

Residential Smart Inverter

ES LD 5.0-10kW

- LX A5.0-30
- LX U5.0-30
- GW14.3-BAT-LV-G10
- GW16.1-BAT-LV-G10

Solutions Manual

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Foreword

Overview

This document mainly introduces the product information, installation and wiring, configuration and commissioning, troubleshooting, and maintenance content of the energy storage system composed of inverters, battery systems, and smart meters. Before installing and using the product, please read this manual carefully to understand the product safety information and become familiar with the product functions and features. The document may be updated from time to time without notice; please obtain the latest version of the materials and more product information from the official website.

Applicable Products

The energy storage system includes the following products:

Product type	Product information	Description
Inverter	ES LD Series	Rated output power: 5kW-10kW
Battery system	LX A5.0-30	Rated capacity 5.12kWh, supports up to 30 parallel clusters
	LX U5.0-30	Rated capacity 5.12kWh, supports up to 30 parallel clusters
	GW14.3-BAT-LV-G10	Rated capacity 14.3kWh, supports up to 30 parallel clusters
	GW16.1-BAT-LV-G10	Rated capacity 16.1kWh, supports up to 30 parallel clusters
Smart Meter	GM330	The monitoring module in the energy storage system can detect operating voltage, current, and other information in the system

Product type	Product information	Description
Smart Communication Dongle	WiFi/LAN Kit-20	System operation information can be uploaded to the monitoring platform via WiFi or LAN signals

Symbol Definitions

 DANGER
Indicates a high potential hazard that, if not avoided, will result in death or serious injury.
 WARNING
Indicates a moderate potential hazard which, if not avoided, could result in death or serious injury to personnel.
 CAUTION
Indicates a low potential hazard which, if not avoided, may result in moderate or minor injury to personnel.
NOTICE
Emphasis and supplement to the content; may also provide tips or hints for optimized product use, helping you solve a problem or save time.

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1 Safety Precautions

Always comply with the safety precautions contained in this document when operating the equipment.

WARNING

The equipment has been designed in strict accordance with safety regulations and has passed testing. However, as electrical equipment, relevant safety instructions must be observed before any operation on the equipment. Improper operation may cause serious personal injury or property damage.

1.1 General Safety

NOTICE

- Due to product version upgrades or other reasons, the document content may be updated from time to time. Unless otherwise agreed, the document content does not supersede the safety precautions on the product label. All descriptions in the document are for use guidance only.
- Before installing the equipment, please read this document carefully to understand the product and precautions.
- All operations on the equipment must be performed by professional and qualified electrical technicians, who must be familiar with the relevant standards and safety regulations of the project location.
- When operating the equipment, use insulated tools and wear personal protective equipment to ensure personal safety. When handling electronic components, wear anti-static gloves, anti-static wrist straps, anti-static clothing, etc., for Protection of the equipment from electrostatic damage.
- Unauthorized disassembly or modification may cause equipment damage, and such damage is not covered by the warranty.
- Equipment damage or personal injury caused by failure to install, use, or configure the equipment in accordance with this document or the corresponding user manual is not within the scope of responsibility of the equipment manufacturer.
- For more product warranty information, please visit the official website: <https://www.goodwe.com/warrantyrelated.html>.

1.2 Personnel Requirements

NOTICE

To ensure the safety, compliance, and efficiency of the entire process of equipment transportation, installation, wiring, operation, and maintenance, the work must be performed 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 risks and hazards, and who have received professional operation training or have extensive practical experience.
- Personnel who have received relevant technical and safety training, possess certain operational experience, are able to recognize the dangers that specific work may pose to themselves, and can take protective measures to minimize risks to themselves and others.
- Qualified electrical technicians who meet the regulatory requirements of the country/region where they are located.
- Persons with a degree in electrical engineering / an advanced diploma in an electrical discipline or equivalent / professional qualifications in the electrical field, and at least 2/3/4 years of experience in testing and supervising work using electrical equipment safety standards.

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

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

4. Equipment and component replacement may only be performed by authorized personnel.

1.3 System Safety



- Before making electrical connections, disconnect all upstream switches of the equipment to ensure that the equipment is de-energized. Live-line operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- For devices that support connection to PV strings, the PV input end has weak surge current withstand capability. It is strictly prohibited to use a DC voltage source to directly power on through the PV port. If power-on from the PV port is required, follow the steps below. If machine damage is caused by violation of these instructions, it is considered man-made damage and is not covered by product warranty.
 1. First, limit the output current of the DC voltage source within the Max. Current from Grid range allowed by the PV port.
 2. Then close the inverter's DC Switch.
 3. Finally, slowly increase the output voltage of the DC source from zero to the target value at a rate of ≤ 50 V/s.
- To prevent personal hazards or equipment damage caused by live-line operation, a circuit breaker must be added on the voltage input side of the equipment.
- All operations such as transportation, storage, installation, operation, use, and maintenance shall comply with applicable laws, regulations, standards, and specifications.
- The specifications of cables and components used for electrical connections shall comply with local laws, regulations, standards, and specifications.
- Use the cable connectors supplied with the package to connect the equipment cables. If connectors of other models are used, any resulting equipment damage shall not be the responsibility of the equipment manufacturer.
- Ensure that all equipment cable connections are correct, tight, and not loose. Improper wiring may cause poor contact or damage to the equipment.
- The Protection ground wire of the equipment must be securely connected.
- To ensure Protection of the equipment and its components from damage during transportation, ensure that transportation personnel are professionally trained. During transportation, record the operation steps, keep the equipment balanced, and prevent it from falling.
- The equipment is heavy. Allocate personnel according to the equipment Weight to prevent it from exceeding the human handling Weight range and causing crushing injuries to personnel.
- Ensure that the equipment is placed stably and cannot tilt. Tipping of the equipment may cause equipment damage and personal injury.

 WARNING

- During equipment installation, avoid placing load on the terminals; otherwise, the terminals may be damaged.
- Avoid subjecting cables to excessive tensile force; otherwise, poor connections may result. When wiring, reserve an appropriate cable length to prevent the cables from being taut.
- Properly secure and support the cables to prevent the cables' own weight, tensile force, bending force, torsional force, or other external mechanical stress from acting on terminals or connectors for extended periods.
- Ensure that the Protection grounding conductor is reliably connected, and reserve an appropriate margin. When subjected to unexpected tensile force or other external mechanical stress, ensure that the Protection grounding conductor does not disconnect before other conductors.
- Cables of the same type shall be bundled together. Cables of different types shall be routed at least 30 mm apart. Intertwining or crossing is prohibited.
- Using cables in high-temperature environments may cause insulation aging or damage. The distance between cables and heat-generating components or the outer edge of heat source areas shall be at least 30 mm.

1.3.1 PV String Safety

WARNING

- Ensure that the module frames and mounting bracket system are properly grounded.
- After completing the DC cable connections, ensure that the cable connections are tight and not loose. Improper wiring may cause poor contact or high impedance and damage the inverter.
- Use a multimeter to measure the positive and negative poles of the DC cables to ensure that the positive and negative poles are correct and not reversed; and that the voltage is within the allowable range.
- Use a multimeter to measure the DC cables to ensure that the positive and negative poles are correct and not reversed; the voltage should be lower than the maximum DC input voltage. Damage caused by reverse connection and Overvoltage is not within the responsibility of the equipment manufacturer.
- The PV string output does not support grounding. Before connecting the PV string to the inverter, ensure that the minimum insulation resistance to ground of the PV string meets the minimum insulation impedance requirement ($R = \text{Max. Input Voltage (V)} / 30\text{mA}$).
- Do not connect the same PV string to multiple inverters; otherwise, the inverter may be damaged.
- PV modules used with the inverter must comply with IEC 61730 Class A standards.
- When the PV string input voltage or input current is high, the inverter output power may be derated.

1.3.2 Inverter Safety

WARNING

- Ensure that the voltage and frequency at the grid-connection point comply with the inverter's grid-tie specifications.
- It is recommended to add Protection devices such as circuit breakers or fuses on the AC side of the inverter. The specifications of the Protection devices must be greater than 1.25 times the inverter AC output Max. Current.
- If the inverter triggers fewer than 5 Arc Failure alarms within 24 hours, the alarm can be automatically cleared. After the 5th Arc Failure alarm, the inverter will shut down for Protection. After the fault is cleared, the inverter can operate normally.
- If no battery is configured in the PV system, the BACK-UP function is not recommended; otherwise, it may cause a risk of system power outage.
- When the grid voltage and frequency change, inverter output power derating may occur.

1.3.3 Battery Safety

DANGER

- Before operating equipment in the system, ensure that the equipment has been powered off to avoid electric shock hazards. During equipment operation, strictly observe all safety precautions in this manual and safety signs on the equipment.
- Without official authorization from the equipment manufacturer, do not disassemble, modify, or repair the battery or control box; otherwise, electric shock hazards or equipment damage may occur, and losses caused thereby are not within the scope of the equipment manufacturer's responsibility.
- Do not impact, pull, drag, squeeze, or step on the equipment, and do not place the battery in fire; otherwise, the battery may explode.
- Do not place the battery in a high-temperature environment. Ensure there is no heat source near the battery and that it is not exposed to direct sunlight. If the ambient temperature exceeds 60°C, a fire may occur.
- If the battery or control box has obvious defects, cracks, damage, or other abnormalities, do not use it. Battery damage may cause electrolyte leakage.
- When the battery is operating, do not move the battery system. If you need to replace or add batteries, please contact the after-sales service center.
- Battery Short Circuit 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.
- The battery DC circuit breaker shall comply with the requirements of AS/NZS 5139.

WARNING

- Battery Current may be affected by factors such as temperature, humidity, weather conditions, etc., which may cause battery current limiting and affect the load capacity.
- If the battery cannot start, please contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Please perform regular inspection and maintenance on the battery according to the battery maintenance requirements.

Emergency Measures for Emergency Situations

- **Battery Electrolyte Leakage**

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

- Inhalation: Evacuate from the contaminated area and seek medical help immediately.
- Eye contact: Flush with clean water for at least 15 minutes and seek medical help immediately.
- Skin contact: Thoroughly wash the contacted area with soap and clean water, and seek medical help immediately.
- Ingestion: Induce vomiting and seek medical assistance immediately.

- **Fire**

- When the battery temperature exceeds 150°C, there is a fire risk. After the battery catches fire, it may release toxic and harmful gases.
- To avoid fire, ensure that carbon dioxide, Novec1230, or FM-200 fire extinguishers are available near the equipment.
- When extinguishing a fire, do not use ABC dry powder fire extinguishers. Firefighters must wear protective clothing and self-contained breathing apparatus.

- **Battery triggers fire protection function**

For batteries equipped with an optional fire protection function, after the fire protection function is triggered, perform the following operations:

- Immediately disconnect the main power switch to ensure that no current flows through the battery system.
- Perform a preliminary inspection of the battery appearance for damage, deformation, leakage, or abnormal odor, and inspect the battery enclosure, connectors, and cables.
- Use a temperature sensor to measure the battery and ambient temperature to ensure there is no risk of overheating.
- Isolate and mark damaged batteries, and dispose of them properly in accordance with local regulatory requirements.

1.3.4 Meter Safety

WARNING

If the grid voltage fluctuates above 265 V, long-term overvoltage operation may damage the meter. It is recommended to add a fuse with a Rated Current of 0.5 A on the voltage input side of the meter to provide Protection for the meter.

1.4 Safety Symbols and Certification Markings

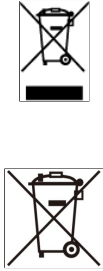
Description

DANGER

- After the equipment is installed, the labels and warning signs on the enclosure must be clearly visible and must not be obstructed, altered, or damaged.
- The following descriptions of enclosure warning labels are for reference only; please refer to the labels actually used on the equipment.

No.	Symbol	Meaning
1		Potential hazards exist when the equipment is running. Take proper protective measures when operating the equipment.
2		High voltage hazard. High voltage is present when the equipment is running. Before operating the equipment, ensure that the equipment is powered off.
3		The inverter surface is at high temperature. Do not touch it while the equipment is running; otherwise, burns may result.
4		Use the equipment properly. Using it under extreme conditions may cause an explosion risk.
5		The battery contains flammable materials. Fire hazard.

No.	Symbol	Meaning
6		The equipment contains corrosive electrolyte. Avoid contact with leaked electrolyte or volatile gases.
7		Delayed discharge. After the equipment is powered off, wait 5 minutes until the equipment is fully discharged.
8		Keep the equipment away from open flames or ignition sources.
9		Keep the equipment out of areas accessible to children.
10		Do not extinguish with water.
11		Do not lift the equipment after the battery system wiring is completed or while the battery system is in operation.
12		Do not disassemble
13		Before operating the equipment, read the product manual carefully.
14		Do not directly disconnect or plug/unplug the DC terminals while the equipment is operating.
15		Wear personal protective equipment during installation, operation, and maintenance.

No.	Symbol	Meaning
16		The equipment must not be disposed of as household waste. Dispose of the equipment in accordance with local laws and regulations, or return it to the equipment manufacturer.
17		Protection Grounding Conductor Connection Point
18		Recycling Mark
19		CE Certification mark.
20		TUV mark.
21		RCM mark.

1.5 EU Declaration of Conformity

1.5.1 Devices with Wireless Communication Function

Devices with wireless communication function that can be sold on the European market meet the following directive requirements:

- 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 Devices Without Wireless Communication Function (Except Batteries)

Devices without wireless communication function that can be sold on the European market meet the following directive requirements:

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

1.5.3 Battery

Batteries that can be sold on the European market meet the following directive requirements:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)*¹
- Regulation (EU) 2023/1542 Article 12 - Safety of stationary battery energy storage systems
- Regulation (EU) 2023/1542 Article 10 - Performance and durability requirements for rechargeable industrial batteries, LMT batteries and electric vehicle batteries
- Regulation (EU) 2023/1542 Article 14 - Information on the state of health and expected lifetime of batteries
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

*1: Our battery products meet the hazardous substance limit requirements specified in this regulation.

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

2 System Introduction

2.1 System Overview

The residential smart inverter solution integrates devices such as inverters, batteries, smart meters, and Smart Communication Sticks. In the PV system, it converts solar energy into electrical energy to meet household electricity demands. The energy IoT devices in the system manage electrical equipment by identifying the overall power status of the system, thereby achieving intelligent management of power for load usage, storage in batteries, or output to the grid, etc.

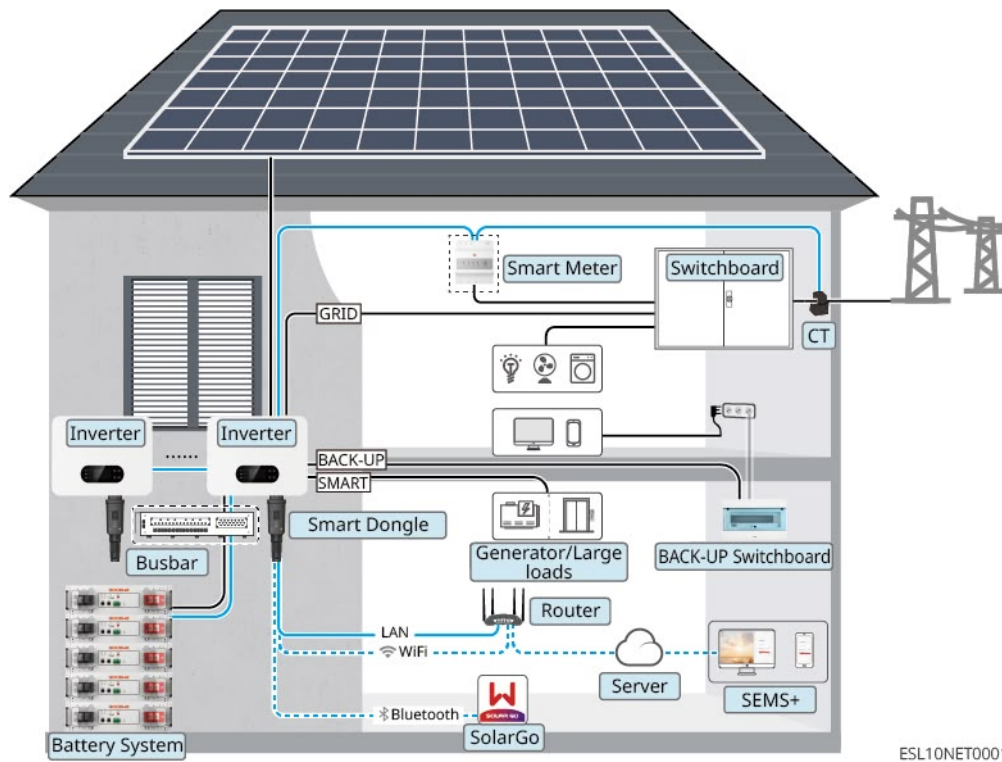
WARNING

- Battery models should be selected according to the inverter and battery compatibility list. For battery requirements in the same system, such as whether models can be mixed and matched, whether capacities are consistent, etc., please refer to the battery user manual of the corresponding model or contact the battery manufacturer for relevant requirements. [Inverter and Battery Compatibility List](#): https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_Battery%20Compatibility%20Overview-EN.pdf
- Due to product version upgrades or other reasons, the document content will be updated from time to time. For the compatibility between inverters and IoT products, please refer to: https://en.goodwe.com/Ftp/EN/Downloads/User%20Manual/GW_Compatibility-list-of-GoodWe-inverters-and-IoT-products-EN.pdf
- For detailed networking and wiring schemes for each scenario, please refer to: [5.2.System Wiring Detailed Diagram\(Page 95\)](#)
- The energy storage system is not suitable for connecting devices that rely on stable power supply, such as life-sustaining medical equipment. Please ensure that when the system is powered off, it will not cause personal injury.
- In a fully off-grid inverter system, if the battery remains in low-light or rainy weather for an extended period and cannot be recharged in time, overdischarge may occur, resulting in battery performance degradation or damage. To ensure long-term stable system operation, avoid completely discharging the battery. Recommended measures are as follows:
 1. During off-grid operation, set the minimum SOC Protection threshold. It is recommended to set the lower limit of the off-grid battery SOC to 30%.
 2. When SOC approaches the Protection threshold, the system will automatically enter load limiting or Protection mode.
 3. If there is insufficient sunlight for consecutive days and the battery SOC is too low, the battery should be recharged in a timely manner through external energy sources (such as a generator or grid auxiliary charging).
 4. Regularly check the battery status to ensure it is within the safe operating range.
 5. It is recommended to fully charge and fully discharge the battery once every six months to calibrate SOC accuracy.

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

Off-grid Load Capacity Description						
Load Type	GW5K-ES-LD-G10		GW7.5K-ES-LD-G10		GW10K-ES-LD-G10	
	Single-phase (L-N)	Two-phase/Split-phase (L1-L2)	Single-phase (L-N)	Two-phase/Split-phase (L1-L2)	Single-phase (L-N)	Two-phase/Split-phase (L1-L2)
Rated Power of single inductive load (kVA)	1.1	2.2	1.1	2.2	1.1	2.2
Total inductive load Rated Power (kVA)	$0.44 \cdot P_n / 2$	$0.44 \cdot P_n$	$0.5 \cdot P_n / 2$	$0.5 \cdot P_n$	$0.5 \cdot P_n / 2$	$0.5 \cdot P_n$
Capacitive Load (kVA)	$0.33 \cdot P_n / 2$	$0.33 \cdot P_n$	$0.33 \cdot P_n / 2$	$0.33 \cdot P_n$	$0.33 \cdot P_n / 2$	$0.33 \cdot P_n$
Half-wave Load (kW)	1.5	NA	2	NA	2.5	NA
Note: • P_n: Inverter rated output power. • When two or more units are connected in parallel, the allowable total motor load Rated Power = single motor load Rated Power * number of parallel units * 80%. • Half-wave Load: Some old or non-EMC-compliant household appliances (such as hair dryers and small heaters using half-wave rectification, etc.).						

General Scenario



Device Type	Model	Description
Inverter	GW5K-ES-LD-G10 GW7.5K-ES-LD-G10 GW10K-ES-LD-G10	• When only one inverter is used in the system, it supports connection to a generator, large load, or grid-tied unit. • System Parallel Quantity Requirements: ◦ The system supports a maximum of 10 inverters in parallel. ◦ If a GW combiner box is used, the maximum number of inverters in parallel is 6. ◦ If 10 inverters in parallel are required, please provide your own busbar based on the system power and the number of battery clusters in parallel. • When operating in parallel, the microgrid function is not supported. • For Parallel Networking, the following version requirements must be met: ◦ All inverters in the parallel system must have the same software version. ◦ All inverters in the parallel system must be of the same model. ◦ The inverter ARM software version must be 03.135 or higher. ◦ The inverter DSP software version must be 01.1074 or higher.
Battery system	LX A5.0-30	The same system supports a maximum of 30 battery clusters in parallel.
	LX U5.0-30	• The same system supports a maximum of 30 clusters in parallel. • Parallel cluster expansion is temporarily not supported between different models. For the same model, customers are allowed to expand parallel clusters within one year of purchase; after one year, parallel cluster expansion is not allowed.

Device Type	Model	Description
	GW14.3-BAT-LV-G10	The same system supports a maximum of 30 clusters in parallel: • Products with SN code 25C and later support 30 clusters in parallel by default. • For products before 25C, if 30 clusters in parallel are required, please contact GoodWe after-sales service center to Upgrade Firmware version. • For product SN code viewing, refer to 11.3.SN Code Meaning(Page 297)。
	GW16.1-BAT-LV-G10	The same system supports a maximum of 30 battery clusters in parallel.
	Lead-acid battery	• Supports connection to AGM, GEL, and Flooded lead-acid batteries. • Calculate the Battery Qty that can be connected in series according to the lead-acid Battery Voltage; the total voltage of the series-connected batteries must not exceed 60V
Busbar	BCB-11-WW-0 BCB-22-WW-0 BCB-32-WW-0 BCB-33-WW-0 (Purchased from GoodWe) Third-party busbar	Please select the combiner box based on the charge/discharge capability of the inverters in the system, the load size, and the charge/discharge capability of the battery. • BCB-11-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 360A, a working power of 18kW, and can connect up to 3 inverters and 6 batteries. • BCB-22-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 12 batteries.

Device Type	Model	Description
		◦ When used with LX A5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 6 batteries. ◦ When used with LX U5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 6 batteries. • BCB-32-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with LX A5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with LX U5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 8 batteries. ◦ When used with GW14.3-BAT-LV-G10, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with GW16.1-BAT-LV-G10, the battery system supports a maximum operating current of 720 A, an operating power of 36 kW, connection of up to 6 inverters, and 15 batteries • BCB-33-WW-0: ◦ When used with LX U5.0-30, the battery system supports a maximum operating current of 720 A, an operating power of 36 kW, connection of up to 6 inverters, and 15 batteries. When Battery Qty exceeds 8, two fuses rated at 600 A

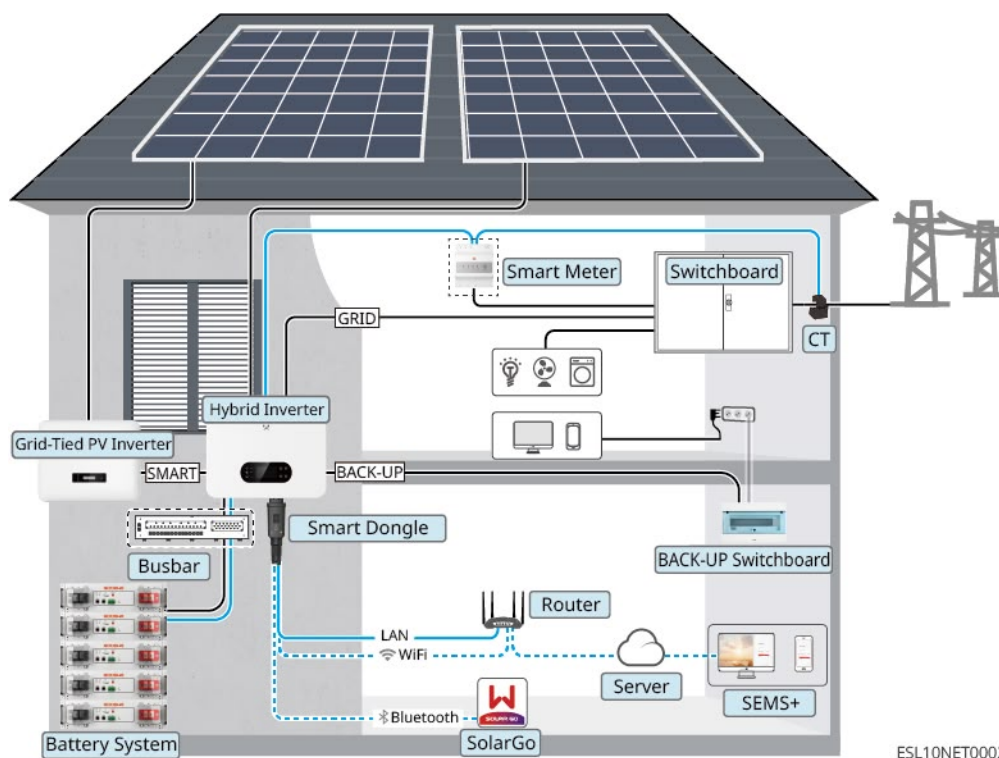
Device Type	Model	Description
		need to be connected in parallel. Third-party busbar: Please configure it yourself according to system power and current
Smart Meter	- Built-in meter (standard) - GM330 (purchased from GoodWe)	- Please use the CT shipped with the box to connect the inverter. The CT ratio is 120 A:40 mA - GM330: CT can be purchased from GoodWe or by yourself. CT transformation ratio requirement: nA/5A - nA: CT primary-side input current; n ranges from 200 to 5000 5A: CT secondary-side output current
Communication Stick	WiFi/LAN Kit-20 (standard)	- Please use the WiFi/LAN Kit-20 smart communication stick for local commissioning of the device and remote monitoring of system operating information - In a parallel system, each inverter must be equipped with a WiFi/LAN Kit-20, and the software version must be V2.5 or above
Large Load	-	Supports SG Ready. Large Load specifications: - Total Large Load power < maximum output power of the GEN port - Large Load power + BACK-UP power < AC Max. Input Power (grid)
Generator	-	- Generator power must be greater than the total power of all loads on the BACKUP port - Diesel Generator Type must be consistent with Type of Electrical Supply System

Microgrid Scenario

When a grid-tied inverter is connected to the GEN port of a hybrid inverter, it is a Microgrid Scenario.

WARNING

- In a Microgrid Scenario, the open-circuit voltage of the PV string connected to the PV-storage hybrid inverter is not recommended to be ≥ 490 V, to avoid high system voltage under harsh operating conditions triggering overvoltage Protection.
- In a microgrid system, the inverter does not support parallel operation, and only one hybrid inverter can be used in the system.
- If the system is in a high-temperature or BMS current-limiting condition, the battery charging power may be limited, causing the system voltage to be too high and triggering overvoltage Protection.



ESL10NET0002

Device Type	Model	Description
Inverter	GW5K-ES-LD-G10 GW7.5K-ES-LD-G10 GW10K-ES-LD-G10	• In a microgrid system, the inverter does not support parallel operation, and only one inverter can be used in the system • The inverter ARM software version must be 03.135 or higher. • The inverter DSP software version must be 01.1074 or higher.
Battery system	LX A5.0-30	The same system supports a maximum of 30 battery clusters in parallel.
	LX A5.0-10	• Up to 15 batteries can be connected in parallel clusters in the same system. • Only supported for use with an inverter via the Mix Parallel Unit
	LX U5.0-30	• The same system supports a maximum of 30 clusters in parallel. • Parallel cluster expansion is temporarily not supported between different models. For the same model, customers are allowed to expand parallel clusters within one year of purchase; after one year, parallel cluster expansion is not allowed.
	GW14.3-BAT-LV-G10	The same system supports a maximum of 30 clusters in parallel: • Products with SN code 25C and later support 30 clusters in parallel by default. • For products before 25C, if 30 clusters in parallel are required, please contact GoodWe after-sales service center to Upgrade Firmware version. • For product SN code viewing, refer to 11.3.SN Code Meaning(Page 297).

Device Type	Model	Description
	GW16.1-BAT-LV-G10	The same system supports a maximum of 30 battery clusters in parallel.
	Lead-acid battery	• Supports connection to AGM, GEL, and Flooded lead-acid batteries. • Calculate the Battery Qty that can be connected in series according to the lead-acid Battery Voltage; the total voltage of the series-connected batteries must not exceed 60V
Busbar	BCB-11-WW-0 BCB-22-WW-0 BCB-32-WW-0 BCB-33-WW-0 (Purchased from GoodWe) Third-party busbar	Please select the combiner box based on the charge/discharge capability of the inverters in the system, the load size, and the charge/discharge capability of the battery. • BCB-11-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 360A, a working power of 18kW, and can connect up to 3 inverters and 6 batteries. • BCB-22-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 12 batteries. ◦ When used with LX A5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 6 batteries. ◦ When used with LX U5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 6 batteries. • BCB-32-WW-0: ◦ When used with LX A5.0-10, the battery system supports a maximum working current of 720A,

Device Type	Model	Description
		a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with LX A5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with LX U5.0-30, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 8 batteries. ◦ When used with GW14.3-BAT-LV-G10, the battery system supports a maximum working current of 720A, a working power of 36kW, and can connect up to 6 inverters and 15 batteries. ◦ When used with GW16.1-BAT-LV-G10, the battery system supports a maximum operating current of 720 A, an operating power of 36 kW, connection of up to 6 inverters, and 15 batteries • BCB-33-WW-0: ◦ When used with LX U5.0-30, the battery system supports a maximum operating current of 720 A, an operating power of 36 kW, connection of up to 6 inverters, and 15 batteries. When Battery Qty exceeds 8, two fuses rated at 600 A need to be connected in parallel. • Third-party busbar: Please configure it yourself according to system power and current

Device Type	Model	Description
Smart Meter	- Built-in meter (standard) - GM330 (purchased from GoodWe)	- Please use the CT shipped with the box to connect the inverter. The CT ratio is 120 A:40 mA - GM330: CT can be purchased from GoodWe or by yourself. CT transformation ratio requirement: nA/5A - nA: CT primary-side input current; n ranges from 200 to 5000 5A: CT secondary-side output current
Communication Stick	WiFi/LAN Kit-20 (standard)	- Please use the WiFi/LAN Kit-20 smart communication stick for local commissioning of the device and remote monitoring of system operating information - In a parallel system, each inverter must be equipped with a WiFi/LAN Kit-20, and the software version must be V2.5 or above
Grid-tied inverter	-	- It is recommended to use GoodWe brand grid-tied inverters; third-party grid-tied inverters are supported - In a microgrid system, please ensure: - The safety parameter settings of the grid-tied inverter must be consistent with those of the hybrid inverter, such as Type of Electrical Supply System, overfrequency Derating function, etc. - Rated output power of the grid-tied inverter $\leq$ rated output power of the hybrid inverter - When the microgrid system is in a grid-connected state, if power limitation is required, please ensure: - The PV-storage hybrid inverter must be configured via the SEMS+ APP Power Limit Parameter Settings interface; for grid-tied

Device Type	Model	Description
		inverters, configure according to the actual tool used. ◦ To ensure that the grid-tied inverter can continue generating power, it is necessary to use the SEMS+ APPMicrogrid Control Parametersinterface to adjust the output power of the hybrid inverter. • In a microgrid system, the Type of Electrical Supply System of the PV-storage hybrid inverter is configured as a two-phase grid. When matched with a single-phase grid-tied inverter, the output power of the grid-tied inverter will be affected by the output voltage, and Derating may occur. • In a microgrid system, if the battery SOC is lower than 5%, or the load power is greater than 5% of the inverter's Rated Power, the grid-tied inverter cannot be awakened through the Automatic Wake-up function. • Note: The output Power Control accuracy of different grid-tied inverters varies. Set the grid-tied power limit parameter values according to actual conditions.

2.2 Product Introduction

2.2.1 Inverter

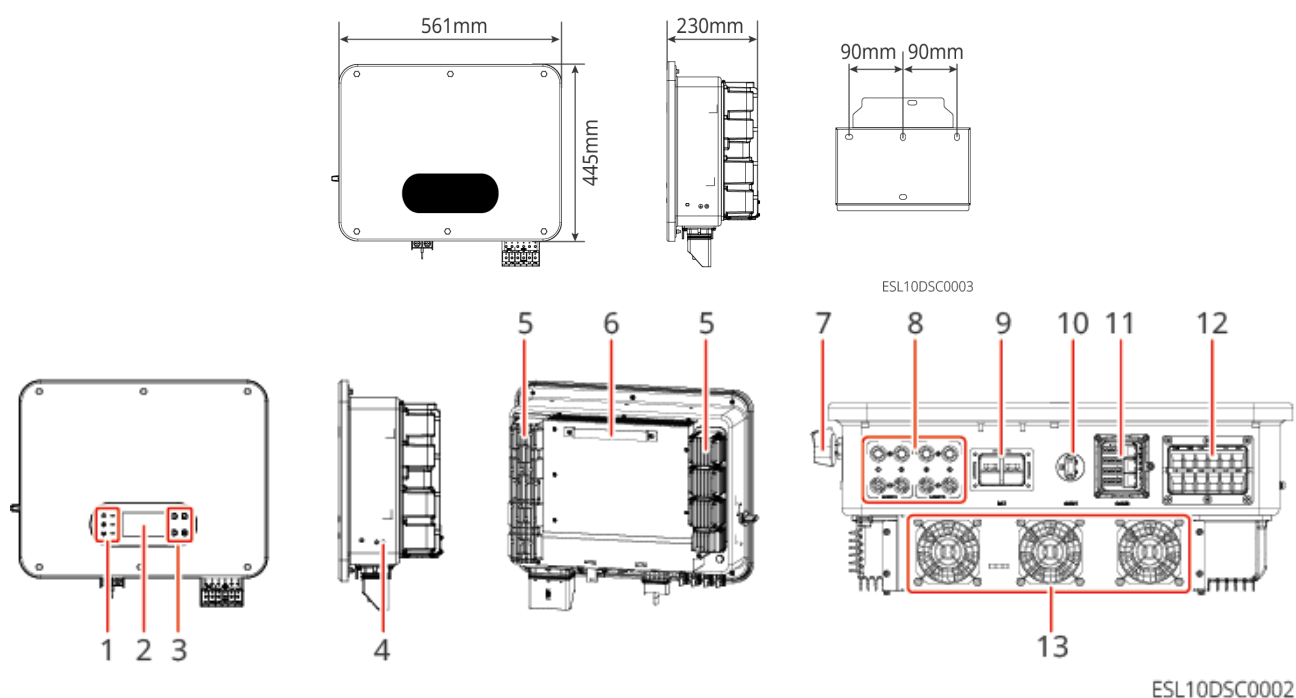
In a PV system, the inverter controls and optimizes energy flow through an integrated energy management system. The electricity generated by the PV system can be supplied to loads, stored in batteries, exported to the grid, etc.

No.	Model	Rated output power	Rated output voltage
1	GW5K-ES-LD-G10	5kW	

No.	Model	Rated output power	Rated output voltage
2	GW7.5K-ES-LD-G10	7.5kW	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE
3	GW10K-ES-LD-G10	10kW	

NOTICE

The appearance of inverters with different power ratings may vary. Please refer to the actual product.



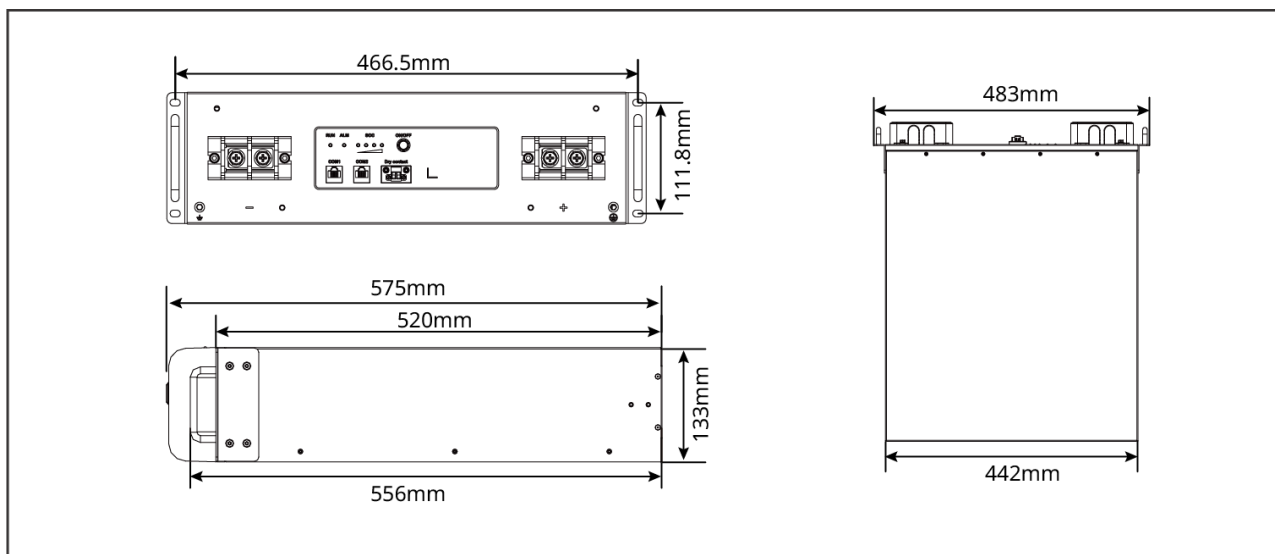
No.	Component/Silkscreen	Description
1	Indicator light	Indicates the inverter's operating status.
2	Display screen	View inverter-related data.
3	Buttons	Used in conjunction with the display screen to operate the inverter.
4	Grounding terminal	Connect the Protection ground wire.
5	Heat sink	Used for heat dissipation of the inverter.

6	Mounting bracket	Mount the inverter.
7	DC Switch	Controls the connection or disconnection of the DC input.
8	PV input port	Connect the PV module DC input cables. • GW5K-ES-LD-G10: PV+/PV- x 2 • GW7.5K-ES-LD-G10: PV+/PV- x 3 • GW10K-ES-LD-G10: PV+/PV- x 4
9	Battery port	Connect the battery DC cable.
10	Smart Dongle port	Connect the Smart Dongle. Select the Smart Dongle type according to actual requirements.
11	Communication Port	Connect load control, CT, RS485, Remote Shutdown/Rapid Shutdown
12	AC port	Connect the AC cable to connect the inverter to the power grid.
13	Fan	The inverter is equipped with external fans, which can cool the inverter when the temperature is too high. • GW5K-ES-LD-G10: No external fans. • GW7.5K-ES-LD-G10: External fans x 2. • GW10K-ES-LD-G10: External fans x 3.

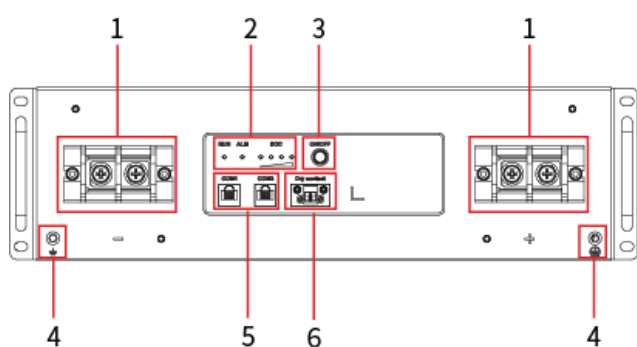
2.2.2 Battery

The battery system can store and release energy according to the requirements of the photovoltaic energy storage system. The input and output ports of this energy storage system are both low-voltage DC. The inverter supports use with lead-acid batteries. For lead-acid battery-related product information, please obtain it from the lead-acid battery manufacturer.

2.2.2.1 LX A5.0-30



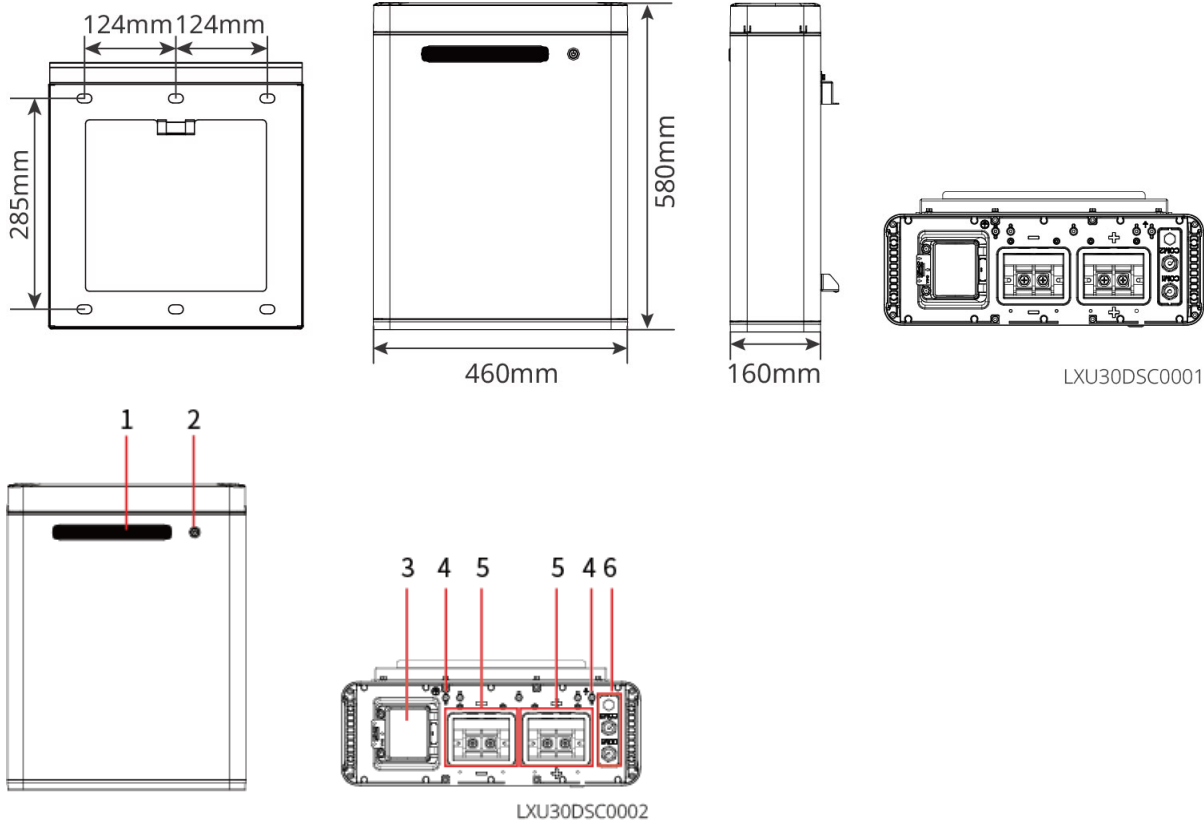
LXA30DSC0001



LXA30DSC0002

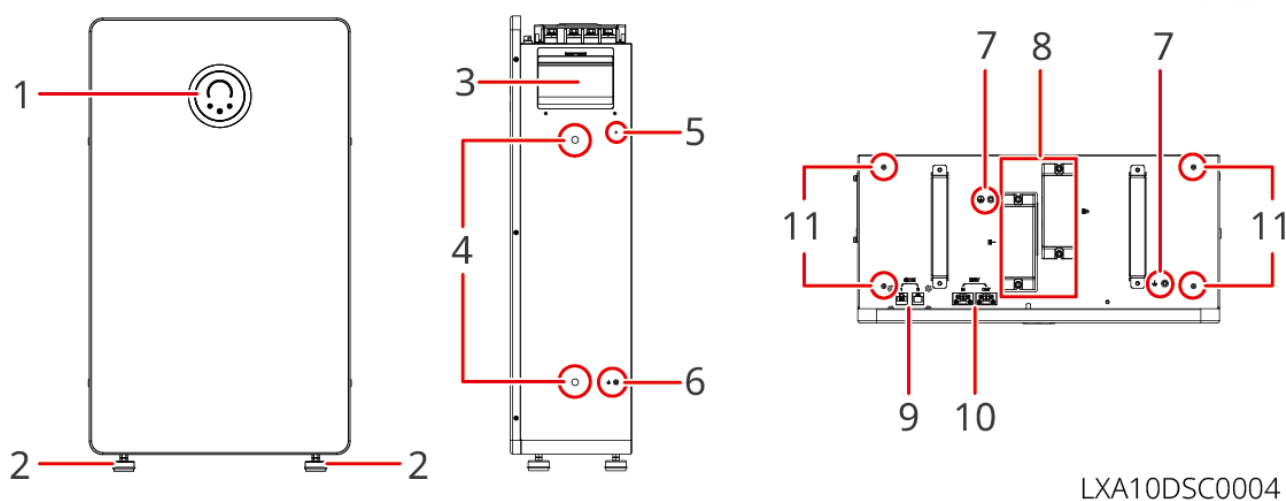
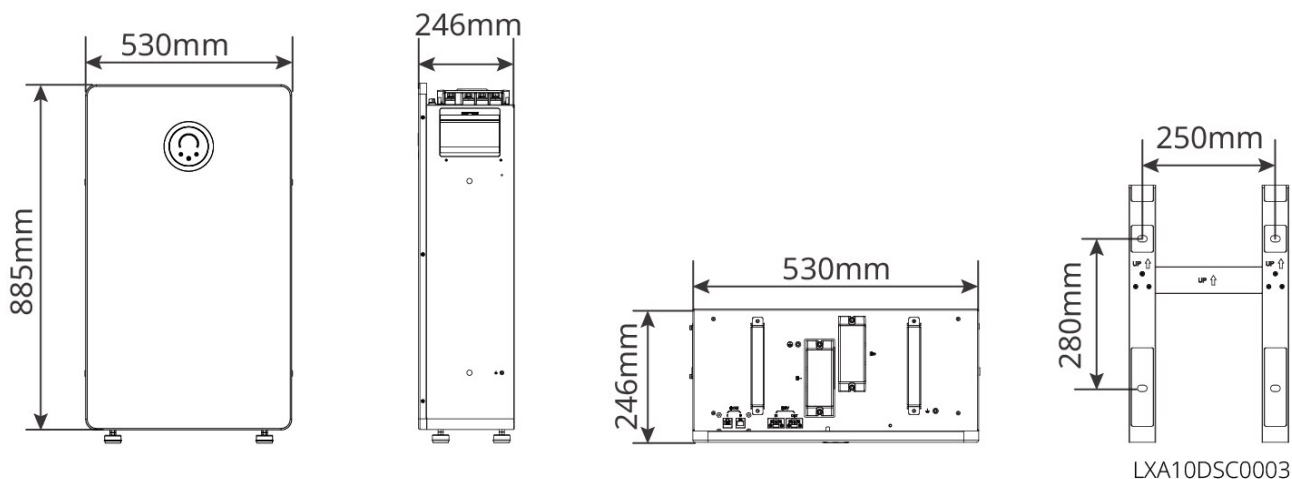
No.	Component/Silk screen	Description
1	Battery DC Port	Connect the battery DC input cable.
2	Indicator light	Indicates the battery operating status.
3	Battery System Button	Used for battery power-on/off and black start.
4	Protection Ground Terminal	Connect the enclosure Protection ground wire.
5	Communication Port	Connect the battery communication cable.
6	Dry Contact	Reserved.

2.2.2.2 LX U5.0-30



No.	Component/Silk screen	Description
1	Indicator light	Indicates the battery operating status.
2	Battery System Button	Used for battery power-on/off and black start.
3	Battery Circuit Breaker	Used for battery power-on/off.
4	Protection Ground Terminal	Connect the enclosure Protection ground wire.
5	Battery DC Port	Connect the battery DC input cable.
6	Communication Port	Connect the battery communication cable.

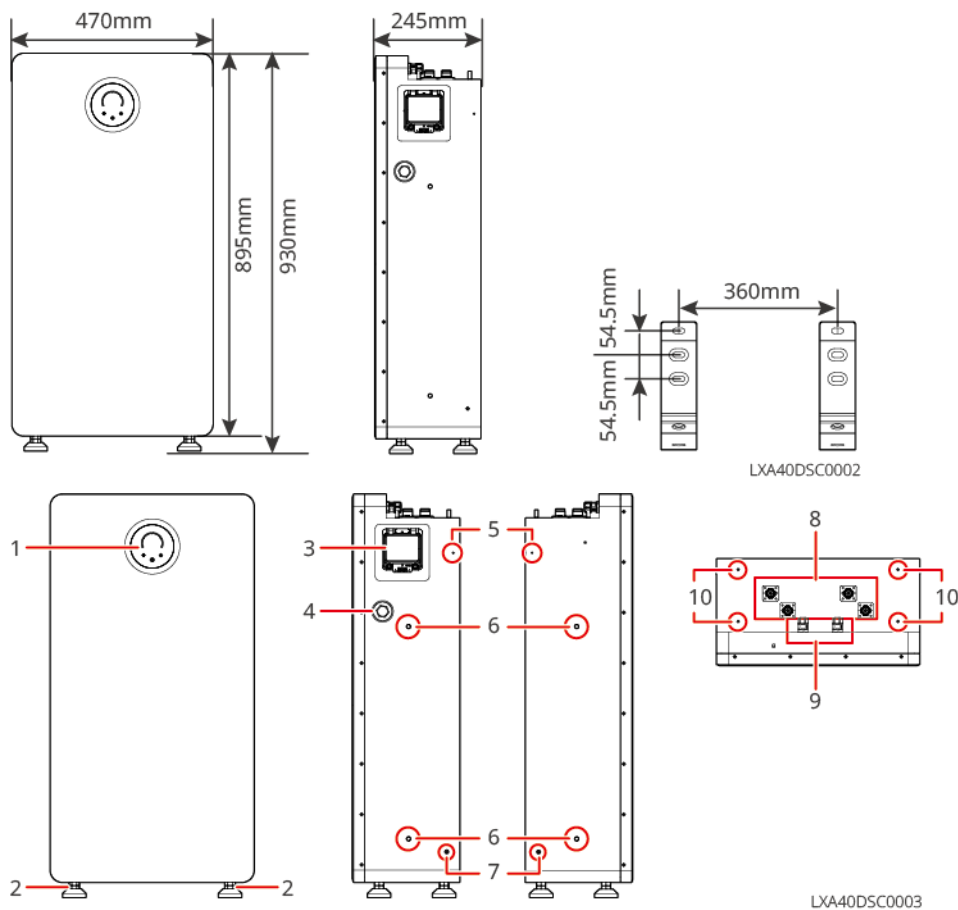
2.2.2.3 GW14.3-BAT-LV-G10



No.	Component/Silk screen	Description
1	Indicator light	Indicates the battery operating status.
2	Feet	Supports the battery.
3	Battery Circuit Breaker	Used for battery power-on/off.
4	Lifting Bar Mounting Holes	Used for installing the lifting bar. Used when manually carrying the battery.
5	L-shaped Bracket Mounting Holes	Used to secure the battery to the wall.
6	Protection Ground Terminal	Connect the enclosure Protection ground wire. Reserved.

No.	Component/Silk screen	Description
7	Protection Ground Terminal	Connect the battery system Protection ground wire.
8	Battery DC Port	Connect the battery DC input cable.
9	Communication Port	Connect the battery communication cable.
10	Dry Contact	Reserved.
11	Decorative cover mounting hole	Used to secure the battery decorative cover.

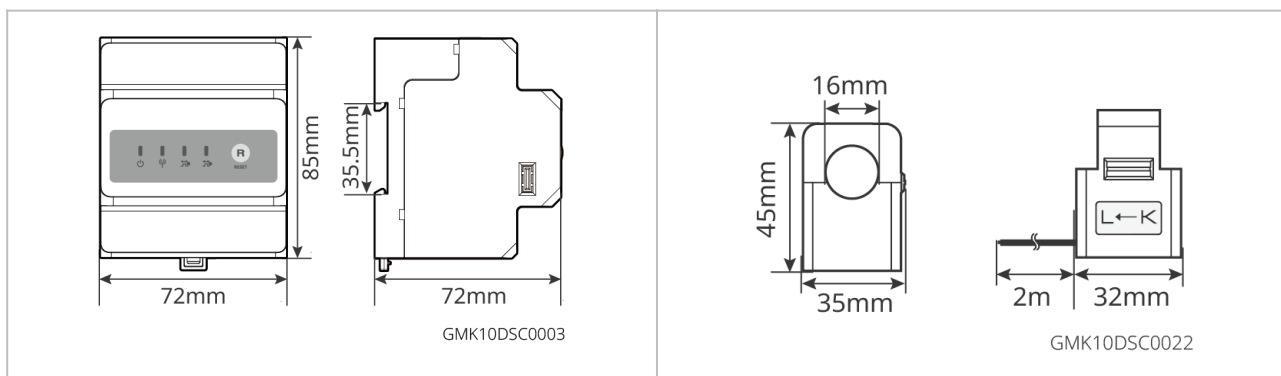
2.2.2.4 GW16.1-BAT-LV-G10



No.	Component/Silk screen	Description
1	Indicator light	Indicates the battery operating status.
2	Feet	Supports the battery.
3	Battery Circuit Breaker	Used for battery power-on/off.
4	Explosion-proof breather valve	Balances the internal and external air pressure of the battery to prevent explosion.
5	Anti-tip bracket mounting holes	Used to secure the battery to the wall.
6	Lifting Bar Mounting Holes	Used for installing the lifting bar. Used when manually carrying the battery.
7	Protection Ground Terminal	Connect the enclosure Protection ground wire.
8	Battery DC Port	Connect the battery DC input cable.
9	Communication Port	Connect the BMS communication cable between the inverter and the battery
10	DRY port	Connect the battery dry contact signal cable. It can be connected to external fire protection devices, etc.
11	Decorative cover mounting hole	Used to secure the battery decorative cover.

2.2.3 Smart Meter

The Smart Meter can measure and monitor electrical data in the photovoltaic energy storage system, such as voltage, current, frequency, Power Factor, power, etc.

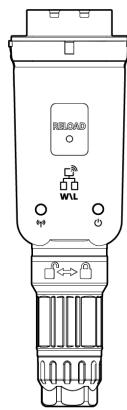


No.	Model	Application Scenarios
1	GM330	The CT can be purchased from GoodWe or purchased on your own. CT ratio requirement: nA: 5A - nA: CT primary-side input current; the range of n is 200-5000 5A: CT secondary-side output current

2.2.4 Smart Communication Stick

The Smart Communication Stick is mainly used for real-time transmission of various inverter power generation data to the remote monitoring platform, and for connecting to the Smart Communication Stick via the APP for local device commissioning.

WiFi/LAN Kit-20

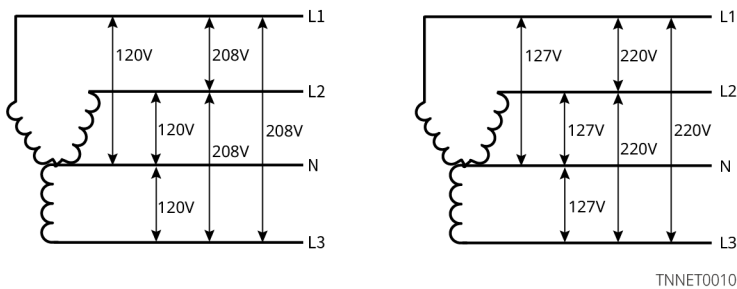


Smart dongle 0006

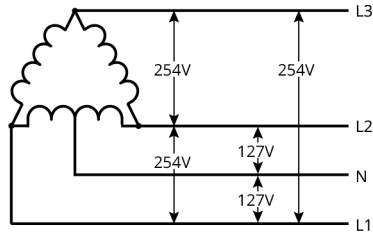
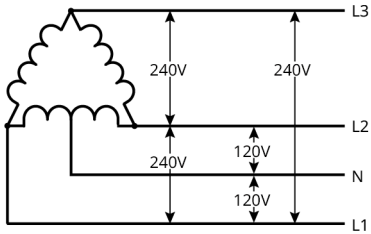
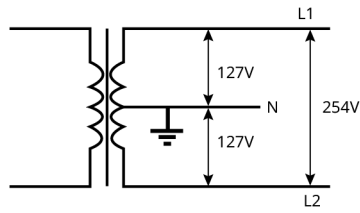
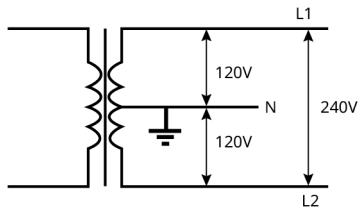
WiFi/LAN Kit-20 supports Bluetooth, WiFi, and LAN signal types, and is suitable for local device commissioning and transmitting device operation information to the remote monitoring system.

2.3 Supported Grid Types

Two-Phase Grid

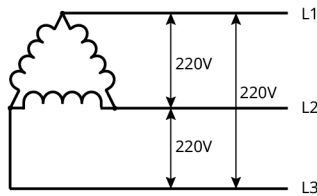
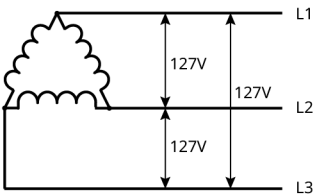
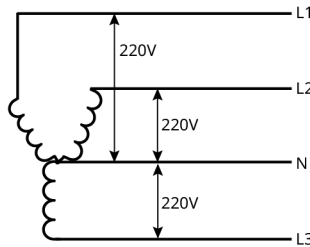
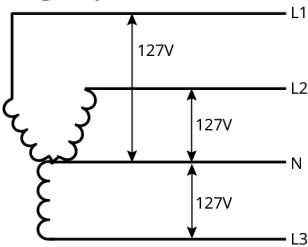


Split-Phase Grid



TNNET0011

Single-phase



TNNET0012

2.4 System Mode

NOTICE

After First-time Installation of the GW14.3-BAT-LV-G10 and GW16.1-BAT-LV-G10 battery systems, they will automatically perform one full battery charge, and after completion switch to the configured operating mode.

Self-consumption Mode

- Basic mode of system operation.

- PV generation preferentially supplies the load; excess electricity charges the battery, and any remaining electricity is sold to the grid. When PV generation cannot meet the load's power demand, the battery supplies power to the load; when the battery charge also cannot meet the load's power demand, the grid supplies power to the load.

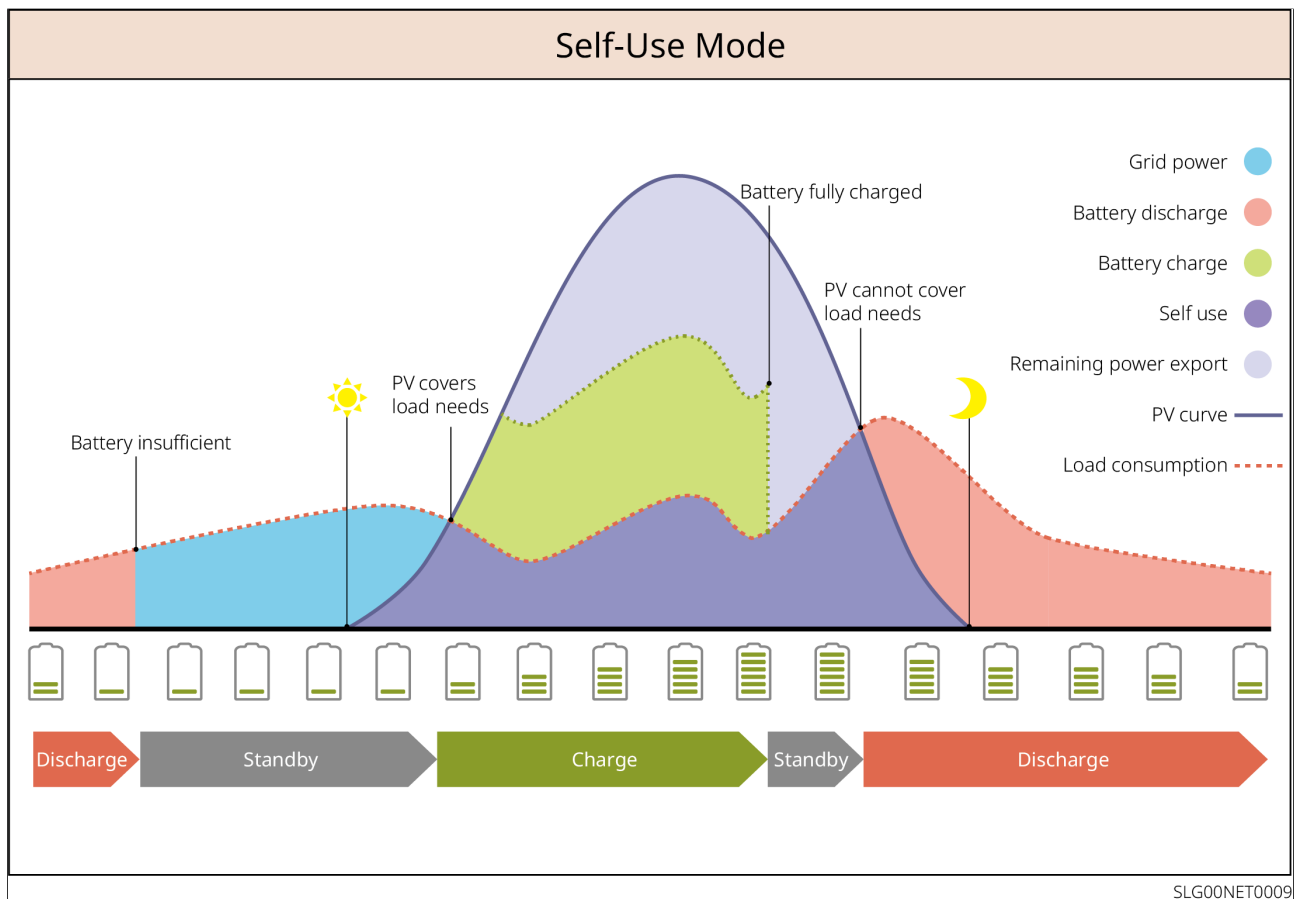


Figure1 Self-consumption Mode

Backup Mode

- Recommended for areas with unstable grid.
- When a Grid Power Outage occurs, the inverter switches to off-grid operating mode, and the battery discharges to supply power to loads, ensuring uninterrupted power for BACK-UP loads; when the grid recovers, the inverter operating mode switches to grid-tied operation.
- To ensure the battery SOC is sufficient to maintain normal system operation in off-grid mode, when the system is grid-tied, the battery will charge to the backup

power SOC using PV or purchased grid electricity. If it is necessary to purchase electricity from the grid to charge the battery, please confirm that local grid laws and regulations are met.

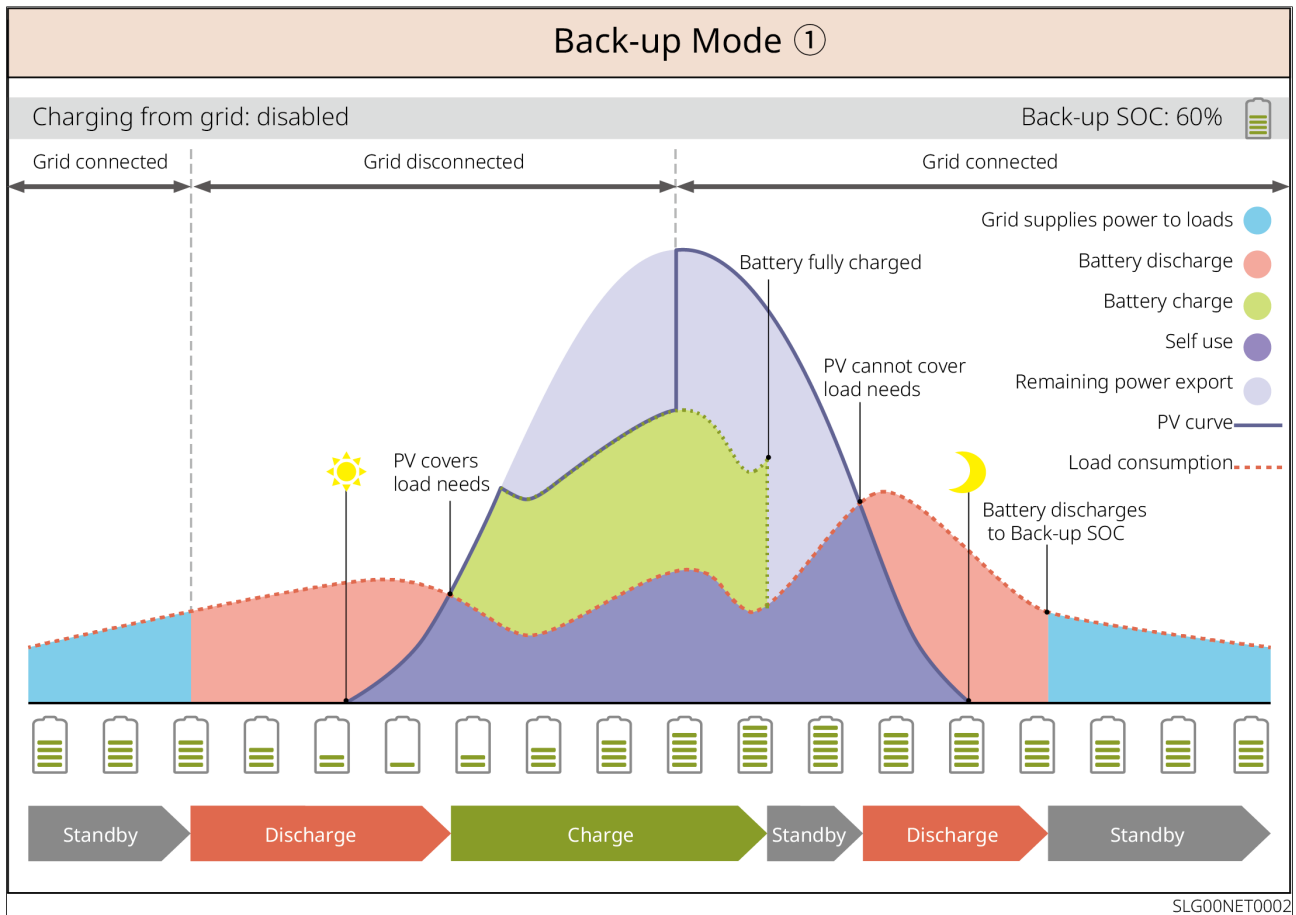


Figure2 Backup Mode 1

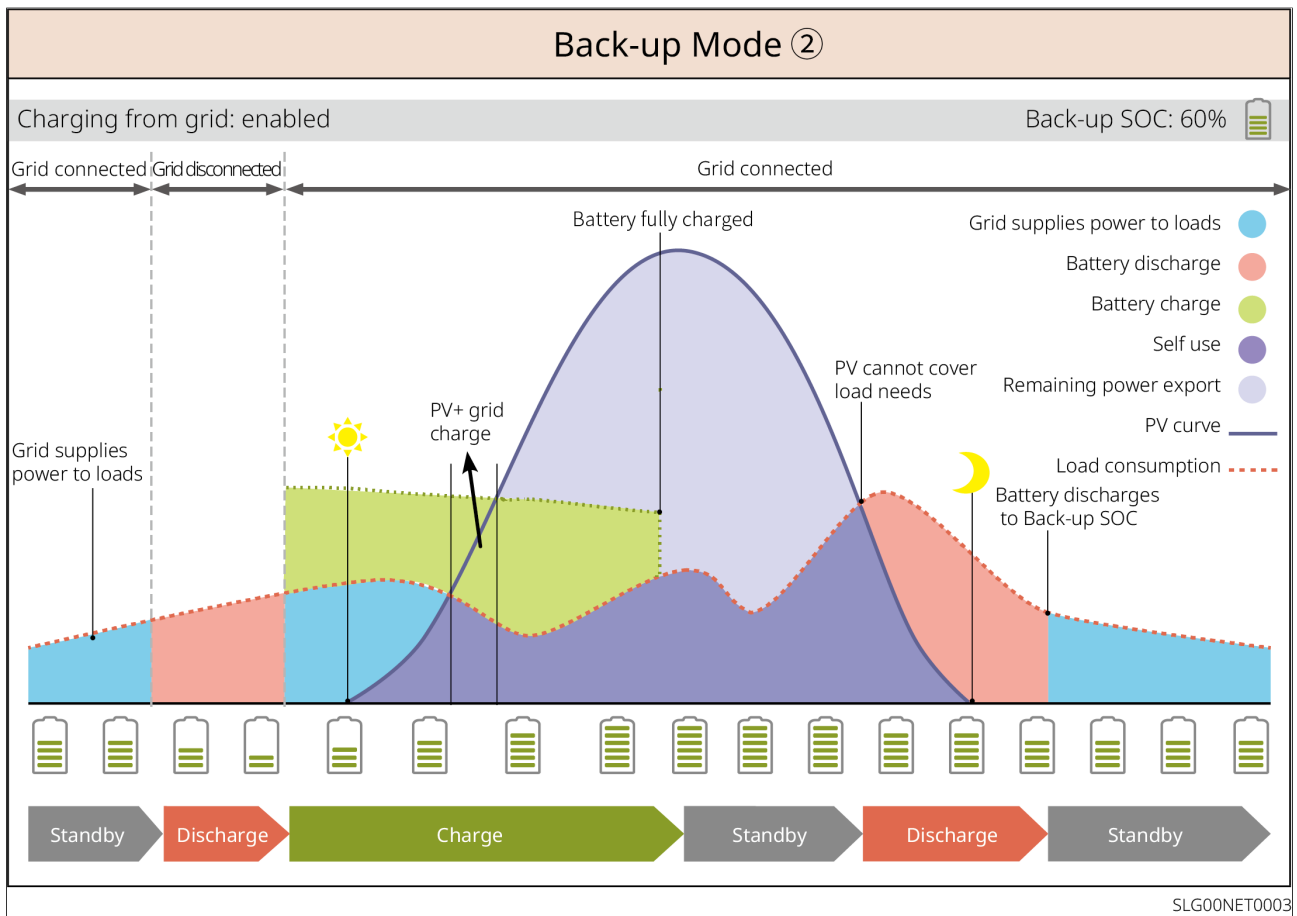


Figure3 Backup Mode 2

TOU Mode

In compliance with local laws and regulations, based on grid peak-valley Tariff differences, set different time periods for purchasing electricity and Export Energy. For example: during valley Tariff periods, set the battery to charging mode to purchase electricity from the grid for charging; during peak Tariff periods, set the battery to discharging mode to supply power to loads via the battery.

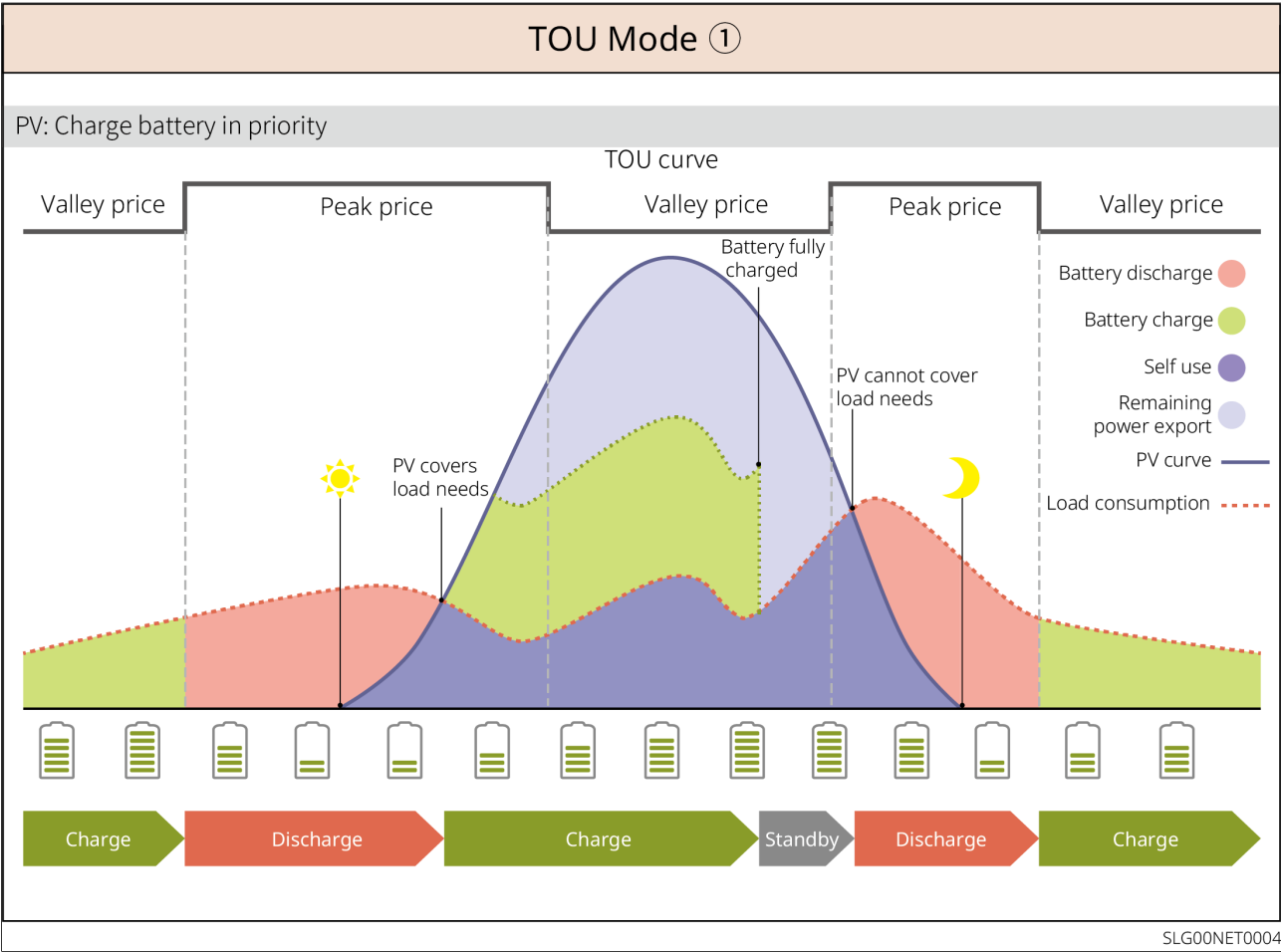


Figure4 TOU Mode 1

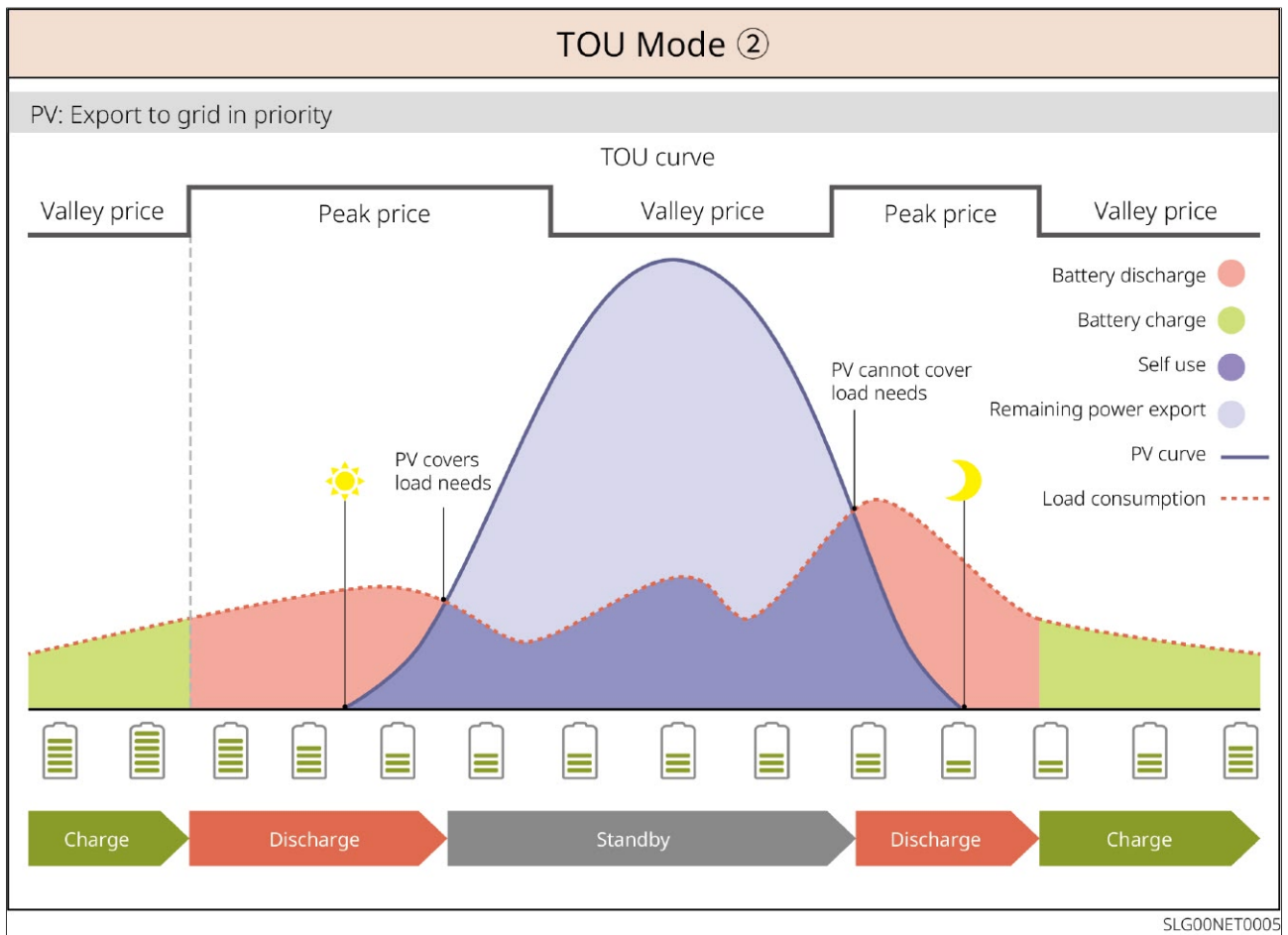


Figure5 TOU Mode 2

Intelligent Charging (Delayed Charging) Mode

- Applicable to areas with grid-tied power output limits.
- Setting a peak power limit allows PV generation exceeding the grid-tied limit to be used to charge the battery; or set a PV charging period, during which PV generation is used to charge the battery.

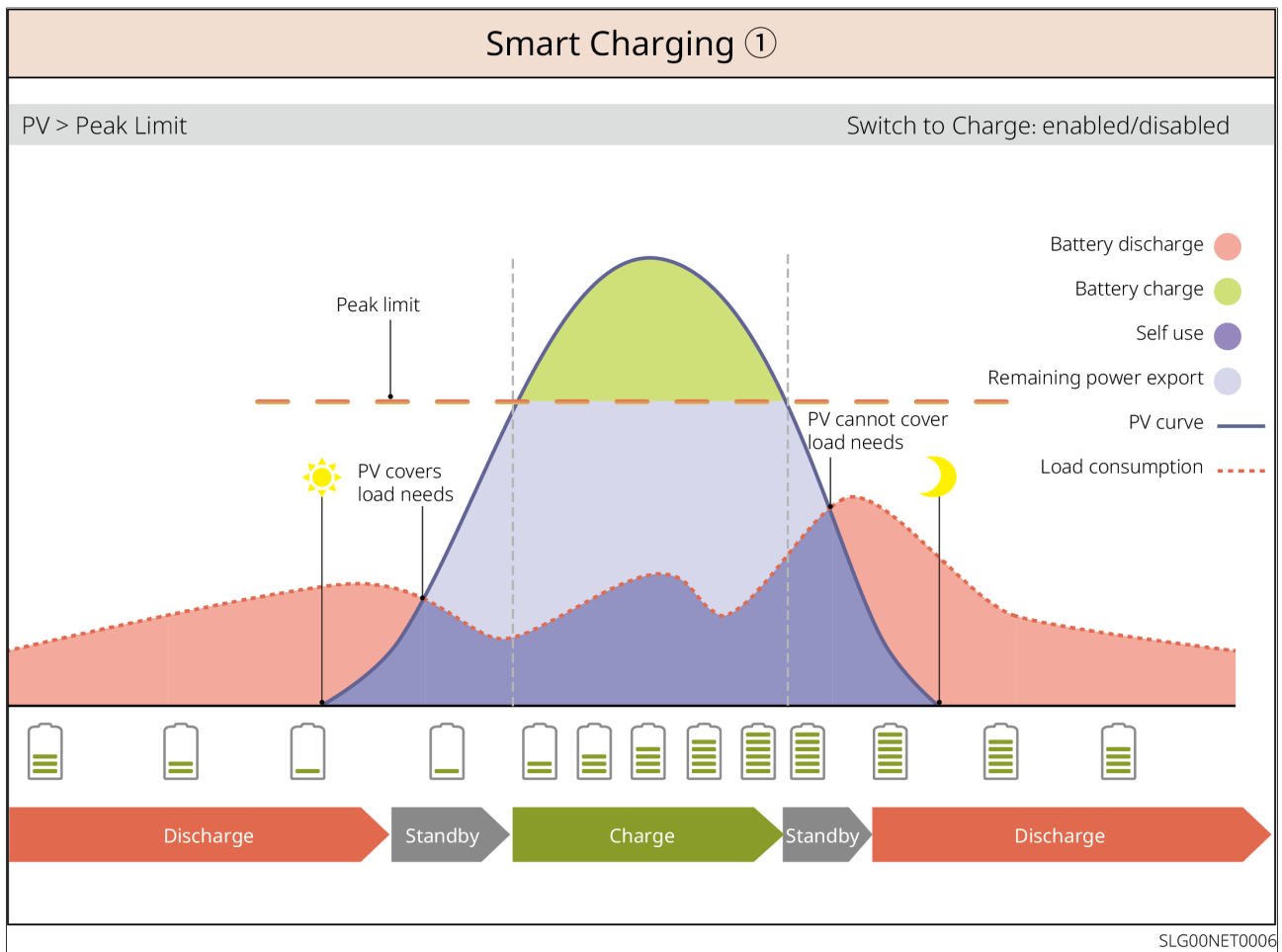


Figure6 Intelligent Charging (Delayed Charging) Mode 1

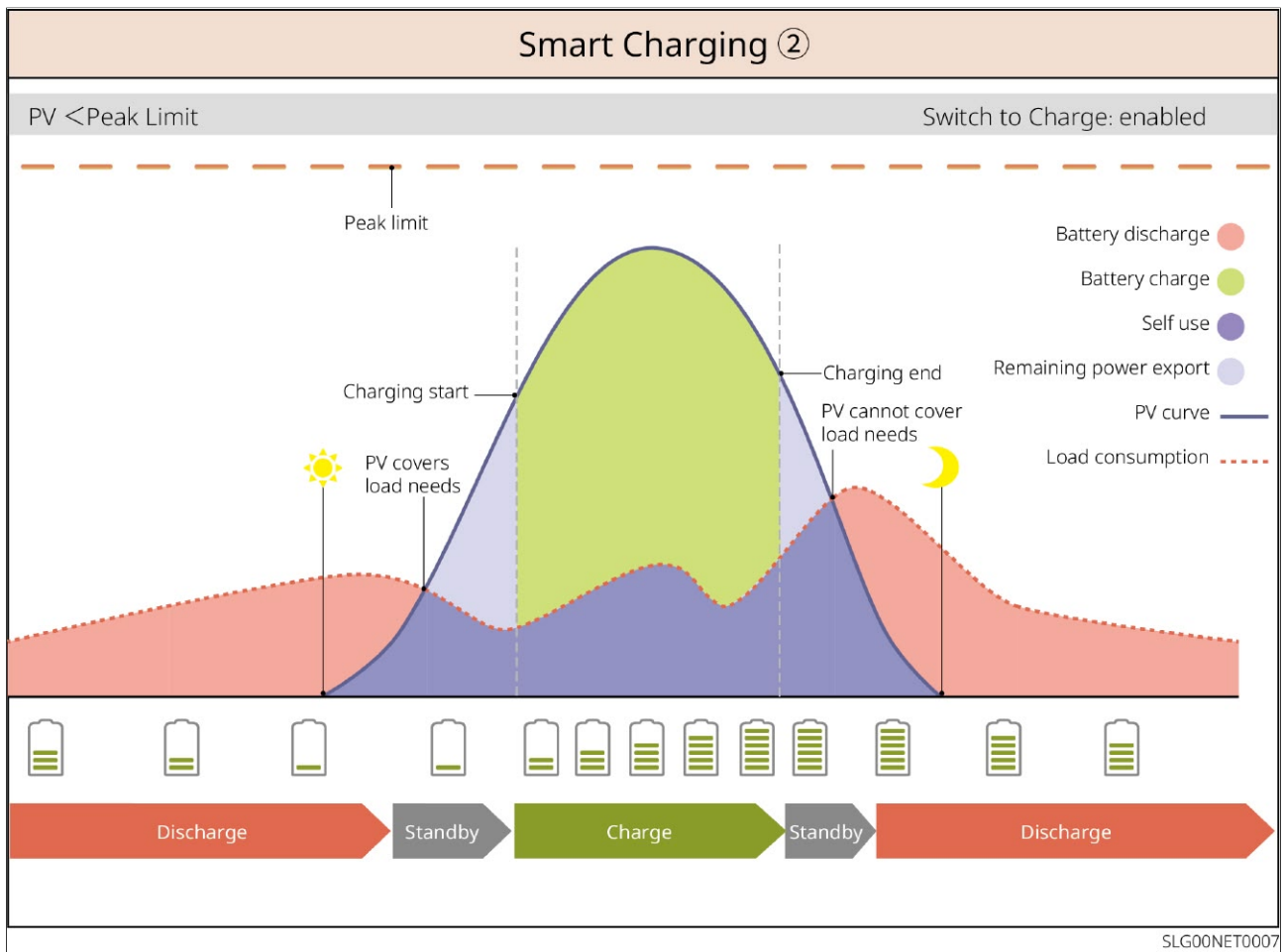


Figure7 Intelligent Charging (Delayed Charging) Mode 2

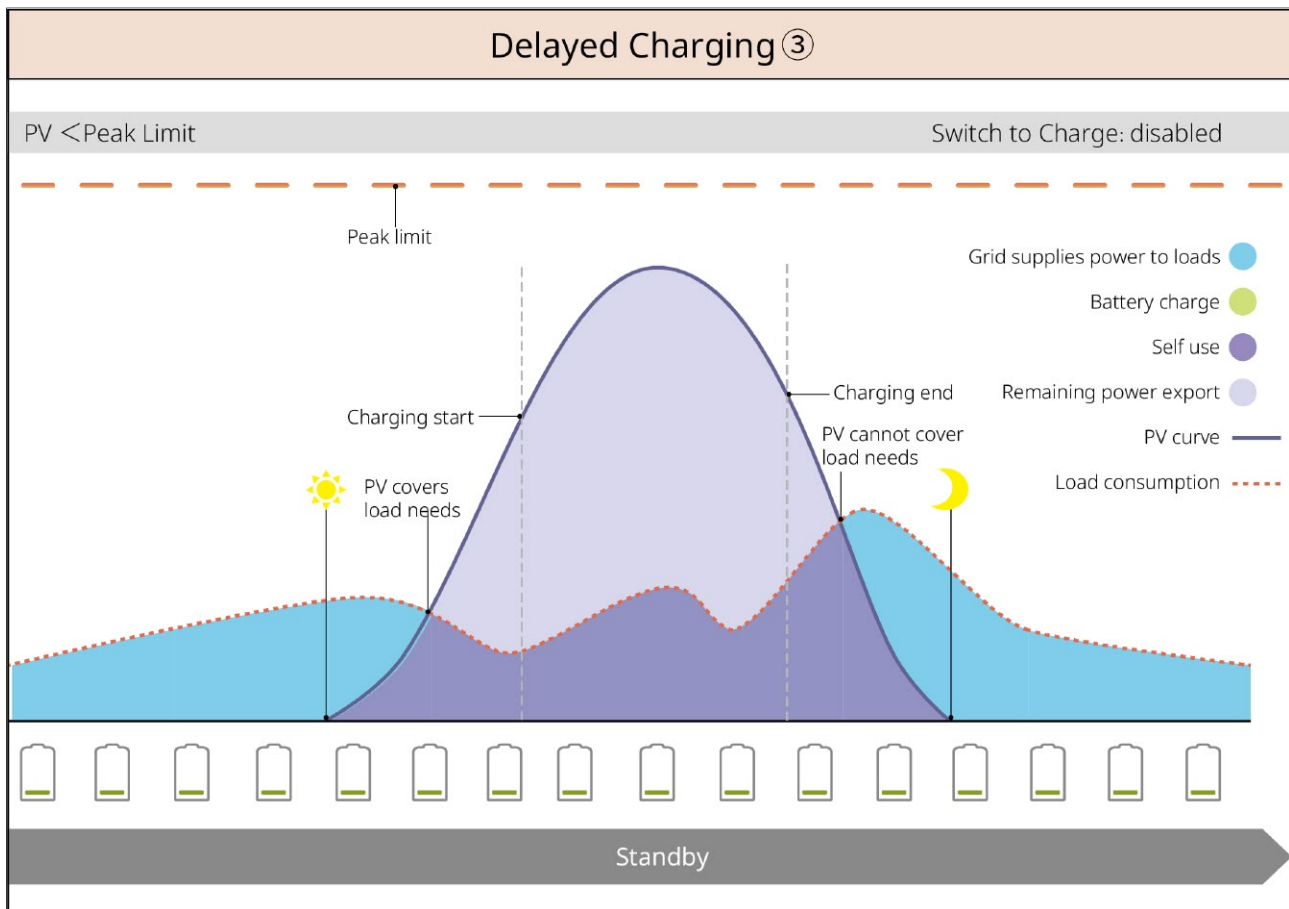


Figure8 Intelligent Charging (Delayed Charging) Mode 3

Demand Control Mode

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

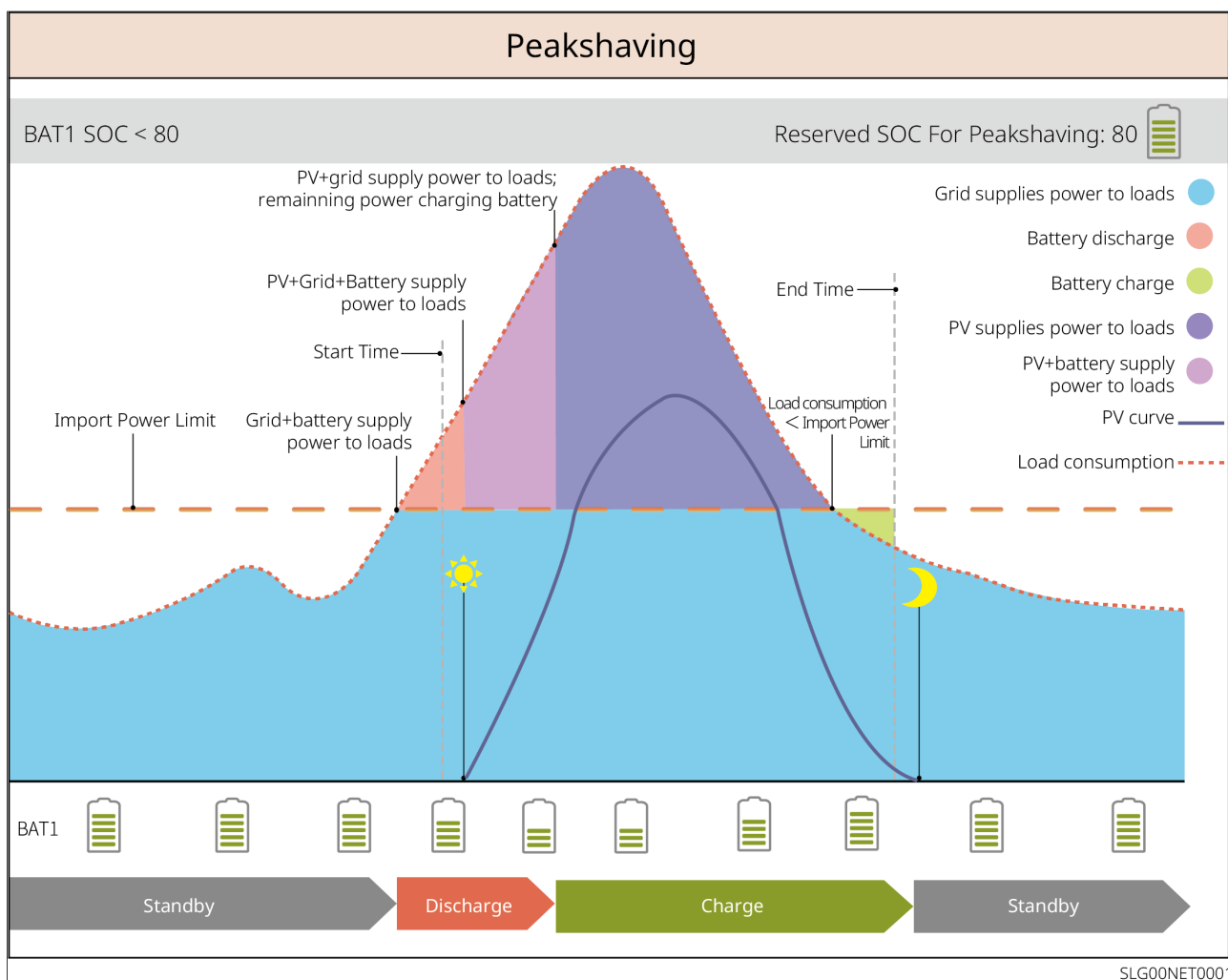


Figure9 Demand Control Mode

Off-Grid Mode

NOTICE

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

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

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

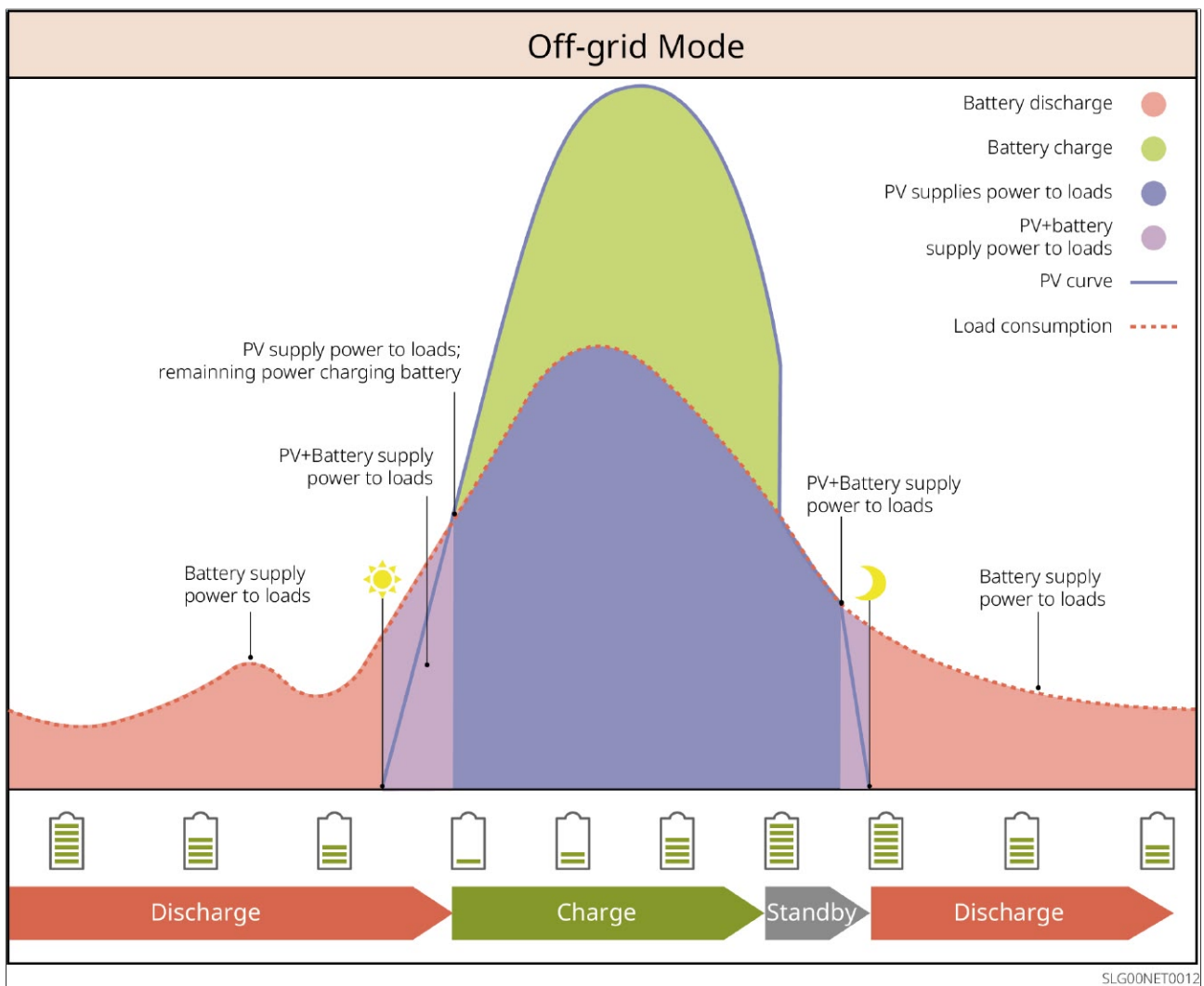


Figure10 Off-Grid Mode

2.5 Features

AFCI

The inverter integrates an AFCI circuit Protection device, used to detect Arc Fault (arc fault) and quickly cut off the circuit when detected, thereby preventing electrical fires.

Causes of arc generation:

- Connector connections in the PV system are damaged.
- Incorrect or damaged cable connections.
- Aging of connectors and cables.

Fault handling methods:

1. When the inverter detects an arc fault, the fault type can be viewed via the inverter display or App.
2. If the inverter triggers fewer than 5 faults within 24 hours, after waiting for 5 minutes, the machine will automatically restore grid-connected Protection. After the 5th Arc Fault, the fault must be cleared before the inverter can operate normally. For specific operations, please refer to the SEMS+ APP User Manual.

Load Control

Inverter dry contact control port, supports connecting an additional contactor to control load on or off. Supports household loads, heat pumps, etc.

Load control methods are as follows:

- Time control: Set the time to control 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 selected as ON, the load will turn on; when the control mode is set to OFF, the load will turn off.
- BACK-UP load control: The inverter has a built-in relay dry contact control port, which can control whether the load is turned off via the relay. In off-grid mode, if an Overload at the BACK-UP terminal is detected or the battery SOC value is lower than the battery off-grid Protection set value, the load connected to the relay port can be turned off.

Two-phase unbalanced output

The inverter grid-connected terminal and BACK-UP terminal both support two-phase unbalanced output, and each phase can be connected to loads of different power.

The maximum output power per phase for different models is shown in the following table:

No.	Model	Maximum single-phase output power
1	GW5K-ES-LD-G10	2.5kW
2	GW7.5K-ES-LD-G10	3.7kW
3	GW10K-ES-LD-G10	5kW

Rapid Shutdown (RSD)

In a Rapid Shutdown system, the Rapid Shutdown transmitter and receiver work

together to achieve system Rapid Shutdown. The receiver maintains module output by receiving the transmitter's signal. The transmitter can be external or built into the inverter. In an emergency, the external trigger device can be enabled to stop the transmitter from working, thereby shutting down the modules.

- 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 Equipment Inspection and Storage

3.1 Equipment Inspection

Before signing for the product, please carefully check the following:

1. Check whether the outer packaging is damaged, such as deformation, holes, cracks, or other signs that may cause damage to the equipment inside the packaging box. If there is damage, do not open the packaging and contact your dealer.
2. When removing the battery, please ensure the packaging carton is intact. If the packaging is accidentally damaged and a return or exchange is required due to product quality issues, please contact GoodWe after-sales or your dealer to obtain a dedicated packaging box.
3. Check whether the equipment model is correct. If it does not match, do not open the packaging and contact your dealer or after-sales service center.
4. Check whether the types and quantities of delivered items are correct and whether the appearance is damaged. If there is damage, contact your dealer or after-sales service center.

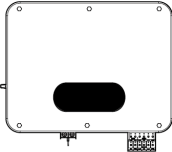
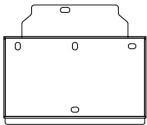
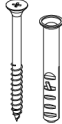
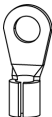
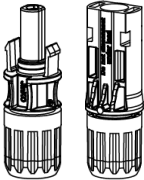
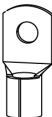
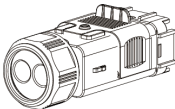
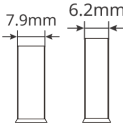
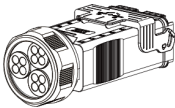
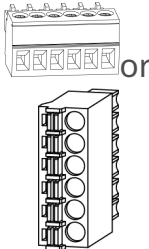
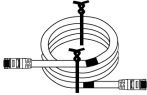
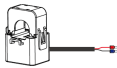
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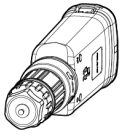
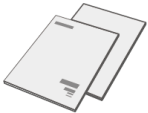
WARNING

Check whether the type and quantity of the package contents are correct and whether there is any damage to the appearance. If there is any damage, contact your dealer.

After the package contents are removed from the packaging, do not place them on rough, uneven, or sharp surfaces to avoid paint peeling.

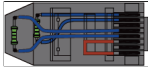
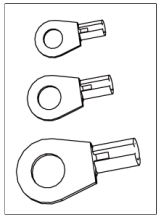
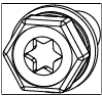
3.2.1 Inverter Delivery Items

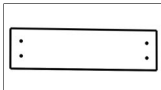
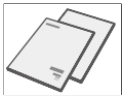
Component	Description	Component	Description
	Inverter x1		Backplate x1
	Expansion bolts x4		Protection ground terminal x 1
	PV DC wiring terminals • GW5K-ES-LD-G10: PV+/PV- x 2 • GW7.5K-ES-LD-G10: PV+/PV- x 3 • GW10K-ES-LD-G10: PV+/PV- x 4		Battery OT terminals x 2
	Battery connector x1		AC tubular terminal x 24 (7.9mm x 15; 6.2mm x 15)
	AC cover x 1		Communication tubular terminal x 18
	6-pin communication terminal x 3		BMS communication cable x 1
	CT x 2		Lead-acid battery temperature sensor cable x 1

Component	Description	Component	Description
	Lead-acid battery temperature sensor cable fixing adhesive sticker x 2		Smart Dongle x1
	Product documentation x 1		PV terminal unlocking tool x 1

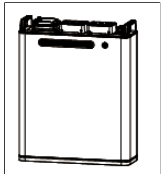
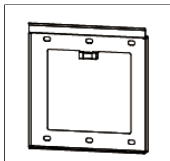
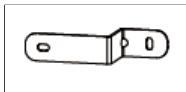
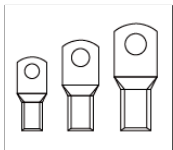
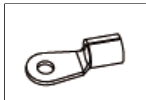
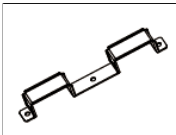
3.2.2 Battery Deliverables

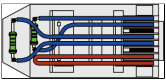
3.2.2.1 LX A5.0-30

Component	Description	Component	Description
	Battery module x 1		Terminating resistor x 1 When connected to a third-party busbar, this terminating resistor must be installed on the battery
	- M5 OT terminal x 2: recommended for connecting 10 mm² cable - M8 OT terminal x 4: recommended for connecting 50 mm² cable - M10 OT terminal x 2: recommended for connecting 70 mm² cable		M5*12 grounding screw x 2

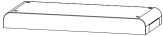
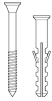
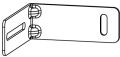
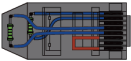
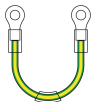
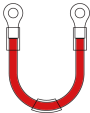
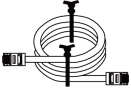
Component	Description	Component	Description
	Hanging bracket x 2 Provided when wall mounting is selected as the Mounting Method		M6*70 expansion bolt x 4 Provided when wall mounting is selected as the Mounting Method
	M5*12 grounding screw x 2 Provided when wall mounting is selected as the Mounting Method		Marking template x 1 Provided when wall mounting is selected as the Mounting Method
	Battery bracket x 2 (optional) Provided when stacking is selected as the Mounting Method		M4*8 screw x 8 Provided when stacking is selected as the Mounting Method
	Product documentation x 1		Negative power cable (optional) x 1
	Positive power cable (optional) x 1		Grounding cable (optional) x 1
	Communication cable (optional) x 1		Decorative cover (optional) x 1

3.2.2.2 Battery Package Contents (LX U5.0-30)

Component	Description	Component	Description
	Battery x 1		Plastic top cover x 1
	Wall-mount bracket x 1		Expansion screw x 2
	Anti-tipping bracket x 2		• 35-8 OT terminal x 4: Recommended for connecting 25 mm² or 35 mm² cables • 50-8 OT terminal x 4: Recommended for connecting 50 mm² cables • 70-10 OT terminal x 2: Recommended for connecting 70 mm² cables
	14-5 grounding terminal x 2		M5 combination bolt x 7
	M10 expansion bolt x 6		Wire harness fixing plate x 1

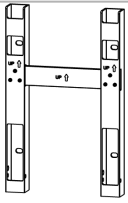
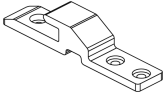
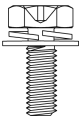
Component	Description	Component	Description
	Terminating resistor x 1		Product documentation x 1

3.2.2.3 Battery Delivery Items (GW14.3-BAT-LV-G10)

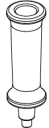
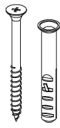
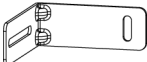
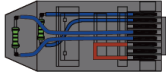
Component	Description	Component	Description
	Battery x 1		Wire Cover x 1
	Lifting Bar x 2 (Shipped with the box after October 2025)		Expansion Bolt x 2
	M5*16 Cross Recessed Hex Head Screw x 7		Wall-Lock Anti-Tip Bracket x 2
	Terminating resistor x 1		Grounding OT Terminal x 1 (Shipped with the box before October 2025)
	DC OT terminal x 6 (Shipped with the box before October 2025)		Grounding cable x 1 (Shipped with the box after October 2025)
	Positive power cable x 1 (Shipped with the box after October 2025)		Negative power cable x 1 (Shipped with the box after October 2025)
	Communication cable x 1		Product documentation x 1

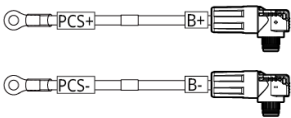
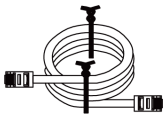
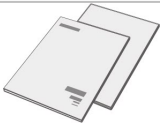
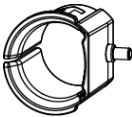
Optional accessories

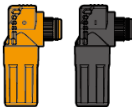
Component	Description	Component	Description
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	Wall-mounting bracket x 1		Hook x 4
	M5*16 cross recessed hex head screw x 12		M10 expansion bolt x 4

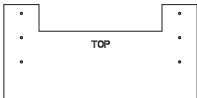
3.2.2.4 Battery Delivery Items (GW16.1-BAT-LV-G10)

Component	Description	Component	Description
	Battery x 1		Decorative cover x 1
	Lifting Bar x 2		Expansion Bolt x 2
	M5*12 hex socket screws x 7		Wall-Lock Anti-Tip Bracket x 2
	Terminating resistor x 1		Grounding cable x 1

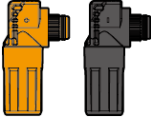
Component	Description	Component	Description
	Positive power cable x 1 Negative power cable x 1 • 1 m cable: standard for some models • 2m cable: ◦ Overseas: standard for some models ◦ Domestic: none		Decorative cover rubber plugs x 4
	Communication cable x 1		Product documentation x 1
	Quick-connect terminal unlocking tool x 1		(Optional) Dry contact connector x 1
	(Optional) Tubular terminals x 4		SC50-8 OT terminal • Domestic: Partially standard x 2 • Overseas: x 0

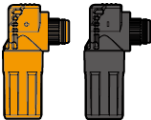
Component	Description	Component	Description
	Battery positive quick connector Battery negative quick connector - Domestic: Partially standard x 2 - Overseas: x 0		

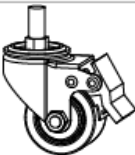
Optional accessories

Component	Description	Component	Description
	Wall-mount bracket x 2		Positioning cardboard x 1
	M10 expansion bolt x 6		M10*60 bolt x 2

Component	Description	Component	Description
 	Positive power cable for parallel connection between battery clusters x 1 Negative power cable for parallel connection between battery clusters x 1		

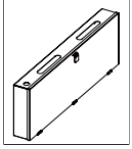
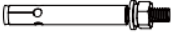
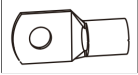
Component	Description	Component	Description
	Battery positive quick connector x 1 Battery negative quick connector x 1		SC50-8 OT terminal x 5
	Positive power cable x 1 Negative power cable x 1		

Component	Description	Component	Description
	Battery positive quick connector x 1 Battery negative quick connector x 1		SC50-8 OT terminal x 2

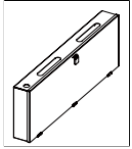
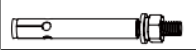
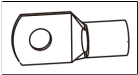
Component	Description	Component	Description
	Battery roller x 4		

3.2.3 Combiner Box Deliverables

3.2.3.1 BCB-22-WW-0

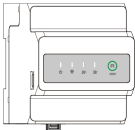
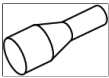
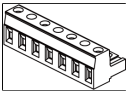
Component	Description	Component	Description
	BCB-22-WW-0 combiner box x 1		M6 expansion bolts x 4
	(25-8) OT terminals x 36 (70-10) OT terminals x 6	-	-

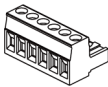
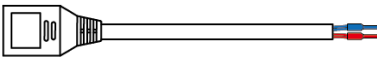
3.2.3.2 BCB-32-WW-0, BCB-33-WW-0 (Optional)

Component	Description	Component	Description
	BCB-32-WW-0, BCB-33-WW-0 combiner box x 1		M6 expansion bolts x 4
	(50-8) OT terminals x 30 (70-10) OT terminals x 6	-	-

3.2.4 Smart Meter Deliverables

3.2.4.1 GM330

Component	Description	Component	Description
	Smart meter x 1		2PIN communication terminal x 1
	Tubular terminal x 6		7PIN communication terminal x 1

Component	Description	Component	Description
	6PIN communication terminal x 1		RS485 communication terminal x 1
	Screwdriver x 1		Product documentation x 1
	2PIN terminal to RJ45 terminal adapter cable x 1	-	-

3.3 Device Storage

If the device is not to be put into use immediately, store it according to the following requirements. After long-term storage, the device can be used again only after inspection and confirmation by professional personnel.

1. If the inverter has been stored for more than two years, or has not been operated for more than 6 months after installation, it is recommended to put it into use only after inspection and testing by professional personnel.
2. To ensure good electrical performance of the internal electronic components of the inverter, it is recommended to power it on once every 6 months during storage. If it has not been powered on for more than 6 months, it is recommended to have it inspected and tested by professional personnel before putting it into use.
3. To ensure battery performance and service life, it is recommended to avoid long-term idle storage. Long-term storage may cause deep discharge of the battery, resulting in irreversible chemical loss, capacity degradation, or even complete failure. It is recommended to use it promptly. If the battery needs to be stored for a long time, maintain it according to the following requirements:

Battery Model	Battery Storage Initial SOC Range	Recommended Storage Temperature	Charge/Discharge Maintenance Cycle ^[1]	Battery Maintenance Method ^[2]
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LX A5.0-30	30%~40%	0~35℃	-20~45℃, ≤6 months	For maintenance methods, please consult your dealer or after-sales service center.
LX U5.0-30	30%~40%	0~35℃	-20~35℃, ≤12 months 35~45℃, ≤6 months	
GW14.3-BAT-LV-G10	30%~40%	0~35℃	-20~35℃, ≤12 months 35~45℃, ≤6 months	
GW16.1-BAT-LV-G10				

NOTICE

[1] The storage time is calculated from the SN date on the battery outer packaging. After exceeding the storage period, charge/discharge maintenance is required. (Battery maintenance time = SN date + charge/discharge maintenance cycle). For how to view the SN date, refer to: [11.3.SN Code Meaning\(Page 297\)](#).

[2] After passing the charge/discharge maintenance, if the outer packaging 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 maintaining records.

Packaging Requirements:

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

Environmental Requirements:

1. Ensure the device is stored in a cool place and avoid direct sunlight.
2. Ensure that the storage environment is clean, with appropriate temperature and humidity ranges and no condensation. If there is condensation at the device ports, do not install the device.
3. Ensure that the device is kept away from flammable, explosive, corrosive, and other items during storage.

Stacking Requirements:

1. Ensure that the stacking height and orientation of the inverter are arranged according to the instructions on the packaging box label.

2. Ensure that there is no risk of tipping after stacking the inverters.

4 Installation



When performing equipment installation and electrical connections, please use the supplied items shipped with the device; otherwise, any resulting equipment damage is not covered by the warranty.

4.1 System Installation and Commissioning Process

Steps	1 Installation	2 PE	3 PV	4 Battery	5 AC	6 COM	7 Communication module	
Inverter								
Tools	 D: 80mm Φ: 8mm	 M5 1.5-2N·m		 M8 5.5-6.6N·m 52mm 6-7N·m	 M8 4-6N·m 98mm 5-6N·m M4 0.3-0.5N·m	 M4 1.5N·m 40mm 5-6N·m		
Steps	1 Installation					2 PE	3 Battery	4 COM
Battery								
Tools	 M4 1.4N·m M6 6N·m M5 4N·m M4 1.4N·m M5 4N·m ST5.5*70 10N·m					 M5 4N·m M5 4N·m M8 12N·m		
Steps	1 Installation				2 PE	3 Battery	4 COM	
Battery								
Tools	 D: 80mm Φ: 10mm D: 65mm Φ: 12mm ST5.5 4N·m M5 4N·m M10 15N·m M10 20N·m ST5.5 4N·m M5 4N·m M10 15N·m M5 4N·m				 M5 4N·m M5 4N·m	 M10 15N·m		
Steps	1 Installation	2 Cable Connections	3 Power	4 Commissioning				
Smart meter								

4.2 Installation Requirements

4.2.1 Installation Environment Requirements

NOTICE

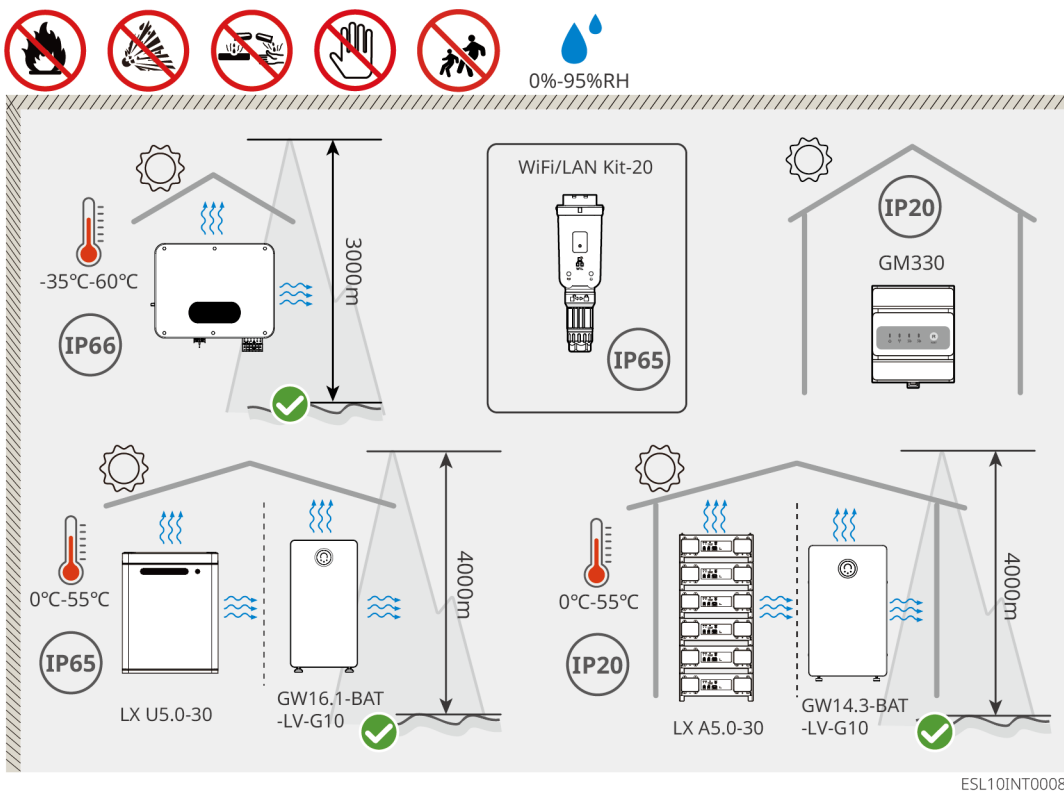
If installed in an environment below 0°C, the battery will be unable to continue charging to recover energy after being fully discharged, resulting in Battery Undervoltage.

- LX A5.0-30, LX U5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10: Charging temperature range: $0 < T \leq 55^{\circ}\text{C}$; Discharging temperature range: $-20 < T \leq 55^{\circ}\text{C}$
- For batteries with the optional heating film:
 - LX U5.0-30: Charging temperature range: $-20 < T \leq 55^{\circ}\text{C}$; Discharging temperature range: $-20 < T \leq 55^{\circ}\text{C}$

1. The equipment must not be installed in flammable, explosive, corrosive, or similar environments.
2. The ambient temperature and humidity of the equipment installation environment must be within the appropriate range.
3. The installation position must be out of reach of children and avoid locations that are easily touched.
4. When the inverter is running, the enclosure temperature may exceed 60°C. Do not touch the enclosure before it cools down to prevent burns.
5. The equipment must avoid installation environments such as direct sunlight, rain, and snow accumulation. It is recommended to install it in a sheltered location. If necessary, a sunshade can be built.
6. The installation space must meet the equipment's ventilation and heat dissipation requirements as well as operation space requirements.
7. The installation environment must meet the equipment's Ingress Protection Rating. The inverter, battery, and Smart Communication Dongle are suitable for indoor and outdoor installation; the meter is suitable for indoor installation.
8. The equipment installation height must facilitate operation and maintenance, ensuring that equipment indicators, all labels, and wiring terminals are easy to view and operate.
9. The equipment installation altitude must be lower than the Max. Operating Altitude.
10. Before installing the equipment outdoors in salt-affected areas, consult the equipment manufacturer. Salt-affected areas mainly refer to areas within 500 m of

the coast. The affected area is related to sea breeze, precipitation, terrain, etc.

11. Keep away from strong magnetic field environments to avoid electromagnetic interference. If there is a radio station or wireless communication equipment operating below 30 MHz near the installation location, install the equipment according to the following requirements:
 - a. Inverter: Add a multi-turn ferrite core at the inverter's DC input line or AC output line, or add a low-pass EMI filter; or ensure the distance between the inverter and wireless electromagnetic interference equipment exceeds 30 m.
 - b. Other equipment: The distance between the equipment and wireless electromagnetic interference equipment must exceed 30 m.
12. The DC cables and communication cables between the battery and inverter must be less than 3 m in length. Ensure that the installation distance between the inverter and battery meets the cable length requirements.



4.2.2 Installation Space Requirements

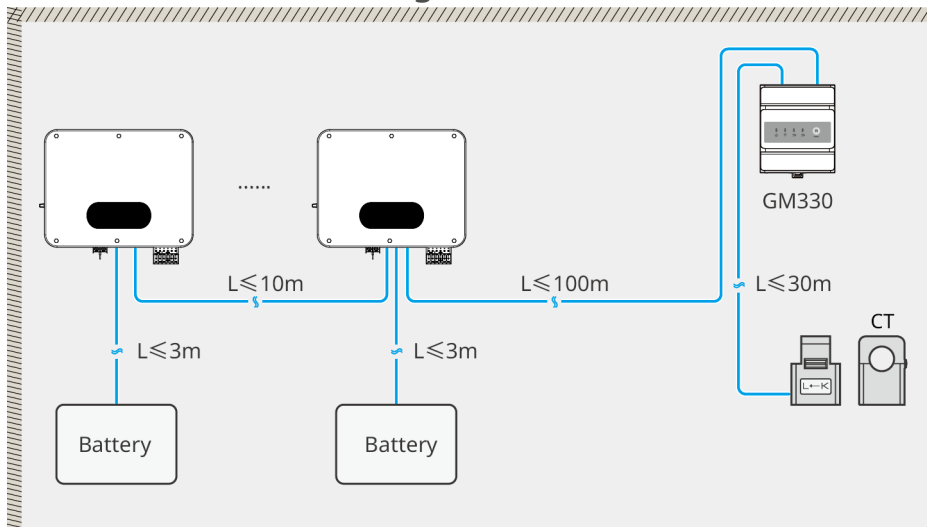
When installing equipment in the system, reserve a certain amount of space around the equipment to ensure sufficient installation and heat dissipation space.

- When using CAT7E communication cables between inverters, the cable length must

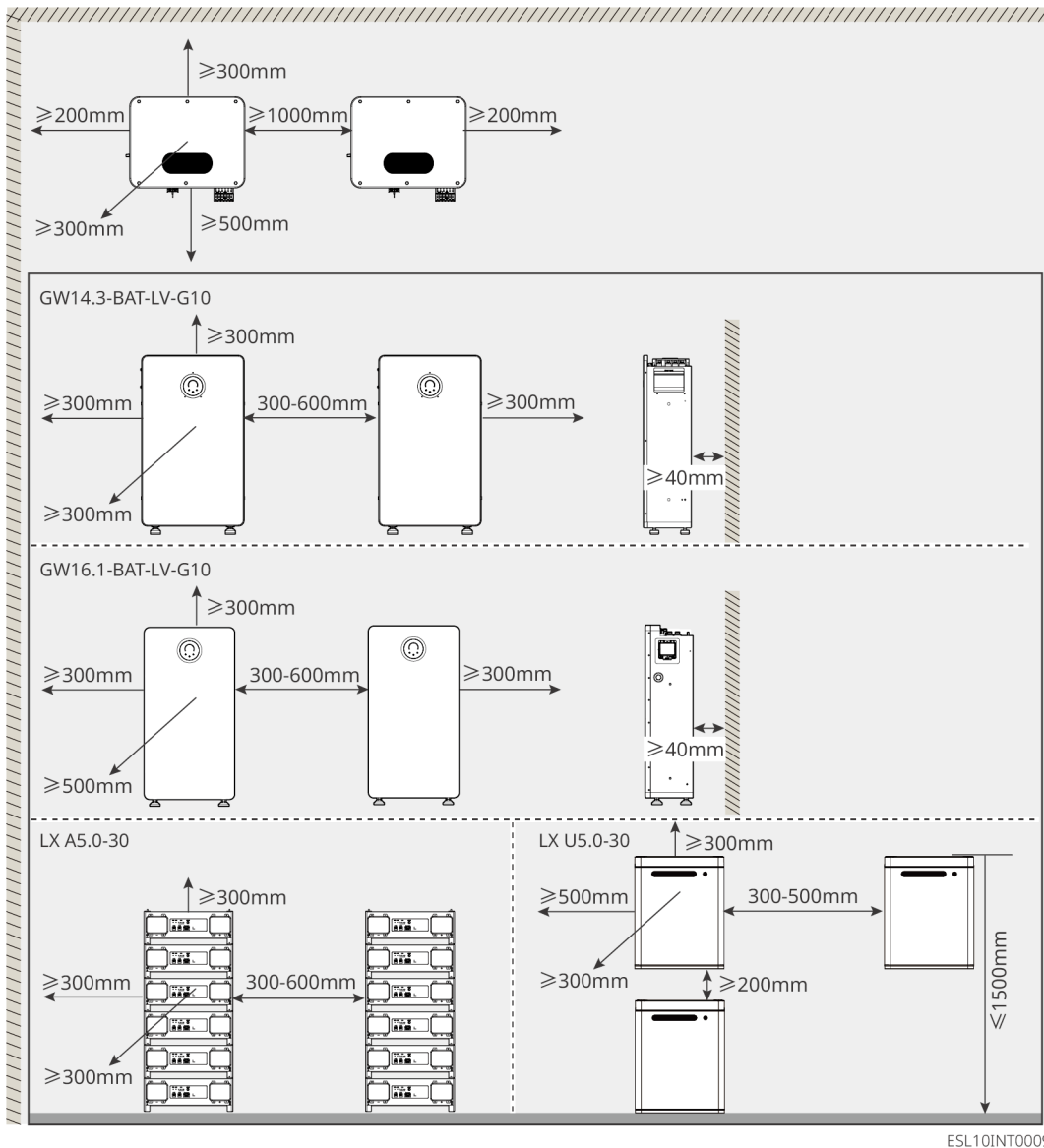
not exceed 10 meters; when using CAT5E or CAT6E communication cables, the cable length must not exceed 5 meters. Do not exceed 10 m for communication cables; otherwise, communication abnormalities may occur.

- For CT installation, use CAT5E or higher shielded Ethernet cable, and the cable length must not exceed 30 meters.
- RS485 twisted-pair shielded cable for communication between the inverter and the meter, with cable length not exceeding 100 meters.

Communication cable length



Installation Space

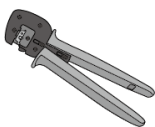
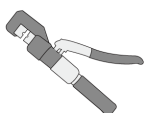
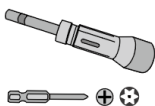
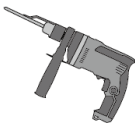
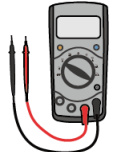
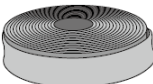


4.2.3 Tool Requirements

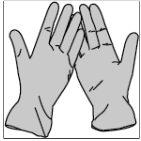
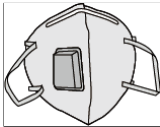
NOTICE

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

Installation Tools

Tool Type	Description	Tool Type	Description
	Diagonal pliers		RJ45 crimping tool
	Wire stripper		Spirit level
	Open-end wrench		PV terminal crimping tool A-2546B
	AC terminal crimping tool YQK-70		Torque wrench M2、M4、M5、M8
	Impact drill (Φ8 mm drill bit)		Cable ties
	Rubber mallet		Socket wrench set
	Marker pen		Multimeter Measuring range ≤600 V
	Heat-shrink tubing		Heat gun
	Vacuum cleaner		

Personal protective equipment

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

4.3 Equipment Handling

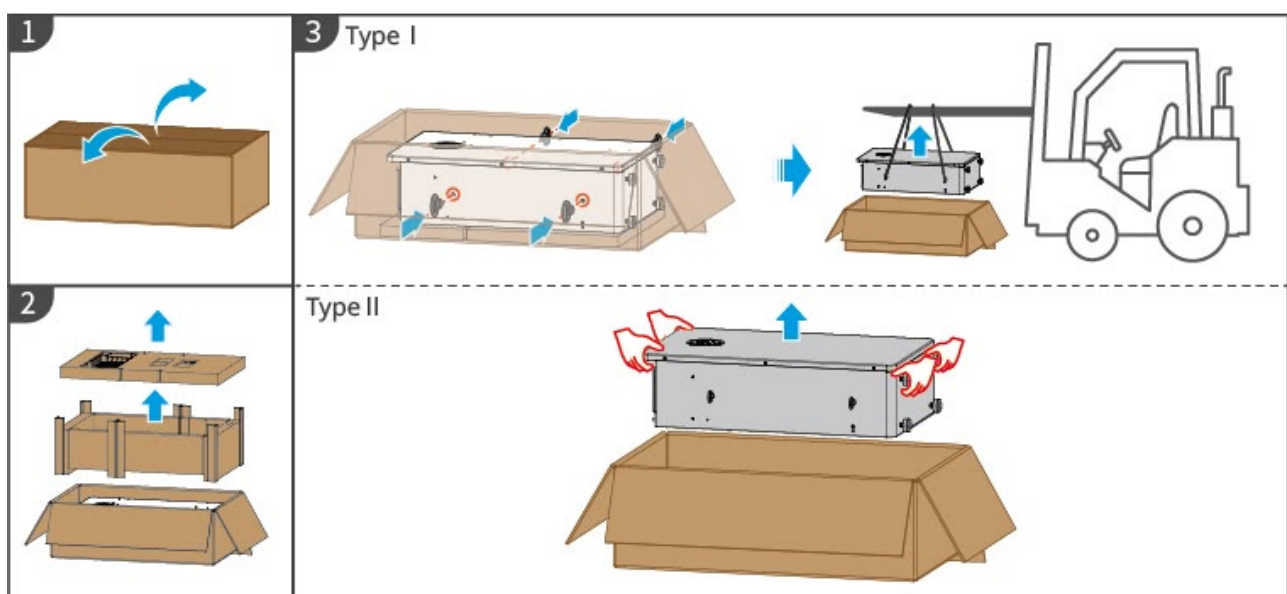
 CAUTION

1. During transportation, transfer, installation, and other operations, the laws, regulations, and relevant standards of the country/region must be complied with.
2. Before installation, the equipment must be moved to the installation site. During handling, to avoid personal injury or equipment damage, please pay attention to the following:
3. Please allocate corresponding personnel according to the equipment Weight to prevent the equipment from exceeding the Weight range that can be carried by a person, causing crushing injuries to personnel.
4. Please wear safety gloves to avoid injury.
5. Please ensure that the equipment remains balanced during handling to avoid falling.
6. The battery system can be removed from the packaging box by crane or hoisting and transported to the installation site.
 - Crane requirements (GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10, GW10.0-BAT-LV-G10): load-bearing capacity ≥ 180 kg
7. When moving the equipment by hoisting, use flexible slings or straps.

Requirements for the lifting rings and lifting ropes of GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10, and GW10.0-BAT-LV-G10:

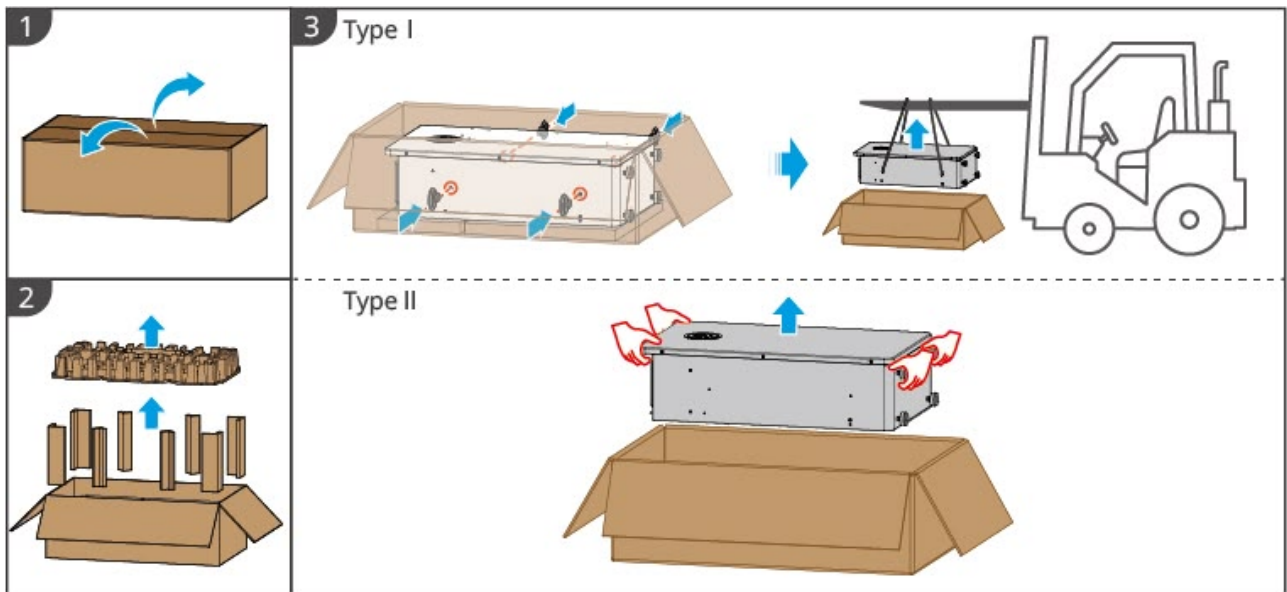
 - Lifting rings: 4 M10 lifting rings, lifting ring load-bearing capacity ≥ 260 kg
 - Lifting rope: 1 piece, rope length ≥ 2.5 m, lifting rope load-bearing capacity ≥ 600 kg

GW14.3-BAT-LV-G10:



LXA10INT0010

GW16.1-BAT-LV-G10:



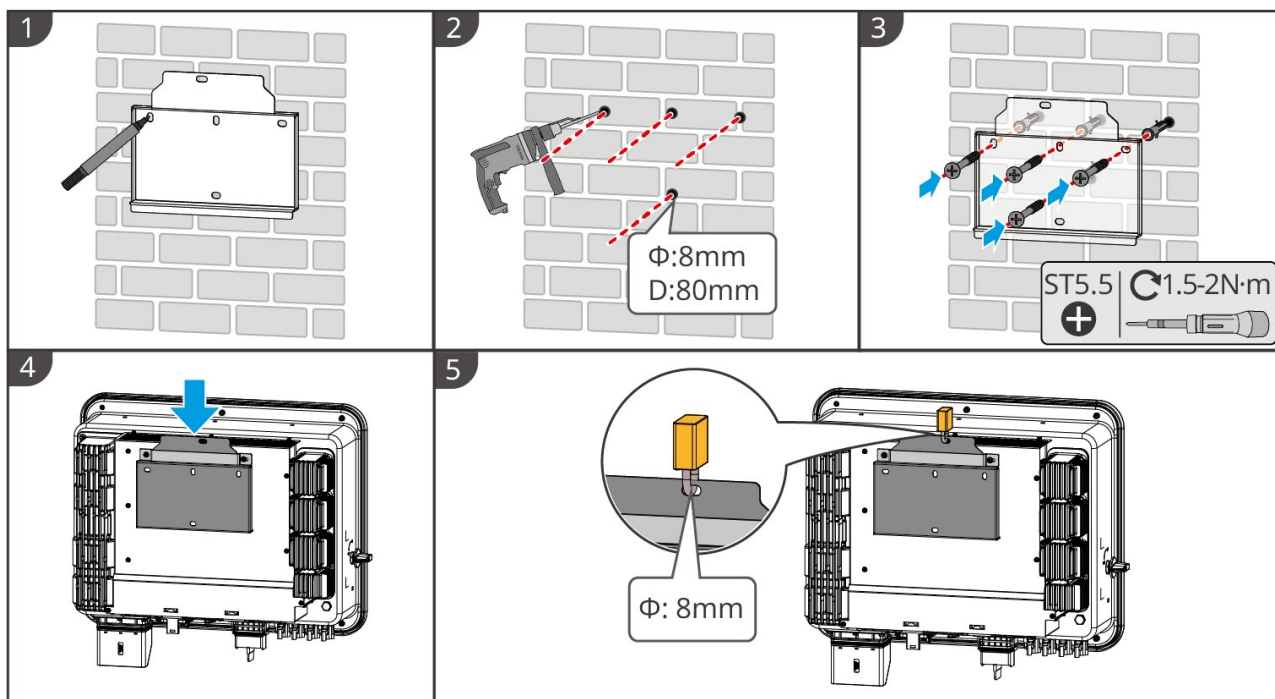
LXA40INT0005

4.4 Installing the Inverter

⚠ CAUTION

- When drilling, ensure that the drilling positions avoid water pipes, cables, etc. inside the wall to prevent danger.
- When drilling, wear safety goggles and a dust mask to prevent dust from being inhaled into the respiratory tract or entering the eyes.
- Ensure that the inverter is installed securely to prevent it from falling and injuring personnel.

1. Place the back mounting plate horizontally on the wall, and use a marking pen to mark the drilling positions.
2. Use an impact drill to drill holes.
3. Use expansion screws to secure the inverter back mounting plate bracket to the wall.
4. Hang the inverter on the backplate. After hanging, use screws to secure the backplate and the inverter to ensure that the inverter is installed securely.



ESL10INT0002

4.5 Installing the Battery

⚠ WARNING

- When installing the battery system, ensure that it is installed horizontally and securely. When using an anti-tipping bracket, the anti-tipping bracket must be vertical and closely attached to the wall and the battery system surface.
- When using an impact drill to drill holes, use cardboard or other covering materials to shield the battery system to prevent foreign objects from entering the equipment and causing equipment damage.
- After marking the drilling positions with a marker pen, move the battery system away to prevent equipment damage caused by the impact drill being too close to the battery system when drilling.

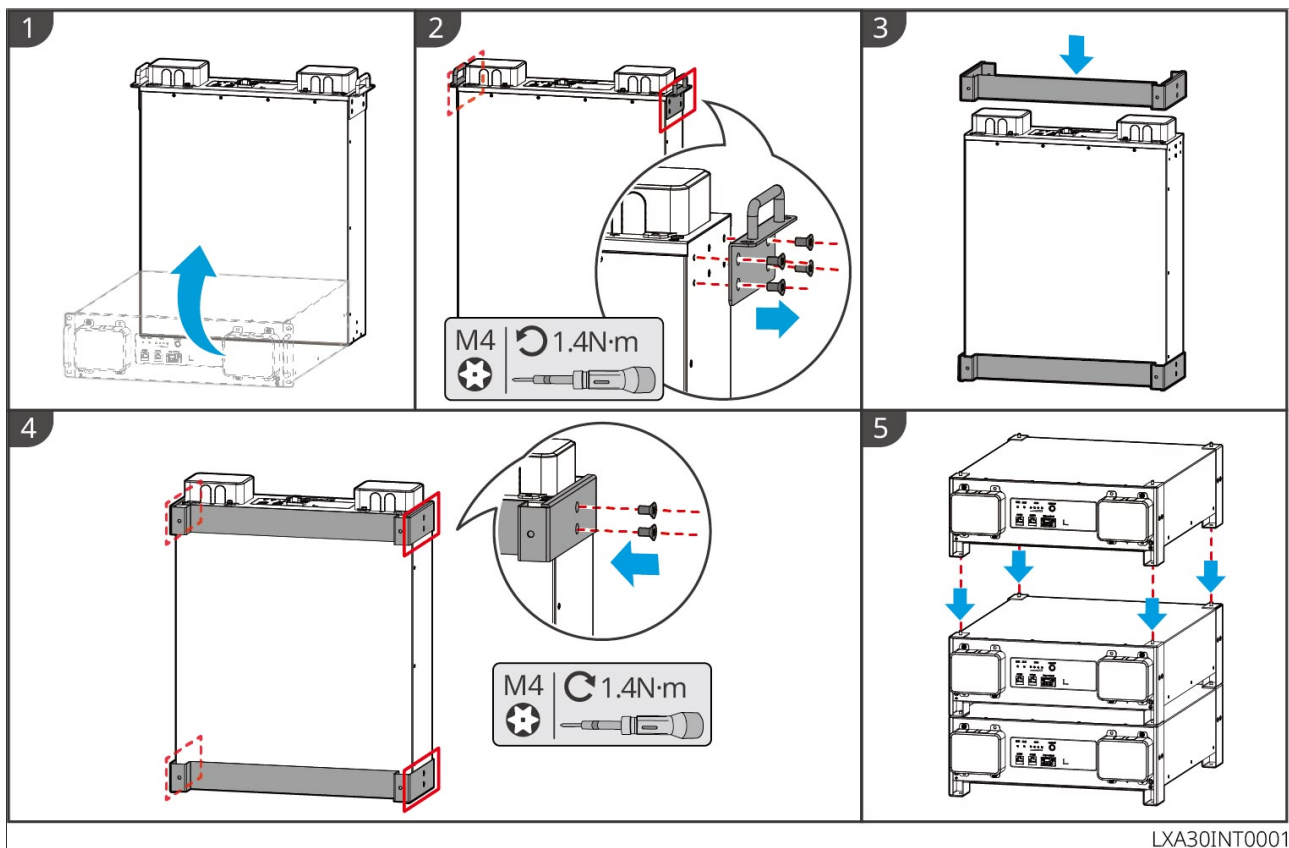
4.5.1 LX A5.0-30

LX A5.0-30: Floor stacking

NOTICE

Floor stacking supports up to 6 batteries.

1. Place the battery vertically and remove the battery handles.
2. Install the bracket on the battery and secure it with screws.
3. Place the battery flat and stack multiple batteries for installation. Ensure that the positioning pins are inserted into the positioning holes.

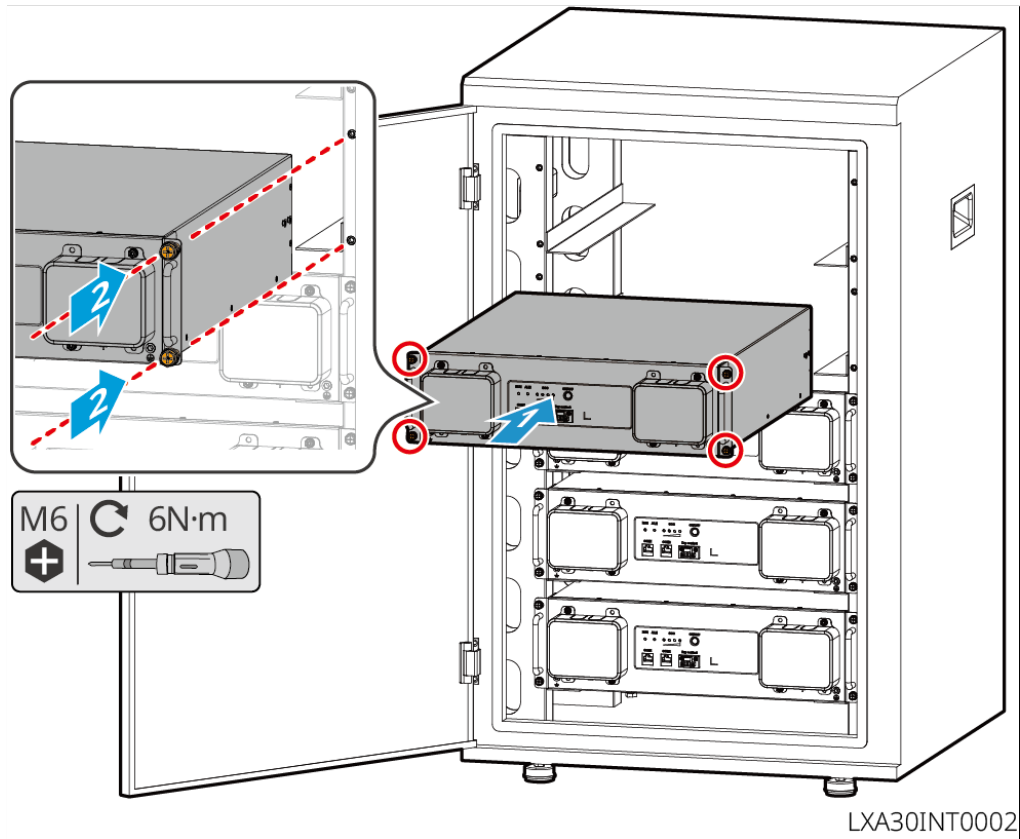


LX A5.0-30: Cabinet installation

NOTICE

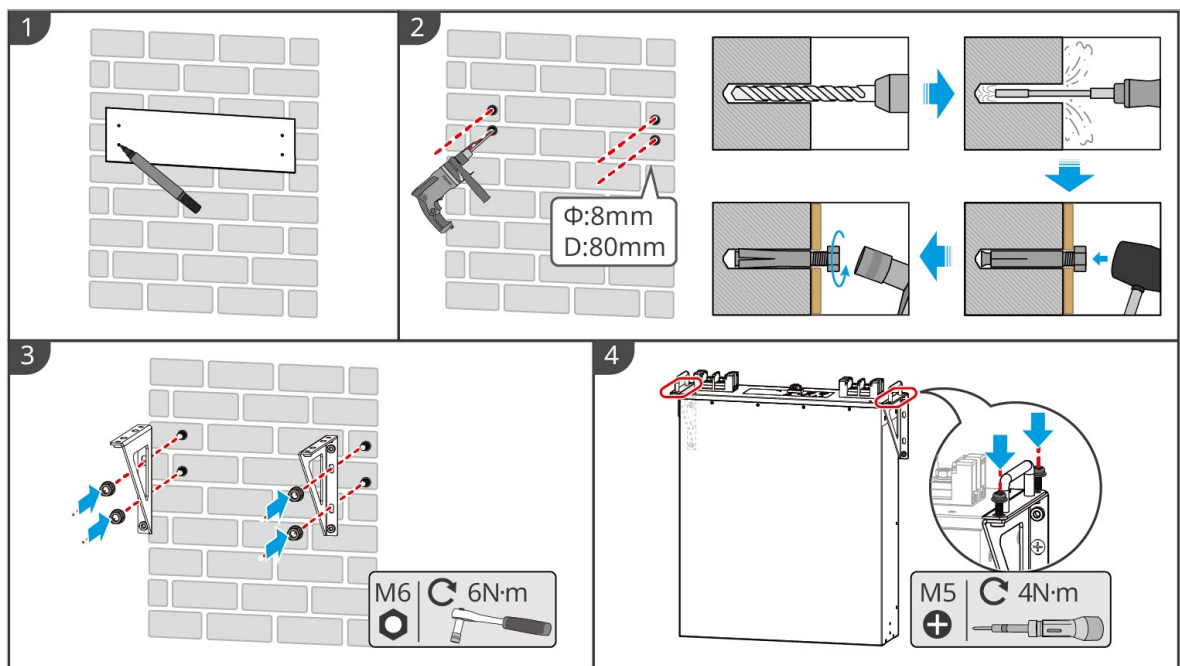
- Recommended for installation in a 19-inch standard cabinet: L × W: 600 × 800 mm or above; H: select according to battery thickness (133 mm) or above.
- Cabinet installation requires attaching electrical labels and warning labels to the front panel of any battery (these labels are shipped separately as accessories).

1. Place the battery on the guide rails in the cabinet, and secure the battery to the cabinet with screws from the handle positions.



LX A5.0-30: Wall-mounted installation

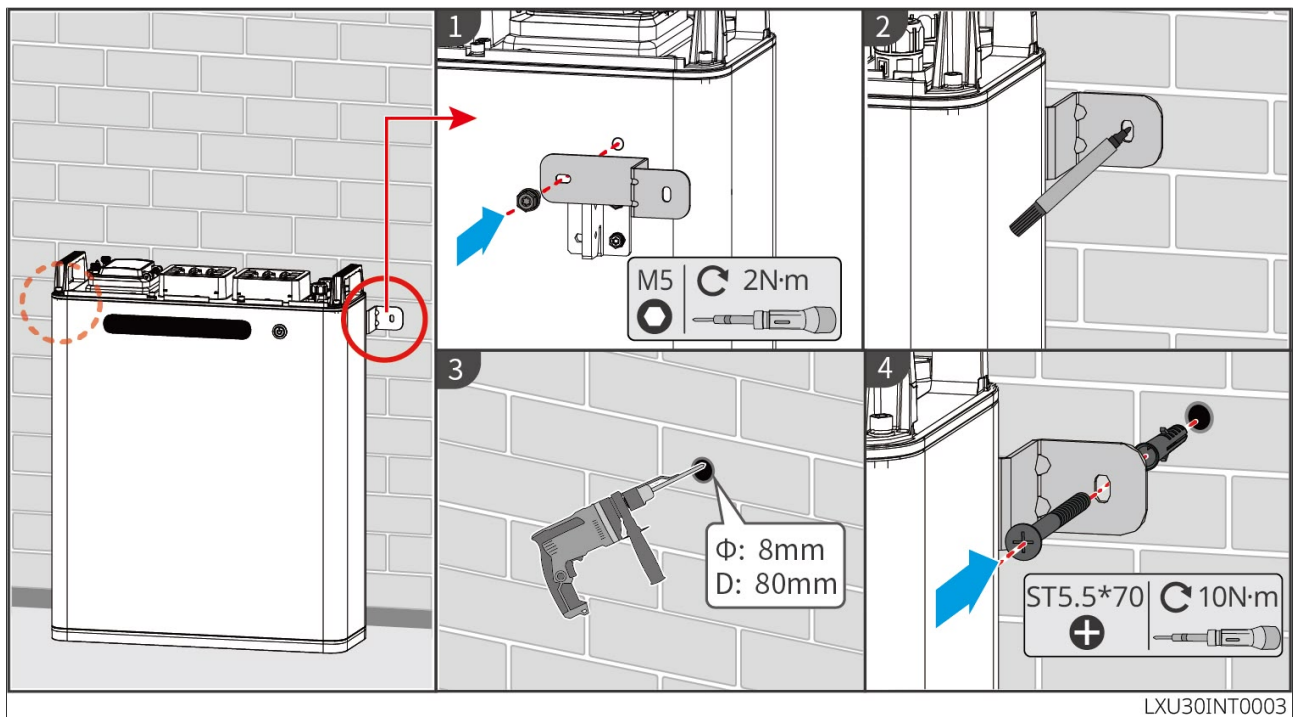
1. Determine the drilling positions according to the marking template, and mark the drilling positions with a marker.
2. Drill holes with an impact drill.
3. Install the battery wall bracket.
4. Install the battery on the bracket and secure the battery to the bracket with screws.



LXA30INT0003

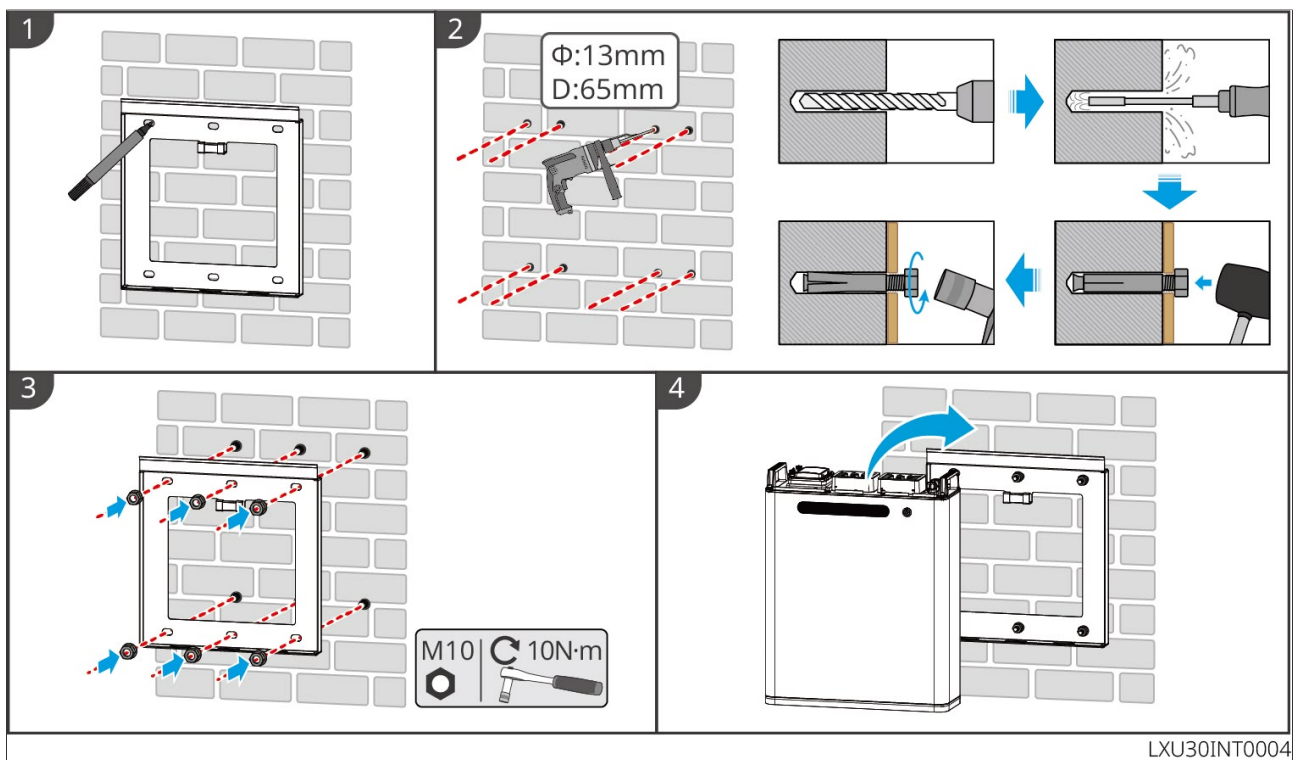
4.5.2 LX U5.0-30

LX U5.0-30: Floor-standing installation



LXU30INT0003

LX U5.0-30: Wall-mounted installation

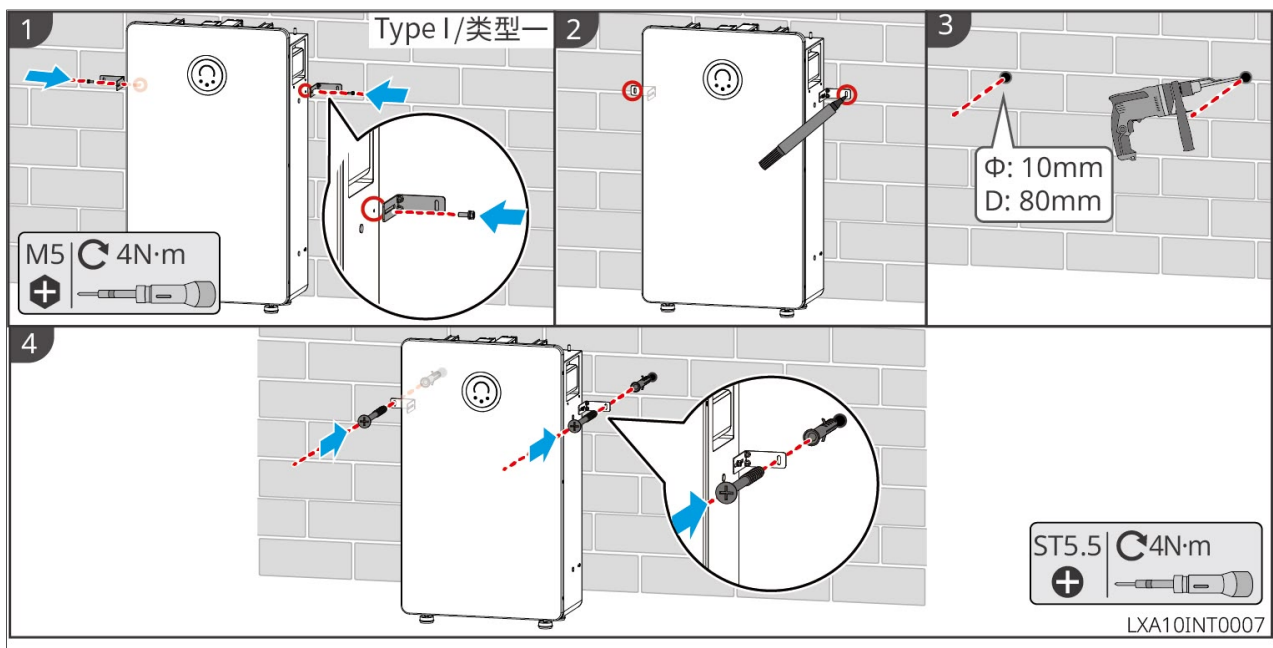


4.5.3 GW14.3-BAT-LV-G10

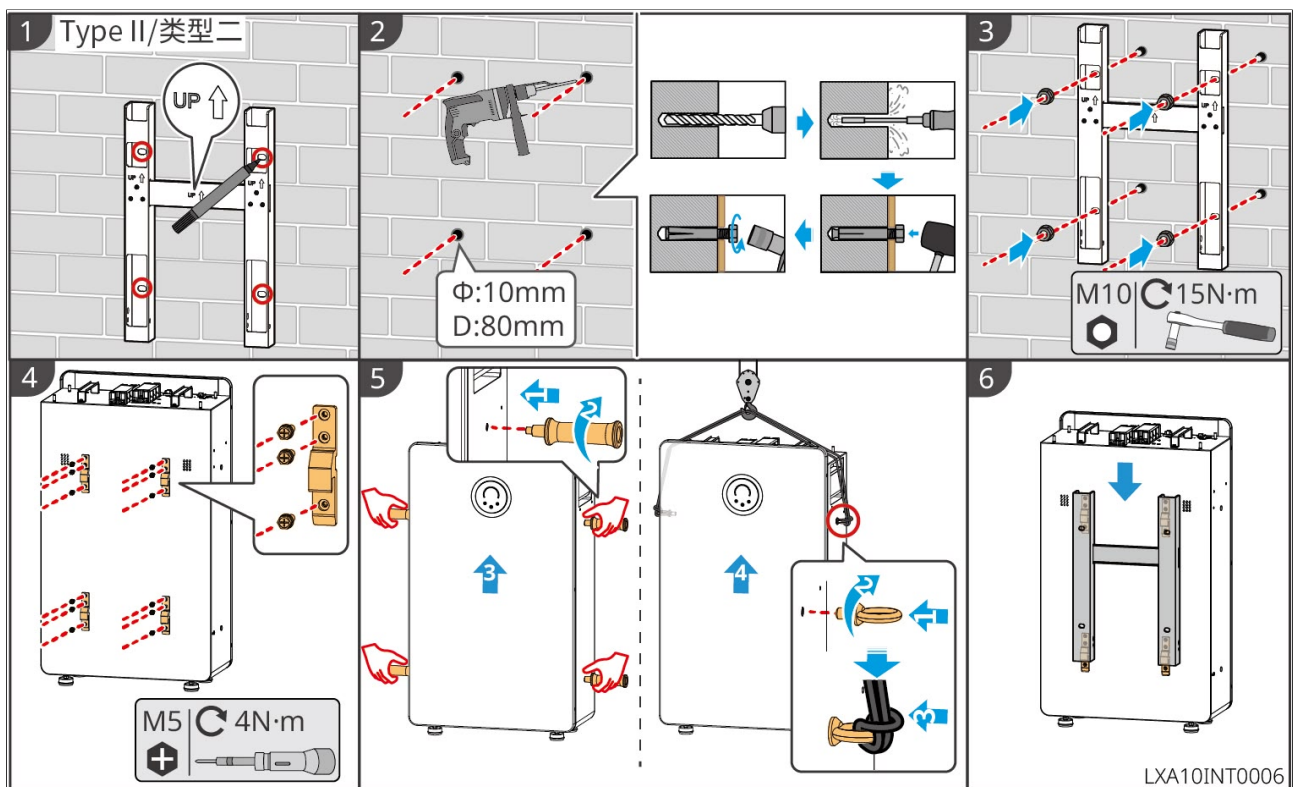
NOTICE

- Wall mounting requires two-person installation.

GW14.3-BAT-LV-G10: Floor installation



GW14.3-BAT-LV-G10: Wall-mounted installation

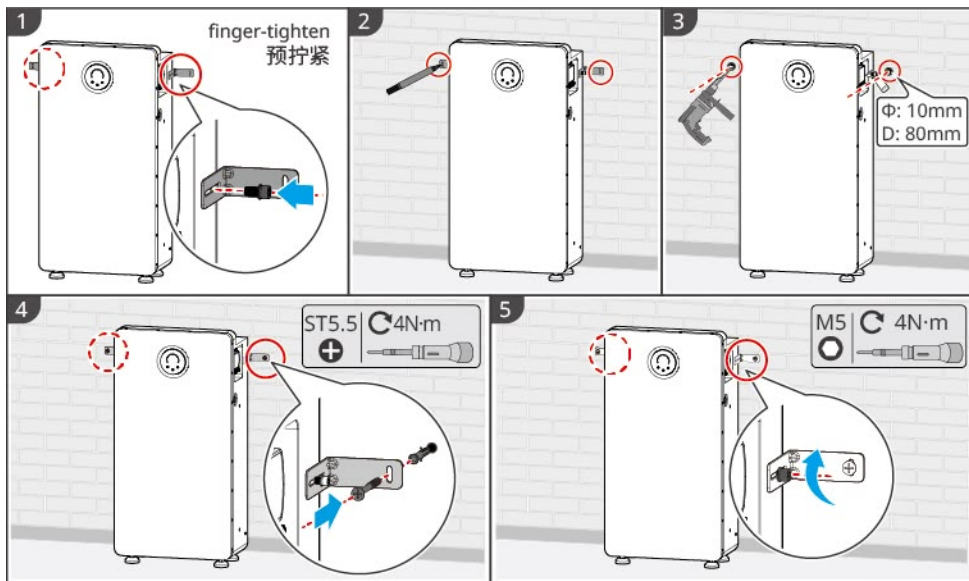


4.5.4 GW16.1-BAT-LV-G10

NOTICE

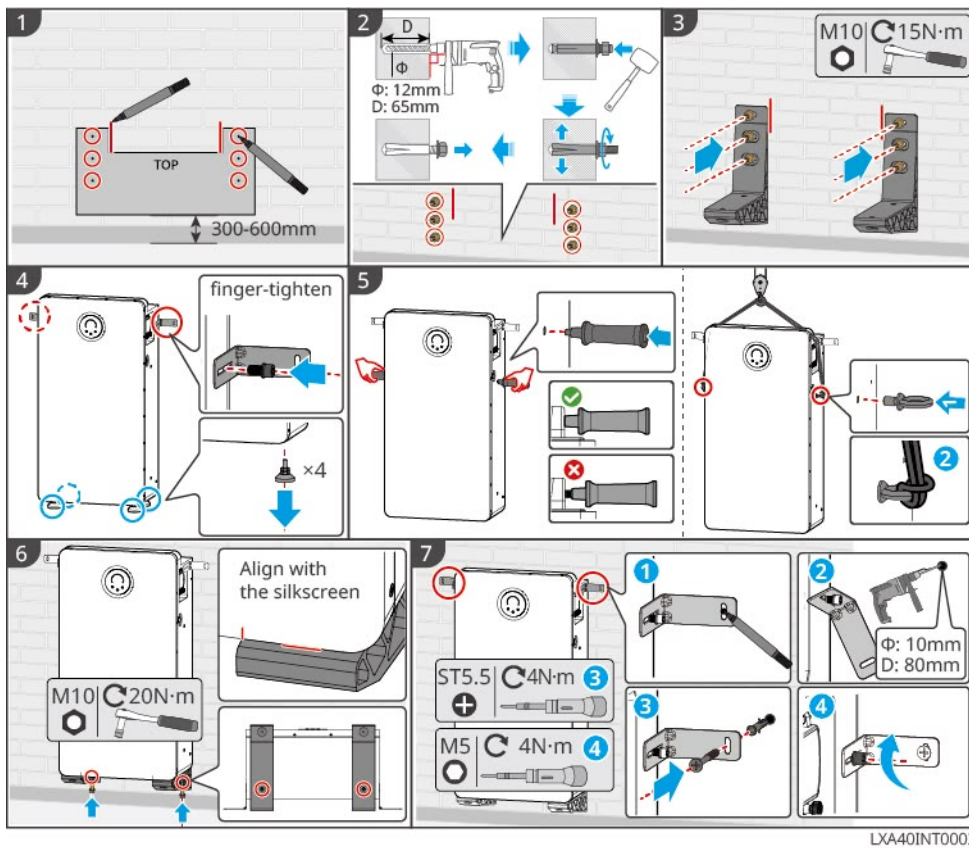
- Wall mounting requires two-person installation.

Floor installation

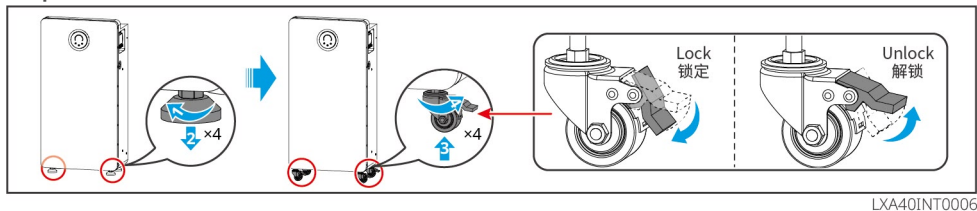


LXA40INT0002

Wall-mounted installation



(Optional) Install rollers

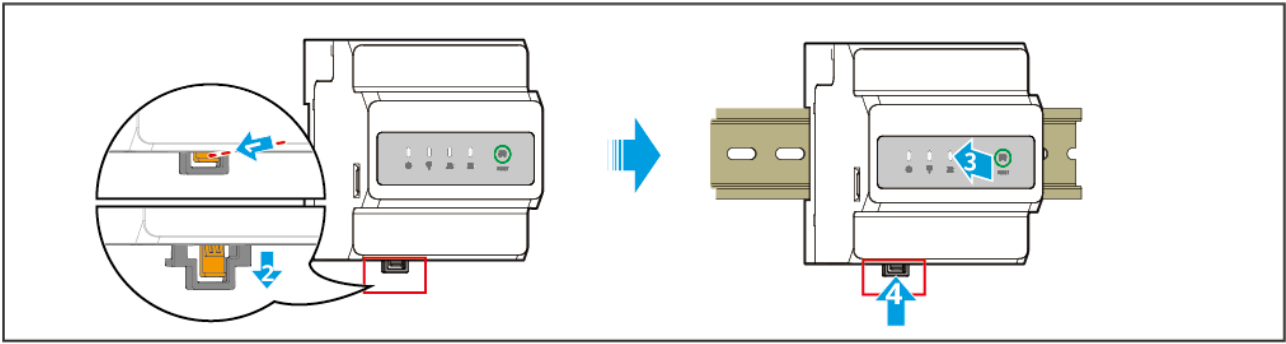


4.6 Install the Electric Meter

⚠ WARNING

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

GM330



GMK10INT0003

5 System Wiring

DANGER

- The erection, routing, and connection of cables must comply with local laws, regulations, and code requirements.
- All operations during electrical connection and the specifications of cables and components used must comply with local legal and regulatory requirements.
- Before performing electrical connections, disconnect the equipment's DC Switch and AC output switch to ensure the equipment is powered off. Live-line operation is strictly prohibited; otherwise, hazards such as electric shock may occur.
- Cables of the same type should be tied together and routed separately from cables of different types. They must not be intertwined or crossed.
- If cables are subjected to excessive tension, poor connection may result. When wiring, leave a certain length of cable before connecting it to the inverter wiring port.
- When crimping the wiring terminal, ensure that the conductor part of the cable is in full contact with the wiring terminal. Do not crimp the cable insulation together with the wiring terminal; otherwise, the equipment may fail to operate, or after operation, unreliable connection may cause overheating and damage to the inverter terminal block.
- For unused cable routing holes and ports (including communication ports), use the dedicated terminals or plugs from the accessories supplied with the box to reliably seal them. Otherwise, the following risks may occur:
 - Electric shock hazard: Exposed electrical ports may allow personnel to directly contact live parts, causing electric shock accidents.
 - Protection failure: Open ports allow dust, moisture, or foreign objects to enter, which may cause short circuits, fire, or equipment failure.

NOTICE

- When performing electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- Only professionals are permitted to perform operations related to electrical connections.
- The cable colors in the figures in this document are for reference only. Specific cable specifications must comply with local regulatory requirements.
- For parallel systems, please comply with the safety precautions in the user manuals of the relevant products in the system.

5.1 System Wiring Electrical Block Diagram

NOTICE

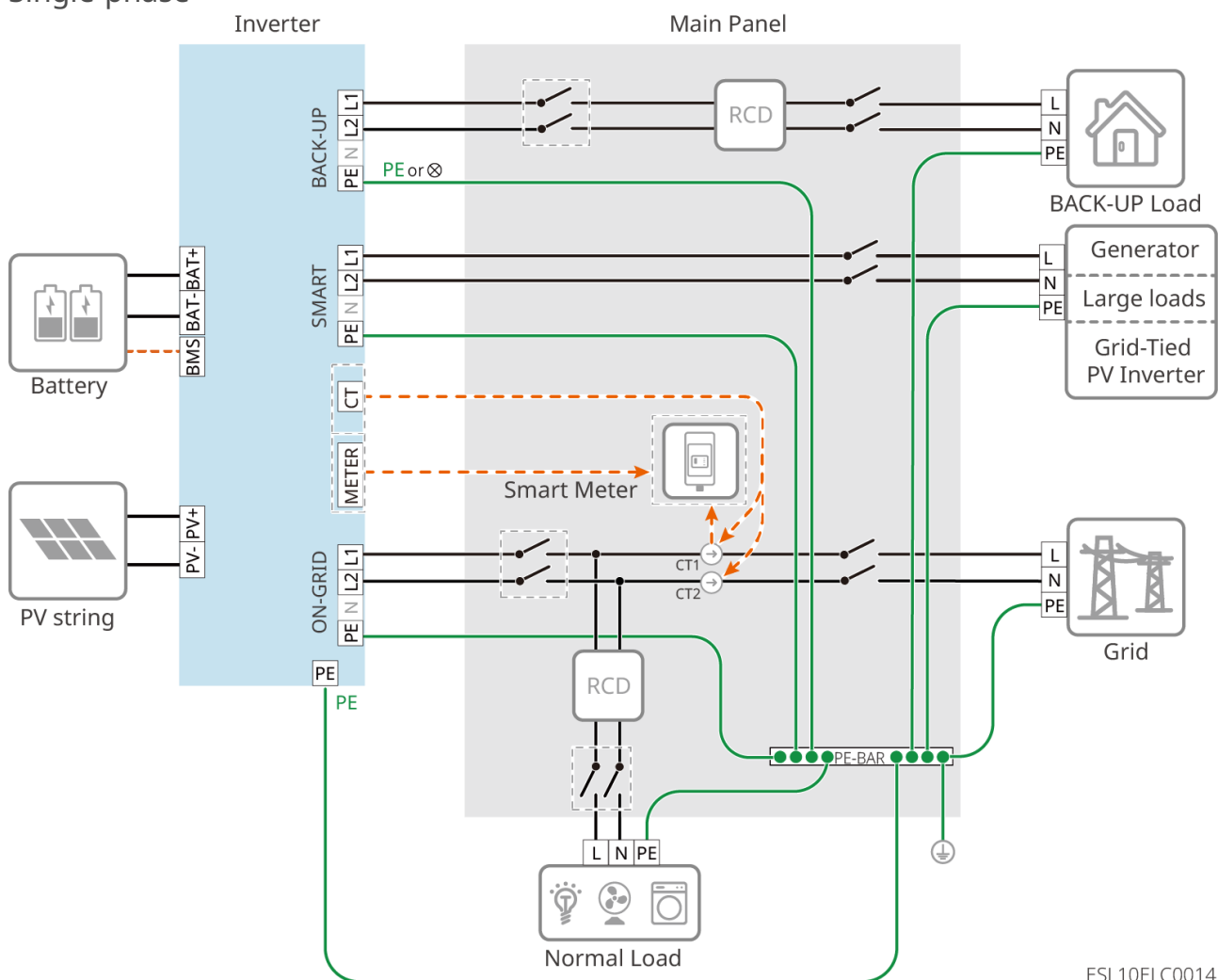
- Depending on the regulatory requirements of different regions, the wiring methods for the N and PE lines of the inverter's ON-GRID and BACK-UP ports are different. The local regulatory requirements shall prevail.
- The inverter has a built-in meter and can be directly connected to a CT. The CT cable shipped with the box is 10 m. If a longer distance is required, a shielded cable compliant with local regulations can be used to extend it to 30 m.
- CT connection length to the inverter exceeding 30m will result in decreased accuracy. If high accuracy is required, 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.
- After the inverter is powered on, the BACK-UP AC port is energized. If maintenance is required on the BACK-UP load, power off the inverter; otherwise, electric shock may result.

N and PE lines are wired separately in the distribution box

NOTICE

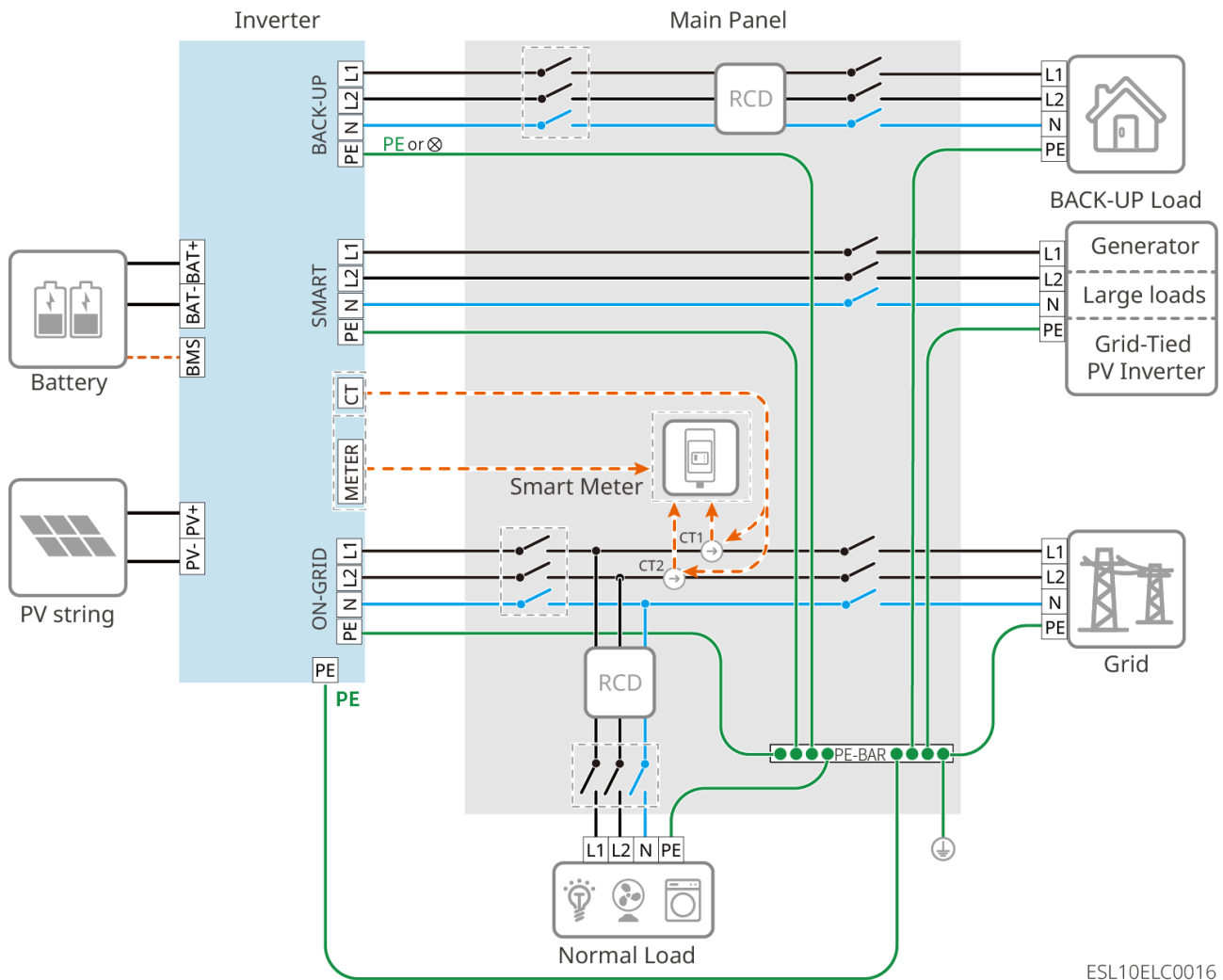
- Please ensure that the BACK-UP Protection ground wire is correctly and securely connected; otherwise, when a grid fault occurs, the BACK-UP function may be abnormal.
- For regions other than Australia, New Zealand, etc., the following wiring methods apply:

Single-phase



ESL10ELC0014

Two-phase/split-phase



ESL10ELC0016

5.2 System Wiring Detailed Diagram

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

- Connecting a smart meter enables grid feed-in power limiting and load monitoring functions.
- After connecting the smart meter, please enable **grid feed-in power limit** function via the App.

NOTICE

- The GM330 meter is optional. If you need to use it, please contact GoodWe to purchase it.
 - If the inverter's built-in meter is not used in the system, do not connect the inverter's CT port.
 - If the grid-connected inverter needs grid feed-in power limiting, connect a meter or CT device separately.
 - The detailed system wiring diagram only shows relevant wiring methods. For specific wiring methods of the grid-connected inverter, refer to the grid-connected inverter manual.
-
- The detailed wiring diagram for the single-unit system only uses some equipment models for wiring illustration. Please refer to the corresponding wiring guidance chapter for wiring based on the equipment actually used.
 - In the detailed wiring diagram for the parallel system, the wiring related to parallel operation is mainly described. For wiring requirements of other ports, refer to the single-unit system.

5.2.1 Single-Unit System Wiring Detail - Single-Phase

Scenario with Built-in Meter

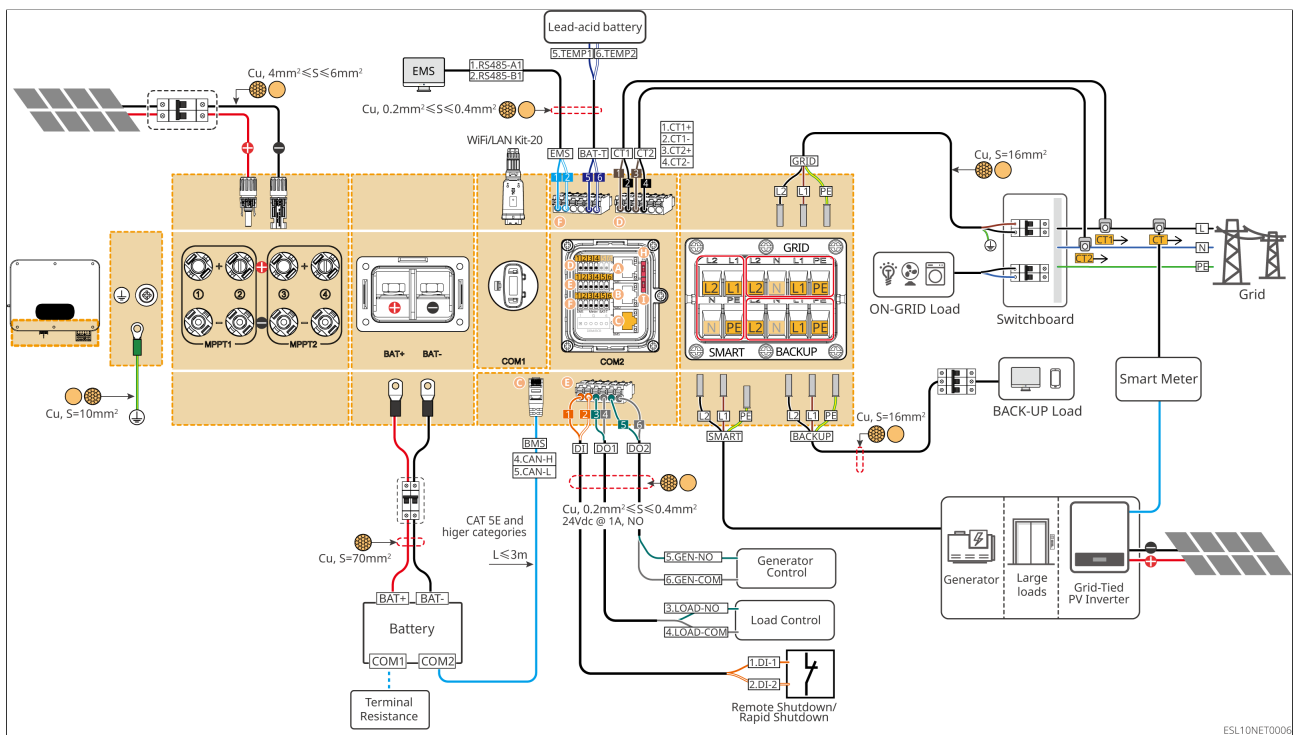


Figure11 Scenario with Built-in Meter

Scenario with GM330 Meter

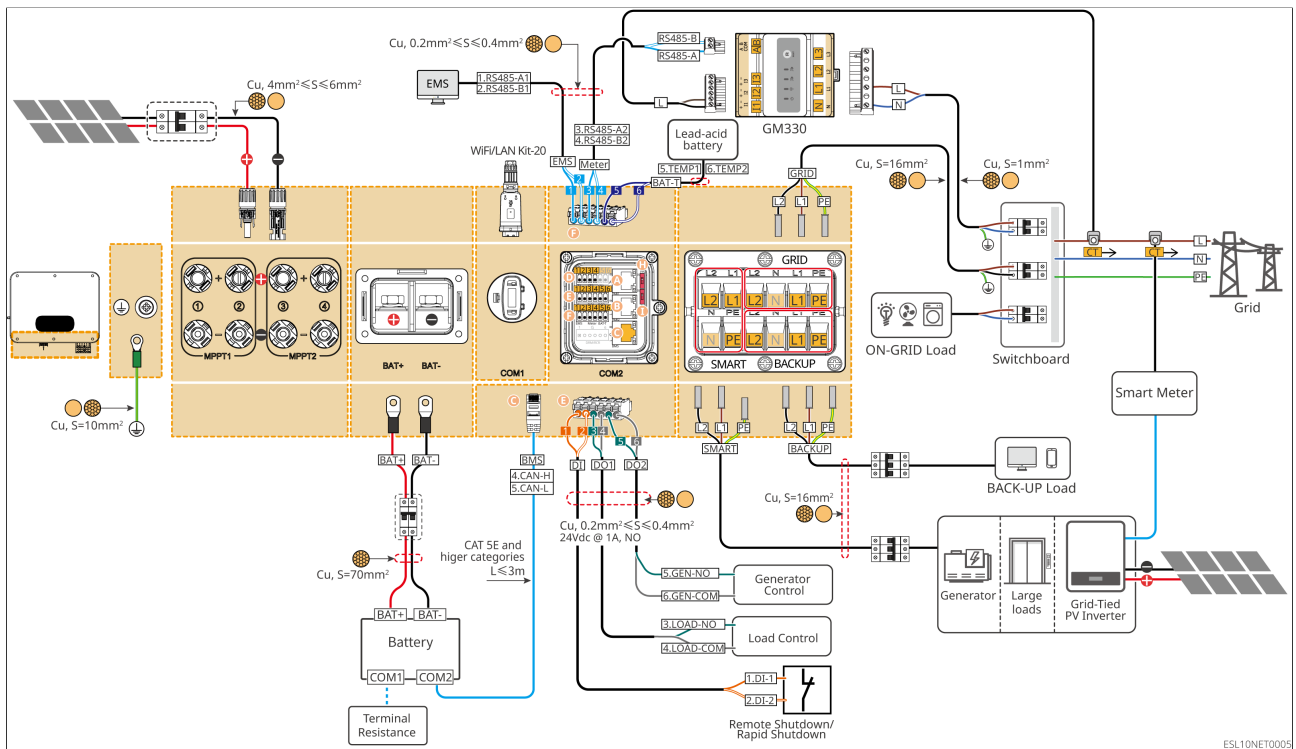


Figure12 Scenario with GM330

Networking Solution for Load Monitoring and Grid-Tied Inverter Generation Monitoring in Coupled Scenario

- In the scenario where the GRID port of a single unit is connected to a grid-tied inverter, the built-in meter or GM330 meter is supported. If the GM330 meter is required, refer to the wiring method in the networking diagram of the scenario with GM330 meter.
- Meter 1 can be the built-in meter or GM330; Meter 2 supports only GM330.

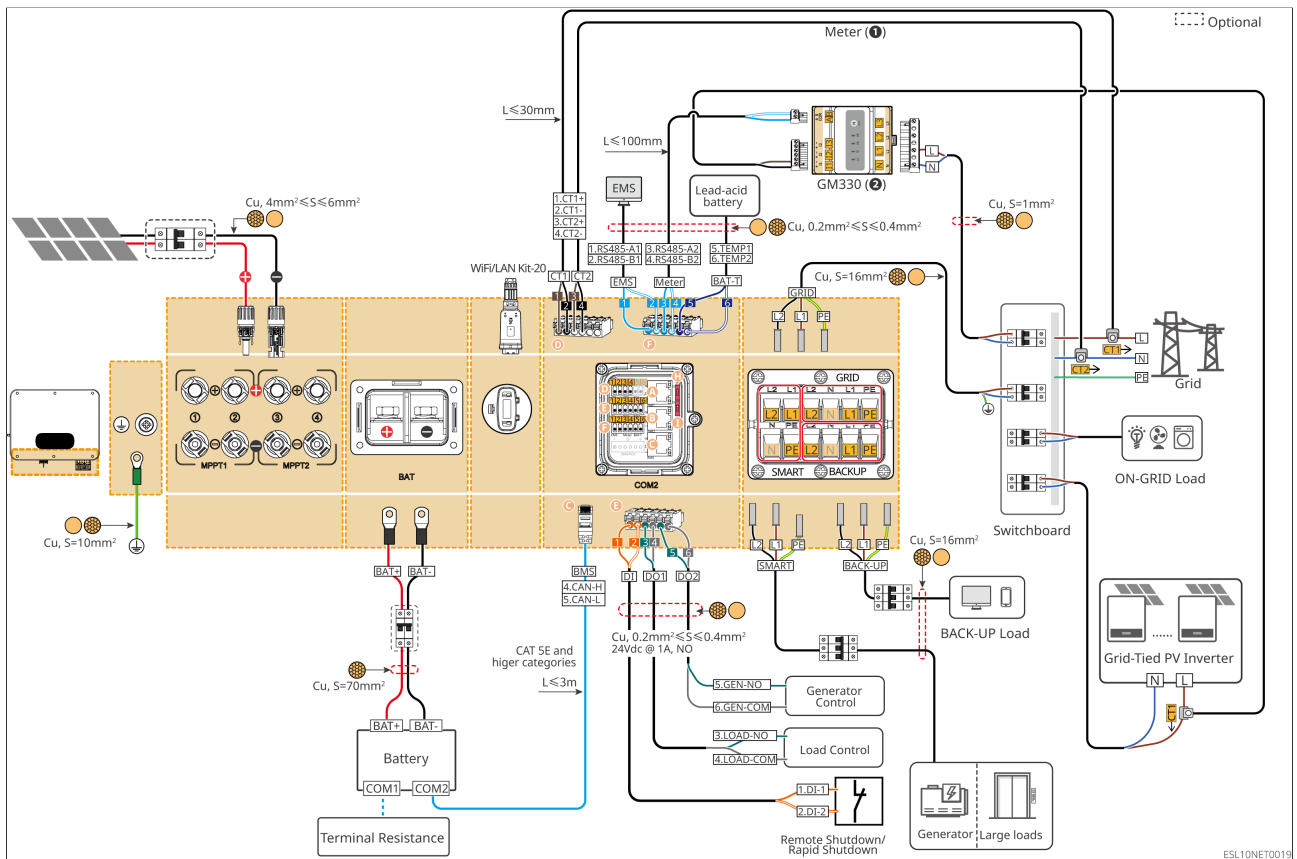


Figure13 Networking Solution for Load Monitoring and Grid-Tied Inverter Generation Monitoring in Coupled Scenario

5.2.2 Single-Unit System Wiring Detail - Two-Phase/Split-Phase

Scenario with Built-in Meter or GM330 Meter

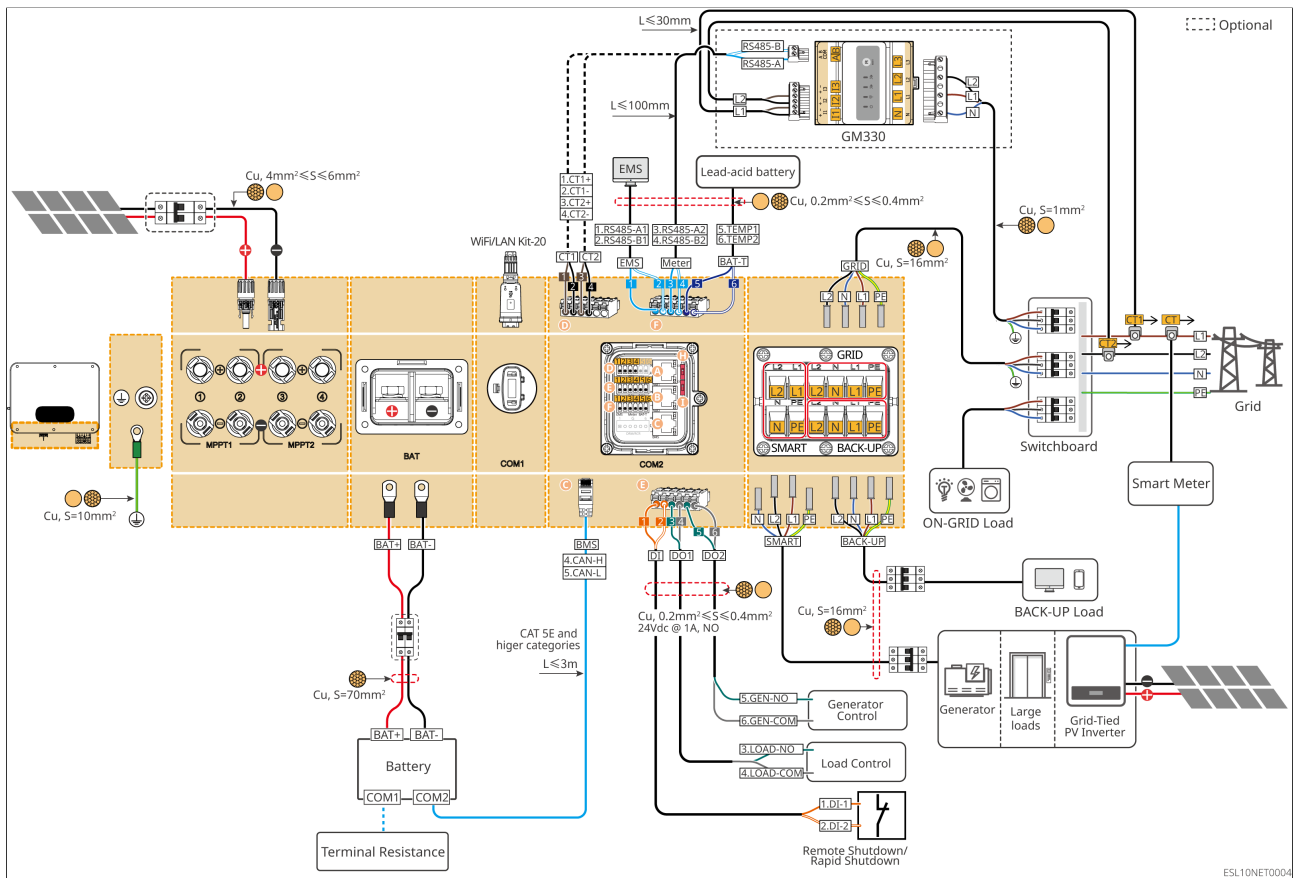


Figure14 Scenario with Built-in Meter or GM330 Meter

Networking Solution for Load Monitoring and Grid-Tied Inverter Generation Monitoring in Coupled Scenario

NOTICE

- In the scenario where the GRID port of a single unit is connected to a grid-tied inverter, the built-in meter or GM330 meter is supported. If the GM330 meter is required, refer to the GM330 meter wiring method in the networking diagram of the scenario with built-in meter or GM330 meter.
- Meter 1 can be the built-in meter or GM330; Meter 2 supports only GM330.
- In the coupled scenario, the grid-tied inverter selects the corresponding Access Mode according to its own Nominal Voltage:
 - When connected to a 127V grid voltage: the L terminal of grid-tied inverter 1 must be connected to the L1 wire of the grid, and the N terminal of grid-tied inverter 1 must be connected to the N wire of the grid; the L terminal of grid-tied inverter 2 must be connected to the L2 wire of the grid, and the N terminal of grid-tied inverter 2 must be connected to the N wire of the grid.
 - When connected to a 220V grid voltage: the L terminal of the grid-tied inverter must be connected to the L1 wire of the grid, and the N terminal of the grid-tied inverter must be connected to the L2 wire of the grid.

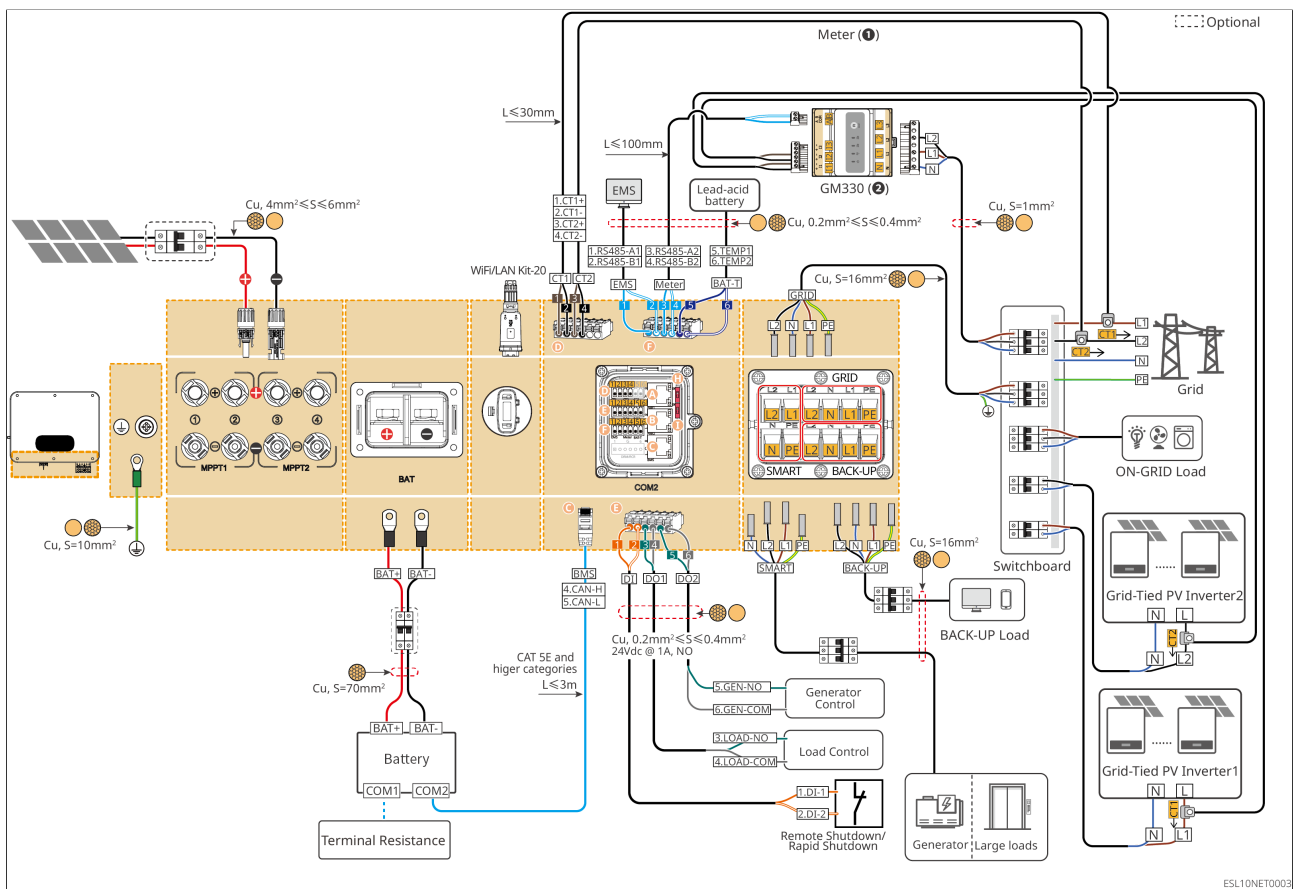


Figure15 Coupled Scenario (Connected to 127V Grid Voltage)

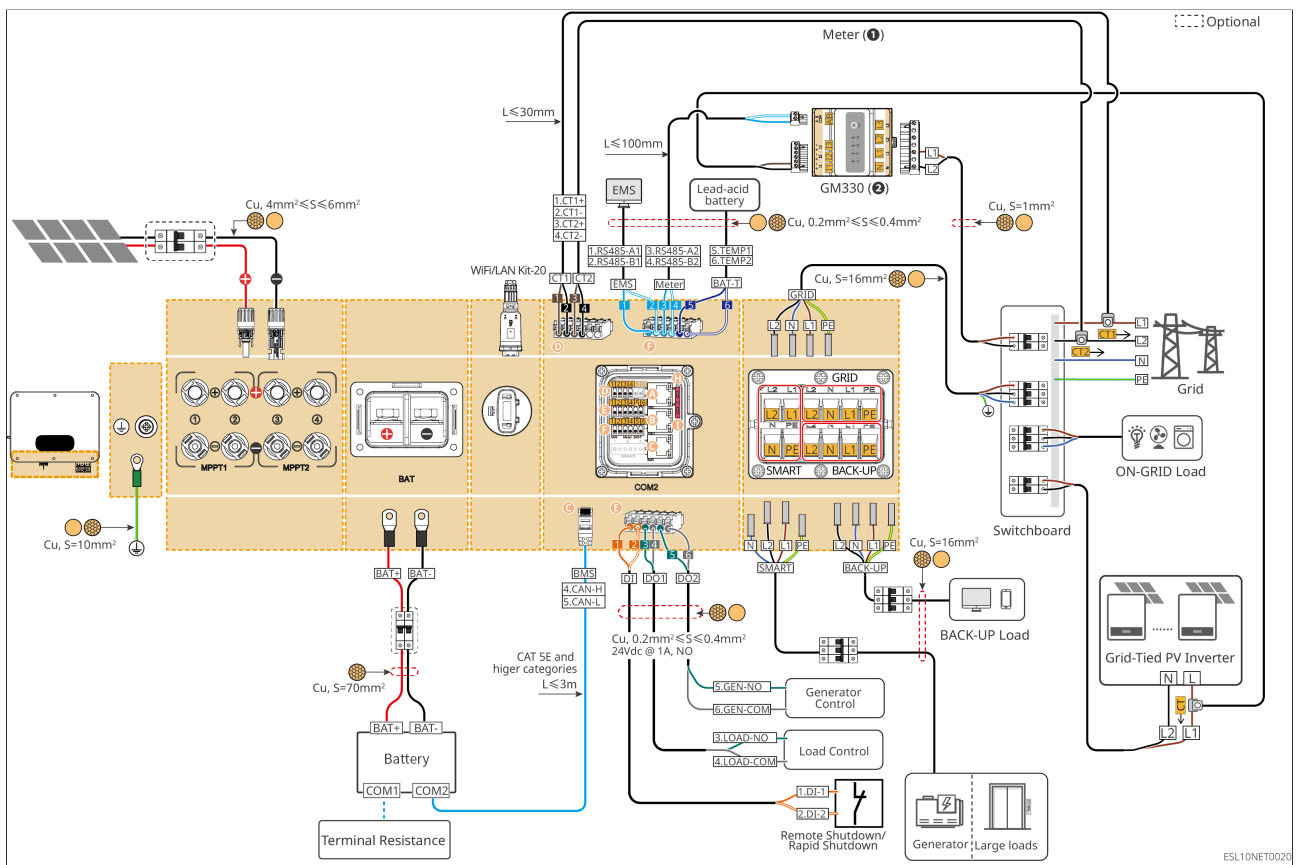


Figure16 Coupled Scenario (Connected to 220V Grid Voltage)

5.2.3 Parallel System Wiring Details - Single Phase

NOTICE

- The inverter connected to the meter is the master inverter, and the others are slave inverters. The master inverter needs to be set via the App **RS485 parallel** to set it as the master.
- In parallel scenarios, please use the GM330 smart meter.
- To implement functions such as Remote Shutdown, Load Control, and Diesel Generator Control, connect the communication cable to the master inverter.
- The following figures focus on parallel-related wiring. For wiring requirements of other ports, refer to the single-unit system.
- In parallel scenarios, each inverter can be connected to batteries of different models under the inverter's non-combiner mode. For specific wiring, [refer to connecting battery cables](#)
- In a parallel system, if you need to disconnect the circuit breaker of any port of a slave inverter, disconnect the circuit breakers of the other ports of the same inverter at the same time; otherwise, abnormal system operation may occur.
- The inverter's built-in meter supports Parallel Networking of up to 2 devices. If the number of devices in the parallel system exceeds 2, an external GM330 smart meter is required.
- The parallel system does not support connection to grid-tied inverters.

Scenario with Built-in Meter

- In the scenario where the parallel system is paired with a built-in meter, for the non-combiner battery wiring method, refer to the non-combiner battery wiring method in the scenario where the parallel system is paired with a GM330 meter.
- In parallel scenarios, large-load combiner connection is supported. For the wiring method, refer to the large-load connection method in the scenario where the parallel system is paired with a GM330 meter.

DIP Switch

- Master inverter: SW1: ON, SW2: ON.
- Slave inverter 1: SW1: ON, SW2: ON.

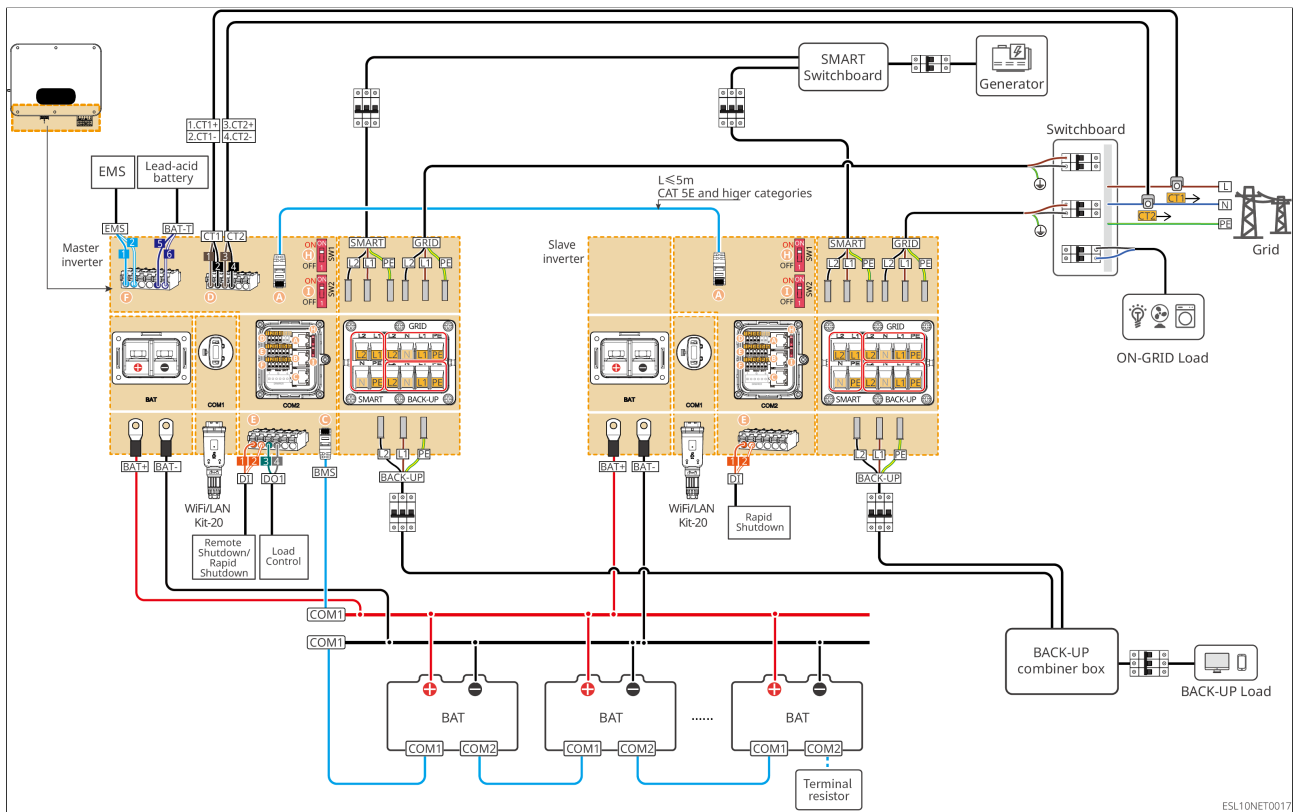


Figure17 Scenario with Built-in Meter

Scenario with GM330

- In parallel operation scenarios, generator busbar connection is supported. For the wiring method, refer to the generator connection method in the parallel operation with built-in meter scenario.

DIP Switch

- Master inverter: SW1: ON, SW2: ON.
- Slave inverter 1 and slave inverter n-1: SW1: OFF, SW2: OFF.
- Slave inverter n: SW1: ON, SW2: ON.

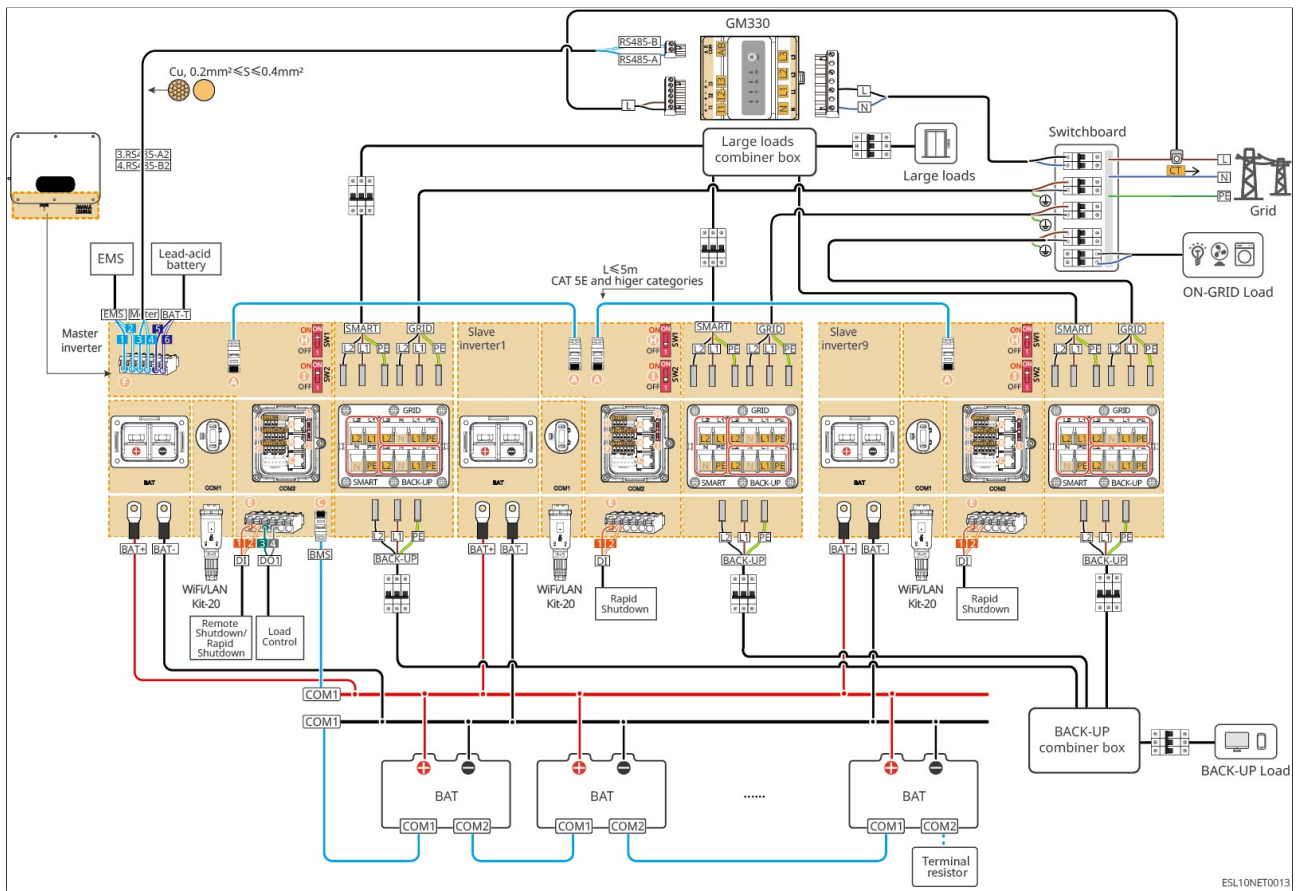


Figure18 Scenario with GM330

5.2.4 Parallel System Wiring Detail - Two-Phase/Split-Phase

NOTICE

- The inverter connected to the meter is the master inverter, and the others are slave inverters. The master inverter needs to be set via the App **RS485 parallel** to set it as the master.
- In parallel scenarios, please use the GM330 smart meter.
- To implement functions such as Remote Shutdown, Load Control, and Diesel Generator Control, connect the communication cable to the master inverter.
- The following figures focus on parallel-related wiring. For wiring requirements of other ports, refer to the single-unit system.
- In parallel scenarios, each inverter can be connected to batteries of different models under the inverter's non-combiner mode. For specific wiring, [refer to connecting battery cables](#)
- In a parallel system, if you need to disconnect the circuit breaker of any port of a slave inverter, disconnect the circuit breakers of the other ports of the same inverter at the same time; otherwise, abnormal system operation may occur.
- The inverter's built-in meter supports Parallel Networking of up to 2 devices. If the number of devices in the parallel system exceeds 2, an external GM330 smart meter is required.
- The parallel system does not support connection to grid-tied inverters.

Scenario with Built-in Meter

- In the scenario where the parallel system is paired with a built-in meter, for the non-combiner battery wiring method, refer to the non-combiner battery wiring method in the scenario where the parallel system is paired with a GM330 meter.
- In parallel operation scenarios, generator busbar connection is supported. For the wiring method, refer to the generator connection method in the parallel operation with GM330 meter scenario.

DIP Switch

- Master inverter: SW1: ON, SW2: ON.
- Slave inverter 1: SW1: ON, SW2: ON.

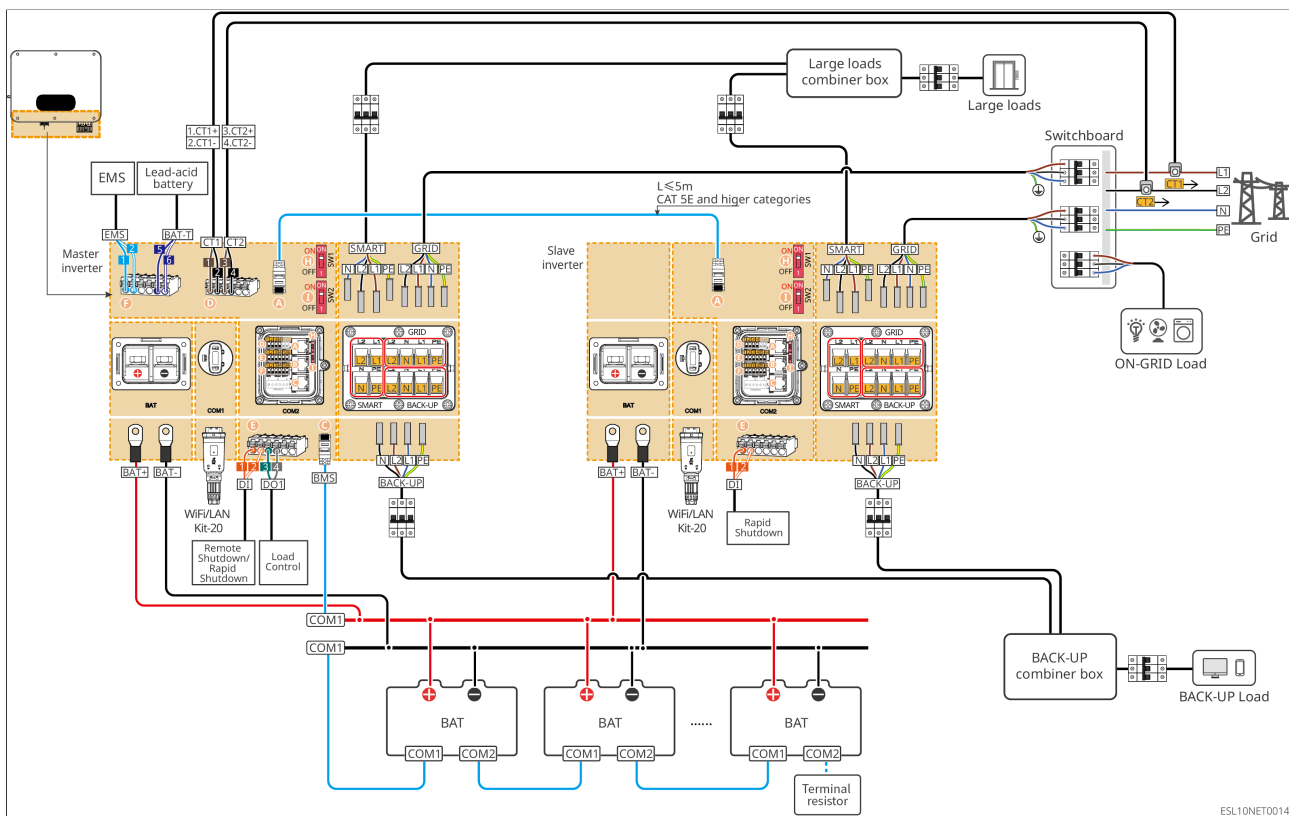


Figure19 Scenario with Built-in Meter

Scenario with GM330

- In parallel operation scenarios, large load busbar connection is supported. For the wiring method, refer to the large load connection method in the parallel operation with built-in meter scenario.

DIP Switch

- Master inverter: SW1: ON, SW2: ON.
- Slave inverter 1 and slave inverter n-1: SW1: OFF, SW2: OFF.
- Slave inverter n: SW1: ON, SW2: ON.

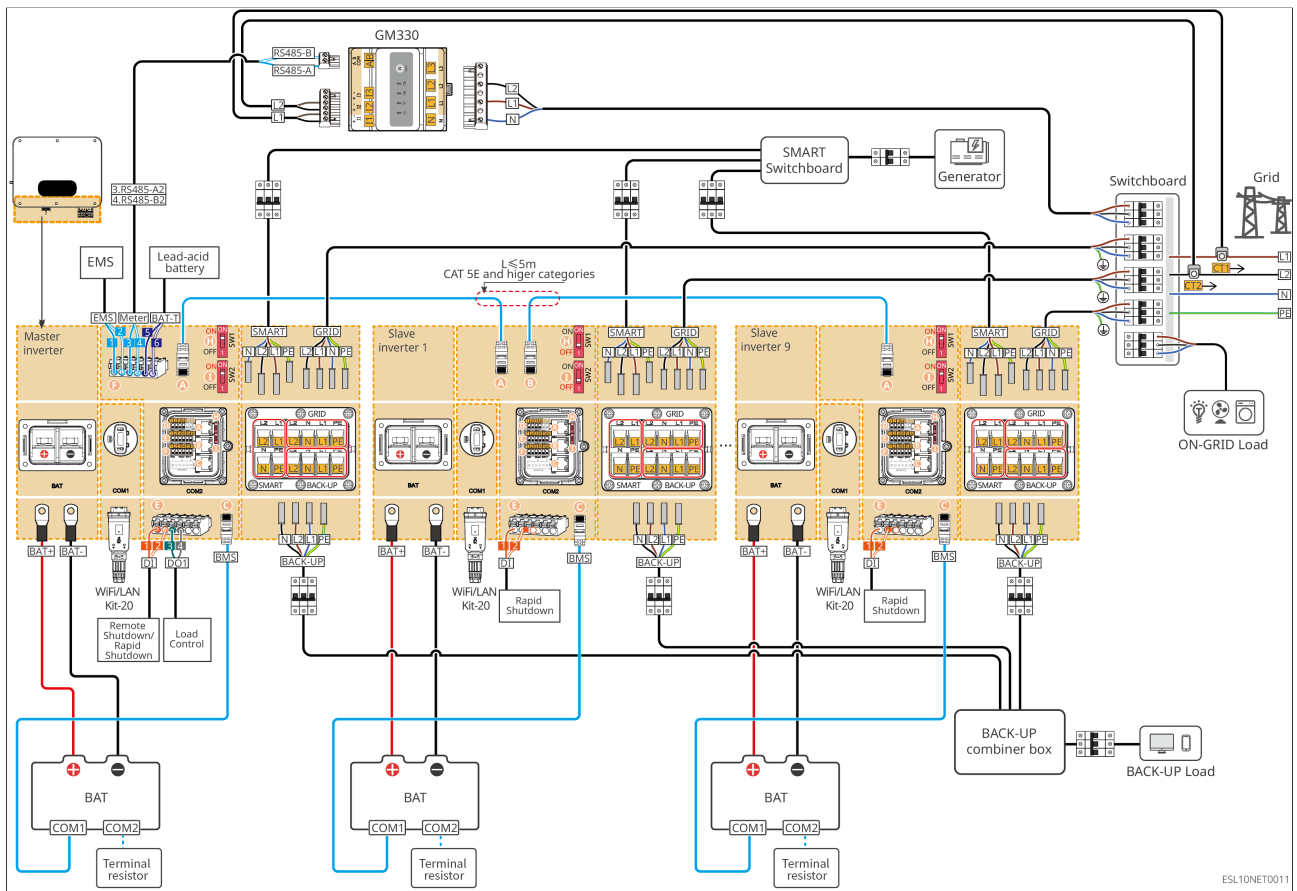


Figure20 Scenario with GM330

5.3 Material Preparation



- It is prohibited to connect loads between the inverter and the AC Switch directly connected to the inverter.
- Each inverter must be equipped with an AC output circuit breaker. Multiple inverters must not be connected to the same AC circuit breaker at the same time.
- To ensure that the inverter can be safely disconnected from the grid in the event of an abnormal condition, connect an AC circuit breaker on the AC side of the inverter. Select an appropriate AC circuit breaker in accordance with local regulations.
- After the inverter is powered on, the BACK-UP AC port is energized. If maintenance is required on the BACK-UP load, power off the inverter; otherwise, electric shock may result.
- For cables used in the same system, it is recommended that the conductor material, cross-sectional area, length, etc. be consistent.
 - BACK-UP AC cable of each inverter
 - ON-GRID AC cable of each inverter
 - Power cable between the inverter and the battery
 - Power cable between batteries
 - Power cable between the inverter and the busbar
 - Power cable between the battery and the busbar

5.3.1 Switch Preparation

No.	Circuit breaker	Recommended Specifications	Remarks
1	ON-GRID Circuit Breaker		

No.	Circuit breaker	Recommended Specifications	Remarks
2	BACK-UP Load Circuit Breaker	For whole-home backup power scenarios, the following is recommended: • Rated Current: $\geq 80\text{A}$ • Nominal Voltage: ◦ Two-phase/split-phase: $\geq 127\text{Vac}$ ◦ Single-phase 127V: $\geq 127\text{Vac}$ ◦ Single-phase 220V: $\geq 220\text{Vac}$ For partial backup power scenarios, the following is recommended: • Rated Current: ◦ GW5K-ES-LD-G10: $\geq 32\text{A}$ ◦ GW7.5K-ES-LD-G10: $\geq 40\text{A}$ ◦ GW10K-ES-LD-G10: $\geq 63\text{A}$ • Nominal Voltage: ◦ Two-phase/split-phase: $\geq 127\text{Vac}$ ◦ Single-phase 127V: $\geq 127\text{Vac}$ ◦ Single-phase 220V: $\geq 220\text{Vac}$ Note: If the inverter BACK-UP port is not used, the ON-GRID circuit breaker can be selected according to the maximum grid-tied current.	During actual selection, you may also select according to the actual operating current by yourself to choose a fully compliant with local installation regulations circuit breaker.
3	Battery Switch	Optional according to local laws and regulations • GW5K-ES-LD-G10: Rated Current $\geq 125\text{A}$, Nominal Voltage $\geq 60\text{Vdc}$ • GW7.5K-ES-LD-G10: Rated Current $\geq 200\text{A}$, Nominal Voltage $\geq 60\text{Vdc}$ • GW10K-ES-LD-G10: Rated Current $\geq 250\text{A}$, Nominal Voltage $\geq 60\text{Vdc}$	

No.	Circuit breaker	Recommended Specifications	Remarks
4	SMART Circuit Breaker	- Rated Current: - GW5K-ES-LD-G10: $\geq 25A$ - GW7.5K-ES-LD-G10: $\geq 38A$ - GW10K-ES-LD-G10: $\geq 50A$ - Nominal Voltage: - Two-phase/split-phase: $\geq 127V_{ac}$ - Single-phase 127V: $\geq 127V_{ac}$ - Single-phase 220V: $\geq 220V_{ac}$	
5	Leakage Current Protection Device	Optional according to local laws and regulations - Type A - ON-GRID side^{*1}: 300mA - BACK-UP side: 30mA	Self-provided
6	Load Circuit Breaker	Specification requirements must be determined according to the actual load used.	Self-provided
^{*1}: The inverter has a built-in general-purpose current-sensing residual current monitoring unit. Once a leakage current exceeding the limit is detected, the inverter will immediately disconnect from the utility grid. However, if regulations mandate the installation of an external Residual Current Protection Device (RCD), it is recommended that this Protection device be a Type A RCD with a residual operating current not less than 300 mA (for Apparent Power less than 30 kVA, 300 mA is recommended; for greater than 30 kVA, 10 mA/kVA is recommended). An RCD with a residual operating current meeting the requirements may also be selected according to local regulations. For example, in Chile, local regulations require an RCD with a residual operating current not greater than 30 mA to be installed between the inverter and the grid for inverters of 5 kVA and below. However, note that due to PV panels, an RCD with a smaller residual operating current is more prone to nuisance tripping under adverse conditions such as rainy weather.			

5.3.2 Cable Preparation

No.	cable	Recommended Specifications	Acquisition Method
1	Inverter Enclosure Protection Grounding Conductor	• Single-core outdoor copper-core cable • Conductor cross-sectional area: $S=10\text{mm}^2$	Self-provided
2	Battery Protection Grounding Conductor	• Single-core outdoor copper-core cable • Conductor Cross-Sectional Area: ◦ LX A5.0-30: 10mm^2 ◦ LX U5.0-30: 10mm^2 ◦ GW14.3-BAT-LV-G10: 10mm^2 ◦ GW16.1-BAT-LV-G10: 10mm^2	• Self-provided • LX A5.0-30: Accessory acquisition (optional) • GW14.3-BAT-LV-G10: For some machines, the grounding cable is shipped with the battery accessories • GW16.1-BAT-LV-G10: Standard configuration
3	PV DC cable	• Industry-standard outdoor PV cable • Conductor cross-sectional area: $4\text{mm}^2\text{-}6\text{mm}^2$ • Cable outer diameter: $4.8\text{mm}\text{-}6.3\text{mm}$	Self-provided

No.	cable	Recommended Specifications	Acquisition Method
4	Battery DC cable	• Single-core outdoor copper-core cable • Inverter Battery Port Wiring Requirements: ◦ Conductor cross-sectional area: 70mm² ◦ Cable outer diameter: 15.7mm-16.7mm • Cable requirements among the inverter, battery, and busbar: see the table listed in the Connecting Battery Cables chapter	• LX U5.0-30: Can be purchased from GoodWe • LX A5.0-30: Accessory acquisition (optional) • GW14.3-BAT-LV-G10: For some machines, the battery DC cable is shipped with the battery accessories • GW16.1-BAT-LV-G10: ◦ DC cable between inverter and battery: Standard configuration ◦ DC cable between batteries: Can be purchased from GoodWe

No.	cable	Recommended Specifications	Acquisition Method
5	AC cable	• Inverter AC Input/Output Cables (BACKUP/GRID): ◦ Conductor cross-sectional area: 16mm² ◦ Multi-core outdoor copper-core cable outer diameter: less than 10.5mm ◦ Single-core outdoor copper-core cable outer diameter: less than 30mm • Generator Power Cables (GEN): ◦ Conductor cross-sectional area: 16mm² ◦ Multi-core outdoor copper-core cable outer diameter: less than 10.5mm ◦ Single-core outdoor copper-core cable outer diameter: less than 30mm	Self-provided
6	Smart meter power cable	• Outdoor copper-core cable • Conductor cross-sectional area: 1mm²	Self-provided

No.	cable	Recommended Specifications	Acquisition Method
7	Battery communication cable	Communication between the combiner box and battery, as well as between batteries, requires standard shielded network cables of CAT 5E or above and shielded RJ45 connectors.	• Self-provided • LX A5.0-30: Accessory acquisition (optional) • GW14.3-BAT-LV-G10: ◦ Communication cable between inverter and battery: Standard for some models ◦ Battery-to-battery communication cable: user-supplied, cable length ≤ 2 m • GW16.1-BAT-LV-G10: ◦ Inverter-to-battery communication cable: standard configuration ◦ Battery-to-battery communication cable: user-supplied, cable length ≤ 1 m
8	Meter RS485 communication cable	• Shielded twisted pair • Conductor cross-sectional area: 0.2 mm^2–0.4 mm^2	Self-provided
9	Inverter parallel communication cable	CAT 5E or higher specification standard shielded network cable and shielded RJ45 connectors	Self-provided

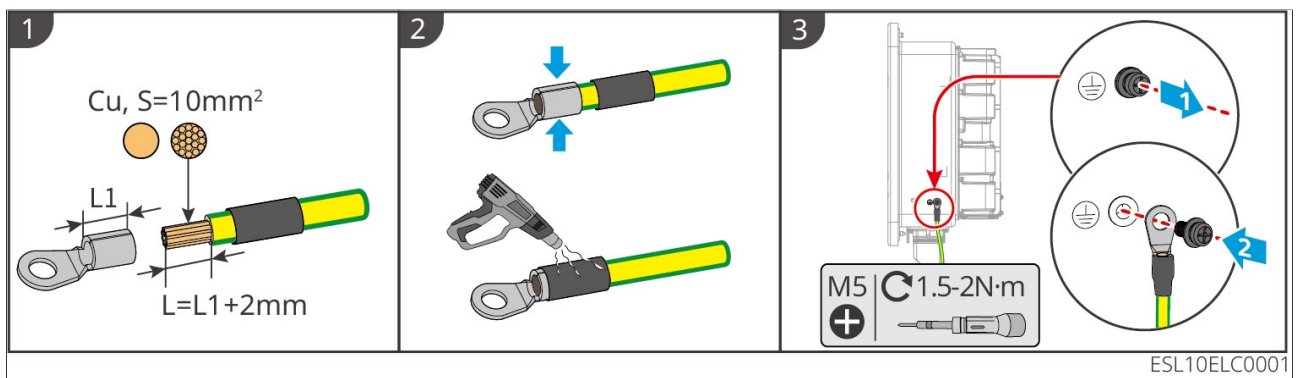
No.	cable	Recommended Specifications	Acquisition Method
10	Remote Shutdown communication cable	• Copper-core twisted pair • Conductor cross-sectional area: 0.2 mm²–0.4 mm²	Self-provided
11	Inverter-side battery communication cable	-	Available from inverter accessories

5.4 Connect the Protection Ground Cable

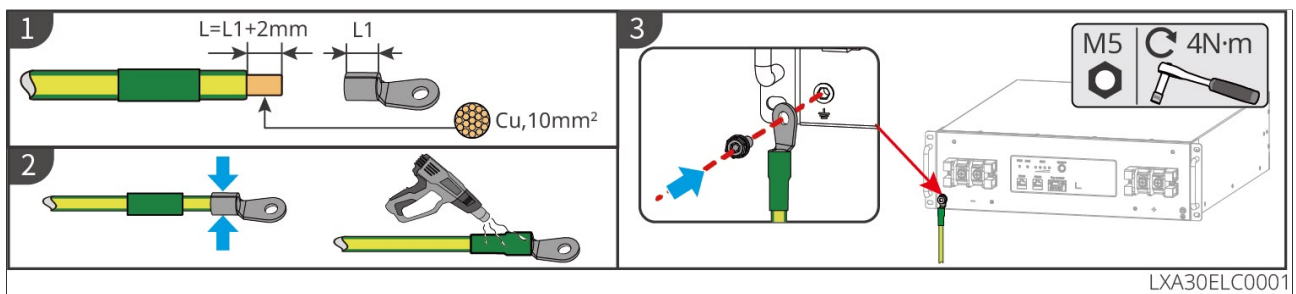
WARNING

- The Protection grounding of the enclosure cannot replace the Protection ground cable of the AC output port. When wiring, ensure that the Protection ground cables at both locations are reliably connected.
- When multiple devices are used, ensure equipotential bonding of the Protection grounding points on all equipment enclosures.
- To improve the corrosion resistance of the terminals, after the Protection ground cable is connected and installed, it is recommended to apply silicone or paint on the outside of the grounding terminal for protection.
- When installing the device, the Protection ground cable must be installed first; when removing the device, the Protection ground cable must be removed last.

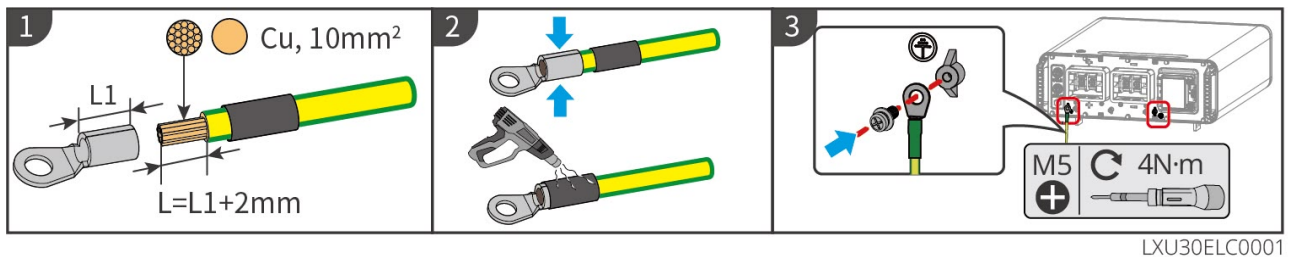
Inverter



Battery LX A5.0-30

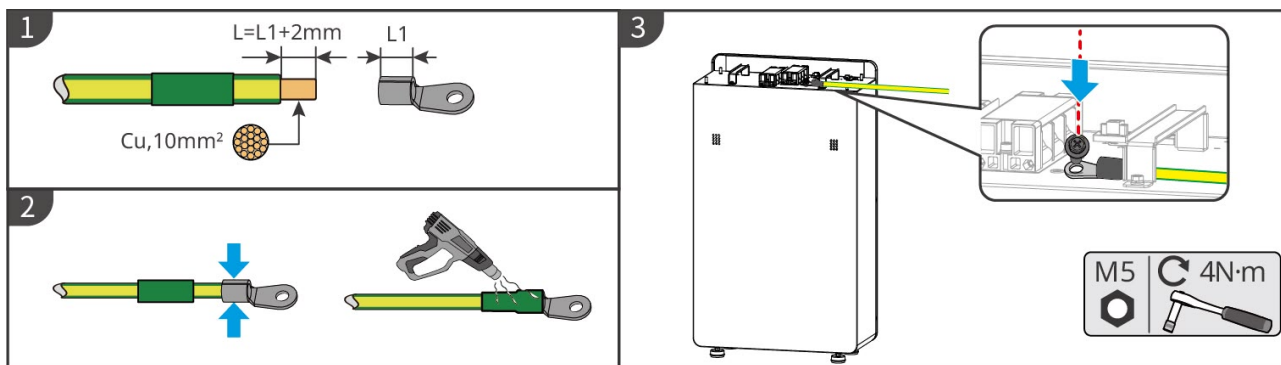


LX U5.0-30



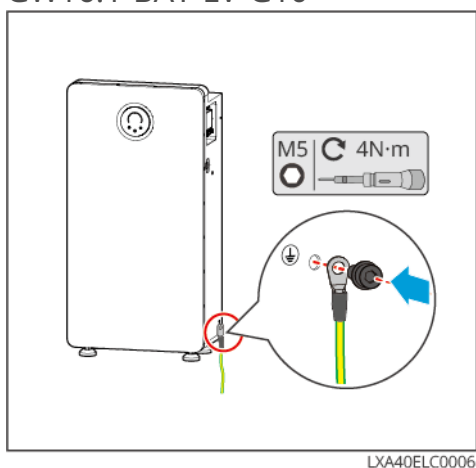
GW14.3-BAT-LV-G10

- If the ground cable is shipped with the battery accessories, use the shipped cable; no crimping is required.



LXA10ELC0014

GW16.1-BAT-LV-G10



5.5 Connect PV Cables



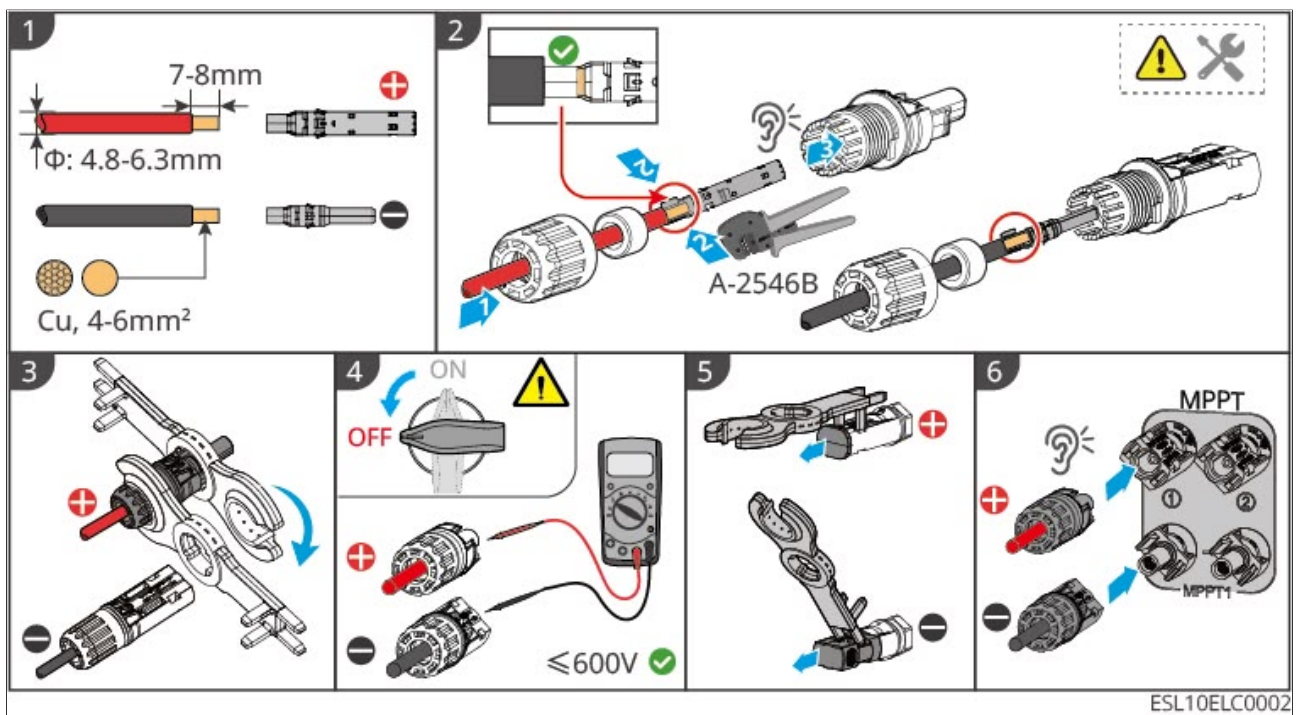
- Do not connect the same PV string to multiple inverters; otherwise, the inverter may be damaged.
- Before connecting the PV strings to the inverter, confirm the following information; otherwise, the inverter may be permanently damaged, and in severe cases, a fire may occur, causing personal injury and property damage.
 1. Ensure that the Max. MPPT Short Circuit Current and Max. Input Voltage of each MPPT are within the allowable range of the inverter.
 2. Ensure that the positive pole of the PV string is connected to the PV+ of the inverter, and the negative pole of the PV string is connected to the PV- of the inverter.

 WARNING

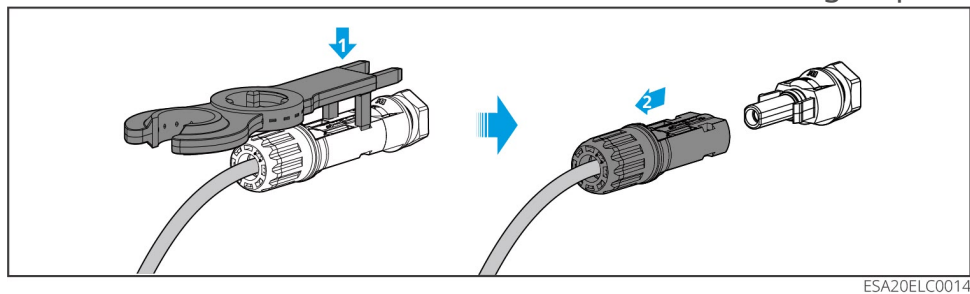
- The PV string output does not support grounding. Before connecting the PV string to the inverter, ensure that the minimum insulation resistance to ground of the PV string meets the minimum insulation impedance requirement ($R = \text{Max. Input Voltage}/30\text{mA}$).
- After the DC cables are connected, ensure that the cable connections are tight and not loose.
- Use a multimeter to measure the positive and negative poles of the DC cables to ensure that the positive and negative poles are correct and not reversed; and that the voltage is within the allowable range.

NOTICE

- The two PV strings in each MPPT must use the same model, the same number of panels, the same tilt angle, and the same azimuth to ensure maximum Efficiency.
- In the scenario of parallel connection of PV panels, to avoid circulating current between parallel branches and its impact on system Efficiency and safety, the length of the connecting cable between the combiner point and the inverter DC input terminal should be less than 2 m.



If the PV terminals need to be disassembled, refer to the following steps:



5.6 Connecting Battery Cables

DANGER

- In a single-unit system, do not connect the same Battery BANK to multiple inverters; otherwise, it may cause inverter damage.
- Do not connect loads between the inverter and the battery.
- When connecting battery cables, use insulated tools to prevent accidental electric shock or Battery Short Circuit.
- Ensure that the battery open-circuit voltage is within the allowed range of the inverter.
- Between the inverter and the battery, choose whether to configure a DC Switch in accordance with local laws and regulations.

NOTICE

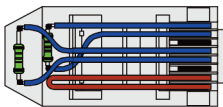
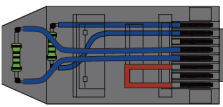
- In scenarios using a battery Mix Parallel Unit, the BAT1 power port of the Mix Parallel Unit must be paired with the BAT1 communication port, and the BAT2 power port must be paired with the BAT2 communication port. Communication ports must not be mixed and matched.
- The battery wiring methods supported by the BAT2 port of the Mix Parallel Unit are the same as those of BAT1.

Refer to the following table for recommended cables between the inverter, battery, and busbar:

Busbar-to-battery power cable	Battery-to-battery power cable	Inverter-to-busbar power cable	Inverter-to-battery direct-connection power cable* ¹
LX U5.0-30: 25mm ² LX A5.0-30: 50mm ² GW14.3-BAT-LV-G10: 70mm ² GW16.1-BAT-LV-G10: 50mm ²	LX A5.0-30、LX U5.0-30: 50mm ² GW14.3-BAT-LV-G10: 70mm ² GW16.1-BAT-LV-G10: 50mm ²	70mm ²	70mm ²

*1: When the inverter is directly connected to the battery, the power cable should be selected according to the recommended specifications; if the directly connected battery model is GW16.1-BAT-LV-G10, only 50 mm² cable is supported; if the directly connected battery model is GW14.3-BAT-LV-G10, only 50 mm² cable is supported, and the port's maximum continuous charge/discharge current is the battery's maximum charge/discharge current.

Terminating resistor usage instructions:

Terminating resistor appearance	Battery Type	PIN Description
	LX U5.0-30, LX A5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10 (GW Combiner Box)	Connect a 120Ω resistor across PIN1/2 and PIN4/5 respectively; short the 7/8 wire harness
	LX U5.0-30, LX A5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10 (third-party busbar)	Connect a 120Ω resistor across PIN1/2 and PIN4/5 respectively; short the 6/8 wire harness

LX A5.0-30 Communication Port Definitions

PIN	COM1	COM2	Description
1	-	-	Reserved
2	-	-	
3	Parallel OUT+	Parallel OUT+	Parallel Communication Port
4	CAN_1H	CAN_1H	Connect to inverter communication or battery parallel-cluster communication port
5	CAN_1L	CAN_1L	
6	Parallel OUT2+	Parallel OUT2+	Parallel Interlock Communication Port
7	-	-	Reserved
8	Parallel OUT-	Parallel OUT-	Parallel Communication Port

LX U5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10 Communication Port Definitions

PIN	COM1	COM2	Description
1	RS485A	RS485A	Reserved
2	RS485B-	RS485B-	
3	Parallel OUT+	Parallel OUT+	Parallel Communication Port
4	CAN_H	CAN_H	Connect to inverter communication or battery parallel-cluster communication port
5	CAN_L	CAN_L	
6	Parallel OUT2+	Parallel OUT2+	Parallel Communication Port
7	-	-	Reserved
8	Parallel OUT-	Parallel OUT-	Parallel Communication Port

Battery System Wiring Diagram

LX A5.0-30: Hand-in-hand Connection Mode

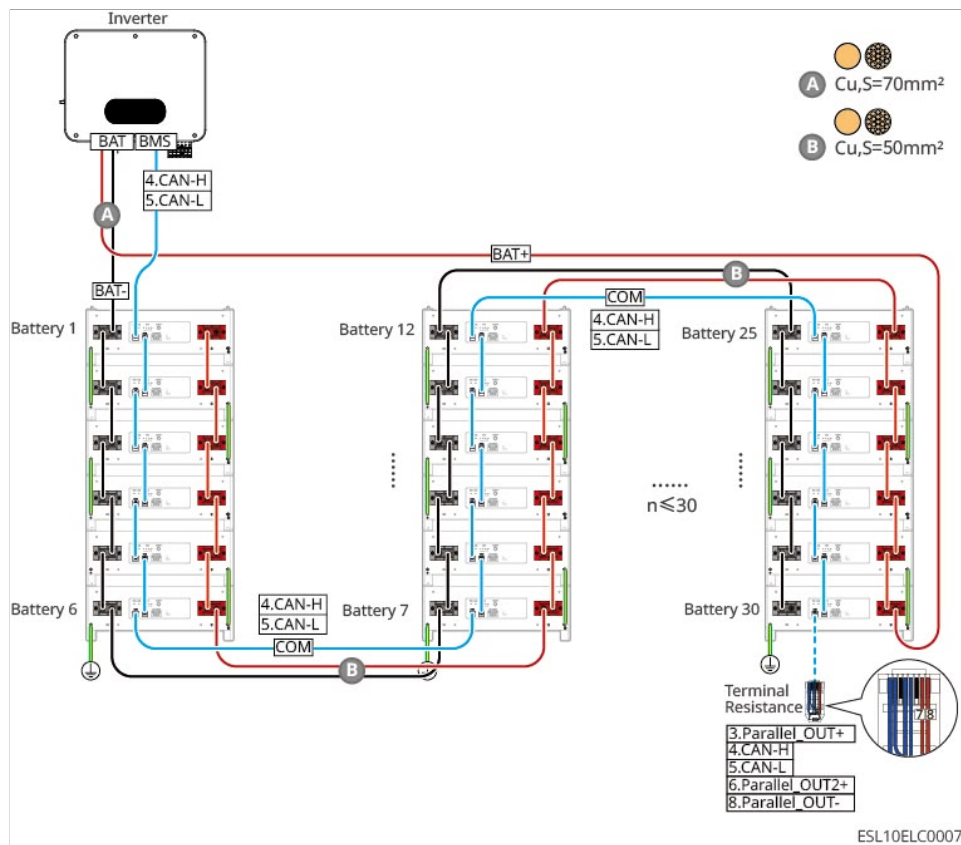


Figure21 LX A5.0-30: Hand-in-hand Connection Mode

LX A5.0-30: Connection Mode with Combiner Box BCB-22-WW-0

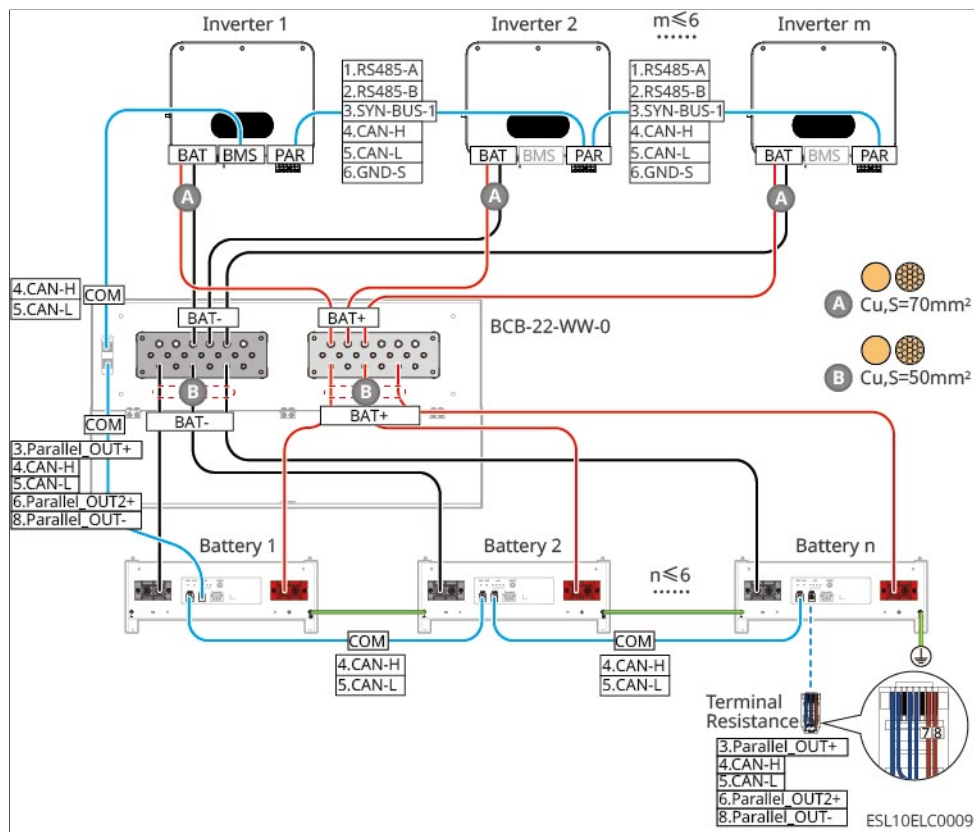


Figure22 LX A5.0-30: Connection Mode with Combiner Box BCB-22-WW-0

LX A5.0-30: Connection Mode with Combiner Box BCB-32-WW-0

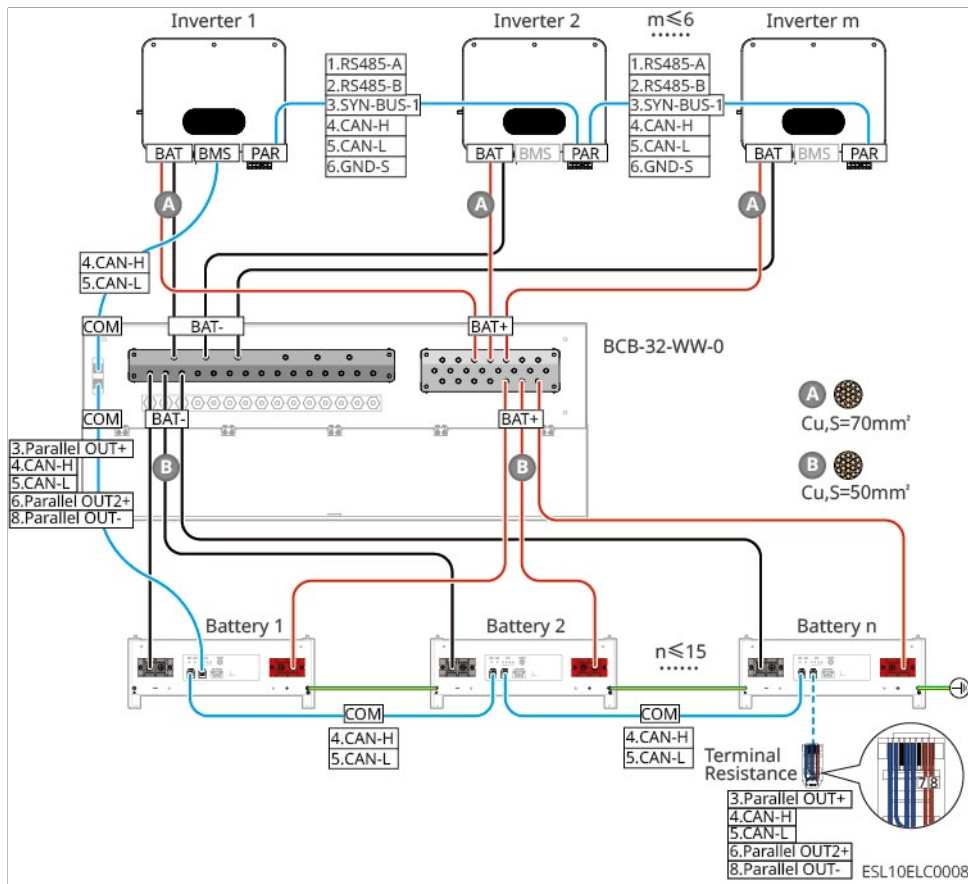


Figure23 LX A5.0-30: Connection Mode with Combiner Box BCB-32-WW-0

LX U5.0-30: Hand-in-hand Connection Mode

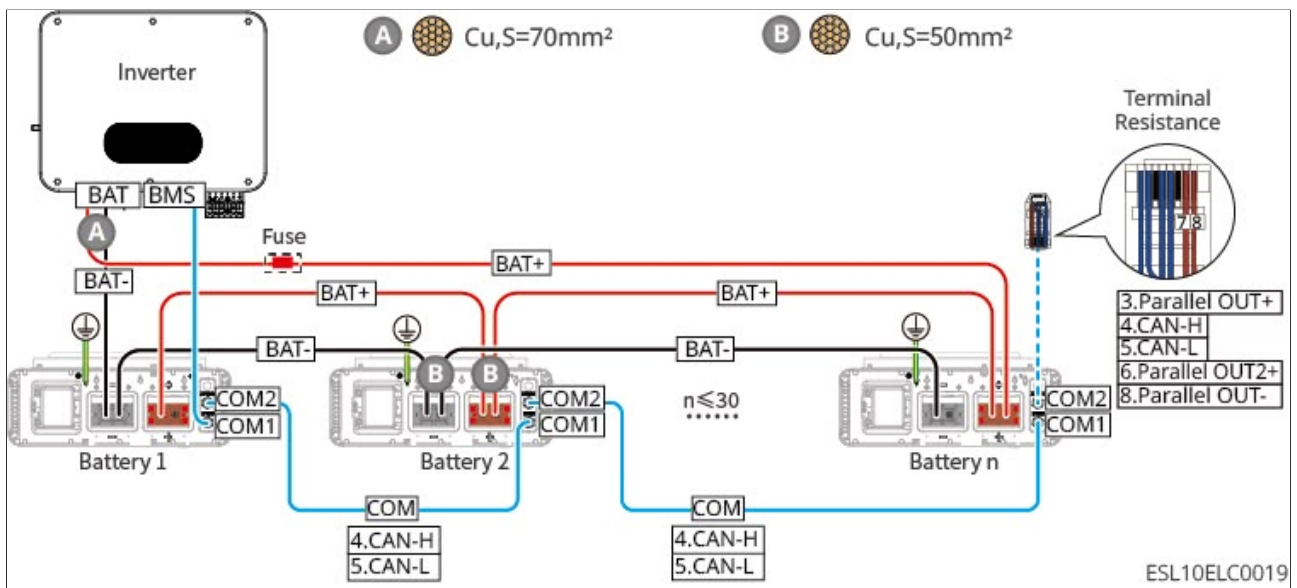


Figure24 LX U5.0-30: Hand-in-hand Connection Mode

LX U5.0-30: When Battery Qty ≤ 6 units, batteries are connected with BCB-22-WW-0

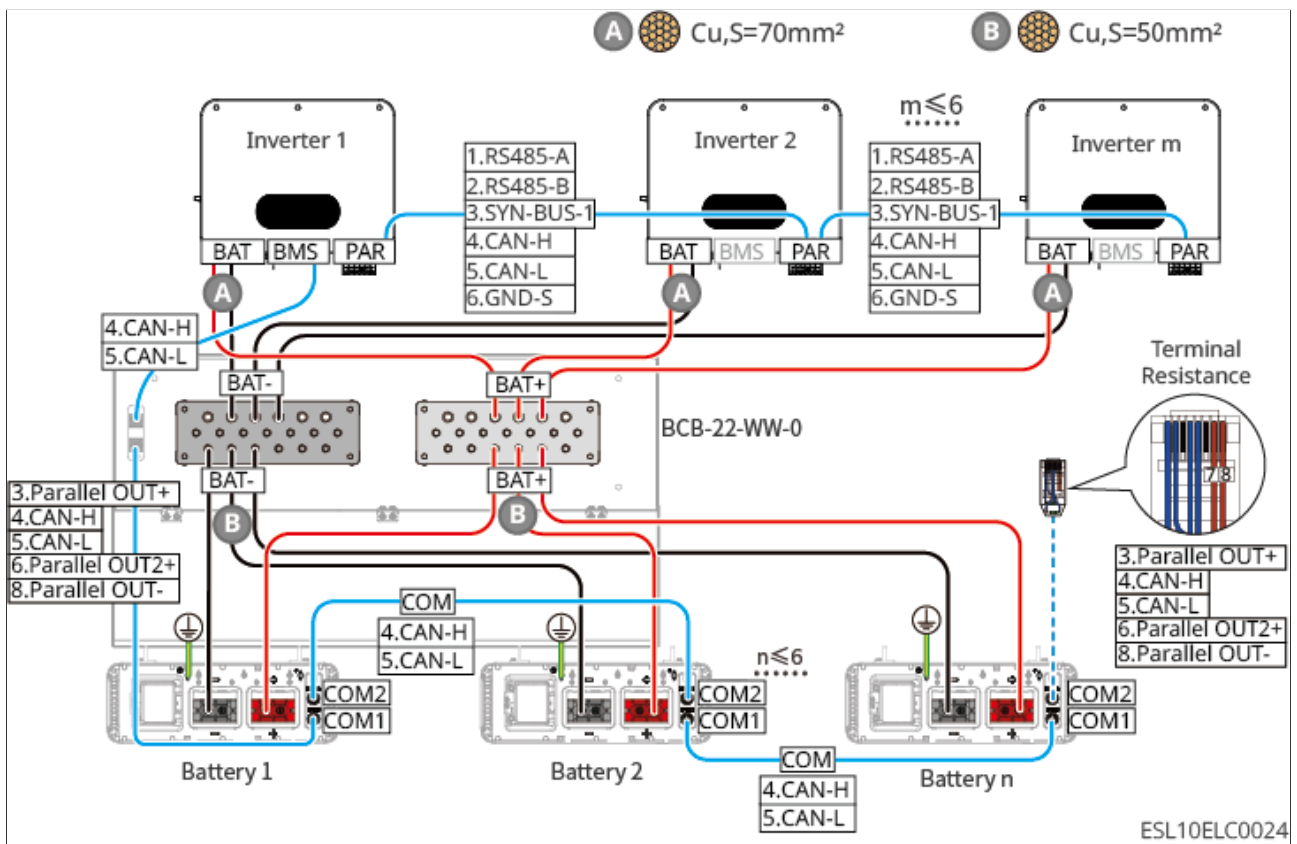


Figure25 LX U5.0-30: When Battery Qty ≤ 6 units, batteries are connected with BCB-22-WW-0

LX U5.0-30: When Battery Qty ≤ 8 units, batteries are connected with BCB-32-WW-0

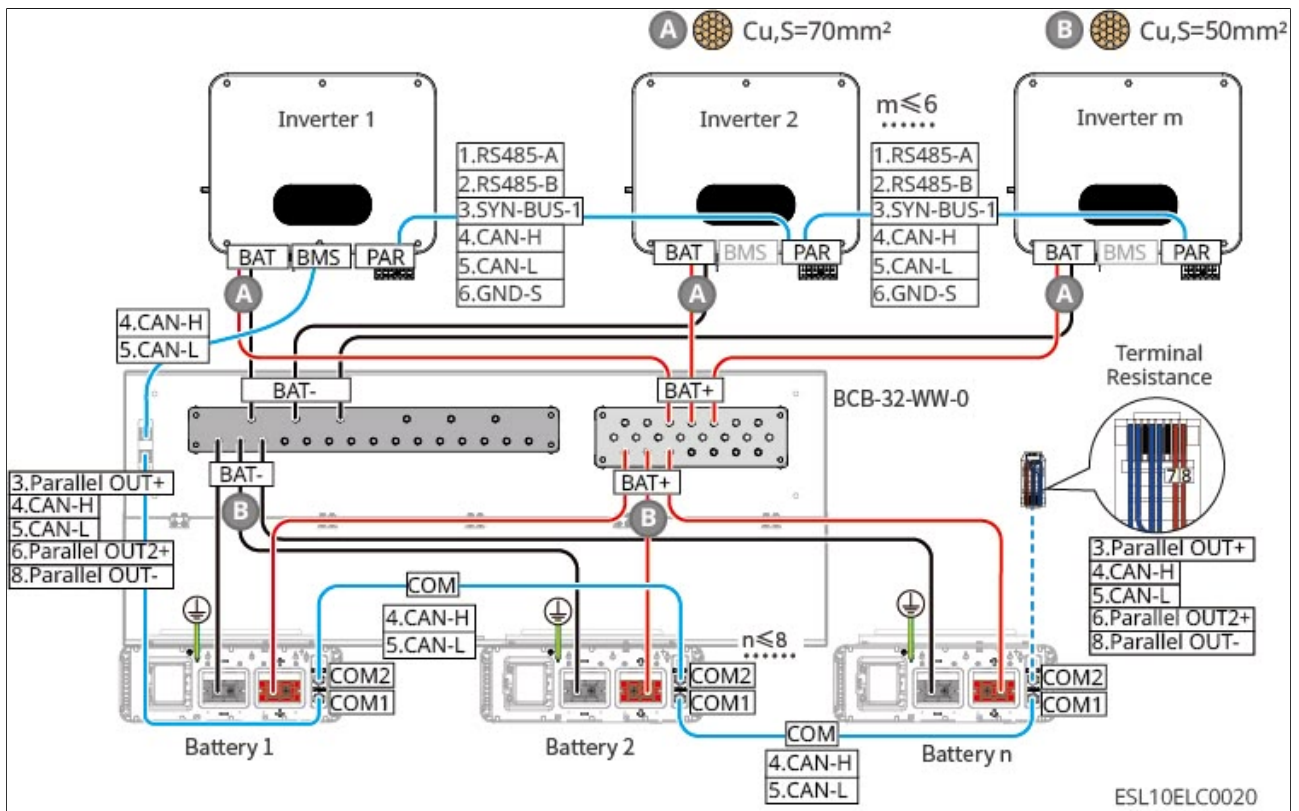


Figure26 LX U5.0-30: When Battery Qty ≤ 8 units, batteries are connected with BCB-32-WW-0

LX U5.0-30: When Battery Qty ≤ 15 units, batteries are connected with busbar BCB-33-WW-0

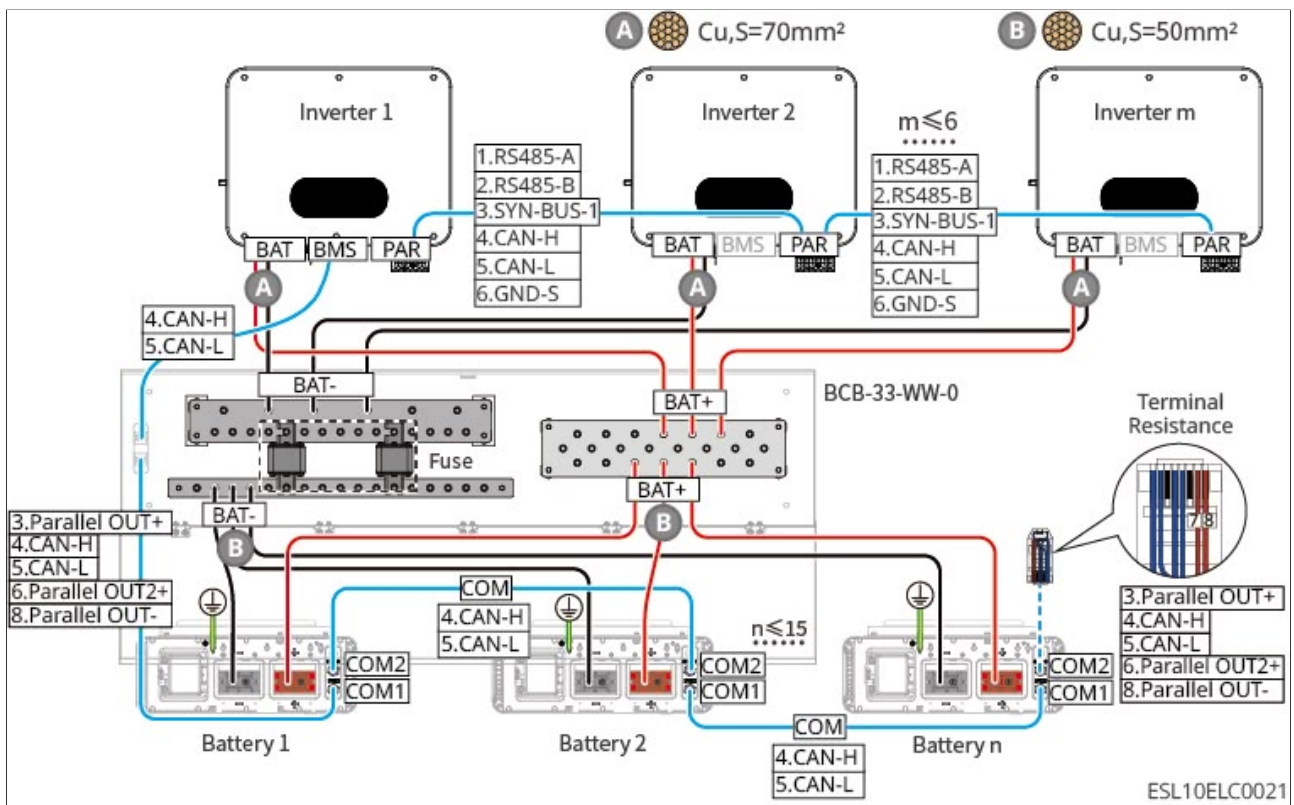


Figure27 LX U5.0-30: When Battery Qty ≤ 15 units, batteries are connected with busbar BCB-33-WW-0

LX U5.0-30: When Battery Qty ≤ 8 units, batteries are connected with a third-party busbar

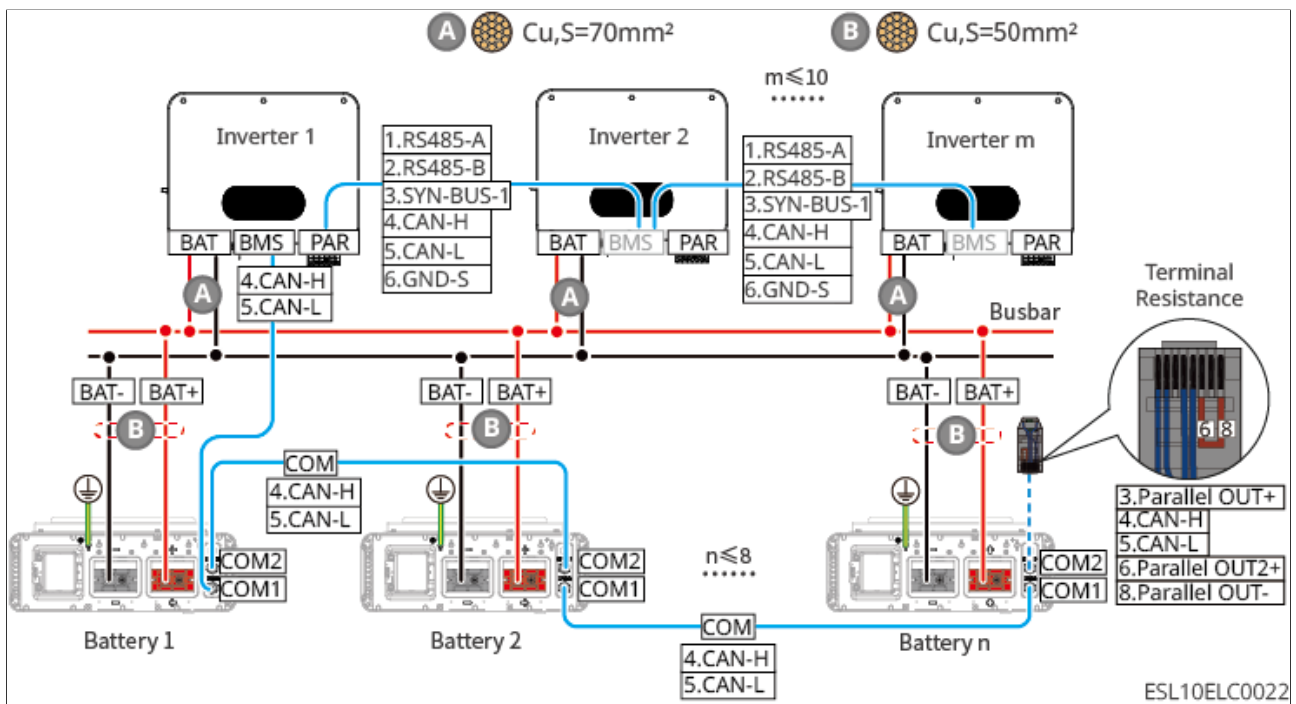


Figure28 LX U5.0-30: When Battery Qty ≤ 8 units, batteries are connected with a third-party busbar

LX U5.0-30: When Battery Qty > 8 units, batteries are connected with a third-party busbar

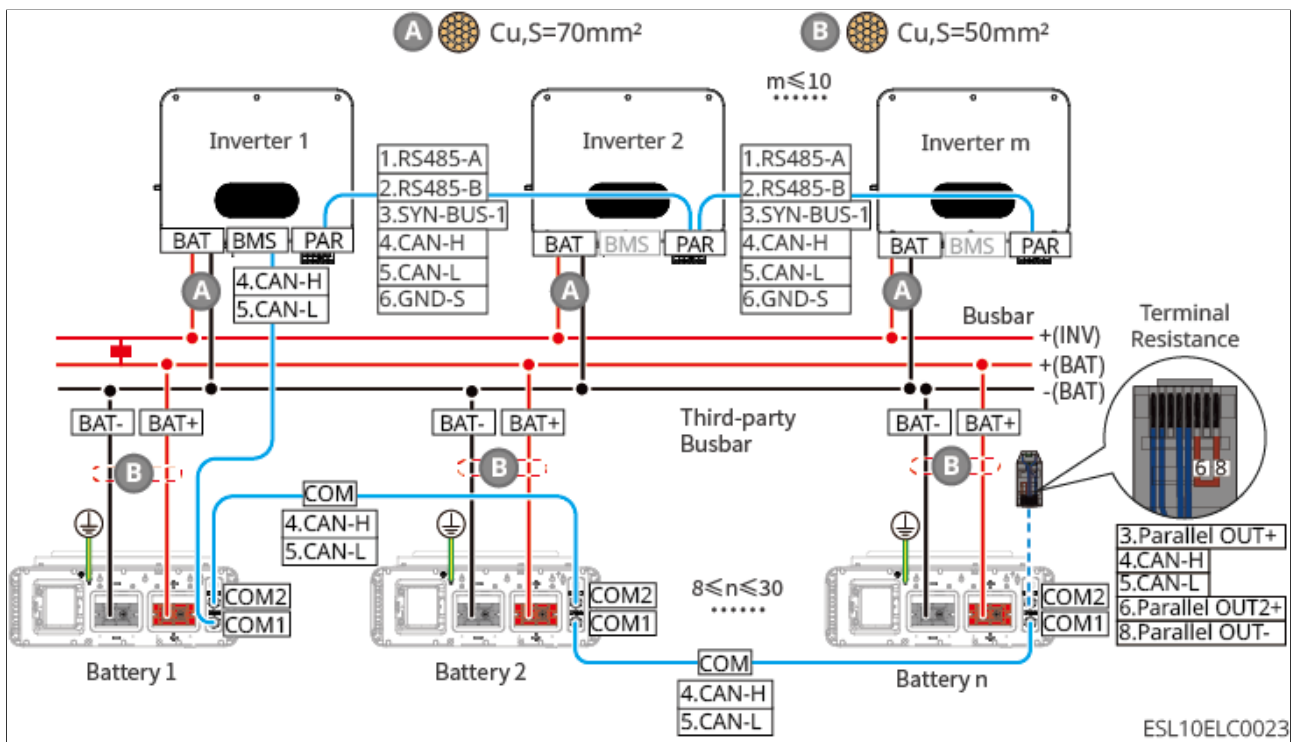


Figure29 LX U5.0-30: When Battery Qty > 8 units, batteries are connected with a third-party busbar

GW14.3-BAT-LV-G10: When batteries are directly connected to 2 single-output inverters, the wiring diagram is as follows:

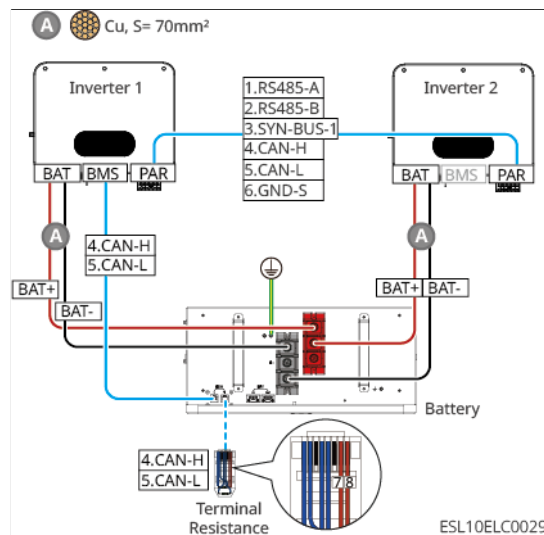


Figure30 GW14.3-BAT-LV-G10: Batteries directly connected to 2 single-output inverters

GW14.3-BAT-LV-G10: When batteries are connected hand-in-hand to one single-

output inverter, the wiring diagram is as follows:

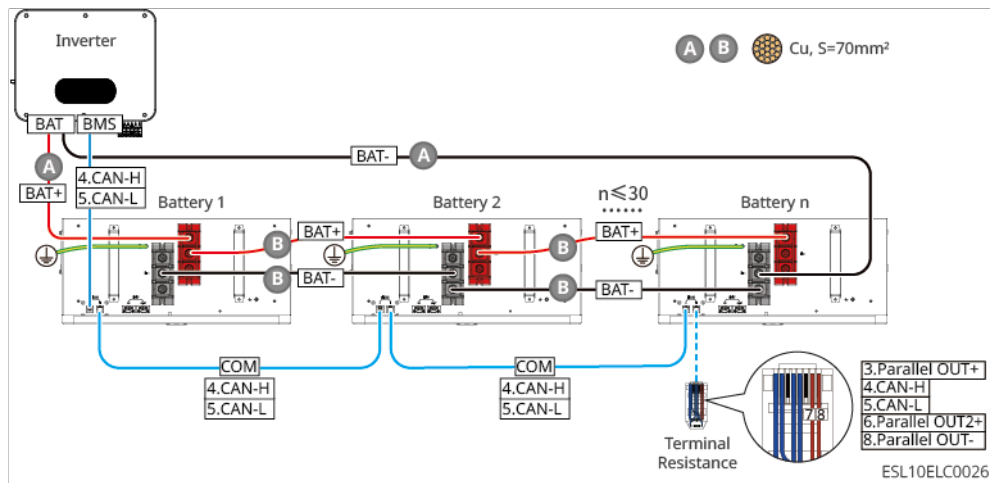


Figure31 GW14.3-BAT-LV-G10: Battery daisy-chain connection to a single 1-output inverter

GW14.3-BAT-LV-G10: When Battery Qty ≤ 15 and a combiner box (BCB-32-WW-0, current $\leq 720A$) is used to connect to a single 1-output inverter, the wiring diagram is as follows:

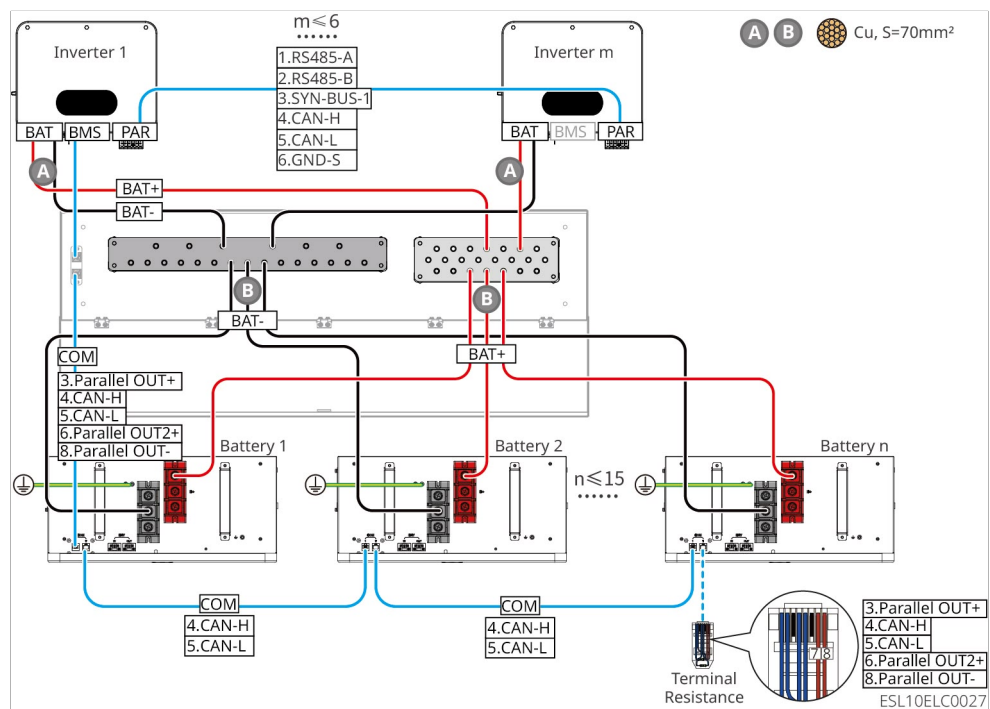


Figure32 GW14.3-BAT-LV-G10: Battery Qty ≤ 15 , using a combiner box (BCB-32-WW-0, current $\leq 720A$) to connect to a single 1-output inverter

GW16.1-BAT-LV-G10: Battery daisy-chain connection to inverter:

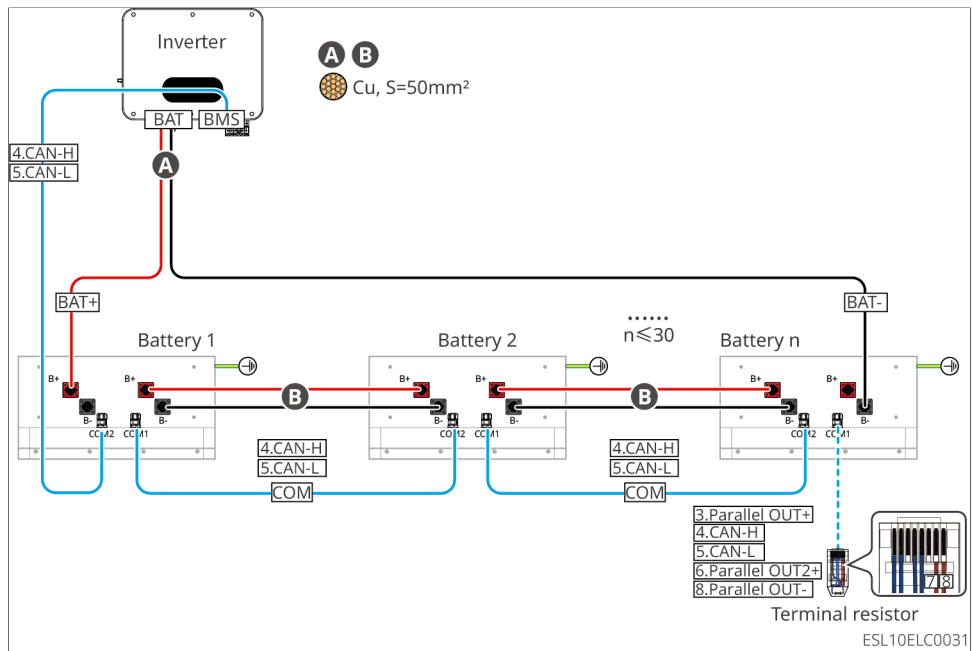


Figure33 GW16.1-BAT-LV-G10: Battery daisy-chain connection to inverter

GW16.1-BAT-LV-G10: Battery Qty ≤ 15 , using a combiner box (BCB-32-WW-0, current $\leq 720A$) to connect to inverter:

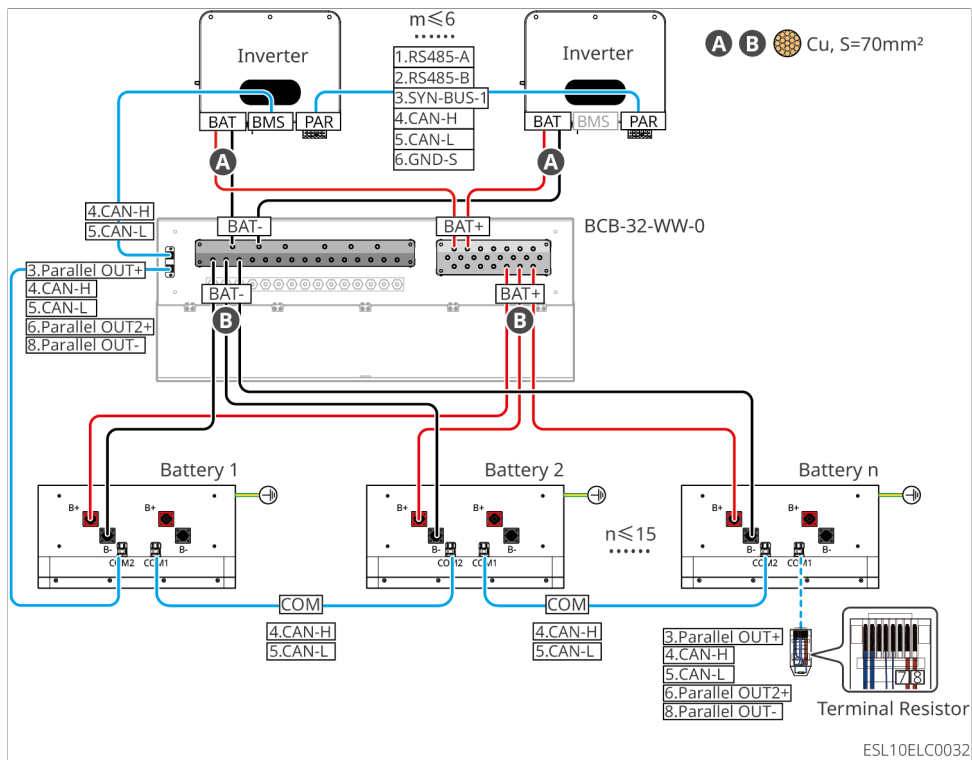


Figure34 GW16.1-BAT-LV-G10: Battery Qty ≤ 15 , using a combiner box (BCB-32-WW-0, current $\leq 720A$) to connect to inverter

When inverters are paralleled, the batteries are used with a third-party busbar; the wiring diagram is as follows:

Battery: LX A5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10

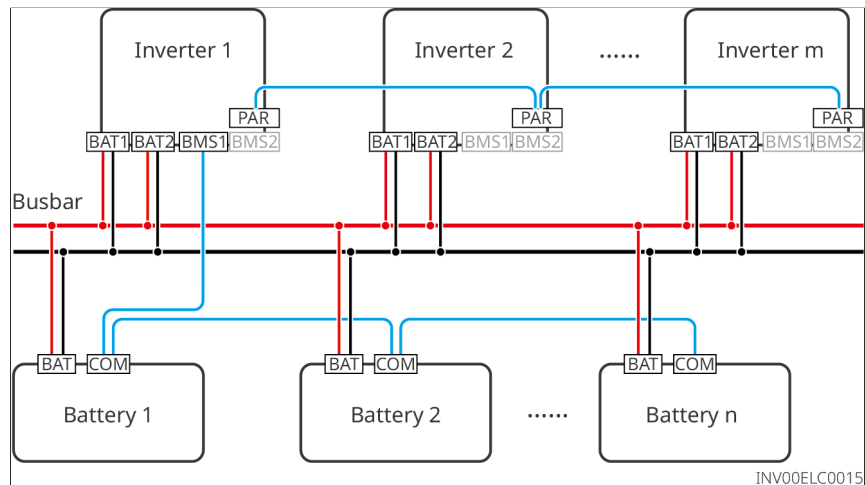


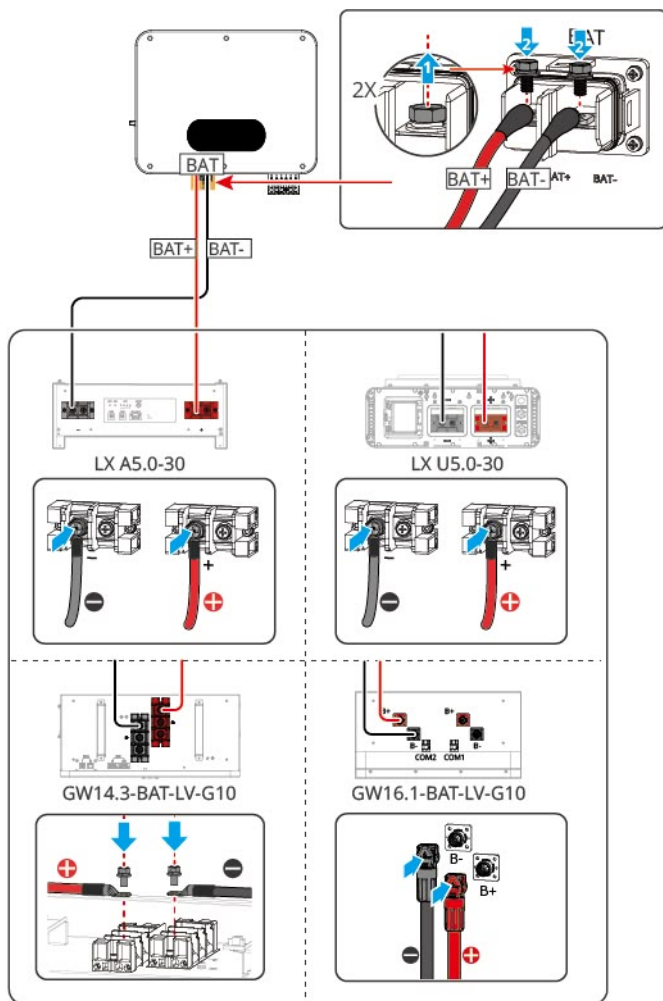
Figure35 When inverters are paralleled, batteries are used with a third-party busbar

5.6.1 Connect Inverter and Battery Power Cables

! WARNING

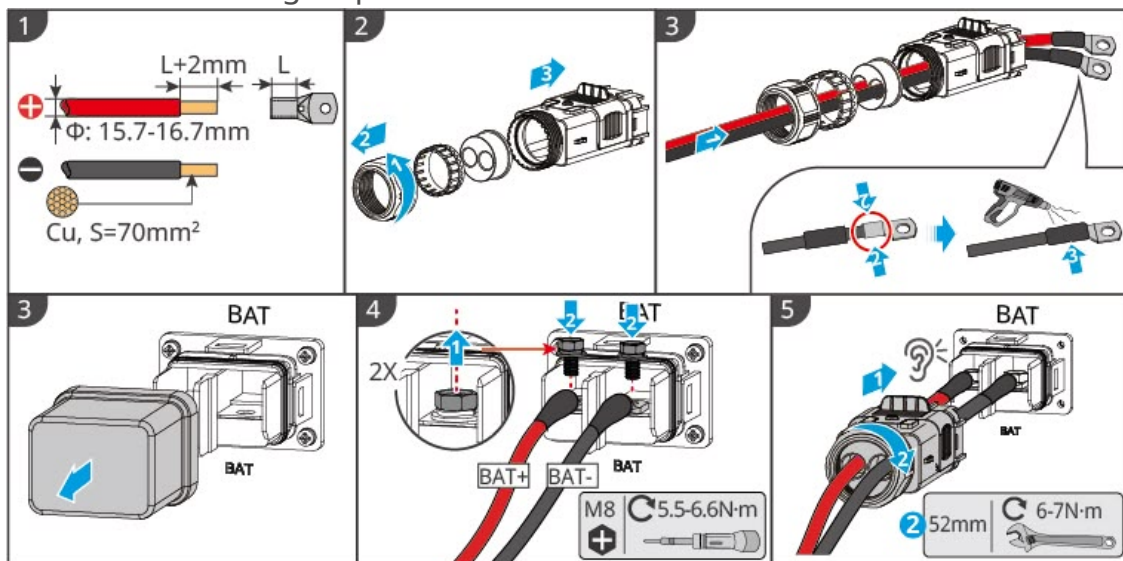
- Use a multimeter to measure the positive and negative poles of the DC cables to ensure that the positive and negative poles are correct and not reversed; and that the voltage is within the allowable range.
- During wiring, the battery cables must exactly match the 'BAT+', 'BAT-', and grounding terminals of the battery. Incorrect cable connection will cause equipment damage.
- Ensure the wire core is fully inserted into the terminal wiring hole with no exposed part.
- Ensure the cables are securely connected; otherwise, during equipment operation, the terminals may overheat and cause equipment damage.
- Do not connect the same Battery BANK to multiple inverters; otherwise, it may cause inverter damage.

Inverter and battery power cable wiring overview



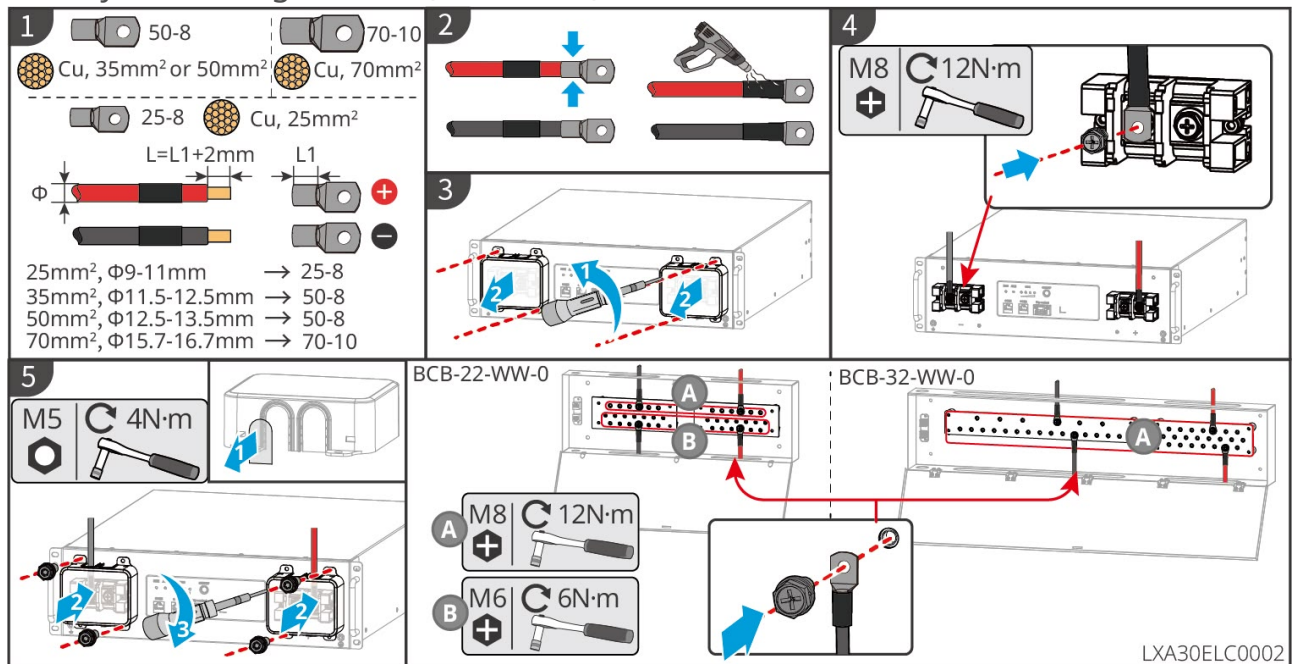
ESL10ELC0011

Inverter-side wiring steps

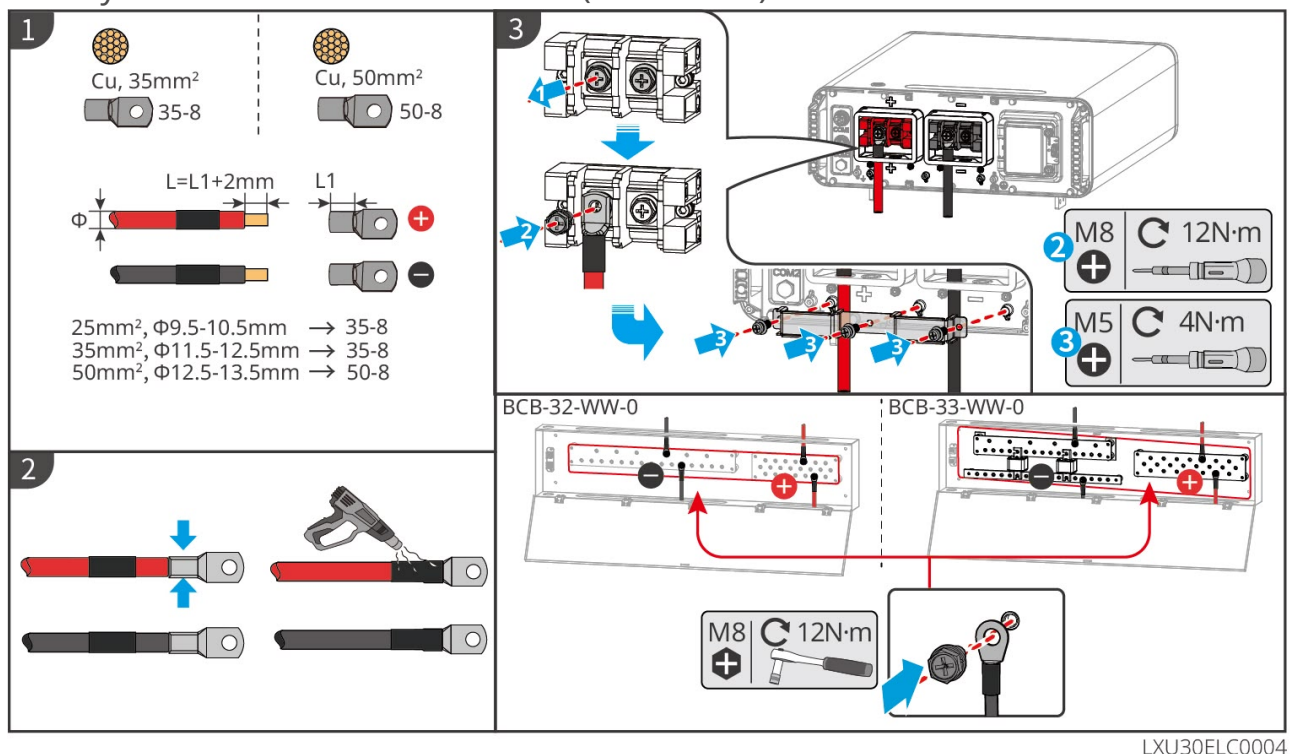


ESL10ELC0003

Battery-side wiring method (LX A5.0-30)

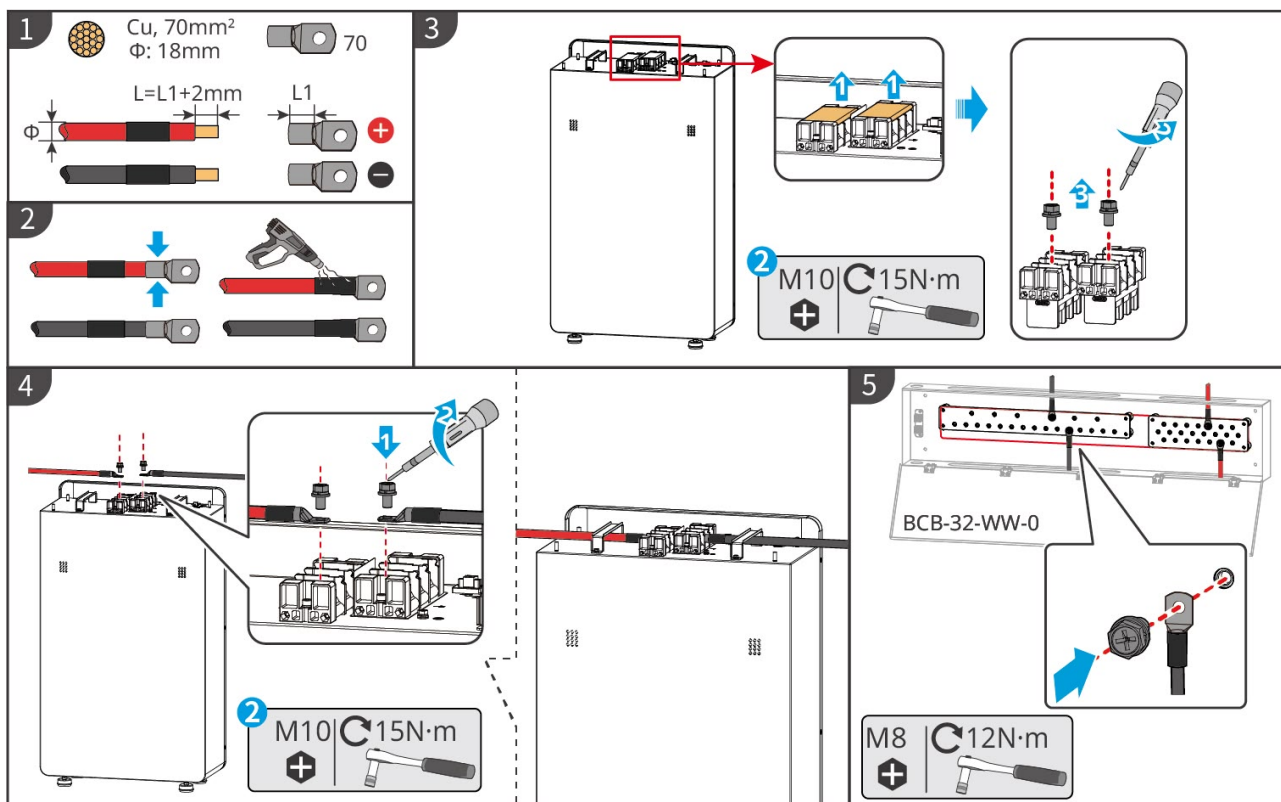


Battery-side cable fabrication method (LX U 5.0-30)



Battery-side cable fabrication method (GW14.3-BAT-LV-G10)

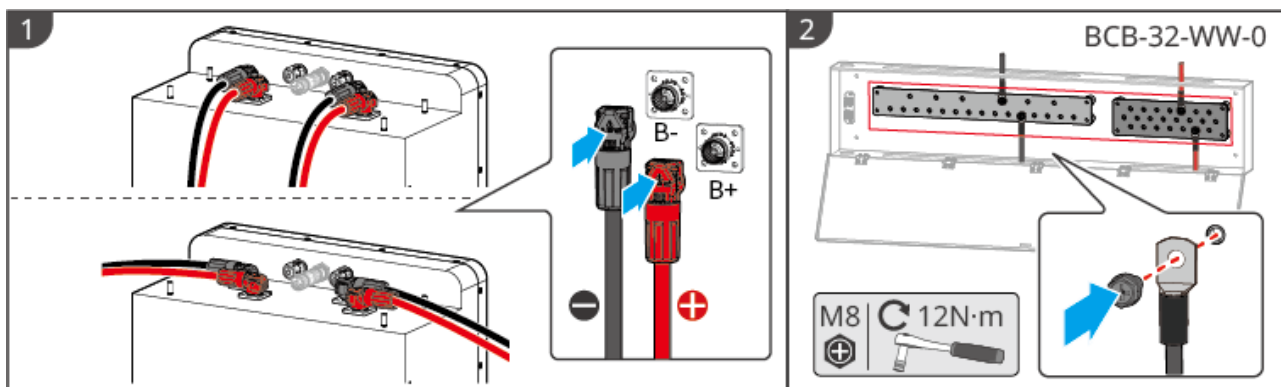
- GW14.3-BAT-LV-G10: If power cables are shipped with the battery accessories, use the shipped cables; crimping is not required



LXA10ELC0015

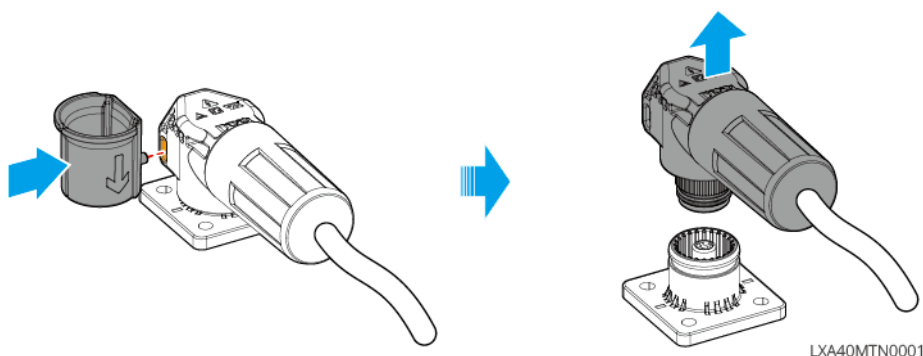
Battery-side cable fabrication method (GW16.1-BAT-LV-G10)

- The battery is shipped with a 1 m positive and negative power cable between the inverter and battery. If the cable length is insufficient during actual wiring, prepare your own cable and crimp it according to the following steps. After the cable is fabricated, mate the battery quick-connect terminal head with the battery port.



LXA40ELC0007

Battery DC quick-connect terminal unlocking method (optional)



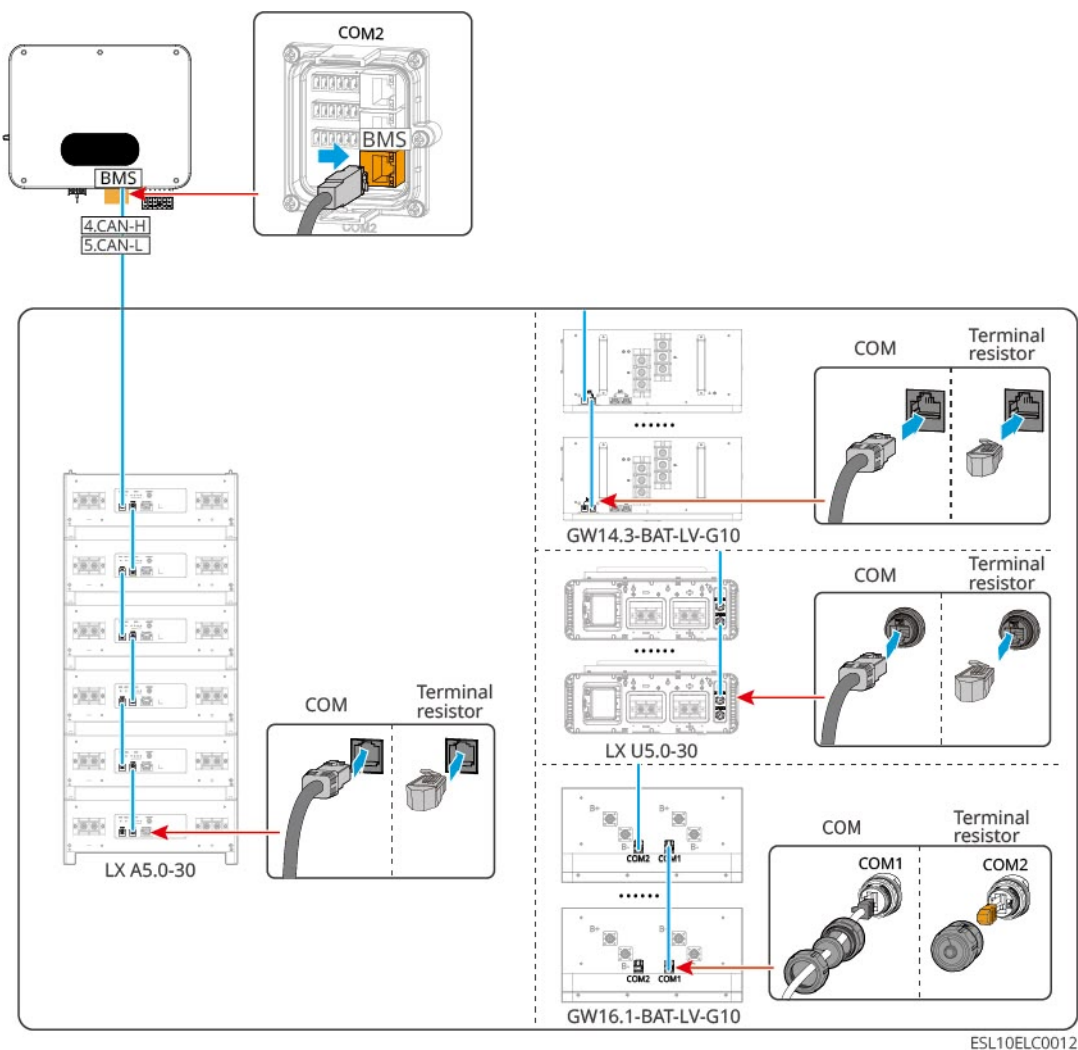
5.6.2 Connect Inverter and Battery Communication Cable

NOTICE

The inverter is shipped with a BMS battery communication cable; it is recommended to use the BMS battery communication cable provided. If the shipped communication cable cannot meet the requirements, prepare your own shielded network cable and shielded RJ45 plug; when crimping, only crimp PIN4 and PIN5 of the plug; otherwise, communication may fail.

BMS communication connection instructions between inverter and battery:

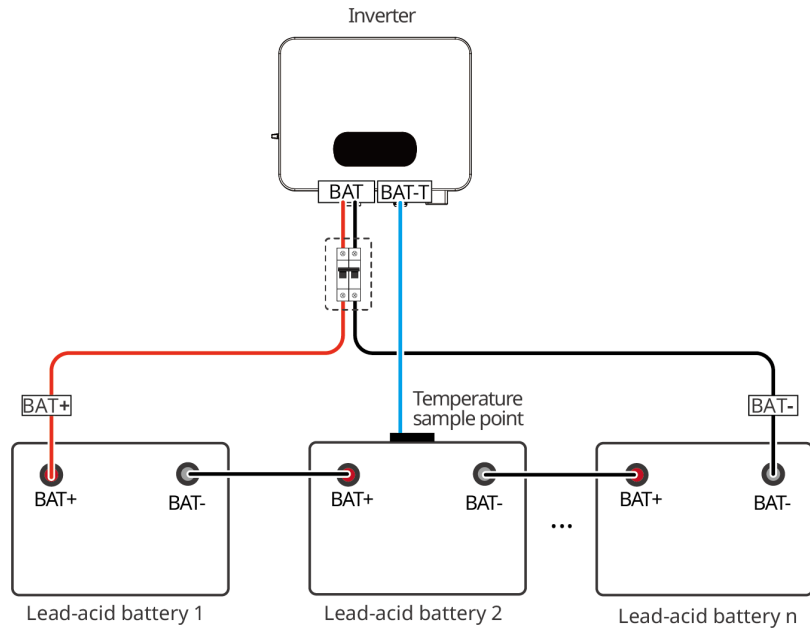
Inverter port	Connect to battery port	Port definition	Description
BMS(CAN)	COM1	4: CAN_H 5: CAN_L	- CAN communication is used between the inverter and the battery - Connect the inverter BMS port to the battery COM1 port



ESL10ELC0012

NOTICE

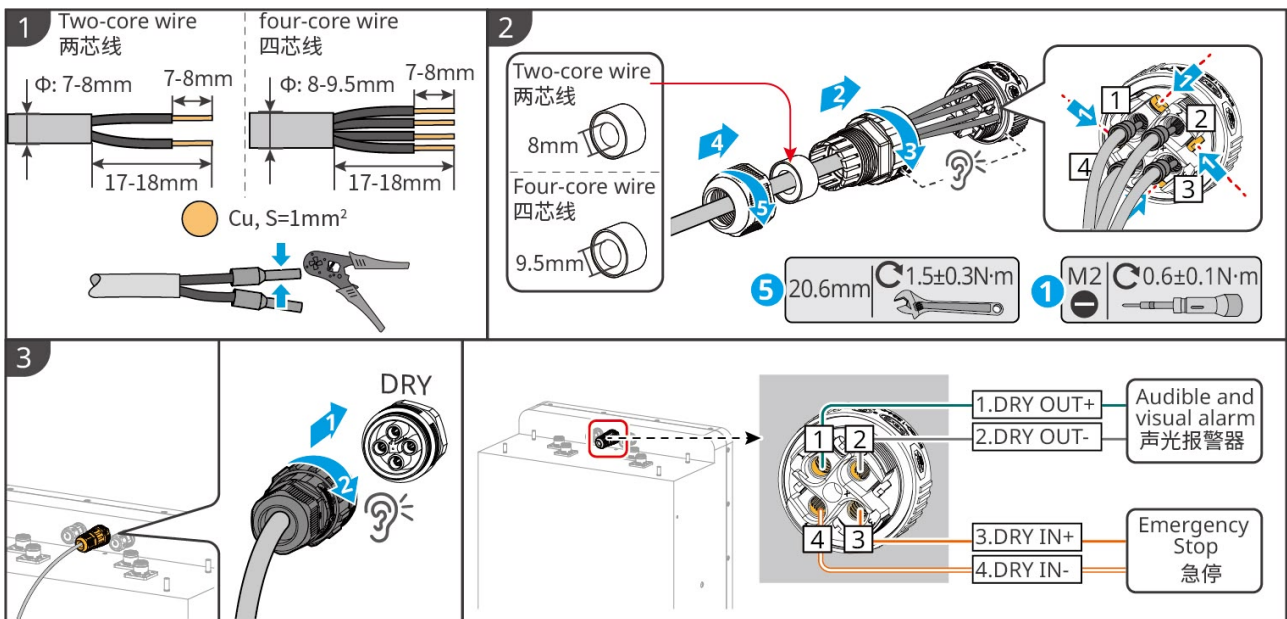
- When connecting the lead-acid battery temperature sensor cable, it is recommended to connect the temperature sensor cable at a location with poor heat dissipation. For example, when lead-acid batteries are placed side by side, secure the sensor to the lead-acid battery located in the middle.
- For better Protection of the cells, the temperature sampling cable must be installed, and it is recommended to place the battery in an environment with good heat dissipation.



ESU10ELC0094

5.6.3 Connect Battery Communication Cable

GW16.1-BAT-LV-G10:



LXA40ELC0010

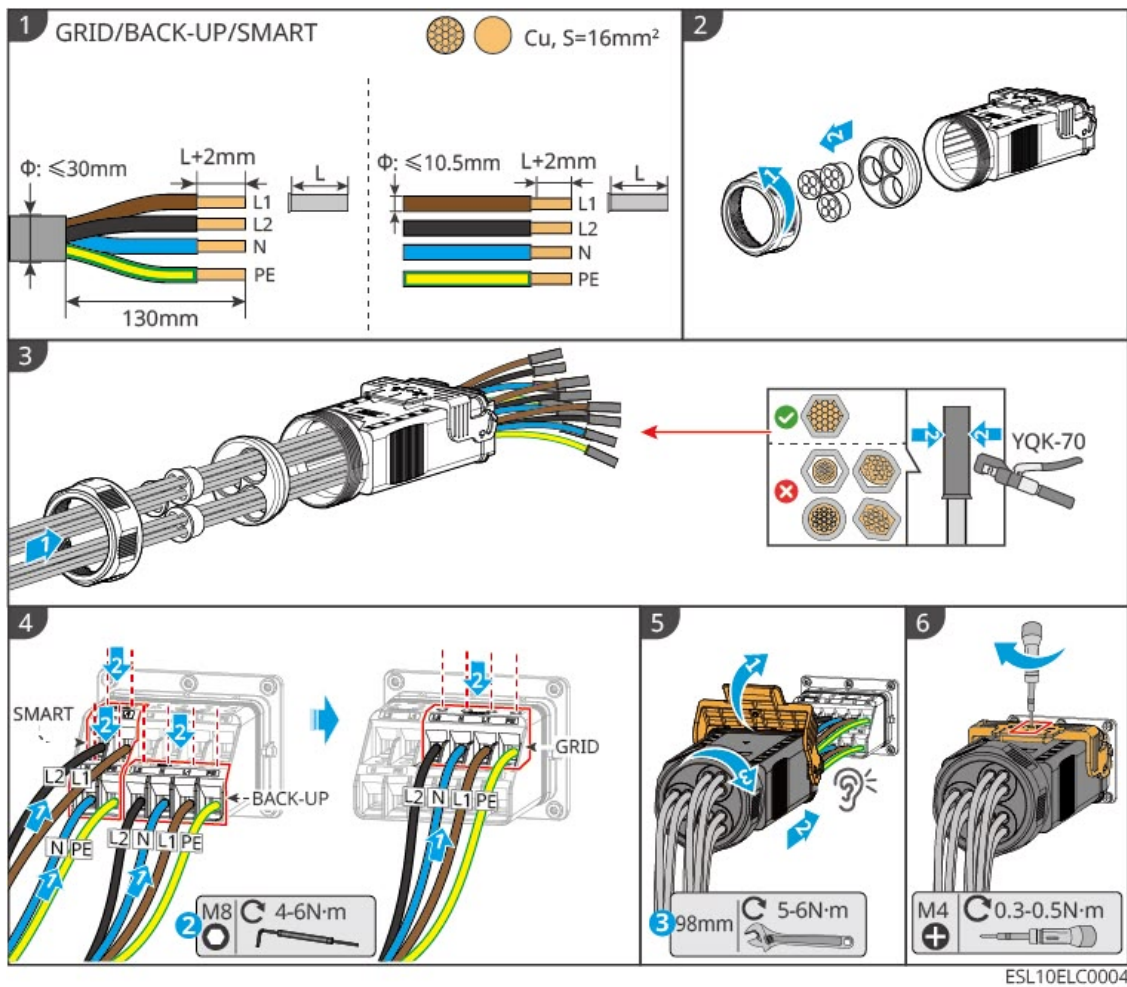
Communication Function Description

Port	Functions	Description
1-2	Fire alarm actuation signal communication port	Dry contact output signal interface, normally NO (normally open state) DO contact rating: 5V@10mA. Connect the audible and visual alarm cable to trigger an external audible and visual alarm device.
3-4	EPO signal communication port	Dry contact input signal interface, normally NO (normally open state) DI contact rating: 5V@10mA. Connect an external EPO switch to de-energize the battery system in the event of a fire.

5.7 Connect AC Cables

WARNING

- The inverter integrates a Residual Current Monitoring Unit (RCMU) internally to prevent the residual current from exceeding the specified value. When the inverter detects a leakage current greater than the permissible value, it will quickly disconnect from the grid.
- During wiring, the AC cables must exactly match the "BACK-UP", "ON-GRID", "GEN", and ground ports of the AC terminal. Incorrect cable connection will cause equipment damage.
- Ensure that the wire core is fully inserted into the terminal wiring hole with no exposed part.
- Ensure that the insulation board at the AC terminal is clamped tightly and not loose.
- Ensure the cables are securely connected; otherwise, during equipment operation, the terminals may overheat and cause equipment damage.

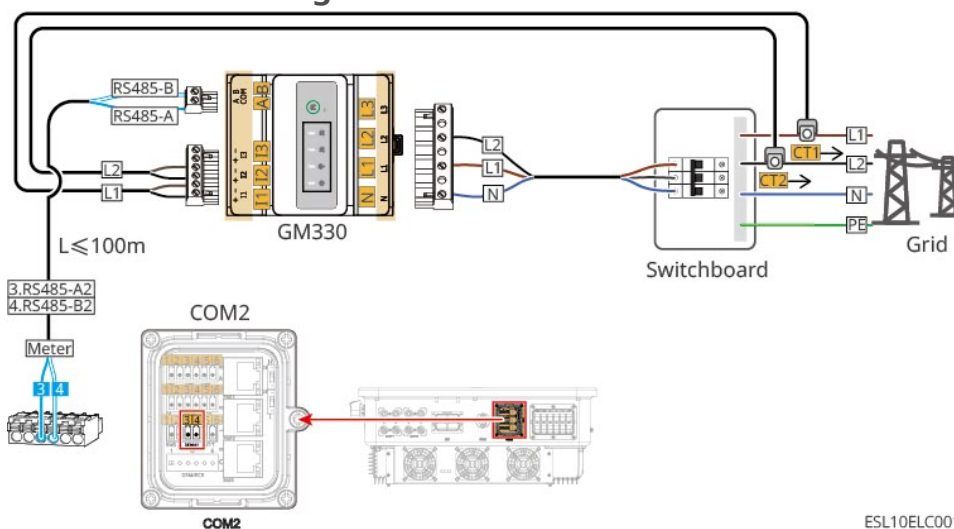


5.8 Connect the Meter Cable

NOTICE

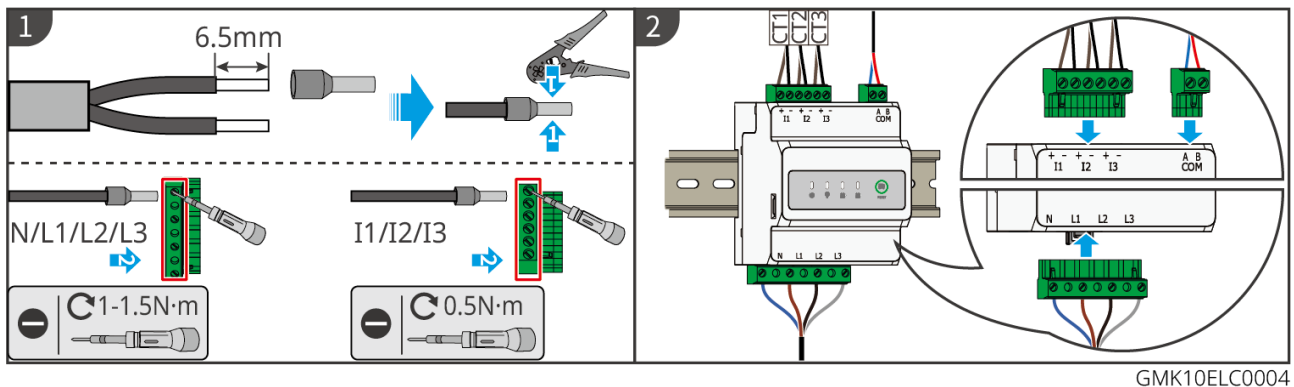
- Ensure that the CT connection direction and phase sequence are correct; otherwise, the monitoring data may be incorrect.
- Ensure that all cables are correctly connected, tightened, and not loose. Improper wiring may cause poor contact or damage the meter.
- In areas with lightning hazard, if the meter cable length exceeds 10 m and the cable is not routed in grounded metal conduit, it is recommended to install external lightning protection devices.
- The outer diameter of the AC power line must be smaller than the aperture of the CT to ensure that the AC power line can pass through the CT.
- To ensure the CT current detection accuracy, the CT cable length is recommended not to exceed 30 m.
- Do not use a network cable as the CT cable; otherwise, excessive current may damage the meter.
- The CT provided by the equipment manufacturer may vary slightly in size and appearance depending on the model, but the installation and wiring method is the same.

GM330 meter wiring

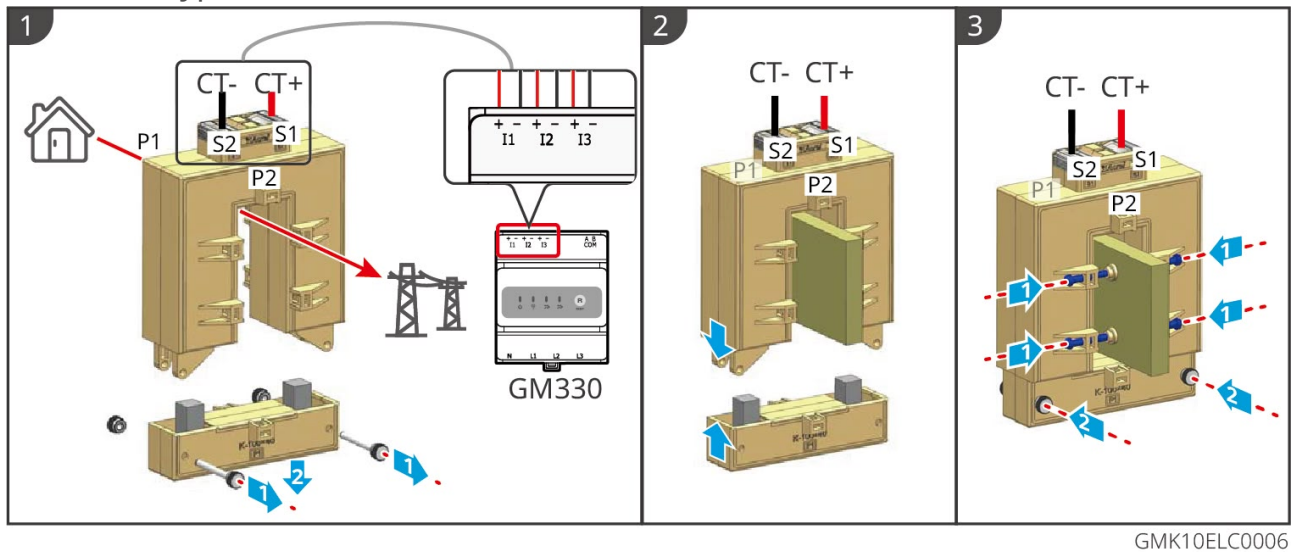


ESL10ELC0013

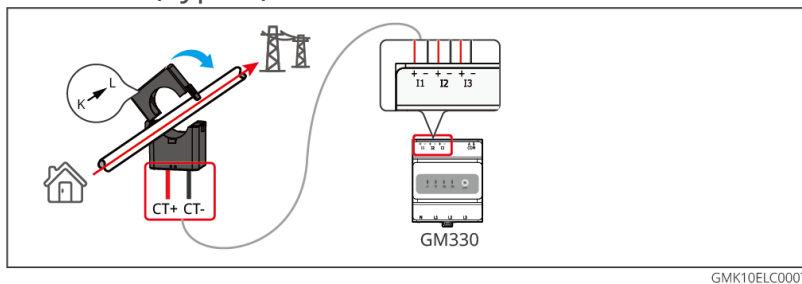
Wiring steps



Install CT (Type 1)



Install CT (Type 2)

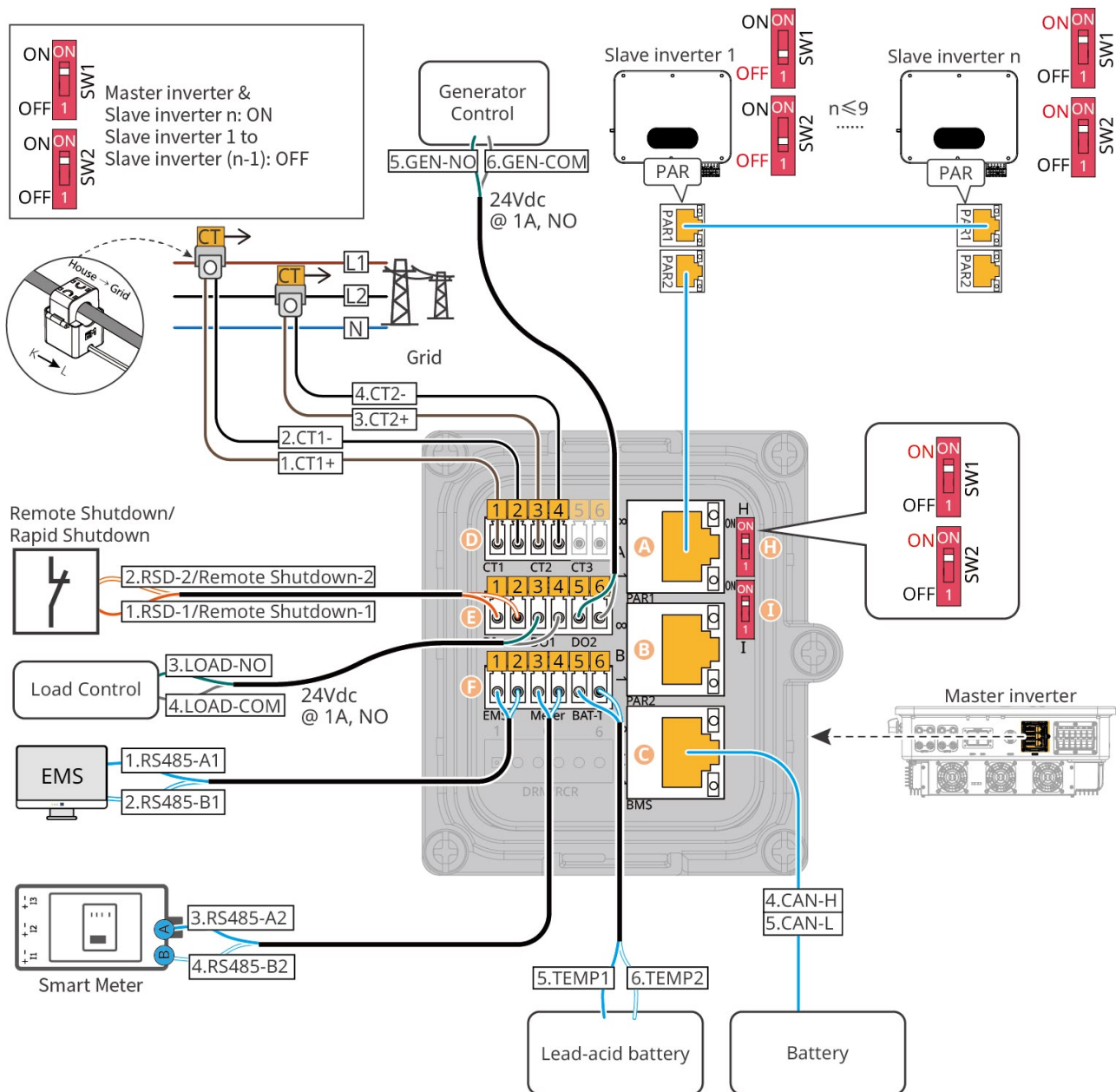


5.9 Connect the Inverter Communication Cable

NOTICE

- The inverter communication function is optional. Select it according to the actual usage scenario.
- The inverter supports connection to a mobile phone or WEB interface via Bluetooth, WiFi, or LAN communication to set device-related parameters, view device operation information and error information, and keep informed of system status in a timely manner.
- In a single-unit system, installing the WiFi/LAN Kit-20 smart communication stick is supported.
- In a parallel system, both the master and slave inverters need to be equipped with the WiFi/LAN Kit-20 smart communication stick for networking.
- If you need to use the Remote Shutdown function, enable this function in the App after wiring is completed.
- If the inverter is Not Connected to a Remote Shutdown device, do not enable this function in the App; otherwise, the inverter cannot operate in grid-connected mode.
- Remote Shutdown function: Connect the communication cable to the master inverter. Rapid Shutdown function: Connect the communication cable to each inverter separately. If you need to use both the Rapid Shutdown and Remote Shutdown functions at the same time, please contact the after-sales service center.

Communication Function Description



ESL10ELC0006

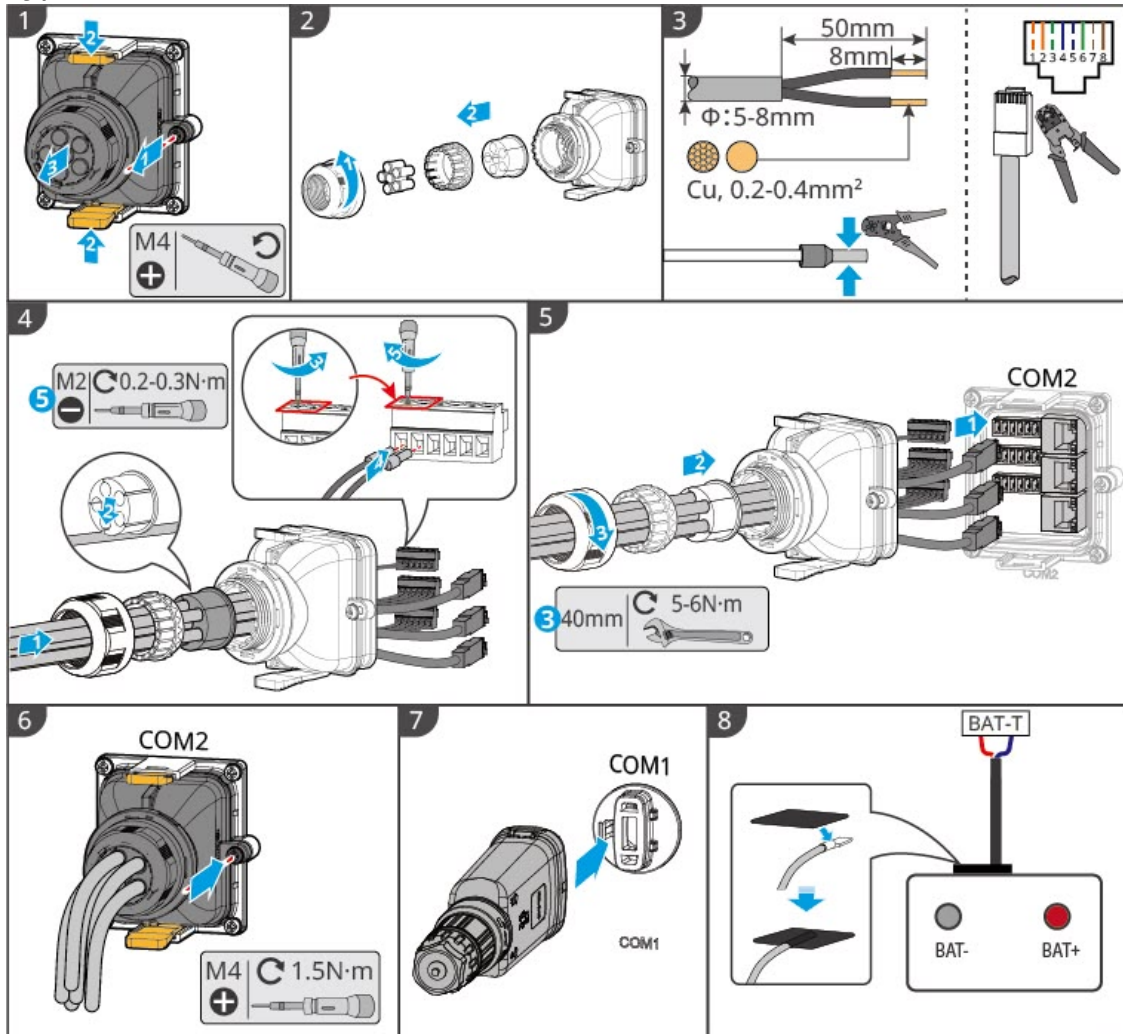
Port (Silkscreen)		Functions	Description
A	PAR1	Parallel communication port 1	Parallel communication port. Please use CAT5E or higher standard Ethernet cable and RJ45 connector.
B	PAR2	Parallel communication port 2	

Port (Silkscreen)		Functions	Description
C	BMS	Battery BMS communication	When connecting a lithium-ion battery, it is used to connect the battery system BMS communication cable and supports CAN signal communication.
D	CT1, CT2	CT connection port	Connect CT communication cable
	CT3	Reserved	-
E	DI	Remote Shutdown/Rapid Shutdown	• Remote Shutdown Function: ◦ When an accident occurs, the device can be controlled to stop operation ◦ The Remote Shutdown device must be a normally closed switch • Rapid Shutdown: In a Rapid Shutdown system, the Rapid Shutdown transmitter and receiver work together to achieve system Rapid Shutdown. The receiver maintains module output by receiving signals from the transmitter. The transmitter can be external or built into the inverter. In an emergency, an external trigger device can be enabled to stop the transmitter, thereby shutting down the modules. ◦ The Rapid Shutdown device must be a normally closed switch

Port (Silkscreen)		Functions	Description
	DO1	Load Control	• Supports connecting dry contact signals to implement load control and other functions. The DO contact rating is 24 Vdc @ 1 A, NO/COM normally open contacts • Supports SG Ready heat pump connection, and controls the heat pump via dry contact signals • Supported Operating Modes: ◦ Operating mode 2 (signal: 0:0): Energy-saving Mode. In this mode, the heat pump runs in Energy-saving Mode ◦ Operating mode 3 (signal: 0:1): Recommendation ON. In this mode, the heat pump increases hot water reserve to store heat while maintaining current operation
	DO2	Generator start/stop control Control port	Supports connection of Diesel Generator Control signals The DO contact rating is 24 Vdc @ 1 A, NO/COM normally open contacts
F	EMS	EMS communication port	Connect third-party EMS devices for energy control. Connecting third-party EMS devices is not supported in parallel operation scenarios
	Meter	Meter communication	Supports connection to external smart meters via RS485 communication
	BAT-T	Lead-acid temperature measurement port	Used to connect the lead-acid temperature sensing cable
D	CT1, CT2	CT connection port	When only the inverter's built-in meter is used, connect CT communication cable
H	SW1	Parallel operation DIP switch	In multi-unit parallel scenarios, set the parallel operation DIP switches of the first and last inverters to ON, and those of the other inverters to OFF
I	SW2		

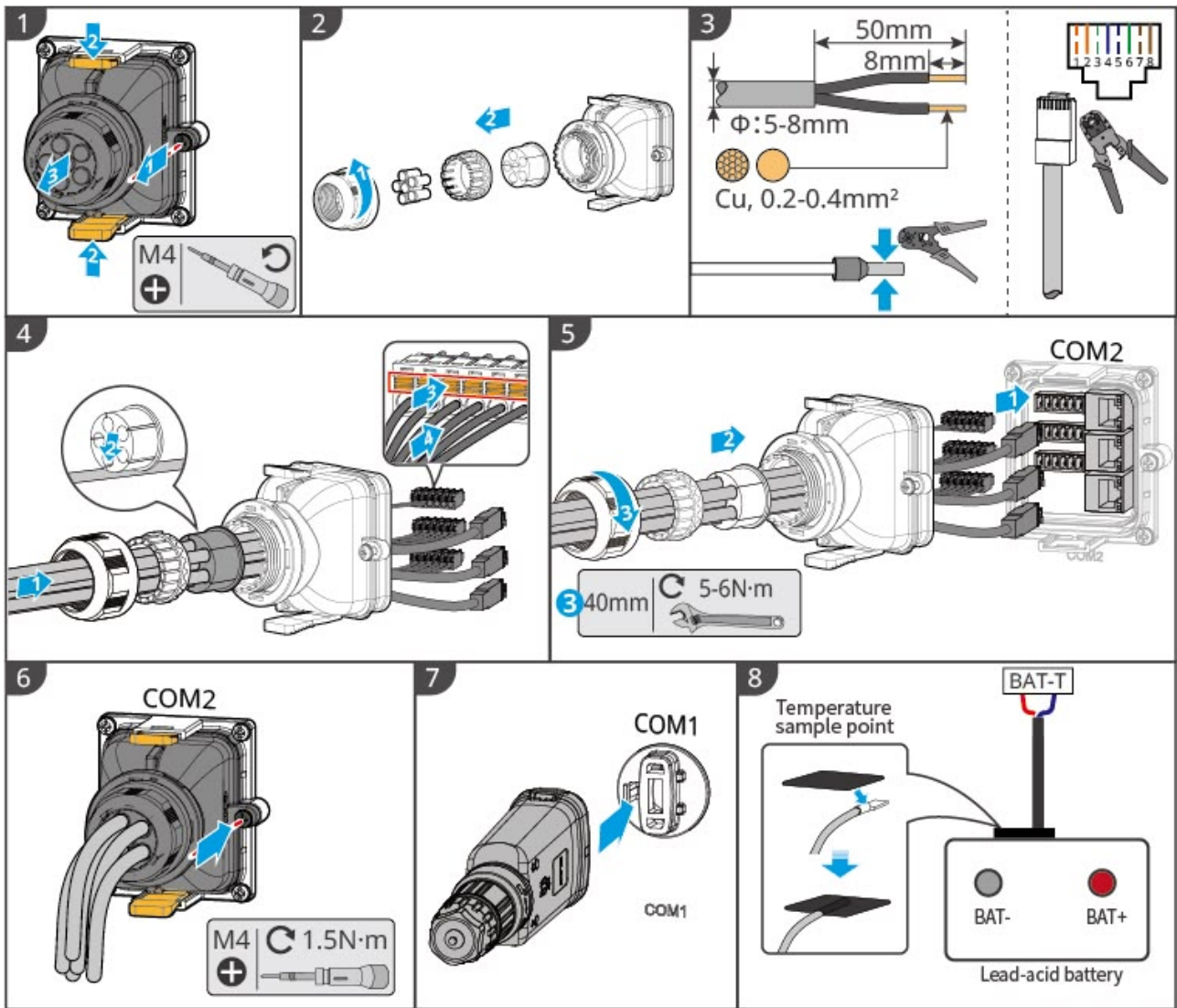
Communication cable connection method

Type 1



ESL10ELC0005

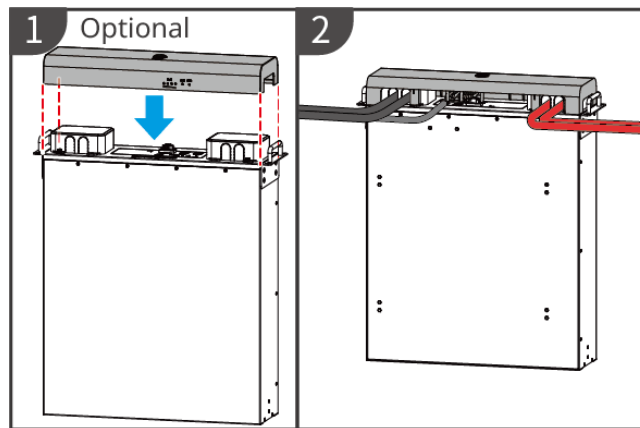
Type 2



ESL10ELC0034

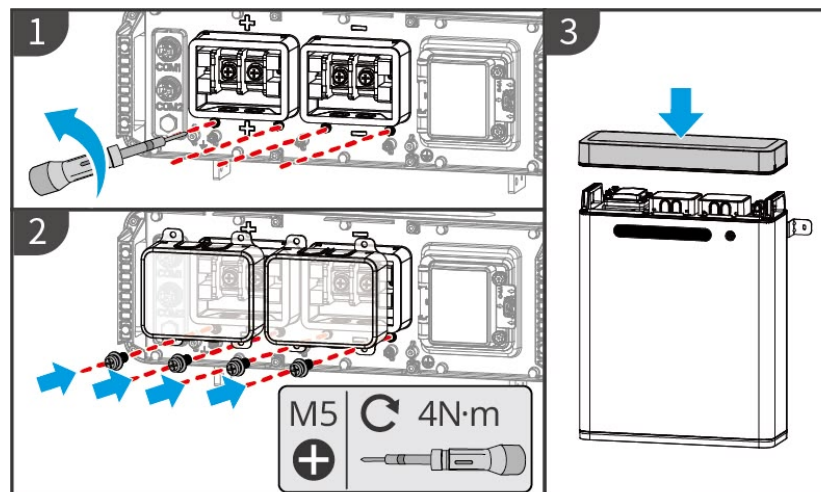
5.10 Install Battery Protection Cover

5.10.1 LX A5.0-30



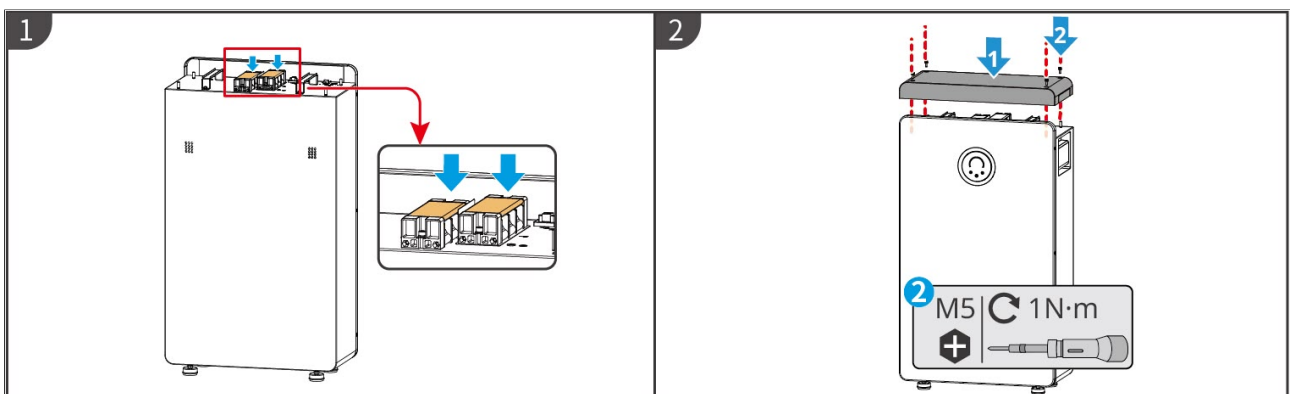
LXA30INT0006

5.10.2 LX U5.0-30



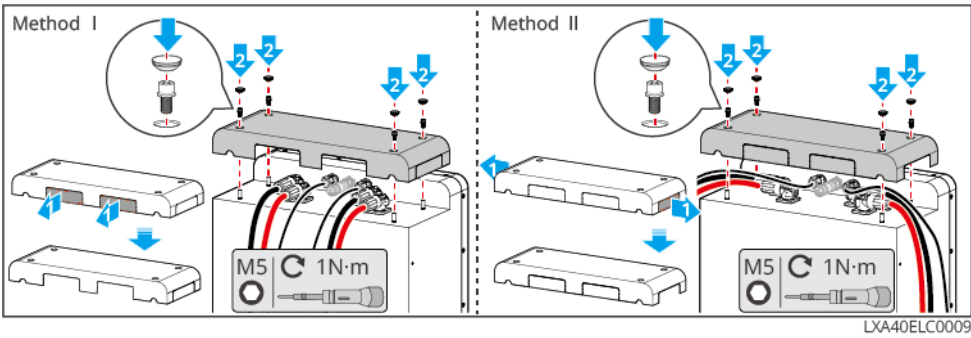
LXU30INT0006

5.10.3 GW14.3-BAT-LV-G10



LXA10ELC0017

5.10.4 GW16.1-BAT-LV-G10



6 System Trial Run

6.1 System Pre-Power-on Check

No.	Check Items
1	The device is installed securely; the installation position is convenient for operation and maintenance; the installation space is convenient for ventilation and heat dissipation; and the installation environment is clean and tidy.
2	The Protection ground cable, DC cable, AC cable, communication cable, and terminal resistor are correctly and securely connected.
3	Cable binding complies with routing requirements, is properly arranged, and is free from damage.
4	For unused cable entries and ports, be sure to use the matching terminals from the accessories for reliable connection, and ensure they have been sealed.
5	Ensure that used cable entry holes are properly sealed.
6	The voltage and frequency at the inverter's grid-connection point meet the grid-connection requirements.

6.2 System Power-On



- Battery black start: When no PV power is generated in the PV system and the grid is abnormal, if the inverter cannot work normally, the battery black start function can be used to force the battery to discharge and start the inverter. The inverter can enter off-grid mode and supply power to loads from the battery.
- After the battery system starts, please ensure that 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 open and power off the battery system.
- When there are multiple batteries in the system, starting any one battery starts all batteries.
 - GW14.3-BAT-LV-G10: After the battery is powered off and then powered on again, restart each battery one by one, or wait 15 minutes and then start any one battery; all batteries will then start.

Power-on procedure

1. (Select according to local regulations) Close the switch between the inverter and the battery.
2. Start the battery system.
 - a. LX A5.0-30: Press the battery system switch for ≤ 2 s.
 - b. LX U5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10: Close the battery system integrated circuit breaker, then short-press the battery system button.
3. Close the inverter's DC Switch.
4. (Select according to local regulations) Close the circuit breaker between the PV modules and the inverter.
5. Close the GRID circuit breaker.
6. Close the BACK-UP circuit breaker.
7. (Optional) Close the SMART circuit breaker.

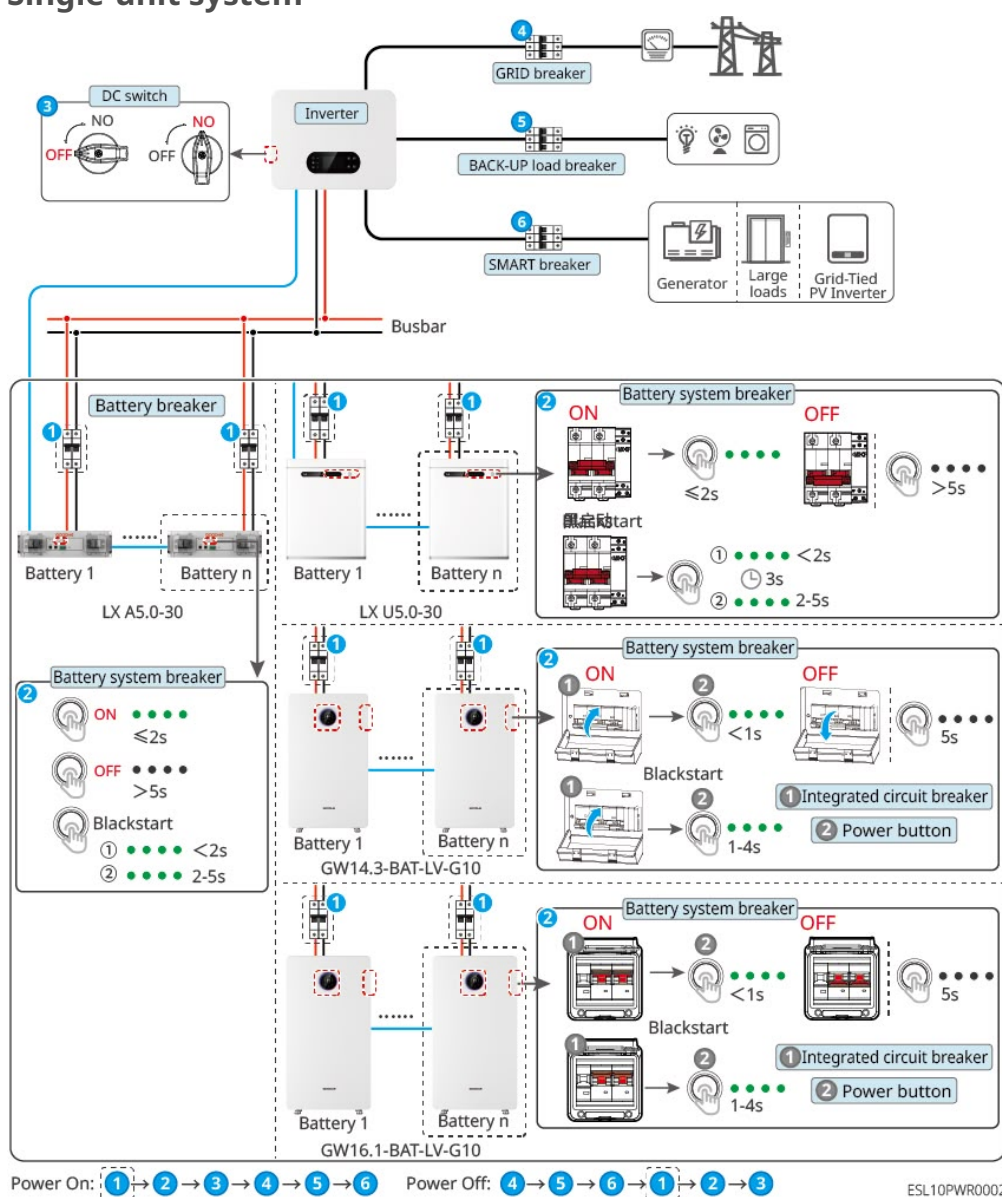
Battery black start

1. Close the battery system switch.
2. Starting the Battery:
 - a. LX A5.0-30, LX U5.0-30: Short-press the battery multi-function button for < 2 seconds, then long-press for 2-5 seconds to start the battery system. The battery will force discharge to activate the inverter.
 - b. GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10: Long-press the battery multi-function

button for 1-4 seconds to start the battery system. The battery will force discharge to activate the inverter.

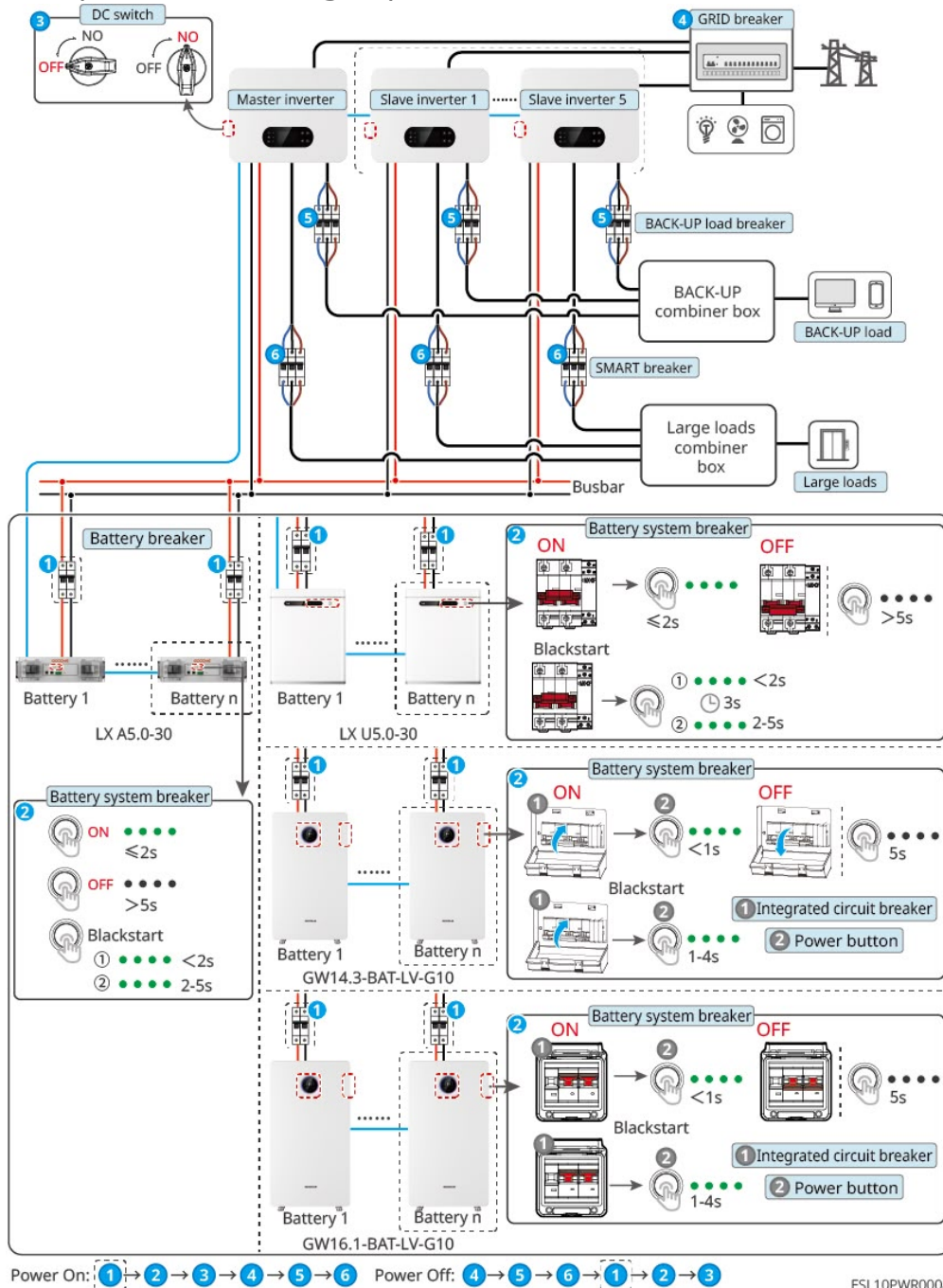
3. Close the inverter's DC Switch.
4. (Select according to local regulations) Close the circuit breaker between the PV modules and the inverter.
5. Close the GRID circuit breaker.
6. Close the BACK-UP circuit breaker.
7. (Optional) Close the SMART circuit breaker.

Single-unit system



Parallel system

Multiple inverters, off-grid parallel



6.3 Indicator Light Introduction

6.3.1 Inverter Indicator Lights

Indicator light	Status	Description
		Inverter is starting up and is in self-check mode
		Inverter is operating normally in grid-connected power generation or off-grid mode
		BACK-UP output Overload
		System Fault
		LCD ON: The inverter is powered on and in standby mode. LCD OFF: The inverter is powered off.
		Grid abnormal, inverter BACK-UP port power supply normal.
		Grid normal, inverter BACK-UP port power supply normal.
		No power supply at BACK-UP port.
		Inverter monitoring module resetting.
		No connection established between the inverter and the communication terminal.
		Communication failure between the communication terminal and the cloud server.
		Inverter monitoring normal.
		Inverter monitoring module not started.

6.3.2 Battery Indicator

6.3.2.1 LX A5.0-30、LX U5.0-30

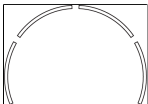
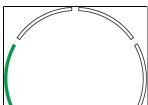
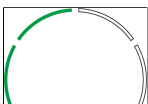
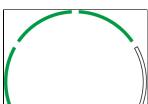
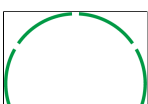
Indicator light		System status
	SOC indicator shows no green	SOC=0%

Indicator light		System status
	The first SOC indicator displays green	$0\% < \text{SOC} \leq 25\%$
	The second SOC indicator displays green	$25\% < \text{SOC} \leq 50\%$
	The third SOC indicator displays green	$50\% < \text{SOC} \leq 75\%$
	The fourth SOC indicator displays green	$75\% < \text{SOC} \leq 100\%$
 RUN indicator	Solid green	Battery system operating normally
	Green flashing once per second	Battery system is in standby state
	Green flashing 3 times/s	PCS Comm Loss
	Slow flashing	After an alarm occurs in the battery system, a self-test will be performed. Wait for the self-test to complete; it will then transition to normal operating state or fault state.
 ALM indicator	Solid red	Determine the fault type based on the SOC indicator display pattern, and handle it according to the recommended methods in the fault handling chapter.

6.3.2.2 GW14.3-BAT-LV-G10

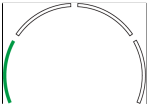
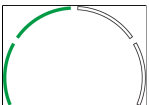
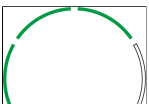
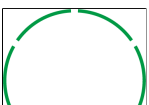
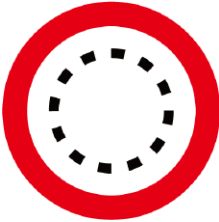


Normal Status

Indicat or Name	Indicator Light Status		Corresponding Other Light Status	System status
SOC Indicat or		SOC indicator solid green	/	SOC=0% 0% < SOC ≤ 25% 25% < SOC ≤ 50% 50% < SOC ≤ 75% 75% < SOC ≤ 100%
		SOC indicator flashing green		Battery system is in discharging state
				
				
				
Running indicator light + touch button		Solid white	 Blue-purple Breathing Light	System operating normally
		Flashing white	 Blue-purple running light	System preparing

Indicat or Name	Indicator Light Status		Corresponding Other Light Status	System status
Commu nication indicator		Solid white	/	PCS communication normal

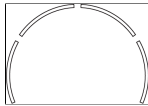
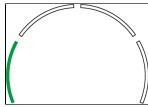
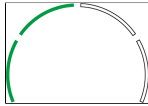
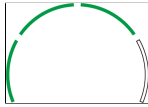
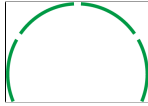
Abnormal state

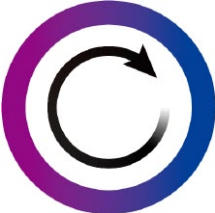
Indicat or Name	Indicator Light Status		Corresponding Other Light Status	System status
SOC Indicat or	   	SOC indicator solid green	 Red flashing  Off  Solid red	Determine the fault type based on the SOC indicator display pattern, and handle it according to the recommended methods in the fault handling chapter.
Commu nication indicator		Off	/	PCS Comm Loss
System alarm indicator		Solid white	/	System alarm and undervoltage fault levels 2, 3, 4

6.3.2.3 GW16.1-BAT-LV-G10

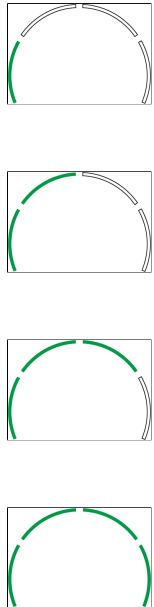
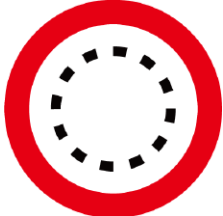


Normal Status

Indicat or Name	Indicator Light Status		Corresponding Other Light Status	System status	
SOC Indicat or		SOC indicator solid green	/	SOC=0%	
				0% < SOC ≤ 25%	
		SOC indicator flashing green		25% < SOC ≤ 50%	
				50% < SOC ≤ 75%	
				75% < SOC ≤ 100%	
				Battery system is in discharging state	

Indicat or Name	Indicator Light Status		Corresponding Other Light Status	System status
Running indicator light + touch button		Solid white	 Blue-purple Breathing Light	System operating normally
		Flashing white	 Blue-purple running light	System preparing
Commu nication indicator		Solid white	/	PCS communication normal

Abnormal state

Indicator or Name	Indicator Light Status		Corresponding Other Light Status	System status
SOC Indicator		SOC indicator solid green	 Red  Off  Solid red	Determine the fault type based on the SOC indicator display pattern, and handle it according to the recommended methods in the fault handling chapter.
Communication indicator		Off	/	PCS Comm Loss
System alarm indicator		Solid white	/	System alarm and undervoltage fault levels 2, 3, 4

6.3.3 Smart Meter Indicator

6.3.3.1 GM330

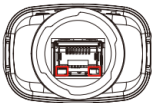
Type	Status	Description
Power indicator 	Solid	Meter powered on, no RS485 communication
	Flashing	Meter powered on, RS485 communication normal
	Off	Meter powered off
	Off	Reserved

Type	Status	Description
Communication indicator 	Flashing	Press and hold the Reset button for ≥ 5 s; the Power LED and Import/Export Energy LED flash: meter reset
Import/Export Energy LED 	Solid	Import energy from the grid
	Flashing	Export Energy to the grid
	Off	No energy import, no Export Energy
	Reserved	

6.3.4 Smart Communication Stick Indicator

6.3.4.1 WiFi/LAN Kit-20

Indicator light	Status	Description
Power indicator 		Solid on: The Smart Communication Stick is powered on.
		Off: The Smart Communication Stick is not powered on.
Communi- cation indicator 		Solid on: Communication in Wi-Fi mode or LAN mode is normal.
		Flashes once: The Smart Communication Stick's Bluetooth signal is enabled and waiting for App connection.
		Flashes twice: The Smart Communication Stick is Not Connected to the router.
		Flashes four times: The Smart Communication Stick communicates normally with the router, but is Not Connected to the server.
		Flashes six times: The Smart Communication Stick is identifying connected devices.
		Off: The Smart Communication Stick is undergoing a software reset or is not powered on.

Indicator light	Color	Status	Description
LAN Port Communication LED 	Green	Solid	100 Mbps wired network connection is normal.
		Off	- Ethernet cable is Not Connected. 100 Mbps wired network connection is abnormal. 10 Mbps wired network connection is normal.
	Yellow	Solid	10/100 Mbps wired network connection is normal; no communication data is being sent or received.
		Flashing	Communication data is being sent/received.
		Off	Ethernet cable is Not Connected.

Button	Description
Reload	Press and hold for 0.5–3 s; the Smart Communication Stick will reset.
	Press and hold for 6–20 s; the Smart Communication Stick will restore factory settings.

7 System Commissioning

7.1 Commissioning Method Overview

For inverter models with a display, users can set parameters through the app or through the LCD screen.

7.2 Configuration via LCD

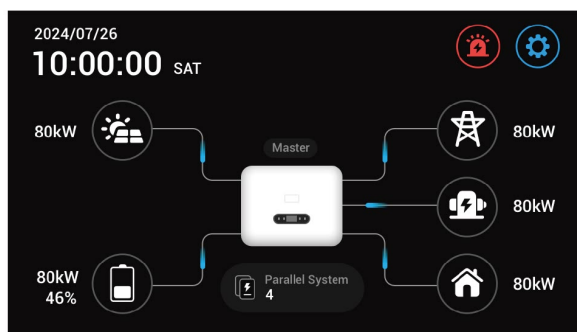
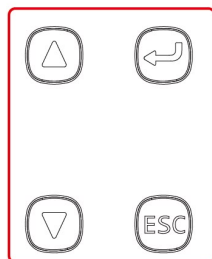
7.2.1 LCD Introduction

Through the LCD screen, users can:

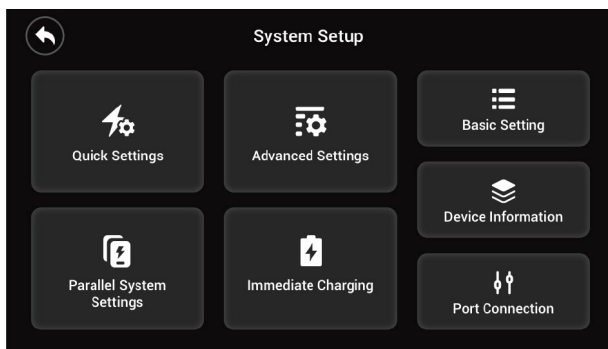
1. View device operating data, software version, alarm information, etc.
2. Set parameters, safety region, Power Limit, etc.

LCD Interface Introduction

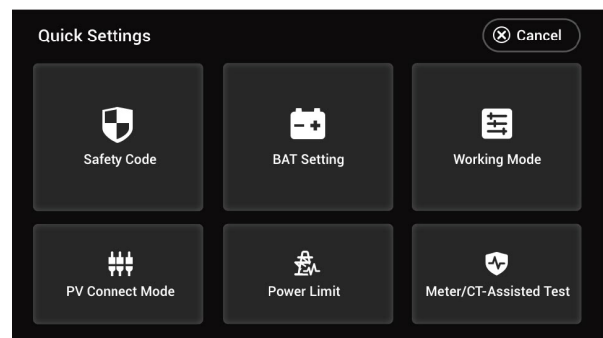
The LCD supports both touch and button operation.



ESL10CON0004



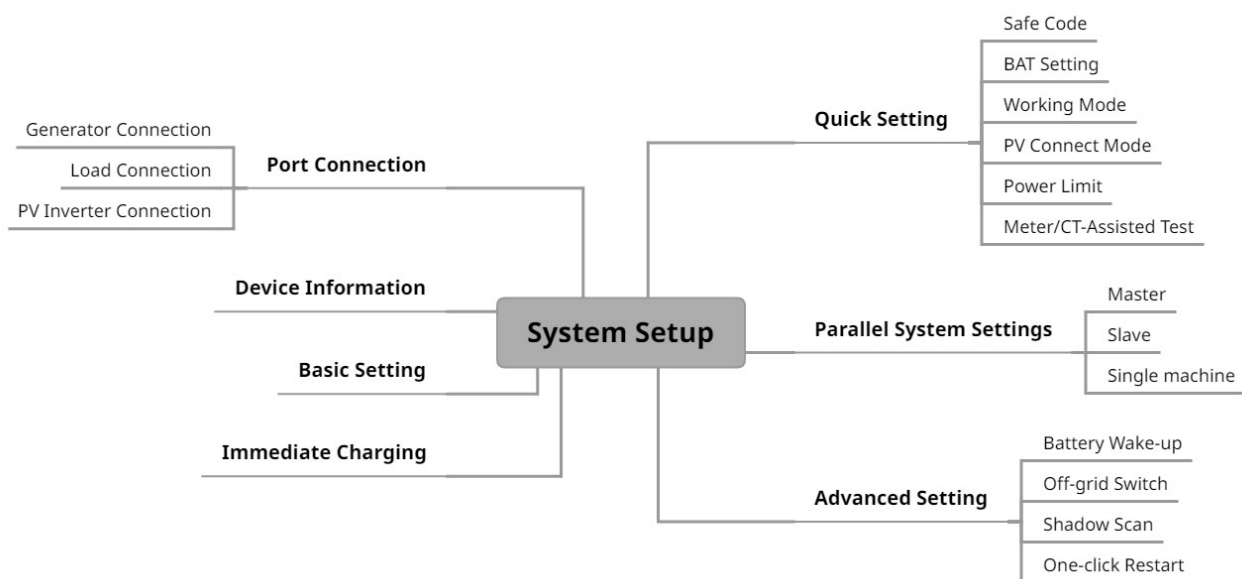
ESL10CON0005



ESU10CON0008

Name/Icon	Description
	Up
	Down
	Confirm
	• Short press: exit page •  and  Press and hold simultaneously for 5s: restart the device
	Used to view PV current, voltage, Energy Generation, and other information.
	Used to view battery model, status, and other information
	Used to view inverter alarm and fault information
	Used to enter the inverter settings interface
	Used to view grid status information
	Used to view generator status
	Used to view inverter load information
	Return to the main screen
Cancel	Return to the previous menu
Next	Go to the next settings page
Back	Return to the previous settings page

LCD settings interface structure



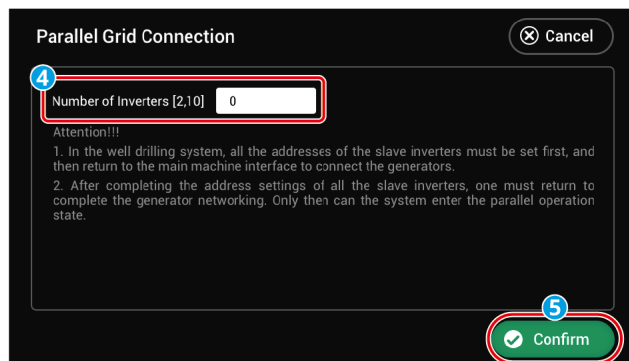
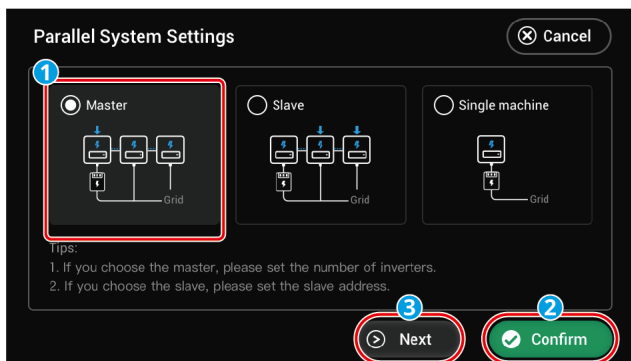
7.2.2 Parallel System Settings

1. On the main screen, tap >Parallel System Settings, enter the parameter settings screen.
2. According to the actual wiring of the inverter, set it as Master, Slave, or Single Unit.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

NOTICE

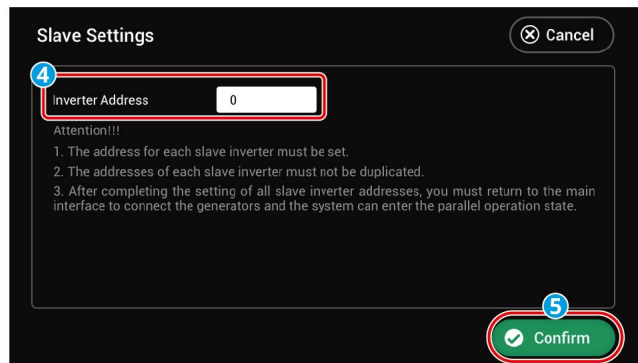
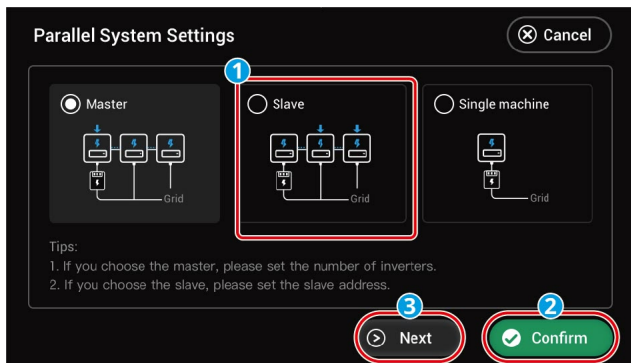
Please ensure that Confirm is clicked on each page to ensure the parameters take effect; otherwise, the system will run with default parameters.

Set Master Inverter Parameters



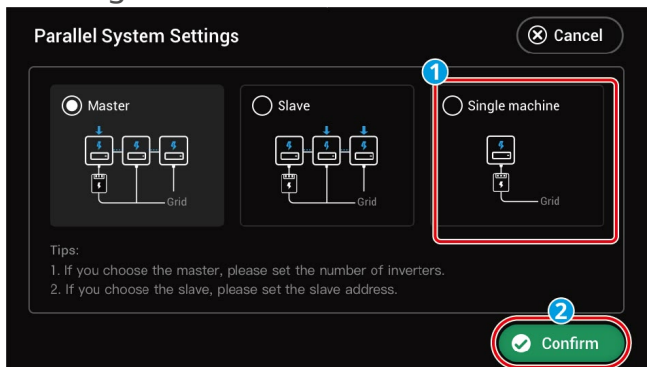
ESL10CON0006

Set Slave Inverter Parameters



ESL10CON0007

Set Single Unit

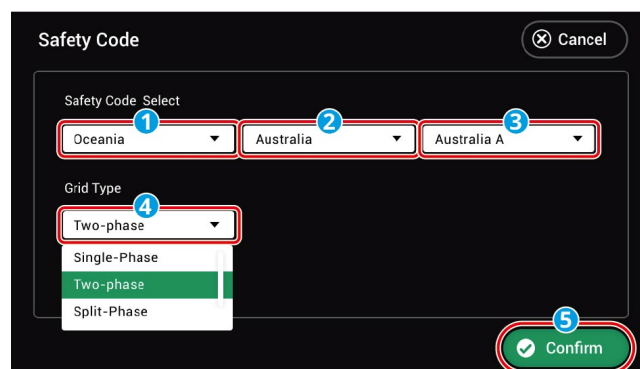


ESL10CON0008

7.2.3 Quick Settings

Safety Code Settings

1. On the main screen, tap > Quick Settings > Safe Code, enter the parameter setting interface.
2. Please select the corresponding safety code based on the country or region where the device is located.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.



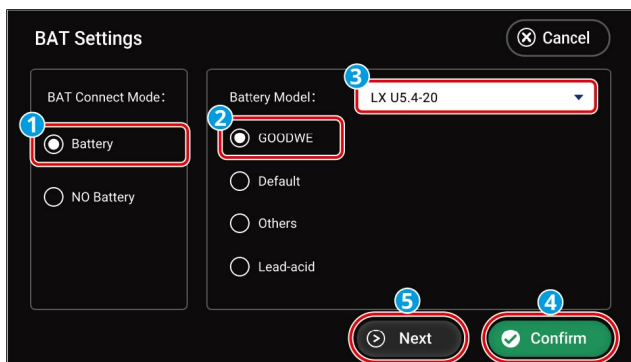
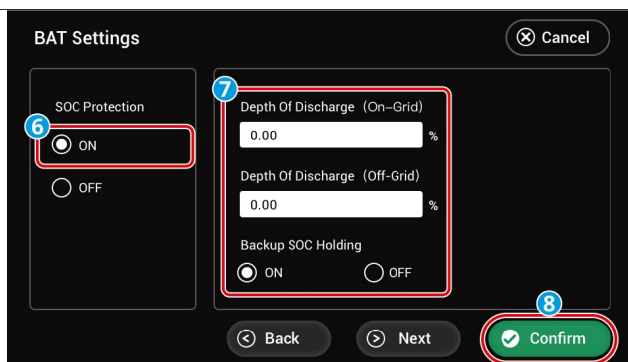
ESL10CON0003

Battery Parameter Settings

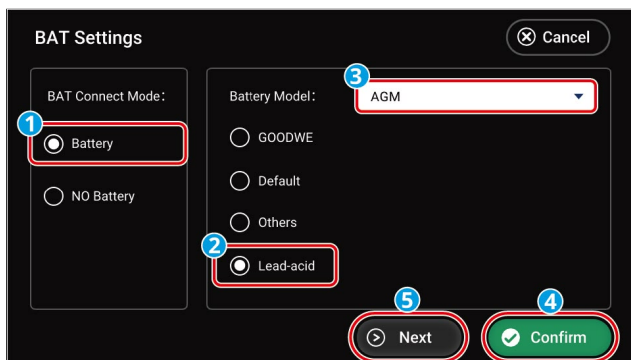
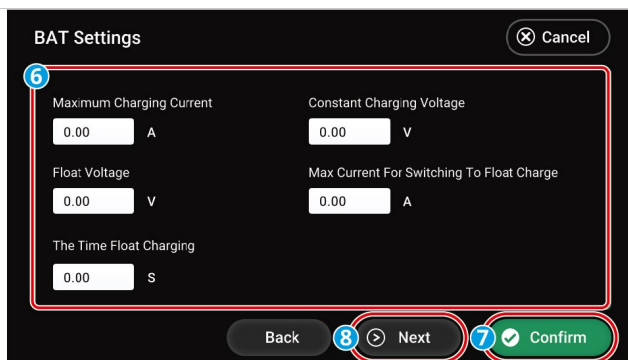
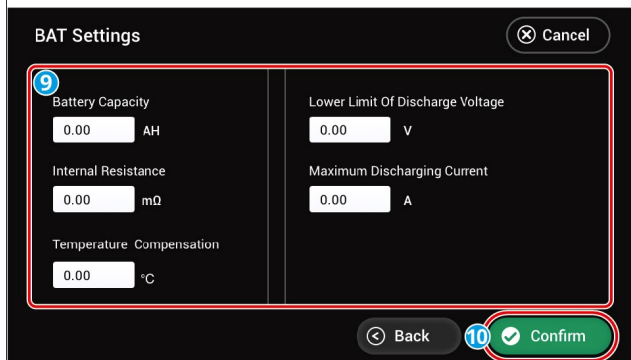
1. On the main screen, tap  > Quick Settings > BAT Setting, enter the parameter setting interface.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

NOTICE

Please ensure that Confirm is clicked on each page to ensure the parameters take effect; otherwise, the system will run with default parameters.

ESU10CON0010

ESU10CON0011

General Data Settings

BAT Connection Mode	Type	Description
Battery	GOODWE	If a GoodWe brand lithium battery is connected in the system, select GOODWE and select the correct model. If the GOODWE battery model actually used is not included in the options, use the App to configure it.
	Default	If the third-party lithium battery model connected in the system is not in this list, please select according to the actual situation: • Lithium 50Ah • Lithium 100Ah
	Others	If the third-party lithium battery model connected in the system is in this list, please select the correct model according to the actual situation.
	Lead acid	If the battery connected in the system is a lead-acid battery, select Lead acid and select the correct lead-acid type. Currently, GEL, AGM, and Flooded are supported.
NO Battery	No battery is connected to the system.	
BAT Setting	Set according to the battery actually connected in the system.	

Lithium Battery Parameter Settings

Parameter Name	Description
SOC Protection	Enable or disable the SOC Protection Function.
Depth Of Discharge (On-Grid)	Maximum depth of discharge Protection point for the battery when the inverter is operating in grid-connected mode.
Depth Of Discharge (Off-Grid)	Maximum depth of discharge Protection point for the battery when the inverter is operating off-grid.

Backup SOC Holding	To ensure that the battery SOC is sufficient to maintain normal system operation during off-grid operation, when the system is operating in grid-connected mode, the battery will be charged via the grid or PV to the set SOC Protection value.
--------------------	--

Lead-Acid Battery Parameter Settings

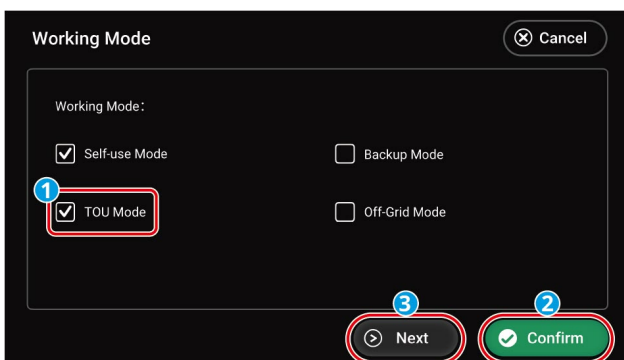
Parameter Name	Description
Maximum Charging Current	Battery charging defaults to Constant Charge mode; The maximum charging voltage and maximum Charging Current in this mode need to be set; set them according to the battery technical specifications.
Constant Charging Voltage	
Float Voltage	When the battery Charging Current is less than Maximum Current For Switch To Float Charge and the Duration reaches The Time Float Charging, the battery charging state switches from Constant Charge mode to Float Charge mode. Float Voltage is the maximum battery charging voltage in Float Charge mode; set it according to the battery technical specifications.
The Time Float Charging	
Maximum Current For Switch To Float Charge	
Battery Capacity	Set the battery capacity according to the parameters of the actually connected battery.
Internal Resistance	The internal resistance of the battery; set it according to the battery technical specifications.
Temperature Compensation	By default, when the temperature is higher than 25°C, the upper limit of the charging voltage decreases by 3 mV for every 1°C increase. In practice, set it according to the battery technical specifications.
Lower Limit Of Discharge Voltage	Set it according to the battery technical specifications.
Maximum Discharging Current	Set it according to the battery technical specifications. The higher the discharge current, the shorter the battery operating time.

Set Working Mode

1. On the main screen, tap  > Quick Settings > Working Mode to enter the parameter settings screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

NOTICE

Please ensure that Confirm is clicked on each page to ensure the parameters take effect; otherwise, the system will run with default parameters.



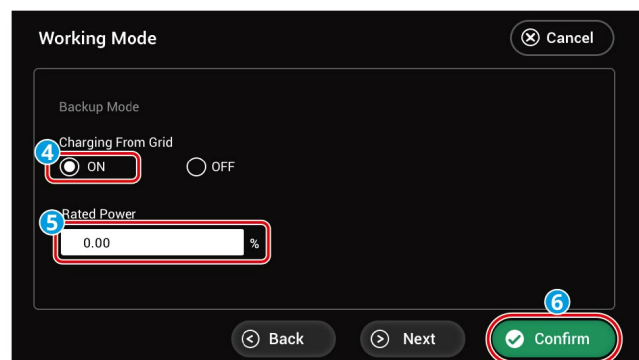
Working Mode

Working Mode:

☒ Self-use Mode ☐ Backup Mode

☒ TOU Mode ☐ Off-Grid Mode

Next Confirm



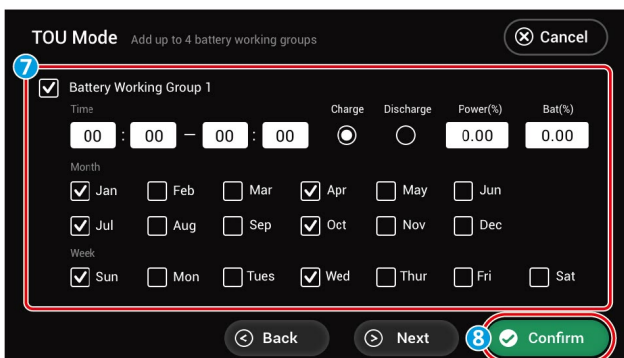
Working Mode

Backup Mode

Charging From Grid ☒ ON ☐ OFF

Rated Power %

Back Next Confirm



TOU Mode Add up to 4 battery working groups

☒ Battery Working Group 1

Time : - :

Charge ☒ Discharge ☐ Power(%) Bat(%)

Month ☒ Jan ☐ Feb ☐ Mar ☒ Apr ☐ May ☐ Jun

☒ Jul ☐ Aug ☐ Sep ☒ Oct ☐ Nov ☐ Dec

Week ☒ Sun ☐ Mon ☐ Tues ☒ Wed ☐ Thur ☐ Fri ☐ Sat

Back Next Confirm

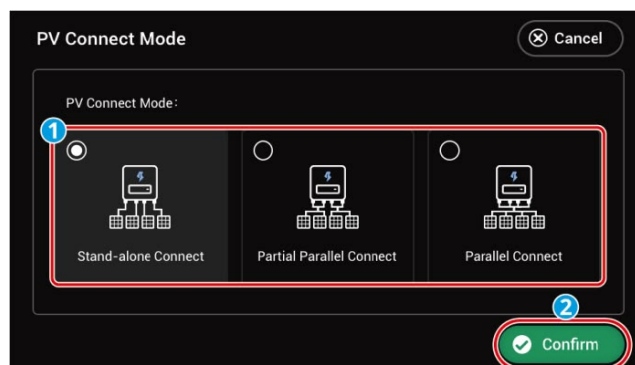
ETL10CON0008

Parameter Name		Description
Self-use Mode		When Working Mode Settings is set to Self-use Mode, Back-up Mode, TOU Mode, and Off-Grid Mode can be enabled simultaneously. Select according to actual conditions. Working mode operation priority: Off-Grid Mode > Back-up Mode > TOU Mode > Self-use Mode.
Back-up Mode	Charging From Grid	Enable this function to allow the system to purchase electricity from the grid.

	Rated Power	Percentage of the power when purchasing electricity relative to the inverter Rated Power.
TOU Mode	Time	Within the Start Time and End Time, the battery charges or discharges according to the configured charge/discharge mode and Rated Power.
	Charge/Discharge	Set to charge or discharge according to actual requirements.
	Power (%)	Percentage of the charging or discharging power relative to the inverter Rated Power.
	Bat (%)	After the battery SOC reaches the set SOC, stop charging. To set the stop SOC for battery discharge, refer to Battery Parameter Settings chapter to set Depth of Discharge (On-Grid) and Depth of Discharge (Off-Grid) via the LCD screen.
Off-Grid Mode		In Off-Grid mode, the inverter disconnects from the grid, supplies power only to the BACK-UP load, and uses surplus energy to charge the battery.

Set PV Access Mode

1. On the main screen, tap  > Quick Settings > PV Connect Mode to enter the parameter settings screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

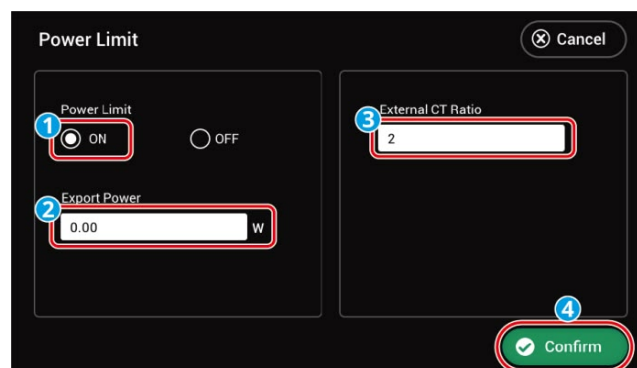


ESU10CON0015

Parameter Name	Description
Stand-alone Connect	PV strings are connected to the inverter-side MPPT ports in a one-to-one correspondence.
Partial Parallel Connect	When one PV string is connected to multiple MPPT ports on the inverter side, other PV modules are also connected to other MPPT ports on the inverter side.
Parallel Connect	When an external PV string is connected to the inverter-side PV input ports, one PV string is connected to multiple PV input ports.

Set Grid-Connected Power Limit

1. On the main screen, tap  > Quick Settings > Power Limit to enter the parameter setting screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.



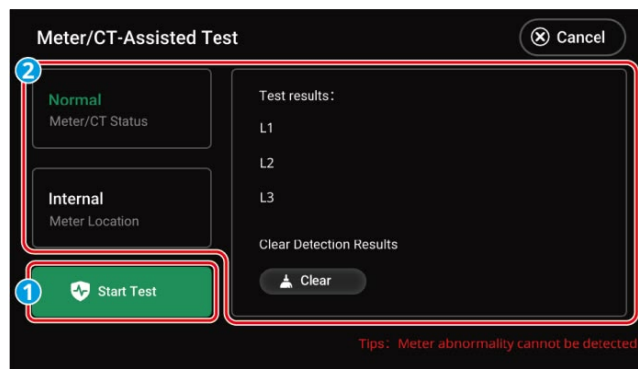
ESU10CON0016

Parameter Name	Description
Power Limit	When Output Power Limit is required by the grid standards of certain countries or regions, enable this function.
Export Power	Set according to the actual Max. Power that can be fed into the grid.

External CT Ratio	Set to the ratio of the primary-side current to the secondary-side current of the external CT. - Built-in meter: No need to set the CT ratio. The default CT ratio is 120A/40mA. - GM330: CT can be purchased from GoodWe or by yourself. CT transformation ratio requirement: nA/5A - nA: CT primary-side input current; the range of n is 200-5000. 5A: CT secondary side output current.
-------------------	---

Meter/CT Auxiliary Detection

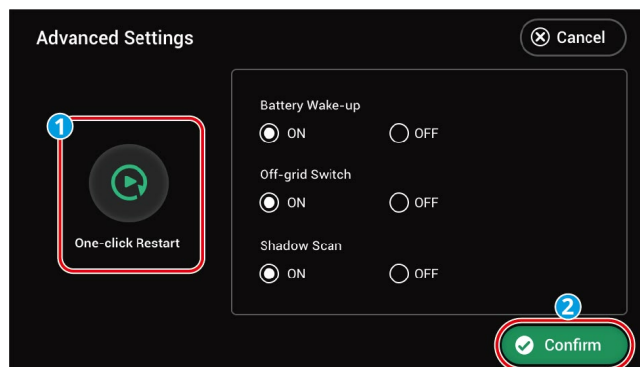
1. On the main screen, tap  > Quick Settings > Meter/CT Assisted Test to enter the parameter setting screen.
2. Tap Start Test to start detection. After detection is complete, determine the detection result based on the on-screen prompt.



ESU10CON0026

7.2.4 Set Advanced Parameters

1. On the main screen, tap  > Advanced Settings to enter the parameter setting screen. Enter the initial password: 1111.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

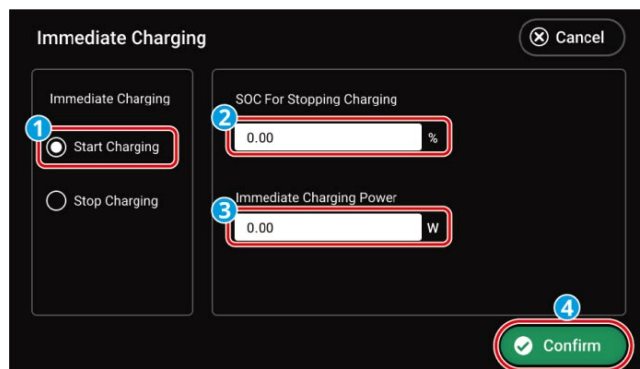


ESU10CON0020

Parameter Name	Description
One-click restart	Use this function to quickly restart the inverter.
Battery Wake-up	After enabling, when the battery is shut down due to undervoltage Protection, the battery can be awakened. If there is a circuit breaker between the lithium battery and the inverter, ensure that the circuit breaker is closed. After enabling, the output voltage at the battery port is approximately 60V.
Off-grid Switch	In off-grid mode, the off-grid control switch controls enabling and disabling of the inverter's off-grid function. In grid-connected mode, this function does not take effect. The switch is initially in the ON state, and the off-grid function is available. After the inverter is powered on, the inverter enables the off-grid output function. In off-grid state, by turning the off-grid switch off and then on, you can clear the off-grid Overload time and restart off-grid output.
Shadow Scan	When PV modules are severely shaded, enabling the shadow scan function can optimize the inverter's power generation Efficiency.

7.2.5 Set Immediate Charging

1. On the main screen, tap  > Immediate Charging to enter the parameter setting screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

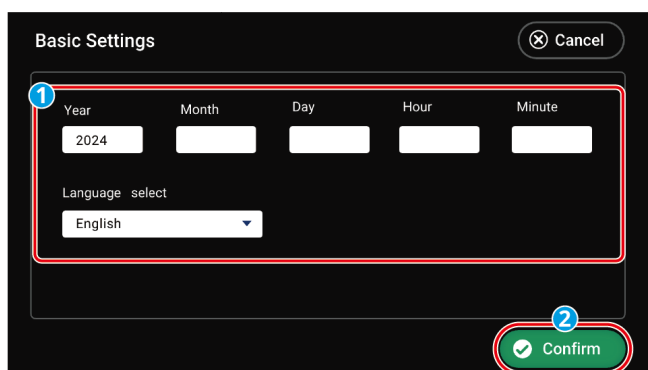


ESU10CON0021

Parameter Name	Description
Immediate Charging	After enabling, the grid immediately charges the battery. It takes effect only once. Select Enable or Stop according to actual needs.
SOC For Stopping Charging	When Immediate Charging is enabled, charging of the battery stops when the battery SOC reaches the charge cut-off SOC.
Immediate Charging Power	When Immediate Charging is enabled, the charging power as a percentage of the inverter's Rated Power. For example, for an inverter with a Rated Power of 10 kW, when set to 60, the charging power is 6 kW.

7.2.6 Set General Data

1. On the main screen, tap  > Basic Settings to enter the parameter setting screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.



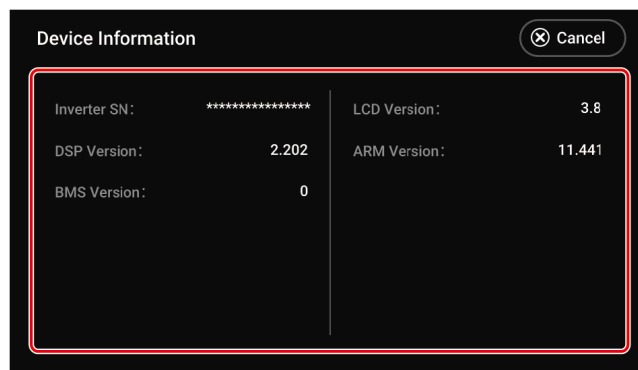
ESU10CON0027

7.2.7 View Device Information

1. On the main screen, tap  > Device Information to enter the parameter query screen.

NOTICE

You can view the inverter serial number, DSP version, BMS version, LCD version, and ARM version.



ESU10CON0028

7.2.8 Set Port Connection

NOTICE

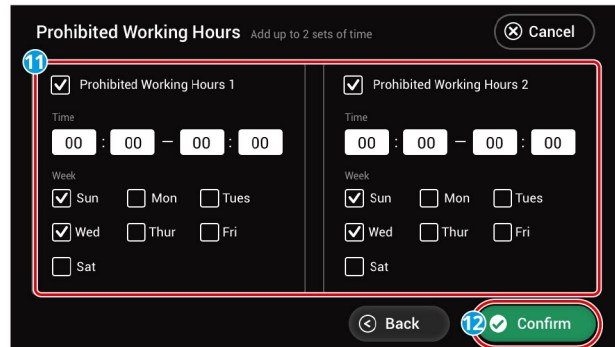
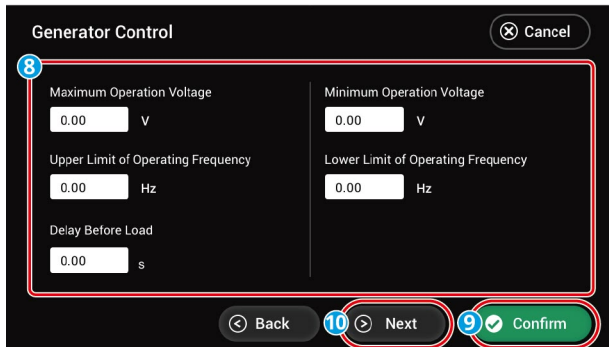
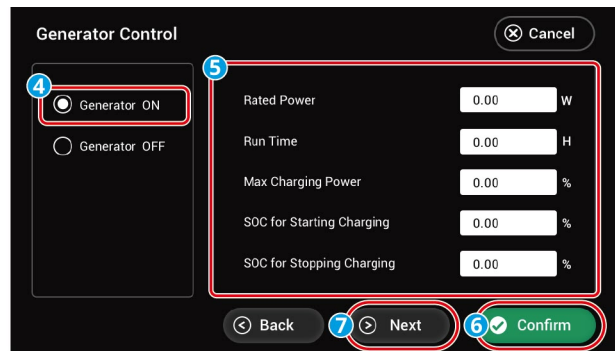
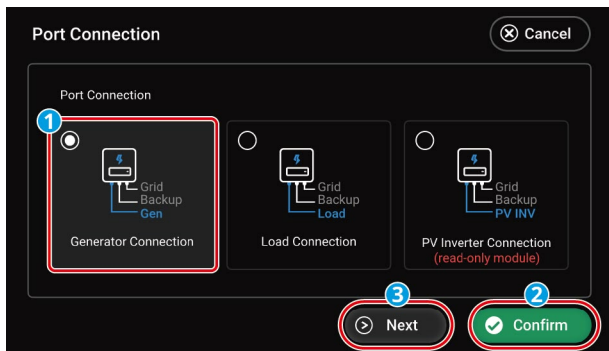
In microgrid mode, if you need to configure parameters related to the grid-tied inverter, please connect to the APP to set them.

Set Port Connection Generator

1. On the main screen, tap  > Port Connection, enter the parameter setting screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

NOTICE

Please ensure that Confirm is clicked on each page to ensure the parameters take effect; otherwise, the system will run with default parameters.



ETL10CON0004

No.	Parameter Name	Description
1	Generator ON/OFF	Control the start/stop of the generator. Only applicable to generators that support dry contacts.
2	Rated Power	The generator's Rated Power.
3	Run Time	Continuous operation time of the generator. After the set operating time is exceeded, the generator will automatically shut down. This function is only effective for generators that support dry contact connection.
4	Max Charging Power	Set the Max. Charging Power for the generator to charge the battery.
5	SOC for Starting Charging	Set the start SOC for the generator to charge the battery. When the battery SOC is lower than the set value, the generator will charge the battery.
6	SOC for Stopping Charging	Set the SOC at which the generator stops charging the battery. When the battery SOC reaches the set value, the generator will stop charging the battery.
7	Maximum Operation Voltage	Set the upper operating voltage limit of the generator.

8	Minimum Operation Voltage	Set the lower operating voltage limit of the generator.
9	Upper Limit Of Operating Frequency	Set the upper operating frequency limit of the generator.
10	Lower Limit Of Operating Frequency	Set the lower operating frequency limit of the generator.
11	Delay Before Load	No-load warm-up time before the generator accepts load.
12	Prohibited Working Hours	Please set the generator prohibited operating time according to actual conditions.

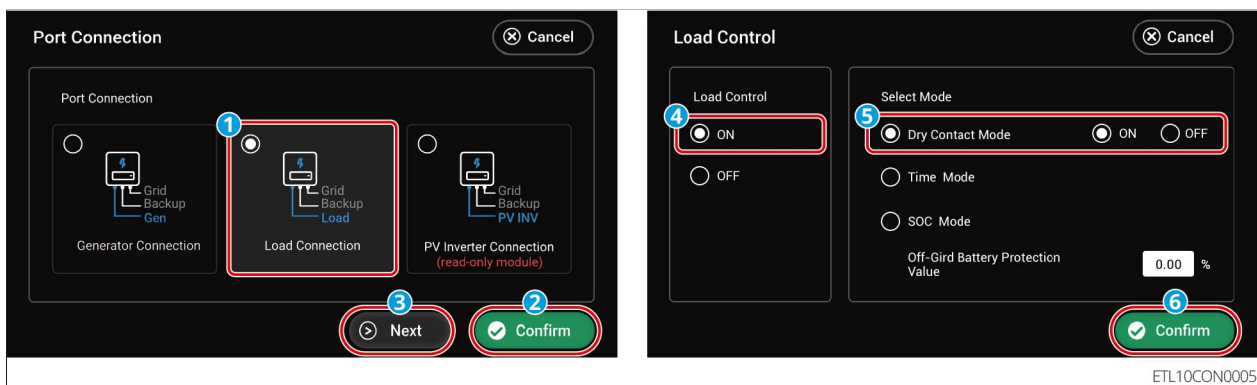
Set Port Connection Load Control

1. On the main screen, tap  > Port Connection, enter the parameter setting screen.
2. Please set the parameters according to the actual situation.
3. After the settings are complete, tap Confirm. When the interface displays Confirm OK, the parameter settings are successful.

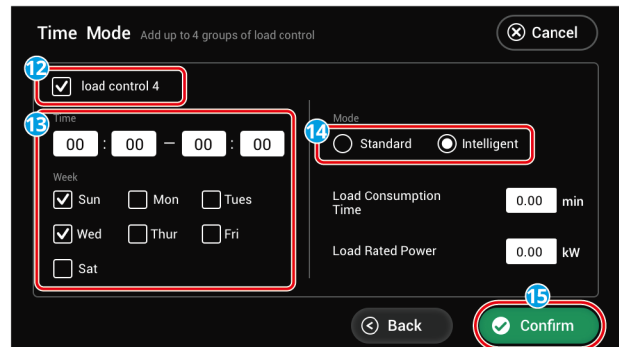
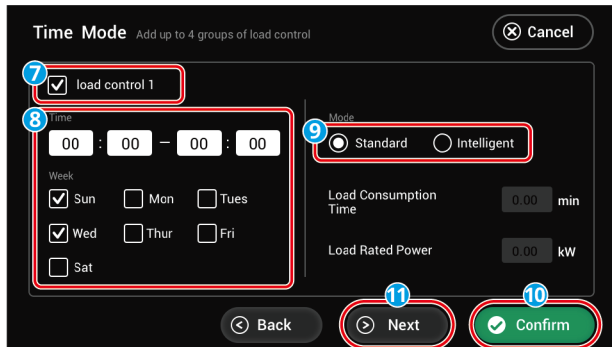
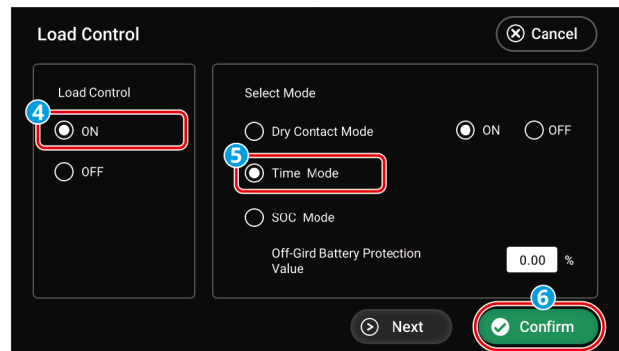
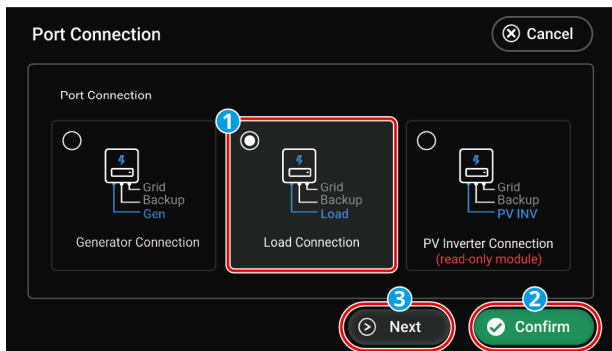
NOTICE

Please ensure that Confirm is clicked on each page to ensure the parameters take effect; otherwise, the system will run with default parameters.

Dry Contact Mode

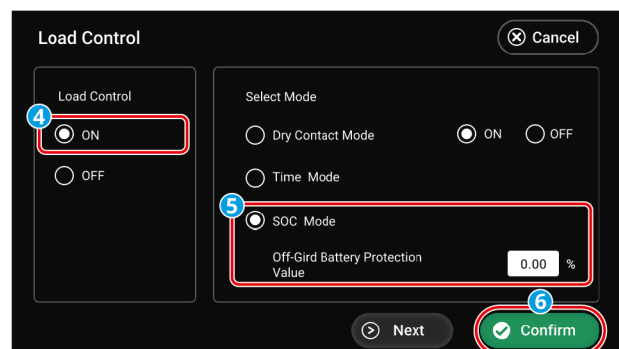
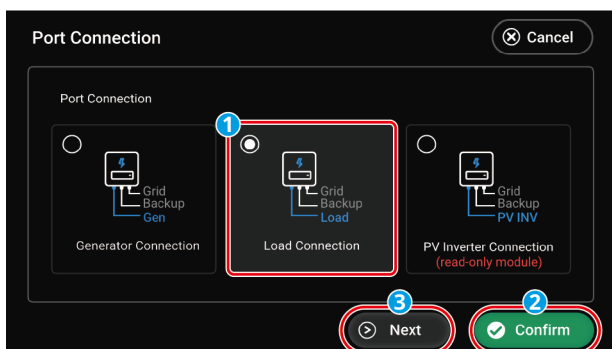


Time Mode



ETL10CON0007

SOC Mode



ETL10CON0006

No.	Parameter Name	Description
1	Load Control ON/OFF	Set Load Control Function On/Off
2	Dry Contact Mode	ON: When the switch status is selected as ON, start supplying power to the load. OFF: When the switch status is set to OFF, stop supplying power to the load.
3	Time Mode	Within the set time period, power will be automatically supplied to or cut off from the load. Standard Mode or Smart Mode can be selected.
4	Load Control 1	Set the load control time for group 1; up to 4 groups can be set.

5	Mode: Standard/Intelligent	Standard Mode: Power will be supplied to the load within the set time period. Smart Mode: Within the set time period, when the surplus energy generated by PV exceeds the preset load Rated Power, start supplying power to the load.
6	Load Consumption Time	Minimum running time after the load is turned on, to avoid frequent switching of the load due to energy fluctuations. Only applicable to Smart Mode.
7	Load Rated Power	When the surplus energy generated by PV exceeds this load's Rated Power, start supplying power to the load. Only applicable to Smart Mode.
8	SOC Mode	The inverter's built-in relay dry contact control port can control whether to supply power to the load via the relay.
9	Off-Grid Battery Protection Value	In off-grid mode, if an Overload at the BACK-UP terminal is detected or the battery SOC is lower than the off-grid battery Protection setting value, the power supply to loads connected to the relay port can be stopped. Set the off-grid battery Protection value according to actual needs.

8 System Commissioning and Plant Monitoring

8.1 Setting Inverter Parameters via the App

SEMS+ App is software used for remote plant monitoring or local device commissioning. It supports installers or owners:

- Remotely monitor plant operation status and set plant and device operating parameters.
- Locally connect to devices to view device operation status and set device parameters.

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



SEMS+ App User Manual

8.1.1 Download and Install SEMS+ App

Mobile Phone Requirements

- Mobile phone operating system requirements: Android 7.0 and above, iOS 15.1 and above.
- Mobile phone supports a web browser and can connect to the Internet.
- Mobile phone supports WLAN/Bluetooth functions.

Download Methods

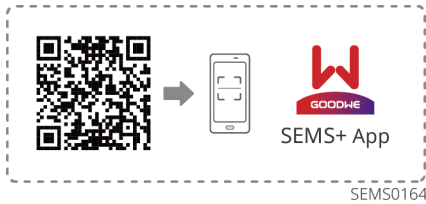
Method 1:

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



Method 2:

Scan the QR code below to download and install.



Add Home Screen Widget

- When the App version is V2.5.2 or later, SEMS+ App can be added to the mobile phone home screen.
- The steps to add a home screen widget vary by operating system. Please follow the actual steps.
- After the home screen widget is added, you can quickly view the plant operation status without opening the App.

8.2 Perform Plant Monitoring via SEMS+ WEB

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

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

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



the SEMS+ WEB User Manual

9 System Maintenance

9.1 System Power-Off

DANGER

- When operating and maintaining devices in the system, power off the system. Operating devices while they are energized may cause device damage or electric shock hazards.
- After the device is powered off, it takes some time for internal components to discharge. Wait according to the time requirement on the label until the device is fully discharged.
- Restart the battery by powering it on via the air switch.
- When shutting down the battery system, strictly follow the battery system power-off requirements to prevent damage to the battery system.
- When there are multiple batteries in the system, powering off any one battery will power off all batteries.

NOTICE

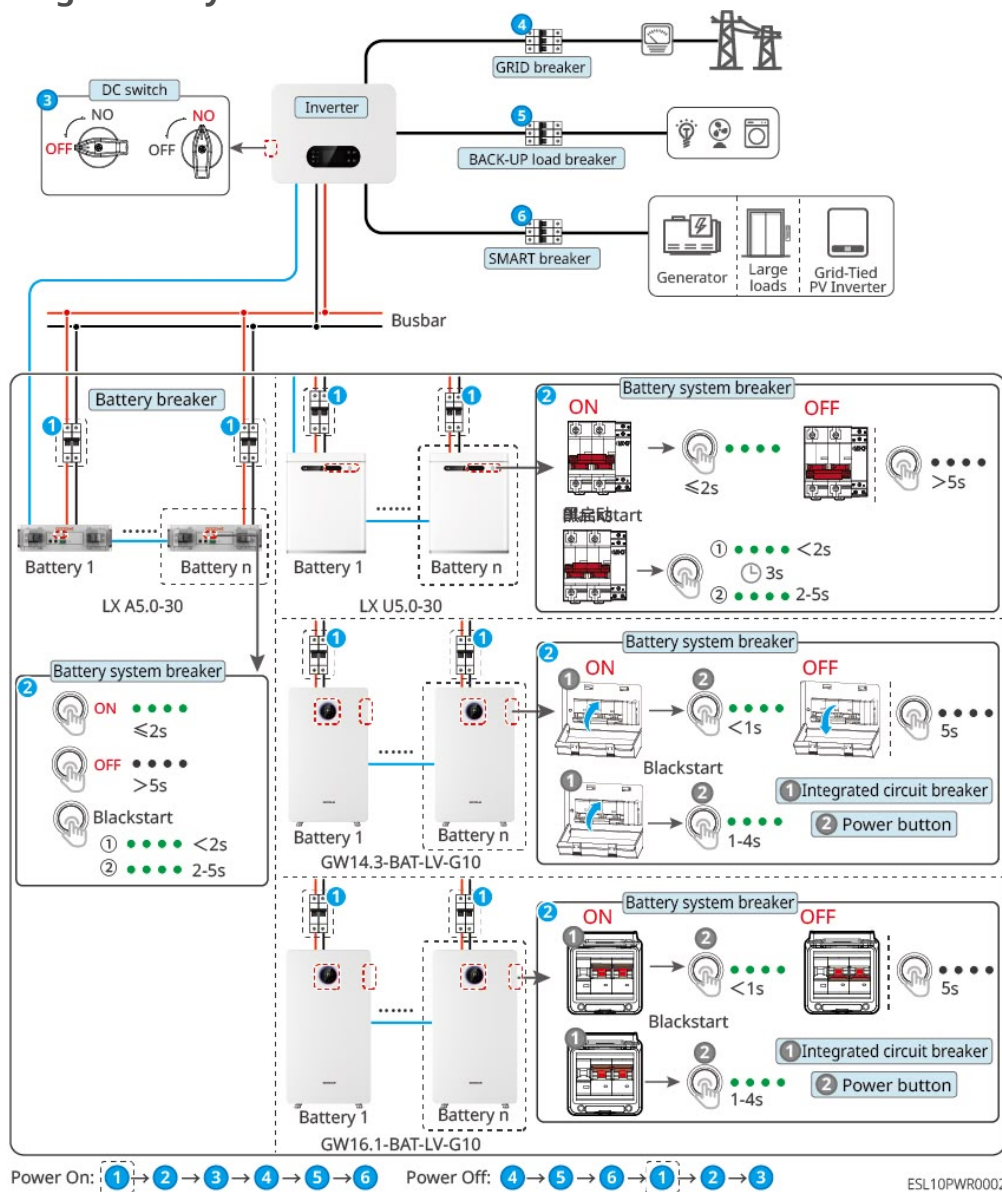
- Circuit breakers between the inverter and the battery, and between battery systems, must be installed in accordance with local laws and regulations.
- To ensure effective Protection of the battery system, keep the cover plate of the battery system switch closed; the protective cover can automatically close after being opened. If the battery system switch is not used for a long time, secure it with screws.

Power-Off Procedure

1. Disconnect the ON-GRID circuit breaker.
2. Disconnect the BACK-UP circuit breaker.
3. (Optional) Disconnect the SMART circuit breaker.
4. (Select according to local regulations) Disconnect the switch between the inverter and the battery.

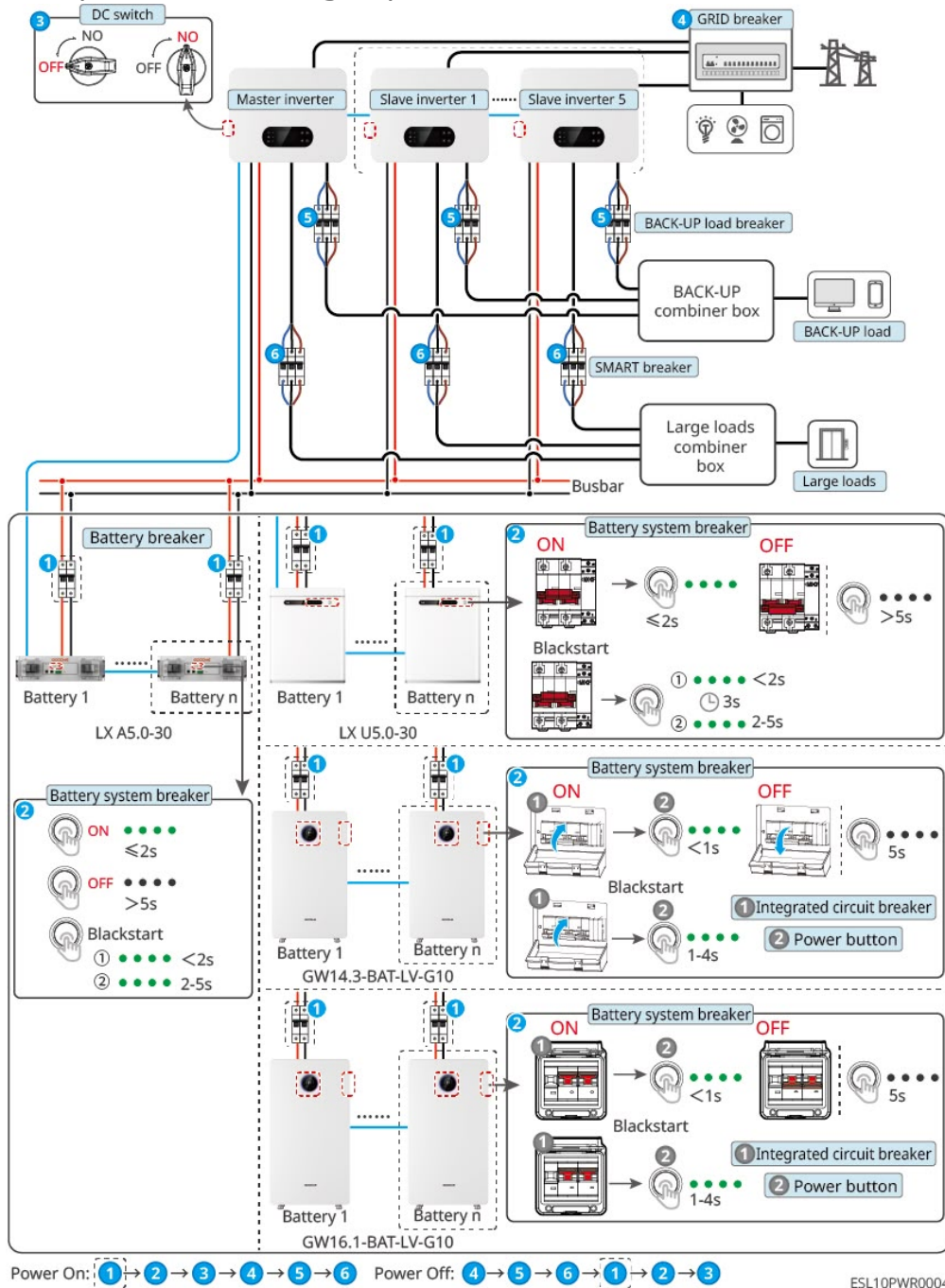
5. Power off the battery system:
 - a. LX A5.0-30: Press and hold the battery multi-function button for more than 5 seconds.
 - b. LX U5.0-30, GW14.3-BAT-LV-G10, GW16.1-BAT-LV-G10: Press and hold the battery system button for more than 5 seconds, and the integrated circuit breaker of the battery system will automatically disconnect.
6. (Select according to local regulations) Disconnect the circuit breaker between the PV modules and the inverter.
7. Disconnect the inverter's DC Switch.

Single-unit system



Parallel system

Multiple inverters, off-grid parallel



9.2 Device Removal



- Ensure the device is powered off.
- Wear personal protective equipment when operating the device.
- When removing wiring terminals, use proper removal tools to avoid damaging the terminals or the device.
- Unless otherwise specified, the device removal method is the reverse of the installation method, and this document will not repeat it.

1. Power off the system.
2. Use labels to mark the cable types of the cables connected in the system.
3. Disconnect the connecting cables of the inverter, battery, and smart meter in the system, such as DC cables, AC cables, communication cables, and Protection ground cables.
4. Remove devices such as the smart communication stick, inverter, battery, and smart meter.
5. Store the device properly. If it will be put into use later, ensure that the storage conditions meet the requirements.

9.3 Device Disposal

When the equipment can no longer be used and needs to be scrapped, dispose of it in accordance with the electrical waste disposal requirements stipulated by the laws and regulations of the country/region where the equipment is located. The equipment must not be disposed of as household waste.

9.4 Periodic Maintenance



- If any issue that may affect the battery or energy storage inverter system is found, please contact after-sales personnel. Disassembly without authorization is prohibited.
- If exposed copper conductor strands are found inside the conductive wire, do not touch it. High-voltage hazard. Please contact after-sales personnel. Disassembly without authorization is prohibited.
- If other emergencies occur, please contact after-sales personnel immediately and operate under their guidance, or wait for after-sales personnel to operate on site.

Maintenance Content	Maintenance Method	Maintenance Cycle	Maintenance Purpose
System Cleaning	Check the heat sink, fan, and air inlet/outlet for foreign objects and dust. Check whether the installation space meets requirements and whether debris has accumulated around the equipment.	Once every 6 months	Prevent heat dissipation failure.
System Installation	Check whether the equipment is installed securely and whether the fastening screws are loose. Check whether the equipment appearance is damaged or deformed.	Once every 6 months to once every 12 months	Confirm the stability of the equipment installation.
Electrical Connections	Check whether electrical connections are loose, whether the cable appearance is damaged, and whether copper is exposed.	Once every 6 months to once every 12 months	Confirm the reliability of electrical connections.

Maintenance Content	Maintenance Method	Maintenance Cycle	Maintenance Purpose
Sealing Performance	Check whether the sealing performance of the equipment cable entry holes meets requirements. If the gaps are too large or the holes are not sealed, reseal them.	Once every 12 months	Confirm that the machine is sealed and its waterproof performance is intact.
Battery Maintenance	If the battery has not been used or fully charged for a long time, it is recommended to charge the battery periodically.	Once every 15 days	Protection of battery service life.

9.5 Fault

NOTICE

The fault content in this manual is updated from time to time, and faults may vary slightly among different models. Please refer to the real-time display on the device.

9.5.1 View Fault/Alarm Details

All fault and alarm details of the energy storage system are displayed in **SolarGo App**、**SEMS+ App**、**SEMS+ WEB** and on the LCD screen. If your product is abnormal and no related fault information is found in **SolarGo App**、**SEMS+ App**、**SEMS+ WEB** or on the LCD screen, please contact the after-sales service center.

- LCD Screen

Tap or select the fault information icon on the screen  to view the alarm or fault information of the energy storage system.

- SolarGo App

Go to [Home] > [Parameters] > [Alarm] to view the energy storage system alarm information.

- SEMS+ App

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

- SEMS+ WEB

1. Open SEMS+ WEB and log in with any account.
2. On the plant details page, click "Alarm" to view all alarm information of the current plant.

9.5.2 Fault Information and Handling Methods

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

When contacting the after-sales service center, please collect the following information to facilitate quick problem 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 modules are obstructed or shaded, etc. For the installation environment, it is recommended to provide photos, videos, and other files to assist in problem analysis.
3. Grid conditions.

9.5.2.1 System Fault

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

No.	Fault	Solutions
1	Unable to search for the wireless signal of the Smart Communication Stick	1. Ensure that no other devices are connected to the wireless signal of the Smart Communication Stick. 2. Ensure that the App has been upgraded to the latest version. 3. Ensure that the Smart Communication Stick is powered normally and the blue indicator is blinking or steady on. 4. Ensure that the smart device is within the communication range of the Smart Communication Stick. 5. Refresh the device list in the App again. 6. Restart the inverter.
2	Unable to connect to the wireless signal of the Smart Communication Stick	1. Ensure that no other devices are connected to the wireless signal of the Smart Communication Stick. 2. Restart the inverter or communication stick, and try to connect to the wireless signal of the Smart Communication Stick again. 3. Ensure that the encrypted Bluetooth pairing is successful.
3	Unable to find the router SSID	1. Place the router close to the Smart Communication Stick, or add a WiFi repeater to enhance the WiFi signal. 2. Reduce the number of devices connected to the router.
4	After all configurations are complete, the Smart Communication Stick fails to connect to the router.	1. Restart the inverter. 2. Check whether 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 close to the Smart Communication Stick, or add a WiFi repeater to enhance the WiFi signal.

No.	Fault	Solutions
5	After all configurations are complete, the Smart Communication Stick fails to connect to the server.	Restart the router and inverter.

9.5.2.2 Inverter Fault

9.5.2.2.1 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 automatically clears after grid power supply is restored. 2. Check whether the AC line or AC Switch is disconnected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F02	Grid Overvoltage Protection	The grid voltage is higher than the allowable range, or the high-voltage Duration exceeds the high voltage ride-through setting.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. If not, contact the local power utility. If yes, the Grid Overvoltage Protection threshold must also be modified after obtaining the consent of the local power utility. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are properly connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F03	Grid Undervoltage Protection	The grid voltage is below the allowable range, or the Low Voltage Duration exceeds the Low Voltage Ride-Through setting.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. If not, contact the local power operator. If yes, you also need to modify the Grid Undervoltage Protection setting after obtaining the consent of the local power operator. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are properly connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F04	Grid Rapid Overvoltage Protection	Abnormality occurs in grid voltage detection, or an excessively high voltage triggers the fault.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage is within the allowable range. If not, contact the local power operator. If yes, you also need to modify the Grid Undervoltage Protection setting after obtaining the consent of the local power operator. 3. If it cannot recover for a long time, check whether the AC-side circuit breaker and output cable are properly connected.
F05	10minOvervoltage Protection	Within 10min, the grid voltage sliding average exceeds the range specified by safety regulations.	Check whether the grid voltage has been operating at a relatively high voltage for a long time. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator. If yes, you also need to modify the grid 10min Overvoltage Protection point after obtaining the consent of the local power operator.

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

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F08	Grid Frequency Instability	Grid abnormality: The actual grid frequency rate of change does not comply with the local grid standard.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator.
F09	Anti-islanding Protection	The grid has been disconnected, but the grid voltage is maintained due to the presence of loads. According to safety regulation Protection requirements, stop grid connection.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator.
F10	Voltage Ride-Through Undervoltage Fault	Grid abnormality: The duration of Grid Voltage Abnormal exceeds the time specified for high/low voltage ride-through.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F11	HVRT Overvoltage	Grid abnormality: The duration of Grid Voltage Abnormal exceeds the time specified for high/low voltage ride-through.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F12	30mAGfciProtection	During inverter operation, the input-to-ground insulation impedance becomes low.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. After the fault is cleared, normal operation will resume, and manual intervention is not required. 2. If it occurs frequently or cannot be recovered for a long time, check whether the PV string-to-ground impedance is too low.
F13	60mAGfciProtection	During inverter operation, the input-to-ground insulation impedance becomes low.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. After the fault is cleared, normal operation will resume, and manual intervention is not required. 2. If it occurs frequently or cannot be recovered for a long time, check whether the PV string-to-ground impedance is too low.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F14	150mAGfciProtection	During inverter operation, the input-to-ground insulation impedance becomes low.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. After the fault is cleared, normal operation will resume, and manual intervention is not required. 2. If it occurs frequently or cannot be recovered for a long time, check whether the PV string-to-ground impedance is too low.
F15	GfciSlow-change Protection	During inverter operation, the input-to-ground insulation impedance becomes low.	1. If it occurs occasionally, it may be caused by an occasional external line abnormality. After the fault is cleared, normal operation will resume, and manual intervention is not required. 2. If it occurs frequently or cannot be recovered for a long time, check whether the PV string-to-ground impedance is too low.
F16	DCIProtection Level1	The High DC Component of the inverter output current is above the safety regulation or machine default allowable range.	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F17	DCIProtection Level2	The High DC Component of the inverter output current is above the safety regulation or machine default allowable range.	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F18	Low Insulation Resistance	1. The PV string is short-circuited to Protection ground. 2. The installation environment of the PV strings is humid for extended periods, and the line-to-ground insulation is poor. 3. Low Insulation Resistance of the battery port line to ground.	1. Check the impedance of the PV string/battery port to Protection ground. If a short circuit occurs, locate and rectify the short-circuit point. 2. Check whether the inverter's Protection ground wire is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, please use Appto reset the inverter's "Insulation Resistance Protection Point". Inverters for the Australian and New Zealand markets, when an insulation resistance fault occurs, the alarm can also be provided in the following ways: 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, after setting the alarm notification method, the alarm information can be sent to the customer by email.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F19	Grounding Abnormal	1. The inverter's Protection ground wire is Not Connected. 2. When the PV string output is grounded, the inverter output side is not connected to an isolation transformer.	1. Please confirm whether the inverter's Protection ground wire is Not Connected properly. 2. In the scenario where the PV string output is grounded, please confirm whether the inverter output side is connected to an isolation transformer.
F20	Hard Power Limit Protection	Abnormal Load Fluctuation	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F21	Internal Comm Loss	SlaveDSP1Communication Timeout-MasterDSP, SlaveDSP2Communication Timeout-MasterDSP, SlaveDSP2Communication Timeout-SlaveDSP1, MasterDSPCommunication Timeout-SlaveDSP1, MasterDSPCommunication Timeout-SlaveDSP2or SlaveDSP1Communication Timeout-SlaveDSP2: 1. Chip is not powered on 2. Chip program version error	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
		MasterDSPcanmodule error, SlaveDSP1canmodule error or SlaveDSP2canmodule error: 1. Frame format error 2. Parity check error 3. can busoffline 4. HardwareCRCcheck error 5. When sending (receiving), the control bit is receiving (sending) 6. Transmission to an unauthorized unit	
F22	Generator waveform detection fault	1. When the generator is Not Connected, this fault will always be displayed; 2. When the generator is operating, failure to meet generator safety requirements 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. When the generator is not connected, ignore this fault; 2. If this fault occurs when the generator is faulty, it is normal. After the generator recovers, wait for a period of time and the fault will be automatically cleared; 3. This fault will not affect the normal operation of off-grid mode 4. If the generator and the grid are connected at the same time and safety requirements are met, the grid has priority for grid connection, and the system will operate in grid-connected mode.
F28	ParallelIOSelf-Check Abnormal	Parallel communication cable is not securely connected or parallelIOchip is damaged	Check whether the parallel communication cable is securely connected, then checkIOchip for damage; if so, replaceIOchip
F29	Parallel Grid Line Reversed	The grid lines of some machines are reversed with others	Reconnect the grid lines
F30	AC HCT check Abnormal	AC sensor has sampling abnormality	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer 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,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F32	Inverter Internal Failure	Inverter has a fault	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F33	FlashR/W Abnormal	Possible causes: flashcontent has changed;flashlifetime exhausted;	1. Upgrade to the latest firmware 2. Contact the distributor or after-sales service center
F34	AFCI Check Failure	During the AFCI self-check, the arc module did not detect an Arc Failure as expected	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F35	Cabinet Overtemperature	Cabinet Overtemperature. Possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F36	Bus Overvoltage	BUSOvervoltage, possible causes: 1. PVvoltage is too high; 2. InverterBUSvoltage sampling is abnormal; 3. The isolation effect of the dual-split transformer at the rear end of the inverter is poor, causing two inverters to affect each other when connected to the grid; one of the inverters reports DC overvoltage when connected to the grid;	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F37	PVInput Overvoltage	PVinput voltage is too high, possible causes: PV array configuration error: too many PV modules are connected in series in the string, causing the string open-circuit voltage to be higher than the maximum operating voltage of the inverter	Check the series configuration of the corresponding PV array string to ensure that the string open-circuit voltage does not exceed the maximum operating voltage of the inverter. After the PV array is correctly configured, the inverter alarm automatically clears.
F38	PVContinuous Hardware Overcurrent	1. Improper module configuration 2. Hardware damage	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F39	PVContinuous Software Overcurrent	1. Improper module configuration 2. Hardware damage	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F40, F98	String Reverse Connection(String1-n) n: Determine according to the actual Number of Strings of the inverter	PVString Reverse Connection	Check whether the string is reverse-connected.

9.5.2.2.2 Fault Handling (Fault Codes F41-F80)

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F41	Generator Port Overload	1. Off-grid side output exceeds the requirements specified in the datasheet 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 the requirements specified in the datasheet	Verify the off-grid side output voltage, current, power, and other data to determine the cause of the issue.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F42, F164,F 165	DC Arcing Failure(String1-n): Determine according to the actual Number of Strings of the inverter	1. DC-side connection terminal is loose; 2. DC-side connection terminal has poor contact; 3. DC cable conductor is damaged and has poor contact	1. After the machine is reconnected to the grid, check whether the voltage and current of each channel abnormally decrease to zero; 2. Check whether the DC-side terminals are securely connected.
F43	Grid Waveform Abnormal	Grid abnormality: abnormal grid voltage detection triggers the fault.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F44	Grid Phase Loss	Grid abnormality: a single-phase voltage sag occurs in the grid.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F45	Grid Voltage Imbalance	Grid phase voltage difference is too large.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid voltage and frequency are within the allowable range and stable. If not, contact the local power operator.
F46	Grid Phase Sequence Failure	Abnormal connection between inverter and grid: wiring is not in positive phase sequence	1. Check whether the inverter-to-grid wiring is in positive phase sequence. After the wiring is correct (e.g., swap any two live wires), the fault automatically disappears. 2. If the wiring is correct but the fault persists, contact your dealer or after-sales service center.
F47	Grid Rapid Shutdown Protection	After detecting a Grid Power Outage condition, quickly shut down the output	After grid power supply is restored, the fault automatically disappears
F48	Grid Neutral Wire Loss (SplitGrid)	Split-phase Grid Neutral Wire Loss	1. The alarm automatically clears after grid power supply is restored. 2. Check whether the AC line or AC Switch is disconnected.
F49	L-PE Short Circuit	Output phase line toPElow impedance or short circuit	Check output phase line toPEimpedance, find out the location with low impedance and repair it.
F50	DCVProtection Level1	Abnormal Load Fluctuation	

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F51	DCVProtection Level2	Abnormal Load Fluctuation	1. If the abnormality is caused by an external fault, the inverter will automatically resume normal operation after the fault disappears, without manual intervention. 2. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or after-sales service center.
F52	Leakage current (GFCI) multiple fault shutdown	North American safety regulations require that after multiple faults, it cannot automatically recover; manual recovery or waiting 24h to recover	Please check whether the PV string to ground impedance is too low.
F53	DC Arc Failure (AFCI) multiple fault shutdown	North American safety regulations require that after multiple faults, it cannot automatically recover; manual recovery or waiting 24h to recover	1. After the machine is reconnected to the grid, check whether the voltage and current of each channel abnormally decrease to zero; 2. Check whether the DC-side terminals are securely connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F54	External communication disconnection	Inverter external device communication lost, possibly due to peripheral power supply issue, Communication Protocols mismatch, or corresponding peripheral not configured, etc.	Judgment is made based on the actual model and detection enable bit; for peripherals not supported by some models, detection will not be performed.
F55	Back-upOutput Overload	Prevent the inverter from continuous Overload output.	Turn off some off-grid loads to reduce the inverter's off-grid output power.
F56	Back-upOutput Overvoltage	Prevent inverter output overvoltage from causing load damage.	1. If it occurs occasionally, it may be caused by load switching, and no manual intervention is required. 2. If it occurs frequently, please contact the distributor or after-sales service center.
F57	ExternalBox Fault	Switch On-Grid to Off-Grid: waiting forBoxto switch relays takes too long	1. CheckBoxwhether it is working properly; 2. CheckBoxwhether the communication wiring is correct;
F58	CTLoss	CTconnection wire disconnected (Japanese safety regulation requirement)	CheckCTwhether the wiring is correct;
F59	ParallelCAN Comm Abnormal	Parallel communication cable not connected securely or some machines are not online.	Check whether all machines are powered on and whether the parallel communication cables are securely connected.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F60	ParallelBackupLine Reversed	Some machines backup wire is connected in reverse with others	Reconnect backup wire.
F61	Inverter Soft Start Failure	Inverter Soft Start Failure during off-grid cold start	Check whether the machine's inverter module is damaged.
F62	AC HCT Failure	HCT sensor is abnormal	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F63	GFCI HCT Failure	Leakage current sensor is abnormal	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F64	Inverter Internal Failure	Inverter has a fault	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F65	AC Terminal Overtemperature	AC Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the distributor or after-sales service center.
F66	INVModule Overtemperature	Inverter module overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the distributor or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F67	BoostModule Overtemperature	BoostModule Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the distributor or after-sales service center.
F68	AC Capacitor Overtemperature	Output filter capacitor overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If ventilation and ambient temperature are normal, contact the distributor or after-sales service center.
F69	PV IGBT Short Circuit Fault	Possible causes: 1. IGBT short circuit 2. Inverter sampling circuit abnormal	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F70	PV IGBTOpen Circuit	1. No PWM output caused by software issue: 2. Drive circuit abnormality: 3. IGBTOpen circuit	
F71	NTCAbnormal	NTCtemperature sensor is abnormal	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F72	PWM Abnormal	PWMabnormal waveform occurs	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F73	CPUInterrupt Abnormal	CPUinterrupt is abnormal	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F74	Microelectronics fault	Function Safety detected an abnormality	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F75	PV HCTFault	boostCurrent Sensor Abnormal	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F76	1.5VRef Abnormal	Reference Circuit Failure	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F77	0.3VRef Abnormal	Reference Circuit Failure	
F78	CPLDVersion Error	CPLDVersion Error	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F79	CPLDComm Failure	CPLDandDSPCommunication Content Error or Timeout	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F80	Model Recognition Fault	Fault related to Model Recognition Error	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

9.5.2.2.3 Fault Handling (Fault Codes F81-F121)

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F81	P-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 rear end of the inverter is poor, causing two inverters to affect each other when connected to the grid; one of the inverters reports DC overvoltage when connected to the grid;	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F82	N-Bus Overvoltage		
F83	Bus Overvoltage (Secondary CPU1)		

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F84	P-Bus Overvoltage (SecondaryC PU1)	BUSOvervoltage, possible causes: 1. PVvoltage is too high; 2. InverterBUSvoltage sampling is abnormal; 3. The isolation effect of the dual-split transformer at the rear end of the inverter is poor, causing two inverters to affect each other when connected to the grid; one of the inverters reports DC overvoltage when connected to the grid;	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F85	N-Bus Overvoltage (SecondaryC PU1)		
F86	Bus Overvoltage (SecondaryC PU2)		Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F87	P-Bus Overvoltage (SecondaryC PU2)		

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F88	N-Bus Overvoltage (SecondaryC PU2)	BUSOvervoltage, possible causes: 1. PVvoltage is too high; 2. InverterBUSvoltage sampling is abnormal; 3. The isolation effect of the dual-split transformer at the rear end of the inverter is poor, causing two inverters to affect each other when connected to the grid; one of the inverters reports DC overvoltage when connected to the grid;	
F89	P-Bus Overvoltage(CPLD)		Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F90	N-Bus Overvoltage(CPLD)	BUSOvervoltage, possible causes: 1. PVvoltage is too high; 2. InverterBUSvoltage sampling is abnormal; 3. The isolation effect of the dual-split transformer at the rear end of the inverter is poor, causing two inverters to affect each other when connected to the grid; one of the inverters reports DC overvoltage when connected to the grid;	
F91	FlyCap Software Overvoltage	FlyCap Overvoltage, possible causes: 1. PVvoltage is too high; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch,5minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F92	FlyCap Hardware Overvoltage		

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F93	FlyCap Undervoltage	FlyCap Undervoltage, possible causes: 1. PVenergy insufficient; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch,5minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F94	FlyCap Precharge Failure	FlyCap Precharge Failure, possible causes: 1. PVenergy insufficient; 2. Inverter FlyCap voltage sampling abnormal;	Disconnect the AC output side switch and DC input side switch,5minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F95	FlyCap Precharge Abnormal	1. Improper control loop parameters 2. Hardware damage	Disconnect the AC output side switch and DC input side switch,5minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F96, F97	String overcurrent(String1-n) n: Determine according to the actual Number of Strings of the inverter	Possible causes: 1. String overcurrent; 2. String current sensor abnormal	Disconnect the AC output side switch and DC input side switch,5minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F99, F100	String missing(String1-n) n: Determine according to the actual Number of Strings of the inverter	String fuse blown (if any)	Check whether the fuse is blown.
F101	Battery1Precharge Failure	Battery1precharge circuit fault (e.g., precharge resistor burnt out)	Check whether the precharge circuit is good. After the battery is powered on alone, check whether the Battery Voltage and bus voltage are consistent. If not, contact your dealer or after-sales service center.
F102	Battery1Relay Failure	Battery1relay cannot operate normally	After the battery is powered on, check whether the battery relay operates and whether the closing sound is heard. If it does not operate, contact your dealer or after-sales service center.
F103	Battery1Overvoltage	Battery1input voltage exceeds the rated range of the unit	Confirm whether the Battery Voltage is within the rated range of the unit.
F104	Battery2Precharge Failure	Battery2precharge circuit fault (e.g., precharge resistor burnt out)	Check whether the precharge circuit is good. After the battery is powered on alone, check whether the Battery Voltage and bus voltage are consistent. If not, contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F105	Battery2Relay Failure	Battery2relay cannot operate normally	After the battery is powered on, check whether the battery relay operates and whether the closing sound is heard. If it does not operate, contact your dealer or after-sales service center.
F106	Battery2Overvoltage	Battery2input voltage exceeds the rated range of the unit	Confirm whether the Battery Voltage is within the rated range of the unit.
F107	On-grid PWM Sync Failure	Abnormality occurs during carrier synchronization and grid connection.	1. Check whether the synchronization cable is connected properly 2. Check whether the master-slave setting is correct; 3. Disconnect the AC output side switch and DC input side switch, 5 minutes later close the AC output side switch and DC input side switch. If the fault persists, contact your dealer or after-sales service center.
F108	DSPCommunication Failure	-	-
F109	ExternalSTSFault	Inverter andSTSconnection cable abnormality	Check whether the wire harness connection sequence between the inverter andSTS corresponds one-to-one in order.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F110	Export Limit Protection	1. Inverter fault and grid disconnection 2. metercommunication unstable 3. Reverse power flow condition occurs	1. Check whether the inverter has other fault messages. If so, handle them accordingly; 2. Checkmeterconnection is reliable; 3. If this alarm occurs frequently and affects the normal power generation of the plant, please contact your dealer or after-sales service center.
F111	BypassOverload	-	-
F112	Black Start Failure	-	-
F113	Offgrid AC Ins Volt High	-	-
F114	Relay Failure2	Relay abnormality, cause: 1. Relay abnormality (relay short circuit) 2. Relay sampling circuit abnormality. 3. AC side wiring abnormality (possible loose connection or short circuit)	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F115	SVGPrecharge Disabled	SVGPrecharge Hardware Failure	Contact your dealer or after-sales service center.
F116	SVG ModeSVG PIDPrevention Failure	PIDHardware Abnormality	

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F117	DSPVersion Error	DSPSoftware Version Recognition Error	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F118	MOSContinuous Overvoltage	1. Software issue causes the inverter drive to be shut down earlier than the flyback drive; 2. Inverter drive circuit abnormality prevents turn-on; 3. PVvoltage is too high; 4. Mosvoltage sampling is abnormal;	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F119	Bus short-circuit fault	Hardware damage	If aBUSshort-circuit fault occurs and the inverter remains disconnected from the grid, contact your dealer or after-sales service center.
F120	Bus sampling abnormal	1. BUSvoltage sampling hardware fault	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F121	DCSample Abnormal	1. BUSvoltage sampling hardware fault 2. Battery Voltage sampling hardware fault 3. DcrlyRelay Failure	Disconnect the AC output side switch and DC input side switch, 5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.

9.5.2.2.4 Troubleshooting (Fault Codes F122-F171)

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F122	PV Input Mode Error	PV Access Mode has three modes. Taking four-channel MPPT as an example: 1. Parallel mode: i.e., AAAA mode (same-source mode), PV1-PV4 share the same source, 4 channels of PV are connected to the same PV module 2. Partial parallel mode: i.e., AACC mode, PV1 and PV2 are connected to the same source, PV3 and PV4 are connected to the same source 3. Independent mode: i.e., ABCD mode (not same-source), PV1、PV2、PV3、PV4 are connected independently, 4 channels of PV each connect to a separate PV module If the	Check PV Access Mode is set correctly (ABCD、AACC、AAAA), and set the PV Access Mode 1. Confirm whether each actually connected PV channel is correctly connected; 2. If the PV is correctly connected, check via the APP or screen whether the currently set "PV Access Mode" 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 a mode consistent with the actual situation. After setting, disconnect PV and AC power and restart; 4. After setting, if the current "PV Access Mode" is consistent with the actual Access Mode but this fault is still reported, contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
		actualPVAccess Mode does not match the device-configuredPVAccess Mode, this fault will be reported	
F123	Multi-channelPVphase error	PVInput Mode Setting Error	CheckPVAccess Mode is set correctly (ABCD、AACC、AAAA), and set thePVAccess Mode 1. Confirm whether each actually connectedPVchannel is correctly connected; 2. If thePVis correctly connected, check via theAPPor screen whether the currently set "PVAccess Mode" corresponds to the actual Access Mode; 3. If the currently set "PVAccess Mode" does not match the actual Access Mode, use theAPPor screen to set the "PVAccess Mode" to a mode consistent with the actual situation. After setting, disconnectPVandACpower and restart; 4. After setting, if the current "PVAccess Mode" is consistent with the actual Access Mode but this fault is still reported, contact your dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F124	Battery1Reversed	Battery1reverse polarity	Check whether the positive and negative terminals of the battery and device are consistent.
F125	Battery2Reversed	Battery2reverse polarity	Check whether the positive and negative terminals of the battery and device are consistent.
F126	Abnormal battery connection	Abnormal battery connection	Check whether the battery is operating normally.
F127	BAT Overtemperature	Battery overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F128	Ref Voltage Abnormal	Reference Circuit Failure	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F129	Cabinet Under Temperature	Cabinet Under Temperature, possible cause: ambient temperature too low.	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F130	ACSideSPDFault	AC-side SPD failure	Replace theAC-side surge protective device.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F131	DCSideSPDFault	DC-side SPD failure	Replace theDC-side surge protective device.
F132	Internal Fan Abnormal	Internal Fan Abnormal, possible causes: 1. Fan power supply abnormal; 2. Mechanical failure(locked rotor) ; 3. Fan aging damage.	Disconnect the AC output side switch and DC input side switch,5 minutes later, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
F133	External Fan Abnormal	External Fan Abnormal, possible causes: 1. Fan power supply abnormal; 2. Mechanical failure(locked rotor) ; 3. Fan aging damage.	
F134	PIDAbnormal	PIDhardware fault orPVovervoltagePID pause	PVovervoltage-inducedPIDpause warning requires no action;PIDhardware faults can be cleared by turning off thePIDswitch and then turning it on to clear thePIDfault. Replace thePIDdevice.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
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 trip reason is a PV short circuit or reverse connection. Check whether there are historical PV short-circuit warnings or historical PV reverse-connection warnings. If they exist, maintenance personnel need to check the corresponding PV conditions. After inspection and if no fault is found, the trip switch can be manually closed, and the warning can be cleared through the APP interface by using the Clear Historical Fault operation.
F136	Historical PV IGBT short-circuit warning	Possible causes: Overcurrent occurred, causing the trip switch to trip;	Contact the dealer or after-sales service center; maintenance personnel need to follow the historical PV short-circuit warning subcode to check whether the Boost hardware where the short circuit occurred and the external strings have faults; after inspection and if no fault is found, the warning can be cleared through the APP interface by using the Clear Historical Fault operation.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F137 , F138	HistoricalPVreverse-connection warning(String1-n) (n: Determined according to the inverter's actual Number of Strings)	Possible causes: APVreverse connection caused the trip switch to trip;	Contact the dealer or after-sales service center; maintenance personnel need to follow the historicalPVreverse connection warning subcode, check whether the corresponding string is reverse-connected, and check whether thePVpanel configuration has a voltage difference; after inspection and if no fault is found, you can clear this warning through theAPPinterface by using the Clear Historical Fault operation.
F139	FlashR/W Error	Possible causes: 1. Flashcontent has changed; 2. Flashlifetime exhausted;	1. Upgrade to the latest firmware; 2. Contact your dealer or after-sales service center.
F140	Meter Comm Loss	This warning may only be reported after the Power Limit function is enabled. Possible causes: 1. Meter not connected; 2. Incorrect wiring of the communication cable connecting the meter and the inverter.	Check the meter wiring and connect the meter correctly. After checking, if the fault persists, contact the dealer or after-sales service center.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F141	PVType Identification Failure	PVPanel Identification Hardware Abnormality	Contact your dealer or after-sales service center.
F142	PV String Mismatch	PVString Mismatch: Under the sameMPPT, the open-circuit voltage configurations of the two strings are different.	Check the open-circuit voltages of the two strings and configure strings with the same open-circuit voltage under the sameMPPT; long-term PV String Mismatch poses a safety hazard.
F143	CTNot Connected	CTNot Connected	CheckCTwiring.
F144	CTReversed	CTReversed	CheckCTwiring.
F145	PE Loss	PE Not Connected	Check the PE wiring.
F146	PV String Terminal Overtemperature(String 1~8)	37176register,PVterminal temperature alarm subcode1is set	-
F147	PV String Terminal Overtemperature(String 9~16)	37177register,PVterminal temperature alarm subcode2is set	-
F148	PV String Terminal Overtemperature(String 17~20)	37178register,PVterminal temperature alarm subcode3is set	-

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F149	HistoricalPVreverse-connection warning(String33~48)	Possible causes: APVreverse connection caused the trip switch to trip;	Contact the dealer or after-sales service center; maintenance personnel need to follow the historicalPVreverse connection warning subcode, check whether the corresponding string is reverse-connected, and check whether thePVpanel configuration has a voltage difference; after inspection and if no fault is found, you can clear this warning through theAPPinterface by using the Clear Historical Fault operation.
F150	Battery1Voltage Low	Battery Voltage is lower than the set value	-
F151	Battery2Voltage Low	Battery Voltage is lower than the set value	-
F152	Low Voltage of Battery Power	Battery is not in charging mode, and the voltage is lower than the shutdown voltage	-
F153	Battery1Voltage High	-	-
F154	Battery2Voltage High	-	-

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F155	Online Low Insulation Resistance	1. The PV string is short-circuited to Protection ground. 2. The installation environment of the PV strings is humid for extended periods, and the line-to-ground insulation is poor.	1. Check the impedance of the PV string to Protection ground. If a short circuit occurs, rectify the short-circuit point. 2. Check whether the inverter's Protection ground wire is correctly connected. 3. If it is confirmed that the impedance is indeed lower than the default value in rainy weather, reset the insulation resistance Protection point.
F156	Micro-grid Overload Warning	backup terminal input overcurrent	If it occurs occasionally, no action is required; if this alarm occurs frequently, contact your dealer or after-sales service center.
F157	Manual Reset	-	-
F158	Generator Phase Sequence Abnormal	-	-
F159	Multiplexed Port Configuration Abnormal	Multiplexed(Generator) port is configured as micro-grid or large load, but a generator is actually connected	Use APP to change the multiplexed(Generator) port configuration.
F160	EMS Forced Off-grid	EMS issues a forced off-grid command, but the off-grid function is not enabled	Enable the off-grid function.

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F161	Passive Anti-islanding Protection	-	-
F162	Grid Type Fault	Actual Type of Electrical Supply System(two-phase or split-phase) does not match the configured safety regulation	According to the actual Type of Electrical Supply System, switch to the corresponding safety regulation.
F163	Grid Phase Instability	Grid abnormality: the rate of change of grid voltage phase does not comply with local grid standards.	1. If it occurs occasionally, it may be a short-term grid abnormality. The inverter will resume normal operation after detecting that the grid is normal, and no manual intervention is required. 2. If it occurs frequently, check whether the grid frequency is within the allowable range. If not, contact the local power operator.
F166	PV Terminal Overtemperature	PV Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F167	AC Terminal Overtemperature Warning	AC Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. The internal fan is operating abnormally.	1. Check whether the inverter installation location is well ventilated and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature occurs, improve the ventilation and heat dissipation. 3. If both ventilation and ambient temperature are normal, contact your dealer or after-sales service center.
F168	Battery Terminal Overtemperature	Battery Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature.	
F169	Battery Terminal Overtemperature Warning	Battery Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature.	

Fault Code	Fault Name	Fault Cause	Troubleshooting Suggestions
F170	STS Overtemperature	STS Overtemperature, possible causes: 1. STS installation location is not ventilated. 2. Ambient Overtemperature.	
F171	Abnormal wiring between inverter and battery	Abnormal power line connection between battery and inverter	Check whether the power line connection between the battery and inverter is normal.

9.5.2.2.5 Fault Symptom Handling

Fault Name	Fault Cause	Troubleshooting Suggestions
Generator Failure	1. When the generator is Not Connected, this fault will be displayed continuously. 2. When the generator is running, failure to meet generator safety regulations will trigger this fault.	1. If the generator is not connected, ignore this fault; 2. If this fault occurs when the generator is faulty, it is normal. After the generator recovers, wait for a period of time; the fault will be automatically cleared; 3. This fault will not affect the normal operation of off-grid mode 4. If the generator and grid are connected at the same time and meet safety regulation requirements, the grid will be prioritized for grid connection, and the system will operate in grid-connected state.

Fault Name	Fault Cause	Troubleshooting Suggestions
BMS Status Bit Error	BMS Module 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, contact your dealer or after-sales service center.
Ambient Overtemperature	- Poor machine ventilation - Hot airflow flows back to the ambient temperature sampling point	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, contact your dealer or after-sales service center.
PV Terminal Overtemperature	PV Terminal Overtemperature, possible causes: - The inverter installation location is not ventilated. - Ambient Overtemperature. - Internal fan operation is abnormal.	- Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. - If there is no ventilation or Ambient Overtemperature, improve the ventilation and heat dissipation conditions. - If ventilation and ambient temperature are normal, contact your dealer or after-sales service center.
Battery Terminal Overtemperature	Battery Terminal Overtemperature, possible causes: - The inverter installation location is not ventilated. - Ambient Overtemperature.	- Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. - If there is no ventilation or Ambient Overtemperature, improve the ventilation and heat dissipation conditions. - If ventilation and ambient temperature are normal, contact your dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
AC Terminal Overtemperature Warning	AC Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature. 3. Internal fan operation is abnormal.	
Battery Terminal Overtemperature Warning	Battery Terminal Overtemperature, possible causes: 1. The inverter installation location is not ventilated. 2. Ambient Overtemperature.	1. Check whether the ventilation at the inverter installation location is good and whether the ambient temperature exceeds the maximum allowable ambient temperature range. 2. If there is no ventilation or Ambient Overtemperature, improve the ventilation and heat dissipation conditions. 3. If ventilation and ambient temperature are normal, contact your dealer or after-sales service center.
Three-phase on-grid fault	Three-phase external wiring error	Reconnect the wiring.
External STS Failure	Abnormal connection cable between inverter and STS	Check whether the wire harness connection sequence between the inverter and the STS corresponds one-to-one in order.

Fault Name	Fault Cause	Troubleshooting Suggestions
Parallel Comm Timeout Shutdown	Under parallel operation, if the slave exceeds 400 seconds without communicating with the master	Check whether the parallel communication harness is reliably connected, and check whether slave addresses are duplicated.
Three-phase off-grid phase loss fault	Three-phase system phase loss	1. Check whether all inverters are powered on; 2. Check whether each phase of the three-phase group is connected to an inverter;
EPO	External trigger of the hardware EPO button or remote trigger of the EPO command	1. If Remote Shutdown is actively triggered, it can be ignored; 2. If no active trigger is present, please contact your dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
High combustible gas concentration	The combustible gas device automatically triggers when it detects a concentration of 20% LEL or above	1. After the fault occurs, the machine automatically opens the air valve to exhaust gas and reduce the concentration. When the concentration drops below 5% LEL and remains for 15 minutes, the fault will automatically clear. 2. After the fault occurs, if a cluster-level Fire Fighting Failure is triggered, the air valve will automatically close, and the air valve status will be confirmed within 30 s to ensure that cluster-level fire fighting performs Protection in an enclosed space. 3. Please contact your dealer or after-sales service center.
The combustible gas device's control signal for opening the air valve is inconsistent with the feedback signal	The control signal for opening the air valve is inconsistent with the feedback signal	1. Check that the harness signal connection is correct. 2. Please contact your dealer or after-sales service center.
One-click Shutdown Stop	Check via the App whether the one-click shutdown function is enabled	Disable one-click shutdown.
Offline shutdown	-	-
Remote shutdown	-	-

Fault Name	Fault Cause	Troubleshooting Suggestions
On-Grid SPD Fault	-	1. Try restarting the machine and observe whether the fault is cleared; 2. If the fault cannot be cleared after restart, please contact your dealer or after-sales service center.
Off-Grid SPD Fault	-	1. Try restarting the machine and observe whether the fault is cleared; 2. If the fault cannot be cleared after restart, please contact your dealer or after-sales service center.
Child Node Communication Failure	Internal Comm Abnormal	1. Try restarting the machine and observe whether the fault is cleared; 2. If the fault cannot be cleared after restart, please contact your dealer or after-sales service center.
Dehumidifier Communication Failure	Communication link abnormality between the dehumidifier and the LC control box	1. Check the link communication harness and observe whether the fault is eliminated; 2. Try restarting the machine and observe whether the fault is cleared; 3. If the fault cannot be eliminated after restart, please contact your dealer or after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
Combustible Gas Detection Equipment Communication Failure	1. The combustible gas device was not properly configured with RS-485 address 2 at the factory. 2. Communication link abnormality between the combustible gas device and the LC control box	1. Check the link communication harness and observe whether the fault is eliminated; 2. Try restarting the machine and observe whether the fault is cleared; 3. Use the method provided by the combustible gas manufacturer to check whether the address of the combustible gas device is 2; if not, modify it; 4. If the fault cannot be eliminated after restart, please contact your dealer or after-sales service center.
DG Communication Failure	Communication link abnormality between the control board and the DG	1. Check the link communication harness and observe whether the fault is eliminated; 2. Try restarting the machine and observe whether the fault is eliminated; 3. If the fault cannot be eliminated after restarting, please contact your dealer or after-sales service center.
Battery Over Voltage	1. Single cell overvoltage 2. Voltage sampling line abnormality	Record the fault symptom, restart the battery, wait a few minutes, and confirm whether the fault disappears. If the problem still exists after restart, please contact the after-sales service center.
Battery Undervoltage	1. Battery total overvoltage 2. Voltage sampling line abnormality	

Fault Name	Fault Cause	Troubleshooting Suggestions
	1. Battery total undervoltage 2. Voltage sampling line abnormality	
Battery Overcurrent	1. Excessive Charging Current, battery current limiting abnormality: sudden changes in temperature and voltage values 2. Inverter response abnormality	
	Excessive battery discharge current	
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 Suggestions
Battery Imbalance	1. If the temperature difference is too large, the battery will limit battery power at different stages, i.e., limit the charge and discharge current. Therefore, this problem is generally unlikely to occur. 2. Cell capacity degradation causes excessive internal resistance; during Overcurrent, the temperature rise is large, resulting in a large temperature difference. 3. Poor welding of cell tabs causes the cell to heat up too quickly under Overcurrent. 4. Temperature sampling problem; 5. Loose power line connection	

Fault Name	Fault Cause	Troubleshooting Suggestions
	1. Uneven cell aging 2. Slave board chip issues can also cause excessive cell voltage difference; 3. Slave board balancing problems can also cause excessive cell voltage difference 4. Caused by wiring harness problems	
Insulation Resistance	Insulation resistance damage	Check whether the ground wire is properly connected, restart the battery, and if the problem still exists after restart, please contact the after-sales service center.
Pre-charging Failure	Pre-charging Failure	Indicates that during precharge, the voltage across the precharge MOS always exceeds the specified threshold. After shutdown and restart, observe whether the fault persists. Check whether the wiring is correct and whether the precharge MOS is damaged.
Sampling Harness Fault	Battery sampling line poor contact or disconnected	Check the wiring and restart the battery. If the problem still exists after restart, contact the after-sales service center.
	Cell voltage sampling line poor contact or disconnected	Check the wiring and restart the battery. If the problem still exists after restart, contact the after-sales service center.
	Cell temperature sampling line poor contact or disconnected	

Fault Name	Fault Cause	Troubleshooting Suggestions
	Dual-channel current comparison error is too large, or the current sampling line circuit is abnormal	
	Dual-channel voltage comparison error is too large, or the voltage comparison error between the MCU and AFE is too large, or the voltage sampling line circuit is abnormal	
	Temperature sampling line circuit abnormal, or poor contact or disconnected	
	Overvoltage level 5 or overtemperature level 5; three-terminal fuse blown	Three-segment fuse blown; contact the after-sales service center to replace the main control board.
Relay or MOS Overtemperature	Relay or MOS Overtemperature	This fault indicates that the MOS temperature exceeds the specified threshold. Shut down and leave standing for 2 h until the temperature recovers.
Shunt Overtemperature	Shunt Overtemperature	This fault indicates that the shunt temperature exceeds the specified threshold. Shut down and leave standing for 2 h until the temperature recovers.

Fault Name	Fault Cause	Troubleshooting Suggestions
BMS1 Other Fault 1 (Residential ESS category)	Relay or MOS open circuit	1. Upgrade the software, shut down and leave standing for 5 minutes; after restart, check whether the fault persists; 2. If it persists, replace the battery pack
	Relay or MOS short circuit	1. Upgrade the software, shut down and leave standing for 5 minutes; after restart, check whether the fault persists; 2. If it persists, replace the battery pack
	Abnormal communication between the master cluster and slave cluster, or cell inconsistency between clusters	1. Check the slave unit's battery information and software version, and whether the communication cable connection with the master unit is normal 2. Upgrade the software
	Abnormal battery system return harness, causing the interlock signal not to form a loop	Check whether the terminating resistor is installed correctly
	Abnormal communication between BMS and PCS	1. Confirm whether the communication cable interface definition between the battery and inverter is correct; 2. Contact the after-sales service center to check the backend data and observe whether the inverter and battery software are correctly matched.
	Abnormal communication harness between BMS main control and slave control	1. Check the wiring and restart the battery; 2. Upgrade the battery. If the problem still exists after restart, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Communication loss between main negative chips	
	Air switch or shunt trip abnormal	1. Shut down and leave for 5 minutes; after restarting, check whether the fault persists; 2. Observe whether the blind-mate connectors at the bottom of the PACK and PCU and the communication pins are loose or skewed;
	MCU self-test failed	Upgrade the software, restart the battery. If the problem still exists after restart, please contact the after-sales service center.
	1. Software version too low or BMS board damaged 2. A large number of inverters are connected in parallel, causing excessive impact on the battery during pre-charging	1. Upgrade the software and observe whether the fault persists 2. In parallel operation, black-start the battery first, then start the inverter
	MCU internal fault	Upgrade the software, restart the battery. This is generally for detecting MCU or external component damage. If the problem still exists after restart, please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Total control current exceeds the specified threshold	1. Shut down and leave for 5 minutes; after restarting, check whether the fault persists; 2. Check whether the inverter power setting is too high, causing the bus load to be exceeded;
	Inconsistent battery cells in parallel clusters	Confirm whether the battery cells in parallel clusters are consistent
	Reverse connection of positive and negative poles of parallel cluster batteries	Check whether the positive and negative poles of parallel cluster batteries are reverse-connected
	Severe overtemperature, overvoltage, etc. triggering the fire protection system	Contact the after-sales service center.
Air Conditioner Failure	Air conditioner abnormal failure	Try to restart the system. If the fault is not cleared, contact the after-sales service center.
	Cabinet door not closed	Check whether the cabinet door is properly closed
	Supply voltage too high	Confirm whether the supply voltage value meets the air conditioner input voltage requirements; after confirming compliance, power on again.
	Insufficient supply voltage	
	No voltage input	

Fault Name	Fault Cause	Troubleshooting Suggestions
	Unstable supply voltage	Try to restart the system. If the fault is not cleared, contact the after-sales service center.
	Unstable compressor voltage	
	Poor sensor contact or damage	
	Air conditioner fan abnormal	
BMS1 Other Fault 2 (Residential ESS)	Abnormal voltage or current inside DCDC	Refer to the specific DC Failure details.
	DCDC Overload or excessively high heatsink temperature, etc.	
	Abnormal cell sampling or inconsistent aging levels	Please contact the after-sales service center.
	Fan operation is not executed normally	Please contact the after-sales service center.
	Output port screws are loose or have poor contact	1. Shut down the battery and check the wiring and output port screws. 2. After confirmation, restart the battery and observe whether the fault persists. If it persists, please contact the after-sales service center.
	Battery has been used for too long or the cells are severely damaged	Please contact the after-sales service center to replace the pack.

Fault Name	Fault Cause	Troubleshooting Suggestions
	1. Software version too low or BMS board damaged 2. A large number of inverters are connected in parallel, causing excessive impact on the battery during pre-charging	1. Upgrade the software and observe whether the fault persists. 2. If in parallel operation, black-start the battery first, then start the inverter.
	Heating film damaged	Please contact the after-sales service center.
	The three-terminal fuse of the heating film is open, and the heating function cannot be used	Please contact the after-sales service center.
	Software model, cell type, and hardware model do not match	Check whether the software model, SN number, cell type, and hardware model are consistent. If not, please contact the after-sales service center.
	Thermal management board communication disconnected	1. Shut down and leave for 5 minutes; after restarting, check whether the fault persists; 2. If the fault does not clear, contact after-sales to replace the pack.
	Pack fan fault signal triggered	
DCDC Failure	Output port voltage too high	Check the output port voltage. If the output port voltage is normal and the fault still cannot clear automatically after restarting the battery, please contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	The DCDC module detects that the Battery Voltage exceeds the maximum charging voltage	Stop charging, discharge to below 90% SOC or leave it idle for 2 h. If ineffective and the fault still exists after restart, please contact the after-sales service center.
	Heatsink temperature too high	Leave the battery idle for 1 h and wait for the heatsink temperature to drop. If ineffective and the fault still exists after restart, please contact the after-sales service center.
	Excessive battery discharge current	Check whether the load exceeds the battery's discharge capability. Turn off the load or shut down the PCS for 60 s. If ineffective and the fault still exists after restart, please contact the after-sales service center.
	The positive and negative poles of the output port power harness are reversed with the parallel battery cluster or PCS	Turn off the battery manual switch, check whether the output port wiring is correct, and restart the battery.
	Output power relay cannot close	Check whether the output port wiring is correct and whether a short circuit exists. If ineffective and the fault still exists after restart, contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	Power device overtemperature	Let the battery stand for 1 h until the temperature of the power devices inside the battery decreases. If ineffective and the fault still exists after restart, contact the after-sales service center.
	Relay sticking	If the fault still exists after restart, contact the after-sales service center.
Battery Rack Circulating Current Failure	1. Cell imbalance 2. No full-charge calibration at first power-on	Record the fault symptom, restart the battery, wait a few minutes, and confirm whether the fault disappears. If the problem still exists after restart, please contact the after-sales service center.
BMS1 Other Fault 3 (Large-scale Energy Storage Type)	Abnormal communication with Linux module	1. Check whether the communication cable connection is normal 2. Upgrade the software, restart the battery, and observe whether the fault persists. If it persists, contact the after-sales service center.
	Cell temperature rise too fast	Abnormal cell; contact after-sales to replace the pack.
	SOC below 10%	Charge the battery.
	SN write does not comply with rules	Check whether the number of SN digits is normal. If abnormal, contact the after-sales service center.
	1. Daisy-chain communication abnormality within the battery cluster 2. Inconsistent cell aging degree between battery clusters	1. Check the contact condition of the battery pack in a single cluster 2. Confirm the usage of each battery cluster, such as cumulative charge/discharge capacity, cycle count, etc. 3. Contact the after-sales service center.

Fault Name	Fault Cause	Troubleshooting Suggestions
	High humidity inside the pack	-
	Fuse open	Contact after-sales to replace the pack.
	Battery power low	Charge the battery.
BMS1 Other Fault 4 (Large-scale Energy Storage Type)	Air switch 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)	Continuous Overload (>690 kVA) for 10 s	Please contact the after-sales service center.
Overload Protection (Smart Port)	Continuous Overload (>690 kVA) for 10 s	Please contact the after-sales service center.
Overcurrent Protection (Jinggui)	-	-
Overcurrent Protection (Smart Port)	-	-

Fault Name	Fault Cause	Troubleshooting Suggestions
Master AC On Meter Comm Error	1. The meter may not be connected to the master 2. The meter communication cable may be loose	1. Check whether the meter is connected to the master 2. Check whether the meter communication cable is loose
Parallel Slave Meter Error	Meter connected to slave	Set the device connected to the meter as the master
Slave AC On Timeout with Master	1. Incorrect slave address setting 2. Slave communication cable is loose	1. Check whether the slave address is duplicated 2. Check whether the parallel communication cable is loose

9.5.2.3 Battery Fault (LX a5.0-30, LX U5.0-30)

Alarm Status

 When the battery ALM indicator shows red, identify and troubleshoot the fault based on the status shown by the SOC indicator.

No.	SOC Indicator	Fault Name	Solutions
1		Battery Over Voltage Battery Undervoltage	1. Check via the APP whether the inverter's Charging Current limit is 0. If it is 0, confirm whether the communication cable between the battery and the inverter is reliably connected and communication is normal. 2. Power off and leave for 5 minutes. After restarting, check whether the fault persists. 3. If the fault is not cleared, please contact the after-sales service center.

No.	SOC Indicator	Fault Name	Solutions
2		Battery Overcurrent	1. Check via the APP whether the battery model is correct, and confirm whether the battery real-time current is greater than the Charging Current Limit or Discharge Current Limit value; if so, please contact the after-sales service center. 2. If it is less than the limit, power off the battery or upgrade the firmware, then restart to confirm whether the fault persists. 3. If the fault is not cleared, please contact after-sales.
3		Battery Overtemperature Battery Undertemperature Battery Terminal Overtemperature	Shut down and let it stand for 60 minutes, and wait for the temperature to recover; if the problem still exists after restart, please contact the after-sales service center.
4		Battery Imbalance SOH Too Low Fault	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
5		Pre-charging Failure	1. Confirm whether the battery output terminals and the inverter are connected in reverse. 2. Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.

No.	SOC Indicator	Fault Name	Solutions
6	○●○●	Sampling Harness Fault	Confirm whether the battery switch is closed. If the battery switch is already closed and the problem still exists, please contact the after-sales service center.
7	●●○○	Relay or MOS Overtemperature Shunt Overtemperature	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
		BMS Other Fault: Output Port Overtemperature Fault	1. Check whether the battery power cable is securely locked. Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
8	○●●○	Other Protection: MOS Cannot Close	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
9	○●●●	Other Protection: MOS Adhesion	
10	●○○○	Other Protection: Parallel Cluster Fault	1. Confirm whether the type and installation position of the termination resistor are correct. 2. Confirm whether the communication cables between batteries and between the battery and the inverter are reliably connected and communication is normal. 3. If the fault is not cleared, please contact the after-sales service center.

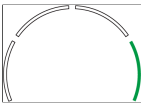
No.	SOC Indicator	Fault Name	Solutions
11	○○○○	Other Protection: Communication with Inverter Lost	1. Confirm whether the communication cables between batteries and between the battery and the inverter are reliably connected and communication is normal. 2. If the fault is not cleared, please contact the after-sales service center.
12	●○○●	Other Protection: BMU Communication Fault	1. Confirm whether the type and installation position of the termination resistor are correct. 2. Confirm whether the communication cables between batteries and between the battery and the inverter are reliably connected and communication is normal. 3. Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
13	●○○●○	Other Protection: Air Switch Stuck Fault	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
14	●●○○●	Other Protection: Software Failure	Restart the battery. If the problem persists after restart, contact the after-sales service center.
15	●●●○	Other Protection: Hardware Overcurrent Fault	
16	●●●●	Other Protection: Microelectronics Fault	

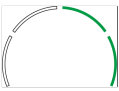
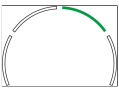
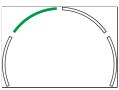
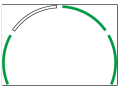
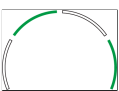
No.	SOC Indicator	Fault Name	Solutions
		Heating Film Three-Terminal Abnormality	1. Upgrade Software 2. Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.

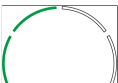
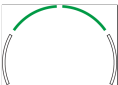
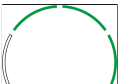
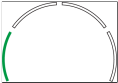
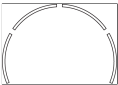
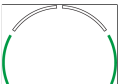
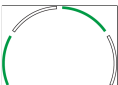
9.5.2.4 Battery Fault (GW14.3-BAT-LV-G10)

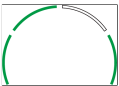
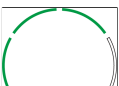
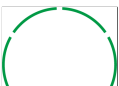


When the battery alarm indicator is red , the outer ring marquee LED flashes red, and when the running LED is off, use the SOC indicator status to locate and troubleshoot the fault.

No.	SOC Indicator	Fault Name	Solutions
1		Battery Over Voltage	1. Check via the App whether the inverter's Charging Current limit is 0. If it is 0, confirm whether the communication cable connection between the battery and the inverter is reliable and communication is normal. 2. Shut down and leave it for 5 minutes; after restarting, confirm whether the fault persists. 3. If the fault persists, please contact the after-sales service center.
		Battery Undervoltage	

2		Battery Overcurrent	1. Check via the App whether the battery model is correct, and confirm whether the battery's real-time current is greater than the Charging Current Limit or Discharge Current Limit value. Please contact the after-sales service center. 2. If it is less than the limit, shut down the battery or upgrade the firmware, and restart to confirm whether the fault persists. 3. If the fault persists, please contact after-sales.
3		Battery Overtemperature	Shut down and let it stand for 60 minutes, and wait for the temperature to recover; if the problem still exists after restart, please contact the after-sales service center.
		Battery Undertemperature	
		Battery Terminal Overtemperature	
4		Battery Imbalance	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
		SOH Too Low Fault	
5		Pre-charging Failure	1. Confirm whether the battery output terminal and the inverter are connected in reverse. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.
6		Sampling Harness Fault	Confirm whether the battery circuit breaker is closed. If the battery circuit breaker is already closed and the problem still exists, please contact the after-sales service center.

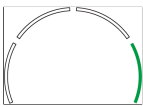
7		Relay or MOS Overtemperature	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
		Output port over-temperature	1. Check whether the battery power cable is securely locked. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.
8		MOS cannot close	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
9		MOS adhesion	
10		Parallel cluster fault	1. Confirm whether the type and installation position of the terminating resistor are correct. 2. Confirm whether the communication cable between batteries and the communication cable between the battery and the inverter are reliably connected and communication is normal. 3. If the fault persists, please contact the after-sales service center.
11		Software and hardware version mismatch	Restart the battery. If the problem persists after restart, contact the after-sales service center.
12		BMU communication fault	
13		Circuit breaker sticking fault	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.

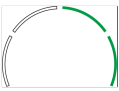
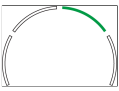
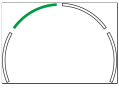
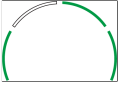
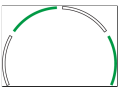
14		Software Failure	Restart the battery. If the problem persists after restart, contact the after-sales service center.
15		Hardware Overcurrent Fault	
16		Microelectronics fault	
		Heating Film Three-Terminal Abnormality	1. Upgrade the software. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.

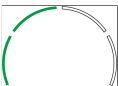
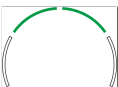
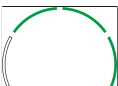
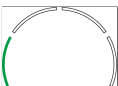
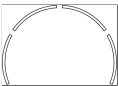
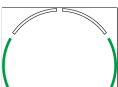
9.5.2.5 Battery Fault (GW16.1-BAT-LV-G10)

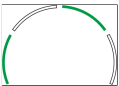
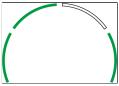
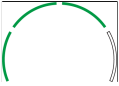
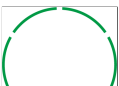


When the battery alarm indicator is red , the outer ring marquee LED flashes red, and when the running LED is off, use the SOC indicator status to locate and troubleshoot the fault.

No.	SOC Indicator	Fault Name	Solutions
1		Battery Over Voltage	1. Check via the App whether the inverter's Charging Current limit is 0. If it is 0, confirm whether the communication cable connection between the battery and the inverter is reliable and communication is normal. 2. Shut down and leave it for 5 minutes; after restarting, confirm whether the fault persists. 3. If the fault persists, please contact the after-sales service center.
		Battery Undervoltage	

2		Battery Overcurrent	1. Check via the App whether the battery model is correct, and confirm whether the battery's real-time current is greater than the Charging Current Limit or Discharge Current Limit value. Please contact the after-sales service center. 2. If it is less than the limit, shut down the battery or upgrade the firmware, and restart to confirm whether the fault persists. 3. If the fault persists, please contact after-sales.
3		Battery Overtemperature	Shut down and let it stand for 60 minutes, and wait for the temperature to recover; if the problem still exists after restart, please contact the after-sales service center.
		Battery Undertemperature	
		Battery Terminal Overtemperature	
4		Battery Imbalance	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
		SOH Too Low Fault	
5		Pre-charging Failure	1. Confirm whether the battery output terminal and the inverter are connected in reverse. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.
6		Sampling Harness Fault	Confirm whether the battery circuit breaker is closed. If the battery circuit breaker is already closed and the problem still exists, please contact the after-sales service center.

7		Relay or MOS Overtemperature	Shut down and let it stand for 30 minutes; if the problem still exists after restart, please contact the after-sales service center.
		Output port over-temperature	1. Check whether the battery power cable is securely locked. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.
8		MOS cannot close	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
9		MOS adhesion	
10		Parallel cluster fault	1. Confirm whether the type and installation position of the terminating resistor are correct. 2. Confirm whether the communication cable between batteries and the communication cable between the battery and the inverter are reliably connected and communication is normal. 3. Use the battery SN code to confirm whether the battery cells in the parallel cluster are consistent. 4. If the fault is not cleared, please contact the after-sales service center.
11		Software and hardware version mismatch	Restart the battery. If the problem persists after restart, contact the after-sales service center.
12		BMU communication fault	

13		Circuit breaker sticking fault	Shut down and let it stand for 5 minutes; if the problem still exists after restart, please contact the after-sales service center.
14		Software Failure	Restart the battery. If the problem persists after restart, contact the after-sales service center.
15		Hardware Overcurrent Fault	
16		Microelectronics fault	
		Heating Film Three-Terminal Abnormality	1. Upgrade the software. 2. Shut down and let it stand for 5 minutes. If the problem still exists after restart, please contact the after-sales service center.

10 Technical Specifications

10.1 Inverter Parameters

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Battery Side			
Battery Type*1	LFP (LiFePO ₄) /Lead-acid	LFP (LiFePO ₄) /Lead-acid	LFP (LiFePO ₄) /Lead-acid
Nominal Voltage (V)	48	48	48
Voltage Range (V)	40~60	40~60	40~60
Start-up Voltage (V)	44.2	44.2	44.2
Number of Battery Inputs	1	1	1
Max. Continuous Charging Current (A)	120	165	220
Max. Continuous Discharging Current (A)	120	165	220
Max. Charging Power (kW)	5.0	7.5	10.0
Max. Discharging Power (kW)	5.5	8.2	11.0
PV Side			
Max. Input Power (kW)	10.0	15.0	20.0

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Max. Input Voltage (V) ^{*2}	600	600	600
MPPT Operating Voltage Range (V) ^{*3}	50~550	50~550	50~550
MPPT Operating Voltage Range at Nominal Power (V)	150-500	150-500	150-500
Start-up Voltage (V)	60	60	60
Nominal Input Voltage (V)	360	360	360
Max. MPPT Current (A)	20/20	40/20	40/40
Max. MPPT Short Circuit Current (A)	26/26	52/26	52/52
Max. Backfeed Current to the Array (A)	0	0	0
Number of MPPTs	2	2	2
Number of Strings per MPPT	1/1	2/1	2/2
AC Side (Grid Port)			
Rated Power (kW)	5.0	7.5	10.0
Max. Power (kW)	5.0	7.5	10.0
Rated Power at 40°C (kW)	5.0	7.5	10.0
Max. Power at 40°C (kW)	5.0	7.5	10.0

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Rated Apparent Power from Grid (kVA)	5.0	7.5	10.0
Rated Apparent Power to Grid (kVA)	5.0	7.5	10.0
Max. Apparent Power to Grid (kVA)	5.0	7.5	10.0
Max. Apparent Power from Grid (kVA)	16.0	16.0	16.0
Nominal Voltage (V)	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE
Voltage Range (V)	170~290 170~290 170~290 170~290	170~290 170~290 170~290 170~290	170~290 170~290 170~290 170~290
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	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Rated Current from Grid (A)	24.0 @120/208V, 2L/N/PE 22.7 @127/220V, 2L/N/PE 20.8 @120/240V, 2L/N/PE 19.7 @127/254V, 2L/N/PE	36.1 @120/208V, 2L/N/PE 34.1 @127/220V, 2L/N/PE 31.3 @120/240V, 2L/N/PE 29.5 @127/254V, 2L/N/PE	48.1 @120/208V, 2L/N/PE 45.5 @127/220V, 2L/N/PE 41.7 @120/240V, 2L/N/PE 39.4 @127/254V, 2L/N/PE
Rated Current to Grid (A)	24.0 @120/208V, 2L/N/PE 22.7 @127/220V, 2L/N/PE 20.8 @120/240V, 2L/N/PE 19.7 @127/254V, 2L/N/PE	36.1 @120/208V, 2L/N/PE 34.1 @127/220V, 2L/N/PE 31.3 @120/240V, 2L/N/PE 29.5 @127/254V, 2L/N/PE	48.1 @120/208V, 2L/N/PE 45.5 @127/220V, 2L/N/PE 41.7 @120/240V, 2L/N/PE 39.4 @127/254V, 2L/N/PE
Max. Current from Grid (A)	63.0	63.0	63.0
Max. Current to Grid (A)	24.0 @120/208V, 2L/N/PE 22.7 @127/220V, 2L/N/PE 20.8 @120/240V, 2L/N/PE 19.7 @127/254V, 2L/N/PE	36.1 @120/208V, 2L/N/PE 34.1 @127/220V, 2L/N/PE 31.3 @120/240V, 2L/N/PE 29.5 @127/254V, 2L/N/PE	48.1 @120/208V, 2L/N/PE 45.5 @127/220V, 2L/N/PE 41.7 @120/240V, 2L/N/PE 39.4 @127/254V, 2L/N/PE
Max. Output Fault Current (Peak and Duration) (A)	105A, 3us	105A, 3us	130A, 3us

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Inrush Current (Peak and Duration) (A)	105A, 3 μ s	105A, 3 μ s	130A, 3 μ s
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)	105	105	130
Type of Voltage	a.c.	a.c.	a.c.
AC Side (Back-up Port)			
Rated Output Apparent Power (kVA)	5.0	7.5	10.0
Max. Output Apparent Power (kVA)	Off-grid: 5.5(10.0, 10s) Bypass: 16.0	Off-grid: 8.2(15.0, 10s) Bypass: 16.0	Off-grid: 11.0(20.0, 10s) Bypass: 16.0
Nominal Output Voltage (V)	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240V, 2L/N/PE 127/254V, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240V, 2L/N/PE 127/254V, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240V, 2L/N/PE 127/254V, 2L/N/PE

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Nominal Output Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	45~55/55~65	45~55/55~65	45~55/55~65
Rated Output Current (A)	24.0 @120/208V, 2L/N/PE 22.7 @127/220V, 2L/N/PE 20.8 @120/240V, 2L/N/PE 19.7 @127/254V, 2L/N/PE	36.1 @120/208V, 2L/N/PE 34.1 @127/220V, 2L/N/PE 31.3 @120/240V, 2L/N/PE 29.5 @127/254V, 2L/N/PE	48.1 @120/208V, 2L/N/PE 45.5 @127/220V, 2L/N/PE 41.7 @120/240V, 2L/N/PE 39.4 @127/254V, 2L/N/PE
Max. Output Current (A) ^{*4}	Off-grid: 24.0, Bypass: 63.0	Off-grid: 36.1, Bypass: 63.0	Off-grid: 48.1, Bypass: 63.0
Max. Fault Current (Peak and Duration) (A)	105A, 3us	105A, 3us	130A, 3us
Inrush Current (Peak and Duration) (A)	105A, 3us	105A, 3us	130A, 3us
Maximum Overcurrent Protection (A)	105	105	130
THDv (@Linear Load)	<3%	<3%	<3%
On/Off-grid Switching Time (ms)	≤4	≤4	≤4
AC Side (Smart Port)			

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Rated Apparent Power (kVA)	5.0	7.5	10.0
Max. Apparent Power (kVA)	12.7	12.7	12.7
Nominal Voltage (V)	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE	120/208, 2L/N/PE 127/220, 2L/N/PE 120/240, 2L/N/PE 127/254, 2L/N/PE
Voltage Range (V)	170~290	170~290	170~290
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 (A)	50	50	50
Efficiency			
Max. Efficiency	97.6%	97.6%	97.6%
Max. Battery to AC Efficiency	95.5%	95.5%	95.5%
MPPT Efficiency	99.9%	99.9%	99.9%
Protection			
PV String Current Monitoring	Integrated	Integrated	Integrated

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
PV Insulation Resistance Detection	Integrated	Integrated	Integrated
Residual Current Monitoring	Integrated	Integrated	Integrated
PV Reverse Polarity Protection	Integrated	Integrated	Integrated
Battery Reverse Polarity Protection	Integrated	Integrated	Integrated
Anti-islanding Protection	Integrated	Integrated	Integrated
AC Overcurrent Protection	Integrated	Integrated	Integrated
AC Short Circuit Protection	Integrated	Integrated	Integrated
AC Overvoltage Protection	Integrated	Integrated	Integrated
DC Switch	Integrated	Integrated	Integrated
DC Surge Protection	Type II	Type II	Type II
AC Surge Protection	Type II	Type II	Type II
AFCI	Integrated	Integrated	Integrated
Rapid Shutdown ^{*5}	Optional	Optional	Optional
Remote Shutdown	Integrated	Integrated	Integrated
General Data			

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Operating Temperature Range (°C)	-35~+60	-35~+60	-35~+60
Operating Environment	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
Storage Temperature (°C)	-40~+85	-40~+85	-40~+85
Relative Humidity	0 ~ 95%	0 ~ 95%	0 ~ 95%
Max. Operating Altitude (m)	3000	3000	3000
Cooling Method	Natural Cooling	Smart Fan Cooling	Smart Fan Cooling
User Interface	LCD, WLAN+APP	LCD WLAN+APP	LCD 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)	26.4	27.3	28.9
Dimension (W×H×D mm)	561*445*230	561*445*230	561*445*230
Noise Emission (dB)	<35	<45	<45
Topology	Non-isolated	Non-isolated	Non-isolated

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Power Self-consumption at Night (W)	<15	<15	<15
Ingress Protection Rating	IP66	IP66	IP66
Anti-corrosion Class	C4	C4	C4
DC Connector	JK01M	JK01M	JK01M
AC Connector	TG	TG	TG
Environmental Category	4K4H	4K4H	4K4H
Pollution Degree	III	III	III
Overvoltage Category	DC II / AC III	DC II / AC III	DC II / AC III
Protective Class	I	I	I
Decisive Voltage Classification (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 Mounted	Wall Mounted	Wall Mounted
Active Anti-islanding Method	AFDPF + AQDPF*6	AFDPF + AQDPF*6	AFDPF + AQDPF*6
Type of Electrical Supply System	Two Phase/Split Phase	Two Phase/Split Phase	Two Phase/Split Phase

Technical Data	GW5K-ES-LD-G10	GW7.5K-ES-LD-G10	GW10K-ES-LD-G10
Country of Manufacture	China	China	China
Certification			
Grid Standard	Please refer to the official website		
Safety Regulation			
EMC			

*1: Different models of batteries cannot be mixed in parallel on same battery input.

*2: When the input voltage ranges from 560V to 600V, the inverter will enter the 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: The Max. Output Current in off-grid operation accounts for a three-phase maximum 150% unbalanced capability.

*5: For Brazil, Rapid Shutdown is integrated.

*6: AFDPF: Active Frequency Drift with Positive Feedback, AQDPF: Active Q Drift with Positive Feedback.

10.2 Battery Technical Specifications

10.2.1 LX A5.0-30

Technical Parameters	LX A5.0-30
Nominal Capacity (kWh)	5.12
Usable energy (kWh) ^{* 1}	5
Cell Type	LFP (LiFePO4)

Technical Parameters	LX A5.0-30
Operating Voltage Range (V)	43.2~58.24
Rated Capacity (Ah)	100
Nominal Charge Current (A) ^{*2}	60
Max. Continuous Charge Current (A) ^{*2*3}	90
Nominal Discharge Current (A) ^{*2}	100
Max. Continuous Discharge Current (A) ^{*2*3}	150
Max. Pulse Discharge Current (A) ^{*2*3}	<200A (30s)
Max. Continuous Discharge Power (W)	7200
Communication	CAN
Operating Temperature Range (°C)	Charge: 0 < T ≤ 55 Discharge: -20 < T ≤ 55
Maximum Operating Altitude (m)	4000
Weight (Kg)	44
Dimensions (W x H x D mm)	442*133*520 (Excluding hanger) 483*133*559 (Including hanger)
Ingress Protection Rating	IP20
Application Method	On-grid/On-grid + Backup/ off Grid
Scalability	Max. 30 in Parallel (150kWh) (Hand to hand /Combiner box /Busbar)

Technical Parameters	LX A5.0-30
Mounting Method	19-inch standard rack, Floor-mounted, Wall-Mounted
Round-trip Efficiency ^{*1}	≥96%
Safety	IEC62619、IEC63056、N140
EMC	EN IEC61000-6-1、EN IEC61000-6-2、EN IEC61000-6-3、EN IEC61000-6-4
Transportation	UN38.3、ADR
Environment	ROHS

*1 Test conditions: 100% DOD, 0.2C charge & discharge at 25°C± 2°C, at the beginning of life.

*2 The system's working current and power values will be related to temperature and State of Charge (SOC)

*3 Max charge / discharge current and power values maybe variant with different inverter models.

10.2.2 LX U5.0-30

Technical Parameters	LX U5.0-30
Nominal Battery Energy (kWh)	5.12
Usable Energy (kWh)*1	5
Cell Type	LiFePO4
Nominal Voltage (V)	51.2
Operating Voltage Range (V)	43.2~58.24
Rated Capacity (Ah)	100
Nominal Charge Current (A)	60
Max Charge Current (A)*2*3	90
Nominal Discharge Current (A)*4	100
Max Discharge Current (A)*2*3	100

Technical Parameters	LX U5.0-30
Pulse Discharging current (A)*2*3	< 200A (30S)
Max. Charging/Discharging Power (kW)	4.95
Communication	CAN
TChg (Charging Temperature Range) (°C)	0<T≤55
TDsch (Discharging Temperature Range) (°C)	-20<T≤55
Ambient Temperature (°C)	0 < T ≤ 40 (Recommend 10 < T ≤ 30)
	Optional heating: -20 < T ≤ 40 (Recommend 10 < T ≤ 30)
Relative Humidity	5~95%
Maximum Storage Time	12 Months (maintenance-free)
Max. Operating Altitude (m)	4000
Heating	Optional
Fire Suppression	Optional, Aerosol
Unit Weight (kg)	50
Unit Dimensions (W*H*D mm)	460*580*160
Enclosure Protection Rating	IP65
Applications	On Grid / On Grid + Backup / off Grid
Scalability	30P
Mounting Method	Wall Mounted / Grounded
Round-trip Efficiency*1	≥96%
Cycle Life	> 6000 @25±2°C 0.5C 70%SOH 90%DOD
Safety	VDE2510-50、IEC62619、IEC62040、N140、IEC63056
EMC	EN IEC61000-6-1, EN IEC61000-6-2, EN IEC61000-6-3, EN IEC61000-6-4
Transportation	UN38.3、ADR
Environment	ROHS

Technical Parameters	LX U5.0-30
*1 Test conditions: 100% DOD, 0.2C charge & discharge at 25°C±2°C, at the beginning of life. *2 The system's working current and power values will be related to temperature and State of Charge (SOC). *3 Max charge / discharge current values may be variant with different inverter models.	

10.2.3 GW14.3-BAT-LV-G10

Technical Data	GW14.3-BAT-LV-G10
Rated Energy (kWh)	14.3
Usable Energy (kWh)*1	≥13.8
Battery Type	LFP (LiFePO ₄)
Nominal Voltage (V)	51.2
Max. Continuous Charging Current (A)	224
Max. Continuous Discharging Current (A)	260
Max. Input Power (System) (kW)*2	12
Max. Output Power (System) (kW)*2	12 (13.2 @10min)
Peak Output Power (System) (kW)*2	20 @15s
Charging Temperature Range (°C)	0~55
Discharging Temperature Range (°C)	-20~55
Relative Humidity	5~85%
Max. Operating Altitude (m)	4000
Noise Emission (dB)	≤35

Technical Data		GW14.3-BAT-LV-G10
Communication		CAN, RS485
Weight (kg)		125
Dimensions (W×H×D mm)		530*885*246 (Without the base) 530*918.6*246 (With base included)
Optional Function Configuration		Aerosol
Ingress Protection		IP20
Storage Temperature (°C)		-20~45
Ambient Temperature (°C)		0~45 (Standard configuration) 10~35 (Recommend) -20~45 (Optional)
Max. Storage time		12 months (-20°C~35°C) 6 months (35°C~45°C)
Scalability		30 pcs
Mounting Method		Floor-Mounted, Wall-Mounted
Cycle Life		≥6500 (25±2°C, 0.5C, 90%DOD, 70%EOL)
Country of Manufacture		China
Standard and Certification	Safety	IEC 62619, IEC 63056, IEC 60730-1
	EMC	EN IEC61000-6-1, EN IEC61000-6-2, EN IEC61000-6-3, EN IEC61000-6-4
	Transportation	UN38.3, ADR, MSDS

*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.

10.2.4 GW16.1-BAT-LV-G10

Technical Data	GW16.1-BAT-LV-G10
Battery Type	LFP (LiFePO4)
Rated Capacity (Ah)	314
Rated Energy (kWh)	16.1
Usable Energy (kWh) ^{*1}	≥14.9
Nominal Voltage(V)	51.2
Voltage Range(V)	45.92~57.76
Max. Continuous Charging Current (System) (A)	157
Max. Continuous Discharging Current (System) (A)	200
Max. Input.Power (kW) ^{*2}	8
Max. Output.Power (kW) ^{*2}	10
Peak Output Power (System)(kW) ^{*2}	16 (15s)
Charging Temperature Range(°C)	0~55
Discharging Temperature Range (°C)	-20~55
Relative Humidity	5-95%
Max. Operating Altitude (m)	4000

Technical Data		GW16.1-BAT-LV-G10
Communication		CAN
Weight (kg)		≤122
Useable Extinguishing Agent		CO2, H2O
Crucial Material		LiFePO ₄ , C, Cu, LiPF ₆ , Al, (C ₃ H ₆)n
Ingress Protection		IP65
Protective Class		I
Dimensions (W×H×D mm)		≤470*895*245 (No base)
Optional Function Configuration		Regulating wheel (Optional); Aerosol fire extinguishing (Optional)
Storage Temperature (°C)		-20 ~45
Max. Storage time		-20-35°C≤12months
		35-45°C≤ 6 months
Scalability		30P
Mounting Method		Wall-Mounted、Floor-Mounted
Cycle Life		≥6000 (25±2°C 0.5C 90%DOD 70% SOH)
Country of Manufacture		China
Standard and Certification	Safety	IEC62619, IEC60730, IEC63056, CE
	EMC	CE
	Transportation	UN38.3, MSDS

*1: Test conditions, 100% DOD (cell 2.87~3.61V voltage range), 0.2P charge & discharge at 25±2°C for battery system at the beginning of life. Usable energy is defined by its initial design value. Actual available energy may vary depending on charge/discharge rate, environmental conditions (e.g. temperature), transport and storage factors.

*2: Max.Input Power/Max.Output Power/Peak Output Power derating will occur

related to Temperature and SOC.

*3: This refers to the Cycle Life of the battery cell

10.3 Smart Meter Technical Specifications

10.3.1 GM330

Technical Specifications		GM330
Measurement Range	Supported Type of Electrical Supply System	Three-phase, split-phase, single-phase
	Voltage Range L-L (Vac)	172~817
	Voltage Range L-N (Vac)	100~472
	Nominal Frequency (Hz)	50/60
	CT Ratio	nA:5A
Communication Parameters	Communication Method	RS485
	Communication Distance (m/ft)	1000/3280
Accuracy Parameters	Voltage/Current	Class 0.5
	Active Energy	Class 0.5
	Reactive Energy	Class 1
General Parameters	Dimensions (WxHxD mm/in)	72x85x72/2.83x3.35x2.83
	Housing	4 modules
	Weight (g/lb)	240/0.53
	Mounting Method	DIN rail
	User Interface	4 LEDs, Reset button
	Power Consumption (W)	≤5
Environmental Parameters	IP Rating	IP20
	Operating Temperature Range (°C/°F)	-30~+70/-22~+158
	Storage Temperature Range (°C/°F)	-30~70/-22~+158
	Relative Humidity (non-condensing)	0~95%

Technical Specifications		GM330
	Max. Operating Altitude (m/ft)	3000/9842
Certification Parameters	Certificates	UL1741/ANSI

10.4 Smart Communication Stick Technical Specifications

10.4.1 WiFi/LAN Kit-20

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

11 Appendix

11.1 FAQ

11.1.1 How to Perform Meter/CT Auxiliary Detection?

The Meter Connect Check function can check whether the meter CT is connected correctly and the current operating status of the meter and CT.

- Method 1:

1. Go to **[Home]** > **[Settings]** > **[Meter/CT Auxiliary Detection]** to enter the detection page.
2. Click Start Detection. After the detection is complete, view the detection result.

- Method 2:

1. Click  > **[System Setup]** > **[Quick Setting]** > **[Meter/CT Assisted Test]** to enter the detection page.
2. Click Start Detection. After the detection is complete, view the detection result.

11.1.2 How to Upgrade the Device Version

Through the firmware information, you can view or upgrade the inverter's DSP version, ARM version, BMS version, and communication module software version. Some communication modules do not support upgrading the software version through the App; please refer to the actual product.

- **Upgrade prompt:**

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

- **Regular upgrade:**

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

Tap Check for Updates. If a new version is available, follow the on-screen prompts to complete the upgrade.

- **Forced upgrade:**

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

11.2 Terminology Explanation

- **Overvoltage Category Explanation**

- **Overvoltage Category I:** Equipment connected to circuits with measures that limit transient Overvoltage to a relatively low level.
- **Overvoltage Category II:** Energy-consuming equipment supplied by a fixed distribution installation. Such equipment includes appliances, portable tools, and other household and similar loads. If special requirements are placed on the reliability and suitability of such equipment, Overvoltage Category III shall be used.
- **Overvoltage Category III:** Equipment in fixed distribution installations, where the reliability and suitability of the equipment must meet special requirements. It includes switching devices in fixed distribution installations and industrial equipment permanently connected to fixed distribution installations.
- **Overvoltage Category IV:** Equipment used upstream in the power supply of the distribution installation, including measuring instruments and upstream overcurrent Protection devices, etc.

- **Explanation of Wet Location Categories**

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

- **Environmental Category Explanation:**

- **Outdoor inverter:** The ambient air temperature range is -25 to +60°C, suitable for environments with Pollution Degree 3;
- **Indoor Type II inverter:** The ambient air temperature range is -25 to +40°C, suitable for environments with Pollution Degree 3;

- **Indoor Type I inverter:** The ambient air temperature range is 0 to +40°C, suitable for environments with Pollution Degree 2;
- **Pollution Degree Category Explanation**
 - **Pollution Degree 1:** No pollution or only dry, non-conductive pollution;
 - **Pollution Degree 2:** Normally, only non-conductive pollution occurs; however, occasional temporary conductive pollution caused by condensation must be considered;
 - **Pollution Degree 3:** Conductive pollution occurs, or non-conductive pollution becomes conductive due to condensation;
 - **Pollution Degree 4:** Persistent conductive pollution, for example, pollution caused by conductive dust, rain, or snow.

11.3 Battery SN Code Meaning

*****2388*****

T

The 11th-14th digits

LXD10DSC0002

The 11th to 14th digits of the product SN code are the production time code.

The production date in the above figure is 2023-08-08

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

Month	January–September	October	November	December
Month code	1~9	A	B	C

- The 14th digit is the production day; for example, the 8th is represented by 8; Numerals are preferred for representation; for example, 1–9 represent days 1–9, A represents the 10th day, and so on. Letters I and O are not used to avoid

confusion. Details are as follows:

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

Production day	10th	11th	12th	13th	14th	15th	16t h	17t h	18t h	19t h	20t h
Code	A	B	C	D	E	F	G	H	J	K	L

Production day	21st	22nd	23rd	24th	25th	26t h	27t h	28t h	29t h	30t h	31st
Code	M	N	P	Q	R	S	T	U	V	W	X

12 Contact Information

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