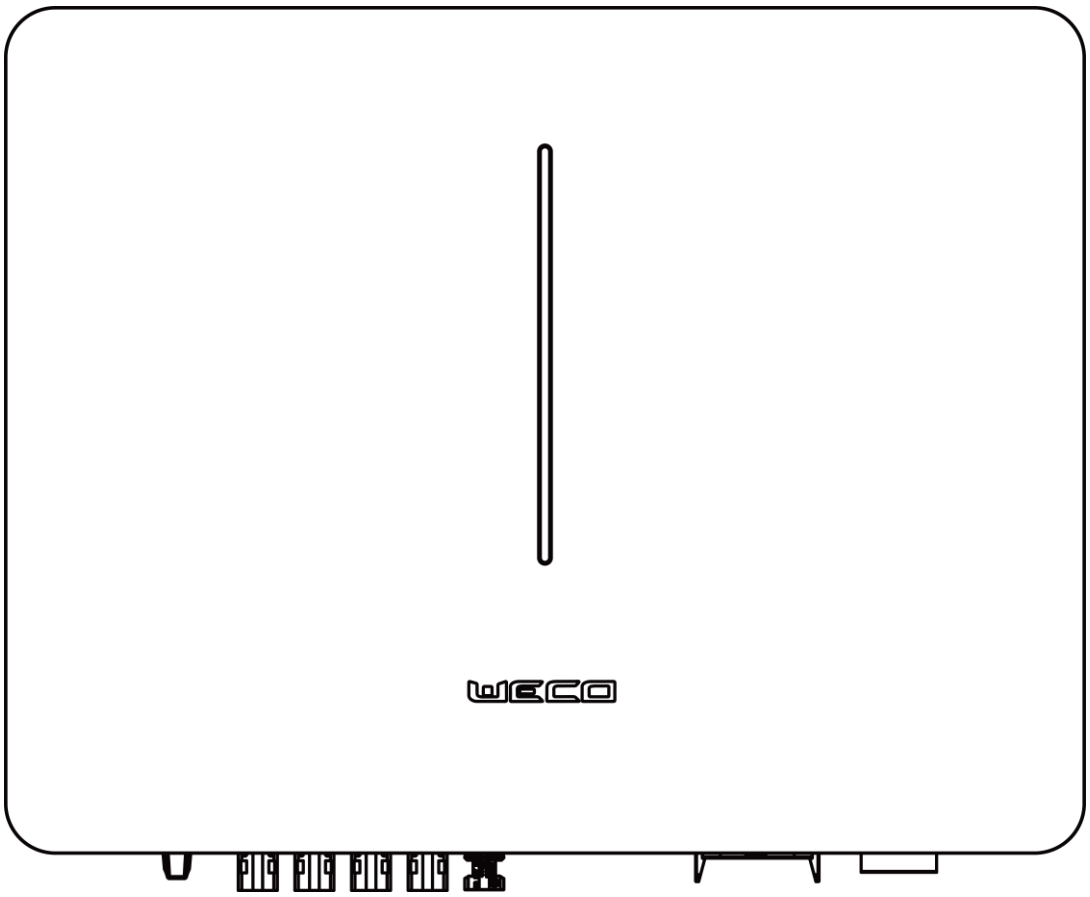
TK SERIES



TK 4-20K Hybrid Inverter User Manual

For Europe market

400Vac

Overview

This document mainly introduces the methods of installation, electrical connection, commissioning, maintenance and troubleshooting of the TK series inverters.
Please read this manual carefully before installation and operation to understand the safety information and to familiarise yourself with the functions and features of the TK series inverters.

Personnel requirements

All details in the manual, instructions for installation, operation, maintenance and troubleshooting are intended for authorised installers.
This manual is intended primarily for:

- Harwdare Installer.
- Installing and Commissioning Engineer.
- On-site maintenance engineer.
- System maintenance engineer.
- Sales engineer.
- Users.

The end user (inexperienced person) may only use this product after receiving appropriate training from the installer.

Conventional Symbols Used in the Manual and on the Product.

To ensure the safety of people, equipment and everything related to the installation or use of the product, the following warning symbols are included in the manual to remind operators of the safety issues to be followed. Please learn and understand these symbols carefully.

Meaning of symbols in the manual or on the device:

Warning symbol	Meaning of the label
Danger! 	It is used to signal situations of imminent danger which, if not avoided, could result in death or serious physical injury.
Attention! 	Used to warn of potentially dangerous situations that, if not avoided, could result in death or serious physical injury.
Attention! 	Used to warn of potentially dangerous situations that, if not avoided, could cause moderate or minor personal injury.
Note! 	Used to convey equipment or environmental safety warning information that, if not avoided, could result in equipment damage, loss of data, reduced equipment performance or other unpredictable results.
Read instructions 	Read the manual for important critical information, best practices, tips, etc. The 'information you will read' is not safety warning information to be understood as absolute, it must always be interpreted in relation to the environment, the type of installation, the skills of the installer, and the circumstances. Although these warnings contain information about people, equipment or environmental damage, they must always be evaluated in relation to the laws in force and the regulations in force at that location. The principle of maximum safety applies, and if you find any partial information to be incorrect or contrary to local laws, you must not install the inverter/system.
High Voltage 	This label indicates the presence of high voltage inside the product, contact with which may cause an electric shock.
15 minutes waiting tim Capacitors present 	This label indicates the presence of capacitors inside the inverter capable of storing energy even after shutdown. Wait 15 minutes after switching off the inverter before performing any work on it.
Hot surfaces 	This symbol indicates that the temperature here is above the acceptable range for the human body and that it must not be touched to avoid personal injury.
Ground connection 	This symbol indicates that this is the protective earth (PE) terminal and that a solid earth is required to ensure the safety of operators.



OPERATIONAL SAFETY PREMISES

Read this manual carefully. Do not install in case of doubt or discrepancy

Hybrid solar inverters and batteries are designed to be safe and reliable when used properly and maintained consistently and diligently. By following these safety and maintenance guidelines, the efficient and safe operation of the system can be ensured, protecting people and property from possible hazards and/or damage. However, to ensure the safety and proper operation of the system, it is essential to follow the safety and maintenance guidelines.
If you have any questions or problems, do not hesitate to contact a qualified technician for assistance.
This inverter should only be installed, maintained and repaired by professional operators.

Safety and Maintenance
1. Proper Use and Regular Maintenance:

- The inverter and the batteries connected to it must be used in accordance with the manufacturer's instructions.

Proper use and constant maintenance are essential to ensure the safety and durability of the system, as well as to maintain the warranty of the various devices connected to it.

- Carry out periodic checks to ensure that all components function correctly and show no signs of wear or damage.

2. Fault Management:

- In the event of a fault, activate all safety procedures immediately. This may include completely disconnecting the inverter from both AC and DC power lines.
- Use external circuit breakers and/or disconnectors, installed and sized according to local standards, to completely isolate the inverter if necessary.
- Never attempt to repair the inverter or batteries yourself. Always contact a qualified technician for any work.

3. Constant Monitoring:

- Constantly monitor the system to ensure that it functions properly. This includes checking the quality of the electricity grid (voltage and frequency) and the status of the solar panels and batteries.
- Variations in the voltage and frequency parameters of the electricity grid, as well as changes in the status of the solar panels and batteries, can affect the inverter's operation, causing standby or idle conditions.

Safety Procedures

1. Disconnection of the Inverter:

- In the event of an emergency or breakdown, follow these procedures:
  - Isolate the inverter using the external circuit breakers to disconnect it from the AC and DC power lines.
  - Avoid touching electrical parts or internal components of the inverter without first checking for voltage with a voltage tester.
  - Disconnect and switch off the inverter when a persistent fault is present.
  - Report the fault immediately to a qualified technician or to WeCo.

2. Inspection and Maintenance:

- Carry out periodic checks of the fans, connectors and surfaces to prevent dust accumulation and ensure proper system operation.
- Ensure that the electrical protections are working properly and that the connectors are well tightened.
- Check the grounding of the system annually.

3. Grid Quality Monitoring:

- Check that the grid voltage and frequency are within the expected ranges to prevent the inverter from entering standby or idle conditions.
- Use the inverter monitoring app to receive notifications and alarms in the event of faults or anomalies.
- In case of no voltage or out-of-range grid values, the inverter will necessarily disconnect from the AC grid and this may contribute to the failure to recharge the battery from the grid when necessary.
- Always monitor the inverter and keep it connected to the internet at all times so that you can receive alarm notifications and emails in time to mitigate the problem.
- Ensure that the inverter's internet connection is always active to ensure constant monitoring.

ISTRUZIONI DI SICUREZZA E PRECAUZIONI GENERALI

General Precautions:

1. LOTO (Lockout-Tagout): Always apply the LOTO procedure to ensure that the inverter is disconnected from all power sources during installation, maintenance or repair. Follow the following steps scrupulously:

a) Identify all energy sources.
b) Isolate the energy by physical disconnection.
c) Lock the isolating devices with safety locks.
d) Attach warning labels.
e) Check that there is no residual energy before starting work.

2. Residual Voltage Measurement: Use a certified tester to check that there is no residual voltage on the terminals before proceeding with any operation.

3. Use of PPE (Personal Protective Equipment): Always wear insulating gloves, safety goggles, protective helmet and clothing suitable for electrical work.

4. Grounding: Ensure that the system is correctly earthed and have the earthing check performed at least once a year by a qualified technician, check for certificates and measurements of the earthing before operating, take new measurements anyway.

SCHEDULED MAINTENANCE PROCEDURES

Scheduled activity to ensure the safety and reliability of the System:
Before starting any activities, ensure that you have the appropriate safety measures in place as mandated by local regulations and your company's safety supervisor.
This includes having portable firefighting systems, such as CO2 and powder extinguishers, readily available.
Additionally, verify that all personal protective equipment (PPE) and tools comply with your country's electrical codes and the safety procedure of your company

1. **Emergency and Safety Breakers**
    a. Frequency: every 6 months and after any event that trigger the protections, or after an electrical event that might have impacted on the reliability of the systems
    b. Ensure that all emergency and safety interrupters are easily accessible and in proper working condition. Regularly test their functionality to guarantee they can be activated quickly in case of an emergency.
    c. Test the function of the emergency buttons across all the connected devices
    d. Ensure that all personnel are familiar with their locations and operation procedures by making regular training

2. **External Parts cleaning**

Checking and Cleaning Fans
    a. Frequency: every 6 months, (every three months if the area is in a dusty location)
    b. Procedure: Isolate the inverter, remove the protective grids and clean the fans with compressed air and a vacuum to extract the dust, do not compress the dust towards the inner parts of the inverter.
    c. Check that the fans rotate freely and replace any defective components in consultation with the manufacturer in order not to lose the warranty claim and to avoid damaging the inverter parts.

Cleaning Dissipation Surfaces and Parts and Exteriors:
    d. Frequency: every 6 months. (every three months if the area is in a dusty location)
    e. Procedure: Isolate the inverter from active connections, power grid, batteries, solar panels, loads on EPS line.
    f. Remove dust and dirt from internal and external surfaces using antistatic cloths and a hoover suitable for electronic components.
    g. Do not use water, oils, aggressive products or acids to clean system parts.
    h. Use a soft brush to clean the corners and the surfaces.

3. **Inspection of the fixing bolts and mechanical parts of the cabinet**
    a. Frequency: Every 3-6 month or after any natural expectational events such as storm earthquake, typhoon, extreme wind heavy rain
    b. Inspect the fixing bolts in the concrete slabs to ensure the torque is adequate.
    c. Check that the metal parts are free from rust.
    d. Ensure there are no obstructions, rust, or cracks on any of the doors or access points of the cabinets.

4. **Checking Connector Tightness (All terminals) :**
    a. Frequency: every 6 months.
    b. Procedure: Insulate the inverter, check and tighten the AC and DC cable connectors using a torque spanner where possible.
    c. Ensure that the connectors are securely fastened to prevent overheating or loss of contact.
    d. A loosen conductor can lead to fire due to the high resistance.

4. Checking Tightening of Screws on Battery LV Terminals:
    a. Frequency: every 6 months.
    b. Procedure: Isolate the inverter, use a torque spanner to tighten the screws on the low voltage (LV) battery terminals on both sides.
    c. Check for corrosion or signe of over heating and replace any defective components.

5. Checking Protections on AC Line Input and EPS Side:
    a. Frequency: every 6 months or after any relevant event
    b. Procedure: Isolate the inverter, visually inspect the protections, check the ratings and correct operation by means of appropriate tests. Replace any defective components.

6. Checking the Release Circuit (Remote Emergency Button):
    a. Frequency: every 6 months or after any relevant event
    b. Procedure: Test the correct operation of the trip circuit by simulating an emergency condition and verify that the inverter disconnects as expected.

7. Internet connection and App:
    a. Frequency: daily.
    b. Procedure: Check the inverter's internet connection, ensure it is up and running. Check the associated App daily to receive notifications and emails in the event of faults or alarms. If there is no internet connection, carry out a daily manual supervision of the system.

GENERAL PRECAUTIONS FOR USERS

General Safety Precautions

Security for End-Users to carry out maintenance and supervision procedures of their plant.

General Precautions:

a) Do Not Touch Damaged Parts: Do not operate or touch visibly damaged parts of the inverter or solar system. Immediately report any damage to a qualified technician.
b) Do not touch the rear or side openings of the inverter as they may be very hot.
c) Earthing: Have the earthing of the system checked annually by a qualified technician.
d) Cleaning and Maintenance: Do not carry out cleaning or maintenance without authorisation and supervision by a qualified technician.
e) Daily Supervision: In the absence of an Internet connection, supervise the system on a daily basis to prevent any faults from affecting the functionality of the system.

Permitted and Required Activities:

a) Check App Connection: Check the inverter's App daily for updates on faults or alarms.
b) Notification Monitoring: Ensure that you receive notifications and emails from the App in case of faults or alarms.
c) Reporting Problems: Immediately report any problems or anomalies encountered to the professional installer and await his intervention.

Prohibited Activities:

a) Work on Electrical Parts: Do not carry out any work on electrical parts or internal components of the inverter, solar panels or batteries.
b) Self-maintenance: Do not attempt repairs without the supervision of a qualified technician.
c) Do not alter wiring or the arrangement of wiring, inverters or batteries.
d) Handling of Components: Do not manipulate or disconnect components of the solar system or inverter.

SUPERVISORY PROCEDURE FOR A SOLAR INVERTER or PCS

Daily Cadence

1. **System Status Monitoring:**
   a) Check the general operation of the inverter via the monitoring app.
   b) Check for alarms or notifications in the app.
   c) Ensure that the inverter is running and not in standby or idle mode.

2. **Checking the Internet Connection:**
   a) Check that the inverter's internet connection is active to ensure remote monitoring and notification in the event of faults.

3. **Verification of Production Parameters:**
   a) Check solar energy production data and battery charge status.
   b) Compare data with expected data to identify any anomalies.

Weekly cadence

1. **Visual Inspection of Inverter and Batteries:**
   a) Carry out a visual inspection of the inverter and batteries to identify any signs of wear, damage or overheating.
   b) Ensure that there are no objects or debris obstructing the inverter's ventilation.
2. **Checking Cables and Connectors:**
   a) Check that cables and connectors are securely connected and show no signs of damage.
3. **Ventilation System Control:**
   a) Check that the inverter fans are working properly and that the air intakes are not obstructed.

Monthly cadence

1. **Verification of System Performance:**
   a) Analysing monthly energy production data to ensure that the inverter is operating correctly.
   b) Compare the data with those of previous months to identify any negative trends.
2. **Checking the Batteries:**
   a) Check the state of charge and capacity of the batteries.
   b) Check for signs of battery degradation, such as swelling or leakage.
3. **Inspection of Electrical Connections:**
   a) Check the tightness of the connectors and screws on the battery and solar panel terminals.
   b) Ensure that there are no signs of corrosion or overheating.
4. **Testing of Protection Systems:**
   a) Verify the functioning of protective devices (circuit breakers, fuses, overload relief systems).
   b) Test the operation of the emergency release circuit if present.

PLANNED ACTIVITY TO ENSURE THE SAFETY AND RELIABILITY OF THE BATTERY SYSTEM WITH HEAT PUMP CONDITIONER CABINET CONNECTED TO AN POWER CONVERSION SYSTEM

Before starting any activities, ensure that you have the appropriate safety measures in place as mandated by local regulations and your company's safety supervisor.

This includes having portable firefighting systems, such as CO2 and powder extinguishers, readily available.

Additionally, verify that all personal protective equipment (PPE) and tools comply with your country's electrical codes and the safety procedure of your company.

1. Emergency and Safety Breakers

a) Frequency: Every 6 months, after any event that triggers the protections, or after an electrical event that might have impacted the reliability of the system.
b) Procedure: a. Ensure that all emergency and safety breakers are easily accessible and in proper working condition. Test their functionality regularly to guarantee they can be activated quickly in case of an emergency.
c) Test the emergency buttons across all connected devices to verify they function properly. c. Conduct regular training to ensure all personnel are familiar with the location and operation of these breakers.

2. Cleaning and Maintenance of External Components

Checking and Cleaning Fans of the Battery Module :

a) Frequency: Every 6 months (or every 3 months if the area is in a dusty location).
b) Procedure: Isolate the battery system, remove protective grids, and clean the fans using compressed air and a vacuum to extract the dust without pushing it into the internal parts of the system.
c) Ensure the fans rotate freely, and consult the manufacturer for replacement of any defective components to avoid warranty issues.

Cleaning Dissipation Surfaces, Parts, and Exteriors:

a) Frequency: Every 6 months (or every 3 months in dusty environments).
b) Procedure:
c) Isolate the battery system from active connections, including the power grid, battery, heat pump, and any other connected systems.
d) Use antistatic cloths and a hoover suitable for electronic components to remove dust from both internal and external surfaces.
e) Do not use water, oils, aggressive products, or acids. A soft brush can be used for cleaning tight corners and surfaces.

3. Inspection of Fixing Bolts and Mechanical Parts of the Cabinet

a) Frequency: Every 3-6 months or after significant natural events such as storms, earthquakes, typhoons, or heavy rain.
b) Procedure: Inspect the fixing bolts to ensure proper torque.
c) Check for rust or damage on metal components.
d) Ensure there are no cracks, rust, or obstructions on any doors or access points to the cabinet.

4. Checking Connector Tightness (All Terminals)

a) Frequency: Every 6 months.
b) Procedure: Isolate the battery system and open the DC circuit on both side , breaker and maintenance manual cartridge switch.
c) Check and tighten all cable connectors using a torque spanner to ensure proper contact.
d) Ensure all connectors are securely fastened to prevent overheating and potential fire hazards.

5. Tightening of Screws on Battery Terminals

a) Frequency: Every 6 months.
b) Procedure:
c) Isolate the battery system.
d) Use a torque spanner to check and tighten screws of the battery terminals and bus bars
e) Inspect for signs of corrosion or overheating and replace defective components as necessary.

6. Checking Protections on the AC Line Input for AUX services of the cabinet

a) Frequency: Every 6 months or after any relevant event.
b) Procedure: Isolate the battery system.
c) Visually inspect the protections and verify the correct ratings.
d) Conduct appropriate tests to ensure correct operation and replace any defective components.

7. Checking the Release Circuit (Remote Emergency Button)

a) Frequency: Every 6 months or after any relevant event.
b) Procedure: Simulate an emergency condition to test the trip circuit and ensure the battery system disconnects as expected.
c) Verify proper functionality by conducting an actual test.
d) Internet Connection and Monitoring App

9. Checking the Communication between Batteries and Inverter (CAN/BMS)

a) Frequency: Every 6 months or after any relevant event (e.g., communication loss, system malfunction, or component replacement).
b) Procedure: Verify Connection Stability
c) Ensure the physical CAN/BMS connections between the batteries and the inverter are secure and free from any damage.
d) Inspect the communication cables and connectors for signs of wear, damage, or loose connections.

Monitor Communication Status:

a) Use the system's monitoring software or app to check the status of the CAN communication. Look for any warning messages or

alarms indicating communication issues between the batteries and the inverter.

b) Ensure the BMS (Battery Management System) is properly communicating with the inverter, exchanging vital information such as state of charge (SoC), voltage, temperature, and current.

Perform CAN Communication Test:

a) Perform a communication test to ensure that the CAN bus is transmitting data correctly between the batteries and the inverter.
b) Use diagnostic tools to verify the integrity of the data being transferred (e.g., using a CAN bus analyzer or other testing devices).

Firmware Compatibility Check:

a) Ensure that the firmware of both the batteries' BMS and the inverter is up-to-date and compatible with each other.
b) Check with the manufacturer for any required updates or patches that address communication issues.

Check for Fault Codes or Errors locally and via Cloud:

a) Review the system's log for any fault codes or error messages related to communication.
b) If any errors are found, follow the troubleshooting procedure outlined in the manufacturer's guide, which may involve restarting the system, replacing faulty cables, or recalibrating the communication protocols.

Inspect Communication Latency:

a) Ensure the communication between the batteries and the inverter is responsive, with minimal delay.
b) Slow communication can indicate issues within the CAN bus network or interference that may affect the performance of the energy system.

Re-establish Communication After Event:

a) After any maintenance, electrical event, or system reset, recheck the communication between the batteries and inverter to ensure the system is working as intended.
b) Test multiple restart of the system to ensure the self-addressing of the battery module and the data communication is consistent and reliable
c) Check the Communication data alert by disconnecting and plugging again the CAN BMS line from battery cabinet and inverter

Internet Data and Cloud Service

a) Frequency: Daily.
b) Procedure: Check the battery system's internet connection daily to ensure proper monitoring.
c) Use the associated app to receive notifications and alarms for system faults.
d) In case of internet disconnection, manually supervise the system daily to monitor performance and safety conditions.

Documentation:

Record the results of the communication check in the maintenance log for future reference, including any repairs, replacements, or recalibrations performed.

SAFETY MANAGEMENT AND SUPERVISION OF LITHIUM BATTERY

Lithium batteries, commonly used in solar energy storage systems, require specific precautions due to their potential risk of fire, explosion and toxic gas release. The following are additional safety measures and best practices for handling lithium batteries.

Specific Risks of Lithium Batteries

Risk of Overheating and Burning of Lithium Batteries due to Thermal Runaway.

Excessive discharge and low temperatures contribute to dendrite formation and subsequent cell damage.

Safety Measures

Preface:

Lithium batteries can overheat and catch fire if damaged, overcharged or exposed to very high temperatures.

Install the batteries in a well-ventilated room capable of maintaining controlled and, if possible, constant temperatures throughout the year.

A correct installation carried out according to the requirements of the manual contributes to improving the overall safety of the storage system.

Although both inverter and batteries are equipped with active and passive safety systems, residual risks that could cause damage to persons or property cannot be excluded if not well understood and assessed during the design phase.

It is essential to ensure that the site chosen for the installation meets the minimum safety requirements, that it is easily accessible, that it allows agile maneuvering in case of an emergency, that it protects against flooding, and that it is away from combustibles, gases or flammable substances.

Constantly monitor battery temperature using battery management systems (BMS). Avoid overloading by using appropriate chargers and overload protection devices.

Risk of Explosion:

Lithium batteries can ventilate if subjected to physical damage or short circuits.

Safety Measures:

a) Protect batteries from shocks and physical damage by using robust housings, marking locations and providing adequate lighting and passive protection against both vertical and horizontal shocks.
b) Carry out periodic checks for signs of damage or deformation.
c) Use short-circuits protection devices and follow the manufacturer's instructions for installation and use.

Risk of Toxic Gas Release:

In the event of overheating, overcharging, misuse or fire (induced or generated), lithium batteries may release gas from electrolytic gasification.

Normally, the cells ventilate by opening the upper cell valve when the internal pressure exceeds about 150 bar, which allows the release of gas and prevents high internal cell temperatures.

Battery sensors managed by the BMS interrupt charging when the temperature is too high, but still far below the thermal runaway trigger.

Risk of Excessive Battery Discharge

Over-discharge of batteries can irreversibly damage the cells and compromise the safety and efficiency of the system.

Excessive discharge can cause dendrites to form inside the cells, increasing the risk of internal short-circuits and fires.

Actions to Take in the Event of Excessive Discharge:

Monitoring: Ensure that the charge levels are above the minimum permissible level, check that the inverter is connected to the AC grid.

Isolation: If a battery becomes excessively discharged, isolate it immediately from the rest of the system to prevent further damage.

Inspection and Replacement: Have a qualified technician carry out a thorough inspection. If the battery is damaged, replace it with a new one.

Preventive Maintenance:

Schedule regular maintenance to check the state of the batteries and prevent excessive discharges.

Set up the APP to notify important events.

Monitor AC-side inverter power switches to ensure emergency charging of batteries in case of low voltage and/or lack of sufficient solar production to charge batteries.

Monitor photovoltaic fuses or breakers to ensure energy production from photovoltaic panels.

Safety Measures:

a) Install gas detectors and adequate ventilation systems in battery installation areas for increased safety.
b) Evacuate the area immediately if gas or a burning smell is detected.
c) Use respiratory masks and other personal protective equipment in case of emergency.

Best Practice for Emergency Management of Storage Plants with Inverters, Solar Panels and Lithium Batteries.

In Case of Overheating or Smoke:

a) Immediately isolate the inverter and batteries by operating an emergency button that acts universally on the circuits.
b) Evacuate the area and call the emergency services.
c) Do not attempt to extinguish the fire with water; use CO_2 or powder extinguishers if available.
d) Inform the fire brigade that these are lithium batteries.

In Case of Fire:

a) Use CO_2 or powder extinguishers specifically designed for lithium batteries.
b) Evacuate the area and call the emergency services.
c) Do not attempt to extinguish the fire with water.

Maintenance and Prevention:

Carry out regular checks of the system internally including the condition of the batteries.

Ensure that the batteries are installed in a suitable environment and protected from physical damage. Strictly follow the manufacturer's guidelines for the installation, use and maintenance of lithium batteries.

Important Notes:

The direct current supplied by solar panels and batteries can be extremely dangerous. It is essential that only qualified personnel carry out operations involving the installation, maintenance and repair of the inverter and associated system.

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1 Safety Instructions

1.1 General safety considerations



Note!

- This manual is an integral part of the inverter and describes the assembly, installation, commissioning and maintenance of the product. Please read it carefully before beginning any operation.
- Personnel responsible for inverter operation, product installation, electrical connection, commissioning, maintenance and troubleshooting must be qualified electricians and must be trained to use the correct operating methods in accordance with the laws of the state in which the inverter is used.
- Any person involved in the operation, installation and maintenance of the inverter must be trained and supervised by a company safety officer regarding the interaction between the inverter and the local electrical system and possible interference with other existing infrastructure.
- WECO is not responsible for the installation process or the selection of installers, who must be qualified according to local regulations. WECO assumes no responsibility for violations of general operational safety requirements or safety standards for the installation and use of the equipment.

All information and advice contained in this documentation does not constitute an express or implied action contrary to local regulations or standards. The safety guidelines included in this document may not include or consider all applicable regulations in the area of installation/operation. Always review and consider applicable federal, state, and local laws and regulations in accordance with product industry standards.

WECO cannot be held liable for malfunctions or damage caused in such circumstances:

- Shipping damages in operations not managed by WeCo.
- Damage caused by storage conditions that do not comply with the requirements of the product documentation.
- Improper storage, installation and use of the equipment.
- Unqualified personnel using and operating the equipment.
- Damage caused by third parties during improper installation or maintenance.
- Damage caused by non-compliant installation of devices connected to the inverter
- Failure to observe the operating instructions and safety warnings contained in the product and documentation.
- Operating in harsh environments beyond what is described in the product and documentation.
- Operations and settings that go beyond the parameters specified in the applicable technical specifications.
- Unauthorised disassembly and/or repair, alteration of the product or modification of the software code, installation of inappropriate firmware.
- Equipment damage caused by abnormal natural environments (such as lightning, earthquakes, fire, storms, etc.). l
- The warranty period has expired, and the warranty service has not been extended.
- Any installation and operating environment outside of those specified by relevant standards.

1.2 Statement

Personnel capable of installation, cabling, commissioning, maintenance, troubleshooting and replacement must meet the following criteria:

- Operators must receive professional training from their employer before operating devices for the first time.
- Operators must read this manual in its entirety and master safety issues related to operation.
- Operators must be familiar with the relevant safety specifications of electrical installations.
- The operator must know the operating principle and composition of photovoltaic storage systems and be familiar with the user manual for this product.
- During operation, do not wear metal objects such as rings, watches, key rings, etc., and always wear personal protective equipment (such as insulating gloves, insulating shoes, etc..).
- Installers or company managers must train and inform the end customer in the ordinary use of the inverter and train them on emergency management, how to interact with safety devices and how to interpret alarms or warnings indicated in the APP.
- The markings on the inverter contain important information for safe operation. It is strictly forbidden to alter or damage the casing and/or the safety markings on the frame.
- The inverter is equipped with a nameplate on the side which contains important information on product parameters. Alteration is strictly forbidden.

1.3 System Installation



Danger!

It is strictly forbidden to use the inverter connected to any source of electricity during installation at first start-up and in any case during maintenance or troubleshooting, the inverter must first be switched off and then switched on in sequence to exclude injury or damage. Ensure that all power sources are disconnected when installing the inverter. Lock and label all power sources so that they cannot be switched on before installation is complete.

- The process of lifting and positioning the inverter must be performed slowly and safely, the product could be damaged and operators could be injured.
- When installing the inverter, ensure that it is not electrically connected to any power source.
- There must be at least the distance specified in the manual between the inverter and surrounding objects to ensure sufficient space for installation and heat dissipation. If you have any questions about the installation distance, please consult a service technician.
- During installation, avoid liquids, debris or conductive particles entering the system, which could cause internal short circuits or system failure.
- Do not install on rainy or particularly humid days as waterproof connectors, once opened, may retain moisture and then once closed may oxidise internally and become dangerous.

1.4 Electrical connections



Danger!

Before making any electrical connections, ensure that the inverter is undamaged and carry out installation only under safe conditions.

Avoid installing the inverter where there is visible damage to prevent electric shock, fire and personal injury.

Do not install the inverter if there is any damage to the inverter housing or metal casing.

- All electrical connections must comply with national electrical regulations. If the procedures in this manual or the information contained herein conflict with local laws, do not install the product and consult your technician and/or supplier.
- The equipment must be permanently connected to a protective earth. When installing equipment that must be earthed, the earthing cable must be installed first. When disassembling the equipment, the earth cable must be removed last.
- External cables must be protected in cable ducts or pipes and reliably secured with cable clamps and brackets. Buried cables must be marked with special burying markers and then backfilled ensuring that no deformation or damage caused by stresses on the cables occurs during backfilling or later.
- The inverter may only be connected to the grid with the permission of the local energy authority in accordance with the regulations in force at the time.
- The cables used in the system must be securely connected, well insulated and of adequate specification.
- The use of cables in high-temperature environments can cause the insulating layer to age and damage the cables. The distance between cables and heating devices or heat sources must be at least 30 mm.
- When the temperature is too low, shocks and vibrations can cause the cable's plastic outer jacket to break. All cables must be laid and installed at a temperature above zero, especially in low-temperature environments.
- Cable specifications are different for grid, battery and photovoltaic connection. These requirements must be strictly adhered to.
- All DC cables must be installed in such a way as to provide as short a path as possible, and the positive and negative cables of the string or main DC supply must be bundled together. Avoid creating loops in the system.

1.5 Procedures



Danger!

High-voltage inputs to the inverter are dangerous. Please strictly follow the safety precautions listed in this manual and other relevant documents.

Always follow LOTO procedure to avoid serious safety risks.

- When the ESY is switched on for the first time, it must be configured by a professional electrician.
- Incorrect settings can impair the proper functioning of the inverter and result in the inverter not conforming to the country's certification.
- Some inverter components, such as copper bars, inductors, etc., take some time to cool down after being switched off. Do not touch them immediately after a power failure and beware of burns.
- Use the equipment in accordance with local rules and regulations.
- Capacitors in the inverter are subject to slow discharge, so wait 15 minutes before working inside the inverter and ensure that all terminals have 0Volt by checking with a voltmeter.

1.6 Maintenance and Replacement



Danger!

When using the inverter, be aware that the DC and AC inputs and outputs are "high voltage" and can cause electric shock, resulting in death, serious injury or property damage.
Therefore, before performing any maintenance work, you must turn off the power, wait 15 minutes and work in strict accordance with the safety precautions listed in this manual and other relevant documents**.**

- Only service the Inverter if you are familiar with the contents of this manual and have the appropriate training, tools and test equipment.
- Before maintenance, turn off the inverter, input and output switches, and wait at least 15 minutes before performing any operations on the inverter.
- During maintenance sessions, avoid access of unrelated personnel to the maintenance site and place temporary warning signs or fencing to isolate.
- The inverter may only be re-powered after the fault has been resolved, otherwise the fault may expand or the equipment may be damaged.
- During maintenance, follow ESD protection specifications and wear antistatic equipment.
- Avoid opening cabinet doors in wet or rainy weather for maintenance or repair of products.
- When carrying out various operations such as maintenance and inspection of equipment, competent personnel must take appropriate protective measures, such as wearing noise-reducing earplugs, insulating shoes and anti-scald gloves.

2 Product Introduction

2.1 Product Introduction

The inverter is a three-phase converter, capable of converting solar energy into alternating current or storing DC energy in the battery for use when needed. The user can use the app to flexibly choose the most advantageous operating mode according to the actual usage scenario, with different situations of PV, grid, battery, load and so on.

Inverter Model

This paragraph defines product models: TK-4K-S, TK-5K-XL, TK-6K-S, TK-8K-S, TK-10K-S, TK-12K-S, TK-10K-M, TK-12K-M, TK-15K-M, TK-20K-M. Naming convention TK (using TK-20K-M as an example):

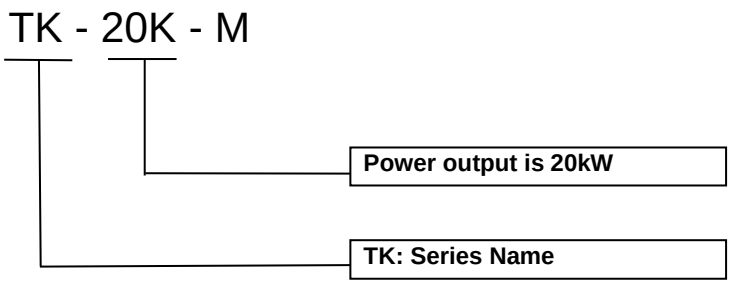


Figure 2-1

2.2 Description of appearance

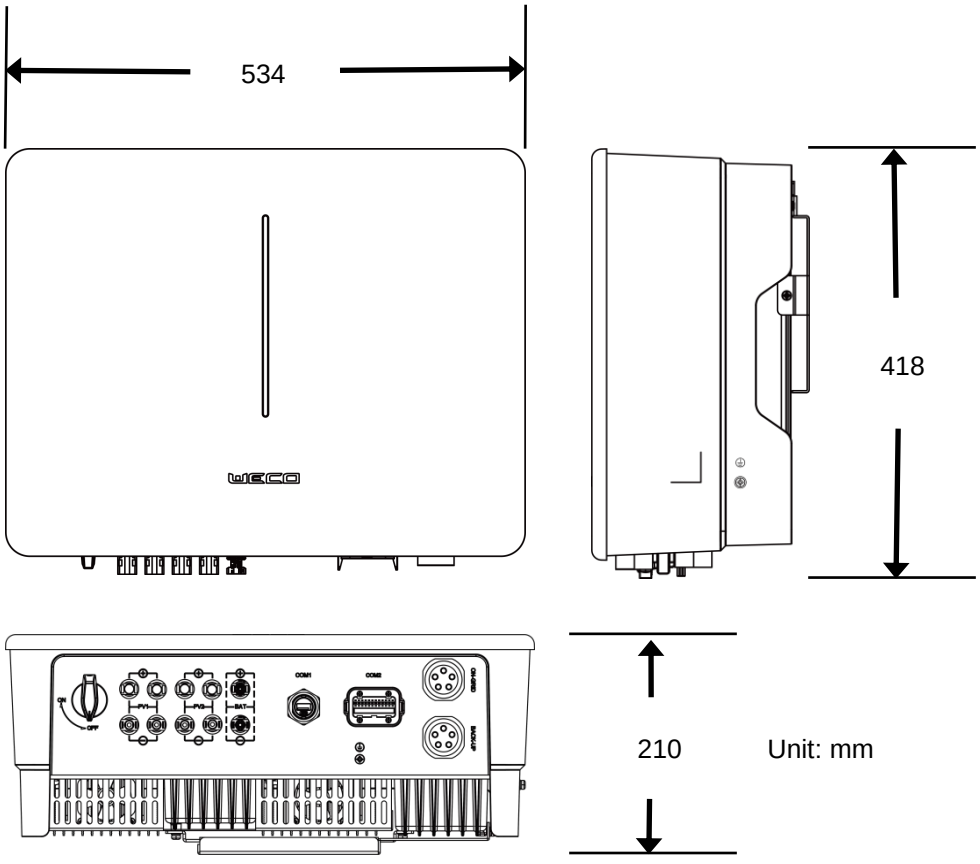


Figure 2-2

2.3 Terminals of inverter

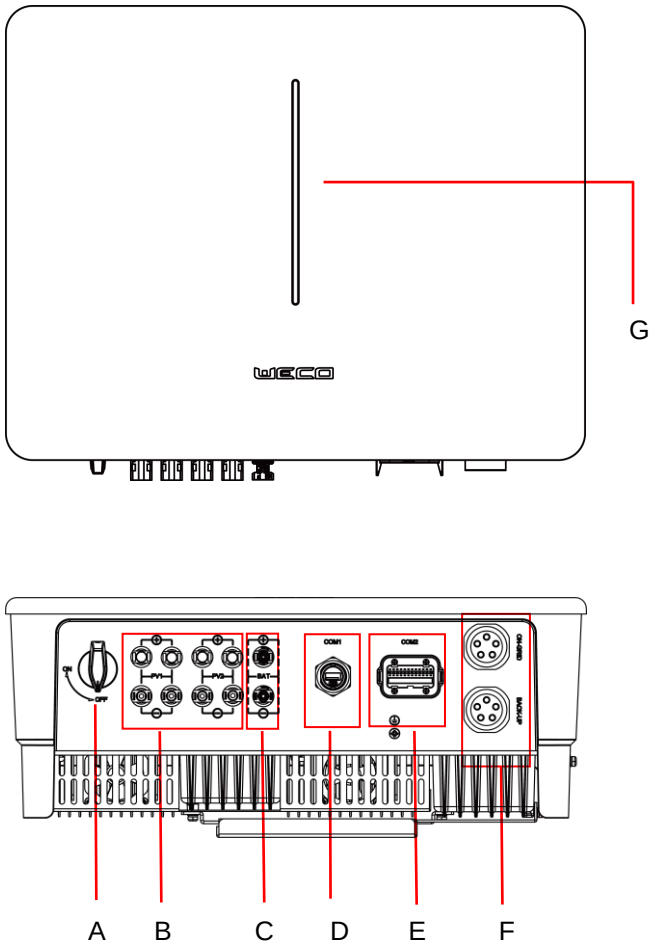


Figure 2-3

NO.	Terminal	Description
A	DC switch	DC switch for PV1 and PV2
B	DC Input terminal	PV input port
C	Battery input terminal	Battery connector
D	COM1	COM1 interface for WIFI module terminal
E	COM2	COM2 interface for Meter/BMS/RS485/DRED/DO Connector
F	AC input terminal	Used for On-grid and Back up output cable connection
G	LED Bar	Display working states of the inverter.

2.4 System Topology

For proper operation of the EPS load, make sure that the maximum load power of the EPS is within the limits of the inverter, otherwise the system will not be able to support the EPS in case of power failure and an overload alarm may occur. (Refer to the product data sheet).

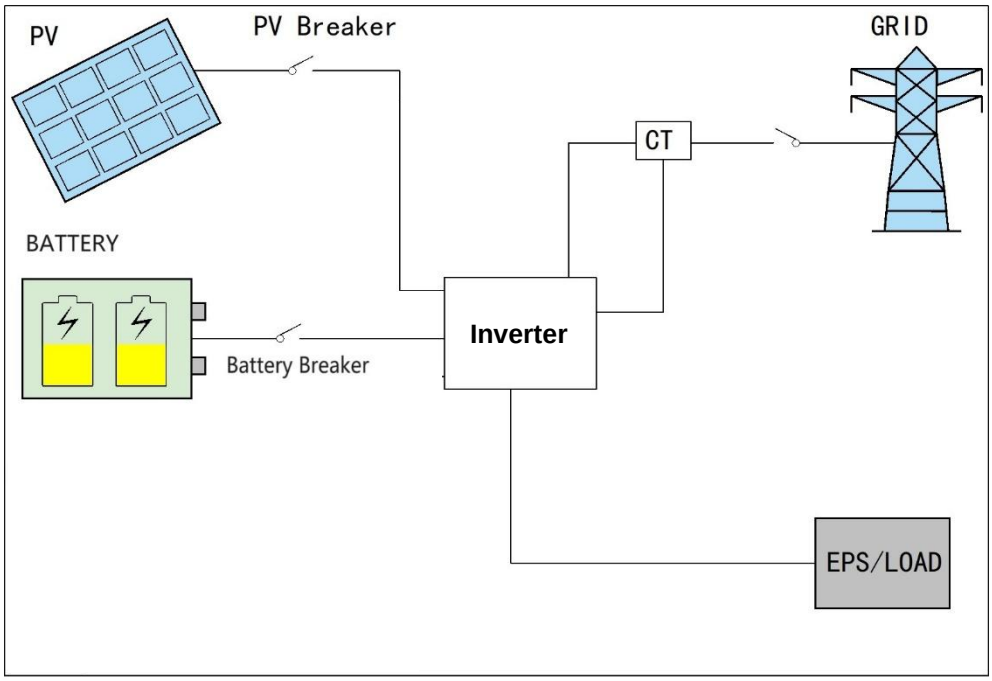


Figure 2-4

3 Pre-installation

3.1 Check the outer packaging

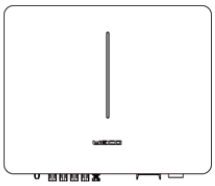
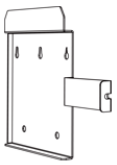
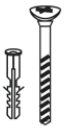
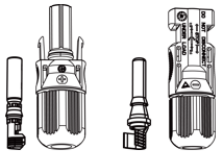
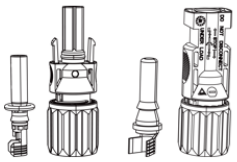
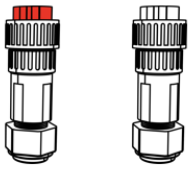
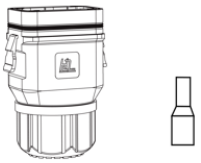
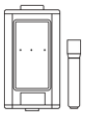
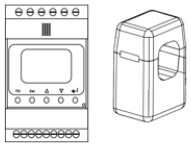
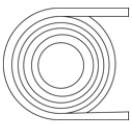
Before unpacking the inverter, check the outer packaging for visible damage, such as holes, cracks, or other signs of possible damage inside, and check the inverter model. If the packaging has abnormalities or the inverter model does not match, do not open it and contact your dealer as soon as possible.

3.2 Packing list

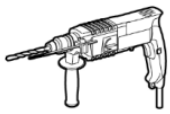
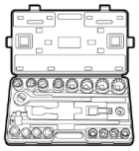
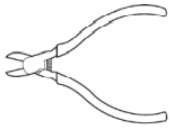
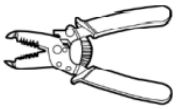
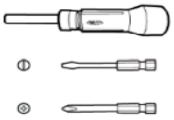
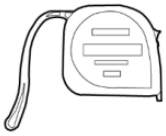
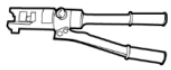
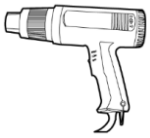
Check Deliverables

After unpacking the inverter, check that the delivery is complete and that there is no obvious external damage. If something is missing or damaged, please contact your dealer.
The following is the packing list for reference only, product deliveries are based on the actual packing list inside the box, if you have any questions about deliveries please contact your dealer.

Table-1 Packing list (Reference only)

 Hybrid Inverter 1pcs	 Wall Mounting Bracket 1pcs	 Expansion plug set 5pcs	 M5 screw 1pcs
 TK-4~12K-S PV Connector set 2pairs TK-10~20K-M PV Connector set 4pairs	 Battery Connector set 1pairs	 On-Grid connector 1pcs Back-Up connector 1pcs	 COM2 Communication Connector set 1pcs
 WIFI Module 1pcs	 Meter with 3 CTs set 1pcs	 3m battery cable 1pcs 10m communication cable 1pcs	 PE Terminal 1pcs

3.3 Installation tools and gauges requirement

Installation	 Hammer drill (drill bit Φ8mm).	 Torque socket wrench (sleeve opening: 8mm, for M6 bolts; Torque range: 0N•m~ 15N•m).	 Torque wrench (opening size: 13mm; Torque range: 0N•m~1.5N•m).
	 Diagonal pliers	 Wire strippers	 Torque screwdriver (head: M4, M6; Torque range: 0N•m~ 5N•m).
	 Rubber hammer	 Tool knife	 Wire cutters
	 Crimping pliers (Model: H4TC0001; Manufacturer: Amphenol).	 Open Wrench (Model: H4TW0001; Manufacturer: Amphenol).	 Cable ties
	 vacuum cleaner	 Multimeter (DC voltage range ≥ 600V DC).	 Markers
	 Steel tape measure	 Horizontal ruler	 Hydraulic pliers
	 Heat shrink tubing	 Heat guns	

Personal protective equipment	 Safety gloves	 Protective goggles	 Dust masks
	 Safety boots		

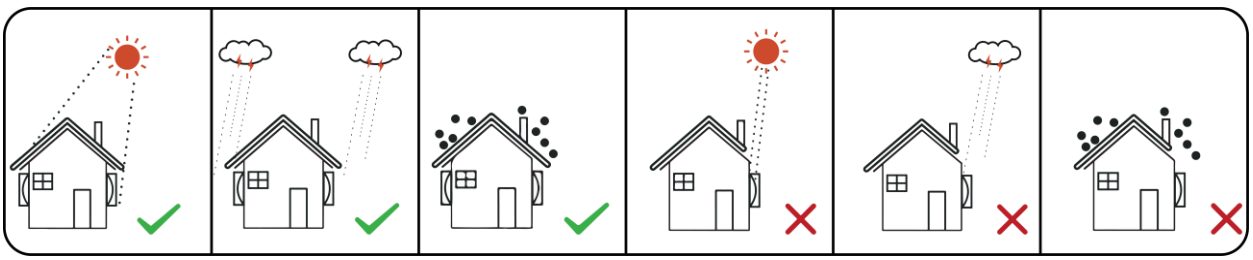
3.4 Installation requirement

1) Inverter installation must comply with local fire regulations (consult your company's safety department for details).
2) Do not install the inverter near flammable materials, liquids or gases; The installation site must be approved by local authorities.
3) Ensure that the installation surface is strong enough to support the inverter and that the supporting screws are capable of meeting the load requirements of the inverter installation.
4) Inverters must be marked and confined to a dedicated area, room or technical compartment, must not be accessible to third parties, and must be illuminated for safe operation.
5) Post signs, in the immediate vicinity, warning and danger for the presence of solar inverters connected to batteries and solar panels.
6) Inform the person responsible for managing the electrical system of the presence of the solar inverter and batteries, update the electrical diagrams of the buildings.

Installation environment requirements

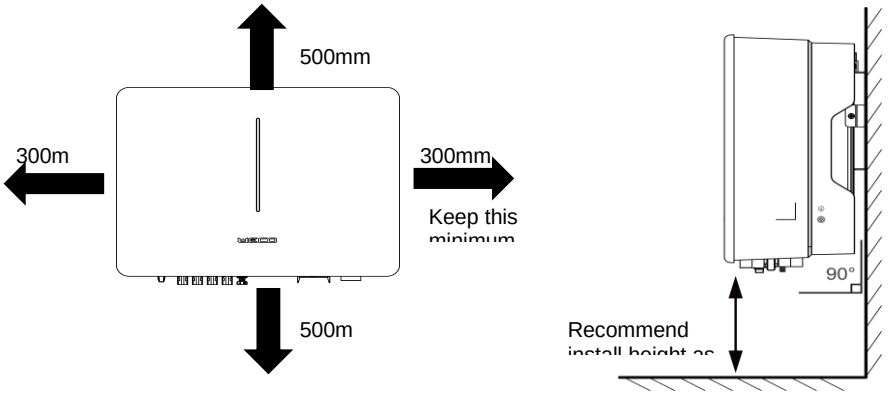
1) The inverter has an IP65 degree of protection and can be installed outdoors, although it is recommended to install it in a protected environment to prolong its service life and performance
2) The inverter should be installed in a well-ventilated environment to ensure good heat dissipation. (Do not install the inverter outside without any weather protection/shielding.
3) WeCo suggests that installation take place in dedicated technical rooms in order to maximize the safety and durability of the system.
4) The installation location of the CT or digital meter should be close to the grid meter, refer to the CT connection section or digital meter section for more details.
5) Do not install inverters in areas where flammable and explosive materials are stored.
6) Do not install inverter in a place that can be reached by children.
7) Inverter installed in the salt-damaged area will be corroded and may cause fire, do not install the inverter outdoors in the salt-damaged area. Salt-damaged areas are areas within 500 to 800 meters from the coast or affected by sea breezes. Areas affected by sea breezes vary depending on weather conditions (e.g. typhoons, seasonal winds) or terrain (with dikes, hills).
8) Keep away from direct sunlight, exposure to rain, and snow accumulation. It is recommended to choose a sheltered, ventilated, dry, and safe installation site for inspection and maintenance activities. It should be accessible, clearly visible, and easily accessible even by third parties, for safety reasons.
9) It must be marked that the installation is equipped with a photovoltaic system with batteries, and it must be clearly indicated to the procedure for shutting down and isolating the system from the rest of the system Batteries, if installed, must be installed in accordance with the battery manual.
10) Batteries must be installed in a safe place, and in a dedicated technical room, in a place not subject to the stationing of people.

Figure 3-1



Installation space requirements

When installing the inverter, a certain amount of space should be reserved around the inverter to ensure that there is enough space for installation and heat dissipation.
And do not install the inverter too high, Installing the inverter too high is not conducive to heat dissipation, installation, and maintenance. The height of installation is recommended 1500mm from the floor to the bottom of inverter. For more detail, please refer to the figure3-2



.

Figure 3-2

3.5 Cable Preparation

Note!

Disconnect the external AC circuit breaker or another AC load circuit breaker to ensure safe disconnection of the inverter from the grid. and the single-phase circuit breaker connected to the inverter should be based on the rated output current of the inverter model.

If the external AC circuit breaker has a leakage protection function, its rated leakage operating current should be ≥ 100mA.

Make sure the grounding wire of the inverter is well connected to ensure safety and reduce leakage current.

The use of knife switches is prohibited for interrupting the AC circuit.

The switches below are recommended by WECO. For any other selection, please choose the cable according to local regulations.

Relevant Cable & wires introduction

The cables shown below are recommended by WECO but must still be validated by the design engineer in your electrical design. Choose the cable according to local standards and design specifications.

No.	location	Description	Wire diameter (mm^2)	Note
1	PV input cable	PV power input line, Based on inverter model	2.5-4.0	Based on inverter model
2	Battery input cable	Battery power input line,use connect with battery power terminal	10	
3	Grid-side input cable	Grid power input line,use to power the inverter system	2.5-10	Based on inverter model
4	Back up load output cable	Back up Load power line,use to connect EPS load port	2.5-10	Based on inverter model
5	PE connection cable	PE cable connect the outside of inverter to PE bar	5-10	Based on inverter model
6	CT or Digital Meter communication cable	CT use to jig on the Grid-L line to active Back up, Anti-reflux functions;		Provided by WECO
7	WECO battery communication cable	Battery communication cable connect the battery and inverter;		Provided by WECO; Other brand of battery,please check with battery supplier

4 Installation

Before installing the TK series inverter, please read this manual carefully.

Danger!

Before making the electrical connection, make sure that all the switches of the inverter are in "OFF" state, otherwise the high voltage of the inverter may cause the risk of electric shock.

Warning!

- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.
- Work on electrical connections should be carried out by professional electricians.
- When making electrical connections, personnel must wear personal protective equipment.
- Placing installation tools, metal parts and debris on the inverter during the installation process is strictly prohibited. After installation, promptly clean the inverter and surrounding objects.
- After completing the wiring or after interrupting the wiring process, the cable opening must be sealed immediately to prevent the entry of water vapor or small animals.

Note!

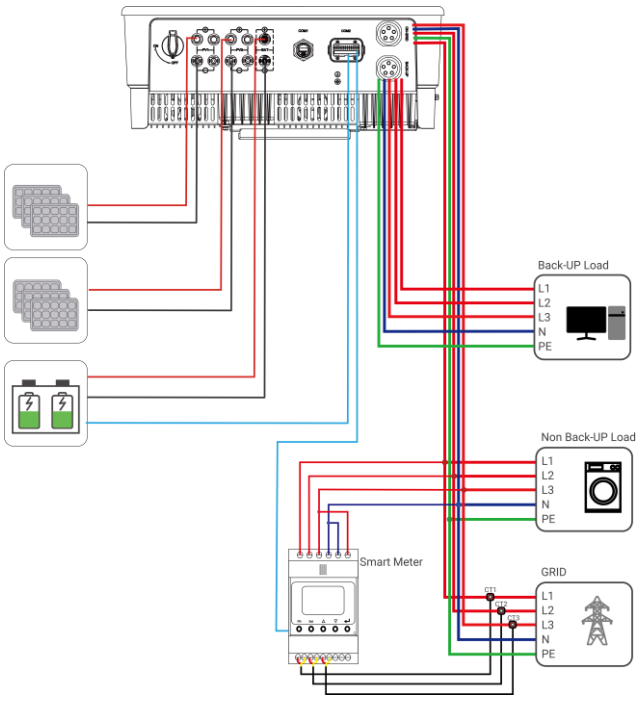
Only qualified professionals are allowed to install this product. Before installing the inverter, follow the instructions for the use of personal protective equipment; Also, due to the weight and safety of the inverter, it is recommended that the inverter be installed by two people.

Read Info

The color of the cable involved in all electrical connection diagrams in this section is for reference only, and the cable selection should comply with the local cable standards.

4.1 Steps instructions

To better guide installation personnel, this chapter explains step by step how to install an ESY series inverter system. Referring to the image below, break down the installation steps into:



4.2 Installation Steps

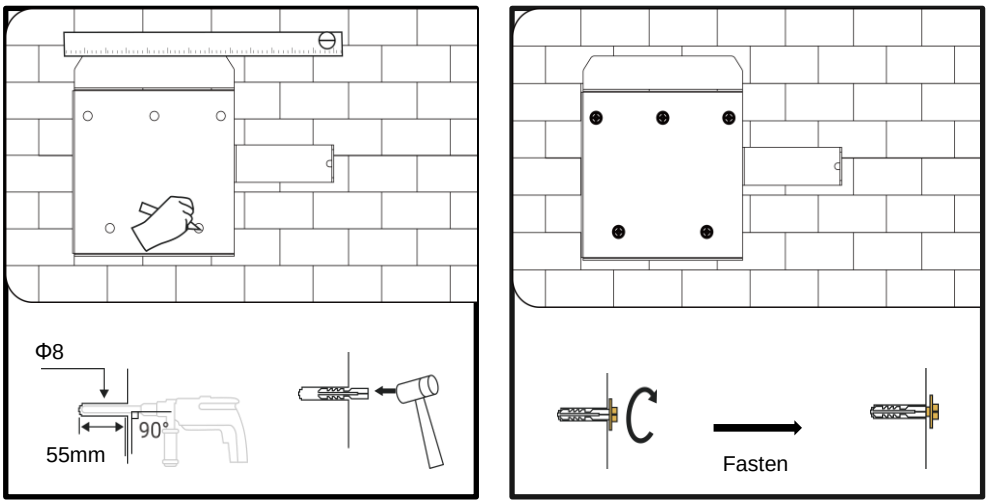
- Step 1: Install the TK inverter on a wall.
- Step 2: Connect the PE cable to TK inverter
- Step 3: Connect the PV strings to TK inverter.
- Step 4: Connect battery to TK inverter.
- Step 5: Connect the AC cable to TK inverter.
- Step 6: Connect Meter to TK inverter.
- Step 7: Connect WIFI Dongle to TK inverter.

Step 1: Install the TK inverter on a wall

a. Use a drill tool to make 6* ϕ8x55mm holes on the wall according to the mounting holes position of the mounting bracket. (The hole depth during 50-60mm)

b. Install the plug in the holes, then tighten the M6*35mm screw to lock the bracket on the wall.

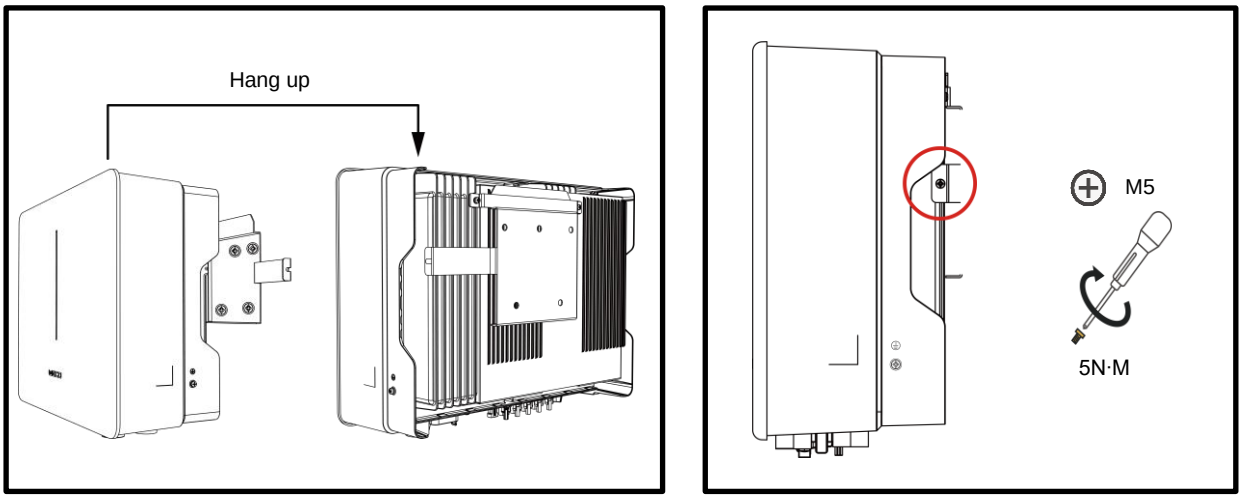
a. Marke the holes. b. Fix the bracket on the wall.



c. Lift the inverter, hang it up on the wall bracket, align the holes of inverter with the holes of the wall bracket.

d. Fix with M5 screw on the right side to fasten the inverter on the bracket.

c. Hang up the inverter. d. Fasten the back bracket.



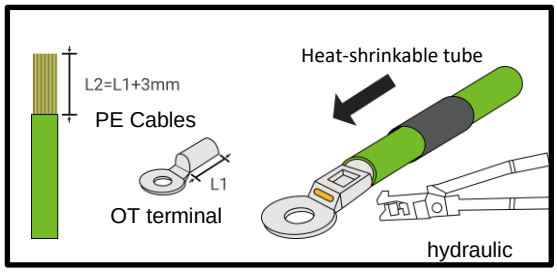
Step 2: Connect the PE cable to inverter.

(a) Make the OT terminals for PE cable.

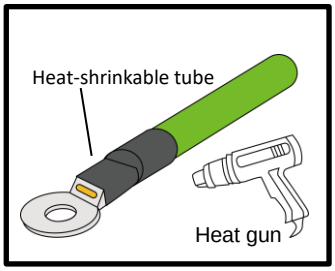
(b) Protect the conductor with a heat shrink tube.

(c) Connect to the PE terminal on the right side of the inverter inside.

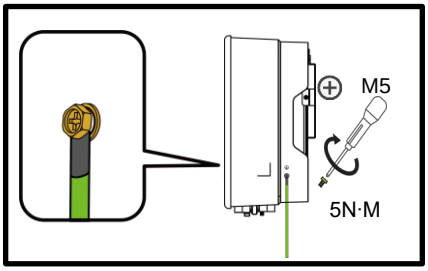
1. Make the OT terminal for “PE” cable.



2. Put on the heat shrink tube.



3. Fasten PE cable.

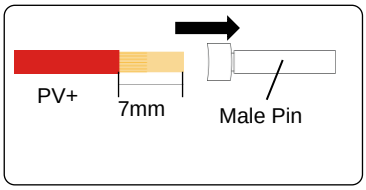


Step 3: Connect the PV strings to TK inverter.

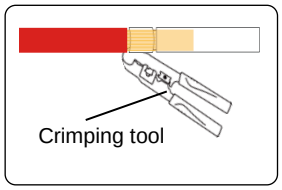
Make the PV+ connector:

(a) Strip the 7mm conductor of PV+ and insert the conductor into the Male Pin.
(b) Using a crimping tool to crimp the cable end of PV+.
(c) Put the PV+ end to the PV+ connector, and fasten the screw.

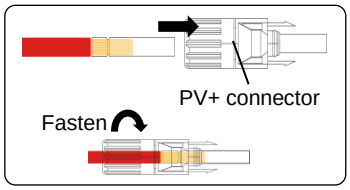
a. Put the PV+ to Male Pin.



b. Crimp the PV+.



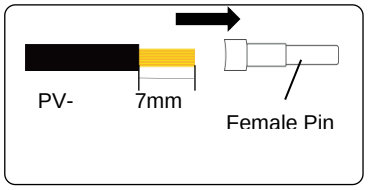
c. Make the PV+ connector.



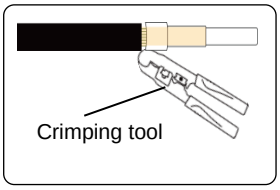
Make the PV- connector:

(d) Strip the 7mm conductor of PV- and insert the conductor into the Female Pin.
(e) Using a crimping tool to crimp the Cable end of PV-.
(f) Put the PV- end to the PV- connector, and fasten the screw.

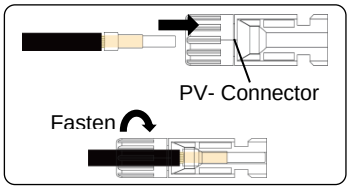
d. Put the PV- to Female Pin.



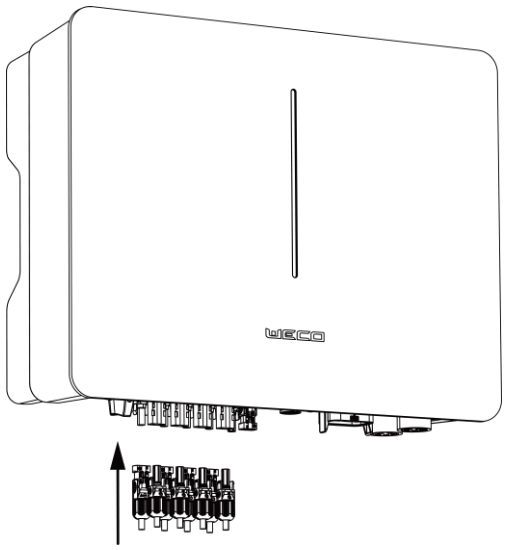
e. Crimp the PV-.



f. Make the PV- terminal.



Connect each PV sting to TK PV terminal:

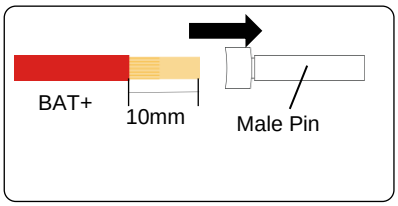


Step 4: Connect the Battery to TK inverter.

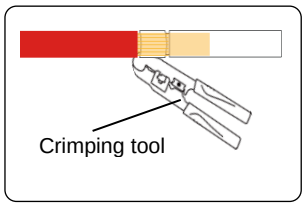
Make the BAT+ connector:

(a) Strip the 10mm conductor of BAT+ and insert the conductor into the Male Pin.
(b) Using a crimping tool to crimp the cable end of BAT+.
(c) Put the BAT+ end to the BAT+ connector, and fasten the screw.

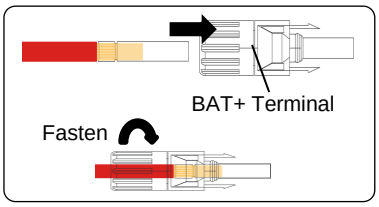
a. Put the BAT+ to Male Pin.



b. Crimp the BAT+.



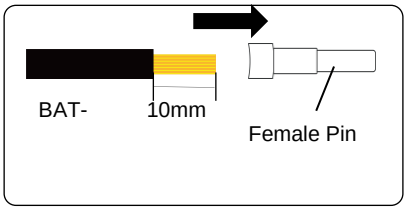
c. Make the BAT+ terminal.



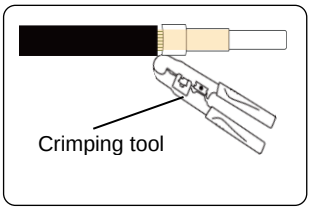
Make the BAT- connector:

(d) Strip the 10mm conductor of BAT- and insert the conductor into the Female Pin.
(e) Using a crimping tool to crimp the Cable end of BAT-.
(f) Put the BAT- end to the BAT- connector, and fasten the screw.

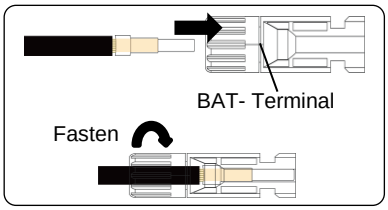
d. Put the BAT- to Female Pin.



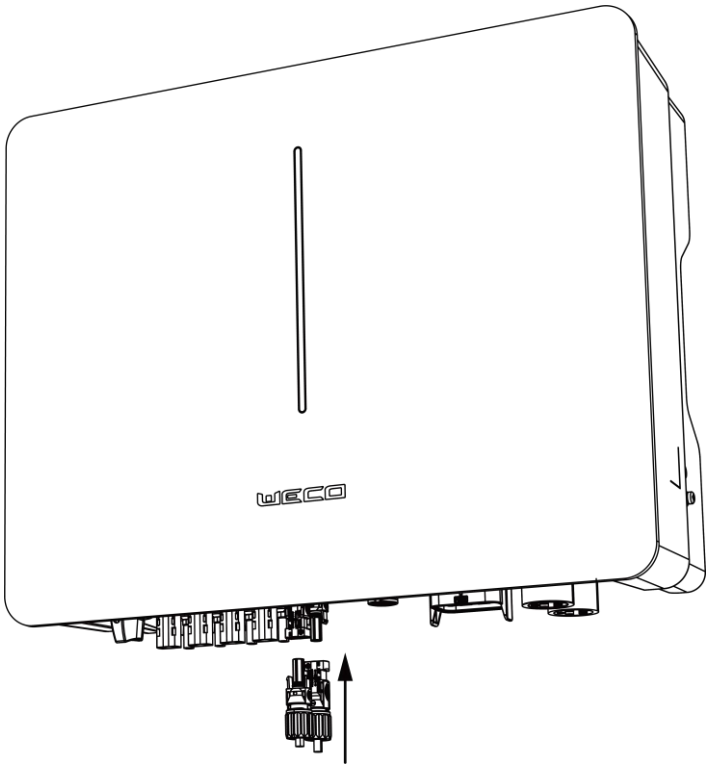
e. Crimp the BAT-.



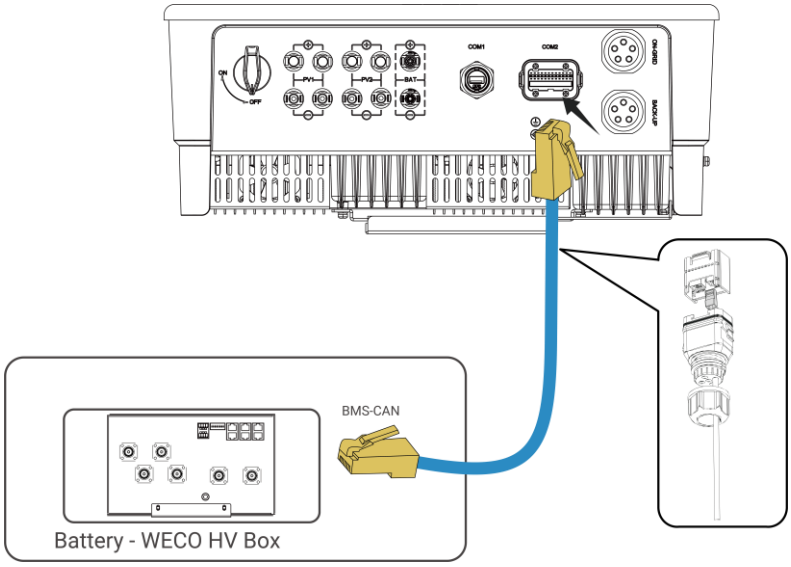
f. Make the BAT- terminal.



Connect the power cable of Battery to TK inverter.



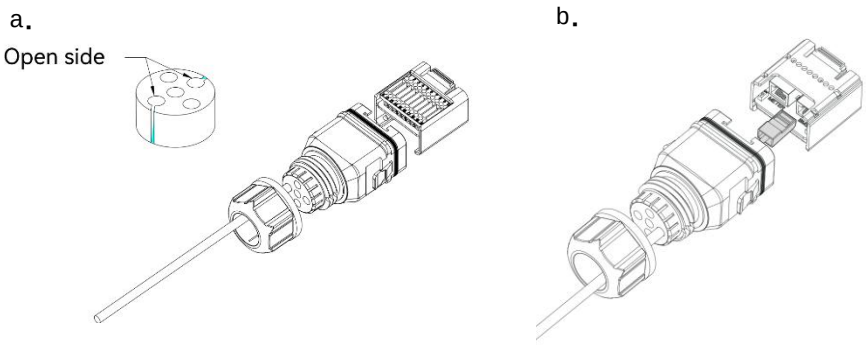
Connect the Communication cable between Battery and TK.



Connect the battery to the TK COM2 with a special RJ45 cable from the accessory.

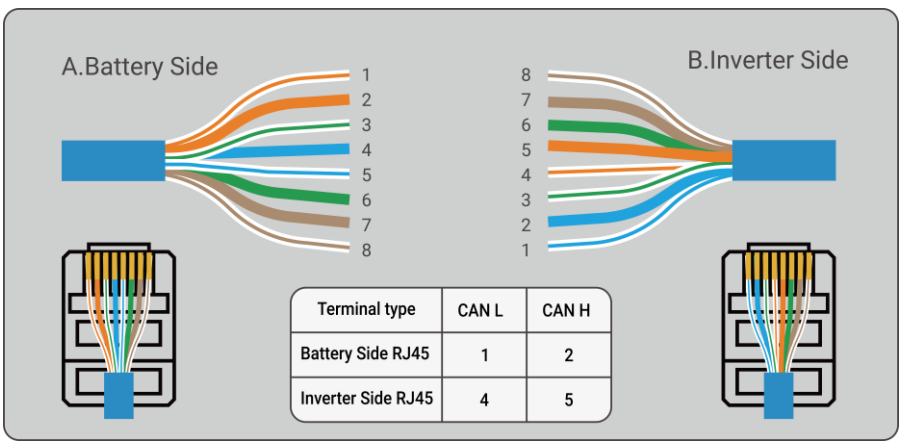
(a) Thread the RJ45 plug of appropriate length through the swivel nut, and insert it into the open side of the rubber gasket.

(b) Insert one side of the RJ45 plug into the RJ45 port of terminal block.



Note!

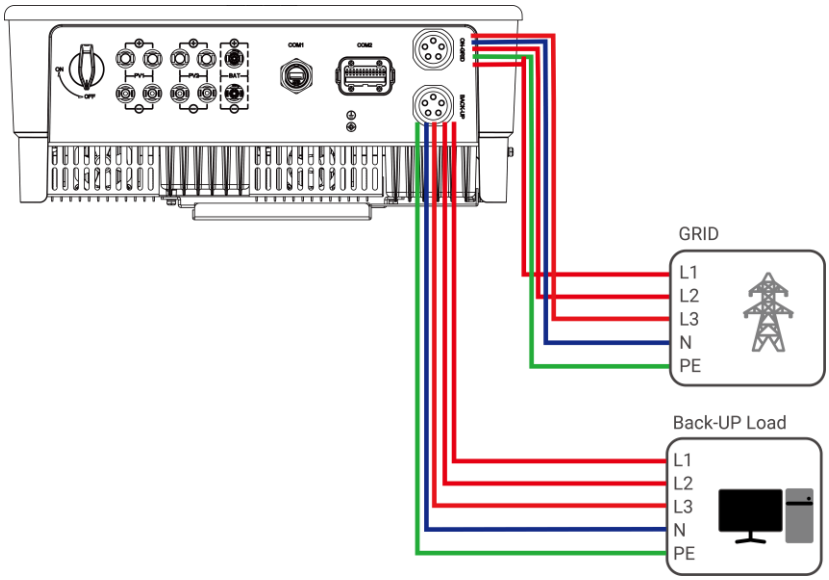
Example with WECO Battery HV Box Communication RJ45 connector. If LAN cable need to be prepared onsite, refer to the cable definition in the following figure 4-1. The color order at both ends is different.



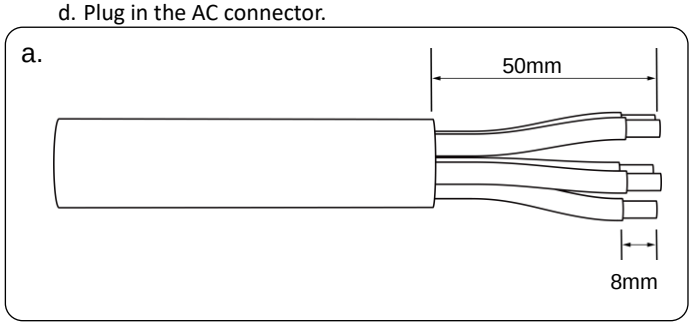
Terminal type	CAN L	CAN H
Battery Side RJ45	1	2
Inverter Side RJ45	4	5

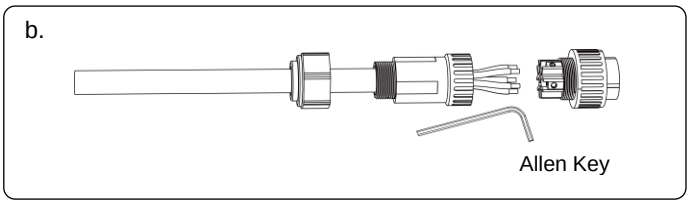
Figure 4-1

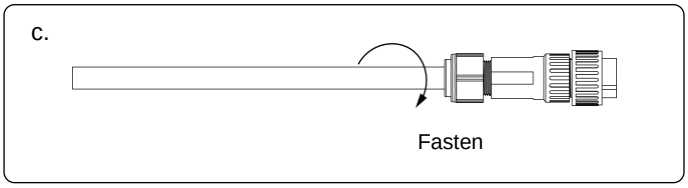
Step 5: Connect the AC cables to TK inverter

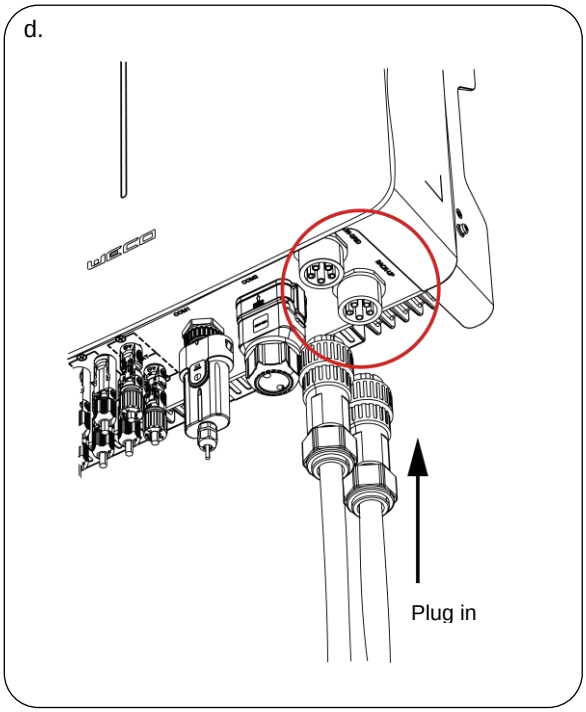


a. Strip the 8mm conductor of AC cables.
b. Fasten the cable to the connector pins.
c. Run the cable gland and fasten the nut.
d. Plug in the AC connector.







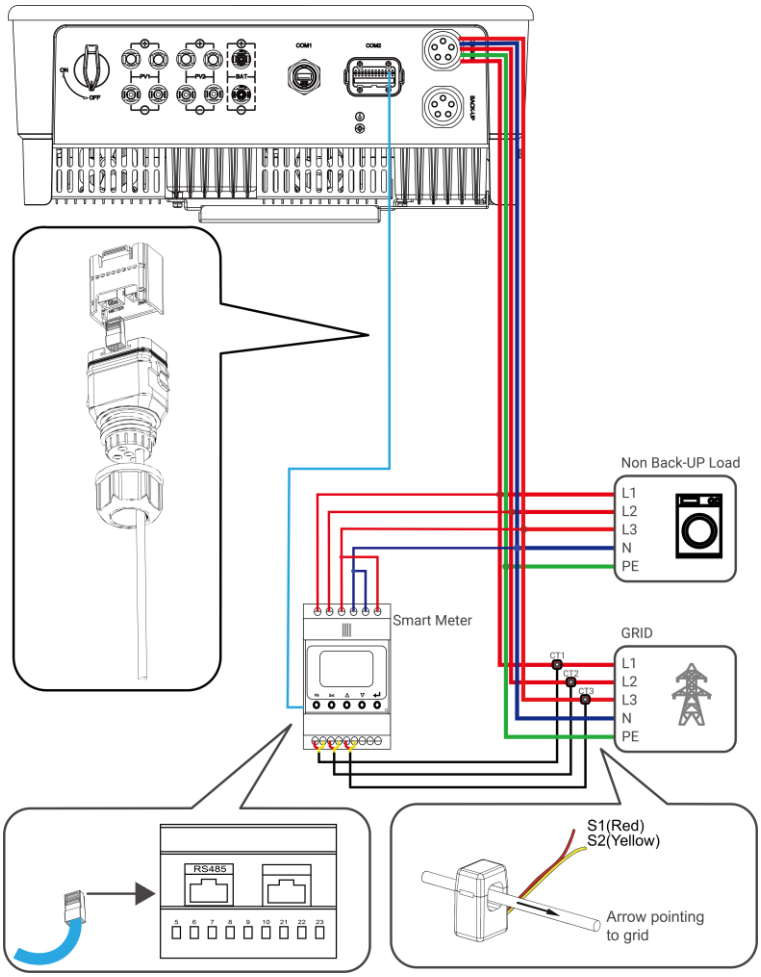


Step 6: Connect Meter to TK inverter

The current Transformer, also called CT, is usually installed on the L wires between the house loads and the power grid.

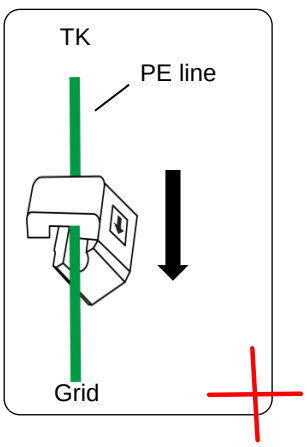
The Meter can be installed in the AC combiner box or other places that are unable to be touched by children. CT cable with length of 2m, it's fixed and can't be extended. The CTs have been connected to the Meter when you received them, and you just need to follow the wiring diagram in the Meter to connect CT.

Meter connection

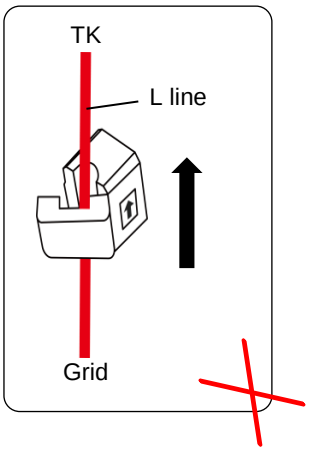


Fault CT connection cases

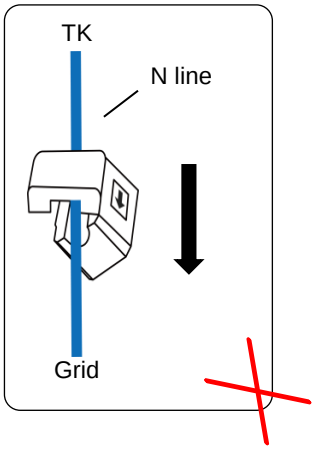
Case1: Connected to fault Line



Case2: Fault Orientation



Case3: Connected to fault Line



Note!

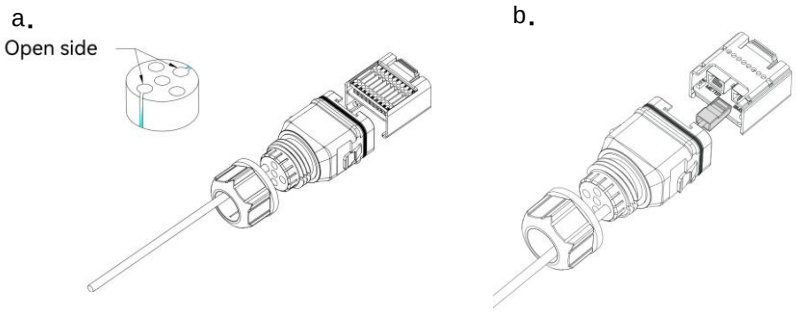
CT installation direction should strictly follow the instruction in the user manual, otherwise, the inverter may not be working normally.The CT has to be corresponding with the port in the meter, and the connection between CT and Meter needs to be reliable, otherwise, the CT measurement accuracy may be affected.

Connect the Communication cable between Meter and TK inverter.

Connect the battery to the TK COM2 with a special RJ45 cable from the accessory.

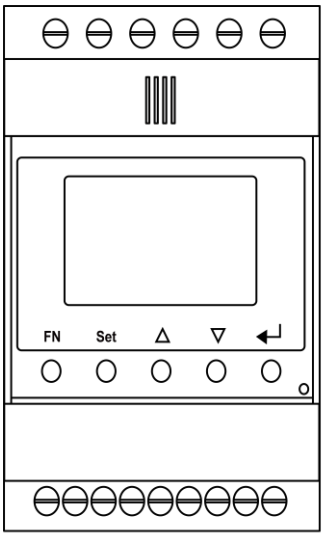
(a) Thread the RJ45 plug of appropriate length through the swivel nut, and insert it into the open side of the rubber gasket..

(b) Insert one side of the RJ45 plug into the RJ45 port of terminal block.



Meter Overview

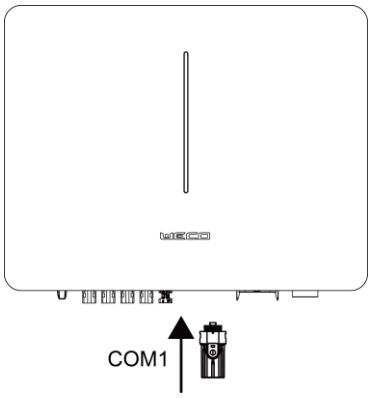
Meter terminals definition as shown in table below:



NO.	Definition		Function
	ACR10R	SM	
1	L1		L1/L2/L3/N connect to grid to detect power grid voltage
2	L2		
3	L3		
4	N		
5	L1-S1		To detect the CT current and direction
6	L1-S2		
7	L2-S1		
8	L2-S2		
9	L3-S1		
10	L3-S2		
11	/	PE	Ground connection
12	L	/	Power supplied from grid
13	N	/	
RS485	/	Reserve	
	RS485	RS485-2	Communicate with hybrid inverter
ANT	/	Reserve	
LAN	/	Reserve	
Type-C	/	Type-C	Specified Debug Interface. Do not use it by non-professionals

Step7: Connect WIFI dongle to TK

Connect the WIFI dongle to TK COM terminal.



5 System Commissioning

5.1 Power-up checklist

Note!

- Please check the following checklist before turning on the system for the first time; otherwise, the device may be dangerous or damaged.
- Always consult local regulations, wear appropriate personal protective equipment during operations for your own safety.
- Before checking or starting, make sure the power is off and there is no electricity, to avoid damage and risk to people.
- The operation can only be performed by authorized persons or licensed electricians.

First Power on - Preparation Checking items and acceptance criteria

Item	Check the item	Acceptance Criteria
1	Inverter installation	The inverter is installed correctly and is robust and reliable. 1. The installation space is reasonable, the environment is clean and tidy, and there are no construction residues.
2	Switches	1. All power switches connected to the inverter are in the "OFF" state.
3	Cables management	1. Cable arrangement is reasonable to meet the user's needs and in accordance with local regulations
4	Grounding	1. Ground wire connection is correct and reliable
5	AC Grid connection	Inverter network input cable L, N, PE is well connected to the main panel switch. 1. The CT is fixed on the right grid cable (phase L) and well tightened.
6	DC PV Connection	Ensure that the PV panels are well grounded. Ensure that all PV cables are well connected and insulated without damage or exposed. Check the number of PV panels in each string and the open-circuit voltage of the PV panel, making sure that it does not exceed the maximum MPPT voltage. 1. Check PV panel operation and open circuit current, making sure that all limits are within the MPPT ampere range.
7	DC Battery connection	Ensure that the power connections between battery and inverter are made according to the requirements of the relevant manuals and make sure that the tightening torque is correct. 1. Ensure that the RJ 45 battery communication terminal is properly connected to the BMS CAN port of the inverter.
8	AC Load connection	1. Make sure the load cable L, N, PE are well connected to the load switch.
9	Inverter communication ports	Make sure that all terminals are well connected and that unused terminals and connections are covered with waterproof covers. 1. Ensure that the WiFi antenna is installed correctly.
10	Plastic brackets and ties	Ensure that with create hindrance or sharp corners after cutting.

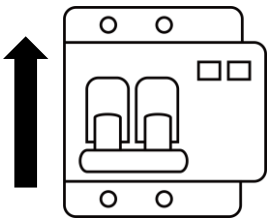
5.2 System power up

Prerequisites

Before closing the AC switch between the inverter and the grid, it is necessary to measure whether the AC voltage on the grid side of the AC switch is within the range allowed by the inverter.

Procedure

Step 1: Turn on the inverter to activate the WiFi device and configure the inverter. Close only the AC switch between the inverter and the grid if the inverter is connected to the grid. If the system is offgrid, start-up by turning on the batteries.



5.3 Commission on APP

Procedure:

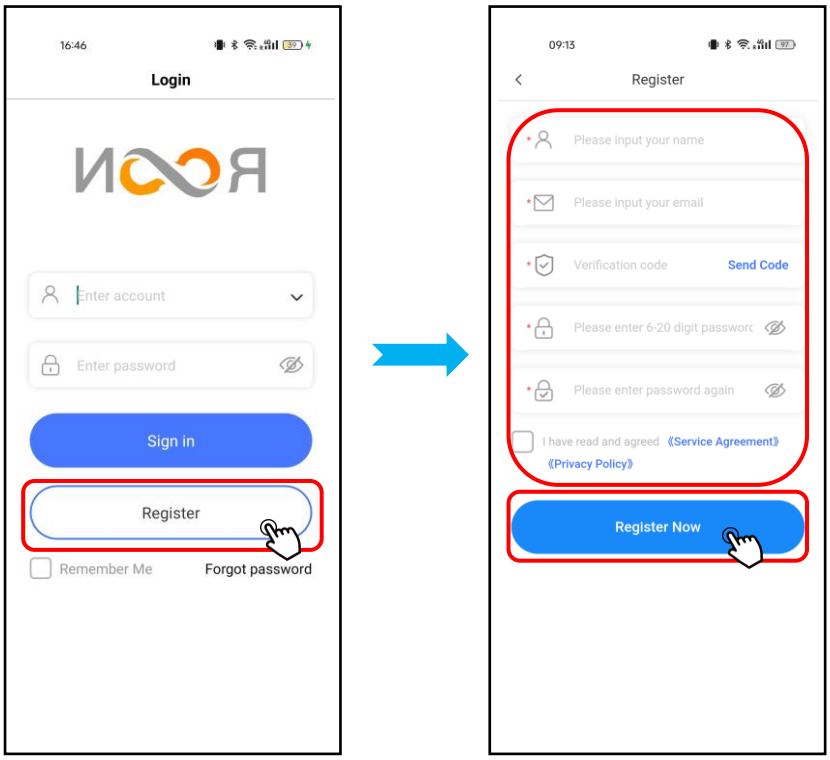
Step 1: Download and install the app

Search for "Noor" in the Google Play or App Store application market.

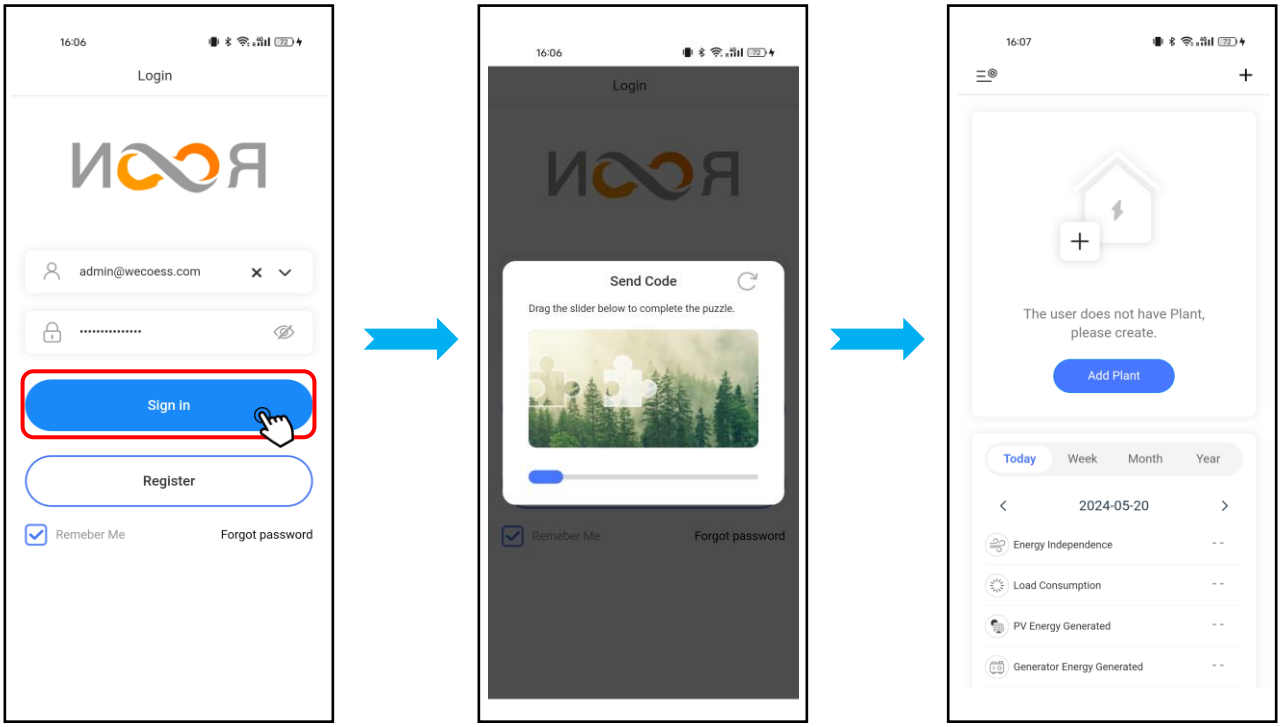
Step 2: Register Noor APP account and Sign in Noor APP

a. Click “Register”.

b. Fill in the account info step by step and Click “Register Now!”.



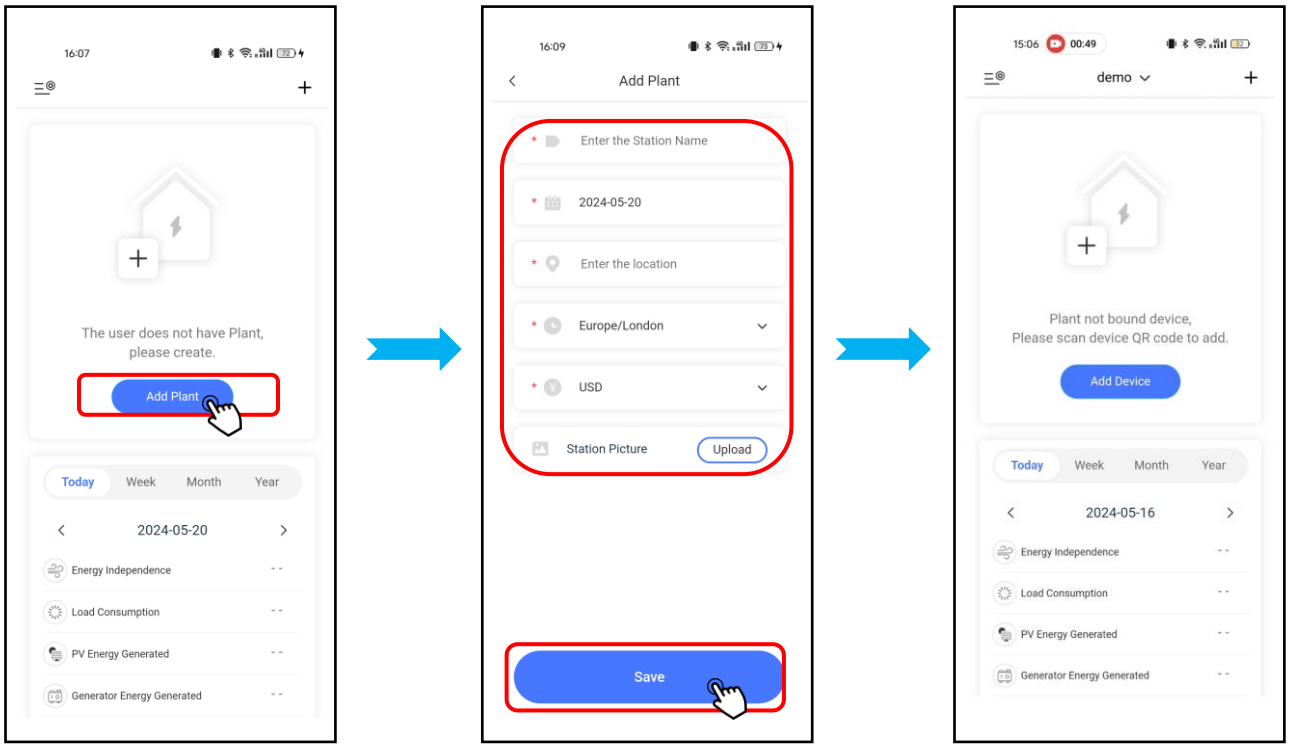
c. Fill in the account and password and Click “Sign In”.



Step 3: Add Plant on Noor APP

a. Click “Add Plant”.

b. Fill in the Plant info and Click “Save”.

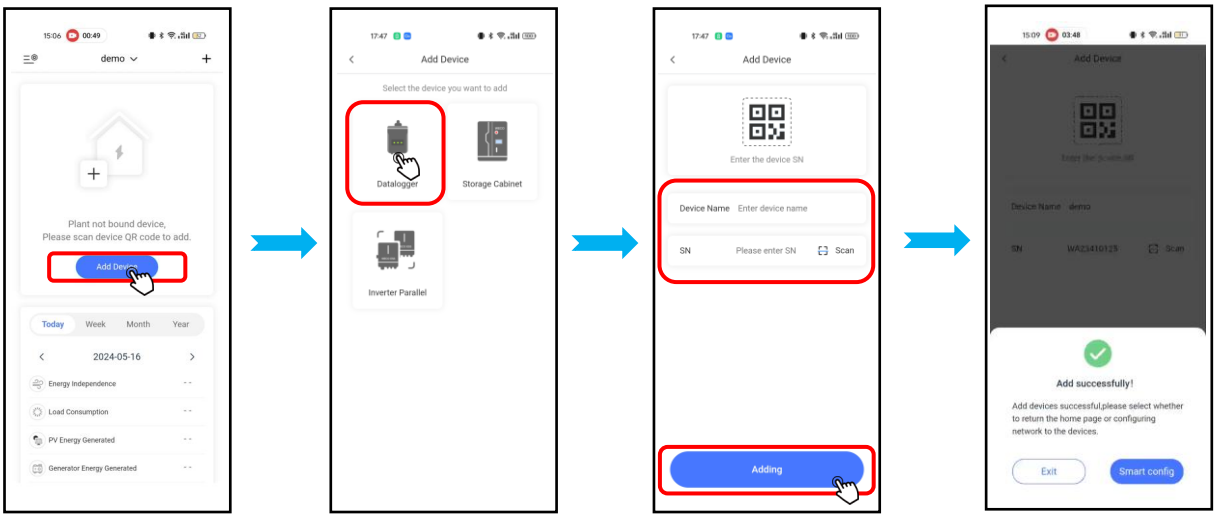


Step 4: Add Device on the Plant and config the WIFI module

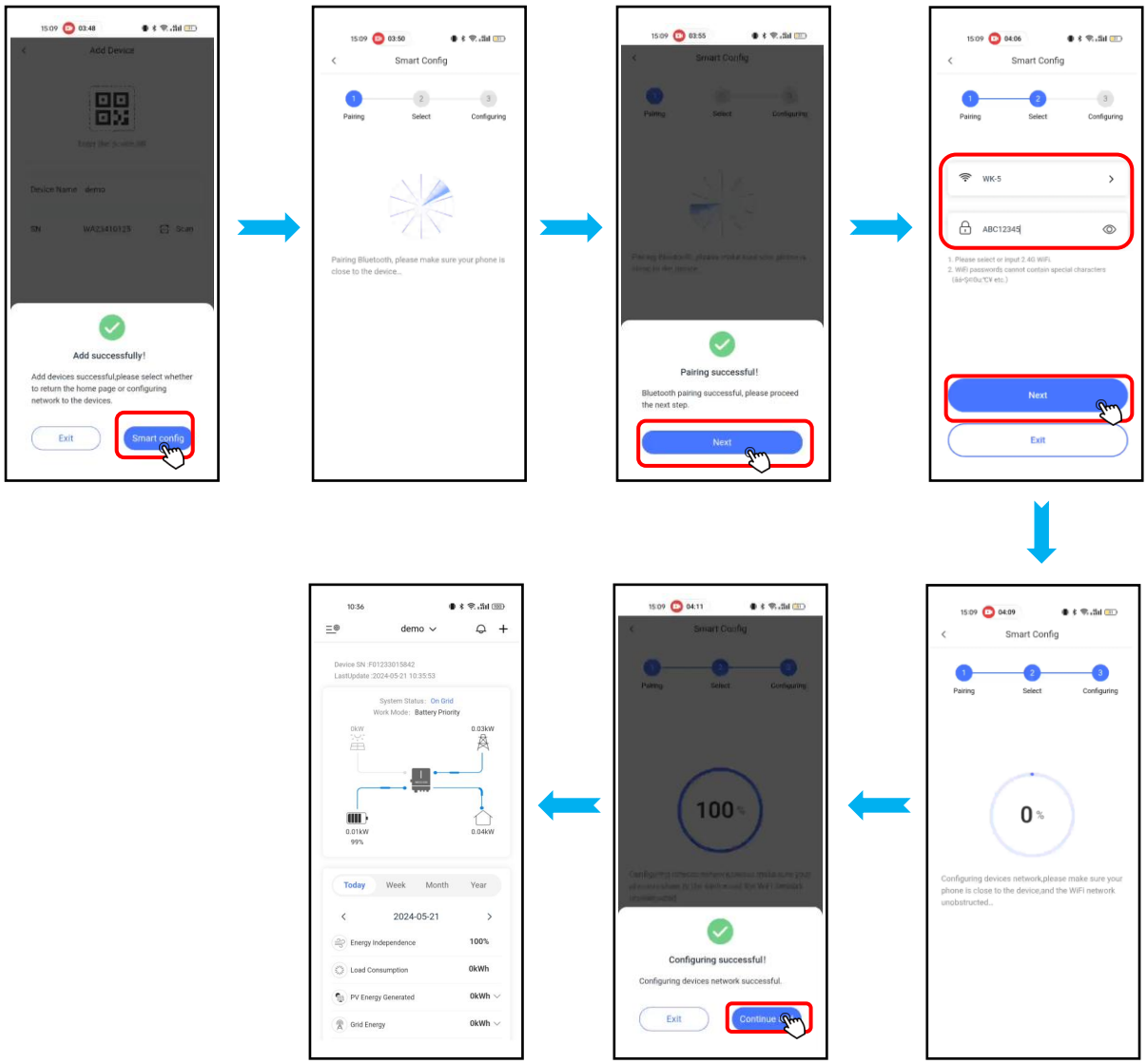
a. Click “Add Device”.

b. Click the “Datalogger”.

c. Scan the QR code of WIFI module or manual input WIFI module SN number and Click “Adding” to finish add device.

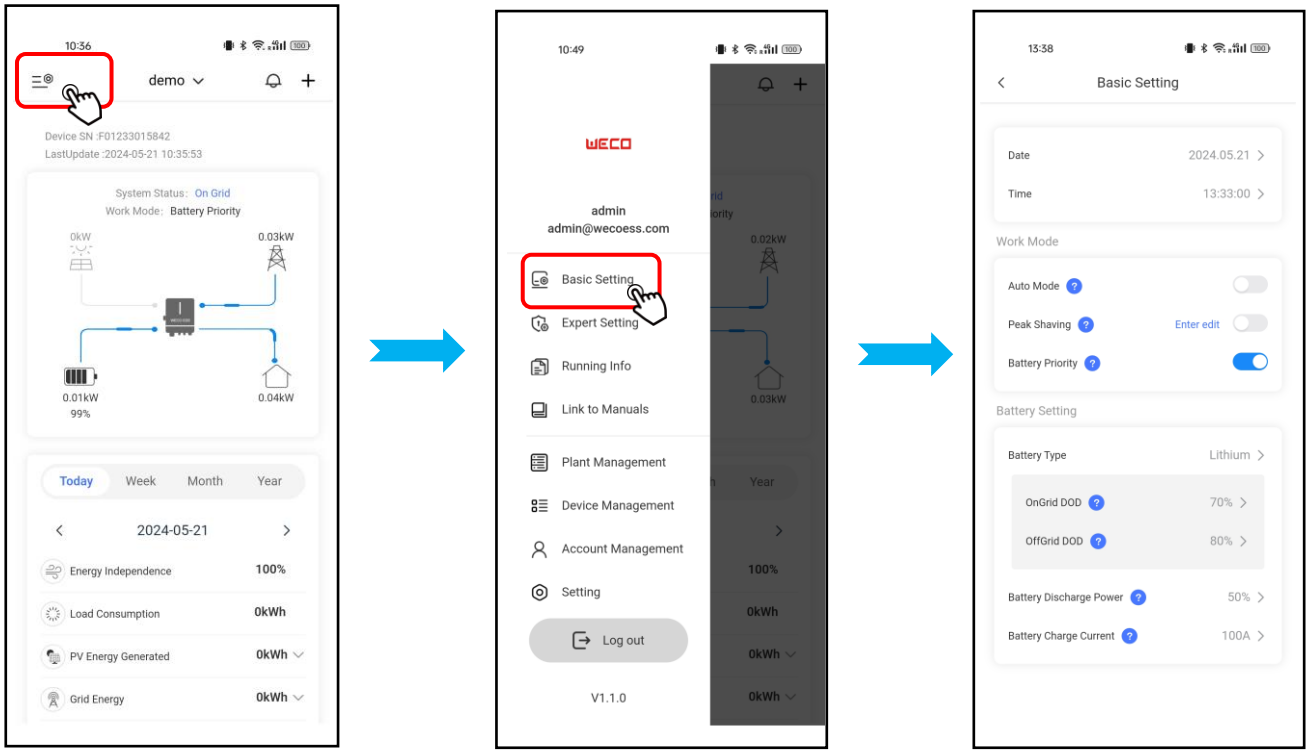


d. Click “Smart config” to config the WIFI module to homeowner Router step by step.

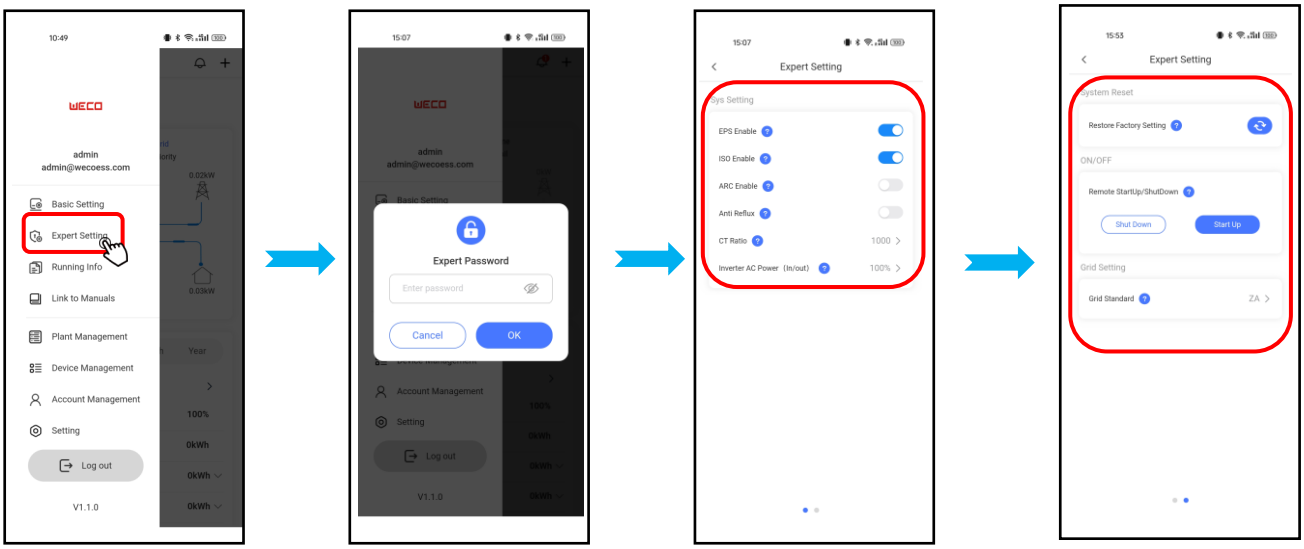


Step 5: Inverter setting

a. Click the icon and “Basic Setting” to enter the inverter basic setting page.

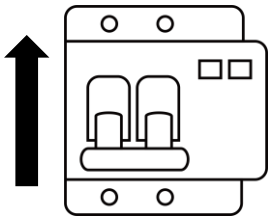


b. Click the “Expert Setting” and input the password to enter the advanced setting page.

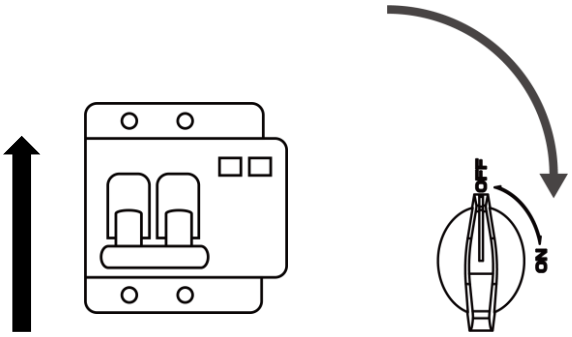


5.4 Energize the system

After finishing all the commission steps, installer can power on the inverter step by step.
Step 1: If the inverter is connected to the battery, close the battery breaker first and then turn on the battery.



Step 2: If there is a PV breaker between the inverter and the photovoltaic string, close the breaker. Then turn the "PV SWITCH" located on the left side of the inverter in the "ON" position.



Step 3: Observe the LED indicator to check the operating status of the inverter.

6 System Maintenance

6.1 Routine Maintenance

In order to ensure that the inverter can operate well for a long time, it is recommended to maintain it routinely as described in this section.

Caution!

- Perform system power-down operations while performing maintenance such as system cleaning, electrical connections, grounding reliability, etc. (see 6.2 System Power-down).
- Please use specialized protective equipment and insulation tools to avoid electric shock injuries or short circuit faults.
- It is prohibited to use a damp cloth to clean exposed copper bars or other potentially conductive parts, and it is also prohibited to use water or any solvent to clean the inverter.
- It is prohibited to maintain the inverter with electricity, and operations such as checking and tightening screw torque require the battery to be powered off. Only after taking effective preventive measures can operations be carried out.
- When it is necessary to move or rewire, the power input must be cut off, and after waiting for 15 minutes, the internal energy of the machine is fully discharged. After confirming with a multimeter that there is no dangerous voltage on the DC bus and the parts to be repaired inside the machine, maintenance can begin.

Maintain lists

Check the content	Check the method	Maintenance cycles
System cleaning	Regularly check the dust inside the box for dirt	Every six months to 1 time in a year
System operating status	Observe whether the appearance of the inverter is damaged or deformed. Listen to whether there is an abnormal sound during the operation of the inverter. When the inverter is running, check whether the parameters of the inverter are set correctly.	1 time every six months
Electrical connection	Check the cable connection for detachment and looseness. Check the cable for damage, focusing on whether the skin of the cable in contact with the metal surface has any traces of cuts.	Half a year after the first commissioning, and then once every six months to a year.
Grounding reliability	Check that the grounding cable is reliably grounded.	Half a year after the first commissioning, and then once every six months to a year.
Devices reliability	Check the battery (if there is), generator (if there is), PV strings, grid stability status	Half a year after the first commissioning, and then once every six months to a year.

6.2 Power down the system

**Warning!**

- After the inverter is powered down, there is still residual power and heat in the chassis, which may cause electric shock or burns. Therefore, after 15 minutes of powering down the inverter system, wear protective gloves before operating the inverter.
- If the inverter is connected to an battery device, please make sure to use the APP to issue a shutdown command, and after the inverter has been turned off, perform the power-down operation.
- If the user does not use the APP to issue the shutdown command, the inverter will switch to off-grid working mode after the power down on the grid side.

Procedure

Step 1: Use the APP to issue shutdown commands.
Step 2: Disconnect the inverter and the AC circuit breaker input on the grid side.
Step 3: Disconnect the PV DC circuit breaker between the inverter and the PV string.
Step 4: If the inverter battery port is connected to an battery device, disconnect the battery input circuit breaker.

6.3 System power-up

Prerequisites

Before closing the AC switch between the inverter and the grid, it is necessary to measure whether the AC voltage on the grid side of the AC switch is within the allowable range of the inverter.

Before closing the inverter and the PV DC input switch, it is necessary to measure whether the DC voltage on the PV DC switch side is within the allowable range of the inverter.

Before closing the DC input switch between the inverter and the energy storage device, it is necessary to measure whether the DC voltage on the DC switch side of the energy storage device is within the allowable range of the inverter.

Procedure:

Step 1: If the inverter energy storage port is connected to an energy storage device, close the energy storage switch first, and then the auxiliary power switch of the energy storage device.
Step 2: Close the AC switch between the inverter and the grid.
Step 3: If there is a DC SWITCH between the inverter and the photovoltaic string, close the DC SWITCH.
Step 4: Place the "DC SWITCH" located on the left side of the inverter in the "ON" position.
Step 5: Set the inverter parameters through the App, see “Noor Cloud APP Operation”.
Step 6: (Optional) Use a spot thermometer to detect the temperature at the connection between the DC terminal and the energy storage terminal. After the inverter has been working for a period of time, the temperature at the DC terminal connection is detected to confirm that the DC terminal contact is good. Make sure the temperature rise does not exceed 30°C.
Step 7: Observe the LED indicator to check the operating status of the inverter.

6.4 Troubleshooting

The fault messages and their corresponding troubleshooting methods are listed below:

Error/Fault Message	Description	Solution
Grid Lost	Grid power outage, AC switch or circuit is disconnected.	(1). Confirm whether the grid supply is lost. (2). Check whether the AC breaker and terminal are well connected.
Grid Voltage Fault	The inverter detects that the mains voltage is outside the limit of the selected safety range.	(1). Check whether the safety code is correct. (2). Check whether the AC cable wiring is correct. (3). Check whether the voltage increase is caused by a high impedance of the AC cable. In this case, the cable can be replaced. (4). Verify with the approval of the Electricity Authority whether it is possible to change the limit.
Grid Frequency Fault	Grid over frequency or under frequency, the grid frequency is higher or lower than the set protection value.	(1). Check whether the AC cable is correct and well connected. (2). Verify with the approval of the Electricity Authority whether it is possible to change the limit.
DCI Fault	Inverter detects that the the direct current injection value exceeds the range.	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
ISO Over Limitation	Inverter detects that DC side's insulation impedance to the ground is too low.	(1). Check whether PV panels, cables, and connectors are waterlogged or damaged. (2). Use a megohmmeter to measure ground resistance on the DC side, and the measured value should not be less than 500 kΩ. (3). If the problem persists, contact the installation company.
GFCI Fault	The inverter detects that the ground leakage current exceeds the limitation.	(1). Restart the inverter. (2). Check whether the PV panels, cables, and connectors are waterlogged or damaged. (3). If the problem persists, contact the installation company.
PV Over Voltage	PV input voltage exceeds the upper limit.	Reduce the number of PV panels to make sure that the open-circuit voltage of each string is lower than the inverter maximum allowed input voltage.
Bus Voltage Fault	The voltage of bus circuit is too high	(1). Check whether the input voltage exceeds the limit. (2). Restart the inverter. (3). If the problem persists, contact the installation company.
Inverter Over Temperature	The inverter detects its high internal temperature.	(1) Check whether the inverter installation location is well ventilated. (2) Try to turn it off for a while, and then power it back on when it cools down. (3) If the problem persists, contact the installation company.
N - PE Check Fault	The ground cable is loss or in poor connection	Check whether the ground cable wiring is correct.
SPI Fault	Internal communication got failed. Caused by a strong external magnetic field etc.	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
E2 Fault	Internal storage got abnormal. Caused by a strong external magnetic field etc.	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
GFCI Device Fault	GFCI device got abnormal	(1). Restart the inverter. (2). If the problem persists, contact the installation company.

AC Transducer Fault	AC transducer got abnormal	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
Relay Check Fail	Self-checking of internal relay got failed. Neutral & ground cable are in poor connection on AC side.	(1). Use multimeter to measure the voltage between N&PE cable on AC side. If the voltage is higher than 10V, which means the neutral or ground connection is abnormal. (2). Restart the inverter. (3). If the problem persists, contact the installation company.
Internal Fan Fault	Inverter's internal fan got failed	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
External Fan Fault	Inverter's external fan got failed	Check whether the fan is blocked by foreign matters, clean them if necessary.
Bat OV	Battery protection triggered	(1). Check the battery status and whether the alarm is actually triggered on the battery side. (2). Restart the system.
Backup OV	Abnormal voltage on the back- upside	Turn off inverter and remove the back-up connector. Use a multimeter to measure whether there is voltage existing on the back-up connector.
Bus Volt Low	Abnormal voltage on the DC inverter BUS	Check whether the battery voltage and PV input voltage are normal
Hard Fault	Hardware protection got triggered	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
Backup OP	Output power over limitation on back-up side	Check whether the load power on back-up side exceeds the maximum output power of inverter.
Inverter OV	The load power exceeds the range	(1). Check whether there is an impact load on the back-up side and whether the load power is too high. (2). Check whether back-up side is short circuit.
Inverter OF	The load power exceeds the range	(1). Check whether there is an impact load on the back-up side and whether the load power is too high. (2). Check whether back-up side is short circuit.
Inverter OC	The load power exceeds the range	(1). Check whether there is an impact load on the back-up side and whether the load power is too high. (2). Check whether back-up side is short circuit.
SCI Fault	Internal communication got failed. Caused by a strong external magnetic field etc.	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
FLASH Fault	Internal storage anomaly. Caused by a strong external magnetic field etc.	(1). Restart the inverter. (2). If the problem persists, contact the installation company.
Meter Comm Fault	Abnormal communication between meter and inverter.	(1). Check whether the communication connection. between inverter and meter is reliable. (2). Confirm whether the meter model is compatible and if the settings are correct.
BMS Comm Fault	Abnormal communication between inverter and battery BMS.	(1). Check whether the battery ID selection is correct. (2). Check whether the communication connection between inverter and BMS is reliable. (3). Check the working status of battery.

7 Storage & Care

7.1 System Storage

If the inverter is not immediately put into service within 2 months from the production date, the storage specifications needs to be met as follow:

- The inverter should be stored indoors, not in direct sunlight or rain. The environment should be dry, clean and well ventilated, there should be no organic solvents or corrosive gases, conductive metal dust, and it should be located away from heat and fire sources.
- After the storage period has passed, the product must be inspected and tested by professional personnel before it can be put into use. During storage, relevant certificates that meet the product's storage requirements, such as temperature and humidity records, photos of the storage environment and inspection reports, should be kept.
- Do not remove the outer packaging of the inverter.
- Storage temperature should be maintained at -20°C~+60°C; Relative humidity should be maintained at 5% relative humidity ~ 95% relative humidity.
- Handle the inverter with care to avoid personal injury or damage to the equipment caused by its weight.
- Regular inspections must be carried out during storage. The packaging must be intact. If the packaging is damaged, it should be replaced immediately.
- After the system has been idle for a long time, the inverter and photovoltaic devices and batteries should be inspected and tested by professionals before they can be put into operation.

7.2 System Care

Firmware update

In order to benefit from the warranty, it is a prerequisite that the inverter is connected to the WiFi network via the dongle provided Updating the firmware is critical to optimize inverter performance and warranty.

Normally the WECO team updates the system remotely, so always keep the inverter online to avoid missing the update.

During the upgrade, the system may operate in bypass mode (directly using mains power). Make sure the inverter is in normal condition and the Internet connection is stable, then press the update button in the NOOR application to start the system update.

When your inverter loses WIFI or is not online, it will no longer be' remotely monitorable and you will not be able to receive notifications or email alerts and warnings, a prolonged disconnection from the WiFi network for more than 30 days will cause you to lose your right to the additional warranty.

The inverter must be connected to the Internet via 2.4 Ghz home WIFI. Smartphone hotspot is only possible as a backup connection in case of loss of WIFI. Check the NET light on the WIFI dongle to see whether the WIFI connection is successful or not.

ATTENTION

Critical updates must be performed within 60 days of publication or the additional warranty will be voided.

Updates can also be performed via bluetooth APP locally, without the need for a WiFi network; however, your cell phone will need to be connected to the 4 or 5G network to act as an automatic router.

8 Inverter Disposal

8.1 Remove the inverter

Procedure:

Step 1: perform a system shutdown operation (see 6.3 System Shutdown).

Step 2: Wait 15 minutes, make sure there is no residual voltage in the connections. Then disconnect all electrical connections to the inverter, including signal lines, PV input lines, battery input lines, AC output lines, and protective grounding cables.

Step 3: Remove the screws securing the inverter.

Note: Please note that for any reason, personnel or installer should not disassemble/demolish the inverter without WECO's permission, otherwise the device will not be under warranty.

8.2 Packaging inverters

If you have the original packaging of the inverter, insert it into the original packaging and seal it tightly with tape.
If you can no longer find the original inverter packaging, use a wooden box suitable for the weight and size of the inverter to seal it tightly.

8.3 Scrap inverters

At the end of the inverter's useful life, dispose of it in accordance with the electrical waste disposal law in force at the place of installation.

Appendix A abbreviations

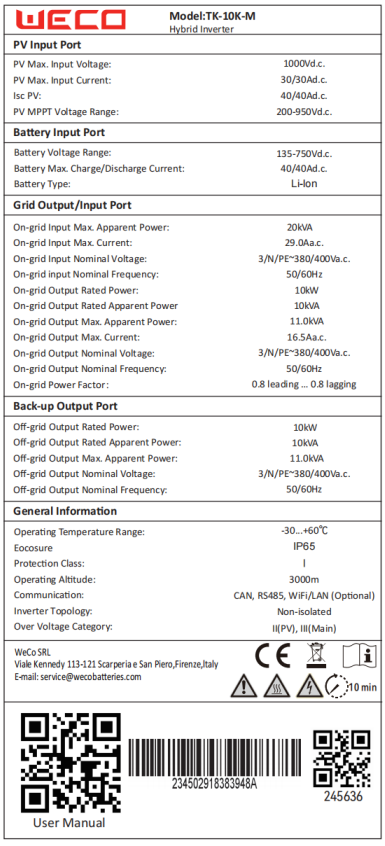
A	
AC	Alternating Current
B	
BAT	Battery
D	
DC	Direct Current
H	
HP	Heat Pump
I	
ID	Identifier
L	
LED	Light Emitting Diode
LVRT	Low Voltage Ride-Through
M	
MPPT	Maximum Power Point Tracking
P	
PC	Personal Computer
PE	Protective Earthing
PV	Photovoltaic
R	
RCD	Residual Current Device
RH	Relative Humidity
S	
SG	Smart Ready
SN	Serial Number
T	
THDI	Total Harmonic Current Distortion
WEEE	Waste Electrical and Electronic Equipment
WiFi	Wireless Fidelity

Appendix B Label Description

Symbols on product

icon	name	meaning
	Anti-scald warning sign	The inverter has a high shell temperature when working, there is a risk of scalding, and it is strictly forbidden to touch it
	High voltage hazard sign	Solar inverter with high voltage input, do not disconnect under load. Disconnect all power sources before servicing and allow 15 minutes for capacitors to discharge. To avoid electric shocks, carefully follow the steps in the manual.
	Inverter grounding label	Protect the ground wire connection location
	Inverter warning label	Risk of electric shock, do not remove the top cover. The product must be installed and maintained by qualified professional installers. Please read the user manual carefully before use.
	Inverter serial number label	Serial number information
	QR code label	Scan the code to check the latest manual

Nameplate



Model:TK-10K-M	Hybrid Inverter
PV Input Port	
PV Max. Input Voltage:	1000Vd.c.
PV Max. Input Current:	30/30Ad.c.
Isc PV:	40/40Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	40/40Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	20kVA
On-grid Input Max. Current:	29.0Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	10kW
On-grid Output Rated Apparent Power	10kVA
On-grid Output Max. Apparent Power:	11.0kVA
On-grid Output Max. Current:	16.5Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	10kW
Off-grid Output Rated Apparent Power:	10kVA
Off-grid Output Max. Apparent Power:	11.0kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
Protection Class:	I
Operating Altitude:	3000m
Communication:	CAN, RS485, WiFi/LAN (Optional)
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV), III(Main)

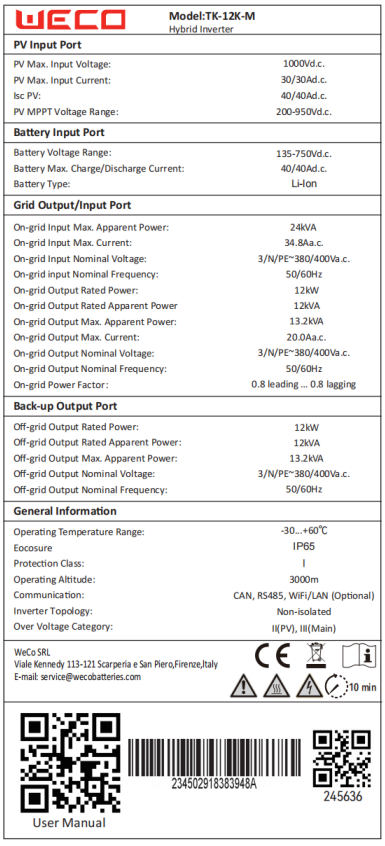
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User Manual



Model:TK-12K-M	Hybrid Inverter
PV Input Port	
PV Max. Input Voltage:	1000Vd.c.
PV Max. Input Current:	30/30Ad.c.
Isc PV:	40/40Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	40/40Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	24kVA
On-grid Input Max. Current:	34.8Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	12kW
On-grid Output Rated Apparent Power	12kVA
On-grid Output Max. Apparent Power:	13.2kVA
On-grid Output Max. Current:	20.0Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	12kW
Off-grid Output Rated Apparent Power:	12kVA
Off-grid Output Max. Apparent Power:	13.2kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
Protection Class:	I
Operating Altitude:	3000m
Communication:	CAN, RS485, WiFi/LAN (Optional)
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV), III(Main)

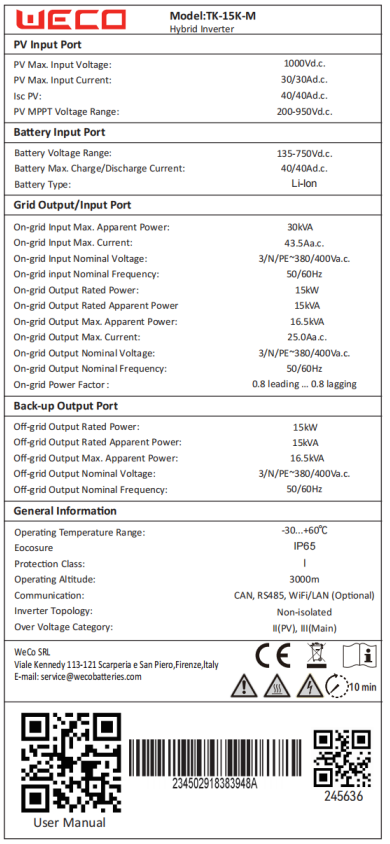
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User Manual



Model:TK-15K-M	Hybrid Inverter
PV Input Port	
PV Max. Input Voltage:	1000Vd.c.
PV Max. Input Current:	30/30Ad.c.
Isc PV:	40/40Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	40/40Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	30kVA
On-grid Input Max. Current:	43.5Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	15kW
On-grid Output Rated Apparent Power	15kVA
On-grid Output Max. Apparent Power:	16.5kVA
On-grid Output Max. Current:	25.0Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	15kW
Off-grid Output Rated Apparent Power:	15kVA
Off-grid Output Max. Apparent Power:	16.5kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
Protection Class:	I
Operating Altitude:	3000m
Communication:	CAN, RS485, WiFi/LAN (Optional)
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV), III(Main)

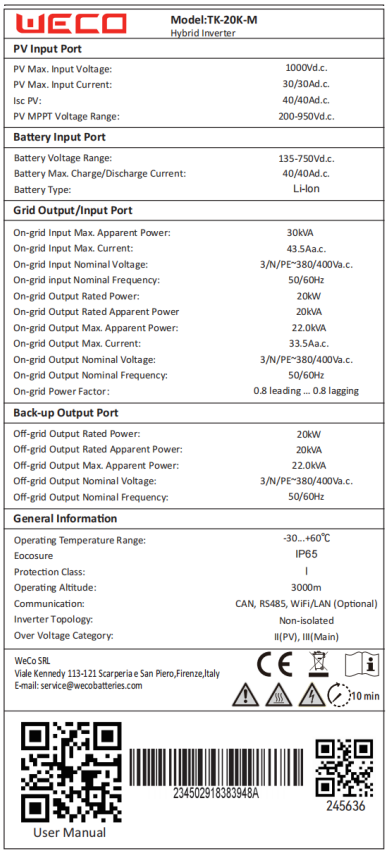
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User Manual



Model:TK-20K-M	Hybrid Inverter
PV Input Port	
PV Max. Input Voltage:	1000Vd.c.
PV Max. Input Current:	30/30Ad.c.
Isc PV:	40/40Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	40/40Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	30kVA
On-grid Input Max. Current:	43.5Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	20kW
On-grid Output Rated Apparent Power	20kVA
On-grid Output Max. Apparent Power:	22.0kVA
On-grid Output Max. Current:	33.5Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	20kW
Off-grid Output Rated Apparent Power:	20kVA
Off-grid Output Max. Apparent Power:	22.0kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
Protection Class:	I
Operating Altitude:	3000m
Communication:	CAN, RS485, WiFi/LAN (Optional)
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV), III(Main)

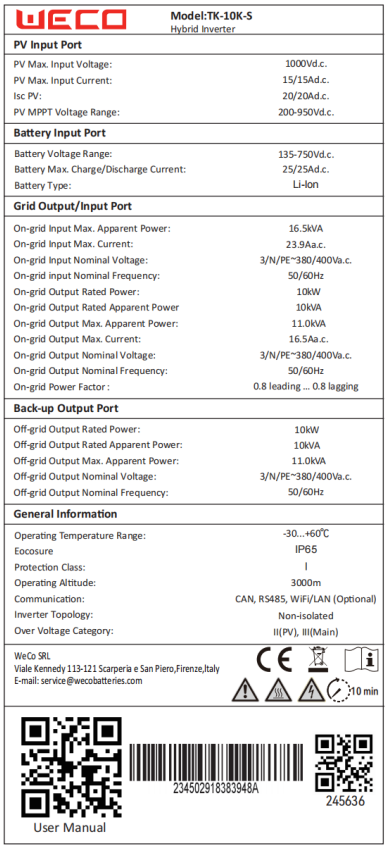
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Model:TK-10K-S	Hybrid Inverter
PV Input Port	
PV Max. Input Voltage:	1000Vd.c.
PV Max. Input Current:	15/15Ad.c.
Isc PV:	20/20Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	25/25Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	16.5kVA
On-grid Input Max. Current:	23.9Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	10kW
On-grid Output Rated Apparent Power	10kVA
On-grid Output Max. Apparent Power:	11.0kVA
On-grid Output Max. Current:	16.5Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	10kW
Off-grid Output Rated Apparent Power:	10kVA
Off-grid Output Max. Apparent Power:	11.0kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
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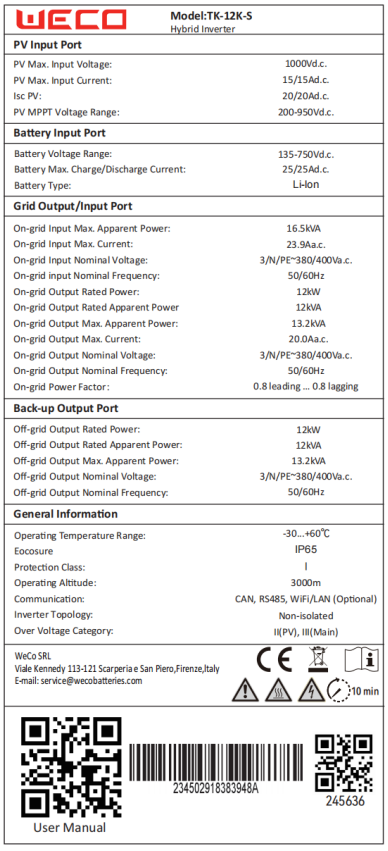
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PV Max. Input Current:	15/15Ad.c.
Isc PV:	20/20Ad.c.
PV MPPT Voltage Range:	200-950Vd.c.
Battery Input Port	
Battery Voltage Range:	135-750Vd.c.
Battery Max. Charge/Discharge Current:	25/25Ad.c.
Battery Type:	Li-Ion
Grid Output/Input Port	
On-grid Input Max. Apparent Power:	16.5kVA
On-grid Input Max. Current:	23.9Aa.c.
On-grid Input Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid input Nominal Frequency:	50/60Hz
On-grid Output Rated Power:	12kW
On-grid Output Rated Apparent Power	12kVA
On-grid Output Max. Apparent Power:	13.2kVA
On-grid Output Max. Current:	20.0Aa.c.
On-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
On-grid Output Nominal Frequency:	50/60Hz
On-grid Power Factor:	0.8 leading ... 0.8 lagging
Back-up Output Port	
Off-grid Output Rated Power:	12kW
Off-grid Output Rated Apparent Power:	12kVA
Off-grid Output Max. Apparent Power:	13.2kVA
Off-grid Output Nominal Voltage:	3/N/PE~380/400Va.c.
Off-grid Output Nominal Frequency:	50/60Hz
General Information	
Operating Temperature Range:	-30...+60℃
Eocosure	IP65
Protection Class:	I
Operating Altitude:	3000m
Communication:	CAN, RS485, WiFi/LAN (Optional)
Inverter Topology:	Non-isolated
Over Voltage Category:	II(PV), III(Main)

WeCo SRL
Viale Kennedy 113-121 Scarperia e San Piero,Firenze,Italy
E-mail: service@wecobatteries.com

10 min

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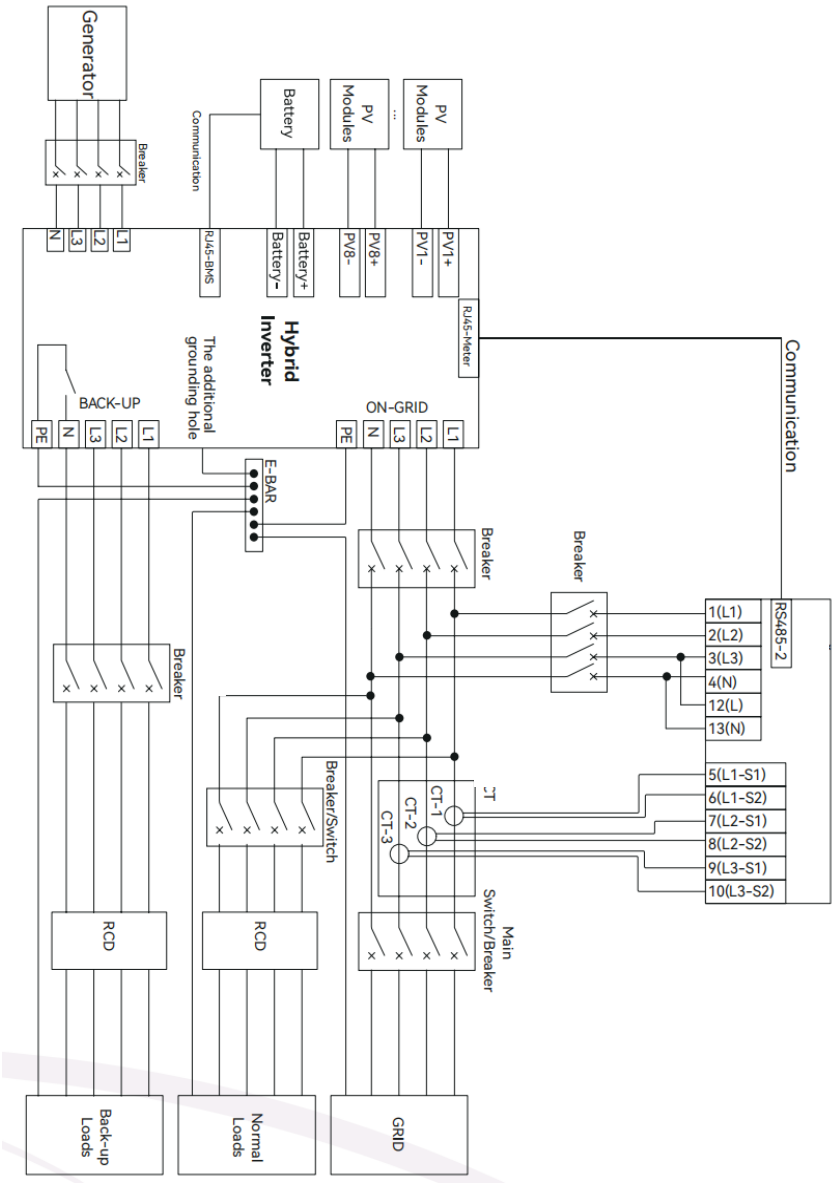
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User Manual

Appendix D Working Mode & Light Language

The TK inverter can be connected up to 8 PV strings, and each MPPT circuit can support 2 strings of solar panel. Device contains Maximum power point tracking, DC to AC conversion through inverter circuit, and surge protection function on both DC and AC side. The TK inverter can expand the energy storage function through the energy storage interface, and the energy generated by the PV string is supplied to the local load for use, and the excess energy is stored in the energy storage equipment. The electrical energy stored in the energy storage equipment can be released to the grid according to the user's load situation, and the peak-valley regulation of the grid can be realized to obtain maximum benefits.

Schematic:



Note!

Above wiring schematic of TK inverter applies to wiring rules that require the N (neutral) wire of the EPS to be disconnected from the N (neutral) wire of the grid, which is applicable to most of countries in the world.

For few countries, these countries request a wiring rules that require that the N (neutral) wire of other power sources must not be isolated or switched /connect with PE. So if you are not familiar with your local rules please contact professional local institution for confirmation.

Please control the home loads, and make sure it is within the “BACK-UP/EPS output rating” under EPS mode, otherwise the inverter will shut down with an “overload fault” warning. Please confirm with the mains grid operator whether there is any special regulations for grid connection.

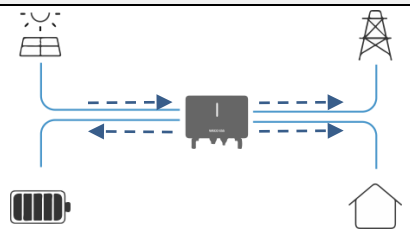
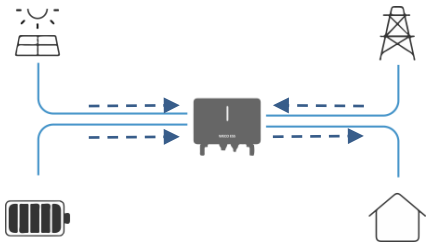
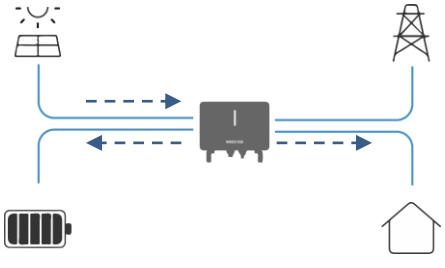
Description of the LEDs

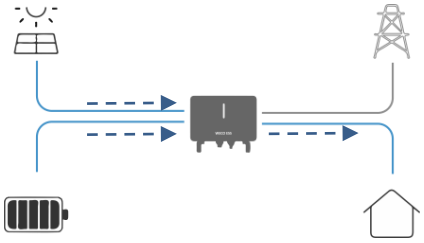
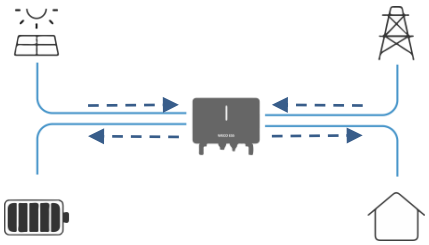
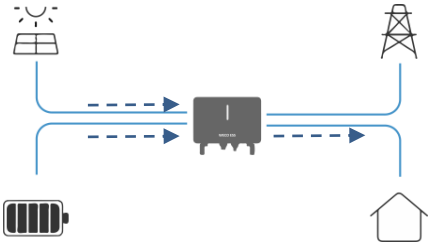
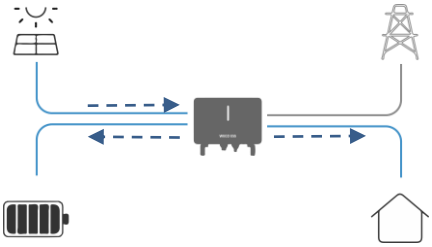
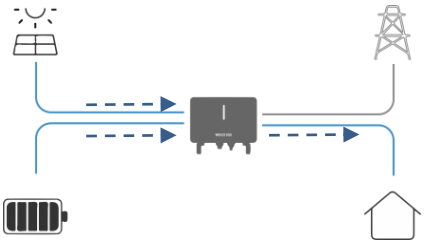
The LED Bar is described in the following table

Equipment status	Light language	remarks
Standby	Blink light blue light for 6s once (3S lights on,3S lights off)	The device is normal and operate under bypass, and APP remote shutdown does not work
On-Grid Work	Blink light, green light for 6s once (3S lights on, 3S lights off)	
Off-Grid Work	Blink light green light for 3s once (0.5S lights on, 2.5S lights off)	
Alarm	Blink light orange light for 3s once (1.5Slights on, 1.5S lights off)	Recoverable alarm, automatic recove ry
Fault	Red light continuously	The fault causes the system to stop working and requires manual maintenance
Updating	White light continuously	The system is updating.

Description of Operation Modes

Inverter has the following basic operation modes and you can configure the operation mode as per your preference in the App.

Mode Type	Scenario	Brief Description
Auto Mode		In this working mode, when the power from the PV array is sufficient, PV power will supply the loads, battery, and grid in the order of loads first, battery second, and grid last. (You can set the power to the grid to 0W when the local grid doesn't allow inverter power to feed to the grid).
		When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery is not enough to supply loads.
Battery Priority		In this working mode, the inverter will use the power from PV or grid to charge the battery until it is fully charged, and as long as the grid is there, the battery won't discharge.

		When the grid fails, power from PV and battery will supply loads connected on the back-up side (UPS).
Peak Shaving		In this working mode, you can set charge/dis- charge power and time in the App, inverter will use the power from PV or grid (whether to use can be set in the App) to charge the battery in the predetermined period.
		Inverter will use power from PV and battery to supply loads in the predetermined period and the insufficient part will be supplied by the grid.
Off-grid Mode		In the purely off-grid mode, power from PV will supply the back-up loads first and then charge the battery if there's surplus power.
		When the power from PV isn’t enough, the battery will discharge to supply back-up loads together with PV.

Appendix E SG ready Heat Pump Introduction

Solution Introduction

TK inverters have integrated the intelligent load management function, which can help customers to use their green power with their SG ready heat pump (HP) more efficiently. For better to use this function, we made this file to guide the connection and settings.

SG Ready and Work Modes Introduction

Check Deliverable
SG ready is a label issued by the German Heat Pump Association, in order to offer a flexible use of the HP. It requires that four different operation modes (as shown below) of the HP can be triggered via two zero voltage contacts. TK inverters support switching between the most frequently used work modes 2 and 3, which is controlled by a normally open dry contact on multi-function connector (pin1 and pin2 in COM2).

Mode1: OFF (Contact status 1:0)
At this mode, the HP is turned off. And the operator can assigns a daily fixed off time of up two hours per day.

Mode2: Normal (Contact status 0:0)
HP operates in normal energy efficient mode and operates with normal set-points.

Mode3: Recommended ON (Contact status 0:1)
HP is operating in an enhanced heating mode for hot water generation or room heating. This is not a direct start-up command, but an activation recommendation corresponding to the surplus PV power or battery soc level.

Mode4: Forced ON (Contact status 1:1)
HP will be forced on and work in the following control modes:
4a: HP is switched on, temperatures increased to max.
4b: HP and back-up heater are switched on, temperatures increased to max.

Intelligent Load Management Function Introduction

Disable
Before we use the function, we need to define the usage of the multi-function relay. Disable means not using the load management function.

Manual Mode
Manually control the heat pump operates between Mode2 and Mode3. (OFF correspond to Mode2, On correspond to Mode3.)

Smart Mode
A. By Grid Power-- use in system **WITHOUT** power export limitation.
Set the feed-in power threshold for triggering the heat pump entering Mode3. When the meter detects the feed-in power equal to or greater than the set value, heat pump will enter heating mode or smart loads start working.
B. By Battery SOC -- use in system **WITH** power export limitation.
Set the battery SOC threshold for triggering the heat pump entering Mode3. When inverter detects the battery SOC value equal to or greater than the set value, pump will enter heating mode or smart loads start working.
C. Base on Time
Set the operation periods for heat pump switch between Mode2&3 according to user habits or preferences. Up to 3 periods can be set. When this mode is enabled, a higher priority than other modes within the period. Outside the period, the heat pump or smart load operates according to the parameters set by the smart mode.

Wire Connection

Most SG ready HP has integrated the contact for receiving EVU signal. Different EVU signals corresponding to different SG Ready HP working modes. Here we use a common case as an example:

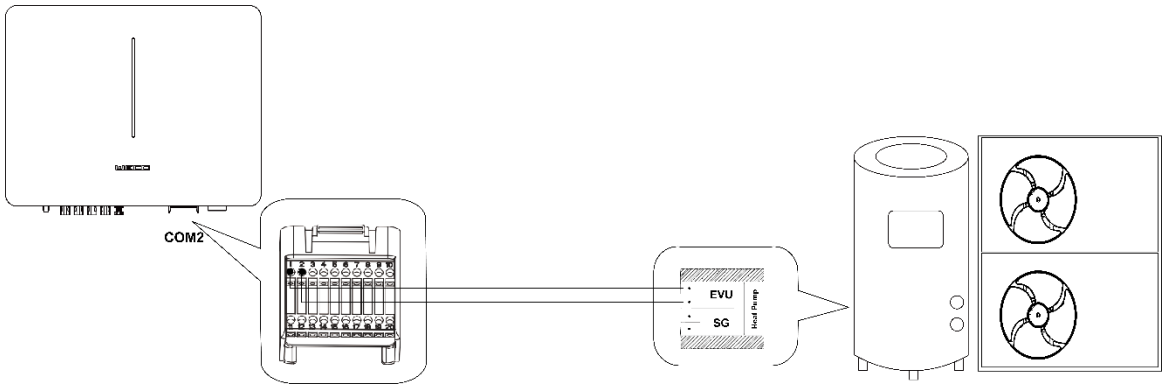
Work	Contact Status	
	SG	EVU
Mode1:OFF	●	○
Mode2:Normal	○	○
Mode3:Recommended ON	○	●
Mode4:Forced ON	●	●

○: **OFF;** ●ON

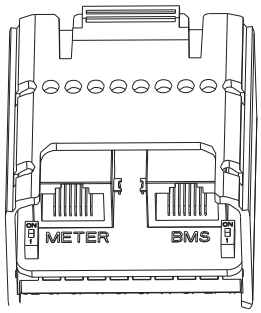
Note!

Different HP manufacture may has different definition and name of the EVU contact, please consult the HP manufacture for detailed information and do the installation under their guide. Wrong connection may cause error and damage.

As TK inverters support switching the HP between Mode2 and Mode3, we only need connect the EVU port of the heat pump to the multi-function relay in COM2 of the inverter. As the picture shown below:

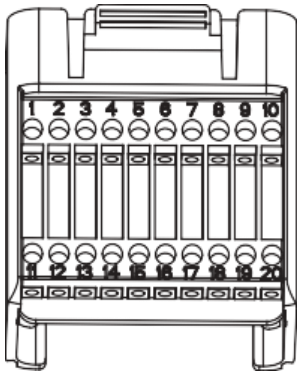


Wire Diagram of Inverter and SG Ready HP



Terminating resistor for CAN(Parallel)

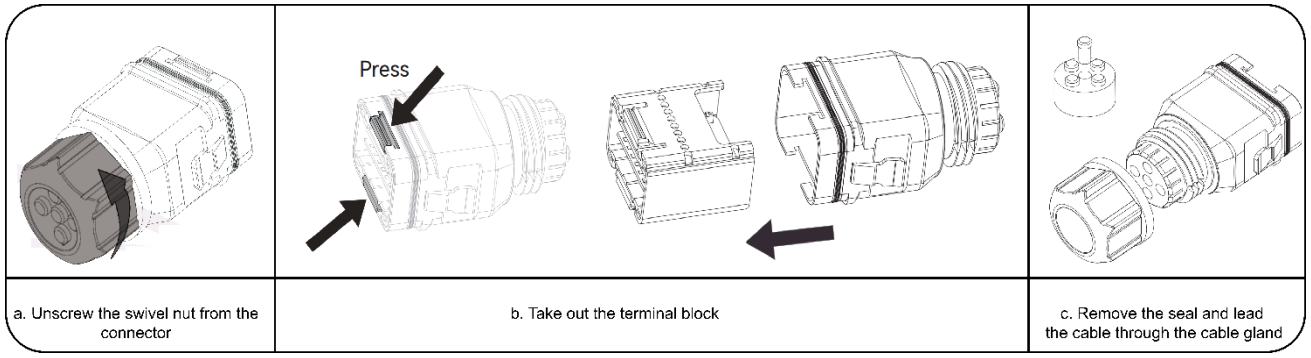
Terminating resistor for RS485(BMS)



Pin	Definition	Function
METER（RJ45-1）	RS 485	Communicate with Meter
BMS（RJ45-1）	CAN	Communicate with BMS
1	COM	Multifunction Relay
2	NO (Normally Open)	
3-4	/	Reserved
5	DRM4/8	DRED For Australia and New Zealand
6	DRM3/7	
7	DRM2/6	
8	DRM1/5	
15	COM D/0	
16	REF D/0	
9-10	/	Reserved
11	Fast stop +	Fast stop
12	Fast stop -	
13	485 B1	EMS
14	485 A1	
17	CANL_P	CAN for parallel connection of invekers
18	CANH_P	
19-20	/	Reserved

COM2 Pins Definition

Assembling the Inverter COM2

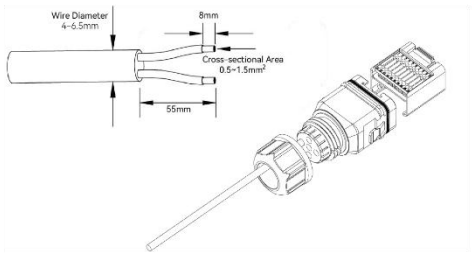


a. Unscrew the swivel nut from the connector

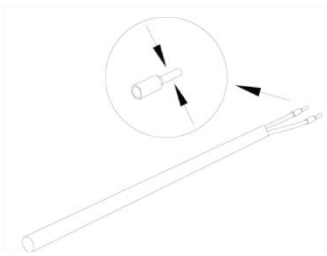
b. Take out the terminal block

c. Remove the seal and lead the cable through the cable gland

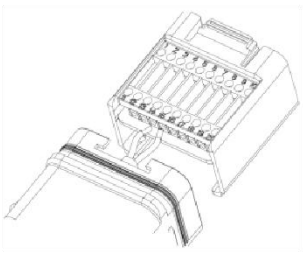
Connect the Cables to Inverter



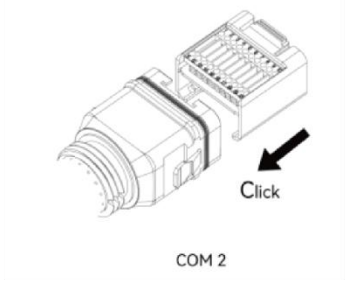
a. Thread the cable of appropriate length through the swivel nut and the housing. Remove the cable jacket and strip the wire insulation.



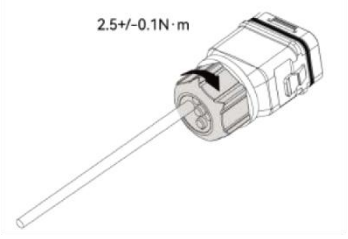
b. (Optional) When using a multi-core multi-strand copper wire cable, connectthe AC wire head to the cord end terminal(hand-tight).
In case of single-strand copper wire, skip this step.



c. Fix all the wires to the terminal plug according to the assignment and tighten to a torque of 1.2+/-0.1N·m with ascrewdriver.

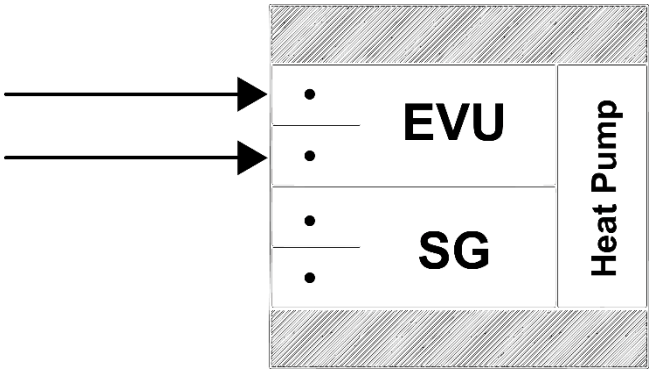


d. Pull the wires outward to check whetherthey are firmly installed. Insert the terminal block into the connector until it snaps into place with an audible click.



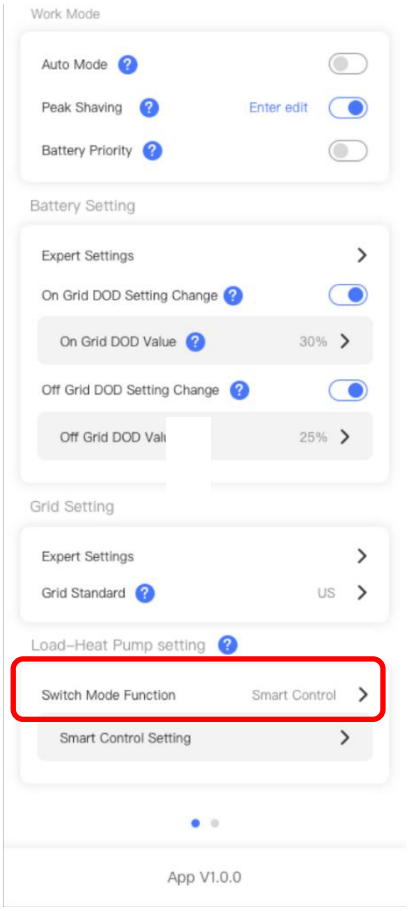
e. Fasten the swivel nut.

Connect the cables to Heat Pump
Find the EVU port in the HP connector, and connect the pilled wire into it. (If you can not find the relative connector, please consult the HP manufacturer.)



Inverter configuration

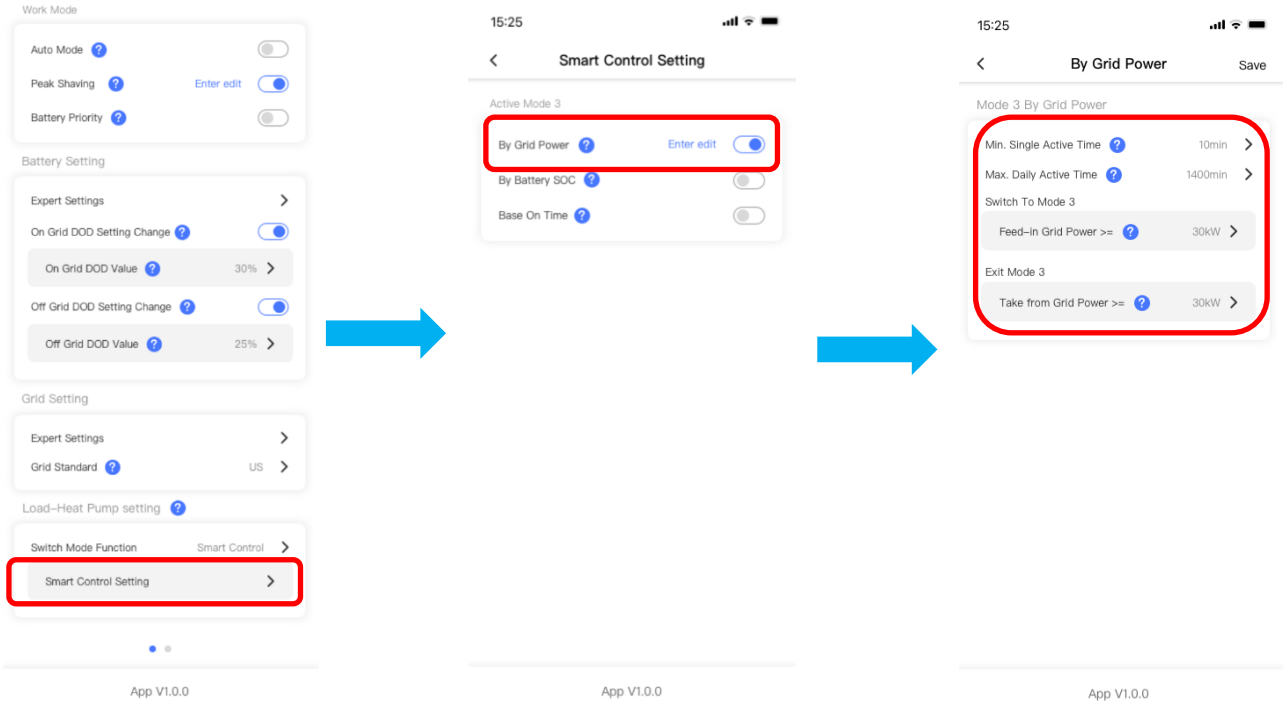
Note!
Before the configuration, please check other cable (power cable and ground cable) is properly and reliably connected, and make sure the SG ready function of heat pump is activated.
Noor Cloud APP Configuration
Step1: Enable the function
Manual Mode: switching the HP between Mode2 and Mode3. (OFF: Mode2; ON: Mode3)
Smart Mode: Switching the HP according to different factors: By Grid Power, By Battery SOC or Base on time. period. Only one of the three modes can be functional at the same time.



Step2: Smart Mode Setting

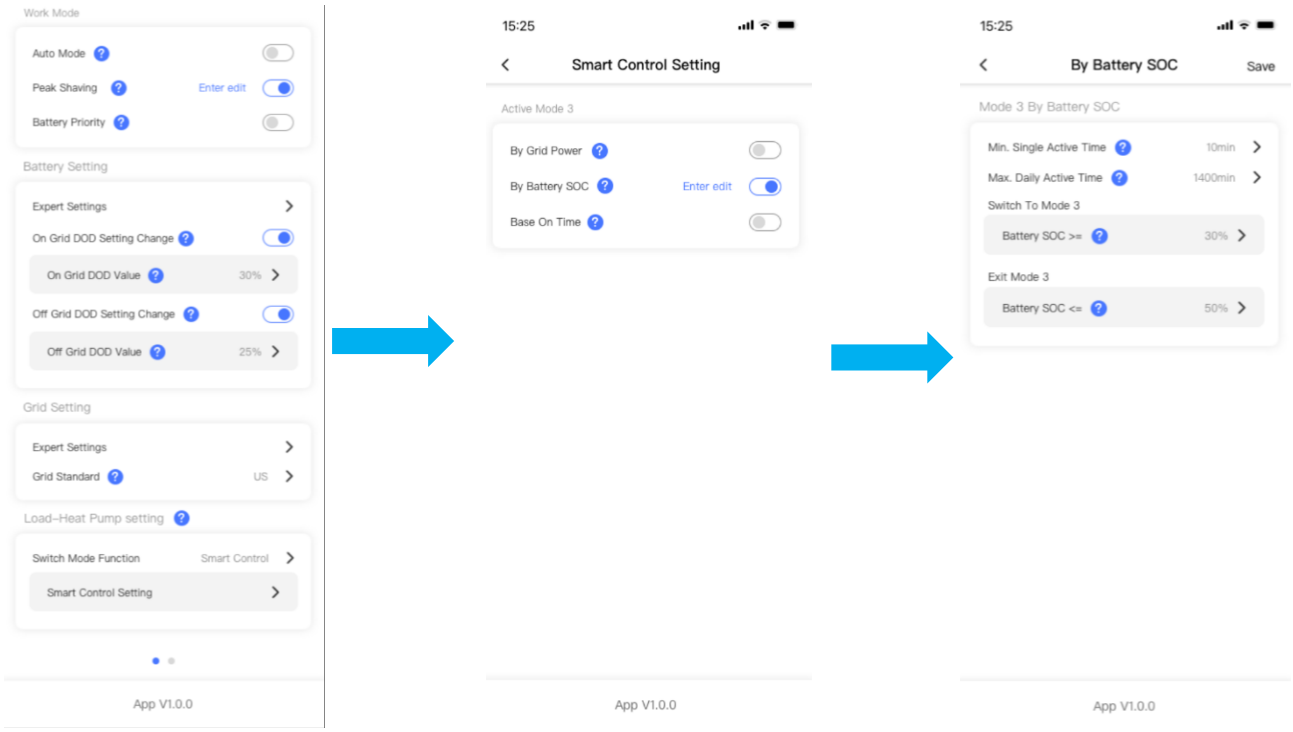
By Grid Power

Suitable for the system **without** power export limitation.



By Battery SOC

Suitable for the system **with** power export limitation.



Base on Time
Support up to 3 preset time periods.

