Liquid Cooling Energy Storage System

TRENE-P500B1044L-2H/TRENE-P499B1044L-2H
TRENE-P400B1044L-2.5H/TRENE-P399B1044L-2.5H
TRENE-P319B1044L-3H/TRENE-P260B1044L-4H
TRENE-P250B1044L-4H/TRENE-P249B1044L-4H

User Manual

Version 0.0

www.solaxpower.com

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About This Manual

Scope of Validity

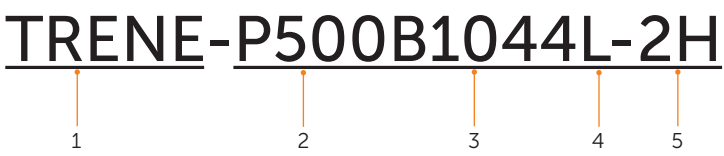
This manual is an integral part of the intelligent all-in-one liquid cooling energy storage system. It describes the transportation, storage, installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

This manual is valid for the following system models:

- TRENE-P500B1044L-2H
- TRENE-P499B1044L-2H
- TRENE-P400B1044L-2.5H
- TRENE-P399B1044L-2.5H
- TRENE-P319B1044L-3H
- TRENE-P260B1044L-4H
- TRENE-P250B1044L-4H
- TRENE-P249B1044L-4H

Model description

TRENE-P500B1044L-2H is used for example.



No.	Definition	Description
1	Product series	TRENE: Name of the AC couple series project
2	Power	Rated power of the PCS. Value range: 500 (500 kW), 499 (499.6 kW), 400 (400 kW), 399 (399.6 kW), 319 (319.6 kW), 260 (260 kW)
3	Battery capacity	B1044: The battery capacity is 1044 kWh.
4	Cooling system	L: Liquid cooling
5	Energy storage duration	• 2H: 2-hour energy storage • 2.5H: 2.5-hour energy storage • 3H: 3-hour energy storage • 4H: 4-hour energy storage

Target Group

The installation, maintenance and grid-related setting can only be performed by qualified personnel who:

- Are licensed and/or satisfy state and local regulations.
- Have good knowledge of this manual and other related documents.
- The operator is required to obtain any Certifications for Electrician.

Conventions

The symbols that may be found in this manual are defined as follows.

Symbol	Description
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE!	Provides tips for the optimal operation of the product.

Change History

Version 0.0 (2025-01-16)

Initial release

Table of Contents

1 Safety

1.1 General Safety

Before transporting, storing, installing, operating, using and/or maintaining the device, please carefully read and understand the document, and strictly follow the instructions and safety precautions given herein, as well as symbols affixed on the device. The safety instructions herein are only supplements to local laws and regulations.

The operator should not only abide by all safety precautions provided in the document, including but not limited to the “Danger” sign, "Warning" sign, "Caution" sign, and "Notice" sign, but also comply with relevant international, national and local laws, regulations, standards, guidelines and industry rules in the process of transportation, storage, installation, operation, and maintenance. SolaX will not assume any responsibilities for the loss caused by improper operation, or violation of safety standards for design, production and equipment suitability.

SolaX will not be liable for maintenance for possible device failure, device malfunction, or parts damage, nor will the company assume any liability to pay compensation for the possible physical and property damage resulting from the installation environment that does not meet the design requirements.

The device is well designed and tested to meet all applicable state and international safety standards. However, like all electrical and electronic equipment, safety precautions must be observed and followed during the installation of the device to reduce the risk of personal injury and to ensure a safe installation.

SolaX will not assume any responsibilities if any of the following circumstances occur, including but not limited to:

- Device damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption, war, typhoon, tornado, etc.
- Device damage due to human cause or caused by strong vibrations from external factors before, during and after installation.
- Device used or operated against local policy or regulations.
- Failure to follow the operation instructions and safety precautions on the product and in this document.
- Installation and use under improper environment or electrical condition.
- Unauthorized modifications to the product or software.
- Device damage caused during transportation by the customer or the third party.
- Storage conditions that do not meet the requirements specified in this document
- Use of incompatible inverters or devices.
- Installation and commissioning operated by unauthorized personnel who are not licensed and /or satisfy state and local jurisdiction regulations.

1.2 Device Safety

To prevent personal injury or property damage from improper operation, please carefully read the following installation precautions before installation.

1.2.1 Container Safety

DANGER!

- According to the local laws and regulations related to high-altitude work, operators must wear PPE, e.g., a helmet, safety belt, or waist harness, when they work at heights, while the other end of the harness must connect to a secure structure to prevent fall incidents.

WARNING!

- Please prepare tools that meet the requirements before installation, and check the number of tools after installation, to avoid leaving them inside the equipment.
- Please ensure that the Container has been thoroughly secured before operating it. Otherwise, it may cause personal injury or equipment damage due to tilting or collapsing the Container.
- Please ensure that the Container's vents and cooling system are working properly when it is running. If the vents are blocked, it will lead to overheating, and even equipment damage or fire hazard.
- Please ensure that the Container's vents and cooling system are kept away from heat sources.
- Do not drill holes in the device to avoid equipment failure.
- If the circumstances that may cause personal injury or equipment failure occur, such as, fluid flowing into the equipment, stop operation and power off immediately. Otherwise, it may cause a short circuit or damage.
- Do not open the Container doors on a rainy or high humid day (≥80% humidity). If the doors have to be opened on such days, please take proper protective measures.

CAUTION!

- Do not use a straight ladder. When electrical work is involved, a wooden ladder or an insulated ladder shall be used.
- The equipment shall not be used to provide a backup power source in the following circumstances:
  a. Equipment related to life;
  b. Sensitive precision instruments;
  c. Home appliances will be faulty in the case of a power failure during operation.

NOTICE!

- The signs and messages on the labels and nameplates attached to the device need to be visible and clear.

1.2.2 Battery Safety

DANGER!

- Do not connect the positive and negative poles of a battery together. Otherwise, it may be short-circuited. This will result in an excessive flow of current and large quantities of energy for a short time, and then will cause battery leakage, smoke, the emission of flammable gases, thermal runaway, fire, or even an explosion. Therefore, the battery must be powered off before maintenance.
- If a battery is overheated, it will cause leakage, smoke, release of flammable gases, thermal runaway, fire, or even an explosion. Therefore, please ensure that the installation site shall be well ventilated and kept away from high temperatures.
- Do not dismantle, change, shake, drop, crush, impact, cut, penetrate with a sharp object, or any other ways to damage the battery. Otherwise, it may cause leakage, smoke, emission of flammable gases, thermal runaway, fire, or even an explosion.
- Do not mix different types or makes of the battery. Otherwise, it may cause leakage or rupture, resulting in personal injury or property damage.
- The battery electrolyte is toxic and volatile. Never get in contact with the leaked liquids or inhale gases in the case of the battery leakage or odor, and contact professionals immediately. The professional must wear PPE (including but not limited to safety glasses, safety gloves, gas masks, and protective clothing) before powering off the device, and then contact our company at once after removing the damaged battery.
- Normally, the battery will not release any gases. However, in the following situations: burnt, needle-pricked, squeezed, struck by lightning, overcharged, or subject to other adverse conditions that may cause battery thermal runaway, the battery may be damaged or an abnormal chemical reaction may occur inside the battery, resulting in electrolyte leakage or production of gases. If the battery needs to exhaust flammable gas, safe emission measures must be taken to prevent fire and device corrosion.
- Do not use damaged batteries, and ensure that the installation site must be well ventilated.

WARNING!

- Please read the document carefully before installation, operation and maintenance.
- Must arrange fire-fighting equipment in advance according to the local laws, regulations, and standards while installing and commissioning the device.
- Please check that there is no damage to the outer packaging before and after unpacking, and in the process of storage and transportation. The battery shall be correctly placed or stacked in accordance with the requirements stipulated on the labels to prevent damaging or scrapping the battery resulting from crushing or falling.

⚠ WARNING!

- Must tighten screws securing cables and on the copper bars according to the torque information specified in the document, and check whether they are tightened periodically. For instance, whether there is any rust, corrosion, or any other foreign object on it, and then clean it up if any. Because the loose screw connections may result in excessive voltage drops and large currents, leading to generating a lot of heat and burning the battery.
- The battery should be charged in time after discharge, to prevent battery damage due to overdischarge. If a battery pack is stored for a long time, please periodically recharge it to protect it from damage according to the storage requirements specified in the document.
- Please charge the battery within the specific temperature range because the low temperature may result in a short circuit. Hence, do not charge it when the temperature is below the low limit of the operating temperature.
- Do not use the battery when you find a bulge, or dents on the battery housing, and contact the installer or professional maintenance personnel to dismantle and replace it. The damaged battery must be kept away from other devices and flammable and explosive articles, and do not contact it except for professionals.
- Before operation, ensure that there are no irritating or burning smells around the battery.
- Do not weld or grind near a battery. Because electric sparks or arcs may cause fires.
- Do not step, lead, stand, or set on the battery.

NOTICE!

Transportation requirements for battery:

- Relevant qualifications for the transport of dangerous goods must be obtained by the forwarding agent engaged in such businesses, and they must strictly abide by the local regulations for the transport of dangerous goods.
- Please check the battery before transportation. If a battery leaks, smells, or is damaged, do refuse to transport it.
- Please handle gently in the process of loading and unloading, transportation, and moving a battery to prevent bumping, and take effective moisture-proof measures to prevent personal injuries and battery damage.
- Unless otherwise specified, do not transport the batteries, which are classified as dangerous goods, together with food, medicine, or other additives on the same means of transport.

If the battery leaks electrolyte or any other chemical materials, the electrolyte leakage can lead to toxic gases. Therefore, do not contact with them at all times. In case of accidentally coming into contact with them, please do as follows:

- In case of inhalation: Leave the contaminated area immediately, and seek medical attention at once;
- In case of contact with eyes: Rinse eyes with running water for at least 15 minutes, and seek medical attention;
- In case of contact with skin: Wash the contact area thoroughly with soap, and seek medical attention;
- In case of ingestion: Induce vomiting, and seek medical attention.

NOTICE!

If a fire breaks out where the battery is installed, please do as follows:
- In case a battery is charging when the fire breaks out, provided it is safe to do so, press the emergency stop button and unplug the power cable;
- In case a battery is not on fire yet, use a water-based fire extinguisher or a carbon dioxide extinguisher to extinguish the fire;
- In case a battery catches fire, do not try to put it out, and evacuate immediately;
- A battery may catch fire when it is heated above 150°C/302°F. If the battery catches fire, please evacuate immediately since it will generate noxious and poisonous gases.

Recovery of damaged or wasted battery:
- Dispose of the damaged or wasted batteries according to local laws and regulations instead of placing them in the household trash or curbside recycling bins. Otherwise, it may cause environmental pollution or explosions.
- Ensure that the damaged or wasted batteries are not exposed to the following situations: high temperatures, high humidity, direct sunlight, or corrosive environments.
- Contact a battery recycling company to scrap the battery, which leaks electrolytes, or is damaged or expired.
- Please take protective steps to prevent battery short circuits before moving batteries.
- Please keep away from flammable material storage areas, residential areas, and other population centers when transporting and storing the damaged battery.

1.2.3 Liquid Cooling Unit Safety

WARNING!

- When the liquid cooling unit is running, please do not touch the internal components of the unit with your hands at will to avoid electric shock or injury from the fan blades.

CAUTION!

- If severe vibration or abnormal sound occurs during running or debugging of the unit, please stop all operations and immediately cut off the circuit switch for inspection.
- Do not allow liquids such as water to enter the terminal area of the device during installation and maintenance.
- Only when all the circuit switches are turned off and the internal control board no longer flashes the signal light, can you operate the device circuit and electronic devices, and you must wear anti-static gloves.
- The waste is hazardous. Please properly handle it, and avoid contact of the waste with soil or drainage systems.
- Coolant may cause irritation to eyes, skin, and throat. When handling, wear PPE and use only authorized tools.
- Do not heat the liquid cooling unit in an empty container since it may cause an explosion.

NOTICE!

- While injecting the liquid, if the injection process is interrupted manually, restart the process from the beginning when resuming.
- During injection, ensure that the hose in the coolant collection tank is fully submerged and maintains proper coolant flow.
- After completing injection and drainage, thoroughly flush the hoses of the inject machine to remove residual coolant.
- Use a coolant collection tank with a capacity of 20 liters or more, and keep it clean, dry and free from contaminants.

NOTICE!

If the coolant leaks, please avoid contact with it at all times. In case of accidentally coming into contact with it, please do as follows:

- In case of contact with eyes: Rinse eyes with running water for at least 15 minutes, and seek medical attention;
- In case of contact with skin: Wash the contact area thoroughly with soap, and seek medical attention.

1.2.4 PCS Safety

DANGER!

- Only operate the inverter if it is in a technically faultless condition. Operating a faulty inverter may lead to electric shock or fire.
- Do not attempt to open the enclosure without authorization from SolaX. Unauthorized opening of the enclosure will void the warranty and can result in lethal danger or serious injury due to electric shock.
- Make sure that the inverter is reliably grounded before any operation to prevent the risk of electric shock causing lethal danger or serious injury.
- Only qualified personnel can perform the installation, wiring, maintenance of the inverter by following this document and the related regulations.

WARNING!

- Operators must wear PPE while installation and maintenance of the device.
- During operation, avoid touching any parts of the PCS.
- Never connect or disconnect the AC and DC connector while the inverter is running.
- Prior to conducting any maintenance, turn off the AC and DC power and disconnect them from the inverter. Wait for 15 minutes to fully discharge the energy.
- Avoid touching the inverter while it is running, as it becomes hot during operation and may cause personal injuries.

1.2.5 Utility Grid Safety

NOTICE!

- Only connect the inverter to the grid with the permission of the local utility grid company.

1.3 Electrical Safety

DANGER!

- Please make sure that the unit is free from any damage before the electrical connection.
- Do not modify, change, or dismantle the device, do not change the power-on and power-off sequences and the installation procedure written in the document, and please properly and correctly operate it.
- Do not power on the device during installation. Otherwise, it may cause a fire, personal injury, or device damage.
- Must remove earrings, rings, bracelets, watches, and any other metal jewelry before operation, to avoid electrical shock, burns, or even death.
- During operation, special insulated tools must be used to avoid electric shock or short circuit failure. The insulated tools' voltage ratings must exceed the system voltage ratings. Please refer to "Technical Data" for system information.

WARNING!

- Please wear PPE, such as, protective clothing, insulating shoes, goggles, safety helmets, insulating gloves, etc., when conducting electrical wiring.
- Do not touch the power supply equipment directly, or through conductors or damp objects.
- Do not touch the parts of the equipment of which warning signs are attached, to avoid personal injury or device damage.

CAUTION!

- Do not power on the device until it has been installed and confirmed by professionals.
- In the event of a fire, evacuate immediately and call the local fire services.

NOTICE!

- Please operate according to the safety code for power station.
- Before installation, it is necessary to set up temporary safety fences or warning lines and hang warning signs in the operation area, to prohibit non-staff from entering here.
- Please make sure that the equipment and its associated switches are off before connecting and disconnecting power cables.

NOTICE!

- Please check whether the protective housing and insulating sleeve for an electrical component have been installed correctly after finishing installation, to avoid electric shock.
- Must turn off the output switch of the power supply equipment when maintaining its electrical terminal device and power distribution device.
- If the device is required to be powered off during troubleshooting and diagnosis, please do as the following procedure: power off > electricity testing > connecting grounding cable > hanging warning signs and setting up guardrails.
- Must hang up "Do Not Switch On" warning signs on the relevant switches or circuit breakers before completing maintenance, to prevent power connection. Do not switch on before the fault is solved.
- Do not use water, alcohol, oil, or other solvents when cleaning electrical components inside and outside the device.

NOTICE!

Grounding Requirements:

- The device's grounding impedance shall meet the requirements of local electrical safety standards.
- The equipment shall be permanently connected to a grounding wire within the building's electrical system. Please check whether the device is reliably grounded before operation. The grounding cable should be removed last while dismantling and maintaining the device.
- Do not start the device if it is not fitted with a grounding conductor.
- All acts against the grounding conductor are prohibited.
- If the device is equipped with a three-pronged socket, make sure that the ground prong is reliably grounded.
- For the device that may generate large contact currents, please make sure that the grounding terminal on the housing has been grounded before powering on, to avoid electric shock.

Cable Requirements:

- When deciding the wire diameter, and connecting or wiring cables, follow the local laws, regulations, and codes to ensure safety.
- When external conditions (e.g., placement method, ambient temperature, etc.) change, the cable type must be verified according to IEC-60364-5-52 or local laws, regulations and standards. For instance, whether the cable's current-carrying capacity meets the requirements.
- Before connecting power cables, please make sure that the cable labels are correctly labelled and the cable terminals are well insulated.
- Do not loop and twist cables while conducting electrical wiring. If the length of the power cable is not enough, please replace it instead of joining or welding. Ensure that all the cables of the correct type and size are fully connected and well insulated, and the edges of cable slots and crossing holes are smooth.

NOTICE!

- It is recommended to bundle similar cables with cable ties, to ensure that the inside of the device is neat and tidy and to avoid cable jacket damage.
- Please use fireproof mud to seal the threading openings immediately after finishing wiring, to avoid the entry of water vapour or small animals.
- Cables should be kept away from heaters or other heat sources, because a high temperature environment may result in aging and damage to cable insulation.

2 Product Overview

2.1 Product Introduction

Featuring an all-in-one design, the liquid cooling energy storage system integrates high-performance PCS, BMS, high-capacity battery packs, smart EMS1000, and advanced liquid cooling unit and fire protection mechanism in one Container. As a smart outdoor energy storage system, it is easy to install and expand, and is especially applicable to industrial and commercial scenarios.

2.1.1 Features

- **All-round Protection:** It is equipped with multiple safety protection measures, such as built-in over-voltage, over-current, over-temperature and other protection functions, as well as fireproof materials and level 4 fire safety protection system, allowing it to detect and respond to potential electrical hazards and contain fire in time.
- **EMS Unified Management:** The integrated intelligent EMS system can autonomously adjust the energy storage strategy based on real-time electricity price information, and switch among application scenarios to maximize the efficiency of the system, and accelerate the return on investment cycle.
- **Enduring Stable Performance:**The system supports stable operation under three-phase imbalance conditions, ensuring a stable and reliable power supply in various complex electrical environments through its flexible expandability.
- **Fast Deployment and Scalability:** The highly integrated design minimizes the installation process yet maintains capability for convenient expansion, making it adaptable to commercial and industrial applications of varying scales and requirements.

2.1.2 Dimensions

Figure 2-1 Dimensions

2.1.3 Appearance

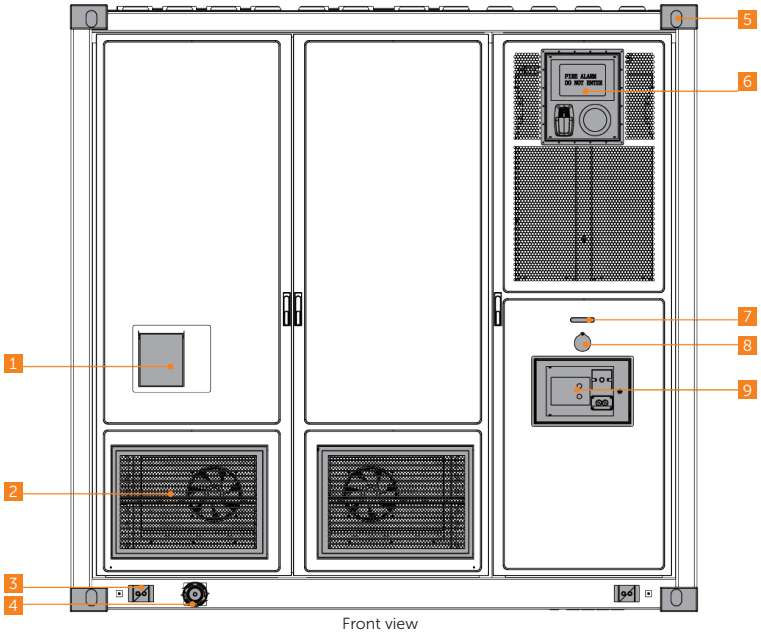


Figure 2-2 Exterior parts (1)

Table 2-1 Parts description (1)

No.	Item	Description
1	Intake fan	Draws in the fresh air into the system
2	Louvered vent	For ventilation and heat dissipation
3	Grounding point	To perform grounding protection for the system
4	Fire hose connector	Connects to hydrants for fire suppression
5	Corner fitting	To hoist and secure the container
6	Warning area	See "Figure 2-3 Warning area"
7	System operation indicator	To indicate the operation status of the system
8	System emergency stop button	To shut down the system in emergency circumstances
9	Fire protection system emergency stop area	See "Figure 2-4 Emergency stop area of the fire protection system"

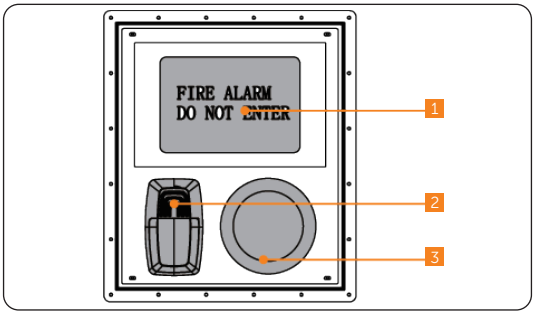


Figure 2-3 Warning area

Table 2-2 Parts in the warning area

No.	Item	Description
1	Gas release warning signage	To indicate whether the air pressure in the fire protection system is normal
2	Audible and visual alarm	To provide both audible and visual signals to alert people to a potential danger or emergency situation
3	Fire alarm bell	To emit a loud sound to alert people to an emergency or danger

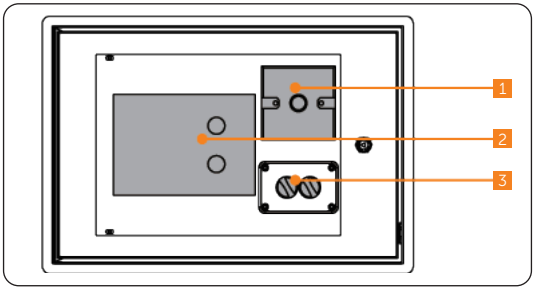


Figure 2-4 Emergency stop area of the fire protection system

Table 2-3 Parts in the emergency stop area

No.	Item	Description
1	Fire emergency stop button	To shut down the fire protection system in emergency circumstances
2	Manual & automatic transfer switch and emergency start button	To perform auto or manual control of the fire protection system
3	Fire-fighting fan control switch	To start or stop the fire-fighting fan

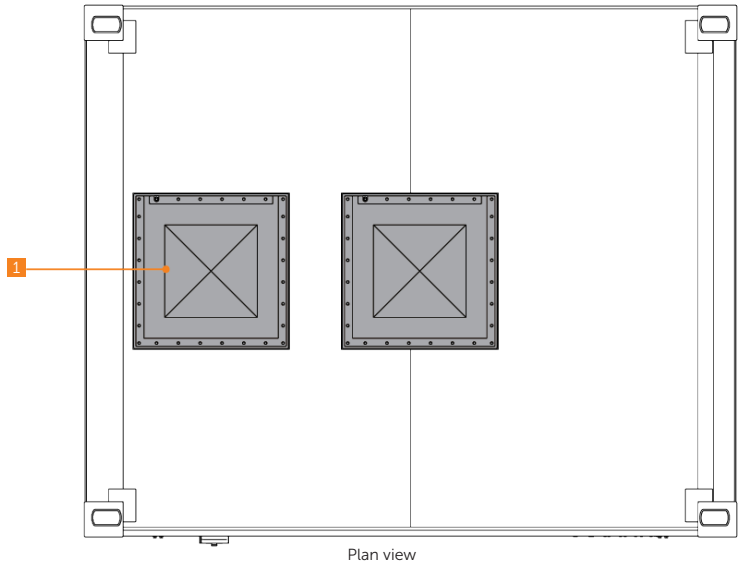


Figure 2-5 Exterior parts (2)

Table 2-4 Parts description (2)

No.	Item	Description
1	Deflagration venting panel	To release pressure and gases out of the Container

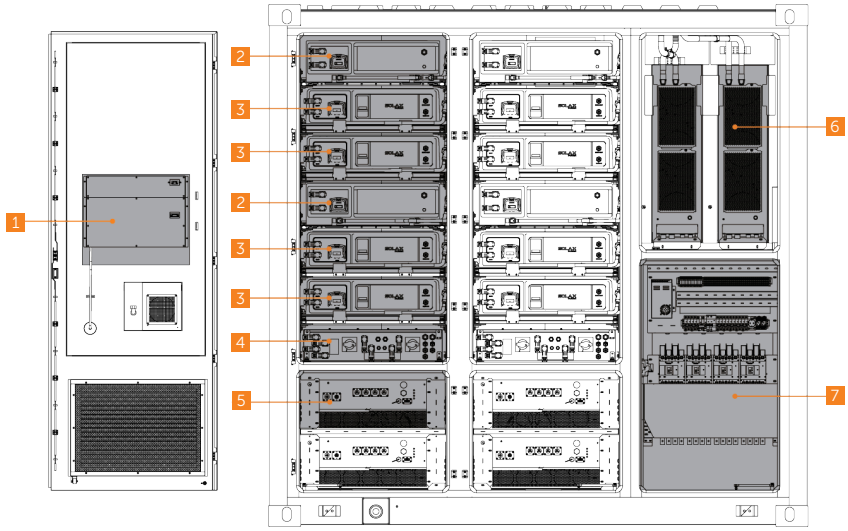


Figure 2-6 Interior parts in the front

Table 2-5 Parts description (3)

No.	Item	Description
1	Dehumidifier	To reduce and maintain the humidity level in the container
2	52S battery pack	For details, see "52S battery pack"
3	104S battery pack	For details, see "104S battery pack"
4	High-voltage box	For details, see "2.2.2.1 High-voltage Box"
5	PCS	For details, see "2.6 Power Conversion System"
6	Liquid cooling unit	To cool down or heat the battery packs for optimal operation. For details, see "2.2.4.1 Liquid Cooling Unit"
7	Power distribution system	To distribute AC power for the energy storage system. For details, see "2.2.1 Power Distribution System"

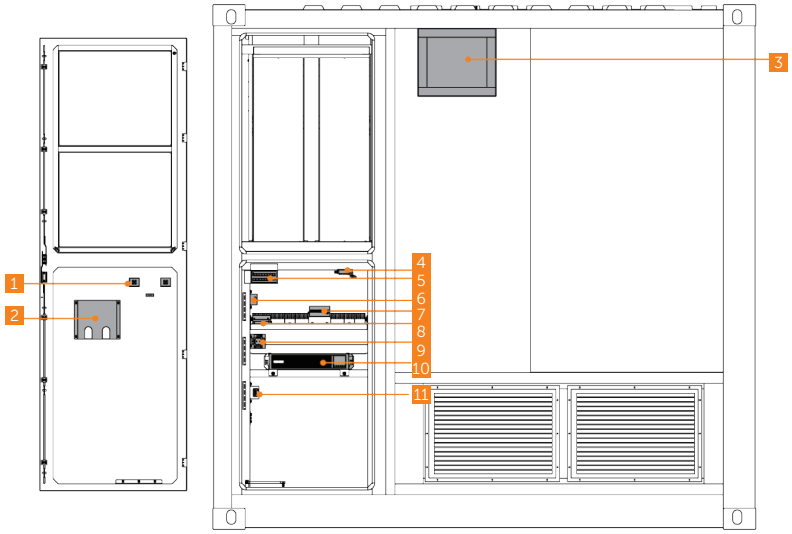


Figure 2-7 Interior parts at the rear

Table 2-6 Parts description (4)

No.	Item	Description
1	Antenna port	Connected to 4G antennas for expanding data exchange • Sub (left): Reserved • Main (right): Connected to the included 4G antenna
2	File pocket	To store documents and other materials
3	Exhaust fan	Expels air, heat, or harmful gases from the system
4	Travel switch	To monitor the door status
5	Switch	To connect multiple devices within a network
6	24 d. c. V power port	Reserved for EMS1000 power supply
7	EMS1000	To manage the energy flow and operation of the entire system
8	IO module	To collect signal and control other modules
9	Socket	Supplies power for UPS
10	UPS	To provide backup power for the system
11	230 a.c. V power port	Reserved

2.2 Major Parts Description

2.2.1 Electrical Compartment

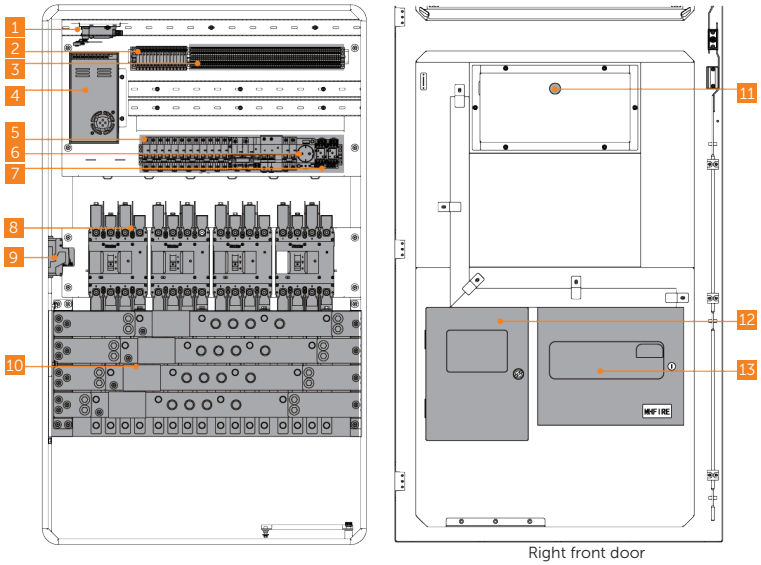


Figure 2-8 Appearance of the electrical compartment

Table 2-7 Electrical compartment description

No.	Item	Description
1	Travel switch	To monitor the door status
2	Fuse	/
3	Din rail terminal block	To organize wiring
4	Auxiliary power	Switches 230 a.c. V to 24 d.c. V to supply power for 24 d.c. V load
5	MCB	Supplies power and protection for parts in the container; For details, see "Figure 2-7 MCBs".
6	230 a.c. V power socket	Reserved
7	Intermediate relay	To distribute control signals to the emergency stop button

No.	Item	Description
8	PCS breaker	To control the connection to PCS
9	SPD & SPD breaker	To offer surge protection for the system and control the connection of the SPD
10	Copper busbar	To connect the system to grid
11	AC power indicator	To indicate the power supply status of the AC side
12	Fire-fighting module box	To store flammable gas detector and relay
13	Fire alarm control panel	Links the other fire protection parts to control fire

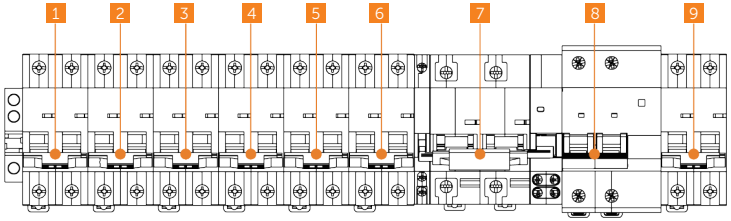


Figure 2-9 MCBs

Table 2-8 MCB designation

No.	Item	Description
1	QF6	For liquid cooling unit connection
2	QF7	
3	QF10	For UPS connection
4	QF11	For dehumidifier connection
5	QF12	For thermal fan connection
6	QF13	Reserved
7	QF8	For mains power supply
8	QF9	For undervoltage protection for the main circuit
9	QF14	For fire protection system and fire fan connection

2.2.2 DC Side Battery System

The battery system includes 2 high-voltage boxes and 4 battery clusters. A battery cluster consists of one 52S battery pack and two 104S battery packs. Each high-voltage box manages 2 battery clusters.

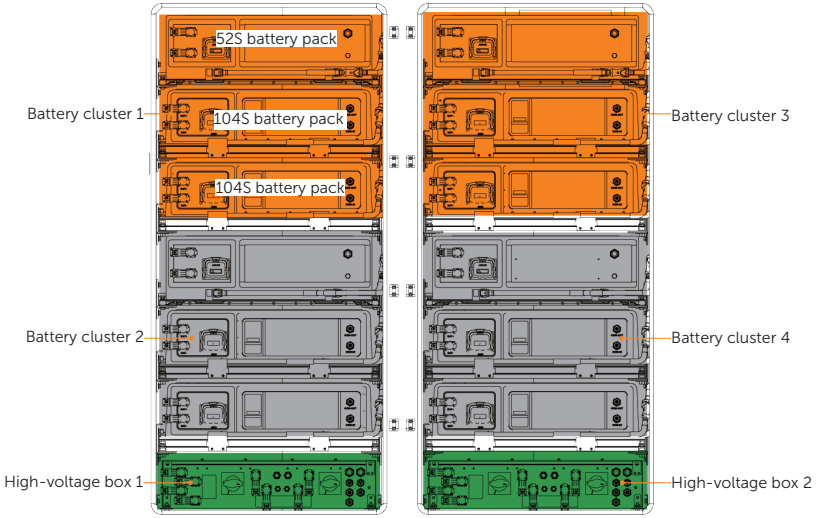


Figure 2-10 Composition of the battery system

NOTICE!

- The description below uses only one of each type of parts for example.
- Follow the sequence when assigning address for the battery system: BMS > 104S battery pack > 104S battery pack >52S battery pack.

2.2.2.1 High-voltage Box

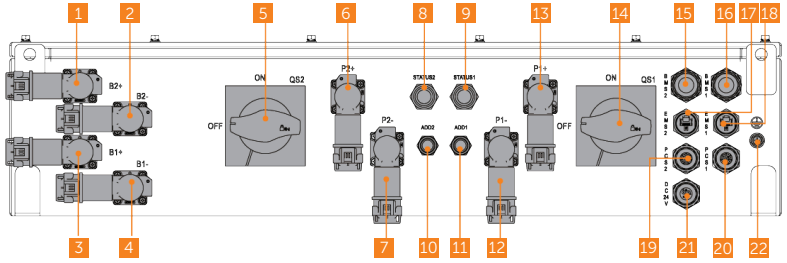


Figure 2-11 Appearance of high-voltage box

Table 2-9 Terminal description of high-voltage box

No.	Marking	Item	Description
1	B2+	Positive battery input port	Positive input port for battery cluster 2
2	B2-	Negative battery input port	Negative input port for battery cluster 2
3	B1+	Positive battery input port	Positive input port for battery cluster 1
4	B1-	Negative battery input port	Negative input port for battery cluster 1
5	QS2	Circuit breaker	Main circuit switch for battery cluster 2
6	P2+	Positive PCS input port	Positive input port for PCS 2
7	P2-	Negative PCS input port	Negative input port for PCS 2
8	STATUS2	Battery status indicator light	Status indicator light for battery cluster 2
9	STATUS1		Status indicator light for battery cluster 1
10	ADD2	Address assigning button	To assign address for battery cluster 2
11	ADD1		To assign address for battery cluster 1
12	P1-	Positive PCS input port	Positive input port for PCS 1
13	P1+	Negative PCS input port	Negative input port for PCS 1
14	QS1	Circuit breaker	Main circuit switch for battery cluster 1
15	BMS2	BMS Communication port	Communication port with battery cluster
16	BMS1		
17	EMS2	EMS communication port	Communication port with EMS1000
18	EMS1		
19	PCS2	PCS communication port	Communication port with PCS
20	PCS1		
21	DC24V	Power port	24 d.c. V power supply for the high voltage box
22		Grounding point	For high-voltage box protection

2.2.2.2 Battery Packs

The system includes two types of battery packs, 52S battery pack and 104S battery pack.

52S battery pack

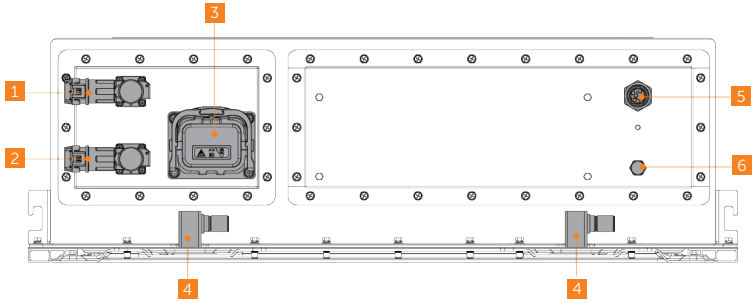


Figure 2-12 Appearance of 52S battery pack

Table 2-10 Terminal description of 52S battery pack

No.	Item	Description
1	Positive power port	To connect to positive power cord
2	Negative power port	To connect to negative power cord
3	MSD	To protect personnel and device safety during maintenance
4	Coolant inlet and outlet	To inject and drain the coolant
5	COM port	To connect to BMS or other battery packs for communication
6	Vent valve	For airtightness testing

104S battery pack

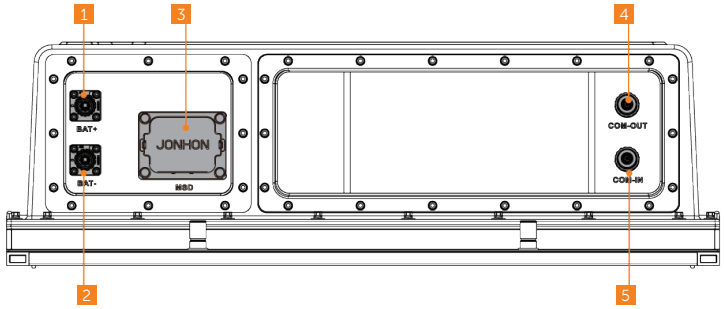


Figure 2-13 Appearance of 104S battery pack

Table 2-11 Terminal description of 104S battery pack

No.	Marking	Item	Description
1	BAT+	Positive power port	To connect to positive power cord
2	BAT-	Negative power port	To connect to negative power cord
3	MSD	MSD	To protect personnel and device safety during maintenance
4	COM-OUT	Communication output port	To connect to other battery pack for communication
5	COM-IN	Communication input port	To connect to other battery pack for communication

2.2.3 Power Conversion System

The energy storage system includes 4 PCSs.

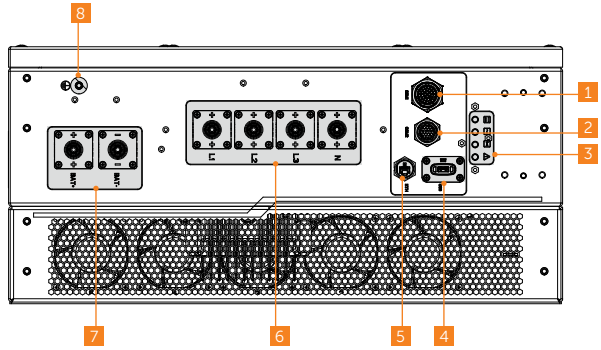


Figure 2-14 Terminals of PCS

Table 2-12 Description of PCS terminals

No.	Item	Description
1	COM1	COM 1 communication terminal
2	COM2	COM 2 communication terminal
3	LED light	To display the operation state.
4	USB	USB terminal
5	ETH	ETH terminal
6	L1/L2/L3/N	Grid connection terminal
7	BAT	Battery connection terminal
8	Grounding point	For PCS grounding protection

2.2.4 Liquid Cooling System

The liquid cooling system consists of 2 liquid cooling units and 2 groups of liquid cooling pipes.

2.2.4.1 Liquid Cooling Unit

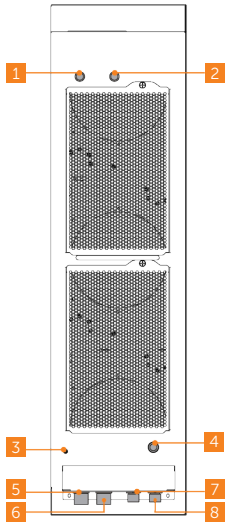


Figure 2-15 Appearance of liquid cooling unit

Table 2-13 Description of Liquid cooling unit

No.	Item	Description
1	Coolant inlet	/
2	Coolant outlet	/
3	Grounding point	To perform grounding protection for the unit
4	Coolant injecting &draining port	To inject and drain the coolant into and from the unit
5	Liquid cooling unit power port	To supply power for the liquid cooling unit
6	Make-up water pump power port	To supply power for the make-up water pump power
7	Debug port	To debug the unit
8	COM port	To communicate with the IO module

2.2.4.2 Liquid Cooling Pipe

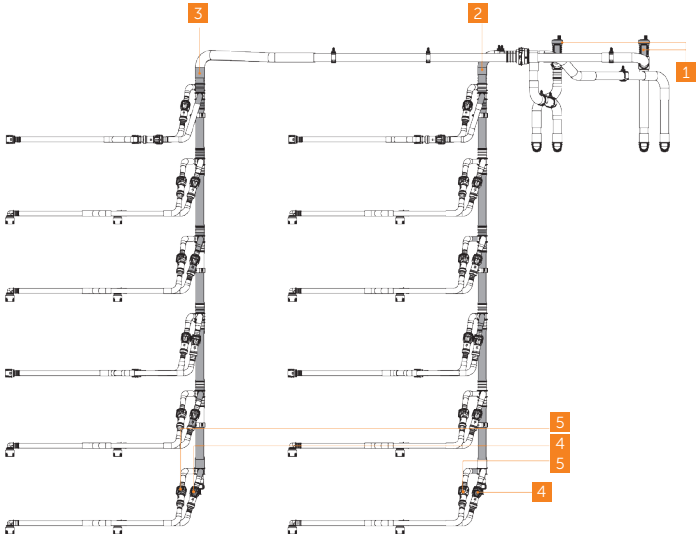


Figure 2-16 Appearance of the liquid cooling pipes

Table 2-14 Description of Description of PCS terminals

No.	Item	Description
1	Air vent valve	To expel air from the pipes
2	Coolant pipeline	Pipeline for battery cluster 3 and 4
3	Coolant pipeline	Pipeline for battery cluster 1 and 2
4	Drain outlet	To drain the coolant
5	Globe Valve	Works as a control valve for filling and venting procedures

2.2.5 Fire Protection System

This section includes all fire protection parts of the system, and some parts might have been introduced in former sections.

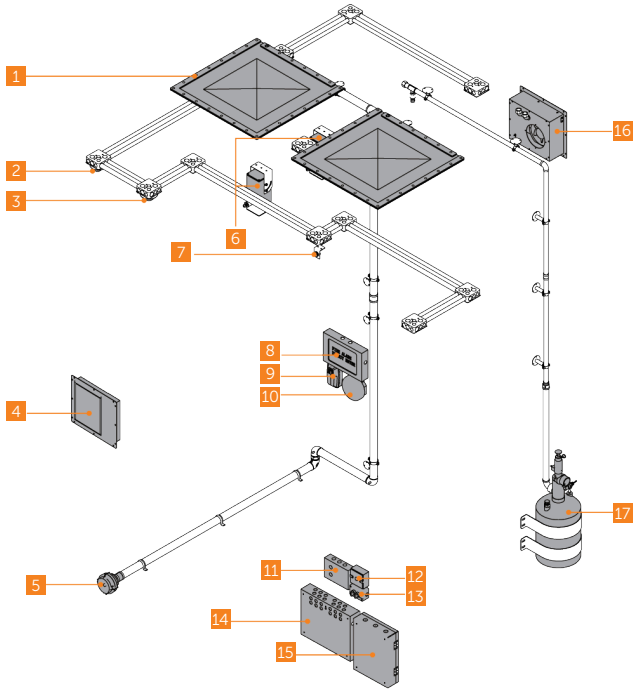


Figure 2-18 System fire suppression system

Table 2-15 Description of the fire suppression system

No.	Item	Description	Image
1	Deflagration venting panel (Optional)	To release pressure and gases out of the Container	
2	Heat detector	To monitor the temperature in the container	
3	Smoke detector	To monitor smoke in the container	

No.	Item	Description	Image
4	Intake fan	Draws in the fresh air into the system	
5	Fire hose connector	Connects to hydrants for fire suppression	
6	Aerosol fire extinguishing unit (Optional)	To suppress fire	
7	Flammable gas detector	Detects flammable gas in the container	
8	Gas release warning signage	To indicate whether the air pressure in the fire protection system is normal	
9	Audible and visual alarm	To provide both audible and visual signals to alert people to a potential danger or emergency situation	
10	Fire alarm bell	To emit a loud sound to alert people to an emergency or danger	
11	Manual & automatic transfer switch and emergency start button	To perform auto or manual control of the fire protection system	

No.	Item	Description	Image
12	Fire emergency stop button	To shut down the fire protection system in emergency circumstances	
13	Fire-fighting fan control switch	To start or stop the fan	
14	Fire-fighting module box	To store flammable gas detector and relay	
15	Fire alarm control panel	Links other fire protection parts to protect the system against or control fire	
16	Exhaust fan	Expels air, heat, or harmful gases from the system	
17	Perfluorohexanone extinguisher (Optional)	To suppress fire	

NOTICE!

- Deflagration venting panel, aerosol Fire-fighting module box and perfluorohexanone extinguisher are optional. Please select them based on your needs.
- To prevent environmental pollution from the contaminated water generated by the water-based fire suppression after activation, we recommend installing a water collection tank and an accident water collection system at the base of the Container, and implement proper anti-seepage layers on the ground. All precautions shall comply with local safety and environmental laws and regulations.

2.2.6 Energy Management System

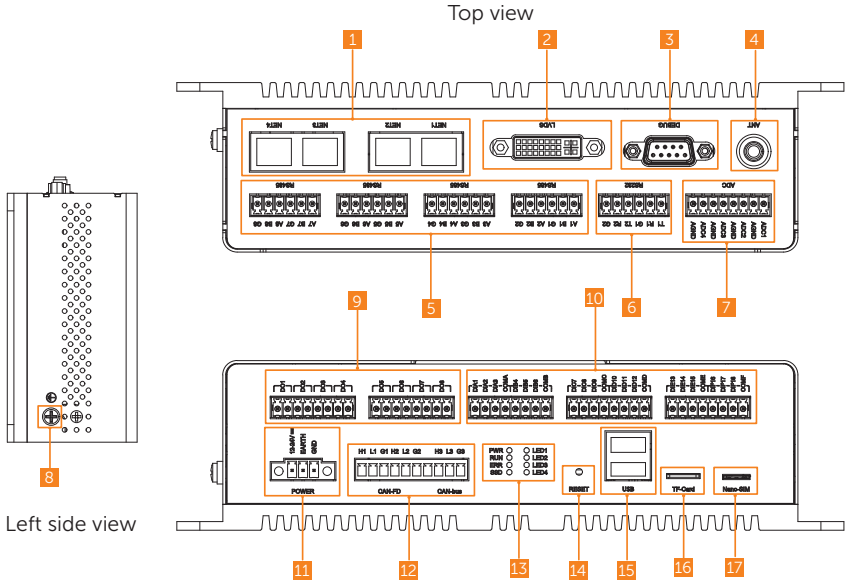


Figure 2-19 Appearance of EMS1000

Table 2-16 Description of appearance

Position	Area	Item	QTY	Description
Top	1	Ethernet terminal (NET)	4	• NET1: Connected to the switch • NET2: Connected to EMS1000 PRO • NET3: Reserved • NET4: Connected to the router for network
	2	LVDS terminal	1	Reserved
	3	Debug terminal (DEBUG)	1	Reserved
	4	Antenna socket (ANT)	1	For expanding signal transmission

Position	Area	Item	QTY	Description
Top	5	RS485 terminal	8	• 1-5: Reserved • 6: Connected to other grid-connected inverter • 7: Reserved • 8: Only connected to the meter
	6	RS232 terminal	2	Reserved
	7	ADC terminal	4	Reserved
Left side	8	Earthing terminal	1	For device earthing
Bottom	9	DO terminal	8	Reserved
	10	DI terminal	18	DIA1-DIA3 and COMA, DIB4 and COMB: Dry contact DIB5-COMF: Reserved
	11	Power supply (POWER)	1	12 Vdc-24 Vdc
	12	CAN terminal	3	2 × CAN-FD, and 1 × CAN-bus
	13	Indicators	8	• Power status (PWR) • Running status (RUN) • Error (ERR) • SSD status (SSD) • LED 1-LED4: Reserved
	14	Reset button (RESET)	1	For device resetting
	15	USB socket (USB)	2	For device update
	16	TF card socket (TF Card)	1	For firmware programming
	17	Nano-SIM card socket (Nano-SIM)	1	For 4G communication

2.3 Supported Power Grid

There are different ways of wiring for different grid systems. TT / TN-S / TN-C-S are shown as below. Please confirm with SolaX whether other grid systems are applicable or not.

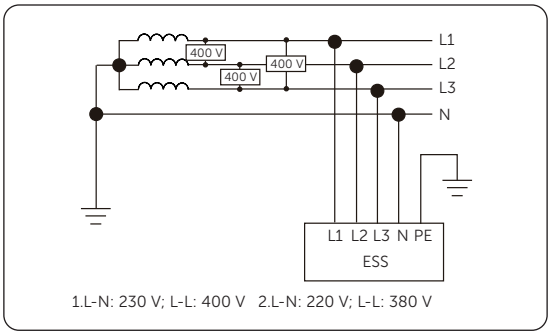


Figure 2-20 Supported power grid-TT

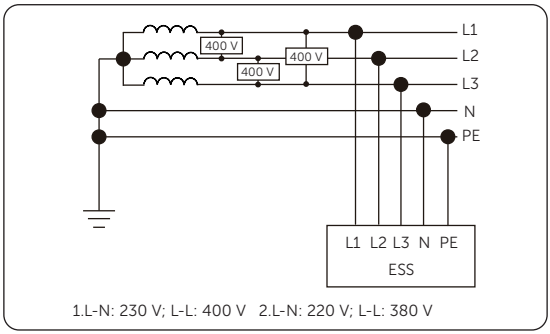


Figure 2-21 Supported power grid-TN-S

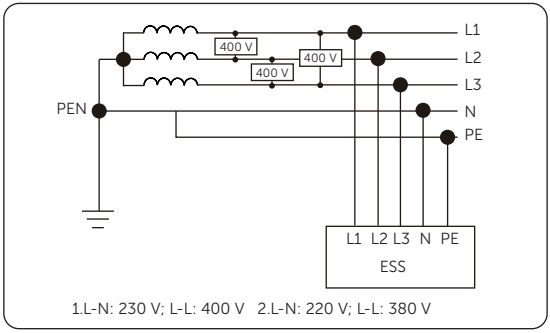


Figure 2-22 Supported power grid-TN-C-S

2.4 Operating Principle

2.4.1 Electrical Schematic Diagram

The Electrical Schematic Diagram label is pasted on the interior of the right front door.

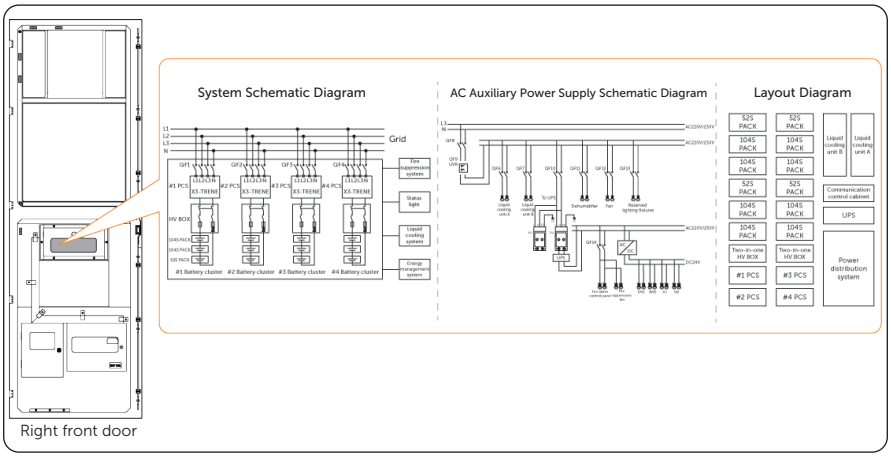


Figure 2-23 Position and content of the label

NOTICE!

- In an off-grid situation, the current will vary due to the types of electrical loads. The common electrical load can be classified into following types, resistive load, inductive load, capacitive load, half-wave load, etc. Therefore, the types of electrical loads shall be fully considered when designing and configuring a system. For specific requirements, contact SolaX.

2.4.2 Working Mode

The liquid cooling energy storage system offers 3 working modes: charging, discharging and standby, and can store and release energy according to EMS1000 commands.

Table 2-17 Working mode description

States	Description
Charging	The EMS1000 controls the PCS to charge the battery and store surplus energy in the battery.
Discharging	When the grid is insufficient to supply the load, the system needs to control the battery to supply power for the load, in which case the energy stored in the battery is converted by the PCS to feed the load.
Standby	Power on without performing work.

2.5 Typical Application Scenario

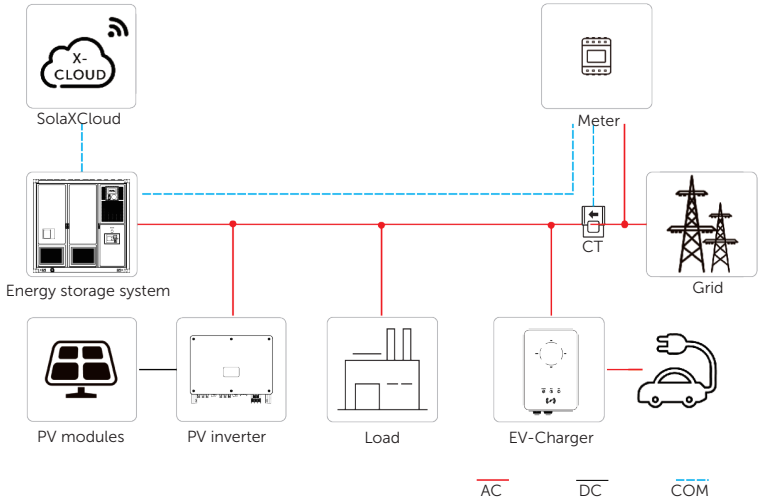


Figure 2-24 System overview diagram

NOTICE!

- An external communication cable should have shielding function.

Table 2-18 System item description

Item	Description
Energy storage system	"ALL-IN-ONE" intelligent outdoor energy storage system
Meter/CT/ Rogowski coil	The meter/CT/Rogowski coil is used for import / export or consumption readings, and manages the battery charge / discharge accordingly for smart energy management applications.
EV-Charger (Optional)	The system can communicate with SolaX EV-Charger to form a storage and EV charging energy system, thus maximizing the utilization of energy.
Grid	400 V / 230 V and 380 V / 220 V grid are supported.
PV Inverter	The PV inverter converts the direct current (DC) generated by solar panels into alternating current (AC) that is compatible with the power grid, and to facilitate the bidirectional flow of electricity, thereby maximizing the efficiency of solar energy utilization and providing grid support.
SolaXCloud	SolaXCloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaXCloud, the operators and installers can always view key and up-to-date data. Commercial platform can be connected through EMS1000 connection (EMS1000 is integrated into the Container).

2.6 Graphical Symbols

Table 2-19 Symbol description

Symbol	Description
CE	CE mark of conformity.
	TUV certification.
	Protective grounding point.
	Grounding point.

Symbol	Description
	Caution, hot surface. The enclosure temperature may be high while running. Therefore, do not contact to avoid scalding.
	Danger, electric shock. Do not touch the device after it is powered on. Otherwise, an electric shock may occur.
	Danger. Due to possible risks, do not touch the device after it is powered on.
	Observe enclosed documentation.
	The device cannot be disposed together with the household waste.
	Do not operate the system until it is isolated from mains and battery.
	Danger of high voltage. Do not touch live parts for 15 minutes after disconnection from the power sources.
	The battery system must be disposed of at a proper facility for environmentally-safe recycling.
	The battery module may explode. The rechargeable battery can become hot during operation. Avoid touch during operation.
	Keep the device away from children.
	Keep the device from open flames or ignition sources.

3 Transportation and Storage

3.1 Hoisting Requirements

DANGER!

- Please be careful to avoid physical collisions during transportation. Do not place the equipment upside down, be exposed to water, etc., which may result in equipment damage, or even a fire or an explosion.

NOTICE!

- The equipment must be transported in its original packaging. SolaX will not be held responsible for any damage to the equipment caused by improper transportation or by transportation after it has been installed.
- Please strictly comply with the transportation requirements of the warning signs on the packaging and equipment.
- To reduce product damage caused by shocking, tilting or impacting during transportation, it is recommended to consider sea or road (with better conditions) transport instead of rail and air transports.
- Relevant qualifications for the transport of dangerous goods must be obtained by the forwarding agent engaged in such businesses, and they must strictly abide by the local regulations for the transport of dangerous goods. Please check the battery before transportation. If a battery leaks, smells, or is damaged, do refuse to transport it.

- The crane or lifting tool for hoisting the container shall have a sufficiently load bearing capacity of no less than 15 t. A lifting frame can be used if needed.
- Set up enough warning signs or define the warning area to prevent from non-staff from entering the lifting area.
- Only qualified personnel with enough operational skills and have received relevant training can perform the hoisting of the container according to local laws and regulations.
- Before hoisting, please make sure:
  - » The lifting tools are complete, tested and fully secured.
  - » All doors of the equipment are closed and locked.
  - » The lifting ropes are qualified, and are fully secured.
- Do not hoist outdoors in rain, snow, wind and other bad weather.
- Keep the container horizontal and level during hoisting.

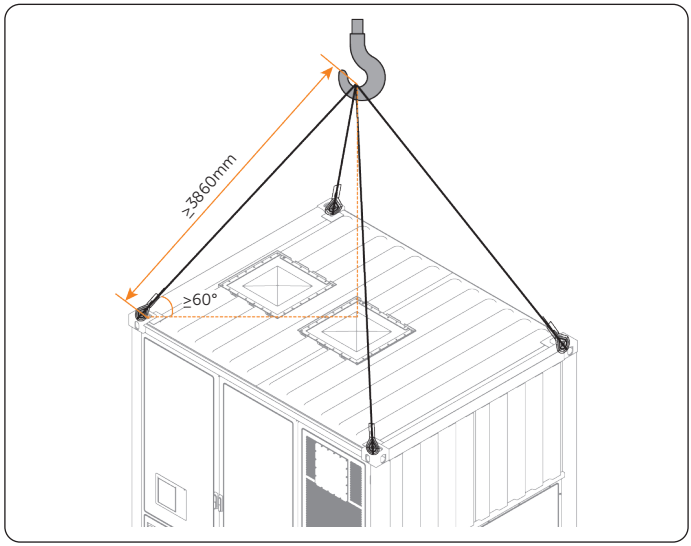


Figure 3-1 Requirements for container hoisting

3.2 Storage Requirements

3.2.1 Container Storage

- Strictly comply with the storage requirements on the warning signs and other information on the packaging to avoid equipment damage.
- Storage temperature: -20°C to +60°C.
- Relative humidity for device storage: 5%–95%.

NOTICE!
• Since the batteries have been installed in the Container in the factory, the storage requirements for the battery must also be abided by when storing the Container.

3.2.2 Battery Storage

DANGER!

- The battery must be stored indoors, where the environment should meet the following requirements:
  - » Avoiding direct sunlight and keeping out of rain;
  - » Dry and well-ventilated;
  - » Keeping away from heat and fire sources;
  - » Keeping away from radiation;
  - » Keeping away from chemicals;
  - » Keeping away from dust and metal conductive dust;
  - » Being equipped with fire facilities.
- Batteries must be stored in accordance with the requirements of the warning signs and other information on the packaging.
- Do not store with any other electronic equipment, chemicals, or other items that may cause interference or danger.
- Please pay attention to the height when stacking batteries to avoid deforming or damaging the battery at the bottom.

NOTICE!

- Do not store the batteries for a long time. If long periods of storage are unavoidable, please recharge it periodically to avoid battery damage. For details, see "10.3.3 Maintenance of the Battery Pack".

- Regarding with the storage information, see the following table:

Table 3-1 Storage information

Storage temperature range	Storage time
50°C to 60°C	3 months
30°C to 50°C	6 months
-20°C to +30°C	12 months

- Relative humidity for device storage: 5%–95%.
- If the battery has been stored for more than 1 year, it must be checked and tested by professionals before use.

4 Preparation before Installation

4.1 Installation Site Selection

The installation site is critical to the safety, service life, and performance of the device, and it should be convenient for electrical connections, operation, and maintenance. Therefore, the installation site should be selected according to the *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems* and the local laws and regulations.

The installation site shall meet the following requirements:

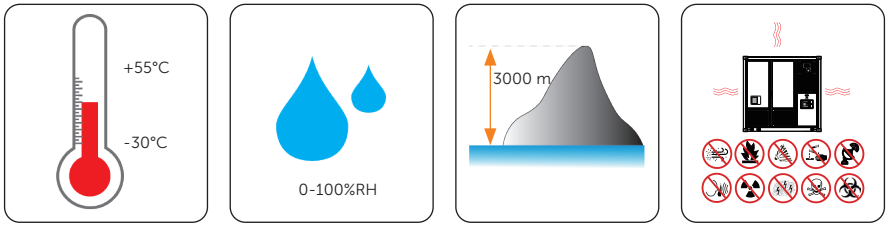
- **Laws, regulations and industry standards**: The selection of installation sites must strictly comply with local laws, regulations, and related industry standards.
- **Fire safety**: Fire extinguishers must be configured at the installation site according to the local fire codes, and a port for the water fire extinguishing system shall be reserved.
- **Safety spacing**:
  - » Install the device outdoors. The installation distance between the device and residential areas, population centers, or production buildings should meet the requirements of the local fire codes and standards.
  - » If the safety spacing cannot be met, a firewall that meets the requirements of the local fire codes must be built between the device and adjacent buildings. During the planning phase, it is crucial to consider the space for transportation, installation and maintenance of the device.
- **Flood and waterlogging prevention**:
  - » Avoid low-lying and flood-prone areas. The installation site that the device is to be located must be at least 250 mm higher than the highest water level in history.
  - » Since winds and wind-driven waves from rivers, lakes, and seas can affect the device, the foundation must be built at least 0.6 m higher than the maximum wave height in history.
  - » If a large amount of water flows in or through the energy storage power station, drainage facilities should be set up.
  - » If the installation site is prone to water accumulation, take waterproof measures, including but not limited to installing water baffles, configuring a drainage system, or raising the height of the foundation to prevent device damage.
- **Avoid liquid intrusion**: The installation area should be far away from the area where liquid is likely to be generated or leaked to avoid device failure.
- **Good transportation**: Good transportation for the installation site.

- **Reserve space**: During the planning phase, please consider the space for capacity expansion or connection in parallel in the future.
- **Avoiding bad soil**: Do not install devices on the undesirable soil that are prone to deformation and settlement.
- **Keeping away from salt-damaged and polluted areas**: Since the salt-damaged and polluted areas may corrode the device, the installation site must meet the following requirements:

  NOTICE!

  - If the Container is installed in polluted areas, please clean the Container exterior regularly every 1–3 months, or perform cleaning more frequently in easily polluted areas.
  - Do not use acidic or alkaline cleaning agents, and make sure to rinse the Container thoroughly with clean water after cleaning.

- **Additional fence**: For security reasons, the installation area should be surrounded by locking fences or walls accessible to qualified persons only.
- **Installation environment requirements**:
  - » Temperature: -30°C to +55°C.
  - » Relative humidity: 0 – 100% RH.
  - » Altitude: Below 3000 meters.
  - » Good ventilation.
  - » Keep away from sandy and dusty environments.
  - » Keep away from high temperature environment such as heat source and fire source, etc.
  - » Keep away from flammable and explosive materials and areas with dust.
  - » Keep away from corrosive substances.
  - » Keep away from strong electromagnetic fields and antenna.
  - » Keep away from strong vibration and noise sources.
  - » Keep away from areas with radiation.
  - » Keep away from areas with metal conductive and magnetic dust.
  - » Keep away from areas that produce or have toxic and harmful gases.
  - » Keep away from environments that are prone to microbial growth.



4.1.1 Installation Foundation Requirements

To ensure the normal operation of the container, pleas construct the concrete foundation following the requirements below.

- Ensure the foundation's load-bearing capacity is at least 15 t.
- The position of the corner fittings of the container must be set to load-bearing points with steel plates and steel studs.
- Strictly follow the construction drawing to prevent any misalignment between the load-bearing points of the concrete foundation and corner fittings.
- After construction completes, perform a flatness inspection for the load-bearing points of the foundation using professional instruments such as spirit level or laser level. Make sure the overall flatness of all load-bearing points is within the allowable tolerance, and keep a record of the results.
- Allowable tolerance range: Horizontal deviation between load-bearing points at corner fittings:≤2 mm

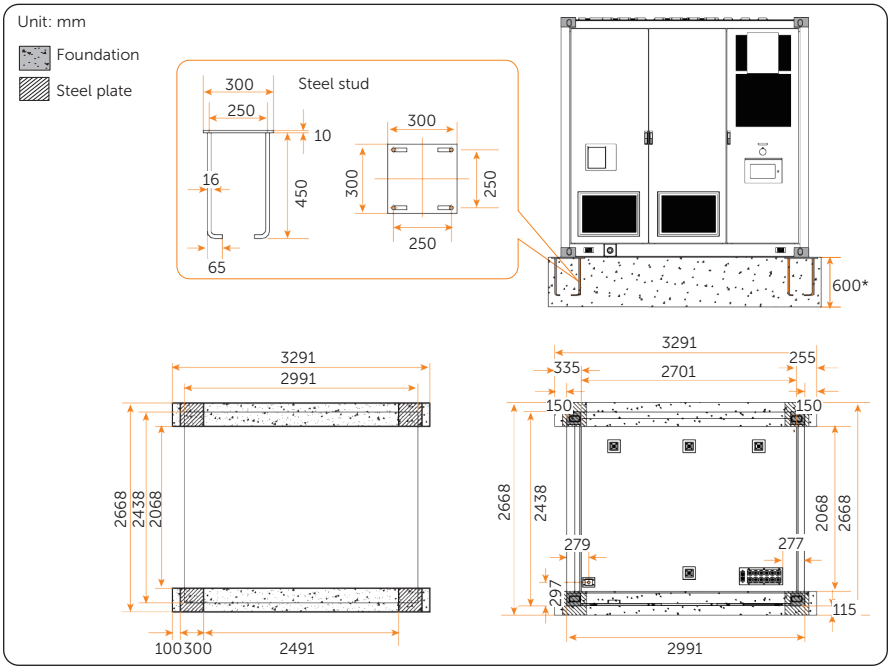


Figure 4-1 Foundation requirements

NOTICE!

*: The height of the foundation above the floor is subject to the requirements of local departments and the on-site conditions.

4.1.2 Clearance Requirements

Single Container

For a single container, reserve a space of at least 3500 mm in the front, 1000 mm at the rear, 600 mm on the left, 1000 mm on the right, and 1500 mm on the top.

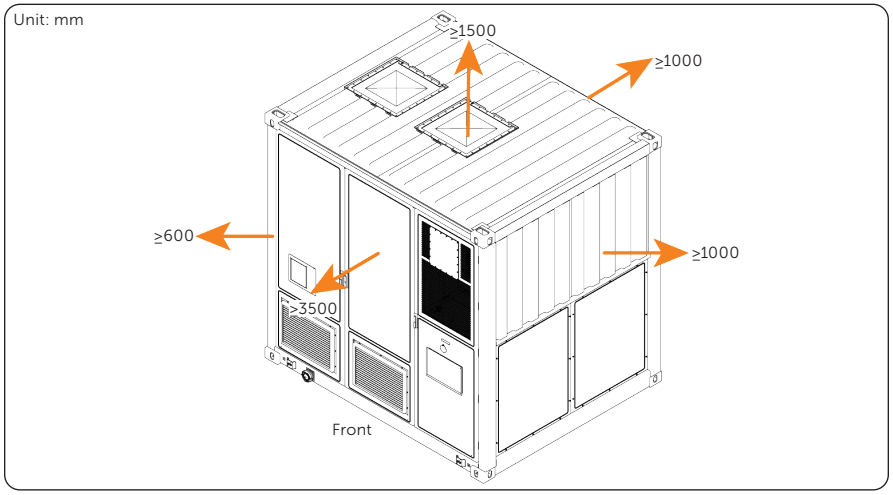


Figure 4-2 Clearance requirements for a single container

Multiple Containers

For multiple containers, we recommend 2 types of arrangement solutions: all containers placed in a row side by side, or all container placed in a column face to face.

NOTICE!

If multiple containers will be placed side by side, the distance between each two containers must be 76 mm as shown in Plan A. Otherwise, place them in a column as plan B.

- **Plan A: Placed in a Row Side by Side**

In this case, the distance between each two containers must be 76 mm as required by the customs. Besides, reserve a space of at least 600 mm for the leftmost container, and 1000 mm for rightmost container.

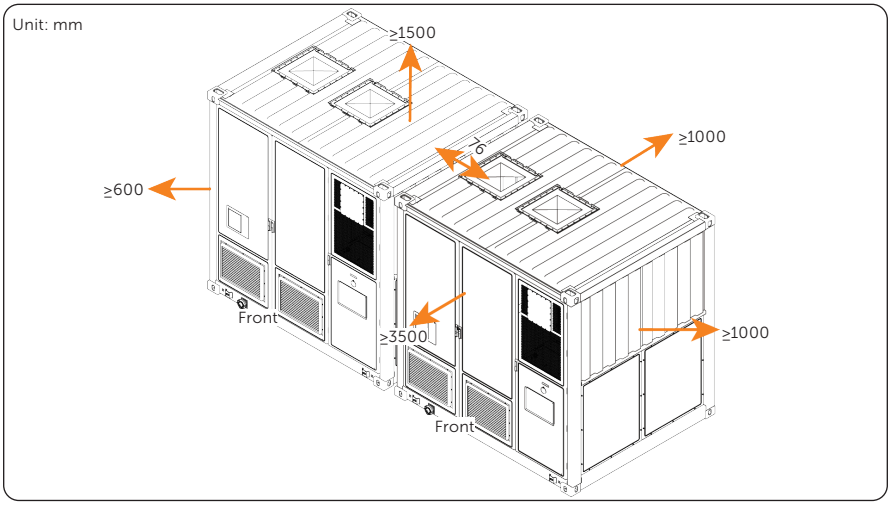


Figure 4-3 Clearance requirements for containers side by side

- **Plan B: Placed in a Column Face to Face**

In this case, reserve a space of at least 3500 mm in the front of the container, 1000 mm at the rear, 600 mm on the left, and 1000 mm on the right.

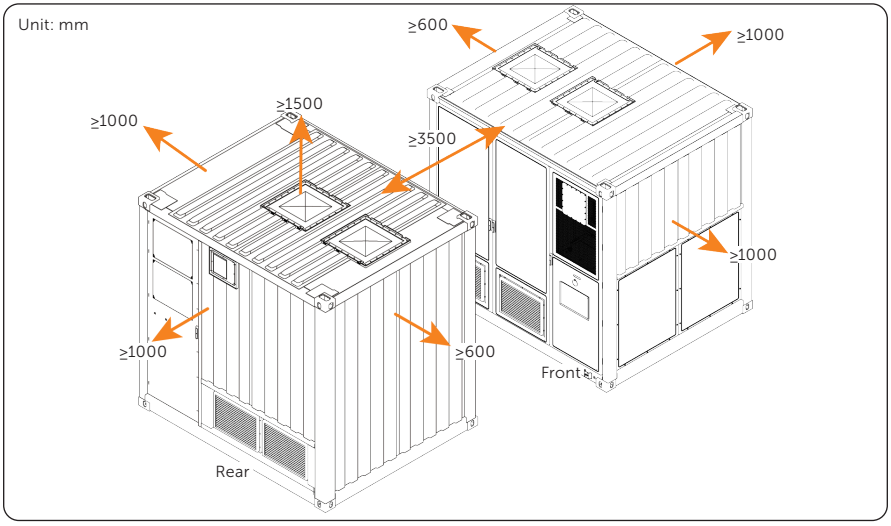
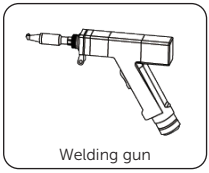
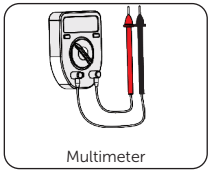


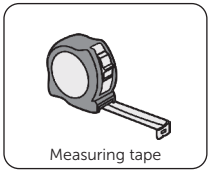
Figure 4-4 Clearance requirements for containers face to face

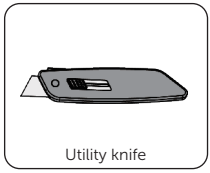
4.2 Tool Requirements

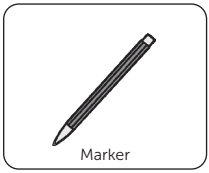
The tools used include but are not limited to the recommended tools below. Please use other auxiliary tools according to the site requirements. Please note that the tools used must comply with local regulations.

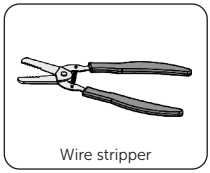

Welding gun

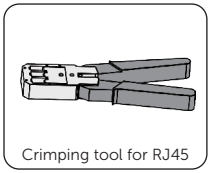

Multimeter

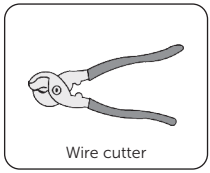

Measuring tape

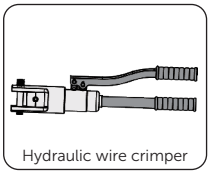

Utility knife

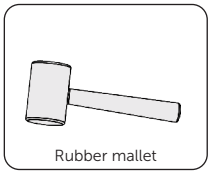

Marker

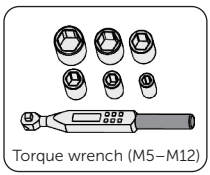

Wire stripper

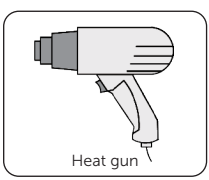

Crimping tool for RJ45

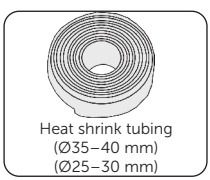

Wire cutter

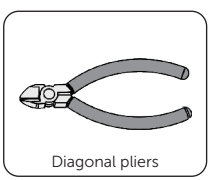

Hydraulic wire crimper

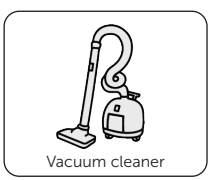

Rubber mallet

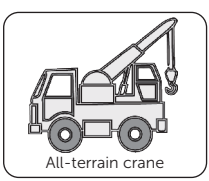

Torque wrench (M5–M12)

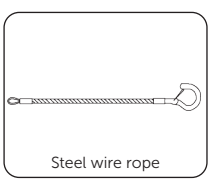

Heat gun

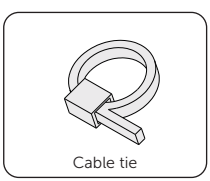

Heat shrink tubing
(Ø35–40 mm)
(Ø25–30 mm)

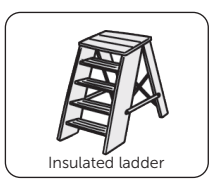

Diagonal pliers

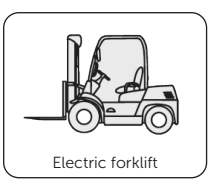

Vacuum cleaner


All-terrain crane


Steel wire rope

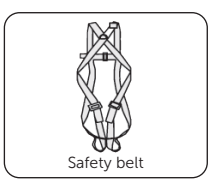

Cable tie


Insulated ladder


Electric forklift


Safety vest


Safety helmet


Safety belt

4.3 Additionally Required Materials

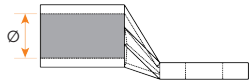
The specification of grid cables required for the multiple container models are different. Prepare cables and terminals of proper specification for your container model based on the tables below.

NOTICE!

- Select matching ring terminals and cables for cable connection.
- Arrange the wiring conforming to local laws and regulations.
- The tables below are for reference only. Please adjust the materials according to on-site conditions and local requirements.

Commonly Required Materials (For Container Grounding)

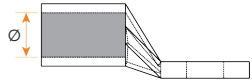
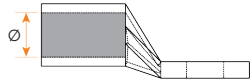
Table 4-2 Commonly required materials for all container models

No.	Required Material		Type	Conductor Cross-section	Quantity
1	PE cable		Conventional yellow and green wire	120 mm^2	1 pc
2	Ring terminal		TLK120-12	 Inner diameter of cable conductor: Ø12.5 mm	1 pc

TRENE-P500B1044L-2H & TRENE-P499B1044L-2H

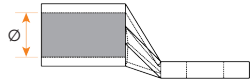
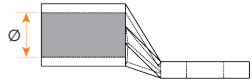
Table 4-3 Additionally required materials (1)

No.	Required Material		Type	Conductor Cross-section	Quantity
1	Grid cable		Single-core copper wire	240 mm^2	2 groups (L1, L2, L3, and N)
2	PE cable		Conventional yellow and green wire	120 mm^2	1 pc

No.	Required Material		Type	Conductor Cross-section	Quantity
3	Ring terminal		DT240-12	 Inner diameter of cable conductor: Ø17.5 mm	8 pcs (For connecting gird power cables)
4			TLK120-8	 Inner diameter of cable conductor: Ø12.5 mm	1 pc (For connecting grid PE cable)

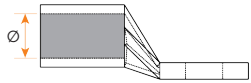
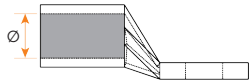
TRENE-P400B1044L-2.5H & TRENE-P399B1044L-2.5H

Table 4-4 Additionally required materials (2)

No.	Required Material		Type	Conductor Cross-section	Quantity
1	Grid cable		Single-core copper wire	300 mm^2	1 group (L1, L2, L3 and N)
2	PE cable		Conventional yellow and green wire	150 mm^2	1 pc
3	Ring terminal		DT300-12	 Inner diameter of cable conductor: Ø19.5 mm	4 pcs (For connecting gird power cables)
4			TLK150-8	 Inner diameter of cable conductor: Ø14 mm	1 pc (For connecting grid PE cable)

TRENE-P319B1044L-3H

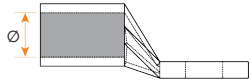
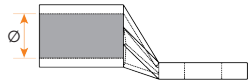
Table 4-5 Additionally required materials (3)

No.	Required Material		Type	Conductor Cross-section	Quantity
1	Grid cable		Single-core copper wire	240 mm^2	1 group (L1, L2, L3 and N)
2	PE cable		Conventional yellow and green wire	120 mm^2	1 pc
3	Ring terminal		DT240-12	 Inner diameter of cable conductor: Ø17.5 mm	4 pcs (For connecting gird power cables)
4			TLK120-8	 Inner diameter of cable conductor: Ø12.5 mm	1 pc (For connecting grid PE cable)

TRENE-P260B1044L-4H & TRENE-P250B1044L-4H & TRENE-P249B1044L-4H

Table 4-6 Additionally required materials (4)

No.	Required Material		Type	Conductor Cross-section	Quantity
1	Grid cable		Single-core copper wire	185 mm^2	1 group (L1, L2, L3 and N)
2	PE cable		Conventional yellow and green wire	95 mm^2	1 pc

No.	Required Material		Type	Conductor Cross-section	Quantity
3	Ring terminal		DT185-12	 Inner diameter of cable conductor: Ø15.5 mm	4 pcs (For connecting gird power cables)
4			TLK95-8	 Inner diameter of cable conductor: Ø11 mm	1 pc (For connecting grid PE cable)

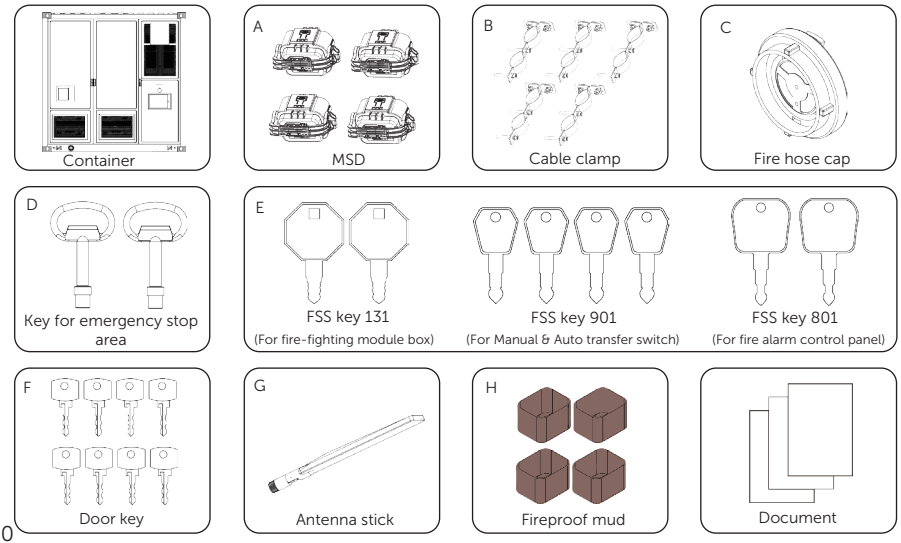
5 Unpacking and Inspection

5.1 Unpacking

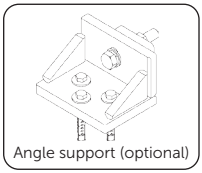
- The equipment undergoes testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur. Before unpacking the Container, please carefully check again.
- To ensure the Container remains stable during transportation, workers would use ropes to secure it to the transfer transportation vehicle from both the top and bottom ring.
- Due to the Container height exceeding 2m, please take necessary precautions for working at heights when removing the outer packaging.
- When unpacking, please handle all packaging materials properly for future storage or relocation of this equipment.
- After unpacking, please check if the equipment is intact and if all accessories are complete. If there is any damage or missing accessories, please contact your dealer immediately for assistance.

5.2 Packing List

Included Parts



Optional Parts


Angle support (optional)

No.	Item	Quantity (PCS)	Description
/	Container	1	/
A	MSD	4	/
B	Cable clamp	5	For fixing the grid cables
C	Fire hose cap	1	For fire hose protection
D	Key for emergency stop area	2	For unlocking the emergency stop area of the fire protection system
E	FSS key 131	2	For unlocking the door of the Fire-fighting module box
	FSS key 901	4	For unlocking the door of the Manual & Automatic transfer switch
	FSS key 801	2	For unlocking the door of the fire alarm control panel
F	Door key	8	For locking and unlocking the container door
G	4G Antenna stick	1	For expanding data transmission
H	Fireproof mud	4	For sealing off the grid cable inlet
/	Document	/	/
/	Angle support	4	Optional

NOTICE!

- FSS keys (131, 901 and 801) are delivered in a bundle.

6 Mechanical Installation

6.1 Container Fixing

The container can be fixed onto the foundation through welding or angle supports. Welding is more recommended for higher stability and easier maintenance. For preparation before fixing the container to the concrete foundation, see "3.1 Hoisting Requirements" to move the container onto the foundation.

6.1.1 Fixing through Welding (Recommended)

This fixing method requires you to set up steel plates into the foundation in advance.

NOTICE!

- Ensure that all load-bearing points are well aligned with the foundation.
- Remove the coating around the load-bearing points before welding, and repaint around the area after welding. For how to repaint the container, see "13.2 How to Repaint the Container".

Weld the embedded steel plates on the foundation to the 4 corner fittings at the front and rear of the container.

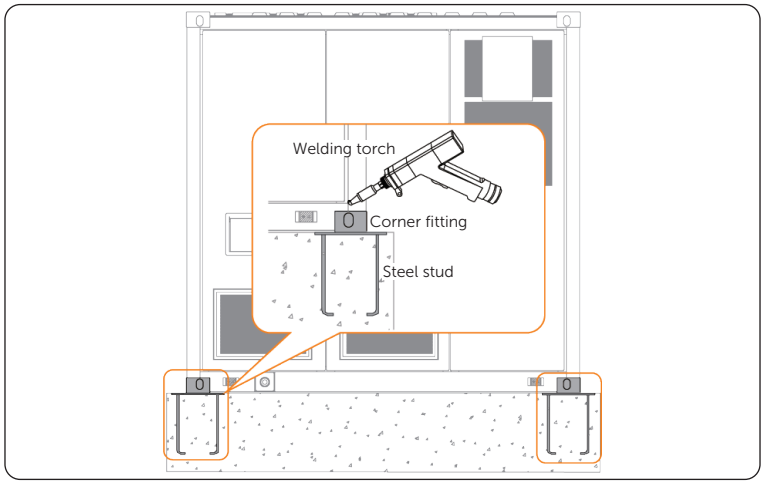


Figure 6-1 Welding the container

6.1.2 Fixing through Angle Supports

NOTICE!

The angle supports can be installed either on the left and right side, or the front and rear side of the container. The diagrams below use the former for example.

Angle Support Solution for a Single Container

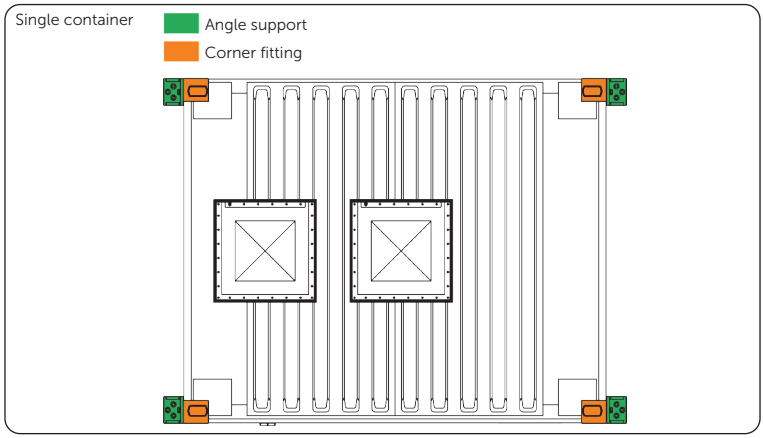


Figure 6-2 Solution for fixing a single container through angle supports

Angle Support Solution for Two Containers

NOTICE!

- The two containers are bound through connectors in between upon delivery.
- Angle supports are required only on the sides of the combined containers.

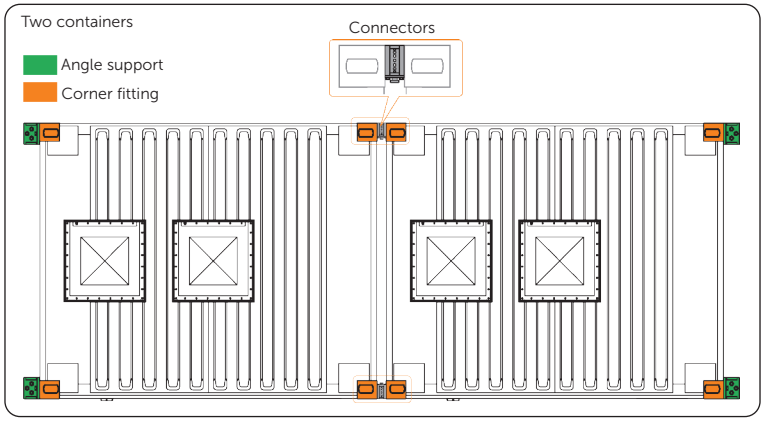


Figure 6-3 Solution for fixing two containers through angle supports

Angle Support Dimensions

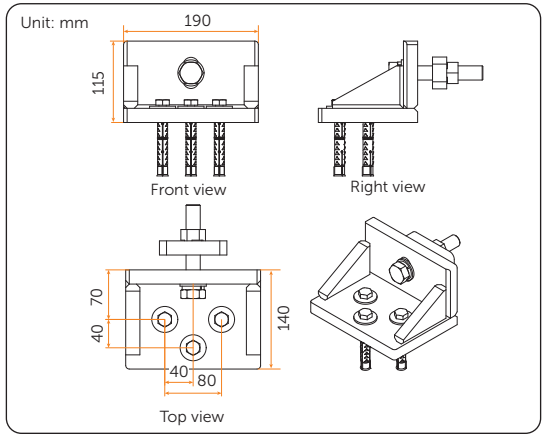


Figure 6-4 Dimensions of the angle support

Angle Support Installation Procedure

The angle support installation procedure is identical either the angle supports are installed in the front and rear side of the container or the left and right side.

Step 1: Disassemble the angle support into separate M20 hex bolt, angle support, corner fixing plate and M12 expansion bolts.

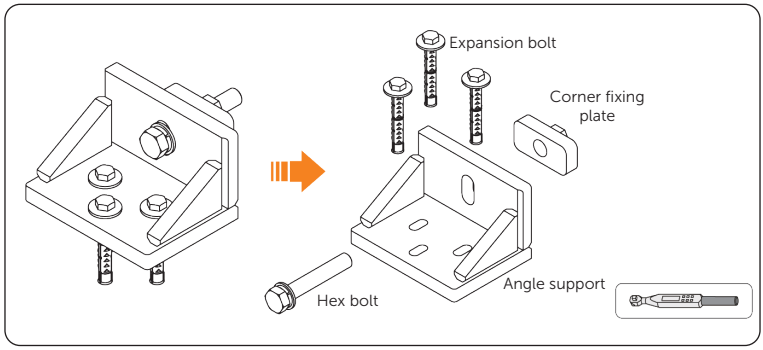


Figure 6-5 Disassembling the angle support

Step 2: Align the hole of the angle support with the corner fitting, and then draw circles through the fixing holes on the bottom of the angle support.

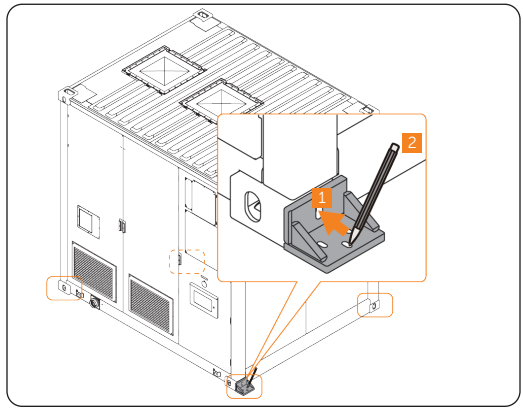


Figure 6-6 Drawing circles on the foundation

Step 3: Remove the angle support, drill holes into the foundation through the markings, and then clean the site.

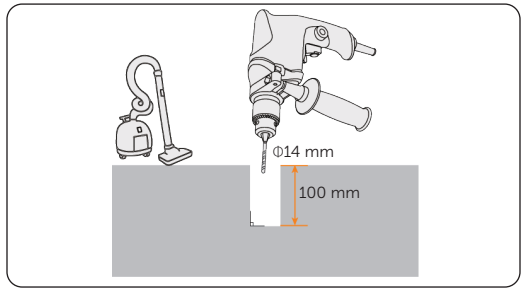


Figure 6-7 Drilling holes

Step 4: Insert the corner fixing plate into the hole of the corner fitting.

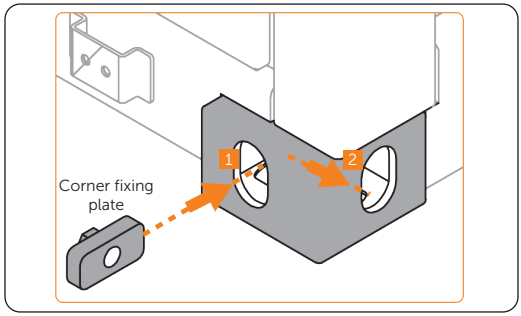


Figure 6-8 Inserting the corner fixing plate

Step 5: Use the original M20 hex bolt and this corner fitting to secure the angle support onto the container, and then tighten the M20 screw.

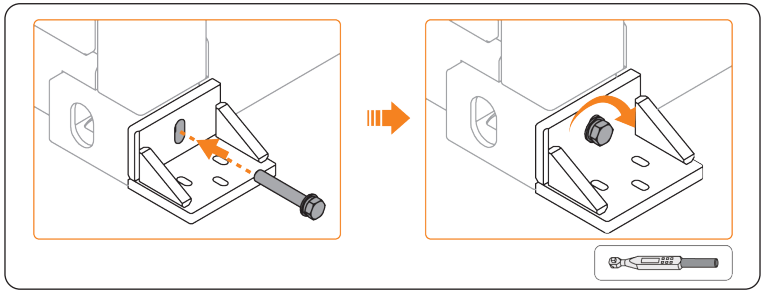


Figure 6-9 Securing the angle support to the container

Step 6: Hammer in the M12 expansion bolts into the holes in the foundation, and then tighten the expansions bolts.

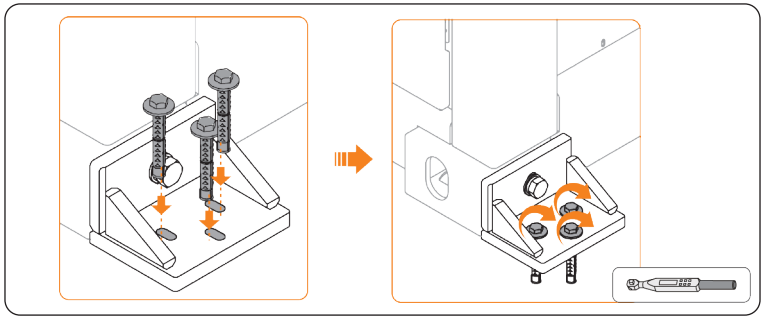


Figure 6-10 Securing the container to the foundation

6.2 Installation of Antenna

The container is designed with 2 antenna ports at the rear. The left one is for connecting the 4G antenna stick for data transmission, and the right one is reserved for users.

NOTICE!

- Keep the sealing caps on if the antenna terminals are not used.

Step 1: Remove the silicone cap from the antenna port.

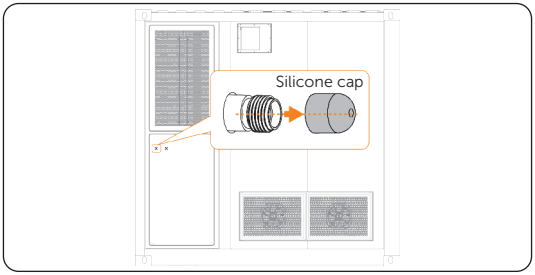


Figure 6-11 Removing silicone cap

Step 2: Insert and swirl the antenna stick (part H) clockwise to fix it on the Container port.

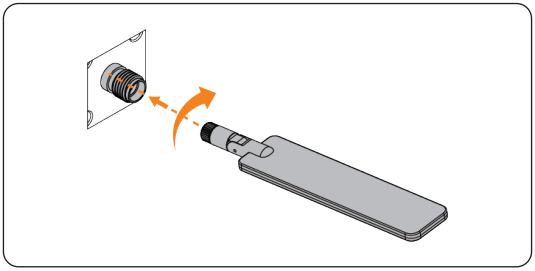


Figure 6-12 Installing antenna stick

Step 3: Fold the antenna up 90°.

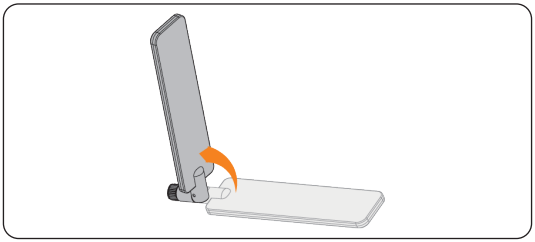


Figure 6-13 Folding up antenna stick

6.3 Installation of MSD

NOTICE!
MSD of the 104S battery pack on the bottom of each battery cluster is unplugged upon delivery to ensure safety.

Step 1: Unlock the front doors.

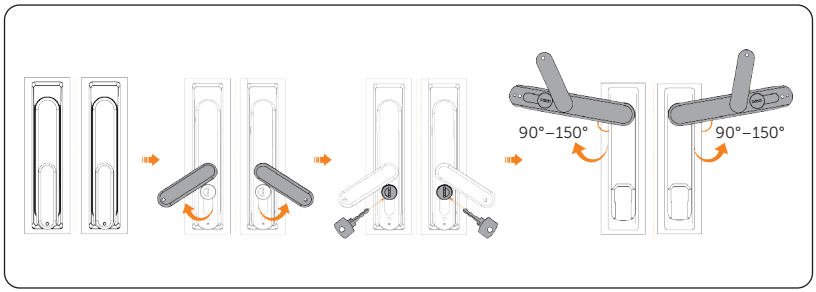


Figure 6-14 Opening the front doors

Step 2: Open the door until the door stay locks into place.

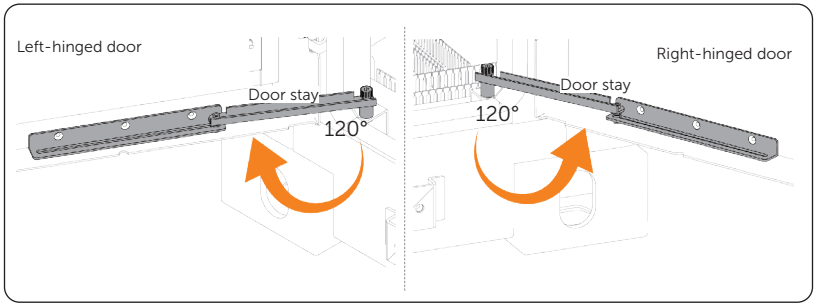


Figure 6-15 Fixing the door with door stay

Step 3: Remove the cover on the MSD socket of the battery pack.

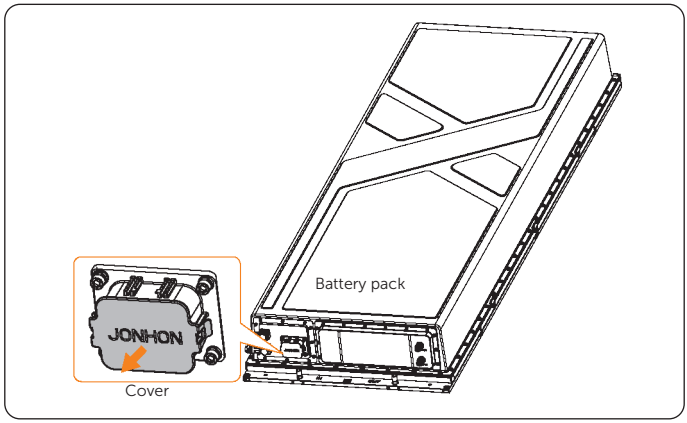


Figure 6-16 Removing cover

Step 4: Install the MSD.

» Insert the MSD into the MSD socket.

» Push the handle up to make sure that the plug is fully closed.

» Pull the green sheet to lock.

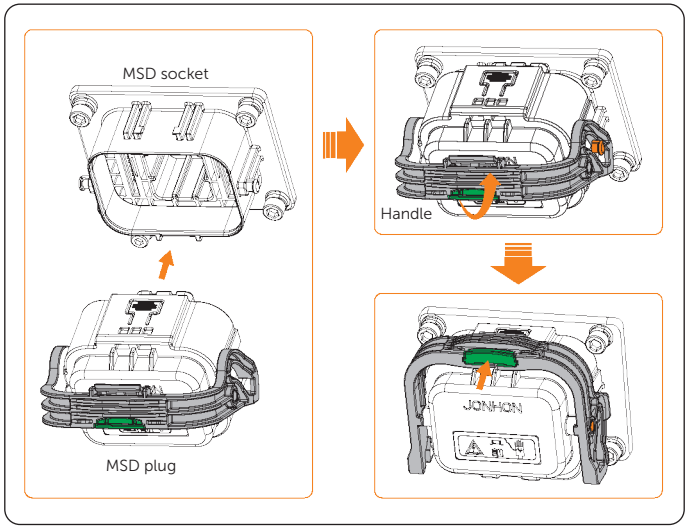


Figure 6-17 Installation of MSD

Step 5: Repeat Step 4 to install the rest MSDs to the remaining 104S battery packs.

6.4 Installation of Fire Hose Cap

Fire hose cap is not attached to the fire hose upon delivery. Please install it onto the fire hose after fixing the container.

Align the cap to the fire hose, and then rotate it to secure the cap onto the hose.

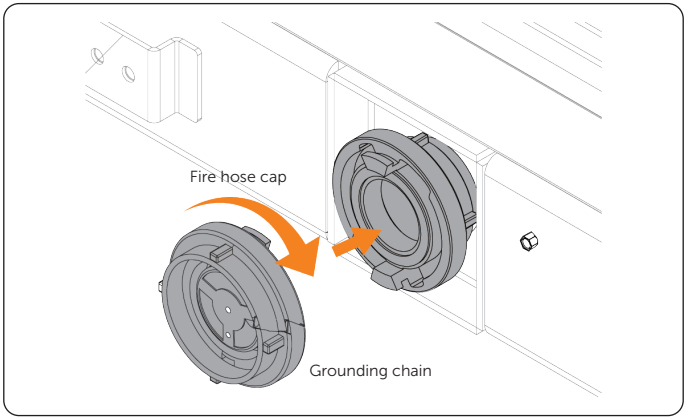


Figure 6-18 Attaching the fire hose cap

7 Electrical Connection

The system features easy and convenient electrical connection. Connections among the system parts are completed upon delivery, and you only need to connect the system to the ground for protection, to the grid for power supply, to external router for communication, and to the grid meter for power flow monitoring.

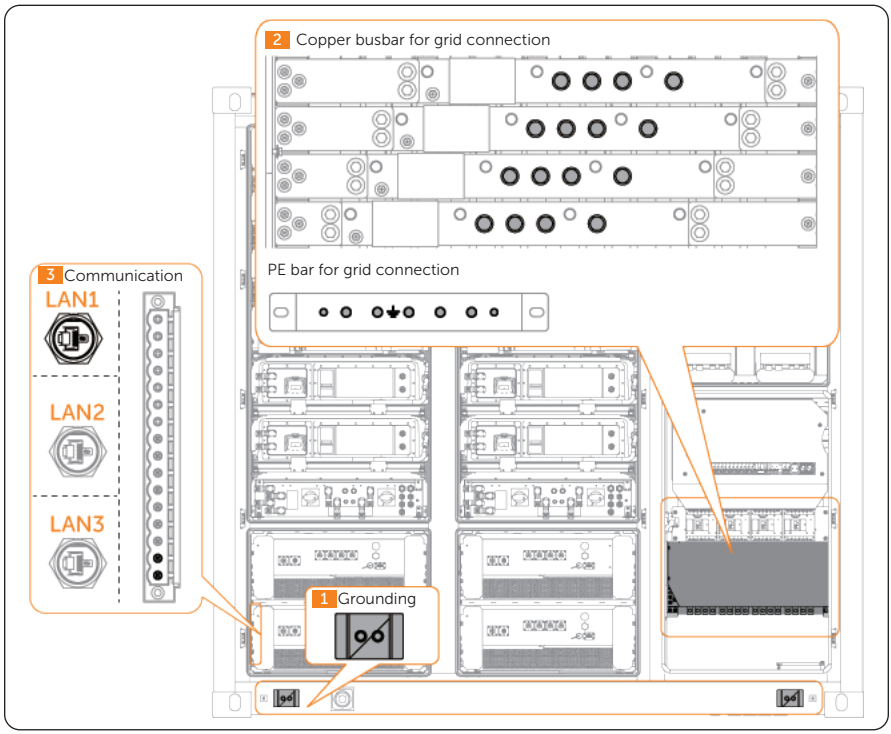


Figure 7-1 Position of the wiring areas

7.1 Grounding Connection

Connect PE wire for the container for grounding protection before connecting the power cables.

NOTICE!

- The container offers 4 grounding terminals on the front bottom, with two terminals on each side.
- Select any one of the grounding terminals to connect the PE wire.
- It is strictly prohibited to install fuses, switches, or other devices on the PE wire.

Step 1: Strip the outer jacket off the PE cable to an appropriate length.

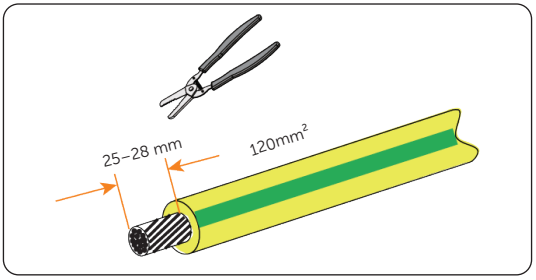


Figure 7-2 Striping cable jacket

Step 2: Cut a section of heat shrink tubing, thread it through the stripped cable, and then attach the ring terminal.

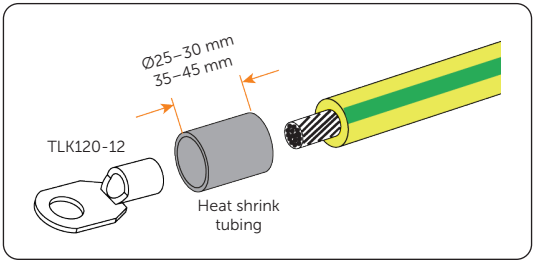


Figure 7-3 Attaching tubing and ring terminal

Step 3: Crimp the terminal, pull the heat shrink tubing section to the crimped area, and then heat them with a heat gun.

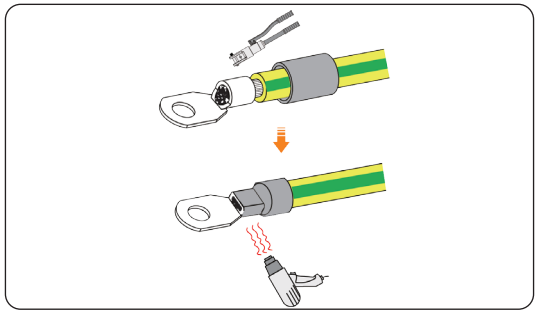


Figure 7-4 Crimping and heating

Step 4: Remove the M12 screw attached to the grounding point, align the ring terminal of the PE cable to the grounding terminal, and then use the original M12 screw to secure the connection.

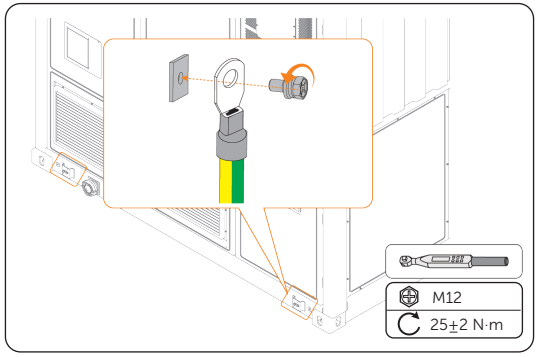


Figure 7-5 Securing PE cable

7.2 Grid Connection

NOTICE!

- The cable entry holes for grid connection are at the bottom of the container's electrical compartment.
- The current-carrying capacity of the grid power cables must meet the requirements of system operation and on-site environment.

NOTICE!

- The procedure of making grid cables are the same for all container models. This section uses the grid wiring of TRENE-P500B1044L-2H for example.
- 2 groups of grid cables (L1, L2, L3 and N wire) are required for TRENE-P500B1044L-2H.

Table 7-1 Cable specification requirements

Cable Type	Conductor Cross-section	Insulation Stripe	Heat Shrink Tubing	Ring Terminal (REC)
Single-core copper cable	L1, L2, L3, N: 240mm^2	34–36 mm	Diameter: Ø35–40 mm Length: 70–80 mm	DT240-12
	PE: 120mm^2	25–28 mm	Diameter: Ø25–30mm Length: 35–45mm	TLK120-8

Step 1: Prepare the power cables.

a. Strip the outer jacket off the power and PE cables.

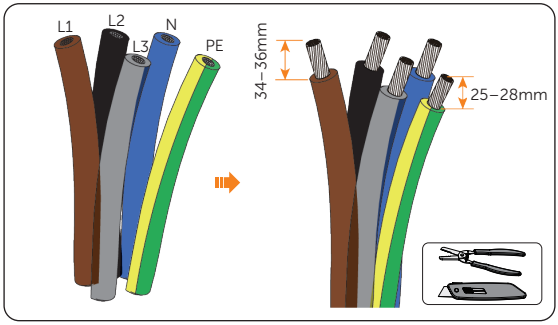


Figure 7-6 Striping cable jackets

b. Cut sections of heat shrink tubing, thread them through the stripped cables, and then attach the ring terminals.

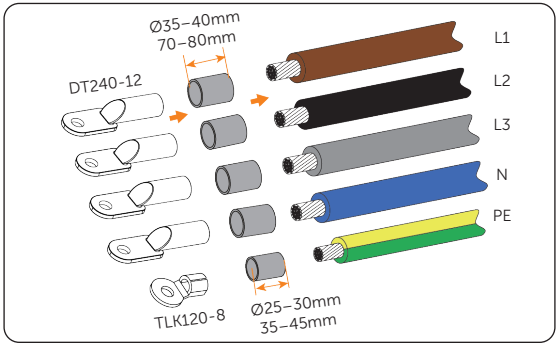


Figure 7-7 Attaching tubing sections and ring terminals

c. Crimp the terminals, pull the heat shrink tubing sections to the crimped area, and then heat them with a heat gun.

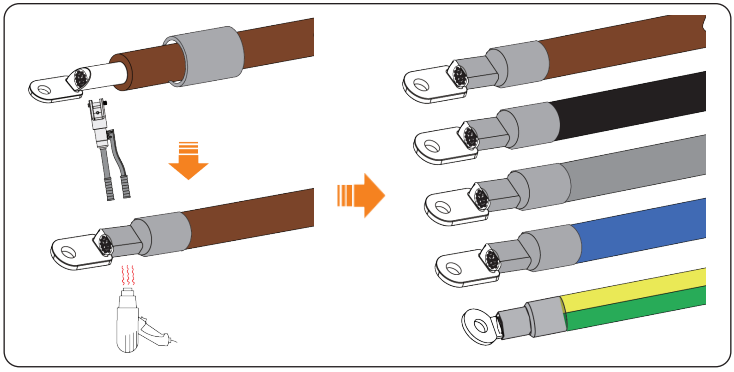


Figure 7-8 Crimping and heating

Step 2: Open the right front door, and use the door stay to keep it wide open.

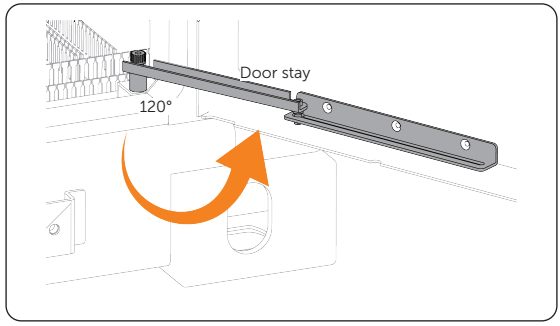


Figure 7-9 Fixing the door with the door stay

Step 3: Remove the wire cover from the wiring area.

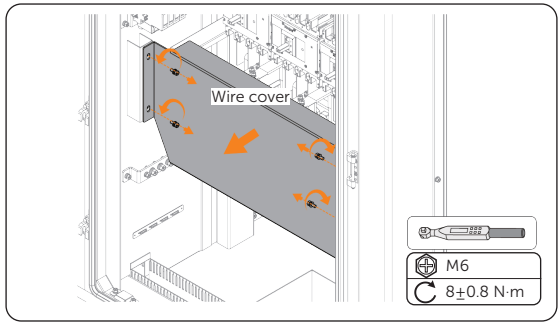


Figure 7-10 Removing the wire cover

Step 4: Remove the M6 screws, lift the cable entry plate up, and then cut holes through the cable entries.

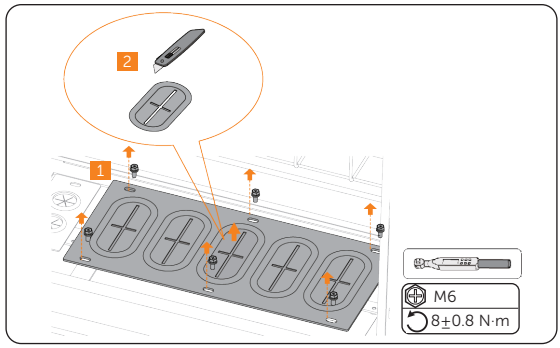


Figure 7-11 Cutting through the cable entries

Step 5: Thread the PE and power cables through the cable entries in sequence.

Step 6: Unscrew a M8 screw from the PE bar, align the PE cable to the terminal, and then use the screw to secure the connection.

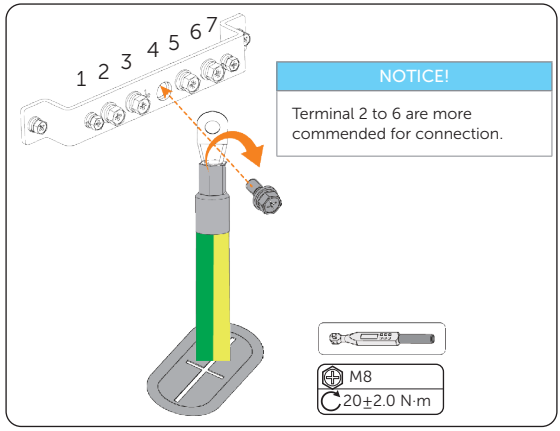


Figure 7-12 Connecting the PE cable

Step 7: Unscrew the M12 screws from copper busbar, align the power cables to corresponding terminals, and then use the screws to secure the connections.

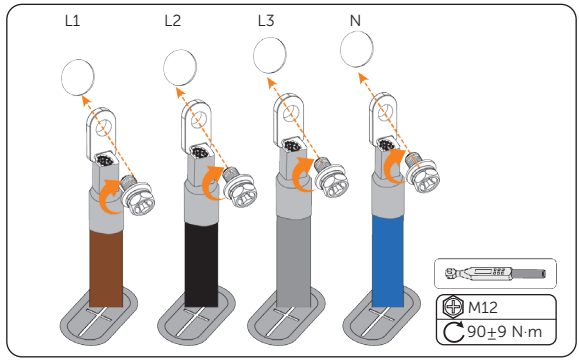


Figure 7-13 Connecting the power cables

Step 8: Press the entry plate down, and then use the original M6 screws to secure it.

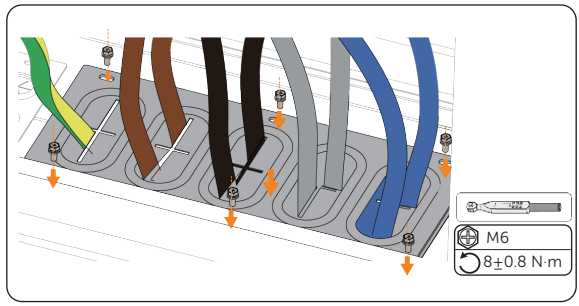


Figure 7-14 Securing the cable entry plate

Step 9: Disassemble the cable clamp (part B).

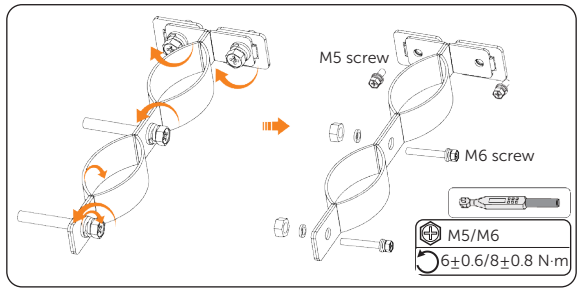


Figure 7-15 Disassembling the cable clamp

Step 10: Embrace the cables with the hoops, use the M5 screws to attach the hoops onto the rail, and then use the M6 screws to secure these cables.

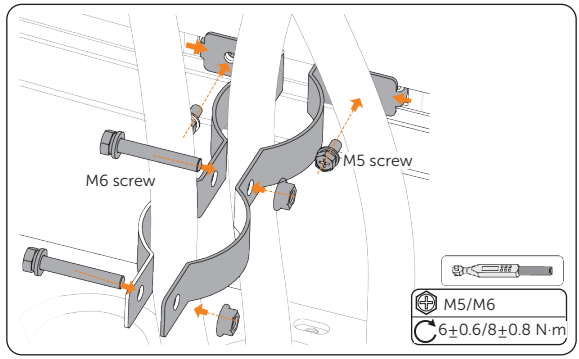


Figure 7-16 Securing cables with cable clamps

Step 11: Attach fireproof mud to seal all the cable entries.

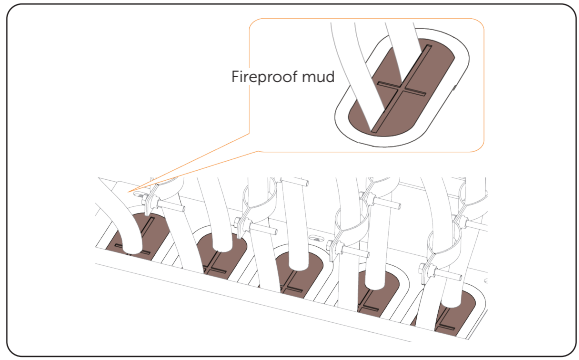


Figure 7-17 Attaching fireproof mud

Step 12: Install the wire cover back onto the power distribution area.

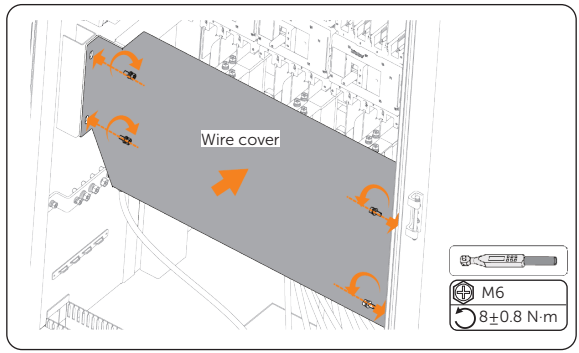
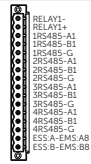


Figure 7-18 Reinstalling the wire cover

7.3 Communication Connection

The adapter terminals from EMS1000 for network connection, parallel connection, and external meter connection are located on the left front side of the container.

No.	Marking	Terminal type	Definition	Figure
1	LAN1	RJ45	For external network connection	
2	LAN2		For parallel connection with PCS (input port)	
3	LAN3		For parallel connection with PCS (output port)	
4	/	Terminal block	For dry contact connection, communication with PCS and connection to meter	

7.3.1 Network Connection

Connect LAN1 port of the container to Ethernet so that you can view the system operation details remotely.

NOTICE!

- Network cable is not in the scope of delivery. Please prepare them in advance.

Step 1: Strip the outer jacket off the network cable to an appropriate length at both ends.

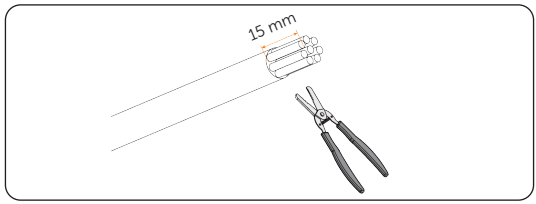
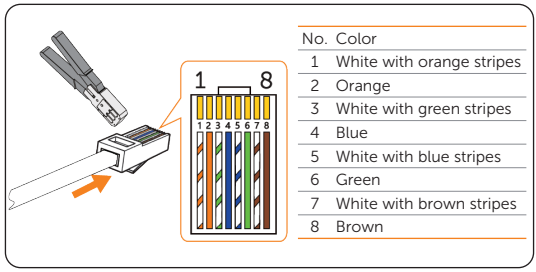


Figure 7-19 Stripping cable jacket

Step 2: Insert the wires into the pin contacts of the RJ45 connector in sequence, and then use a crimping tool to securely crimp the wires into the connector.



No.	Color
1	White with orange stripes
2	Orange
3	White with green stripes
4	Blue
5	White with blue stripes
6	Green
7	White with brown stripes
8	Brown

Figure 7-20 Crimping RJ45

Step 3: Disassemble the cable gland, and then remove a sealing plug from it.

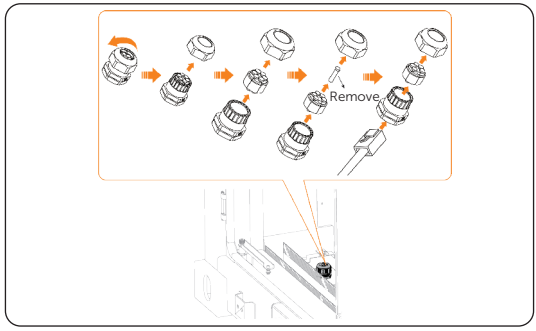


Figure 7-21 Removing the sealing plug from the cable gland

Step 4: Thread the network cable through the hole of the cable gland, and then insert the RJ45 connector at one end of the network cable into **LAN1** port.

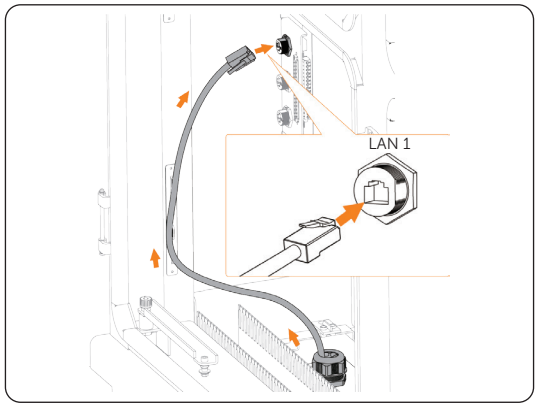


Figure 7-22 Connecting network cable to the container

Step 5: Insert the RJ45 connector at the other end of the network cable into the router port.

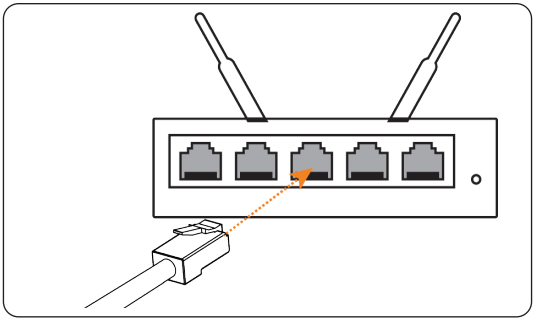


Figure 7-23 Connecting the network cable to the router

7.3.2 Meter Connection

Connect the meter to the container for electricity flow monitoring.

NOTICE!

- SolaX M3-40 and rogowski coil (1000A/40mA) are used for wiring procedure illustration. The meter and coil are optional. Please contact SolaX sales for purchase.
- This meter model includes a 5-meter communication cable upon delivery.

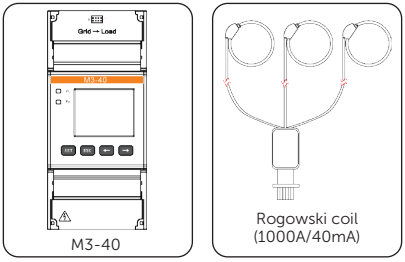


Figure 7-24 M3-40 meter and Rogowski coil

Table 7-1 Corresponding terminals of EMS1000 and M3-40

Terminal of the container		RS485 terminal of M3-40	
Marking	Pin assignment	Marking	Pin assignment
ESS:A-EMS:A8	RS485A	RS485-A	RS485A
ESS:B-EMS:B8	RS485B	RS485-B	RS485B

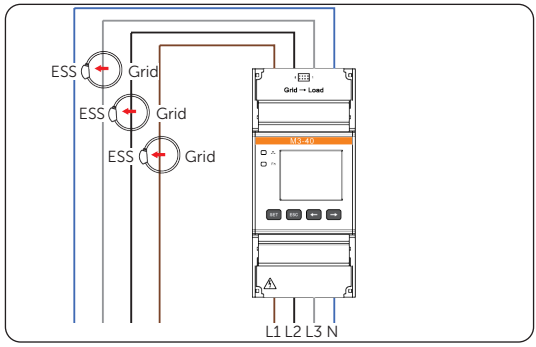


Figure 7-25 Wiring diagram of M3-40 and Rogowski coil

Step 1: Insert the connector of the Rogowski coil into the CT terminal of M3-40, and then clip the Rogowski coil onto the grid cables.

Pay special attention to the direction of the coil.

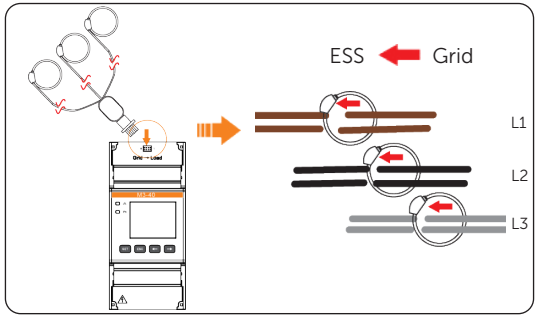


Figure 7-26 Connecting the CT

Step 2: Strip the communication cable to an appropriate length at both ends.

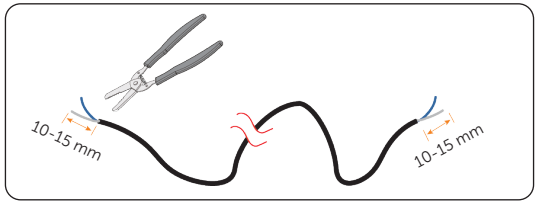


Figure 7-27 Stripping the communication cable

Step 3: Use a flat-headed screwdriver to secure the conductors into A8 and B8 of the RS485 terminals.

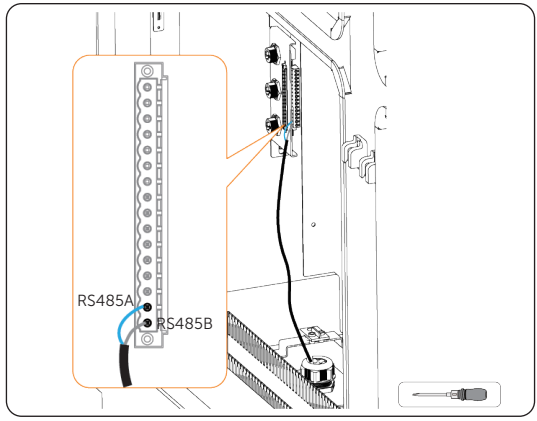


Figure 7-28 Connecting communication cable to the container

Step 4: Thread the other end of the communication out of the container through the cable threading holes, and then connect the other end of the conductors respectively into port 24 and 25 of the meter.

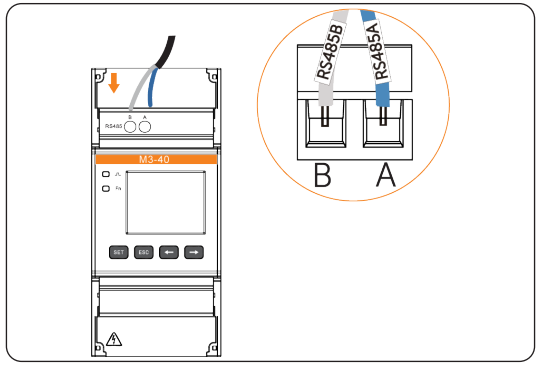


Figure 7-29 Connecting communication cable to the meter

8 System Power-on

8.1 Checking before Power-on

Ensure that all the cables are properly connected, and that all the electric components are switched off.

Table 8-1 Checklist

No.	Item	Description
1	Equipment appearance	• Check whether the equipment is in good condition, with a clean, non-peeling paint, and rust-free surface. • Ensure that the labels on the equipment are clear and easy to read. If any label is damaged, replace it at once.
2	Cable appearance	• Check whether the cable jacket is in good condition. • Check whether the protective pipes are in good condition.
3	Cable connection	• Check whether the cable connection position is consistent with the design principles. • Ensure that the procedure for crimping terminals strictly observes the requirements, and the terminals are securely fastened. • Check whether the labels on the both sides of cables are clear, and the direction of both labels is the same.
4	Wiring	• Ensure that the wiring procedure is consistent with the principle of separation of strong and weak electricity. • Ensure that the cables are properly arranged. • Leave a little extra length for adjustments. • Keep cables tidy in the Container. • **Check if the grid connection voltage meets: L1+N=220/230 V, L2+N=220/230 V, L3+N=220/230V, L1+L2=380/400 V, L2+L3=380/400 V, L1+L3=380/400 V.**
5	System emergency stop button	Make sure to check if the emergency stop button is in the released position
6	Copper bars	Check to make sure the copper bars are not deformed.

8.2 Powering on the System

The position of parts for powering on the system is as follows.

NOTICE!

- Before performing the power-up operations on these parts, check the power status of the system through the AC power indicator on the right front door of the electrical compartment.
- Each time after turning on a part of the Container system, make sure the component works normally.
- Before powering on, make sure the Auto & Manual transfer switch is set to **Manual Only** mode. For procedure, see Step 1 below.

Figure 8-1 Position of parts for powering on the system

Step 1: Rotate the Auto & Manual transfer switch to **Manual Only**.

The Auto & Manual transfer switch is provided on both the emergency stop area of fire protection system and the fire alarm control panel. Select any of them for operation.

» Operating on emergency stop area: Unlock the emergency stop area with the key (part D), and then rotate the switch clockwise to **Manual Only** with FSS key 901 (part E).

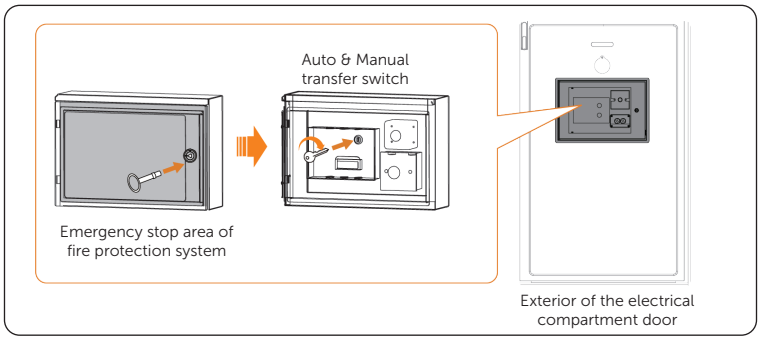


Figure 8-2 Enabling **Manual Only** mode on emergency stop area

» Operating on fire alarm control panel: Unlock the fire alarm control panel with FSS key 801 (part E), and then rotate the switch clockwise to **Manual Only** with FSS key 901 (part E).

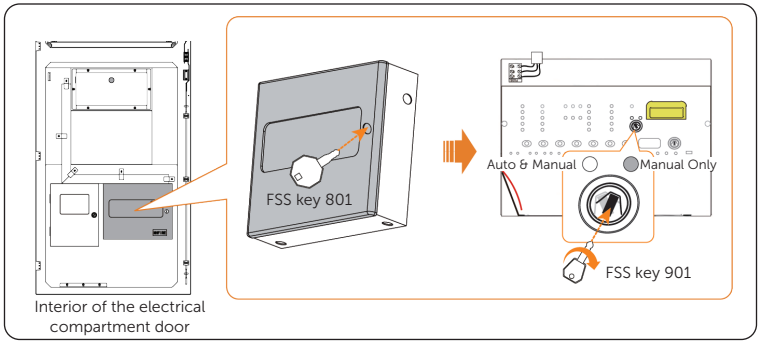


Figure 8-3 Enabling **Manual Only** mode on fire alarm control panel

Step 2: Flip up the PCS breakers.

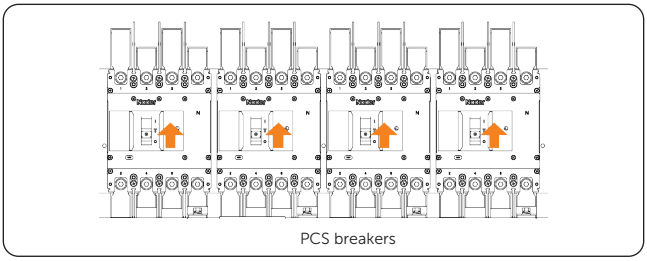


Figure 8-4 Flipping up PCS breakers

Step 3: Flip up the grid SPD breakers.

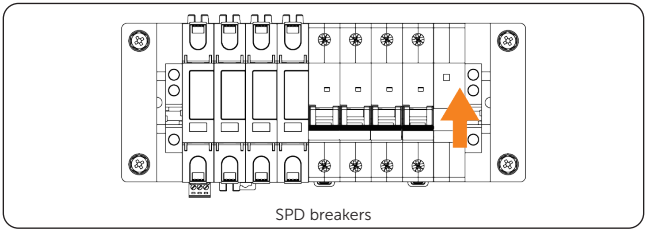


Figure 8-5 Flipping up SPD breakers

Step 4: Flip up the MCBs (Miniature Circuit Breakers).

a. Flip up QF8 for mains power supply.

b. Flip up QF9 for undervoltage protection for the main circuit.

c. Flip up QF10 for UPS.

d. Flip up QF6 and QF7 for liquid cooling unit.

e. Flip up QF11 for dehumidifier.

f. Flip up QF12 for thermal fan.

g. Flip up QF14 for fire protection system and fire fan.

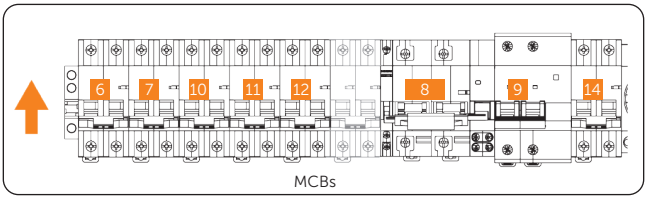


Figure 8-6 Flipping up MCBs

Step 5: Press and hold the power button of the UPS for 5 seconds to turn on it.

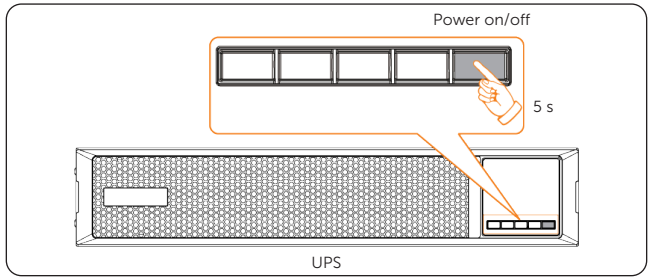


Figure 8-7 Turning on the UPS

Step 6: Connect wires in the fire control panel.

a. Connect signal cables of the sprinkler: Press down the latch on the enclosure, pull out the positive and negative cables out, and then insert and secure the cables to the fire control panel based on the markings.

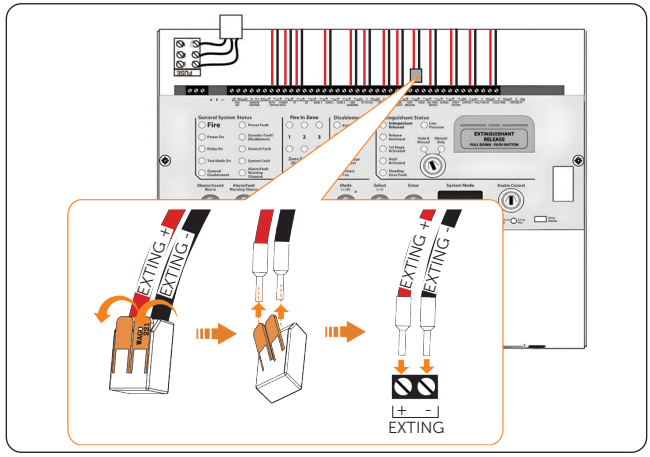


Figure 8-8 Connecting signal cables of sprinkler

b. Connect the power cables of the storage batteries: Connect the positive and negative power cables respectively to the two storage batteries.

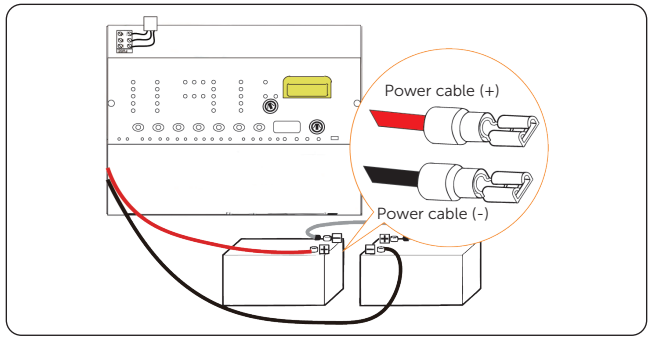


Figure 8-9 Connecting power cables for the storage batteries

Step 7: Restore the Auto & Manual transfer switch to **Auto & Manual** mode with FSS key 901, and then use FSS key 801 to lock the fire alarm control panel.

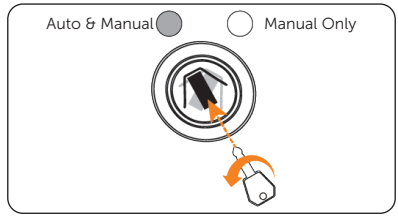


Figure 8-10 Restoring the Auto & Manual transfer switch

Step 8: Turn the rotary switch to the "ON" position to turn on the high-voltage box.

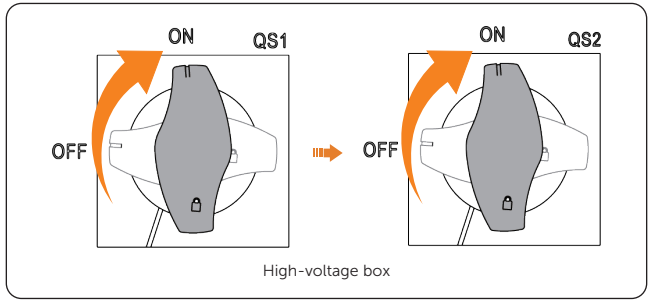


Figure 8-11 Turning on the high-voltage box

Step 9: Gently lift the door stay up with your foot to pull the stopper head out of the limit hole, and then close the door.

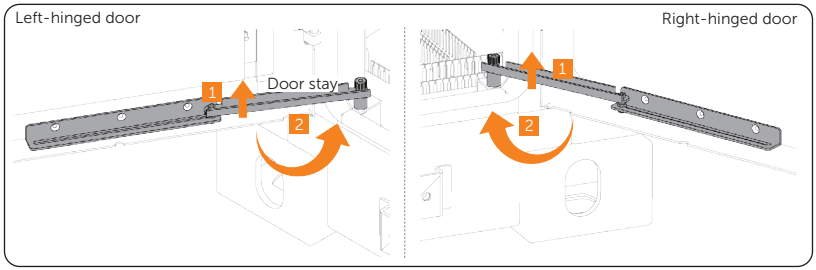


Figure 8-12 Closing the doors

Step 10: Lock the doors, and then remove and properly keep the keys.

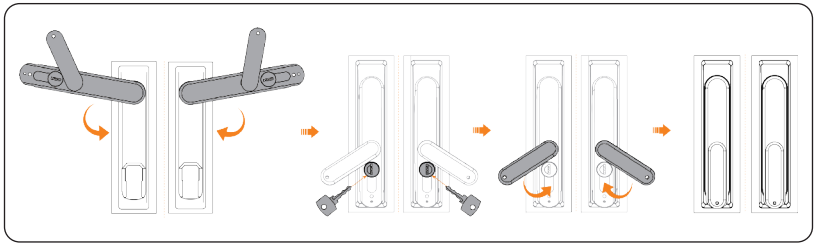


Figure 8-13 Locking the doors

NOTICE!
• Make sure you have locked the doors well after normally powering on the system.

9 Operation on EMS and SolaXCloud

Log in to EMS1000 webpage and SolaXCloud for unified management of the system.

9.1 Operation on EMS1000 Webpage

NOTICE!

- IE browser is not supported currently, and we recommend logging in to the webpage through Chrome.
- For detailed operations on EMS1000, see *EMS1000 User Manual*.

Step 1: Connect the computer to NET3 of EMS1000 with a network cable, or connect the computer to EMS1000 hotspot named WiFi_SN, and then go to the defined IP address based on the connection mode.

» For wired connection: 192.168.11.10

» For hotspot connection: 192.168.10.10

Step 2: On the login page, select the language, enter the username and password, and then click **Login**.

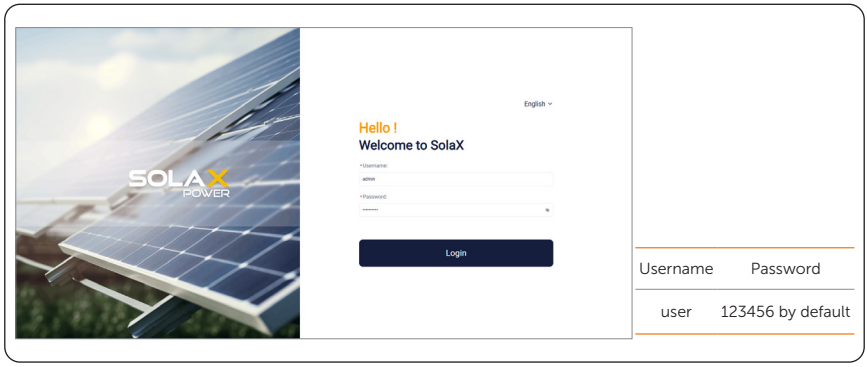


Figure 9-1 Logging in to EMS1000 webpage

9.2 SolaXCloud APP Login

Step 1: Downloading and installing App.

Select and scan the QR code below to download SolaxCloud APP. You can also find the QR codes at the button right of the login page of www.solaxcloud.com. In addition, you can search with the key word SolaxCloud in Apple Store or app store to download it.

Figure 9-2 QR code

Step 2: On the login page, enter your username and password. Select the checkbox to agree to the privacy policy and terms of use. Click on **Log in** to complete the app login. You can directly contact the SolaX to obtain your login credentials.

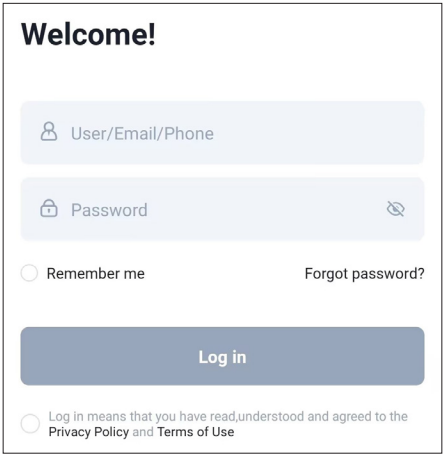


Figure 9-3 Login page

10 Troubleshooting and Maintenance

10.1 Powering off the System

There are two methods to power off the system: normal power-off and emergency power-off. The latter is used only in emergencies.

Normal Power Off

Step 1: Open the front and rear doors.

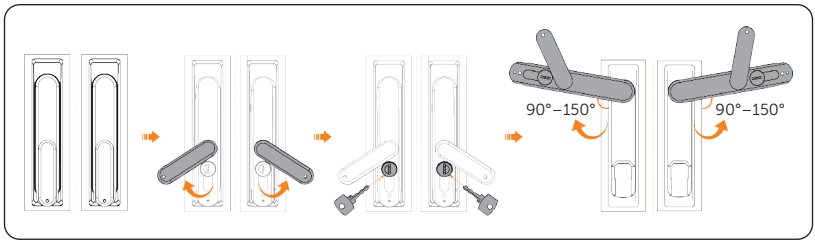


Figure 10-4 Opening the doors

Step 2: Flip down the MCBs.

a. Flip down QF14 for fire protection system and fire fan.

b. Flip down QF12 for thermal fan.

c. Flip down QF11 for dehumidifier.

d. Flip down QF6 and QF7 for liquid cooling unit.

e. Flip down QF10 for UPS.

f. Flip down QF9 for undervoltage protection for the main circuit.

g. Flip down QF8 for mains power supply.

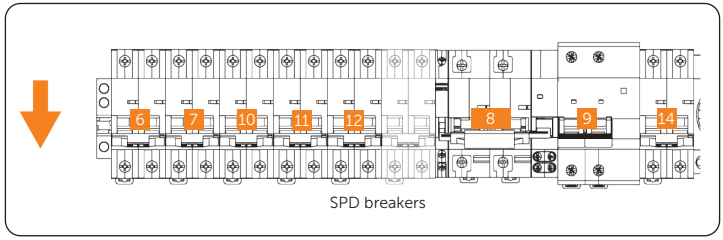


Figure 10-5 Flipping down MCBs

Step 3: Flip down the grid SPD breakers.

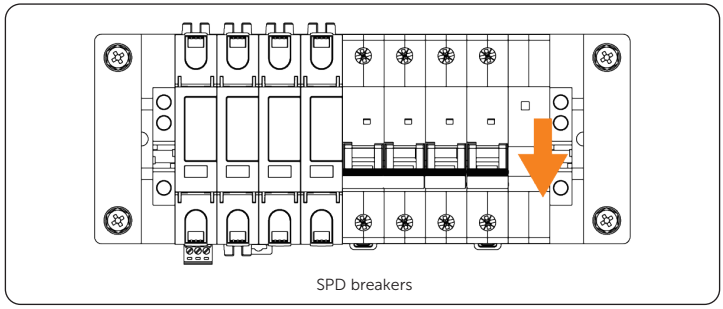


Figure 10-6 Flipping down SPD breakers

Step 4: Flip down the PCS breakers.

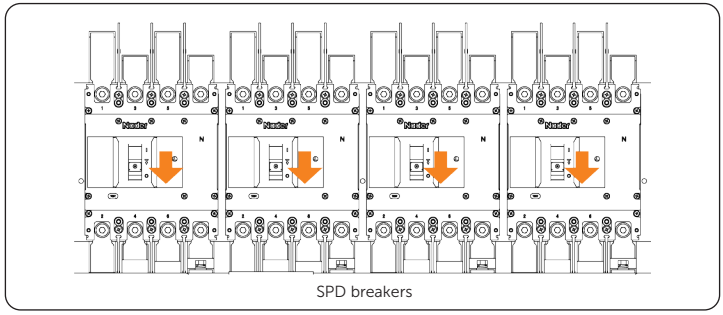


Figure 10-7 Flipping down PCS breakers

Step 5: Turn the rotary switch to the "OFF" position to turn off the high-voltage box.

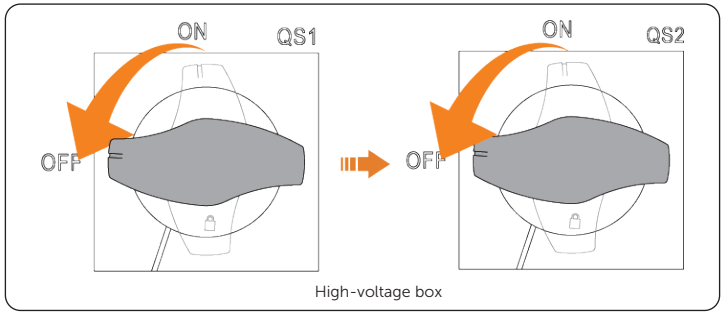


Figure 10-8 Turning on the high-voltage box

Step 6: Press and hold the power button of the UPS for 5 seconds to turn off it.

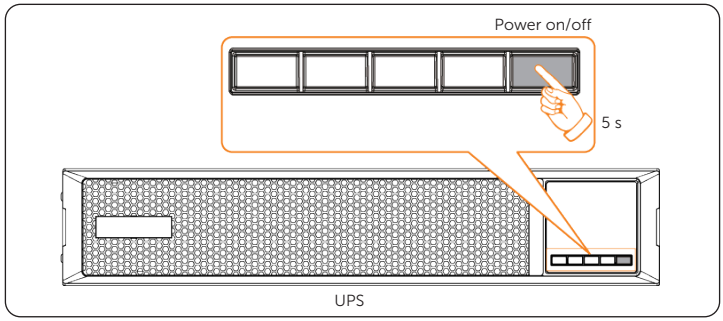


Figure 10-9 Turning off the UPS

Step 7: Power off the storage batteries in the fire alarm control panel.

a. Unlock the fire alarm control panel with FSS key 801 (part E).

b. Rotate the Auto & Manual transfer switch clockwise to **Manual Only** with FSS key 901 (part E).

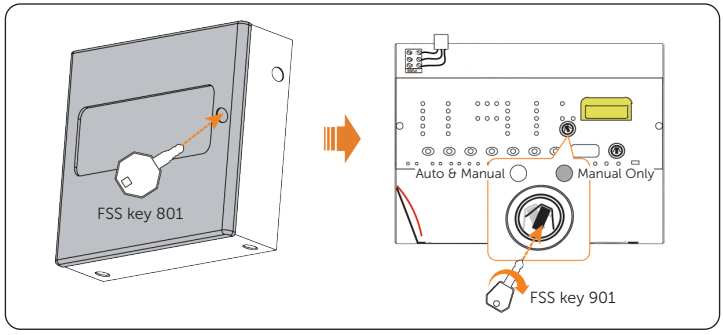


Figure 10-10 Enabling **Manual Only** mode for fire alarm control panel

c. Unplug the power cables from the connectors of the storage batteries.

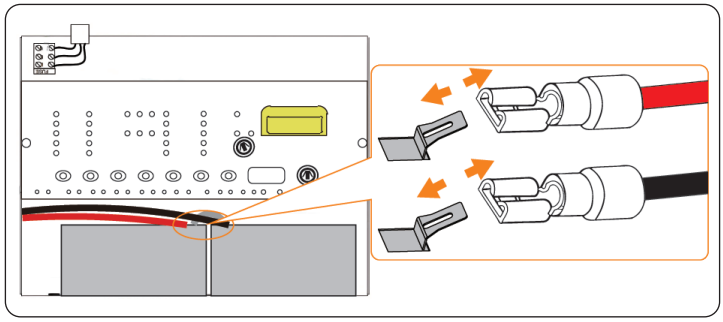


Figure 10-11 Connecting power cables for the storage batteries

d. Lock the fire alarm control panel with FSS key 801.

NOTICE!

After maintenance completes, remember to restore the Auto & Manual transfer switch to **Auto & Manual** mode.

Emergency Power Off

⚠ WARNING!

- Do not press the emergency stop button unless in an emergency.
- Some modules inside the Container may still have power after pressing the emergency stop button, therefore, non-professionals are not allowed to operate them.

Step 1: Flip up the cover.

Step 2: Press the emergency stop button.

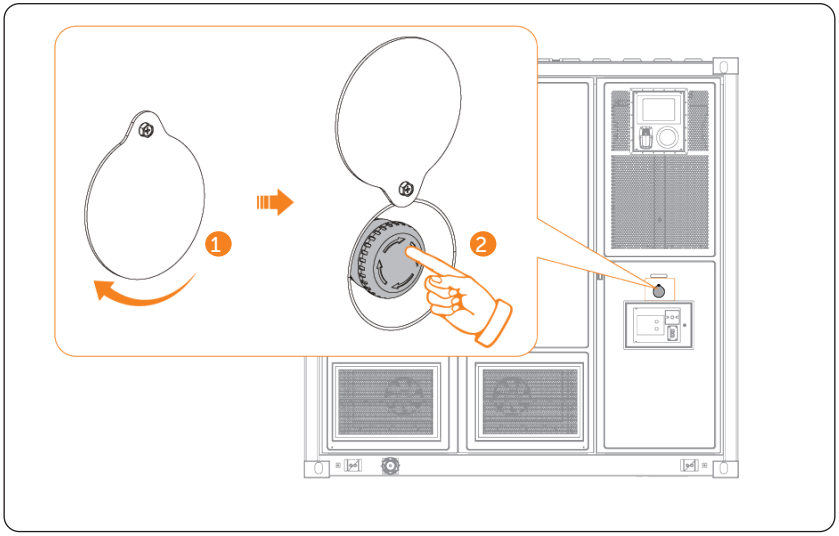


Figure 10-12 Pressing emergency stop button

NOTICE!

If it has been pressed, the emergency stop button must be reset before starting the equipment. The reset steps are shown as follows:

a. Rotate the cover;
b. Rotate the button according to the arrow direction shown on the button. Then the button will spring back to its original position.

10.2 Troubleshooting

This section lists the possible problems with the equipment, and provides information and procedures for identifying and resolving them. In case of any errors, check for the warnings or error messages on the system control panel or App, and then refer to the suggestions below. For further assistance, contact SolaX Customer Service. Please provide the model and SN of the Container, and be prepared to describe the system installation details.

Table 10-1 Troubleshooting list

Fault code	Description and Diagnosis
UCellHi_4	Single Cell Overvoltage Category IV • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
UCellHi_5	Single Cell Overvoltage Category V • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
UCellLow_4	Single Cell Undervoltage Category IV • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
UCellLow_5	Single Cell Undervoltage Category V • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
UCellDiff	Voltage difference fault • Or contact SolaX for help.
HVBOver_4	Overvoltage category IV of total voltage • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
HVBOver_5	Overvoltage category V of total voltage • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.

Fault code	Description and Diagnosis
HVBLow	Undervoltage category IV of total voltage • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
HVBLow	Undervoltage category V of total voltage • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
PosRlyAdh	Sticking contacts of main positive relay • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
PosRlyOpen	Open circuit of main positive relay • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
TempHigh	Overtemperature fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
TLineFlt_1	Temperature sampling fault level 1 • Check if the temperature sensor is short-circuited. • Or contact SolaX for help.
TLineFlt_4	Temperature sampling fault level 4 • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
TempLow	Low-temperature fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.

Fault code	Description and Diagnosis
DsgOver_4	Discharge overcurrent fault level 4 • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
DsgOver_5	Discharge overcurrent fault level 5 • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
ChgOver_4	Charge overcurrent fault level 4 • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
ChgOver_5	Charge overcurrent fault level 5 • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
ICOMFault	Internal communication fault • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
OCOMFault	External communication fault • Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
MCOMFault	Intermediate network communication fault • Do not power on, and the charging current is limited to 0 A. • Or contact SolaX for help.
UCellLineOpenFlt	Voltage sampling fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.

Fault code	Description and Diagnosis
VoltSensorFlt	Voltage sensor fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
CurrSensorFlt	Current sensor fault • Contact SolaX for help.
NegRlyAdh	Sticking contacts of main negative relay • Restart the device. • Or contact SolaX for help.
NegRlyOpen	Open circuit of main negative relay • Restart the device. • Or contact SolaX for help.
FlashFlt	Flash fault • Check if the external Flash communication is normal. • Or contact SolaX for help.
ChgReqFlt	Charging request fault • Check the device is properly charged. • Or contact SolaX for help.
InsFlt	Insulation fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
SOCLowFlt	Low SOC • Check if the device is running out of power. • Or contact SolaX for help.
PreChgFailFlt	External short-circuit fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
AFEProtectFlt	Battery's hardware protection fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.

Fault code	Description and Diagnosis
SelfCheckFlt	Self-test fault • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 1 second. • Or contact SolaX for help.
LinkerTempHilFlt_3	Fault on overtermperature of high-voltage connector • Check whether the charge/discharge current is over 50% of rated charge/discharge current. • Or contact SolaX for help.
LinkerTempHilFlt_5	Fault on overtermperature of high-voltage connector • Check whether the charge/discharge current is over 50% of rated charge/discharge current. • Or contact SolaX for help.
BatLinkerTempHi_5	High-temperature fault of pole • The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the PCS, it will be turned off forcefully after 3 seconds. • Or contact SolaX for help.
FanFault	Fan fault • Check whether any foreign objects stick to the fan. • Contact SolaX for help.
FuseSt	Fuse fault • Contact SolaX for help.
DCSwitch	DC switch fault • Contact SolaX for help.

10.3 Maintenance

Regular maintenance is required for the device. The table below lists the operational maintenance for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.

DANGER!

- Before replacing the battery pack, remove the MSD, and power off the system to avoid the risk of electric shock.
- Do not use a wet cloth to clean the copper busbar or other conductive parts.
- Do not use water or any solvents to clean the battery.

WARNING!

- Maintenance of the battery must not be performed while the battery is live. Operations such as torque verification and tightening of screws must be done after the battery is powered off. These operations can only be carried out after explaining the risks to the customer, obtaining written consent, and implementing effective preventive measures.
- Only qualified person can perform the maintenance for the device.
- Only use the spare parts and accessories approved by SolaX for maintenance.

CAUTION!

Operation and Maintenance Safety Requirements:

- Before connecting or disconnecting cables, ensure that the protection switch for the corresponding circuit is turned off.
- Use a voltage tester rated for the corresponding voltage level to check for live power, ensuring the equipment is completely powered off.
- If there are live components nearby, use insulating boards or insulating tape to cover or wrap them.
- After securely connecting the maintenance circuit to the main grounding circuit with a grounding wire, proceed with operation and maintenance.
- After completing the maintenance, remove the grounding wire between the maintenance circuit and the main grounding circuit.

NOTICE!

- We recommend not opening the door during rainy or high-humidity weather, such as when the relative humidity is consistently above 80%.
- If the door must be opened during rainy weather, the Container should be shielded to prevent water from entering and damaging the internal modules.
- Additionally, when opening the Container door in high-humidity conditions for more than 0.5 hours, manual forced dehumidification must be performed in both off-grid and grid-connected scenarios to prevent equipment failure or network collapse.

NOTICE!

After maintenance completes, remember to restore the Auto & Manual transfer switch to **Auto & Manual** mode.

10.3.1 Maintenance of the Container

Table 10-2 Maintenance list of container

Item	Check notes	Maintenance interval
Container appearance	• No obvious coating peeling or scratches. • No noticeable paint peeling or rust. • No damage to the door lock. • No dust accumulation. • No entry of insects, rodents, snakes, or more.	Every 12 months
Explosion vent	• No noticeable paint peeling or rust. • The explosion vent plate is not damaged. • No foreign objects or snow/ice accumulation on the top.	Every 12 months

10.3.2 Maintenance of the PCS

Table 10-3 Maintenance list of PCS

Item	Check notes	Maintenance interval
Operation status	• No damage or deformation on the appearance. • No unusual sounds during operation. • All parameters are correctly set during equipment operation.	Every 12 months
Electric connection	• No cables are loose or disconnected. • Check for any cable damage, focusing on the areas where the cable contacts metal surfaces for signs of cuts or abrasions.	Every 12 months
Grounding reliability	The grounding cable is properly grounded.	Every 12 months

10.3.3 Maintenance of the Battery Pack

Table 10-4 List of general maintenance

Item	Check notes	Maintenance interval
Coolant inlet and outlet	There is no coolant leakage at the PACK coolant inlet and outlet.	Every 12 months
Pack appearance	There is no obvious damage, paint peeling, or rust.	Every 12 months
Cable connections	• No cables are loose or disconnected. • Check for any cable damage, focusing on the areas where the cable contacts metal surfaces for signs of cuts or abrasions.	Every 12 months
Grounding reliability	The grounding cable is properly grounded.	Every 12 months

Table 10-5 List of charging requirements

Circumstance	Measure
If the ambient temperature for storage is between 30°C and 50°C	Recharge the battery packs at least once every 6 months
If the ambient temperature for storage is between -20°C and 30°C	Recharge the battery packs at least once every 12 months.
In the first installation	The interval among manufacture dates of battery packs shall not be exceed 3 months.
If a battery pack is replaced or added for capacity expansion	Each battery's SOC should be consistent. The max. SOC difference should be ±5%.
If users want to increase their battery system capacity	Ensure that the SOC of the existing system capacity is about 40%. The manufacture date of the new battery pack shall not exceed 6 months. If the manufacture date of the new one exceeds 6 months, please charge it to around 40%.

⚠ WARNING!

- Only qualified person can perform the maintenance for the device.

10.3.4 Maintenance of the Liquid Cooling Unit

Table 10-6 Maintenance list of liquid cooling unit

Item	Check notes	Maintenance interval
Draining port	The draining port is clean, and free from dust accumulation, foreign object, blockage, and damage	Every 3 months
Operation status	• The chiller is clean and dust-free and free of dirt. • The chiller operates without abnormal vibration and noise.w	Every 12 months
Pipeline reliability	• The refrigeration system has no refrigerant leakage. • The coolant circulation system has no leakage.	Every 12 months
Filter cleaning	The filter screen is free from dust accumulation, foreign object, blockage, and damage	Every 12 months
Reliability of power cable and power terminal of wiring panel	• No looseness of electrical cables and terminals. • There is no aging, damage, abnormal heating and other abnormalities in the power cable. • There is no dust at the wiring panel.	Every 12 months
Coolant	• Concentration meets range requirements • The PH value and the concentration of each electrolyte meet the requirements. See *Maintenance Manual* for details. • No dirt, precipitation, algae, etc.	Every 12 months

10.3.5 Maintenance of the Fire Suppression System

Quarterly Maintenance Items

Item	Check notes	Maintenance interval
Smoke detector	• Check if the indicator light of the detector can flash red normally. • Check if there is any accumulated dust or stain on the surface. • Check if there are any objects covering the detector.	Every 3 months
Heat detector	• Check if the indicator light of the detector can flash red normally. • Check if there is any accumulated dust or stain on the surface. • Check if there are any objects covering the detector.	Every 3 months
Combustible gas detector	• Check if the indicator light of the detector can come on green normally. • Check if there is any damage to the monitoring modules, cables, or sensor, or if there is any visible damage to the structure. • Check if there is any accumulated dust at the sensor inlet.	Every 3 months
Exhaust fan and electric ventilation louver	• Check if the devices are deformed, corroded, or aged. • Check if the device is installed securely.	Every 3 months
Fan start & stop button	• Check if the devices are deformed, corroded, or aged. • Check if the device is installed securely.	Every 3 months

Semi-Annual Maintenance Items

Item	Check notes	Maintenance interval
Signal of the fire control panel	• Check if the indicator light of the detector can flash red normally. • Check if there is any accumulated dust or stain on the surface. • Check if there are any objects covering the detector.	Every 6 months
Manual & automatic transfer switch and emergency start button	• Check if the indicator light of the detector flash red normally. • Check if there is any accumulated dust or stain on the surface. • Check if there are any objects covering the detector.	Every 6 months
Fire alarm bell	• Check if the devices are deformed, corroded, or aged. • Check if the device is installed securely.	Every 6 months
Audible and visible alarm	• Check if the devices are deformed, corroded, or aged. • Check if the device is installed securely.	Every 6 months
Fire emergency stop button	• Check if the devices are deformed, corroded, or aged. • Check if the device is installed securely.	Every 6 months
Gas fire extinguishing device	• Check if the bracket which supports the device is loose. • Check if the body of the device is damaged. • Check if the aerosol inside the device is expired. • Check if the pressure is within normal range.	Every 6 months
Combustible gas detector	Check if the alarm light of the detector can light up normally.	Every 6 months

Annual Maintenance Items

Item	Check notes	Maintenance interval
Fire control panel	• Check if the indicator light of the detector can come on normally. • Check if the fuse is aged. • Check if the cables for interface device are connected correctly. • Check if the main power supply occurs the following circumstances: open circuit, loose connection of cables, phase loss, overheating, short circuit, overload, and more.	Every 12 months
Gas fire extinguishing device	Check if there are any issues in the battery compartment structure that might cause the leakage of fire extinguishing agent or change in protective volume.	Every 12 months
Explosion-proof plate	• Check if the plate is deformed, corroded, or aged. • Check if the plate is installed securely.	Every 12 months
Smoke detector	Check if the detector can normally send signal.	Every 12 months
Heat detector	Check if the detector can normally send signal.	Every 12 months
Combustible gas detector	Check if the detector can normally send signal.	Every 12 months
Manual & automatic transfer switch and emergency start button	Check if the detector can normally send signal.	Every 12 months
Fire emergency stop button	• Check if the stopping delay is running normally.	Every 12 months
Fire alarm bell	• Check if the alarm sound could be heard when the system is triggered. • Check if the alarm sound meets the specified decibel level.	Every 12 months
Audible and visible alarm	• Check if the light can come on normally. • Check if the light intensity meets the specified value.	Every 12 months

11 Dispose of Wasted and Damaged Battery Pack

Please dispose of the rechargeable battery or accessories in accordance with the disposal regulations for electronic waste which is applied at the installation site.

NOTICE!

- The expenses for dispose of the wasted or damaged battery packs incurred shall be borne by the user.

12 Technical Data

System Parameter

Model	TRENE-P500B1044L-2H	TRENE-P499B1044L-2H	TRENE-P400B1044L-2.5H	TRENE-P399B1044L-2.5H
AC SIDE (ON-GRID)				
Rated AC power	500 kW	499.6 kW	400 kW	399.6 kW
Max. output apparent power	500 kVA	499.6 kVA	440 kVA	399.6 kVA
Rated AC current	724.8 a.c. A@230 V 757.6 a.c. A@220 V	724.4 a.c. A@230 V 757.2 a.c. A@220 V	580 a.c. A@230V 606.4 a.c. A@220V	579.2 a.c. A@230 V 605.6 a.c. A@220 V
Max. output continuous current	724.8 a.c. A@230 V 757.6 a.c. A@220 V	724.4 a.c. A@230 V 757.2 a.c. A@220 V	580 a.c. A@230V 606.4 a.c. A@220V	579.2 a.c. A@230 V 605.6 a.c. A@220 V
Rated AC voltage	3 / N / PE, 230 / 400 V 3 / N / PE, 220 / 380 V			
AC voltage range	340 a.c. V–440 a.c. V			
Rated AC frequency	50 Hz / 60Hz			
AC SIDE (OFF-GRID)				
Rated AC output voltage	3 / N / PE, 230 / 400 V 3 / N / PE, 220 / 380 V			
Rated AC frequency	50 Hz / 60 Hz			
Unbalance load capacity (off-grid)	100%			
Max. AC output continuous current	797.2 a.c. A@230V 833.6 a.c. A@220V	796.8 a.c. A@230V 832.8 a.c. A@220V	638.0 a.c. A@230V 666.8 a.c. A@220V	637.2 a.c. A@230V 666.0 a.c. A@220V

Model	TRENE-P500B1044L-2H	TRENE-P499B1044L-2H	TRENE-P400B1044L-2.5H	TRENE-P399B1044L-2.5H
SYSTEM PARAMETERS				
Dimensions (W ×H × D)	2991 mm × 2896 mm × 2438 mm			
Weight	13 t			
Operating temperature range	-30°C to +55°C (>45°C derating)			
Relative humidity	0–100% RH			
Max. operating altitude	3000 m			
Cooling concept	Liquid cooling			
Ingress protection	IP55			
Topology	Non-isolated			
Standards	IEC 62619, IEC 63056, IEC 62040, IEC 62477, IEC 61000, IEC 62933, UN 38.3, UL9540A			
Communication interfaces	Ethernet			
Communication protocol	Modbus TCP			
Anti-corrosion degree	C4 (C5 optional)			
Configuration of safety	Gas fire suppression + Water-based fire suppression + Ventilation + Deflagration venting panel (optional)			

Model	TRENE-P319B1044L-3H	TRENE-P260B1044L-4H	TRENE-P250B1044L-4H	TRENE-P249B1044L-4H
AC SIDE (ON-GRID)				
Rated AC power	319.6 kW	260 kW	250 kW	249 kW
Max. output apparent power	319.6 kVA	260 kVA	250 kVA	249 kVA
Rated AC current	463.2 a.c. A@230 V 484.4 a.c. A@220 V	377.2 a.c. A@230 V 394 a.c. A@220 V	362.4 a.c. A@230 V 378.8 a.c. A@220 V	361.2 a.c. A@230 V 377.6 a.c. A@220 V
Max. output continuous current	463.2 a.c. A@230 V 484.4 a.c. A@220 V	377.2 a.c. A@230 V 394 a.c. A@220 V	362.4 a.c. A@230 V 378.8 a.c. A@220 V	361.2 a.c. A@230 V 377.6 a.c. A@220 V
Rated AC voltage	3 / N / PE, 230 / 400 V 3 / N / PE, 220 / 380 V			
AC voltage range	340 a.c. V–440 a.c. V			
Rated AC frequency	50 Hz / 60Hz			
AC SIDE (OFF-GRID)				
Rated AC output voltage	3 / N / PE, 230 / 400 V 3 / N / PE, 220 / 380 V			
Rated AC frequency	50 Hz / 60 Hz			
Unbalance load capacity (off-grid)	100%			
Max. AC output continuous current	509.6 a.c. A@230V 532.8 a.c. A@220V	414.8 a.c. A@230V 433.6 a.c. A@220V	398.8 a.c. A@230V 416.8 a.c. A@220V	397.2 a.c. A@230V 415.2 a.c. A@220V

Model	TRENE-P319B1044L-3H	TRENE-P260B1044L-4H	TRENE-P250B1044L-4H	TRENE-P249B1044L-4H
SYSTEM PARAMETERS				
Dimensions (W ×H × D)	2991 mm × 2896 mm × 2438 mm			
Weight	13 t			
Operating temperature range	-30°C to +55°C (>45°C derating)			
Relative humidity	0–100% RH			
Max. operating altitude	3000 m			
Cooling concept	Liquid cooling			
Ingress protection	IP55			
Topology	Non-isolated			
Standards	IEC 62619, IEC 63056, IEC 62040, IEC 62477, IEC 61000, IEC 62933, UN 38.3, UL9540A			
Communication interfaces	Ethernet			
Communication protocol	Modbus TCP			
Anti-corrosion degree	C4 (C5 optional)			
Configuration of safety	Gas fire suppression + Water-based fire suppression + Ventilation + deflagration venting panel (optional)			

High-voltage Box

Model:	TBMS-R15D
Operating Voltage Range	250 d.c. V–1500 d.c. V
Nominal Charge/Discharge Current	157 d.c. A
Max. Charge/Discharge Current	186 d.c. A
Operating Temperature Range	-30°C to +65°C
Ingress Protection	IP65
Weight	58 kg
Dimension (W × H × D)	1174 mm × 173 mm × 776 mm

Battery Cluster

Product Model	TRENE-C261L
Battery Designation	IFpP74/176/209[(104S)2.5S]M/-30+50/95
Battery Type	LiFePO4
Rated Capacity	314 Ah
Cell Manufacturer	A
Rated DC Voltage	832 d.c. V
DC Voltage Range	650 d.c. V–949 d.c. V
Peak Charge/Discharge Current	186 d.c. A
Conditional Short-circuit Current (Icc)	< 10000 d.c. A
Max. Continuous Charge/Discharge Power	130.5 kW
Charge Temperature	0°C to 55°C

Discharge Temperature	-30°C to +55°C
Allowable Storage Temperature	-30°C to +60°C (< 3 months)
Recommended Storage Temperature	-10°C to +40°C (< 3 months)
Altitude	Below 3000 m
Dimension (W × H × D)	2196 mm × 807 mm × 985mm
Weight	1721 kg
Ingress Protection	IP65
Protection Class	I
Certified to	IEC 62619, IEC 63056, IEC 62477, UL 9540A

Battery Pack

Model:	TB-HR522	TB-HR1044
Battery Designation	IFpP74/176/209[(104S)2.5S]M/-30+50/95	
Battery Type	LFP 314 Ah	LFP 314 Ah
Cell Manufacturer:	A	A
Nominal Battery Voltage	166.4 d.c. V	332.8 d.c. V
Nominal Capacity	52.2 kWh	104.4 kWh
Charge/Discharge Rate	≤0.5P	≤0.5P
Battery Configuration	1P52S	1P104S
Ingress Protection	IP67	IP67
Weight	346 kg	670 kg

13 Appendix

13.1 Requirements for OT/DT Terminal

For different types of cables, select proper terminals and additional components for connection.

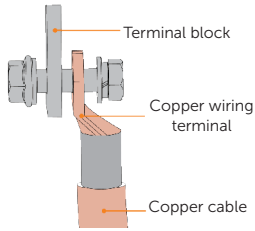
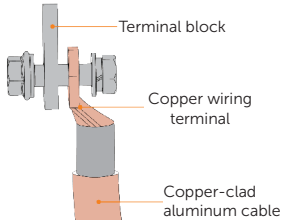
CAUTION!

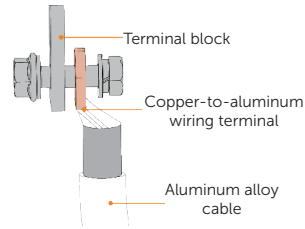
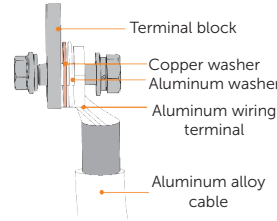
- Do not connect the aluminum wiring terminal directly to the terminal block or copper bar in case of electrochemical corrosion, which might affect the reliability of cable connection.
- While using an aluminum wiring terminal, copper washer, and aluminum washer, pay special attention to the position of the two washers. The copper washer shall make contact with the terminal block, and the aluminum washer shall make contact with the aluminum wiring terminal.

NOTICE!

- The copper-to-aluminum wiring terminal used in scenario 3, and aluminum wiring terminal, copper washer, and aluminum washer used in scenario 4 must comply with the requirements in IEC61238-1.

Table 13-1 Terminal requirements for different types of cables

Scenario	Cable Type	Wiring Terminal Type	Figure Illustration
1	Cooper cable	Copper wiring terminal	
2	Copper-clad aluminum cable	Copper wiring terminal	

Scenario	Cable Type	Wiring Terminal Type	Figure Illustration
3	Aluminum alloy cable	Copper-to-aluminum wiring terminal	
4	Aluminum alloy cable	• Aluminum wiring terminal • Copper washer • Aluminum washer	

13.2 How to Repaint the Container

Check the paint damage on the surface of the Container, with details below:

- For light scratches or small areas of stubborn stains, please see "13.2.1 Light Scratches & Small Areas of Stubborn Stains" to treat them.
- If the deep scratches or large areas of stubborn stains can be treated by users, please refer to "13.2.2 Deep Scratches and Large Areas of Stubborn Stains".
- If the damaged area is too large and cannot be treated, please contact the after-sale personnel for assistance.

WARNING!

- If the Container is installed outdoors without shield, do not repaint it in rainy, snowy, windy, or stormy days.

NOTICE!

- Use paint of pantone11-4202TPG color.
- For light scratches and small areas of stubborn stains, spray paint and hairbrush are recommended.
- For deep scratches or large areas of stubborn stains, oil paint and paint sprayer are recommended.

13.2.1 Light Scratches & Small Areas of Stubborn Stains

This solution applies to light scratches without reaching the steel substrate and stubborn stains on the surface.

Tools and Materials Required

Prepare tools and enough materials according to actual conditions.

Table 13-2 Tools and materials

No.	Tool/Material	No.	Tool/Material
1	Spray/oil paint	2	Fine sandpaper
3	Anhydrous ethanol	4	Cotton cloth
5	Hairbrush (for small scratched area)	6	Spray paint (if there is a large area of light scratch, paint sprayer is recommended.)

Repainting Procedure

Step 1: Gently sand the scratched area with a fine sandpaper to remove rust and stains on the surface.

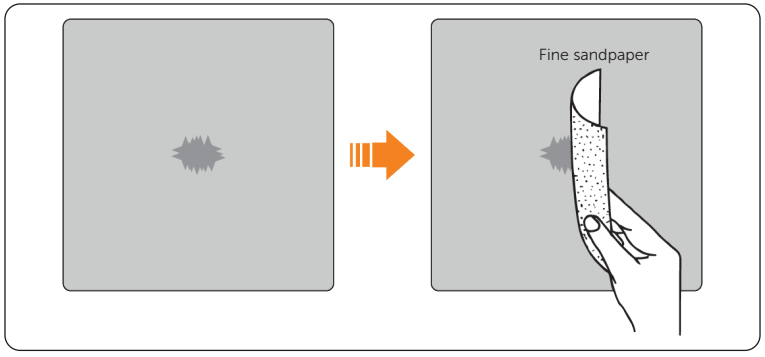


Figure 13-1 Sanding the scratched area

Step 2: Moisten a cotton cloth with anhydrous ethanol, wipe the scratched area with it to remove dust and dirt, and then use a dry cotton cloth to wipe the area dry.

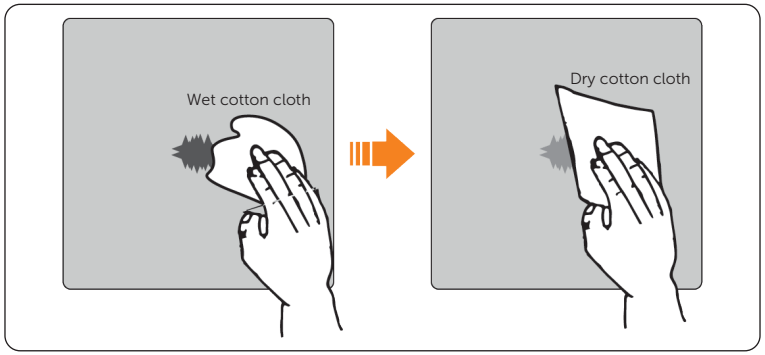


Figure 13-2 Cleaning the scratched area

Step 3: Use hairbrush or spray paint to apply paint to the surface of the scratched area until it is fully and evenly covered.

NOTICE!

- While applying paint, make sure the newly applied paint is thin and even, so that the scratched area can appear consistent and smooth on the surface.
- If there is color difference between the scratched area and the surroundings, cover the surrounding area with tape or paper in case of color contamination.

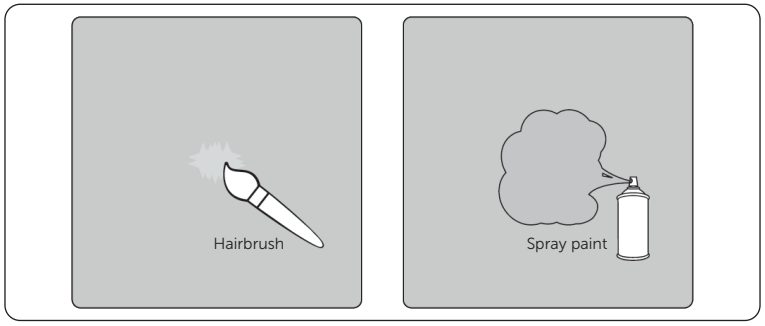


Figure 13-3 Applying paint

Step 4: After completing applying the paint, wait for around 30 minutes for the paint to get dry, and then check whether the repaired area meets the requirements.

NOTICE!

- The color of the repaired area shall be consistent with the surrounding area.
  - » Use a colorimeter to measure the color difference, of which Delta E shall be ≤ 3.
  - » If the color cannot be measured by a colorimeter, make sure that there is no obvious color difference at the edges between the repaired area and the surrounding area, as well as no bumps, scratches, flakings, or breaks.
- For spray painting, we recommend painting for at least 3 times before pausing to check the effect, and then repeat spray painting and observing until it meets the requirements.

13.2.2 Deep Scratches and Large Areas of Stubborn Stains

This solution applies to deep scratches where the primer has been damaged and reach the steel substrate.

Tools and Materials Required

Prepare tools and enough materials according to actual conditions.

Table 13-3 Tools and materials

No.	Tool/Material	No.	Tool/Material
1	Spray/oil paint	2	Zinc-rich primer
3	Fine sandpaper	4	Anhydrous ethanol
5	Cotton cloth	6	Hairbrush (for small areas of deep scratches and stubborn stains)
7	Paint sprayer (for large areas of deep scratches and stubborn stains)		

Repainting Procedure

Step 1: Gently sand the scratched area with a fine sandpaper to remove rust and stains on the surface.

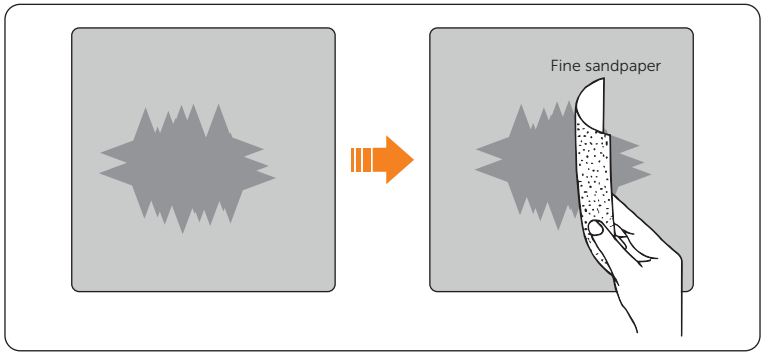


Figure 13-4 Sanding the scratched area

Step 2: Moisten a cotton cloth with anhydrous ethanol, wipe the scratched area with it to remove dust and dirt, and then use a dry cotton cloth to wipe the area dry.

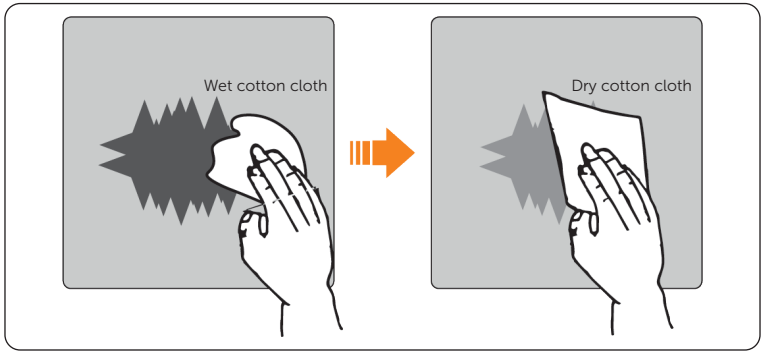


Figure 13-5 Cleaning the scratched area

Step 3: Use a paint spray to apply the zinc-rich primer to the scratched area.

NOTICE!

- If the steel substrate is visible on the scratched area, the zinc-rich primer must be applied first to entirely cover the substrate.
- Wait for the primer to get dry before applying the top coat to the scratched area.

Step 4: Use a paint spray to apply paint to the surface of the scratched area until it is fully and evenly covered.

NOTICE!

- While applying paint, make sure the newly applied paint is thin and even, so that the scratched can appear consistent and smooth on the surface.
- If there is color different between the scratched area and the surroundings, cover the surrounding area with tape or paper in case of color contamination.

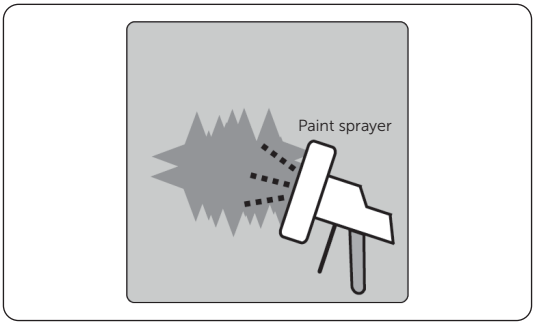


Figure 13-6 Applying paint

Step 5: After completing applying the paint, wait for around 30 minutes for the paint to get dry, and then check whether the repaired area meets the requirements.

NOTICE!

- The color of the repaired area shall be consistent with the surrounding area.
  - » Use a colorimeter to measure the color difference, of which Delta E shall be ≤ 3.
  - » If the color cannot be measured by a colorimeter, make sure that there is no obvious color difference at the edges between the repaired area and the surrounding area, as well as no bumps, scratches, flakings, or breaks.
- For spray painting, we recommend painting for at least 3 times before pausing to check the effect, and then repeat spray painting and observing until it meets the requirements.

13.2.3 Logo & Pattern damaged, Dents or Dings

In this case, we recommend contacting a local spray painting company for customized treatment based on the actual conditions.

Table 13-4 Damage extent and recommended solution

No.	Damaged Area	Recommended Solution
1	• Size < 100 mm^2 • depth < 3 mm	Use a poly-putty base to fix the dents and dings first, and then deal with them according to "Repainting Procedure" for Deep Scratches.
2	• Size > 100 mm^2 • depth > 3 mm	Contact local supplier to make a plan for repair.

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