2026-07-20 V1.0

Small-scale Microgrid

Static Transfer Switch

GW250K-STS-PCS-G10

User Manual

GOODWE

Copyright Notice

Trademark Authorization

Note

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

Preface

Over view

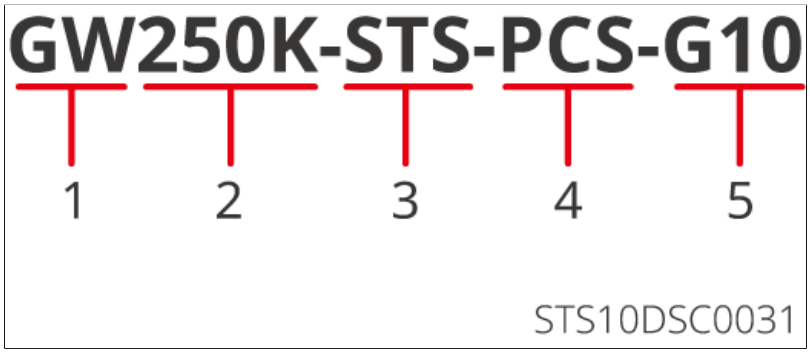
This document mainly introduces the product information, installation wiring, configuration and commissioning, fault troubleshooting, and maintenance of the On/Off-grid Switching Cabinet (hereinafter referred to as STS). Please read this manual carefully before installing and using this product to under stand the safety information and become familiar with the functions and features. 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.https://en.goodwe.com/.

Applicable Products

This document is applicable to the following equipment models:

model	Rated Power	Nominal Voltage
GW250K-STS-PCS-G10	250kW	220/380V，230/400V，240/415V，3L/N/PE

Model Meaning



Serial Number	Meaning	Description
1	brand code	GW: GoodWe

Serial Number	Meaning	Description
2	Rated Power	250K: Rated Power is 250kW
3	Series Name	STS: STS Series
4	characteristic code	PCS: Only compatible with GoodWe PCS
5	version code	G10: First-generation product

Symbol Definition

⚠Danger
Indicates a highly potentially dangerous situation that, if not avoided, will result in death or serious injury.

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

⚠Caution
Indicates a low-level potential hazard which, if not avoided, could result in moderate or minor injury to personnel.

Note
Emphasis and supplementation of content may also provide tips or tricks for optimized product use, helping you solve a problem or save time.

Table of Contents

1 Safety Precautions

The safety precautions contained in this document must always be complied with when operating the equipment.

⚠Warning
The equipment has been strictly designed and tested in accordance with safety regulations. However, as an electrical device, relevant safety instructions must be followed before any operation. Improper operation may lead to serious injury or property damage.

1.1 general safety

Note

- Due to product version upgrades or other reasons, the document content will be updated from time to time. Unless otherwise agreed, the document content shall not replace the safety precautions on the product label. All descriptions in the document are provided solely as usage guidance.
- Please read this document carefully before installing the equipment to under stand the product and precautions.
- All equipment operations must be carried out by professional and qualified electrical technicians, who shall be thoroughly familiar with the relevant local standards and safety regulations of the project site.
- When operating equipment, use insulated tools and wear personal protective equipment to ensure personal safety. When contacting electronic components, wear static gloves, static wrist straps, anti-static clothing, etc., for the Protection of equipment from static damage.
- Unauthorized disassembly or modification may cause equipment damage, and such damage is not covered under 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 shall not be within the responsibility of the equipment manufacturer. For more product warranty information, please visit the official website: https://en.goodwe.com/warrantyrelated.html.

1.2 Personnel Requirements

Note

To ensure the safety, compliance, and efficiency of the entire process of equipment transport, installation, wiring, operation, and maintenance, operations must be carried out by professional or qualified personnel.

1. Professionals or qualified personnel include:
   - Personnel who have mastered the equipment working principles, system structure, and knowledge related to risks and hazards, and have received professional operation training or possess extensive practical experience.
   - Personnel who have received relevant technical and safety training, possess certain operational experience, are able to be aware of the hazards that specific tasks may pose to the mselves, and can take protective measures to minimize risks to the mselves and others.
   - Qualified electrical technical personnel meeting the regulatory requirements of the applicable country/region.
   - Hold an electrical engineering degree / advanced diploma in electrical discipline or equivalent qualifications / possess professional qualifications in the electrical field, and have at least 2/3/4 years of experience in testing and supervisory work using electrical equipment safety standards.
2. Personnel involved in special tasks such as electrical work, work at height, and special equipment operation must hold valid qualification certificates required by the location of the equipment.
3. Medium voltage equipment operation must be performed by a certified high-voltage electrician.
4. Equipment and component replacement shall only be performed by authorized personnel.

1.3 EU Declaration of Conformity

1.3.1 Equipment with wireless communication function

Equipment with wireless communication functions placed on the European market shall comply with the requirements of the following directives:

- Radio Equipment Directive 2014/53/EU (RED)
- Restrictions of Hazardous Substances Directive 2011/65/EU and (EU) 2015/863 (RoHS)

- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No 1907/2006 (REACH)

1.3.2 Equipment with out wireless communication capability

Devices with out wireless communication functions that can be sold in the European market meet the requirements of the following directives:

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

1.4 Safety Symbols and Certification Marks Description

⚠Danger

- After equipment installation, labels and warning signs on the enclosure must be clearly visible. Covering, altering, or damaging the m is prohibited.
- The following enclosure warning label descriptions are for reference only. Please refer to the actual label on the equipment for accurate information.

Serial Number	symbol	Description
1		The re are potential hazards during equipment operation. Take protective measures when operating the equipment.

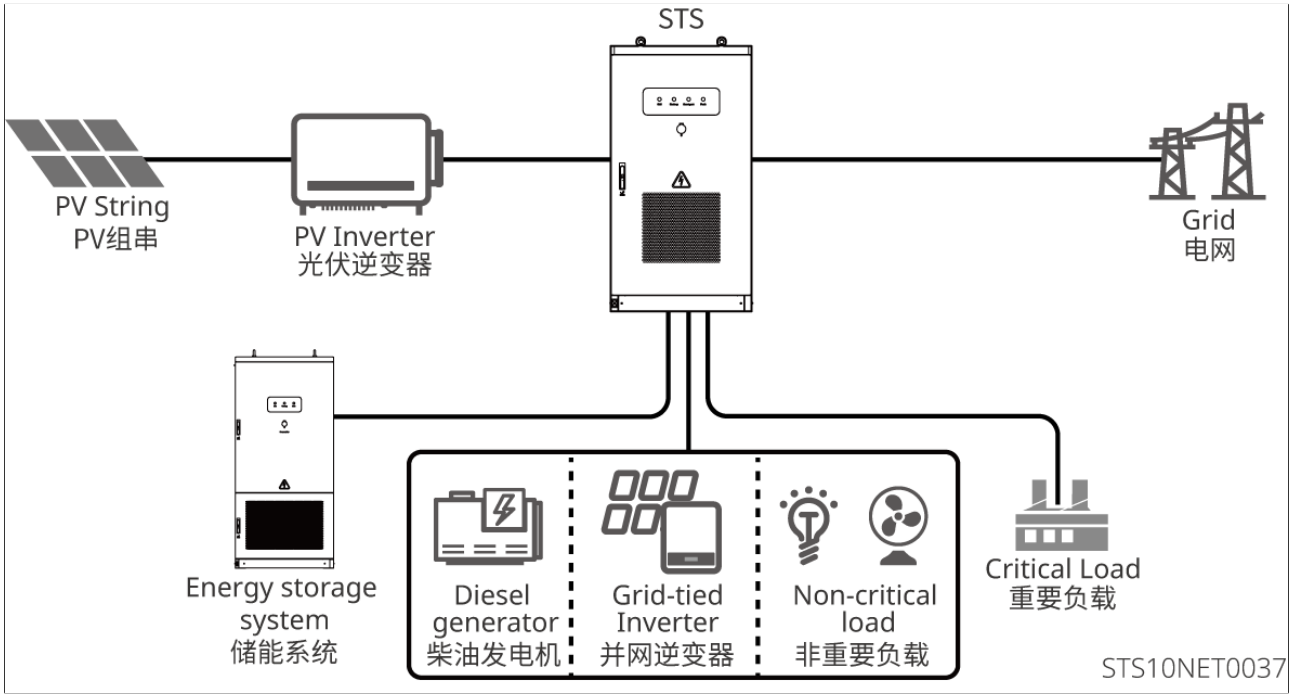
Serial Number	symbol	Description
2		Danger: High voltage. High voltage exists when the equipment is operating. Before operating the equipment, ensure it is de-energized.
3		The equipment surface has high temperature. Do not to uch during operation, otherwise it may cause burns.
4		Please use the equipment properly. Use under extreme conditions may result in explosion risk.
5		Battery contains flammable materials. Caution: fire risk.
6		The equipment contains corrosive electrolyte. Avoid contact with leaked electrolyte or volatile gases.
7		Delayed discharge. After the equipment is powered off, please wait for 5 minutes until the equipment is fully discharged.
8		The equipment should be kept away from open flames or ignition sources.
9		The equipment should be kept away from areas accessible to children.
10		Please use the equipment properly. Use under extreme conditions may result in explosion risk.
11		Battery contains flammable materials. Caution: fire risk.
12		After the battery system is wired or the battery system is in operation, do not lift the equipment.

Serial Number	symbol	Description
13		Do not extinguish with water.
14	 	Before operating the equipment, please read the product manual carefully.
15		Personal protective equipment shall be worn during installation, operation and maintenance.
16		Equipment shall not be disposed of as household waste. Please dispose of the equipment in accordance with local laws and regulations, or return it to the equipment manufacturer.
17		Protection ground wire connection point.
18		Recycling symbol. The equipment shall be placed in the correct location and recycled in accordance with local environmental regulations.
19		CE Certification mark.
20		RCM Certification Mark.

2 Product Introduction

2.1 Product Introduction

STS supports the integration of PV inverters, energy storage systems, Diesel Generators, loads, and the grid, assisting the entire system in achieving seamless On/Off-grid switching to meet the backup power demands of regions with unstable power supply.
The main application scenarios are as follows:



port	Description
Inverter	PV inverter connection port. Maximum port capacity 500kVA, supports 2 centralized access lines (1 of which is optional).

port	Description
ESS	Energy storage system connection port. Max. port capacity 250kVA, supports up to 2 energy storage system connections, with each path having a Max. Current from Grid of 417.8A.
Smart-port	The Smart-port port can be connected to diesel generator, photovoltaic, or non-critical loads, with a maximum port capacity of 250kVA and a Max. Current from Grid of 417.8A. The access type can be set on the SEC3000C WEB interface, and the system executes corresponding control logic based on the settings: • Defined as the normally closed contactor of the circuit when the PV inverter is connected. • The definition is that when the diesel generator is connected, the opening and closing commands are executed based on the set SOC. • Defined as when loads are connected, non-critical loads are connected, and open and close commands are executed based on the set SOC to shed non-critical loads. • It is defined that the system does not execute the port logic when no device is connected.
Back-up	Load connection port. Port capacity: 250 kVA. Supports single-phase/three-phase loading, maximum phase current: 417.8 A.
Grid	Maximum configured capacity 315kVA, Max. Current from Grid 478.6A. For supported grid types, refer to 2.3.Supported Grid Types(Page 17). Wiring method: 3L/N/PE.

Note
1. When the Smart-port is connected to non-critical loads, the total load connection capacity of the Smart-port and Back-up ports shall not exceed 200kVA. 2. Load imbalance transient variation shall not exceed 0.8Sn, where Sn is the capacity of the energy storage system.

Off-grid load capacity of microgrid system

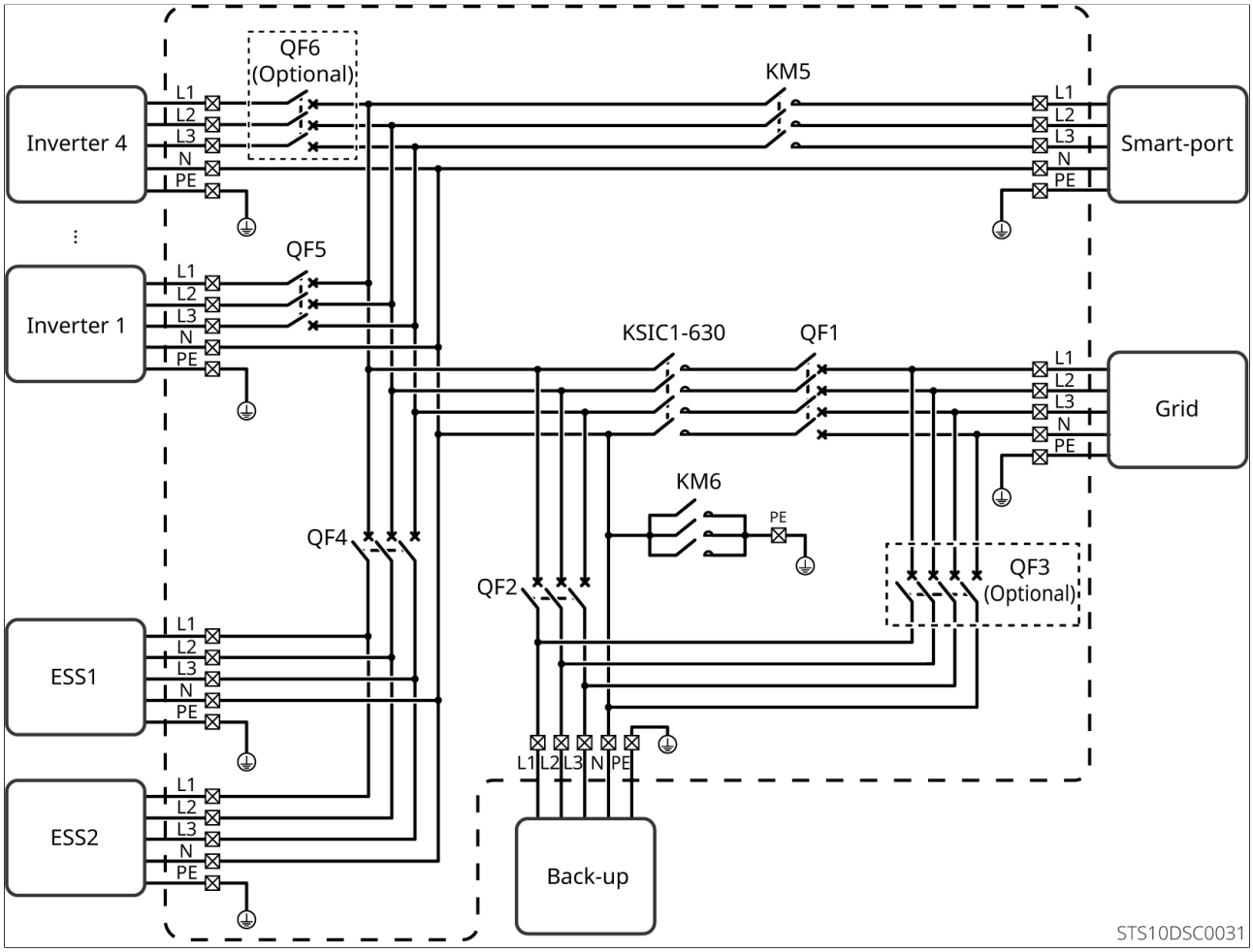
Off-grid load capacity	Technical Specifications	Note
total load	≤0.8*Pn	1. Single-phase rated capacity = (1/3) * Pn 2. Load per phase ≤ 0.8 * single-phase rated capacity, i. e., load per phase ≤ (1/3) * 0.8 * Pn 3. Setting a factor of 0.8 provides a 20% dynamic adjustment margin, ensuring stable output under load fluctuations and with a 0.8 PF load.
nonlinear load	Half-wave rectification load ≤ 0.4*Pn	The total harmonic distortion of load current must meet the requirements of relevant codes or standards.
unbalanced load	1. Two-phase load: ≤ (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	Note
motor load	1. For direct-on-line, star-delta starting, or soft starter with gradual start, single motor load ≤ 0.1 * Pn 2. Variable frequency motor load ≤ 0.8 * Pn	1. If the re are other base loads, the ability to switch and start motor-type loads should be proportionally reduced. The motor starting surge current should be ≤ 8 * motor Rated Current; otherwise, it is recommended to add a soft starter or variable frequency drive for the motor. 2. If there are motor loads and ordinary non-impact loads in the system, configure load capacity: A*10+1.25*B≤Pn, where: A: Simultaneously started motor load capacity B: Other General Loads

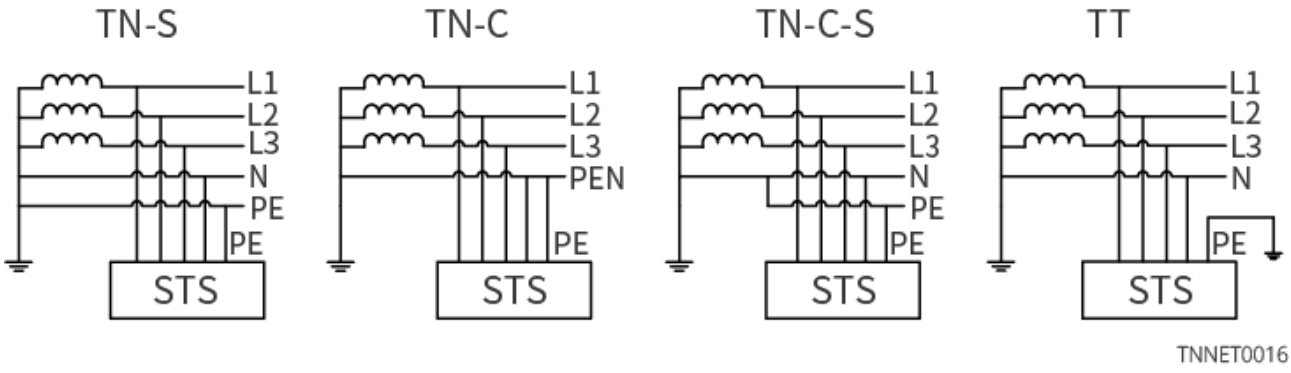
Product Features

- Supports integration of PV grid-tied inverter, energy storage system, diesel generator, load, and utility grid, with flexible configuration.
- Supports seamless On/Off-grid switching with in 20ms.
- Seamless switching of diesel generator
- In coordination with SEC3000C, centralized management of energy and loads can be achieved.

2.2 Circuit block diagram

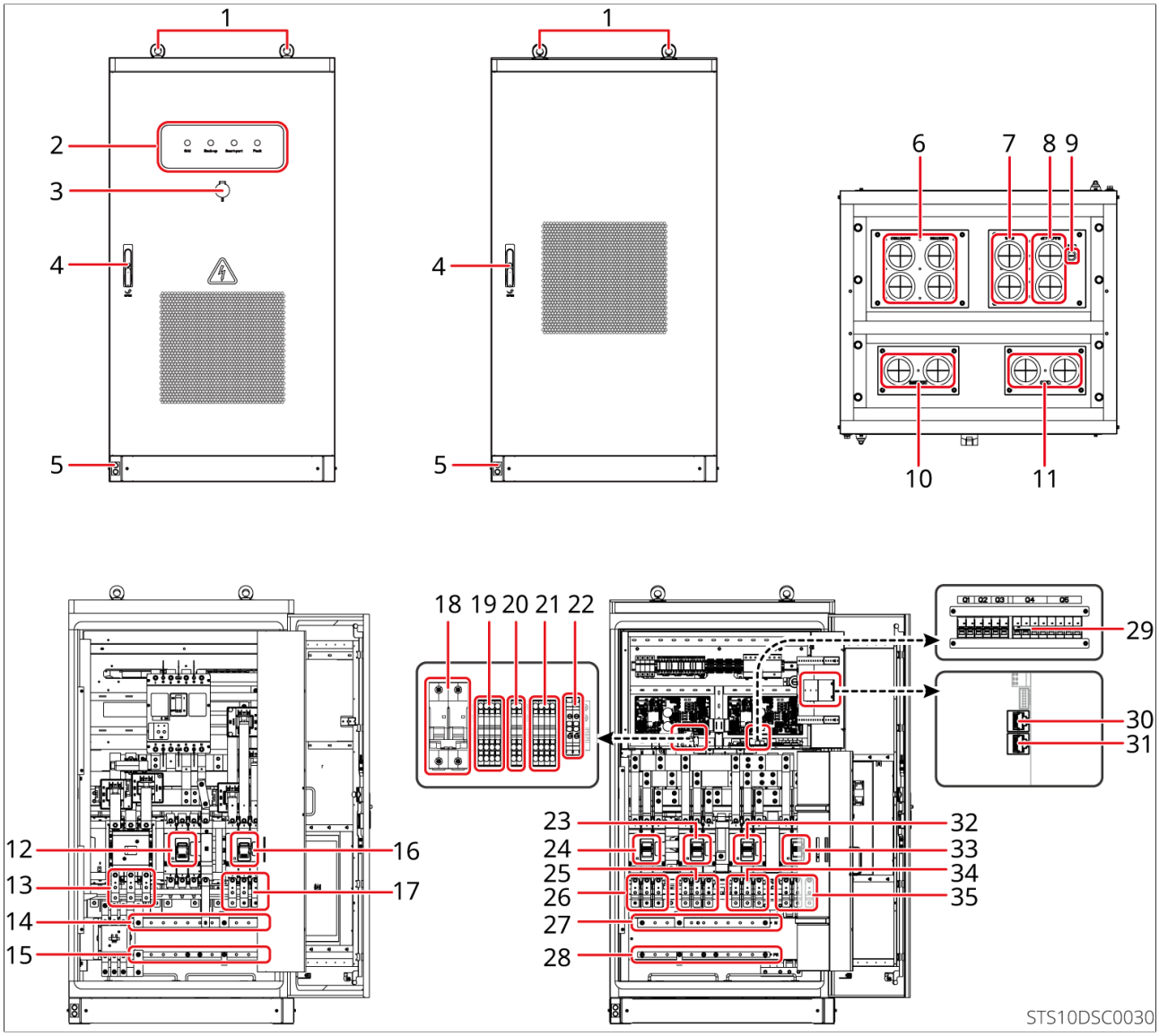


2.3 Supported grid for ms



2.4 Appearance & Dimensions

2.4.1 Appearance and Internal Components



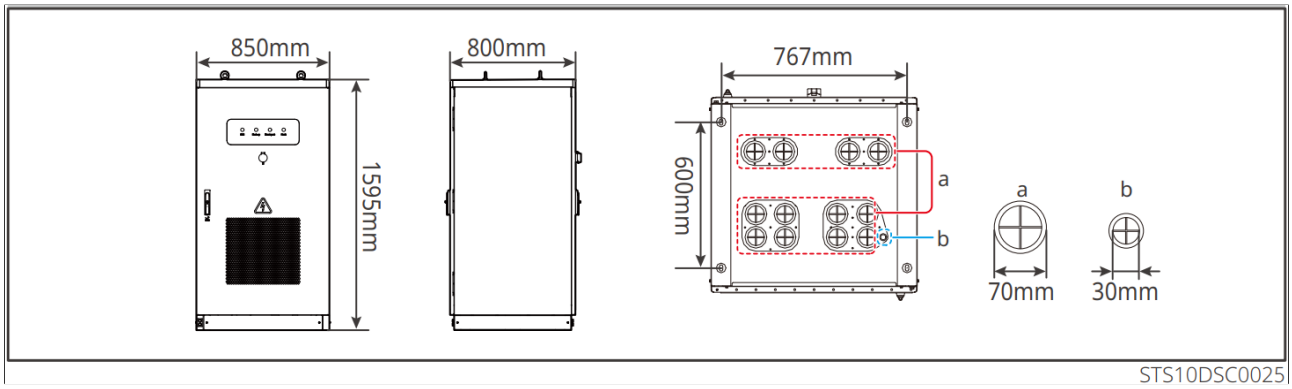
Serial Number	component	Description
1	lifting ring	For hoisting and handling
2	indicator light	Indicate STS operating status

Serial Number	component	Description
3	EPO button	In case of emergency, this button can be used to shut down the system.
4	door lock	Please use the key to open the cabinet door lock. When not operating inside the equipment, close and lock the cabinet door.
5	Protection grounding point	Used to connect protection earth wire
6	Inverter port	for connecting photovoltaic inverter
7	ESS port	Used for connecting energy storage systems
8	Back-up port	For connecting the load
9	COM port	For connecting communication lines
10	Smart port	Used for connecting diesel generator, PV inverter, and non-critical loads.
11	Grid port	for grid connection
12	Bypass switch	The bypass switch can control the direct connection of the load to the grid. • When the ESS/Inverter/Smart-port ports require maintenance, to ensure uninterrupted power supply to the load, the Bypass switch can be closed while all other switches are opened, allowing safe maintenance of the se ports. • In normal condition, the BYPASS switch must remain open and be locked by the customer with the ir own padlock; the padlock hole is 18 mm.

Serial Number	component	Description
13	Smart-port terminal block	Power line for connecting Diesel Generator/PV inverter/non-critical load
14	Neutral terminal block	Used for connecting the neutral line
15	PE terminal block	Used for connecting the PE conductor.
16	Grid Input Circuit Breaker	used to control grid input
17	Grid terminal block	Used for connecting grid-connected power lines
18	Q6 circuit breaker	SEC3000C power tap switch, used to control the power supply of SEC3000C.
19	Load Control	(Reserved) 2-channel DO port for load control
20	RS485 Diesel Generation Control controller communication	(Reserved) RS485 port for communication with diesel generator.
21	diesel generator start/stop control port	(Reserved) DO port for controlling diesel generator start/stop
22	Bypass DI wiring terminal	(Reserved) Bypass DI connection port
23	Energy Storage System Circuit Breaker	For controlling the input of the energy storage system
24	load input circuit breaker	For controlling load input
25	ESS port terminal block	Power cable for connecting energy storage system

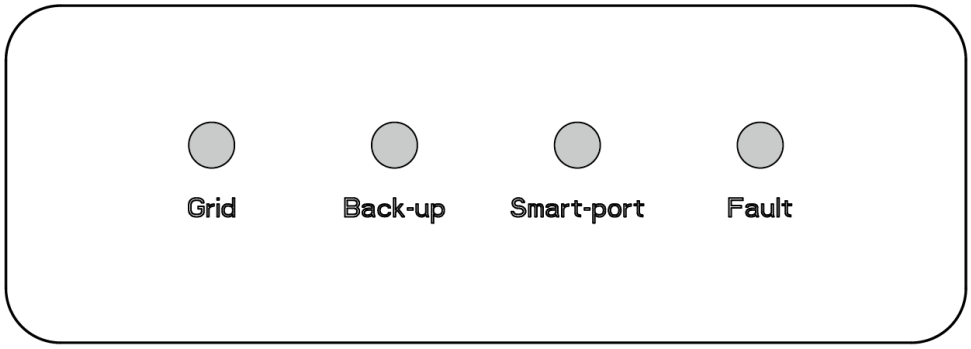
Serial Number	component	Description
26	Back-up port terminal block	power cable for connecting load
27	Neutral terminal block	Used for connecting the neutral line
28	PE terminal block	Used for connecting the PE conductor.
29	control switch	Q1, Q2, Q3: Auxiliary power distribution supply switch grid-side surge arrester switch Q5: Bus side surge protector switch
30	LAN port	Used for communication with SEC3000C.
31	PCS Ethernet port	for communication with energy storage system
32	PV inverter input circuit breaker	For controlling PV inverter input
33	Optional PV inverter input circuit breaker	For controlling PV inverter input
34	Inverter terminal block	Power cable for connecting PV inverters
35	Inverter terminal block	Power cable for connecting PV inverters

2.4.2 Product Dimensions



STS10DSC0025

2.4.3 Indicator Light Description

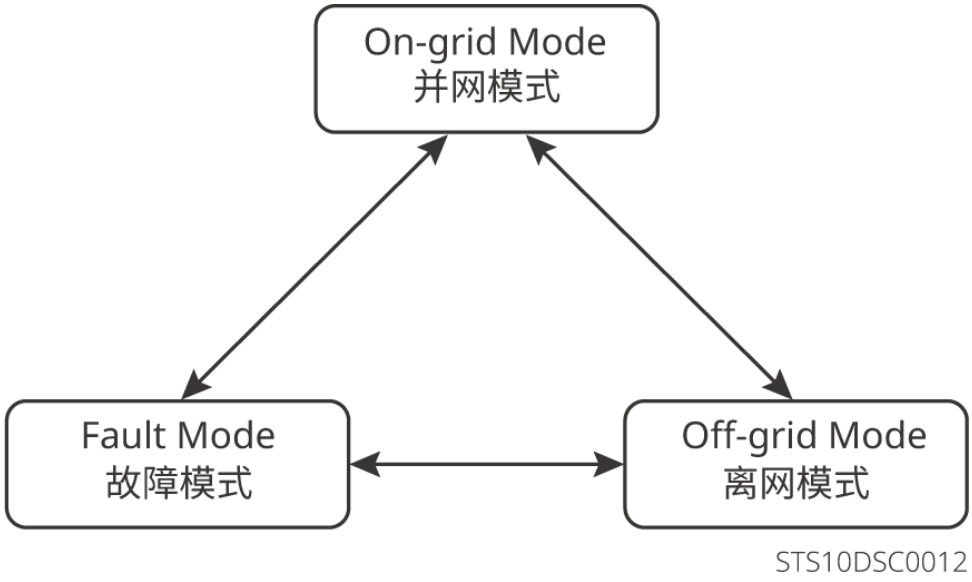


STS10DSC0016

indicator light	status	Description
Grid	▬▬	Steady on: Grid voltage normal and Jinggui switch closed.
	▬ ▬ ▬	Flicker: Grid voltage normal, Jinggui switch is not closed.
	———	Extinguish: No grid voltage
Back-up	▬▬	Changliang: Load circuit breaker closed.
	———	Extinguish: Load circuit breaker opens.

indicator light	status	Description
Smart-port	▬▬▬	Steady: Smart-port voltage normal and Smart-port contactor closed.
	▮▮▮▮▮▮▮▮	Blinking: Smart-port port voltage normal, Smart-port port contactor disconnected.
	———	Off: Smart-port port has no voltage
Fault	▮▮▮▮▮▮▮▮	Red light flashing and buzzer alarm: system failure.
	———	Off: No Fault

2.5 Operating Mode



Serial Number	mode	Description
1	grid connection	When the grid is normal, the STS transfer switch is closed, and the system is in grid-connected state.

Serial Number	mode	Description
2	off-grid	During a Grid Power Outage, the STS transfer switch opens, and the system is in off-grid state.
3	fault	The fault indicator light is red. Please handle it promptly.

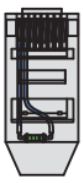
3 Equipment Inspection and Storage

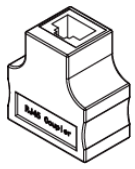
3.1 Equipment inspection

Before accepting the product, please thoroughly check the following items:

1. Check the outer packaging for damage, such as deformation, holes, cracks, or other signs that may cause damage to the equipment inside the packing case. If damaged, do not open the package and contact your dealer.
2. Check whether the STS model is correct. If not, do not open the packaging and contact your dealer.
3. Check whether the type and quantity of delivery items are correct, and whether the appearance is damaged. If damaged, please contact your dealer.

3.2 deliverable

component	Description	component	Description
	On/Off-grid Changeover Cabinet ×1		Expansion bolt ×4
	M8 hexagon head combination bolt ×80		Firestop putty × 36
	Tubular terminal ×12		Terminating resistor ×1

component	Description	component	Description
	Double-ended RJ45 connector ×4 Reserved for equipment maintenance use		Manual ×1

3.3 Equipment storage

If the equipment is not to be put into immediate operation, please store it according to the following requirements:

1. Ensure that the outer packaging box is not removed and the desiccant inside is not lost.
2. Ensure the storage environment is clean, with appropriate temperature and humidity range, and no condensation.
3. Ensure that the stacking height and orientation of the equipment comply with the label instructions on the packaging box.
4. Ensure no risk of tipping over after equipment stacking.
5. If the storage time of the equipment exceeds two years or the non-operation time after installation exceeds six months, it is recommended that inspection and testing be carried out by qualified personnel before commissioning.
6. To ensure good electrical performance of the electronic components inside the equipment, it is recommended to power on once every six months during storage. If the equipment has not been powered on for more than six months, it is recommended to under go inspection and testing by professionals before being put into use.

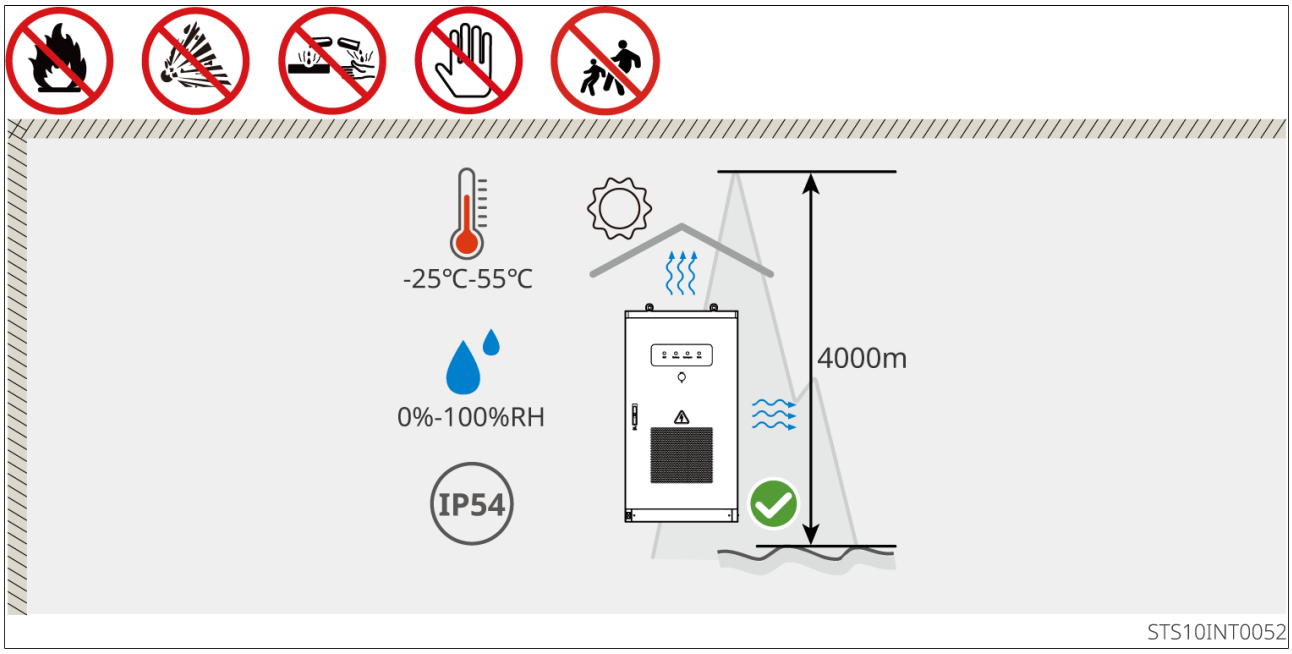
4 installation

4.1 Installation Requirements

Installation Environment Requirements

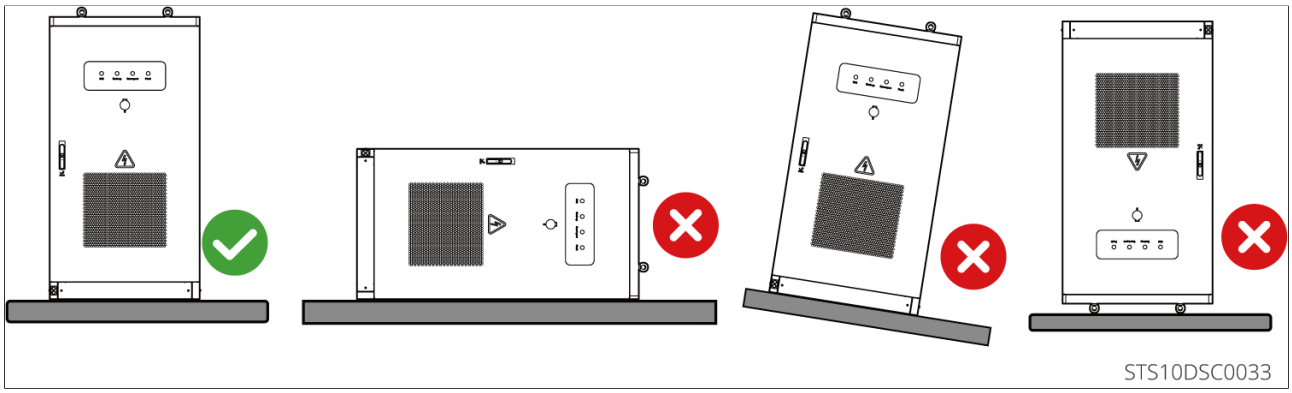
1. The equipment shall not be installed in flammable, explosive, corrosive, or other hazardous environments.
2. The installation space must meet the equipment's ventilation and heat dissipation requirements as well as the operating space requirements.
3. The equipment's Ingress Protection Rating meets outdoor installation requirements, and the temperature and humidity of the installation environment must be with in the suitable range.
4. Equipment should be installed away from sun exposure, rain, snow accumulation, etc. It is recommended to install in a shaded location. If necessary, a sunshade can be erected.
5. The installation location must be kept out of reach of children and avoid areas prone to accidental contact.
6. The installation height of the equipment shall facilitate operation and maintenance, ensuring that equipment indicators and all labels are easily visible, and wiring terminals are convenient to operate.
7. Equipment installation altitude must be below 4000m.
8. Equipment installed in salt-affected areas is subject to corrosion. Salt-affected areas refer to regions with in 500 meters of the coastline or areas influenced by sea breeze. The extent of sea breeze influence varies depending on meteorological conditions (e. g., typhoons, seasonal winds) or topography (e. g., embankments, hills).
9. If the equipment is installed in public areas outside work and living zones (such as parking lots, stations, factories, etc.), install a protective mesh on the exterior of the equipment and erect safety warning signs for isolation, prohibiting unauthorized personnel from approaching. This is to prevent personal injury or property damage caused by accidental contact or other reasons by non-professionals during equipment operation.
10. Keep away from strong magnetic field environments to avoid electromagnetic interference. If the re are radio stations or wireless communication equipment operating below 30MHz near the installation location, install the equipment according to the following requirements:

- Add a ferrite core with multi-turn winding at the AC line of the equipment, or add a low-pass EMI filter.
- The distance between the equipment and the wireless electromagnetic interference equipment exceeds 30 m.



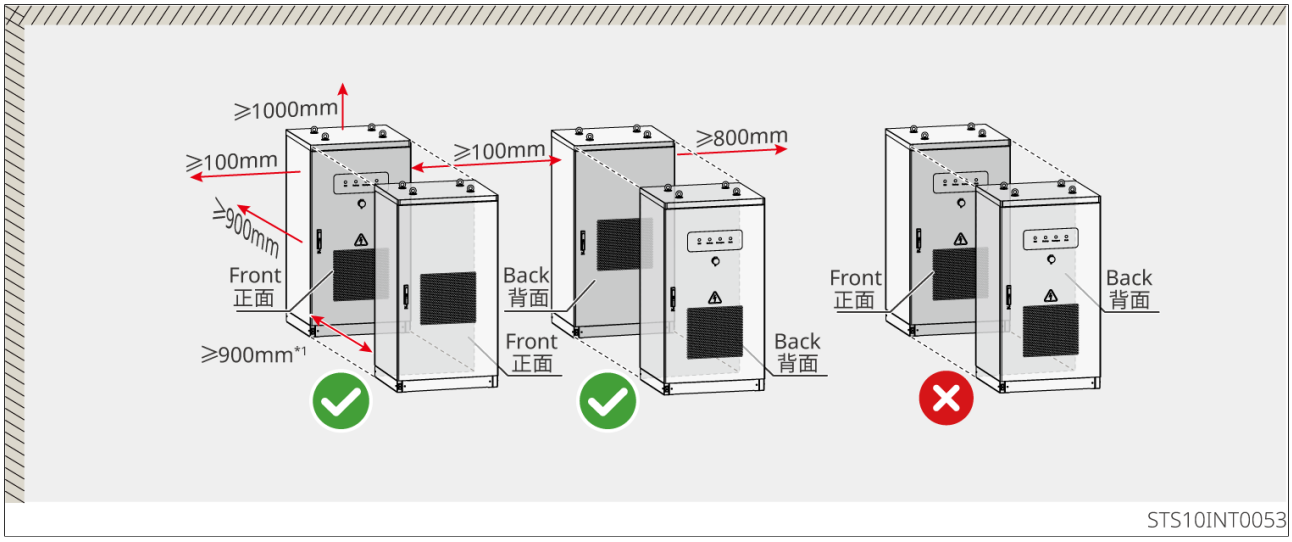
Installation Angle Requirements

The equipment must be installed vertically and steadily on the foundation to ensure equipment stability and normal heat dissipation.
It is for bidden to tilt, lay on side, or invert the equipment, as the se may cause equipment damage, unstable operation, or safety hazards.



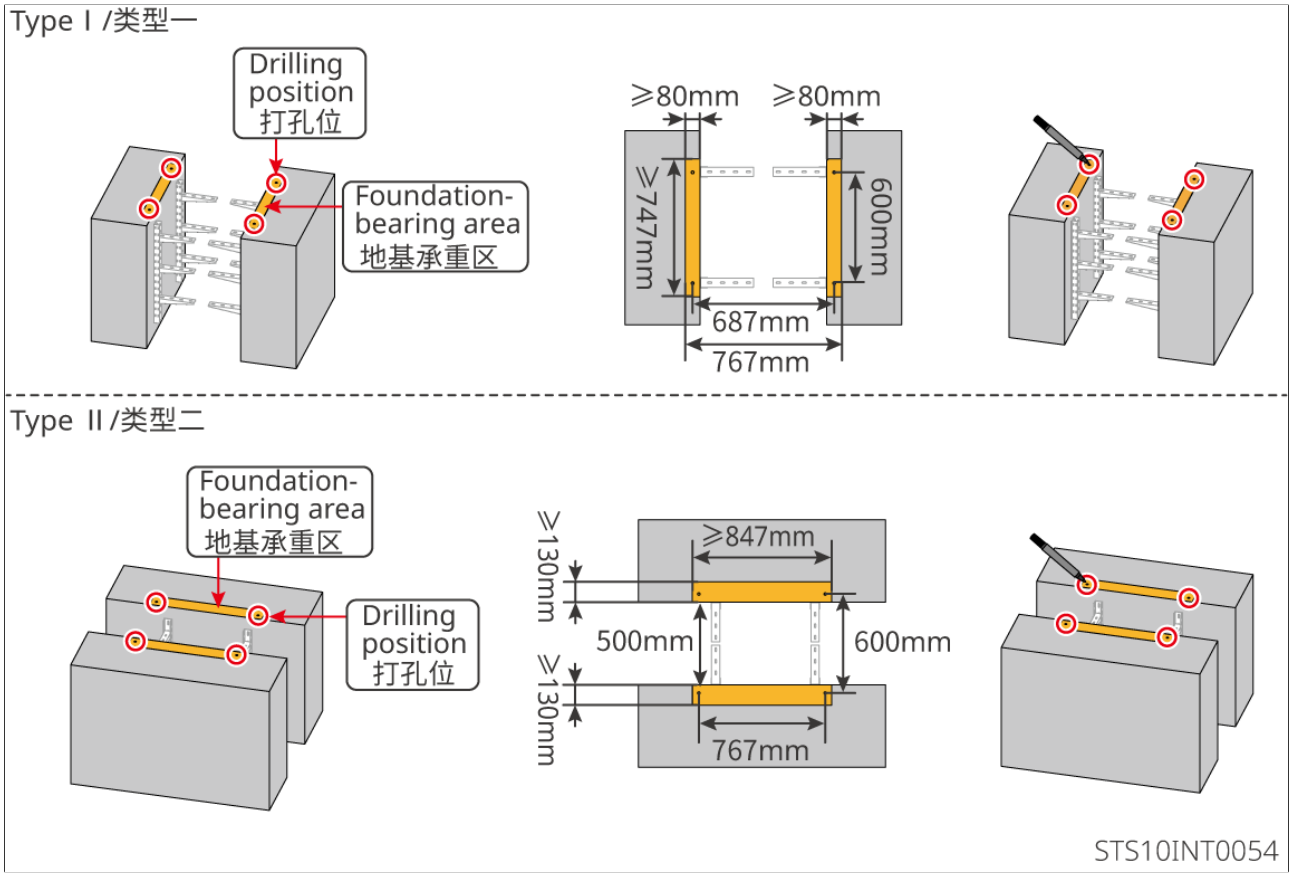
Installation space requirements

Note
When using a for klift, the front-to-rear distance between equipment must be at least 2.5m.



Foundation requirements for installation

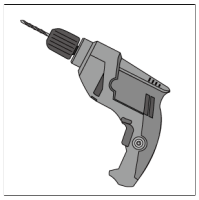
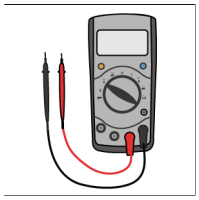
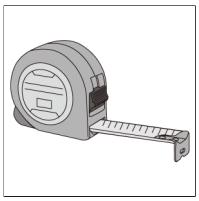
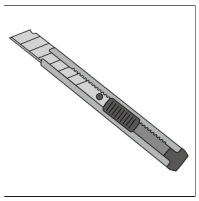
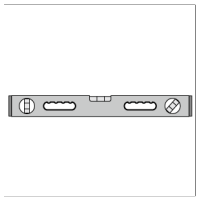
- The equipment installation foundation shall be constructed with C35 concrete or other concrete of equivalent performance.
- Before installation, ensure the base is level, firm, flat, dry, and has sufficient load-bearing capacity. No depressions or tilts are allowed.
- The base needs to have pre-embedded conduits or reserved outlet holes to facilitate cable routing for the equipment.
- The equipment uses bottom entry wiring, and the foundation must have dust-proof and rodent-proof design to prevent for eign objects from entering.
- The foundation must incorporate anti-water accumulation and damp-proof design to prevent cable aging and short circuit, which could affect the normal operation of equipment.
- Due to the relatively large diameter of the equipment cables, the embedded conduit/reserved cable outlet must be designed with sufficient space for cable routing to ensure smooth connection and prevent abrasion.

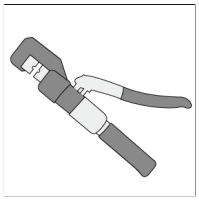
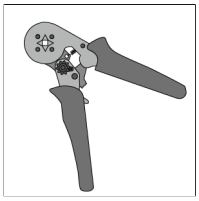
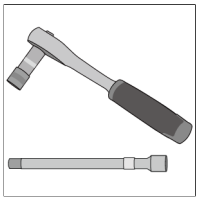
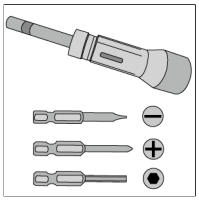
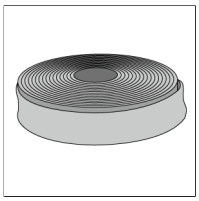
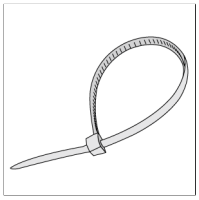
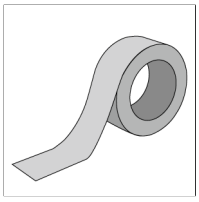


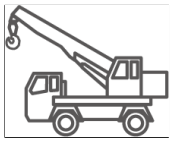
4.2 Tool requirements

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

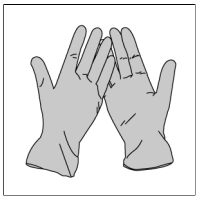
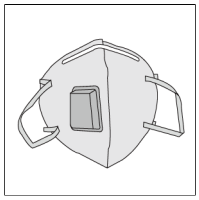
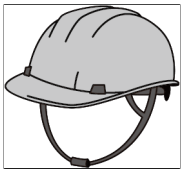
Installation tool

Tool type	Description	Tool type	Description
	Hammer drill (drill bit 16mm)		multimeter
	tape measure		Utility knife
	rubber mallet		level
	marker		Diagonal cutting pliers
	wire stripper		RJ45 connector crimping tool

Tool type	Description	Tool type	Description
	Hydraulic crimping tool		Tubular terminal crimping pliers
	Socket Wrench Set		to rque screwdriver
	heat gun		heat shrink sleeve
	vacuum cleaner		cable tie
	open-end wrench		insulation tape

Tool type	Description	Tool type	Description
	for klift		crane

Personal Protective Equipment (PPE)

Tool type	Description	Tool type	Description
	insulating gloves, protective gloves		Dust mask
	Safety goggles		safety shoes
	protective clothing		safety helmet

4.3 Handling requirements

⚠Caution

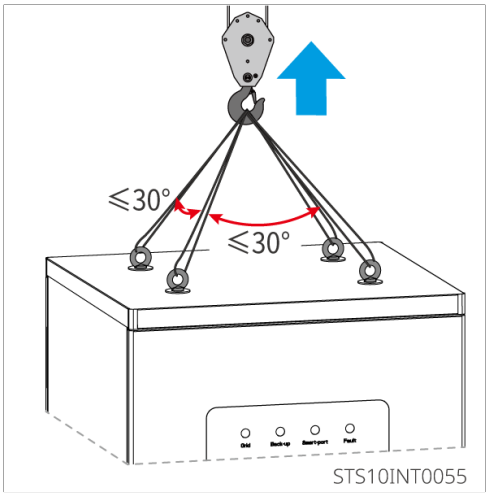
1. Equipment must comply with the laws, regulations, and relevant standards of the country or region where it is located during transportation, handling, installation, and other operations.
2. To Protection the equipment from damage during transportation, please ensure that the transportation personnel are professionally trained. Record the operation steps during transportation, and keep the equipment balanced to avoid dropping.
3. Before installation, the energy storage system must be transported to the installation site. During handling, to avoid personal injury or equipment damage, please note the following:

- Please allocate personnel and tools according to the equipment Weight, to prevent the equipment from exceeding the weight range that a person can carry and causing injury.
- Please ensure the equipment remains balanced during handling to avoid falling.
- During equipment handling, ensure the cabinet doors are locked.

Note

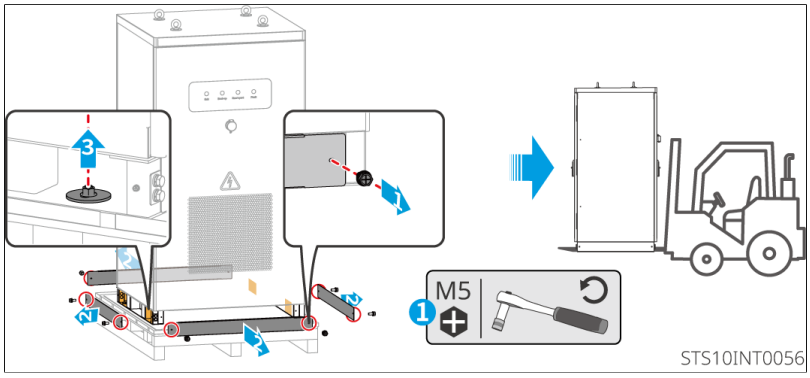
- Equipment can be transported to the installation site by hoisting or for klift.
- When using lifting methods to handle equipment, please select flexible slings or straps, and the load capacity of a single strap needs to be ≥5t.
- When using a for klift to move equipment, the for klift's load capacity must be ≥5t.
- The door panel surface finish is a vulnerable part during installation and transport. Please handle with care.

- **hoisting and handling**



1. Use slings with hooks or U-hooks for lifting operations of equipment.
2. Use lifting equipment to lift and transport the equipment.

- **Forklift Handling**



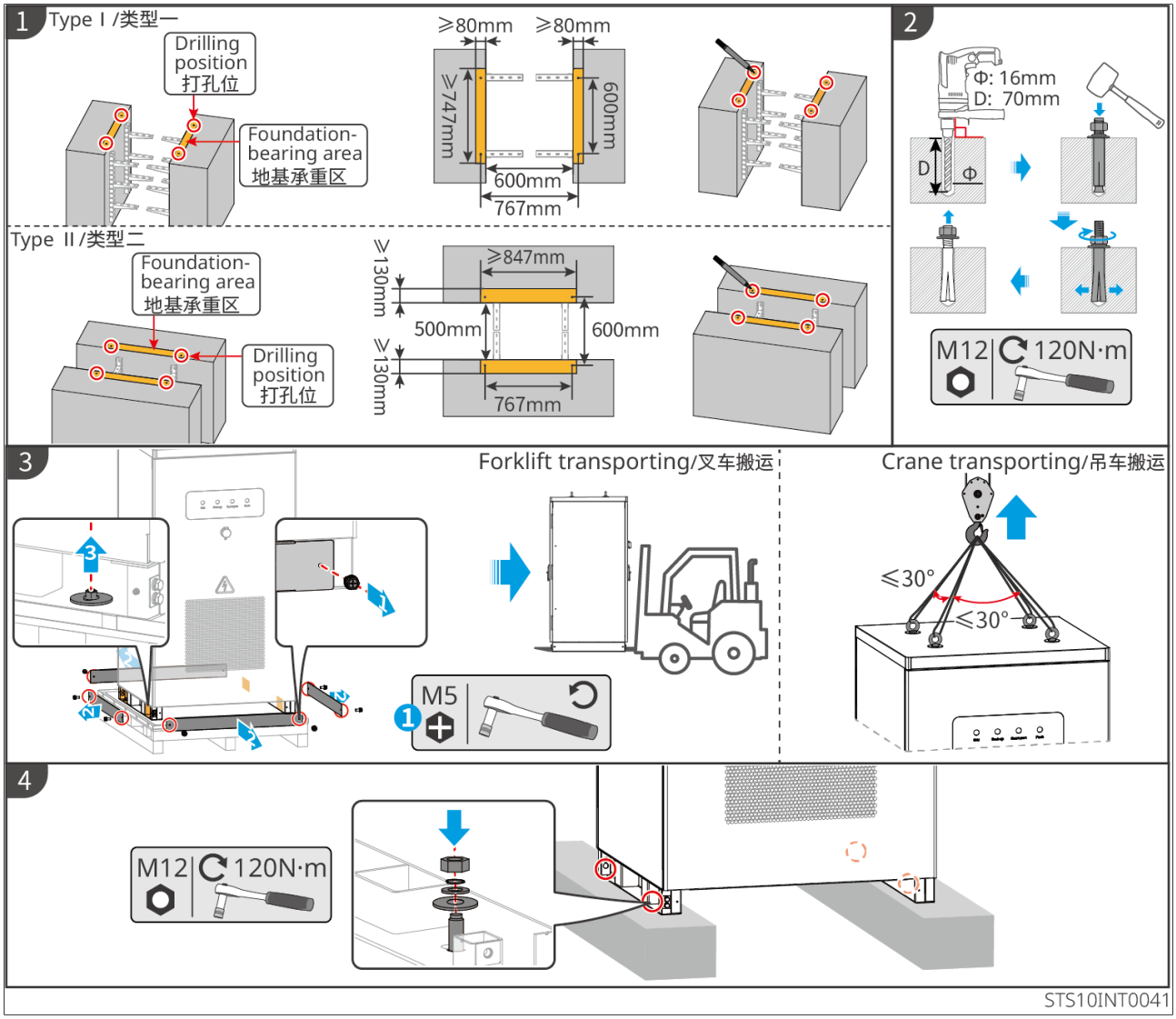
1. Remove the front and rear panels of the equipment.
2. Use a for klift to handle the equipment, ensuring the equipment's center of gravity is positioned at the center of the for klift's for ks.

4.4 Install On/Off-grid switching cabinet

1. Use a marker pen to mark the drilling positions on the foundation.
2. Use a hammer drill to drill holes in the ground and install expansion bolts.

3. Move the cabinet onto the foundation and remove the side panels.

4. Secure the cabinet to the foundation.



5 electrical connection

⚠Danger

- All operations, cables, and component specifications used during the electrical connection process must comply with local laws and regulations.
- Before making electrical cable connections, ensure that all upstream switches of the equipment are disconnected.
- Before making any electrical connections, disconnect all switches of the equipment and ensure it is de-energized. Live operation is strictly prohibited, otherwise risks such as electric shock may occur.
- Cables of the same type should be bundled together and routed separately from cables of different types. Intertwining or crossing between the m is prohibited.
- If the cable is subjected to excessive tension for ce, it may cause poor connection. When wiring, please leave some slack in the cable before connecting it to the device connection terminal.
- When crimping the terminal, ensure that the conductor part of the cable is in full contact with the terminal. Do not crimp the cable insulation together with the terminal. Failure to do so may result in the equipment not functioning, or may cause heat generation due to unreliable connections during operation, leading to damage to the equipment's terminal block or other components.
- The use of cables in high-temperature environments may cause insulation aging and damage. The distance between cables and heating components or the periphery of heat source areas shall be at least 30 mm.

Note

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

5.1 Pre-wiring preparation

Cable Preparation

No.	cable	Type	Recommended Specifications	Description
1	Protection ground wire	Hot-dip galvanized flat steel	Shall comply with the local earthing design code for AC electrical installations.	User-Provided
2	power line	Outdoor 5-core copper/aluminum wire	For the power cables and terminal specifications adapted to each port, please refer to the Connecting Power Cables section.	User-Provided
3	DI signal line	Outdoor twisted pair cable with copper core compliant with local standards	Conductor cross-sectional area: 0.32~0.5mm²	User-Provided
4	LAN communication cable	Standard shielded network cable with RJ45 connectors, CAT 5E or higher		User-Provided
Note: The cable specifications recommended in the table are for reference only. When selecting the actual cable, the user needs to comprehensively consider the influence of factors such as installation ambient temperature, laying method, number of parallel cables, voltage deviation, and the rmal stability, and correct the current-carrying capacity through corresponding correction coefficients. The selected cable must meet the following requirements: cable current-carrying capacity ≥ Rated Current of over current Protection device ≥ maximum Rated Current.				

Circuit breaker ready

Smart-port port recommended external over current Protection device	Recommended Specifications	Acquisition method
AC circuit breaker	Rated Current: 1000A	captive

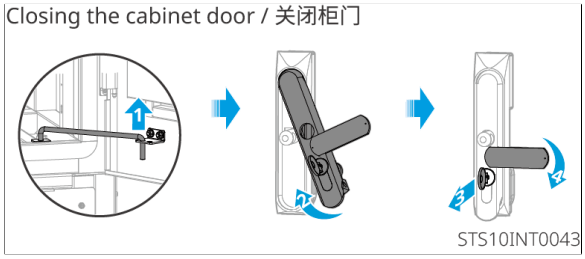
UPS Preparation (Optional)

Brand		Schneider
Model		SPM1K
Input/Output	Nominal Input Voltage	220 V
	Input Voltage Range	110~300 VAC
	Input Current Protection	10A Protection
	output voltage	220 V (default)/230 V/240 V
	maximum output power	800 W
	Output Efficiency	88%
	output terminal	GB socket ×3
Battery	battery capacity	9 Ah*2
	Battery Voltage	24 V
	Charging Time	Charge to 90% in 4 hours
Other	operating temperature	0~+40℃
	Storage Temperature	-15~+60℃

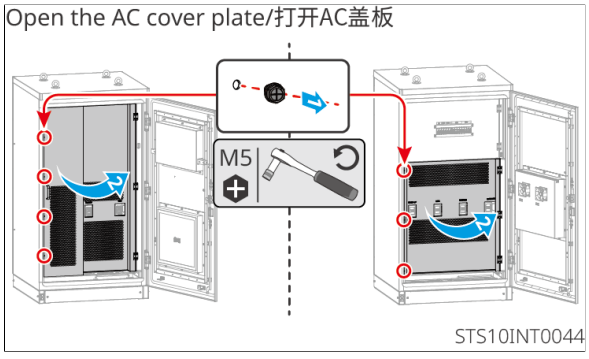
	altitude	1 km (output capacity decreases by 1% per 100 m elevation increase)
	dimension	145*288*223 mm
	Net weight	9.3 kg

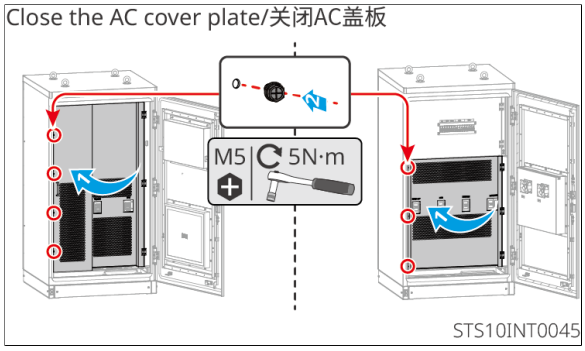
Cabinet door and cover plate operation

- **Cabinet Door**

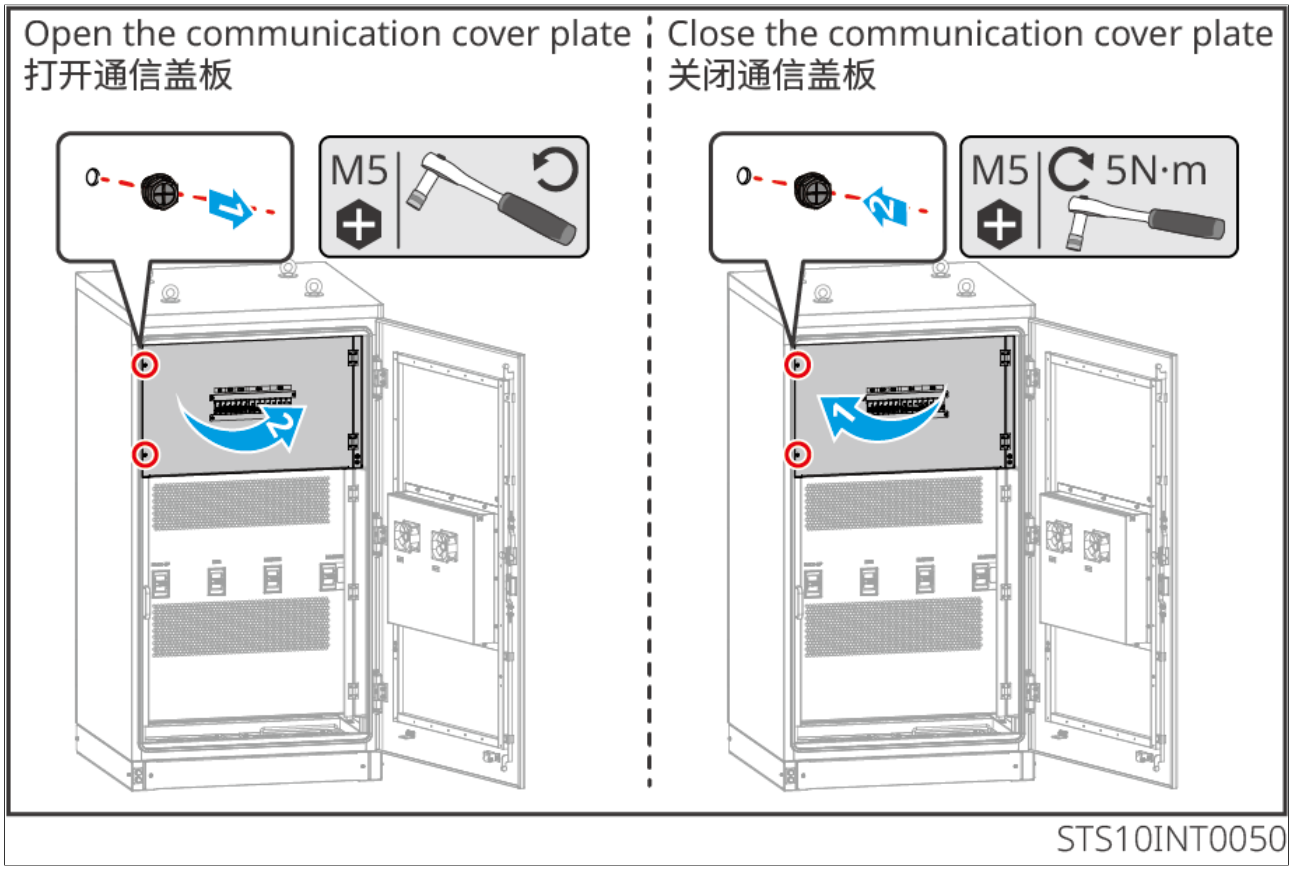


- **AC Cover**

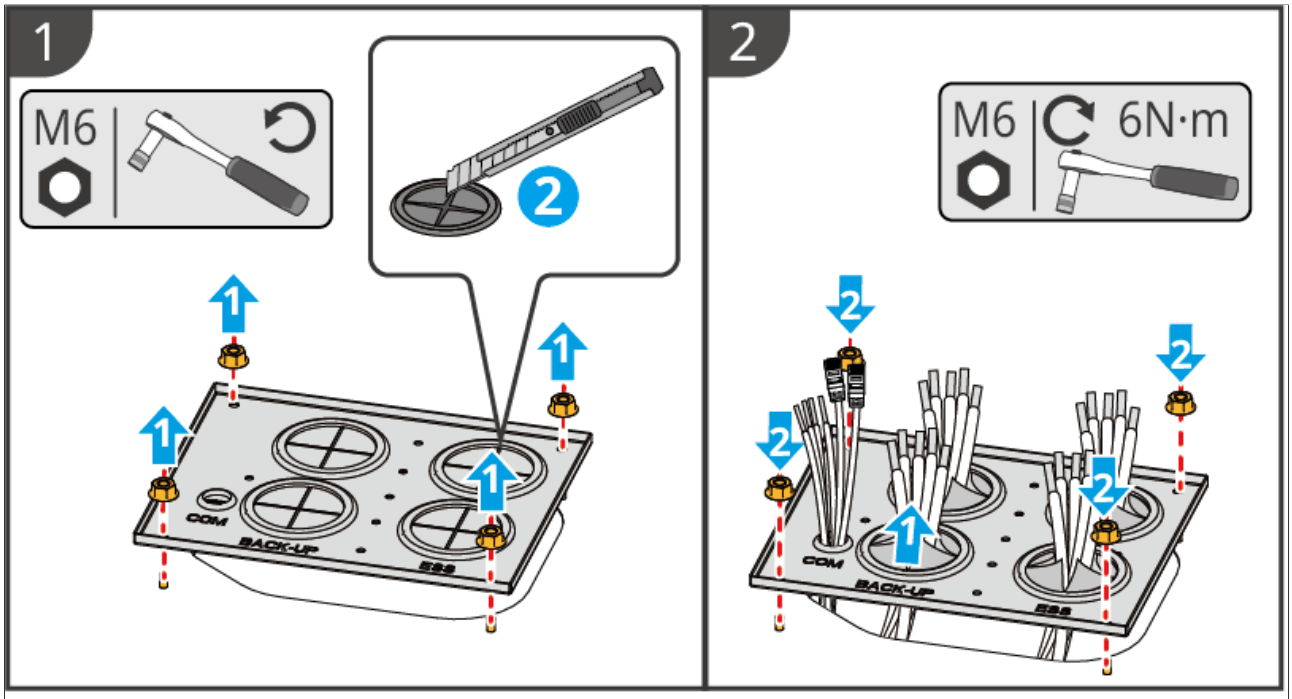




- **Communication Cover**



Operation of connection terminal and cable guard

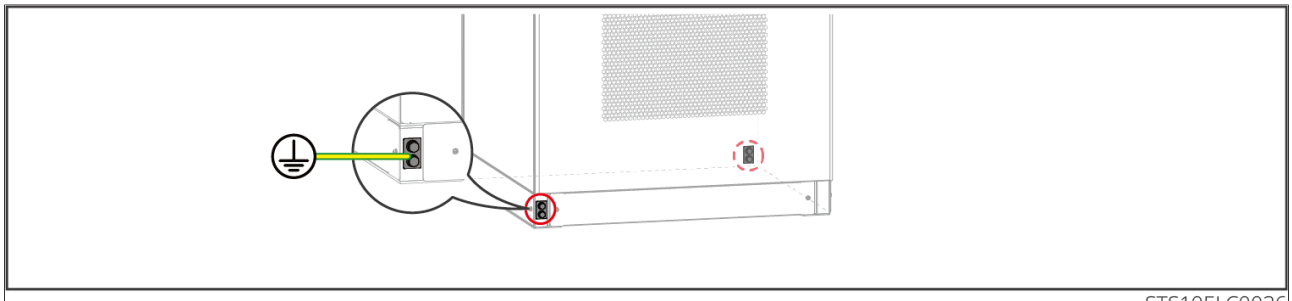


STS10ELC0038

5.2 Connect the Protection earth wire

Warning

- Before operating the equipment, ensure that the system is reliably grounded and appropriate protective measures are taken. Otherwise, the re may be a risk of electric shock.
- To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint on the exterior of the grounding terminal after completing the ground connection for protection.

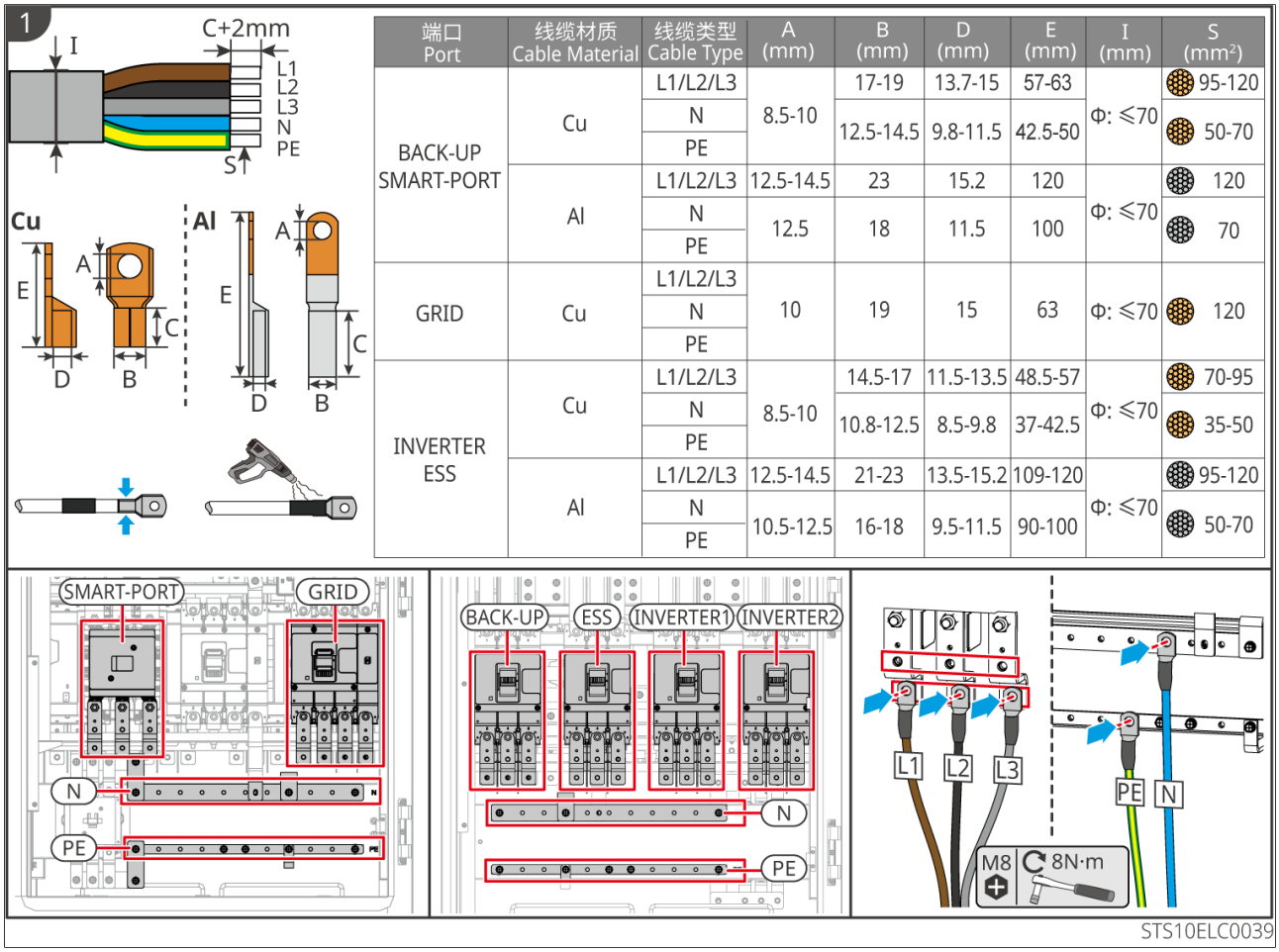

STS10ELC0036

5.3 Connect the power cable

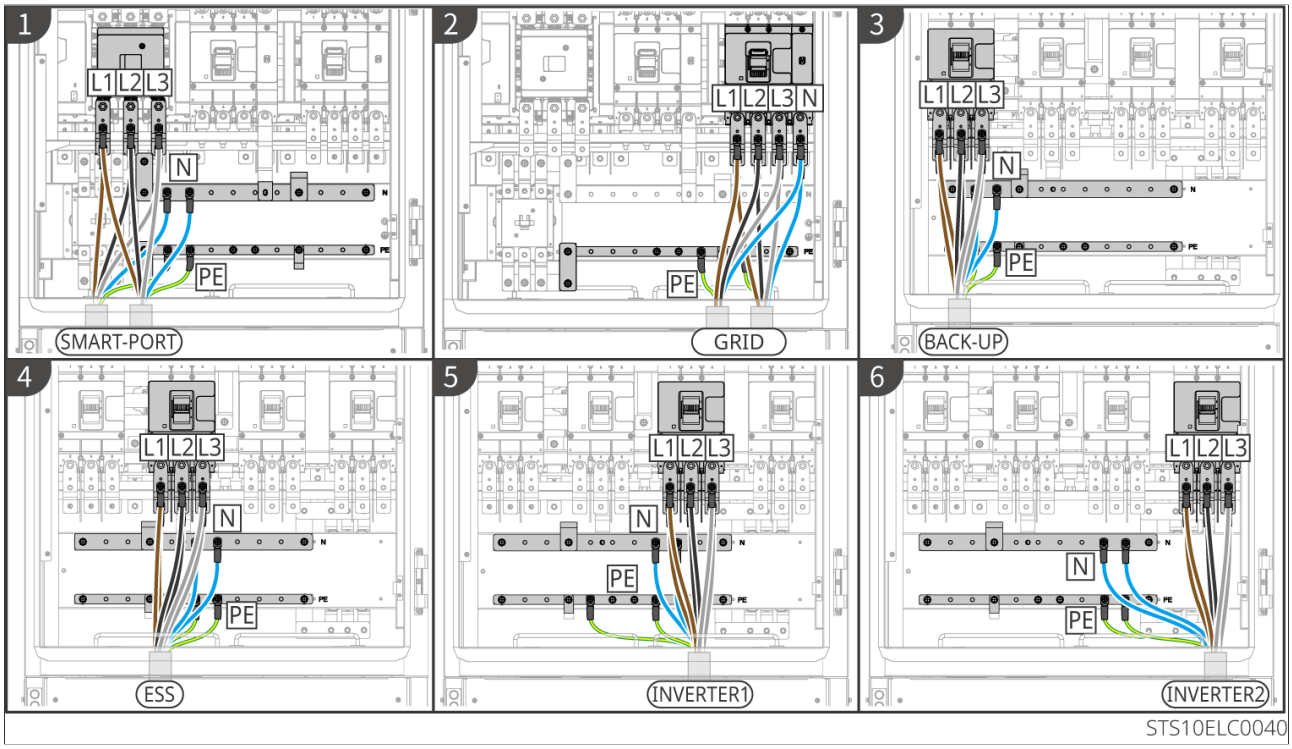
Smart-port & Back-up & Grid & ESS & Inverter

Note
The STS terminal bar is a copper busbar. If aluminum wires are used, please prepare copper-aluminum transition terminals.

1. Prepare cables and terminals, and perform crimping.
2. Use screws to secure the crimped cables to the corresponding copper busbars.



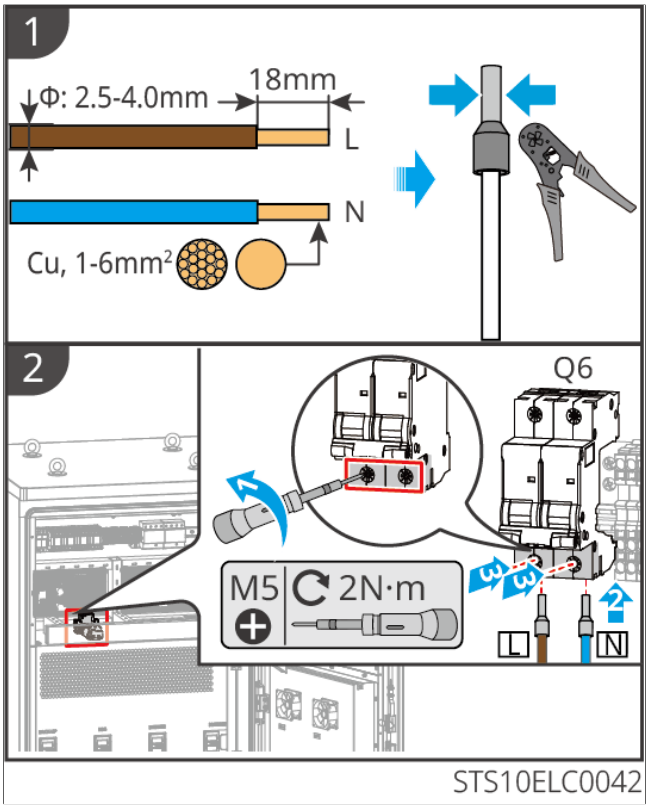
端口 Port	线缆材质 Cable Material	线缆类型 Cable Type	A (mm)	B (mm)	D (mm)	E (mm)	I (mm)	S (mm²)
BACK-UP SMART-PORT	Cu	L1/L2/L3	8.5-10	17-19	13.7-15	57-63	Φ: ⩽70	95-120
		N		12.5-14.5	9.8-11.5	42.5-50		50-70
		PE						
	Al	L1/L2/L3	12.5-14.5	23	15.2	120		120
		N	12.5	18	11.5	100		70
		PE						
GRID	Cu	L1/L2/L3	10	19	15	63	Φ: ⩽70	120
		N						
		PE						
INVERTER ESS	Cu	L1/L2/L3	8.5-10	14.5-17	11.5-13.5	48.5-57	Φ: ⩽70	70-95
		N		10.8-12.5	8.5-9.8	37-42.5		35-50
		PE						
	Al	L1/L2/L3	12.5-14.5	21-23	13.5-15.2	109-120		95-120
		N	10.5-12.5	16-18	9.5-11.5	90-100		50-70
		PE						



Q6 (Connect the SEC3000C power cable)

Note
It is recommended to install a UPS between the Q6 power supply port and the SEC3000C to ensure the stable operation of the SEC3000C. Please refer to Preparation Before Wiring for the recommended UPS model.

1. Prepare single-phase AC cables and terminals. For detailed requirements, please refer to SEC3000C User Manual.
2. crimping terminal.
3. Loosen the screws at the bottom of the Q6 circuit breaker, insert the terminals, and the n tighten the m.

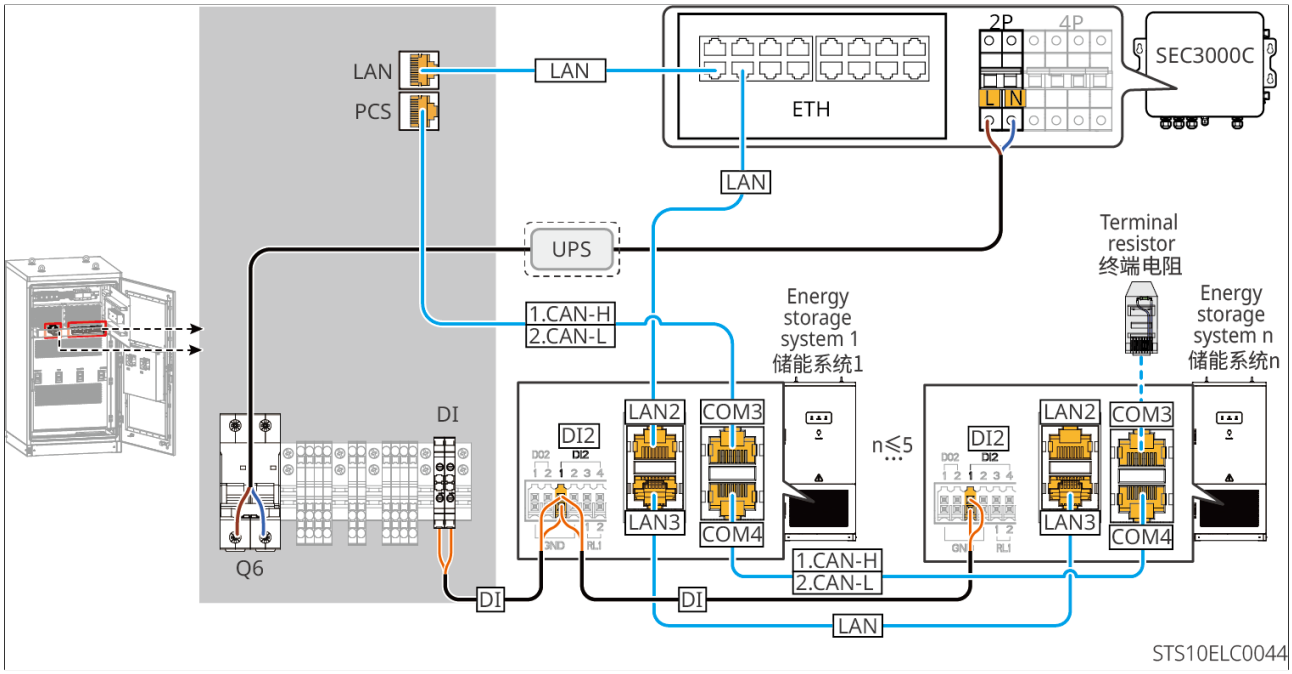


5.4 Connect communication cable

Note

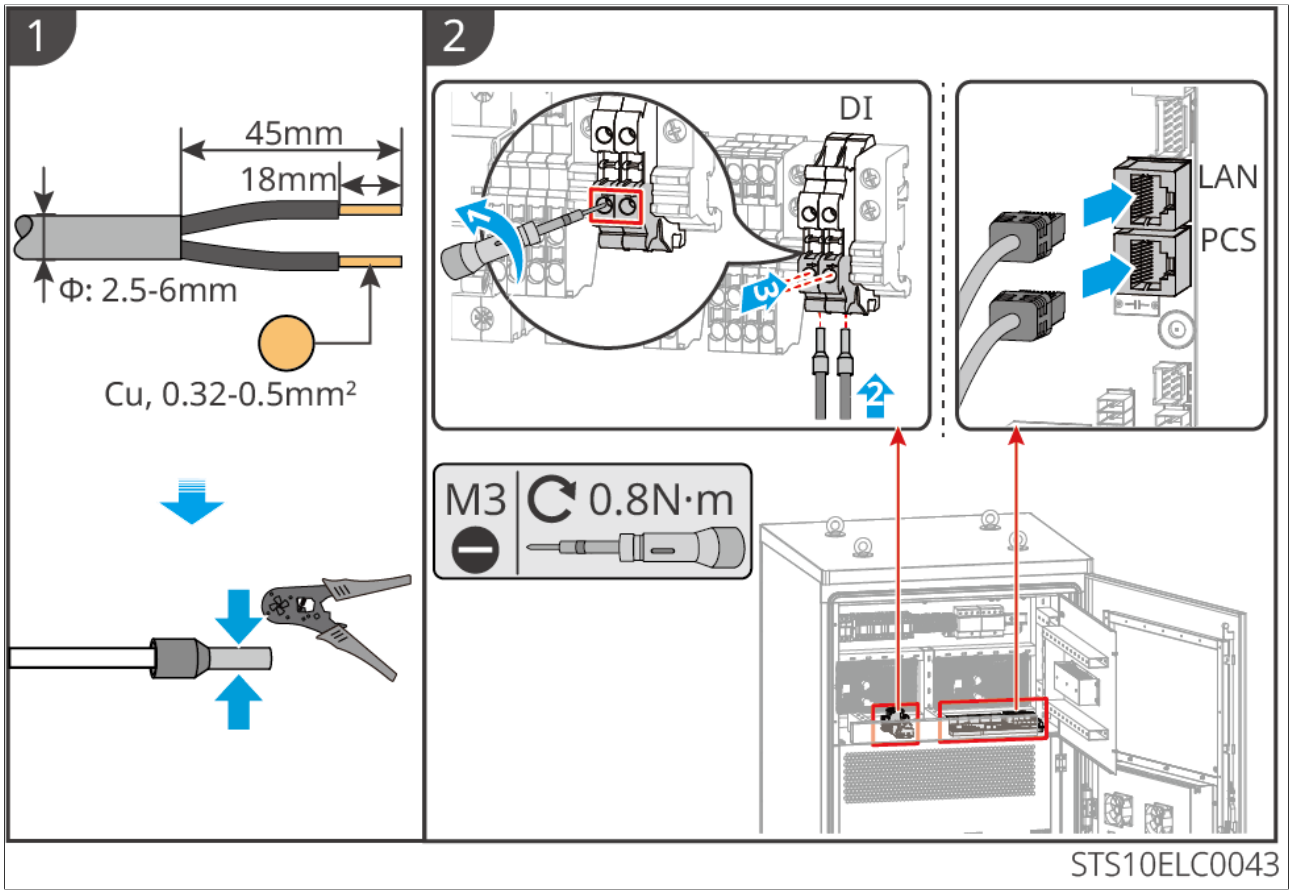
- Before connecting the communication line, please open the communication cover plate first.
- The communication cable between the STS and its nearest energy storage system shall not exceed 45m in length, and the communication cable between two adjacent energy storage systems shall not exceed 5m in length.
- When multiple energy storage systems are paralleled, please insert a terminating resistor into the COM port of the last energy storage system.
- When multiple energy storage systems are operated in parallel, if one of the m fails and requires complete power-off for maintenance, unplug the network cables connected to the COM3 and COM4 ports of that system, and use a dual-head RJ45 connector to short-circuit the se two network cables. If the last energy storage system fails, unplug the network cable from its COM port and the network cable from the COM port of the previous system, the n remove the termination resistor from the faulty system and plug it into the COM port of the previous system.
- It is recommended to install a UPS between the STS and the SEC3000C. With the UPS installed, the system can achieve remote black start; with out the UPS, remote black start cannot be achieved.

Wiring Over view



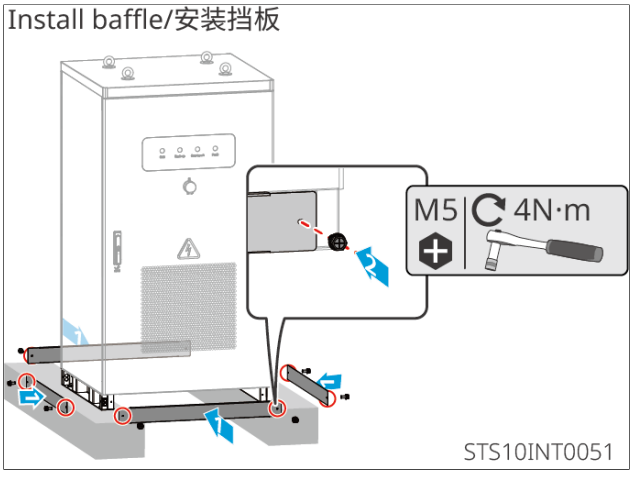
Operating steps

1. Prepare communication cables and crimp terminals.
2. Please pass the communication cable through the bottom COM port and connect it to the corresponding communication port.

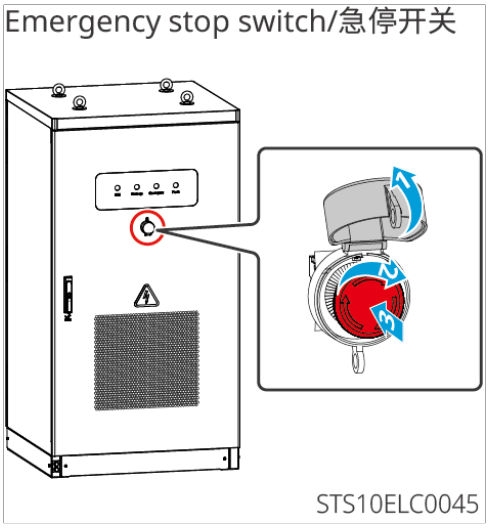


5.5 Post-wiring operation

1. Install baffle.



2. Release the EPO switch.


Emergency stop switch/急停开关
1
2
3
STS10ELC0045

6 equipment commissioning

6.1 Pre-energization check

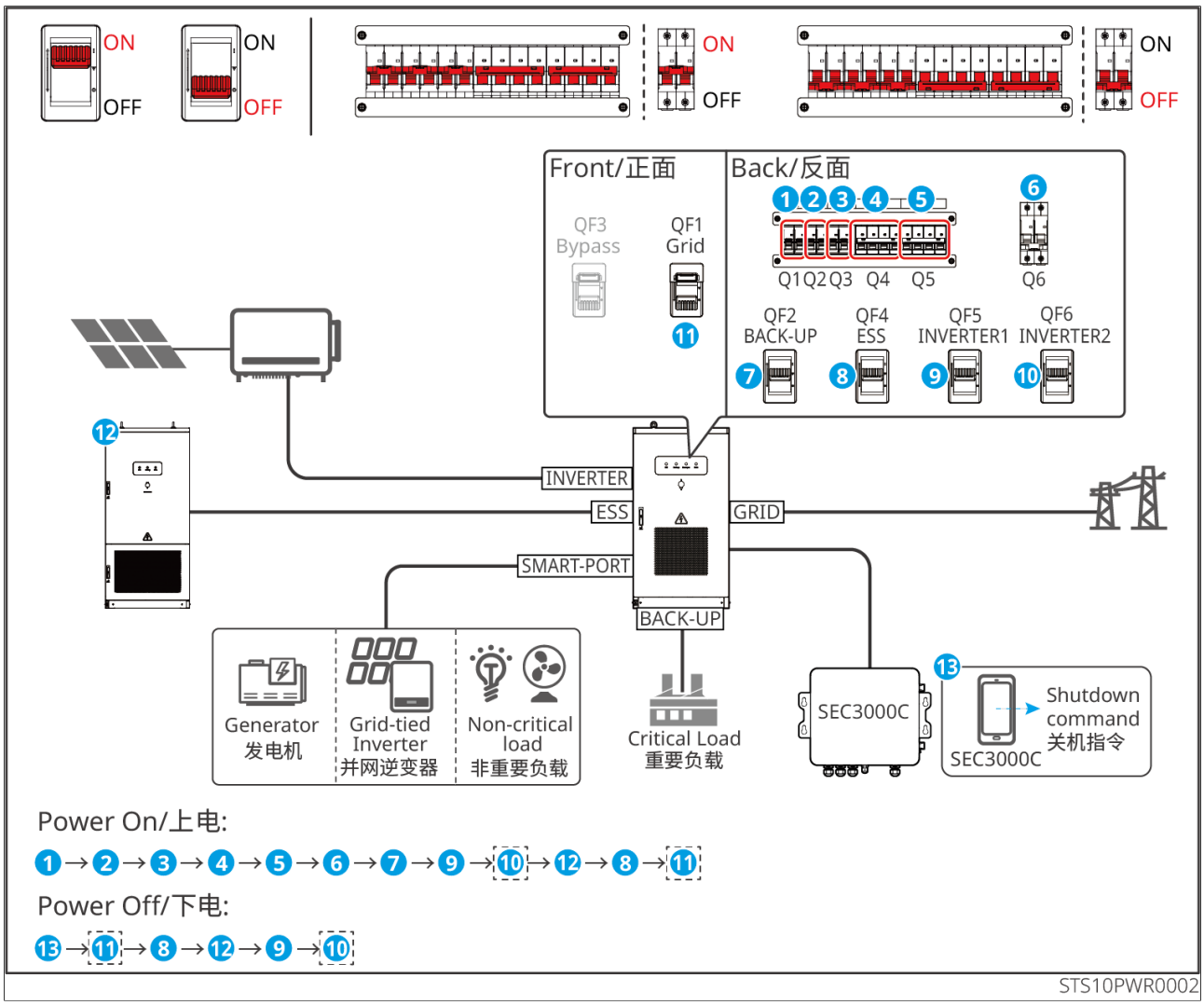
Serial Number	Inspection Item
1	The equipment is installed firmly, with the installation position convenient for operation and maintenance, the installation space conducive to ventilation and heat dissipation, and the installation environment clean and tidy.
2	Protection earth wire, power line, and communication line are connected correctly and firmly.
3	Cable binding meets routing requirements, with reasonable distribution and no damage.
4	Unused cable entry holes and ports must be securely connected using the terminals provided with the accessory and have been properly sealed.
5	Ensure that the used cable entries are sealed.
6	The voltage and frequency at the grid connection point of the equipment meet the grid connection requirements.

6.2 Power on the equipment

Note
Please open the cover plate before powering on.

1. Close Q1 switch (GRID single-phase power supply circuit breaker).
2. Close the Q2 switch (BUS single-phase power take-off circuit breaker).
3. Close the Q3 switch (Smart-port single-phase power takeoff circuit breaker).
4. Close Q4 switch (grid-connected lightning arrester circuit breaker).
5. Close the Q5 switch (off-grid lightning arrester MCB).

6. Close the Q6 switch (SEC3000C power supply switch).
7. Close the QF2 switch (load switch).
8. Close the QF5 switch (PV inverter switch).
9. (Optional) Close the QF6 switch (PV inverter switch).
   QF6 switch is optional; if the equipment does not actually have this switch, skip this step.
10. Energy storage system power up.
11. Close the QF4 switch (energy storage system switch).
12. (Optional) Close QF1 switch (main incoming switch).
    If the GRID port is Not Connected to the grid, skip this step.



7 Equipment commissioning via SEC3000C embedded web

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 equipment in the PV power generation system, such as grid-tied inverters, energy storage inverters, and meters, store logs, and send the data to the monitoring and management platform, enabling centralized monitoring, operation, and maintenance of the PV system.
For detailed functions, 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 the common functions of SEMS+:

- Manage organization or user information, etc.
- Add, monitor power station information, etc.
- Equipment Maintenance

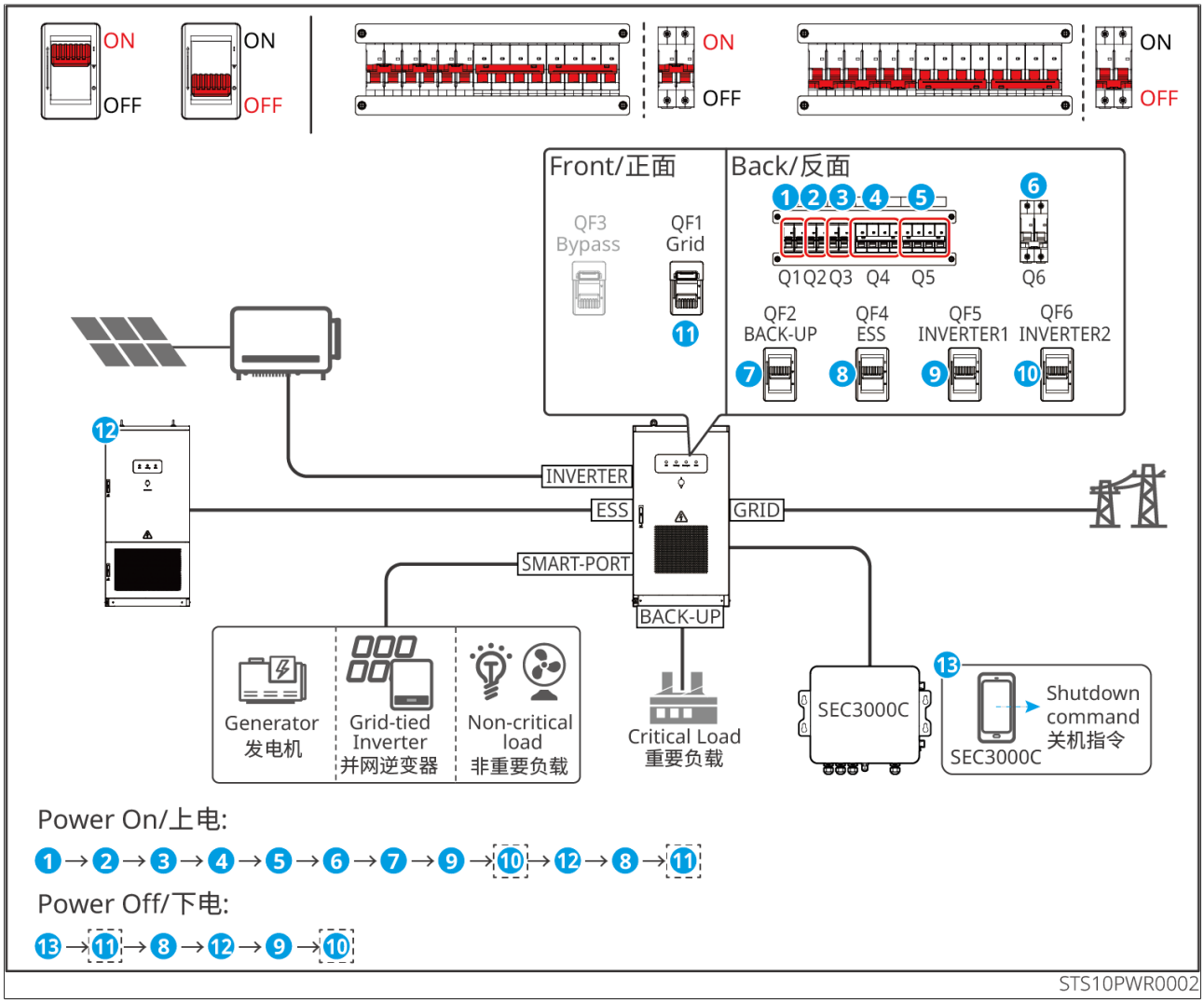
For detailed functions, please refer to 《SEMS+ User Manual》。

9 system maintenance

9.1 Equipment power-off

Note
After power down, please close the cover plate.

1. Send shutdown command to the system via SEC3000C WEB interface.
2. (Optional) Disconnect QF1 circuit breaker (main incoming circuit breaker).
   If the GRID port is Not Connected to the grid, skip this step.
3. Open QF2 switch (load switch).
4. Disconnect the QF4 switch (energy storage system switch).
5. Energy storage system power down.
6. Disconnect QF5 switch (photovoltaic inverter switch).
7. (Optional) Disconnect the QF6 switch (PV inverter switch).
   QF6 switch is optional; if the equipment does not actually have this switch, skip this step.



9.2 Fault Handling

Please perform fault troubleshooting according to the following methods. If the troubleshooting methods fail to assist you, please contact the after-sales service center.

When contacting the after-sales service center, please collect the following information for quick problem resolution.

1. Equipment information, such as: serial number, software version, equipment installation time, fault occurrence time, fault occurrence frequency, etc.
2. Equipment installation environment, such as weather conditions, installation location, etc. For the installation environment recommendations, photos, videos,

and other files can be provided to assist in problem analysis.
3. Grid conditions.

Fault Type	Fault indication	Fault Handling
MC control board fault	NTC Abnormal (Ambient Temperature)	Please contact the distributor/GoodWe after-sales service center.
	Internal Fan Abnormal	Please contact the distributor/GoodWe after-sales service center.
	DSP Communication Failure	1、Power off and check whether the RJ45 port for PCS communication controlled by MC and the COM port RJ45 of the 261 integrated cabinet LC are connected or abnormal 2、Troubleshoot the abnormality and re-power on. If the fault persists, please contact the dealer/GoodWe after-sales service center.
	Contactor Communication Failure	1、下电后检查MC控制的CN20控制口和京硅开关的凤凰端子是否接上或存在异常 2、排除异常重新上电后若故障依然存在，请联系经销商/固德威售后服务中心
	DG Communication Failure	1. After power-off, check whether the RS485 port of the DG terminal block in the cabinet and the communication terminal on the DG side are connected or abnormal. 2. After troubleshooting and re-powering, if the fault persists, contact the dealer/GoodWe after-sales service center.
EPO	Cabinet Internal Fault	1. In case of human error pressing the emergency stop button, after confirming that the STS is completely de-energized and safe, rotate the emergency stop button to reset 2. If the emergency stop was pressed due to a danger or emergency, please contact the dealer or GoodWe after-sales service center.

Fault Type	Fault indication	Fault Handling
Contactor Failure 1	Magnetic Latching Inadvertent Trip Warning	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Magnetic Latching False Closing Warning	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	主磁保持合闸失败	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	主磁保持分闸失败	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Abnormal Relay Disconnection in Closed State	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Abnormal relay closure in the open state	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Relay Close Failure	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Relay Open Failure	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.

Fault Type	Fault indication	Fault Handling
	A Phase Current Trip Shutdown Timeout	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Phase B Current Trip Shutdown Timeout	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Phase C Current Trip Shutdown Timeout	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Input Three-phase Power Loss	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	24V Supply Undervoltage	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Latching Drive Undervoltage	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Parallel Mode Setting Error	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Internal 485 communicatio n lost	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
Contactor Failure 2	Parallel Slave Action Failed	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.

Fault Type	Fault indication	Fault Handling
	N相接线错误	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	ABC Phase Sequence Error	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Phase Loss Error	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	MCU Overtemperature Error	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Parallel: One-split-one-combine	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Dual-unit closing when interlocked	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Control Contact Simultaneous Trigger	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
	Subcontracting frequency too high	Power off the entire system, the n power on again after 5 minutes. If the fault persists, contact the dealer or GoodWe after-sales service center.
Over load Protection 1	Over load Protection (GRID)	1. Power off the entire system, and power on again after 5 minutes. If the fault disappears, 2. If it occurs twice or more within a month, please contact the dealer/GoodWe after-sales service center.

Fault Type	Fault indication	Fault Handling
Over load Protection 2	Over load Protection (Smart-port)	1. Power off the system entirely, then power on again after 5 minutes. If the fault disappears, 2. If it occurs two times or more within one month, please contact the dealer or GoodWe after-sales service center.
Lightning Protection Fault 1	Grid-side SPD1 operation	Check whether the SPD1 surge protective device has been actuated. Please contact the dealer/Growatt after-sales service center and report the actuation status.
Lightning Protection Fault 2	Off-grid side SPD2 operation.	Check whether the SPD1 surge protective device has been actuated. Please contact the dealer/Growatt after-sales service center and report the actuation status.

9.3 periodic maintenance

⚠Danger
Before maintenance, ensure that the STS is fully de-energized. Live operation may cause equipment damage or risk of electric shock.

Maintenance content	Maintenance Method	maintenance cycle
system cleaning	• Check the heatsink fins and air inlet/outlet vents for for eign objects and dust. • Check whether the fan and dust filter are clean and free of dust accumulation.	once every six months

Maintenance content	Maintenance Method	maintenance cycle
Fan	Check whether the fan operates normally, whether the re is any abnormal noise, and whether the appearance is normal.	1 time/year
electrical connection	Check whether electrical connections are loose, whether the cable appearance is damaged, and whether the re is exposed copper.	once every six months to once a year
hermeticity	Check whether the sealing of equipment cable entry holes meets requirements. If the re is a gap to o large or unsealed, reseal it.	1 time/year

9.4 Equipment dismantling

⚠Caution

- Before dismantling the STS, ensure that the equipment is completely powered off.
- When operating, wear personal protective equipment (PPE).

1. Open the cabinet door.
2. Disconnect all electrical connections of STS, including: power lines, communication lines, protection grounding wires.
3. Unscrew the fixing screw of the STS base.
4. Use hoisting or for klift to move the STS away from the base.
5. Store the equipment properly. If it is to be put into use subsequently, please ensure that the storage conditions meet the requirements.

9.5 Equipment Scrapping

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

10 Technical Data

Technical Data	GW250K-STS-PCS-G10	GW500K-STS-PCS-G10
Grid side		
Nominal Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE	
Voltage Range (V)	340~440	340~440
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	47.5~52.5/57.5~62.5	47.5~52.5 /57.5~62.5
Rated. Current (A)	478.6	957.2
Max. Current (A)	550@10s	1000@10s
Rated Power (kW)	250	500
Max. Apparent Power (kVA)	315	630
Rated Conditional Short-circuit Current (kA)	10	20
Back-up side		
Nominal Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE	
Voltage Range (V)	340~440	340~440
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	47.5~52.5/57.5~62.5	47.5~52.5 /57.5~62.5
Rated. Current (A)	417.8	835.6
Max. Current (A)	550@10s	1000@10s

Technical Data	GW250K-STS-PCS-G10	GW500K-STS-PCS-G10
Rated Power (kW)	250	500
Max. Apparent Power (kVA)	275	550
Rated Conditional Short-circuit Current (kA)	10	20
ESS side		
Nominal Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE	
Voltage Range (V)	340~440	340~440
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	47.5~52.5/57.5~62.5	47.5~52.5 /57.5~62.5
Rated. Current (A)	417.8	835.6
Max. Current (A)	550@10s	1000@10s
Rated Power (kW)	250	500
Max. Apparent Power (kVA)	275	550
Rated Conditional Short-circuit Current (kA)	10	20
Smart Port side		
Nominal Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE	
Voltage Range (V)	340~440	340~440
Nominal Frequency (Hz)	50/60	50/60

Technical Data	GW250K-STS-PCS-G10	GW500K-STS-PCS-G10
Frequency Range (Hz)	47.5~52.5/57.5~62.5	47.5~52.5 /57.5~62.5
Rated. Current (A)	417.8	835.6
Max. Current (A)	550@10s	1000@10s
Rated Power (kW)	250	500
Max. Apparent Power (kVA)	275	550
Rated Conditional Short-circuit Current (kA)	10	20
Inverter side		
Nominal Voltage (V)	220/380, 230/400, 240/415, 3L/N/PE	
Voltage Range (V)	340~440	340~440
Nominal Frequency (Hz)	50/60	50/60
Frequency Range (Hz)	47.5~52.5/57.5~62.5	47.5~52.5 /57.5~62.5
Rated. Current (A)	835.6	1519.4
Max. Current (A)	1100@10s	1800@10s
Rated Power (kW)	500	1000 (Centralized Access 500+Independent Access 500)
Max. Apparent Power (kVA)	550	1000 (Centralized Access 500+Independent Access 500)

Technical Data	GW250K-STS-PCS-G10	GW500K-STS-PCS-G10
Rated Conditional Short-circuit Current (kA)	10	20
General Data		
On/Off Grid Transfer Time (ms)	<20	<20
Operating Temperature Range (℃)	-25~+55	-25~+55
Storage Temperature (℃)	-40~+70	-40~+70
Relative Humidity	0~100%	0~100%
Pollution Degree	III	III
Max. Operating Altitude (m)	4000	4000
Cooling Method	Smart Fan Cooling	Smart Fan Cooling
Communication	LAN、CAN	LAN, CAN
Weight (kg)	450	750
Dimension (W×H×D mm)	850×1600×800	1100×2010×1000
Mounting Method	Grounded	Grounded
Noise Emission (dB)	<60	<60
Ingress Protection Rating	IP54	IP54
Overvoltage Category	III	III
Protective Class	I	I

Technical Data	GW250K-STS-PCS-G10	GW500K-STS-PCS-G10
Certification		
Safety Regulation	IEC 61439-1、IEC 61439-2 EN 61439-1、EN 61439-1 IEC 60730	IEC 61439-1、IEC 61439-2 EN 61439-1、EN 61439-1 IEC 60730

11 Contact Details

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