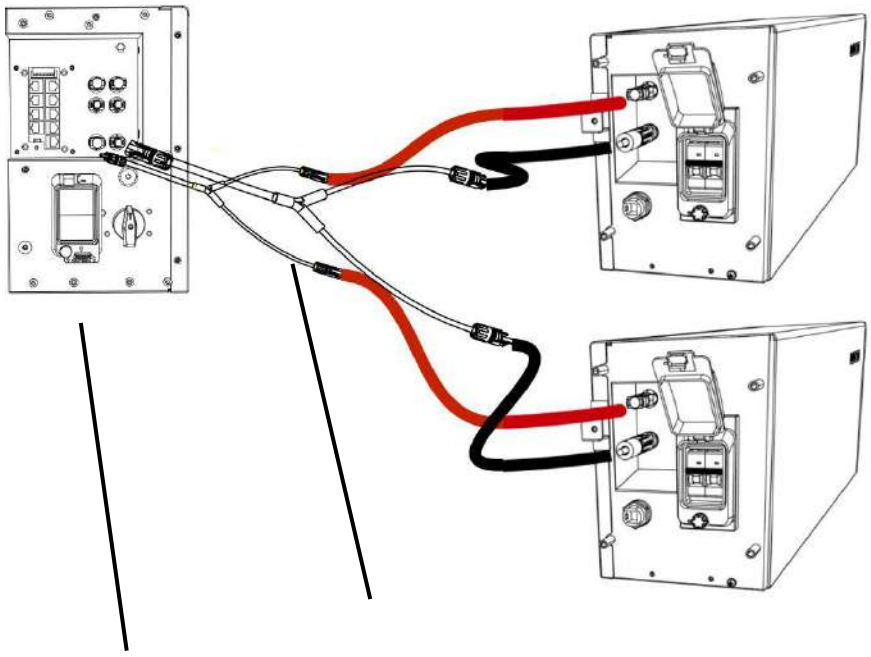
Inverter module left side

Communication cable

Cluster expansion module left side

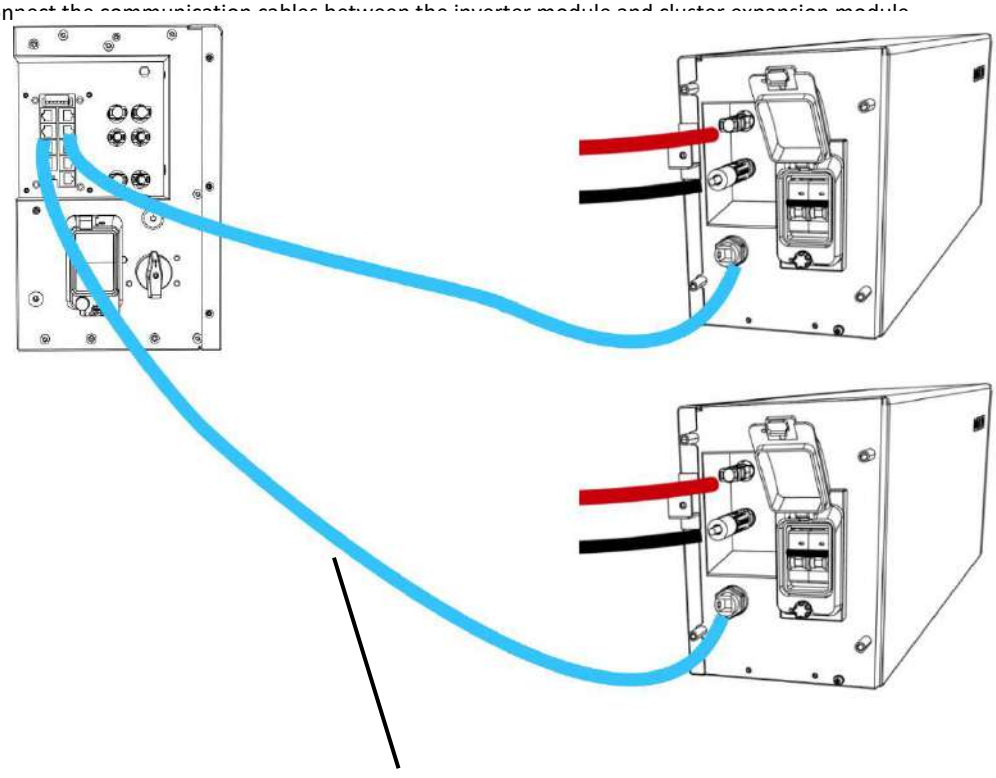
The connection of the power cable between the inverter stacking tower and the 2 cluster expansion stacking towers are as follow.

1.. Connect the power cables between the inverter module and cluster expansion module.



Inverter module left side Cluster parallel kit Cluster expansion module left side

2. Connect the communication cables between the inverter module and cluster expansion module



Inverter module left side Communication cable Cluster expansion module left side

WeCo Srl
Viale Kennedy 113-121 Scarperia e San Piero Firenze
www.wecobatteries.com