

V1.4-2026-07-28

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

Over view

This document primarily introduces an energy storage system consisting of an inverter, a battery system, a static transfer switch cabinet (hereinafter referred to as STS), and a smart meter. It covers product information, installation and wiring, configuration, testing and commissioning, as well as troubleshooting and maintenance. Please read this manual carefully before installing or using the product to understand safety information and familiarize yourself with the product's functions and features. This manual may be updated periodically; please visit the official website for the latest version and additional product information.

Applicable Products

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	Rated Output Power: 5 kW - 30 kW
battery system	GW5.1-BAT-D-G20 GW5.1-BAT-D-G21	Rated energy 5.12 kWh
	GW8.3-BAT-D-G20 GW8.3-BAT-D-G21	Rated energy 8.32kWh
	GW6.0-BAT-D-G20	Rated energy 6 kWh

Product Type	Product Information	Description
	GW9.0-BAT-D-G20	Rated energy 9kWh
Static Transfer Switch Cabinet (STS)	GW30K-ST5-G10	Rated output power: 30 kW (grid side)
	GW60K-ST5-G10	Rated output power: 60kW (grid side)
electricity meter	GMK330 GM330	In energy storage systems, the monitoring module can detect information such as operating voltage and current.
communication module	WiFi/LAN Kit-20	System operation information can be uploaded to the monitoring platform via WiFi or LAN signals.
	4G Kit-G20	The system operation information can be uploaded to the monitoring platform via 4G.

Symbol Definition

 DANGER
Indicates a highly potential danger that, if not avoided, will result in death or serious injury.
 WARNING
Indicates a moderately potential danger that, if not avoided, may result in death or serious injury.
 CAUTION
Indicates a low potential danger that, if not avoided, may result in moderate or minor injury.
NOTICE

Emphasizes and supplements the content, and may also provide tips or tricks for optimizing product use, helping you solve a problem or save your time.

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1 Safety Precautions

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

WARNING

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

1.1 General Safety

NOTICE

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

1.2 personnel requirements

NOTICE

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

1. Qualified personnel include:

- Personnel who have mastered knowledge of equipment working principles, system structure, risks and hazards, and have received professional operation training or possess extensive practical experience.
- Personnel who have received relevant technical and safety training, possess certain operational experience, are aware of potential dangers specific tasks may pose to themselves, and can take protective measures to minimize risks to themselves and others.
- Qualified electrical technicians meeting the regulatory requirements of the country/region.
- Personnel holding a degree in electrical engineering/an advanced diploma in electrical discipline or equivalent/possessing professional qualifications in the electrical field, with at least 2/3/4 years of experience in testing and supervision work using electrical equipment safety standards.

2. Personnel involved in special tasks such as electrical work, work at heights, and special equipment operation must hold valid qualification certificates as required by the equipment's location.

3. Medium-voltage equipment operation must be performed by certified high-voltage electricians.

4. Equipment and component replacement is only permitted to be performed by authorized personnel.

1.3 system safety



- Before making electrical connections, disconnect all upstream switches of the equipment to ensure the equipment is de-energized. Do not work on live equipment; otherwise, there is a risk of electric shock or other hazards.
- Devices supporting PV string connection have weak surge current tolerance at the PV input terminal. It is strictly prohibited to directly power on via the PV port using a DC voltage source. If powering on via the PV port is necessary, please follow the steps below. Any machine damage caused by improper operation is considered human-induced damage and is not covered by the product warranty.
 1. First, limit the output current of the DC voltage source to within the Max. Current from Grid allowed at the PV port.
 2. Reclose the DC switch of the inverter.
 3. Finally, slowly raise the DC source output voltage from zero to the target value at a rate of $\leq 50\text{V/s}$.
- To prevent personal danger or equipment damage caused by live operation, a circuit breaker should be added at the voltage input side of the equipment.
- All operations such as transportation, storage, installation, operation, usage, and maintenance shall comply with applicable laws, regulations, standards, and code requirements.
- The specifications of cables and components used for electrical connections shall comply with local laws, regulations, standards, and codes.
- Use the cable connectors supplied with the unit to connect the equipment cables. If other types of connectors are used, any equipment damage resulting therefrom shall not be covered under the manufacturer's liability.
- Ensure that all cables of the equipment are connected correctly, tightly, and without looseness. Improper wiring may cause poor contact or damage to the equipment.
- The equipment's Protection Earth Wire must be firmly connected.
- For the Protection of equipment and its components from damage during transportation, please ensure that transport personnel have received professional training. Record the operation steps during transportation and maintain the balance of the equipment to prevent it from falling.
- The equipment is heavy. Please assign personnel according to the equipment Weight to prevent the equipment from exceeding the Weight range that can be carried by a person, which could cause injury.
- Ensure the equipment is placed stably and not tilted. Equipment overturning may cause equipment damage and personal injury.

 Warning

- During equipment installation, avoid bearing load on the terminal blocks, otherwise they may be damaged.
- If the cable is subjected to excessive tension for a long time, it may cause poor connection. When wiring, please leave some slack in the cable before connecting it to the device connection terminal.
- Cables of the same type should be bundled together, while cables of different types should be laid at least 30mm apart. Twisting or crossing each other is prohibited.
- The use of cables in high-temperature environments may cause insulation aging and damage. The distance between cables and heating components or the periphery of heat source areas shall be at least 30 mm.

1.3.1 PV String Safety

WARNING

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

1.3.2 Inverter Safety

WARNING

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

1.3.3 Battery Safety

DANGER

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



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

Emergency Response Measures

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

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

1.3.4 Smart Meter Safety

WARNING

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

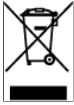
1.4 Safety Symbols and Certification Marks

DANGER

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

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

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

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

1.5 EU Declaration of Conformity

1.5.1 Equipment with Wireless Communication Modules

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

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

1.5.2 Equipment without Wireless Communication Modules (Except Battery)

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

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

1.5.3 Battery

The Battery sold in the European market complies with 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)*¹
- Regulation (EU) 2023/1542 Article 12 - Safety of stationary battery energy storage systems
- Regulation (EU) 2023/1542 Article 10 - Performance and durability requirements for rechargeable industrial batteries, LMT batteries and electric vehicle batteries
- Regulation (EU) 2023/1542 Article 14 - Information on the state of health and expected lifetime of batteries
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

Our Battery products comply with the hazardous substance restriction requirements stipulated by this act.

More EU Declaration of Conformity can be obtained from [Official Website](#) Acquisition.

2 System Introduction

2.1 System Over view

Warning

- To complete the battery management system (BMS) calibration, during the First-time Installation and commissioning phase, the system (ESA) default program setting will charge the battery to 100% state of charge (SOC).
- The energy storage system is not suitable for connecting devices that require a stable power supply, such as life-sustaining medical equipment. Ensure that no personal injury occurs when the system is powered off.
- If the residential storage integrated machine is in a high temperature or BMS current limiting situation, it may cause the battery charging power to be limited, resulting in excessive system voltage triggering over voltage Protection.
- The inverter only supports GoodWe brand batteries as specified in this manual. If no battery is connected, it can only operate in grid-tied mode and must be installed on the base provided with the package.
- In Microgrid Scenario, the PV open circuit voltage of the residential integrated storage machine is recommended to be less than $0.85 * PV \text{ Max. Input Voltage}$ to avoid triggering over voltage Protection due to excessively high system voltage under harsh working conditions.
- In the Microgrid Scenario, ensure that the over-frequency derating point of the grid-connected inverter is consistent with that of the household storage all-in-one.
- If the grid-tied inverter requires output power limitation, please connect a meter or CT etc. separately.
- Please ensure that the over frequency derating curve of the grid-connected inverter is set as follows:
 - Final Power Setting is 0% P_n
 - Response delay time set to 0, hysteresis function disabled.
- In an inverter's fully off-grid operation system, if the battery is exposed to prolonged low sunlight or rainy weather with out timely recharging, it may lead to over-discharge, causing battery performance degradation or damage. To

Warning

ensure long-term stable system operation, the battery should be prevented from being fully discharged. Suggested measures are as follows:

- When operating off-grid, set the minimum SOC Protection threshold. It is recommended to set the off-grid battery SOC lower limit to 30%.
- When SOC approaches the Protection threshold, the system automatically enters load limiting or Protection mode.
- If there is insufficient sunlight for several consecutive days and the battery SOC is too low, the battery should be recharged in a timely manner using external energy sources (such as generator or grid-assisted charging).
- Regularly check the battery status to ensure it is within the safe operating range.
- It is recommended to fully charge and discharge the battery once every six months to calibrate SOC accuracy.
- Please connect the inverter to the APP and complete the corresponding settings of the battery parameters.
- Due to product version upgrades or other reasons, the document content will be updated from time to time. 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 each scenario, please refer to:
[5.2.Detailed System Wiring Diagram\(Page 115\)](#).

Note

- Whole-house backup power scenario: When the grid fails, the energy storage system seamlessly takes over all loads, ensuring continuous and stable power supply for the entire house, so that all electrical devices remain unaffected by grid fluctuations.
- In the whole-house backup power scenario, there is no need to connect additional meters or CTs. Simply set the "Meter Type" to "Built-in CT, External No Meter No CT" in the App to achieve the Power Limit function.

Under off-grid conditions, the energy storage system can normally supply power to the following loads:

Description of off-grid load capacity of BACK-UP port				
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 Inductive Load Rated Power (kVA)	1.1	3.3	2.2	6.6
Total Rated Power of Multiple Inductive Loads (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	-

Description of off-grid load capacity of BACK-UP port

Note:

- P_n: Inverter rated output power.
- Half-wave Load: Some older or non-compliant home appliances (such as hair dryers and small heaters using half-wave rectification) that do not meet EMC standards.
- If the total power of multiple inductive loads calculated based on the rated power is less than the rated power of a single inductive load, the total rated power of multiple inductive loads = the rated power of a single inductive load.
- If inductive load is required, it is recommended to use it with a frequency converter.
- For 2 or more units in parallel, the allowed total inductive load Rated Power = single inductive load Rated Power * number of parallel units * 80%.

Note

If using Static Transfer Switch (STS) cabinet, please ensure the following:

1. When the SMART-PORT port is connected to non-critical loads, the maximum total load capacity of the SMART-PORT and BACK-UP ports is as follows:

- GW30K-STG-G10≤30kVA
- GW60K-STG-G10≤60kVA

To ensure continuous power supply to the loads connected to the BACK-UP port during a Grid Power Outage, it is recommended that the total power of the SMART-PORT port plus the BACK-UP load does not exceed the rated output power of the energy storage system.

2.1.1 General scenario

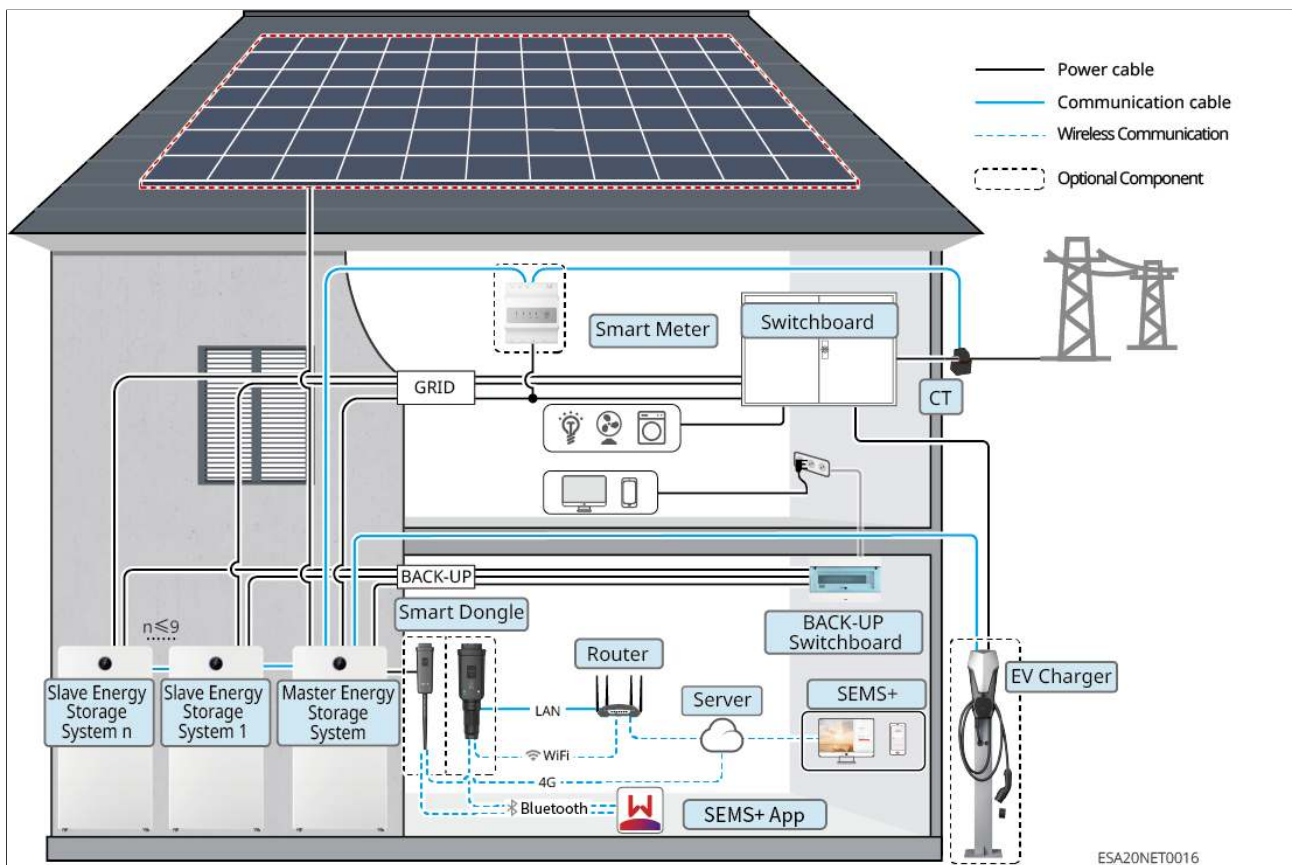


Figure1 General Scenario 1

Static Transfer Switch Cabinet (STS)

Equipment Type	Model	Description
Energy storage 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	• Only in single-unit scenario, it supports connecting to GoodWe AC charging pile. • The system supports up to 10 inverters for forming a parallel system, and supports On/Off-grid hybrid parallel connection of inverters of different power levels. It is recommended to use a high-power inverter as the master when mixing. When in parallel operation, the microgrid function is not supported. If the number of parallel units exceeds 6, please contact the after-sales service center. • Support Diesel Generator Control and generator charging the battery. If a generator needs to be connected, please use the GMK330 or GM330 smart meter. • In a parallel system, each inverter requires the installation of WiFi/LAN Kit-20. • The system networking shall meet the following version requirements: ◦ Inverter ARM software version is 04.182 and above. ◦ The inverter DSP software version is 02.2013 and above.

Equipment 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. • System supports 5-108kWh, suitable for matching different power and energy requirements. • Battery heating film is optional; only models equipped with the heating film can activate the "battery heating" function. Batteries without the heating film should not be used in low-temperature environments; otherwise, the equipment may fail to operate. • GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW6.0-BAT-D-G20, GW9.0-BAT-D-G20与GW5.1-BAT-D-G21, GW8.3-BAT-D-G21 When used together, the battery heating function is unavailable. • If the system requires mixed battery usage and separate expansion, ensure that the BMS software version is V06 or above and the DCDC version is V06 or above.
Static Transfer Switch Cabinet (STS)	GW30K-ST5-G10 GW60K-ST5-G10	• Optional, please contact GoodWe for purchase if needed. • Support connecting 1 energy storage inverter, diesel generator, load, and grid.
smart meter	Inverter built-in energy meter	
	GMK330 (Purchased from GoodWe)	

Equipment Type	Model	Description
	GM330 (Purchased from GoodWe)	• Built-in meter: Please use the CT supplied with the inverter to connect. ◦ CT ratio is 120A:40mA. ◦ When the inverter's built-in meter is not sufficient, you can contact dealers to purchase the GMK330 or GM330 smart meter. • GMK330: CT not replaceable, CT ratio 120A:40mA • GM330: CT can be sourced from GoodWe or purchased separately. CT ratio requirement: nA/5A ◦ nA: CT primary side input current, n ranges from 200 to 5000 ◦ 5A: CT secondary side output current • If the number of inverters in parallel exceeds 2, or the wire gauge or range of the standard CT does not meet the total parallel current requirement on site, please use the GM330 smart meter.
Smart Communication Stick	WiFi/LAN Kit-20	• Suitable for inverter single-unit networking and parallel networking scenarios. • Use Bluetooth signal to configure device parameters and view device operation information locally; upload system operation information to the monitoring platform via WiFi or LAN. • Please ensure that the firmware version of the Smart Communication Stick is 07 or above.

Equipment Type	Model	Description
	4G Kit-G20	• Applicable to the single-inverter grid-connected scenario. • Bluetooth signal is used for near-end configuration of device parameters and viewing device operation information, while 4G is used to upload system operation information to the monitoring platform.

2.1.2 Microgrid Scenario

When the on-grid inverter is connected to the BACK-UP port of the energy storage inverter, it is a microgrid scenario.

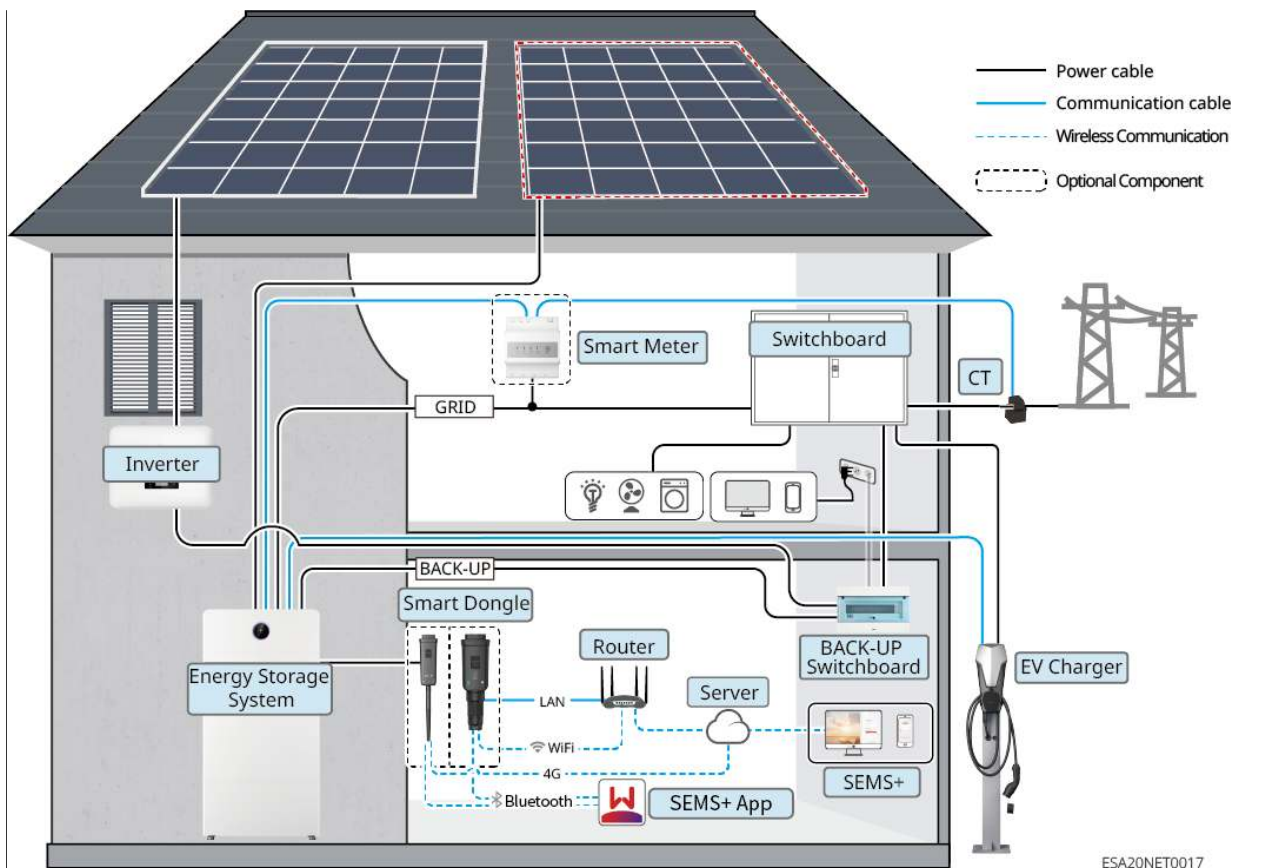


Figure3 Microgrid Scenario 1

with Static Transfer Switch Cabinet (STS)

When the grid-connected inverter is connected to the SMART-PORT of the static transfer switch cabinet (STS), it is a Microgrid Scenario.

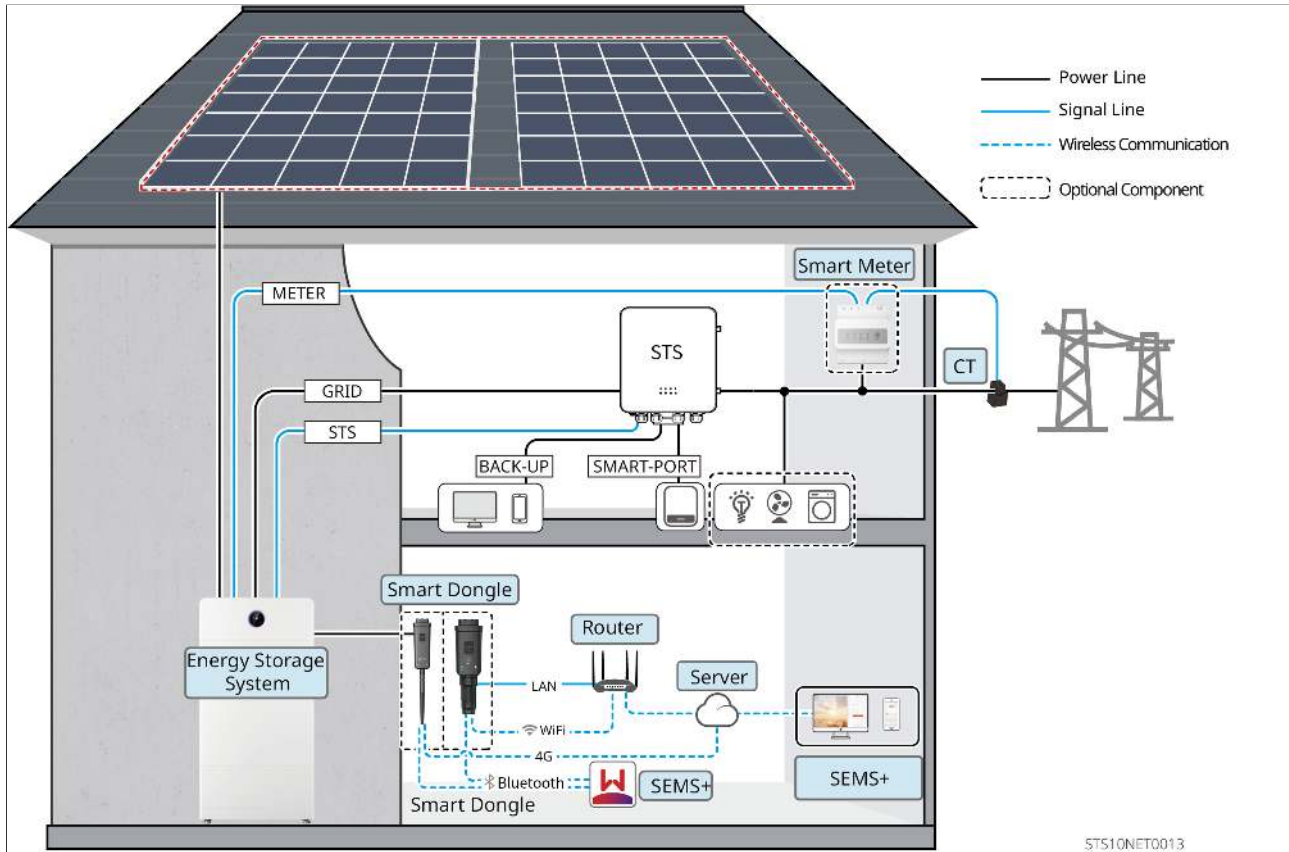


Figure4 Microgrid Scenario 2: with STS

Equipment Type	model	Description
energy storage 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 the Microgrid Scenario, the system only supports the use of one energy storage inverter. • In the Microgrid Scenario, connecting generators is not supported. • During system networking, satisfy the following version requirements: ◦ Inverter ARM software version is 04.182 and above. ◦ Inverter DSP software version is 02.2013 or later.

Equipment 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 support mixed use. - System supports 5-108kWh to meet different power and energy matching requirements. - Battery heating film is optional; only models equipped with the heating film can enable the "Battery Heating" function. Batteries not equipped with the heating film should not be used in low-temperature environments, otherwise the equipment may fail to operate. - GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, GW6.0-BAT-D-G20 , GW9.0-BAT-D-G20 Battery heating function is not available when used in combination. - If the system has battery mixing and split-type expansion requirements, ensure that the BMS software version is V06 or above and the DCDC version is V06 or above.
Static Transfer Switch Cabinet (STS)	GW30K-STG-G10 GW60K-STG-G10	- Optional. For usage, please contact Goodwe to purchase. - Supports connection of 1 energy storage inverter, diesel generator, load, and grid.
smart meter	Inverter built-in meter	
	GMK330 (purchased from GoodWe)	

Equipment Type	model	Description
	GM330 (purchased from Goodwe)	- Built-in meter: Please use the CT supplied with the inverter for connection. - CT ratio: 120A:40mA - When the built-in meter of the inverter does not meet the usage requirements, you can contact the dealer to purchase a GMK330 or GM330 smart meter. - GMK330: CT does not support replacement, CT ratio is 120A:40mA. - GM330: CT supports from GoodWe or self-purchase, CT ratio is nA:5A.
Smart Communication Stick	WiFi/LAN Kit-20	- Using Bluetooth signal for local configuration of device parameters and viewing device operation information, and uploading system operation information to the monitoring platform via WiFi or LAN. - Please ensure the firmware version of the smart communication stick is 07 or above.
	4G Kit-G20	Using Bluetooth for local configuration of device parameters and viewing device operational information, and uploading system operation data to the monitoring platform via 4G.

Equipment Type	model	Description
grid-connected inverter	-	• Goodwe brand grid-tied inverters are recommended, and the use of third-party grid-tied inverters is supported. • In the Microgrid Scenario, please ensure that the rated output power of the grid-connected inverter $\leq$ the rated output power of the hybrid inverter. • When the microgrid system is in grid-connected state, if power limitation is required, please ensure: ◦ The energy storage inverter needs to be set in the grid power limit interface of the SEMS+ App. For the grid-tied inverter, please set it according to the actual tool used. ◦ To ensure that the grid-tied inverter can continuously generate power, it is necessary to adjust the output power of the hybrid inverter through the microgrid mode interface of the SEMS+ App. Note: Different grid-tied inverters have different output power control accuracy. Please set the grid-tied power limit parameter value according to the actual situation.

2.1.3 coupling scenario

When a grid-tied inverter is connected to the GRID port of a storage inverter, it is a coupling scenario.

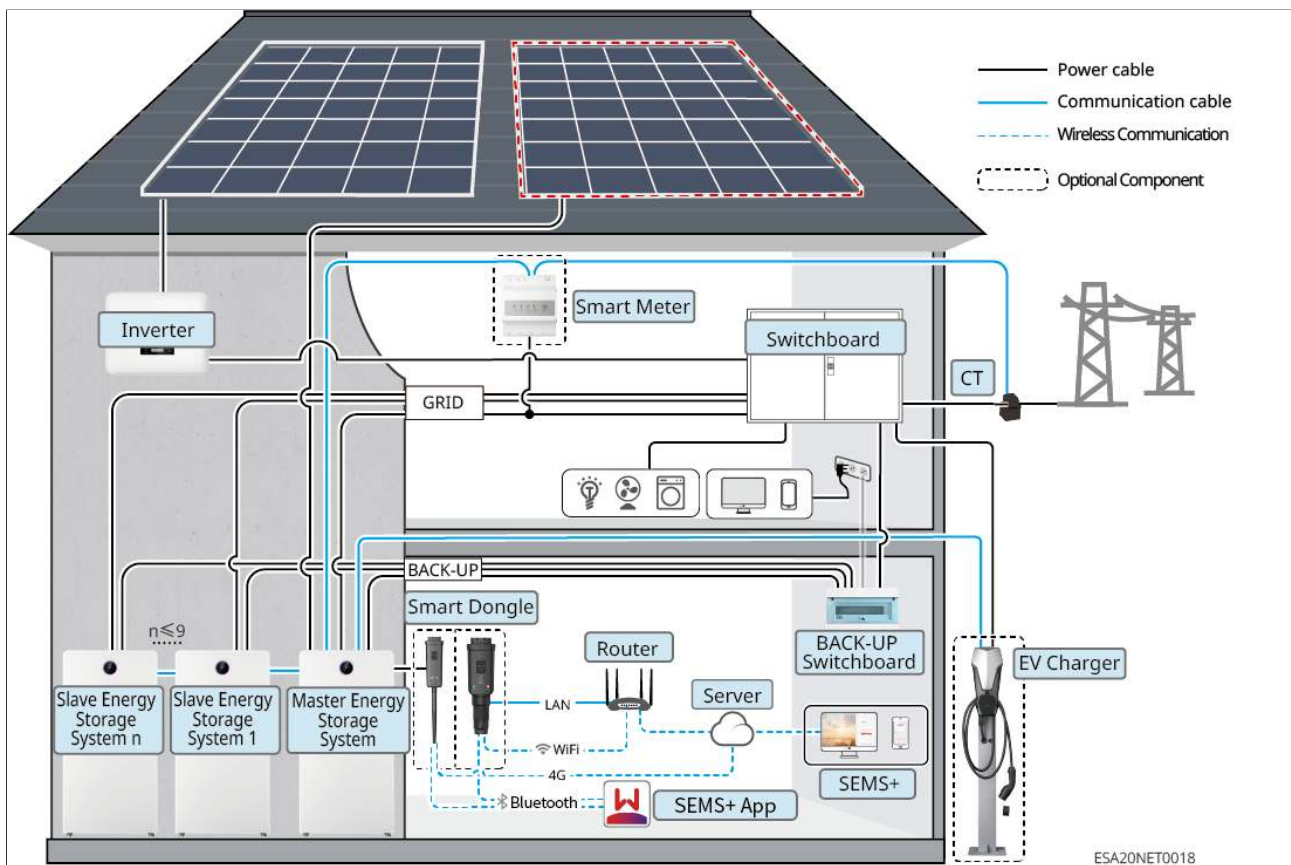


Figure5 Coupling Scenario 1

with Static Transfer Switch Cabinet (STS) networking

When the grid-tied inverter is connected to the GRID port of the Static Transfer Switch (STS), it is a coupling scenario.

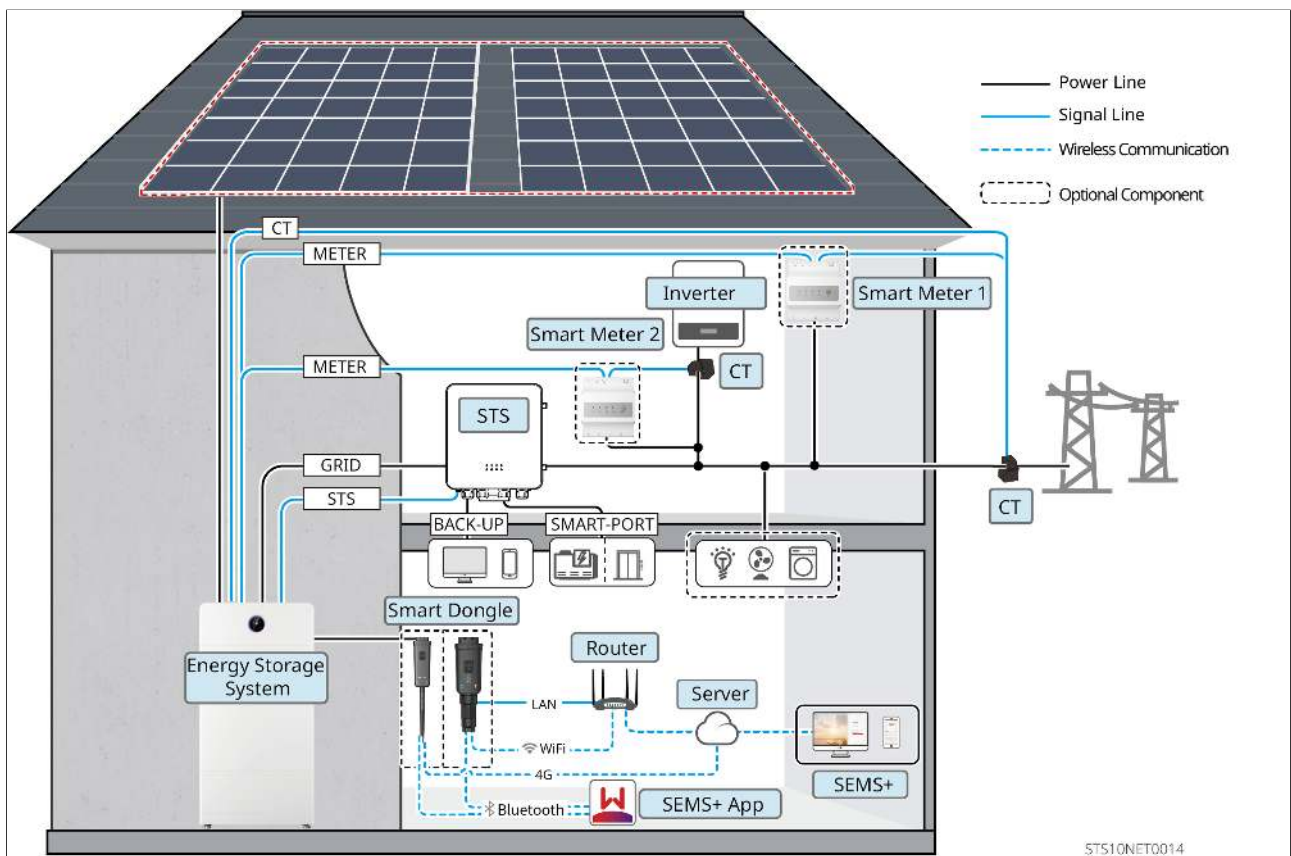


Figure6 Coupling Scenario 2: With STS

Equipment Type	Model	Description
Energy storage 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	• Only in single-unit scenario, it supports connecting to GoodWe AC charging pile. • The system supports up to 10 inverters for forming a parallel system, and supports On/Off-grid hybrid parallel connection of inverters of different power levels. It is recommended to use a high-power inverter as the master when mixing. When in parallel operation, the microgrid function is not supported. If the number of parallel units exceeds 6, please contact the after-sales service center. • Support Diesel Generator Control and generator charging the battery. If a generator needs to be connected, please use the GMK330 or GM330 smart meter. • In a parallel system, each inverter requires the installation of WiFi/LAN Kit-20. • The system networking shall meet the following version requirements: ◦ Inverter ARM software version is 04.182 and above. ◦ The inverter DSP software version is 02.2013 and above.

Equipment 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 5-108kWh to meet different power and energy matching requirements. • Battery heating film is optional; only models equipped with the heating film can activate the "battery heating" function. Batteries without the heating film should not be used in low-temperature environments; otherwise, the equipment may fail to operate. • When 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 are used in combination, the battery heating function is unavailable. • If the system requires mixed battery usage and separate expansion, ensure that the BMS software version is V06 or above and the DCDC version is V06 or above.
Static Transfer Switch Cabinet (STS)	GW30K-STG-G10 GW60K-STG-G10	• Optional, please contact GoodWe for purchase if needed. • Support connecting 1 energy storage inverter, diesel generator, load, and grid.
smart meter	Inverter built-in energy meter	
	GMK330 (purchased from GoodWe)	

Equipment Type	Model	Description
	GM330 (purchased from GoodWe)	• Built-in meter: Please use the CT supplied with the inverter to connect. ◦ CT ratio is 120A:40mA. ◦ When the inverter's built-in meter is not sufficient, you can contact dealers to purchase the GMK330 or GM330 smart meter. • GMK330: CT cannot be replaced, CT ratio is 120A:40mA • GM330: CT can be sourced from GoodWe or purchased separately. CT ratio requirement: nA/5A ◦ nA: CT primary side input current, n ranges from 200 to 5000 ◦ 5A: CT secondary side output current • If the number of inverters in parallel exceeds 2, or the wire gauge or range of the standard CT does not meet the total parallel current requirement on site, please use the GM330 smart meter.
Smart Communication Stick	WiFi/LAN Kit-20	• Use Bluetooth signal to configure device parameters and view device operation information locally; upload system operation information to the monitoring platform via WiFi or LAN. • Please ensure that the firmware version of the Smart Communication Stick is 07 or above.

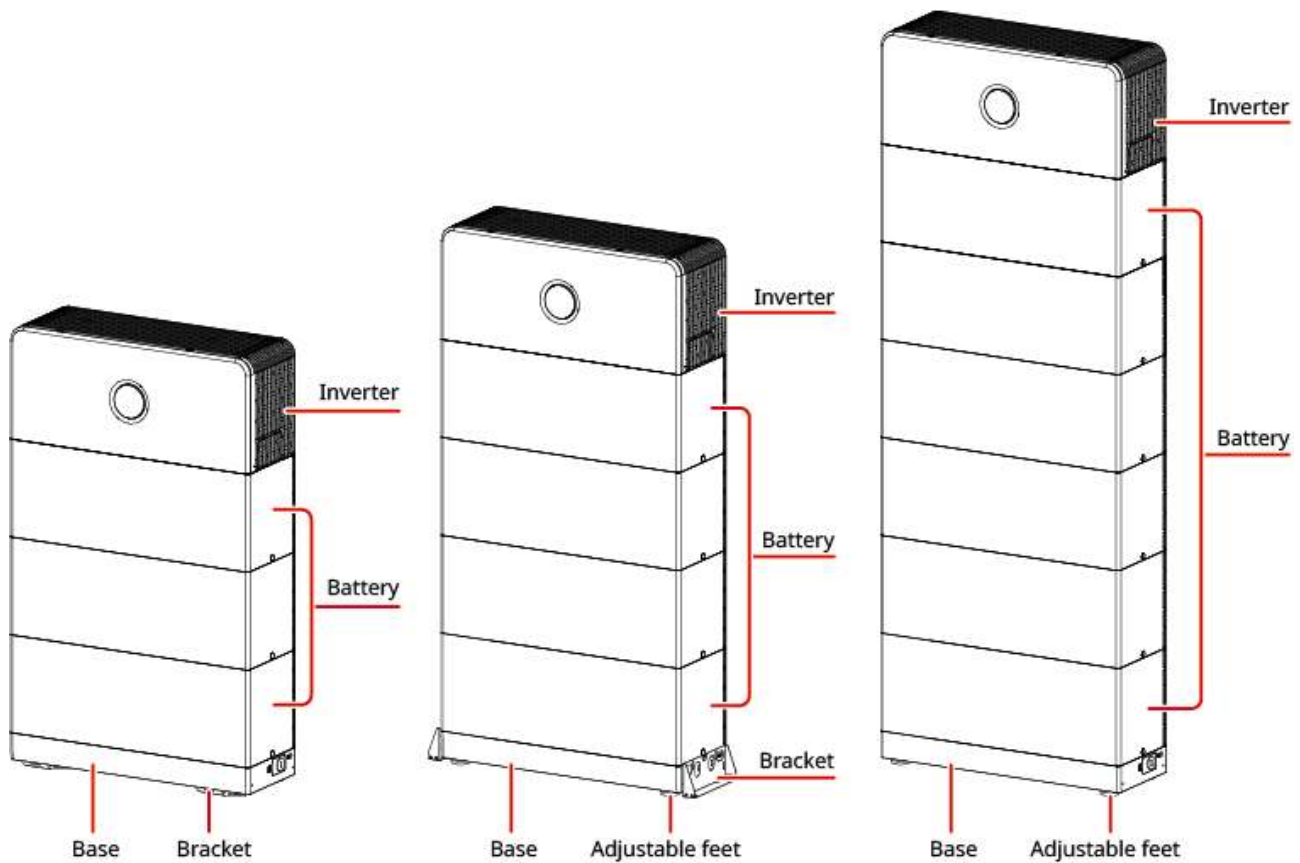
Equipment Type	Model	Description
	4G Kit-G20	Bluetooth signal is used for near-end configuration of device parameters and viewing device operation information, while 4G is used to upload system operation information to the monitoring platform.
grid-connected inverter	-	• It is recommended to use GoodWe brand grid-tied inverters, and third-party grid-tied inverters are also supported. • In the coupling scenario, ensure that the rated output power of the grid-tied inverter is less than or equal to the rated output power of the hybrid inverter. • When the coupled system is in grid-connected mode and power limitation is required, please ensure that the energy storage inverter is set through the grid-connected power limitation interface of the SEMS+ App, and the grid-connected inverter should be set according to the actual tool used. Note: The output Power Control accuracy of different grid-connected inverters varies; please set the grid-connected power limit parameter value according to actual conditions.

2.2 Product Overview

2.2.1 Residential Energy Storage All-in-One (Three-Phase)

All-in-one residential energy storage unit adopts a blind-mate stacking connection method and integrates inverter and battery cells through a modular design.

All-in-one Residential Storage System Appearance Description:



ESA20DSC0007

The system supports battery capacity expansion, and the total battery capacity is determined by the quantity and specifications of battery modules. Configuration must strictly adhere to the restrictions specified in this section. System over all configuration description:

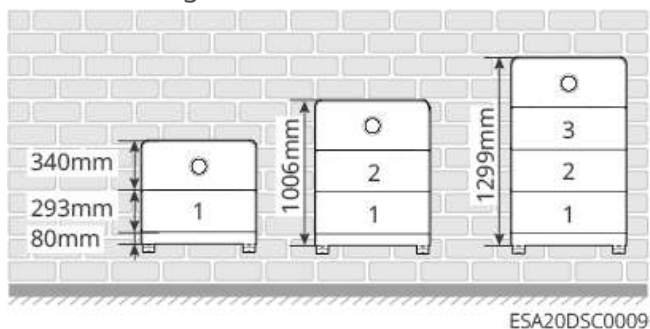
A: GW5.1-BAT-D-G20, GW5.1-BAT-D-G21, GW6.0-BAT-D-G20

B: GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20

Mounting Method	Number of Expansion Groups	single stack	Total number of batteries
ground-mounted installation	≤3 groups	Floor-Mounted Standoff Bracket ≤4 pieces Wall-mounted ≤6 units	≤12pcs
Wall-mounted Installation (A)	≤3 Groups	≤3pcs	≤9 units

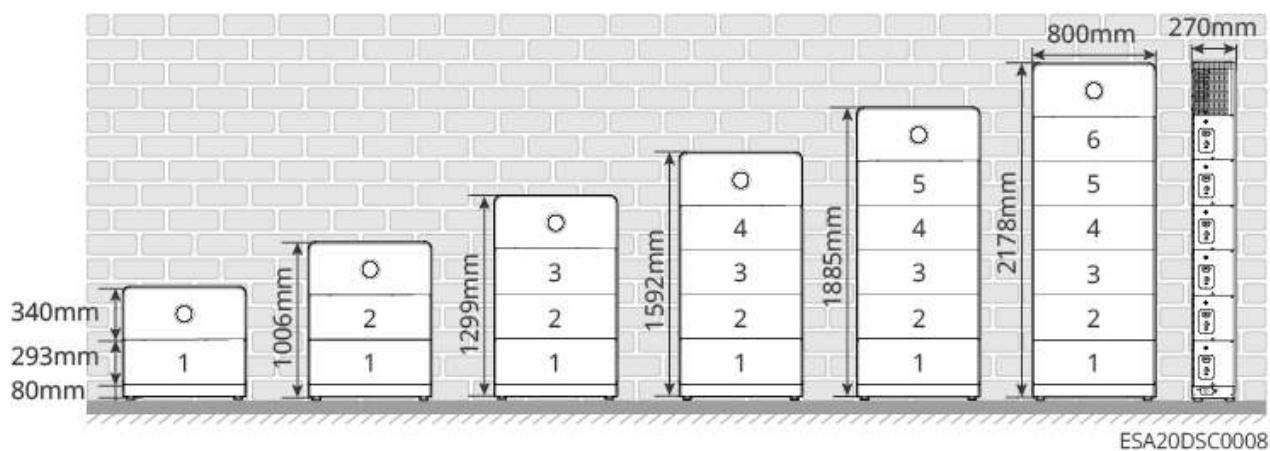
Mounting Method	Number of Expansion Groups	single stack	Total number of batteries
挂墙Installation (A/B/A+B)	≤3 sets	≤2 pieces	≤6piece
Note: expansion groups × stacks per group ≤ total system battery count.			

Wall Mounting

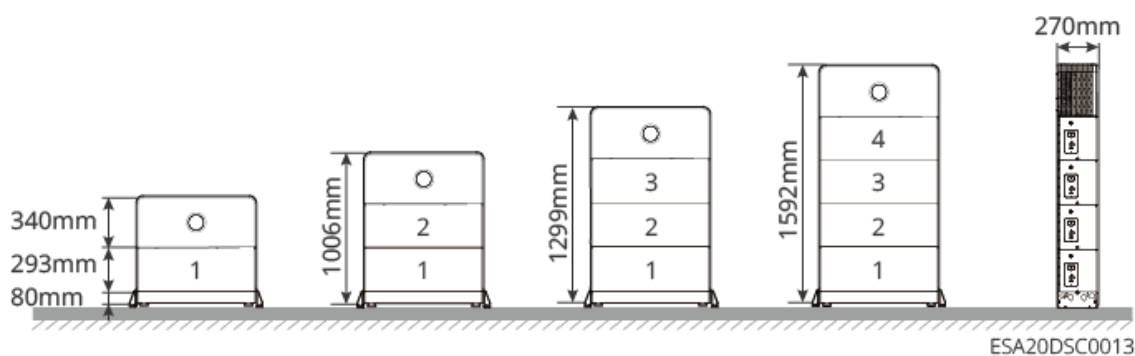


Floor Mounting

- wall-mounted

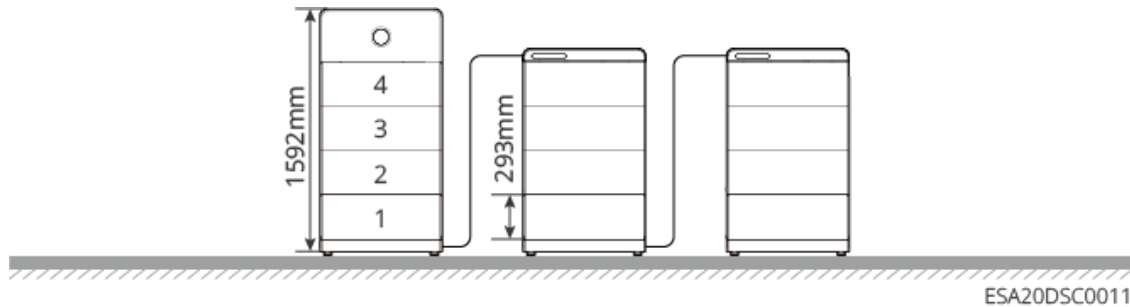


- wall-mounted installation

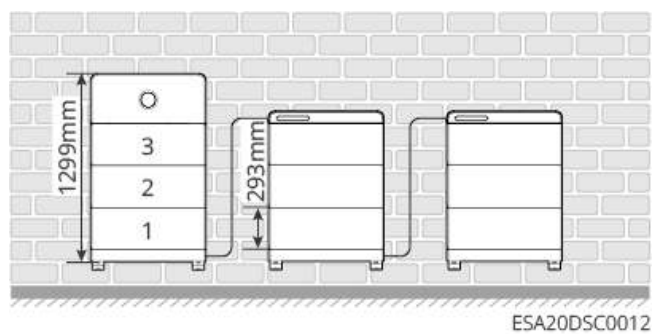


Battery Cluster Expansion Installation

- ground-mounted installation

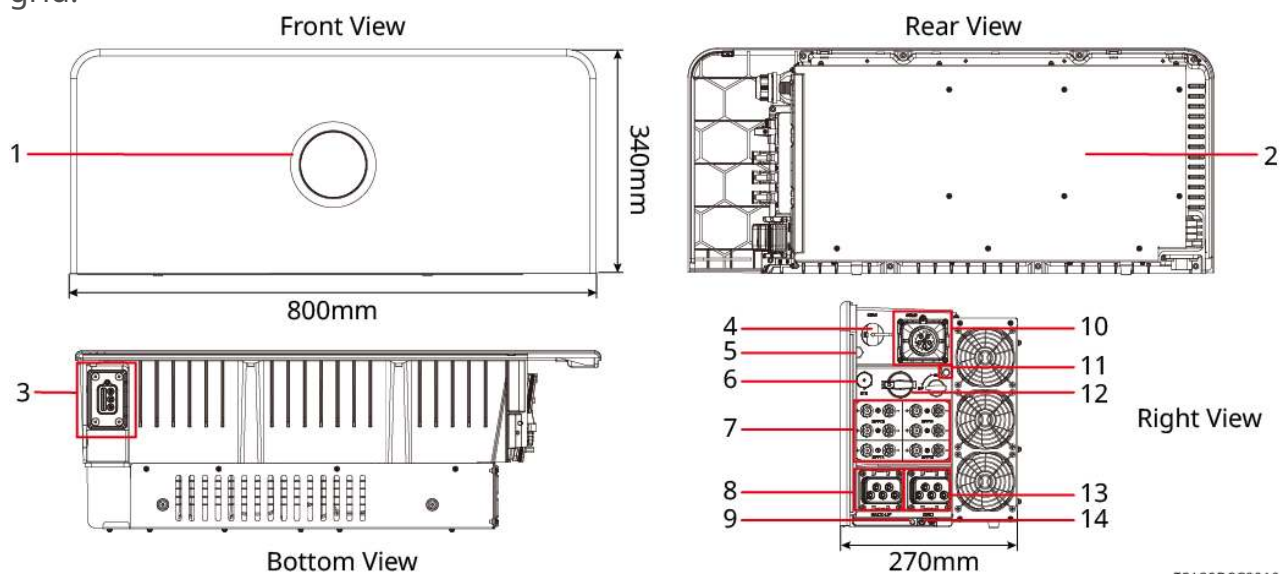


- Wall-mounted installation



Inverter Appearance Description:

In the photovoltaic system, the inverter controls and optimizes energy flow through an integrated energy management system. The electricity generated by the photovoltaic system can be supplied to loads, stored in batteries, or exported to the grid.



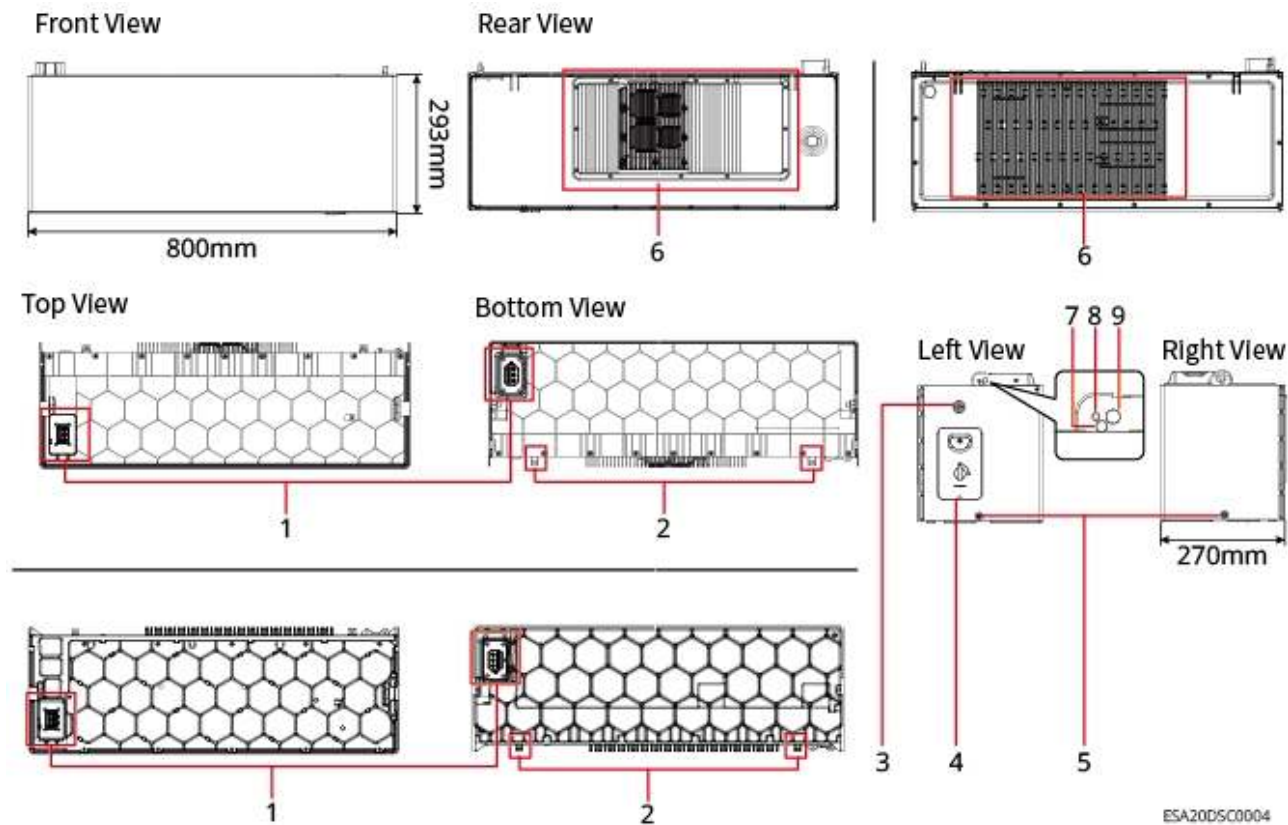
ESA20DSC0010

Serial Number	Component/Silkscreen	Description
1	indicator light	Indicates the operating status of the inverter.
2	heatsink	Inverter heat dissipation.
3	connector	Power and communication ports for inverter-to-battery connection.
4	Smart Communication Stick Connection Port	• Can be connected to a smart communication stick, such as WiFi/LAN or other communication modules. Please select the module type according to actual requirements. • Supports connecting a USB drive for Local Upgrade of the inverter software version.
5	breathing valve	-
6	STS communication interface	Connect Static Transfer Switch Cabinet (STS).
7	PV Input Terminal	Only ETA models, BTA models do not have PV input terminals. • Connectable to PV module DC input line. • Number of PV input terminals: ◦ GW5K-ETA-G20 , GW6K-ETA-G20 , GW8K-ETA-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 line to critical load or grid-tied inverter.
9	battery fixing hole	Stationary inverter and battery

Serial Number	Component/Silkscreen	Description
10	communication port	Connectable load control, CT, RS485, Remote Shutdown/Fast Shutdown, DRED (Australia)/RCR (Europe) and other communication lines.
11	Lifting bar mounting hole	Used for installing the hand lift bar. Use when handling inverter.
12	DC Switch	Only the ETA model has a DC switch; the BTA model does not. Control DC input connection or disconnection.
13	GRID port	Connect the AC lines to connect the inverter to the grid.
14	Protection earth terminal	Connect the box Protection earth wire.
15	cooling fan	Inverter heat dissipation. The number of cooling fans is as follows: - GW5K-ETA-G20, GW6K-ETA-G20, GW8K-ETA-G20, GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20, 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: 1 - GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 3

Battery System Appearance Description:

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 both high voltage direct current.

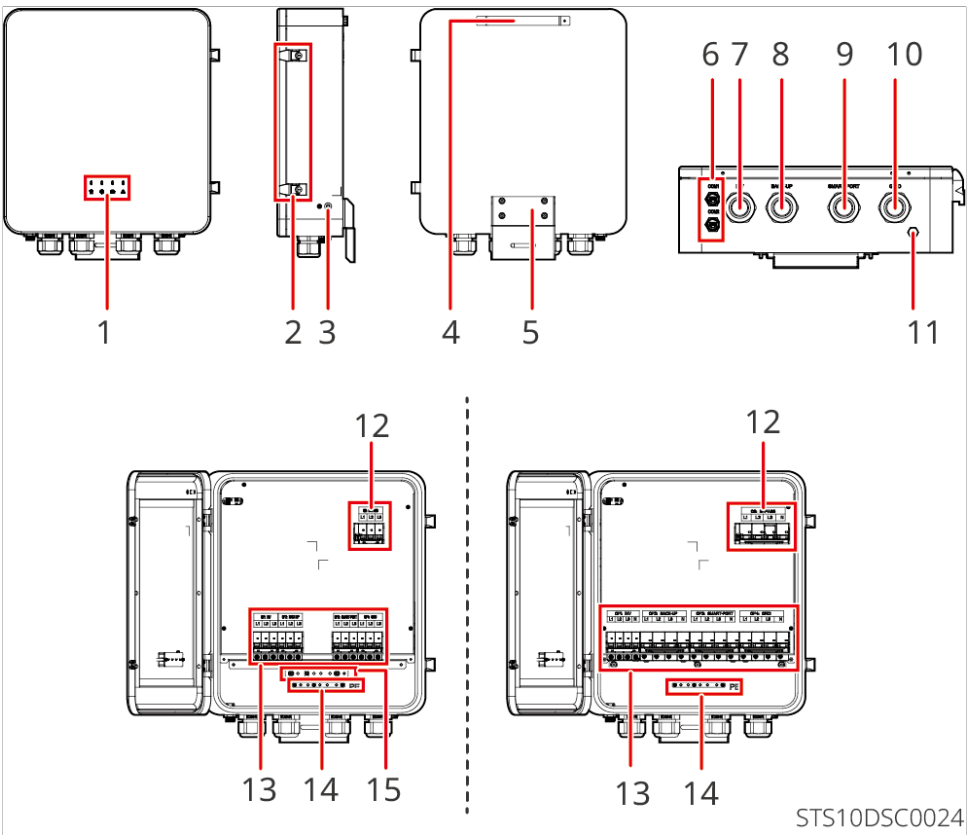


Serial Number	component	Description
1	connector	Power and communication ports for battery-to-battery and battery-to-inverter connections.
2	Anti-tilt bracket fixing hole	Used for fixing the battery to the wall.

Serial Number	component	Description
3	Multi-function button indicator light	- Indicate battery operating status. - Battery black start function: When there is no PV power generation in the photovoltaic system and the grid is abnormal, the inverter cannot operate normally. At this time, long press the multifunction button for 2 seconds to start the battery system, activate the inverter, and make the inverter operate in off-grid mode, with the battery discharging to supply power to the load. - Battery power-off function: Long press the multifunction button for >5s to power off the battery system.
4	battery disconnect switch	Battery Power Input/Output Switch
5	battery compartment fixing hole	Fixation between two batteries.
6	heatsink	battery heat dissipation
7	battery lifting hole	For hoisting batteries. When stacking more than three battery modules, lifting tools shall be used for installation.
8	Battery or inverter mounting holes	Used for inter-battery fixing or inverter-to-battery fixing.
9	Lifting bar mounting hole	Used for installing the hand lift bar. For manual handling of batteries.

2.2.2 STS Appearance Description

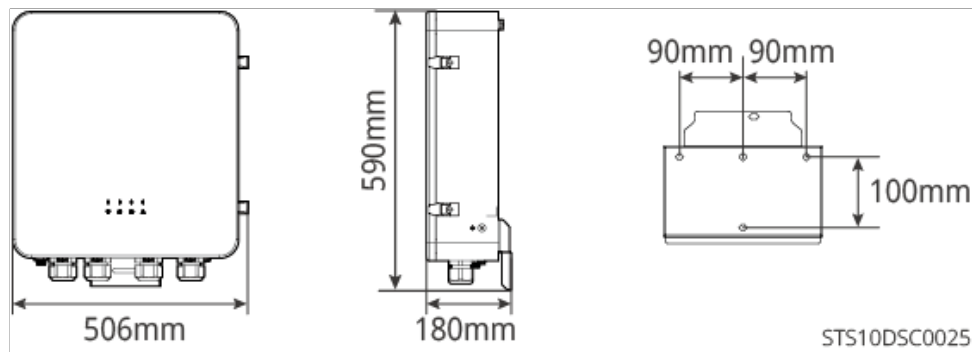
Appearance



Serial Number	Component Name	Description
1	indicator light	Equipment working status indication
2	Locking latch	Cabinet door used to open/close STS
3	Protection earth terminal	Used to connect the enclosure grounding wire
4	mounting bracket	Used for hanging the device on the backplate.
5	Fixed support bracket	for wall mounting and supporting equipment

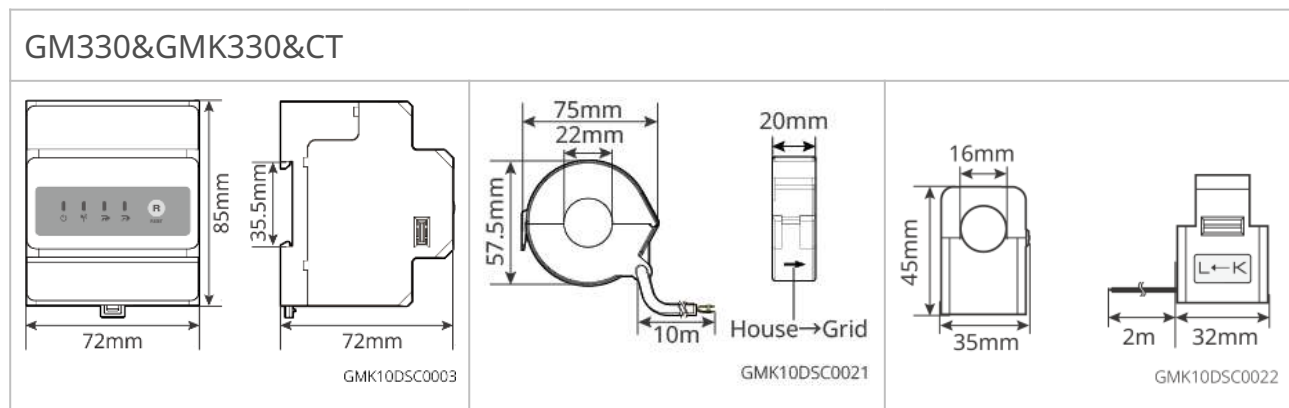
Serial Number	Component Name	Description
6	communication terminal	• COM1: Connect to inverter STS communication port. • COM2: Reserved
7	Inverter input cable entry	cable entry
8	BACK-UP Incoming Line Port	
9	Smart Port Inlet	
10	Grid inlet	
11	breathing valve	-
12	BYPASS switch	During inverter shutdown maintenance, if the STS BACK-UP port load needs to remain powered, close the BYPASS switch to supply the load directly from the mains; after the inverter is powered on and resumes operation, open the BYPASS switch to switch the load back to inverter supply.
13	circuit breaker and AC connection terminal	• INVERTER: Used for connecting the inverter • BACK-UP: for connecting BACKUP loads • SMART-PORT: Used to connect generators, large loads, or grid-tied inverters • GRID: used for connecting to the power grid
14	PE terminal block	Used for connecting the PE conductor.
15	Neutral terminal block (Australia only)	Used for connecting the neutral line

Dimension



2.2.3 Smart Meter

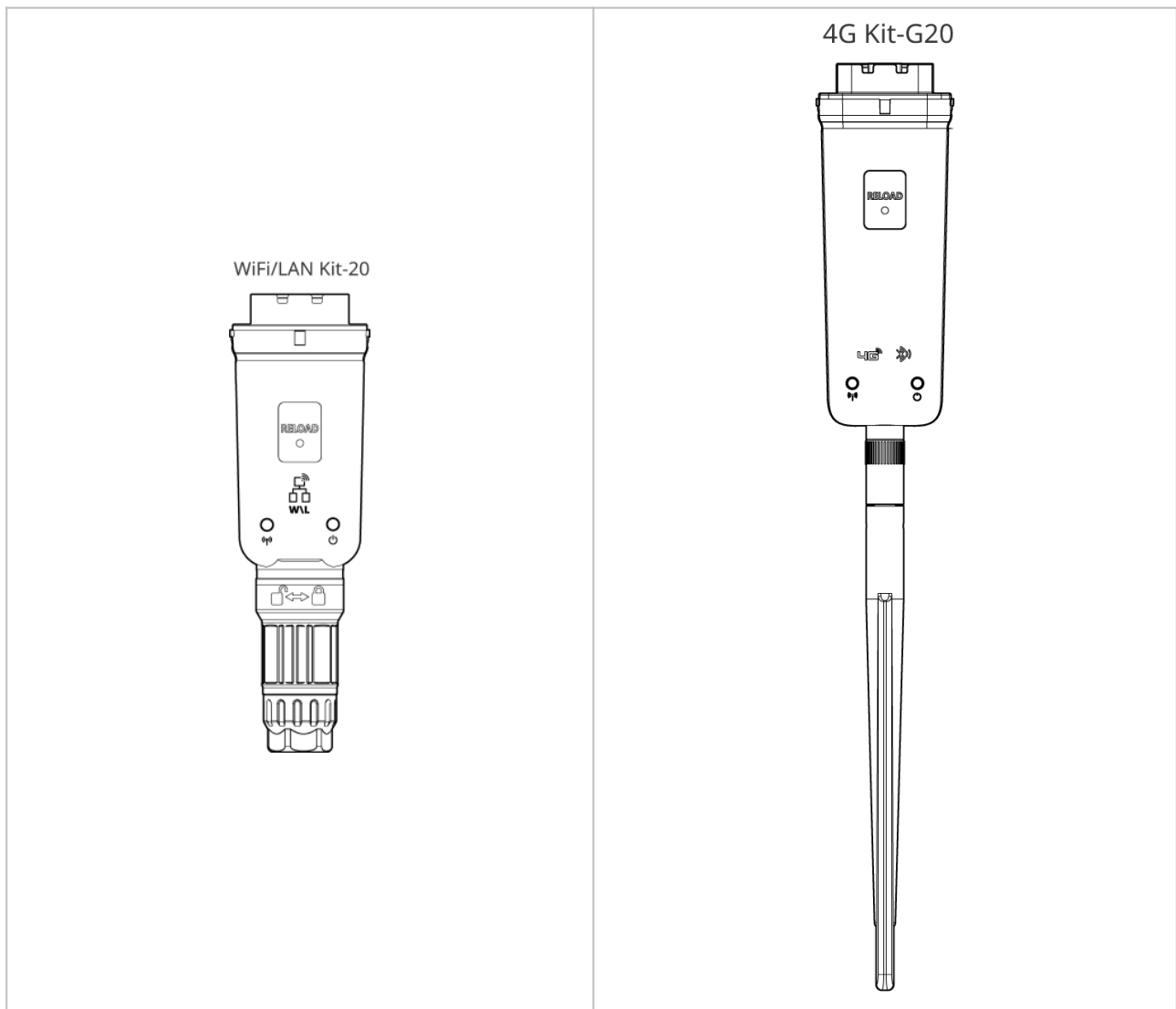
The Smart Meter measures and monitors electrical data in the photovoltaic energy storage system, such as: voltage, current, frequency, Power Factor, power, etc.



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

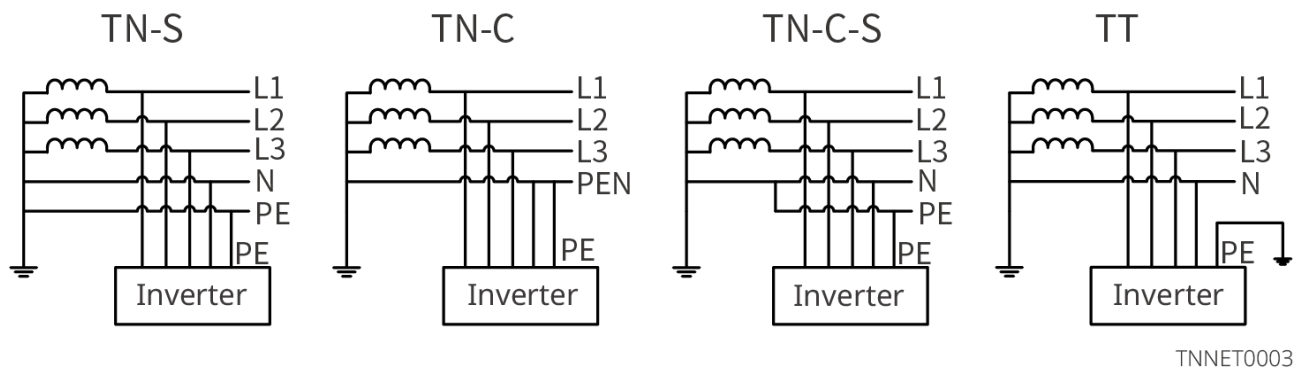
2.2.4 smart dongle

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



No.	model	Signal Type	Applicable Scenarios
1	WiFi/LAN Kit-20	WiFi, LAN, Bluetooth	Single-unit and multi-unit inverter scenarios
2	4G Kit-G20	4G, Bluetooth	Single-unit inverter scenarios.

2.3 Supported Grid Types



2.4 system mode

Note

To calibrate the battery management system (BMS), the system will automatically perform a battery full charge after the First-time Installation and commissioning is completed. After this process, the system runs according to the set working mode.

Self-consumption

- Basic mode of system operation.
- PV power generation supplies loads first, the n excess power charges the battery, and any remaining power is sold to the grid. When PV generation cannot meet the load demand, the battery supplies power to the loads; if the battery power is also insufficient, the grid supplies power to the loads.

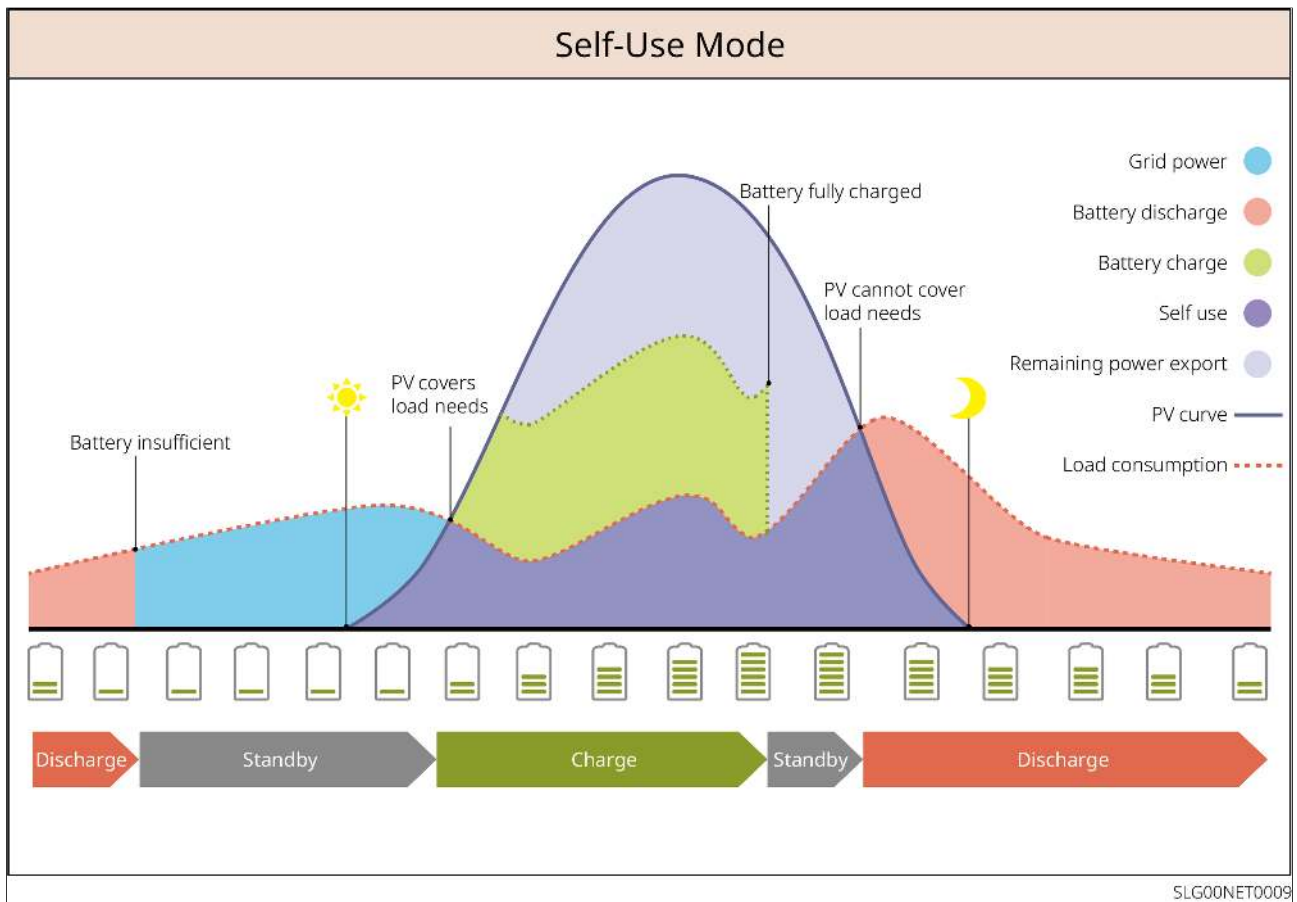


Figure7 Self-consumption

Backup Mode

- Recommended for use in areas with unstable power grids.
- When a Grid Power Outage occurs, the inverter switches to off-grid operation mode, and the battery discharges to power the load, ensuring that the BACK-UP load remains uninterrupted. When the grid is restored, the inverter switches its operation mode to grid-tied operation.
- To ensure that the battery SOC is sufficient to maintain normal system operation during off-grid conditions, during grid-connected operation, the battery will charge to the backup power SOC using PV or purchased electricity from the grid. If charging the battery by purchasing electricity from the grid is required, ensure compliance with local grid regulations and legal requirements.

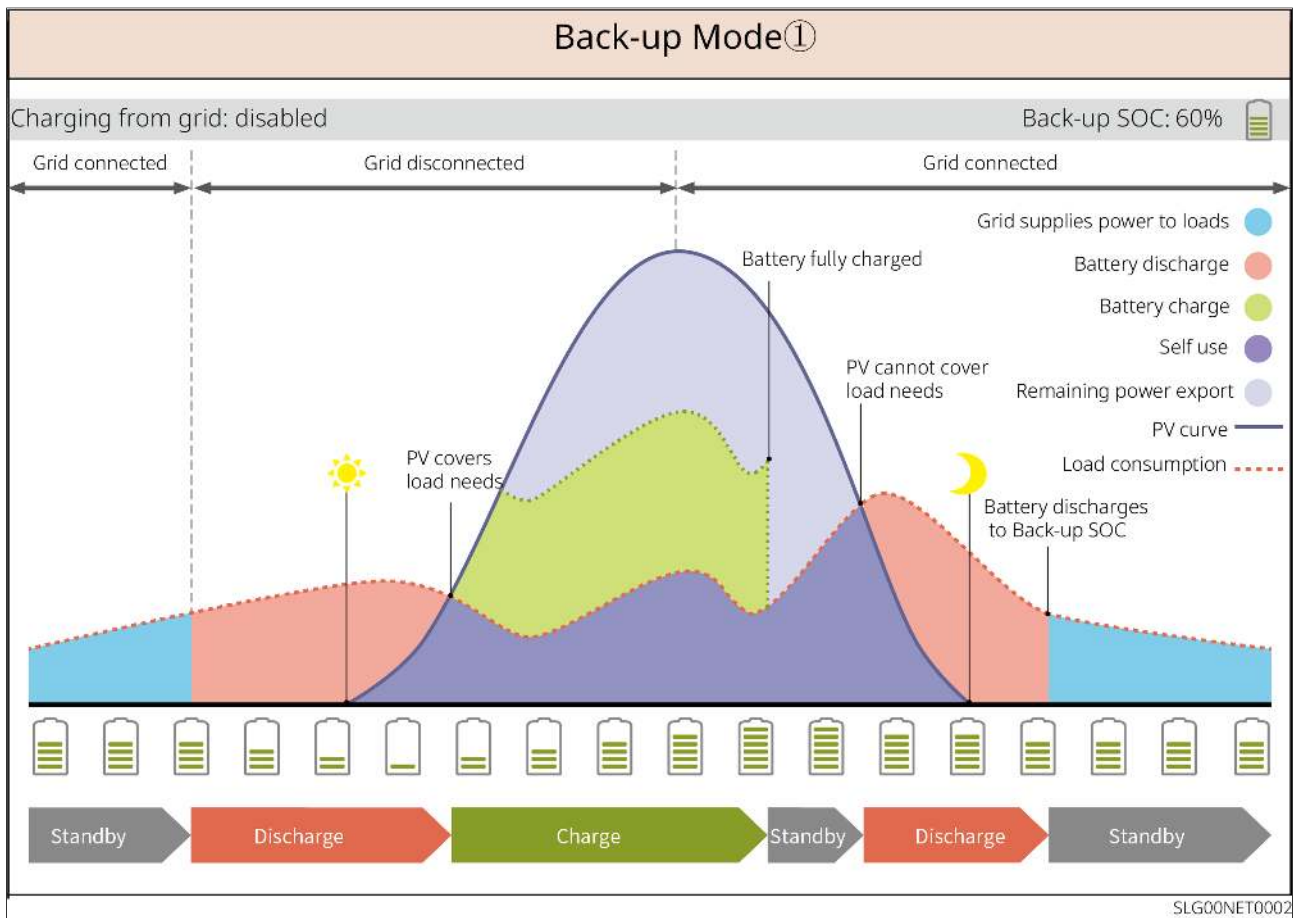


Figure8 Backup Mode1

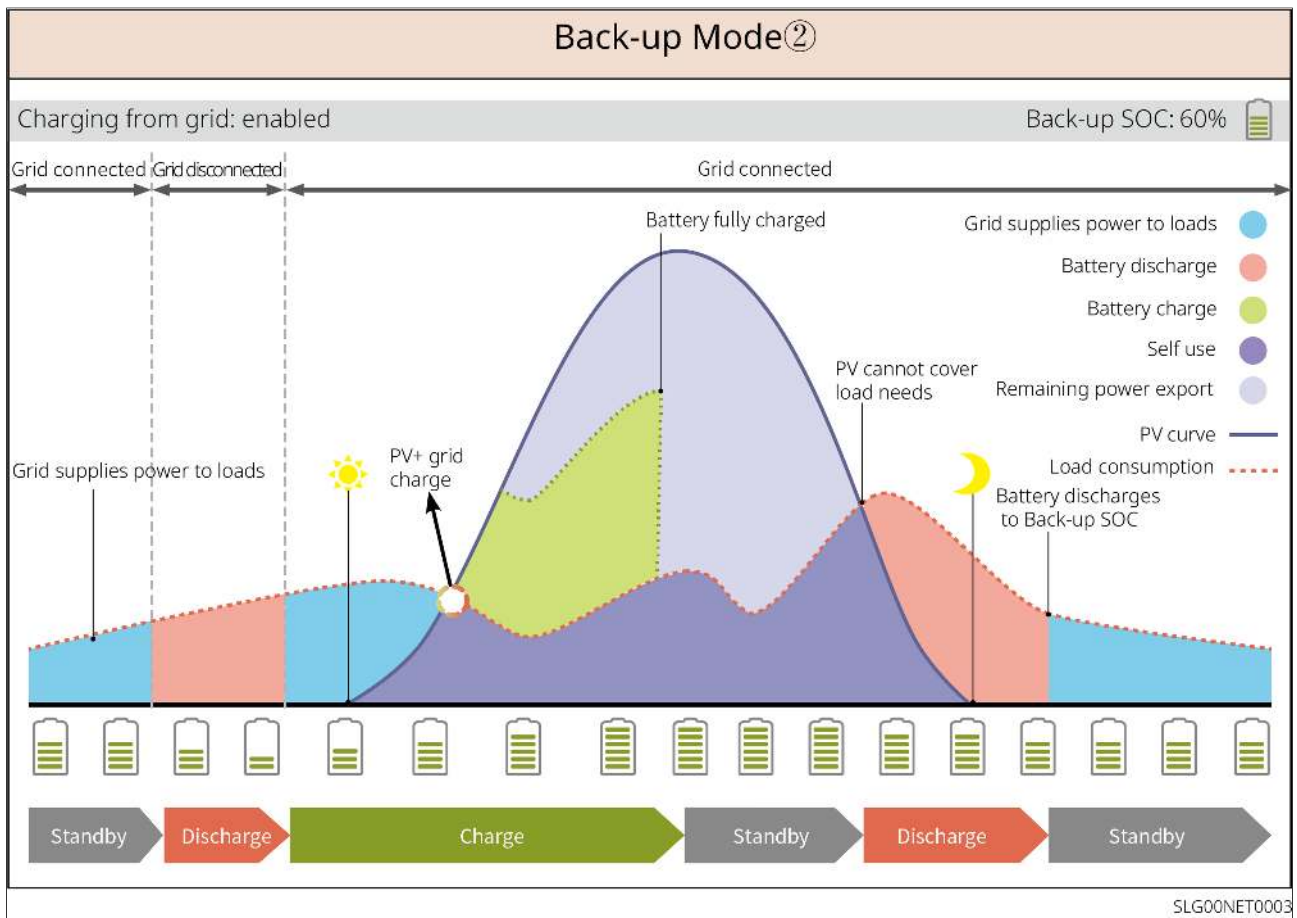


Figure9 Backup Mode 2

TOU Mode

While complying with local laws and regulations, set different time periods for buying electricity and Export Energy based on the peak-valley Tariff differences of the grid. For example, during the low tariff period, set the battery to charging mode and purchase electricity from the grid to charge; during the peak tariff period, set the battery to discharging mode and supply power to the load via the battery.

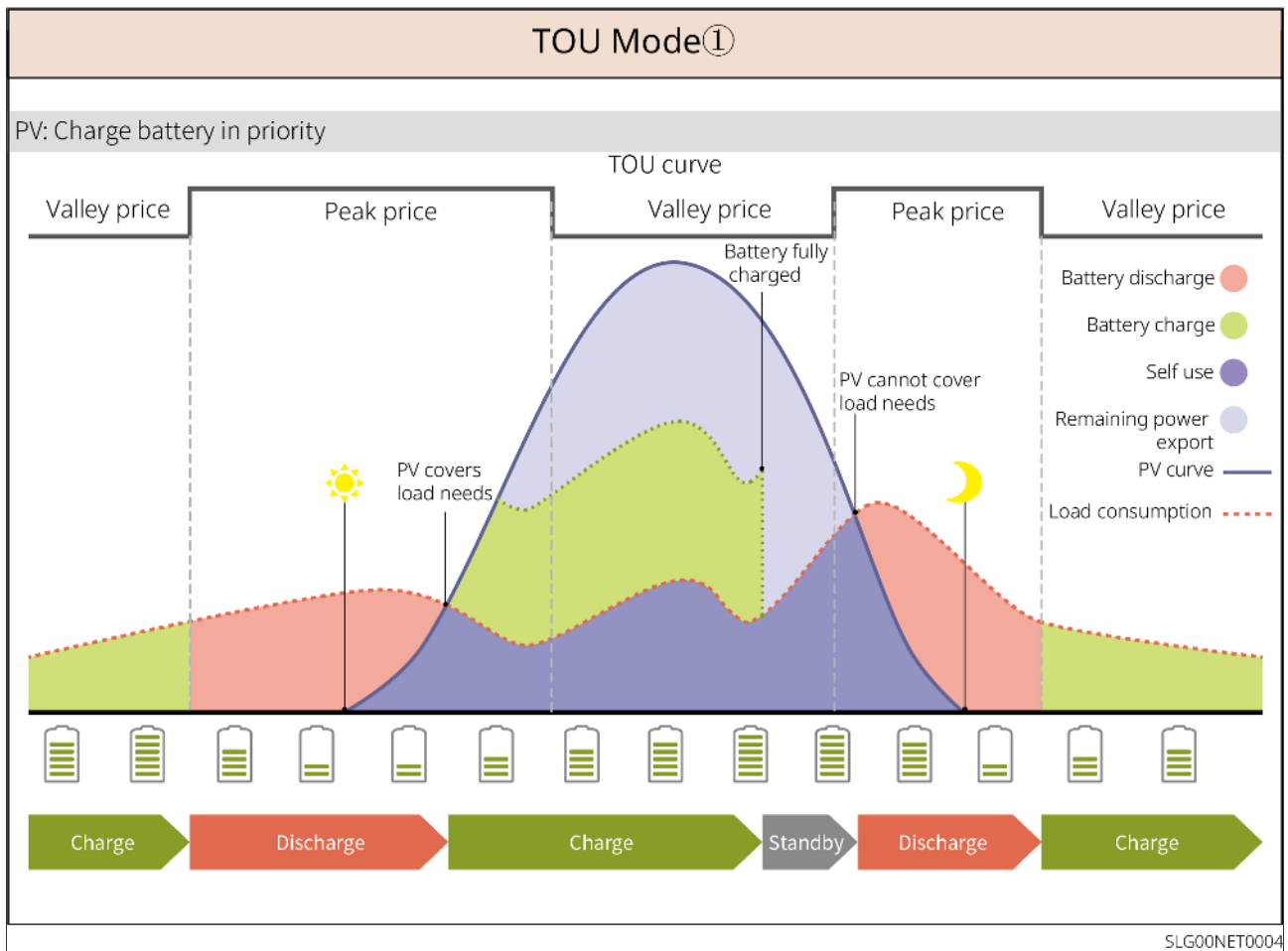


Figure10 TO U Mode 1

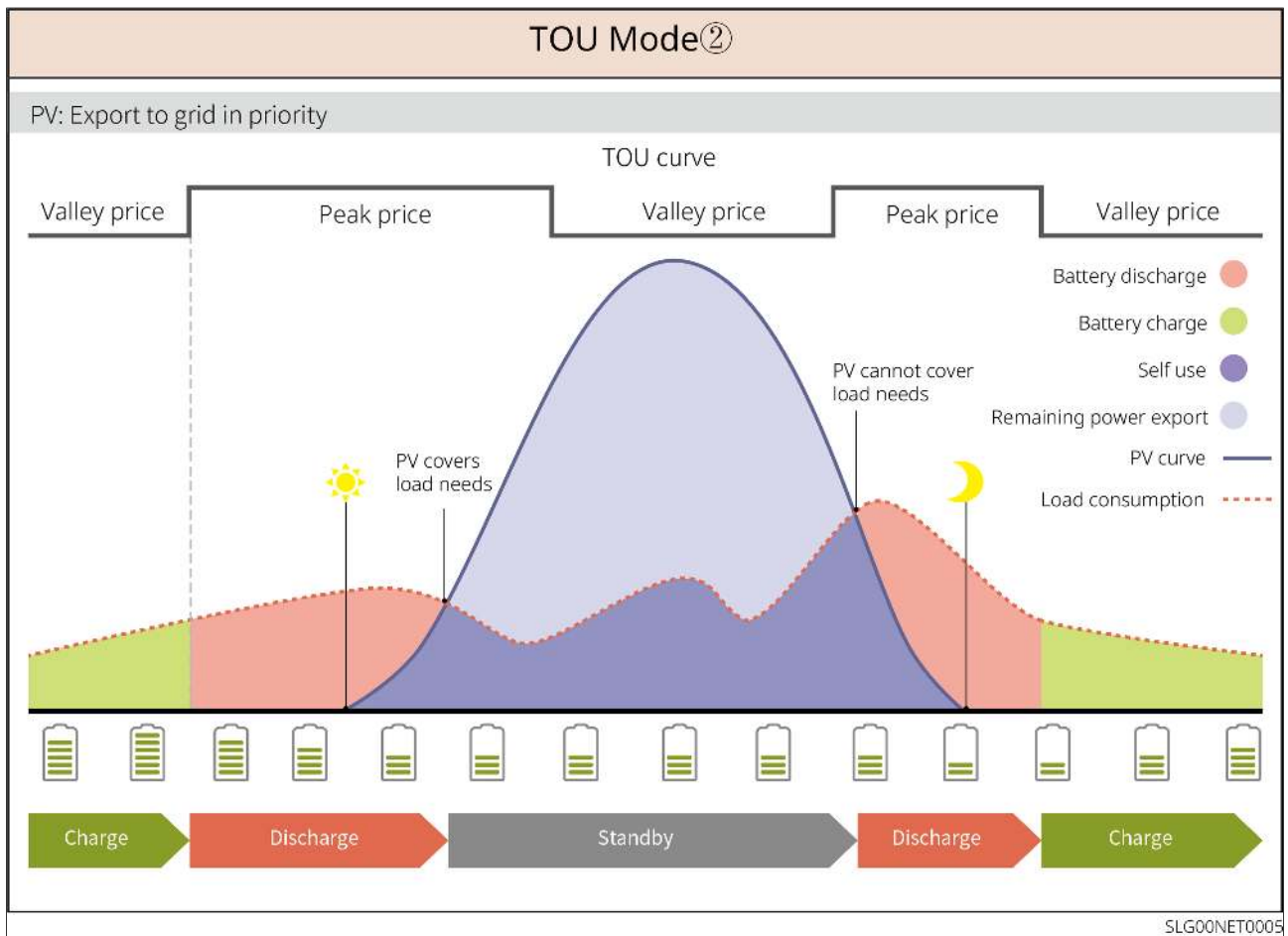


Figure11 TO U Mode 2

Smart Charging (Delayed Charging) Mode

- Suitable for areas with grid-connected power output limitations.
- Setting the peak power limit allows excess PV generation beyond the grid connection limit to be used for charging the battery; alternatively, setting a PV charging period enables the utilization of PV generation to charge the battery during that period.

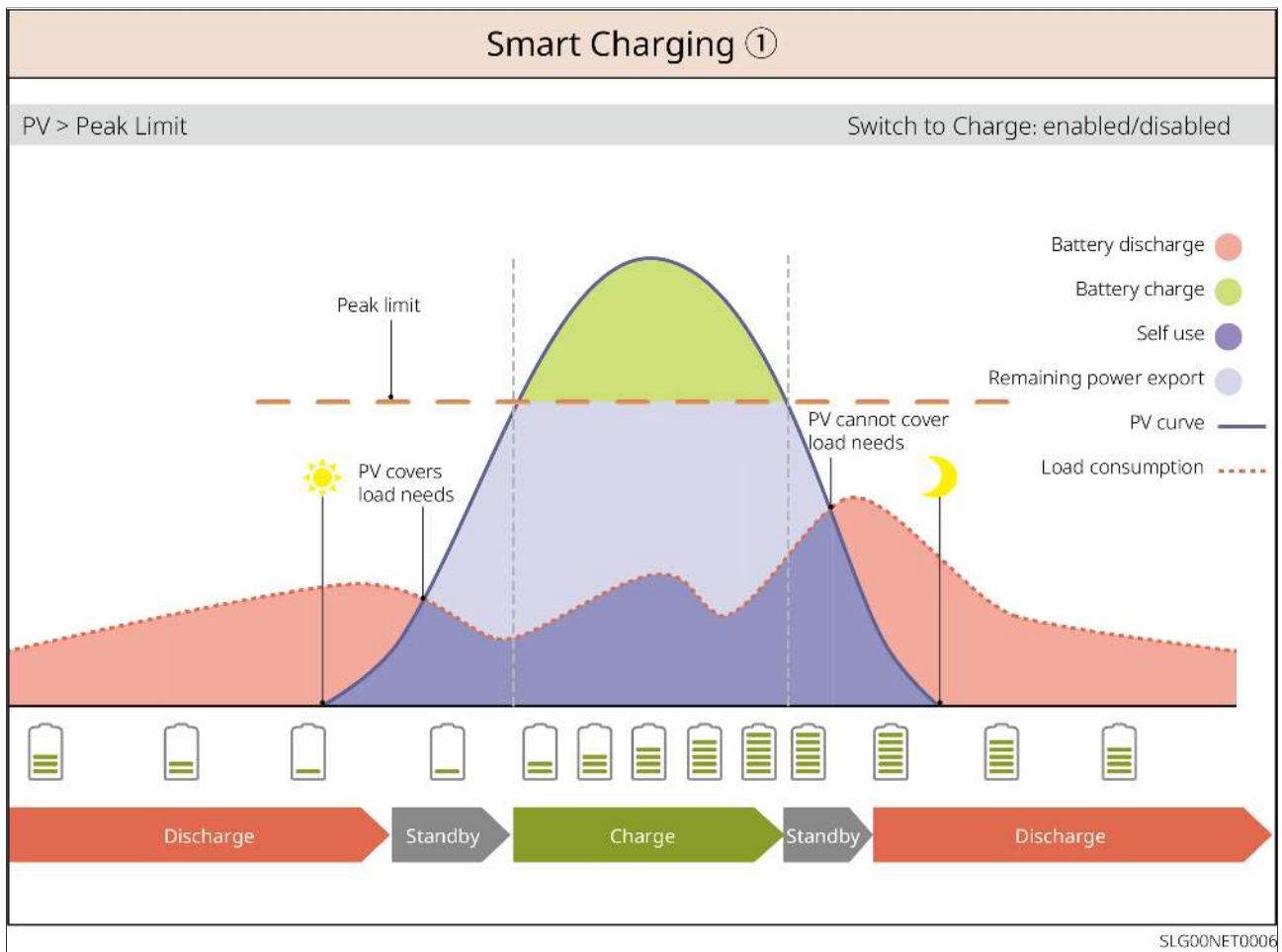


Figure12 Delayed Charging Mode 1

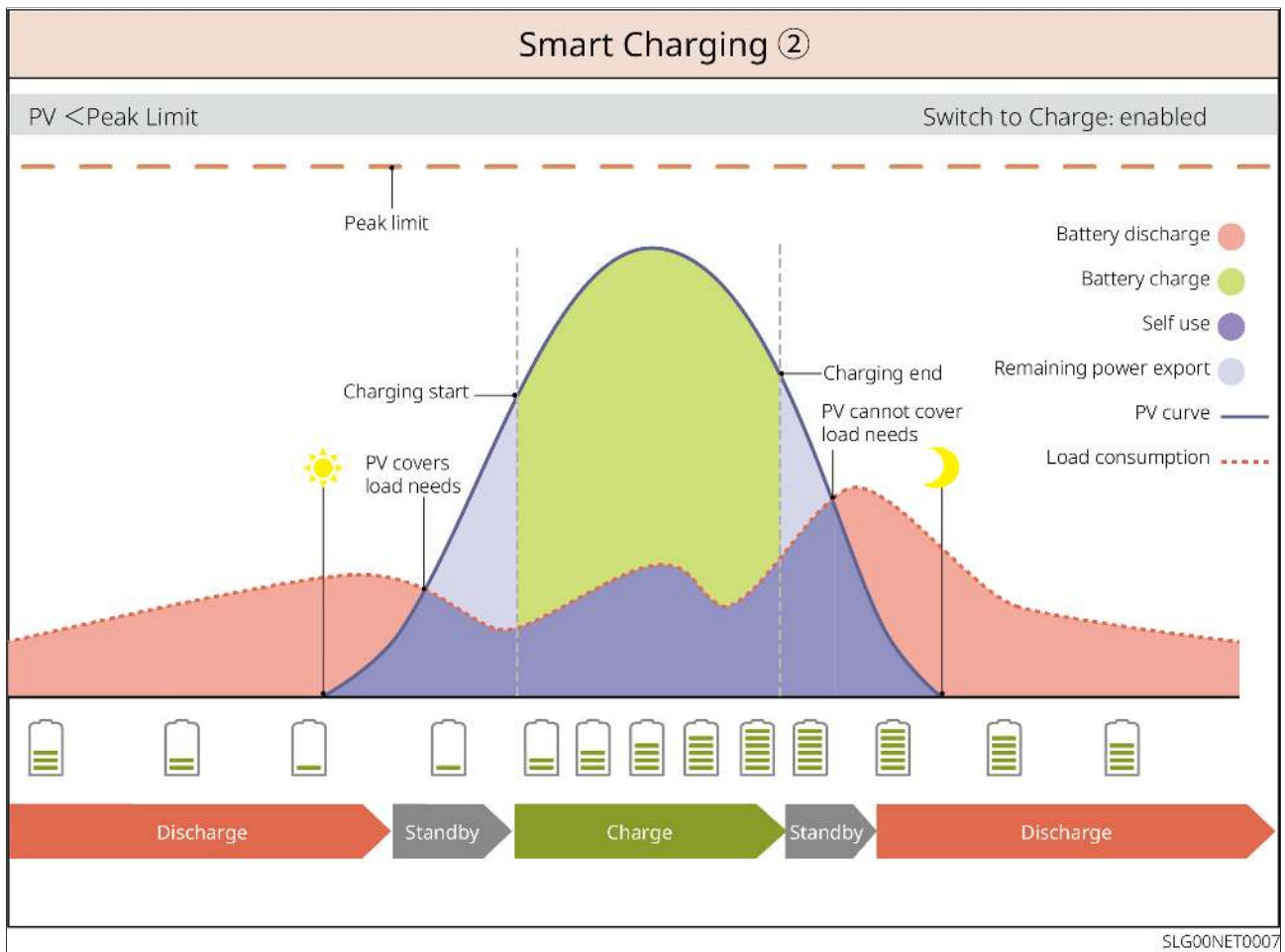


Figure13 Delayed Charging Mode 2

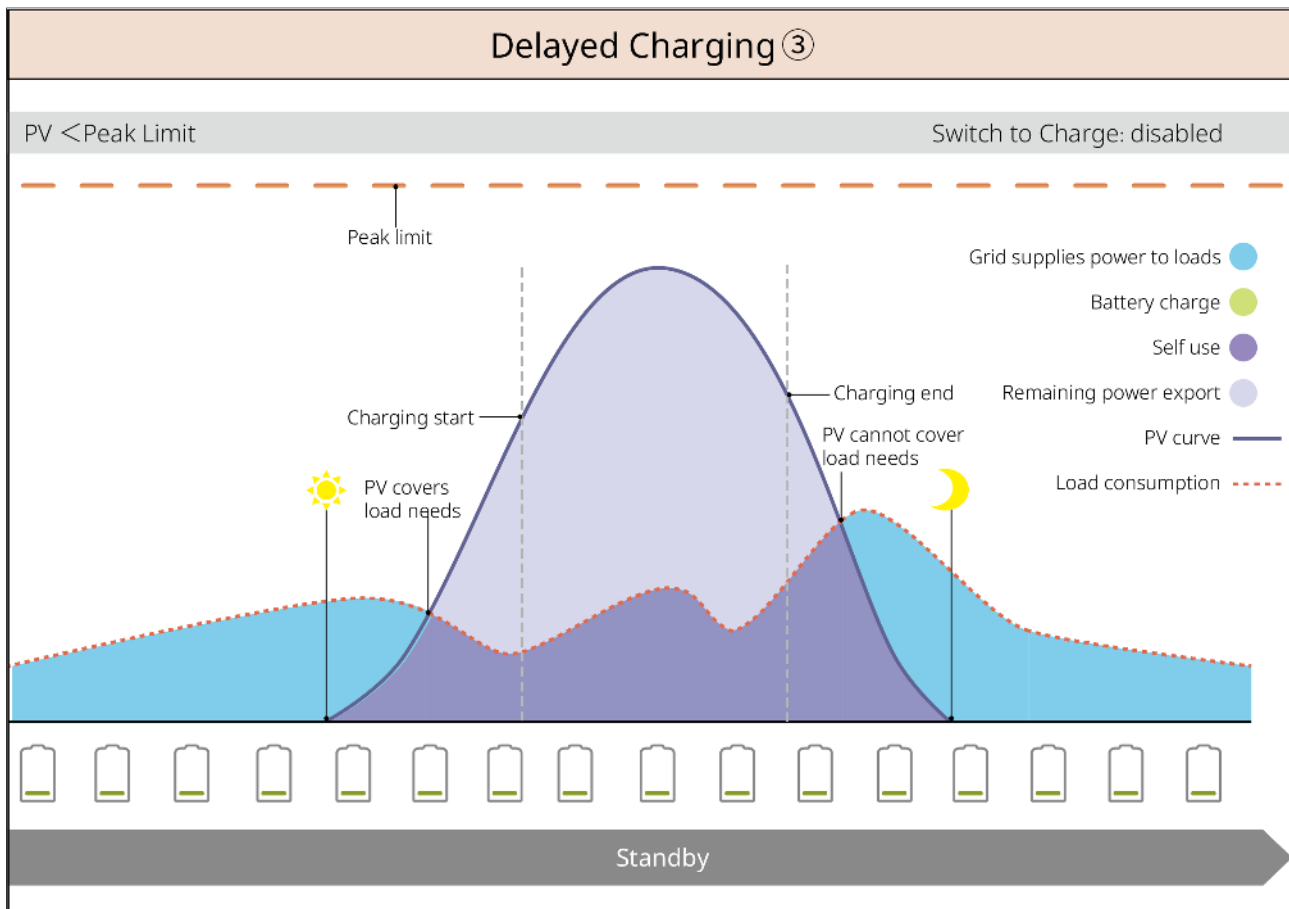


Figure14 Delayed Charging Mode 3

Demand Control Mode

- Mainly applicable to industrial and commercial scenarios.
- When the total load power consumption exceeds the power quota with in a short period, the battery can be discharged to reduce the excess power consumption beyond the quota.
- When the battery SOC is lower than the reserved SOC for demand management, the system purchases power from the grid based on time period, load power consumption, and purchased power peak limit.

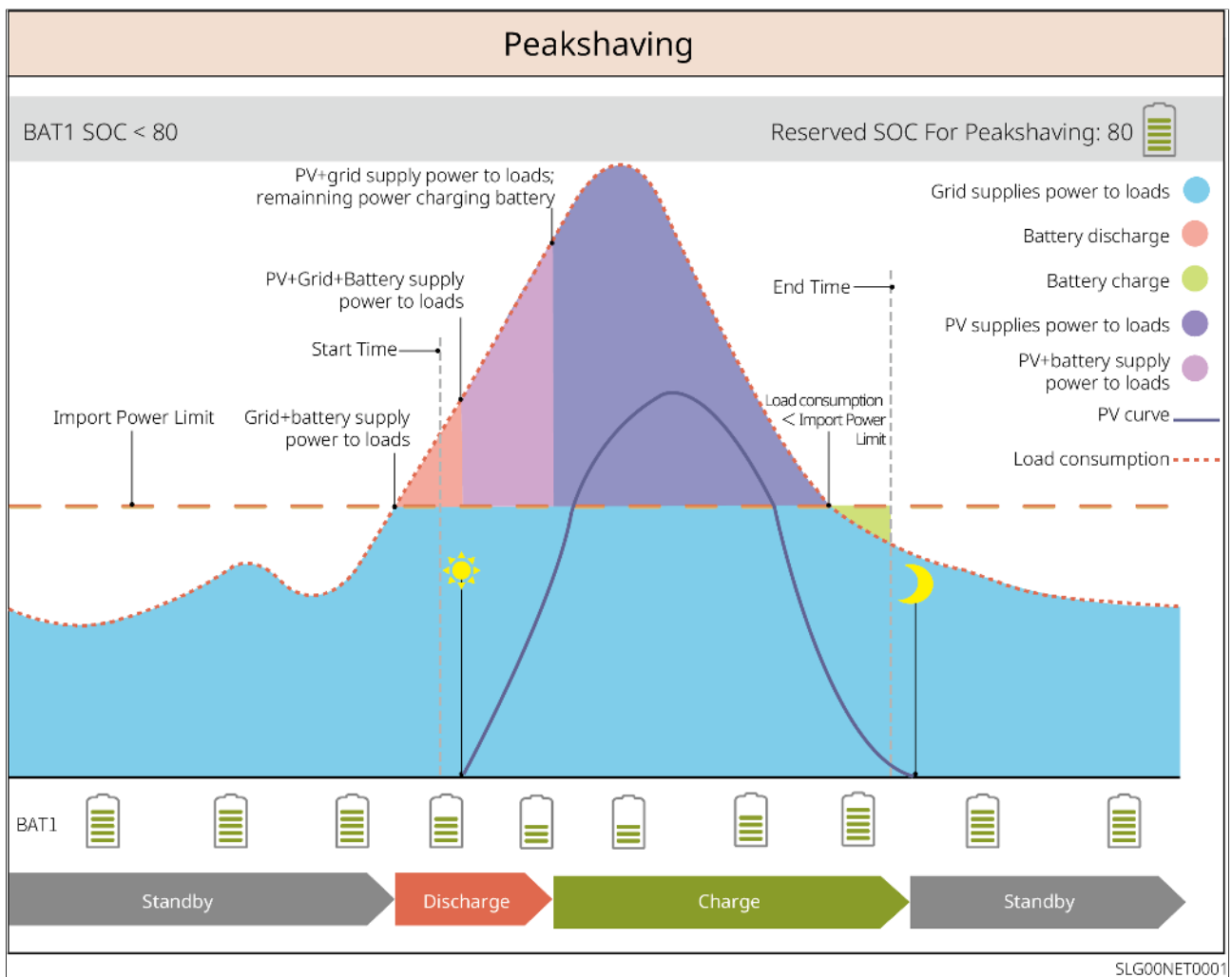


Figure15 Demand Control Mode

Off-grid Mode

Note

When the inverter is Not Connected to the battery system, do not run pure off-grid mode.

When Grid Power Outage occurs, the inverter switches to off-grid working mode.

- During daytime, PV generation preferentially supplies the load, and surplus electricity charges the battery.
- At night, the battery discharges to supply power to the load, ensuring uninterrupted power for the backup load.

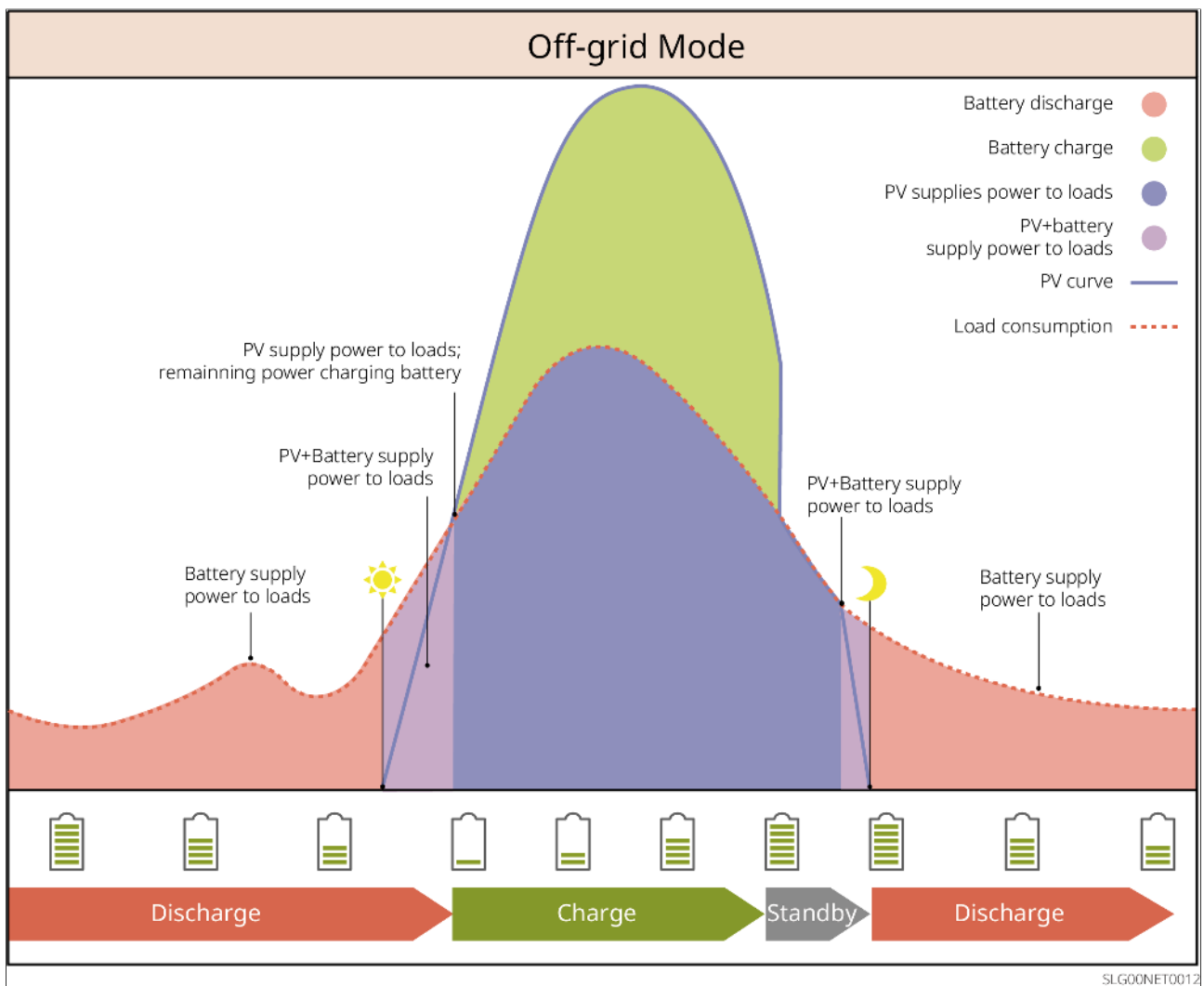


Figure16 off-grid mode

2.5 Features

NOTICE

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

AFCI

The inverter integrates an AFCI circuit protection device to detect arc faults and quickly cut off 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 of connectors or cables.

Fault handling methods:

1. When the inverter detects an arc, you can view the fault type via the App.
2. If the inverter triggers a fault <5 times within 24 hours, it will automatically restore grid connection after a 5-minute wait. After the 5th arc fault, the fault must be cleared before the inverter can resume normal operation. 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 detection functions 1: One pair of PV input ports (PV+, PV-) connects to one PV input string 2/1: One arc detection channel has 2 MPPT inputs; One arc detection channel has 1 MPPT input; 2: Has 2 arc detection channels

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

Three-Phase Unbalanced Output

Both the grid-tie side and the BACK-UP side of the inverter support three-phase unbalanced output, allowing connection of loads with different power ratings to each phase. The maximum output power per phase for different models is shown in the table below:

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

Rapid Shutdown (RSD) Rapid Shutdown

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 case of an emergency, the transmitter can be deactivated by enabling an external trigger device, 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:

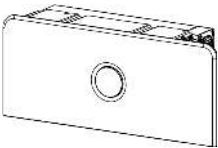
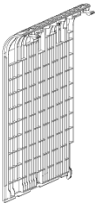
1. Check if the outer packaging is damaged, such as deformation, holes, cracks, or other signs that could cause damage to the equipment inside the box. If damaged, do not open the packaging and contact your dealer.
2. Check if the device model is correct. If it does not match, do not open the packaging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

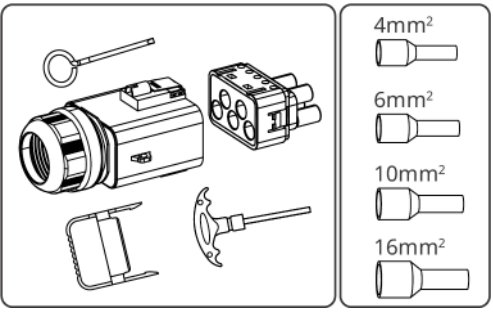
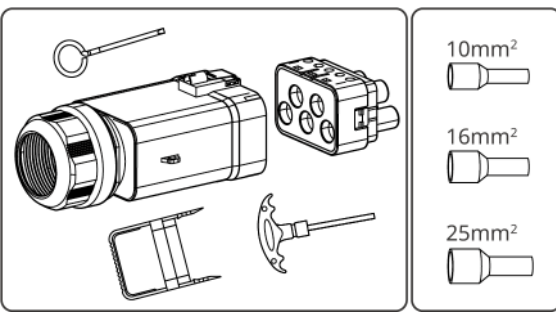
3.2 deliverables

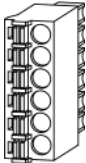
WARNING

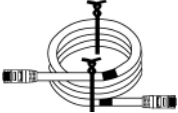
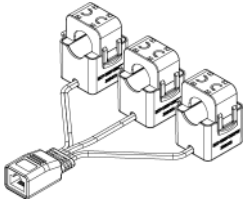
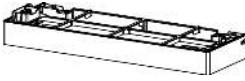
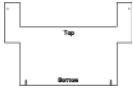
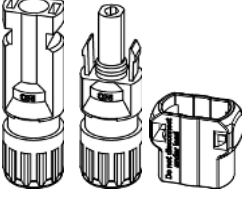
Check if the type and quantity of the delivered items are correct, and if there is any damage to the appearance. If there is any damage, please contact your dealer. After removing the delivered items from the packaging, do not place them on rough, uneven, or sharp surfaces to avoid paint chipping.

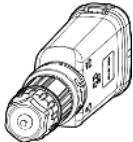
3.2.1 Inverter Deliverables

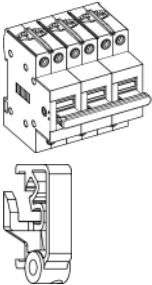
Part	Description	Part	Description
	Inverter x 1		Top Decorative Cover x 1
	Left Decorative Cover x 1		Right Decorative Cover x 1

Part	Description	Part	Description
		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	

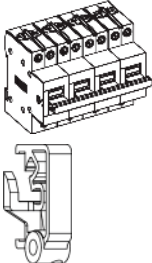
Part	Description	Part	Description
	Handle x 2		GMK330 Smart Meter x N - GW5K-ETA-G20 , GW6K-ETA-G20 , GW8K-ETA-G20, GW6K-EHA-G20, GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW15K-ETA-G20, GW20K-ETA-G20, GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20 x 0 - GW5K-BTA-G20, GW6K-BTA-G20, GW8K-BTA-G20, 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 x 1
	OT Grounding Terminal x 1		6PIN Communication Terminal x 2

Part	Description	Part	Description
	2PIN Communication Terminal x 2		PIN terminal x 16
	CT Connection Cable x 1		CT x 1
	Battery Base x 1		Adjustable Feet x 4
	Anti-tilt Bracket x 4		M5*16 Screw x 9
	M5*60 Expansion Screw x 4		Drilling Template Paper x 2
			PV Terminal Unlocking Tool x N N: China region x 0; Other regions x 1.

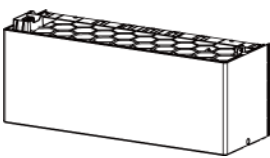
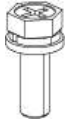
Part	Description	Part	Description
	PV Terminal and PV Terminal Tamper-proof Cover • GW5K-ETA-G20 , GW6K-ETA-G20 , GW8K-ETA-G20, GW6K-EHA-G20: 3 • GW9.999K-ETA-G20, GW10K-ETA-G20, GW12K-ETA-G20, GW15K-ETA-G20, GW20K-ETA-G20, GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20: 4 • GW5K-BTA-G20, GW6K-BTA-G20, 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

Part	Description	Part	Description
	• (Australia only) Manual Transfer Switch x1 • Manual Transfer Switch Lock x N Note: For use in single-unit scenarios only		Cable Cover x N N: Standard in Australia; Optional in Europe.
	Product Documentation x 1	-	-

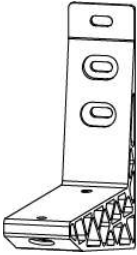
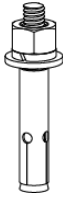
(Europe only) manual transfer switch

Component	Description
	• Manual Transfer Switch x1 • Manual Transfer Switch Lock x1 Note: For use in single-unit scenarios only. Please contact your dealer for purchase if needed.

3.2.2 Battery delivery unit

component	Description	component	Description
	Battery x 1		M5*16 screw x2
	Silicone cap x 2	-	-

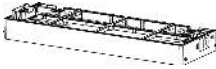
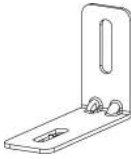
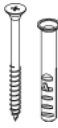
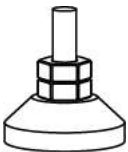
Battery Mounting Bracket (Optional)

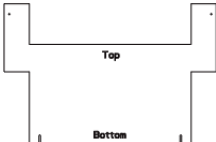
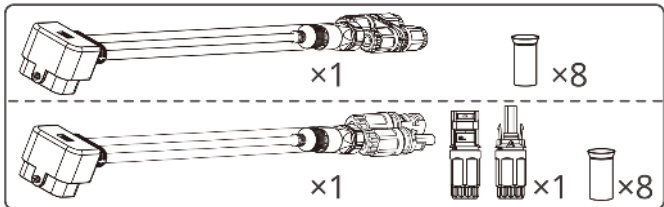
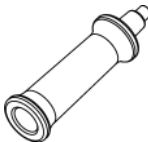
component	Description	component	Description
	Mounting bracket x 2		M10 expansion bolt x 6
	M10 screw x 4	-	-

3.2.2.1 Battery Expansion Kit Deliverable (Optional)

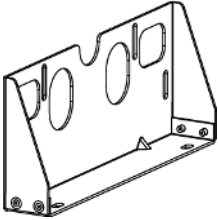
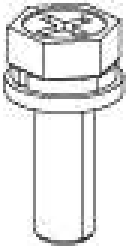
Note

The system supports 5-108kWh. A single column can stack up to 6 batteries. If there is a need for more energy, or if installation conditions require reducing the stacking height of a single column, or other scenarios requiring expansion, please contact GoodWe or a dealer to purchase the battery expansion kit.

component	Description	component	Description
	Base x 1		Anti-tilt bracket x 4
	M5 screw x 7		M6 expansion bolt x 4
	Adjustable Feet x 4		OT ground terminal x 1

component	Description	component	Description
	Terminating resistor x 1		Battery decorative cover x 1
	Punch marking paper x 2		Hex key x 1
		Battery cluster expansion harness x 1	
	unlocking tool x N		3m battery cluster expansion connection positive wire harness x 1
	3m battery cluster expansion negative wire harness x 1		Battery cluster expansion network cable x 1
	Silicone cap x 2		Handle x 2
	Product Document x 1	-	-

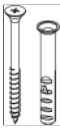
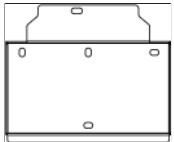
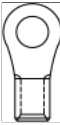
3.2.2.2 Floor-Mounted Standoff Bracket (Optional)

Part	Description	Part	Description
	Floor-Mounted Standoff Bracket x 2		M6 expansion bolts x 4
	M5 mounting screws x 4	-	-

3.2.3 STS deliverable

Note

When different models of equipment are shipped to different markets, the required deliverables may vary. Please refer to the actual receipt.

component	Description	component	Description
	Static Transfer Switch Cabinet x1		Expansion bolts x6
	Back Mounting Plate x1		Neutral terminal x4

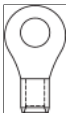
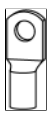
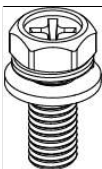
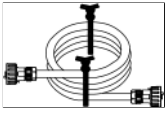
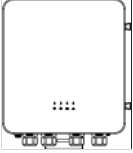
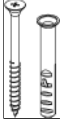
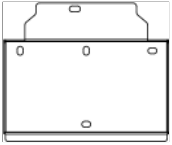
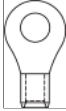
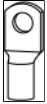
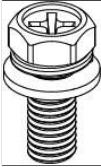
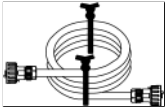
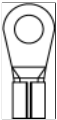
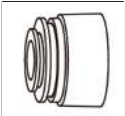
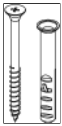
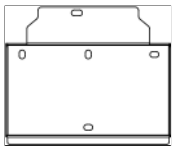
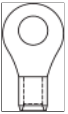
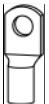
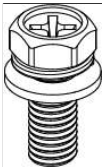
component	Description	component	Description
	63A AC terminal × 16		Neutral line locking screws ×4
	63A ground terminal ×4		Ground terminal screws × 4
	M8 enclosure grounding OT terminal × 1		Enclosure grounding screw ×1
	Communication waterproof ring ×1		Cabinet door keys × 2
	ESA three-phase integrated machine communication conversion cable × 1		Inverter communication cable × 1
	100A Grounding Terminal ×4		Gland sealing ring ×4
	Communication RJ45 connector ×2		Manual ×1

Table42 GW30K-STS-G10-Australia Region

component	Description	component	Description
	Static Transfer Switch Cabinet ×1		Expansion bolts ×6
	Back Mounting Plate ×1		63A ground terminal ×4
	63A AC terminal × 16		Ground terminal screws × 4
	M8 enclosure grounding OT terminal × 1		Enclosure grounding screw ×1
	Communication waterproof ring ×1		Cabinet door keys × 2
	ESA three-phase integrated machine communication conversion cable × 1		Inverter communication cable × 1
	100A Grounding Terminal ×4		Gland sealing ring ×4

component	Description	component	Description
	Communication RJ45 connector ×2		Manual ×1

Table43 GW30K-ST5-G10-Other Regions

component	Description	component	Description
	Static Transfer Switch Cabinet ×1		Expansion bolts ×6
	Back Mounting Plate ×1		100A AC terminals × 12
	63A AC terminals ×4		100A Grounding Terminal ×4
	63A ground terminal ×4		Ground terminal screws × 4
	M8 enclosure grounding OT terminal × 1		Enclosure grounding screw ×1

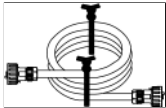
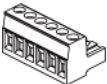
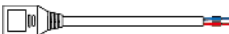
component	Description	component	Description
	Communication waterproof ring ×1		Cabinet door keys × 2
	ESA three-phase integrated machine communication conversion cable × 1		Inverter communication cable × 1
	Gland sealing ring ×4		Communication RJ45 connector ×2
	Manual ×1	-	-

Table44 GW60K-ST5-G10-Other Regions

3.2.4 Smart Meter Delivery Set GM330&GMK330

3.2.4.1 Attachment List

Component	Instructions	Component	Instructions
	Smart Meterx1 GMK330:CT×3; GMK360: CT×6; GM330: CT x 0。		2PIN connector x1 Applicable to GM330.

Component	Instructions	Component	Instructions
	6PIN communication terminal x1 Applicable to GM330.		7PIN communication terminal x1 Applicable to GM330.
	Electricity meter Applicable to GMK330/GMK360.		RS485 communication terminal x 1
	2PIN terminal and RJ45 terminal adapter cable x 1		screwdriver x1
	PIN terminal GMK330/GMK360: x 5 ; GM330: x 6。		Product Documentation x 1

3.3 Storage

- If the inverter has been stored for more than two years or has not been operated for more than six months after installation, it is recommended to have it inspected and tested by a professional 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 six months during storage. If it has not been powered on for more than six months, it is recommended to have it inspected and tested by a professional before use.
- To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Prolonged storage may cause the battery to deep discharge, leading to irreversible chemical degradation, resulting in capacity decay or even complete failure, timely use is advised. If the battery needs to be stored for a long period, please perform maintenance according to the following requirements:

NOTICE

[1] The storage time is calculated from the SN date on the battery's outer packaging. After exceeding the storage cycle, charge-discharge maintenance is required. (Battery maintenance time = SN date + charge-discharge maintenance cycle). For how to view the SN date, refer to: [10.3.Battery SN Code Meaning\(Page 352\)](#).

[2] After the charge-discharge maintenance is qualified, if there is a Maintaining Label on the outer box, please update the maintenance information on the Maintaining Label. If there is no Maintaining Label, please record the maintenance time and battery SOC yourself and keep the data properly for maintaining 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	30~40%	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	30~40%	0~35℃	-20~35℃, 12 months 35~45℃, 6 months 45~55℃, 1 month	
GW9.0-BAT-D-G20				

Packaging Requirements:

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

Environmental Requirements:

1. Ensure the device is stored in a cool place, avoiding direct sunlight.
2. Ensure the storage environment is clean, with appropriate temperature and humidity ranges, and no condensation. If condensation is observed on the device ports, do not install the device.
 - GW5.1-BAT-D-G20, GW8.3-BAT-D-G20, GW5.1-BAT-D-G21, GW8.3-BAT-D-G21 battery storage humidity range: 5%-95%.
 - GW6.0-BAT-D-G20, GW9.0-BAT-D-G20 battery storage humidity range: 4%-100%.
3. Ensure the device is stored away from flammable, explosive, corrosive, and other hazardous materials.
4. Stacking Requirements:
 - Ensure the stacking height and orientation of the device are arranged according to the instructions on the packaging box label.
 - Ensure there is no risk of toppling after the devices are stacked.

4 Installation



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

4.1 Installation Requirements

4.1.1 Installation Environment Requirements

Note

- Inverter Operating Temperature Range: -35°C to 60°C.
- GW5.1-BAT-D-G20, GW8.3-BAT-D-G20: Charging Temperature Range: -18°C-55°C; Discharging Temperature Range: -20°C-55°C. If installed in an environment below -18°C, the battery will be unable to continue charging after being fully discharged to recover energy, resulting in battery undervoltage protection.
- GW5.1-BAT-D-G21, GW8.3-BAT-D-G21: Charging Temperature Range: 2°C-55°C; Discharging Temperature Range: -20°C-55°C. If installed in environment below 2°C, the battery will not be able to recharge and recover energy after being fully discharged, causing battery undervoltage protection.
- GW6.0-BAT-D-G20、GW9.0-BAT-D-G20: Charging Temperature Range: -20°C-55°C; Discharging Temperature Range: -20°C-55°C. If installed in an environment below -20°C, the battery will be unable to recharge and restore energy after being fully discharged, causing battery undervoltage protection.

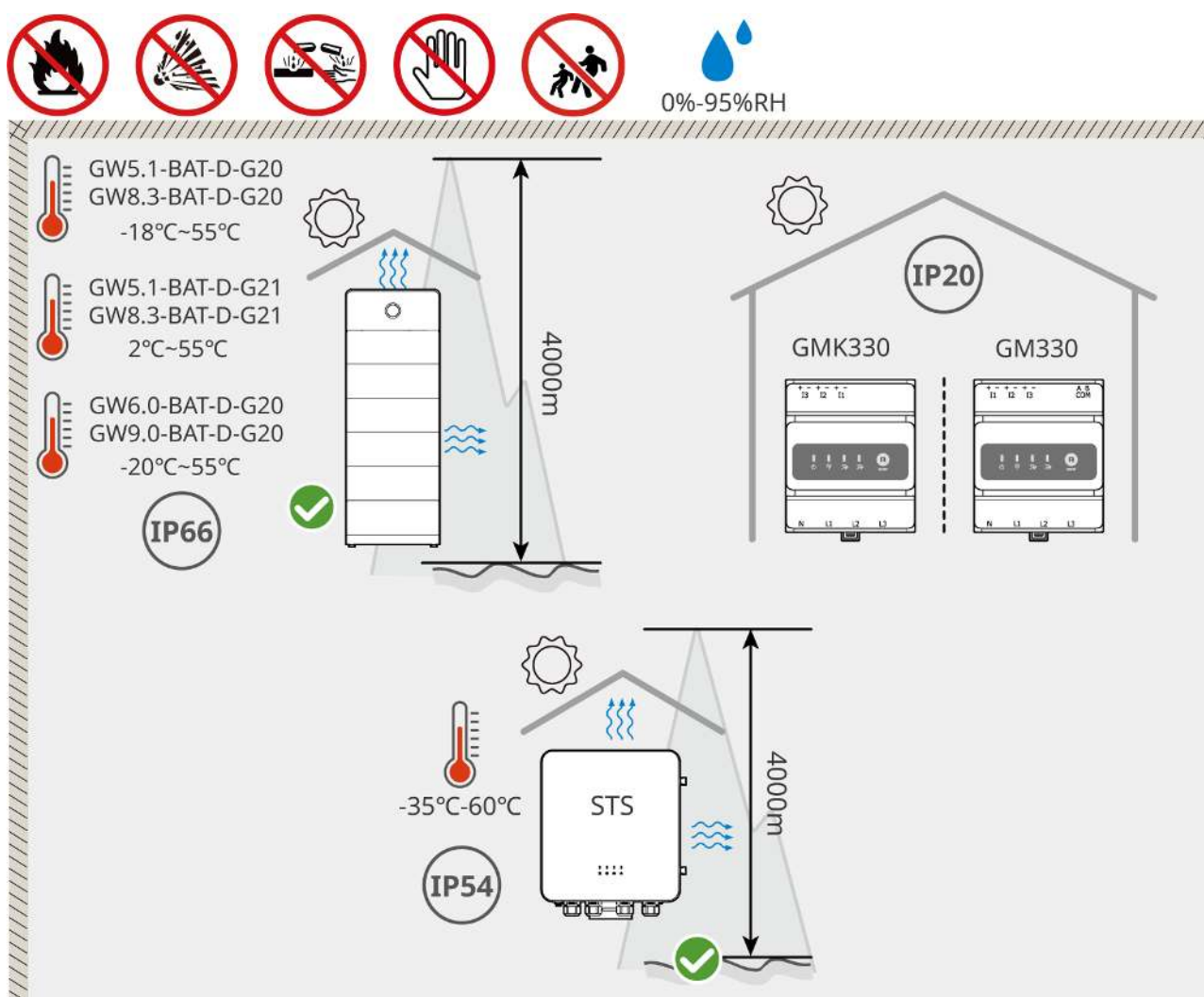
1. Equipment must not be installed in flammable, explosive, corrosive, or similar environments.
2. The ambient temperature and humidity during equipment installation must be within the suitable range.
3. The mounting location must be kept out of children's reach and should avoid easily accessible positions.
4. During equipment operation, the surface may be hot. To prevent burns, avoid

contact.

5. It is recommended to install the equipment in locations that avoid direct sunlight, rain, snow accumulation, and other environmental factors, giving priority to sheltered positions. If complete avoidance is not possible, ensure that the temperature, humidity, and other conditions of the installation environment always remain within the allowable range specified in the equipment specification.
 6. Adverse environmental conditions such as direct sunlight and high temperature may cause inverter output power derating.
 7. Installation space must meet the requirements for equipment ventilation and heat dissipation as well as operational space requirements.
 8. The installation environment must meet the Ingress Protection Rating of the equipment. Inverters, batteries, and smart communication sticks are suitable for indoor and outdoor installation; meters are suitable for indoor installation.
 9. The installation height of the equipment shall facilitate operation and maintenance, ensuring that indicator lights and all labels are easily visible, and terminal connections are easy to operate.
 10. The equipment installation altitude is below the Max. Operating Altitude.
 11. Before installing equipment outdoors in salt-affected areas, consult the equipment manufacturer. Salt-affected areas primarily refer to regions within 500 meters from the coastline. The affected area depends on factors such as sea wind, precipitation, and terrain.
 12. The installation and storage location of equipment should avoid areas with direct cold air blowing, such as air conditioning outlets. Excessive local temperature difference may cause condensation on the equipment, thereby leading to the following risks:
 - a. Electrical insulation performance degrades, posing a risk of leakage or short circuit;
 - b. Corrosion of metal connectors and terminals leads to increased contact resistance.
 - c. Electronic components damaged by moisture.
 - d. Long-term condensation may accelerate equipment aging and shorten its service life;
- Installation Recommendation: Select a location with good ventilation and uniform temperature and humidity distribution for equipment installation, ensuring that the environment around the equipment meets the manufacturer's specified Operating Environment requirements.
13. Keep away from strong magnetic field environments to avoid electromagnetic interference. If there is a radio station or wireless communication equipment below 30MHz near the installation location, install the equipment according to the

following requirements:

- Inverter: Add multi-turn winding ferrite cores at the DC input line or AC output line of the inverter, or add low-pass EMI filters; or ensure the distance between the inverter and wireless electromagnetic interference equipment exceeds 30m.
- Other equipment: The distance between the equipment and wireless electromagnetic interference devices exceeds 30m.



ESA20INT0011

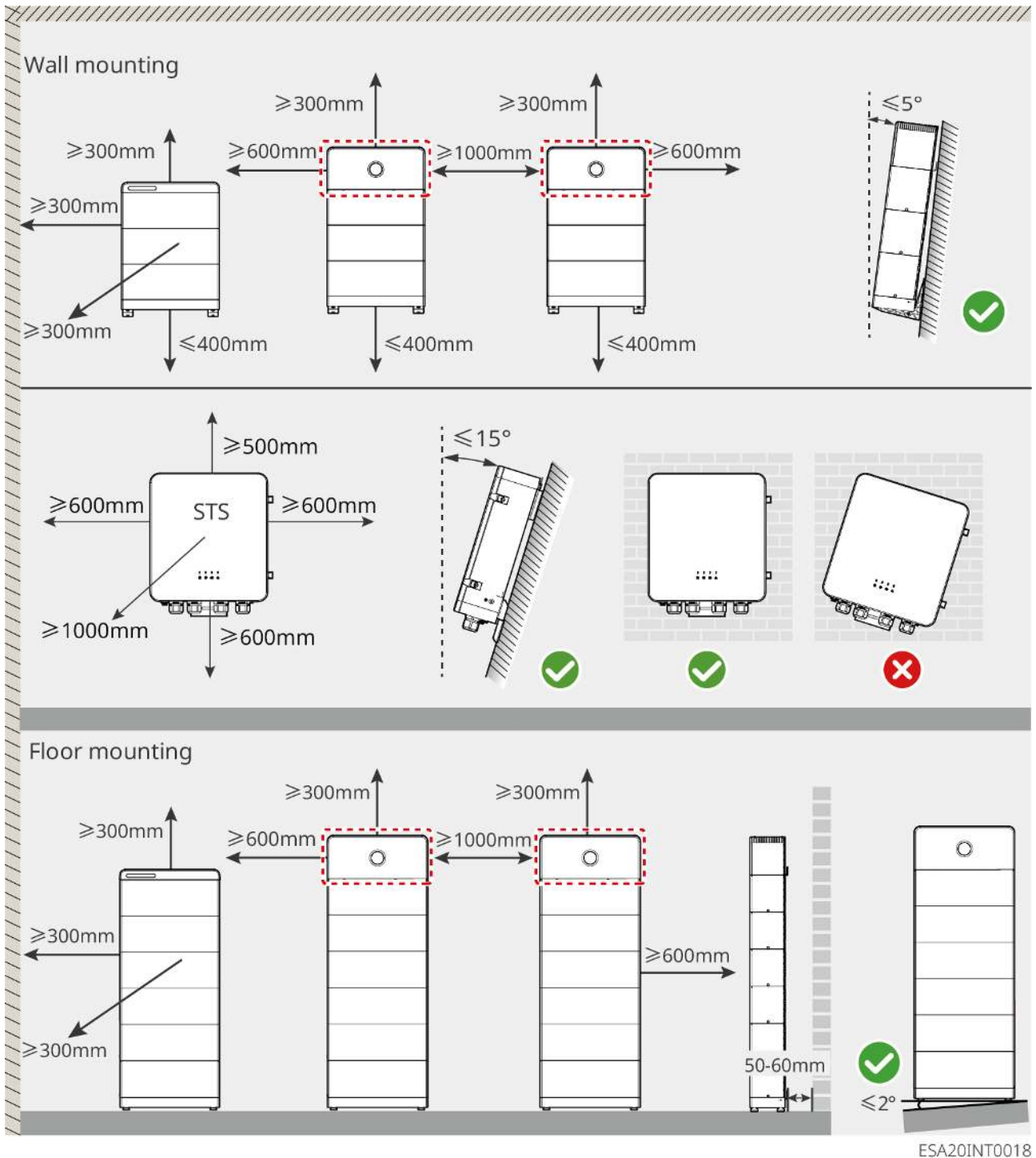
4.1.2 Installation space requirements

1. Installation Space

- Ventilation, heat dissipation, and operating space
 - The installation space must meet the equipment's ventilation and heat

dissipation requirements, ensuring that sufficient cooling clearance is reserved around the equipment.

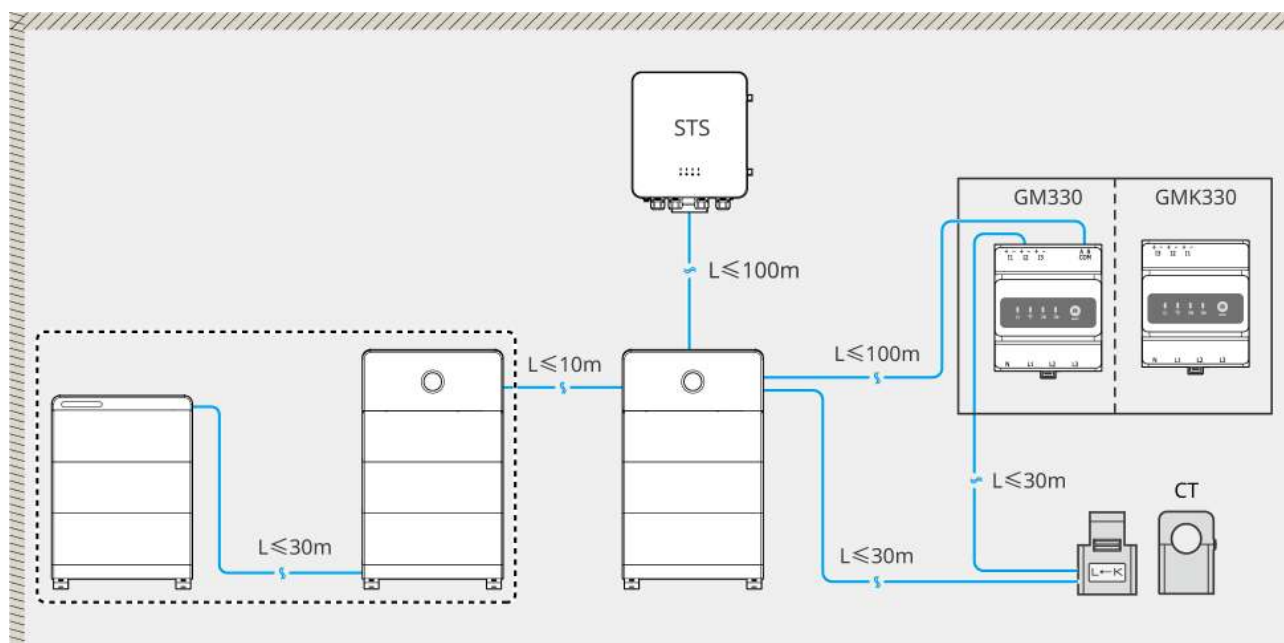
- The installation space must meet the operational space requirements to facilitate routine inspection, wiring, and maintenance operations.
- Mounting Height
 - Equipment installation height should facilitate operation and maintenance.
 - Ensure that equipment indicator lights and all labels are clearly visible.
 - Ensure that the terminal block is easy to operate.



2. Device Communication Cable Length Requirement

- When using CAT 7E communication cables between inverters, the cable distance should not exceed 10 meters; when using CAT 5E or CAT 6E communication cables, the cable distance should not exceed 5 meters. The communication cables must not exceed 10m, otherwise communication abnormalities may occur.

- For CT installation, shielded network cables of CAT 5E or higher should be used, and the cable length should not exceed 30 meters.
- RS485 twisted pair shielded cable for communication between inverter and meter, cable distance not exceeding 100 meters.



ESA20INT0012

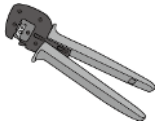
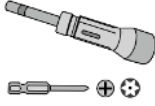
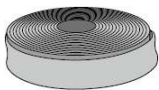
4.1.3 Tool Requirements

NOTICE

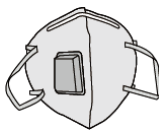
During installation, it is recommended to use the following installation tools. If necessary, other auxiliary tools may be used on-site.

Installation Tools

Tool Type	Description	Tool Type	Description
	diagonal plier		RJ45 connector crimping tool
	wire stripper		Level bar

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

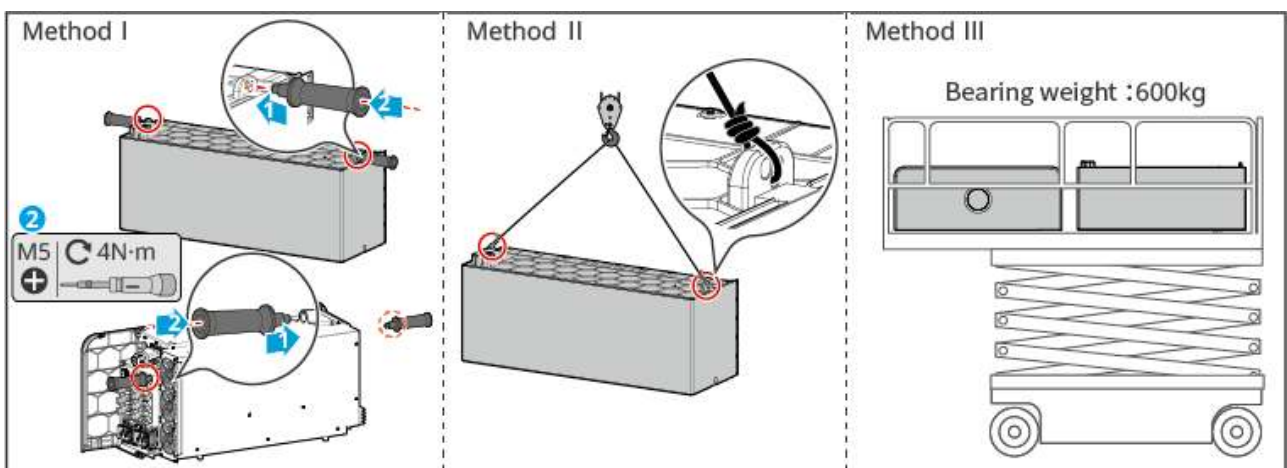
Personal Protective Equipment

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

4.2 Equipment Handling

CAUTION

- During transportation, handling, Installation, and other operations, it must comply with the laws, regulations, and relevant standards of the country or region where it is located.
- Before Installation, it is necessary to move Equipment Handling to Installation. To prevent personal injury or equipment damage during the transportation process, please NOTICE the following matters:
 1. Please equip the corresponding personnel according to the Weight to prevent the equipment from exceeding the Weight range that can be manually handled, thereby avoiding injury to personnel.
 2. Please wear safety gloves to avoid injury.
 3. Please ensure the equipment remains balanced during transportation to avoid falling.
 4. Battery system can be transported by hoisting to the Installation location.
 5. When lifting and moving equipment using a hoisting method, please use flexible slings or straps. The load-bearing capacity of a single strap must meet the following requirements:
 - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21, GW6.0-BAT-D-G20 $\geq 185\text{KG}$
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20 $\geq 240\text{KG}$



ESA20INT0013

4.3 Equipment installation

 Caution

- When drilling, ensure the drilling position avoids water pipes, cables, etc., inside the wall to prevent hazards.
- When drilling, wear safety goggles and a dust mask to avoid inhaling dust or getting it into your eyes.
- The inverter shall be installed above the battery. The battery shall not be installed above the inverter.
- During battery system installation, ensure it is installed horizontally and securely. When placing the battery base, batteries, and inverter, confirm the alignment of holes between the upper and lower layers; the anti-tilt bracket should be vertically flush with the ground, wall, or the surface of the battery system.
- When using a hammer drill for drilling holes, it is necessary to cover the battery system with shields such as cardboard to prevent foreign objects from entering the inside of the equipment and causing damage.
- When performing wall-mounted installation, to ensure your life and property safety, please make sure to evaluate the load-bearing capacity of the wall.

Note

- The battery should be installed on a base, which can be floor-mounted or installed on a bracket.
- For floor-mounted installation, a maximum of 4 batteries can be stacked away from the wall, and a maximum of 6 batteries can be stacked against the wall.
- The maximum stacking quantity when using bracket installation is described as follows:
 - Identical Energy Stacking:
 - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21: Up to 3 units.
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21: at most 2 units.
 - GW6.0-BAT-D-G20: Maximum 3 units.
 - GW9.0-BAT-D-G20: Max 2 units.
 - Energy aliasing:
 - When GW5.1-BAT-D-G20, GW5.1-BAT-D-G21 and GW6.0-BAT-D-G20 are stacked together, a single group of the system supports up to 3 units
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20 and models stacked with them, the system supports up to 2 units per group.
- When installing against the wall, the base, bracket, and top battery must be fixed to the wall with anti-tipping brackets.
- When marking the drilling positions for the mounting bracket, have one person stabilize the base while another uses a marker to indicate the drilling locations.
- When installing the battery and inverter, remove the protective cover on the blind-mate connector before stacking.

Wall-mounted Installation

Step 1: Install the base on the mounting bracket.

Step 2: The bracket fits tightly against the wall. Ensure the bracket is placed firmly, and observe the bubble level in the middle of the base.

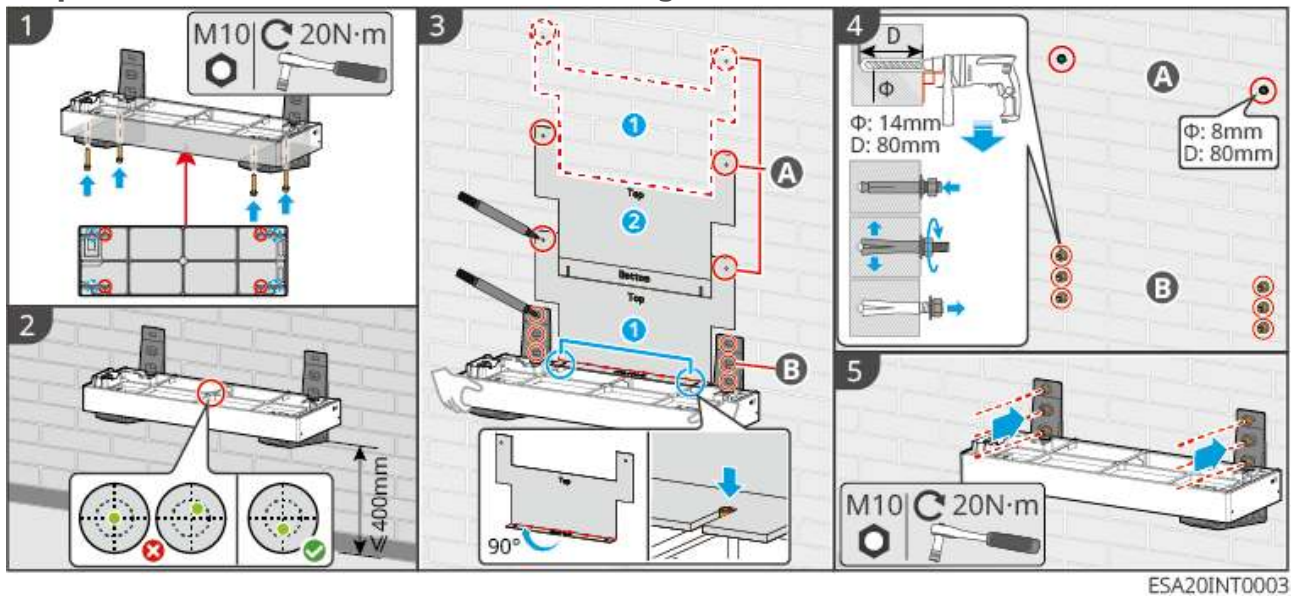
Step 3: After adjusting the position and level of the mounting bracket, use a marker to mark the drilling positions, after marking, remove the mounting bracket. (A: PACK fixing hole positions; B: bracket fixing hole positions.)

Step 4: Drill holes and install expansion screws.

1. Use an impact drill to drill holes.
2. Clean holes.

3. Use a rubber mallet to install the expansion bolt into the hole.
4. Use a hex wrench to tighten the nut clockwise to expand the bolt.
5. Rotate the nut counterclockwise to remove it.
6. Use a torque screwdriver to tighten the anti-tilt bracket to the wall.

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



Floor-mounted Installation
wall-mounted

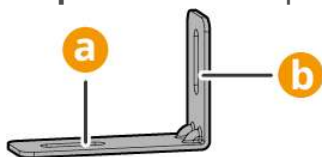
Step 1: Install the adjustable feet on the bottom of the base, and fix the anti-tip bracket on the base.

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

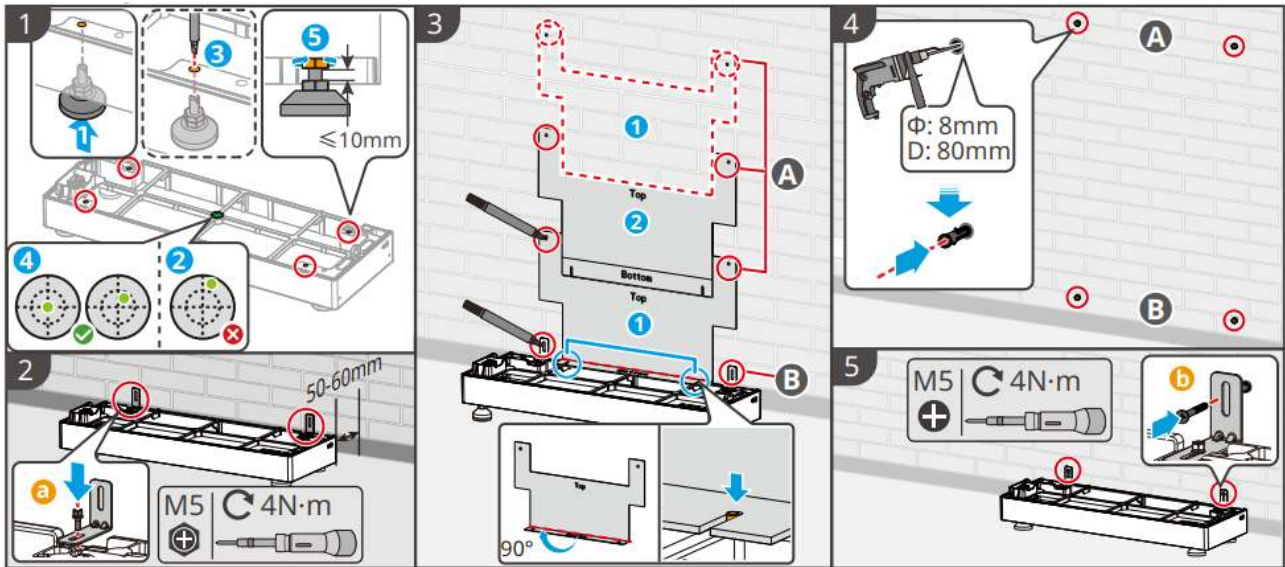
Step 3: After adjusting the position and levelness of the base, use drilling marking paper to mark the drilling positions. Once marked, remove the base. (A: PACK fixing holes; B: Bracket fixing holes.)

Step 4: Use a hammer drill to make holes and clean the holes.

Step 5: Use a Phillips screwdriver to tighten the anti-tipping bracket to the wall.



a: Fixed surface with base; b: Fixed surface with wall.



wall-mounted installation

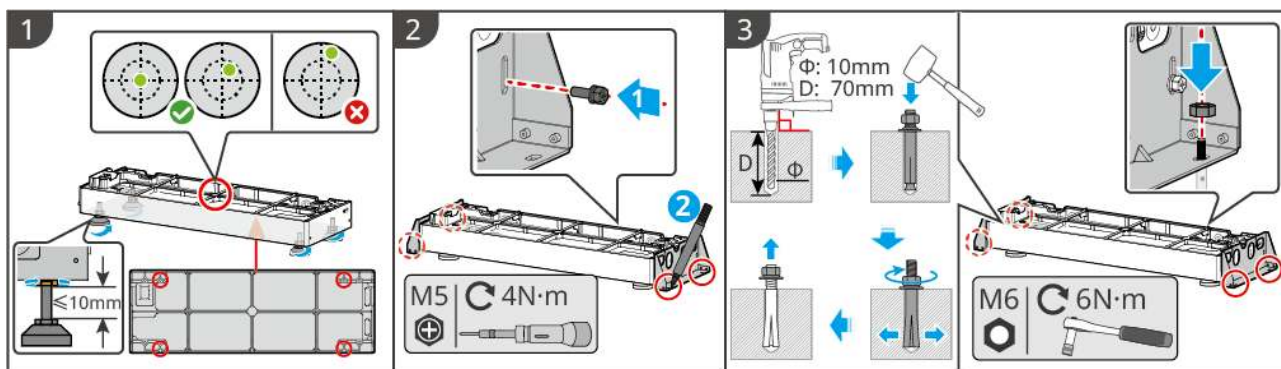
Step 1: Install the adjustable feet on the bottom of the base. Observe the bubble level in the middle of the base. If the bubble is not centered, use the adjustable feet to level.

Step 2: After adjusting the position and levelness of the base, securely fasten the Floor-Mounted Standoff Bracket to the base. Select an appropriate position and mark the drilling location. After marking, remove the base.

Step 3: Drill holes and install expansion bolts.

1. Use an impact drill to drill holes.
2. Clean holes.
3. Use a rubber mallet to install the expansion bolt into the hole.
4. Use a hex wrench to tighten the nut clockwise to expand the bolt.
5. Rotate the nut counterclockwise to remove it.
6. Use a torque screwdriver to tighten the Floor-Mounted Standoff Bracket to the ground.

Step 4: Use a hex wrench to fix the base to the ground.



ESA20INT0015

Install Battery and Inverter

Note

When installing against a wall, the topmost battery needs to be fixed to the wall using an anti-tilt bracket.

Step 1: Remove the protective cover on the blind-mate connector at the bottom of the inverter or battery.

Step 2: Install the handle (Optional), then stack the battery onto the base.

If installing more than 3 batteries, please use lifting equipment.

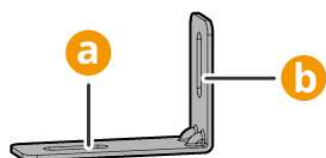
Step 3: Tighten the screws between the battery and the base or between batteries.

If multiple batteries need to be installed, repeat **Step 1** and **Step 2** to complete all battery installations. The number of battery stacks follows the "[2.2.1.System Overall Configuration Description\(Page 45\)](#)".

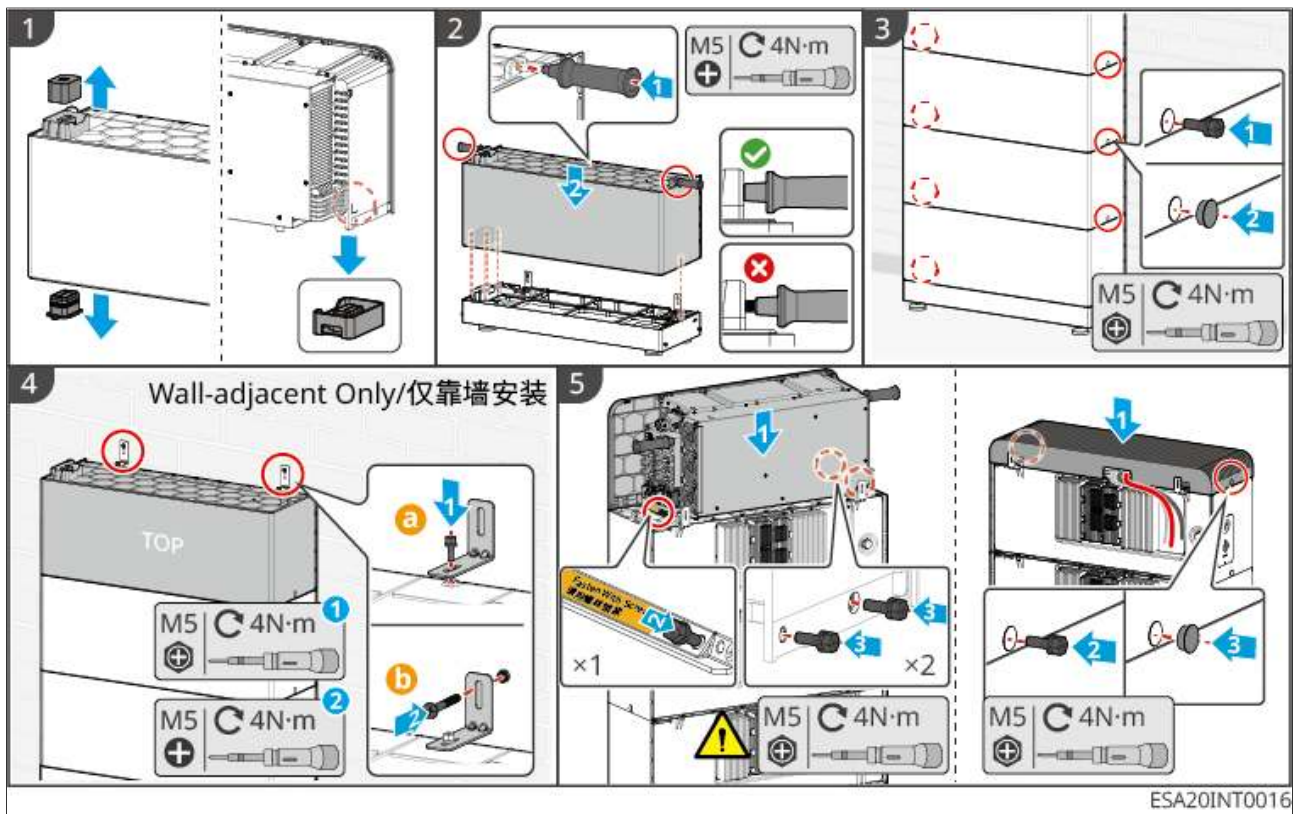
Step 4: (Optional) Secure the top battery to the wall using an anti-tip bracket.

Step 5: Install the inverter or battery decorative cover.

- Integrated installation: Lift the inverter, align it, and stack it on top of the battery, then tighten the screws between the inverter and the battery. If the system is configured as an integrated unit, the installation is now complete.
- Split-type expansion: Repeat the steps for battery installation. After completing the electrical connection, place the battery decorative cover on top of the battery, and tighten the side screws.



a: Fixing surface to PACK; b: Fixing surface to wall.



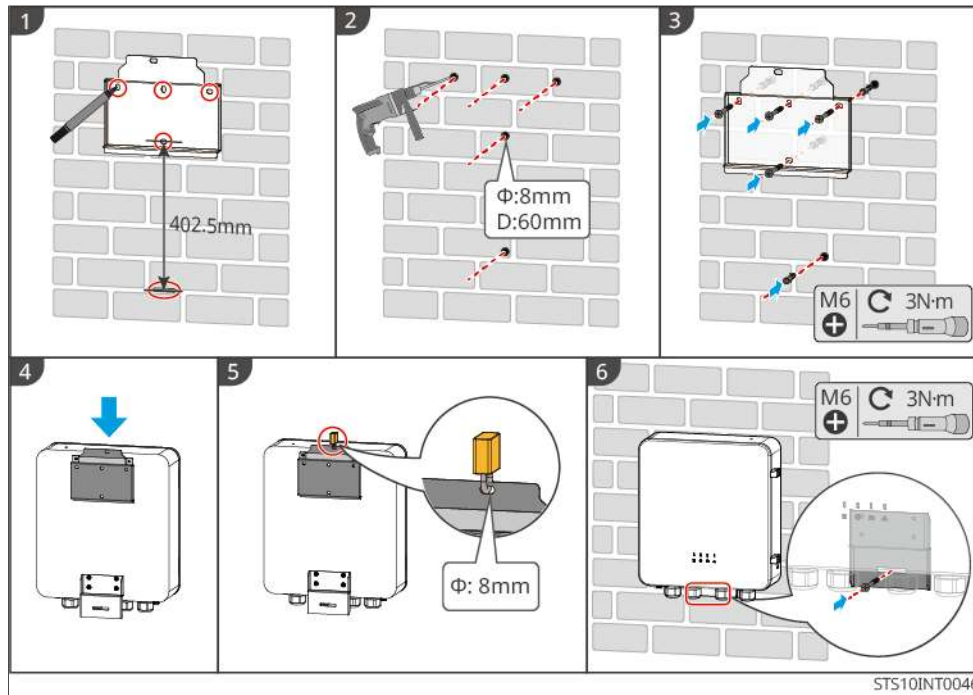
4.4 Install STS

! Caution

- When drilling, ensure the drilling position avoids water pipes, cables, etc., inside the wall to prevent hazards.
- When drilling, wear safety goggles and a dust mask to avoid inhaling dust or getting it into your eyes.
- When performing wall-mounted installation, to ensure your life and property safety, please make sure to evaluate the load-bearing capacity of the wall.
- Ensure the equipment is securely installed to prevent falling and injuring personnel.

1. Place the backplate horizontally on the wall surface, and use a marker pen to mark the drilling positions.
2. Use an impact drill to drill holes.
3. Secure the back plate to the wall with expansion bolts.

4. Mount the STS on the backplate.
5. Install anti-theft lock.
6. Secure the mounting bracket to the wall using M6 screws.

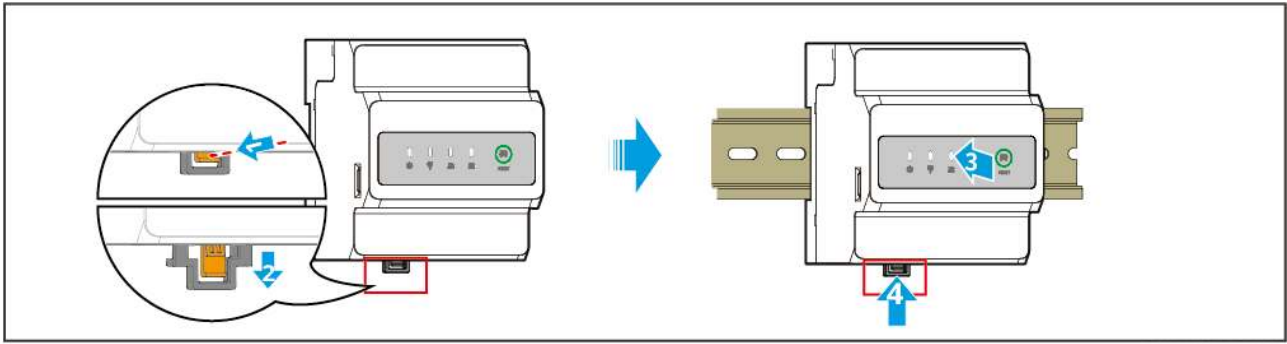


4.5 Installing the Smart Meter

WARNING

In areas with lightning DANGER, if the meter cable length exceeds 10m and the cable is not routed with grounding Steel conduit, it is recommended to install external lightning protection devices.

GM330&GMK330



GMK10INT0003

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

Step 2: Place the meter on the positioning track and reinstall the buckle onto the meter.

5 system wiring

Danger

- The installation, routing, and connection of cables must comply with local laws, regulations, and code requirements.
- All operations, cables, and component specifications used during the electrical connection process must comply with local laws and regulations.
- Before making electrical connections, disconnect the device's DC Switch and AC output switch to ensure the device is disconnected from power. Never perform operations while energized, otherwise risks such as electric shock may occur.
- Cables of the same type should be bundled together and routed separately from cables of different types. Intertwining or crossing between the m is prohibited.
- If the cable is subjected to excessive tension, it may lead to poor connection. When wiring, please leave a certain length of slack before connecting to the inverter terminal block.
- When crimping the terminal, ensure that the cable conductor is fully in contact with the terminal. Do not crimp the cable insulation together with the terminal, as this may cause the equipment to fail to operate, or generate heat due to unreliable connections after operation, potentially damaging the inverter terminal block.
- This inverter has not been tested and verified in accordance with the AS/NZS 4777.2:2020 standard for multi-phase inverter combinations, the refore such combination schemes should not be adopted.
- For unused cable entry holes and ports (including communication ports), please use the dedicated terminals or plugs provided in the box accessories to reliably seal the m. Otherwise, the following risks may occur:
 - Electric shock hazard: Open electrical ports may cause direct contact with live parts, leading to electric shock accidents.
 - Protection failure: Open ports allow ingress of dust, moisture, or for eign objects, which may cause short circuits, fire, or equipment malfunction.

Note

- When performing electrical connections, please wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- Only qualified personnel are allowed to perform electrical connection operations.
- The cable colors in the graphics of this document are for reference only, and specific cable specifications must comply with local regulatory requirements.
- Static Transfer Switch Cabinet (STS) is an optional component applicable only to system standalone scenarios. If required, refer to the wiring method below for connection.

5.1 System Wiring and Electrical Block Diagram

Note

- According to the regulatory requirements of different regions, the wiring methods of N and PE wires for the GRID and BACK-UP ports of the inverter vary, and the specific wiring shall follow local regulations.
- The inverter has a built-in meter and can be directly connected to the CT for use. The CT cable shipped with the unit is 10 meters. If a longer distance is required, a CAT5e or higher shielded cable can be used to extend the connection up to 30 meters.
- CT connection length to inverter exceeding 30m will reduce accuracy. For high accuracy requirements, an external smart meter can be connected.
- The built-in relay of the inverter's GRID AC port is in the open state when the inverter is in off-grid mode, and in the closed state when the inverter is in grid-connected mode.
- When the inverter is powered on, the BACK-UP AC port becomes energized. If maintenance on the BACK-UP load is required, please power off the inverter; otherwise, it may cause electric shock.
- In an all-home backup scenario, if the total power of connected loads exceeds 1.1 times the inverter's Rated Power, after a grid outage, the inverter will stop outputting due to Over load Protection. At this point, please shut down some non-essential loads to ensure that the total power of loads is less than 1.1 times the inverter's Rated Power.

Neutral and PE wires are connected together in the distribution box

Note

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

Type 1:

Whole house backup power

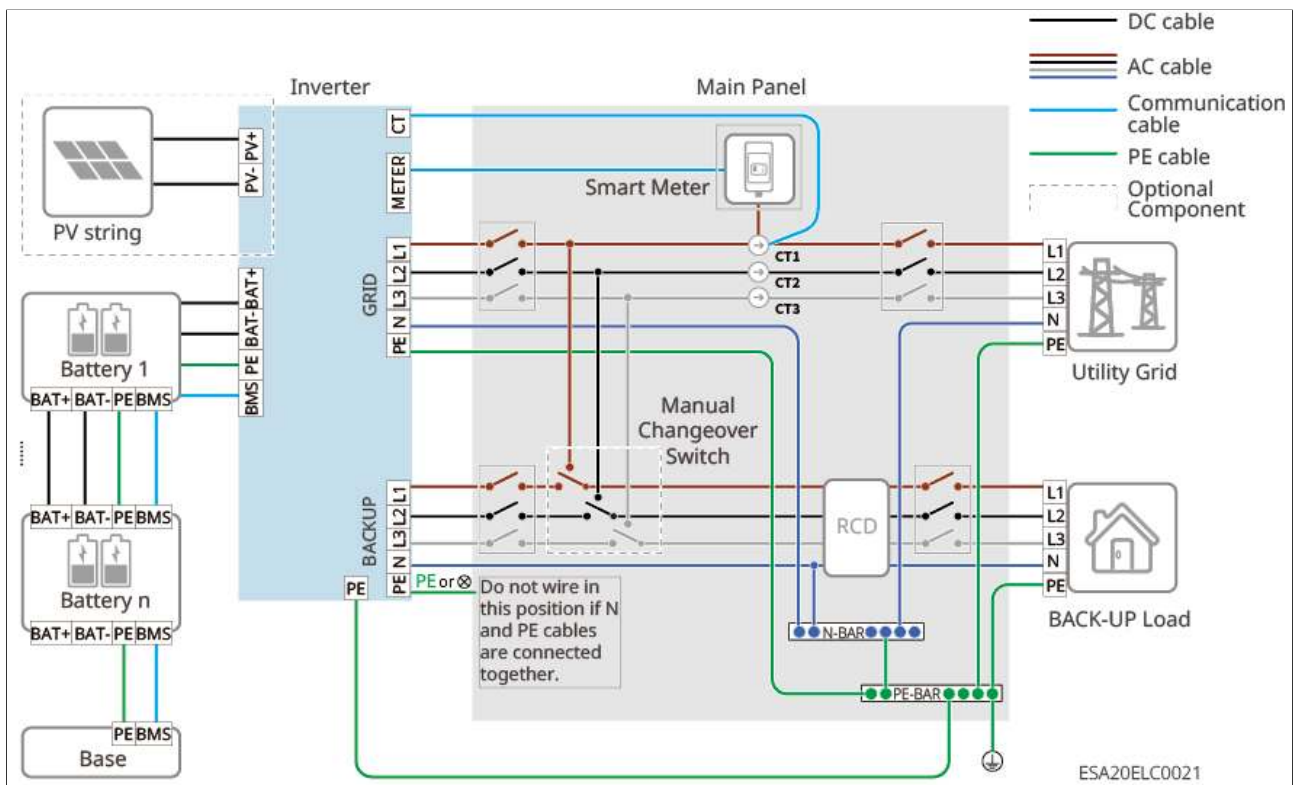


Figure17 Whole house backup power

Partial backup power

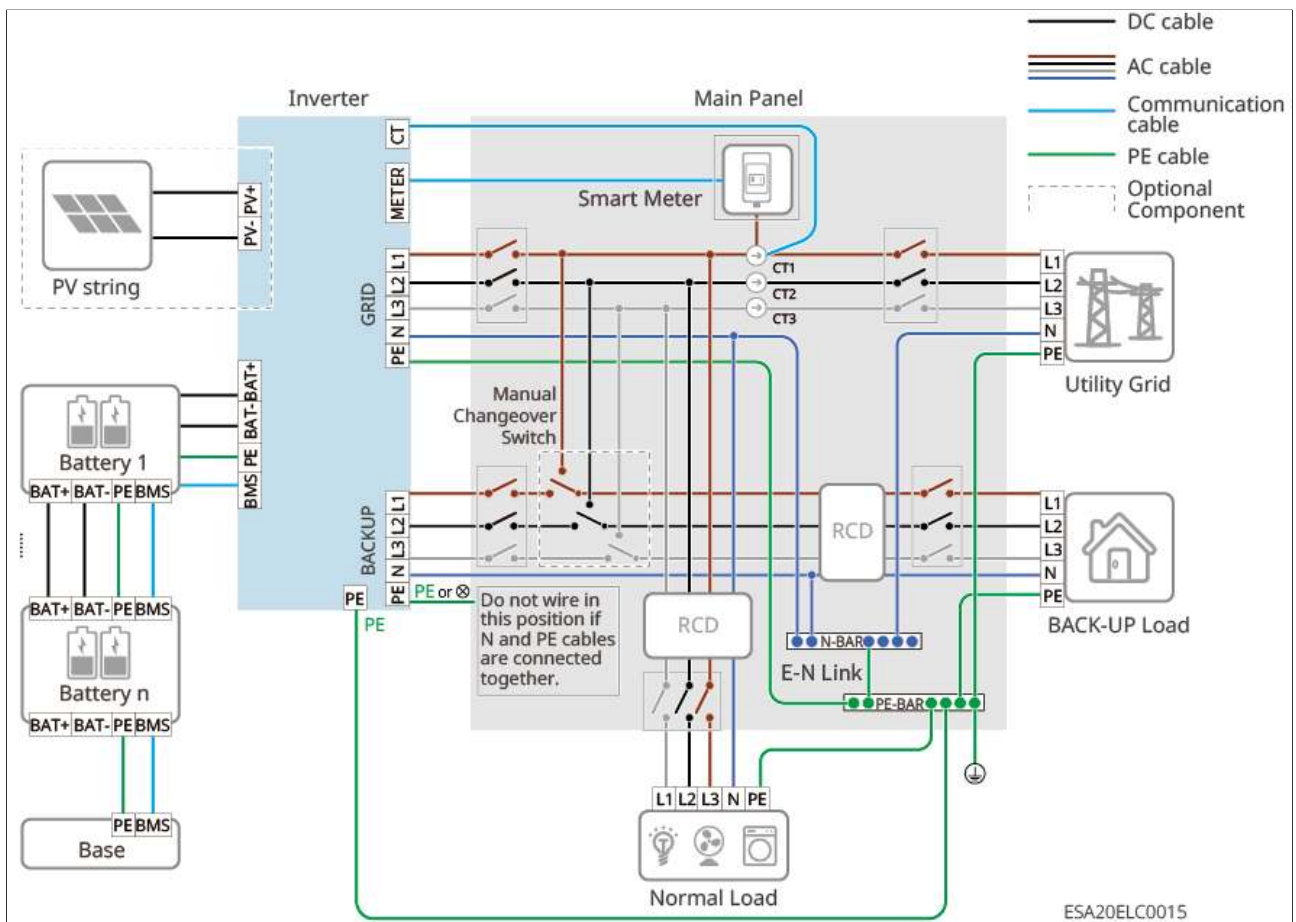


Figure18 Partial backup power

Type 2

Whole house backup power

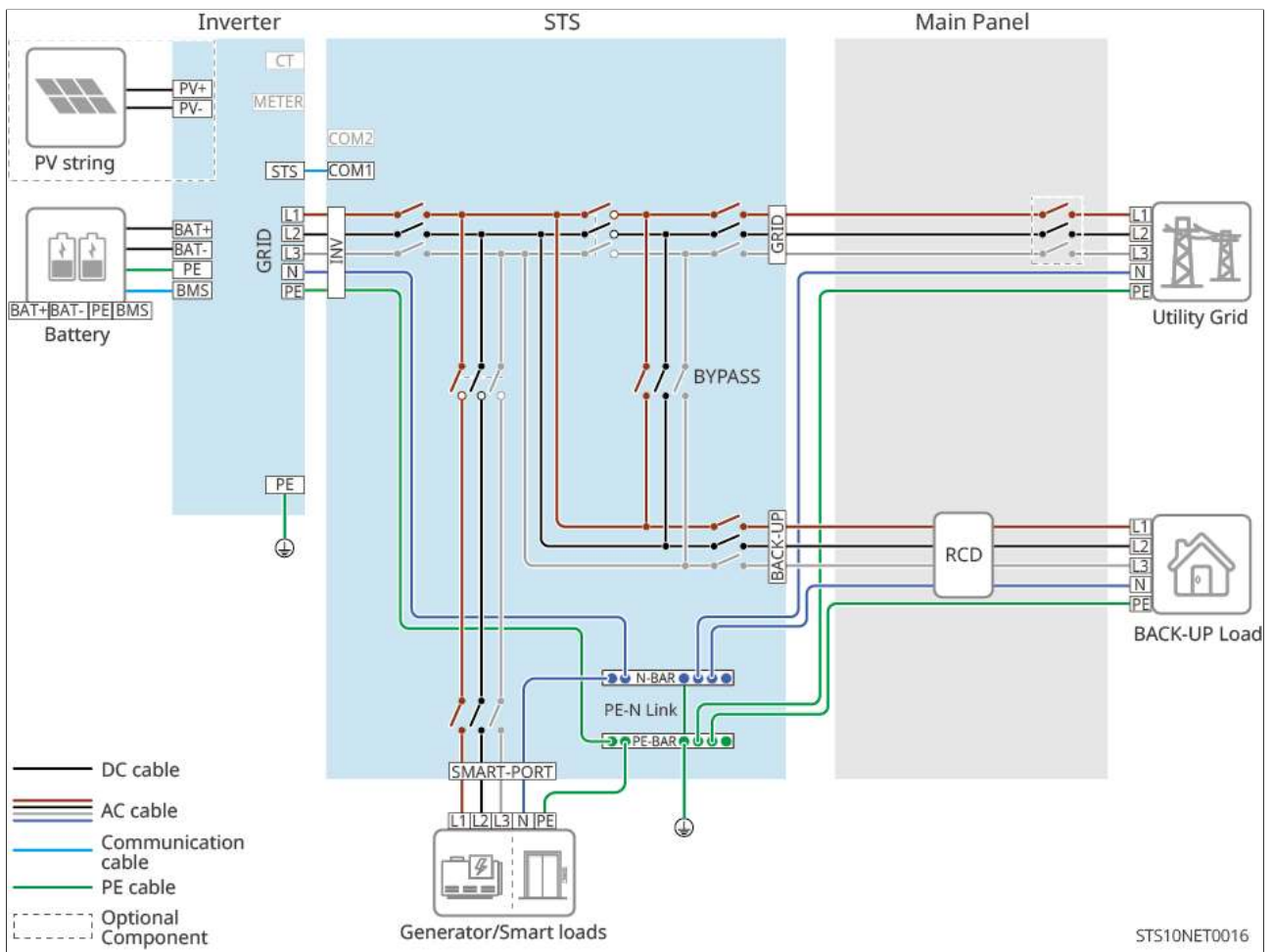


Figure19 with STS whole-house backup power

Partial backup power

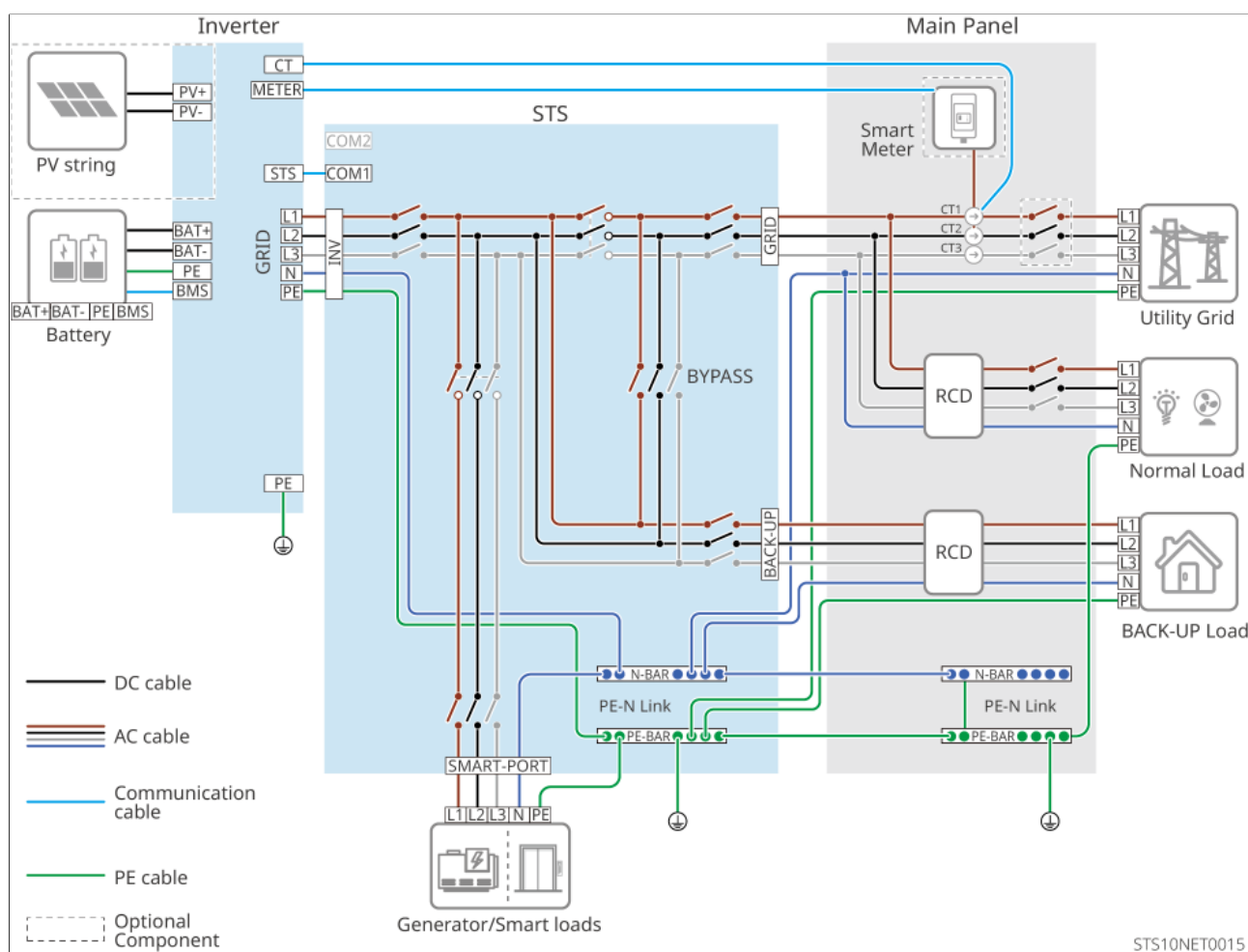


Figure20 with partial backup power for STS

NandPEwires are connected separately in the distribution box

Note

- Please ensure that the Protection ground wire of BACK-UP is correctly and securely connected; otherwise, abnormal operation of the BACK-UP function may occur during a grid fault.
- In a parallel system, do not install Residual Current Protection Devices (RCDs) on the grid-connected branches of each inverter. RCDs should be uniformly installed at the grid summary point.
- Regions other than Australia, New Zealand, etc. are applicable to the following wiring method:

Type I:
Whole house backup power

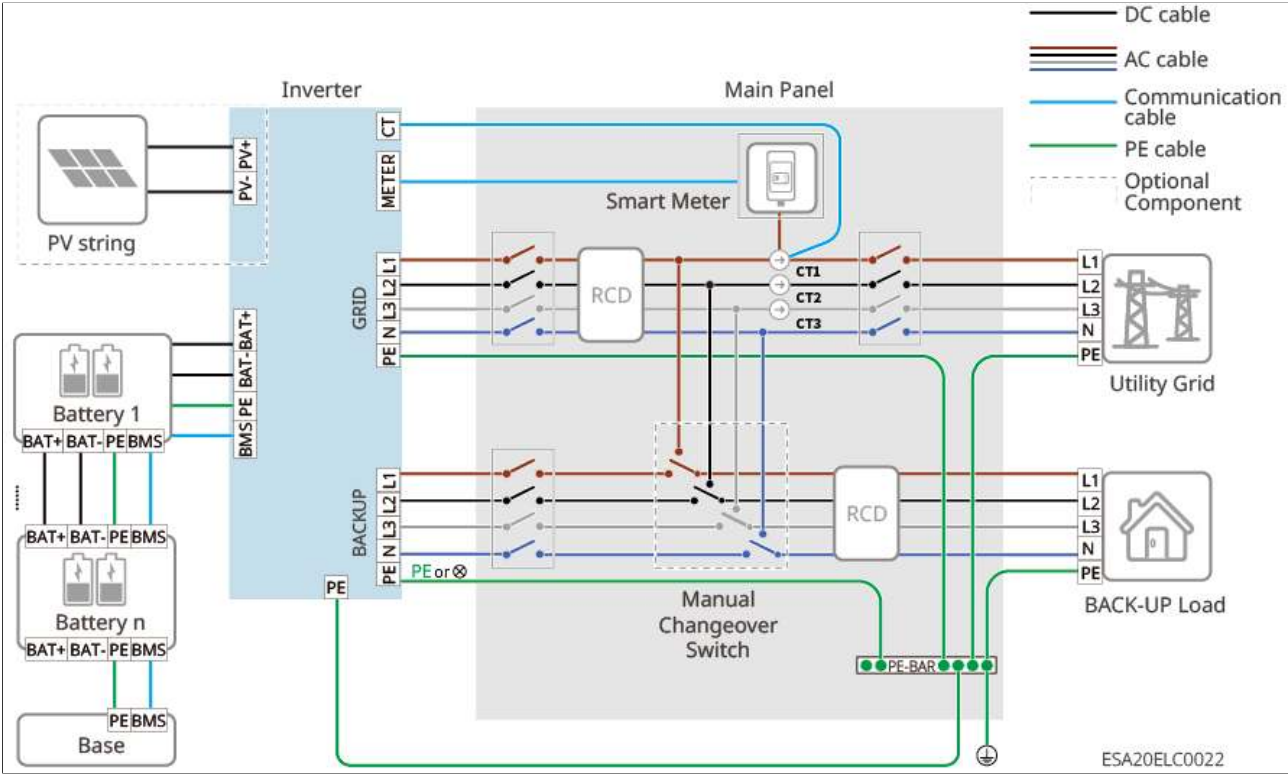


Figure21 Whole house backup power

Partial backup power

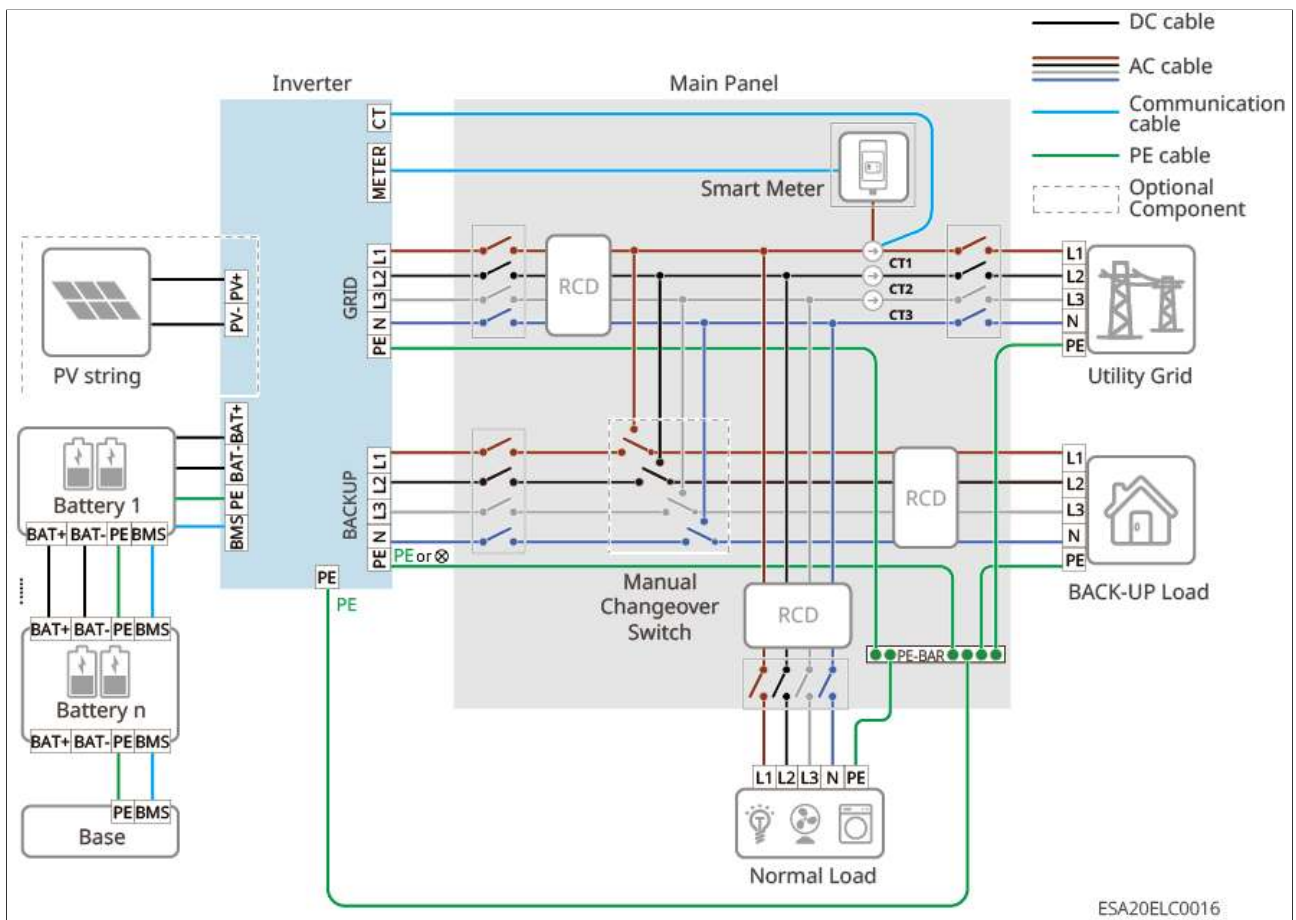


Figure22 Partial backup power

Type 2:

Note

If the inverter does not need to connect the N and PE wires when switching to off-grid mode, this function can be set via the "Backup Power N and PE Relay Switch" in the "Advanced Settings" interface of the App. The following wiring method is applicable to regions other than Australia, New Zealand, etc.:

Whole house backup power

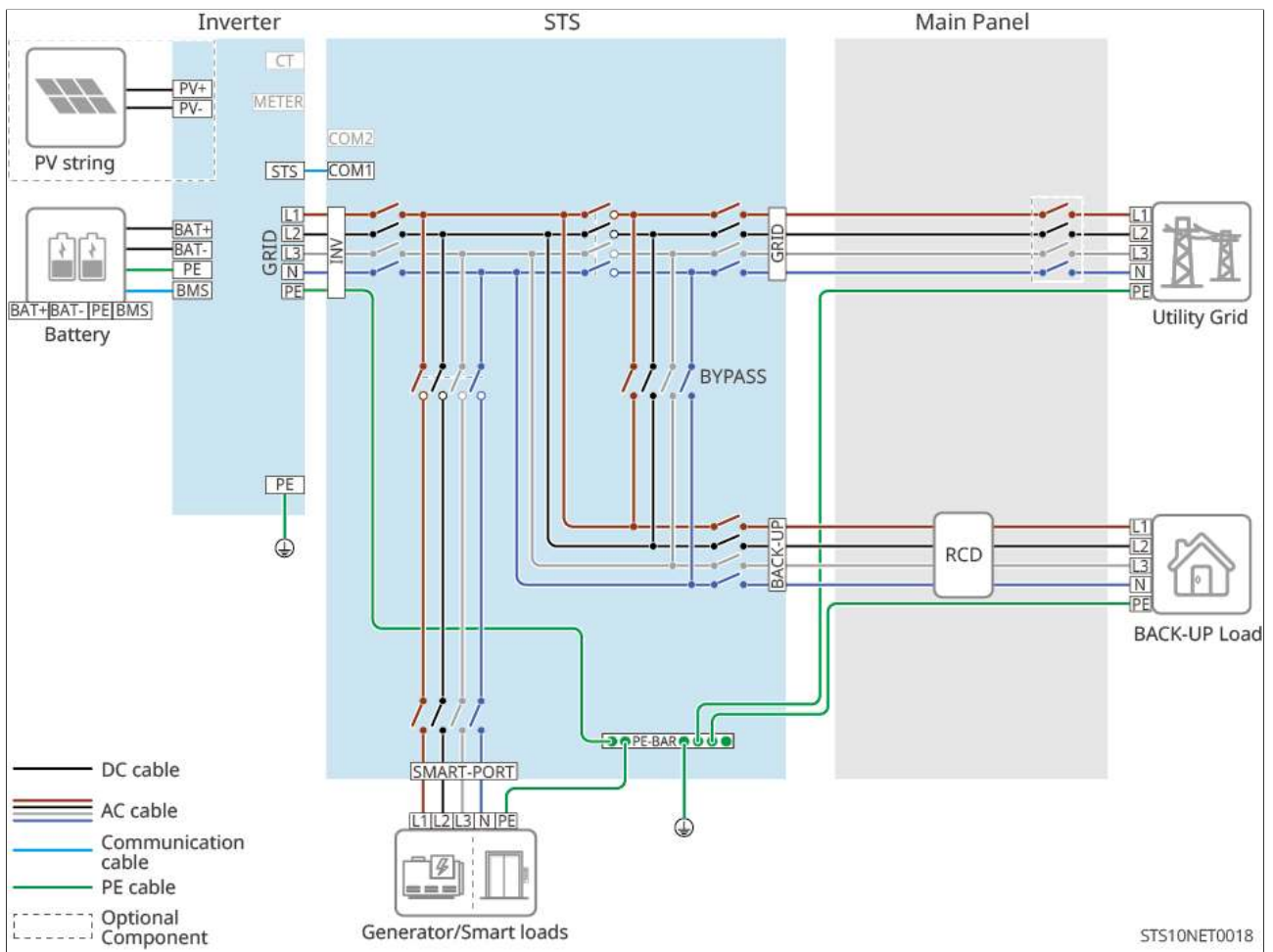


Figure23 with STS whole-house backup power

Partial backup power

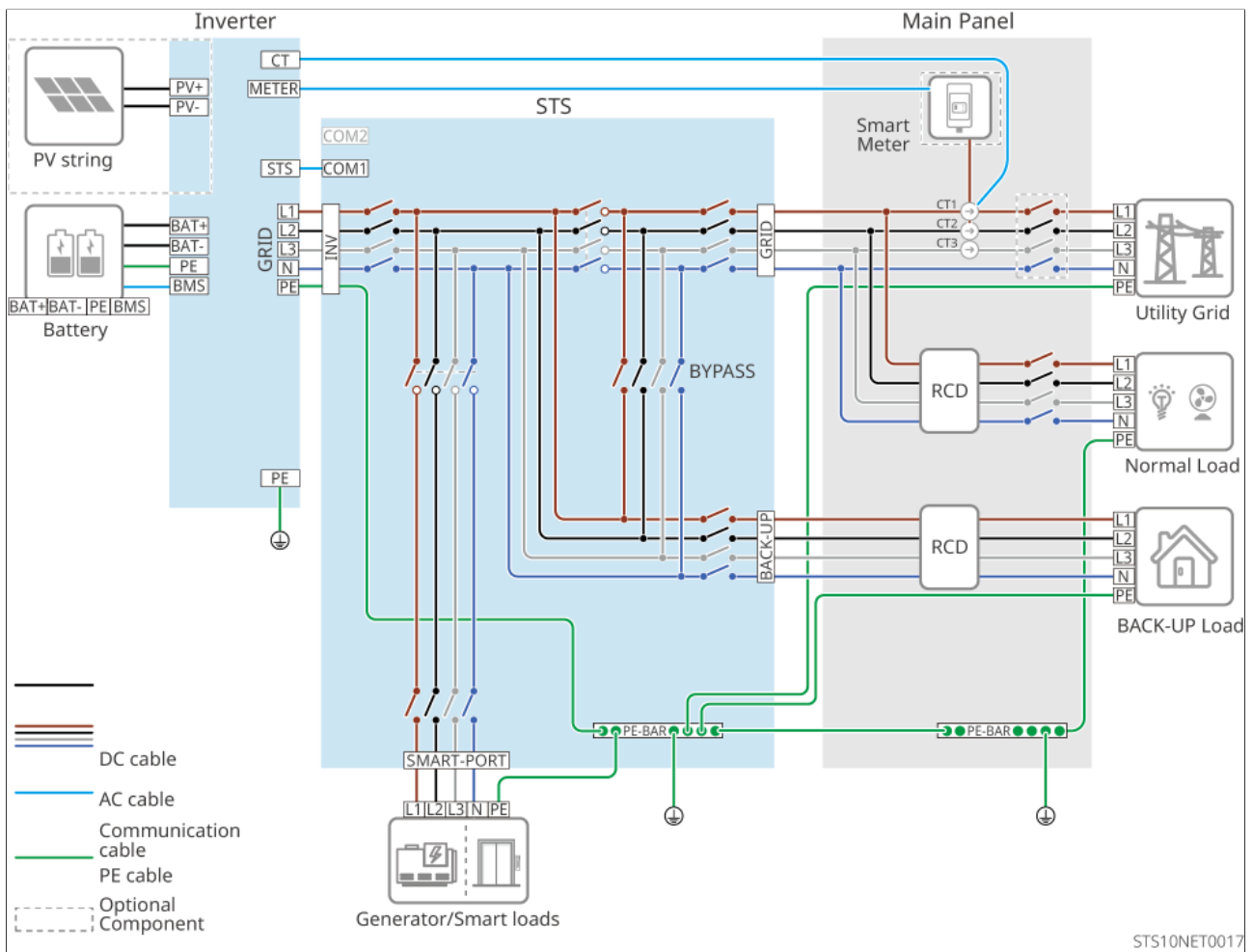
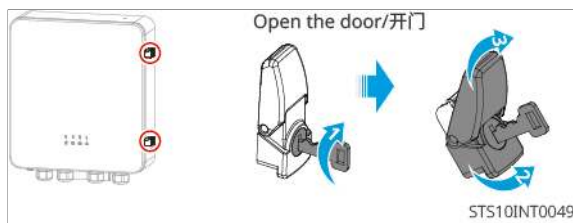


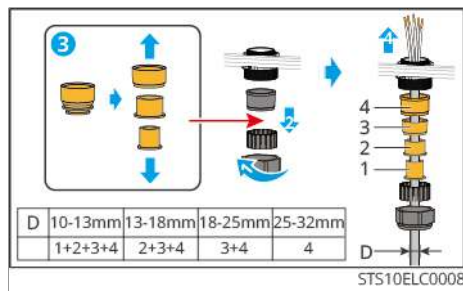
Figure 24 with partial backup power for STS

5.2 Pre-wiring preparation for STS

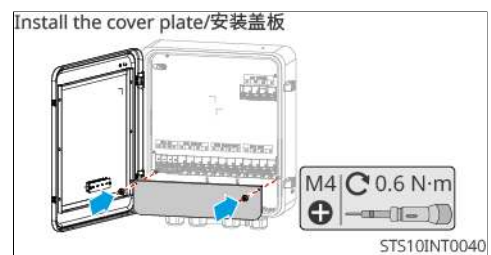
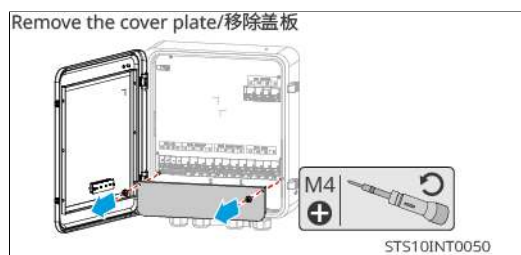
• Cabinet Door



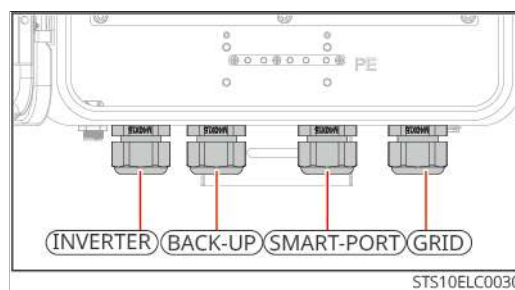
• Cable Gland Operation



• Cover Operation



• Wiring Diagram



5.3 System Wiring Detail Drawing

When all loads in the photovoltaic system cannot consume the Energy Generation produced with in the system, the surplus Energy Generation will be fed into the grid. In this case, a smart meter or CT can be used to monitor the system's Energy Generation and control the Energy Generation fed into the grid.

- Connect to smart meter to enable output power limitation and load monitoring functions.

- After connecting the smart meter, please enable the "Grid Power Limitation" function through the SEMS+ App.

In the system wiring detail drawing, only some models of equipment are shown for wiring illustration. Please refer to the corresponding wiring instruction chapter based on the actual equipment used for wiring.

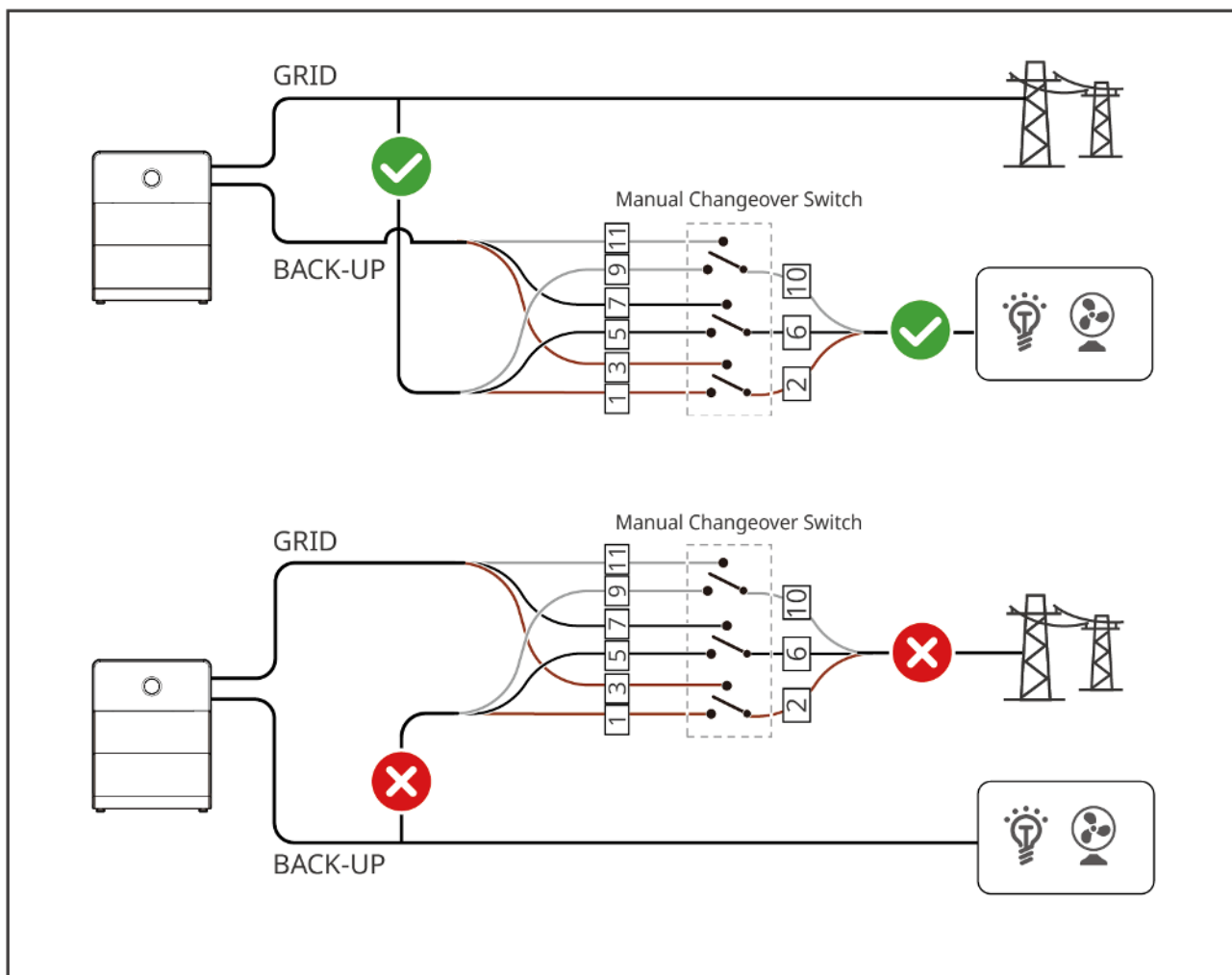
Warning

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

Australia region

Note

In Australia, a 3-pole manual transfer switch is included with the product upon shipment. If needed, please wire it according to the wiring method for the 3-pole manual transfer switch shown in the wiring diagram below.

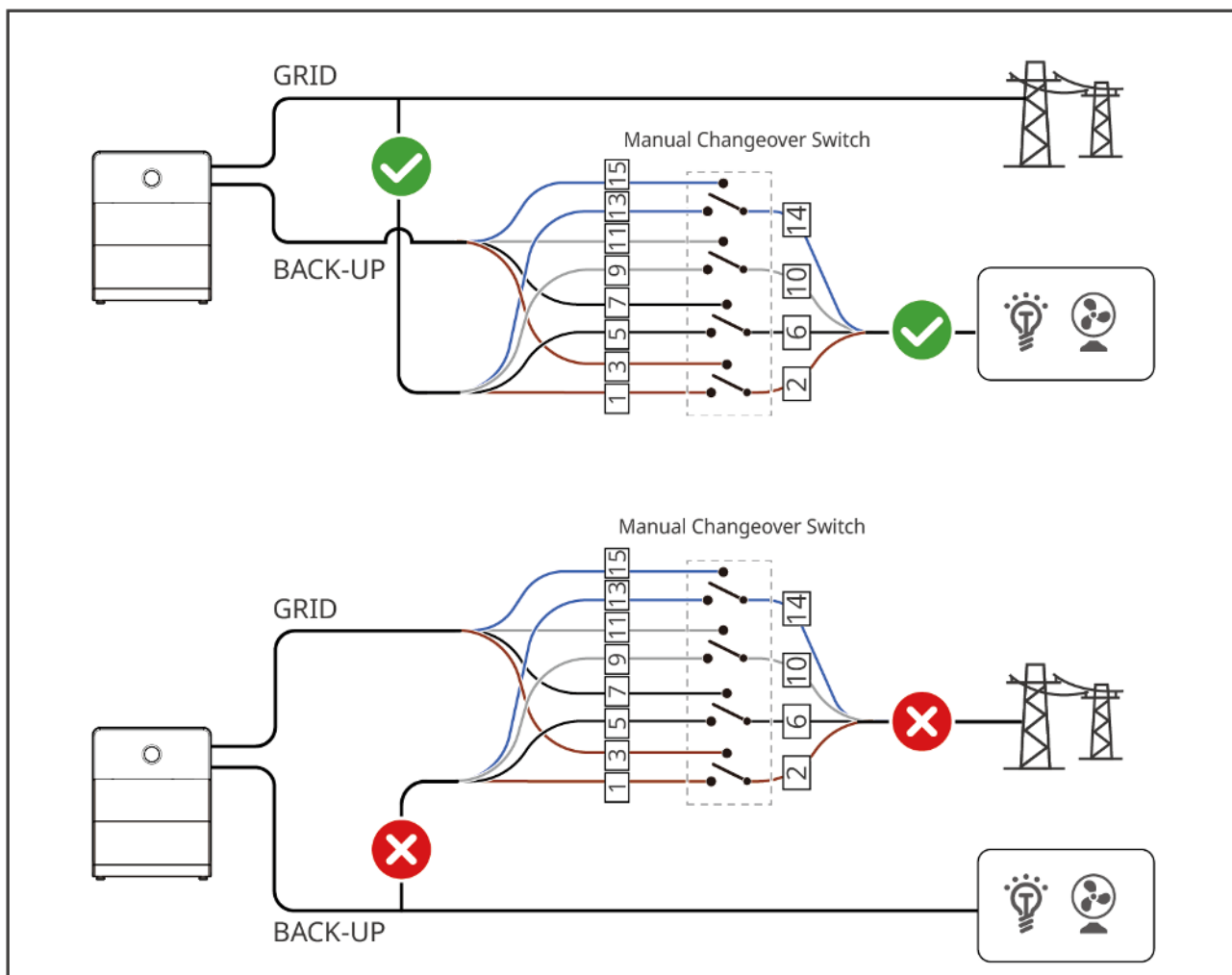


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European region

Note

In Europe, if a manual transfer switch is required, please purchase a 4-pole manual transfer switch through a dealer or procure it yourself. After obtaining the switch, proceed with wiring according to the wiring method for the 4-pole manual transfer switch shown in the wiring diagram below.



ESA20ELC0035

Note

- Different wiring methods for electric meters vary; please refer to the actual meter.
- When not using the inverter's built-in meter, do not connect the inverter's CT port.
- In the whole-house backup power scenario, there is no need to connect additional meters or CTs. Simply set the "Meter Type" to "Built-in CT, External No Meter No CT" in the App to achieve the Power Limit function.
- Manual transfer switch and STS are only applicable to single inverter scenarios. Please choose whether to install them based on actual operating conditions. Configure only one of them, do not install both.
- If the system needs to use a generator, please follow the following requirements.

Note

- When the system is not configured with STS, the generator is connected to the inverter GRID port, and an external meter must be used. If an ATS switch is provided, it must have interlocking functionality.
- When the system is configured with STS, the generator connects to the STS Smart-Port with out requiring an external meter.
- If the system requires inverter parallel networking, please note the following:
 - The inverter's built-in meter supports system Parallel Networking. If the number of parallel inverters exceeds 2, or the wire diameter or range of the standard CT does not meet the total current requirement of the parallel inverters on site, please use the GM330 smart meter.
 - In a parallel system, the DIP switches of the first and last inverters must be set to the ON position, while the other inverters should be set to the OFF position.
 - In the parallel system, the inverter connected to the meter is the master inverter, and the others are slave inverters.
 - The master inverter needs to be set as the master through the App "Set RS485 parallel operation". The slave inverter also needs to be set as the slave. For specific operation steps, please refer to the App user manual.
 - In a parallel system, if it is necessary to connect DRED devices, RCR devices, Remote Shutdown devices, SG Ready heat pumps, etc., please connect to the master inverter.
 - Remote Shutdown function: connect the communication cable to the main inverter. Quick Shutdown function: connect the communication cable to each inverter separately. If both Quick Shutdown and Remote Shutdown functions are needed, please contact after-sales service center.
 - In a parallel system, each inverter needs to be equipped with a WiFi/LAN Kit-20.
 - The parallel system supports generator connection. If a generator needs to be connected, ensure that:
 - Generator power must be greater than the total power of all loads on the BACKUP port.
 - The current capacity of the matching ATS can meet the total current demand when all inverters output at Rated Power simultaneously.
 - In a parallel system, if it is necessary to disconnect any port circuit breaker of a certain inverter, please synchronously disconnect the other port circuit breakers of this inverter; otherwise, it may cause abnormal system operation.
 - Microgrid Scenario does not support parallel operation of energy storage

Note

inverters.

- In microgrid and coupling scenarios, if grid-tied inverter power generation monitoring and load monitoring functions need to be realized, dual-meter networking is required.
 - Meter 1 or the built-in meter is used to monitor the grid-connected power of the system.
 - Meter 2 is used to monitor the power generation of the grid-connected inverter.
 - By integrating data from meter 1 and meter 2, the monitoring platform can achieve real-time monitoring of load power consumption.
 - The dual-meter combination scheme for microgrid and coupling scenarios is shown in the table below "Dual-Meter Configuration Scheme". The connection method of the meter between the grid side and the AC side of the grid-tied inverter does not vary with different meter models.
 - If the grid-tied inverter requires output power limitation, please connect a meter or CT etc. separately.

Dual Meter Configuration

Meter 1 (Grid Side)	Meter 2 (AC side of grid-tied inverter)
built-in electric meter	GMK330
built-in electric meter	GM330
GMK330	GMK330
GM330	GM330
GMK330	GM330
GM330	GMK330

5.3.1 General scenario

Detailed Wiring Diagram of Single Inverter System

- Manual transfer switch is optional. Please decide whether to install it based on the

actual application scenario.

In the whole-house backup power scenario, built-in CT networking.

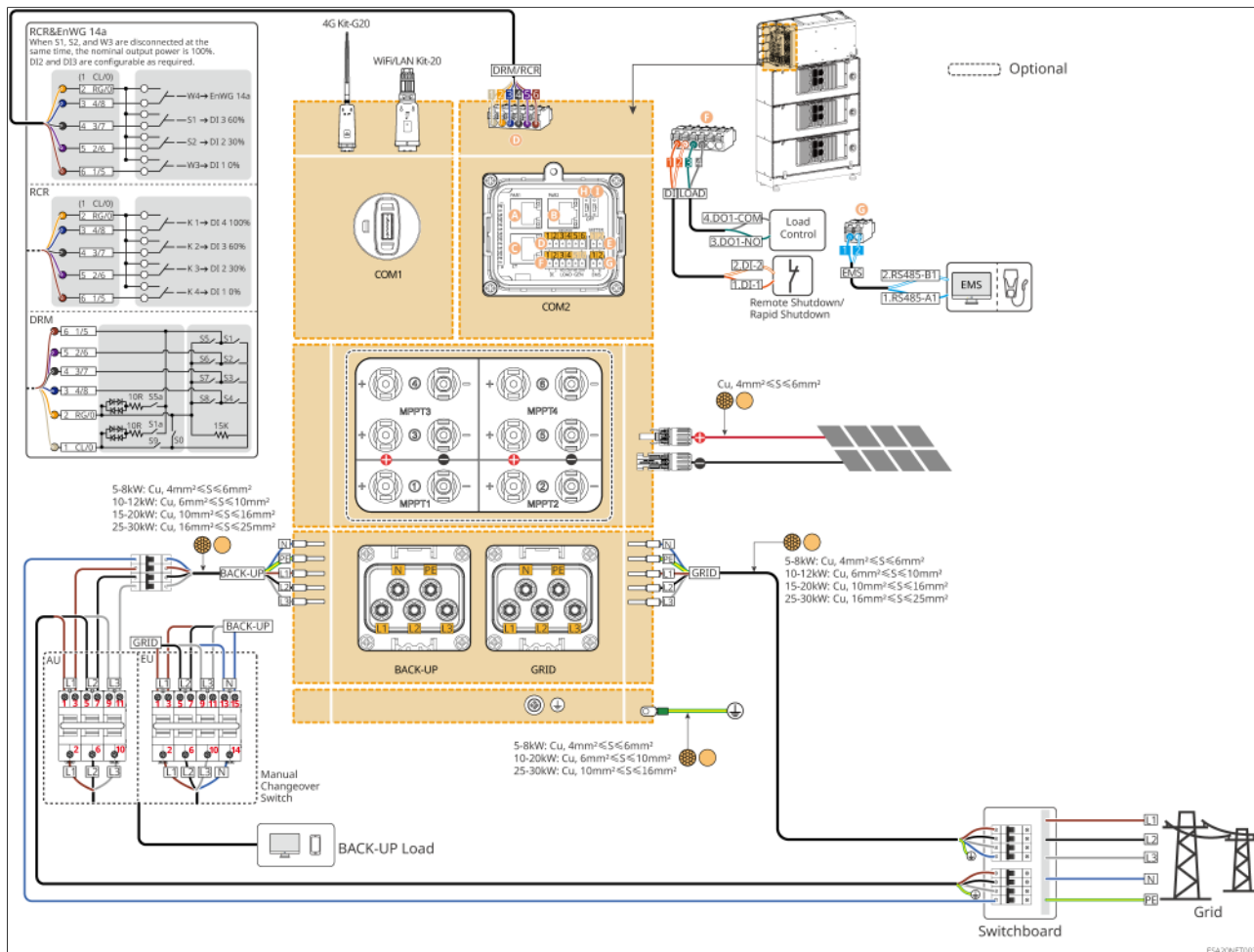


Figure25 General Scenario 1: Whole-House Backup Power Built-in CT Networking Diagram

Networking with built-in meter

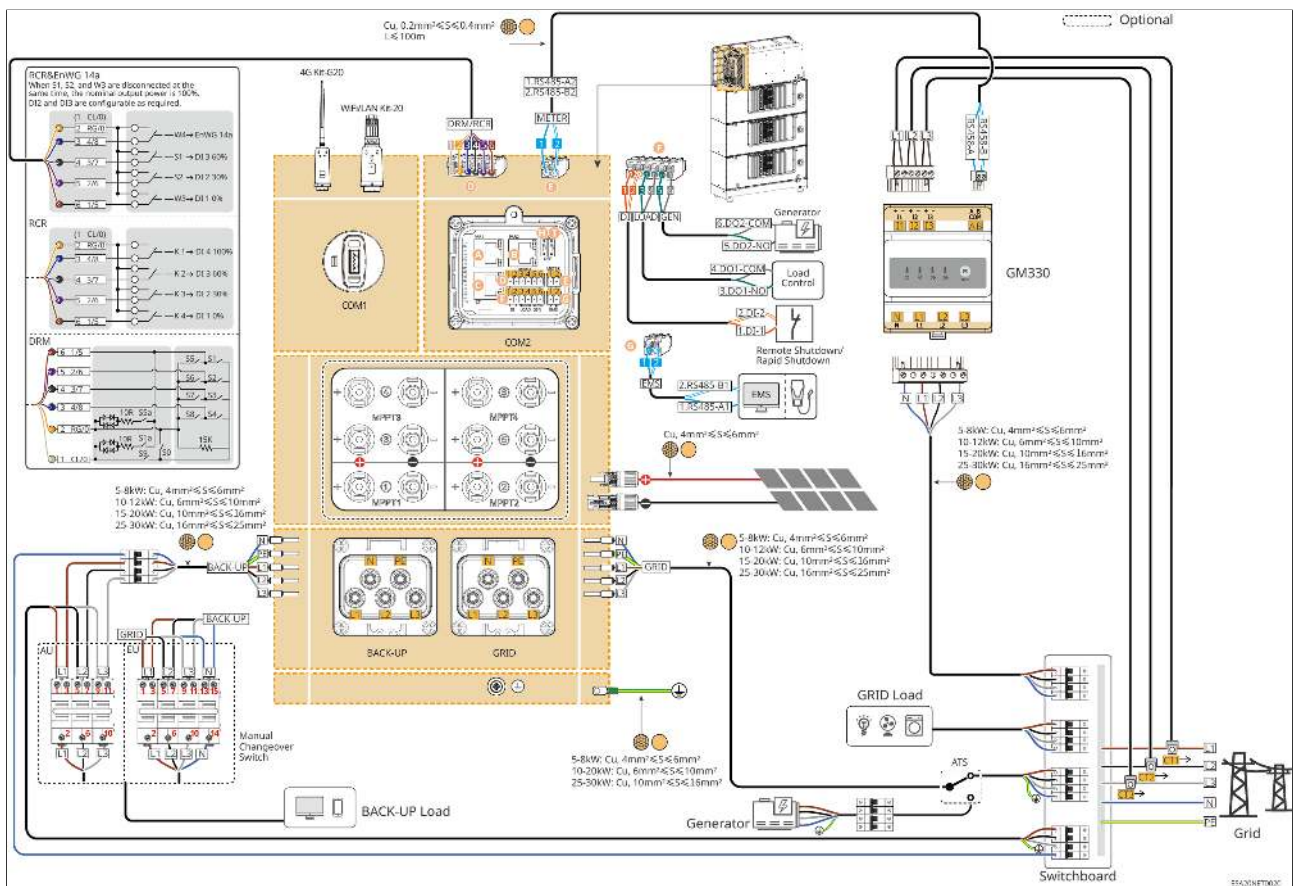


Figure 27 General Scenario 3: Network Diagram with GM330 Meter

Configure GMK330 meter networking

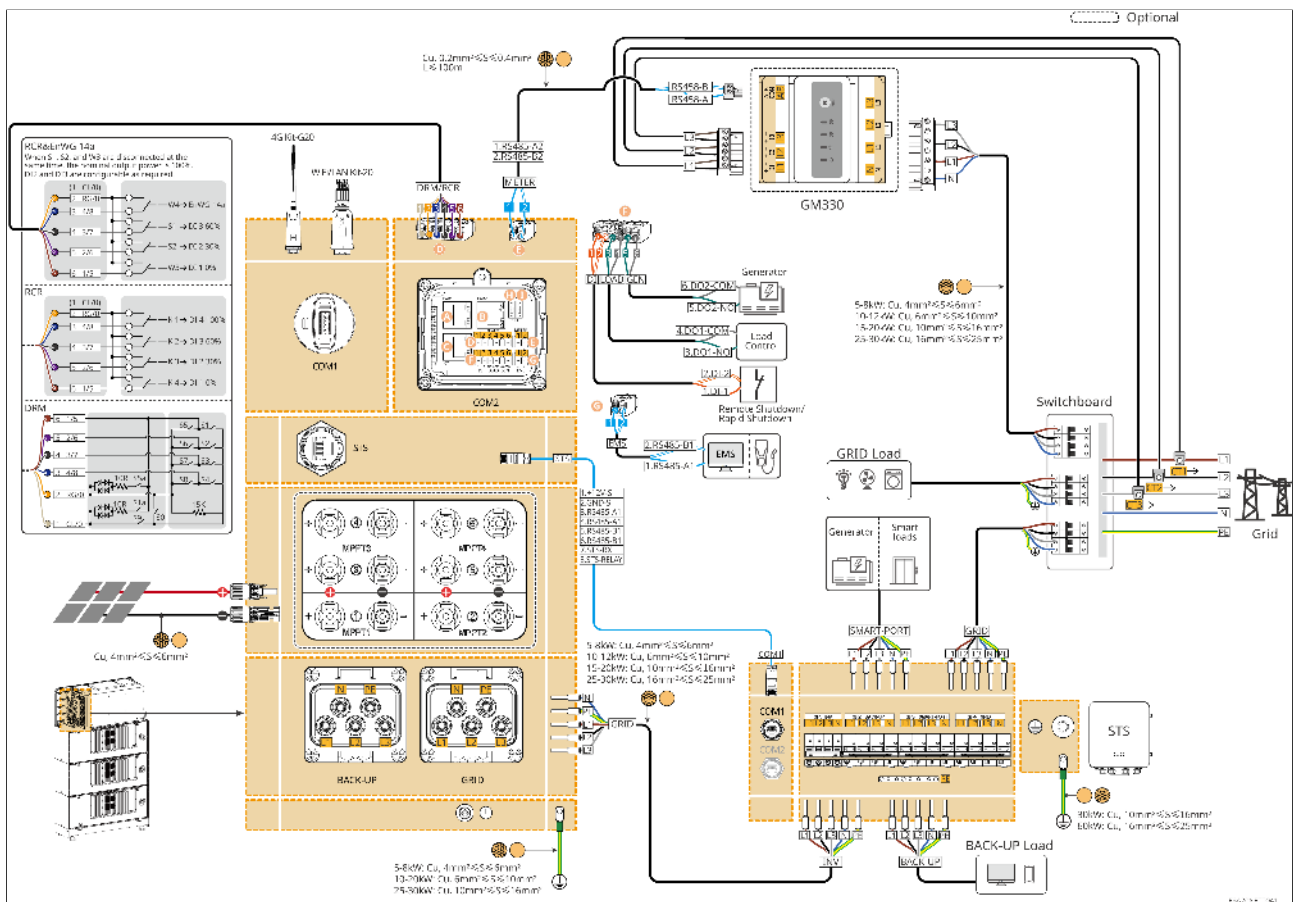


Figure30 General Scenario 6: Networking Diagram of Inverter with STS Partial Backup Power Supply

Inverter Parallel System Wiring Detail Diagram

The following diagram focuses on the wiring for parallel operation. For wiring requirements of other ports, please refer to the single-unit system.

Parallel inverter with built-in meter networking

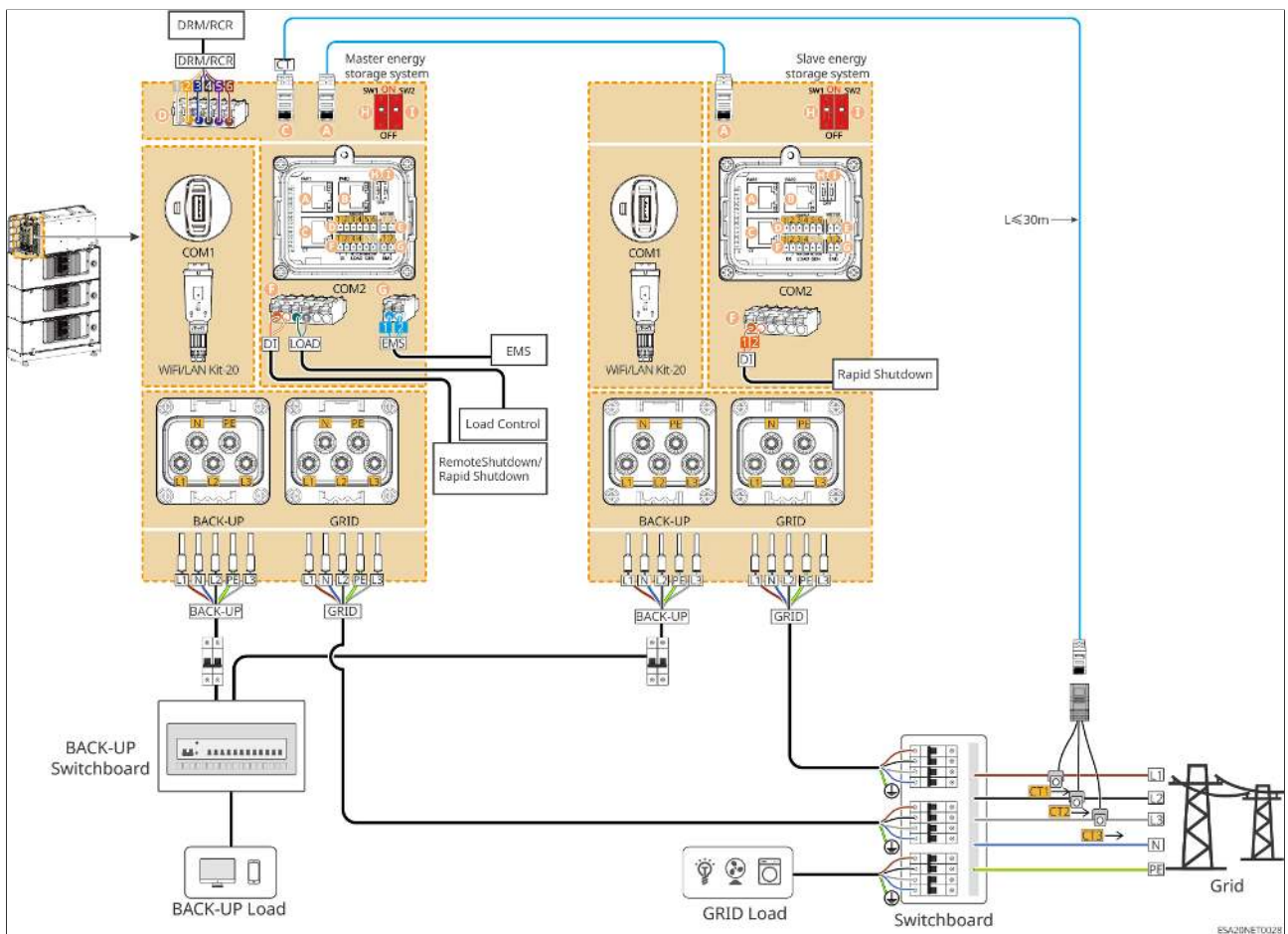


Figure31 General Scenario 7: Inverter Parallel Operation with Built-in Meter Wiring Diagram

Parallel inverters with GMK330 networking

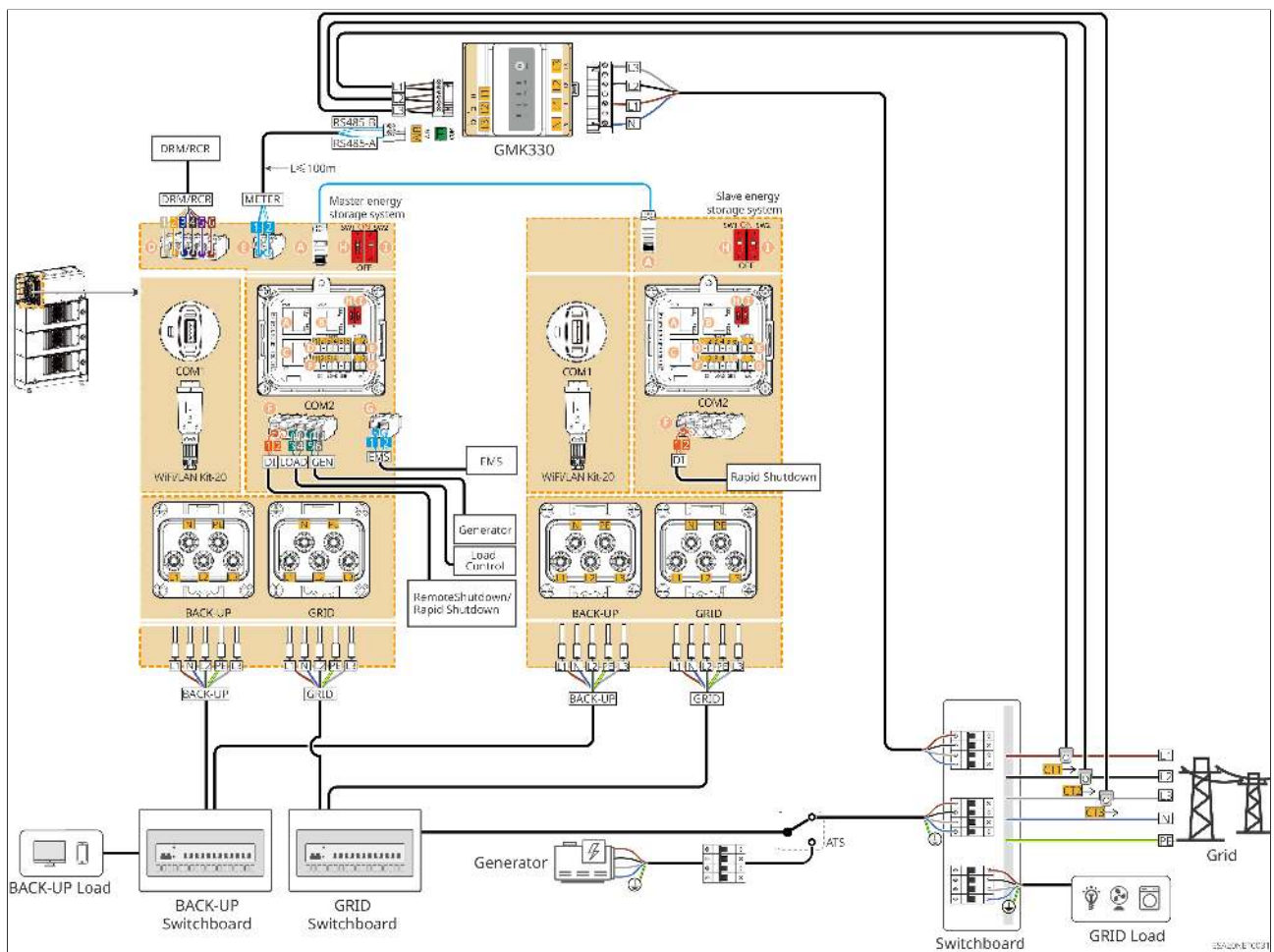


Figure32 General Scenario 8: Inverter Parallel Operation with GMK330 Networking Diagram

Inverter parallel connection with GM330 networking

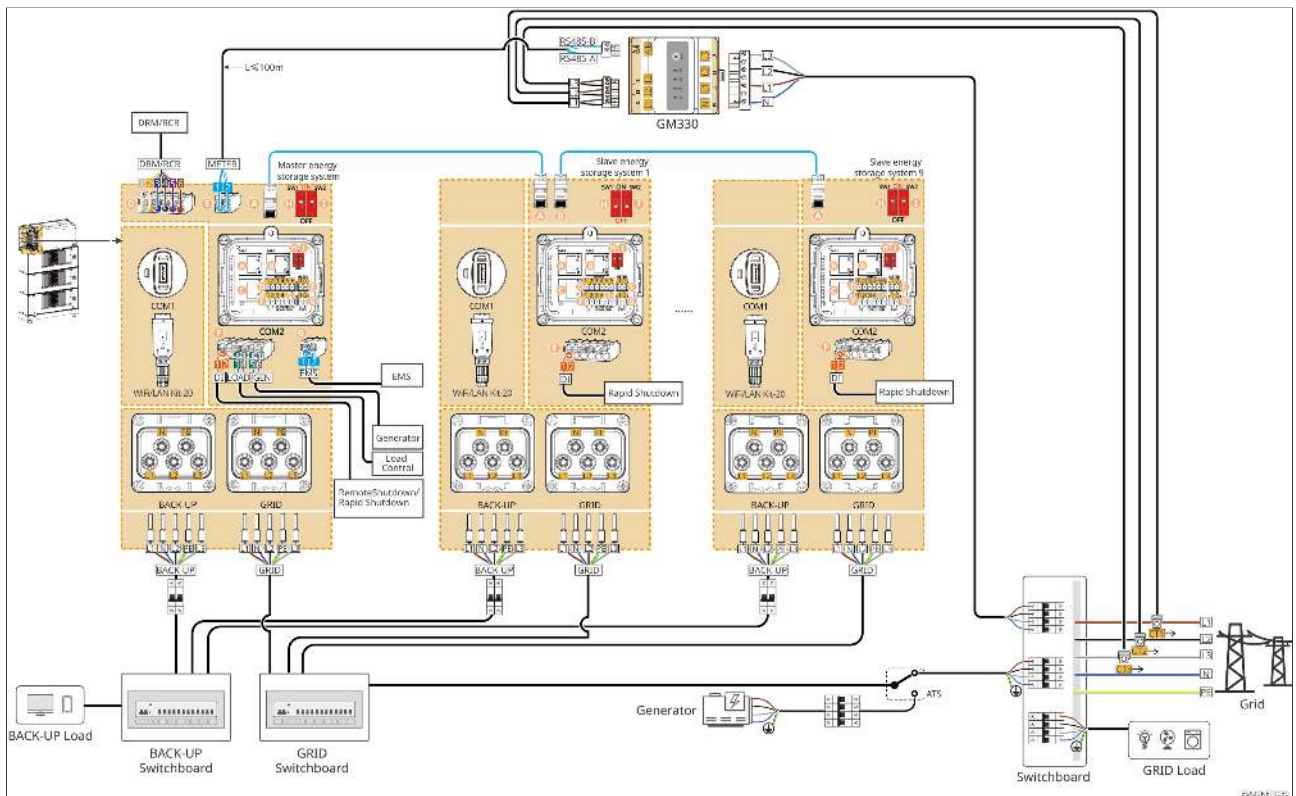


Figure33 General Scenario 9: Inverter Parallel Configuration with GM330 Network Diagram

5.3.2 Microgrid Scenario

Detailed Wiring Diagram of Inverter Standalone System

- Microgrid Scenario does not support connecting generators, and does not support Parallel Networking.
- Manual transfer switch is optional. Please decide whether to install it based on the actual application scenario.
- In Microgrid Scenario, if the grid-connected inverter requires output power limitation, please separately connect a meter or CT or other equipment.

Built-in meter + GM330 meter networking

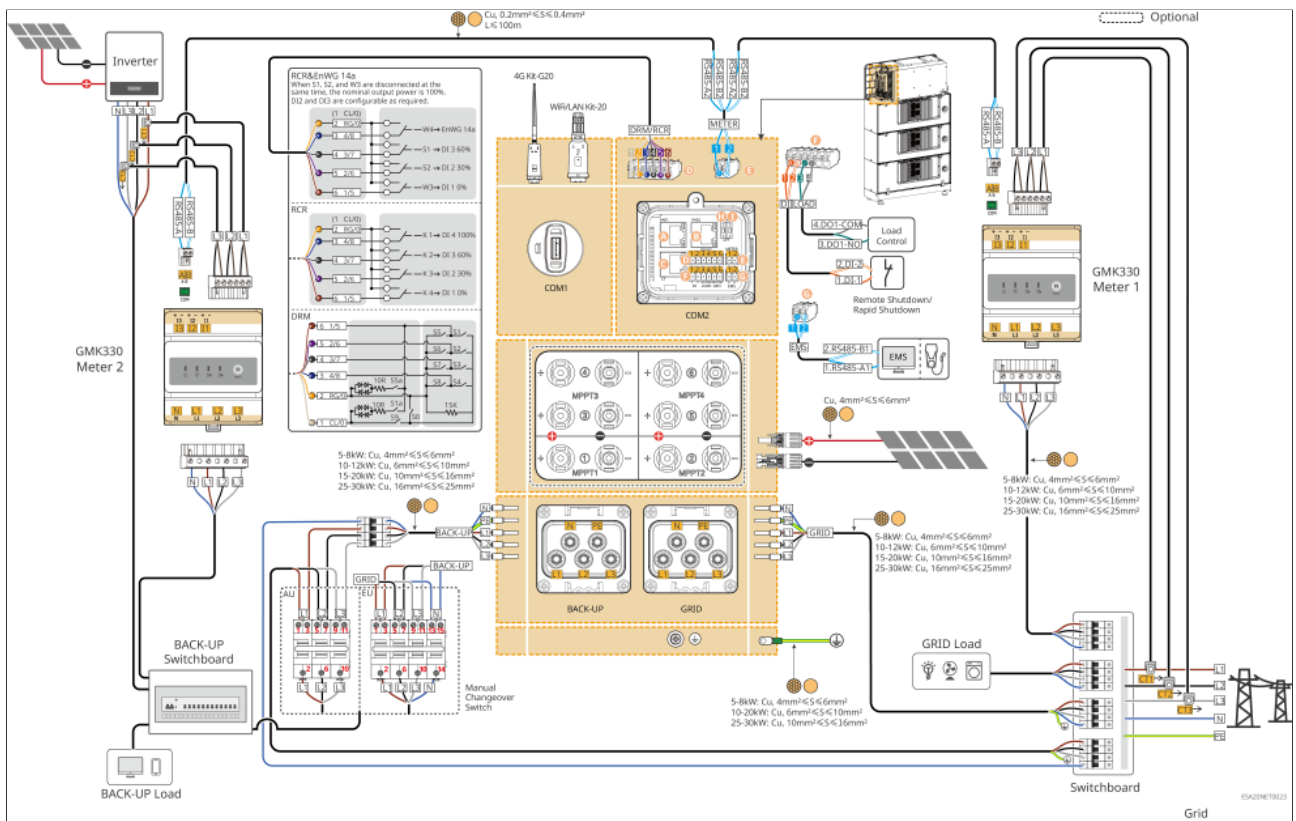


Figure35 Microgrid Scenario 2: GMK330+GMK330 Meter Networking Diagram

Microgrid Scenario, inverter configured with static transfer switch cabinet (STS) to form a network.

Microgrid Scenario: In the partial backup power configuration diagram with STS, the meter uses GM330 as an example. For wiring instructions of other meter models, please refer to the general scenario wiring instructions.

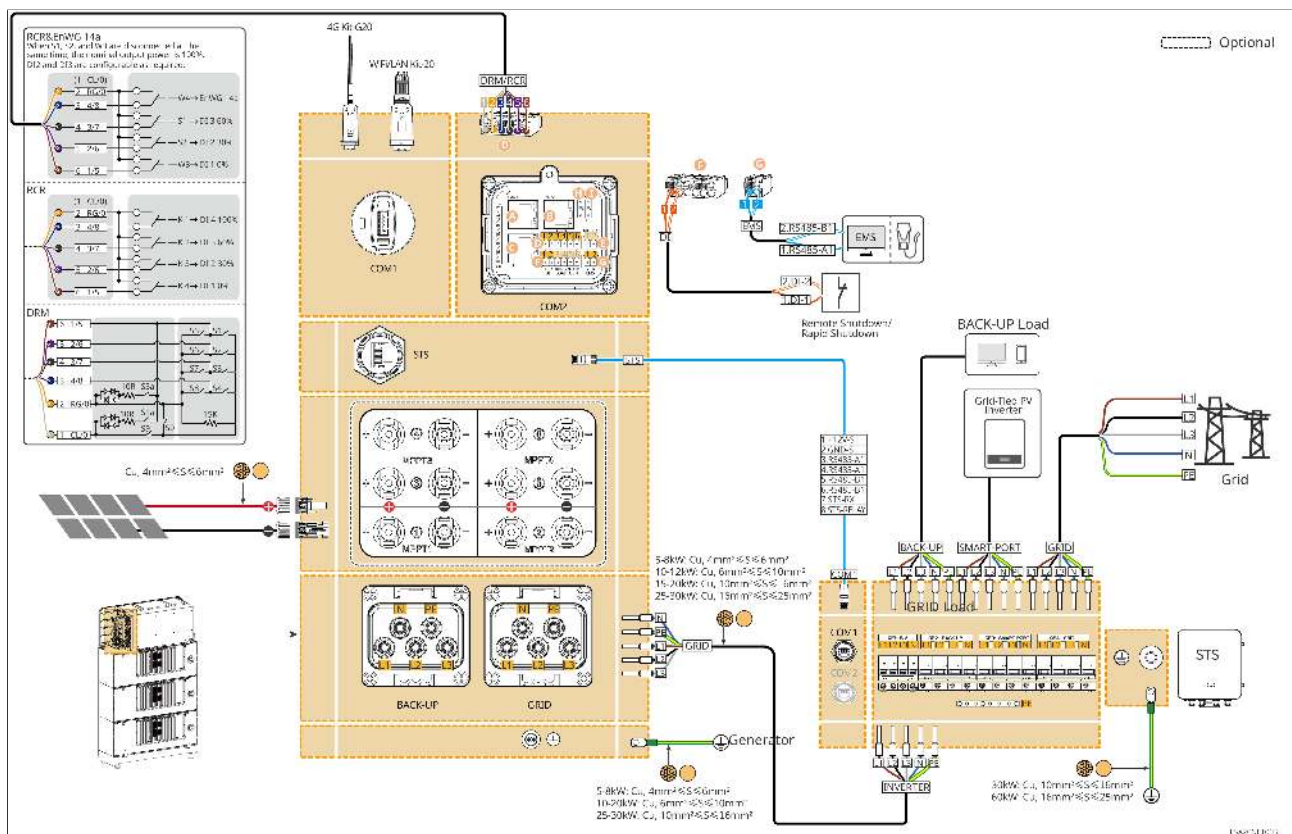


Figure36 Microgrid Scenario 4: Inverter with STS Whole-House Backup Power Networking Diagram

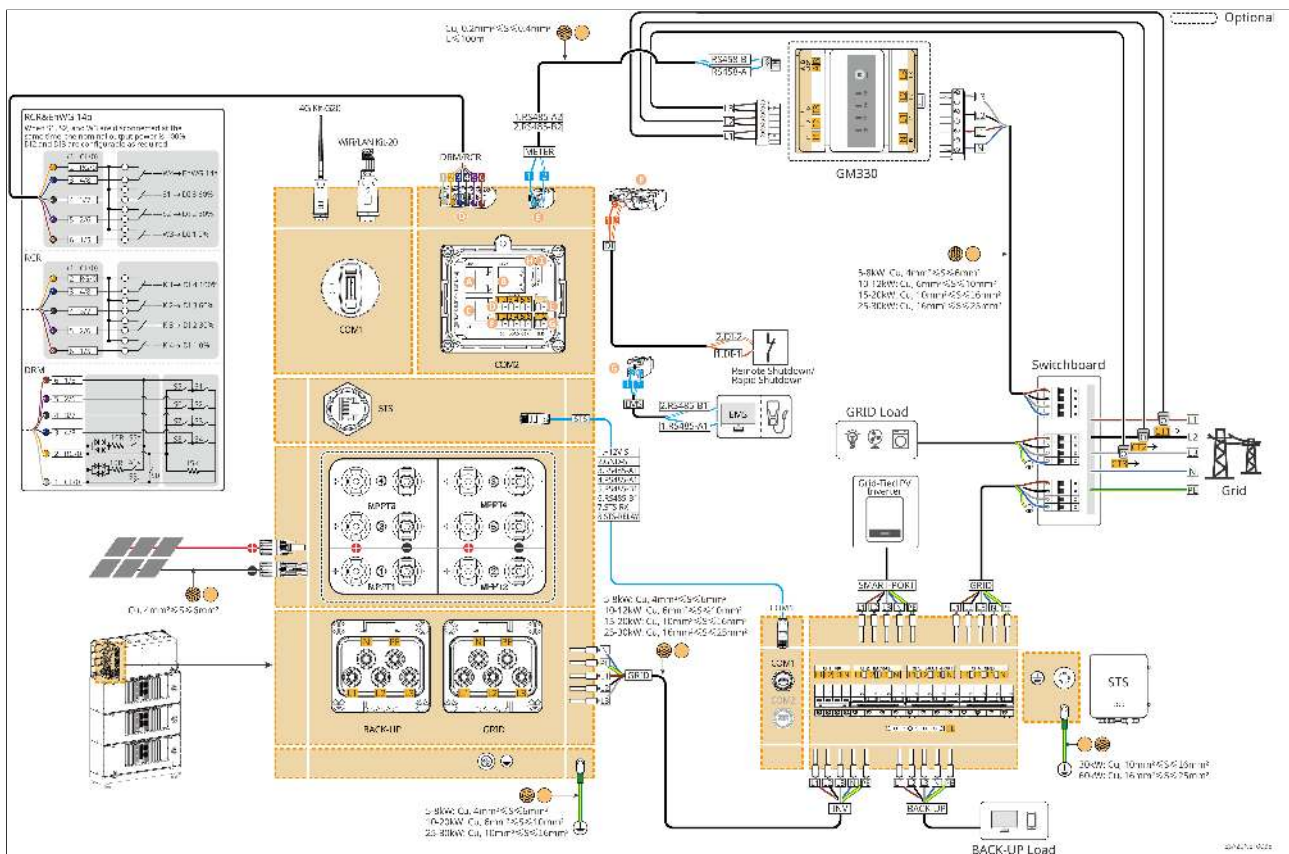


Figure 37 Microgrid Scenario 5: Inverter with STS Partial Backup Power Networking Diagram

5.3.3 coupling scenario

Inverter Single-Unit System Wiring Diagram

- Manual transfer switch is optional. Please decide whether to install it based on the actual application scenario.
- In coupling scenarios, if the grid-connected inverter requires output power limitation, separately connect devices such as an electric meter or CT.

Built-in meter + GMK330 meter networking

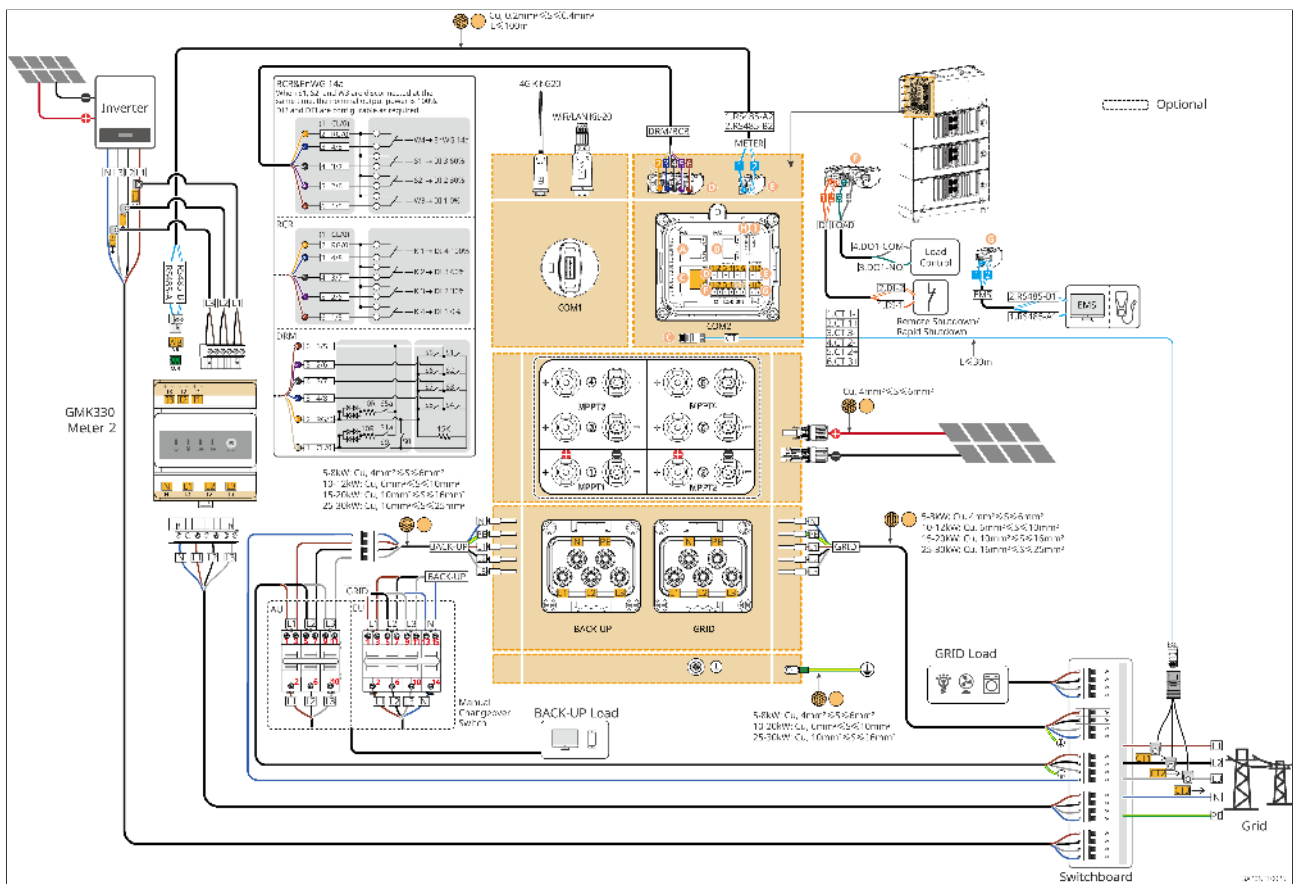


Figure38 Coupling Scenario 1: Network Diagram of Built-in Meter + GMK330 Meter

GM330+GM330 Meter Networking

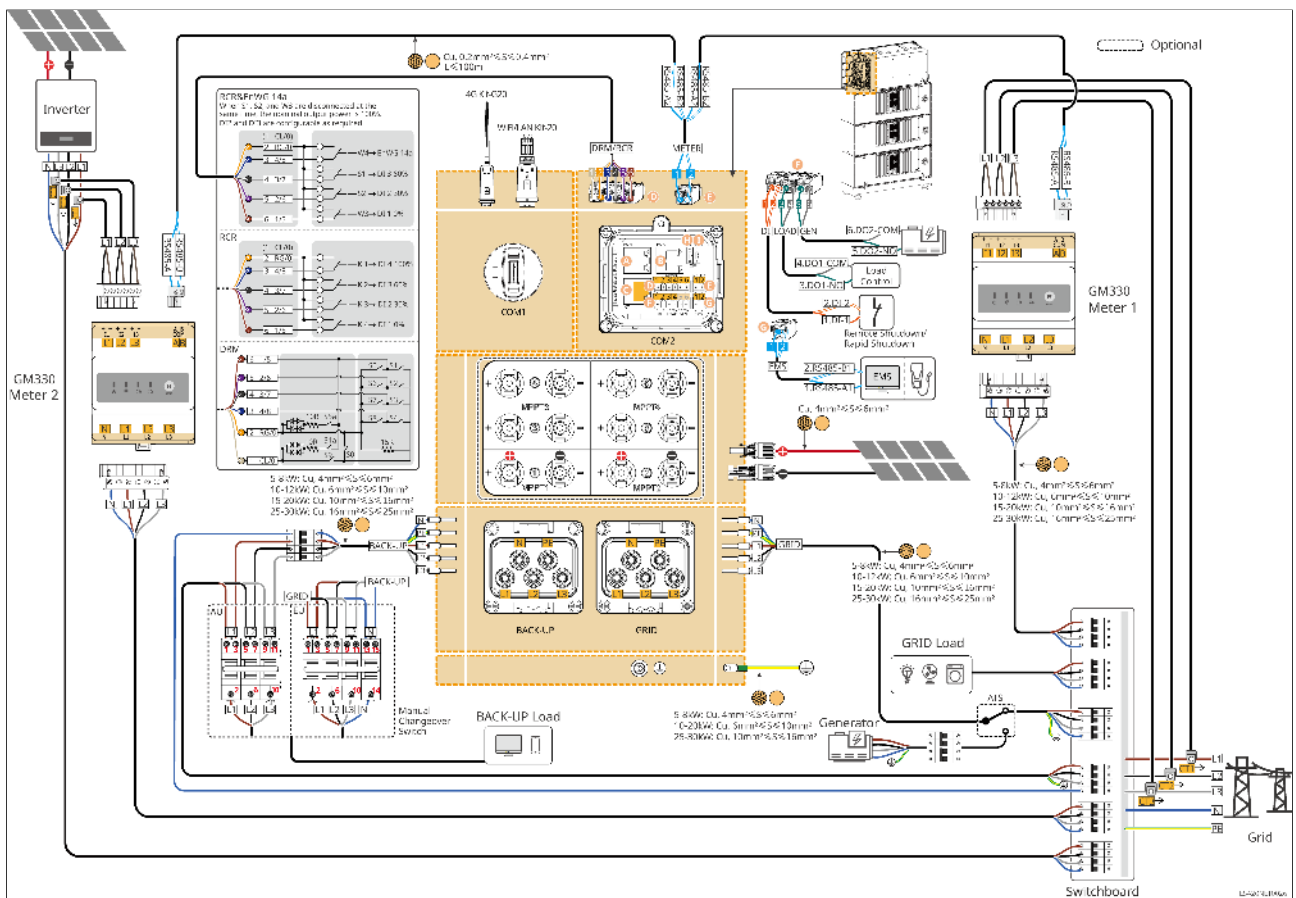


Figure39 Coupling Scenario 2: GM330+GM330 Meter Networking Diagram

Coupling scenario, inverter with static transfer switch (STS) network diagram

In the coupling scenario with STS partial backup power networking diagram, the meter is illustrated using GM330+GM330 as an example. For wiring methods of other meter models, refer to the general scenario wiring instructions.

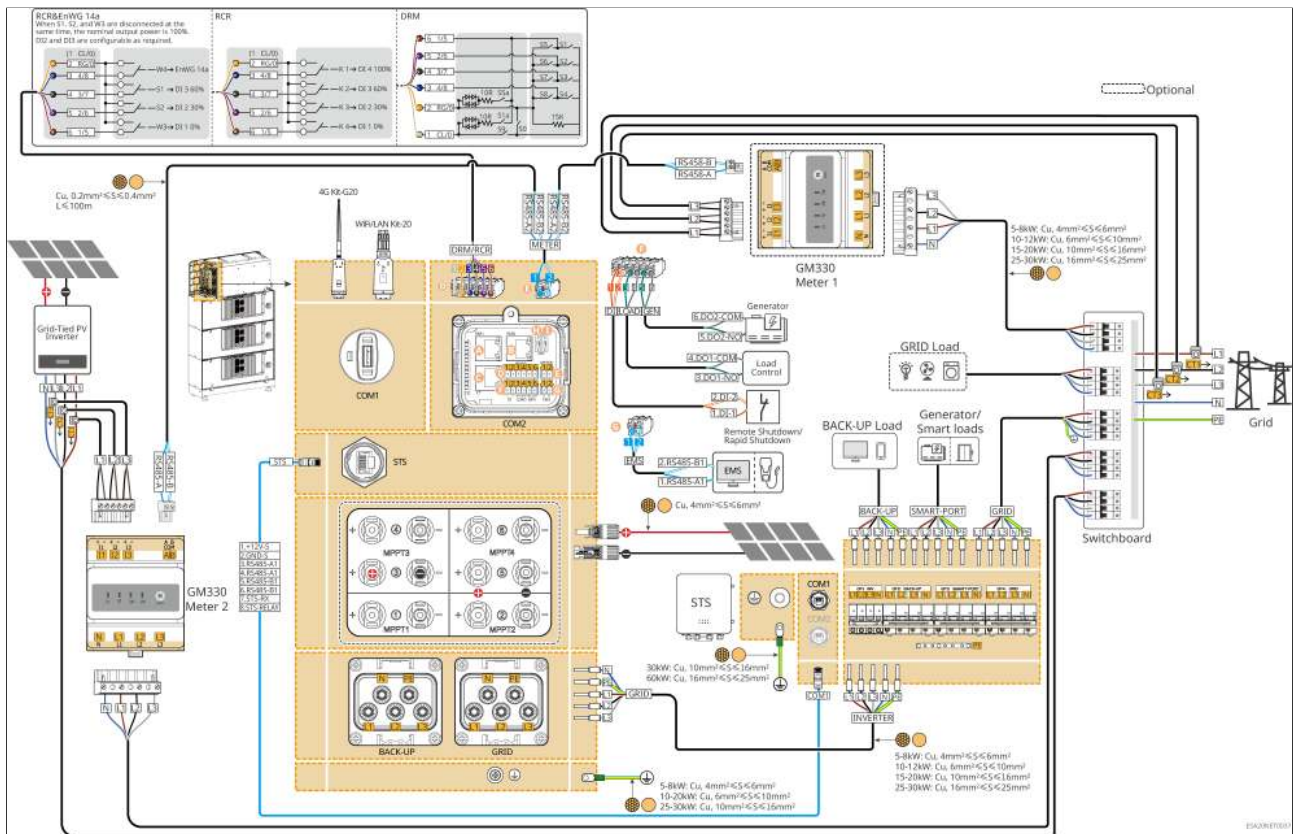


Figure 40 Coupling Scenario 3: Inverter with STS Partial Backup Power Grid Connection Diagram

Inverter Parallel System Wiring Detailed Diagram

Coupled scenario, take the GM330 as an example for parallel meter wiring. For wiring of other meter models, refer to the parallel meter wiring instructions in the general scenario.

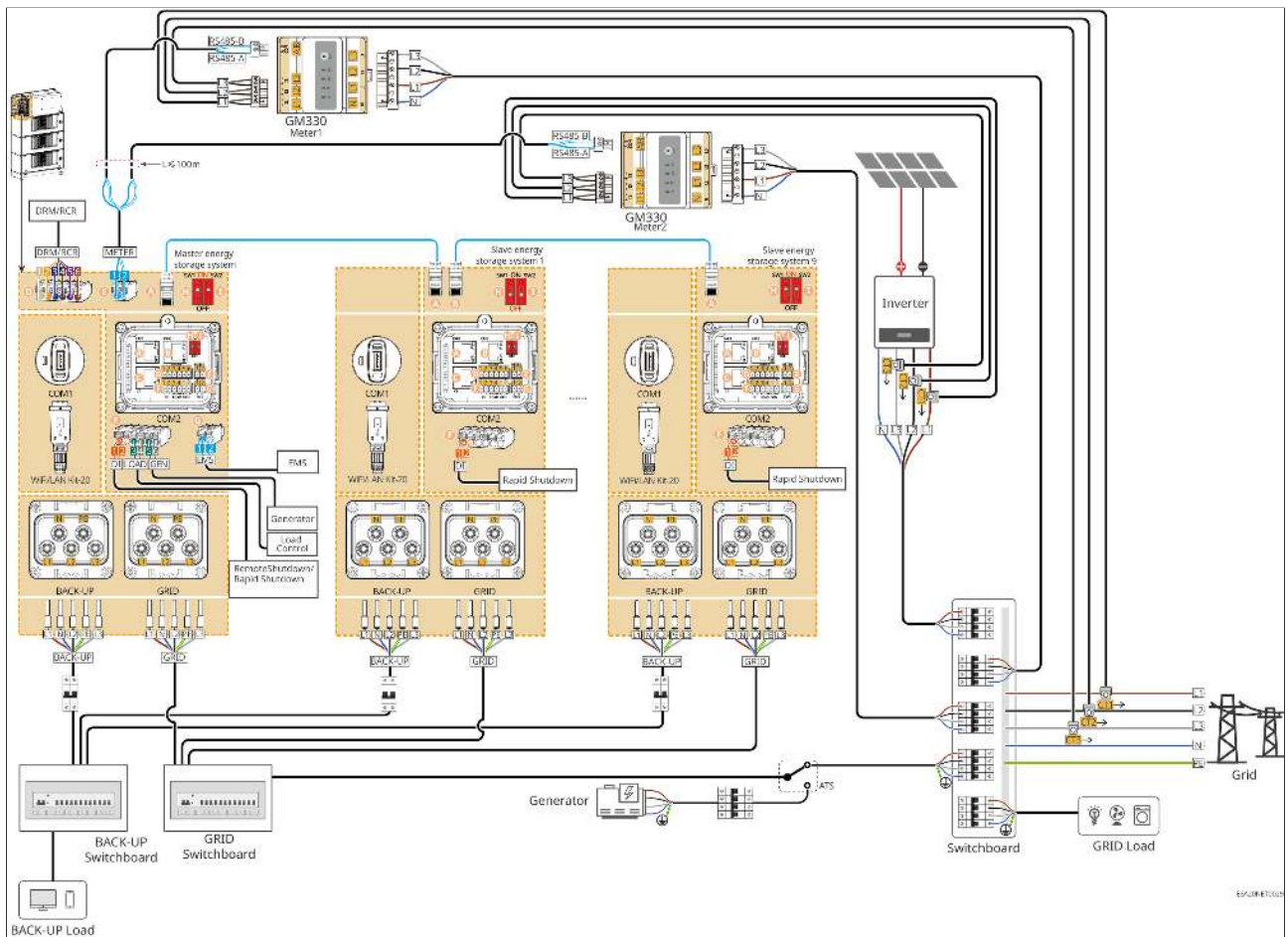


Figure41 Coupling Scenario 4: Diagram of Parallel Networking with GM330

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

5.4.1 Switch ready

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Notes
1	GridCircuit Breaker BACK-UP circuit breaker	Some backup power scenarios are recommended as follows: • Nominal Voltage$\geq$230Vac • Rated Current requirements are as follows: ◦ GW5K-ETA-G20: 20A ◦ GW6K-ETA-G20: 20A	self-owned	

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Notes
		◦ GW8K-ETA-G20: 20A ◦ GW9.999K-ETA-G20: 32A ◦ GW10K-ETA-G20: 32A ◦ GW12K-ETA-G20: 40A ◦ GW15K-ETA-G20: 50A ◦ GW20K-ETA-G20: 50A ◦ GW25K-ETA-G20: 63A ◦ GW29.999K-ETA-G20: 80A ◦ GW30K-ETA-G20: 80A ◦ GW5K-BTA-G20: 20A ◦ GW6K-BTA-G20: 20A ◦ GW8K-BTA-G20: 20A ◦ GW9.999K-BTA-G20: 32A ◦ GW10K-BTA-G20: 32A ◦ GW12K-BTA-G20: 40A ◦ GW15K-BTA-G20: 50A ◦ GW20K-BTA-G20: 50A ◦ GW25K-BTA-G20: 63A ◦ GW29.999K-BTA-G20: 80A ◦ GW30K-BTA-G20: 80A Recommended whole-house backup power scenarios are as follows: • Nominal Voltage$\geq$230Vac • Rated Current		In actual selection, a circuit breaker that complies with local installation regulations can also be chosen based on the actual working current.

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Notes
		requirements are as follows: ◦ GW5K-ETA-G20: 63A ◦ GW6K-ETA-G20: 63A ◦ GW8K-ETA-G20: 63A ◦ GW9.999K-ETA-G20: 80A ◦ GW10K-ETA-G20: 80A ◦ GW12K-ETA-G20: 80A ◦ GW15K-ETA-G20: 100A ◦ GW20K-ETA-G20: 100A ◦ GW25K-ETA-G20: 125A ◦ GW29.999K-ETA-G20: 125A ◦ GW30K-ETA-G20: 125A ◦ GW5K-BTA-G20: 63A ◦ GW6K-BTA-G20: 63A ◦ GW8K-BTA-G20: 63A ◦ GW9.999K-BTA-G20: 80A ◦ GW10K-BTA-G20: 80A ◦ GW12K-BTA-G20: 80A ◦ GW15K-BTA-G20: 100A ◦ GW20K-BTA-G20: 100A ◦ GW25K-BTA-G20: 125A ◦ GW29.999K-BTA-G20: 125A ◦ GW30K-BTA-G20: 125A Note: If the inverter BACK-UP port is not used, the GRID		

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Notes
		circuit breaker can be selected according to the maximum on-grid current.		
2	ATS switch	For the same model, the ATS switch and the GRID circuit breaker have the same specifications.	self-owned	
3	Residual Current Protection Device (RCD)	RCD equipment installation and RCD specification selection: It is recommended to connect a Type A RCD with a residual current tripping level $\geq 300\text{mA}$ at the AC output of the inverter. (For inverter capacity $< 30\text{kVA}$, select residual current tripping level as 300mA ; for inverter capacity $\geq 30\text{kVA}$, select residual current tripping level as 10mA/kVA .)	self-owned	In actual selection, appropriate RCD specifications can also be chosen according to local regulatory requirements.

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Notes
4	Optional manual transfer switch	Nominal Voltage$\geq$230Vac 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-owned - Shipped with inverter (Australia only)	- Use for single-unit scenario only - During actual selection, an appropriate manual transfer switch can also be chosen according to local regulations.

5.4.2 Preparing Cables

No.	Cable	Recommended Specification	Supply Method
1	PE cable	Inverter Protective Grounding: • 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 STS Protective Grounding: • Conductor cross-sectional area: ◦ GW30K-STG-G10: 10-16mm² ◦ GW60K-STG-G10: 16-25mm² • Cable outer diameter: ◦ GW30K-STG-G10: 18-25mm ◦ GW60K-STG-G10: 24-32mm	Customer-supplied
2	PV DC Cable	• Industry-standard outdoor PV cable • Conductor cross-sectional area: 4mm²-6mm² • Cable outer diameter: 5.9mm-8.8mm	Customer-supplied

No.	Cable	Recommended Specification	Supply 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, GW15K-ETA-G20, GW20K-ETA-G20, GW15K-BTA-G20, GW20K-BTA-G20: 10-26mm ◦ GW25K-ETA-G20, GW29.999K-ETA-G20, GW30K-ETA-G20, GW25K-BTA-G20, GW29.999K-BTA-G20, GW30K-BTA-G20: 18-30mm	Customer-supplied

No.	Cable	Recommended Specification	Supply Method
4	STS Power Cable	- Multi-core outdoor copper cable - SMART-PORT AC cable, BACK-UP AC cable, GRID AC cable - Conductor cross-sectional area: - GW30K-STG-G10: 14-25mm² - GW60K-STG-G10: 16-25mm² - Cable outer diameter: 10-32mm	Customer-supplied
5	Smart Meter Power Cable	- Outdoor copper cable - Conductor cross-sectional area: 1mm²	Customer-supplied
6	Meter RS485 Communication cable	- Shielded twisted pair - Conductor cross-sectional area: 0.2mm²-0.4mm²	Customer-supplied
7	EMS or EV Charger RS485 Communication cable		
8	Remote Shutdown	- Shielded cable meeting local standards - Conductor cross-sectional area: 0.2mm²-0.4mm² - Cable outer diameter: 5mm-8mm	Customer-supplied
9	Load Control and Generator Control DO Communication cable		
10	RCR/DRED/14a Signal Cable		

No.	Cable	Recommended Specification	Supply Method
11	CT Communication cable	Standard straight-through Ethernet cable: • RJ45 shielded connector • CAT 5E or higher-grade straight-through shielded Ethernet cable • Connector specification must match the cable specification	Customer-supplied
12	Inverter Parallel Communication Cable	Standard straight-through Ethernet cable: • RJ45 shielded connector • CAT 5E or higher-grade straight-through shielded Ethernet cable ◦ Recommended length for CAT 5E or CAT 6E not exceeding 5 meters ◦ Recommended length for CAT 7E not exceeding 10 meters • Connector specification must match the cable specification	Customer-supplied
13	STS Communication cable	Standard straight-through Ethernet cable: • RJ45 shielded connector • CAT 5E or higher-grade straight-through shielded Ethernet cable • Connector specification must match the cable specification	Connect to inverter STS communication port: Shipped with the unit

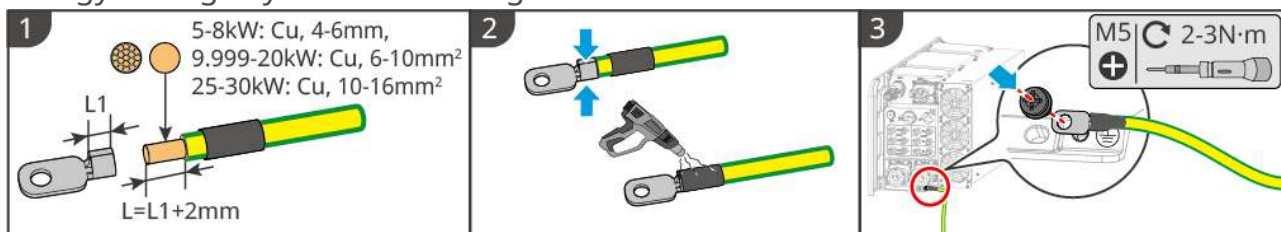
No.	Cable	Recommended Specification	Supply Method
Note: The cable specifications recommended in the table are for reference only. During actual cable selection, factors such as installation ambient temperature, laying method, number of parallel runs, voltage deviation, and thermal stability must be comprehensively considered, and the ampacity should be corrected using corresponding correction factors. The selected cable must meet the following requirement: Cable ampacity $\geq$ Rated current of the overcurrent protection device $\geq$ Maximum rated current.			

5.5 Connect the Protection earth wire

Warning

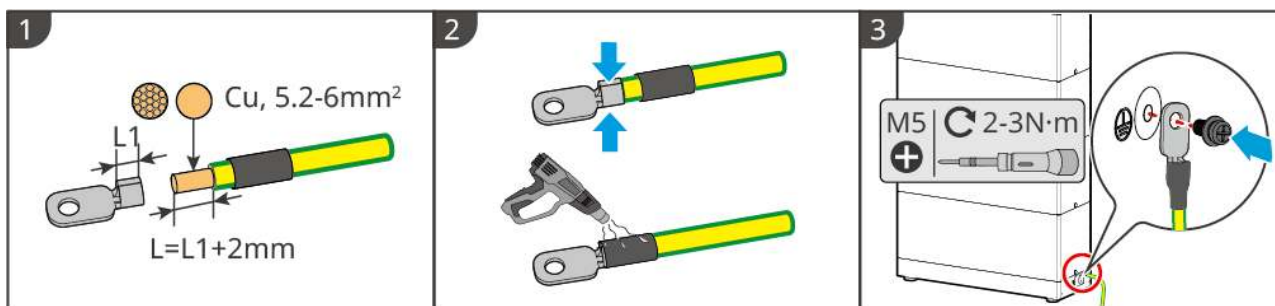
- The Protection Earthing of the chassis enclosure cannot replace the Protection Earth Wire of the AC output port. When wiring, ensure that both Protection Earth Wires are reliably connected.
- To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint on the outside of the grounding terminal for protection after the installation of the Protection earth wire connection is completed.
- When installing equipment, the Protection ground wire must be installed first; when removing equipment, the Protection ground wire must be removed last.
- Battery grounding is integrated into the blind-mate connector connected to the inverter, and the system is uniformly grounded through the inverter, so no separate grounding operation for the battery is required during installation. If there is a need for split expansion, please ground the expanded Battery BANK separately.

Energy Storage System Grounding:



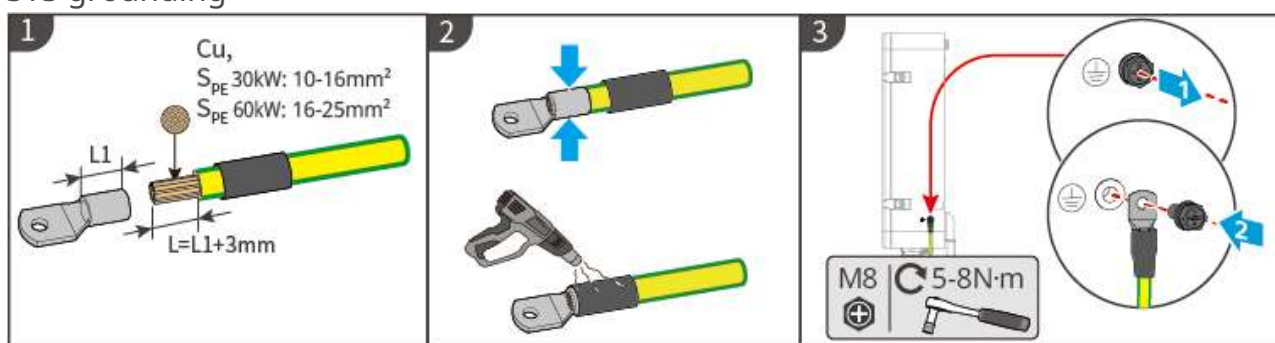
ESA20ELC0031

Expanded Battery BANK Grounding:



BAT20ELC0003

STS grounding



STS10ELC0029

5.6 Connecting the PV Cable

⚠ DANGER

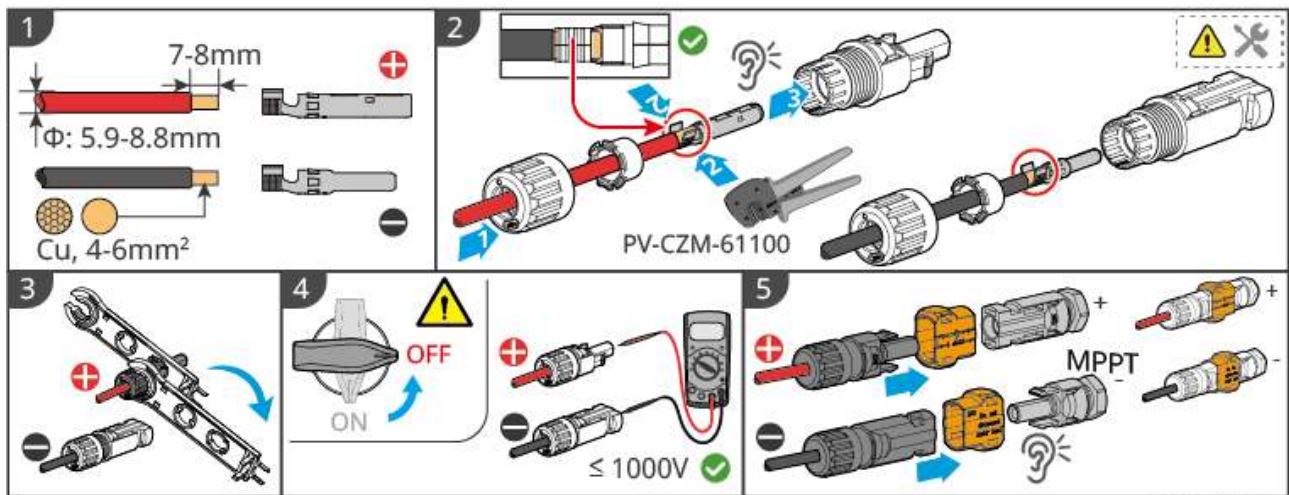
- Do not connect the same PV string to multiple inverters, as this may cause inverter damage.
- Before connecting the PV string to the inverter, confirm the following information. Failure to do so may cause permanent damage to the inverter, and in severe cases, may lead to fire, resulting in personal 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 pole of the PV string is connected to the inverter's PV+ terminal, and the negative pole is connected to the inverter's PV- terminal.

⚠ 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.

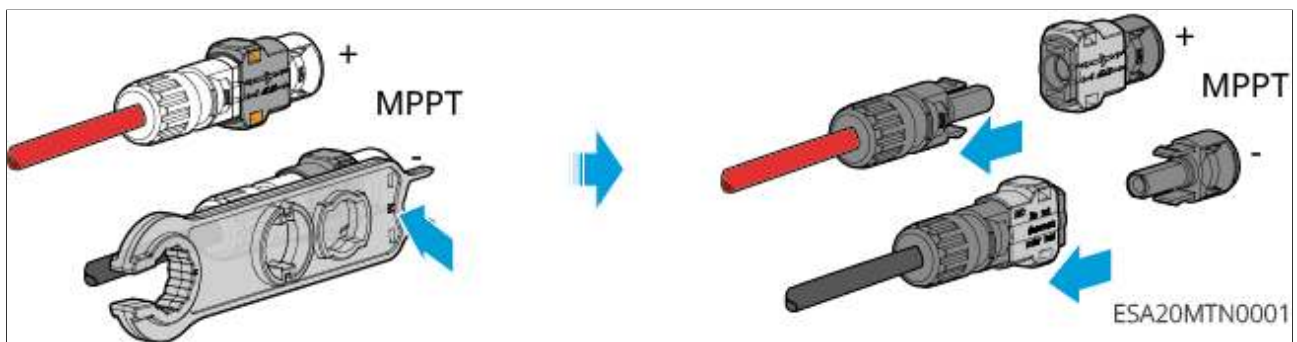
NOTICE

- 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 applies 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:



5.7 Expansion line connection for Battery

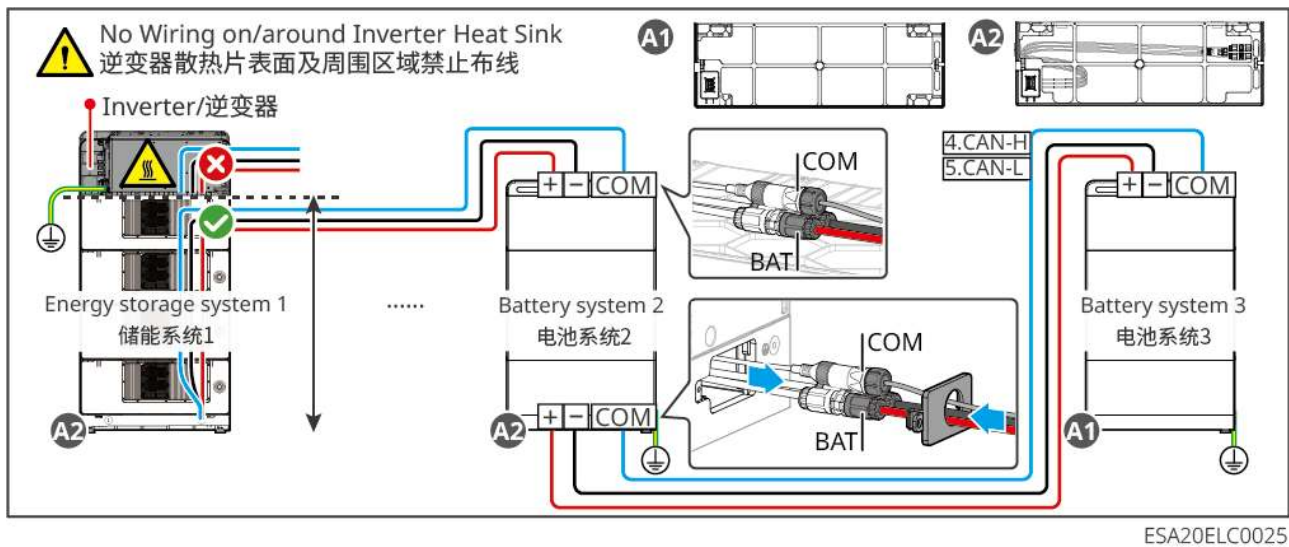


- Do not connect any load between Inverter and Battery.
- When Connecting the Battery Cable, use insulated tools to prevent accidental electric shock or Battery Short Circuit.
- Please ensure that Battery open-circuit voltage is within the allowable range of Inverter.
- Between Battery and Battery, please configure DC Switch according to local laws and regulations.
- Inverter heat sink surface and surrounding areas are prohibited from wiring to prevent overheating damage to the wire harness.

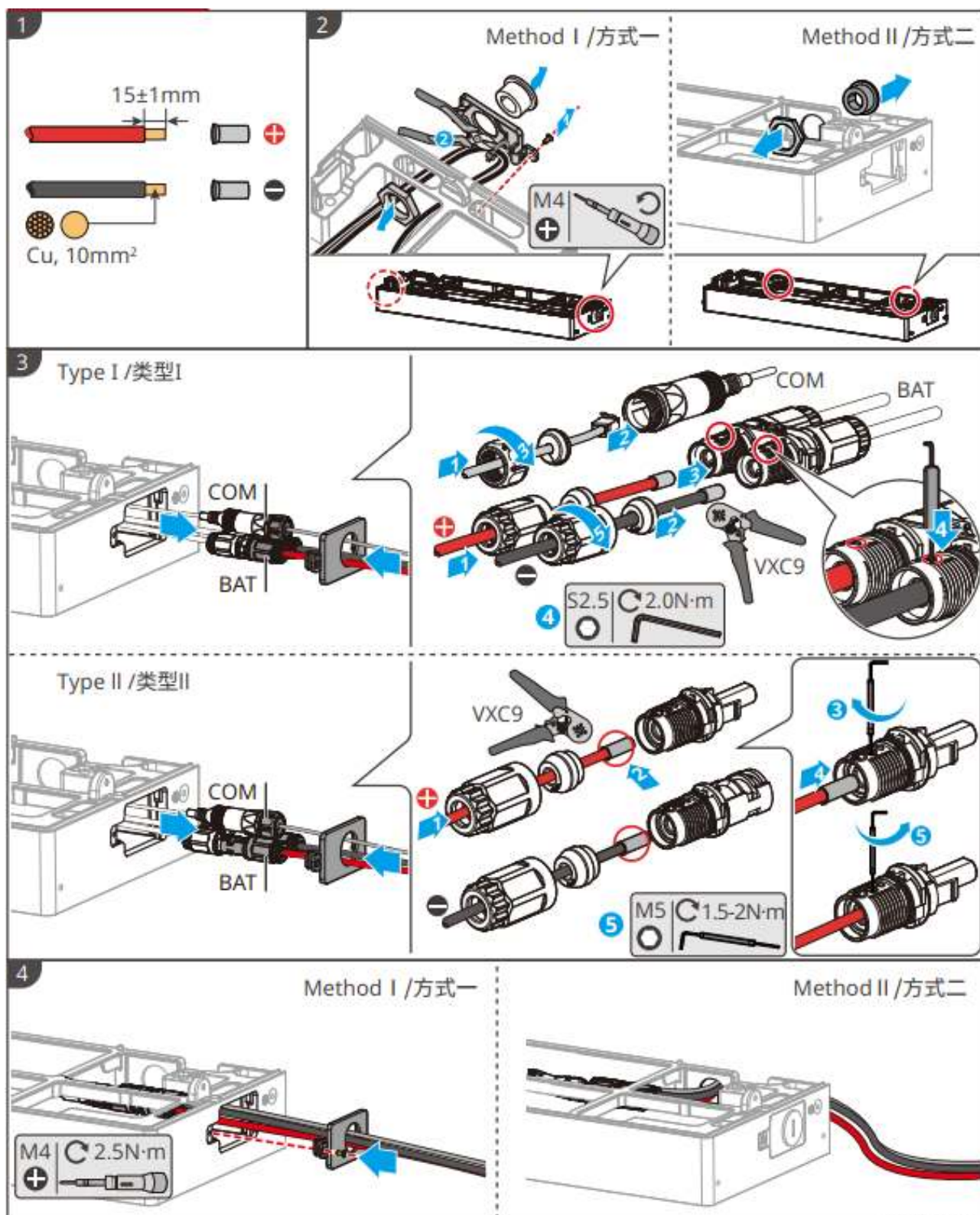
energy storage system Expansion Overview

A1: Base shipped with Inverter

A2: Installation Base with parallel port

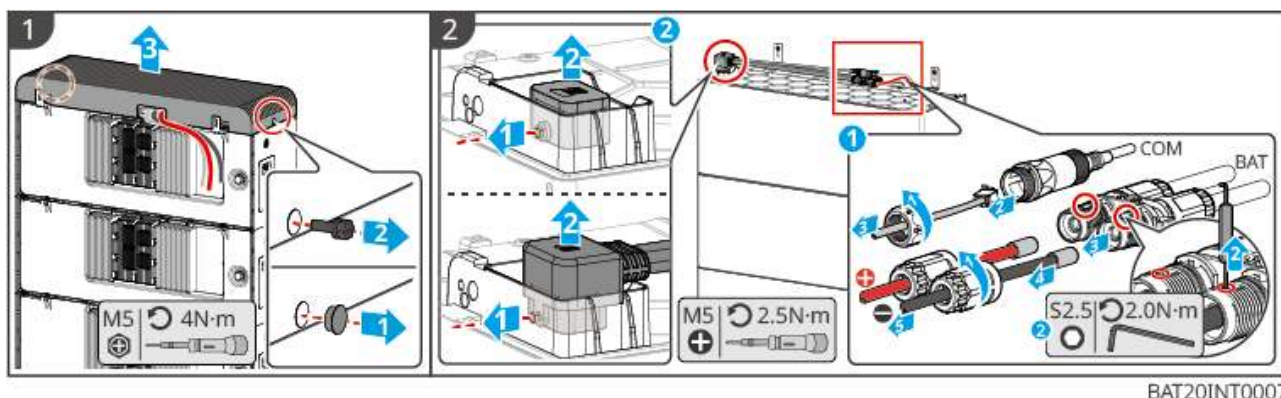


Battery system Expansion Harness Manufacturing Method



BAT20ELC0004

Battery Expansion Harness Disassembly Method



BAT20INT0007

5.8 Connect AC cable

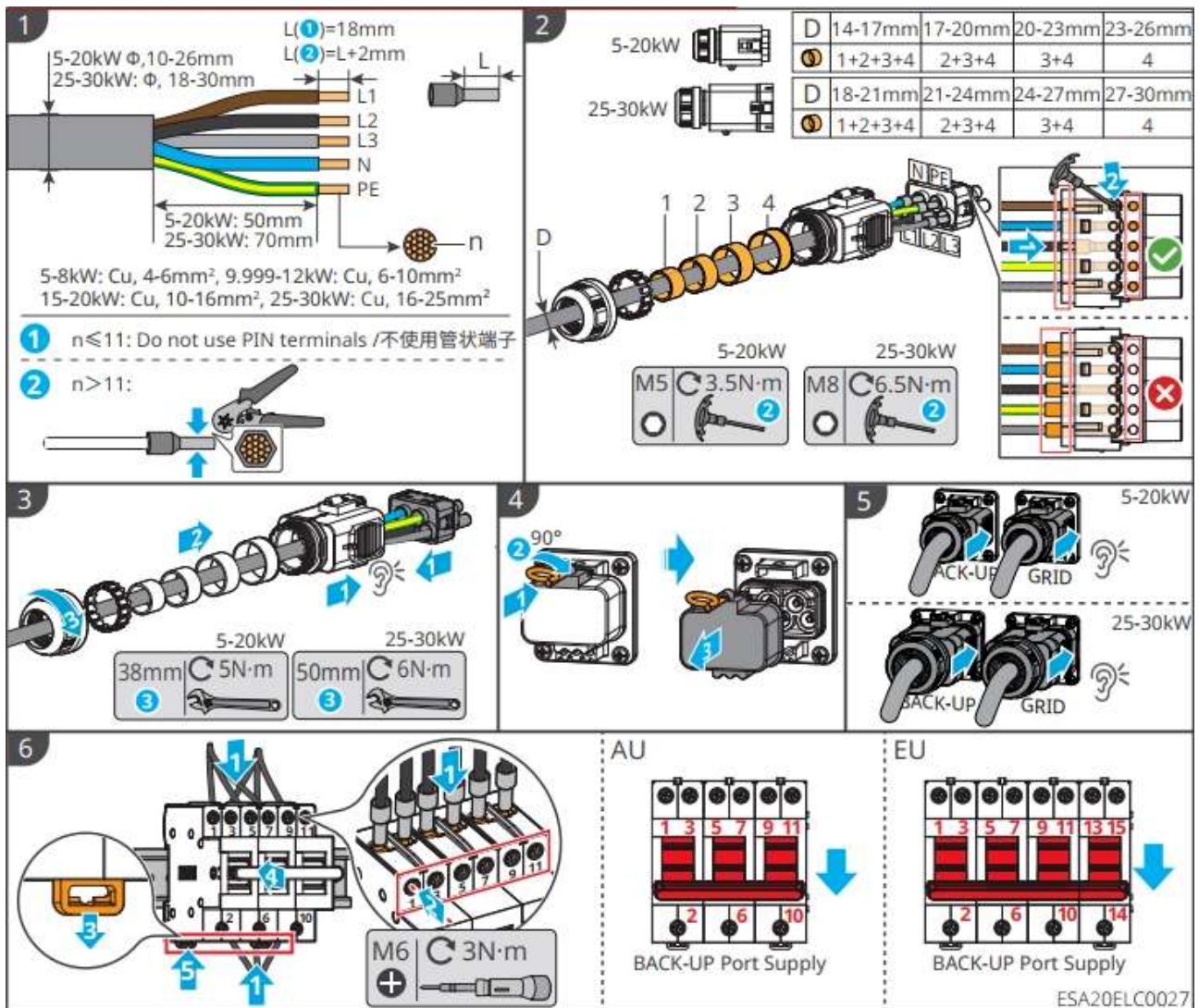
⚠ Warning

- The inverter integrates a Residual Current Monitoring unit (RCMU) to prevent residual current from exceeding the specified value. When the inverter detects a leakage current greater than the allowable value, it will quickly disconnect from the grid.
- During wiring, the AC wires must exactly match the "BACKUP" and "GRID" grounding ports on the AC terminals. Incorrect cable connections may result in equipment damage.
- Ensure the conductor core is fully inserted into the terminal connection hole with out any exposure.
- Please ensure that the insulation plate at the AC terminal is tightly clamped and free from loosening.
- Ensure cable connections are secure; otherwise, the terminals may over heat during equipment operation, causing damage to the equipment.

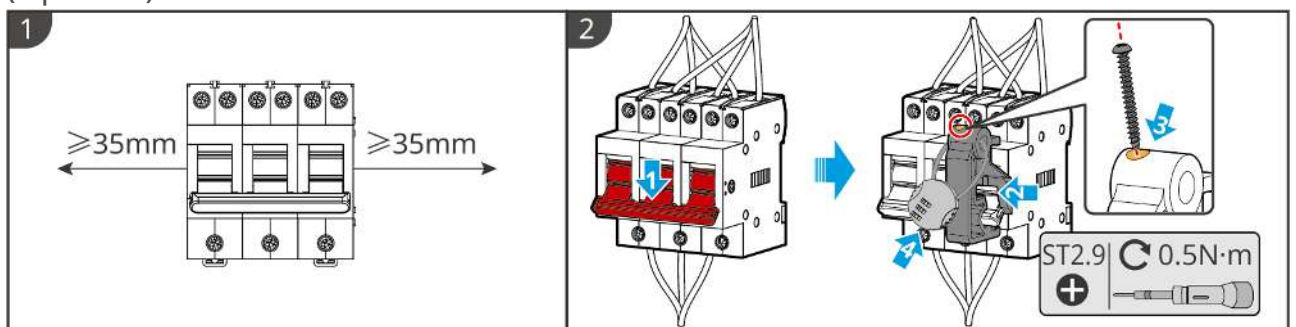
Note

- When crimping AC cables, it is recommended to use a crimping tool with a crimping shape of hexagonal (hexagon) or larger.
- After the system is installed and the wiring is confirmed to be correct, under normal operation, the BACK-UP port of the energy storage inverter should supply power to the critical household loads.
- After completing the AC wiring, switch the manual transfer switch to the "BACK-UP" position to engage. The fixed lock hasp supplied with the cabinet can be installed or not based on the actual situation. If installation is required, to facilitate the installation and removal of the lock accessory, a space of at least 35mm should be reserved on both left and right sides of the switch.
- STS is an optional accessory. If required, please refer to the wiring method below for connection.

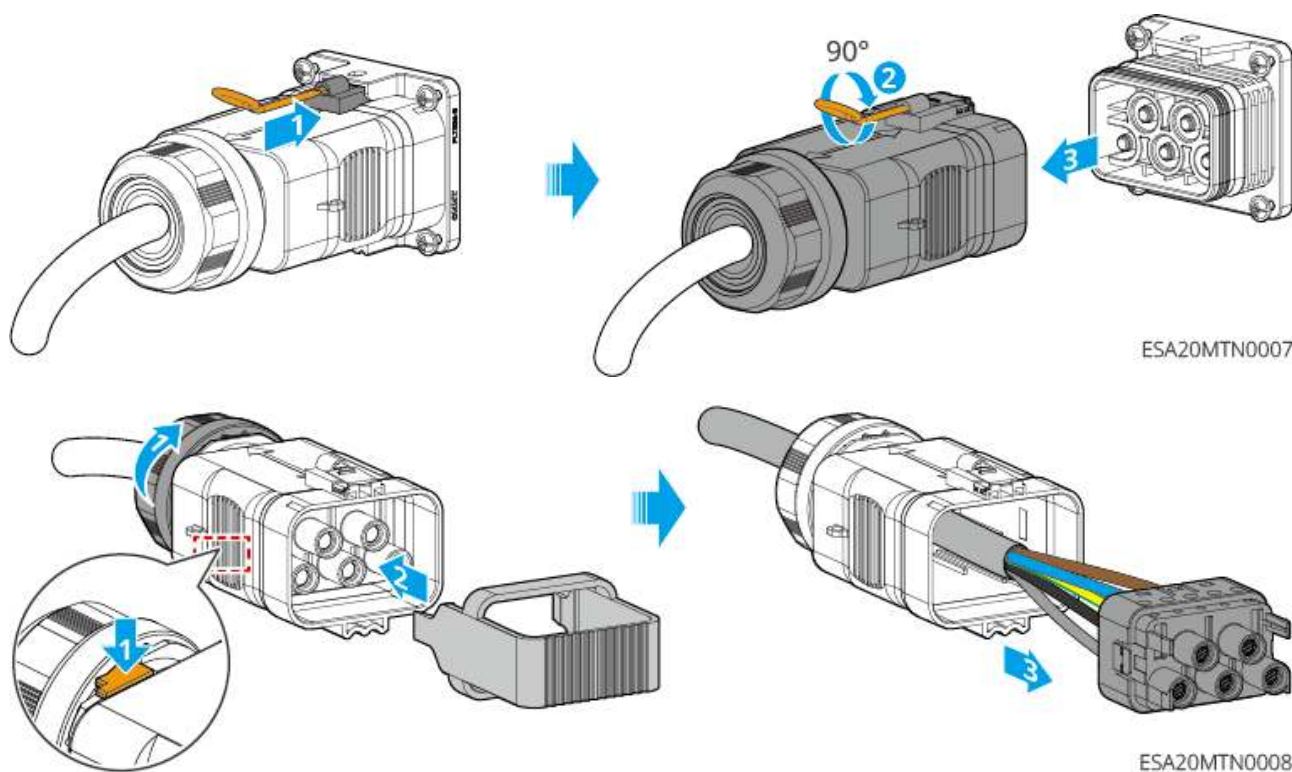
5.8.1 Connect the inverter AC line.



(Optional) Install manual transfer switch lock



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



5.8.2 Connect the STS power line

⚠ Warning

- To ensure that the STS can be safely disconnected from the grid in the event of an abnormal situation, please connect an AC Switch between the STS and the grid. Select an appropriate AC Switch according to local regulations.
- Please ensure that the STS is correctly connected to devices such as the inverter, grid, backup load, or generator. Incorrect connections may cause equipment damage.
- When wiring, the AC wires should fully match the "L1", "L2", "L3", "N", and "PE" ports of the AC terminals. Incorrect cable connection may cause a power outage.
- Ensure the conductor core is fully inserted into the terminal connection hole with out any exposure.
- Please ensure that the insulation plate at the AC terminal is tightly clamped and free from loosening.
- Ensure cable connections are secure; otherwise, the terminals may over heat during equipment operation, causing damage to the equipment.

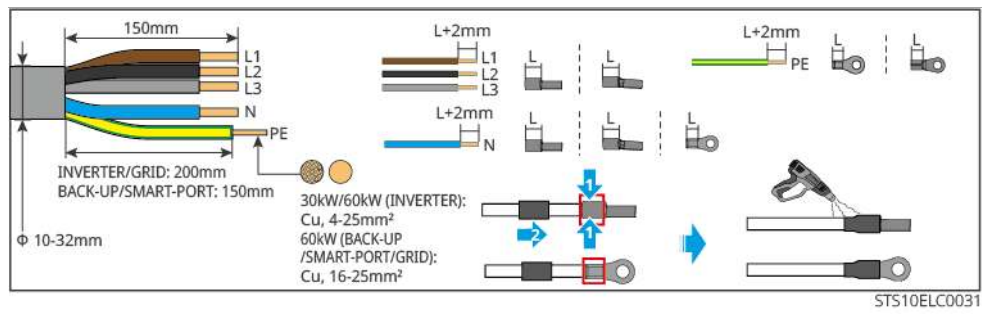


Figure42 cable fabrication

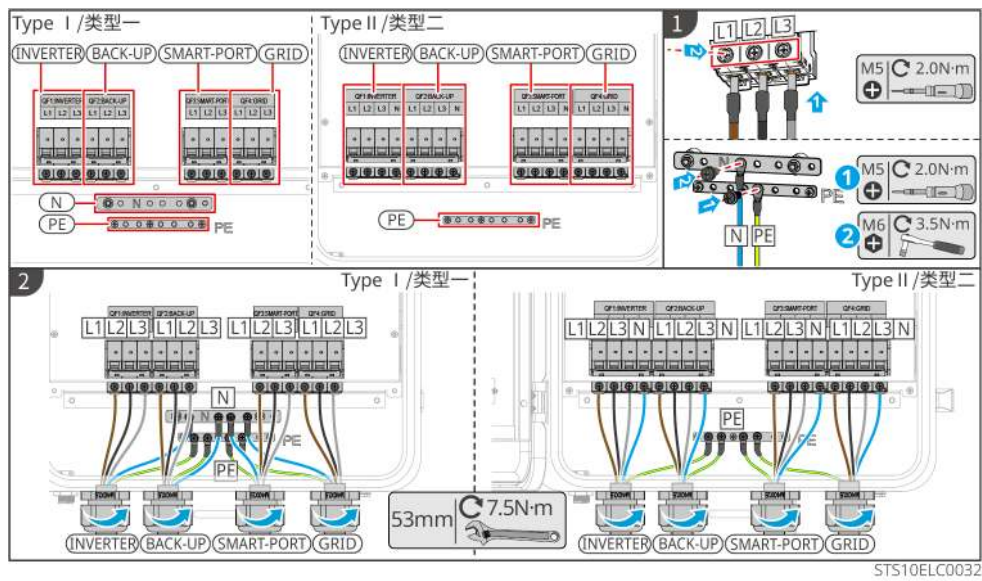


Figure43 30kW model cable connection

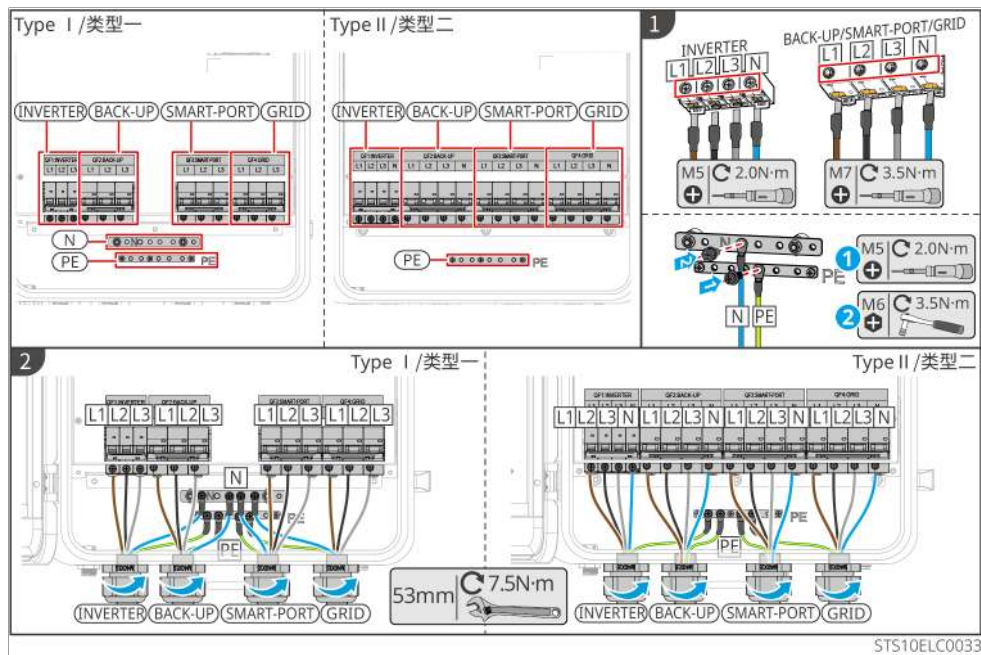
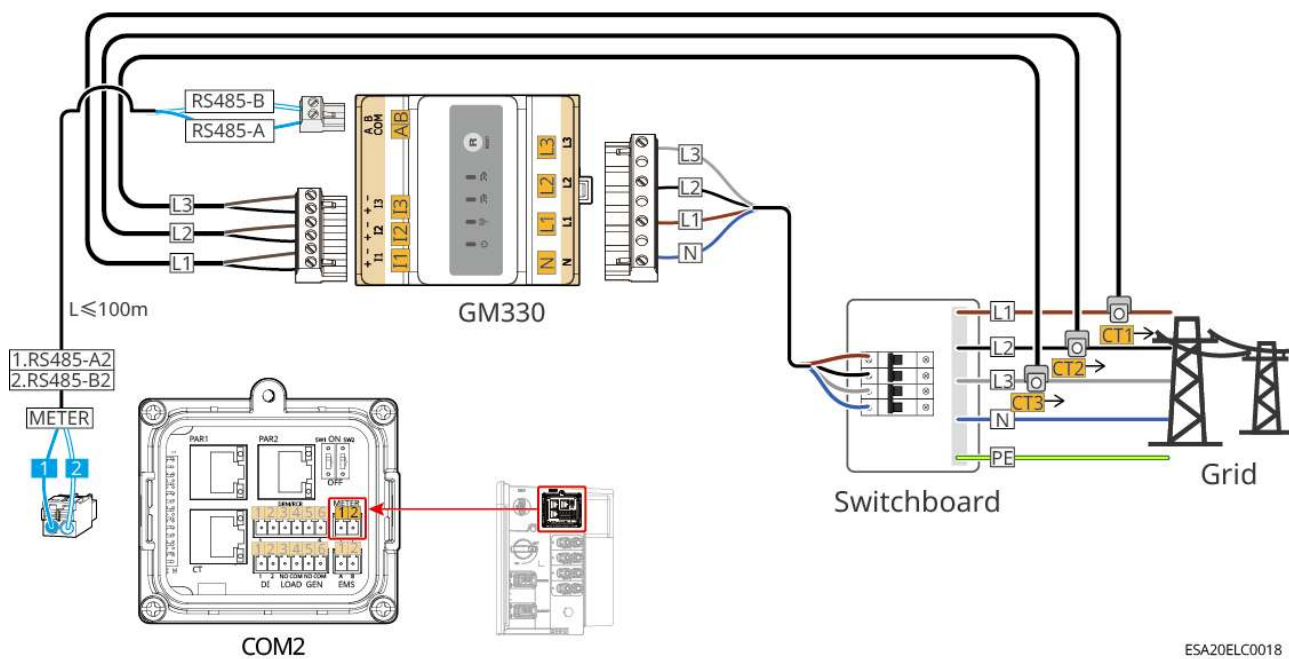


Figure44 Cable connection for 60kW model

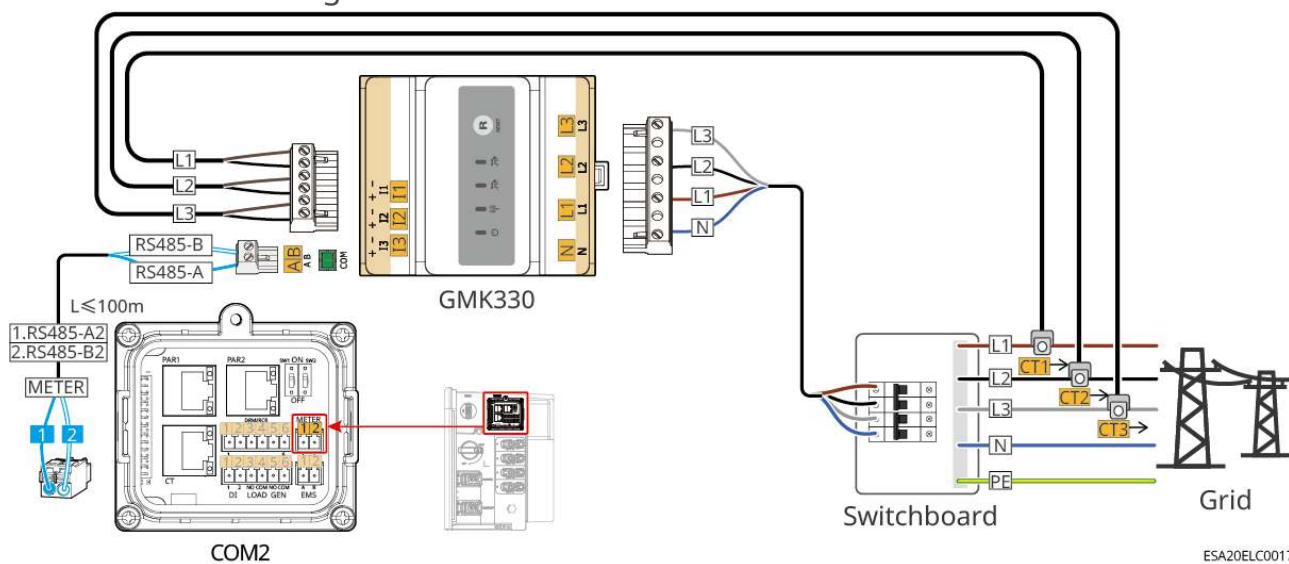
5.9 Connecting the Meter Cable

NOTICE

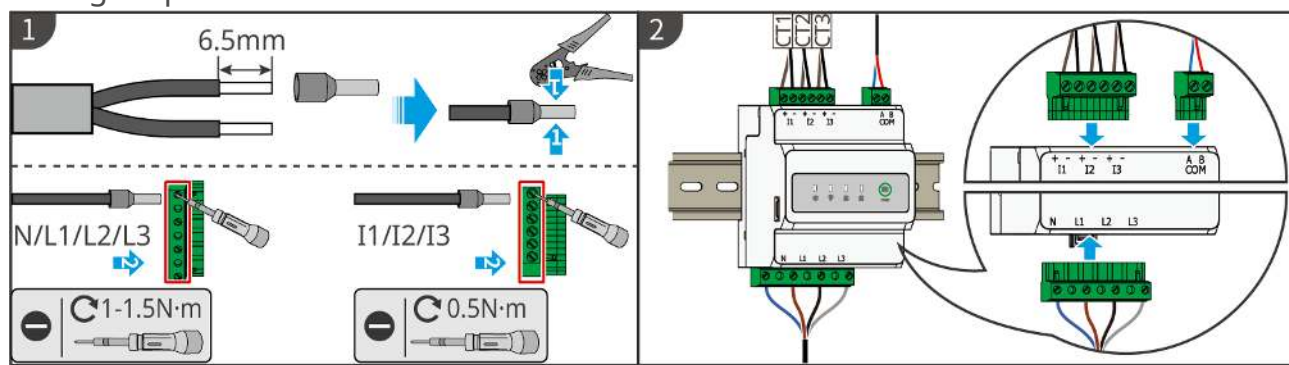
- If there is a need for multiple inverters to be connected in parallel for networking, please consult the manufacturer to purchase a meter separately.
- Please ensure that the CT connection direction and phase sequence are correct; otherwise, it may lead to incorrect monitoring data.
- Ensure that all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



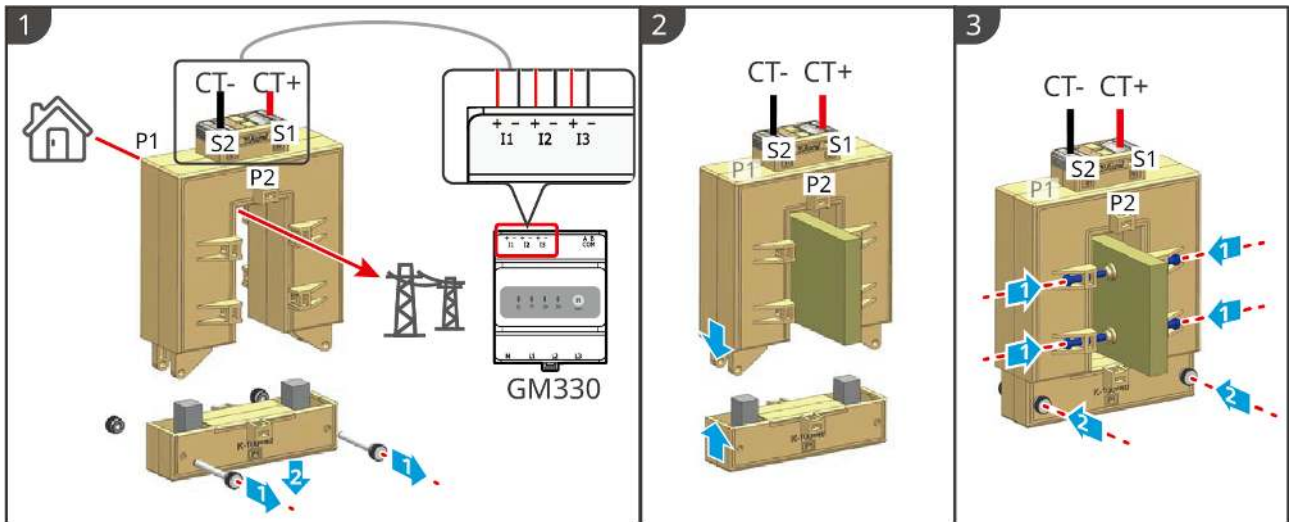
GMK330 Meter Wiring



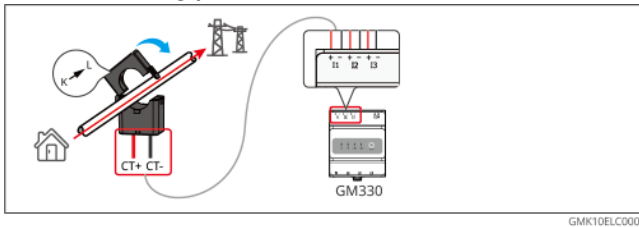
Wiring Steps



Install CT (Type One)



Install CT (Type Two)



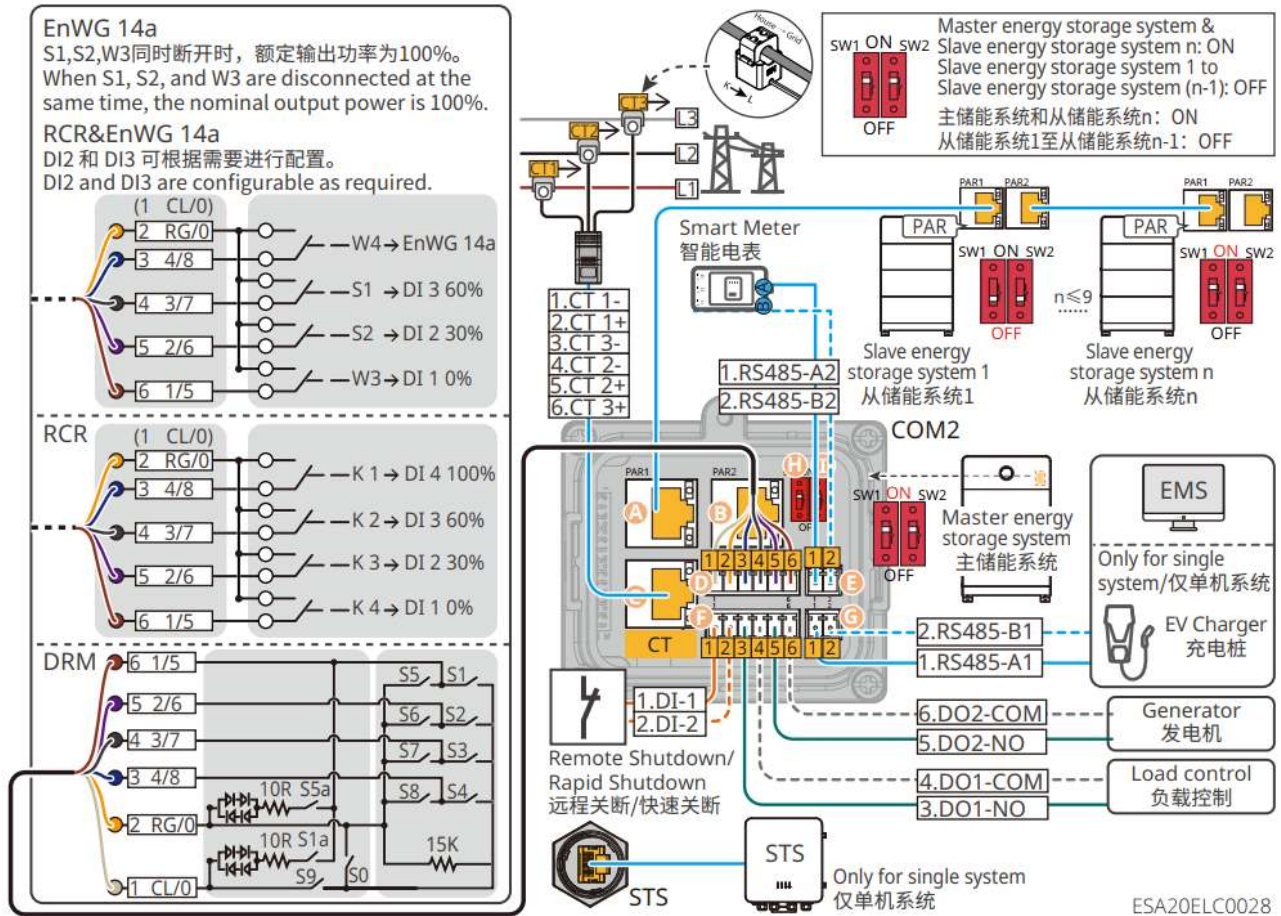
5.10 Connect communication cable

5.10.1 Connect inverter communication line

Note

- To ensure the electric meter and CT function properly, please ensure the following: CT must be correctly connected to the phase wire, CT1 is connected to L1, CT2 is connected to L2, CT3 is connected to L3.
- When using the inverter built-in meter, please use the CT shipped with the inverter.
- To use DRED, RCR, or the remote shutdown function, please enable it in the GoodWe SEMS+ App after completing the wiring.
- If the inverter is not connected to a DRED device or remote shutdown device, do not enable this function in the SEMS+ App, otherwise the inverter cannot operate on-grid.
- In a parallel system, to implement DRED and RCR functions, simply connect the DRED and RCR communication cables to the master inverter.
- To ensure the waterproof rating of the inverter, do not remove the waterproof plugs of unused communication ports on the inverter.
- Inverter DO Signal Communication Port, can connect dry contact signal specifications: $\text{Max} \leq 24\text{Vdc}$, 1A.
- Inverter communication function is optional; select based on actual use scenario.
- The inverter supports connection via Bluetooth, WiFi, and LAN communication methods to mobile devices or web interfaces for setting device parameters, viewing operation and error information, and promptly under standing system status.
- The inverter STS port should be connected to STS COM1. Connecting to CT is strictly prohibited, as it may cause equipment damage.
- In a single-machine system, it supports the installation of WiFi/LAN Kit-20 or 4G Kit-CN smart communication stick.
- In a parallel system, both the master and slave inverters need to be equipped with the WiFi/LAN Kit-20 intelligent communication stick for networking.
- In a parallel system, the DIP switches of the first and last inverters must be set to the ON position, while the other inverters should be set to the OFF position.

Communication Function Description

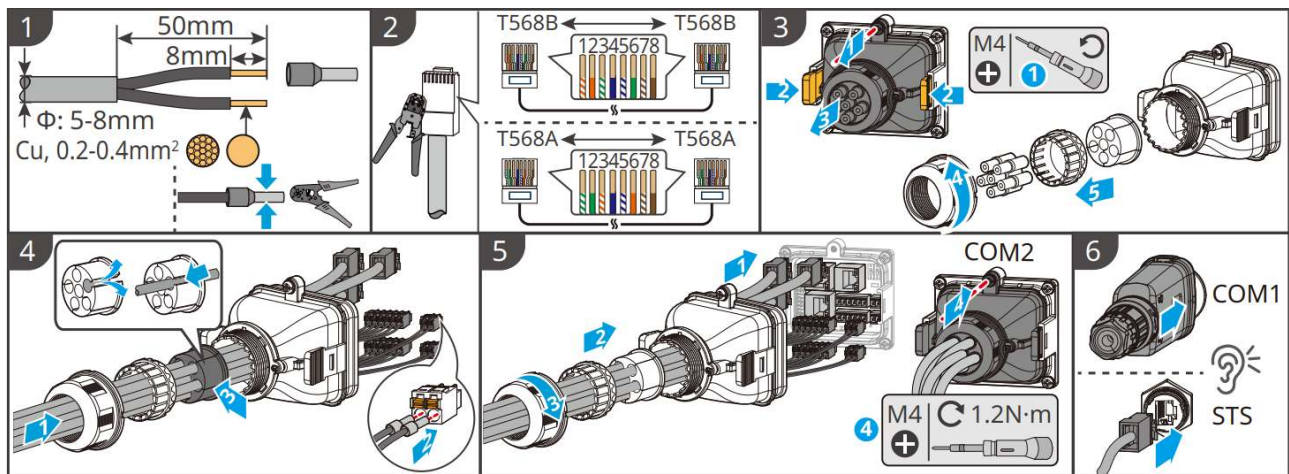


Port (Silkscreen)		function	description
A	PAR1	Parallel communication port 1	Parallel communication port.
B	PAR2	Parallel communication port 2	
C	CT	CT	When only using the inverter's built-in meter, connect the CT communication cable.

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

Port (Silkscreen)		function	description
	LOAD	load control	- Supports connection to dry contact signals, enabling load control and other functions. DO contact rating is 24 V DC@1A, NO/COM normally open contact. - Supports SG Ready heat pump integration, controlling the heat pump through dry node contact signals.
	GEN	Diesel Generator Control Port	Supports access to Diesel Generator Control signals to control the start/stop of the generator. In a Microgrid Scenario, connecting to a generator is not supported.
G	EMS	EMS/EV Charger Communication Port	- Connect to third-party EMS equipment for energy control - Only supports connecting to GoodWe charging piles in single-machine scenarios.
H	SW1	Parallel operation DIP switch	In a multi-machine parallel scenario, the parallel DIP switches of the first and last inverters need to be set to the ON position, and the other inverters to the OFF position.
I	SW2		

How to Connect the Communication Cable



ESA20ELC0005

5.10.2 Connect the STS communication cable

Note

- When connecting the communication cable to the inverter, please use the communication cable shipped with the product.
- The length of the communication cable shipped with the box is 10m. If this length is insufficient, please prepare a standard network cable of CAT 5E or higher specification and use the RJ45 connectors shipped with the box to crimp the cable.
- The length of self-made communication cables should not exceed 100m, otherwise it may cause communication anomalies.
- When making a self-made communication cable, please cut off the communication cable shipped with the unit and take its waterproof grommet to install on the self-made cable.
- After the communication line connection is completed, please ensure waterproof Protection.
- COM2 port function reserved. Do not remove waterproof cover.

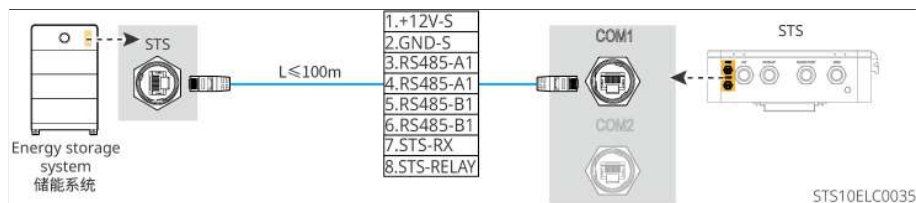


Figure45 Wiring Over view

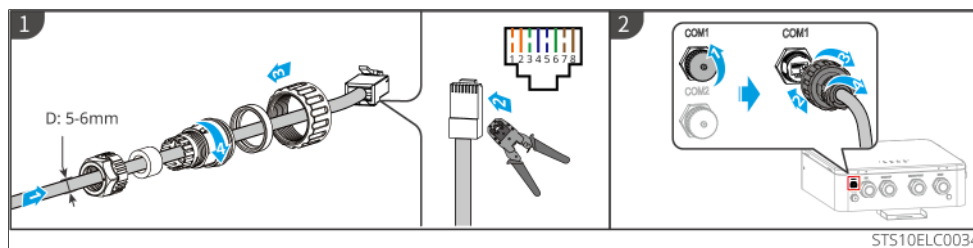
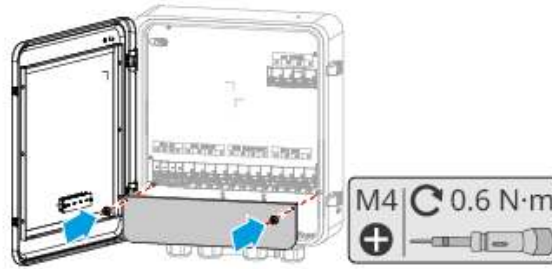


Figure46 Wiring steps

5.11 Install STS cover plate

Install the cover plate/安装盖板



STS10INT0040

6 System Commissioning

6.1 Check Before Power ON

No.	Inspection items
1	The equipment is firmly installed, easy to operate and maintain, with sufficient space for ventilation and heat dissipation, and the environment is clean and tidy.
2	PE cable, DC cables, AC cables, and Communication cable are correctly and securely connected.
3	The cable ties meet the wiring requirements, are reasonably distributed, and show no signs of damage.
4	Unused through-holes and port must be reliably connected using the provided terminal accessories and properly sealed.
5	Ensure that all used wire feed-through holes are properly sealed.
6	The voltage and Frequency of the Inverter on-grid access point comply with the on-grid 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 work normally, the battery black start function can be used to force battery discharge to start the inverter. The inverter can enter off-grid mode operation, and the battery supplies power to the load.
- After the battery system is started, please ensure that the communication between the inverter and the battery system is normal within 15 minutes. If the inverter and battery system cannot communicate normally, the battery system switch will automatically disconnect, cutting off power to the battery system.
- When the inverter is working normally, please set the manual transfer switch to the BACK-UP position to engage, so that the inverter's BACK-UP port supplies power to the load.
- PV strings and '5' are only applicable to the ETA series.

NOTICE

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

power on

- **Standalone system**

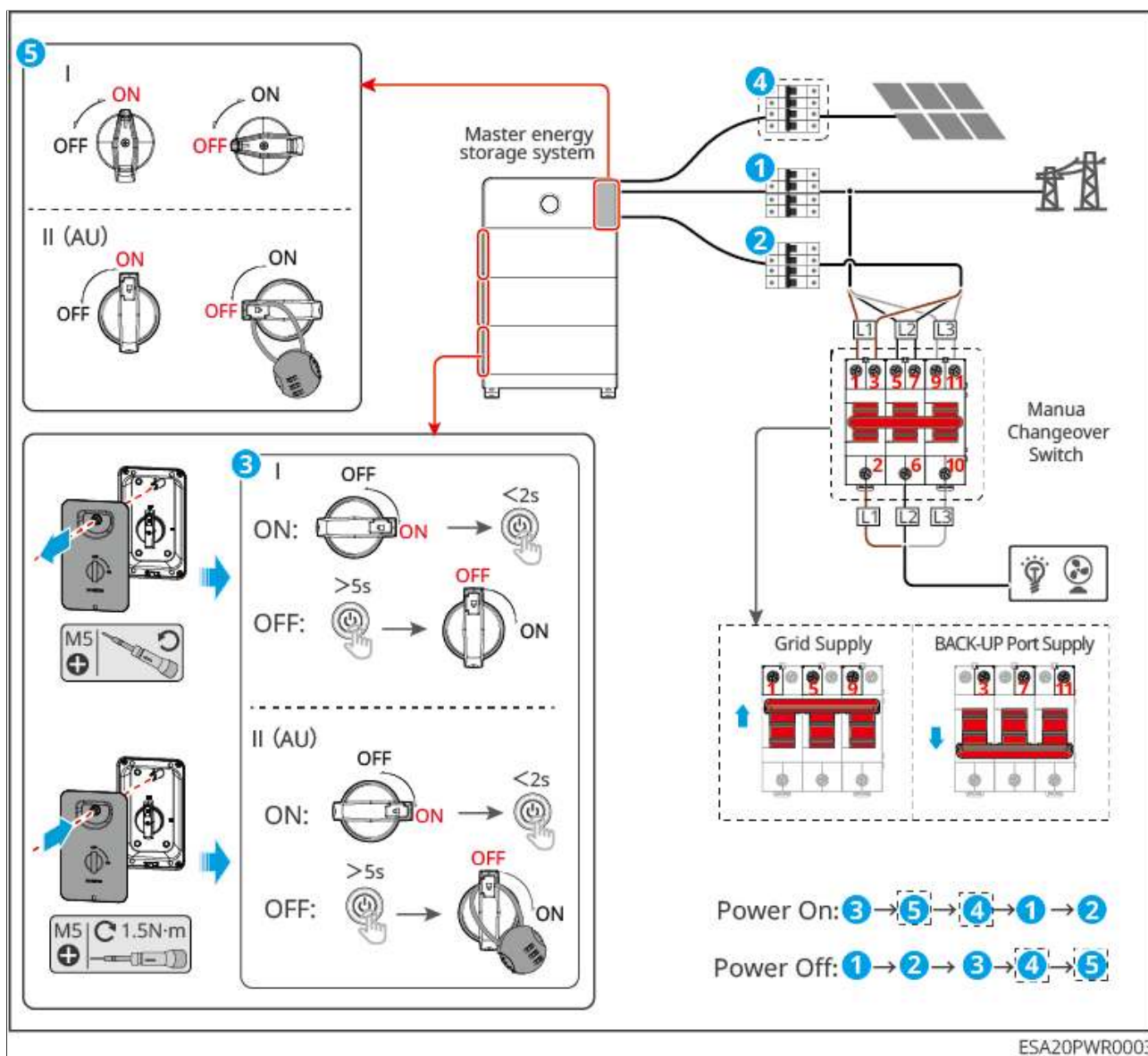


Figure47 Standalone system power on

1. Close the battery power switch and briefly press the battery's multifunction button. When there are multiple batteries in the system, close the power switches of all batteries. Briefly press the multifunction button of any battery to start all batteries.
2. Close the inverter's DC switch.
3. Close the circuit breaker between the PV components and the inverter.
4. Close the GRID circuit breaker.
5. Set the manual transfer switch to the BACK-UP position to engage, supplying power to the load from the BACK-UP port. Close the BACK-UP circuit breaker.

Power on with static transfer switch cabinet

During inverter shutdown maintenance, if it is necessary to keep the load on the STS BACK-UP port powered, close the BYPASS switch to supply power directly from the grid to the load.

 DANGER

- Always operate in the sequence of closing the BYPASS switches; otherwise, there is a risk of electric shock.
- When the BYPASS switch is closed, QF1 must be disconnected; otherwise, there is a risk of electric shock.
- After switching is completed, please close the cabinet door.
- Do not discard the spring clip.

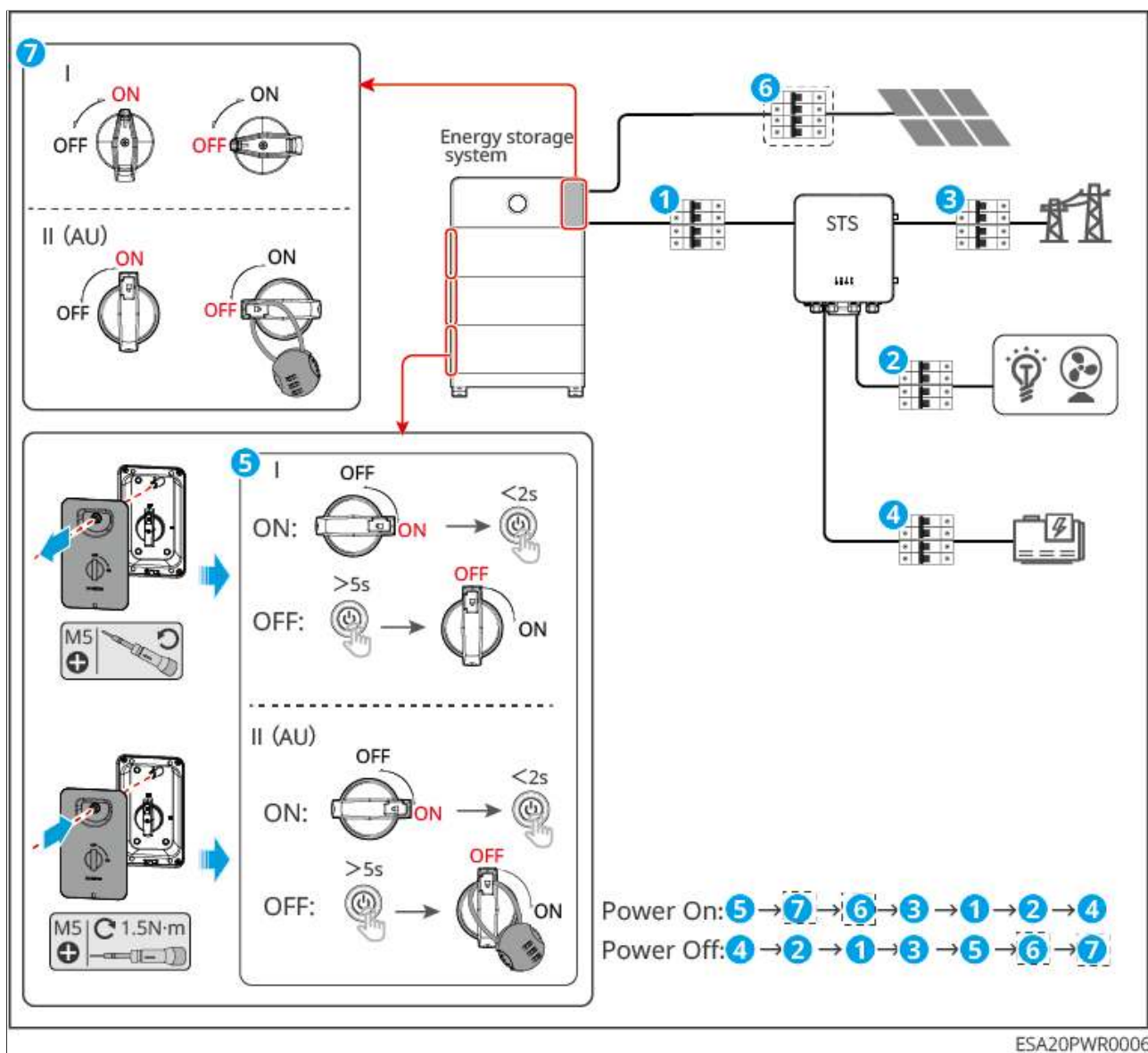


Figure48 Power on with static transfer switch cabinet

1. Close the battery power switch and briefly press the battery's multifunction button. When there are multiple batteries in the system, close the power switches of all batteries. Briefly press the multifunction button of any battery to start all batteries.
2. Close the inverter's DC switch.
3. Close the circuit breaker between the PV components and the inverter.
4. Close the STS GRID circuit breaker.
5. Close the STS INV circuit breaker.
6. Close the STS BACK-UP circuit breaker.
7. Close the STS SMART-PORT circuit breaker.

STS BYPASS switch closed

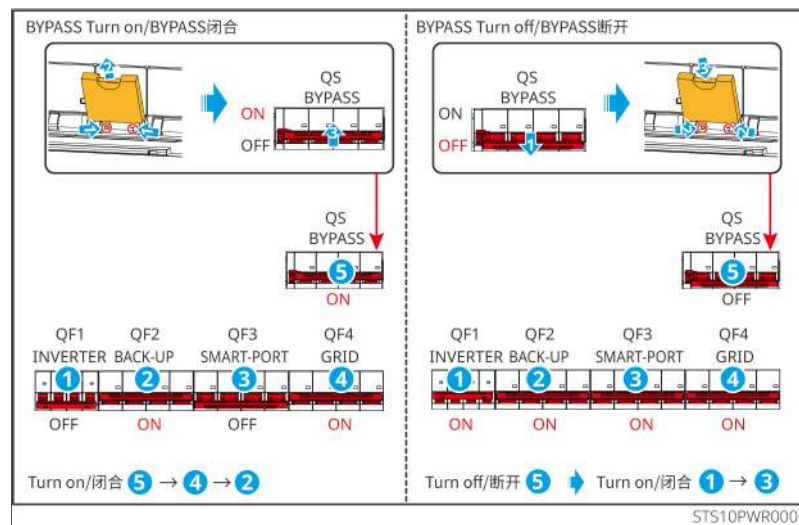
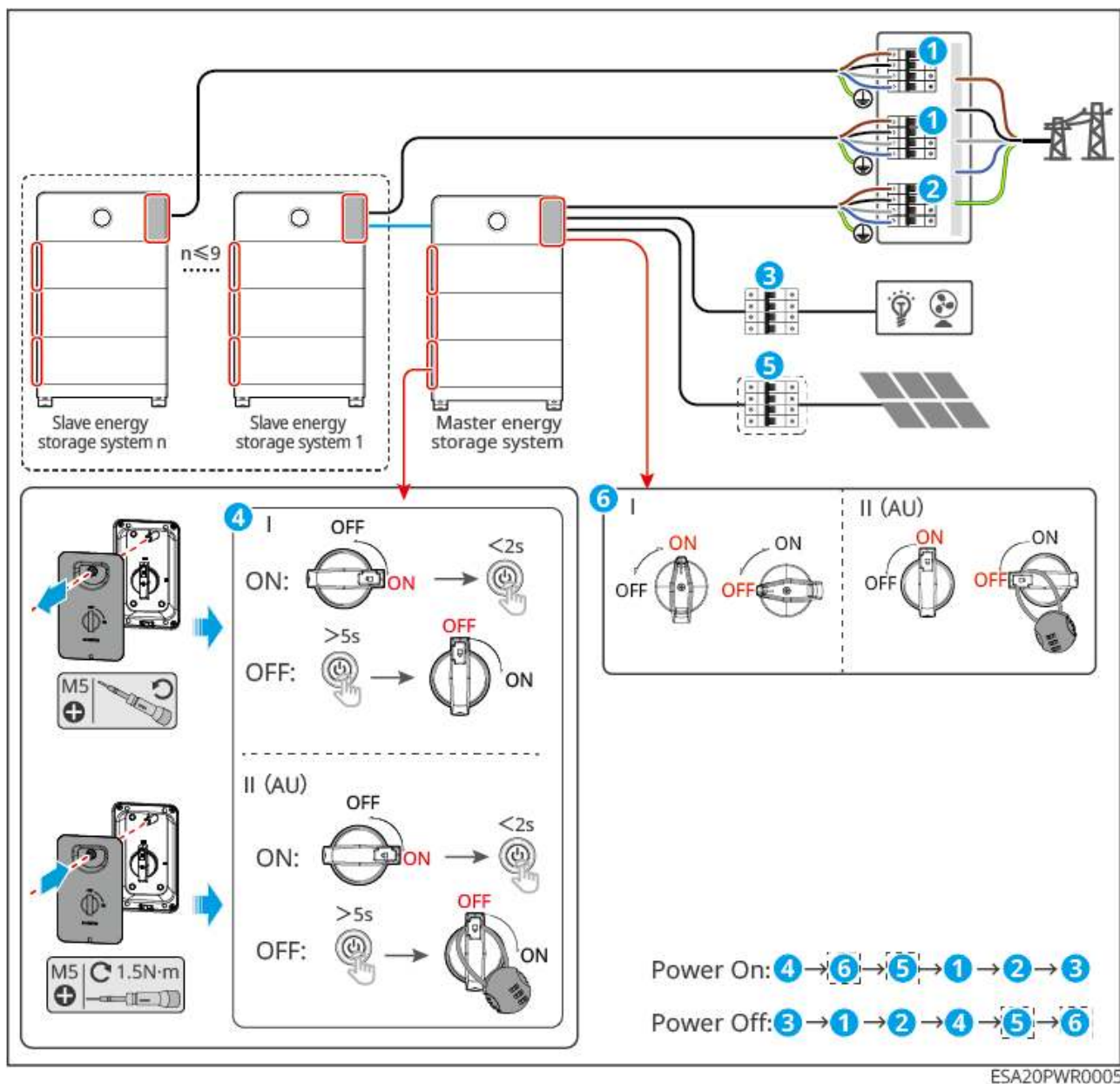


Figure49 BYPASS switch closed

1. Disconnect all circuit breakers: QF1–QF4 open, QS1 open and locked.
2. Power off the inverter and wait for 5 minutes.
3. Keep QS1 open with lock → remove the spring clip → close QS1.
4. Operate QS1 to the spring clip lock position, keep it engaged with lock.
5. Close the GRID circuit breaker QF4.
6. Close the BACK-UP circuit breaker QF2.

• parallel system

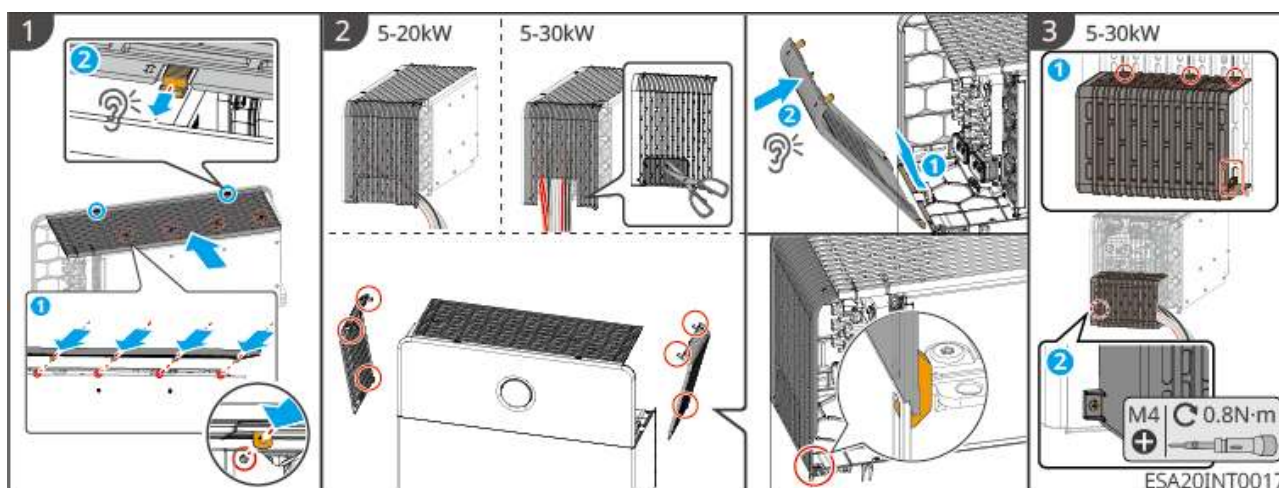


1. Close the battery power switch and briefly press the battery's multifunction button. When there are multiple batteries in the system, close the power switches of all batteries. Briefly press the multifunction button of any battery to start all batteries.
2. Close the inverter's DC switch.
3. (Optional) Close the circuit breaker between the PV components and the inverter.
4. Close the GRID circuit breaker of the slave inverter.
5. Close the GRID circuit breaker of the master inverter.
6. Close the BACK-UP circuit breaker.

Battery black start

1. Close the battery power switch. When there are multiple batteries in the system, close the power switches of all batteries.
2. Close the inverter's DC switch.
3. (Optional) Close the circuit breaker between the PV components and the inverter.
4. Close the GRID circuit breaker.
5. Close the BACK-UP circuit breaker.
6. After powering on all batteries separately, wait for 15 seconds, then press and hold the multifunction button of any battery for 2 seconds to force discharge and activate the inverter.

6.3 Installing the Protective Cover



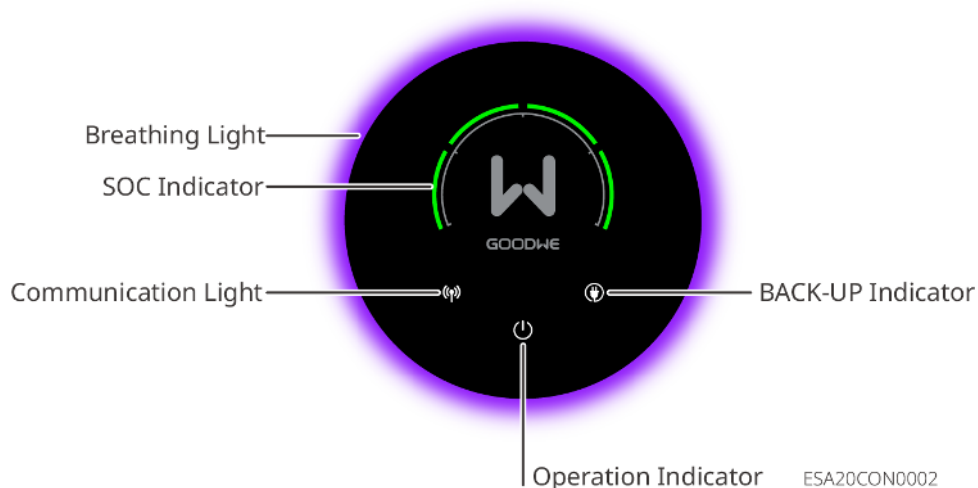
Step 1: Install the inverter top cover. Align the cover with the installation slot on the top of the inverter and slide it forward.

Step 2: Install the side cover. Place the side cover into the slot on the side of the battery and push it forward.

Step 3: (Optional) If using side cable routing, install the cable cover.

6.4 Indicators

6.4.1 Inverter Indicators

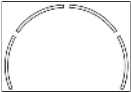
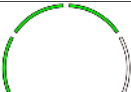
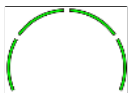


Breathing Light:

- When the system is in an upgrade state: The Breathing Light is a green marquee light; the head of the marquee is brightest and the tail is dimmest. The length of the marquee and the upgrade percentage are influenced by the SEMS+ App settings and the device's operational status.
- Except during inverter upgrades, system faults, and inverter power-off states, the Breathing Light status is affected by the App settings in the SEMS+ App. For setup instructions, please refer to the SEMS+ App User Manual.

Indicator	Indicator Status	Breathing Light Status	Description
		• 3min/Always On: Blue-purple chasing light stays on	Inverter is powered on and in standby mode
		• Always Off: Off	Inverter is starting up and in self-test mode
		• 3min: Blue-purple breathing for 3min then off • Always On via App: Blue-purple breathing stays on • Always Off via App: Off	Inverter operating normally in grid-tied generation or off-grid mode

Indicator	Indicator Status	Breathing Light Status	Description
		Red flashing	System fault
		Off	Inverter is powered off
		/	Inverter monitoring module resetting
			No connection established between inverter and communication terminal
			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
			No power supply to BACK-UP port
			System upgrade
			System fault

Indicator	Indicator Status	Breathing Light Status	Description
			System overload
			Battery has no charge
			Steady on: Charge Flashing: Discharge Battery SOC: $0\% < \text{SOC} \leq 25\%$
			Steady on: Charge Flashing: Discharge Battery SOC: $25\% < \text{SOC} \leq 50\%$
			Steady on: Charge Flashing: Discharge Battery SOC: $50\% < \text{SOC} \leq 75\%$
			Steady on: Charge Flashing: 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	Blinking 1 time/S	--	System Ready	Standby
	Blinking 3 times/S		PCS Communication Lost	--
3	Blinking 1 time/2S	--	System Alarm	Includes Level 2 faults from the fault list, where the under-voltage fault is steady on when it is Level 2, 3, or 4.
4	--	Steady On	System Fault	Level 3 and above faults from the fault list (steady on when under-voltage fault is Level 5).

6.4.3 STS indicator light

indicator light	status	Description
		Grid port voltage normal
		No voltage at grid port
		Backup port voltage normal
		Backup port has no voltage.
		SMART-PORT port voltage normal
		No voltage at SMART-PORT.
		Equipment failure
		Equipment fault-free

6.4.4 Smart Meter Indicator Lights GM330&GMK330

6.4.4.1 Indicator Light Description

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

6.4.5 Smart Dongle Indicator

- **WiFi/LAN Kit-20**

NOTICE

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

Indicator	Status	Description
Power Light 		Constantly lit: The Smart Communication Stick is powered on.
		Off: The Smart Communication Stick is not powered on.
Communi- cation Light 		Constantly lit: Communication is normal in WiFi mode or LAN mode.
		Single flash: The Smart Communication Stick's Bluetooth signal is enabled, waiting to connect to the App.
		Two flashes: The Smart Communication Stick is not connected to the router.
		Four flashes: The Smart Communication Stick communicates normally with the router, but is not connected to the server.
		Six flashes: 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.
		Blinking	Communication data is being transmitted or received.
		Off	Network cable is not connected.

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

• 4G Kit-G20

Indicator	Status	Description
Power Light 		Steady on: The Smart Communication Stick is powered on.
		Off: The Smart Communication Stick is not powered on.
Communication Light 		Steady on: The Smart Communication Stick is connected to the server, communication is normal.
		Blinks twice: The Smart Communication Stick is not connected to the base station.
		Blinks four times: The Smart Communication Stick is connected to the base station but not to the server.
		Blinks six times: Communication between the Smart Communication Stick and the inverter is disconnected.
		Off: The Smart Communication Stick is undergoing a software reset or is not powered on.
Button	Description	
Reload	Hold for 0.5~3 seconds, the Smart Communication Stick will restart.	
	Hold for 6~20 seconds, the Smart Communication Stick will restore factory settings.	

7 System Debugging and Power Station Monitoring

7.1 Perform device commissioning and power station monitoring via SEMS+ App

SEMS+ App is a software for remote power station monitoring or local equipment commissioning. Supporting installers or owners:

- Remotely monitor the operation of the power station and set station and device operating parameters.
- Local connection device, view device operation status and set device parameters.

Download and Install SEMS+ App

Mobile Phone Requirements:

- Mobile OS requirements: Android 7.0 and above, iOS 15.1 and above.
- Mobile phone supports web browser, connect to Internet.
- The mobile phone supports WLAN/Bluetooth function.

Download method:

Mode 1:

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



Mode 2:

Scan the QR code below to download and install.



For detailed functions, please refer to "[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

7.2 Perform device commissioning and power station monitoring via SEMS+ WEB

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

1. Manage organization or user information, etc.
2. Adding, monitoring power station information, etc.
3. Maintain equipment.

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



SEMS+ WEB User Manual

8 Maintenance

8.1 System power-down

Danger

- When performing operation and maintenance on equipment in the system, please power off the system. Operating equipment with power on may cause equipment damage or electric shock hazard.
- After the equipment is powered off, it takes some time for the internal components to discharge. Please wait until the equipment is fully discharged according to the time requirement on the label.
- The battery restart should be performed by powering on via an air switch.
- When performing power-off maintenance on the inverter, STS QF1 INV must be disconnected; otherwise, there is a risk of electric shock.
- When shutting down the battery system, strictly follow the battery system power-down requirements to prevent damage to the battery system.

Warning

When the inverter is under power-off maintenance or fault, to ensure normal operation of the load, switch the manual transfer switch to the grid side to engage, so that the grid supplies power to the load.

Note

- To ensure effective protection of the battery system, the cover plate of the battery system switch shall be kept closed. If the battery system switch is not used for a long time, it needs to be secured with screws.
- When the air switch is open, all live parts of the positive and negative circuits are disconnected, the equipment is in a safe de-energized condition, with no exposed hazardous live parts, and there is no risk of electric shock from human contact.
- If the system is equipped with a Static Transfer Switch (STS) cabinet and the power-down is completed, please close the top cover of the STS.
- PV String and "5" only for ETA series.

Power Off

- **Single-unit Scenario:**

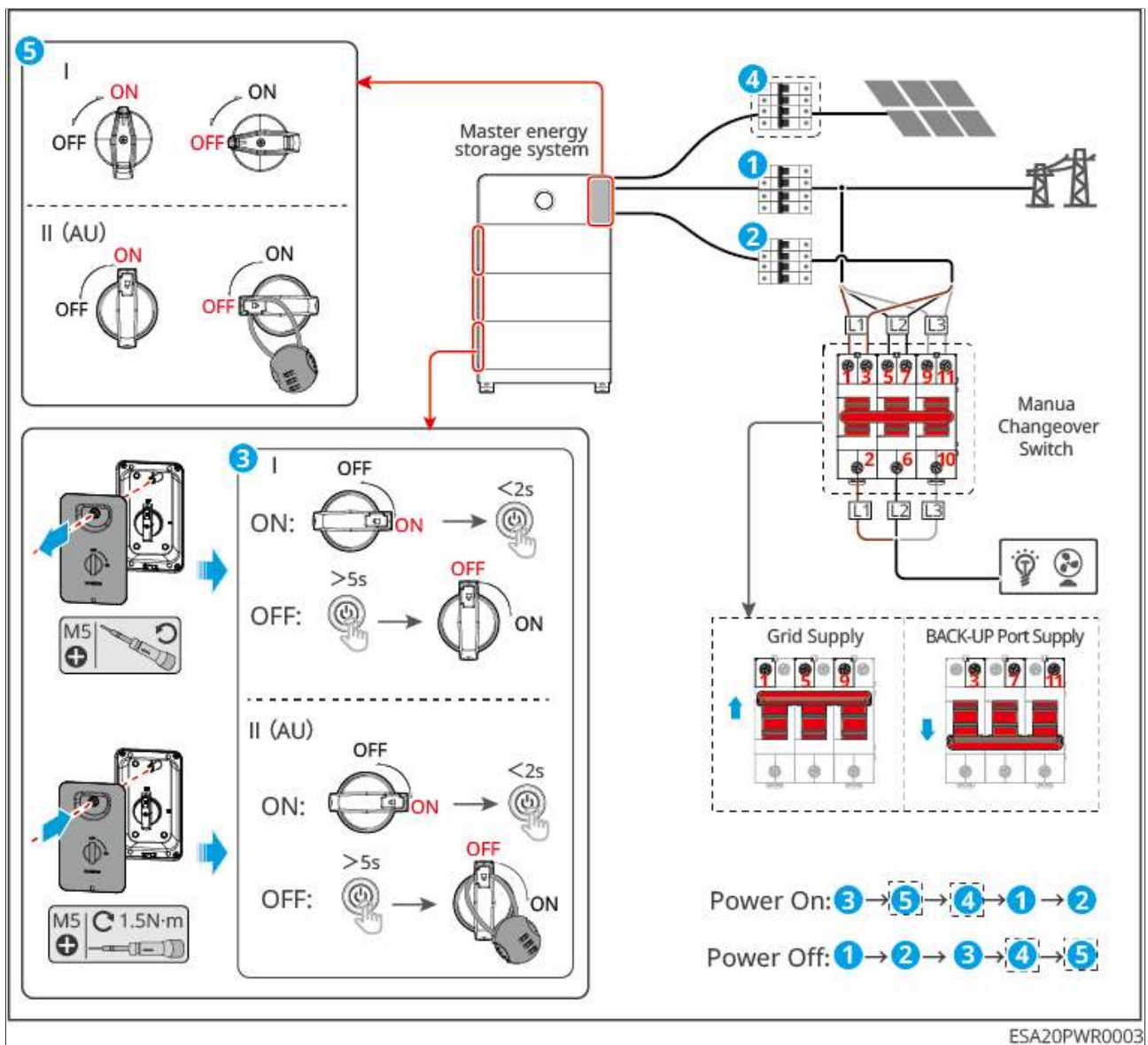


Figure50 Power in single-machine scenario

1. Disconnect the BACK-UP circuit breaker.
2. Disconnect the GRID circuit breaker.
3. Long press the multifunction button on any battery for 5 seconds to power off the battery system. If the system contains multiple batteries, this operation will power off all batteries without the need to operate each one individually. Finally, disconnect the battery system switch.
4. (optional) Disconnect the circuit breaker between PV modules and the inverter.
5. Disconnect the DC switch of the inverter. Turn the manual transfer switch to the grid side to engage, and the grid will supply power to the load.

Power-off with Static Transfer Switch Cabinet

After the inverter is powered on and resumes operation, disconnect the BYPASS switch, and the load switches back to inverter power supply.

Danger

- Please strictly follow the opening sequence of the BYPASS switch; otherwise, there may be a risk of electric shock.
- When the BYPASS switch is closed, STS QF1 INV must be disconnected; otherwise, there may be a risk of electric shock.
- Do not discard the circlip.

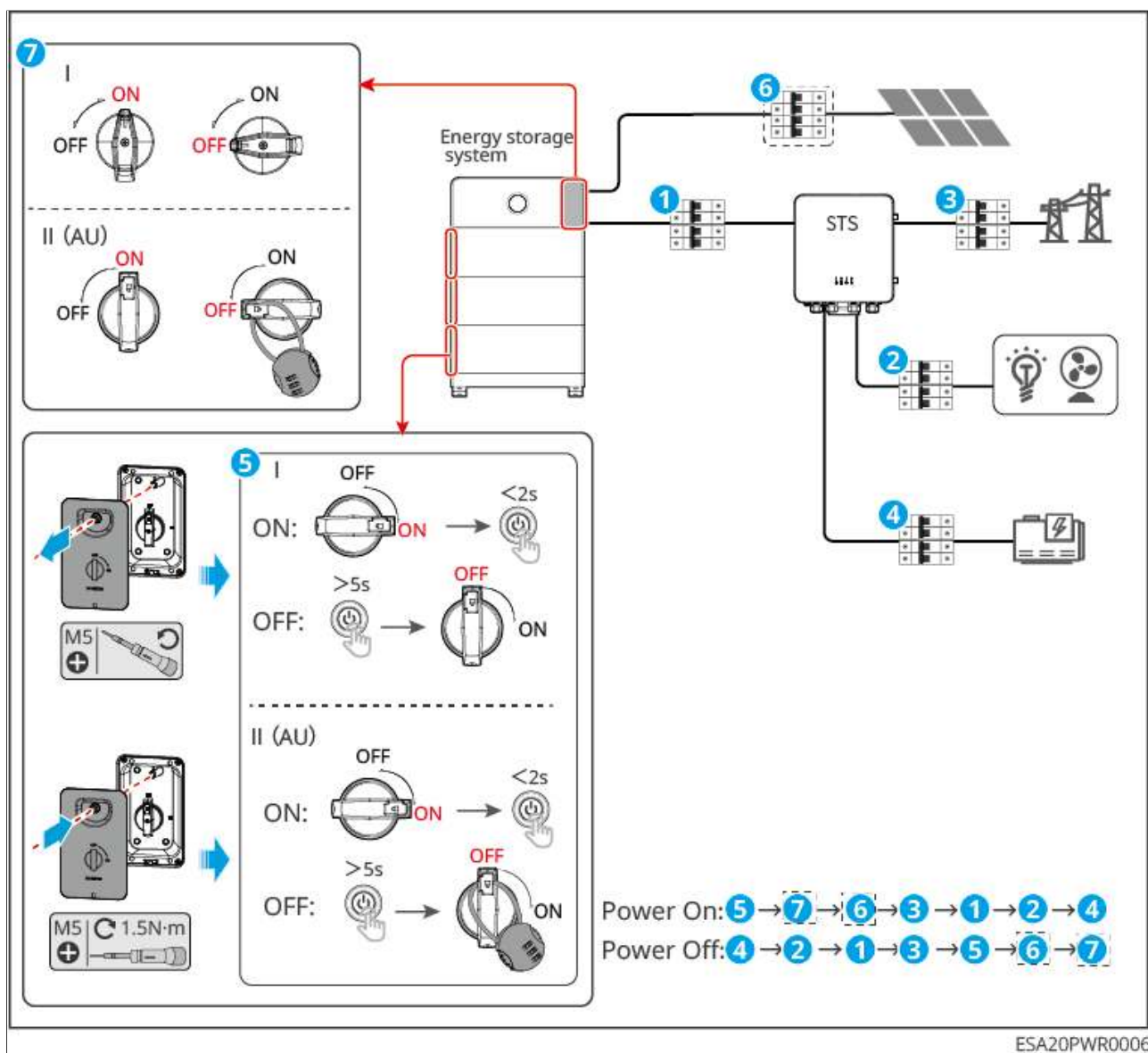


Figure51 Power down with static transfer switch cabinet

1. Open the STS SMART-PORT circuit breaker.
2. Open the STS BACK-UP circuit breaker.
3. Open the STS INV circuit breaker.
4. Disconnect the STS GRID circuit breaker.
5. Long press any battery multifunction button for 5 seconds to power off the battery system. If the system contains multiple batteries, this operation will power off all batteries without the need to operate each one individually. Finally, disconnect the battery system switch.
6. (Optional) Disconnect the circuit breaker between the PV modules and the inverter.

7. Disconnect the DC Switch of the inverter.

STS Bypass Switch Open

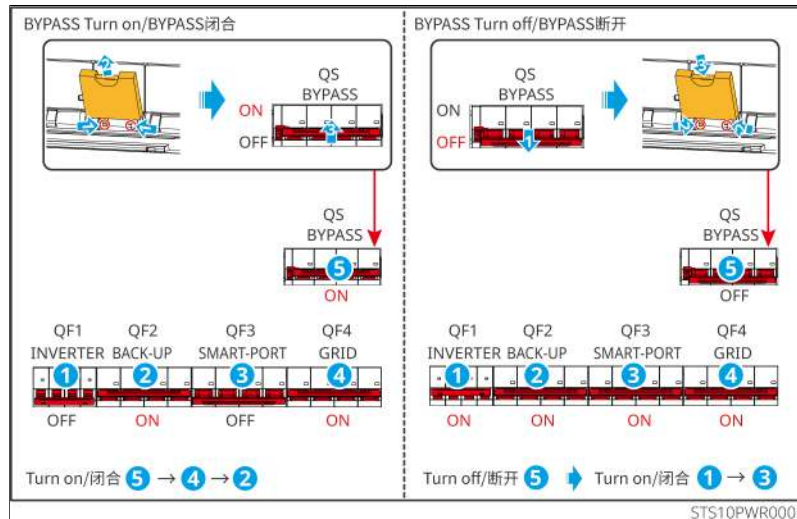
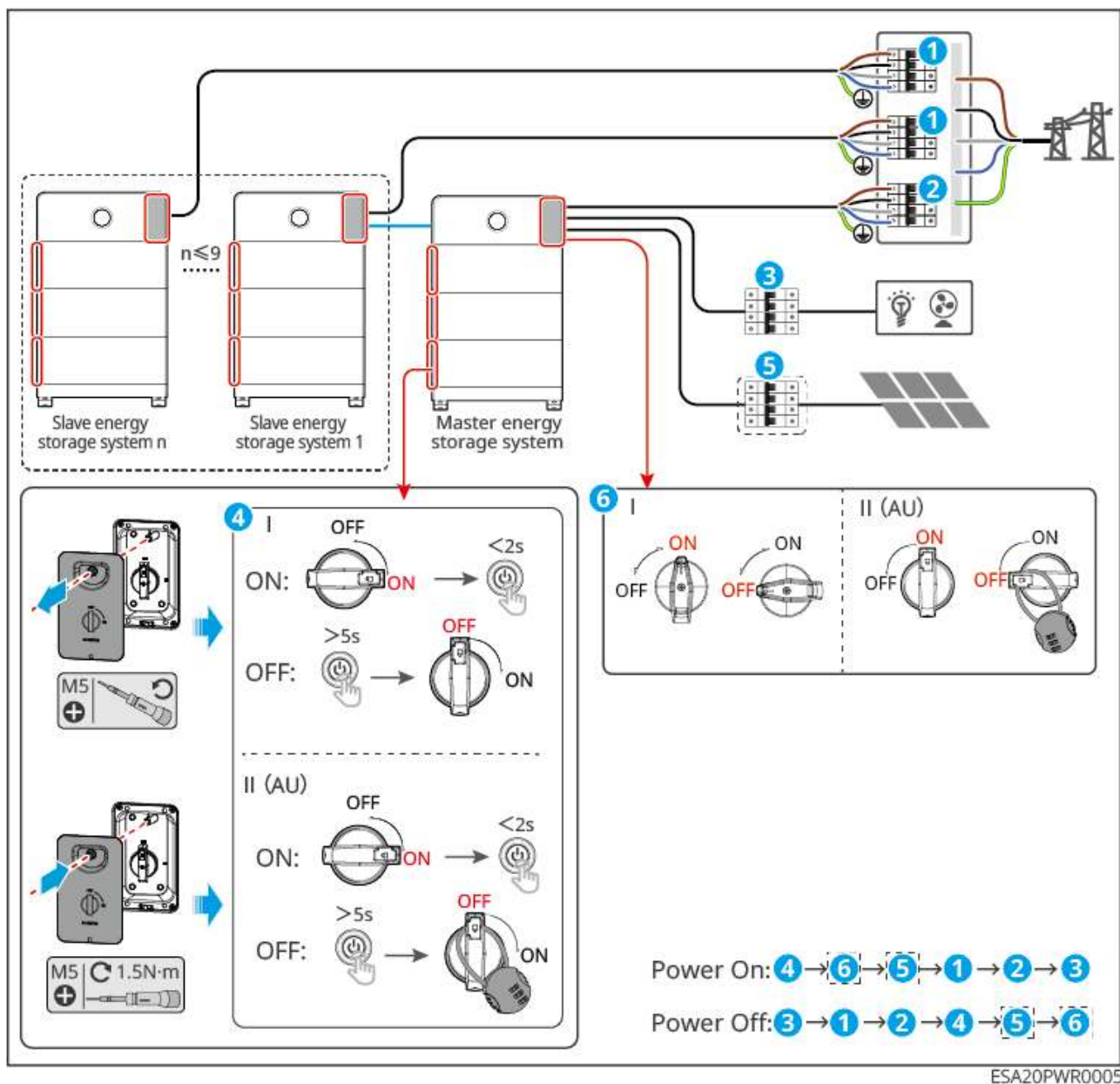


Figure52 BYPASS Switch Open

1. Current status: GRID bypass power supply BACK-UP; QF3, QF1 open; QF4, QF2, QS1 closed.
2. Disconnect QS1 → Use a circlip to place QS1 in the locked state (to prevent misoperation)
3. Disconnect QF4 and QF2: At this point, QF1–QF4 and QS1 are all disconnected.
4. Inverter power-on
5. Close QF1 to QF4 sequentially according to the power-on sequence.

- **Parallel scenario:**



ESA20PWR0005

1. Disconnect the BACK-UP circuit breaker.
2. Will disconnect from the inverter's grid circuit breaker.
3. Disconnect the main inverter Grid circuit breaker.
4. Press and hold the multi-function button on any battery for 5 seconds to power off the battery system. If the system contains multiple batteries, this operation will power off all batteries without the need to operate each one individually. Finally, turn off the battery system switch.
5. (Optional) Disconnect the circuit breaker between the PV modules and the inverter.
6. Disconnect the DC Switch of the inverter.

8.2 Removing the Equipment



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

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

8.3 Disposing of the Equipment

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

8.4 Routine Maintenance



- If any issues that may affect the Battery or hybrid inverter system are discovered, please contact after-sales personnel. Unauthorized disassembly is strictly prohibited.
- If exposed copper wires are found inside the conductive line, do not touch them. High voltage DANGER, please contact after-sales personnel. Unauthorized disassembly is prohibited.
- In case of any other emergencies, please contact the after-sales personnel immediately. Follow their instructions for operation or wait for on-site assistance from the after-sales team.

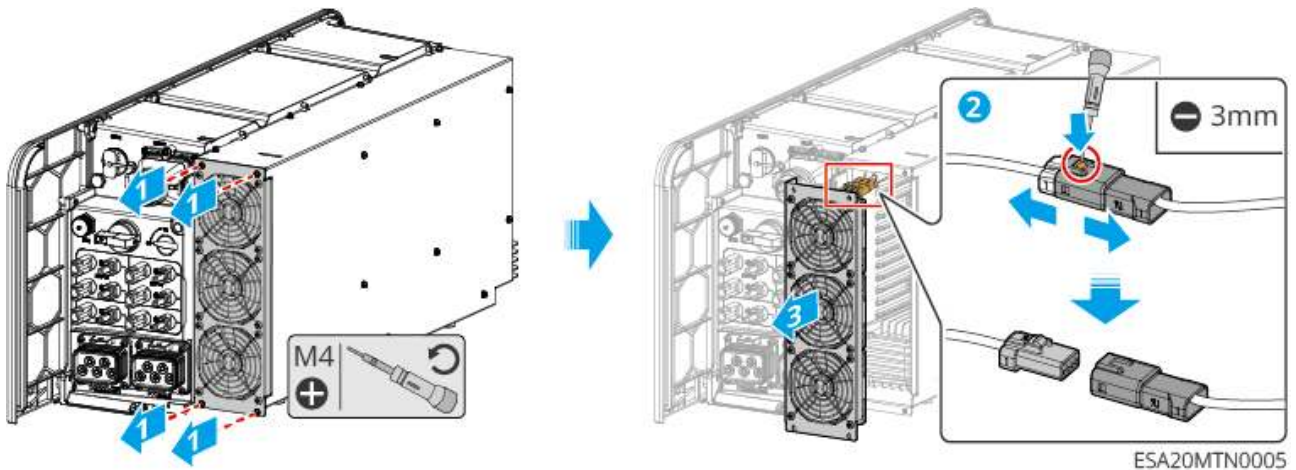
Maintenance Content	Maintenance method	Maintenance cycle	Maintenance purpose
System cleaning	Check for any foreign objects or dust in the heat sink and air inlet/outlet. Check if the Installation space meets the requirements, and inspect whether there is any debris accumulation around the equipment.	Once every six months	Prevent heat dissipation.
System Installation	Check whether the equipment Installation is secure and whether the fasteners screw are loose. Inspect the equipment for any damage or deformation on the exterior.	Once every six months to once a year	Verify the stability of the Installation equipment.
Electrical connection	Check for loose electrical connections, damaged cable insulation, or exposed copper conductors.	Once every six months to once a year	Verify the reliability of electrical connections.

Maintenance Content	Maintenance method	Maintenance cycle	Maintenance purpose
fan	Check if the fan has any abnormal noise; Check the fan blades for cracks; Check if the fan has abnormal blockage or stalling;	1 time/half year	Prevent fan fault.
Sealing	Check whether the cable entry hole Sealing of the equipment meets the requirements. If the gap is too large or unsealed, resealing is required.	Once per year	Verify that the machine's 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 perform Charge on the Battery regularly.	Once/15 days	ProtectionBattery service life.

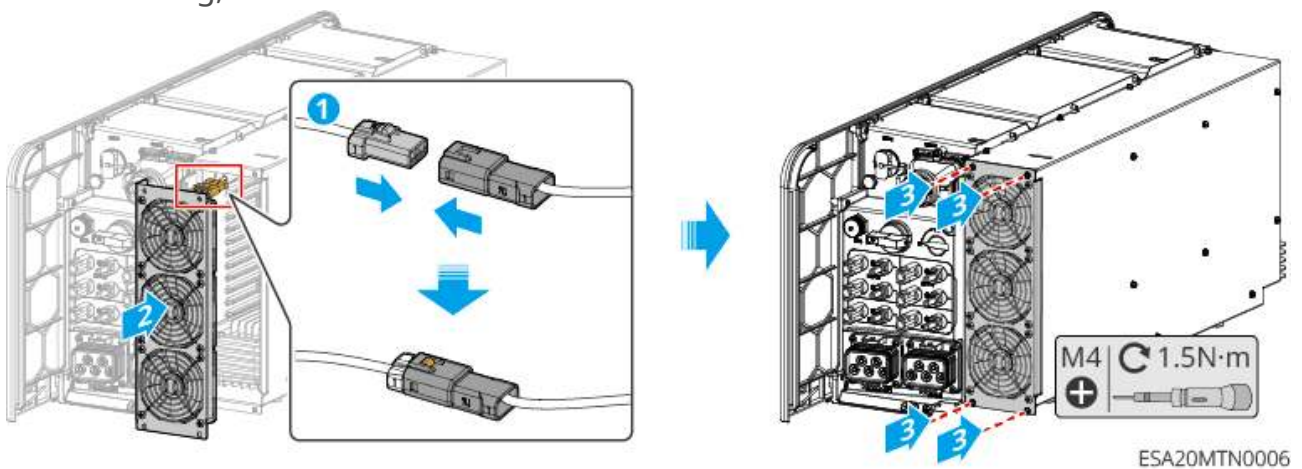
Fan maintenance can be specifically referred to the following steps:

There is a fan module on the exterior of Inverter. To clean the fan module more effectively, remove it from the machine before cleaning. The specific steps are as follows:

1. Inverterpower off, refer to [8.1.Power OFF the System\(Page 185\)](#).
2. Wait for the residual voltage in the system to be fully discharged and the fan module to completely stop operating.
3. Use screwdriver dismantle module to lock screw, and remove the entire fan module.
4. Clean the fan using a soft brush, cloth, or vacuum cleaner.



After cleaning, reinstall the fan module back into the machine.



8.5 fault

NOTICE

The manual's fault content is updated irregularly, and there may be slight variations between different models. Please refer to the real-time display on your device for specific information.

8.5.1 View fault/alarm details

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

- SEMS+ App

1. Open SEMS+ App and log in with any account.
2. On the home page, click "Alarm" to view the alarm information of all power stations under the account.

- SEMS+ WEB

1. Open SEMS+ WEB and log in using any account.
2. On the power station detail interface, click "Alarm" to view all alarm information of the current power station.

8.5.2 Fault Information and Troubleshooting

Please perform troubleshooting according to the following methods. If the troubleshooting methods cannot help you, please contact the after-sales service center.

When contacting the after-sales service center, please collect the following information to facilitate a quick resolution.

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

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

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

No.	fault	Resolution
5	After all configuration is complete, the Smart Communication Stick fails to connect to the server	Restart the router and the inverter.

8.5.2.1 Inverter Fault

8.5.2.1.1 Fault Handling (Fault Codes F01-F40)

fault code	Fault Name	fault cause	Fault Handling Recommendations
F01	Grid Power Outage	1. Grid power outage. 2. AC line or AC switch disconnected.	After grid power restoration, the alarm automatically disappears. 2. Check whether the AC line or AC switch is disconnected.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F02	Grid Overvoltage Protection	Grid voltage exceeds the allowable range, or the high voltage Duration exceeds the high voltage ride-through setting value.	1. If it occurs occasionally, it may be a short-term grid anomaly. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If this occurs frequently, check whether the grid voltage is within the allowed range. If not, contact the local power operator. If it is, also modify the grid overvoltage protection point after obtaining consent from the local power operator. 3. If it cannot be restored for a long time, check whether the AC side circuit breaker and output cable are connected properly.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F03	Grid Undervoltage Protection	The grid voltage is below the allowable range, or the Low Voltage Duration exceeds the Low Voltage Ride-Through setting value.	1. If it occurs occasionally, it may be due to a short-term grid anomaly. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If this occurs frequently, check whether the grid voltage is within the allowable range. If not, contact the local power operator. If yes, you also need to modify the grid undervoltage protection point with the consent of the local power operator. 3. If it cannot be restored for a long time, please check whether the AC side circuit breaker and output cable are connected properly.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F04	Grid Rapid Overvoltage Protection	Abnormal grid voltage detection or over voltage trigger fault.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If this occurs frequently, please check whether the grid voltage is within the allowable range. If not, please contact the local power operator. If it is, you also need to modify the grid undervoltage protection point after obtaining consent from the local power operator. 3. If it cannot be restored for a long time, check whether the AC side circuit breaker and output cable are connected properly.
F05	Grid 10min Overvoltage	The sliding average of the grid voltage over 10min exceeds the safety regulation range.	Check whether the grid voltage is operating at a high voltage for a long time. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator. If yes, after obtaining the consent of the local power operator, modify the grid 10min overvoltage protection point.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F06	Grid Overfrequency	Grid Anomaly: The actual grid frequency exceeds the local grid standard requirements.	1. If it occurs occasionally, it may be due to a temporary grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, please contact the local power operator. If it is, also modify the grid overfrequency protection point after obtaining consent from the local power operator.
F07	Grid Underfrequency	Grid abnormality: The actual grid frequency is lower than the local grid standard requirement.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator. If it is, you also need to modify the grid overfrequency protection point after obtaining consent from the local power operator.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F08	Grid Frequency Instability	Grid anomaly: The actual frequency change rate of the power grid does not comply with local grid standards.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, please check whether the grid frequency is within the permissible range. If not, please contact the local power operator.
F09	Anti-islanding Protection	The grid has been disconnected; due to the presence of loads, the grid voltage is maintained. According to safety regulation Protection requirements, grid connection is stopped.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting the grid is normal and does not require manual intervention. 2. If this occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator.
F10	Under voltage Ride-Through Fault	Grid abnormal: The duration of Grid Voltage Abnormal exceeds the time specified in high and low voltage ride-through regulations.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, please check whether the Grid Voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F11	HVRT Overvoltage	Grid abnormal: The duration of Grid Voltage Abnormal exceeds the time specified in high and low voltage ride-through regulations.	1. If it occurs sporadically, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable; if not, please contact the local power operator.
F12	30mA GFCI Protection	During inverter operation, the input-to-ground insulation impedance decreases.	1. If it occurs occasionally, it may be caused by an occasional abnormality of the external circuit. After the fault is cleared, it will resume normal operation without manual intervention. 2. If it occurs frequently or cannot be restored for a long time, please check whether the PV string insulation resistance to ground is too low.
F13	GFCI Protection (60mA)	During inverter operation, the input-to-ground insulation impedance decreases.	1. If it occurs occasionally, it may be caused by an occasional abnormality in the external circuit. After the fault is cleared, it will resume normal operation without manual intervention. 2. If it occurs frequently or cannot be recovered for a long time, please check whether the PV string impedance to ground is too low.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F14	GFCI Protection (150mA)	During inverter operation, the input-to-ground insulation impedance decreases.	1. If it occurs occasionally, it may be caused by an occasional abnormality in the external circuit. After the fault is cleared, it will resume normal operation without manual intervention. 2. If it occurs frequently or cannot be restored for a long time, please check whether the insulation resistance of the PV string to ground is too low.
F15	GFCI Gradual Change Protection	During inverter operation, the input-to-ground insulation impedance decreases.	1. If it occurs occasionally, it may be caused by an accidental external circuit abnormality. The fault will be cleared automatically and normal operation will resume without manual intervention. 2. If this occurs frequently or cannot be recovered for a long time, please check whether the PV string's ground insulation resistance is too low.
F16	DCIProtection Level1	The DC component of the inverter output current is higher than the allowable range of safety regulations or machine defaults.	1. If the anomaly is introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects normal power generation of the power station, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F17	DCI Protection Level2	The DC component of the inverter output current is higher than the allowable range of safety regulations or machine defaults.	1. If the abnormality is introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears without 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.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F18	Low Insulation Resistance	1. PV String short circuit to protective earth 2. The environment where the PV strings are installed is relatively humid for a long time, and the conductor insulation to ground is poor. 3. Low insulation resistance of battery port line to ground.	1. Check the impedance of the PV string/battery port to protective earth. If a short circuit occurs, check and rectify the short circuit point. 2. Check whether the protective ground wire of the inverter is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, please use App to reconfigure the inverter“Insulation Resistance Protection Point”. When an insulation resistance fault occurs in inverters in the Australian and New Zealand markets, it can also be alerted by the following methods: 1. The 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 minutes. 2. If the inverter is added to the monitoring platform, after setting the alarm notification method, the alarm information can be sent to the customer via email.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F19	Grounding Abnormal	1. The inverter's protective ground wire is not connected. 2. When the output of the PV string is grounded, the inverter output side is not connected to an isolation transformer.	1. Please confirm whether the inverter's protective ground wire is not connected normally. 2. If in the scenario where the output of the PV string is grounded, please confirm whether the inverter output side is connected to an isolation transformer.
F20	Hard 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 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	Fault Handling Recommendations
F21	Internal Comm Loss	Slave DSP1 Communication Timeout - Master DSP, Slave DSP2 Communication Timeout - Master DSP, Slave DSP2 Communication Timeout - Slave DSP1, Master DSP Communication Timeout - Slave DSP1, Master DSP Communication Timeout - Slave DSP2 or Slave DSP1 Communication Timeout - Slave DSP2: 1. Chip not powered on 2. Chip Program Version Error	Disconnect the AC output side switch and the DC input side switch. After 5 minutes, close the AC output side switch and the DC input side switch. If the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
		Master DSPcan Module Error, Slave DSP1can Module Error or Slave DSP2can Module Error: Frame Format Error 2. Parity Check Error 3. can bus offline 4. Hardware CRC check error 5. When transmitting (receiving), the control bit is set to receive (transmit). 6. Transmission to Unauthorized Units	
F22	Generator waveform detection fault	1. This fault will always be displayed when the generator is not connected.; 2. Under Diesel Generator operation, this fault will be triggered if the Diesel Generator safety regulations are not met.	1. Diesel Generator Not Connected, ignore this fault; 2. It is normal for this fault to occur when the generator fails. After the generator recovers, wait for a period of time and the fault will automatically clear; 3. This fault does not affect the normal operation of Off-grid Mode. 4. When both the generator and the grid are connected and meet the safety regulation requirements, the grid takes priority for grid connection, and it will work in the grid-connected state.
F23	Generator abnormal access		
F24	Generator low voltage		
F25	Generator high voltage		
F26	Low generator frequency		
F27	Generator frequency high		

fault code	Fault Name	fault cause	Fault Handling Recommendations
F28	Paralell I/O Check Abnormal	Parallel communication cable not firmly connected or parallel I/O chip damaged.	Check if the parallel communication cable is securely connected, then check if the IO chip is damaged. If so, replace the IO chip.
F29	Paralell Grid Line Reversed	Some machines have the ir grid cables connected in reverse with others.	Reconnect the grid line
F30	AC HCT check Abnormal	Abnormal sampling in AC sensor	Disconnect the AC output switch and DC input switch. After 5 minutes, close the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.
F31	GFCI HCT Check Abnormal	Leakage current sensor sampling anomaly.	Disconnect the AC output side switch and DC input side switch. 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F32	Inverter Internal Failure	Inverter fault exists.	Disconnect the switch on the AC output side and the switch on the DC input side. After 5 minutes, close the switch on the AC output side and the switch on the DC input side. If the fault persists, please contact the dealer or after-sales service center.
F33	FlashR/W Abnormal	Possible causes: flash content has changed; flash lifespan exhausted	1. Upgrade to the latest version of the program 2. Contact the dealer or after-sales service center

fault code	Fault Name	fault cause	Fault Handling Recommendations
F34	AFCI Check Failure	During the Arc Failure self-test process, the Arc Failure module did not detect the Arc Failure.	Disconnect the AC output switch and the DC input switch, then close the AC output switch and the DC input switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F35	Cabinet Overtemperature	Cabinet Over temperature, possible cause: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature 3. Internal Fan Abnormal.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or the ambient temperature is too high, please improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F36	Bus Overvoltage	BUS Overvoltage, possible cause: 1. PV Voltage High; 2. Inverter BUS Voltage Sampling Abnormal; 3. The isolation effect of the double-split transformer at the rear end of the inverter is poor, causing mutual interference when the two inverters are connected to the grid, and one of them reports DC overvoltage when connecting to the grid;	Disconnect the AC output side switch and the DC input side switch. 5 minutes later, close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F37	PV Input Overvoltage	PV Input voltage too high, possible cause: PV array configuration error: the number of PV panels connected in series in a string is too high, 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 strings to ensure that the open-circuit voltage of the strings does not exceed the maximum operating voltage of the inverter. After the PV array configuration is correct, the inverter alarm will disappear automatically.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F38	PV Continuous Hardware Overcurrent	1. Improper PV module configuration 2. Hardware Damage	Disconnect the AC output side switch and the DC input side switch. 5 minutes later, close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F39	PV Continuous Software Overcurrent	1. Incorrect Component Configuration 2. Hardware Damage	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F40, F98	PV String Reversed(String1-n) n: Determined by the actual number of inverter strings	PVPV String Reversed	Check whether the string is reverse-connected.

8.5.2.1.2 Fault Handling (Fault Codes F41-F80)

fault code	Fault Name	fault cause	Fault Handling Recommendations
F41	Generator Port Overload	1. Off-grid side output exceeds specification requirements 2. Off-Grid Side Short Circuit 3. Off-grid Terminal Voltage Too Low 4. When used as a heavy load port, the heavy load exceeds the specifications.	Confirm the off-grid side output voltage, current, power and other data to identify the cause of the problem.
F42, F164, F165	AFCI Failure(PV String1-n) n: Based on the inverter's actual number of strings.	1. DC side connection terminal loose; 2. Loose DC side connection terminal; 3. DC Cable Core Damaged or Loose Connection	1. After the machine reconnects to the grid, check whether the voltage and current of each circuit are abnormal, reduced, or become zero; 2. Check whether the DC side terminals are firmly connected.
F43	Grid Waveform Abnormal	Grid abnormality: Abnormal grid voltage detection triggers a fault.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowed range and stable. If not, contact the local power operator.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F44	Grid Phase Loss	Grid abnormality: Grid voltage has a single-phase sag.	1. If it occurs occasionally, it may be due to a temporary grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If this occurs frequently, check whether the grid voltage and frequency are within the permissible range and stable. If not, contact the local power operator.
F45	Grid Voltage Imbalance	Excessive phase voltage imbalance in the power grid.	1. If it appears occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, please check whether the grid voltage and frequency are within the allowed range and stable. If not, please contact your local power operator.
F46	Grid Phase Sequence Failure	Inverter and grid wiring anomaly: non-positive sequence wiring.	1. Check whether the wiring of the inverter and the grid is in positive sequence. After the wiring is normal (e.g., swap any two live wires), the fault will automatically disappear. 2. If the wiring is correct and the fault still exists, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F47	Grid Rapid Shutdown Protection	Quickly shut down output after detecting the Grid Power Outage condition.	The fault automatically disappears after grid power restoration.
F48	Neutral Line Loss (Split Grid)	Split-phase Grid Neutral Wire Loss	1. After grid power supply is restored, the alarm clears automatically. 2. Check whether the AC line or AC switch is disconnected.
F49	L-PE Short Circuit	Output phase to PE low impedance or short circuit	Detect the impedance between the output phase line and PE, and identify. Repair locations with low impedance.
F50	DCVProtection Level1	Abnormal load fluctuation	1. If the abnormality is introduced by an external fault, the inverter will automatically resume normal operation after the fault disappears without 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	DCV Protection Level2	Abnormal load fluctuation	
F52	Multiple GFCI Failures	North American safety regulations require that after multiple faults, the system cannot automatically recover; it must be manually reset or recover after waiting 24h.	Please check if the PV string's impedance to ground is too low.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F53	AFCI (AFCI) Multiple Failures	Per North American safety standards, automatic recovery is not permitted after multiple faults – recovery must be performed manually or after a 24-hour delay.	1. After the machine reconnects to the grid, check whether various voltages and currents abnormally decrease to zero; 2. Check if the DC side terminals are securely connected.
F54	External communication disconnection	Communication with external devices of the inverter is lost, possibly due to peripheral power supply issues, mismatched Communication Protocols, or failure to configure the corresponding peripherals.	Judgment is made based on the actual model and detection enable bit. Peripherals not supported by certain models will not be detected.
F55	Back-up Output Overload	Prevent inverter from continuous over load output.	Turn off some off-grid loads to reduce the inverter's off-grid output power.
F56	Back-up Output Overvoltage	Prevent load damage caused by inverter output over voltage.	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.
F57	External Box Failure	Switch On-Grid to Off-Grid, waiting for Box relay switching time too long	1. Check if Box is working normally; 2. Check Box communication wiring is correct;

fault code	Fault Name	fault cause	Fault Handling Recommendations
F58	CTLoss	CT connection cable disconnected (Japan Safety Regulation Requirements)	Check if the CT wiring is correct;
F59	Parallel CAN Comm Abnormal	The parallel communication cable is not securely connected, or a machine is not online.	Check whether all machines are powered on and whether the parallel communication cables are securely connected.
F60	Parallel Back-up Line Reversed	The backup lines of some machines are reversed with others.	Reconnect the backup wire.
F61	Inverter Soft Start Failure	During off-grid cold start, Inverter Soft Start Failure	Check if the inverter module of the machine is damaged.
F62	AC HCT Failure	HCT Sensor Abnormal	Disconnect the AC output side switch and the DC input side switch, close the AC output side switch and the DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F63	GFCI HCT Failure	Leakage current sensor anomaly detected.	Disconnect the AC output side switch and the DC input side switch. 5 minutes later, close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F64	Inverter Internal Failure	Inverter fault exists.	Disconnect the AC output side switch and the DC input side switch. After 5 minutes, close the AC output side switch and the DC input side switch. If the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F65	AC Terminal Overtemperature	AC Terminal Over temperature, possible causes: 1. Inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal Fan Abnormal.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is poor ventilation or the ambient temperature is too high, improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
F66	INV Module Overtemperature	Inverter module over temperature, possible causes: 1. Inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal Fan Abnormal.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If it is not ventilated or the ambient temperature is too high, improve its ventilation and heat dissipation. 3. If the ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F67	Boost Module Overtemperature	Boost Module Overtemperature, possible causes: 1. Inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal fan operates abnormally.	1. Check whether the ventilation at the inverter installation site is good and whether the ambient temperature exceeds the maximum allowed ambient temperature range. 2. If ventilation is poor or the ambient temperature is too high, improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
F68	AC Capacitor Overtemperature	Output filter capacitor temperature is too high. Possible causes: 1. Inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal Fan Abnormal.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowed ambient temperature range. 2. If there is no ventilation or the ambient temperature is too high, please improve its ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
F69	PV IGBT Short Circuit	Possible causes: 1. IGBT Short Circuit 2. Inverter Sampling Circuit Abnormal	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 the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F70	PV IGBT Open Circuit	1. Software issue causes no PWM generation. 2. Drive Circuit Abnormal: 3. IGBT Open Circuit	
F71	NTCAbnormal	NTC temperature sensor abnormal	Disconnect the AC output side switch and DC input side switch. 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, contact the distributor or after-sales service center.
F72	PWM Abnormal	PWM abnormal waveform appears	Disconnect the AC output side switch and the DC input side switch, then close the AC output side switch and the DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.
F73	CPUInterrupt Abnormal	CPU Interrupt Abnormal	Disconnect the AC output side switch and the DC input side switch. After 5 minutes, close the AC output side switch and the DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F74	microelectronic fault	Function Safety detected an anomaly	Turn off the AC output switch and DC input switch. 5 minutes later, close the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F75	PV HCT Failure	boostCurrent Sensor Abnormal	Turn off the AC output side switch and the DC input side switch. After 5 minutes, turn on the AC output side switch and the DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F76	1.5V Ref Abnormal	Reference circuit fault	Disconnect the AC output side switch and the DC input side switch. 5 minutes later, close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F77	0.3V Ref Abnormal	Reference circuit fault	
F78	CPLD Version Error	CPLD Version Error	Disconnect the AC output side switch and the DC input side switch. 5 minutes later, close the AC output side switch and the DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F79	CPLD Comm Failure	CPLD and DSP communication content error or timeout	Disconnect the AC output side switch and DC input side switch, and then close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, please contact the dealer or after-sales service center.
F80	Model identification fault	Fault Regarding Model Recognition Error	Disconnect the AC output side switch and the DC input side switch. After 5 minutes, close the AC output side switch and the DC input side switch. If the fault persists, contact the dealer or after-sales service center.

8.5.2.1.3 Fault Handling (Fault Codes F81-F121)

fault code	Fault Name	fault cause	Fault Handling Recommendations
F81	P-Bus Overvoltage	Bus Overvoltage, possible cause: 1. PVOvervoltage; 2. InverterBUSVoltage Sampling Abnormal; 3. The isolation effect of the dual-split transformer at the rear end of the inverter is poor, causing the two inverters to interfere with each other when connected to the grid, and one of them reports DC overvoltage during grid connection.	Turn off the AC output switch and DC input switch, 5 minutes later turn on the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.
F82	N-Bus Overvoltage		
F83	Bus Overvoltage (Slave CPU1)		Disconnect the AC output switch and DC input switch, then close them 5 minutes later. If the fault still exists, contact the dealer or after-sales service center.
F84	P-Bus Overvoltage (Slave CPU1)		

fault code	Fault Name	fault cause	Fault Handling Recommendations
F85	N-Bus Overvoltage (Slave CPU1)	BUS Overvoltage, possible causes: 1. PV Overvoltage 2. InverterBUS Voltage Sampling Abnormal; 3. The isolation effect of the double-split transformer at the back end of the inverter is poor, causing mutual interference when two inverters are connected to the grid, and one of them reports DC overvoltage when connected to the grid;	
F86	Bus Overvoltage (Slave CPU2)		Disconnect the AC output side switch and DC input side switch. 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F87	P-Bus Overvoltage (Slave CPU2)		

fault code	Fault Name	fault cause	Fault Handling Recommendations
F88	N-Bus Overvoltage (Slave CPU2)	BUS Overvoltage, Possible cause: 1. PV voltage too high; 2. Inverter BUS voltage sampling anomaly; 3. The isolation effect of the dual-split transformer at the inverter rear end is poor, causing two inverters to interfere with each other when connected to the grid, and one of the inverters reports DC overvoltage when connecting to the grid;	
F89	P-Bus Overvoltage (CPLD)		Disconnect the AC output side switch and DC input side switch. 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F90	N-Bus Overvoltage(CPLD)	BUSOvervoltage, Possible cause: 1. PV Overvoltage 2. InverterBUSVoltage Sample Abnormal; 3. The isolation effect of the dual-split transformer at the inverter output is poor, causing interference between the two inverters when connected to the grid, and one of them reports DC overvoltage when connecting to the grid.	
F91	FlyCap Software Overvoltage	Flying capacitor over voltage, possible causes: 1. PV Overvoltage; 2. Inverter FlyCap Voltage Sampling Abnormal;	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F92	FlyCap Hardware Overvoltage		
F93	FlyCap Undervoltage	FlyCap Under voltage, possible causes: 1. PVInsufficient energy; 2. FlyCap Voltage Sample Abnormal;	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F94	FlyCap Precharge Failure	FlyCap Precharge Failure, possible causes: 1. PV Power Insufficient; 2. Inverter FlyCap Voltage Sampling Abnormal;	Disconnect the AC output switch and DC input switch. After 5 minutes, reconnect the AC output switch and DC input switch. If the fault persists, please contact the dealer or after-sales service center.
F95	FlyCap Precharge Abnormal	1. Control Loop Parameters Unreasonable 2. Hardware Damage	Disconnect the AC output side switch and DC input side switch. Close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, please contact the dealer or after-sales service center.
F96, F97	PV String Overcurrent(String1-n) n: Determined based on the actual number of PV strings of the inverter.	Possible causes: 1. PV String Overcurrent; 2. PV String Current Sensor Abnormal	Turn off the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F99, F100	PV String Loss(String1-n) n: Determined based on the actual number of inverter strings	String fuse disconnected (if any)	Check if the fuse is blown.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F101	Battery 1 Precharge Failure	Battery 1 Pre-charge Circuit Failure (pre-charge resistor burned out, etc.)	Check whether the pre-charge circuit is functioning properly. After only the battery is powered on, verify whether the Battery Voltage and the bus voltage are consistent. If not, contact the dealer or after-sales service center.
F102	Battery 1 Relay Failure	Battery 1 Relay Cannot Operate Normally	After the battery is powered on, check whether the battery relay operates and whether a closing sound is heard. If it does not operate, contact the distributor or after-sales service center.
F103	Battery1 Overvoltage	Battery 1 input voltage exceeds the machine's rated range	Confirm whether the Battery Voltage is with in the machine's rated range.
F104	Battery 2 Precharge Failure	Battery2 Precharge Circuit Failure (Precharge Resistor Burnt Out, etc.)	Check whether the pre-charge circuit is functioning properly. After only the battery is powered on, verify whether the Battery Voltage and the bus voltage are consistent. If not, contact the dealer or after-sales service center.
F105	Battery2Relay Failure	Battery 2 relay cannot operate normally	After the battery is powered on, check whether the battery relay operates and whether a closing sound is heard. If it does not operate, contact the distributor or after-sales service center.
F106	BAT2 Overvoltage	Battery 2 Input Voltage Exceeds Unit Rated Range	Confirm whether the Battery Voltage is with in the machine's rated range.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F107	On-grid PWM Sync Failure	Abnormality in carrier synchronization grid connection.	1. Check if the sync cable connection is normal 2. Check if the master-slave setting is normal; 3. Disconnect the AC output side switch and DC input side switch. 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F108	DSP Communication Failure	-	-
F109	External STS Failure	Inverter and STS connection cable abnormal	Check whether the wiring harness connection sequence between the inverter and STS corresponds one by one.
F110	Export Limit Protection	1. Inverter fault disconnection 2. MeterCommunication Unstable 3. Reverse power flow condition occurs	1. Check if the inverter has any other error messages. If so, perform targeted handling; 2. Check whether the meter connection is reliable; 3. If this alarm occurs frequently and affects the normal power generation of the power station, please contact the dealer or after-sales service center.
F111	Bypass Over Load	-	-
F112	Black Start Failure	-	-
F113	Offgrid AC Ins Volt High	-	-

fault code	Fault Name	fault cause	Fault Handling Recommendations
F114	Relay Failure2	Relay abnormal, reason: 1. Relay Abnormal (Relay Short Circuit) 2. Relay sampling circuit abnormal. 3. AC side wiring abnormality (possible loose connection or short circuit)	Disconnect the AC output side switch and DC input side switch, and after 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F115	SVGPrecharge Disabled	SVG Precharge Hardware Failure	Contact the dealer or after-sales service center.
F116	SVG Mode PID Prevention Failure	PIDHardware Abnormal Prevention	
F117	DSP Version Error	DSP Firmware Version Identification Error	Disconnect the AC output side switch and DC input side switch. 5 minutes later, reconnect the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
F118	MOSContinuous Overvoltage	1. Software issue causes inverter drive to turn off before flyback drive: 2. Inverter driver circuit abnormality causes failure to turn on: 3. PVOvervoltage; 4. MosVoltage Sampling Abnormal;	Disconnect the AC output side switch and DC input side switch. Close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F119	busbar short circuit fault	hardware damage	If a BUS short circuit fault occurs and the inverter remains off-grid, please contact the dealer or after-sales service center.
F120	Bus sampling anomaly	1. Bus Voltage Sampling Hardware Failure	Disconnect the AC output switch and DC input switch. After 5 minutes, close the AC output switch and DC input switch. If the fault persists, contact the dealer or after-sales service center.
F121	DC Sample Abnormal	1. BUSVoltage Sampling Hardware Failure 2. Battery Voltage Sampling Hardware Failure 3. Dcrly Relay Failure	Disconnect the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

8.5.2.1.4 Fault Handling (Fault Codes F122-F171)

fault code	Fault Name	fault cause	Fault Handling Recommendations
F122	PVInput Mode Error	PV Access Mode has three modes, taking four MPPT as an example: 1. Parallel Mode: i.e. AAAA Mode (Same Source Mode), PV1-PV4 same source, 4 strings PV connect to the same PV panel 2. Partial Parallel Mode: i.e., AACC mode, PV1 and PV2 are connected from the same source, PV3 and PV4 are connected from the same source. 3. Independent Mode: i.e., ABCD Mode (Non-identical), PV1, PV2, PV3, PV4 independently connected, 4 strings of PV each connected to a PV panel If the actual connection mode of PV does not match the connection mode set by the	Check whether the PV Input Mode is correctly set (ABCD, AACC, AAAA), and re-set the PV Input Mode in the correct way. 1. Confirm that each connected PV is correctly connected; 2. If the PV is correctly connected, check via APP or the screen whether the currently set "PV Access Mode" corresponds to the actual access mode; 3. If the currently set "PV Connection Mode" does not match the actual access mode, it needs to be set to the mode consistent with the actual situation via APP or the screen. After the setting is completed, disconnect PV and AC from the power supply and restart; 4. After the setting is completed, if the current "PV Input Mode" is consistent with the actual input mode, but the fault is still reported, please contact the dealer or after-sales service center.

fault code	Fault Name	fault cause	Fault Handling Recommendations
		device for PV, this fault will be reported.	
F123	Multi-string PV Phase Error	PVInput Mode Error	Check if the PV input mode is correctly set (ABCD, AACC, AAAA), and re-set the PV input mode in the correct way. 1. Check whether the actual connected PV strings are correctly connected; 2. If PV is correctly connected, check through the APP or screen whether the currently set "PV Connection Mode" corresponds to the actual connection mode. 3. If the currently set "PV Access Mode" does not match the actual access mode, it is necessary to set the "PV Access Mode" to a mode consistent with the actual situation through APP or the screen. After the setting is complete, disconnect the power supply of PV and AC and restart; 4. After configuration, if the current "PV Connection Mode" matches the actual connection mode, but the fault is still reported, please contact the dealer or after-sales service center.
F124	Battery1 Reverse Connection Failure	Battery 1 Positive and Negative Terminals Reversed	Check whether the positive and negative terminals of the battery and the machine are consistent.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F125	Battery 2 Reverse Connection Failure	Battery 2 Positive and Negative Terminals Reversed	Check whether the positive and negative terminals of the battery and the machine are consistent.
F126	Battery abnormal connection	Battery abnormal connection	Check whether the battery is operating normally.
F127	BAT Overtemperature	Battery temperature too high, possible causes: 1. Inverter installation location not ventilated. 2. Ambient Overtemperature. 3. Internal Fan Abnormal.	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F128	Ref Voltage Abnormal	Reference circuit fault	Disconnect the AC output side switch and DC input side switch, then close the AC output side switch and DC input side switch after 5 minutes. If the fault persists, please contact the dealer or after-sales service center.
F129	Cabinet Under Temperature	Cabinet Under Temperature, possible cause: low ambient temperature.	Turn off the AC output switch and the DC input switch. After 5 minutes, turn on the AC output switch and the DC input switch. If the fault persists, contact the dealer or after-sales service center.
F130	AC SPD Failure	AC SPD Failure	Replace the lightning protection devices on the AC side.
F131	DC Side SPD Failure	DC Side SPD Failure	Replace the DC side surge protective device.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F132	Internal Fan Abnormal	Internal Fan Abnormal, possible causes: 1. Fan Power Supply Abnormal 2. Mechanical Fault(Stall); 3. Fan aging damage.	Open the AC output side switch and DC input side switch. After 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, contact the dealer or after-sales service center.
F133	External Fan Abnormal	External Fan Abnormal, possible causes: 1. Fan Power Supply Abnormal; 2. Mechanical Fault(Stall); 3. Fan aging damage.	
F134	PID Abnormal	PIDHardware Failure or PVOvervoltage PIDPaused	PV Overvoltage caused by PID pause warning can be ignored. PID hardware fault can be cleared by turning off the PID switch and then turning it on to clear the PID fault, and replace the PID device.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F135	Trip-Switch Trip Warning	Possible causes: Overcurrent or PV reverse connection causes the trip switch to trip;	Contact the dealer or after-sales service center; the reason for the trip is PV short circuit or reverse connection. Check if there is any historical PV short circuit warning or historical PV reverse connection warning. If yes, a maintenance technician needs to check the corresponding PV situation. After inspection and no faults found, you can manually close the trip switch and clear the historical faults through the APP interface to clear this warning.
F136	HistoryPV IGBT Short Circuit Warning	Possible causes: Over current occurred, causing the trip switch to trip.	Contact the dealer or after-sales service center; the maintenance personnel should check whether the PV short circuit warning sub-code history indicates a fault in the Boost hardware or external string; after inspection, if no fault is found, the warning can be cleared through the APP interface by clearing the historical fault operation.
F137 , F138	Historical PV Reverse Connection Warning (String 1-n) (n: judge based on the actual number of inverter strings)	Possible causes: Occurred PV reverse connection causes the trip switch to trip;	Contact the dealer or after-sales service center; Maintenance personnel should check whether the corresponding string is reverse-connected according to the historical PV reverse connection warning subcode, check whether there is a voltage difference in the PV panel configuration; After the inspection is completed and no fault is found, the warning can be cleared through the APP interface by clearing the historical fault operation.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F139	FlashR/W Error	Possible causes: 1. FlashContent changed; 2. Flash Lifespan exhausted;	1. Upgrade to the latest program version; 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 reasons: 1. Meter Not Connected; 2. Meter and inverter communication cable wiring error.	Check the meter wiring and connect the meter correctly. If the fault persists after inspection, please contact the dealer or after-sales service center.
F141	PVType Identification Failure	PVPanel Identification Hardware Abnormal	Contact the dealer or after-sales service center.
F142	PV String Mismatch	PV PV String Mismatch, under the same MPPT, two strings have different open-circuit voltage configurations.	Check the open-circuit voltage of two PV strings, and configure strings with the same open-circuit voltage under the same MPPT. Long-term string mismatch poses a safety hazard.
F143	CT Not Connected	CT Not Connected	Check CT wiring.
F144	CTReversed	CT Reversed	Check CT wiring.
F145	PE Loss	Ground wire not connected	Check the ground wire.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F146	PV String Terminal Overtemperature(String 1~8)	37176 Register PV Terminal Temperature Alarm Subcode 1 Has Been Set	-
F147	PV String Terminal Overtemperature(String 9~16)	37177 Register PV Terminal Temperature Alarm Subcode 2 Is Set	-
F148	PV String Terminal Overtemperature(String 17~20)	37178 Register PV Terminal Temperature Alarm Subcode 3 Has Been Set	-
F149	历史PV Reverse Connection Warning (String 33~48)	Possible causes: PV reverse connection causes trip switch tripped;	Contact the dealer or after-sales service center; the maintenance personnel should check the corresponding PV string for reverse polarity based on the historical PV Reverse Polarity Warning sub-code, and check if there is a voltage difference in the PV panel configuration; after inspection, if no fault is found, the warning can be cleared through the App interface by performing the clear historical fault operation.
F150	BAT1 Voltage Low	Battery Voltage below set value	-
F151	Battery 2 Voltage Low	Battery Voltage below set value	-
F152	Low Voltage of Battery Power	Battery non-charging mode, voltage below shutdown voltage	-

fault code	Fault Name	fault cause	Fault Handling Recommendations
F153	Battery 1 Voltage High	-	-
F154	Battery 2 Voltage High	-	-
F155	Online Low Insulation Resistance	1. PV string short circuit to protective earth. 2. The environment for PV string installation is relatively humid for a long time and the wiring has poor insulation to ground.	1. Check the impedance of the PV string to protective earth. If a short circuit occurs, rectify the short circuit point. 2. Check whether the protective ground wire of the inverter is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, please reset the "Insulation Resistance Protection Point".
F156	Micro-grid Overload Warning	backup Port Input Current Too High	Occasional occurrence requires no action; if the alarm occurs frequently, please contact the dealer or after-sales service center.
F157	Manual Reset	-	-
F158	Generator Phase Sequence Abnormal	-	-
F159	Multiplexed Port Configuration Abnormal	Multiplexed (Diesel Generator) port configured as Microgrid or large load, but actually connected to a Diesel Generator	Use APP to change the multiplexed (Diesel Generator) port configuration.

fault code	Fault Name	fault cause	Fault Handling Recommendations
F160	EMS Forced Off-grid	EMS issues forced off-grid, but the off-grid function is not enabled	Enable off-grid function.
F161	Passive Anti-islanding Protection	-	-
F162	Grid Type Fault	The actual grid type (two-phase or split-phase) does not match the safety regulation settings.	Switch to the corresponding safety regulations according to the actual Type of Electrical Supply System.
F163	Grid Phase Instability	Grid anomaly: Grid voltage phase change rate does not comply with local grid standards.	1. If it occurs occasionally, it may be due to a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If this occurs frequently, please check whether the grid frequency is within the allowable range. If not, please contact the local power operator.
F166	PV Terminal Overtemperature	PV Terminal Overtemperature, possible causes: 1. Inverter installation location without ventilation. 2. Ambient Overtemperature. 3. Internal Fan Abnormal.	

fault code	Fault Name	fault cause	Fault Handling Recommendations
F167	AC Terminal Overtemperature Warning	AC Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient overtemperature. 3. Internal fan abnormal. [7]	1. Check whether the ventilation at the inverter installation location is adequate and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If ventilation is inadequate or the ambient temperature is too high, improve ventilation and heat dissipation. 3. If both ventilation and ambient temperature are normal, contact the dealer or after-sales service center.
F168	Battery terminal over-temperature	BAT Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature.	
F169	Battery terminal high temperature alarm	BAT Terminal Overtemperature, possible causes: 1. Poor ventilation at inverter installation location. 2. Ambient temperature too high.	
F170	STS over-temperature	STS Overtemperature, possible causes: 1. The STS installation location is not well ventilated. 2. Ambient Overtemperature.	

fault code	Fault Name	fault cause	Fault Handling Recommendations
F171	Abnormal inverter-to-battery wiring	Abnormal connection of the power cable between the battery and inverter.	Check whether the power line connection between the battery and the inverter is normal.

8.5.2.1.5 Fault Symptom Handling

Fault Name	Fault Cause	Fault Handling Suggestion
Generator Failure	1. This fault will be displayed continuously when no generator is connected. 2. When the generator is operating, this fault will be triggered if generator safety regulations are not met.	1. Ignore this fault if no generator is connected; 2. When this fault appears during a generator failure, it is normal. Wait for a period after the generator recovers, and the fault will clear automatically; 3. This fault does not affect the normal operation of off-grid mode. 4. When both generator and grid are connected and meet safety requirements, grid connection takes priority, and the system will operate in grid-connected mode.
BMS Status Bit Error	BMS module failure	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.
Ambient Overtemperature	1. Poor ventilation of the machine 2. Hot air flow back to the ambient temperature sampling point	Disconnect the AC output side switch and DC input side switch, wait for 5 minutes, then close the AC output side switch and DC input side switch. If the fault persists, please contact the dealer or after-sales service center.

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

Fault Name	Fault Cause	Fault Handling Suggestion
BAT Terminal Overtemperature Warning	BAT terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, please improve ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
Three-phase on-grid fault	Three-phase external wiring error	Re-wire the connections.
External STS Failure	Abnormal connection cable between inverter and STS	Check if the wiring sequence of the harness connecting the inverter and the STS corresponds one-to-one in order.

Fault Name	Fault Cause	Fault Handling Suggestion
Parallel Comm Timeout Shutdown	In parallel mode, if a slave unit has not communicated with the master for over 400 seconds	Check if the parallel communication harness is securely connected. Check for duplicate slave addresses.
Three-phase off-grid phase loss fault	Phase loss in a three-phase system group	1. Check if all inverters are powered on; 2. Check if each phase in the three-phase group is connected to an inverter;

Fault Name	Fault Cause	Fault Handling Suggestion
EPO	External trigger of hardware EPO button or remote trigger of EPO command	1. If it was actively triggered by remote shutdown, it can be ignored; 2. If not actively triggered, please contact the distributor or after-sales service center.
High combustible gas concentration	Automatically triggered when the combustible gas device detects a concentration of 20% LEL or higher	1. After the fault occurs, the unit will automatically open the air damper to ventilate and reduce the concentration. The fault will automatically clear after the concentration remains below 5% LEL for 15 minutes. 2. If a cluster-level fire protection fault is triggered after this fault occurs, the air damper will automatically close. Confirm the damper status within 30s to ensure the cluster-level fire protection operates in an enclosed space. 3. Please contact the distributor or after-sales service center.
Mismatch between air damper open command and feedback signal for combustible gas device	Mismatch between the control signal to open the air damper and the feedback signal	1. Check the harness signal connection for issues. 2. Please contact the distributor or after-sales service center.
One-touch shutdown	Check via the App if the one-touch shutdown function is enabled	Disable the one-touch shutdown.

Fault Name	Fault Cause	Fault Handling Suggestion
Offline shutdown	-	-
Remote shutdown	-	-
On-Grid SPD Fault	-	1. Try restarting the unit and observe if the fault clears; 2. If the fault persists after restarting, please contact the distributor or after-sales service center.
Off-Grid SPD Fault	-	1. Try restarting the unit and observe if the fault clears; 2. If the fault persists after restarting, please contact the distributor or after-sales service center.
Child Node Communication Failure	Internal Comm Abnormal	1. Try restarting the unit and observe if the fault clears; 2. If the fault persists after restarting, please contact the distributor or after-sales service center.
Dehumidifier communication fault	Abnormal communication link between the dehumidifier and the LC control box	1. Check the link communication harness and observe if the fault clears; 2. Try restarting the unit and observe if the fault clears; 3. If the fault persists after restarting, please contact the distributor or after-sales service center.

Fault Name	Fault Cause	Fault Handling Suggestion
Combustible gas detection device communication fault	1. The combustible gas device was not properly configured with the 485 address set to 2 during factory settings. 2. Abnormal communication link between the combustible gas device and the LC control box	1. Check the link communication harness and observe if the fault clears; 2. Try restarting the unit and observe if the fault clears; 3. Use the method provided by the combustible gas manufacturer to check if the device address is 2. If not, modify it; 4. If the fault persists after restarting, please contact the distributor or after-sales service center.
DG Communication Failure	Abnormal communication link between the control board and the diesel generator	1. Check the link communication harness and observe if the fault clears; 2. Try restarting the unit and observe if the fault clears; 3. If the fault persists after restarting, please contact the distributor or after-sales service center.
Battery Over Voltage	1. Single cell voltage too high 2. Abnormal voltage sensing line	Record the fault phenomenon, restart the battery, wait a few minutes, and confirm if the fault disappears. If the problem persists after restarting, please contact the after-sales service center.
	1. Total battery voltage too high 2. Abnormal voltage sensing line	
Battery Undervoltage	1. Single cell voltage too low 2. Abnormal voltage sensing line	

Fault Name	Fault Cause	Fault Handling Suggestion
	1. Total battery voltage too low 2. Abnormal voltage sensing line	
Battery Overcurrent	1. Charging current too high, abnormal battery current limiting: sudden changes in temperature and voltage values 2. Inverter response abnormal	
	Battery discharge current too high	
Battery Overtemperature	1. Ambient Overtemperature 2. Abnormal temperature sensor	
Battery Undertemperature	1. Ambient temperature too low 2. Abnormal temperature sensor	
Battery Terminal Overtemperature	Terminal temperature too high	

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

Fault Name	Fault Cause	Fault Handling Suggestion
	1. Inconsistent cell aging levels 2. Slave board chip issues can also cause excessive cell voltage difference; 3. Slave board balancing issues can also cause excessive cell voltage difference 4. Caused by harness issues	
Insulation Resistance	Insulation resistance damaged	Check if the ground wire is properly connected, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
Pre-charging Failure	Pre-charging Failure	Indicates that during pre-charging, the voltage across the pre-charge MOS always exceeds the specified threshold. After powering off and restarting, observe if the fault persists. Check if wiring is correct and if the pre-charge MOS is damaged.
Sensing line fault	Battery sensing line poor contact or disconnected	Check wiring, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
	Cell voltage sensing line poor contact or disconnected	Check wiring, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
	Cell temperature sensing line poor contact or disconnected	

Fault Name	Fault Cause	Fault Handling Suggestion
	Dual-channel current comparison error too large, or abnormal current sensing line loop	
	Dual-channel voltage comparison error too large or MCU vs. AFE voltage comparison error too large, or abnormal voltage sensing line loop	
	Temperature sensing line loop abnormal or poor contact/disconnected	
	Overvoltage level 5 or overtemperature level 5, tripping the three-terminal fuse	The three-terminal fuse is blown. Please contact the after-sales service center to replace the main control board.
Relay or MOS overtemperature	Relay or MOS overtemperature	This fault indicates the MOS tube temperature exceeds the specified threshold. Power off and let it sit for 2 hours for temperature recovery.
Shunt overtemperature	Shunt overtemperature	This fault indicates the shunt temperature exceeds the specified threshold. Power off and let it sit for 2 hours for temperature recovery.

Fault Name	Fault Cause	Fault Handling Suggestion
BMS1 Other Faults 1 (Residential Storage)	Relay or MOS open circuit	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists; 2. If it persists, replace the battery pack
	Relay or MOS short circuit	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists; 2. If it persists, replace the battery pack
	Communication abnormal between master and slave clusters or cell inconsistency between clusters	1. Check the slave battery information, software version, and if the communication cable connection to the master is normal 2. Upgrade software
	Battery system loop harness abnormal, causing interlock signal loop not formed	Check if the terminal resistor is installed correctly
	BMS and PCS communication abnormal	1. Confirm if the communication cable interface definition between the inverter and the connected battery is correct; 2. Please contact the after-sales service center, check backend data, and observe if the inverter and battery software are correctly matched.
	BMS master and slave control communication harness abnormal	1. Check wiring, restart the battery; 2. Upgrade the battery software. If the problem persists after restarting, please contact the after-sales service center.

Fault Name	Fault Cause	Fault Handling Suggestion
	Communication loss between main negative chips	
	Circuit breaker, shunt trip abnormal	1. Power off and let it sit for 5 minutes, restart and see if the fault persists; 2. Observe the PACK and PCU bottom blind-mate connectors, check if communication pins are loose or bent;
	MCU self-test failure	Upgrade software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
	1. Software version too low or BMS board damaged 2. Large number of inverters in parallel, causing excessive inrush current during battery pre-charge	1. Upgrade software, observe if the fault persists. 2. If in parallel configuration, start the battery in black start mode first, then start the inverters.
	MCU internal fault	Upgrade software, restart the battery. This usually indicates MCU or external component damage. If the problem persists after restarting, please contact the after-sales service center.
	Total control current exceeds specified threshold	1. Power off and let it sit for 5 minutes, restart and see if the fault persists; 2. Check if the inverter power setting is too high, causing the bus load to be exceeded;

Fault Name	Fault Cause	Fault Handling Suggestion
	Inconsistent cells in parallel clusters	Confirm if the cells in the parallel clusters are consistent.
	Reverse polarity connection of parallel cluster batteries	Check if the positive and negative terminals of the parallel cluster batteries are reversed.
	Severe overtemperature/overvoltage etc. triggering fire protection system	Contact the after-sales service center.
Air Conditioner Failure	Air conditioner abnormal failure	Try restarting the system. If the fault is not resolved, please contact the after-sales service center.
	Cabinet door not closed	Check if the cabinet door is properly closed
	Supply voltage too high	Confirm if the supply voltage meets the air conditioner input voltage requirements. Confirm compliance before reapplying power.
	Insufficient supply voltage	
	No voltage input	
	Unstable supply voltage	Try restarting the system. If the fault is not resolved, please contact the after-sales service center.
	Compressor voltage unstable	
	Sensor poor contact or damaged	
	Air conditioner fan abnormal	

Fault Name	Fault Cause	Fault Handling Suggestion
BMS1 Other Faults 2 (Residential Storage)	Internal voltage or current abnormal in DCDC	Refer to specific DC fault content.
	DCDC overload or heatsink overtemperature, etc.	
	Cell sensing abnormal or inconsistent aging levels	Please contact the after-sales service center.
	Fan action not executed normally	Please contact the after-sales service center.
	Output port screw loose or poor contact	1. Power off the battery, check wiring and output port screw condition. 2. After confirmation, restart the battery, observe if the fault persists. If it persists, please contact the after-sales service center.
	Battery used for too long or cells severely damaged	Please contact the after-sales service center to replace the pack.
	1. Software version too low or BMS board damaged 2. Large number of inverters in parallel, causing excessive inrush current during battery pre-charge	1. Upgrade software, observe if the fault persists. 2. If in parallel configuration, start the battery in black start mode first, then start the inverters.
	Heating film damaged	Please contact the after-sales service center.

Fault Name	Fault Cause	Fault Handling Suggestion
	Heating film three-terminal fuse blown, heating function unavailable	Please contact the after-sales service center.
	Software model, Cell Type, hardware model mismatch	Check if the software model, SN, Cell Type, and hardware model are consistent. If not, please contact the after-sales service center.
	Thermal management board communication line break	1. Power off and let it sit for 5 minutes, restart and see if the fault persists; 2. If the fault does not recover, contact after-sales to replace the pack.
	Pack fan fault signal triggered	
DCDC fault	Output port voltage too high	Check the output port voltage. If the voltage is normal and the fault does not clear itself after restarting the battery, please contact the after-sales service center.
	DCDC module detects battery voltage exceeding maximum charging voltage	Stop charging, discharge to below 90% SOC or let it sit for 2 hours. If ineffective and the fault persists after restarting, please contact the after-sales service center.
	Heatsink temperature too high	Let the battery sit for 1 hour for heatsink temperature to drop. If ineffective and the fault persists after restarting, please contact the after-sales service center.
	Battery discharge current too high	Check if the load exceeds the battery's discharge capability. Turn off the load or stop PCS operation for 60s. If ineffective and the fault persists after restarting, please contact the after-sales service center.

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

Fault Name	Fault Cause	Fault Handling Suggestion
	SN writing does not comply with rules	Check if the SN digit count is normal. If abnormal, please contact the after-sales service center.
	1. Communication abnormal in battery cluster daisy chain 2. Inconsistent cell aging levels between battery clusters	1. Check the pack contact condition within a single cluster. 2. Confirm the usage of each cluster, such as cumulative charge/discharge capacity, cycle count, etc. 3. Please contact the after-sales service center.
	High humidity inside pack	-
	Fuse blown	Contact after-sales to replace the pack.
	Battery low power	Charge the battery.
BMS1 Other Faults 4 (Large-scale Storage)	Circuit breaker abnormal	Contact after-sales to replace the pack.
	External device abnormal	Contact after-sales to replace the pack.
Contactor Failure 1	-	-
Contactor Failure 2	-	-
Overload Protection (Ksic)	Sustained overload (over 690KVA) for 10s	Please contact the after-sales service center.
Overload protection (Smart port)	Sustained overload (over 690KVA) for 10s	Please contact the after-sales service center.

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

8.5.2.2 battery fault

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
1	BMS1 Rack1 Total Voltage Too High Warning	1. Battery system over voltage 2. Voltage measurement line abnormal	1. Discharge the battery to check if the fault persists; 2. If the fault is not resolved, contact the after-sales service center.
2	BMS1 Rack1 Total Voltage Low Warning	1. Battery system under voltage 2. Voltage measurement line abnormal	1. Charge the battery and let it rest to see if the fault persists. When the inverter has charging conditions, restart the battery to trigger a quick charge. 2. Determine the working status of the inverter, whether it is not charging the battery due to working mode or other issues, try to charge the battery through the inverter, and observe if the fault is resolved. 3. If the fault is not resolved, contact after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
3	BMS1 Rack1 Cell Overvoltage Warning	1. Single cell over voltage 2. Voltage measurement line abnormal	1. Discharge the battery and let it stand to see if the fault persists; 2. If the fault is not resolved, contact the after-sales service center.
4	BMS1 Rack1 Cell Voltage Too Low Warning /BMS1 RACK1 Cell voltage is too low warning	1. Single cell voltage too low 2. Voltage measurement line abnormal	1. Charge the battery and let it rest to see if the fault persists; 2. Verify the inverter's operation and determine if it is not charging the battery due to working mode or other issues. Attempt to charge the battery via the inverter and observe if the fault clears. 3. If the fault persists, contact after-sales service.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
5	BMS1 Rack1 Charging Overtemperature Warning	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Stop charging and discharging, let it rest and check if the fault persists; 2. If the fault persists, contact the after-sales service center.
6	BMS1 Rack1 Discharging Temperature Too High Warning	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Stop charging/discharging, let it rest, and check if the fault persists. 2. If the fault is not resolved, contact after-sales service.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
7	BMS1 Rack1 Charging temperature is too low warning	1. Low ambient temperature 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is higher than -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is lower than -20°C, turn off the battery and place it in a warm environment, and use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
8	BMS1 Rack1 Discharging Temperature Too Low Warning/	1. Low ambient temperature 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is higher than -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is lower than -20°C, shut down 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.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
9	BMS1 Rack1 Charge Overcurrent Warning/	1. Charging Current too high, battery current limiting abnormal: temperature and voltage values sudden change 2. Inverter abnormal response	1. Stop charging and let it rest to see if the fault persists; 2. Check if the inverter is configured with excessive power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.
10	BMS1 Rack1 Discharge overcurrent warning/ BMS1 RACK1 Discharge overcurrent warning	1. Excessive discharge current, abnormal current limiting of battery: sudden change in temperature and voltage values. 2. Inverter abnormal response	1. Stop discharging, let it rest and check if the fault persists; 2. Check if the inverter's power setting is too high, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
11	BMS1 Rack1 Insulation Resistance Low Warning/	Insulation resistance damage or abnormal contact	Check whether the ground wire is properly connected, restart the battery. If the problem persists after restart, please contact the after-sales service center.
12	BMS1 Rack1 Cell excessive temperature differentials warning/	1. In different stages of excessive temperature difference, the battery will limit its power, i. e., limit the charge/discharge current. The refore, this issue is generally unlikely to occur. 2. Cell capacity degradation leads to excessive internal resistance, resulting in a large temperature rise during over current, and thus the temperature difference	Power off, restart the battery, and wait for 2 hours. If the problem is not resolved, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
		becomes large. 3. Poor welding of cell tabs leads to rapid heating of the cell under Over current. 4. Temperature sampling issue; 5. Loose power line connection	
13	BMS1 Rack1 Post Overtemperature Warning/	Terminal post over temperature	1. Stop charging and discharging, and let it stand to see if the fault persists; 2. If the fault is not resolved, contact after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
14	BMS1 Rack1 Cell excessive voltage differential warning/	1. Cell aging inconsistency 2. Slave board chip issues can also lead to excessive cell voltage difference. 3. Slave board balancing issues can also cause excessive cell voltage difference. 4. caused by wiring harness issues	1. Stop charging and discharging, and let it sit to see if the fault persists; 2. If the fault is not resolved, contact after-sales service center.
15	BMS1 Rack1 PCS communication loss warning/	Abnormal communication between BMS and PCS	Check whether the communication cable connection between the battery and the inverter is intact.
16	BMS1 Rack1 DCDC warning/ BMS1 RACK1 DCDC warning	Abnormal voltage or current inside the DC-DC converter.	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.
17	BMS1 Rack1 Heat film MOS adhesion warning/	Heating film MOSFET damaged	Please contact the after-sales service center.
18	BMS1 Rack1 Heat film MOS open warning/	Heating circuit abnormal	Please contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
19	BMS1 Rack1 Total Voltage Too High Fault/	1. Battery system over voltage 2. Voltage measurement line abnormal	1. Discharge the battery to see if the fault persists; 2. If the fault is not resolved, please contact the after-sales service center.
20	BMS1 Rack1 Total Voltage Too Low Fault/	1. Battery system under voltage 2. Voltage measurement line abnormal	1. Charge the battery and let it stand to see if the fault persists; 2. Check the inverter operating status to determine if it is not charging the battery due to working mode issues, etc. Try charging the battery through the inverter and observe if the fault is resolved. 3. If the fault is not resolved, please contact the after-sales service center.
21	BMS1 Rack1 Cell Overvoltage Fault/	1. Single cell over voltage 2. Voltage measurement line abnormal	1. Discharge the battery and let it sit to check if the fault persists; 2. If the fault is not resolved, please contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
22	BMS1 Rack1 Cell voltage is too low fault	1. Single cell voltage too low 2. Voltage sampling line abnormal	1. Charge the battery and let it sit to see if the fault persists. 2. Determine the inverter's operating status, and check if the battery is not being charged due to issues such as the operating mode. Try charging the battery through the inverter and observe if the fault is resolved.
23	BMS1 Rack1 Charging Overtemperature Fault/	1. Ambient Overtemperature - Temperature sensor abnormal	1. Place the battery in a cool place, shut it down and let it sit for 30 minutes. After restarting, check if the fault persists; 2. If the fault persists, please contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
24	BMS1 Rack1 Discharge Overtemperature Fault/	1. Ambient Overtemperature Temperature sensor abnormal	1. Place the battery in a cool area, power it off and let it sit for 30 minutes, then restart and check if the fault persists. 2. If the fault persists, please contact the after-sales service center.
25	BMS1 Rack1 Charging Temperature Too Low Fault /	1. Low ambient temperature 2. Temperature sensor abnormal	1. Check the cell temperature via the backend. If the minimum temperature is above -20°C, set the battery to discharge to increase the cell temperature. 2. If the temperature is below -20°C, turn off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If the above measures are ineffective, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
26	BMS1 Rack1 Discharging temperature too low fault	1. Low ambient temperature 2. Temperature sensor abnormal	1. Check the battery 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, turn off the battery and place it in a warm environment. Use it after the cell temperature rises. 3. If none of the above works, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
27	BMS1 Rack1 Charge Overcurrent Fault/	1. Charging Current too high, battery current limiting abnormal: temperature and voltage values sudden change 2. Inverter abnormal response	1. Shut down and leave idle for 5 minutes, then restart and check if the fault persists; 2. Check whether the inverter power setting is too high, causing the battery rated current to be exceeded; 3. If the overcurrent persists, contact the after-sales service center.
28	BMS1 Rack1 Discharge Overcurrent Fault/	1. Excessive discharge current, abnormal current limiting of battery: sudden change in temperature and voltage values. 2. Inverter abnormal response	1. Power off for 5 minutes, then restart to check if the fault persists; 2. Check if the inverter power setting is too high, causing the battery rated operating current to be exceeded; 3. If overcurrent persists, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
29	BMS1 Rack1 Insulation Resistance Low Fault/	Insulation resistance damage or abnormal contact	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.
30	BMS1 RACK1 Cell excessive temperature differentials fault/ BMS1 RACK1 Cell excessive temperature differentials fault	1. In different stages of excessive temperature difference, the battery will limit its power, i. e., limit the charge/discharge current. Therefore, this issue is generally unlikely to occur. 2. Cell capacity degradation leads to excessive internal resistance, resulting in a large temperature rise during over current, and thus the temperature difference	Power off, restart the battery, and wait for 2 hours. If the problem is not resolved, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
		becomes large. 3. Poor welding of cell tabs leads to rapid heating of the cell under Over current. 4. Temperature sampling issue; 5. Loose power line connection	
31	BMS1 RACK1 Post temperature is too high fault/	Terminal post over temperature	1. If the fault persists after 30 minutes of shutdown, restart and check; 2. If the fault persists, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
32	BMS1 Rack1 Cell excessive voltage differentials fault/	1. Cell aging inconsistency 2. Slave board chip issues can also lead to excessive cell voltage difference. 3. The slave board balancing issue can also cause excessive cell voltage difference. 4. caused by wiring harness issues	Power off, restart the battery, and wait for 2 hours. If the problem is not resolved, contact the after-sales service center.
33	BMS1 Rack1 Relay or MOS Short-circuit Fault/	MOS short circuit	1. Upgrade the software, let the device sit idle for 5 minutes after shutdown, then restart and check if the fault persists; 2. If it persists, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
34	BMS1 Rack1 Relay or MOS open circuit fault/	MOS open circuit	1. Upgrade the software, power off and let it sit for 5 minutes, restart and check if the fault persists. 2. If it persists, contact the after-sales service center.
35	BMS1 Rack1 Pre-charging Failure/	The voltage across the pre-charge MOSFET always exceeds the specified threshold.	1. Upgrade the software, power off and leave it for 5 minutes, then restart and check 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 sampling line poor contact or disconnection	Shut down, check wiring, restack batteries, and if the problem persists after restart, contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
37	BMS1 Rack1 Relay or MOS temperature is too high fault/	Relay or MOSFET over-temperature	1. Upgrade the software, power off and let it sit for 30 minutes, then restart and check if the fault persists; 2. If it persists, contact after-sales service center.
38	BMS1 Rack1 Combiner Box Overtemperature Fault/	Shunt over temperature	1. Upgrade the software, leave it powered off for 30 minutes, then restart and check if the fault persists; 2. If it persists, contact the after-sales service center.
39	BMS1 Rack1 Slave MCU communication fault/	Communication loss between master and slave chips	1. Check the wiring, restart the battery, 2. Update the battery. If the problem persists after restart, please contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
40	BMS1 Rack1 BMU Comm Failure/	BMS master-slave communication harness fault	1. Check the wiring, restart the battery, 2. Upgrade the battery. If the problem persists after restart, please contact the after-sales service center.
41	BMS1 Rack1 Micro-electronics fault/	MCU internal fault	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.
42	BMS1 Rack1 Hardware Overcurrent Fault/	1. Software version is too low or BMS board is damaged. 2. When a large number of inverters operate in parallel, the battery experiences excessive surge during pre-charge.	1. Upgrade the software and observe if the fault persists. 2. In case of parallel connection, black start the battery first, then start the inverter.
43	BMS1 Rack1 Application software fault/	MCU self-test failed	Upgrade the software, restart the battery. If the problem persists after restart, please contact the after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
44	BMS1 Rack1 Parallel Rack fault/	Communication anomaly between main cluster and slave cluster, or cell inconsistency between clusters.	1. Check the battery information and software version of the slave, and whether the communication cable connection with the master is normal. 2. software upgrade
45	BMS1 Rack1 DCDC fault /	DCDC over load 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	1. Cell identification anomaly 2. Different types of cell stacking	Check the cell type
47	BMS1 Rack1 Output Port Over Temperature Fault/	Loose screw or poor contact at the output port.	1. Battery shutdown, check the wiring and output terminal screws 2. After confirmation, restart the battery, observe if the fault persists, if it persists, contact after-sales service center.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
48	BMS1 Rack1 SOH too low fault/	Excessive battery usage or severe cell damage	Replace pack
49	BMS1 Rack1 Heating Film Three-Terminal Fault/ BMS1 RACK1 Heating film MOS Three-terminal fault	Heating film MOSFET 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
Battery Side			
Battery Type	LFP (LiFePO ₄)	LFP (LiFePO ₄)	LFP (LiFePO ₄)
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 Input	1	1	1
Max. Continuous Charging Current (A)	6.7	8.1	10.7
Max. Continuous Discharging Current (A)	7.4	8.9	11.8
Max. Charging Power (kW)	5	6	8
Max. Discharging Power (kW)	5.5	6.6	8.8
PV Side			
Max. Input Power (kW)	10	12	16

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
Max. Input Voltage (V)*1	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	185~850	225~850	300~850
Start-up Voltage (V)	150	150	150
Nominal Input Voltage (V)	750	750	750
Max. MPPT Current (A)	21/21/21	21/21/21	21/21/21
Max. MPPT Short Circuit Current (A)	26/26/26	26/26/26	26/26/26
Max. Backfeed Current to The Array (A)	0	0	0
Number of MPPTs	3	3	3
Number of Strings per MPPT	1/1/1	1/1/1	1/1/1
AC Side (Grid Port)			
Rated Power (kW)	5	6	8
Max. Power (kW)	5	6	8
Rated Apparent Power to Grid (kVA)	5	6	8

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
Rated Apparent Power from Grid (kVA)	5	6	8
Max. Apparent Power to Grid (kVA) ^{*3}	5	6	8
Max. Apparent Power from Grid (kVA)	43.5 ^{*4}	43.5 ^{*4}	43.5 ^{*4}
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)	7.6 @380V 7.3 @400V	9.1 @380V 8.7 @400V	12.2 @380V 11.6 @400V
Rated Current from Grid (A)	7.6 @380V 7.3 @400V	9.1 @380V 8.7 @400V	12.2 @380V 11.6 @400V
Max. Current to Grid (A) ^{*6}	7.6 @380V 7.3 @400V	9.1 @380V 8.7 @400V	12.2 @380V 11.6 @400V
Max. Current from Grid (A) ^{*6}	63.0 ^{*4}	63.0 ^{*4}	63.0 ^{*4}
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	46.7	46.7	46.7
Type of Voltage	a.c.	a.c.	a.c.
AC Side (Back-up Port)			
Rated Apparent Power (kVA)	5	6	8
Max. Apparent Power (kVA) ^{*7}	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
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
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 (A)	7.6 @380V 7.3 @400V	9.1 @380V 8.7 @400V	12.2 @380V 11.6 @400V
Max. Current (A) ^{*7}	Off-grid: 11.4, on-grid: 63	Off-grid: 13.7, on-grid: 63	Off-grid: 18.2, on-grid: 63
Max. Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms
Maximum Overcurrent Protection (A)	46.7	46.7	46.7
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time (ms)	<4	<4	<4
Efficiency			
Max. Efficiency	98.00%	98.00%	98.00%
European Efficiency	96.40%	96.90%	97.10%
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

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
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
DC Switch	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional
AFCI	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
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)	34	34	34
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤35	≤35	≤35
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

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	III	III	III
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 PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method ^{*8}	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
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			

Technical Data	GW5K-ETA-G20	GW6K-ETA-G20	GW8K-ETA-G20
EMC			

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Battery Side			
Battery Type	LFP (LiFePO ₄)	LFP (LiFePO ₄)	LFP (LiFePO ₄)
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 Input	1	1	1
Max. Continuous Charging Current (A)	13.4	13.4	16.1
Max. Continuous Discharging Current (A)	14.7	14.7	17.7
Max. Charging Power (kW)	10	10	12
Max. Discharging Power (kW)	11	11	13.2
PV Side			
Max. Input Power (kW)	20	20	24

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Max. Input Voltage (V)*1	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	250~850	250~850	300~850
Start-up Voltage (V)	150	150	150
Nominal Input Voltage (V)	750	750	750
Max. MPPT Current (A)	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
Max. Backfeed Current to The Array (A)	0	0	0
Number of MPPTs	4	4	4
Number of Strings per MPPT	1/1/1/1	1/1/1/1	1/1/1/1
AC Side (Grid Port)			
Rated Power (kW)	9.999	10	12
Max. Power (kW)	9.999	10	12
Rated Apparent Power to Grid (kVA)	9.999	10	12

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Rated Apparent Power from Grid (kVA)	9.999	10	12
Max. Apparent Power to Grid (kVA) ^{*3}	9.999	10	12
Max. Apparent Power from Grid (kVA)	43.5 ^{*4}	43.5 ^{*4}	43.5 ^{*4}
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)	15.2 @380V 14.5 @400V	15.2 @380V 14.5 @400V	18.2 @380V 17.4 @400V
Rated Current from Grid (A)	15.2 @380V 14.5 @400V	15.2 @380V 14.5 @400V	18.2 @380V 17.4 @400V
Max. Current to Grid (A) ^{*6}	15.2 @380V 14.5 @400V	15.2 @380V 14.5 @400V	18.2 @380V 17.4 @400V
Max. Current from Grid (A) ^{*6}	63.0 ^{*4}	63.0 ^{*4}	63.0 ^{*4}
Max. Output Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	74.6@4μs

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	25.4@5ms
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	74.6	74.6	74.6
Type of Voltage	a.c.	a.c.	a.c.
AC Side (Back-up Port)			
Rated Apparent Power (kVA)	10	10	12
Max. Apparent Power (kVA)*7	Off-grid: 11(20.0, 10s), on-grid: 43.5	Off-grid: 11(20.0, 10s), on-grid: 43.5	Off-grid: 13.2(24, 10s), on-grid: 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
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 (A)	15.2 @380V 14.5 @400V	15.2 @380V 14.5 @400V	18.2 @380V 17.4 @400V
Max. Current (A)*7	Off-grid: 22.8, on-grid:63	Off-grid: 22.8, on-grid: 63	Off-grid: 27.3, on-grid: 63
Max. Fault Current (Peak and Duration) (A)	74.6@4μs	74.6@4μs	74.6@4μs

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	25.4@5ms
Maximum Overcurrent Protection (A)	74.6	74.6	74.6
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time (ms)	<4	<4	<4
Efficiency			
Max. Efficiency	98.10%	98.10%	98.10%
European Efficiency	97.20%	97.20%	97.20%
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

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
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
DC Switch	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional
AFCI	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-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)	34	34	34
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤40	≤40	≤40
Topology	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	III	III	III
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 PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method ^{*8}	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Type of Electrical Supply System	three phase	three phase	three phase
Country of Manufacture	China	China	China
Certification			

Technical Data	GW9.999K-ETA-G20	GW10K-ETA-G20	GW12K-ETA-G20
Grid Standard	Please refer to the official website		
Safety Regulation			
EMC			

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Battery Side			
Battery Type	LFP (LiFePO ₄)	LFP (LiFePO ₄)	LFP (LiFePO ₄)
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 Input	1	1	1
Max. Continuous Charging Current (A)	20.1	26.7	33.3
Max. Continuous Discharging Current (A)	22.1	29.4	36.7
Max. Charging Power (kW)	15	20	25
Max. Discharging Power (kW)	16.5	22	27.5
PV Side			

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Max. Input Power (kW)	30	40	50
Max. Input Voltage (V)*1	1000	1000	1000
MPPT Operating Voltage Range (V)*2	120~950	120~950	120~950
MPPT Voltage Range at Nominal Power (V)	360~850	400~850	400~850
Start-up Voltage (V)	150	150	150
Nominal Input Voltage (V)	750	750	750
Max. MPPT Current (A)	21/21/21/21	21/21/21/21	21/21/42/42
Max. MPPT Short Circuit Current (A)	26/26/26/26	26/26/26/26	26/26/52/52
Max. Backfeed Current to The Array (A)	0	0	0
Number of MPPTs	4	4	4
Number of Strings per MPPT	1/1/1/1	1/1/1/1	1/1/2/2
AC Side (Grid Port)			
Rated Power (kW)	15	20	25
Max. Power (kW)	15	20	25

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Rated Apparent Power to Grid (kVA)	15	20	25
Rated Apparent Power from Grid (kVA)	15	20	25
Max. Apparent Power to Grid (kVA) ^{*3}	15	20	25
Max. Apparent Power from Grid (kVA)	43.5 ^{*4}	43.5 ^{*4}	55.2 ^{*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
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)	22.8 @380V 21.8 @400V	30.4 @380V 29.0 @400V	37.9 @380V 36.3 @400V
Rated Current from Grid (A)	22.8 @380V 21.8 @400V	30.4 @380V 29.0 @400V	37.9 @380V 36.3 @400V
Max. Current to Grid (A) ^{*6}	22.8 @380V 21.8 @400V	30.4 @380V 29.0 @400V	37.9 @380V 36.3 @400V
Max. Current from Grid (A) ^{*6}	63.0 ^{*4}	63.0 ^{*4}	80.0 ^{*5}

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Max. Output Fault Current (Peak and Duration) (A)	83.3@4μs	83.3@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	29.1@5ms	29.1@5ms	32.3@5ms
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	83.3	83.3	125
Type of Voltage	a.c.	a.c.	a.c.
AC Side (Back-up Port)			
Rated Apparent Power (kVA)	15	20	25
Max. Apparent Power (kVA) ^{*7}	Off-grid: 16.5(30, 10s), on-grid:43.5	Off-grid: 22(30.0, 10s), on-grid:43.5	Off-grid: 27.5(45.0, 10s), on-grid: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
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 (A)	22.8 @380V 21.8 @400V	30.4 @380V 29.0 @400V	37.9 @380V 36.3 @400V
Max. Current (A) ^{*7}	Off-grid: 33.4, on-grid: 63	Off-grid: 33.4, on-grid: 63	Off-grid: 50.0, on-grid: 80

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Max. Fault Current (Peak and Duration) (A)	83.3@4μs	83.3@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	29.1@5ms	29.1@5ms	32.3@5ms
Maximum Overcurrent Protection (A)	83.3	83.3	125
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time (ms)	<4	<4	<4
Efficiency			
Max. Efficiency	98.10%	98.10%	98.20%
European Efficiency	97.30%	97.30%	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

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
PV Reverse Polarity Protection	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
DC Switch	Integrated	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II	Type II
Rapid Shutdown	Optional	Optional	Optional
AFCI	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-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)	34	34	38
Dimension (W×H×D mm)	800*340*270	800*340*270	800*340*270
Noise Emission (dB)	≤40	≤40	≤45
Topology	Non-isolated	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	III	III	III
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 PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method*8	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Type of Electrical Supply System	three phase	three phase	three phase
Country of Manufacture	China	China	China
Certification			
Grid Standard			

Technical Data	GW15K-ETA-G20	GW20K-ETA-G20	GW25K-ETA-G20
Safety Regulation	Please refer to the official website		
EMC			

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
Battery Side		
Battery Type	LFP (LiFePO ₄)	LFP (LiFePO ₄)
Nominal Voltage (V)	750	750
Voltage Range (V)	700~950	700~950
Start-up Voltage (V)	720	720
Number of Battery Input	1	1
Max. Continuous Charging Current (A)	40.0	40.0
Max. Continuous Discharging Current (A)	44.1	44.1
Max. Charging Power (kW)	30	30
Max. Discharging Power (kW)	33	33
PV Side		
Max. Input Power (kW)	60	60
Max. Input Voltage (V) ^{*1}	1000	1000
MPPT Operating Voltage Range (V) ^{*2}	120~950	120~950

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
MPPT Voltage Range at Nominal Power (V)	450~850	450~850
Start-up Voltage (V)	150	150
Nominal Input Voltage (V)	750	750
Max. MPPT Current (A)	21/21/42/42	21/21/42/42
Max. MPPT Short Circuit Current (A)	26/26/52/52	26/26/52/52
Max. Backfeed Current to The Array (A)	0	0
Number of MPPTs	4	4
Number of Strings per MPPT	1/1/2/2	1/1/2/2
AC Side (Grid Port)		
Rated Power (kW)	29.999	30
Max. Power (kW)	29.999	30
Rated Apparent Power to Grid (kVA)	29.999	30
Rated Apparent Power from Grid (kVA)	29.999	30
Max. Apparent Power to Grid (kVA) ^{*3}	29.999	30
Max. Apparent Power from Grid (kVA)	55.2 ^{*5}	55.2 ^{*5}
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
Voltage Range (V)	180 ~ 260 (According to local standard)	180 ~ 260 (According to local standard)
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Rated Current to Grid (A)	45.5 @380V 43.5 @400V	45.5 @380V 43.5 @400V
Rated Current from Grid (A)	45.5 @380V 43.5 @400V	45.5 @380V 43.5 @400V
Max. Current to Grid (A)*6	45.5 @380V 43.5 @400V	45.5 @380V 43.5 @400V
Max. Current from Grid (A)*6	80.0*5	80.0*5
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms
THDi	<3%	<3%
Maximum Output Overcurrent Protection (A)	125	125
Type of Voltage	a.c.	a.c.
AC Side (Back-up Port)		
Rated Apparent Power (kVA)	30	30
Max. Apparent Power (kVA)*7	Off-grid: 33(45.0, 10s), on-grid: 55.2	Off-grid: 33(45.0, 10s), on-grid: 55.2

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Rated Current (A)	45.5 @380V 43.5 @400V	45.5 @380V 43.5 @400V
Max. Current (A)*7	Off-grid: 50.0, on-grid: 80	Off-grid: 50.0, on-grid: 80
Max. Fault Current (Peak and Duration) (A)	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms
Maximum Overcurrent Protection (A)	125	125
THDv (@Linear Load)	<3%	<3%
On/Off-grid Switching Time (ms)	<4	<4
Efficiency		
Max. Efficiency	98.20%	98.20%
European Efficiency	97.40%	97.40%
Max. Battery to AC Efficiency	98.00%	98.00%
Protection		
PV String Current Monitoring	Integrated	Integrated

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
PV Insulation Resistance Detection	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated
DC Switch	Integrated	Integrated
DC Surge Protection	Type II(Type I+II optional)	Type II(Type I+II optional)
AC Surge Protection	Type II	Type II
Rapid Shutdown	Optional	Optional
AFCI	Optional	Optional
Remote Shutdown	Integrated	Integrated
General Data		
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°C)	-35~+60	-35~+60

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
Operating Environment	Indoor/Outdoor	Indoor/Outdoor
Relative Humidity	0~100%	0~100%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Smart Fan Cooling	Smart Fan Cooling
User Interface	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)	RS485, WiFi+LAN+Bluetooth, 4G+Bluetooth(Optional)
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	38	38
Dimension (W×H×D mm)	800*340*270	800*340*270
Noise Emission (dB)	≤45	≤45
Topology	Non-isolated	Non-isolated
Self-consumption at Night (W)	≤10	≤10
Ingress Protection Rating	IP66	IP66
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal

Technical Data	GW29.999K-ETA-G20	GW30K-ETA-G20
Environmental Category	4K4H	4K4H
Pollution Degree	III	III
Overvoltage Category	DC II / AC III	DC II / AC III
Protective Class	I	I
Storage Temperature (°C)	-40~+70	-40~+70
The Decisive Voltage Class (DVC)	Battery: C PV: C AC: C Com: A	Battery: C PV: C AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method*8	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Type of Electrical Supply System	three phase	three phase
Country of Manufacture	China	China
Certification		
Grid Standard	Please refer to the official website	
Safety Regulation		
EMC		

*1: When the input voltage ranges from 950V to 1000V, the inverter will enter the standby mode, and the voltage returns to 950V to enter the normal operation state.

*2: Please refer to the user manual for the MPPT Voltage Range at nominal Power.

*3: According to the local grid regulation.

*4: GOODWE ESA series has internal bypass 63A passthrough ability to support whole

home backup solution. If the customer don't want to do any breaker upgrade, the main breaker size in GoodWe commissioning APP can be set as previous breaker size.

*5: GOODWE ESA series has internal bypass 80A passthrough ability to support whole home backup solution. If the customer don't want to do any breaker upgrade, the main breaker size in GoodWe commissioning APP can be set as previous breaker size.

*6: If the backup port is not used, select an appropriate circuit breaker based on the AC maximum output current.

*7:"Off grid"means the energy of backup output only comes from PV and battery. "On grid"means the energy of the backup output includes the energy from grid or generator(on-grid) side.

*8: AFDPF: Active Frequency Drift with Positive Feedback

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
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

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

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
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
Max. Output Fault Current (Peak and Duration) (A)	46.7@4μs	46.7@4μs	46.7@4μs	74.6@4μs
Inrush Current (Peak and Duration) (A)	21.3@5ms	21.3@5ms	21.3@5ms	25.4@5ms
THDi	<3%	<3%	<3%	<3%

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

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

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°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)

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

Technical Data	GW5K-BTA-G20	GW6K-BTA-G20	GW8K-BTA-G20	GW9.999K-BTA-G20
DC Connector	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal	MC4, VACONN Terminal
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (°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
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

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

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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
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

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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
Inrush Current (Peak and Duration) (A)	25.4@5ms	25.4@5ms	29.1@5ms	29.1@5ms
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	74.6	74.6	83.3	83.3
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Output Apparent Power (kVA)	10	12	15	20

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Max. Output Apparent Power (kVA)*6	Off-grid: 11(20.0, 10s), on-grid: 43.5	Off-grid: 13.2(24, 10s), on-grid: 43.5	Off-grid: 16.5(30, 10s), on-grid: 43.5	Off-grid: 22(30.0, 10s), on-grid: 43.5
Nominal Output Voltage (V)	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE	220/380, 230/400, 3L/N/PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Rated Output Current (A)	15.2 at 380V 14.5 at 400V	18.2 at 380V 17.4 at 400V	22.8 at 380V 21.8 at 400V	30.4 at 380V 29.0 at 400V
Max. Output Current (A)*3	Off-grid: 22.8, on-grid: 63	Off-grid: 27.3, on-grid: 63	Off-grid: 33.4, on-grid: 63	Off-grid: 33.4, on-grid: 63
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%

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
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				
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

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Operating Temperature Range (°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-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-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)	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
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

Technical Data	GW10K-BTA-G20	GW12K-BTA-G20	GW15K-BTA-G20	GW20K-BTA-G20
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I
Storage Temperature (°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
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4	SMS(Slip-mode frequency) +AFD*4
Type of Electrical Supply System	three phase	three phase	three phase	three phase
Country of Manufacture	China	China	China	China
Certification				
Grid Standard				

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

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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
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

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
Max. Output Fault Current (Peak and Duration) (A)	125@4μs	125@4μs	125@4μs
Inrush Current (Peak and Duration) (A)	32.3@5ms	32.3@5ms	32.3@5ms
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	125	125	125
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Output Apparent Power (kVA)	25	30	30
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

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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			
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

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
AC Overcurrent Protection	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
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
Communication with BMS	CAN	CAN	CAN

Technical Data	GW25K-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-G20
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
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-BTA-G20	GW29.999K-BTA-G20	GW30K-BTA-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
	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			

*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
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			

Technical Data		GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
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)			
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 (LiFePO4)	
Rated Capacity (Ah)		314Ah	
Rated Energy (kWh)		6	9

Technical Data	GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
Usable Energy (kWh)* ¹	5.9	8.85
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	
Noise Emission (dB)	≤27	
Communication	CAN&485	
Weight (kg)	61±1kg	77±1kg
Useable Extinguishing Agent	CO ₂ , H ₂ O	
Crucial Material	LiFePO ₄ , C, Cu, LiPF ₆ , Al, (C ₃ H ₆) _n	
Ingress Protection	IP66	
Protective Class	I	
Dimensions (W×H×D mm)	800*326*270	

Technical Data		GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
Function Configuration		Heating (Integrated); Aerosol fire extinguishing (Integrated)	
Storage Temperature (°C)		-20 ~55	
Max. Storage time		12 months (-20°C~35°C) 6 months (35°C~45°C)	
Scalability ^{*3}		12P	
Mounting Method		Floor stacked / Wall-mounted / Grounded	
Cycle Life		≥6000 (25±2°C 0.5C 90%DOD 70%EOL)	
Country of Manufacture		China	
Standard and Certification	Safety	IEC62619, IEC60730, EN62477, IEC63056, IEC62040, CE, CEC, Regulation 2023/1542 , 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.

9.3 STS Technical Data

Technical Data	GW30K-STG-G10	GW60K-STG-G10
Grid side		
Nominal Voltage (V)	220/380,230/400,240/415 , 3L/N/PE	220/380,230/400,240/415 , 3L/N/PE

Technical Data	GW30K-STS-G10	GW60K-STS-G10
Voltage Range (V)	114~280 (according to local standard)	114~280 (according to local standard)
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Rated. Current (A)	45.5@380V 43.5@400V 41.6@415V	91.0@380V 87.0@400V 83.4@415V
Max. Current (A)	63.0	100.0
Rated Power (kW)	30	60
Rated Conditional Short-circuit Current (kA)	1	1
Back-up side		
Nominal Voltage (V)	220/380,230/400,240/415 , 3L/N/PE	220/380,230/400,240/415 , 3L/N/PE
Voltage Range (V)	114~280 (according to local standard)	114~280 (according to local standard)
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Rated. Current (A)	45.5@380V 43.5@400V 41.6@415V	91.0@380V 87.0@400V 83.4@415V
Max. Current (A)	63.0	100.0
Rated Output Power (kW)	30	60
Max. Bypass Current (A)*1	63.0	100.0

Technical Data	GW30K-STS-G10	GW60K-STS-G10
Rated Conditional Short-circuit Current (kA)	1	1
Smart Port side		
Nominal Voltage (V)	220/380,230/400,240/415 , 3L/N/PE	220/380,230/400,240/415 , 3L/N/PE
Voltage Range (V)	114~280 (according to local standard)	114~280 (according to local standard)
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65
Rated. Current (A)	45.5@380V 43.5@400V 41.6@415V	91.0@380V 87.0@400V 83.4@415V
Max. Current (A)	63.0	100.0
Rated Power (kW)	30	60
Rated Conditional Short-circuit Current (kA)	1	1
Inverter side		
Nominal Voltage (V)	220/380,230/400,240/415 , 3L/N/PE	220/380,230/400,240/415 , 3L/N/PE
Voltage Range (V)	114~280 (according to local standard)	114~280 (according to local standard)
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65

Technical Data	GW30K-STS-G10	GW60K-STS-G10
Rated. Current (A)	45.5@380V 43.5@400V 41.6@415V	45.5@380V 43.5@400V 41.6@415V
Max. Current (A)	63.0	100.0
Rated Power (kW)	30	30
Rated Conditional Short-circuit Current (kA)	1	1
General Data		
On/Off Grid Transfer Time (ms)	≤4	≤4
Operating Temperature Range (°C)	-35~+60	-35~+60
Storage Temperature (°C)	-40~+70	-40~+70
Relative Humidity	0 ~ 100%	0 ~ 100%
Pollution Degree	III	III
Max. Operating Altitude (m)	4000	4000
Cooling Method	Natural Convection	Natural Convection
Communication	RS485	RS485
Weight (kg)	12.5	15
Dimension (W×H×D mm)	506*590*180	506*590*180
Mounting Method	Wall Mounted	Wall Mounted
Noise Emission (dB)	35	35
Ingress Protection Rating	IP54	IP54
Anti-corrosion Class	C4L	C4L
Overvoltage Category	III	III

Technical Data	GW30K-STS-G10	GW60K-STS-G10
Protective Class	I	I
Certification		
Safety Regulation	IEC 61439-1、IEC 61439-2 EN 61439-1、EN 61439-1	IEC 61439-1、IEC 61439-2 EN 61439-1、EN 61439-1

9.4 Smart Meter Technical Data

9.4.1 GM330

model	GM330
Measurement Range	
Supported Grid Types	1P2W/3P3W/3P4W
Operating voltage (Vac)*	3P4W: 100~472 L-N 3P3W: 100~472 L-L
Frequency (Hz)	50/60
CT ratio	nA: 5A
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

model	GM330
General Parameters	
Dimensions (W*H*D mm)	72*85*72
Housing	4-module
Weight (g)	240
Mounting Method	DIN Rail
User Interface	4 LEDs, Reset Button
Power Consumption (W)	< 5
Environmental Parameters	
IP Rating	IP20
Operating Temperature Range (°C)	-30-+70
Storage Temperature Range (°C)	-30-+70
Relative Humidity (non-condensing)	0-95%
Max. Operating Altitude (m)	3000

*Supports 1.1 times voltage access.

*The standard CT for the meter has been uniformly updated to the 120A:40mA specification. Meters equipped with the 200A:50mA specification CT will no longer be sold after June 2026.

9.4.2 GMK330

model	GMK330
Measurement Range	
Supported Grid Types	1P2W/3P3W/3P4W

model	GMK330
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
Mounting Method	DIN Rail
User Interface	4 LEDs, Reset Button
Power Consumption (W)	< 5
Environmental Parameters	
IP Rating	IP20

model	GMK330
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 connection.

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

9.5 Smart Dongle Technical Data

9.5.1 WiFi/LAN Kit-20

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

technical parameter	WiFi/LAN Kit-20
Max. Operating Altitude (m)	4000

9.5.2 4G Kit-G20

Product Model	4G Kit-G20
Device Management	
Maximum Supported Inverter Quantity	1
Power Parameters	
Input Voltage (V)	5
Power Consumption (W)	≤5
Interface Method	USB
Communication Parameters	
4G/3G/2G	LTE-FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28/66 LTE-TDD: B34/38/39/40/41 WCDMA: B1/2/4/5/6/8/19 GSM/EDGE: B2/3/5/8
GNSS Positioning	/
Bluetooth	Bluetooth V5.0
Mechanical Parameters	
Dimensions (Width × Height × Thickness mm)	48.3*328*32.3 (Including external antenna)
Weight (g)	100 (Including external antenna)
indicator	LED* 2
Mounting Method	Plug and Play
SIM Card Size	Micro sim, 15mm*12mm
Environmental Parameters	
Operating Temperature Range (°C)	-30~+65
Storage Temperature Range (°C)	-40~+70
Relative Humidity	0-100%
IP Rating	IP66

Product Model	4G Kit-G20
Max. Operating Altitude (m)	4000
Standards Met	
Certification	CE-RED (EN18031), RCM

10 Appendix

10.1 FAQ

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

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

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

10.1.2 How to Upgrade the Device Version

Through firmware information, you can view or upgrade:

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

- **Prompt Upgrade:**

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

- **Regular Upgrade:**

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

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

- **Forced Upgrade:**

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

on-screen instructions.

Inverter Software Version Upgrade

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

10.2 Explanation of Terms

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

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

- **Definition of Environmental Categories:**
 - **Outdoor Inverter:** Ambient air temperature range from -25°C to +60°C, suitable for Pollution Degree 3 environments.
 - **Indoor Type II Inverter:** Ambient air temperature range from -25°C to +40°C, suitable for Pollution Degree 3 environments.
 - **Indoor Type I Inverter:** Ambient air temperature range from 0°C to +40°C,

suitable for Pollution Degree 2 environments.

- **Definition of Pollution Degree Categories**

- **Pollution Degree 1:** No pollution or only dry, non-conductive pollution.
- **Pollution Degree 2:** Normally only non-conductive pollution occurs. Temporary conductivity caused by condensation must be expected occasionally.
- **Pollution Degree 3:** Conductive pollution occurs, or dry non-conductive pollution becomes conductive due to condensation.
- **Pollution Degree 4:** Persistent conductive pollution occurs, for example, due to conductive dust, rain, or snow.

10.3 Battery SN Code Meaning

*****2388*****
T
The 11th-14th digits

LXD10DSC0002

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

- The 11th and 12th digits are the last two digits of the production year, e.g., 2023 is represented as 23;
- The 13th digit is the production month, e.g., August is represented as 8;
Details are as follows:

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

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

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

Production Date	10	11	12	13	14	15	16	17	18
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Code	A	B	C	D	E	F	G	H	J
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Production Date	21	22	23	24	25	26	27	28	29
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Code	M	N	P	Q	R	S	T	U	V
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11 Contact Information

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