

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

GW6.0-BAT-D-G20

GW9.0-BAT-D-G20

Solutions Manual

GOODWE

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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 mainly introduces the product information, installation and wiring, configuration and commissioning, troubleshooting, and maintenance content in the energy storage system composed of inverters, Battery system, and smart meters. Before installing and using the product, carefully read this manual to understand the product safety information and familiarize yourself with the product's functions and features. The document may be updated irregularly; 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
	GW6.0-BAT-D-G20	Rated energy 6kWh

Product Type	Product Information	Description
	GW9.0-BAT-D-G20	Rated energy 9kWh
Meter	GMK330 GM330	Monitoring module in the energy storage system, capable of detecting operational parameters such as system voltage and current.
smart dongle	WiFi/LAN Kit-20	Uploads system operational information to the monitoring platform via WiFi or LAN signal.

Symbol Definition

 DANGER
Indicates a highly potential hazard that, if not avoided, will result in death or serious injury.
 WARNING
Indicates a moderately potential hazard that, if not avoided, could result in death or serious injury.
 CAUTION
Indicates a low-level potential hazard that, if not avoided, could result in moderate or minor injury.
NOTICE
Emphasis and supplementation of content, may also provide tips or tricks for optimal product use, which can help you solve a problem or save your time.

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1 Safety Precautions

Please always adhere to the safety precaution information contained in this document when operating the equipment.

WARNING

The device has been strictly designed and tested in accordance with safety regulations, but as an electrical device, relevant safety instructions must be followed before any operation. 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 is updated periodically. Unless otherwise agreed, the document content cannot replace the safety precautions on the product label. All descriptions in the document are for guidance only.
- Please read this document carefully before installing the equipment to understand the product and its precautions.
- All operations on the equipment 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 equipment, use insulated tools and wear personal protective equipment to ensure personal safety. Contact with electronic components requires wearing ESD gloves, ESD wrist straps, anti-static clothing, etc., to protect the equipment from electrostatic damage.
- Unauthorized disassembly or modification may cause equipment damage, and such damage is not covered by the warranty.
- Equipment damage or personal injury caused by installation, use, or configuration of the equipment not in accordance with 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, all work must be performed by professionals or qualified personnel.

1. Professionals or qualified personnel include:

- Personnel who have mastered knowledge of equipment working principles, system architecture, 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, can recognize potential dangers specific tasks may pose to themselves, and can take protective measures to minimize risks to themselves and others.
- Qualified electrical technicians who meet the regulatory requirements of the country/region where the work is performed.
- Personnel holding a degree in electrical engineering/an advanced diploma in electrical discipline or equivalent/professional qualifications in the electrical field, and possessing 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 height, or special equipment operation must hold valid qualification certificates required by the location where the equipment is installed.

3. Operation of medium-voltage equipment must be performed by certified high-voltage electricians.

4. Replacement of equipment and components is only permitted to be carried out by authorized personnel.

1.3 System Safety



- Before making any electrical connections, disconnect all upstream switches of the equipment to ensure it is powered off. Operating 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 live operation, a circuit breaker must be installed on the voltage input side of the equipment.
- 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 equipment cables. Damage caused by using other models of connectors is not within the manufacturer's responsibility.
- Ensure all equipment cable connections are correct, secure, and not loose. 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 transport personnel are professionally trained. Record the operational 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.
- Ensure the equipment is placed stably and not tilted. Toppling may cause equipment damage and personal injury.



- Avoid putting weight on the terminals during equipment installation, as this may cause terminal damage.
- If the cable is subjected to excessive tension, it may lead to poor connections. Leave a certain length of slack in the cable before connecting it to the equipment's terminal port.
- Cables of the same type should be bundled together. Different types of cables should be routed at least 30mm apart and must not be entangled or cross-routed.
- Using cables in high-temperature environments may cause insulation aging or 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 completing DC cable connections, ensure all connections are tight and secure with no looseness. Improper wiring may lead to poor contact or high impedance, potentially damaging the inverter.
- Use a multimeter to measure the DC cable positive and negative poles to ensure correct polarity (no reverse connection) and that the voltage is within the permissible range.
- Use a multimeter to measure the DC cable to ensure correct polarity (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.
- 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 ($R = \text{Max. Input Voltage (V)} / 30\text{mA}$).
- Do not connect the same PV string to multiple inverters, as this may cause inverter damage.
- The photovoltaic modules used with the inverter must comply with IEC 61730 Class A standard.
- 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 that the voltage and frequency at the grid connection point comply with the inverter's grid connection specifications.
- It is recommended to add protective devices such as circuit breakers or fuses on the AC side of the inverter. The specification of the protective device should 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 automatically cleared. 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 no battery is configured in the photovoltaic system, it is not recommended to use the BACK-UP function, as it may cause a system power outage risk.
- Changes in grid voltage and frequency may cause the inverter output power to derate.

1.3.3 Battery Safety

DANGER

- Before operating any equipment in the system, ensure the equipment is powered off to avoid the risk of electric shock. Strictly adhere to all safety precautions in this manual and the safety labels on the equipment during operation.
- Do not disassemble, modify, or repair the battery without official authorization from the manufacturer, as this may pose an electric shock hazard or cause equipment damage. Losses resulting from such actions are beyond the manufacturer's liability.
- Do not impact, pull, drag, squeeze, or step on the equipment, and do not place the battery in fire, as this may cause the battery to explode.
- Do not place the battery in high-temperature environments. Ensure there are no heat sources near the battery and avoid direct sunlight. Fire may occur if the ambient temperature exceeds 60°C.
- Do not use the battery if it shows obvious defects, cracks, damage, or other abnormalities. Battery damage may lead to electrolyte leakage.
- Do not move the battery system while it is operating. If battery replacement or addition is required, 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, potentially leading to fire.
- To protect the battery pack and its components from damage during transportation, ensure transport personnel are professionally trained. Record operational steps during transport and keep the equipment balanced to prevent falls.
- The battery equipment is heavy. Ensure an appropriate number of personnel is assigned according to the equipment's weight to avoid exceeding human lifting capacity and causing injury from dropping.



- Battery current may be affected by factors such as temperature, Humidity, weather conditions, etc., which may lead to current limiting and affect load capacity.
- If the battery fails to start, contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Perform regular inspection and maintenance on the battery according to its maintenance requirements.
- Ensure the battery system is not damaged during transportation and storage. Keep the equipment stable and avoid tilting, as tipping may cause equipment damage and personal injury.

Emergency Response Measures

- Battery electrolyte leakage

If a battery module leaks electrolyte, avoid contact with the leaked liquid or gas. Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If you accidentally come into contact with the leaked substance, please do the following:

- 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. The battery may release toxic and harmful gases after catching fire.
- To prevent fire, ensure that carbon dioxide or water fire extinguishing devices are available near the equipment.
- 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 the optional fire protection function, after the fire protection function is triggered, perform the following operations:

- Immediately cut off the main power switch to ensure no current passes 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 temperature of the battery and its surroundings 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 damage 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 the equipment is installed, the labels and warning signs on the enclosure must remain clearly visible; covering, altering, or damaging them is prohibited.
- The enclosure warning label descriptions below are for reference only. Please refer to the actual labels used on the equipment.

No.	Symbol	Meaning
1		Potential hazard exists during equipment operation. Take protective measures when operating the equipment.
2		High voltage hazard. High voltage is present during equipment operation. 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 vapors.
7		Delayed discharge. After powering off the equipment, wait for 5 minutes until it is completely discharged.
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		Read the product manual carefully before operating the equipment.
12		Wear personal protective equipment during installation, operation, and maintenance.
13		Do not dispose of the equipment as household waste. Dispose of it according to local regulations or return it to the manufacturer.

No.	Symbol	Meaning
14		Grounding point.
15		Recycling symbol.
16		CE marking.
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 functions that can be sold in the European market must meet 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 that can be sold in the European market meet the following directive requirements:

- 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)

More EU declarations of conformity can be obtained from the [official website](#).

2 System Introduction

2.1 System Overview

The integrated home energy storage solution combines devices such as inverters, Battery, Smart Meter, and smart communication sticks. In a photovoltaic system, it converts solar energy into electricity to meet household power demands. The IoT energy devices in the system manage electrical appliances by identifying the overall power status within the system, thereby enabling intelligent management of electricity 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 a stable power supply, such as life-sustaining medical equipment. Please ensure that a system power failure will not cause personal injury.
- If the all-in-one residential storage system is in a high-temperature environment or under BMS current limiting, the battery charging power may be restricted, which could lead to excessively high system voltage triggering overvoltage protection.
- In microgrid scenarios, it is recommended that the PV open-circuit voltage of the all-in-one residential storage system be $< 0.85 * \text{PV maximum input voltage}$ to prevent excessively high system voltage from triggering overvoltage protection under harsh operating conditions.
- In microgrid scenarios, please ensure the over-frequency power reduction point of the grid-tied inverter matches that of the all-in-one residential storage system.
- If output power limitation is required for the grid-tied inverter, please connect metering or CT devices separately.
- Please ensure the over-frequency power reduction curve of the grid-tied inverter is set as follows:
 - Set the endpoint power to 0% P_n
 - Set the response delay time to 0, and disable the hysteresis function
- In a system where the inverter operates completely off-grid, if the battery experiences prolonged periods of low sunlight or rainy weather and cannot be replenished in time, it may lead to over-discharge, causing battery performance degradation or damage. To ensure long-term stable system operation, avoid

 WARNING

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 limiting or protection mode.
- If there are consecutive days of insufficient sunlight 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.
- Please connect the inverter to the APP and set the relevant battery parameters.
- Due to product version upgrades or other reasons, document content is updated periodically. For the compatibility 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 solutions for various scenarios, please refer to: [5.2.Detailed System Wiring Diagram\(Page 85\)](#).

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

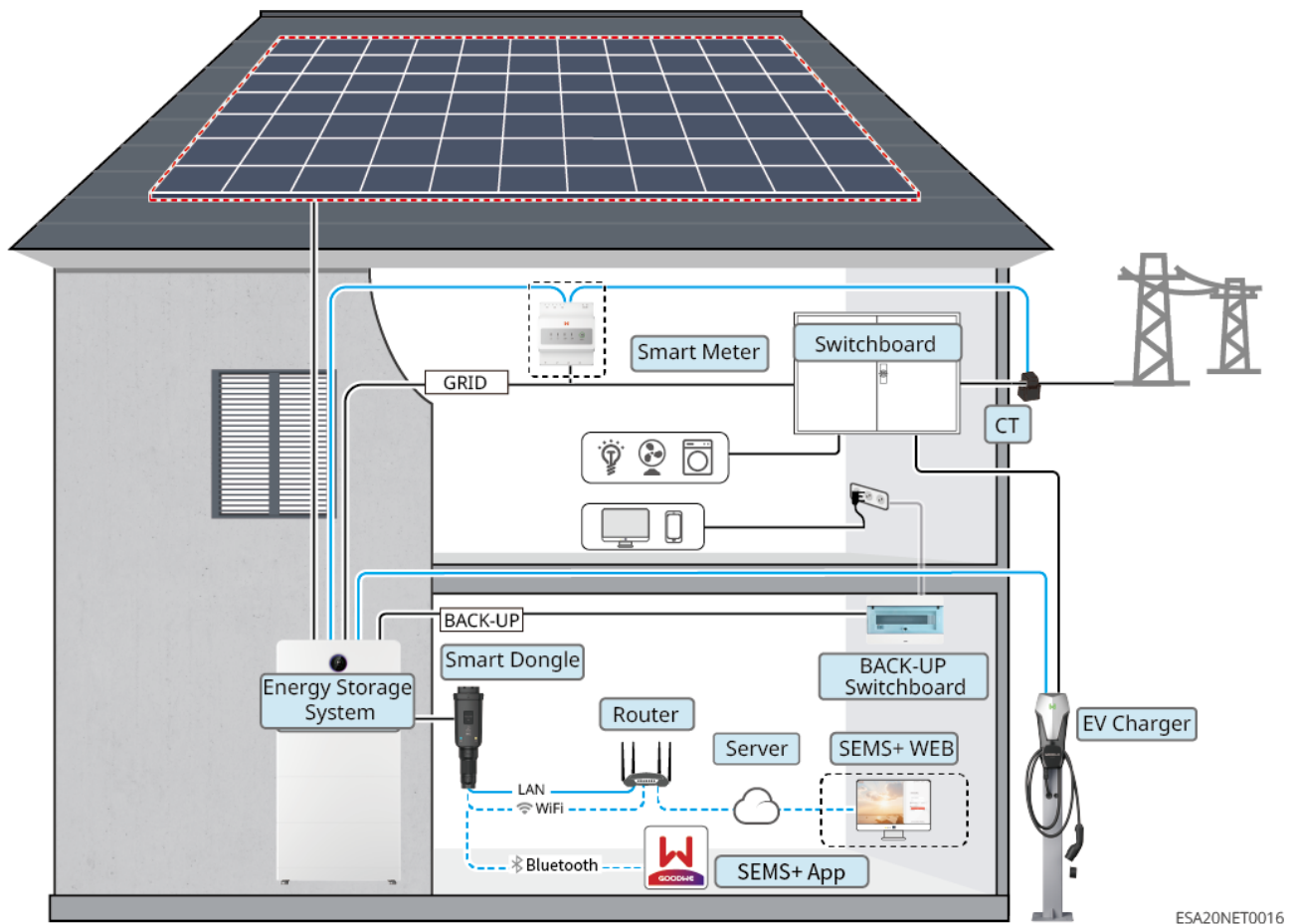
BACK-UP Port Off-Grid Load Capacity Specifications				
Inverter Model	GW5K-ETA-G20 GW6K-ETA-G20 GW8K-ETA-G20 GW9.999K-ETA-G20 GW10K-ETA-G20 GW12K-ETA-G20 GW15K-ETA-G20 GW20K-ETA-G20 GW5K-BTA-G20 GW6K-BTA-G20 GW8K-BTA-G20 GW9.999K-BTA-G20 GW10K-BTA-G20 GW12K-BTA-G20 GW15K-BTA-G20 GW20K-BTA-G20		GW25K-ETA-G20 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
Multiple Motor Loads Total Rated Power (kVA)	$0.4 \cdot P_n / 3$	$0.4 \cdot P_n$	$0.4 \cdot P_n / 3$	$0.4 \cdot P_n$
Capacitive Load (kVA)	$0.33 \cdot P_n / 3$	$0.33 \cdot P_n$	$0.33 \cdot P_n / 3$	$0.33 \cdot P_n$
Half-Wave Load (kW)	2	-	3	-

BACK-UP Port Off-Grid Load Capacity Specifications

Note:

- P_n : Inverter rated output power.
- Half-Wave Load: Some older or non-EMC compliant appliances (such as 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 equals the rated power of a single motor load.

General Scenario

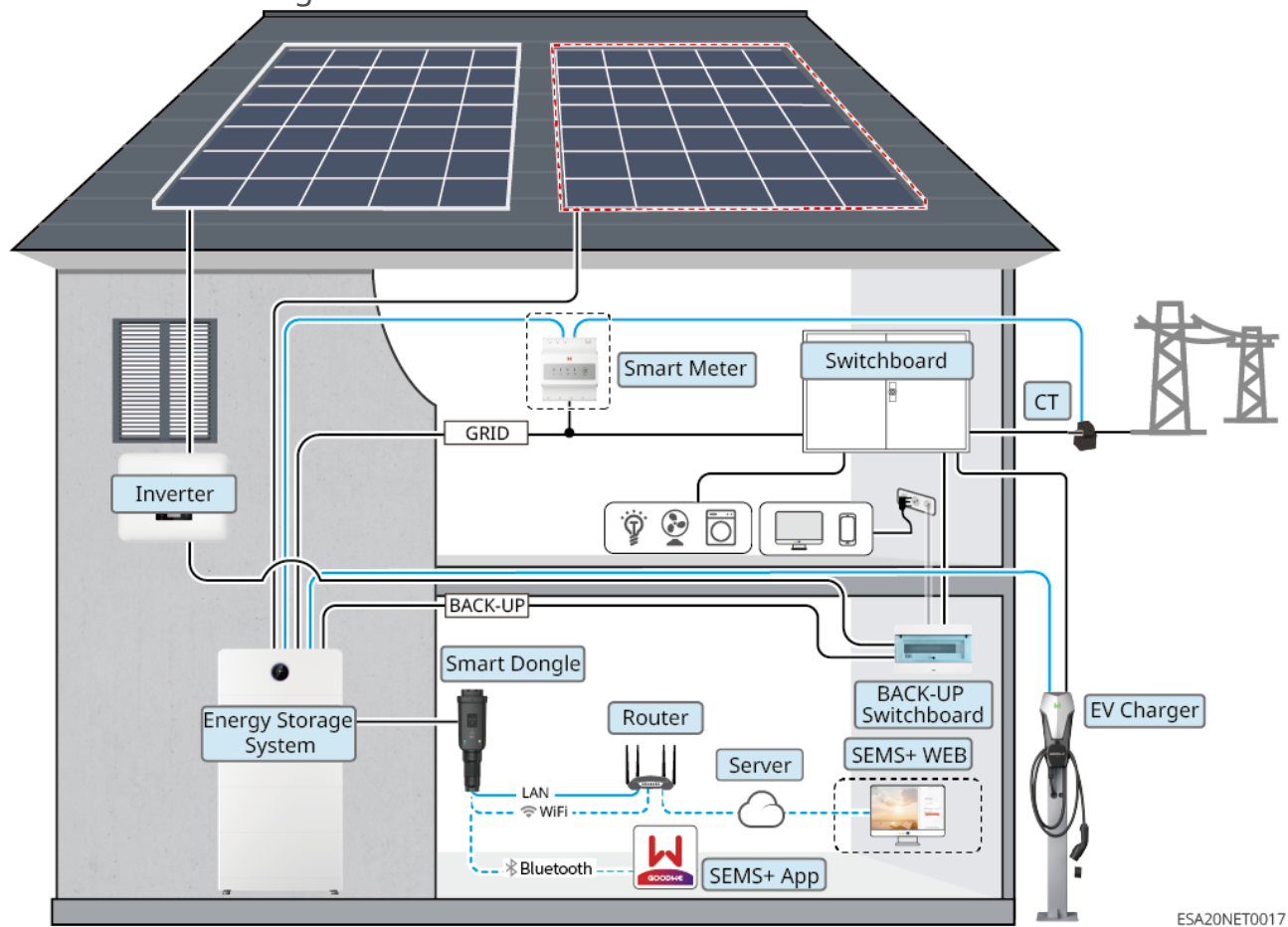


Device type	model	Description
hybrid inverter	GW5K-ETA-G20	• Can connect to GoodWe AC charging pile. • Supports generator control, generator charging the battery. If you need to connect a generator, please use GMK330 or GM330 Smart Meter.
	GW6K-ETA-G20	
	GW8K-ETA-G20	
	GW9.999K-ETA-G20	
	GW10K-ETA-G20	
	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	

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 GW6.0-BAT-D-G20 GW9.0-BAT-D-G20	• Different models of battery modules support mixed use. • The system supports 5-96kWh, meeting different power and energy matching requirements. • When GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 are mixed with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating environment temperature requirement is based on GW5.1-BAT-D-G21 and GW8.3-BAT-D-G21. • 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 usage, you can contact dealers to purchase GMK330 or GM330 Smart Meter. • GMK330: CT does not support replacement, CT ratio is 120A:40mA • GM330: CT can be purchased from GoodWe or self-purchased, CT ratio is nA:5A.
	GMK330 (purchased from GoodWe)	
	GM330 (purchased from GoodWe)	
Smart dongle	WiFi/LAN Kit-20	• Through Bluetooth signal to achieve near-end configuration of device parameters, view device operation information, and through WiFi or LAN upload system operation information to the monitoring platform. • Please ensure that the firmware version of the Smart dongle is 06 or above.

Microgrid Scenario

When the 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 microgrid scenarios, only one hybrid inverter is supported in the system. • In microgrid scenarios, connecting a generator is not supported.

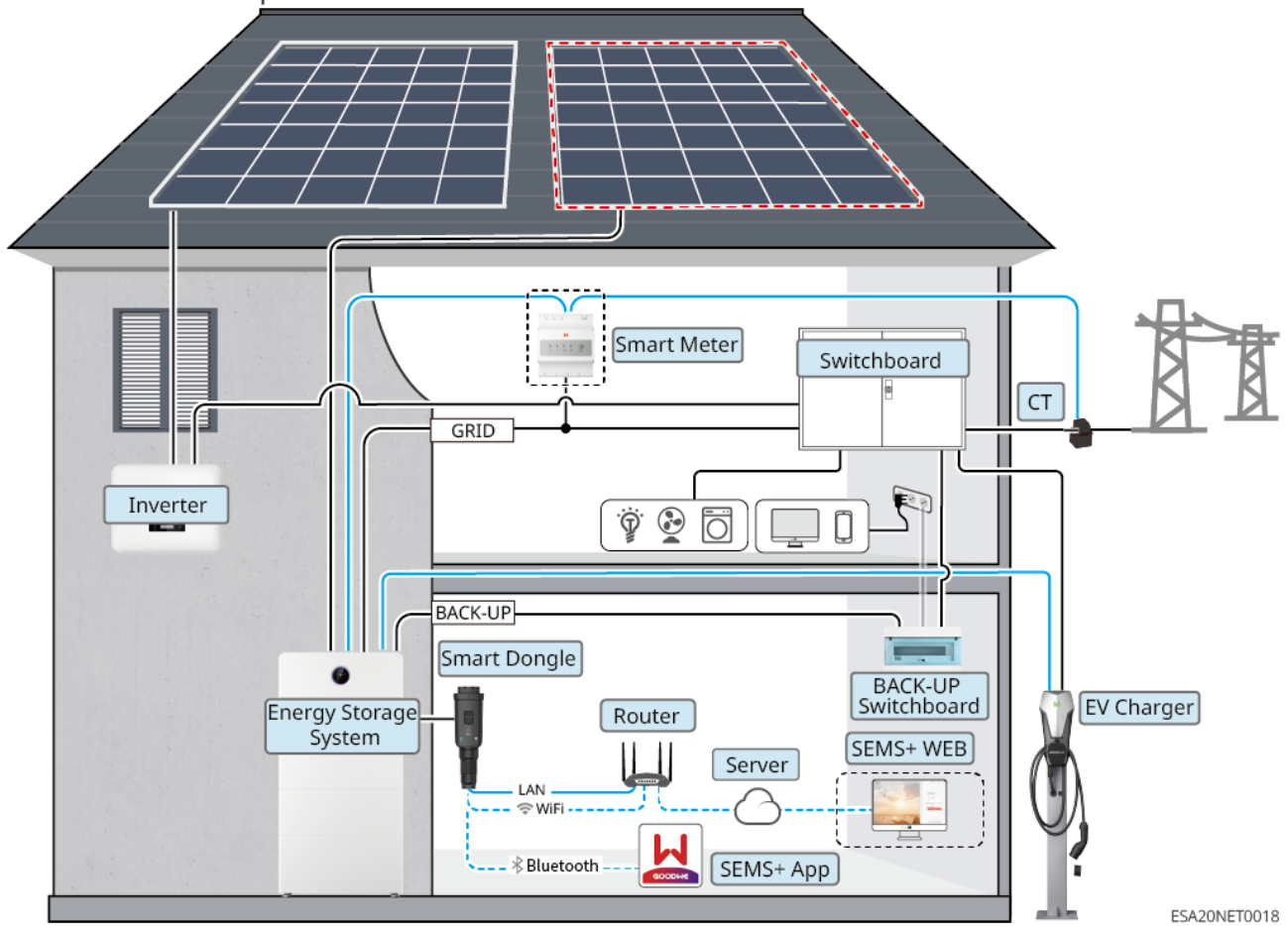
Device Type	model	Description
Battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21 GW8.3-BAT-D-G20 GW8.3-BAT-D-G21 GW6.0-BAT-D-G20 GW9.0-BAT-D-G20	- Battery modules of different models can be mixed. - The system supports 5-96kWh, meeting different power and energy matching requirements. - When mixing GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating environment temperature requirements are based on GW5.1-BAT-D-G21, GW8.3-BAT-D-G21. - If the system requires split expansion, 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 requirements, you can contact dealers to purchase GMK330 or GM330 Smart Meters. - GMK330: CT cannot be replaced, CT ratio is 120A:40mA - GM330: CT can be purchased from GoodWe or independently, 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 signals for local configuration of device parameters and viewing device operation information; upload system operation information to the monitoring platform via WiFi or LAN. • Ensure that the firmware version of the Smart dongle is 06 or above.
grid-tied PV inverter	-	• It is recommended to use GoodWe brand grid-tied PV inverters, and third-party grid-tied PV inverters are supported. • In microgrid scenarios, ensure that the rated output power of the grid-tied PV inverter is $\leq$ the rated output power of the hybrid inverter. • When the microgrid system is in grid-connected state, if power limitation is required, ensure that: ◦ The hybrid inverter should be set through the grid-connected power limitation interface in the GoodWe Cloud+ App; for the grid-tied PV inverter, set it according to the actual tools used. ◦ To ensure that the grid-tied PV inverter can continue to generate power, adjust the output power of the hybrid inverter through the microgrid mode interface in the GoodWe Cloud+ App. Note: The output power control accuracy of different grid-tied PV inverters varies; set the grid-connected power limitation parameter values according to the actual situation.

Coupled Scenario

When the grid-tied inverter is connected to the hybrid inverter's GRID port, it

constitutes a coupled 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 a GoodWe AC charging pile. • Supports generator control and charging the battery with a generator. If a generator needs to be connected, 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 GW6.0-BAT-D-G20 GW9.0-BAT-D-G20	• Different models of battery modules can be mixed. • The system supports 5-96kWh, meeting different power and energy matching requirements. • When mixing GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating environment temperature requirement shall follow GW5.1-BAT-D-G21, GW8.3-BAT-D-G21. • If the system requires split-type expansion, please ensure the BMS and DCDC software version is 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's built-in meter does not meet the requirements, you can contact the distributor 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 separately; CT ratio is nA:5A.
	GMK330 (Purchased from GoodWe)	
	GM330 (Purchased from GoodWe)	

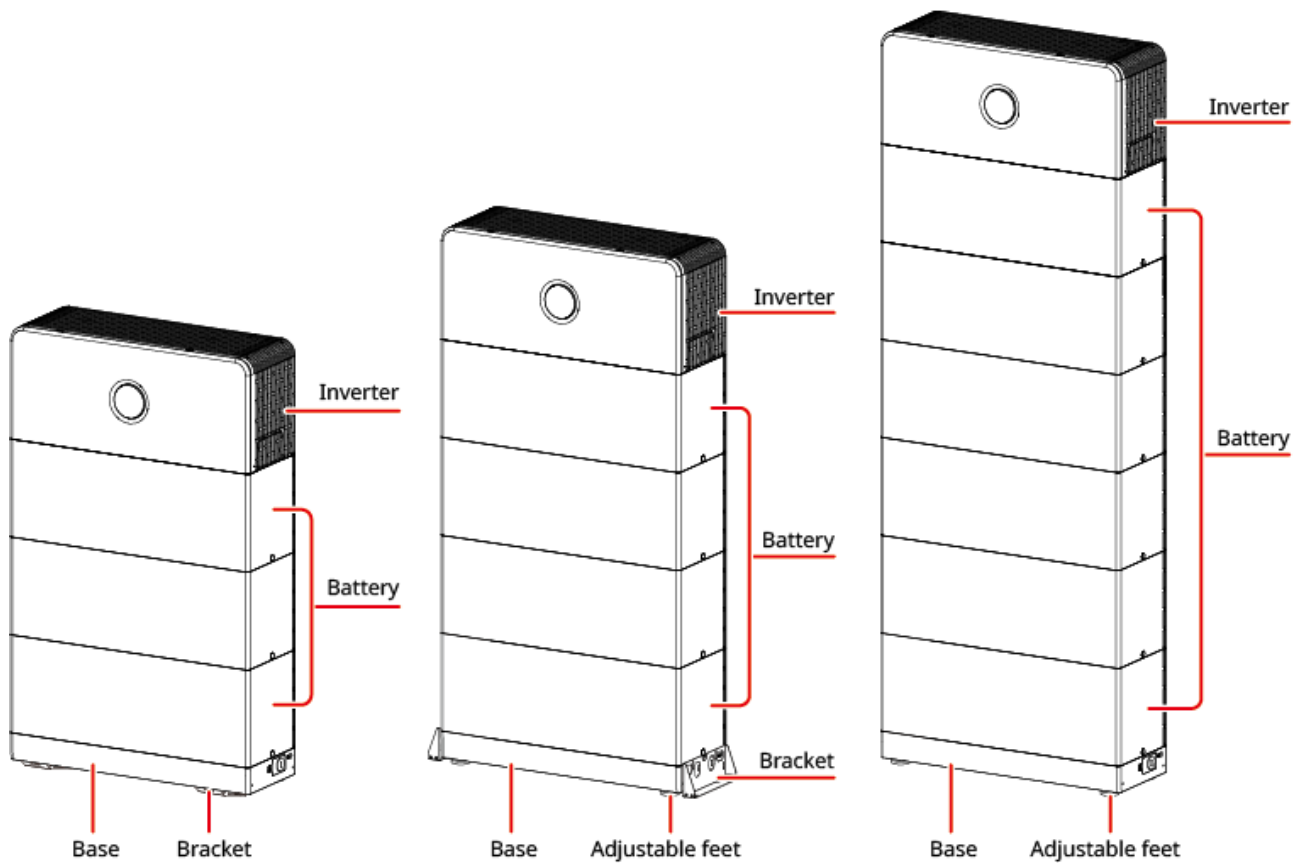
Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Uses Bluetooth signal for local configuration of device parameters and viewing device operation information; uses WiFi or LAN to upload system operation information to the monitoring platform. • Please ensure the firmware version of the Smart dongle is 06 or above.
grid-tied PV inverter	-	• GoodWe brand grid-tied PV inverters are recommended; third-party grid-tied PV inverters are supported. • In a coupling scenario, please ensure the rated output power of the grid-tied PV inverter $\leq$ the rated output power of the hybrid inverter. • When the coupling system is in grid-connected mode, if power limitation is required, please ensure: The hybrid inverter must be configured in the Grid Power Limit interface of the GoodWe App; configure the grid-tied PV inverter according to the actual tools used. Note: Different grid-tied PV inverters have different output power control accuracy. Please set the grid power limit parameter value according to the actual situation.

2.2 Product Overview

2.2.1 Residential Three-Phase All-in-One

Residential Three-Phase All-in-One:

The Residential Three-Phase All-in-One uses a blind-plug stacking connection method and integrates the Inverter and Battery units through modular design.

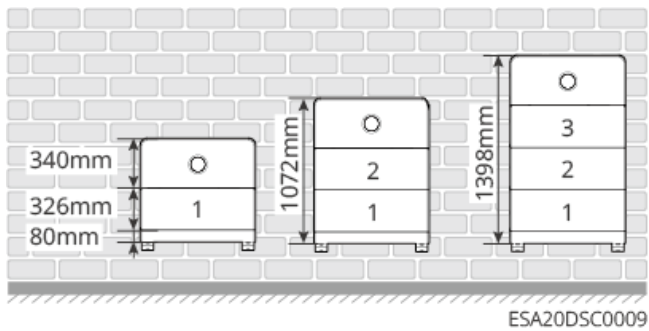


ESA20DSC0007

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 limitations specified in this section. Overall system configuration description:

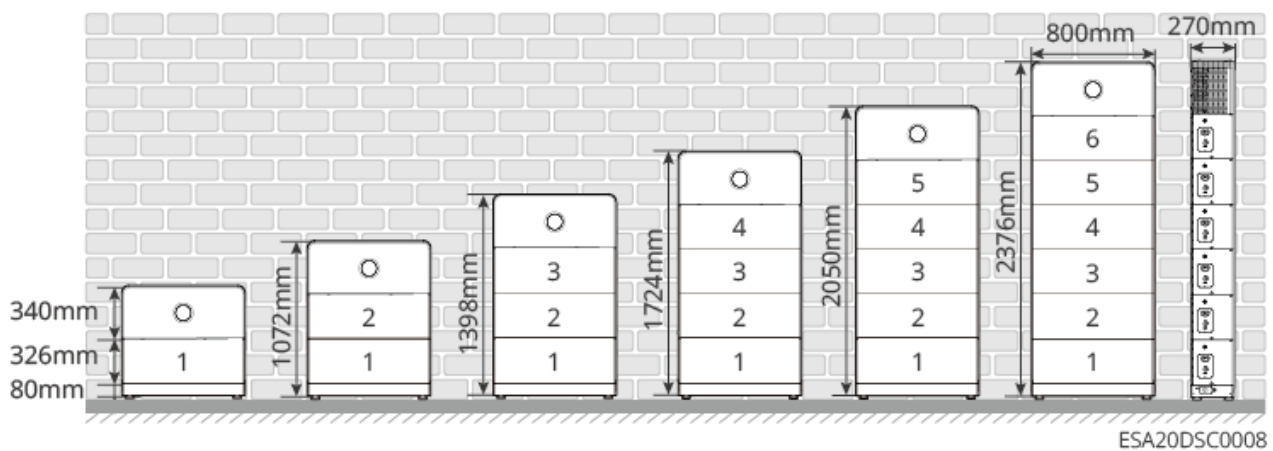
Mounting method	Total batteries	Expansion groups	Stack per group
Floor Installation	≤12 units	≤3 groups	Off-wall ≤4 units Against-wall ≤6 units
Wall-mounted Installation (5kWh model)	≤9 units	≤3 groups	≤3 units
Wall-mounted Installation(8kWh/5kWh+8kWh model)	≤6 units	≤3 groups	≤2 units
Note: Expansion groups × Stack per group ≤ Total system batteries			

Wall-Mounted Installation

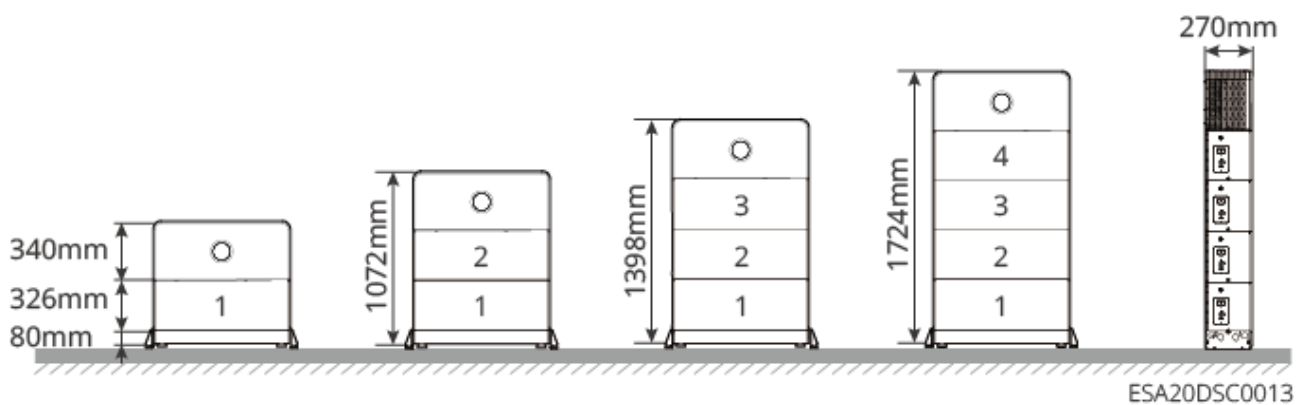


Floor Installation

- Against-Wall Installation

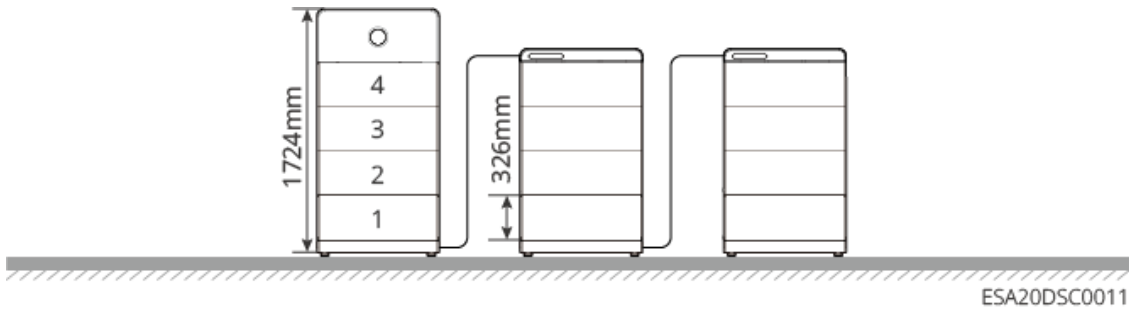


- Away-From-Wall Installation

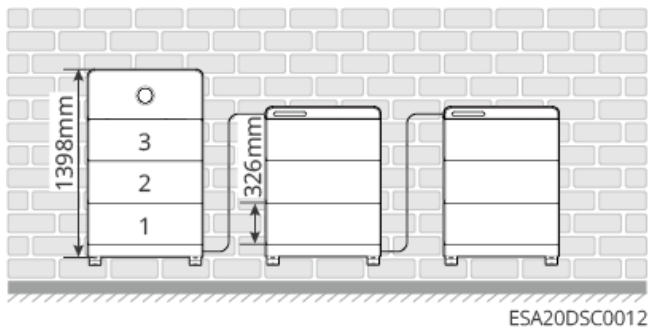


Cluster Expansion Installation

- Floor Installation

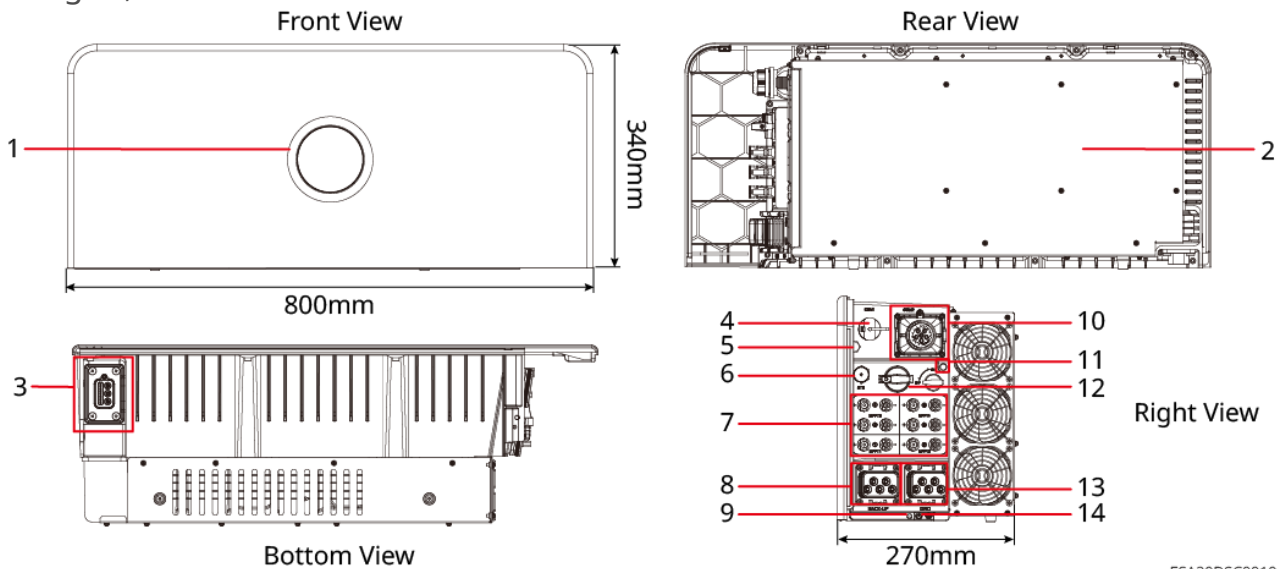


- Wall-Mounted Installation



Inverter:

The Inverter controls and optimizes the energy flow in the photovoltaic system through an integrated energy management system. It can supply the electricity generated in the photovoltaic system to loads, store it in the Battery, or output it to the grid, etc.



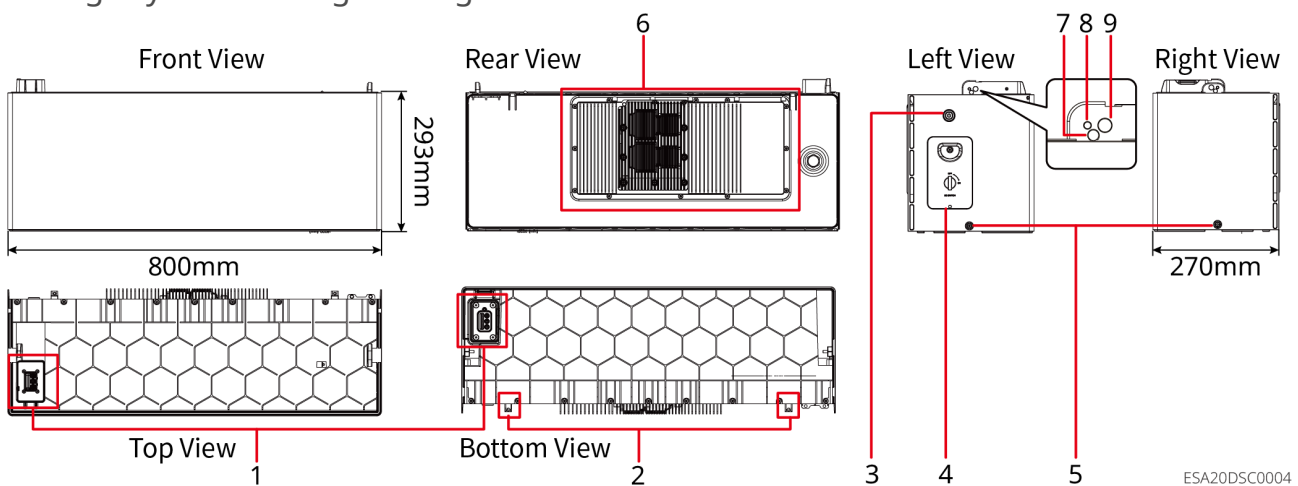
ESA20DSC0010

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 based on actual requirements. • Supports connecting a USB flash drive for local upgrade of the inverter software version.
5	Ventilation valve	-
6	STS Communication Interface	Reserved
7	PV Input Terminals	For ETA models only. BTA models do not have PV input terminals. • Can connect 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-tie 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	For ETA models only. 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 protective earth wire for the enclosure.

Battery:

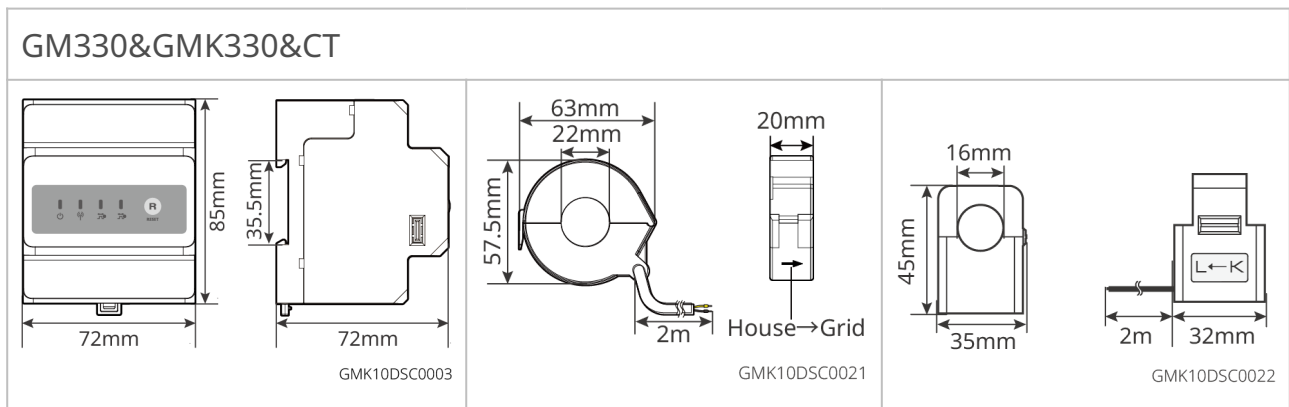
The Battery system can store and release electricity according to the requirements of the photovoltaic energy storage system. The input and output ports of this energy storage system are high-voltage direct current.



No.	Component	Description
1	Connector	Power and Communication Port for connecting battery to battery, and battery to inverter.
2	Anti-tip bracket fixing hole	Used for fixing the battery to the wall.
3	Multi-function 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 work normally; you can press and hold the multi-function button for 2 seconds to start the battery system, activate the inverter, so that the inverter enters off-grid mode operation, and the battery discharges to power the load. - Battery shutdown function: Press and hold the multi-function button for >5 seconds to shut down the battery system.
4	Battery isolation switch	Battery power input and output switch.
5	Battery inter-fixing hole	Used for fixing between two batteries.
6	heat sink	Battery heat dissipation
7	Battery lifting hole	Used for lifting the battery. When stacking more than three batteries, use lifting tools for installation.
8	Battery or inverter fixing hole	Used for fixing between batteries or between inverter and battery.
9	Lifting bar installation hole	Used for installing the lifting bar. 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, Output Power Factor, power, etc.

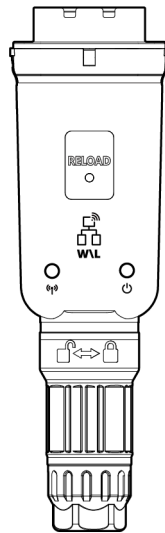


No.	model	Applicable Scenarios
1	GM330	CT can be purchased from GoodWe or independently. CT transformation ratio requirement: nA: 5A - nA: CT primary side input current, where n ranges from 200-5000 5A: CT secondary side output current
2	GMK330	CT is shipped with the meter. CT transformation ratio: 120A: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

2.2.3 smart dongle

The smart dongle is primarily used for transmitting various inverter power generation data in real-time to a remote monitoring platform, and for connecting to the smart dongle via the SEMS+ App for local device debugging.

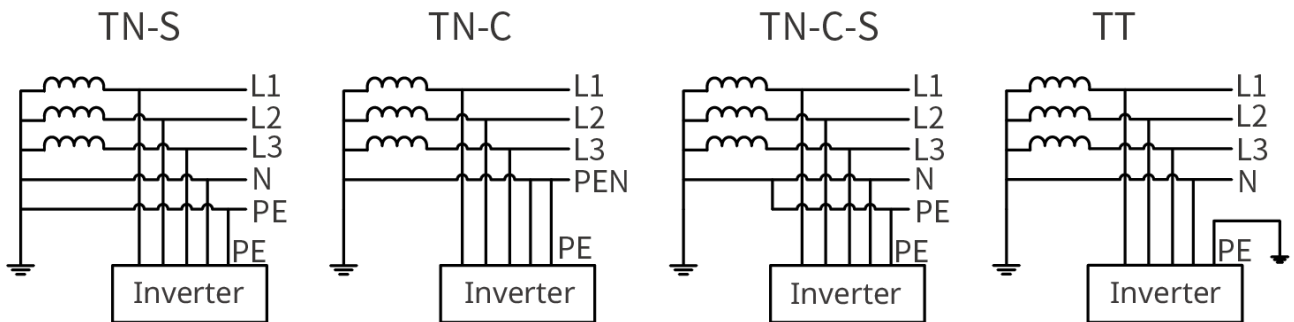
WiFi/LAN Kit-20



Smart dongle 0006

No.	model	Signal Type	Applicable Scenarios
1	WiFi/LAN Kit-20	WiFi, LAN, Bluetooth	Upload system operation information to the monitoring platform via WiFi or LAN signal

2.3 Supported Grid Types



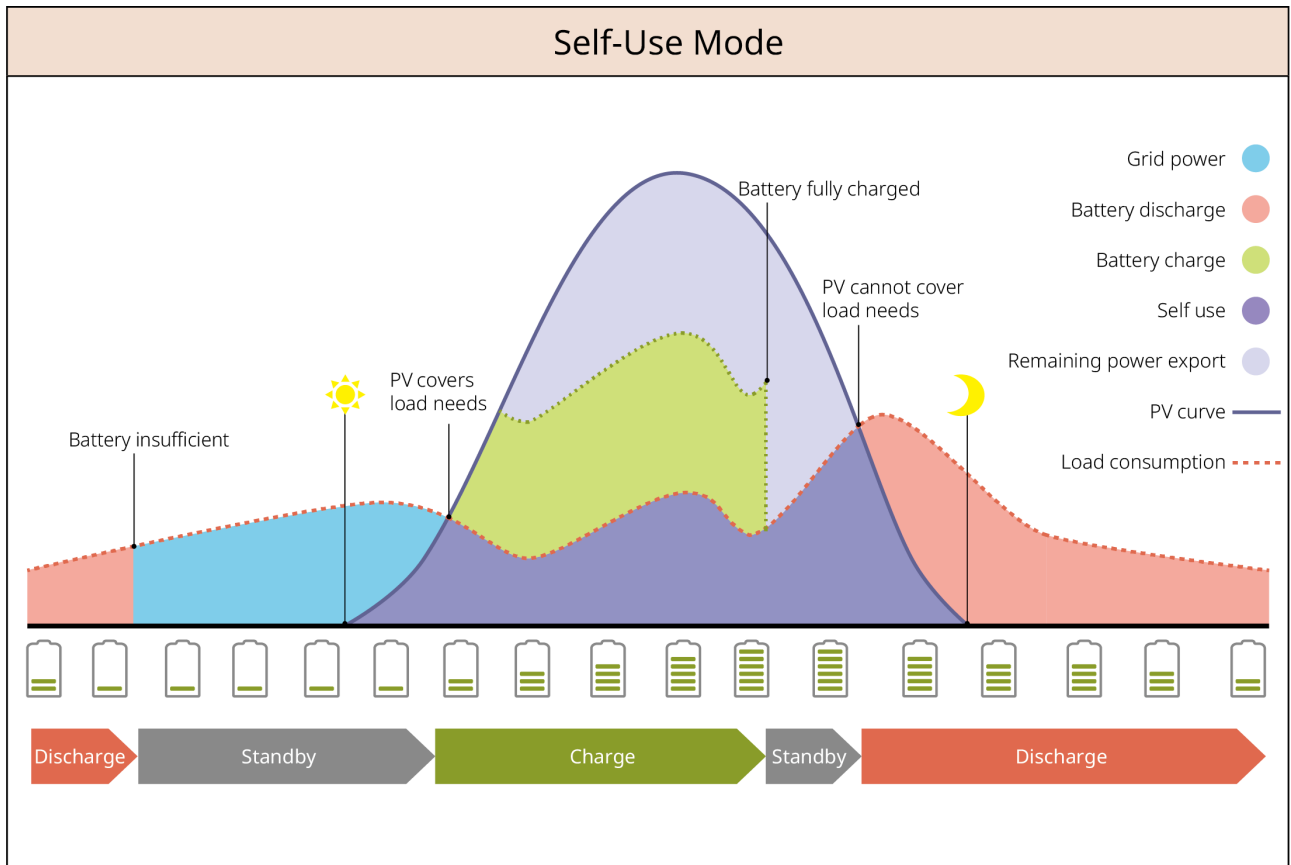
TNNET0003

2.4 System Working Mode

self use

- The basic mode of system operation.
- PV power generation prioritizes supplying power to the loads, excess electricity charges the battery, and any remaining electricity is sold to the grid. When PV

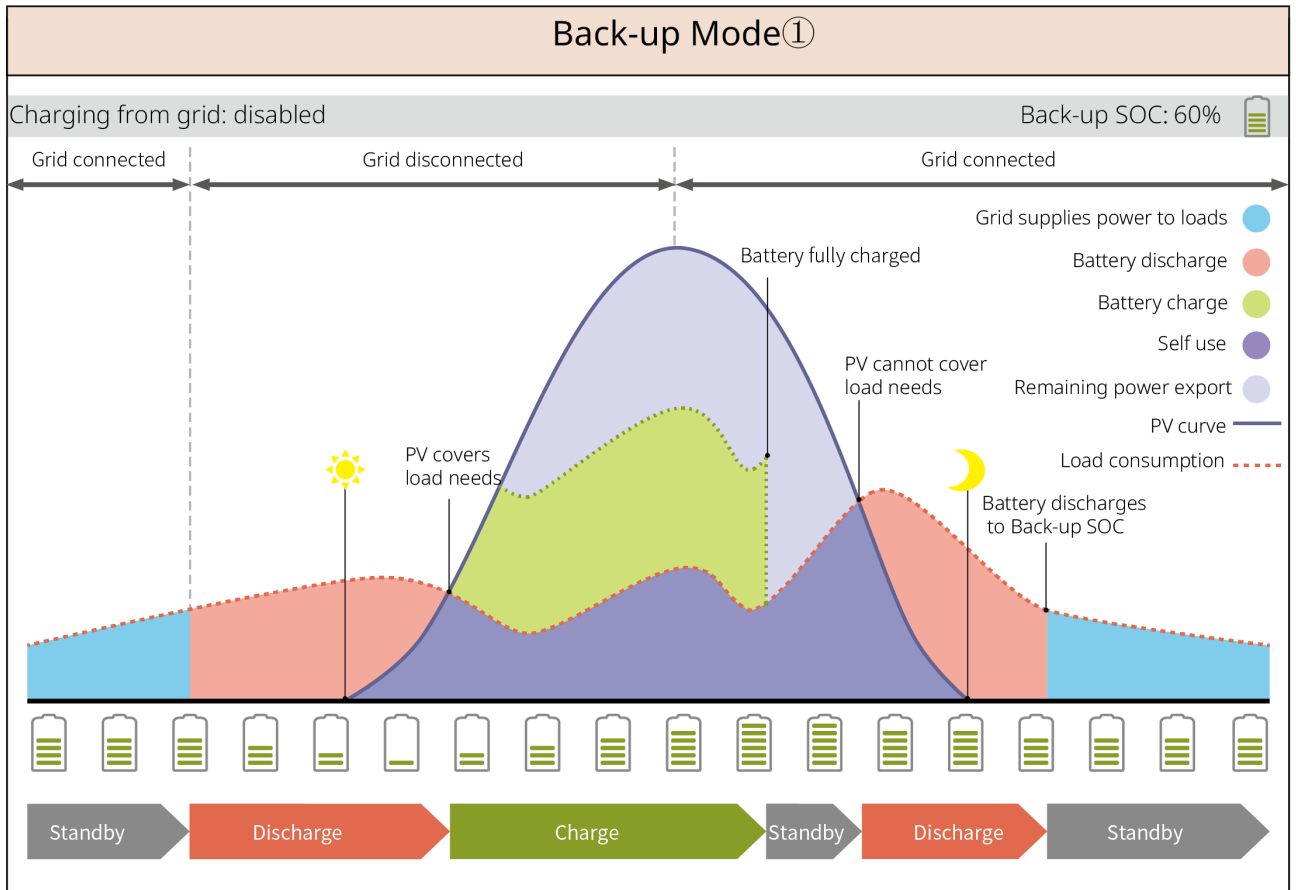
power generation does not meet the load power demand, the battery supplies power to the loads; when the battery power also does not meet the load power demand, the grid supplies power to the loads.



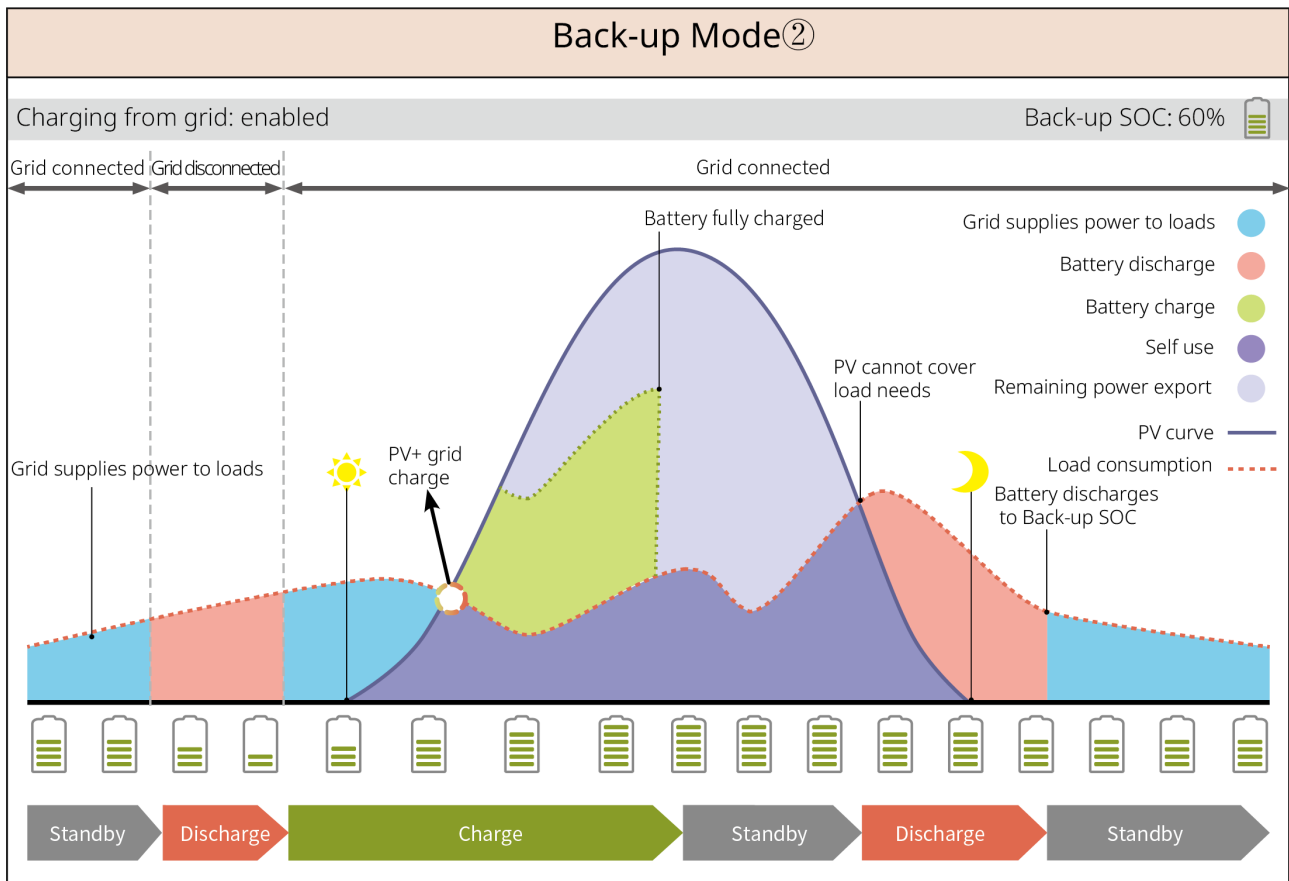
SLG00NET0009

Back-up Mode

- Recommended for use in areas with unstable grid.
- When the grid power is out, the inverter switches to off-grid working mode, and the battery discharges to supply power to the loads, ensuring that BACK-UP Loads do not lose power; when the grid is restored, the inverter working mode switches to grid-connected operation.
- To ensure that the battery SOC is sufficient to maintain normal operation when the system is off-grid, during grid-connected operation, the battery will use PV or buy electricity from the grid to charge to the backup power SOC. If it is necessary to buy electricity from the grid to charge the battery, please confirm that it meets local grid laws and regulations.



SLG00NET0002

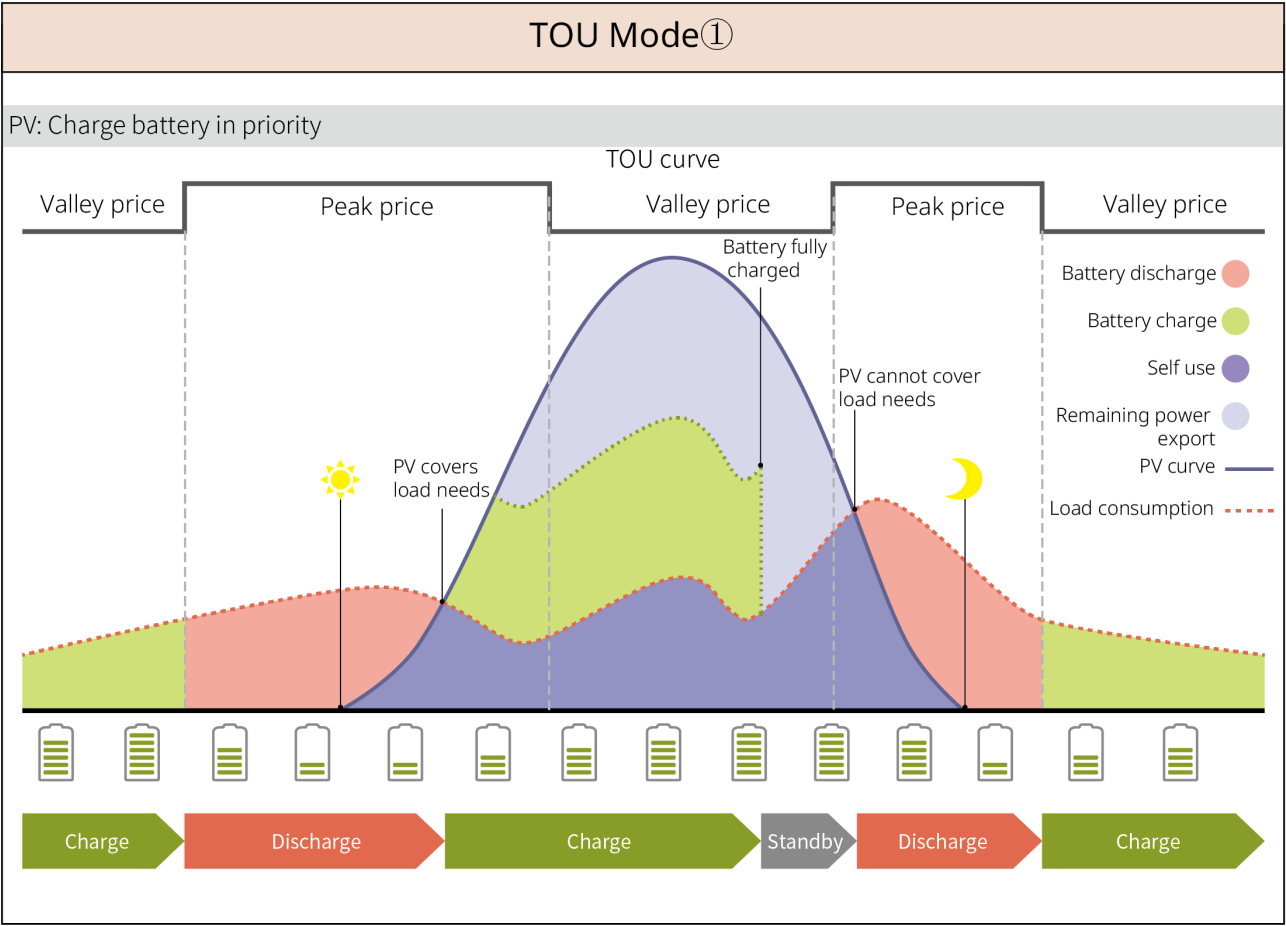


SLG00NET0003

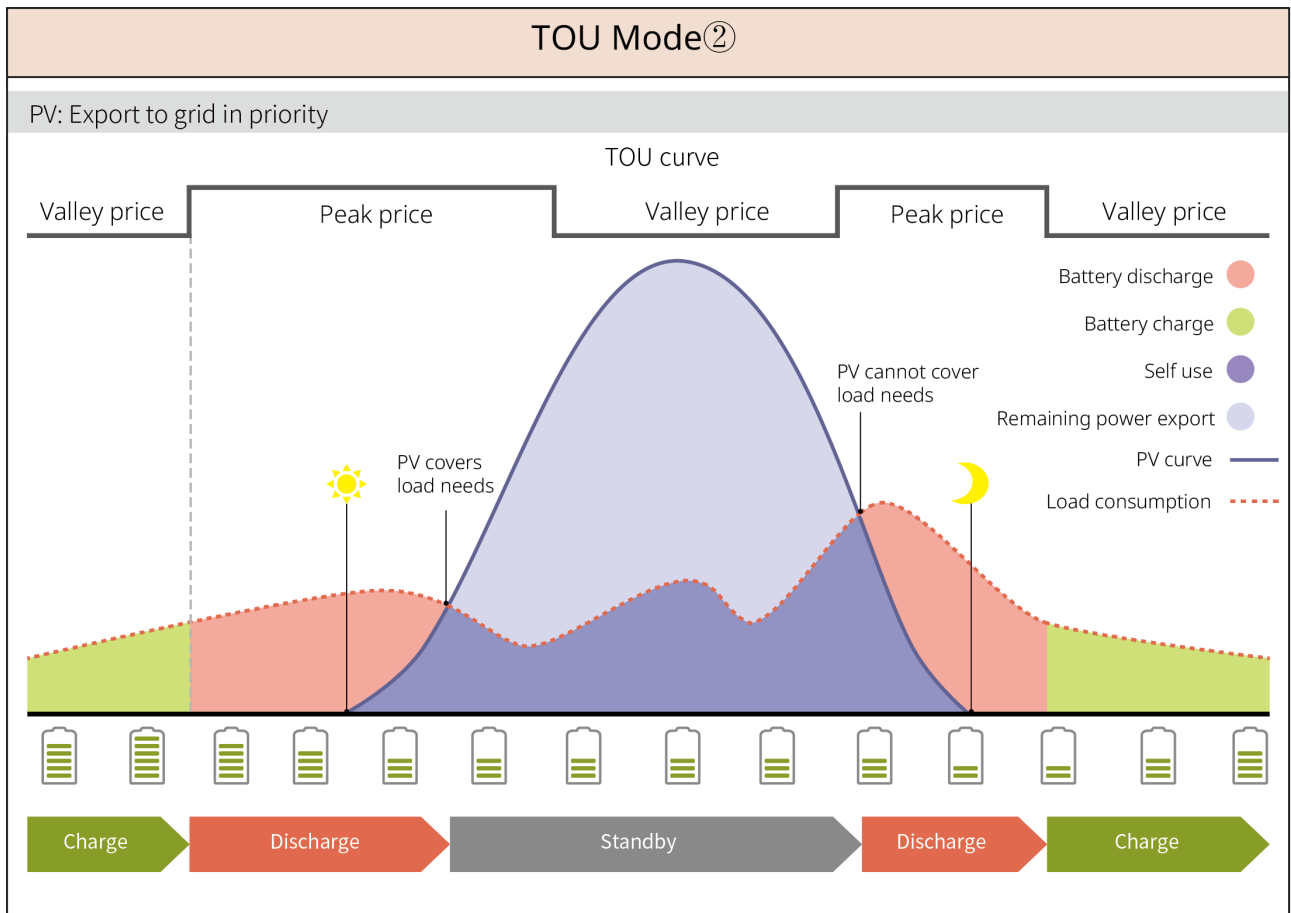
TOU Mode

Under the condition of meeting local laws and regulations, set different time periods for buying and selling electricity based on the difference between peak and valley electricity prices of the grid.

For example: during valley electricity price periods, set the battery to charging mode, buying electricity from the grid to charge; during peak electricity price periods, set the battery to discharging mode, supplying power to the loads through the battery.



SLG00NET0004



SLG00NET0005

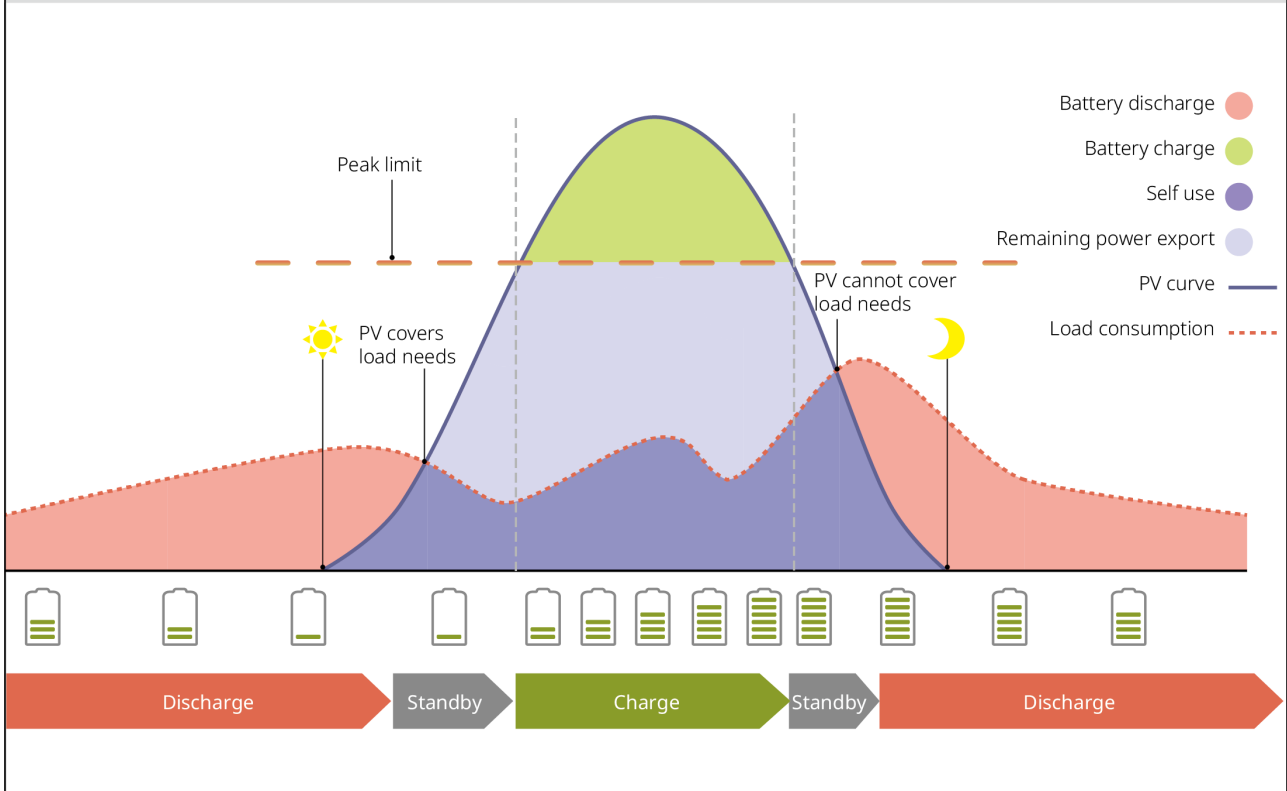
Delayed Charging Mode

- Suitable for areas with grid-connected power output limitations.
- Setting a peak power limit can use photovoltaic power generation that exceeds the grid-connected limit to charge the battery; or set PV charging periods, using photovoltaic power generation to charge the battery during the charging periods.

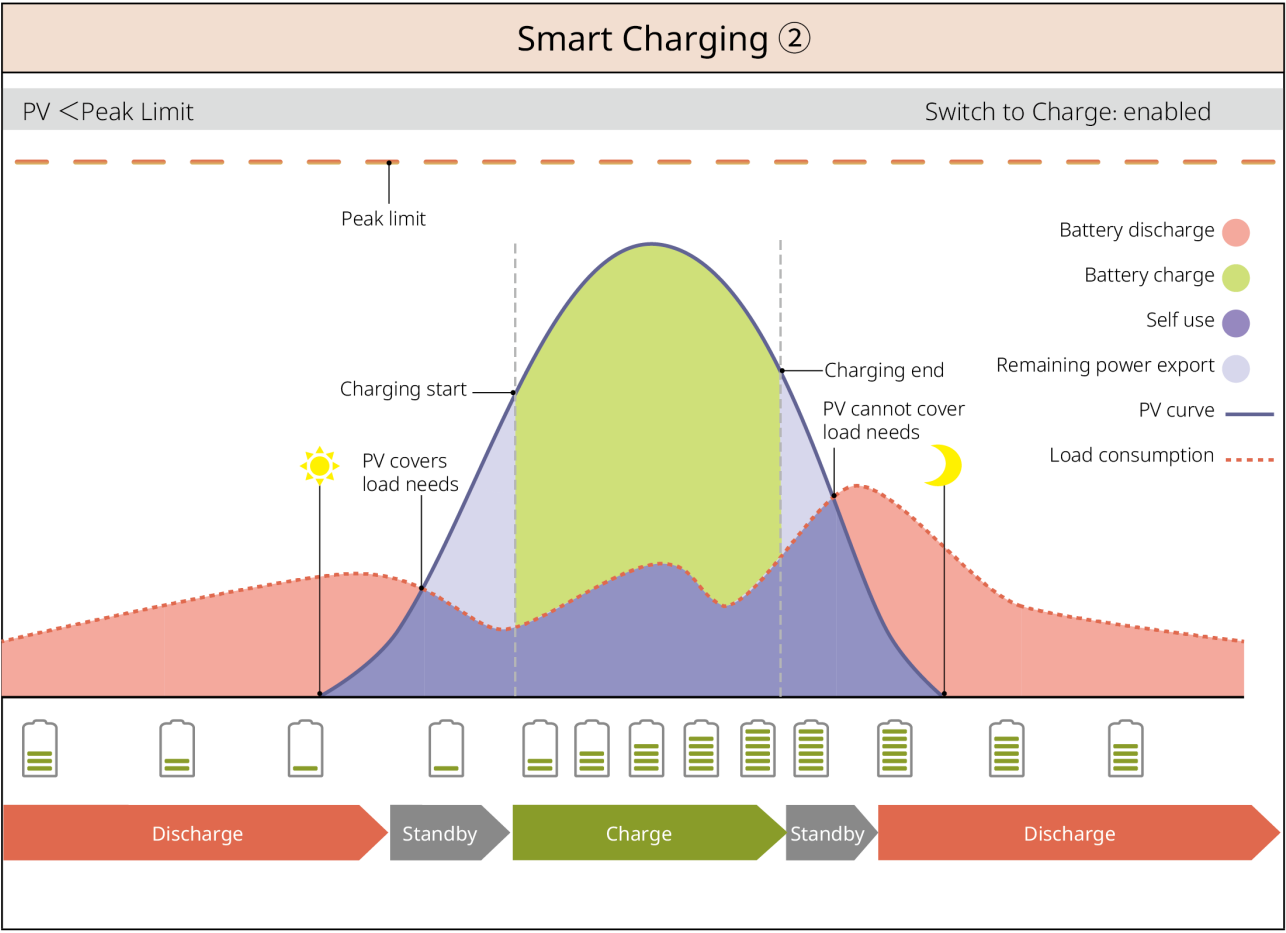
Smart Charging ①

PV > Peak Limit

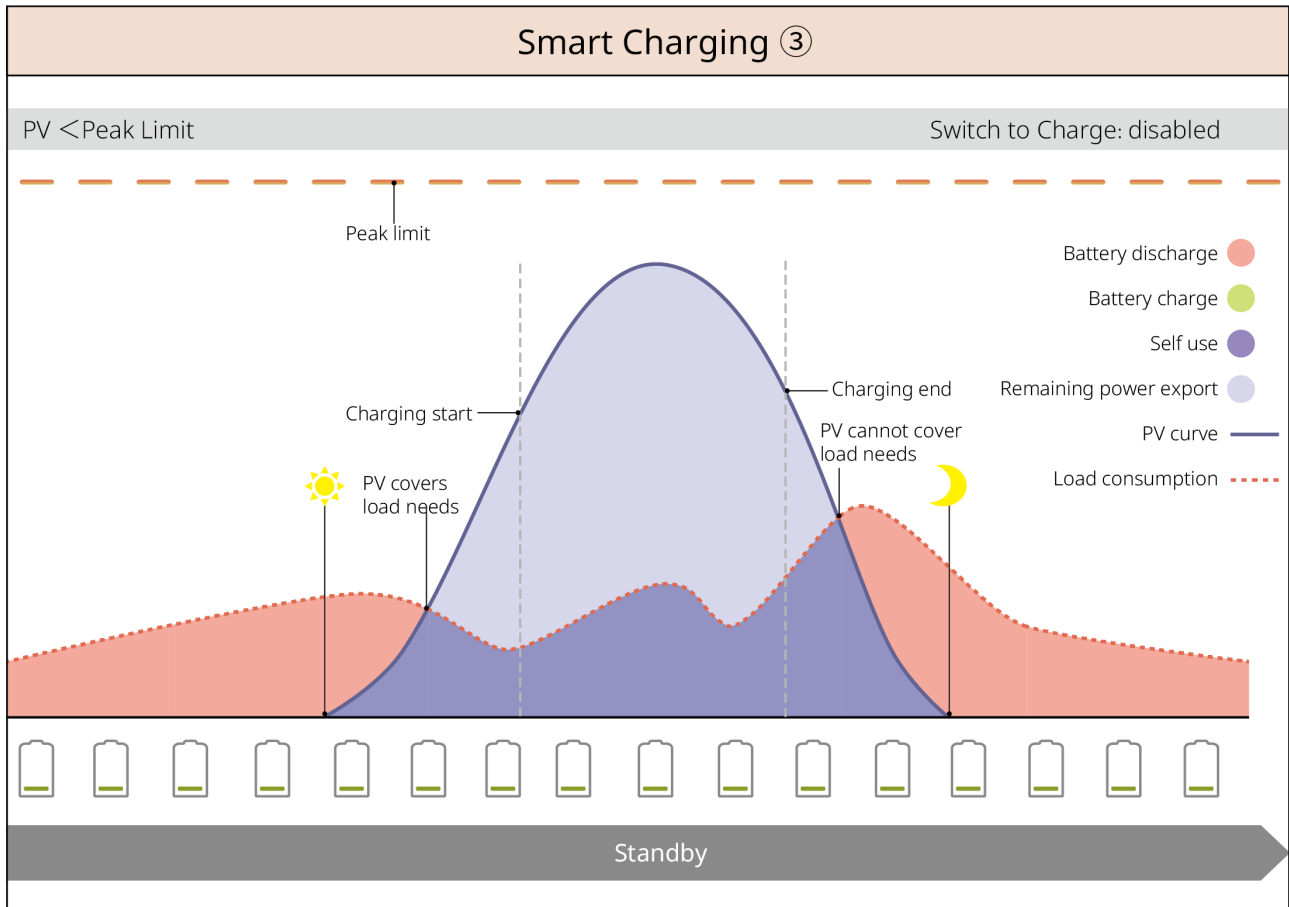
Switch to Charge: enabled/disabled



SLG00NET0006



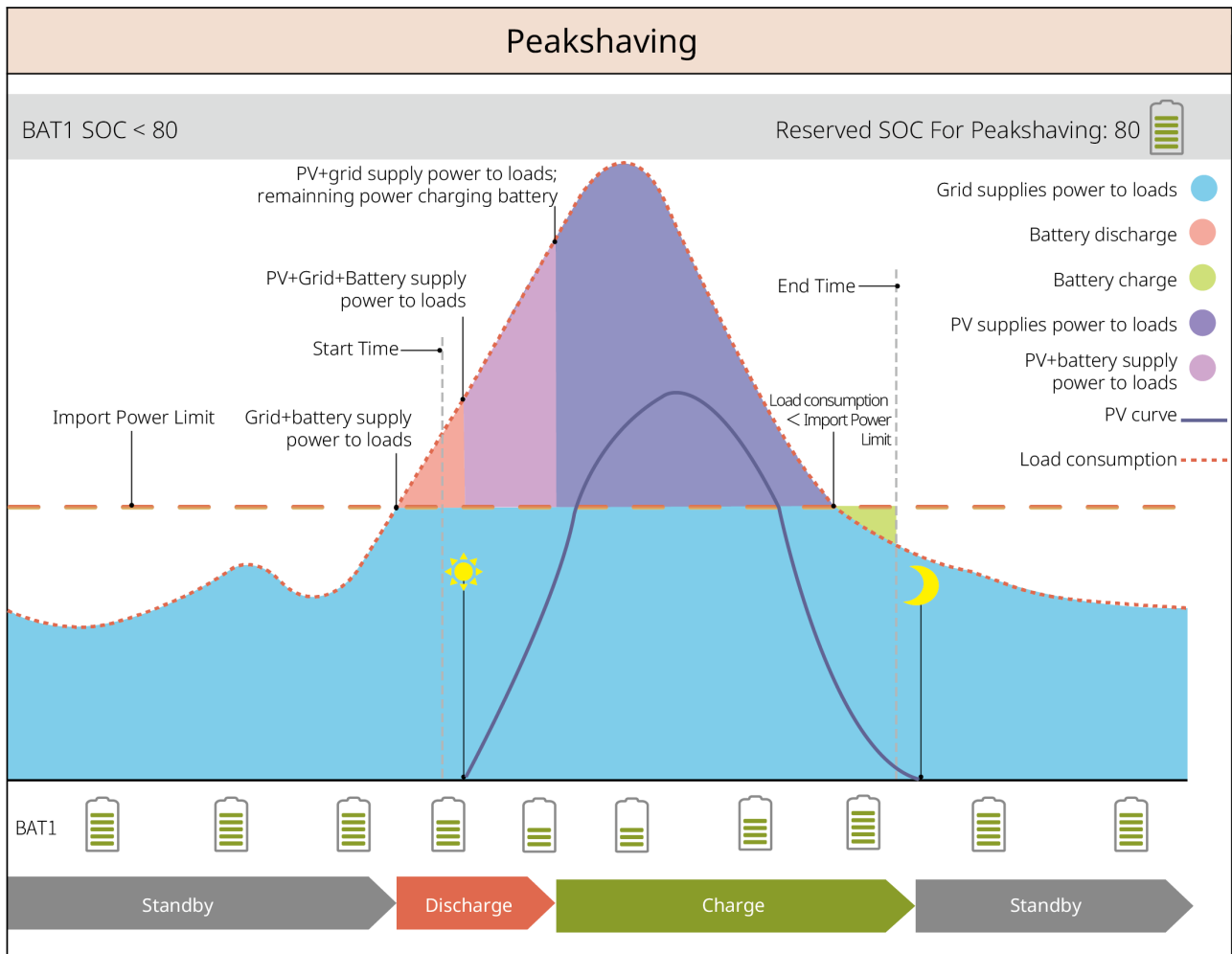
SLG00NET0007



SLG00NET0008

Demand Management Mode

- Mainly suitable for industrial and commercial scenarios.
- When the total power consumption of the loads exceeds the electricity quota in a short time, battery discharge can be used to reduce the electricity consumption beyond the quota.
- When the battery SOC is all below the reserved SOC for demand management, the system buys electricity from the grid based on time periods, load electricity consumption, and peak electricity purchase limits.



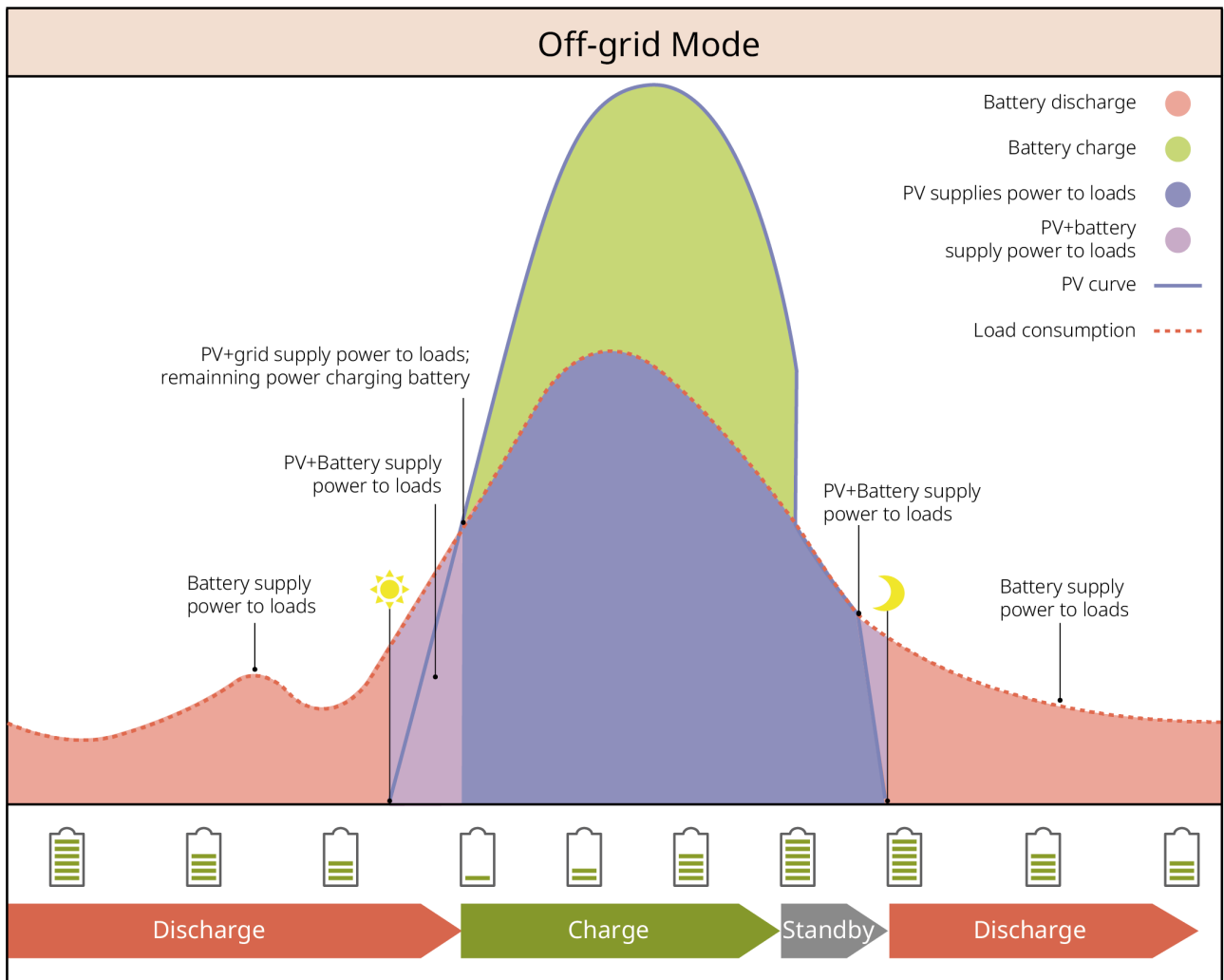
Off-grid Mode

NOTICE

Do not operate in pure off-grid mode when the inverter is not connected to the battery system.

When the grid power is out, the inverter switches to off-grid working mode.

- During the day, PV power generation prioritizes supplying power to the loads, and excess electricity charges the battery.
- At night, the battery discharges to supply power to the loads, ensuring that BACK-UP Loads do not lose power.



SLG00NET0012

2.5 Features

NOTICE

Specific features are subject to the product's actual configuration.

AFCI

The inverter integrates an AFCI circuit protection device to detect arc faults and quickly shut down the circuit when detected, thereby preventing electrical fires.

Causes of arc generation:

- Damage to connector connections in the PV system.
- Incorrect or damaged cable connections.
- Aging connectors or cables.

Fault handling methods:

1. When the inverter detects an arc, you can check the fault type via the App.
2. If the inverter triggers a fault <5 times within 24 hours, it will automatically restore grid connection protection after a 5-minute wait. After the 5th arc fault, the inverter can only resume normal operation after the fault is cleared. 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 within the inverter AFPE (arc fault protection equipment): Combines both AFD and AFI 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
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 within the inverter AFPE (arc fault protection equipment): Combines both AFD and AFI 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

model	Label	Description
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 within the inverter AFPE (arc fault protection equipment): Combines both AFD and AFI 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

The inverter's grid-tie end and BACK-UP end both support three-phase unbalanced output, allowing different power loads to be connected to each phase. The maximum output power per phase for different models is shown in the table below:

No.	model	Maximum Single-Phase 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

No.	model	Maximum Single-Phase Output Power
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 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, by enabling an external trigger device, the transmitter can be stopped, thereby shutting down the modules.

- 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 trigger 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:

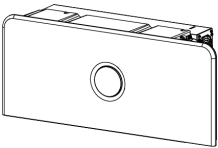
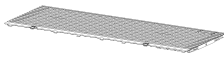
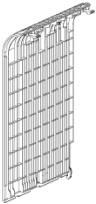
1. Check if the outer packaging is damaged, such as deformation, holes, cracks, or other signs that might cause damage to the equipment inside the packaging. If damaged, do not open the packaging and contact your dealer.
2. Check if the device model is correct. If it does not match, do not open the packaging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

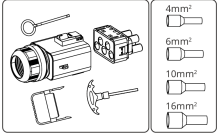
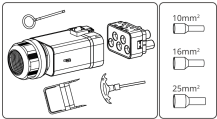
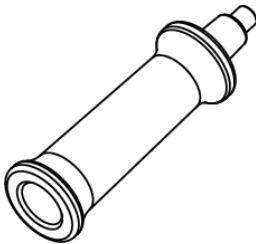
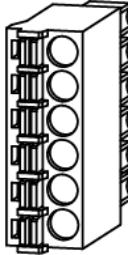
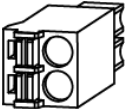
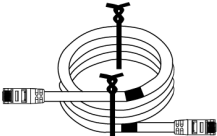
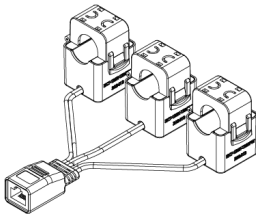
3.2 deliverables

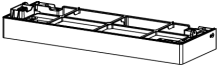
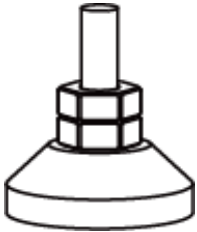
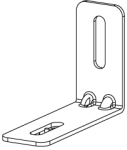
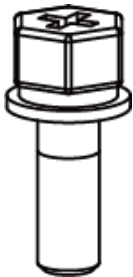
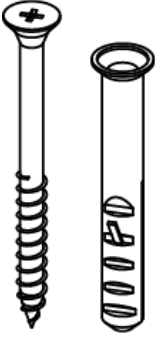
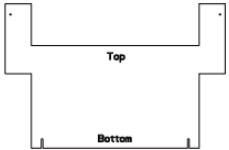
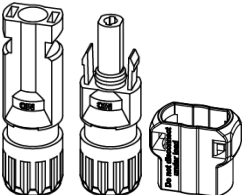
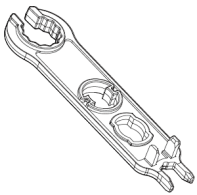


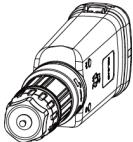
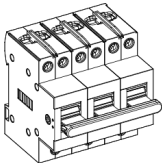
Check if the type and quantity of delivered items are correct, and if there is any damage to the appearance. If damaged, please contact your dealer.
After removing the delivered items from the packaging, do not place them on rough, uneven, or sharp surfaces to avoid paint chipping.

3.2.1 Inverter Deliverables

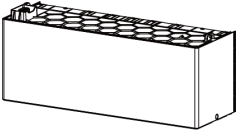
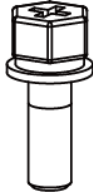
Part	Description	Part	Description
	Inverter x 1		Decorative cover top x 1
	Decorative cover left x 1		Decorative cover right x 1

Part	Description	Part	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

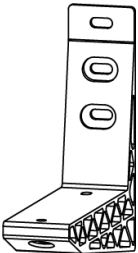
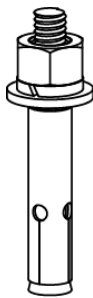
Part	Description	Part	Description
	Battery base x 1		Adjustable feet x 4
	Anti-tip bracket x 4		M5*16 screw x 9
	M5*60 expansion screw x 4		Drilling template x 2
			PV terminal unlocking tool x N N: China region x 0; Other regions x 1.

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

3.2.2 Batteries Deliverables

Component	Description	Component	Description
	Battery x 1		M5*16 Screw x 2
	Silicone Cap x 2	-	-

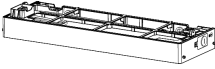
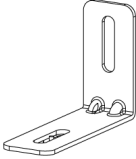
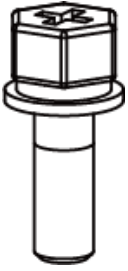
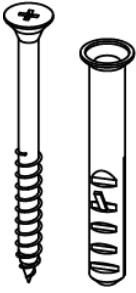
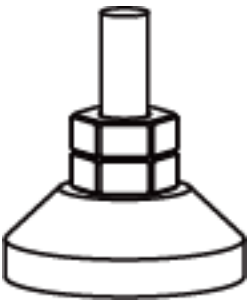
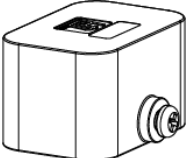
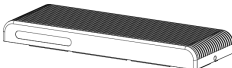
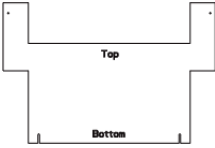
Bracket Installation (Optional)

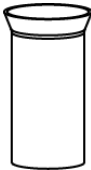
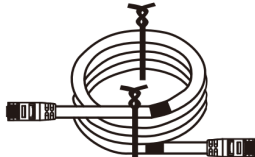
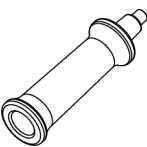
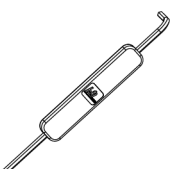
Component	Description	Component	Description
	Mounting Bracket x 2		M10 Expansion Screw x 6
	M10 Screw x 4	-	-

3.2.2.1 Battery Expansion Kit Deliverables

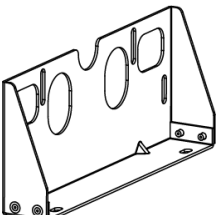
NOTICE

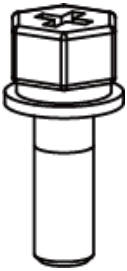
The system supports 5-96kWh, meeting different power and energy matching requirements. A single column has a maximum energy of 48kWh. If you have higher energy demands, please contact GoodWe or a dealer to purchase a battery expansion kit.

Part	Description	Part	Description
	Base x 1		locking bracket x 4
	M5 screws x 7		M6 expansion screws x 4
	Adjustable feet x 4		OT grounding terminal x 1
	Terminal resistor x 1		Battery decorative cover x 1
	Drilling template paper x 2		Battery expansion cluster harness x 1

Part	Description	Part	Description
	PIN terminal x 8		Battery expansion cluster positive connection harness x 1
	Battery expansion cluster negative connection harness x 1		Battery expansion cluster network cable x 1
	Silicone caps x 2		Handle x 2
	Hex key x 1		Product documentation x 1

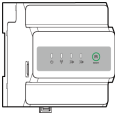
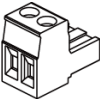
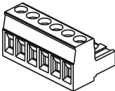
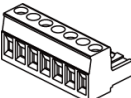
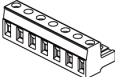
3.2.2.2 Wall-Mount Bracket Deliverables

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 Deliverables GM330&GMK330

3.2.3.1 Attachment List

Part	Description	Part	Description
	Smart meter x1		2PIN communication terminal x1
	6PIN communication terminal x1		7PIN communication terminal x1
	Meter communication terminal		screwdriver x1
	PIN terminal x 6		Product documentation x 1

3.3 Storage

- If the inverter has been stored for more than two years or has not been operational for over 6 months after installation, it is recommended to have it inspected and tested by professionals before putting it into use.

- To ensure the good electrical performance of the internal electronic components of the inverter, it is recommended to power it on once 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 professionals before use.
- To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Prolonged storage may lead to deep discharge of the battery, causing irreversible chemical degradation, resulting in capacity decay or even complete failure, timely use is advised. If the battery requires long-term storage, please perform maintenance according to the following requirements:

NOTICE

[1] The storage time is calculated from the SN date on the battery 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\(Page 286\)](#).

[2] After the charge-discharge maintenance is qualified, if the outer box has a Maintaining Label, 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 distributor or after-sales service center.
GW8.3-BAT-D-G20				
GW5.1-BAT-D-G21				
GW8.3-BAT-D-G21				
GW6.0-BAT-D-G20				

Battery Model	Initial SOC Range for Battery Storage	Recommended Storage Temperature	Charge/Discharge Maintenance Cycle ^[1]	Battery Maintenance Method ^[2]
GW9.0-BAT-D-G20				

Packaging Requirements:

Ensure the outer packaging box is not removed and the desiccant inside the box is not lost.

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 present 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 device installation and electrical connections, please use the delivery items included in the shipment. Otherwise, any resulting device 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.
- GW6.0-BAT-D-G20, GW9.0-BAT-D-G20: Charging temperature range: -20°C to 55°C; Discharging temperature range: -20°C to 55°C. If installed in an environment below -20°C, the battery will be unable to recharge and restore energy after being depleted, leading to battery undervoltage protection.

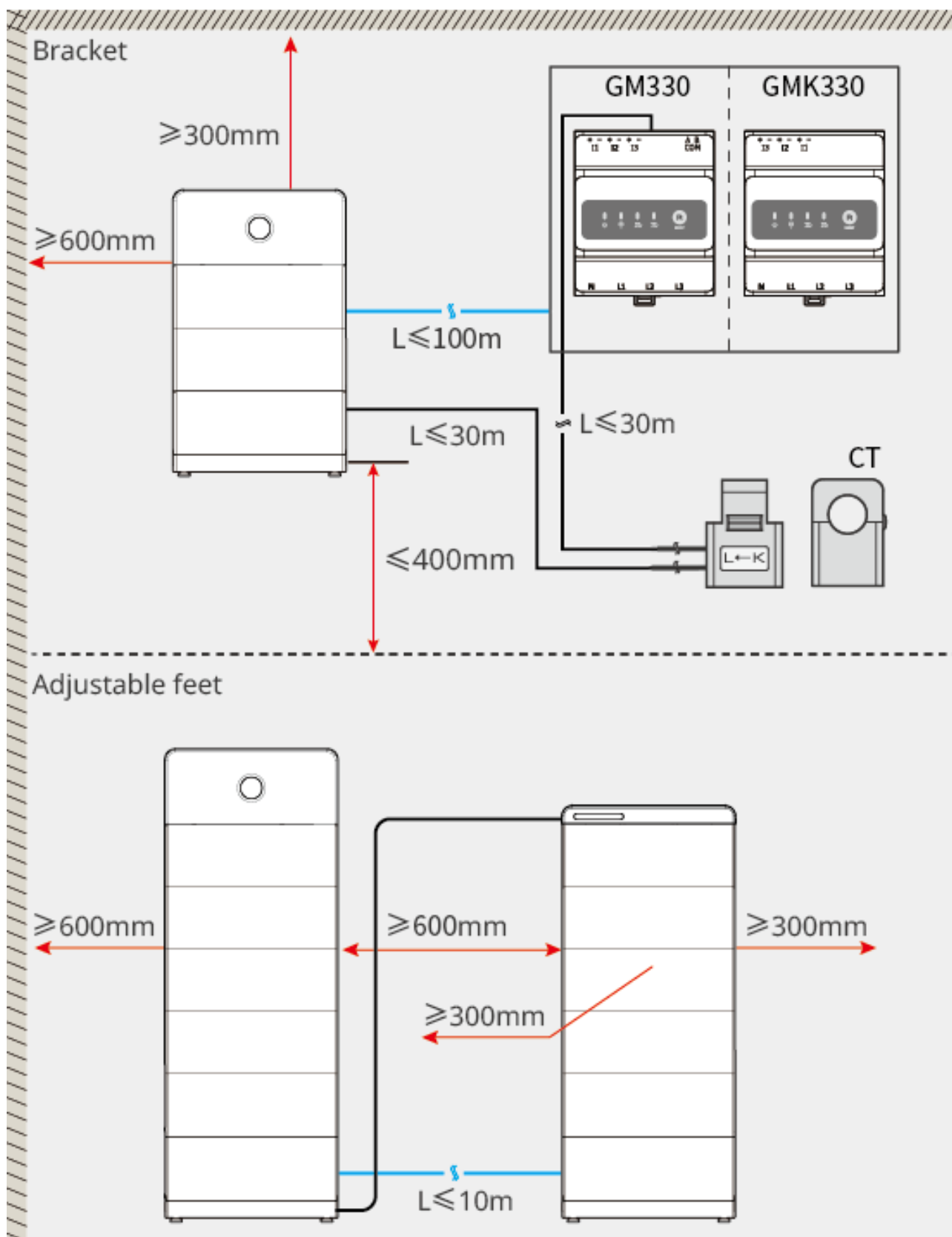
1. The device must not be installed in flammable, explosive, corrosive, or similar environments.
2. The temperature and humidity of the installation environment must be within a suitable range.
3. The installation location should be out of reach of children and avoid easily accessible positions.
4. The device surface may be hot during operation; be cautious to prevent burns.

5. The device should avoid installation environments with direct sunlight, rain, snow accumulation, etc. It is recommended to install in a sheltered location; if necessary, a sunshade can be built.
6. The installation space must meet the ventilation, heat dissipation, and operational space requirements of the device.
7. The installation environment must meet the protection level of the device. Inverter, batteries, and smart communication sticks are suitable for indoor and outdoor installation; electricity meters are suitable for indoor installation.
8. The installation height of the device should facilitate operation and maintenance, ensuring that device indicators, all labels are easily visible, and terminal connections are easy to operate.
9. The installation altitude of the device should be below the maximum operating altitude.
10. Before outdoor installation in salt damage areas, consult the device manufacturer. Salt damage areas mainly refer to areas within 500m from the coast. The affected area is related to sea breeze, precipitation, terrain, and other conditions.
11. The device will generate noise during operation. The installation location should be away from areas with high noise sensitivity, such as residential areas, schools, hospitals, etc., to avoid the noise from the device during operation causing disturbance to people living in the nearby environment.
12. Stay away from strong magnetic field environments to avoid electromagnetic interference. If there are radio stations or wireless communication devices below 30MHz near the installation location, install the device according to the following requirements:
 - Inverter: Add a ferrite core with multiple windings at the DC input line or AC output line of the inverter, or add a low-pass EMI filter; or the distance between the inverter and the wireless electromagnetic interference device exceeds 30m
 - Other devices: The distance between the device and the wireless electromagnetic interference device exceeds 30m.

4.1.2 Installation Space Requirements

When installing devices in the system, sufficient space should be reserved around the equipment to ensure adequate space for installation and heat dissipation.

- Installing a CT requires using CAT 5E or higher shielded network cable, 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.



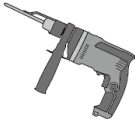
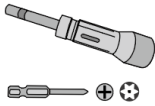
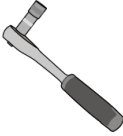
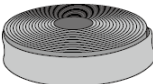
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4.1.3 Tool Requirements

NOTICE

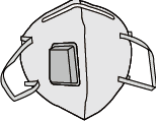
During installation, it is recommended to use the following installation tools. If necessary, other auxiliary tools can be used on-site.

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 (bit Φ12mm)		torque wrench M4, M5, M6, M10
	rubber hammer		socket wrench
	Marker pen		multimeter Range ≤1000V
	Heat shrink tubing		Hot air gun

Tool Type	Description	Tool Type	Description
	cable tie		Vacuum cleaner

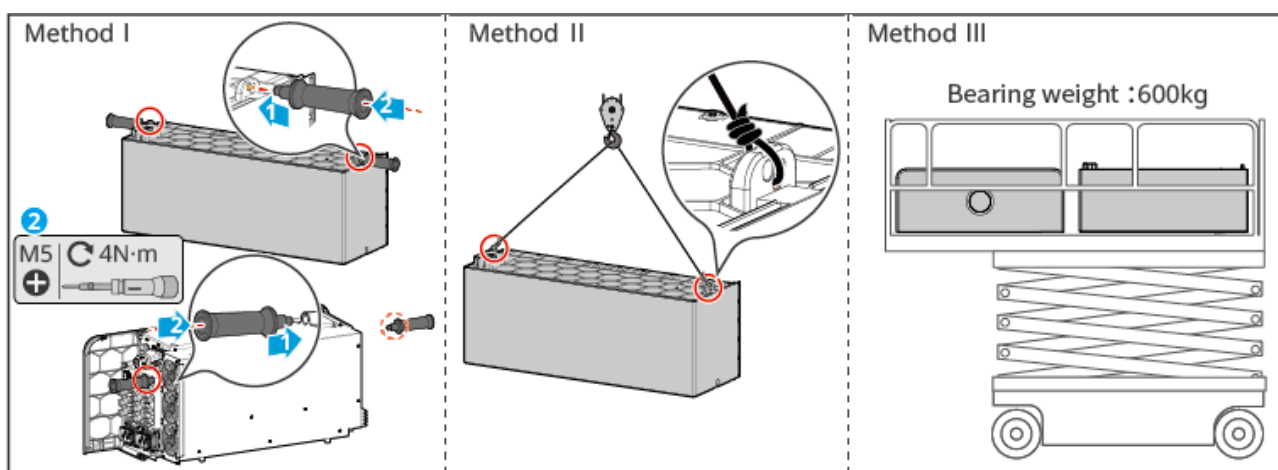
personal protective equipment

Tool Type	Description	Tool Type	Description
	Insulation gloves, Protective gloves		Dust mask
	goggle		Safety shoes

4.2 Equipment Handling

⚠ CAUTION

- During operations such as transportation, turnover, and installation, it must comply with the laws, regulations, and relevant standard requirements of the country or region where it is located.
- 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. Please allocate personnel according to the weight of the equipment to prevent the equipment from exceeding the weight range that can be carried by humans, causing injury.
 2. Please wear safety gloves to avoid injury.
 3. Please ensure that the equipment remains balanced during moving to avoid falling.
 4. The battery system can be transported to the installation site using hoisting.
 5. When using hoisting to move the equipment, please use flexible slings or straps. The load-bearing capacity of a single strap should meet the following requirements:
 - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21, GW6.0-BAT-D-G20 $\geq 180\text{KG}$
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20 $\geq 240\text{KG}$



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4.3 Installation Equipment

CAUTION

- When drilling, ensure the drilling location avoids water pipes, cables, etc., inside the wall to prevent danger.
- When drilling, please wear safety goggles and a dust mask to avoid dust inhalation into the respiratory tract or entry into the eyes.
- The inverter is installed above the battery; the battery must not be installed 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 holes on the upper and lower layers are aligned; the anti-tipping bracket should be vertical and tightly against the ground, wall, or battery system surface.
- When using an impact drill for drilling, use cardboard or other coverings to shield the battery system to prevent foreign objects from entering the equipment and causing damage.
- For wall-mounted installation, to ensure the safety of your life and property, please be sure to assess the wall's load-bearing capacity.

NOTICE

- The battery must be installed on the base, which can be floor-mounted or rack-mounted.
- For floor installation, a maximum of 4 batteries can be stacked when placed away from the wall, and up to 6 batteries can be stacked when placed against the wall.
- When installing against a wall, the base, rack, and the top battery must be secured to the wall using an anti-tip bracket.
- When marking drill hole positions for rack installation, have one person hold the base steady while another uses a marker to mark the drill positions.
- When installing the battery and inverter, remove the protective covers from the blind-mate connectors before stacking.

Wall Mounting Installation

The maximum stacking quantity when using wall-mounted installation is described below:	
GW5.1-BAT-D-G20 , GW5.1-BAT-D-G21 and GW6.0-BAT-D-G20 stacking	Maximum three batteries per stack
GW8.3-BAT-D-G20 , GW8.3-BAT-D-G21 and GW9.0-BAT-D-G20 stacking	Maximum two batteries per stack
GW5.1-BAT-D-G20 , GW5.1-BAT-D-G21 , GW6.0-BAT-D-G20 , GW8.3-BAT-D-G20 , GW8.3-BAT-D-G21 and GW9.0-BAT-D-G20 stacking	

Step 1: Install the base onto the mounting bracket.

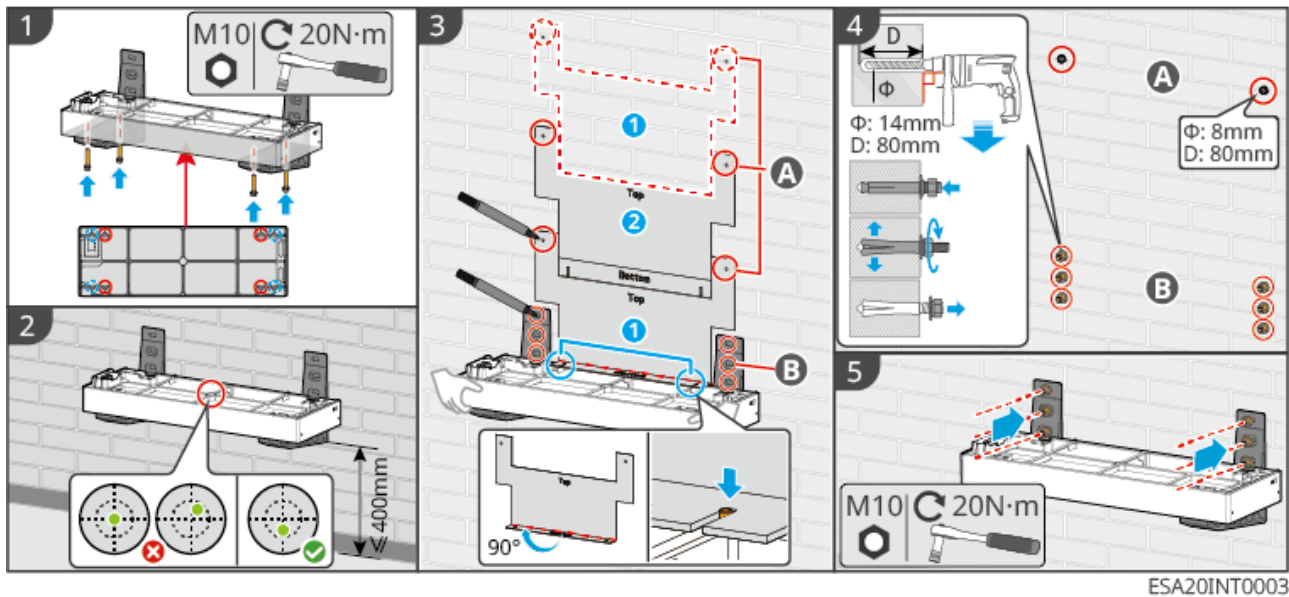
Step 2: Place the mounting bracket flush against the wall. Ensure the bracket is securely positioned and observe the level bubble in the center of the base.

Step 3: After adjusting the position and levelness of the mounting bracket, use a marker to mark the drilling positions. 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 nuts clockwise to expand the bolts.
5. Rotate the nuts counterclockwise to remove them.
6. Use a torque screwdriver to secure the anti-tip bracket to the wall.

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



Floor Standing Installation

Installation Against Wall

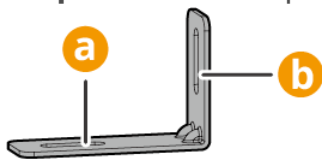
Step 1: Install the adjustable feet onto the bottom of the base, and secure the anti-tip bracket to the base.

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

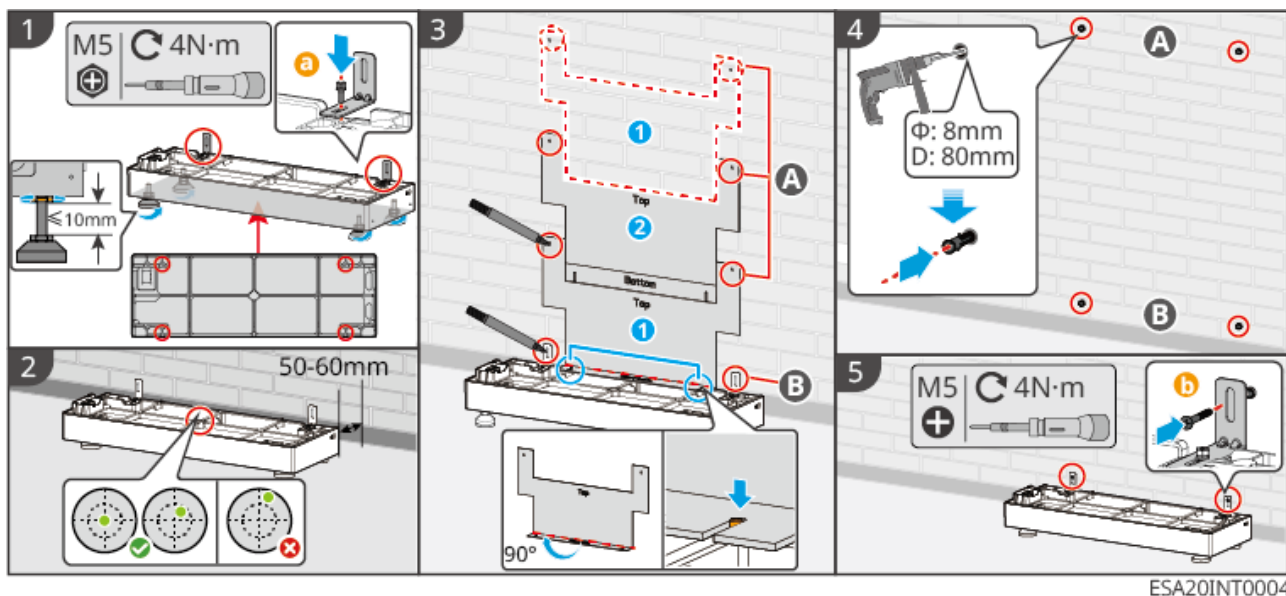
Step 3: After adjusting the position and levelness of the base, use a drilling template to mark the drilling positions. Once marked, remove the base. (A: PACK fixing holes; B: Bracket fixing holes.)

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: Surface fixed to the base; b: Surface fixed to the wall.



Installation Away from Wall

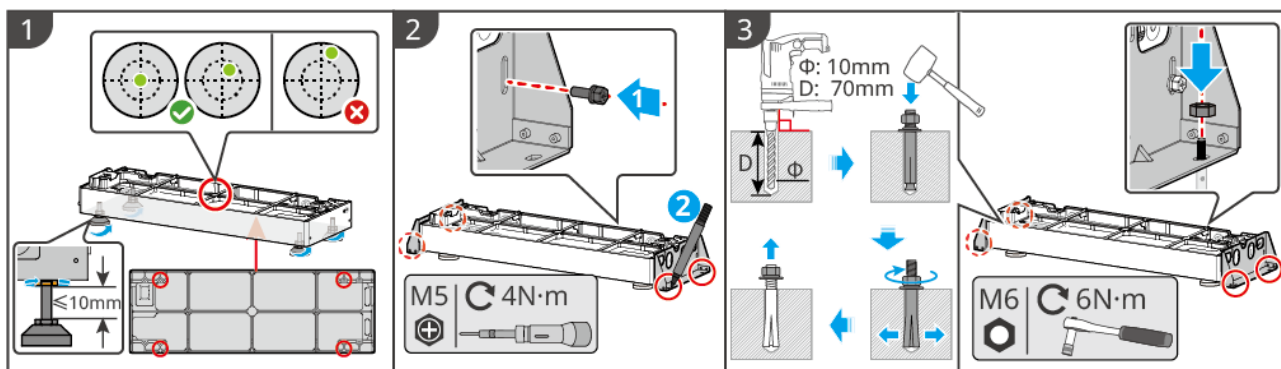
Step 1: Install the adjustable feet onto the bottom of the base. Observe the level bubble in the center of the base. If the bubble is not centered, use the adjustable feet to level the base.

Step 2: After adjusting the position and levelness of the base, secure the away-from-wall mounting bracket to the base. Choose a suitable location to mark the drilling positions. 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 nuts clockwise to expand the bolts.
5. Rotate the nuts counterclockwise to remove them.
6. Use a torque screwdriver to secure the anti-away-from-wall bracket to the floor.

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



ESA20INT0015

Installing Battery and Inverter

NOTICE

When wall-mounted, the topmost battery must be secured to the wall using an anti-tip bracket.

Step 1: Remove the protective covers from the blind-mate connectors on the bottom of the inverter or battery.

Step 2: Install the handles (optional), and stack the battery onto the base.

If installing more than 3 batteries, use a lifting tool.

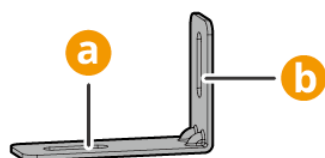
Step 3: Tighten the screws between the battery and the base, or between batteries.

If installing multiple batteries, repeat **Step 1** and **Step 2** to complete the installation of all batteries. The stacking quantity must follow 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.

- Integrated 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 integrated configuration, the installation is complete at this point.
- Split-type Expansion: Repeat the steps for installing batteries. After completing the electrical connections, place the battery decorative cover on top of the battery and tighten the side screws.



a: Surface fixed to the PACK; b: Surface fixed to the wall.

5 System Wirings

DANGER

- The erection, 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 dangers such as electric shock.
- Cables of the same type should be bundled together and arranged separately from different types of cables. Intertwining or crossing arrangements are prohibited.
- If cables are subjected to excessive tension, poor connections may result. When connecting, leave a certain length of slack in the cable before connecting it to the inverter terminals.
- When crimping terminals, ensure the cable conductor makes full contact with the terminal. Do not crimp the cable insulation together with the terminal, as this may cause equipment malfunction or, after operation, lead to inverter terminal damage due to unreliable connections and overheating.
- This inverter has not been tested or verified for multi-inverter combinations and/or multi-phase inverter combinations according to the AS/NZS 4777.2:2020 standard. Therefore, such combination schemes should not be used.

NOTICE

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

5.1 System Wiring Electrical Block Diagram

NOTICE

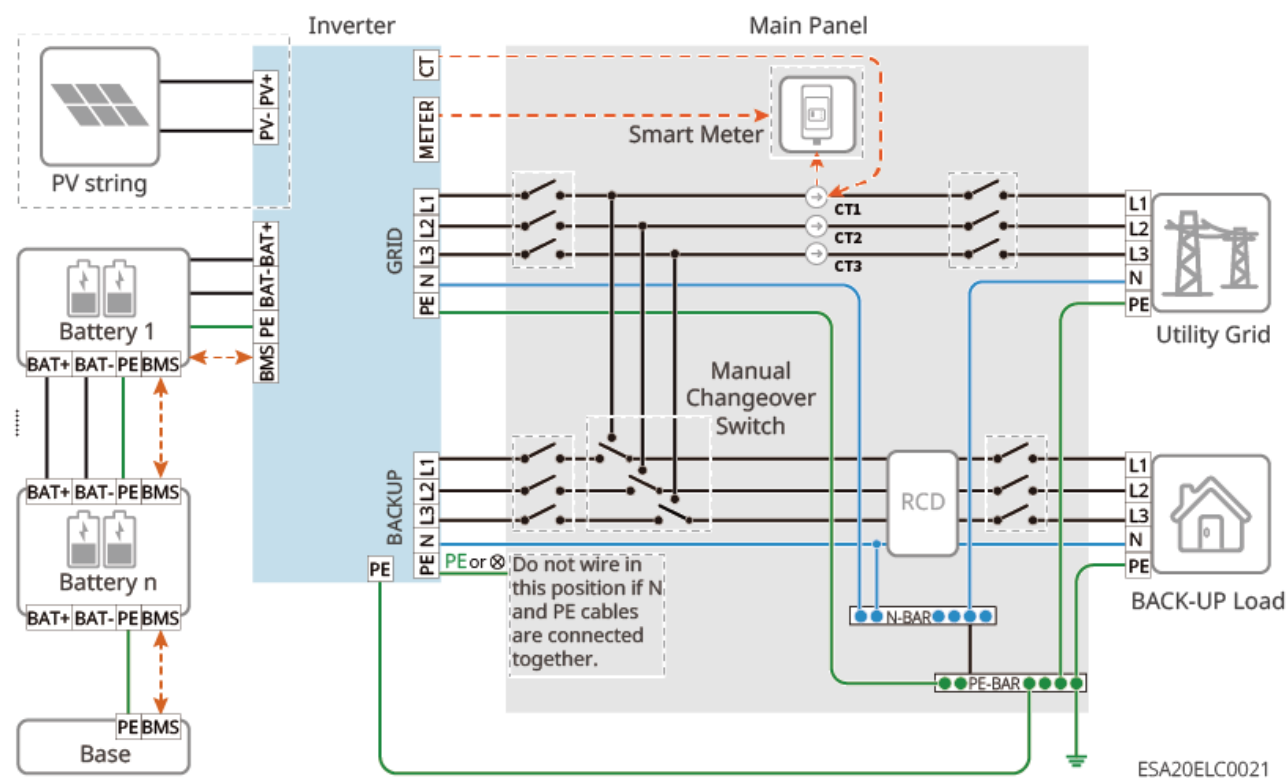
- Depending on the regulatory requirements of different regions, the wiring methods for the N and PE lines of the inverter's GRID and BACK-UP ports may vary. Please refer to local regulations for specifics.
- The inverter has a built-in meter and can be directly connected to the CT for use. The CT network cable shipped with the box is 10 meters long. If a longer distance is required, shielded network cables of CAT5E or above can be used to extend it up to 30 meters.
- When the connection length between CT and the inverter exceeds 30m, accuracy may decrease. If high precision is required, 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 in the open state; when the inverter is in grid-connected operation mode, the built-in GRID relay is in the closed state.
- After 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.
- In a whole-house backup power scenario, if the total power of the connected loads exceeds 1.1 times the inverter's rated power, after a grid power outage, the inverter will stop output due to overload protection. At this time, please turn off some non-essential loads to ensure that the total load power is less than 1.1 times the inverter's rated power.

The N and PE lines are connected together in the distribution box

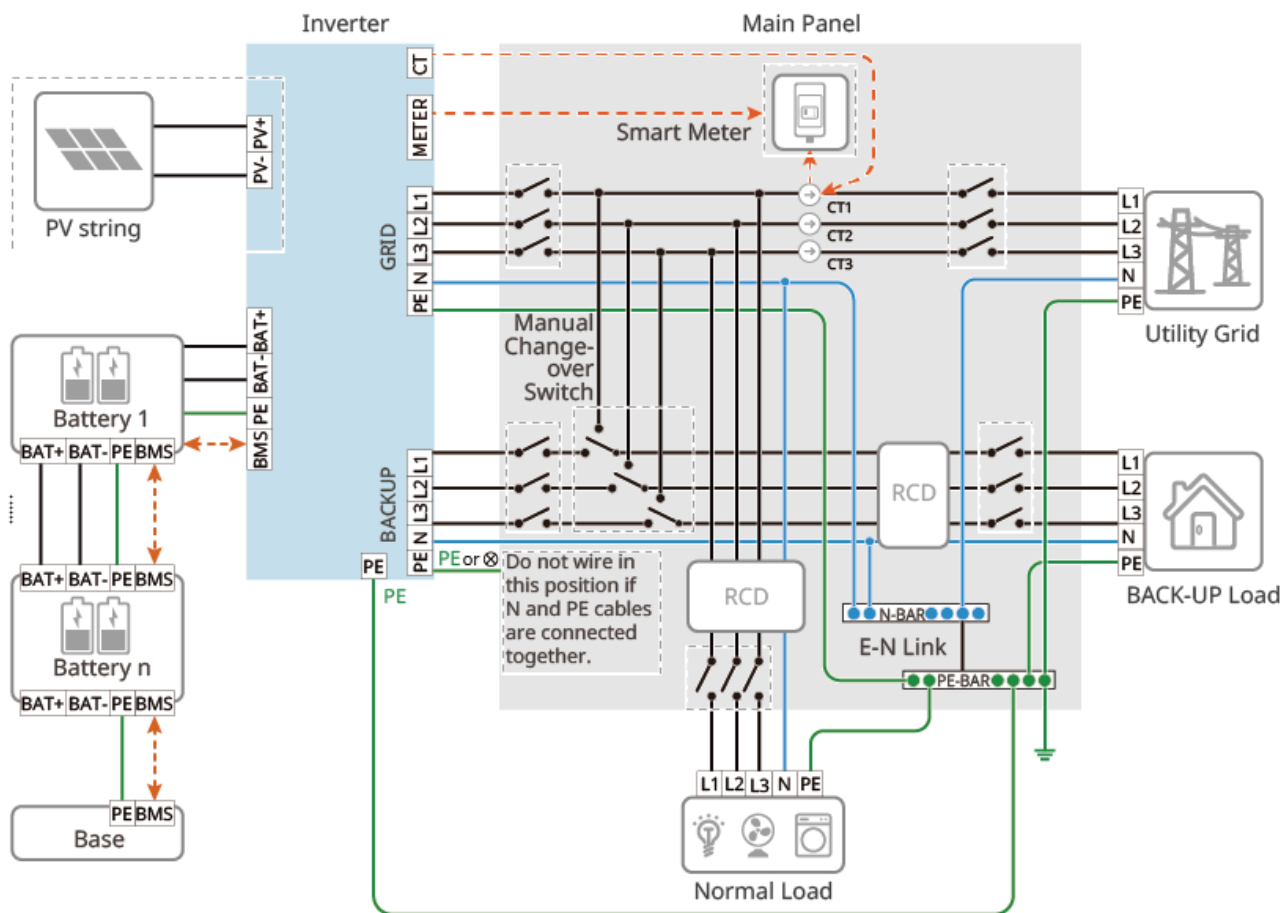
NOTICE

- To maintain neutral integrity, the neutral wires on the grid-connected side and off-grid side must be connected together; otherwise, the off-grid function cannot be used normally.
- The following diagram is a schematic of the grid system for regions such as Australia and New Zealand.

Whole House Backup Power



Partial Backup Power



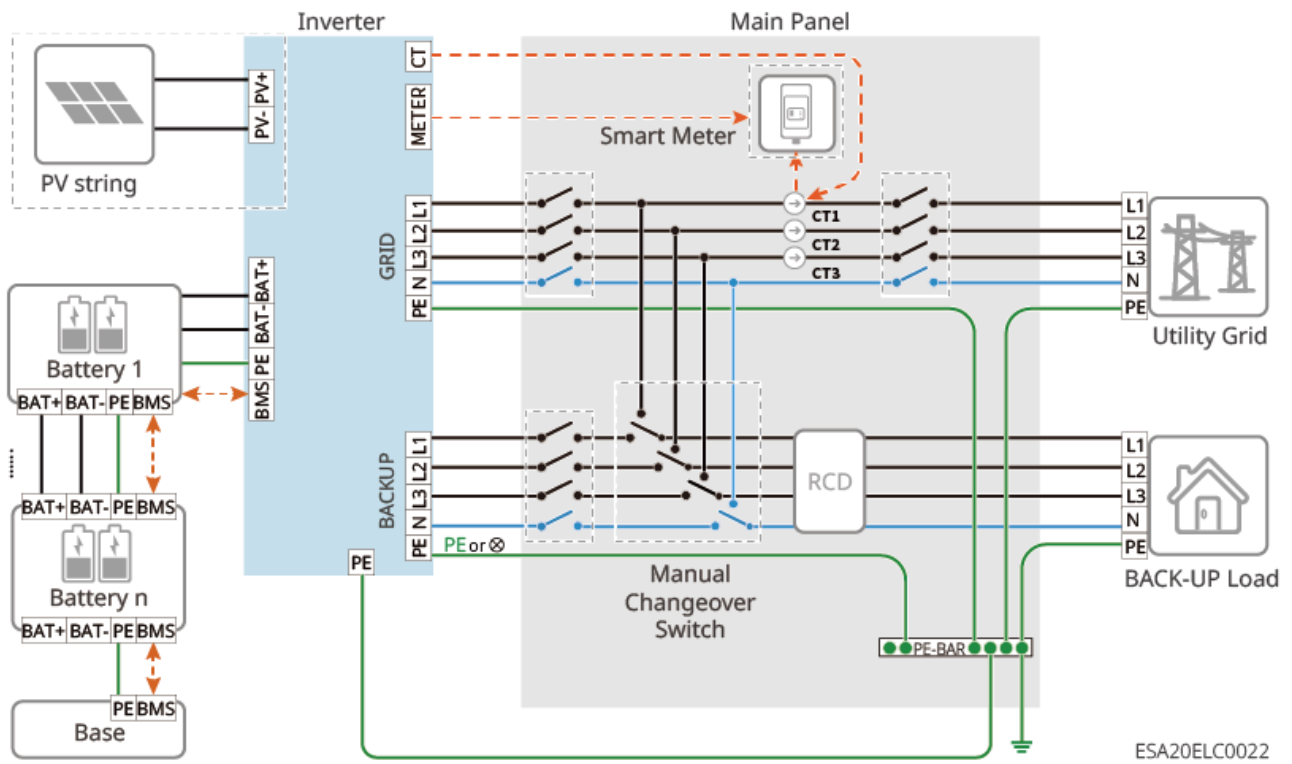
ESA20ELC0015

N and PE lines are wired separately in the distribution box

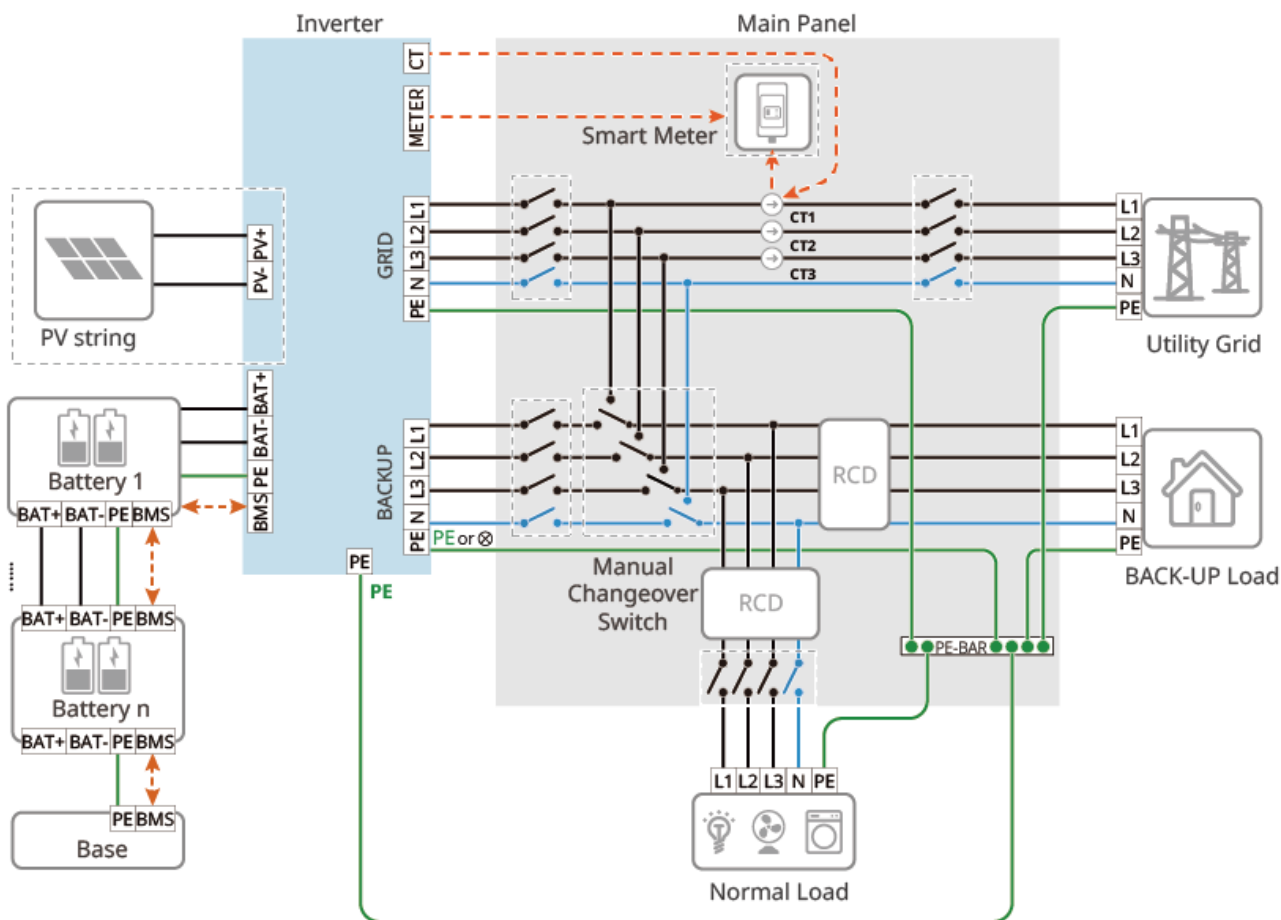
NOTICE

- Ensure the protective earth wire for the BACK-UP is correctly and securely connected. Otherwise, the BACK-UP function may operate abnormally in the event of a grid fault.
- The following wiring method applies to regions other than Australia, New Zealand, etc.:

Whole House Backup Power



Partial Backup Power



ESA20ELC0016

5.2 Detailed System Wiring Diagram

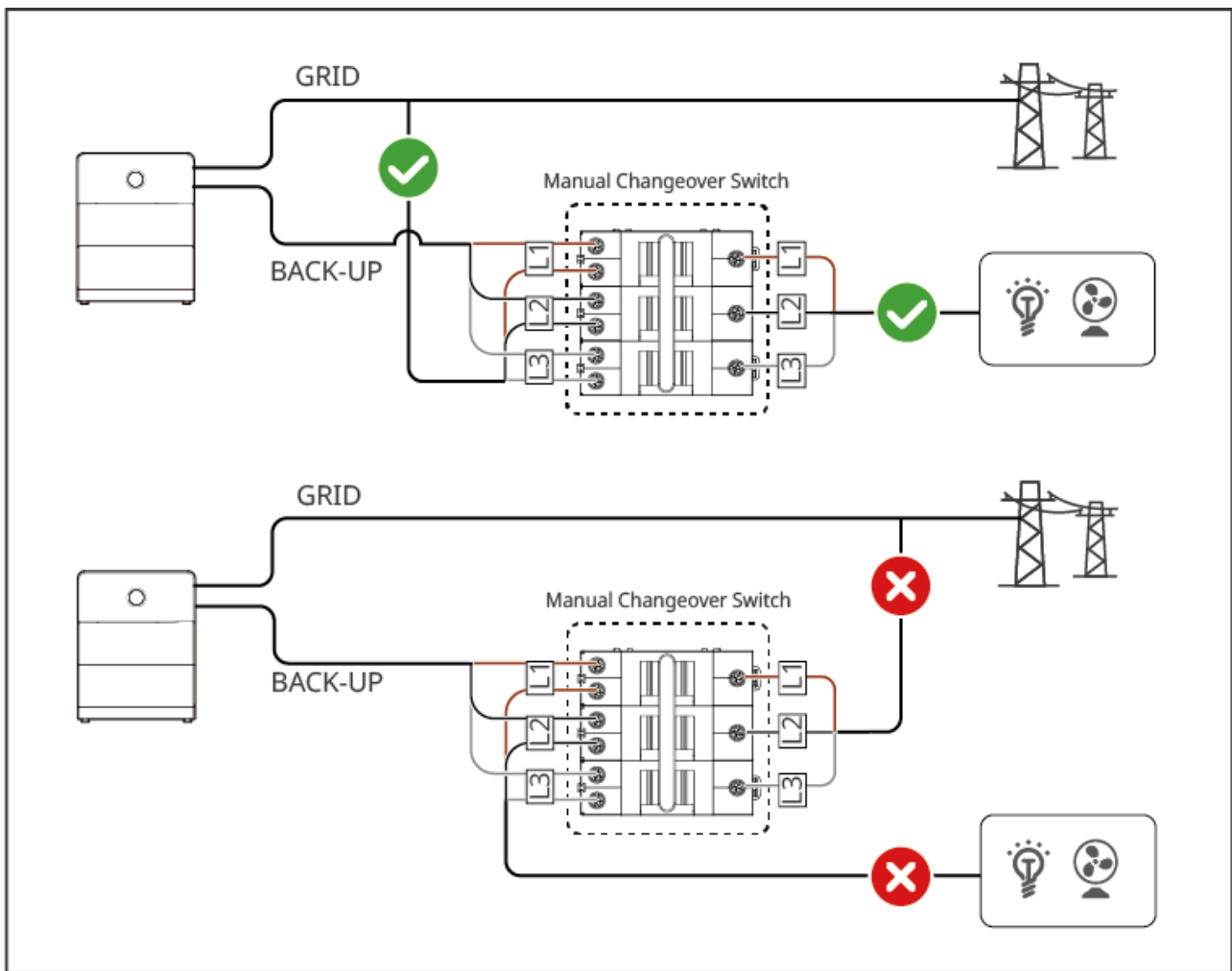
When all loads in the photovoltaic system cannot consume the electricity generated by the system, the surplus electricity will be fed into the grid. In this case, a smart meter or CT can be used to monitor the system's power generation and control the amount of electricity fed into the grid.

- 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 SEMS+ App.

The Detailed System Wiring Diagram only shows wiring examples using some device models. Please refer to the corresponding wiring guide section for the actual devices you are using when making connections.

WARNING

The common contact of the manual transfer switch must be on the BACK-UP load side of the Inverter, and must not be connected to the GRID utility side. If connected to the GRID utility side, the Inverter's off-grid mode and bypass mode will operate simultaneously. When the utility power fails, the distribution cabinet connected to the Inverter's GRID port will still carry high voltage, posing a risk of electric shock.



ESA20ELC0019

NOTICE

- In microgrid and coupled scenarios, if grid-tied inverter power generation monitoring and load monitoring functions are required, a dual-meter networking setup 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 a separate meter or CT device.
- In microgrid and coupled scenarios 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 optional and shipped based on order; please decide whether to install it according to the actual usage scenario. If using a self-provided ATS or STS switch, this switch must have an interlock function.

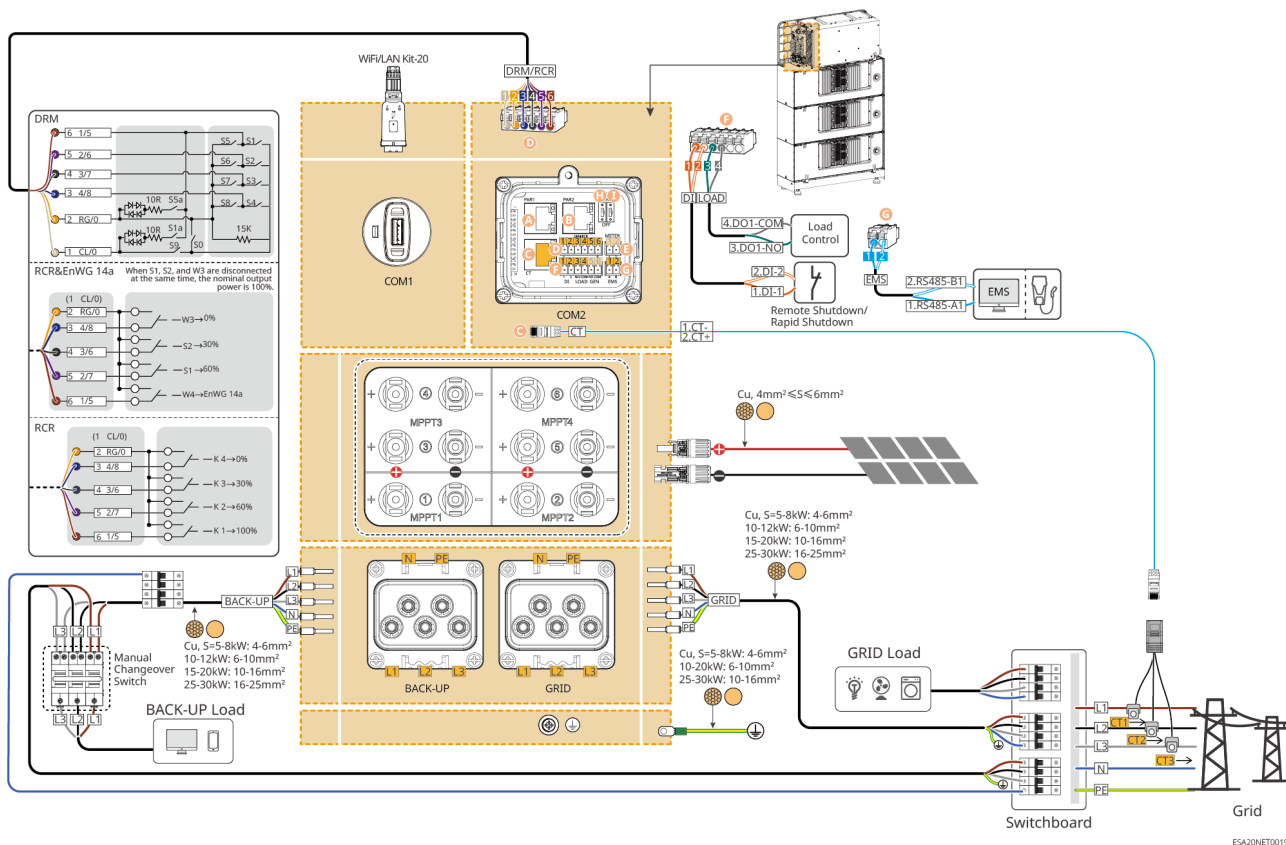
Dual Meter Configuration Scenarios

Meter 1 (Grid Side)	Meter 2 (Grid-tie Inverter AC Side)
Built-in Meter	GMK330
Built-in Meter	GM330
GMK330	GMK330
GM330	GM330
GMK330	GM330
GM330	GMK330

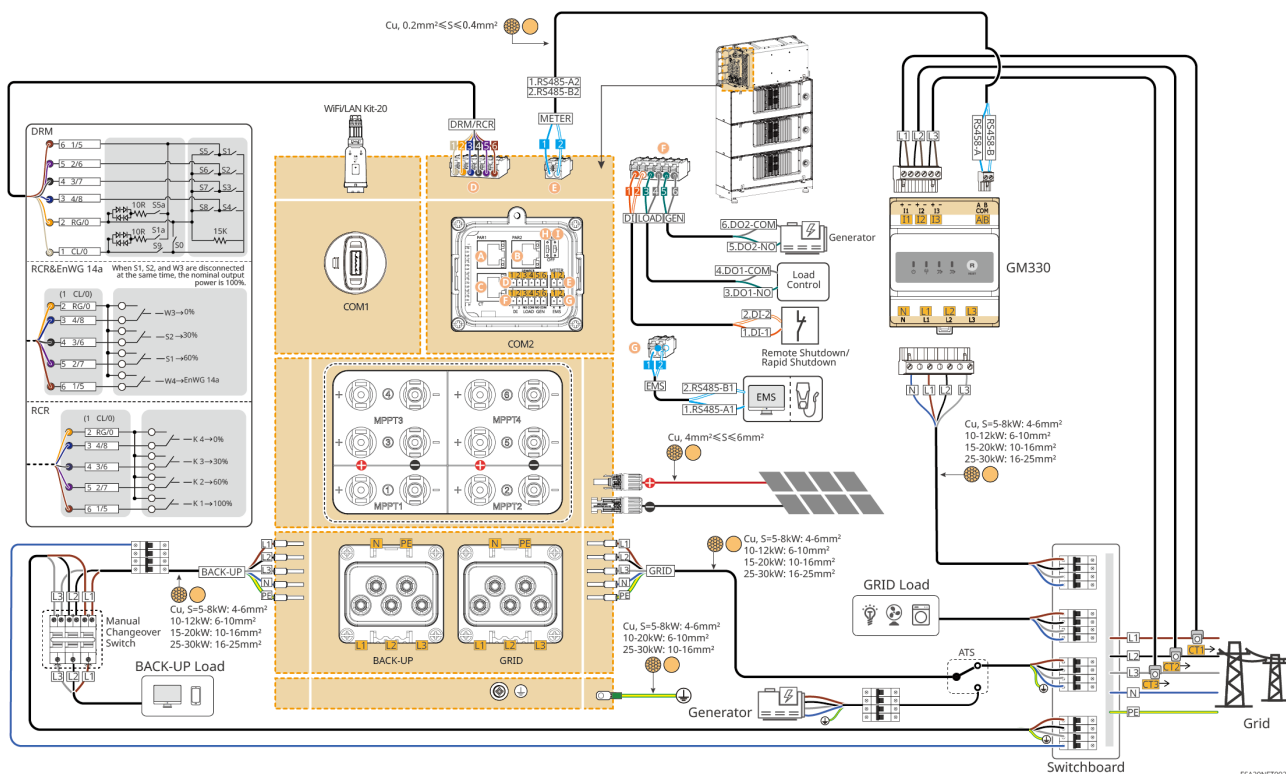
General Scenarios

Scenario with Built-in Meter

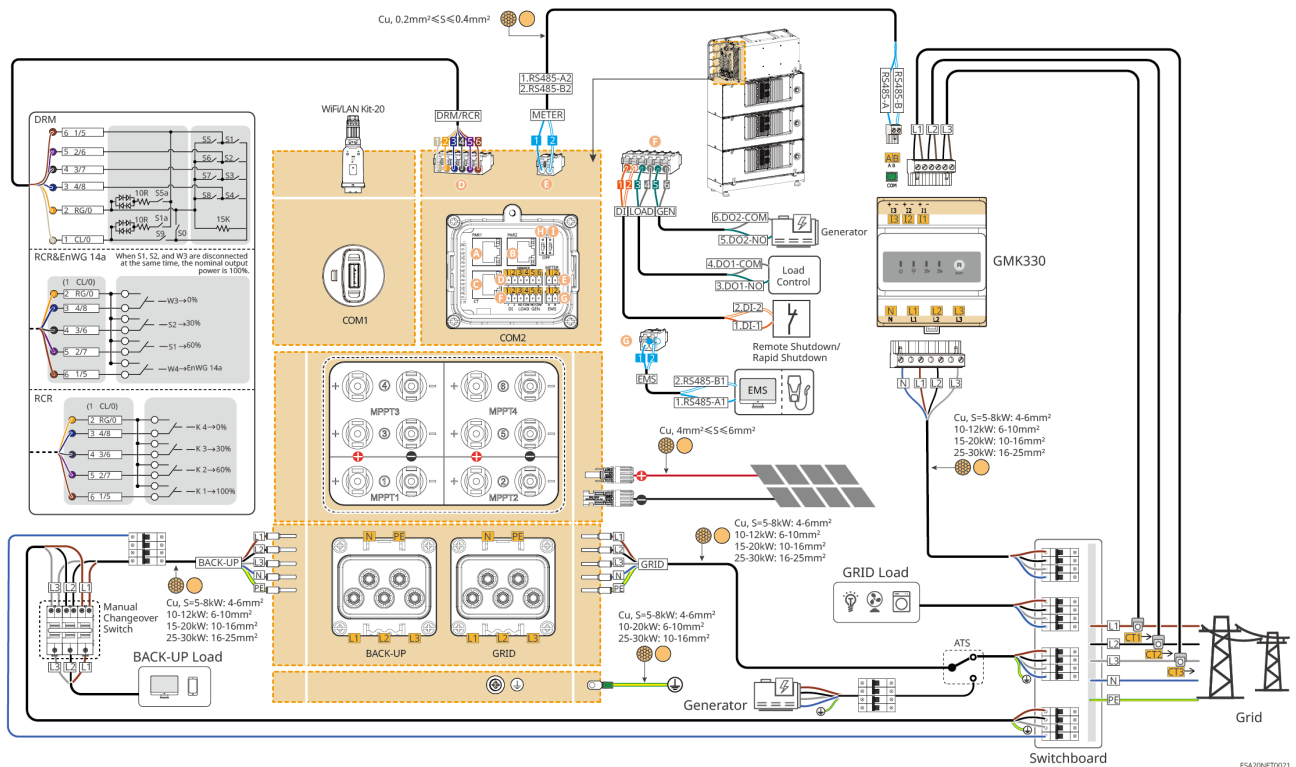
Scenarios using a built-in meter do not support connection to a generator.



Scenario with GM330 Meter



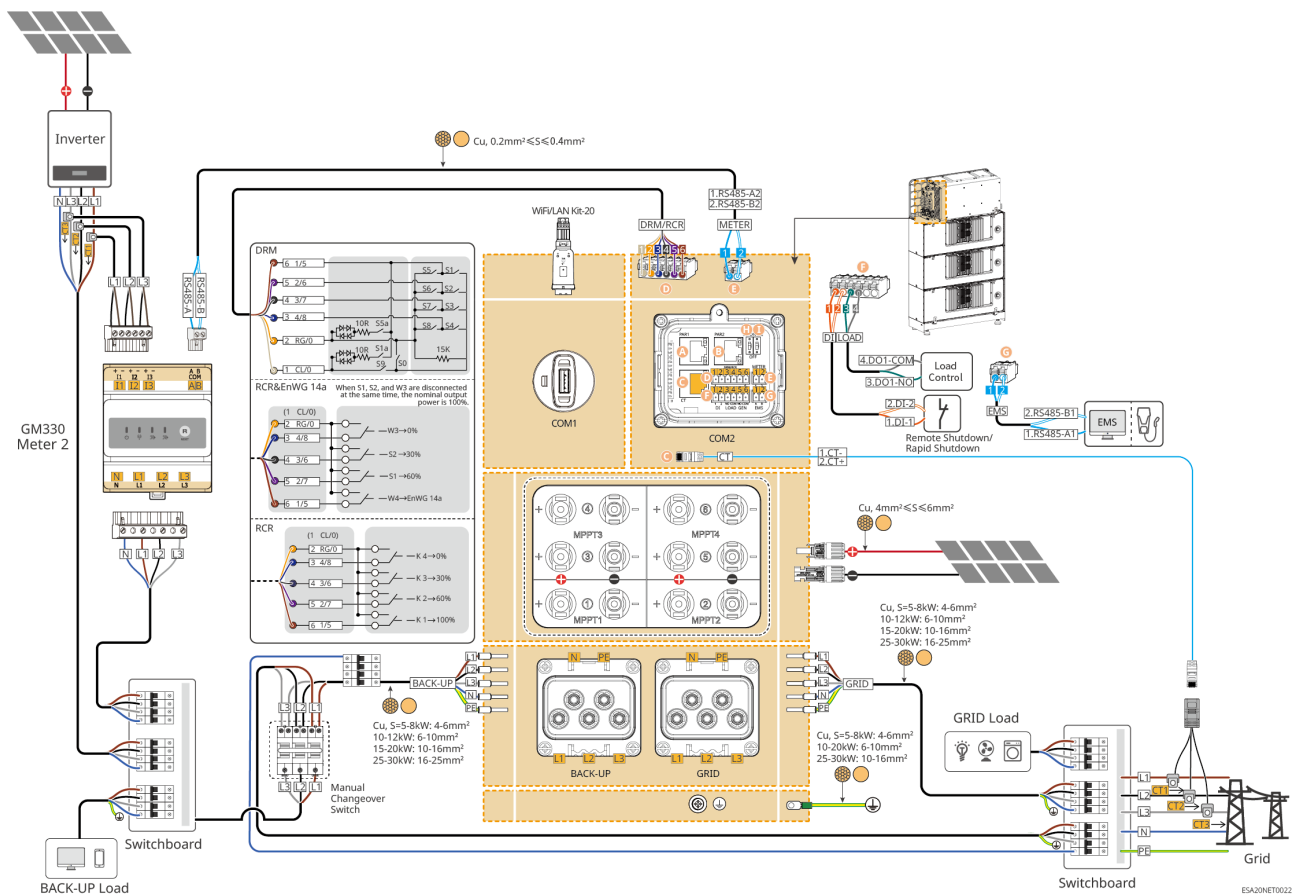
Scenario with GMK330 Meter



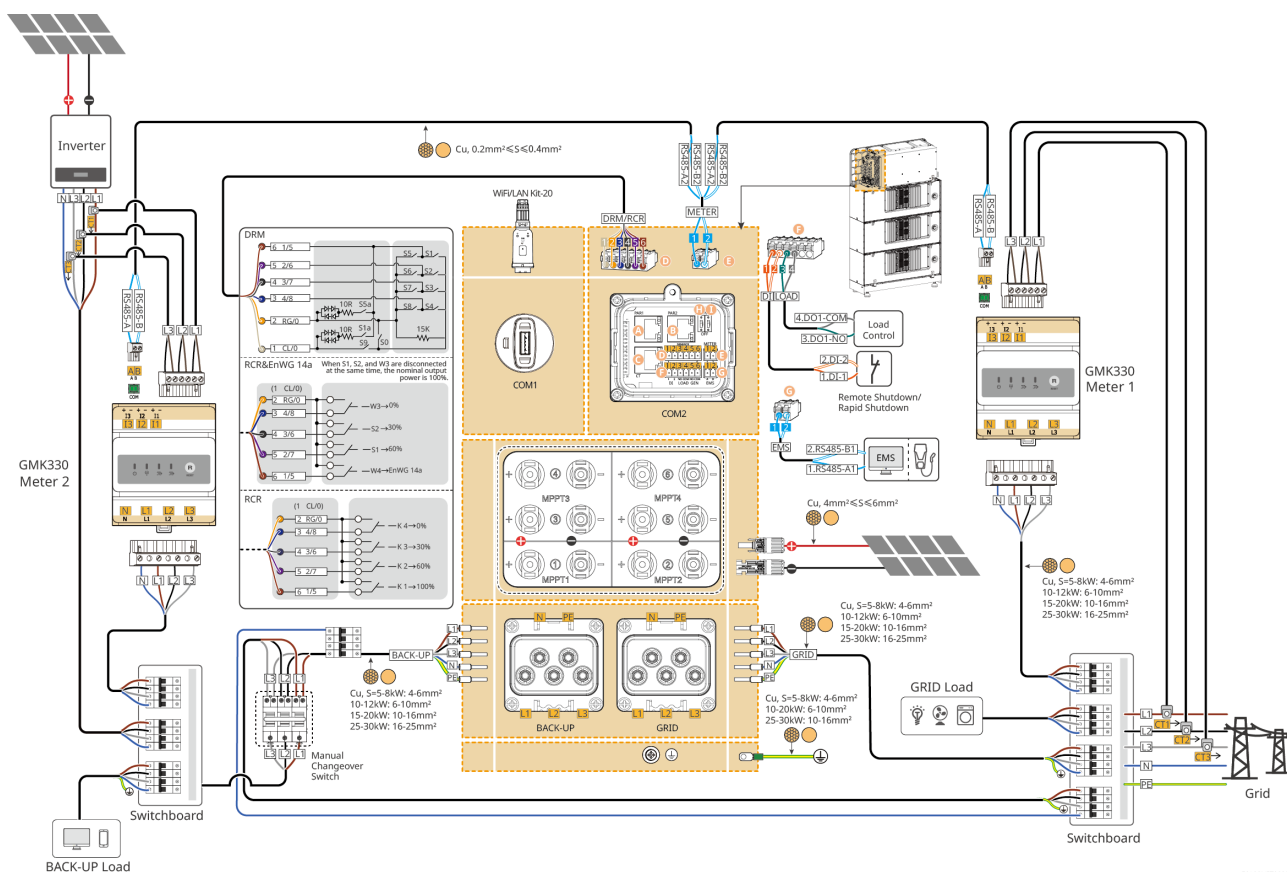
Microgrid Scenario Network Diagram

- Microgrid scenarios do not support connection to a generator.
- The manual transfer switch is optional. Please decide whether to install it based on the actual usage scenario.

Built-in Meter + GM330 Meter Network Diagram



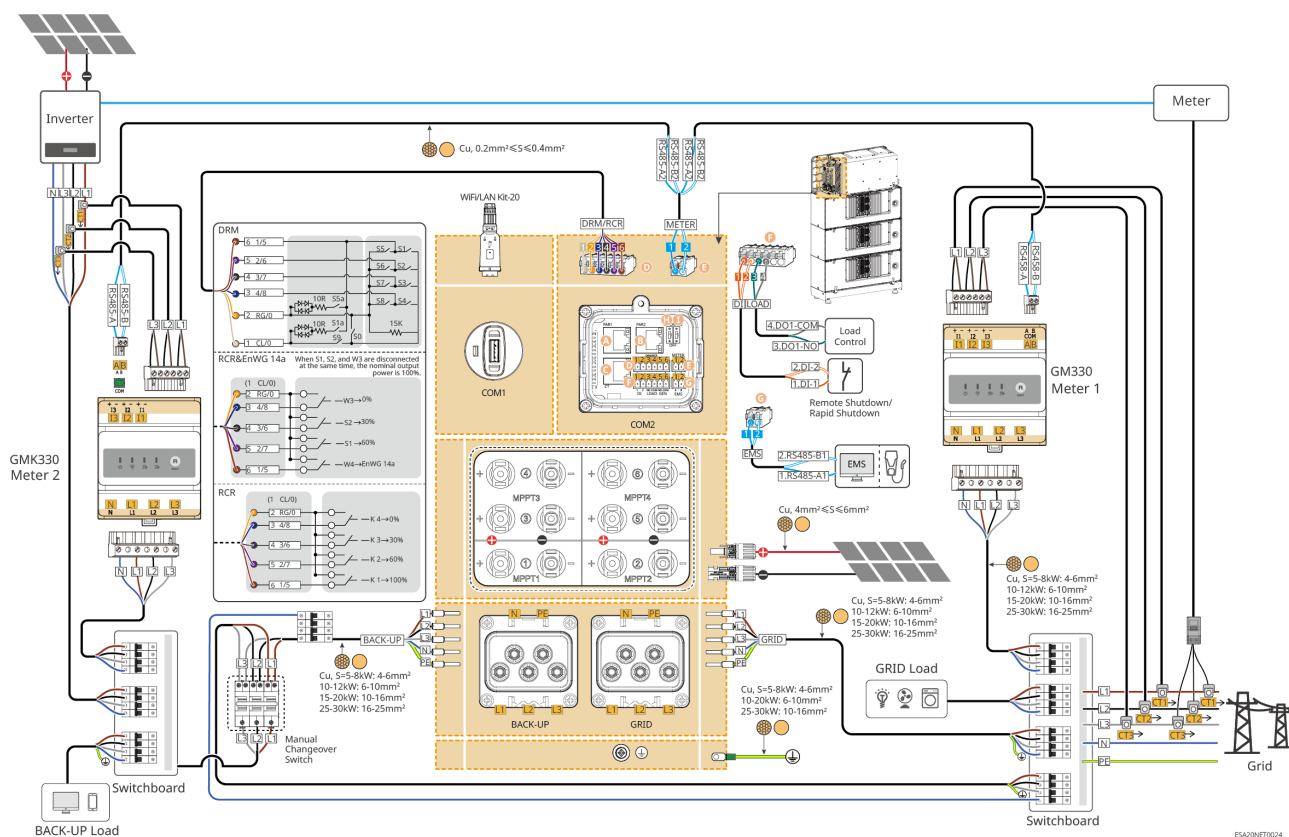
GMK330 + GMK330



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 separate meter or CT device.

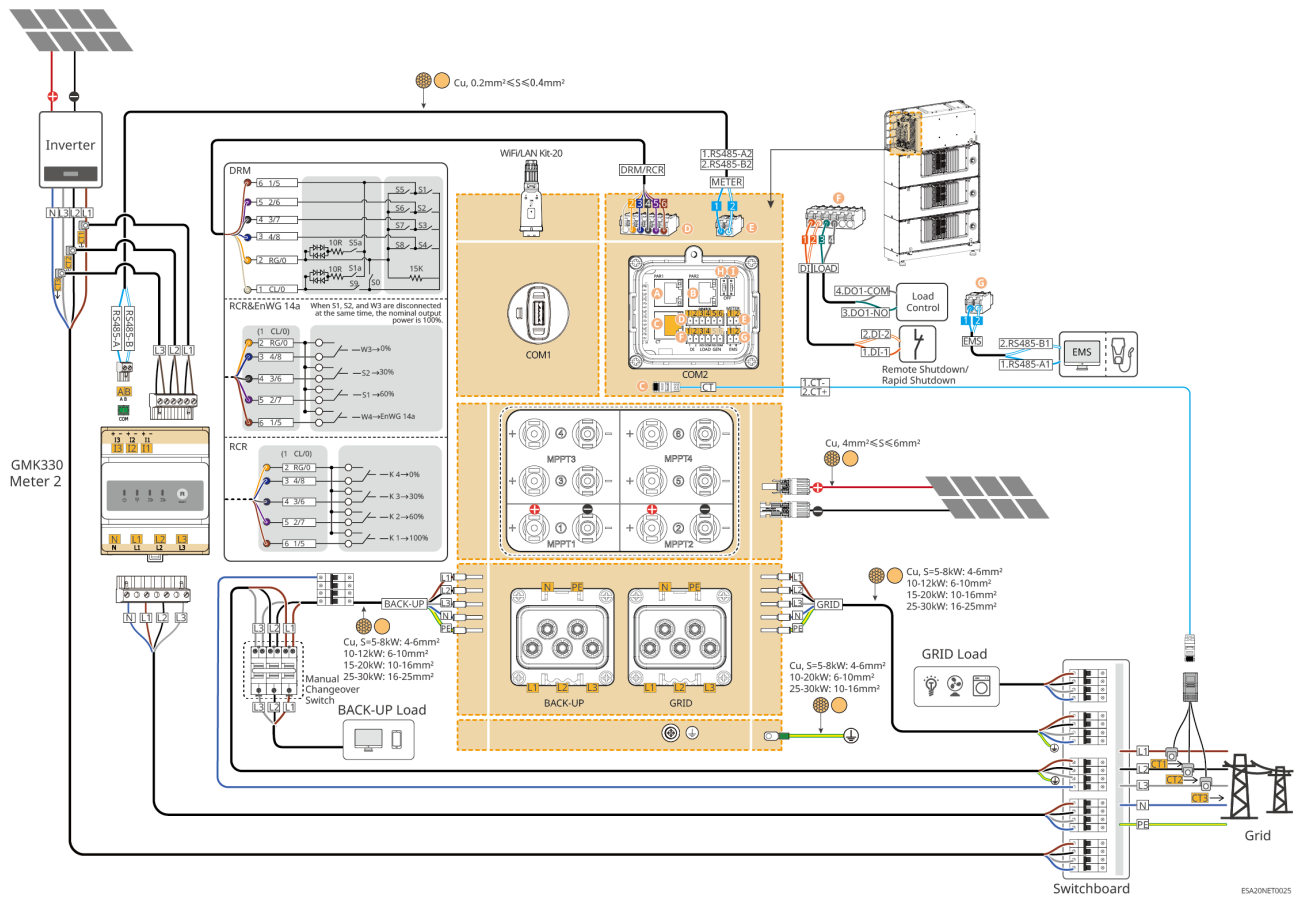
GM330 + GMK330



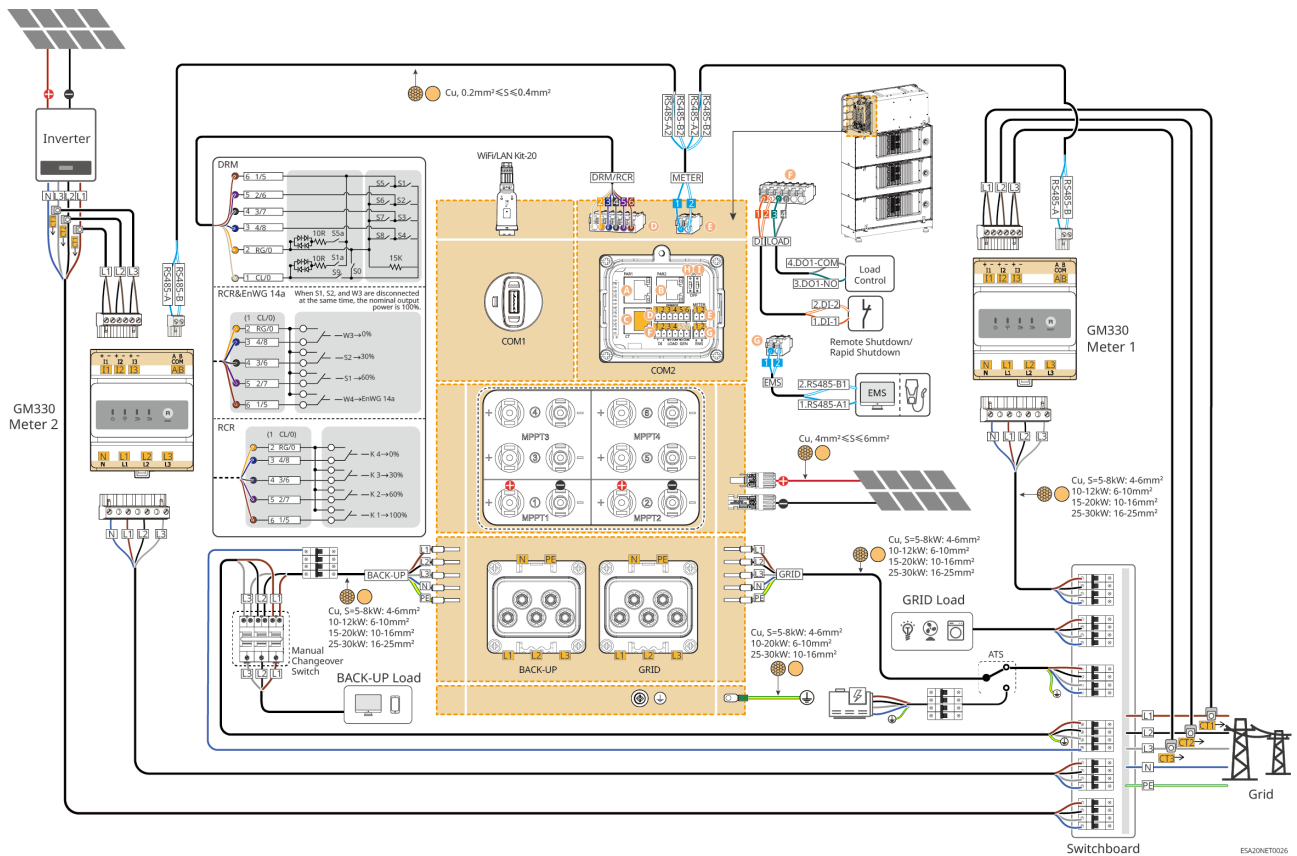
Coupled Scenario Dual Meter Network Diagram

- The manual transfer switch is optional. Please decide whether to install it based on the actual usage scenario.
- Scenarios using a built-in meter do not support connection to a generator.

Built-in Meter + GMK330



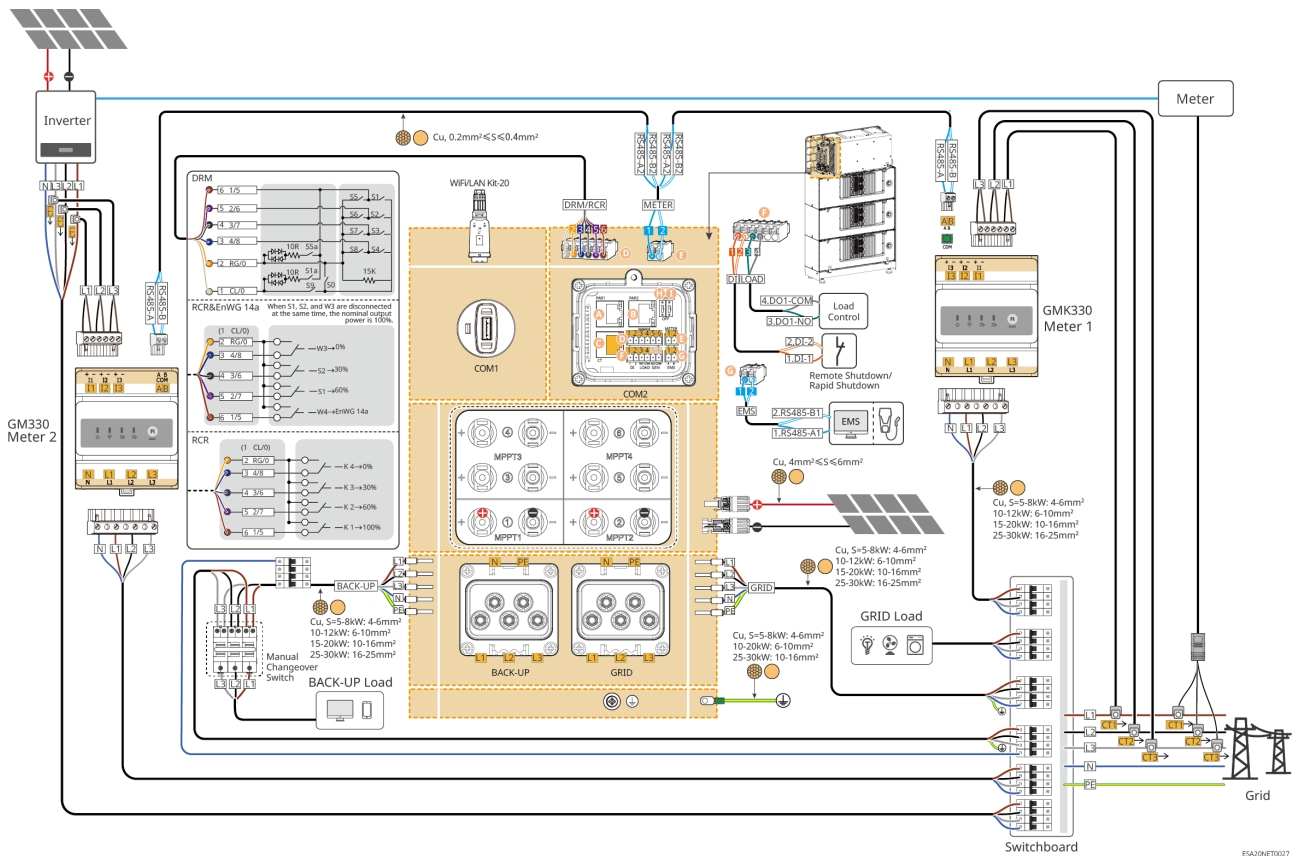
GM330 + GM330 Network Diagram



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 separate meter or CT device.

GMK330 + GM330



5.3 Preparing Materials



- 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 must not be connected to a single AC circuit breaker simultaneously.
- To ensure the inverter can safely disconnect from the grid in case of an abnormality, please install 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, power down the inverter first; otherwise, electric shock may occur.
- For cables used in the same system, it is recommended that the following be consistent: conductor material, cross-sectional area, length, etc.
 - The inverter's BACK-UP AC cable
 - The inverter's GRID AC cable
- The inverter supports connection 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	Recommendations for partial backup scenarios are as follows: • Rated voltage $\geq 230V_{ac}$ • Rated current requirements are as follows: ◦ GW5K-ETA-G20: 20A ◦ GW6K-ETA-G20: 20A ◦ GW8K-ETA-G20: 20A ◦ GW9.999K-ETA-G20: 32A	Self-provided	During actual selection, a breaker that meets local installation regulations can also be chosen based on the actual operating current.

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ 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 Recommendations for whole-house backup scenarios are as follows: • Rated voltage $\geq 230V_{ac}$ • Rated current requirements are as follows: ◦ GW5K-ETA-G20: 63A ◦ GW6K-ETA-G20: 63A ◦ GW8K-ETA-G20: 63A		

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ 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 according to the maximum grid-connected current.		
2	ATS switch	The specifications of the ATS switch and the GRID breaker for the same model are consistent.	Self-provided	

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
3	RCD	RCD device installation and RCD specification selection: It is recommended to install a Type A RCD with a residual current trigger level $\geq 300\text{mA}$ on the AC output side of the inverter (for inverter capacity $< 30\text{kVA}$, select a residual current operating level of 300mA ; for inverter capacity $\geq 30\text{kVA}$, select a residual current operating level of 10mA/kVA). Alternatively, select an appropriate RCD specification according to local regulatory requirements.	Self-provided	-
4	(Optional) Manual transfer switch	Rated voltage $\geq 230\text{Vac}$ Rated 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, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 80A	- Self-provided - Shipped with the inverter (Australia only)	During actual selection, an appropriate manual transfer switch can also be chosen according to local regulations.

5.3.2 Preparing Cables

No.	Cable	Recommended Specification	Acquisition Method
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: 4-6mm² ◦ 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 mm² ◦ GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 10-16 mm²	Self-provided
2	PV DC Cable	• Industry-standard outdoor PV cable • Conductor cross-sectional area: 4mm²-6mm² • Cable outer diameter: 5.9mm-8.8mm	Self-provided

No.	Cable	Recommended Specification	Acquisition Method
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: 4-6mm² ◦ GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW9.999K-BTA-G20, GW10K-BTA-G20, GW12K-BTA-G20: 6-10mm² ◦ GW15K-ETA-G20, GW20K-ETA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 10-16mm² ◦ GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 16-25mm² • 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	Self-provided
4	Smart Meter Power Cable	• Outdoor copper cable • Conductor cross-sectional area: 1mm²	Self-provided

No.	Cable	Recommended Specification	Acquisition Method
5	Meter RS485 Communication cable	• Shielded twisted pair • Conductor cross-sectional area: 0.2mm²-0.4mm²	Self-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	Self-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 higher specification standard shielded network cable and RJ45 RJ45 connector	Self-provided

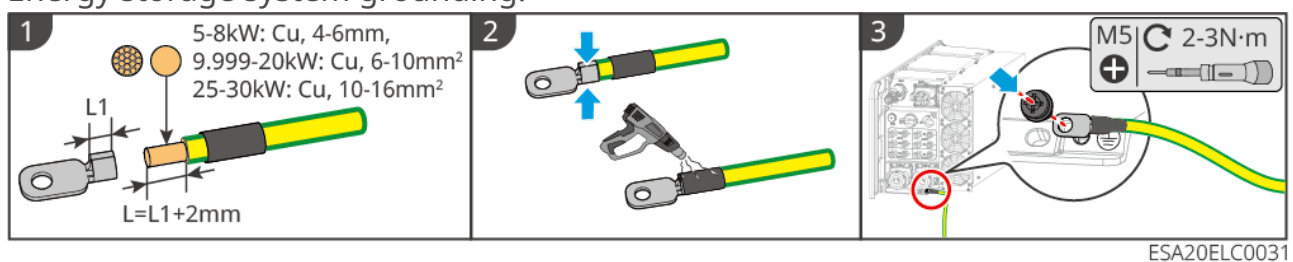
5.4 Connecting the PE cable



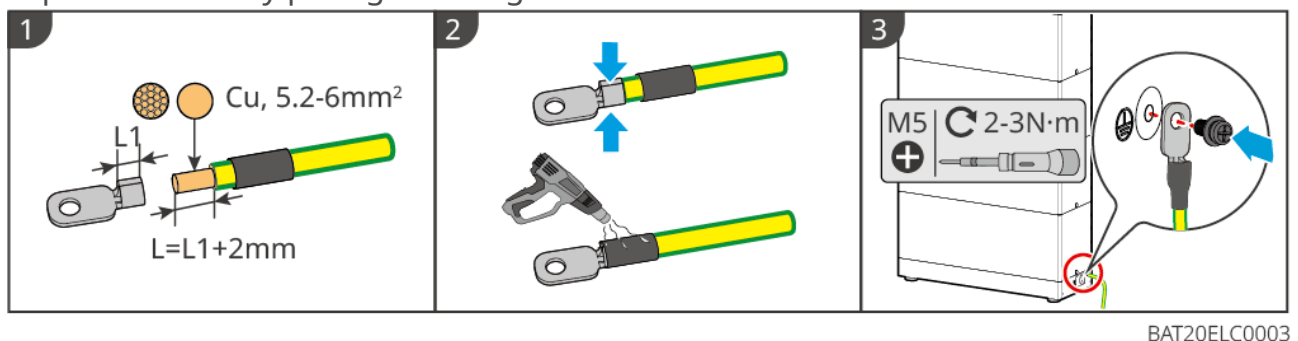
WARNING

- The protective grounding of the chassis cannot replace the protective ground wire of the AC output port. When wiring, ensure that the protective ground wires at both locations are reliably connected.
- To improve the corrosion resistance of the terminals, it is recommended to apply silicone or paint to the exterior of the grounding terminals for protection after the protective ground wire connection is installed.
- When installing the device, the protective ground wire must be installed first; when removing the device, the protective ground wire must be removed last.
- The battery grounding is integrated into the blind-mate 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 need for split expansion, please separately ground the expansion battery pack.

Energy storage system grounding:



Expansion battery pack grounding:



5.5 Connecting the PV Cable

⚠ DANGER

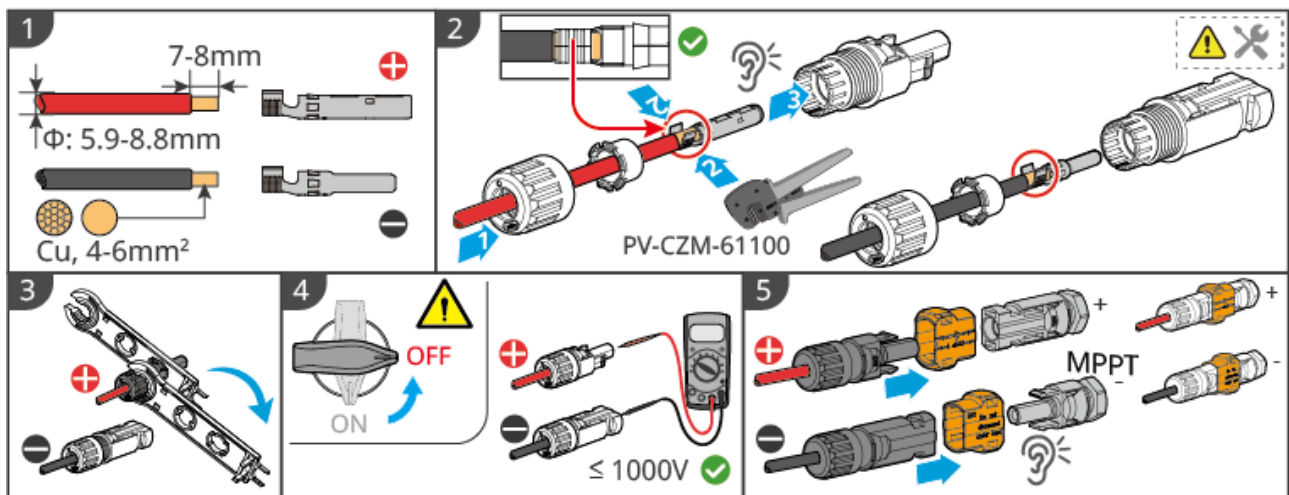
- Do not connect the same PV string to multiple inverters, as this may cause inverter damage.
- Before connecting the PV string to the inverter, confirm the following information. Failure to do so may cause permanent damage to the inverter and, in severe cases, may lead to fire resulting in personal injury and property loss.
 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 terminal of the PV string is connected to the inverter's PV+, and the negative terminal 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 impedance requirement ($R = \text{Max.Input Voltage} / 30\text{mA}$).
- 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 cable to ensure correct polarity (no reverse connection) and that the voltage is within the allowable range.

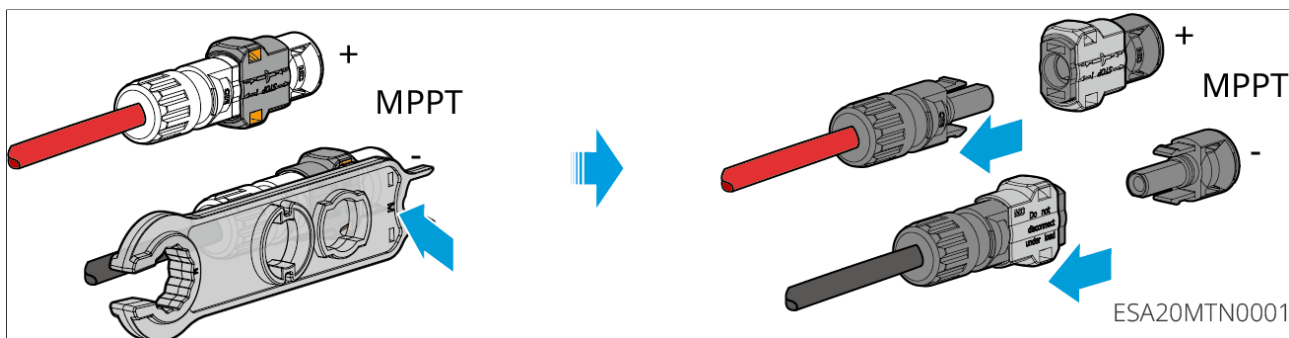
NOTICE

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



ESA20ELC0030

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



ESA20MTN0001

5.6 Connecting the Battery Expansion Cable

! DANGER

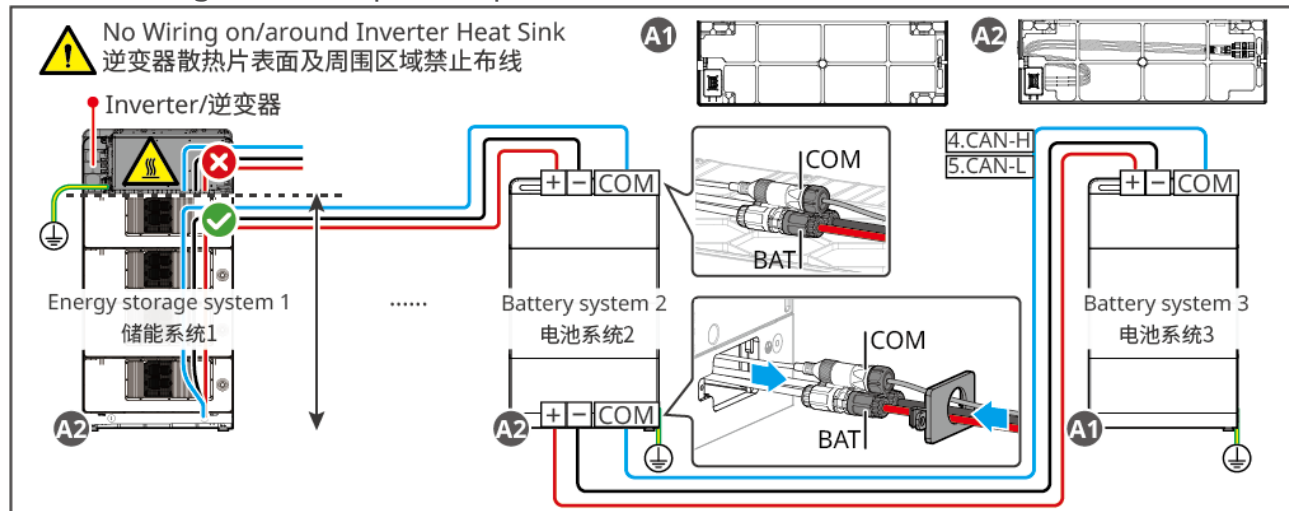
- Do not connect loads between the inverter and the battery.
- When connecting battery cables, use insulated tools to prevent accidental electric shock or battery short circuit.
- Ensure that the battery open-circuit voltage is within the allowable range of the inverter.
- Between batteries, choose whether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

Only available for BAT 5.1 & 8.3kWh

Overview of Energy Storage System Expansion

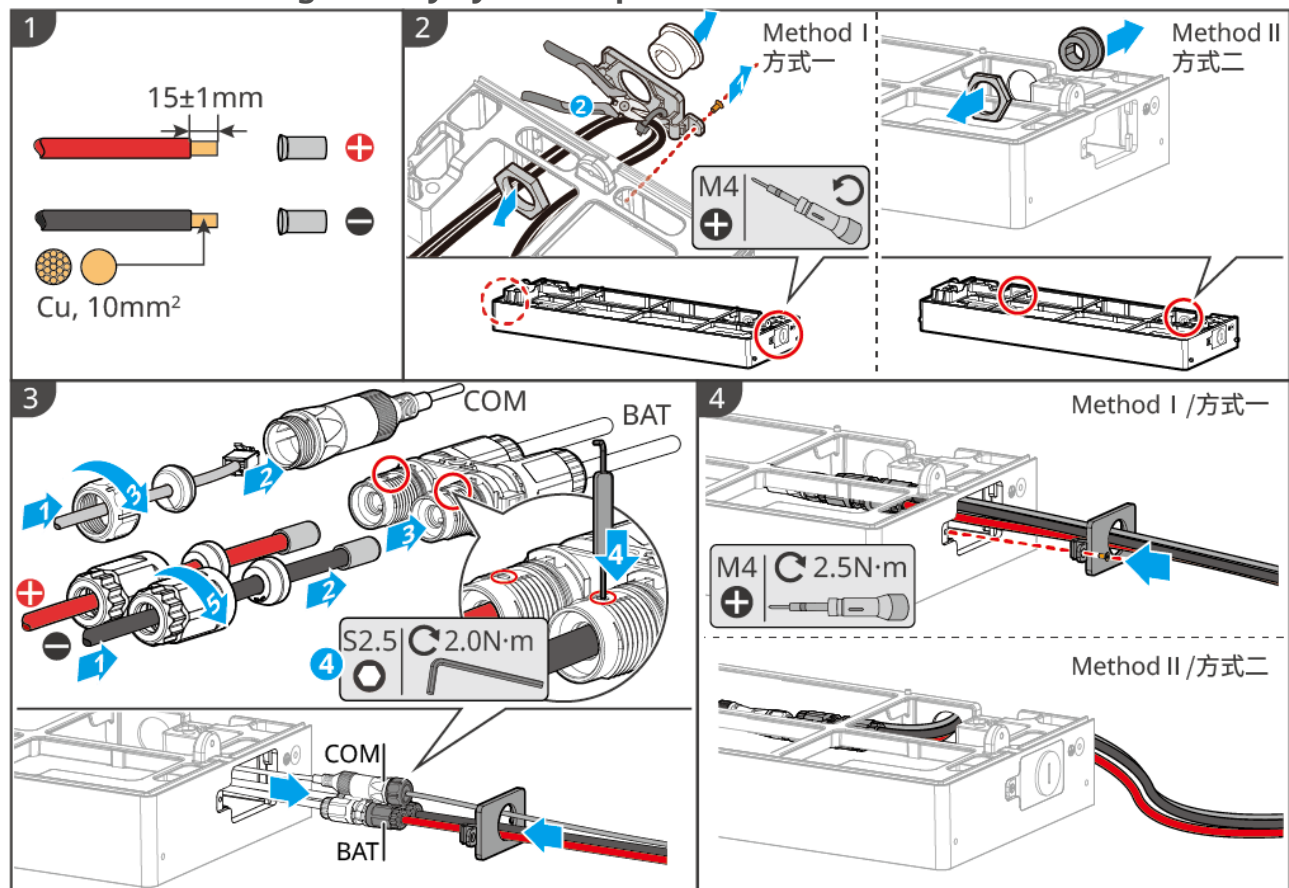
A1: Base shipped with the inverter

A2: Mounting base with parallel ports



ESA20ELC0025

Method for Making Battery System Expansion Cable Harness

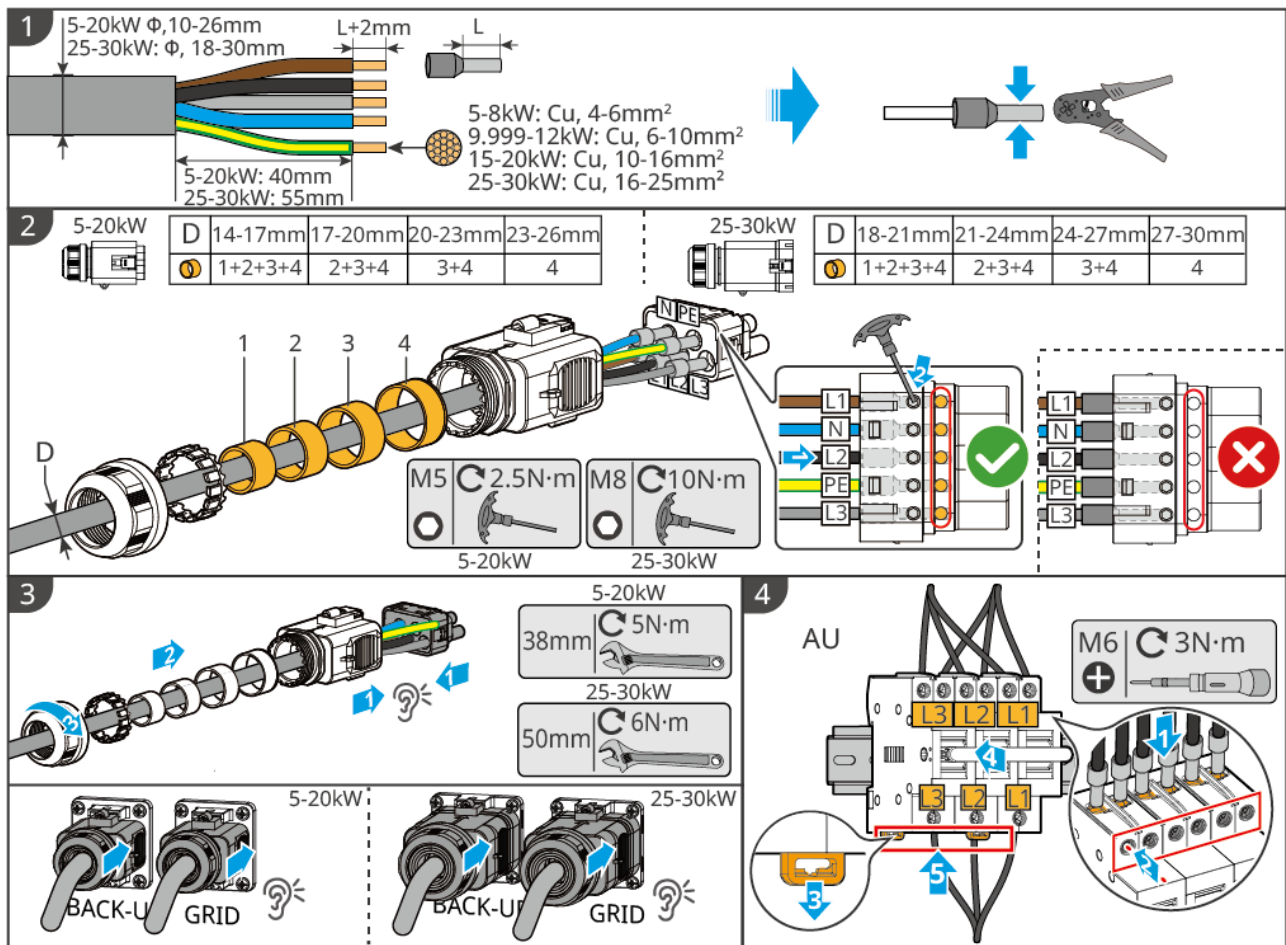


BAT20ELC0004

5.7 Connecting the AC Cable

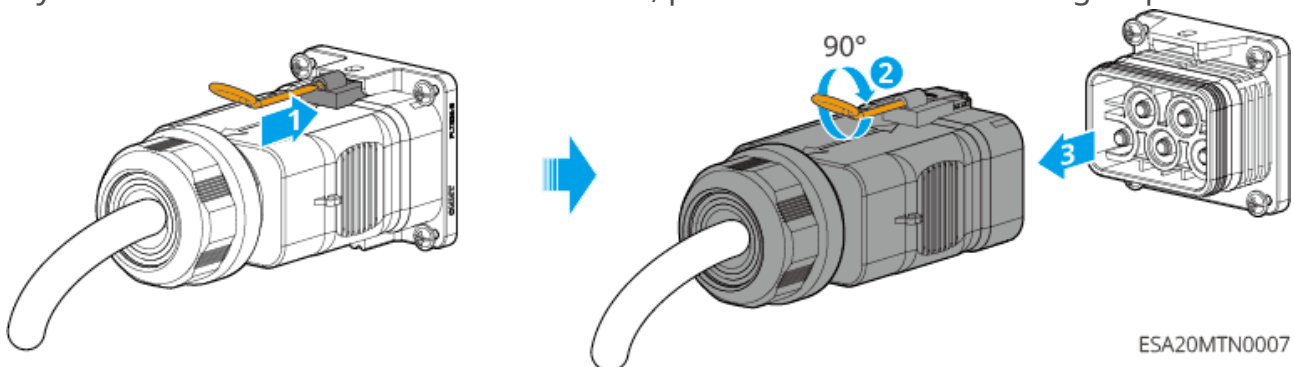
WARNING

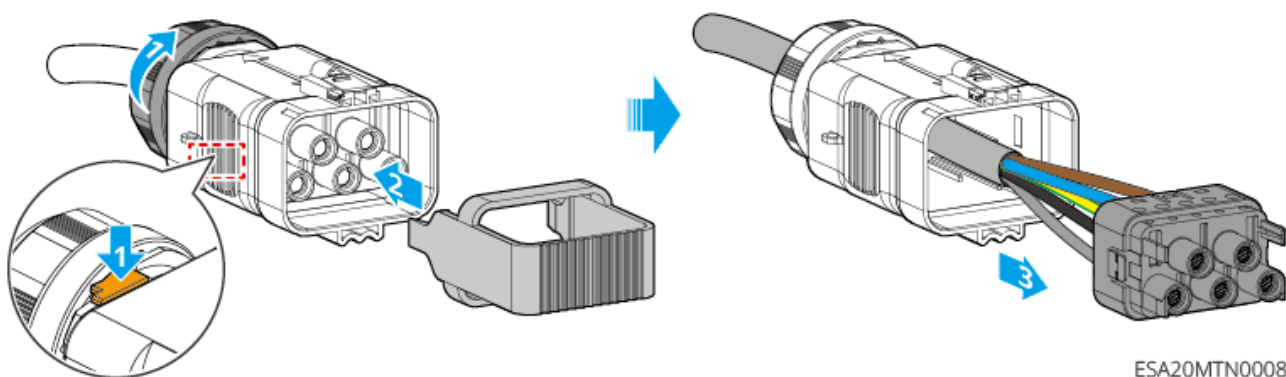
- The inverter integrates a Residual Current Monitoring Unit (RCMU) internally to prevent residual current from exceeding the specified value. When the inverter detects a leakage current greater than the permissible value, it will quickly disconnect from the grid.
- During wiring, ensure the AC wires fully match the "BACKUP" and "GRID" grounding 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 terminal is securely fastened and not loose.
- Ensure all cable connections are tight; otherwise, overheating of the terminals during operation may cause equipment damage.



ESA20ELC0027

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



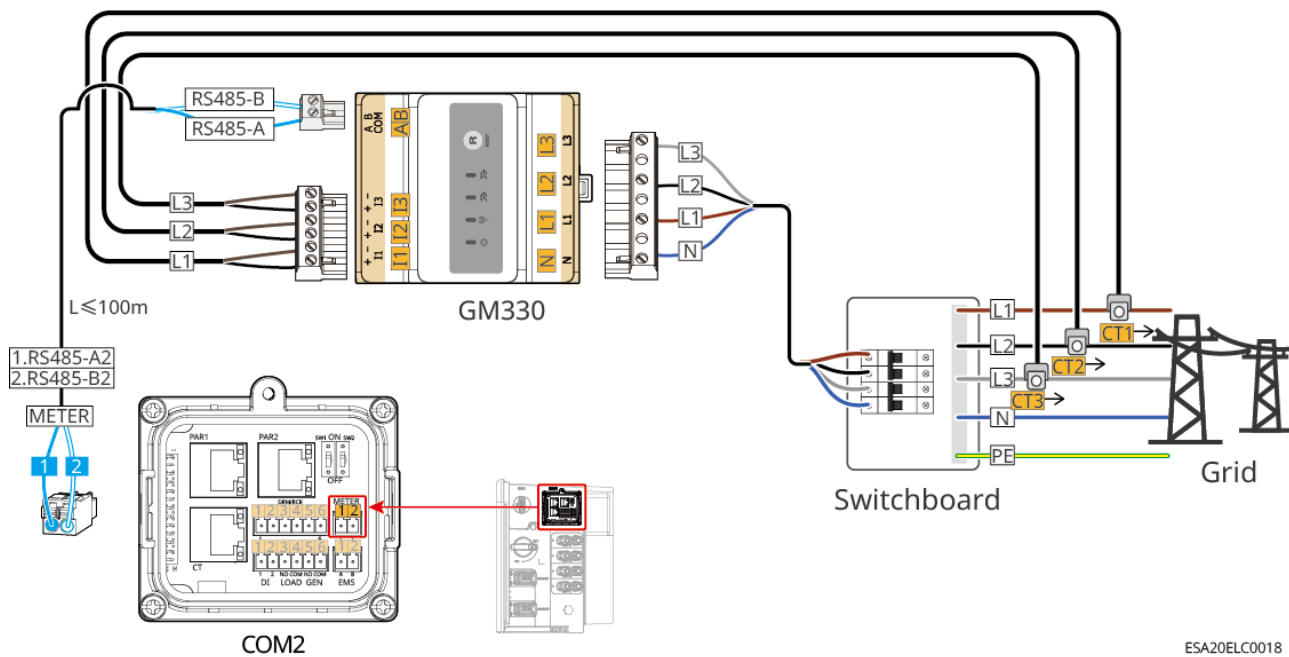


5.8 Connecting the Meter Cable

NOTICE

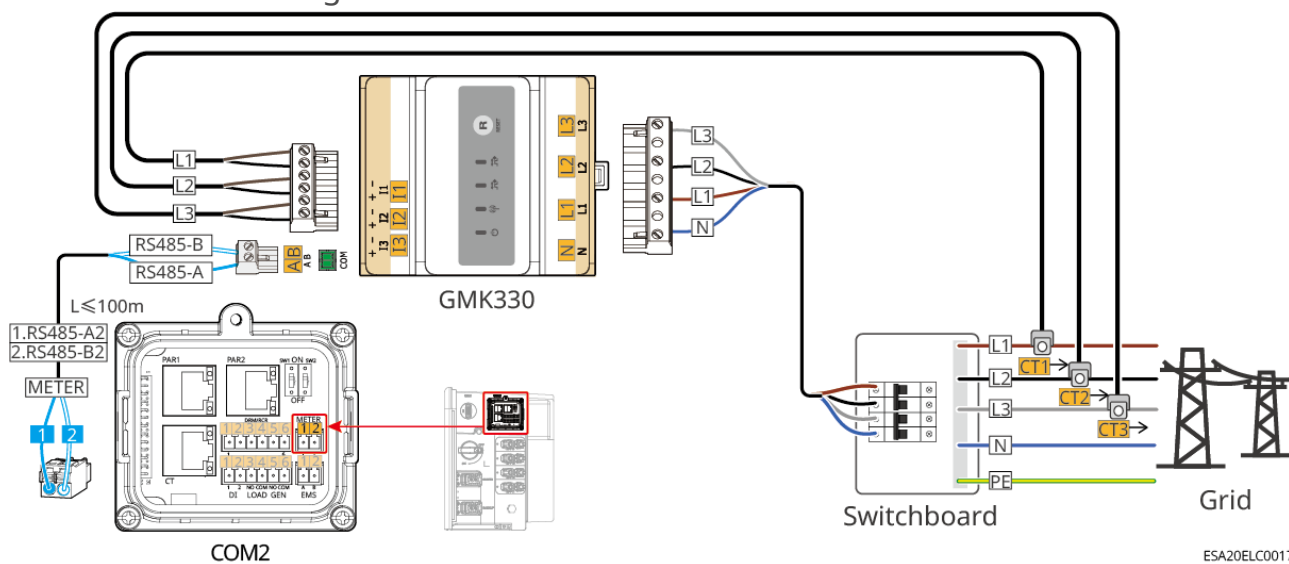
- If you require networking of multiple inverters in parallel, please consult the manufacturer to purchase a meter separately.
- Please ensure the CT connection direction and phase sequence are correct; otherwise, it may lead to incorrect monitoring data.
- Ensure all cable connections are correct, secure, and not loose. 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 cable is not routed using grounded metal conduit, it is recommended to install external lightning protection devices.

GM330 Meter Wiring



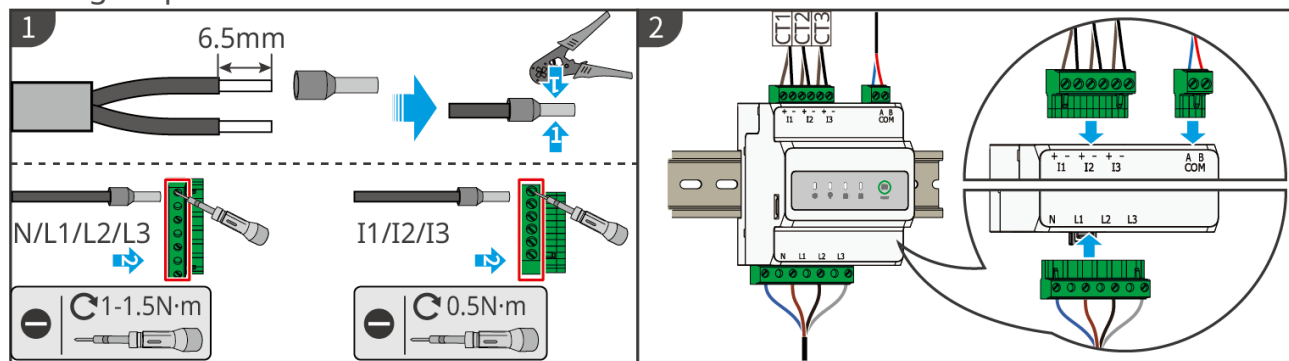
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GMK330 Meter Wiring

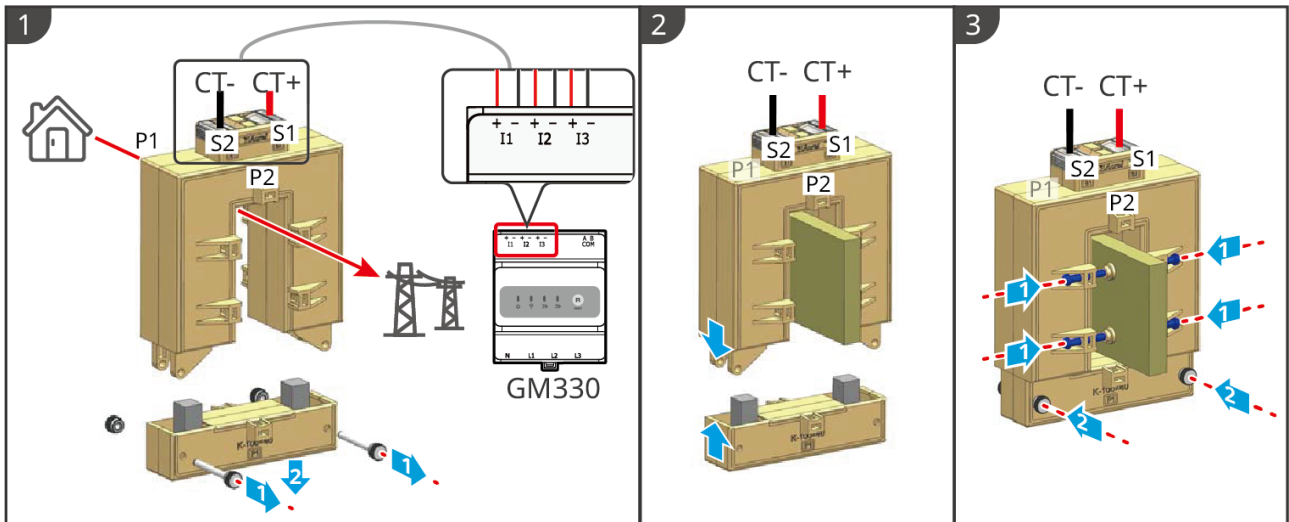


ESA20ELC0017

Wiring Steps

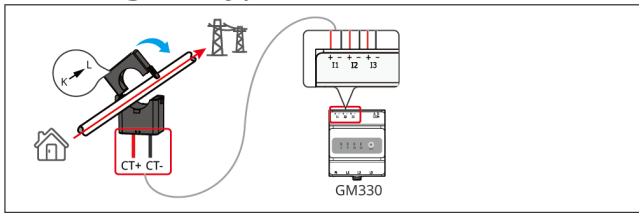


Installing CT (Type One)



GMK10ELC0006

Installing CT (Type Two)



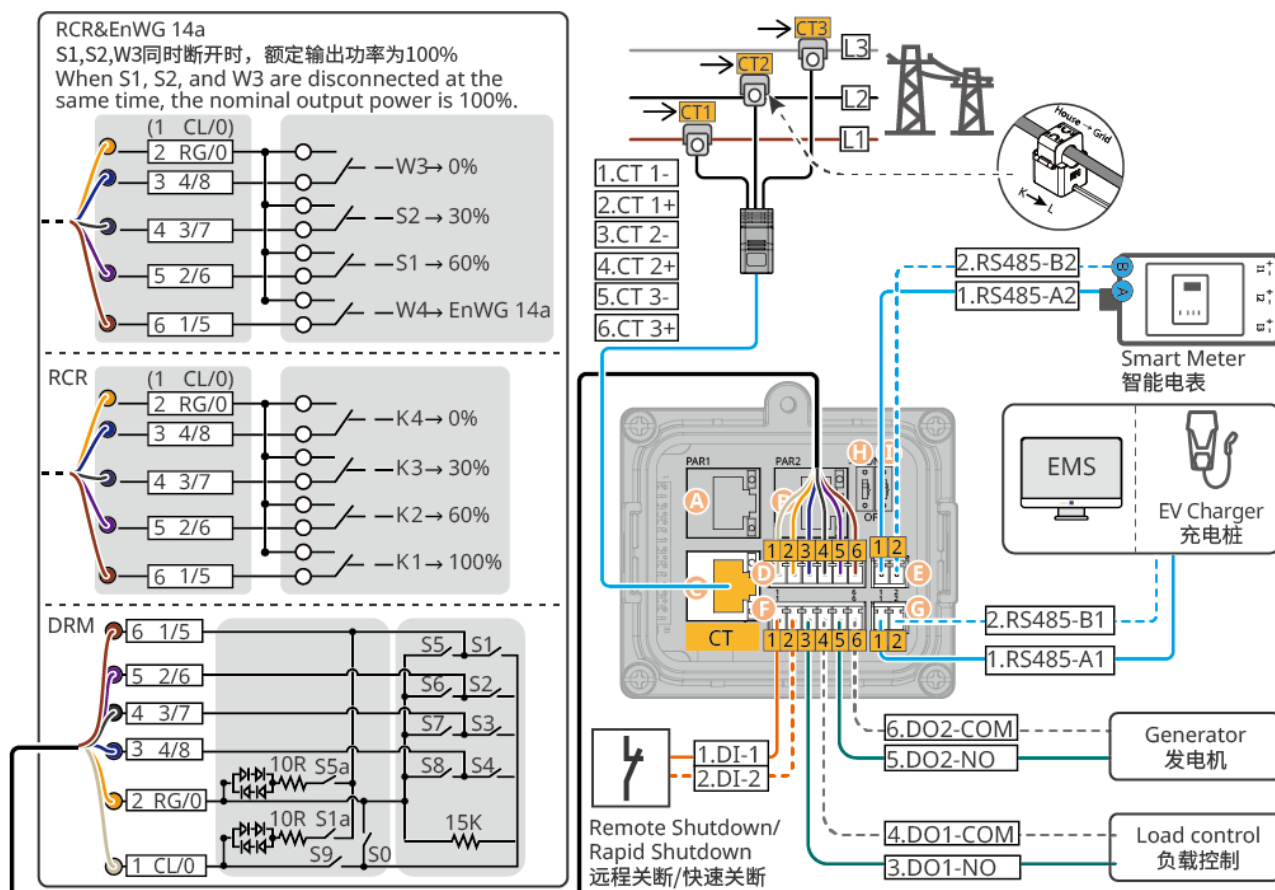
GMK10ELC0007

5.9 Connecting the Inverter Communication Cable

NOTICE

- To ensure the meter and CT can be used normally, please ensure the following: ensure that CT is connected matching the phase lines, CT1 is connected to L1, CT2 to L2, and CT3 to L3.
- When using the built-in meter of the Inverter, please use the CT shipped with the box.
- If you need to use DRED, RCR, or the remote shutdown function, after wiring is completed, please turn on this function in the SEMS+ App.
- If the Inverter is not connected to a DRED device or remote shutdown device, do not turn on this function in the SEMS+ App, otherwise the Inverter will not be able to operate in grid-connected mode.
- To ensure the waterproof rating of the Inverter, do not remove the waterproof plugs from unused communication ports on the Inverter.
- The DO signal communication port of the Inverter can connect dry contact signals with specifications: $\text{Max} \leq 24\text{Vdc}$, 1A.
- The communication function of the Inverter is optional, please select according to the actual usage scenario.
- The Inverter supports connecting via Bluetooth, WiFi, or LAN to a mobile phone or WEB interface to set device parameters, view device operation information, error information, and promptly understand the system status.

Communication Function Description



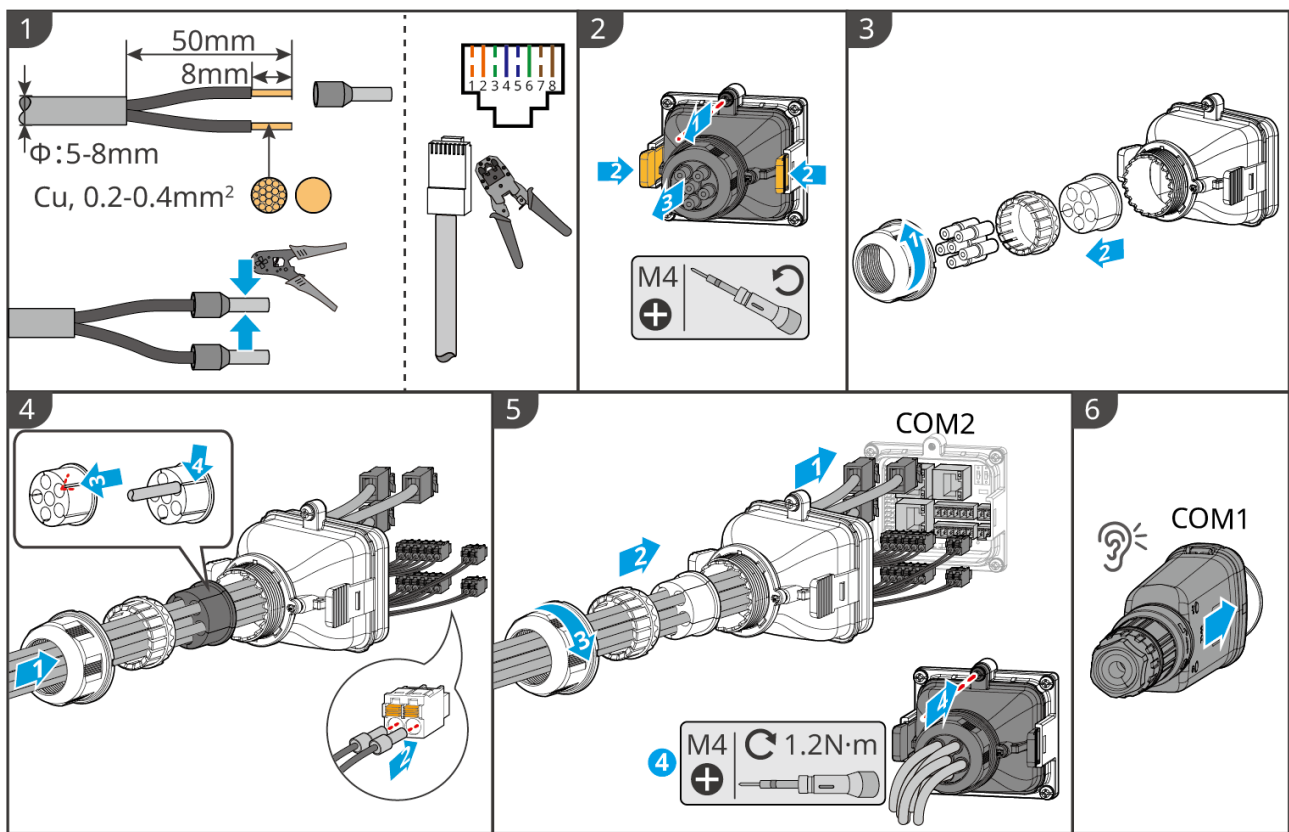
ESA20ELC0028

Port (Silkscreen)		Function	Description
A	PAR1	Reserved	-
B	PAR2		
C	CT	CT Connection Port	CT communication cable needs to be connected 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 RCR signal control port to meet grid dispatch requirements in European regions. • DRED (Demand Response Enabling Device): Provides DRED signal control port to meet DERD certification requirements in regions like Australia. • EnWG (Energy Industry Act) 14a: All controllable loads need to 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	Uses RS485 communication to connect to an external smart meter.
F	DI	remote shutdown / Rapid Shutdown	• 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 component output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In case of emergency, by enabling an external trigger device, the transmitter can be stopped, thereby shutting down the components.

Port (Silkscreen)		Function	Description
	LOAD	load control	• Supports connection to dry contact signals to achieve load control and other functions. DO contact capacity is 24V DC@1A, NO/COM normally open contacts. • Supports SG Ready heat pump access, controlling the heat pump via dry contact signals.
	GEN	Generator Control Port	Supports access to generator control signals to control generator start/stop. Connection to generator is not supported 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



ESA20ELC0005

6 System Commissioning

6.1 Check Before Power ON

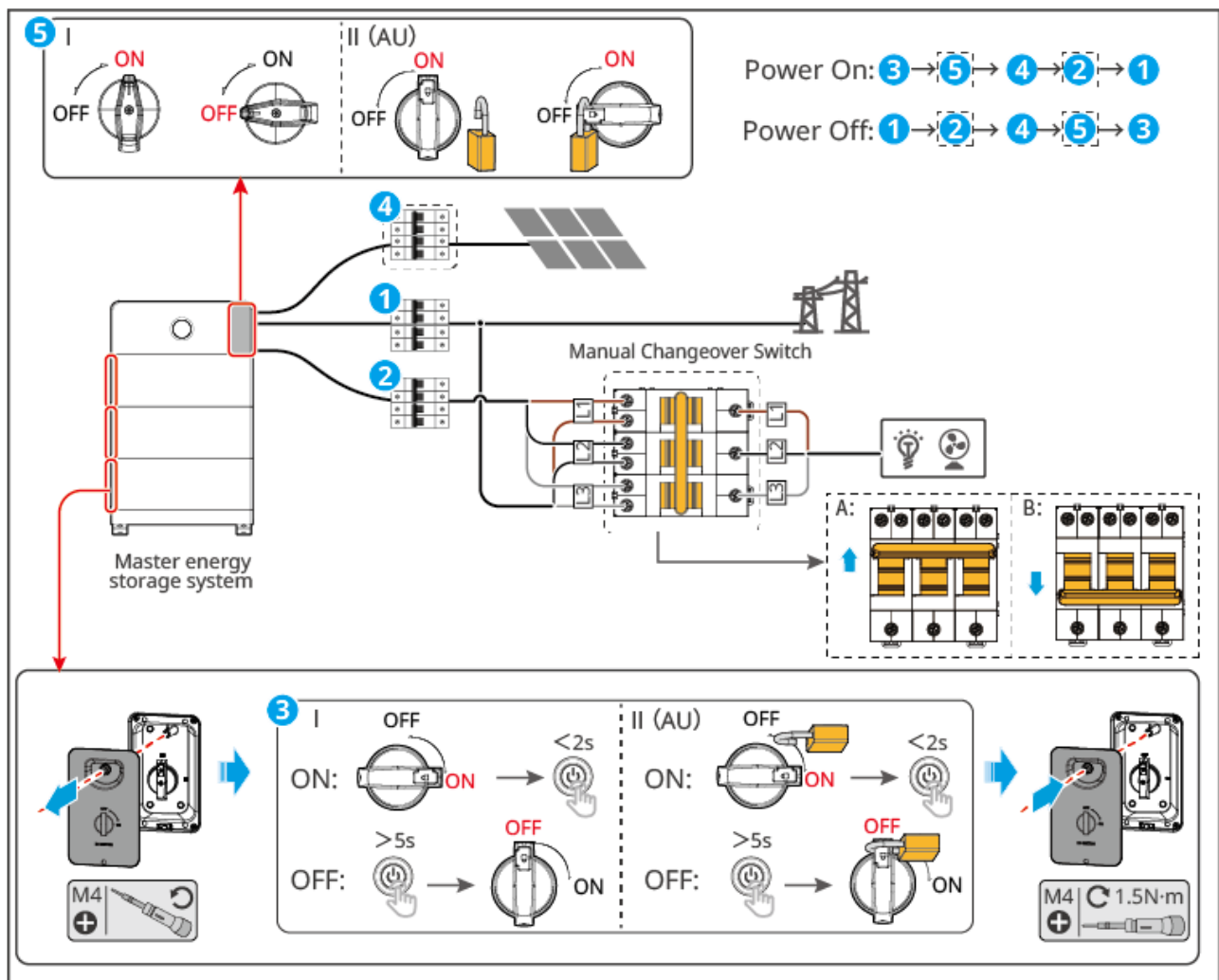
No.	Inspection Item
1	The equipment is securely installed, positioned for convenient operation and maintenance, with adequate space for ventilation and heat dissipation, and in a clean and tidy environment.
2	PE cable, DC cable, AC cable, and communication cable connections are correct and secure.
3	Cable bundling meets routing requirements, is reasonably distributed, and free from 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 used cable entry holes have been sealed.
6	The voltage and frequency at the inverter grid connection point meet the grid connection 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, supplying power to the loads from the battery.
- After the battery system starts, please ensure normal communication between the inverter and the battery system within 15 minutes. If the inverter and the battery system cannot communicate normally, the battery system switch will automatically disconnect, cutting power to the battery system.
- When the inverter is operating normally, set the manual transfer switch to position B to supply power to the loads from the inverter's BACK-UP port. When the inverter is powered down for maintenance or is faulty, to ensure normal operation of the loads, please set the manual transfer switch to position A to supply power to the loads from the grid.
- PV string and "Step 5" are only applicable to the ETA series.

power on



ESA20PWR0003

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 BACK-UP circuit breaker, and (optional) manually switch the transfer switch to the B state.
5. Close the GRID circuit breaker.

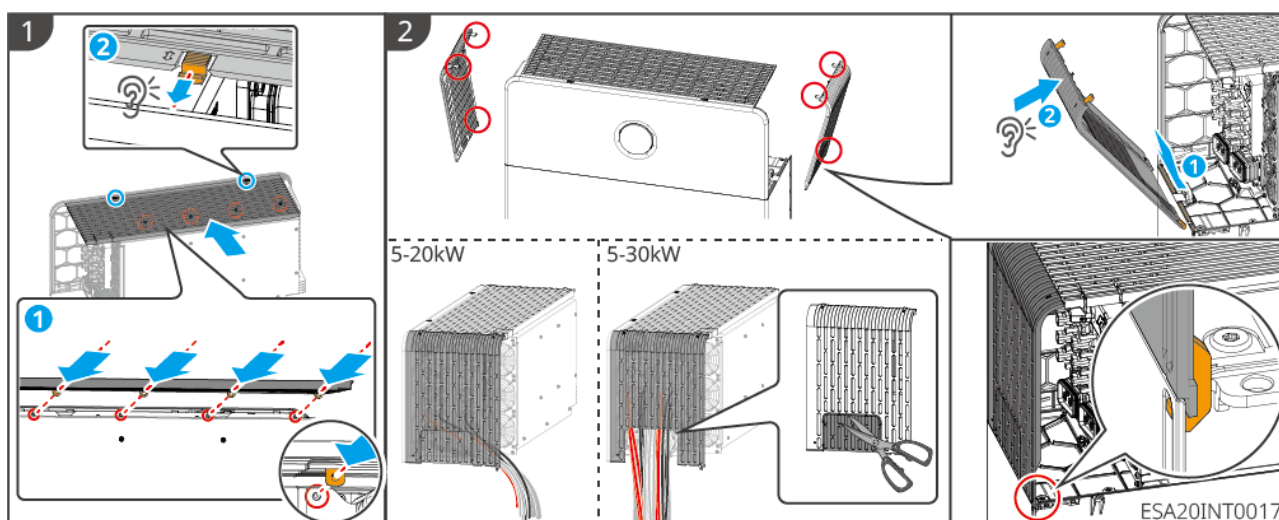
Battery Black Start

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 BACK-UP circuit breaker.
5. Close the GRID circuit breaker.
6. After all batteries are powered on separately, wait for 15 seconds, then press and hold the multifunction button on any battery for 2 seconds to force the battery to discharge and activate the inverter.

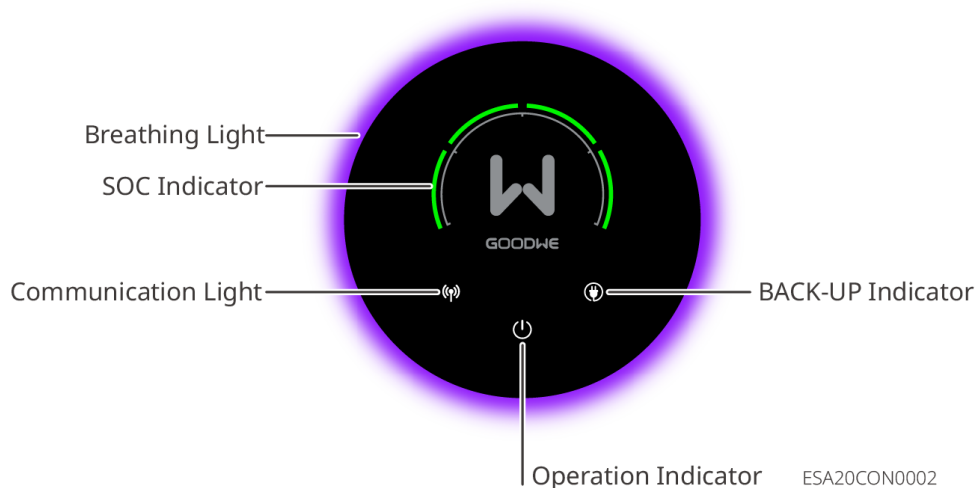
1. Close the GRID circuit breaker.
2. Close the BACK-UP circuit breaker.
3. Close the battery system switch.
4. Close the DC switch of the inverter.
5. Press and hold the multifunction button on any battery for 2 seconds to start the battery system. The battery forces discharge to activate the inverter.

6.3 Installing the Protective Cover



6.4 Indicators

6.4.1 Inverter Indicators

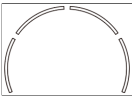
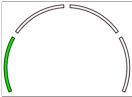
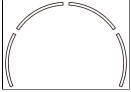
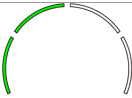
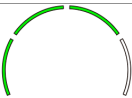
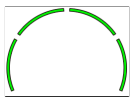


Breathing Light:

- When the system is in upgrade status: 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 SEMS+ 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 SEMS+App. For setup instructions, please refer to the SEMS+ App UserManual.

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

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

indicator	Indicator State	Breathing Light State	Description
			System upgrade
			System fault
			Battery no power
			Constantly lit: Charge Blinking: Discharge Battery SOC: $0\% < \text{SOC} \leq 25\%$
			Constantly lit: Charge Blinking: Discharge Battery SOC: $25\% < \text{SOC} \leq 50\%$
			Constantly lit: Charge Blinking: Discharge Battery SOC: $50\% < \text{SOC} \leq 75\%$
			Constantly lit: Charge Blinking: Discharge Battery SOC: $75\% < \text{SOC} \leq 100\%$

6.4.2 Battery Indicators

Button Indicators

No.	 Green Light	 Red Light	Battery System Status	Description
1	Steady On	--	System Operating Normally	Run
2	Flashing1 time/S		System Ready	Standby
	Flashing3 times/S	--	PCSCCommunication Loss	--
3	Flashing1 time/2S	--	System Alarm	Including faults in the fault list2level faults, among which under-voltage fault is2,3,4level when
4	--	Steady On	System Fault	In the fault list3level and above faults (under-voltage fault is5level when steady on)

6.4.3 Smart Meter Indicator Lights GM330&GMK330

6.4.3.1 Indicator Light Instructions

Type	Status	Description
 Power Light	Constantly lit	The meter is powered on, no RS485 communication.
	Flashing	The meter is powered on, RS485 communication is normal.
	Off	The meter is powered off.
 Communication Light	Off	Reserved.
	Flashing	Press the Reset button for ≥5s, the power light and buy/sell light flash: the meter resets.

Type	Status	Description
 Buy/Sell Light	Constantly lit	buy power from the grid.
	Flashing	sell power to the grid.
	Off	Not buying or selling power.
 Buy/Sell Light (only for GMK360)	Constantly lit	buy power from the grid.
	Flashing	sell power to the grid.
	Off	Not buying or selling power.

6.4.4 Smart Dongle Indicator

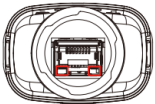
- WiFi/LAN Kit-20

NOTICE

- After double-clicking the Reload button to enable Bluetooth, the communication indicator will switch to a single-blink state. Please connect to the SEMS+ App within 5 minutes, otherwise Bluetooth will automatically turn off.
- The single-blink state of the communication indicator only occurs after double-clicking the Reload button to enable Bluetooth.

Indicator	Status	Description
Power Light 		Steady on: The Smart Communication Stick is powered on.
		Off: The Smart Communication Stick is not powered on.
Communi- cation Light 		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 SEMS+ App.

Indicator	Status	Description
		Two blinks: The Smart Communication Stick failed to connect to the router.
		Four blinks: The Smart Communication Stick communicates normally with the router but failed to connect 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
LAN Port Communication Light 	Green	Steady On	100Mbps wired network connection is normal.
		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 0.5~3 seconds to reset the smart communication stick.
	Hold for 6~20 seconds to restore the smart communication stick to factory settings.
	Double-click quickly to enable Bluetooth signal (maintains for 5 minutes only).

7 System Commissioning

7.1 Setting Inverter Parameters via App

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

- Remotely monitor the operation status of the power station and set the operating parameters of the station and devices.
- Locally connect to devices, view device 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 SEMS+ App

Phone Requirements:

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

Download Methods:

Method 1:

Search for "SEMS+" in Google Play, App Store, Huawei, Honor, Xiaomi, OPPO, or vivo app stores to download and install.



Method 2:

Scan the QR code below to download and install.



7.2 Power Plant Monitoring via SEM+ WEB

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

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

For detailed functions, please refer to the [SEM+ WEB User Manual](#).



SEM+ WEB User Manual

8 Maintenance

8.1 Power OFF the System

DANGER

- When performing operation and maintenance on equipment in the system, please power off the system. Operating equipment while powered on may cause equipment damage or electric shock DANGER.
- After the equipment is powered off, internal components require some time to discharge. Please wait until the equipment 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 of the battery system switch closed. If the battery system switch will not be used for an extended period, secure it with screws.

When the circuit breaker is tripped, all live conductors in the positive and negative circuits are disconnected. The equipment enters a safe power-off state with no exposed hazardous live parts, eliminating electric shock hazards upon human contact.

power off



- ## 8.2 Removing the Equipment



- Ensure the device is powered off.
- Wear personal protective equipment when operating the device.
- Use proper disassembly tools when removing wiring terminals to avoid damaging the terminals or the device.
- Unless otherwise specified, the device disassembly method is the reverse order of the installation method, which will not be repeated in this document.

1. Power down the system.
2. Use tags to label the types of cables connected in the system.
3. Disconnect the cables connected to the inverter, battery, and smart meter in the system, such as: DC cables, AC cables, communication cables, and PE cables.
4. Remove devices such as the smart communication stick, inverter, battery, and smart meter.
5. Properly store the equipment. If it will be put into use later, ensure that 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



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

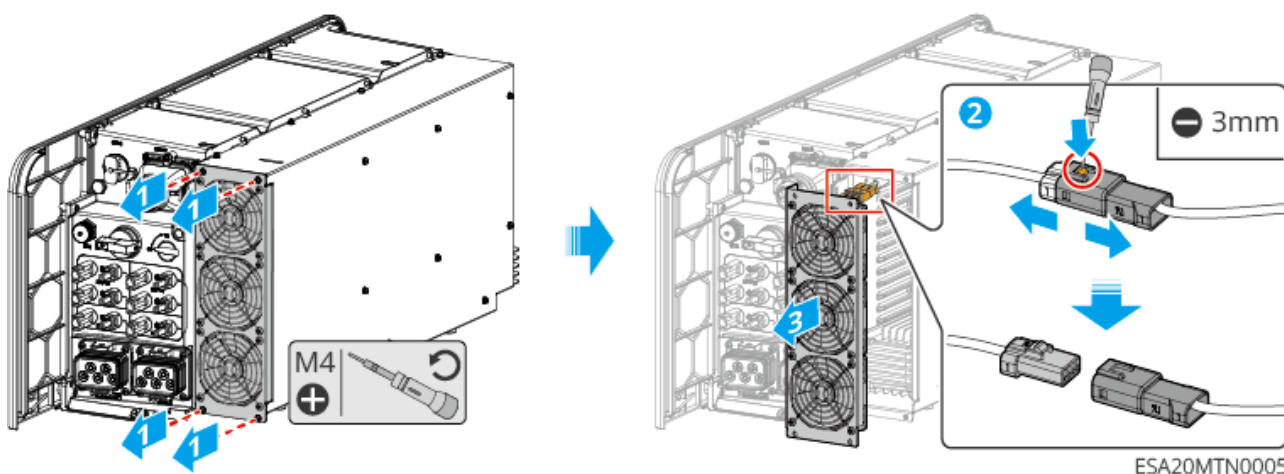
Maintenance Content	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check if there is any foreign object or dust on the heat sink, air inlet/outlet. Check if the installation space meets requirements, and if there is any clutter accumulated around the equipment.	Once every six months	Prevent cooling failure.
System Installation	Check if the equipment installation is secure and if fastening screws are loose. Check if the equipment appearance is damaged or deformed.	Once every six months to once a year	Confirm equipment installation stability.
Electrical Connection	Check if electrical connections are loose, if cable appearance is damaged, or if copper is exposed.	Once every six months to once a year	Confirm electrical connection reliability.
Fan	Check if the fan has abnormal noise; Check if the fan blades have cracks; Check if the fan has abnormal blockage;	Once every six months	Prevent fan failure.

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

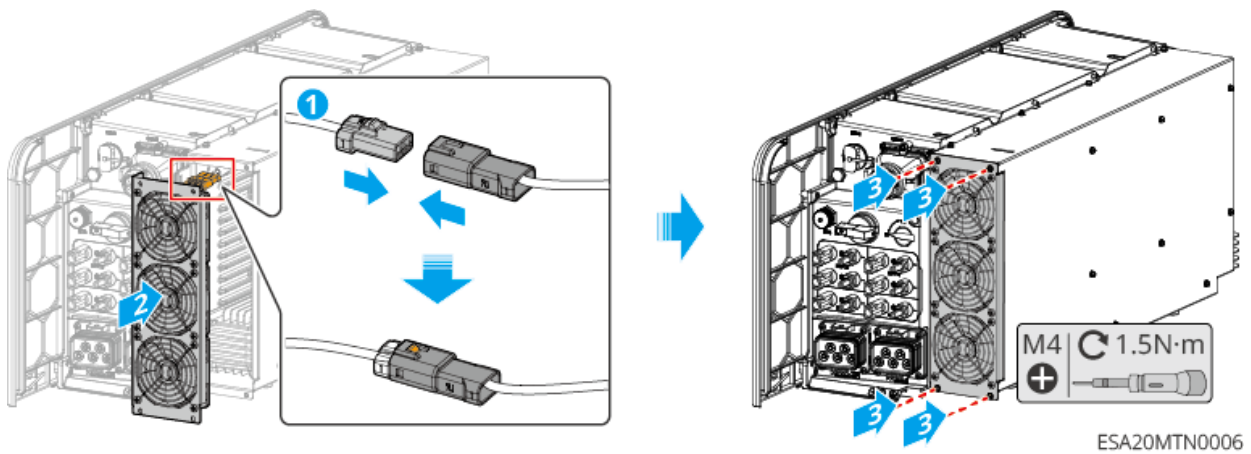
For fan maintenance, refer to the following steps specifically:

There is a fan module on the exterior of the inverter. To better clean the fan module, please remove the fan module from the machine before cleaning. The specific steps are as follows:

1. Power off the inverter. For reference, see [8.1.Power OFF the System\(Page 129\)](#).
2. Wait for the residual voltage of the system to be completely discharged, and the fan module to stop running completely.
3. Use a screwdriver to remove the module fastening screws, and take out the fan module as a whole.
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.



- 1.
- 2.

8.5 fault

8.5.1 Viewing Fault/Alarms Information

All fault and alarm details of the energy storage system are displayed in the **SEMS+ App and SEMS+ WEB**. If your product is abnormal and you do not see relevant fault information in the **SEMS+ App or SEMS+ WEB**, please contact the after-sales service center.

- In SEMS+ App

1. Open the SEMS+ App and log in with any account.
2. On the home page, click "Alarms" to view the alarm information for all power plants within the account.

- SEMS+ WEB

1. Open SEMS+ 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 obstructed or shaded, etc. Providing photos, videos, or other files of the installation environment is recommended to assist in problem analysis.

3. Grid conditions.

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

No.	fault	Resolution
1	Unable to detect 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 on normally, with the blue indicator light blinking or steadily lit. 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 has been successfully paired with encryption.
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 Inverterfault

fault code	fault name	fault cause	Troubleshooting recommendation
F01	Grid disconnected	1. Utility grid power outage. 2. AC line or AC Switch disconnected.	1. The alarm automatically disappears after Grid connected recovery. 2. Check if the AC line or AC Switch is disconnected.
F02	Grid Overvoltage	Utility gridvoltage exceeds the allowable range, or the high voltage duration surpasses the high voltage ride-through setting.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention.

fault code	fault name	fault cause	Troubleshooting recommendation
			2. If it occurs frequently, please check whether Utility gridvoltage is within the allowable range. • If Utility gridvoltage exceeds the permissible range, please contact the local power operator. • If the Utility gridvoltage is within the allowable range, it is necessary to modify the InverterGrid Overvoltage point after obtaining approval from the local power operator, HVRTEnable or disable the Grid Overvoltage function. 3. If the issue persists for an extended period, please check whether the AC-side breaker and output cables are properly connected.
F03	Grid Undervoltage	Utility gridvoltage is below the permissible range, or the duration of low voltage exceeds the low voltage ride-through setting.	1. If it occurs occasionally, it may be due to a temporary abnormality in Utility grid. Inverter will resume normal operation after detecting that Utility grid is normal, without requiring manual

fault code	fault name	fault cause	Troubleshooting recommendation
			intervention. 2. If it occurs frequently, check whether Utility gridvoltage is within the allowable range. • If Utility gridvoltage exceeds the permissible range, please contact the local power operator. • If the Utility gridvoltage is within the allowable range, it is necessary to modify the InverterGrid Undervoltage point after obtaining consent from the local power operator.LVRTor disable the Grid Undervoltage function. 3. If the issue persists for an extended period, please check whether the AC side breaker and output cables are properly connected.
F04	Grid Rapid Overvoltage	Utility gridvoltage detection shows abnormality or ultra-high voltage triggers fault.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation after detecting that Utility grid is normal, without

fault code	fault name	fault cause	Troubleshooting recommendation
			requiring manual intervention. 2. If it occurs frequently, check whether Utility grid and voltage are within the allowable range. • If Utility gridvoltage exceeds the permissible range, please contact the local power operator. • If the Utility gridvoltage is within the allowable range, it is necessary to modify the InverterGrid Undervoltage point after obtaining consent from the local power operator.LVRTEnable or disable the Grid Undervoltage function. 3. If the issue persists for an extended period, please check whether the AC-side breaker and output cables are properly connected.

fault code	fault name	fault cause	Troubleshooting recommendation
F05	10minOvervoltage Protection	In10minThe sliding average of Utility gridvoltage exceeds the safety regulation limits.	1. If it occurs occasionally, it may be due to a temporary abnormality in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention. 2. Check if Utility gridvoltage is operating at a high voltage for an extended period. If this occurs frequently, verify whether Utility gridvoltage is within the allowable range. • If Utility gridvoltage exceeds the permissible range, please contact the local power operator. • If the Utility gridvoltage is within the allowable range, it is necessary to obtain approval from the local power operator before modifying the Utility grid.10minOvervoltage Protection point.

fault code	fault name	fault cause	Troubleshooting recommendation
F06	Grid Overfrequency	Utility grid anomaly: Utility grid actual Frequency exceeds local Utility grid standard requirements.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention. 2. If it occurs frequently, check whether Utility gridFrequency is within the allowable range. • If the Utility gridFrequency exceeds the permissible range, please contact the local power operator. • If the Utility gridFrequency is within the allowable range, the Grid Overfrequency point needs to be modified after obtaining consent from the local power operator.

fault code	fault name	fault cause	Troubleshooting recommendation
F07	Grid Underfrequency	Utility grid anomaly: Utility grid actual Frequency is below local Utility grid standard requirements.	1. If it occurs occasionally, it may be due to a temporary abnormality in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention. 2. If it occurs frequently, check whether Utility grid and Frequency are within the allowable range. • If Utility gridFrequency exceeds the allowable range, please contact the local power operator. • If the Utility grid Frequency is within the allowable range, the Grid Overfrequency point needs to be modified after obtaining consent from the local power operator.

fault code	fault name	fault cause	Troubleshooting recommendation
F08	Grid Frequency Instability	Utility grid anomaly: Utility grid actual Frequency variation rate does not comply with local Utility grid standard.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention. 2. If it occurs frequently, check whether Utility grid and Frequency are within the allowable range. • If the Utility gridFrequency exceeds the permissible range, please contact the local power operator. • If Utility gridFrequency is within the allowable range, please contact your dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F163	Grid Phase Instability	Utility grid anomaly: Utility grid voltage phase change rate does not comply with local Utility grid standard.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation upon detecting that Utility grid is functioning properly, without requiring manual intervention. 2. If it occurs frequently, check whether Utility grid and Frequency are within the allowable range. • If the Utility gridFrequency exceeds the permissible range, please contact the local power operator. • If the Utility gridFrequency is within the allowable range, please contact your dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F09	Anti-islanding Protection	Utility grid has been disconnected, maintaining Utility grid voltage due to the presence of load. According to safety regulation Protection, on-grid is stopped.	1. If it occurs occasionally, it may be due to a temporary abnormality in Utility grid. The Inverter will resume normal operation after detecting that Utility grid is normal, without requiring manual intervention. 2. If it occurs frequently, check whether Utility grid and Frequency are within the allowable range. • If Utility gridFrequency exceeds the permissible range, please contact the local power operator. • If the Utility gridFrequency is within the allowable range, please contact your dealer or after-sales service center.
F10	LVRT Undervoltage	Utility grid anomaly: Utility gridvoltage duration exceeds the specified high-low transition time.	

fault code	fault name	fault cause	Troubleshooting recommendation
F11	HVRT Overvoltage	Utility grid anomaly: Utility grid voltage exceeds the specified high-low transition duration.	1. If it occurs occasionally, it may be due to a temporary abnormality in Utility grid. Inverter will resume normal operation after detecting that Utility grid is normal, without requiring manual intervention. 2. If this occurs frequently, please check whether Utility grid, voltage, and Frequency are within the allowable range and stable. If not, contact the local power operator; if yes, contact your dealer or after-sales service center.
F43	Grid Waveform Abnormal	Utility grid anomaly: Utility grid voltage detection triggered fault due to abnormality.	
F44	Grid Phase Loss	Utility grid anomaly: Utility grid voltage has a single-phase voltage dip.	

fault code	fault name	fault cause	Troubleshooting recommendation
F45	Grid Voltage Imbalance	Excessive phase difference between Utility grid and voltage.	1. If it occurs occasionally, it may be due to a temporary anomaly in Utility grid. Inverter will resume normal operation after detecting that Utility grid is functioning properly, without requiring manual intervention. 2. If it occurs frequently, please check whether Utility grid, voltage, and Frequency are within the allowable range and stable. If not, please contact the local power operator; if yes, please contact your dealer or after-sales service center.
F46	Grid Phase Sequence Failure	Inverter and Utility grid wiring abnormality: wiring is not in positive sequence	1. Check whether the wiring of Inverter and Utility grid is in positive sequence. After the wiring is corrected (e.g., by swapping any two live wires), fault will automatically disappear. 2. If the wiring is correct and fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F47	Grid Rapid Shutdown Protection	Quickly shut down the output upon detecting the Grid disconnected operating condition.	1. Grid connected disappears automatically after fault is restored
F48	Utility grid Neutral line loss	Split-phase Utility grid neutral loss	1. The alarm automatically disappears after Grid connected recovery. 2. Check if the AC line or AC Switch is disconnected.
F160	EMS/Forced off-grid	EMS Issue forced off-grid command, but the off-grid function is not enabled.	Enable off-grid function
F161	Passive Anti-islanding Protection	-	-
F162	Grid Type Fault	Actual Grid type (two-phase or split-phase) does not match the set safety regulations.	Switch the corresponding safety regulations according to the actual Grid type.

fault code	fault name	fault cause	Troubleshooting recommendation
F12	30mAGfciProtection	During operation, the input-to-ground insulation resistance becomes low.	1. If it occurs occasionally, it may be caused by temporary abnormalities in the external circuit. It will return to normal operation after fault is cleared, without requiring manual intervention. 2. If the issue occurs frequently or persists for an extended period without recovery, please check whether the PV String ground impedance is too low.
F13	60mAGfciProtection	During operation, the input-to-ground insulation resistance becomes low.	1. If it occurs occasionally, it may be caused by temporary abnormalities in the external circuit. It will return to normal operation after fault is cleared, without requiring manual intervention. 2. If the issue occurs frequently or cannot be resolved for an extended period, please check whether the PV String ground impedance is too low.

fault code	fault name	fault cause	Troubleshooting recommendation
F14	150mAGfciProtection	During operation, the input-to-ground insulation resistance becomes low.	1. If it occurs occasionally, it may be caused by temporary abnormalities in the external circuit. It will return to normal operation after the fault is cleared, without requiring manual intervention. 2. If the issue occurs frequently or persists for an extended period, check whether the PV String ground impedance is too low.
F15	Gfcigradual Protection	During operation, the input-to-ground insulation resistance becomes low.	1. If it occurs occasionally, it may be caused by an external line anomaly. The system will resume normal operation after the fault is cleared without manual intervention. 2. If the issue occurs frequently or persists for an extended period, please check whether the PV String ground impedance is too low.

fault code	fault name	fault cause	Troubleshooting recommendation
F16	DCIPrimary Protection	The DC component of the inverter output current exceeds the safety regulations or the default allowable range of the machine.	1. If the abnormality is caused by an external fault, the Inverter will automatically resume normal operation after the fault disappears, without requiring manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the dealer or after-sales service center.
F17	DCISecondary Protection	The DC component of the inverter output current exceeds the safety regulations or the default allowable range of the machine.	1. If the abnormality is caused by an external fault, the Inverter will automatically resume normal operation after the fault disappears, without requiring manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of power station, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F18	Low Insulation Resistance	1. PV String to Protection ground short circuit. 2. The environment of PV String Installation is consistently humid, and the line-to-ground insulation is poor. 3. Batteryport line-to-ground Low Insulation Resistance.	1. Check the impedance between PV String/Batteryport and ground Protection. A resistance value greater than 80kΩ is normal. If the measured resistance is less than 80kΩ, locate and rectify the short circuit point. 2. Check if the PE cable of the Inverter is properly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, please reset the "Inverter insulation resistance Protection point" via the App. Australia and New Zealand markets Inverter, when insulation resistance fault occurs, can also issue alarms through the following methods: 1. Inverter is equipped with a buzzer. When a fault occurs, the buzzer will sound continuously for 1 minute. If the fault is not resolved, the buzzer will sound again every 30

fault code	fault name	fault cause	Troubleshooting recommendation
			minutes. 2. If Inverter is added to the monitoring platform and the alarm notification method is configured, alarm information can be sent to customers via email.
F19	Grounding Abnormal	1. The PE cable of Inverter is not connected. 2. When the output of PV String is grounded, the output side of Inverter is not connected to an isolation transformer.	1. Please confirm whether the Inverter of PE cable is not properly connected. 2. In the scenario where the output of PV String is grounded, please confirm whether the output side of Inverter is connected to an isolation transformer.
F49	L-PE Short Circuit	Output phase line toPELow impedance or short circuit	Detect output phase line toPEImpedance, find out Locations with low impedance and repair them.

fault code	fault name	fault cause	Troubleshooting recommendation
F50	DCVPrimary Protection	Abnormal load fluctuation	1. If the abnormality is caused by an external fault, the Inverter will automatically resume normal operation after the fault disappears, without requiring manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the dealer or after-sales service center.
F51	DCVSecondary Protection	Abnormal load fluctuation	1. If the abnormality is caused by an external fault, the Inverter will automatically resume normal operation after the fault disappears, without requiring manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the distributor or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F20	Hardware power limit Protection	Abnormal load fluctuation	1. If the abnormality is caused by an external fault, the Inverter will automatically resume normal operation after the fault disappears, without requiring manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the dealer or after-sales service center.
F21	Internal Comm Loss	Reference specific subcode reason	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault still persists, please contact the dealer or after-sales service center.
F52	Leakage currentGFCIMultiple fault shutdowns	North American safety regulations require that after multiple fault, the system must not recover automatically and requires manual intervention or waiting.24hpost-recovery	1. Please check if the PV String ground impedance is too low.

fault code	fault name	fault cause	Troubleshooting recommendation
F53	DC arcAFCIMultiple fault shutdowns	North American safety regulations require that after multiple fault, the system cannot automatically recover and must be manually reset or wait.24hPost-recovery	1. After the machine is re-on-grid, check whether the voltage current of each circuit is abnormally reduced to zero. 2. Check if the DC side terminal is securely connected.
F54	External Comm Loss	Inverter external device communication lost, possibly due to peripheral power supply issues, Communication Protocols mismatch, or unconfigured corresponding peripherals.	Judgment is made based on the actual model and detection enable bits; peripherals not supported by certain models will not be detected.
F55	Back-upport Overload fault	1. Prevent Inverter from continuous overload output.	1. Disconnect some off-grid loads to reduce the off-grid output Power of Inverter.

fault code	fault name	fault cause	Troubleshooting recommendation
F56	Back-upport overvoltage fault	2. Prevent damage to the load caused by Inverter output overvoltage.	1. If it occurs occasionally, it may be caused by load switching and does not require manual intervention. 2. If it occurs frequently, please contact the dealer or after-sales service center.
F107	On-grid PWM Sync Failure	Abnormal condition detected in carrier synchronization on-grid	1Check if the synchronization line connection is normal. 2Check if the master-slave configuration is normal. 3Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F57	External connectionBoxfault	Wait for grid disconnectionBoxE xcessive relay switching time	1. InspectionBoxIs it functioning properly; 2. InspectionBoxIs the communication wiring correct;
-	Generator Failure		

fault code	fault name	fault cause	Troubleshooting recommendation
F22	Generator Waveform Detection Fault	1. This fault will always be displayed when the generator is not connected. 2. During generator operation, failure to meet generator safety regulations will trigger this fault.	1. When the generator is not connected, ignore this fault; 2. This fault is normal when the generator experiences fault. After the generator recovers, wait for a period of time, and the fault will clear automatically. 3. The fault does not affect the normal operation of the off-grid mode. 4. The generator and Utility grid are connected simultaneously and meet safety requirements. Utility grid takes priority over on-grid and will operate in the Utility grid on-grid state.
F23	Generator Abnormal Connection		
F24	Generator Low Voltage		
F25	Generator High Voltage		
F26	Generator Low Frequency		
F27	Generator High Frequency		
F109	External connectionSTSfault	andSTSAbnormal connection cable	Check the Inverter andSTSWhether the wiring sequence of the harness connections corresponds one-to-one in order.
F58	CTMissing fault	CTConnection wire disconnected (Japanese safety standard requirement)	InspectionCTIs the wiring correct.

fault code	fault name	fault cause	Troubleshooting recommendation
F110	Export Limit Protection	1. Inverter fault trip-off 2. meterUnstable communication 3. Reverse power flow condition occurs	1. Check if there are any other error messages in Inverter. If present, perform targeted troubleshooting. 2. InspectionmeterIs the connection reliable? 3. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the distributor or after-sales service center.
F111	Bypass overload	-	-
F112	Black Start Failure	-	-
F28	Parallel operationIOSelf-check abnormality	Parallel communication line is not securely connected or parallel operationIOChip damage	Check if the parallel communication cable is securely connected, and then inspect again.IOIs the chip damaged? If so, replace it.IOChip.
F59	Parallel operationCANComm unication anomaly	Parallel communication line is not securely connected or some machines are offline.	Check whether all machines are power on and ensure the parallel communication cables are securely connected.

fault code	fault name	fault cause	Troubleshooting recommendation
F29	Parallel Grid Line Reversed	Some machines have the Utility grid line connected in reverse with others.	Reconnect the Utility grid wire.
F60	Parallel operationBack-upreverse connection	Partial machinesbackupLine reversed with other connections	reconnectionbackupLine.
F61	INV Soft Start Failure	Off-grid cold start INV Soft Start Failure	Check whether the inverter module of the machine is damaged.
F113	Offgrid AC Ins Volt High	-	-
F30	AC HCT Check Abnormal	AC sensor sampling anomaly	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault still persists, please contact the dealer or after-sales service center.
F62	AC HCT Failure	HCTSensor abnormality detected	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault still persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F31	GFCI HCT Check Abnormal	Leakage current sensor sampling anomaly detected.	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault still persists, please contact the dealer or after-sales service center.
F63	GFCI HCT Failure	Leakage current sensor abnormality detected.	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F32	Relay Check Abnormal	Relay abnormality, reason: 1Relay abnormality (relay short circuit) 2Relay sampling circuit abnormality. 3Abnormal AC side wiring (possible loose connection or short circuit phenomenon)	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F64	Relay Failure	1Relay abnormality (relay short circuit) 2Relay sampling circuit abnormality. 3Abnormal AC side wiring (possible loose connection or short circuit)	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F164	DC arc fault (string)17~32)	1DC side connection terminal loose; 2DC side connection terminal loose contact; 3Core damage and poor contact	1After the machine is re-on-grid, check whether the voltage current of each circuit is abnormally reduced to zero. 2Check if the DC side terminal is securely connected.
F165	DC combiner box (string combiner)33~48)	1DC side connection terminal loose; 2DC side connection terminal loose contact; 3Core damage and poor contact	1After the machine is re-on-grid, check whether the voltage current of each circuit is abnormally reduced to zero. 2Check if the DC side terminal is securely connected.
F33	FlashRead/Write Error	Possible causes: flashContent has been modified;flashEnd of life	1. Upgrade to the latest version of the program 2. Contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F42	DC arc fault (string)1~16)	1DC side connection terminal loose; 2DC side connection terminal loose contact; 3DC cable core damage and poor contact	1After the machine is re-on-grid, check whether the voltage current of each circuit is abnormally reduced to zero. 2Check if the DC side terminal is securely connected.
F34	AFCI Check Failure	During the arc self-test process, the arc module failed to detect the arc fault.	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F65	AC Terminal Overtemperature	AC Terminal Overtemperature, Possible causes: 1Inverter Installation Location not ventilated. 2Ambient temperature is too high. 3Internal fan operation abnormal.	

fault code	fault name	fault cause	Troubleshooting recommendation
F35	Cabinet Overtemperature	Cabinet Overtemperature, Possible causes: 1Inverter Installation Location is not ventilated. 2Ambient temperature is too high. 3Internal fan operation abnormal.	1Check whether the ventilation of InverterInstallation Location is adequate and whether the ambient temperature exceeds the maximum allowable range. 2If there is no ventilation or the ambient temperature is too high, please improve the ventilation and heat dissipation conditions. 3If ventilation and ambient temperature are both normal, please contact the dealer or after-sales service center.
F66	INVModule temperature too high	Inverter module temperature is too high, possible causes: 1Inverter Installation Location is not ventilated. 2Ambient temperature is too high. 3Internal fan operation abnormal.	

fault code	fault name	fault cause	Troubleshooting recommendation
F67	BoostModule temperature too high	BoostModule temperature too high, possible causes: 1InverterInstallatio n Location is not ventilated. 2Ambient temperature is too high. 3Internal fan operation abnormal.	
F68	AC Capacitor Overtemperature	Output filter capacitor temperature is too high, possible causes: 1Inverter Installation Location Non-ventilated. 2Ambient temperature is too high. 3Internal fan operation abnormal.	

fault code	fault name	fault cause	Troubleshooting recommendation
F114	Relay Failure2	Relay abnormality, reason: 1Relay abnormality (relay short circuit) 2Relay sampling circuit abnormality. 3Abnormal AC side wiring (possible loose connection or short circuit)	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F69	PV IGBT short circuit	Possible causes: 1. IGBTshort circuit 2Abnormal sampling circuit of Inverter	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F70	PV IGBTOpen circuit	1. Software issue causing failure to transmit waves. 2. Drive circuit abnormality: 3. IGBTOpen circuit	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F71	NTCAbnormal	NTCTemperature sensor abnormality detected	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F72	PWM Abnormal	PWMAbnormal waveform detected	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F73	CPUInterruption anomaly	CPUAbnormal interruption occurred	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F74	Microelectronic Failure	Functional safety detects an anomaly	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F75	PV HCTfault	boostcurrent sensor abnormality	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F76	1. 5VBaseline anomaly	Reference circuit	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F77	0. 3VBaseline anomaly	Reference circuit	
F78	CPLDVersion identification error	CPLDVersion identification error	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F79	CPLDCommunication fault	CPLDandDSPCommunication content error or timeout	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F80	Model Type Error	Regarding the incorrect identification of the model type fault	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F115	SVGPrecharge failure	SVGPrecharge hardware failure	Contact the dealer or after-sales service center.
F116	nightSVG PIDPrevention of fault	PIDPrevent hardware anomalies	Contact the dealer or after-sales service center.
F117	DSPVersion identification error	DSPSoftware version identification error	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F36	Bus Overvoltage		Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F81	P-Bus Overvoltage		
F82	N-Bus Overvoltage		
F83	DeputyCPU1)		
F84	DeputyCPU1)		

fault code	fault name	fault cause	Troubleshooting recommendation
F85	DeputyCPU1)	BUSOvervoltage, possible causes: 1. PVvoltage too high 2InverterBUSSampling anomaly 3The rear-end double-split Inverter has poor isolation, causing mutual interference between the two Inverter on-grid. One of them reports DC overvoltage when Inverter on-grid.	
F86	Bus Overvoltage(deputy CPU2)		
F87	DeputyCPU2)		
F88	N-Bus Overvoltage (deputy)CPU2)		
F89	P-Bus Overvoltage(CPLD)		
F90	N-Bus Overvoltage (CPLD)		
F118	MOSContinuous overvoltage	1. Software issue causes the inverter drive to shut down earlier than the flyback drive. 2. Inverter drive circuit abnormality prevents turn-on. 3. PVvoltage too high 4. MosSampling anomaly	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F119	Bus Short Circuit	1. Hardware damage	In case of occurrenceBUSAfter a short circuit fault, the Inverter remains in an off-grid state. Please contact the dealer or after-sales service center.
F120	Bus Sample Abnormal	1. BusSampling hardware	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F121	DCLateral sampling abnormality	1. Bus sampling hardware 2. Batteryvoltage Sampling Hardware fault 3. DcrlyRelay Failure	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F37	PVInput overvoltage	PVInput voltage is too high, possible causes: Incorrect PV array configuration, with too many PV Battery panels connected in series, causing the open-circuit voltage of the string to exceed the maximum operating voltage of the Inverter.	Check the series configuration of the corresponding PV array string to ensure that the open-circuit voltage of the string does not exceed the maximum working voltage of the Inverter. Once the PV array is correctly configured, the Inverter alarm will automatically disappear.
F38	PVContinuous hardware overcurrent	1. Unreasonable module configuration 2. Hardware damage	Disconnect the AC output side switch and DC input side switch,5After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F39	PVContinuous software overcurrent	1. Unreasonable module configuration 2. Hardware damage	
F91	FlyCap Software Overvoltage	Flying capacitor overvoltage, possible causes: 1. PVvoltage too high 2Inverter flying capacitor voltage sampling anomaly;	

fault code	fault name	fault cause	Troubleshooting recommendation
F92	FlyCap Hardware Overvoltage	Flying capacitor overvoltage, possible causes: 1. PV voltage too high 2. Inverter flying capacitor voltage sampling anomaly;	Disconnect the AC output side switch and DC input side switch, 5. After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F93	FlyCap Undervoltage	FlyCap Undervoltage, Possible causes: 1. PV Energy deficiency; 2. Inverter flying capacitor voltage sampling anomaly;	
F94	FlyCap Precharge Failure	FlyCap Precharge Failure, Possible causes: 1. PV Energy deficiency; 2. Inverter flying capacitor voltage sampling anomaly;	
F95	FlyCap Precharge Abnormal	1. Unreasonable control loop parameters 2. Hardware damage	
F96	String overcurrent(String1 ~16)		

fault code	fault name	fault cause	Troubleshooting recommendation
F97	String overcurrent(String1 7~32)	Possible causes: 1. String Overcurrent 2. String current sensor anomaly	
F40	String reverse connection(String1~16)	PVString reverse connection	Check if the string is reverse connected.
F98	String reverse connection(String17~32)	PVString reverse connection	Check if the string is reverse connected.
F99	String loss(String1~16)	String fuse disconnected (if applicable)	Check if the fuse is blown.
F100	String loss(String17~32)	String fuse disconnected (if applicable)	Check if the fuse is blown.

fault code	fault name	fault cause	Troubleshooting recommendation
F122	PVIncorrect access mode setting	PVThere are three access modes in total, with four channels.MPPTFor example: 1. Parallel mode: that isAAAAMode(homologous mode),PV1-PV4homologous,4RoadPVConnect the same photovoltaic panel 2. Partial Parallel Mode: i.e.AACCMode,PV1andPV2Homologous connection,PV3andPV4homologous connection 3. Stand-alone mode: i.e.ABCDMode(non-homologous),PV1、PV2、PV3、PV4Independent connection,4RoadPVEach connected to a photovoltaic panel IfPVThe actual connection mode and equipment	InspectionPVIIs the access mode correctly set?ABCD、AACCC、AAAA), reset in the correct wayPVConnection mode. 1. Confirm the actual connected circuitsPVIIs the connection correct. 2. IfPVCorrectly connected, passedAppor screen to check the current settingsPVWhether the "connection mode" corresponds to the actual connection mode. 3. If the currently setPVThe "connection mode" does not match the actual connection mode and needs to be adjusted.Appor the screen willPVSet the "Connection Mode" to match the actual situation. After completing the settings,PVandACPower supply disconnection and restart. 4. After the setup is completed, if the currentPVThe access mode matches the actual connection mode, but this

fault code	fault name	fault cause	Troubleshooting recommendation
		configurationPVThi s fault will be reported if the access mode does not match.	fault error still occurs. Please contact the dealer or after-sales service center.
-	String reverse connection(String33~48)	PVString reverse connection	Check if the string is reverse connected.
-	String loss(String33~48)	String fuse disconnected (if applicable)	Check if the fuse is blown.
-	String overcurrent(String33~48)	Possible causes: 1. String Overcurrent 2. String current sensor anomaly	

fault code	fault name	fault cause	Troubleshooting recommendation
F123	Multi-string PV Phase Mismatch Failure	Incorrect PV input mode setting	Check whether the PV connection mode is correctly set (ABCD, AACC, AAAA) and reset the PV connection mode in the correct way. 1. Verify that each connected PV string is correctly wired. 2. If the PV is correctly connected, check whether the currently set "PV connection mode" corresponds to the actual connection mode via the App or screen. 3. If the currently set "PV Connection Mode" does not match the actual connection mode, it is necessary to set the "PV Connection Mode" to the mode consistent with the actual situation via the App or screen. After completing the setting, disconnect the PV and AC power supply and restart. 4. After the setup is completed, if the current "PV Connection Mode" matches the actual connection mode but this fault still appears, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F101	Battery1Precharge fault	Battery1Pre-Charge circuit fault (pre-Charge resistance burnout, etc.)	Check whether the pre-Charge circuit is in good condition. Only after Battery power on, verify whether the Battery voltage matches the busbar voltage. If they do not match, please contact the dealer or after-sales service center.
F102	Battery1Relay Failure	Battery1Relay fails to operate normally	After Battery power on, check whether the Battery relay operates and if the closing sound is heard. If it does not function, please contact the dealer or after-sales service center.
F103	Battery1overvoltage at connection point	Battery1The input voltage exceeds the rated range of the machine.	Verify if Batteryvoltage is within the machine's rated range.
F104	Battery2Precharge fault	Battery2Pre-Charge circuit fault (pre-Charge resistance burnout, etc.)	Check whether the pre-Charge circuit is in good condition. Only after Battery power on, verify whether the Battery voltage matches the busbar voltage. If they do not match, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F105	Battery2Relay Failure	Battery2The relay fails to operate normally.	After Battery power on, check whether the Battery relay operates and if the closing sound is heard. If it does not function, please contact the dealer or after-sales service center.
F106	Battery2overvoltage at the point of connection	Battery2The input voltage exceeds the rated range of the machine.	Verify whether Battery voltage is within the machine's rated range.
F124	Battery1Reverse connection fault	Battery1Reverse polarity of positive and negative terminals	Check whether the polarity of Battery and the machine terminals is consistent.
F125	Battery2Reverse connection fault	Battery2Reverse polarity of positive and negative terminals	Check whether the polarity of Battery and the machine terminal is consistent.
F126	BAT Connection Abnormal	BAT Connection Abnormal	Check if the Battery is functioning properly.
-	BMS Status Bit Error	BMS Module fault	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If fault persists, please contact the distributor or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F127	BAT Overtemperature	Battery temperature too high, possible causes: 1 Inverter Installation Location Non-ventilated. 2 Ambient temperature is too high. 3 Internal fan operation abnormal.	
F128	Ref Voltage Abnormal	Reference circuit	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F129	Cabinet Under Temperature	Cabinet Under Temperature, Possible causes: 1. The ambient temperature is too low.	
F130	ACsideSPDfault	ACFailure of lateral lightning protection device	ReplacementACLateral lightning protection device.
F131	DCsideSPDfault	DCFailure of the lateral lightning protection device	ReplacementDCSide lightning protection device.

fault code	fault name	fault cause	Troubleshooting recommendation
F132	Internal Fan Abnormal	Internal Fan Abnormal, Possible causes: 1Abnormal fan power supply; 2Mechanical fault(Locked rotor); 3Fan aging and damage.	Disconnect the AC output side switch and DC input side switch,5 After a few minutes, close the AC output side switch and the DC input side switch. If fault persists, please contact the dealer or after-sales service center.
F133	External Fan Abnormal	External Fan Abnormal, Possible causes: 1Abnormal fan power supply; 2Mechanical fault(Locked rotor); 3Fan aging and damage.	
F134	PIDDiagnose abnormality	PIDHardware fault orPVvoltage too highPIDSuspend	PVExcessive voltagePIDPause WARNING No action required,PIDHardware fault can be turned off.PIDSwitch Reclose ClearPIDfault, replacementPIDdevice

fault code	fault name	fault cause	Troubleshooting recommendation
F135	Trip-Switch Trip Warning	Possible causes: Overcurrent or PVReverse connection causes the trip switch to trip.	Please contact the dealer or after-sales service center. The reason for disconnection is due to occurrence.PVShort circuit or reverse connection, need to check for any historical issues.PVShort circuit WARNING or historyPVReverse connection WARNING. If present, maintenance personnel should inspect the corresponding issue.PVAfter the inspection is completed and no fault is found, the trip switch can be manually closed, and then passed through.AppInterface Clear History fault Operation Clears This WARNING.

fault code	fault name	fault cause	Troubleshooting recommendation
F136	historyPV IGBT short circuit	Possible causes: Overcurrent caused the trip switch to open.	Please contact the dealer or after-sales service center. Maintenance personnel should follow the historicalPVShort-circuit WARNING subcode, check for short-circuit occurrenceBoostCheck if there is any fault in the hardware and external string; after confirming there is no fault, it can proceed.AppInterface Clear History fault Operation Clears This WARNING.
F137	HistoryPVReverse polarity WARNING(String1~16)	Possible causes: OccurrencePVReverse connection causes the trip switch to trip.	Contact the dealer or after-sales service center. Maintenance personnel should follow the historicalPVReverse connection WARNING subcode, check whether the corresponding string is reversed, checkPVIIs there a voltage difference in the panel configuration? After checking and confirming no fault, it can be passed.AppInterface Clear History fault Operation Clears This WARNING.

fault code	fault name	fault cause	Troubleshooting recommendation
F138	historyPVReverse connection(String17~32)	Possible causes: occurrencePVReverse connection causes the trip switch to trip.	Contact the dealer or after-sales service center. Maintenance personnel should follow the historicalPVReverse connection WARNING subcode, check whether the corresponding string is reversed, checkPVIIs there a voltage difference in the panel configuration? After checking and confirming no fault, it can be passed.AppInterface Clear History fault Operation Clears This WARNING.
F139	FlashRead/Write Error	Possible causes: flashContent has been modified;flashEnd of life	1. Upgrade to the latest version of the program. 2. Contact the dealer or after-sales service center.
F140	Meter Comm Loss	This WARNING may only be reported after enabling the power limit function. Possible causes: 1. Meter not connected; 2. The communication line connection between the meter and Inverter is incorrect.	Check the meter wiring and ensure the meter is correctly connected. If fault persists after inspection, please contact the dealer or after-sales service center.

fault code	fault name	fault cause	Troubleshooting recommendation
F141	PVPanel type identification failed	PVPanel identification hardware anomaly	Contact the dealer or after-sales service center.
F142	PV String Mismatch	PVPV String Mismatch, same circuitMPPTThe configurations of the next two strings are different.	Check the two strings open-circuit voltage, and configure the strings with the same open-circuit voltage to the same circuit.MPPTUnder prolonged PV String Mismatch, there are potential safety hazards.
F143	CTNot connected	CTNot connected	InspectionCTWiring.
F144	CTreverse connection	CTreverse connection	InspectionCTWiring.
F145	PE Loss/PE Loss	Ground wire not connected	Check the ground wire.
F146	String terminal temperature high(String1~8)	37176RegisterPVterminal temperature alarm subcode1Set position	-
F147	String terminal temperature high(String9~16)	37177RegisterPVterminal temperature alarm subcode2Set position	-
F148	String terminal temperature high(String17~20)	37178registerPVterminal temperature alarm subcode3Set	-

fault code	fault name	fault cause	Troubleshooting recommendation
F149	HistoryPVReverse connection(String33~48)	Possible causes: OccurrencePVReverse connection causes the trip switch to trip.	Please contact the dealer or after-sales service center; maintenance personnel should follow the history.PVReverse polarity WARNING subcode, check whether the corresponding string has reversed polarity, inspectPVIIs there a voltage difference in the panel configuration? After checking, it can be passed if there is no fault.AppInterface Clear History fault Operation Clears This WARNING.
F150	Battery1voltage low	Batteryvoltage is below the set value	-
F151	Battery2voltage low	Batteryvoltage is below the set value	-
F152	Low Voltage of BAT Power	Battery non-Charge mode, voltage below shutdown voltage	-
F153	BAT1 Voltage High	-	-
F154	BAT2 Voltage High	-	-

fault code	fault name	fault cause	Troubleshooting recommendation
F155	On Line Low Insulation Resistance	1. PV String to Protection ground short circuit. 2. The environment of PV String Installation is consistently humid, and the line-to-ground insulation is poor.	Check the impedance of PV String to Protection ground. If a short circuit is found, rectify the short circuit point. 2. Check if the PE cable of the Inverter is properly connected. 3. If it is confirmed that the impedance is indeed lower than the default value under rainy conditions, please reset the "insulation resistance Protection point."
F156	Micro-grid Overload Warning	Backup terminal input current is too high	Occasional occurrences require no action; if this alarm appears frequently, please contact the dealer or after-sales service center.
F157	Manual Reset	-	-
F158	Generator Phase Sequence Abnormal	-	-
F159	Multiplexed Port Configuration Abnormal	Reuse (Generator) port configured as a microgrid or large load, but actually connected to a generator.	Using the App, modify the reuse (generator) port configuration.

fault code	fault name	fault cause	Troubleshooting recommendation
F41	Generator Port Overload	1. Off-grid side output exceeds the specifications stated in the technical documentation. 2. Off-grid side short circuit 3. Off-grid terminal voltage too low 4. When acting as a high-power load port, the load exceeds the specifications outlined in the datasheet.	By verifying the data, confirm the off-grid side output voltage, current, Power, and other data to identify the cause of the issue.
F108	DSP Communication Fail	-	-

fault name	fault cause	Troubleshooting recommendation
Parallel Comm Timeout Shutdown	In parallel operation, if the slave exceeds 400ms No communication from the host within seconds.	Check whether the parallel communication harness is securely connected and verify that the slave addresses are not duplicated.
One-click Remote Shutdown	Check if the one-touch shutdown function is enabled via the App.	Deactivate one-touch shutdown.

fault name	fault cause	Troubleshooting recommendation
Offline Shutdown	-	-
Remote Shutdown	-	-
Child Node Communication Failure	Internal communication exception	Restart the machine and observe whether fault is eliminated.
DG Communication Failure	Abnormal communication link between the control board and the diesel generator	1. Check the link communication harness and observe whether fault is eliminated. 2. Attempt to restart the machine and observe whether the fault is resolved; 3. If the fault persists after restarting, please contact the after-sales service center.
Battery Over Voltage	1. The voltage of a single cell is too high. 2. Abnormal voltage collection line	Record the fault phenomenon, restart the Battery, wait for a few minutes, and confirm whether the fault disappears. If the problem persists after restarting, please contact the after-sales service center.
	- Battery total pressure too high 2. Abnormal voltage collection line	
Battery Under Voltage	1. Single cell voltage too low 2. Abnormal voltage collection line	
	1. Battery Total pressure too low 2. voltage Acquisition Line Anomaly	

fault name	fault cause	Troubleshooting recommendation
Battery Over Current	1. Chargecurrent is too large, Battery current limiting is abnormal: temperature and voltage value mutation 2. Inverter response anomaly	
	Battery dischargecurrent is too large	
Battery Over Temperature	1. Ambient temperature is too high 2. Temperature sensor abnormality	
	1. Ambient temperature is too high 2. Temperature sensor abnormality	
Battery Under Temperature	1. Ambient temperature is too low 2. Temperature sensor abnormality	
	1. Ambient temperature is too low 2. Temperature sensor abnormality	
Battery Pole Over Temperature	Pole temperature too high	

fault name	fault cause	Troubleshooting recommendation
Battery Imbalance	1. Excessive temperature difference in different stages. Battery will impose restrictions on BatteryPower, that is, limit the charging of Dischargecurrent. Therefore, this issue is generally unlikely to occur. 2. The capacity of the battery cell degrades, leading to excessive internal resistance, significant temperature rise during current, and consequently, a large temperature difference. 3. Poor welding of the battery cell tabs, leading to excessive current and rapid temperature rise in the battery cell. 4. Temperature sampling issue; 5. Loose power cable connection	
	1. Inconsistent aging levels of battery cells 2. Issues with the board chips can also lead to excessive voltage differences between battery cells. 3. Imbalance issues in the battery pack can also lead to excessive voltage differences between cells. 4. Harness issues lead to	
	1. Inconsistent aging levels of battery cells 2. Issues with the board chip can also lead to excessive voltage differences between battery cells. 3. Imbalance issues in the battery pack can also lead to excessive voltage differences between cells. 4. Harness issue causing	

fault name	fault cause	Troubleshooting recommendation
Insulation Resistance	Insulation resistance failure	Check if the ground wire is properly connected and restart the Battery. If the issue persists after restarting, please contact the after-sales service center.
Pre-charge Failure	Precharge failure	It indicates that during the precharge process, the voltage across the precharge MOS consistently exceeds the specified threshold. After restarting the system, observe whether this fault persists, and check whether the wiring is correct and whether the precharge MOS is damaged.
Collection Line Failure	Collection line poor contact or disconnected	Check the wiring and restart the Battery. If the issue persists after restarting, please contact the after-sales service center.
	Single voltage collection line poor contact or disconnected	
	Single temperature acquisition line poor contact or disconnected	

fault name	fault cause	Troubleshooting recommendation
	Dual-channel current comparison error is too large, or current acquisition line circuit is abnormal	Check the wiring and restart the Battery. If the issue persists after restarting, please contact the after-sales service center.
	Dual-channel voltage comparison error is too large or MCU and AFE voltage comparison error is too large, or voltage acquisition line loop is abnormal.	
	Temperature acquisition circuit loop abnormal or poor contact, disconnected	
	Overvoltage level 5 or overtemperature level 5, fuse the three-terminal fuse.	To fuse the three-section fuse, it is necessary to contact the after-sales service center to replace the main control board.
Relay or MOS Over Temperature	Relay or MOS Over Temperature	The fault indicates that the MOSFET temperature has exceeded the specified threshold. Power off and let it stand for 2 hours to allow temperature recovery.
Shunt Over Temperature	Shunt Over Temperature	The fault indicates that the temperature of the diverter tube has exceeded the specified threshold. Power off and allow it to stand for 2 hours to wait for temperature recovery.

fault name	fault cause	Troubleshooting recommendation
BMS1 Other Failure 1 (RES)	Relay or MOS open circuit	1. Upgrade the software, power off and let it sit for 5 minutes, then check if fault persists after restarting. 2. If the issue persists, replace the Battery package.
	Relay or MOS short circuit	1. Upgrade the software, power off and let it stand for 5 minutes, then check if fault persists after restarting. 2. If the issue persists, replace the Battery package.
	Communication abnormality between the master cluster and slave cluster, or inconsistency of battery cells among clusters.	1. Check the Battery information and software version of the slave device, as well as whether the communication line connection with the master device is normal. 2. Upgrade the software
	Abnormal wiring harness in the Battery system circuit, resulting in the interlocking signal not forming a complete loop.	Check if Terminal resistor Installation is correct

fault name	fault cause	Troubleshooting recommendation
	BMS and PCS communication abnormality	1. Verify that the interface definition of the communication line between Inverter and Battery is correct. 2. Please contact the after-sales service center to check the backend data and verify whether the Inverter and Battery software are correctly matched.
	Abnormal communication harness between BMS master and slave control	1. Check the wiring and restart the Battery;
	Loss of communication between main and negative chips	2. Upgrade the Battery. If the problem persists after restarting, please contact the after-sales service center.
	Circuit breaker, shunt trip abnormal	Let the system stand powered off for 5 minutes, then restart to check if fault persists; 2. Check whether the blind mating connectors and communication pins at the bottom of the PACK and PCU are loose or misaligned.

fault name	fault cause	Troubleshooting recommendation
	MCU self-test failed	Upgrade the software and restart the Battery. If the issue persists after restarting, contact the after-sales service center.
	1. The software version is too low or the BMS board is damaged. 2. The number of Inverter parallel units is large, and the Battery experiences excessive impact during pre-charging.	1. Upgrade the software and observe whether fault persists. 2. In the case of parallel operation, perform a black start on Battery before starting Inverter.
	MCU internal fault	Upgrade the software and restart the Battery. Typically, this issue is caused by a damaged MCU or external component. If the problem persists after restarting, please contact the after-sales service center.
	Master Control current exceeds the specified threshold	1. Let the system stand idle and shut down for 5 minutes, then restart to check if fault persists; 2. Check if the Inverter setting is too large, causing the bus load to be exceeded.

fault name	fault cause	Troubleshooting recommendation
	Cell inconsistency in parallel clusters	Confirm whether the cells in the cluster Battery are consistent.
	Cluster Battery reverse polarity of positive and negative terminals	Check whether the positive and negative poles of the string Battery are reversed.
	Severe overheating or overvoltage triggers the fire protection system.	Contact the after-sales service center.
Air Conditioner Failure	Abnormal failure of air conditioning	Try restarting the system. If fault persists, please contact the after-sales service center.
	Cabinet door not closed	Check whether the cabinet door is properly closed.
	Power supply voltage overvoltage	Verify that the power supply voltage value meets the air conditioning input voltage requirements, and ensure compliance before re-power on.
	Insufficient power supply	
	No voltage input	
	Unstable power supply voltage	
	Compressor instability	Try to restart the system. If fault persists, please contact the after-sales service center.
	Sensor poor contact or damaged	
	Abnormal air conditioning fan	
BMS2 Other Failure 2 (RES)	There is an abnormality in the voltage or current inside the DCDC.	Refer to the specific DCfault content for details.
	DCDC overload or excessive heat sink temperature	

fault name	fault cause	Troubleshooting recommendation
	Abnormal cell acquisition or inconsistent aging levels	Please contact the after-sales service center.
	Fan operation not executed properly	Please contact the after-sales service center.
	Output port screw loose or poor contact	1. Battery Shut down, check wiring and output port screw status 2. After confirmation, restart the Battery and observe whether the fault persists. If it does, please contact the after-sales service center.
	Battery has been used for too long or the battery cell is severely damaged.	Please contact the after-sales service center to replace the pack.
	1. The software version is too low or the BMS board is damaged. 2. A large number of Inverter parallel units, Battery experiences excessive impact during pre-charging.	1. Upgrade the software and observe whether fault persists. 2. In the case of parallel operation, perform a black start on Battery before starting Inverter.
	Heating film damaged	Please contact the after-sales service center.
	The three-terminal fuse of the heating film is blown, rendering the heating function unusable.	Please contact the after-sales service center.

fault name	fault cause	Troubleshooting recommendation
	Software model, Cell Type, hardware model mismatch	Check whether the software model, serial number (SN), Cell Type, and hardware model are consistent. If they are inconsistent, please contact the after-sales service center.
	Thermal management board communication disconnection	Let the system stand powered off for 5 minutes, then restart to check if fault persists; 2. If the fault is not restored, contact after-sales service to replace the pack.
	Thermal management board communication disconnection	Let the system stand and shut down for 5 minutes, then restart to check if fault persists. 2. If the fault is not restored, contact after-sales service to replace the pack.

fault name	fault cause	Troubleshooting recommendation
	Thermal management board communication disconnection	1. Let the system remain powered off for 5 minutes, then restart and check if fault persists; 2. If the fault is not restored, contact after-sales service to replace the pack.
	Pack fan fault signal trigger	1. Let the system remain powered off for 5 minutes, then restart to check if fault persists; 2. If the fault is not restored, contact after-sales service to replace the pack.
DCDC Failure	Output portvoltage too high	Check the output portvoltage. If the output portvoltage is normal and the fault still cannot be resolved after restarting Battery, please contact the after-sales service center.

fault name	fault cause	Troubleshooting recommendation
	The DCDC module detected that the Battery voltage exceeded the maximum Charge voltage.	Stop Charge and Discharge when SOC drops below 90% or remains inactive for 2 hours. If the issue persists and restarting fault does not resolve it, please contact the after-sales service center.
	Radiator temperature too high	Let the Battery stand for 1 hour until the radiator temperature drops. If the issue persists and restarting the fault does not resolve it, please contact the after-sales service center.
	Battery dischargecurrent is too large	Check if the load exceeds the Battery's Discharge capacity. Turn off the load or stop the PCS for 60 seconds. If the issue persists after restarting the fault, please contact the after-sales service center.
	Output port power harness positive and negative poles are reversed with the combiner box Battery or PCS.	Turn off the Battery manual switch, check if the output port wiring is correct, and restart the Battery.

fault name	fault cause	Troubleshooting recommendation
	The Power output relay fails to close.	Check whether the output port wiring is correct and if there is a short circuit. If the issue persists after restarting fault, please contact the after-sales service center.
	Power device temperature too high	Let the Battery stand for 1 hour to allow the temperature of internal Power components to decrease. If the issue persists and restarting the fault does not resolve it, please contact the after-sales service center.
	Relay sticking	Restart fault still exists, please contact the after-sales service center.
Battery Rack Circulating Current Failure	1. Cell imbalance 2. First power on undercharge correction	-

fault name	fault cause	Troubleshooting recommendation
BMS2 Other Failure 3 (LES)	Communication exception with Linux module	1. Check if the communication link is functioning properly. 2. Upgrade the software, restart the Battery, and observe whether the fault persists. If it does, please contact the after-sales service center.
	Excessive temperature rise of battery cell	Cell abnormality, contact after-sales service for pack replacement.
	SOC below 10%	Perform Charge on Battery.
	SN writing does not comply with the rules	Check if the SN digits are normal. If abnormal, please contact the after-sales service center.
	Battery cluster daisy-chain communication anomaly 2. Inconsistent aging levels of battery cells between Battery clusters	1. Check the contact condition of a single Battery pack. 2. Confirm the usage of each cluster Battery, such as cumulative charge Discharge capacity, cycle count, etc. 3. Please contact the after-sales service center.
	High Humidity within the pack	-

fault name	fault cause	Troubleshooting recommendation
	Fuse tripped	Contact after-sales service to replace the pack.
	Battery low power	Perform Charge on Battery.
BMS2 Other Failure 4 (LES)	Circuit Breaker Anomaly	Contact after-sales service to replace the pack.
	External device abnormality	Contact after-sales service to replace the pack.
Contactor Fault 1	-	-
Contactor Fault 2	-	-
Overload Protection (Jinggui)	Continuous overload (exceeding 690kVA) for 10s	Please contact the after-sales service center.
Overload (Smart Inverter)	Continuous overload (exceeding 690 kVA) for 10s	Please contact the after-sales service center.
Communication Abnormality Between Host and Meter When AC is Powered On in Parallel System	1. The meter may not be connected to the host. 2. The meter communication cable may be loose.	1. Check if the meter is connected to the main unit. 2. Check if the meter communication cable is loose.

fault name	fault cause	Troubleshooting recommendation
Slave Power Meter in Parallel System is Abnormal	The meter is connected to the slave unit.	Set the meter connection machine as the master.
Slave Device in Parallel System Communication Timeout with Master After AC Power-On for More Than 10 Minutes	1. Incorrect slave address setting 2. Slave communication line is loose	1. Check whether the slave address is duplicated. 2. Check if the parallel communication cable is loose.

8.5.2.2 Battery Fault

No.	Fault Name	Fault Cause	Fault Handling Suggestions
1	BMS1 RACK1 Total Voltage Too High Warning /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 Suggestions
2	BMS1 RACK1 Total Voltage Too Low Warning /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 working condition. Determine if the battery is not being charged 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 Too High Warning /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 Suggestions
4	BMS1 RACK1 Cell Voltage Too Low Warning /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 working condition. Determine if the battery is not being charged 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 Too High Warning /BMS1 RACK1 Charging temperature is too high warning	1. Ambient temperature is too high. 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 Suggestions
6	BMS1 RACK1 Discharging Temperature Too High Warning /BMS1 RACK1 Discharging temperature is too high warning	1. Ambient temperature is too high. 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 Too Low Warning /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 raise 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 recovers. 3. If none of the above works, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
8	BMS1 RACK1 Discharging Temperature Too Low Warning/ 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 raise 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 recovers. 3. If none of the above works, contact the after-sales service center.
9	BMS1 RACK1 Charge Overcurrent Warning/ BMS1 RACK1 Charge overcurrent warning	1. Charging current is too high, battery current limiting is abnormal: temperature and voltage values change abruptly. 2. Inverter response is abnormal.	1. Stop charging, let it rest, and observe if the fault persists. 2. Check if the inverter power setting is too high, causing it to exceed the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
10	BMS1 RACK1 Discharge Overcurrent Warning/ BMS1 RACK1 Discharge overcurrent warning	1. Discharge current is too high, battery current limiting is abnormal: temperature and voltage values change abruptly. 2. Inverter response is abnormal.	1. Stop discharging, let it rest, and observe if the fault persists. 2. Check if the inverter power setting is too high, causing it to exceed the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.
11	BMS1 RACK1 Insulation Resistance Too Low Warning/ BMS1 RACK1 Insulation resistance is too low warning	Insulation resistor is damaged or contact is abnormal.	Check if the ground wire is properly connected, restart the battery. If the problem persists after restart, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
12	BMS1 RACK1 Cell Excessive Temperature Differentials Warning/ 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. So 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 temperature rise of the cell 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.
13	BMS1 RACK1 Post Temperature Too High Warning/ 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.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
14	BMS1 RACK1 Cell Excessive Voltage Differentials Warning/ 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/ BMS1 RACK1 PCS communication loss warning	Communication between BMS and PCS is abnormal.	Check if the communication line connection between the battery and the inverter is intact.
16	BMS1 RACK1 DCDC Warning/ BMS1 RACK1 DCDC warning	There is voltage or current abnormality inside the DCDC.	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.
17	BMS1 RACK1 Heating Film MOS Adhesion Warning/ 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 Suggestions
18	BMS1 RACK1 Heating Film MOS Open Warning/ BMS1 RACK1 Heat film MOS open warning	Heating circuit is abnormal.	Please contact the after-sales service center.
19	BMS1 RACK1 Total Voltage Too High Fault/ 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 Too Low Fault/ 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 working condition. Determine if the battery is not being charged 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 Too High Fault/ 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 Suggestions
22	BMS1 RACK1 Cell Voltage Too Low Fault/ 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 working condition. Determine if the battery is not being charged 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 Too High Fault/ BMS1 RACK1 Charging temperature is too high fault	1. Ambient temperature is too high. 2. Temperature sensor is abnormal.	1. Place the battery in a cool place, let it rest and power off for 30 minutes, 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 Suggestions
24	BMS1 RACK1 Discharging Temperature Too High Fault/ BMS1 RACK1 Discharging temperature is too high fault	1. Ambient temperature is too high. 2. Temperature sensor is abnormal.	1. Place the battery in a cool place, let it rest and power off for 30 minutes, restart and observe if the fault persists. 2. If the fault persists, please contact the after-sales service center.
25	BMS1 RACK1 Charging Temperature Too Low Fault/ 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 raise 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 recovers. 3. If none of the above works, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
26	BMS1 RACK1 Discharging Temperature Too Low Fault 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 raise 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 recovers. 3. If none of the above works, contact the after-sales service center.
27	BMS1 RACK1 Charge Overcurrent Fault/ BMS1 RACK1 Charge overcurrent fault	1. Charging current is too high, battery current limiting is abnormal: temperature and voltage values change abruptly. 2. Inverter response is abnormal.	1. Let it rest and power off for 5 minutes, restart and observe if the fault persists. 2. Check if the inverter power setting is too high, causing it to exceed the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
28	BMS1 RACK1 Discharge Overcurrent Fault/ BMS1 RACK1 Discharge overcurrent fault	1. Discharge current is too high, battery current limiting is abnormal: temperature and voltage values change abruptly. 2. Inverter response is abnormal.	1. Let it rest and power off for 5 minutes, restart and observe if the fault persists. 2. Check if the inverter power setting is too high, causing it to exceed the battery's rated operating current. 3. If overcurrent persists, contact the after-sales service center.
29	BMS1 RACK1 Insulation Resistance Too Low Fault/ BMS1 RACK1 Insulation resistance is too low fault	Insulation resistor 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 Suggestions
30	BMS1 RACK1 Cell Excessive Temperature Differentials Fault/ 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. So 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 temperature rise of the cell 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 Suggestions
31	BMS1 RACK1 Post Temperature Too High Fault/ BMS1 RACK1 Post temperature is too high fault	Post temperature is too high.	1. Let it rest and power off 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/ 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/ BMS1 RACK1 Relay or MOS short-circuit fault	MOS short-circuit.	1. Upgrade the software, let it rest and power off 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 Suggestions
34	BMS1 RACK1 Relay or MOS Open-Circuit Fault/ BMS1 RACK1 Relay or MOS open-circuit fault	MOS open-circuit.	1. Upgrade the software, let it rest and power off for 5 minutes, restart and observe if the fault persists. 2. If it persists, contact the after-sales service center.
35	BMS1 RACK1 Precharge Failed Fault/ BMS1 RACK1 The precharge failed fault	The voltage across the precharge MOS always exceeds the specified threshold.	1. Upgrade the software, let it rest and power off 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/ BMS1 RACK1 Acquisition line fault	Battery acquisition line has poor contact or is disconnected.	Power off, check the wiring, restack the batteries, restart. If the problem persists after restart, please contact the after-sales service center.
37	BMS1 RACK1 Relay or MOS Temperature Too High Fault/ BMS1 RACK1 Relay or MOS temperature is too high fault	Relay or MOS Over Temperature	1. Upgrade the software, let it rest and power off 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 Suggestions
38	BMS1 RACK1 Diverter Temperature Too High Fault/ BMS1 RACK1 Diverter temperature is too high fault	Shunt Over Temperature	1. Upgrade the software, let it rest and power off 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/ BMS1 RACK1 Slave MCU communication fault	Communication loss between master and slave chips.	1. Check the wiring, restart the battery. 2. Upgrade the battery, restart. If the problem persists after restart, please contact the after-sales service center.
40	BMS1 RACK1 BMU Communication Fault/ BMS1 RACK1 BMU communication fault	BMS master control and slave control communication wiring harness is abnormal.	1. Check the wiring, restart the battery. 2. Upgrade the battery, restart. If the problem persists after restart, please contact the after-sales service center.
41	BMS1 RACK1 Micro-electronics Fault/ BMS1 RACK1 Micro-electronics fault	Internal MCU fault.	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestions
42	BMS1 RACK1 Hardware Overcurrent Fault/ BMS1 RACK1 Hardware overcurrent fault	1. Software version is too low or BMS board is damaged. 2. Large number of inverters in parallel, excessive inrush current during battery precharge.	1. Upgrade the software, observe if the fault persists. 2. For parallel inverter situations, start the battery with a black start first, then start the inverters.
43	BMS1 RACK1 Application Software Fault/ BMS1 RACK1 Application software fault	MCU self-test failed.	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.
44	BMS1 RACK1 Parallel RACK Fault/ BMS1 RACK1 Parallel RACK fault	Communication between the main RACK and slave RACKs is abnormal, or the cells between RACKs are inconsistent.	1. Check the slave battery information and software version, and whether the communication line connection with the master is normal. 2. Upgrade the software.
45	BMS1 RACK1 DCDC Fault/ BMS1 RACK1 DCDC fault	DCDC overload or heatsink temperature too high, etc.	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.
46	BMS1 RACK1 Inconsistent Cell Fault 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 Suggestions
47	BMS1 RACK1 Output Port Over Temperature Fault/ 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/ 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/ 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 from 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-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
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
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

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-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)	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%

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
European Efficiency	96.40%	96.90%	97.10%	97.20%
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				
Operating Temperature Range (°C)	-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

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
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
Environmental Category	4K4H	4K4H	4K4H	4K4H

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
Pollution Degree	IV	IV	IV	IV
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 (°C)	-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	Please refer to the official website			
Safety Regulation				

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20	GW9.999K-ETA-G20
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
PV Side				

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
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)				
Rated Power (kW)	10	12	15	20

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
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
Rated Current from 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
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
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
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				
Operating Temperature Range (°C)	-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

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
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
Environmental Category	4K4H	4K4H	4K4H	4K4H

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
Pollution Degree	IV	IV	IV	IV
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 (°C)	-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	Please refer to the official website			
Safety Regulation				

Technical Data	GW10K-ETA-G20	GW12K-ETA-G20	GW15K-ETA-G20	GW20K-ETA-G20
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
Max. Input Voltage (V)*1	1000	1000	1000

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
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
Max. Apparent Power to Grid (kVA)	25	29.999	30

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
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 from 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 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
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging

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			
Operating Temperature Range (°C)	-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

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
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	IV	IV	IV
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III

Technical Data	GW25K-ETA-G20	GW29.999K-ETA-G20	GW30K-ETA-G20
Protective Class	I	I	I
Storage Temperature (°C)	-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
Nominal Voltage (V)	750	750	750	750

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
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
Rated Apparent Power to Grid (kVA)	5	6	8	9.999

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
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 from 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 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

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
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
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
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				

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Operating Temperature Range (°C)	-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	IV	IV	IV	IV
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 (°C)	-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 from 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 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
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
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

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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%
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				
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor or	Indoor/Outdoor or	Indoor/Outdoor or	Indoor/Outdoor or

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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
Self-consumption at Night (W)	≤10	≤10	≤10	≤10

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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	IV	IV	IV	IV
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 (°C)	-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
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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
Max. Continuous Charging Current (A)	33.3	40.0	40.0

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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)
Nominal Frequency (Hz)	50/60	50/60	50/60

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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 from 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 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
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
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			
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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
Conditional Short-circuit Current (A)	6000	6000	6000

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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 (°C)	-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
Certification			
Grid Standard			

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

*1: When the input voltage ranges from 950V to 1000V, the inverter will enter the standby mode, and the voltage returns to 950V 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
Max. Input Power (System) (kW)*2	5	8	5	8

Technical Data	GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
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 (°C)	-20 ~55			
Max. Storage time	12 months (-20°C~35°C)			
	6 months (35°C~45°C)			
Scalability	6 pcs			
Mounting Method	Floor stacked / Wall-mounted			
Cycle Life	≥6000 (25±2°C, 0.5C, 90%DOD, 70%EOL)			

Technical Data		GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
Country of Manufacture		China			
Standard and Certification	Safety	IEC62619, IEC60730, EN62477, IEC63056, IEC62040, CE, CEC, VDE2510			
	EMC	CE, RCM			
	Transportation	UN38.3 ADR			

Technical Data		GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
Battery Type		LFP (LiFePO ₄)	
Rated Capacity (Ah)		314Ah	
Rated Energy (kWh)		6.0	9.0
Usable Energy (kWh) ^{*1}		5.8	8.7
Nominal Voltage(V) (Battery)		19.2	28.8
Voltage Range(V) (Battery)		16.2~21.9	24.3~32.8
Operating Voltage Range (V) (single phase system)		350~550	
Operating Voltage Range (V) (three phase system)		700~950	
Max. Input Current (System) (A)		7.1	10.7
Max. Output Current (System) (A)		7.9	11.8
Max. Input Power (System) (kW) ^{*2}		3	4.5
Max. Output Power (System)(kW) ^{*2}		3	4.5
Peak Output Power (System)(kW) ^{*2}		4.5 (10s)	6.75 (10s)
Charging Temperature Range (°C)		-20~55	
Discharging Temperature Range (°C)		-20~55	
Relative Humidity(%)		4-100	
Max. Operating Altitude (m)		4000	

Technical Data		GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
Noise Emission (dB)		≤27	
Communication		CAN	
Weight (kg)		61±2	77±2
Useable Extinguishing Agent		CO ₂ , H ₂ O	
Crucial Material		LiFePO ₄ , C, Cu, LiPF ₆ , Al, (C ₃ H ₆) _n	
Dimensions (W×H×D mm)		800*326*270	
Ingress Protection		IP66	
Protective Class		I	
Function Configuration		Heating (Integrated); Aerosol fire extinguishing (Integrated)	
Storage Temperature (°C)		-20 ~55	
Max. Storage time		-20-35°C ≤ 12months 35-45°C ≤ 6 months	
Scalability ^{*3}		12P	
Mounting Method		Floor stacked / Wall-mounted / Grounded	
Cycle Life ^{*4}		≥10000	
Usable/Rated Capacity(%)		97	
Country of Manufacture		China	
Standard and Certification	Safety	IEC62619, IEC60730, EN62477, IEC63056, IEC62040, CE, CEC, Regulation2023/1542, VDE2510-50	
	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.

*3 For single-column stacked installations, the maximum number of parallel units is 6.

*4: Based on test data under specific laboratory conditions

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
	Rated Frequency (Hz)	50/60
	CT ratio	nA:5A
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)	72x85x72/2.83x3.35x2.83
	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 (°C/°F)	-30~+70/-22~+158
	Storage Temperature Range (°C/°F)	-30~70/-22~+158
	Relative Humidity (non-condensing)	0~95%
	Max. Operating Altitude (m/ft)	3000/9842

technical parameter		GM330
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
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

model	GMK330
Mounting method	DIN Rail
User Interface	4 LEDs, Reset Button
Power Consumption (W)	< 5
Environmental Parameters	
IP Rating	IP20
Operating Temperature Range (°C)	-30-+70
Storage Temperature Range (°C)	-30-+70
Relative Humidity (non-condensing)	0-95%
Max. Operating Altitude (m)	3000

*Supports 1.1 times rated voltage input.

*The standard CT for the meter has been uniformly updated to the 120A:40mA specification. Meters equipped with the 200A:50mA CT 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

technical parameter		WiFi/LAN Kit-20
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 (°C)		-30~+60
Storage Temperature Range (°C)		-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 verify whether the meter CT is correctly connected and check the current operating status of the meter and CT.

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

10.1.2 How to Upgrade the Device Version

You can view or upgrade the following via firmware information:

The inverter's DSP version, ARM version, communication module software version, and the battery's BMS version, DCDC version, etc.

- **Prompt Upgrade:**

The user opens the App, and an upgrade prompt pops up on the home page. The user can choose whether to upgrade. If upgrade is selected, follow the on-screen instructions to complete the upgrade.

- **Regular Upgrade:**

Go to **[Home] > [Settings] > [Firmware Information]** to access the firmware information viewing interface.

Click "Check for Updates". If a new version is available, follow the on-screen instructions to complete the upgrade.

- **Forced Upgrade:**

The App pushes upgrade information. The user must upgrade as prompted; otherwise, the App cannot be used. Follow the on-screen instructions to complete the

upgrade.

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 Operating Voltage Range
IDC,max	Max. Input Current per MPPT	Max. Input Current per MPPT
ISC PV	Max. Short Circuit Current per MPPT	Max. Short Circuit Current per MPPT
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 from Utility Grid
Smax (from grid)	Max. Apparent Power from Utility Grid	Max. Apparent Power 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. AC Current From Utility Grid
P.F.	Power Factor	Output Power Factor

Abbreviation	English Description	Chinese Description
Sr	Back-up Nominal apparent power	Back-up Nominal apparent power
Smax	Max. Output Apparent Power (VA) Max. Output Apparent Power without Grid	Max. Output Apparent Power
IAC,max	Max. Output Current	Max. Output Current
UAC,r	Nominal Output Voltage	Max. Output Voltage
fAC,r	Nominal Output Frequency	Nominal Output 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 Power Supply
UAC	Power Supply/AC Power Supply	Power Supply/AC Power Supply
UAC,r	Power Supply/Input Voltage Range	Power Supply/Input Voltage Range
Toperating	Operating Temperature Range	Operating Temperature Range
Pmax	Max Output Power	Max Output Power
PRF	TX Power	TX 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	Power Supply Input Voltage
U _{sys} ,max	Max System Voltage	Max System Voltage
Haltitude,max	Max. Operating Altitude	Max. Operating Altitude
PF	Power Factor	Output Power Factor
THDi	Total Harmonic Distortion of Current	Total Harmonic Distortion of Current
THDv	Total Harmonic Distortion of Voltage	Total Harmonic Distortion of Voltage

Abbreviation	English Description	Chinese Description
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 Commucation
Modbus TCP/IP	Modbus Transmission Control / Internet Protocol	Modbus Transmission Control / Internet Protocol
Modbus RTU	Modbus Remote Terminal Unit	Modbus Remote Terminal Unit
SCR	Short-Circuit Ratio	Short-Circuit Ratio
UPS	Uninterruptable Power Supply	Uninterruptable 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	Surge Protection Device
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
GFCI	Ground Fault Circuit Interrupter	Ground Fault Circuit Interrupter
RCMU	Residual Current Monitoring Unit	Residual Current Monitoring Unit
FRT	Fault Ride Through	Fault Ride Through
HVRT	High Voltage Ride Through	High Voltage Ride Through

Abbreviation	English Description	Chinese Description
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 Measure 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

- **Overvoltage Category Definition**
 - **Overvoltage Category I:** Equipment connected to circuits with measures to limit transient overvoltages to a relatively low level.
 - **Overvoltage Category II:** Energy-consuming equipment supplied by fixed electrical installations. This category includes appliances, portable tools, and other household and similar loads. If special requirements for the reliability and suitability of such equipment exist, Overvoltage Category III applies.
 - **Overvoltage Category III:** Equipment within fixed electrical installations where reliability and suitability must meet special requirements. 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, including meters and primary overcurrent protection devices.
- **Damp Location Category Definition**

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

- **Environment Category Definition:**
 - **Outdoor Inverter:** Ambient air temperature range -25°C to +60°C, suitable for Pollution Degree 3 environments.
 - **Indoor Type II Inverter:** Ambient air temperature range -25°C to +40°C, suitable for Pollution Degree 3 environments.
 - **Indoor Type I Inverter:** Ambient air temperature range 0°C to +40°C, suitable for Pollution Degree 2 environments.
- **Pollution Degree Category Definition**
 - **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 considered.
 - **Pollution Degree 3:** Conductive pollution occurs, or non-conductive pollution becomes conductive due to condensation.
 - **Pollution Degree 4:** Persistent conductive pollution occurs, for example due to conductive dust or rain/snow.

10.4 Battery SN Code Meaning

*****2388*****


The 11th-14th digits

LXD10DSC0002

Digits 11-14 of the product SN code represent the production date code.

The production date in the image above is 2023-08-08.

- Digits 11 and 12 represent the last two digits of the production year, e.g., 2023 is represented as 23;
- Digit 13 represents 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

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

Production Date	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