V1.0-2026-01-10

Residential All-In-One Energy Storage System

ESA 5-30kW

GW5.1-BAT-D-G20
GW8.3-BAT-D-G20
GW5.1-BAT-D-G21
GW8.3-BAT-D-G21

Solutions Manual

GOODWE

Copyright Statement

Copyright Statement

Trademark Authorization

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NOTICE

Due to product version upgrades or other reasons, the content of this document is updated periodically. Unless otherwise agreed, the content of this document cannot replace the safety precautions on the product label. All descriptions in the document are for guidance only.

About This Manual

Overview

This document primarily introduces the product information, installation wiring, configuration and commissioning, troubleshooting, and maintenance content for the energy storage system composed of inverters, Battery system, and smart meters. Please read this manual carefully before installing and using the product to understand the product safety information and familiarize yourself with the product's functions and features. The document may be updated periodically; please obtain the latest version of the materials and more product information from the official website.

Applicable Model

The energy storage system includes the following products:

Product Type	Product Information	Description
Inverter	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20 GW25K-BTA-G20 GW29.999K-BTA-G20 GW30K-BTA-G20	Nominal output power: 5kW-30kW
Battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21	Rated energy 5.12kWh
	GW8.3-BAT-D-G20 GW8.3-BAT-D-G21	Rated energy 8.32kWh

Product Type	Product Information	Description
Electricity meter	GMK330 GM330	A monitoring module in the energy storage system that can detect operating voltage, current, and other information within the system.
smart dongle	WiFi/LAN Kit-20	Uploads system operating information to the monitoring platform via WiFi or LAN signals.

Symbol Definition

⚠DANGER
Indicates a highly potential danger that, if not avoided, will result in death or serious injury.
⚠WARNING
Indicates a moderately potential danger that, if not avoided, may result in death or serious injury.
⚠CAUTION
Indicates a low potential danger that, if not avoided, may result in moderate or minor injury.
NOTICE
Emphasizes and supplements the content, and may also provide tips or tricks for optimizing product use, helping you solve a problem or save your time.

Table of Contents

1 Safety Precautions

The safety precautions information contained in this document must always be followed when operating the device.

⚠WARNING

The device has been strictly designed and tested in accordance with safety regulations, but as an electrical device, before performing any operations on the device, relevant safety instructions must be followed. Improper operation may lead to serious injury or property damage.

1.1 General Safety

NOTICE

- Due to product version upgrades or other reasons, the document content will be updated periodically. Unless otherwise agreed, the document content cannot replace the safety precautions on product labels. All descriptions in the document are for guidance only.
- Please read this document carefully before installing the device to understand the product and precautions.
- All operations of the device must be performed by professional and qualified electrical technicians who are familiar with the relevant standards and safety regulations at the project location.
- When operating the device, use insulated tools and wear personal protective equipment to ensure personal safety. When handling electronic components, wear anti-static gloves, anti-static wrist straps, anti-static clothing, etc., to protect the device from electrostatic damage.
- Unauthorized disassembly or modification may cause device damage, and such damage is not covered by the warranty.
- Device damage or personal injury caused by not installing, using, or configuring the device according to the requirements of this document or the corresponding user manual is beyond the manufacturer's liability. For more product warranty information, please obtain it through the official website: https://en.goodwe.com/warrantyrelated.html.

1.2 personnel requirements

NOTICE

To ensure safety, compliance, and efficiency throughout the entire process of equipment transportation, Installation, wiring, operation, and maintenance, operations must be performed by qualified personnel.

1. Qualified personnel include:
   - Personnel who have mastered knowledge of equipment working principles, system structure, risks and hazards, and have received professional operation training or possess extensive practical experience.
   - Personnel who have received relevant technical and safety training, possess certain operational experience, are aware of potential dangers specific tasks may pose to themselves, and can take protective measures to minimize risks to themselves and others.
   - Qualified electrical technicians meeting the regulatory requirements of the country/region.
   - Personnel holding a degree in electrical engineering/an advanced diploma in electrical discipline or equivalent/possessing professional qualifications in the electrical field, with at least 2/3/4 years of experience in testing and supervision work using electrical equipment safety standards.
2. Personnel involved in special tasks such as electrical work, work at heights, and special equipment operation must hold valid qualification certificates as required by the equipment's location.
3. Medium-voltage equipment operation must be performed by certified high-voltage electricians.
4. Equipment and component replacement is only permitted to be performed by authorized personnel.

1.3 System Safety

⚠DANGER

- Before performing electrical connections, disconnect all upstream switches of the device to ensure it is powered off. Working on live circuits is strictly prohibited, as it may lead to hazards such as electric shock.
- To prevent personal injury or equipment damage caused by working on live circuits, a circuit breaker must be added to the voltage input side of the device.
- All operations including transportation, storage, installation, operation, use, and maintenance must comply with applicable laws, regulations, standards, and specifications.
- The specifications of cables and components used for electrical connections must comply with local laws, regulations, standards, and specifications.
- Use the cable connectors provided in the package to connect the device cables. If other models of connectors are used, any resulting equipment damage is not within the manufacturer's liability.
- Ensure all cables of the device are correctly connected, securely fastened, and free from looseness. Improper wiring may cause poor contact or damage the equipment.
- The equipment's protective grounding wire must be firmly connected.
- To protect the equipment and its components from damage during transportation, ensure that transport personnel are professionally trained. Record the operation steps during transportation and keep the equipment balanced to avoid dropping.
- The equipment is heavy. Assign personnel according to the equipment's weight to prevent it from exceeding the human lifting capacity and causing injury from falling.
- Ensure the equipment is placed stably and not tilted. Equipment tipping over may cause equipment damage and personal injury.

⚠WARNING

- During equipment installation, avoid having the terminals bear weight, as this may cause terminal damage.
- If the cable is subjected to excessive tension, it may lead to poor connections. When wiring, leave a certain length of cable slack before connecting it to the equipment's terminal ports.
- Cables of the same type should be bundled together. Different types of cables should be routed at least 30mm apart and must not be intertwined or cross-routed.
- Using cables in high-temperature environments may cause insulation aging and damage. Maintain a distance of at least 30mm between cables and heat-generating components or the periphery of heat source areas.

1.3.1 PV String Safety

⚠WARNING

- Ensure the component frame and mounting system are properly grounded.
- After connecting the DC cables, ensure the cable connections are tight and secure with no looseness. Improper wiring may cause poor contact or high impedance, and damage the inverter.
- Use a multimeter to measure the positive and negative poles of the DC cables to ensure correct polarity, with no reverse connection; and that the voltage is within the permissible range.
- Use a multimeter to measure the DC cables to ensure correct polarity, with no reverse connection; the voltage should be lower than the maximum DC input voltage. Damage caused by reverse connection and overvoltage is not covered by the equipment manufacturer's warranty.
- The PV string output does not support grounding. Before connecting the PV string to the inverter, ensure the minimum insulation resistance to ground of the PV string meets the minimum insulation resistance requirement (R=Max. Input Voltage (V)/30mA).
- Do not connect the same PV string to multiple inverters, as this may damage the inverters.
- The PV modules used with the inverter must comply with IEC 61730 Class A standards.
- When the PV string input voltage or input current is high, it may cause the inverter output power to derate.

1.3.2 Inverter Safety

⚠WARNING

- Ensure the voltage and frequency at the grid connection point comply with the inverter's grid-connection specifications.
- It is recommended to install protective devices such as circuit breakers or fuses on the AC side of the inverter. The rating of the protective device must be greater than 1.25 times the maximum AC output current of the inverter.
- If the inverter triggers an arc fault alarm less than 5 times within 24 hours, the alarm can be cleared automatically. After the 5th arc fault alarm, the inverter will shut down for protection. The inverter can resume normal operation only after the fault is cleared.
- If a battery is not configured in the photovoltaic system, it is not recommended to use the BACK-UP function, as it may cause a system power outage risk.
- Grid voltage and frequency fluctuations may cause the inverter output power to derate.

1.3.3 Battery Safety

⚠DANGER

- Before operating any devices in the system, ensure that the devices are powered off to avoid the risk of electric shock. During device operation, strictly adhere to all safety precautions in this manual and the safety labels on the devices.
- Do not disassemble, modify, or repair the battery without official authorization from the device manufacturer. Otherwise, it may cause electric shock or device damage, and any losses incurred are beyond the manufacturer’s liability.
- Do not impact, pull, drag, squeeze, or step on the device, and do not place the battery in fire, as the battery may explode.
- Do not place the battery in high-temperature environments. Ensure there are no heat sources near the battery and that it is not exposed to direct sunlight. If the ambient temperature exceeds 60°C, it may cause a fire.
- Do not use the battery if it has obvious defects, cracks, damage, or other conditions. Battery damage may lead to electrolyte leakage.
- Do not move the battery system while it is operating. If battery replacement or addition is needed, contact the after-sales service center.
- Battery short circuits may cause personal injury. The instantaneous high current from a short circuit can release a large amount of energy, which may lead to a fire.
- To protect the battery pack and its components from damage during transportation, ensure that transport personnel are professionally trained. Record the operating steps during transportation and keep the device balanced to avoid dropping.
- The battery device is heavy. Assign personnel according to the device's weight to prevent it from exceeding the weight range that can be manually handled, which could cause injury to personnel.

⚠WARNING

- Battery current may be affected by factors such as temperature, Humidity, weather conditions, etc., which may cause current limiting and affect load capacity.
- If the battery cannot start, contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Regularly inspect and maintain the battery according to its maintenance requirements.
- Ensure that the battery system is not damaged during transportation and storage. Ensure that the device is placed stably and not tilted, as tipping may cause device damage and personal injury.

Emergency Response Measures

- Battery electrolyte leakage
  If a battery module leaks electrolyte, avoid contact with the leaking liquid or gas. Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If accidental contact with the leaked substance occurs, take the following actions:
  - inhalation: Evacuate from the contaminated area and seek medical help immediately.
  - Eye contact: Rinse with clean water for at least 15 minutes and seek medical help immediately.
  - Skin contact: Wash the affected area thoroughly with soap and water and seek medical help immediately.
  - Ingestion: Induce vomiting and seek medical assistance immediately.
- Fire
  - When the battery temperature exceeds 150°C, there is a risk of fire. A battery fire may release toxic and harmful gases.
  - To prevent fire, ensure carbon dioxide or water fire extinguishing equipment is available near the device.
  - When extinguishing a fire, do not use ABC dry powder fire extinguishers. Firefighters must wear protective clothing and self-contained breathing apparatus.
- Battery triggers fire protection
  For batteries equipped with optional fire protection functionality, after the fire protection function is triggered, perform the following actions:
  - Immediately cut off the main power switch to ensure no current flows through the battery system.

- Conduct a preliminary visual inspection of the battery for any damage, deformation, leakage, or unusual odor. Check the battery casing, connectors, and cables.
- Use a temperature sensor to detect the battery and its ambient temperature to ensure there is no risk of overheating.
- Isolate and label the damaged battery, and dispose of it properly according to local regulations.

1.3.4 Smart Meter Safety

⚠WARNING

If the grid voltage fluctuation exceeds 265V, long-term overvoltage operation may cause damage to the meter. It is recommended to add a fuse with a rated current of 0.5A on the voltage input side of the meter to protect it.

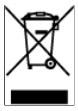
1.4 Safety Symbols and Certification Marks

⚠DANGER

- After equipment installation, labels and warning signs on the enclosure must remain clearly visible. Do not cover, alter, or damage them.
- The following enclosure warning label descriptions are for reference only. Please refer to the actual labels used on the equipment.

No.	Symbol	Meaning
1		Potential hazard exists during equipment operation. Please take protective measures when operating the equipment.
2		High voltage hazard. High voltage is present during equipment operation. Please ensure the equipment is powered off before performing any operations.

No.	Symbol	Meaning
3		The inverter surface is at high temperature. Do not touch during operation to avoid burns.
4		Use the equipment properly. There is a risk of explosion under extreme conditions.
5		Battery contains flammable materials. Beware of fire.
6		The equipment contains corrosive electrolyte. Avoid contact with leaked electrolyte or volatile gases.
7		Delayed discharge. After powering off the equipment, please wait 5 minutes for it to discharge completely.
8		Keep the equipment away from open flames or ignition sources.
9		Keep the equipment out of reach of children.
10		Do not extinguish with water.
11		Please read the product manual carefully before operating the equipment.
12		Personal protective equipment must be worn during installation, operation, and maintenance.

No.	Symbol	Meaning
13		This equipment must not be disposed of as household waste. Please dispose of it according to local laws and regulations, or return it to the manufacturer.
14		Grounding point.
15		Recycling symbol.
16		CE certification mark.
17		TUV mark.
18		RCM mark.

1.5 EU Declaration of Conformity

1.5.1 Equipment with Wireless Communication Modules

Equipment with wireless communication modules sold in the European market must comply with the following directives:

- Radio Equipment Directive 2014/53/EU (RED)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.5.2 Equipment without Wireless Communication Modules (Except Battery)

Equipment without wireless communication modules that can be sold in the European market meets the requirements of the following directives:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.5.3 Battery

Batteries sold in the European market must comply with the following directives:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Battery Directive 2006/66/EC and Amending Directive 2013/56/EU
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

For more EU Declarations of Conformity, please visit the official website.

2 System Introduction

2.1 System Overview

The integrated residential storage solution combines devices such as an inverter, Battery, Smart Meter, and smart communication stick. In a photovoltaic system, it converts solar energy into electricity to meet household power needs. The energy IoT devices in the system manage electrical appliances by identifying the overall power situation, thereby intelligently managing power for supplying loads, storing to the Battery, or exporting to the grid.

⚠WARNING

- The energy storage system is not suitable for connecting devices that rely on stable power supply, such as life-sustaining medical equipment. Ensure that system power failure does not cause personal injury.
- If the residential storage inverter operates at high temperatures or under BMS current limiting conditions, the battery charging power may be restricted, potentially causing system overvoltage and triggering overvoltage protection.
- The inverter only supports GoodWe brand batteries specified in this manual. If no battery is connected, it can only operate in grid-tied mode and must be installed on the base provided in the package.
- In microgrid scenarios, it is recommended that the PV open-circuit voltage of the residential storage inverter be < 0.85 * PV maximum input voltage to prevent system overvoltage and triggering of overvoltage protection under harsh operating conditions.
- In microgrid scenarios, ensure that the over-frequency power reduction point of the grid-tied inverter matches that of the residential storage inverter.
- If output power limitation is required for the grid-tied inverter, please connect a meter or CT device separately.
- Ensure the over-frequency power reduction curve of the grid-tied inverter is configured as follows:
  - Set the endpoint power to 0% Pn
  - Set the response delay time to 0, and disable the hysteresis function
- In a fully off-grid inverter system, if the battery remains under low sunlight or rainy conditions for an extended period without timely recharging, it may lead to

⚠WARNING

over-discharge, causing battery performance degradation or damage. To ensure long-term stable system operation, avoid completely draining the battery. Recommended measures are as follows:

- During off-grid operation, set a minimum SOC protection threshold. It is recommended to set the off-grid battery SOC lower limit to 30%.
- When the SOC approaches the protection threshold, the system will automatically enter load limitation or protection mode.
- If there is insufficient sunlight for several consecutive days and the battery SOC is too low, promptly replenish the battery using external energy sources (such as a generator or grid-assisted charging).
- Regularly check the battery status to ensure it operates within a safe range.
- It is recommended to perform a full charge and discharge cycle every six months to calibrate SOC accuracy.

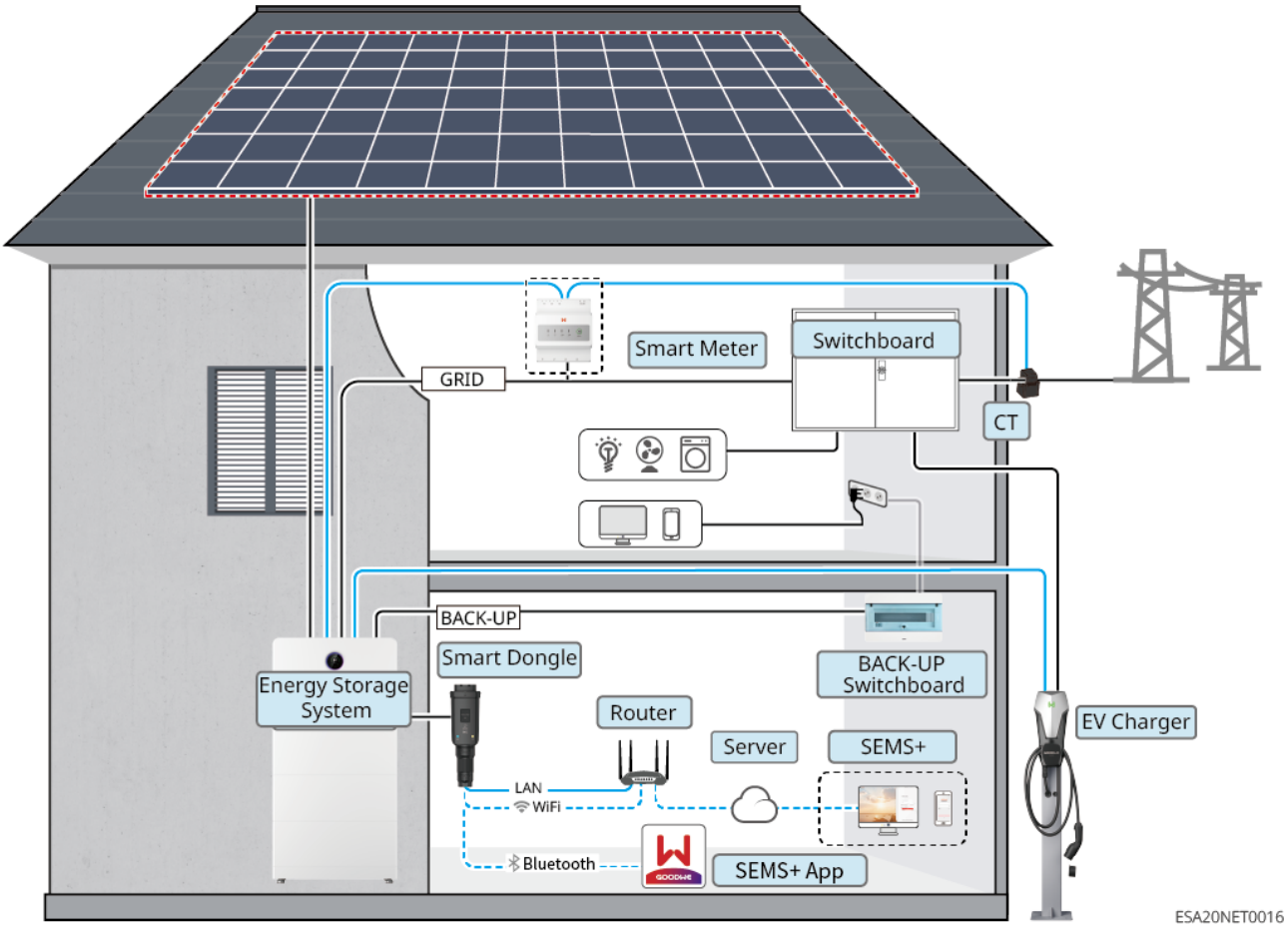
- Due to product version upgrades or other reasons, document content is updated periodically. For the compatibility relationship between inverters and IoT products, please refer to: https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_Compatibility-list-of-GoodWe-inverters-and-IoT-products-EN.pdf
- For detailed networking and wiring schemes for various scenarios, please refer to: 5.2.Detailed System Wiring Diagram(Page 88).

When the energy storage system is in off-grid mode, it can normally supply the following loads:

BACK-UP Port Off-grid Load Capacity Specifications				
Inverter Model	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20		GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20 GW25K-BTA-G20 GW29.999K-BTA-G20 GW30K-BTA-G20	
Load Type	Single-phase	Three-phase	Single-phase	Three-phase
Single Motor Load Rated Power (kVA)	1.1	3.3	2.2	6.6
Total Rated Power of Multiple Motor Loads (kVA)	0.4*Pn/3	0.4*Pn	0.4*Pn/3	0.4*Pn
Capacitive Load (kVA)	0.33*Pn/3	0.33*Pn	0.33*Pn/3	0.33*Pn
Half-wave Load (kW)	2	-	3	-

BACK-UP Port Off-grid Load Capacity Specifications
Note: • Pn: Inverter rated output power. • Half-wave Load: Some older or non-EMC compliant household appliances (e.g., hair dryers, small heaters using half-wave rectification). • If the total power of multiple motor loads calculated based on the rated power is less than the rated power of a single motor load, then the Total Rated Power of Multiple Motor Loads = Single Motor Load Rated Power.

General Scenario



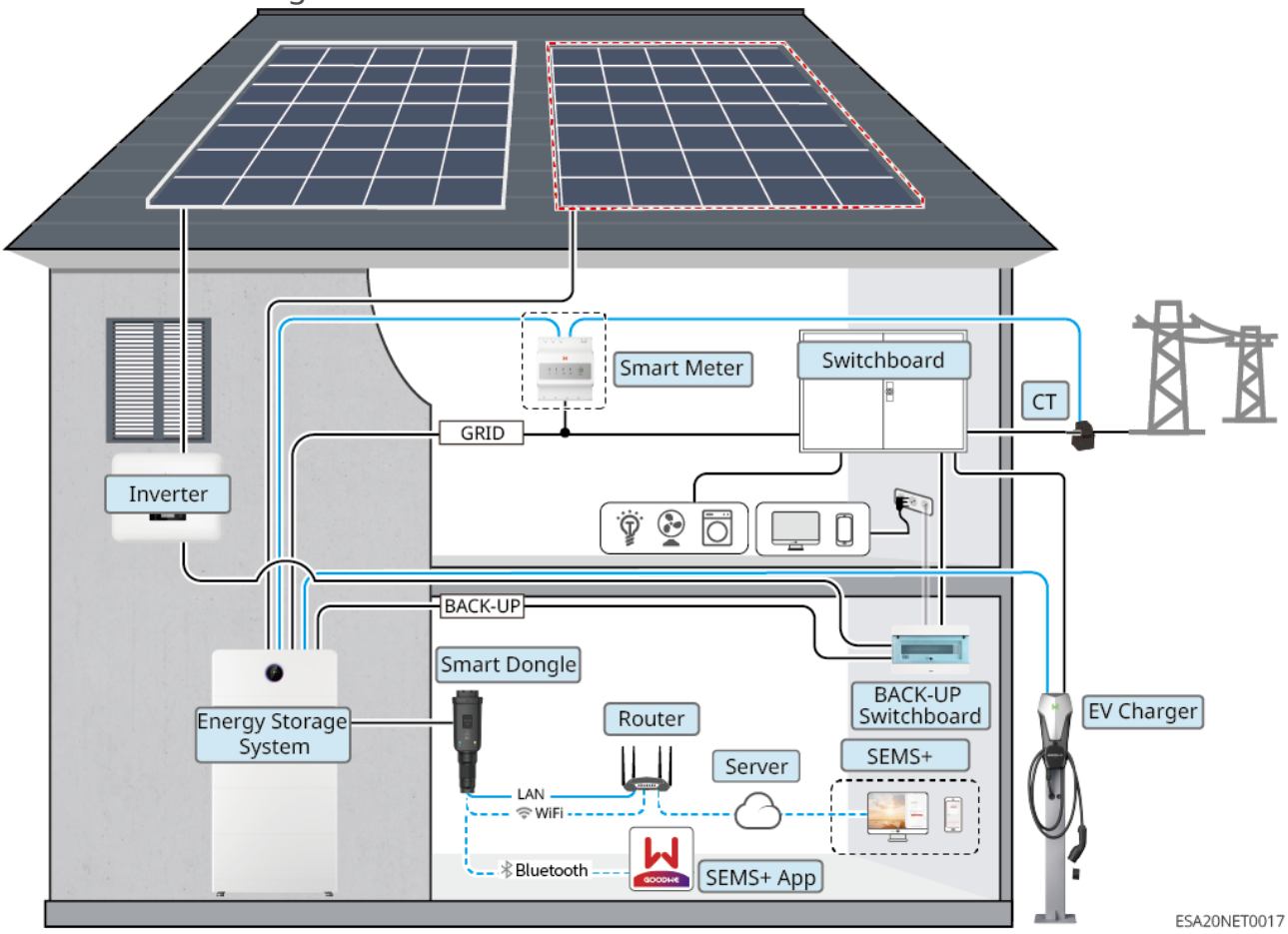
Device Type	model	Description
hybrid inverter	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20 GW25K-BTA-G20 GW29.999K-BTA-G20 GW30K-BTA-G20	• Can be connected to GoodWe AC charging pile. • Supports generator control, generator charging the battery. If a generator needs to be connected, please use GMK330 or GM330 Smart Meter.

Device Type	model	Description
Battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21 GW8.3-BAT-D-G20 GW8.3-BAT-D-G21	• Battery modules of different models can be mixed. • The system supports 5-96kWh, meeting the use of different power and energy matching. • Battery heating film is optional; only models configured with heating film can enable the "battery heating" function. Batteries without heating film should not be used in low-temperature environments, otherwise it may cause the device to fail to operate. • GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW5.1-BAT-D-G21, GW8.3-BAT-D-G21 When mixed, the battery heating function is unavailable. • If the system has a split expansion requirement, please ensure that the BMS and DCDC software versions are V04 or above.
Smart Meter	Inverter built-in meter	• Built-in meter: Please use the CT shipped with the box to connect to the inverter. ◦ CT ratio is 120A:40mA. ◦ When the inverter built-in meter does not meet the use, you can contact dealers to purchase GMK330 or GM330 Smart Meter. • GMK330: CT cannot be replaced, CT ratio is 120A:40mA • GM330: CT can be purchased from GoodWe or on your own, CT ratio is nA:5A.
	GMK330 (purchased from GoodWe)	
	GM330 (purchased from GoodWe)	

Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Use Bluetooth signal to configure device parameters locally, view device operation information, and upload system operation information to the monitoring platform via WiFi or LAN. • Please ensure that the firmware version of the Smart dongle is 06 or above.

Microgrid Scenario

When a grid-tied inverter is connected to the hybrid inverter's BACK-UP port, it constitutes a Microgrid Scenario.



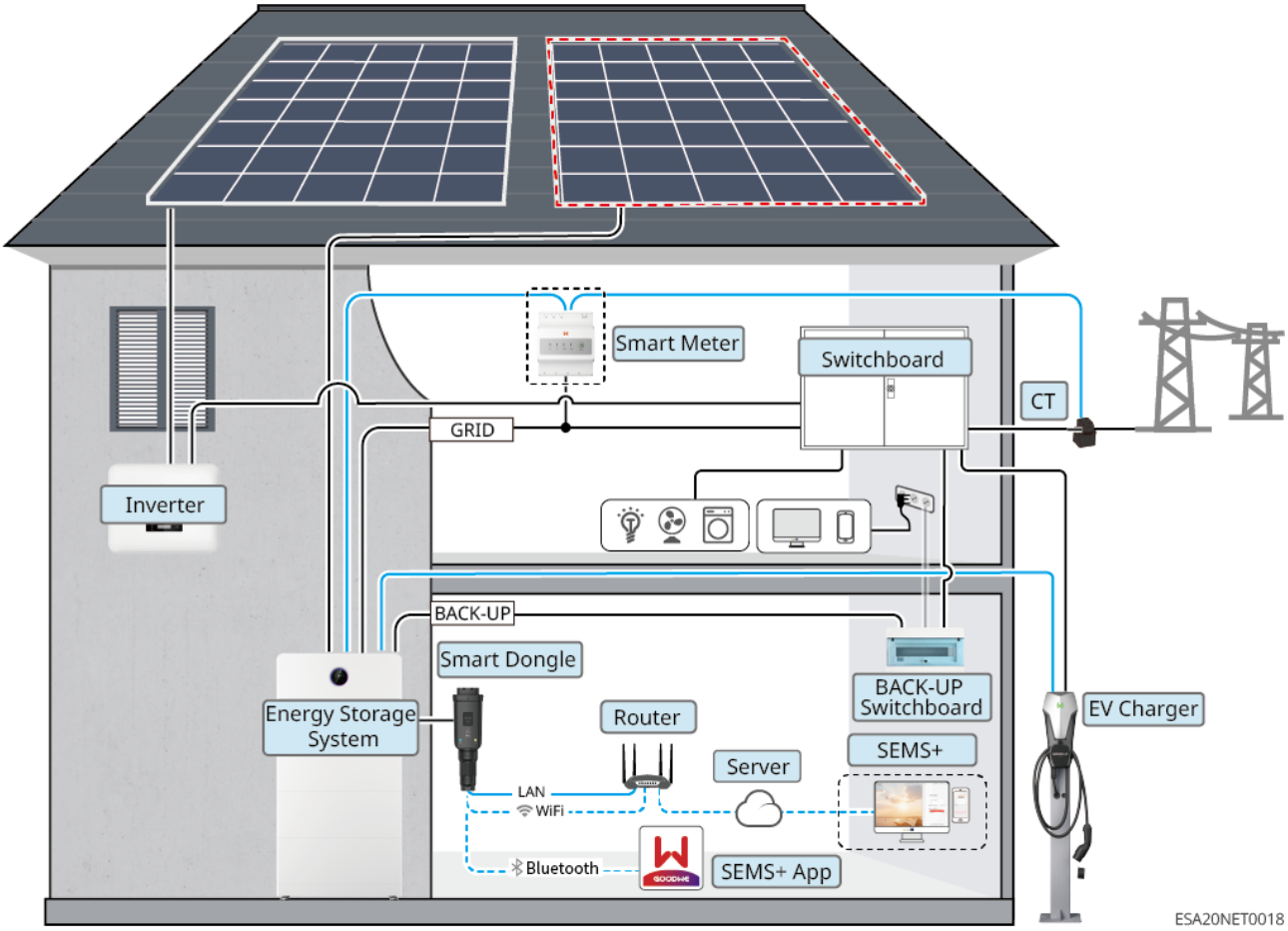
Device Type	model	Description
hybrid inverter	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20 GW25K-BTA-G20 GW29.999K-BTA-G20 GW30K-BTA-G20	• In a microgrid scenario, only one hybrid inverter is supported in the system. • In a microgrid scenario, connection to a generator is not supported.

Device Type	model	Description
Battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21 GW8.3-BAT-D-G20 GW8.3-BAT-D-G21	• Different models of battery modules can be mixed and used. • The system supports 5-96kWh, meeting different power and energy matching requirements. • Battery heating film is optional. The "Battery Heating" function can only be enabled for models configured with the heating film. Batteries without the heating film should not be used in low-temperature environments, otherwise the equipment may fail to operate. • GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW5.1-BAT-D-G21, GW8.3-BAT-D-G21The battery heating function is unavailable when these models are mixed. • If the system requires expansion with split units, ensure the BMS and DCDC software version is V04 or above.
Smart Meter	Inverter Built-in Meter	• Built-in meter: Use the CT shipped with the inverter to connect to the inverter. ◦ CT ratio is 120A:40mA. ◦ If the inverter's built-in meter is insufficient, contact your dealer to purchase a GMK330 or GM330 Smart Meter. • GMK330: CT cannot be replaced. CT ratio is 120A:40mA. • GM330: CT can be purchased from GoodWe or elsewhere. CT ratio is nA:5A.
	GMK330 (Purchase from GoodWe)	
	GM330 (Purchase from GoodWe)	

Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Uses Bluetooth signal for local configuration of device parameters and viewing device operation information. Uses WiFi or LAN to upload system operation information to the monitoring platform. • Ensure the firmware version of the Smart Communication Dongle is 06 or above.
grid-tied PV inverter	-	• GoodWe brand grid-tied inverters are recommended. Third-party grid-tied inverters are supported. • In a microgrid scenario, ensure the grid-tied inverter's rated output power ≤ the hybrid inverter's rated output power. • When the microgrid system is in grid-connected mode, if power limitation is required, ensure: ◦ For the hybrid inverter, set it in the Grid-connected Power Limitation interface of the SEMS+ App. For the grid-tied inverter, set it according to the actual tools used. ◦ To ensure the grid-tied inverter can continue generating power, adjust the hybrid inverter's output power in the Microgrid Mode interface of the SEMS+ App. Note: The output power control precision varies among different grid-tied inverters. Set the grid-connected power limitation parameter values according to the actual situation.

Coupled Scenario

When a grid-tied inverter is connected to the hybrid inverter's GRID port, it constitutes a Coupled Scenario.


Smart Meter
Switchboard
CT
GRID
Inverter
BACK-UP
Smart Dongle
BACK-UP Switchboard
EV Charger
Energy Storage System
Router
SEMS+
Server
LAN
WiFi
Bluetooth
SEMS+ App
ESA20NET0018

Device Type	model	Description
hybrid inverter	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20 GW25K-BTA-G20 GW29.999K-BTA-G20 GW30K-BTA-G20	• Can be connected to GoodWe AC charging piles. • Supports generator control and generator charging the battery. If connecting a generator, please use the GMK330 or GM330 Smart Meter.

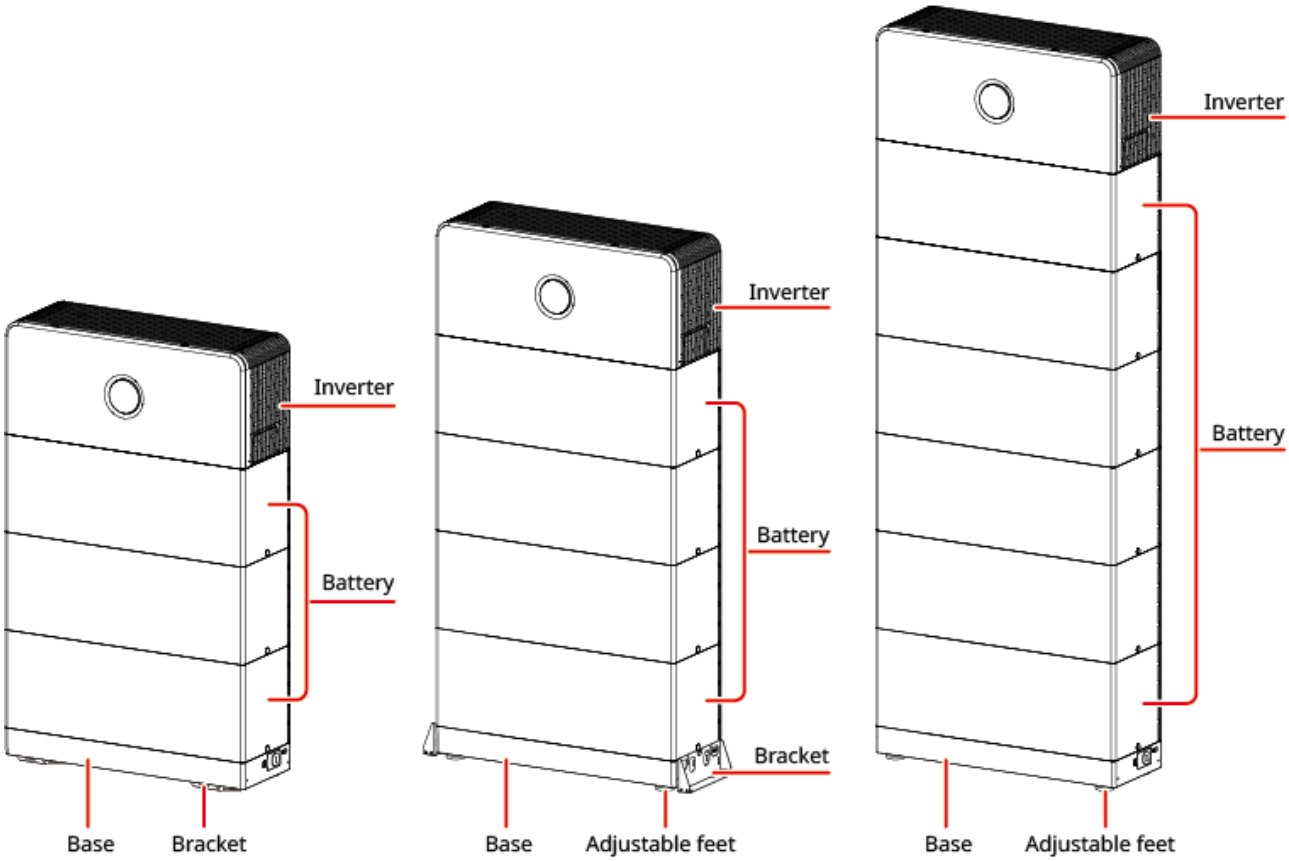
Device Type	model	Description
Battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21 GW8.3-BAT-D-G20 GW8.3-BAT-D-G21	• Different models of battery modules can be mixed. • The system supports 5-96kWh, meeting different power and energy matching requirements. • Battery heating film is optional. The "Battery Heating" function can only be enabled for models configured with the heating film. Batteries without the heating film should not be used in low-temperature environments, as this may prevent the device from operating. • GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW5.1-BAT-D-G21, GW8.3-BAT-D-G21The battery heating function is unavailable when these models are mixed. • If the system requires split-type expansion, please ensure the BMS and DCDC software version is V04 or higher.
Smart Meter	Inverter Built-in Meter	• Built-in Meter: Please use the CT shipped with the box to connect to the inverter. ◦ CT ratio is 120A:40mA ◦ If the inverter's built-in meter does not meet usage requirements, you can contact dealers to purchase the GMK330 or GM330 Smart Meter. • GMK330: CT cannot be replaced; CT ratio is 120A:40mA. • GM330: CT can be purchased from GoodWe or separately; CT ratio is nA:5A.
	GMK330 (Purchase from GoodWe)	
	GM330 (Purchase from GoodWe)	

Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Uses Bluetooth signals for local configuration of device parameters and viewing device operation information. Uses WiFi or LAN to upload system operation information to the monitoring platform. • Please ensure the Smart Communication Dongle's firmware version is 06 or higher.
grid-tied PV inverter	-	• GoodWe brand grid-tied inverters are recommended, but third-party grid-tied inverters are supported. • In coupling scenarios, ensure the grid-tied inverter's rated output power ≤ the hybrid inverter's rated output power. • When the coupled system is in grid-connected mode and power limitation is required, please ensure: The hybrid inverter must be configured via the grid-connected power limit interface in the SEMS+ App. Configure the grid-tied inverter according to the actual tool used. Note: The output power control precision varies among different grid-tied inverters. Please set the grid-connected power limit parameter value according to the actual situation.

2.2 Product Overview

2.2.1 Residential Three-Phase All-in-One Unit

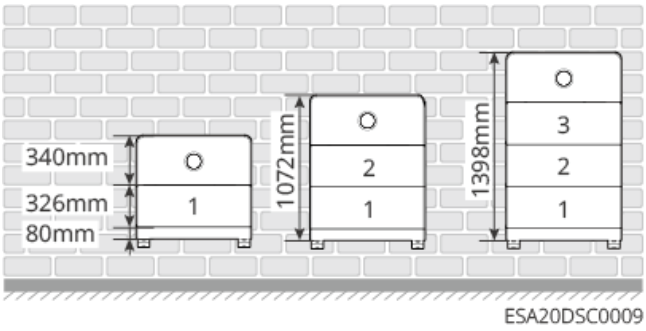
Residential Three-Phase All-in-One Unit:
The residential three-phase all-in-one unit employs a blind-plug stacking connection method and integrates the Inverter and Battery units through a modular design.



The energy storage system supports Battery capacity expansion. The total Battery capacity is determined by the number and specifications of Battery modules. Configuration must strictly adhere to the constraints specified in this chapter. Overall system configuration description:

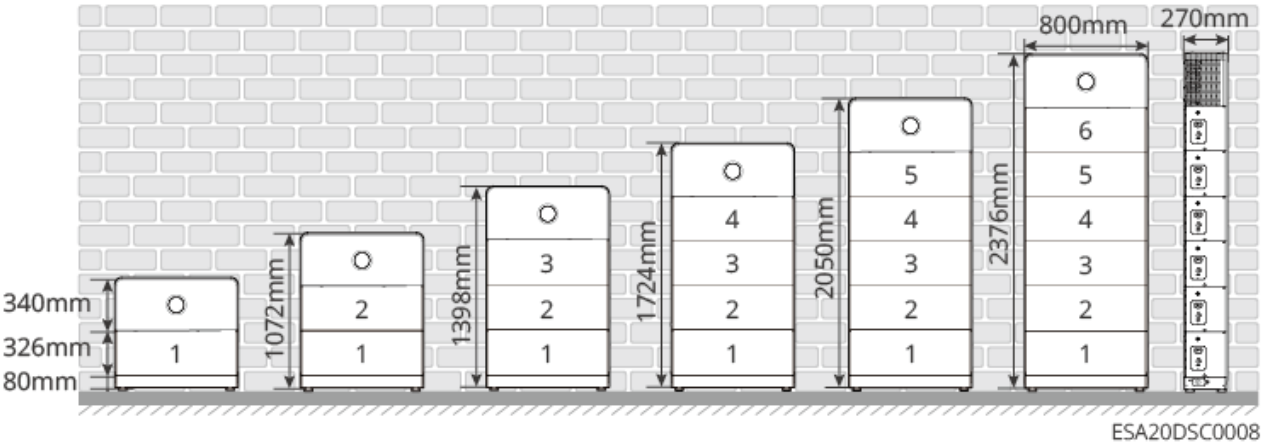
Mounting Method	Total Batteries	Expansion Groups	Single Group Stacking
Floor Installation	≤12 units	≤3 groups	Free-standing: ≤4 units Wall-mounted: ≤6 units
Wall-mounted Installation (5kWh models)	≤9 units	≤3 groups	≤3 units
Wall-mounted Installation (8kWh and models mixed-stacked with them)	≤6 units	≤3 groups	≤2 units
Note: **Expansion Groups × Single Group Stacking Quantity ≤ Total System Batteries**			

Wall-Mounted Installation

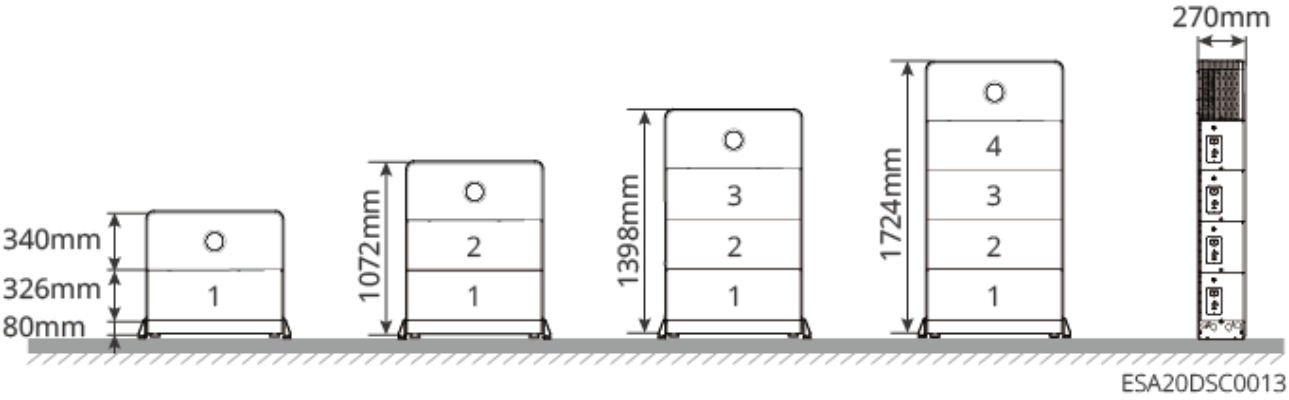


Floor-Mounted Installation

- Wall-Adjacent Installation

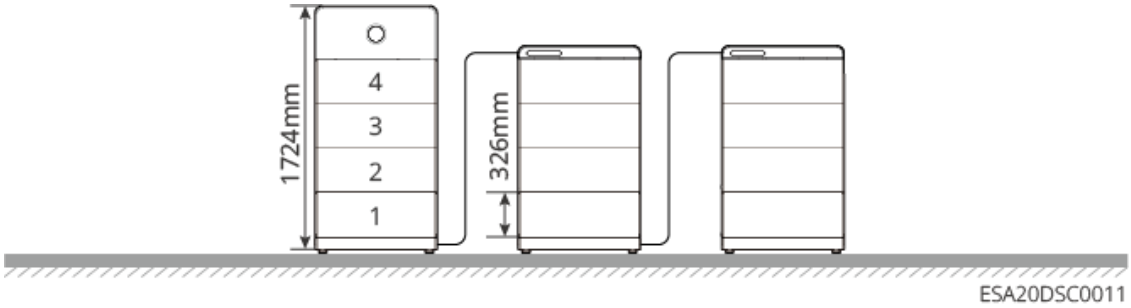


- Free-Standing Installation (Away from Wall)

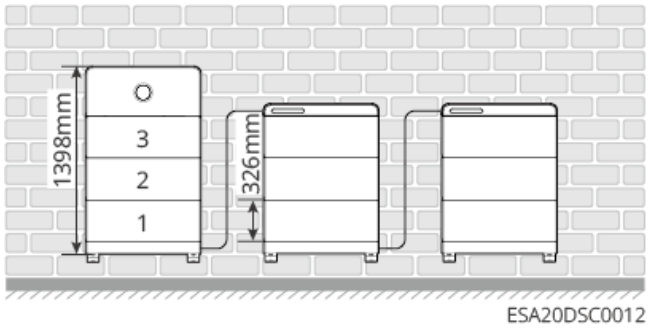


Cluster Expansion Installation

- Floor-Mounted Installation

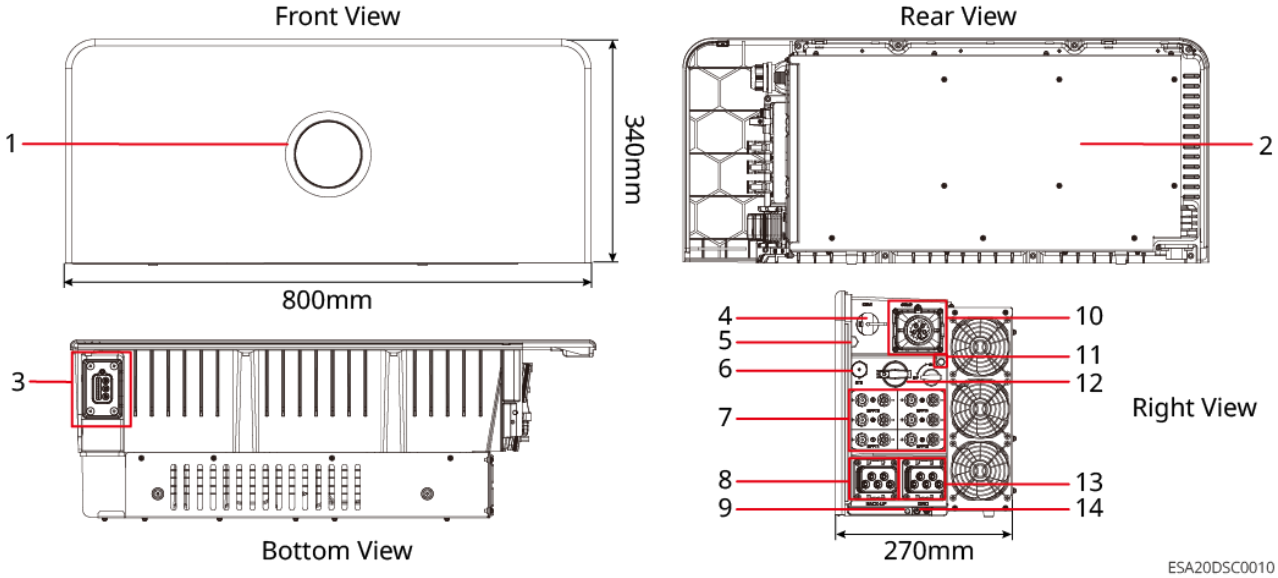


- Wall-Mounted Installation



Inverter:

The Inverter controls and optimizes the energy flow within the photovoltaic system through its integrated energy management system. It can supply power generated by the PV system to loads, store it in the Battery, or export it to the grid.

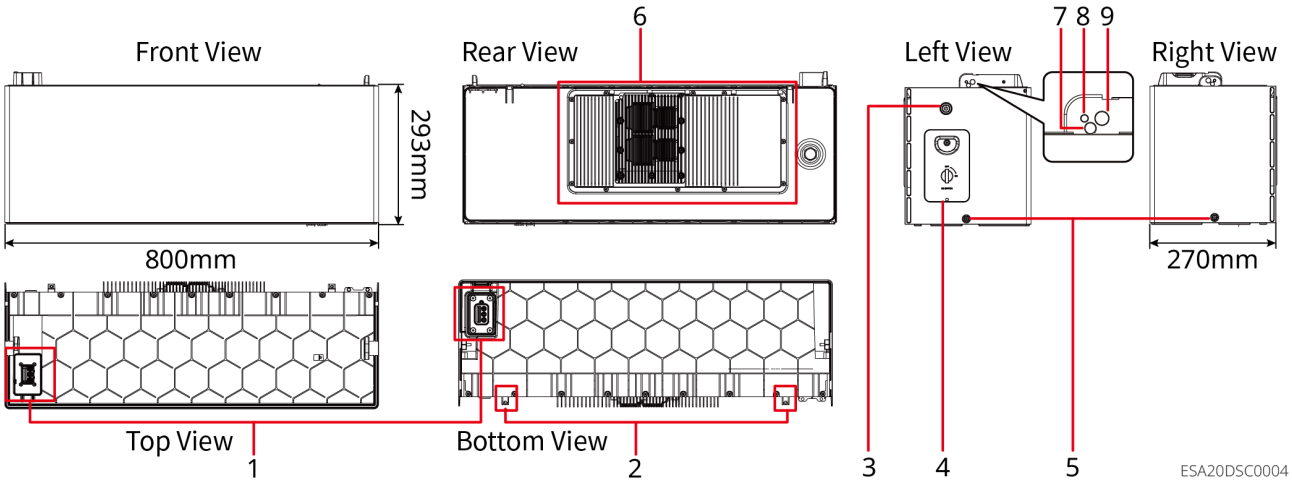


No.	Component/Silkscreen	Description
1	indicator	Indicates the operating status of the inverter.
2	heat sink	Heat dissipation for the inverter.
3	Connector	Power and communication ports for connecting the inverter to the battery.
4	Smart Communication Stick Connection Port	• Can connect to smart communication sticks, such as WiFi/LAN communication modules. Please select the module type according to actual needs. • Supports connecting a USB flash drive for local inverter software version upgrade.
5	Ventilation valve	-
6	STS Communication Interface	Reserved
7	PV Input Terminals	Only for ETA models. BTA models do not have PV input terminals. • Can connect to DC input cables from PV modules. • The number of PV input terminals is as follows: ◦ GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW6K-EHA-G20: 3 ◦ GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW15K-ETA-G20, GW20K-ETA-G20, GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20: 4
8	BACK-UP Port	Connect AC cables to connect critical loads or grid-tied inverters.
9	Battery Mounting Holes	Secure the inverter and the battery.

No.	Component/Silkscreen	Description
10	Communication Port	Can connect communication cables for load control, CT, RS485, Remote Shutdown/Rapid Shutdown, DRED (Australia)/RCR (Europe), etc.
11	Carrying Handle Mounting Holes	Used for installing the carrying handle. Used when moving the inverter.
12	DC Switch	Only for ETA models. BTA models do not have a DC switch. Controls the connection or disconnection of the DC input.
13	GRID Port	Connect AC cables to connect the inverter to the grid.
14	Grounding terminal	Connect the chassis protective ground wire.

Battery:

The Battery system can store and release electrical energy according to the requirements of the photovoltaic energy storage system. Both the input and output ports of this energy storage system are high-voltage direct current.

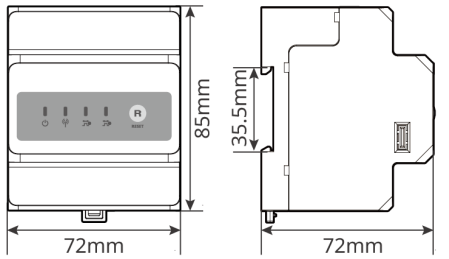


No.	Component	Description
1	Connector	Power and Communication Port for connecting battery to battery, and battery to inverter.
2	Anti-tip bracket mounting holes	Used for securing the battery to the wall.
3	Multifunction button indicator light	• Indicates the battery operating status. • Battery black start function: When there is no PV power generation in the photovoltaic system and the grid is abnormal, the inverter cannot operate normally; you can press and hold the multifunction button for 2 seconds to start the battery system, activate the inverter, putting the inverter into off-grid operation mode, with the battery discharging to power the loads. • Battery power-off function: Press and hold the multifunction button for >5 seconds to power off the battery system.
4	Battery isolation switch	Battery power input/output switch.
5	Inter-battery mounting holes	Used for securing between two battery units.
6	heat sink	Battery heat dissipation
7	Battery lifting holes	Used for hoisting the battery. When stacking more than three batteries, hoisting tools must be used for installation.
8	Battery or inverter mounting holes	Used for securing between batteries or between the inverter and battery.
9	Carrying handle mounting holes	Used for installing the carrying handle. Used during manual battery handling.

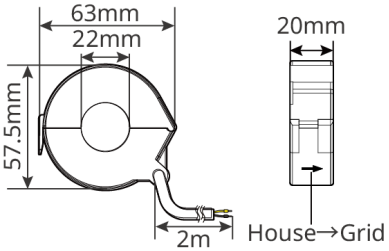
2.2.2 Smart Meter

The Smart Meter measures and monitors electrical data in the photovoltaic energy storage system, such as: voltage, current, frequency, Power Factor, power, etc.

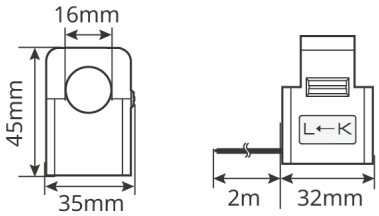
GM330&GMK330&CT



GMK10DSC0003



GMK10DSC0021



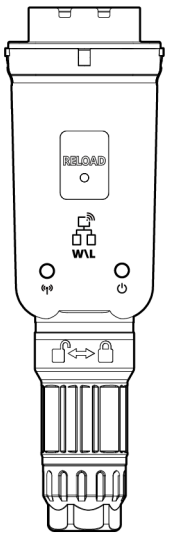
GMK10DSC0022

No.	model	Applicable Scenarios
1	GM330	CT can be purchased from GoodWe or separately. CT ratio requirement: nA: 5A • nA: CT primary side input current, n range is 200-5000 • 5A: CT secondary side output current
2	GMK330	CT is shipped with the meter. CT ratio: • 120A: 40mA

2.2.3 smart dongle

The smart dongle is mainly used for real-time transmission of various power generation data from inverters to remote monitoring platforms, and for connecting the smart dongle via the Xiaogu Cloud Window+ App for proximal device debugging.

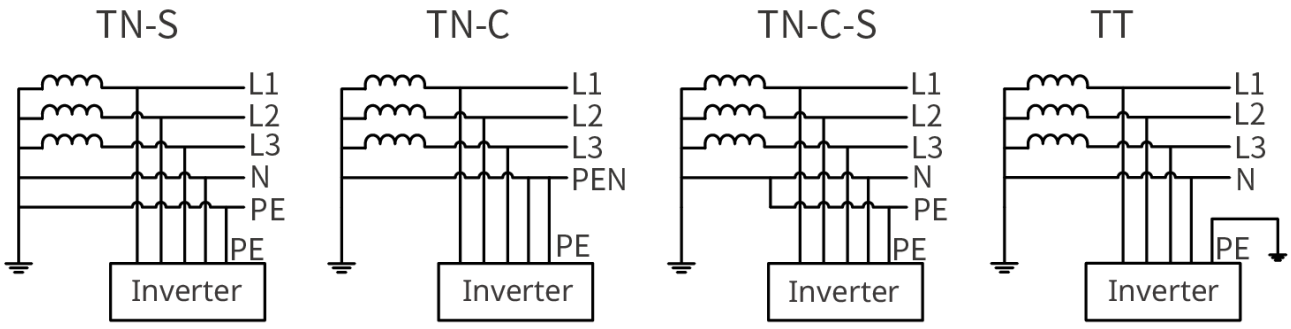
WiFi/LAN Kit-20



Smart dongle 0006

No.	model	Signal Type	Applicable Scenario
1	WiFi/LAN Kit-20	WiFi, LAN, Bluetooth	Can upload system operation information to the monitoring platform via WiFi or LAN signals

2.3 Supported Grid Types



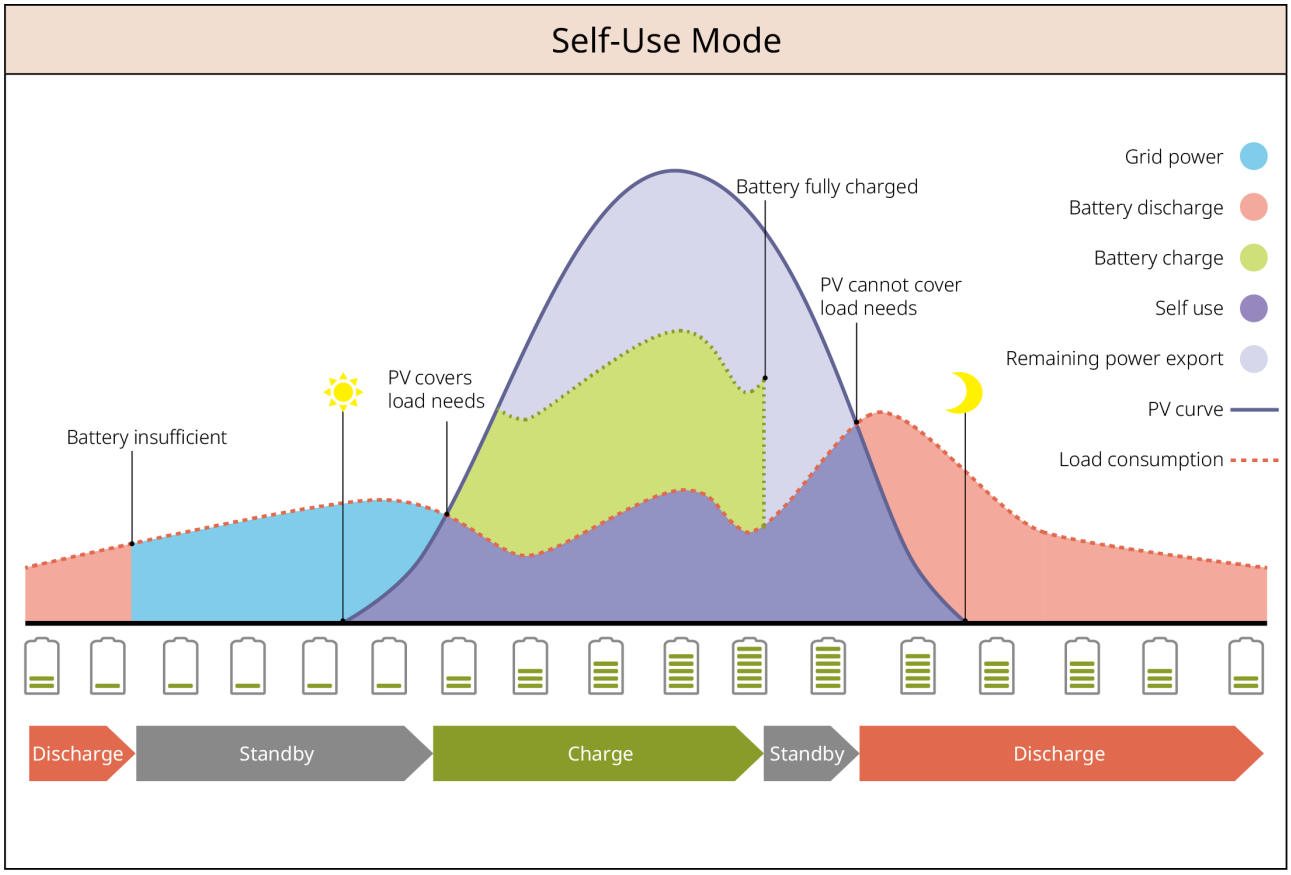
TNNET0003

2.4 System Working Mode

Self-consumption

- The basic operating mode of the system.
- PV generation first supplies power to the loads, excess energy charges the battery, and any remaining energy is sold to the grid. When PV generation cannot meet the

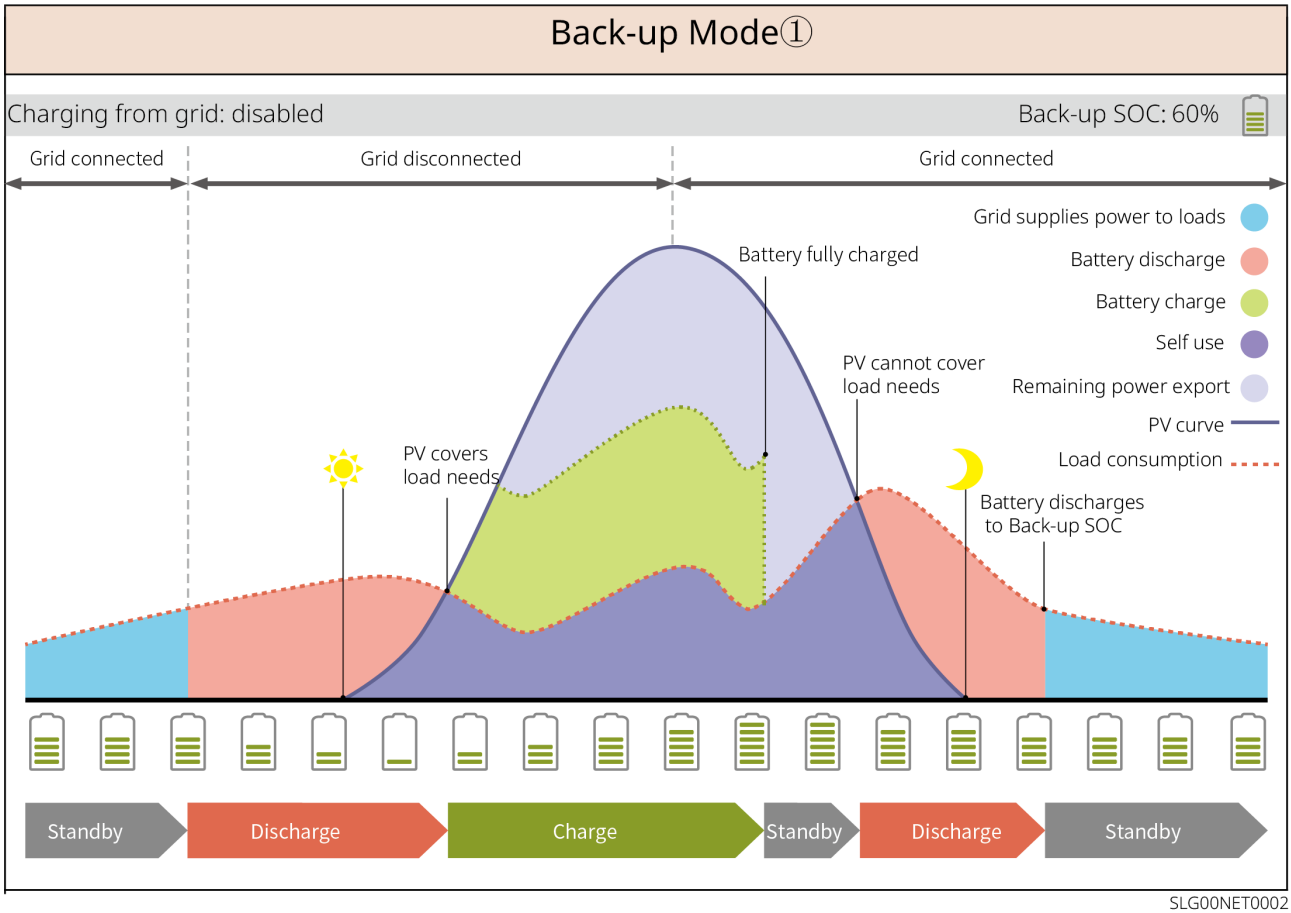
load demand, the battery supplies power to the loads; when the battery power is also insufficient to meet the load demand, the grid supplies power to the loads.



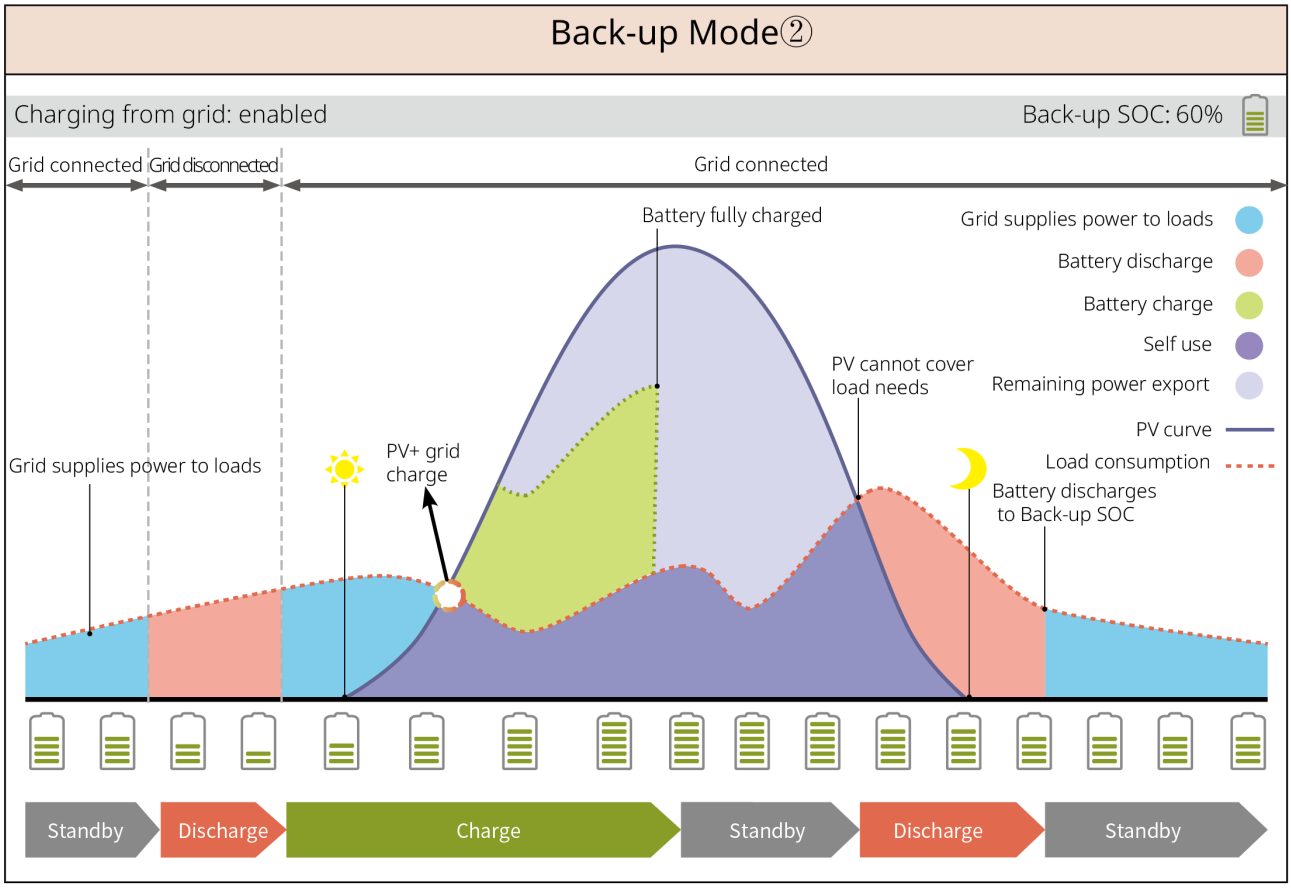
SLG00NET0009

Backup Mode

- Recommended for use in areas with unstable grids.
- When the grid fails, the inverter switches to off-grid working mode, and the battery discharges to supply power to the loads, ensuring uninterrupted power for the BACK-UP Loads. When the grid is restored, the inverter switches its working mode back to grid-connected operation.
- To ensure the battery SOC is sufficient to maintain normal system operation during off-grid periods, the system will charge the battery using PV or by purchasing electricity from the grid to the backup power SOC during grid-connected operation. If purchasing electricity from the grid to charge the battery, please ensure compliance with local grid laws and regulations.



SLG00NET0002



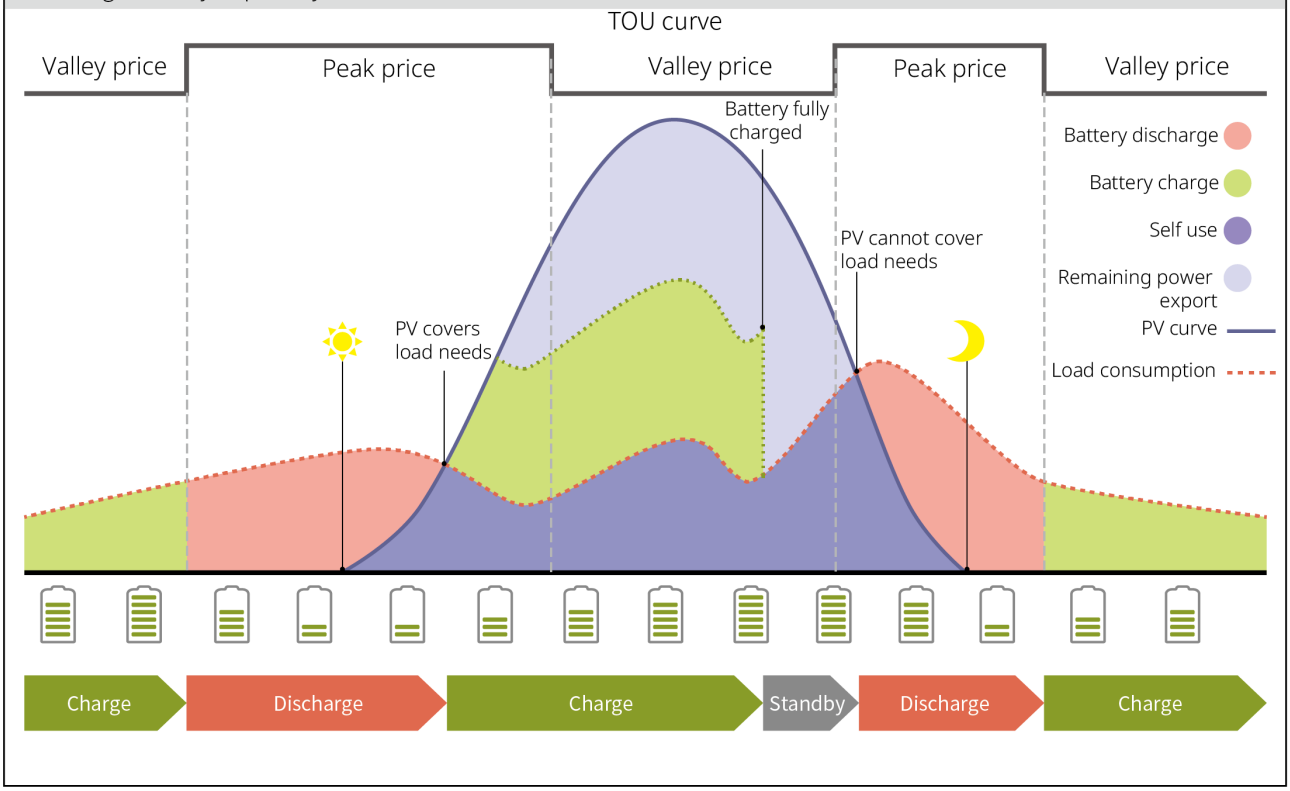
SLG00NET0003

TOU Mode

In compliance with local laws and regulations, buy and sell electricity during different time periods based on the difference between peak and valley grid electricity prices. For example: During valley price periods, set the battery to charging mode to purchase electricity from the grid for charging; during peak price periods, set the battery to discharging mode to supply power to the loads via the battery.

TOU Mode①

PV: Charge battery in priority



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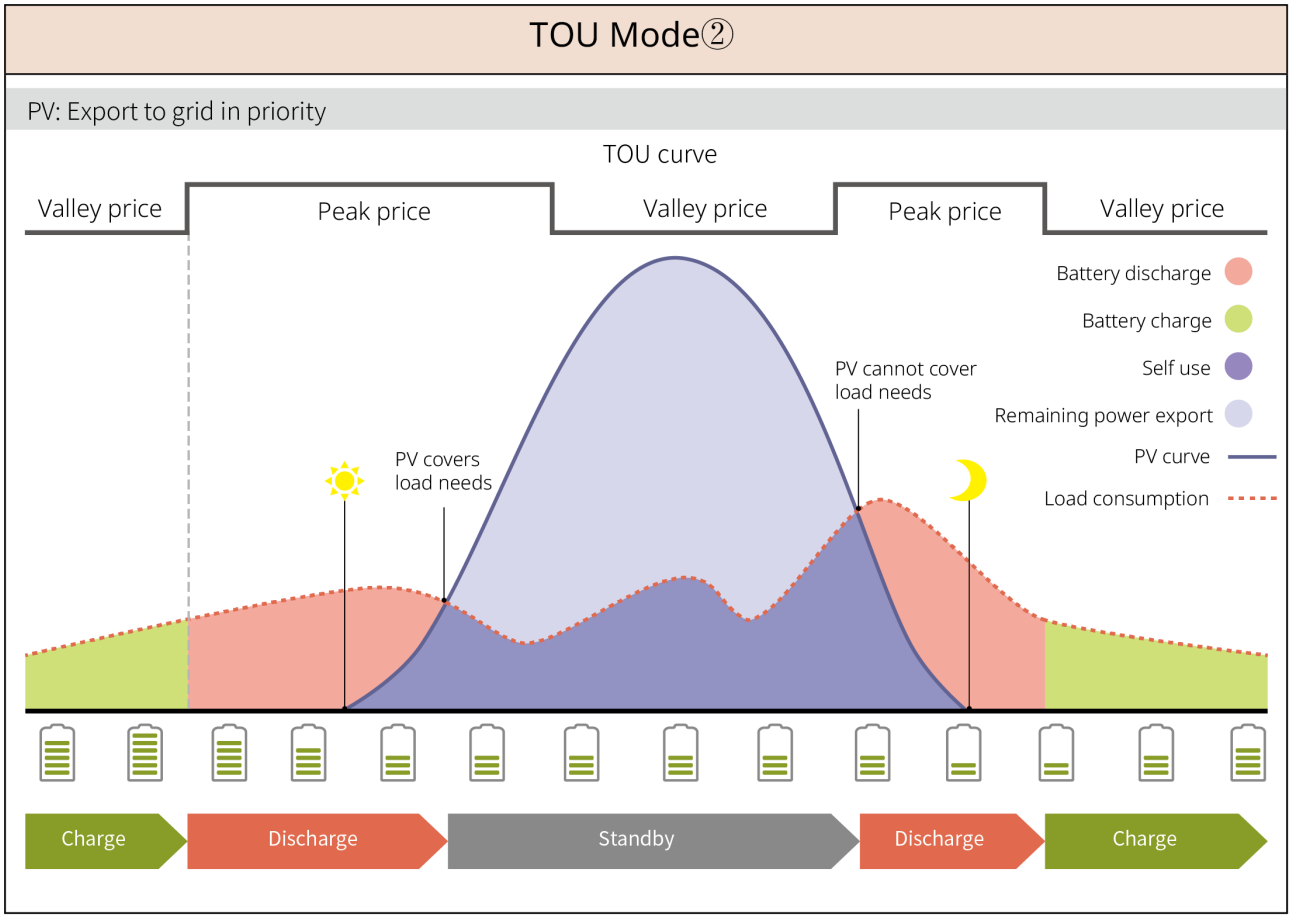


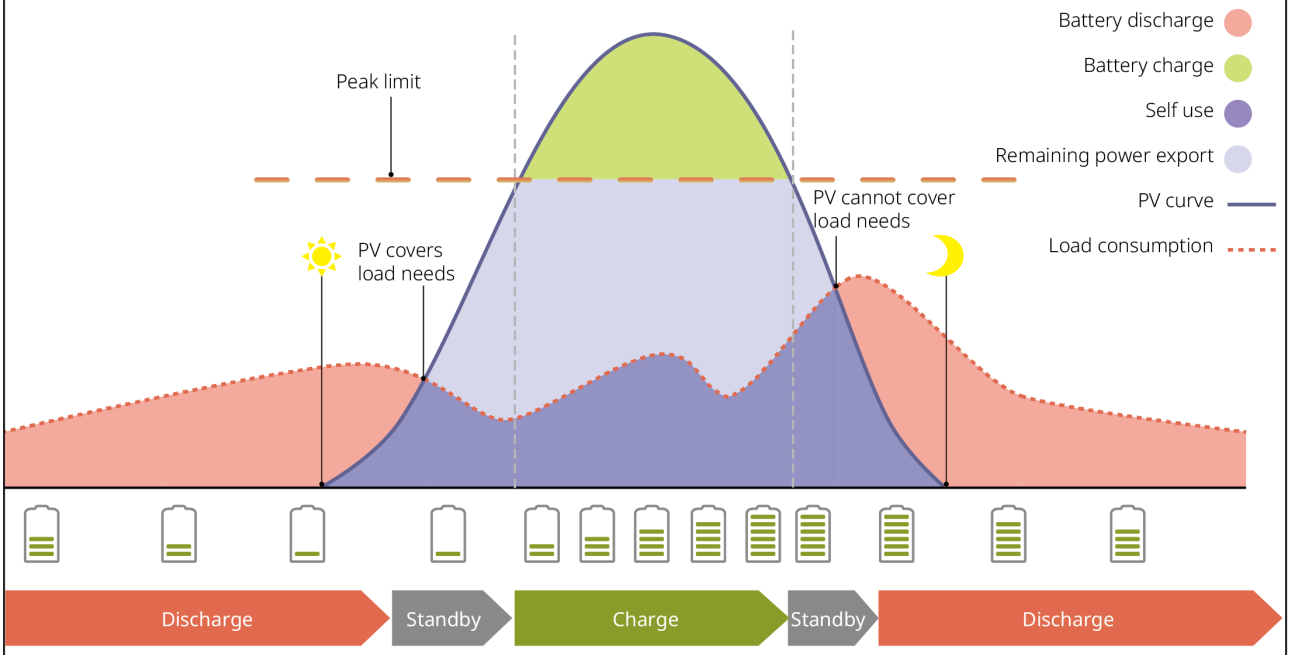
SLG00NET0005

Delayed Charging Mode

- Suitable for areas with grid-connected power output limits.
- Setting a peak power limit can use PV generation exceeding the grid connection limit to charge the battery; or setting a PV charging period to utilize PV generation for charging the battery during that period.

Smart Charging ①

PV > Peak Limit | Switch to Charge: enabled/disabled



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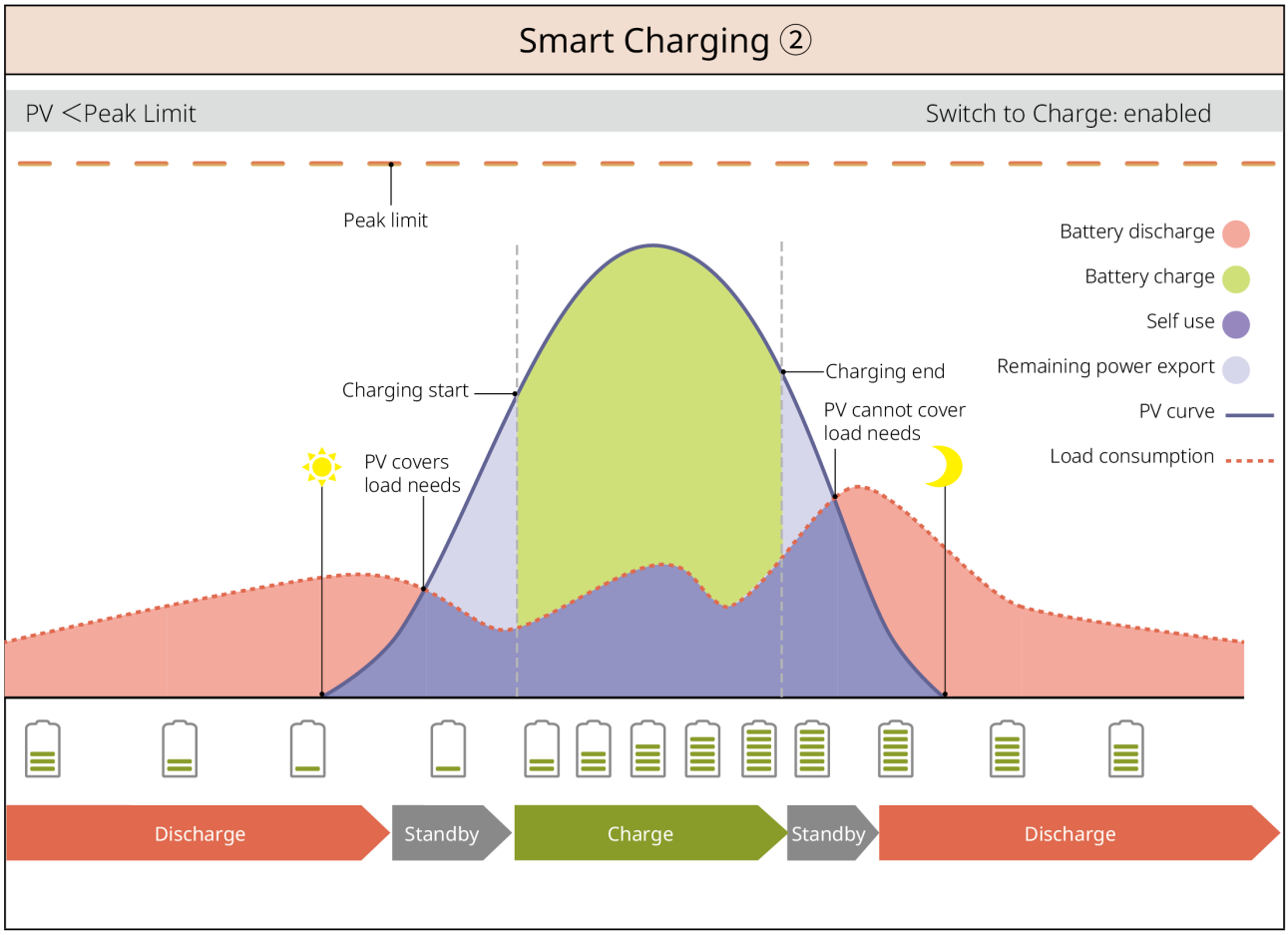

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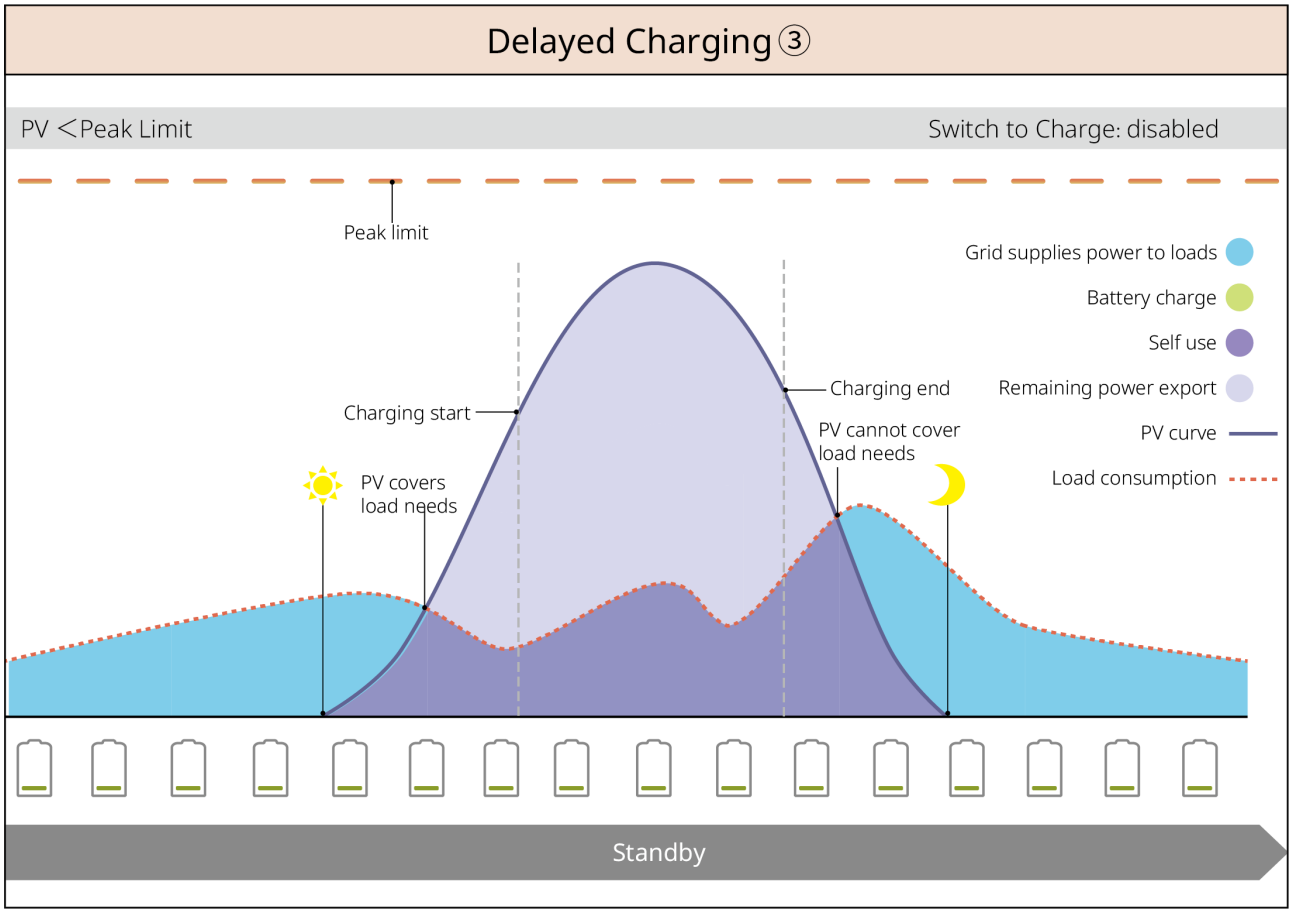
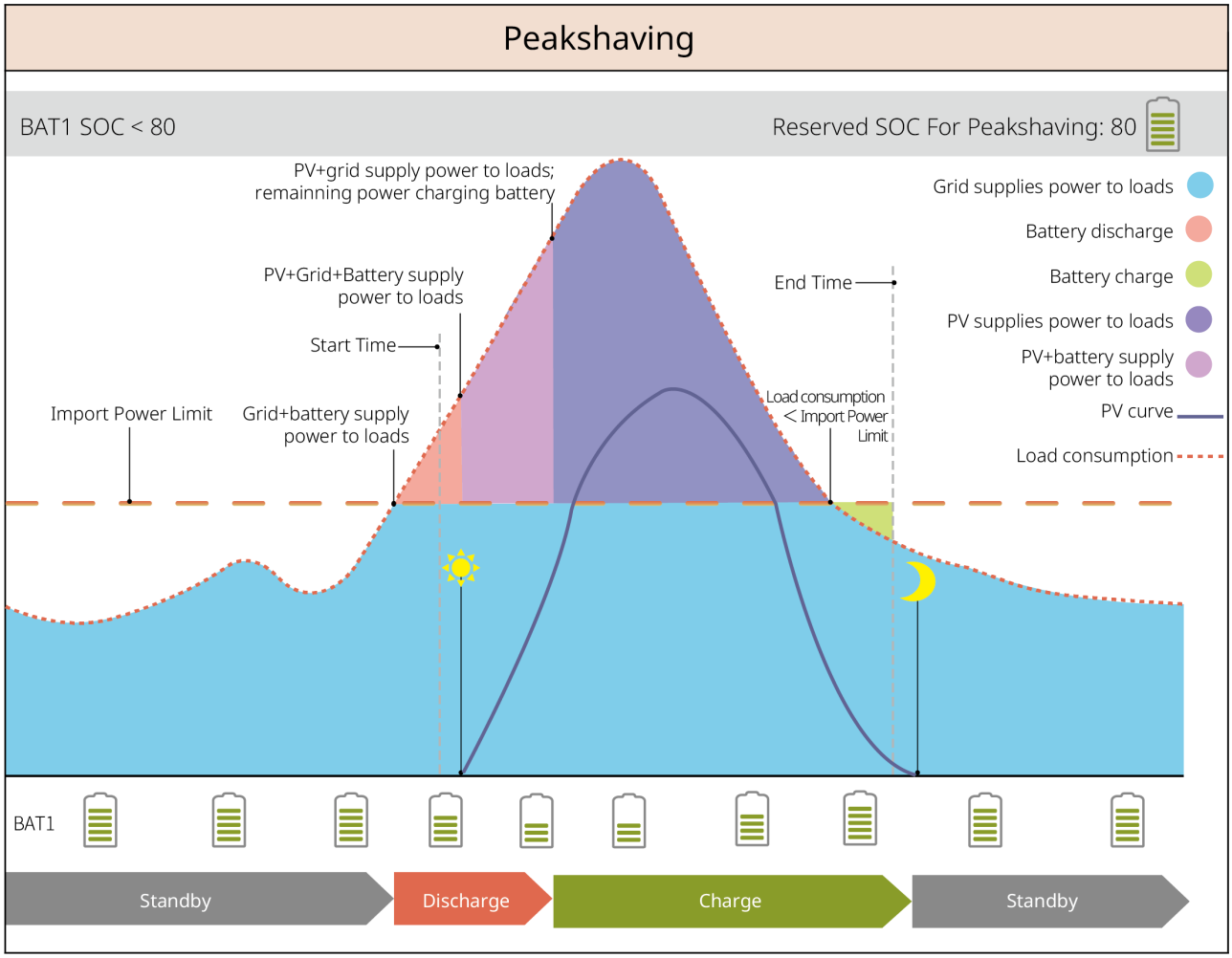


Demand Control Mode

- Primarily applicable to commercial and industrial scenarios.
- When the total load power consumption exceeds the electricity quota within a short period, battery discharge can be used to reduce the portion of consumption exceeding the quota.
- When the battery SOC is lower than the reserved SOC for demand control, the system purchases electricity from the grid based on the time period, load consumption, and peak purchase power limit.



SLG00NET0001

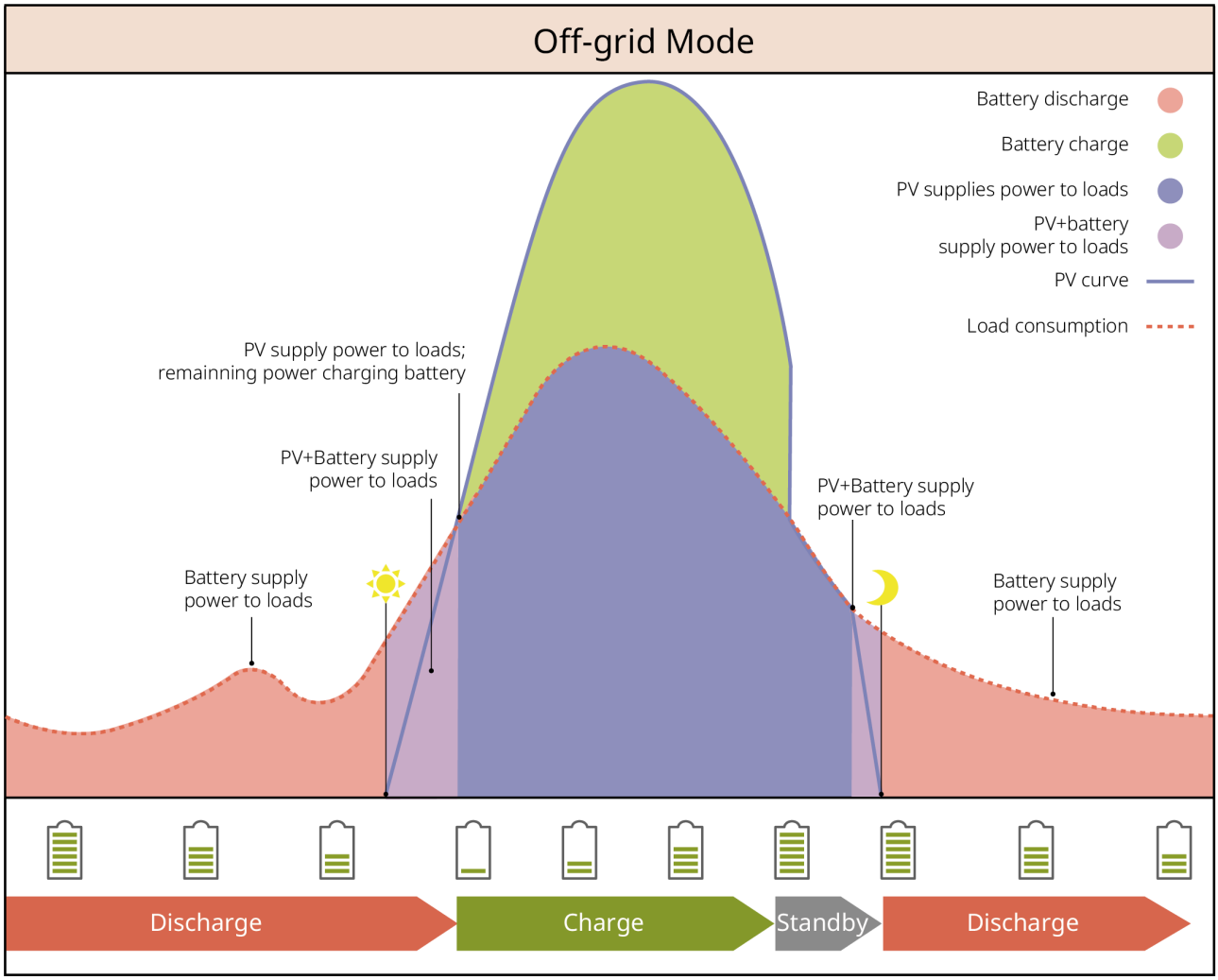
Off-grid Mode

NOTICE

When the inverter is not connected to the battery system, do not operate in pure off-grid mode.

When the grid fails, the inverter switches to off-grid working mode.

- During the day, PV generation first supplies power to the loads, and excess energy charges the battery.
- At night, the battery discharges to supply power to the loads, ensuring uninterrupted power for the BACK-UP Loads.



SLG00NET0012

2.5 Features

NOTICE
Please refer to the actual product configuration for specific features.

AFCI

The inverter integrates an AFCI circuit protection device, which detects arc faults (arc fault) and quickly cuts off the circuit when detected, thereby preventing electrical fires.

Causes of arc generation:

- Damage to connector connections in the photovoltaic system.
- Incorrect or damaged cable connections.

- Aging of connectors and cables.

Fault handling methods:

1. When the inverter detects an arc occurrence, the fault type can be viewed through the App.
2. If the inverter triggers a fault less than 5 times within 24 hours, after waiting for 5 minutes, the machine will automatically restore grid connection protection. After the 5th arc fault, the fault must be cleared before the inverter can operate normally. For specific operations, please refer to the "SEMS+ App User Manual".

model	Label	Description
GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20	AFCI: F-I-AFPE-1-2/1-2	F (Full coverage): Full coverage of inverter PV input ports I (Integrated): Integrated inside the inverter AFPE (arc fault protection equipment): Combines AFD and AFI two types of arc fault detection functions 1: One pair of PV input ports (PV+, PV-) connects to one string of PV input 2/1: One arc fault detection channel has 2 MPPT inputs; one arc fault detection channel has 1 MPPT input; 2: There are 2 arc fault detection channels

model	Label	Description
GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20	AFCI: F-I-AFPE-1-2/2-2	F (Full coverage): Full coverage of inverter PV input ports I (Integrated): Integrated inside the inverter AFPE (arc fault protection equipment): Combines AFD and AFI two types of arc fault detection functions 1: One pair of PV input ports (PV+, PV-) connects to one string of PV input 2/2: Each arc fault detection channel has 2 MPPT inputs; 2: There are 2 arc fault detection channels
GW25K-ETA-G20 GW29.999K-ETA-G20 GW30K-ETA-G20	AFCI: F-I-AFPE-1-2/4-2	F (Full coverage): Full coverage of inverter PV input ports I (Integrated): Integrated inside the inverter AFPE (arc fault protection equipment): Combines AFD and AFI two types of arc fault detection functions 1: One pair of PV input ports (PV+, PV-) connects to one string of PV input 2/4: One arc fault detection channel has 2 MPPT inputs; one arc fault detection channel has 4 MPPT inputs; 2: There are 2 arc fault detection channels

Three-Phase Unbalanced Output

Both the grid connection end and the BACK-UP end of the inverter support three-phase unbalanced output, and each phase can be connected to loads of different power. The maximum output power per phase for different models is shown in the table below:

No.	model	Single-Phase Maximum Output Power
1	GW5K-ETA-G20 GW5K-BTA-G20	2.5kW
2	GW6K-ETA-G20 GW6K-BTA-G20	3kW
3	GW8K-ETA-G20 GW8K-BTA-G20	4kW
4	GW9.999K-ETA-G20 GW9.999K-BTA-G20	5kW
5	GW10K-ETA-G20 GW10K-BTA-G20	5kW
6	GW12K-ETA-G20 GW12K-BTA-G20	6kW
7	GW15K-ETA-G20 GW15K-BTA-G20	7.3kW
8	GW20K-ETA-G20 GW20K-BTA-G20	7.3kW
9	GW25K-ETA-G20 GW25K-BTA-G20	11kW
10	GW29.999K-ETA-G20 GW29.999K-BTA-G20	11kW
11	GW30K-ETA-G20 GW30K-BTA-G20	11kW

Rapid Shutdown (RSD)

In a Rapid Shutdown system, the Rapid Shutdown transmitter and receiver are used together to achieve rapid system shutdown. The receiver maintains component output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In emergency situations, by enabling an external triggering device, the transmitter can be stopped, thereby shutting down the components.

- External transmitter
  - Transmitter models: GTP-F2L-20, GTP-F2M-20
    https://en.goodwe.com/Ftp/Installation-instructions/RSD2.0-transmitter.pdf
  - Receiver models: GR-B1F-20, GR-B2F-20

https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_RSD-20_Quick-Installation-Guide-POLY.pdf

- Built-in transmitter
  - External triggering device: External switch
  - Receiver models: GR-B1F-20, GR-B2F-20
    https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_RSD-20_Quick-Installation-Guide-POLY.pdf

3 Check and Storage

3.1 Check Before Receiving

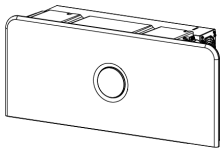
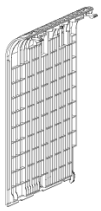
Before receiving the product, please carefully check the following:

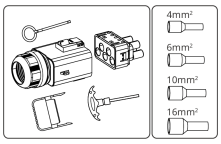
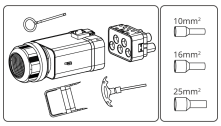
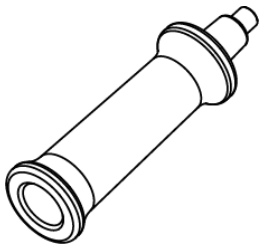
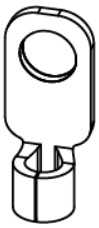
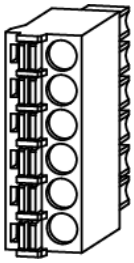
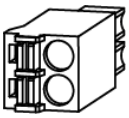
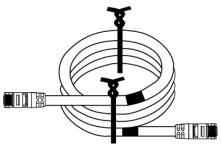
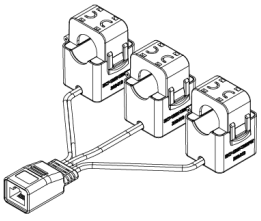
1. Check if the outer packaging is damaged, such as deformation, holes, cracks, or other signs that could cause damage to the equipment inside the box. If damaged, do not open the packaging and contact your dealer.
2. Check if the device model is correct. If it does not match, do not open the packaging and contact your dealer.

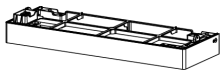
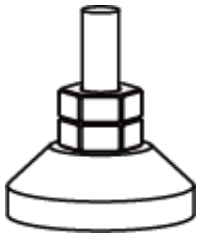
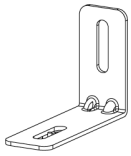
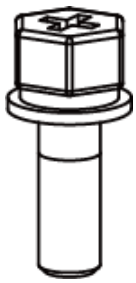
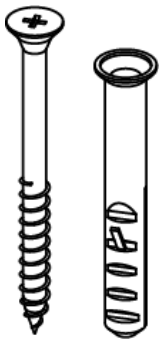
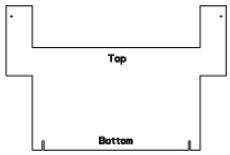
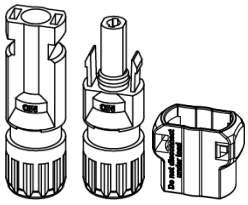
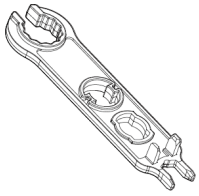
3.2 deliverables

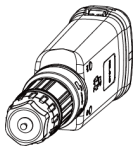
⚠WARNING
Check if the type and quantity of the delivered items are correct, and if there is any damage to the appearance. If there is any damage, please contact your dealer. After removing the delivered items from the packaging, do not place them on rough, uneven, or sharp surfaces to avoid paint chipping.

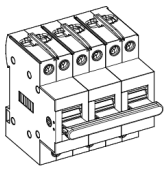
3.2.1 Inverter Deliverables

Component	Description	Component	Description
	Inverter x 1		Decorative cover top x 1
	Decorative cover left x 1		Decorative cover right x 1

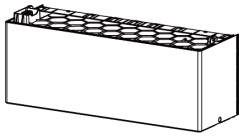
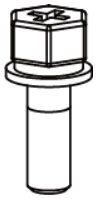
Component	Description	Component	Description
 or 	AC terminal kit x 2 • AC wiring terminal x 2 • PIN terminal x N ◦ 5-20kW: ▪ 4mm² x 5 ▪ 6mm² x 5 ▪ 10mm² x 5 ▪ 16mm² x 5 ◦ 25-30kW: ▪ 10mm² x 5 ▪ 16mm² x 5 ▪ 25mm² x 5		Handle x 2
	OT grounding terminal x 1		6PIN communication terminal x 2
	2PIN communication terminal x 2		PIN terminal x 16
	CT connection cable x 1		CT x 1

Component	Description	Component	Description
	Battery base x 1		Adjustable feet x 4
	Anti-tip bracket x 4		M5*16 screw x 9
	M5*60 expansion screw x 4		Drilling template paper x 2
			PV terminal unlocking tool x N N：China region x 0；Other regions x 1。

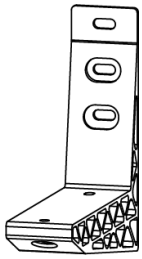
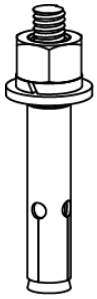
Component	Description	Component	Description
	PV terminal and PV terminal anti-tamper cover • GW5K-ETA-G20，GW6K-ETA-G20，GW8K-ETA-G20，GW6K-EHA-G20：3 • GW9.999K-ETA-G20，GW10K-ETA-G20，GW12K-ETA-G20，GW15K-ETA-G20，GW20K-ETA-G20，GW25K-ETA-G20，GW29.999K-ETA-G20，GW30K-ETA-G20：4 • GW5K-BTA-G20，GW6K-BTA-G20，GW8K-BTA-G20，GW9.999K-BTA-G20，GW10K-BTA-G20，GW12K-BTA-G20，GW15K-BTA-G20，GW20K-BTA-G20，GW25-BTA-G20，GW29.999K-BTA-G20，GW30K-BTA-G20：0		Smart dongle x 1

Component	Description	Component	Description
	Product documentation x 1		Manual transfer switch (Australia only) x 1

3.2.2 Batteries Deliverables

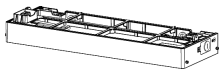
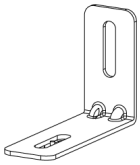
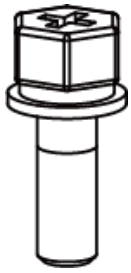
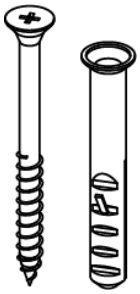
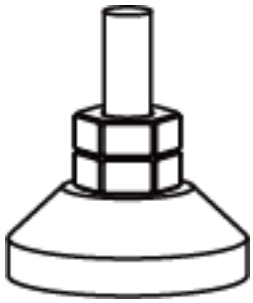
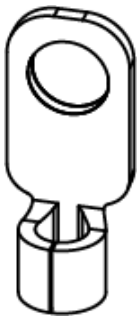
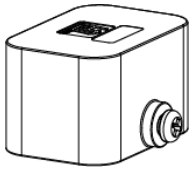
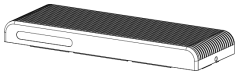
Part	Description	Part	Description
	Battery x 1		M5*16 screw x 2
	Silicone cap x 2	-	-

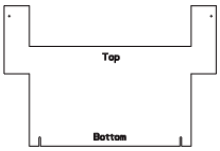
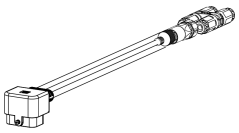
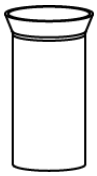
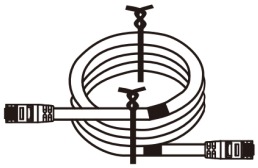
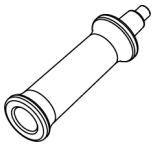
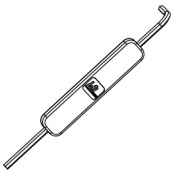
Battery rack (optional)

Component	Description	Component	Description
	Mounting bracket x 2		M10 expansion screw x 6
	M10 screw x 4	-	-

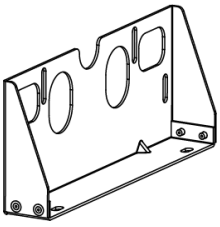
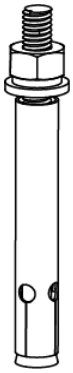
3.2.2.1 Battery Expansion Kit Deliverables (Optional)

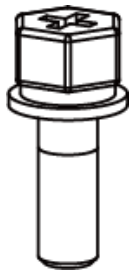
NOTICE
The system supports 5-96kWh. A single stack can accommodate up to 6 batteries. For scenarios requiring more energy, needing to reduce single-stack height due to installation constraints, or other expansion needs, please contact GoodWe or your distributor to purchase a battery expansion kit.

Part	Description	Part	Description
	Base x 1		locking bracket x 4
	M5 Screw x 7		M6 Expansion Screw x 4
	Adjustable Feet x 4		OT Grounding Terminal x 1
	Terminal resistor x 1		Battery Decorative Cover x 1

Part	Description	Part	Description
	Drilling Template Paper x 2		Battery Cluster Expansion Harness x 1
	PIN terminal x 8		Battery Cluster Expansion Positive Connection Harness x 1
	Battery Cluster Expansion Negative Connection Harness x 1		Battery Cluster Expansion Network Cable x 1
	Silicone Cap x 2		Handle x 2
	Hex Key x 1		Product Documentation x 1

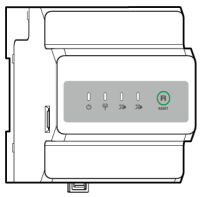
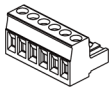
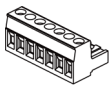
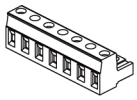
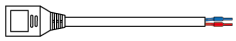
3.2.2.2 Wall-Mount Bracket Deliverables (Optional)

Component	Description	Component	Description
	Wall-mount bracket x 2		M6 expansion screw x 4

Component	Description	Component	Description
	M5 fixing screw x 4	-	-

3.2.3 Smart Meter Delivery Set GM330&GMK330

3.2.3.1 Attachment List

Part	Description	Part	Description
	Smart meter x1 GMK330: CT x 3; GMK360: CT x 6; GM330: CT x 0.		2PIN communication terminal x1 Applicable to GM330.
	6PIN communication terminal x1 Applicable to GM330.		7PIN communication terminal x1 Applicable to GM330.
	Meter communication terminal Applicable to GMK330/GMK360.		RS485 communication terminal x 1
	2PIN terminal and RJ45 terminal adapter cable x 1		screwdriver x1

Part	Description	Part	Description
	PIN terminal GMK330/GMK360: x 5 ; GM330: x 6.		Product documentation x 1

3.3 Storage

- If the inverter has been stored for more than two years or remains unused for more than 6 months after installation, it is recommended to have it inspected and tested by qualified personnel before putting it into operation.
- To ensure the good electrical performance of the internal electronic components of the inverter, it is recommended to power it on every 6 months during storage. If it has not been powered on for more than 6 months, it is recommended to have it inspected and tested by qualified personnel before putting it into operation.
- To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Prolonged storage may cause the battery to deep discharge, leading to irreversible chemical degradation, capacity decay, or even complete failure, therefore timely use is advised. If the battery requires long-term storage, please maintain it according to the following requirements:

NOTICE

[1] The storage time is calculated from the SN date on the battery outer packaging. After exceeding the storage cycle, charge-discharge maintenance is required. (Battery maintenance time = SN date + charge-discharge maintenance cycle). For the method to view the SN date, refer to: 10.4.Battery SN Code Meaning(Page 285).
[2] After the charge-discharge maintenance is qualified, if there is a Maintaining Label on the outer box, please update the maintenance information on the Maintaining Label. If there is no Maintaining Label, please record the maintenance time and battery SOC yourself and keep the data properly to facilitate the preservation of maintenance records.

Battery Model	Initial SOC Range for Battery Storage	Recommended Storage Temperature	Charge/Discharge Maintenance Cycle[1]	Battery Maintenance Method[2]
GW5.1-BAT-D-G20	35~45%	0~35℃	-20~35℃, 12 months 35~45℃, 6 months	For maintenance methods, please consult the dealer or after-sales service center.
GW8.3-BAT-D-G20				
GW5.1-BAT-D-G21				
GW8.3-BAT-D-G21				

Packaging Requirements:
Ensure the outer packaging box is not removed and the desiccant inside the box is not missing.
Environmental Requirements:

1. Ensure the device is stored in a cool place, avoiding direct sunlight.
2. Ensure the storage environment is clean, with appropriate temperature and humidity ranges, and free from condensation. If condensation is observed on the device ports, do not install the device. Battery storage humidity range: 5%-95%.
3. Ensure the device is stored away from flammable, explosive, corrosive, and other hazardous materials.

Stacking Requirements:

1. Ensure the stacking height and orientation of the device comply with the instructions on the packaging box label.
2. Ensure there is no risk of the stacked devices tipping over.

4 Installation

⚠DANGER

When performing equipment installation and electrical connections, please use the delivery items shipped with the box. Otherwise, any resulting equipment damage will not be covered under warranty.

4.1 Installation Requirements

4.1.1 Installation Environment Requirements

NOTICE

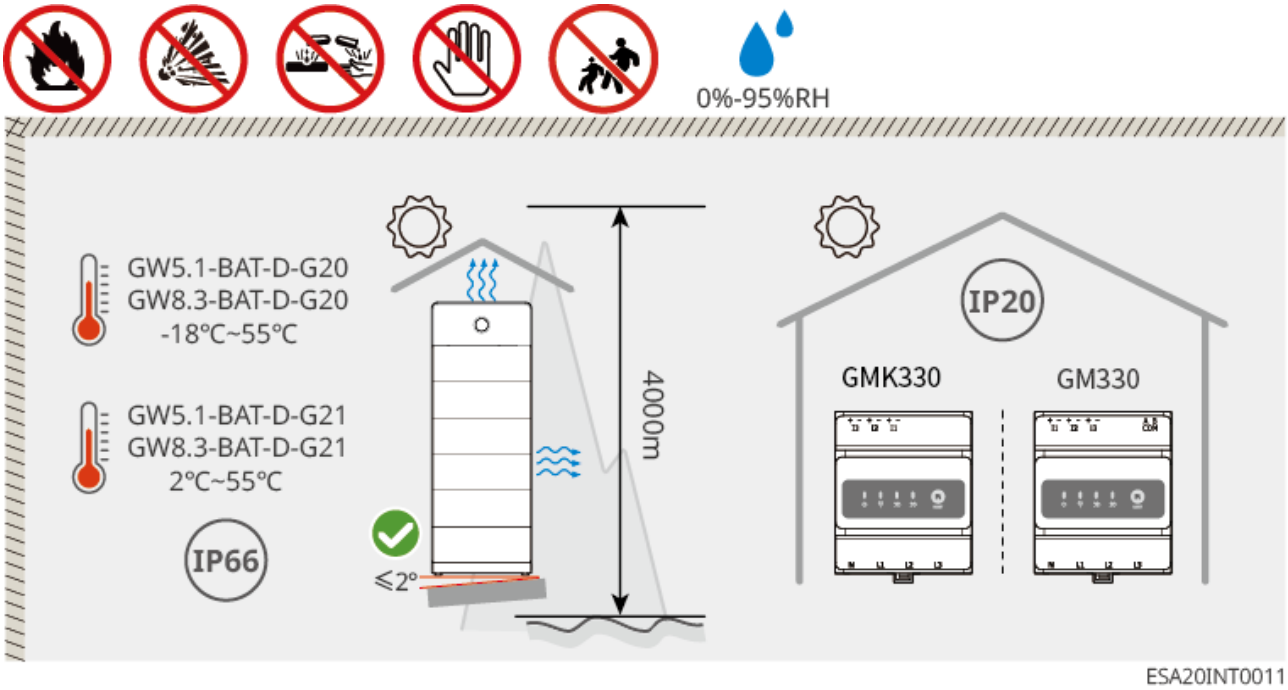
- Inverter operating temperature range: -35°C to 60°C.
- GW5.1-BAT-D-G20, GW8.3-BAT-D-G20: Charging temperature range: -18°C to 55°C; Discharging temperature range: -20°C to 55°C. If installed in an environment below -18°C, the battery will be unable to recharge and restore energy after being depleted, leading to battery undervoltage protection.
- GW5.1-BAT-D-G21, GW8.3-BAT-D-G21: Charging temperature range: 2°C to 55°C; Discharging temperature range: -20°C to 55°C. If installed in an environment below 2°C, the battery will be unable to recharge and restore energy after being depleted, leading to battery undervoltage protection.

1. The equipment must not be installed in flammable, explosive, corrosive, or similar environments.
2. The temperature and humidity of the installation environment must be within a suitable range.
3. The installation location must be out of reach of children and avoid areas where it is easily touched.
4. The equipment surface may become hot during operation to prevent burns.
5. The equipment must be installed away from direct sunlight, rain, snow accumulation, and similar conditions. It is recommended to install it in a sheltered location. If necessary, a sunshade can be constructed.
6. The installation space must meet the equipment's ventilation, heat dissipation, and

operational space requirements.

7. The installation environment must satisfy the equipment's protection rating. The Inverter, battery, and smart communication stick are suitable for indoor and outdoor installation; the meter is suitable for indoor installation.
8. The installation height of the equipment should facilitate operation and maintenance, ensuring the equipment indicator lights, all labels are easy to view, and the wiring terminals are easy to operate.
9. The installation altitude of the equipment must be lower than the maximum operating altitude.
10. For outdoor installation in salt damage areas, please consult the equipment manufacturer. Salt damage areas mainly refer to regions within 500m of the coast. The affected area is related to factors such as sea breeze, precipitation, and terrain.
11. The equipment generates noise during operation. The installation location should be away from areas highly sensitive to noise, such as residential living areas, schools, and hospitals. This is to prevent the noise generated during equipment operation from disturbing people living in the nearby environment.
12. Keep away from strong magnetic field environments to avoid electromagnetic interference. If there are radio stations or wireless communication equipment below 30MHz near the installation location, please install the equipment according to the following requirements:

- Inverter: Add ferrite cores with multiple windings or add low-pass EMI filters at the DC input lines or AC output lines of the Inverter; or ensure the distance between the Inverter and the wireless electromagnetic interference equipment exceeds 30m.
- Other equipment: Ensure the distance between the equipment and the wireless electromagnetic interference equipment exceeds 30m.

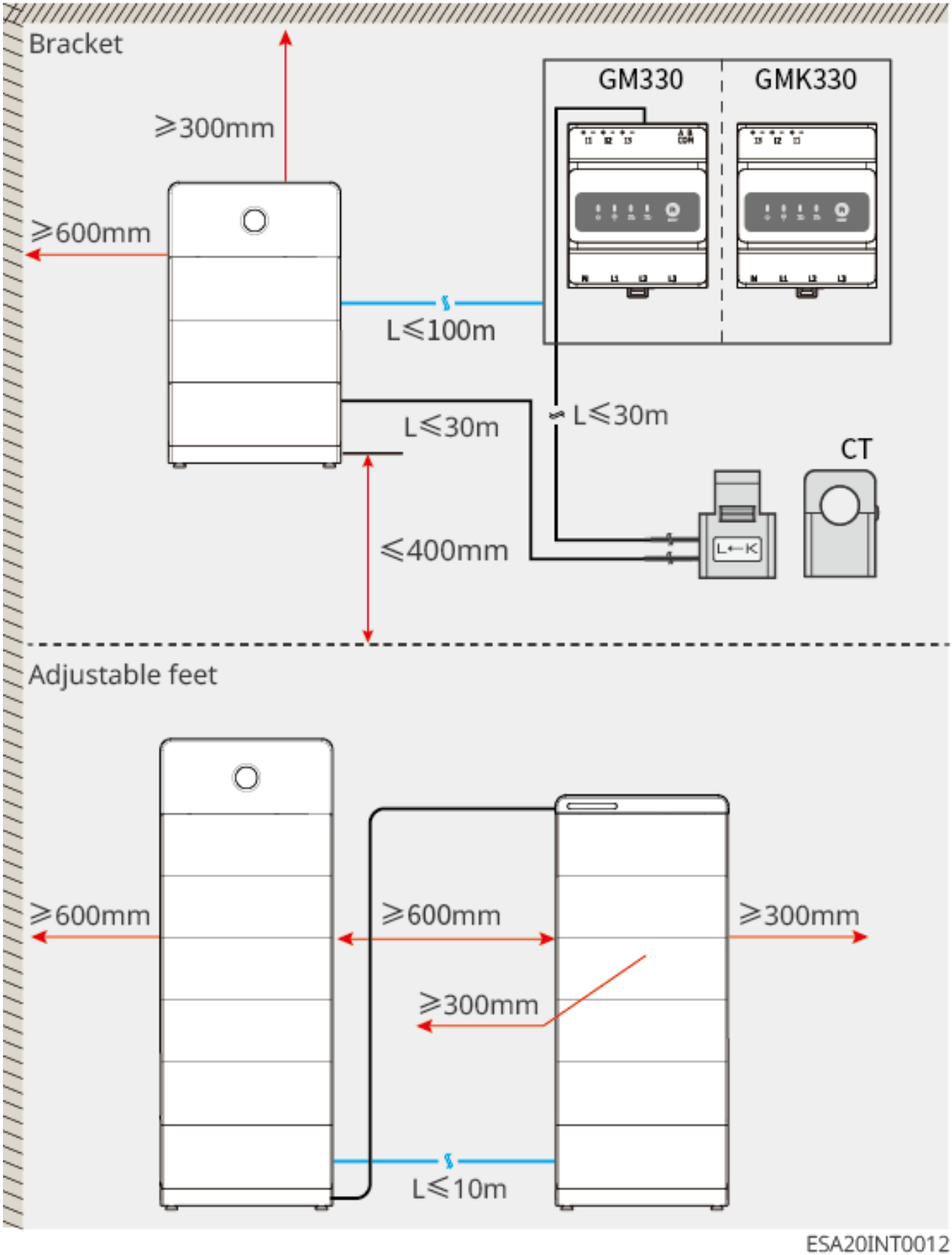


4.1.2 Installation Space Requirements

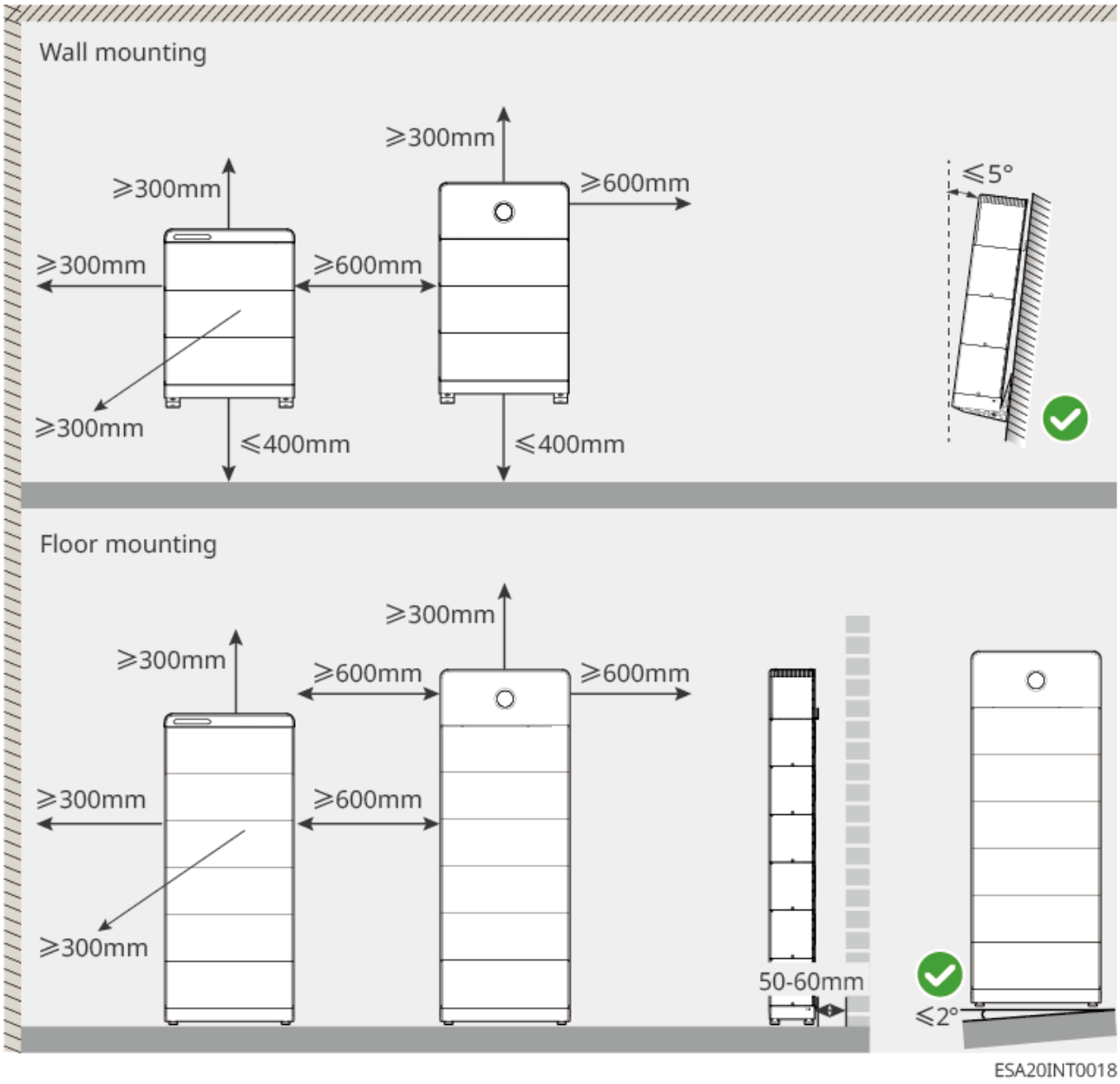
When installing equipment in the system, a certain amount of space should be reserved around the equipment to ensure sufficient space for installation and heat dissipation.

- Installing a CT requires using shielded network cable of CAT 5E or above, with a cable distance not exceeding 30 meters.
- The RS485 twisted-pair shielded cable for communication between the inverter and the meter should not exceed 100 meters in length.

Communication Cable Length



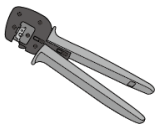
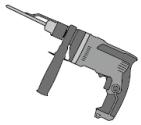
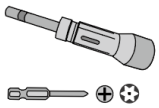
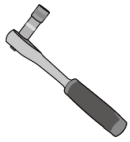
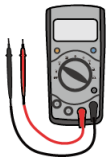
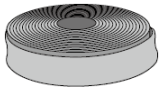
Installation Space



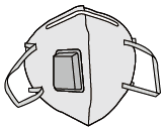
4.1.3 Tool Requirements

NOTICE
During installation, it is recommended to use the following installation tools. If necessary, other auxiliary tools may be used on-site.

Installation Tools

Tool Type	Description	Tool Type	Description
	diagonal plier		RJ45 connector crimping tool
	wire stripper		Level bar
	open-end wrench		PV terminal crimping tool PV-CZM-61100
	hammer drill (drill bit Φ12mm)		torque wrench M4, M5, M6, M10
	rubber hammer		socket wrench
	marker pen		multimeter Range ≤ 1000V
	heat shrink tubing		heat gun
	cable tie		vacuum cleaner

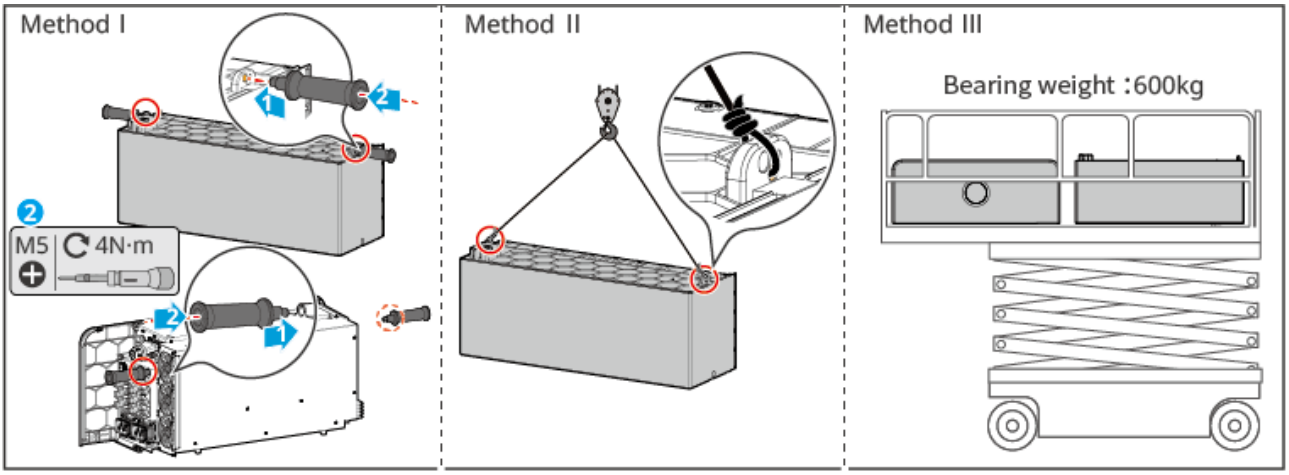
Personal Protective Equipment

Tool Type	Description	Tool Type	Description
	Insulated gloves, protective gloves		Dust mask
	goggle		Safety shoes

4.2 Equipment Handling

⚠CAUTION

- During operations such as transportation, handling, and installation, the laws, regulations, and relevant standards of the country or region must be complied with.
- Before installation, the equipment needs to be moved to the installation site. To avoid personal injury or equipment damage during the moving process, please note the following:
  1. Based on the equipment weight, arrange a sufficient number of personnel to avoid the equipment exceeding the human lifting capacity and causing injury.
  2. Please wear safety gloves to prevent injury.
  3. Ensure the equipment remains balanced during movement to prevent it from falling.
  4. The battery system can be transported to the installation site using lifting methods.
  5. When using lifting methods to move the equipment, please use flexible slings or straps. The load-bearing capacity per single strap must meet the following requirements:
     - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21≥180KG
     - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21 ≥240KG



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4.3 Equipment Installation

⚠CAUTION

- When drilling holes, ensure the drilling location avoids water pipes, cables, etc., inside the wall to prevent danger.
- When drilling holes, please wear safety goggles and a dust mask to avoid inhaling dust into the respiratory tract or getting it into the eyes.
- The inverter is installed above the battery; do not install the battery above the inverter.
- When installing the battery system, ensure it is level and secure. When placing the battery base, battery, and inverter, confirm that the hole positions on the upper and lower layers are aligned; the anti-tipping bracket should be vertical and tightly attached to the ground, wall, or battery system surface.
- When using an impact drill to make holes, use cardboard or other coverings to shield the battery system to prevent foreign objects from entering the device and causing damage.
- When installing on the wall, to ensure the safety of your life and property, be sure to assess the wall's load-bearing capacity.

NOTICE

- The battery must be installed on a base, which can be floor-mounted or installed on a mounting bracket.
- For floor installation, a maximum of 4 batteries can be stacked when placed away from the wall, and a maximum of 6 batteries can be stacked when placed against the wall.
- The maximum stacking quantity when using a mounting bracket is as follows:
  - Same energy capacity stacking:
    - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21: Maximum of 3 units.
    - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21: Maximum of 2 units.
  - Mixed energy capacity stacking:
    - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21: When mixed stacking, the system supports a maximum of 3 units per group.
    - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21 and models mixed and stacked with them: The system supports a maximum of 2 units per group.
- When installed against a wall, the base, mounting bracket, and the top battery must be secured to the wall using an anti-tip bracket.
- When marking drilling positions for bracket installation, have one person hold the base steady while another uses a marker to mark the drilling spots.
- When installing the battery and inverter, remove the protective cover from the blind-mate connector before stacking.

Wall-Mounted Installation

Step 1: Install the base onto the mounting bracket.

Step 2: Place the mounting bracket flush against the wall. Ensure the bracket is positioned stably and observe the spirit level in the center of the base.

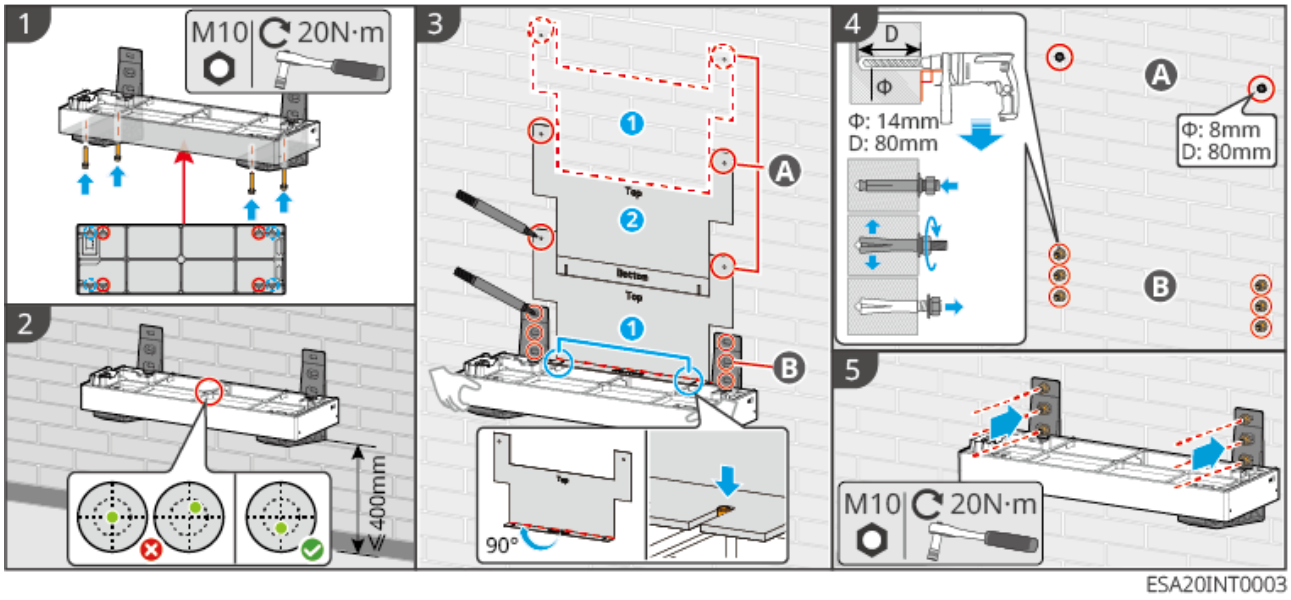
Step 3: After adjusting the bracket's position and level, use a marker to mark the drilling points. Once marked, remove the bracket. (A: PACK fixing holes; B: Bracket fixing holes.)

Step 4: Drill holes and install expansion bolts.

1. Use an impact drill to drill the holes.
2. Clean the holes.
3. Use a rubber mallet to install the expansion bolts into the holes.
4. Use a hex wrench to tighten the nut clockwise to expand the bolt.

5. Rotate the nut counterclockwise to remove it.
6. Use a torque screwdriver to secure the anti-tip bracket to the wall.

Step 5: Use a hex wrench to secure the mounting bracket to the wall.



Floor Installation

Wall-Adjacent Installation

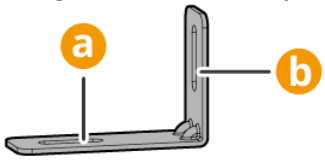
Step 1: Install the adjustable feet onto the bottom of the base and secure the anti-tip bracket to the base.

Step 2: Place the base 50-60mm away from the wall, keeping it parallel to the wall. Observe the spirit level in the center of the base. If the bubble is not centered, use the adjustable feet to level it.

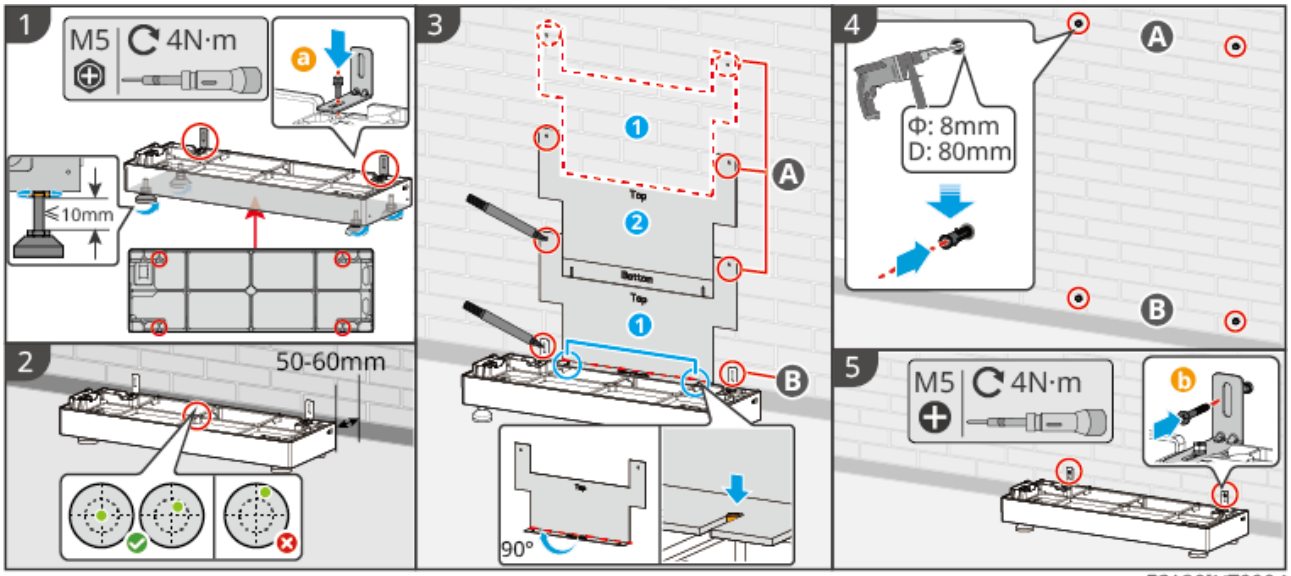
Step 3: After adjusting the base's position and level, use a drilling template to mark the drilling points. Once marked, remove the base. (A: PACK fixing holes; B: Bracket fixing holes.)

Step 4: Use an impact drill to drill the holes and clean them.

Step 5: Use a Phillips screwdriver to secure the anti-tip bracket to the wall.



a: Base fixing surface; b: Wall fixing surface.



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Freestanding Installation (Away from Wall)

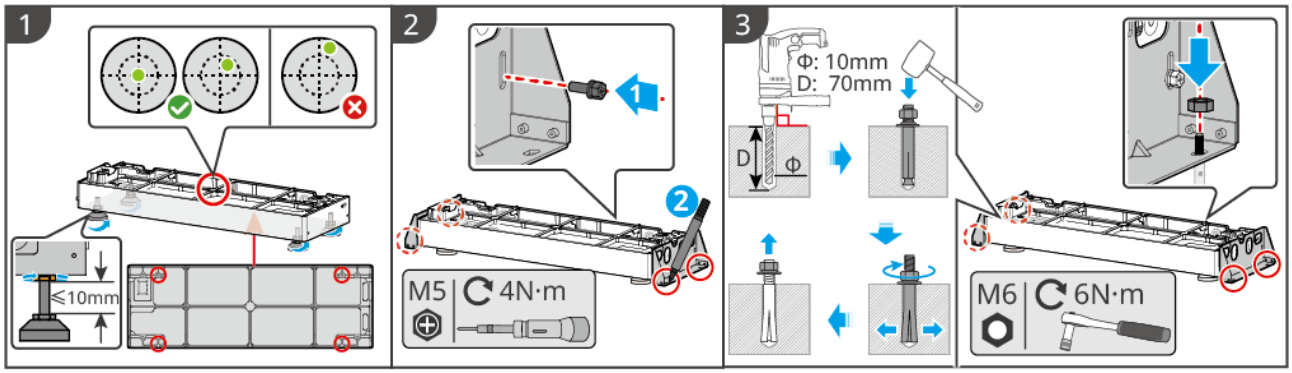
Step 1: Install the adjustable feet onto the bottom of the base. Observe the spirit level in the center of the base. If the bubble is not centered, use the adjustable feet to level it.

Step 2: After adjusting the base's position and level, secure the freestanding installation bracket to the base. Choose a suitable location to mark the drilling points. Once marked, remove the base.

Step 3: Drill holes and install expansion bolts.

1. Use an impact drill to drill the holes.
2. Clean the holes.
3. Use a rubber mallet to install the expansion bolts into the holes.
4. Use a hex wrench to tighten the nut clockwise to expand the bolt.
5. Rotate the nut counterclockwise to remove it.
6. Use a torque screwdriver to secure the anti-tip bracket (for freestanding) to the floor.

Step 4: Use a hex wrench to secure the base to the floor.



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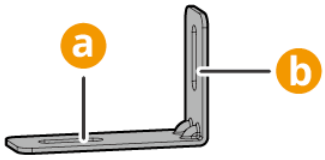
Installing the Battery and Inverter

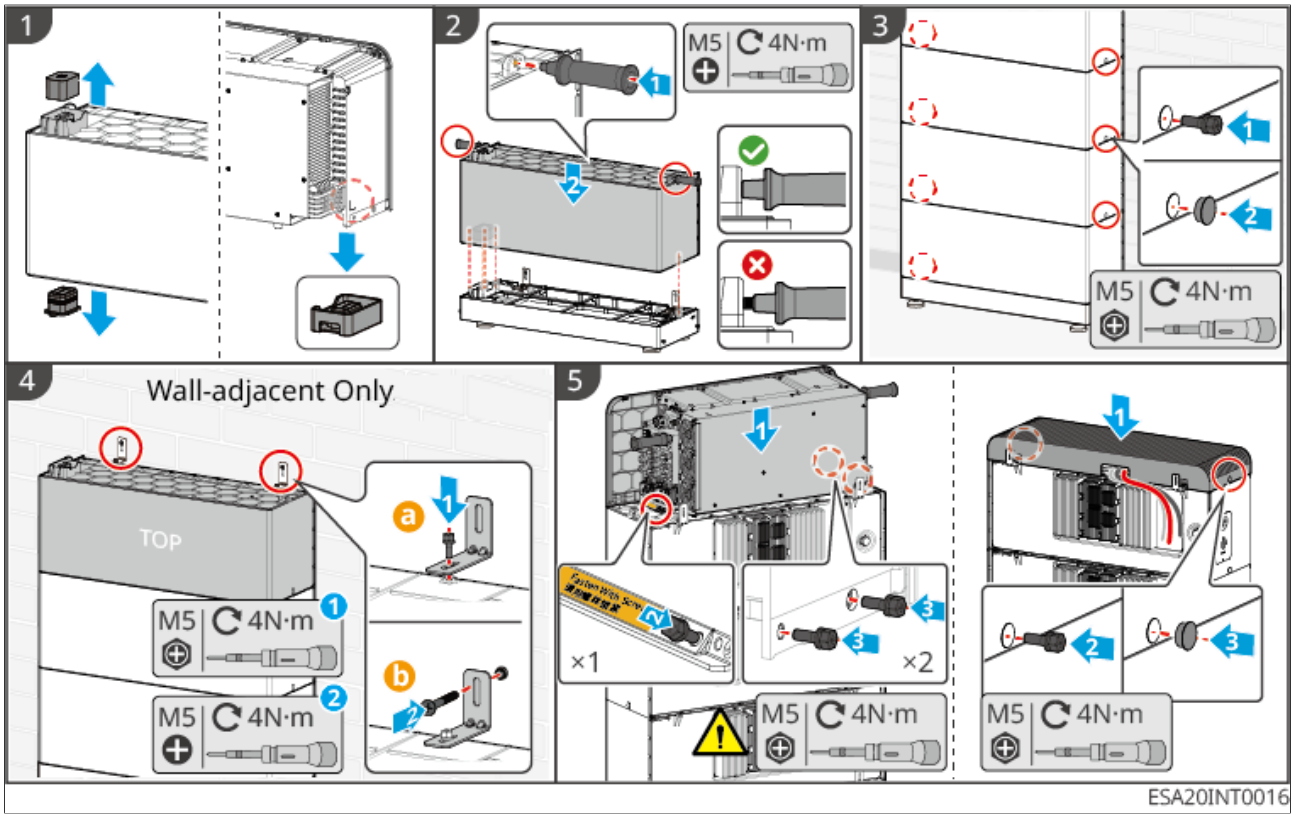
NOTICE
When installing against the wall, the topmost battery must be secured to the wall using an anti-tipping bracket.

Step 1: Remove the protective cover from the blind-mate connector on the bottom of the inverter or battery.
Step 2: (Optional) Install the handle, then stack the battery onto the base.
If installing more than 3 batteries, use lifting equipment.
Step 3: Tighten the screws between the battery and the base, or between batteries.
If installing multiple batteries, repeat **Step1** and **Step2** to complete the installation of all batteries. The number of stacked batteries must comply with the "2.2.1.System Overall Configuration Description(Page 36)".
Step 4: (Optional) Secure the topmost battery to the wall using an anti-tip bracket.
Step 5: Install the inverter or battery decorative cover.

- All-in-One Installation: Lift the inverter, align it, and stack it on top of the battery. Tighten the screws between the inverter and the battery. If the system is an all-in-one configuration, the installation is now complete.
- Split-Type Expansion: Repeat the battery installation steps. After completing the electrical connections, place the battery decorative cover on top of the battery and tighten the side screws.



a: PACK fixing surface; b: Wall fixing surface.

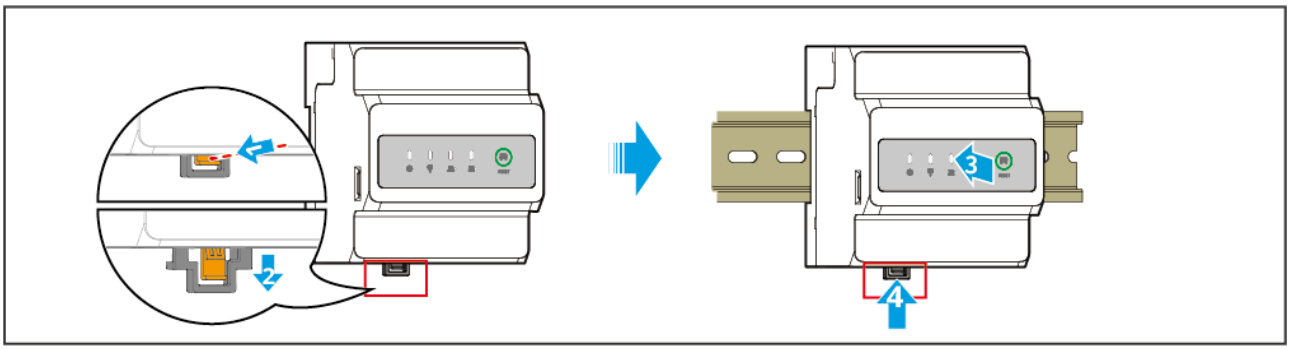


4.4 Installing the Smart Meter

⚠WARNING

In areas with lightning hazard, if the meter cable length exceeds 10m and the cable is not routed using grounded metal conduit, it is recommended to install external lightning protection devices.

GM330&GMK330



Step 1: Pull out the buckle at the bottom of the smart meter.

Step 2: Place the smart meter on the positioning rail and reattach the buckle to the

meter.

5 System Wirings

⚠DANGER

- The installation, routing, and connection of cables must comply with local laws, regulations, and code requirements.
- All operations during electrical connection, as well as the specifications of cables and components used, must meet local legal and regulatory requirements.
- Before performing electrical connections, disconnect the DC switch and AC output switch of the equipment to ensure it is powered off. Live working is strictly prohibited, as it may lead to hazards such as electric shock.
- Cables of the same type should be bundled together and arranged separately from different types of cables. Intertwining or cross-routing is prohibited.
- If cables are subjected to excessive tension, poor connections may result. During wiring, leave a certain length of cable slack before connecting to the inverter terminals.
- When crimping terminals, ensure the conductor part of the cable makes full contact with the terminal. Do not crimp the cable insulation together with the terminal, as this may cause the equipment to malfunction, or lead to overheating and damage to the inverter terminal block due to unreliable connections during operation.
- The inverter is not tested to AS/NZS 4777.2:2020 for combinations and/or multiple phase inverter combinations so that combpinations should not be used.
- Unused cable entry holes and ports (including communication ports) must be reliably sealed using the dedicated terminal blocks or plugs provided in the accessory kit. Failure to do so may result in the following risks:
  - Electric Shock Hazard: Open electrical ports may allow direct contact with live parts, leading to electric shock accidents.
  - Protection Failure: Open ports can allow dust, moisture, or foreign objects to enter, potentially causing short circuits, fires, or equipment failure.

NOTICE

- When performing electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- Only qualified personnel are permitted to perform electrical connection operations.
- The cable colors shown in the graphics in this document are for reference only. Actual cable specifications must comply with local regulations.

5.1 System Wiring Electrical Block Diagram

NOTICE

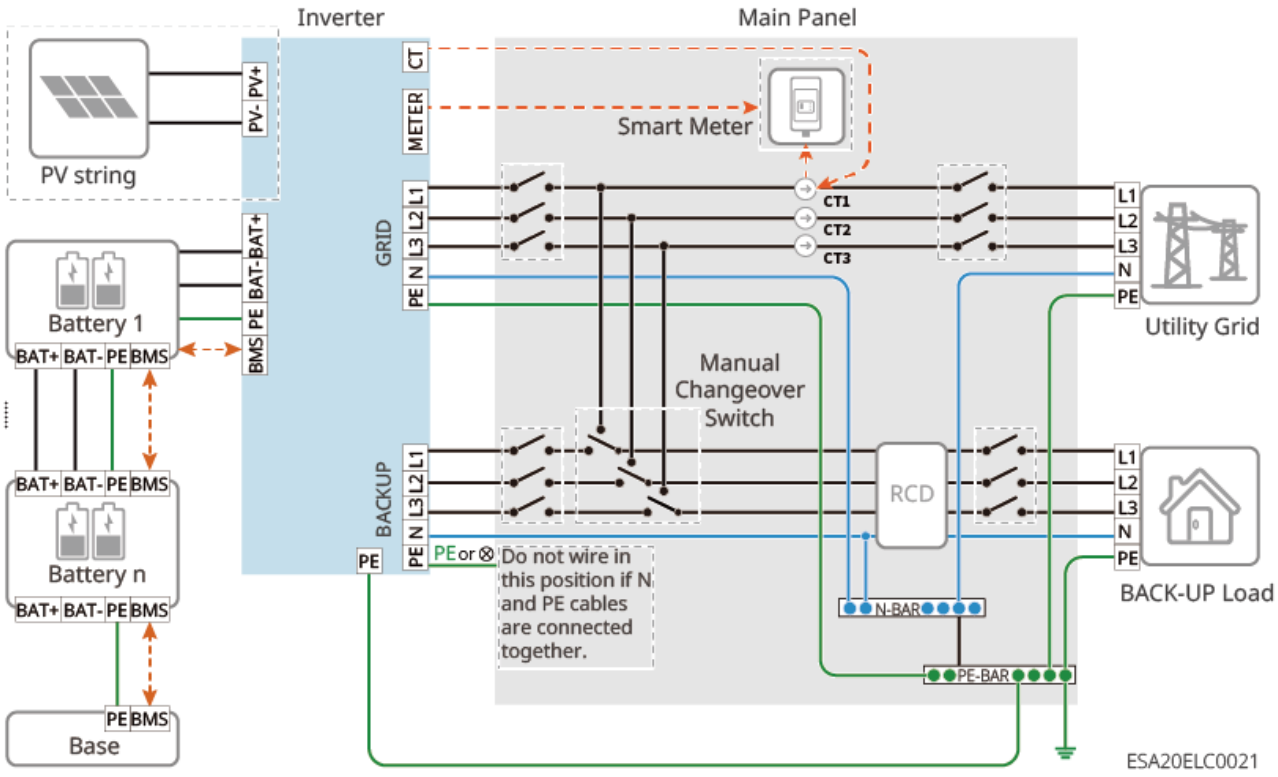
- Depending on regional regulatory requirements, the wiring methods for the N and PE lines of the inverter's GRID and BACK-UP ports may differ. Please comply with local regulations.
- The inverter has a built-in energy meter and can be directly connected to a CT for use. The CT network cable included in the shipment is 10 meters. For longer distances, you can use shielded network cable of CAT5E or higher grade to extend it up to 30 meters.
- CT accuracy will decrease when the connection length to the inverter exceeds 30m. For higher accuracy requirements, an external smart meter can be connected.
- The inverter's GRID AC port has a built-in relay. When the inverter is in off-grid mode, the built-in GRID relay is open; when the inverter is in grid-connected mode, the built-in GRID relay is closed.
- When the inverter is powered on, the BACK-UP AC port is live. If maintenance on the BACK-UP Loads is required, please power down the inverter to avoid electric shock.
- In a whole-house backup scenario, if the total power of the connected loads exceeds 1.1 times the inverter's rated power, the inverter will stop outputting due to overload protection after a grid outage. In this case, please turn off some non-essential loads to ensure the total load power is less than 1.1 times the inverter's rated power.

N and PE lines are connected together in the distribution box

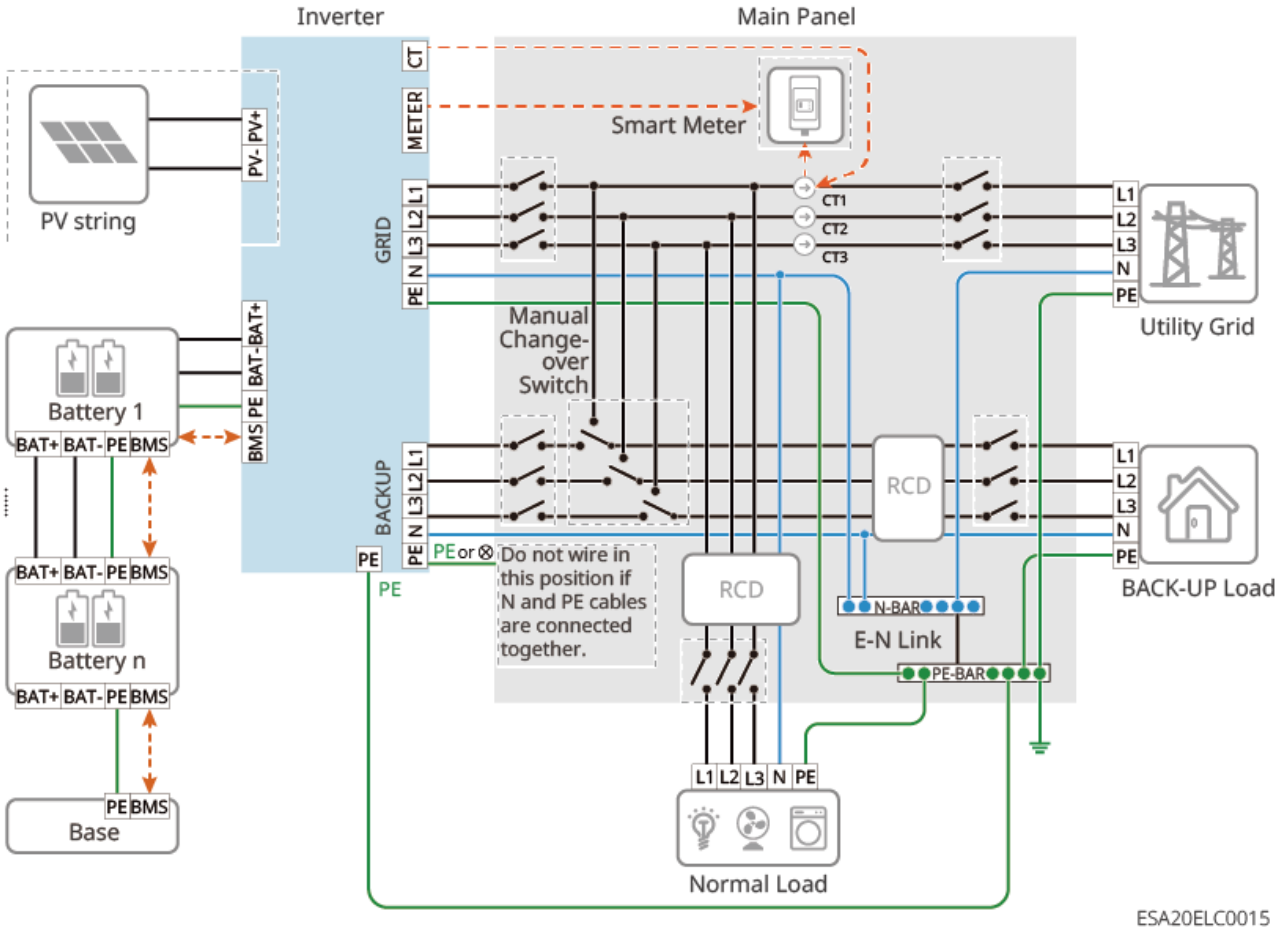
NOTICE

- To maintain neutral integrity, the neutral lines of the grid-connected side and the off-grid side must be connected together; otherwise, the off-grid function cannot operate normally.
- The diagram below illustrates the grid system for regions such as Australia and New Zealand:

Whole-house backup power



Partial backup power

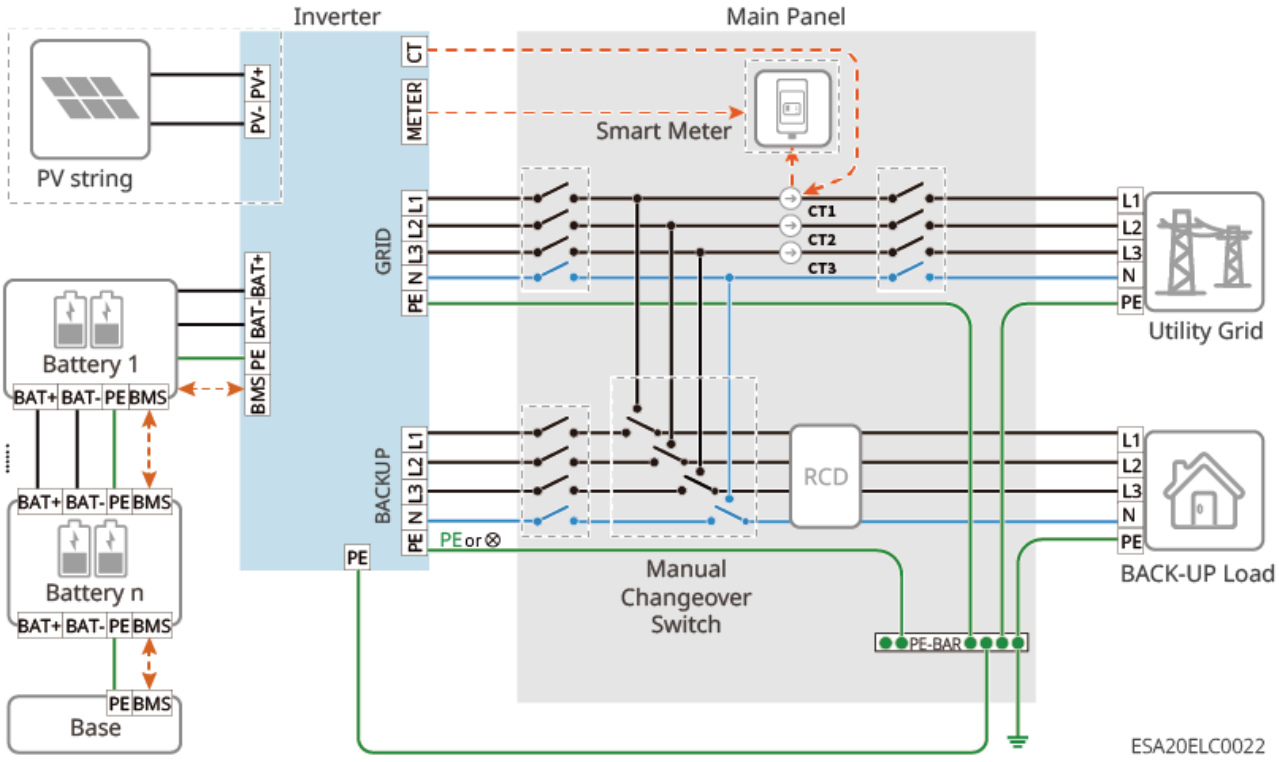


N and PE lines are wired separately in the distribution box

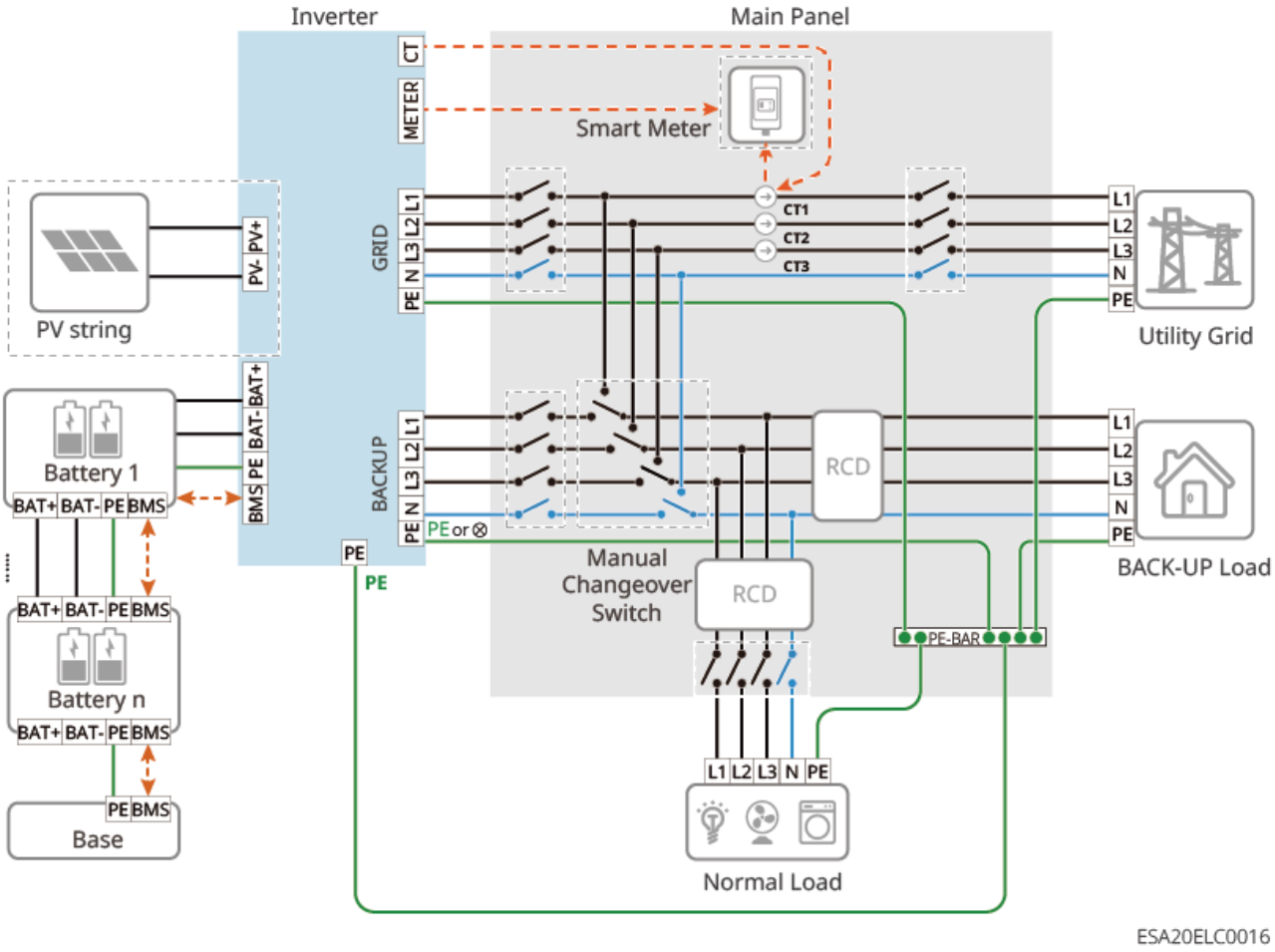
NOTICE

- Please ensure that the protective ground wire of BACK-UP is correctly and securely connected; otherwise, the BACK-UP function may malfunction when a grid fault occurs.
- Other regions except Australia, New Zealand, etc. are applicable to the following wiring methods:

Whole-house backup power



Partial backup power



5.2 Detailed System Wiring Diagram

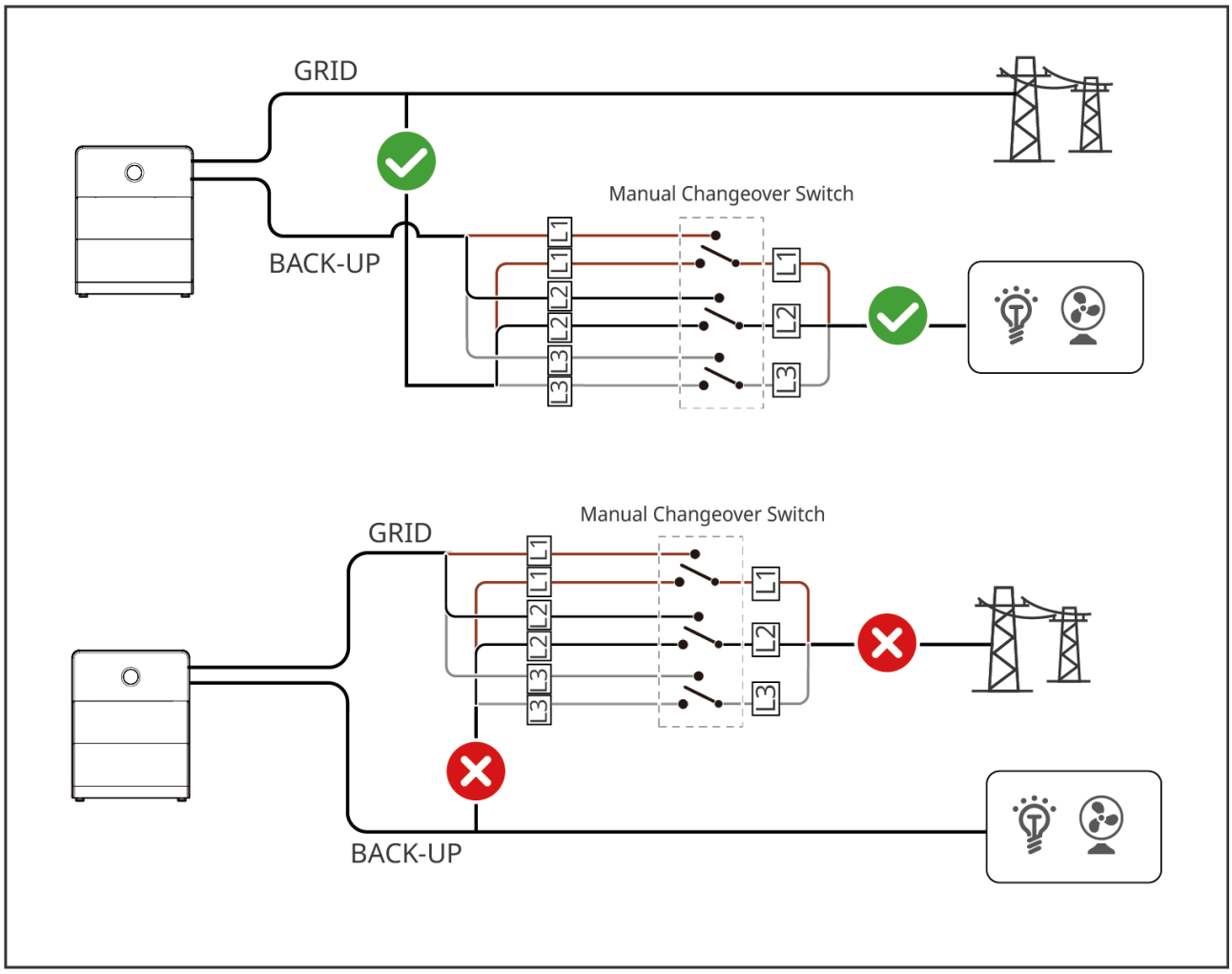
When all loads in the photovoltaic system cannot consume the electricity generated by the system, the surplus electricity will be fed into the grid. In this case, a smart meter or CT monitoring system can be used to monitor the system's power generation and control the amount of electricity fed into the grid.

- Connecting a smart meter enables output power limiting and load monitoring functions.
- After connecting the smart meter, please enable the "Export power limit" function via the Xiaogu Cloud Window+ App.

The Detailed System Wiring Diagram only shows wiring examples using some model devices. Please refer to the corresponding wiring guide chapter for the actual devices you are using for wiring.

⚠WARNING

The common contact of the manual transfer switch must be at the Inverter's BACK-UP load side, do not connect to the GRID grid side. If connected to the GRID grid side, the Inverter's off-grid mode and bypass mode operate simultaneously, when the grid power is out, the distribution cabinet connected to the Inverter's GRID port still has high voltage electricity, there may be a risk of electric shock.



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NOTICE

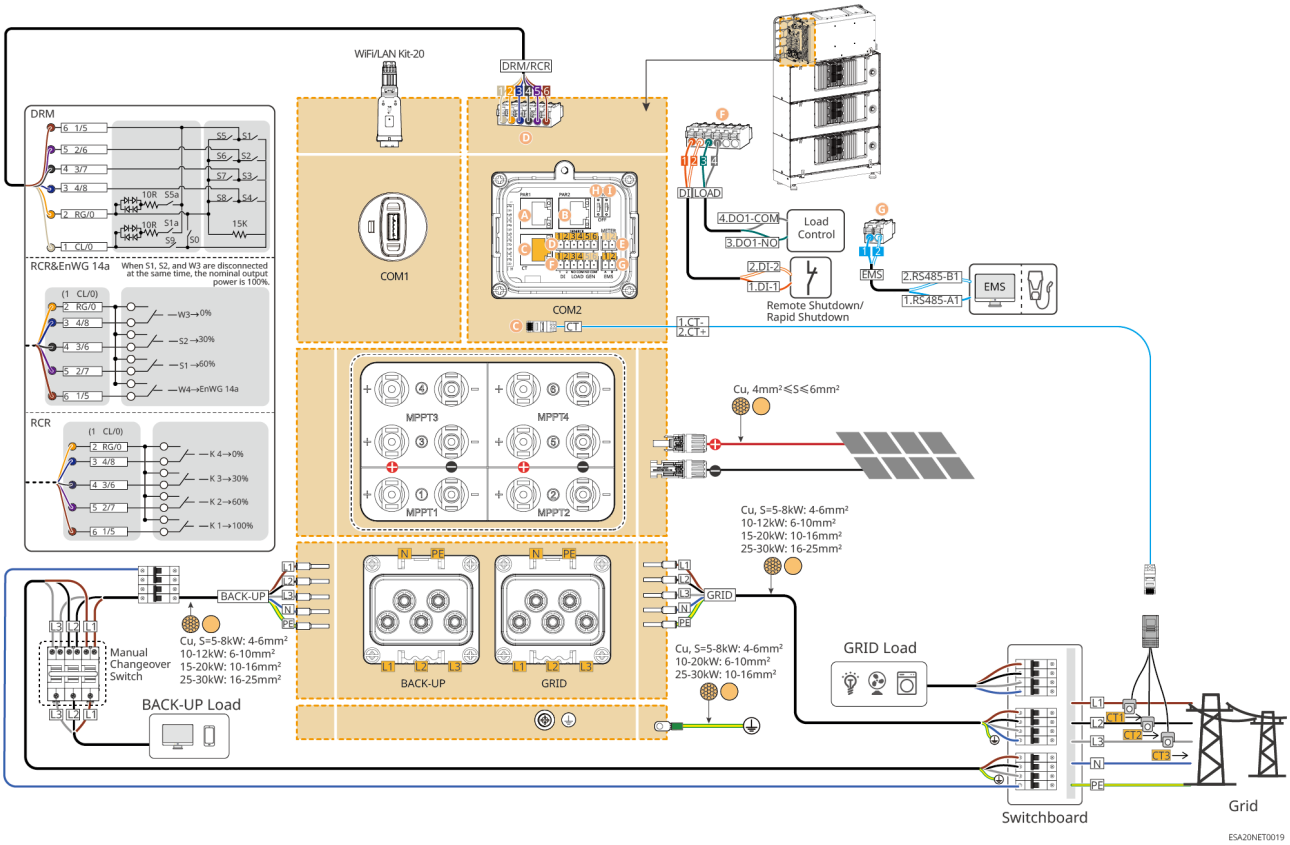
- In microgrid and coupling scenarios, if grid-tied inverter power generation monitoring and load monitoring functions are required, dual-meter networking must be used.
  - Meter 1 or the built-in meter is used to monitor the system's grid-connected power.
  - Meter 2 is used to monitor the grid-tied inverter's power generation.
  - By integrating data from Meter 1 and Meter 2, the monitoring platform can achieve real-time monitoring of load power consumption.
- If output power limitation is required for the grid-tied inverter, please connect separate equipment such as a meter or CT.
- In microgrid and coupling scenarios configured with dual meters, the meter wiring method is the same.
- When not using the inverter's built-in meter, do not connect to the inverter's CT port.
- The manual transfer switch is shipped as an optional accessory; please decide whether to install it based on the actual usage scenario. If using a self-provided ATS or STS switch, this switch must have an interlock function.

Dual Meter Configuration Scenarios	
Meter 1 (Grid Side)	Meter 2 (Grid-tied Inverter AC Side)
Built-in Meter	GMK330
Built-in Meter	GM330
GMK330	GMK330
GM330	GM330
GMK330	GM330
GM330	GMK330

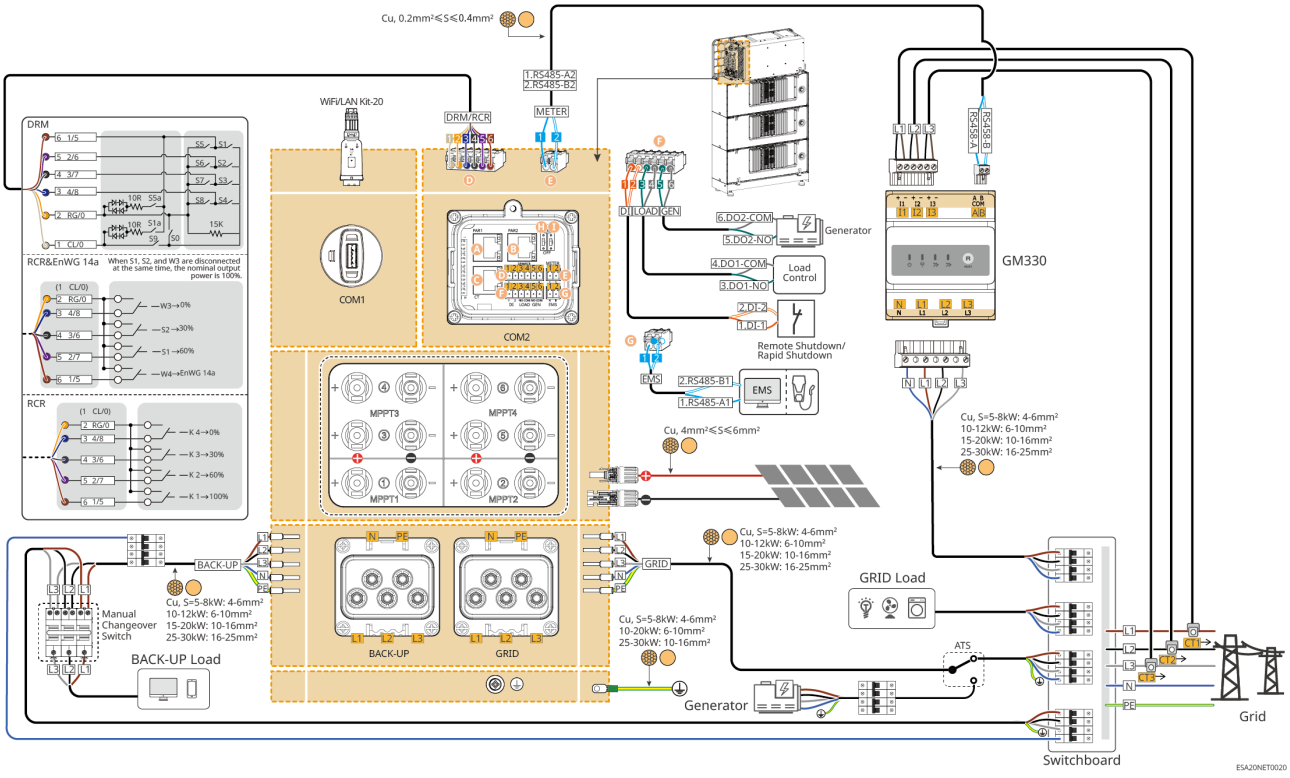
General Scenario

Scenario with Built-in Meter

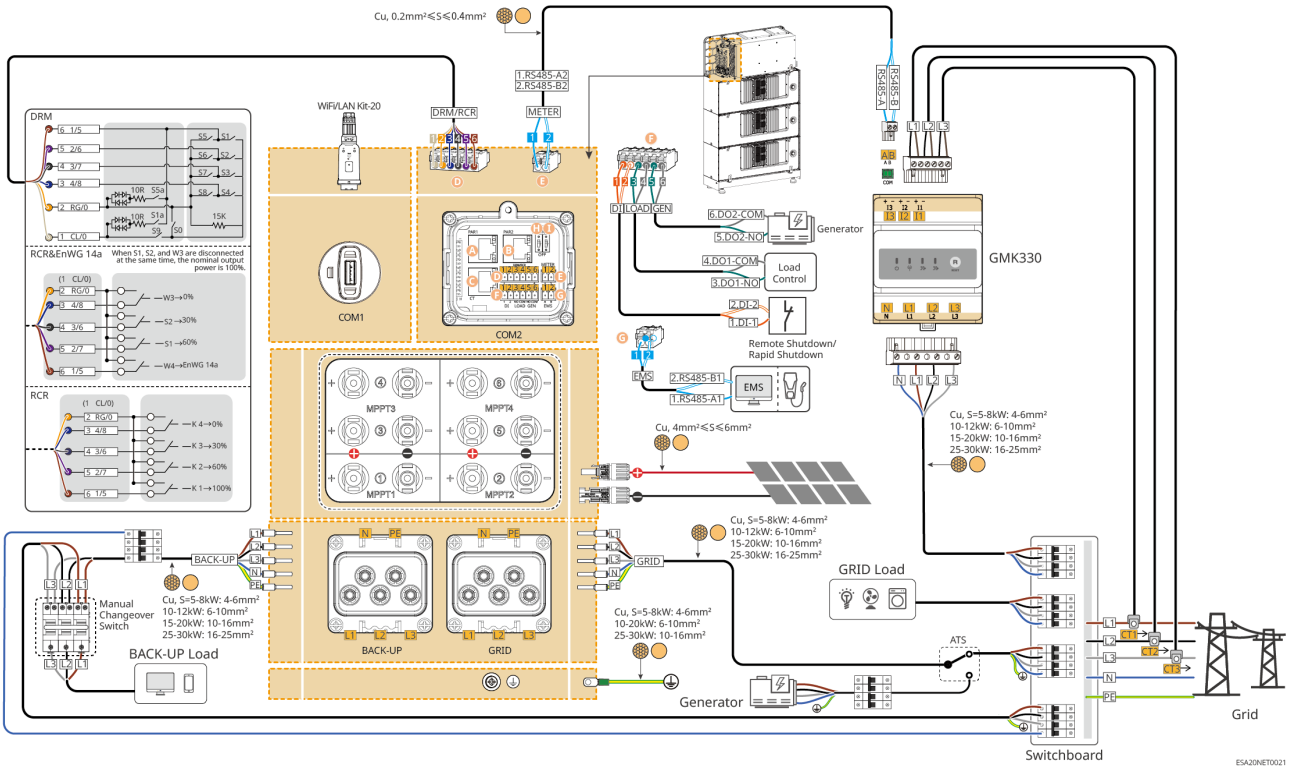
The scenario with a built-in meter does not support connecting a generator.



Scenario with GM330 Meter



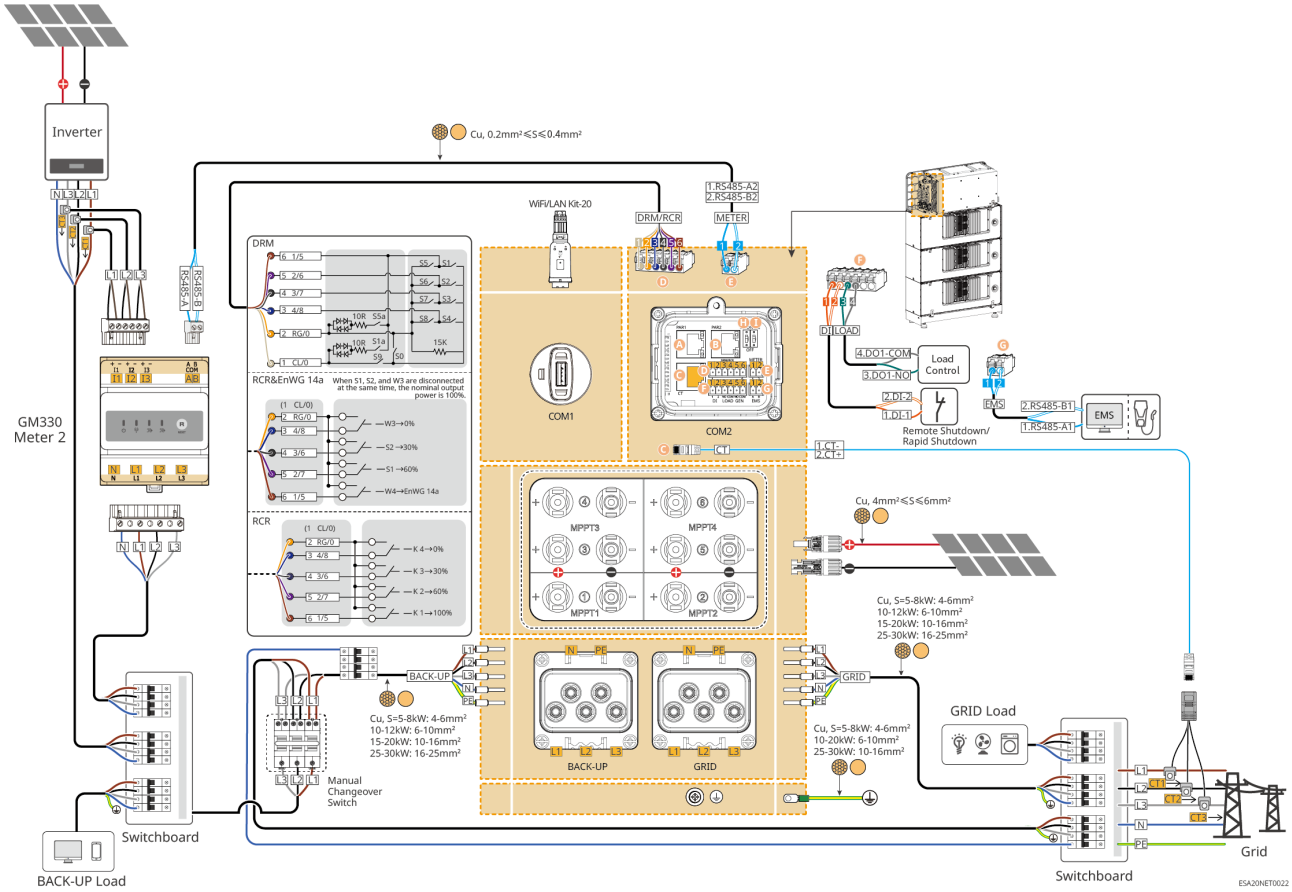
Scenario with GMK330 Meter



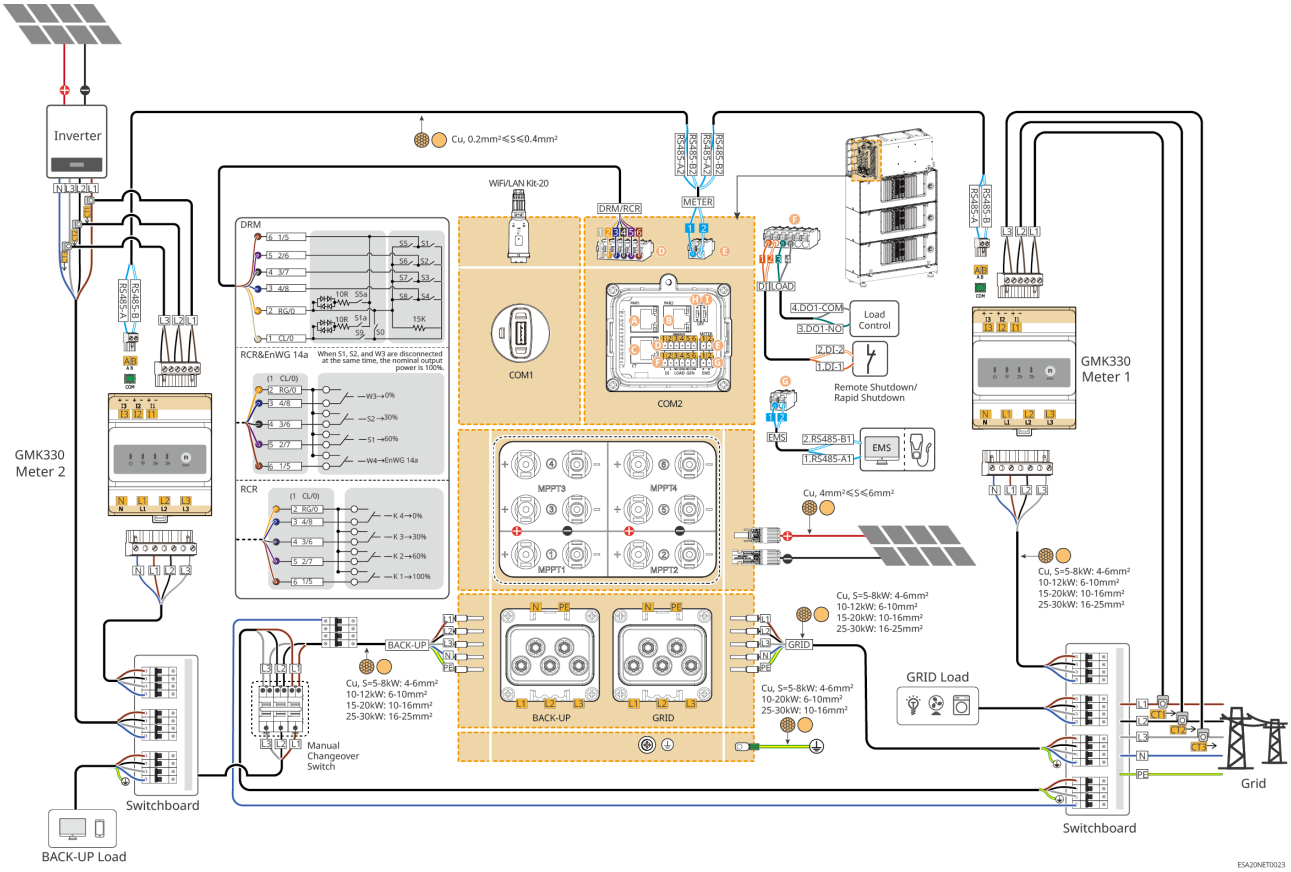
Microgrid Scenario Network Diagram

- The Microgrid Scenario does not support connecting a generator.
- The manual transfer switch is optional. Please choose whether to install it based on the actual usage scenario.

Built-in Meter + GM330 Meter Network Diagram



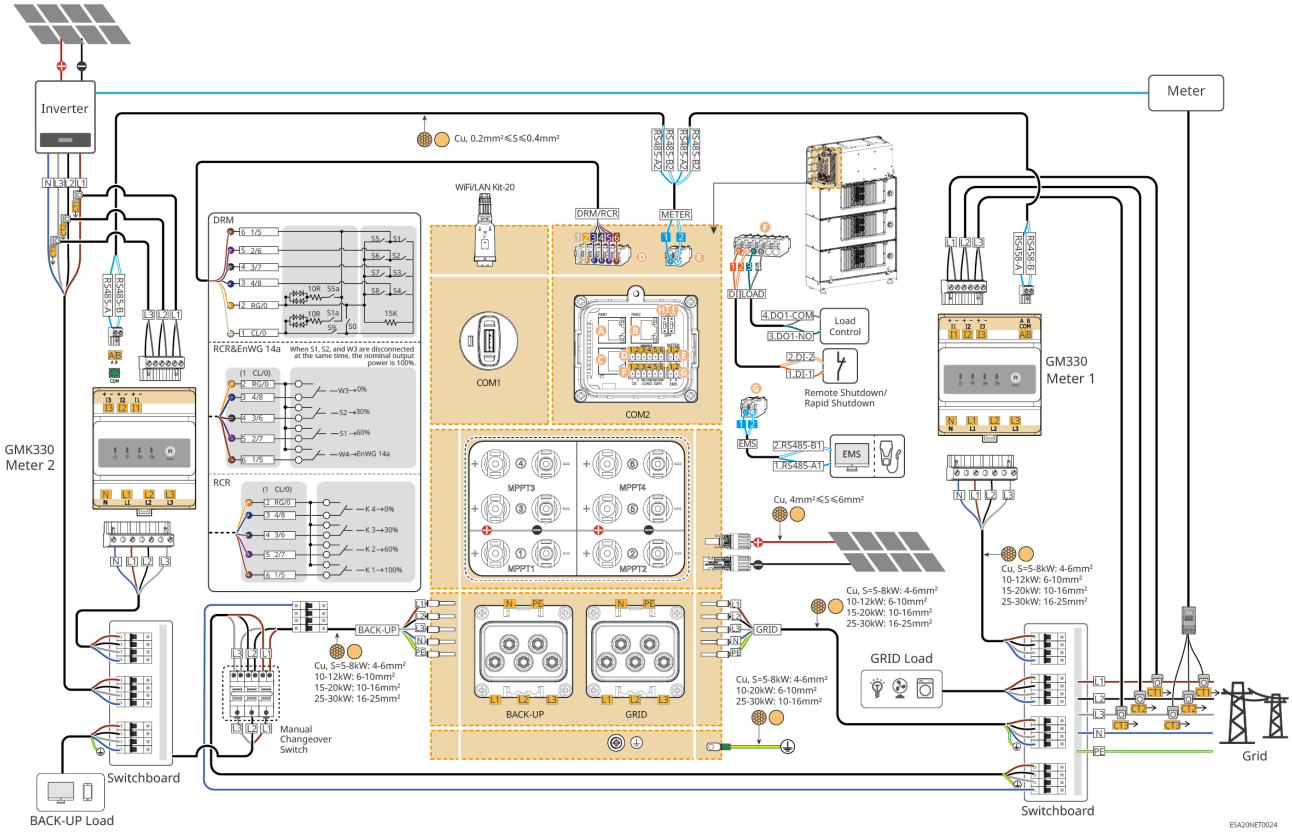
GMK330 + GMK330



Microgrid Scenario, Grid-tied Inverter Export Power Limit Network Diagram

If output power limiting is required for grid-tied inverters in a Microgrid Scenario, please connect a meter or CT device separately.

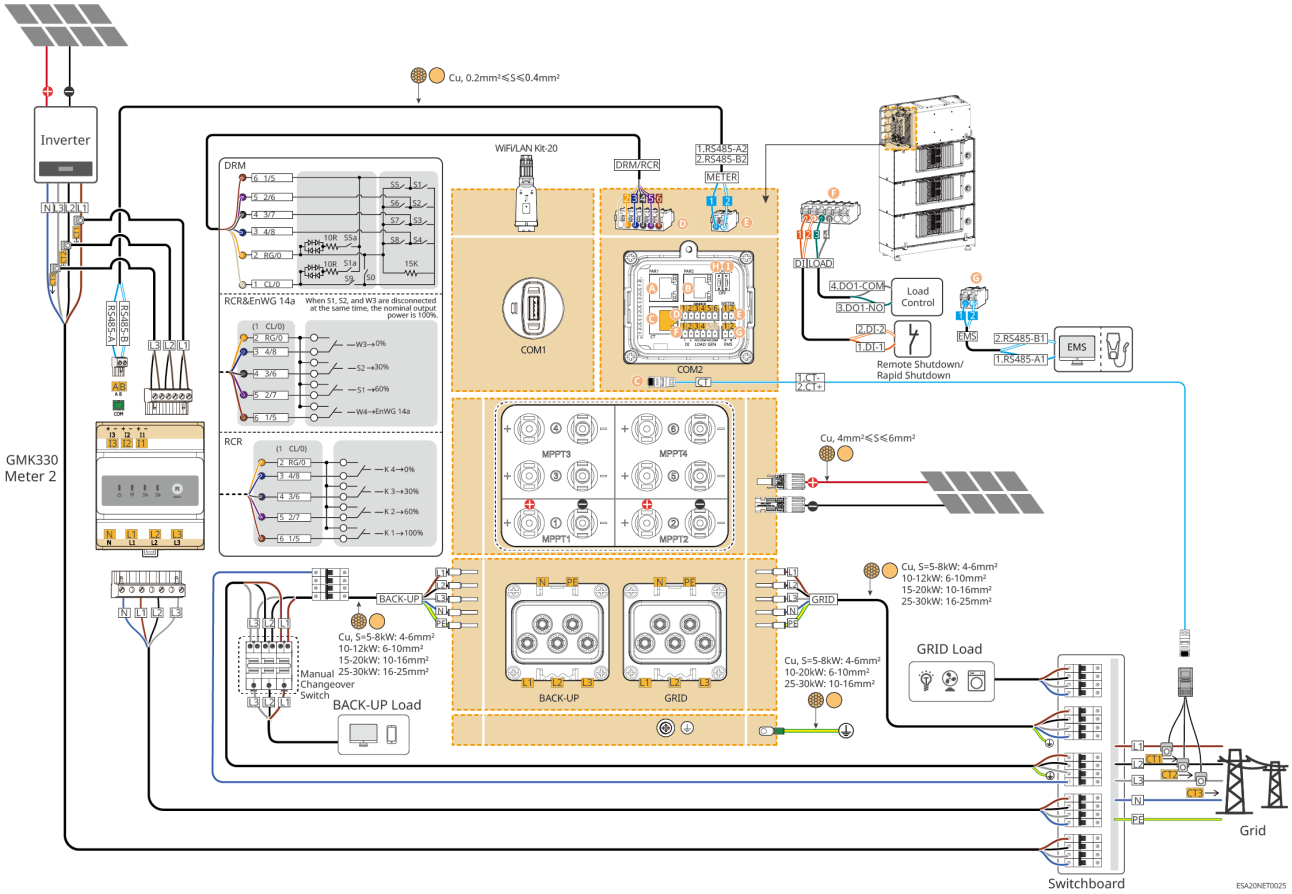
GM330 + GMK330



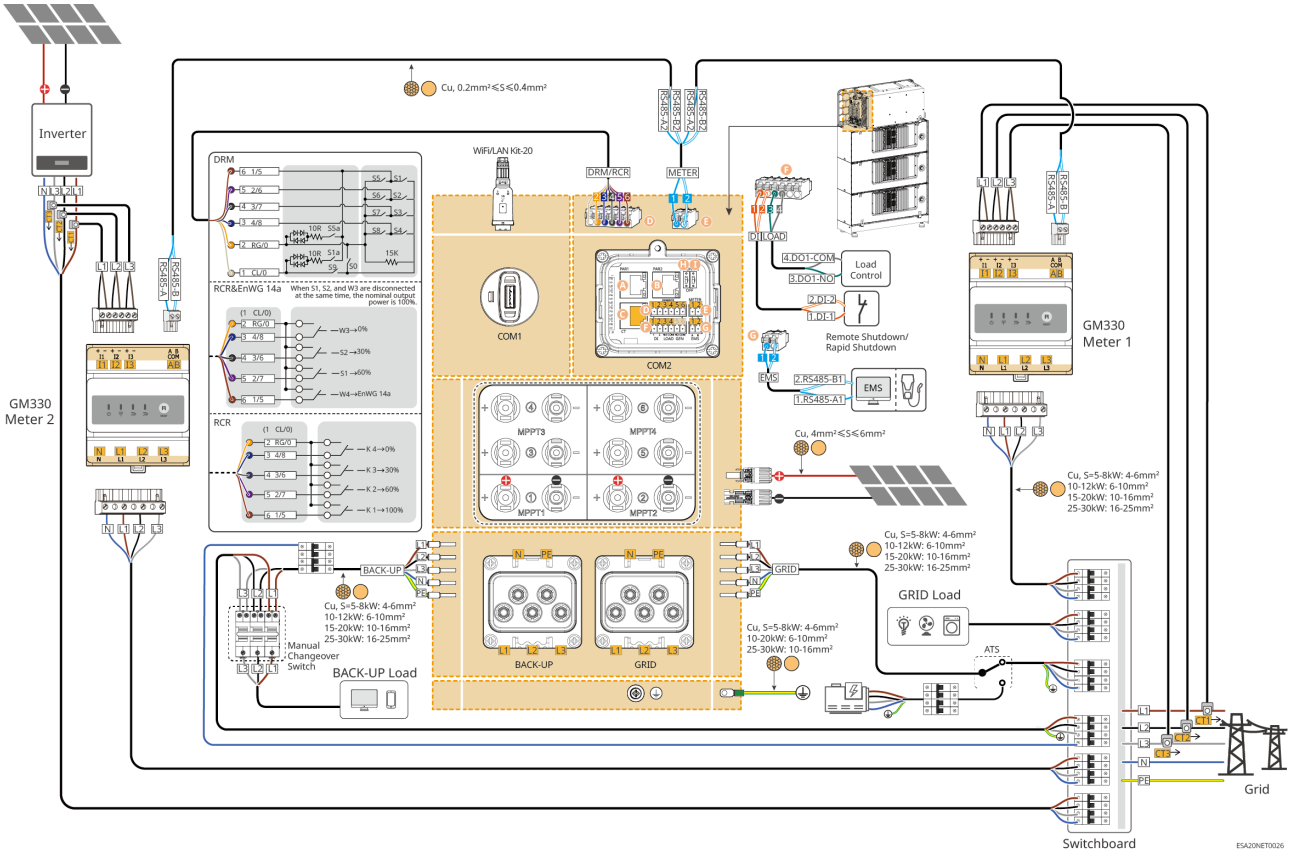
Coupled Scenario Dual Meter Network Diagram

- The manual transfer switch is optional. Please choose whether to install it based on the actual usage scenario.
- The scenario with a built-in meter does not support connecting a generator.

Built-in Meter + GMK330



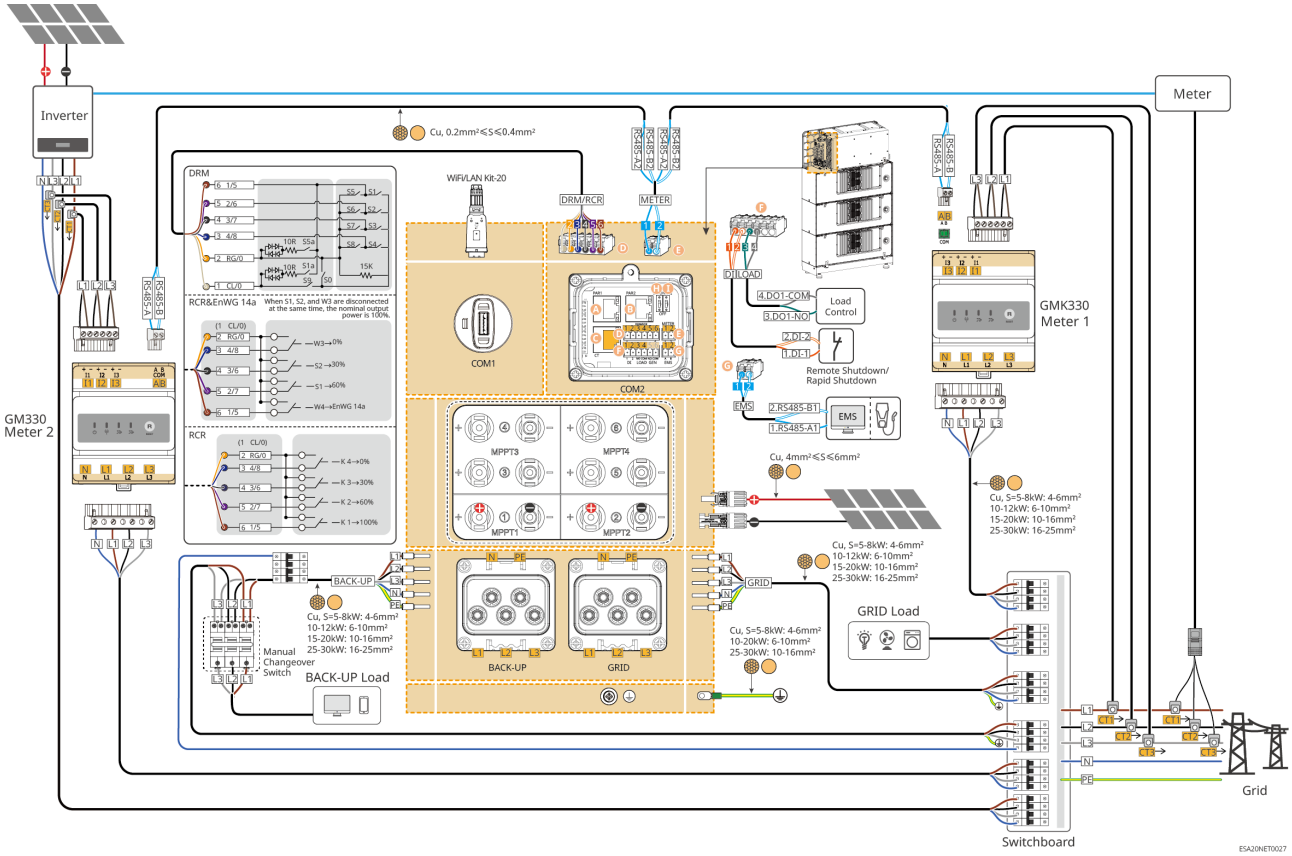
GM330 + GM330 Network Diagram



Coupled Scenario, Grid-tied Inverter Export Power Limit Network Diagram

If output power limiting is required for grid-tied inverters in a Coupled Scenario, please connect a meter or CT device separately.

GMK330 + GM330



5.3 Preparing Materials

⚠WARNING

- Do not connect loads between the inverter and the AC switch directly connected to the inverter.
- Each inverter must be equipped with an AC output circuit breaker. Multiple inverters cannot be connected to one AC circuit breaker simultaneously.
- To ensure that the inverter can safely disconnect from the grid in case of abnormalities, please connect an AC circuit breaker on the AC side of the inverter. Select a suitable AC circuit breaker according to local regulations.
- When the inverter is powered on, the BACK-UP AC port is live. If maintenance is required on the BACK-UP Loads, please power off the inverter; otherwise, it may cause electric shock.
- For cables used in the same system, it is recommended that the following cable conductor material, cross-sectional area, length, etc., be consistent.
  - Inverter's BACK-UP AC cable
  - Inverter's GRID AC cable
- The inverter supports connecting to a generator via an ATS switch to achieve switching between grid and generator power supply. The ATS switch is by default connected to the grid.

5.3.1 Preparing Breakers

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
1	GRID breaker BACK-UP breaker	For partial backup power scenarios, the recommendations are as follows: • Nominal Voltage ≥230Vac • Nominal current requirements are as follows: ◦ GW5K-ETA-G20: 20A ◦ GW6K-ETA-G20: 20A ◦ GW8K-ETA-G20: 20A	Self-provided	In actual selection, you can also choose a breaker that meets local installation regulations based on the actual working current.

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ GW9.999K-ETA-G20: 32A ◦ GW10K-ETA-G20: 32A ◦ GW12K-ETA-G20: 40A ◦ GW15K-ETA-G20: 50A ◦ GW20K-ETA-G20: 50A ◦ GW25K-ETA-G20: 63A ◦ GW29.999K-ETA-G20: 80A ◦ GW30K-ETA-G20: 80A ◦ GW5K-BTA-G20: 20A ◦ GW6K-BTA-G20: 20A ◦ GW8K-BTA-G20: 20A ◦ GW9.999K-BTA-G20: 32A ◦ GW10K-BTA-G20: 32A ◦ GW12K-BTA-G20: 40A ◦ GW15K-BTA-G20: 50A ◦ GW20K-BTA-G20: 50A ◦ GW25K-BTA-G20: 63A ◦ GW29.999K-BTA-G20: 80A ◦ GW30K-BTA-G20: 80A For whole-house backup power scenarios, the recommendations are as follows: • Nominal Voltage ≥230Vac • Nominal current requirements are as follows: ◦ GW5K-ETA-G20: 63A		

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ GW6K-ETA-G20: 63A ◦ GW8K-ETA-G20: 63A ◦ GW9.999K-ETA-G20: 80A ◦ GW10K-ETA-G20: 80A ◦ GW12K-ETA-G20: 80A ◦ GW15K-ETA-G20: 100A ◦ GW20K-ETA-G20: 100A ◦ GW25K-ETA-G20: 125A ◦ GW29.999K-ETA-G20: 125A ◦ GW30K-ETA-G20: 125A ◦ GW5K-BTA-G20: 63A ◦ GW6K-BTA-G20: 63A ◦ GW8K-BTA-G20: 63A ◦ GW9.999K-BTA-G20: 80A ◦ GW10K-BTA-G20: 80A ◦ GW12K-BTA-G20: 80A ◦ GW15K-BTA-G20: 100A ◦ GW20K-BTA-G20: 100A ◦ GW25K-BTA-G20: 125A ◦ GW29.999K-BTA-G20: 125A ◦ GW30K-BTA-G20: 125A Note: If the inverter BACK-UP port is not used, the GRID breaker can be selected based on the maximum grid-connected current.		

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
2	ATS switch	The specifications of the ATS switch and GRID breaker for the same model are consistent.	Self-provided	
3	RCD	RCD device installation and RCD specification selection: It is recommended to connect a Type A RCD with a residual current trip level ≥300mA to the AC output side of the inverter (for inverter capacity <30kVA, select the residual current action level as 300mA; for inverter capacity ≥30kVA, select the residual current action level as 10mA/kVA). Alternatively, select an appropriate RCD specification based on local regulatory requirements.	Self-provided	-

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
4	(Optional) Manual transfer switch	Nominal Voltage ≥230Vac Nominal current requirements are as follows: • GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW15K-ETA-G20, GW20K-ETA-G20, GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20, GW9.999K-BTA-G20, GW10K-BTA-G20, GW12K-BTA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 63A • GW25K-ETA-G20, W29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 80A	• Self-provided • Shipped with the inverter (Australia only)	In actual selection, you can also choose an appropriate manual transfer switch based on local regulations.

5.3.2 Preparing Cables

No.	Cable	Recommended Specification	Source
1	Inverter Chassis Protective Ground Cable	• Single-core outdoor copper cable • Conductor cross-sectional area: ◦ GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20: 4-6mm^2 ◦ GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW15K-ETA-G20, GW20K-ETA-G20, GW9.999K-BTA-G20, GW10K-BTA-G20, GW12K-BTA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 6-10 mm^2 ◦ GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 10-16 mm^2	User-provided
2	PV DC Cable	• Industry-standard outdoor photovoltaic cable • Conductor cross-sectional area: 4mm^2-6mm^2 • Cable outer diameter: 5.9mm-8.8mm	User-provided

No.	Cable	Recommended Specification	Source
3	AC Cable	• Inverter AC input/output cable (BACK UP/GRID): • Conductor cross-sectional area: ◦ GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20: 4-6mm^2 ◦ GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW9.999K-BTA-G20, GW10K-BTA-G20, GW12K-BTA-G20: 6-10mm^2 ◦ GW15K-ETA-G20, GW20K-ETA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 10-16mm^2 ◦ GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 16-25mm^2 • Multi-core outdoor copper cable outer diameter: ◦ GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20, GW9.999K-BTA-G20, GW10K-BTA-G20, GW12K-BTA-G20: 10-26mm ◦ GW15K-ETA-G20, GW20K-ETA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 18-30mm	User-provided
4	Smart Meter Power Cable	• Outdoor copper cable • Conductor cross-sectional area: 1mm^2	User-provided

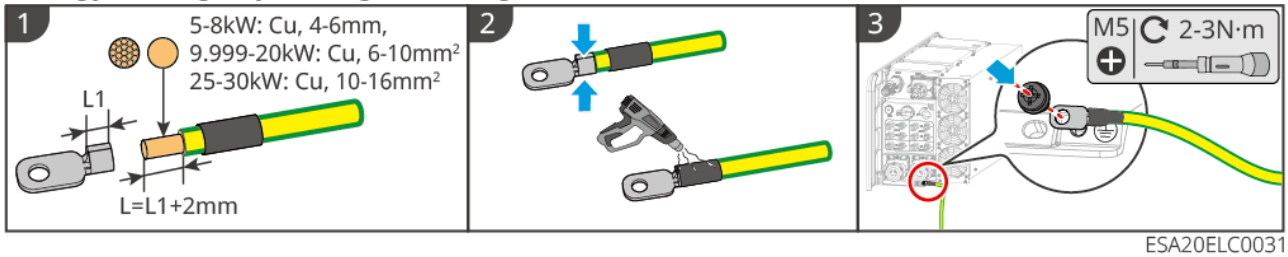
No.	Cable	Recommended Specification	Source
5	Meter RS485 Communication cable	• Shielded twisted pair • Conductor cross-sectional area: 0.2mm²-0.4mm²	User-provided
6	EMS or Charging Pile RS485 Communication cable		
7	Remote Shutdown	• Shielded cable meeting local standards • Conductor cross-sectional area: 0.2mm²-0.4mm² • Cable outer diameter: 5mm-8mm	User-provided
8	Load Control and Generator Control DO Communication cable		
9	RCR/DRED/14a Signal Cable		
10	CT Communication cable	standard network cable: CAT 5E or above standard shielded network cable and RJ45 connector	User-provided

5.4 Connecting the PE cable

⚠WARNING

- The protective grounding of the chassis cannot replace the protective ground wire of the AC output port. When wiring, ensure the protective ground wires at both locations are reliably connected.
- To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint over the external part of the grounding terminal for protection after the protective ground wire connection installation is completed.
- When installing the equipment, the protective ground wire must be installed first; when removing the equipment, the protective ground wire must be removed last.
- The battery grounding is integrated into the blind-mating connector connected to the inverter. The system is uniformly grounded through the inverter, so no separate grounding operation is required for the battery during installation. If there is a requirement for split expansion, please separately ground the expansion battery pack.

Energy storage system grounding:



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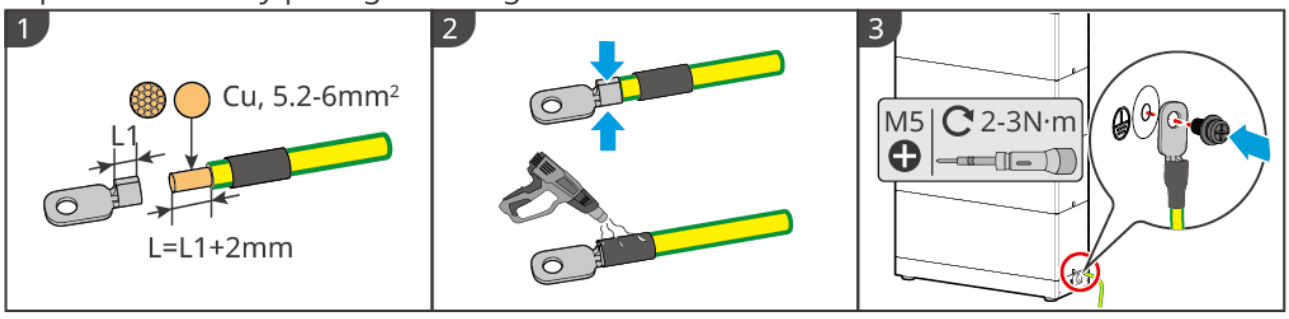
Expansion battery pack grounding:



BAT20ELC0003

5.5 Connecting the PV Cable

⚠DANGER

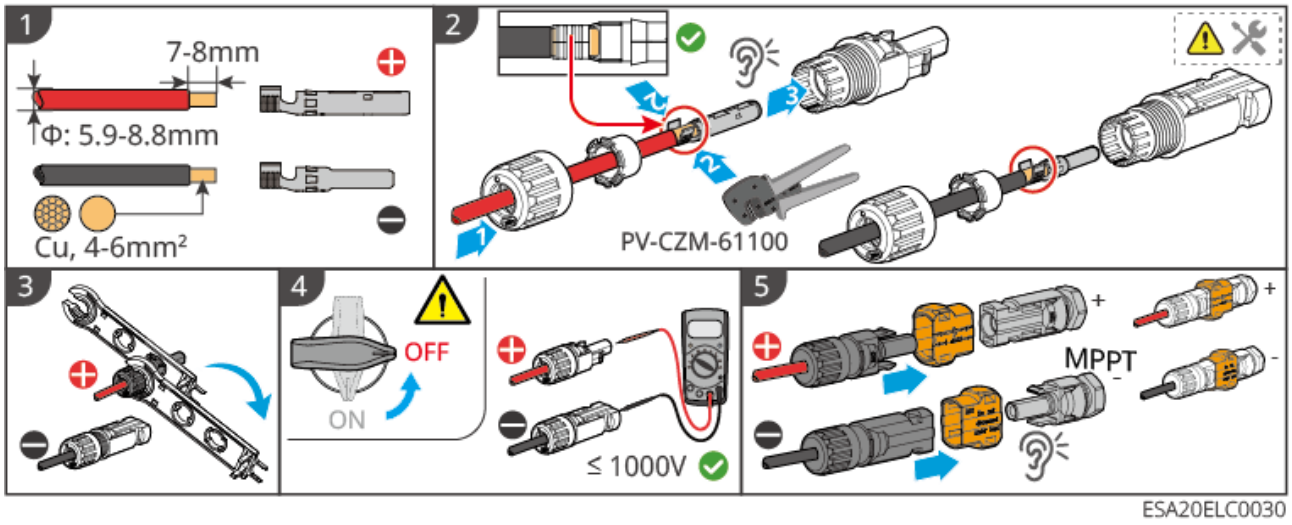
- Do not connect the same PV string to multiple inverters, as this may cause inverter damage.
- Before connecting the PV string to the inverter, confirm the following information. Failure to do so may cause permanent damage to the inverter, and in severe cases, may lead to fire causing personal injury and property damage.
  1. Ensure the maximum short-circuit current and Max. Input Voltage for each MPPT are within the inverter's allowable range.
  2. Ensure the positive pole of the PV string is connected to the inverter's PV+, and the negative pole of the PV string is connected to the inverter's PV-.

⚠WARNING

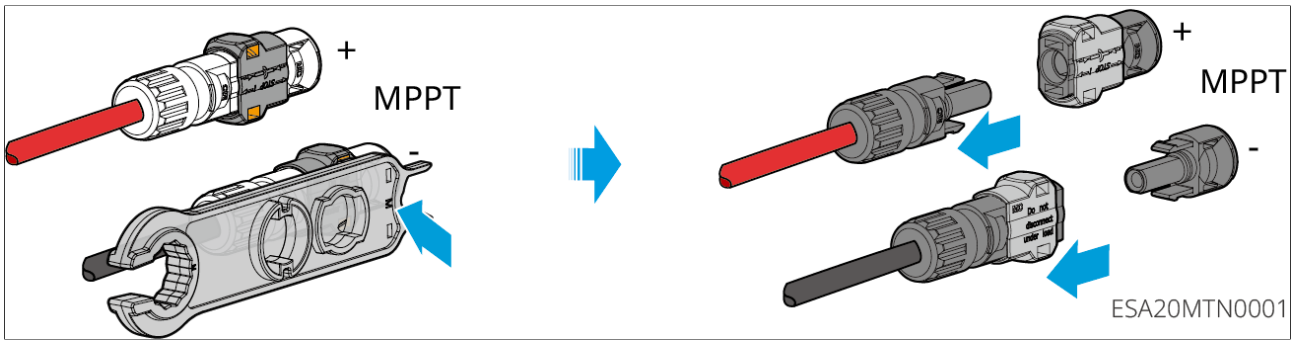
- PV string output does not support grounding. Before connecting the PV string to the inverter, ensure the minimum insulation resistance to ground of the PV string meets the minimum insulation resistance requirement (R=Max. Input Voltage/30mA).
- After completing the DC cable connection, ensure the cable connections are tight and secure, with no looseness.
- Use a multimeter to measure the positive and negative poles of the DC cables to ensure correct polarity (no reverse connection) and that the voltage is within the allowable range.

NOTICE

- The two PV strings within each MPPT must use the same model, the same number of panels, and the same tilt and azimuth angles to ensure maximum efficiency.
- Connecting PV cables is only for the ETA model; the BTA model does not have PV connection ports.



To disassemble the PV terminal, please refer to the following steps:



5.6 Connecting the Battery Expansion Cable

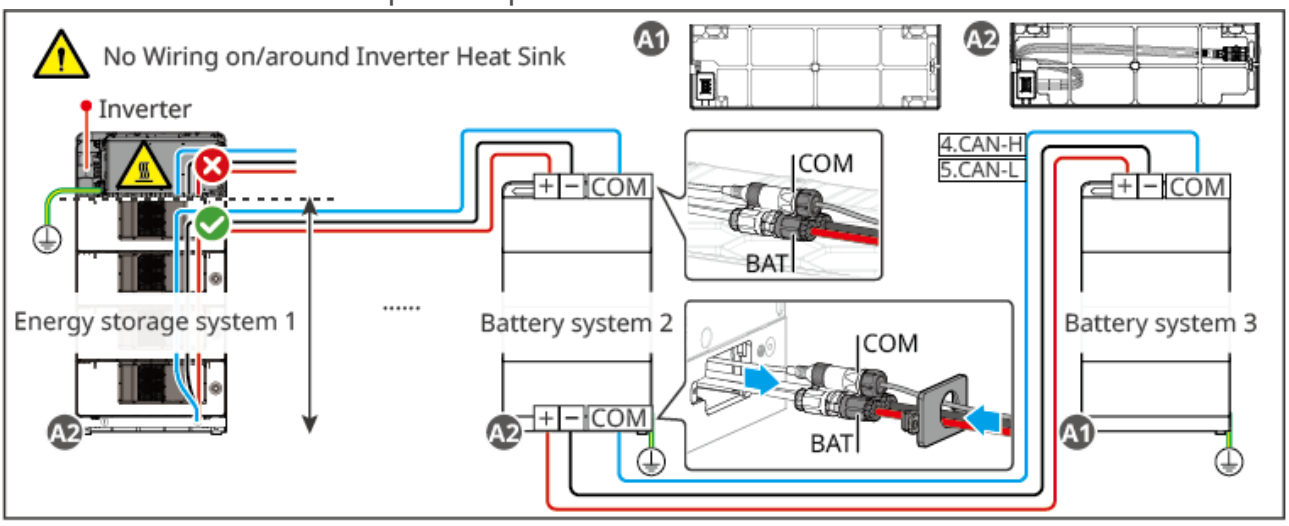
DANGER

- Do not connect loads between the inverter and the battery.
- When connecting battery cables, use insulated tools to prevent accidental electric shock or short-circuiting of the battery.
- Ensure the battery open-circuit voltage is within the inverter's allowable range.
- Select whether to install a DC switch between batteries according to local laws and regulations.
- Do not route wires on the surface or around the inverter heat sink to prevent overheating and damage to the wiring harness.

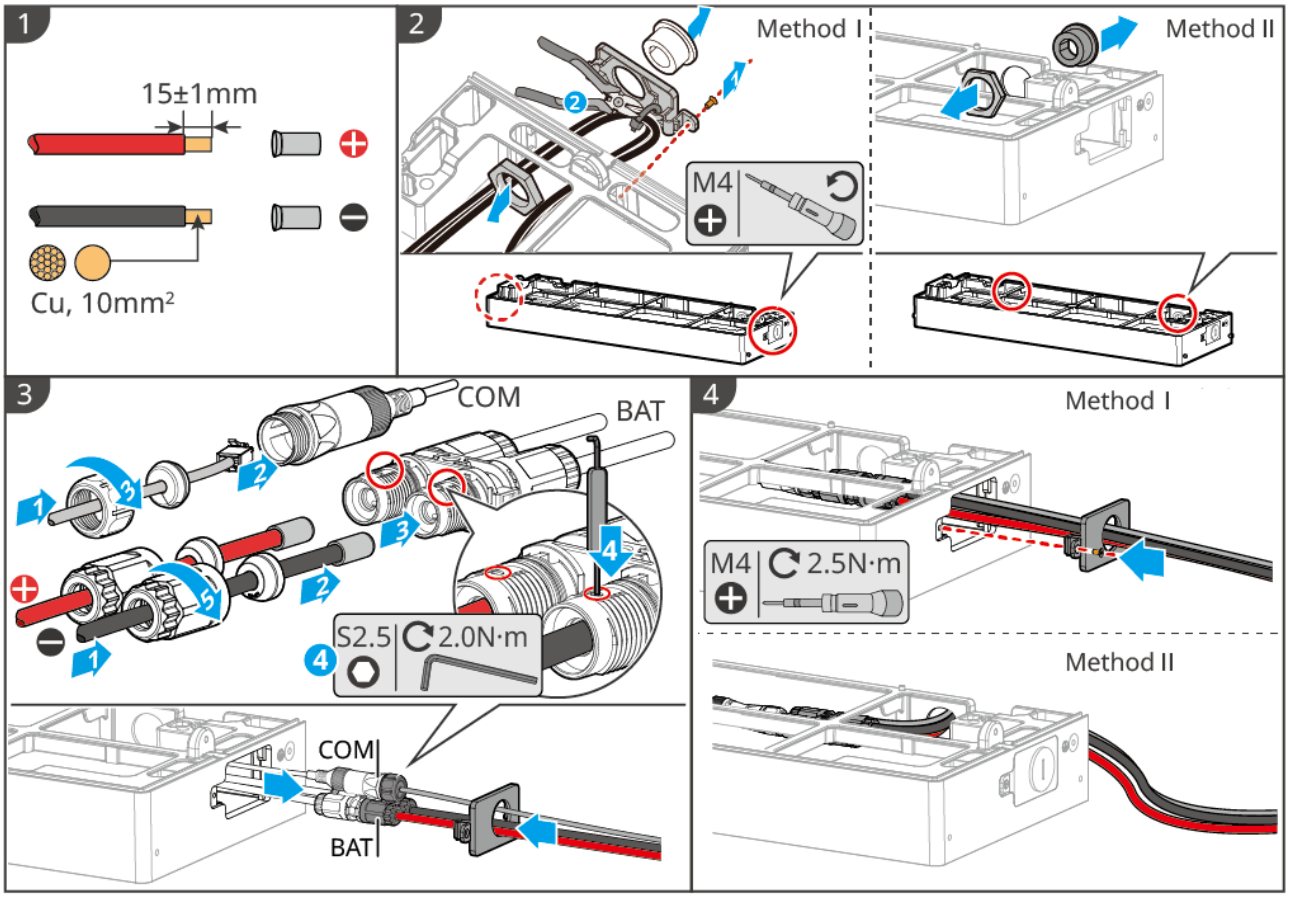
Energy Storage System Expansion Overview

A1: Base shipped with the inverter

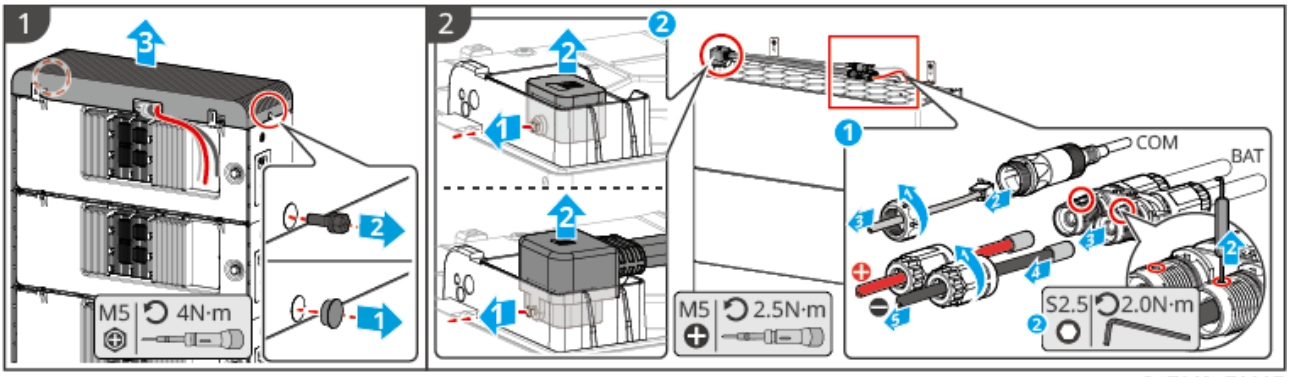
A2: Installation base with parallel port



Battery System Expansion Cable Harness Manufacturing Method



Battery Expansion Cable Harness Disassembly Method



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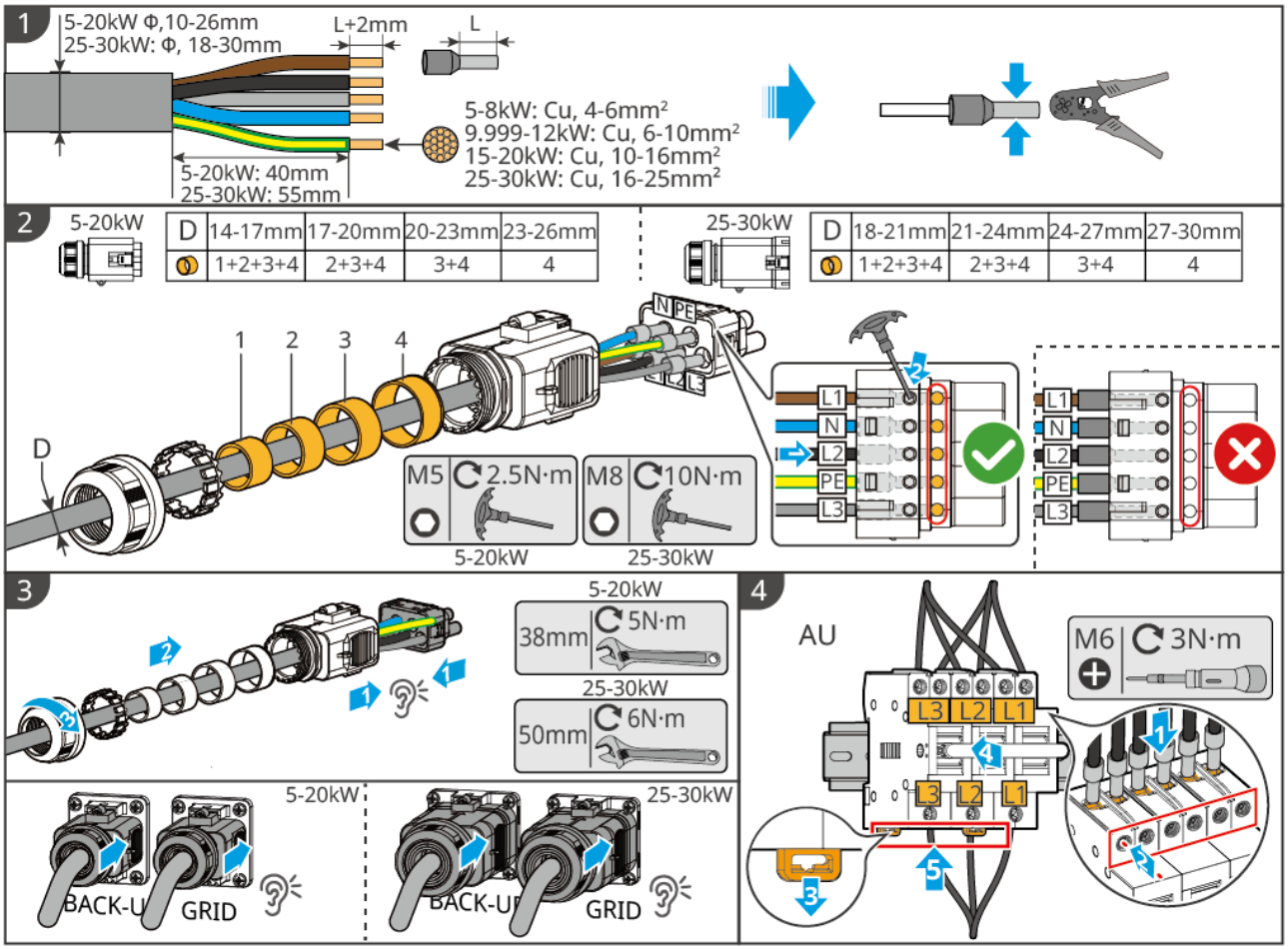
5.7 Connecting the AC Cable

⚠WARNING

- The inverter integrates a Residual Current Monitoring Unit (RCMU) internally to prevent residual current from exceeding the specified value. When the inverter detects a leakage current greater than the allowable value, it will quickly disconnect from the grid.
- During wiring, ensure the AC cables fully match the "BACKUP" and "GRID" ground ports of the AC terminals. Incorrect cable connection will cause equipment damage.
- Ensure the wire cores are fully inserted into the terminal wiring holes with no exposed parts.
- Ensure the insulation plate at the AC terminals is securely fastened and not loose.
- Ensure the cable connections are tight. Otherwise, during operation, overheating of the terminals may occur, leading to equipment damage.



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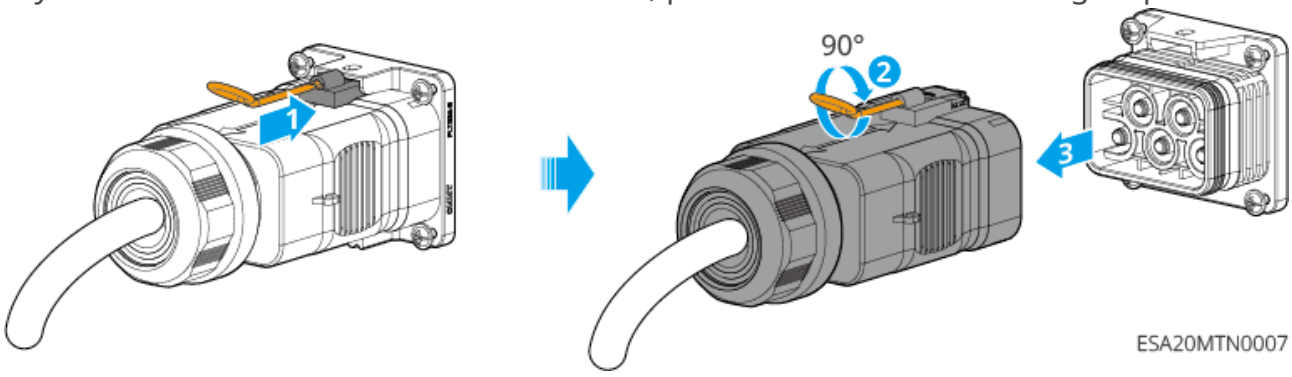
If you need to disassemble the AC terminal, please refer to the following steps:



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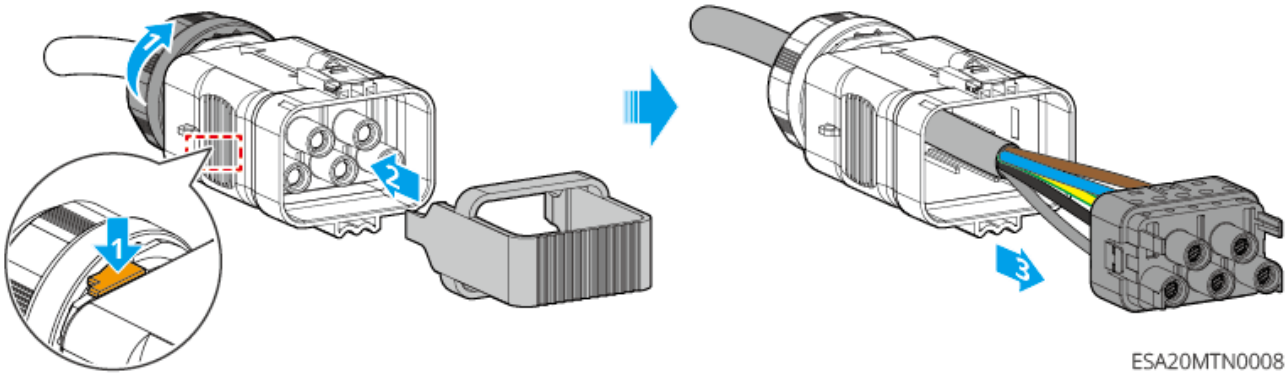
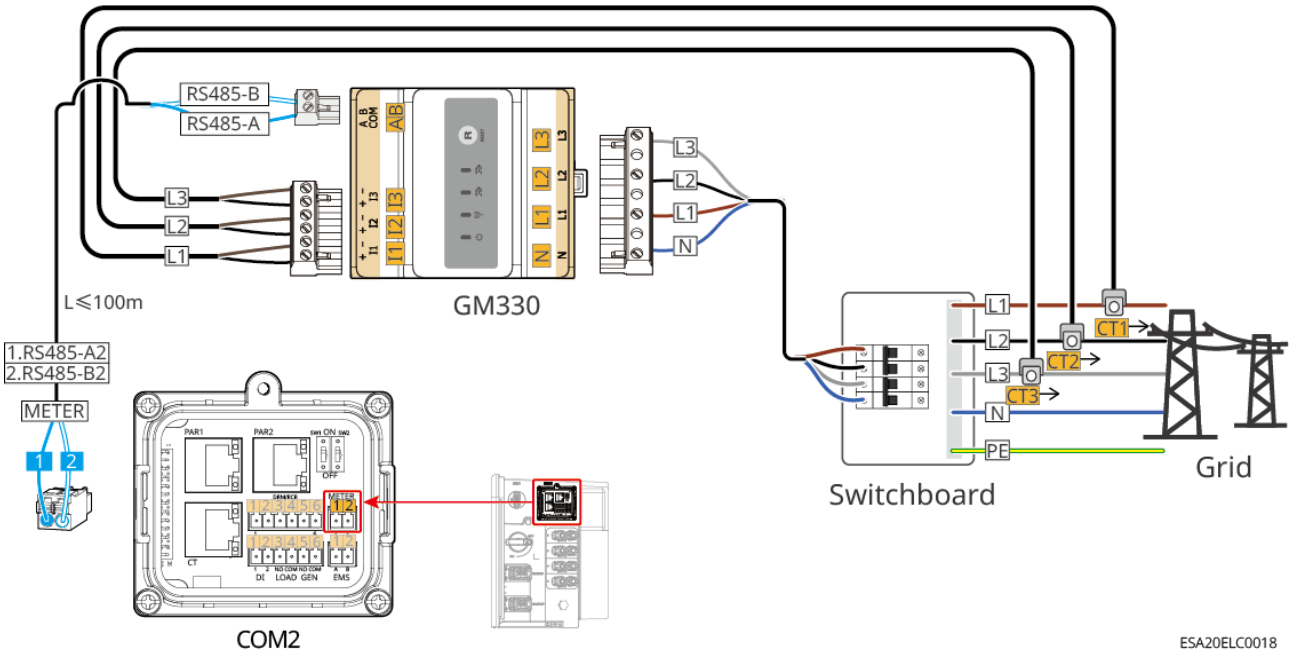


5.8 Connecting the Meter Cable

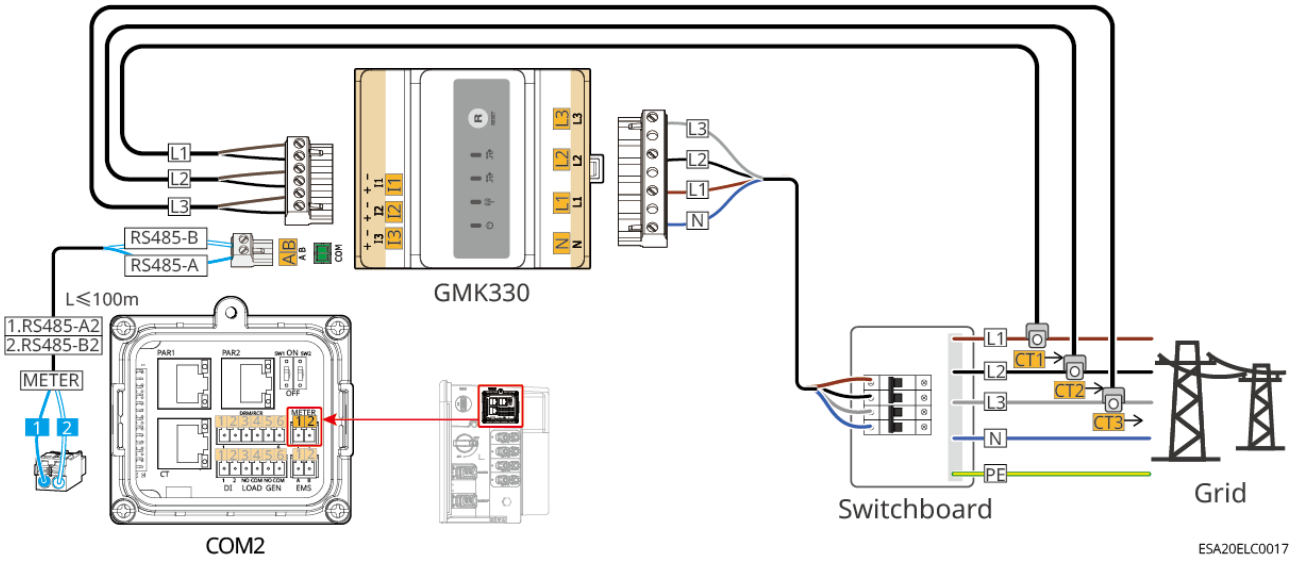
NOTICE

- If there is a need for multiple inverters to be connected in parallel for networking, please consult the manufacturer to purchase a meter separately.
- Please ensure that the CT connection direction and phase sequence are correct; otherwise, it may lead to incorrect monitoring data.
- Ensure that all cables are connected correctly, tightly, and without looseness. Improper wiring may cause poor contact or damage to the meter.
- In areas with lightning risks, if the meter cable length exceeds 10m and the cables are not laid with grounded metal conduits, it is recommended to install external lightning protection devices.

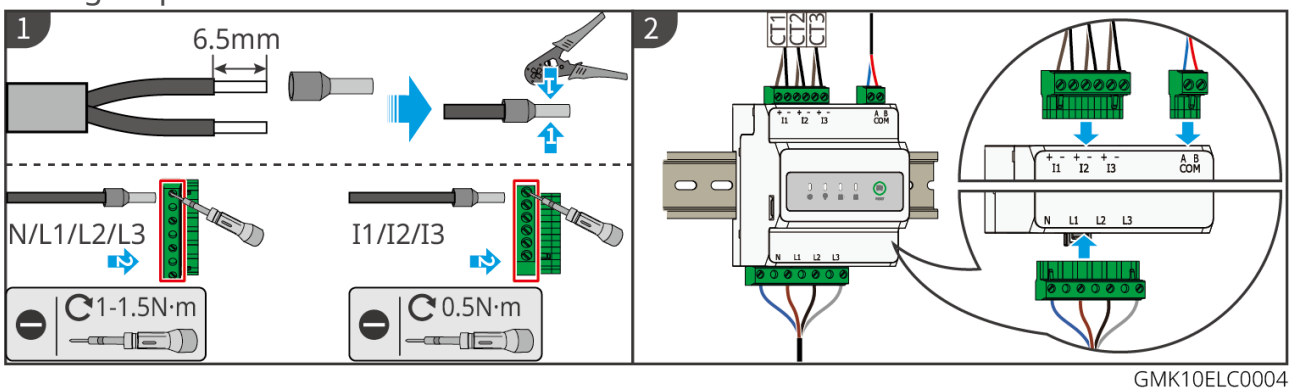
GM330 Meter Wiring



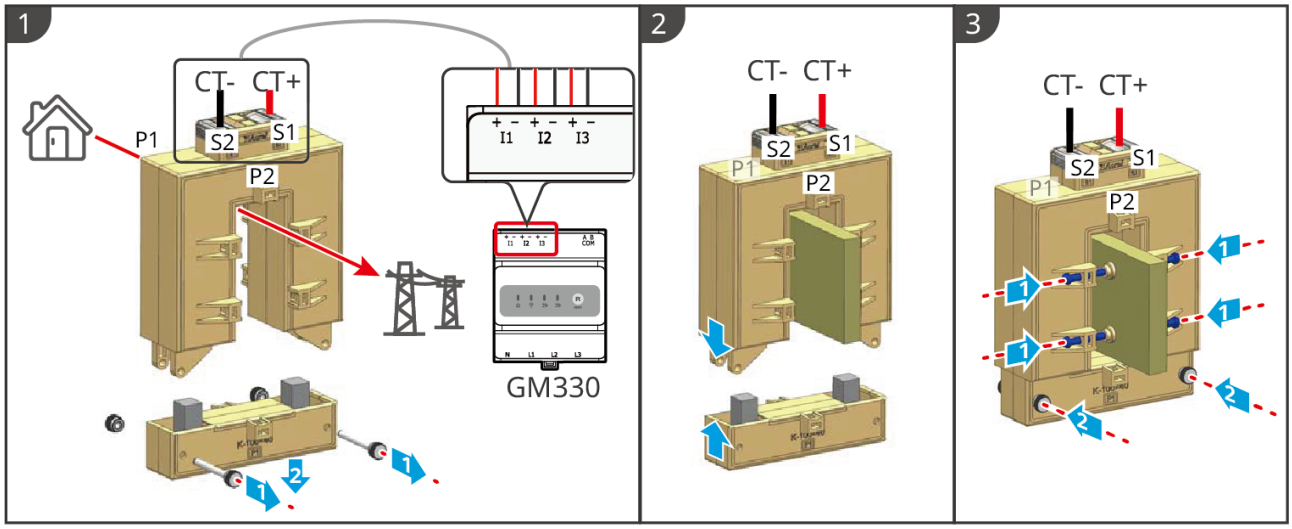
GMK330 Meter Wiring



Wiring Steps



Install CT (Type One)



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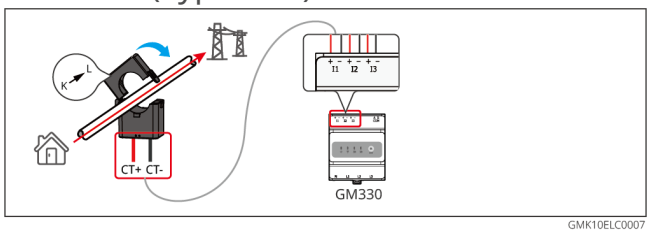
Install CT (Type Two)



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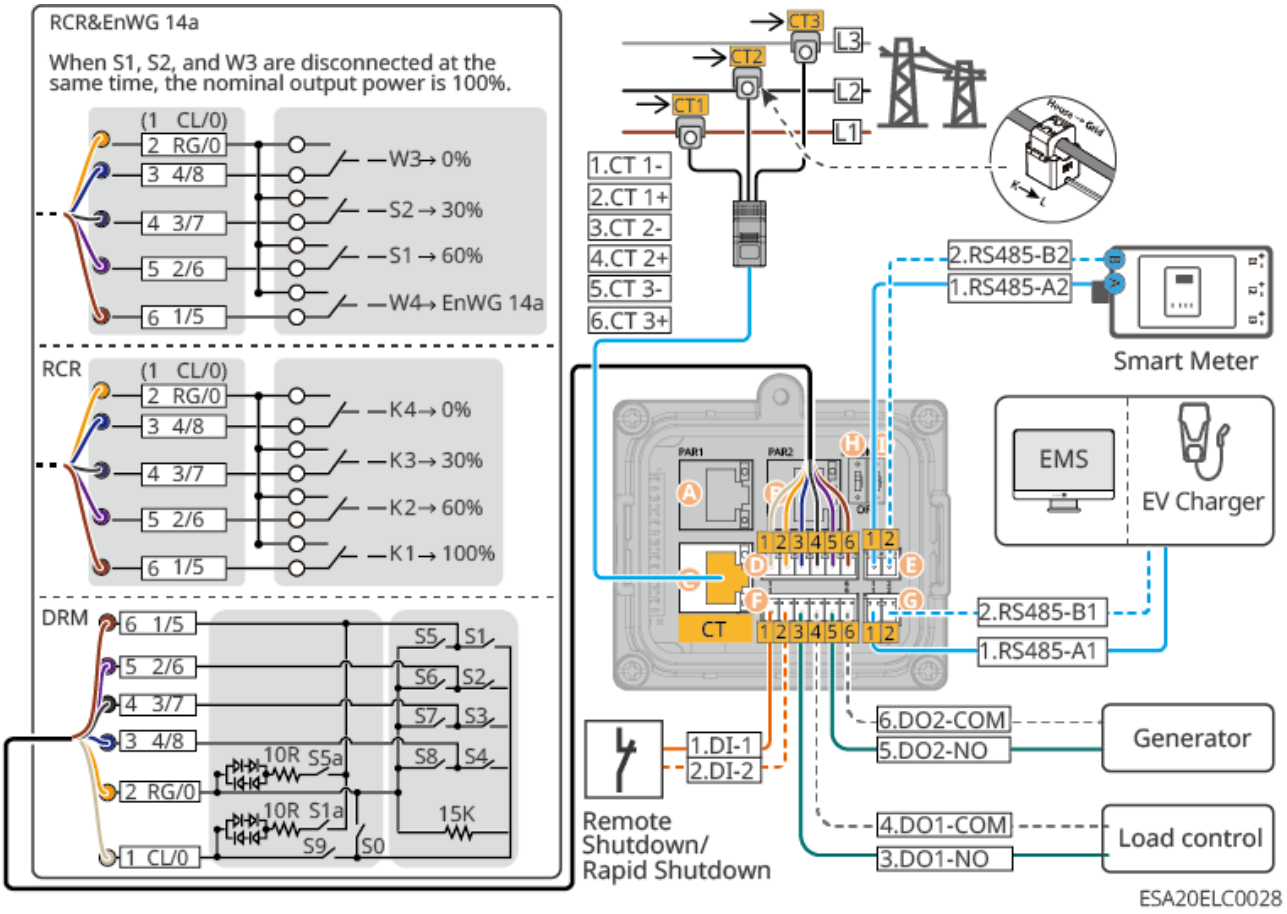
5.9 Connecting the Inverter Communication Cable

NOTICE

- To ensure proper operation of the meter and CT, please ensure the following: CT must be connected to the matching phase wire, with CT1 connected to L1, CT2 to L2, and CT3 to L3.
- When using the built-in meter of the Inverter, please use the CTs shipped with the unit.
- If DRED, RCR, or remote shutdown functions are required, please enable them in the SEMS+ App after wiring is completed.
- Do not enable these functions in the SEMS+ App if the Inverter is not connected to a DRED device or remote shutdown device, otherwise the Inverter will not be able to connect to the grid.
- To maintain the Inverter's waterproof rating, do not remove the waterproof plugs from unused communication ports on the Inverter.
- The Inverter's DO signal communication port can connect to dry contact signals with specifications: Max≤24Vdc, 1A.
- The Inverter's communication functions are optional; please select based on actual usage scenarios.
- The Inverter supports connecting via Bluetooth, WiFi, or LAN to a mobile phone or WEB interface to set device parameters, view operational information and error messages, and stay informed about system status.

Communication Function Description

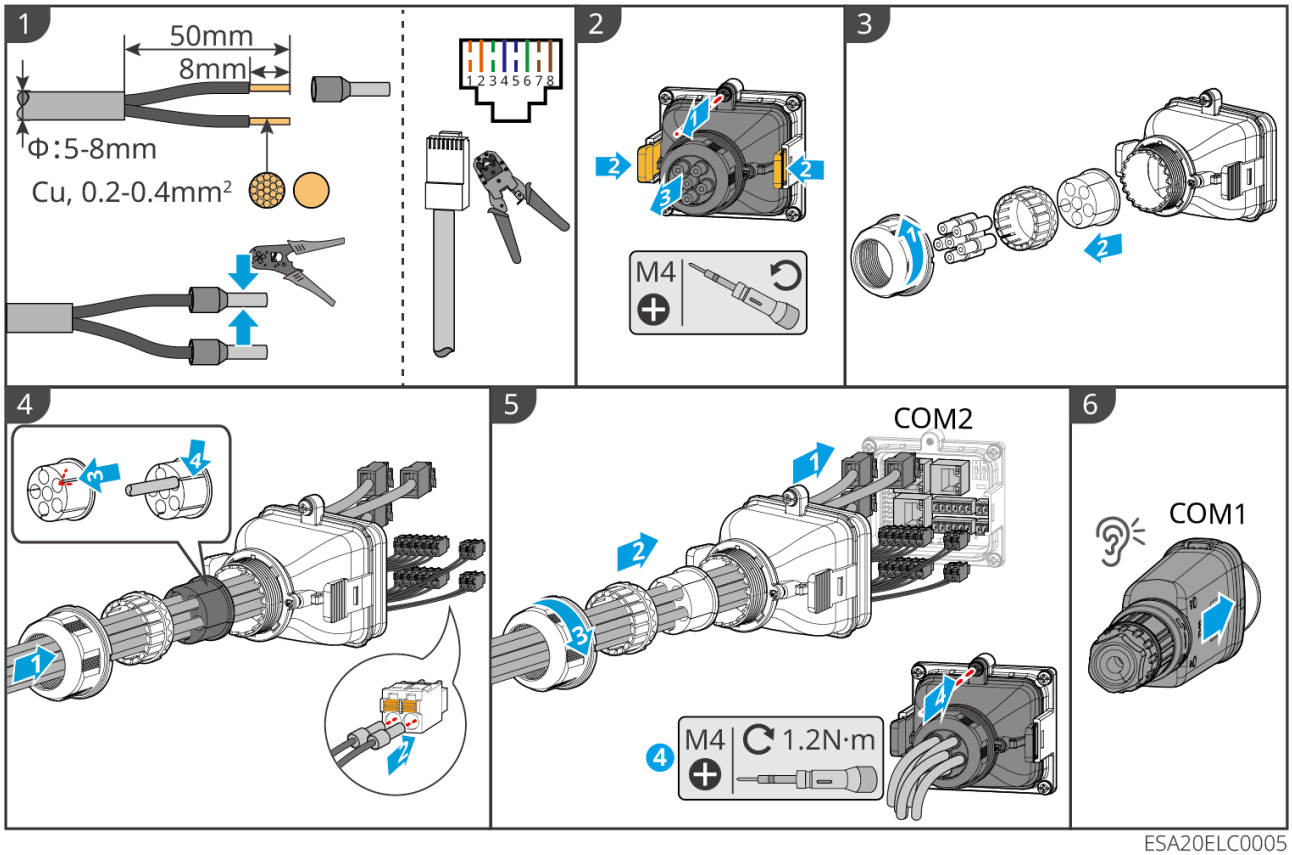


Port (Silkscreen)		Function	Description
A	PAR1	Reserved	-
B	PAR2		
C	CT	CT Connection Port	Connect the CT communication cable only when using the inverter's built-in meter.

Port (Silkscreen)		Function	Description
D	DRM/RCR	RCR, DRED, or EnWG 14a Function Connection Port	• RCR (Ripple Control Receiver): Provides an RCR signal control port to meet grid dispatch requirements in European regions. • DRED (Demand Response Enabling Device): Provides a DRED signal control port to meet DERD certification requirements in regions such as Australia. • EnWG (Energy Industry Act) 14a: All controllable loads must accept emergency dimming from the grid. Grid operators can temporarily reduce the maximum grid purchase power of controllable loads to 4.2kW.
E	METER	Meter Connection Port	Use RS485 communication to connect an external smart meter.
F	DI	Remote Shutdown/Rapid Shutdown	• Connect an external Remote Shutdown device. Default is off. • In a Rapid Shutdown system, the rapid shutdown transmitter and receiver work together to achieve rapid system shutdown. The receiver maintains module output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In an emergency, enabling an external trigger device can stop the transmitter, thereby shutting down the modules.

Port (Silkscreen)		Function	Description
	LOAD	Load Control	• Supports connection to dry contact signals to achieve functions such as load control. The DO contact rating is 24V DC@1A, NO/COM normally open contacts. • Supports SG Ready heat pump connection, controlling the heat pump via dry contact signals.
	GEN	Generator Control Port	Supports connection to generator control signals to control generator start/stop. Not supported for generator connection in microgrid scenarios.
G	EMS	EMS/Charging Pile Communication Port	Connect to third-party EMS devices for energy control or connect to GoodWe charging piles.
H	SW1	-	-
I	SW2		

Method for Connecting the Communication Cable



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6 System Commissioning

6.1 Check Before Power ON

No.	Check Item
1	The equipment is securely installed, the installation location facilitates operation and maintenance, the installation space allows for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	The PE cable, DC cable, AC cable, and communication cable are connected correctly and securely.
3	Cable bundling meets wiring requirements, is reasonably distributed, and shows no damage.
4	For unused cable entry holes and ports, please use the terminals provided with the accessories for reliable connection, and ensure they are sealed.
5	Ensure that all used cable entry holes have been sealed.
6	The voltage and frequency at the inverter grid connection point meet the grid interconnection requirements.

6.2 Power ON

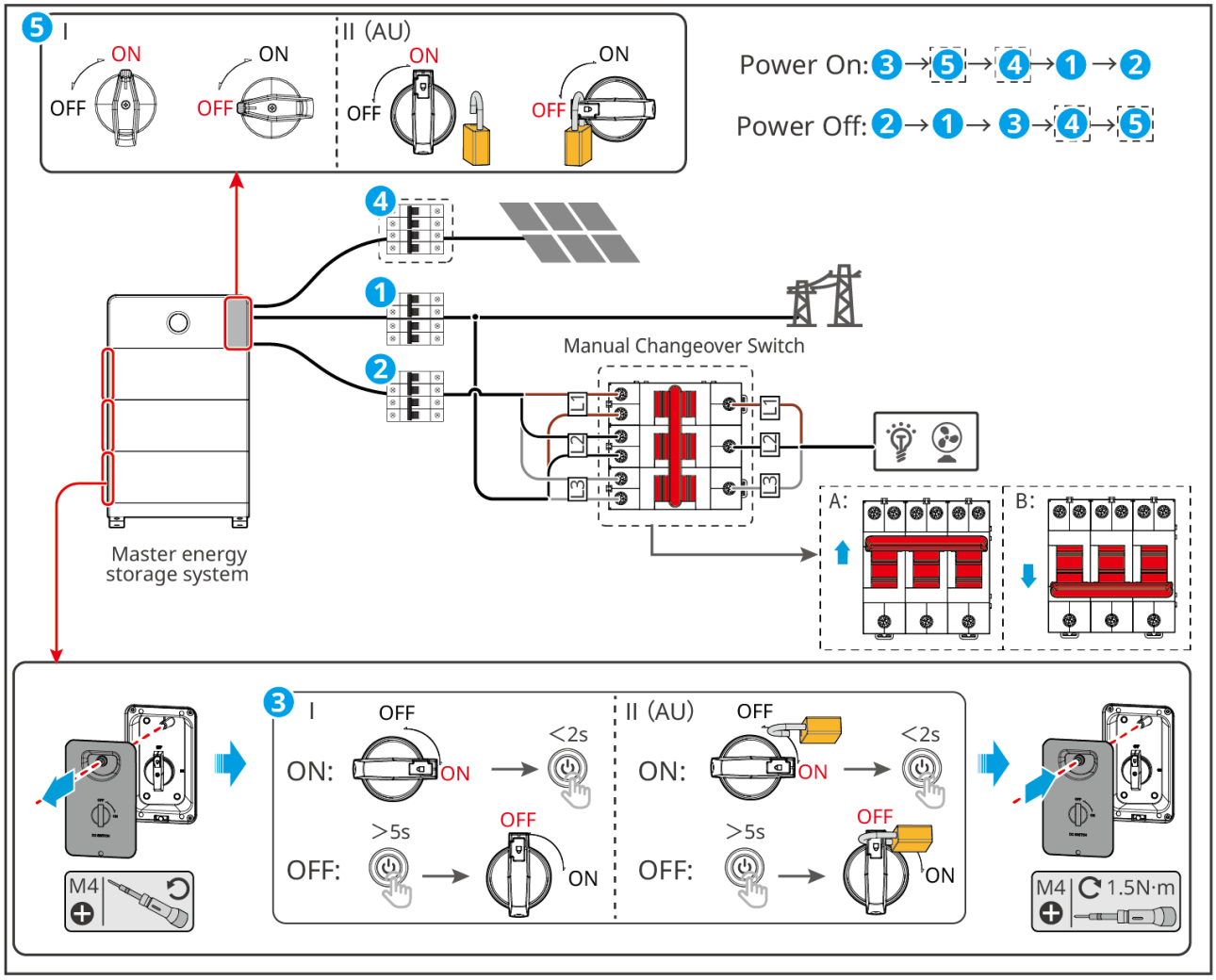
⚠WARNING

- Battery Black Start: When there is no PV power generation in the photovoltaic system and the grid is abnormal, if the inverter cannot operate normally, the battery black start function can be used to force the battery to discharge and start the inverter. The inverter can then enter off-grid mode operation, supplying power to the load from the battery.
- After the battery system starts, please ensure that the communication between the inverter and the battery system is normal within 15 minutes. If the inverter and the battery system cannot communicate normally, the battery system switch will automatically disconnect, cutting off power to the battery system.
- When the inverter is operating normally, set the manual transfer switch to position B to supply power to the load from the inverter's BACK-UP port; when the inverter is powered down for maintenance or has a fault, to ensure normal operation of the load, please set the manual transfer switch to position A to supply power to the load from the grid.
- "Step 4" and "Step 5" only apply to the ETA series.

NOTICE

When the system is powered on for the first time, it is recommended to perform a battery black start. Close the battery power switch and briefly press the multifunction button on one of the batteries. Observe whether the inverter's SOC indicator lights up. If the indicator lights up, it indicates the battery is connected normally, and you can proceed to close the inverter's DC switch.

power on



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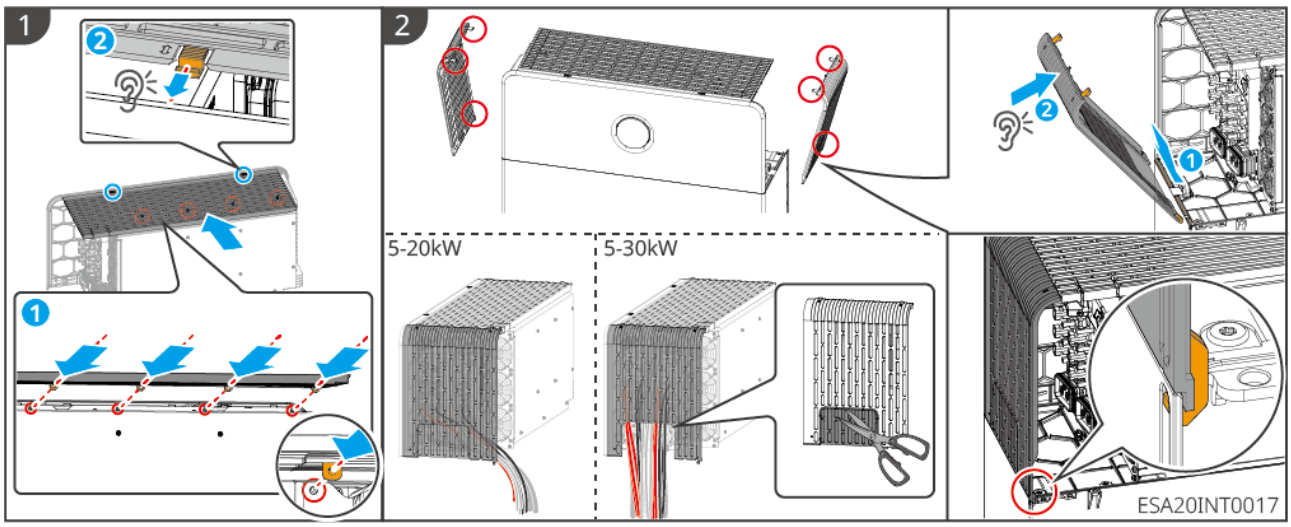
1. Close the battery power switch and briefly press the multifunction button on the battery. When there are multiple batteries in the system, close the power switches on all batteries. Briefly pressing the multifunction button on any one battery will start all batteries.
2. Close the DC switch of the inverter.
3. (Optional) Close the circuit breaker between the PV components and the inverter.
4. Close the GRID circuit breaker.
5. Close the BACK-UP circuit breaker, and (optional) set the manual transfer switch to the B state.

Battery Black Start

1. Close the battery power switch. When there are multiple batteries in the system, close the power switches on all batteries.

2. Close the DC switch of the inverter.
3. (Optional) Close the circuit breaker between the PV components and the inverter.
4. Close the GRID circuit breaker.
5. Close the BACK-UP circuit breaker.
6. After all batteries are powered on individually, wait for 15 seconds, then press and hold the multifunction button on any one battery for 2 seconds to force the battery to discharge and activate the inverter.

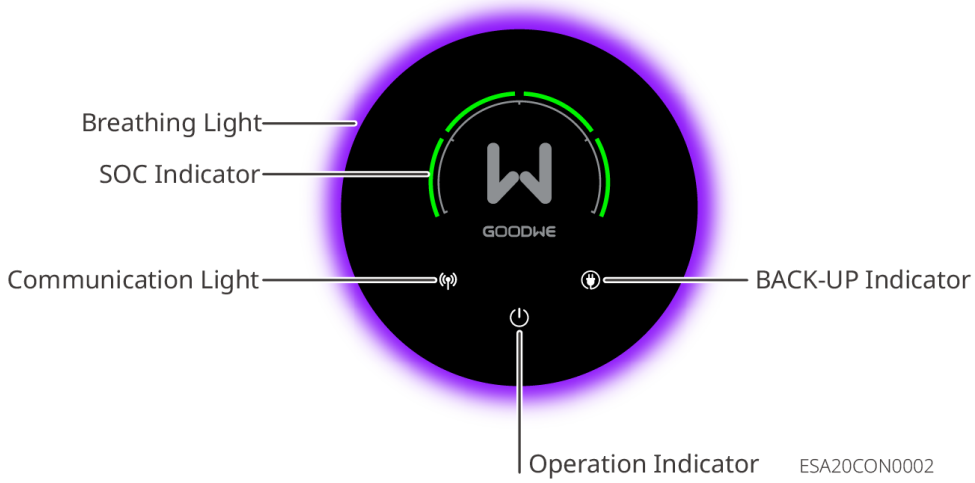
6.3 Install Protective Cover



Step 1: Install the top protective cover of the inverter. Align the cover with the top installation slot of the inverter and slide it forward.
Step 2: Install the side protective cover. Place the side cover into the card slot on the side of the battery and push it forward.

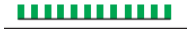
6.4 Indicators

6.4.1 Inverter Indicators

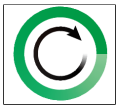
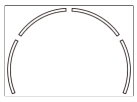
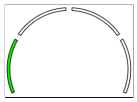
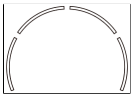
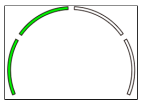
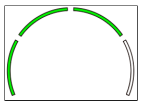
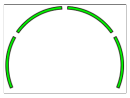


Breathing Light:

- When the system is upgrading: The breathing light is a green running light; the head of the running light is the brightest and the tail is the dimmest, the length of the running light and the upgrade percentage are affected by the Xiaogu Cloud Window+ App settings and the device's operational status.
- Except for inverter upgrade, system fault, and inverter power-off status, the breathing light status is affected by the App settings on the Xiaogu Cloud Window+ App. For setup instructions, please refer to the Xiaogu Cloud Window+ App User Manual.

indicator	Indicator Status	Breathing Light Status	Description
⏻		• 3min/Always on: Blue-purple chasing light stays on • Always off: Not lit	The inverter is powered on and in standby mode
			The inverter is starting up and in self-test mode

indicator	Indicator Status	Breathing Light Status	Description
		• 3min: Blue-purple breathing for 3min then off • Always on in App: Blue-purple breathing stays on • Always off in App: Not lit	The inverter is operating normally in grid-tied power generation or off-grid mode
		Red flashing	System fault
		Off	The inverter is powered off
		/	Inverter monitoring module is resetting
			Inverter and communication terminal are not connected
			Communication failure between communication terminal and cloud server
			Inverter monitoring is normal
			Inverter monitoring module is not started
			Grid abnormal, inverter BACK-UP port power supply normal
			Grid normal, inverter BACK-UP port power supply normal
			BACK-UP port has no power supply

indicator	Indicator Status	Breathing Light Status	Description
			System upgrade
			System fault
			Battery has no charge
			Constantly lit: Charge Flashing: Discharge Battery SOC: 0% < SOC ≤ 25%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 25% < SOC ≤ 50%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 50% < SOC ≤ 75%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 75% < SOC ≤ 100%

6.4.3 Smart Meter Indicator Lights GM330&GMK330

6.4.3.1 Indicator Light Description

Type	Status	Description
Power Light	Steady On	The meter is powered on, with no RS485 communication.
	Blinking	The meter is powered on, with normal RS485 communication.
	Off	The meter is powered off.
Comm Light	Off	Reserved.
	Blinking	Press and hold the Reset button for ≥5s, and the Power Light and Buy/Sell Power Light blink: The meter is resetting.
Buy/Sell Power Light	Steady On	buy power from the grid.
	Blinking	Selling power to the grid.
	Off	Not buying or selling power.
Buy/Sell Power Light (GMK360 only)	Steady On	buy power from the grid.
	Blinking	Selling power to the grid.
	Off	Not buying or selling power.

6.4.4 Smart Dongle Indicator

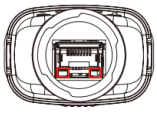
- **WiFi/LAN Kit-20**

NOTICE

- After double-clicking the Reload button to turn on Bluetooth, the communication indicator light will switch to a single-blink state. Please connect to the Xiaogu Cloud Window+ App within 5 minutes, otherwise Bluetooth will automatically turn off.
- The communication indicator light's single-blink state only appears after double-clicking the Reload button to turn on Bluetooth.

Indicator	Status	Description
Power indicator		Steady on: The Smart Communication Stick is powered on.
		Off: The Smart Communication Stick is not powered on.
Communication indicator		Steady on: Communication is normal in WiFi mode or LAN mode.
		Single blink: The Smart Communication Stick's Bluetooth signal is enabled, waiting to connect to the Xiaogu Cloud Window+ App.
		Two blinks: The Smart Communication Stick has not connected to the router.
		Four blinks: The Smart Communication Stick communicates normally with the router but has not connected to the server.
		Six blinks: The Smart Communication Stick is identifying connected devices.
		Off: The Smart Communication Stick is undergoing a software reset or is not powered on.

Indicator	Color	Status	Description
	Green	Steady on	100Mbps wired network connection is normal.

Indicator	Color	Status	Description
LAN port communication indicator 		Off	• Network cable is not connected. • 100Mbps wired network connection is abnormal. • 10Mbps wired network connection is normal.
	Yellow	Steady on	10/100Mbps wired network connection is normal, with no communication data being transmitted or received.
		Flashing	Communication data is being transmitted or received.
		Off	Network cable is not connected.

Button	Description
Reload	Hold for 0.5 to 3 seconds to reset the Smart Communication Stick.
	Hold for 6 to 20 seconds to restore the Smart Communication Stick to factory settings.
	Double-click quickly to enable Bluetooth signal (maintained for only 5 minutes).

7 System Commissioning

7.1 Setting Inverter Parameters via App

SEMS+ App is a software used for remote power plant monitoring or local device debugging. It supports installers or owners to:

- Remotely monitor the operation status of the power plant and set operation parameters for the plant and devices.
- Locally connect to devices to view their operation status and set device parameters.

For detailed functions, please refer to the "SEMS+ App User Manual". The user manual can be obtained from the official website or by scanning the QR code below.

SEMS+ App User Manual

7.1.1 Download and Install XiaoGu Cloud Window+ App

Phone Requirements:

- Operating System: Android 7.0 or above, iOS 15.1 or above.
- Phone must support a web browser and connect to the Internet.
- Phone must support WLAN/Bluetooth functionality.

Download Methods:
Method 1:
Search for "XiaoGu Cloud Window+" in Google Play, App Store, Huawei, Honor, Xiaomi, OPPO, or vivo app stores to download and install.

SEMS0163

Method 2:

Scan the QR code below to download and install.

SEMS0164

7.2 Monitoring power stations via SEMS+ WEB

SEMS+ WEB is a monitoring platform that can communicate via WiFi or LAN. The following are the common functions of SEMS+ WEB:

1. Manage organization or user information, etc.
2. Add and monitor power station information, etc.
3. Maintain equipment.

For detailed functions, please refer to the SEMS+ WEB User Manual.

SEMS+ WEB User Manual

8 Maintenance

8.1 Power OFF the System

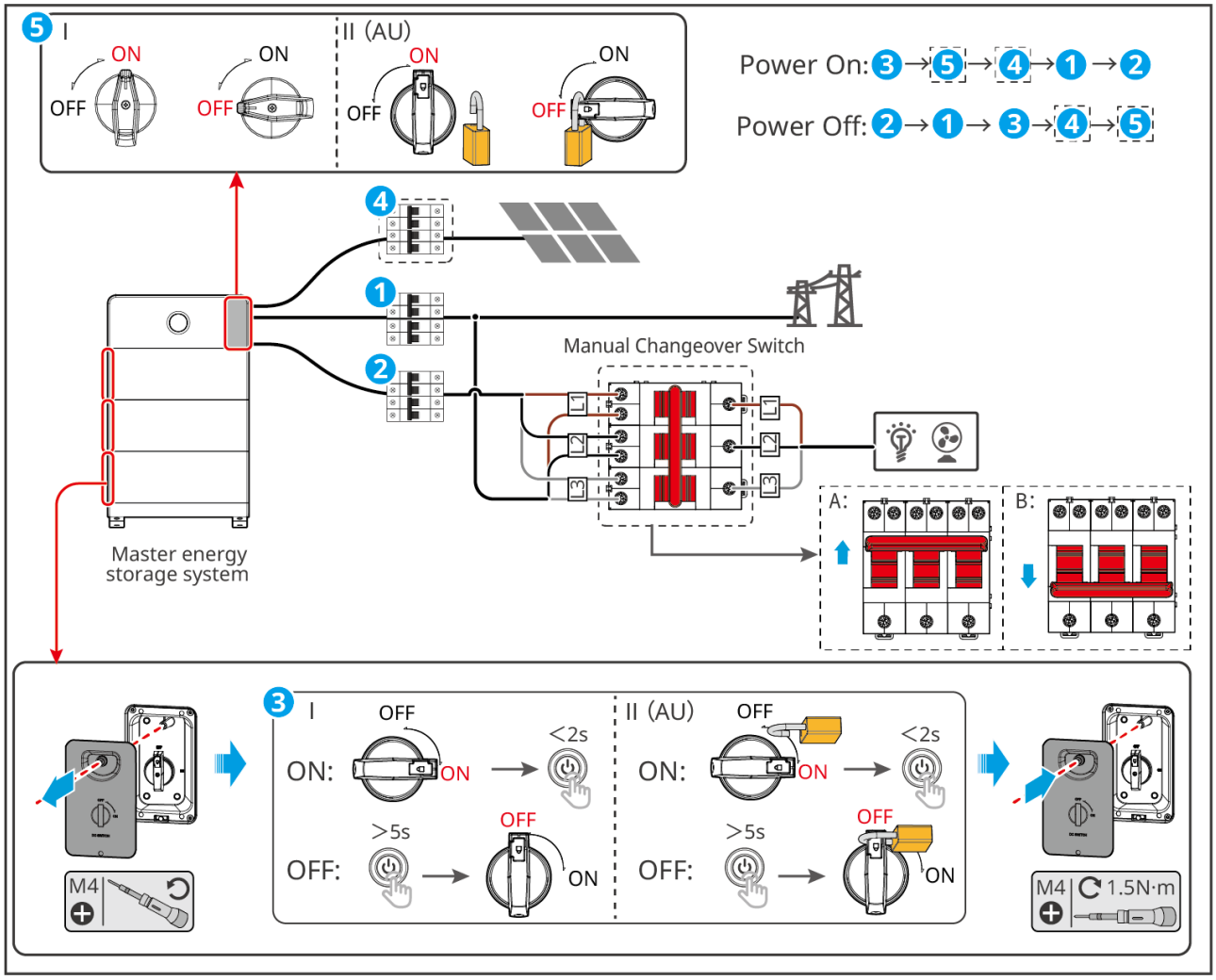
⚠DANGER

- When performing operation and maintenance on devices in the system, please power off the system. Operating devices with power on may cause device damage or electric shock DANGER.
- After the device is powered off, internal components require some time to discharge. Please wait until the device is completely discharged according to the label time requirements.
- Restarting the battery should be done using the air switch power-on method.
- When shutting down the battery system, strictly adhere to the battery system power-off requirements to prevent damage to the battery system.

NOTICE

- To ensure effective protection of the battery system, keep the cover plate of the battery system switch closed. If the battery system switch is not used for an extended period, secure it with screws.
- "Step 4" and "Step 5" are only applicable to the ETA series.

power off



ESA20PWR0003

1. Disconnect the BACK-UP circuit breaker.
2. Disconnect the GRID circuit breaker.
3. Press and hold any battery's multifunction button for 5 seconds to power off the battery system. If the system contains multiple batteries, this operation will power off all batteries; there is no need to operate them individually. Finally, disconnect the battery system switch.
4. (Optional) Disconnect the circuit breaker between the PV components and the inverter.
5. Disconnect the inverter's DC switch. (Optional) Set the manual transfer switch to position A.

8.2 Removing the Equipment

DANGER

- Ensure the device is powered off.
- When operating the device, please wear personal protective equipment.
- When removing wiring terminals, use standard disassembly tools to avoid damaging the terminals or device.
- Unless otherwise specified, the device disassembly method is the reverse order of the installation method, and this document will not elaborate further.

1. Power down the system.
2. Label the cables connected in the system to indicate their types.
3. Disconnect the cables from the Inverter, Battery, and smart meter in the system, such as DC cables, AC cables, Communication cable, and PE cable.
4. Remove equipment such as the smart communication stick, Inverter, Battery, and smart meter.
5. Store the equipment properly. If it will be put into use again later, ensure the storage conditions meet the requirements.

8.3 Disposing of the Equipment

When the equipment can no longer be used and needs to be disposed of, please handle it according to the electrical waste disposal requirements of the regulations in the country/region where the equipment is located. The equipment must not be disposed of as general household waste.

8.4 Routine Maintenance

WARNING

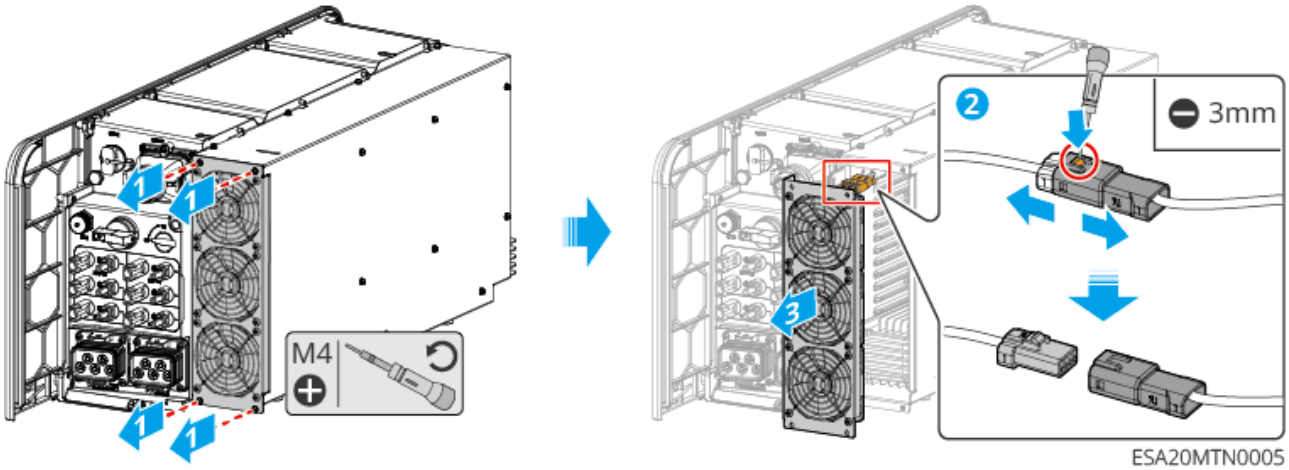
- If any issues that may affect the battery or energy storage inverter system are found, contact after-sales personnel. Disassembly by unauthorized persons is prohibited.
- If exposed copper wires inside the conductive wires are found, do not touch them. High voltage danger. Contact after-sales personnel. Disassembly by unauthorized persons is prohibited.
- In case of other emergencies, contact after-sales personnel immediately. Operate under the guidance of after-sales personnel or wait for on-site operation by after-sales personnel.

Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check the heat sink and air inlet/outlet for foreign objects or dust. Check if the installation space meets requirements and if there is debris accumulation around the equipment.	Once every 6 months	Prevent cooling failures.
System Installation	Check if the equipment installation is secure and if fastening screws are loose. Check the equipment exterior for damage or deformation.	Once every 6 months to once a year	Confirm equipment installation stability.
Electrical Connections	Check electrical connections for looseness, inspect cable exteriors for damage or exposed copper.	Once every 6 months to once a year	Confirm electrical connection reliability.
Fan	Check the fan for abnormal noise; Check fan blades for cracks; Check the fan for abnormal blockage/stalling;	Once every 6 months	Prevent fan failure.

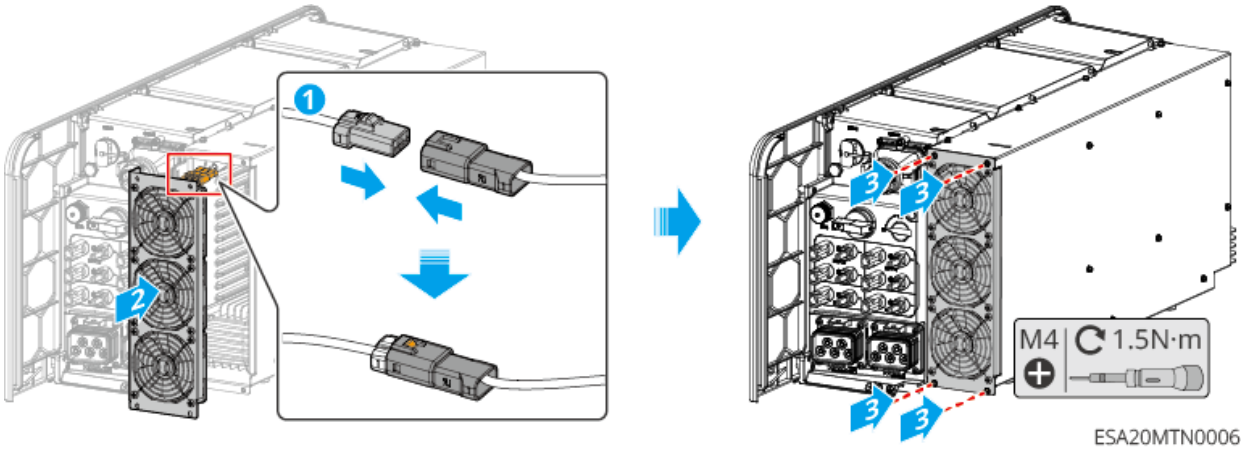
Maintenance Item	Maintenance Method	Maintenance Cycle	Maintenance Purpose
Sealing	Check if the sealing of equipment cable entry holes meets requirements. If gaps are too large or unsealed, reseal them.	Once a year	Confirm machine sealing and waterproof integrity.
Battery Maintenance	If the battery has not been used or fully charged for an extended period, it is recommended to charge it regularly.	Once every 15 days	Protect battery service life.

For fan maintenance, refer to the following steps:
The inverter has a fan module on the outside. To better clean the fan module, please remove it from the machine before cleaning. The specific steps are as follows:

1. Power off the inverter. You can refer to 8.1.Power OFF the System(Page 133).
2. Wait for the system residual voltage to be completely discharged and the fan module to completely stop running.
3. Use a screwdriver to remove the module mounting screws and take out the entire fan module.
4. Use a soft brush, cloth, or vacuum cleaner to clean the fan.



After cleaning is completed, reinstall the fan module back into the machine.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8.5 fault

8.5.1 Viewing Fault/Alarms Information

Detailed information for all faults and alarms in the energy storage system is displayed in the **XiaoGu CloudWindow+ App and XiaoGu CloudWindow+ WEB**. If your product experiences an abnormality and no related fault information is seen in the **XiaoGu CloudWindow+ App or XiaoGu CloudWindow+ WEB**, please contact the after-sales service center.

- In XiaoGu CloudWindow+ App

1. Open the XiaoGu CloudWindow+ App and log in with any account.
2. On the homepage, click "Alarms" to view alarm information for all power plants under the account.

- XiaoGu CloudWindow+ WEB

1. Open the XiaoGu CloudWindow+ WEB and log in with any account.
2. On the power plant details interface, click "Alarms" to view all alarm information for the current power plant.

8.5.2 Fault Information and Troubleshooting

Please perform troubleshooting according to the following methods. If the troubleshooting methods cannot help you, please contact the after-sales service center.
When contacting the after-sales service center, please collect the following information to facilitate a quick resolution.

1. Product information, such as: serial number, software version, device installation time, fault occurrence time, fault frequency, etc.
2. Device installation environment, such as: weather conditions, whether components are blocked, have shadows, etc. It is recommended to provide photos, videos, and

other files to assist in problem analysis.
3. Grid conditions.

If the system experiences a problem not listed, or if following the instructions still cannot prevent the problem or abnormality, immediately stop system operation and contact your dealer immediately.

No.	fault	Resolution
1	Unable to search for the Smart Communication Stick's wireless signal	1. Ensure no other devices are connected to the Smart Communication Stick's wireless signal. 2. Ensure the Smart Communication Stick is powered normally, with the blue signal light flashing or steady on. 3. Ensure the smart device is within the communication range of the Smart Communication Stick. 4. Refresh the App device list again. 5. Restart the inverter.
2	Unable to connect to the Smart Communication Stick's wireless signal	1. Ensure no other devices are connected to the Smart Communication Stick's wireless signal. 2. Restart the inverter or the communication stick, then try connecting to the Smart Communication Stick's wireless signal again. 3. Ensure Bluetooth pairing and encryption were successful.
3	Unable to find the router's SSID	1. Place the router closer to the Smart Communication Stick, or add a WiFi repeater to enhance the WiFi signal. 2. Reduce the number of devices connected to the router.

No.	fault	Resolution
4	After all configuration is complete, the Smart Communication Stick fails to connect to the router	1. Restart the inverter. 2. Check if the network name, encryption method, and password in the WiFi configuration match those of the router. 3. Restart the router. 4. Place the router closer to the Smart Communication Stick, or add a WiFi repeater to enhance the WiFi signal.
5	After all configuration is complete, the Smart Communication Stick fails to connect to the server	Restart the router and the inverter.

8.5.2.1 Inverter Fault

8.5.2.1.1 Troubleshooting (Fault Codes F01-F40)

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F01	Grid Power Outage	1. Grid power outage. 2. AC line or AC switch is disconnected.	1. The alarm will disappear automatically after grid power is restored. 2. Check if the AC line or AC switch is disconnected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F02	Grid Overvoltage Protection	Grid voltage exceeds the allowable range, or the high-voltage duration exceeds the HVRT setting value.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overvoltage protection point after obtaining consent from the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cables are properly connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F03	Grid Undervoltage Protection	Grid voltage is below the allowable range, or the low-voltage duration exceeds the LVRT setting value.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid undervoltage protection point after obtaining consent from the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cables are properly connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F04	Grid Rapid Overvoltage Protection	Abnormal grid voltage detection or ultra-high voltage triggers the fault.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid voltage is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid undervoltage protection point after obtaining consent from the local power operator. 3. If it cannot be restored for a long time, check if the AC side circuit breaker and output cables are properly connected.
F05	10min Overvoltage Protection	The moving average of grid voltage within 10min exceeds the safety regulation specified range.	Check if the grid voltage has been operating at a high level for a long time. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid 10min overvoltage protection point after obtaining consent from the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F06	Grid Overfrequency	Grid anomaly: The actual grid frequency is higher than the local grid standard requirements.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overfrequency protection point after obtaining consent from the local power operator.
F07	Grid Underfrequency	Grid anomaly: The actual grid frequency is lower than the local grid standard requirements.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overfrequency protection point after obtaining consent from the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F08	Grid Frequency Instability	Grid anomaly: The rate of change of the actual grid frequency does not comply with local grid standards.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator.
F09	Anti-islanding Protection	The grid has been disconnected, but grid voltage is maintained due to the presence of loads. Grid connection is stopped according to safety protection requirements.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid frequency is within the allowable range. If not, contact the local power operator.
F10	LVRT Undervoltage Fault	Grid anomaly: The duration of abnormal grid voltage exceeds the time specified by the HVRT/LVRT.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F11	HVRT Overvoltage	Grid anomaly: The duration of abnormal grid voltage exceeds the time specified by the HVRT/LVRT.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, check if the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F12	30mA GFCI Protection	The input-to-ground insulation impedance becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by occasional external line anomalies. It will resume normal operation after the fault is cleared, requiring no manual intervention. 2. If it occurs frequently or cannot be restored for a long time, check if the PV string's impedance to ground is too low.
F13	60mA GFCI Protection	The input-to-ground insulation impedance becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by occasional external line anomalies. It will resume normal operation after the fault is cleared, requiring no manual intervention. 2. If it occurs frequently or cannot be restored for a long time, check if the PV string's impedance to ground is too low.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F14	150mA GFCI Protection	The input-to-ground insulation impedance becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by occasional external line anomalies. It will resume normal operation after the fault is cleared, requiring no manual intervention. 2. If it occurs frequently or cannot be restored for a long time, check if the PV string's impedance to ground is too low.
F15	GFCI Gradual Change Protection	The input-to-ground insulation impedance becomes low during inverter operation.	1. If it occurs occasionally, it may be caused by occasional external line anomalies. It will resume normal operation after the fault is cleared, requiring no manual intervention. 2. If it occurs frequently or cannot be restored for a long time, check if the PV string's impedance to ground is too low.
F16	DCI Level 1 Protection	The DC component of the inverter output current is higher than the safety regulation or the machine's default allowable range.	1. If it is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, requiring no manual intervention. 2. If this alarm occurs frequently, affecting the normal power generation of the power station, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F17	DCI Level 2 Protection	The DC component of the inverter output current is higher than the safety regulation or the machine's default allowable range.	1. If it is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, requiring no manual intervention. 2. If this alarm occurs frequently, affecting the normal power generation of the power station, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F18	Low Insulation Resistance	1. PV string shorted to protective earth. 2. The PV string installation environment is long-term humid and the line has poor insulation to ground. 3. Battery port line has low impedance to ground.	1. Check the impedance of the PV string/battery port to protective earth. A value greater than 80kΩ is normal. If the checked value is less than 80kΩ, locate and rectify the short-circuit point. 2. Check if the inverter's protective earth wire is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy/overcast environments, reset the inverter's "Insulation Impedance Protection Point" via the App. For inverters in the Australian and New Zealand markets, the following additional alarm methods apply when an insulation impedance fault occurs: 1. The inverter is equipped with a buzzer. When a fault occurs, the buzzer sounds continuously for 1 minute; if the fault is not resolved, the buzzer sounds again every 30 minutes. 2. If the inverter is added to the monitoring platform and alarm notification methods are set, alarm information can be sent to the customer via email.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F19	Grounding Abnormal	1. The inverter's protective earth wire is not connected. 2. When the PV string output is grounded, the inverter output side is not connected to an isolation transformer.	1. Confirm if the inverter's protective earth wire is not properly connected. 2. In scenarios where the PV string output is grounded, confirm if the inverter output side is connected to an isolation transformer.
F20	Hardware Anti-backfeed Protection	Load abnormal fluctuation	1. If it is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, requiring no manual intervention. 2. If this alarm occurs frequently, affecting the normal power generation of the power station, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F21	Internal Comm Loss	Sub DSP1 communication timeout - Main DSP, Sub DSP2 communication timeout - Main DSP, Sub DSP2 communication timeout - Sub DSP1, Main DSP communication timeout - Sub DSP1, Main DSP communication timeout - Sub DSP2 or Sub DSP1 communication timeout - Sub DSP2: 1. Chip not powered on 2. Chip program version error	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
		Main DSP can module error, Sub DSP1 can module error or Sub DSP2 can module error: 1. Frame format error 2. Parity check error 3. can bus offline 4. Hardware CRC check error 5. Control bit is receive (transmit) during transmission (reception) 6. Transmission to an unauthorized unit	
F22	Generator Waveform Detection Fault	1. This fault will be displayed continuously when the generator is not connected; 2. When the generator is operating, failure to meet generator safety regulations will trigger this fault.	
F23	Generator Abnormal Connection		
F24	Generator Voltage Low		
F25	Generator Voltage High		
F26	Generator Frequency Low		

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F27	Generator Frequency High		1. Ignore this fault when the generator is not connected; 2. When this fault occurs due to a generator fault, it is normal. Wait for a period after the generator recovers, and the fault will clear automatically; 3. This fault does not affect the normal operation of off-grid mode. 4. When both the generator and grid are connected and meet safety requirements, the grid has priority for grid connection, and the system will operate in grid-connected status.
F28	Parallel I/O Self-check Abnormal	Parallel communication cable is not securely connected or parallel IO chip is damaged	Check if the parallel communication cable is securely connected, then check if the IO chip is damaged. If yes, replace the IO chip.
F29	Paralell Grid Line Reversed	Some machines' grid lines are connected in reverse with others	Reconnect the grid lines correctly.
F30	AC HCT check Abnormal	AC sensor has sampling abnormality	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F31	GFCI HCT Check Abnormal	Leakage current sensor has sampling abnormality	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.
F32	Inverter Internal Failure	Inverter has a fault	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.
F33	Flash Read/Write Error	Possible causes: flash content changed; flash lifespan exhausted;	1. Upgrade to the latest program version. 2. Contact the distributor or after-sales service center.
F34	AFCI Check Failure	During the arc self-check process, the arc detection module did not detect an arc fault as expected.	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F35	Cabinet Overtemperature	Cabinet temperature is too high, possible causes: 1. Inverter installation location is not ventilated. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is good and if the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is poor or ambient temperature is too high, improve its ventilation and heat dissipation conditions. 3. If ventilation and ambient temperature are both normal, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F36	Bus Overvoltage	BUS overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter BUS voltage sampling is abnormal; 3. The isolation effect of the dual-split transformer at the inverter rear end is poor, causing mutual influence when two inverters are connected in parallel, with one inverter reporting DC overvoltage during grid connection;	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F37	PV Input Overvoltage	PV input voltage is too high, possible cause: PV array configuration error, too many PV panels connected in series per string, causing the string's open-circuit voltage to be higher than the inverter's maximum operating voltage.	Check the series configuration of the corresponding PV array string to ensure the string's open-circuit voltage is not higher than the inverter's maximum operating voltage. After the PV array is correctly configured, the inverter alarm will disappear automatically.
F38	PV Continuous Hardware Overcurrent	1. Module configuration unreasonable. 2. Hardware damaged.	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.
F39	PV Continuous Software Overcurrent	1. Module configuration unreasonable. 2. Hardware damaged.	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F40, F98	String Reverse Connection (String 1-n) n: Determined based on the actual number of inverter strings.	PV string reverse connection	Check if the string is reversely connected.

8.5.2.1.2 Troubleshooting (Fault Codes F41-F80)

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F41	Generator Port Overload	1. Off-grid side output exceeds specification requirements. 2. Off-grid side short circuit. 3. Off-grid terminal voltage is too low. 4. When used as a heavy load port, the heavy load exceeds specification requirements.	1. Confirm the off-grid side output voltage, current, power and other data to identify the cause of the problem.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F42	DC Arcing Failure (String 1-n) n: Determined by the actual number of inverter strings.	1. Loose DC side connection terminals. 2. Poor contact at DC side connection terminals. 3. Damaged DC cable cores causing poor contact.	1. After the unit reconnects to the grid, check if the voltage and current of each string abnormally decrease or become zero. 2. Check if the DC side terminals are securely connected.
F43	Grid Waveform Abnormal	Utility grid abnormality: Abnormal grid voltage detection triggers the fault.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, please check if the grid voltage and frequency are within the allowable range and stable. If not, please contact the local power operator.
F44	Grid Phase Loss	Utility grid abnormality: Single-phase voltage dip on the grid.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, please check if the grid voltage and frequency are within the allowable range and stable. If not, please contact the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F45	Grid Voltage Imbalance	Excessive difference in grid phase voltages.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, please check if the grid voltage and frequency are within the allowable range and stable. If not, please contact the local power operator.
F46	Grid Phase Sequence Failure	Inverter and grid wiring abnormality: Wiring is not in positive sequence.	1. Check if the inverter and grid wiring are in positive sequence. The fault will automatically disappear after correct wiring (e.g., swapping any two live wires). 2. If the fault persists despite correct wiring, please contact the dealer or after-sales service center.
F47	Grid Rapid Shutdown Protection	Quickly shuts down output after detecting a grid power outage condition.	The fault automatically disappears after grid power supply is restored.
F48	Grid Neutral Wire Loss (Split-phase Grid)	Loss of neutral wire in a split-phase grid.	1. The alarm automatically disappears after grid power supply is restored. 2. Check if the AC line or AC switch is disconnected.
F49	L-PE Short Circuit	Low impedance or short circuit between output phase line and PE.	Measure the impedance between the output phase line and PE, locate the position with low impedance and repair it.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F50	DCV Level 1 Protection	Abnormal load fluctuation.	1. If it is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, requiring no manual intervention. 2. If this alarm occurs frequently, affecting normal power generation of the plant, please contact the dealer or after-sales service center.
F51	DCV Level 2 Protection	Abnormal load fluctuation.	
F52	Leakage Current (GFCI) Multiple Fault Shutdown	North American safety regulations require manual reset or waiting 24h for recovery after multiple faults, no automatic recovery.	Please check if the PV string-to-ground impedance is too low.
F53	DC Arcing (AFCI) Multiple Fault Shutdown	North American safety regulations require manual reset or waiting 24h for recovery after multiple faults, no automatic recovery.	1. After the unit reconnects to the grid, check if the voltage and current of each string abnormally decrease or become zero. 2. Check if the DC side terminals are securely connected.
F54	External Communication Link Failure	External device communication loss for the inverter. Possible causes: peripheral power issue, communication protocol mismatch, corresponding peripheral not configured, etc.	Determine based on the actual model and enabled detection bits. Peripherals not supported by certain models will not be detected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F55	Back-up Port Overload Fault	Prevents the inverter from continuously outputting overload.	Turn off some off-grid loads to reduce the inverter's off-grid output power.
F56	Back-up Port Overvoltage Fault	Prevents inverter output overvoltage from damaging loads.	1. If it occurs occasionally, it may be caused by load switching and requires no manual intervention. 2. If it occurs frequently, please contact the dealer or after-sales service center.
F57	External Box Fault	Waiting too long for Box relay switching during grid-to-off-grid transition.	1. Check if the Box is working normally. 2. Check if the Box communication wiring is correct.
F58	CT Loss Fault	CT connection wire disconnected (Japanese safety regulation requirement).	Check if the CT wiring is correct.
F59	Parallel CAN Communication Abnormality	Parallel communication cable not securely connected or some units are offline.	Check if all units are powered on and if the parallel communication cables are securely connected.
F60	Parallel Back-up Connection Reversed	Backup wiring of some units is reversed with others.	Reconnect the backup wiring.
F61	Inverter Soft Start Failure	Inverter soft start failure during off-grid cold start.	Check if the inverter module is damaged.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F62	AC HCT Failure	HCT sensor abnormality exists.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F63	GFCI HCT Failure	Leakage current sensor abnormality exists.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F64	Inverter Internal Failure	Inverter fault exists.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F65	AC Terminal Overtemperature	AC terminal temperature is too high. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, improve its ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F66	INV Module Overtemperature	Inverter module temperature is too high. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, improve its ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
F67	Boost Module Overtemperature	Boost module temperature is too high. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, improve its ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F68	AC Capacitor Overtemperature	Output filter capacitor temperature is too high. Possible causes: 1. Inverter installation location lacks ventilation. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, improve its ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
F69	PV IGBT Short Circuit Fault	Possible causes: 1. IGBT short circuit. 2. Inverter sampling circuit abnormality.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F70	PV IGBT Open Circuit Fault	1. Software issue causing no PWM generation. 2. Drive circuit abnormality. 3. IGBT open circuit.	
F71	NTC Abnormality	NTC temperature sensor abnormality.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F72	PWM Abnormal	Abnormal PWM waveform detected.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F73	CPU Interrupt Abnormality	CPU interrupt abnormality occurred.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F74	Microelectronics Fault	Functional safety detection detected an abnormality.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F75	PV HCT Fault	Boost current sensor abnormality.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F76	1.5V Reference Abnormality	Reference circuit fault.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F77	0.3V Reference Abnormality	Reference circuit fault.	

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F78	CPLD Version Recognition Error	CPLD version recognition error.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F79	CPLD Communication Fault	CPLD and DSP communication content error or timeout.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F80	Model Identification Fault	Fault related to model identification error.	Disconnect the AC output side switch and DC input side switch, wait 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

8.5.2.1.3 Troubleshooting (Fault Codes F81-F121)

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F81	P-Bus Overvoltage		Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F82	N-Bus Overvoltage	BUS overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter BUS voltage sampling is abnormal; 3. Poor isolation effect of the split-phase transformer at the inverter output, causing mutual interference when two inverters are grid-connected, with one inverter reporting DC overvoltage during grid connection;	
F83	Bus Overvoltage (Sub CPU1)		Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F84	P-Bus Overvoltage (Sub CPU1)		

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F85	N-Bus Overvoltage (Sub CPU1)	BUS overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter BUS voltage sampling is abnormal; 3. Poor isolation effect of the split-phase transformer at the inverter output, causing mutual interference when two inverters are grid-connected, with one inverter reporting DC overvoltage during grid connection;	
F86	Bus Overvoltage (Sub CPU2)		Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F87	P-Bus Overvoltage (Sub CPU2)		

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F88	N-Bus Overvoltage (Sub CPU2)	BUS overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter BUS voltage sampling is abnormal; 3. Poor isolation effect of the split-phase transformer at the inverter output, causing mutual interference when two inverters are grid-connected, with one inverter reporting DC overvoltage during grid connection;	
F89	P-Bus Overvoltage(CPLD)		Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F90	N-Bus Overvoltage(CPLD)	BUS overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter BUS voltage sampling is abnormal; 3. Poor isolation effect of the split-phase transformer at the inverter output, causing mutual interference when two inverters are grid-connected, with one inverter reporting DC overvoltage during grid connection;	
F91	FlyCap Software Overvoltage	FlyCap overvoltage, possible causes: 1. PV voltage is too high; 2. Inverter FlyCap voltage sampling is abnormal;	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F92	FlyCap Hardware Overvoltage		

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F93	FlyCap Undervoltage	FlyCap undervoltage, possible causes: 1. PV energy is insufficient; 2. Inverter FlyCap voltage sampling is abnormal;	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center
F94	FlyCap Precharge Failure	FlyCap precharge failure, possible causes: 1. PV energy is insufficient; 2. Inverter FlyCap voltage sampling is abnormal;	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center
F95	FlyCap Precharge Abnormal	1. Control loop parameters are unreasonable 2. Hardware damage	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F96, F97	String Overcurrent(String1-n) n: Determined based on the actual number of inverter strings	Possible causes: 1. String overcurrent; 2. String current sensor is abnormal	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center
F99, F100	String Missing(String1-n) n: Determined based on the actual number of inverter strings	String fuse is open (if present)	Check if the fuse is open.
F101	Battery 1 Precharge fault	Battery 1 precharge circuit fault (precharge resistor burned out, etc.)	Check if the precharge circuit is in good condition, and whether the battery voltage matches the bus voltage after the battery is powered on. If not, please contact the dealer or after-sales service center.
F102	Battery 1 Relay Failure	Battery 1 relay cannot operate normally	After the battery is powered on, check if the battery relay is working, and if a closing sound is heard. If it does not operate, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F103	Battery 1 Connection Overvoltage	Battery 1 connection voltage exceeds the machine's rated range	Confirm if the battery voltage is within the machine's rated range.
F104	Battery 2 Precharge fault	Battery 2 precharge circuit fault (precharge resistor burned out, etc.)	Check if the precharge circuit is in good condition, and whether the battery voltage matches the bus voltage after the battery is powered on. If not, please contact the dealer or after-sales service center.
F105	Battery 2 Relay Failure	Battery 2 relay cannot operate normally	After the battery is powered on, check if the battery relay is working, and if a closing sound is heard. If it does not operate, please contact the dealer or after-sales service center.
F106	Battery 2 Connection Overvoltage	Battery 2 connection voltage exceeds the machine's rated range	Confirm if the battery voltage is within the machine's rated range.
F107	On-grid PWM Sync Failure	Abnormalities occurred during carrier synchronization grid connection	1. Check if the synchronization cable connection is normal 2. Check if the master/slave settings are normal; 3. Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F108	DSP Communication fault	-	-

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F109	External STS fault	Abnormal cable connection between the inverter and the STS	Check if the wiring sequence of the harness between the inverter and the STS corresponds correctly one by one.
F110	Export Limit Protection	1. Inverter reports error and disconnects from grid 2. meter communication is unstable 3. Reverse power flow condition occurs	1. Check if the inverter has other error messages. If yes, perform targeted troubleshooting; 2. Check if the meter connection is reliable; 3.If this alarm occurs frequently, affecting normal power generation of the power station, please contact the dealer or after-sales service center.
F111	Bypass Overload	-	-
F112	Black Start Failure	-	-
F113	Offgrid AC Ins Volt High	-	-
F114	Relay Failure2	Relay abnormality, causes: 1. Relay abnormality (relay short circuit) 2. Relay sampling circuit is abnormal. 3. AC side wiring is abnormal (there may be poor connection or short circuit)	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F115	SVG Precharge Disabled	SVG precharge hardware failure	Contact the dealer or after-sales service center.
F116	Nighttime SVG PID Prevention fault	PID prevention hardware abnormality	
F117	DSP Version Recognition Error	DSP software version recognition error	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F118	MOS Continuous Overvoltage	1. Software issue causing inverter drive to turn off earlier than flyback drive: 2. Inverter drive circuit abnormal causing failure to turn on: 3. PV voltage is too high; 4. Mos voltage sampling is abnormal;	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F119	Bus Short Circuit fault	Hardware damage	If the inverter remains offline after a BUS short circuit fault occurs, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F120	Bus Sampling Abnormality	1. BUS voltage sampling hardware fault	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F121	DC Side Sampling Abnormality	1. BUS voltage sampling hardware fault 2. Battery voltage sampling hardware fault 3. Dcrly relay fault	Disconnect the AC output side switch and the DC input side switch, wait for 5 minutes, then close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
F122	PV Access Mode Setting Error	There are three PV access modes, taking four MPPT channels as an example: 1. Parallel mode: i.e., AAAA mode (same source mode), PV1-PV4 are from the same source, all 4 PV channels are connected to the same solar panel 2. Partial parallel mode: i.e., AACC mode, PV1 and PV2 are connected from the same source, PV3 and PV4 are connected from the same source 3. Independent mode: i.e., ABCD mode (different sources), PV1, PV2, PV3, PV4 are connected independently, each of the 4 PV channels is connected to one solar panel If the actual PV	Check if the PV access mode is set correctly (ABCD, AACC, AAAA), reset the PV access mode correctly. 1. Confirm that the actual connected PV channels are correctly wired; 2. If the PV is correctly connected, check the currently set "PV Access Mode" via the APP or screen to see if it corresponds to the actual access mode; 3. If the currently set "PV Access Mode" does not match the actual access mode, use the APP or screen to set the "PV Access Mode" to the mode consistent with the actual situation. After setting, disconnect the PV and AC power supply and restart; 4. After setting, if the current "PV Access Mode" matches the actual access mode, but this fault still occurs, please contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Recommendation
		access mode does not match the PV access mode set on the device, this fault will be reported	

8.5.2.1.4 Troubleshooting (Fault Codes F122-F163)

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F123	Multi-channel PV Phase Error	PV Input Mode Setting Error	Check if the PV Access Mode is set correctly (ABCD, AACC, AAAA). Reset the PV Access Mode correctly. 1. Confirm that each actual PV channel is correctly connected. 2. If the PV is correctly connected, check via APP or screen whether the currently set "PV Access Mode" corresponds to the actual connection mode. 3. If the currently set "PV Access Mode" does not match the actual connection mode, use the APP or screen to set the "PV Access Mode" to the mode consistent with the actual situation. After setting, disconnect and restart the PV and AC power supply. 4. After setting, if the current "PV Access Mode" matches the actual connection mode but this fault still occurs, please contact the dealer or after-sales service center.
F124	Battery 1 Reverse Connection fault	Battery 1 Positive and Negative Poles Reversed	Check if the polarities of the Battery and the machine terminals are consistent.
F125	Battery 2 Reverse Connection fault	Battery 2 Positive and Negative Poles Reversed	Check if the polarities of the Battery and the machine terminals are consistent.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F126	Abnormal Battery Connection	Abnormal Battery Connection	Check if the Battery is working normally.
F127	BAT Overtemperature	Battery temperature is too high. Possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F128	Ref Voltage Abnormal	Reference circuit fault	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F129	Cabinet Under Temperature	Cabinet temperature is too low. Possible cause: Ambient temperature is too low.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F130	AC Side SPD fault	AC Side Surge Protective Device Failure	Replace the AC side surge protective device.
F131	DC Side SPD fault	DC Side Surge Protective Device Failure	Replace the DC side surge protective device.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F132	Internal Fan Abnormal	Internal fan abnormal. Possible causes: 1. Abnormal fan power supply. 2. Mechanical fault (stall). 3. Fan aging or damage.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F133	External Fan Abnormal	External fan abnormal. Possible causes: 1. Abnormal fan power supply. 2. Mechanical fault (stall). 3. Fan aging or damage.	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F134	PID Diagnosis Abnormal	PID hardware fault or PID paused due to high PV voltage.	No action required for PID pause warning caused by high PV voltage. For PID hardware fault, clear the PID fault by turning the PID switch off and then on, and replace the PID device.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F135	Trip-Switch Trip Warning	Possible causes: Overcurrent or PV reverse connection caused the trip-switch to trip.	Contact the dealer or after-sales service center. The tripping reason was due to PV short circuit or reverse connection. Check if there is a history of PV short circuit warning or PV reverse connection warning. If present, maintenance personnel need to check the corresponding PV condition. After checking and confirming no fault, you can manually close the trip-switch and clear this warning via the APP interface's clear historical fault operation.
F136	Historical PV IGBT Short Circuit Warning	Possible causes: Overcurrent caused the trip-switch to trip.	Contact the dealer or after-sales service center. Maintenance personnel need to check the Boost hardware and external string for faults according to the historical PV short circuit warning subcode. After checking and confirming no fault, this warning can be cleared via the APP interface's clear historical fault operation.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F137, F138	Historical PV Reverse Connection Warning (String 1-n) (n: determined by the actual number of inverter strings)	Possible causes: PV reverse connection caused the trip-switch to trip.	Contact the dealer or after-sales service center. Maintenance personnel need to check if the corresponding string has a reverse connection according to the historical PV reverse connection warning subcode, and check if there is a voltage difference in the PV panel configuration. After checking and confirming no fault, this warning can be cleared via the APP interface's clear historical fault operation.
F139	Flash Read/Write Error Warning	Possible causes: 1. Flash content changed. 2. Flash end of life reached.	1. Upgrade to the latest firmware. 2. Contact the dealer or after-sales service center.
F140	Meter Comm Loss	This warning may only occur after enabling anti-backflow function. Possible causes: 1. Meter not connected. 2. Incorrect wiring of the communication cable between the meter and the inverter.	Check the meter wiring and connect the meter correctly. After checking, if the fault persists, please contact the dealer or after-sales service center.
F141	PV Panel Type Identification Failure	PV panel identification hardware abnormal	Contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F142	PV String Mismatch	PV string mismatch. Two strings under the same MPPT have different open-circuit voltage configurations.	Check the open-circuit voltage of the two strings. Configure strings with the same open-circuit voltage under the same MPPT. Prolonged string mismatch poses a safety hazard.
F143	CT Not Connected	CT not connected	Check CT wiring.
F144	CT Reverse Connection	CT reverse connection	Check CT wiring.
F145	PE Loss	Ground wire not connected	Check the ground wire.
F146	String Terminal High Temperature (String 1~8)	Register 37176 PV terminal temperature warning subcode 1 is set.	-
F147	String Terminal High Temperature (String 9~16)	Register 37177 PV terminal temperature warning subcode 2 is set.	-
F148	String Terminal High Temperature (String 17~20)	Register 37178 PV terminal temperature warning subcode 3 is set.	-

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F149	Historical PV Reverse Connection Warning (String 33~48)	Possible causes: PV reverse connection caused the trip-switch to trip.	Contact the dealer or after-sales service center. Maintenance personnel need to check if the corresponding string has a reverse connection according to the historical PV reverse connection warning subcode, and check if there is a voltage difference in the PV panel configuration. After checking and confirming no fault, this warning can be cleared via the APP interface's clear historical fault operation.
F150	Battery 1 Low Voltage	Battery voltage is below the set value.	-
F151	Battery 2 Low Voltage	Battery voltage is below the set value.	-
F152	Low Voltage of Battery Power	Battery not in charging mode, voltage below shutdown voltage.	-
F153	Battery 1 High Voltage	-	-
F154	Battery 2 High Voltage	-	-

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F155	Online Low Insulation Resistance	1. Photovoltaic string short circuit to protective earth. 2. The photovoltaic string installation environment is humid for a long time and the line has poor insulation to ground.	1. Check the impedance of the photovoltaic string to the protective earth. If a short circuit is found, please rectify the short circuit point. 2. Check if the inverter's protective earth wire is correctly connected. 3. If it is confirmed that the impedance is indeed below the default value in rainy conditions, please reset the "Insulation Resistance Protection Point".
F156	Micro-grid Overload Warning	backup terminal input current is too high.	Occasional occurrence requires no action. If this warning occurs frequently, please contact the dealer or after-sales service center.
F157	Manual Reset	-	-
F158	Generator Phase Sequence Abnormal	-	-
F159	Multiplexed Port Configuration Abnormal	Multiplexed (generator) port is configured for micro-grid or large load, but a generator is actually connected.	Use the APP to change the multiplexed (generator) port configuration.
F160	EMS Forced Off-grid	EMS issued forced off-grid command, but off-grid function is not enabled.	Enable the off-grid function.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestion
F161	Passive Anti-islanding Protection	-	-
F162	Grid Type Fault	Actual grid type (two-phase or split-phase) does not match the set safety standard.	Switch to the corresponding safety standard according to the actual grid type.
F163	Grid Phase Instability	Grid abnormal: The rate of change of grid voltage phase does not comply with local grid standards.	1. If it occurs occasionally, it may be a temporary grid anomaly. The inverter will resume normal operation after detecting a normal grid, requiring no manual intervention. 2. If it occurs frequently, please check if the grid frequency is within the allowable range. If not, please contact the local power operator.

8.5.2.1.5 Fault Phenomenon Handling

Fault Name	Fault Cause	Troubleshooting Suggestion
Generator Failure	1. This fault will be displayed continuously when the generator is not connected. 2. When the generator is operating, this fault will be triggered if generator safety regulations are not met.	1. If the generator is not connected, ignore this fault; 2. If this fault appears when the generator malfunctions, this is normal. Wait for a period after the generator recovers, and the fault will clear automatically; 3. This fault does not affect the normal operation of off-grid mode. 4. When both the generator and grid are connected and meet safety requirements, the grid has priority for grid connection, and the system will operate in grid-tied mode.
BMS Status Bit Error	BMS module failure	Turn off the AC output side switch and DC input side switch, wait for 5 minutes, then turn on the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
Ambient Overtemperature	1. Poor machine ventilation 2. Hot air flow back to the ambient temperature sampling point	Turn off the AC output side switch and DC input side switch, wait for 5 minutes, then turn on the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestion
PV Terminal Overtemperature	PV terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or the ambient temperature is too high, please improve the ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
BAT Terminal Overtemperature	BAT terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or the ambient temperature is too high, please improve the ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
AC Terminal Overtemperature Warning	AC terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high. 3. Internal fan operation is abnormal.	

Fault Name	Fault Cause	Troubleshooting Suggestion
BAT Terminal Overtemperature Warning	BAT terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or the ambient temperature is too high, please improve the ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
Three-phase on-grid fault	Three-phase external wiring error	Reconnect the wiring.

Fault Name	Fault Cause	Troubleshooting Recommendation
Parallel Comm Timeout Shutdown	In a parallel system, if a slave unit has not communicated with the master for over 400 seconds.	Check if the parallel communication harness is securely connected. Check for duplicate slave addresses.
Three-phase off-grid phase loss fault	Phase loss in a three-phase system group.	1. Check if all inverters are powered on. 2. Check if each phase in the three-phase group is connected to an inverter.
EPO	External triggering of the hardware emergency stop button or remote triggering of the emergency stop command.	1. If triggered intentionally via remote shutdown, it can be ignored. 2. If not triggered intentionally, please contact the distributor or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
One-Touch Shutdown	Check via the App if the one-touch shutdown function is enabled.	Disable the one-touch shutdown.
Offline Shutdown	-	-
Remote Shutdown	-	-
On-Grid SPD Fault	-	-
Off-Grid SPD Fault	-	-
Child Node Communication Failure	Internal communication abnormality.	Restart the unit and observe if the fault clears.
DG Communication Failure	Abnormal communication link between the control board and the diesel generator.	1. Check the communication harness link and observe if the fault clears. 2. Try restarting the unit and observe if the fault clears. 3. If the fault persists after restart, contact the after-sales service center.
Battery Over Voltage	1. Single cell voltage too high. 2. Voltage sensing line abnormality.	Record the fault phenomenon, restart the battery, wait a few minutes, and confirm if the fault disappears. If the problem persists after restart, please contact the after-sales service center.
	1. Battery total voltage too high. 2. Voltage sensing line abnormality.	

Fault Name	Fault Cause	Troubleshooting Recommendation
Battery Undervoltage	1. Single cell voltage too low. 2. Voltage sensing line abnormality.	
	1. Battery total voltage too low. 2. Voltage sensing line abnormality.	
Battery Overcurrent	1. Charging current too high, battery current limiting abnormality: sudden change in temperature and voltage values. 2. Inverter response abnormality.	
	Battery discharge current too high.	
Battery Overtemperature	1. Ambient temperature too high. 2. Temperature sensor abnormality.	
	1. Ambient temperature too high. 2. Temperature sensor abnormality.	

Fault Name	Fault Cause	Troubleshooting Recommendation
Battery Undertemperature	1. Ambient temperature too low. 2. Temperature sensor abnormality.	
	1. Ambient temperature too low. 2. Temperature sensor abnormality.	
Battery Terminal Overtemperature	Terminal temperature too high.	

Fault Name	Fault Cause	Troubleshooting Recommendation
Battery Imbalance	1. Excessive temperature difference. At different stages, the battery will limit its power, i.e., limit charge/discharge current. Therefore, this issue is generally difficult to occur. 2. Cell capacity degradation leads to excessive internal resistance, causing high temperature rise during overcurrent and thus large temperature difference. 3. Poor welding of cell tabs leads to rapid cell temperature rise during overcurrent. 4. Temperature sampling issue. 5. Loose power line connection.	

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Inconsistent cell aging levels. 2. Slave board chip issues can also cause excessive cell voltage difference. 3. Slave board balancing issues can also cause excessive cell voltage difference. 4. Caused by harness issues.	
	1. Inconsistent cell aging levels. 2. Slave board chip issues can also cause excessive cell voltage difference. 3. Slave board balancing issues can also cause excessive cell voltage difference. 4. Caused by harness issues.	
Insulation Resistance	Insulation resistance damaged.	Check if the ground wire is properly connected, restart the battery. If the problem persists after restart, please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
Pre-charging Failure	Pre-charging failure.	Indicates that during the pre-charging process, the voltage across the pre-charge MOS always exceeds the specified threshold. After powering off and restarting, observe if this fault persists. Check if the wiring is correct and if the pre-charge MOS is damaged.
Harness Fault	Battery harness poor contact or disconnection.	Check wiring, restart the battery. If the problem persists after restart, please contact the after-sales service center.
	Cell voltage sensing line poor contact or disconnection.	Check wiring, restart the battery. If the problem persists after restart, please contact the after-sales service center.
	Cell temperature sensing line poor contact or disconnection.	
	Excessive error in dual-channel current comparison, or abnormal current sensing line loop.	
	Excessive error in dual-channel voltage comparison or MCU vs. AFE voltage comparison, or abnormal voltage sensing line loop.	

Fault Name	Fault Cause	Troubleshooting Recommendation
	Temperature sensing line loop abnormal or poor contact/disconnection.	
	Overvoltage level 5 or overtemperature level 5, tripping the three-terminal fuse.	The three-terminal fuse is blown. Contact the after-sales service center to replace the main control board.
Relay or MOS Overtemperature	Relay or MOS overtemperature.	This fault indicates the MOS transistor temperature exceeds the specified threshold. Power off and let it sit for 2 hours for temperature recovery.
Shunt Overtemperature	Shunt overtemperature.	This fault indicates the shunt temperature exceeds the specified threshold. Power off and let it sit for 2 hours for temperature recovery.
BMS1 Other Fault 1 (Residential Storage)	Relay or MOS open circuit.	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If it persists, replace the battery pack.
	Relay or MOS short circuit.	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If it persists, replace the battery pack.
	Communication abnormality between master and slave racks, or cell inconsistency between racks.	1. Check the slave battery information and software version, and if the communication cable connection to the master is normal. 2. Upgrade software.

Fault Name	Fault Cause	Troubleshooting Recommendation
	Battery system loop harness abnormality, causing the interlock signal not to form a loop.	Check if the terminal resistor is installed correctly.
	BMS and PCS communication abnormality.	1. Confirm if the communication cable interface definitions between the inverter and the connected battery are correct. 2. Please contact the after-sales service center to check backend data and observe if the inverter and battery software are correctly matched.
	BMS master control and slave control communication harness abnormality.	1. Check wiring, restart the battery. 2. Upgrade the battery. If the problem persists after restart, please contact the after-sales service center.
	Communication loss between main negative chips.	
	Circuit breaker, shunt trip abnormality.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. Observe the blind-mating connectors at the bottom of PACK and PCU, check if communication pins are loose or bent.
	MCU self-test failure.	Upgrade software, restart the battery. If the problem persists after restart, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Software version too low or BMS board damaged. 2. Large number of inverters in parallel, excessive inrush current during battery pre-charging.	1. Upgrade software, observe if the fault persists. 2. In parallel scenarios, perform a black start of the battery first, then start the inverters.
	MCU internal fault.	Upgrade software, restart the battery. This usually indicates MCU or external component damage. If the problem persists after restart, please contact the after-sales service center.
	Total control current exceeds specified threshold.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. Check if the inverter power setting is too high, exceeding the bus load capacity.
	Inconsistent cells in parallel battery racks.	Confirm if the cells in the parallel battery racks are consistent.
	Reverse polarity connection of parallel battery racks.	Check if the positive and negative terminals of the parallel battery racks are connected reversely.
	Severe overtemperature/overvoltage etc., triggering the fire suppression system.	Contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
Air Conditioner Failure	Air conditioner abnormal failure.	Try restarting the system. If the fault is not resolved, please contact the after-sales service center.
	Cabinet door not closed.	Check if the cabinet door is properly closed.
	Supply voltage too high.	Confirm if the supply voltage value meets the air conditioner input voltage requirements. After confirmation, power on again.
	Insufficient supply voltage.	
	No voltage input.	
	Unstable supply voltage.	
	Compressor voltage unstable.	Try restarting the system. If the fault is not resolved, please contact the after-sales service center.
	Sensor poor contact or damaged.	
	Air conditioner fan abnormal.	
BMS1 Other Fault 2 (Residential Storage)	Internal voltage or current abnormality in DCDC.	Refer to specific DC fault content.
	DCDC overload or heatsink temperature too high, etc.	
	Cell sensing abnormality or inconsistent aging levels.	Please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
	Fan operation not executed normally.	Please contact the after-sales service center.
	Output port screws loose or poor contact.	1. Power off the battery, check wiring and output port screw condition. 2. After confirmation, restart the battery, observe if the fault persists. If it exists, please contact the after-sales service center.
	Battery used for too long or cells severely damaged.	Please contact the after-sales service center to replace the pack.
	1. Software version too low or BMS board damaged. 2. Large number of inverters in parallel, excessive inrush current during battery pre-charging.	1. Upgrade software, observe if the fault persists. 2. In parallel scenarios, perform a black start of the battery first, then start the inverters.
	Heating film damaged.	Please contact the after-sales service center.
	Heating film three-terminal fuse blown, heating function unavailable.	Please contact the after-sales service center.
	Software model, cell type, hardware model mismatch.	Check if the software model, SN, cell type, and hardware model are consistent. If not, please contact the after-sales service center.
	Thermal management board communication line break.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If the fault does not recover, contact after-sales to replace the pack.

Fault Name	Fault Cause	Troubleshooting Recommendation
	Thermal management board communication line break.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If the fault does not recover, contact after-sales to replace the pack.
	Thermal management board communication line break.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If the fault does not recover, contact after-sales to replace the pack.
	Pack fan fault signal triggered.	1. Power off and let it sit for 5 minutes, restart and see if the fault persists. 2. If the fault does not recover, contact after-sales to replace the pack.
DCDC Fault	Output port voltage too high.	Check the output port voltage. If the output port voltage is normal and the fault does not clear by itself after restarting the battery, please contact the after-sales service center.
	DCDC module detects battery voltage exceeding maximum charging voltage.	Stop charging, discharge to below 90% SOC or let it sit for 2 hours. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Heatsink temperature too high.	Let the battery sit for 1 hour for heatsink temperature to drop. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Battery discharge current too high.	Check if the load exceeds the battery's discharge capability. Turn off the load or stop the PCS for 60 seconds. If ineffective and the fault persists after restart, please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
	Output port power harness positive/negative terminals connected reversely to parallel racks or PCS.	Turn off the battery manual switch, check if the output port wiring is correct, restart the battery.
	Output power relay cannot close.	Check if the output port wiring is correct and if there is a short circuit. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Power device temperature too high.	Let the battery sit for 1 hour for internal power device temperature to drop. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Relay welded/stuck.	If the fault persists after restart, please contact the after-sales service center.
Battery Rack Circulating Current Failure	1. Cell imbalance. 2. First power-on without full charge calibration.	Record the fault phenomenon, restart the battery, wait a few minutes, and confirm if the fault disappears. If the problem persists after restart, please contact the after-sales service center.
BMS1 Other Fault 3 (Utility Storage)	Communication abnormality with Linux module.	1. Check if the communication cable link is normal. 2. Upgrade software, restart the battery and observe if the fault persists. If it exists, please contact the after-sales service center.
	Cell temperature rise too fast.	Cell abnormality, contact after-sales to replace the pack.
	SOC below 10%.	Charge the battery.

Fault Name	Fault Cause	Troubleshooting Recommendation
	SN writing does not conform to rules.	Check if the SN digit count is normal. If abnormal, please contact the after-sales service center.
	1. Daisy-chain communication abnormality within a battery rack. 2. Inconsistent cell aging levels between battery racks.	1. Check the pack contact condition within a single rack. 2. Confirm the usage of each rack, such as cumulative charge/discharge capacity, cycle count, etc. 3. Please contact the after-sales service center.
	Excessive humidity inside pack.	-
	Fuse blown.	Contact after-sales to replace the pack.
	Battery low power.	Charge the battery.
BMS1 Other Fault 4 (Utility Storage)	Circuit breaker abnormality.	Contact after-sales to replace the pack.
	External device abnormality.	Contact after-sales to replace the pack.
Contactor Failure 1	-	-
Contactor Failure 2	-	-
Overload Protection (Ksic)	Sustained overload (exceeding 690KVA) for 10s.	Please contact the after-sales service center.
Overload Protection (Smart Port)	Sustained overload (exceeding 690KVA) for 10s.	Please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
Overcurrent Protection (Ksic)	-	-
Overcurrent Protection (Smart Port)	-	-
Master AC On Meter Comm Error	1. Possibly the meter is not connected to the master. 2. Possibly the meter communication cable is loose.	1. Check if the meter is connected to the master. 2. Check if the meter communication cable is loose.
Parallel Slave Meter Error	Meter connected to a slave unit.	Set the unit with the meter as the master.
Slave AC On Timeout with Master	1. Slave address setting error. 2. Slave communication cable loose.	1. Check for duplicate slave addresses. 2. Check if the parallel communication cable is loose.

8.5.2.2 Battery Fault

No.	Fault Name	Fault Cause	Fault Handling Suggestion
1	BMS1 RACK1 Total voltage is too high warning	1. Battery system voltage is too high. 2. Voltage acquisition line is abnormal.	1. Discharge the battery and observe if the fault persists. 2. If the fault does not recover, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
2	BMS1 RACK1 Total voltage is too low warning	1. Battery system voltage is too low. 2. Voltage acquisition line is abnormal.	1. Charge the battery, let it rest, and observe if the fault persists. 2. Check the inverter's working condition to see if it is not charging the battery due to issues like working mode. Try charging the battery via the inverter and observe if the fault recovers. 3. If the fault does not recover, contact the after-sales service center.
3	BMS1 RACK1 Cell voltage is too high warning	1. Single cell voltage is too high. 2. Voltage acquisition line is abnormal.	1. Discharge the battery, let it rest, and observe if the fault persists. 2. If the fault does not recover, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
4	BMS1 RACK1 Cell voltage is too low warning	1. Single cell voltage is too low. 2. Voltage acquisition line is abnormal.	1. Charge the battery, let it rest, and observe if the fault persists. 2. Check the inverter's working condition to see if it is not charging the battery due to issues like working mode. Try charging the battery via the inverter and observe if the fault recovers. 3. If the fault does not recover, contact after-sales.
5	BMS1 RACK1 Charging temperature is too high warning	1. Ambient Overtemperature 2. Temperature sensor is abnormal.	1. Stop charging/discharging, let it rest, and observe if the fault persists. 2. If the fault does not recover, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
6	BMS1 RACK1 Discharging temperature is too high warning	1. Ambient Overtemperature 2. Temperature sensor is abnormal.	1. Stop charging/discharging, let it rest, and observe if the fault persists. 2. If the fault does not recover, contact after-sales.
7	BMS1 RACK1 Charging temperature is too low warning	1. Ambient temperature is too low. 2. Temperature sensor is abnormal.	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
8	BMS1 RACK1 Discharging temperature is too low warning	1. Ambient temperature is too low. 2. Temperature sensor is abnormal.	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.
9	BMS1 RACK1 Charge overcurrent warning	1. Charging current is too high, battery current limiting is abnormal: sudden changes in temperature and voltage values. 2. Inverter response is abnormal.	1. Stop charging, let it rest, and observe if the fault persists. 2. Check if the inverter is set to a power output that exceeds the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
10	BMS1 RACK1 Discharge overcurrent warning	1. Discharging current is too high, battery current limiting is abnormal: sudden changes in temperature and voltage values. 2. Inverter response is abnormal.	1. Stop discharging, let it rest, and observe if the fault persists. 2. Check if the inverter is set to a power output that exceeds the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.
11	BMS1 RACK1 Insulation resistance is too low warning	Insulation resistance is damaged or contact is abnormal.	Check if the ground wire is properly connected, restart the battery. If the problem persists after restarting, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
12	BMS1 RACK1 Cell excessive temperature differentials warning	1. At different stages of excessive temperature differential, the battery will limit the battery power, i.e., limit the charge/discharge current. Therefore, this problem is generally difficult to occur. 2. Cell capacity degradation leads to excessive internal resistance, causing large temperature rise during overcurrent, resulting in large temperature differential. 3. Poor welding of cell tabs leads to rapid cell temperature rise during overcurrent. 4. Temperature sampling issue. 5. Power line connection is loose.	Power off, restart the battery, wait for 2 hours. If the problem is not resolved, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
13	BMS1 RACK1 Post temperature is too high warning	Post temperature is too high.	1. Stop charging/discharging, let it rest, and observe if the fault persists. 2. If the fault does not recover, contact the after-sales service center.
14	BMS1 RACK1 Cell excessive voltage differentials warning	1. Inconsistent cell aging levels. 2. Issues with the slave board chip can also cause excessive cell voltage differential. 3. Slave board balancing issues can also cause excessive cell voltage differential. 4. Caused by wiring harness issues.	1. Stop charging/discharging, let it rest, and observe if the fault persists. 2. If the fault does not recover, contact the after-sales service center.
15	BMS1 RACK1 PCS communication loss warning	Communication between BMS and PCS is abnormal.	Check if the communication cable connection between the battery and the inverter is intact.
16	BMS1 RACK1 DCDC warning	Internal voltage or current abnormality exists in the DCDC.	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
17	BMS1 RACK1 Heat film MOS adhesion warning	Heating film MOS is damaged.	Please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
18	BMS1 RACK1 Heat film MOS open warning	Heating circuit is abnormal.	Please contact the after-sales service center.
19	BMS1 RACK1 Total voltage is too high fault	1. Battery system voltage is too high. 2. Voltage acquisition line is abnormal.	1. Discharge the battery and observe if the fault persists. 2. If the fault does not recover, please contact the after-sales service center.
20	BMS1 RACK1 Total voltage is too low fault	1. Battery system voltage is too low. 2. Voltage acquisition line is abnormal.	1. Charge the battery, let it rest, and observe if the fault persists. 2. Check the inverter's working condition to see if it is not charging the battery due to issues like working mode. Try charging the battery via the inverter and observe if the fault recovers. 3. If the fault does not recover, please contact the after-sales service center.
21	BMS1 RACK1 Cell voltage is too high fault	1. Single cell voltage is too high. 2. Voltage acquisition line is abnormal.	1. Discharge the battery, let it rest, and observe if the fault persists. 2. If the fault does not recover, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
22	BMS1 RACK1 Cell voltage is too low fault	1. Single cell voltage is too low. 2. Voltage acquisition line is abnormal.	1. Charge the battery, let it rest, and observe if the fault persists. 2. Check the inverter's working condition to see if it is not charging the battery due to issues like working mode. Try charging the battery via the inverter and observe if the fault recovers. 3. If the fault does not recover, please contact the after-sales service center.
23	BMS1 RACK1 Charging temperature is too high fault	1. Ambient Overtemperature 2. Temperature sensor is abnormal.	1. Place the battery in a cool place, power it off and let it rest for 30 minutes, then restart and observe if the fault persists. 2. If the fault persists, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
24	BMS1 RACK1 Discharging temperature is too high fault	1. Ambient Overtemperature 2. Temperature sensor is abnormal.	1. Place the battery in a cool place, power it off and let it rest for 30 minutes, then restart and observe if the fault persists. 2. If the fault persists, please contact the after-sales service center.
25	BMS1 RACK1 Charging temperature is too low fault	1. Ambient temperature is too low. 2. Temperature sensor is abnormal.	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
26	BMS1 RACK1 Discharging temperature is too low fault	1. Ambient temperature is too low. 2. Temperature sensor is abnormal.	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is below -20°C, power off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.
27	BMS1 RACK1 Charge overcurrent fault	1. Charging current is too high, battery current limiting is abnormal: sudden changes in temperature and voltage values. 2. Inverter response is abnormal.	1. Power off and let it rest for 5 minutes, restart and observe if the fault persists. 2. Check if the inverter is set to a power output that exceeds the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
28	BMS1 RACK1 Discharge overcurrent fault	1. Discharging current is too high, battery current limiting is abnormal: sudden changes in temperature and voltage values. 2. Inverter response is abnormal.	1. Power off and let it rest for 5 minutes, restart and observe if the fault persists. 2. Check if the inverter is set to a power output that exceeds the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.
29	BMS1 RACK1 Insulation resistance is too low fault	Insulation resistance is damaged or contact is abnormal.	1. Check if the ground wire is properly connected, restart the battery. 2. Upgrade the software. If the problem persists, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
30	BMS1 RACK1 Cell excessive temperature differentials fault	1. At different stages of excessive temperature differential, the battery will limit the battery power, i.e., limit the charge/discharge current. Therefore, this problem is generally difficult to occur. 2. Cell capacity degradation leads to excessive internal resistance, causing large temperature rise during overcurrent, resulting in large temperature differential. 3. Poor welding of cell tabs leads to rapid cell temperature rise during overcurrent. 4. Temperature sampling issue. 5. Power line connection is loose.	Power off, restart the battery, wait for 2 hours. If the problem is not resolved, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
31	BMS1 RACK1 Post temperature is too high fault	Post temperature is too high.	1. Power off and let it rest for 30 minutes, restart and observe if the fault persists. 2. If the fault persists, please contact the after-sales service center.
32	BMS1 RACK1 Cell excessive voltage differentials fault	1. Inconsistent cell aging levels. 2. Issues with the slave board chip can also cause excessive cell voltage differential. 3. Slave board balancing issues can also cause excessive cell voltage differential. 4. Caused by wiring harness issues.	Power off, restart the battery, wait for 2 hours. If the problem is not resolved, contact the after-sales service center.
33	BMS1 RACK1 Relay or MOS short-circuit fault	MOS short-circuit.	1. Upgrade the software, power off and let it rest for 5 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
34	BMS1 RACK1 Relay or MOS open-circuit fault	MOS open-circuit.	1. Upgrade the software, power off and let it rest for 5 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.
35	BMS1 RACK1 The precharge failed fault	The voltage across the precharge MOS always exceeds the specified threshold.	1. Upgrade the software, power off and let it rest for 5 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.
36	BMS1 RACK1 Acquisition line fault	Battery acquisition line has poor contact or is disconnected.	Power off, check the wiring, restack the battery. If the problem persists after restarting, please contact the after-sales service center.
37	BMS1 RACK1 Relay or MOS temperature is too high fault	Relay or MOS overtemperature.	1. Upgrade the software, power off and let it rest for 30 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
38	BMS1 RACK1 Diverter temperature is too high fault	Diverter overtemperature.	1. Upgrade the software, power off and let it rest for 30 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.
39	BMS1 RACK1 Slave MCU communication fault	Communication loss between master and slave chips.	1. Check the wiring, restart the battery. 2. Upgrade the battery. If the problem persists after restarting, please contact the after-sales service center.
40	BMS1 RACK1 BMU communication fault	BMS master and slave control wiring harness is abnormal.	1. Check the wiring, restart the battery. 2. Upgrade the battery. If the problem persists after restarting, please contact the after-sales service center.
41	BMS1 RACK1 Micro-electronics fault	Internal MCU fault.	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
42	BMS1 RACK1 Hardware overcurrent fault	1. Software version is too low or BMS board is damaged. 2. Large number of parallel inverters, causing excessive inrush current during battery precharge.	1. Upgrade the software, observe if the fault persists. 2. In case of parallel operation, start the battery with a black start first, then start the inverter.
43	BMS1 RACK1 Application software fault	MCU self-test failed.	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
44	BMS1 RACK1 Parallel RACK fault	Communication abnormality between the main RACK and slave RACKs, or inconsistency of cells between RACKs.	1. Check the slave battery information and software version, and whether the communication cable connection to the master is normal. 2. Upgrade the software.
45	BMS1 RACK1 DCDC fault	DCDC overload or heat sink temperature is too high, etc.	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
46	BMS1 RACK1 Inconsistent cell fault	1. Cell identification is abnormal. 2. Different types of cells are stacked.	Check the cell type.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
47	BMS1 RACK1 The output port over temperature fault	Output port screws are loose or have poor contact.	1. Power off the battery, check the wiring and the condition of the output port screws. 2. After confirmation, restart the battery, observe if the fault persists. If it exists, contact the after-sales service center.
48	BMS1 RACK1 SOH too low fault	Battery has been used for too long or cells are severely damaged.	Replace the pack.
49	BMS1 RACK1 Heating film MOS Three-terminal fault	Heating film MOS is damaged.	Please contact the after-sales service center.

9 technical parameter

9.1 Inverter Parameters

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Battery Side				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Voltage (V)	750	750	750	750
Voltage Range (V)	700-950	700-950	700-950	700-950
Start-up Voltage (V)	720	720	720	720
Number of Battery Inputs	1	1	1	1
Max. Continuous Charging Current (A)	6.7	8.1	10.7	13.4
Max. Continuous Discharging Current (A)	7.4	8.9	11.8	14.7
Max. Charging Power (kW)	5	6	8	10
Max. Discharging Power (kW)	5.5	6.6	8.8	11
PV Side				

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Max. Input Power (kW)	10	12	16	20
Max. Input Voltage (V)*1	1000	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	185~850	225~850	300~850	250~850
Start-up Voltage (V)	150	150	150	150
Nominal Input Voltage (V)	750	750	750	750
Max. MPPT Current（A）	21/21/21	21/21/21	21/21/21	21/21/21/21
Max. MPPT Short Circuit Current (A)	26/26/26	26/26/26	26/26/26	26/26/26/26
Number of MPPTs	3	3	3	4
Number of Strings per MPPT	1/1/1	1/1/1	1/1/1	1/1/1/1
AC Side (On-Grid)				
Rated Power (kW)	5	6	8	9.999

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Max. Power (kW)	5	6	8	9.999
Rated Apparent Power to Grid (kVA)	5	6	8	9.999
Rated Apparent Power from Grid (kVA)	5	6	8	9.999
Max. Apparent Power to Grid (kVA)	5	6	8	9.999
Max. Apparent Power from Grid (kVA)	43.5	43.5	43.5	43.5
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Rated Current fromGrid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Max. Current to Grid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Max. Current from Grid (A)	63.0	63.0	63.0	63.0
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs	74.6@4μs
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms	25.4@5ms
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	46.7	46.7	46.7	74.6
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Output Apparent Power (kVA)	5	6	8	10
Max. Output Apparent Power (kVA)	Off-grid: 5.5 (10.0, 10s), on-grid: 43.5	Off-grid: 6.6(12, 10s), on-grid: 43.5	Off-grid: 8.8 (16.0, 10s), on-grid: 43.5	Off-grid: 11(20.0, 10s), on-grid: 43.5
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Max. Output Current (A)*3	Off-grid: 11.4, on-grid: 63	Off-grid: 13.7, on-grid:63	Off-grid: 18.2, on-grid: 63	Off-grid: 22.8, on-grid:63
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs	74.6@4μs
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms	25.4@5ms
Maximum Overcurrent Protection (A)	46.7	46.7	46.7	74.6
THDv (@Linear Load)	<3%	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4	<4
Efficiency				
Max. Efficiency	98.00%	98.00%	98.00%	98.10%
European Efficiency	96.40%	96.90%	97.10%	97.20%

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%	98.00%
Protection				
PV String Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional	Optional
AFCI	Optional	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	34	34	34	34
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤35	≤35	≤35	≤40
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C	Battery: C
	PV: C	PV: C	PV: C	PV: C
	AC: C	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A	Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase	three phase
Country of Manufacture	China	China	China	China
Certification				
Grid Standard				

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Safety Regulation	Please refer to the official website			
EMC				

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Battery Side				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Voltage (V)	750	750	750	750
Voltage Range (V)	700-950	700-950	700-950	700-950
Start-up Voltage (V)*1	720	720	720	720
Number of Battery Inputs	1	1	1	1
Max. Continuous Charging Current (A)	13.4	16.1	20.1	26.7
Max. Continuous Discharging Current (A)	14.7	17.7	22.1	29.4
Max. Charging Power (kW)	10	12	15	20
Max. Discharging Power (kW)	11	13.2	16.5	22

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
PV Side				
Max. Input Power (kW)	20	24	30	40
Max. Input Voltage (V)*1	1000	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	250~850	300~850	360~850	400~850
Start-up Voltage (V)	150	150	150	150
Nominal Input Voltage (V)	750	750	750	750
Max. MPPT Current（A）	21/21/21/21	21/21/21/21	21/21/21/21	21/21/21/21
Max. MPPT Short Circuit Current (A)	26/26/26/26	26/26/26/26	26/26/26/26	26/26/26/26
Number of MPPTs	4	4	4	4
Number of Strings per MPPT	1/1/1/1	1/1/1/1	1/1/1/1	1/1/1/1
AC Side (On-Grid)				

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Rated Power (kW)	10	12	15	20
Max. Power (kW)	10	12	15	20
Rated Apparent Power to Grid (kVA)	10	12	15	20
Rated Apparent Power from Grid (kVA)	10	12	15	20
Max. Apparent Power to Grid (kVA)	10	12	15	20
Max. Apparent Power from Grid (kVA)	43.5	43.5	43.5	43.5
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Rated Current fromGrid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Current to Grid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Current from Grid (A)	63.0	63.0	63.0	63.0
Max. Output Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	83.3@4μs	83.3@4μs
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	29.1@5ms	29.1@5ms
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	74.6	74.6	83.3	83.3
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Output Apparent Power (kVA)	10	12	15	20
Max. Output Apparent Power (kVA)	Off-grid: 11(20.0, 10s), on-grid: 43.5	Off-grid: 13.2(24, 10s), on-grid: 43.5	Off-grid: 16.5(30, 10s), on-grid:43.5	Off-grid: 22(30.0, 10s), on-grid:43.5

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Output Current (A)*3	Off-grid: 22.8, on-grid: 63	Off-grid: 27.3, on-grid: 63	Off-grid: 33.4, on-grid: 63	Off-grid: 33.4, on-grid: 63
Max. Output Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	83.3@4μs	83.3@4μs
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	29.1@5ms	29.1@5ms
Maximum Overcurrent Protection (A)	74.6	74.6	83.3	83.3
THDv (@Linear Load)	<3%	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4	<4
Efficiency				
Max. Efficiency	98.10%	98.10%	98.10%	98.10%

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
European Efficiency	97.20%	97.20%	97.30%	97.30%
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%	98.00%
Protection				
PV String Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional	Optional
AFCI	Optional	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	34	34	34	34
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤40	≤40	≤40	≤40
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C	Battery: C
	PV: C	PV: C	PV: C	PV: C
	AC: C	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A	Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase	three phase
Country of Manufacture	China	China	China	China
Certification				
Grid Standard				

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Safety Regulation	Please refer to the official website			
EMC				

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Battery Side			
Battery Type	Li-Ion	Li-Ion	Li-Ion
Nominal Voltage (V)	750	750	750
Voltage Range (V)	700-950	700-950	700-950
Start-up Voltage (V)	720	720	720
Number of Battery Inputs	1	1	1
Max. Continuous Charging Current (A)	33.3	40.0	40.0
Max. Continuous Discharging Current (A)	36.7	44.1	44.1
Max. Charging Power (kW)	25	30	30
Max. Discharging Power (kW)	27.5	33	33
PV Side			
Max. Input Power (kW)	50	60	60

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Max. Input Voltage (V)*1	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	400~850	450~850	450~850
Start-up Voltage (V)	150	150	150
Nominal Input Voltage (V)	750	750	750
Max. MPPT Current（A）	21/21/42/42	21/21/42/42	21/21/42/42
Max. MPPT Short Circuit Current (A)	26/26/52/52	26/26/52/52	26/26/52/52
Number of MPPTs	4	4	4
Number of Strings per MPPT	1/1/2/2	1/1/2/2	1/1/2/2
AC Side (On-Grid)			
Rated Power (kW)	25	29.999	30
Max. Power (kW)	25	29.999	30
Rated Apparent Power to Grid (kVA)	25	29.999	30
Rated Apparent Power from Grid (kVA)	25	29.999	30

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Max. Apparent Power to Grid (kVA)	25	29.999	30
Max. Apparent Power from Grid (kVA)	55.2	55.2	55.2
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Rated Current fromGrid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Current to Grid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Current from Grid (A)	80.0	80.0	80.0
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms	32.3@5ms

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	125	125	125
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Output Apparent Power (kVA)	25	30	30
Max. Output Apparent Power (kVA)	Off-grid: 27.5(45.0, 10s), on-grid:55.2	Off-grid: 33(45.0, 10s), on-grid: 55.2	Off-grid: 33(45.0, 10s), on-grid:55.2
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Output Current (A)*3	Off-grid: 50.0, on-grid: 80	Off-grid: 50.0, on-grid: 80	Off-grid: 50.0, on-grid: 80
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms	32.3@5ms

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Maximum Overcurrent Protection (A)	125	125	125
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4
Efficiency			
Max. Efficiency	98.20%	98.20%	98.20%
European Efficiency	97.40%	97.40%	97.40%
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%
Protection			
PV String Current Monitoring	Integrated	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
AC Overcurrent Protection	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional
AFCI	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	38	38	38
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤45	≤45	≤45
Topology	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	III	III	III

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C
	PV: C	PV: C	PV: C
	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase
Country of Manufacture	China	China	China
Certification			
Grid Standard	Please refer to the official website		
Safety Regulation			
EMC			

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Battery Side				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Nominal Voltage (V)	750	750	750	750
Voltage Range (V)	700-950	700-950	700-950	700-950
Start-up Voltage (V)	720	720	720	720
Number of Battery Inputs	1	1	1	1
Max. Continuous Charging Current (A)	6.7	8.1	10.7	13.4
Max. Continuous Discharging Current (A)	7.4	8.9	11.8	14.7
Max. Charging Power (kW)	5	6	8	10
Max. Discharging Power (kW)	5.5	6.6	8.8	11
AC Side (On-Grid)				
Rated Power (kW)	5	6	8	9.999
Max. Power (kW)	5	6	8	9.999

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Rated Apparent Power to Grid (kVA)	5	6	8	9.999
Rated Apparent Power from Grid (kVA)	5	6	8	9.999
Max. Apparent Power to Grid (kVA)	5	6	8	9.999
Max. Apparent Power from Grid (kVA)	43.5	43.5	43.5	43.5
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Rated Current fromGrid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Max. Current to Grid (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Max. Current from Grid (A)	63.0	63.0	63.0	63.0
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs	74.6@4μs
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms	25.4@5ms
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	46.7	46.7	46.7	74.6
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Output Apparent Power (kVA)	5	6	8	10
Max. Output Apparent Power (kVA)	Off-grid: 5.5 (10.0, 10s), on-grid: 43.5	Off-grid: 6.6(12, 10s), on-grid：43.5	Off-grid: 8.8 (16.0, 10s), on-grid: 43.5	Off-grid: 11(20.0, 10s), on-grid: 43.5
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	7.6 at 380V 7.3 at 400V	9.1 at 380V 8.7 at 400V	12.2 at 380V 11.6 at 400V	15.2 at 380V 14.5 at 400V
Max. Output Current (A)*3	Off-grid: 11.4, on-grid: 63	Off-grid: 13.7, on-grid:63	Off-grid: 18.2, on-grid: 63	Off-grid: 22.8, on-grid:63
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs	74.6@4μs
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms	25.4@5ms
Maximum Overcurrent Protection (A)	46.7	46.7	46.7	74.6
THDv (@Linear Load)	<3%	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4	<4
Efficiency				
Max. Efficiency	98.00%	98.00%	98.00%	98.10%
European Efficiency	96.40%	96.90%	97.10%	97.20%
CEC Efficiency	NA	NA	NA	NA

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%	98.00%
Protection				
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	30	30	30	30
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤35	≤35	≤35	≤35

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Conditional Short-circuit Current (A)	6000	6000	6000	6000
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C	Battery: C
	AC: C	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A	Com: A

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase	three phase
Country of Manufacture	China	China	China	China
Certification				
Grid Standard	Please refer to the official website			
Safety Regulation				
EMC				

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Battery Side				
Battery Type	Li-Ion	Li-Ion	Li-Ion	Li-Ion
Nominal Voltage (V)	750	750	750	750
Voltage Range (V)	700-950	700-950	700-950	700-950
Start-up Voltage (V)	720	720	720	720

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Number of Battery Inputs	1	1	1	1
Max. Continuous Charging Current (A)	13.4	16.1	20.1	26.7
Max. Continuous Discharging Current (A)	14.7	17.7	22.1	29.4
Max. Charging Power (kW)	10	12	15	20
Max. Discharging Power (kW)	11	13.2	16.5	22
AC Side (On-Grid)				
Rated Power (kW)	10	12	15	20
Max. Power (kW)	10	12	15	20
Rated Apparent Power to Grid (kVA)	10	12	15	20
Rated Apparent Power from Grid (kVA)	10	12	15	20

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Max. Apparent Power to Grid (kVA)	10	12	15	20
Max. Apparent Power from Grid (kVA)	43.5	43.5	43.5	43.5
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Rated Current fromGrid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Current to Grid (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Current from Grid (A)	63.0	63.0	63.0	63.0
Max. Output Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	83.3@4μs	83.3@4μs

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	29.1@5ms	29.1@5ms
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	74.6	74.6	83.3	83.3
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Output Apparent Power (kVA)	10	12	15	20
Max. Output Apparent Power (kVA)*6	Off-grid: 11(20.0, 10s), on-grid: 43.5	Off-grid: 13.2(24, 10s), on-grid: 43.5	Off-grid: 16.5(30, 10s), on-grid: 43.5	Off-grid: 22(30.0, 10s), on-grid: 43.5
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Output Current (A)*3	Off-grid: 22.8, on-grid: 63	Off-grid: 27.3, on-grid: 63	Off-grid: 33.4, on-grid: 63	Off-grid: 33.4, on-grid: 63

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Max. Output Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	83.3@4μs	83.3@4μs
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	29.1@5ms	29.1@5ms
Maximum Overcurrent Protection (A)	74.6	74.6	83.3	83.3
THDv (@Linear Load)	<3%	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4	<4
Efficiency				
Max. Efficiency	98.10%	98.10%	98.10%	98.10%
European Efficiency	97.20%	97.20%	97.30%	97.30%
CEC Efficiency	NA	NA	NA	NA
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%	98.00%
MPPT Efficiency	NA	NA	NA	NA
Protection				

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60	-35~+60

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	30	30	30	30
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤35	≤35	≤40	≤40
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Conditional Short-circuit Current (A)	6000	6000	6000	6000
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C	Battery: C
	AC: C	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A	Com: A

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase	three phase
Country of Manufacture	China	China	China	China
Certification				
Grid Standard	Please refer to the official website			
Safety Regulation				
EMC				

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Battery Side			
Battery Type	Li-Ion	Li-Ion	Li-Ion
Nominal Voltage (V)	750	750	750
Voltage Range (V)	700-950	700-950	700-950
Start-up Voltage (V)	720	720	720
Number of Battery Inputs	1	1	1

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Max. Continuous Charging Current (A)	33.3	40.0	40.0
Max. Continuous Discharging Current (A)	36.7	44.1	44.1
Max. Charging Power (kW)	25	30	30
Max. Discharging Power (kW)	27.5	33	33
AC Side (On-Grid)			
Rated Power (kW)	25	29.999	30
Max. Power (kW)	25	29.999	30
Rated Apparent Power to Grid (kVA)	25	29.999	30
Rated Apparent Power from Grid (kVA)	25	29.999	30
Max. Apparent Power to Grid (kVA)	25	29.999	30
Max. Apparent Power from Grid (kVA)	55.2	55.2	55.2
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Nominal Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Rated Current fromGrid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Current to Grid (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Current from Grid (A)	80.0	80.0	80.0
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms	32.3@5ms
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	125	125	125
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Output Apparent Power (kVA)	25	30	30

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Max. Output Apparent Power (kVA)*6	Off-grid: 27.5(45.0, 10s), on-grid: 55.2	Off-grid: 33(45.0, 10s), on-grid: 55.2	Off-grid: 33(45.0, 10s), on-grid: 55.2
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	37.9 at 380V 36.3 at 400V	45.5 at 380V 43.5 at 400V	45.5 at 380V 43.5 at 400V
Max. Output Current (A)*3	Off-grid: 50.0, on-grid: 80	Off-grid: 50.0, on-grid: 80	Off-grid: 50.0, on-grid: 80
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms	32.3@5ms
Maximum Overcurrent Protection (A)	125	125	125
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<4	<4	<4
Efficiency			

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Max. Efficiency	98.20%	98.20%	98.20%
European Efficiency	97.40%	97.40%	97.40%
CEC Efficiency	NA	NA	NA
Max. Battery to AC Efficiency	98.00%	98.00%	98.00%
Protection			
Residual Current Monitoring	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Operating Temperature Range (℃)	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	32	32	32
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤45	≤45	≤45
Topology	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Conditional Short-circuit Current (A)	6000	6000	6000
Ingress Protection Rating	IP66	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	IV	IV	IV
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I
Storage Temperature (℃)	-40~+70	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C	Battery: C	Battery: C
	AC: C	AC: C	AC: C
	Com: A	Com: A	Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase
Country of Manufacture	China	China	China

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Certification			
Grid Standard	Please refer to the official website		
Safety Regulation			
EMC			

*1: When the input voltage ranges from 950V to 1000V, the inverter will enter the standby mode, and the voltage returns to950V to enter the normal operation state.
*2: Please refer to the user manual for the MPPT Voltage Range at nominal Power.
*3: The Max. Output Current in off-grid operation accounts for a three-phase maximum 150% unbalanced capability.
*4: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

9.2 Battery Technical Data

Technical Data	GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
Rated Energy (kWh)	5.12	8.32	5.12	8.32
Usable Energy (kWh)*1	5	8	5	8
Battery Type	LFP ($LiFePO_4$)			
Operating Voltage Range (V) (single phase system)	350~550			
Operating Voltage Range (V) (three phase system)	700~950			
Max. Input Current (System) (A)	12	19	12	19
Max. Output Current (System) (A)	13.2	21	13.2	21

Technical Data	GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
Max. Input Power (System) (kW)*2	5	8	5	8
Max. Output Power (System) (kW)*2	5	8	5	8
Peak.Output Power (System) (kW)*2	7.5 @10s	12 @10s	7.5 @10s	12 @10s
Charging Temperature Range (°C)	-18~55		2~55	
Discharging Temperature Range (°C)	-20~55		-20~55	
Relative Humidity	5-95%			
Max. Operating Altitude (m)	4000			
Noise Emission (dB)	≤29			
Communication	CAN			
Weight (kg)	57.5±1	79±1	57.5±1	79±1
Dimensions (W×H×D mm)	800*326*270			
Optional Function Configuration	heating		/	
Ingress Protection	IP66			
Storage Temperature (℃)	-20 ~55			
Max. Storage time	12 months (-20℃~35℃)			
	6 months (35℃~45℃)			
Scalability	6 pcs			

Technical Data		GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
Mounting Method		Floor stacked / Wall-mounted			
Cycle Life		≥6000 (25±2℃, 0.5C, 90%DOD, 70%EOL)			
Country of Manufacture		China			
Standard and Certification	Safety	IEC62619, IEC60730, EN62477，IEC63056，IEC62040，CE, CEC, VDE2510			
	EMC	CE, RCM			
	Transportation	UN38.3 ADR			

*1: Test conditions, 100% DOD (cell 2.85~3.6V voltage range), 0.2P charge & discharge at 25±2 °C for battery system at the beginning of life. Usable energy is defined by its initial design value. Actual available energy may vary depending on charge/discharge rate, environmental conditions (e.g. temperature), transport and storage factors.
*2: Max. Input Power /Max. Output Power/Peak.Output Power derating will occur related to Temperature and SOC.

9.3 Smart Meter Technical Data

9.3.1 GM330

technical parameter		GM330
Measurement Range	Supported Grid Type	Three-phase, Split-phase, Single-phase
	voltage range L-L (Vac)	172~817
	voltage range L-N (Vac)	100~472
	Nominal Frequency (Hz)	50/60
	CT ratio	nA:5A

technical parameter		GM330
Communication Parameters	Communication Method	RS485
	Communication Distance (m/ft)	1000/3280
Accuracy Parameters	voltage/current	Class 0.5
	Active Energy	Class 0.5
	Reactive Energy	Class 1
General Parameters	Dimensions (WxHxD mm/in)	72x85x72/2.83x3.35×2.83
	Housing	4-module
	Weight (g/lb)	240/0.53
	Mounting Method	DIN Rail
	User Interface	4 LEDs, Reset Button
	Power Consumption (W)	≤5
Environmental Parameters	IP Rating	IP20
	Operating Temperature Range (℃/°F)	-30~+70/-22~+158
	Storage Temperature Range (℃/°F)	-30~70/-22~+158
	Relative Humidity (non-condensing)	0~95%
	Max. Operating Altitude (m/ft)	3000/9842
Certification Parameters	Certificates	UL1741/ANSI

9.3.2 GMK330

model	GMK330
Measurement Range	
Supported Grid Types	1P2W/3P3W/3P4W
Operating voltage (Vac)*	3P4W：90~264 L-N 3P3W：90~264 L-L

model	GMK330
Frequency (Hz)	50/60
CT ratio	120A: 40mA 200A: 50mA*
Number of CTs	3
Accuracy Parameters	
voltage/current	Class 0.5
Active Energy	Class 0.5
Reactive Energy	Class 1
Communication Parameters	
Communication Method	RS485
Communication Distance (m)	1000
General Parameters	
Dimensions (W*H*D mm)	72*85*72
Housing	4-module
Weight (g)	240
Mounting Method	DIN Rail
User Interface	4 LEDs, Reset Button
Power Consumption (W)	< 5
Environmental Parameters	
IP Rating	IP20
Operating Temperature Range (℃)	-30-+70

model	GMK330
Storage Temperature Range (℃)	-30-+70
Relative Humidity (non-condensing)	0-95%
Max. Operating Altitude (m)	3000

*Supports 1.1 times rated voltage connection.
*The standard CT for the meter has been uniformly changed to the 120A:40mA specification. Meters equipped with CTs of the 200A:50mA specification will no longer be sold after June 2026.

9.4 Smart Dongle Technical Data

9.4.1 WiFi/LAN Kit-20

technical parameter		WiFi/LAN Kit-20
Output Voltage (V)		5
Power Consumption (W)		≤2
Communication Interface		USB
Communication Parameters	Ethernet	10M/100Mbps Auto-negotiation
	Wireless	IEEE 802.11 b/g/n @2.4 GHz
	Bluetooth	Bluetooth V4.2 BR/EDR and Bluetooth LE Standard
Mechanical Parameters	Dimensions (W×H×D mm)	48.3*159.5*32.1
	Weight (g)	82
	Ingress Protection Rating	IP65
	Mounting Method	USB Port Plug and Play
Operating Temperature Range (℃)		-30~+60
Storage Temperature Range (℃)		-40~+70
Relative Humidity		0-95%
Max. Operating Altitude (m)		4000

10 Appendix

10.1 FAQ

10.1.1 How to conduct auxiliary detection for smart meters/CT?

The meter detection function can detect whether the meter CT is connected correctly and the current operating status of the meter and CT.

1. Navigate to the detection page via **[Home]** > **[Settings]** > **[Meter/CT Auxiliary Detection]**.
2. Click Start Detection, wait for the detection to complete, and then view the detection results.

10.1.2 How to Upgrade the Device Version

Through firmware information, you can view or upgrade:
The inverter's DSP version, ARM version, communication module software version, battery's BMS version, DCDC version, etc.

- **Prompt Upgrade:**

When the user opens the App, an upgrade prompt pops up on the home page. The user can choose whether to upgrade. If they choose to upgrade, they can complete the upgrade by following the on-screen instructions.

- **Regular Upgrade:**

Go to **[Home]** > **[Settings]** > **[Firmware Information]** to enter the firmware information viewing interface.
Click "Check for Updates". If a new version is available, complete the upgrade by following the on-screen instructions.

- **Forced Upgrade:**

The App pushes upgrade information. The user must upgrade according to the prompts; otherwise, the App cannot be used. Complete the upgrade by following the

on-screen instructions.

Inverter Software Version Upgrade

- The inverter supports software upgrade via a USB drive.
- Before using a USB drive to upgrade the device, please contact the after-sales service center to obtain the software upgrade package and upgrade method.

10.2 Abbreviations

Abbreviation	English Description	Chinese Description
Ubatt	Battery Voltage Range	Battery voltage range
Ubatt,r	Nominal Battery Voltage	Nominal battery voltage
Ibatt,max (C/D)	Max. Charging Current Max. Discharging Current	Max. charging/discharging current
EC,R	Rated Energy	Rated energy
UDCmax	Max.Input Voltage	Max. Input Voltage
UMPP	MPPT Operating Voltage Range	MPPT voltage range
IDC,max	Max. Input Current per MPPT	Max. input current per MPPT string
ISC PV	Max. Short Circuit Current per MPPT	Max. short-circuit current per MPPT string
PAC,r	Nominal Output Power	Nominal output power
Sr (to grid)	Nominal Apparent Power Output to Utility Grid	Nominal Apparent Power Output to Utility Grid
Smax (to grid)	Max. Apparent Power Output to Utility Grid	Max. Apparent Power Output to Utility Grid
Sr (from grid)	Nominal Apparent Power from Utility Grid	Nominal apparent power purchased from utility grid
Smax (from grid)	Max. Apparent Power from Utility Grid	Max. apparent power purchased from utility grid
UAC,r	Nominal Output Voltage	Nominal output voltage
fAC,r	Nominal AC Grid Frequency	Nominal AC Grid Frequency
IAC,max(to grid)	Max. AC Current Output to Utility Grid	Max. AC Current Output to Utility Grid
IAC,max(from grid)	Max. AC Current From Utility Grid	Max. Current from Grid

Abbreviation	English Description	Chinese Description
P.F.	Power Factor	Power Factor
Sr	Back-up Nominal apparent power	Off-grid nominal apparent power
Smax	Max. Output Apparent Power (VA) Max. Output Apparent Power without Grid	Max. Apparent Power to Grid
IAC,max	Max. Output Current	Max. Current to Grid
UAC,r	Nominal Output Voltage	Max. output voltage
fAC,r	Nominal Output Freqency	Nominal output voltage frequency
Toperating	Operating Temperature Range	Operating Temperature Range
IDC,max	Max. Input Current	Max. input current
UDC	Input Voltage	Input voltage
UDC,r	DC Power Supply	DC input
UAC	Power Supply/AC Power Supply	Input voltage range/AC input
UAC,r	Power Supply/Input Voltage Range	Input voltage range/AC input
Toperating	Operating Temperature Range	Operating Temperature Range
Pmax	Max Output Power	Maximum Power
PRF	TX Power	Transmit power
PD	Power Consumption	Power consumption
PAC,r	Power Consumption	Power consumption
F (Hz)	Frequency	Frequency
ISC PV	Max. Input Short Circuit Current	Max. input short-circuit current
Udcmin-Udcmax	Range of input Operating Voltage	Operating Voltage range
UAC,rang(L-N)	Power Supply Input Voltage	Adapter input voltage range
Usys,max	Max System Voltage	Max. system voltage
Haltitude,max	Max. Operating Altitude	Max. operating altitude
PF	Power Factor	Power Factor
THDi	Total Harmonic Distortion of Current	Current harmonic distortion

Abbreviation	English Description	Chinese Description
THDv	Total Harmonic Distortion of Voltage	Voltage harmonic distortion
C&I	Commercial & Industrial	Commercial & Industrial
SEMS	Smart Energy Management System	Smart Energy Management System
MPPT	Maximum Power Point Tracking	Maximum power point tracking
PID	Potential-Induced Degradation	Potential-induced degradation
Voc	Open-Circuit Voltage	open-circuit voltage
Anti PID	Anti-PID	Anti-PID
PID Recovery	PID Recovery	PID Recovery
PLC	Power-line Commucation	Power-line carrier communication
Modbus TCP/IP	Modbus Transmission Control / Internet Protocol	Modbus over TCP/IP
Modbus RTU	Modbus Remote Terminal Unit	Modbus over serial link
SCR	Short-Circuit Ratio	Short-circuit ratio
UPS	Uninterruptable Power Supply	Uninterruptible power supply
ECO mode	Economical Mode	Economic Mode
TOU	Time of Use	Time of use
ESS	Energy Stroage System	energy storage system
PCS	Power Conversion System	Power conversion system
RSD	Rapid shutdown	Rapid Shutdown
EPO	Emergency Power Off	Emergency Poweroff
SPD	Surge Protection Device	Lightning protection
ARC	zero injection/zero export Power Limit / Export Power Limit	Power Limit
DRED	Demand Response Enabling Device	Demand response enabling device
RCR	Ripple Control Receiver	-
AFCI	AFCI	AFCI DC arc-fault protection
GFCI	Ground Fault Circuit Interrupter	GFCI

Abbreviation	English Description	Chinese Description
RCMU	Residual Current Monitioring Unit	Residual current monitoring unit
FRT	Fault Ride Through	Fault ride-through
HVRT	High Voltage Ride Through	High voltage ride-through
LVRT	Low Voltage Ride Through	Low voltage ride-through
EMS	Energy Management System	Energy management system
BMS	Battery Management System	Battery management system
BMU	Battery Measure Unit	Battery measurement unit
BCU	Battery Control Unit	Battery control unit
SOC	State of Charge	State of charge
SOH	State of Health	State of health
SOE	State Of Energy	State of energy
SOP	State Of Power	State of power
SOF	State Of Function	State of function
SOS	State Of Safety	State of safety
DOD	Depth of discharge	depth of discharge

10.3 Explanation of Terms

- **Definition of Overvoltage Categories**
  - **Overvoltage Category I**: Equipment connected to circuits where measures are taken to limit transient overvoltages to a suitably low level.
  - **Overvoltage Category II**: Energy-consuming equipment supplied from a fixed electrical installation. This category includes appliances, portable tools, and other household and similar loads. If special requirements for reliability and suitability of such equipment exist, Overvoltage Category III applies.
  - **Overvoltage Category III**: Equipment in fixed electrical installations where special requirements for reliability and suitability must be met. This includes switching devices in fixed installations and industrial equipment permanently connected to fixed electrical installations.
  - **Overvoltage Category IV**: Equipment used at the origin of the electrical installation. This includes meters and primary overcurrent protection devices, etc.
- **Definition of Damp Location Categories**

Environmental Parameters	Level		
	3K3	4K2	4K4H
Temperature Range	0~+40℃	-33~+40℃	-33~+40℃
Humidity Range	5% to 85%	15% to 100%	4% to 100%

- **Definition of Environmental Categories:**
  - **Outdoor Inverter**: Ambient air temperature range from -25°C to +60°C, suitable for Pollution Degree 3 environments.
  - **Indoor Type II Inverter**: Ambient air temperature range from -25°C to +40°C, suitable for Pollution Degree 3 environments.
  - **Indoor Type I Inverter**: Ambient air temperature range from 0°C to +40°C, suitable for Pollution Degree 2 environments.
- **Definition of Pollution Degree Categories**
  - **Pollution Degree 1**: No pollution or only dry, non-conductive pollution.
  - **Pollution Degree 2**: Normally only non-conductive pollution occurs. Temporary conductivity caused by condensation must be expected occasionally.
  - **Pollution Degree 3**: Conductive pollution occurs, or dry non-conductive pollution becomes conductive due to condensation.
  - **Pollution Degree 4**: Persistent conductive pollution occurs, for example, due to conductive dust, rain, or snow.

10.4 Battery SN Code Meaning

The 11th to 14th digits of the product SN code represent the production time code. The production date in the above image is 2023-08-08

- The 11th and 12th digits are the last two digits of the production year, e.g., 2023 is represented as 23;

- The 13th digit is the production month, e.g., August is represented as 8; Details are as follows:

Month	Jan-Sep	Oct	Nov	Dec
Month Code	1~9	A	B	C

- The 14th digit is the production date, e.g., the 8th day is represented as 8; Numbers are preferred for representation, e.g., 1~9 represent the 1st to 9th days, A represents the 10th day, and so on. Among them, the letters I and O are not used to avoid confusion. Details are as follows:

Production Day	1	2	3	4	5	6	7	8	9
Code	1	2	3	4	5	6	7	8	9

Production Date	10	11	12	13	14	15	16	17	18
Code	A	B	C	D	E	F	G	H	J

Production Date	21	22	23	24	25	26	27	28	29
Code	M	N	P	Q	R	S	T	U	V

11 Contact Information

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