User Manual

Battery Energy Storage System

Samvolt 50kW/60kWh

Jun. 2024 Revision A.0

About this manual

This manual describes how to install the Samvolt 50kW/60kWh battery system. Please read this manual carefully before you start to install the product, and follow the instructions throughout the installation process. If you are not sure about any of the requirements, recommendations, or safety procedures described in this manual, please contact Samvolt immediately for advice and clarification. The information included in this manual is accurate at the time of publication. However, with regards to the product design and technical specification updates, our company reserves the right to make changes at any time without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. The illustrated items maybe different from the actual items at the installation location.

Content

1 Safety Precautions

1.1 Warning Sign

Warning signs are used to warn you about the conditions that may cause severe injury or damage to the device. They instruct you to exercise caution to prevent danger. The following table describes the warning signs used in this manual.

Sign	Description
	This battery pack contains high voltage which can cause electric shock resulting in severe injury.
	Make sure that the battery polarity is connected correctly.
	Keep the battery pack away from open flame or ignition sources
	Keep the battery pack away from children.
	Read the manual before installing and operating the battery pack.
	The battery pack is heavy enough to cause severe injury
	The battery pack may leak corrosive electrolyte.
	The battery pack may explode.
	The battery pack should not be disposed with household waste at the end of its working life.
	Physical injury or damage to the devices may occur if related requirements are not followed.

1.2 Safety instructions

For safety reasons, installers are responsible for familiarizing themselves with the contents of this manual and all warnings before performing installation.

General safety precautions

	Failure to observe the precautions described in this section can cause serious injury to persons or damage to property, observe the following precautions.

1.2.1 Risks of explosion

- Do not subject the battery pack to strong impacts.
- Do not crush or puncture the battery pack.
- Do not dispose of the battery pack in a fire.

1.2.2 Risks of fire

- Do not expose the battery pack to temperatures in excess of 60°C.
- Do not place the battery pack near a heat source, such as a fireplace.
- Do not expose the battery pack to direct sunlight.
- Do not allow the battery connectors to touch conductive objects such as wires.

1.2.3 Risks of electric shock

- Do not disassemble the battery pack.
- Do not touch the battery pack with wet hands.
- Do not expose the battery pack to moisture or liquids.
- Keep the battery pack away from children and animals.

1.2.4 Risks of damage to the battery pack

- Do not allow the battery pack to come in contact with liquids.
- Do not subject the battery pack to high pressures.
- Do not place any objects on top of the battery pack.

1.3 Battery handling guide

- Use the battery pack only as directed.
- Do not use the battery pack if it is defective, appears cracked, broken or otherwise damaged, or fails to operate.
- Do not attempt to open, disassemble, repair, tamper with, or modify the battery pack. The battery pack is not user serviceable.
- To protect the battery pack and its components from damage when transporting, handle

with care.

- Do not impact, pull, drag or step on the battery pack.
- Do not subject it to any strong force.
- Do not insert foreign objects into any part of the battery pack.
- Do not use cleaning solvents to clean the battery pack.

1.4 Response to emergency situations

The Samvolt 50kW/60kWh comprises multiple batteries that are designed to prevent hazards resulting from failures. However, Samvolt cannot guarantee their absolute safety.

1.4.1 Leaking batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. the electrolyte is corrosive and contact may cause skin irritation and chemical burns. If someone is exposed to the leaked substance, do these actions:

1.4.2 Inhalation

Evacuate the contaminated area, and seek medical attention immediately.

1.4.3 Eye contact

Rinse eyes with flowing water for 15 minutes, and seek medical attention immediately.

1.4.4 Skin contact

Wash the affected area thoroughly with soap and water, and seek medical attention immediately.

1.4.5 Ingestion

Induce vomiting, and seek medical attention immediately.

1.4.6 Fire

In case there is a fire, always have an ABC or carbon dioxide extinguisher.

	The battery pack may catch fire when heated above 150°C. If a fire breaks out where the battery pack is installed, do these actions:

- Extinguish the fire before the battery pack catches fire.

- If it is impossible to extinguish the fire but you have time, move the battery pack to a safe area before it catches fire.
- If the battery pack has caught fire, do not try to extinguish the fire. Evacuate people immediately.

	If the battery catches fire, it will produce noxious and poisonous gases. Do not approach.

1.4.7 Wet batteries

If the battery pack is wet or submerged in water, do not try to access it. Contact Samvolt or your distributor for technical assistance.

1.4.8 Damaged batteries

Damaged batteries are dangerous and must be handled with extreme caution. They are not fit for use and may pose a danger to people or property.

If the battery pack seems to be damaged, pack it in its original container, and then return it to Samvolt or your distributor.

	Damaged batteries may leak electrolyte or produce flammable gas. If you suspect such damage, immediately contact Samvolt for advice and information.

1.5 Qualified installers

This manual and the tasks and procedures described herein are intended for use by skilled workers only. A skilled worker is defined as a trained and qualified electrician or installer who has all of the following skills and experience:

- Knowledge of the functional principles and operation of on-grid systems.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices.
- Knowledge of and adherence to this manual and all safety precautions and best practices.

2 Equipment Inspection and Storage

2.1 Inspection before signing

Before signing for the product, please check the following details：

- Check the outer packaging for damage, such as holes, deformation, cracks, or other signs that may cause damage to the device inside the package. If there is any damage, do not open the package and contact your distributor.
- Check if the equipment model is correct, if not, do not open the package and contact your distributor.
- Check whether the delivered parts are of the correct type and quantity and whether they are damaged. If they are damaged, please contact your distributor.

2.2 Deliverables List

After unpacking the product, please check the deliverables for completeness and if any components are found missing or incomplete, please contact dealers in time.

NO.	Name	Quantity
1	Samvolt 50kW/60kWh battery system	1PCS
2	Product manual	1PCS
3	Battery charging connector	1 Pair
4	Screw	1 bag

2.3 Device Storage

If the battery system is not put into use immediately, store it as follows:

- Ensure that the storage environment is clean, the temperature and humidity ranges are appropriate, and there is no condensation.
- After long-term storage, it needs to be checked and confirmed by professional personnel before it can continue to use.
- The devices are packed in a packing case. Place desiccant in the packing case and seal the packing case.
- If the device is not installed within 3 days after unpacking, place the device in the packing box.
- If the battery module is expected to be stored for more than 30 days, the SOC should be adjusted to 30% to 45% and it needs to be fully charged and discharged every three months.
- Storage temperature range: -20℃~60℃ storage conditions do not exceed 7 days. -20℃~45℃ storage conditions do not exceed 7 months. 0℃~45℃ storage conditions do not exceed 3 months.0℃~25℃ storage conditions do not exceed 1 years.

- Humidity range: 5~95% no condensation. Do not install the interface when it is wet and

congealed.

- The device should be stored in a cool place, away from direct sunlight.
- Equipment storage should be away from inflammable, explosive, corrosive and other items.
- Ensure that the battery system is not damaged during transportation and storage.
- Do not put the battery into the fire, otherwise there is a risk of explosion.
- When the ambient temperature is too high, the battery system has the risk of fire.

3 Product Introduction

Samvolt 50kW/60kWh is a LFP lithium battery product with BMS (Battery Management System). It is a high-voltage battery module with CAN communication, under-voltage,over-voltage,over-current,over-temperature,under-temperature protection functions. It has the characteristics of high energy density, long life, safety and reliability and so on, and It is your trustworthy green environmental product.

3.1 Features

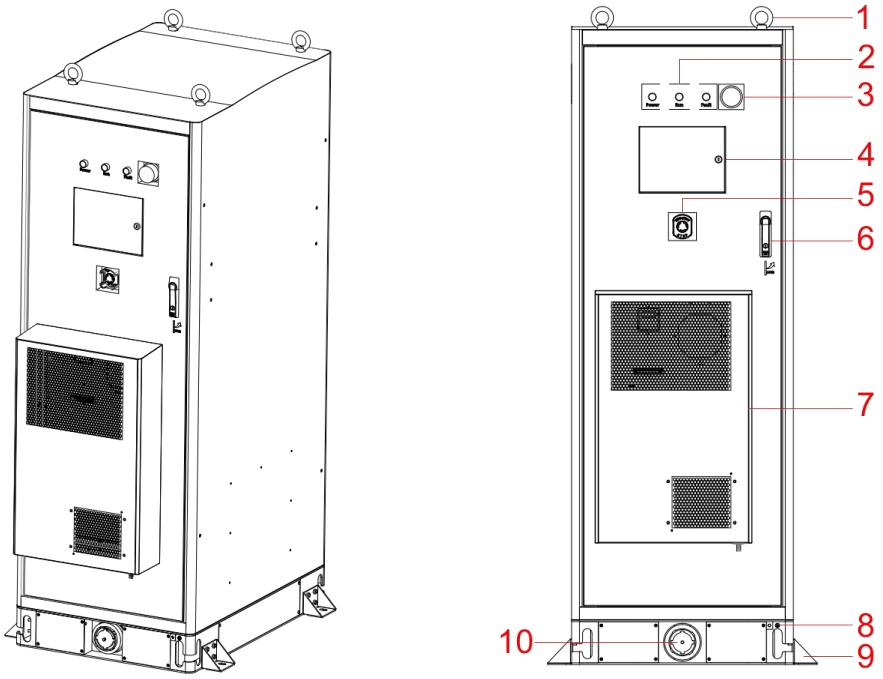
- Excellent Safety Performance
- Long cycle life
- Support for CAN-communication
- High energy density
- Excellent battery management system
- Number of expandable battery units
- Wi-Fi monitor
- LCD display and settings
- Fire, smoke, water detection function
- Built-in air conditioning, adjustable temperature
- Supports maximum of 5 parallel connections

3.2 Application

- Back-up power
- Micro-grid
- Small industrial and commercial energy storage battery system

3.3 Appearance

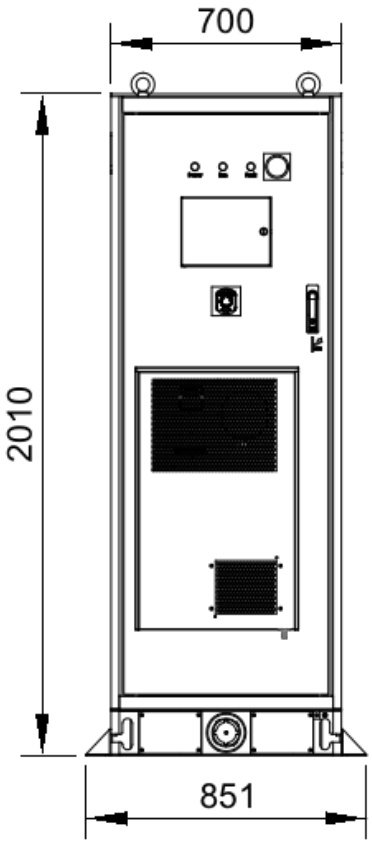
3.3.1 Appearance introduction



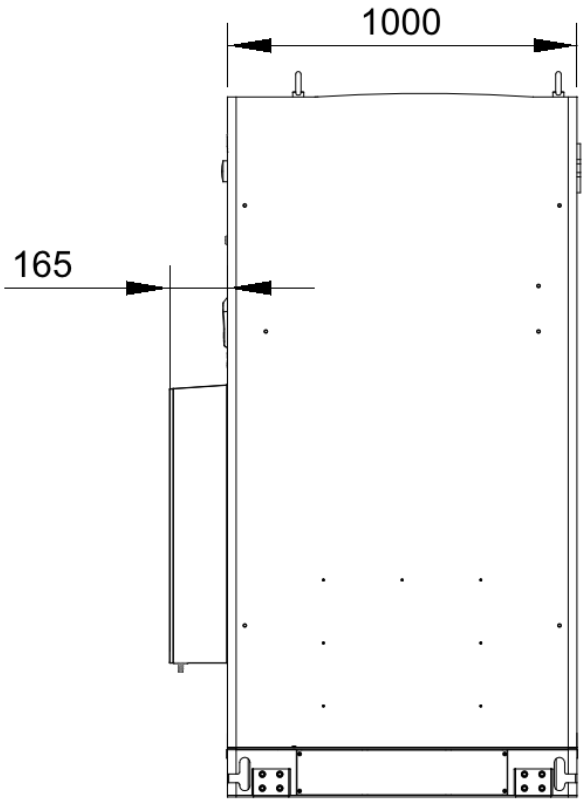
System appearance view

NO.	Name	Remark
1	Ring	For move battery system
2	Status Indicator Light	Indicates the current working status of the battery system
3	Acousto-optic alarm	Issue an alarm when a fault occurs
4	Operation display	View and set battery system parameters
5	Emergency stop button	In case of an accident, press this button
6	Door lock	Safety protection device
7	Air conditioner	Adjust the temperature inside the battery system
8	PE	Battery system ground point
9	Bracket	Fixed battery system on the ground
10	Fire hydrant	Connect hydrant pipe for outfire

3.3.2 Dimensions introduction



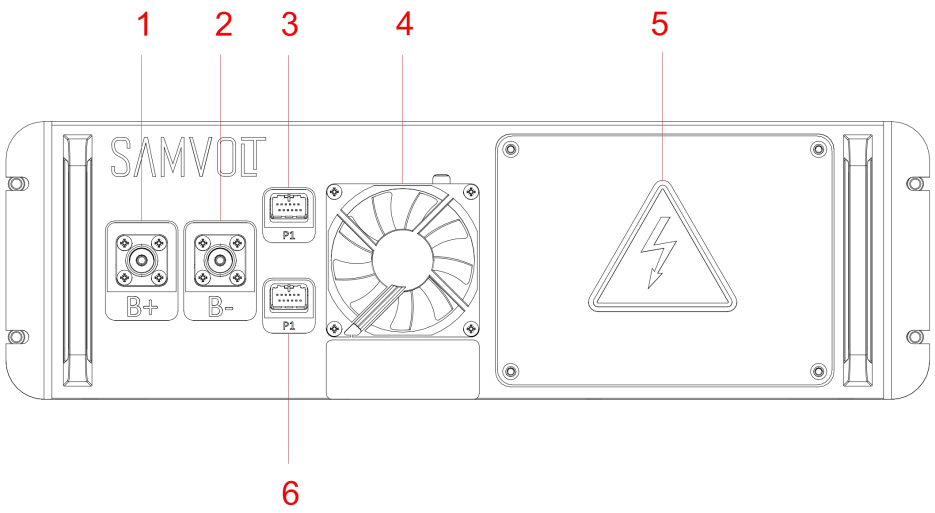
Front view



Side view

Width	700	mm
Depth	1000	mm
Height	2010	mm

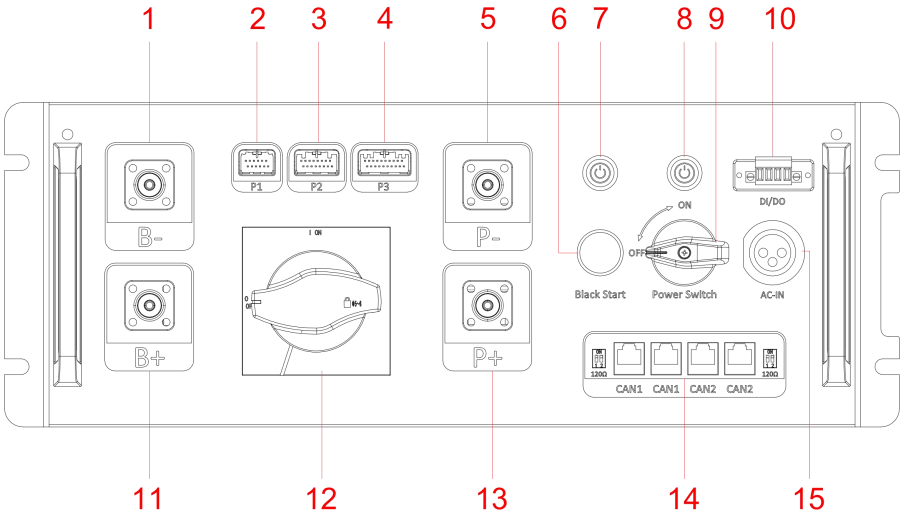
3.3.3 Battery module introduction



Battery module interface diagram

NO.	Name	Remark
1	B+	Battery module positive port
2	B-	Battery module negative port
3、6	P1	Battery module expansion port
4	Fan	Heat dissipation function
5	Danger sign	Reminder and warning function

3.3.4 Main control module introduction

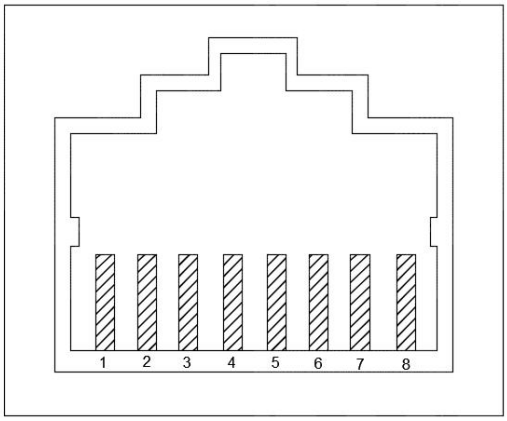


Main control module interface diagram

NO.	Name	Remark
1	B-	Battery module negative port
2	P1	Battery module expansion port
3	P2	Emergency stop, fire, sound and light alarm, access switch control port
4	P3	LCD communication, air conditioning communication, RS485 communication port
5	P-	Output negative of battery module
6	Black Start button	Press and hold for about 10 seconds to output the battery voltage
7	Black Start signal indicator	Indicates that the battery enters the black start function
8	BMS Power indicator light	Indicates that the BMS is powered on
9	Battery system power switch	Used to control the power-on and power-off of the battery system
10	DI/DO	LED light power connection port
11	B+	Battery module positive port
12	DC switch	Dc power supply
13	P+	Output positive of battery module
14	Communication port	CAN1 is used for battery parallel connection, CAN2 is used to communicate with the inverter

15	AC-IN	AC input port

CAN1 and CAN2 communication interface definition as follows:



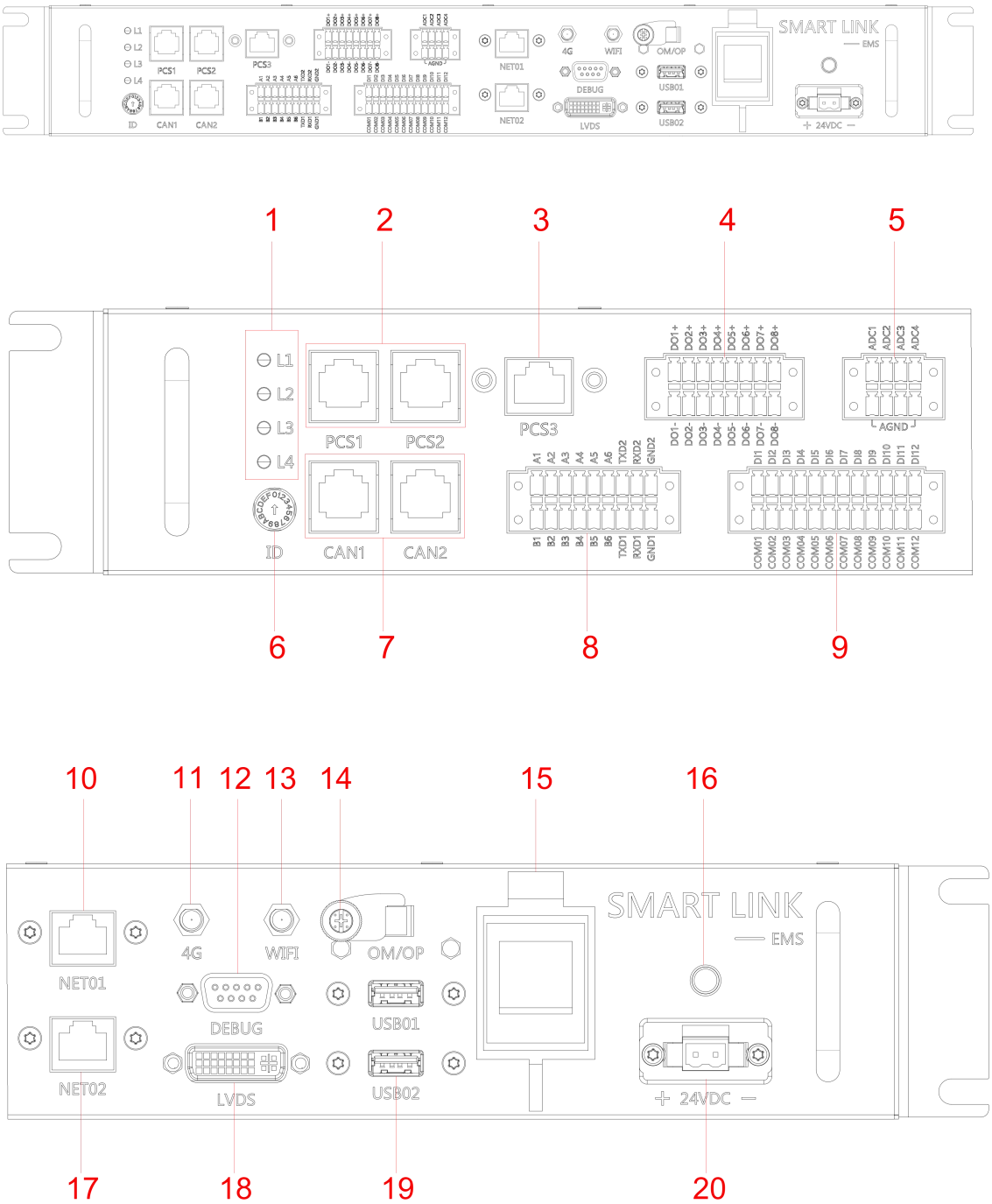
CAN1 port (for battery communication)

1	2	3	4	5	6	7	8
—	—	—	CAN1H	CAN1L		—	—

CAN2 port (for inverter communication)

1	2	3	4	5	6	7	8
			CAN1H	CAN1L			

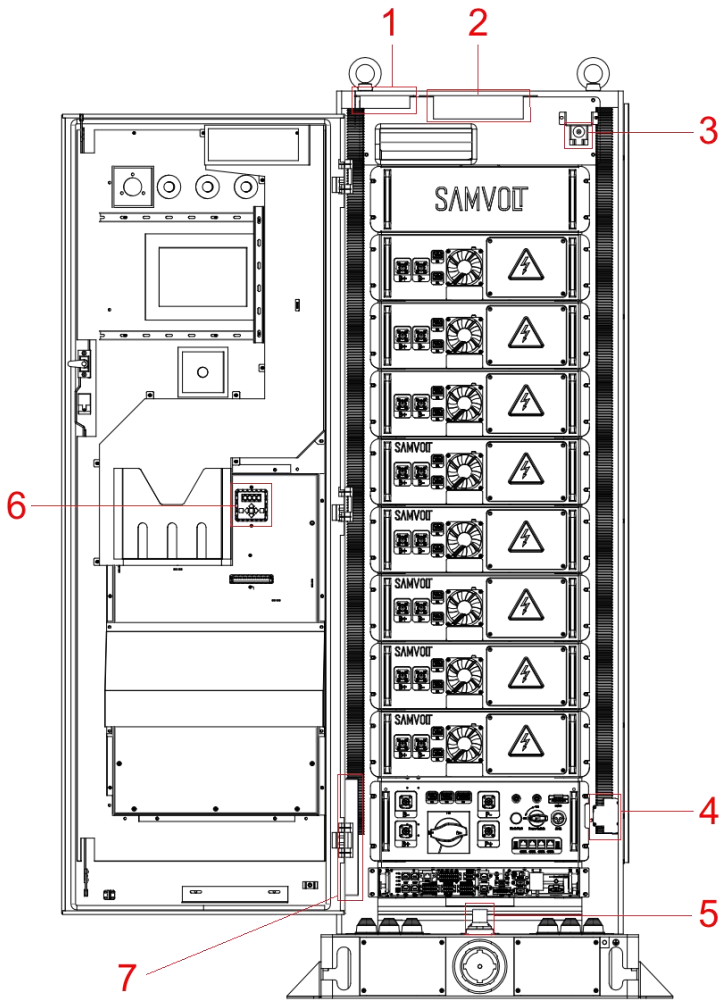
3.3.5 Smart Link-EMS introdution



Smart Link-EMS interface diagram

NO.	Name	Remark
1	Running status indicator light	Indicates the current operating status of the system
2	PCS1,PCS2	CAN and RS485 communication,connect to the inverter
3	PCS3	NET communication,connect to the inverter
4	8pin DO	RS485 and RS232 communication,used for lighting, fire fighting, sound and light alarms
5	4pin ADC	
6	ID	Battery protocol selection
7	CAN1,CAN2	CAN1 is used for internal communication and CAN2 is used for external communication
8	12pin DI dry contact	Water sensor, emergency stop, stroke switch, temperature and humidity sensor
9	6pin DI wet contact	
10	NET01	Ethernet interface
11	4G	Connect 4G signal stick
12	DEBUG	For debugging
13	Wi-Fi	Connect Wi-Fi stick
14	OM/OP	Automatic or manual mode
15	Power switch	Power on and off
16	Power indicator light	
17	NET02	Connect dispatch device
18	LVDS	Connect the EMS screen
19	USB01,USB02	
20	24VDC	24V power supply

3.3.6 Battery system internal introdution



Internal appearance of the battery system

NO.	Name	Remark
1	Smoke detector	Photoelectric smoke detector, used for smoke detection.
2	Light	Used for lighting inside the cabinet.
3	Door status sensor	Monitors the door opening and closing status.
4	AC Breaker	Switch on or off the AC power supply of the battery system
5	Water sensor	Detects water based on the resistance change between both electrodes.
6	Air conditioning operating panel	Used to adjust the air conditioner temperature
7	Fire protection device	Used for extinguishing fire

4 Installation

4.1 Installation requirements

4.1.1 Installation environment requirements

- Do not install the device in an environment that is flammable, explosive, or corrosive.
- Keep the installation position out of reach of children and away from easy to touch locations.
- The installation space must meet the requirements for ventilation, heat dissipation, and operation space.
- The protection level of the device must meet the requirements for outdoor installation, and the ambient temperature and humidity must be within the appropriate range.
- The device must be installed on the outdoor ground, and cannot be installed indoors or on the roof of a building.
- Do not place the device in a high temperature environment. Ensure that there is no heat source near the device.
- Ensure that the device is installed at a height that is easy to operate and maintain. Ensure that device indicators and all labels are easy to view, and wiring terminals are easy to operate.
- The installation altitude of the energy storage system is lower than 3000m above the maximum working altitude.
- Stay away from strong magnetic field environment to avoid electromagnetic interference.

Notice:

Do not expose the battery system directly to sunlight, it is suggested to build sunshade. Equipment installed in cold areas needs to be equipped with a heating system.

	If the ambient temperature is outside the operating range, the battery pack stops operating to protect itself. The optimal temperature range for the battery pack to operate is 15°C to 30°C. Frequent exposure to harsh temperatures may deteriorate the performance and lifetime of the battery pack.

4.1.2 Installation angle requirement

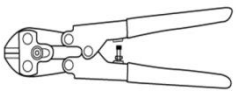
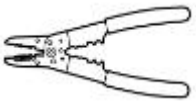
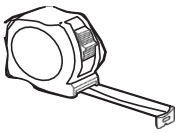
Ensure that the device is installed horizontally and cannot be tilted, horizontally, or upside down.

4.1.3 Installation foundation support requirements

- The device must be installed on a concrete or other non-combustible surface base.
- Before installation, ensure that the base is level, firm, smooth, dry, and has enough load-bearing force, and do not sag or tilt.
- A trench or cable outlet hole must be reserved for the base to facilitate cable routing.

4.1.4 Installation tools requirements

You are advised to use the following installation tools. If necessary, other auxiliary tools can be used on site.

Item	Picture	Name
1		Phillips-screwdriver bit
2		L-Shaped Wrench
3		Wire cutters
4		Wire stripper
5		Tape measure
6		Drill

4.1.5 Installation materials

The installers should prepare the following materials.

NO.	Name	Description
1	Charging cables	Connect the battery and inverter for battery charging and discharging
2	Network cables	Connect the battery and inverter for communication
3	DC breaker	Control disconnects the battery from the inverter

4.2 Installation battery system

4.2.1 Remove the battery system

Caution：

- When carrying out transportation, turnover, installation and other operations, it must meet the laws and regulations and relevant standards of the country and region.
- To protect equipment from damage during transportation, ensure that transportation personnel are professionally trained. Record the operation procedure during transportation and keep it device balance to avoid device fall.
- Before installation, move the energy storage system to the installation site. To avoid personal injury or device damage, pay attention to the following:
  1) Prepare personnel and tools according to the weight of the device. Otherwise, personnel may be injured due to the weight of the device.
  2) Ensure that the device is balanced to avoid falling.
  3) Ensure that the cabinet door is locked during device transportation.

Notice:

- The energy storage system can be hoisted or transported to the installation site by forklift.
- When lifting devices, use flexible straps or straps. Each strap must have a load-bearing capacity of at least 3t.
- When you use a forklift to move devices, the forklift bearing capacity must be at least 3t.

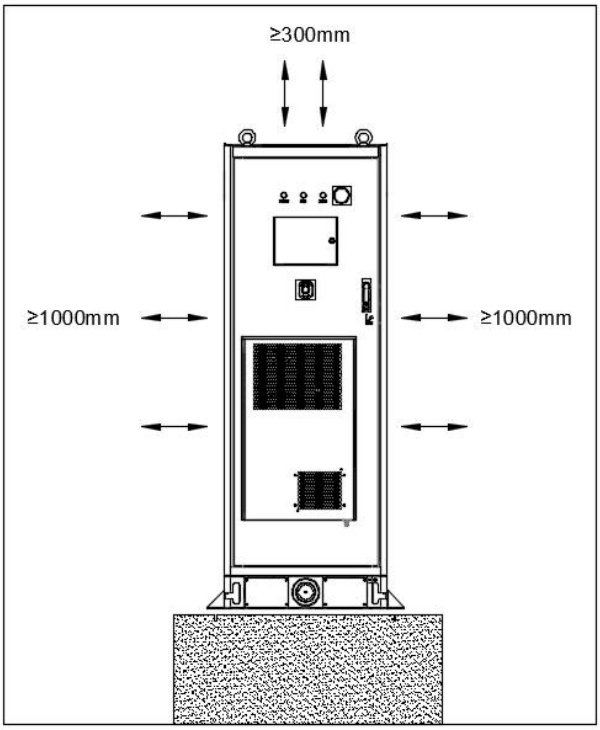
4.2.2 Installation battery system

Caution：

- Ensure that the energy storage system is vertically pressed to the ground without tipping risk.
- Ensure that the energy storage system is securely installed to prevent personnel from falling over.

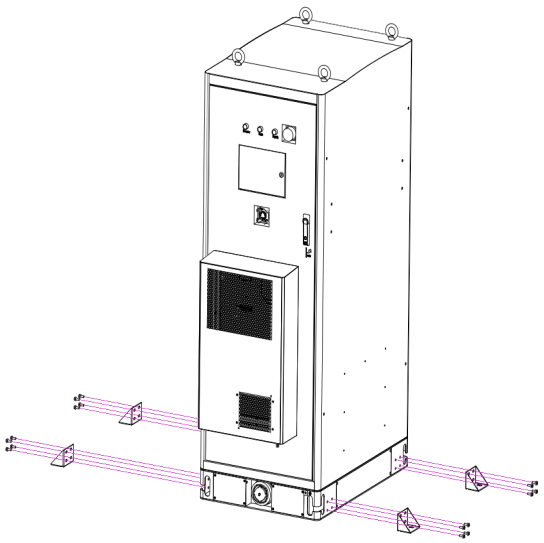
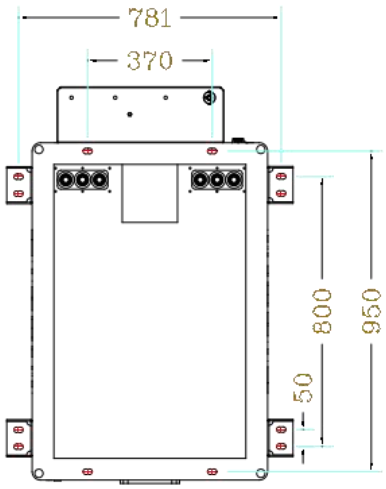
Installation preparation

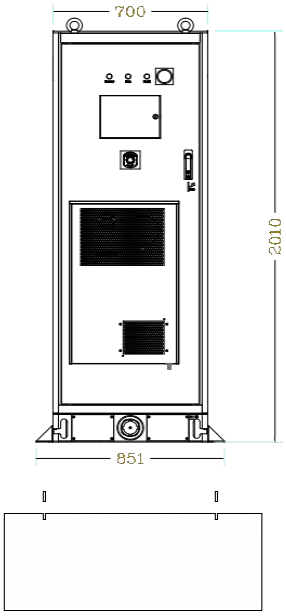
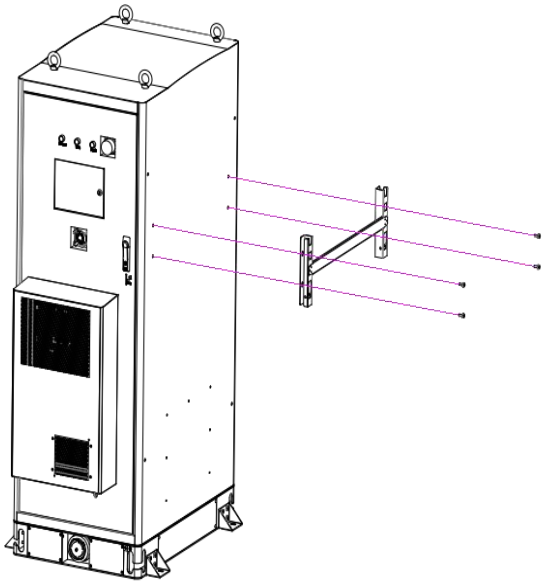
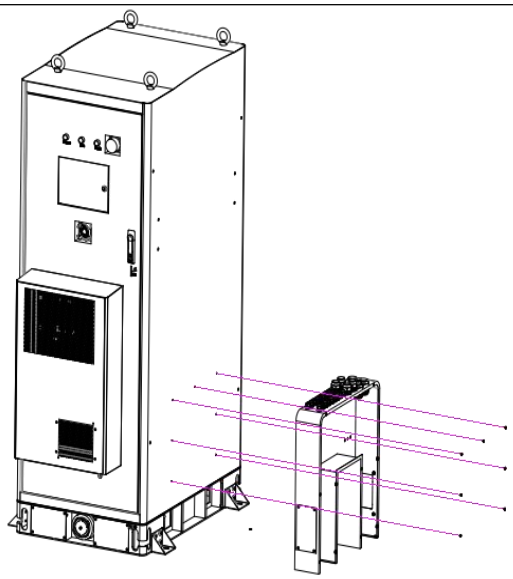
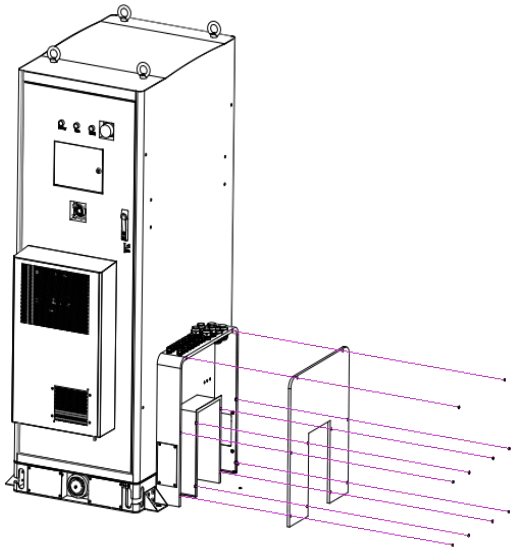
The cabinet is installed on the ground , with a base height greater than 200mm.Maintain good ventilation on both sides, and the minimum gap between both sides and the top as shown in the following picture. Inverters can be installed on both sides.

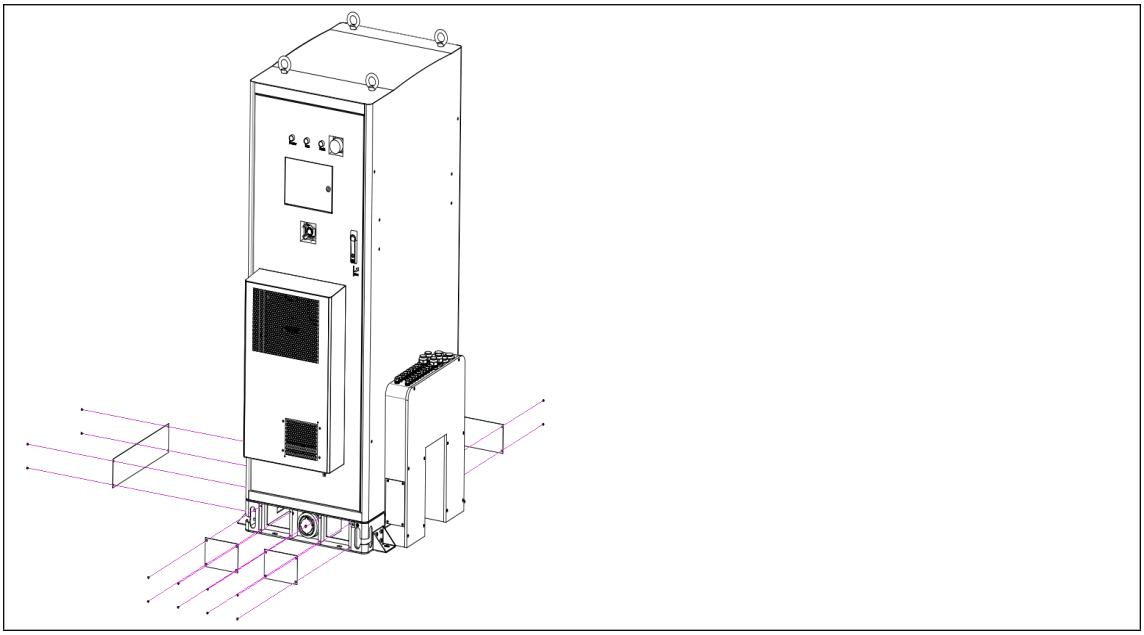


Installation dimension diagram

Installation guidance

Step 1: Install the left and right mounting brackets on the cabinet using M8 screws	Step 2: Drill 4 holes in the ground according to the actual size and use expansion screws to fix the base,with a base bearing capacity of >2000 Kg.
	 unit:mm

Step 3: Secure the product to the ground	Step 4: Install the inverter mounting bracket on the left or right side of the cabinet using M8 screws
 unit:mm	
Step 5:Install the cable trough on the side where the inverter bracket is installed	Step 6: After the cable is installed, put the cable trough cover plate on
	
Step 7: Put the other sealing plates on	



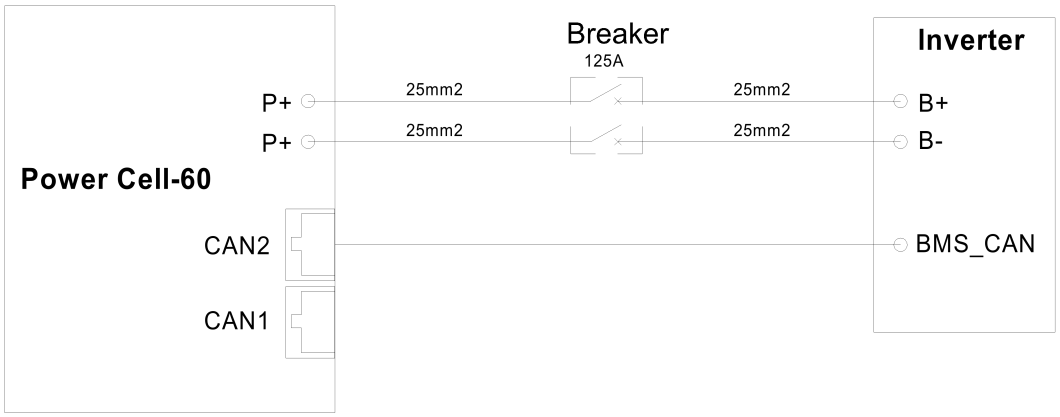
5 Electrical Connection

5.1 Connection requirements

- Safety note: Power supply to the inverter and battery must be cut off before connection to avoid electric shock.
- Grounding Instructions: This product must be connected to a grounded, metallic, permanent wiring system.
- Note: Personal protective equipment, such as safety shoes, safety gloves, insulating gloves, etc. must be worn during electrical connection.
- All electrical connections should be made by qualified professionals.
- The cable colors in this document are for reference only. The cable specifications must comply with local laws and regulations.
- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.

5.2 Electrical system connection diagram

One unit



5.3 Electrical Connection

Step 1:Connect the battery line and communication line to the inverter according to the electrical system connection diagram.

Step 2:Connect the air conditioner power cable.

6. Operation instructions

6.1 Check before starting up

- The equipment should be installed firmly, the installation location should be convenient for operation and maintenance, the installation space should be convenient for ventilation and heat dissipation, and the installation environment should be clean and tidy.
- The protection ground cable, battery power cable, inverter power cable, communication cable, and AC cable are properly and firmly connected.
- Cable bundling meets requirements and is reasonably distributed without damage.
- Before power-on, all switches are in the off state.

Notice:

- Do not reverse or short circuit the positive and negative electrodes of the battery, otherwise the battery pack will be damaged.
- Do not connect the BMS communication line incorrectly, otherwise the battery will not work or be damaged.
- Equipment damage caused by incorrect wiring is not covered by the equipment warranty.

6.2 System Startup

Step 1: Open the front door of the battery, rotate the BMS Power to the ON position, and then rotate the battery circuit switch to the ON position, and the running indicator will light up and the display will light up.

Step 2: Turn on the inverter power PV or power grid, and the inverter starts to run.

Step 3: Select the correct battery protocol on the inverter.

Step 4: Check whether the battery can be charged and discharged.

Notice:

- The Samvolt 50kW/60kWh must communicate with the inverter normally to work normally.
- In pure off-grid mode, without PV and power grid, press the black start button for a long time to start the system.

6.3 Status Indicator Light Introduction

NO.	Power	Run	Fault	Status
1	on	off	off	Power on
2	on	on	off	Charge and discharge operation
3	on	off	on	Fault
4	off	off	off	Power off

6.4 System Shutdown

Step 1: Rotate the BMS Power switch to the OFF position and the battery circuit switch to the OFF position
Step 2: Disconnect all power supplies of the inverter.
Step 3: Disconnect the air conditioner.

7. Maintenance and troubleshooting

7.1 Maintenance

- It is recommended that the battery system needs to be recharged every 6 months from the time it leaves the factory.
- When the system is not used for a long time, it is necessary to disconnect the battery output to avoid battery exhaustion.
- During system operation, professionals should regularly check the system for abnormalities and faults. If any problems are found, please deal with them in time,Otherwise the battery system will be permanently damaged.
- Professionals should regularly clean the surface and interior of the system (with all power disconnected)
- During the storage period, professionals should regularly check the battery system for abnormalities, if any problems are found, please deal with it in time.

7.2 Troubleshooting

NO.	Faults Phenomenon	Faults Cause	Solution
1	The power indicator is off	1) Battery low voltage 2) No AC input	1) Check the battery voltage and charge it 2) Check the AC input
2	The battery has no	1) No communication	1) Check the

	output voltage	with the inverter 2) The fuse or relay or breaker is damaged	communication connection between the battery and the inverter 2) Check the fuses,relay and breaker inside the battery
3	Battery communication exception	1) The communication cable is improperly connected or loose 2) The inverter battery protocol is incorrectly selected	1) Check the communication connection between the battery and the inverter 2) Check the Settings of the inverter
4	Battery voltage low	No charging for a long time	Connect the photovoltaic or power grid to enable the inverter to charge the battery
5	The sound and light alarm is blinking	The door was not closed tightly	Check the door
6	Fault indicator light on	The battery is seriously faulty	Check the battery fault history

Notice:

Damage to the battery system due to under voltages

- Charge the over-discharged system within seven days when the temperature is above 25°C.
- Charge the over-discharged system within fifteen days when the temperature is below 25°C.
- If the battery system doesn't start up, please contact Samvolt local after-sales service within 48 hours.Otherwise, the battery could be permanently damaged.
- If the battery system cannot be charged for a long time, please turn off it.

8. Technical parameters

Physical characteristics		
Dimensions (W * D * H)	700*1000*2010mm	
Weight	880kg	
Electrical characteristics		
Battery type	LFP	
Total energy capacity	61.44kWh	
Usable energy capacity	49.15kWh	
Battery capacity (Nominal)	100Ah	
Nominal voltage	614.4V	
Charge voltage (CV)	656.6V	
Discharge cut-off voltage	604.8V	
Charge/discharge current (Nominal)	50A/50A	
Charge/discharge current (Max)	100A/100A	
Recommend Depth of Discharge	80%	
Cycle life @ 25℃*	≥6000	
DC disconnect	Contactor Fuse	
Number of expandable battery units	5	
BMS		
Monitoring parameters	System Voltage System Current Cell Voltage Cell temperature	
Communication	CAN	
Operating conditions		
Condition	Indoor conditioned	
Operating temperature	-20~50℃	
Operating temperature (Recommended)	15~30℃	
Storage temperature	-20~60℃	≤7 days
	-20~45℃	≤1 month
	0~45℃	≤3 months
	0~25℃	≤1 years
Humidity	5%~95%	
Altitude	Max. 2,000m	
Cooling strategy	Fans and air conditioning	
Fire protection system	Aerosols	
Reliability & Certification		
Certificates	IEC62619/IEC62477/UN38.3/CE/RoHS	
Protection grade	IP55	

* **Warranty**
Please refer to Samvolt WARRANTY CONDITIONS

9 DOD setting of inverter

To make sure the battery working smoothly, we recommend the DOD setting of inverter as follows.
On-grid DOD:80%
Off-grid DOD:70%
Power dispatching mode DOD:70%

10 Contact us

We hope that this user manual has clearly demonstrated the product. If you still have any doubts or something not clear about it in the specifications, feel free contact to us please. we will do our best to support you!

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