V01

INSTALLATION MANUAL OF ENERGY STORAGE SYSTEM STORION-H30/H50-G3

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Copyright Statement

Please keep this manual safe and strictly follow all safety and operating instructions contained within this manual. Do not install or operate the system before reading this manual.

Note

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Due to product version upgrades or other reasons, the content of this document may be updated periodically. This document is intended for guidance only and does not constitute any form of commitment. The actual product shall prevail.

If the entire system needs to be powered off, you must first manually shut down the Windows operating system on the SCADA. Ensure that the Windows operating system has shut down properly before proceeding with the power-off process.

Please note that the SCADA system and cloud platform accounts are not interchangeable.

Preface

Overview

The STORION-H30/H50-G3 energy storage system features high integration and high density design, with flexible expansion capabilities and strong grid connection performance. It is a high-quality, stable, and high-tech product used in today's power supply applications.

This manual is specifically designed to resolve operational issues, including safety notices, product functions, and product maintenance.

Symbol Convention

The following table describes the symbols that may appear in this manual and their meanings.

Symbol	Description
CAUTION	Indicates a potential risk; if not avoided, it may cause the system to fail to operate properly or report faults.
WARNING	Indicates a moderate potential hazard; if not avoided, it may lead to system damage or personal injury.
DANGER	Indicates a high potential hazard; if not avoided, it will result in death or serious injury.
NOTE	Provides additional explanations for key information in the text. "Explanations" are not safety warnings and do not involve information related to personal, system, or environmental harm.

Terminology

1. Battery Management System (BMS)

Monitors the operational information of battery cells, battery packs, and system units (such as voltage, current, temperature, and battery protection parameters), and intelligently assesses the state of charge (SOC), state of health (SOH), and total energy output to ensure battery safety.

2. Energy Management System (EMS)

Consists of data collection and monitoring systems and supports automatic power generation control, economic dispatch control, and power system status and safety analysis.

3. Battery Energy Storage System (BESS)

A combination of series- and parallel-connected batteries and the BMS, used to connect the DC side of PCS.

4. Energy Storage System (ESS)

A combination of a battery system and power conversion systems (PCSs) such as STO-RION-H30/H50-G3. An ESS can be used as an independent power source or be directly controlled by a monitoring system.

5. Photovoltaic (PV)

A PV power system is a new type of power generation system that utilizes the photovoltaic effect of semiconductor materials in solar cells to directly convert solar radiation energy into electrical energy.

6. On-Grid System

On-grid systems typically consist of PV strings, PCSs, battery systems, and the power grid. When the electricity generated by the PV strings is sufficient, the excessive electricity can be fed into the grid. When the electricity generated by the PV strings and battery system is insufficient, the grid can supply power to the load.

7. Off-Grid System

Off-grid systems are suitable for areas without a grid or where the grid power is unstable. These systems typically consist of PV strings, energy storage inverters, battery systems, and generators. When the battery has sufficient energy, the load is powered by the PV system and the battery. If the battery energy is insufficient, the generator powers the load while charging the battery system.

Version Information

Version	Date	Content
V01	2025.09.01	New

Contents

Contents

1. Safety Instructions

Statement

This manual contains important information about the product operation. It is imperative to thoroughly read and understand its contents before initiating any operational procedures.

Please keep this manual for future reference during installation, operation, and maintenance.

Please strictly follow the instructions outlined in this manual during installation, operation, and maintenance to prevent product damage, personal injury, and property loss.

In the case of incomplete system, be sure to shut down the entire system (including the battery and energy storage inverter) before installation personnel leave the site.

In the event of a system failure during normal operation, consult the troubleshooting table provided in this manual for elimination. If the issue persists, contact an AlphaESS engineer for assistance in a timely manner. Be sure to shut down the system (including the battery and energy storage inverter) before the AlphaESS engineer replies.

To ensure optimal reliability and compliance with warranty requirements, energy storage systems must be installed, operated, and maintained under the instructions specified in this manual. The company disclaims any liability for violations of general safety operation requirements or safety standards related to the design, production, and use of the products. Any product damage resulting from such violations is not covered by the warranty.

1.1 Operator Requirements

- Operators must hold a professional qualification certificate from AlphaESS or an authorized entity by AlphaESS.
- Operators must be familiar with the product, including its components and operating principles.

- Operators must be well-versed in the product manual and strictly follow the instructions for installation, operation, and maintenance.
- Operators should ensure that at least two personnel are present during any product-related work.
- Do not perform maintenance work before the product has been shut down.
- After the system has officially started operation or maintenance has been completed, the key must be removed.

1.2 Personal Safety

- Install clear signage at PV, battery,PCS, distribution box, and other locations to prevent accidental closing of switches that could cause accidents.
- Erect warning signs or establish safety warning zones in the operating area.
- When performing electrical connections, commissioning, or product maintenance on the system, use a multimeter to conduct electrical measurements to ensure electrical parameters meet requirements. Please use and connect the measuring instruments correctly to ensure personnel safety.
- High voltage is present in the system; accidental contact can result in fatal electric shock hazards, so proper protective measures must be taken when performing live testing.
- Ensure that the system's connections and operation comply with relevant regulations to prevent arcing or electrocution accidents.

CAUTION

The following installation tools and protective equipment are required during installation, operation, and maintenance.

The following table describes the installation tools.

No.	Name	Model Specifications (Accuracy)	Unit	Quantity
1	Multimeter	/	pcs	1
2	Megohmmeter	/	pcs	1
3	Diagonal Cutting Pliers	/	pcs	1
4	PH2.5 Phillips Screwdriver	PH2.5x110mm	pcs	1
5	Socket Set	/	pcs	1
6	PH2 Phillips Screwdriver	PH2x200mm	pcs	1
7	Torque Wrench	/	pcs	1
8	Wire Stripper	/	pcs	1
9	Network Cable Crimping Tool	/	pcs	1
10	Crimping Tool	/	pcs	1
11	Measuring Tape	/	pcs	1
12	Impact Drill	/	pcs	1

The protective equipments are given in the table below.

No.	Name	No.	Name
1	Safety shoes	4	Safety goggles

2	Safety helmet	5	Dust mask
3	Safety gloves		

DANGER

All products must be powered off and maintained in strict accordance with the related requirements specified in this manual.

1.3 Electrical Safety

1.3.1 Grounding Requirements

1. Equipment grounding impedances should meet local electrical standards.
2. Install the protective ground cable first when installing the product, and remove it last when dismantling.
3. The system should be permanently grounded. Before operating the system, verify that all electrical connections are secure and that the system is reliably grounded.
4. Never operate the equipment without the grounding conductor installed.
5. Do not damage or impair the grounding conductor.

DANGER

Installation is forbidden until grounding is properly completed.

1.3.2 Cabling Requirements

1. Cable selection, installation and routing shall comply with local codes and standards.
2. Power cables shall be free of kinks or twists during laying. If the length is insufficient, replace the entire cable—joints or splices are not permitted.
3. Protective measures must be applied when cables pass through conduits or entry holes to prevent damage from sharp edges or burrs.

4. Cables used in high-temperature environments may suffer from insulation aging or damage.Maintain a minimum clearance of 30 mm between cables and any heat-emitting component or heat-source zone.
5. Cables of the same category shall be bundled together; different categories shall be separated by at least 30 mm and shall not cross or intertwine.
6. All cables shall be securely connected, adequately insulated, and of the appropriate specifications.
7. Buried cables shall be firmly secured with cable supports and clamps. Cables within the backfill zone shall be installed in a manner that prevents mechanical stress or deformation during backfilling.
8. At low temperatures impact or vibration can embrittle the plastic sheath and cause cracking. The following requirements apply:
   - Cables shall be installed only when the ambient temperature is above 0 °C and shall be handled gently, especially in cold environments.
   - If cables have been stored below 0 °C, they shall be conditioned at room temperature for at least 24 h before installation.

1.4 Mechanical Safety

1.4.1 Transportation Safety

1. When moving large products with their transport packaging unremoved, use a forklift to lift the cabinet from the bottom before moving it.
2. When using a forklift for handling, the forks must be positioned at the middle to prevent tipping. Before moving, secure the equipment to the forklift with ropes; during movement, a dedicated person must supervise.
3. The cabinet's tilt angle must comply with the requirements shown in the diagram: with packaging, tilt angle $\alpha \leq 15°$; after removing the packaging, tilt angle $\alpha \leq 10°$. Refer to Figure 1-1:

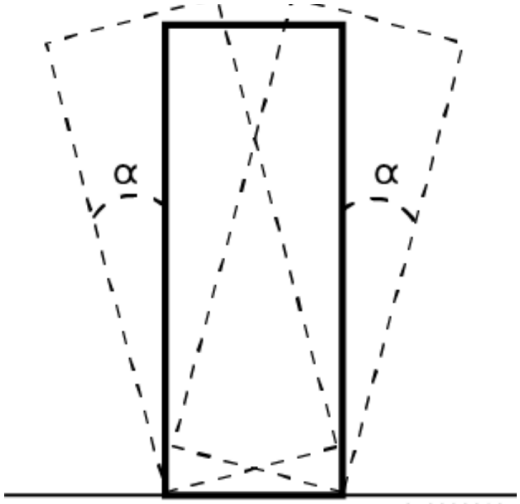


Figure 1-1

1.4.2 Hoisting Safety

1. All personnel engaged in hoisting operations must have received appropriate training and hold valid certification before performing any lifting work.
2. The foundation or ground surface at the hoisting site must meet the load-bearing requirements of the crane.
3. The hoisting area shall be barricaded and posted with temporary warning signs.
4. Entry beneath the boom or load is prohibited during hoisting.
5. Snagging or dragging slings and wire ropes is prohibited; striking slings with hard objects is also prohibited.
6. The included angle between any two slings shall not exceed 90°. Refer to Figure 1-2:

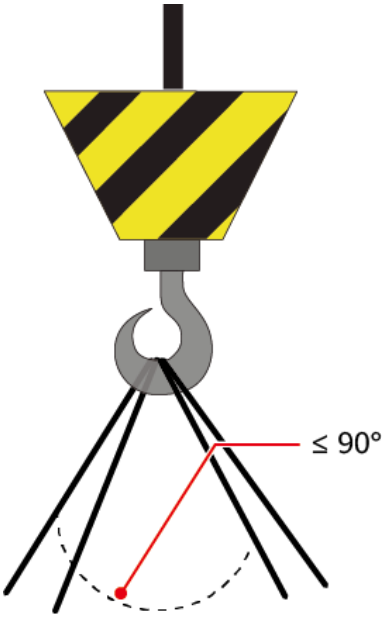


Figure 1-2

7. The crane hook centerline must be kept plumb (vertically aligned) with the cabinet's lifting point/center of gravity at all times. Side loading of the hook is strictly prohibited.
8. During hoisting, the cabinet's horizontal tilt angle (relative to level) shall be no greater than 5°.
9. The hoisting acceleration shall be ≤ 0.5 g, and the lifting process shall be carried out smoothly at a constant speed, avoiding sudden starts, stops, or impacts.
10. The angle between the sling and the horizontal plane of the cabinet top shall be ≥ 60° . (Equivalently, the sling angle relative to the vertical shall be ≤ 30° .)

1.4.3 Working-at-Heights Safety

1. When performing elevated work that may involve electrical hazards, use a wooden ladder or an insulated ladder.
2. Platform ladders with guardrails shall be used wherever practicable;straight ladders are prohibited.

3. Before using a ladder, confirm that it is free from damage and that its load-bearing capacity meets the requirements. Overload is prohibited.
4. Ladders must be placed on a stable surface, and during operation, a second person shall hold the ladder securely.
5. When climbing a ladder, maintain body stability and ensure that the center of gravity does not extend beyond the ladder's side rails, thereby reducing the risk of falls and ensuring safety.
6. When using an A-frame ladder, the spreader/locking rope must be firmly secured.

1.4.4 Aerial Safety

1. Work carried out at a height of 2 m or more above ground level is classified as work at height and such operations must be supervised by a designated safety monitor.
2. Personnel shall be trained and certified before being assigned to work at height.
3. An exclusion zone shall be established and clearly signed at every work-at-height site; unauthorized entry is prohibited.

1.5 Environmental Requirements

1.5.1 Site Selection Requirements

Do not select the sites that are not recommended by industry standards and regulations, including but not limited to the following areas:

- Areas with sources of strong vibration, loud noises, and strong electromagnetic interference
- Areas with dust, oil fumes, harmful gases, corrosive gases, etc.
- Areas with corrosive, flammable, and explosive materials
- Areas with existing underground facilities

- Areas with adverse geological conditions such as rubbery soil and soft soil layer, or prone to waterlogging and land subsidence
- Under a reservoir, water landscape, and water room
- Areas prone to earthquakes and with seismic fortification intensity higher than 9
- Areas prone to debris flow, landslide, quicksand, karst caves, and other direct hazards
- Areas within the mining land subsidence (dislocation) zone
- Areas within the scope of blasting hazard
- Areas prone to flood due to a dam or levee failure
- Protection areas for important water supply sources
- Protection areas for historic relics
- Populated areas, high-rise buildings, and underground buildings
- Intersections and busy roads of urban main roads

NOTE

The ESS site selection and fire safety must comply with local laws and regulations. Due to limited ventilation and drainage, indoor installation of the system cabinet is not recommended.

The requirements for selecting an outdoor site are as follows:

1. There must be no combustible materials within 3 m of the ESS or the site to prevent fire from spreading.
2. You are advised not to add any overhead structure above the ESS. If an over-head structure is necessary in special scenarios, the following conditions must be met:
   - The distance between the overhead structure and the top of the ESS shall be greater than 3 m.
   - The overhead structure shall be non-combustible.

3. The horizontal level of the installation site shall be above the highest water level of that area in history and at least 300 mm above the ground. The site must not be located in a low-lying land.
4. The ESS and the site must be in an environment free from explosion risks.
5. Transportation to the site shall be convenient and fire suppression facilities shall be reliable.
6. When installing, commissioning, and operating the ESS, ensure that at least two gas fire extinguishers, such as heptafluoropropane, perfluorohexanone, or carbon dioxide fire extinguishers, are provided near each unit to ensure fire safety.
7. The ESS shall be installed more than 30 m away from the third-party wireless communication facilities.
8. The site shall be in a well-ventilated place.
9. The safety distances between the ESS and buildings shall comply with local fire protection regulations or standards. The ESS located outdoors must be at least 10 ft (3.048 m) away from lot lines, public ways, buildings, combustible materials, hazardous materials, high-piled stock, parking spaces, and other exposure hazards not associated with electrical grid infrastructure.
10. The distance between the ESS and residential buildings must be greater than or equal to 12 m, and the distance between the ESS and densely populated buildings such as schools and hospitals must be greater than 30.5 m. If the distance does not meet the requirement, fire walls shall be installed between the ESS and the buildings.
11. The ESS shall not be installed in salt-affected or polluted areas because this will cause corrosion.

The ESS shall be used in the following or better environments:

- Outdoor environment more than 10km away from the coast.
- More than 5000 m away from heavy pollution sources such as smelteries, coal mines, and thermal power plants.
- More than 3000 m away from medium pollution sources such as chemical, rubber, and electroplating industries.
- More than 2000 m away from light pollution sources such as packing houses, tanneries, boiler rooms, slaughterhouses, landfill sites, and sewage treatment plants.
- It is recommended that physical walls or fences be used for isolation and protection in the energy storage equipment area. The fences shall be equipped with a door lock and the recommended fence height is greater than 2.2 m.

NOTE

You are advised to select another site if the safety distance for a site cannot meet the requirements of relevant national standards.

1.5.2 Foundation Requirements

1. The ESS must be installed on concrete or other non-combustible surfaces.
2. Ensure that the installation surface is horizontal, secure, flat, and has sufficient load-bearing capacity.
3. Subsidence or slope is not allowed.
4. The foundation shall sustain the total weight of the equipment.
5. If the load-bearing capacity of the foundation does not meet the requirement, a review is required.
6. The bottom of the excavated foundation must be compacted and flat.
7. After the foundation is excavated, prevent water from entering the foundation.
8. If water enters the foundation, excavate and refill the affected parts.
9. The levelness tolerance between the foundation and the contact surface of the cabinet must be less than or equal to 3 mm.

10. The foundation must be above the highest water level of the local area in history and at least 300 mm above the ground.
11. Construct drainage facilities based on the local geological conditions and municipal drainage requirements to ensure that no water will accumulate at the equipment foundation.
12. The foundation construction must meet the local drainage requirements for the maximum historical rainfall.
13. The drained water must be disposed of in accordance with local laws and regulations.
14. Reserve trenches or cable inlets for the ESS during foundation construction.
15. The reserved holes on the foundation and the cable inlets at the bottom of the equipment shall be sealed.
16. The design specifications of the ESS foundation shall be reviewed based on the installation environment, ground bearing capacity, geological features, and seismic resistant requirements of the project site.

2. System Introduction

2.1 Product Introduction

The STORION-H30/H50-G3 features a 30 kW or 50 kW PCS and M77314-S battery modules. An optional ATS cabinet enables dual-source automatic transfer. The system capacity ranges from 72.3 kWh to 120.5 kWh; the topology is shown below.

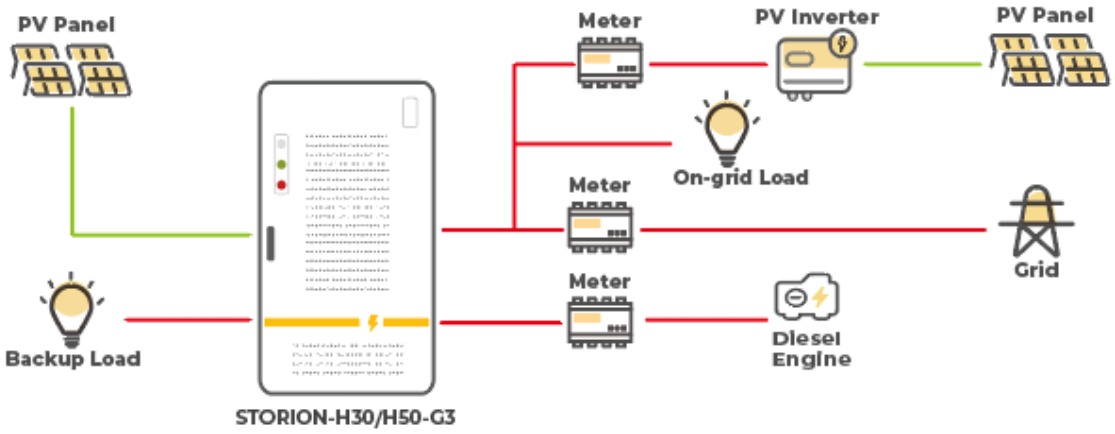


Figure 2-1

2.2 Product Features

AlphaESS Lithium Iron Phosphate (LFP) batteries offer long cycle life and high reliability, meeting diverse energy-storage applications.

The highly modular design enables easy assembly, transport, and maintenance.

Real-time balancing maintains excellent cell-to-cell uniformity across all modules.

Its detachable, compact, and flexible chassis simplifies installation and testing for a wide range of field applications.

Advanced thermal management keeps the system within its optimal temperature range.

The system supports both local and remote monitoring and control. Seamless communication among the BMS, PCS, EMS, and supervisory system enables flexible grid dispatch.

2.3 Product Composition

2.3.1 Appearance Introduction

The appearance of the STORION-H30/H50-G3 energy storage system is shown below:

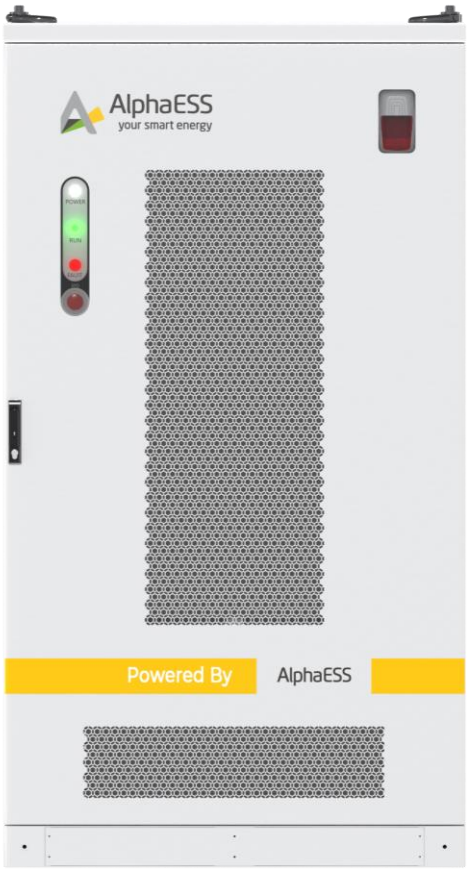
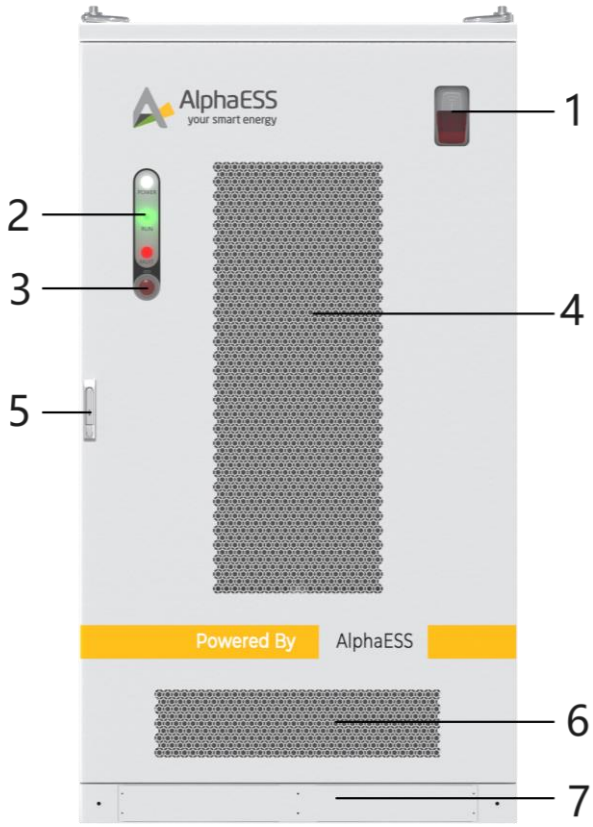


Figure 2-2

NOTE

***The above image is for reference only. Please refer to the actual received product!**

Product appearance description is given in the table below:

View	Description
 Figure 2-3	Front View 1. Fire Alarm Indicator 2. Status Indicator 3. EPO Button 4. Air Conditioner 5. Door Lock 6. PCS Air Intake Vent 7. Bottom Protective Panel

NOTE

***The above image is for reference only. For more information, refer to the actual product received.**

2.3.2 Indicator Light Function Description

Three indicator lights—POWER, RUN and FAULT—are mounted on the upper part of the cabinet door to show the system operating status.

The indicator description is given in the table below:

Name	Color	Description

POWER	White	Steady ON when the system is powered; OFF when power is lost.
RUN	Green	Steady ON while the system is operating and delivering power; slow blink during off-grid operation; OFF if any fault occurs.
FAULT	Red	Steady ON when a fault prevents normal operation; OFF at all other times.

The status and descriptions of the LED indicator lights are listed in the following table.

Name	Description
POWER ON, RUN ON, FAULT OFF	System operating normally
POWER ON, RUN OFF, FAULT ON	FAULT ON indicates a system fault
POWER ON, RUN OFF, FAULT OFF	System is shut down

2.3.3 Cabinet Dimensions

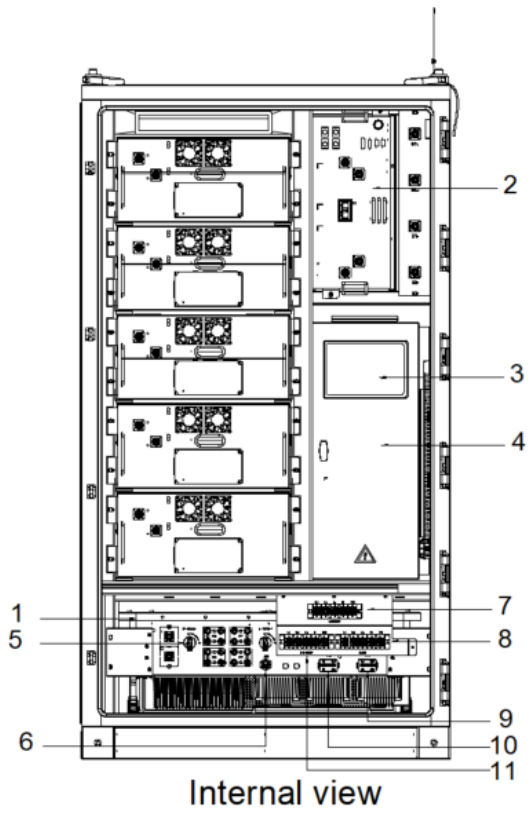
Figure 2-4

Cabinet dimensions are given in the table below.

Machine Type	STORION-H30/H50-G3
W（mm）	1120
H（mm）	1300
D（mm）	2095*

Note: Height includes lifting rings.

2.3.4 Cabinet Internal Design

View	Description
 Internal view Figure 2-5	1. PCS 2. HV Box 3. SCADA 4. Distribution Box 5. DC Circuit Breaker 6. COM1 port 7.BACK-UP output terminal 8. Genset output terminal 9. COM3 port(reserve) 10. COM2 port 11.On-grid output terminal

2.3.5 Equipment Operation Switch Location Overview

In the STORION-H30/H50-G3 system, the following switches are included: the auxiliary power switch of the HV box, the molded case circuit breaker (MCCB) of the HV box, the auxiliary power switch of the cabinet, and the PV switches of the PCS.

The operating positions of each switch within the system are shown in the figure below.

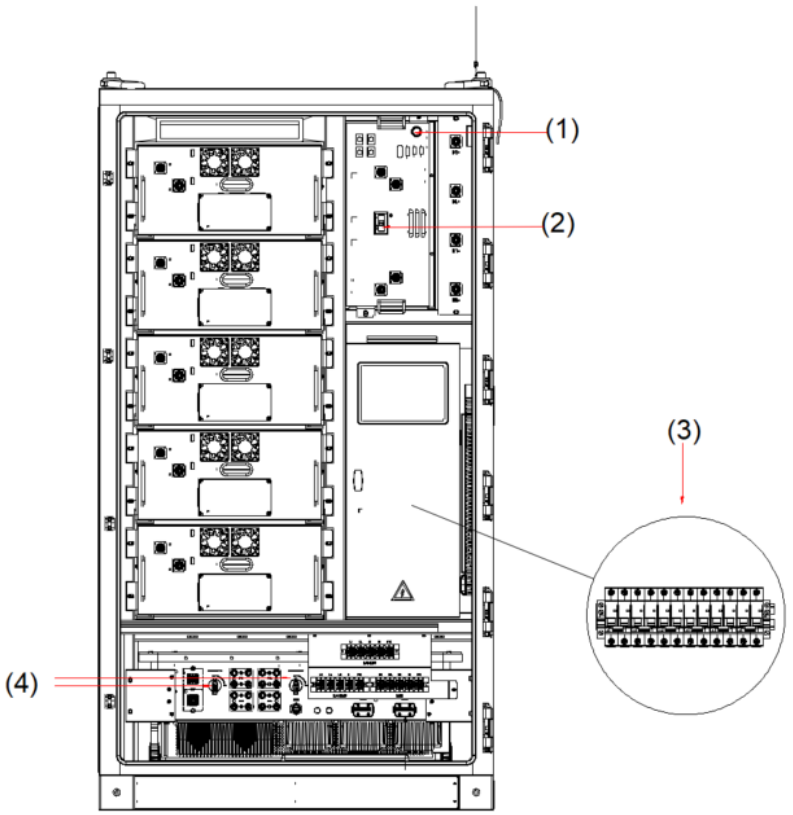


Figure 2-6

The functions of these switches in the system are described in the table below:

Number	Equipment Switch	Description
1	HV-BOX Auxiliary Power Switch	Control AC power supply to HV box
2	HV-BOX MCCB	Control battery DC system
3	AC Auxiliary Power Switch	Control AC auxiliary supply incoming

4	PV switches of the PCS.	Control PV switch strings 1–2 / 3–4

2.3.6 Cable Entry

For convenient on-site cable connections, all cables between internal devices in the system cabinet are pre-connected before delivery. Communication cables connecting the system cabinet to external devices can enter through the cable entry located at the bottom left or bottom right of the system cabinet. The system cable entry diagram is shown below:

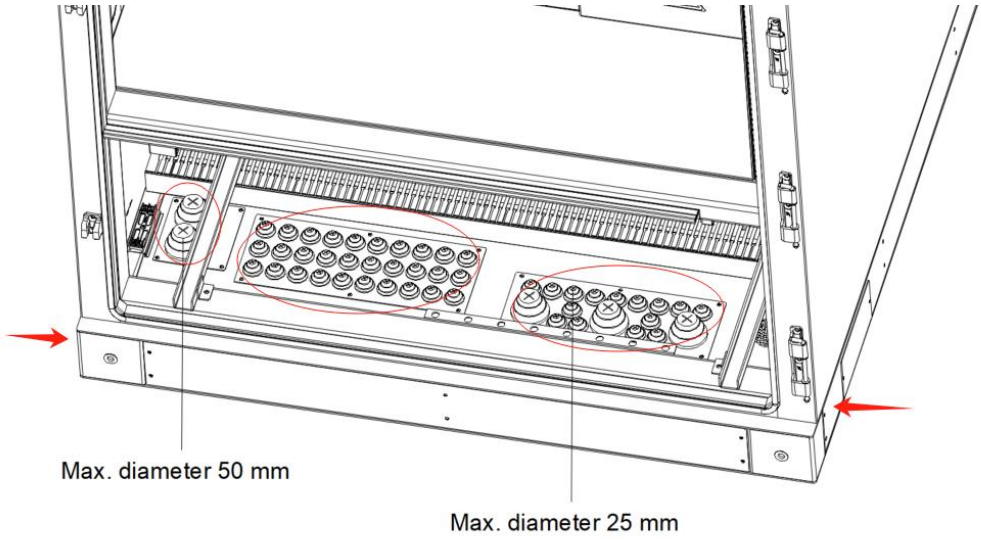


Figure 2-7

Dimension requirements are given in the table below.

Number	Description	Dimensions
1	System Cable Outlet	Max. diameter 25 mm
2	System Cable Outlet	Max. diameter 50 mm

2.3.7 Air Conditioner Drain Outlet

The air conditioner drain outlet is located on the right side of the cabinet. Refer to Figure 2-8:

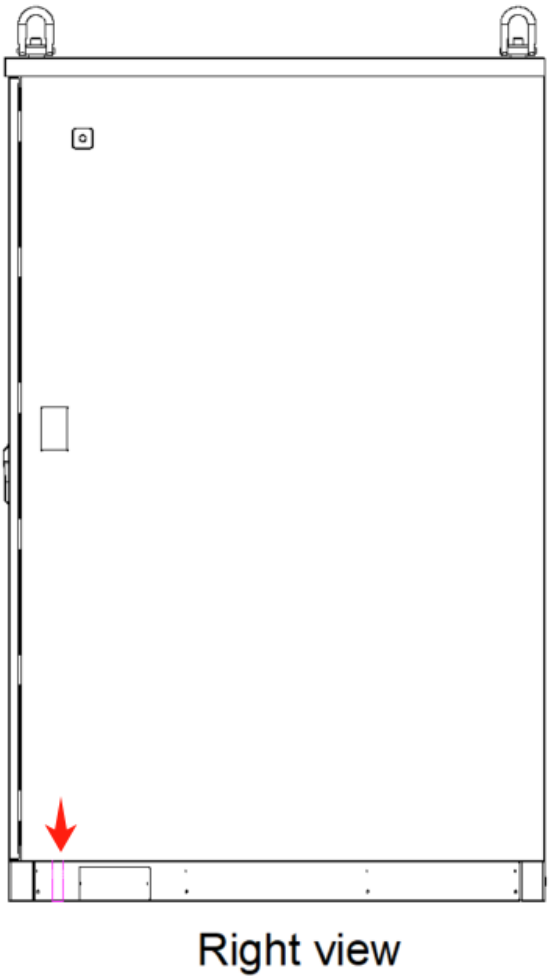


Figure 2-8

3. Product Components Introduction

3.1 M77314-S

The battery is shown as below:

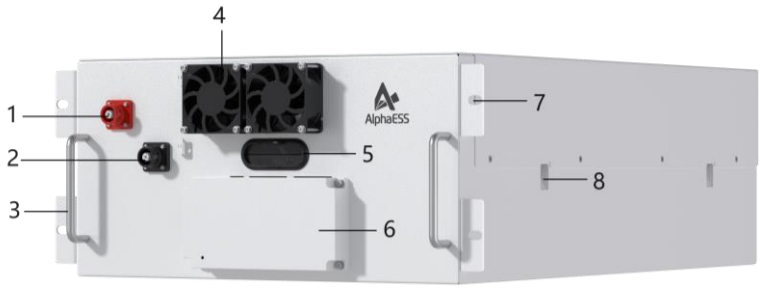


Figure 3-1

Appearance introduction is shown in the table below:

Number	Description	Number	Description
1	Battery Negative (-)	5	Sample Cable Entry Port
2	Battery Positive (+)	6	BLMU
3	Handle	7	Mounting Hole
4	Fan	8	Lifting Hole

Battery technical parameters are given in the table below.

Number	Description	Technical parameter
1	Model	M77314-S
2	Battery Type	LFP(LiFePO4)
3	Cell Manufacturer	CALB
4	Weight	168 kg
5	Dimensions [W×H×D mm]	526mm × 814mm × 250mm

6	IP Protection	IP20
7	Fire-Fighting System	Aerosol
8	Energy Capacity	24.1 kWh
9	Usable Capacity	22.9 kWh
10	Nominal Voltage	76.8 V
11	Operating Voltage Range	64.8 V – 84V
12	Cycle Life	≥8000@0.5C 25°C
13	Max. Charging Current	157 A
14	Max. Discharging Current	157 A
15	Operating Temperature Range	-20 ℃~50 ℃
16	Relative Humidity	15%~85%

3.2 HV-Box

The HV-Box diagram is shown as below:

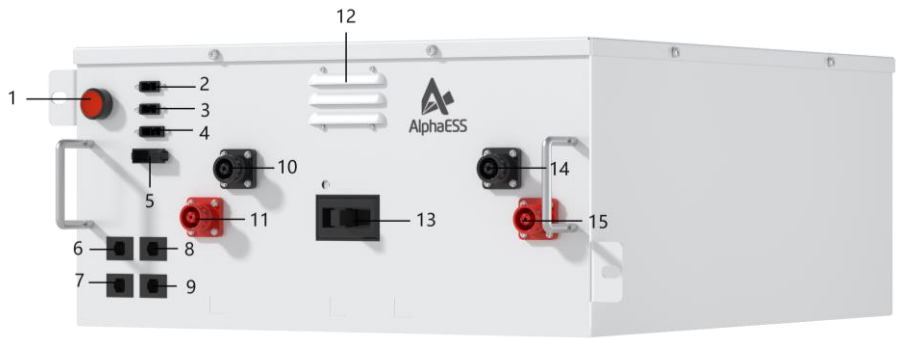


Figure 3-2

HV-BOX appearance introduction is shown in the table below:

Number	Description	Number	Description
1	Auxiliary Power Switch	9	BCMU2
2	AC Power Supply	10	Power Cable Positive (Connect to Battery)
3	AC Power Supply	11	Power Cable Negative (Connect to Battery)
4	DC Power Supply	12	Vent
5	BLMU to BCMU Communication Port	13	Circuit Breaker Switch
6	TCP Communication Port	14	Power Cable Positive (Connect to PCS)
7	RS485 Communication Port	15	Power Cable Negative (Connect to PCS)
8	BCMU1		

HV-BOX technical parameters are shown in the table below:

Technical Parameter		Technical Specification
DC Side Parameters	Voltage (V)	Max. 1000
	Current (A)	Max. 250
Auxiliary Power Supply	Voltage Range (V)	24
	Power Supply (W)	Max.150
Mechanical Specification	Enclosure Material	Galvanized Steel Sheet
	Dimensions (L×W×H, mm)	526*670*250（±2）
	Weight (kg)	≤30
	Cooling Method	Air Cooling
	Storage Temperature (°C)	-20~70
	Operating Temperature Range (°C)	-30~50
	Recommended Operating Temperature Range (°C)	23±5
	Operating Humidity Range	≤85% RH (non-condensing)

3.3 EMS、SCADA and Interface Definition

The EMS module is shown below:

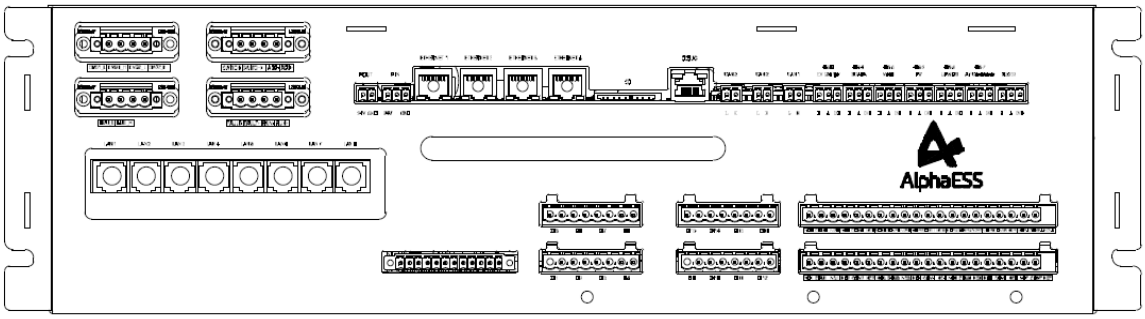


Figure 3-3

The SCADA three-view diagram is shown below:

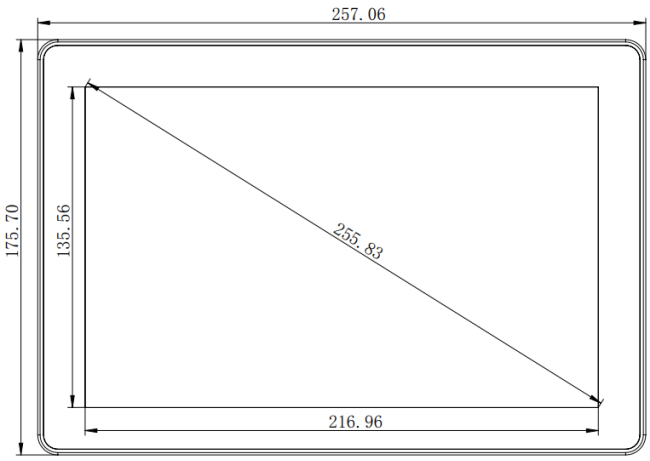


Figure 3-4

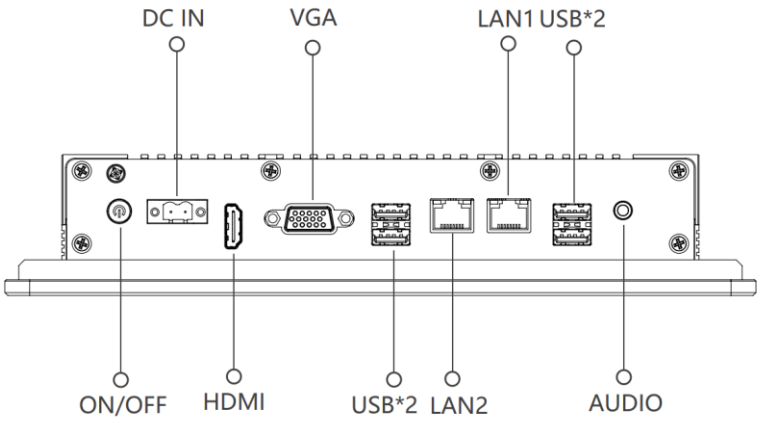


Figure 3-5

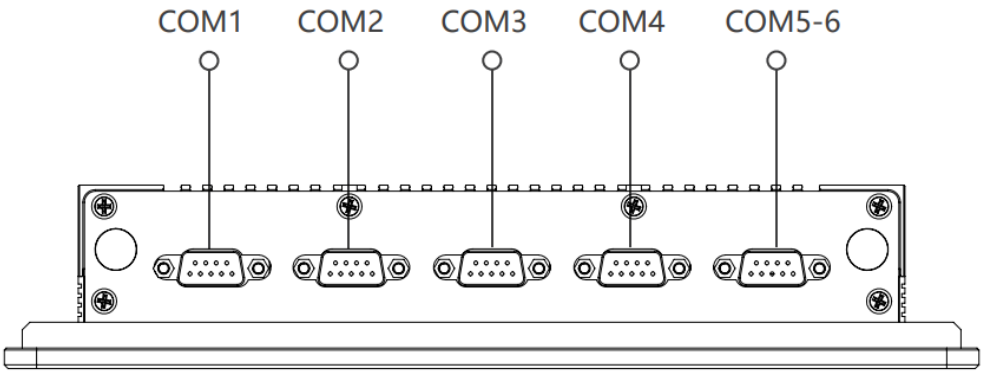


Figure 3-6

Interface definitions are shown in the table below:

Number	Interface Name	Interface Definition	Remarks
EMS			
1	DI1	Emergency Stop Signal	Remote Signal (External Normally Closed)
2	DI3	Smoke Sensor Feedback	Remote Signal (External Normally Open)
3	DI4	Temperature Sensor Feedback	Remote Signal (External Normally Open)
4	DI5	Fire Protection Activation	Remote Signal (External Normally Open)
5	DI6	Dual Power Supply - Main Power Signal	Remote Signal (External Normally Open)
6	DI7	Dual Power Supply - Backup Power Signal	Remote Signal (External Normally Open)
7	DI9	Water Ingression Feedback	Remote Signal (External Normally Open)
8	DI10	Access Control Feedback	Remote Signal (External Normally Open)
9	DI11	RRCR_K1	Remote Signal (External Normally Open)
10	DI12	RRCR_K2	Remote Signal (External Normally Open)
11	DI13	RRCR_K3	Remote Signal (External Normally Open)
12	DI14	RRCR_K4	Remote Signal (External Normally Open)

13	DI15	Limit ESS Charging Power	Remote Signal (External Normally Open)
14	DI16	Do Not Limit ESS Charging Power	Remote Signal (External Normally Open)
15	DO2	Generator Start/Stop	Normally Open Contact
16	DO3	Request PCS Shutdown	Normally Open Contact
17	DO5	Shed Non-Critical Loads	Normally-open contact (wet contact)
18	DO6	Shed Critical Loads	Normally-open contact (wet contact)
19	DO7	Audible and Visual Alarm	Normally Open Contact
20	SYS_RUN_LED	Run LED	Output 24V active switch signal
21	SYS_FAULT_LED	Fault LED	Output 24V active switch signal
22	24V_IN	Input Power	EMS Power Supply
23	LAN1	SCADA_FS	Connected to SCADA's LAN 1 via a network switch. Default IP address for EMS LAN 1: 192.168.200.101
24	LAN2	Energy Storage Converter	Connected to the PCS via a network switch. Default IP address for LAN 2: 192.168.200.102
25	LAN3	4G Router	Default IP address for LAN 3: 192.168.200.103
26	LAN4	Follower Cabinet Communication	
27	SD Card	SD Card	
28	CAN1	CAN Communication	CAN communication between EMS and BAMU
29	RS485-4	HMI/SCADA_FS	Connect to COM1 of SCADA_FS
30	RS485-5	Energy Meter	
31	RS485-7	Air Conditioner	

32	SWITCH	Input Power	Switch 24V DC power supply
33	ADD	ID Allocation	ID communication between BCMU and BAMU
34	BMU	CAN Communication	CAN communication between BCMU and BAMU
SCADA			
1	INPUT	Power Input	
2	LAN1	EMS	Connected to EMS LAN1 via network switch.
3	COM1	EMS	Connected to EMS RS485

EMS and SCADA display screen technical parameters are shown in the table below:

Number	Description	Technical Parameter
EMS		
1	Dimensions (L×W×H)	490.6×323×161mm
2	Communication	RS-485×4,Ethernet10Mbps×3
3	Operating Voltage	24V
4	Power Consumption	＜10W
SCADA		
5	Dimensions (L×W×H)	257×176×48mm
6	Communication	4*RS-232、2*RS-232/RS485
7	Data Storage	Standalone: 3 years Parallel operation: 180 days
8	Power Consumption	＜19W
9	Resolution	1280×800
10	Input Voltage	24V

3.4 PCS

The external view of the PCS is shown in Figure 3-7:

Figure 3-7

Inverter technical parameters are shown in the table below:

Item		30kW	50kW
PV input	Start-up VoltageMax. DC Input(V)	210	210
	Max. DC Input Voltage(V)	1000	1000
	Rated DC input Voltage(V)	620	620
	Operating Voltage Range(V)	200-950	200-950
	MPPT Voltage Range(V)	200-850	330-850
	No. of MPP Trackers	4	4
	No. of PV inputs per MPPT	2	2
	Max. PV input Current(A)	40×4	40×4
	Max. Short-circuit Current(A)	50×4	50×4
Battery Side	Battery Voltage Range(V)	150-840	
	Maximum Charging/Discharge Current(A)	150/150	

On-grid	Rated Output Power	30	50
	Max. Output Power	30	50
	Rated Output Voltage	3/N/PE, 220/380V; 230/400V; 240/415V	
	Rated Output Frequency(Hz)	50/60	
	Power Factor	0.8 leading ...0.8 lagging	
Dimensions (W×H×D mm)		909×735×305	
Weight(kg)		89	
Ingress Protection		IP65	

4. Installation

4.1 Installation Location

NOTE

Install the outdoor energy-storage cabinet in accordance with local fire-regulation clearances—e.g., from escape routes, doors, windows and air-inlet vents.

When installing the STORION-H30/H50-G3, maintain adequate clearance on all sides to permit ventilation, heat dissipation, installation and maintenance; see the dimensional diagram below.

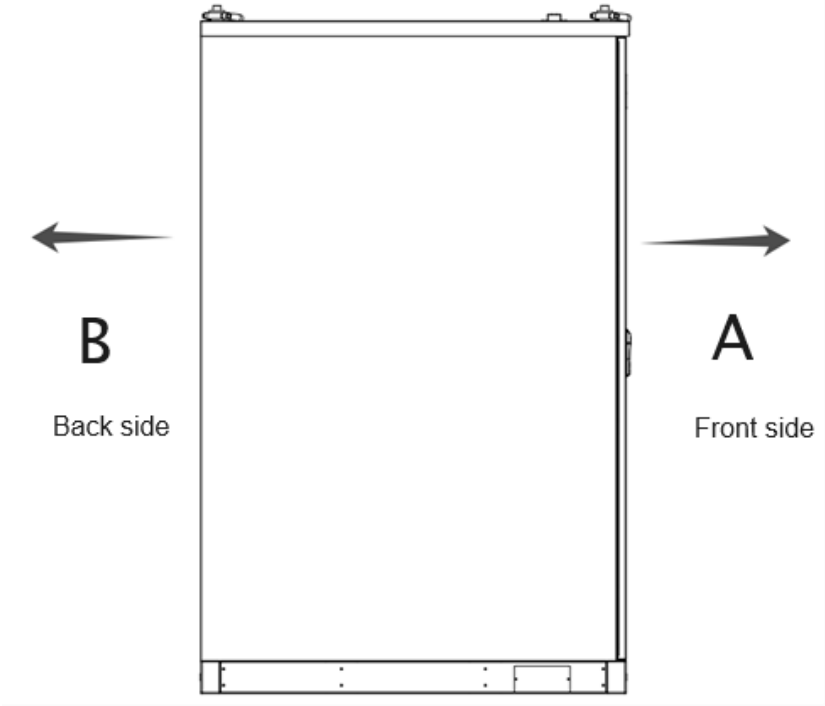


Figure 4-1

A ⩾ 2000 mm: ensures the cabinet front door can open fully, providing adequate ventilation and sufficient space for operation and maintenance.

B ⩾ 500 mm: ensures sufficient ventilation clearance at the rear of the cabinet.

A minimum side-to-wall clearance of 300 mm is required to allow the cabinet door to open 120° for easy maintenance and commissioning. Refer to Figure 4-2.

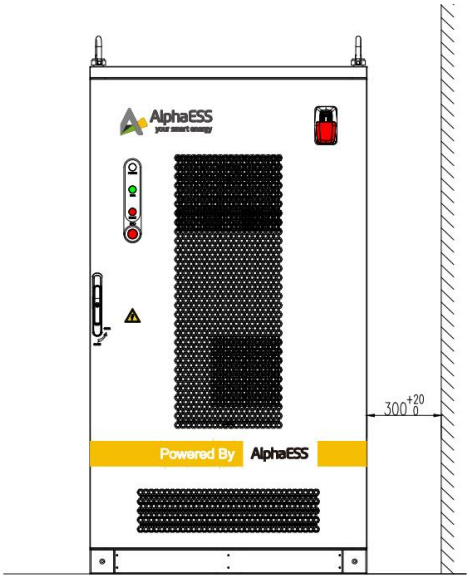


Figure 4-2

When an expansion cabinet is installed, the gap between the expansion cabinet and the main cabinet shall be less than 100 mm. Refer to Figure 4-3.

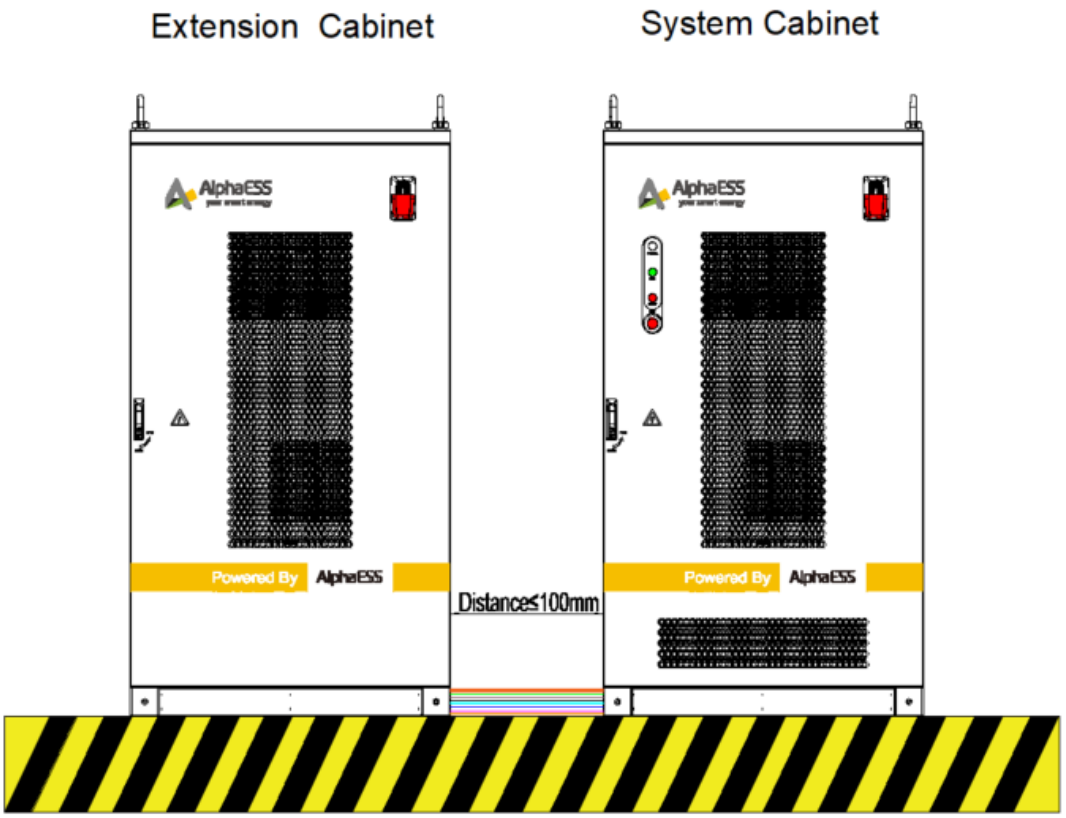


Figure 4-3

4.2 Cabinet Fixing

NOTE

Before opening the package, check the packaging for any visible signs of damage. If damage is found, do not open the package; verify the system model and contact your dealer immediately.

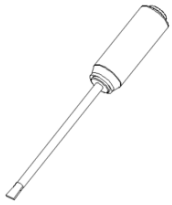
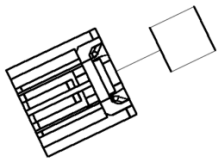
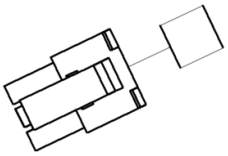
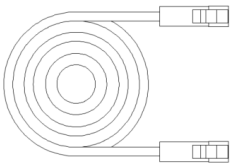
After unpacking, check that all items are intact. If any visible damage is found on the exterior, contact your distributor immediately.

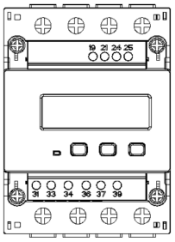
4.2.1 Packing List

CAUTION

Please check the parts list before product installation. Do not randomly connect power or communication cables. Check the part number before cabling.

The Packing list is shown in the table below:

			
PV terminal 8 pairs	Screwdriver	OT terminals(50kW): KST TL35-8 X4 KST TL25-8 X8 KST TL16-8 X3	OT terminals(30kW): KST TL25-8 X4 KST TL16-8 X11
			

Battery Terminating resistor	HV BOX Terminating resistor	10m communication cable 3m communication cable	
			
Meter	CT×3		

4.2.2 Cabinet Installation

4. 2. 2. 1 Transportation Conditions

All equipment of the STORION-H30/H50-G3 cabinet are pre-assembled and fixed within the cabinet before leaving the factory. The entire cabinet can be transported as a unit.

4. 2. 2. 2 Forklift Transportation

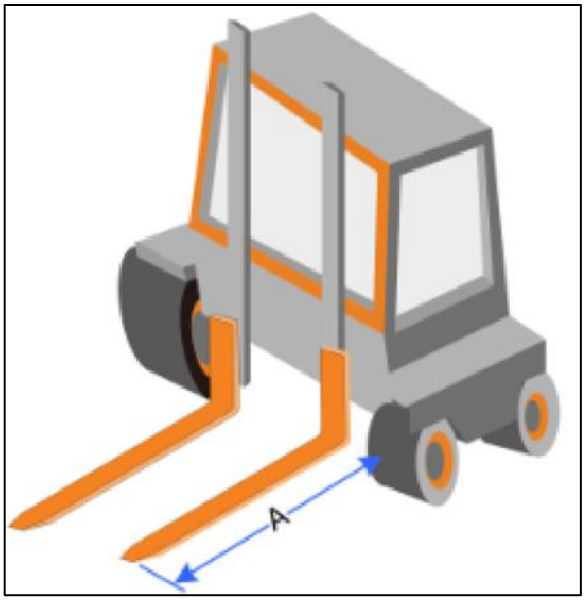
If the installation site is level, the cabinet may be moved with a forklift. STORION-H30/H50-G3 is fitted with dedicated fork pockets in the base—insert the forks from the front pockets only.

CAUTION

If forklift handling is used, the following requirements must be met:

- The forklift shall have a rated capacity of at least 5 tonnes.
- The fork tines shall be no shorter than 1,300 mm.
- Lifting and lowering must be carried out slowly and smoothly.
- The cabinet may only be placed on a level, obstacle-free surface free of bumps or debris.
- Remove the external wooden crate before forklift transport.

See the forklift-handling diagram below.



A≥1300

4.2.2.3 Equipment Installation

After moving the STORION-H30/H50-G3 cabinet to the installation location using a forklift or other equipment, fix its base using M12 screws (to be supplied by the customer). The base diagram is shown below:

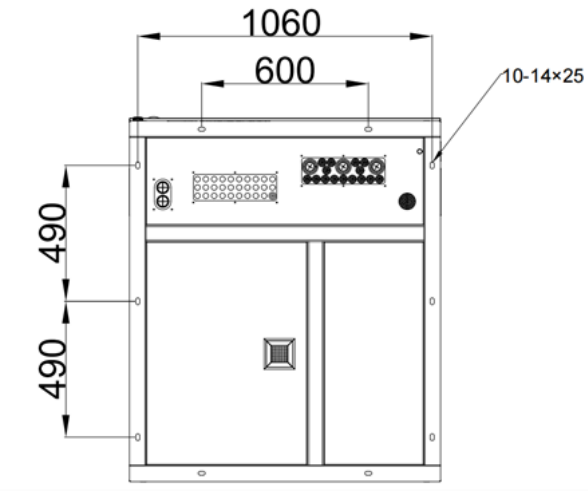


Figure 4-4

CAUTION

Cable entry holes are located at the bottom of the STORION-H30/H50-G3 cabinet. Cables pass through the holes in the base into the cable tray.

When the STORION-H30/H50-G3 cabinet needs to be fixed to channel steel, Φ12 holes must be drilled into the steel, and screws should be used to secure the cabinet to the channel steel. The diagram for fixing to channel steel is shown below:

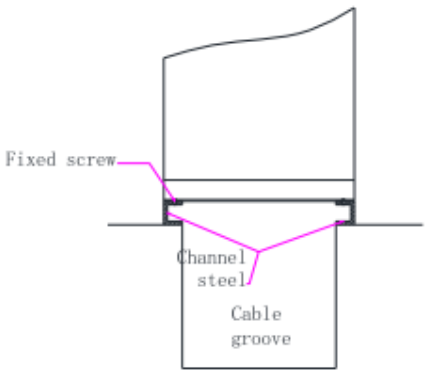


Figure 4-5

When securing the STORION-H30/H50-G3 cabinet to a concrete floor, drill holes and anchor it with bolts. The foundation must be C30-grade (or higher) reinforced concrete, capable of bearing more than 2 tons. External cable entry should preferably be protected by metal conduits, and an air-conditioning drain must be pre-installed in the foundation. The diagram for fixing to a concrete floor is shown below:

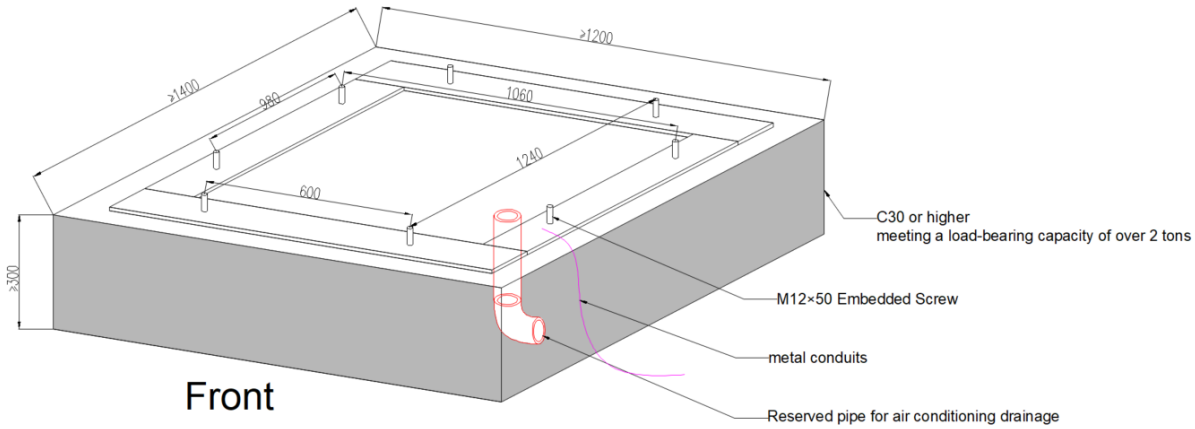


Figure 4-6

CAUTION

The STORION-H30/H50-G3 system cabinet itself weighs at least 1.3 tons. It is recommended to make a foundation using cement or concrete according to local standard requirements for installing the outdoor cabinet.

4.3 Electrical Connection of System Cabinet

4.3.1 Safety Precautions

Before performing any electrical connections or other operations on the energy storage integrated system and related equipment, observe the following safety precautions.

- Disconnect all external connections to the energy storage integrated system, as well as connections to internal power supplies.
- Ensure that disconnection points cannot be accidentally re-energized.
- Use a multimeter to ensure the equipment is completely de-energized.
- Apply the required grounding.
- Cover nearby components that may remain energized with insulating cloth or material.

4.3.2 Cabinet Grounding Installation

The bottom of the system cabinet is pre-equipped with four grounding points. Select the appropriate point based on the on-site installation conditions. The customer must prepare the grounding cable. Refer to Figure 4-7.

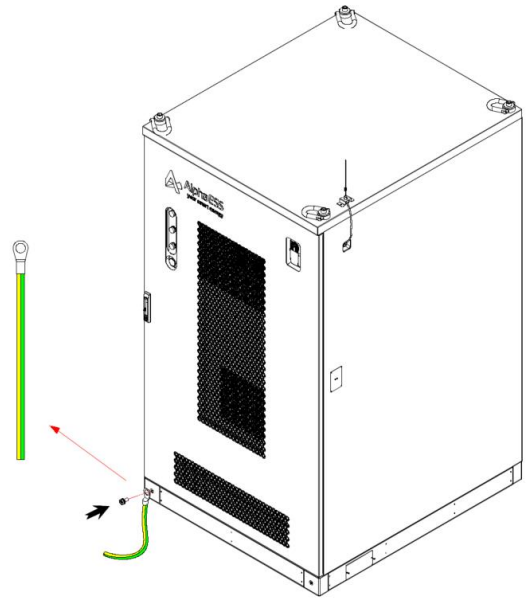


Figure 4-7

Use an M10 socket to remove the nut from the grounding point at the bottom of the cabinet. Select a grounding cable with a cross-section of 35 mm^2 or larger, crimp an OT/DT/SC35-10 terminal to it, and connect the grounding cable to the cabinet's grounding point. Ensure the grounding point is securely installed with a torque value of 15 N·m.

WARNING

Ensure the STORION-H30/H50-G3 outdoor cabinet is reliably grounded. If not connected or loose, electric shock may occur. It is recommended to paint over the outside of the grounding terminal after installation for protection.

CAUTION

Grounding resistance should be less than 4Ω.

4.3.3 Antenna Mounting

The antenna is pre-connected for wireless communication. After removing the wrapping film, place the antenna vertically into the clip on the top of the cabinet. Refer to Figure 4-8.

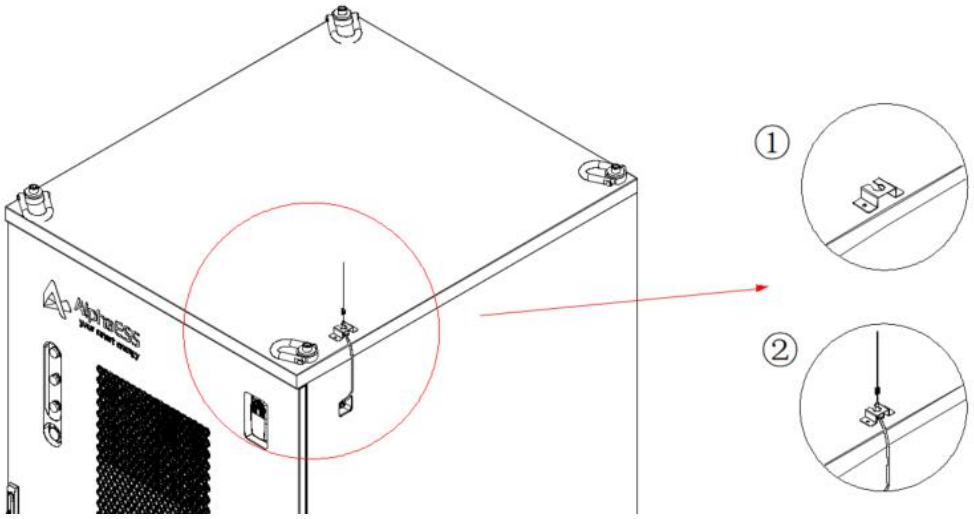


Figure 4-8

4.3.4 Remove Incoming-Port Cover

Cable entry holes are located on both sides of the cabinet bottom. Select the appropriate side based on on-site installation conditions. Use an M4 socket or a Phillips screwdriver to remove the M4 screws on both sides of the cable entry hole cover plate. Refer to Figure 4-9.

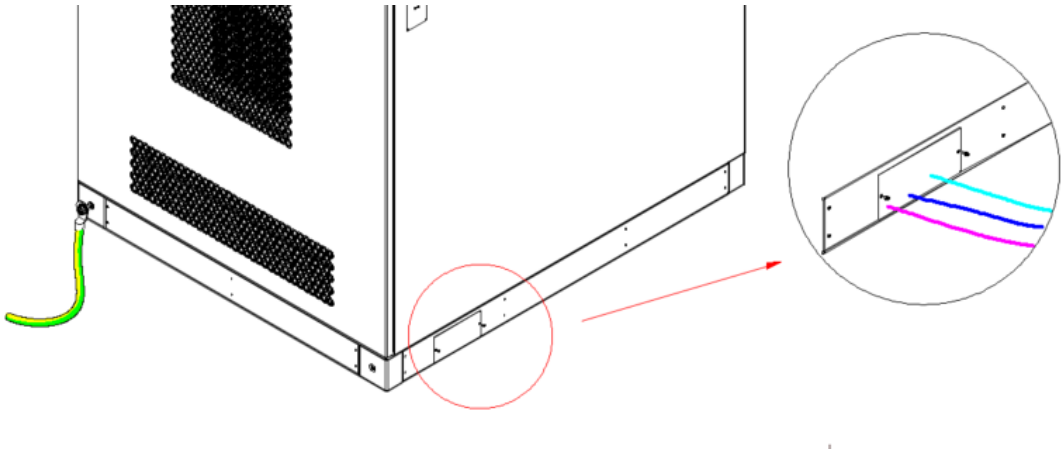


Figure 4-9

4.3.5 Load Connection

Route the load-side AC cables through the side entry port into the cabinet base, then feed them through the base gland plate into the cabinet interior. Cut the rubber grommet to match the cable diameter, pass the cable through the grommet to the PCS, and complete the connections in the specified sequence.

The maximum current, recommended cable size and terminal type for each model are given in the table below.

Model	Max Current (A)	Phase	Recommended cable size (mm^2)	Terminal Model
STORION-H30-G3	45.5	L1/L2/L3/N	16	KST TL16-8

		PE	16	KST TL16-8
STORION-H50-G3	75.8	L1/L2/L3/N	25	KST TL25-8
		PE	16	KST TL16-8

1. Verify that the AC-load-side phase sequence is correct.
2. Use a multimeter to confirm that no voltage is present on the cables to be connected to the load side.
3. Select the appropriate cable according to the system model. Ensure that the selected cable specification can safely carry the maximum current, and crimp the cables with the specified terminals provided in the accessory list.
4. Using an M8 socket, connect the cable conductors L1/L2/L3/N/PE to the corresponding L1/L2/L3/N/PE terminals on the PCS BACK-UP block inside the cabinet; tighten to 12 N·m.
5. Ensure all connections are secure.

The cabling connection of the load-side is shown below:

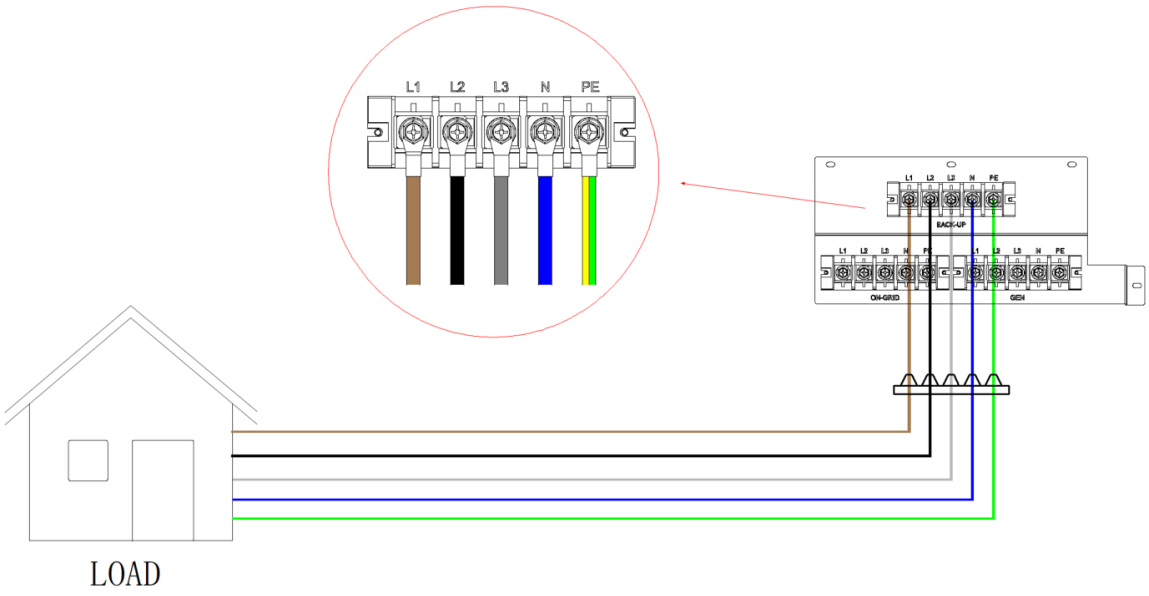


Figure 4-10

4.3.6 Grid Connection

Route the grid-side AC cables through the side entry port into the cabinet base, then feed them through the base gland plate into the cabinet interior. Cut the rubber grommet to match the cable diameter, pass the cable through the grommet to the PCS, and complete the connections in the specified sequence.

The maximum current, recommended cable size and terminal type for each model are given in the table below.

Model	Max Current (A)	Phase	Recommended cable size (mm^2)	Terminal Model
STORION-H30-G3	90.9	L1/L2/L3/N	25	KST TL25-8
		PE	16	KST TL16-8
STORION-H50-G3	121.2	L1/L2/L3/N	35	KST TL35-8
		PE	16	KST TL16-8

1. Verify that the AC-grid-side phase sequence is correct.
2. Use a multimeter to confirm that no voltage is present on the cables to be connected to the grid side.
3. Select the appropriate cable according to the system model. Ensure that the selected cable specification can safely carry the maximum current, and crimp the cables with the specified terminals provided in the accessory list.
4. Using an M8 socket, connect the cable conductors L1/L2/L3/N/PE to the corresponding L1/L2/L3/N/PE terminals on the PCS ON-GRID block inside the cabinet; tighten to 12 N·m.
5. Ensure all connections are secure.

The cabling connection of the grid-side is shown below:

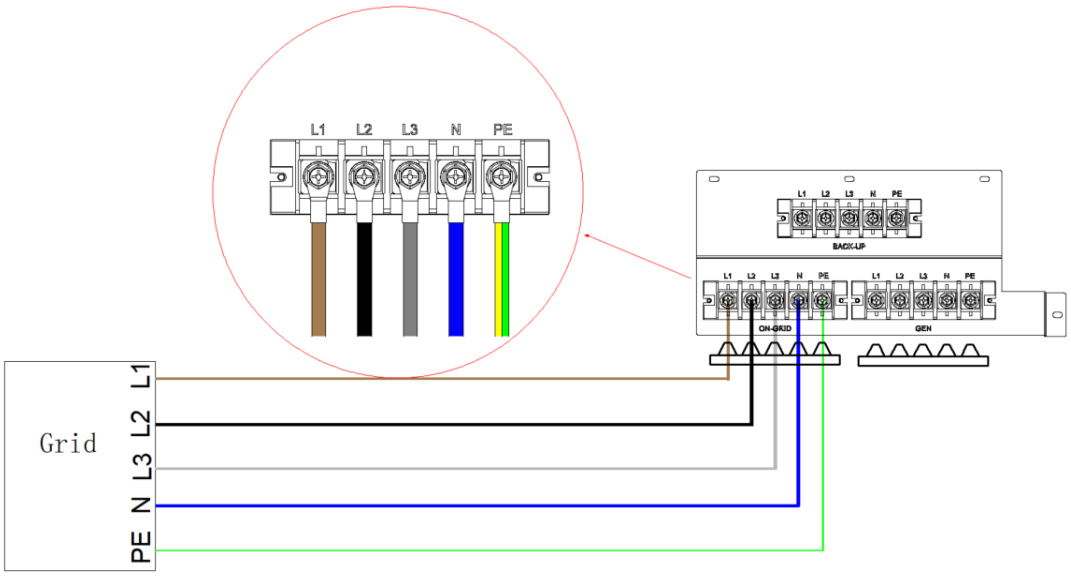


Figure 4-11

4.3.7 Diesel Generator Side Connection

4. 3. 7. 1 Diesel Generator Power Cable Connection

Route the generator-side AC cables through the side entry port into the cabinet base, then feed them through the base gland plate into the cabinet interior. Cut the rubber grommet to match the cable diameter, pass the cable through the grommet to the PCS, and complete the connections in the specified sequence.

The maximum current, recommended cable size and terminal type for each model are given in the table below.

Model	Max Current (A)	Phase	Recommended cable size (mm^2)	Terminal Model
STORION-H30-G3	54.5	L1/L2/L3/N	16	KST TL16-8
		PE	16	KST TL16-8
STORION-H50-G3	90.9	L1/L2/L3/N	25	KST TL25-8
		PE	16	KST TL16-8

1. Ensure the AC wiring phase sequence on the diesel generator side is correct.
2. Use a multimeter to confirm that no voltage is present on the cables to be connected to the generator side.
3. Select the appropriate cable according to the system model. Ensure that the selected cable specification can safely carry the maximum current, and crimp the cables with the specified terminals provided in the accessory list.
4. Using an M8 socket, connect the cable conductors L1/L2/L3/N/PE to the corresponding L1/L2/L3/N/PE terminals on the PCS GEN block inside the cabinet; tighten to 12 N·m.
5. Ensure all connections are secure.

The cabling connection of the generator-side is shown below:

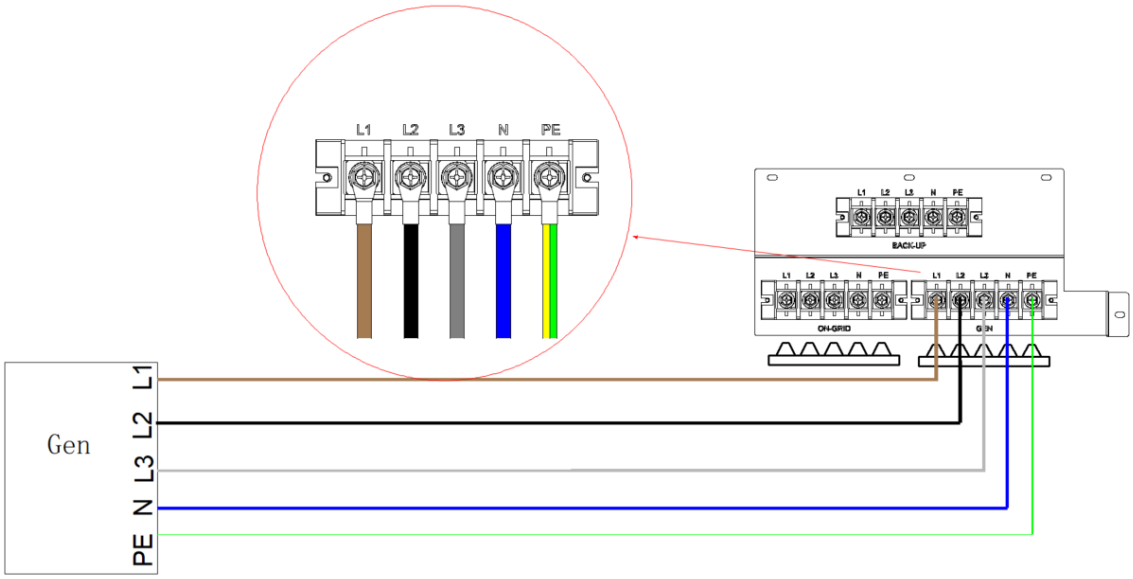


Figure 4-12

4.3.7.2 Generator Dry Contact Connection

1. It is recommended to use a two-core shielded twisted-pair cable with a cross-sectional area of 0.75 mm^2 or larger.

2. Connect the dry contact (NO/COM) of the diesel generator to the system cabinet (XT4:11B/XT4:12B). Refer to Figure 4-13.

A diagram of the generator dry contact connection is shown below:

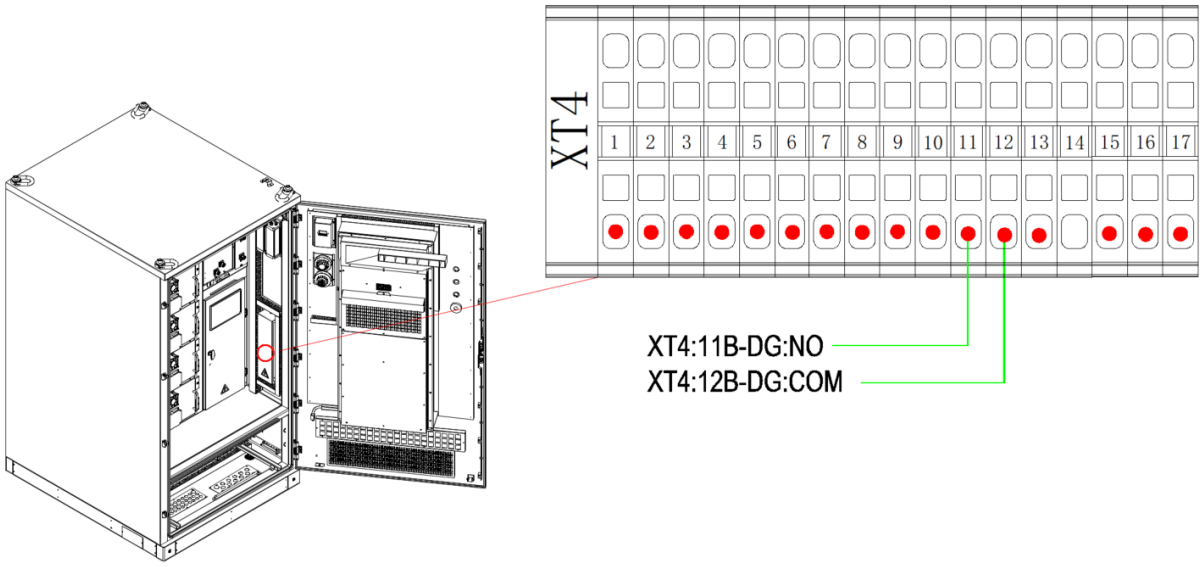


Figure 4-13

4.3.8 Meter and CT Connection

1. Connect grid phases L1/L2/L3/N to meter terminals 1/4/7/10 respectively to supply power and voltage reference.
2. Verify that the circuit is de-energised before installing the CTs.
3. Pass grid L1 through the CT (P1 → P2) and continue to the inverter grid-side L1 terminal; connect CT secondary S1 to meter terminal 31 and S2 to terminal 33.
4. Pass grid L2 through the CT (P1 → P2) and continue to the inverter grid-side L2 terminal; connect CT secondary S1 to meter terminal 34 and S2 to terminal 36.
5. Pass grid L3 through the CT (P1 → P2) and continue to the inverter grid-side L3 terminal; connect CT secondary S1 to meter terminal 37 and S2 to terminal 39.
6. Wire meter RS-485 terminals 24 and 25 to system-cabinet terminals XT4:13B and XT4:14B respectively to complete the communication link.

7. If a diesel generator is present, install its meter and CTs in the same way as for the grid side, then connect generator-meter RS-485 terminals 24 and 25 to grid-meter RS-485 terminals 19 and 21 to establish the daisy-chain communication.

The meter and CT connection is shown below:

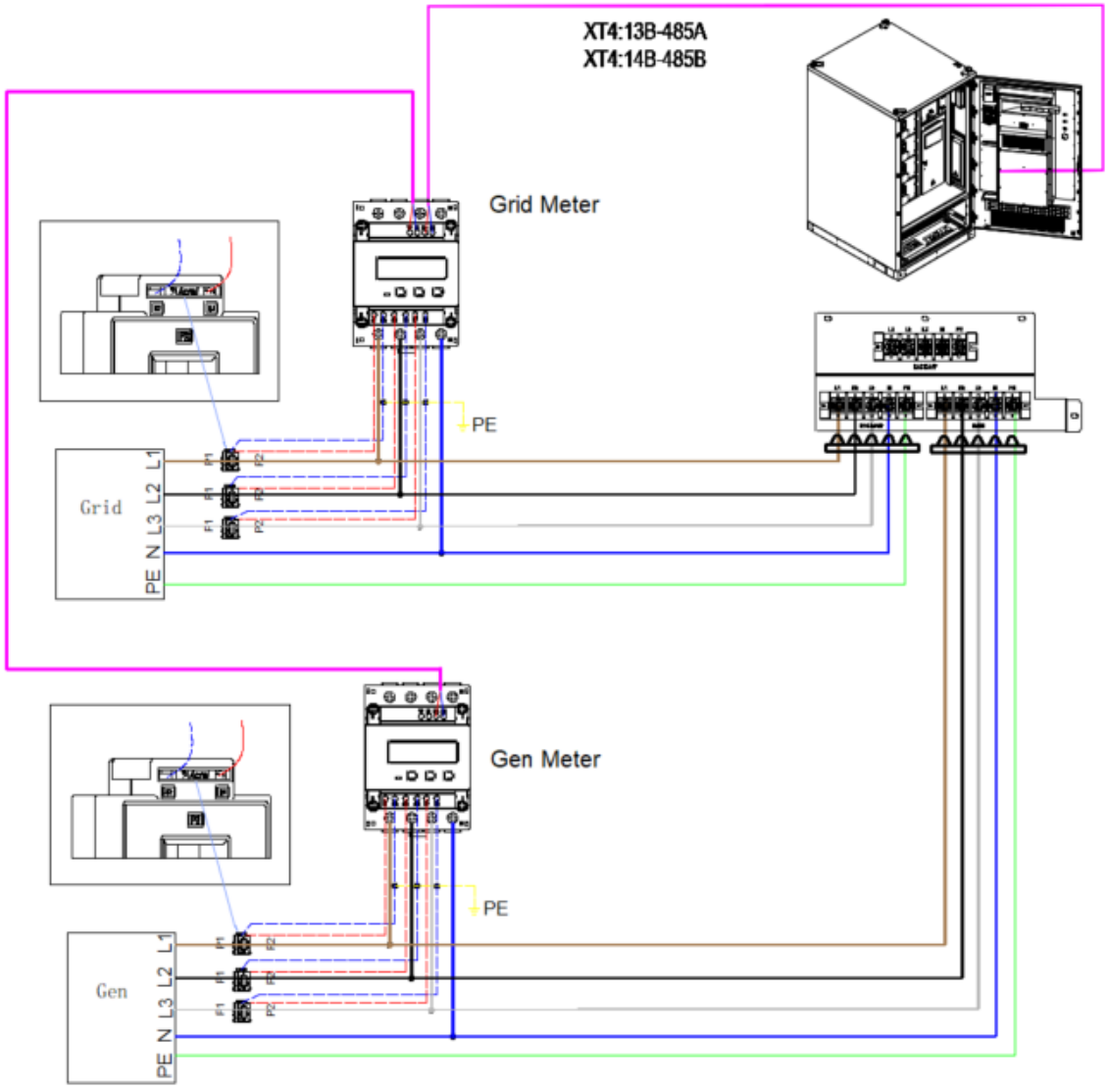


Figure 4-14

To set the communication address or baud rate, follow the steps below:

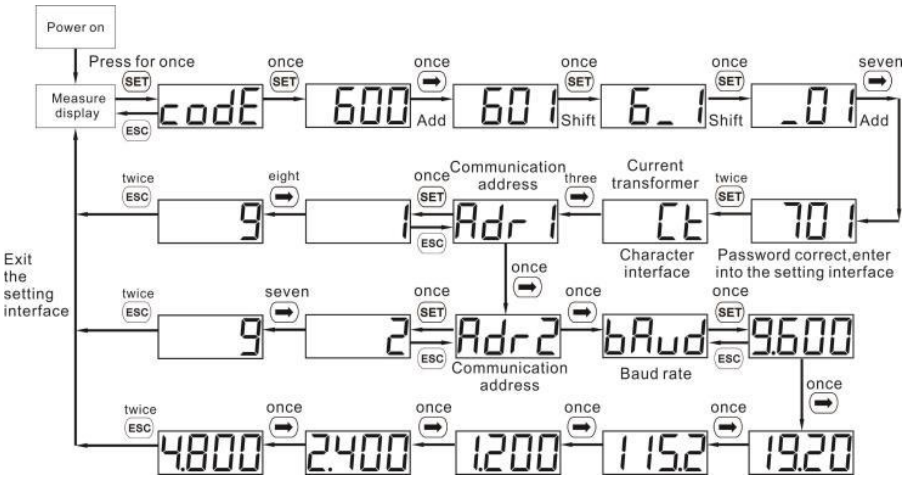


Figure 4-15

Use this procedure to check the baud rate and set the communication address. The baud rates and corresponding addresses for each meter are listed below.

Grid Meter Address	101
Diesel Generator Meter Address	182
Communication Baud Rate	9600

If the direct-connection method is used, ensure the current is less than 50 A. The installation procedure is as follows.

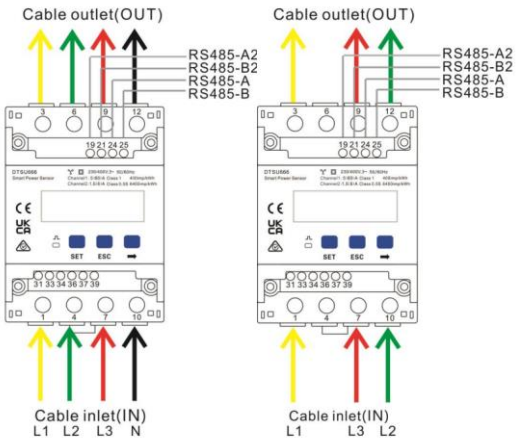


Figure 4-16

4.3.9 PV Connection

Select the appropriate cable specifications based on the actual situation. The recommended specifications are as follows:

Name	Outer Diameter	Conductor Cross-Section
DC Cable	5.9~8.8mm	4mm²（12AWG）or 6mm²（10AWG）

1. Peel off the DC cable insulation sleeve for 7 mm. Disassemble the PV connector in the packing list. Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier, with the "Phoenix CRIMPFOX-RC 10" being the recommended choice. Pull back the cable with some power to check if the terminal is well-connected to the cable.

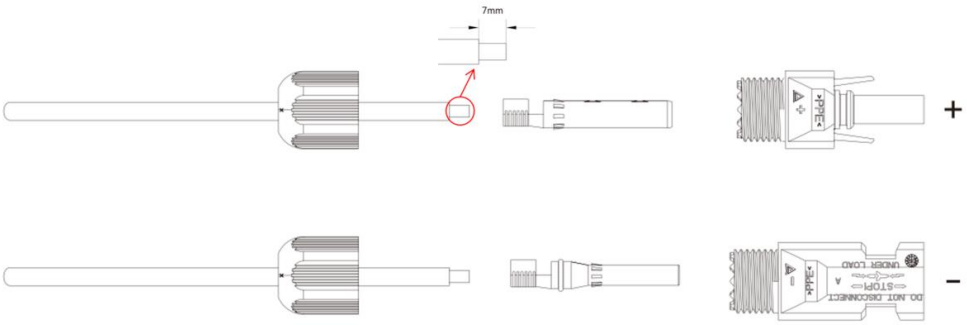


Figure 4-17

2. Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached in the connector.
3. To ensure proper sealing of the terminal, use an open-end wrench to securely tighten the nut to the end.

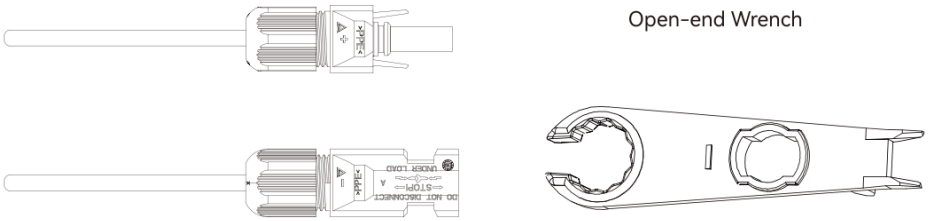


Figure 4-18

4. Check whether the DC switch is on the "OFF" position.
5. Check whether the cable polarity of the PV string is correct. The maximum input voltage for the PV string is 950v.If the voltage of PV string ranges from 950V to 1000v, the inverter will enter standby mode. Exceeding 1000V will result in inverter damage.
6. Insert the positive and negative connectors into the inverter DC input terminals respectively, a click sound should be heard if the terminals are well connected.

A diagram of the PV-side cable connection is shown below:

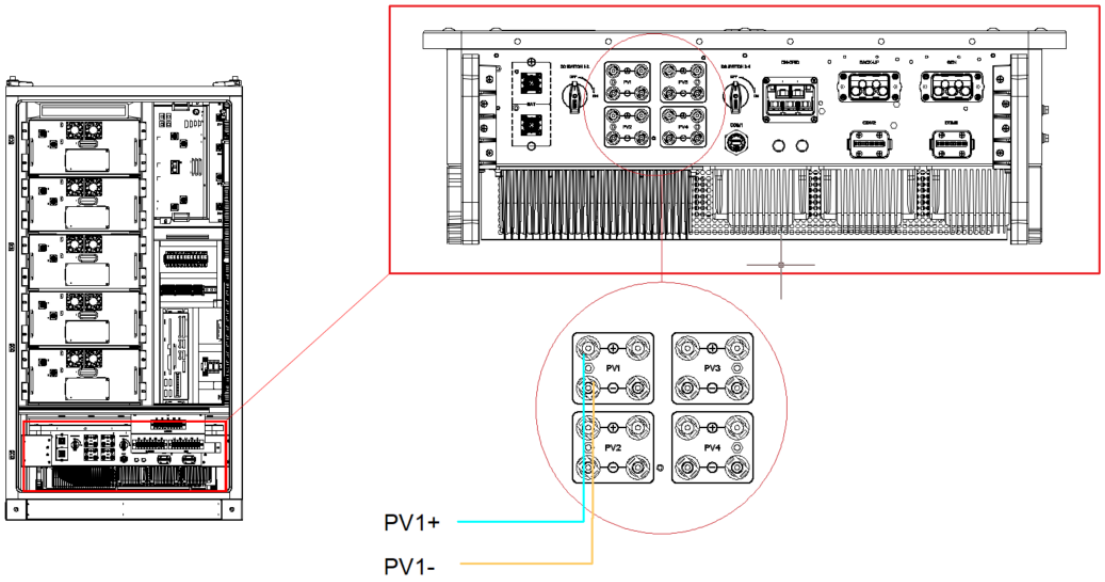


Figure 4-19

If a PV meter is configured, its connection method is consistent with that of the grid side. The PV meter address and communication baud rate are as follows:

PV Meter Address	121
Communication Baud Rate	9600

4.3.10 Network Connection

1. For wireless connection, insert the SIM card into the 4G router inside the cabinet's distribution box; wait 3 minutes and check the system's network status via SCADA.

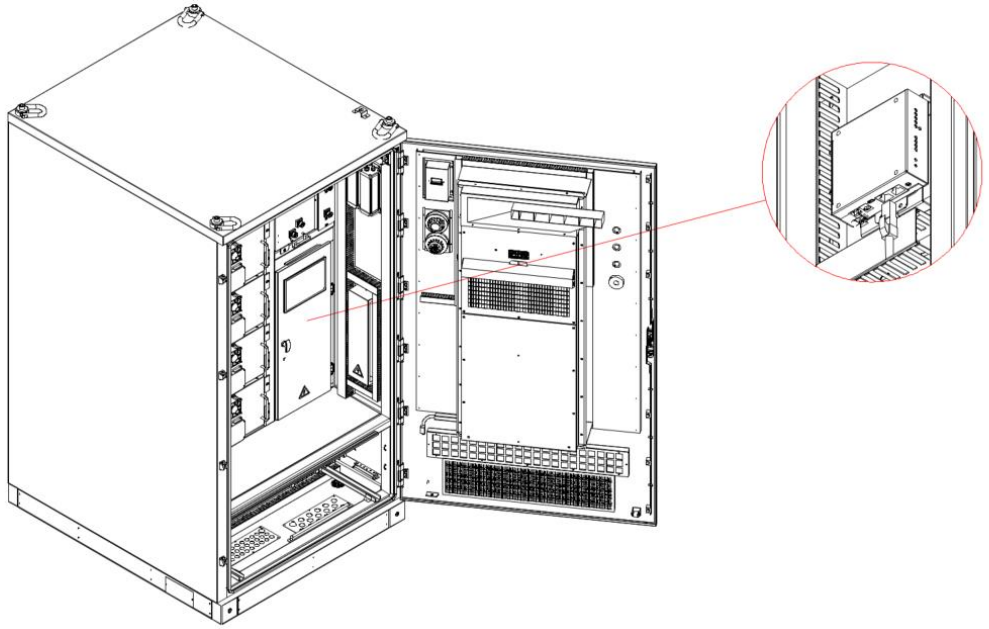


Figure 4-20

2. For wired connection, plug the active Ethernet cable into Net1 on the cabinet's terminal block; wait 3 minutes and verify the network status via SCADA.

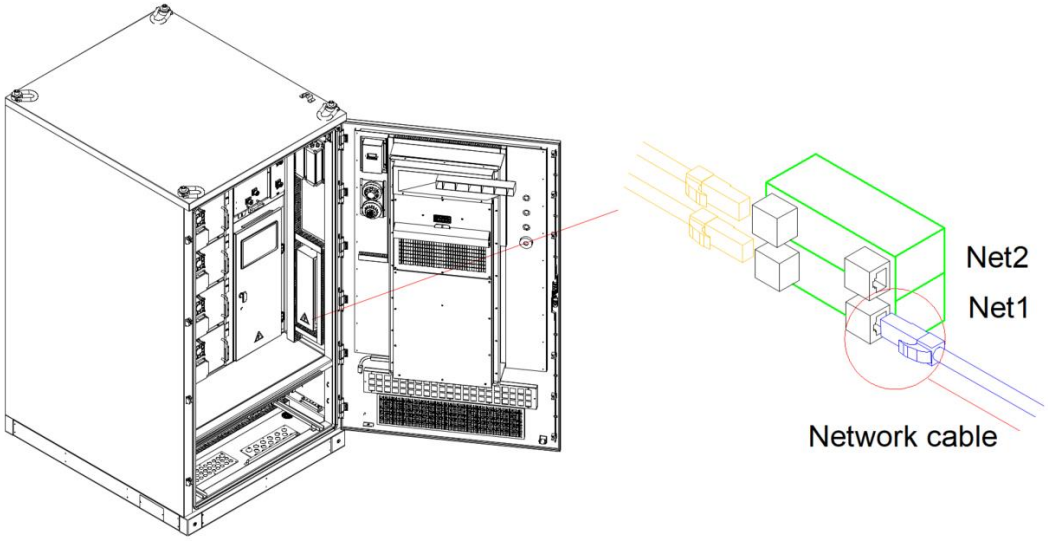


Figure 4-21

4.3.11 Expansion Cabinet Connection (Optional)

After the expansion cabinet has been moved to the installation site with a forklift or other equipment, secure its base with M12 screws (supplied by the customer) and ground it in the same way as the system cabinet.

Remove the side cable-entry blanking plates from both the system and expansion cabinets. Route the expansion-cable harness out through the bottom of the expansion cabinet and in through the side cable entry of the system cabinet. For the cable diameter, cut a cross in the top of the rubber grommet and feed the cable through it.

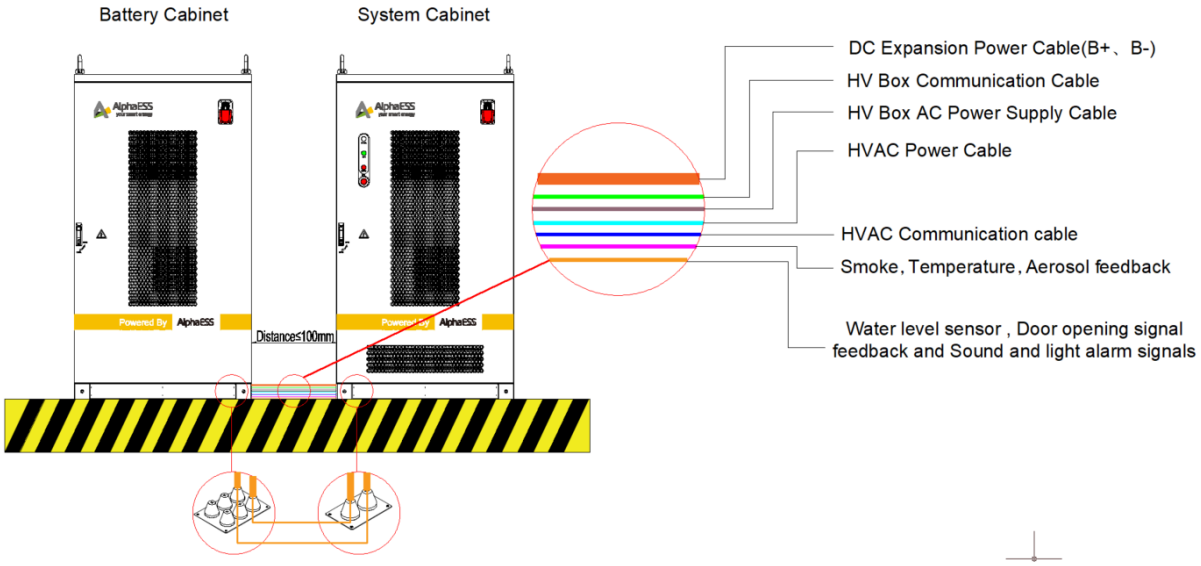


Figure 4-22

The expansion cabinet comes pre-installed with all cable harnesses and crimped terminals. Complete the wiring by following the steps below:

1. Route the B+ and B- DC power cables from the expansion cabinet through the bottom of the cabinet into the system cabinet. Then, along the internal wiring channel, connect them to the B1+ and B1- ports of the system cabinet's busbar box.

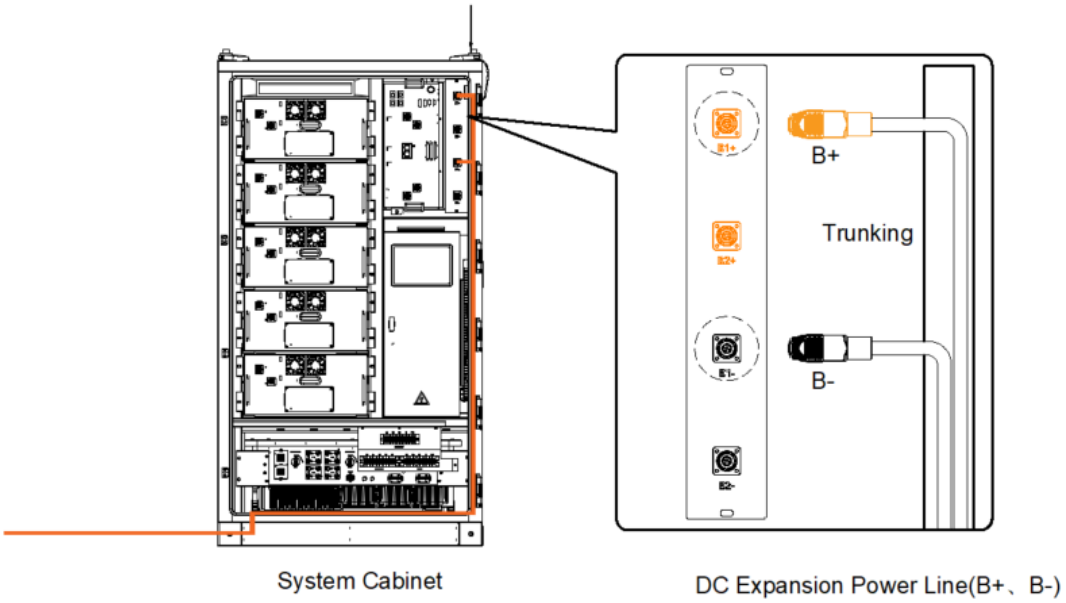


Figure 4-23

2. Route the AC power cables labeled L and N from the expansion cabinet through the bottom of the cabinet into the system cabinet. Then, along the internal wiring channel, connect them to the vacant AC terminals on the high-voltage box of the system cabinet.

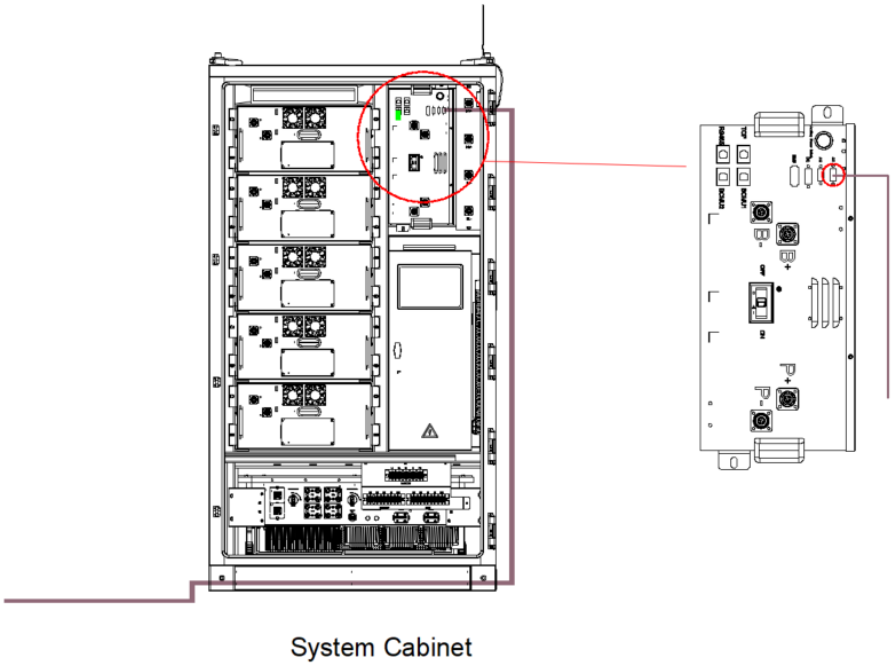


Figure 4-24

3. Remove the terminal resistor from the BCMU2 port of the system cabinet. Then, route the network cable from the expansion cabinet through the bottom of the cabinet into the system cabinet. Along the internal wiring channel, connect it to the vacant BCMU2 communication port on the high-voltage box of the system cabinet.

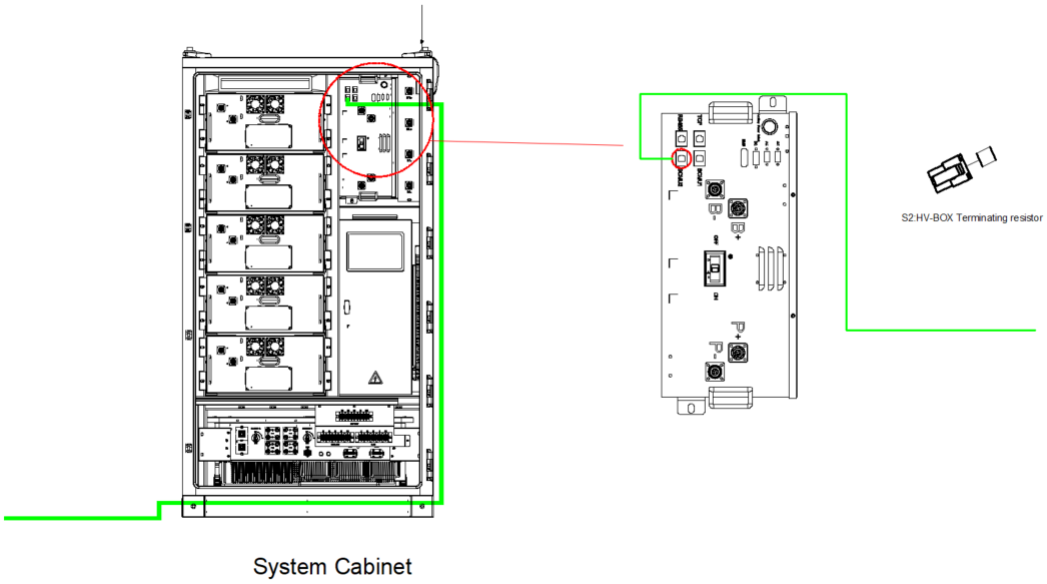


Figure 4-25

4. Route the HVAC power cables labeled HVAC:L and HVAC:N, along with the communication cables labeled HVAC:485A and HVAC:485B, from the expansion cabinet through the bottom of the cabinet into the system cabinet. Then, along the internal wiring channel, connect them to terminals 1B to 4B of the terminal block XT6 in the system cabinet.
5. Route the two 6-core cables from the expansion cabinet through the bottom of the cabinet into the system cabinet. Then, along the internal wiring channel, connect them to terminals 5B to 16B of the terminal block XT6 in the system cabinet according to the cable labels.
6. Remove the jumper between terminals 13 and 14 on the XT6 terminal block.

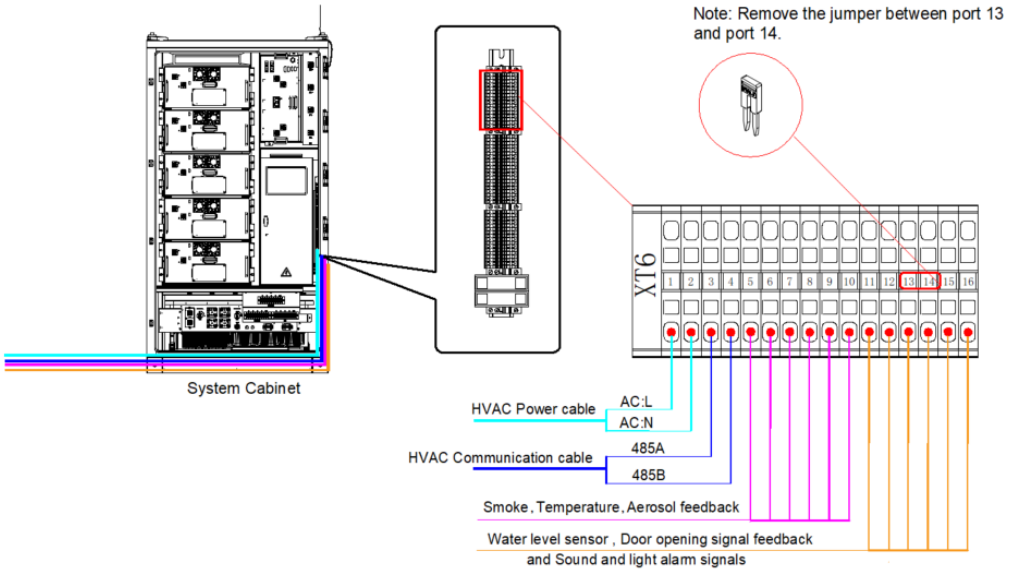


Figure 4-26

After completing all cable connection, it is necessary to add the battery and air conditioning equipment on the SCADA of the system cabinet. The operating steps are as follows:

1. On the system cabinet SCADA, navigate to Maintain -> Basic parameters configuration.
2. Choose Device Operation, configure according to the following settings, and click "Write".

Operation Type	Equipment category	Equipment subclass	Protocol	Model	Device ID	Upload cycle to cloud platform（s）
Add Device	battery	cluster	ebp-can-alpha	M77314_S	0x02010001	300
Add Device	Other	air_condition	modbus-tcl	TC003MH2AA	0x0700001	300

5. Startup and Operation

After system wiring is completed, the following steps must be carried out before start-up:

1. Use a multimeter to measure the voltage at the high-voltage box input terminals; the acceptable range is given in the “System Normal Voltage Range” table at the end of this document.
2. With an insulation tester, check the insulation resistance at the high-voltage box input (B+ to ground and B– to ground); the resistance must be ≥ 1 MΩ.
3. For further details, refer to the Operation Manual.

6. Technical Contact

If you have any technical issues with our products, please contact us. The contact information can be found on the front page of this manual. To help us quickly resolve your issue, please provide the following information:

A. System configuration

B. Product serial number

C. Software version number

D. Fault information

E. Photovoltaic module information

7. Attachment

7.1 System Installation of a Torque Wrench

Number	Location	Specification & Material	Qty	Torque (Nm)
1	Mount antenna bracket	Screw, Stainless Steel 304, M5*12, Cross Pan Head, Triple Combination	2pcs	2.8±10%
2	Mount battery and high-voltage box, mount PCS	Screw GB/T9074.13 SUS304 Natural Color, Cross Recessed Hexagon Triple Combination M8*20	26pcs	15±10%
3	Mount busbar box, mount EMS box	Cross Recessed Hexagon Head Bolt with Spring Washer and Flat Washer Assembly, GB/T9074.13, Stainless Steel 304, Silver, M6*20	6pcs	8±10%
4	Mount limit switch, mount router	Screw GB/T 9074.13 SUS304, Cross Recessed Hexagon Triple Combination Screw M4*14	6pcs	1.6±10%
5	Mount explosion-proof light, mount aerosol fire extin-guisher	Nut GB/T6187.1-2000 M5, Hexagon Flange	16pcs	5±10%
6	Mount barrier termi-nals and M8 nuts on PCS side	M8 Nut	20pcs	15±10%
7	Secure PCS mounting ears	M5 Screw	8pcs	5±10%

NOTE

Please follow the recommended torque values in the table. If there are any special or abnormal situations, please provide your feedback to an AlphaESS engineer.

7.2 System Normal Voltage Range Table

Number of Batteries	M77314-S
3	208.8V~252V
4	278.4V~336V
5	348V~420V