V1.1 2026-04-20

Small-scale Microgrid

Static Transfer Switch

GW500K-STS-PCS-G10

User Manual

GOODWE

Copyright Statement

NOTICE

Due to product version upgrades or other reasons, the document content may be updated periodically. Unless otherwise agreed, the document content cannot replace the safety precautions on product labels. All descriptions in the document are for guidance only.

About This Manual

Overview

This document mainly introduces the product information, installation wiring, configuration testing, troubleshooting, and maintenance of the GW500K-STS-PCS-G10 grid-tie and off-grid switching cabinet (hereinafter referred to as STS). Before installing and using this product, please read this manual carefully to understand the product safety information and familiarize yourself with the functions and features of the product. The document may be updated periodically. Please obtain the latest version and more product information from the official website: https://www.goodwe.com.

Applicable Model

This document applies to the following models of devices:

model	Nominal output power	Nominal output voltage
GW500K-STS-PCS-G10	500kW	220/380V，230/400V，3L/N/PE

Symbol Definition

⚠DANGER
Indicates a situation with a high level of potential danger, which, if not avoided, will result in death or serious injury.

⚠WARNING
Indicates a moderate potential hazard that, if not avoided, could result in death or serious injury.

⚠CAUTION
Indicates a situation with low potential hazard which, if not avoided, could result in moderate or minor injury.

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

Table of Contents

1 Safety Precautions

Please always adhere to the safety precaution information contained in this document when operating the device.

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

1.1 General Safety

NOTICE

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

1.2 personnel requirements

NOTICE

To ensure safety, compliance, and efficiency throughout the entire process of equipment transportation, installation, wiring, operation, and maintenance, all tasks must be performed by professionals or qualified personnel.

1. Professionals or qualified personnel include:
   - Personnel who have mastered knowledge of equipment working principles, system structure, risks and hazards, and have received professional operational training or possess extensive practical experience.
   - Personnel who have received relevant technical and safety training, possess certain operational experience, are aware of the potential dangers specific tasks 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.
   - Personnel holding a degree in electrical engineering/an advanced diploma in electrical disciplines or equivalent/possessing professional qualifications in the electrical field, and with at least 2/3/4 years of experience in testing and regulatory work using electrical equipment safety standards.
2. Personnel involved in special tasks such as electrical work, work at heights, and operation of special equipment must hold valid qualification certificates required by the location of the equipment.
3. Operation of medium-voltage equipment must be performed by certified high-voltage electricians.
4. Replacement of equipment and components is only permitted to be performed by authorized personnel.

1.3 EU Declaration of Conformity

1.3.1 Equipment with Wireless Communication Modules

Equipment with Wireless Communication Modules that can be sold in the European market meets 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)

1.3.2 Equipment without wireless communication functionality

Equipment without wireless communication functionality that can be sold in the European market meets 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)

1.4 Safety Symbols and Certification Marks

⚠DANGER

- After the device is installed, the labels and warning signs on the box must be clearly visible. It is prohibited to block, alter, or damage them.
- The following box warning label descriptions are for reference only. Please refer to the actual labels used on the device.

No.	Symbol	Description
1		There is potential danger when the device is operating. Please take precautions when operating the device.
2		High voltage danger. High voltage exists when the device is operating. Ensure the device is powered off before operating it.
3		The device surface is hot. Do not touch it while the device is operating, as it may cause burns.

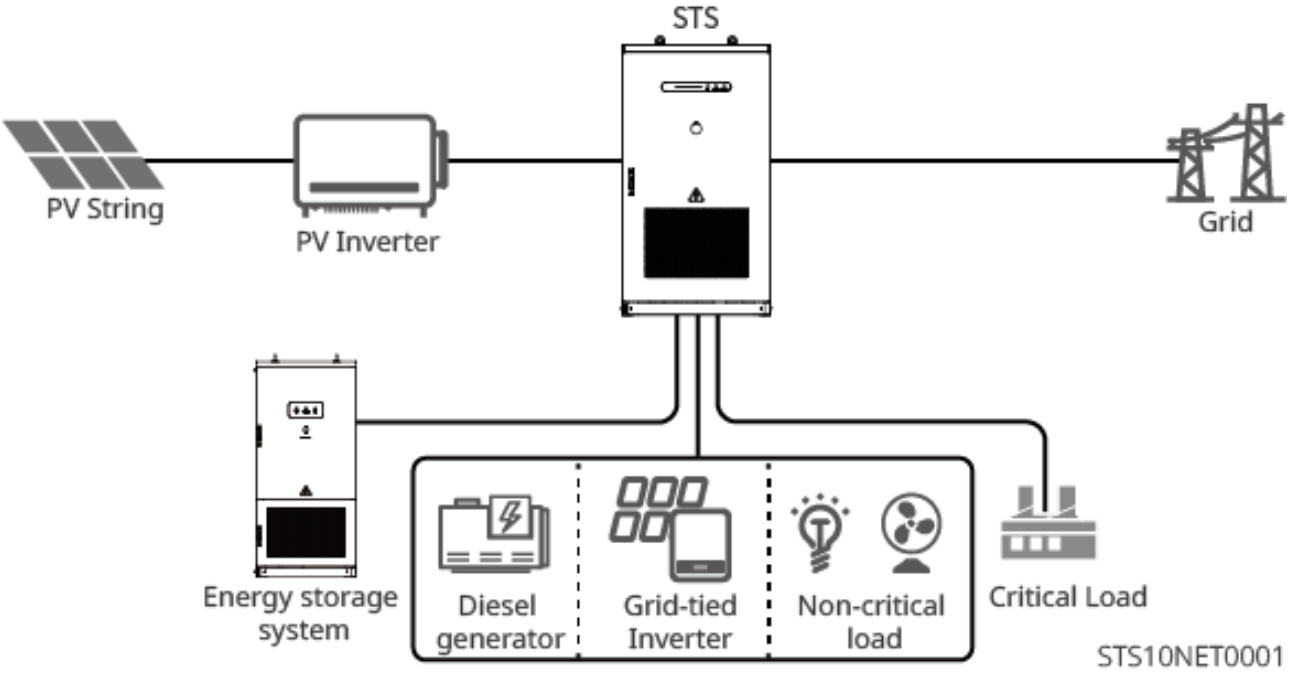
No.	Symbol	Description
4		Use the device properly. Using it under extreme conditions may pose a risk of explosion.
5		The battery contains flammable materials. Beware of fire.
6		The device contains corrosive electrolyte. Avoid contact with leaked electrolyte or vapor.
7		Delayed discharge. After powering off the device, wait for 5 minutes until the device is fully discharged.
8		The device should be kept away from open flames or ignition sources.
9		The device should be kept out of reach of children.
10		Use the device properly. Using it under extreme conditions may pose a risk of explosion.
11		The battery contains flammable materials. Beware of fire.
12		Do not lift the device after the battery system is wired or while the battery system is operating.
13		Do not extinguish with water.
14	 	Before operating the device, please read the product manual carefully.

No.	Symbol	Description
15		Personal protective equipment must be worn during installation, operation, and maintenance.
16		The device should not be disposed of as household waste. Dispose of the device according to local laws and regulations, or return it to the manufacturer.
17		Grounding point.
18		Recycling symbol. The device should be placed in the correct location and recycled according to local environmental regulations.
19		CE certification mark.
20		RCM certification mark.

2 Product Introduction

2.1 Product Overview

STS supports the connection of PV inverters, energy storage system, Diesel Generator, loads, and the grid, assisting the entire system in achieving seamless grid-tied/off-grid switching to meet the power backup needs of regions with unstable power supply.
The main application scenarios are as follows:



port	Description
Inverter	Photovoltaic inverter connection port. Maximum port capacity 1MVA, supports 1 centralized (optional) and 5 string-type connections. • Centralized: port capacity 500kVA, maximum input current 1250A • String-type: port capacity 500kVA, maximum input current per circuit 250A.

port	Description
ESS	Energy storage system connection port. Maximum port capacity 550kVA, supports up to 5 energy storage system connections, maximum input current per circuit 250A.
Smart-port	Smart-port interface can connect to diesel generators, photovoltaics, or non-critical loads, maximum port capacity 550kVA, maximum input current 1000A. The access type can be set on the SEC3000C WEB interface, and the system executes corresponding control logic based on the settings: • When defined as photovoltaic inverter access, the circuit contactor is normally closed. • When defined as diesel generator access, execute open and close commands based on the set SOC. • When defined as load access, connect non-critical loads, execute open and close commands based on the set SOC, used to shed non-critical loads. • When defined as no device connected, the system does not execute the logic for this port.
Back-up	Load connection port. Port capacity 500kVA. Supports single-phase/three-phase loading, maximum phase current 835.6A.
Grid	Maximum configuration capacity 630kVA, maximum input current 1000A. For supported grid types, please refer to 2.3.Supported Grid Types(Page 16), wiring method is 3L/N/PE.

NOTICE

1. When the Smart-port is connected to non-critical loads, the total load capacity connected to the Smart-port and Back-up ports must not exceed 500 kVA.
2. The load imbalance variation must not exceed 0.8Sn, where Sn is the capacity of the energy storage system.

Off-grid Load Capacity of the Microgrid System

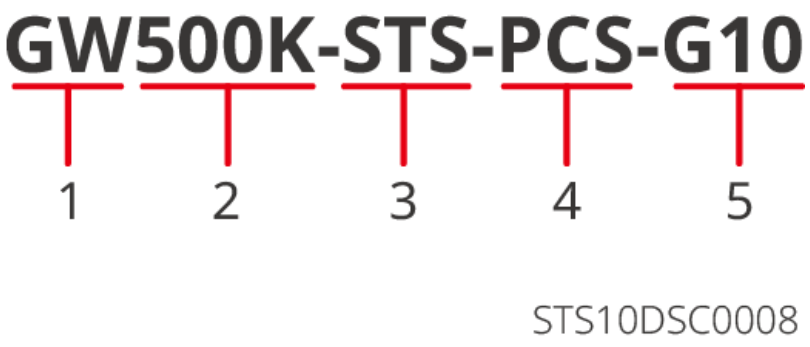
Off-grid Load Capacity	Technical Specifications	Remarks
Total Load	≤0.8*Pn	1. Single-phase rated capacity = (1/3)*Pn 2. Load per phase ≤ 0.8 * Single-phase rated capacity, i.e., load per phase ≤ (1/3)*0.8*Pn 3. Setting the 0.8 coefficient reserves 20% dynamic adjustment margin, ensuring stable output even during load fluctuations and when driving loads with 0.8pf.
Non-linear Load	Half-wave rectified load ≤ 0.4*Pn	The total harmonic content of the load current must meet specification or standard requirements.
Unbalanced Load	1. Two-phase loading: ≤ (2/3)*0.8*Pn 2. Single-phase loading: ≤ (1/3)*0.8*Pn	1. Single-phase rated capacity = (1/3)*Pn 2. Load per phase ≤ 0.8 * Single-phase rated capacity, i.e., load per phase ≤ (1/3)*0.8*Pn

Off-grid Load Capacity	Technical Specifications	Remarks
Motor Load	1. Single motor load for direct-on-line, star-delta start, or soft starter ramp-up methods ≤ 0.1*Pn 2. Variable frequency motor load ≤ 0.8*Pn	1. If other base loads exist, the capacity for switching motor loads decreases proportionally. Motor starting inrush current ≤ 8 * motor rated current; otherwise, it is recommended to add a variable frequency drive for soft starting. 2. If the system contains motor loads and ordinary non-impact loads, configure the load capacity as: A*10 + 1.25*B ≤ Pn, where: A: Capacity of simultaneously starting motor loads B: Other ordinary loads

Product Features

- Supports connection of PV grid-tied inverters, energy storage system, Diesel Generator, loads, and the grid, offering flexible configuration
- Supports seamless grid-tied/off-grid switching within 20ms
- Seamless Diesel Generator switching
- Enables centralized management of energy and loads when paired with SEC3000C

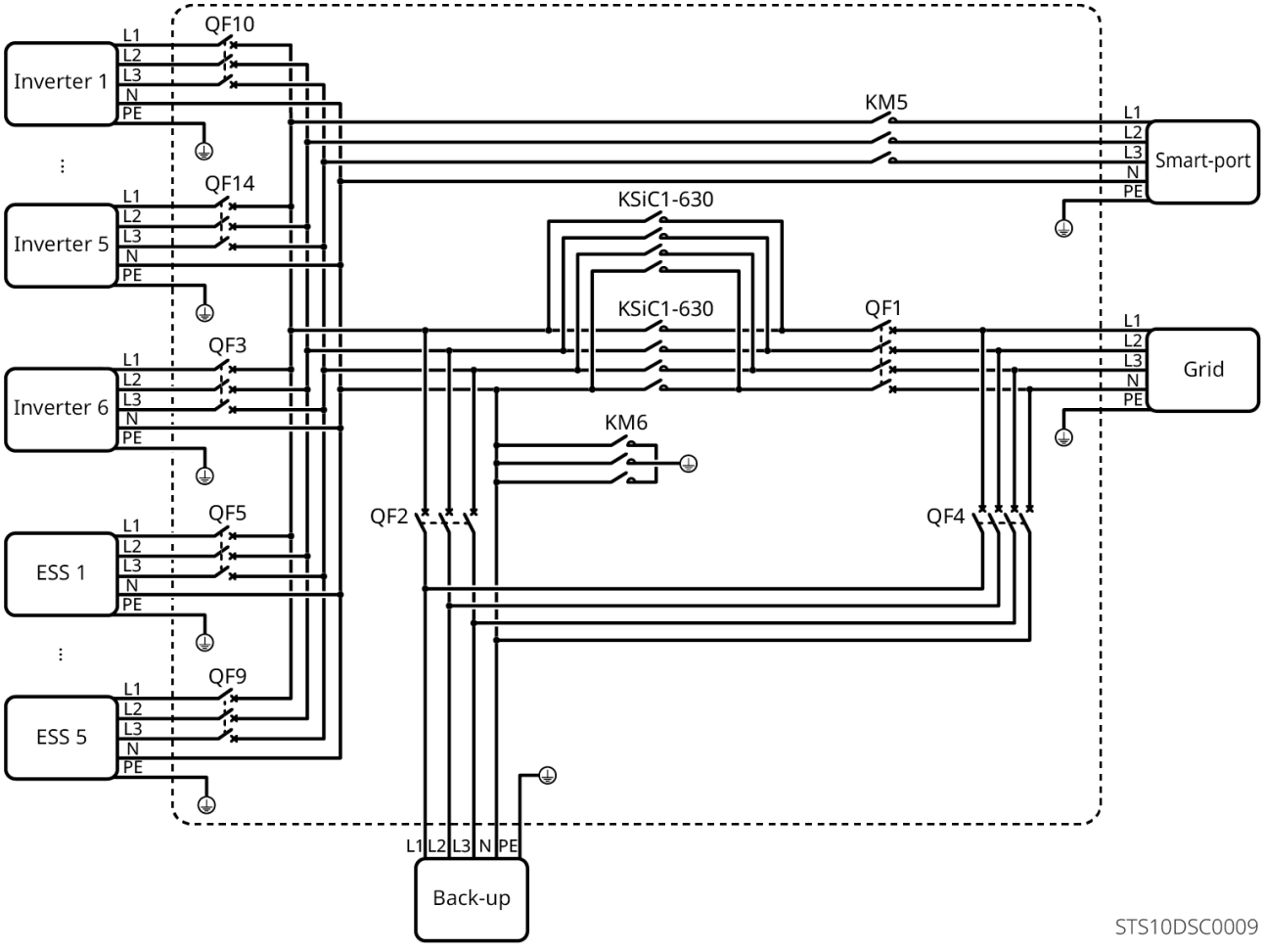
Model Number Description



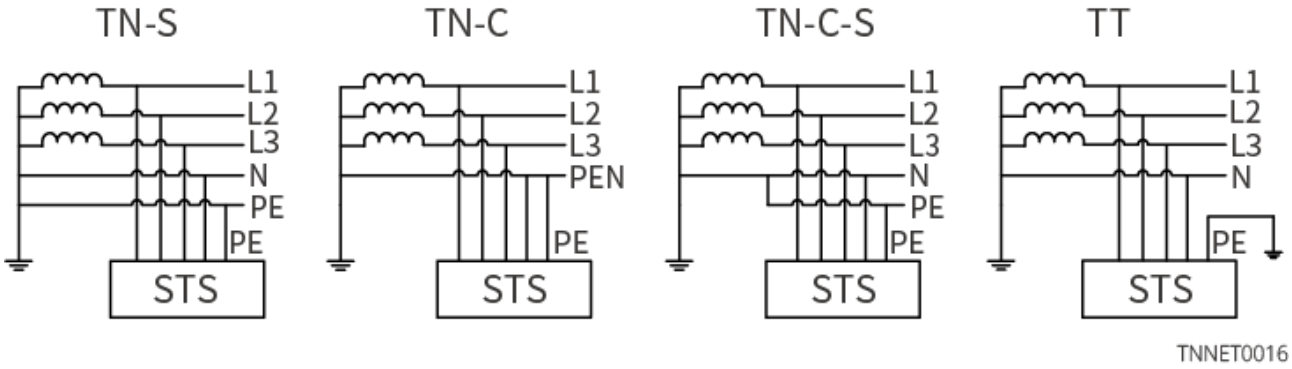
STS10DSC0008

No.	Meaning	Description
1	Brand code	GW: GoodWe
2	Rated Power	500K: Rated power is 500kW
3	Series code	STS: STS series
4	Feature code	PCS: Only compatible with GoodWe PCS
5	Version code	G10: First generation product

2.2 Circuit Block Diagram

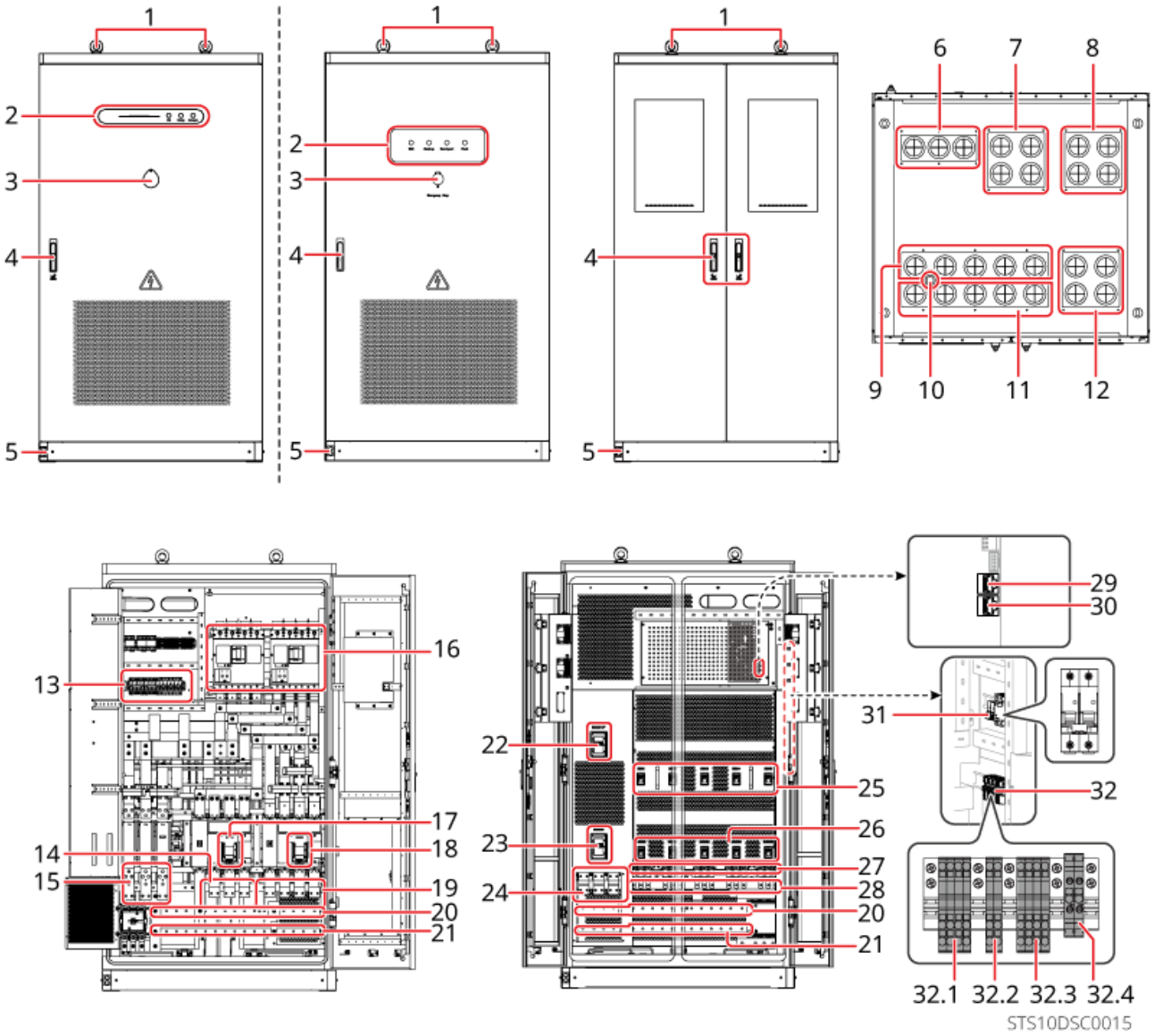


2.3 Supported Grid Types



2.4 Appearance & Dimensions

2.4.1 Introduction to Exterior and Internal Components



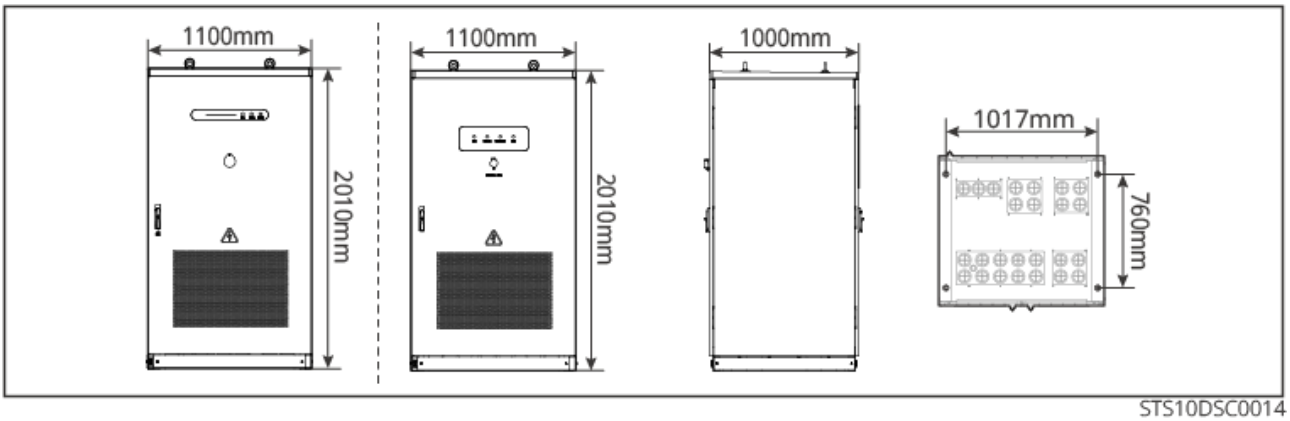
No.	Component	Description
1	Lifting eye	Used for hoisting and handling
2	indicator	Indicates the operating status of the STS
3	Emergency stop button	In case of an emergency, use this button to stop the system operation.
4	Door lock	Use the key to open the cabinet door lock. Close and lock the cabinet door when internal device operation is not required.

No.	Component	Description
5	Protective grounding point	Used for connecting the protective grounding wire
6	Smart-port port	Used for connecting diesel generators, photovoltaic inverters, and non-critical loads
7	Back-up port	Used for connecting loads
8	Grid port	Used for connecting to the power grid
9	ESS port	Used for connecting the energy storage system
10	COM port	Used for connecting communication cables
11	Inverter port	Used for connecting photovoltaic inverters (string type)
12	Inverter port	Used for connecting photovoltaic inverters (centralized type)
13	Switch	Q1, Q2, Q3: Auxiliary power distribution supply switches Q4: Grid-side surge protector switch Q5: BUS-side surge protector switch
14	Back-up port terminal block	Used for connecting load power cables
15	Smart-port port terminal block	Used for connecting power cables for diesel generators / photovoltaic inverters / non-critical loads
16	Grid-connected/Off-grid transfer switch	Used for controlling the system's grid-connected/off-grid transfer

No.	Component	Description
17	Bypass switch	The Bypass switch can control the direct connection of loads to the grid • When maintenance is required for the ESS/Inverter/Smart-port ports, to ensure uninterrupted load operation, the Bypass switch can be closed and all other switches opened, allowing safe maintenance on these ports. • Under normal conditions, the BYPASS switch must remain open and be locked by the customer using their own padlock. The padlock hole is 18 mm.
18	Grid input circuit breaker	Used for controlling grid input
19	Grid port terminal block	Used for connecting grid-connected power cables
20	Neutral (N) terminal block	Used for connecting the neutral (N) wire
21	Protective Earth (PE) terminal block	Used for connecting the protective earth (PE) wire
22	Load input circuit breaker	Used for controlling load input
23	(Optional) Centralized PV inverter input circuit breaker	Used for controlling centralized photovoltaic inverter input
24	(Optional) Inverter port terminal block	Used for connecting power cables for centralized photovoltaic inverters

No.	Component	Description
25	Energy storage system circuit breaker	Used for controlling energy storage system input
26	String PV inverter input circuit breaker	Used for controlling string photovoltaic inverter input
27	Inverter port terminal block	Used for connecting power cables for string photovoltaic inverters
28	ESS port terminal block	Used for connecting power cables for the energy storage system
29	LAN port	Used for communicating with the SEC3000C
30	PCS port	Used for communicating with the energy storage system
31	Q6 circuit breaker	SEC3000C power supply switch, used for controlling SEC3000C power supply
32	Terminal block	Wiring terminal block
32.1	LOAD load control	(Reserved) 2 DO ports for LOAD load control
32.2	RS485 diesel generator controller communication	(Reserved) RS485 port for communication with the diesel generator
32.3	Diesel generator start/stop control port	(Reserved) DO port for controlling diesel generator start/stop
32.4	Bypass DI wire connection port	(Reserved) Bypass DI wire connection port

2.4.2 Product Dimensions



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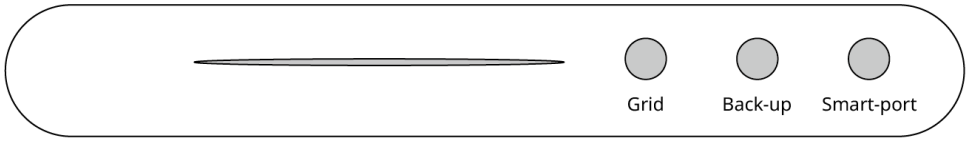
2.4.3 Indicator Light Description

Type I



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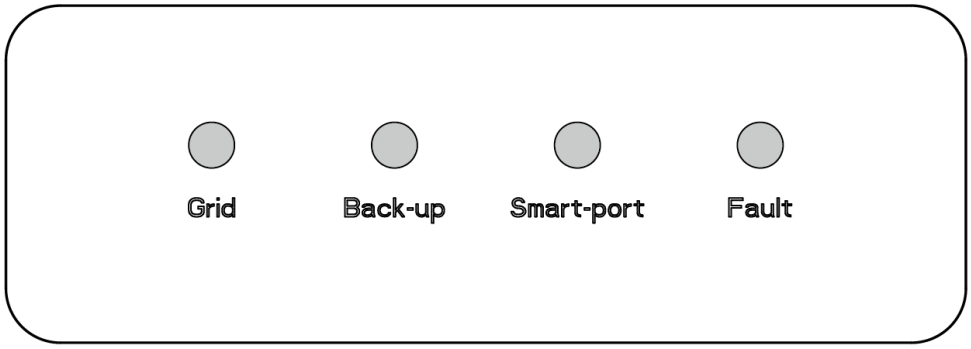
Indicator	Status	Description
Grid	▬▬	Steady on: Grid voltage is normal and the Jinggui switch is closed.
	▮▮▮▮▮▮▮▮	Flashing: Grid voltage is normal, but the Jinggui switch is not closed.
	▁▁▁▁	Off: No grid voltage.
Back-up	▬▬	Steady on: Load circuit breaker is closed.
	▁▁▁▁	Off: Load circuit breaker is open.
Smart-port	▬▬	Steady on: Smart port voltage is normal and the smart port contactor is closed.
	▮▮▮▮▮▮▮▮	Flashing: Smart port voltage is normal, but the smart port contactor is open.
	▁▁▁▁	Off: No smart port voltage.

Indicator	Status	Description
Fault indicator		Red light on: Alarm or fault has occurred.
		Green light on: No fault or alarm.

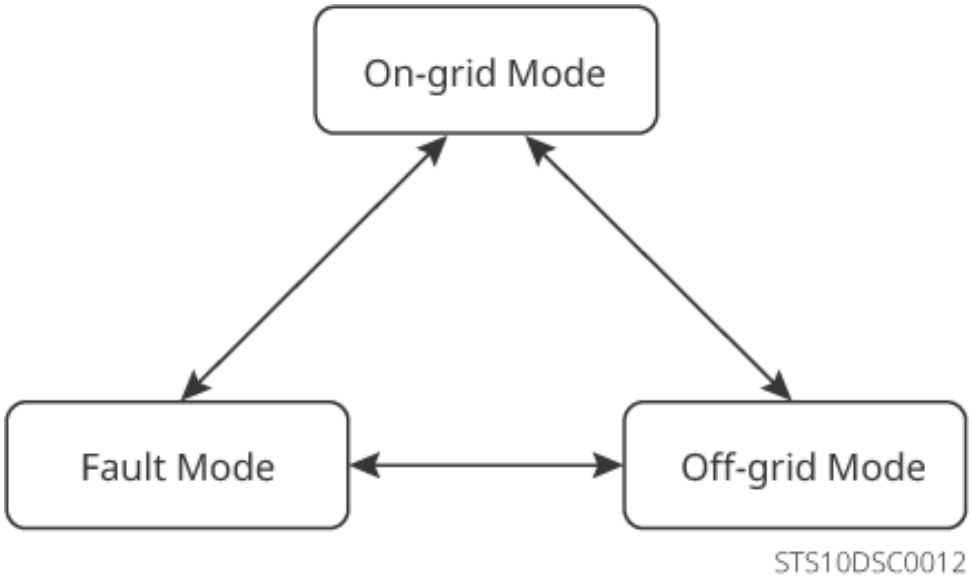
Type II



STS10DSC0016

Indicator	Status	Description
Grid		Steadily lit: Grid voltage is normal and the grid-tie/off-grid switching switch is closed.
		Off: The grid-tie/off-grid switching switch is open.
Back-up		Steadily lit: The load circuit breaker is closed.
		Off: The load circuit breaker is open.
Smart-port		Steadily lit: Smart-port voltage is normal and the Smart-port contactor is closed.
		Off: No voltage at the Smart-port and the Smart-port contactor is open.
Fault		Red light flashing with buzzer alarm: System fault occurred.
		Off: No fault.

2.5 Operating Mode



No.	Mode	Description
1	on-grid	When the grid is normal, the STS switch is closed, and the system is in the on-grid state.
2	Off-grid	When the grid is powered off, the STS switch is disconnected, and the system is in the off-grid state.
3	fault	The fault indicator light is red, please handle it promptly.

3 Check and Storage

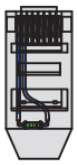
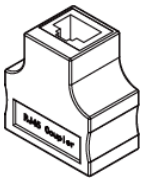
3.1 Check Before Receiving

Before receiving the product, please carefully check the following:

1. Check if the outer packaging is damaged, such as deformation, holes, cracks, or other signs that could cause damage to the equipment inside the packaging. If damaged, do not open the packaging and contact your dealer.
2. Check if the inverter model is correct. If it does not match, do not open the packaging and contact your dealer.
3. Check if the type and quantity of delivered items are correct, and if there is any damage to the appearance. If damaged, contact your dealer.

3.2 deliverables

Part	Description	Part	Description
	Grid-tie/Off-grid switching cabinet ×1		Expansion bolt ×4
	M8X25 hexagon combination bolt ×60		M8X30 hexagon combination bolt ×60
	Fireproofing mud ×50		PIN terminal ×12

Part	Description	Part	Description
	Terminal resistor ×1		Dual-head RJ45 connector ×4 Reserved for device maintenance
	User manual ×1		

3.3 Storage

If the device is not put into use immediately, store it according to the following requirements:

1. Ensure the outer packaging box is not removed and the desiccant inside the box is not missing.
2. Ensure the storage environment is clean, with appropriate temperature and humidity ranges, and free from condensation.
3. Ensure the stacking height and orientation of the devices are arranged according to the requirements indicated on the packaging box label.
4. Ensure there is no risk of toppling after the devices are stacked.
5. If the device storage time exceeds two years or the device remains idle for more than 6 months after installation, it is recommended to have it inspected and tested by professional personnel before putting it into use.
6. To ensure the good electrical performance of the internal electronic components, it is recommended to power on the device 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.

4 Installation

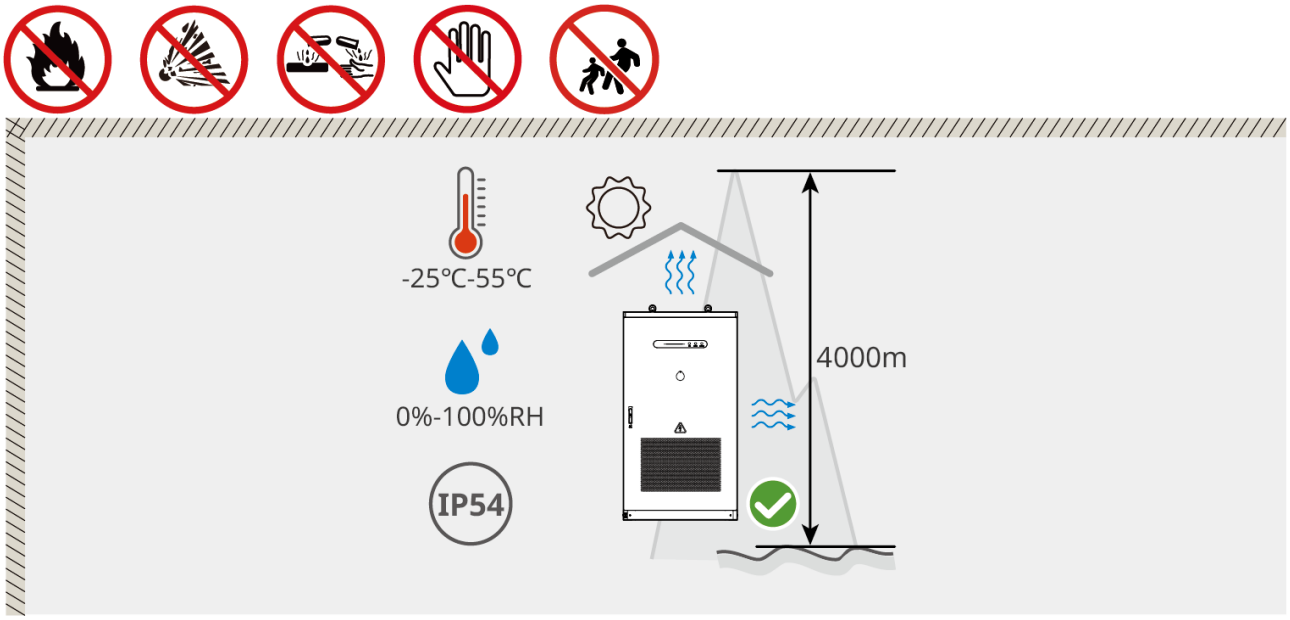
4.1 Installation Requirements

Installation Environment Requirements

1. The device must not be installed in flammable, explosive, corrosive, or similar environments.
2. The installation space must meet the device's ventilation and heat dissipation requirements as well as operational space requirements.
3. The device's protection rating is suitable for outdoor installation; the installation environment temperature and humidity must be within the appropriate range.
4. The device should avoid installation environments exposed to direct sunlight, rain, snow accumulation, etc. It is recommended to install in a sheltered location; if necessary, a sunshade can be constructed.
5. The installation location must be out of reach of children and avoid being placed in easily accessible positions.
6. The device installation height should facilitate operation and maintenance, ensuring that device indicators, all labels are easily viewable, and wiring terminals are easy to operate.
7. The device installation altitude must be below 4000m.
8. The device will be corroded if installed in salt damage areas. Salt damage areas refer to areas within 500m of the coast or areas affected by sea breeze. The areas affected by sea breeze vary depending on meteorological conditions (e.g., typhoons, seasonal winds) or topography (with embankments, hills).
9. If the device is installed in public places other than work and living areas (such as parking lots, stations, factories, etc.), install a protective net around the device and erect safety warning signs for isolation, prohibiting unauthorized personnel from approaching, to prevent personal injury or property damage due to accidental contact by non-professional personnel or other reasons during device operation.
10. Keep away from strong magnetic field environments to avoid electromagnetic interference. If there are radio stations or wireless communication devices below 30MHz near the installation location, install the device according to the following requirements:

- Add a ferrite core with multiple windings at the device AC line, or add a low-pass EMI filter.
- The distance between the device and the wireless electromagnetic interference

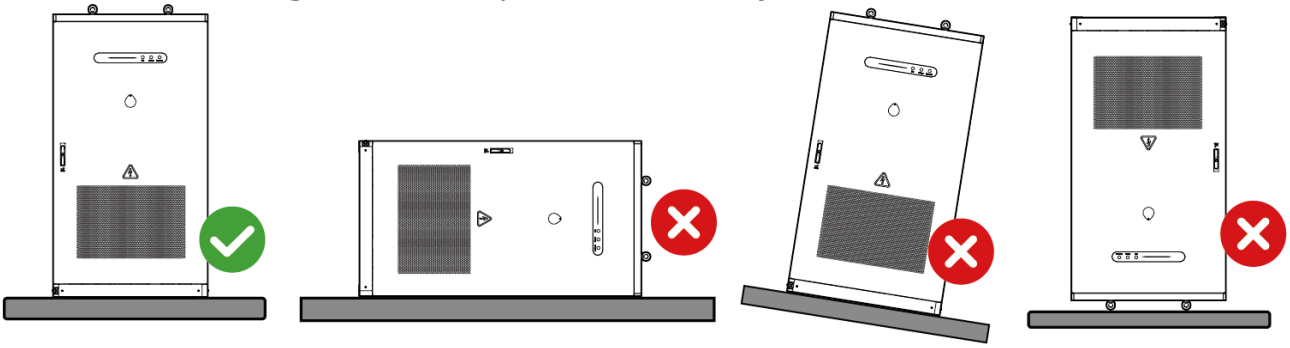
device should exceed 30m.



STS10INT0017

Installation Angle Requirements

The device must be installed vertically and steadily on the foundation to ensure device stability and normal heat dissipation.
It is prohibited to place the device tilted, on its side, or upside down, as these may cause device damage, unstable operation, or safety hazards.



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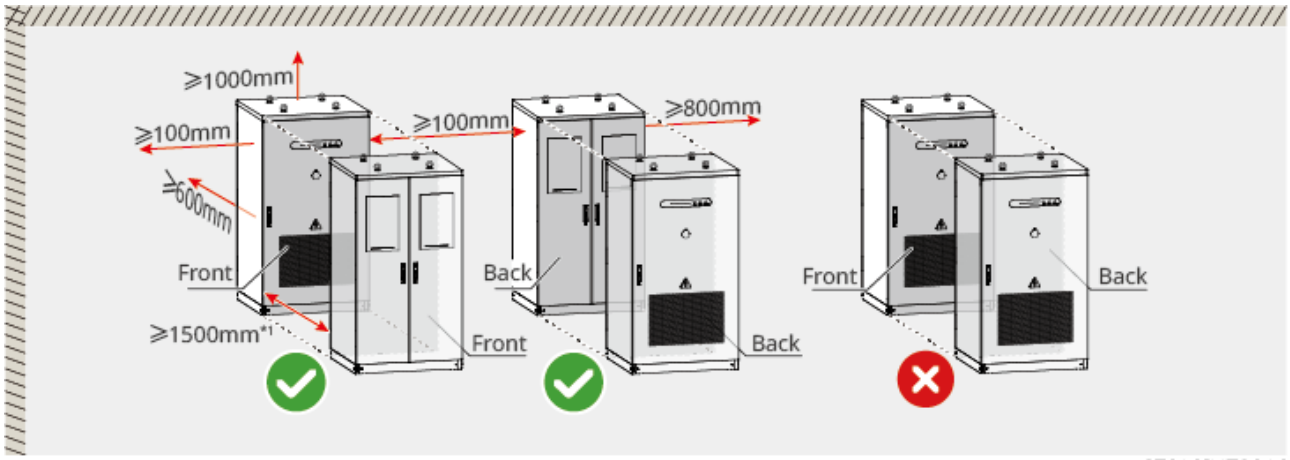
Installation Space Requirements

NOTICE

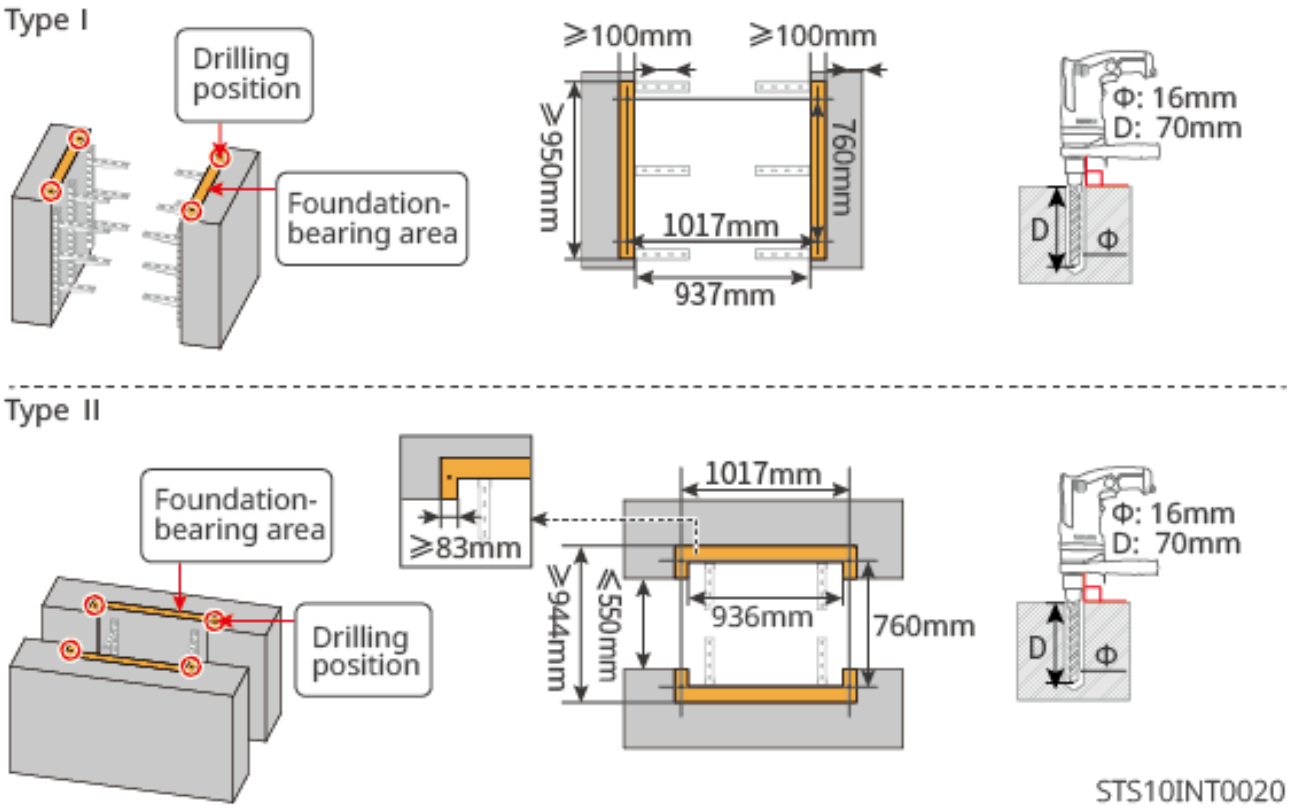
When using a forklift, the clearance in front of and behind the equipment must be greater than or equal to 2.5m.



STS10INT0016

Installation Foundation Requirements

- The device installation foundation must be constructed using C35 concrete or other concrete with equivalent performance.
- Before installation, ensure that the base is level, firm, flat, dry, and has sufficient load-bearing capacity; depressions or tilting are prohibited.
- The base should have pre-buried pipes or reserved cable outlets to facilitate device wiring.
- The device uses bottom cable entry, so the foundation must have dust-proof and rodent-proof design to prevent foreign objects from entering.
- The foundation must have anti-water accumulation and moisture-proof design to prevent cable aging and short circuits, which could affect the normal operation of the device.
- Since the device cables are thick, the pre-buried pipes/reserved cable outlets must be designed with sufficient space for the cables to ensure smooth connection and prevent wear.

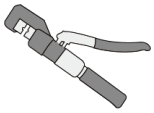
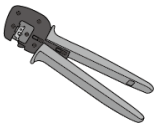
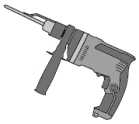
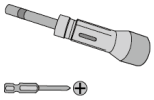
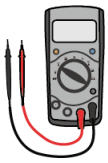
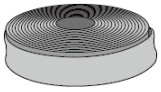
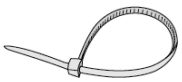


4.2 Tool Requirements

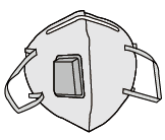
NOTICE
During installation, it is recommended to use the following installation tools. If necessary, other auxiliary tools can be used on-site.

Installation Tools

Tool Type	Description	Tool Type	Description
	diagonal plier		RJ45 crimping tool

Tool Type	Description	Tool Type	Description
	wire stripper		YQK-70 hydraulic crimper
	open-end wrench		PV terminal crimping tool PV-CZM-61100
	hammer drill (drill bit Φ8mm)		torque wrench
	rubber hammer		socket wrench
	marker pen		multimeter range ≤1100V
	heat shrink tubing		heat gun
	cable tie		vacuum cleaner

Personal Protective Equipment

Tool Type	Description	Tool Type	Description
	Insulated gloves, protective gloves		Dust mask

Tool Type	Description	Tool Type	Description
	goggle		Safety shoes

4.3 Handling Requirements

⚠CAUTION

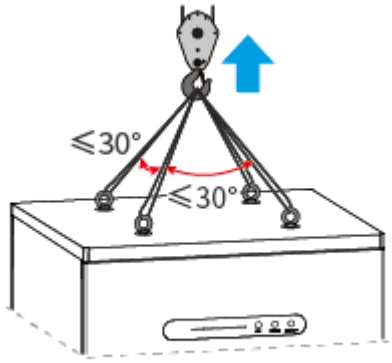
1. When the equipment is being transported, turned over, installed, or operated, it must comply with the laws, regulations, and relevant standards of the country or region where it is located.
2. To protect the equipment from damage during transportation, ensure that the transport personnel are professionally trained. Record the operation steps during transportation and keep the equipment balanced to prevent it from falling.
3. Before installation, the energy storage system needs to be moved to the installation site. To avoid personal injury or equipment damage during the moving process, please note the following:

- Based on the equipment weight, allocate corresponding personnel and tools to prevent the equipment from exceeding the weight range that can be manually carried, which could injure personnel.
- Ensure that the equipment remains balanced during the moving process to avoid falling.
- During the equipment moving process, ensure that the cabinet doors are locked.

NOTICE

- The equipment can be transported to the installation site using hoisting or a forklift.
- When hoisting the equipment, use flexible slings or straps, with a single strap load-bearing capacity of ≥5t.
- When using a forklift to move the equipment, the forklift's load capacity must be ≥5t.
- The door panel surface is a vulnerable area during installation and transportation; please handle with care.

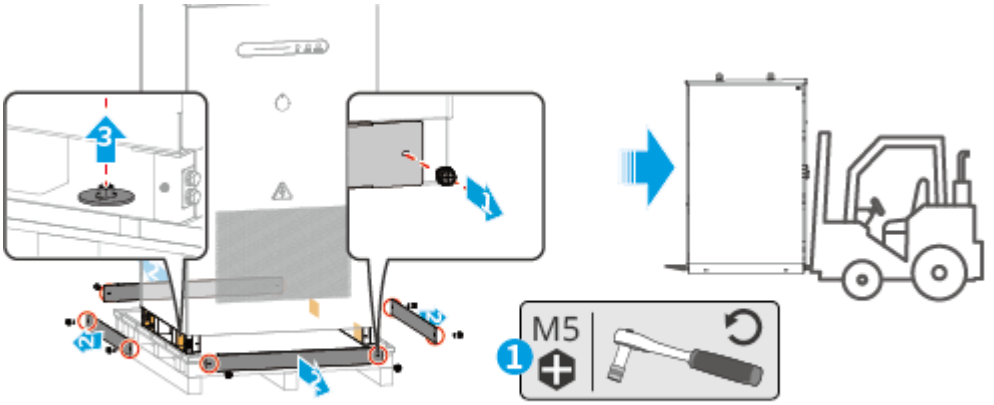
- **Lifting and Handling**



STS10INT0022

Step 1: Use a sling with a lifting hook or shackle to perform lifting operations on the equipment.
Step 2: Use a lifting device to hoist and move the equipment.

- **Forklift Handling**

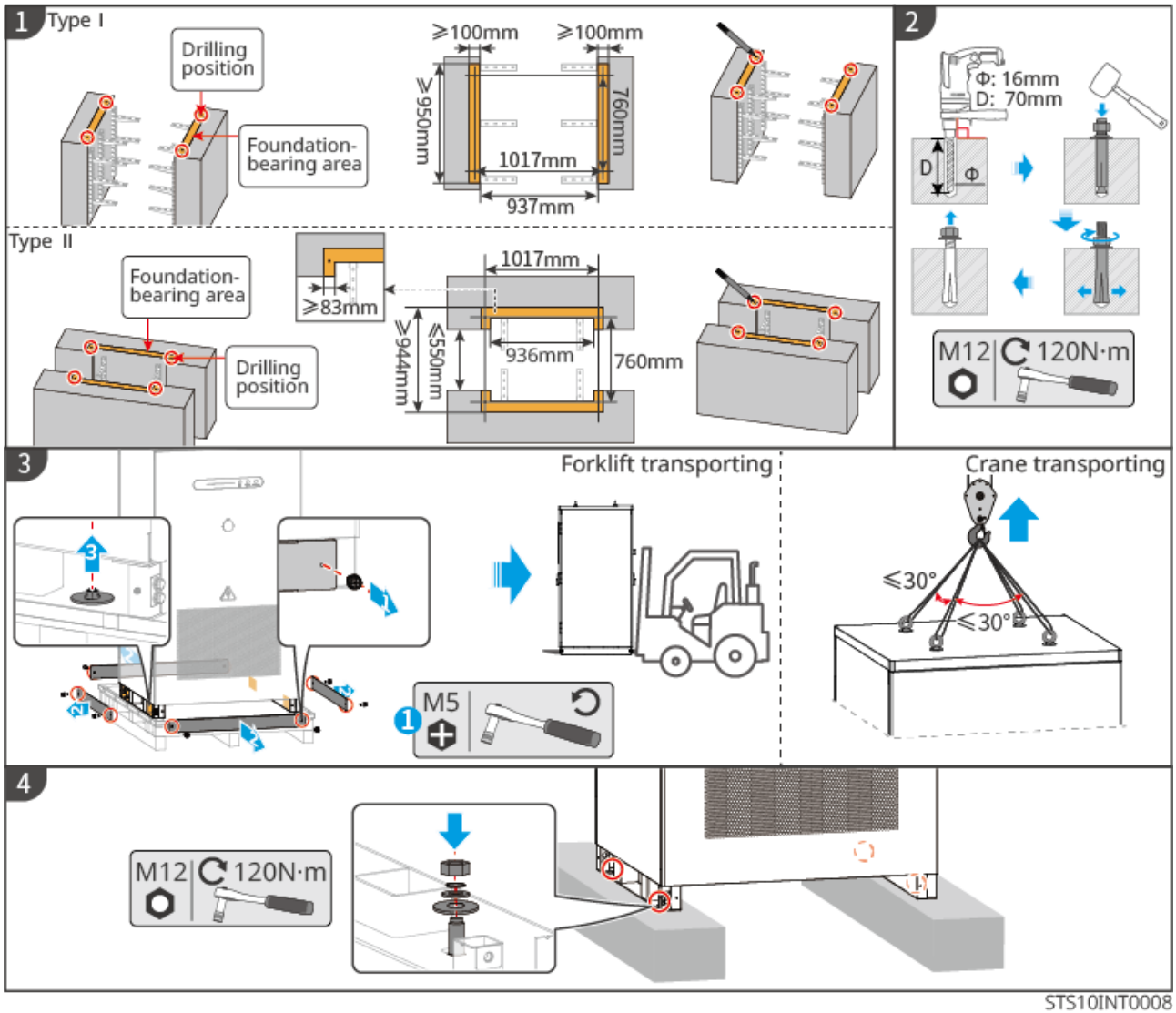


STS10INT0021

Step 1: Remove the front and rear baffles of the equipment.
Step 2: Use a forklift to move the equipment, ensuring the equipment's center of gravity is positioned at the center of the forklift forks.

4.4 Installation of Grid-Tied and Off-Grid Switching Cabinet

Step 1: Use a marker pen to mark the drilling positions on the foundation.
Step 2: Use an impact drill to create holes in the ground and install expansion bolts.
Step 3: Move the cabinet onto the foundation and remove the surrounding protective panels.
Step 4: Secure the cabinet to the foundation.


1
Type I
Drilling position
Foundation-bearing area
⩾100mm
⩾100mm
⩾950mm
760mm
1017mm
937mm
Type II
Foundation-bearing area
⩾83mm
1017mm
⩽944mm
⩽550mm
936mm
760mm
Drilling position
2
Φ: 16mm
D: 70mm
D
Φ
M12
120N·m
3
Forklift transporting
Crane transporting
⩽30°
⩽30°
M5
1
4
M12
120N·m
STS10INT0008

5 Electrical Connection

⚠DANGER

- All operations during electrical connection, as well as the specifications of cables and components used, must comply with local laws and regulations.
- Before performing electrical cable connections, ensure all upstream switches of the equipment are disconnected.
- Before performing electrical connections, disconnect all switches of the equipment to ensure the equipment is powered off. Live operation is strictly prohibited, as it may lead to hazards such as electric shock.
- Cables of the same type should be bundled together and routed separately from different types of cables. Intertwining or crossing of cables is prohibited.
- If cables are subjected to excessive tension, poor connections may result. When connecting, leave a certain length of slack in the cable before connecting it to the equipment's terminal port.
- When crimping wire terminals, ensure the conductor part of the cable makes full contact with the terminal. Do not crimp the cable insulation together with the terminal, as this may cause the equipment to fail to operate or result in terminal block damage due to unreliable connections and subsequent heating after operation.
- Using cables in high-temperature environments may cause insulation aging and damage. Maintain a distance of at least 30mm between cables and heat-generating components or the periphery of heat source areas.

NOTICE

- Before performing electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulating gloves as required.
- Only trained professionals are permitted to perform electrical connections and related operations.
- Please keep the cabinet door keys in a safe place.
- The cable colors in the graphics of this document are for reference only. Specific cable specifications must comply with local regulatory requirements.

5.1 Pre-wiring Preparation

Preparing Cables

No.	Cable	Type	Recommended Specification	Description
1	PE cable	Hot-dip galvanized flat steel	Must comply with the local grounding design specifications for AC electrical installations.	User-provided
2	power cable	Outdoor five-core copper/aluminum cable	For the power cables and terminal specifications suitable for each port, please refer to the 5.3.Connecting Power Cables(Page 41) section.	User-provided
3	DI signal cable	Outdoor copper-core twisted pair cable meeting local standards	Conductor cross-sectional area: 0.32~0.5mm²	User-provided
4	LAN communication cable	Standard shielded network cable of CAT 5E or above specification with RJ45 connectors		User-provided

Note:
The cable specifications recommended in the table are for reference only. During actual cable selection, users must comprehensively consider the influences of factors such as installation ambient temperature, laying method, number of parallel runs, voltage deviation, and thermal stability, and correct the current-carrying capacity using corresponding correction coefficients. The selected cable must meet the following requirement: Cable current-carrying capacity ≥ Rated current of overcurrent protection device ≥ Maximum rated current.

Circuit Breaker Preparation

Recommended External Overcurrent Protection Device for Smart-port Ports	Recommended Specification	Acquisition Method
AC breaker	Rated Current: 1000A	User-provided

UPS Preparation (Optional)

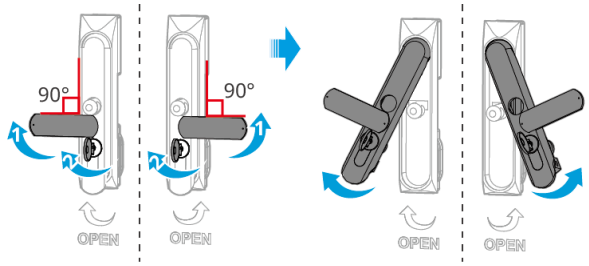
Brand		Schneider
model		SPM1K
Input/Output	Nominal Input Voltage	220 V
	Input Voltage Range	110~300 VAC
	Input Current Protection	10 A Protection
	Output Voltage	220 V (default) /230 V/240 V
	Maximum Output Power	800 W
	Output Efficiency	88%
	Output Terminals	National Standard sockets*3
Battery	Battery Capacity	9 Ah*2
	Battery Voltage	24 V
	Charging Time	4 hours to charge to 90%
Other	Operating Temperature	0~+40℃
	Storage Temperature	-15~+60℃

	Altitude	1 km (Output capacity decreases by 1% per 100 m increase)
	Dimensions	145*288*223 mm
	Net Weight	9.3 kg

Cabinet Door and Cover Plate Operation

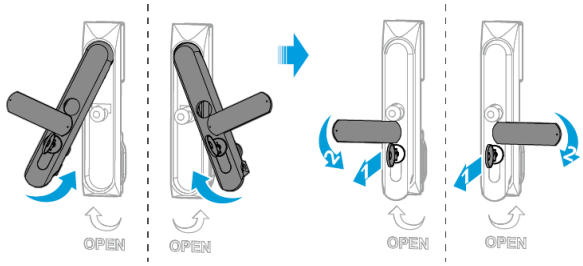
- **Cabinet Door**

Open the cabinet door



STS10INT0009

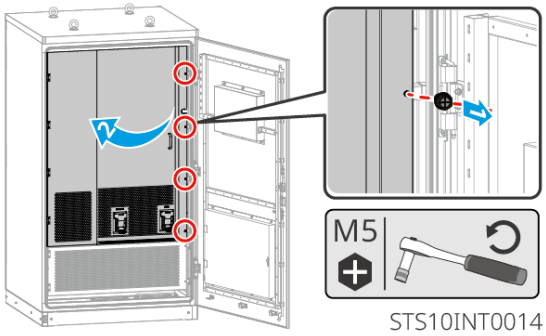
Close the cabinet door



STS10INT0010

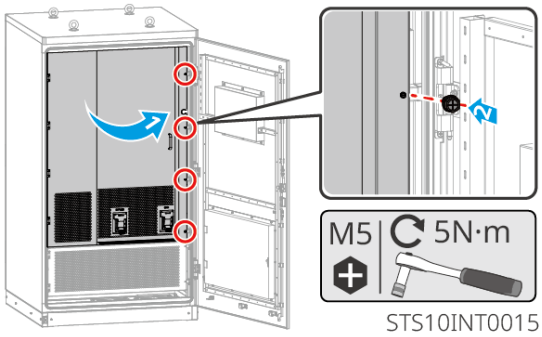
- **Upper Cover Plate**

Open the upper cover plate



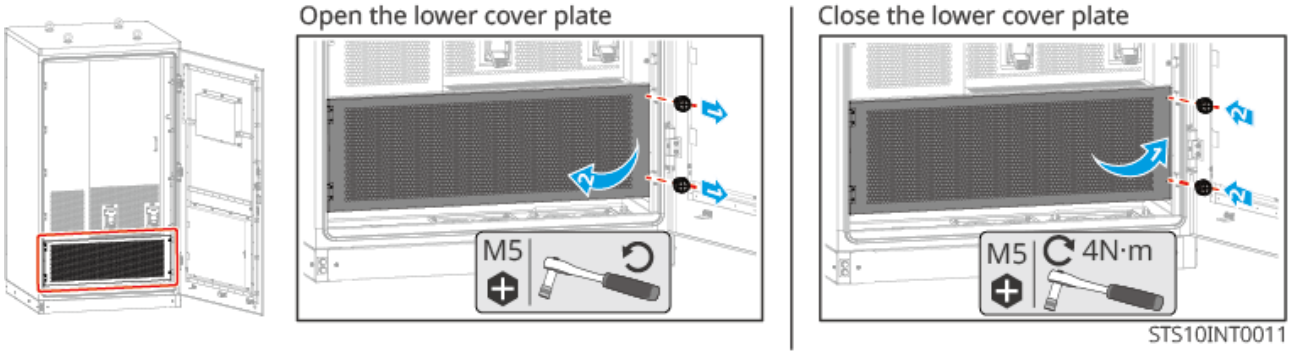
STS10INT0014

Close the upper cover plate

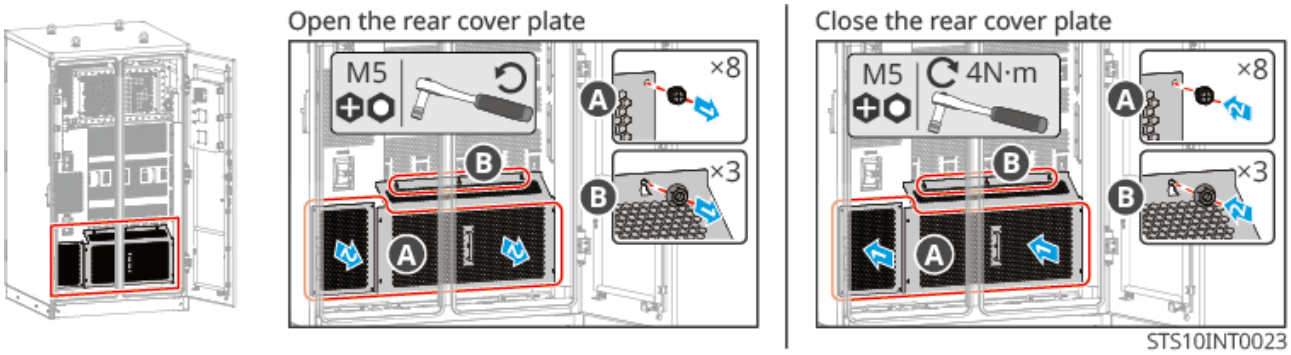


STS10INT0015

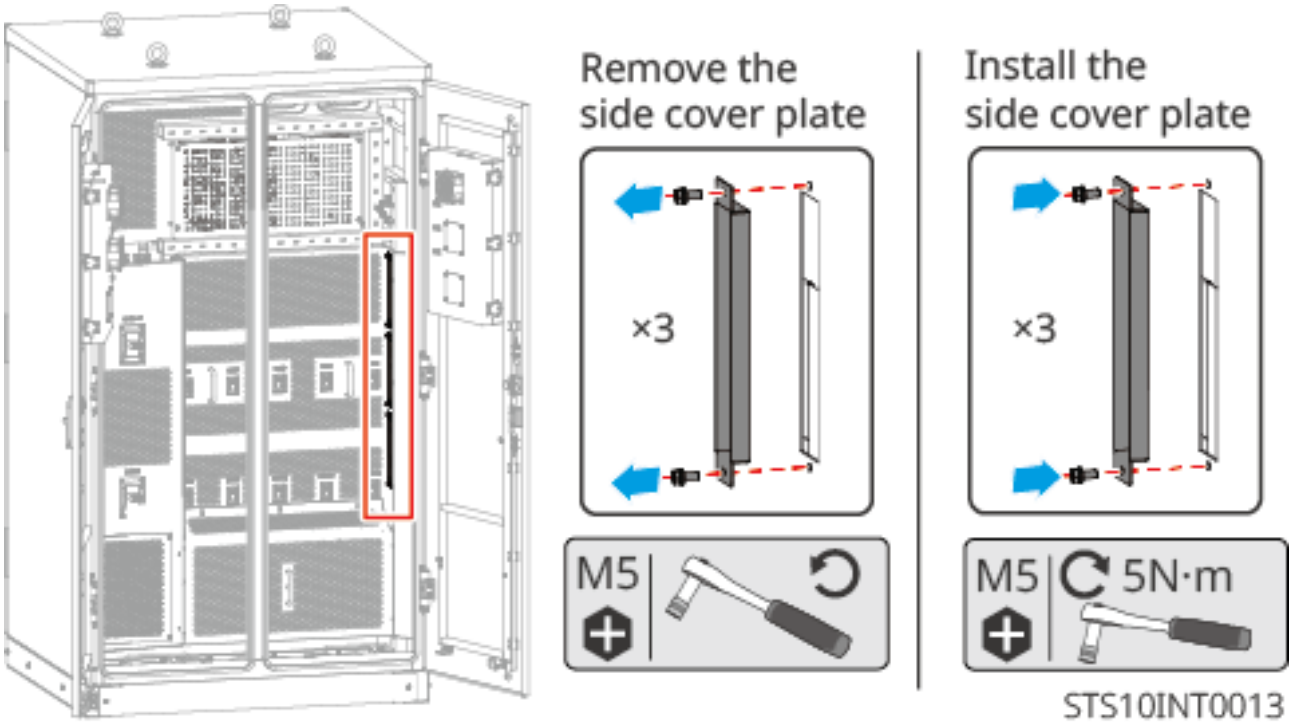
- **Lower Cover Plate**



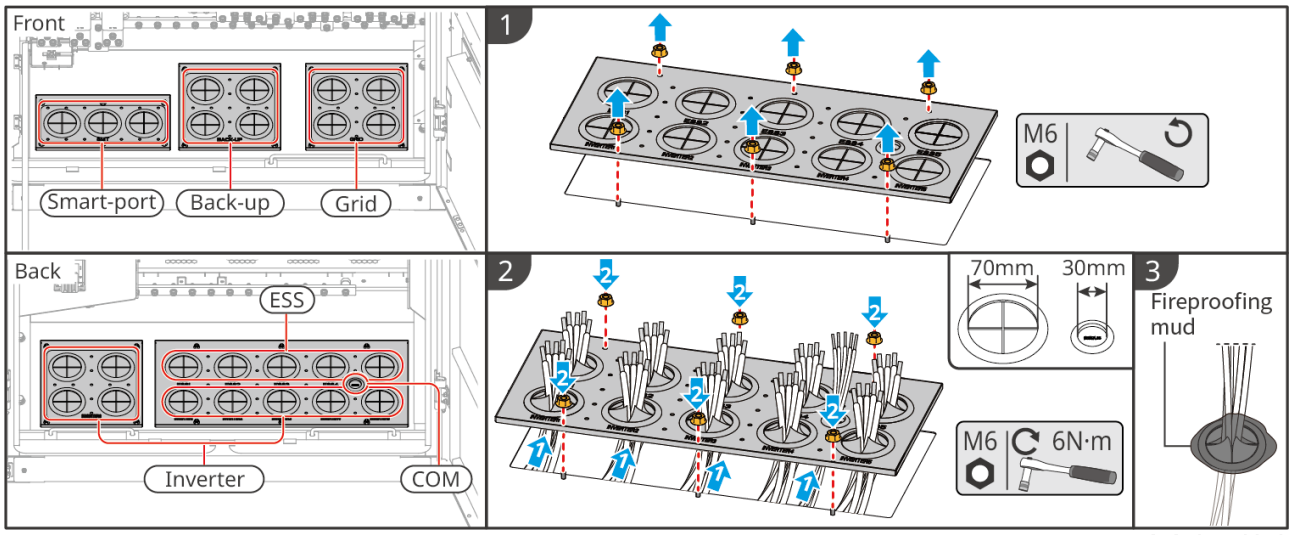
- **Rear Cover Plate**



- **Side Cover Plate**



Wiring Port and Wire Protection Plate Operation

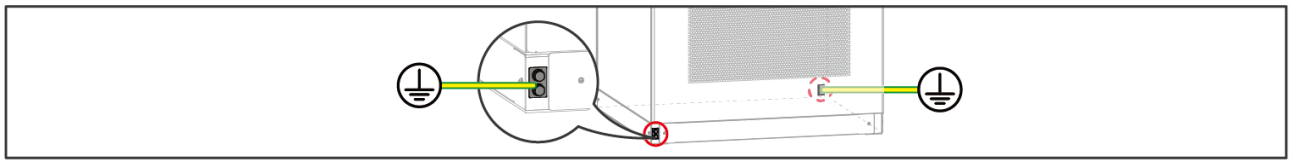


STS10INT0012

5.2 Connecting the PE cable

WARNING

- Before operating the device, ensure the system is properly grounded and all relevant protective measures are taken, otherwise there is a risk of electric shock.
- To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint to the exterior of the grounding terminal for protection after the ground wire connection is completed.



STS10ELC0013

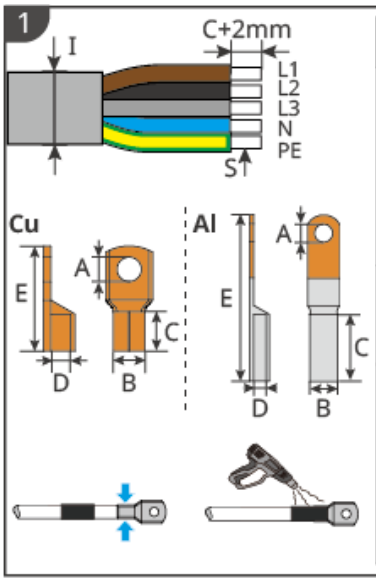
5.3 Connecting Power Cables

NOTICE

- The STS terminal block is a copper bar. If using aluminum wire, please prepare copper-aluminum transition terminals yourself.
- The Back-up, Grid, and Inverter (centralized) ports can use 95mm² or 120mm² copper core cables. If using 95mm² copper wire, 4 strands need to be connected; if using 120mm² copper wire, only 3 strands need to be connected.

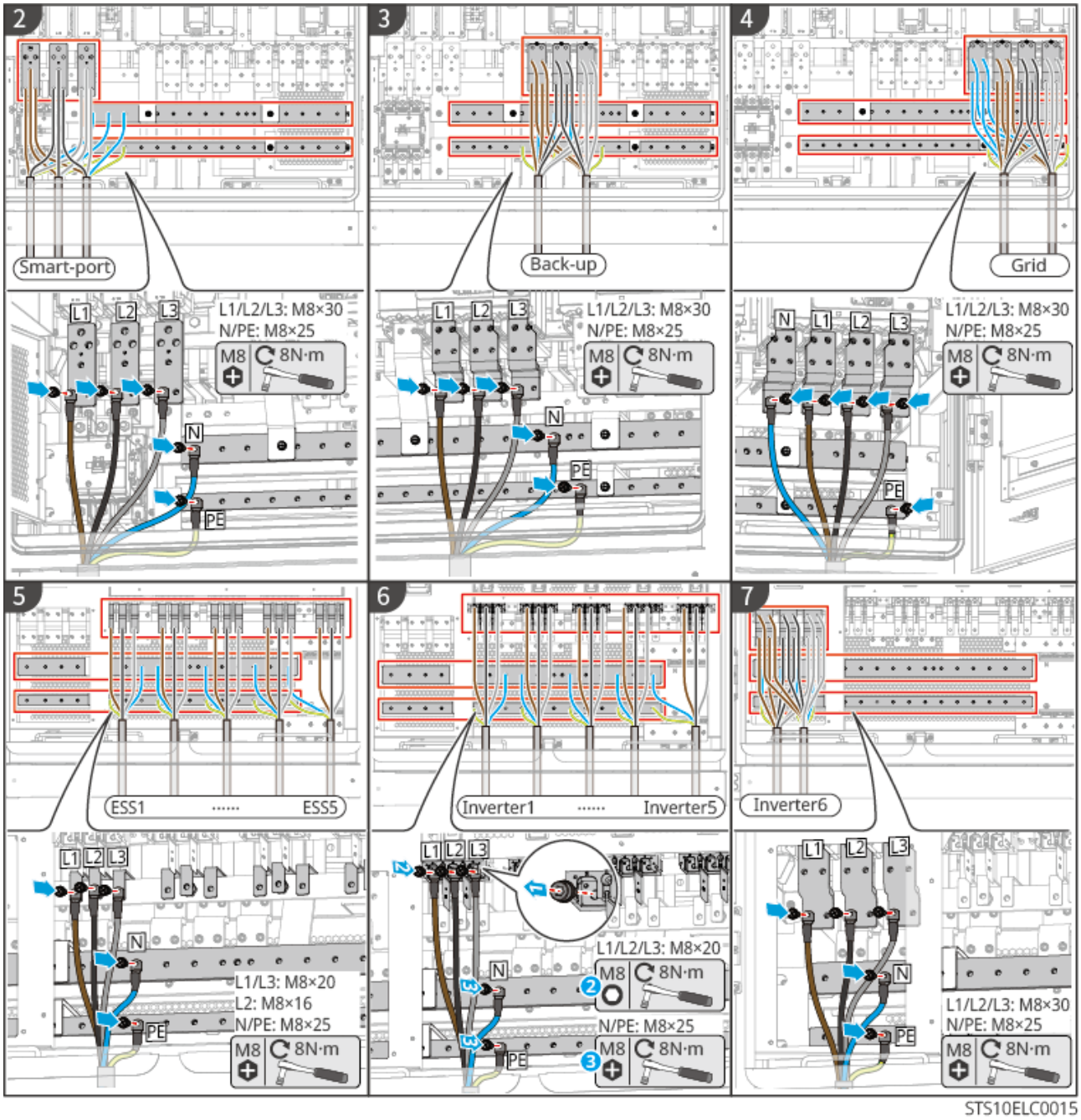
Step 1: Prepare the cable and terminal, and perform crimping.
Step 2: Unscrew the screw on the copper busbar, and use the screw to secure the crimped cable onto the copper busbar.

Smart-port & Back-up & Grid & ESS & Inverter



端口 Port	线缆材质 Cable Material	线缆类型 Cable Type	A (mm)	B (mm)	D (mm)	E (mm)	I (mm)	S (mm²)
Grid Back-up Inverter1-5	Cu	L1/L2/L3	8.5-10	17-19	13.7-15	57-63	Φ: ≤70	95-120
		N		12.5-14.5	9.8-11.5	42.5-50		50-70
		PE						
	Al	L1/L2/L3	12.5-14.5	23	15.2	120	Φ: ≤70	120
		N	12.5	18	11.5	100		70
		PE						
Smart-port	Cu	L1/L2/L3	10	19	15	63	Φ: ≤70	120
		N						
		PE						
Inverter6 ESS	Cu	L1/L2/L3	8.5-10	14.5	11.5	48.5-50	Φ: ≤70	70
		N		10.8	8.5	37-38		35
		PE						
	Al	L1/L2/L3	12.5	21	13.5	109	Φ: ≤70	95
		N	10.5	16	9.5	90		50
		PE						

STS10ELC0014



Q6 (Connecting SEC3000C Power Cable)

NOTICE

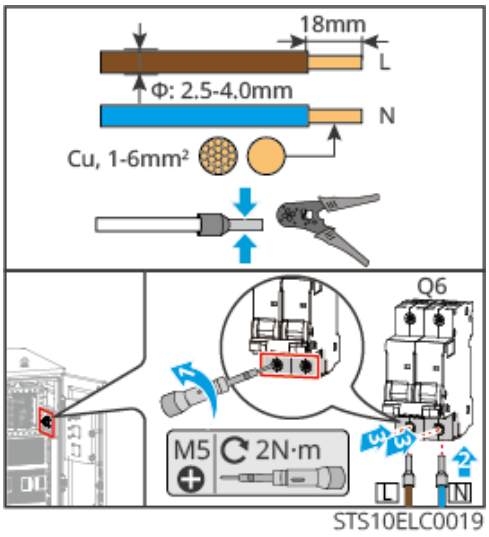
It is recommended to equip a UPS between the Q6 power supply port and the SEC3000C to ensure stable operation of the SEC3000C. For the recommended UPS models, please refer to 5.1.Pre-wiring Preparations(Page 36).

Step 1: Prepare the single-phase AC cable and terminal. For specific requirements,

please refer to the SEC3000C User Manual.

Step 2: Crimp the terminal.

Step 3: Loosen the screw at the bottom of the Q6 circuit breaker, insert the terminal, and then tighten the screw.

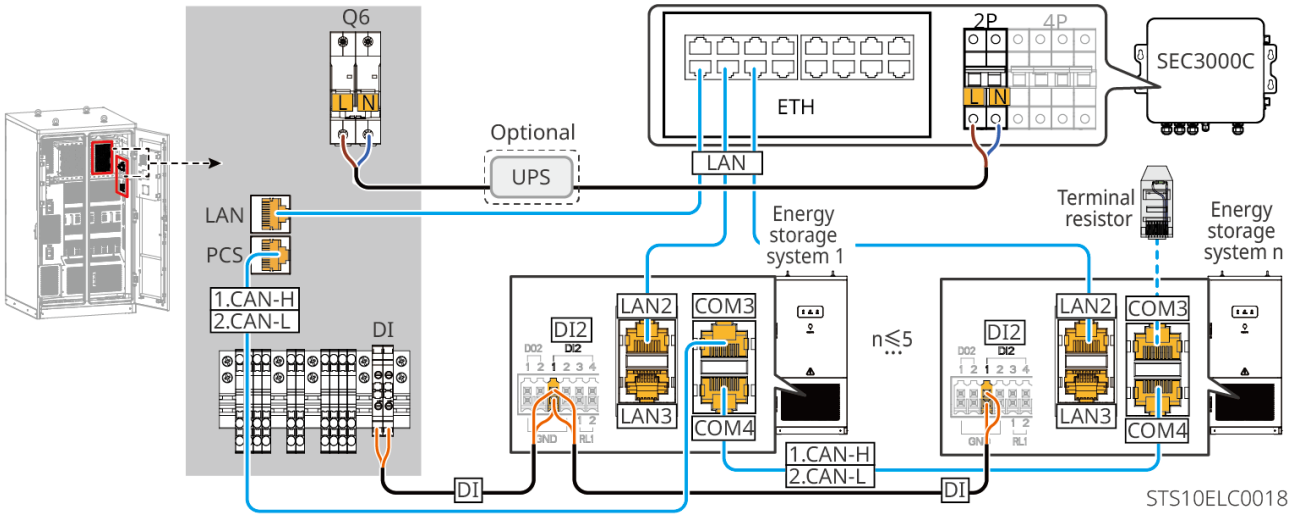


5.4 Connecting Communication Cables

NOTICE

- Before connecting the communication cable, open the side cover first.
- The length of the communication cable between the STS and the nearest energy storage system should not exceed 45 m, and the length between two adjacent energy storage systems should not exceed 5 m.
- When multiple energy storage systems are connected in parallel, insert the terminal resistor into the COM port of the last energy storage system.
- When multiple energy storage systems are connected in parallel, if one system fails and requires a complete power-down, unplug the network cables connected to its COM3 and COM4 ports, and use a double-ended RJ45 connector to short these two cables. If the last energy storage system fails, unplug the network cables from its COM port and the COM port of the previous system, then remove the terminal resistor from the failed system and insert it into the COM port of the previous system.
- It is recommended to install a UPS between the STS and the SEC3000C. With a UPS installed, the system can achieve remote black start; without a UPS, remote black start is not possible.

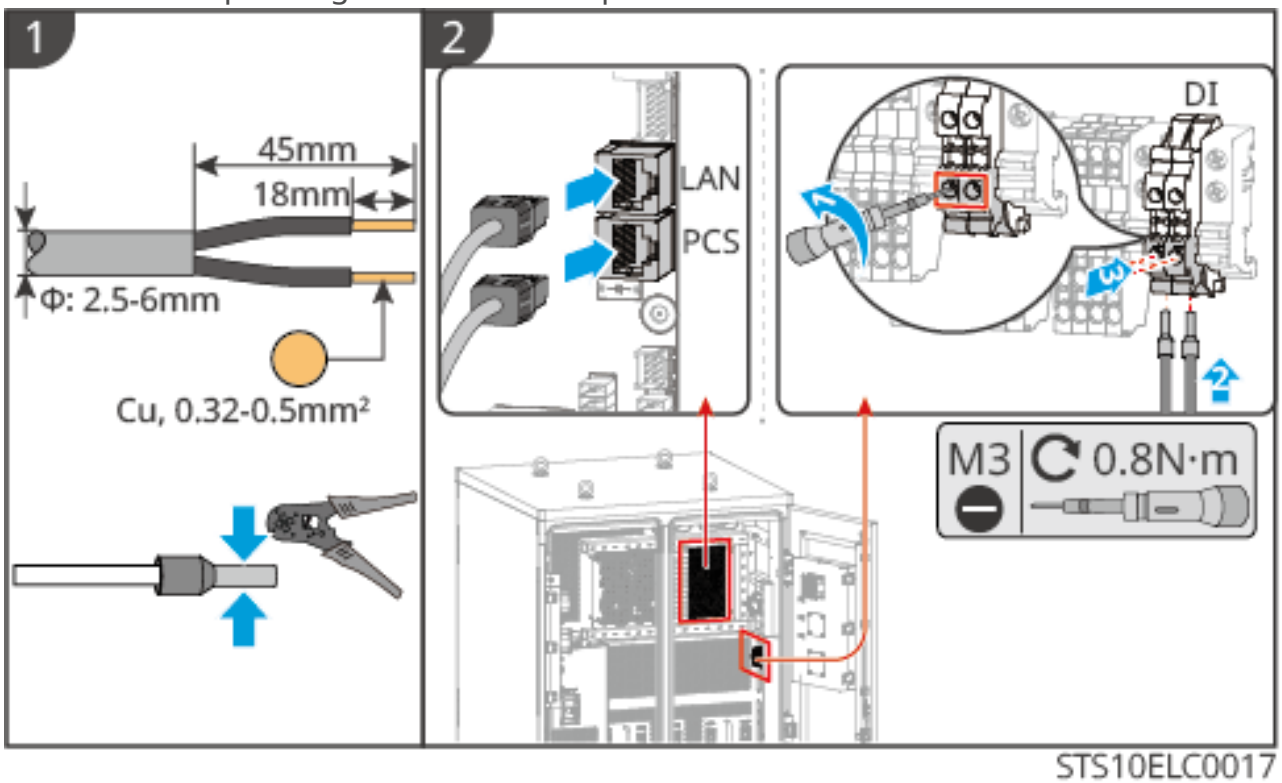
Wiring Overview



Procedure

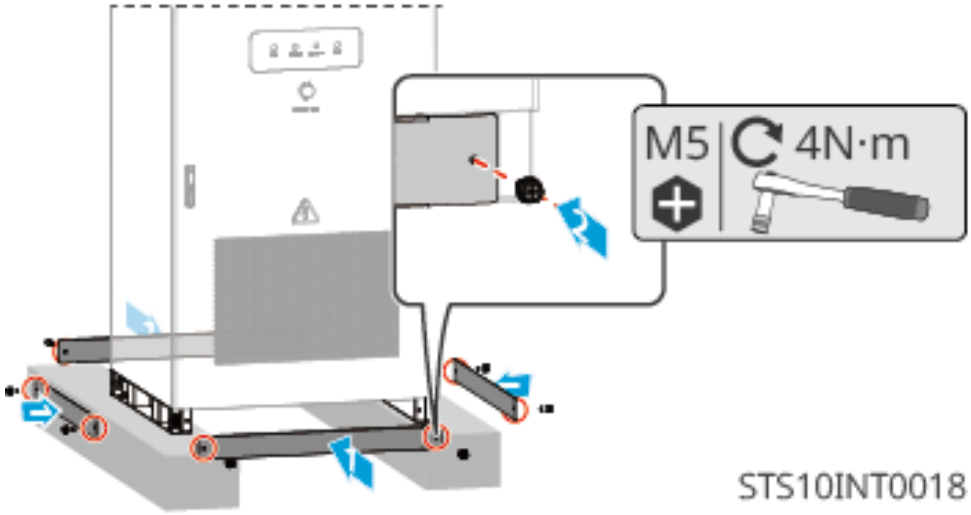
Step 1: Prepare the communication cable and crimp the terminal.

Step 2: Pass the communication cable through the bottom COM port and insert it into the corresponding communication port.

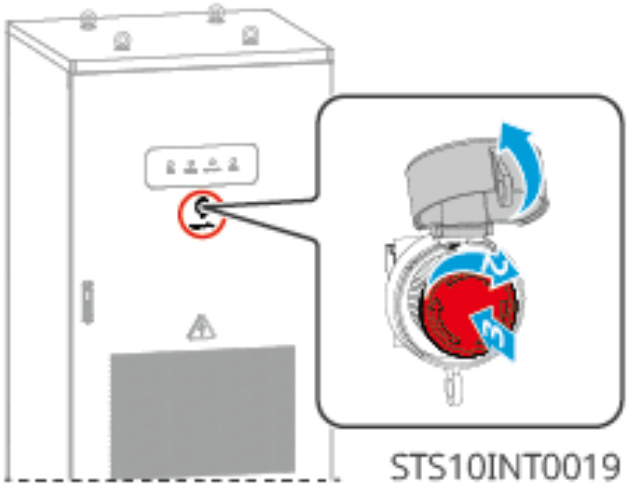


5.5 Post-Wiring Operations

Step 1: Install the baffle.



Step 2: Release the emergency stop switch.



6 Equipment Trial Run

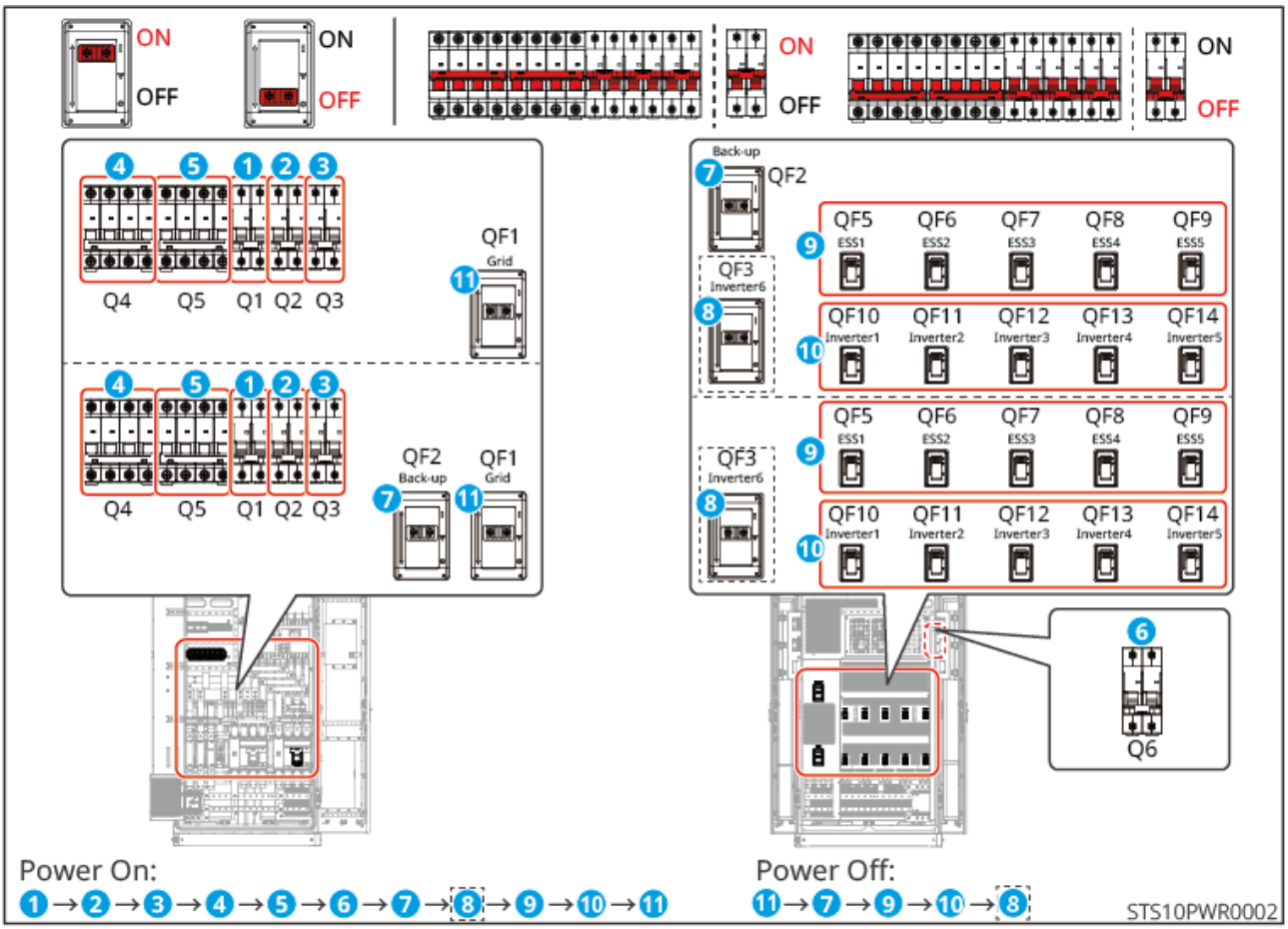
6.1 Pre-power-on Inspection

No.	Inspection Item
1	The equipment is securely installed, positioned for easy operation and maintenance, with adequate space for ventilation and heat dissipation, and in a clean and tidy environment.
2	The PE cable, power cable, and communication cables are correctly and securely connected.
3	Cables are bundled according to routing requirements, distributed reasonably, and show no damage.
4	Unused ports are sealed.
5	The voltage and frequency at the equipment's grid connection point meet the grid interconnection requirements.

6.2 Device Power-On

NOTICE
Before powering on, please open the top cover.

Step 1: Close the Q1 switch (GRID single-phase power circuit breaker).
Step 2: Close the Q2 switch (BUS single-phase power circuit breaker).
Step 3: Close the Q3 switch (Smart-port single-phase power circuit breaker).
Step 4: Close the Q4 switch (Grid-connected surge protector circuit breaker).
Step 5: Close the Q5 switch (Off-grid surge protector circuit breaker).
Step 6: Close the Q6 switch (SEC3000C power supply switch).
Step 7: Close the QF2 switch (Load switch).
Step 8: Close the QF3 switch (Centralized switch after PV inverter combiner).
Step 9: Close the QF5~QF9 switches (Energy storage system switches).
Step 10: Close the QF10~QF14 switches (PV inverter switches).
Step 11: Close the QF1 switch (Main incoming line switch).


ON
OFF
ON
OFF
ON
OFF
ON
OFF
Q4
Q5
Q1
Q2
Q3
QF1
Grid
QF2
Back-up
QF3
Inverter6
QF5
ESS1
QF6
ESS2
QF7
ESS3
QF8
ESS4
QF9
ESS5
QF10
Inverter1
QF11
Inverter2
QF12
Inverter3
QF13
Inverter4
QF14
Inverter5
Q6
Power On:
1→2→3→4→5→6→7→8→9→10→11
Power Off:
11→7→9→10→8
STS10PWR0002

7 Device Debugging via SEC3000C Embedded Web

SEC3000C Smart Energy Control Box is a dedicated device for the photovoltaic power generation system monitoring and management platform. It can be used to collect data from devices in the photovoltaic power generation system, such as grid-tied inverters, hybrid inverters, electricity meters, etc., store logs, and send the data to the monitoring and management platform, enabling centralized monitoring, operation, and maintenance of the photovoltaic system.
For detailed functions, please refer to the SEC3000C User Manual.

8 Power Plant Monitoring via SEMS+

SEMS+ is a monitoring platform that communicates with devices via WiFi/LAN/4G. The following are common functions of SEMS+:

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

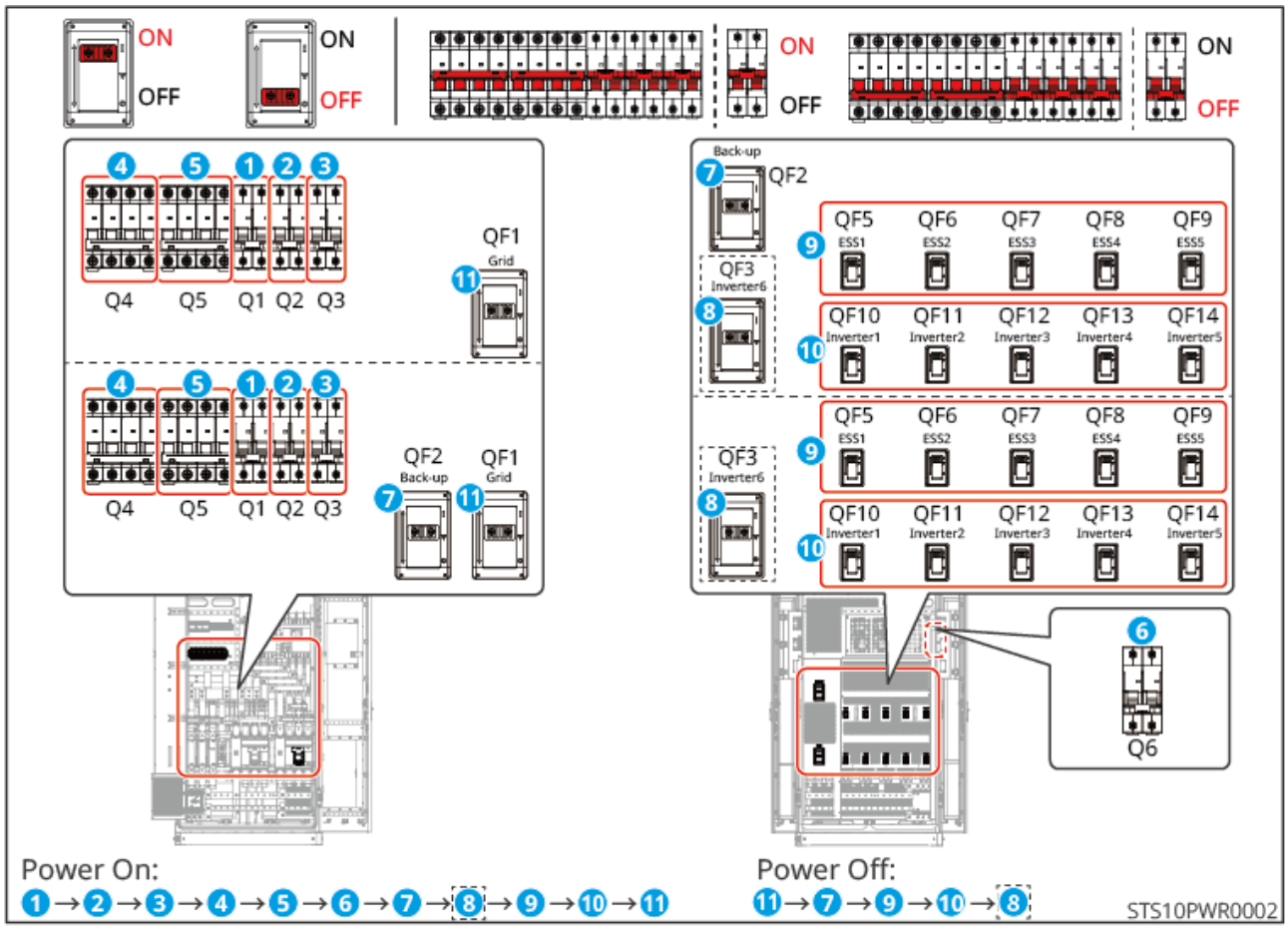
For detailed functions, please refer to the "SEMS+ User Manual".

9 Maintenance

9.1 Device Power Off

NOTICE
After powering down, please close the upper cover panel.

Step 1: Turn off the QF1 switch (Main Incoming Line Switch).
Step 2: Turn off the QF2 switch (Load Switch).
Step 3: Turn off the QF5~QF9 switches (Energy Storage System Switches).
Step 4: Turn off the QF10~QF14 switches (Photovoltaic Inverter Switches).
Step 5: Turn off the QF3 switch (Centralized Switch after PV Inverter Combiner).



9.2 Troubleshooting

Please follow the troubleshooting methods below. If these methods do not resolve your issue, please contact the after-sales service center.
When contacting the after-sales service center, please gather the following information to facilitate a quick resolution.

1. Device information, such as: serial number, software version, device installation time, fault occurrence time, fault frequency, etc.
2. Device installation environment, such as: weather conditions, installation location, etc. Providing photos, videos, or other files of the recommended installation environment can assist in problem analysis.
3. Grid conditions.

Fault Type	Fault Prompt	Troubleshooting
MC Control Board Fault	NTC Abnormal（Ambient Temperature）	Please contact the dealer/GoodWe After-sales Service Center
	Internal Fan Abnormal	Please contact the dealer/GoodWe After-sales Service Center
	DSP Communication Failure	1. After powering down, check if the PCS communication RJ45 port on the MC control board and the COM port RJ45 of the 261 integrated cabinet LC are connected or have any abnormalities. 2. If the fault persists after eliminating abnormalities and repowering, please contact the dealer/GoodWe After-sales Service Center.

Fault Type	Fault Prompt	Troubleshooting
	Contactor Communication Failure	1. After powering down, check if the CN20 control port on the MC control board and the Phoenix terminal of the Jinggui switch are connected or have any abnormalities. 2. If the fault persists after eliminating abnormalities and repowering, please contact the dealer/GoodWe After-sales Service Center.
	DG Communication Failure	1. After powering down, check if the RS485 port of the DG terminal block inside the cabinet and the communication terminal on the DG side are connected or have any abnormalities. 2. If the fault persists after eliminating abnormalities and repowering, please contact the dealer/GoodWe After-sales Service Center.
EPO	Cabinet Internal Fault	1. If the EPO button is pressed due to human error, after confirming the STS is completely powered down and safe, rotate the EPO button to reset. 2. If the EPO was pressed due to an emergency danger, please contact the dealer/GoodWe After-sales Service Center.
Contactor Failure 1	Latching Contactor False Trip Warning	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Latching Contactor False Close Warning	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.

Fault Type	Fault Prompt	Troubleshooting
	Main Latching Contactor Close Failure	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Main Latching Contactor Trip Failure	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Relay Abnormally Open in Closed State	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Relay Abnormally Closed in Open State	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Relay Close Failure	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Relay Trip Failure	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Phase A Current Trip Shutdown Timeout	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.

Fault Type	Fault Prompt	Troubleshooting
	Phase B Current Trip Shutdown Timeout	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Phase C Current Trip Shutdown Timeout	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Input Three-Phase Power Loss	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	24V Power Supply Undervoltage	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Latching Drive Undervoltage	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Dual-Mode Setting Error	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Internal 485 Communication Loss	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
Contactor Failure 2	Parallel Slave Action Failure	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.

Fault Type	Fault Prompt	Troubleshooting
	N Phase Wiring Error	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	ABC Phase Sequence Error	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Phase Loss Error	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	MCU Overtemperature Error	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	One Open One Closed in Parallel Mode	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Both Units Closed in Interlock Mode	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Control Contacts Triggered Simultaneously	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.
	Excessive Trip/Close Frequency	Power down the entire system, wait 5 minutes, and then repower. If the fault persists, please contact the dealer/GoodWe After-sales Service Center.

Fault Type	Fault Prompt	Troubleshooting
Overload Protection 1	Overload Protection (GRID)	1. Power down the entire system, wait 5 minutes, and then repower. If the fault disappears, it's okay. 2. If it occurs twice or more within one month, please contact the dealer/GoodWe After-sales Service Center.
Overload Protection 2	Overload Protection (Smart-port)	1. Power down the entire system, wait 5 minutes, and then repower. If the fault disappears, it's okay. 2. If it occurs twice or more within one month, please contact the dealer/GoodWe After-sales Service Center.
Lightning Protection Fault 1	Grid Side SPD1 Activated	Check if the surge protective device SPD1 is activated. Please contact the dealer/GoodWe After-sales Service Center and report the activation status.
Lightning Protection Fault 2	Off-grid Side SPD2 Activated	Check if the surge protective device SPD1 is activated. Please contact the dealer/GoodWe After-sales Service Center and report the activation status.

9.3 Routine Maintenance

⚠DANGER
Before maintenance, ensure the STS is completely powered off. Operating with power on may cause equipment damage or risk of electric shock.

Maintenance Item	Maintenance Method	Maintenance Cycle
System Cleaning	• Check if there is any foreign object or dust on the heat sink and air inlet/outlet. • Check if the fan and dust filter are clean, with no dust accumulation.	Once every six months
Fan	Check if the fan is operating normally, if there is any abnormal noise, and if its appearance is normal.	Once a year
Electrical Connections	Check if electrical connections are loose, if the cable appearance is damaged, or if there is exposed copper.	Once every six months - Once a year
Sealing	Check if the sealing of the equipment's cable entry holes meets requirements. If gaps are too large or unsealed, reseal them.	Once a year

9.4 Removing the Equipment

⚠CAUTION

- Before removing STS, please ensure that the device is completely powered off.
- During operation, please wear personal protective equipment.

Step 1: Open the cabinet door.
Step 2: Disconnect all electrical connections of the STS, including: power cable, Communication cable, protective grounding wire.
Step 3: Unscrew the fixing screws on the STS base.
Step 4: Use hoisting or a forklift to move and remove the STS from the base.
Step 5: Properly store the equipment. If it will be put into use later, ensure that the storage conditions meet the requirements.

9.5 Disposing of the Equipment

When the equipment can no longer be used and needs to be disposed of, please dispose of the equipment according to the electrical waste disposal regulations of the country/region where the equipment is located. Do not treat the equipment as general household waste.

10 Technical Data

Technical Data	GW500K-STS-PCS-G10
Grid	
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE
Voltage Range (V)	340~440
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	47.5~52.5 /57.5~62.5
Rated Current (A)	957.2
Max. Current (A)	1000@10s
Rated Power (kW)	500
Max. Apparent Power (kVA)	630
Rated Conditional Short-time Current (kA)	20
Back-up	
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE
Voltage Range (V)	340~440
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	47.5~52.5 /57.5~62.5
Rated Current (A)	835.6
Max. Current (A)	1000@10s
Rated Power (kW)	500
Max. Apparent Power (kVA)	550
Rated Conditional Short-time Current (kA)	20
ESS	

Technical Data	GW500K-STS-PCS-G10
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE
Voltage Range (V)	340~440
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	47.5~52.5 /57.5~62.5
Rated Current (A)	835.6
Max. Current (A)	1000@10s
Rated Power (kW)	500
Max. Apparent Power (kVA)	550
Rated Conditional Short-time Current (kA)	20
Smart-port	
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE
Voltage Range (V)	340~440
Nominal Frequency (Hz)	50/60
Frequency Range (Hz)	47.5~52.5 /57.5~62.5
Rated Current (A)	835.6
Max. Current (A)	1000@10s
Rated Power (kW)	500
Max. Apparent Power (kVA)	550
Rated Conditional Short-time Current (kA)	20
Inverter	
Nominal Voltage (V)	220/380, 230/400, 3L/N/PE
Voltage Range (V)	340~440
Nominal Frequency (Hz)	50/60

Technical Data	GW500K-STS-PCS-G10
Frequency Range (Hz)	47.5~52.5 / 57.5~62.5
Rated Current (A)	1519.4
Max. Current (A)	1800@10s
Rated Power (kW)	1000 (Centralized Access 500 + Independent Access 500)
Max. Apparent Power (kVA)	1000 (Centralized Access 500 + Independent Access 500)
Rated Conditional Short-time Current (kA)	20
General Data	
On/Off Grid Transfer Time (ms)	<20
Operating Temperature Range (℃)	-25~+55
Storage Temperature (℃)	-40~+70
Relative Humidity	0~100%
Pollution Degree	III
Max. Operating Altitude (m)	4000
Cooling Method	Smart Fan Cooling
Communication With EMS	LAN+CAN
Weight (kg)	<750
Dimension (W×H×D mm)	1100*2010*1000
Mounting Method	Grounded
Noise Emission (dB)	<60
Ingress Protection Rating	IP54
Overvoltage Category	III
Protective Class	I

Technical Data	GW500K-STS-PCS-G10
Certification	
Grid Standards	NA
Safety Regulation	IEC61439-1, IEC61439-2, EN61439-1, EN61439-2, IEC60730

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