

V1.0 2026-8-26

ESA 261kWh

C&I ESS Solution User Manual (Grid-Connected)

GOODWE

Copyright Notice

Copyright © GoodWe Technologies Co., Ltd. 2026. All rights reserved.

Without authorization from GoodWe Technologies Co., Ltd., all contents of this manual may not be reproduced, transmitted, or uploaded to public networks or other third-party platforms in any form.

Trademark Authorization

GOODWE and other GOODWE trademarks used in this manual are owned by GoodWe Technologies Co., Ltd. All other trademarks or registered trademarks mentioned in this manual are the property of their respective owners.

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.

Foreword

Overview

This document mainly introduces the application scenarios, installation and wiring, operation and maintenance, etc. of the commercial and industrial energy storage system solution. The document may be updated from time to time; please obtain the latest version of the materials and more product information from the official website.

The safety precautions, product information, installation and wiring, configuration and commissioning, troubleshooting, and maintenance of the equipment included in this solution are described in detail in the corresponding equipment's user manual or maintenance manual, which can be obtained from the reference documents.

Intended Audience

This document applies to the following personnel:

- Technical Support Engineer
- Installation Engineer
- Commissioning Engineer

Symbol Definitions

DANGER

Indicates a high potential hazard which, if not avoided, will result in death or serious injury to personnel.

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.

Table of Contents

1 Safety Precautions	6
1.1 General Safety	6
1.2 Personnel Requirements	9
1.3 System Safety	10
1.3.1 PV String Safety	10
1.3.2 Inverter Safety	11
1.3.3 Battery Safety	12
1.3.4 Meter Safety	14
1.4 Safety Symbols and Certification Markings Description	15
1.5 EU Declaration of Conformity	16
1.5.1 Devices with Wireless Communication Function	17
1.5.2 Devices Without Wireless Communication Function (Except Batteries)	17
1.5.3 Battery	17
2 Grid-Connected Solution Introduction	19
2.1 Master-Slave Parallel Operation	19
2.1.1 Networking Introduction	19
2.1.2 Technical Specifications	22
2.2 Parallel Operation via SEC3000C	23
2.2.1 Communication Architecture	23
2.2.2 Networking Introduction	24
2.2.3 Technical Specifications	28

2.3 Parallel Operation via Third-Party EMS	29
2.3.1 Communication Architecture	30
2.3.2 Networking Introduction	30
2.3.3 Technical Specifications	34
3 Operating Mode Introduction	35
3.1 Self-consumption Mode	35
3.2 TOU Mode	35
3.3 TOU Fixed Power Mode	37
3.4 Demand Management	37
3.5 Black Start	38
4 Installation and Wiring	39
5 System Power-On	40
6 System Commissioning	42
6.1 Device Commissioning and Testing via SEC3000C Embedded Web	42
6.2 Plant Monitoring via SEMS+	42
7 Appendix	43
7.1 Reference Documents	43
7.2 FAQ	43
8 Contact Details	45

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

 DANGER

- 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.
- 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 box to connect equipment cables. If connectors of other models are used, any resulting equipment damage is not within 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 excessive tensile force on cables; otherwise, poor connections may result. During wiring, reserve an appropriate cable length to avoid cables being in a taut state.
- Correctly secure and support cables to prevent cable self-weight, tensile force, bending force, torsional force, or other external mechanical stress from acting on terminals or connectors for extended periods.
- Ensure the Protection grounding conductor is reliably connected, and reserve appropriate slack. Under external mechanical stress such as accidental pulling force, ensure that the Protection grounding conductor does not break 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.

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 installing, using, or configuring the equipment not 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

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.
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.

No.	Symbol	Meaning
8		Keep the equipment away from open flames or ignition sources.
9		Keep the equipment out of areas accessible to children.
10		Use the equipment properly. Using it under extreme conditions may cause an explosion risk.
11		The battery contains flammable materials. Fire hazard.
12		Do not lift the equipment after the battery system wiring is completed or while the battery system is in operation.
13		Do not extinguish with water.
14		Before operating the equipment, read the product manual carefully.
15		Wear personal protective equipment during installation, operation, and maintenance.
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		Do not directly disconnect or plug/unplug the DC terminals while the equipment is operating.
18		Protection Grounding Conductor Connection Point
19		Recycling Mark
20		CE Certification mark.
21		TUV mark.
22		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 Grid-Connected Solution Introduction

In grid-connected scenarios, three parallel operation solutions are supported: master-slave parallel operation / parallel operation via SEC3000C / parallel operation via third-party EMS.

- Master-slave parallel operation: ESA261 energy storage system
- Parallel operation via SEC3000C: ESA261 energy storage system + (grid-connected inverter) + SEC3000C
- Parallel operation via third-party EMS: ESA261 energy storage system + (grid-connected inverter) + third-party EMS

NOTICE

At the grid connection point, current transformers (CTs) and electricity meters need to be configured to implement the Power Limit function. Please select a suitable solution based on actual site conditions:

- If on-site power outage operations are permitted, a primary CT can be installed at the grid connection point and connected to the GM330 smart meter.
- If on-site power outage operations are not permitted, a secondary CT should be installed on the existing primary CT and connected to the DTSD1352 secondary meter.

2.1 Master-Slave Parallel Operation

The ESA261 energy storage system supports master-slave parallel operation. During master-slave parallel operation, the system does not support connection to PV inverters, and supports parallel operation of up to 8 energy storage systems. Master-slave parallel operation is supported only in China.

2.1.1 Networking Introduction

Name	Model/Specifications	Description
Energy Storage System	• GW125/261-ESA-LCN-G10 • GW125/261-ESA-LCN-G11 • GW100/261-ESA-LCN-G10 • GW100/261-ESA-LCN-G11	Supports up to 8 energy storage systems in master-slave parallel operation. Ensure that the model and specifications of energy storage systems in the same system remain consistent; mixing products is not recommended. Purchase from GoodWe.
Circuit breaker	-	For circuit Protection, recommended specification: 250 A. To be purchased separately by the customer.
Primary CT	CT ratio: nA/5A. • nA: CT primary-side input current. Depending on the site's PCC busbar or cable specifications, the value of n shall be determined according to actual conditions. • 5A: CT secondary side output current.	For use with GM330 smart meter. To be purchased separately by the customer.
GM330 Smart Meter	GM330	Used for grid-connected power limitation. Purchase from GoodWe.

Name	Model/Specifications	Description
Secondary CT	CT ratio: 5A/2mA. 5A: CT primary side input current, 2mA: CT secondary side output current.	For use with secondary smart meter DTSD1352. Purchase from GoodWe.
Secondary smart meter DTSD1352	DTSD1352	Used for grid-connected power limitation. Purchase from GoodWe.
WE 3.0	WE3.0	Monitoring platform, used to remotely monitor the operating data of the energy storage system and set system parameters. Purchase from GoodWe.

2.1.2 Technical Specifications

Functions		Technical Specifications	Remarks
Multiple units in parallel		≤8	-
Communication		WiFi/LAN/4G	-
Remote Monitoring		Supported	Monitoring via WE3.0
Grid Power Limit (including Power Limit)		Supported	This feature can be combined with Self-consumption/TOU, Demand Control, and Sub-demand Control.
	Self-consumption	Supported	
	TOU	Supported	
	TOU Fixed Power	Supported	

Functions		Technical Specifications	Remarks
Grid Dispatch Features	Self-consumption/TOU+Demand Control	Supported	- Self-consumption Mode (PV+ESS scenario). - TOU Mode (PV+ESS scenario or storage-only scenario, with peak-valley Tariff. Equipped with a meter or using voltage transformer and current transformer sampling). - Remote Dispatch Mode (third-party controller scenario).
	Self-consumption/TOU+Capacity Control	Supported	
	Self-consumption/TOU+Grid Power Limit	Supported	
	Self-consumption/TOU+Demand Control+Sub-demand Control	Supported	
	Self-consumption/TOU+Demand Control+Grid Power Limit	Supported	
	Self-consumption/TOU+Demand Control+Sub-demand Control+Grid Power Limit	Supported	
	Remote Dispatch Mode	Supported	

2.2 Parallel Operation via SEC3000C

2.2.1 Communication Architecture

When connected to SEC3000C, supports up to 20 ESA261 energy storage systems in parallel + 40 grid-tied inverters in parallel.

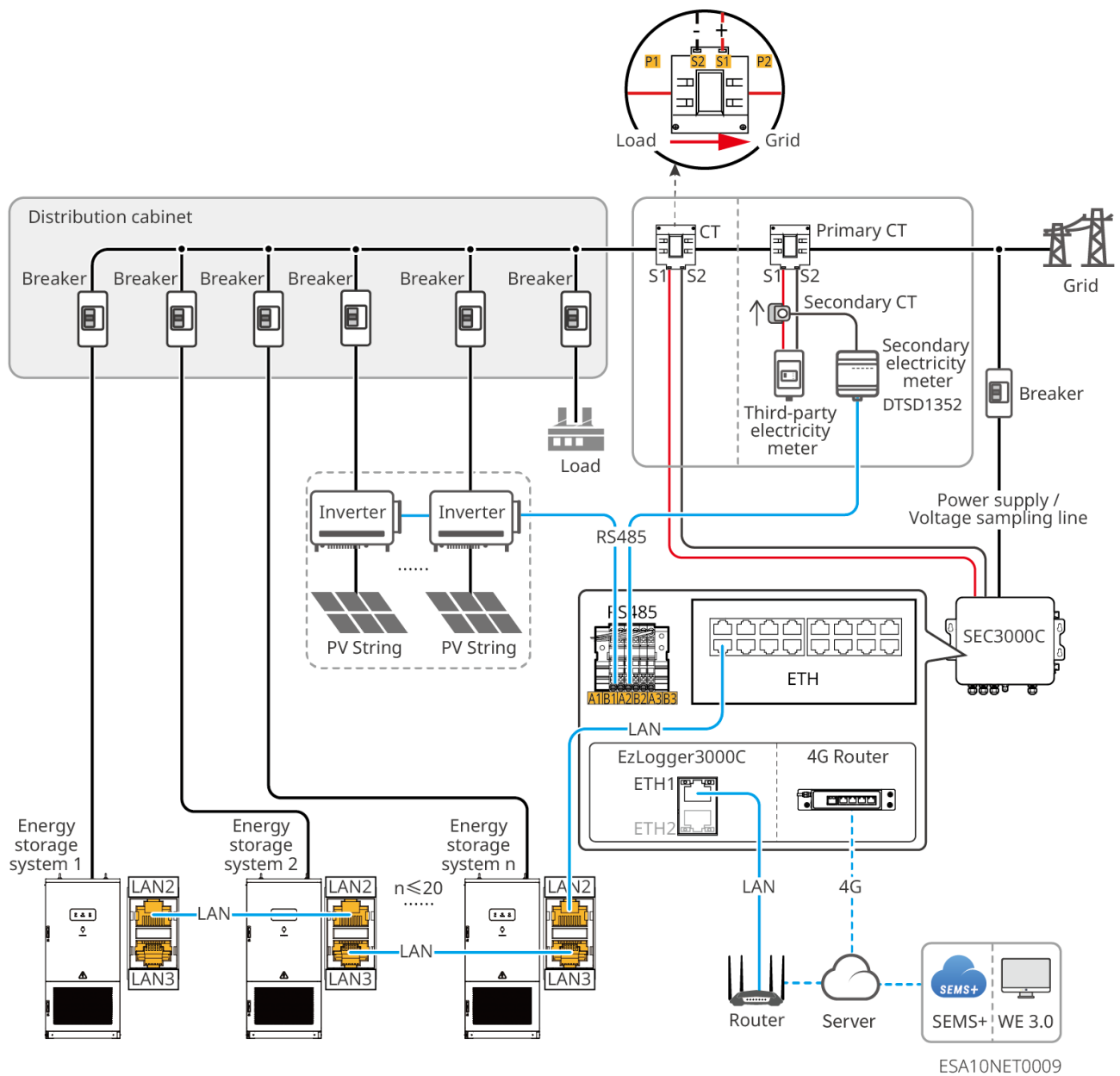
Connecting to SEC3000C	Communication Method	Connection Method	Maximum Parallel Quantity	Monitoring Platform
ESA261 Energy Storage System	LAN	Daisy chain / Daisy chain-star hybrid	20	WE 3.0 (Domestic Version) SEMS+ (Overseas Version)
	LAN	Star	15	
Grid-tied inverter	RS485	Daisy chain	40	

NOTICE

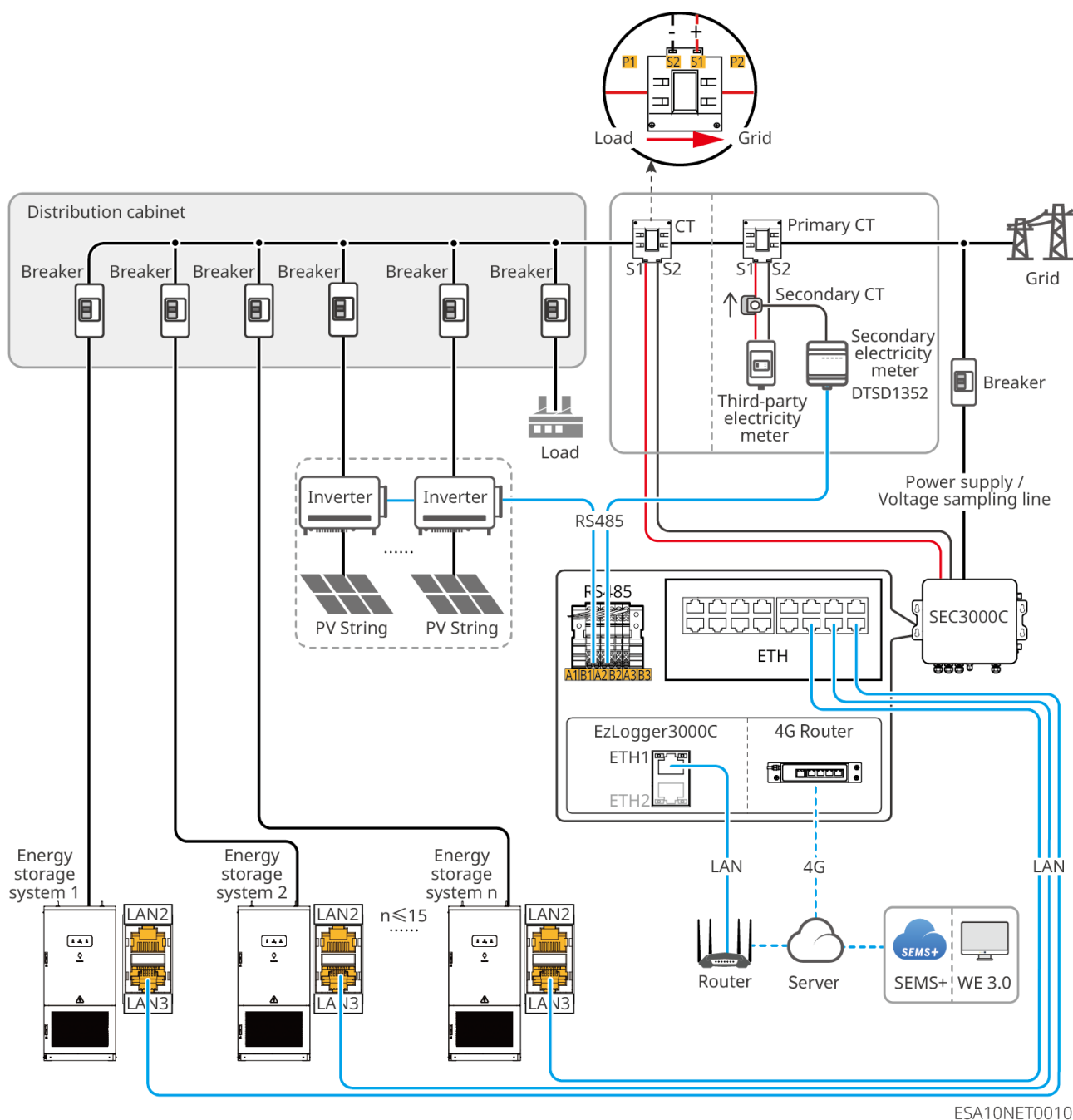
SEC3000C is equipped with 4 RS485 communication interfaces, one of which is already used to connect the built-in GM330 meter, and each of the remaining interfaces can support up to 20 grid-tied inverters in parallel. If the built-in GM330 meter is used directly, or the built-in meter is replaced with an Acrel meter, then up to 60 grid-tied inverters can be connected in parallel. For details, please contact after-sales for support.

2.2.2 Networking Introduction

- **Daisy-Chain Connection**



- **Star Connection**



Name	Model/Specifications	Description
Energy Storage System	- GW125/261-ESA-LCN-G10 - GW125/261-ESA-LCN-G11 - GW100/261-ESA-LCN-G10 - GW100/261-ESA-LCN-G11	Please keep the model and specifications of energy storage systems in the same system consistent. Mixing products is not recommended. Purchase from GoodWe.

Name	Model/Specifications	Description
Circuit breaker	Recommended specification: 250 A	For circuit Protection. To be purchased separately by the customer.
Grid-tied inverter	Please consult Sales for the specific compatible models.	Convert PV DC power to AC power. Purchase from GoodWe.
CT	CT ratio: nA/5A. • nA: CT primary-side input current. Depending on the site's PCC busbar or cable specifications, the value of n shall be determined according to actual conditions. • 5A: CT secondary side output current.	For use with GM330 smart meter. To be purchased separately by the customer.
GM330 Smart Meter	GM330	Used for grid-connected power limitation. Purchase from GoodWe.
Secondary CT	CT ratio: 5A/2mA. • 5A: CT primary side input current, • 2mA: CT secondary side output current.	For use with secondary smart meter DTSD1352. Purchase from GoodWe.
Secondary smart meter DTSD1352	DTSD1352	Used for grid-connected power limitation. Purchase from GoodWe.

Name	Model/Specifications	Description
SEC3000C Smart Energy Control Box	SEC3000C	Collects system data and sends it to WE 3.0/SEMS+ to enable centralized monitoring, operation, and maintenance of the system. Purchase from GoodWe.
SEMS+/WE 3.0	SEMS+/WE 3.0	Remotely monitor the operating data of the energy storage system and set system parameters. Purchase from GoodWe.

2.2.3 Technical Specifications

Functions		Technical Specifications	Remarks
Multiple units in parallel	ESA261 Energy Storage System	- Daisy-chain connection/daisy-chain star hybrid connection: ≤ 20 - Star connection: ≤ 15	-
	Grid-tied inverter	≤ 40	-
Communication	ESA261 Energy Storage System	LAN	-
	Grid-tied inverter	RS485	-
Remote Monitoring		Supported	- Domestic: WE3.0 - Overseas: SEMS+

Functions		Technical Specifications	Remarks
Grid Power Limit (including Power Limit)		Supported	This feature can be combined with Self-consumption/TOU, Demand Control, and Sub-demand Control.
Grid Dispatch Features	Self-consumption	Supported	- Self-consumption Mode (PV+ESS scenario). - TOU Mode (PV+ESS scenario or storage-only scenario, with peak-valley Tariff. Equipped with a meter or using voltage transformer and current transformer sampling). - Remote Dispatch Mode (third-party controller scenario).
	TOU	Supported	
	TOU Fixed Power	Supported	
	Self-consumption/TOU+Demand Control	Supported	
	Self-consumption/TOU+Capacity Control	Supported	
	Self-consumption/TOU+Grid Power Limit	Supported	
	Self-consumption/TOU+Demand Control+Sub-demand Control	Supported	
	Self-consumption/TOU+Demand Control+Grid Power Limit	Supported	
	Self-consumption/TOU+Demand Control+Sub-demand Control+Grid Power Limit	Supported	
	Remote Dispatch Mode	Supported	

2.3 Parallel Operation via Third-Party EMS

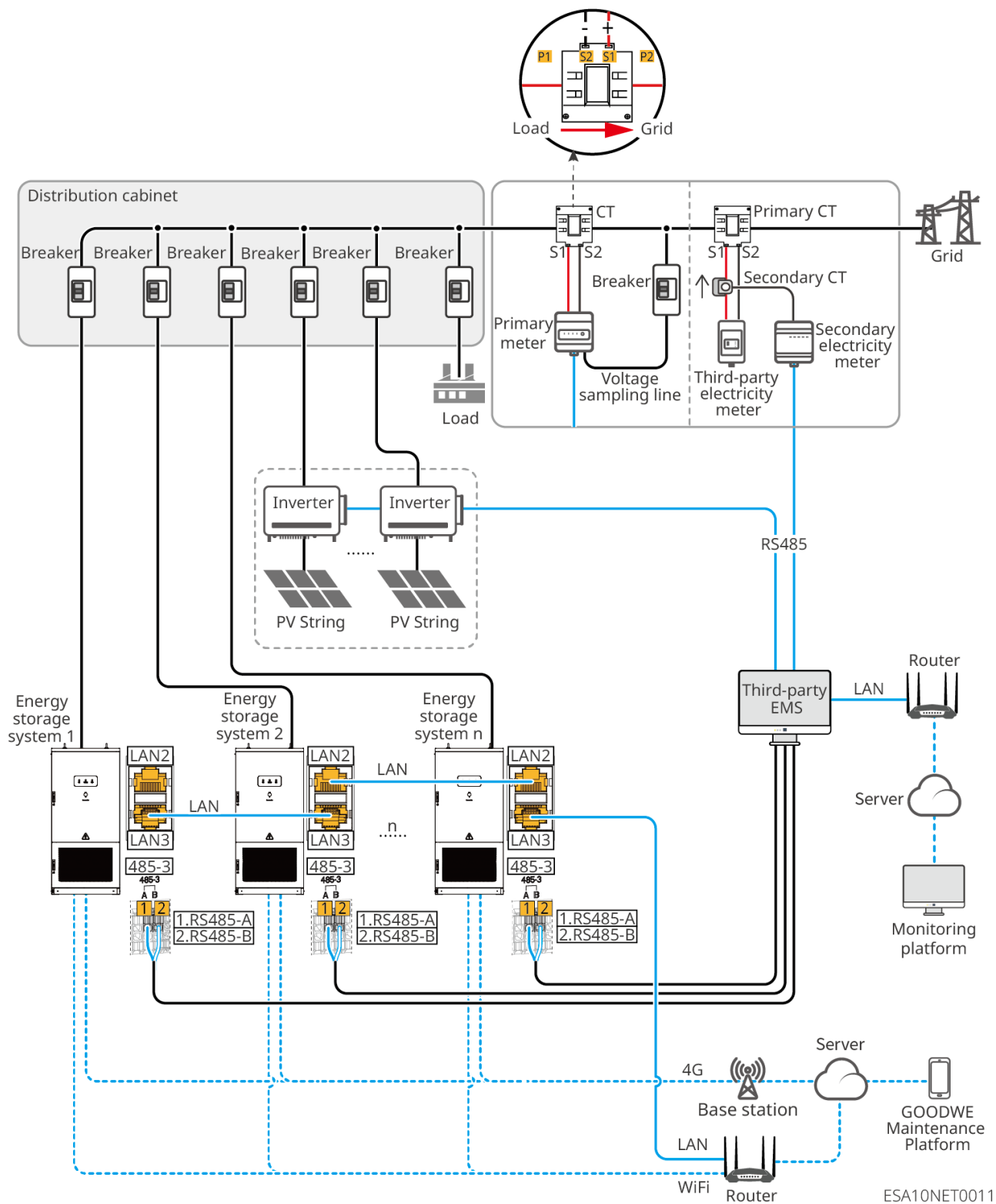
2.3.1 Communication Architecture

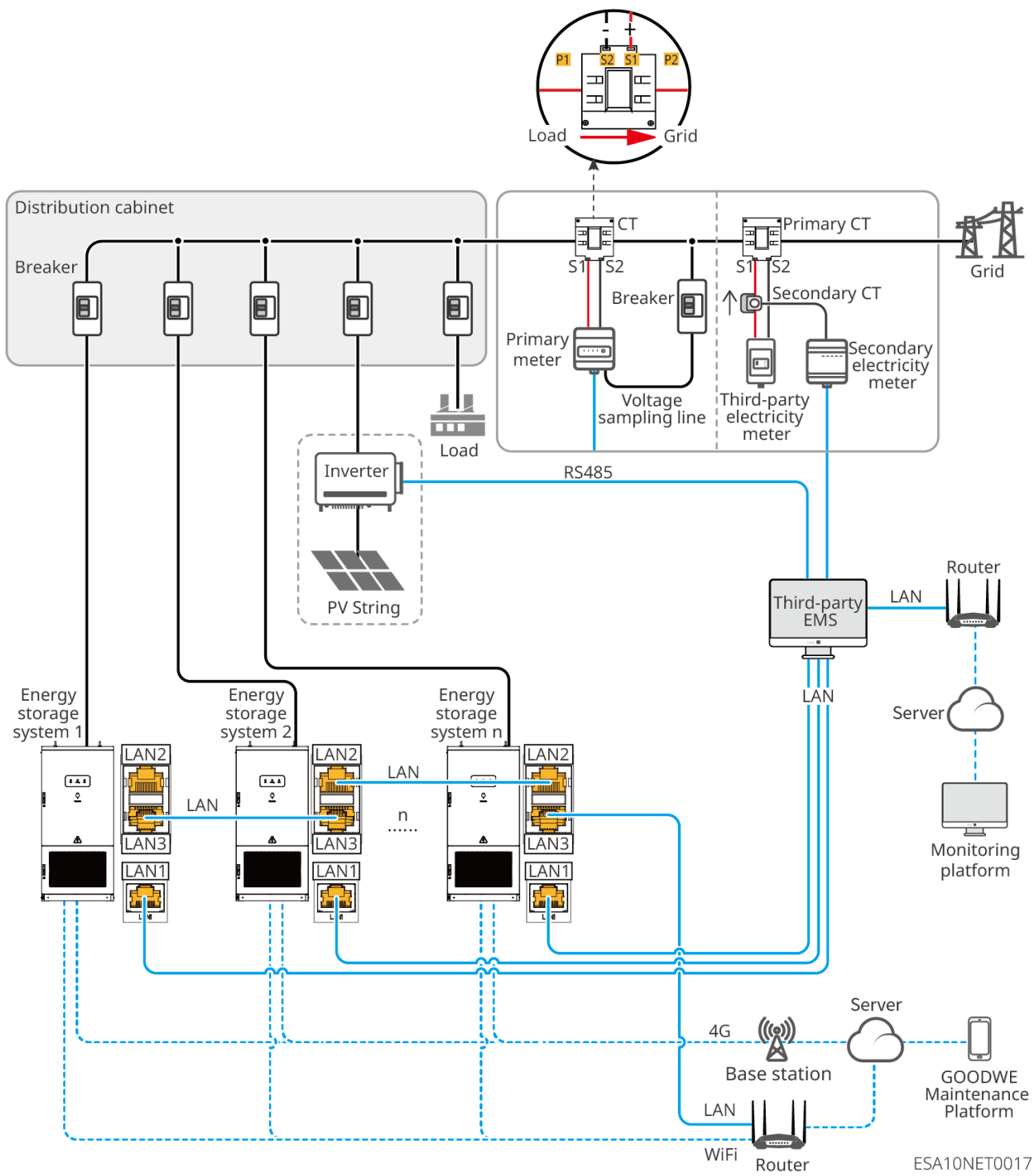
When connected to a third-party EMS, the supported number of parallel units is determined by the third-party EMS.

Connect to Third-party EMS	Communication Method	Connection Method	Maximum Parallel Quantity	Monitoring Platform
ESA261 Energy Storage System	LAN/RS485	Daisy chain	N	Third-party Monitoring Platform
Grid-tied inverter	RS485	Daisy chain	N	

2.3.2 Networking Introduction

- Parallel connection via RS485 cable





Name	Model/Specifications	Description
Energy Storage System	• GW125/261-ESA-LCN-G10 • GW125/261-ESA-LCN-G11 • GW100/261-ESA-LCN-G10 • GW100/261-ESA-LCN-G11	Please keep the model and specifications of energy storage systems in the same system consistent. Mixing products is not recommended. Purchase from GoodWe.
Circuit breaker	Recommended specification: 250 A	Perform circuit Protection; customer to purchase separately.
Grid-tied inverter	Please consult Sales for the specific compatible models.	Convert PV DC power to AC power. Purchase from GoodWe
Primary CT	-	Used with a primary meter; customer to purchase separately.
Primary Meter	-	Used for grid power limit. Purchase separately according to third-party EMS compatibility.
Secondary CT	-	Used in conjunction with a secondary meter, to be purchased separately by the customer.
Secondary meter	-	Used for grid power limit. Purchase separately according to third-party EMS compatibility.
Third-party EMS	-	Collects system data and sends the data to a third-party monitoring platform to enable centralized monitoring, operation, and maintenance of the system. To be purchased separately by the customer.

Name	Model/Specifications	Description
Third-party Monitoring Platform	-	Remotely monitor the operating data of the energy storage system and set system parameters, etc. To be purchased separately by the customer.

2.3.3 Technical Specifications

Functions		Technical Specifications	Remarks
Multiple units in parallel	ESA261 Energy Storage System	N	The maximum number of paralleled units is determined by the third-party EMS.
	Grid-tied inverter		
Remote Monitoring		Supported	When connected to a third-party EMS, monitoring is performed by the third-party monitoring platform.
Grid-connected power limit		Supported	-
Grid Dispatch Features		Supported	The specific supported modes are determined by the third-party EMS.

3 Operating Mode Introduction

3.1 Self-consumption Mode

Self-consumption is applicable to PV energy storage systems with a high PV ratio, where PV generation is sufficient to supply loads. Surplus generation power charges the energy storage. It is mainly suitable for scenarios with low or no Export Tariff subsidy, improving the system's Self-consumption rate and energy self-sufficiency rate, and reducing electricity expenses. PV generation supplies loads preferentially, and surplus generation power charges the energy storage. If the energy storage is fully charged or charging at full power, the surplus Energy Generation is exported to the grid. When generation is insufficient or there is no PV generation at night, the energy storage discharges to supply loads. The grid cannot charge the energy storage, but can supply power to loads.

Control Logic:

- PV supplies loads preferentially; surplus PV charges the energy storage. If the energy storage is fully charged or charging at full power, and grid compliance requirements are met, the surplus PV is exported to the grid; the energy storage cannot be charged from the grid.
- PV energy priority: Load > Energy Storage ESS > Grid
- Load supply priority: PV > Energy Storage ESS > Grid

3.2 TOU Mode

Applicable to PV energy storage systems and pure energy storage systems with peak-valley Tariff differences and meter scenarios. By manually setting Charging Time and discharging time periods, for example, setting the nighttime low Tariff period as the Charging Time period, the system charges the energy storage at Max. Charging Power during this period. For example, if the high Tariff period is set as the discharging time period, it discharges according to the actual load power. The battery can discharge only during the discharging time period, saving electricity costs. During the Charging Time period, the grid is allowed to charge the energy storage; during the discharging time period, the energy storage can supply loads. During other unset time periods, the energy storage does not discharge; PV generation and the grid supply loads, and PV generation can charge the energy storage.

- **Charging Priority:** This means when PV generation exceeds the load, the surplus PV energy charges the energy storage. After the charging power reaches maximum or the energy storage is fully charged, the surplus PV energy is exported to the grid.
- **Export Priority:** This means when PV generation power is greater than the load, the surplus PV energy is exported to the grid preferentially. After the device output power reaches its maximum value, the surplus energy charges the energy storage. This setting is generally applicable to scenarios where the subsidy Tariff is higher than the Import Tariff; the grid cannot charge the energy storage.
- **Grid charging Max. Power:** Set the Max. Power for the grid to reversely charge the energy storage device.

Control Logic

Mode: TOU (Charging Priority)

1. Discharging time period: PV supplies loads preferentially; surplus PV charges the energy storage. If the energy storage is fully charged or charging at full power, and grid compliance requirements are met, the surplus PV is exported to the grid
 - PV energy priority: Load > Energy Storage ESS > Grid
 - Load supply priority: PV > Energy Storage ESS > Grid
2. Charging Time period: The energy storage only charges and does not discharge
 - PV energy priority: Energy Storage ESS > Load > Grid
 - Energy storage charging priority: PV > Grid
3. Non-charging/non-discharging time period: The energy storage cannot discharge and cannot charge from the grid
 - PV energy priority: Load > Energy Storage ESS > Grid
 - Load power supply priority: PV > Grid

Mode: TOU (Feed-in Priority)

1. Discharge period: PV supplies the load first, and surplus PV is preferentially fed into the grid
 - PV energy priority: Load > Grid
 - Load supply priority: PV > Energy Storage ESS > Grid
2. Charging Time period: The energy storage only charges and does not discharge
 - PV energy priority: Load > Grid
 - Energy storage charging priority: Grid > PV
3. Non-charging/non-discharging time period: The energy storage cannot discharge

and cannot charge from the grid

- PV energy priority: Load > Grid
- Load power supply priority: PV > Grid

3.3 TOU Fixed Power Mode

TOU Fixed Power settings are applicable to pure energy storage systems with peak-valley Tariff differences and no-meter scenarios. The main purpose is to configure energy storage for peak-valley arbitrage and reduce electricity costs. By setting charge/discharge time periods, for example, setting the low-Tariff period at night as the Charging Time period, the system charges the energy storage at a fixed charging power during this period. The high-Tariff period is set as the discharge time period, and discharge is performed at a fixed power; the battery can only discharge during the discharge time period. During the Charging Time period, the grid is allowed to charge the energy storage; during the discharge time period, the energy storage can discharge to supply the load. During other unset time periods, the energy storage neither charges nor discharges.

Control Logic:

- Discharge window: the energy storage discharges at fixed power.
- Charging window: the energy storage charges at fixed power.
- Non-charge/non-discharge window: the energy storage neither charges nor discharges.

3.4 Demand Management

Demand control is a limit on the maximum peak power at the grid connection point. In many regions, electricity costs are usually based on a two-part billing method of electricity consumption and maximum peak power.

"Demand control" reduces the maximum peak power purchased from the grid during peak electricity usage periods through energy storage discharge, thereby reducing electricity costs. "Demand control" is applicable to regions with peak power billing. The demand control function can operate under "Self-consumption" or "TOU mode"; by configuring the power purchased from the grid, it reduces the maximum peak power purchased from the grid during peak periods, thereby reducing electricity costs.

Control Logic

1. Set the reserved SOC capacity to be greater than the discharge cutoff SOC and less than the charge cutoff SOC.
2. Set demand control mode:
 - 0: No Control (disable demand limit function)
 - 1: Active Power Control (limits the active power demand at the grid connection point, used to control the active power purchased from the grid so that it does not exceed the set demand limit)
 - 2: Apparent Power Control (limits the apparent power demand at the grid connection point, used to control the apparent power purchased from the grid so that it does not exceed the set demand limit)
3. Set reserved SOC capacity: the backup SOC of the energy storage used for demand control. This value affects the peak shaving capability; the larger this SOC setting, the stronger the peak shaving capability. Set the reserved SOC capacity to be greater than the discharge cutoff SOC and less than the charge cutoff SOC.
4. Set energy storage discharge:
 - 0: Disable (prohibits energy storage discharge, which may cause failure to meet demand control)
 - 1: Enable (default)

3.5 Black Start

Energy storage, PV, and control devices combine into an independent power supply system, improving power supply reliability in the form of a microgrid. When the main grid experiences an unexpected fault or is undergoing operation and maintenance, the microgrid can operate in an islanded state, thereby providing stable power supply to the local grid. To further improve the power supply reliability of the system, the microgrid system should have a black start function in the islanded operating state.

When the off-grid system is shut down, one-click black start enables the entire site's PV and energy storage system to operate. The commercial and industrial On/Off-grid solution uses the energy storage system as the black start power source. When the entire microgrid enters a blackout state due to a fault or there is no grid, by starting the ESA261 energy storage system within the microgrid that has black start capability, it then drives power sources within the microgrid that do not have black start capability, gradually expanding the system restoration range, and ultimately realizing restart of the entire microgrid.

Black start can be performed via SEMS+/SEC3000C.

4 Installation and Wiring

Step 1:Install the equipment.

NOTICE

- Please refer to the corresponding user manual of each device for installation. The devices can be installed in any order.
- Please read the corresponding user manual of each device carefully to fully understand the installation steps and precautions.

Step 2:Wiring.

NOTICE

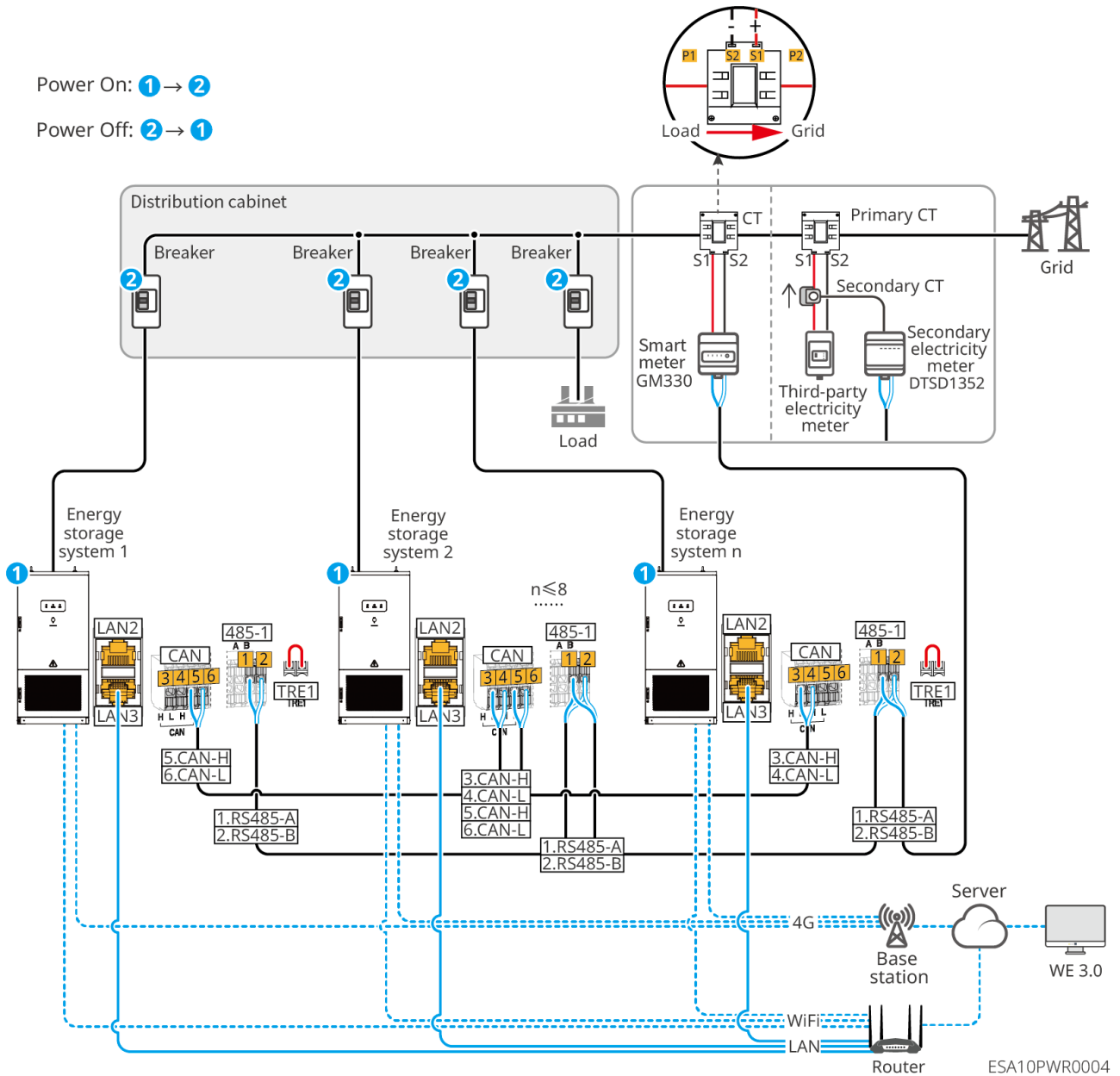
- Please refer to the corresponding user manual of each device for wiring. The wiring sequence of the devices does not matter.
- Please carefully read the corresponding user manual for each device to fully understand the wiring procedures and precautions.

5 System Power-on/Off

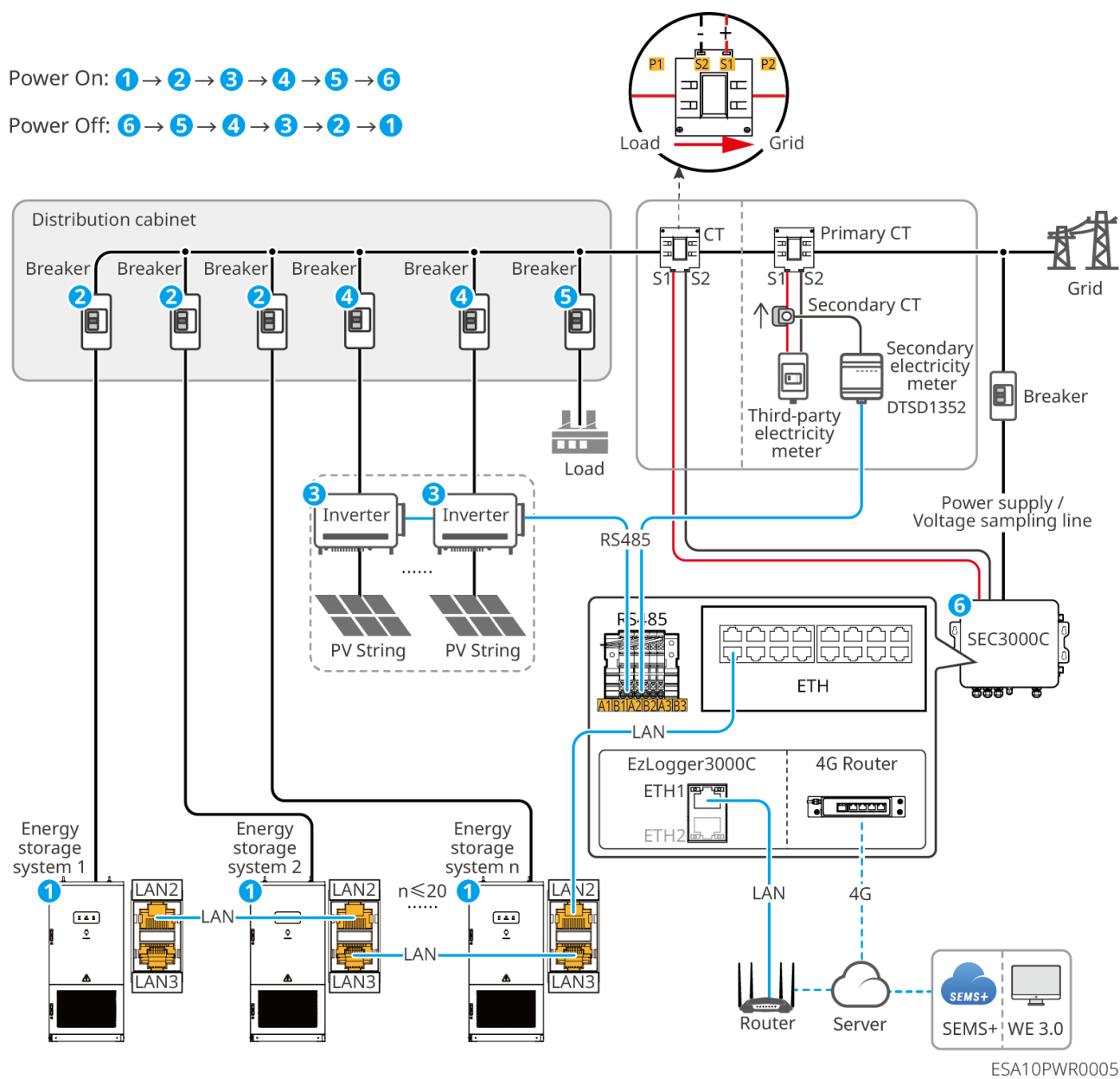
- Master-Slave Parallel Operation

Power On: ① → ②

Power Off: ② → ①



- Parallel Operation via EMS



6 System Commissioning

6.1 Device Commissioning and Testing via SEC3000C Embedded Web

The SEC3000C Smart Energy Control Box is a dedicated device for the monitoring and management platform of photovoltaic power generation systems. It can be used to collect data from devices in the PV power generation system, such as grid-connected inverters, energy storage inverters, meters, etc., store logs, and send data to the monitoring and management platform to achieve centralized monitoring, operation, and maintenance of the PV system.

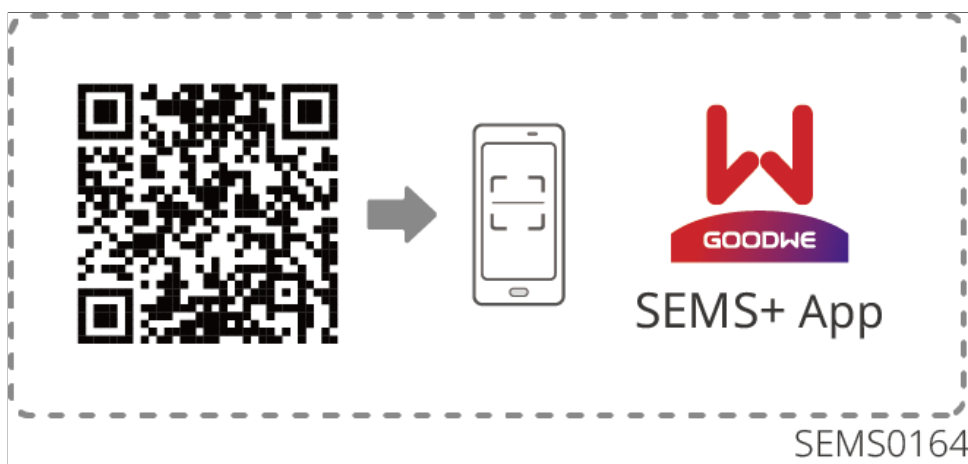
For detailed functions, refer to the [SEC3000C User Manual](#).

6.2 Plant Monitoring via SEMS+

SEMS+ is a monitoring platform that can communicate with devices via WiFi, LAN, or 4G. The following are common functions of SEMS+:

- Manage organizations or user information, etc.
- Add and monitor plant information, etc.
- Maintain equipment.

Scan the following QR code to download and install.



For detailed functions, please refer to the [SEMS+ User Manual](#) 》。

7 Appendix

7.1 Reference Documents

Equipment	Product	Product Model	Reference Documents
Energy Storage System	ESA System 125K/261kWh Commercial and Industrial Energy Storage System	• GW125/261-ESA-LCNG10 • GW125/261-ESA-LCNG11 • GW100/261-ESA-LCNG10 • GW100/261-ESA-LCNG11	• ESA 261kWh Commercial and Industrial Energy Storage System User Manual • ESA 261kWh Commercial and Industrial Energy Storage System Maintenance Manual
Inverter	PV Grid-connected Inverter	Please consult Sales for the specific compatible models.	Contact Sales to obtain
EMS	SEC3000C Smart Energy Control Box	SEC3000C	SEC3000C User Manual
Electricity Meter	GM330 Smart Meter	GM330	GM330 User Manual

7.2 FAQ

1. After Power-on, the SEC3000C Indicator Light Does Not Light Up.

Please confirm that the auxiliary AC power supply is connected.

2. After Power-on, the Meter Indicator Light Does Not Light Up.

Please confirm that the three-phase three-wire power supply is connected.

3. After Power-on, the SEC3000C WEB Page Cannot Be Opened Normally.

- Confirm whether the Ethernet cable is connected correctly.
- If it cannot be accessed within 1 minute after power-on, wait 1 minute and try again.
- The local IP address range is set to 172.18.0.xxx.

4. The WEB Page Shows That the Device Is Offline.

Check the wiring from the internal RS485 cable of the SEC3000C to the 485 communication port of the grid-tied inverter.

5. The Meter Displays Abnormal Data.

Please confirm whether the meter CT ratio setting on the WEB page is consistent with the CT ratio actually used.

8 Contact Details

GoodWe Technologies Co., Ltd.
No. 90 Zijin Rd., New District, Suzhou, China
en.goodwe.com
service@goodwe.com