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Residential All-In-One Energy Storage System

ESA 3-10kW

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 the document will be updated periodically. Unless otherwise agreed, the content of the document cannot replace the Safety Precautions in the product label. All descriptions in the document are provided 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	GW3K-EHA-G20 GW3.6K-EHA-G20 GW5K-EHA-G20 GW6K-EHA-G20 GW8K-EHA-G20 GW9.999K-EHA-G20 GW10K-EHA-G20 GW3K-BHA-G20 GW3.6K-BHA-G20 GW5K-BHA-G20 GW6K-BHA-G20 GW8K-BHA-G20 GW9.999K-BHA-G20 GW10K-BHA-G20	Rated output power: 3kW-10kW

Product Type	Product Information	Description
battery system	GW5.1-BAT-D-G20	Rated energy 5.12 kWh
	GW5.1-BAT-D-G21	
	GW8.3-BAT-D-G20	Rated energy 8.32kWh
	GW8.3-BAT-D-G21	
	GW6.0-BAT-D-G20	Rated energy 6 kWh
	GW9.0-BAT-D-G20	Rated energy 9kWh
Static Transfer Switch Cabinet (STS)	GW30K-STS-G10	Rated output power: 30 kW (grid side)
	GW60K-STS-G10	Rated output power: 60kW (grid side)
electricity meter	GMK110	In energy storage systems, the monitoring module can detect information such as operating voltage and current.
	GM330	
	GMK330	
communication module	WiFi/LAN Kit-20	System operation information can be uploaded to the monitoring platform via WiFi or LAN signals.
	4G Kit-CN-G20 (China Only)	The system operation information can be uploaded to the monitoring platform via 4G.

Symbol Definition

DANGER
Indicates a high-level hazard that, if not avoided, will result in death or serious injury.
 WARNING

Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.
CAUTION
Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.
NOTICE
Highlights key information and supplements the texts. Or some skills and methods to solve product-related problems to save time.

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1 Safety Precautions

Please strictly follow these safety instructions in the user manual during the operation.

WARNING

The products are designed and tested strictly to comply with related safety rules. Follow all the safety instructions and cautions before any operations. Improper operation might cause personal injury or property damage as the products are electrical equipment.

1.1 General Safety

NOTICE

- The information in this user manual is subject to change due to product updates or other reasons. This manual cannot replace the product safety labels unless otherwise specified. All descriptions in the manual are for guidance only.
- Before installations, read through the user manual to learn about the product and the precautions.
- All operations should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations.
- Use insulating tools and wear personal protective equipment(PPE) when operating the equipment to ensure personal safety. Wear anti-static gloves, wrist strips, and cloths when touching electronic devices to protect the equipment from damage.
- Unauthorized dismantling or modification may damage the equipment, and the damage is not covered under the warranty.
- Strictly follow the installation, operation, and configuration instructions in this manual or the user manual. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions. For more warranty details, please visit <https://www.goodwe.com/warrantyrelated.html>.

1.2 personnel requirements

NOTICE

To ensure the safety, compliance, and efficiency throughout the transportation, installation, wiring, operation, and maintenance of the equipment, the work must be carried out by professionals or qualified personnel.

1. Professionals or qualified personnel include:
 - Personnel who have mastered the equipment's working principles, system structure, and knowledge of relevant risks and hazards, and have received professional operation training or possess rich practical experience.
 - Personnel who have received relevant technical and safety training, have certain operational experience, can be aware of potential dangers that specific operations may pose to themselves, and are able to take protective measures to minimize risks to themselves and others.
 - Qualified electrical technicians who meet the regulatory requirements of the country/region where they are located.
 - Personnel who hold a degree in electrical engineering/an advanced diploma in an electrical discipline or equivalent qualification/a professional qualification in the electrical field, and have at least 2/3/4 years of experience in testing and supervising in accordance with electrical equipment safety standards.
2. Personnel engaged in special tasks such as electrical operations, working at heights, and operation of special equipment must hold valid qualification certificates as required by the location of the equipment.
3. Operation of medium-voltage equipment must be performed by certified high-voltage electricians.
4. Replacement of the equipment and its components is only permitted to be carried out 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 PV module frames and the bracket system are securely grounded.
- Ensure the DC cables are connected tightly, securely and correctly. Inappropriate wiring may cause poor contacts or high impedances, and damage the inverter.
- Measure the positive and negative terminals of the DC cable using a multimeter to avoid reverse polarity connection. Also, the voltage should be within the permissible range.
- Measure the DC cable using the multimeter to avoid reverse polarity connection. Also, the voltage should be under the max DC input voltage. The manufacturer shall not be liable for the damage caused by reverse connection and extremely high voltage.
- The PV strings cannot be grounded. Ensure the minimum insulation resistance of PV string to the ground meets the minimum insulation resistance requirements before connecting the PV string to the inverter ($R = \text{maximum input voltage (V)} / 30\text{mA}$).
- Do not connect the same PV string to multiple inverters at the same time. Otherwise, the inverters may be damaged.
- PV modules used with inverters must comply with IEC 61730 Class A standard.

1.3.2 Inverter Safety

WARNING

- The voltage and frequency at the grid connecting point of the grid should meet the grid connecting requirements of the inverter.
- Additional protective devices like circuit breakers or fuses are recommended on the AC side. Specification of the protective device should be at least 1.25 times the maximum AC output current of the inverter.
- The arc fault alarms will be cleared automatically if the alarms are triggered less than 5 times in 24 hours. The inverter will shutdown for protection after the 5th electric arc fault. The inverter can operate normally after the fault is solved.
- BACK-UP is not recommended to use if the PV system is not configured with batteries. Otherwise, there may be a risk of system power outage.

1.3.3 Battery Safety

DANGER

- Keep Power Off before any operations to avoid danger of electric shock. Strictly follow all safety precautions outlined in this manual and safety labels on the equipment during the operation.
- Do not disassemble, modify, or replace any part of the battery without official authorization from the manufacturer. Otherwise, it will cause electrical shock or damages to the equipment, which shall not be borne by the manufacturer.
- Do not hit, pull, drag, squeeze or step on the equipment or put the battery into fire. Otherwise, the battery may explode.
- Do not place the battery in a high temperature environment. Make sure that there is no direct sunlight and no heat source near the battery. When the ambient temperature exceeds 60 °C, it will cause fire.
- Do not use the battery if it is defective, broken, or damaged. Damaged battery may leak electrolyte.
- Do not move the battery system while it is working. Contact after-sales service if the battery shall be replaced or added.
- A short circuit in the battery may cause personal injury. The instantaneous high current caused by a short circuit can release a large amount of energy and may cause a fire.
- To protect the equipment and components from damage during transportation, ensure that the transportation personnel are professionally trained. All operations during the transportation have to be recorded. The equipment shall be kept in balance to avoid falling down.
- Battery The equipment is heavy. Please equip the corresponding personnel according to its weight, so that the equipment does not exceed the maximum weight that the personnel can carry to avoid personnel injuries.



- Factors such as temperature, humidity, weather conditions, etc. may limit the battery's current and affect its load-carrying ability.
- Contact after-sale service immediately if the battery is not able to be started. Otherwise, the battery might be damaged permanently.
- Inspect and maintain the battery regularly according to the maintenance requirements of the battery.
- Ensure that the battery system is not damaged during transportation and storage. Keep the equipment stable to avoid dumping, which can result in equipment damage and personal injuries.

Emergency Measures

- Battery Electrolyte Leakage

If the battery module leaks electrolyte, avoid contact with the leaking liquid or gas. The electrolyte is corrosive. It will cause skin irritation or chemical burn to the operator. Anyone contact the leaked substance accidentally has to act/respond as following:

- Breath in the leaked substance: Evacuate from the polluted area, and seek immediate medical assistance.
- Eye contact: Rinse your eyes for at least 15 minutes with clean water and seek immediate medical assistance.
- Skin contact: Thoroughly wash the touch area with soap and clean water, and seek immediate medical assistance.
- Ingestion: Induce vomiting, and seek immediate medical assistance.
- Fire
 - The battery may burn when the ambient temperature exceeds 150°C. Poisonous and hazardous gas may be released if the battery is on fire.
 - In the event of a fire, please make sure that the carbon dioxide extinguisher or water extinguishing device is nearby.
 - The fire cannot be put out by ABC dry powder extinguisher. Firefighters are required to wear full protective clothing and self-contained breathing apparatus.
- Battery triggers fire protection

For batteries with fire protection functions, perform the following operations after the fire protection function is triggered:

 - Immediately cut off the main power switch to ensure that no current passes through the battery system.
 - Conduct a preliminary inspection of the appearance of the battery to determine

if there is any damage, deformation, leakage, or odor. Check the battery casing, connectors, and cables.

- Use temperature sensors to detect the temperature of the battery and its environment, ensuring there is no risk of overheating.
- Isolate and label damaged batteries, and handle them properly in accordance with local regulations.

1.3.4 Smart Meter Safety

WARNING

If the voltage of the grid fluctuates and exceeds 265V, the meter may be damaged by long-term overvoltage operation. 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

- All labels and warning marks should be visible after the installation. Do not cover, scrawl, or damage any label on the equipment.
- The following descriptions are for reference only. Please refer to the actual labeling of the equipment.

No.	Symbol	Descriptions
1		Potential risks exist. Wear proper PPE before any operations.
2		HIGH VOLTAGE HAZARD. High voltage exists. Disconnect all incoming power and turn off the product before working on it.
3		High-temperature hazard. Do not touch the product under operation to avoid being burnt.

No.	Symbol	Descriptions
4		Operate the equipment properly to avoid explosion.
5		Batteries contain flammable materials, beware of fire.
6		The equipment contains corrosive electrolytes. In case of a leak in the equipment, avoid contacting the leaked liquid or gas.
7		Delayed discharge. Wait 5 minutes after power off until the components are completely discharged.
8		Install the equipment away from fire sources.
9		Keep away from children.
10		Do not pour with water.
11		Read through the user manual before any operations.
12		Wear PPE during installation, operation and maintaining.
13		Do not dispose of the System as household waste. Deal with it in compliance with local laws and regulations, or send it back to the manufacturer.

No.	Symbol	Descriptions
14		Grounding point.
15		Recycle regeneration mark.
16		CE Mark.
17		TUV mark.
18		RCM mark.

1.5 EU Declaration of Conformity

1.5.1 Equipment with Wireless Communication Modules

The equipment with wireless communication modules sold in the European market meets the requirements of 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)

The equipment without wireless communication modules 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 batteries 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)
- Battery Directive 2006/66/EC and Amending Directive 2013/56/EU
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

You can download the EU Declaration of Conformity from our [official website](#).

2 System Introduction

2.1 System Over view

The residential storage integrated machine solution integrates equipment such as inverters, batteries, smart meters, and smart communication sticks. In the PV system, solar energy is converted into electrical energy to meet household electricity demands. The energy IoT devices in the system control electrical appliances by identifying the over all power condition, the reby intelligently managing power for load use, storage in batteries, or export to the grid.

Warning

- The energy storage system is not suitable for connecting equipment that requires a stable power supply, such as life-sustaining medical equipment, etc. Please ensure that when the system is powered off , it does not cause personal injury.
- 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.
- In the Microgrid Scenario, it is recommended that the PV open-circuit voltage of the household storage integrated machine be less than 500V to avoid over voltage Protection triggered by excessively high system voltage under harsh operating conditions.
- If the grid-tied inverter requires output power limitation, please connect a meter or CT etc. separately.
- 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 ensure long-term stable system operation, the battery should be prevented from being fully discharged. Suggested measures are as follows:
 1. When operating off-grid, set the minimum SOC Protection threshold. It is recommended to set the off-grid battery SOC lower limit to 30%.
 2. When SOC approaches the Protection threshold, the system automatically enters load limiting or Protection mode.
 3. If the re is insufficient sunlight for several consecutive days and the battery

Warning

SOC is too low, the battery should be recharged in a timely manner using external energy sources (such as generator or grid-assisted charging).

4. Regularly check the battery status to ensure it is within the safe operating range.
 5. 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 for battery parameters.
 - Due to product version upgrades or other reasons, the document content will be updated from time to time. The compatibility relationship between inverters and IoT products can be referenced at:
https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_Compatibility-list-of-GoodWe-inverters-and-IoT-products-EN.pdf
 - For detailed networking and wiring schemes for each scenario, please refer to:
[5.3.System Wiring Detailed Diagram\(Page 107\)](#).

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.
- When using STS VERSION inverter and full-house backup scenario, there is no need to connect additional electricity meter or CT. Simply set the "Meter Type" to "Built-in CT, No External Meter or CT" in the App to enable the Power Limit function.

When the energy storage system is in off-grid state, the following loads can be used normally:

Off-Grid Load Capacity Description		
Inverter model	ESA 3-6kW	ESA 8-10kW

Off-Grid Load Capacity Description		
Single Inductive Load Rated Power (kVA)	2.2	2.2
Total Rated Power of Multiple Inductive Loads (kVA)	2.2	3.7
capacitive load (kVA)	$0.33 \times P_n$	$0.33 \times P_n$
Note: • P_n: Inverter rated output power. • 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-ST5-G10$\leq$30kVA • GW60K-ST5-G10$\leq$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

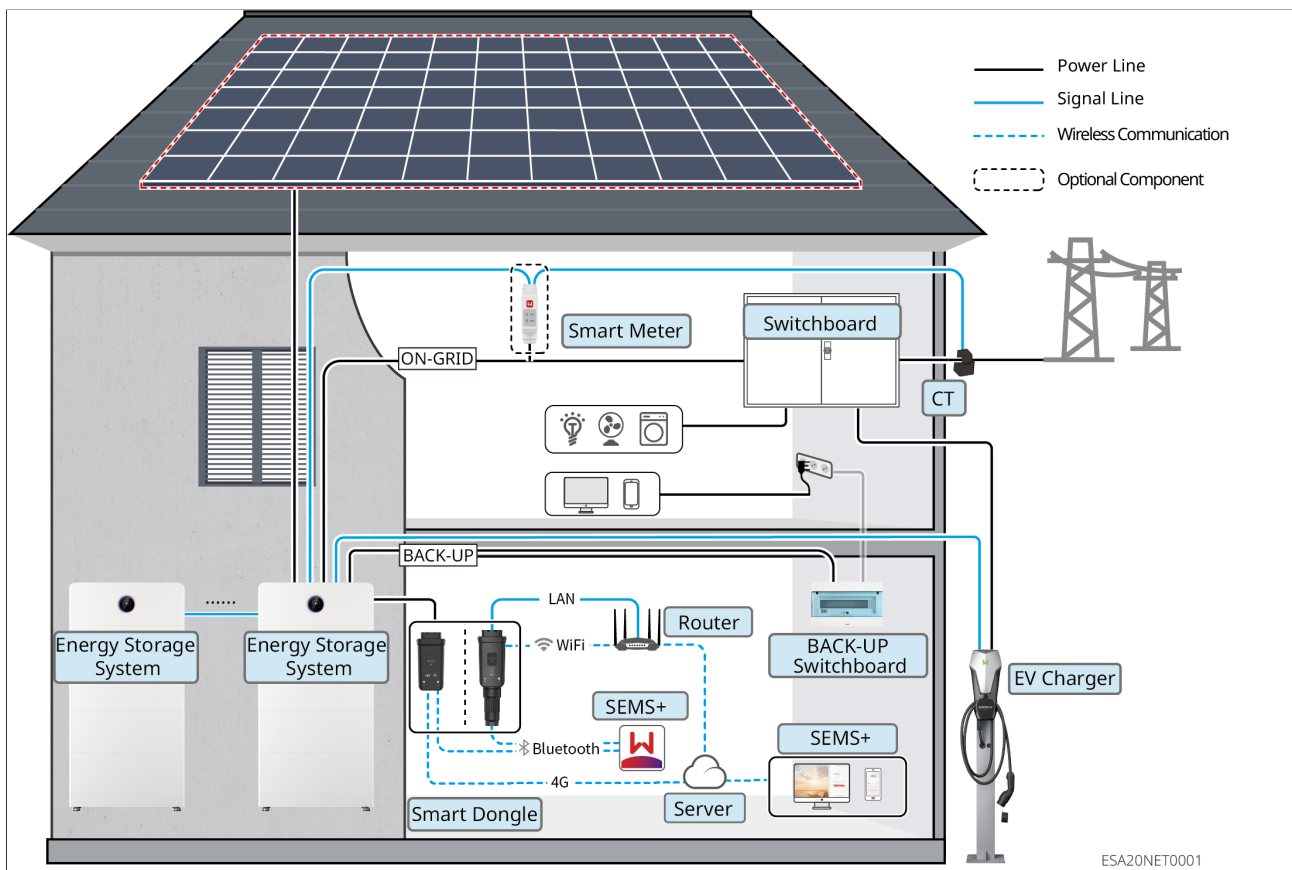


Figure1 General Scene 1

Static Transfer Switch Cabinet (STS)

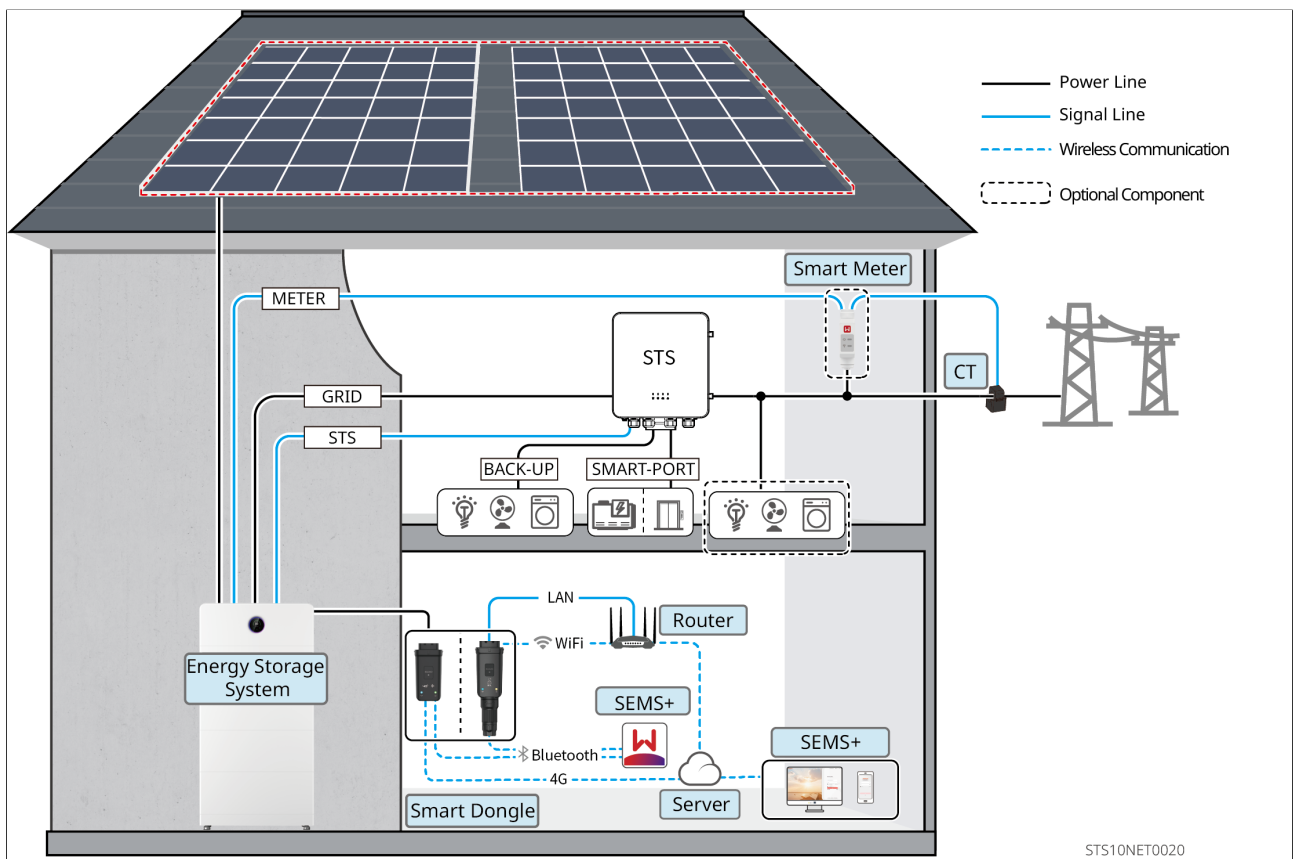


Figure2 General Scenario 2: With STS

Equipment Type	model	Description
energy storage inverter	GW3K-EHA-G20 GW3.6K-EHA-G20 GW5K-EHA-G20 GW6K-EHA-G20 GW8K-EHA-G20 GW9.999K-EHA-G20 GW10K-EHA-G20 GW3K-BHA-G20 GW3.6K-BHA-G20 GW5K-BHA-G20 GW6K-BHA-G20 GW8K-BHA-G20 GW9.999K-BHA-G20 GW10K-BHA-G20	• Compatible with GoodWe AC charging pile. • Only the STS VERSION inverter supports connection to the Static Transfer Switch (STS) cabinet. • The system supports up to 10 inverters to form a parallel system, and supports On/Off-grid hybrid operation for inverters of different power ranges. When the number of parallel inverters exceeds 6, please contact the after-sales service center. • In a parallel system, if GW3K/3.6K/5K/6K models are mixed with GW8K/9.999K/10K models, set the GW8K/9.999K/10K models as the master inverter. • If you need to connect the generator or Parallel Networking, please use GMK110, GM330 or GMK330 smart meters. If the number of parallel inverters exceeds two, please use GM330 smart meter. • In a parallel system, each inverter requires the installation of the WiFi/LAN Kit-20, with a software version of V2.5 or higher. • During system networking, satisfy the following version requirements: ◦ Inverter ARM software version is 05.133 and above. ◦ Inverter DSP software version is 06.6028 or 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	- 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 mixed use. - 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-ST-S-G10 GW60K-ST-S-G10	- Optional. For usage, please contact Goodwe to purchase. - Supports connection of 1 energy storage inverter, diesel generator, load, and grid.
smart meter	Built-in electricity meter (shipped with inverter) GMK110 (purchased from GoodWe) GM330 (Purchased from GoodWe)	

Equipment Type	model	Description
	GMK330(purchased from GoodWe)	- Built-in meter: Please use the CT supplied with the inverter for connection. - CT ratio is 120A:40mA. - When the built-in meter of the inverter is insufficient, contact the dealer to purchase a GMK110, GM330, or GMK330 smart meter. - GMK110: CT cannot be replaced, CT ratio is 120A:40mA - GM330: CT supports purchasing from GoodWe or self-purchase, CT ratio nA:5A. - GMK330: CT Not Replaceable, CT Ratio 120A:40mA - If the number of parallel inverters exceeds 2 or the cable diameter or range of the standard CT does not meet the total current requirement of the parallel system, please use the GM330 smart meter.
Smart Communication Stick	WiFi/LAN Kit-20	- Applicable to inverter single-unit networking and parallel networking scenarios. - 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. - If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the software version of the WiFi/LAN Kit-20 is V2.3 or higher.

Equipment Type	model	Description
	4G Kit-CN-G20 (China Only)	• Only applicable to single-inverter grid-connected scenarios. • Using Bluetooth for local configuration of device parameters and viewing device operational information, and uploading system operation data to the monitoring platform via 4G. • If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the 4G Kit-CN-G20 version is version 05 or above.

2.1.2 Microgrid Scenario

When the grid-tied inverter is connected to the BACK-UP port of the energy storage inverter, it is a Microgrid Scenario.

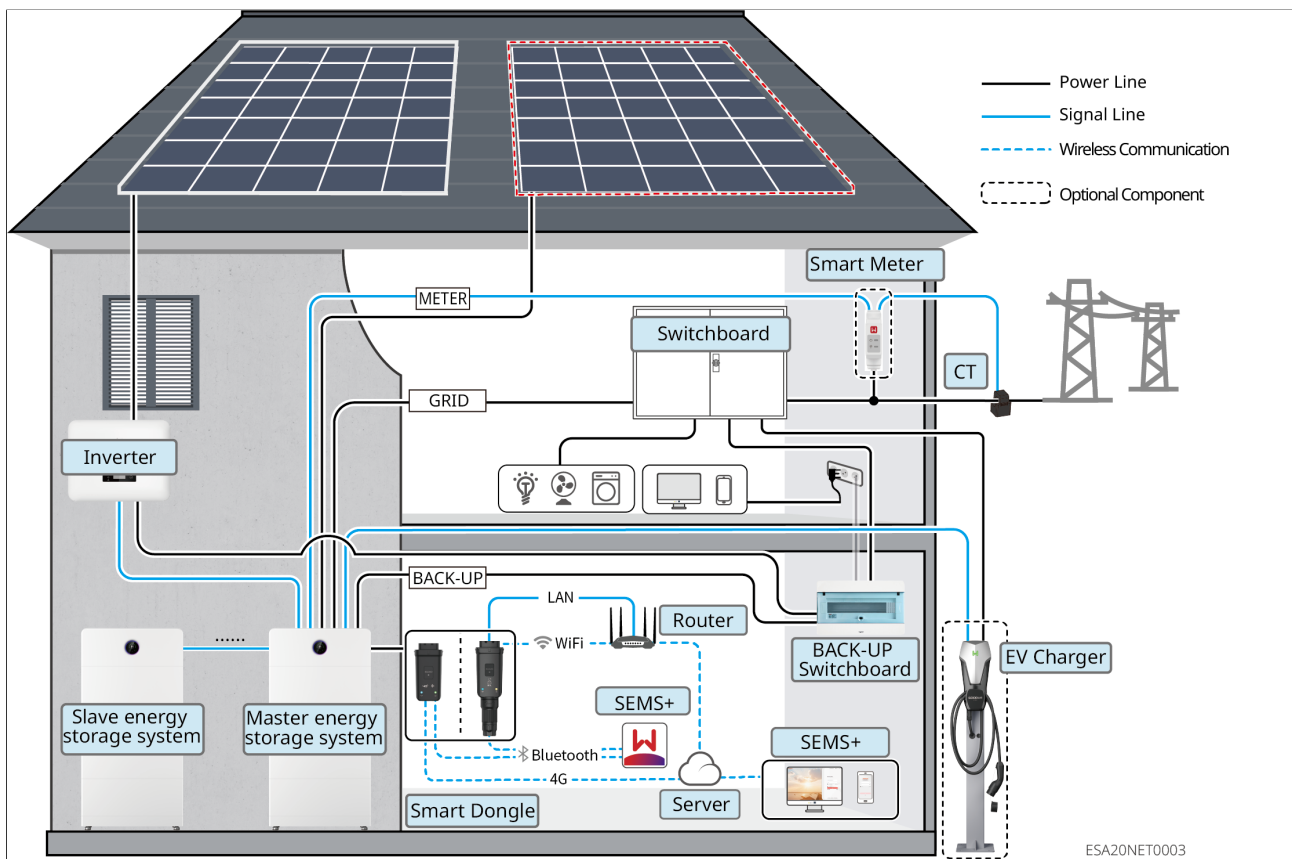


Figure3 Microgrid Scenario 1

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.

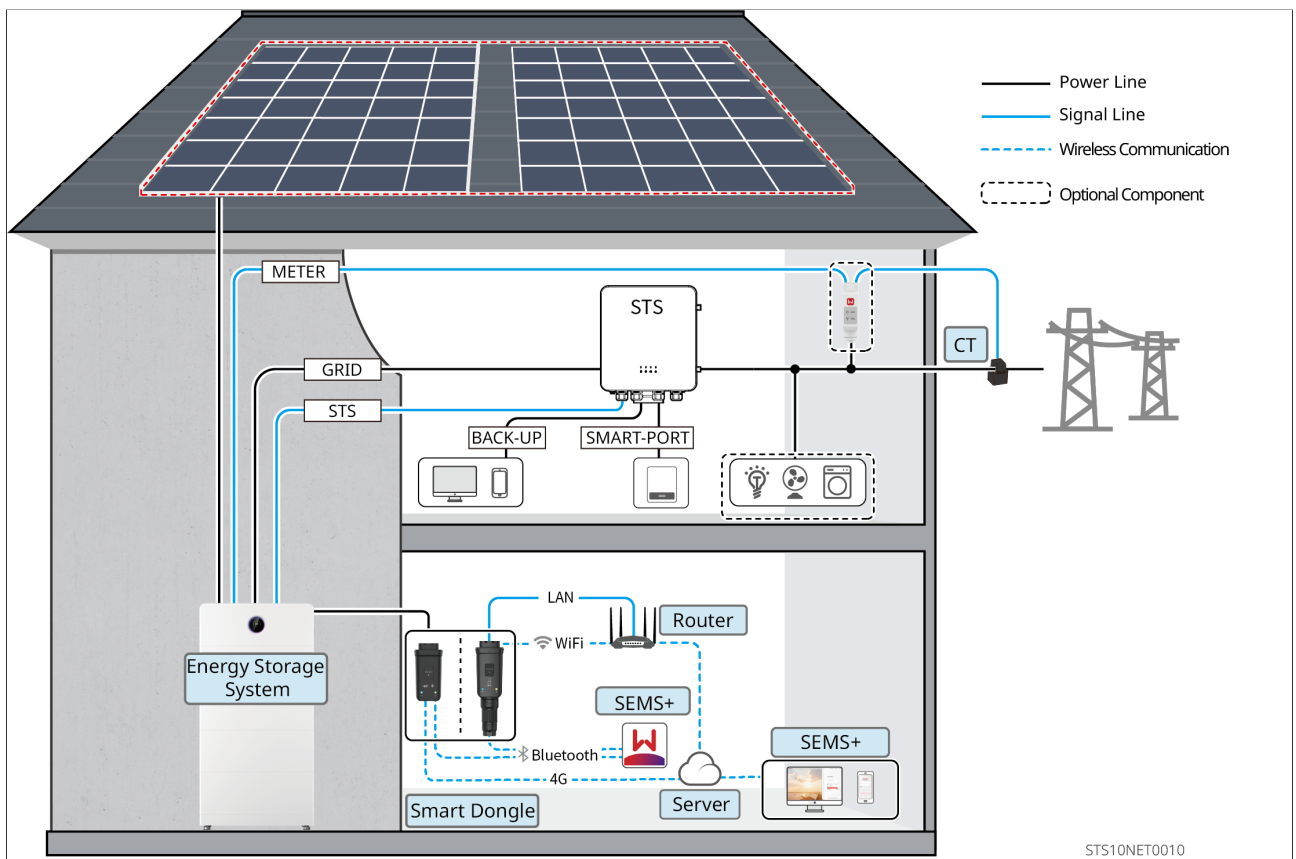


Figure4 Microgrid Scenario 2: with STS

Equipment Type	model	Description
energy storage inverter	GW3K-EHA-G20 GW3.6K-EHA-G20 GW5K-EHA-G20 GW6K-EHA-G20 GW8K-EHA-G20 GW9.999K-EHA-G20 GW10K-EHA-G20 GW3K-BHA-G20 GW3.6K-BHA-G20 GW5K-BHA-G20 GW6K-BHA-G20 GW8K-BHA-G20 GW9.999K-BHA-G20 GW10K-BHA-G20	• Compatible with GoodWe AC charging pile. • In the Microgrid Scenario, connecting generators is not supported. • Only the STS VERSION inverter supports connection to the Static Transfer Switch (STS) cabinet. • The system supports up to 10 inverters to form a parallel system, and supports On/Off-grid hybrid operation for inverters of different power ranges. When the number of parallel inverters exceeds 6, please contact the after-sales service center. • In a parallel system, if GW3K/3.6K/5K/6K models are mixed with GW8K/9.999K/10K models, set the GW8K/9.999K/10K models as the master inverter. • If you need to connect the generator or Parallel Networking, please use GMK110, GM330 or GMK330 smart meters. If the number of parallel inverters exceeds two, please use GM330 smart meter. • In a parallel system, each inverter requires the installation of the WiFi/LAN Kit-20, with a software version of V2.5 or higher. • During system networking, satisfy the following version requirements: ◦ Inverter ARM software version is 05.133 and above. ◦ Inverter DSP software version is 06.6028 or 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	- Battery modules of different models 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 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 When used in combination, the battery heating function is unavailable. - 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	Built-in electricity meter (shipped with inverter) GMK110 (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 is 120A:40mA. ◦ When the built-in meter of the inverter is insufficient, contact the dealer to purchase a GMK110, GM330, or GMK330 smart meter. • GMK110: CT not replaceable, CT ratio is 120A:40mA • GM330: CT can be purchased from GoodWe or by yourself, CT ratio is nA:5A. • GMK330: CT not replaceable, CT ratio is 120A:40mA • If the number of inverters in parallel exceeds 2, or the wire diameter or range of the standard CT does not meet the total parallel current requirement on site, please use the GM330 smart meter.
	GMK330(purchased from GoodWe)	
Smart Communication Stick	WiFi/LAN Kit-20	• Applicable to inverter single-unit networking and parallel networking scenarios. • 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. • If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the software version of the WiFi/LAN Kit-20 is V2.3 or higher.

Equipment Type	model	Description
	4G Kit-CN-G20 (China Only)	• Only applicable to single-inverter grid-connected scenarios. • Using Bluetooth for local configuration of device parameters and viewing device operational information, and uploading system operation data to the monitoring platform via 4G. • If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the 4G Kit-CN-G20 version is version 05 or above.

Equipment Type	model	Description
grid-connected inverter	- DNS G3 - MS G3 - third-party grid-tied inverter	- Goodwe brand grid-tied inverters are recommended, and the use of third-party grid-tied inverters is supported. - If using a GoodWe grid-tied inverter, connect its RS485 port to the EMS port (RS485-B1 and RS485-A1) of COM2 on the storage inverter. Then use the App to configure the "AC Port to the Microgrid" scenario, please ensure that the rated output power of the grid-connected inverter is $\leq$ the rated output power of the energy storage 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 through the grid-tied power limit interface in the App. For the grid-tied inverter, please configure it according to the actual tool used. - To ensure the grid-tied inverter can continuously generate power, adjust the output power of the energy storage inverter through the microgrid mode interface of the 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 an energy storage inverter, it is a coupling scenario.

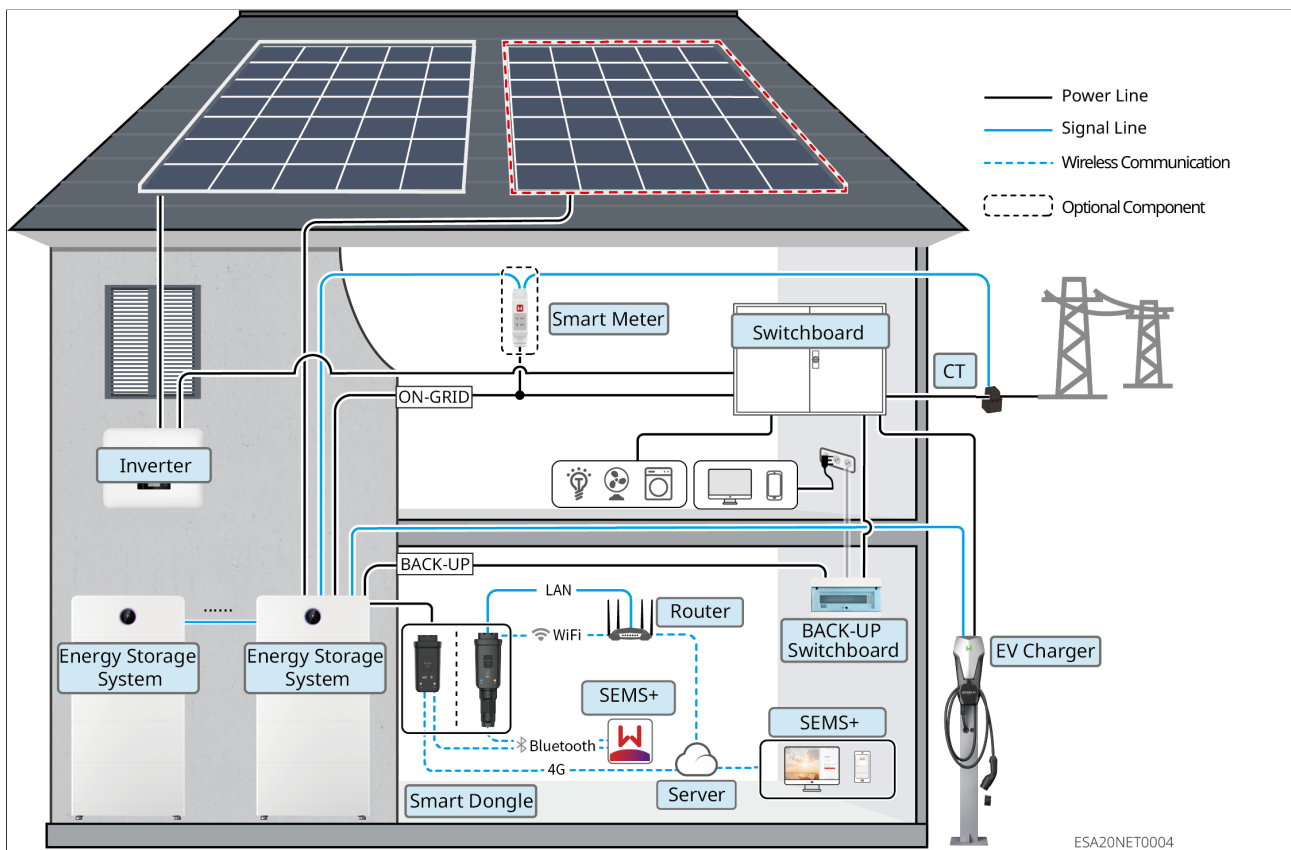


Figure5 Coupling Scenario 1

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

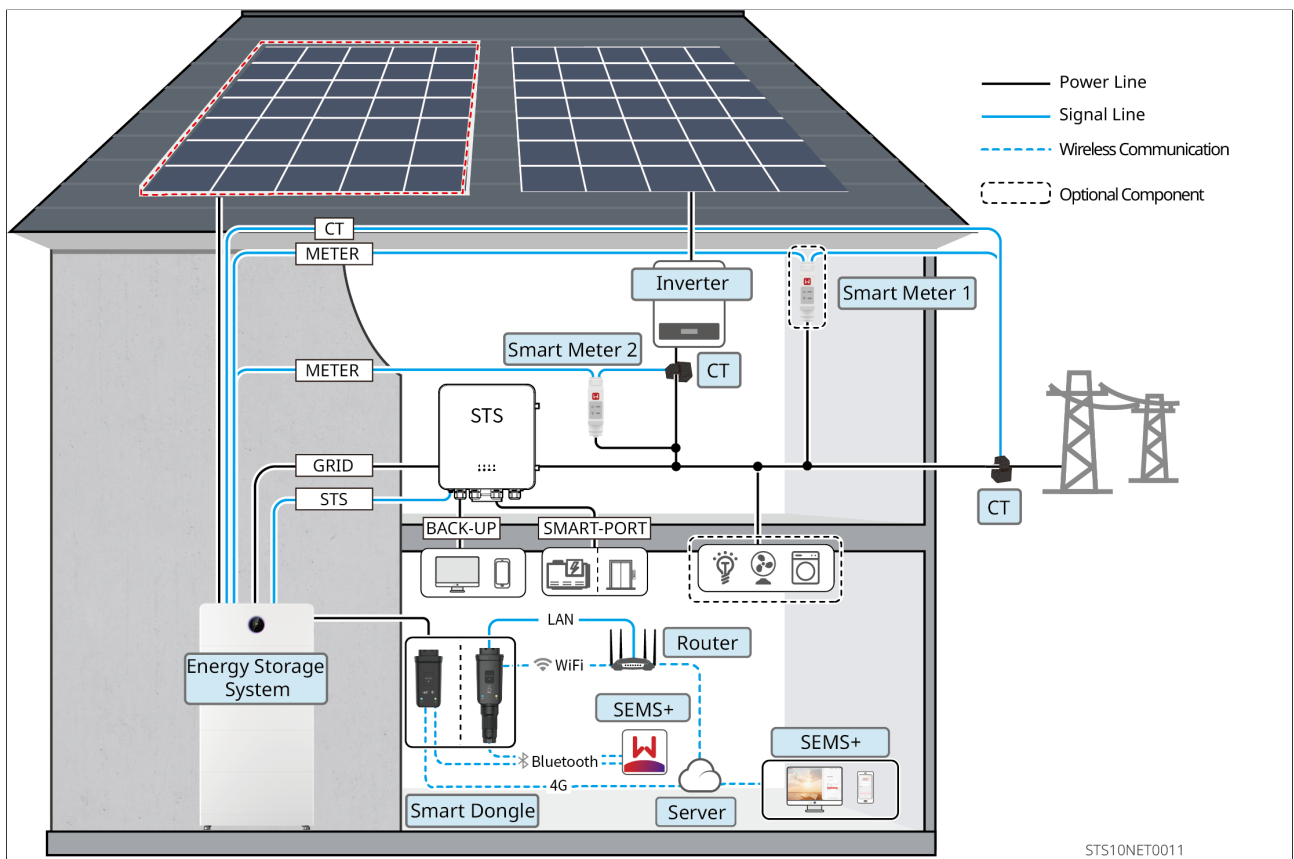


Figure6 Coupling Scenario 2: With STS

Equipment Type	model	Description
energy storage inverter	GW3K-EHA-G20 GW3.6K-EHA-G20 GW5K-EHA-G20 GW6K-EHA-G20 GW8K-EHA-G20 GW9.999K-EHA-G20 GW10K-EHA-G20 GW3K-BHA-G20 GW3.6K-BHA-G20 GW5K-BHA-G20 GW6K-BHA-G20 GW8K-BHA-G20 GW9.999K-BHA-G20 GW10K-BHA-G20	• The system supports up to 10 inverters to form a parallel system, and supports On/Off-grid hybrid operation for inverters of different power ranges. When the number of parallel inverters exceeds 6, please contact the after-sales service center. • Only the STS VERSION inverter supports connection to the Static Transfer Switch (STS) cabinet. • In a parallel system, if GW3K/3.6K/5K/6K models are mixed with GW8K/9.999K/10K models, set the GW8K/9.999K/10K models as the master inverter. • If you need to connect the generator or Parallel Networking, please use GMK110, GM330 or GMK330 smart meters. If the number of parallel inverters exceeds two, please use GM330 smart meter. • In a parallel system, each inverter requires the installation of the WiFi/LAN Kit-20, with a software version of V2.5 or higher. • During system networking, satisfy the following version requirements: ◦ Inverter ARM software version is 05.133 and above. ◦ Inverter DSP software version is 06.6028 or 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	- Battery modules of different models support mixed use. - The system supports 5-108kWh, meeting 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 using them together. - 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	Built-in electricity meter (shipped with inverter)	
	GMK110 (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 is 120A:40mA. - When the built-in meter of the inverter is insufficient, contact the dealer to purchase a GMK110, GM330, or GMK330 smart meter. - GMK110: CT is not replaceable, CT ratio is 120A:40mA - GM330: CT supports purchase from GoodWe or self-purchase, CT ratio is nA:5A. - GMK330: CT not replaceable, CT ratio: 120A:40mA. - 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 system, please use the GM330 smart meter.
	GMK330 Purchased from GoodWe	
Smart Communication Stick	WiFi/LAN Kit-20	- Applicable to inverter single-unit networking and parallel networking scenarios. - 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. - If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the software version of the WiFi/LAN Kit-20 is V2.3 or higher.

Equipment Type	model	Description
	4G Kit-CN-G20 (China Only)	• Only applicable to single-inverter grid-connected scenarios. • Using Bluetooth for local configuration of device parameters and viewing device operational information, and uploading system operation data to the monitoring platform via 4G. • If the inverter needs to use functions such as one-click upgrade, operation log export, etc., please ensure that the 4G Kit-CN-G20 version is version 05 or above.

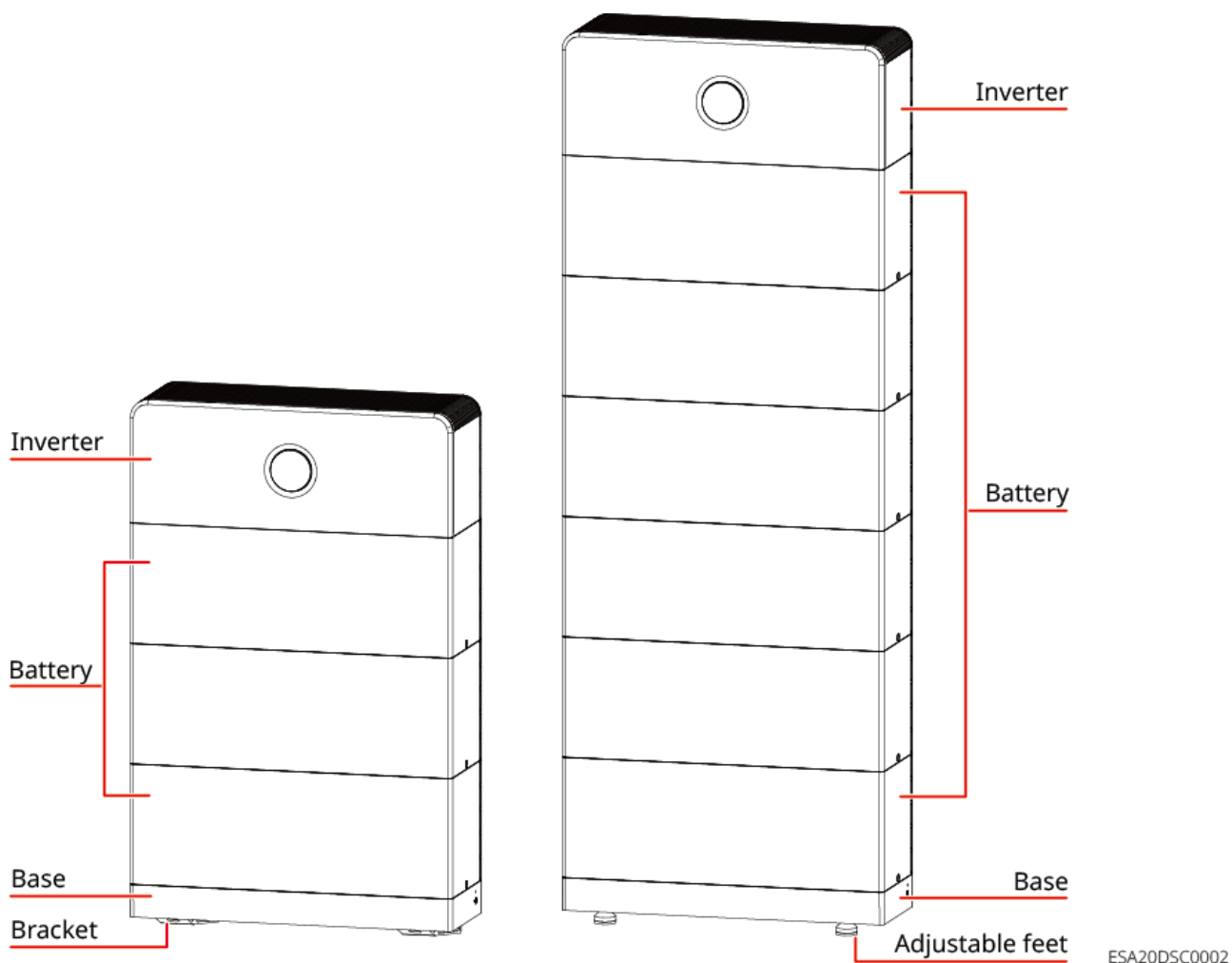
Equipment Type	model	Description
grid-connected inverter	- DNS G3 - MS G3 - third-party grid-tied inverter	- Goodwe brand grid-tied inverters are recommended, and the use of third-party grid-tied inverters is supported. - If using a GoodWe grid-tied inverter, connect its RS485 port to the EMS port (RS485-B1 and RS485-A1) of COM2 on the battery inverter. Then use the App to set "AC Port Connection Settings". - 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 energy storage inverter. - When the coupled system is in grid-connected mode and requires power limitation, ensure that the energy storage inverter is set via the grid-connected power limitation interface in the App, and the grid-connected inverter is set according to the actual tool used. 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.

2.2 Product Overview

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

Residential Single-Phase All-in-One:

Residential single-phase all-in-one machine, integrating battery and inverter through modular design, using blind-mate stacking connection method.



The energy storage system supports battery capacity expansion. The total battery capacity is determined by the quantity and specifications of battery modules, and configuration must strictly comply with the restrictions specified in this section.

System over all configuration description:

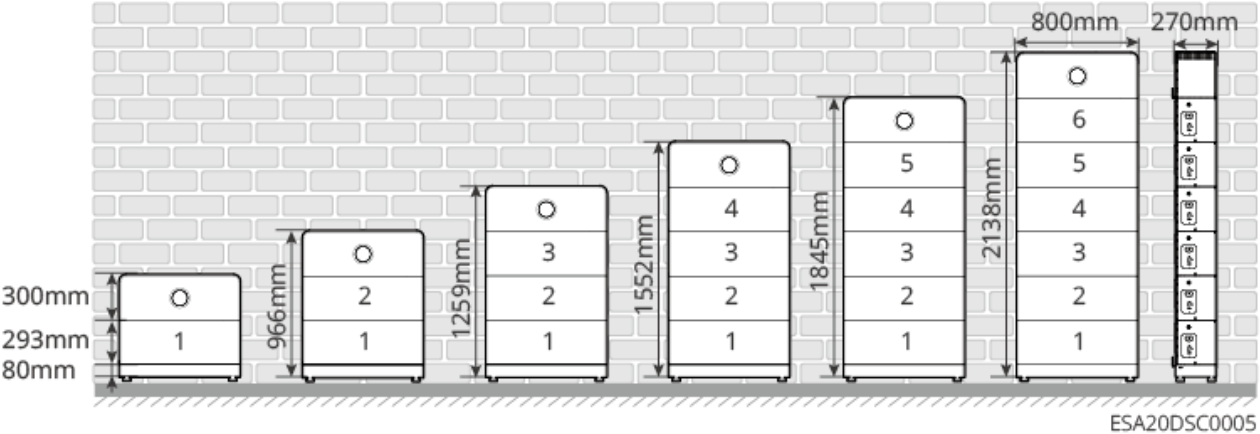
A: GW5.1-BAT-D-G20, GW5.1-BAT-D-G21, GW6.0-BAT-D-G20

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

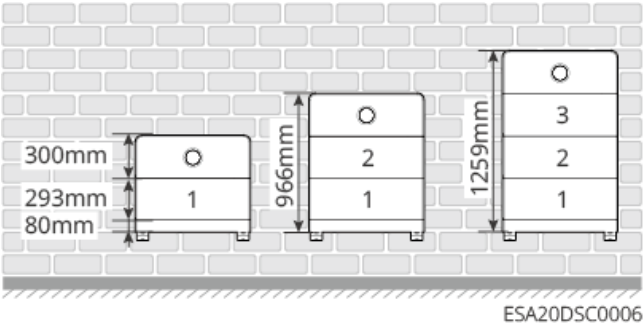
Mounting Method	Number of Expansion Groups	single stack	Total number of batteries
ground-mounted installation	≤3 groups	≤6 pcs	≤12 pcs
Wall-mounted installation (A)	≤3 groups	≤3 units	≤9 Pieces
Wall-mounted Installation (A/B/A+B)	≤3 groups	≤2pcs	≤6 pcs

Mounting Method	Number of Expansion Groups	single stack	Total number of batteries
Note: expansion groups × stacks per group ≤ total system battery count.			

Floor-standing Installation

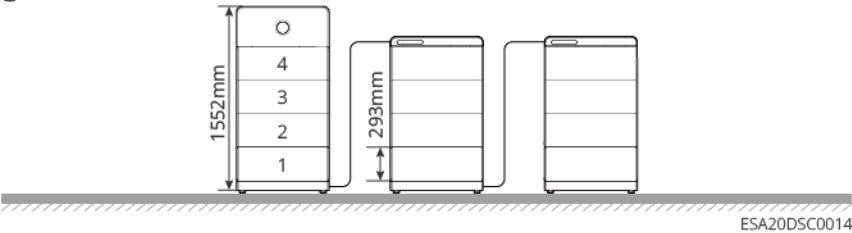


Wall-mounted Installation

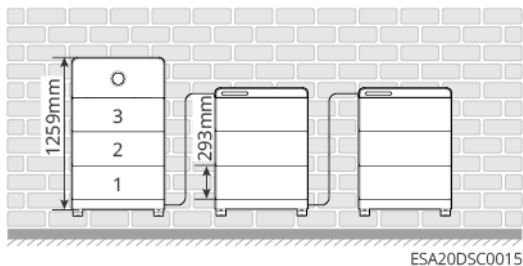


Battery Rack Expansion Installation

ground-mounted installation

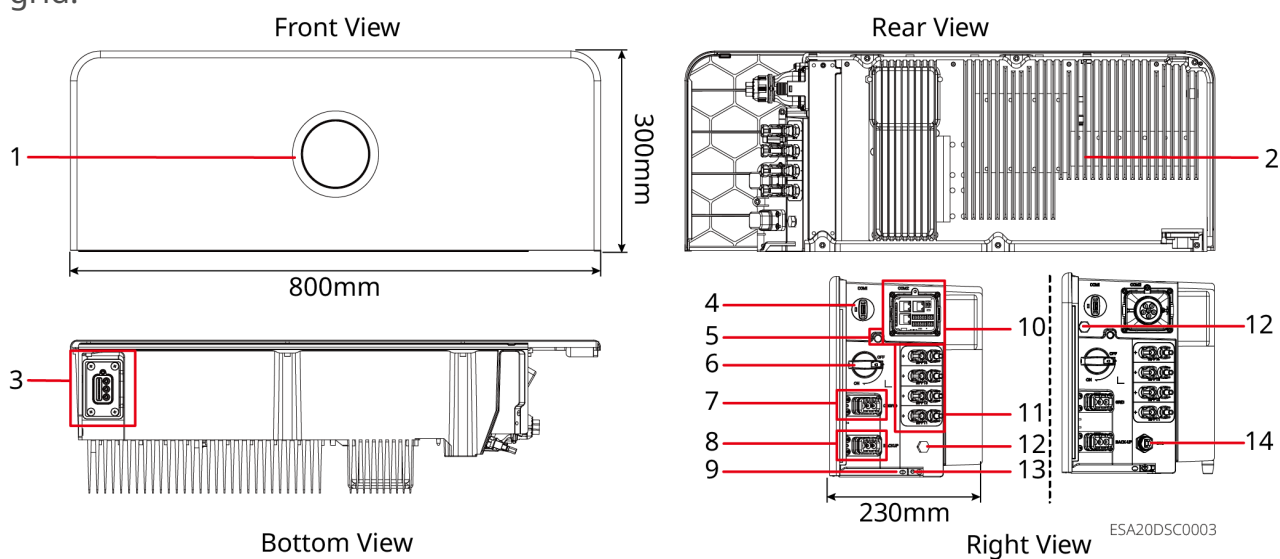


Wall-mounted installation



Inverter:

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.



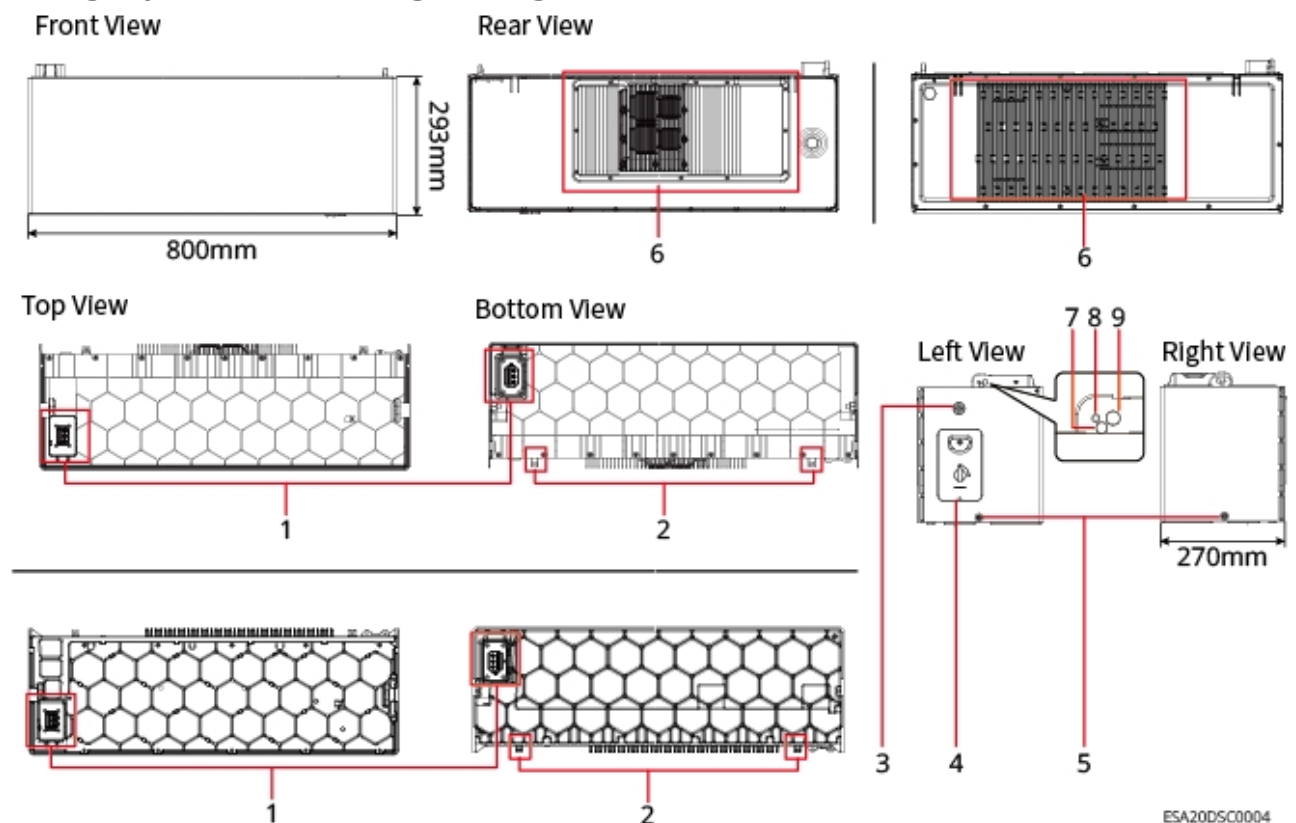
Serial Number	Component/Silkscreen	Description
1	indicator light	Indicates the operating status of the inverter.
2	heatsink	Inverter heat dissipation.
3	connector	Power and communication ports for inverter-to-battery connection.

Serial Number	Component/Silkscreen	Description
4	Smart Communication Stick Connection Port	- Can be connected to smart communication dongles, such as WiFi/LAN Kit-20 and 4G Kit-CN-G20. Please select the module type according to actual requirements. - Supports connecting a USB drive for Local Upgrade of the inverter software version.
5	Lifting bar mounting hole	Used for installing the hand lift bar. Use when handling inverter.
6	DC Switch	Only EHA model, BHA model has no DC Switch. Control DC input connection or disconnection.
7	ON-GRID port	Connect the AC lines to connect the inverter to the grid.
8	BACK-UP port	Connect AC line to critical load or grid-tied inverter.
9	battery fixing hole	Stationary inverter and battery
10	communication port	Connectable load control, CT, RS485, Remote Shutdown/Fast Shutdown, DRED (Australia)/RCR (Europe) and other communication lines.
11	PV Input Terminal	Only EHA model; BHA model has no PV input terminal. Connectable to PV module DC input line. Number of PV input terminals: - GW3K-EHA-G20, GW3.6K-EHA-G20, GW5K-EHA-G20, GW6K-EHA-G20: 2 - GW8K-EHA-G20, GW9.999K-EHA-G20, GW10K-EHA-G20: 4
12	breathing valve	-

Serial Number	Component/Silkscreen	Description
13	Protection earth terminal	Connect the box Protection earth wire.
14	STS communication interface	Connect Static Transfer Switch Cabinet (STS).

Battery:

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

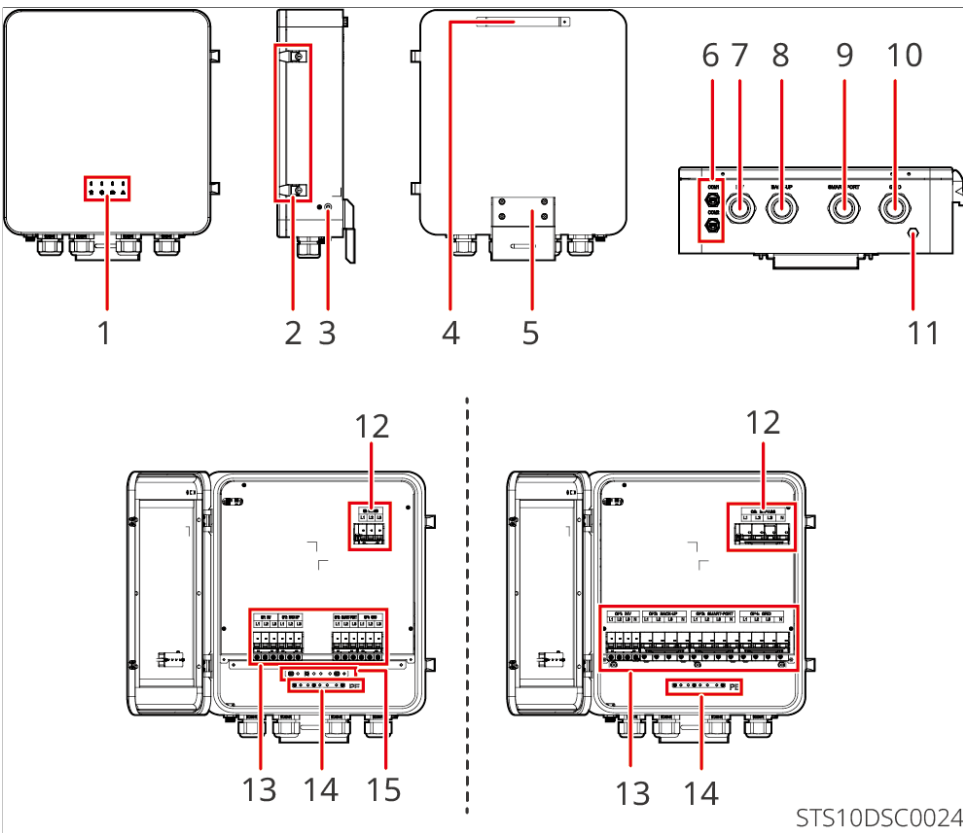


Serial Number	component	Description
1	connector	Power and communication ports for battery-to-battery and battery-to-inverter connections.
2	Anti-tilt bracket fixing hole	Used for fixing the battery to the wall.
3	Multi-function button indicator light	• Indicate battery operating status. • Battery black 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.

Serial Number	component	Description
9	Lifting bar mounting hole	Used for installing the hand lift bar. For manual handling of batteries.

2.2.2 STS Appearance Description

Appearance

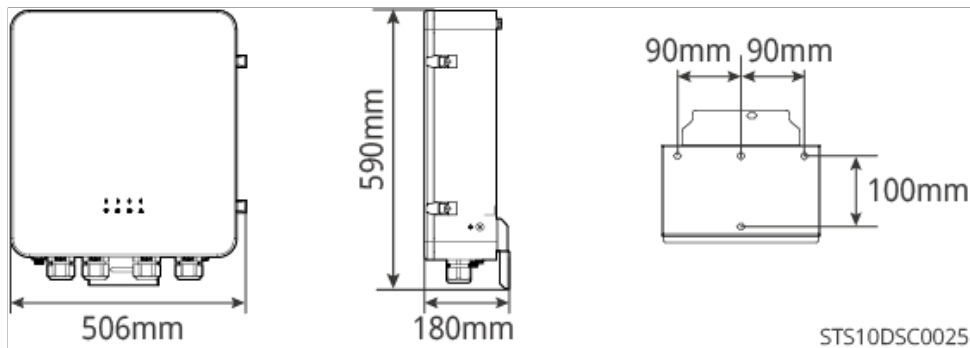


Serial Number	Component Name	Description
1	indicator light	Equipment working status indication
2	Locking latch	Cabinet door used to open/close STS

Serial Number	Component Name	Description
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
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.

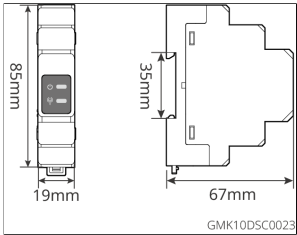
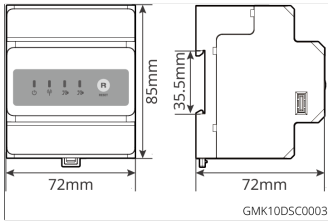
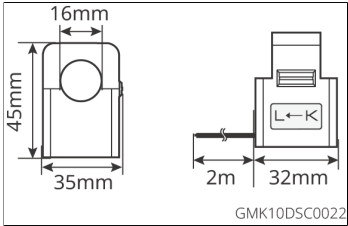
Serial Number	Component Name	Description
13	circuit breaker and AC connection terminal	• INVERTER: Used for connecting the inverter • BACK-UP: for connecting BACKUP loads • SMART-PORT: Used to connect generators, large loads, or grid-tied inverters • GRID: used for connecting to the power grid
14	PE 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

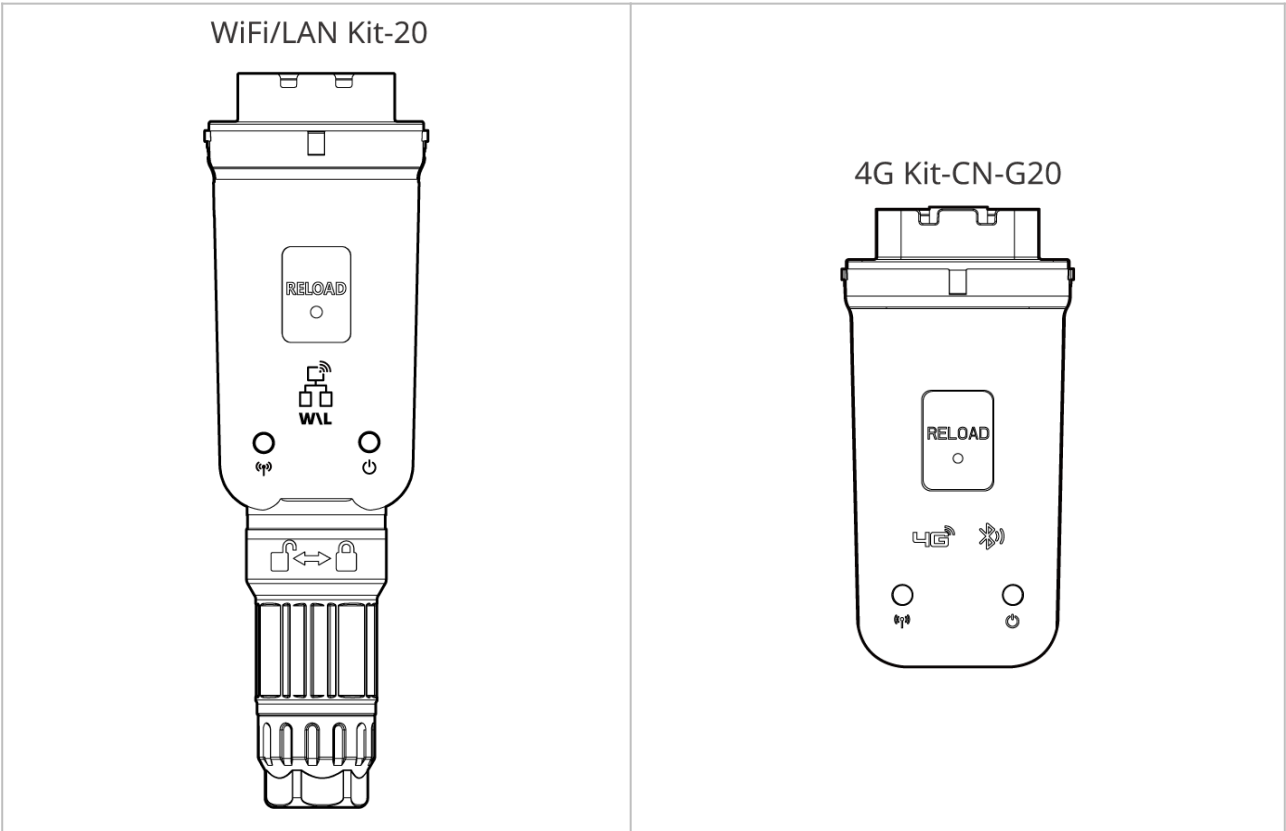
Smart meters can measure and monitor electrical data in PV energy storage systems, such as voltage, current, frequency, Power Factor, power, etc.

GMK110 	GM330&GMK330 	CT 
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Serial Number	model	Application Scenarios
1	GMK110	CT does not support replacement, CT ratio: 120A: 40mA
2	GM330	CT can be procured from GoodWe or purchased separately. CT ratio requirement: nA/5A. - nA: CT primary side input current, n in the range of 200-5000 5A: CT secondary side output current
3	GMK330	CT is delivered with the meter, CT ratio: 120A: 40mA

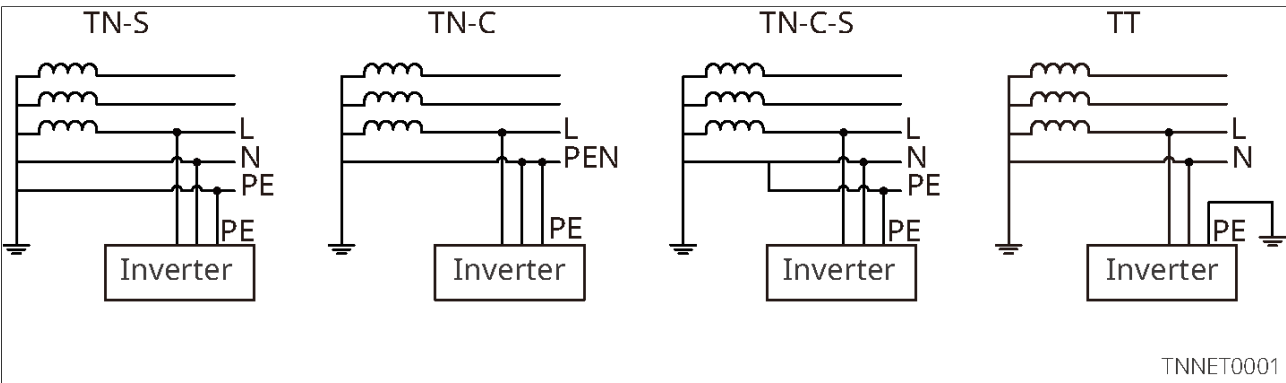
2.2.4 smart dongle

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



No.	model	Signal Type	Applicable Scenario
1	WiFi/LAN Kit-20	WiFi, LAN, Bluetooth	Inverter standalone, multi-unit scenario
2	4G Kit-CN-G20 (China only)	4G, Bluetooth	Inverter standalone scenario

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.

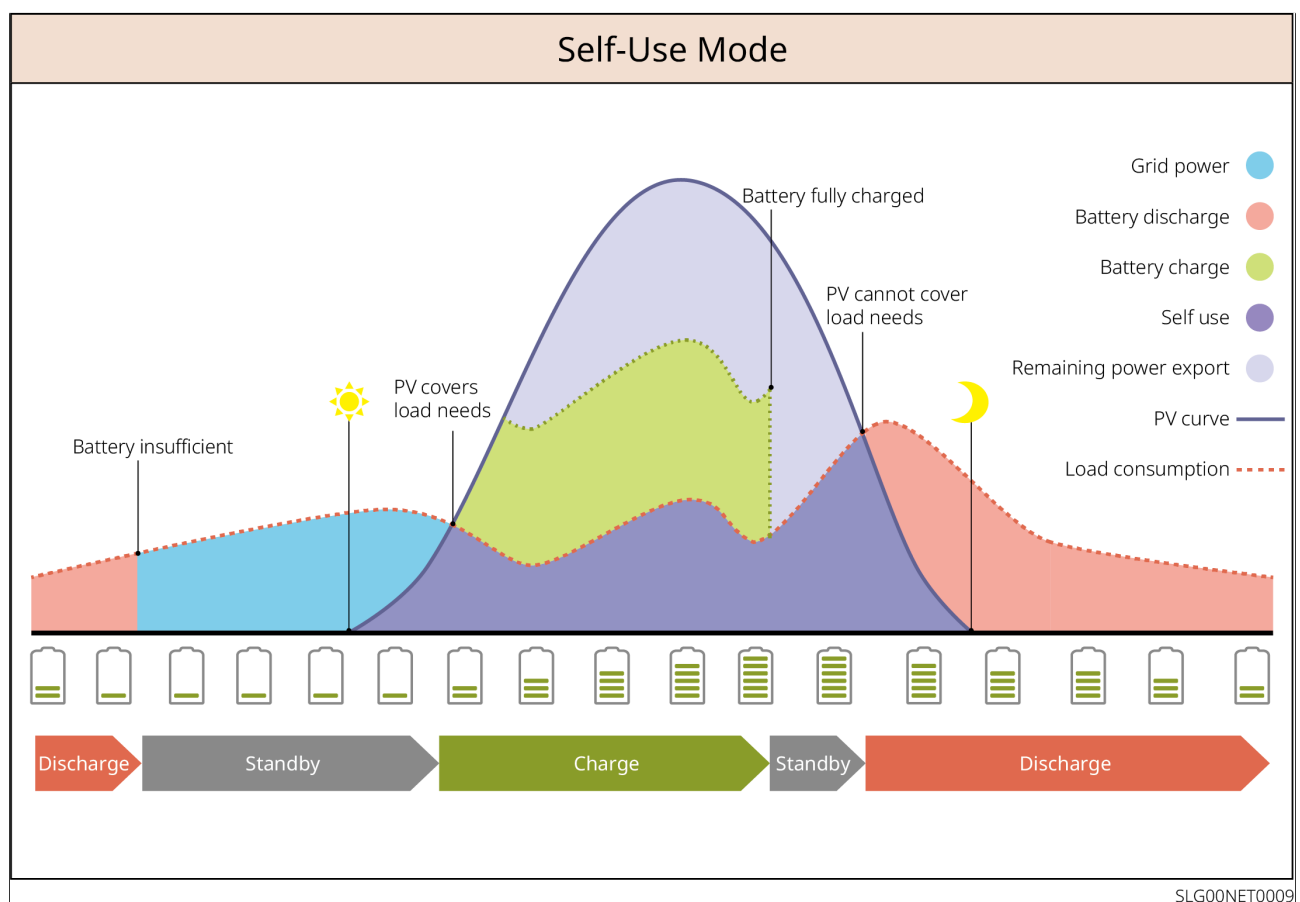


Figure7 Self-consumption

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.

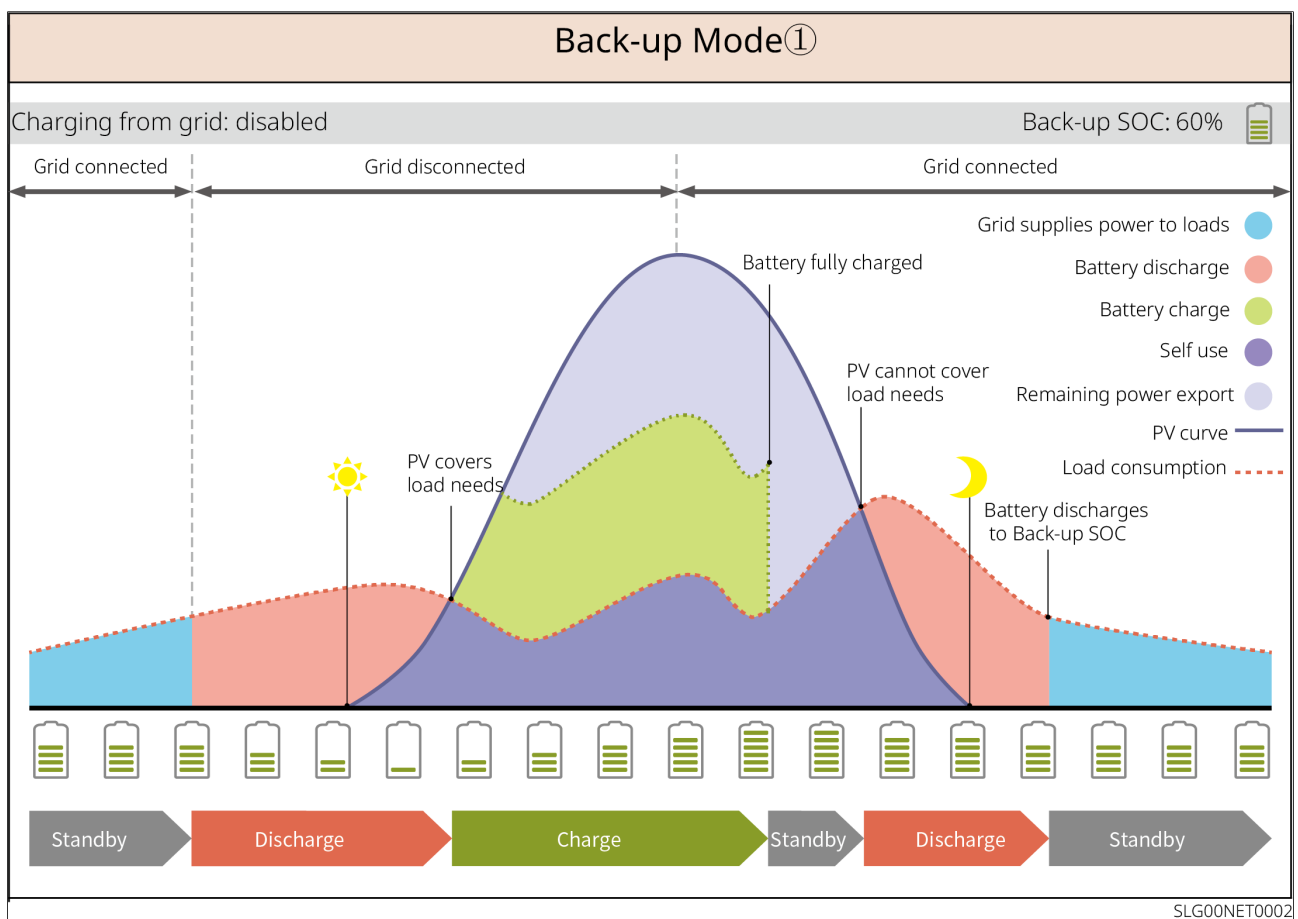


Figure8 Backup Mode1

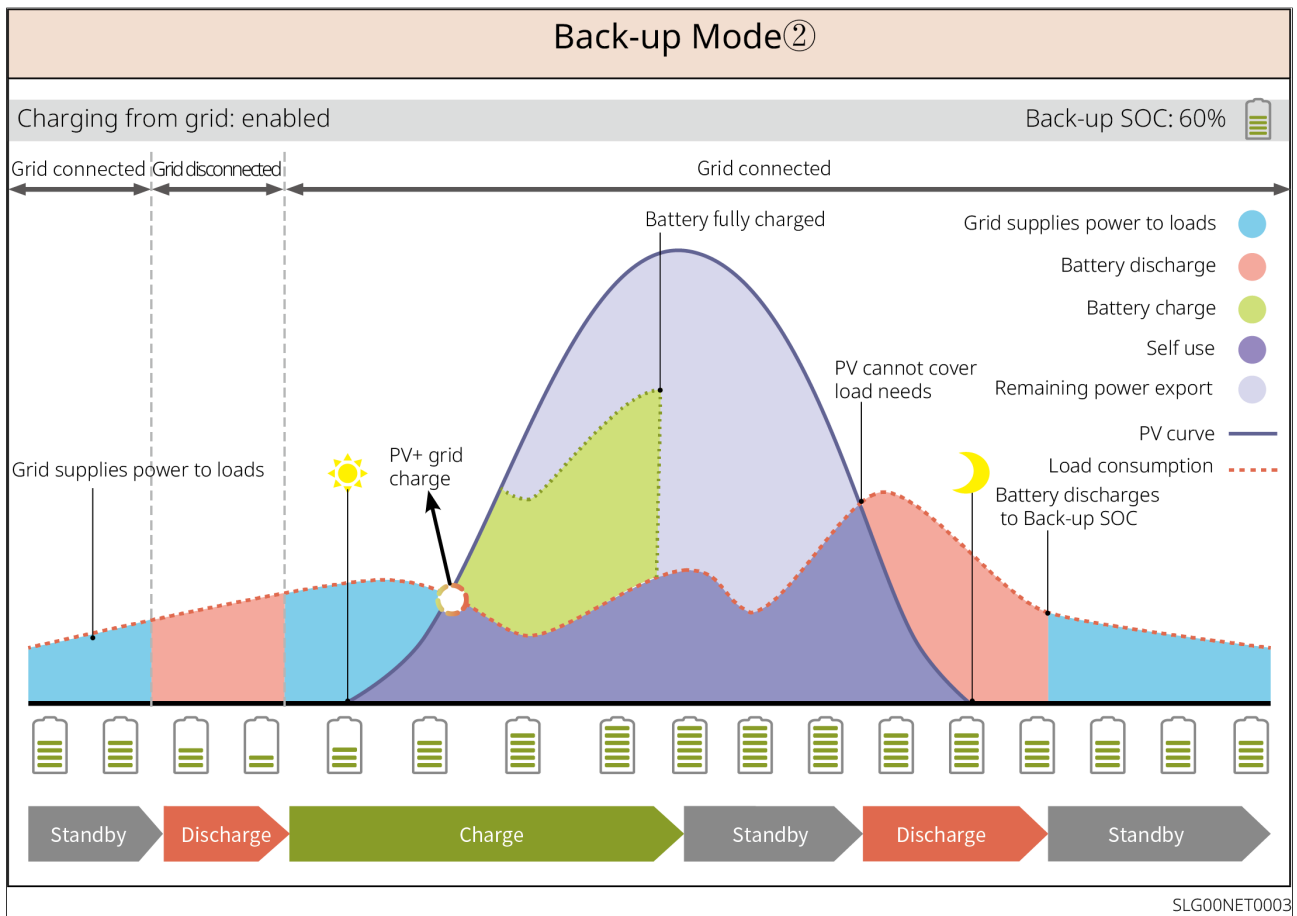


Figure9 Backup Mode 2

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.

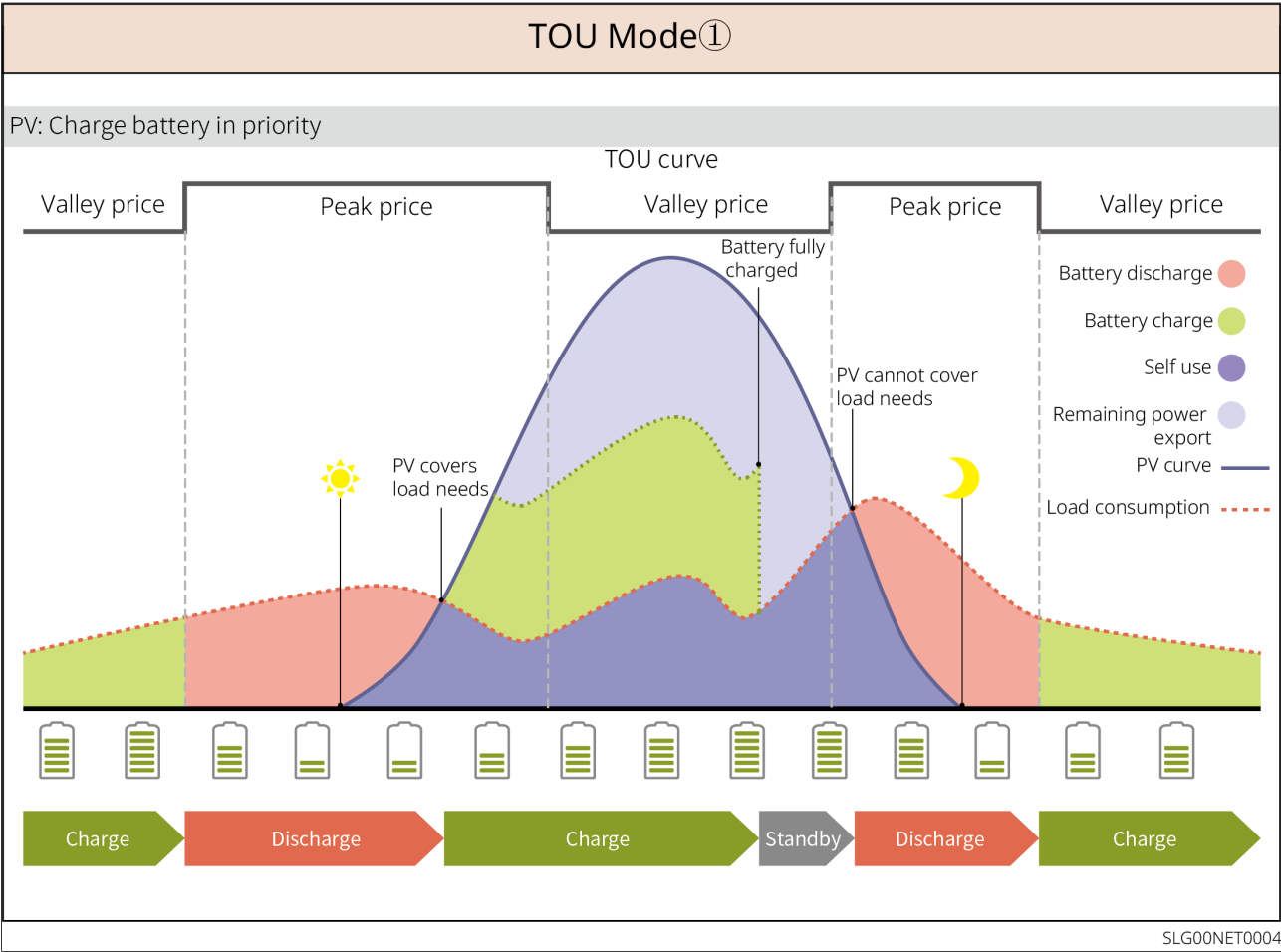


Figure10 TO U Mode 1

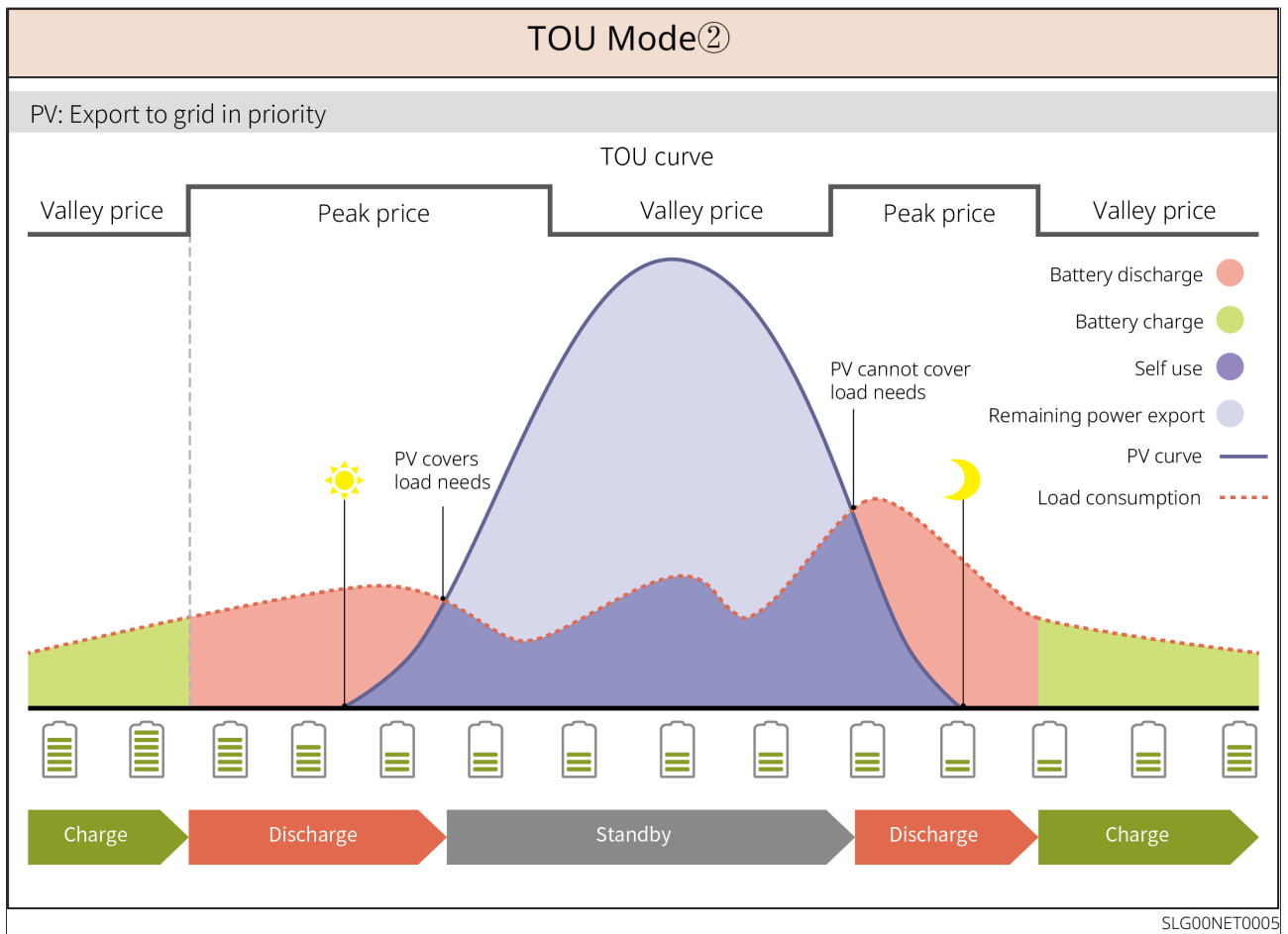


Figure11 TO U Mode 2

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.

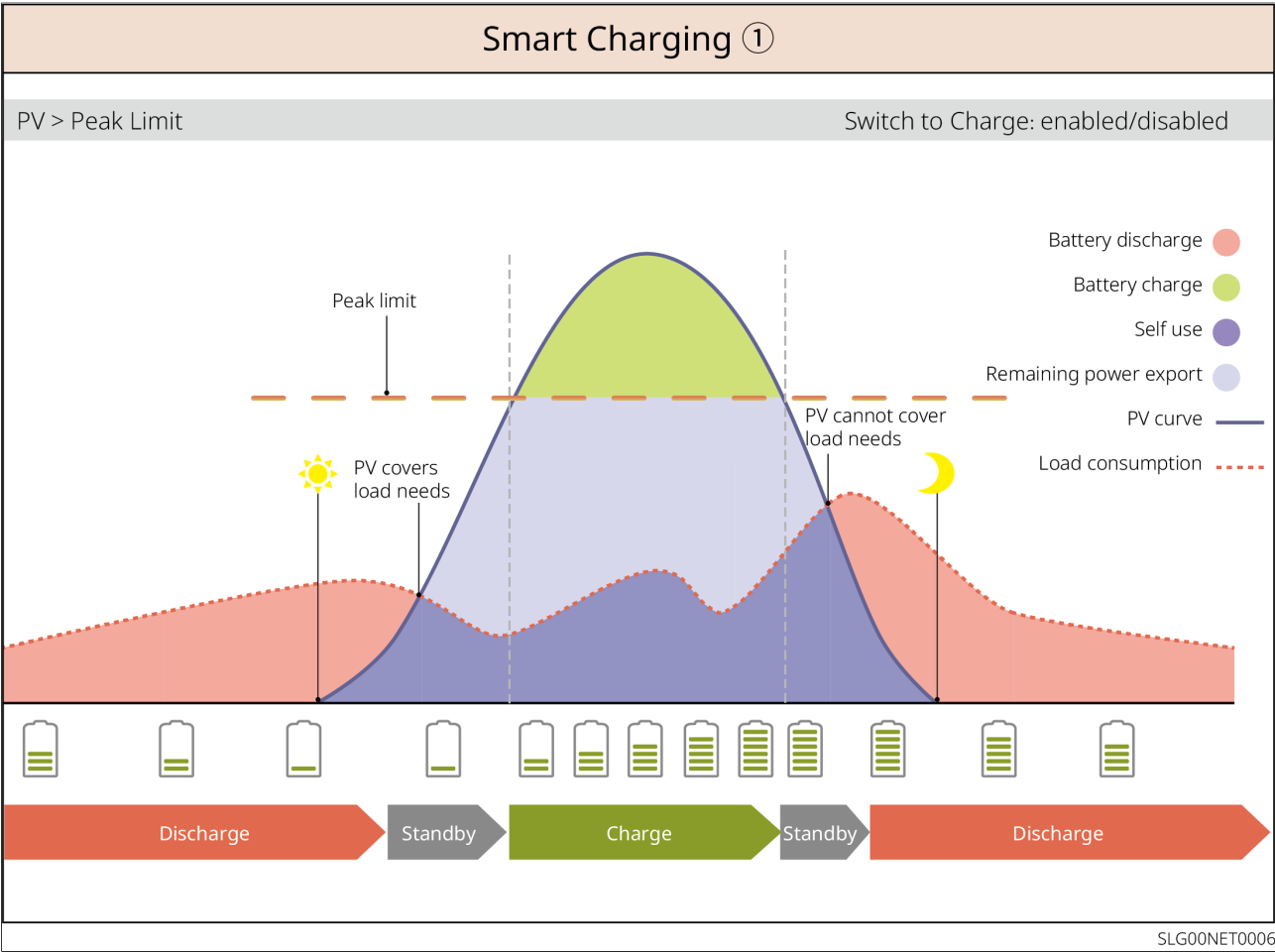


Figure12 Delayed Charging Mode 1

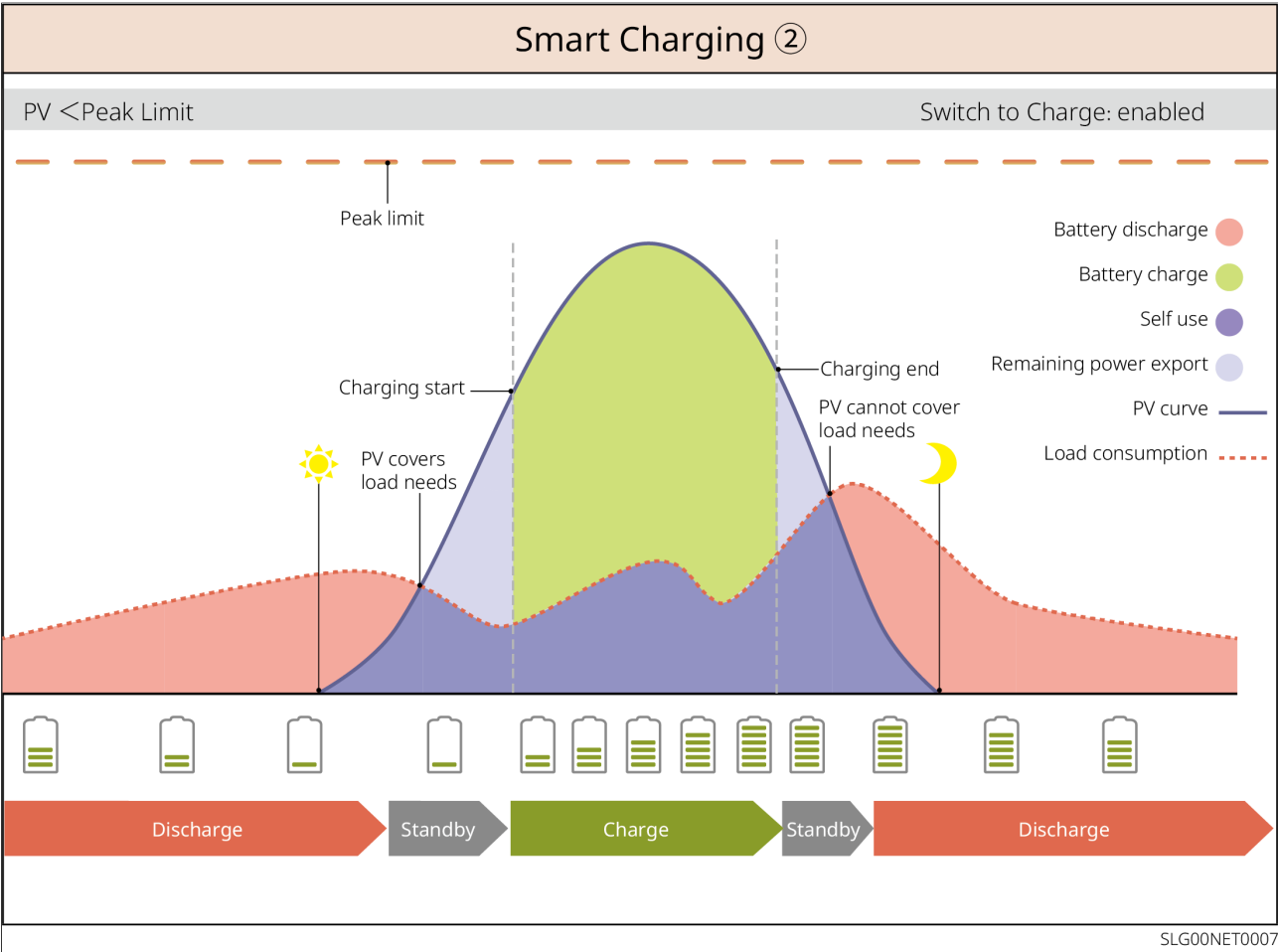


Figure13 Delayed Charging Mode 2

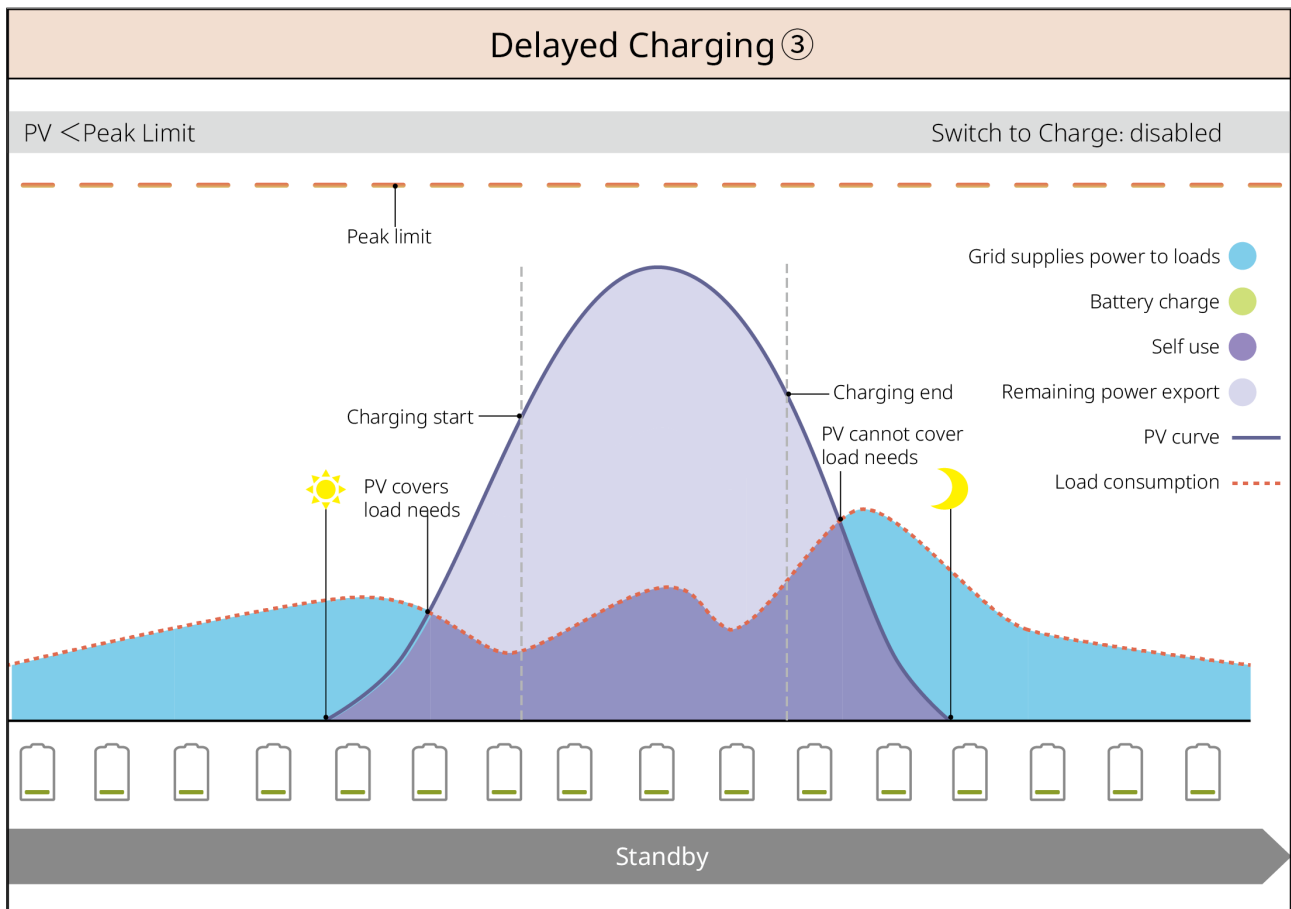


Figure14 Delayed Charging Mode 3

Demand Control Mode

- Mainly applicable to industrial and commercial scenarios.
- When the total load power consumption exceeds the power quota within 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.

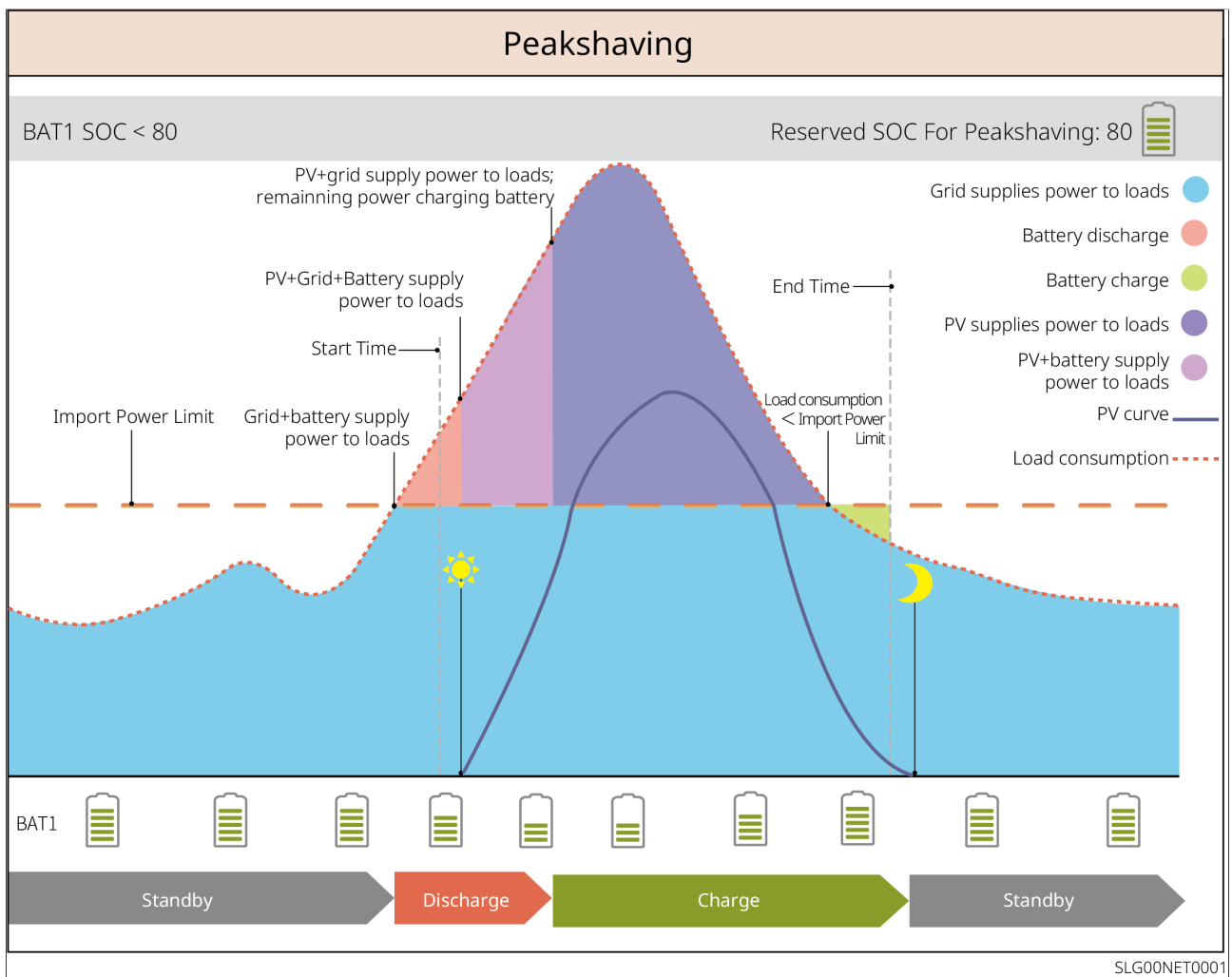


Figure15 Demand Control Mode

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.

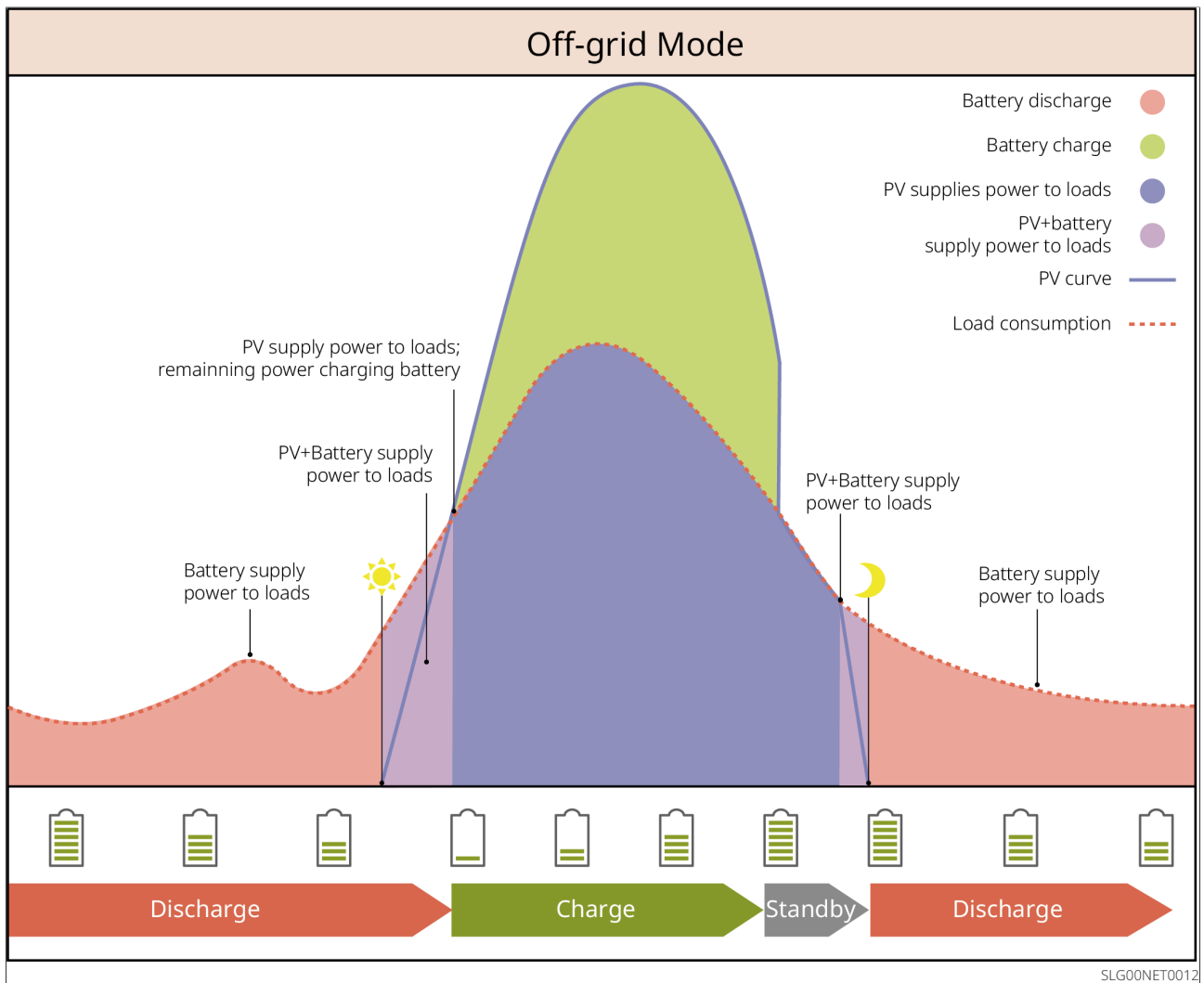


Figure16 off-grid mode

2.5 Features

NOTICE

Specific functional features are subject to the actual product configuration.

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 faults:

- 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 fault, the fault type can be viewed via the App.
2. If the inverter triggers the fault <5 times within 24 hours, it will automatically restore grid connection after a 5-minute wait. After the 5th arc fault, the inverter can only resume normal operation after the fault is cleared. For specific operations, please refer to the App user manual.

model	Label	Description
GW3K-EHA-G20 GW3.6K-EHA-G20 GW5K-EHA-G20 GW6K-EHA-G20	AFCI: F-I-AFPE-1-2-1	F: Full coverage I: Integrated AFPE: Detection and interruption capability provided 1: 1 monitored string per input port 2: 2 input ports per channel 1: 1 monitored channel
GW8K-EHA-G20 GW9.999K-EHA-G20 GW10K-EHA-G20	AFCI: F-I-AFPE-1-2/2-2	F: Full coverage I: Integrated AFPE: Detection and interruption capability provided 1: 1 monitored string per input port 2/2: 2/2 input ports per channel(AFD1: 2 , AFD2: 1) 2: 2 monitored channels

load control

The inverter's dry contact control port supports connecting an additional contactor to control the switching on or off of loads. Supports household loads, heat pumps, etc. Load control methods are as follows:

- Timer control: Set the time to switch loads on or off. The loads will automatically turn on or off within the set time period.

- Switch control: When the control mode is set to ON, the load will turn on; when set to OFF, the load will turn off.
- BACK-UP Loads control: The inverter has a built-in relay dry contact control port, which can control whether the load is switched off via the relay. In off-grid mode, if the BACK-UP terminal is detected to be overloaded and the battery SOC value is below the set off-grid protection value, the load connected to the relay port can be switched off.

Rapid Shutdown (RSD)

In a rapid shutdown system, the rapid shutdown transmitter and receiver work together to achieve system rapid shutdown. The receiver maintains module output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In an emergency, by enabling an external trigger device, the transmitter can be stopped, thereby shutting down the modules.

- External Transmitter
 - Transmitter models: GTP-F2L-20, GTP-F2M-20
<https://en.goodwe.com/Ftp/Installation-instructions/RSD2.0-transmitter.pdf>
 - Receiver models: GR-B1F-20, GR-B2F-20
https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_RSD-20_Quick-Installation-Guide-POLY.pdf
- Built-in Transmitter
 - External trigger device: External switch
 - Receiver models: GR-B1F-20, GR-B2F-20
https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_RSD-20_Quick-Installation-Guide-POLY.pdf

3 Check and Storage

3.1 Check Before Receiving

Check the following items before accept.

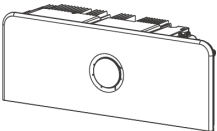
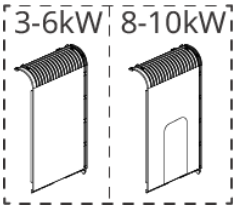
1. Check the outer packing box for damage, such as holes, cracks, deformation, and other signs of equipment damage. Do not unpack the package and contact the supplier as soon as possible if any damage is found.
2. Check the product model. If the product model is not what you requested, do not unpack the product and contact the supplier.

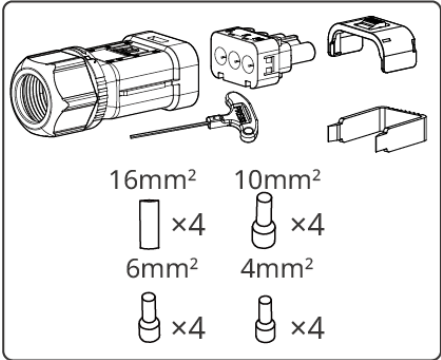
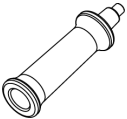
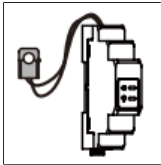
3.2 Deliverables

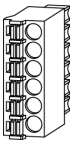
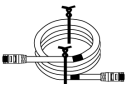
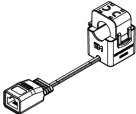
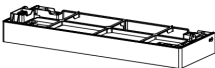
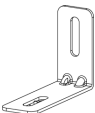
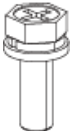
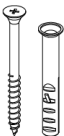
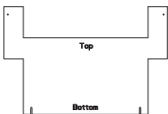
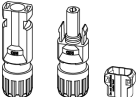


Check the deliverables for correct model, complete contents, and intact appearance. Contact the supplier as soon as possible if any damage is found.

3.2.1 Inverter Deliverables

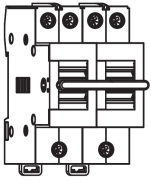
Part	Description	Part	Description
	Inverter x 1		Top decorative cover x 1
	Left decorative cover x 1		Right decorative cover x 1

Part	Description	Part	Description
		AC terminal kit x 2 • AC wiring terminal x 2 • Hexagon screwdriver x 1 • PIN terminal ◦ 4mm² x 4 ◦ 6mm² x 4 ◦ 10mm² x 4 ◦ 16mm² x 4	
	Handle x 2		GMK110 Smart Meter x N • GW3K-EHA-G20, GW3.6K-EHA-G20, GW5K-EHA-G20, GW6K-EHA-G20, GW8K-EHA-G20, GW9.999K-EHA-G20, GW10K-EHA-G20 x 0 • GW3K-BHA-G20, GW3.6K-BHA-G20, GW5K-BHA-G20, GW6K-BHA-G20, GW8K-BHA-G20, GW9.999K-BHA-G20, GW10K-BHA-G20 x 1

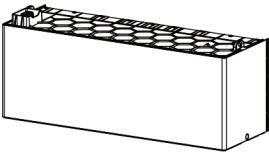
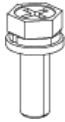
Part	Description	Part	Description
	OT grounding terminal x 1		6PIN communication terminal x 2
	2PIN communication terminal x 2		PIN terminal x 16
	CT connecting cable x 1		CT x 1
	Battery base x 1		Adjustable foot x 4
	Anti-tip bracket x 4		M5*16 screw x 9
	M5*60 expansion screw x 4		Drilling template x 2
 or 			PV terminal unlocking tool x N N: China region x 0; Other regions x 1.

Part	Description	Part	Description
	PV terminal and PV terminal anti-tamper cover x N GW3K-EHA-G20, GW3.6K-EHA-G20, GW5K-EHA-G20, GW6K-EHA-G20 x 4 GW8K-EHA-G20, GW9.999K-EHA-G20, GW10K-EHA-G20 x 8 Note: No PV terminal anti-tamper cover in China region. GW3K-BHA-G20, GW3.6K-BHA-G20, GW5K-BHA-G20, GW6K-BHA-G20, GW8K-BHA-G20, GW9.999K-BHA-G20, GW10K-BHA-G20 x 0	 or 	Smart Dongle x 1
	(Australia only) Manual transfer switch x 1 Note: For use in single-unit scenarios only.		Product documentation x 1

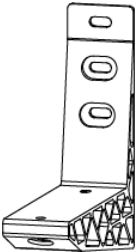
(Europe only) Manual Transfer Switch

Component	Description
	Manual transfer switch x 1 Note: For single-unit scenarios only. Please contact the 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	-	-

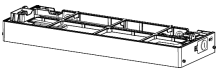
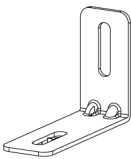
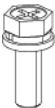
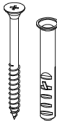
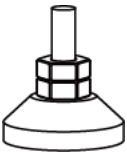
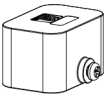
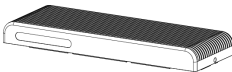
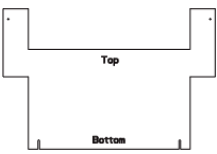
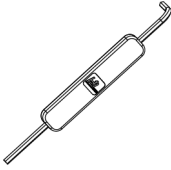
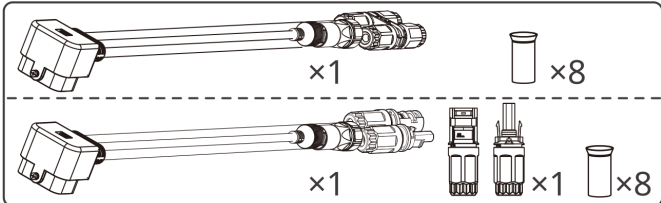
Battery Mounting Bracket (Optional)

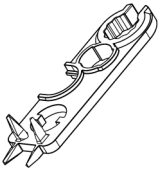
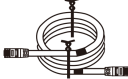
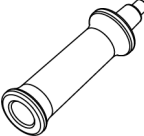
component	Description	component	Description
	Mounting bracket x 2		M10 expansion bolt x 6
	M10 screw x 4	-	-

3.2.2.1 Battery expansion kit delivery item (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 capacity expansion, please contact GoodWe or a dealer to purchase a battery expansion kit.

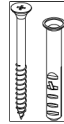
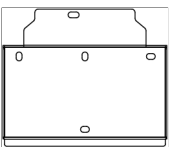
component	Description	component	Description
	Base x 1		Anti-tilt bracket x 4
	M5 screw x 7		M6 expansion bolt x 4
	Adjustable feet x 4		OT ground terminal x 1
	Termination Resistor x 1		Battery decorative cover x 1
	Punch marking paper x 2		Allen key x 1
		Battery Cluster Expansion Harness x 1	

component	Description	component	Description
	Unlocking tool x N		3m battery cluster extension positive wire harness x 1
	3m battery cluster expansion connection negative harness x 1		Battery expansion cluster network cable x 1
	Silicone cap x 2		Handle x 2
	Product document x1	-	-

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

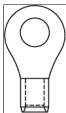
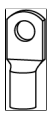
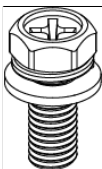
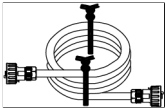
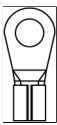
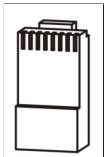
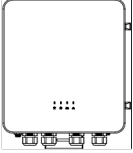
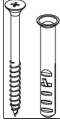
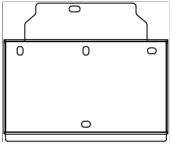
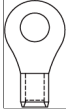
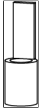
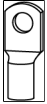
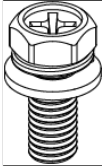
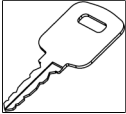
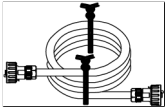
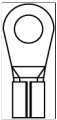
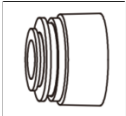
component	Description	component	Description
	63A AC terminal × 16		Neutral line locking screws ×4
	63A ground terminal ×4		Ground terminal screws × 4
	M8 enclosure grounding OT terminal × 1		Enclosure grounding screw ×1
	Communication waterproof ring ×1		Cabinet door keys × 2
	ESA three-phase integrated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

Table40 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

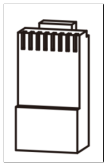
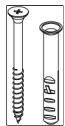
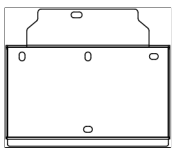
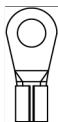
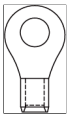
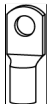
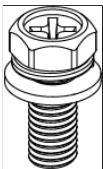
component	Description	component	Description
	Communication RJ45 connector ×2		Manual ×1

Table41 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

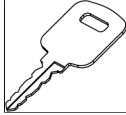
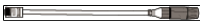
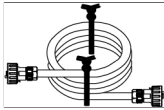
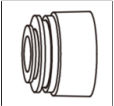
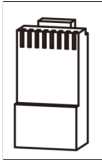
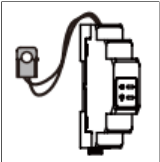
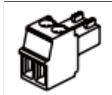
component	Description	component	Description
	Communication waterproof ring ×1		Cabinet door keys × 2
	ESA three-phase integrated machine communication conversion cable × 1		Inverter communication cable × 1
	Gland sealing ring ×4		Communication RJ45 connector ×2
	Manual ×1	-	-

Table42 GW60K-ST5-G10-Other Regions

3.2.4 Smart Meter Deliverables

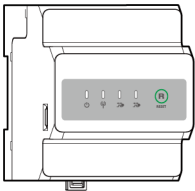
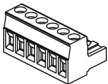
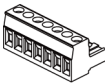
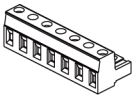
3.2.4.1 GMK110

Component	Description	Component	Description
	Smart Meter and CT x 1		RS485 communication terminals x 1
	Voltage input side terminal x 1		PIN terminal x 4

Component	Description	Component	Description
	Screw driver x 1		Documents x 1

3.2.4.2 Smart Meter Deliverables GM330 & GMK330

3.2.4.2.1 Attachment List

component	Description	component	Description
	Smart Meter x1 GMK330:CT×3; GMK360: CT×6; GM330: CT x 0.		2-pin communication terminal, x1 Applicable to GM330.
	6PIN communication terminal x1 Applicable to GM330.		7-pin communication terminal x1 Applicable to GM330.
	electric meter communication terminal Applicable to GMK330/GMK360.		RS485 communication terminal x 1
	2PIN terminal and RJ45 terminal adapter cable x 1		screwdriver x1
	tubular terminal GMK330/GMK360: x 5 ; GM330: x 6.		Product document x1

3.3 Equipment storage

- If the storage time of the inverter exceeds two years, or the period of inactivity after installation exceeds six months, it is recommended that the inverter be inspected and tested by qualified professionals before being put into operation.
- To ensure good electrical performance of the electronic components inside the inverter, it is recommended to power it on every 6 months during storage; if it has not been powered on for more than 6 months, it is recommended to have it inspected and tested by professionals before put into use.
- To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Prolonged storage may cause deep discharge of the battery, leading to irreversible chemical degradation, capacity fading, or even complete failure, it is recommended to use it promptly. If the battery requires long-term storage, please perform maintenance as per the following requirements:

Note

[1] The storage time is calculated from the SN date on the battery packaging. After the storage period, charge/discharge maintenance is required. (Battery maintenance time = SN date + charge/discharge maintenance cycle). To view the SN date, see: [11.3.Battery SN Code Meaning\(Page 310\)](#).

[2] After charge-discharge maintenance is completed, if the outer box is affixed with a Maintaining Label, update the maintenance information on the Maintaining Label; if there is no Maintaining Label, record the maintenance time and battery SOC by yourself and keep the data properly for maintaining maintenance records.

Battery model	Battery storage initial SOC range	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	
GW8.3-BAT-D-G20				
GW5.1-BAT-D-G21				

Battery model	Battery storage initial SOC range	Recommended Storage Temperature	Charge/discharge maintenance cycle ^[1]	Battery Maintenance Method ^[2]
GW8.3-BAT-D-G21				For maintenance methods, please consult the distributor or after-sales service center.
GW6.0-BAT-D-G20	30~40%	0~35°C	-20~35°C, 12 months	
GW9.0-BAT-D-G20			35~45°C, 6 months 45~55°C, 1 month	

Packaging requirements:

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

Environmental Requirements

1. Ensure the equipment is stored in a cool place, away from direct sunlight.
2. Ensure the storage environment is clean, with appropriate temperature and humidity range, and no condensation. If there is condensation at the device port, do not install the equipment.
 - 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 that the equipment is stored away from flammable, explosive, and corrosive materials.
4. Stacking requirements
 - Ensure that the stacking height and orientation of the equipment comply with the label instructions on the packaging box.
 - Ensure no risk of tipping over after equipment stacking.

4 Installation



Install and connect the equipment with the deliverables included in the package. Otherwise, the manufacturer shall not be liable for the damage.

4.1 Installation Requirements

4.1.1 Installation Environment Requirements

Note

- Inverter Operating Temperature Range: -35°C-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 to recover energy after being fully discharged, resulting in battery undervoltage protection.
- GW5.1-BAT-D-G21, GW8.3-BAT-D-G21: Charging temperature range: 2°C to 55°C; discharging temperature range: -20°C to 55°C. If installed in an environment below 2°C, the battery will not be able to recharge after being fully discharged, resulting in 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 continue charging to recover energy after being fully discharged, causing battery undervoltage protection.

1. The equipment shall not be installed in flammable, explosive, corrosive, or other hazardous environments.
2. The temperature and humidity of the equipment installation environment must be within the appropriate range.
3. The installation location must be kept out of reach of children and avoid areas prone to accidental contact.
4. Surfaces may be hot during equipment operation to prevent burns.
5. It is recommended that the equipment avoid installation environments such as

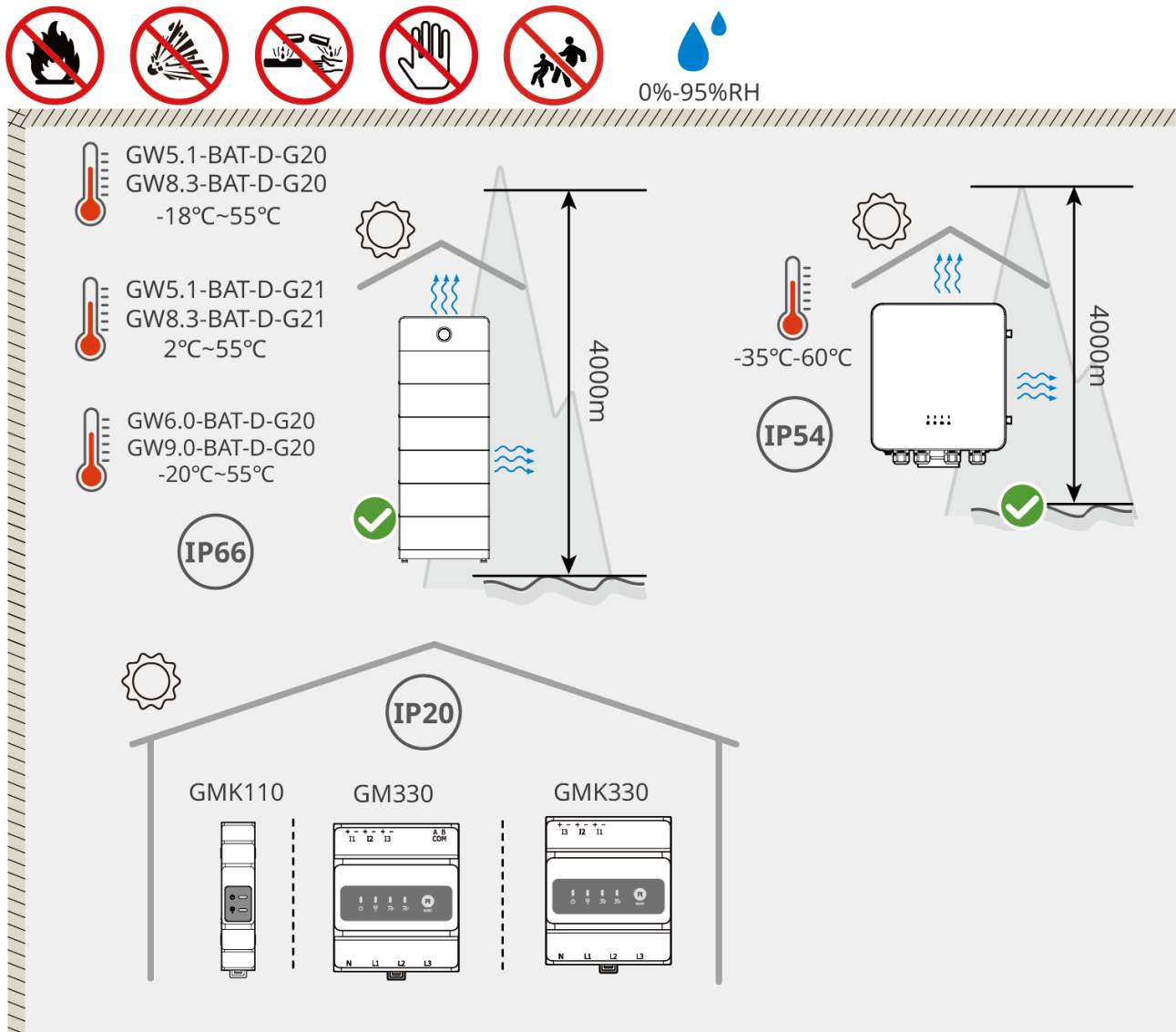
exposure to sunlight, rain, and snow accumulation, and prioritize a sheltered location. If complete avoidance is not possible, ensure that the temperature, humidity, and other conditions of the installation environment are always within the range allowed by the equipment specification sheet.

6. Adverse environmental conditions such as direct sunlight and high temperature may cause inverter output power derating.
7. The installation space must meet the equipment's ventilation and heat dissipation requirements as well as the operating 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; electric meters are suitable for indoor installation.
9. The installation height of the equipment shall facilitate operation and maintenance, ensuring that equipment indicators and all labels are easily visible, and wiring terminals are convenient to operate.
10. The equipment installation altitude is lower than the Max. Operating Altitude.
11. Before installing equipment outdoors in a salt-damage area, please consult the equipment manufacturer. Salt-damage areas primarily refer to areas within 500 meters from the coastline. The affected area is related to conditions such as sea breeze, precipitation, and topography.
12. The installation and storage location of equipment should avoid areas directly exposed to cold drafts such as air conditioning outlets. Excessive local temperature difference may cause condensation on the equipment, thereby leading to the following risks:
 - Electrical insulation performance declines, posing risks of leakage or short circuit;
 - Corrosion of metal connectors and terminals leads to increased contact resistance;
 - Electronic components damaged due to moisture;
 - Long-term condensation may accelerate equipment aging and shorten 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 Operating Environment requirements specified by the manufacturer.

13. Keep away from strong magnetic field environments to avoid electromagnetic interference. If there are radio stations or wireless communication equipment operating below 30MHz near the installation location, install the equipment according to the following requirements:

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



ESA20INT0007

4.1.2 Installation space requirements

1. installation space

a. Ventilation, heat dissipation, and operating space

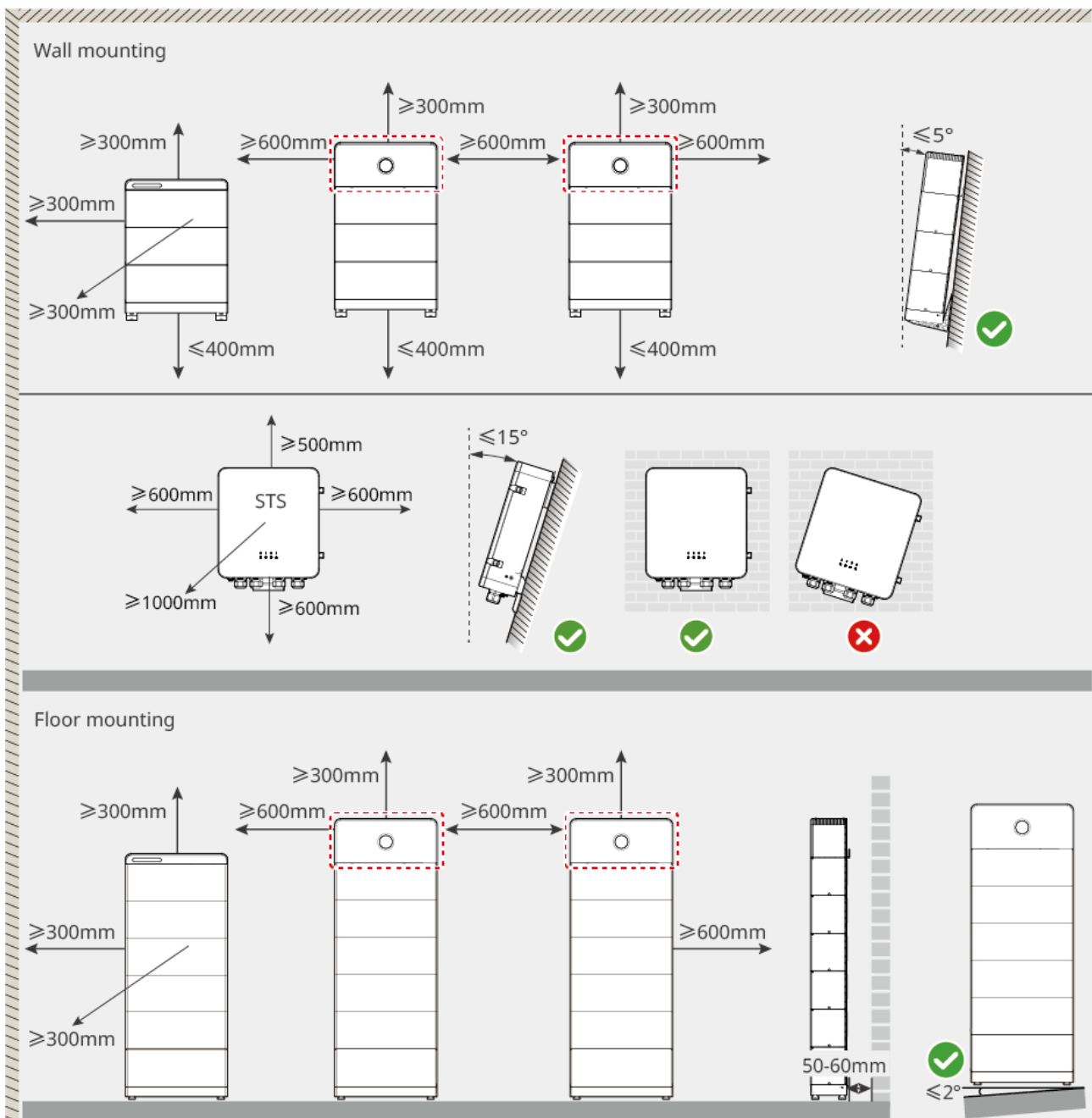
- The installation space must meet the equipment's ventilation and heat dissipation requirements, ensuring that sufficient cooling clearance is reserved

around the equipment.

- The installation space must meet the operational space requirements to facilitate routine inspection, wiring, and maintenance operations.

b. Mounting Height

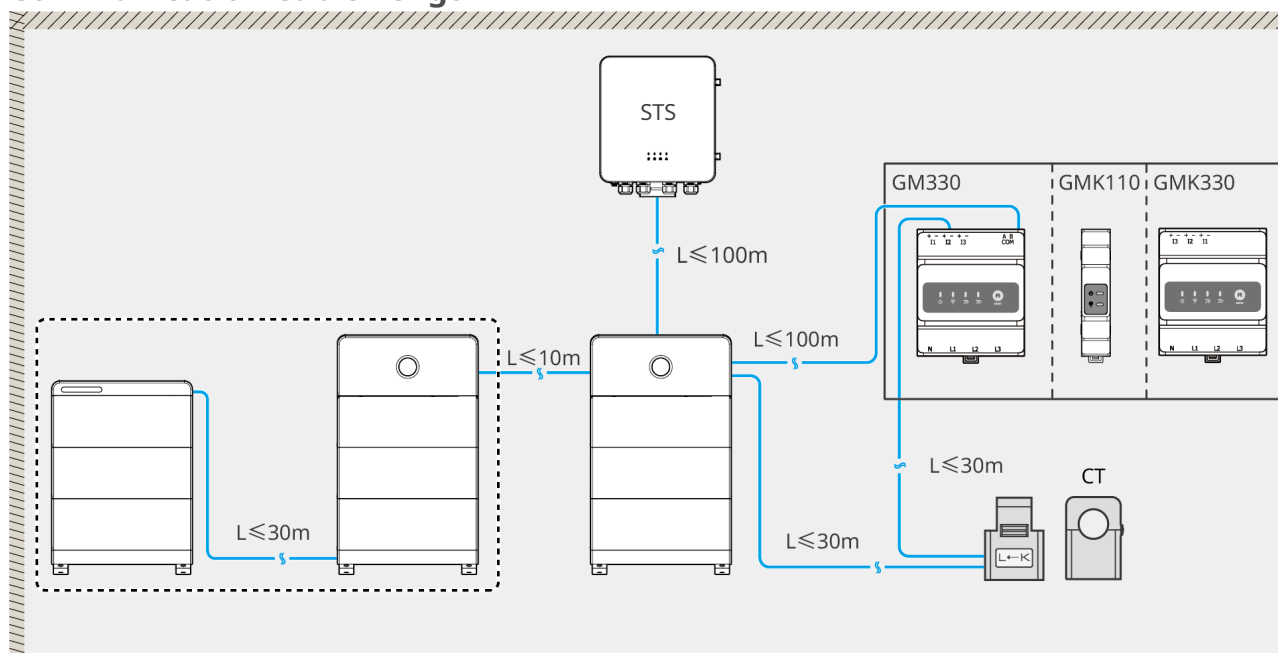
- Equipment installation height should facilitate operation and maintenance.
- Ensure that equipment indicator lights and all labels are clearly visible.
- Ensure that the terminal block is easy to operate.



ESA20INT0008

- 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.

Communication Cable Length



ESA20INT0019

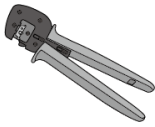
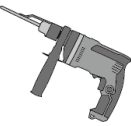
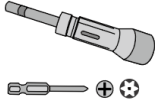
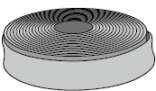
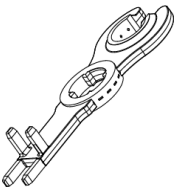
Installation Space

4.1.3 Tool Requirements

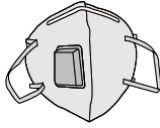
NOTICE

The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.

Installation Tools

Tool Type	Description	Tool Type	Description
	Diagonal pliers		RJ45 crimping tool
	Wire stripper		Level ruler
	Adjustable wrench		PV connector tool PV-CZM-61100
	Impact drill (drill bits Φ12mm)		Torque wrench M4, M5, M6, M10
	Rubber hammer		Socket wrench set
	Marker		Multimeter Range<=600V
	Heat shrink tube		Heat gun
	Cable tie		Vacuum cleaner
	(Only for China) PV Unlocking tool x1	-	-

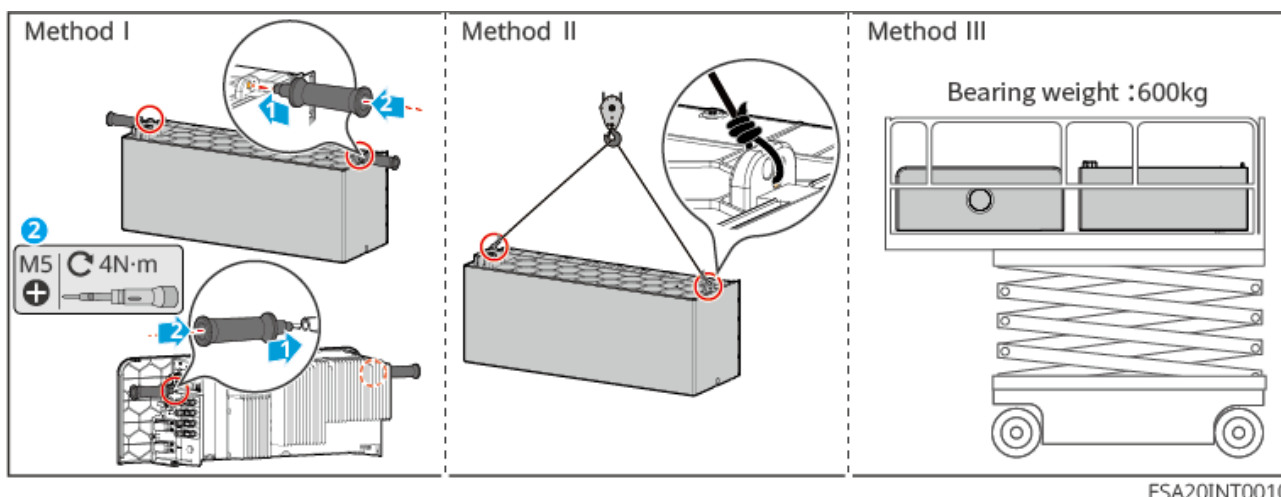
Personal Protective Equipment

Tool Type	Description	Tool Type	Description
	Insulating gloves, protective gloves		Dust mask
	Goggles		Safety shoes

4.2 Equipment Handling

CAUTION

- During operations such as transportation, handling, installation, etc., the laws, regulations, and relevant standard requirements of the country and region must be met.
- Before installation, the equipment needs to be moved to the installation site. To avoid personal injury or equipment damage during the moving process, please note the following:
 1. Based on the equipment weight, assign a corresponding number of personnel to avoid the equipment exceeding the weight limit a person can carry, which may cause injury.
 2. Please wear safety gloves to prevent injury.
 3. Ensure the equipment remains balanced during movement to avoid falling.
 4. The battery system can be hoisted and transported to the installation site.
 5. When using hoisting to move the equipment, 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 ≥185KG
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20 ≥240KG



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.
- When using base-mounted installation, it supports stacking up to 6 batteries.
- The maximum stacking quantity when using bracket installation is described as follows:
 - Identical Energy Stacking:
 - Identical Energy Stacking:
 - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21: Maximum 3 units.
 - GW8.3-BAT-D-G20 , GW8.3-BAT-D-G21: Up to 2 pcs.
 - GW6.0-BAT-D-G20: Up to 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 mixed and stacked, each group supports up to 3 modules
 - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, GW9.0-BAT-D-G20, and models stacked in a mixed configuration with them, the system supports a maximum of 2 units per group.
- The base, mounting bracket, and the top battery must be secured to the wall with an anti-tipping bracket.
- 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 Mounting

Step 1: Install the base on the mounting bracket.

Step 2: The mounting bracket should be flush against the wall. Ensure the bracket is placed securely and observe the bubble level in the middle of the base.

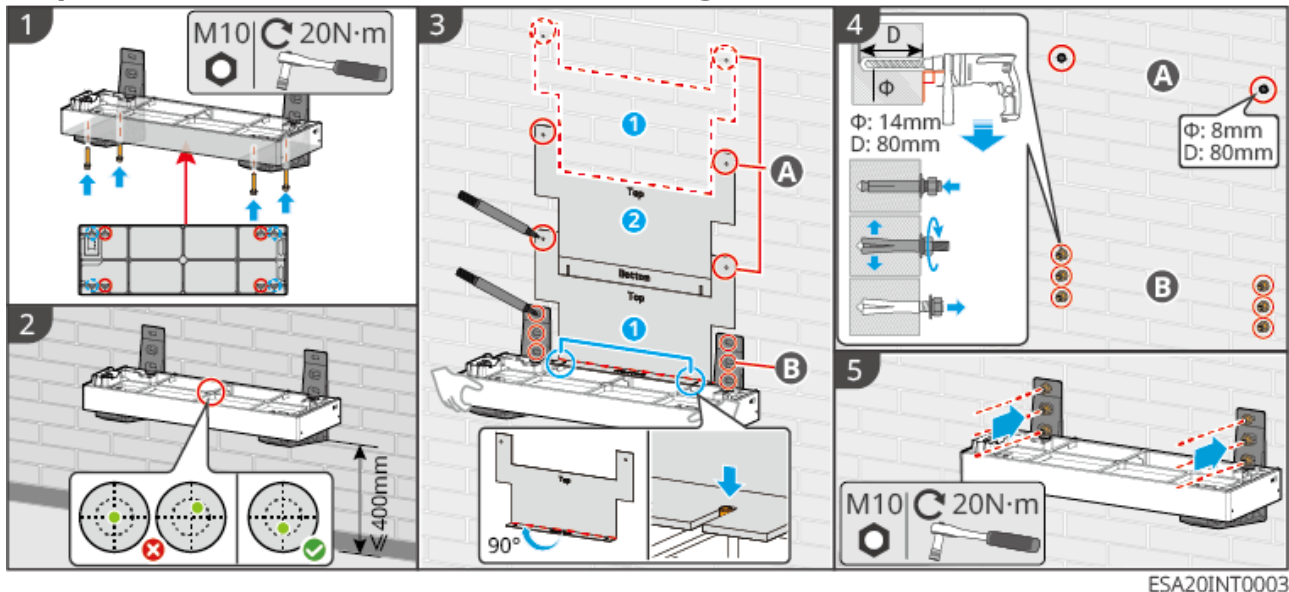
Step 3: After adjusting the position and levelness of the bracket, use a marker to mark the drilling positions. After marking, remove the bracket. (A: PACK fixing holes; B: Bracket fixing holes.)

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 the hex wrench to fix the mounting bracket on the wall.



ESA20INT0003

Mounting Base

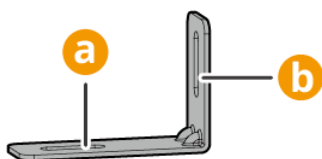
Step 1: Install the adjustable feet at the bottom of the base, and fix the anti-tilt bracket onto the base.

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

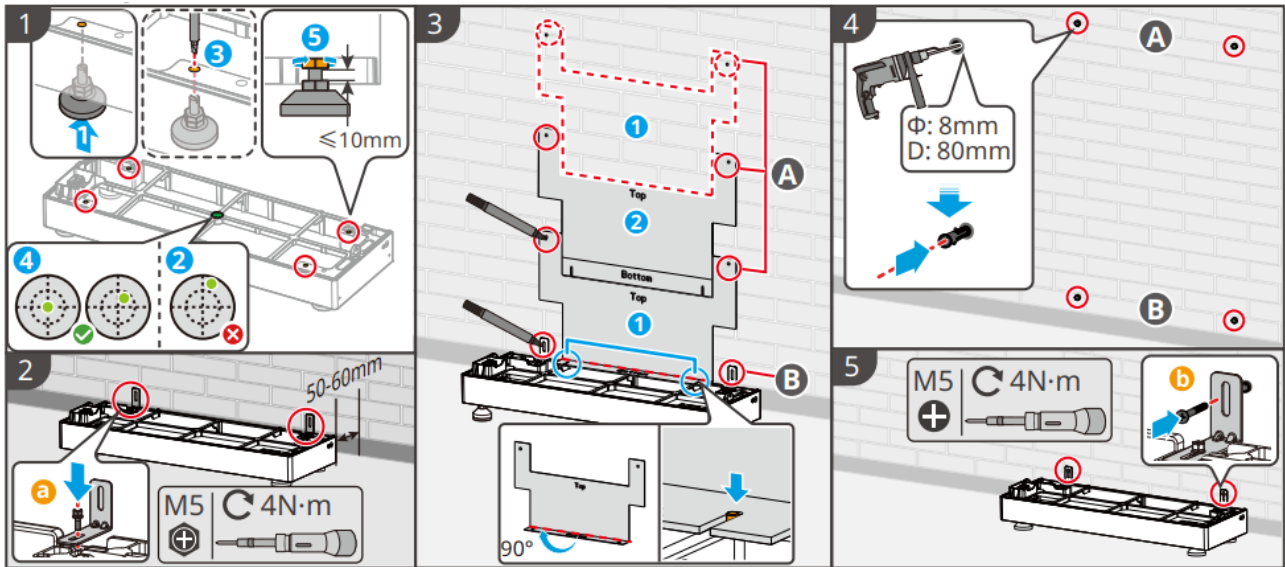
Step 3: After adjusting the position and levelness of the base, use the hole marking paper to mark the drilling positions. After marking, remove the base. (A: PACK fixing hole positions; B: Bracket fixing hole positions.)

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

Step 5: Use a cross-head screwdriver to tighten the anti-tipping bracket against the wall.



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



Install Battery and Inverter

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

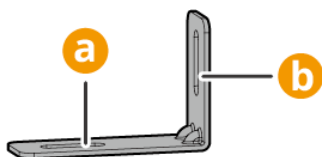
Step 2: Install the handle (optional), and stack the battery onto the base. If installing more than 3 batteries, please use lifting equipment.

Step 3: Secure 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 the installation of all batteries. The number of stacked batteries must follow "[2.2.1.System Overall Configuration Description\(Page 44\)](#)".

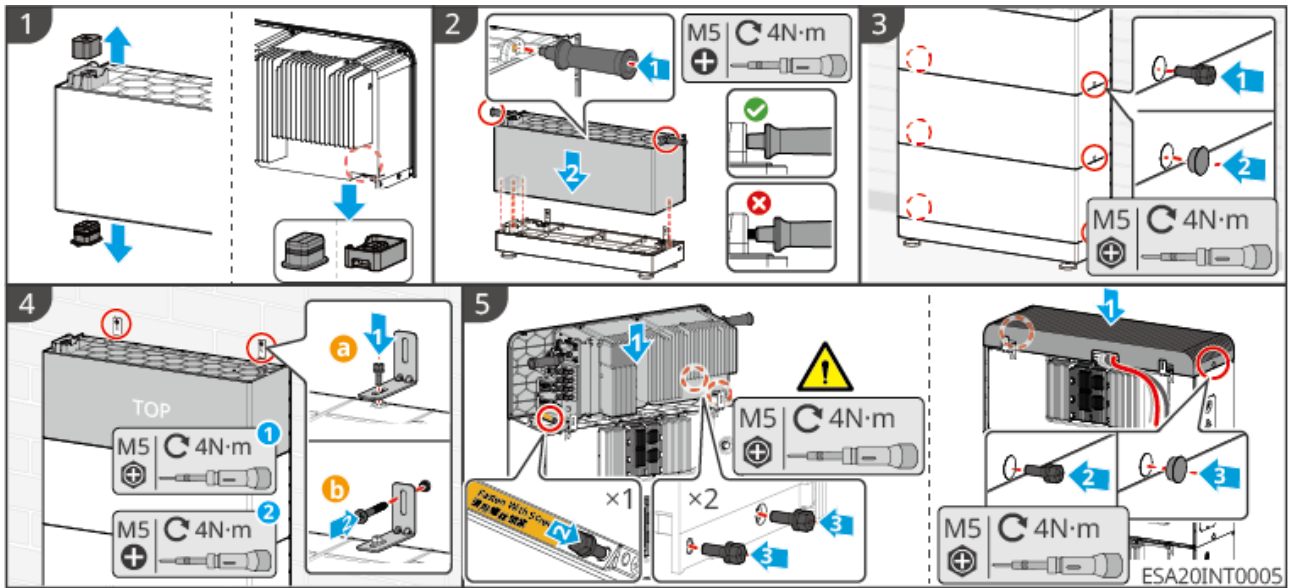
Step 4: The topmost battery is fixed to the wall using anti-tip brackets.

Step 5: Install the inverter or battery protective 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 installing the battery. After completing the electrical connection, place the battery protective cover on top of the battery and tighten the side screws.



a: Surface for fixing with PACK; b: Surface for fixing with wall.

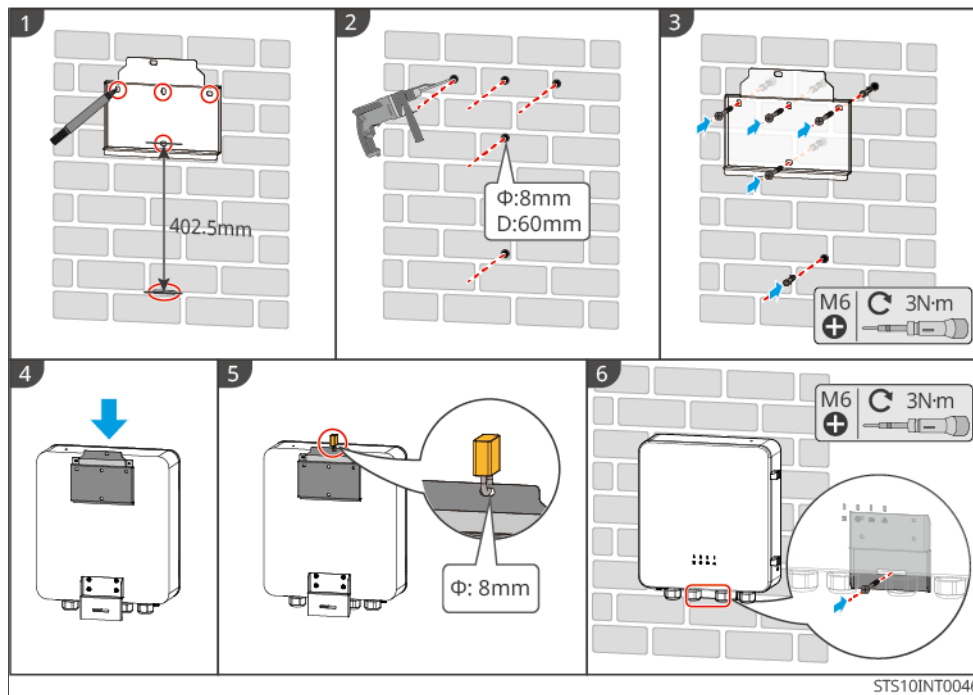


4.4 Install STS

! 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.

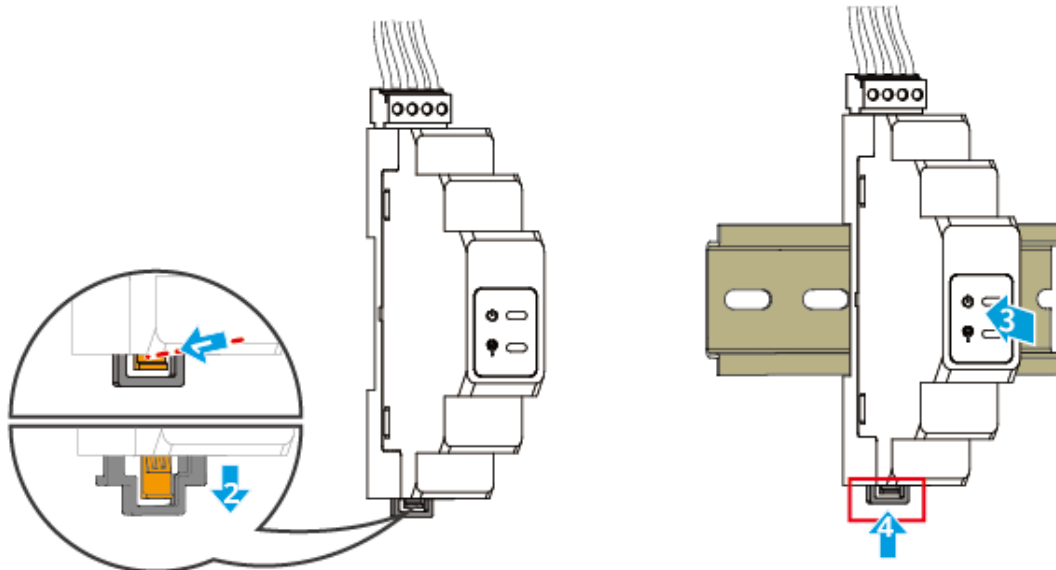


4.5 Install electricity meter

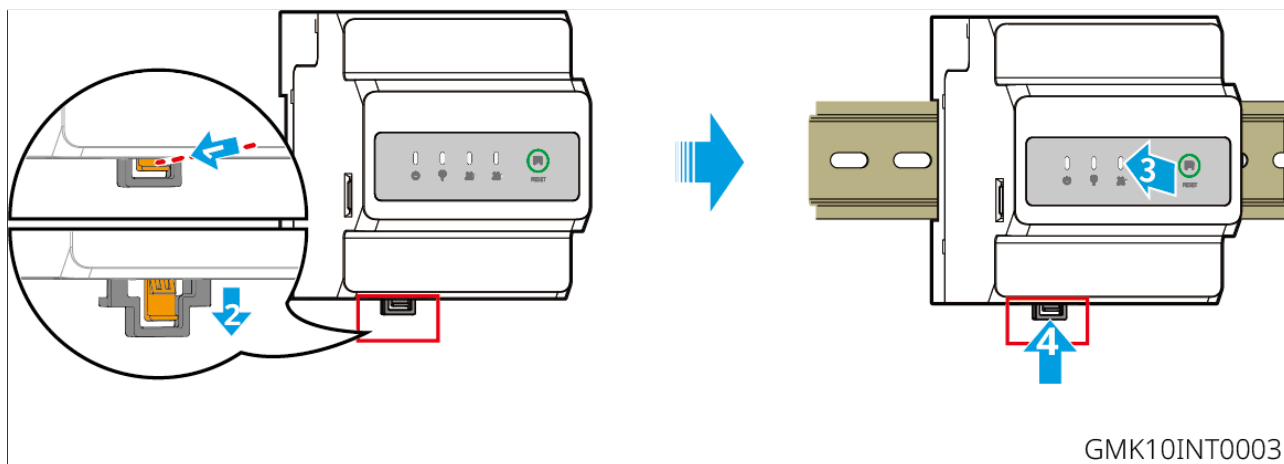
⚠ Warning

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

GMK110



GM330&GMK330



GMK10INT0003

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

- Depending on regional regulatory requirements, the wiring methods for the N and PE conductors at the ON-GRID and BACK-UP ports of the inverter are different. Refer to local regulations for specific details.
- 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 exceeding 30m will reduce accuracy. If high accuracy is required, 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 the whole-house backup power scenario, if the total power of the connected loads exceeds the inverter's Rated Power, the inverter will stop outputting due to Over load Protection after a grid outage. At this point, please turn off some non-essential loads to ensure that the total load power is less than the inverter power.

The N 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

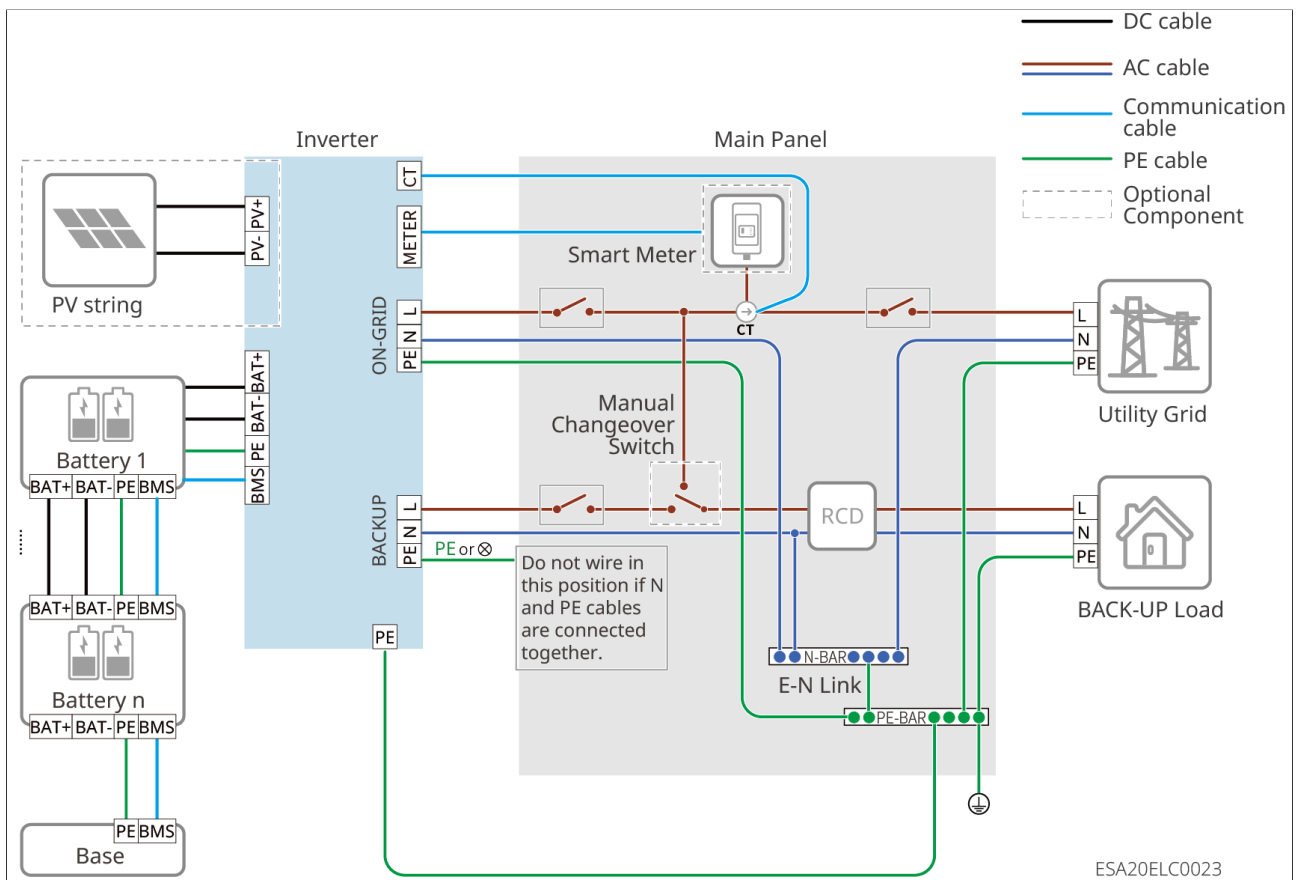


Figure17 Whole house backup power

Partial backup power

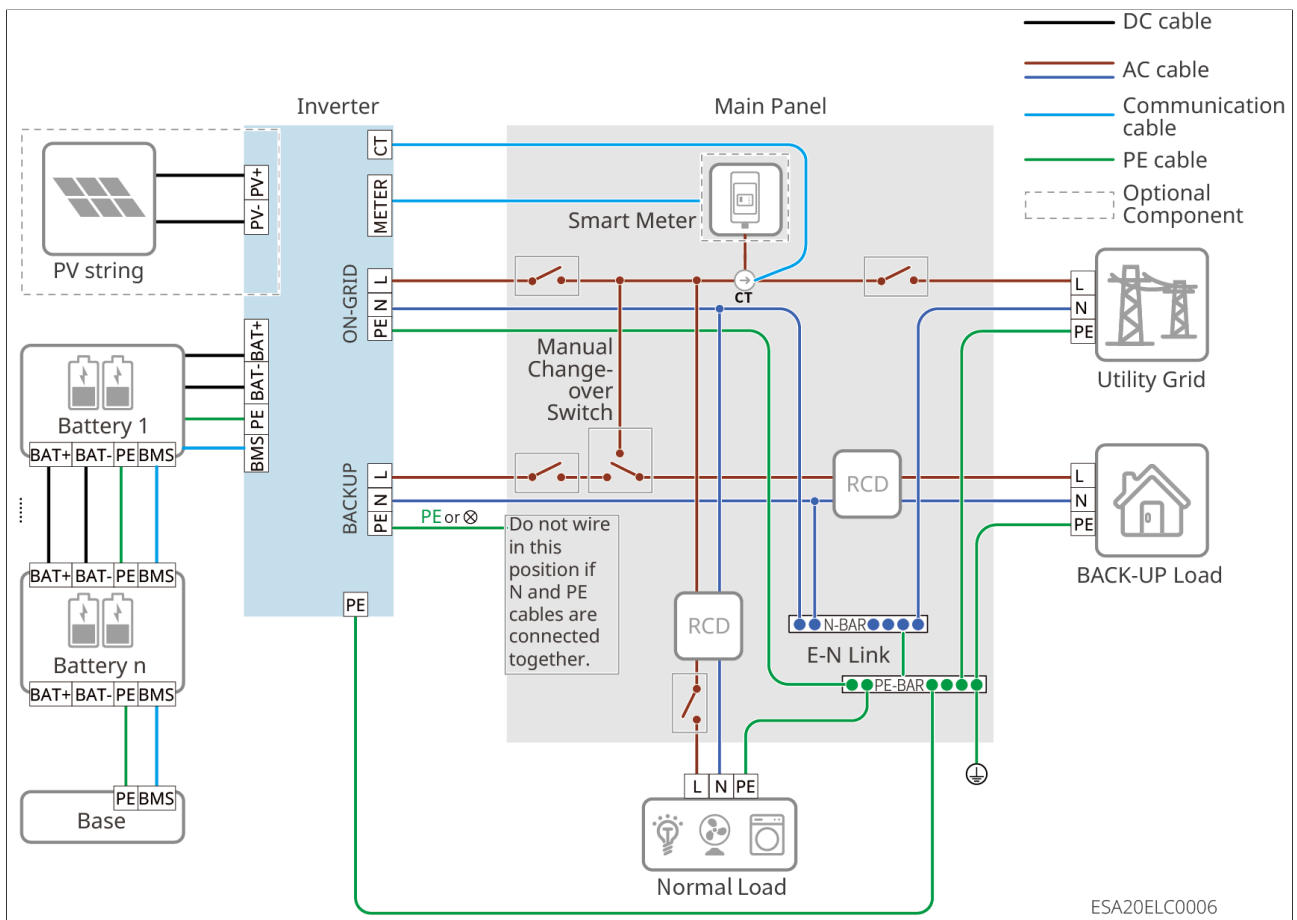


Figure18 Partial backup power

Type 2:

Whole house backup power

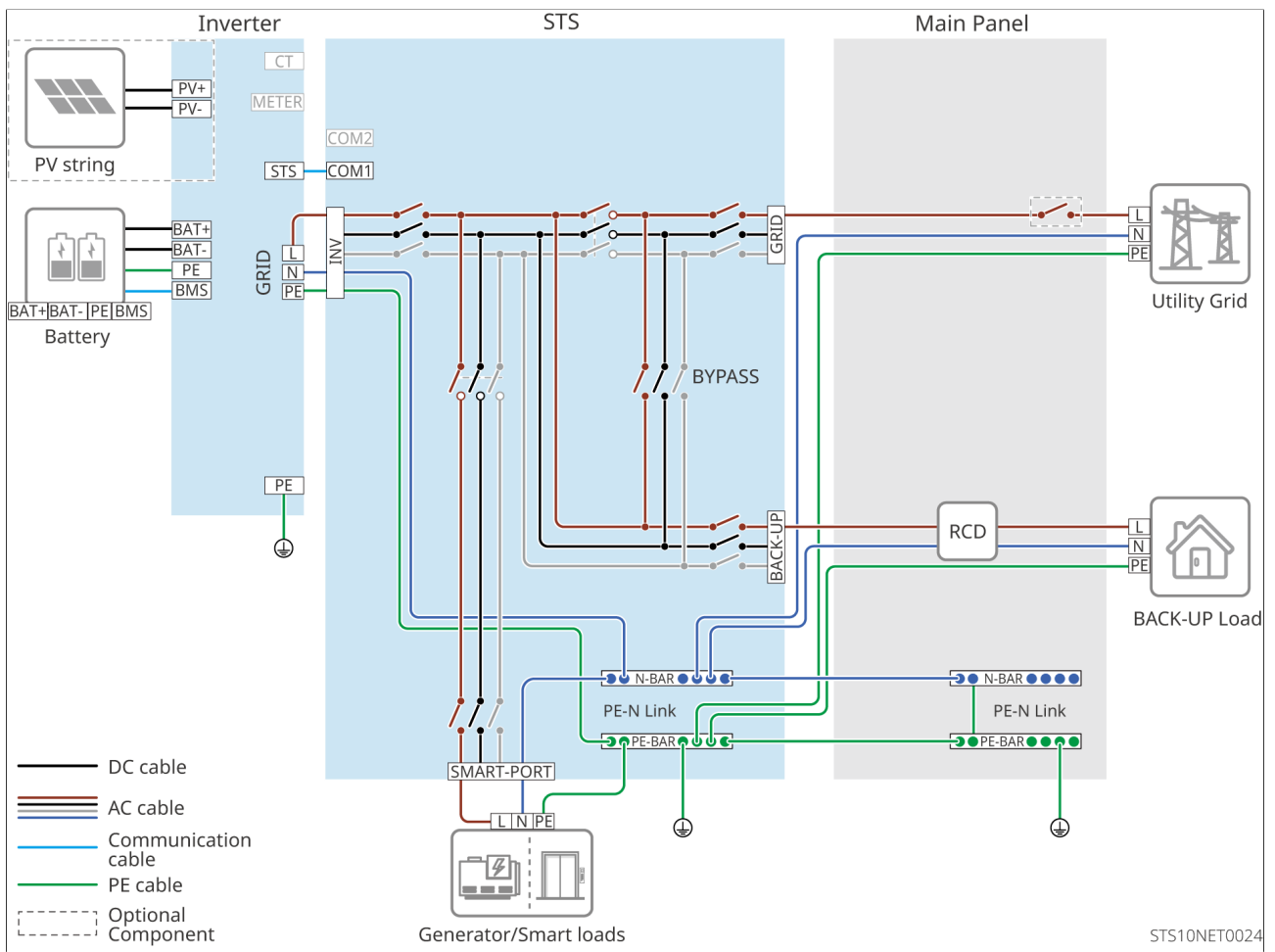


Figure19 with STS whole-house backup power

Partial backup power

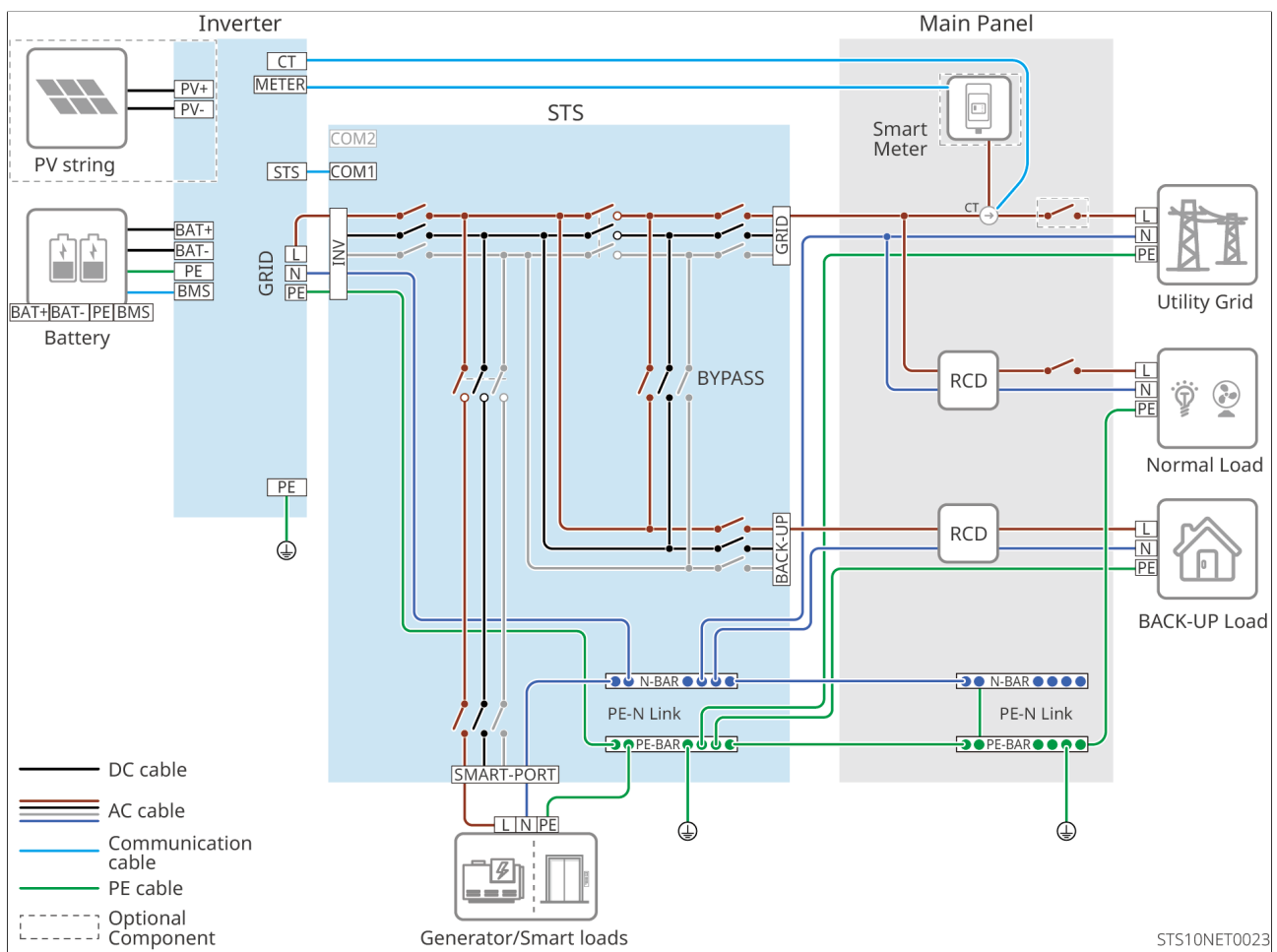


Figure20 with partial backup power for STS

NandPEthe wires are separately wired 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 1:

Whole house backup power

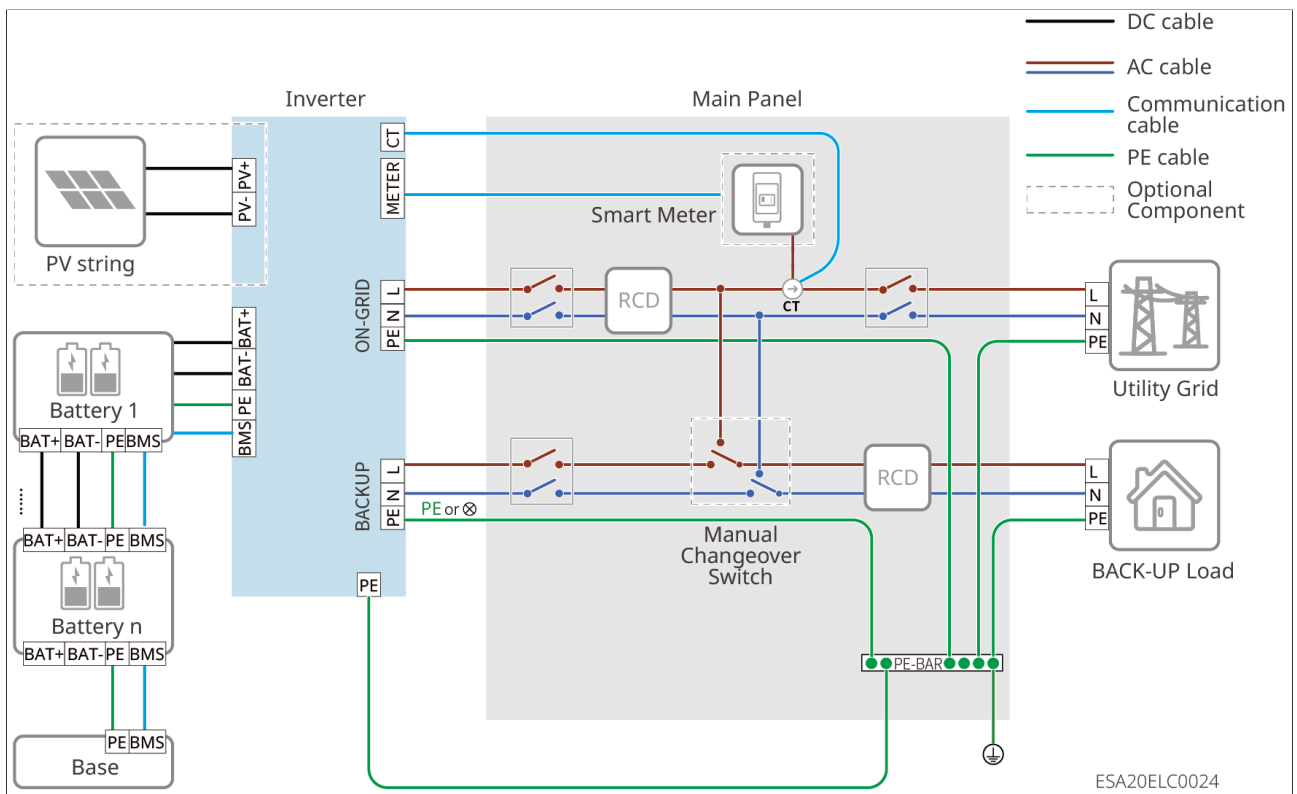


Figure21 Whole house backup power

Partial backup power

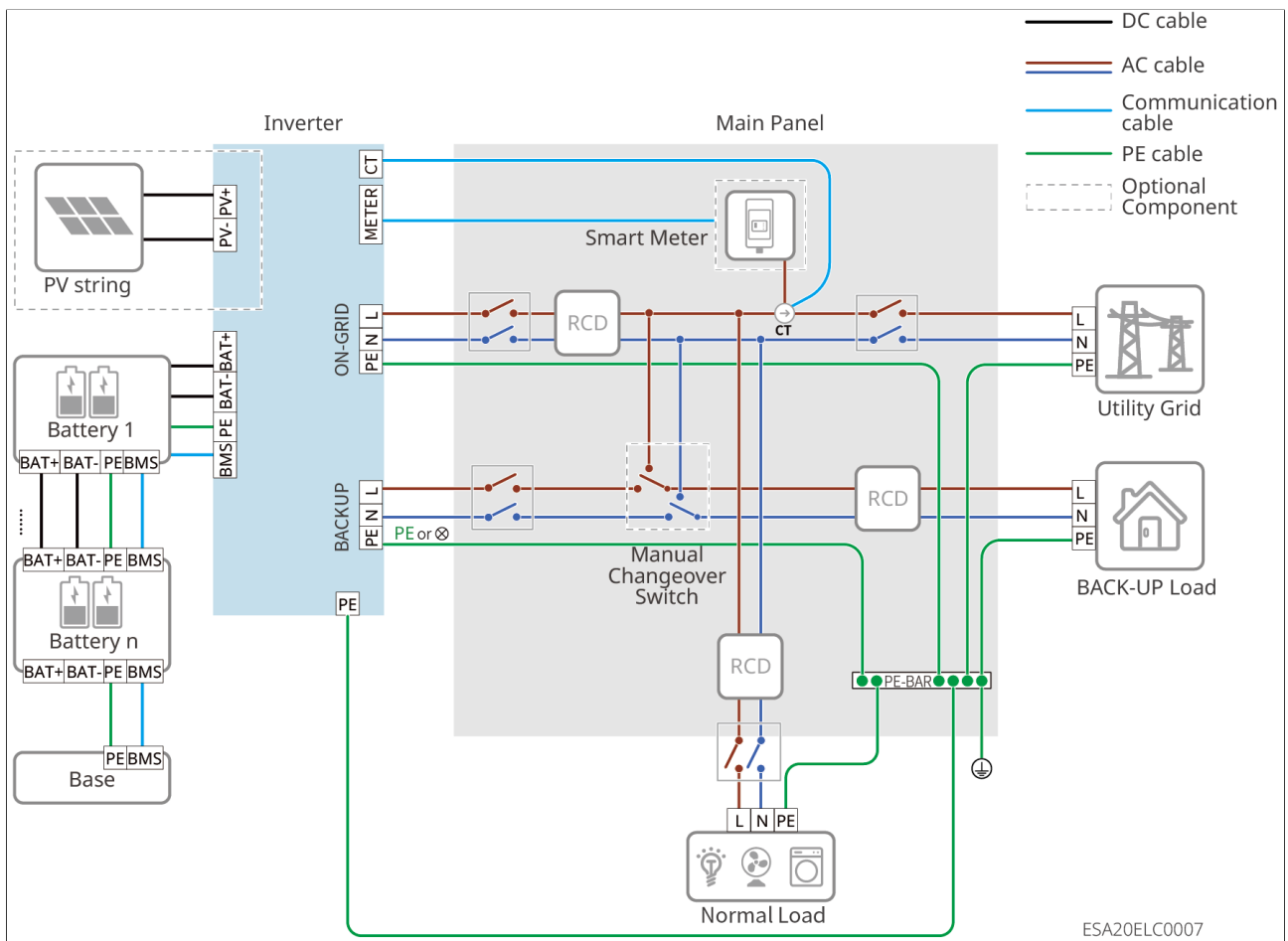


Figure22 Partial backup power

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

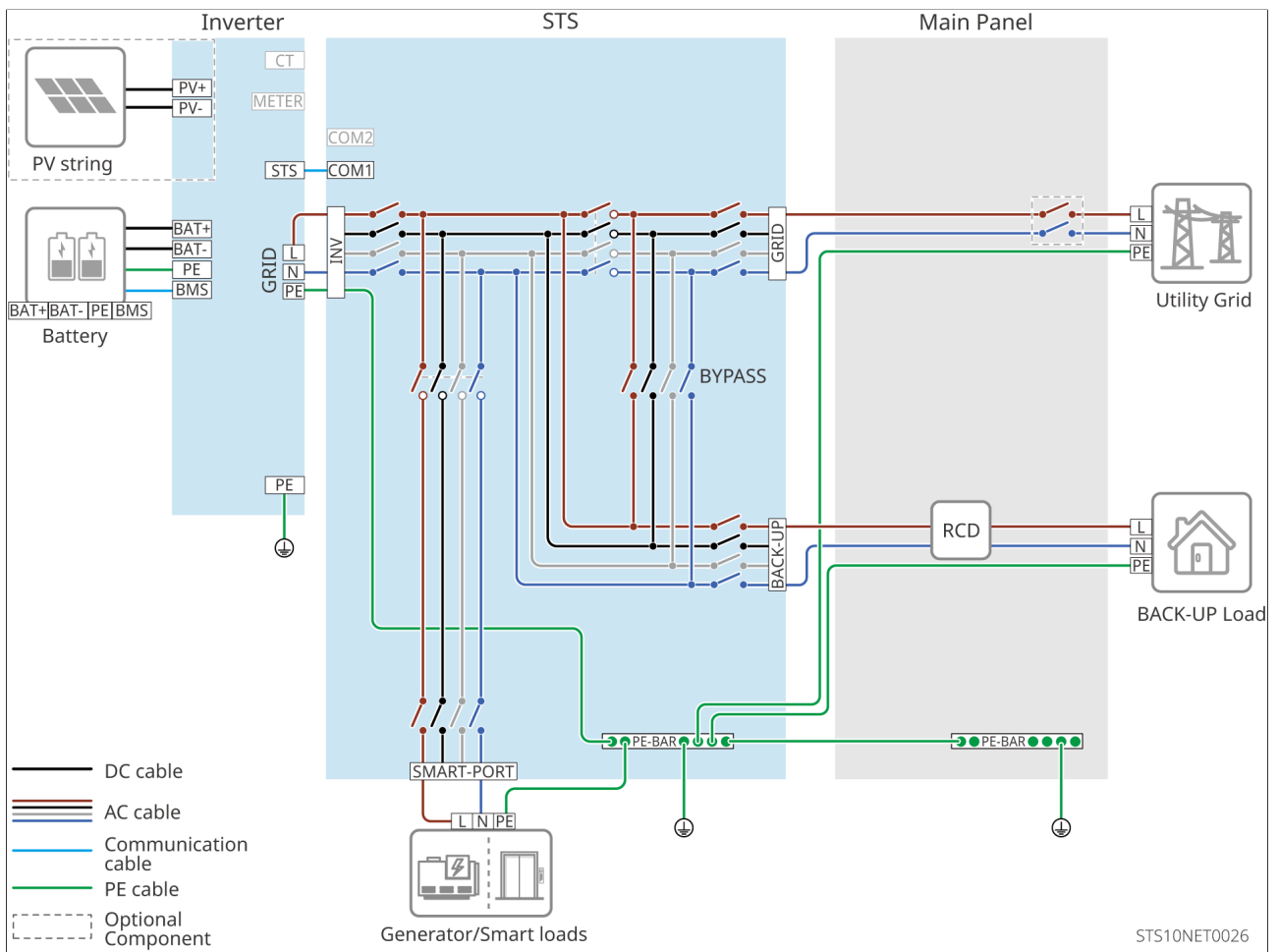


Figure23 with STS whole-house backup power

Partial backup power

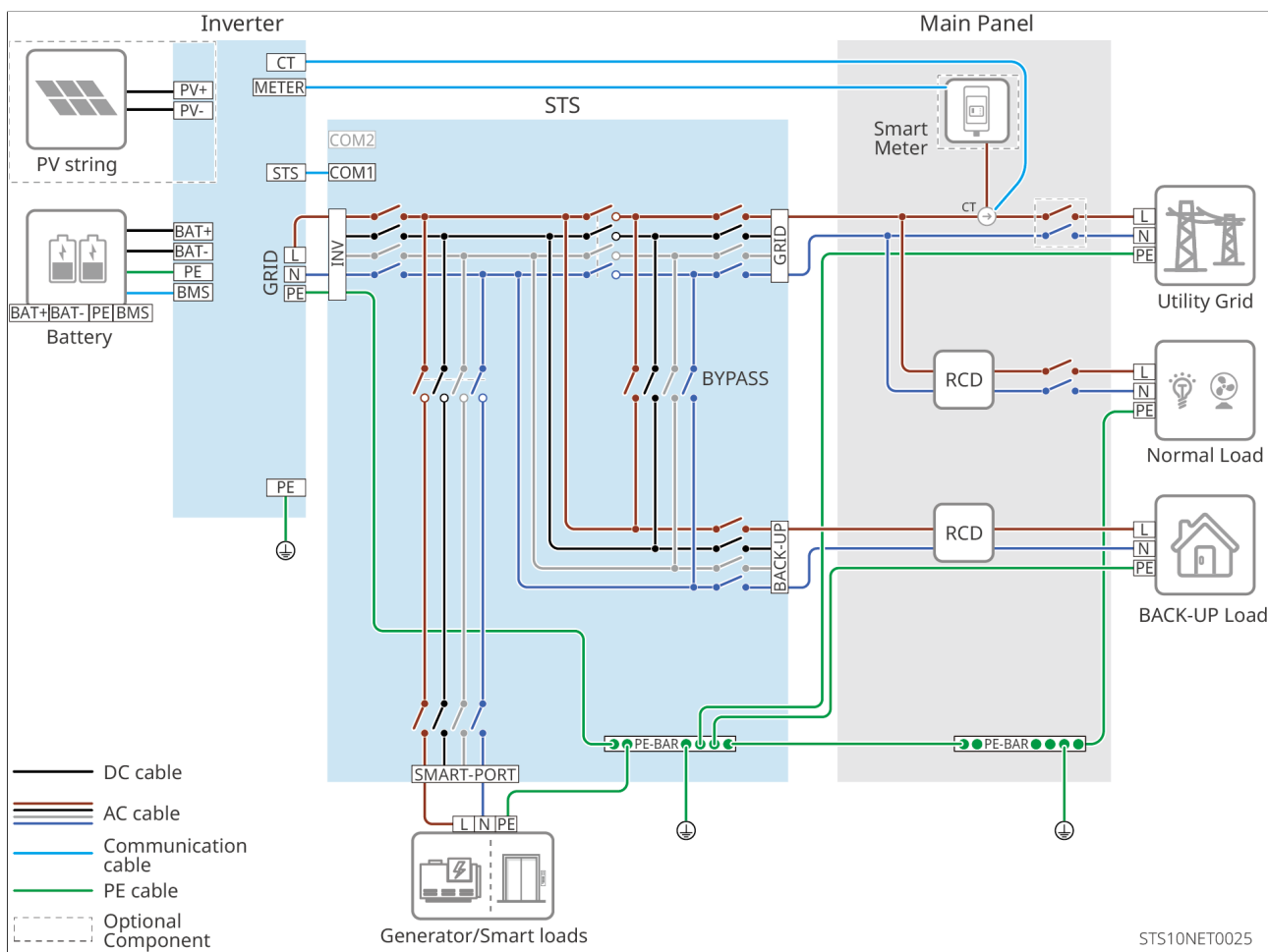
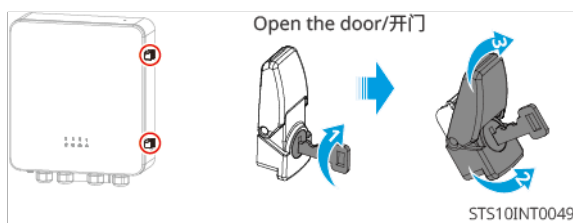


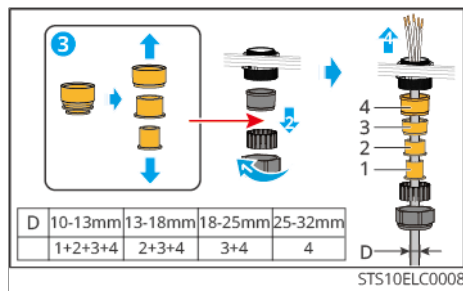
Figure24 with partial backup power for STS

5.2 Pre-wiring preparation for STS

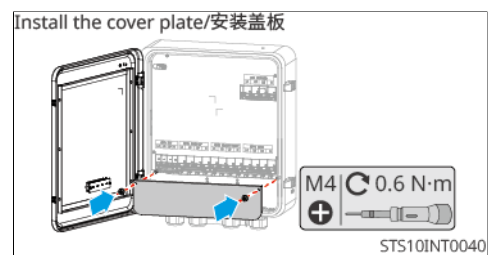
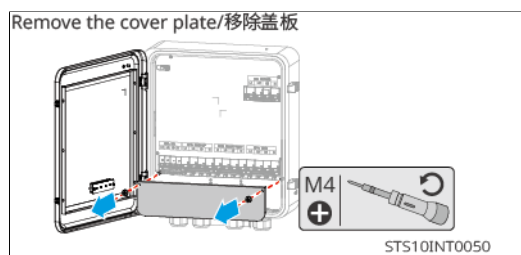
• Cabinet Door



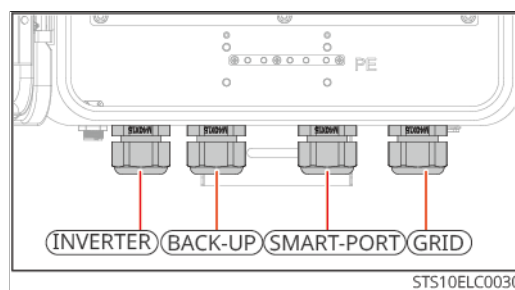
• Cable Gland Operation



• Cover Operation



• Wiring Diagram



5.3 System Wiring Detail Drawing

When all loads in the photovoltaic system cannot consume the energy generated in the system, the surplus energy will be fed into the grid. At this point, a smart meter or CT monitoring system can be used to monitor the system's Energy Generation and control the amount of 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-connected Power Limit" function through the 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

manual transfer switch must be connected to the Back-up load side of the inverter. Do not connect it to the Grid side. If connected to the Grid side, the inverter will operate in both off-grid and bypass modes simultaneously. When the grid power fails, the distribution cabinet connected to the inverter's Grid port will still carry high voltage, posing a risk of electric shock.

Australia region

Note

In Australia, a 1-pole manual transfer switch is included with the product upon shipment. If required, please connect it according to the wiring method for the 1-pole manual transfer switch shown in the wiring diagram below.

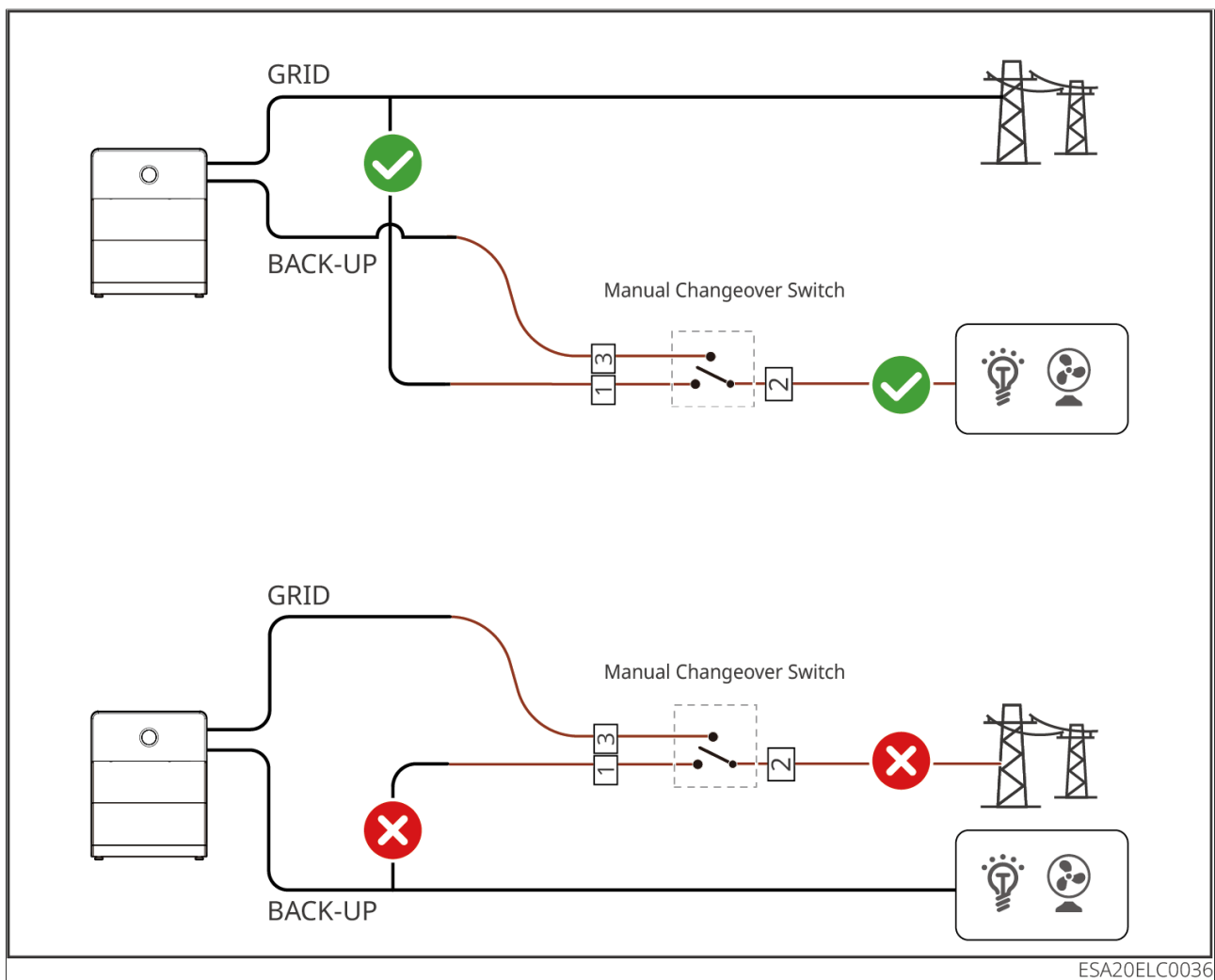
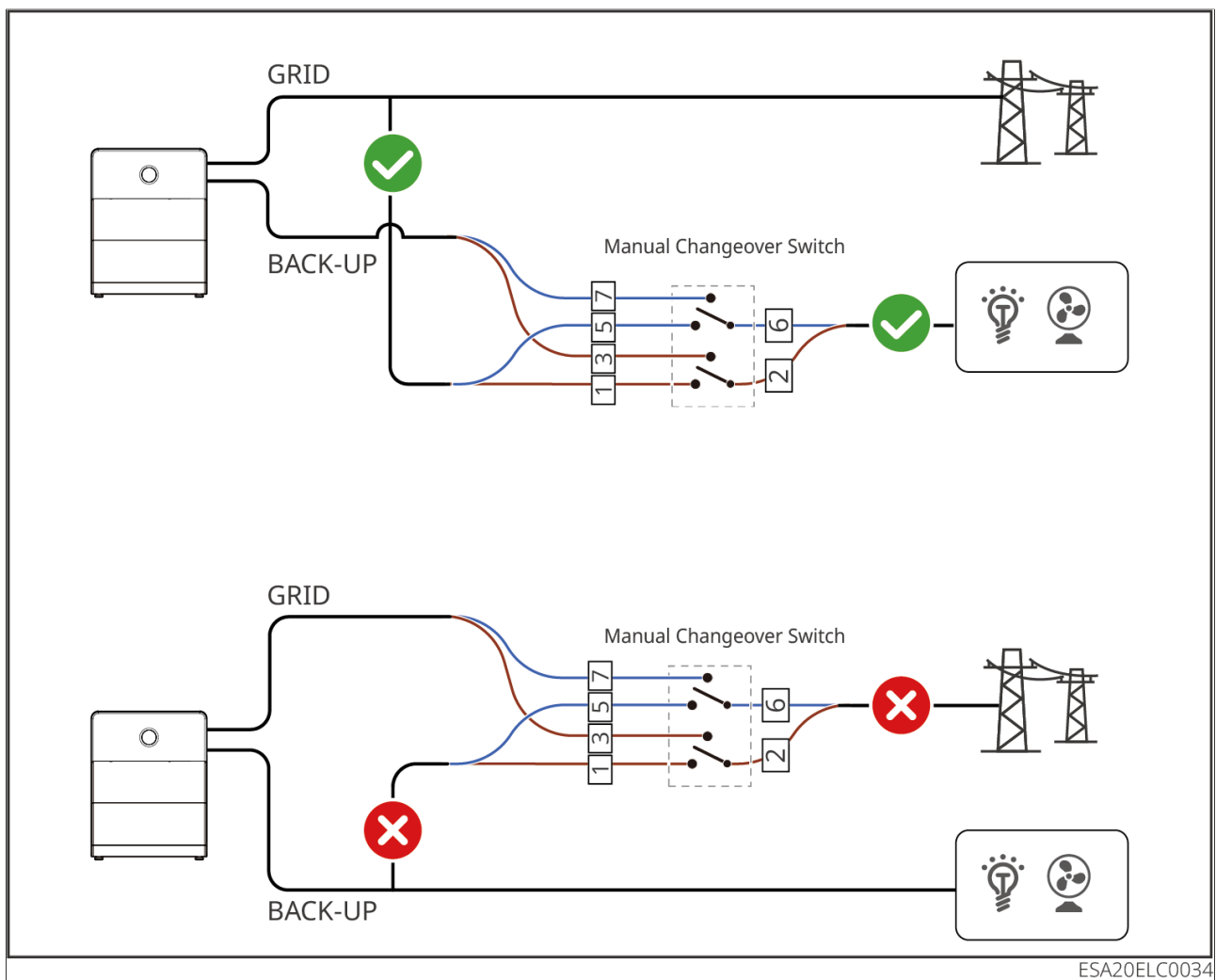


Figure25 Manual Transfer Switch Wiring Diagram for Australian Region

European region

Note

In Europe, if a manual transfer switch is required, please purchase a 2-pole manual transfer switch through a distributor or procure it independently. Once obtained, connect it according to the wiring method of the 2-pole manual transfer switch shown in the wiring diagram below.



ESA20ELC0034

Figure26 European region manual transfer switch wiring diagram

Note

- When installing CT, ensure that current flows from the consumer side to the grid side. Reverse polarity will cause abnormal equipment failure.
- 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.
- When using STS VERSION inverter and full-house backup scenario, there is no need to connect additional electricity meter or CT. Simply set the "Meter Type" to "Built-in CT, No External Meter or CT" in the App to enable the Power Limit

Note

function.

- Manual Transfer Switch and STS are only applicable for single inverter scenarios. Please decide whether to install based on actual working conditions, configure one of them, and do not install both.
- If the system needs to use a generator, please follow the following requirements.
 - 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 parallel networking, please note the following:
 - If the number of inverters in parallel exceeds two, or the wire gauge or range of the standard CT does not meet the total current requirement of the parallel system 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 you need to connect DRED devices, RCR devices, Remote Shutdown devices, NS Protection, SG Ready heat pumps, etc., please connect the m to the main inverter.
 - Remote Shutdown/NS Protection: Connect the communication line to the main inverter. Rapid Shutdown: Connect the communication line to each inverter individually. If both Rapid Shutdown and Remote Shutdown/NS Protection functions are required, please contact the after-sales service center.
 - 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

Note

- breakers of this inverter; otherwise, it may cause abnormal system operation.
- In a parallel system, each inverter needs to be equipped with a WiFi/LAN Kit-20.
- 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 Meter (Standalone Only)	GMK110
Built-in Meter (Standalone Only)	GM330
Built-in Meter (Standalone Only)	GMK330
GMK110	GMK110
GMK110	GM330
GMK110	GMK330
GM330	GM330
GM330	GMK110
GM330	GMK330

Dual Meter Configuration	
GMK330	GMK330
GMK330	GM330
GMK330	GMK110

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.

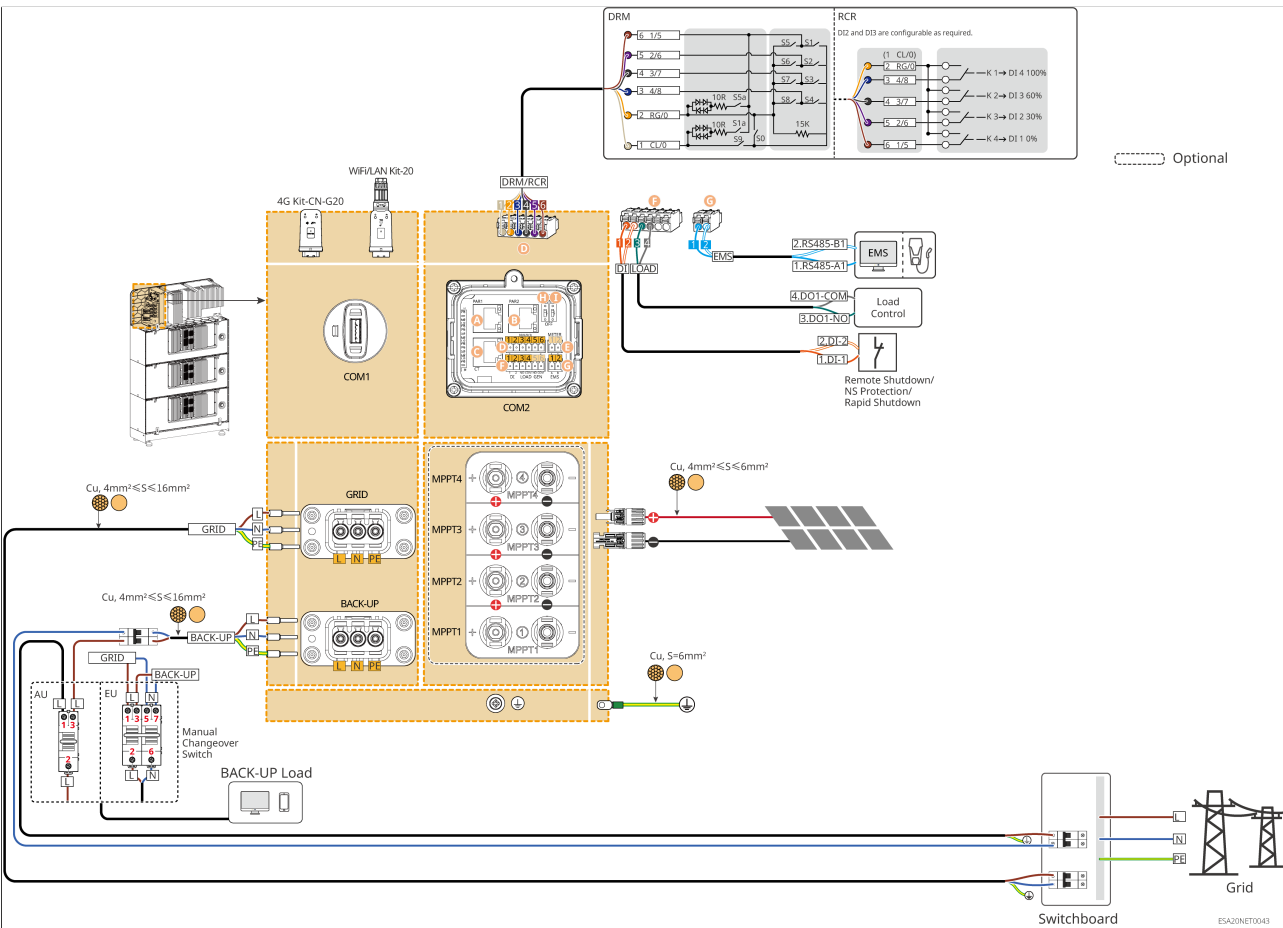


Figure 27 General Scenario 1: Whole-House Backup Power Built-in CT Networking Diagram

Networking with built-in meter

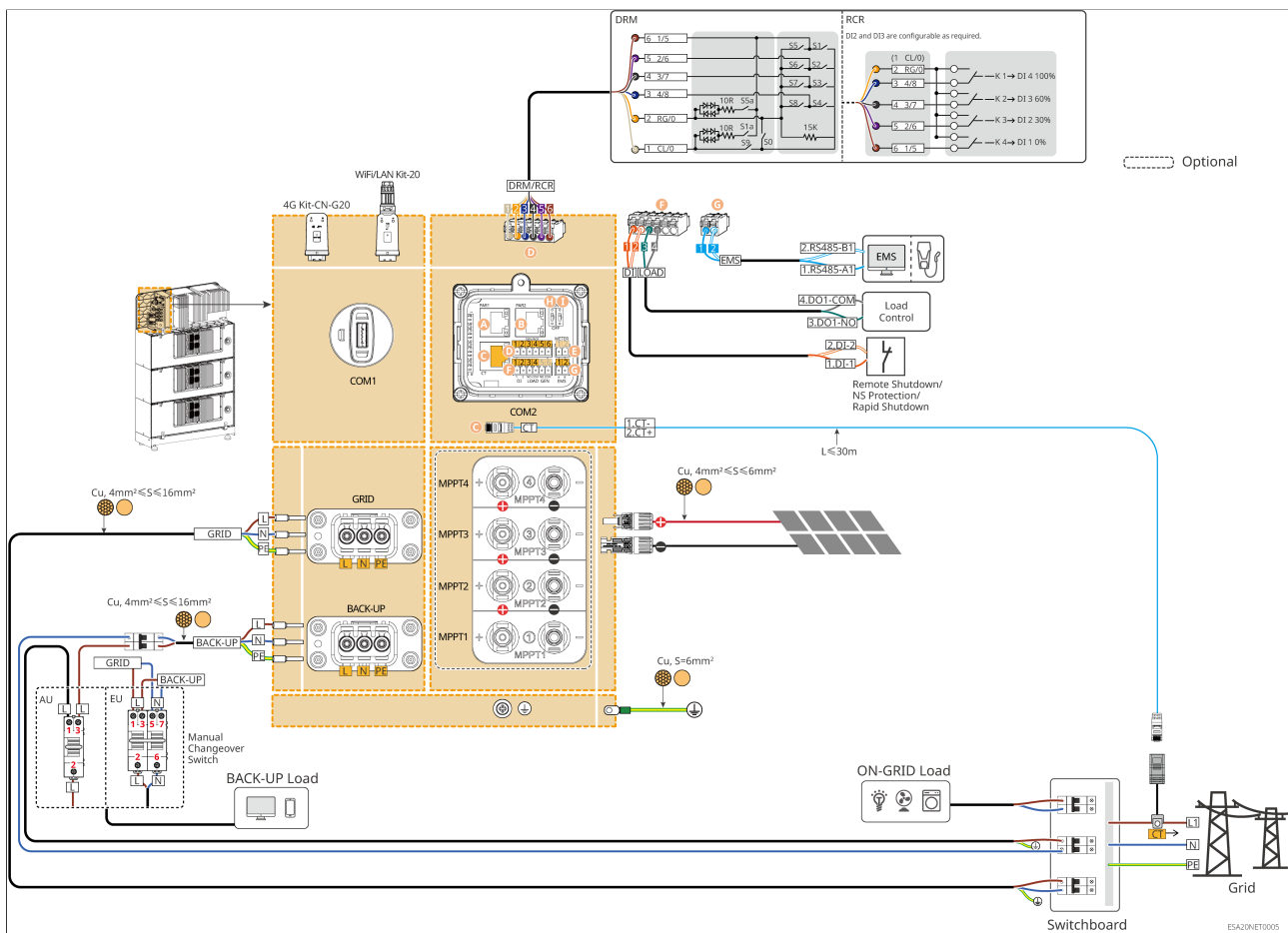


Figure28 General Scenario 2: Networking Diagram with Built-in Meter

Network configuration with GMK110 energy meter

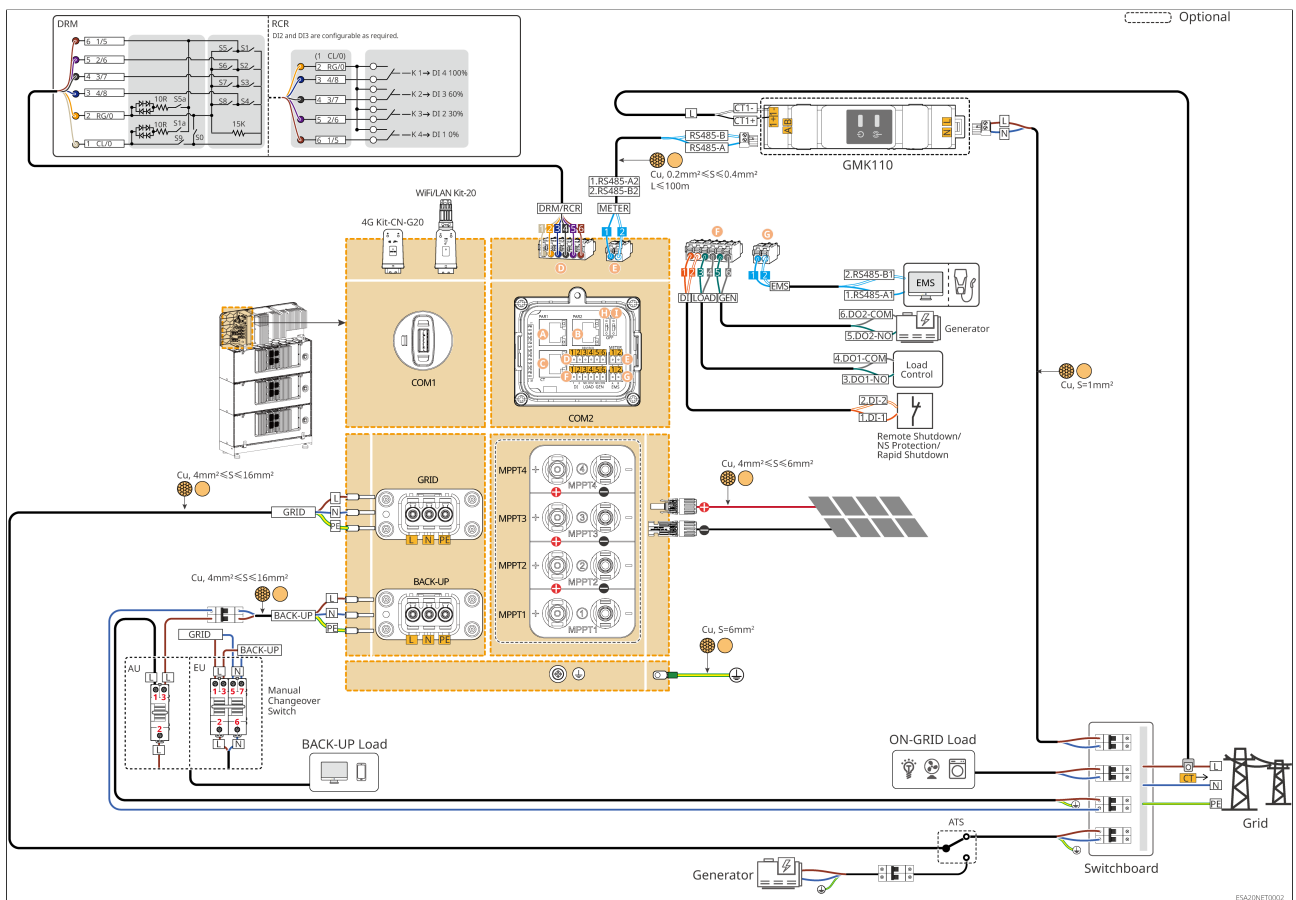


Figure29 General Scenario 3: GMK110 Meter Networking Diagram

Networking with GM330 electric meter

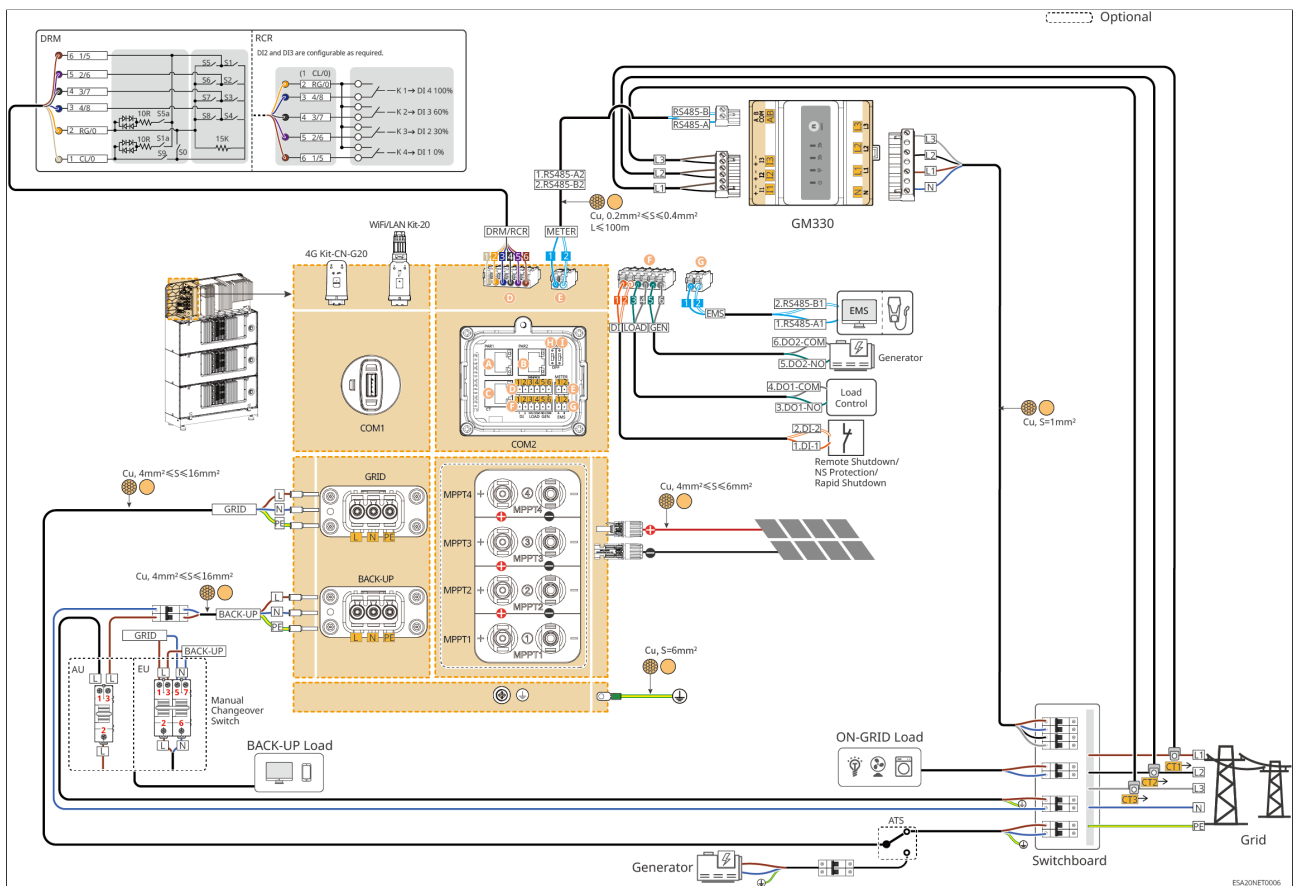


Figure30 General Scenario 4: Networking Diagram with GM330 Meter

Networking with GMK330 electricity meter

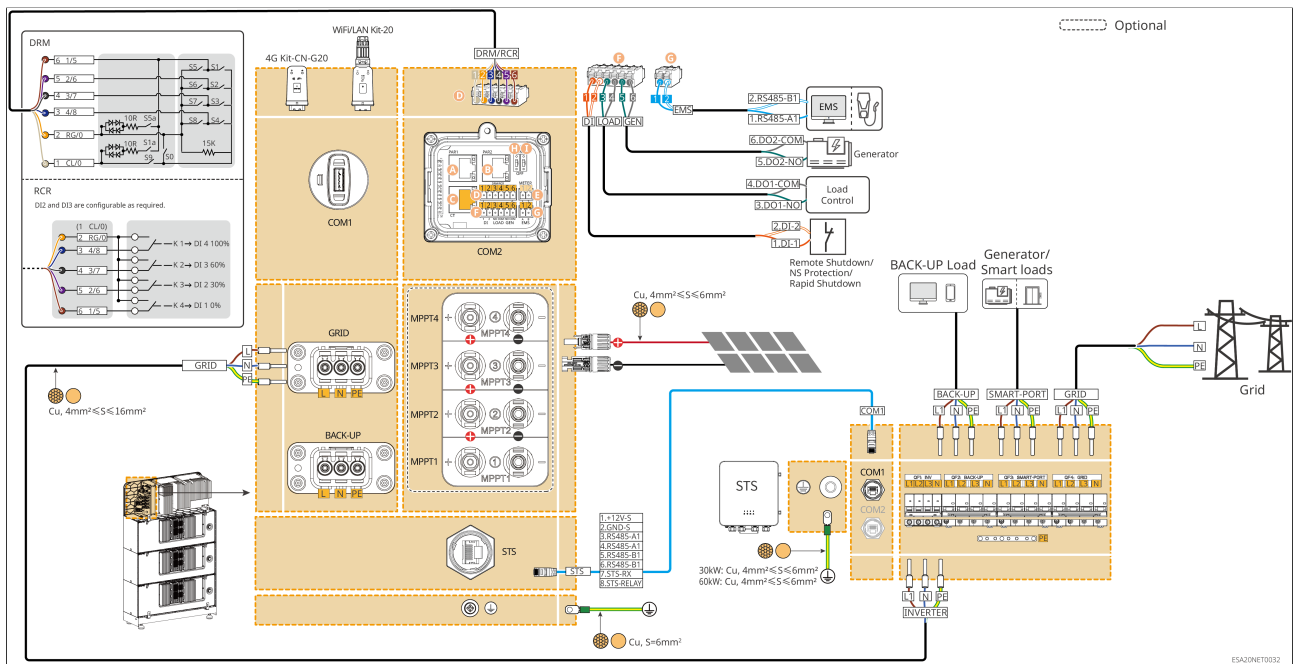


Figure32 General Scenario 6: Inverter with STS Whole-House Backup Power Network Diagram

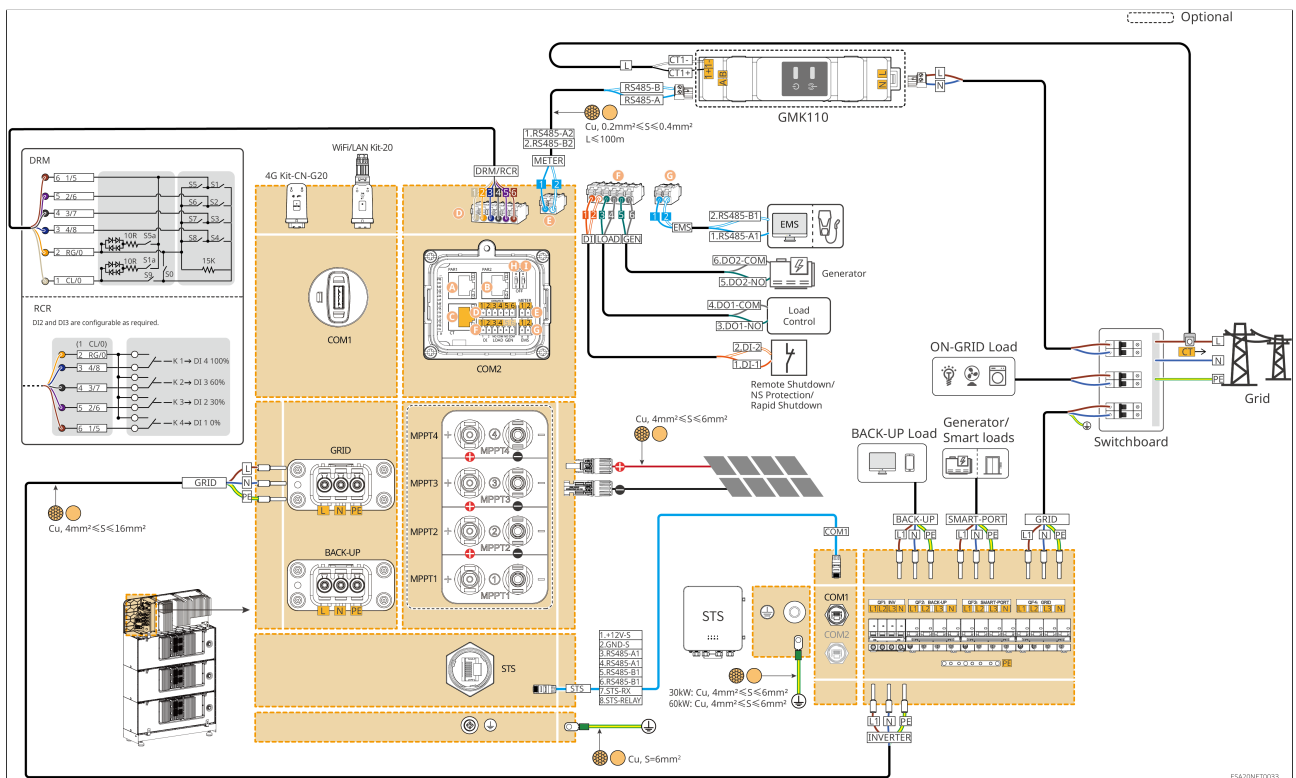


Figure33 General Scenario 7: Inverter with STS Partial Backup Power Network Diagram

Detailed Wiring Diagram of Inverter Parallel System

The following diagram focuses on the wiring for parallel operation. For wiring

requirements of other ports, please refer to the single-unit system.
 Inverter parallel operation with GMK110 networking

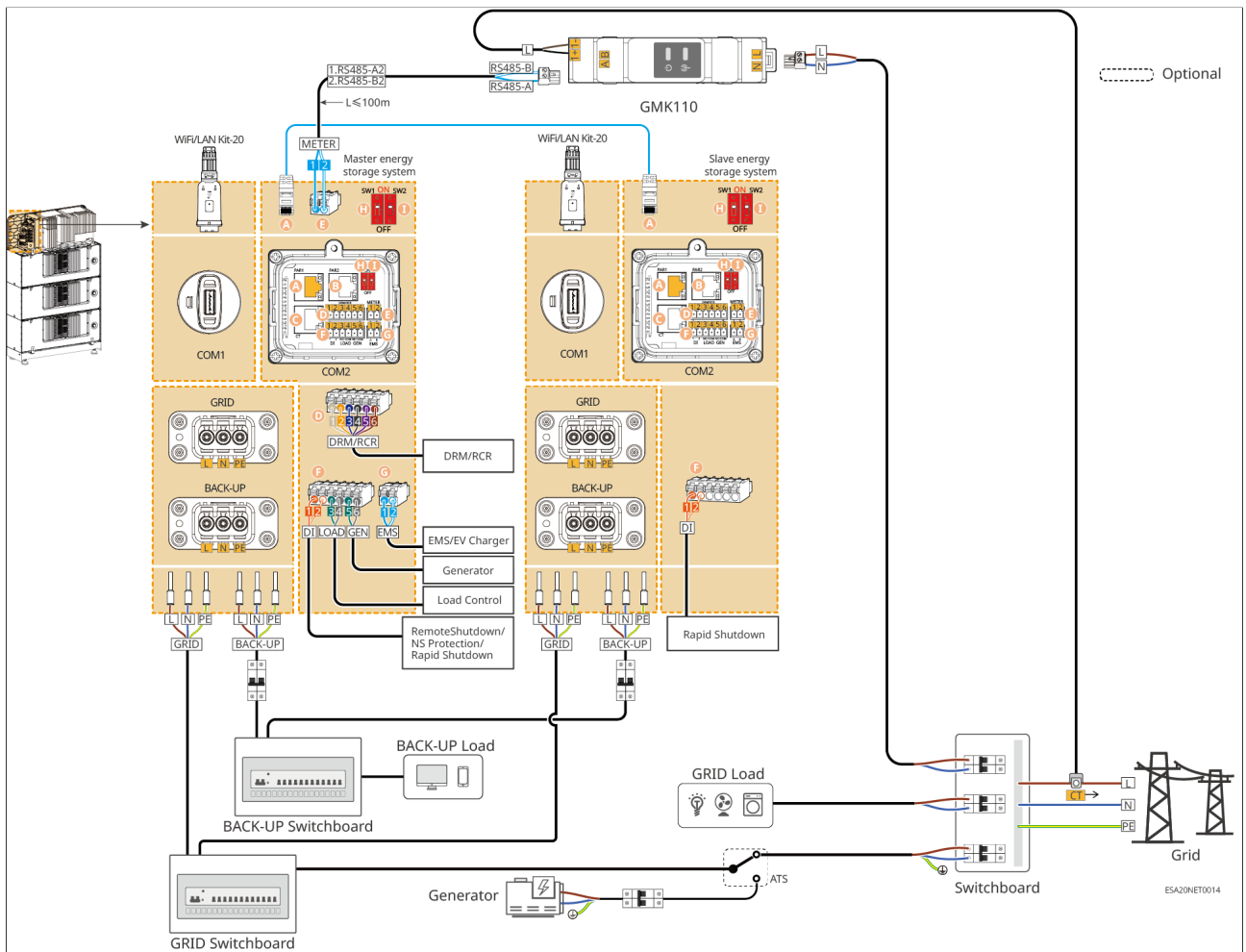


Figure34 General Scenario 8: Inverter Parallel with GMK110 Network Diagram

Inverter parallel connection with GM330 networking

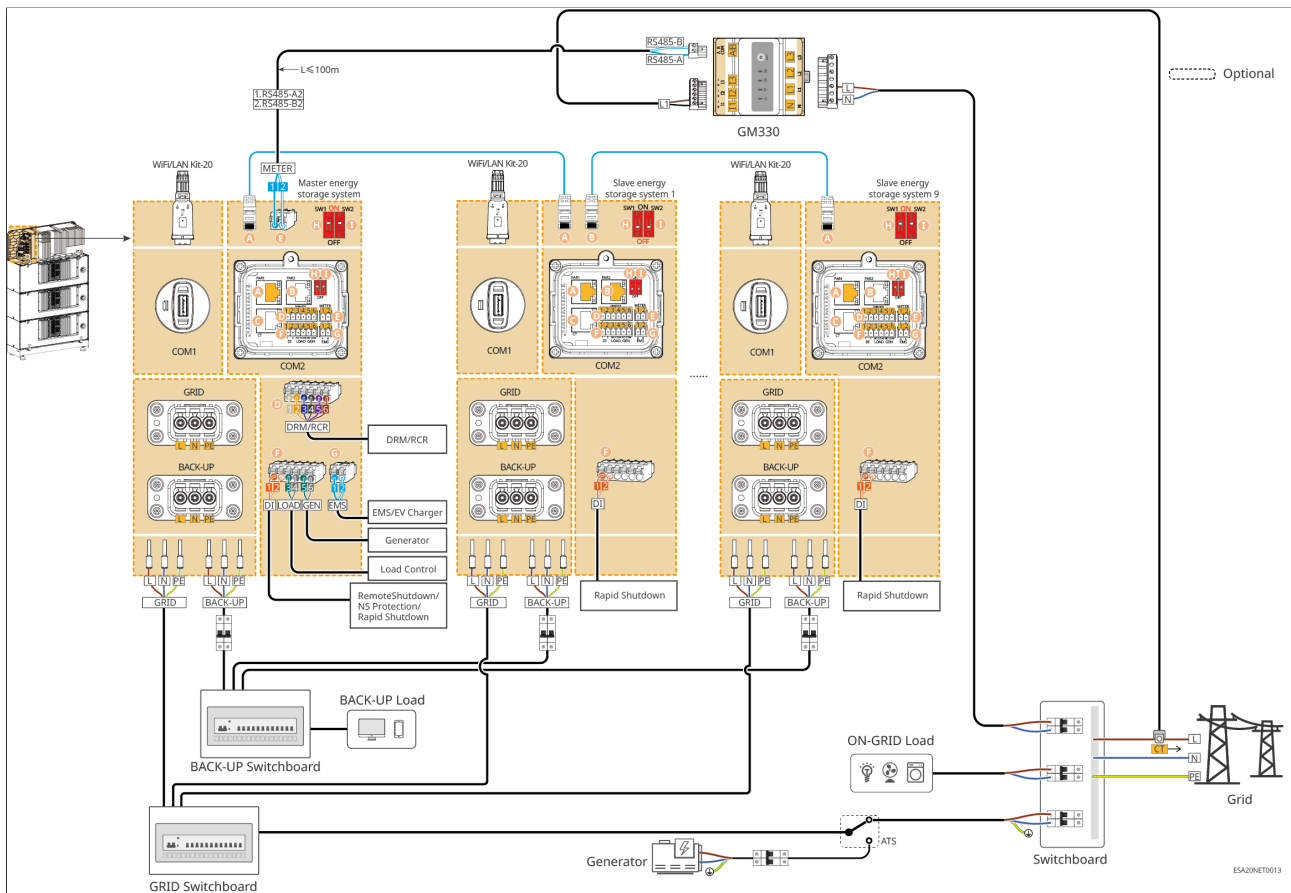


Figure35 General Scenario 9: Inverter Parallel Configuration with GM330 Network Diagram

Inverter parallel operation with GMK330 supports up to two inverters in parallel. For meter wiring method, refer to the single unit "Meter networking with GMK330".

5.3.2 Microgrid Scenario

Inverter Single Unit System Wiring Detailed Diagram

- In the Microgrid Scenario, connecting generators is not supported.
- Manual transfer switch is optional. Please decide whether to install it based on the actual application scenario.
- In the Microgrid Scenario, if the grid-tied inverter needs to limit output power, please connect a meter or CT separately.

Built-in meter + GM330 meter networking

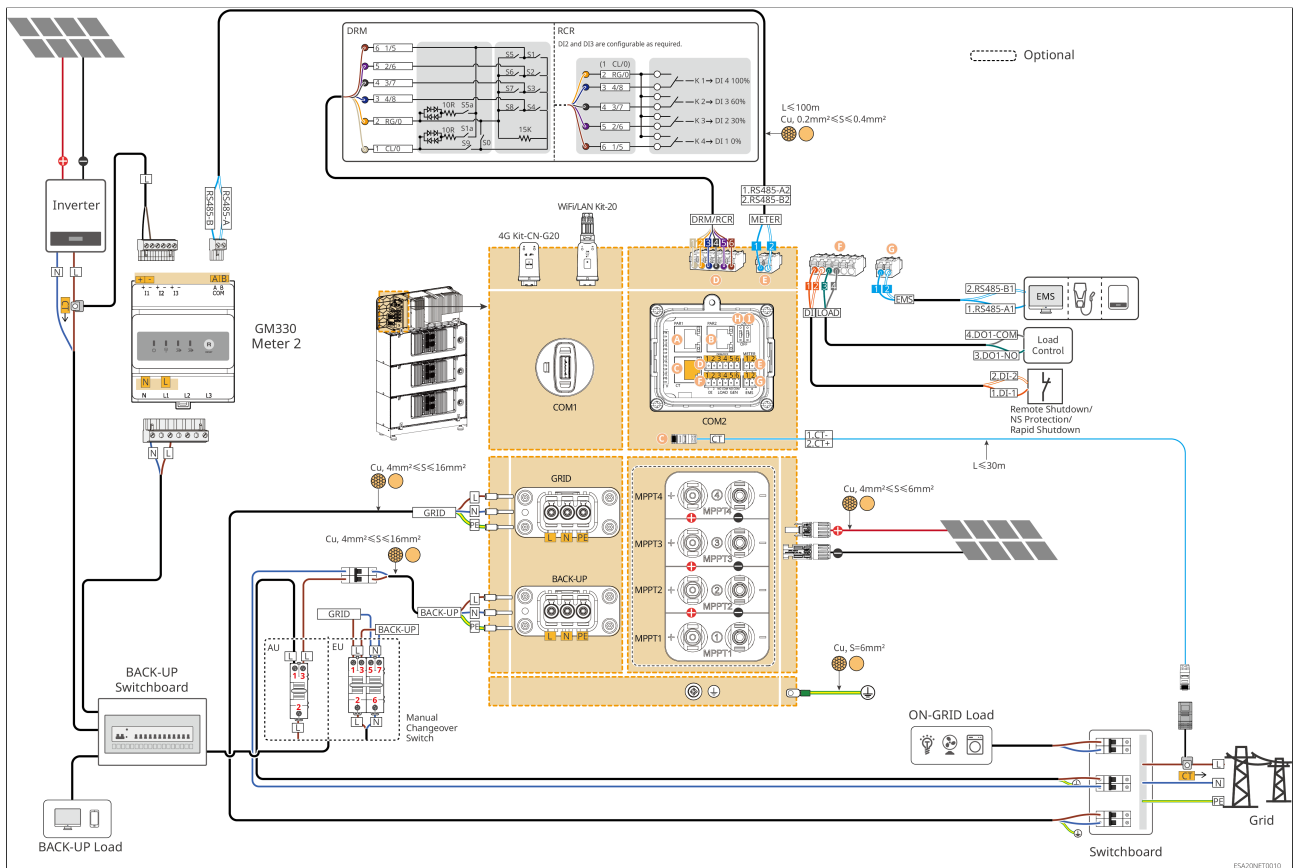


Figure36 Microgrid Scenario 1: Built-in Meter + GM330 Meter Networking Diagram

GMK110+GMK110 networking

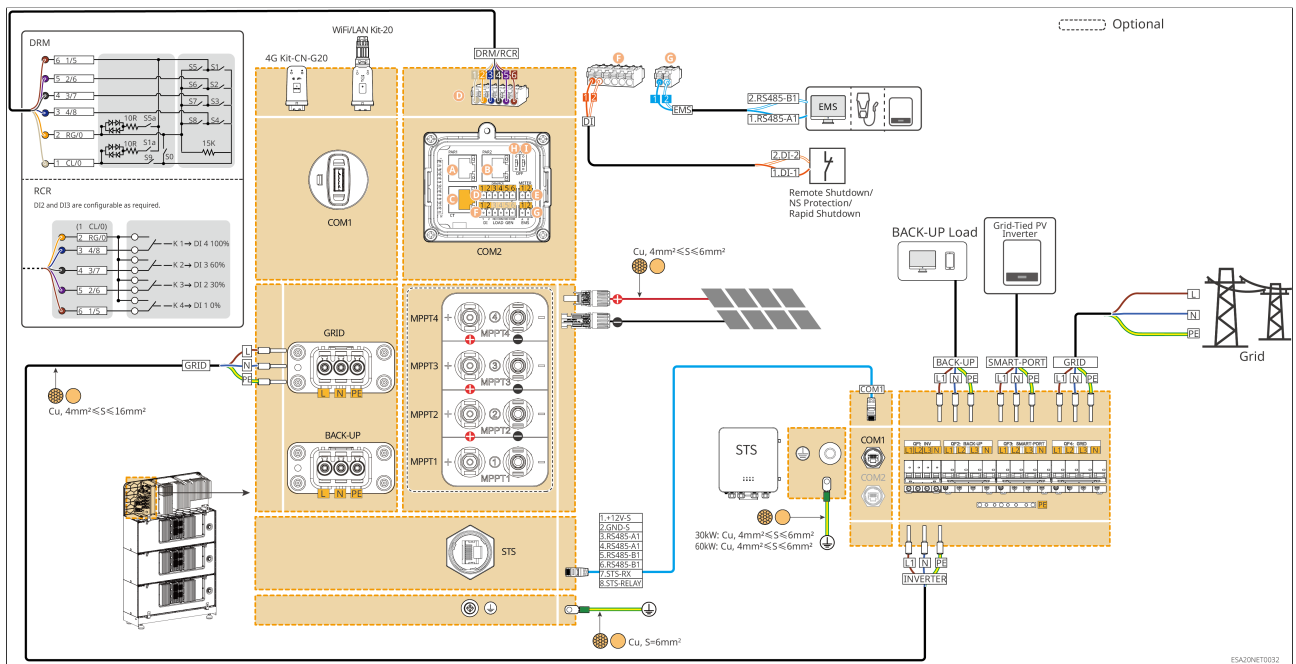


Figure38 Microgrid Scenario 4: Inverter with STS whole-house backup power networking diagram

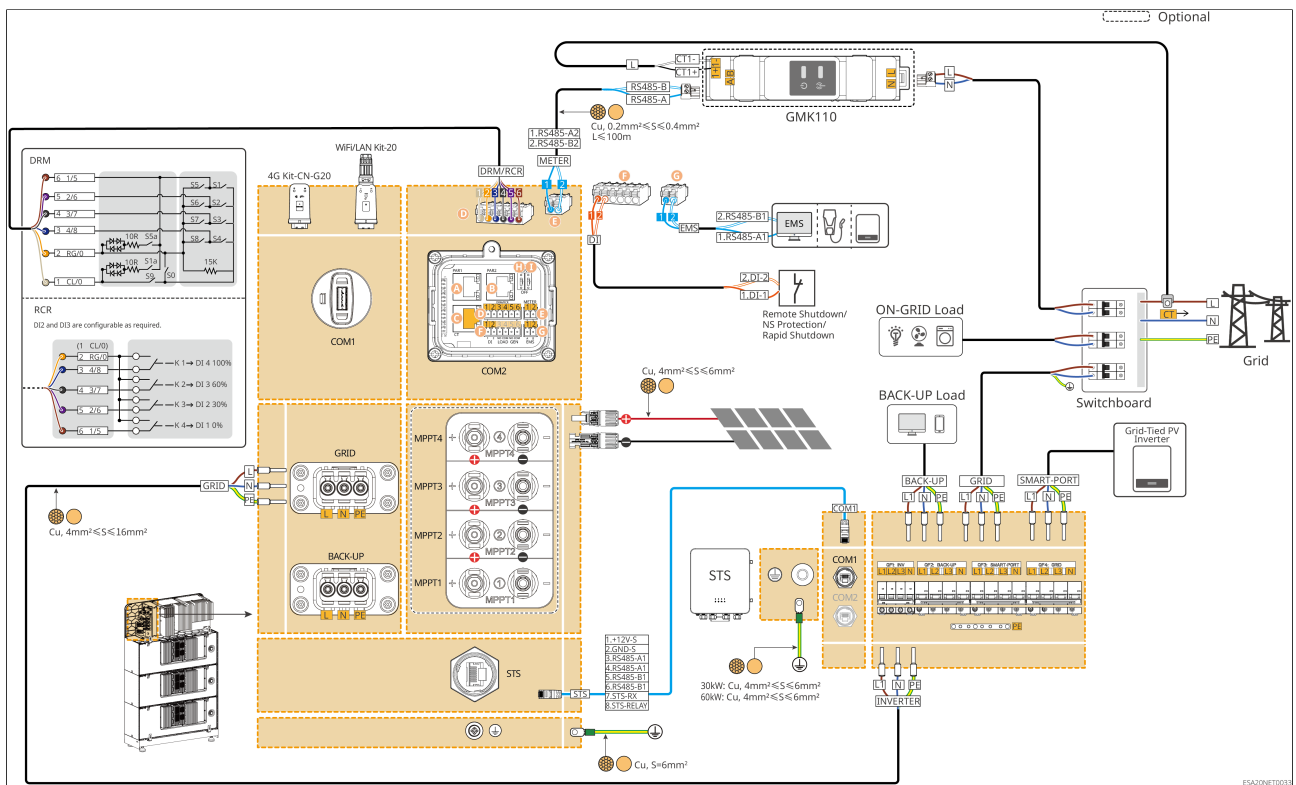


Figure39 Microgrid Scenario 5: Inverter with STS Partial Backup Power Networking Diagram

Inverter Parallel System Wiring Detailed Diagram

In the microgrid scenario, the parallel wiring meter uses GM330 as an example. For

the wiring method of other meter models, please refer to the parallel wiring instructions in the general scenario .

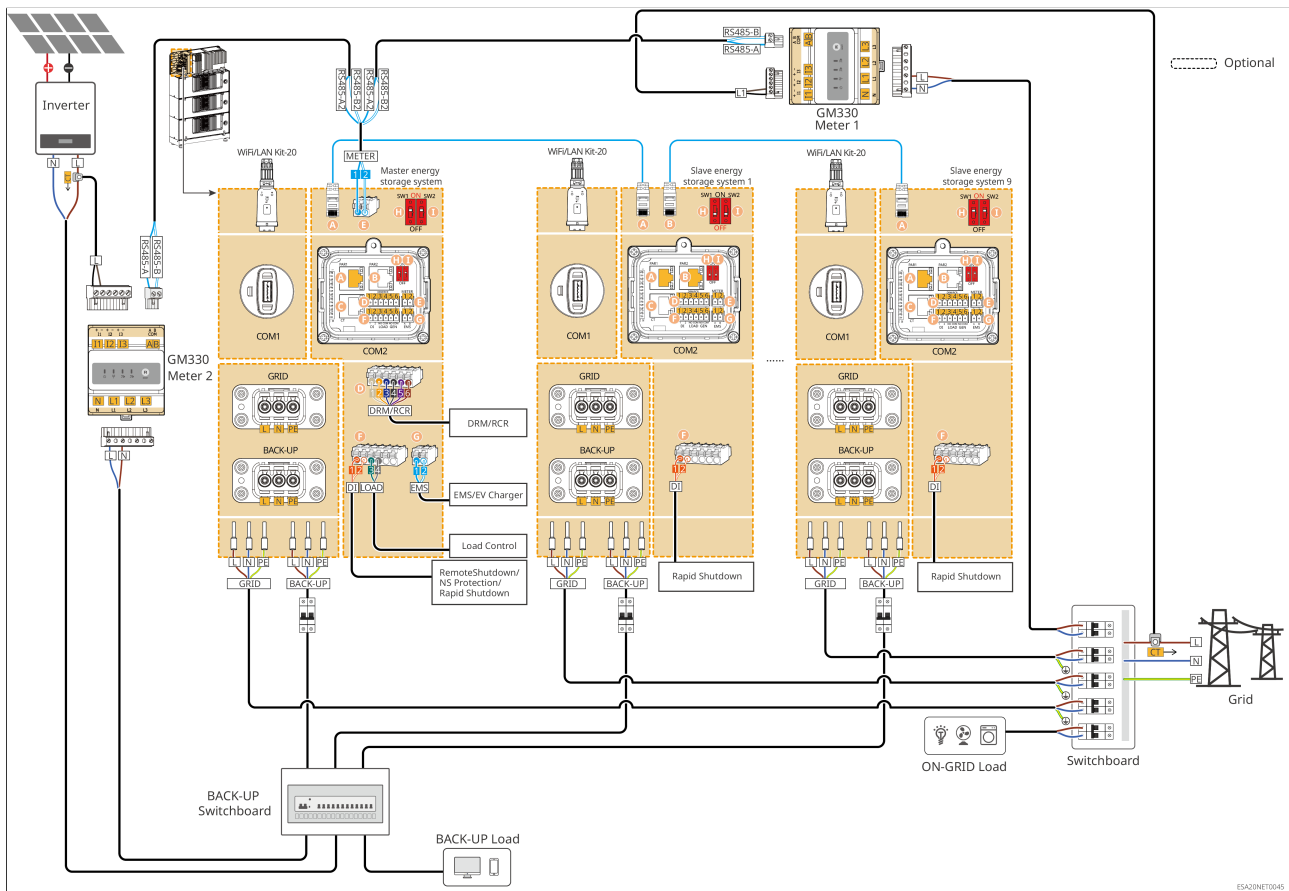


Figure40 Microgrid Scenario 6: Diagram of Parallel Networking with GM330

5.3.3 coupling scenario

Single Inverter 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 + GMK110 meter set

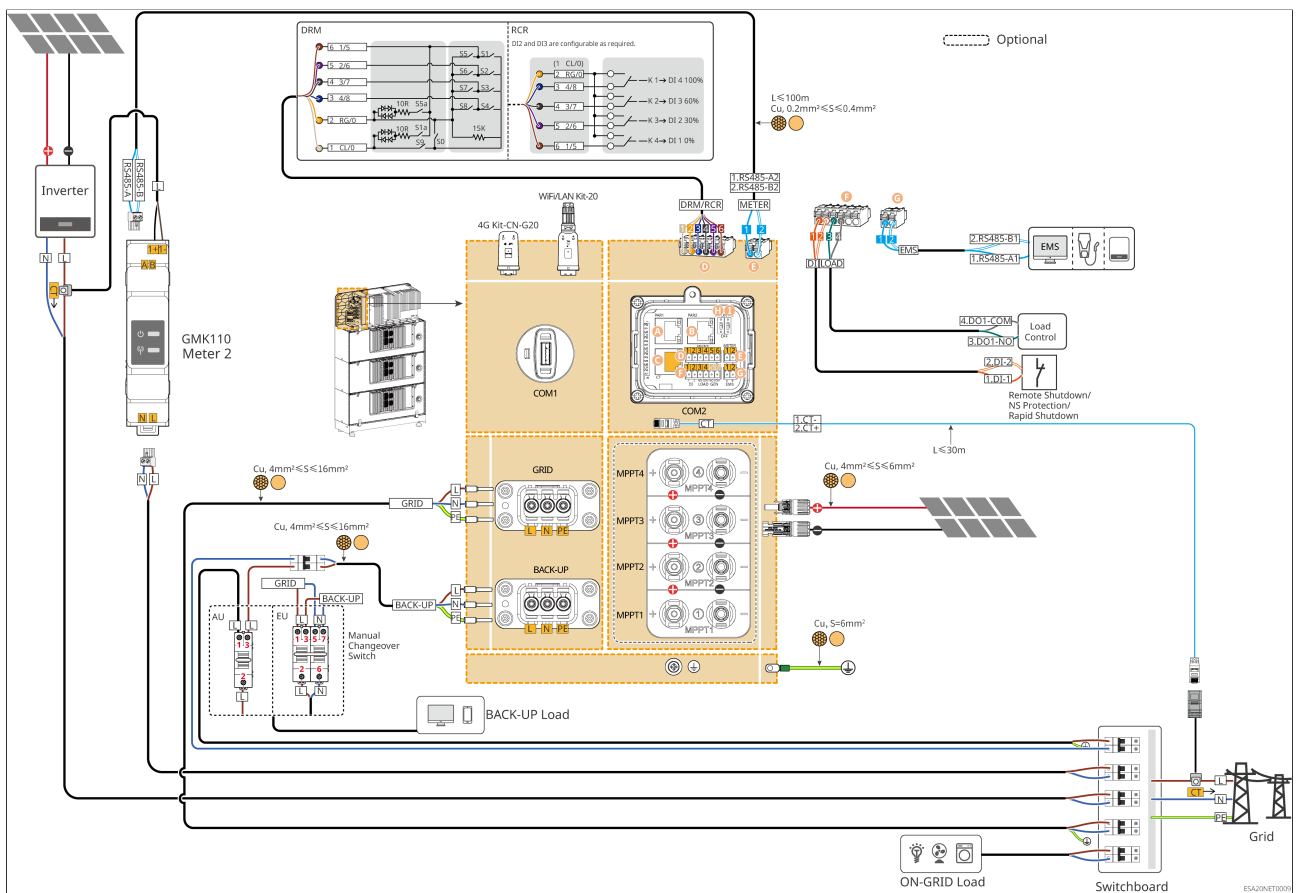


Figure 41 Coupling Scenario 1: Built-in Meter + GMK110 Meter Network Diagram

GM330+GM330 Meter Networking

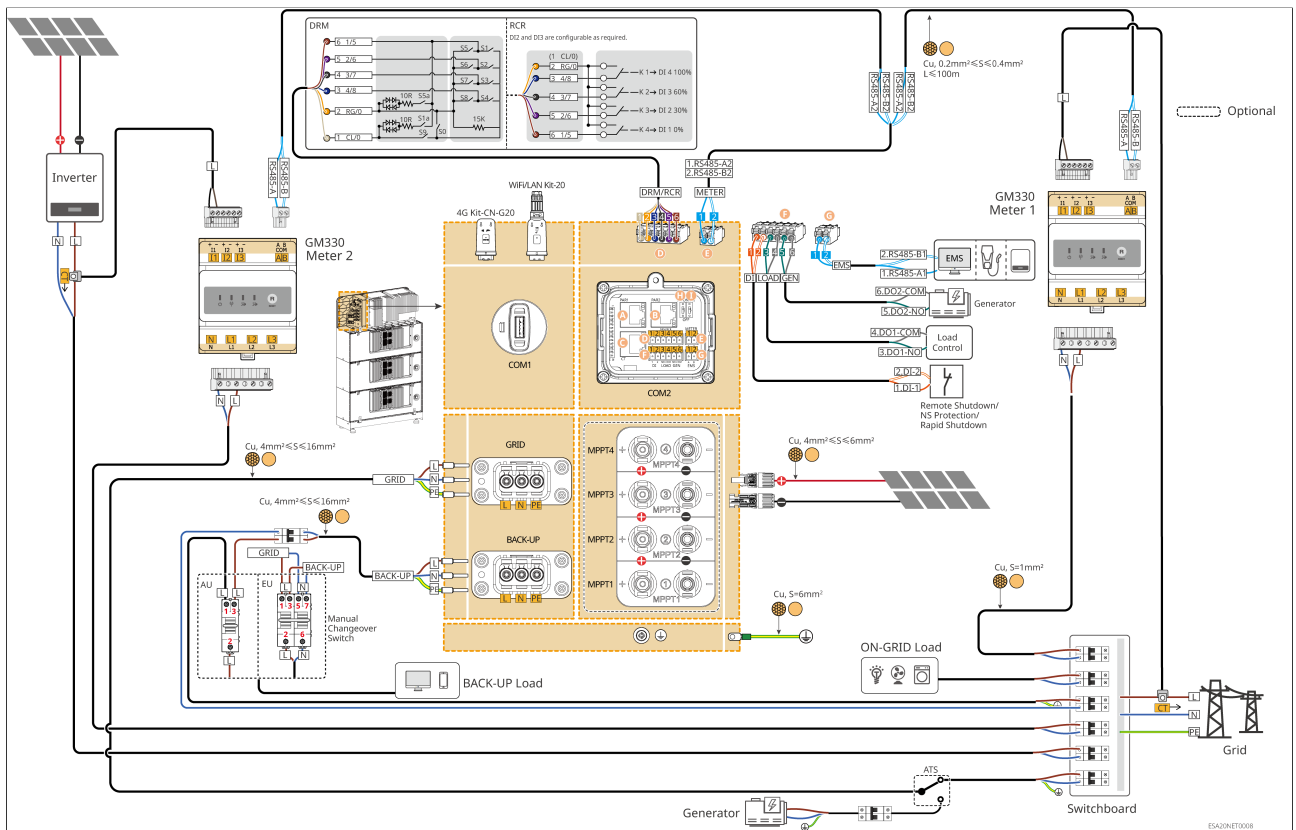


Figure42 Coupling Scenario 2: GM330+GM330 Meter Networking Diagram

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 GMK110+GMK110 as an example. For wiring methods of other meter models, please refer to the general scenario wiring instructions.

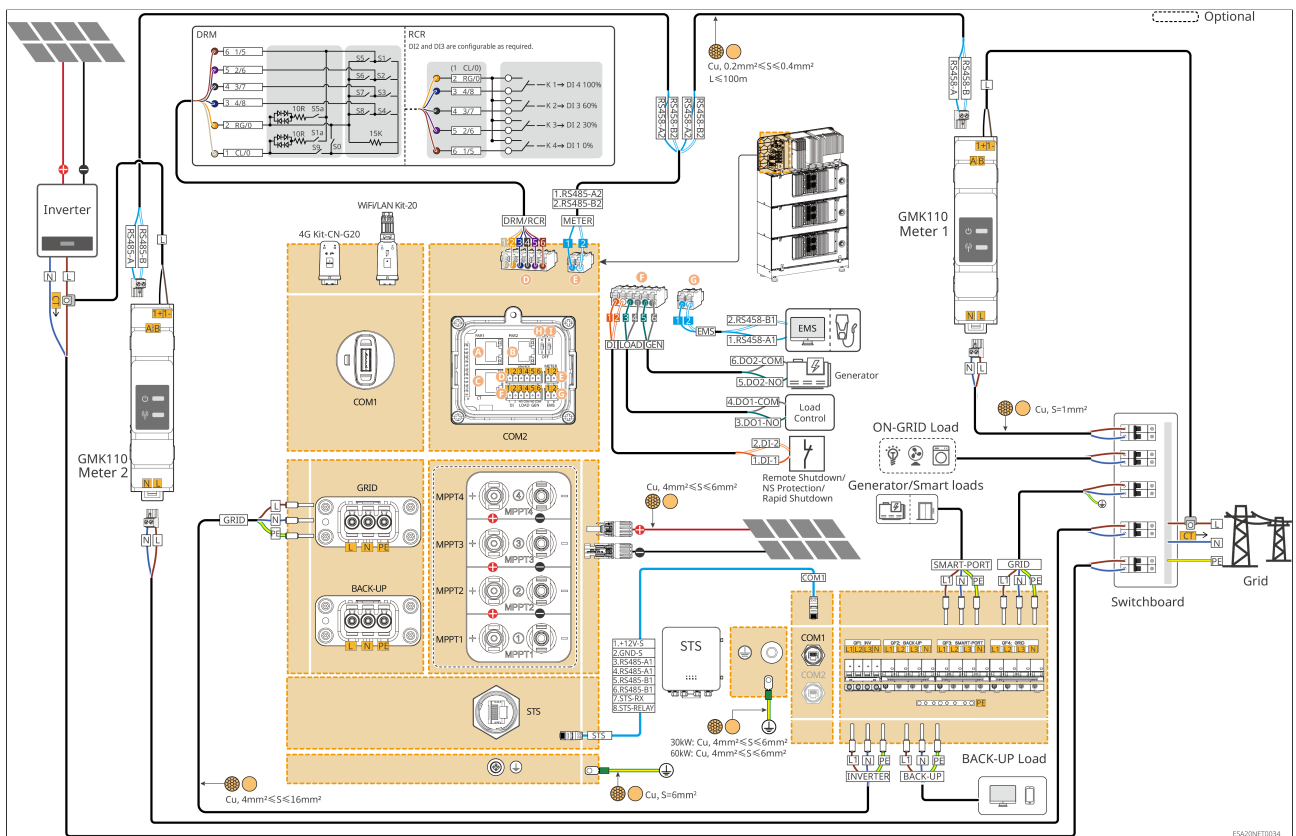


Figure43 Coupling Scenario 3: Inverter with STS Partial Backup Power Grid Connection Diagram

Inverter Parallel System Wiring Diagram

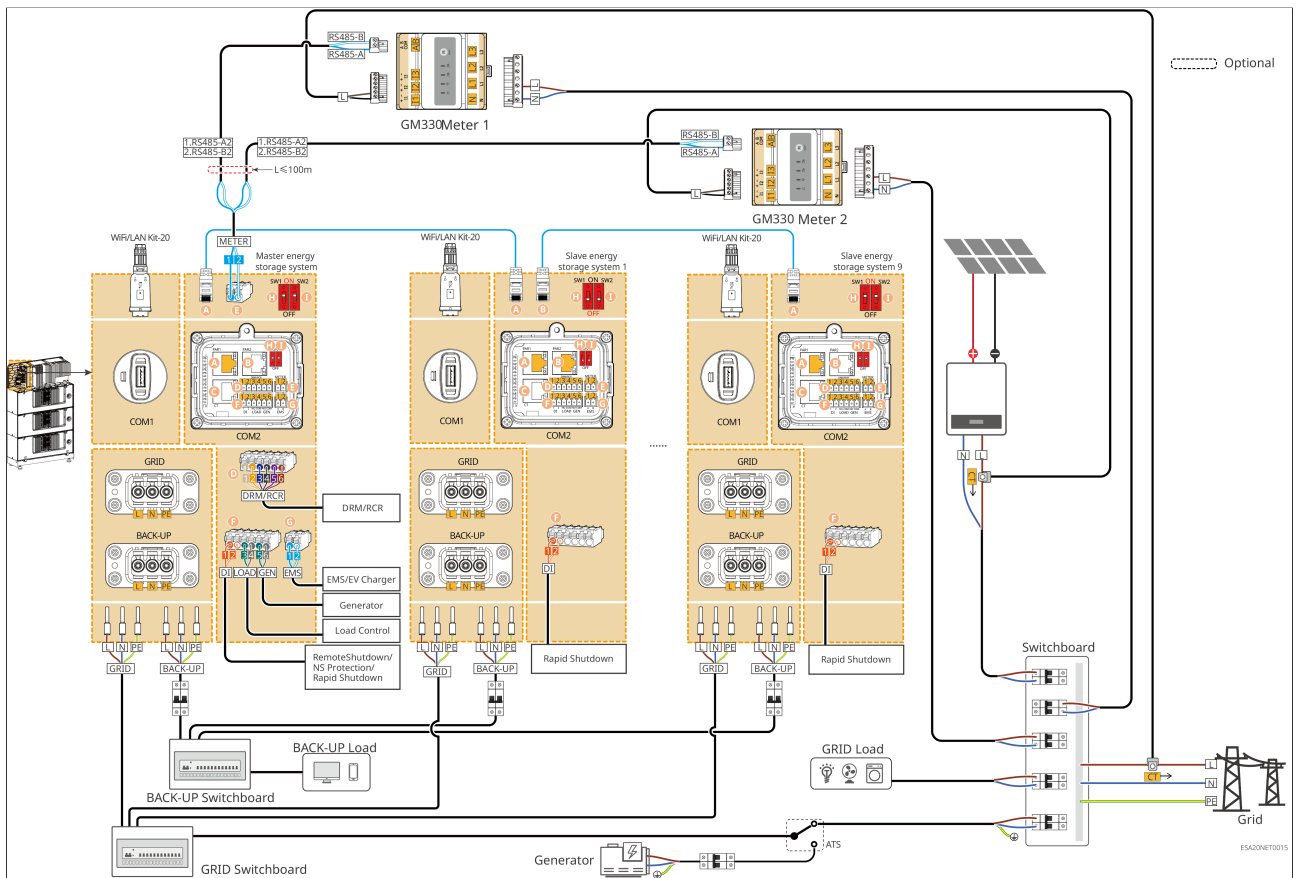


Figure 44 Coupling Scenario 4: Diagram of Parallel Networking with GM330

In the coupling scenario, the parallel wiring meter takes GM330 as an example to illustrate. For wiring methods of other model meters, please refer to the parallel wiring instructions for general scenario. .

5.4 Material preparation



- It is prohibited to connect a load between the inverter and the AC Switch directly connected to the inverter.
- Each inverter must be equipped with one AC output circuit breaker, and multiple inverters cannot be connected to the same AC circuit breaker simultaneously.
- To ensure that the inverter can safely disconnect from the grid in the event of an abnormality, connect an AC circuit breaker on the AC side of the inverter. Select an appropriate AC circuit breaker based on local regulations.
- 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.
- For cables used in the same system, it is recommended that the conductor material, cross-sectional area, length, etc. of the cables be consistent.
 - BACK-UP AC line of each inverter
 - GRID AC line for each inverter
- When connected in a single-unit system, the inverter supports connecting to a generator via an ATS switch to achieve switching between grid and generator power supply. The ATS switch is default connected to the grid.

5.4.1 Switch Preparation

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Note
1	ON-GRID circuit breaker circuit breaker	Some backup power scenarios are recommended as follows: • Nominal Voltage $\geq 230V_{ac}$ • Rated Current requirements are as follows: ◦ GW3K-EHA-G20: 20A ◦ GW3.6K-EHA-G20: 20A	captive	In actual selection, the circuit breaker that meets local installation regulations can also be selected based on the actual working current.

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Note
		◦ GW5K-EHA-G20: 32A ◦ GW6K-EHA-G20: 40A ◦ GW8K-EHA-G20: 50A ◦ GW9.999K-EHA-G20: 63A ◦ GW10K-EHA-G20: 63A ◦ GW3K-BHA-G20: 20A ◦ GW3.6K-BHA-G20: 20A ◦ GW5K-BHA-G20: 32A ◦ GW6K-BHA-G20: 40A ◦ GW8K-BHA-G20: 50A ◦ GW9.999K-BHA-G20: 63A ◦ GW10K-BHA-G20: 63A Whole-house backup power scenario is recommended as follows: • Nominal Voltage$\geq$230Vac • Rated Current requirements are as follows: ◦ GW3K-EHA-G20: 63A ◦ GW3.6K-EHA-G20: 63A ◦ GW5K-EHA-G20: 63A ◦ GW6K-EHA-G20: 63A ◦ GW8K-EHA-G20: 63A ◦ GW9.999K-EHA-G20: 63A		

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Note
		◦ GW10K-EHA-G20: 63A ◦ GW3K-BHA-G20: 63A ◦ GW3.6K-BHA-G20: 63A ◦ GW5K-BHA-G20: 63A ◦ GW6K-BHA-G20: 63A ◦ GW8K-BHA-G20: 63A ◦ GW9.999K-BHA-G20: 63A ◦ GW10K-BHA-G20: 63A Note: If the BACK-UP port of the inverter is not used, the ON-GRID circuit breaker can be selected according to the maximum on-grid current.		
2	ATS Switch	The ATS switch and ON-GRID circuit breaker of the same model have the same specifications.	captive	Single unit only
3	Leakage Current Protection Device (RCD)	RCD installation and RCD specification selection: It is recommended to install a Type A RCD with a residual current tripping threshold $\geq 300\text{mA}$ on the AC output side of the inverter (for inverter capacity $< 30\text{kVA}$, the residual current tripping threshold is set to 300mA ; for inverter capacity $\geq 30\text{kVA}$, the residual current tripping threshold is set to 10mA/kVA).	captive	In actual selection, appropriate RCD specifications can also be chosen according to local regulatory requirements.

Serial Number	circuit breaker	Recommended Specifications	Acquisition method	Note
4	(Optional) Manual Transfer Switch	- Nominal Voltage$\geq$230Vac - Rated Current: 63A	- captive - Shipped with inverter (Australia only)	Single unit only

5.4.2 Preparing Cables

No.	Cable	Recommended Specifications	Acquisition Method
1	Inverter Chassis Protective Ground Wire	Single-core outdoor copper core cable - Single-core outdoor copper core cable - Conductor cross-sectional area: $S=5.2\text{mm}^2\text{-}6\text{mm}^2$ STS Protective Grounding: - Conductor cross-sectional area: - GW30K-STG-G10: $10\text{-}16\text{mm}^2$ - GW60K-STG-G10: $16\text{-}25\text{mm}^2$	Self-provided
2	PV DC Cable	For EHA models only: - Industry-standard outdoor photovoltaic cable - Conductor cross-sectional area: $4\text{mm}^2\text{-}6\text{mm}^2$ - Cable outer diameter: 5.9mm-8.8mm	Self-provided

No.	Cable	Recommended Specifications	Acquisition Method
3	AC Cable	• Inverter AC input/output cable (BACK UP/ON GRID): • Conductor cross-sectional area: 4mm²-16mm² ◦ GW3K-EHA-G20, GW3.6K-EHA-G20: 4mm²-16mm² ◦ GW5K-EHA-G20, GW6K-EHA-G20: 6mm²-16mm² ◦ GW8K-EHA-G20, GW9.999K-EHA-G20, GW10K-EHA-G20: 10mm²-16mm² ◦ GW3K-BHA-G20, GW3.6K-BHA-G20: 4mm²-16mm² ◦ GW5K-BHA-G20, GW6K-BHA-G20: 6mm²-16mm² ◦ GW8K-BHA-G20, GW9.999K-BHA-G20, GW10K-BHA-G20: 10mm²-16mm² • multi-core outdoor copper core cable outer diameter: 10mm-21mm	Self-provided
4	STS Power Cable	• multi-core outdoor copper core 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	Self-provided

No.	Cable	Recommended Specifications	Acquisition Method
5	Smart Meter Power Cable	- Outdoor copper core cable - Conductor cross-sectional area: 1mm²	Self-provided
6	Meter RS485 Communication cable	- Shielded twisted pair - Conductor cross-sectional area: 0.2mm²-0.4mm²	Self-provided
7	EMS or Charging Pile RS485 Communication cable		
8	Remote Shutdown and NS Protection Communication cable	- Shielded cable meeting local standards - Conductor cross-sectional area: 0.2mm²-0.4mm² - Cable outer diameter: 5mm-8mm	Self-provided
9	Load Control and Generator Control DO Communication cable		
10	RCR/DRED Signal Cable		
11	CT Communication cable	Standard straight-through network cable: - RJ45 shielded connector - CAT 5E or higher specification straight-through shielded network cable - Connector specification must match the network cable specification	Self-provided

No.	Cable	Recommended Specifications	Acquisition Method
12	Inverter Parallel Communication cable	Standard straight-through network cable: • RJ45 shielded connector • CAT 5E or higher specification straight-through shielded network cable ◦ CAT 5E or CAT 6E recommended length not exceeding 5 meters ◦ CAT 7E recommended length not exceeding 10 meters • Connector specification must match the network cable specification	Self-provided
13	STS Communication cable	Standard straight-through network cable: • RJ45 shielded connector • CAT 5E or higher specification straight-through shielded network cable • Connector specification must match the network cable specification	Connect to inverter STS communication port: Shipped with STS

Note:

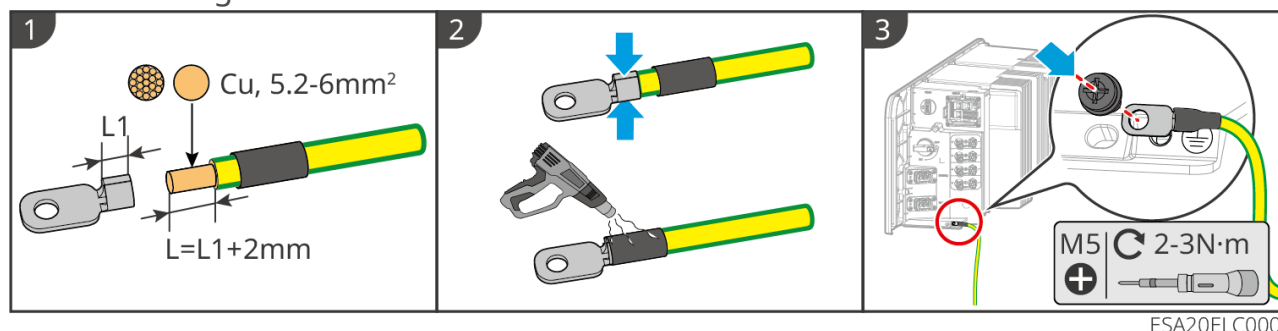
The cable specifications recommended in the table are for reference only. When selecting actual cables, factors such as installation ambient temperature, laying method, number of parallel roots, voltage deviation, and thermal stability must be comprehensively considered, and the current-carrying capacity should be corrected using corresponding correction factors. The selected cable must meet the following requirements: cable current-carrying capacity $\geq$ rated current of overcurrent protection device $\geq$ maximum rated current.

5.5 Connect the Protection earth wire

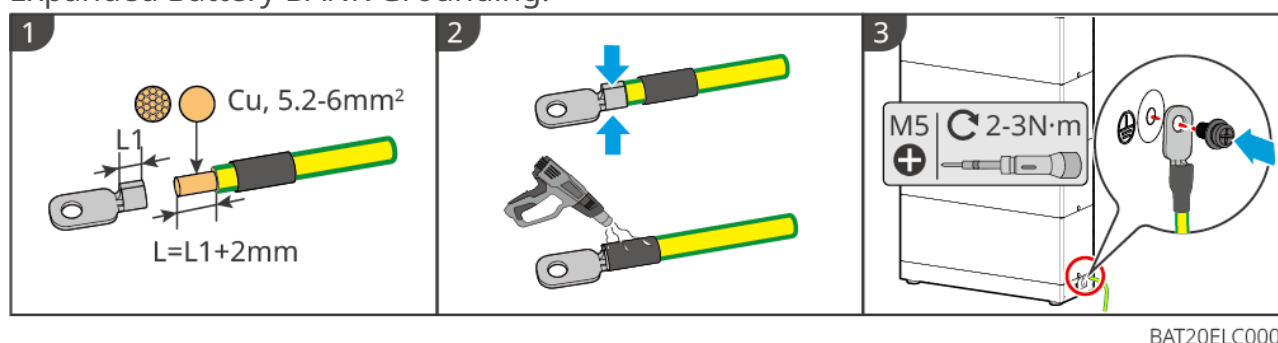
⚠ Warning

- 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.

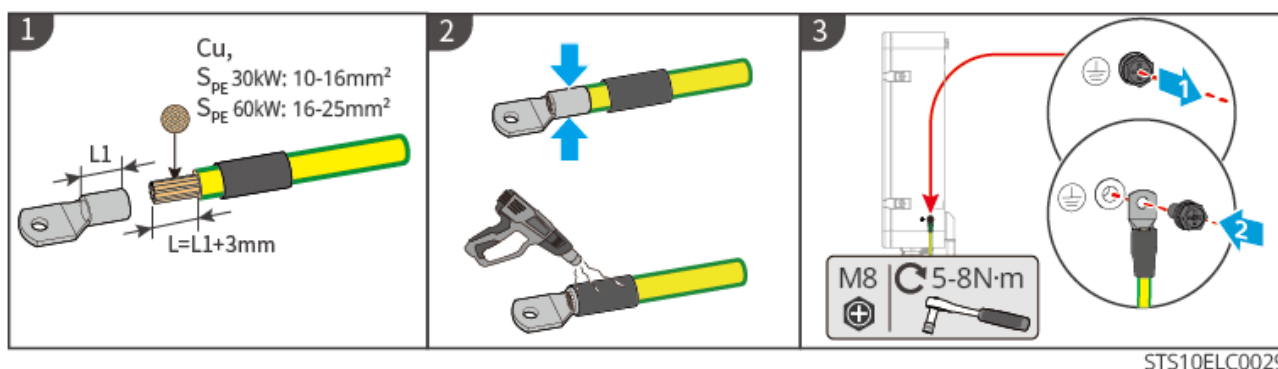
ESS Grounding:



Expanded Battery BANK Grounding:



STS grounding



STS10ELC0029

5.6 Connect PV cables.

⚠ Danger

- Do not connect the same PV string to multiple inverters, otherwise it may cause damage to the inverters.
- Before connecting the PV string to the inverter, please confirm the following information; otherwise, it may cause permanent damage to the inverter, and in severe cases, may cause fire resulting in personal injury and property loss.
 - Please ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage of each MPPT are within the allowable range of the inverter.
 - Please ensure that the positive terminal of the PV string is connected to the PV+ of the inverter, and the negative terminal of the PV string is connected to the PV- of the inverter.

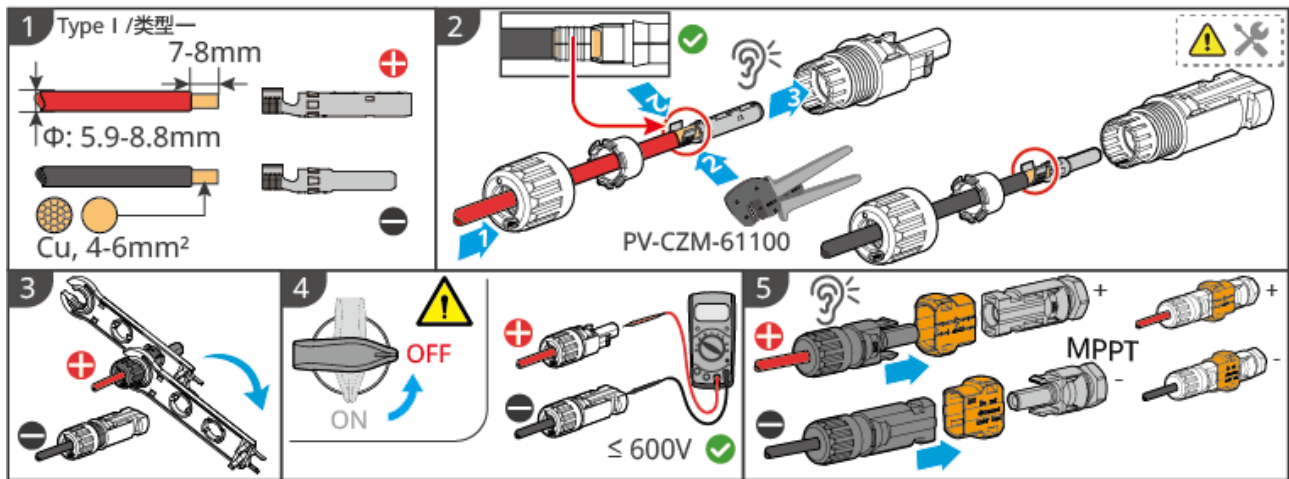
⚠ Warning

- PV string output does not support grounding. Before connecting PV strings to the inverter, ensure that the minimum insulation resistance to ground of the PV strings meets the minimum insulation impedance requirement ($R = \text{Max. Input Voltage} / 30\text{mA}$).
- After completing the DC cable connection, ensure that the cable connection is tight and secure.
- Use a multimeter to measure the positive and negative poles of the DC cable, ensuring correct polarity without reverse connection, and that the voltage is within the allowable range.

Note

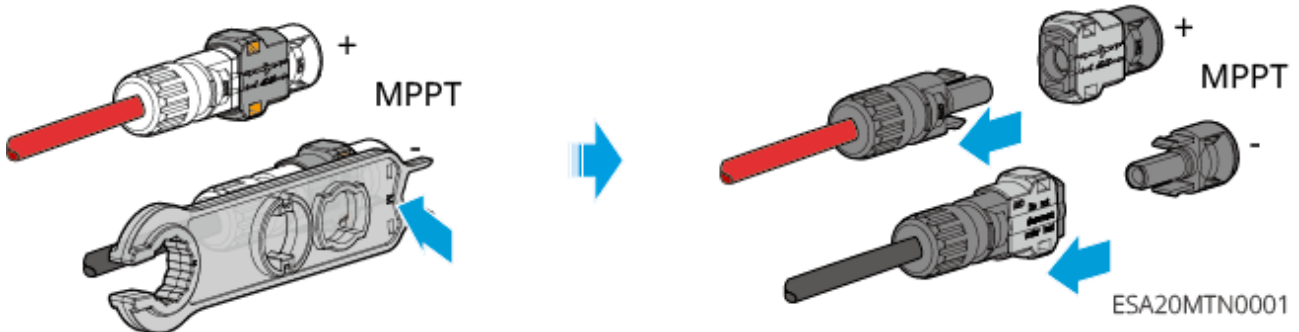
- The two PV strings in each MPPT must use the same model, same number of panels, same tilt angle, and same azimuth angle to ensure maximum Efficiency.
- Connect PV cables only for EHA models; BHA models have no PV connection port.

Type 1:

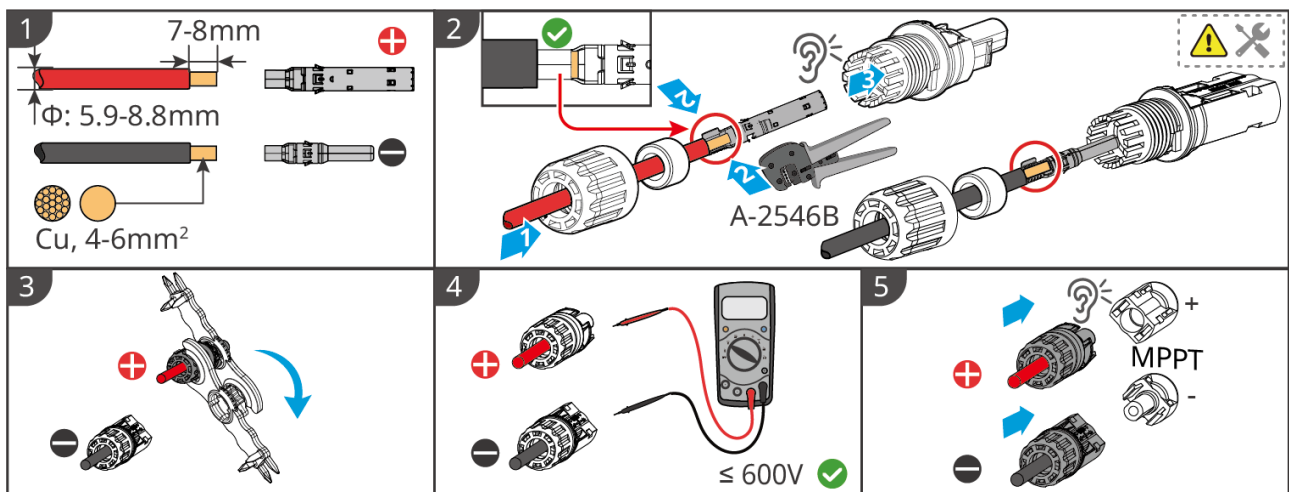


ESA20ELC0004

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

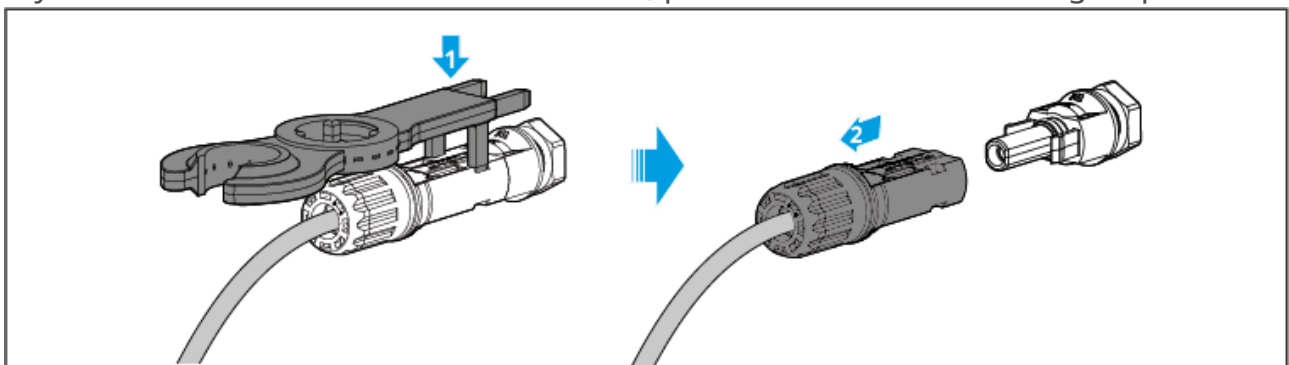


Type 2:



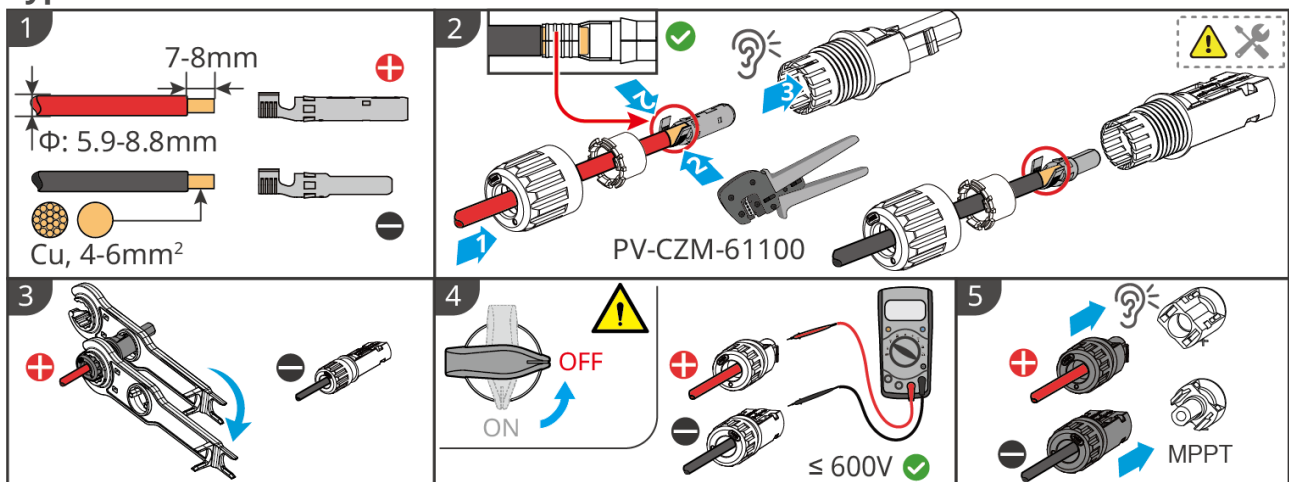
ESA20ELC0013

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



ESA20ELC0014

Type Three:



ESA20ELC0037

5.7 Battery expansion cable

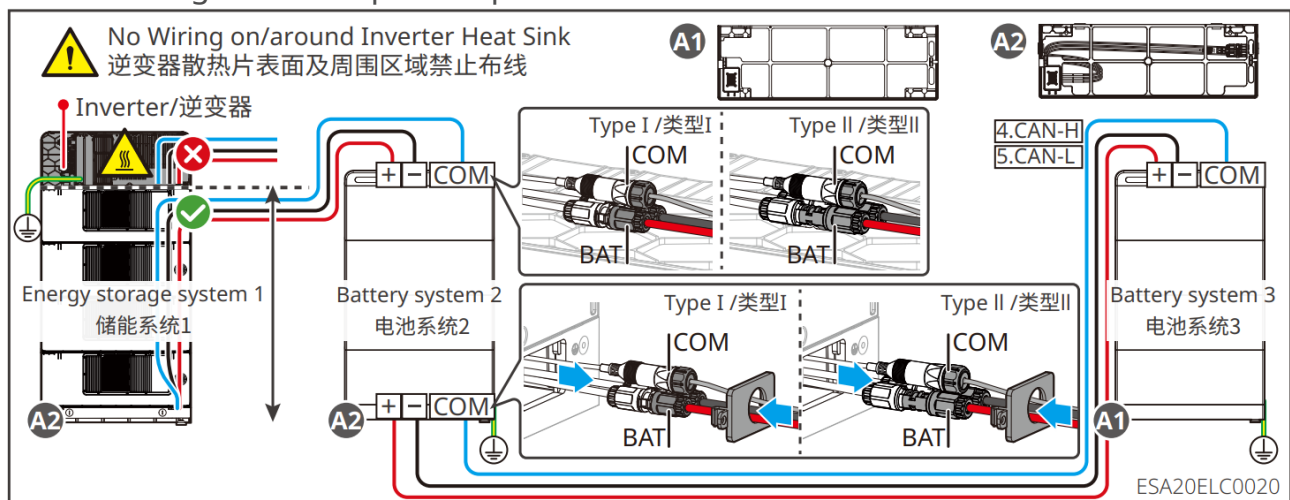
! Danger

- It is prohibited to connect loads between the inverter and the battery.
- When connecting the battery wires, please use insulated tools to prevent accidental electric shock or Battery Short Circuit.
- Please ensure that the open-circuit voltage of the battery is within the allowable range of the inverter.
- Please decide whether to configure a DC Switch between batteries according to local laws and regulations.
- Wiring is prohibited on the surface of the inverter heatsink and in the surrounding area to prevent over heating damage to the harness.

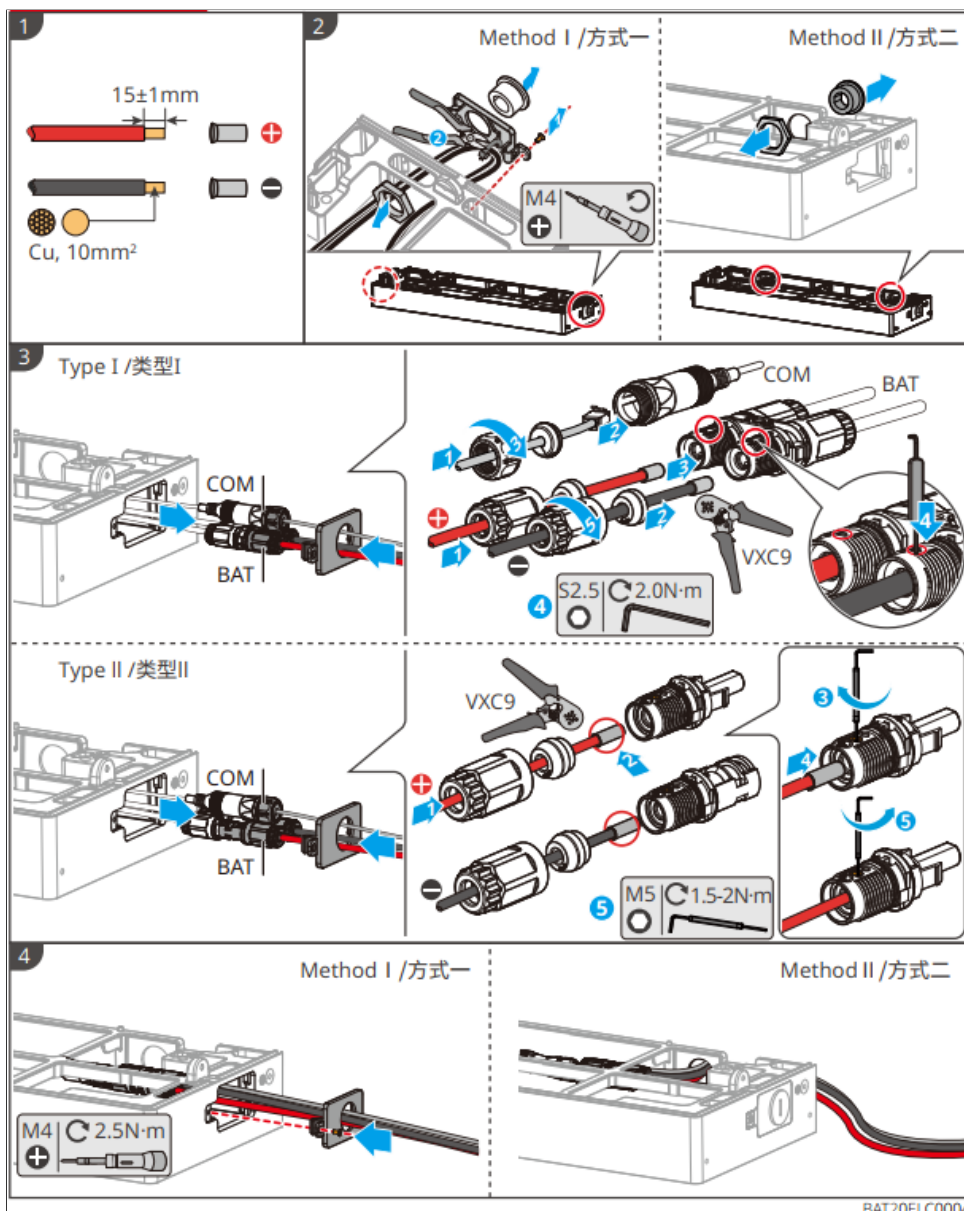
Overview of Energy Storage System Expansion

Base shipped with the inverter

A2: Mounting base with parallel port



Battery System Expansion Harness Manufacturing Method



5.8 Connect AC cable

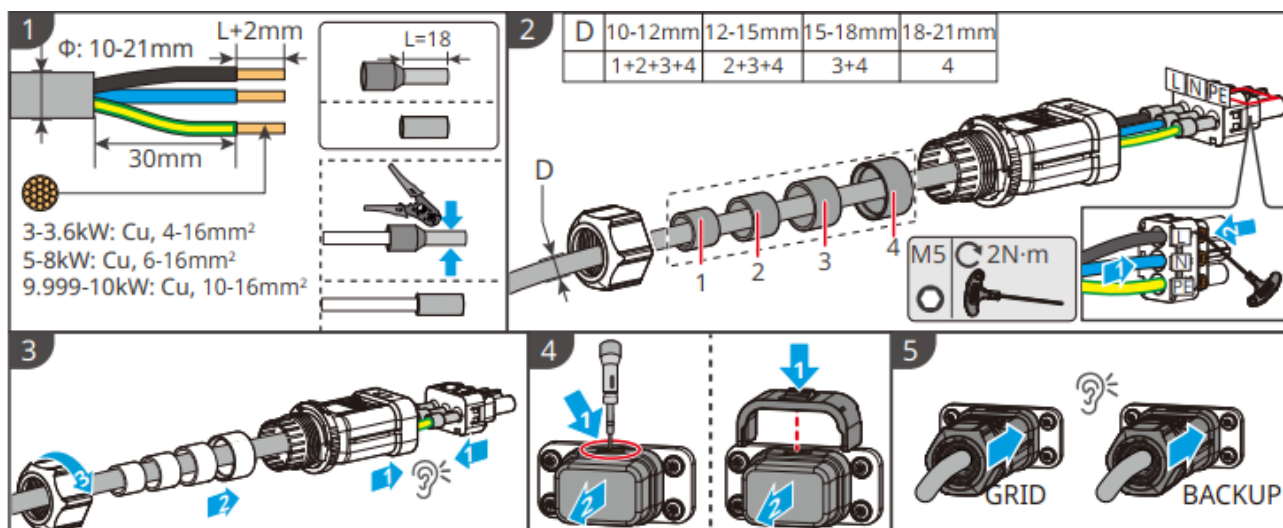
Warning

- 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 without 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.

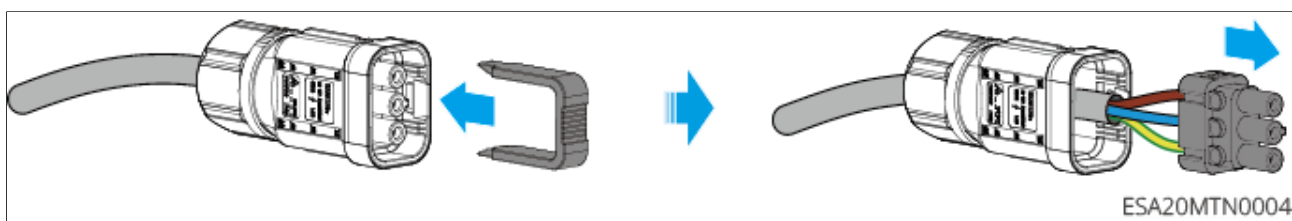
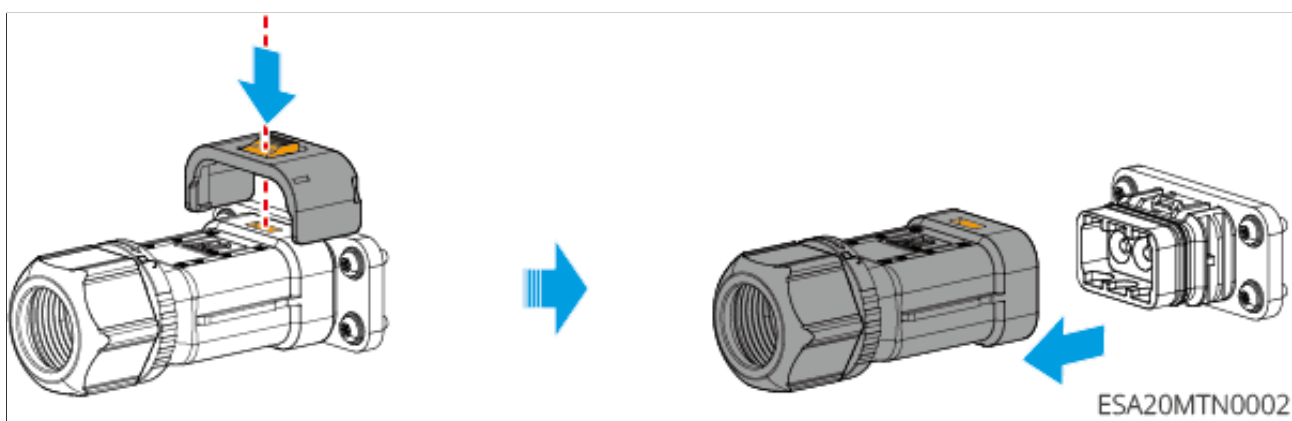
Note

- 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.

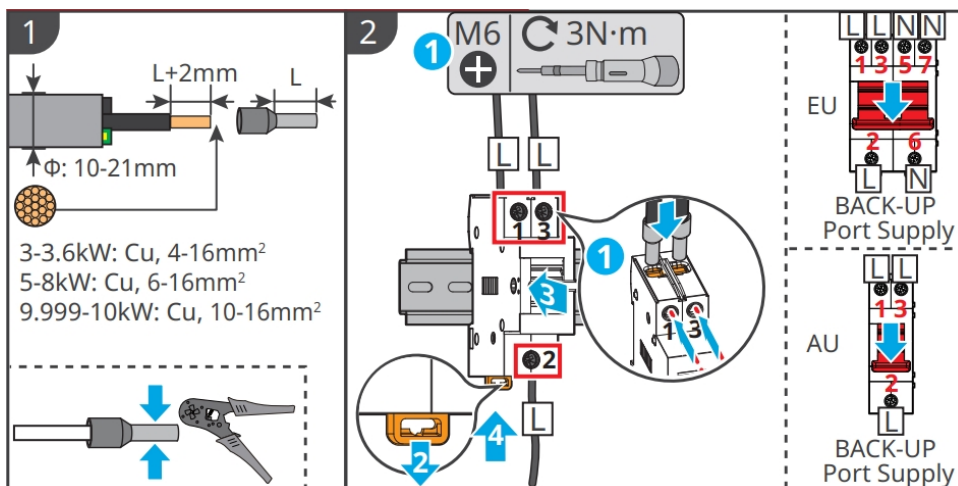
5.8.1 Connect the inverter AC line.



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



(Optional) Connect Manual Transfer Switch



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 without 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.

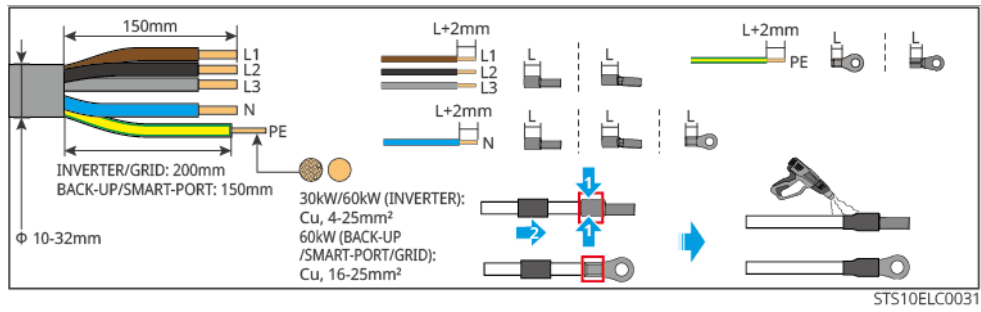


Figure45 cable fabrication

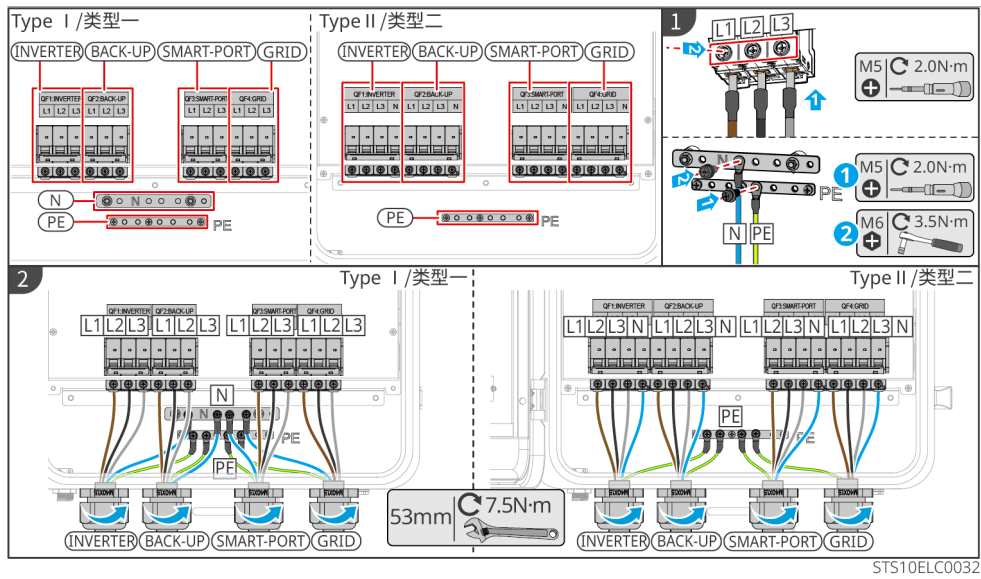


Figure46 30kW model cable connection

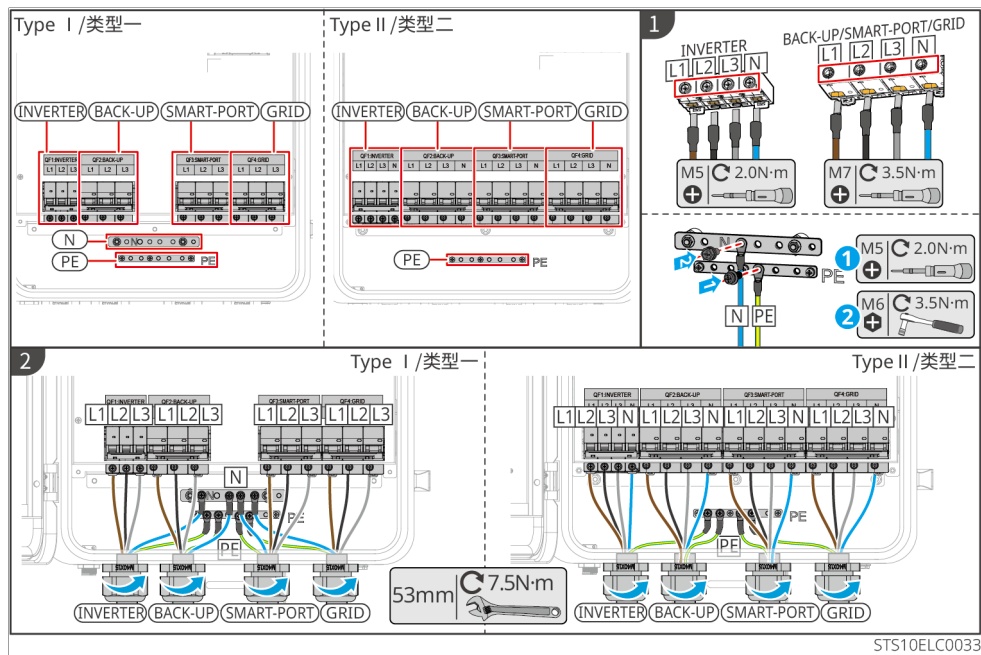


Figure47 Cable connection for 60kW model

5.9 Meter connecting cable

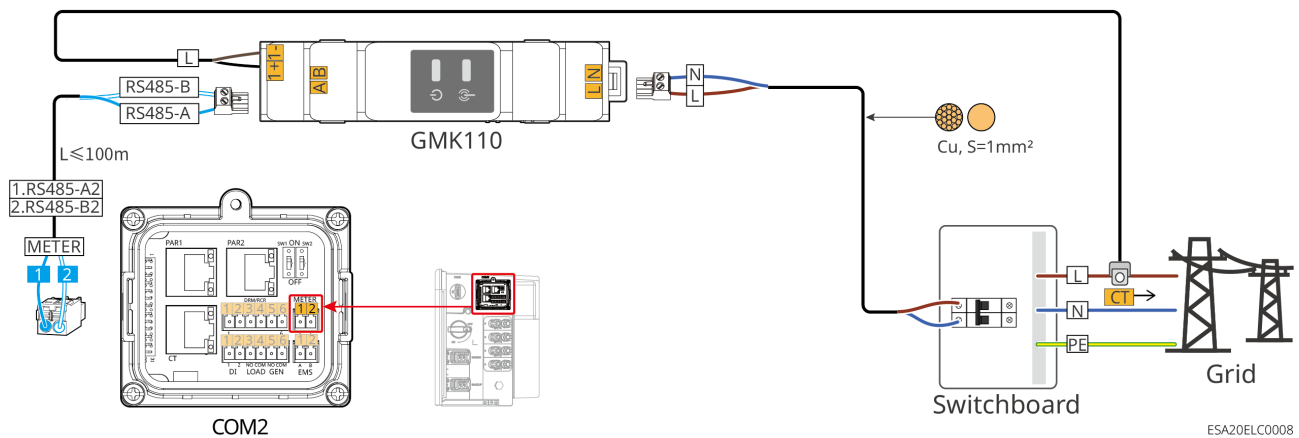
Note

- If there is a need for multiple inverters parallel networking, please consult the manufacturer to purchase the meter separately.
- Please ensure that the CT connection direction and phase sequence are correct; otherwise, it may cause inaccurate monitoring data.
- Ensure that all cables are connected correctly, securely, and without looseness. Improper wiring may cause poor contact or damage to the electricity meter.
- In areas with lightning hazard, if the meter cable length exceeds 10m and the cable is not wired using a grounded metal conduit, it is recommended to install an external lightning protection device.

GMK110 meter wiring

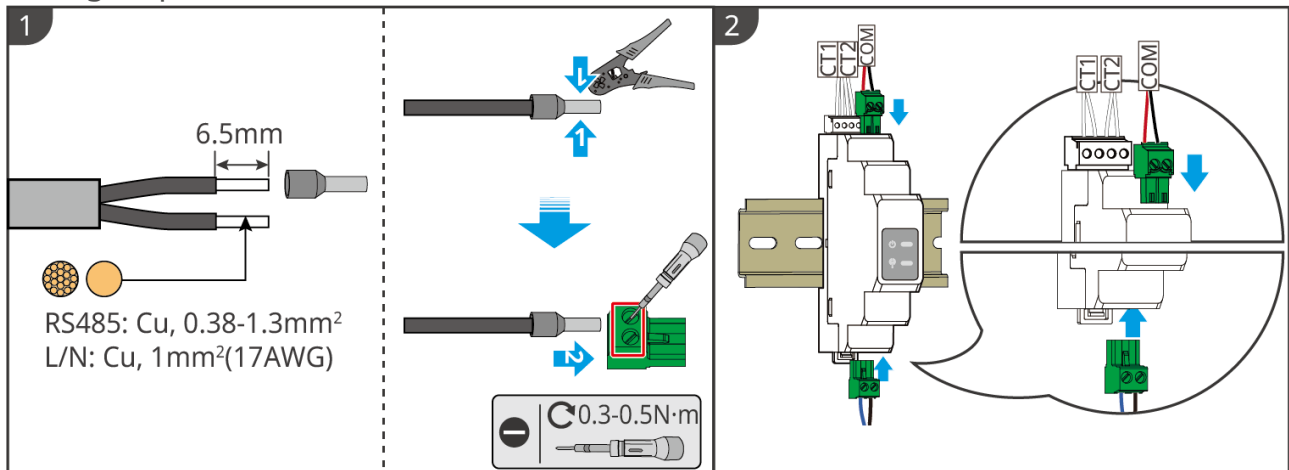
Note

- The outer diameter of the AC power line must be smaller than the aperture of the CT to ensure that the AC power line can pass through the CT.
- To ensure the current measurement accuracy of the CT, the length of the CT cable is recommended not to exceed 30m.
- Do not use Ethernet cable as CT cable, otherwise the meter may be damaged due to excessive current.
- The CTs provided by equipment manufacturers may have slight differences in size and appearance depending on the model, but the installation and wiring method is consistent.



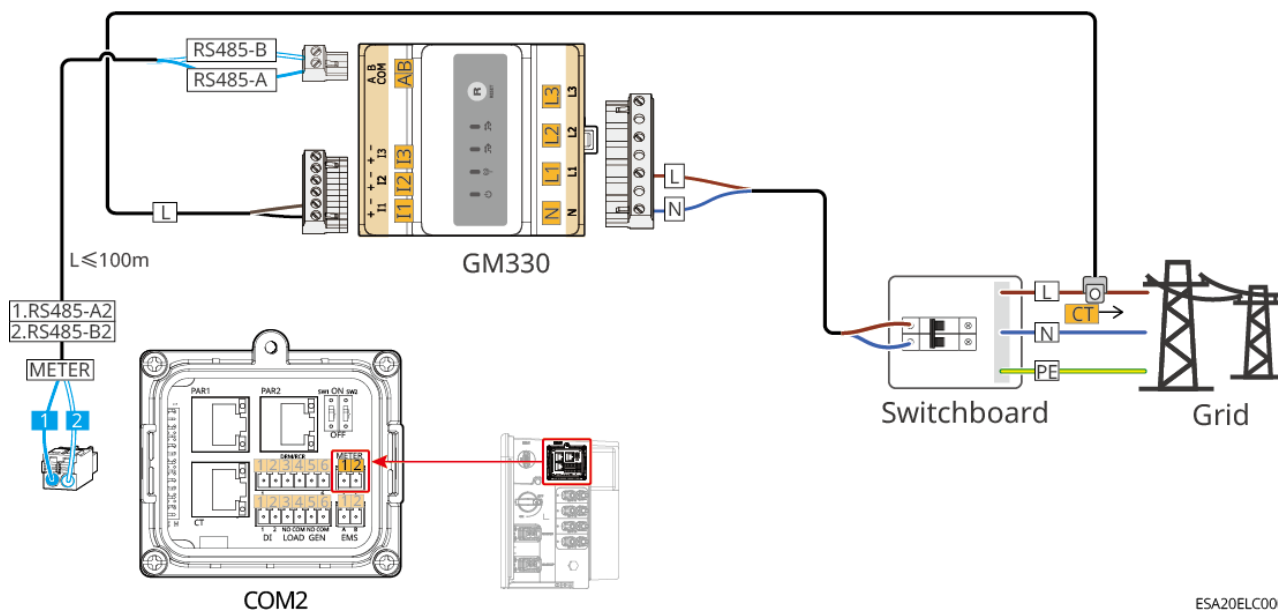
ESA20ELC0008

Wiring steps



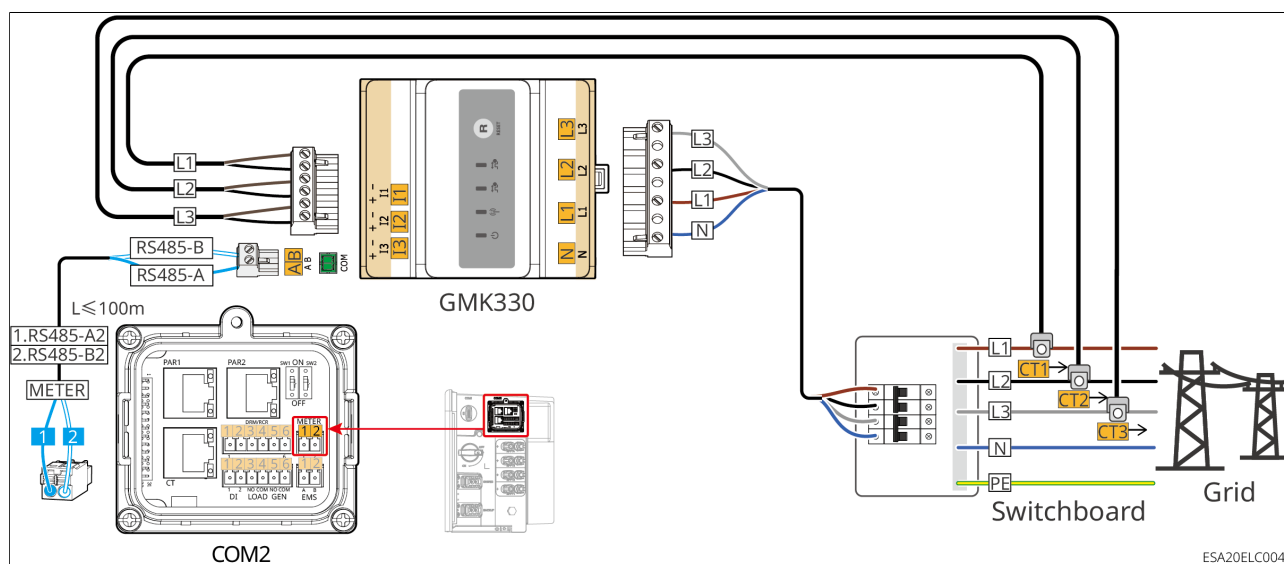
GMK10ELC0002

GM330 meter wiring



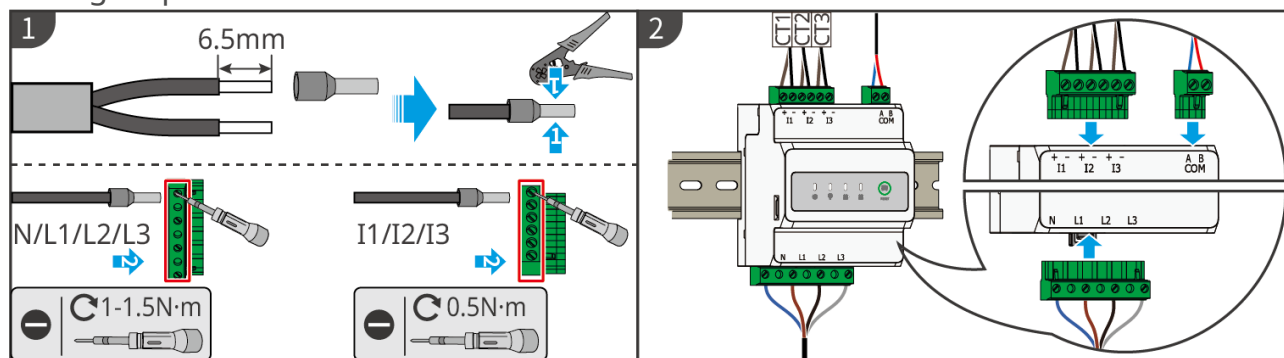
ESA20ELC0009

GMK330 meter wiring

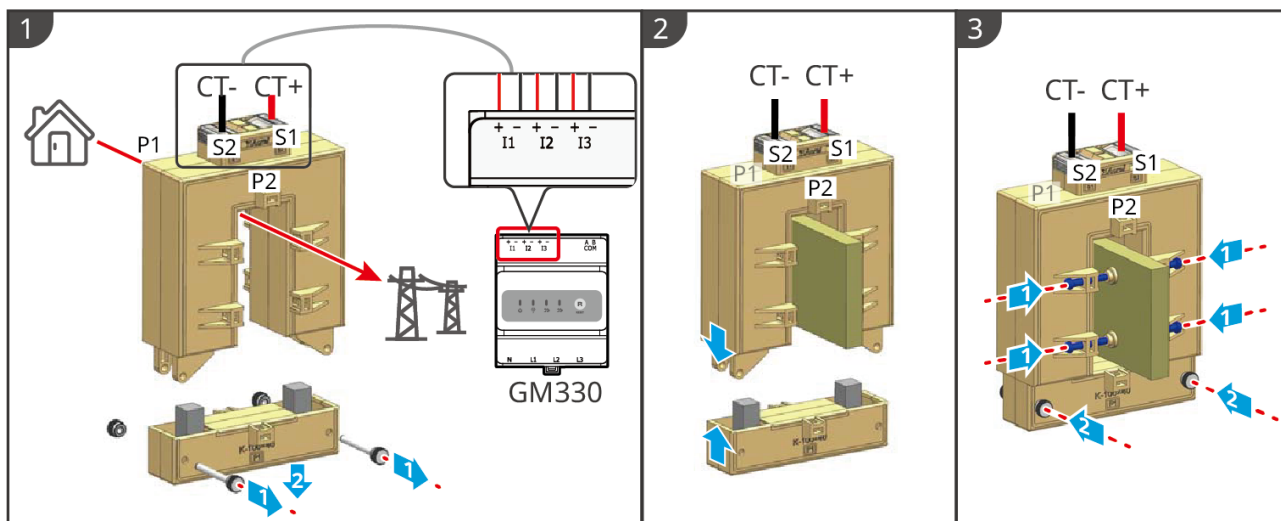


ESA20ELC0004

Wiring steps

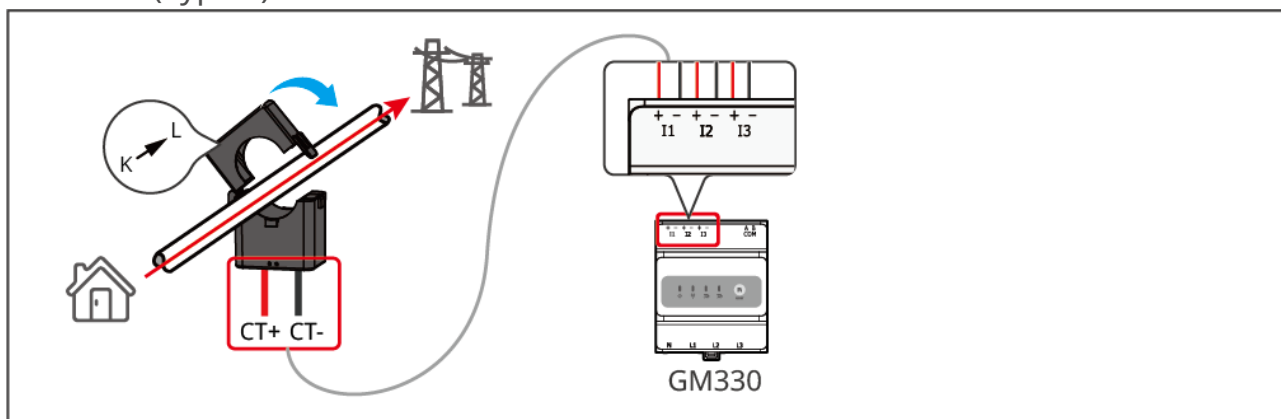


Install CT (Type 1)



GMK10ELC0006

Install CT (Type 2)



GMK10ELC0007

5.10 Connect communication cable

5.10.1 Connect inverter communication line

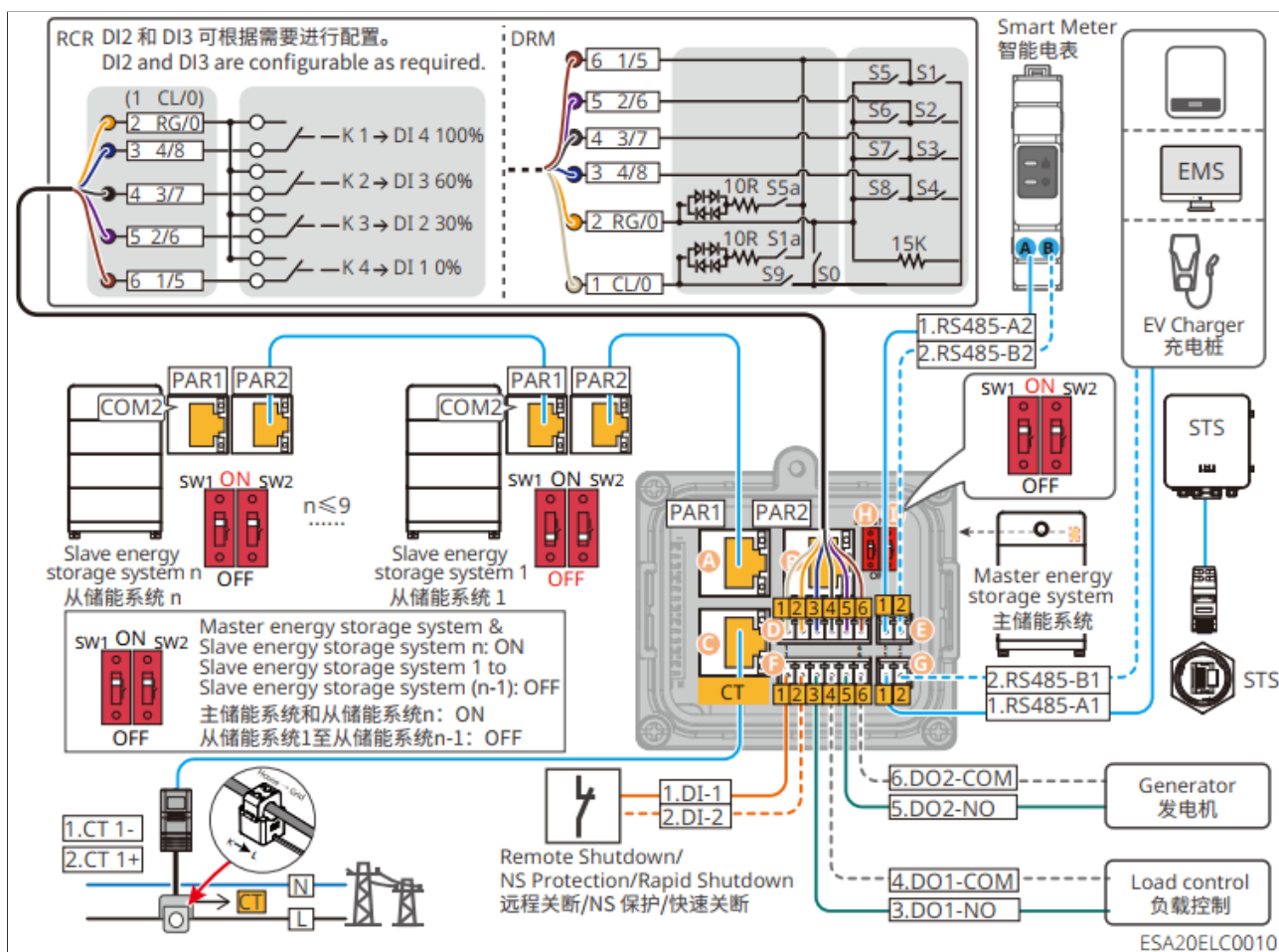
Note

- When using the inverter built-in meter, please use the CT shipped with the inverter.
- Please connect the CT according to the direction of the electric meter. If reversed, it may cause a CT reverse fault.

Note

- If you need to use the DRED, RCR or remote shutdown function, please enable this function in the App after wiring is completed.
- If the inverter is not connected to a DRED device or a remote shutdown device, do not enable this function in the 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 be connected to dry contact A. Signal specifications: $\text{Max} \leq 24\text{Vdc}$, 1A.
- Inverter communication function is optional; select based on actual use scenario.
- The inverter supports connection to a mobile phone or WEB interface via 4G, Bluetooth, WiFi, and LAN communication methods for setting device-related parameters, viewing device operation information and error information, and promptly under standing system status.
- In standalone systems, the installation of WiFi/LAN Kit-20 or 4G Kit-CN-G20 intelligent communication stick is supported.
- 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.
- When using the 4G Kit-CN-G20:
 - If you need Parallel Networking, please contact GoodWe to purchase WiFi/LAN Kit-20.
 - Kit-CN-G20, a Micro-SIM card is standard, and the operator is China Mobile. Please ensure the device is installed in an area covered by the operator's signal. If the local mobile signal is not covered, please contact the operator to optimize the signal.
 - Supports connection to third-party monitoring platforms via MQTT communication protocol.
- 4G Kit-CN-G20 is an LTE single-antenna device, suitable for application scenarios with low data transmission rate requirements.

Communication Function Description

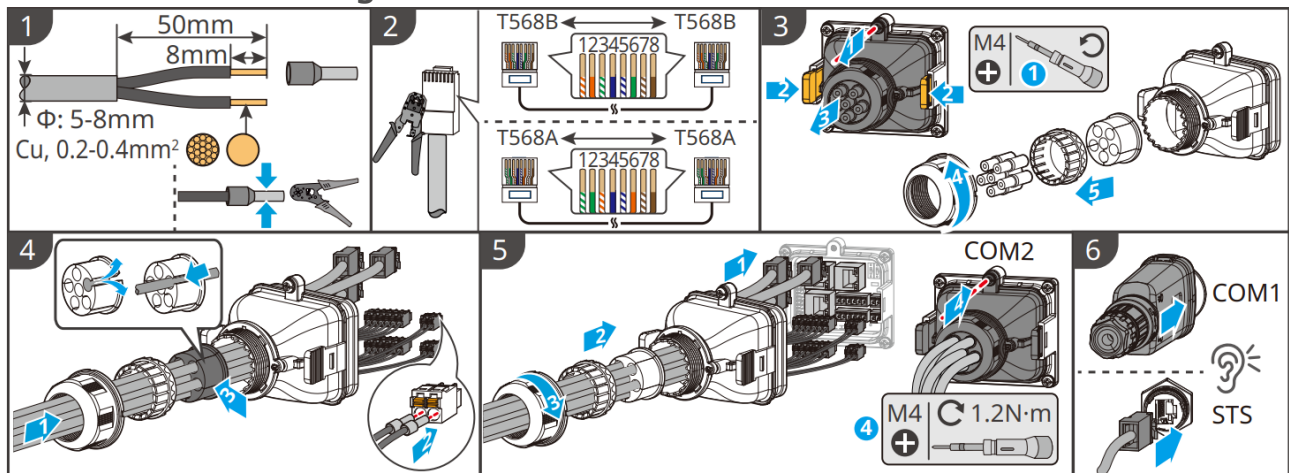


Port (Silkscreen)		function	description
A	PAR1	Parallel communication port 1	Parallel communication port.
B	PAR2	Parallel communication port 2	
C	CT	CT connection port	When only using the inverter's built-in meter, connect the CT communication cable.

Port (Silkscreen)		function	description
D	DRM/RCR	RCR, DRED or EnWG 14a function connection port	- RCR (Ripple Control Receiver) : Provides RCR signal control port to meet grid dispatch requirements in the European region. - DRED (Demand Response Enabling Device): Provides the DRED signal control port, meeting the DERD certification requirements for Australia and other regions.
E	METER	Meter connection port	Use RS485 communication to connect to an external smart meter.
F	DI	Remote Shutdown/NS protection/Rapid Shutdown	- External remote shutdown or local NS Protection 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.
	LOAD	load control	- Support connection with dry contact signal for load control and other functions. DO contact capacity: 24V DC@1A, NO/COM normally open contact. - Supports SG Ready heat pump integration, controlling the heat pump via dry contact signals.

Port (Silkscreen)		function	description
	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/GoodWe On-Grid Inverter	• Connect to third-party EMS equipment for energy control; • Connect GoodWe charging pile; • Connect to GoodWe grid-tied inverter.
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		

Method for Connecting 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.

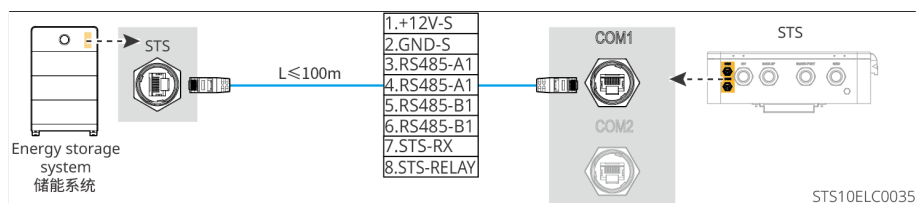


Figure48 Wiring Over view

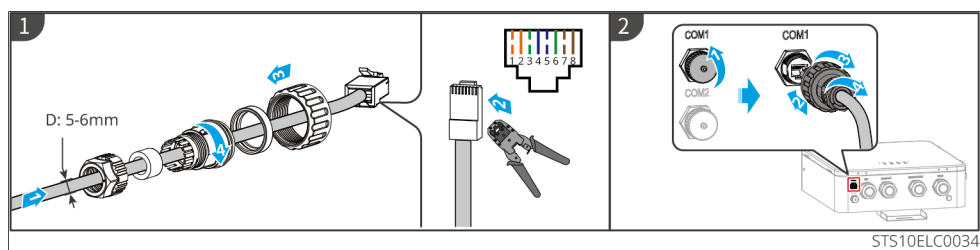
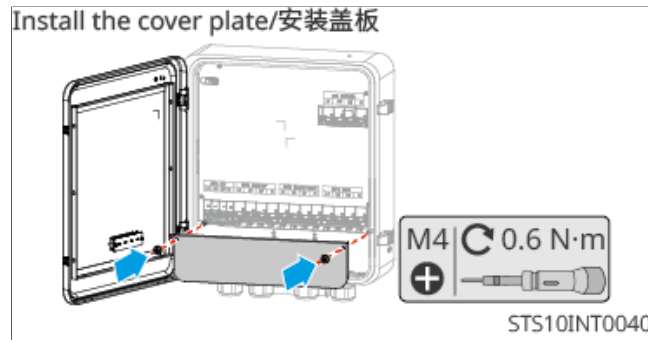


Figure49 Wiring steps

6 Install STS cover plate



7 System Commissioning

7.1 Check Before Power ON

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

7.2 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 the battery to discharge and start the inverter. The inverter can then enter off-grid mode, 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.
- In a standalone scenario, 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 EHA series.

power on

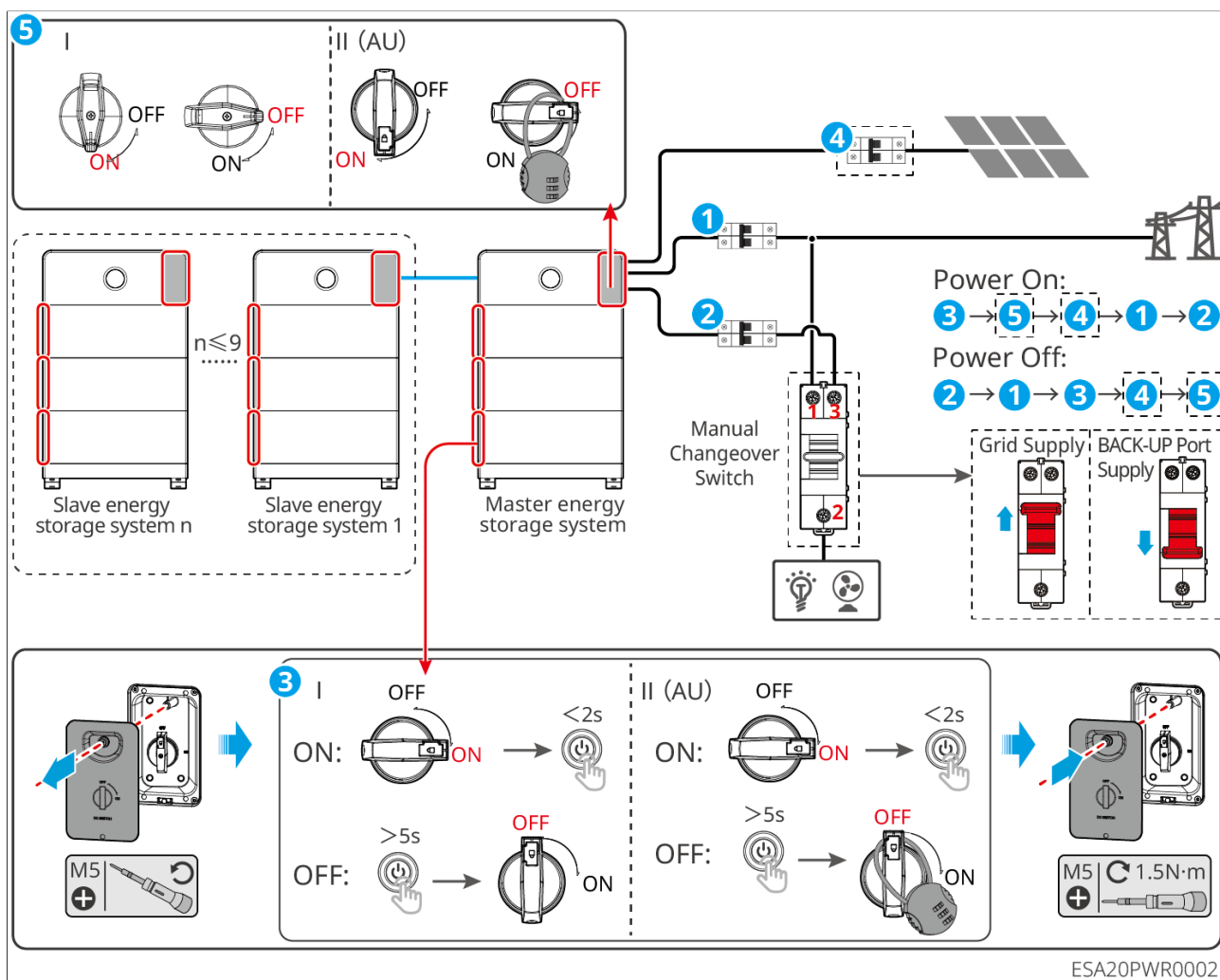


Figure50 Power ON

1. Close the battery power switch and briefly press the battery's multifunction button. If there are multiple batteries in the system, close the power switches on all batteries. Briefly pressing the multifunction button on any one battery will start all batteries.
2. Close the DC switch of the inverter.
3. (Optional) Close the circuit breaker between the PV modules and the inverter.
4. Close the ON-GRID circuit breaker.
5. Close the BACK-UP circuit breaker. In a single-unit scenario, before closing the BACK-UP circuit breaker, first set the manual transfer switch to the BACK-UP position to engage it, allowing the inverter's BACK-UP port to supply power to the loads.

Powering ON with Static Transfer Switch Cabinet

During inverter shutdown for maintenance, if it is necessary to keep the loads on the

STS's BACK-UP port powered without interruption, close the BYPASS switch to allow the utility grid to directly supply power to the loads.

 DANGER

- Always operate the BYPASS switches in the specified closing sequence; 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 completing the switch operation, please close the cabinet door.
- Do not discard the retaining spring.

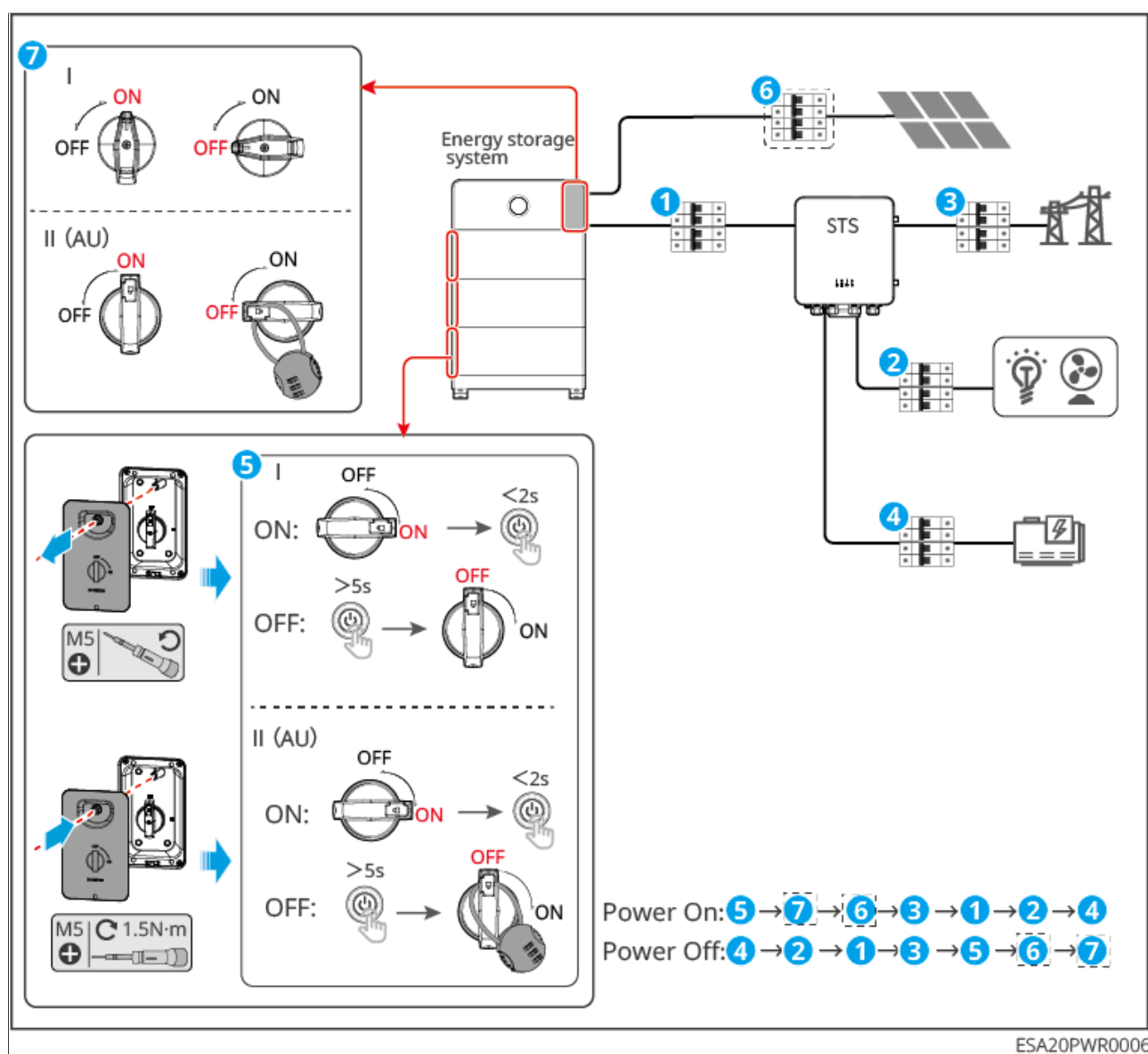


Figure51 Powering ON with Static Transfer Switch Cabinet

1. Close the battery power switch and briefly press the battery's multifunction button. If there are multiple batteries in the system, close the power switches on all batteries. Briefly pressing the multifunction button on any one battery will start all batteries.
2. Close the DC switch of the inverter.
3. Close the circuit breaker between the PV modules 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

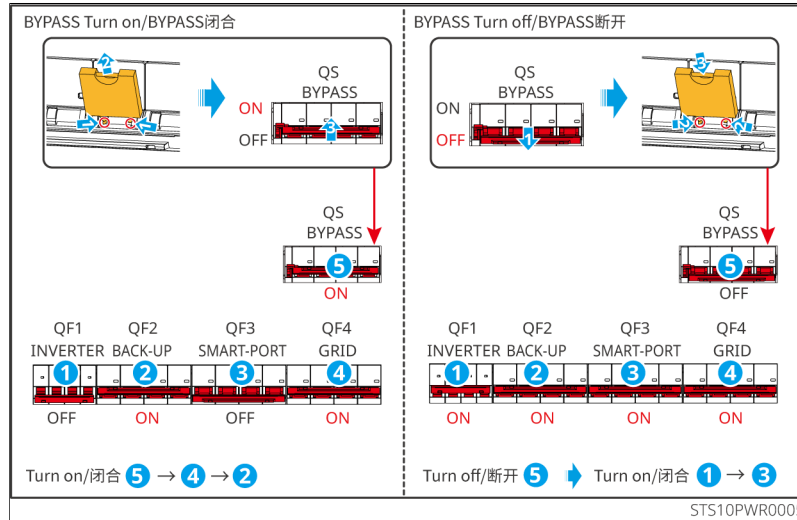


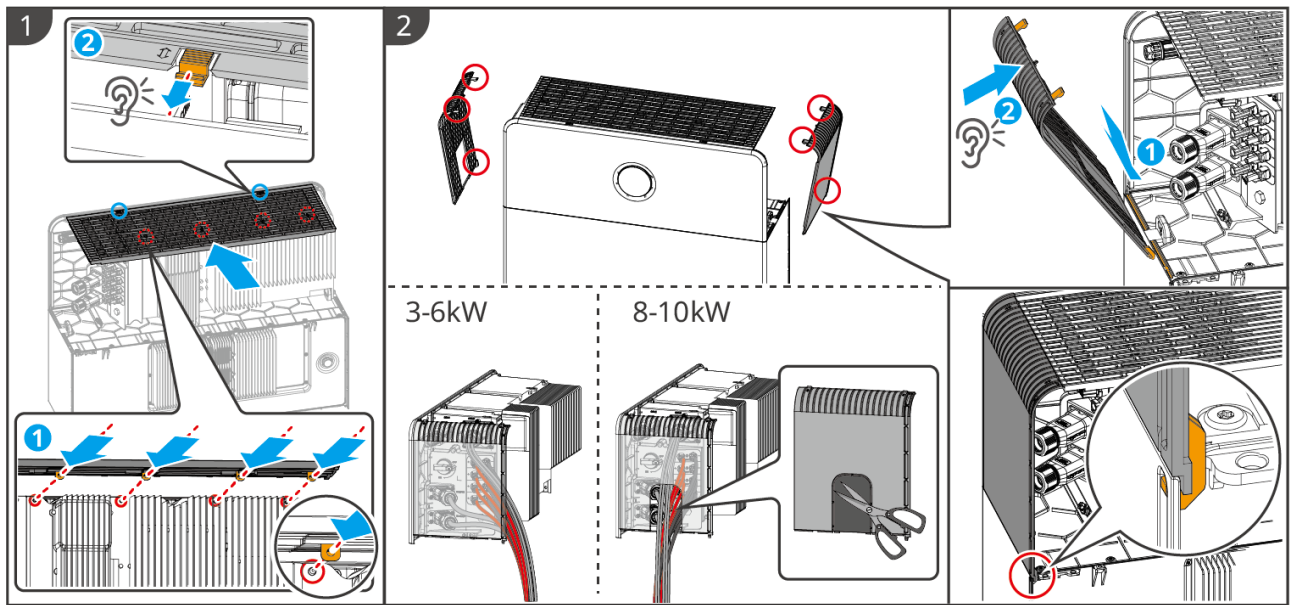
Figure52 BYPASS Switch Closed

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

Battery Black Start

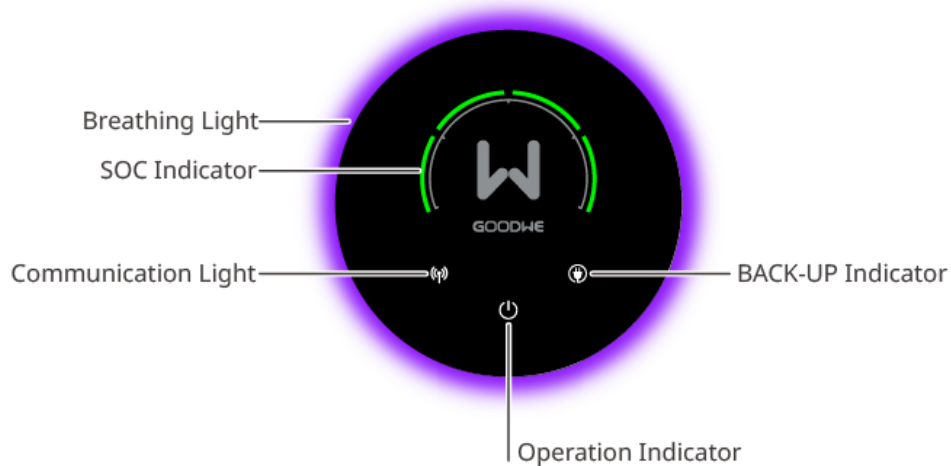
1. Close the battery power switch. If there are multiple batteries in the system, close the power switches on all batteries.
2. Close the DC switch of the inverter.
3. (Optional) Close the circuit breaker between the PV modules and the inverter.
4. Close the ON-GRID circuit breaker.
5. Close the BACK-UP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

7.3 Installing Protective Cover



7.4 Indicators

7.4.1 Inverter Indicators



ESA20CON0002

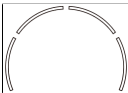
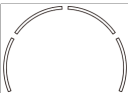
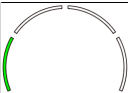
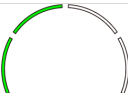
Breathing Light:

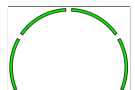
- When the system is upgrading: The breathing light is a green running light; the head of the running light is the brightest and the tail is the dimmest. The length of the running light and the upgrade percentage are affected by the SEMS+ App

settings and the device's operating status.

- Except for 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, please refer to the SEMS+ App User Manual.

Indicator	Indicator Status	Breathing Light Status	Description
		• 3min/Always on: Blue-purple running light stays on • Always off: Off	Inverter powered on, in standby mode
			Inverter starting up, in self-test mode
		• 3min: Blue-purple breathing for 3min then off • Always on in App: Blue-purple breathing stays on • Always off in App: Off	Inverter operating normally in grid-tied or off-grid mode
		Red flashing	System fault
		Off	Inverter powered off
		/	Inverter monitoring module resetting
			No connection established between inverter and communication terminal
			Communication fault between terminal and cloud server
			Inverter monitoring normal
			Inverter monitoring module not started

Indicator	Indicator Status	Breathing Light Status	Description
			Grid abnormal, inverter BACK-UP port power supply normal
			Grid normal, inverter BACK-UP port power supply normal
			BACK-UP port has no power supply
			System upgrade
			System fault
			System overload
			Battery has no power
			Steady on: Charge Flashing: Discharge Battery SOC: $0\% < \text{SOC} \leq 25\%$
			Steady on: Charge Flashing: Discharge Battery SOC: $25\% < \text{SOC} \leq 50\%$

Indicator	Indicator Status	Breathing Light Status	Description
			Steady on: Charge Flashing: Discharge Battery SOC: 50% < SOC ≤ 75%
			Steady on: Charge Flashing: Discharge Battery SOC: 75% < SOC ≤ 100%

7.4.2 Battery Indicators

Button Indicator Light

No.	 Green Light	 Red Light	Battery System Status	Description
1	Steady On	--	System Operating Normally	Run
2	Blink 1 time/S		System Ready	Standby
	Blink 3 times/S	--	PCS Communication Lost	--
3	Blink 1 time/2S	--	System Alarm	Includes Level 2 faults in the fault list, where under-voltage fault is steady on when at levels 2, 3, and 4
4	--	Steady On	System Fault	Level 3 and above faults in the fault list (steady on when under-voltage fault is level 5)

7.4.3 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

7.4.4 Smart Meter Indicator

GM330

Type	Status	Description
Power light 	On	Power on, no RS485 communication.
	Blinks.	Power on, RS485 communication works properly.
	Off	The smart meter has been powered off.
Communication indicator 	Off	Reserved
	Blinks.	Press the Reset button for more than 5 seconds, power light, buying or selling electricity indicator light flash: Reset the meter.
Importing or exporting indicator 	On	Importing from the grid.
	Blinks.	Exporting to the grid.
	Off	Do not import from and export to the grid.
	Reserved	

GMK110

Type	Status	Description
Power light 	On	The smart meter is power on.
	Off	The smart meter has been powered off.

Type	Status	Description
Communication indicator 	Blinks.	Meter communication is normal.
	Off	Meter communication is abnormal or has no communication.

7.4.5 Smart Dongle Indicator

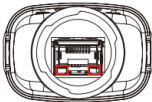
- WiFi/LAN Kit-20

NOTICE

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

Indicator	Status	Description
Power Light 		Steady on: The smart communication stick is powered on.
		Off: The smart communication stick is not powered on.
Communi- cation Light 		Steady on: Communication is normal in WiFi mode or LAN mode.
		Single blink: The smart communication stick's Bluetooth signal is enabled, waiting to connect to the App.
		Two blinks: The smart communication stick is not connected to the router.
		Four blinks: The smart communication stick communicates normally with the router but is not connected to the server.
		Six blinks: The smart communication stick is identifying connected devices.

Indicator	Status	Description
		Off: The smart communication stick is undergoing a software reset or is not powered on.

indicator	Color	Status	Description
LAN Port Communication Indicator 	Green	Steady	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	10/100Mbps wired network connection is normal, no data transmission/reception.
		Flashing	Communication data is being transmitted/received.
		Off	Network cable is not connected.

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

• 4G Kit-CN-G20

Indicator	Status	Description
		Steady on: The smart communication stick is powered on.
		Off: The smart communication stick is not powered on.
		Steady on: The smart communication stick is connected to the server, communication is normal.

Indicator	Status	Description
		Double flash: The smart communication stick is not connected to the communication base station.
		Quadruple flash: The smart communication stick is connected to the communication base station but not to the server.
		Sextuple flash: 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.

8 System Debugging and Power Station Monitoring

8.1 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

8.2 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

9 Maintenance

9.1 System power-off

Danger

- When performing operation and maintenance on equipment in the system, de-energize the system. Live operation of equipment may cause equipment damage or risk of electric shock.
- After equipment power-off, internal components require some time to discharge. Please wait according to the label time requirement until the equipment is fully discharged.
- Restart the battery using the air switch power-on method.
- During inverter power-off maintenance, STS QF1 INV must be disconnected; otherwise, there may be a risk of electric shock.
- When shutting down the battery system, strictly follow the battery system power-off requirements to prevent damage to the battery system.

Warning

In a single-machine scenario, when the inverter is under power-off maintenance or fault, to ensure normal operation of the load, please switch the manual transfer switch to the grid side to close, and the grid will supply power to the load.

Note

- To ensure effective protection of the battery system, the cover of the battery system switch should remain closed. If the battery system switch is not used for an extended period, it must be secured with screws.
- When the circuit breaker is open, all live parts in 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 upon human contact.
- After the system equipped with Static Transfer Switch (STS) cabinet completes power-off, please close the top cover of the STS.
- PV strings and “5” are only applicable to the EHA series.

Power Off

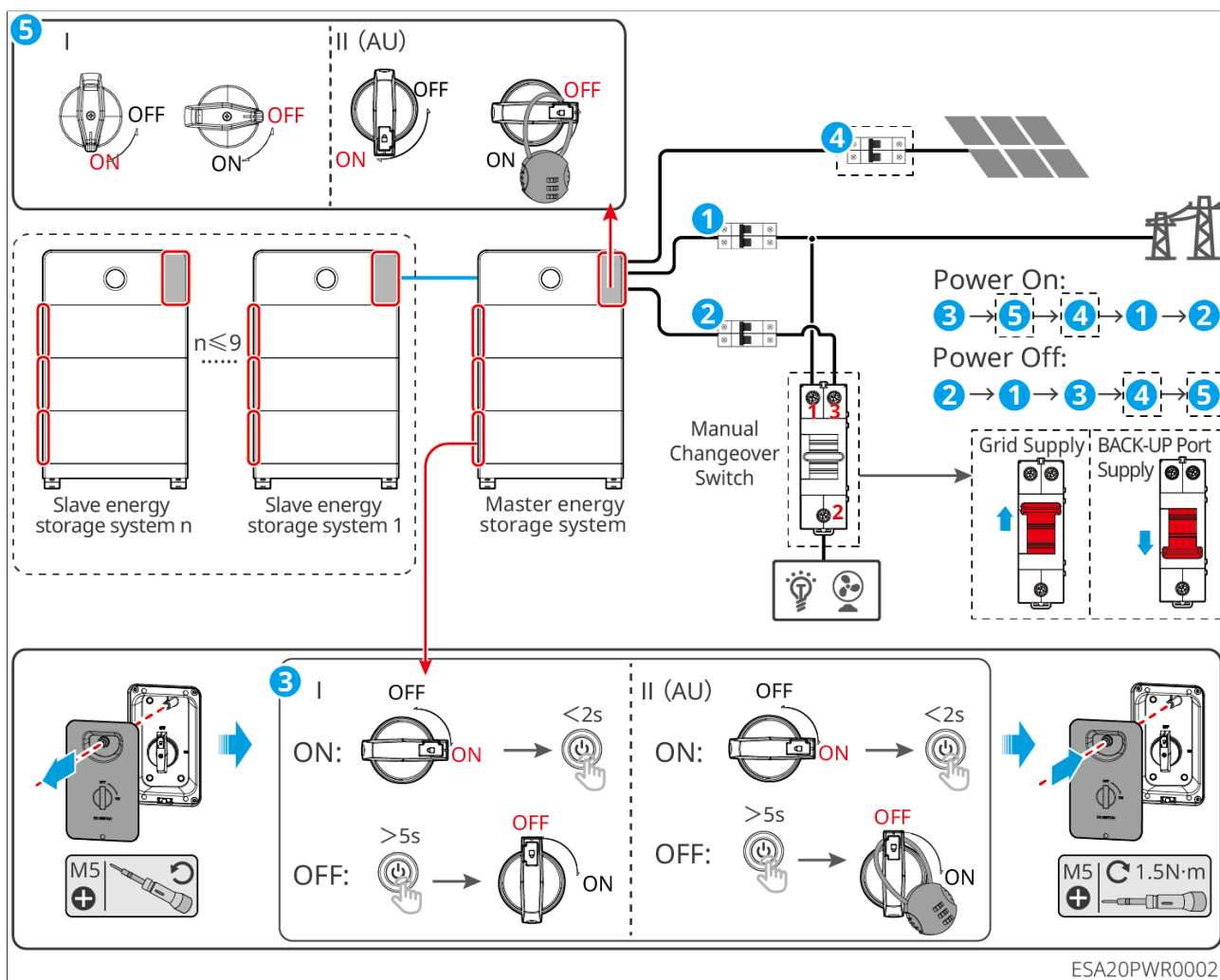


Figure53 System power-off

1. Disconnect the BACK-UP circuit breaker.
2. Disconnect the on-grid circuit breaker.
3. Press and hold 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 with out the need for individual operations. Finally, turn the battery system switch to the OFF position.
4. (Optional) Disconnect the circuit breaker between the PV modules and the inverter.
5. Disconnect the DC Switch of the inverter. In a standalone scenario, after the inverter DC Switch is disconnected, to ggle the manual transfer switch to the grid side to engage, allowing the grid to supply power to the load.

Power Down with Static Transfer Switch Cabinet

After the inverter powers on and resumes operation, disconnect the BYPASS switch,

and the load switches back to inverter power supply.

 Danger

- Be sure to follow the bypass switch disconnection sequence, otherwise there is 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.
- Retaining ring do not discard.

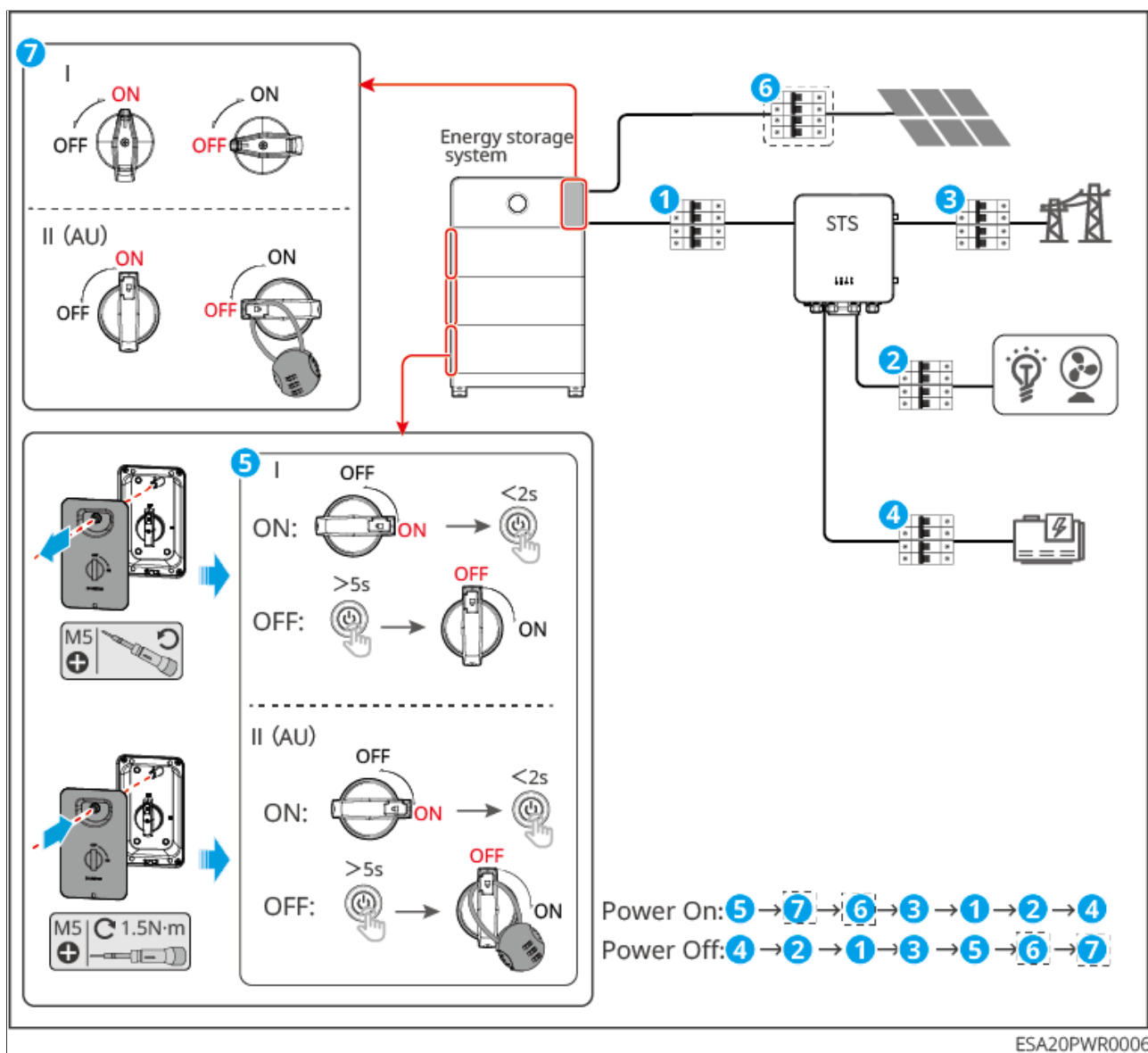


Figure54 Power down with static transfer switch cabinet.

7. Disconnect the inverter's DC Switch.

STS Bypass Switch Open

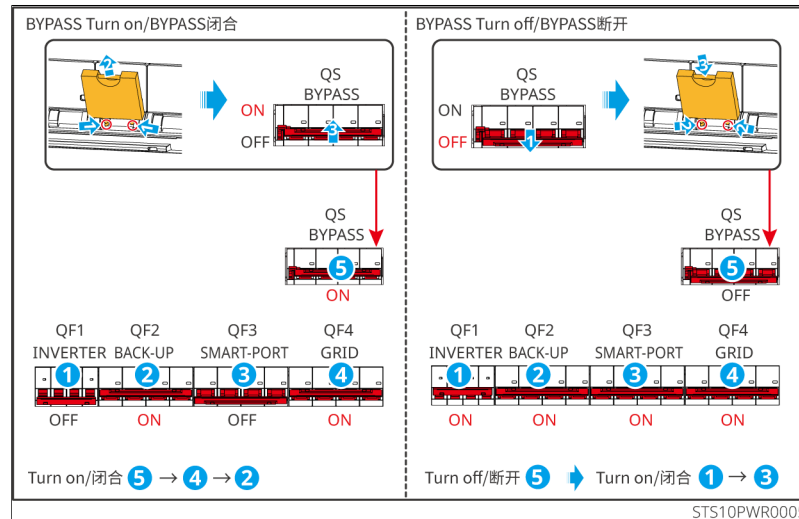


Figure 55 BYPASS Switch Open

1. Current status: GRID bypass power supply BACK-UP; QF3, QF1 open; QF4, QF2, QS1 closed.
2. Disconnect QS1 → Use snap ring to set QS1 in locked state (to prevent misoperation)
3. Disconnect QF4, QF2: At this point, QF1-QF4 and QS1 are all disconnected.
4. Inverter power on
5. According to the power-on sequence, close QF1 through QF4 in sequence.

9.2 Removing the Equipment



DANGER

- Make sure that the equipment is powered off.
- Wear proper PPE during operations.
- Please use standard disassembly tools when removing wiring terminals to avoid damaging the terminals or equipment.
- Unless otherwise specified, the dismantling process of the equipment is in reverse order to the installation process, and it will not be further elaborated in this document.

1. Power off the System.
2. Label the cables connected in the system with tags indicating the cable type.
3. Disconnect the connecting cables of the inverter, battery, and smart meter in the system, such as DC cables, AC cables, communication cables, and PE cables.
4. Remove equipment such as the smart dongle, inverter, battery, and smart meter.
5. Properly store the equipment and ensure that the storage conditions meet the requirements if it needs to be put into use later.

9.3 Disposing of the Equipment

If the equipment cannot work anymore, dispose of it according to the local disposal requirements for electrical equipment waste. The equipment cannot be disposed of together with household waste.

9.4 Routine Maintenance

WARNING

- Contact after-sales service for help if you find any problems that may influence the battery or the hybrid inverter. Disassemble without permission is strictly forbidden.
- Contact after-sales service for help if the copper conductor is exposed. Do not touch or disassemble privately because high voltage danger exists.
- In case of other emergencies, contact the after-sales service as soon as possible. Operate following the instructions or wait for the after-sales service personnel.

Maintainin g Item	Maintaining Method	Maintainin g Period	Maintaining Purpose
System Cleaning	Check the heat sink, air intake, and air outlet for foreign matter or dust. Check whether the installation space meets requirements and whether there is any debris around the device.	Once 6 months	Prevent heat dissipation failures.

Maintaining Item	Maintaining Method	Maintaining Period	Maintaining Purpose
System installation	Check whether the equipment are installed securely and whether the screws are installed tightly. Check whether the equipment is damaged or deformed.	Once 6-12 months	Ensure that the equipment is installed securely.
Electrical connection	Check whether the cables are securely connected. Check whether the cables are broken or whether there is any exposed copper core.	Once 6-12 months	Confirm the reliability of electrical connections.
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big.	Once a year	Confirm that the machine seal and waterproof performance are intact.
Battery maintenance	If the battery is not used for a long time or is not fully charged, it is recommended to charge the battery regularly.	Once/15 days	Protect the battery's lifespan.

9.5 fault

NOTICE

The manual fault content is updated irregularly and varies slightly between different models. Please refer to the device's real-time display for specifics.

9.5.1 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.

9.5.2 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 occurrence frequency, etc.
2. Device installation environment, such as: weather conditions, whether components are obstructed, 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	Solution
1	Cannot search for the Smart Communication Stick wireless signal	1. Ensure no other device is connected to the Smart Communication Stick wireless signal. 2. Ensure the App is upgraded to the latest version. 3. Ensure the Smart Communication Stick is powered normally and the blue signal light is blinking or steadily on. 4. Ensure the smart device is within the communication range of the Smart Communication Stick. 5. Refresh the App device list again. 6. Restart the inverter.
2	Cannot connect to the Smart Communication Stick wireless signal	1. Ensure no other device is connected to the Smart Communication Stick wireless signal. 2. Restart the inverter or the Communication Stick, then try connecting to the Smart Communication Stick wireless signal again. 3. Ensure Bluetooth is successfully encrypted and paired.
3	Cannot find the router 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 configurations are completed, 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 are the same as 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	Solution
5	After all configurations are completed, the Smart Communication Stick fails to connect to the server	Restart the router and the inverter.

9.5.2.1 Inverter Fault

9.5.2.1.1 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.

9.5.2.1.2 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.

9.5.2.1.3 Fault Handling (Fault Codes F81-F121)

fault code	Fault Name	fault cause	Fault Handling Recommendations
F81	P-Bus Overvoltage	Bus Overvoltage, possible cause: 1. PVOvertoltage; 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.

9.5.2.1.4 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.

9.5.2.1.5 Fault Symptom Handling

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

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

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

Fault Name	Fault Cause	Troubleshooting Recommendation
Parallel Comm Timeout Shutdown	In parallel operation, if a slave unit fails to communicate with the master unit for more than 400 seconds.	Check if the parallel communication harness is securely connected. Check if the slave unit addresses are duplicated.
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 of the three-phase group is connected to an inverter.

Fault Name	Fault Cause	Troubleshooting Recommendation
EPO	Externally triggered hardware EPO button or remotely triggered 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 machine will automatically open the air damper to exhaust 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 air damper status within 30s to ensure the cluster-level fire protection is executed in a sealed space. 3. Please contact the distributor or after-sales service center.
Combustible Gas Device Air Damper Open Signal Mismatch	Mismatch between the control signal to open the air damper and the feedback signal.	1. Check that the harness signal connection has no issues. 2. Please contact the distributor or after-sales service center.
One-Key Shutdown	Check via the App if the one-key shutdown function is enabled.	Disable the one-key shutdown.
Offline Shutdown	-	-

Fault Name	Fault Cause	Troubleshooting Recommendation
Remote Shutdown	-	-
On-Grid SPD Fault	-	1. Try restarting the machine 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 machine 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 machine and observe if the fault clears; 2. If the fault persists after restarting, please contact the distributor or after-sales service center.
Dehumidifier Communication Failure	Communication link abnormality between the dehumidifier and the LC control box.	1. Check the link communication harness and observe if the fault clears; 2. Try restarting the machine 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	Troubleshooting Recommendation
Combustible Gas Detection Device Communication Failure	1. The combustible gas device was not properly configured with a 485 address of 2 during factory settings. 2. Communication link abnormality 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 machine and observe if the fault clears; 3. Use the method provided by the combustible gas device 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	Communication link abnormality between the control board and the diesel generator.	1. Check the link communication harness and observe if the fault clears; 2. Try restarting the machine 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. Voltage sensing wire abnormality	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. Voltage sensing wire abnormality	
Battery Undervoltage	1. Single cell voltage too low 2. Voltage sensing wire abnormality	

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Total battery voltage too low 2. Voltage sensing wire abnormality	
Battery Overcurrent	1. Charging current too high, battery current limiting abnormal: temperature and voltage values change abruptly. 2. Inverter response abnormal	
	Battery discharge current too high	
Battery Overtemperature	1. Ambient Overtemperature 2. Temperature sensor abnormal	
Battery Undertemperature	1. Ambient temperature too low 2. Temperature sensor abnormal	
Battery Terminal Overtemperature	Terminal temperature too high	

Fault Name	Fault Cause	Troubleshooting Recommendation
Battery Imbalance	1. Excessive temperature difference. At different stages, the battery will limit its power, i.e., limit charge/discharge current. Therefore, this issue is generally difficult to occur. 2. Cell capacity degradation leads to excessive internal resistance, causing 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. Power cable connection loose	

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Inconsistent cell aging levels 2. Slave board chip issues can also cause excessive cell voltage difference; 3. Slave board balancing issues can also cause excessive cell voltage difference 4. 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. Power off and restart, then observe if the fault persists. Check if the wiring is correct and if the pre-charge MOS is damaged.
Harness Fault	Battery sensing harness 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 harness poor contact or disconnected	Check wiring, restart the battery. If the problem persists after restarting, please contact the after-sales service center.

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

Fault Name	Fault Cause	Troubleshooting Recommendation
Shunt Overtemperature	Shunt overtemperature	This fault indicates the shunt temperature exceeds the specified threshold. Power off and let it sit for 2 hours for temperature recovery.
BMS1 Other Fault 1 (Residential Storage)	Relay or MOS open circuit	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists; 2. If it persists, replace the battery pack.
	Relay or MOS short circuit	1. Upgrade software, power off and let it sit for 5 minutes, restart and see if the fault persists; 2. If it persists, replace the battery pack.
	Communication abnormality between main and slave clusters or cell inconsistency between clusters	1. Check the slave unit's battery information and software version, and if the communication cable connection to the master unit is normal. 2. Upgrade software.
	Battery system loop harness abnormal, causing the interlock signal not to form a loop.	Check if the terminal resistor is installed correctly.
	BMS and PCS communication abnormal	1. Confirm if the communication cable interface definitions between the inverter and the connected battery are correct; 2. Please contact the after-sales service center to check backend data and observe if the inverter and battery software are correctly matched.

Fault Name	Fault Cause	Troubleshooting Recommendation
	BMS master and slave control communication harness abnormal	1. Check wiring, restart the battery; 2. Upgrade the battery firmware. If the problem persists after restarting, please contact the after-sales service center.
	Main negative chip communication loss	
	Circuit breaker, shunt trip abnormal	1. Power off and let it sit for 5 minutes, restart and see if the fault persists; 2. Observe if the communication pins on the PACK and PCU bottom blind-mate connectors 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-charging.	1. Upgrade software, observe if the fault persists. 2. If in parallel operation, 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.

Fault Name	Fault Cause	Troubleshooting Recommendation
	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 is set to a power level that exceeds the bus load capacity;
	Inconsistent cells in parallel clusters	Confirm if the cells in the parallel battery clusters are consistent.
	Reverse polarity connection of parallel cluster batteries	Check if the positive and negative terminals of the parallel cluster batteries are connected reversely.
	Severe overtemperature/overvoltage etc. triggering the 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, then power on again.
	Insufficient supply voltage	
	No voltage input	
	Unstable supply voltage	
	Compressor voltage unstable	

Fault Name	Fault Cause	Troubleshooting Recommendation
	Sensor poor contact or damaged	Try restarting the system. If the fault is not resolved, please contact the after-sales service center.
	Air conditioner fan abnormal	
BMS1 Other Fault 2 (Residential Storage)	DCDC internal voltage or current abnormal	Refer to specific DC fault content.
	DCDC overload or heatsink overtemperature, etc.	
	Cell acquisition 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 terminal screw loose or poor contact	1. Power off the battery, check wiring and output terminal screw condition. 2. After confirmation, restart the battery, observe if the fault persists. If it exists, please contact the after-sales service center.
	Battery used for too long or cells severely damaged	Please contact the after-sales service center to replace the pack.

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Software version too low or BMS board damaged 2. Large number of inverters in parallel, causing excessive inrush current during battery pre-charging.	1. Upgrade software, observe if the fault persists. 2. If in parallel operation, start the battery in black start mode first, then start the inverters.
	Heating film damaged	Please contact the after-sales service center.
	Heating film three-terminal fuse blown, heating function unavailable	Please contact the after-sales service center.
	Software model, Cell Type, hardware model mismatch	Check if the software model, SN, Cell Type, and hardware model are consistent. If not, please contact the after-sales service center.
	Thermal management board communication wire 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 output port voltage is normal and the fault does not clear itself after restarting the battery, please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
	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 overtemperature	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.
	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 overtemperature	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.

Fault Name	Fault Cause	Troubleshooting Recommendation
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 Fault 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 exists, 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.
	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. Daisy-chain communication abnormal within battery cluster 2. Inconsistent cell aging levels between battery clusters	1. Check the pack contact condition within a single battery cluster. 2. Confirm the usage status of each cluster battery, 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 charge	Charge the battery.
BMS1 Other Fault 4 (Large-scale Storage)	Circuit breaker abnormal	Contact after-sales to replace the pack.

Fault Name	Fault Cause	Troubleshooting Recommendation
	External device abnormal	Contact after-sales to replace the pack.
Contactactor Failure 1	-	-
Contactactor Failure 2	-	-
Overload Protection (Ksic)	Sustained overload (exceeding 690KVA) for 10s	Please contact the after-sales service center.
Overload Protection (Smart Port)	Sustained overload (exceeding 690KVA) for 10s	Please contact the after-sales service center.
Overcurrent Protection (Ksic)	-	-
Overcurrent Protection (Smart Port)	-	-
Master AC On Meter Comm Error	1. Possibly the meter is not connected to the master unit. 2. Possibly the meter communication cable is loose.	1. Check if the meter is connected to the master unit. 2. Check if the meter communication cable is loose.
Parallel Slave Meter Error	Meter connected to slave unit	Set the machine with the meter connected as the master unit.

Fault Name	Fault Cause	Troubleshooting Recommendation
Slave AC On Timeout with Master	1. Slave address setting error 2. Slave communication cable loose	1. Check if the slave addresses are duplicated. 2. Check if the parallel communication cable is loose.

9.5.2.2 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.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
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.
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.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
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.
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.

Serial Number	Fault Name	fault cause	Fault Handling Recommendations
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.
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.

10 Technical Parameters

10.1 Inverter Parameters

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Battery Side			
Battery Type	LiFePO ₄	LiFePO ₄	LiFePO ₄
Nominal Battery Voltage (V)	380	380	380
Battery Voltage Range (V)	350~550	350~550	350~550
Start-up Voltage (V) ^{*1}	380	380	380
Number of Battery Input	1	1	1
Max. Continuous Charging Current (A)	11.9	14.3	19.8
Max. Continuous Discharging Current (A)	8.7	10.5	14.5
Max. Charging Power (kW)	4.5	5.4	7.5
Max. Discharging Power (kW)	3.3	3.96	5.5
PV Side			
Max. Input Power (kW)	6	7.2	10

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Max. Input Voltage (V) ^{*2}	600	600	600
MPPT Operating Voltage Range (V) ^{*3}	40~560	40~560	40~560
MPPT Voltage Range at Nominal Power (V)	150~500	150~500	170~500
Start-up Voltage (V)	50	50	50
Nominal Input Voltage (V)	400	400	400
Max. MPPT Current (A)	20	20	20
Max. MPPT Short Circuit Current (A)	26	26	26
Max. Backfeed Current to The Array (A)	0	0	0
Number of MPPTs	2	2	2
Number of Strings per MPPT	1/1	1/1	1/1
AC Side (On-grid)			
Nominal Power (kW)	3	3.6	5
Nominal Apparent Power to Grid (kVA)	3	3.6	5
Max. Apparent Power to Grid (kVA)	3	3.6	5

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Nominal Apparent Power from Grid (kVA)	3	3.6	5
Max. Apparent Power from Grid (kVA) ^{*4}	6	7.2	10
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE
Voltage Range (V)	170~280	170~280	170~280
Nominal Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55 / 55~65	45~55 / 55~65	45~55 / 55~65
Max. Current to Grid (A)	13.7 at 220V 13.1 at 230V 12.5 at 240V	16.4 at 220V 15.7 at 230V 15 at 240V	22.8 at 220V 21.8 at 230V 20.9 at 240V
Max. Current From Grid (A) ^{*4}	27.3 at 220V 26.1 at 230V 25 at 240V	32.8 at 220V 31.4 at 230V 30 at 240V	45.5 at 220V 43.5 at 230V 41.7 at 240V
Nominal Current From Grid (A)	13.7 at 220V 13.1 at 230V 12.5 at 240V	16.4 at 220V 15.7 at 230V 15 at 240V	22.8 at 220V 21.8 at 230V 20.9 at 240V
Max. Output Fault Current (Peak and Duration) (A)	96 at 3μs	96 at 3μs	96 at 3μs
Inrush Current (Peak and Duration) (A)	96 at 3μs	96 at 3μs	96 at 3μs

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Nominal Current (A)	13.7 at 220V 13.1 at 230V 12.5 at 240V	16.4 at 220V 15.7 at 230V 15 at 240V	22.8 at 220V 21.8 at 230V 20.9 at 240V
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	96	96	96
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Nominal Output Apparent Power (kVA)	3	3.6	5
Max. Output Apparent Power (kVA)	3.0 (6.0, 10s)	3.6 (7.2, 10s)	5.0 (10.0, 10s)
Max. Output Apparent Power (Bypass) (kVA)	6	7.2	10
Nominal Output Current (A)	13.7 at 220V 13.1 at 230V 12.5 at 240V	16.4 at 220V 15.7 at 230V 15 at 240V	22.8 at 220V 21.8 at 230V 20.9 at 240V
Max. Output Current (A)*5	13.7 at 220V 13.1 at 230V 12.5 at 240V	16.4 at 220V 15.7 at 230V 15 at 240V	22.8 at 220V 21.8 at 230V 20.9 at 240V
Max. Output Current (Bypass) (A)*5	27.3	32.8	45.5

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Max. Fault Current (Peak and Duration) (A)	96 at 3μs	96 at 3μs	96 at 3μs
Inrush Current (Peak and Duration) (A)	96 at 3μs	96 at 3μs	96 at 3μs
Max. Output Overcurrent Protection (A)	96	96	96
Nominal Output Voltage (V)	220/230/240, L/N/ PE	220/230/240, L/N/ PE	220/230/240, L/N/ PE
Nominal Output Frequency (Hz)	50/60	50/60	50/60
THDv (@Linear Load)	<3%	<3%	<3%
Efficiency			
Max. Efficiency	97.6%	97.6%	97.6%
European Efficiency	96.5%	96.5%	96.8%
Max. Battery to AC Efficiency	98.0%	98.0%	98.0%
Protection			
PV String Current Monitoring	Integrated	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-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 Surge Protection	Type II	Type II	Type II
AC Surge Protection	Type II	Type II	Type II
RSD	Optional	Optional	Optional
AFCI	Integrated	Integrated	Integrated
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Operating Temperature Range (°C)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)
Operating Environment	Outdoor	Outdoor	Outdoor
Relative Humidity	0~95%	0~95%	0~95%

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Natural convection	Natural convection	Natural convection
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	24	24	24
Dimension (W×H×D mm)	800*300*270	800*300*270	800*300*270
Noise Emission (dB)	≤30	≤30	≤30
Topology	Non-isolated	Non-isolated	Non-isolated
Power Self-consumption at Night (W)	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66
DC Connector	MC4	MC4	MC4
AC Connector	plug & play terminal	plug & play terminal	plug & play terminal
Environmental Category	4K4H	4K4H	4K4H

Technical Data	GW3K-EHA-G20	GW3.6K-EHA-G20	GW5K-EHA-G20
Pollution Degree	III (Outside of the inverter)	III (Outside of the inverter)	III (Outside of the inverter)
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
Decisive Voltage Class (DVC)	Battery: A PV: C AC: C Com: A	Battery: A PV: C AC: C Com: A	Battery: A PV: C AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Country of Manufacture	China	China	China
Certification			
Grid Standard	IEC/EN 61000-6-1/-2/-3/-4, IEC/EN 62920, CISPR 11, EN 55011, AS/NZS 61000.6.3/.4, AS 61000.6.4		
Safety Regulation	IEC62109-1/-2, IEC 63037		
EMC	IEC/EN 61000-6-1/-2/-3/-4		

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Battery Side				
Battery Type	LiFePO ₄	LiFePO ₄	LiFePO ₄	LiFePO ₄

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Nominal Battery Voltage (V)	380	380	380	380
Battery Voltage Range (V)	350~550	350~550	350~550	350~550
Start-up Voltage (V)*1	380	380	380	380
Number of Battery Input	1	1	1	1
Max. Continuous Charging Current (A)	23.7	31.6	35.6	35.6
Max. Continuous Discharging Current (A)	17.4	23.2	29	29
Max. Charging Power (kW)	9	12	13.5	13.5
Max. Discharging Power (kW)	6.6	8.8	11	11
PV Side				
Max. Input Power (kW)	12	16	20	20
Max. Input Voltage (V)*2	600	600	600	600

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
MPPT Operating Voltage Range (V)*3	40~560	40~560	40~560	40~560
MPPT Voltage Range at Nominal Power (V)	210~500	170~500	190~500	190~500
Start-up Voltage (V)	50	50	50	50
Nominal Input Voltage (V)	400	400	400	400
Max. MPPT Current (A)	20	20	20	20
Max. MPPT Short Circuit Current (A)	26	26	26	26
Max. Backfeed Current to The Array (A)	0	0	0	0
Number of MPPTs	2	4	4	4
Number of Strings per MPPT	1/1	1/1/1/1	1/1/1/1	1/1/1/1
AC Side (On-grid)				
Nominal Power (kW)	6	8	9.999	10

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Nominal Apparent Power to Grid (kVA)	6	8	9.999	10
Max. Apparent Power to Grid (kVA)	6	8	9.999	10
Nominal Apparent Power from Grid (kVA)	6	8	9.999	10
Max. Apparent Power from Grid (kVA)*4	12	14.5	14.5	14.5
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE
Voltage Range (V)	170~280	170~280	170~280	170~280
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
Max. Current to Grid (A)	27.3 at 220V 26.1 at 230V 25 at 240V	36.4 at 220V 34.8 at 230V 33.4 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V
Max. Current From Grid (A)*4	50 at 220V 50 at 230V 50 at 240V	63 at 220V 63 at 230V 60.5 at 240V	63 at 220V 63 at 230V 60.5 at 240V	63 at 220V 63 at 230V 60.5 at 240V

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Nominal Current From Grid (A)	27.3 at 220V 26.1 at 230V 25 at 240V	36.4 at 220V 34.8 at 230V 33.4 at 240V	45.5 at 220V 43.5 at 230V 41.7 at 240V	45.5 at 220V 43.5 at 230V 41.7 at 240V
Max. Output Fault Current (Peak and Duration) (A)	96 at 3μs	120 at 3μs	120 at 3μs	120 at 3μs
Inrush Current (Peak and Duration) (A)	96 at 3μs	120 at 3μs	120 at 3μs	120 at 3μs
Nominal Current (A)	27.3 at 220V 26.1 at 230V 25 at 240V	36.4 at 220V 34.8 at 230V 33.4 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V
Power Factor	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)	~1 (Adjustable from 0.8 leading to 0.8 lagging)
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	96	120	120	120
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Nominal Output Apparent Power (kVA)	6	8	10	10

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Max. Output Apparent Power (kVA)	6.0(12.0, 10s)	8.0(16.0, 10s)	10.0(20.0, 10s)	10.0(20.0, 10s)
Max. Output Apparent Power (Bypass) (kVA)	12	14.5	14.5	14.5
Nominal Output Current (A)	27.3 at 220V 26.1 at 230V 25 at 240V	36.4 at 220V 34.8 at 230V 33.4 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V
Max. Output Current (A) ^{*5}	27.3 at 220V 26.1 at 230V 25 at 240V	36.4 at 220V 34.8 at 230V 33.4 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V	43.5 at 220V 43.5 at 230V 41.7 at 240V
Max. Output Current (Bypass) (A) ^{*5}	50	63	63	63
Max. Fault Current (Peak and Duration) (A)	96 at 3μs	120 at 3μs	120 at 3μs	120 at 3μs
Inrush Current (Peak and Duration) (A)	96 at 3μs	120 at 3μs	120 at 3μs	120 at 3μs
Max. Output Overcurrent Protection (A)	96	120	120	120
Nominal Output Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Nominal Output Frequency (Hz)	50/60	50/60	50/60	50/60
THDv (@Linear Load)	<3%	<3%	<3%	<3%
Efficiency				
Max. Efficiency	97.6%	97.5%	97.5%	97.5%
European Efficiency	97.0%	96.8%	96.8%	96.8%
Max. Battery to AC Efficiency	98.0%	97.8%	97.8%	97.8%
Protection				
PV String Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Insulation Resistance Detection	Integrated	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-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
DC Surge Protection	Type II	Type II	Type II	Type II
AC Surge Protection	Type II	Type II	Type II	Type II
RSD	Optional	Optional	Optional	Optional
AFCI	Integrated	Integrated	Integrated	Integrated
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Operating Temperature Range (°C)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)
Operating Environment	Outdoor	Outdoor	Outdoor	Outdoor
Relative Humidity	0~95%	0~95%	0~95%	0~95%

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Natural convection	Natural convection	Natural convection	Natural convection
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	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	24	26	26	26
Dimension (W×H×D mm)	800*300*270	800*300*270	800*300*270	800*300*270
Noise Emission (dB)	≤30	≤35	≤35	≤35
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Power Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66	IP66
DC Connector	MC4	MC4	MC4	MC4

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
AC Connector	plug & play terminal	plug & play terminal	plug & play terminal	plug & play terminal
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	III (Outside of the inverter)	III (Outside of the inverter)	III (Outside of the inverter)	III (Outside of the inverter)
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
Decisive Voltage Class (DVC)	Battery: A PV: C AC: C Com: A	Battery: A PV: C AC: C Com: A	Battery: A PV: C AC: C Com: A	Battery: A PV: C AC: C 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	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Country of Manufacture	China	China	China	China
Certification				
Grid Standard	IEC/EN 61000-6-1/-2/-3/-4, IEC/EN 62920, CISPR 11, EN 55011, AS/NZS 61000.6.3/.4, AS 61000.6.4			

Technical Data	GW6K-EHA-G20	GW8K-EHA-G20	GW9.999K-EHA-G20	GW10K-EHA-G20
Safety Regulation	IEC62109-1/-2, IEC 63037			
EMC	IEC/EN 61000-6-1/-2/-3/-4			

*1: If there's no PV, start-up voltage will be 380V.

*2: When the input voltage is 560V-600V, the inverter will enter standby mode, and the voltage returns to 560V to enter the normal operation state.

*3: Please refer to the user manual for the MPPT Voltage Range at Nominal Power.

*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: If the Back-up port is not used, select an appropriate circuit breaker based on the AC Max. Output Current.

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Battery Side			
Battery Type	Li-ion	Li-ion	Li-ion
Nominal Voltage (V)	380	380	380
Voltage Range (V)	350~550	350~550	350~550
Start-up Voltage (V)	380	380	380
Number of Battery Inputs	1	1	1
Max. Continuous Charging Current (A)	7.9	9.5	13.2
Max. Continuous Discharging Current (A)	8.7	10.5	14.5
Max. Charging Power (kW)	3	3.6	5
Max. Discharging Power (kW)	3.3	3.96	5.5

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Short-time withstand current (A)	980	980	980
AC Side (On-grid)			
Rated Power (kW)	3	3.6	5
Max. Power (kW)	3	3.6	5
Rated Apparent Power from Grid (kVA)	3	3.6	5
Rated Apparent Power to Grid (kVA)	3	3.6	5
Max. Apparent Power to Grid (kVA)	3	3.6	5
Max. Apparent Power from Grid (kVA)	6	7.2	10
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE
Voltage Range (V)	170~280	170~280	170~280
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 From Grid (A)	13.7 @220V 13.1 @230V 12.5 @240V	16.4 @220V 15.7 @230V 15 @240V	22.8 @220V 21.8 @230V 20.9 @240V
Rated Current to Grid (A)	13.7 @220V 13.1 @230V 12.5 @240V	16.4 @220V 15.7 @230V 15 @240V	22.8 @220V 21.8 @230V 20.9 @240V
Max. Current From Grid (A)*1	27.3 @220V 26.1 @230V 25 @240V	32.8 @220V 31.4 @230V 30 @240V	45.5 @220V 43.5 @230V 41.7 @240V
Max. Current to Grid (A)	13.7 @220V 13.1 @230V 12.5 @240V	16.4 @220V 15.7 @230V 15 @240V	22.8 @220V 21.8 @230V 20.9 @240V

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Max. Output Fault Current (Peak and Duration) (A)	96A@3μs	96A@3μs	96A@3μs
Inrush Current (Peak and Duration) (A)	96A@3μs	96A@3μs	96A@3μs
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	96	96	96
Short-time withstand current (A)	80	80	80
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Apparent Power (kVA)	3	3.6	5
Max. Apparent Power (kVA)	Off-grid: 3.0 (6.0, 10s) On-grid: 6	Off-grid: 3.6 (7.2, 10s) On-grid: 7.2	Off-grid: 5.0 (10.0, 10s) On-grid: 10
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/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)	13.7 @220V 13.1 @230V 12.5 @240V	16.4 @220V 15.7 @230V 15 @240V	22.8 @220V 21.8 @230V 20.9 @240V
Max. Current (A)	Off-grid: 13.7 @220V 13.1 @230V 12.5 @240V On-grid: 27.3	Off-grid: 16.4 @220V 15.7 @230V 15 @240V On-grid: 32.8	Off-grid: 22.8 @220V 21.8 @230V 20.9 @240V On-grid: 45.5

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Max. Fault Current (Peak and Duration) (A)	96A@3μs	96A@3μs	96A@3μs
Inrush Current (Peak and Duration) (A)	96A@3μs	96A@3μs	96A@3μs
Maximum Output Overcurrent Protection (A)	96	96	96
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time (ms)	<10	<10	<10
Efficiency			
Max. Battery to AC Efficiency	98.0%	98.0%	98.0%
Protection			
Residual Current Monitoring	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated
General Data			
Operating Temperature Range (°C)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Operating Environment	Outdoor	Outdoor	Outdoor
Relative Humidity	0~95%	0~95%	0~95%
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Natural convection	Natural convection	Natural convection
User Interface	LED, WLAN+APP	LED, WLAN+APP	LED, WLAN+APP
Communication with BMS	CAN	CAN	CAN
Communication	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	16.9	16.9	16.9
Dimension (W×H×D mm)	800*300*270	800*300*270	800*300*270
Noise Emission (dB)	≤30	≤30	≤30
Topology	Non-isolated	Non-isolated	Non-isolated
Power Self-consumption at Night (W)	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	IV (Outside of the inverter)	IV (Outside of the inverter)	IV (Outside of the inverter)
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

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Decisive Voltage Class (DVC)	Battery: A AC: C Com: A	Battery: A AC: C Com: A	Battery: A AC: C Com: A
Mounting Method	Wall/Floor Mounted	Wall/Floor Mounted	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Country of Manufacture	China	China	China
Certification			
Grid Standard	Please refer to the official website		
Safety Regulation			
EMC			

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Battery Side				
Battery Type	Li-ion	Li-ion	Li-ion	Li-ion
Nominal Voltage (V)	380	380	380	380
Voltage Range (V)	350~550	350~550	350~550	350~550
Start-up Voltage (V)	380	380	380	380
Number of Battery Inputs	1	1	1	1
Max. Continuous Charging Current (A)	15.8	21.1	26.4	26.4
Max. Continuous Discharging Current (A)	17.4	23.2	29	29

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Max. Charging Power (kW)	6	8	9.999	10
Max. Discharging Power (kW)	6.6	8.8	11	11
Short-time withstand current (A)	980	980	980	980
AC Side (On-grid)				
Rated Power (kW)	6	8	9.999 @230V	10
Max. Power (kW)	6	8	9.999 @230V	10
Rated Apparent Power from Grid (kVA)	6	8	9.999 @230V	10
Rated Apparent Power to Grid (kVA)	6	8	9.999 @230V	10
Max. Apparent Power to Grid (kVA)	6	8	9.999 @230V	10
Max. Apparent Power from Grid (kVA)	12	14.5	14.5 @230V	14.5
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE
Voltage Range (V)	170~280	170~280	170~280	170~280
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

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Rated Current From Grid (A)	27.3 @220V 26.1 @230V 25 @240V	36.4 @220V 34.8 @230V 33.4 @240V	45.5 @220V 43.5 @230V 41.7 @240V	45.5 @220V 43.5 @230V 41.7 @240V
Rated Current to Grid (A)	27.3 @220V 26.1 @230V 25 @240V	36.4 @220V 34.8 @230V 33.4 @240V	43.5 @220V 43.5 @230V 41.7 @240V	43.5 @220V 43.5 @230V 41.7 @240V
Max. Current From Grid (A)*1	50 @220V 50 @230V 50 @240V	63 @220V 63 @230V 60.5 @240V	63 @220V 63 @230V 60.5 @240V	63 @220V 63 @230V 60.5 @240V
Max. Current to Grid (A)	27.3 @220V 26.1 @230V 25 @240V	36.4 @220V 34.8 @230V 33.4 @240V	43.5 @220V 43.5 @230V 41.7 @240V	43.5 @220V 43.5 @230V 41.7 @240V
Max. Output Fault Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs	120A@3μs
Inrush Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs	120A@3μs
Power Factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
THDi	<3%	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	96	120	120	120
Short-time withstand current (A)	80	80	80	80
Type of Voltage	a.c.	a.c.	a.c.	a.c.
Back-up Side				
Rated Apparent Power (kVA)	6	8	10 @230V	10

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Max. Apparent Power (kVA)	Off-grid: 6.0 (12.0, 10s) On-grid: 12	Off-grid: 8.0 (16.0, 10s) On-grid: 14.5	Off-grid: 10.0 @230V(20.0 , 10s @230V) On-grid: 14.5 @230V	Off-grid: 10.0 (20.0, 10s) On-grid: 14.5
Nominal Voltage (V)	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE	220/230/240, L/N/PE
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 (A)	27.3 @220V 26.1 @230V 25 @240V	36.4 @220V 34.8 @230V 33.4 @240V	43.5 @220V 43.5 @230V 41.7 @240V	43.5 @220V 43.5 @230V 41.7 @240V
Max. Current (A)	Off-grid: 27.3 @220V 26.1 @230V 25 @240V On-grid: 50	Off-grid: 36.4 @220V 34.8 @230V 33.4 @240V On-grid: 63	Off-grid: 43.5 @220V 43.5 @230V 41.7 @240V On-grid: 63	Off-grid: 43.5 @220V 43.5 @230V 41.7 @240V On-grid: 63
Max. Fault Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs	120A@3μs
Inrush Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs	120A@3μs
Maximum Output Overcurrent Protection (A)	96	120	120	120
THDv (@Linear Load)	<3%	<3%	<3%	<3%

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
On/Off-grid Switching Time (ms)	<10	<10	<10	<10
Efficiency				
Max. Battery to AC Efficiency	98.0%	97.8%	97.8%	97.8%
Protection				
Residual Current Monitoring	Integrated	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated	Integrated
AC Surge Protection	Type II	Type II	Type II	Type II
Remote Shutdown	Integrated	Integrated	Integrated	Integrated
General Data				
Operating Temperature Range (°C)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)
Operating Environment	Outdoor	Outdoor	Outdoor	Outdoor
Relative Humidity	0~95%	0~95%	0~95%	0~95%

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Max. Operating Altitude (m)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)	4000 (>2000 derating)
Cooling Method	Natural convection	Natural convection	Natural convection	Natural convection
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	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth	RS485, WiFi+LAN+Bluetooth
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	16.9	17.7	17.7	17.7
Dimension (W×H×D mm)	800*300*270	800*300*270	800*300*270	800*300*270
Noise Emission (dB)	≤30	≤35	≤35	≤35
Topology	Non-isolated	Non-isolated	Non-isolated	Non-isolated
Power Self-consumption at Night (W)	≤10	≤10	≤10	≤10
Ingress Protection Rating	IP66	IP66	IP66	IP66
AC Connector	VACONN Terminal	VACONN Terminal	VACONN Terminal	VACONN Terminal
Environmental Category	4K4H	4K4H	4K4H	4K4H
Pollution Degree	IV (Outside of the inverter)	IV (Outside of the inverter)	IV (Outside of the inverter)	IV (Outside of the inverter)
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I	I

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20	GW10K-BHA-G20
Storage Temperature (°C)	-40~+70	-40~+70	-40~+70	-40~+70
Decisive Voltage Class (DVC)	Battery: A AC: C Com: A	Battery: A AC: C Com: A	Battery: A AC: C Com: A	Battery: A AC: C 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	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD	SMS(Slip-mode frequency) +AFD
Country of Manufacture	China	China	China	China
Certification				
Grid Standard	Please refer to the official website			
Safety Regulation				
EMC				

*1: 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.

10.2 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

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

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

Technical Data	GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
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	CO2, H2O	
Crucial Material	LiFePO4, C, Cu, LiPF6, Al, (C3H6)n	
Ingress Protection	IP66	
Protective Class	I	
Dimensions (W×H×D mm)	800*326*270	
Function Configuration	Heating (Integrated); Aerosol fire extinguishing (Integrated)	
Storage Temperature (°C)	-20 ~55	

Technical Data		GW6.0-BAT-D-G20	GW9.0-BAT-D-G20
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.

10.3 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
Voltage Range (V)	114~280 (according to local standard)	114~280 (according to local standard)

Technical Data	GW30K-STS-G10	GW60K-STS-G10
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
Rated Conditional Short-circuit Current (kA)	1	1
Smart Port side		

Technical Data	GW30K-STS-G10	GW60K-STS-G10
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
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

Technical Data	GW30K-STS-G10	GW60K-STS-G10
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
Protective Class	I	I
Certification		

Technical Data	GW30K-STS-G10	GW60K-STS-G10
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

10.4 Smart Meter Technical Data

10.4.1 GMK110

Technical Parameters			GMK110
	Application		Single phase
Input Data	Voltage	Nominal Voltage (V)	220
		Voltage Range (V)	85~288
		Nominal Voltage Frequency (Hz)	50/60
	Current	CT Ratio	120A/40mA
		CT Quantity	1
Communication			RS485
Communication Distance (m)			1000
User Interface			2LED
Accuracy	Voltage/Current		Class I
	Active Energy		Class I
	Reactive Energy		Class II
Power Consumption (w)			<5
Mechanical Parameters	Dimension (W×H×D mm)		19*85*67
	Weight (g)		50
	Mounting Method		Rail Installation
Environmental Parameters	Ingress Protection Rating		IP20
	Operating Temperature Range (°C)		-30~ 60
	Storage Temperature Range (°C)		-30~ 60
	Relative Humidity (Non-Condensing)		0~95%
	Max. Operating Altitude (m)		3000

10.4.2 GM330

technical parameter		GM330
Measurement Range	Supported Grid Types	Three-phase, split-phase, single-phase
	Voltage Range L-L (Vac)	172~817
	Voltage Range L-N (Vac)	100~472
	Nominal Frequency (Hz)	50/60
	CT ratio	nA:5A
Communication Parameters	Communication Method	RS485
	Communication Distance (m/ft)	1000/3280
Accuracy Parameters	Voltage/Current	Class 0.5
	Active Energy	Class 0.5
	Reactive Energy	Class 1
General Parameters	Dimensions (WxHxD mm/in)	72x85x72/2.83x3.35x2.83
	Housing	4 modules
	Weight (g/lb)	240/0.53
	Mounting Method	DIN rail
	User Interface	4 LEDs, Reset Button
	Power Consumption (W)	≤5
Environmental Parameters	IP Rating	IP20
	Operating Temperature Range (°C/°F)	-30~+70/-22~+158
	Storage Temperature Range (°C/°F)	-30~70/-22~+158
	Relative Humidity (no condensation)	0~95%
	Max. Operating Altitude (m/ft)	3000/9842
Certification Parameters	Certificates	UL1741/ANSI

10.5 Smart Dongle Technical Data

10.5.1 WiFi/LAN Kit-20

Technical Parameters		WiFi/LAN Kit-20
Output Voltage (V)		5
Power Consumption (W)		<=2
Communication Port		USB
Communication Parameters	Ethernet	10M/100Mbps Self-adaptation
	Wireless	IEEE 802.11 b/g/n @2.4 GHz
	Bluetooth	Bluetooth V4.2 BR/EDR and Bluetooth LE Standard
Mechanical Parameters	Dimension (W×H×D mm)	48.3*159.5*32.1
	Weight (g)	82
	Ingress Protection Rating	IP65
	Mounting Method	USB Port Plugging and Unplugging
Operating Temperature Range (°C)		-30~+60
Storage Temperature Range (°C)		-40~+70
Relative Humidity		0-95%
Max. Operating Altitude (m)		4000

10.5.2 4G Kit-CN-G20

Product Model		4G Kit-CN-G20
Device Management		
Maximum Supported Number of Inverters		1
Power Parameter		
Input Voltage (V)		5
Power Consumption (W)		<=4
Interface Method		USB
Communication Parameters		
4G/3G/2G		LTE-FDD : B1/B3/B5/B8 LTE-TDD : B34/B39/B40/B41
GNSS Location		/
Bluetooth		Bluetooth V5.0
Mechanical Parameters		
Dimension (W×H×D mm)		48.3*95.5*32.1

Product Model	4G Kit-CN-G20
Weight (g)	87
Indicator	LED* 2
Mounting Method	Plug and Play (PnP)
SIM Dimension	Micro sim,15mm*12mm
Environment Parameters	
Operating Temperature Range (°C)	-30~+65
Storage Temperature (°C)	-40~+70
Relative Humidity	0-100%
IP Grade	IP66
Max. Operating Altitude (m)	4000
Safe Service Life (Year)	5

11 Appendix

11.1 FAQ

11.1.1 How to Conduct Auxiliary Detection for Smart Meters/CT?

Meter detection function, which can detect whether the CT of the meter is connected correctly and the current operation status of the meter and CT.

- Approach 1:

1. Access the detection page through **Home > Settings > Electricity Meter/ CT Auxiliary Detection**.
2. Click "Start Detection" and wait for the detection to complete. Then, view the detection results.

- Approach 2:

1. Access the detection  page through **> [System Setup] > [Quick Setting] > [Meter/CT Assisted Test]**.
2. Click "Start Detection" and wait for the detection to complete. Then, view the detection results.

11.1.2 How to Upgrade the Device Version

Through the firmware information, you can view or upgrade the DSP version, ARM version, BMS version, and smart dongle software version of the inverter. Some smart dongles do not support software version upgrade via SolarGo App, and the actual situation shall prevail.

- **Upgrade prompt:**

When the user opens the APP, an upgrade prompt will pop up on the homepage, and the user can choose whether to upgrade or not. If you choose to upgrade, you can complete the upgrade by following the prompts on the interface.

- **Regular upgrade:**

Access the firmware information viewing interface through "Home" > "Settings"

> "Firmware Information"

Click "Check for Updates". If there is a new version, complete the upgrade according to the prompts on the interface.

- **Forced Upgrade:**

The APP will push upgrade information, and users need to upgrade according to the prompts to continue using the app. You can complete the upgrade by following the prompts on the interface.

Inverter Software Version Upgrade

- To connect USB flash drive for local software upgrading.
- Before upgrading the device using a USB flash drive, please contact the after-sales service center to obtain the software upgrade package and upgrade method.

11.2 Explanation of Terms

- **Overvoltage Category Definition**

- **Category I:** applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.
- **Category II:** applies to fixed downstream equipment. For example, appliances, portable tools and other plug-connected equipment; Voltage category III is used if there are special requirements for the reliability and suitability of such equipment.
- **Category III:** applies to fixed downstream equipment, including the main distribution board. For example, switchgear and other equipment in an industrial installation
- **Category IV:** applies to the upstream equipment in the power supply of the distribution device, including measuring instruments and upstream over-current protection devices.

- **Definition of Types of Damp Places**

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

- **Definition of Environmental Category:**
 - **Outdoor Inverter:** The ambient air temperature range is -25 to +60°C, and it is suitable for environments with pollution degree 3.
 - **Indoor Type II Inverter:** The ambient air temperature range is -25 to +40°C, and it is suitable for environments with pollution degree 3.
 - **Indoor Type I Inverter:** The ambient air temperature range is 0 to +40°C, and it is suitable for environments with pollution degree 2.
- **Definition of Pollution Degree Categories:**
 - **Pollution Degree 1:** No pollution or only dry non-conductive pollution.
 - **Pollution Degree 2:** In general, there is only non-conductive pollution, but the transient conductive pollution caused by occasional condensation must be taken into account.
 - **Pollution Degree 3:** There is conductive pollution, or the non-conductive pollution becomes conductive pollution due to condensation.
 - **Pollution Degree 4:** Persistent conductive pollution, such as pollution caused by conductive dust or rain and snow.

11.3 Battery SN Code Meaning

*****2388*****



The 11th-14th digits

LXD10DSC0002

Bits 11-14 of the product SN code are the production time code.

The above picture has a production date of 2023-08-08

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

Month	1~9	10	11	12
Month	1~9	A	B	C

- The 14th digit is the date of production, e.g., the 8th day is indicated by 8; priority is given to the use of numerical representation, e.g., 1~9 indicates the 1st~9th day, A indicates the 10th day, and so on. The letters I and O are not used to avoid confusion. The details are as follows:

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

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

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

11.4 National Safety Standard

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
Europe			
1	IT-CEI 0-21	56	IE-LV-72A
2	IT-CEI 0-16	57	IE-ESB-C&D(< 110kV)
3	DE LV with PV	58	IE-EirGrid-110kV
4	DE LV without PV	59	PT-D
5	DE-MV	60	EE
6	ES-A	61	NO
7	ES-B	62	FI-A
8	ES-C	63	FI-B

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
9	ES-D	64	FI-C
10	ES-island	65	FI-D
11	BE	66	UA-A1
12	FR-LV	67	UA-A2
13	FR-island-50Hz	68	EN 50549-1
14	FR-island-60Hz	69	EN 50549-2
15	type A-PL_V.1.1	70	DK-West-B-MVHV
16	type B-LV-PL_V.1.1	71	DK-East-B-MVHV
17	type C-PL_V.1.1	72	DK-West-C-MVHV
18	type D-PL_V.1.1	73	DK-East-C-MVHV
19	NL-16/20A	74	DK-West-D-MVHV
20	NL-A	75	DK-East-D-MVHV
21	NL-B	76	FR-Reunion
22	NL-C	77	BE-LV (>30kVA)
23	NL-D	78	BE-HV
24	SE-A	79	CH-B
25	SE MV	80	NI-G99-A
26	SK-A	81	NI-G99-B
27	SK-B	82	NI-G99-C
28	SK-C	83	NI-G99-D
29	HU	84	IE-LV-170kVA

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
30	CH-A	85	IE-MV&HV-200kVA
31	CY	86	DE-HV
32	GR	87	FR-MV
33	DK-West-A	88	CZ-A1/A2-09
34	DK-East-A	89	DE-EHV
35	DK-West-B	90	IE-EirGrid-400KV
36	DK-East-B	91	IE-EirGrid-220KV
37	AT < 1kV	92	IE-EirGrid-66KV
38	AT > 1kV	93	IE-ESB-B
39	BG	94	IE-ESB-D(≥ 110 kV)
40	Czech	95	type B-MV-PL_V.1.1
41	CZ-A1-09	96	GB-G99-A HV
42	CZ-A2-09	97	GB-G99-B LV
43	CZ-B1/B2-09	98	GB-G99-C LV
44	CZ-C	99	UA-B
45	CZ-D	100	UA-C
46	RO-A	101	UA-D
47	RO-B	102	UK-G98
48	RO-D	103	UK-G99-A LV
49	GB-G98	104	UK-G99-B LV
50	GB-G99-A LV	105	UK-G99-C LV

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
51	GB-G99-B HV	106	CZ-A1
52	GB-G99-C HV	107	UK-A-MV
53	GB-G99-D	108	UK-B-MV
54	NI-G98	109	UK-C-MV
55	IE-LV-16/25A	-	-
Global			
1	60Hz-Default	6	IEC 61727-60Hz
2	50Hz-Default	7	Warehouse
3	127Vac-60Hz-Default	8	IEC61727-480Vac-60Hz
4	127Vac-50Hz-Default	9	IEC61727-480Vac-50Hz
5	IEC 61727-50Hz		
Americas			
1	Argentina-220V-LV	38	LUMAPR-2024-220Vac-3P
2	US-208Vac	39	LUMAPR-2024-240Vac-3P
3	US-240Vac	40	Cayman
4	Mexico-220Vac	41	Brazil-220Vac
5	Mexico-440Vac	42	Brazil-208Vac
6	US-480Vac	43	Brazil-230Vac
7	US-208Vac-3P	44	Brazil-240Vac
8	US-220Vac-3P	45	Brazil-254Vac
9	US-240Vac-3P	46	Brazil-127Vac
10	US-CA-208Vac	47	Brazil-ONS

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
11	US-CA-240Vac	48	Barbados
12	US-CA-480Vac	49	Chile-BT
13	US-CA-208Vac-3P	50	Chile-MT-A
14	US-CA-220Vac-3P	51	Chile MT-B
15	US-CA-240Vac-3P	52	Colombia
16	US-HI-208Vac	53	Colombia<0.25MW-208Vac-1P
17	US-HI-240Vac	54	Colombia<0.25MW-120Vac-3P
18	US-HI-480Vac	55	IEEE 1547-208Vac
19	US-HI-208Vac-3P	56	IEEE 1547-220Vac
20	US-HI-220Vac-3P	57	IEEE 1547-240Vac
21	US-HI-240Vac-3P	58	IEEE 1547-230Vac
22	US-Kauai-208Vac	59	Colombia<0.25MW-127Vac-3P
23	US-Kauai-240Vac	60	Colombia>5MW
24	US-Kauai-480Vac	61	Mexico-127V
25	US-Kauai-208Vac-3P	62	Mexico-240V
26	US-Kauai-220Vac-3P	63	US-O&R-208Vac
27	US-Kauai-240Vac-3P	64	US-O&R-240Vac
28	US-ISO-NE-208Vac	65	US-O&R-480Vac
29	US-ISO-NE-240Vac	66	US-O&R-208Vac-3P
30	US-ISO-NE-480Vac	67	US-O&R-220Vac-3P
31	US-ISO-NE-208Vac-3P	68	US-O&R-240Vac-3P

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
32	US-ISO-NE-220Vac-3P	69	Brazil-277Vac
33	US-ISO-NE-240Vac-3P	70	Chile-BT ≤9MW
34	LUMAPR-2024-208Vac	71	Chile-MT ≤9MW
35	LUMAPR-2024-240Vac	72	Chile > 9MW
36	LUMAPR-2024-480Vac	73	Mexico-277Vac
37	LUMAPR-2024-208Vac-3P		
Oceania			
1	Australia-A	4	Newzealand
2	Australia-B	5	Newzealand:2015
3	Australia-C	6	NZ-GreenGrid
Asia			
1	China A	33	Israel-MV
2	China B	34	Israel-HV
3	China's higher voltage	35	Vietnam
4	China's Ultra-High Voltage	36	Malaysia-LV
5	China power station	37	Malaysia-MV
6	Shandong, China	38	DEWA-LV
7	China, Hebei	39	DEWA-MV
8	China PCS	40	Saudi Arabia-220V-LV
9	Taiwan	41	JP-690Vac-50Hz
10	Hong Kong	42	JP-690Vac-60Hz
11	Northeast China	43	Srilanka-MV/HV

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
12	Thailand-MEA	44	IEC 61727-127Vac-50Hz
13	Thailand-PEA	45	IEC 61727-127Vac-60Hz
14	Mauritius	46	JP-550Vac-50Hz
15	Korea	47	JP-550Vac-60Hz
16	India	48	India-Higher
17	India-CEA	49	JP-220Vac-50Hz
18	Pakistan	50	JP-220Vac-60Hz
19	Philippines	51	Saudi Arabia-127V-LV
20	Philippines-127Vac	52	Srilanka-LV >1MW
21	JP-200Vac-50Hz	53	China-YN
22	JP-200Vac-60Hz	54	GB/T 29319-LV
23	JP-440Vac-50Hz	55	GB/T 29319-MV
24	JP-440Vac-60Hz	56	Philippines-277Vac
25	JP-420Vac-50Hz	57	JP-360Vac-50Hz
26	JP-420Vac-60Hz	58	JP-360Vac-60Hz
27	JP-480Vac-50Hz	59	JP-320Vac-50Hz
28	JP-480Vac-60Hz	60	JP-320Vac-60Hz
29	Srilanka-LV<1MW	61	JP-340Vac-50Hz
30	Singapore	62	JP-340Vac-60Hz
31	Israel-OG	63	JP-380Vac-50Hz
32	Israel-LV	64	JP-380Vac-60Hz

Serial Number	Safety Regulation Name	Serial Number	Safety Regulation Name
Africa			
1	Mauritius	5	Ghana-LV
2	South Africa-LV	6	Ghana-HV
3	South Africa-B-MV	7	South Africa-A3-LV
4	South Africa-C-MV	8	Nigeria

11.5 Australia Safety Regulations

For the Australian market, to comply with AS/NZS 4777.2:2020, please select from Australia A, Australia B, Australia C, or New Zealand. Please contact your local electricity grid operator on which Region to select.

Selecting a Region B should then automatically load all region B setpoints for volt-watt, volt-var, underfrequency, overfrequency, etc.

Volt-var response set-point values

Region	Default value	U1	U2	U3	U4
Australia A	Voltage	207V	220V	240V	258V
	Inverter reactive power level (Q) % of S_{rated}	44 % supplying	0%	0%	60 % absorbing
Australia B	Voltage	205V	220V	235V	255V
	Inverter reactive power level (Q) % of S_{rated}	30 % supplying	0%	0%	40 % absorbing
Australia C	Voltage	215V	230V	240V	255V

Region	Default value	U1	U2	U3	U4
	Inverter reactive power level (Q) % of S_{rated}	44 % supplying	0%	0%	60 % absorbing
New Zealand	Voltage	207V	220V	235V	244 V
	Inverter reactive power level (Q) % of S_{rated}	60 % supplying	0%	0%	60 % absorbing
Allowed range	Voltage	180 to 230 V	180 to 230 V	230 to 265 V	230 to 265 V
	Inverter reactive power level (Q) % of S_{rated}	30 to 60 % supplying	0%	0%	30 to 60 % absorbing

NOTE 1: Inverters may operate at a reactive power level with a range up to 100 % supplying or absorbing.

NOTE 2: Australia C parameter set is intended for application in isolated or remote power systems.

Volt-watt response default set-point values

Region	Default value	U3	U4
Australia A	Voltage	253V	260V
	Inverter maximum active power output level (P) % of S_{rated}	100%	20%
Australia B	Voltage	250V	260V
	Inverter maximum active power output level (P) % of S_{rated}	100%	20%
Australia C	Voltage	253V	260V

Region	Default value	U3	U4
	Inverter maximum active power output level (P) % of S_{rated}	100%	20%
New Zealand	Voltage	242 V	250V
	Inverter maximum active power output level (P) % of S_{rated}	100%	20%
Allowed range	Voltage	235 to 255 V	240 to 265 V
	Inverter maximum active power output level (P) % of S_{rated}	100%	20%

NOTE: Australia C parameter set is intended for application in isolated or remote power systems.

Passive anti-islanding voltage limit values

Protective function	Protective function limit	Trip delay time	Maximum disconnection time
Undervoltage 2 (V < <)	70 V	1 s	2 s
Undervoltage 1 (V <)	180 V	10 s	11 s
Overvoltage 1 (V >)	265 V	1 s	2 s
Overvoltage 2 (V > >)	275V	-	0.2 s

Upper connection and reconnection frequency (f_{URF})

Region	f_{URF}
Australia A	50.15 Hz

Australia B	50.15 Hz
Australia C	50.50 Hz
New Zealand	50.15 Hz

Setting steps:

Step 1: Set the safety code to Australia A/B/C/New Zealand on Quick Settigs page based on actual needs.

Step 2: Set the frequency parameters accordingly.

<

Grid Code
(Safety Code)

Save

Europe

Australia

Oceania

America

Asia

Africa

Others

Australia A

Australia A_1

Australia B

Australia C

Australia D

New Zealand

Others

<

Connection Parameters

Ramp Up:

Upper Voltage

110.4

110.4

✓

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✓

Range[15,100]%Vn

Upper Frequency

50.15

50.15

✓

Range[50,65]Hz

Lower Frequency

47.50

47.50

✓

Range[45,60]Hz

Observation Time

60

60

✓

Range[30,30000]s

Soft Ramp Up Gradient

16.7

16.7

✓

Range[0,60000]%Pn/min

Reconnection:

Upper Voltage

110.4

110.4

✓

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✓

Range[15,100]%Vn

Upper Frequency

50.15

50.15

✓

Range[50,65]Hz

Lower Frequency

47.50

47.50

✓

Range[45,60]Hz

Observation Time

60

60

✓

Range[30,30000]s

Reconnection Gradient

16.7

16.7

✓

Range[0,60000]%Pn/min

SLG00CON0144

<

Grid Code
(Safety Code)

Save

Europe

Australia

▼

Oceania

Australia A

○

America

Australia A_1

○

Asia

Australia B

✔

Africa

Australia C

○

Others

Australia D

○

New Zealand

>

Others

>

<

Connection Parameters

Ramp Up:

Upper Voltage

110.4

110.4

✔

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✔

Range[15,100]%Vn

Upper Frequency

50.15

50.15

✔

Range[50,65]Hz

Lower Frequency

47.50

47.50

✔

Range[45,60]Hz

Observation Time

60

60

✔

Range[30,30000]s

Soft Ramp Up Gradient

✔

Soft Ramp Up Gradient

16.7

16.7

✔

Range[0,6000]%Pn/min

Reconnection:

Upper Voltage

110.4

110.4

✔

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✔

Range[15,100]%Vn

Upper Frequency

50.15

50.15

✔

Range[50,65]Hz

Lower Frequency

47.50

47.50

✔

Range[45,60]Hz

Observation Time

60

60

✔

Range[30,30000]s

Reconnection Gradient

✔

Reconnection Gradient

16.7

16.7

✔

Range[0,6000]%Pn/min

SLG00CON0146

<

Grid Code
(Safety Code)

Save

Europe

Australia

▼

Oceania

Australia A

○

America

Australia A_1

○

Asia

Australia B

○

Africa

Australia C

✔

Others

Australia D

○

New Zealand

>

Others

>

<

Connection Parameters

Ramp Up:

Upper Voltage

110.4

110.4

✔

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✔

Range[15,100]%Vn

Upper Frequency

50.50

50.50

✔

Range[50,65]Hz

Lower Frequency

47.50

47.50

✔

Range[45,60]Hz

Observation Time

60

60

✔

Range[30,30000]s

Soft Ramp Up Gradient

✔

Soft Ramp Up Gradient

16.7

16.7

✔

Range[0,6000]%Pn/min

Reconnection:

Upper Voltage

110.4

110.4

✔

Range[80,140]%Vn

Lower Voltage

85.2

85.2

✔

Range[15,100]%Vn

Upper Frequency

50.50

50.50

✔

Range[50,65]Hz

Lower Frequency

47.50

47.50

✔

Range[45,60]Hz

Observation Time

60

60

✔

Range[30,30000]s

Reconnection Gradient

✔

Reconnection Gradient

16.7

16.7

✔

Range[0,6000]%Pn/min

SLG00CON0145

Contact Information

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