V1.6 2026-04-29

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

Solutions Manual

GOODWE

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Copyright Statement

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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

Overview

The energy storage system consists of inverter, battery system, and smart meter. This manual describes the product information, installation, electrical connection, commissioning, troubleshooting and maintenance of the system. Read through this manual before installing and operating the products to understand product safety information and familiarize yourself with functions and features of the product. This manual is subject to update without notice. For more product details and latest documents, visit https://en.goodwe.com/.

Applicable Model

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	Nominal output power: 3kW-10kW
	GW5.1-BAT-D-G20	Rated energy 5.12kWh

Product Type	Product Information	Description
Battery system	GW5.1-BAT-D-G21	
	GW8.3-BAT-D-G20	Rated energy 8.32kWh
	GW8.3-BAT-D-G21	
Meter	GMK110	Monitoring module in the energy storage system, capable of detecting operating voltage, current, and other information.
	GM330	
smart dongle	WiFi/LAN Kit-20	Can upload system operation information to the monitoring platform via WiFi or LAN signals.
	4G Kit-CN-G20 (China only)	Can upload system operation information 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

DANGER

- Disconnect the upstream switches to power off the equipment before any electrical connections. Do not work with power on. Otherwise, an electric shock may occur.
- Install a breaker at the voltage input side of the equipment to prevent personal injury or equipment damage caused by energized electrical work.
- All operations such as transportation, storage, installation, use and maintenance shall comply with applicable laws, regulations, standards and specifications.
- Perform electrical connections in compliance with local laws, regulations, standards and specifications, including cables and component specifications.
- Use the connectors included in the package to connect cables. The manufacturer shall not be liable for the equipment damage if connectors of other models are used.
- Ensure all cables are connected correctly, tightly, and securely. Inappropriate wiring may cause poor connection and damage the equipment.
- The PE cables must be connected and secured properly.
- 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.
- 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.
- Keep the equipment stable to avoid dumping, which can result in equipment damage and personal injuries.

⚠WARNING

- Do not apply mechanical load to terminals, otherwise the terminals may be damaged.
- If the cable bears too much tension, the connection may be poor. Reserve a certain length of the cable before connecting it to corresponding ports.
- Tie the cables of the same type together, and place cables of different types at least 30mm apart. Do not place the cables entangled or crossed.
- Place the cables at least 30mm away from the heating components or heat sources, otherwise the insulation layer of the cables may be aging or broken due to high temperature.

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=maximum input voltage (V)/ 30mA).
- 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 ℃, 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.

⚠WARNING

- 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℃. 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 exceed 265V, the meter may be damage 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 Overview

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

⚠WARNING

- The energy storage system is not suitable for connecting devices that rely on a stable power supply, such as life-supporting medical equipment. Ensure that a system power failure does not cause personal injury.
- If the residential storage inverter is in a high-temperature environment or under BMS current limiting, the battery charging power may be restricted, potentially causing system overvoltage and triggering overvoltage protection.
- In microgrid scenarios, it is recommended that the PV open-circuit voltage for the residential storage inverter be <500V to avoid system overvoltage triggering overvoltage protection under harsh operating conditions.
- In microgrid scenarios, ensure the over-frequency power reduction point of the grid-tied inverter matches that of the residential storage inverter.
- If output power limitation is required for the grid-tied inverter, please connect it separately to a meter or CT device.
- Ensure the over-frequency power reduction curve of the grid-tied inverter is set as follows:
  - Set the endpoint power to 0% Pn
  - Set the response delay time to 0, and disable the hysteresis function
- In a system where the inverter operates completely off-grid, if the battery experiences prolonged low sunlight or rainy weather and cannot be replenished in time, it may lead to over-discharge, causing battery performance degradation or damage. To ensure long-term stable system operation, avoid completely draining the battery. Recommended measures are as follows:
  1. During off-grid operation, set a minimum SOC protection threshold. It is

recommended to set the off-grid battery SOC lower limit to 30%.
2. When the SOC approaches the protection threshold, the system will automatically enter load limiting or protection mode.
3. If there are multiple consecutive days of insufficient sunlight and the battery SOC is too low, promptly replenish the battery using an external energy source (e.g., a generator or grid-assisted charging).
4. Regularly check the battery status to ensure it remains within a safe operating range.
5. It is recommended to perform a full charge and discharge cycle on the battery every six months to calibrate SOC accuracy.

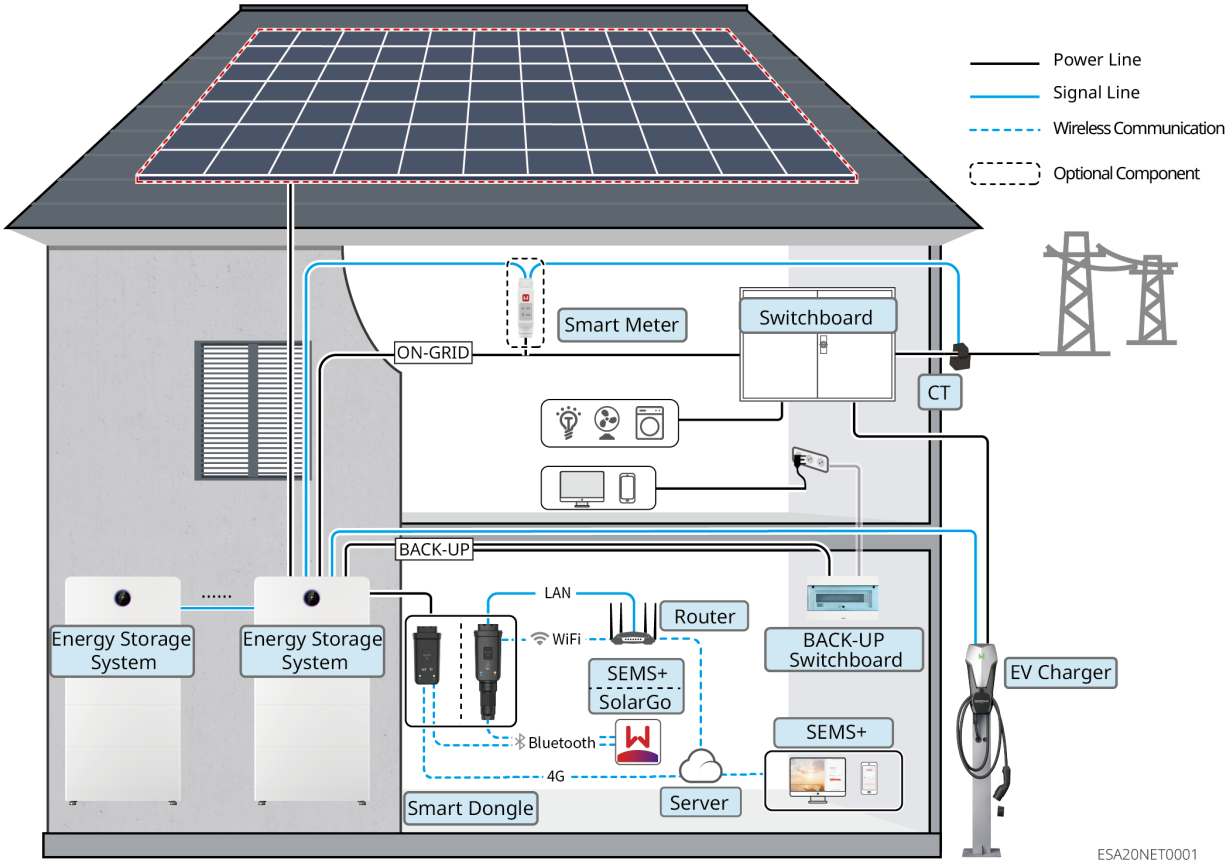
- Due to product version upgrades or other reasons, document content is updated periodically. For the compatibility relationship between inverters and IoT products, please refer to: https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_Compatibility-list-of-GoodWe-inverters-and-IoT-products-EN.pdf
- For detailed networking and wiring schemes for various scenarios, please refer to: 5.2.Detailed System Wiring Diagram(Page 84).

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

Off-grid Load Capacity Specification	
Inverter Model	ESA 3-10kW
Single Inductive Load Rated Power (kVA)	0.3*Pn
Total Inductive Load Rated Power (kVA)	0.3*Pn
Pure Capacitive Load (kVA)	0.33*Pn

Off-grid Load Capacity Specification
Note: • Pn: Inverter rated output power. • If the total power of multiple inductive loads calculated based on the rated power is less than the single inductive load rated power, then the total rated power of multiple inductive loads = the single inductive load rated power. • If inductive loads are to be used, it is recommended to use them in conjunction with a frequency converter. • For 2 or more units in parallel, the allowed total inductive load rated power = single inductive load rated power * number of parallel units * 80%.

General Scenario



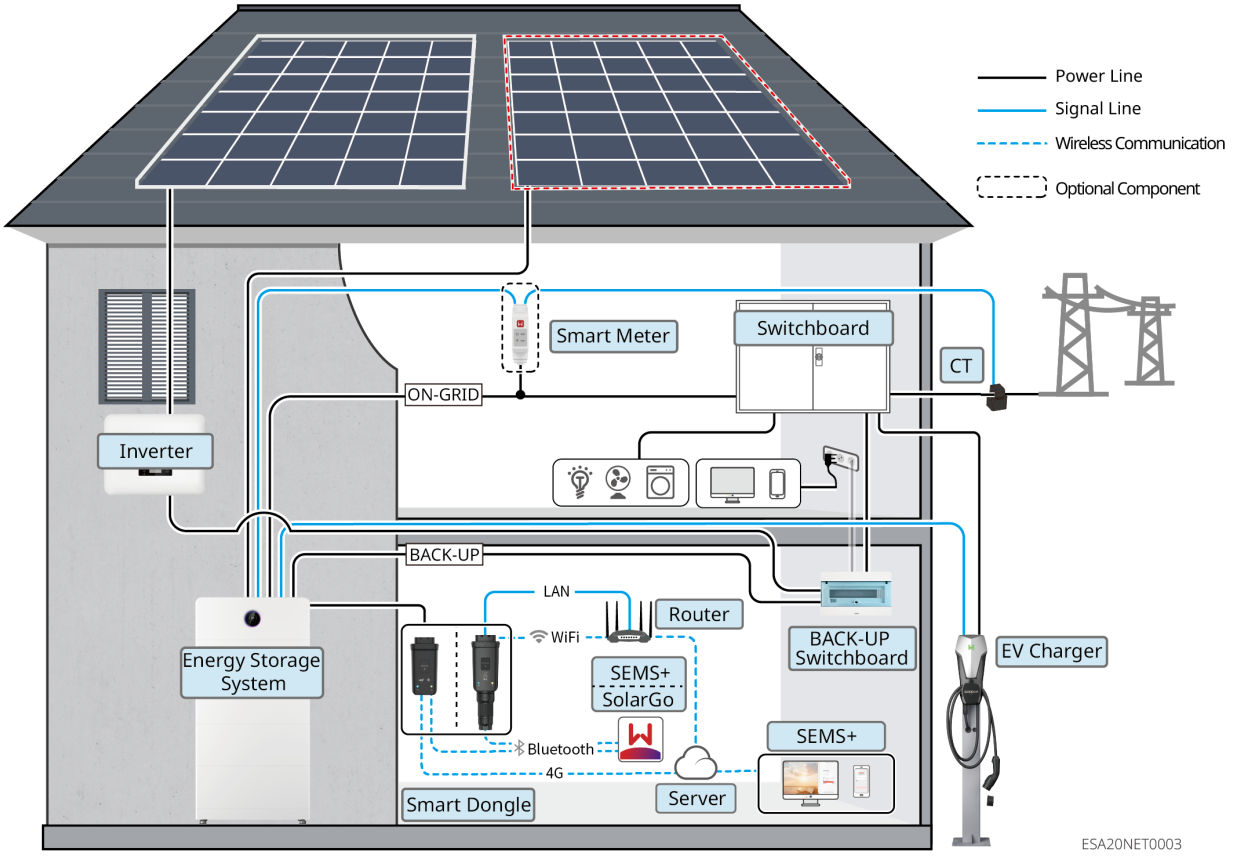
Device type	model	Description
hybrid inverter	GW3K-EHA-G20	• Can be connected to GoodWe AC charging pile. • Only supports generator control and generator charging the battery in single-unit scenarios. • The system supports up to 10 inverters to form a parallel system, supporting hybrid parallel connection of inverters with different power ratings in grid-tied and off-grid modes. • In a parallel system, if GW3K/3.6K/5K/6K models are mixed with GW8K/9.999K/10K models, please set the GW8K/9.999K/10K models as the master inverter. • If you need to connect a generator or set up a parallel network, please use the GMK110 or GM330 Smart Meter. If the number of parallel units exceeds two inverters, please use the GM330 Smart Meter. • In a parallel system, each inverter must be installed with a WiFi/LAN Kit-20, and the software version must be V2.5 or above. • When setting up the system network, meet the following version requirements: ◦ Inverter ARM software version must be 02.99 or above. ◦ Inverter DSP software version must be 03.3010 or above.
	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	
Battery system	GW5.1-BAT-D-G20	
	GW5.1-BAT-D-G21	
	GW8.3-BAT-D-G20	

Device type	model	Description
	GW8.3-BAT-D-G21	• Battery modules of different models support mixed use. • The system supports 5-96kWh, meeting the use of different power and energy matching. • When mixing GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating environment temperature requirements are based on GW5.1-BAT-D-G21, GW8.3-BAT-D-G21.
Smart Meter	Built-in meter (shipped with the inverter)	• Built-in meter: Please use the CT shipped with the box to connect to the inverter. ◦ CT ratio is 120A:40mA. ◦ If the built-in meter of the inverter does not meet the requirements, you can contact the dealer to purchase the GMK110 or GM330 Smart Meter. • GMK110: CT cannot be replaced, CT ratio is 120A:40mA • GM330: CT can be purchased from GoodWe or separately, CT ratio is nA:5A. • If the inverter needs to be connected to a generator, please use the GMK110 or GM330 Smart Meter.
	GMK110 (purchased from GoodWe)	
	GM330 (purchased from GoodWe)	

Device type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Applicable to inverter single-unit networking and parallel networking scenarios. • Configure device parameters and view device operation information locally via Bluetooth signal, and upload system operation information to the monitoring platform via WiFi or LAN. • If the inverter needs to use functions such as one-click upgrade and operation log export, ensure that the WiFi/LAN Kit-20 software version is V2.3 or above.
	4G Kit-CN-G20 (China only)	• Only applicable to inverter single-unit networking scenarios. • Configure device parameters and view device operation information locally via Bluetooth signal, and upload system operation information to the monitoring platform via 4G. • If the inverter needs to use functions such as one-click upgrade and operation log export, ensure that the 4G Kit-CN-G20 version is version 05 or above.

Microgrid Scenario

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



Device Type	model	Description
hybrid inverter	GW3K-EHA-G20	• In a microgrid scenario, only one hybrid inverter is supported in the system. • In a microgrid scenario, connection of a generator is not supported. • The following version requirements must be met when networking the system: ◦ The Inverter ARM software version is 02.99 or above. ◦ The Inverter DSP software version is 03.3010 or above.
	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	

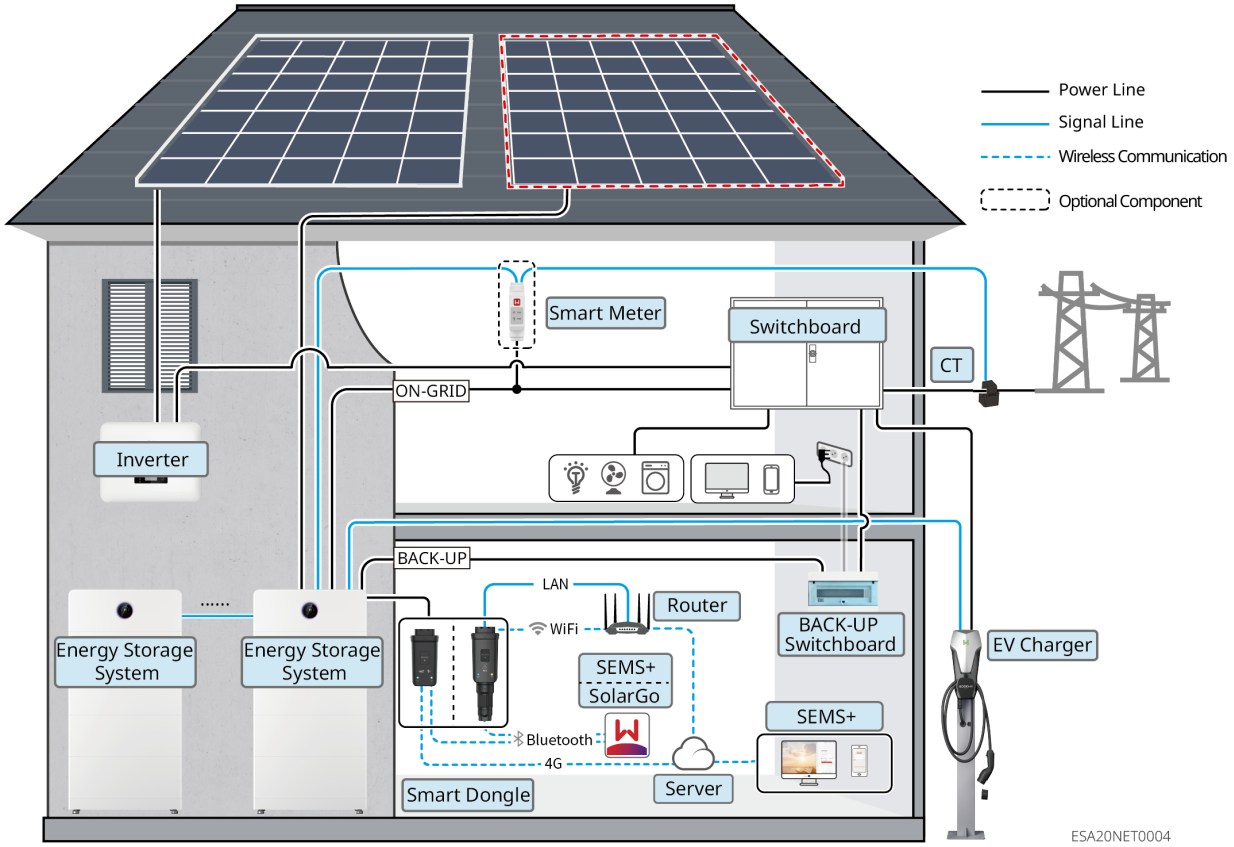
Device Type	model	Description
	GW6K-BHA-G20	
	GW8K-BHA-G20	
	GW9.999K-BHA-G20	
	GW10K-BHA-G20	
Battery system	GW5.1-BAT-D-G20	• Battery modules of different models can be mixed. • The system supports 5-96kWh to meet different power and energy matching requirements. • When GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 are mixed with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating ambient temperature requirement shall follow that of GW5.1-BAT-D-G21, GW8.3-BAT-D-G21.
	GW5.1-BAT-D-G21	
	GW8.3-BAT-D-G20	
	GW8.3-BAT-D-G21	
Smart Meter	Built-in meter (shipped with the Inverter)	• Built-in meter: Please use the CT shipped with the box to connect to the Inverter. ◦ CT ratio is 120A:40mA ◦ If the built-in meter of the Inverter does not meet the requirements, you can contact the dealer to purchase a GMK110 or GM330 Smart Meter. • GMK110: CT is not replaceable, CT ratio is 120A:40mA • GM330: CT can be purchased from GoodWe or separately, CT ratio is nA:5A
	GMK110 (purchased from GoodWe)	
	GM330 (purchased from GoodWe)	

Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Applicable to single Inverter and multiple Inverter networking scenarios. • Uses Bluetooth signal for local configuration of device parameters and viewing device operation information; uses WiFi or LAN to upload system operation information to the monitoring platform. • To use functions such as one-click upgrade and operation log export for the Inverter, ensure the WiFi/LAN Kit-20 software version is V2.3 or above.
	4G Kit-CN-G20 (China only)	• Applicable only to single Inverter networking scenarios. • Uses Bluetooth signal for local configuration of device parameters and viewing device operation information; uses 4G to upload system operation information to the monitoring platform. • To use functions such as one-click upgrade and operation log export for the Inverter, ensure the 4G Kit-CN-G20 version is 05 or above.

Device Type	model	Description
grid-tied PV inverter	-	• GoodWe brand grid-tied PV inverters are recommended; third-party grid-tied PV inverters are supported. • In a microgrid scenario, ensure the rated output power of the grid-tied PV inverter ≤ the rated output power of the hybrid inverter. • When the microgrid system is in grid-connected state, if power limitation is required, ensure that: ◦ The hybrid inverter must be configured via the App's grid-connected power limitation interface; configure the grid-tied PV inverter according to the actual tool used. ◦ To ensure the grid-tied PV inverter can continue generating power, adjust the output power of the hybrid inverter via the App's microgrid mode interface. Note: The output power control accuracy varies among different grid-tied PV inverters; please set the grid-connected power limitation parameter value according to the actual situation.

Coupled Scenario

When the grid-tied inverter is connected to the ON-GRID port of the energy storage inverter, it is a Coupled Scenario.



Device Type	model	Description
hybrid 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	

Device Type	model	Description
	GW6K-BHA-G20	• Generator control is only supported in standalone scenarios, where the generator charges the battery. • The system supports up to 10 inverters forming a parallel system, allowing hybrid inverters of different power ratings to be connected in parallel for on-grid/off-grid operation. • In a parallel system, when GW3K/3.6K/5K/6K models are mixed with GW8K/9.999K/10K models, please set the GW8K/9.999K/10K model as the master inverter. • If connecting a generator or forming a parallel network, please use the GMK110 or GM330 Smart Meter. If the number of parallel inverters exceeds two, please use the GM330 Smart Meter. • In a parallel system, each inverter must be equipped with a WiFi/LAN Kit-20, with software version V2.5 or above required. • The following version requirements must be met for system networking: ◦ Inverter ARM software version is 02.99 or above. ◦ Inverter DSP software version is 03.3010 or above.
	GW8K-BHA-G20	
	GW9.999K-BHA-G20	
	GW10K-BHA-G20	
Battery system	GW5.1-BAT-D-G20	
	GW5.1-BAT-D-G21	
	GW8.3-BAT-D-G20	

Device Type	model	Description
	GW8.3-BAT-D-G21	• Battery modules of different models can be mixed and used together. • The system supports 5-96kWh, meeting the usage requirements for different power and energy matching. • When GW5.1-BAT-D-G20, GW8.3-BAT-D-G20 are mixed with GW5.1-BAT-D-G21, GW8.3-BAT-D-G21, the operating environment temperature requirement shall follow that of GW5.1-BAT-D-G21, GW8.3-BAT-D-G21.
Smart Meter	Built-in meter (shipped with the inverter)	• Built-in meter: Please use the CT shipped with the inverter to connect to the inverter. ◦ CT ratio is 120A:40mA. ◦ If the built-in meter of the inverter does not meet the usage requirements, you can contact the dealer to purchase a GMK110 or GM330 Smart Meter. • GMK110: CT cannot be replaced; CT ratio is 120A:40mA. • GM330: CT can be purchased from GoodWe or independently; CT ratio is nA:5A. • If the inverter needs to connect to a generator, please use the GMK110 or GM330 Smart Meter.
	GMK110 (purchased from GoodWe)	
	GM330 (purchased from GoodWe)	

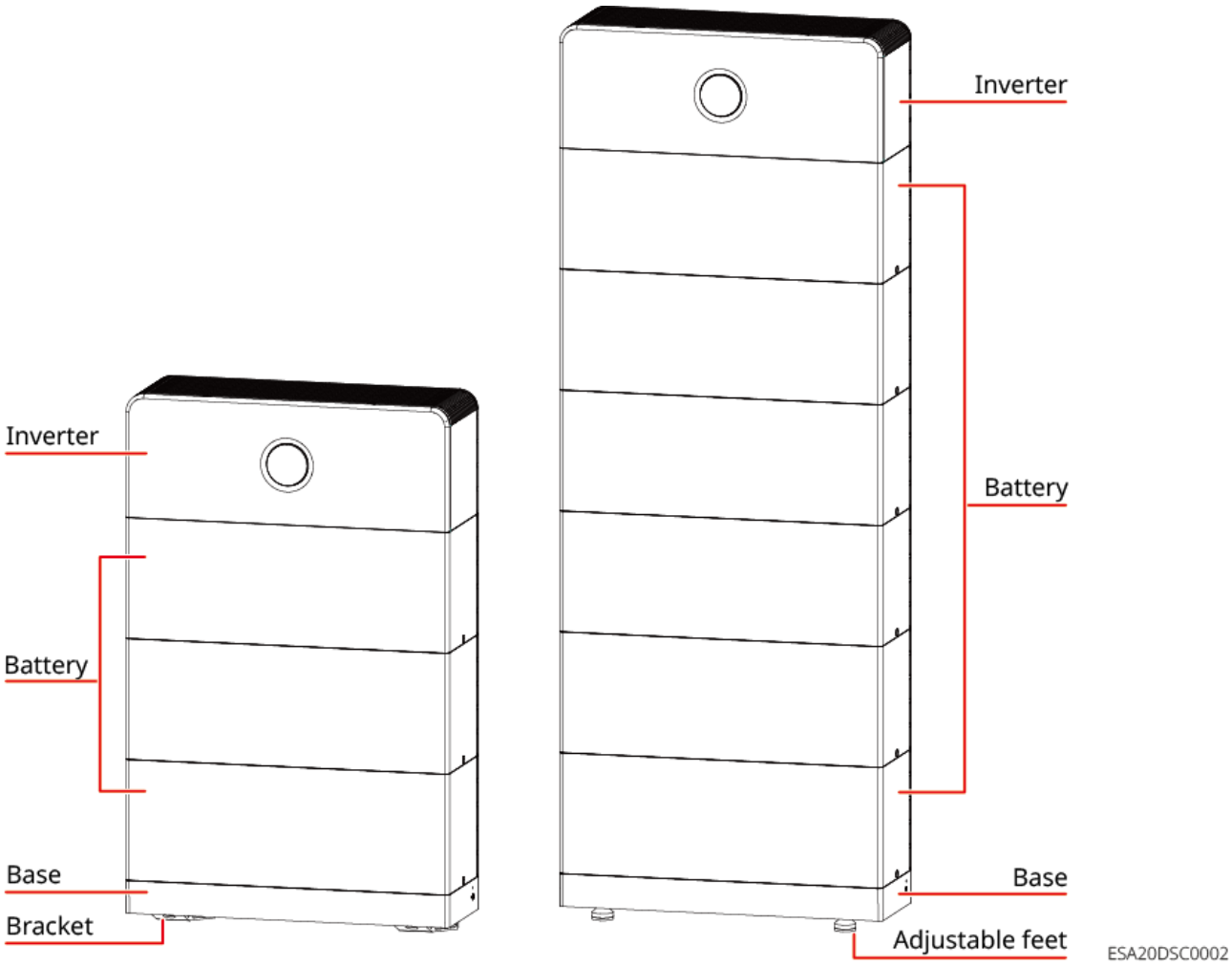
Device Type	model	Description
Smart dongle	WiFi/LAN Kit-20	• Suitable for both single inverter and parallel inverter networking scenarios. • Enables local configuration of device parameters and viewing of device operation information via Bluetooth signal, and uploads system operation information to the monitoring platform via WiFi or LAN. • To use functions like one-click upgrade and operation log export on the inverter, please ensure the WiFi/LAN Kit-20 software version is V2.3 or above.
	4G Kit-CN-G20 (China only)	• Only suitable for single inverter networking scenarios. • Enables local configuration of device parameters and viewing of device operation information via Bluetooth signal, and uploads system operation information to the monitoring platform via 4G. • To use functions like one-click upgrade and operation log export on the inverter, please ensure the 4G Kit-CN-G20 version is version 05 or above.

Device Type	model	Description
grid-tied PV inverter	-	• GoodWe brand grid-tied PV inverters are recommended, and third-party grid-tied PV inverters are also supported. • In a coupling scenario, please ensure the rated output power of the grid-tied PV inverter ≤ the rated output power of the hybrid inverter. • When the coupling system is grid-connected, if power limitation is required, please ensure: the hybrid inverter must be configured via the grid-connected power limitation interface in the App, and the grid-tied PV inverter should be configured according to the actual tool used. Note: The output power control accuracy varies among different grid-tied PV inverters. Please set the grid-connected power limitation parameter value according to the actual situation.

2.2 Product Overview

2.2.1 Residential Single-Phase All-in-One Unit

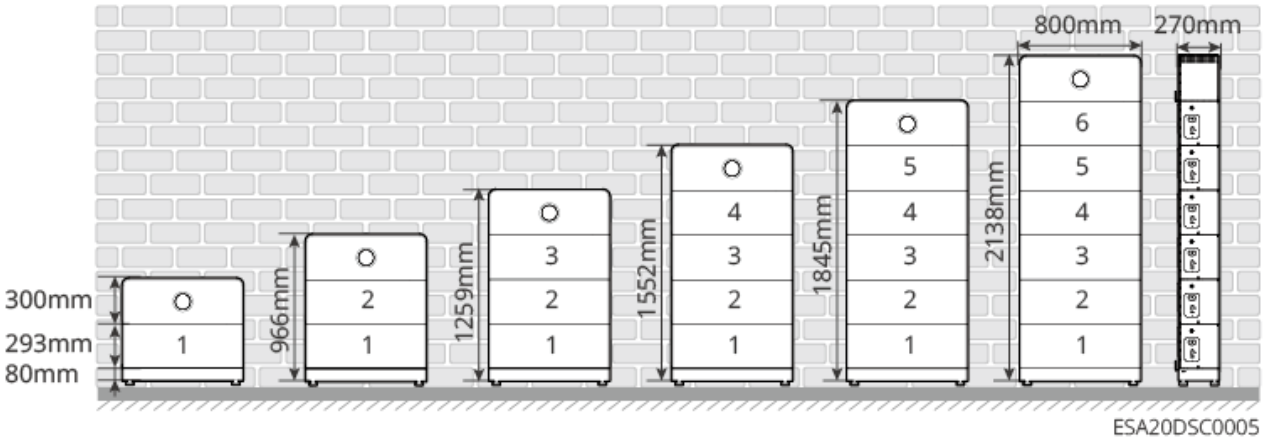
Residential Single-Phase All-in-One Unit:
The Residential Single-Phase All-in-One Unit integrates the Battery and Inverter through modular design, adopting a blind plug stacking connection method.



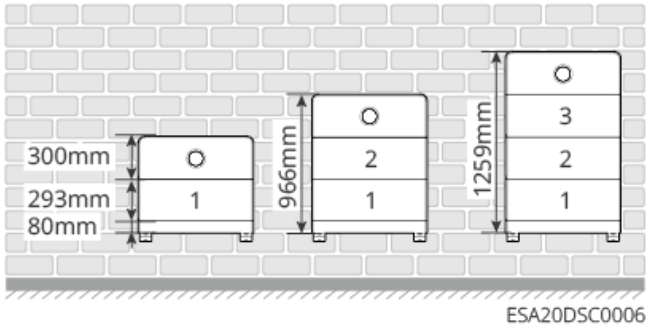
The energy storage system supports Battery capacity expansion. The total Battery capacity is determined by the number and specifications of Battery modules. Configuration must strictly adhere to the limitations specified in this section. Overall system configuration description:
A: GW5.1-BAT-D-G20, GW5.1-BAT-D-G21
B: GW8.3-BAT-D-G20, GW8.3-BAT-D-G21

Mounting Method	Expansion Groups	Single Group Stacking	Total Batteries
Floor Installation	≤3 groups	≤6 pieces	≤12 pieces
Wall-mounted Installation (**A**)	≤3 groups	≤3 pieces	≤9 pieces
Wall-mounted Installation(**A/B/A+B**)	≤3 groups	≤2 pieces	≤6 pieces
Note: Expansion Groups × Single Group Stacking Quantity ≤ Total System Batteries			

Floor Installation

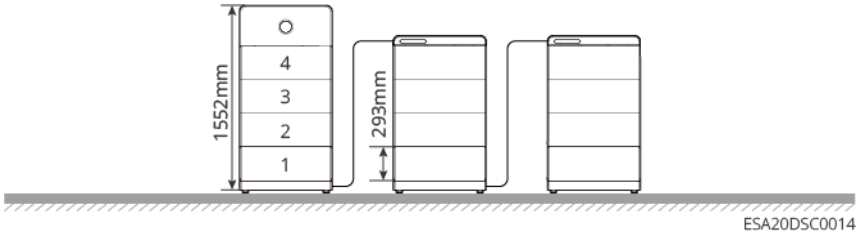


Wall-mounted Installation

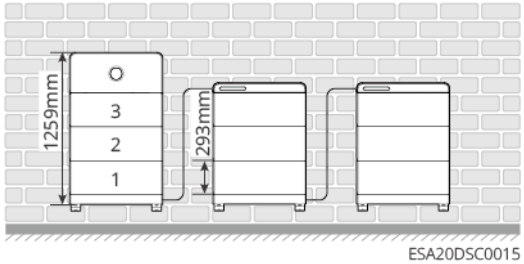


Cluster Expansion Installation

Floor Installation



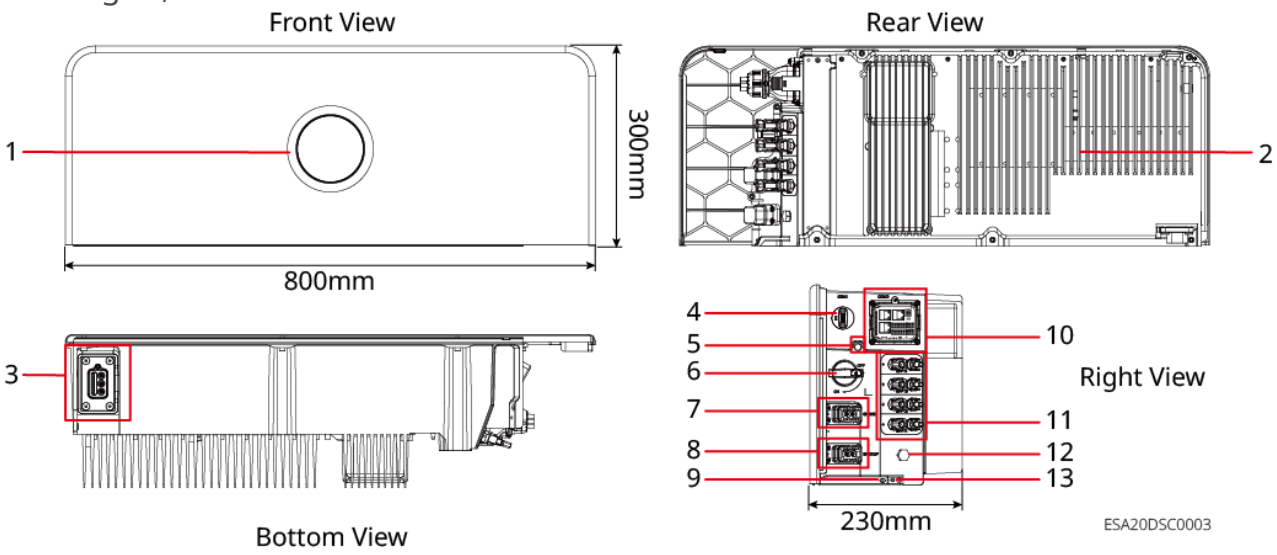
Wall-mounted Installation



Inverter:

The Inverter controls and optimizes the energy flow in the photovoltaic system through the integrated Energy Management System. It can supply the electricity generated in the photovoltaic system to the load, store it in the Battery, or output it

to the grid, etc.

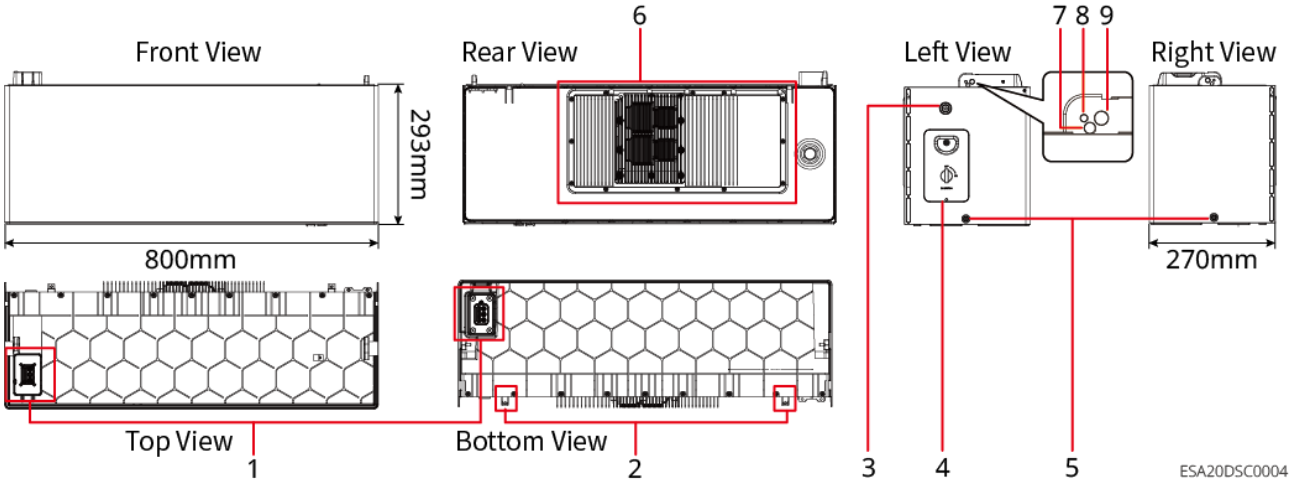


No.	Component/Silk Screen	Description
1	indicator	Indicates the working status of the inverter.
2	heat sink	For inverter heat dissipation.
3	Connector	Power and Communication Port for connecting the inverter to the battery.
4	Smart communication stick connection port	• Can connect to smart communication sticks, such as WiFi/LAN Kit-20 and 4G Kit-CN-G20. Please select the module type according to actual needs. • Supports connecting a USB flash drive for local inverter software version upgrades.
5	Carrying handle mounting hole	Used for installing the carrying handle. Used when moving the inverter.
6	DC Switch	Only for EHA models. BHA models do not have a DC Switch. Controls the connection or disconnection of the DC input.
7	ON-GRID port	Connect AC cables to connect the inverter to the grid.

No.	Component/Silk Screen	Description
8	BACK-UP port	Connect AC cables to connect to critical loads or grid-tied inverters.
9	Battery fixing hole	Secures the inverter and the battery.
10	Communication Port	Can connect communication cables for load control, CT, RS485, Remote Shutdown/Rapid Shutdown, DRED (Australia)/RCR (Europe), etc.
11	PV input terminal	Only for EHA models. BHA models do not have PV input terminals. Can connect PV module DC input cables. The number of PV input terminals is as follows: • 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	Ventilation valve	-
13	Grounding terminal	Connect the chassis protective ground wire.

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.

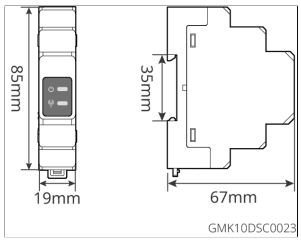
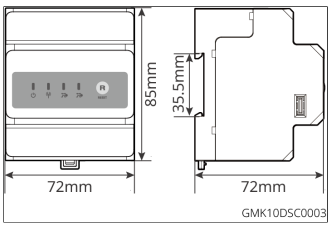
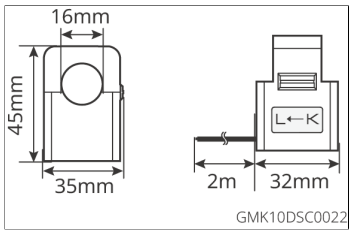


No.	Component	Description
1	Connector	Power and Communication Port for connecting the battery to the battery, and the battery to the inverter.
2	Anti-tip bracket fixing hole	Used for fixing the battery to the wall.
3	Multi-function button indicator light	• Indicates the battery operating status. • Battery black start function: When there is no PV power generation in the photovoltaic system and the grid is abnormal, the inverter cannot operate normally. In this case, press and hold the multi-function button for 2 seconds to start the battery system, activate the inverter, causing the inverter to enter off-grid mode, and the battery discharges to power the load. • Battery power-off function: Press and hold the multi-function button for >5 seconds to power off the battery system.
4	Battery isolation switch	Battery power input/output switch.
5	Inter-battery fixing hole	Used for fixing between two batteries.
6	heat sink	Battery cooling

No.	Component	Description
7	Battery lifting hole	Used for hoisting the battery. When stacking more than three batteries, hoisting tools must be used for installation.
8	Battery or inverter fixing hole	Used for fixing between batteries or between the inverter and the battery.
9	Carrying bar installation hole	Used for installing the carrying bar. Used for manual battery handling.

2.2.2 Smart Meter

The smart meter can measure and monitor the data in the photovoltaic energy storage system, such as voltage, current, frequency, power factor, and power, etc.

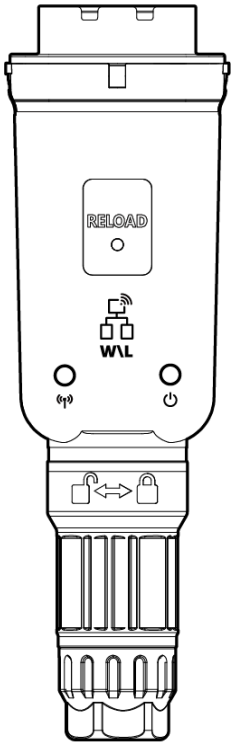
GMK110	GM330	CT
		

No.	Model	Applicable scenarios
1	GMK110	It is not supported to change the CT to other type, CT ratio: 120A: 40mA
2	GM330	Supports purchasing from GOODWE or third-party, CT ratio requirement: nA: 5A • nA: CT Primary side input current, the range of n is 200-5000 • 5A: CT Secondary side output voltage.

2.2.3 smart dongle

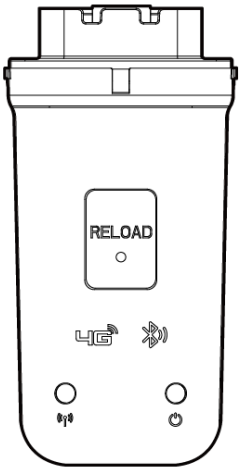
The smart dongle is mainly used for real-time transmission of various power generation data from the inverter to the remote monitoring platform, and for connecting via App to the smart dongle for local device debugging.

WiFi/LAN Kit-20



Smart dongle 0006

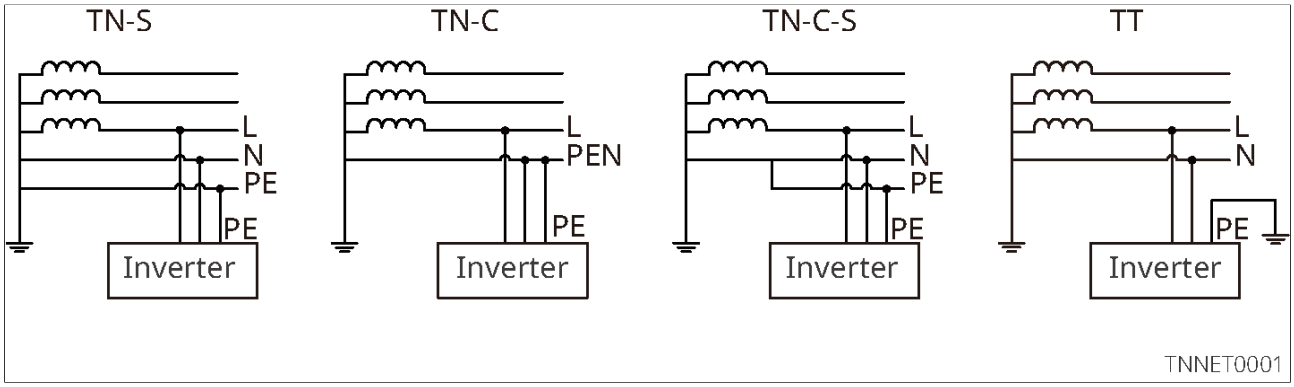
4G Kit-CN-G20



Smart dongle 0010

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

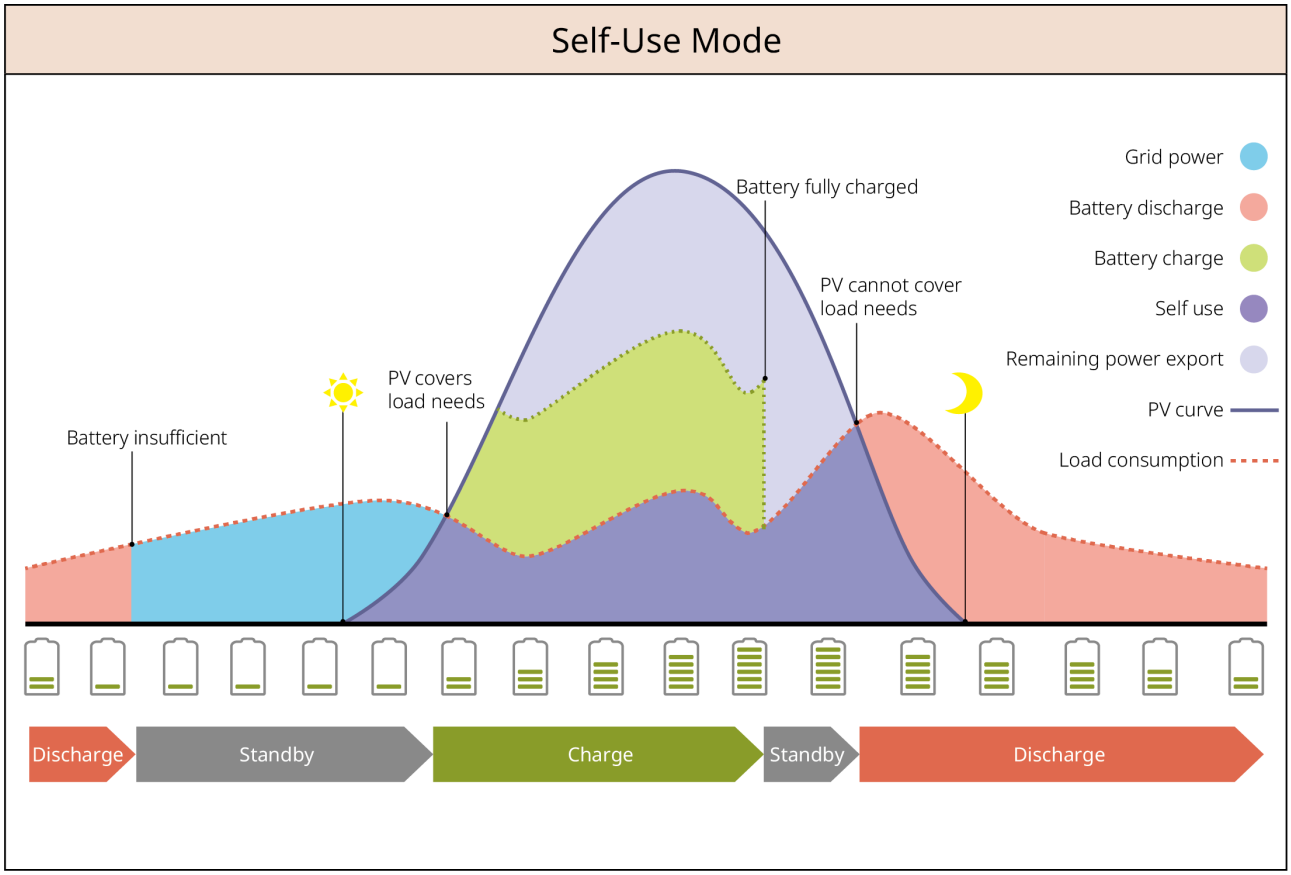
2.3 Supported Grid Types



2.4 System Working Mode

Self-use Mode

- Self-use mode is the basic working mode of the system.
- The power generated by the PV system supply the loads in priority; the excess power will charge the batteries, and then the remaining power will be sold to the utility grid. When the power generated in the PV system is insufficient, the battery will supply the loads in priority. If the battery power is insufficient, the load will be powered by the utility grid.



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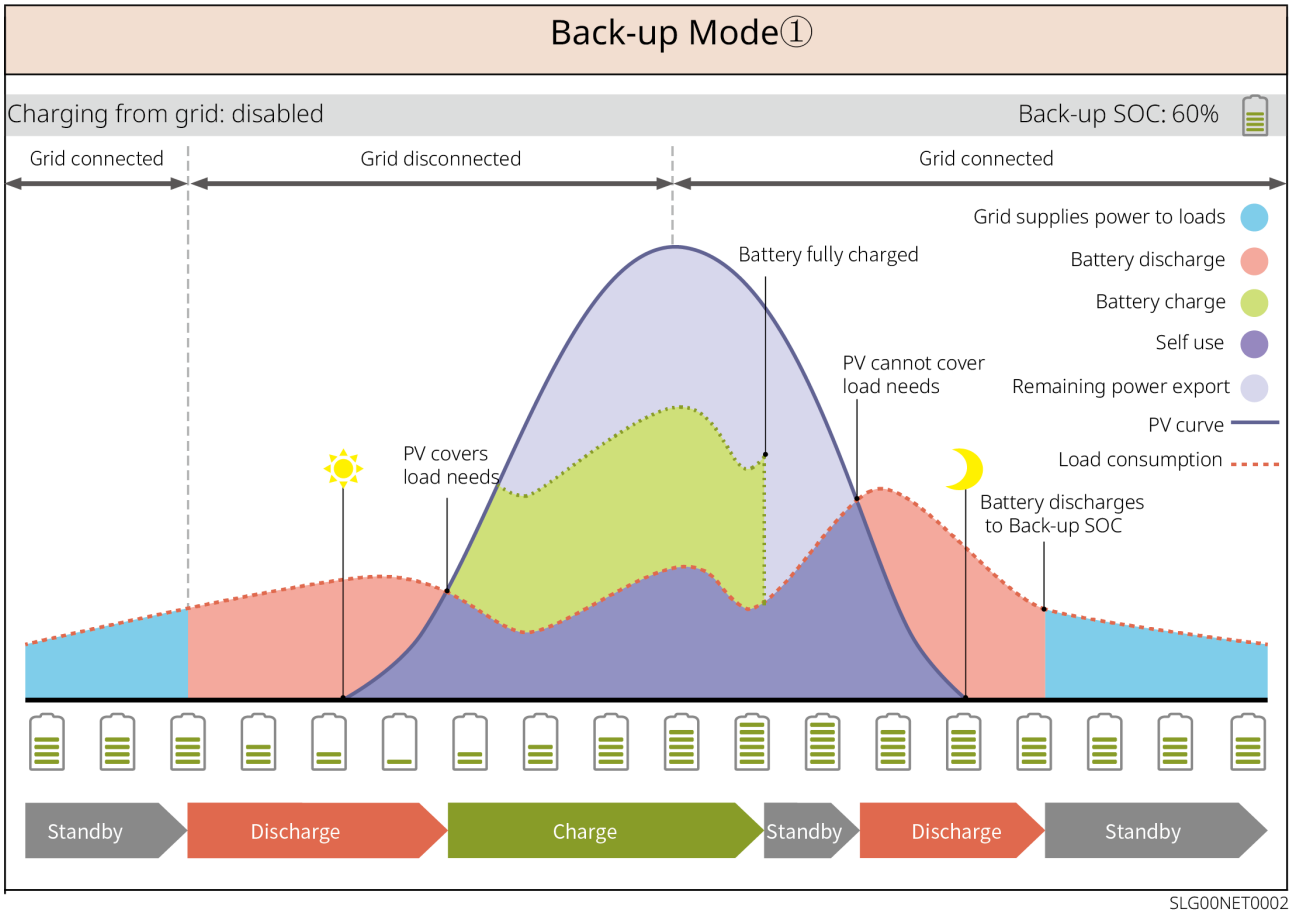
BACK-UP Mode

- The BACK-UP mode is mainly applied to the scenario where the grid is unstable.
- When the grid is disconnected, the inverter turns to off-grid mode and the battery will supply power to the BACK-UP loads; when the grid is restored, the inverter switches to on-grid mode.
- To ensure that the battery SOC is sufficient to maintain normal operation of the system when it is off grid, the battery will be charged to the backup power SOC using PV or grid power during on-grid operation. If you need to purchase electricity from the power grid to charge the battery, please confirm compliance with local power grid laws and regulations.



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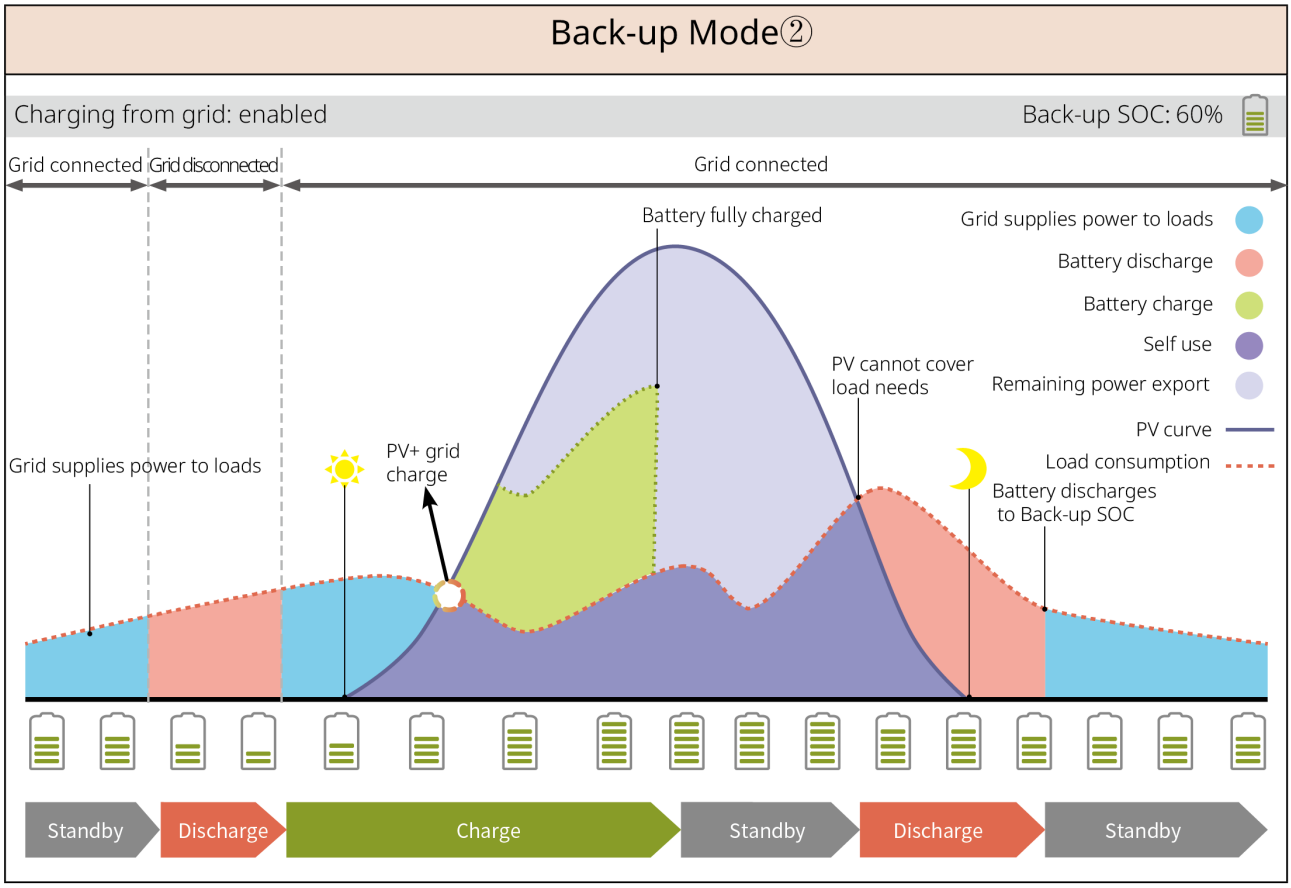

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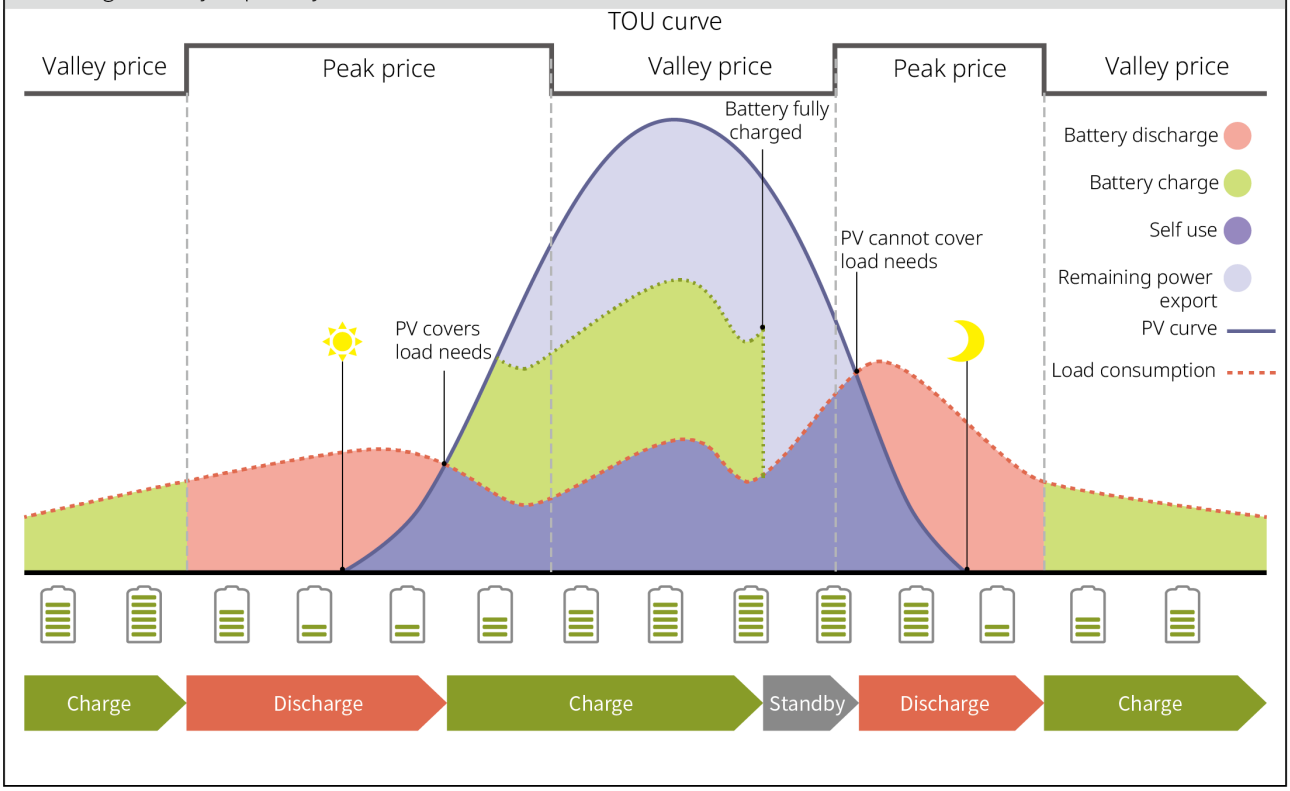
TOU Mode

It is recommended to use TOU mode in scenarios when the peak-valley electricity price varies a lot. Select TOU mode only when it meets the local laws and regulations. For example, set the battery to charge mode during Valley period to charge battery with grid power. And set the battery to discharge mode during Peak period to power the load with the battery.

TOU Mode①

PV: Charge battery in priority



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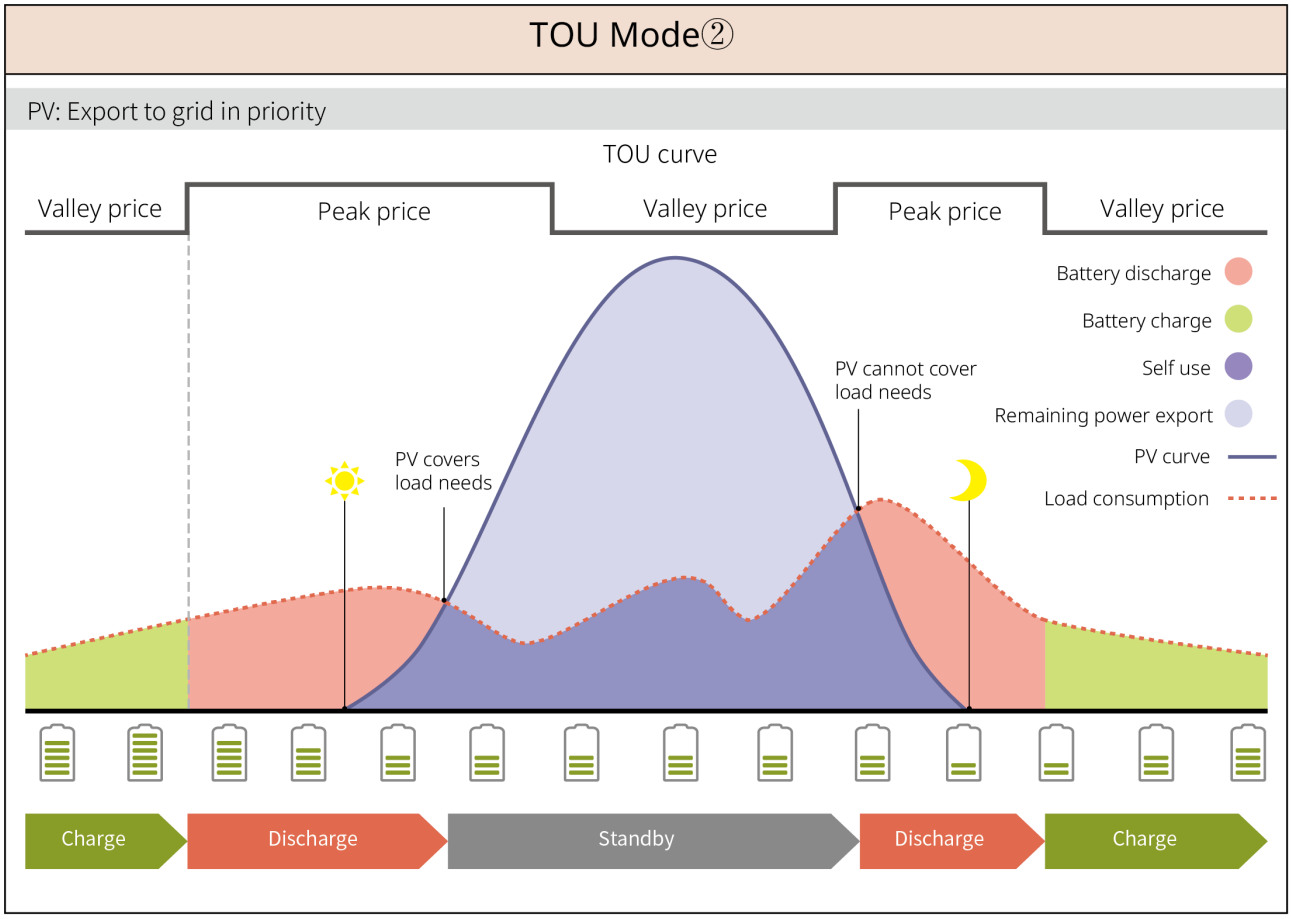

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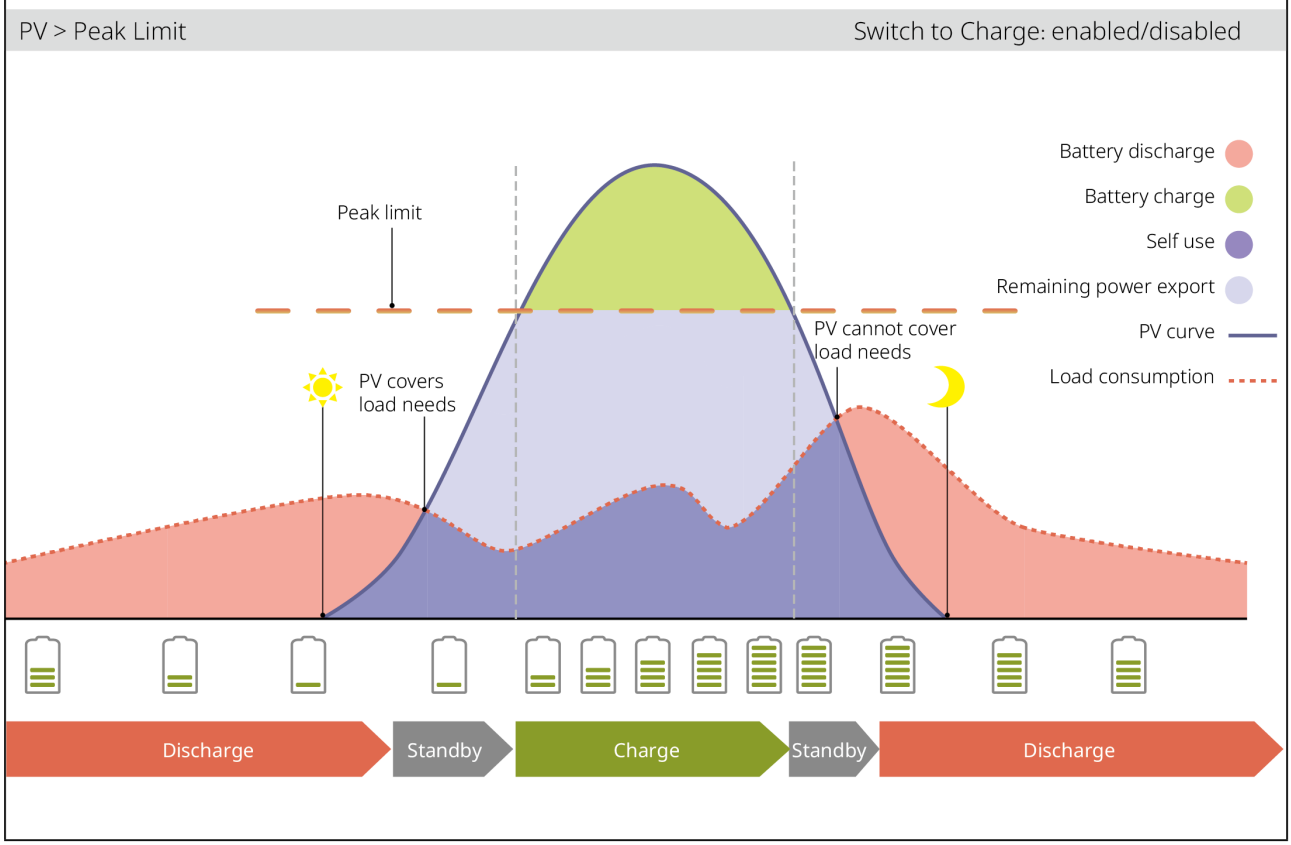
Delayed Charging Mode

- Suitable for areas with on-grid power output restrictions.
- Setting a peak power limit allows the PV power that exceeds the on-grid limit to be used to charge the battery; or setting a PV charging time period, during which the PV power is utilized to charge the battery.

Smart Charging ①



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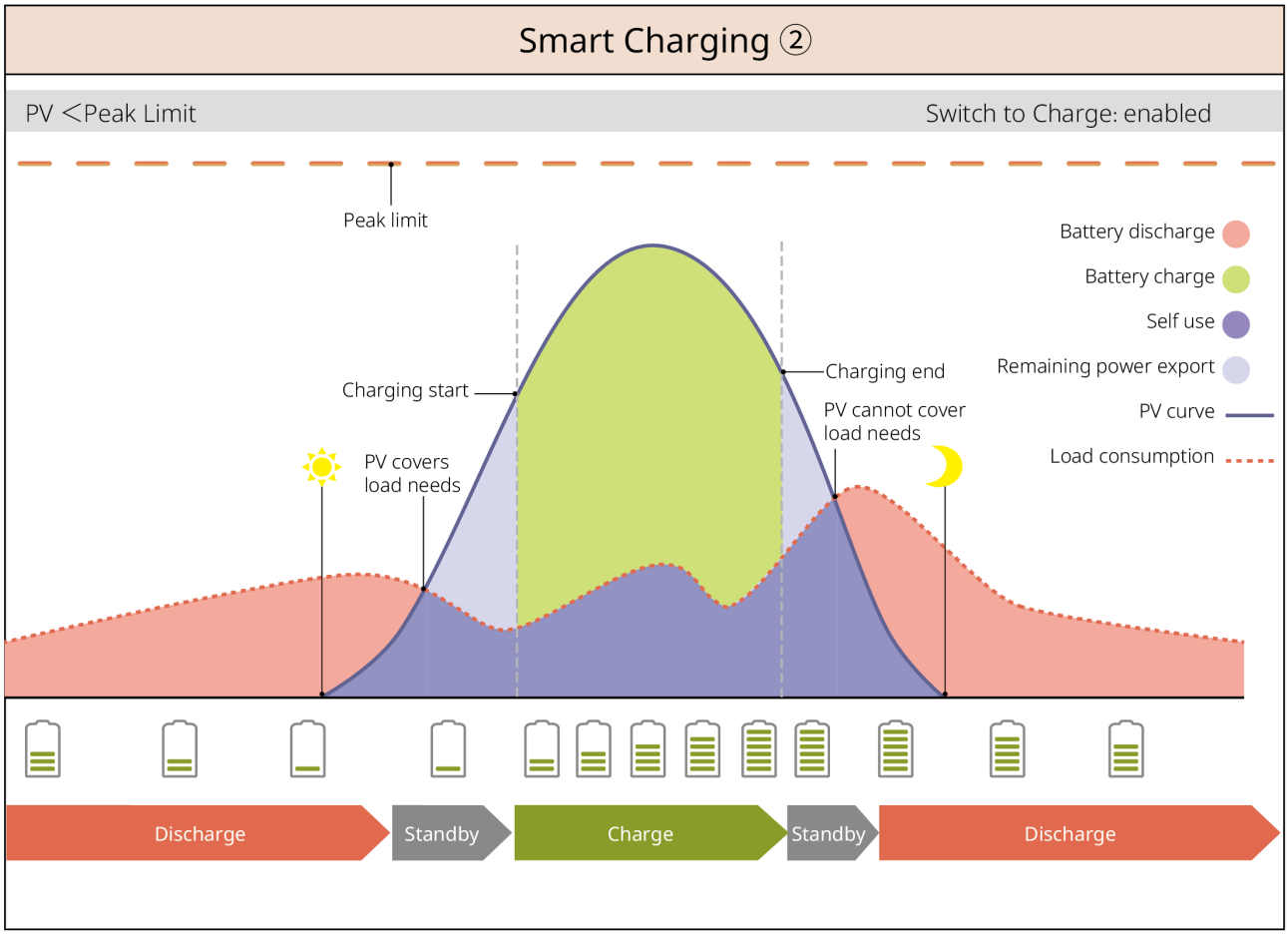

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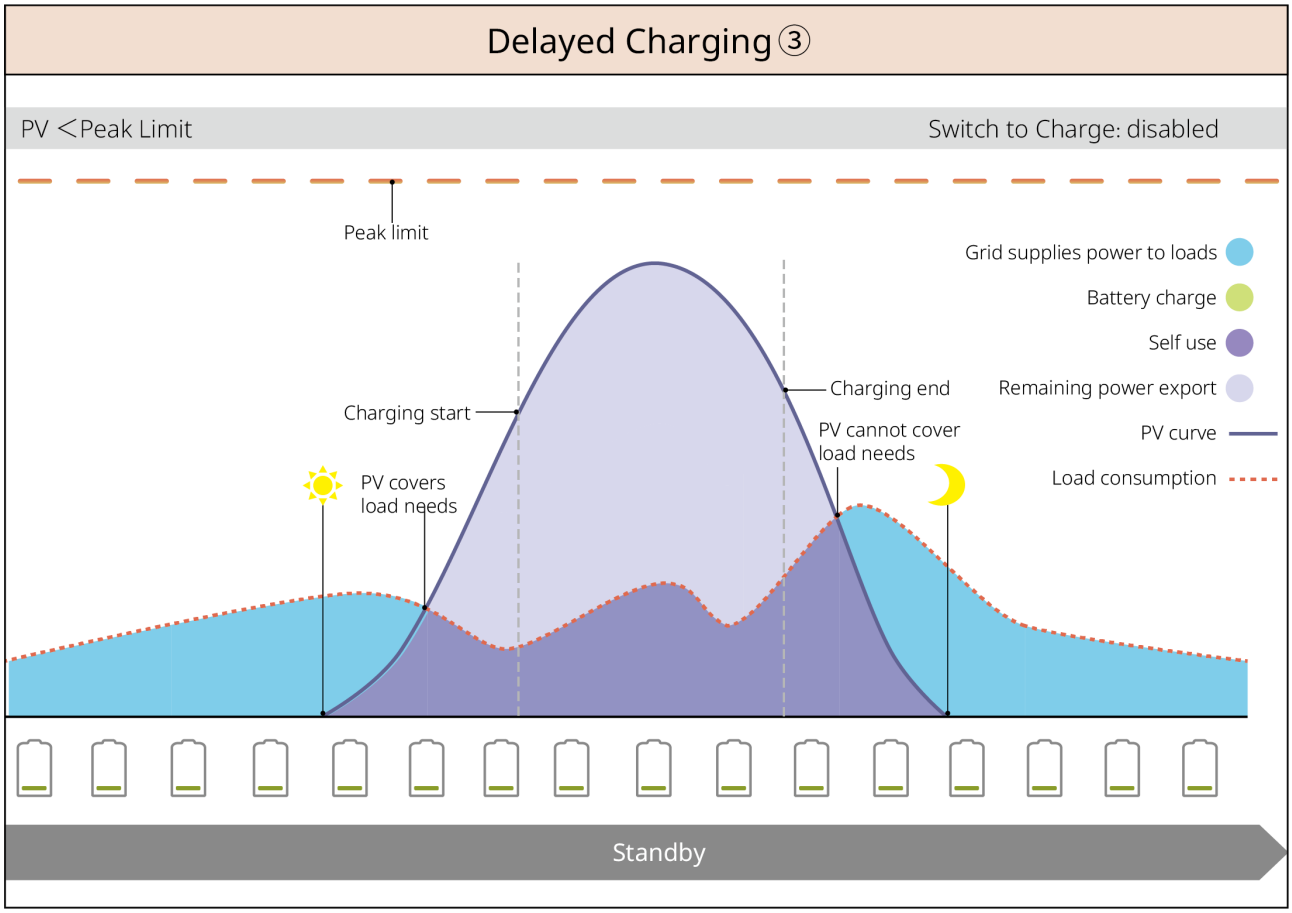
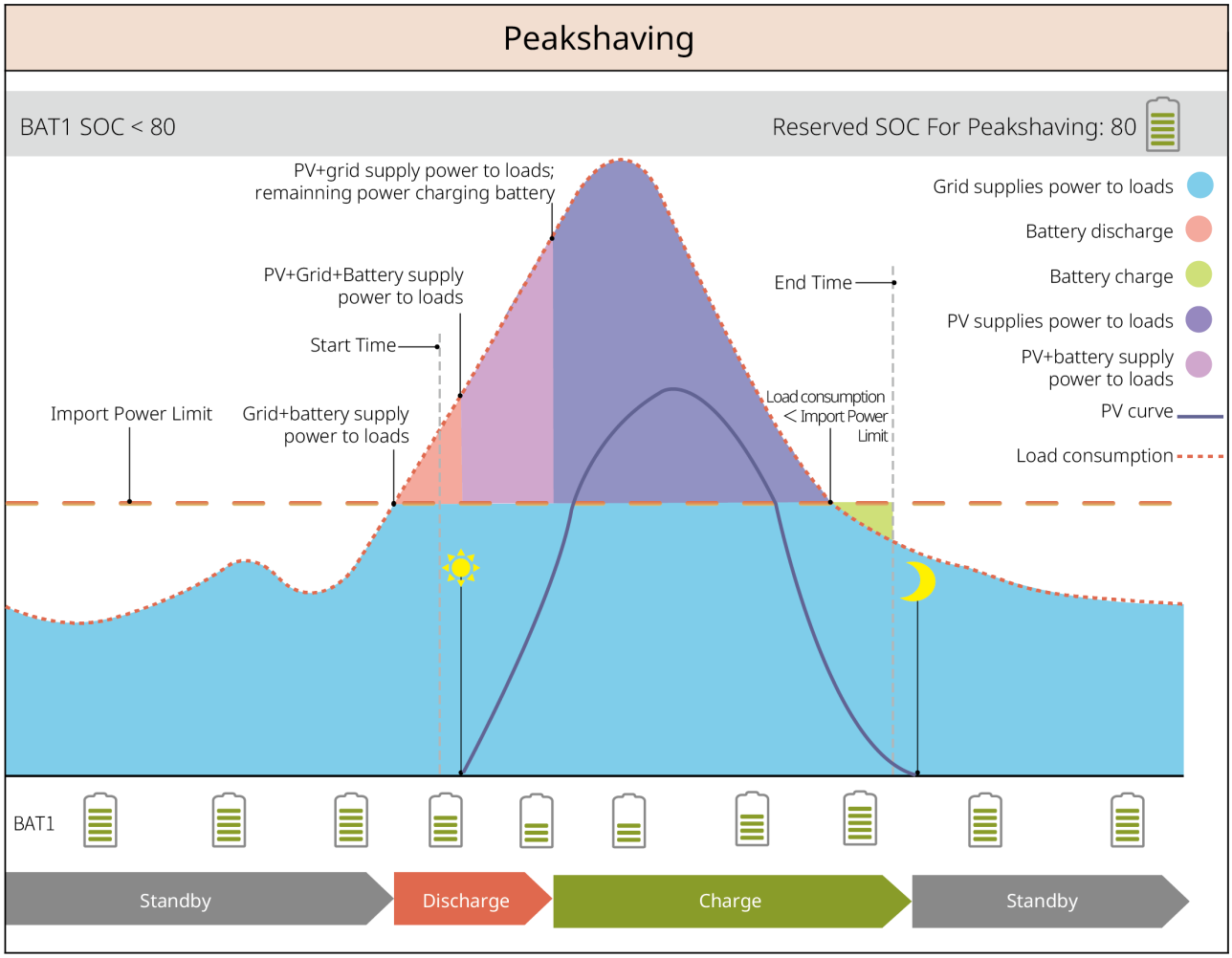


Demand Management Model

- It is mainly applicable to industrial and commercial scenarios.
- When the total power consumption of the load exceeds the power quota within a short period of time, battery discharge can be used to reduce the amount of power consumption exceeding the quota.
- When the battery SOC is below the reserved SOC for demand management, the system buys power from the grid based on the time period, load power usage, and the peak power buy limit.



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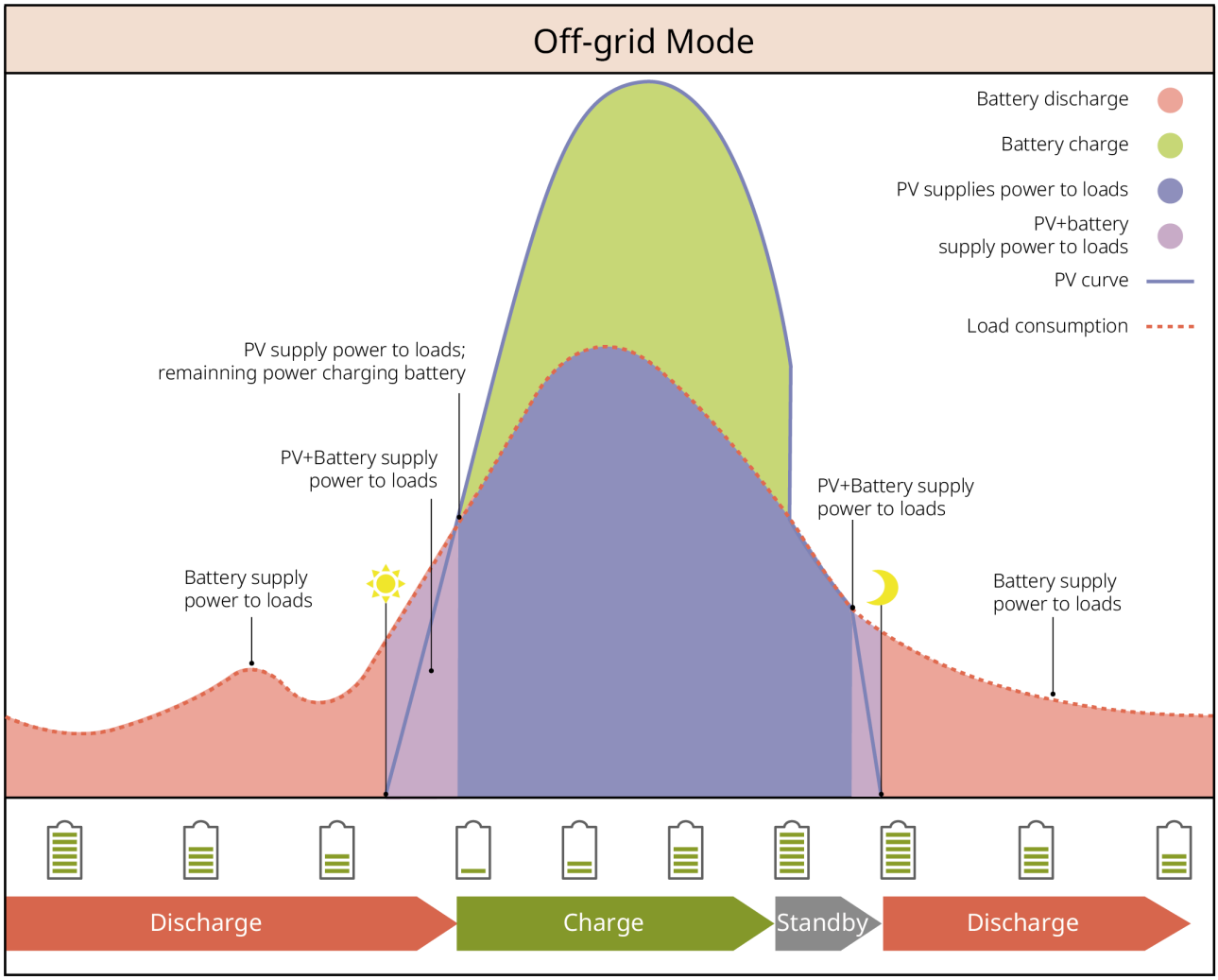
Off-grid Mode

NOTICE

Please do not operate the energy storage system in pure off-grid mode for long periods of time, otherwise there is a risk of over-discharge when the battery cannot be charged in low temperature or low light conditions.

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

- During the day, PV power generation is prioritized for supplying power to loads, and excess power is used to charge batteries.
- Nighttime battery discharge powers the load to ensure uninterrupted power supply to the backup load.



SLG00NET0012

2.5 Features

NOTICE
For specific Features, please refer to the actual product configuration.

AFCI

Inverter Integrated AFCI Circuit Protection device, used to detect Arc Fault (arc fault) and quickly disconnect the POWER OFF circuit when detected, thereby preventing electrical fires.

Causes of arc generation:

- Connectors in the photovoltaic system are damaged.
- Cable connection error or damage.

- Connector and cable aging.

Troubleshooting method:

1. When an arc is detected, the fault type can be viewed on the Inverter display or via the App.
2. If fault is triggered fewer than 5 times within 24 hours, the machine will automatically restore on-grid Protection after a 5-minute wait. After the 5th Arc Fault, Inverter can only resume normal operation after clearing fault. For specific operations, please refer to the "SolarGo APP User Manual."

model	Label	Instructions
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

Inverter Dry contact control port, supports connection of additional contactors for controlling load switching on/off. Compatible with household loads, heat pumps, etc. The load control method is as follows:

- Time Control: Set the time for turning the load on or off. The load will automatically turn on or off within the set time period.

- Switch Control: When the control mode is set to ON, the load will be turned on; when the control mode is set to OFF, the load will be turned off.
- BACK-UP Loads Control: Inverter Built-in relay dry contact control port. The relay can be used to control whether the load is turned off. In off-grid mode, if the Overload Battery SOC value detected at the BACK-UP terminal is lower than the off-grid Protection set value of Battery, the load connected to the relay port can be turned off.

Rapid Shutdown(RSD)

In a Rapid Shutdown system, the Rapid Shutdown transmitter works in conjunction with the receiver to achieve system Rapid Shutdown. The receiver maintains module output by receiving signals from the transmitter. The transmitter can be externally mounted or integrated into the Inverter. In emergency situations, the transmitter can be deactivated by enabling an external trigger device, thereby shutting down the module.

- External transmitter
  - Transmitter model: GTP-F2L-20, GTP-F2M-20
    https://www.goodwe.com/Ftp/Installation-instructions/RSD2.0-transmitter.pdf
  - Receiver model: 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 model: 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

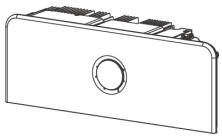
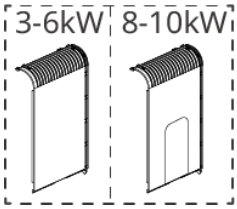
Check the following items before accept.

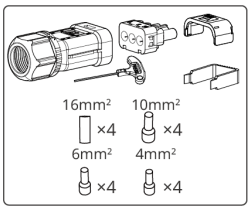
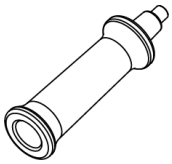
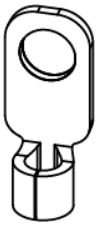
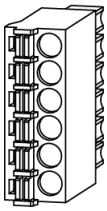
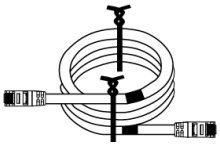
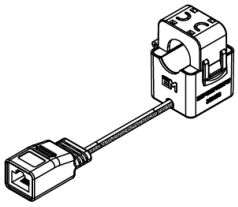
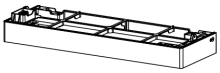
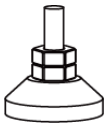
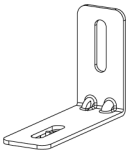
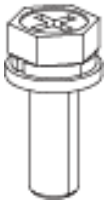
1. Check the outer packing box for damage, such as holes, cracks, deformation, and other signs of equipment damage. Do not unpack the package and contact the supplier as soon as possible if any damage is found.
2. Check the product model. If the product model is not what you requested, do not unpack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

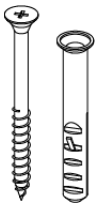
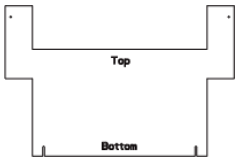
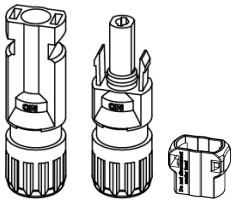
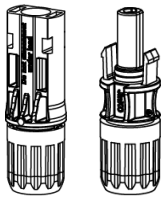
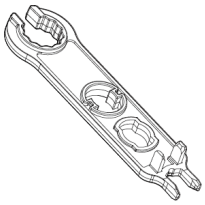
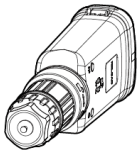
3.2 Deliverables

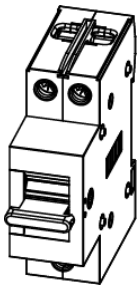
⚠WARNING
Check the deliverables for correct model, complete contents, and intact appearance. Contact the supplier as soon as possible if any damage is found.

3.2.1 Inverter Deliverables

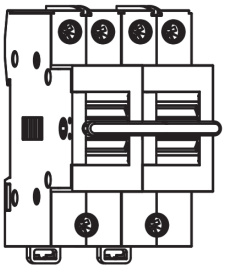
Part	Description	Part	Description
	Inverter x 1		Top decorative cover x 1
	Left decorative cover x 1		Right decorative cover x 1

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
	OT grounding terminal x 1		6PIN communication terminal x 2
	2PIN communication terminal x 2		PIN terminal x 16
	CT connection cable x 1		CT x 1
	Battery base x 1		Adjustable feet x 4
	Anti-tip bracket x 4		M5*16 screw x 9

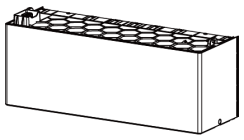
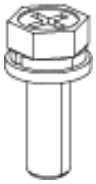
Part	Description	Part	Description
	M5*60 expansion screw x 4		Drilling mark paper x 2
 or 	PV terminal and PV terminal anti-tamper cover x N GW3K-EHA-G20、GW3.6K-EHA-G20、GW5K-EHA-G20、GW6K-EHA-G20：4 GW8K-EHA-G20、GW9.999K-EHA-G20、GW10K-EHA-G20：8 Note: No PV terminal anti-tamper cover in China region GW3K-BHA-G20、GW3.6K-BHA-G20、GW5K-BHA-G20、GW6K-BHA-G20、GW8K-BHA-G20、GW9.999K-BHA-G20、GW10K-BHA-G20：0		PV terminal unlocking tool x N N: China region x 0; other regions x 1.
		 or 	Smart dongle x 1

Part	Description	Part	Description
	Product documentation x 1		• (Australia only) Manual transfer switch x 1 Note: For single-unit scenarios only

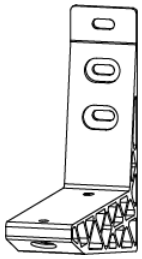
(Europe only) Manual transfer switch

Component	Description
	• Manual transfer switch x 1 Note: For use in standalone scenarios only. Contact the dealer for purchase if needed.

3.2.2 Batteries Deliverables

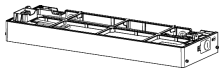
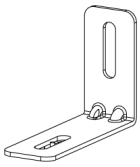
Component	Description	Component	Description
	Battery x 1		M5*16 screw x 2
	Silicone cap x 2	-	-

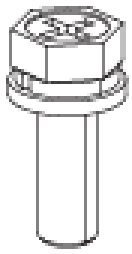
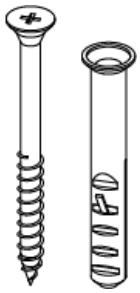
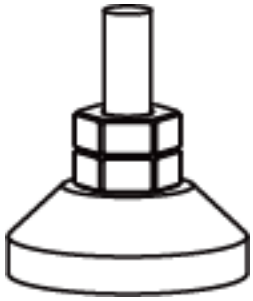
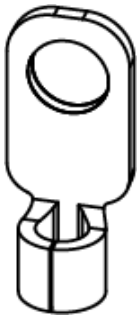
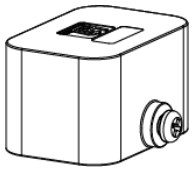
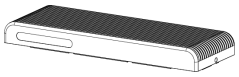
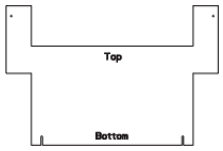
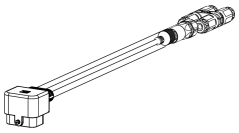
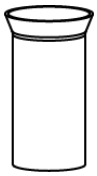
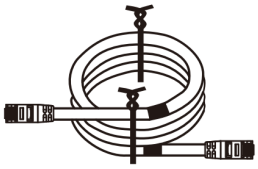
Battery Mount (Optional)

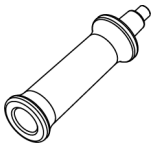
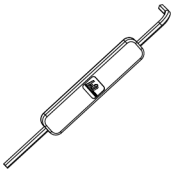
Component	Description	Component	Description
	Bracket x 2		M10 expansion bolt x 6
	M10 screw x 4	-	-

3.2.2.1 Battery Expansion Kit Deliverables (Optional)

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

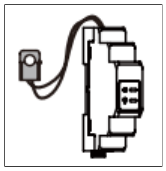
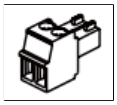
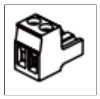
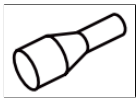
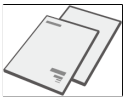
Part	Description	Part	Description
	Base x 1		locking bracket x 4

Part	Description	Part	Description
	M5 screws x 7		M6 expansion screws x 4
	Adjustable feet x 4		OT grounding terminal x 1
	Terminal resistor x 1		Battery decorative cover x 1
	Drilling mark paper x 2		Battery expansion cluster harness x 1
	PIN terminal x 8		Battery expansion cluster positive connection harness x 1
	Battery expansion cluster negative connection harness x 1		Battery expansion cluster network cable x 1

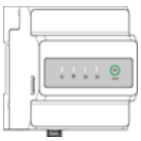
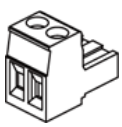
Part	Description	Part	Description
	Silicone cap x 2		Handle x 2
	Hex key x 1		Product documentation x 1

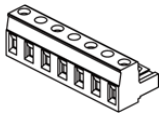
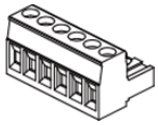
3.2.3 Smart Meter Deliverables

3.2.3.1 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
	Screw driver x 1		Documents x 1

3.2.3.2 GM330

Component	Description	Component	Description
	Smart meter and CT x1		2PIN communication terminal x1

Component	Description	Component	Description
	PIN terminal x 6		7PIN terminal x1
	Screwdriver x1		6PIN communication terminal x1
	2PIN terminal to RJ45 terminal adapter cable x 1		Product documentation x 1

3.3 Storage

- If an inverter has been stored for more than two years or has not been operated for more than six months after installation, it is recommended to have it inspected and tested by qualified personnel before putting it into service.
- To ensure the good electrical performance of the internal electronic components of the inverter, it is recommended to power it on every six months during storage. If it has not been powered on for more than six months, it is recommended to have it inspected and tested by qualified personnel before putting it into service.
- 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 decay, or even complete failure, timely use is recommended. If the battery requires long-term storage, please perform maintenance according to the following requirements:

NOTICE
[1] The storage time is calculated starting from the SN date on the battery's outer packaging. Charging and discharging maintenance is required after exceeding the storage period. (Battery maintenance time = SN date + charging/discharging maintenance cycle). For the method to view the SN date, refer to: 11.3.Battery SN Code Meaning(Page 342). [2] After passing the charging and discharging maintenance, if the outer box has a Maintaining Label, please update the maintenance information on the Maintaining Label. If there is no Maintaining Label, please record the maintenance time and battery SOC yourself and keep the data properly for easy maintenance record keeping.

Battery Model	Initial Battery Storage 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	Consult the dealer or after-sales service center for maintenance methods.
GW8.3-BAT-D-G20				
GW5.1-BAT-D-G21				
GW8.3-BAT-D-G21				

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

1. Ensure the equipment is stored in a cool place, avoiding direct sunlight.
2. Ensure the storage environment is clean, with appropriate temperature and humidity ranges, and no condensation. If condensation is observed on the equipment ports, do not install the equipment. Battery storage humidity range: 5%-95%.
3. Ensure the equipment is stored away from flammable, explosive, corrosive, and other hazardous materials.

Stacking Requirements:

1. Ensure equipment stacking height and orientation comply with the instructions on the packaging box label.
2. Ensure there is no risk of toppling after the equipment is stacked.

4 Installation

DANGER
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

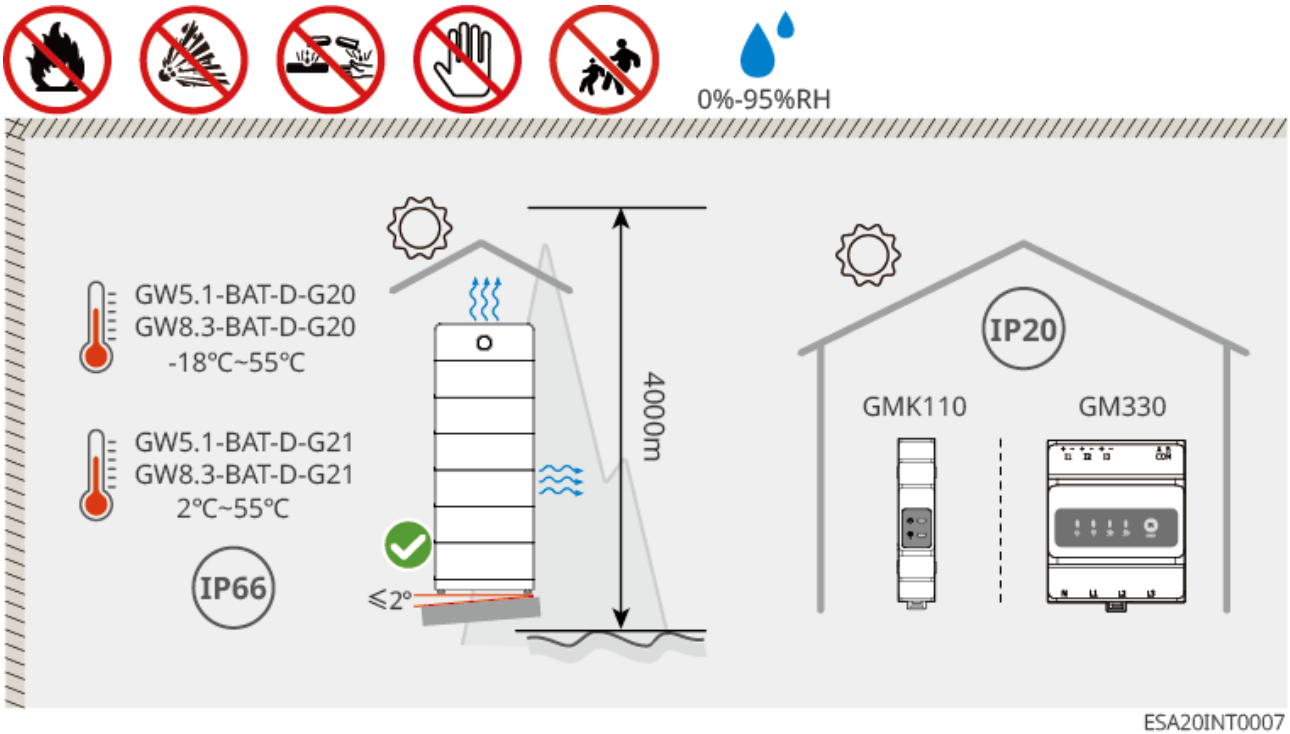
4.1.1 Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. The temperature and humidity at the installation site should be kept within the appropriate range.
3. Keep away from children.
4. High temperatures may exist on the surface of the equipment during operation to prevent burns.
5. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
6. The place to install the equipment shall be well-ventilated for heat radiation and large enough for operations.
7. Check the protection rating of the equipment and ensure that the installation environment meets the requirements. The inverter, battery system, and smart dongle can be installed both indoors and outdoors, but the smart meter can only be installed indoors.
8. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
9. The altitude to install the inverter shall be lower than the maximum working altitude of the system.
10. Consult the manufacturer before installing the equipment outdoors in salt affected areas. A salt-affected area refers to the region within 500 meters offshore, and will be related to the sea wind, precipitation and topography.
11. Install the equipment away from electromagnetic interference. If there is any radio or wireless communication equipment below 30MHz near the equipment, you have to:

- Inverter: add a multi-turn winding ferrite core at the AC output cable of the inverter, or add a low-pass EMI filter. Or the distance between the inverter and the wireless EMI equipment should be more than 30m.
- Other equipment: the distance between the equipment and the wireless EMI equipment should be more than 30m.

NOTICE

- Inverter Operating Temperature Range: -35℃-60℃.
- GW5.1-BAT-D-G20, GW8.3-BAT-D-G20: Charging temperature range: -18℃-55°C; Discharging temperature range: -20℃-55°C. If installed in an environment below -18℃, the battery will not be able to continue charging to restore energy after being discharged, resulting in undervoltage protection.
- GW5.1-BAT-D-G21, GW8.3-BAT-D-G21: Charging temperature range: 2℃-55°C; Discharging temperature range: -20℃-55°C. If installed in an environment below 2℃, the battery will not be able to continue charging to restore energy after being discharged, resulting in undervoltage protection.



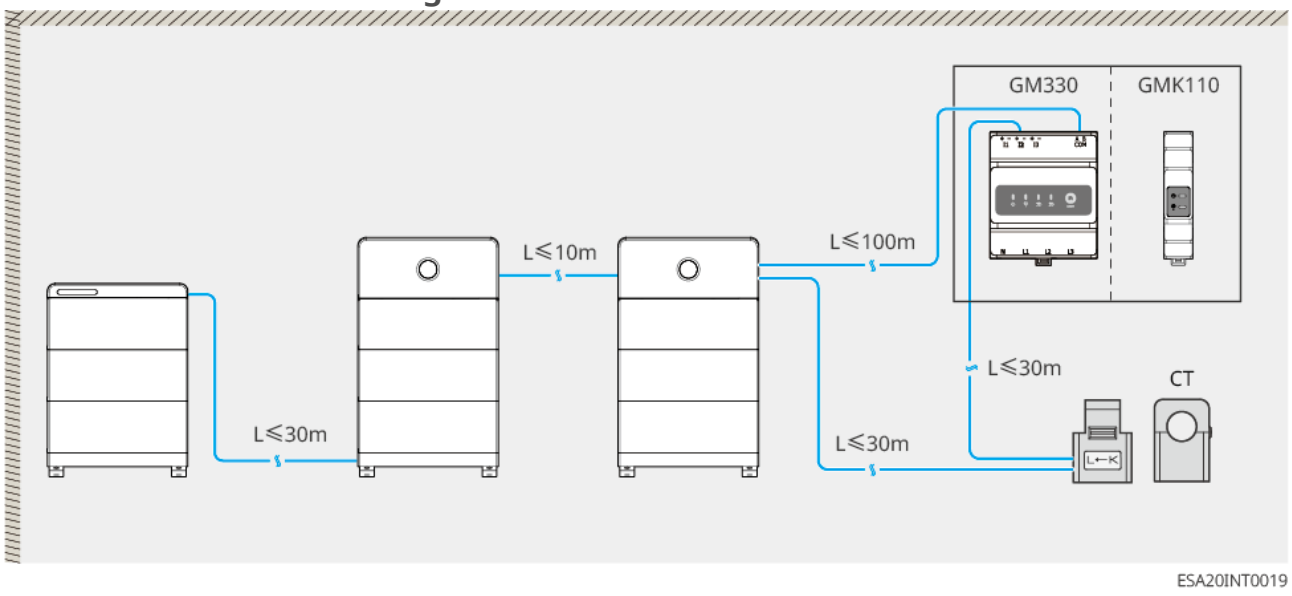
4.1.2 Installation Space Requirements

When installing devices in the system, sufficient space should be reserved around the

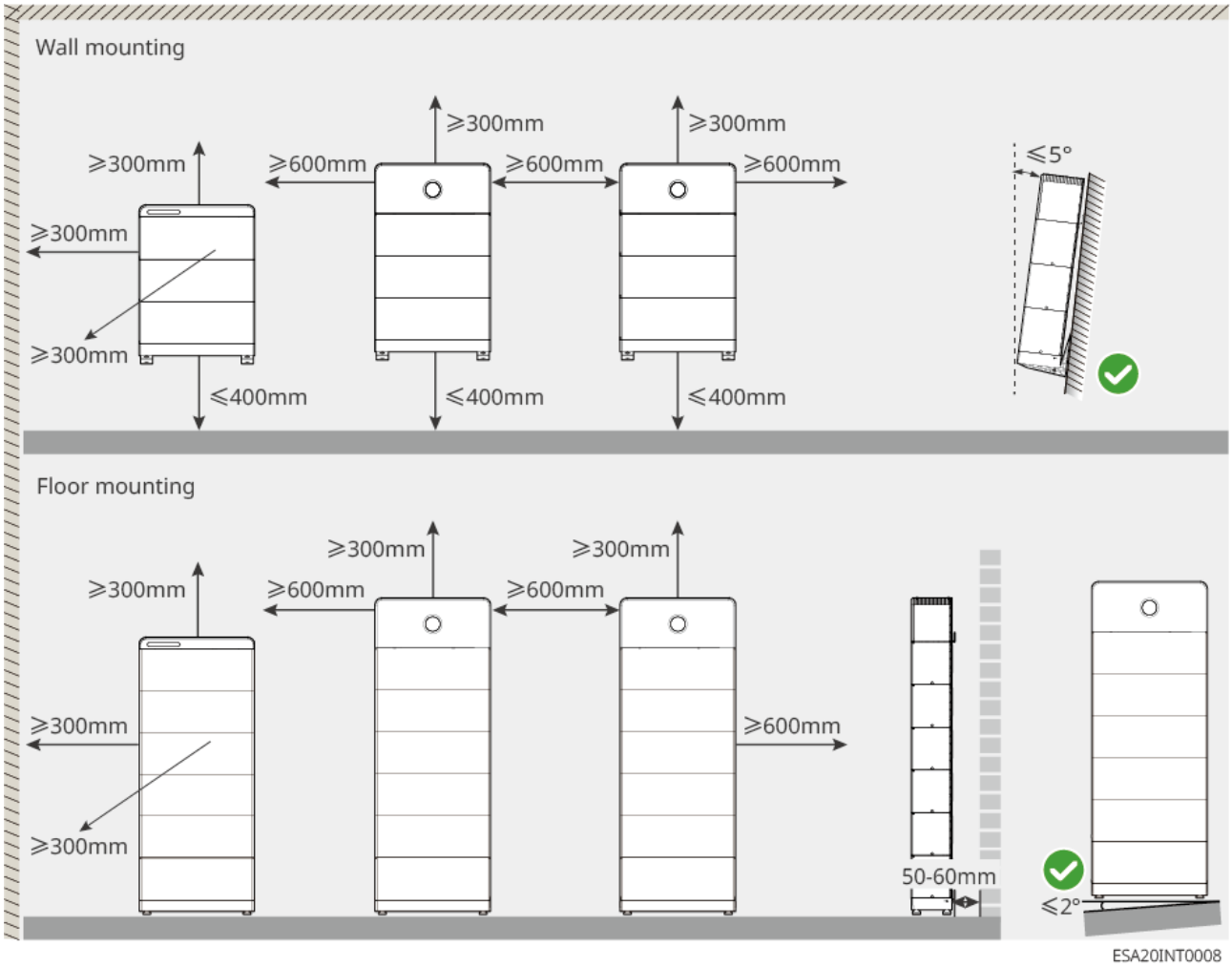
devices to ensure adequate installation and heat dissipation space.

- 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. Do not exceed 10m for communication cables, otherwise communication abnormalities may occur.
- For CT installation, use shielded twisted-pair cables of CAT 5E or above, with a cable distance not exceeding 30 meters.
- The distance for the RS485 twisted-pair shielded cable used for communication between the inverter and the meter should not exceed 100 meters.

Communication Cable Length



Installation Space

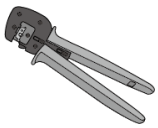
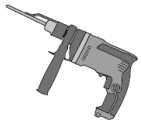
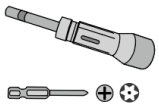
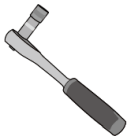
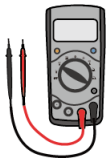
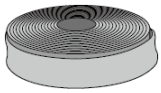
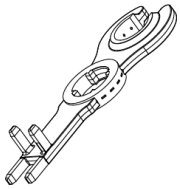


4.1.3 Tool Requirements

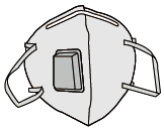
NOTICE
The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.

Installation Tools

Tool Type	Description	Tool Type	Description
	Diagonal pliers		RJ45 crimping tool

Tool Type	Description	Tool Type	Description
	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	-	-

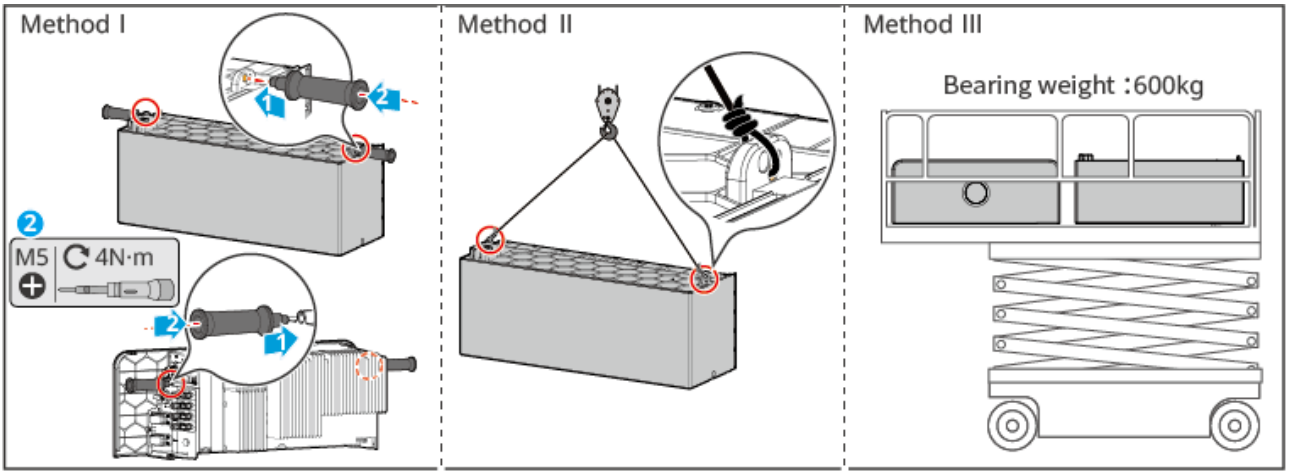
Personal Protective Equipment

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

4.2 Equipment Handling

⚠CAUTION

- Operations such as transportation, turnover, installation and so on must meet the requirements of the laws and regulations of the country or region where inverters are installed.
- Move the equipment to the site before installation. Follow the instructions below to avoid personal injury or equipment damage.
  1. Consider the weight of the equipment before moving it. Assign enough personnel to move the equipment to avoid personal injury.
  2. Wear safety gloves to avoid personal injury.
  3. Keep balance to avoid falling down when moving the equipment.
  4. The battery system can be transported to the installation site by crane.
  5. When moving equipment using a hoisting method, please use flexible slings or straps. The load-bearing capacity of a single strap must meet the following requirements:
     - GW5.1-BAT-D-G20, GW5.1-BAT-D-G21≥180KG
     - GW8.3-BAT-D-G20, GW8.3-BAT-D-G21 ≥240KG



ESA20INT0010

4.3 Installation equipment

⚠CAUTION

- When drilling, ensure the hole position avoids water pipes, cables, etc. inside the wall to prevent DANGER.
- When drilling, wear goggle and a dust mask to prevent dust from inhalation entering the respiratory tract or falling into the eyes.
- Inverter is located above Battery. Do not place Battery Installation above Inverter.
- When Battery systemInstallation, ensure the Installation is level and secure. When placing the BatteryBase, Battery, and Inverter, confirm that the holes on the upper and lower layers are aligned. The locking bracket should be vertically flush with the ground, wall, or Battery system surface.
- When using hammer drill for punching, use cardboard or other protective coverings to shield Battery system to prevent foreign objects from entering the equipment and causing damage.
- When mounting on a wall Installation, ensure the wall's load-bearing capacity is assessed to protect your life and property.

NOTICE

- Battery requires Installation on the Base, and Base can be installed on the ground Installation or mounted on a bracket Installation.
- When using BaseInstallation, it supports stacking up to 6 Battery modules.
- The maximum stacking quantity when using the bracket Installation is specified as follows:
  - Same energy stacking
    - GW5.1-BAT-D-G20 and GW5.1-BAT-D-G21: Up to 3 units.
    - GW8.3-BAT-D-G20 and GW8.3-BAT-D-G21: Maximum of 2 units.
  - Different energy aliasing:
    - When GW5.1-BAT-D-G20, GW5.1-BAT-D-G21 are mixed with GW8.3-BAT-D-G20, GW8.3-BAT-D-G21, the entire system supports a maximum of 2 units.
- The Base, bracket, and the uppermost Battery must be secured to the wall using locking bracket.
- When marking the drilling positions on the bracket Installation, have one person hold the Base steady while another uses a marker to mark the drilling locations.
- When Installing the Battery System and Inverter, remove the protective cover dismantle on the blind-mate connector before stacking.

Wall-mounted Installation

Step 1: Mount the Base Installation on the bracket.

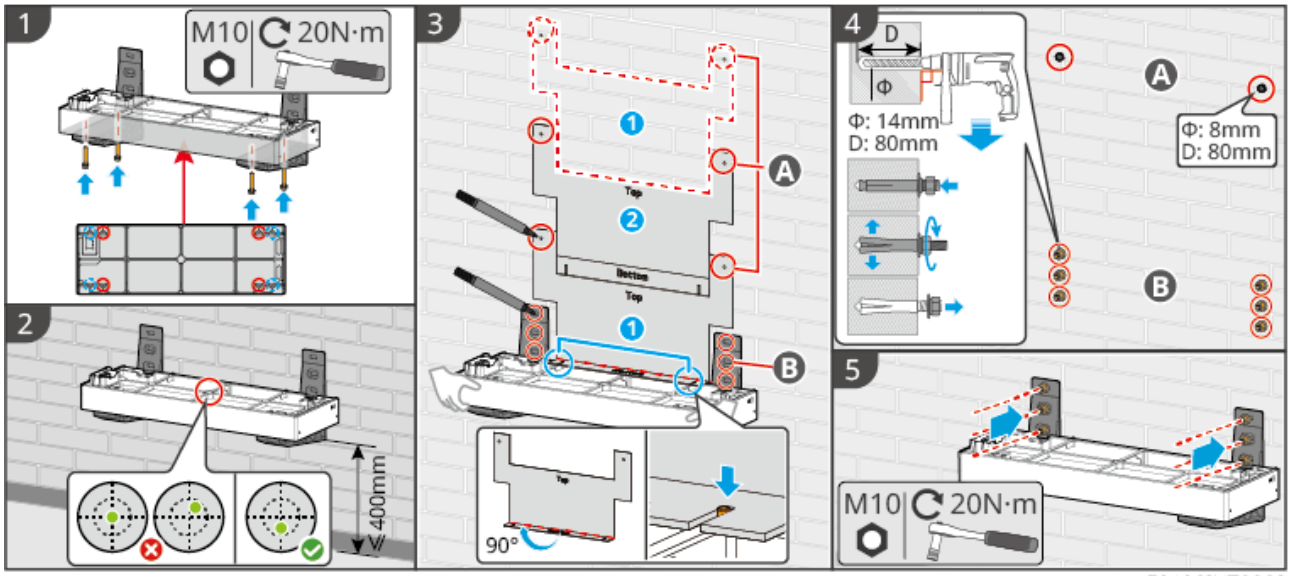
Step 2: The bracket is tightly attached to the wall. Ensure the bracket is securely placed, and observe the level bubble in the center of the Base.

Step 3: After adjusting the position and levelness of the mounting bracket, use a marker to mark the drilling positions. Once marked, remove the bracket. (A: PACKfixing hole position; B: Bracketfixing hole position.)

Step 4: Punch holes and InstallationExpansion screw.

1. Use hammer drill for punching holes.
2. Clean the holes.
3. Use rubber hammer to insert Expansion screw Installation into the hole.
4. Use a hex wrench to tighten the nut clockwise to expand the screw.
5. Rotate the nut counterclockwise to remove.
6. Use torque screwdriver to fasten locking bracket to the wall.

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



ESA20INT0003

Installation Base

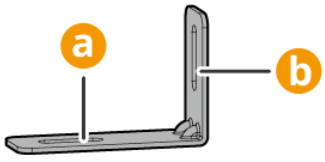
Step 1: Adjust the adjustable foot Installation at the bottom of Base, and secure the locking bracket onto the Base.

Step 2: Place Base 50-60 cm away from the wall.mmPlace it parallel to the wall. Observe the level bubble in the center of the Base. If the bubble is not centered, adjust it using the leveling feet.

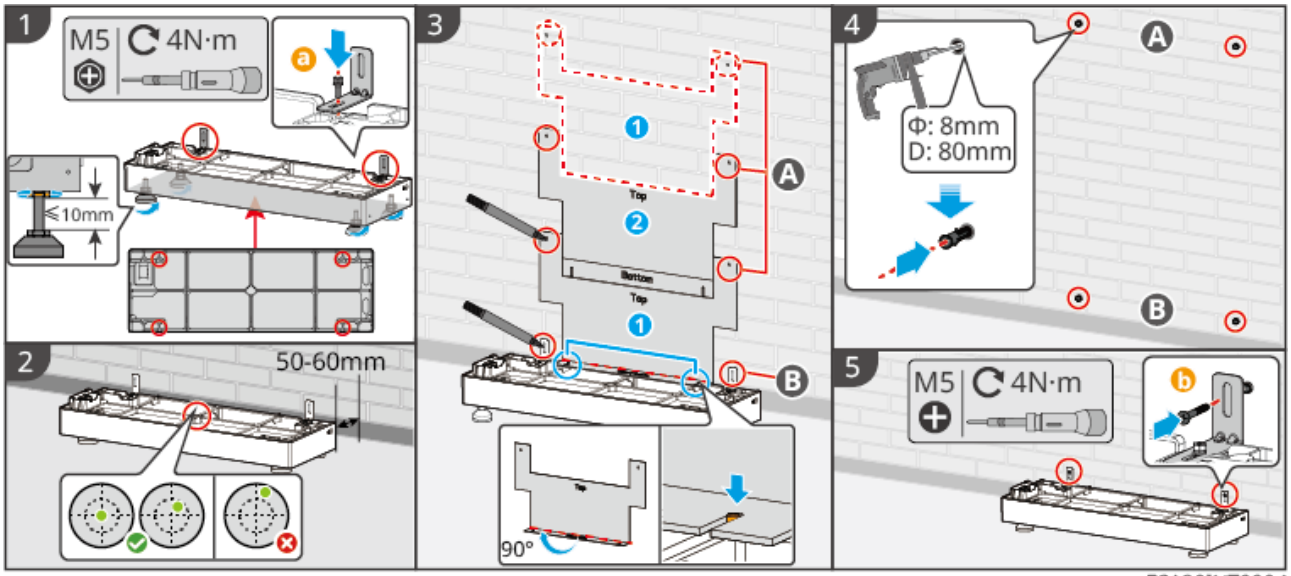
Step 3: After adjusting the position and level of Base, use the hole marking paper to mark the drilling positions. Once marked, remove the Base. (A: PACK fixing hole position; B: Bracket fixing hole position.)

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

Step 5: Secure the locking bracket to the wall using cross screwdriver fasteners.



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



ESA20INT0004

Installing the Battery System and Inverter

Step 1:dismantle Inverter or the protective cover on the bottom blind-mate connector of Battery.

Step 2: InstallationHandle(optional), stack Battery onto Base.

If Installation exceeds 3 pieces of Battery, use lifting tools.

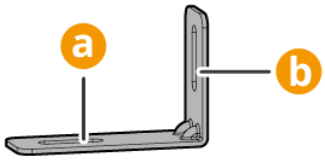
Step 3: Tighten the screw between Battery and Base or between Battery and Battery.

If multiple Battery are required for Installation, please repeat.**Step1**、**Step2**Complete all BatteryInstallation,Battery stacking quantities follow the "2.2.1.System Overall Configuration Description(Page 37).

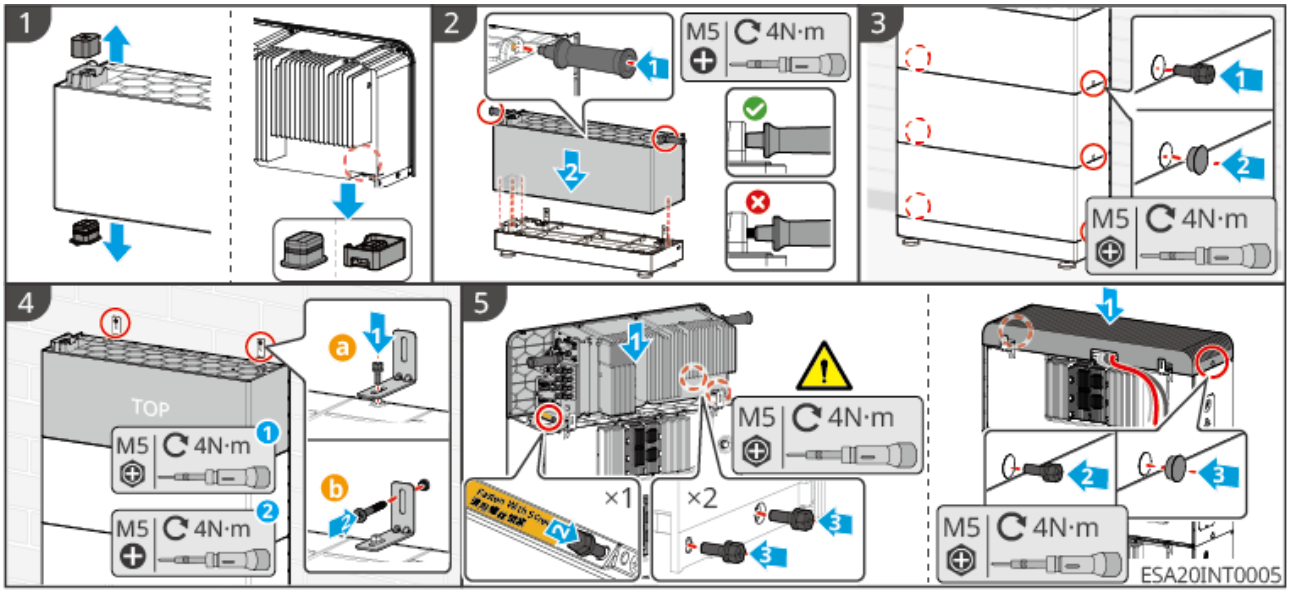
Step 4: The topmost Battery is secured to the wall using locking bracket.

Step 5: Installing the Inverter or Battery Protective coverP.

- Integrated Installation: Lift the Inverter, align it, and stack it on top of the Battery, then fasten the screw between the Inverter and Battery. If the system is configured as an integrated unit, the Installation is now complete.
- Split-type expansion: Repeat the steps of Installing the Battery System. After completing the electrical connections, place the Battery Protective coverP on top of the Battery and secure the side screw.



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

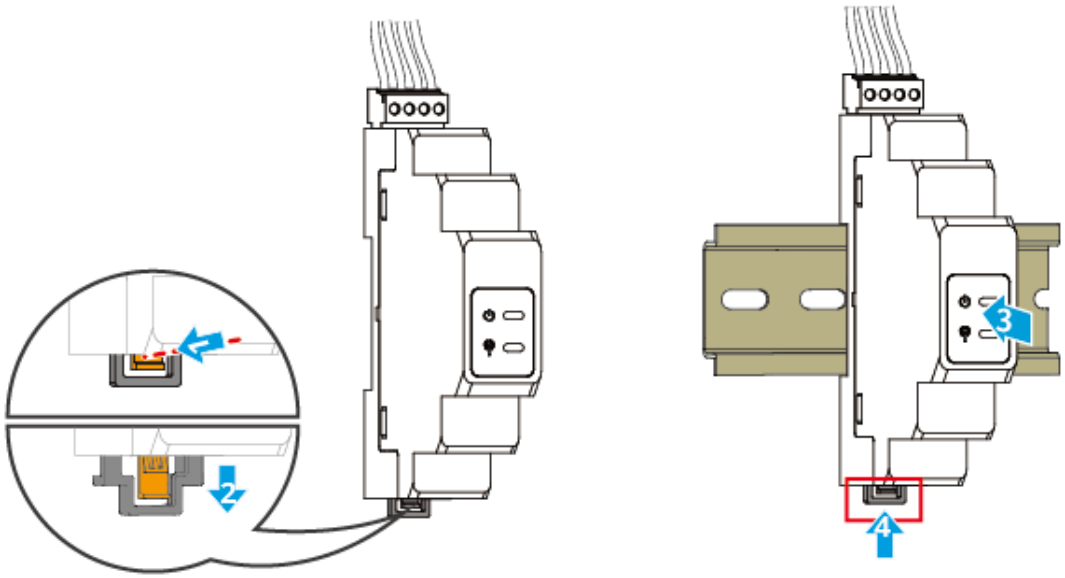


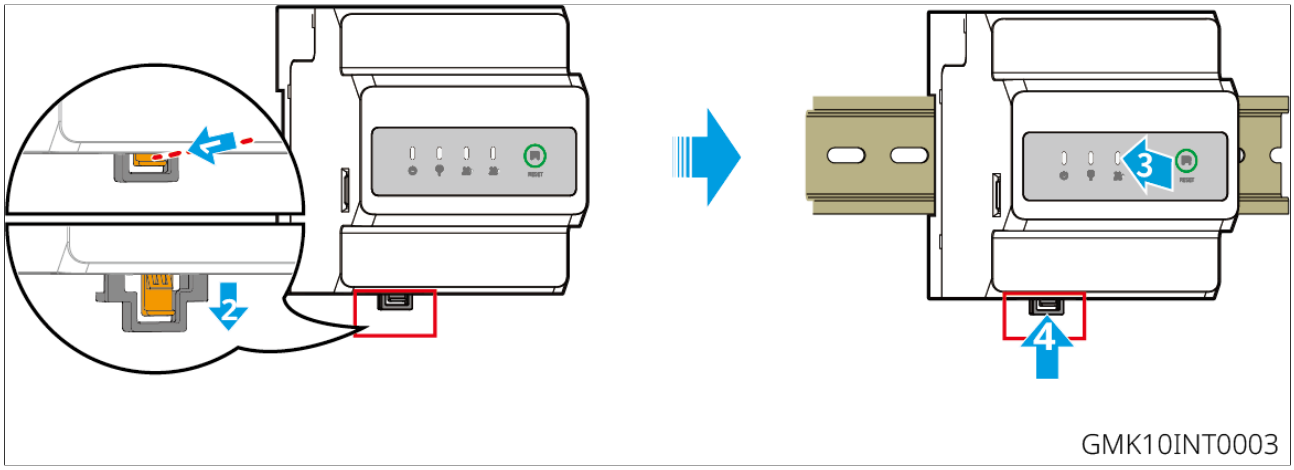
4.4 Installing the Smart Meter

⚠WARNING

In areas at risk of lightning, if the meter cable exceeds 10m and the cables are not wired with grounded metal conduits, you are recommended to use an external lightning protection device.

GMK110




2
3
4
GMK10INT0003

5 System Wirings

⚠DANGER

- The installation, routing, and connection of cables must comply with local laws, regulations, and standard requirements.
- All operations during electrical connections, as well as the specifications of cables and components used, must comply with local laws and regulations.
- Before performing electrical connections, please disconnect the DC switch and AC output switch of the device to ensure it is powered off. Live operation is strictly prohibited, otherwise it may lead to DANGER such as electric shock.
- Cables of the same type should be bundled together and arranged separately from different types of cables. Intertwining or cross-arrangement is prohibited.
- If the cable is subjected to excessive tension, it may lead to poor connections. When wiring, please leave a certain length of cable before connecting to the inverter terminal ports.
- When crimping terminals, ensure that the conductor part of the cable is in full contact with the terminal. Do not crimp the cable insulation together with the terminal, otherwise it may cause the device to fail to operate, or after operation, due to unreliable connections leading to heating and other conditions that damage the inverter terminal block.
- The inverter is not tested to AS/NZS 4777.2:2020 for combinations and/or multiple phase inverter combinations so that combpinations should not be used.
- For unused cable holes and ports (including communication ports), please use the dedicated terminals or plugs provided in the accessory box to reliably seal them. Otherwise, it may cause the following risks:
  - DANGER of electric shock: Open electrical ports may cause direct contact with live parts, leading to electric shock accidents.
  - Failure of protection: Open ports may allow dust, moisture, or foreign objects to intrude, which may lead to short circuits, fires, or equipment failures.

NOTICE

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

5.1 System Wiring Electrical Block Diagram

NOTICE

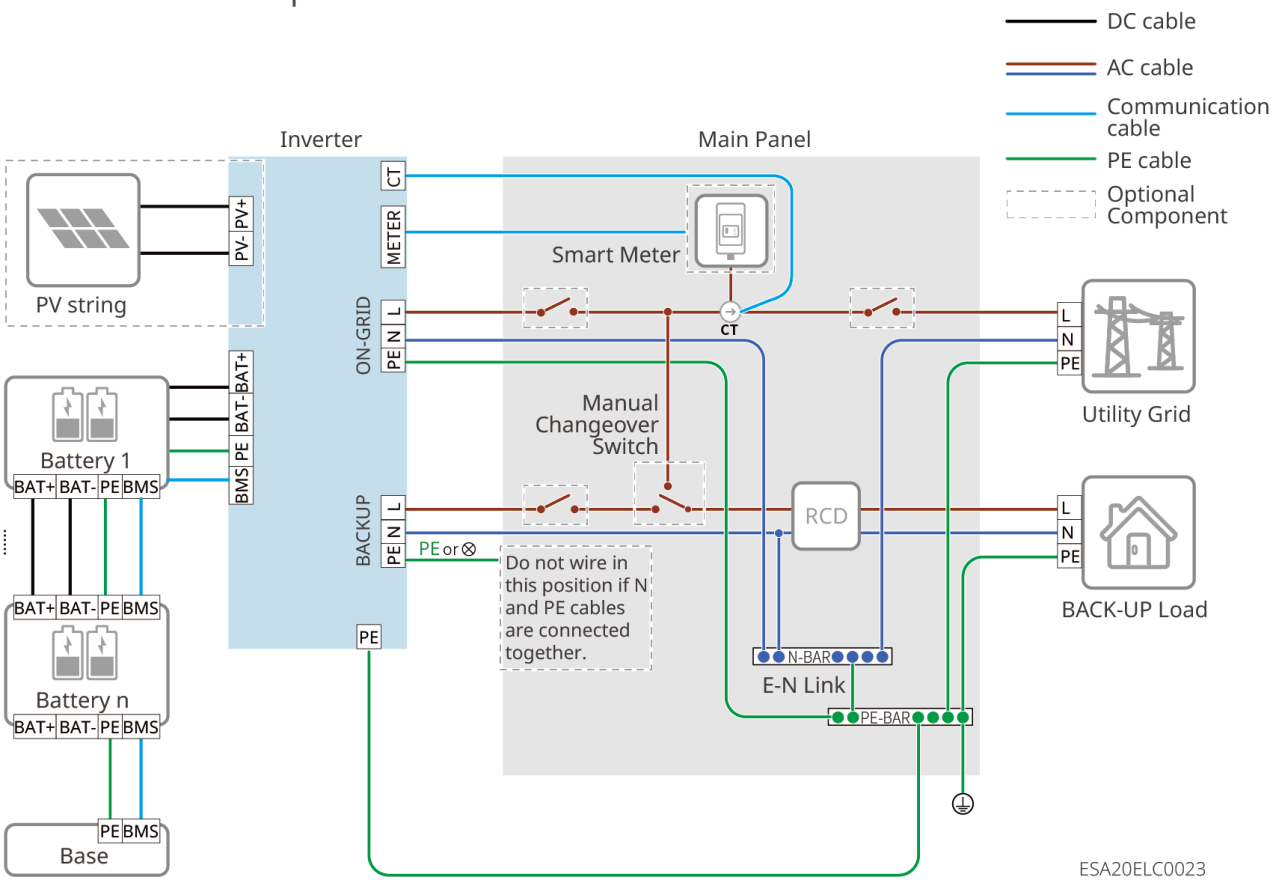
- Depending on regional regulatory requirements, the wiring methods for the N and PE lines of the inverter's ON-GRID and BACK-UP ports differ. Please follow local regulations.
- The inverter has a built-in energy meter and can be directly connected to CTs for use. The CT network cable shipped with the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

N and PE wires are connected together in the distribution box

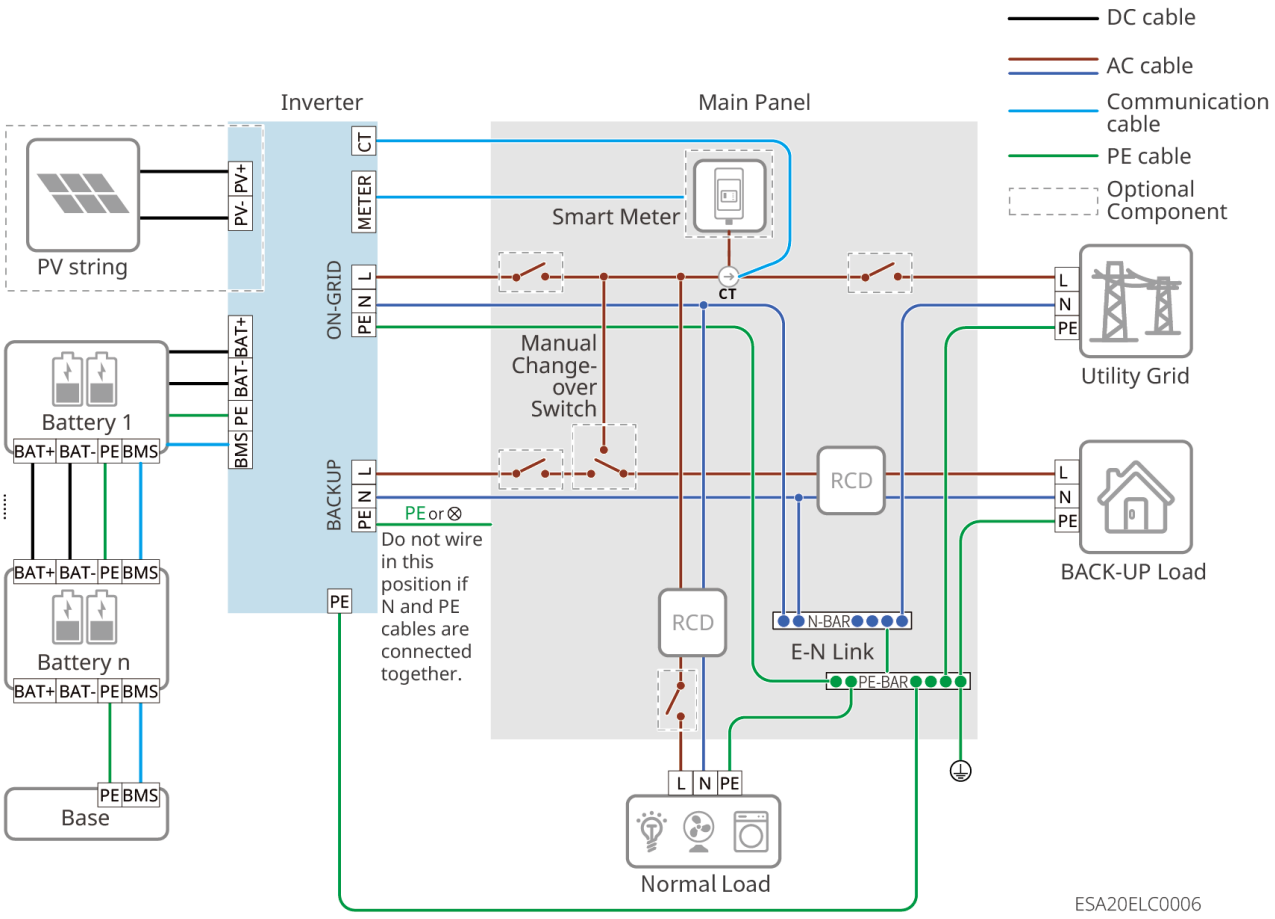
NOTICE

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

Whole House Backup Power



Partial Backup Power

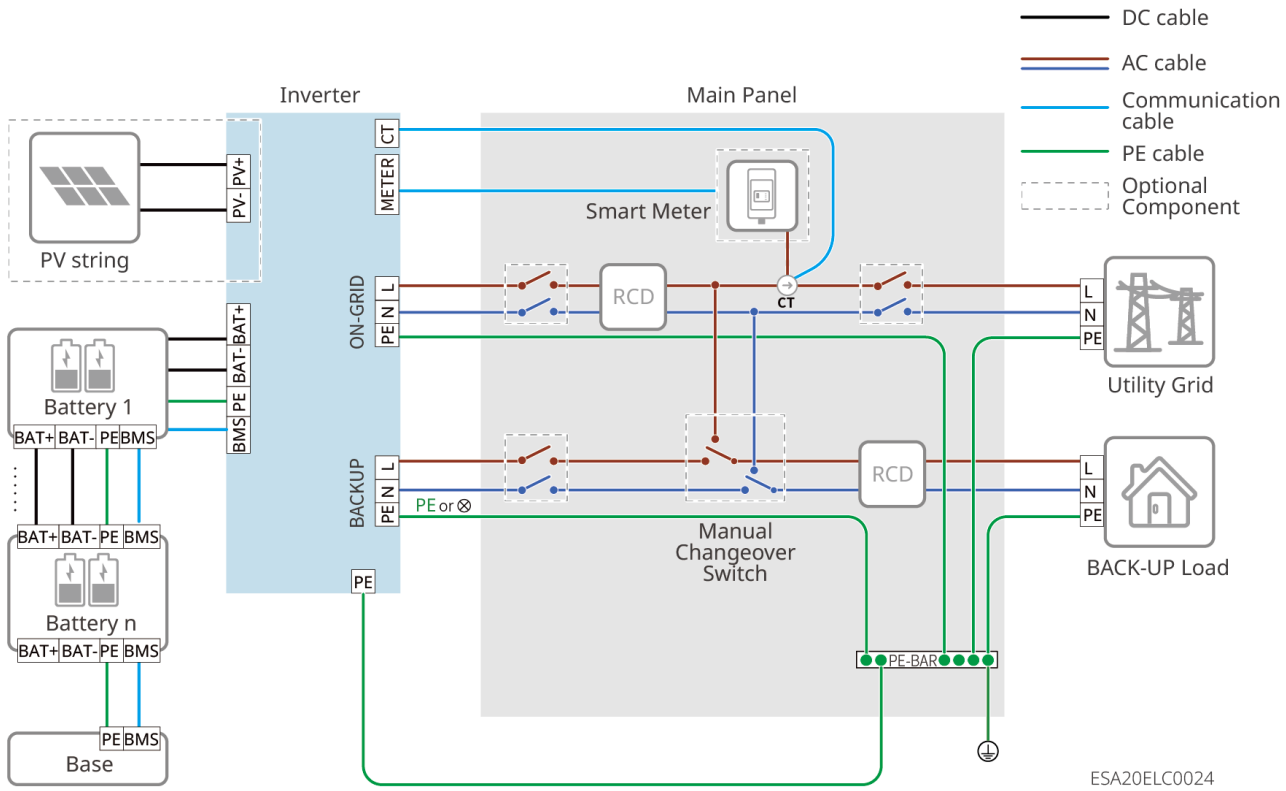


N and PE wires are separately connected in the distribution box

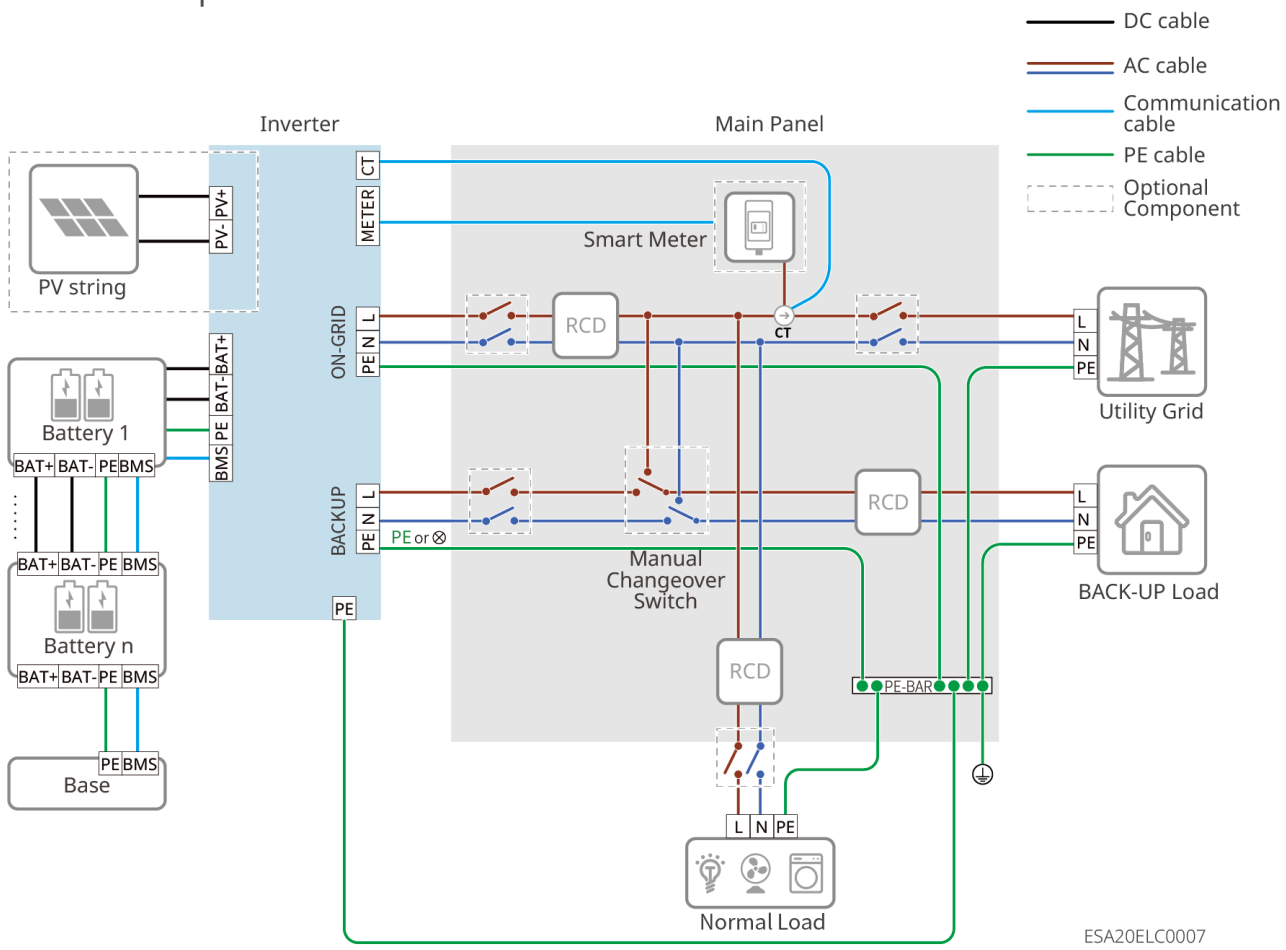
NOTICE

- Ensure the protective grounding wire for the BACK-UP is correctly and securely connected; otherwise, the BACK-UP function may operate abnormally in the event of a grid fault.
- In parallel systems, do not install Residual Current Devices (RCDs) on the grid-connection branch of each inverter. RCDs should be uniformly installed at the grid summary point.
- For regions other than Australia and New Zealand, the following wiring method applies:

Whole House Backup Power



Partial Backup Power



5.2 Detailed System Wiring Diagram

When all loads in the photovoltaic system cannot consume the electricity generated by the system, the remaining electricity will be fed into the grid. At this time, it can be paired with a smart meter or CT monitoring system to monitor the power generation and control the amount of electricity fed into the grid.

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

The Detailed System Wiring Diagram only shows wiring examples for some model devices. Please refer to the corresponding wiring guide chapter based on the actual devices used for wiring.

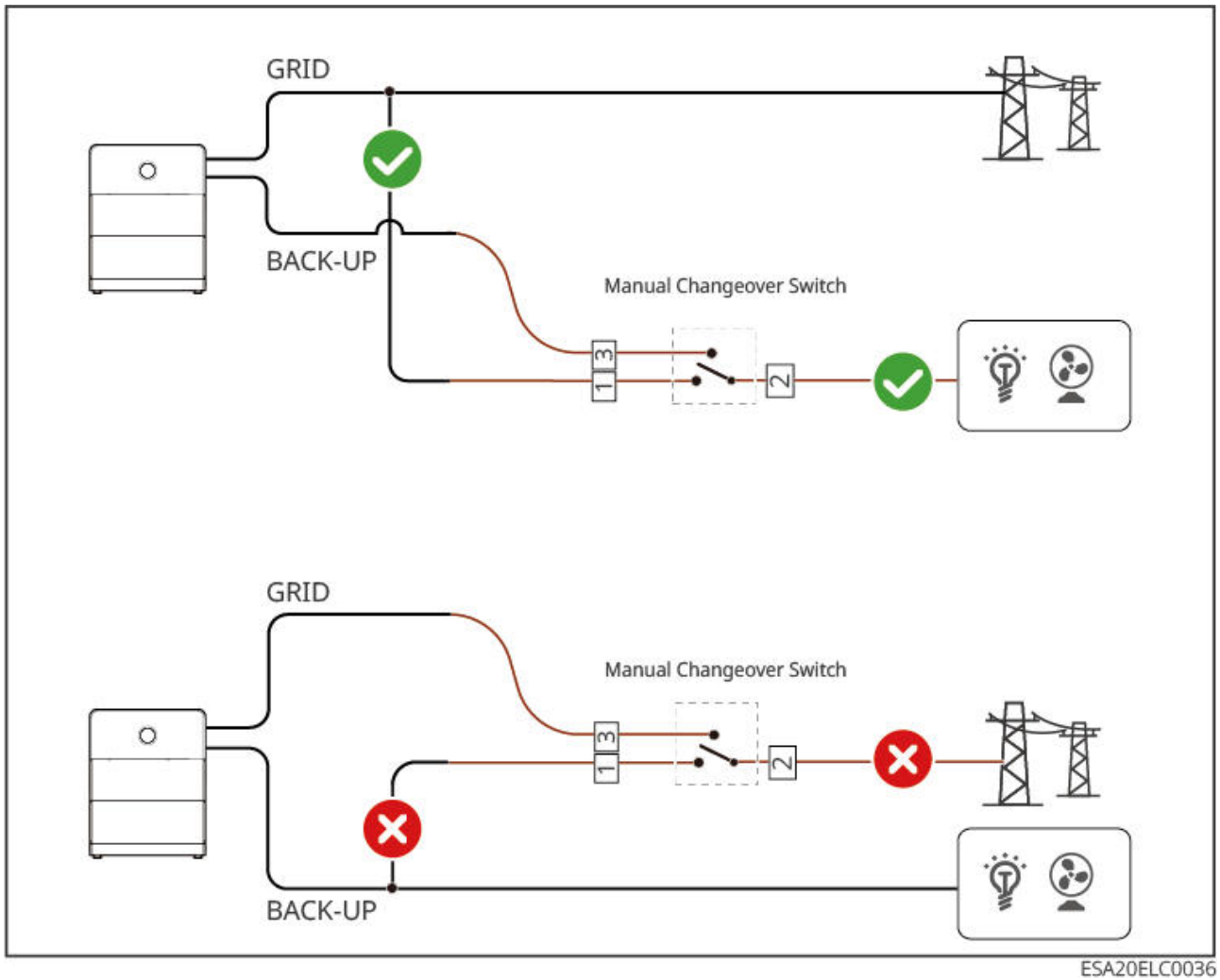
⚠WARNING

The common contact of the manual transfer switch must be on the BACK-UP load side of the Inverter, do not connect it to the GRID grid side. If connected to the GRID grid side, the Inverter's off-grid mode and bypass mode will run simultaneously. When the grid power is out, the distribution cabinet connected to the Inverter's GRID port still has high voltage, which may pose an electric shock risk.

Australia Region

NOTICE

In Australia, a 1-pole manual transfer switch is included in the product packaging. If required, please wire it according to the 1-pole manual transfer switch wiring method shown in the following wiring diagram.



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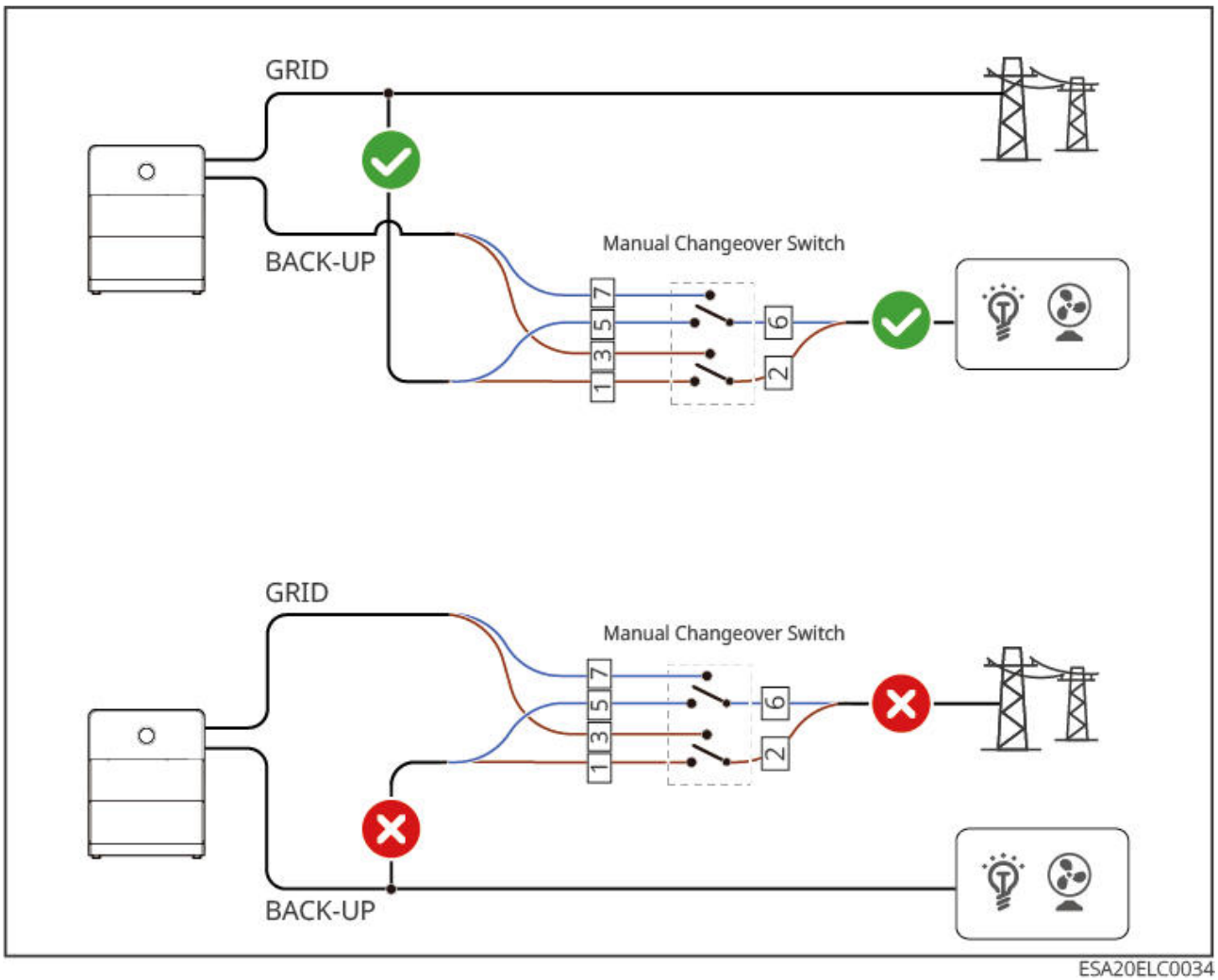
Europe Region

NOTICE

In the European region, if you need to use a manual transfer switch, please purchase a 2-pole manual transfer switch through a dealer or procure it yourself. After obtaining this switch, please wire it according to the wiring method for the 2-pole manual transfer switch in the wiring diagram below.



NOTICE

- For microgrid and coupling scenarios, a dual-meter networking setup is required to achieve grid-tied inverter power generation monitoring and load monitoring functions.
  - Meter 1 or the built-in meter is used to monitor the system's grid-connected power.
  - Meter 2 is used to monitor the grid-tied inverter's power generation.
  - By integrating data from Meter 1 and Meter 2, the monitoring platform can achieve real-time monitoring of load power consumption.
- Please connect the CT according to the direction indicated on the meter. If reversed, it may trigger a CT reverse fault.
- Parallel operation of energy storage inverters is not supported in microgrid scenarios.
- If output power limitation is required for the grid-tied inverter, please connect a separate meter or CT device.
- For microgrid scenarios and coupling scenarios with dual meters, the meter wiring methods are the same.
- When not using the inverter's built-in meter, do not connect to the inverter's CT port.
- The manual transfer switch is only supported for use in single-unit scenarios. Please decide whether to install it based on the actual application scenario. If using a self-provided ATS or STS switch, this switch must have an interlock function.

Dual Meter Configuration Scenarios	
Meter 1 (Grid Side)	Meter 2 (Inverter AC Side)
Built-in meter (standalone only)	GMK110
Built-in meter (standalone only)	GM330
GMK110	GMK110
GM330	GM330
GMK110	GM330

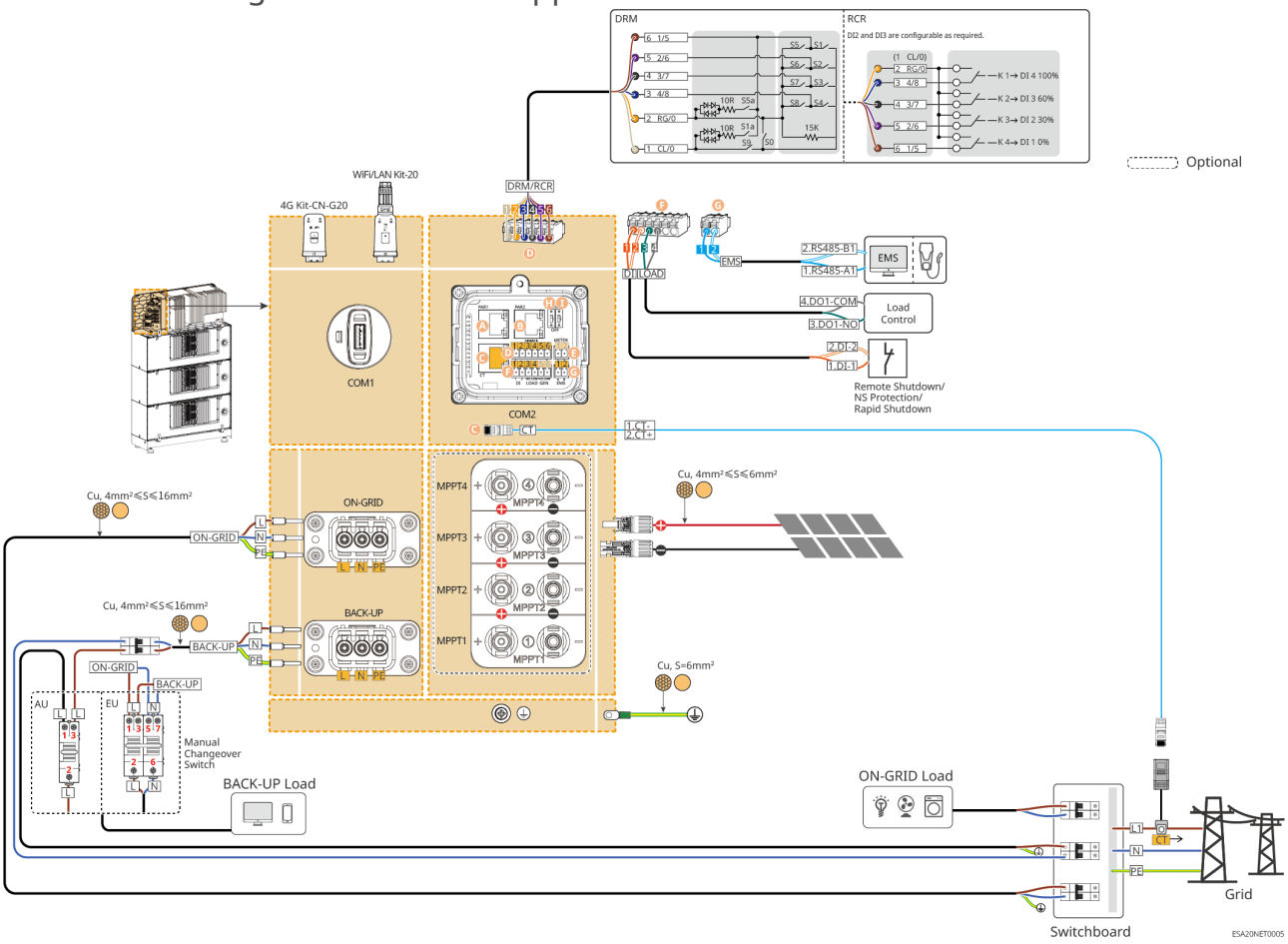
Dual Meter Configuration Scenarios	
GM330	GMK110

5.2.1 Detailed System Wiring Diagram for Single Inverter

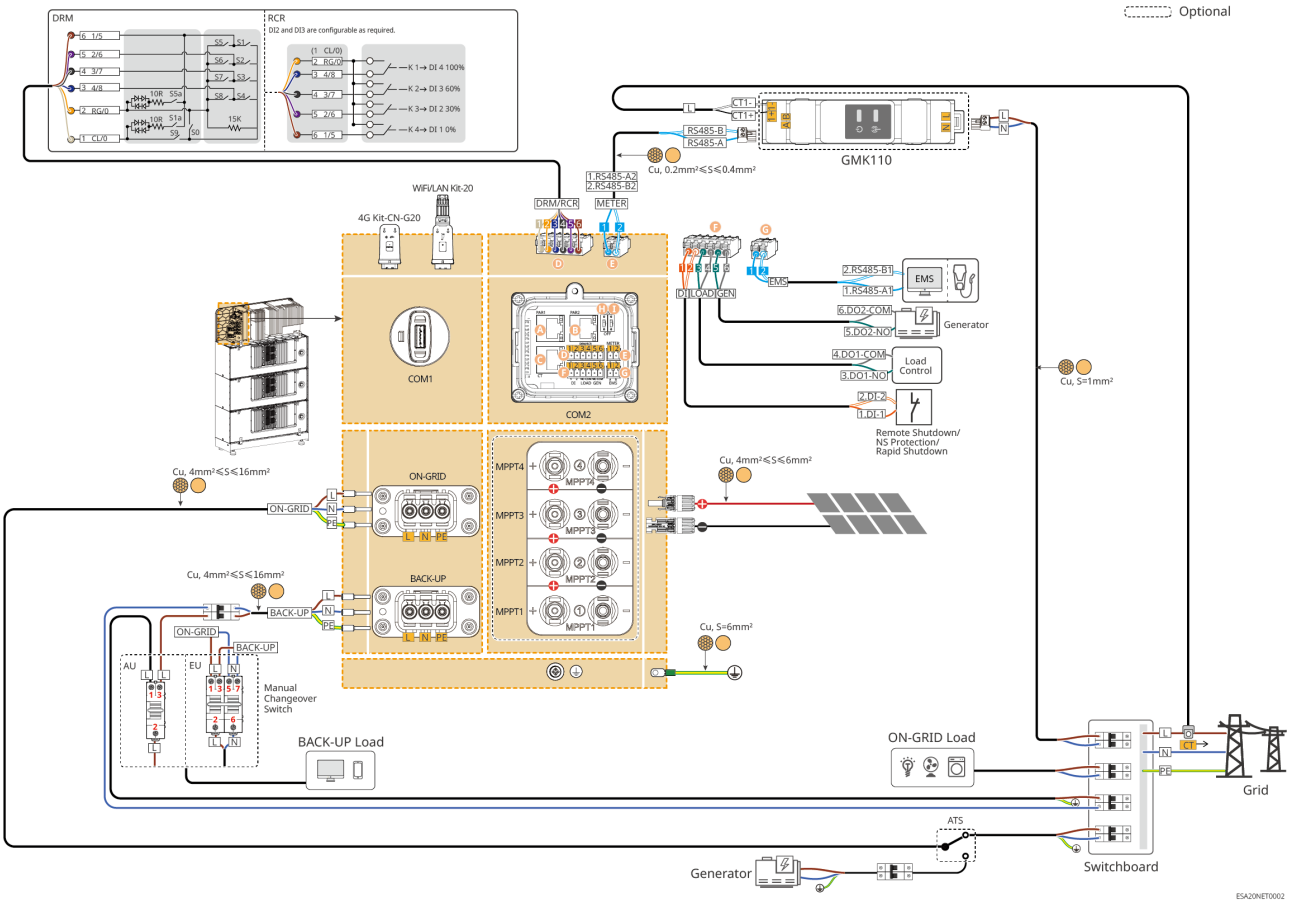
General Scenario

With built-in smart meter scenarios

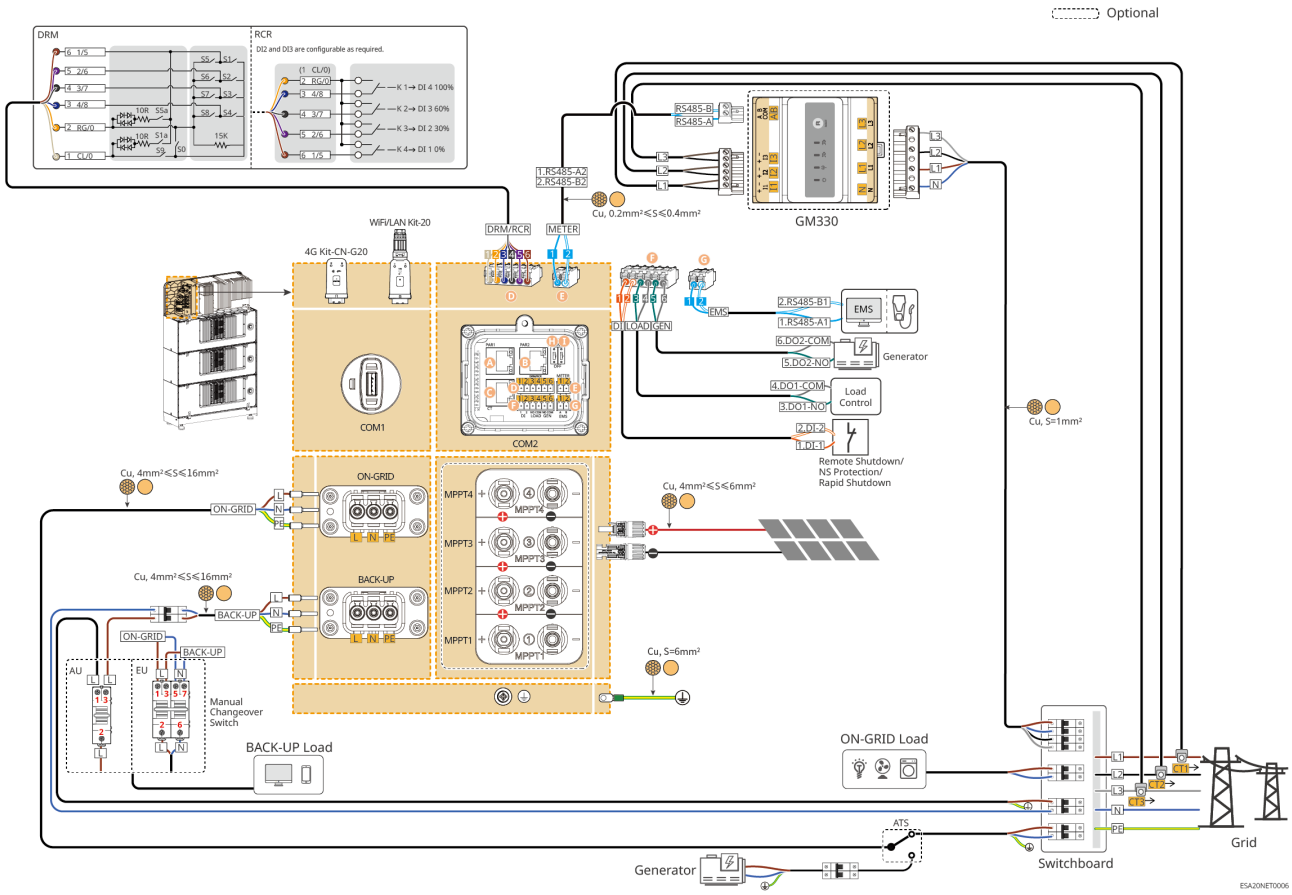
Connection to a generator is not supported.



With GMK110 Smart Meter



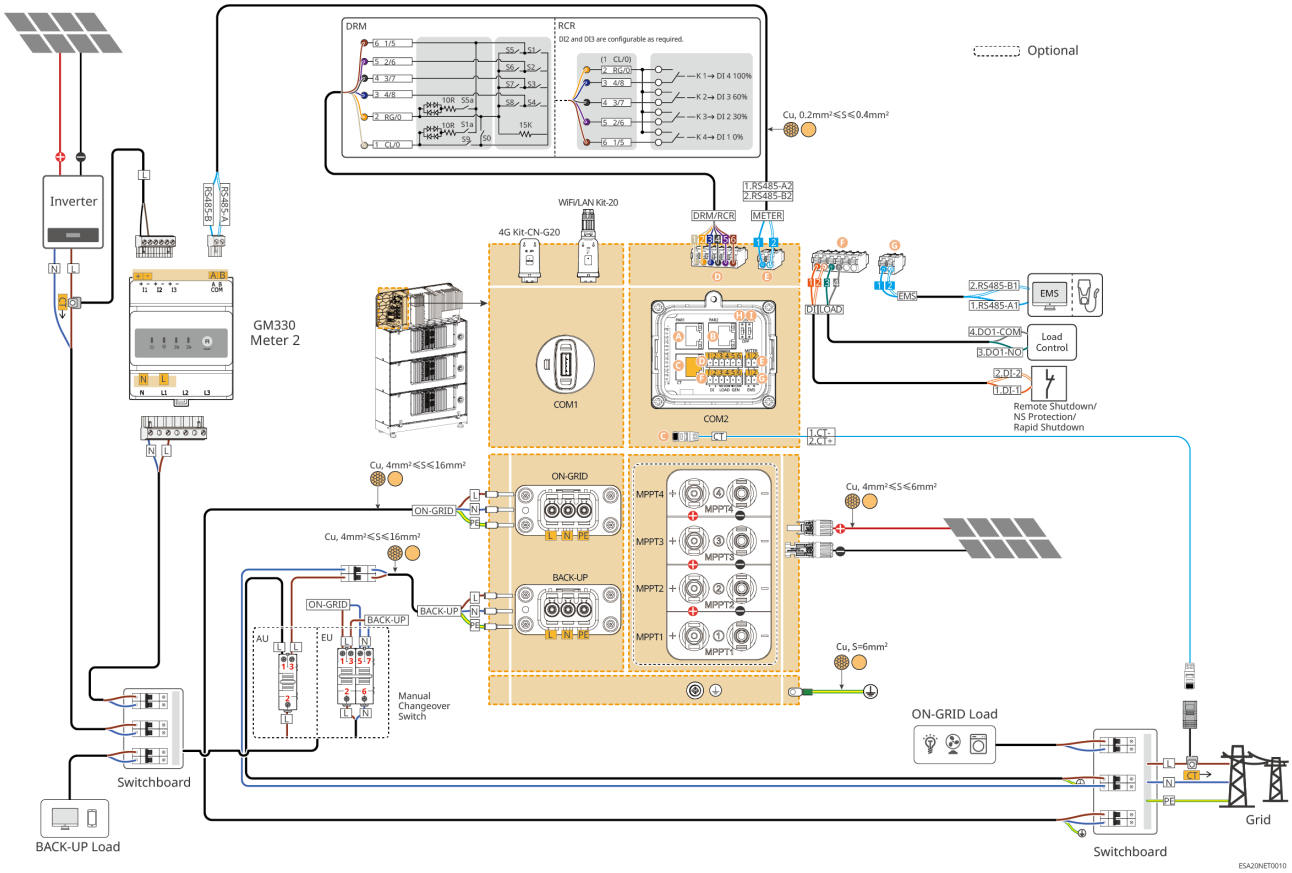
With GM330 Smart Meter



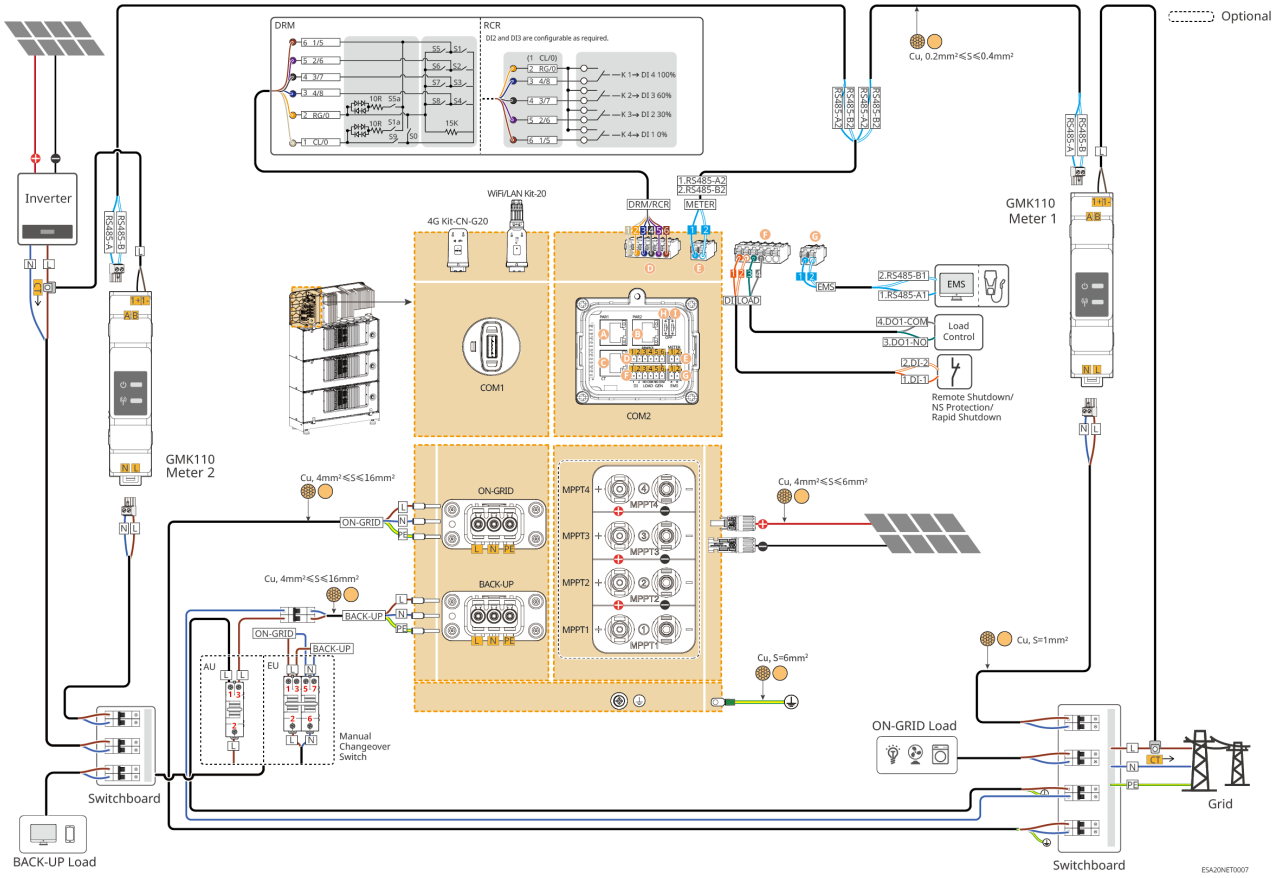
Microgrid Scenario

- In microgrid scenarios, connection to a generator is not supported.
- Manual conversion switches are optional. Please choose whether to install them based on the actual usage scenario.

Built-in Smart Meter+GM330 Smart Meter Networking Diagram

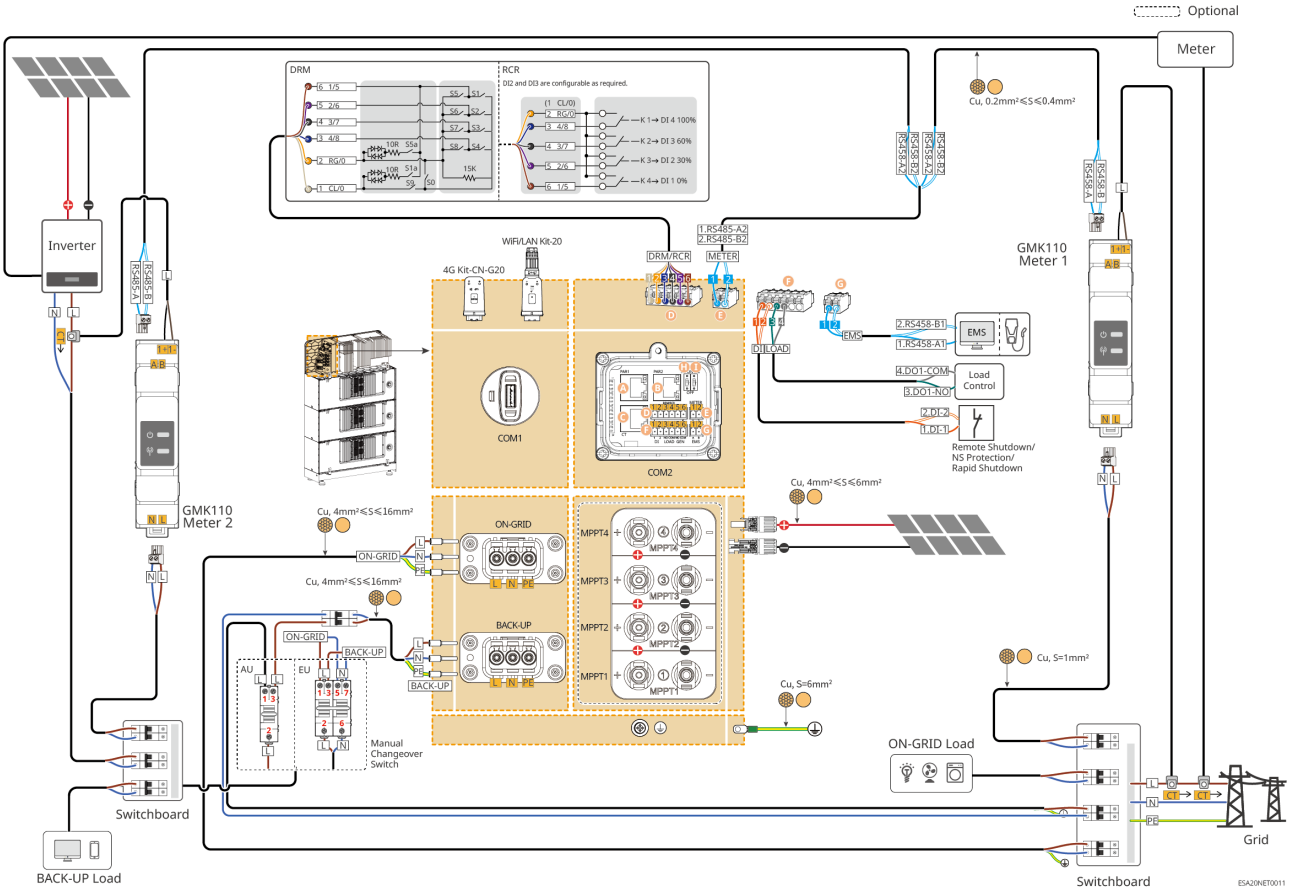


GMK110+GMK110 Networking Diagram



Microgrid Scenario. On-grid Inverter Export Power Limit Networking Diagram

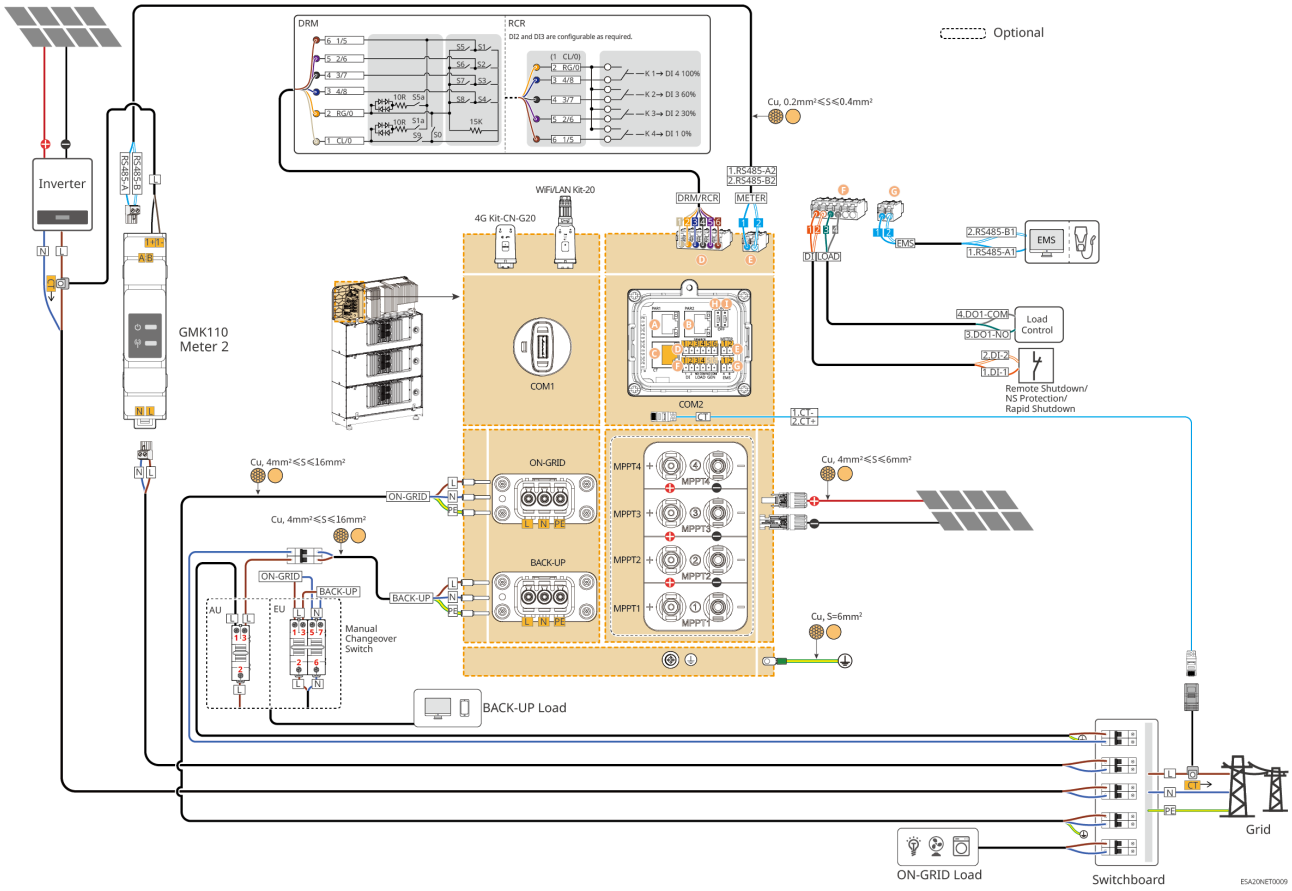
If export power limit is required for the on-grid inverter, please connect a separate device such as a smart meter or CT.



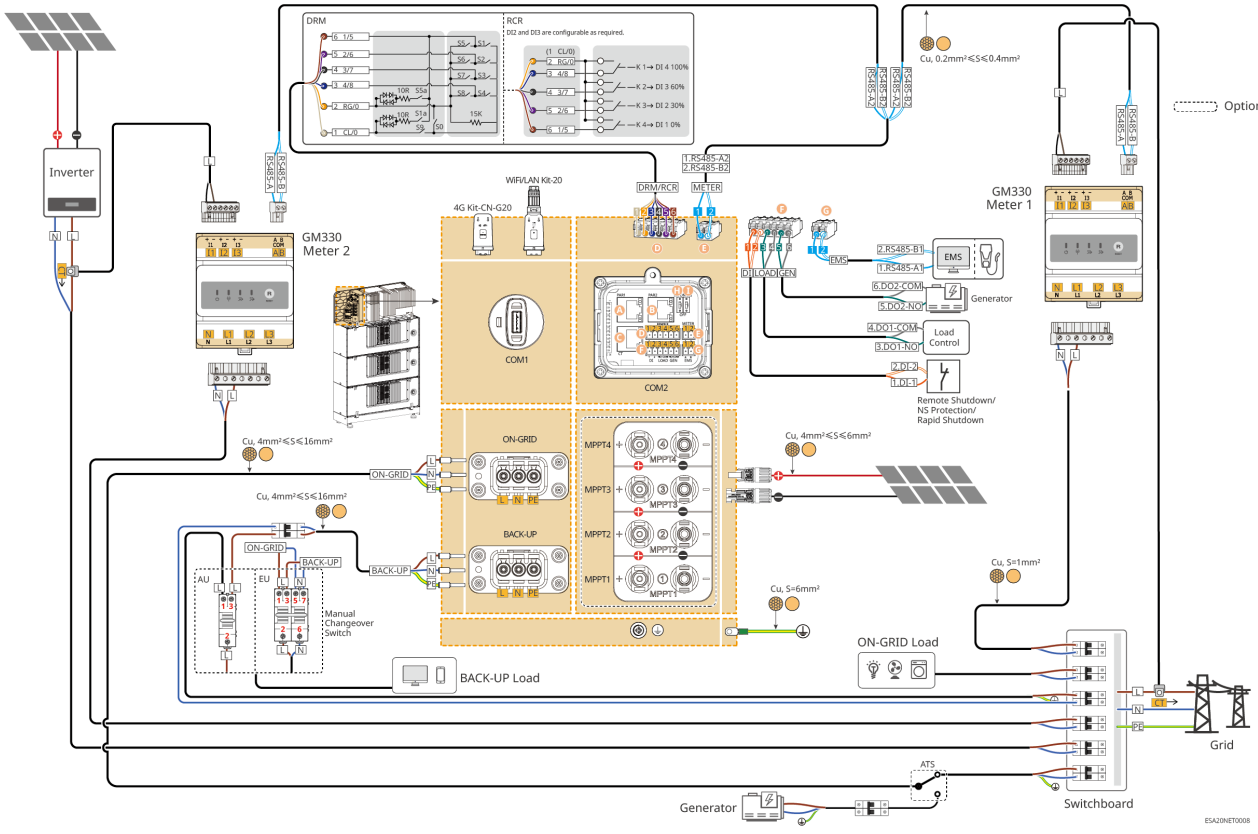
Coupled Scenario. Dual Smart Meter Networking Diagram

- Manual conversion switches are optional. Please choose whether to install them based on the actual usage scenario.
- Connection to a generator is not supported for scenario with inverter using built-in meter.

Built-in Smart Meter+GMK110 Smart Meter Networking Diagram

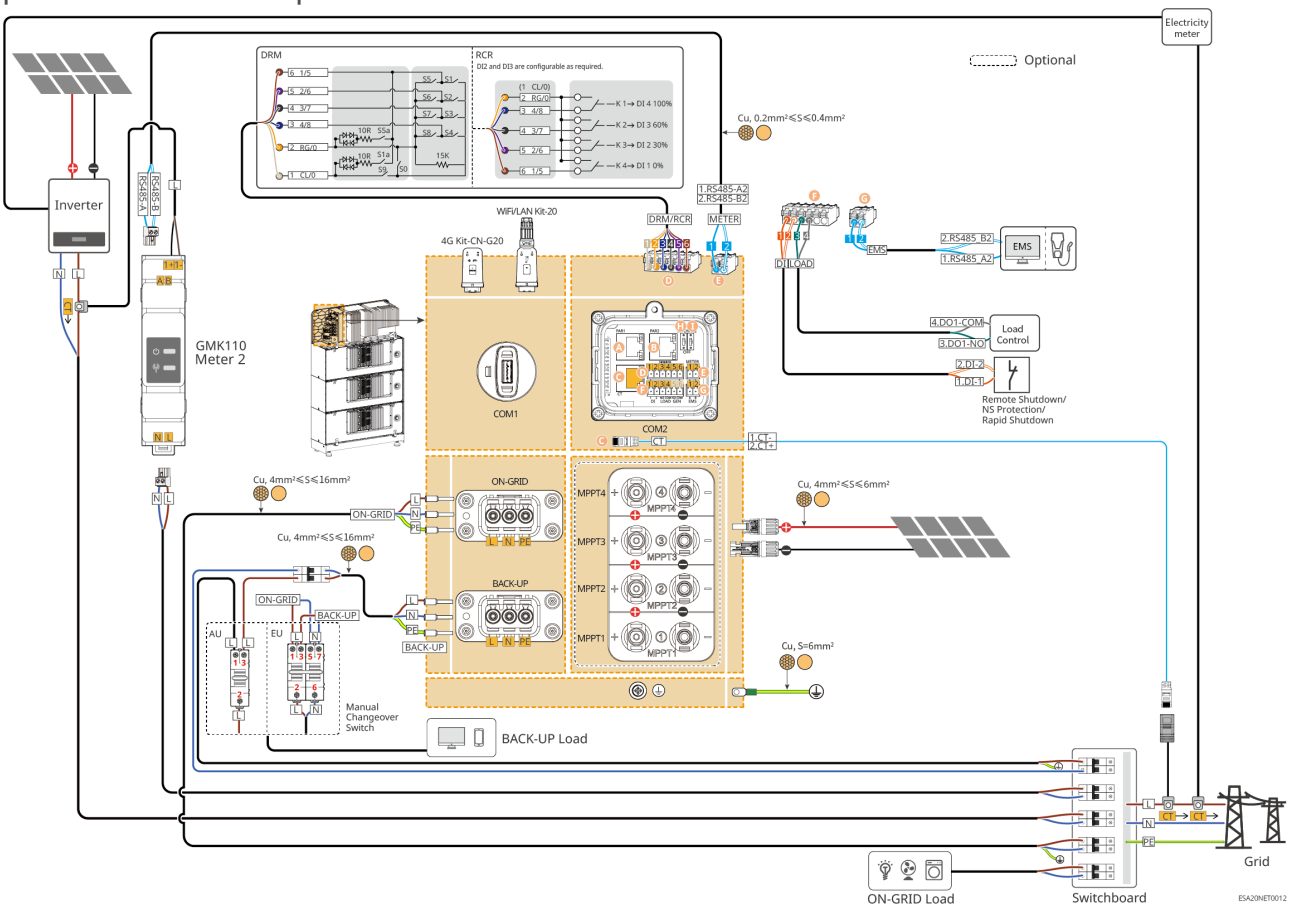


GM330+GM330 Networking Diagram



Coupled Scenario. On-grid Inverter export power limit Networking Diagram

In the coupled scenario, if export power limit is required for the on-grid inverter, please connect a separate device such as a smart meter or CT.



5.2.2 Detailed System Wiring Diagram for Parallel System

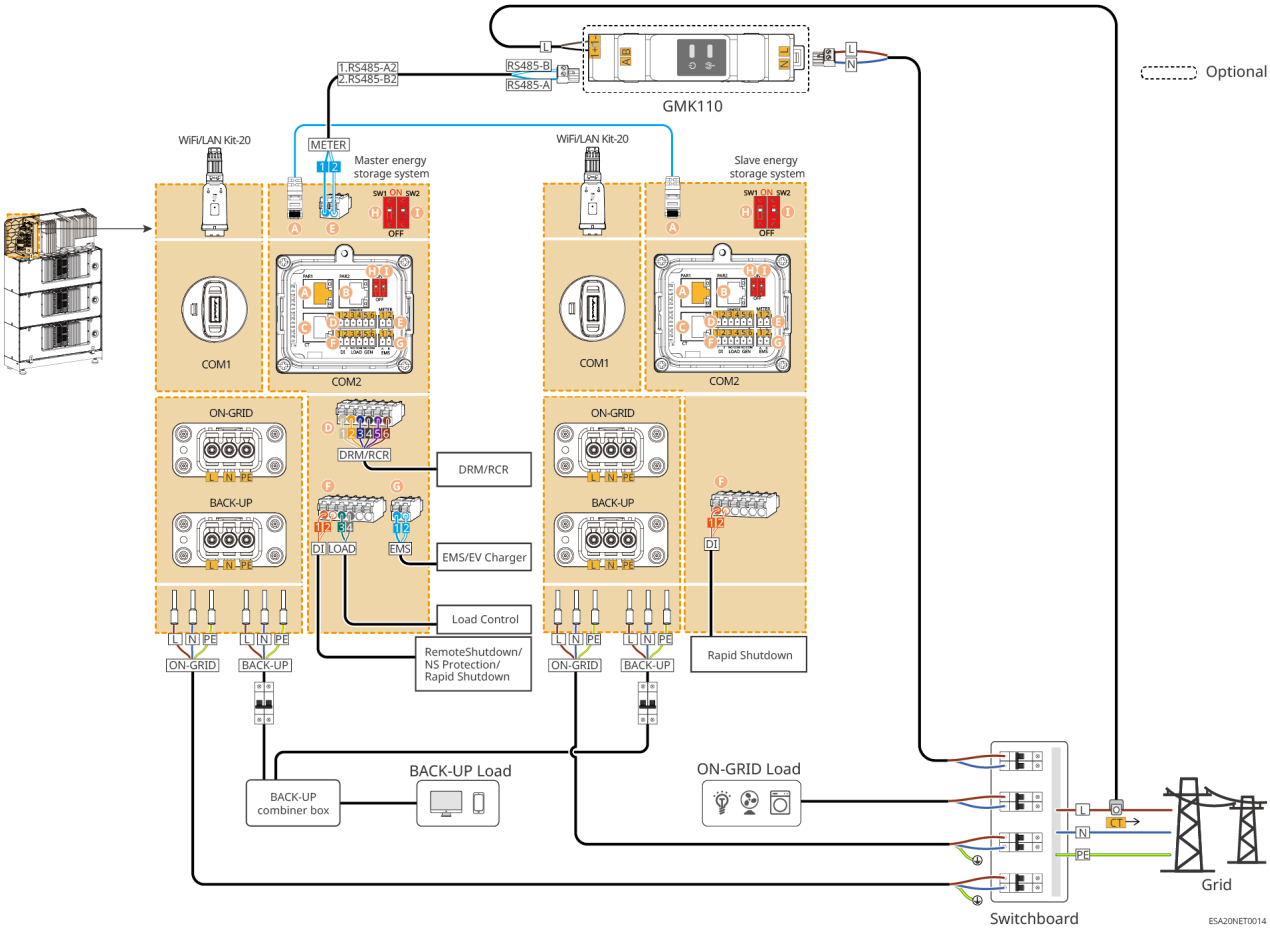
NOTICE

- If the system requires connection of DRED devices, RCR devices, Remote Shutdown devices, NS Protection, SG Ready heat pumps, etc., please connect them to the master inverter.
- Remote Shutdown/NS Protection function: Please connect the communication cable to the master inverter. Rapid Shutdown function: Please connect the communication cable to each inverter separately. If you need to use both Rapid Shutdown and Remote Shutdown/NS Protection functions simultaneously, please contact the after-sales service center.
- For parallel systems with more than two inverters, please use the GM330 Smart Meter.
- Parallel systems do not support generator connection.
- In a parallel system, if you need to disconnect the circuit breaker for any port of an inverter, please simultaneously disconnect the other port circuit breakers of that inverter; otherwise, it may cause abnormal system operation.
- In a parallel system, set the DIP switches of the first and last inverters to the ON position, and set the DIP switches of the other inverters to the OFF position.
- The following diagrams focus on wiring related to parallel operation. For wiring requirements of other ports, please refer to the single-unit system.

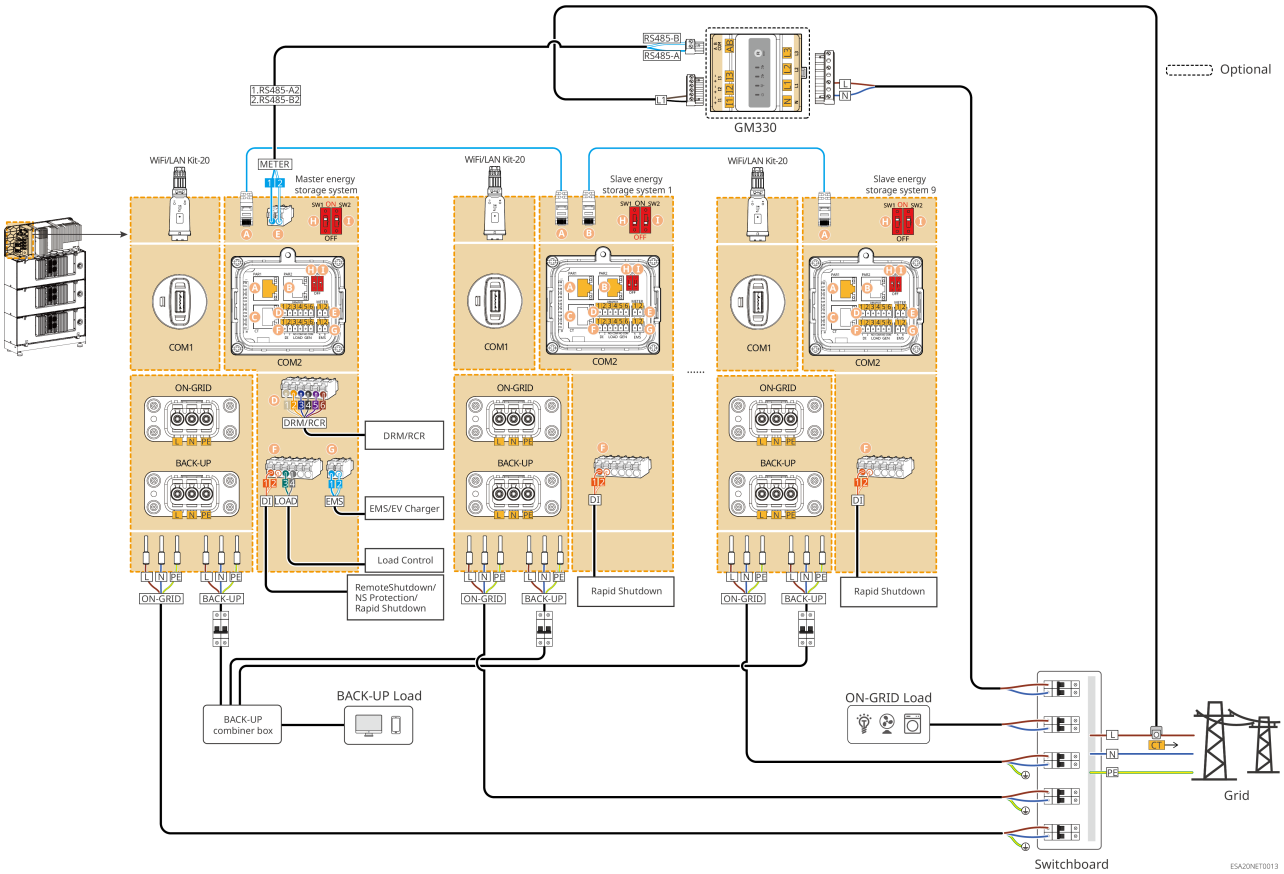
In a parallel system scenario, the inverter connected to the meter is the master inverter, and the others are slave inverters.
The master inverter needs to be set as the host via the app's "Parallel System Settings"。 For specific settings, please refer to 7.1.6.Setting RS485 Parallel System(Page 145).

General Scenario

With GMK110 scenario

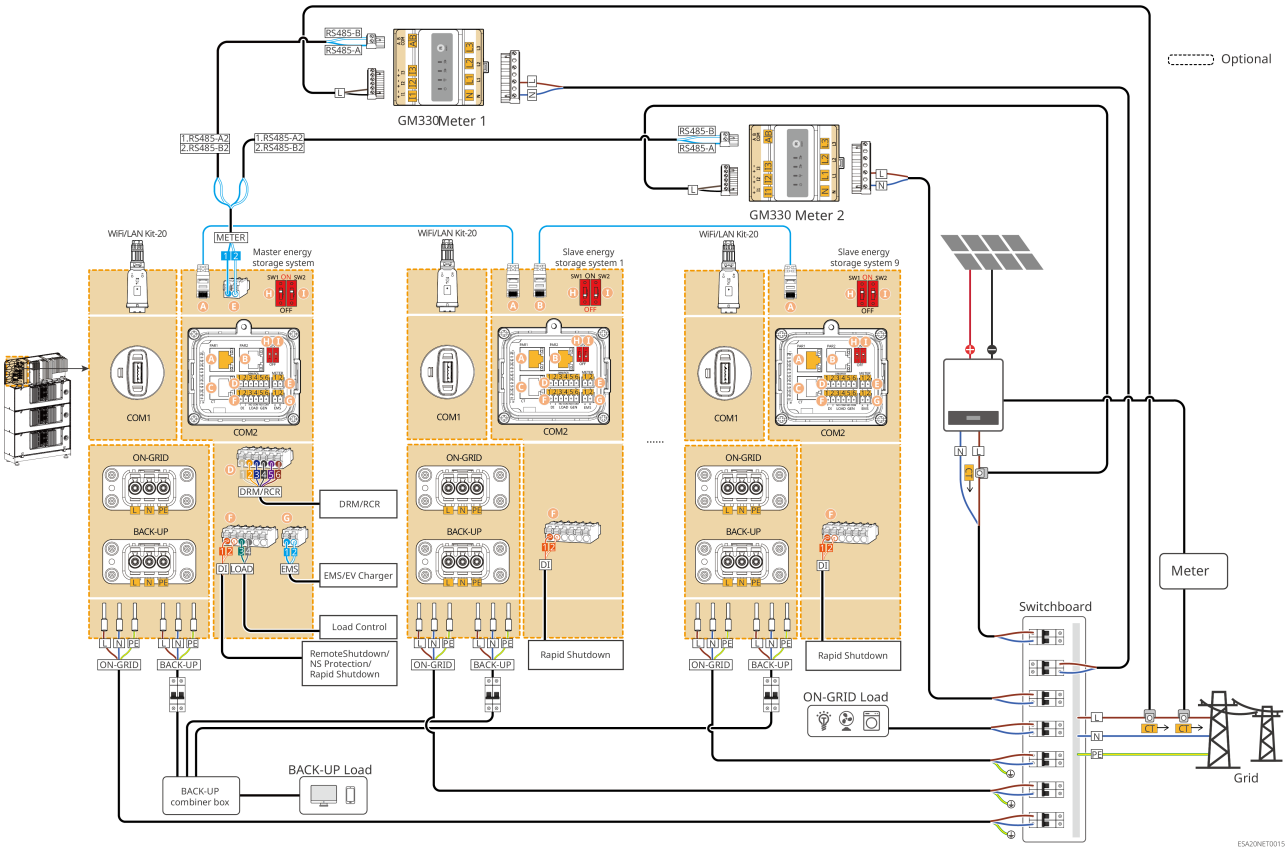


With GM330 scenario



Coupling Scenario

GM330 + GM330 networking



For the wiring method of the system coupling scenario with parallel connection and GMK110, refer to the GMK110 scenario in the general parallel scenario. For the grid-tied inverter wiring method, refer to the single-unit coupling scenario for wiring.

5.3 Preparing Materials

⚠WARNING

- Do not connect loads between the inverter and the AC switch directly connected to the inverter.
- Install one AC output circuit breaker for each inverter. Multiple inverters cannot share one AC circuit breaker.
- An AC circuit breaker shall be installed on the AC side to make sure that the inverter can safely disconnect the grid when an exception happens. Select the appropriate AC circuit breaker in compliance with local laws and regulations.
- When the inverter is powered on, the BACK-UP AC port is charged. Power off the inverter first if maintenance is required on the BACK-UP loads. 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 following cable should be consistent.
  - The AC cable for BACK-UP port of each inverter
  - The AC cable for ON-GRID port of each inverter
- In single inverter scenario, the inverter supports connection to a generator via an ATS switch, enabling switching between grid and generator power supply. The ATS switch is connected to the power grid by default.

5.3.1 Preparing Breakers

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
1	ON-GRID breaker BACK-UP breaker	For partial backup scenarios, the recommendations are as follows: • Nominal Voltage≥230Vac • Rated Current requirements are as follows: ◦ GW3K-EHA-G20: 20A ◦ GW3.6K-EHA-G20: 20A ◦ GW5K-EHA-G20: 32A ◦ GW6K-EHA-G20: 40A	Customer-supplied	During actual selection, you can also choose a breaker that meets local installation regulations based on the actual operating current.

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ 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 For whole-house backup scenarios, the recommendations are as follows: • Nominal Voltage≥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 ◦ GW10K-EHA-G20: 63A ◦ GW3K-BHA-G20: 63A ◦ GW3.6K-BHA-G20: 63A ◦ GW5K-BHA-G20: 63A ◦ GW6K-BHA-G20: 63A		

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
		◦ GW8K-BHA-G20: 63A ◦ GW9.999K-BHA-G20: 63A ◦ GW10K-BHA-G20: 63A Note: If the inverter BACK-UP port is not used, the ON-GRID breaker can be selected based on the maximum grid-connected current.		
2	ATS switch	The specifications of the ATS switch and ON-GRID breaker for the same model are consistent.	Customer-supplied	For single unit only
3	RCD (RCD)	RCD equipment installation and RCD specification selection: It is recommended to connect an A-type RCD with a residual current triggering level ≥300mA to the AC output side of the inverter (for inverter capacity <30kVA, select the residual current operating level as 300mA; for inverter capacity ≥30kVA, select the residual current operating level as 10mA/kVA). You can also choose the appropriate RCD specification based on local regulatory requirements.	Customer-supplied	-

No.	breaker	Recommended Specifications	Acquisition Method	Remarks
4	(Optional) Manual Transfer Switch	• Nominal Voltage≥230Vac • Rated Current: 63A	• Customer-supplied • Shipped with the inverter (Australia only)	For single unit only

5.3.2 Preparing Cables

No.	Cable	Recommended Specifications	Acquisition Method
1	Inverter Enclosure Protective Ground Wire	• Single-core outdoor copper cable • Conductor cross-sectional area: S=5.2mm²-6mm²	Self-provided
2	PV DC Cable	Only for EHA models: • Industry-standard outdoor photovoltaic cable • Conductor cross-sectional area: 4mm²-6mm² • 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 cable outer diameter: 10mm-21mm Note: The above conductor cross-sectional area data is for reference only. During actual on-site installation and wiring, select appropriate cables that meet the requirements for safe current carrying capacity and voltage drop based on actual load current, cable length, installation environment, and heat dissipation conditions.	Self-provided
4	Smart Meter Power Cable	• Outdoor copper cable • Conductor cross-sectional area: 1mm²	Self-provided

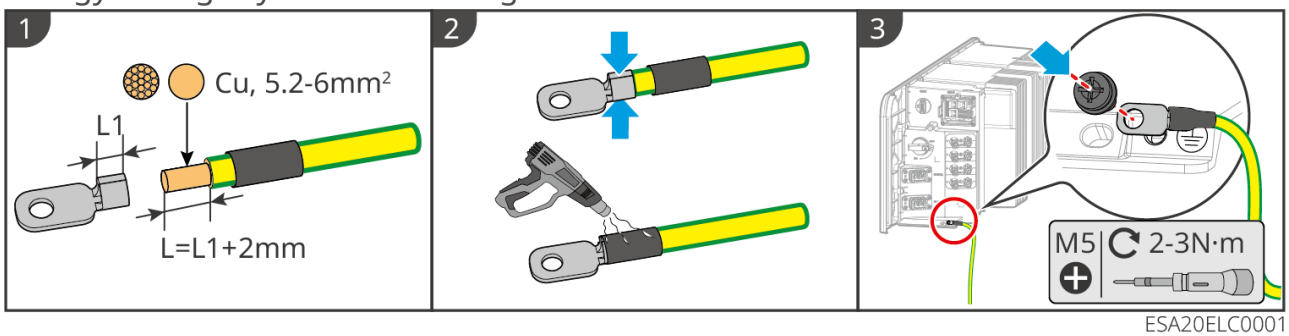
No.	Cable	Recommended Specifications	Acquisition Method
5	Meter RS485 Communication Cable	• Shielded twisted pair • Conductor cross-sectional area: 0.2mm²-0.4mm²	Self-provided
6	EMS or Charging Pile RS485 Communication Cable		
7	Remote Shutdown and NS Protection Communication Cable	• Shielded cable meeting local standards • Conductor cross-sectional area: 0.2mm²-0.4mm² • Cable outer diameter: 5mm-8mm	Self-provided
8	Load Control and Generator Control DO Communication Cable		
9	RCR/DRED Signal Cable		
10	CT Communication Cable	Standard network cable: CAT 5E or higher specification standard shielded network cable and RJ45 connector	Self-provided
11	Inverter Parallel Communication Cable	• RJ45 connector • CAT 5E or higher specification straight-through network cable ◦ CAT 5E or CAT 6E recommended length not exceeding 5 meters ◦ CAT 7E recommended length not exceeding 10 meters	Self-provided

5.4 Connecting the PE cable

⚠WARNING

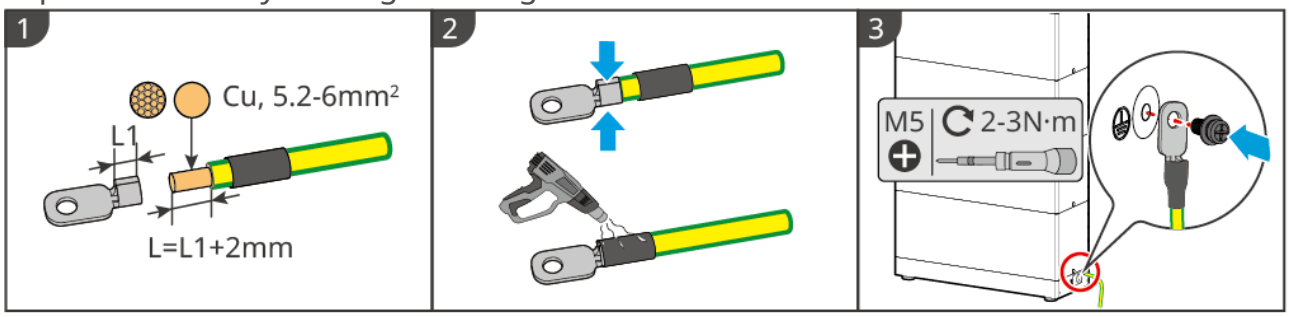
- The Protection grounding of the chassis enclosure cannot replace the PE cable of the AC output port. When wiring, ensure that the PE cable at both locations is reliably connected.
- To improve the corrosion resistance of terminal, it is recommended to apply silica gel or paint on the exterior of Grounding terminal for protection after completing the connection of Installation to PE cable.
- When Installation equipment, the PE cable must be Installation first; when dismantle equipment, the PE cable must be dismantle last.
- The grounding is integrated into the blind-mate connector and connected to the Inverter. The system is uniformly grounded through the Inverter, eliminating the need for separate grounding operations on the Battery during Installation. If there is a need for split-type capacity expansion, please separately ground the expanded Battery BANK.

energy storage system Grounding



ESA20ELC0001

Expansion Battery BANK grounding:



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5.5 Connecting the PV Cable

⚠DANGER

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

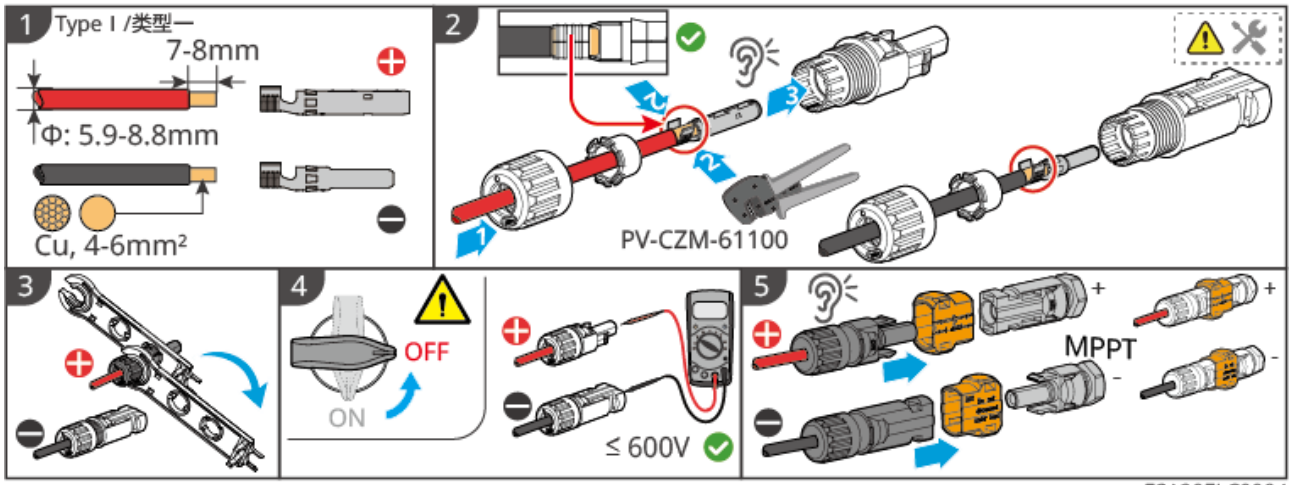
⚠WARNING

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

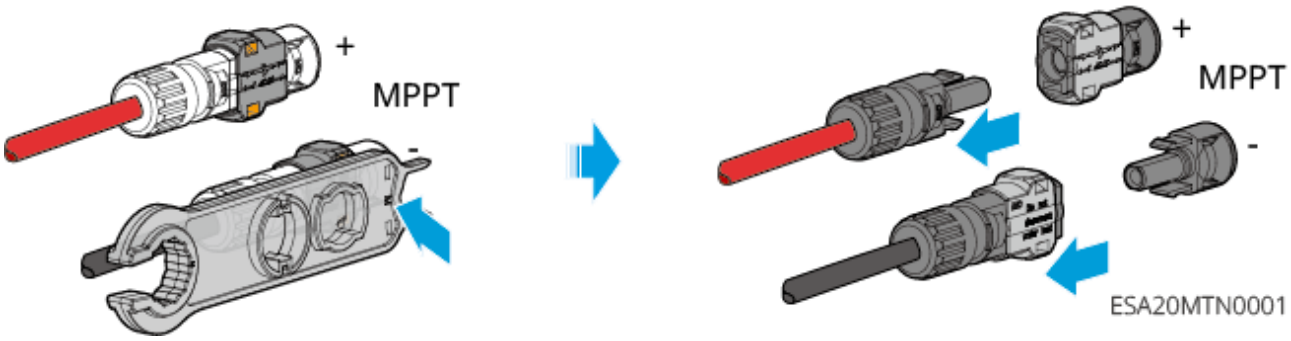
NOTICE

- The two PV strings within each MPPT must use the same model, the same number of panels, the same tilt angle, and the same azimuth angle to ensure maximum efficiency.
- Connecting PV cables applies only to EHA models; BHA models do not have PV connection ports.

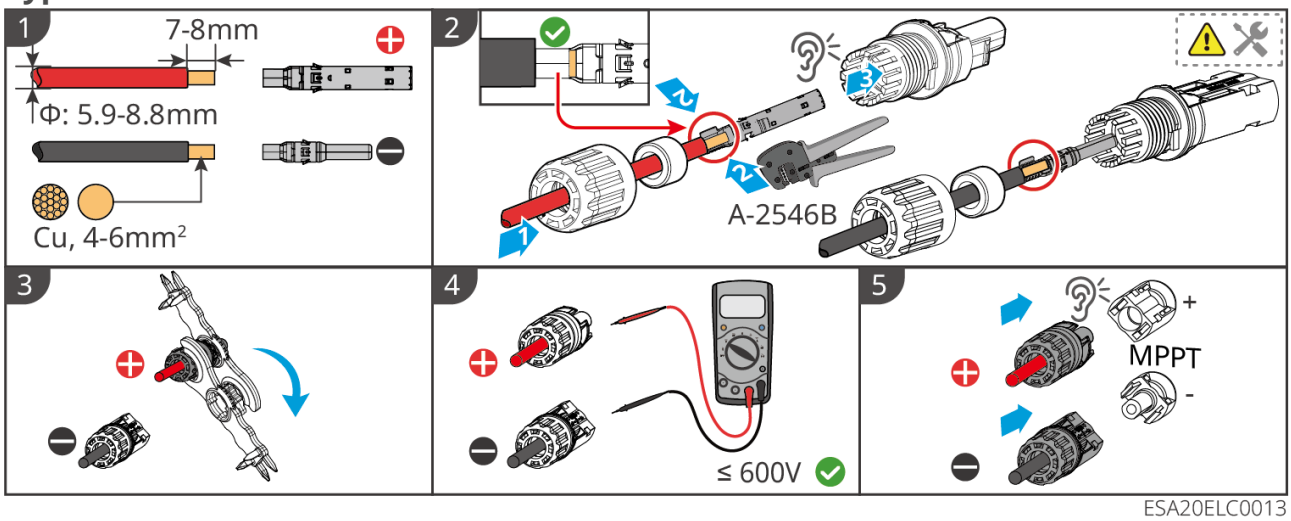
Type 1:



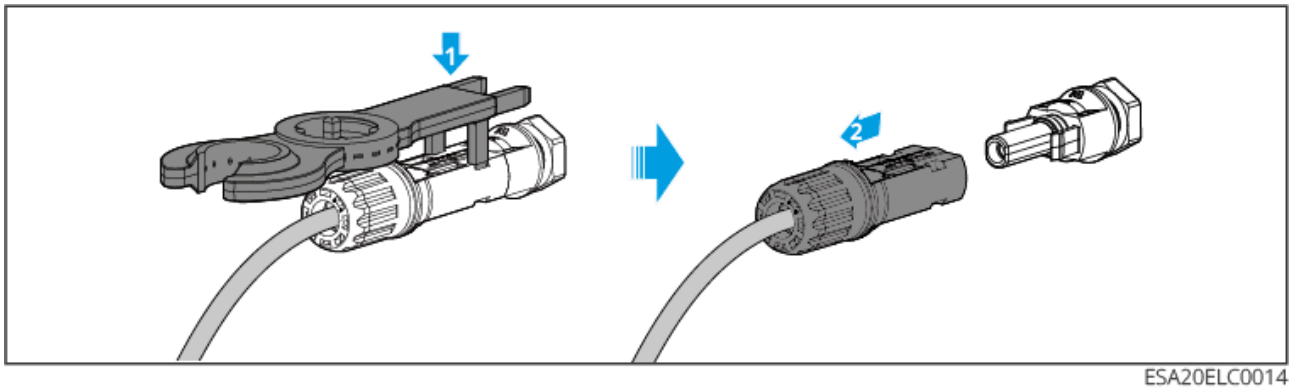
If you need to disassemble the PV terminal, please refer to the steps below:



Type 2:



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



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5.6 Expansion line for connecting Battery

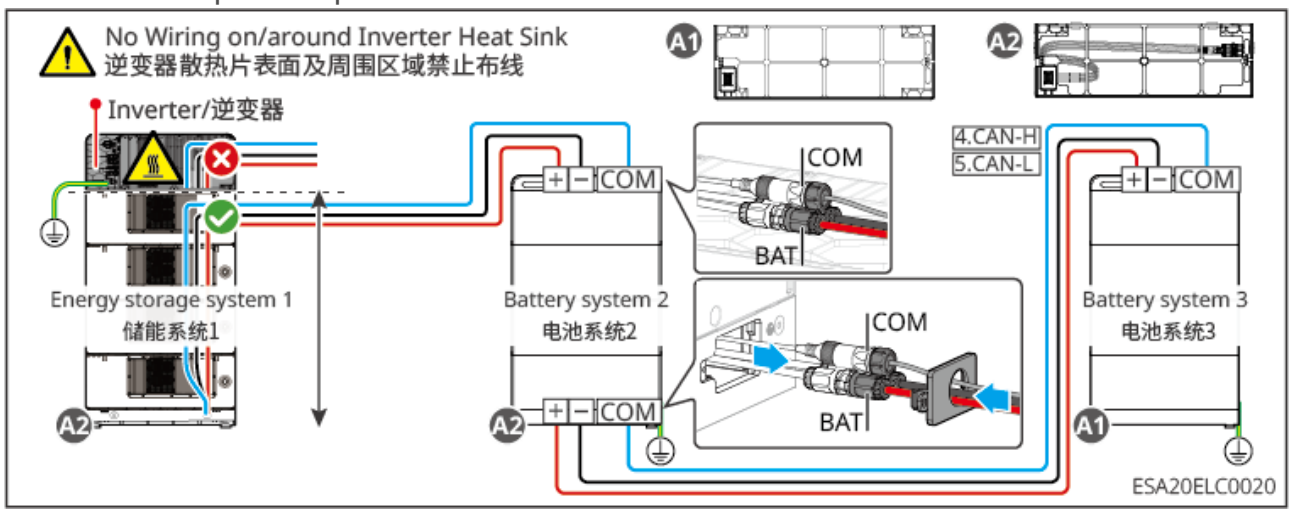
DANGER

- Do not connect any load between the Inverter and Battery.
- When Connecting the Battery Cable, use insulated tools to prevent accidental electric shock or Battery Short Circuit.
- Please ensure that Batteryopen-circuit voltage is within the allowable range of Inverter.
- Between Battery and Battery, please configure DC Switch according to local laws and regulations.
- Inverterheat sink surfaces and surrounding areas must remain free of wiring to prevent overheating damage to wire harnesses.

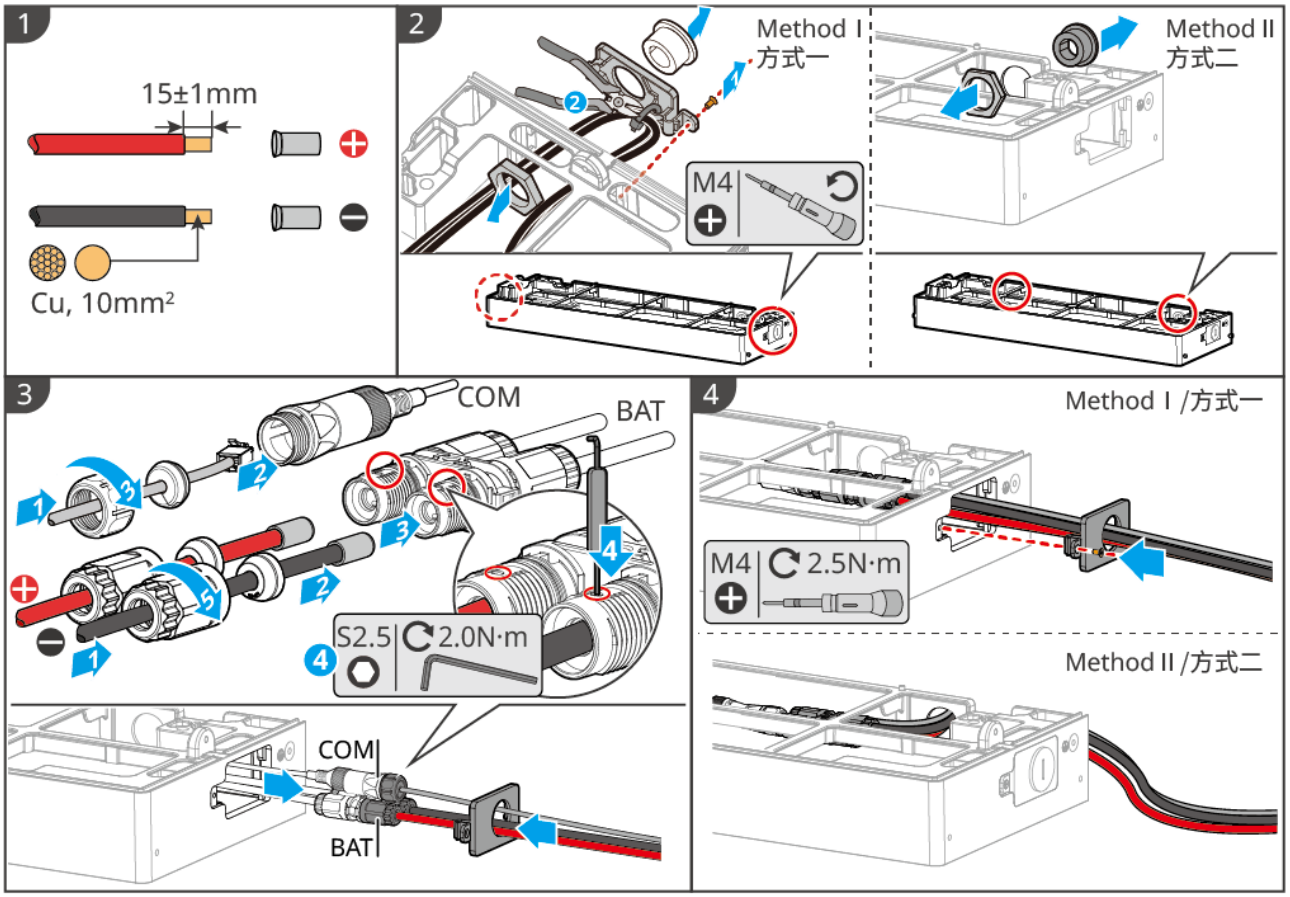
energy storage system Expansion Overview

A1: Base shipped with Inverter

A2: Base with parallel port in Installation



Battery system Expansion Harness Manufacturing Method



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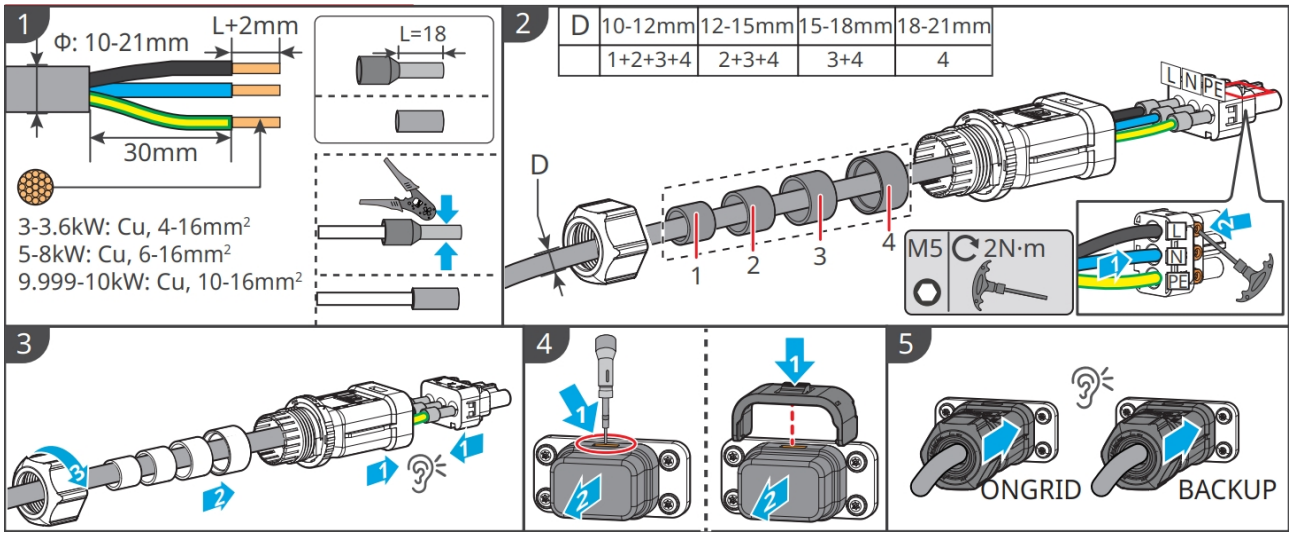
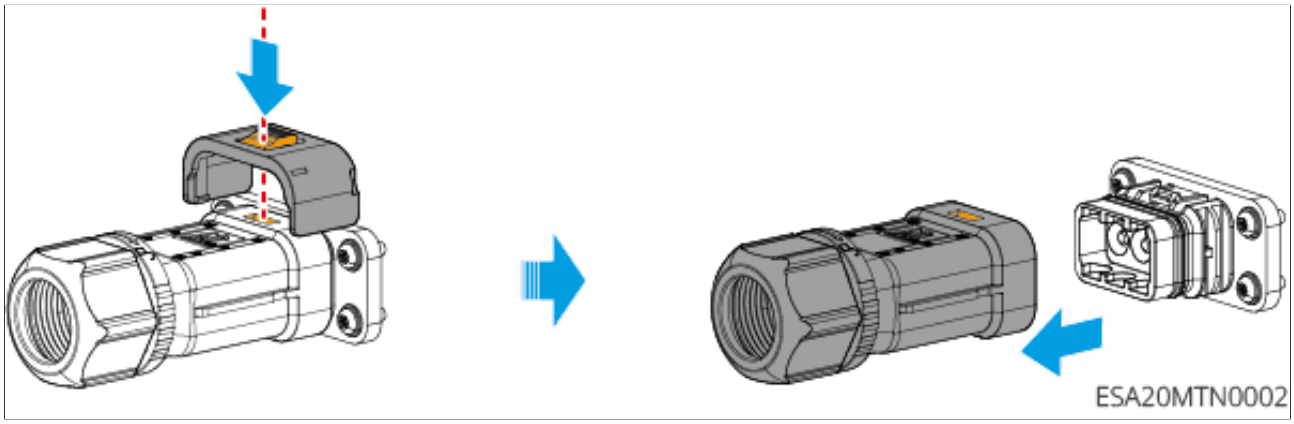
5.7 Connecting the AC Cable

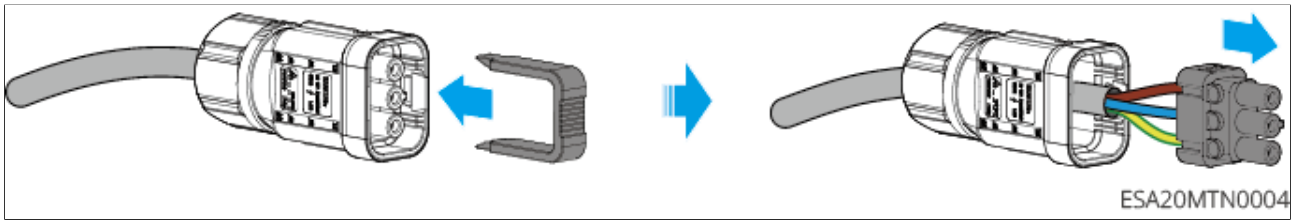
⚠WARNING

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

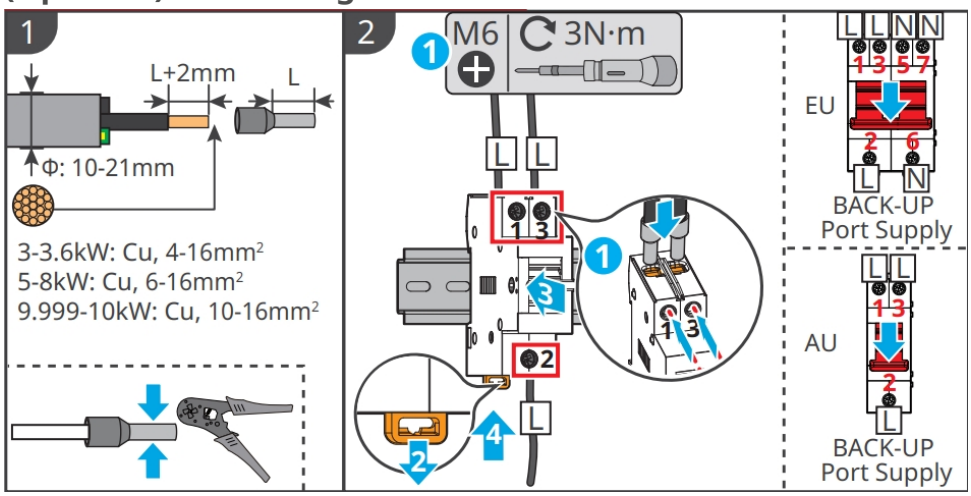


To disassemble the AC terminal, please refer to the following steps:





(Optional) Connecting the Manual Transfer Switch



5.8 Connecting the Meter Cable

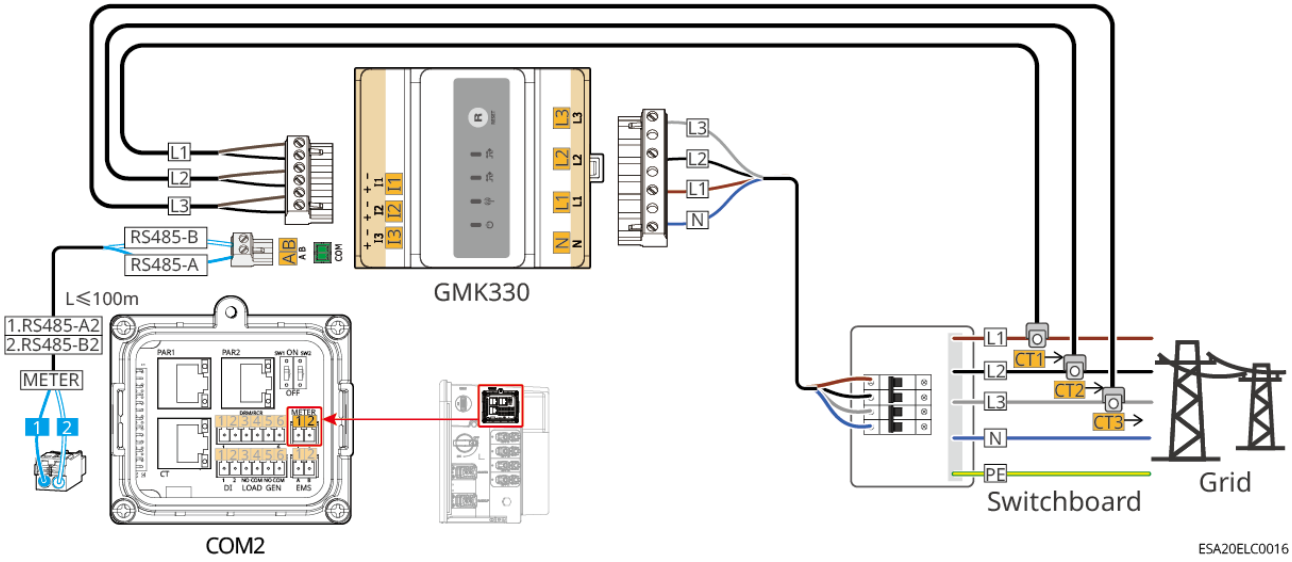
NOTICE

- If multiple InverterParallel Networking units are required, please consult the manufacturer to purchase the meter separately.
- Please ensure the CT connection direction is correct and the phase is accurate; otherwise, it may lead to incorrect monitoring data.
- Ensure all cable connections are correct, secure, and free from looseness. Improper wiring may cause poor contact or damage to the meter.
- In areas with lightning DANGER, if the meter cable length exceeds 10m and the cable is not laid with grounding Steel conduit, it is recommended to install external lightning protection devices.

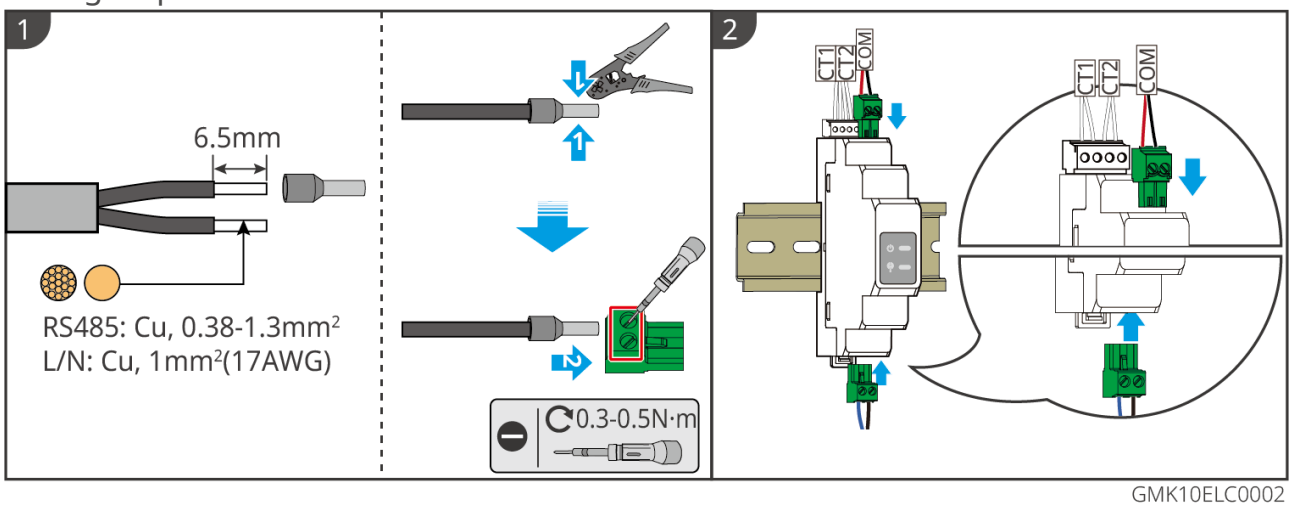
GMK110 meter wiring

NOTICE

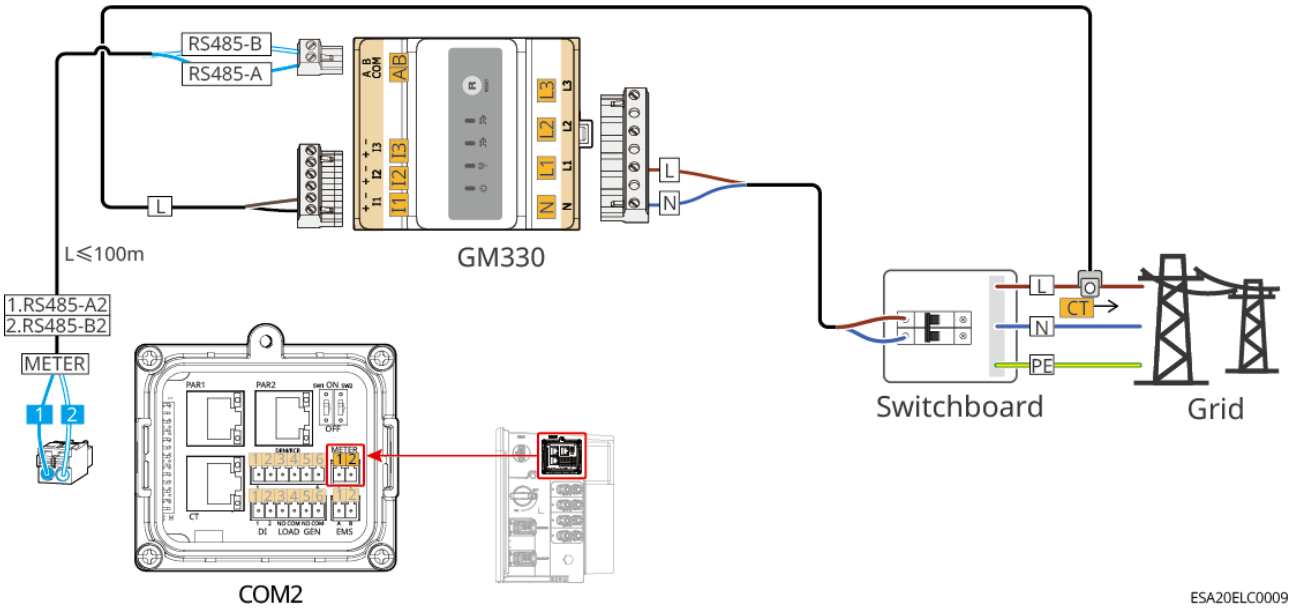
- The outer diameter of the AC power line must be smaller than the CT aperture to ensure the AC power line can pass through the CT.
- To ensure the current monitoring accuracy of the CT, the recommended length of the CT cable should not exceed 30 meters.
- Do not use network cables as CT cables, otherwise the meter may be damaged due to excessive current.
- The CTs provided by equipment manufacturers may vary slightly in size and appearance depending on the model, but the Installation wiring method remains consistent.



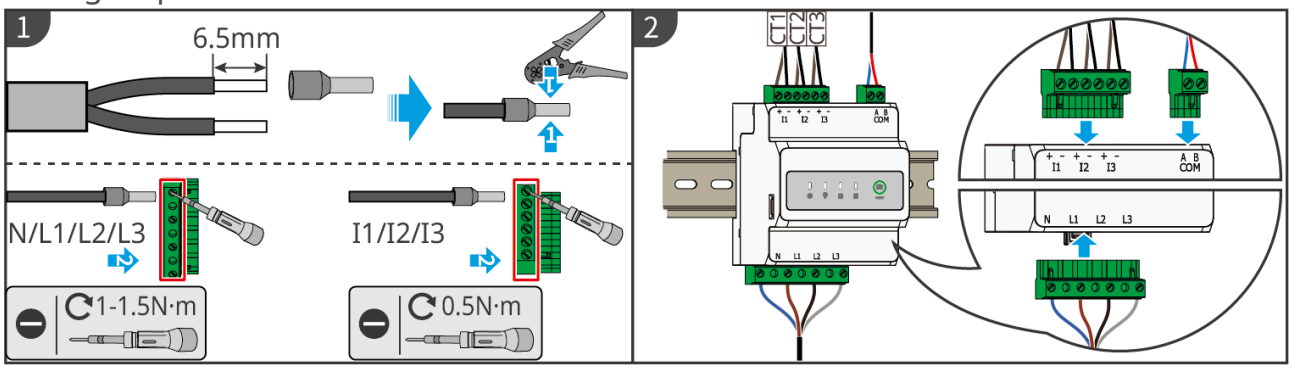
Wiring steps



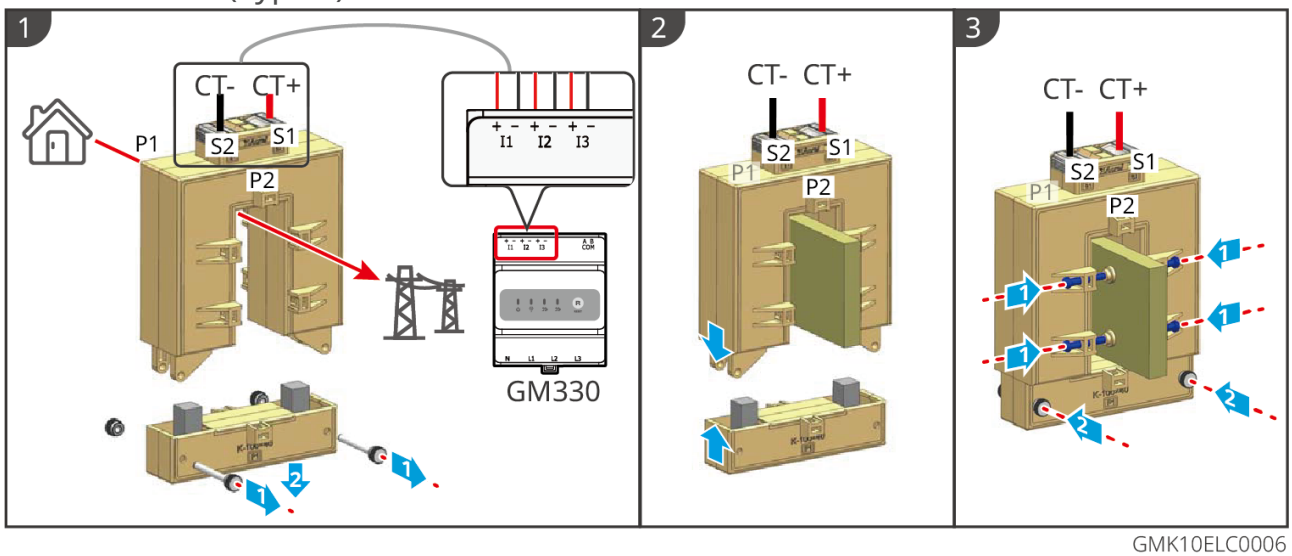
GM330 meter wiring



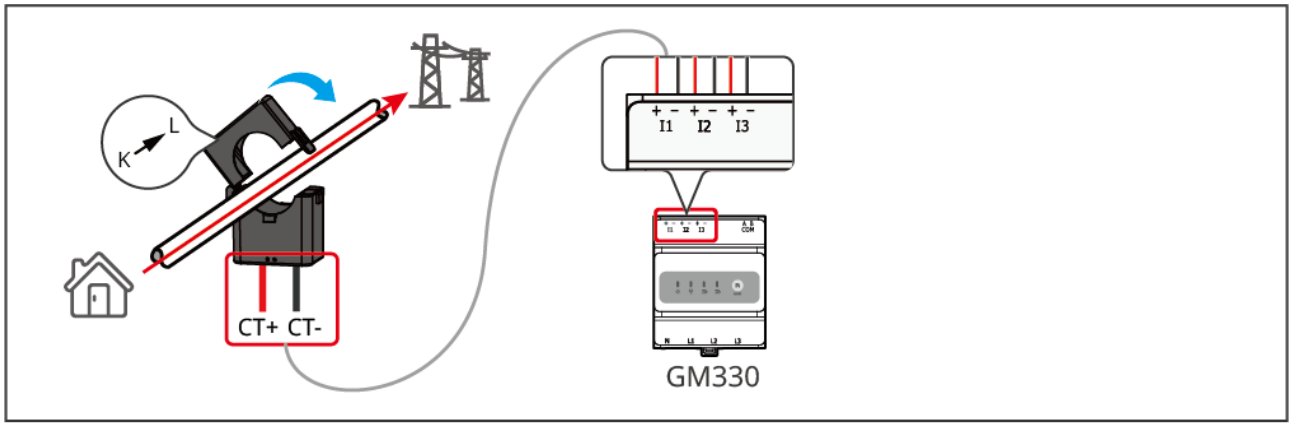
Wiring steps



Installation CT (Type 1)



Installation CT (Type II)



GMK10ELC0007

5.9 Connecting the Inverter Communication Cable

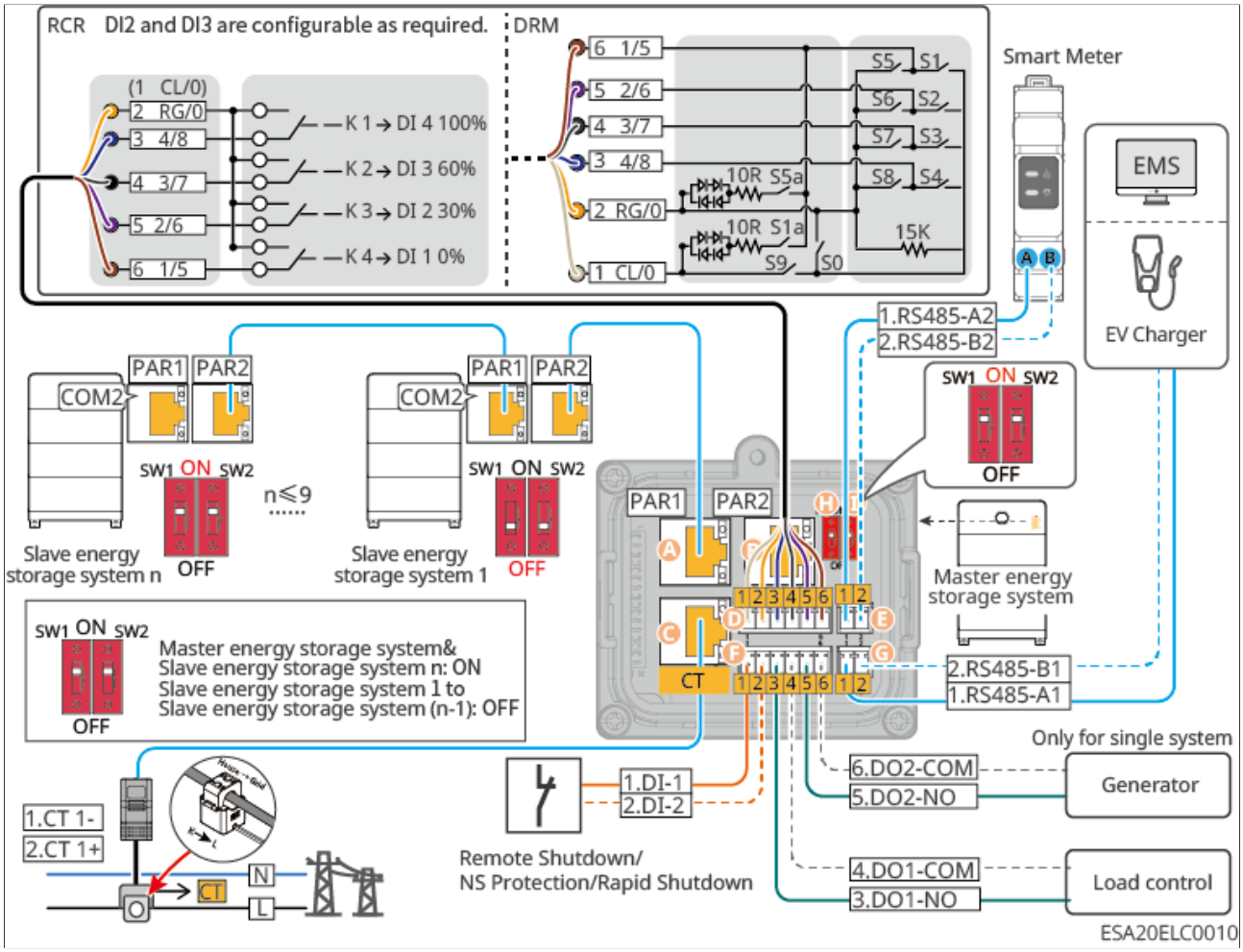
NOTICE

- When using the Inverter's built-in meter, please use the CT shipped with the unit.
- Please connect the CT according to the direction indicated on the meter. If connected in reverse, it may cause a CT reverse fault.
- If you need to use the DRED, RCR, or remote shutdown function, please enable this function in the SolarGo App after wiring is completed.
- Do not enable this function in the SolarGo App if the Inverter is not connected to a DRED device or remote shutdown device, otherwise the Inverter will not be able to operate in grid-connected mode.
- In a parallel system, to implement the DRED or RCR function, only need to connect the DRED or RCR communication cable to the master Inverter.
- To ensure the Inverter's waterproof rating, do not remove the waterproof plugs from unused communication ports on the Inverter.
- The Inverter's DO signal communication port can be connected to a dry contact A signal with the following specifications: Max≤24Vdc, 1A.
- The Inverter's communication functions are optional; please select according to the actual usage scenario.
- The Inverter supports connection to a mobile phone or WEB interface via 4G, Bluetooth, WiFi, or LAN communication methods to set device-related parameters, view device operation information and error messages, and stay informed of the system status.
- In a single-unit system, installation of a WiFi/LAN Kit-20 or 4G Kit-CN-G20 smart communication stick is supported.

NOTICE

- In a parallel system, both the master and slave Inverters need to install a WiFi/LAN Kit-20 smart communication stick for networking.
- In a parallel system, the DIP switches of the first and last Inverters need to be set to the ON position, and the DIP switches of other Inverters to the OFF position.
- When using the 4G Kit-CN-G20:
  - If parallel system networking is required, please contact GoodWe to purchase the WiFi/LAN Kit-20.
  - The standard configuration for China includes a Micro-SIM card from China Mobile. Please ensure the device is installed in an area covered by the carrier's signal. If local China Mobile signal is not available, please contact the carrier to optimize the signal.
  - Supports connection to third-party monitoring platforms via the MQTT communication protocol.
- The 4G Kit-CN-G20 is an LTE single-antenna device, suitable for application scenarios with lower requirements for data transmission rates.

Communication Function Description

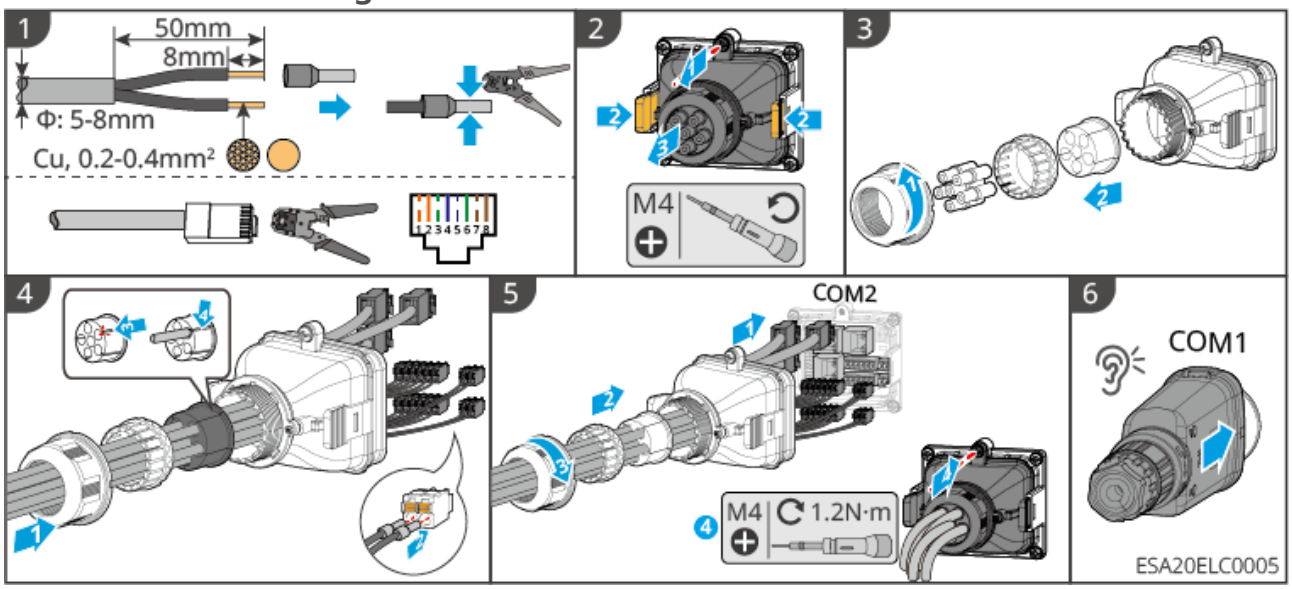


Port (Silkscreen)		Function	Description
A	PAR1	Parallel Communication Port 1	Parallel communication port. Please use CAT 5E or above standard network cable and RJ45 connector.
B	PAR2	Parallel Communication Port 2	
C	CT	CT Connection Port	CT communication cable needs to be connected only when using the inverter's built-in meter.

Port (Silkscreen)		Function	Description
D	DRM/RCR	RCR, DRED or EnWG 14a Function Connection Port	• RCR (Ripple Control Receiver): Provides RCR signal control port to meet grid dispatch requirements in Europe. • DRED (Demand Response Enabling Device): Provides DRED signal control port to meet DERD certification requirements in regions like Australia.
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 is off. • In a Rapid Shutdown system, the Rapid Shutdown transmitter and receiver are used together to achieve rapid system shutdown. The receiver maintains component output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In an emergency, by enabling an external trigger device, the transmitter can be stopped, thereby shutting down the components.
	LOAD	load control	• Supports connection to dry contact signals to achieve functions such as load control. DO contact capacity is 24V DC@1A, NO/COM normally open contacts. • Supports SG Ready heat pump access, controlling the heat pump via dry contact signals.

Port (Silkscreen)		Function	Description
	GEN	Generator Control Port	Single unit networking supports access to generator control signals to control generator start/stop. In microgrid scenarios, connecting a generator is not supported.
G	EMS	EMS/Charging Pile Communication Port	Connect to third-party EMS devices for energy control or connect to GoodWe charging piles.
H	SW1	Parallel DIP Switch	In multi-unit parallel scenarios, set the parallel DIP switch of the first and last inverters to the ON position, and other inverters to the OFF position.
I	SW2		

Method for Connecting the Communication Cable



6 System Commissioning

6.1 Check Before Power ON

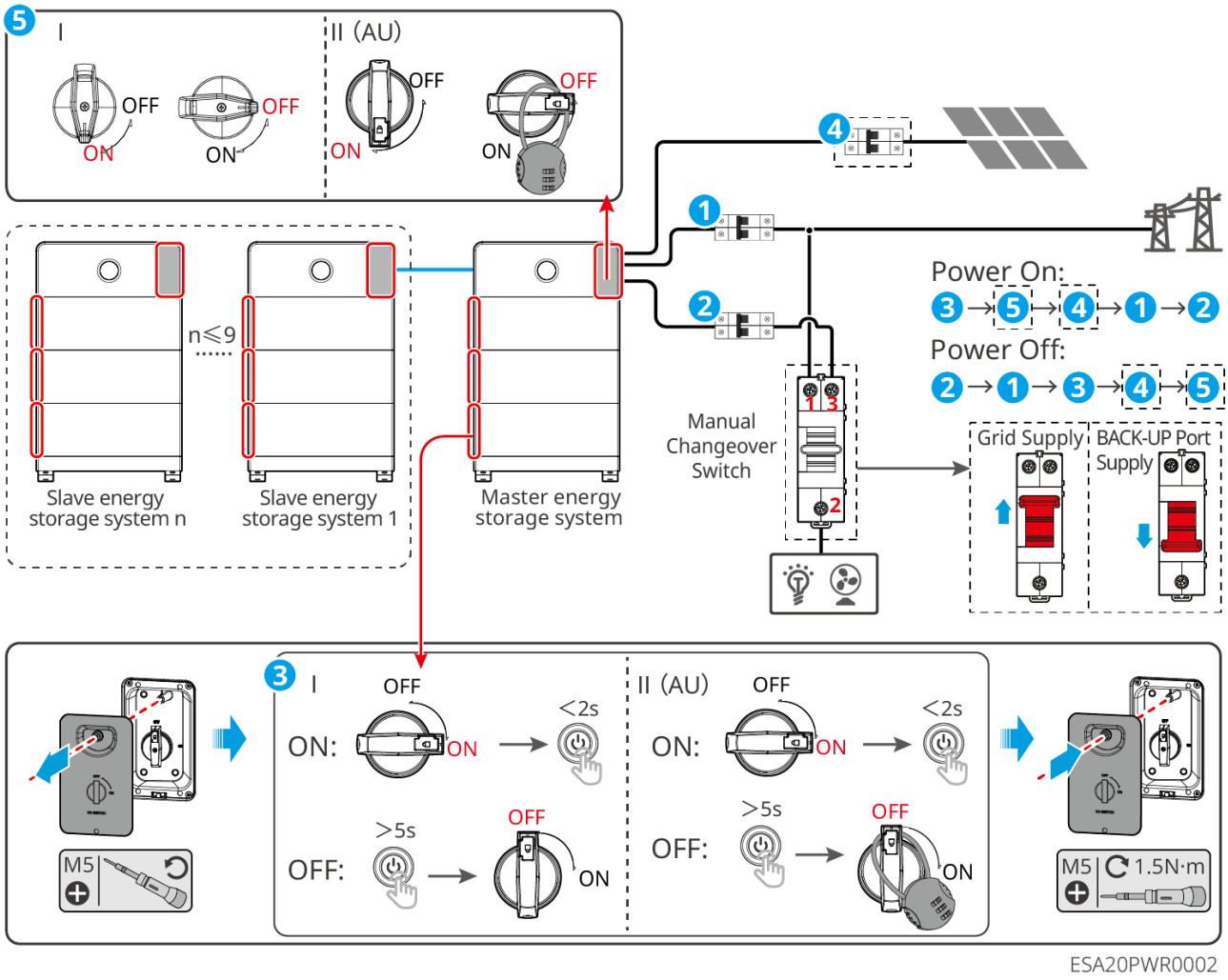
No.	Inspection Item
1	The equipment is installed securely. The installation location facilitates operation and maintenance, the installation space allows for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	PE cable, DC cable, AC cable, and communication cable connections 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.

6.2 Power ON

⚠WARNING

- Battery black start: When there is no power generation from PV in the photovoltaic system and the grid is abnormal, if the inverter cannot work normally, the battery black start function can be used to force battery discharge to start the inverter. The inverter can then enter off-grid mode operation, supplying power to the load from the battery.
- 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 BACK-UP port supplies power to the load.
- PV string and "5" are only applicable to the EHA series.

power on



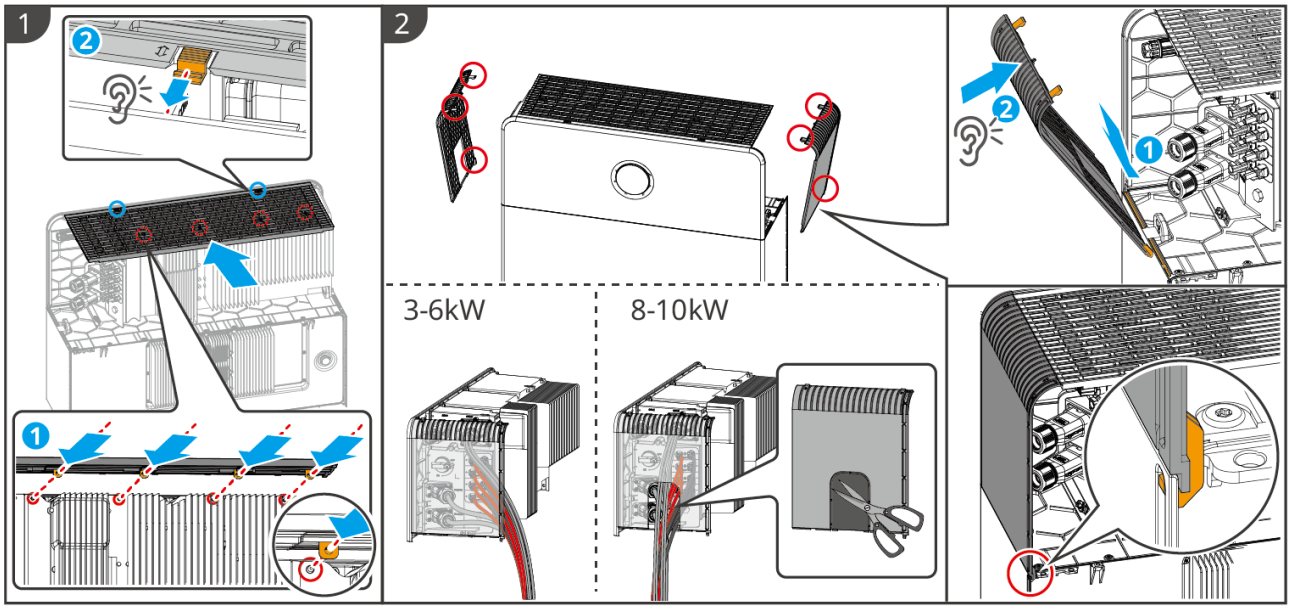
1. Close the battery power switch and briefly press the battery's multifunction button. When there are multiple batteries in the system, close the power switches of all batteries. Briefly press the multifunction button of any battery to start all batteries.
2. Close the inverter's DC switch.
3. (Optional)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

Battery Black Start

1. Close the battery power switch. When there are multiple batteries in the system, close the power switches of all batteries.
2. Close the inverter's DC switch.

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

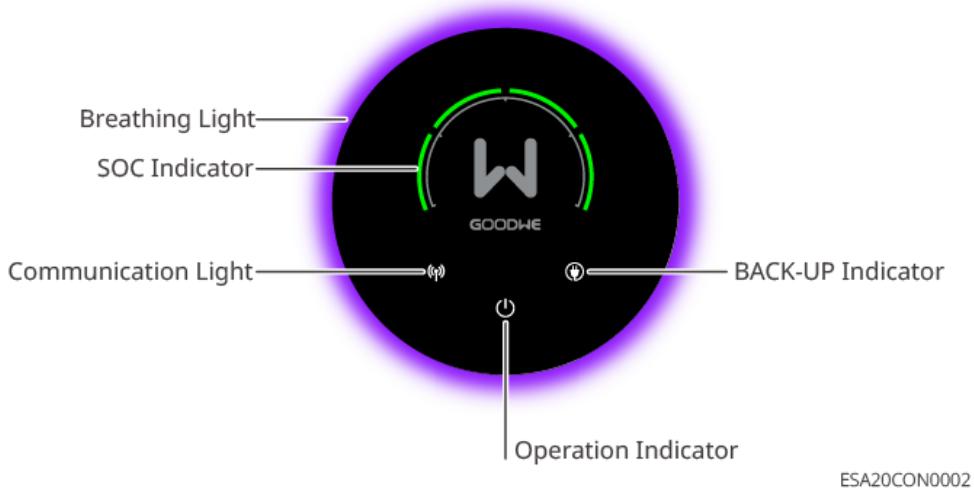
6.3 Installing Protective Cover



ESA20INT0006

6.4 Indicators

6.4.1 Inverter Indicators

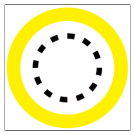
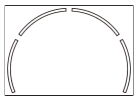
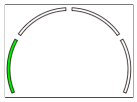
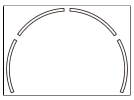
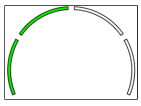
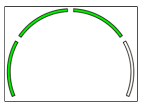
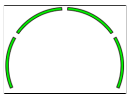


Breathing Light:

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

indicator	indicator state	Breathing Light State	Description
⏻		• 3min/Always on: Blue-purple chasing light always lit • Always off: Not lit	The inverter is powered on and in standby mode
			The inverter is starting up and in self-test mode
		• 3min: Blue-purple breathing for 3 minutes then off • Always on in App: Blue-purple breathing always lit • Always off in App: Not lit	The inverter is operating normally in grid-tied power generation or off-grid mode

indicator	indicator state	Breathing Light State	Description
		Red flashing	System fault
		Off	The inverter is powered off
		/	Inverter monitoring module resetting
			Inverter and communication terminal not connected
			Communication fault between communication terminal and cloud server
			Inverter monitoring normal
			Inverter monitoring module not started
			Grid abnormal, inverter BACK-UP port power supply normal
			Grid normal, inverter BACK-UP port power supply normal
			BACK-UP port no power supply
			System upgrade
			System fault

indicator	indicator state	Breathing Light State	Description
			System overload
			Battery has no power
			Constantly lit: Charge Flashing: Discharge Battery SOC: 0% < SOC ≤ 25%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 25% < SOC ≤ 50%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 50% < SOC ≤ 75%
			Constantly lit: Charge Flashing: Discharge Battery SOC: 75% < SOC ≤ 100%

6.4.2 Battery Indicators

Button Indicator

No.	Green light	Red light	Battery system	Description
1	On	--	The system is working normally.	Run
2	Blinks 1 time/S.		The system is ready.	Standby
	Blinks 3 time/S.	--	The PCScommunication is lost.	--
3	Blinks 1 time/ 2S.	--	System Alarm	When there is an under-voltage fault of level 2, 3, or 4, the indicator flashes. For other level 2 faults, the indicator flashes.
4	--	On	System Failure	Fault list showing faults of level 3 or higher (undervoltage faults remain ON when at level 5)

6.4.3 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.
	On	Importing from the grid.
	Blinks.	Exporting to the grid.

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

6.4.4 Smart Dongle Indicator

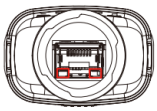
- **WiFi/LAN Kit-20**

NOTICE

- After double-clicking the Reload button to turn on Bluetooth, the communication indicator light will switch to a single 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.

Indicator	Status	Description
Communication 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.
		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.
		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.

7 System Commissioning

7.1 SolarGo APP

7.1.1 Product Introduction

NOTICE

- All the user interface (UI) screenshots or words in this document are based on **SolarGo app V6.6.0**. The UI may be different due to the version upgrade. The screenshots, words or data are for reference only.
- The method to set parameters is the same for all inverters. But the parameters displayed varies based on the equipment model and safety code. Refer to the actual interface display for specific parameters.
- Before setting any parameters, read through user manual of the App and the inverter or charger to learn the product functions and features. When the inverter parameters are set improperly, the inverter may fail to connect to the utility grid or fail to connect to the utility grid in compliance with related requirements and damage the battery, which will affect the inverter's power generation.

SolarGo App is a mobile application that communicates with the inverter via Bluetooth, WIFi, 4G, or GPRS. Commonly used functions are as follows:

- Check the operating data, software version, alarms of the inverter, etc.
- Set grid parameters and communication parameters of the inverter.
- Set charging mode of the charger.
- Maintain the equipment.

7.1.1.1 Downloading and Installing the App

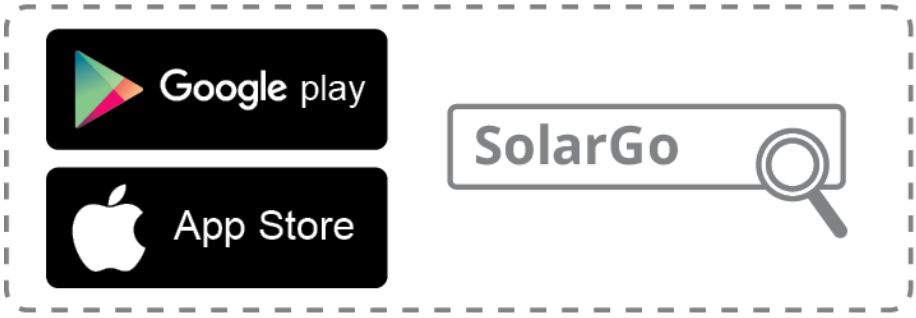
Make sure that the mobile phone meets the following requirements:

- Mobile phone operating system: Android 5.0 or later, iOS 13.0 or later.
- The mobile phone can access the Internet.

- The mobile phone supports WLAN or Bluetooth.

NOTICE
After installing the app, it can automatically prompt users to update the app version.

Method 1: Search SolarGo in Google Play (Android) or App Store (iOS) to download and install the app.



SolarGo App
SLG00CON0135

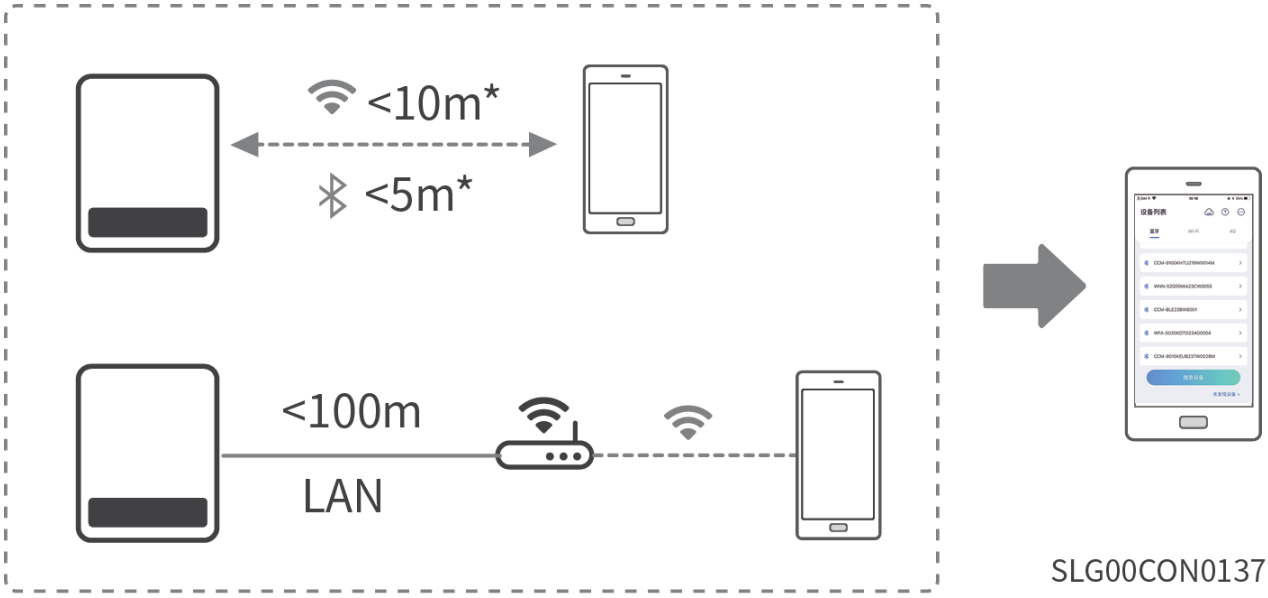
Method 2: Scan the QR code below to download and install the app.

SolarGo App
SLG00CON0136

7.1.1.2 App Connection

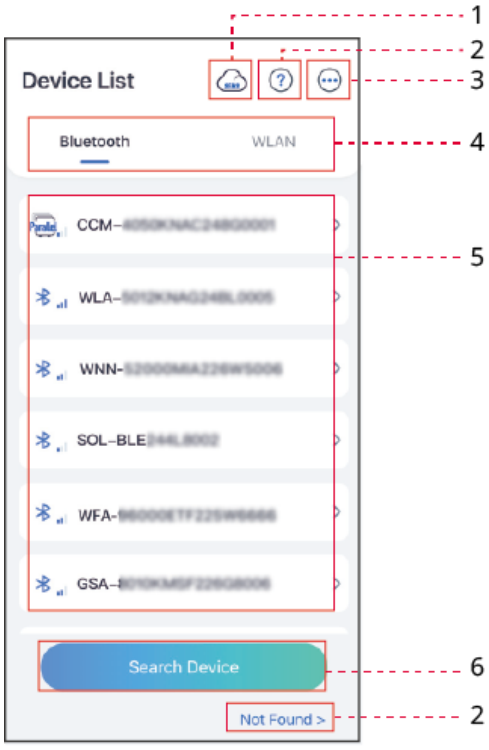
Connect as the following shows after powering on the equipment.

NOTICE
The connection distance varies depending on smart dongles. Refer to the actual used smart dongles.



SLG00CON0137

7.1.1.3 GUI Introductions to Login Page



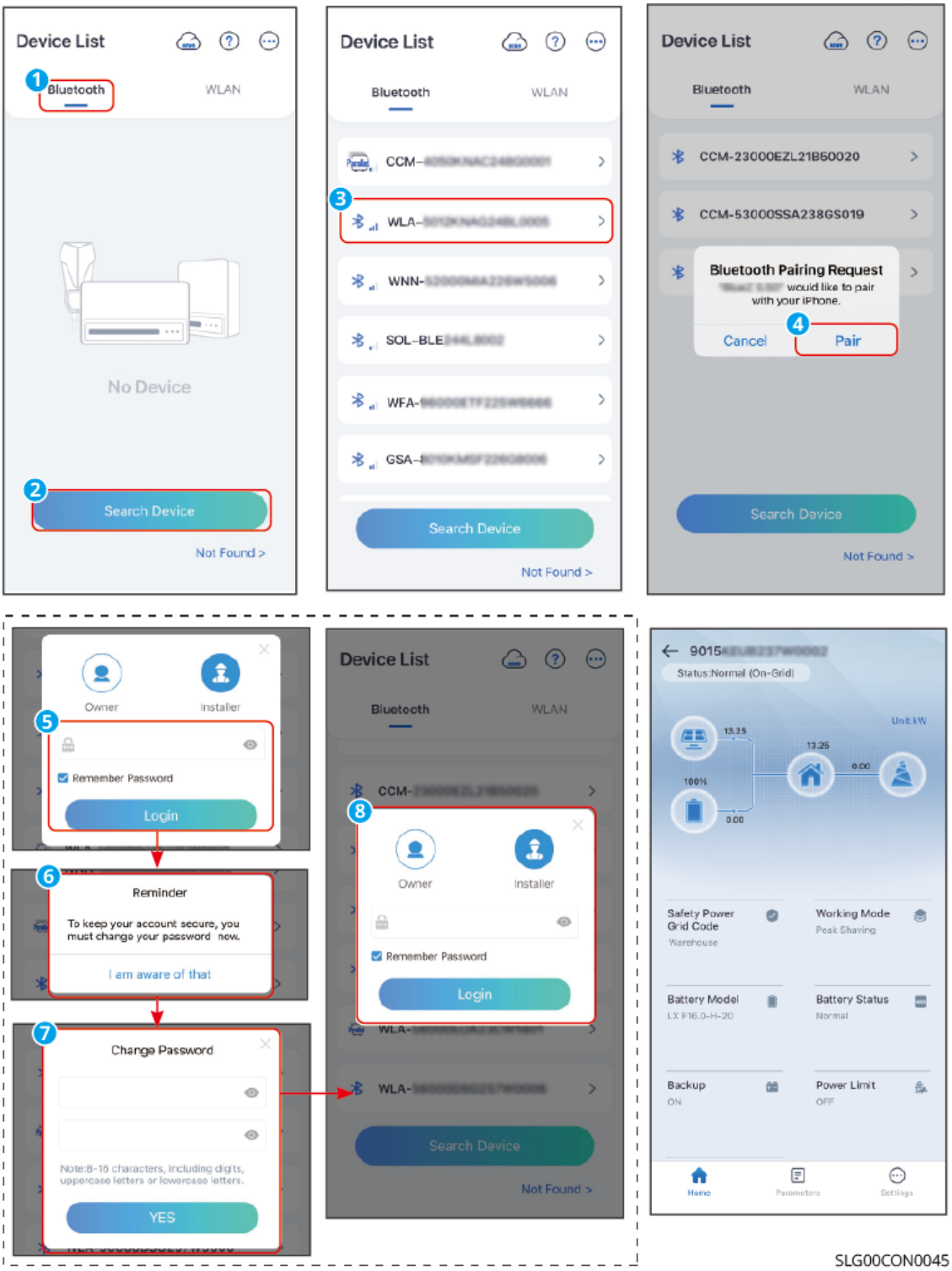
SLG00CON0016

No.	Name/Icon	Description
1	SEMS	Tap the icon to open the page downloading the SEMS Portal app.

No.	Name/Icon	Description
2		Tap to read the connection guide.
	Not found	
3		• Check information such as app version, local contacts, etc. • Other settings, such as update date, switch language, set temperature unit, etc.
4	Bluetooth/WiFi/4G	Select based on actual communication method. If you have any problems, tap  or **NOT Found** to read the connection guides.
5	Device List	• The list of all devices. The last digits of the device name are normally the serial number of the device. • Select the device by checking the serial number of the master inverter when multi inverters are parallel connected. • The device name varies depending on the inverter model or smart dongle model: ◦ Wi-Fi/LAN Kit, Wi-Fi Kit, Wi-Fi Box: Solar-WiFi*** ◦ External or integrated bluetooth mudule:Solar-BLE*** ◦ WiFi/LAN Kit-20: WLA-*** ◦ WiFi Kit-20: WFA-*** ◦ Ezlink3000：CCM-BLE***；CCM-***；*** ◦ 4G Kit-CN-G20/4G Kit-CN-G21: GSA-***; GSB-*** ◦ 4G Kit-G20：GSC-*** ◦ Micro inverter: WNN*** ◦ AC Charger: ***
6	Search Device	Tap **Search Device** if the device is not found.

7.1.2 Connecting the Hybrid Inverter (Bluetooth)

Step 1 Ensure that the inverter is power on, both the inverter and the communication module are working properly.
Step 2 Select **Bluetooth** tab on the SolarGo app hompage.
Step 3 Pull down or tap **Search Device** to refresh the device list. Find the device by the the inverter serial number. Tap the device name to log into the **Home** page. Select the device by checking the serial number of the master inverter when multi inverters are parallel connected.
Step 4 For first connection with the equipment via Bluetooth, there will be a Bluetooth pairing prompt, tap **Pair** to continue the connection.
Step 5 Log in as an Owner or an Installer. Initial password: 1234. Default password: 1234.
Step 6 (Optional): If connecting via WLA-*** or WFA-***, enable Bluetooth Stays On following the prompts as entering the device details page. Otherwise, the bluetooth signal of the device will be off after disconnection.



7.1.3 Connect the Smart Dongle

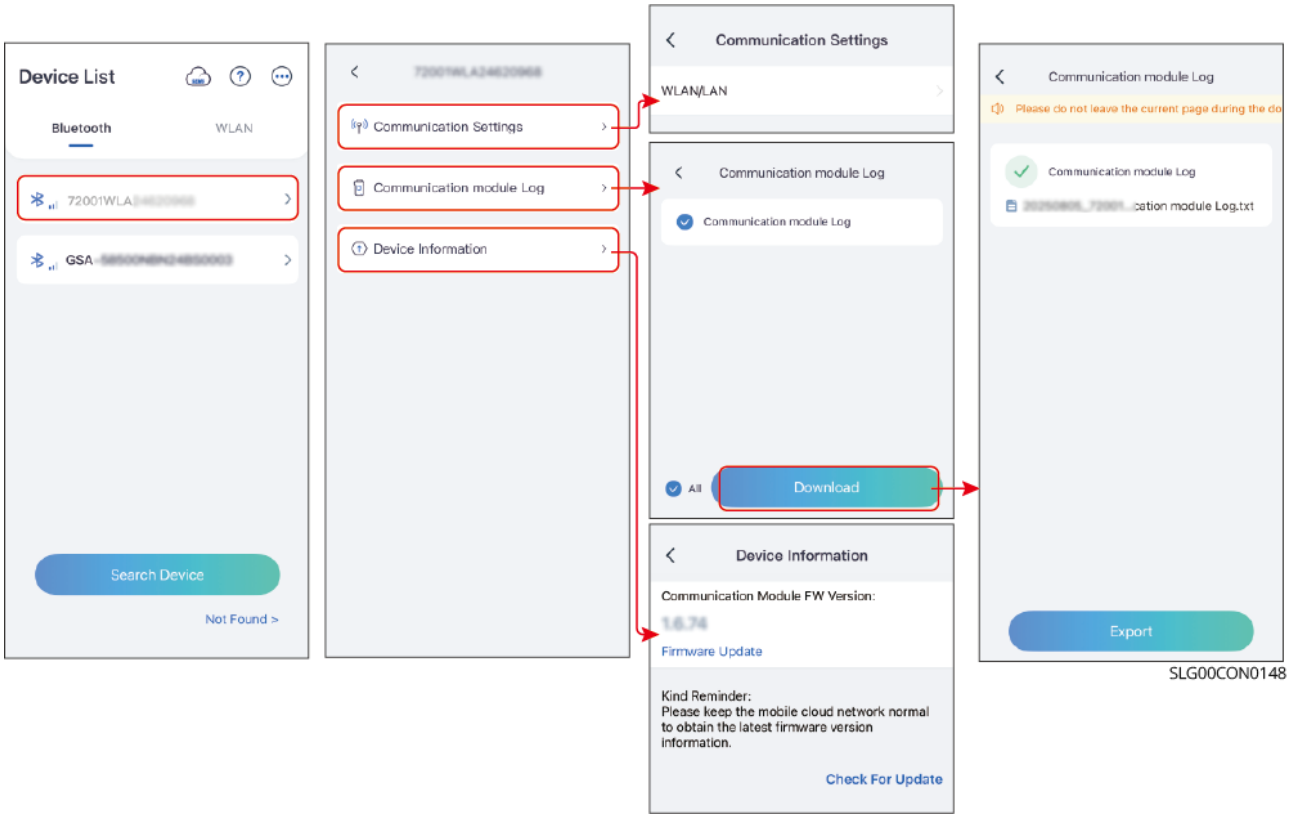
When connecting to an inverter via the SolarGo App, if the inverter signal cannot be detected, the device list interface will display the signal of the smart dongle connected to the inverter.

Supported Smart Dongle types:

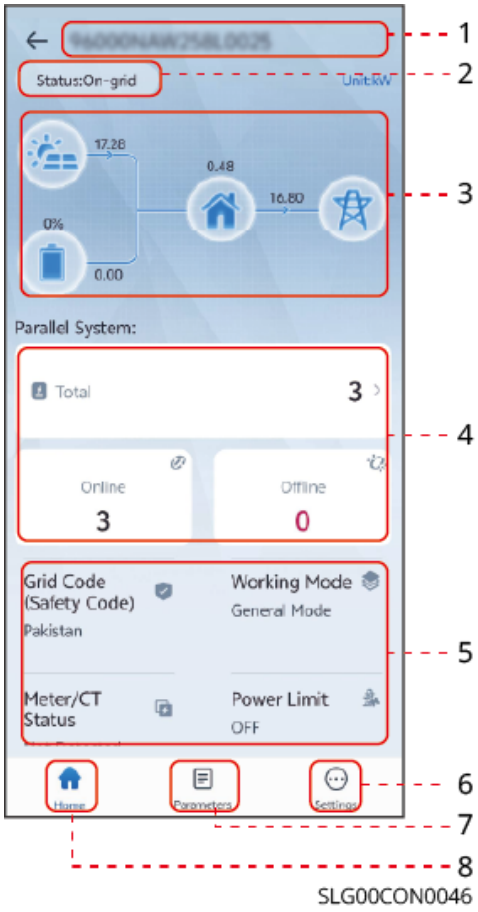
- WiFi/LAN Kit-20
- Ezlink3000
- 4G Kit-CN-G20 ; 4G Kit-CN-G21 ; 4G Kit-G20

Step 1: On the homepage of the SolarGo App, find the grayed-out SN number of the smart dongle and click to enter the settings interface.
Step 2: Set or query parameter information according to actual needs.

- Communication Configuration: Click to set WLAN/LAN parameters and connect the module to the router.
- Communication Module Logs: Click to enter the module log download interface.
- Device Information: Click to view the firmware version of the smart dongle. If a version update is available, you can refer to the on-screen prompts to complete the update.



7.1.4 GUI Introductions to Hybrid Inverters



No.	Name/Icon	Description
1	Serial Number	Serial number of the connected inverter.
2	Device Status	Indicates the status of the inverter, such as Working,Fault, etc.
3	Energy Flow Chart	Indicates the energy flow chart of the PV system. The actual page prevails.
4	System Status	Indicates the system status, such as Safety Code, Working Mode, Battery Model, Battery Status, Power Limit, Three-Phase Unbalanced Output, etc..
5		Home. Tap Home to checkSerial Number, Device Status, Energy Flow Chart, System Status, etc.
6		Parameters. Tap Parameters to check the inverter Data.

No.	Name/Icon	Description
7		• Settings Tap to perform quick settings, basic settings, advanced settings, etc. on the inverter. • Login required to access Quick Setup and Advanced Setting. Contact the supplier or after sales service for password. Password for professional technicians only.

7.1.5 Setting Communication Parameters

NOTICE
The communication configuration interface may be different if the inverter uses different communication modes or connects different communication modules. Please refer to the actual interface.

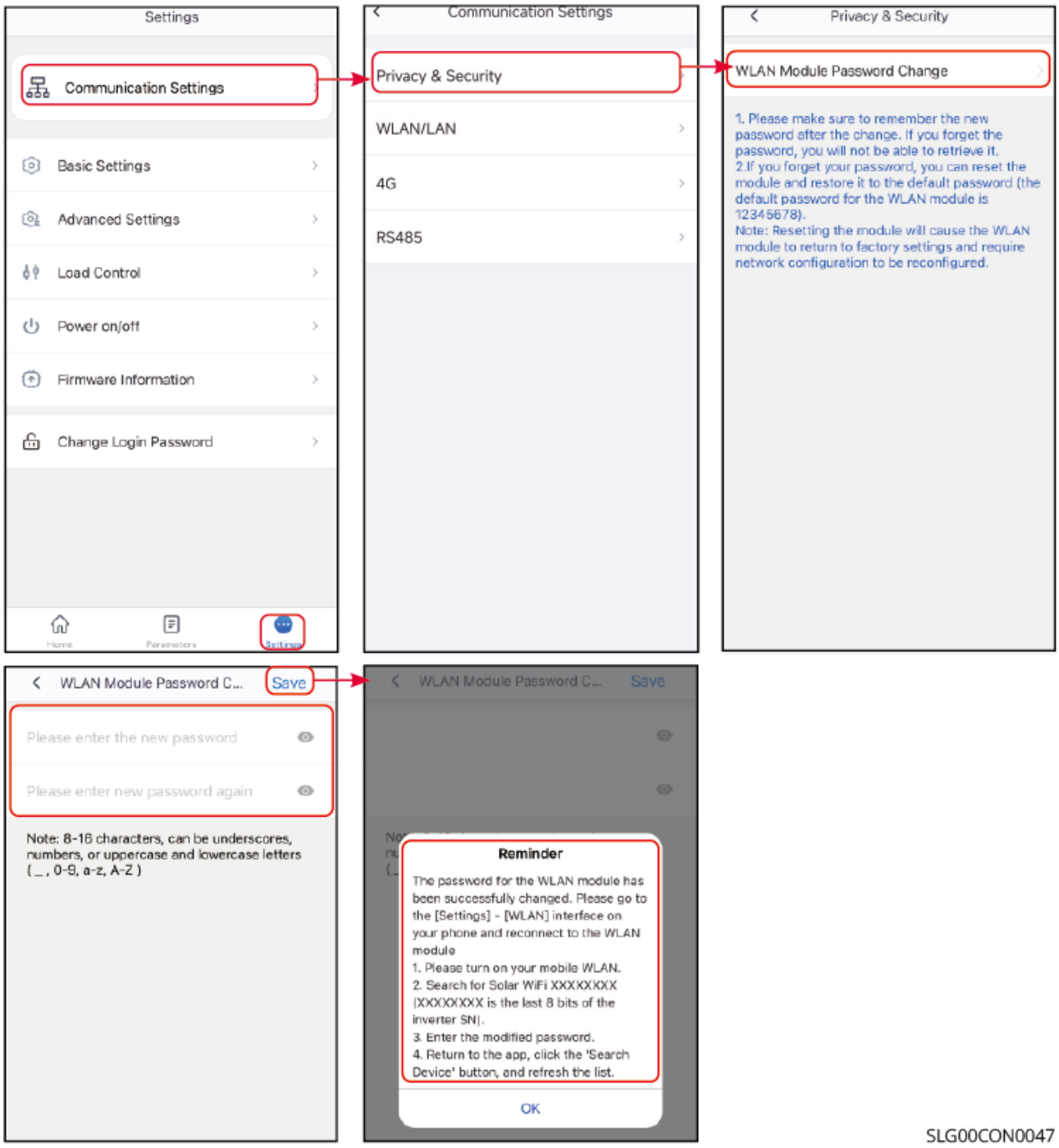
7.1.5.1 Setting Privacy and Security Parameters

Type I

Step 1 : Tap **Home > Settings > Communication Setting > Privacy & Security** to set the parameters.

Step 2 : Set the new password for the WiFi hotspot of the communication module, and tap **Save**.

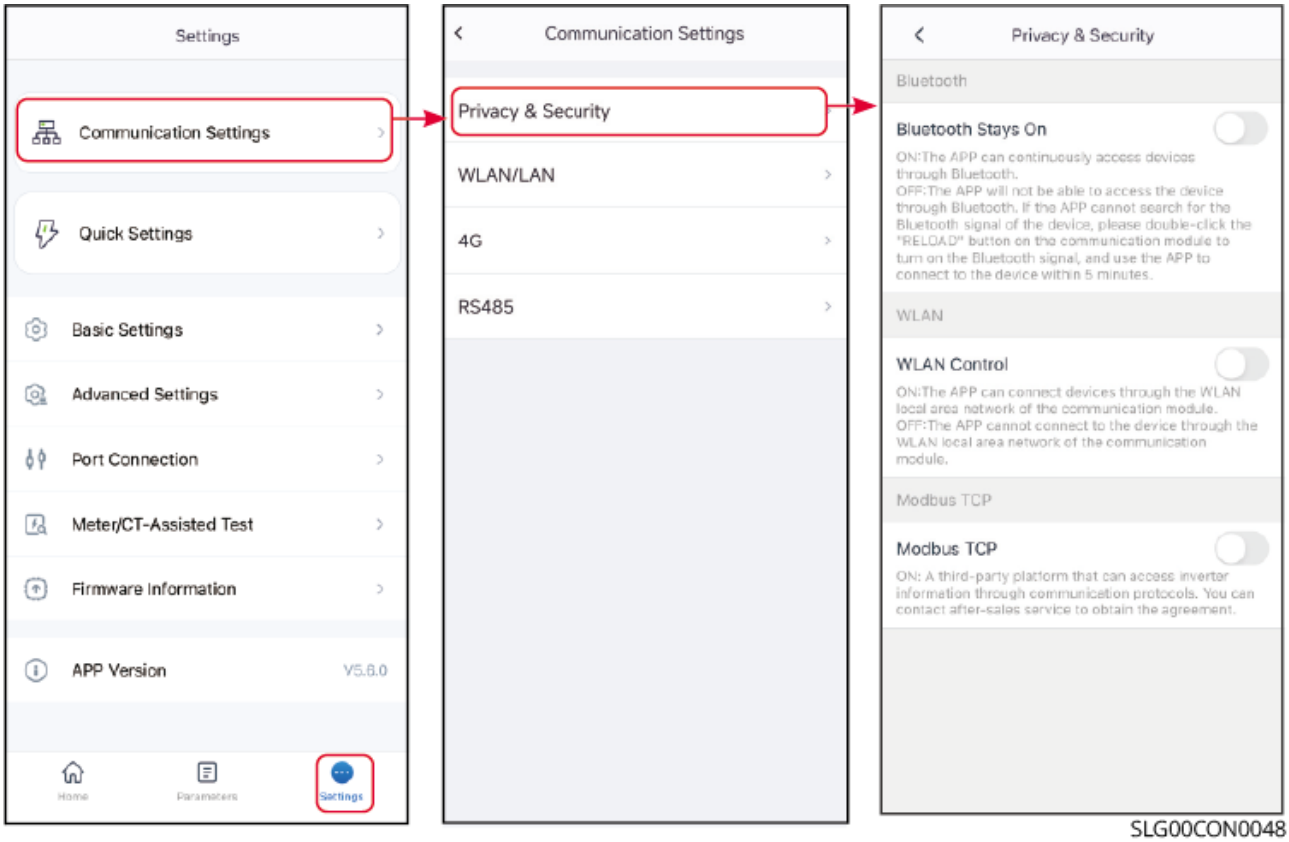
Step 3 Open the WiFi settings of your phone and connect to the inverter's WiFi signal (Solar WiFi***) with the new password.



Type II

Step 1 : Tap **Home > Settings > Communication Setting > Privacy & Security** to set the parameters.

Step 2 Enable Bluetooth Stays On or WLAN Control based on actual needs.



SLG00CON0048

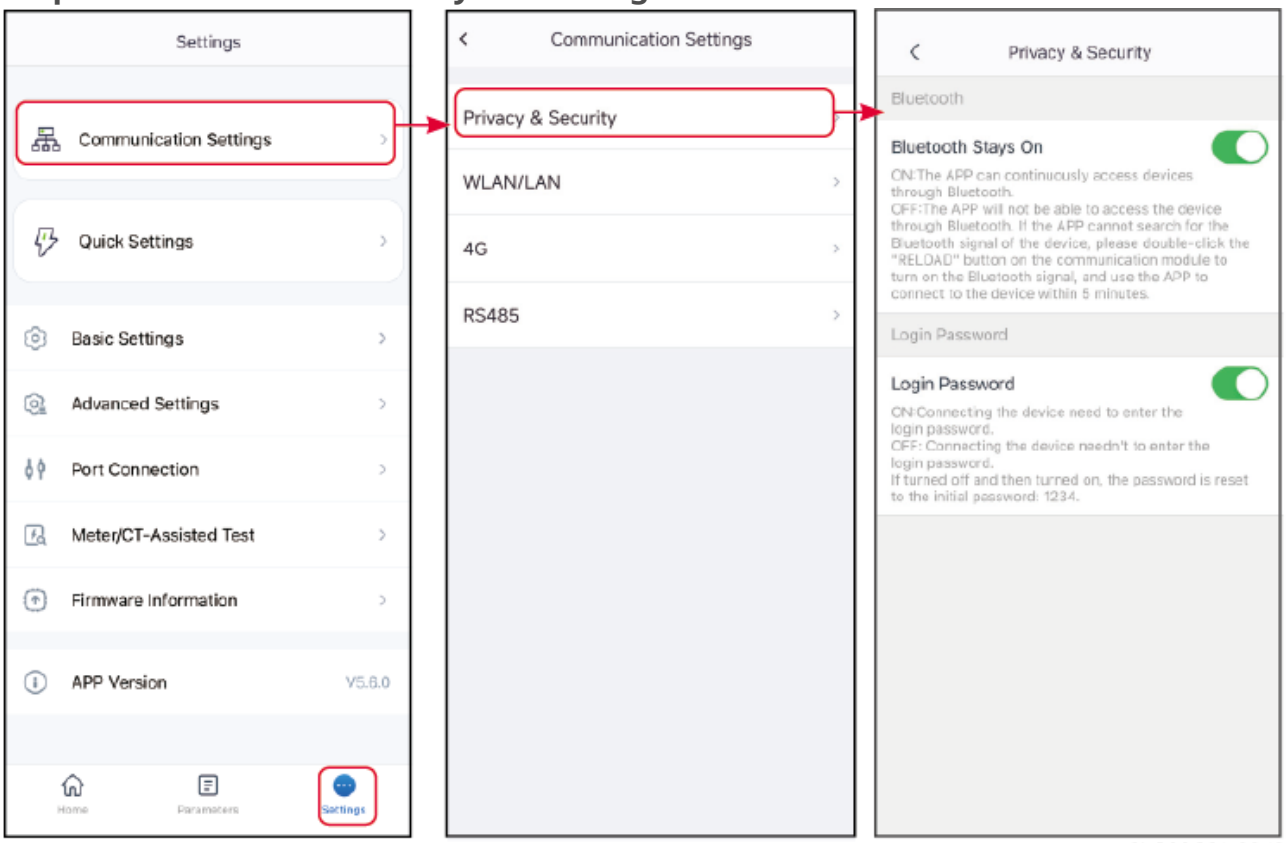
No.	Parameters	Description
1	Bluetooth Stays On	Disabled by default. Enable the function, the bluetooth of the device will be contentious on to keep connected to SolarGo. Otherwise, the bluetooth will be off in 5 minutes, and the device will be disconnected from SolarGo.
2	WLAN Control	Disabled by default. Enable the function, the device and the SolarGo can be connected through the WLAN when they are on the same LAN. Otherwise, they cannot be connected even if they are on the same LAN.
3	Modbus-TCP	Enable the function, the third party monitoring platform can access inverter through Modbus-TCP communication protocol.
4	SSH control Ezlink	After enabling this function, third-party platforms can connect to and control EzLink's Linux system.

Type III

Step 1 : Tap **Home > Settings > Communication Setting > Privacy & Security** to set

the parameters.

Step 2 : Enable **Bluetooth Stays On** or **Login Password** based on actual needs.



SLG00CON0049

No.	Parameters	Description
1	Bluetooth Stays On	Disabled by default. Enable the function, the bluetooth of the device will be contentious on to keep connected to SolarGo. Otherwise, the bluetooth will be off in 5 minutes, and the device will be disconnected from SolarGo.
2	Password	Disabled by default. Enable the function, you will be prompted to enter the login password when connecting the device to SolarGo. Use the initial password and change it at the first login prompt.

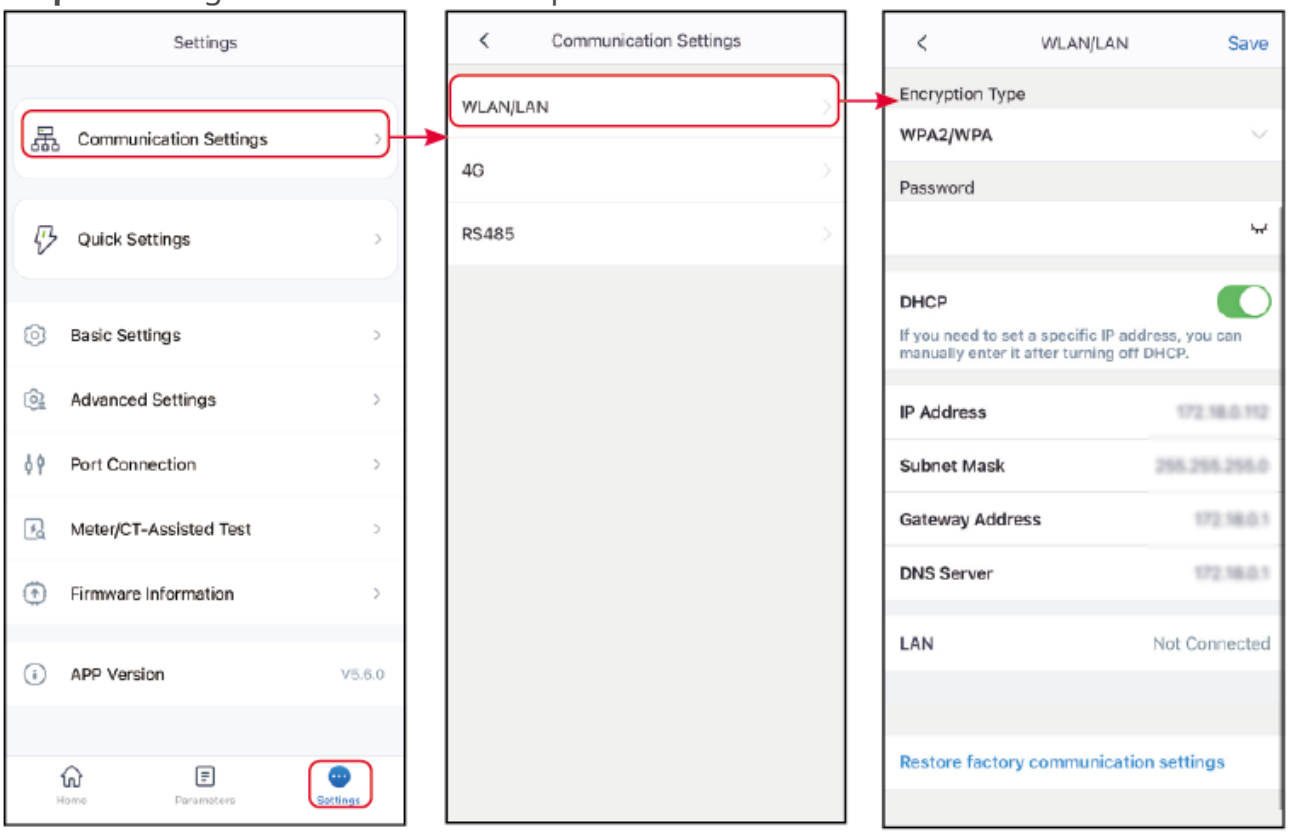
7.1.5.2 Setting WLAN/LAN Parameters

NOTICE

When the inverter is connected to different communication modules, the communication configuration interface may be different. Please refer to the actual interface.

Step 1 : Tap **Home > Settings > Communication Setting > WLAN/LAN** to set the parameters.

Step 2 : Configure the WLAN or LAN parameters based on actual needs.



SLG00CON0050

No.	Parameters	Description
1	Network Name	Only for WLAN. Select WiFi based on the actual connecting.
2	Password	Only for WLAN. WiFi password for the actual connected network.
3	DHCP	Enable DHCP when the router is in dynamic IP mode. Disable DHCP when a switch is used or the router is in static IP mode.

No.	Parameters	Description
4	IP Address	Do not configure the parameters when DHCP is enabled. Configure the parameters according to the router or switch information when DHCP is disabled.
5	Subnet Mask	
6	Gateway Address	
7	DNS Server	

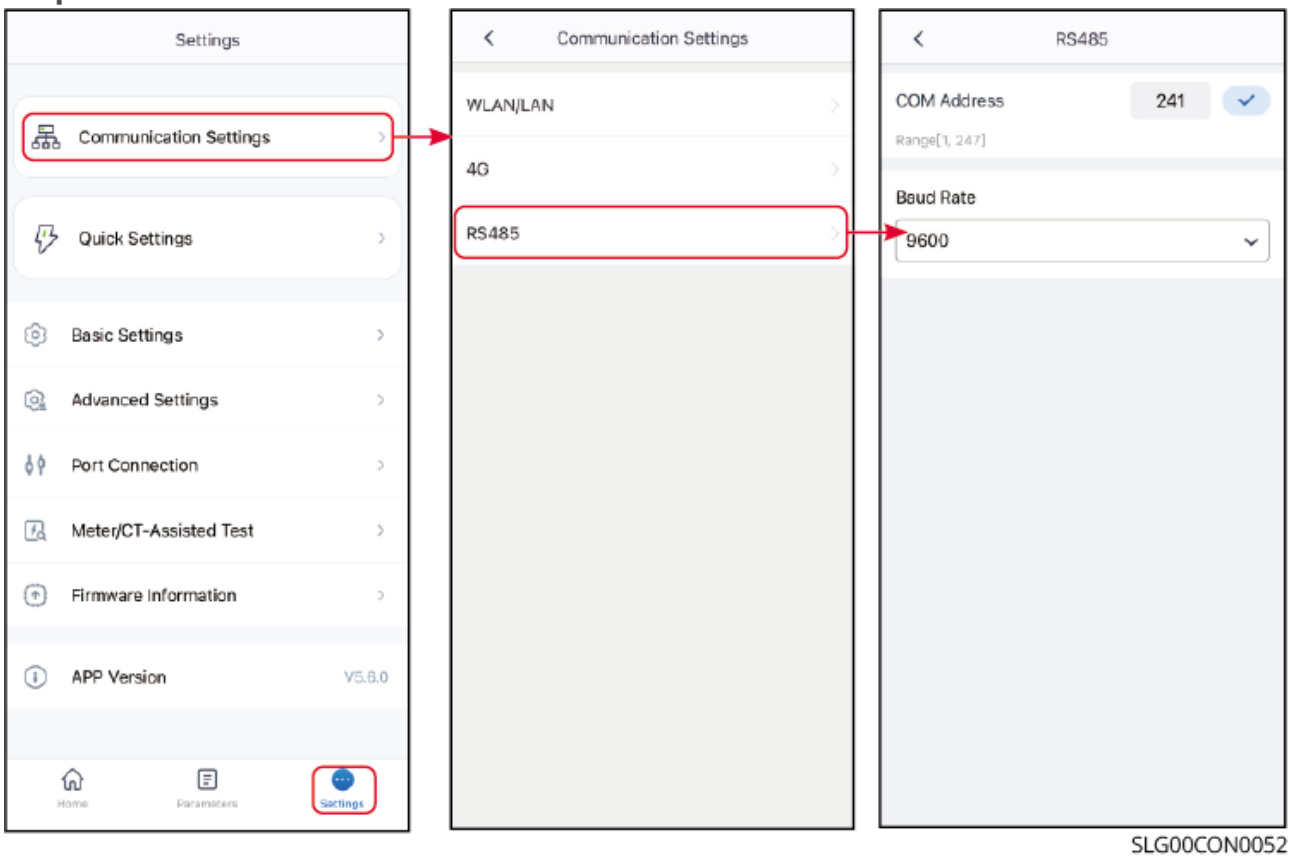
7.1.5.3 Configuring RS485 Parameters

NOTICE

Set the communication address of the inverter. For a single inverter, the address is set based on actual needs. For multi connected inverters, the address of each inverter should be different while cannot be 247.

Step 1: Tap **Home > Settings > Communication Settings > RS485** to set the parameters.

Step 2 : Set the Modbus Address And Baud Rate base on actual situation.



SLG00CON0052

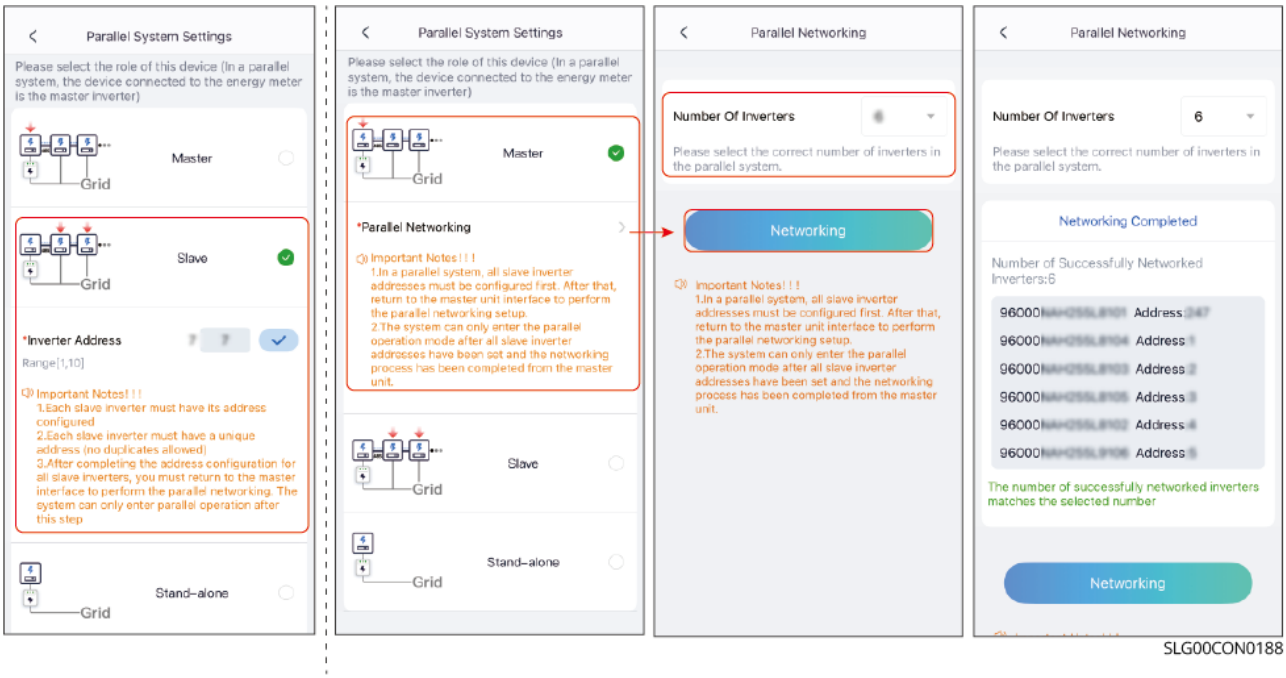
7.1.6 Setting Up the RS485 Parallel System

NOTICE

- When paralleling hybrid inverters via RS485, you must set each inverter as the master or slave inverter individually using the SolarGo App.
- When an inverter in a parallel system needs to be used as a single unit, it must be set to standalone inverter via the SolarGo App.
- Please set the inverter connected to the meter as the master.
- Please first set the slave inverter address, then set the parallel network through the master.

Step 1: Go to the settings interface via **Settings > Parallel System Settings** .
Step 2: Set the inverter to Master, Slave, or Stand-alone based on its actual wiring.

- If the inverter is the master, set it to Master and then exit the connection. After setting the slave inverter address, return to this interface, click **Parallel Networking**, set the number of inverters in the parallel system, and then click **Network**.
- If the inverter is the slave, set the **Inverter Address** and click √.



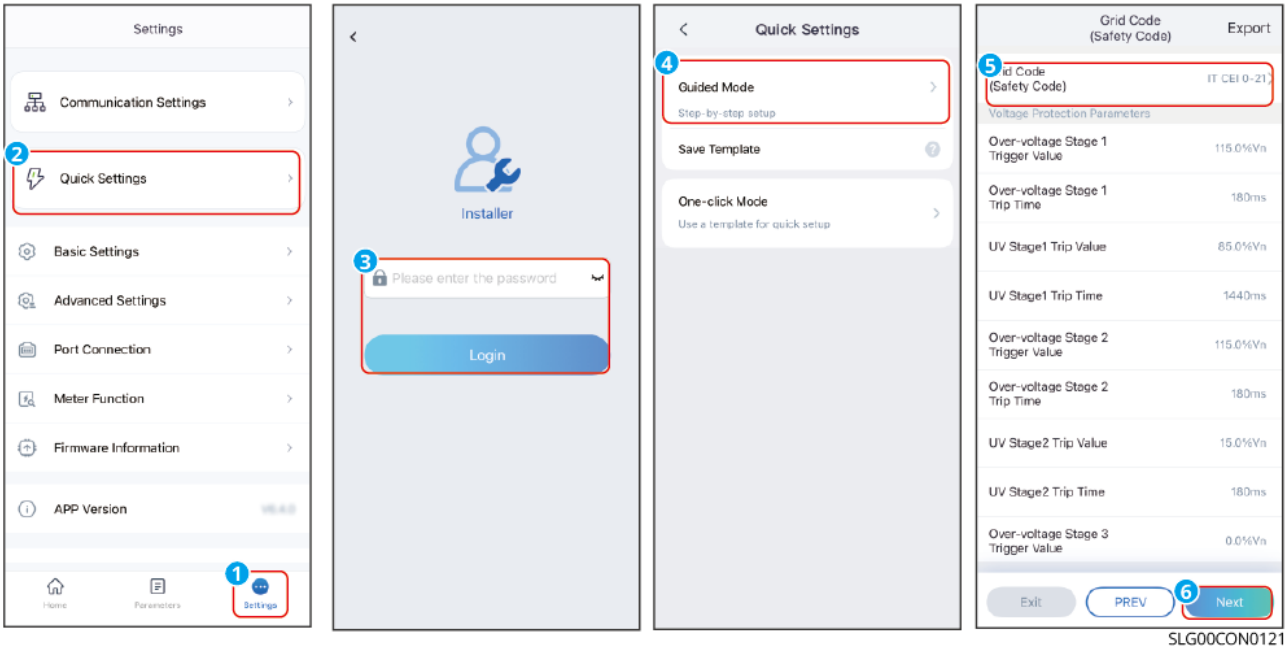
7.1.7 Quick Setting the Basic Information

NOTICE

- The setting page varies depending on inverter model.
- The parameters will be configured automatically after selecting the safety country/region, including overvoltage protection, undervoltage protection, overfrequency protection, underfrequency protection, voltage/frequency connection protection, cosφ curve, Q(U) curve, P(U) curve, FP curve, HVRT, LVRT, etc. Tap Home > Settings > Advanced Settings > Safety Parameters to check the parameters after selecting the safety country.
- The power generation efficiency is different in different working modes. Set the working mode according to the local requirements and situation.
  - Self-use mode: The basic working mode of the system. PV power generation is used to supply power to the load first, the excess power is used to charge the battery, and the remaining power is sold to the grid. When PV power generation cannot meet the load's power demand, the battery will supply power to the load; when the battery power also cannot meet the load's power demand, the grid will supply power to the load.
  - Back-up mode: The back-up mode is mainly applied to the scenario where the grid is unstable. When the grid is disconnected, the inverter turns to off-grid mode and the battery will supply power to the load; when the grid is restored, the inverter switches to grid-tied mode.
  - Economic mode: It is recommended to use economic mode in scenarios when the peak-valley electricity price varies a lot. Select Economic mode only when it meets the local laws and regulations. Set the battery to charge mode during Vally period to charge battery with grid power. And set the battery to discharge mode during Peak period to power the load with the battery.
  - Off-grid mode: suitable for areas without power grid. PV and batteries form a pure off-grid system. PV generates electricity to power the load and excess electricity charges the battery. When PV power generation cannot meet the power demand of the load, the battery will supply power to the load.
  - Smart charging: In some countries/regions, the PV power feed into the utility grid is limited. Select Smart Charging to charge the battery using the surplus power to minimize PV power waste.
  - Peak shaving mode: Peak shaving mode is mainly applicable to peak power limited scenarios. When the total power consumption of the load exceeds the power consumption quota in a short period of time, battery discharge can be used to reduce the power exceeding the quota.

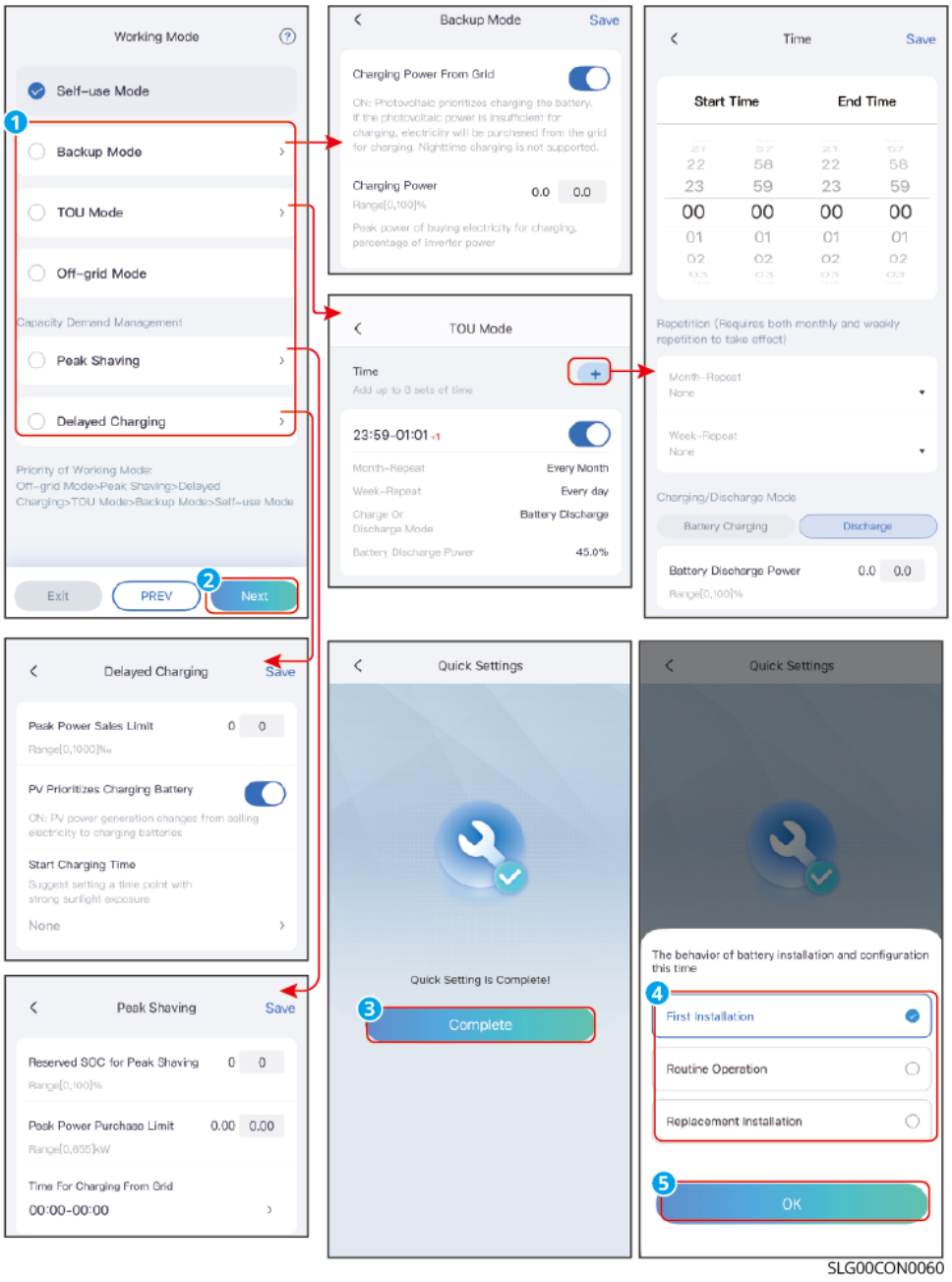
7.1.7.1 Quick Setting the Basic Information(Type I)

Step 1: Tap **Home > Settings > Quick Settings** to set the parameters.
Step 2 : Enter the password for quick settings. Contact the supplier or after sales service for password. Password for professional technicians only.
Step 3 : Some models support one-click configuration. Select **Guided Mode** to quickly configure the system.
Step 4: Select Grid Code(Safety Code)accordingly. Tap **Next** to set the Working Mode.



SLG00CON0121

Step 5: Set the working mode based on actual needs. Tap **Next** to set the Working Mode. For some models, after the working mode configuration is completed, it will automatically enter the CT/meter self-test state. At this time, the inverter will temporarily disconnect from the grid and then automatically reconnect.
Step 6 : Select the battery based on actual situation whether it is **First Installation, Routine Operation** or **Replacement Installation**.



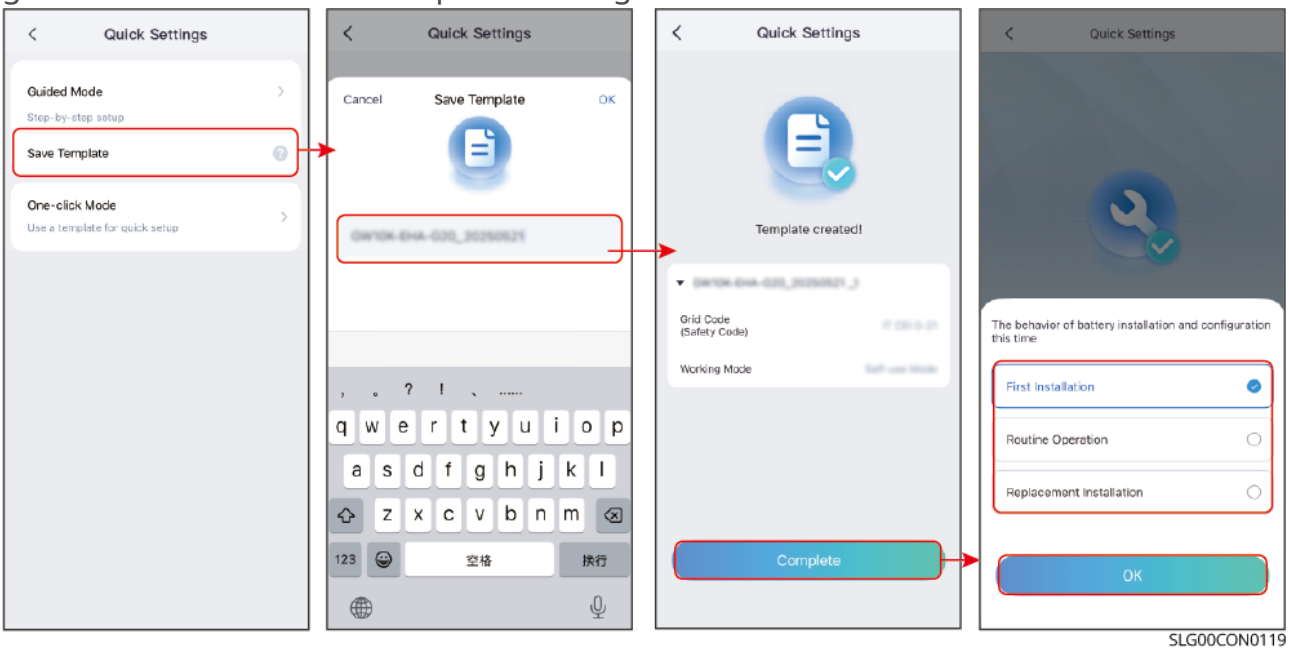
SLG00CON0060

No.	Parameters	Description
Back-up mode		
1	Charging Power From Grid	Enable Charging Power From Grid to allow power purchasing from the utility grid.
2	Charging Power	The percentage of the purchasing power to the rated power of the inverter.
TOU mode		

No.	Parameters	Description
3	Start Time	Within the Start Time and End Time, the battery is charged or discharged according to the set Battery Mode as well as the Rated Power.
4	End Time	
5	Charge Discharge Mode	Charge or discharge according to actual needs.
6	Rated Power	The percentage of the charging/discharging power to the rated power of the inverter.
7	Charge Cut-off SOC	The battery stop charging/discharging once the battery SOC reaches Charge Cut-off SOC.
Peakshaving		
8	Reserved SOC For Peakshaving	In Peak Shaving mode, the battery SOC should be lower than Reserved SOC For Peakshaving. Once the battery SOC is higher than Reserved SOC For Peakshaving, the peak shaving mode fails.
9	Peak Power Purchase Limit	Set the maximum power limit allowed to purchase from the grid. When the loads consume power exceed the sum of the power generated in the PV system and Peak Power Purchase Limit, the excess power will be made up by the battery.
10	Time for Charging From Grid	The utility grid will charge the battery between Start Time and End Time if the load power consumption do not exceed the power quota. Otherwise, only PV power can be used to charge the battery. Otherwise, only PV power can be used to charge the battery.
Smart charging		
11	Peak Power Sales Limit	Set the Peak Power Sales Limit in compliance with local laws and regulations. The Peak Limiting Power shall be lower then the output power limit specified by local requirements.
12	PV Prioritizes Charing Battery	During charging time, the PV power will first charge the battery.

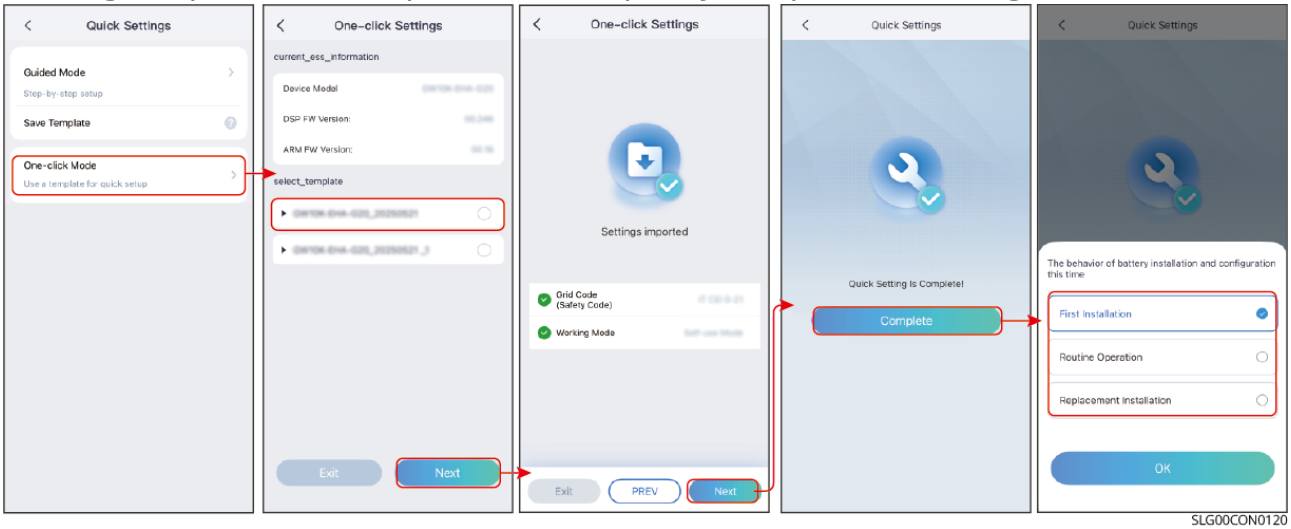
No.	Parameters	Description
13	Start Charging Time	

Step 7 : For devices that support one-click configuration, a template can be generated based on the completed configuration.



SLG00CON0119

Step 8: If you already have a one-click configuration template, you can use the existing template direct import mode to quickly complete the configuration.

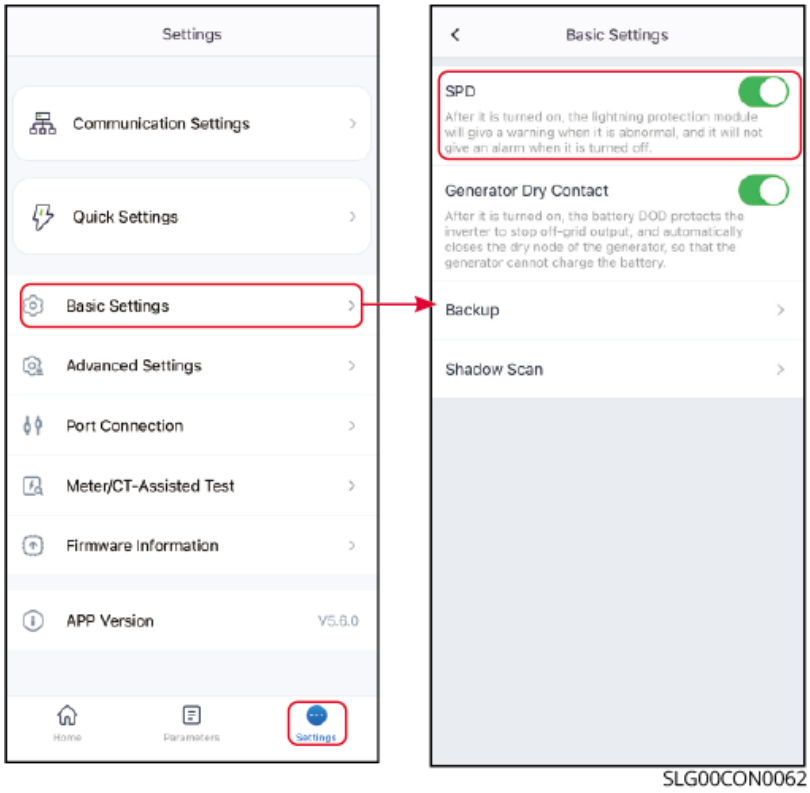


SLG00CON0120

7.1.8 Setting the Basic Information

7.1.8.1 Setting the SPD

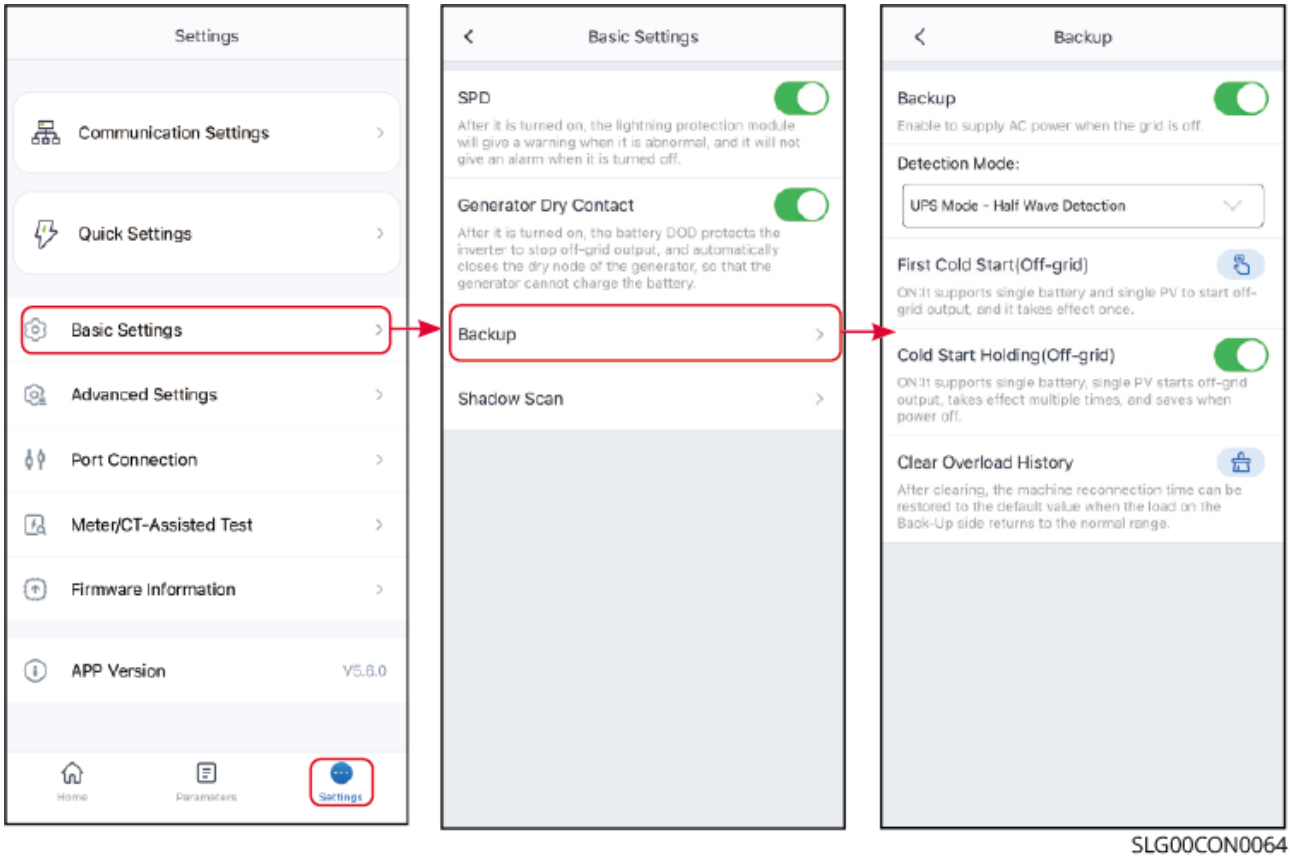
After enabling SPD, when the SPD module is abnormal, there will be SPD module abnormal alarm prompt.
Step 1 : Tap **Home > Settings > Basic Settings > SPD**, to set the parameters.
Step 2 : enable or disable the function based on actual needs.



SLG00CON0062

7.1.8.2 Setting the Back-up Power Parameters

After enabling Backup, the battery will power the load connected to the backup port of the inverter to ensure Uninterrupted Power Supply when the power grid fails.
Step 1 : Tap **Home > Settings > Basic Settings > Backup**, to set the parameters.
Step 2 : Set the backup supply function based on actual needs.



SLG00CON0064

No.	Parameters	Description
1	UPS Mode- Full Wave Detection	Check whether the utility grid voltage is too high or too low.
2	UPS Mode- Half Wave Detection	Check whether the utility grid voltage is too low.
3	EPSmode-with LVRT support.	Stop detecting utility grid voltage.
4	First Cold Start (Off-grid)	It will only take effect once. In off-grid mode, enable First Cold Start (Off-grid) to output backup supply with battery or PV.
5	Cold Start Holding (Off-grid)	Take effect multiple times. In off-grid mode, enable First Cold Start (Off-grid) to output backup supply with battery or PV.

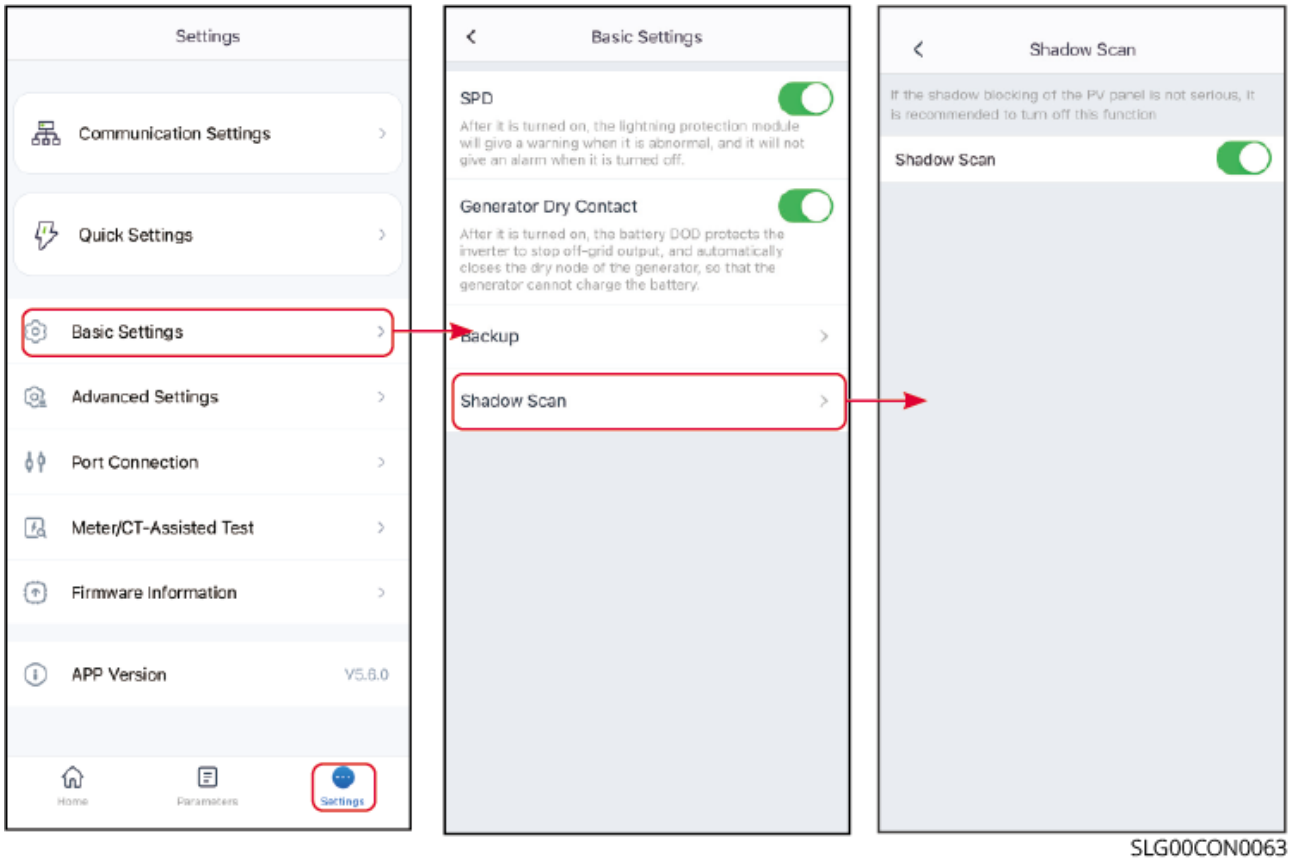
No.	Parameters	Description
6	Clear Overload History	Once the power of loads connected to the inverter BACK-UP ports exceeds the rated load power, the inverter will restart and detect the power again. The inverter will perform restart and detection several times until the overloading problem is solved. Tap Clear Overload History to reset the restart time interval after the power of the loads connected to the BACK-UP ports meets the requirements. The inverter will restart immediately.

7.1.8.3 Setting the Shadow Scan

Enable Shadow Scan when the PV panels are severely shadowed to optimize the power generation efficiency.

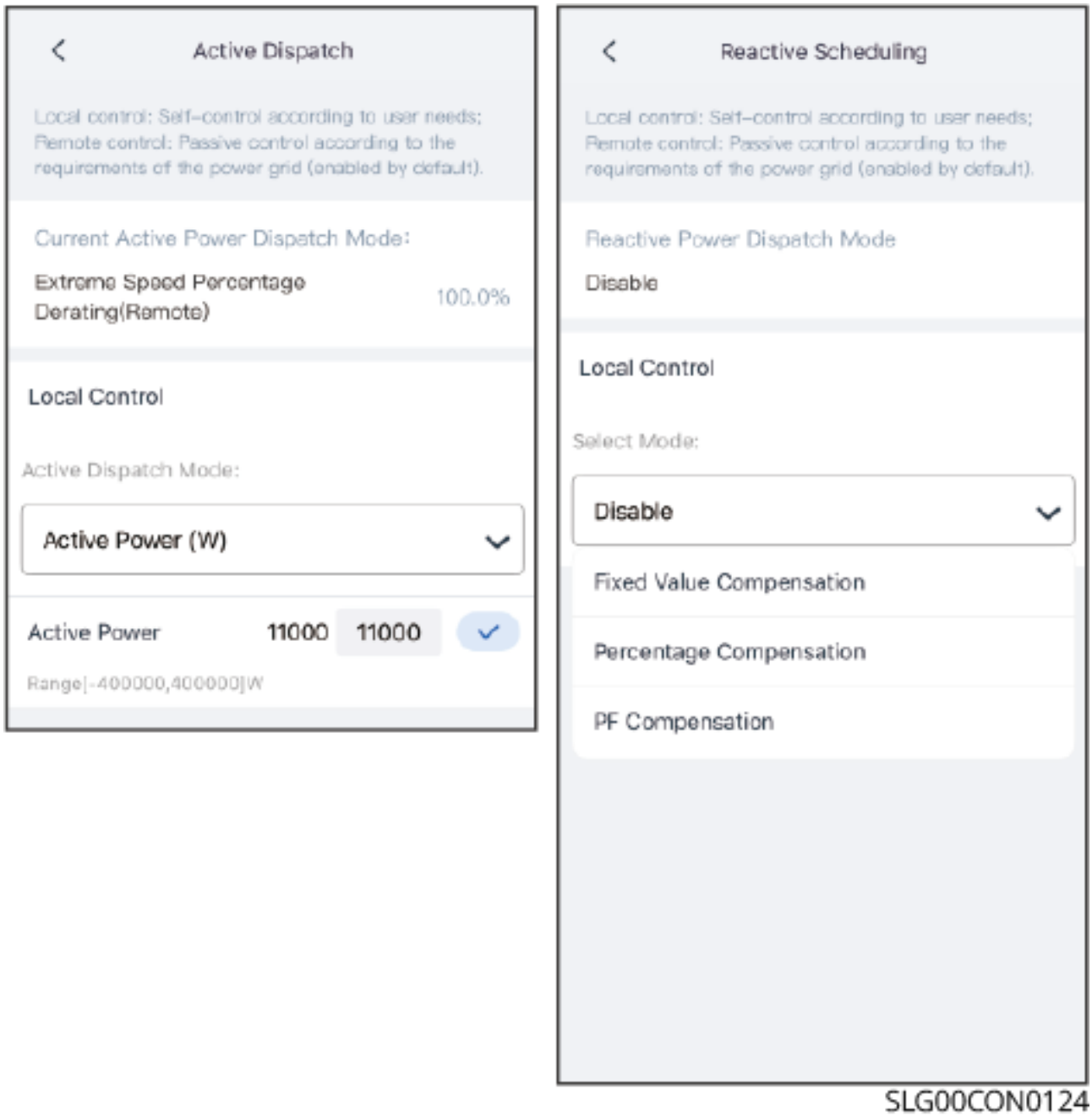
Step 1 : Tap **Home > Settings > Basic Settings> Shadow Scan**, to set the parameters.

Step 2: Enable or disable the function based on actual needs. Set the Shadow Scan interval and MPPT shadow scan if the inverter supports.



7.1.8.4 Setting Power Adjustment Parameters

Step 1: Go to the settings interface via **Home > Settings > Basic Settings > Power Scheduling**.
Step 2: Set the active power dispatch or reactive power dispatch parameters according to the actual situation.



SLG00CON0124

No.	Parameter	Description
Active Scheduling		

No.	Parameter	Description
1	Active Scheduling Mode	According to the requirements of the power grid company in the country/region where the inverter is located, control the active power according to the selected dispatch mode. Supports: • Disabled: Disables active scheduling. • Fixed value reduction: Dispatch according to a fixed value. • Percentage reduction: Dispatch based on a percentage of the rated power.
2	Active Power	• When the active power dispatch mode is set to fixed value derating, the active power is set to a fixed value. • When the active power dispatch mode is set to percentage derating, the active power is set as a percentage of the rated power. 比。
Reactive Scheduling		
3	Reactive Scheduling Mode	According to the requirements of the power grid company in the country/region where the inverter is located, control the reactive power according to the selected dispatch mode. Supports: • Disabled: Disables reactive scheduling. • Fixed value compensation: Dispatch according to a fixed value. • Percentage compensation: Dispatch based on a percentage of the rated power. • PF compensation.
4	Status	Set the power factor as lagging or leading based on actual needs and local grid standards and requirements.

No.	Parameter	Description
5	Reactive Power	• When the reactive power dispatch mode is set to fixed value derating, the reactive power is set to a fixed value. • When the reactive power dispatch mode is set to percentage derating, the reactive power is set as a percentage of the rated power.
6	Power Factor	When the reactive power dispatch mode is set to PF compensation, set the power factor.

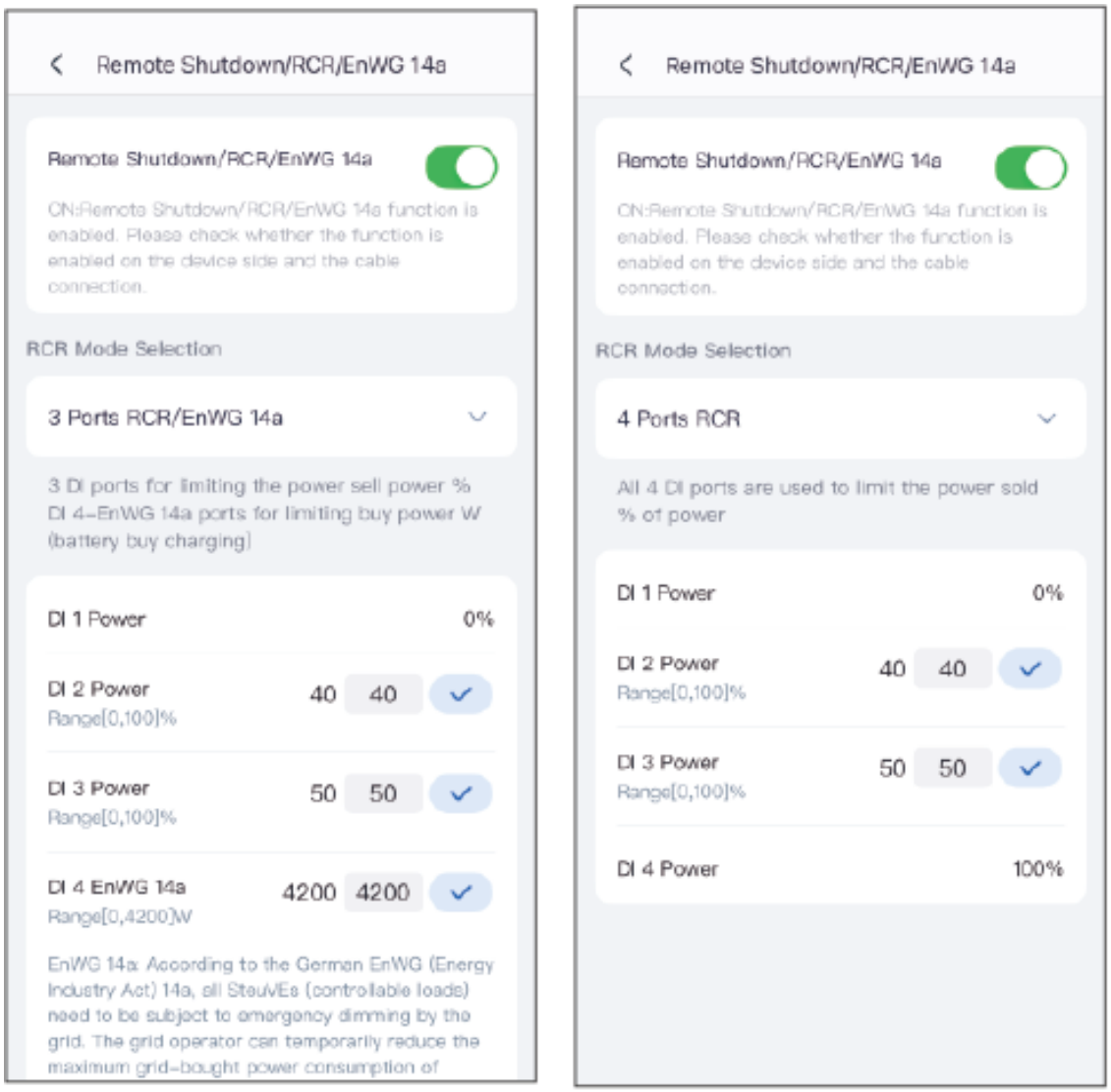
7.1.9 Setting Advanced Parameters

NOTICE

- Advanced parameters can be set when logged in as an "Installer".
- A password is required to enter the advanced settings page. Please contact the supplier or after-sales service to obtain the password. The password is for use by marine technicians only.

7.1.9.1 Setting DRED/Remote Shutdown/RCR/EnWG 14a

Enable DRED/Remote Shutdown/RCR before connecting the third party DRED, remote shutdown, or RCR device to comply with local laws and regulations.
Step 1 : Tap **Home > Settings > Advanced Settings > DRED/Remote Shutdown/RCR** to set the parameters.
Step 2 : Enable or disable the function based on actual needs.
Step 3 : For areas where the EnWG 14a regulation applies, when enabling the RCR function, you need to select the RCR mode according to the actual device type and set the DI port power.



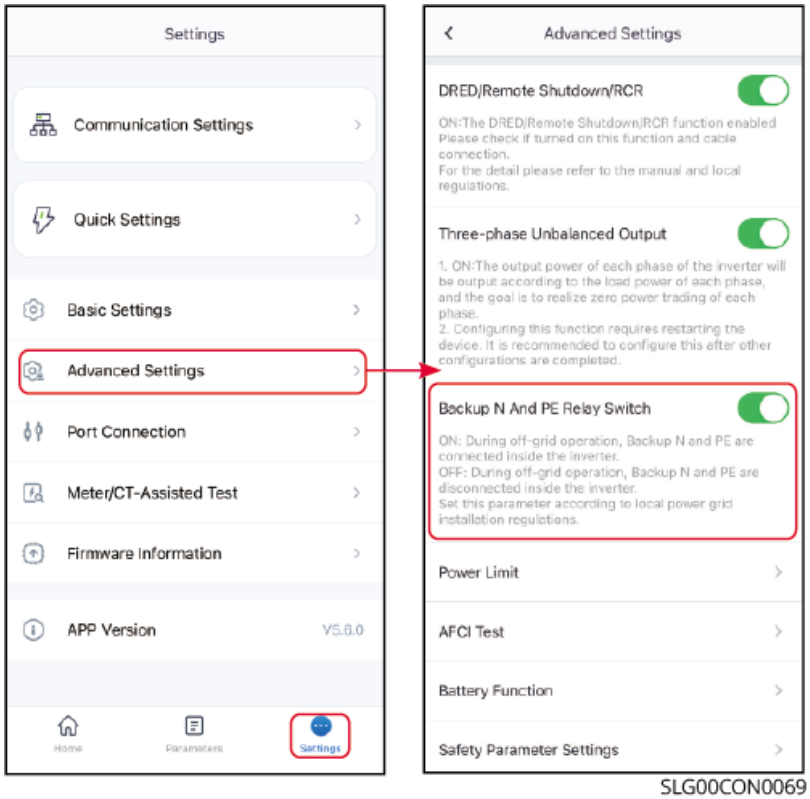
SLG00CON0067

7.1.9.2 Setting the Backup N and PE Relay Switch

To comply with local laws and regulations, ensure that the relay inside the back-up port remains closed and the N and PE wires are connected when the inverter is working off-grid.

Step 1 : Tap **Home > Settings > Advanced Settings > Backup N and PE Relay Switch** to set the parameters.

Step 2 : Enable or disable the function based on actual needs.

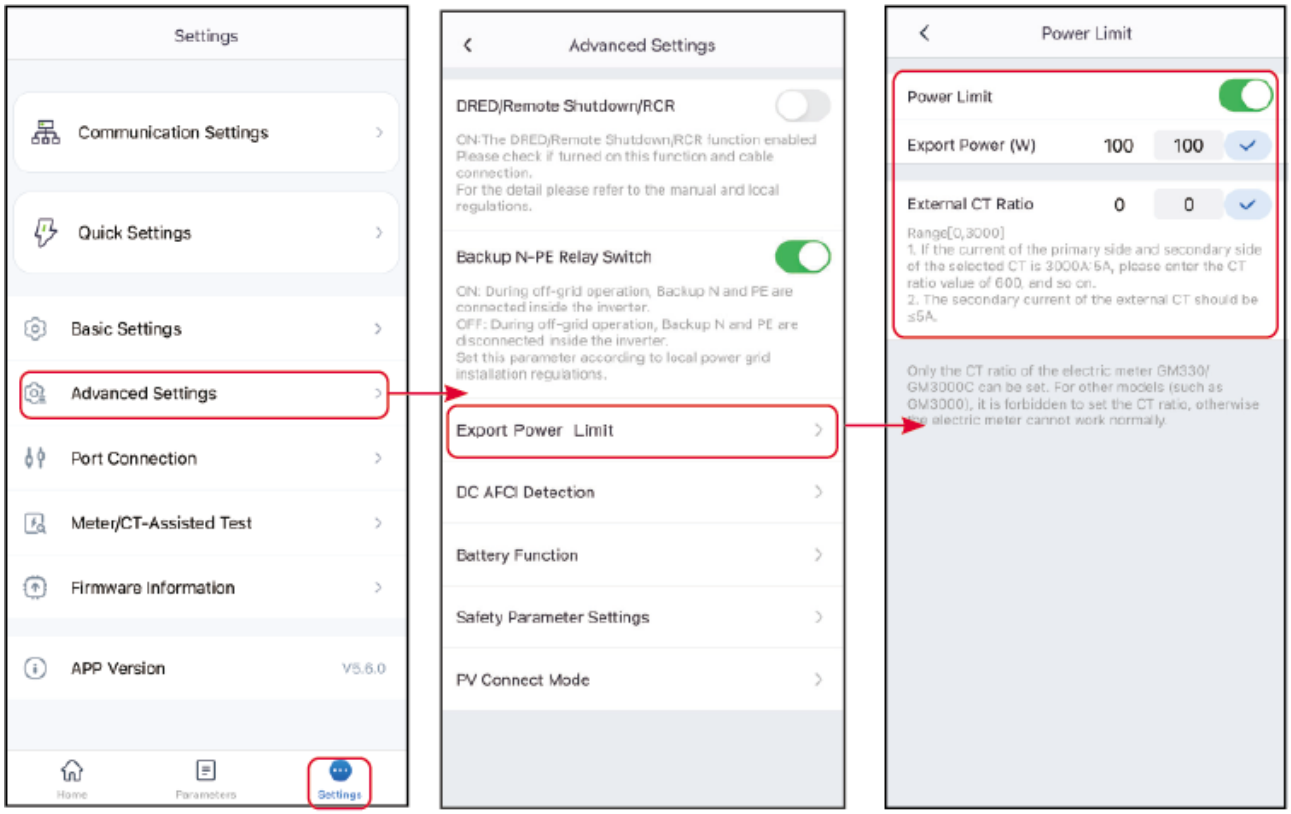


SLG00CON0069

7.1.9.3 Setting the Power Limit Parameters

Step 1: Tap **Home > Settings > Advanced Settings > Power Limit** to set the parameters.
Step 2 : Turn on or off the power limit function according to actual needs.
Step 3 : After turning on the function, enter the parameter value according to actual needs and tap "√" to successfully set the parameter.

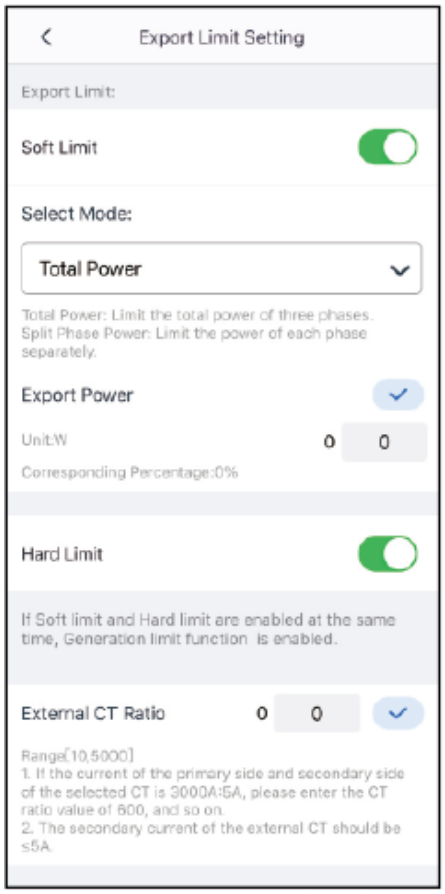
7.1.9.3.1 Set the grid-connected power limit parameters (general)



SLG00CON0070

No.	Parameters	Description
1	Power Limit	Turn on this function when output power needs to be limited according to the grid standards of some countries or regions.
2	Export Power	Set according to the maximum power that can be input to the grid.
3	External Meter CT ratio	Set the ratio of the primary current to the secondary current of the external CT.

7.1.9.3.2 Setting the Power Limit Parameters (Australia)



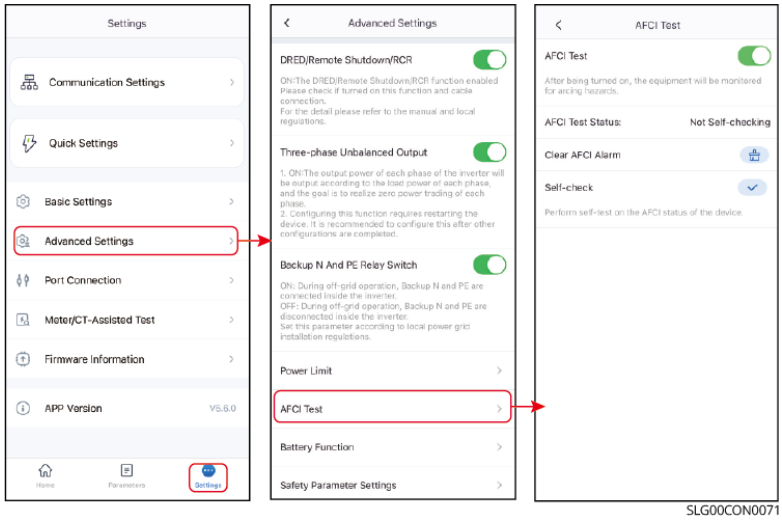
SLG00CON0133

No.	Parameters	Description
1	Software Power Limit	When output power needs to be limited according to grid standards in some countries or regions, turn on this function.
2	Limit Setting	• Set according to the maximum power that can be actually input to the grid. • Supports setting of fixed power value or percentage. The set percentage is the percentage of the limit power to the rated power of the inverter. • After setting the fixed value, the percentage changes automatically; after setting the percentage, the fixed value changes automatically.

No.	Parameters	Description
3	Hardware Power Limit	After enabling this function, when the amount of electricity fed into the grid exceeds the limit value, the inverter will automatically disconnect from the grid.
4	External Meter CT Ratio	Set the ratio of the primary current to the secondary current of the external CT.

7.1.9.4 Setting the AFCI Detection

Step 1 : Tap **Home > Settings > Advanced Settings > AFCI Test** to set the parameters.
Step 2 : Enable AFCI Test, Clear AFCI Alarm and Self-Check based on actual needs.



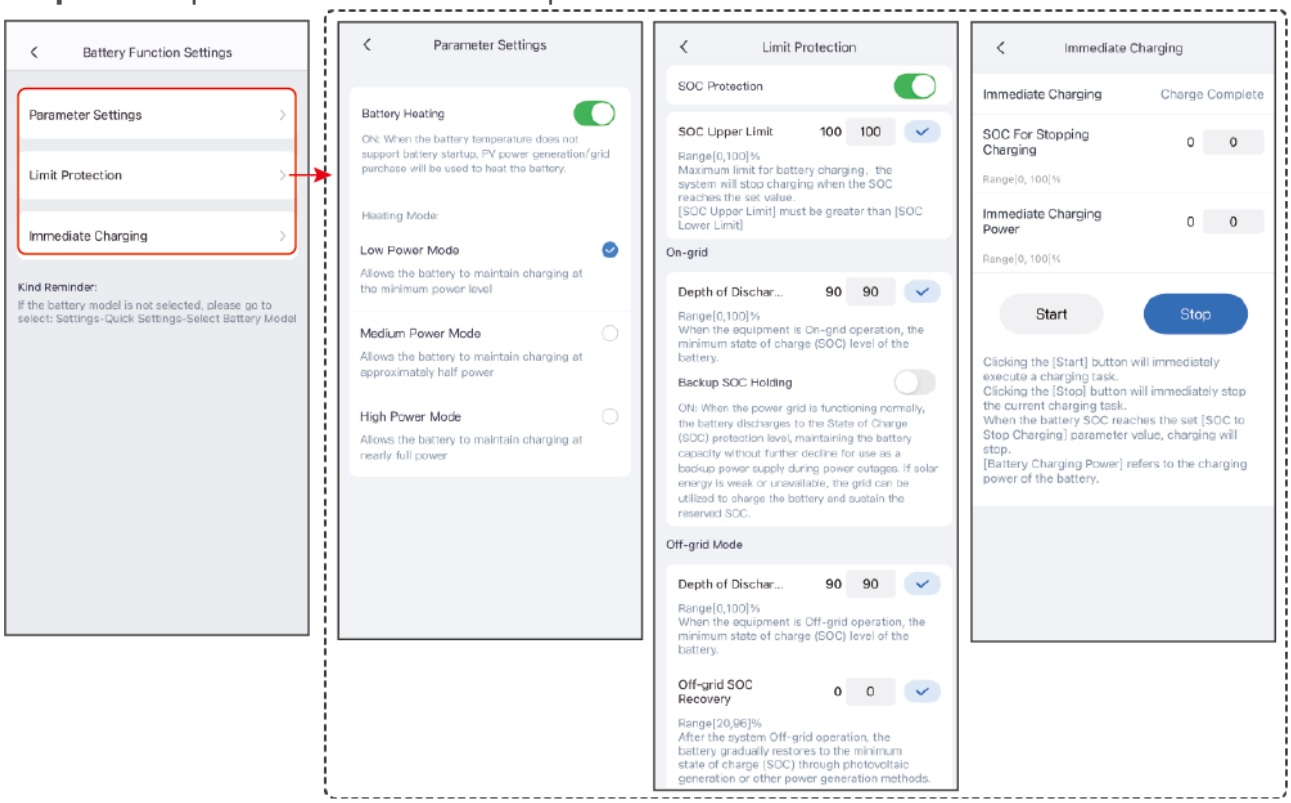
No.	Parameters	Description
1	AFCI Test	Enable or disable AFCI accordingly.
2	AFCI Test Status	The detection status like Not Self-checking.
3	Clear AFCI Alarm	Clear ARC Faulty alarm records.
4	Self-check	Tap to check whether the AFCI function works normally.

7.1.9.5 Setting the Battery

7.1.9.5.1 Set lithium Battery parameters

Step 1 Through**Home > Settings > Battery Function Settings**Enter the parameter setting interface.

Step 2 Enter parameter values as required.



SLG00CON0072

No.	Parameter Name	Instructions
Parameter settings		
1	Maximum Charging Current	Applicable to certain models. Set the maximum Charging Current for Battery charge according to actual requirements.
2	Maximum Discharge current	Applicable to certain models. Set the maximum Dischargecurrent for Battery discharge based on actual requirements.

No.	Parameter Name	Instructions
3	Battery heating	• When a Battery with heating function is selected and connected, this option will be displayed on the interface. After enabling the Battery heating function, if the Battery temperature does not support Battery startup, PV generation or grid power will be used to heat the Battery. • The model temperature varies for different Battery Heating Mode, please refer to the actual conditions. • Enabling the Battery heating function will consume a portion of the system's Power. By default, the Battery heating function operates in Low Power Mode mode, but it can be switched to other Power modes if needed. • The activation and deactivation of the Battery heating function is controlled byBMSIt is automatically controlled based on ambient temperature, so the Installation environment and location of the equipment will affect the activation and deactivation of the heating function. • If PV and ACPower only meets Load consumption, and Battery insufficient supports self-heating, then the heating function cannot be activated.
4	Battery wake-up	After activation, when Battery shuts down due to undervoltage Protection, it can wake up Battery. Only applicable to lithium Battery without breaker. After activation, the output voltage of Battery port is approximately 60V.
Limit Protection		
5	State of Charge (SOC)	When enabled, if the Battery capacity falls below the set depth of discharge, the Protection Function can be activated for Battery.
6	SOC upper limit	The upper limit value of Battery charge, when the SOC of Battery reaches the upper SOC limit, Charge stops.

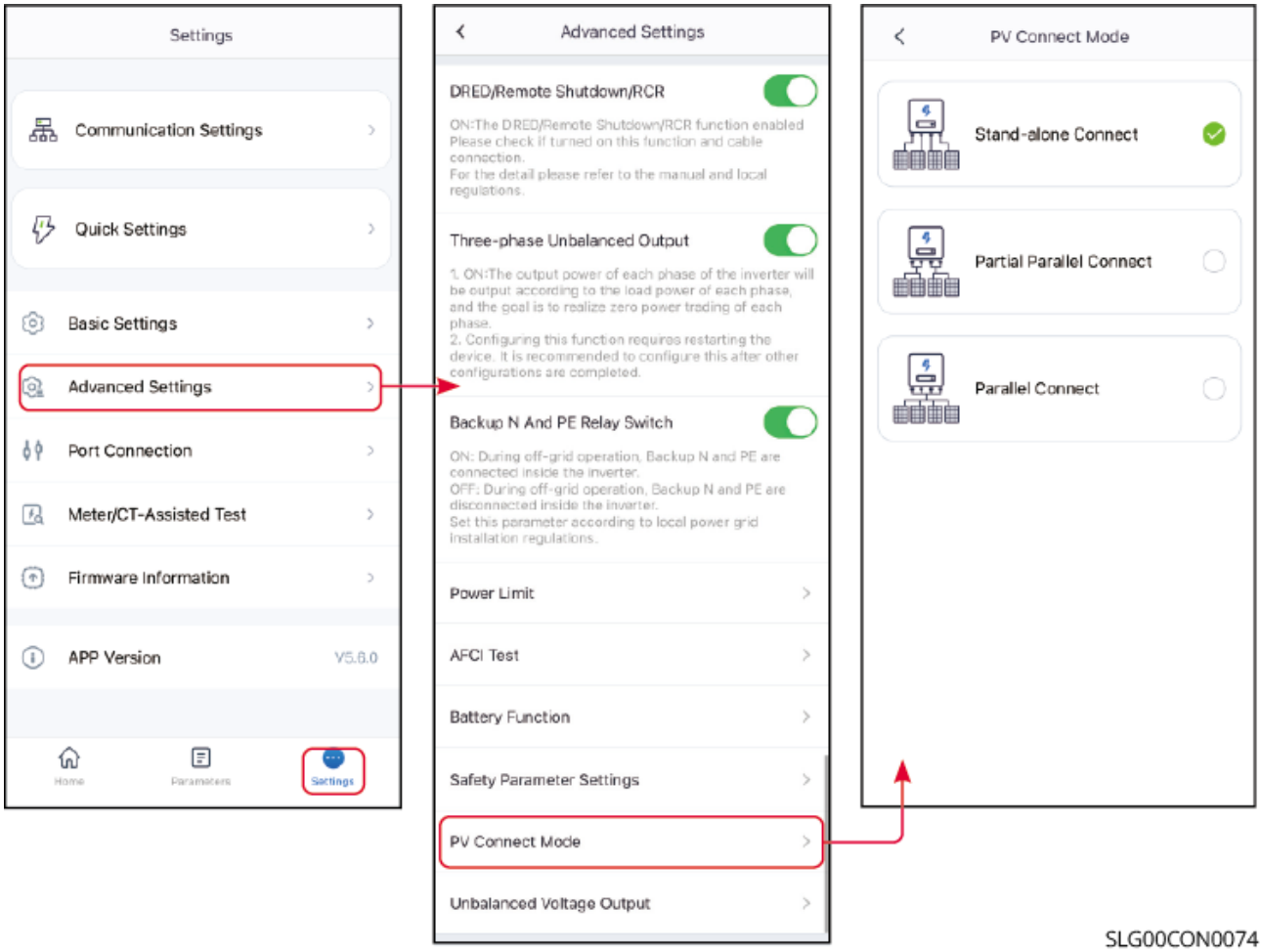
No.	Parameter Name	Instructions
7	depth of discharge (on-grid)	Inverter During operation of on-grid, the maximum allowable value for Discharge is Battery.
8	Back-up SOC hold	To ensure that the Battery SOC is sufficient to maintain normal system operation when off-grid, during on-grid operation, Battery will purchase electricity through Utility grid to charge up to the set SOC Protection value.
9	depth of discharge(Off-grid)	Inverter During off-grid operation, Battery allows the maximum value of Discharge.
10	Off-grid Recovery SOC	During off-grid operation, if the Battery SOC drops to the lower limit, the Inverter stops output and is only used to supply power to the Battery charge until the Battery SOC recovers to the off-grid recovery SOC value. If the lower SOC limit is higher than the off-grid recovery SOC value, the Charge will adjust to the lower SOC limit +10%.
Immediate Charging		
11	Immediate Charging	After activation, Utility grid will immediately supply power to Battery charge. This effect is only triggered once. Please enable or disable this function as needed.
12	Stop the SOC of Charge	When Immediate Charging is turned on, the charging of Battery charge will stop once the SOC of Battery reaches the cutoff SOC of Charge.
13	Immediate Charging Power	When Immediate Charging is turned on, the percentage of Charge Power to Inverter Rated Power. For example, for a Rated Power with a capacity of 10kW, when set to 60, the Charge Power is 6kW.
14	Start	Immediately Start Charging.
15	Stop	Immediately stop the current Charge task.

7.1.9.6 Setting PV Connect Mode

Select the PV connect mode based on the actual connections between the PV strings and MPPT ports of the inverter.

Step 1 : Tap **Home > Settings > Advanced Settings > PV Connect Mode** to set the parameters.

Step 2 : Set the connect mode to Independent Access, Partial Parallel Connect or Parallel Connection based on actual connections.



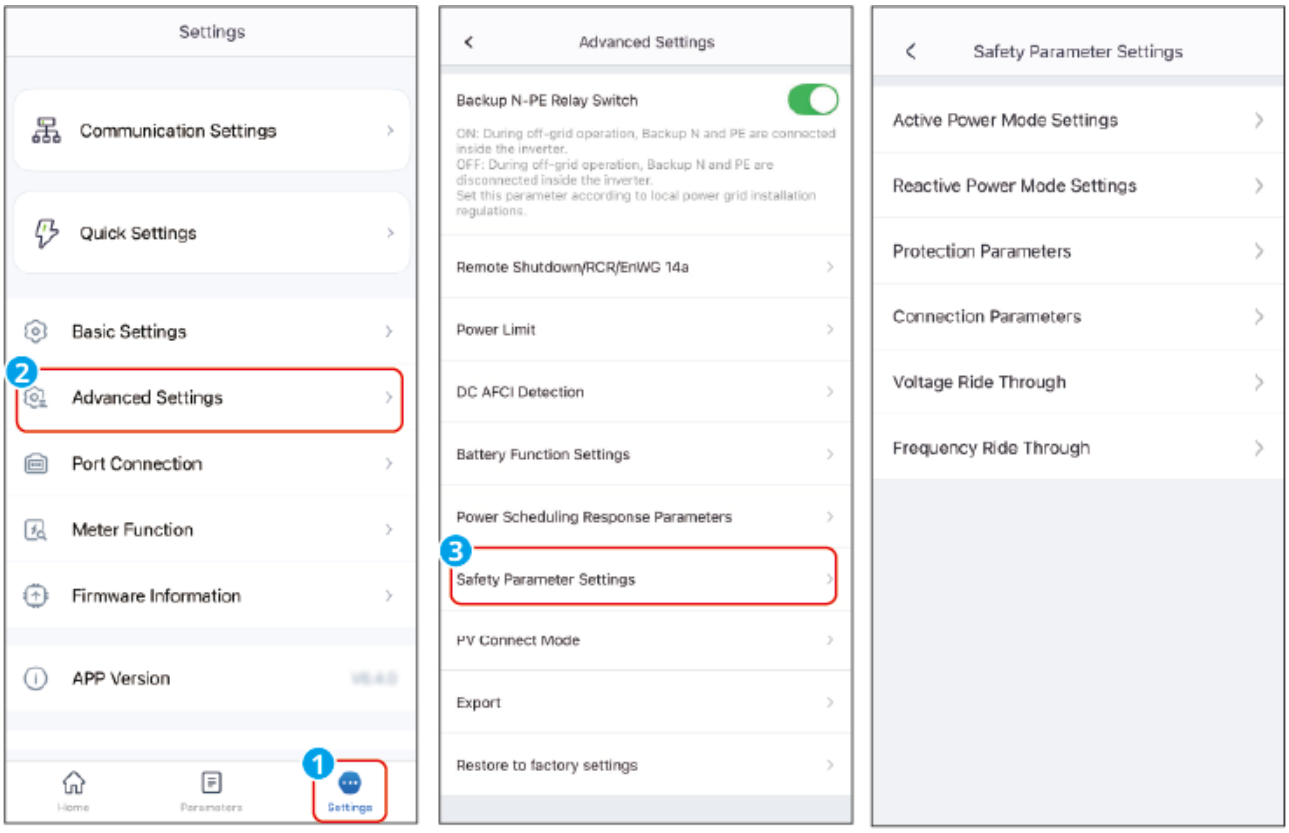
No.	Parameters	Description
1	Stand-alone Connect	The external PV string is connected to multi MPPT terminals of the inverter.

No.	Parameters	Description
2	Partial Parallel Connect	The PV strings are connected to the inverter in both stand-alone and parallel connection. For example, one PV string connect to MPPT1 ad MPPT2, another PV string connect to MPPT3.
3	Parallel Connect	When an external PV string is connected to the PV input port on the inverter side, one PV string is connected to multiple PV input ports.

7.1.10 Setting Safety Parameters

NOTICE

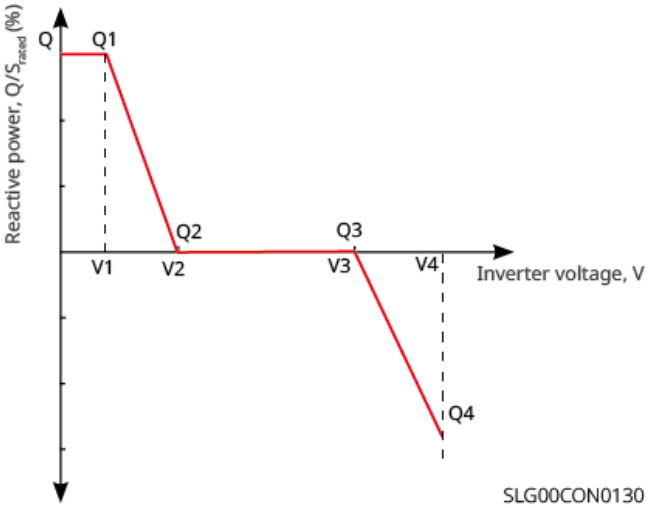
Set the custom safety parameters in compliance with local requirements. Do not change the parameters without the prior consent of the grid company.



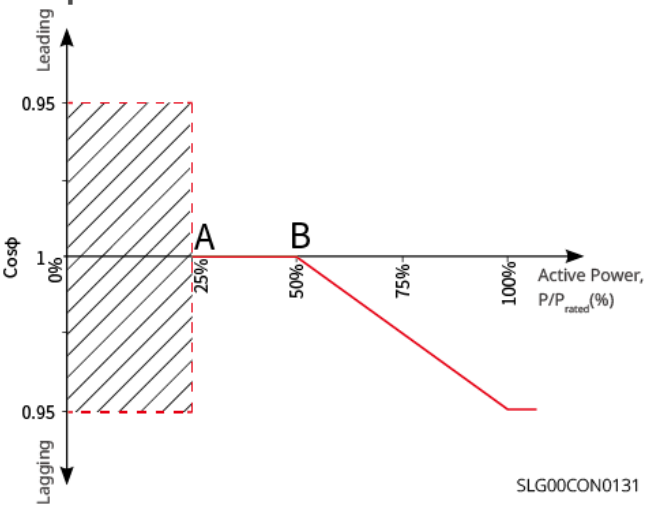
SLG00CON0076

7.1.10.1 Setting the Reactive Power Mode

Step 1 : Tap **Home > Settings > Advanced Settings > Safety Parameter Setting > Reactive Power Mode Settings** to set the parameters.
Step 2 :Set the parameters based on actual needs.
Q(U) Curve



Cosφ Curve



No.	Parameters	Description
Fix PF		
1	Fix PF	Enable Fix PF when it is required by local grid standards and requirements. After the parameters are set successfully, the power factor remains unchanged during the operation of the inverter.

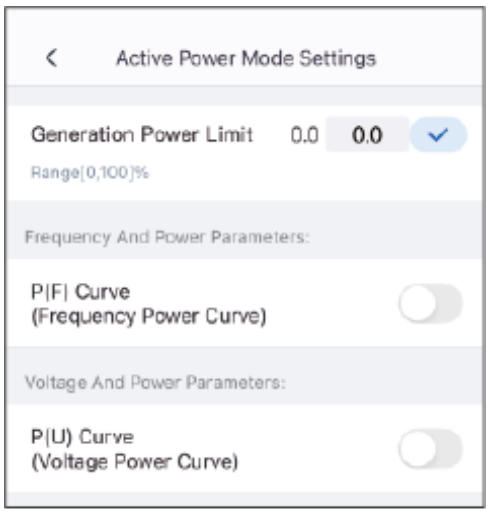
No.	Parameters	Description
2	Under-excited	Set the power factor as lagging or leading based on actual needs and local grid standards and requirements.
3	Over-excited	
4	Power Factor	Set the power factor based on actual needs. Range: 0-~-0.8, or +0.8~+1.
Fix Q		
1	Fix Q	Enable Fix Q when it is required by local grid standards and requirements.
2	Over-excited/Under-excited	Set the reactive power as inductive or capacitive reactive power based on actual needs and local grid standards and requirements.
3	Reactive Power	Set the ratio of reactive power to apparent power.
Q(U) Curve		
1	Q(U) Curve	Enable Q(U) Curve when it is required by local grid standards and requirements.
2	Mode Selection	Set Q(U) curve mode, supporting basic mode and slope mode.
3	Vn Voltage	The percentage of actual voltage to the rated voltage at Vn point, n=1, 2, 3, 4. When set to 90, it means: V/Vrated% = 90%.
4	Vn Reactive Power	The percentage of the reactive output power to the apparent power at Vn point, n=1, 2, 3, 4. For example, setting **Vn Reactive Power** to 48.5 means Q/Srated%=48.5%。
5	Voltage Deadband Width	When Q(U) curve mode is set to slope mode, this parameter defines the voltage deadband range where no reactive power output is required.
6	Over-excitation Slope	(In Q(U) slope mode) Sets the positive or negative slope for reactive power variation during over-voltage conditions.

No.	Parameters	Description
7	Under-excitation Slope	
8	Vn Reactive Power	The percentage of the reactive output power to the apparent power at Vn point, n=1, 2, 3, 4. For example, setting **Vn Reactive Power** to 48.5 means Q/Srated%=48.5%。
9	Q(U) Curve Response Time Constant	The reactive power must reach 95% of the target value within 3 time constants, following a first-order low-pass filter curve.
10	Extended Function	Enable the extended function and configure the corresponding parameters.
11	Lock-In Power	When the inverter output reactive power to the rated power ratio is between the Lock-in power and Lock-out power, the ratio meets Q(U) curve requirements.
12	Lock-out Power	
Cosφ(P) Curve		
1	Cosφ(P) Curve	Enable Cosφ Curve when it is required by local grid standards and requirements.
2	Mode Selection	Set cosφ(P) Curve Mode and support basic mode and slope mode configurations.
3	N-point Power	The percentage of inverter output active power relative to rated power at the N-point. N=A, B, C, D, E。
4	N-point cosφ Value	N-point Power Factor N=A, B, C, D, E。
5	Over-excitation Slope	When cosφ(P) curve mode is set to slope mode, configures the power variation slope as either positive or negative.
6	Under-excitation Slope	
7	N-point Power	The percentage of inverter output active power relative to rated power at the N-point. N=A, B, C。

No.	Parameters	Description
8	N-point cosφ Value	N-point Power Factor N=A, B, C。
9	cosφ(P) Curve Response Time Constant	The reactive power must reach 95% of the target value within 3 time constants, following a first-order low-pass filter curve.
10	Extended Function	Enable the extended function and configure the corresponding parameters.
11	Lock-in Voltage	When the grid voltage is between Lock-in Voltage and Lock-out Voltage, the voltage meets Cosφ curve requirements.
12	Lock-out Voltage	
Q(P) Curve		
1	Q(P) Curve Function	Enable Q(P) Curve when it is required by local grid standards and requirements.
2	Mode Selection	Set Q(P) curve mode, supporting basic mode and slope mode.
3	Pn-point Power	The percentage of the output reactive power to the rated power at Pn point, n=1, 2, 3, 4, 5, 6. For example, setting to 90 means Q/Prated%=90%.
4	Pn-point Reactive Power	The percentage of the output active power to the rated power at Pn point, n=1, 2, 3, 4, 5, 6. For example, When set to 90, it means: P/Prated% = 90%.
5	Over-excitation Slope	When the Q(P) curve mode is set to slope mode, configure the power variation slope as either a positive or negative value.
6	Under-excitation Slope	
7	Pn-point Power	Ratio of reactive power to rated power at Pn points (n=1, 2, 3). For example, setting to 90 means Q/Prated%=90%.

No.	Parameters	Description
8	Pn-point Reactive Power	Ratio of active power to rated power at Pn points (n=1, 2, 3). For example, When set to 90, it means: P/Prated% = 90%.
9	Time Constant	The reactive power must reach 95% of the target value within 3 time constants, following a first-order low-pass filter curve.

7.1.10.2 Setting the Active Power Mode



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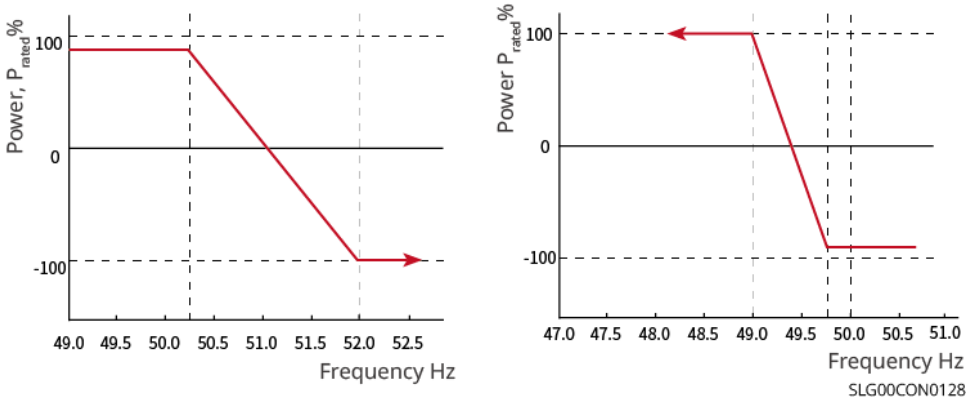
Step 1: Tap **Home > Settings > Advanced Settings > Safety Parameter Settings > Active Power Mode Settings** to set the parameters.

Step 2: Set the parameters based on actual needs.

P(F) Curve



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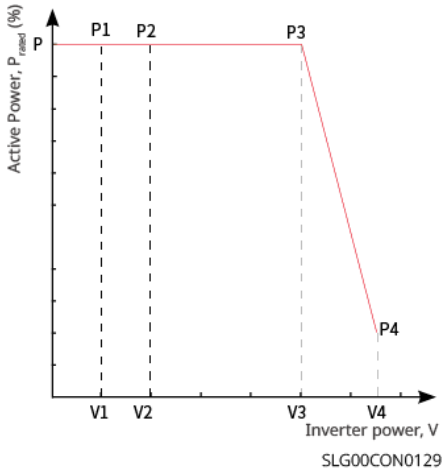
P(U) Curve



No.	Parameters	Explanation
1	Generation Power Limit	Set the change slope when the active output power increases or decreases.
2	Power Gradient	Set the active power change slope.
Overfrequency Unloading		
1	P(F) Curve	Enable P(F) Curve when it is required by local grid standards and requirements.
2	Over-Frequency Load Shedding Mode	Set the overfrequency unloading mode based on actual needs. • Slope mode: adjusts power based on the over frequency point and load reduction slope. • Stop mode: adjusts the power based on the over-frequency start point and over-frequency end point.
3	Overfrequency Threshold	The inverter output active power will decrease when the utility grid frequency is too high. The inverter output power will decrease when the utility grid frequency is higher than **Overfrequency Threshold**.

No.	Parameters	Explanation
4	Import/Export Electricity Conversion Frequency	When the set frequency value is reached, the system switches from selling electricity to buying electricity.
5	Overfrequency Endpoint	The inverter output active power will decrease when the utility grid frequency is too high. The inverter output power will stop decreasing when the utility grid frequency is higher than **Overfrequency Endpoint**.
6	Over-Frequency Power Slope Reference Power	Adjust the inverter output power based on Apparent Active Power, Rated Active Power, Momentary Active Power, Or Max. Active Power.
7	Power response to overfrequency gradient	The inverter output active power will increase when the utility grid frequency is too high. Indicates the slope when the inverter output power decreases.
8	Tentional Delay Ta	Indicates the delayed response time when the inverter output power is higher than the **Overfrequency Threshold**.
9	Hysteretic Function	Enable the hysteretic function.
10	Frequency Hysteresis Point	During over-frequency load reduction, if the frequency decreases, the power output is based on the lowest point of the load reduction power until the frequency is less than the hysteresis point and the power is restored.
11	Hysteresis Waiting Time	For over-frequency load reduction and frequency decrease, when the frequency is less than the hysteresis point, the power recovery waiting time, that is, it takes a certain amount of time to recover the power.

No.	Parameters	Explanation
12	Hysteresis Power Recovery Slope Reference Power	For over-frequency load reduction and frequency decrease, when the frequency is less than the hysteresis point, the power recovery benchmark, that is, the power recovery is based on the recovery slope * the rate of change of the reference power. Support: Pn rated power, Ps apparent power, Pm current power, Pmax maximum power, power difference (△P).
13	Hysteretic Power Recovery Slope	For over-frequency load reduction and frequency reduction, when the frequency is less than the hysteresis point, the power change slope when the power is restored.
Underfrequency Loading		
1	P(F) Curve	Enable P(F) Curve when it is required by local grid standards and requirements.
2	Underfrequency Load Mode	Set the underfrequency unloading mode based on actual needs. • Slope mode: adjusts power based on the underfrequency point and load increase slope. • Stop mode: adjusts the power based on the underfrequency start point and underfrequency end point.
3	Underfrequency Threshold	The inverter output active power will increase when the utility grid frequency is too low. The inverter output power will increase when the utility grid frequency is lower than **Underfrequency Threshold**.
4	Import/Export Electricity Conversion Frequency	When the set frequency value is reached, the system switches from selling electricity to buying electricity.

No.	Parameters	Explanation
5	Underfrequency Endpoint	The inverter output active power will increase when the utility grid frequency is too low. The inverter output power will stop increasing when the utility grid frequency is lower than **Underfrequency Endpoint**.
6	Over-Frequency Power Slope Reference Power	Adjust the inverter output power based on Apparent Active Power, Rated Active Power, Momentary Active Power, Or Max. Active Power.
7	Under-Frequency Power Slope	The inverter output active power will increase when the utility grid frequency is too low. The slope of the inverter output power when it rises.
8	Tentional Delay Ta	Indicates the delayed response time when the inverter output power is lower than the **Underfrequency Threshold**.
9	Hysteretic Function	Enable the hysteretic function.
10	Frequency Hysteresis Point	During underfrequency loading, if the frequency increases, the power is output according to the lowest point of the loaded power until the frequency is higher than the hysteresis point and the power is restored.
11	Hysteresis Waiting Time	For underfrequency loading, the frequency increases, when the frequency is higher than the hysteresis point, the waiting time for power recovery, that is, it takes a certain amount of time to recover the power.

No.	Parameters	Explanation
12	Hysteresis Power Recovery Slope Reference Power	For underfrequency loading, the frequency increases, when the frequency is higher than the hysteresis point, the benchmark for power recovery, that is, the power recovery is carried out according to the recovery slope * the rate of change of the benchmark power. Support: Pn rated power, Ps apparent power, Pm current power, Pmax maximum power, power difference (△P).
13	Hysteretic Power Recovery Slope	For under-frequency loading, frequency increase, when the frequency is higher than the hysteresis point, the power change slope when power is restored.
14	P(U) Curve	Enable P(U) Curve when it is required by local grid standards and requirements.
15	Vn Voltage	The percentage of actual voltage to the rated voltage at Vn point, n= 1, 2, 3, 4. For example, setting Vn Voltage to 90 means V/Vrated%=90%.
16	Vn Active Power	The percentage of the output active power to the apparent power at Vn point, (n= 1, 2, 3, 4). For example, setting **Vn Reactive Power** to 48.5 means P/Prated%=48.5%.
17	Output Response Mode	Set the active power output response mode. Supports: • PT-1 Behavior, realize active scheduling based on the first-order LPF curve within the response time constant. • Gradient Control, realize active scheduling based on the power change slope.
18	Power Gradient	When the output response mode is set to Gradient Control, active power scheduling is achieved according to the power change gradient.

No.	Parameters	Explanation
19	First-order Low-pass Filter Time Parameter	Set the time constant within which the active power changes based on the first order LPF curve when the Output Response Mode is set to be First-order Low-pass Filter Time Parameter.
20	Overload Function Switch	When enabled, the maximum active power output is 1.1 times the rated power; otherwise, the maximum active power output is consistent with the rated power value.

7.1.10.3 Setting Protection Parameters

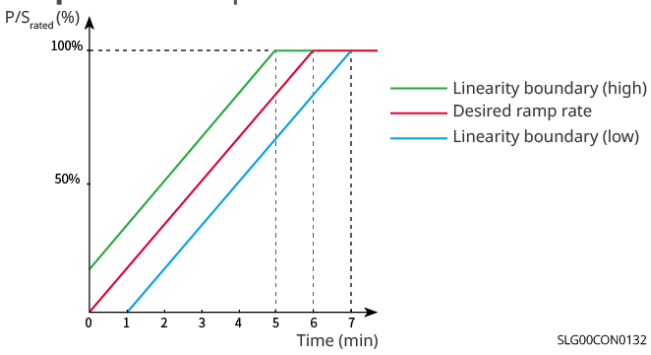
Step 1 : Tap **Home > Settings > Advanced Settings > Safety Parameter Settings > Protection Parameters** to set the parameters.
Step 2: Set the parameters based on actual needs.

No.	Parameters	Description
1	OV Stage n Trip Value	Set the grid overvoltage protection threshold value, n=1,2,3,4.
2	OV Stage n Trip Time	Set the grid overvoltage protection tripping time, n=1,2,3,4.
3	UV Stage n Trip Value	Set the grid undervoltage protection threshold value, n=1,2,3,4.
4	UV Stage n Trip Time	Set the grid undervoltage protection tripping time.
5	10min Overvoltage Trip Threshold	Set the 10min overvoltage protection threshold value.
6	10min Overvoltage Trip Time	Set the 10min overvoltage protection tripping time.
7	OF Stage n Trip Value	Set the grid overfrequency triggering n-th order protection point, n=1,2,3,4.
8	OF Stage n Trip Time	Set the grid overfrequency trigger n-th order trip time, n=1,2,3,4.

No.	Parameters	Description
9	UF Stage n Trip Value	Set the grid underfrequency triggering n-th order protection point, n=1,2,3,4.
10	UF Stage n Trip Time	Set the grid underfrequency trigger n-th order trip time, n=1,2,3,4.

7.1.10.4 Setting Connection Parameters

Step 1 : Tap **Home > Settings > Advanced Settings > Safety Parameter Settings > Protection Parameters** to set the parameters.
Step 2: Set the parameters based on actual needs.



No.	Parameters	Description
Ramp Up		
1	Upper Voltage	The inverter cannot connect to the grid if it is powered on for the first connection and the grid voltage is higher than the **Upper Voltage**.
2	Lower Voltage	The inverter cannot connect to the grid if it is powered on for the first connection and the grid voltage is lower than the **Lower Voltage**.
3	Upper Frequency	The inverter cannot connect to the grid if it is powered on for the first connection and the grid frequency is higher than the **Upper Frequency**.

No.	Parameters	Description
4	Lower Frequency	The inverter cannot connect to the grid if it is powered on for the first connection and the grid frequency is lower than the **Lower Frequency**.
5	Observation Time	The waiting time for connecting the inverter to the grid when meeting the following requirements. 1. The inverter is powered on for the first connection. 2. The utility grid voltage and frequency meet certain requirements.
6	Soft Ramp Up Gradient	Enable the start up power slope.
7	Soft Ramp Up Gradient	Indicates the percentage of incremental output power per minute based on the local requirements when the inverter is powered on for the first time.
Reconnection		
8	Upper Voltage	The inverter cannot connect to the grid if it is reconnecting due to a fault and the grid voltage is higher than the **Upper Voltage**.
9	Lower Voltage	The inverter cannot connect to the grid if it is reconnecting due to a fault and the grid voltage is lower than the **Lower Voltage**.
10	Upper Frequency	The inverter cannot connect to the grid if it is reconnecting due to a fault and the grid frequency is higher than the **Upper Frequency**.
11	Lower Frequency	The inverter cannot connect to the grid if it is reconnecting due to a fault and the grid frequency is lower than the **Lower Frequency**.
12	Observation Time	The waiting time for connecting the inverter to the grid when meeting the following requirements. 1. The inverter is reconnecting to the grid due to a fault. 2. The utility grid voltage and frequency meet certain requirements.
13	Reconnection Gradient	Enable the start up power slope.

No.	Parameters	Description
14	Reconnection Gradient	Indicates the percentage of incremental output power per minute based on the local requirements when the inverter is powered on for the first time. For example, setting Reconnection Gradient to 10 means the reconnect slope is 10%P/Srated/min.

7.1.10.5 Setting Voltage Ride Through Parameters

Step 1 : Tap **Home > Settings > Advanced Settings > Safety Parameter Settings > Voltage Ride Through** to set the parameters.
Step 2 : Set the parameters based on actual needs.

No.	Parameters	Description
LVRT		
1	UVn Voltage	The ratio of the ride through voltage to the rated voltage at UVn point during LVRT. n=1,2,3,4,5,6,7。
2	UVn Time	The ride through time at UVn point during LVRT. n=1,2,3,4,5,6,7
3	Enter Into LVRT Threshold	The inverter will not be disconnected from the utility grid immediately when the grid voltage is between Enter Into LVRT Threshold and Exit LVRT Endpoint.
4	Exit LVRT Endpoint	
5	Slope K2	K-factor for reactive power during LVRT.
6	Zero Current Mode	The system outputs zero current during LVRT.
7	Entry Threshold	Set the entry threshold of zero current mode.
HVRT		

No.	Parameters	Description
1	OVn Voltage	The ratio of the ride through voltage to the rated voltage at OVn point during HVRT. n=1,2,3,4,5,6,7。
2	OVn Time	The ride through time at OVn point during HVRT. n=1,2,3,4,5,6,7。
3	Enter High Crossing Threshold	The inverter will not be disconnected from the utility grid immediately when the grid voltage is between Enter High Crossing Threshold and Exit High Crossing Threshold.
4	Exit High Crossing Threshold	
5	Slope K2	K-factor for reactive power during HVRT.
6	Zero Current Mode	The system outputs zero current during HVRT.
7	Entry Threshold	Set the entry threshold of zero current mode.

7.1.10.6 Setting Frequency Ride Through Parameters

Step 1 : Tap **Home > Settings > Advanced Settings > Safety Parameter Settings > Frequency Ride Through** to set the parameters.
Step 2 : Set the parameters based on actual needs.

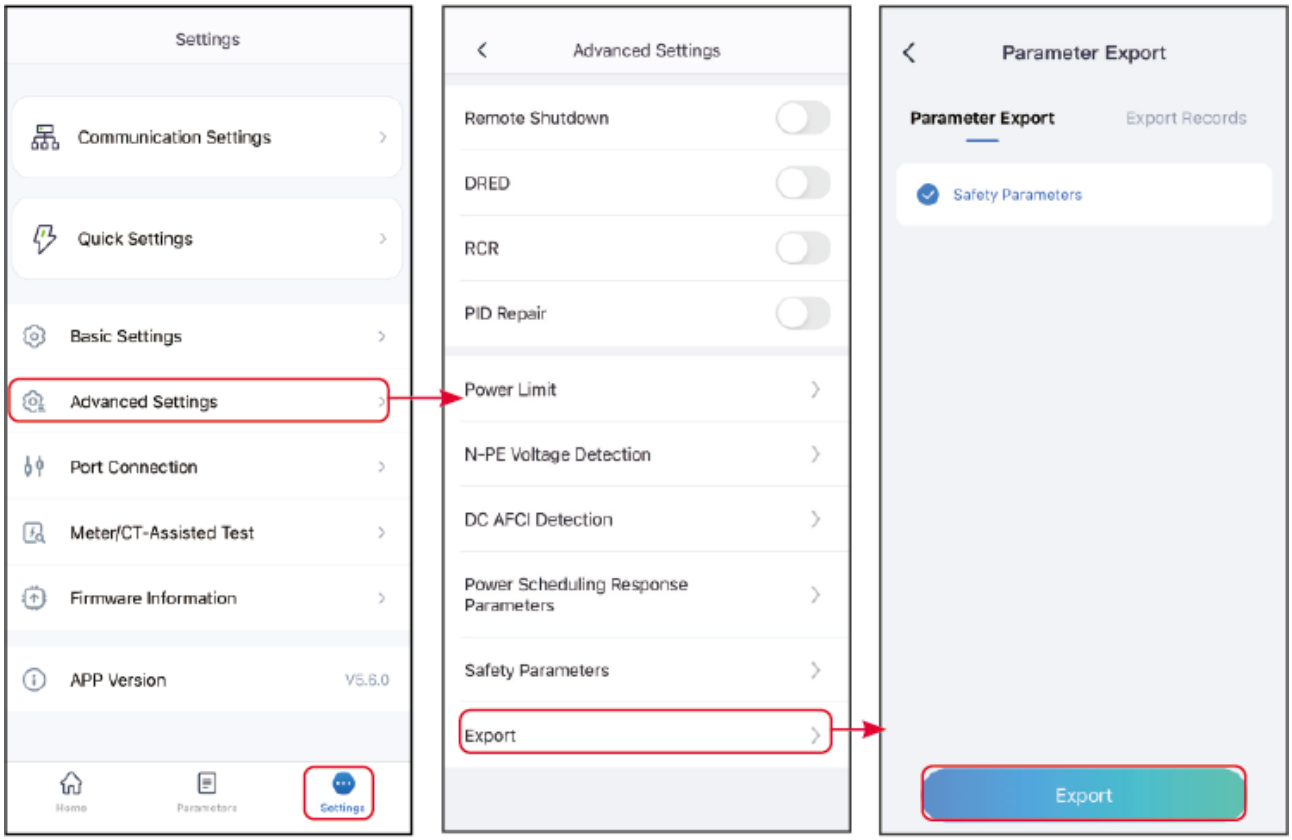
No.	Parameters	Description
1	UFn Frequency	The frequency at the UFn point during frequency ride through.
2	UFn Frequency	The frequency at the UFn point during frequency ride through. n=1,2,3。
3	UFn Time	The ride through duration at the UFn point during frequency ride through. n=1,2,3。

No.	Parameters	Description
4	OFn Frequency	The frequency at the OFn point during frequency ride through. n=1,2,3。
5	OFn Time	The ride through duration at the OFn point during frequency ride through. n=1,2,3。

7.1.11 Exporting Parameters

7.1.11.1 Exporting Safety Parameters

After selecting the safety code, some models support exporting safety parameter files.
Step 1 : Tap **Home > Settings > Advanced Settings > Export** to export the parameters.
Step 2 : Select Safety Parameters, and tap **Export** to start downloading the current safety parameter file. When the export is complete, tap **Share** and choose how you want to open the exported file.



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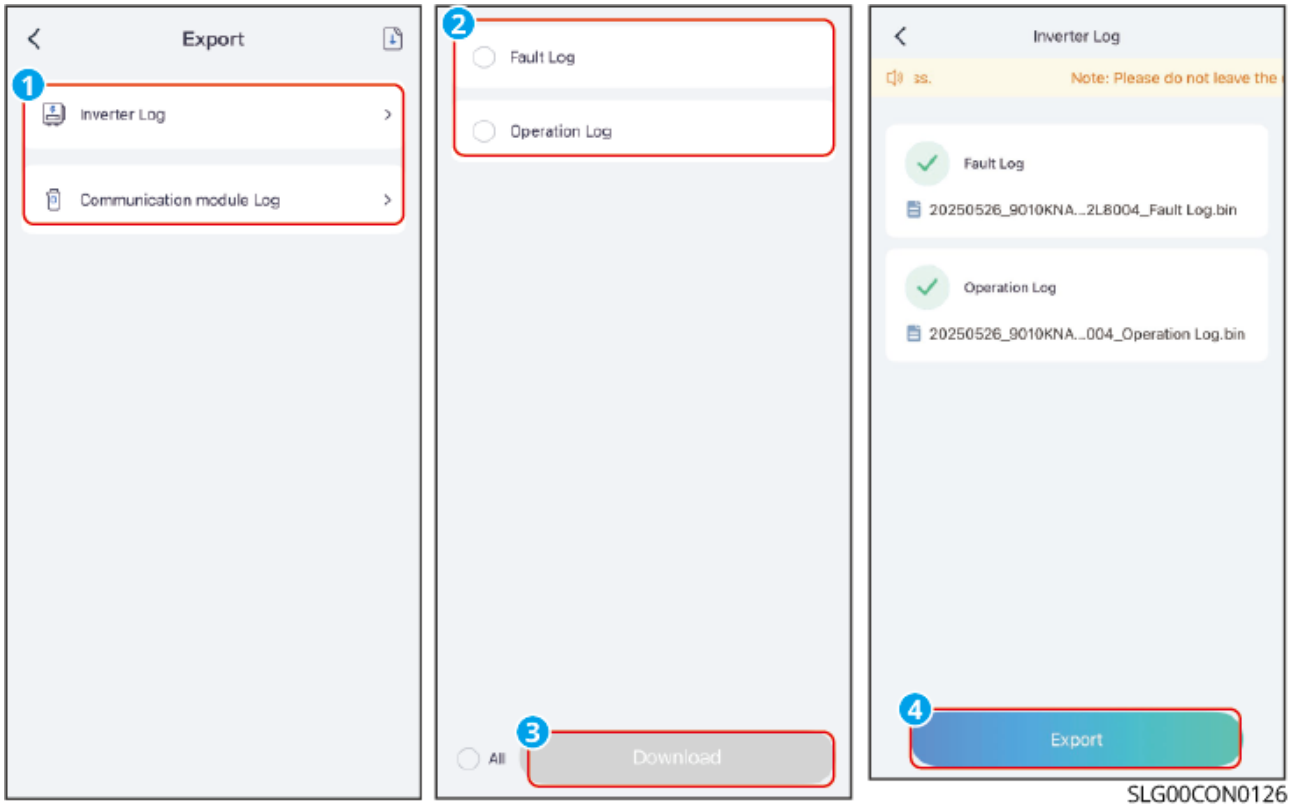
7.1.11.2 Exporting Log Parameters

Step 1 : Tap **Home > Settings > Advanced Settings > Export**.
Step 2 : Select the device type to export logs, such as inverter logs, communication module logs, etc.
Step 3: Select the log type to export, download and export the log file. After the export is complete, tap **Share** and choose how to open the exported file according to actual needs.



7.1.12 Setting the Meter Parameters

7.1.12.1 Bind/Unbind Meter

NOTICE

- When both grid-tied inverters and energy storage inverters are used in a photovoltaic system to achieve coupling or microgrid functions, dual meters may be employed in the system. Please configure the meter binding information according to the actual usage.
- Third-party meters are not supported.

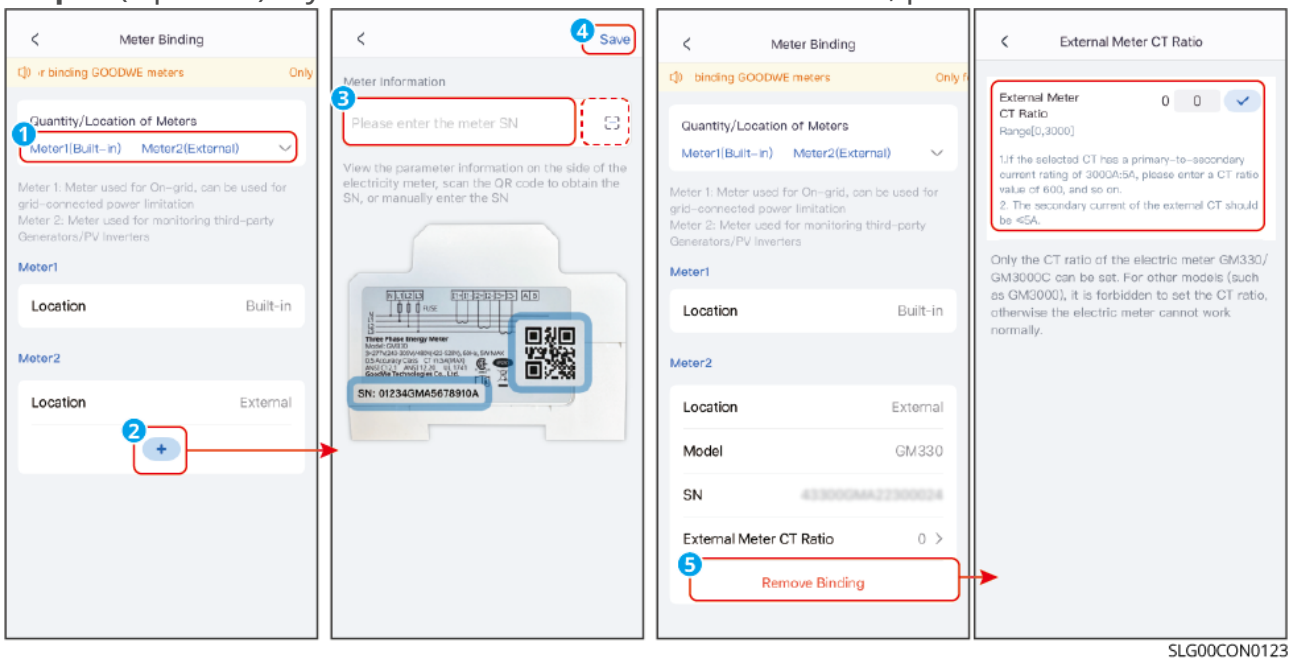
Step 1: Navigate to **Homepage** > **Settings** > **Meter Function** > **Meter Binding**, enter the binding interface.

Step 2: Click the **Meters Number/Location** dropdown to select the actual application scenario. Supports selection: Meter 1 (built-in) no Meter 2; Meter 1 (external) no Meter 2; Meter 1 (built-in) Meter 2 (external); Meter 1 (external) Meter 2 (external). Here, using the Meter 1 (built-in) Meter 2 (external) interface as an example to

introduce how to bind the meter.

Step 3: As shown in the figure below, when selecting to use an external meter, it is necessary to manually add external meter information. Click +, by manually entering the meter SN or scanning the meter SN QR code to bind the meter. When the bound meter model is GM330, please set the meter CT ratio according to the actual situation, click √ to complete the setup. If using other meters, there is no need to set the meter CT ratio.

Step 4: (Optional) If you need to unbind the external meter, please click **Unbind**.



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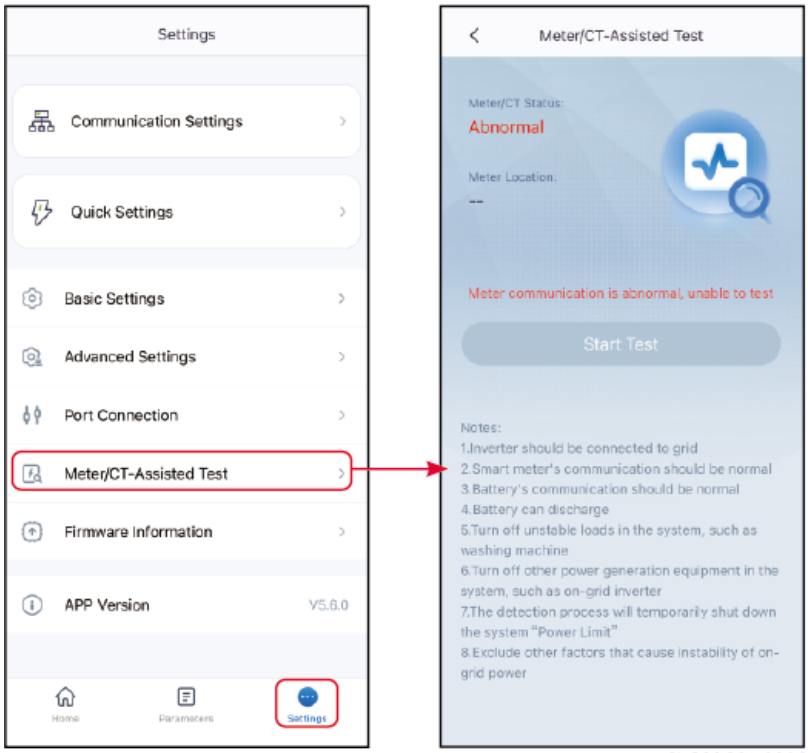
7.1.12.2 Meter/CT-Assisted Test

Meter/CT-Assisted Test is used to auto-check if the Smart Meter and CT are connected in the right way and their working status.

Step 1 : Tap **Home > Settings > Meter/CT Assisted Test** to set the function.

Step 2 : Tap **Start Test** to start test. Check Test Result after test.



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7.1.13 Setting Generator/Load Control

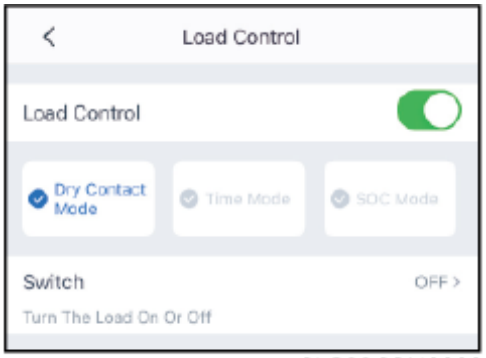
7.1.13.1 Setting Load Control

NOTICE

- Loads and generators can be controlled by SolarGo app when the inverter supports load control function.
- For ET40-50kW series inverters, the load control function is supported only when the inverter is used with STS. The inverter supports load control of the GENERATOR port or the BACKUP LOAD port.

Step 1: Tap **Home > Settings > Port Connection** to set the parameters.
Step 2: Select **Generator Control** or **Load Control** based on actual needs.

- Dry Contact Mode: when the switch is ON, the loads will be powered; when the switch is OFF, the power will be cut off. Turn on or off the switch based on actual needs.



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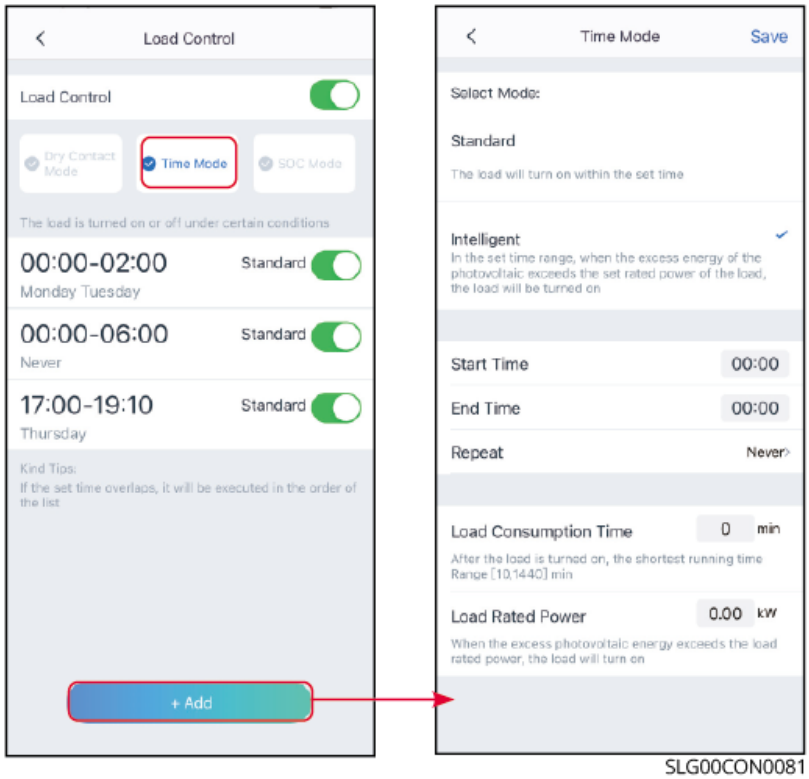
- Time Mode: set the time to enable the load, and the load will be powered automatically within the setting time period. Select standard mode or intelligent mode.



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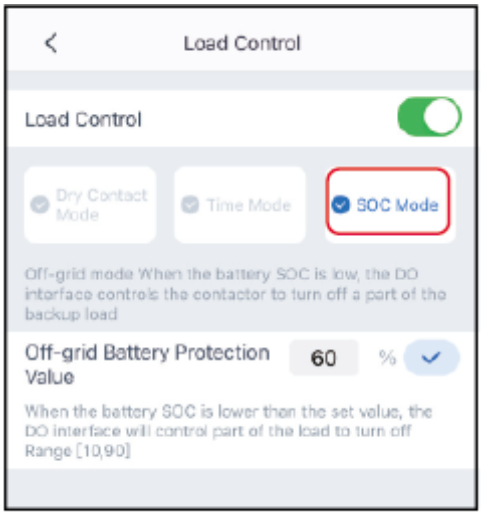
No.	Parameters	Description
1	Standard	The loads will be powered within the setting time period.
2	Intelligent	Once the excess energy of the photovoltaic exceeds the load nominal power within the time period, the loads will be powered.
3	Start Time	

No.	Parameters	Description
4	End Time	The time mode will be on between the Start Time and End Time.
5	Repeat	The repeat days.
6	Load Consumption Time	The shortest load working time after the loads been powered. The time is set to prevent the loads be turned on and off frequently when the PV power fluctuates greatly. Only for Intelligent mode.
7	Load Rated Power	The loads will be powered when the excess energy of the photovoltaic exceeds the nominal power of load. Only for Intelligent mode.

- SOC Mode: the inverter has integrated dry contact controlling port, which can control whether the load is powered or not by contactor. In off-grid mode, the load connected to the port will not be powered if the BACKUP overload is detected or the battery SOC value is lower than the Off-grid battery protection value. Set Off-grid Battery Protection Value based on actual needs.



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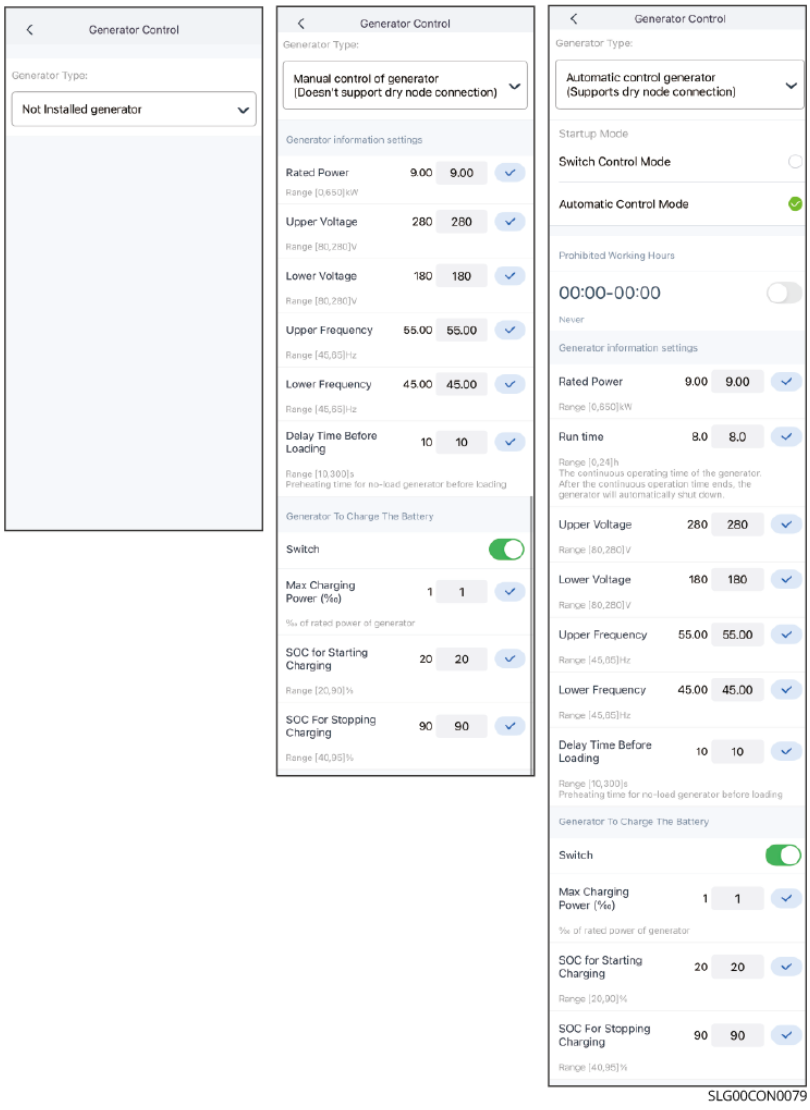
7.1.13.2 Setting the Generator Parameters

NOTICE

- When the inverter supports the generator control function, the generator can be controlled through the SolarGo App.
- For ET40-50kW series inverters, the generator can be connected and controlled only when the inverter is used with STS.

Step 1 : Tap **Home > Settings > Port Connection** to set the parameters.
Step 2: Select Generator Connection or Load Connection based on actual needs.
Step 3 : When setting the generator control function, select the generator type according to the actual access situation. Currently supported:**Not Installed, Manual Control Of Generator** or **Automatic Control Generator.** And set the parameters according to the selected generator type.

- Not Installed: If no generator is connected in the system, select Not Installed.
- Manual Control Of Generator(Doesn’t Support Dry Node Connection): Start or stop the generator manually. The inverter cannot control the generator when Manual Control Of Generator(Doesn’t Support Dry Node Connection) is selected.
- Automatic control generator (Supports dry node connection): If the generator has dry contact port and is connected to the inverter, set the generator control mode to Switch Control Mode or Automatic Control Mode based on actual needs.
  - Switch Control Mode: The generator will start working when the Generator Dry Node Switch is on, and stop automaticallly after reaching Run Time.
  - Automatic Control Mode: The generator will work during Run Time, but stop working during Prohibited Working Hours.



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No.	Parameters	Description
1	Startup Mode	Switch Control Mode/Automatic Control Mode
Switch Control Mode		
2	Generator Dry Node Switch	Only for Switch Control Mode.
3	Run Time	Set the generator’s continuous runtime, after which the generator will be turned off.
Automatic Control Mode		
4	Prohibited Working Hours	Set the time period during which the generator cannot work.

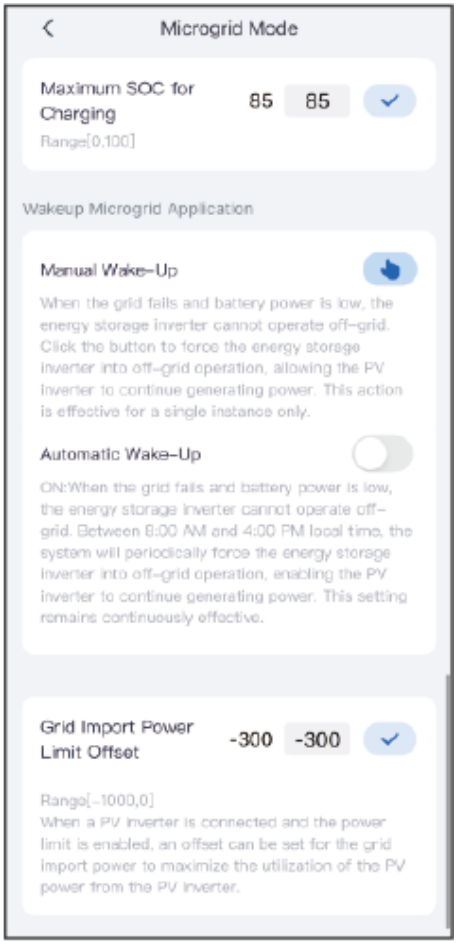
No.	Parameters	Description
5	Run Time	Set the generator’s continuous runtime, after which the generator will be turned off. If the generator start-up operation time includes prohibited working time, the generator will stop running during this time period; after the prohibited working time, the generator will restart running and timing.

No.	Parameters	Description
Generator Information Settings		
1	Rated Power	Set the rated power of the generator.
2	Run Time	Set the continuous running time of the generator. The generator will be shut down after the continuous running time ends.
3	Upper Voltage	Set the operation voltage range of the generator.
4	Lower Voltage	
5	Frequency Cap	Set the operation frequency range of the generator.
6	Lower Frequency	
7	Preheating time	Set the generator no-load preheating time.
Parameter settings for generator charging batteries		
8	Switch	Select whether to use the generator to generate electricity to charge the battery.
9	Max.charging power (‰)	The charging power when the generator generates electricity to charge the battery.
10	Start charging SOC	When the battery SOC is lower than this value, the generator generates electricity to charge the battery.
11	Stop charging SOC	When the battery SOC is higher than this value, stop charging the battery.

7.1.13.3 Setting Microgrid Parameters

NOTICE
When the inverter supports microgrid function, you can set microgrid parameters through SolarGo App.

Step 1 : Tap **Home > Settings > Port Connection** to set the parameters.
Step 2 : According to the actual interface prompts, enter the microgrid control interface and set the microgrid parameters according to actual needs.



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No.	Parameters	Description
1	Maximum SOC for Charging	Set the upper limit of charging SOC, and stop charging when the upper limit is reached.

No.	Parameters	Description
2	Manual wake-up	• When the grid fails, if the battery power is low, the energy storage inverter cannot be supported to work off the grid. Click this button to force the energy storage inverter to output voltage to the grid-connected inverter, thereby starting the grid-connected inverter. • Single effect.
3	Automatic wake-up	• When the grid fails, if the battery power is low, the energy storage inverter cannot be supported to work off the grid. After enabling this function, the system will force the energy storage inverter to output voltage to the grid-connected inverter at a fixed time, thereby starting the grid-connected inverter. • Multiple effect.
4	Grid Import Power Limit Offset	Set the adjustable range of the maximum power that the device can actually buy from the grid.

7.1.14 Equipment Maintenance

7.1.14.1 Checking Firmware Information/Upgrading Firmware Version

Upgrade the DSP version, ARM version, BMS version, AFCI version, or STS version of the inverter, or firmware version of the communication module. Some devices do not support upgrading the firmware version through SolarGo app.

NOTICE

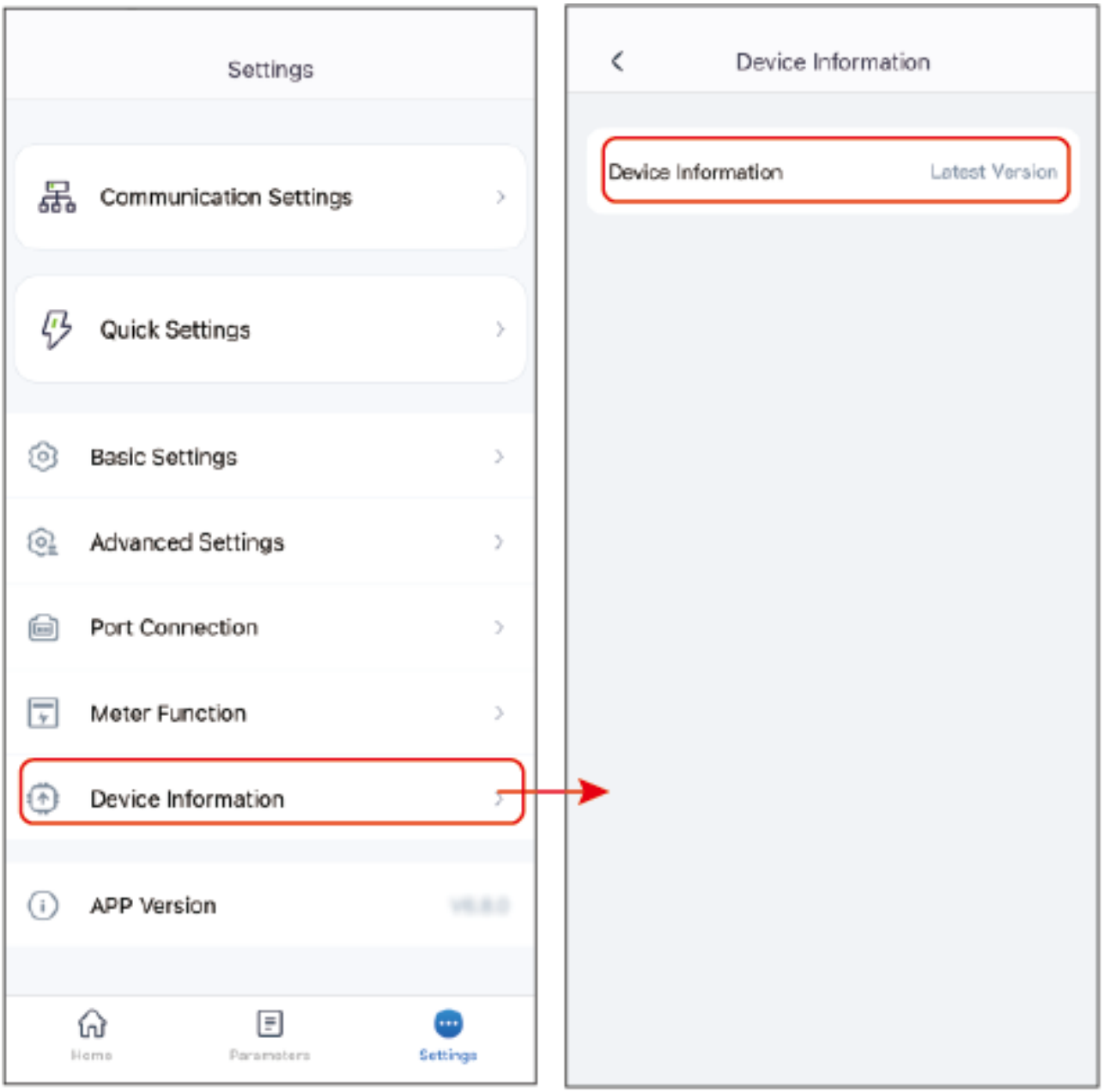
If the Firmware Upgrade dialog box pops up once logging into the app, click Firmware Upgrade to directly go to the firmware information page.

7.1.14.1.1 Regular Upgrade

NOTICE

- When there is a red dot on the right side of the firmware information, please click to view the firmware update information.
- During the upgrade process, please ensure that the network is stable and the device is connected to SolarGo, otherwise the upgrade may fail.

Step 1 : Tap **Home > Settings > Firmware Information** to check the firmware version. If the firmware upgrade dialog box pops up, tap **Firmware Upgrade** and turn to the upgrade interface.
Step 2 : (Optional) Tap **Check For Update** to confirm whether the latest firmware version is available for updating.
Step 3: Tap **Firmware Upgrade** to enter the firmware upgrade interface.
Step 4 : (Optional) Tap **Learn More** to view firmware-related information, such as the current version, the latest version, firmware update records, etc.
Step 5 : Tap **Upgrade** and complete the upgrade according to the prompts on the interface.

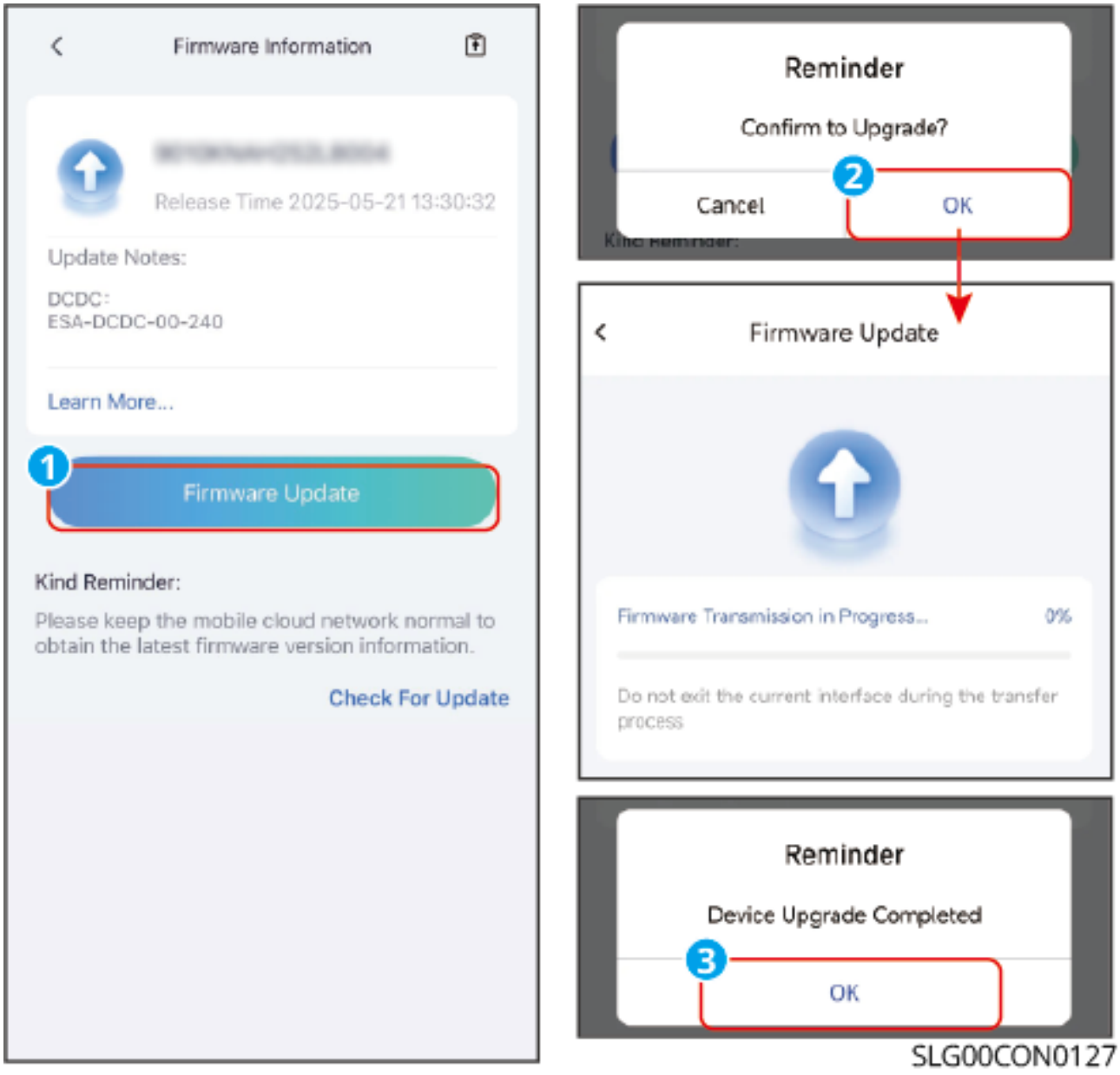


7.1.14.1.2 One-click Upgrade

NOTICE

- When there is a red dot on the right side of the firmware information, please click to view the firmware update information.
- During the upgrade process, please ensure that the network is stable and the device is connected to SolarGo, otherwise the upgrade may fail.

Step 1 : Tap **Home > Settings > Firmware Information**. Tap **Firmware Information** as prompted to enter the firmware upgrade page.
Step 2 : Tap **Upgrade** and follow the prompts to complete the upgrading. If you only need to upgrade a specific firmware version, tap **Learn More** to check the firmware related information and tap **Firmware Upgrade** below the firmware version you want to upgrade, and follow the on-screen prompts to complete the operation.
Step 3 : Tap **Learn More** to view all current firmware version information.
Step 4: (Optional)Tap ,to view the version upgrade record.



7.1.14.1.3 Automatic Upgrade

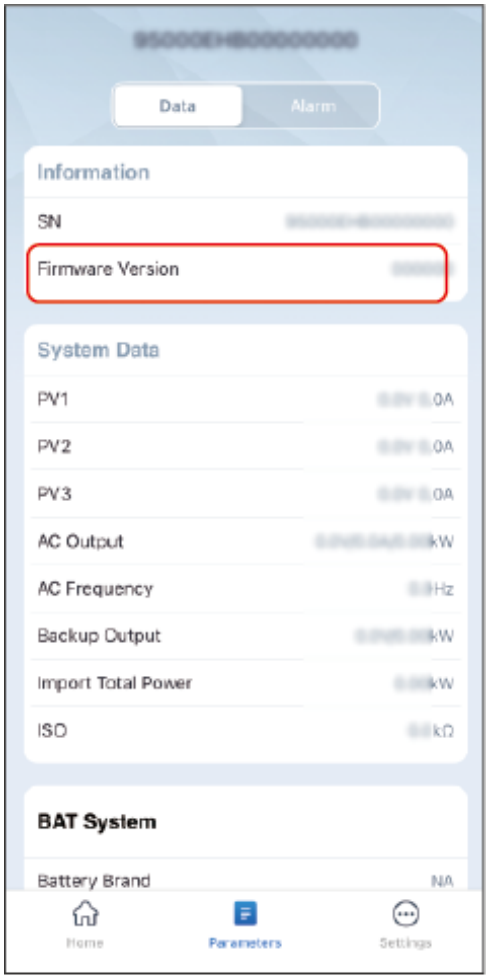
NOTICE

- When using WiFi/LAN Kit-20 or WiFi Kit-20 module communication and the module firmware version is V2.0.1 or above, the device automatic upgrade function can be enabled.
- After the device automatic upgrade function is enabled, if the module version is updated and the device has been connected to the network, the corresponding firmware version can be automatically upgraded.

Step 1 : Tap **Home > Settings > Firmware Information**.
Step 2 : Enable or disable the automatic device upgrade function according to actual needs.

7.1.14.1.4 Checking Firmware Information

Step 1: Tap **Parameters** > **Firmware Version** to check the version information.



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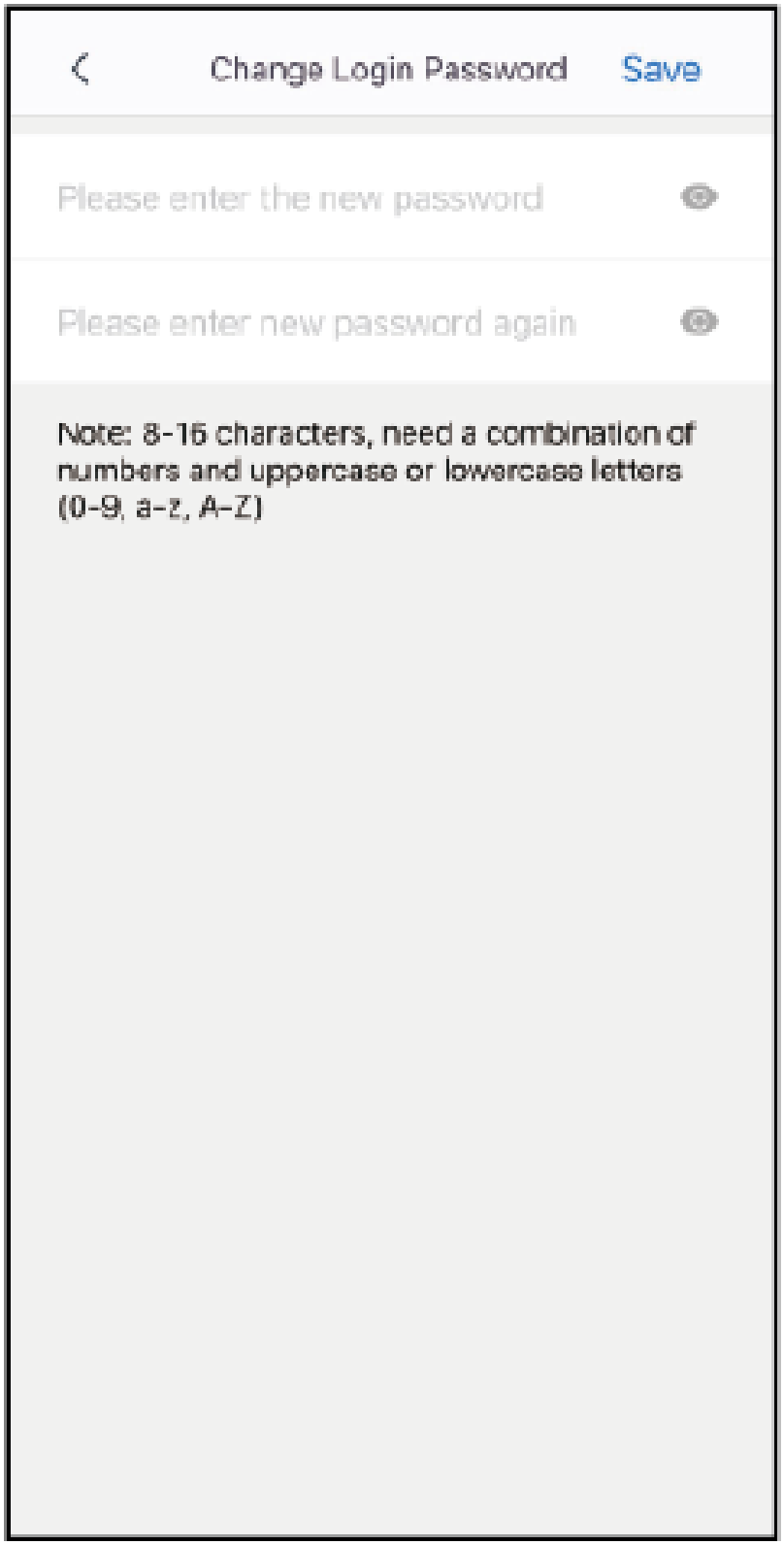
7.1.14.2 Change the Login Password

NOTICE
The login password can be changed. Keep the changed password in mind after changing it. Contact the after-sales service if you forget the password.

Step 1 : Tap **Home > Settings > Change Login Password** to change the password.
Step 2 : Change the password based on actual needs.



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8 System Debugging and Power Station Monitoring

8.1 Setting Inverter Parameters via App

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

- Remotely monitoring power plant operation and setting power plant and device operating parameters.
- Locally connecting to devices to check device operation status and set device parameters.

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

SEMS+ App User Manual

8.1.1 Download and Install SEMS+ AU/NZ App

Phone Requirements:

- Operating System: Android 7.0 or later, iOS 15.1 or later.
- Phone must support a web browser and have an Internet connection.
- Phone must support WLAN/Bluetooth functionality.

Download Methods:
Method 1:
Search for "SEMS+ AU/NZ" in Google Play, App Store, Huawei, Honor, Xiaomi, OPPO,

or vivo app stores to download and install.

SEMS0163

Method 2:

Scan the QR code below to download and install.

SEMS0164

8.2 Power Plant Monitoring via SEMS+ WEB

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

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

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

《SEMS+ WEB User Manual》

9 Maintenance

9.1 Power OFF the System

⚠DANGER

- When performing operation and maintenance on equipment within the system, please power down the system. Operating equipment while energized may cause equipment damage or electric shock hazard.
- After the equipment is powered off, internal components require a certain amount of time to discharge. Please wait according to the time specified on the label until the equipment is completely discharged.
- Restart the battery using the air switch power-on method.
- When shutting down the battery system, strictly adhere to the battery system power-off requirements to prevent damage to the battery system.

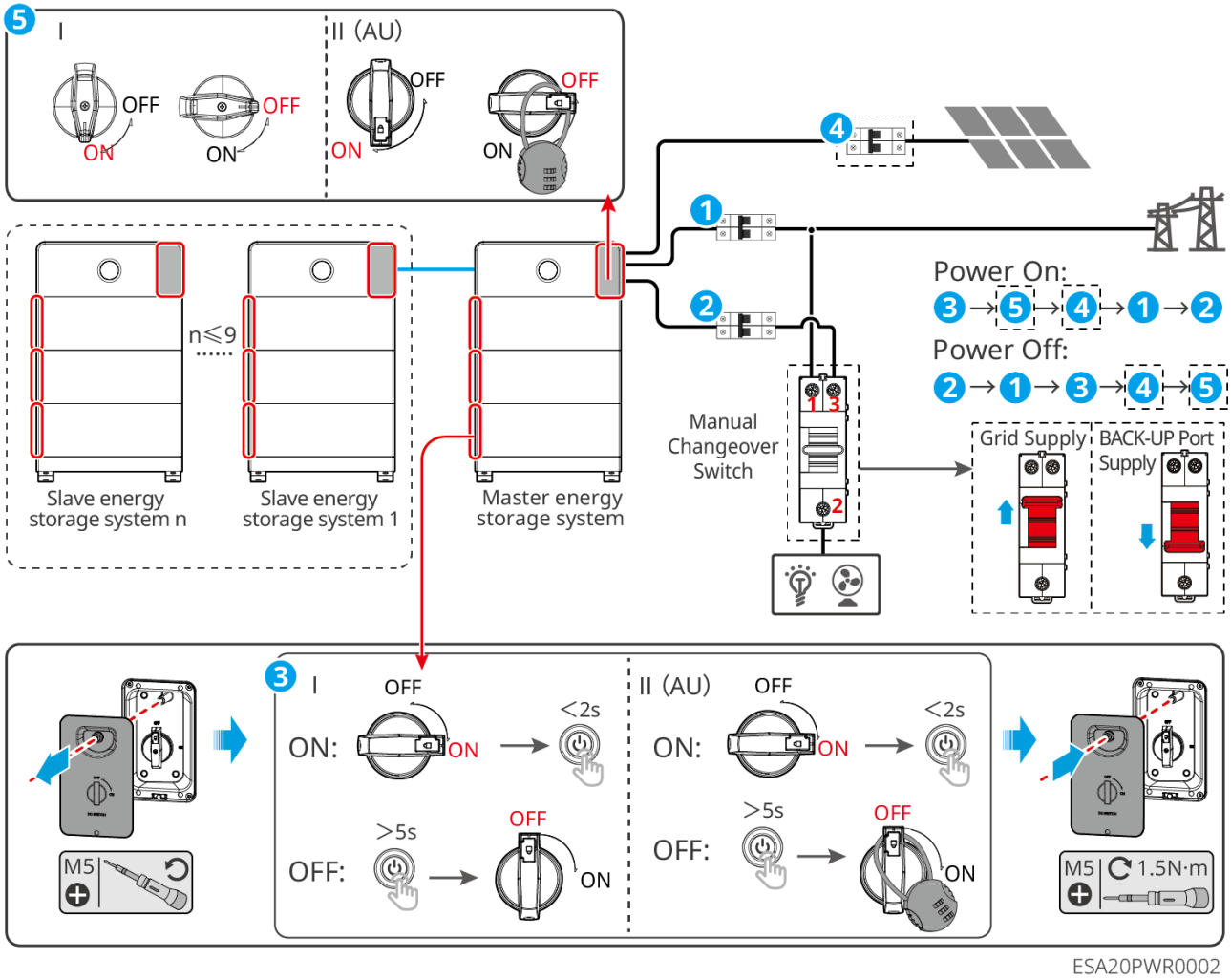
⚠WARNING

In a single-unit scenario, when the inverter is powered down for maintenance or due to a fault, to ensure the load operates normally, please switch the manual transfer switch to the grid side to engage, allowing the grid to supply power to the load.

NOTICE

- To ensure effective protection of the battery system, keep the cover plate of the battery system switch closed. If the battery system switch is not used for a long time, secure it with screws.
- PV string and "5" are only applicable to the EHA series.

power off



1. Turn OFF the BACK-UP circuit breaker.
2. Turn OFF the ON-GRID circuit breaker.
3. Press and hold any battery's multifunction button for 5 seconds to power off the battery system. If the system contains multiple batteries, this operation will power off all batteries, eliminating the need to operate them individually. Finally, rotate the battery system switch to the OFF position.
4. (Optional) Turn OFF the circuit breaker between the PV components and the inverter.
5. Turn OFF the inverter's DC switch. In a single-unit scenario, after the inverter's DC switch is turned off, manually switch the transfer switch to the grid side to engage, allowing the grid to supply power to the loads.

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.

Maintaining Item	Maintaining Method	Maintaining 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.
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.

Maintaining Item	Maintaining Method	Maintaining Period	Maintaining Purpose
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

9.5.1 Viewing Fault/Alarms Information

All fault and alarm details of the energy storage system are displayed on [SolarGo APP], [SEMS+ App], and [SEMS+ WEB]. If your product is abnormal and you do not see related fault information on [SolarGo APP], [SEMS+ App], and [SEMS+ WEB], please contact the after-sales service center.

- SolarGo APP

Via [Home] > [Parameters] > [Alarms], view the energy storage system alarm information.

- SEMS+ App

1. Open the SEMS+ App, log in with any account.
2. Via [power station] > [Alarms], you can view all power station fault information.
3. Click on the specific fault name to view the time when the fault occurred, possible causes, and solutions.

SEMS+ WEB

- Open SEMS+ WEB, log in with any account.
- On the power station details interface, click [Alarms] to view all alarm information for 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.

No.	fault	Solution
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.
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 Troubleshooting (Fault Codes F01-F40)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9.5.2.1.2 Troubleshooting (Fault Codes F41-F80)

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

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

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

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

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

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

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

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

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

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

9.5.2.1.3 Troubleshooting (Fault Codes F81-F121)

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

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

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

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

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

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

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

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

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

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

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

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

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

9.5.2.1.4 Troubleshooting (Fault Codes F122-F163)

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

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

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

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

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

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

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

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

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

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. Triggered when the generator's operation does not meet safety regulations.	1. If no generator is connected, ignore this fault. 2. It is normal for this fault to appear when the generator malfunctions. Wait for a period after the generator recovers, and the fault will clear automatically. 3. This fault does not affect the normal operation of off-grid mode. 4. When both generator and grid are connected and meet safety requirements, grid connection takes priority, and the system will operate in grid-connected mode.
BMS Status Bit Error	BMS module failure	Disconnect the AC output side switch and DC input side switch. 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 abnormal operation.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, please improve ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
BAT Terminal Overtemperature	BAT terminal overtemperature, possible causes: 1. Poor ventilation at the inverter installation location. 2. Ambient temperature is too high.	1. Check if the ventilation at the inverter installation location is adequate and if the ambient temperature exceeds the maximum allowable range. 2. If ventilation is poor or ambient temperature is too high, please improve ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
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 abnormal operation.	

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 ambient temperature is too high, please improve ventilation and heat dissipation conditions. 3. If both ventilation and ambient temperature are normal, please contact the dealer or after-sales service center.
Three-phase on-grid fault	Incorrect three-phase external wiring	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 correctly one by one.

Fault Name	Fault Cause	Troubleshooting Recommendation
Parallel Comm Timeout Shutdown	In parallel mode, 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 slave 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	External hardware EPO button triggered or remote EPO command triggered.	1. If it was actively triggered via remote shutdown, it can be ignored. 2. If not actively triggered, please contact the dealer or after-sales service center.
High Combustible Gas Concentration	Automatically triggered when the combustible gas device detects a concentration of 20% LEL or higher.	1. After the fault occurs, the unit will automatically open the air damper to exhaust and reduce the concentration. The fault will clear automatically after the concentration remains below 5% LEL for 15 minutes. 2. If a cluster-level fire protection fault is triggered after this fault occurs, the air damper will automatically close. Confirm the damper status within 30s to ensure cluster-level fire protection operates in a sealed space. 3. Please contact the dealer or after-sales service center.
Combustible Gas Device Air Damper Open Signal Mismatch with Feedback	The control signal to open the air damper does not match the feedback signal.	1. Check the harness signal connection for issues. 2. Please contact the dealer or after-sales service center.
One-Touch Shutdown	Check via the App if the one-touch shutdown function is enabled.	Disable the one-touch shutdown.
Offline Shutdown	-	-

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

Fault Name	Fault Cause	Troubleshooting Recommendation
Combustible Gas Detection Device Communication Fault	1. The combustible gas device left the factory without the 485 address correctly configured as 2. 2. Communication link abnormality between the combustible gas device and the LC control box.	1. Check the communication harness link, observe if the fault clears; 2. Try restarting the unit, observe if the fault clears; 3. Use the method provided by the combustible gas manufacturer to check if the device address is 2. If not, modify it; 4. If the fault persists after restart, please contact the dealer or after-sales service center.
DG Communication Failure	Communication link abnormality between the control board and the diesel generator.	1. Check the communication harness link, observe if the fault clears; 2. Try restarting the unit, observe if the fault clears; 3. If the fault persists after restart, please contact the dealer or after-sales service center.
Battery Over Voltage	1. Single cell voltage too high. 2. Voltage sensing line abnormality.	Record the fault phenomenon, restart the battery, wait a few minutes, confirm if the fault disappears. If the problem persists after restart, please contact the after-sales service center.
	1. Total battery voltage too high. 2. Voltage sensing line abnormality.	
Battery Undervoltage	1. Single cell voltage too low. 2. Voltage sensing line abnormality.	

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

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

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Inconsistent cell aging. 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 restart, 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 to observe if the fault persists. Check if wiring is correct and if the pre-charge MOS is damaged.
Sensing Line Fault	Battery sensing line poor contact or disconnected.	Check wiring, restart the battery. If the problem persists after restart, please contact the after-sales service center.
	Cell voltage sensing line poor contact or disconnected.	Check wiring, restart the battery. If the problem persists after restart, please contact the after-sales service center.
	Cell temperature sensing line poor contact or disconnected.	

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

Fault Name	Fault Cause	Troubleshooting Recommendation
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 abnormal between master and slave racks or cell inconsistency between racks.	1. Check the slave battery information and software version, and if the communication cable connection to the master is normal. 2. Upgrade software.
	Battery system loop harness abnormal, causing interlock signal not forming 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 match correctly.
	BMS master and slave control communication harness abnormal.	1. Check wiring, restart the battery; 2. Upgrade battery firmware, if the problem persists after restart, please contact the after-sales service center.

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

Fault Name	Fault Cause	Troubleshooting Recommendation
	Reverse polarity connection of parallel battery racks.	Check if the positive and negative terminals of the parallel battery racks are reversed.
	Severe overtemperature/overvoltage etc. triggering fire protection system.	Contact the after-sales service center.
Air Conditioner Failure	Air conditioner abnormal failure.	Try restarting the system. If the fault is not cleared, 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. Re-power on after confirmation.
	Insufficient supply voltage.	
	No voltage input.	
	Unstable supply voltage.	
	Compressor voltage unstable.	Try restarting the system. If the fault is not cleared, please contact the after-sales service center.
	Sensor poor contact or damaged.	
	Air conditioner fan abnormal.	
	DCDC internal voltage or current abnormal.	Refer to specific DC fault content.

Fault Name	Fault Cause	Troubleshooting Recommendation
BMS1 Other Fault 2 (Residential Storage)	DCDC overload or heatsink temperature too high, etc.	
	Cell sensing abnormal or inconsistent aging.	Please contact the after-sales service center.
	Fan operation 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 persists, please contact the after-sales service center.
	Battery used for too long or cells severely damaged.	Please contact the after-sales service center to replace the pack.
	1. Software version too low or BMS board damaged. 2. Large number of parallel inverters, excessive inrush current during battery pre-charge.	1. Upgrade software, observe if the fault persists. 2. For parallel systems, perform a black start of the battery first, then start the inverters.
	Heating film damaged.	Please contact the after-sales service center.
	Heating film three-terminal fuse blown, heating function unavailable.	Please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Recommendation
	Software model, Cell Type, hardware model mismatch.	Check if software model, SN, Cell Type, and hardware model are consistent. If not, please contact the after-sales service center.
	Thermal management board communication cable disconnected.	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 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.
	DCDC module detects battery voltage exceeding maximum charging voltage.	Stop charging, discharge to SOC below 90% or let it sit for 2h. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Heatsink temperature too high.	Let the battery sit for 1h for heatsink temperature to drop. If ineffective and the fault persists after restart, please contact the after-sales service center.
	Battery discharge current too high.	Check if the load exceeds the battery's discharge capability. Turn off the load or stop PCS operation for 60s. If ineffective and the fault persists after restart, please contact the after-sales service center.

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

Fault Name	Fault Cause	Troubleshooting Recommendation
	1. Daisy-chain communication abnormal within a battery rack. 2. Inconsistent cell aging between battery racks.	1. Check the pack contact condition within a single rack. 2. Confirm the usage status of each rack, such as cumulative charge/discharge capacity, cycle count, etc. 3. Please contact the after-sales service center.
	Pack internal humidity too high.	-
	Fuse blown.	Contact after-sales to replace the pack.
	Battery low power.	Charge the battery.
BMS1 Other Fault 4 (Utility Storage)	Circuit breaker abnormal.	Contact after-sales to replace the pack.
	External device abnormal.	Contact after-sales to replace the pack.
Contactor Failure 1	-	-
Contactor Failure 2	-	-
Overload Protection (Ksic)	Sustained overload (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)	-	-

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

9.5.2.2 Battery Fault

No.	Fault Name	Fault Cause	Fault Handling Suggestion
1	BMS1 RACK1 Total Voltage Too High Warning /BMS1 RACK1 Total voltage is too high warning	1. Battery system voltage is too high 2. Voltage acquisition line abnormal	1. Discharge the battery to see if the fault persists; 2. If the fault is not resolved, contact the after-sales service center.

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

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

No.	Fault Name	Fault Cause	Fault Handling Suggestion
6	BMS1 RACK1 Discharging Temperature Too High Warning /BMS1 RACK1 Discharging temperature is too high warning	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Stop charging/discharging, let it rest to see if the fault persists; 2. If the fault is not resolved, contact after-sales.
7	BMS1 RACK1 Charging Temperature Too Low Warning /BMS1 RACK1 Charging temperature is too low warning	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, 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.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
8	BMS1 RACK1 Discharging Temperature Too Low Warning/ BMS1 RACK1 Discharging temperature is too low warning	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, 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.
9	BMS1 RACK1 Charge Overcurrent Warning/ BMS1 RACK1 Charge overcurrent warning	1. Charging current too high, battery current limiting abnormal: sudden temperature and voltage changes 2. Inverter response abnormal	1. Stop charging, let it rest to see if the fault persists; 2. Check if the inverter is set to too high a power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.

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

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

No.	Fault Name	Fault Cause	Fault Handling Suggestion
13	BMS1 RACK1 Post Temperature Too High Warning/ BMS1 RACK1 Post temperature is too high warning	Post temperature too high	1. Stop charging/discharging, let it rest to see if the fault persists; 2. If the fault is not resolved, contact the after-sales service center.
14	BMS1 RACK1 Cell Excessive Voltage Differentials Warning/ BMS1 RACK1 Cell excessive voltage differentials warning	1. Inconsistent cell aging 2. Slave board chip issues can also cause excessive cell voltage differentials; 3. Slave board balancing issues can also cause excessive cell voltage differentials 4. Caused by wiring harness issues	1. Stop charging/discharging, let it rest to see if the fault persists; 2. If the fault is not resolved, contact the after-sales service center.
15	BMS1 RACK1 PCS Communication Loss Warning/ BMS1 RACK1 PCS communication loss warning	BMS and PCS communication abnormal	Check if the communication cable connection between the battery and the inverter is intact
16	BMS1 RACK1 DCDC Warning/ BMS1 RACK1 DCDC warning	DCDC internal voltage or current abnormal	Upgrade the software, restart the battery. If the problem persists after restarting, please contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
17	BMS1 RACK1 Heat Film MOS Adhesion Warning/ BMS1 RACK1 Heat film MOS adhesion warning	Heating film MOS damaged	Please contact the after-sales service center.
18	BMS1 RACK1 Heat Film MOS Open Warning/ BMS1 RACK1 Heat film MOS open warning	Heating circuit abnormal	Please contact the after-sales service center.
19	BMS1 RACK1 Total Voltage Too High Fault/ BMS1 RACK1 Total voltage is too high fault	1. Battery system voltage too high 2. Voltage acquisition 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/ BMS1 RACK1 Total voltage is too low fault	1. Battery system voltage too low 2. Voltage acquisition line abnormal	1. Charge the battery and let it rest to see if the fault persists; 2. Check the inverter's working status to see if it is not charging the battery due to issues like working mode. Try charging the battery via the inverter and observe if the fault is resolved. 3. If the fault is not resolved, please contact the after-sales service center.

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

No.	Fault Name	Fault Cause	Fault Handling Suggestion
24	BMS1 RACK1 Discharging Temperature Too High Fault/ BMS1 RACK1 Discharging temperature is too high fault	1. Ambient Overtemperature 2. Temperature sensor abnormal	1. Place the battery in a cool place, let it rest powered off for 30 minutes, restart and see if the fault persists; 2. If the fault persists, please contact the after-sales service center.
25	BMS1 RACK1 Charging Temperature Too Low Fault/ BMS1 RACK1 Charging temperature is too low fault	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, 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.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
26	BMS1 RACK1 Discharging Temperature Too Low Fault BMS1 RACK1 Discharging temperature is too low fault	1. Ambient temperature too low 2. Temperature sensor abnormal	1. Check the cell temperature in the background. If the minimum temperature is above -20°C, set the battery to discharge to raise the cell temperature. 2. If the temperature is below -20°C, 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.
27	BMS1 RACK1 Charge Overcurrent Fault/ BMS1 RACK1 Charge overcurrent fault	1. Charging current too high, battery current limiting abnormal: sudden temperature and voltage changes 2. Inverter response abnormal	1. Let it rest powered off for 5 minutes, restart and see if the fault persists; 2. Check if the inverter is set to too high a power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.

No.	Fault Name	Fault Cause	Fault Handling Suggestion
28	BMS1 RACK1 Discharge Overcurrent Fault/ BMS1 RACK1 Discharge overcurrent fault	1. Discharge current too high, battery current limiting abnormal: sudden temperature and voltage changes 2. Inverter response abnormal	1. Let it rest powered off for 5 minutes, restart and see if the fault persists; 2. Check if the inverter is set to too high a power, causing it to exceed the battery's rated operating current; 3. If overcurrent persists, contact the after-sales service center.
29	BMS1 RACK1 Insulation Resistance Too Low Fault/ BMS1 RACK1 Insulation resistance is too low fault	Insulation resistance damaged or contact abnormal	1. Check if the ground wire is properly connected, restart the battery, 2. Upgrade the software. If the problem persists, please contact the after-sales service center.

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

No.	Fault Name	Fault Cause	Fault Handling Suggestion
31	BMS1 RACK1 Post Temperature Too High Fault/ BMS1 RACK1 Post temperature is too high fault	Post temperature too high	1. Let it rest powered off for 30 minutes, restart and see if the fault persists; 2. If the fault persists, please contact the after-sales service center.
32	BMS1 RACK1 Cell Excessive Voltage Differentials Fault/ BMS1 RACK1 Cell excessive voltage differentials fault	1. Inconsistent cell aging 2. Slave board chip issues can also cause excessive cell voltage differentials; 3. Slave board balancing issues can also cause excessive cell voltage differentials 4. Caused by wiring harness issues	Power off, restart the battery, wait for 2 hours. If the problem is not resolved, contact the after-sales service center.
33	BMS1 RACK1 Relay or MOS Short-Circuit Fault/ BMS1 RACK1 Relay or MOS short-circuit fault	MOS short-circuit	1. Upgrade the software, let it rest powered off for 5 minutes, restart and see if the fault persists; 2. If it persists, contact the after-sales service center.

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

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

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

No.	Fault Name	Fault Cause	Fault Handling Suggestion
46	BMS1 RACK1 Inconsistent Cell Fault BMS1 RACK1 Inconsistent cell fault	1. Cell identification abnormal 2. Different types of cells stacked together	Check the cell type
47	BMS1 RACK1 The Output Port Over Temperature Fault/ BMS1 RACK1 The output port over temperature fault	Output port screws loose or poor contact	1. Power off the battery, check wiring and output port screw condition 2. After confirmation, restart the battery, observe if the fault persists. If it exists, contact the after-sales service center.
48	BMS1 RACK1 SOH Too Low Fault/ BMS1 RACK1 SOH too low fault	Battery used for too long or cells severely damaged	Replace the pack
49	BMS1 RACK1 Heating Film MOS Three-Terminal Fault/ BMS1 RACK1 Heating film MOS Three-terminal fault	Heating film MOS damaged	Please contact the after-sales service center.

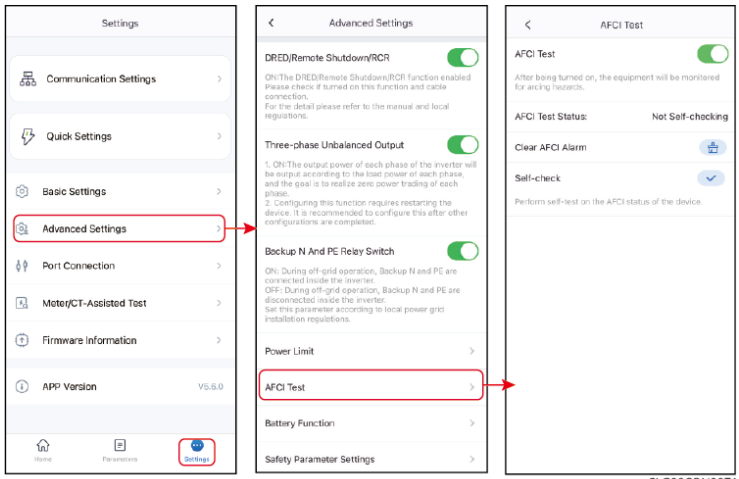
9.5.3 Operation After Fault Clearance

In the energy conservation system, after some fault clearances complete, further operations are needed for the system to restore normal work.

9.5.3.1 Clear AFCI Alarm

[Software]: SolarGo App
[Clearance method]:

1. Step 1: Go to the settings page via **Home** > **Settings** > **Advanced Settings** > **DC AFCI** to set up the AFCI detection function.
2. Tap **[Clear AFCI Alarm]**.



SLG00CON0071

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 (℃)	-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 (℃)	-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 (℃)	-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 (℃)	-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 supprt whole home backup solution. If the customer don't want to do any breaker upgrade, the main breaker size in SolarGo(or SEMS+) 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

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
Max. Charging Power (kW)	3	3.6	5
Max. Discharging Power (kW)	3.3	3.96	5.5
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

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
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
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
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Apparent Power (kVA)	3	3.6	5

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
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)*2	Off-grid: 13.7 @220V 13.1 @230V 12.5 @240V On-grid: 27.3	Off-grid: 6.4 @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
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%

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
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 (℃)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)	-35~+60 (Derating at +40)
Operating Environment	Outdoor	Outdoor	Outdoor

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
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

Technical Data	GW3K-BHA-G20	GW3.6K-BHA-G20	GW5K-BHA-G20
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 (℃)	-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
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
Battery Side			
Battery Type	Li-ion	Li-ion	Li-ion

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
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)	15.8	21.1	26.4
Max. Continuous Discharging Current (A)	17.4	23.2	29
Max. Charging Power (kW)	6	8	9.999
Max. Discharging Power (kW)	6.6	8.8	11
Short-time withstand current (A)	980	980	980
AC Side (On-grid)			
Rated Power (kW)	6	8	9.999
Max. Power (kW)	6	8	9.999
Rated Apparent Power from Grid (kVA)	6	8	9.999
Rated Apparent Power to Grid (kVA)	6	8	9.999

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
Max. Apparent Power to Grid (kVA)	6	8	9.999
Max. Apparent Power from Grid (kVA)	12	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
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)	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
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
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
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
Max. Output Fault Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
Inrush Current (Peak and Duration) (A)	96A@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
THDi	<3%	<3%	<3%
Maximum Output Overcurrent Protection (A)	96	120	120
Type of Voltage	a.c.	a.c.	a.c.
Back-up Side			
Rated Apparent Power (kVA)	6	8	10
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 (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
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)	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

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
Max. Current (A)*2	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
Max. Fault Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs
Inrush Current (Peak and Duration) (A)	96A@3μs	120A@3μs	120A@3μs
Maximum Output Overcurrent Protection (A)	96	120	120
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time（ms）	<10	<10	<10
Efficiency			
Max. Battery to AC Efficiency	98.0%	97.8%	97.8%
Protection			
Residual Current Monitoring	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
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 (℃)	-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%
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

Technical Data	GW6K-BHA-G20	GW8K-BHA-G20	GW9.999K-BHA-G20
Communication Protocols	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP	Modbus-RTU, Modbus-TCP
Weight (kg)	16.9	17.7	17.7
Dimension (W×H×D mm)	800*300*270	800*300*270	800*300*270
Noise Emission (dB)	≤30	≤35	≤35
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 (℃)	-40~+70	-40~+70	-40~+70

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

Technical Data	GW10K-BHA-G20
Max. Charging Power (kW)	10
Max. Discharging Power (kW)	11
Short-time withstand current (A)	980
AC Side (On-grid)	
Rated Power (kW)	10
Max. Power (kW)	10
Rated Apparent Power from Grid (kVA)	10
Rated Apparent Power to Grid (kVA)	10
Max. Apparent Power to Grid (kVA)	10
Max. Apparent Power from Grid (kVA)	14.5
Nominal Voltage (V)	220/230/240，L/N/PE
Voltage Range (V)	170~280
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	45~55 / 55~65
Rated Current From Grid (A)	45.5 @220V 43.5 @230V 41.7 @240V
Rated Current to Grid (A)	43.5 @220V 43.5 @230V 41.7 @240V
Max. Current From Grid (A)*1	63 @220V 63 @230V 60.5 @240V

Technical Data	GW10K-BHA-G20
Max. Current to Grid (A)	43.5 @220V 43.5 @230V 41.7 @240V
Max. Output Fault Current (Peak and Duration) (A)	120A@3μs
Inrush Current (Peak and Duration) (A)	120A@3μs
Power Factor	0.8 leading ... 0.8 lagging
THDi	<3%
Maximum Output Overcurrent Protection (A)	120
Type of Voltage	a.c.
Back-up Side	
Rated Apparent Power (kVA)	10
Max. Apparent Power (kVA)	Off-grid: 10.0 (20.0, 10s) On-grid: 14.5
Nominal Voltage (V)	220/230/240，L/N/PE
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	45~55 / 55~65
Rated Current (A)	43.5 @220V 43.5 @230V 41.7 @240V
Max. Current (A)*2	Off-grid: 43.5 @220V 43.5 @230V 41.7 @240V On-grid: 63

Technical Data	GW10K-BHA-G20
Max. Fault Current (Peak and Duration) (A)	120A@3μs
Inrush Current (Peak and Duration) (A)	120A@3μs
Maximum Output Overcurrent Protection (A)	120
THDv (@Linear Load)	<3%
On/Off-grid Switching Time（ms）	<10
Efficiency	
Max. Battery to AC Efficiency	97.8%
Protection	
Residual Current Monitoring	Integrated
Battery Reverse Polarity Protection	Integrated
Anti-islanding Protection	Integrated
AC Overcurrent Protection	Integrated
AC Short Circuit Protection	Integrated
AC Overvoltage Protection	Integrated
AC Surge Protection	Type II
Remote Shutdown	Integrated
General Data	
Operating Temperature Range (℃)	-35~+60 (Derating at +40)
Operating Environment	Outdoor
Relative Humidity	0~95%

Technical Data	GW10K-BHA-G20
Max. Operating Altitude (m)	4000 (>2000 derating)
Cooling Method	Natural convection
User Interface	LED, WLAN+APP
Communication with BMS	CAN
Communication	RS485, WiFI+LAN+Bluetooth
Communication Protocols	Modbus-RTU, Modbus-TCP
Weight (kg)	17.7
Dimension (W×H×D mm)	800*300*270
Noise Emission (dB)	≤35
Topology	Non-isolated
Power Self-consumption at Night (W)	≤10
Ingress Protection Rating	IP66
AC Connector	VACONN Terminal
Environmental Category	4K4H
Pollution Degree	IV （Outside of the inverter）
Overvoltage Category	DC II / AC III
Protective Class	I
Storage Temperature (℃)	-40~+70
Decisive Voltage Class (DVC)	Battery: A AC: C Com: A

Technical Data	GW10K-BHA-G20
Mounting Method	Wall/Floor Mounted
Active Anti-islanding Method	SMS(Slip-mode frequency) +AFD
Country of Manufacture	China
Certification	
Grid Standard	Please refer to the official website
Safety Regulation	
EMC	

*1: GOODWE ESA series has internal bypass 63A passthrough ability to supprt whole home backup solution. If the customer don't want to do any breaker upgrade, the max current from grid in SolarGo(or SEMS+) can be set as previous breaker size.
*2: The Max. Output Current in off-grid operation accounts for a three-phase maximum 150% unbalanced capability.

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
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

Technical Data	GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
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			
Optional Function Configuration	heating		/	
Ingress Protection	IP66			
Storage Temperature (℃)	-20 ~55			
Max. Storage time	12 months (-20℃~35℃)			
	6 months (35℃~45℃)			

Technical Data		GW5.1-BAT-D-G20	GW8.3-BAT-D-G20	GW5.1-BAT-D-G21	GW8.3-BAT-D-G21
Scalability		6 pcs			
Mounting Method		Floor stacked / Wall-mounted			
Cycle Life		≥6000 (25±2℃, 0.5C, 90%DOD, 70%EOL)			
Country of Manufacture		China			
Standard and Certification	Safety	IEC62619, IEC60730, EN62477，IEC63056，IEC62040，CE, CEC, VDE2510			
	EMC	CE, RCM			
	Transportation	UN38.3 ADR			

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

10.3 Smart Meter Technical Data

10.3.1 GMK110

Technical Parameters			GMK110
	Application		Single phase
Input Data	Voltage	Nominal Voltage (V)	220
		Voltage Range (V)	85~288

Technical Parameters			GMK110
		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 (℃)		-30~ 60
	Storage Temperature Range (℃)		-30~ 60
	Relative Humidity (Non-Condensing)		0~95%
	Max. Operating Altitude (m)		3000

10.3.2 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

technical parameter		GM330
	Reactive Energy	Class 1
General Parameters	Dimensions (WxHxD mm/in)	72x85x72/2.83x3.35×2.83
	Housing	4 modules
	Weight (g/Ib)	240/0.53
	Mounting Method	DIN rail
	User Interface	4 LEDs, Reset Button
	Power Consumption (W)	≤5
Environmental Parameters	IP Rating	IP20
	Operating Temperature Range (℃/°F)	-30~+70/-22~+158
	Storage Temperature Range (℃/°F)	-30~70/-22~+158
	Relative Humidity (no condensation)	0~95%
	Max. Operating Altitude (m/ft)	3000/9842
Certification Parameters	Certificates	UL1741/ANSI

10.4 Smart Dongle Technical Data

10.4.1 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

Technical Parameters		WiFi/LAN Kit-20
	Ingress Protection Rating	IP65
	Mounting Method	USB Port Plugging and Unplugging
Operating Temperature Range (℃)		-30~+60
Storage Temperature Range (℃)		-40~+70
Relative Humidity		0-95%
Max. Operating Altitude (m)		4000

10.4.2 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
Weight (g)	87
Indicator	LED* 2
Mounting Method	Plug and Play (PnP)
SIM Dimension	Micro sim,15mm*12mm
Environment Parameters	
Operating Temperature Range (℃)	-30~+65
Storage Temperature (℃)	-40~+70
Relative Humidity	0-100%
IP Grade	IP66
Max. Operating Altitude (m)	4000

Product Model	4G Kit-CN-G20
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 II**I:** 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℃	-33~+40℃	-33~+40℃
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℃, and it is suitable for environments with pollution degree 3.
  - **Indoor Type II Inverter:** The ambient air temperature range is -25 to +40℃, and it is suitable for environments with pollution degree 3.
  - **Indoor Type I Inverter:** The ambient air temperature range is 0 to +40℃, 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

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 Safety Regulation Countries

No.	Regulation Name	No.	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
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

No.	Regulation Name	No.	Regulation Name
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
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(≥110kV)
40	Czech	95	type B-MV-PL_V.1.1

No.	Regulation Name	No.	Regulation Name
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
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

No.	Regulation Name	No.	Regulation Name
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
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

No.	Regulation Name	No.	Regulation Name
31	US-ISO-NE-208Vac-3P	68	US-O&R-240Vac-3P
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 Higher Voltage	35	Vietnam
4	China Highest Voltage	36	Malaysia-LV
5	China Power Station	37	Malaysia-MV
6	China Shandong	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	China Northeast	43	Srilanka-MV/HV
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

No.	Regulation Name	No.	Regulation Name
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
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
	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
	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

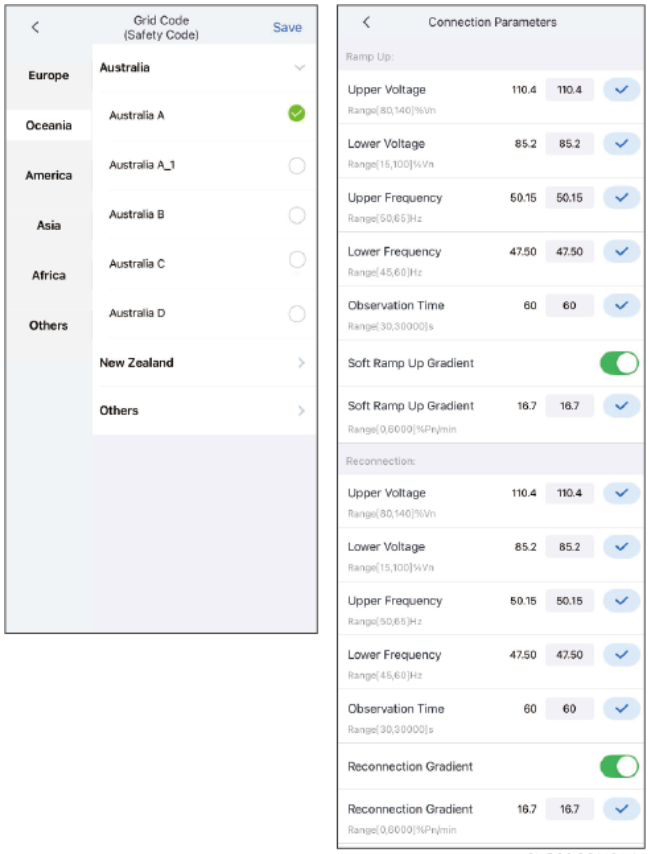
Protective function	Protective function limit	Trip delay time	Maximum disconnection time
Undervoltage 2 (V < <)	70 V	1 s	2 s
Undervoltage 1 (V <)	180 V	10 s	11 s

Protective function	Protective function limit	Trip delay time	Maximum disconnection time
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.



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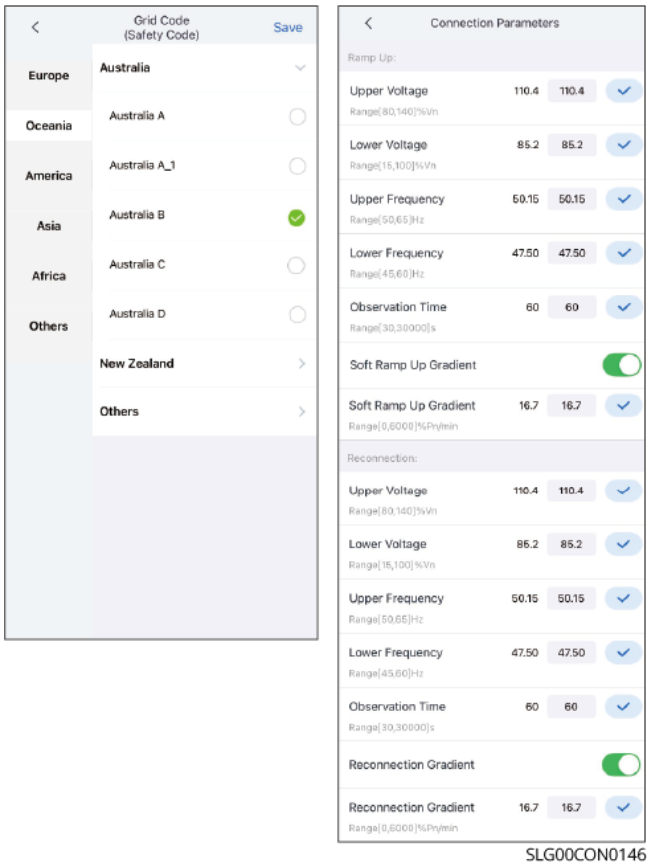

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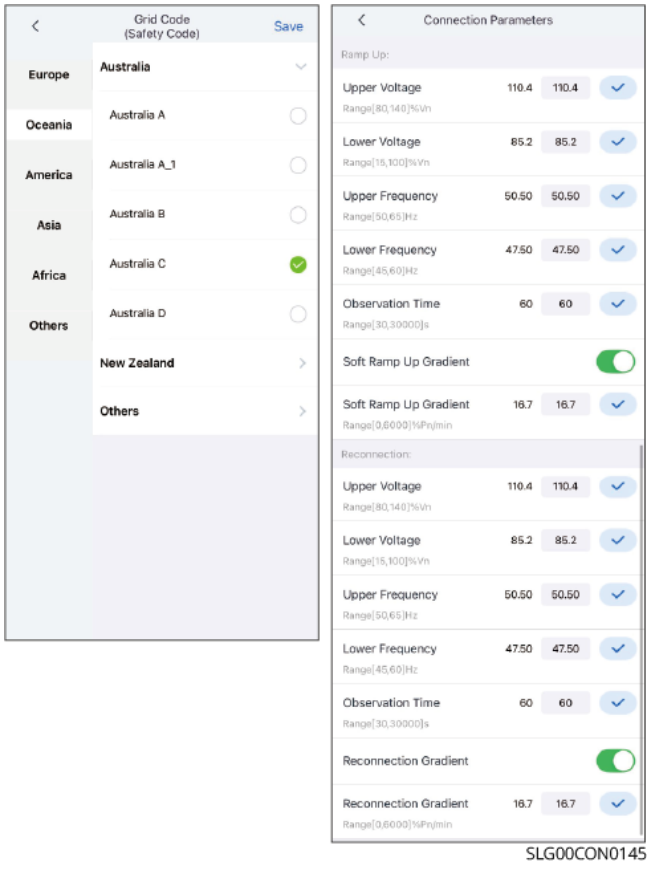

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