

Version: EN-UM-1.7



USER MANUAL

PV 44.0C-614.4 ESS Battery System

HISTORY

VERSION	ISSUED	COMMENTS
1.0	December 24	First release
1.1	March 6	Second release
1.2	April 10	Update accessories list, Add installation requirements
1.3	May 12	Update the interface definition description
1.4	July 11	Update the list description
1.5	August 07	Update product labels and notes
1.6	September 15	Tag Updates
1.7	November 24	Updated units, illustrations, etc.

Preface

About This Manual

This manual provides instructions for the installation, electrical interconnection, and commissioning of the PV 44.0C-614.4 ESS Battery System. It is strongly recommended that installation, operation, and maintenance personnel read this manual and all related documents carefully before use. The illustrations in this manual are for reference only. This manual is subject to revision without prior notice. In case of discrepancies, the actual product shall prevail.

Target Group

PV 44.0C-614.4 ESS Battery System must be installed by professional electrical engineers who have obtained relevant qualifications.

Scope

This manual is applicable to the following Energy storage system:

- PV 44.0C-614.4

Conventions

The following safety instructions and general information are used within this user manual.

 DANGER	Indicates an imminently hazardous situation which, if not correctly followed, will result in serious injury or death.
 WARNING	Indicates a potentially hazardous situation which, if not correctly followed, will result in serious injury or death.
 CAUTION	Indicates a potentially hazardous situation which, if not correctly followed, could result in moderate or minor injury.
 NOTICE	Indicates a potentially hazardous situation which, if not correctly followed, could result in equipment failure to run, or property damage.
 NOTE	Call attention to important information, best practices and tips: supplement additional safety instructions for your better use of the PV 44.0C-614.4 to reduce the waste of you resource.

CONTENTS

Preface.....	3
About This Manual	3
Target Group.....	3
Scope	3
Conventions	3
1. Introduction.....	5
1.1 Brief Introduction	5
1.2 Product Features	5
1.3 Product Identity Definition	6
2. Specification.....	7
2.1 System Performance Parameter.....	7
2.2 Battery Module	8
2.3 Controller.....	10
2.4 Base	14
3. Installation.....	16
3.1 Environmental Requirement.....	16
3.2 Recommended Installation Clearance	18
3.3 Tools	19
3.4 Safety Gear	19
3.5 Unpacking Inspection	19
3.6 Installation Steps.....	21
4. Maintenance	34
4.1 TroubleShooting	34
4.2 Replacement of Main Component.....	35
4.3 Battery Maintenance.....	35
5. Storage	36
6. Shipment	37

1. Introduction

1.1 Brief Introduction

PV 44.0C-614.4 is a high voltage battery storage system based on lithium iron phosphate battery, and it's one of the new energy storage products, it can be used to support reliable power for various types of equipments and systems. PLHS HV is especially suitable for application scene of high power, limited installation space, restricted load-bearing and long cycle life.

1.2 Product Features

- The whole module is non-toxic, non-polluting and environmentally friendly;
- Anode material is made from LiFePO₄ with safety performance and long cycle life;
- Battery management system (BMS) has protection functions including over-discharge, over-charge, over-current and high/low temperature;
- The system can automatically manage charge and discharge state and balance current and voltage of each cell;
- Flexible configuration, multiple battery modules can be in serial for expanding voltage and Capacity.
- Adopted natural cooling reduced system entire noise;
- The module has less self-consumption, up to 6 months without charging; no memory effect, excellent performance of shallow charge and discharge;
- Working temperature range is from -20 to 55°C, with excellent discharge performance and cycle life;
- Small size and light weight, standard module is comfortable for installation and maintenance;

1.3 Product Identity Definition

Figure 1-1 Rechargeable Lithium-ion Battery Pack Label

■ With heating function

PrimeVOLT

Product Name: Rechargeable
Lithium-ion Battery Pack
Product Model: PV 5.5P-76.8
Part No.: 9518-0502-0AG000



Serial No.:
XXXX-XXXXXXX

Rated Energy / Voltage: 5.5 kWh / 76.8 Vdc
Rated Capacity: 72 Ah
Protection Class: I
Operation Voltage Range: 64.8Vdc to 87.6Vdc
Input / Output Current: 60 A
Charging Temperature: -10°C~55°C
Discharging Temperature: -20°C~55°C
IP Grade: IP65

☒ With heating function
☐ Without heating function

CAUTION

- * Do not disassemble the battery pack.
- * Do not immerse the battery pack in water.
- * Do not short-circuit the battery.
- * Do not leave the battery near by fire.

Emergency Situations

- * If leaking, fire, wet, or damaged, switch off the breaker on the DC side and stay away from the battery.
- * Do not touch the leaking liquid.
- * Do not use water to extinguish the fire.Sand or dry powder extinguisher is usable.



■ Without heating function

PrimeVOLT

Product Name: Rechargeable
Lithium-ion Battery Pack
Product Model: PV 5.5P-76.8
Part No.: 9518-0503-0AG000



Serial No.:
XXXX-XXXXXXX

Rated Energy / Voltage: 5.5 kWh / 76.8 Vdc
Rated Capacity: 72 Ah
Protection Class: I
Operation Voltage Range: 64.8Vdc to 87.6Vdc
Input / Output Current: 60 A
Charging Temperature: 0°C~55°C
Discharging Temperature: -20°C~55°C
IP Grade: IP65

☐ With heating function
☒ Without heating function

CAUTION

- * Do not disassemble the battery pack.
- * Do not immerse the battery pack in water.
- * Do not short-circuit the battery.
- * Do not leave the battery near by fire.

Emergency Situations

- * If leaking, fire, wet, or damaged, switch off the breaker on the DC side and stay away from the battery.
- * Do not touch the leaking liquid.
- * Do not use water to extinguish the fire.Sand or dry powder extinguisher is usable.





Figure 1-2 ESS Battery Controller Label

■ With heating function

PrimeVOLT

Product Name: ESS Battery Controller
Product Model: PV 44.0C-614.4
Part NO.: 9517-0500-0AG000



Serial No.:
XXXX-XXXXXXX

Input / Output Current: 60 A
Protection Class: I
Charging Temperature: -10°C~55°C
Discharging Temperature: -20°C~55°C
IP Grade: IP65

☒ With heating function
☐ Without heating function

Product Name: Rechargeable Lithium-ion Battery System

□2"B PV 11.0B+H 11.0kWh 153.6V /IP:P41/149/111/[245]2S[M]-20+50/60
□3"B PV 16.5B+H 16.5kWh 230.4V /IP:P41/149/111/[245]3S[M]-20+50/60
□4"B PV 22.0B+H 22.0kWh 307.2V /IP:P41/149/111/[245]4S[M]-20+50/60
□5"B PV 27.5B+H 27.5kWh 384.0V /IP:P41/149/111/[245]5S[M]-20+50/60
□6"B PV 33.0B+H 33.0kWh 460.8V /IP:P41/149/111/[245]6S[M]-20+50/60
□7"B PV 38.5B+H 38.5kWh 537.6V /IP:P41/149/111/[245]7S[M]-20+50/60
□8"B PV 44.0B+H 44.0kWh 614.4V /IP:P41/149/111/[245]8S[M]-20+50/60

* Mark the system configuration-check the instruction



■ Without heating function

PrimeVOLT

Product Name: ESS Battery Controller
Product Model: PV 44.0C-614.4
Part NO.: 9517-0501-0AG000



Serial No.:
XXXX-XXXXXXX

Input / Output Current: 60 A
Protection Class: I
Charging Temperature: 0°C~55°C
Discharging Temperature: -20°C~55°C
IP Grade: IP65

☐ With heating function
☒ Without heating function

Product Name: Rechargeable Lithium-ion Battery System

□2"B PV 11.0B+H 11.0kWh 153.6V /IP:P41/149/111/[245]2S[M]-20+50/60
□3"B PV 16.5B+H 16.5kWh 230.4V /IP:P41/149/111/[245]3S[M]-20+50/60
□4"B PV 22.0B+H 22.0kWh 307.2V /IP:P41/149/111/[245]4S[M]-20+50/60
□5"B PV 27.5B+H 27.5kWh 384.0V /IP:P41/149/111/[245]5S[M]-20+50/60
□6"B PV 33.0B+H 33.0kWh 460.8V /IP:P41/149/111/[245]6S[M]-20+50/60
□7"B PV 38.5B+H 38.5kWh 537.6V /IP:P41/149/111/[245]7S[M]-20+50/60
□8"B PV 44.0B+H 44.0kWh 614.4V /IP:P41/149/111/[245]8S[M]-20+50/60

* Mark the system configuration-check the instruction



2 Specification

2.1 System Performance Parameter

Table 2-1 The parameter of Rechargeable Lithium-ion Battery System

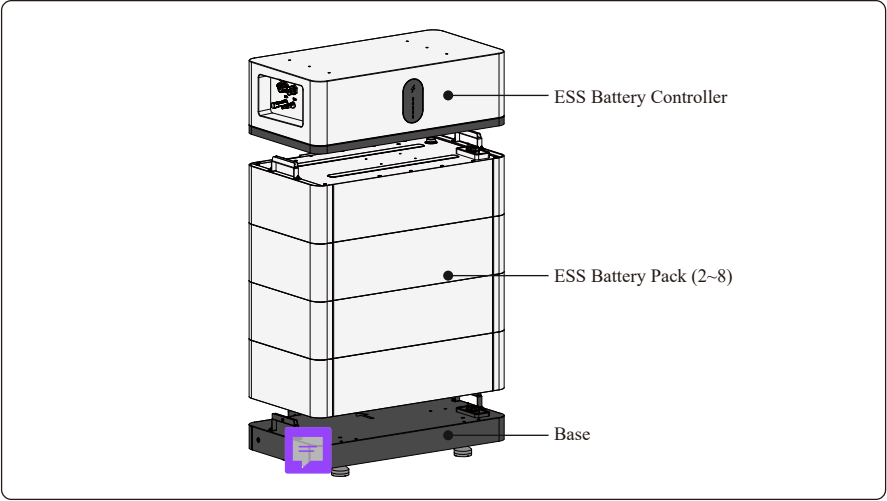
Model Name	PV 11.0B-H	PV 16.5B-H	PV 22.0B-H	PV 27.5B-H	PV 33.0B-H	PV 38.5B-H	PV 44.0B-H
Cell Type	LiFePO ₄ , Prismatic Cell						
Nominal Capacity	72						
Module Number	2	3	4	5	6	7	8
Norminal Energy [kWh]	11.05	16.58	22.11	27.64	33.17	38.70	44.23
Nominal Voltage [V]	153.6	230.4	307.2	384.0	460.8	537.6	614.4
Voltage Range [V]	129.6V~175.2	194.4V~262.8	259.2V~350.4	324.0V~438.0	388.8V~525.6	441.6V~624.0	518.4V~700.8
Max. Continuous Charge / Discharge Current (A)	60						
Rated Charge / Discharge Current	36A (0.5C)						
Rated Charge / Discharge Power (kW)	5.5	8.3	11.1	13.8	16.6	19.4	22.1
Max Charge / Discharge Power (kW)	9.2	13.8	18.4	23.0	27.6	32.3	36.9
Size (W*D*H) mm	675*360*643	675*360*813	675*360*983	675*360*1153	675*360*1323	675*360*1493	675*360*1663
Weight (kg)	127	176.5	226	275.5	325	374.5	424
Protection Degree	IP65						
Altitude (m)	3000						
Warranty ¹	10 years						
Cycle Life ²	6000						
Operating Temperature (°C) ³	-20 to 55						
Noise Emission	<35 dB						
Humidity	5% to 95%RH (non-condensing)						
Cooling	Natural Cooling						
Heating	CAN						
Communication Interface	Low temperature charging heating (option)						
Transmit Certification	UN38.3						
Certification	ROHS						
Safety	EN 62619, EN62477						
EMC	EN 61000-6-1/2/3/4						

1 0.5 C @ 25 °C, 90% DoD, 1 cycle per day

2 0.5C@ 25 °C, 90% DOD

3 Charging Temperature: -10°C to 55°C (With heating function)
0°C to 55°C (Without heating function)
Discharging Temperature: -20°C to 55°C

The following uses four battery modules as an example:



2.2 Battery Pack

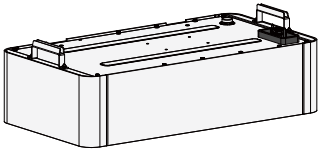


Table 2-2 Product Parameters

Module Name	PV 5.5P-76.8
Cell Technology	72AH-LFP (Prismatic)
Battery Module Energy (kWh)	5.5
Battery Nominal Voltage (Vdc)	76.8
Nominal Capacity (Ah)	72
Battery Module Cell Quantity (pcs)	24
Working Voltage Range (Vdc)	60-87.6
Charge Current (Standard) [A]	60
Discharge Current (Standard) [A]	60
Dimensions (W*D*H, mm)	675*360*170
Communication Mode	CAN
Ambient Temperature (°C)	-20 to 55
IP Grade	IP65 (In stacked up state)
Weight (kg)	49.5

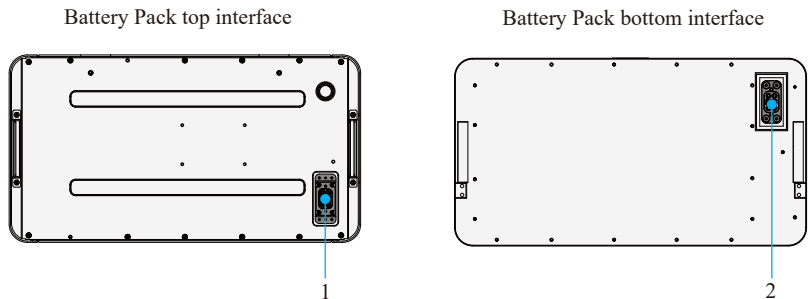


Table 2-3 Interface Definition

Item	Name	Definition
1	Socket interface definition	Battery module input and communication interface
2	Plug interface definition	Battery module output and communication interface

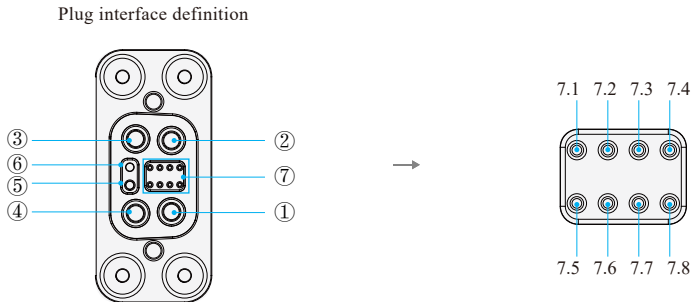
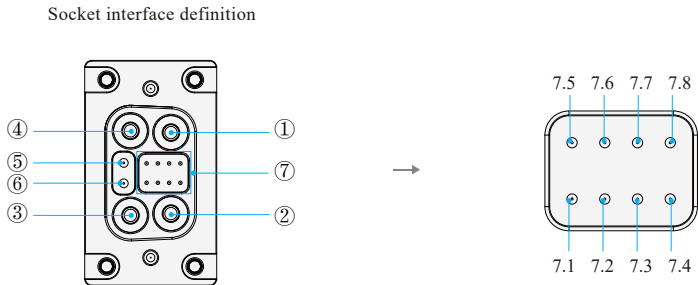


Table 2-4 Port Definition

Pin No.	Socket interface definition	Plug interface definition
1	-	-
2	PE	PE
3	- (Negative)	- (Negative)
4	+ (Positive)	- (Negative)
5	Heating film+	Heating film+
6	Heating film-	Heating film-
7	-	
7.1	CAN-H	CAN-H
7.2	CAN-L	CAN-L
7.3	DI 1	DO 1
7.4	VCC+	VCC+
7.5	VCC-	VCC-
7.6	-	-
7.7	-	-
7.8	-	-

2.3 Controller

Controller front interface

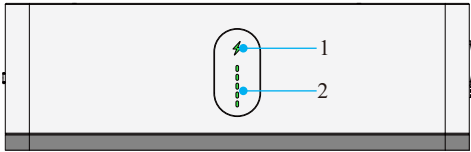


Table 2-5 Display Area Definition

Item	Name	Definition
1	Status LED	Alarm: yellow light, Protection (Fault): red light Charging/Discharging: green light
2	SOC LED	State Of Capacity, green light

The system is equipped with 6 LED indicators.

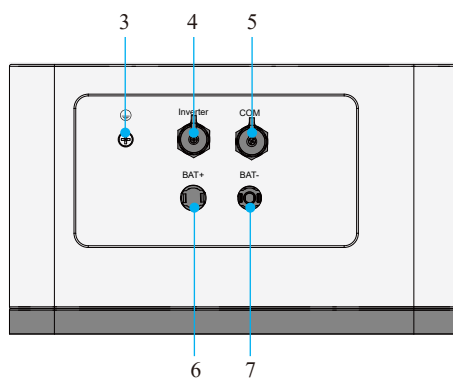
Status Indicator. indicating the current status of the battery system (e.g., Charging, Discharging).

Status		
Power Off		Off
Stand by		On
Charging		On
Discharging		Flash 2s
Warning		On
Protection (Fault)		On

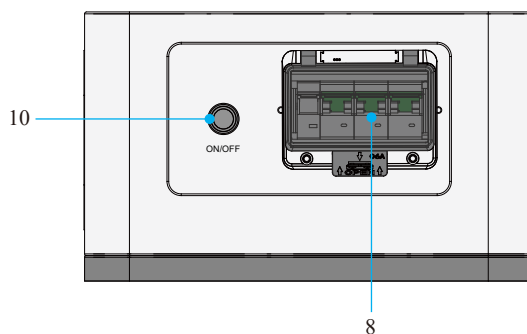
5 SOC Indicators: indicating the battery's State of Charge.

SOC					
					
-	Real SOC	Real SOC	Real SOC	Real SOC	Real SOC
(0 to 0]	(1 to 20]	(21 to 40]	(41 to 60]	(61 to 80]	(81 to 100]
System Self-test: LED1 to LED5 Green Running Horse Light (1s) System Upgrade: LED1 to LED5 Blue Running Horse Light (1s) Charging: The LED indicator at the top flashes continuously.					

Controller HV-BOX left interface



Controller HV-BOX right interface



Controller HV-BOX bottom interface

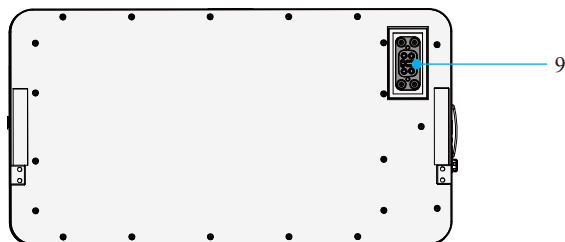
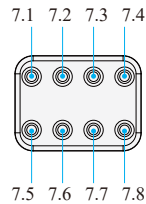
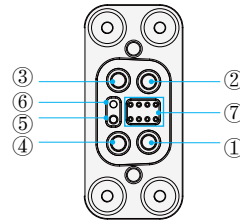


Table 2-7 Interface Definition

Item	Name	Definition
3	Ground Point	PE connecting point
4	Inverter Communication Port	Connect to inverter communication
5	COM Communication Port	COM: Connect to upper computer communication
6	P+ Output Terminal	DC+ to inverter
7	P- Output Terminal	DC- to inverter
8	DC Breaker	DC Breaker 100 A
9	Connector-Plug	Battery module output and communication interface
10	ON/OFF Switch	Long press for 3 seconds to turn on, the light turns blue when on; long press for 3 seconds to turn off, the light turns off when off.

Table 2-8 Controller Connector-Plug Definition

Pin No.	Definition
1	-
2	PE
3	- (Negative)
4	+ (Positive)
5	Heating Film +
6	Heating Film -
7	
7.1	CAN-H
7.2	CAN-L
7.3	DI 1
7.4	VCC+
7.5	VCC-
7.6	-
7.7	-
7.8	-



Connector-Plug

2.4 Base

Base top interface

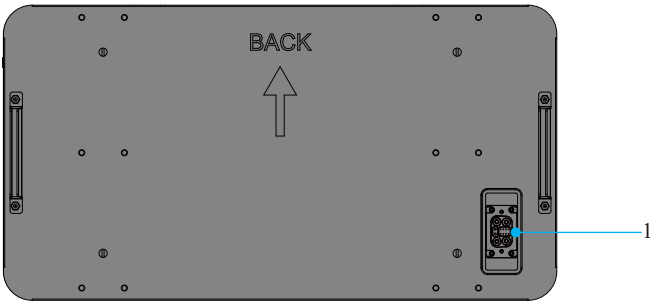
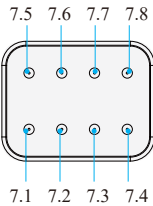
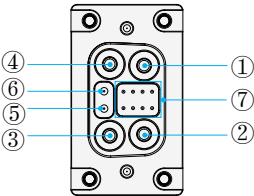


Table 2-9 Interface Definition

Pin No.	Definition
1	NA
2	PE
3	4 Short Circuit
4	3 Short Circuit
5	6 Short Circuit
6	5 Short Circuit
7	
7.1	120 Ω
7.2	120 Ω
7.3	-
7.4	-
7.5	-
7.6	-
7.7	-
7.8	-



Base-Socket

**CAUTION**

If the DC circuit breaker trips due to overcurrent or short circuit, wait for 30 minutes before turning it on again; otherwise, the breaker may be damaged.

**DANGER**

Ensure ON/OFF switch is turned on before waking up the battery. Otherwise it will affect automatic checking process and pose safety risk. DO NOT turn off the ON/OFF switch during normal operation, only in emergency case it could be turned off directly.

Communication Connector

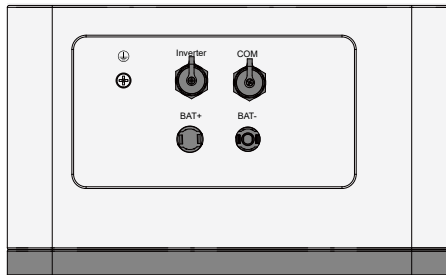
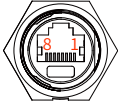
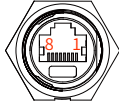


Table 2-9 Interface Definition

Inverter Communication Port		COM Communication Port	
			
PIN 1	PCS-485-B	PIN 1	TX_P
PIN 2	PCS-485-A	PIN 2	TX_N
PIN 3	GND	PIN 3	RX_P
PIN 4	PCS-CAN-H	PIN 4	DI+
PIN 5	PCS-CAN-L	PIN 5	DI-
PIN 6	VCC-	PIN 6	RX_N
PIN 7	N/A	PIN 7	N/A
PIN 8	N/A	PIN 8	N/A

3 Installation

3.1 Environmental Requirement

3.1.1 Cleaning

The battery system is equipped with high-voltage connectors, and environmental conditions may impair its insulation performance. Before installation and system power on, all dust and iron filings must be removed to maintain a clean environment, which shall also have adequate dust resistance. Dust and humidity condition shall be periodically checked during the system continuous operation.

3.1.2 Temperature

ESS battery system working temperature range: -20°C to 55°C. Optimum temperature: 15°C to 30°C; Caution: Out of the working temperature range will cause the battery system over / low temperature alarm or protection which may lead to the cycle life reduction.

3.1.3 Cooling System

Suggest Keep the battery system within the recommended temperature range.

Caution: Out of the working temperature range will cause the battery system to trigger an over-temperature or under-temperature alarm or protection, , which could reduce its cycle life.

3.1.4 Heating System

Danger: The module is equipped with a heating system. When the temperature is below 0°C and needs to be charged, to start the battery system, first start the heating system, until the battery module temperature exceeds 0°C to allow charging. The heating system will continue to heat until the battery module temperature reaches 15°C and stops.

Caution: Out of the working temperature range will cause the battery system over / low temperature alarm or protection which may lead to the cycle life reduction.

3.1.5 Fire-extinguisher System

The room must be equipped with fire-extinguisher system for safety purpose. The fire system shall be inspected regularly to ensure it remains in normal operating condition. For using and maintenance requirements, please follow local fire equipment guidance.

3.1.6 Grounding System

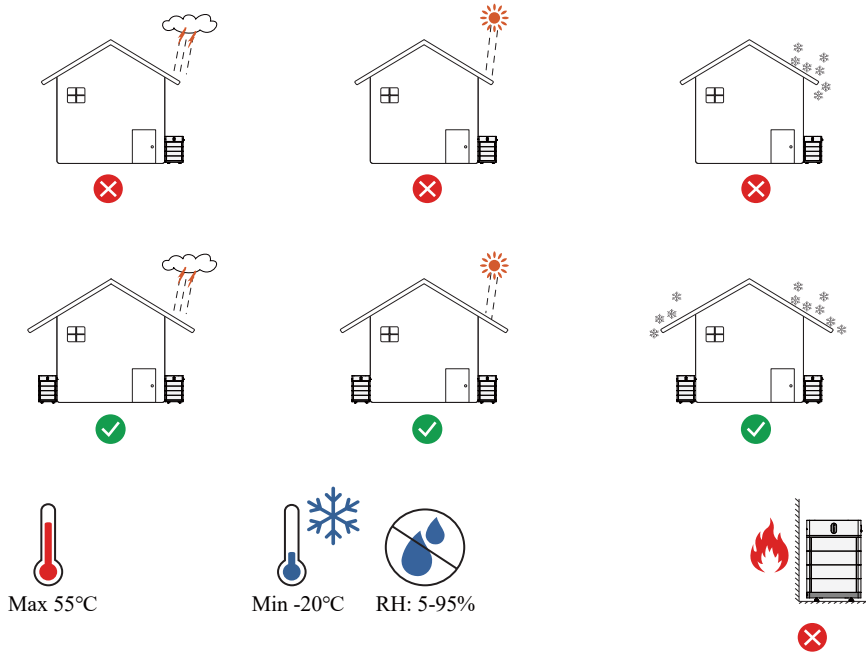
Before battery installation, ensure the battery system's grounding point is stable and reliable. If the battery system is installed in an independent equipment cabin (e.g. container), ensure that the grounding of the cabin is also stable and reliable.

3.1.7 Low Battery Voltage Warning

When the battery is used up, turn off the main battery switch. If the battery is not used for a long time, turn off the main switch of the battery. If not, the battery voltage will be too low, and the machine cannot be started.

3.1.8 Requirements for Installation Location

- A solid support surface (e.g., concrete or masonry) is required.
- The installation location must be inaccessible to children.
- The installation location must be suitable for the weight and dimensions of the PLHS HV.
- The installation location must be protected from direct sunlight.
- Keep away from metal conductive dust.
- Keep away from water source, heat source and inflammable and explosive materials.
- The installation location must be away from fire.
- The operating temperature should be between -20°C to +55°C.
- The ambient humidity should be between 5% to 95% RH (non-condensing).
- Altitude: Sea level $\leq$ 3000 m.



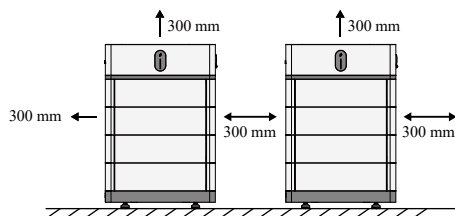
3.2 Recommended Installation Clearance



CAUTION

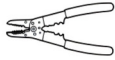
Please note that the battery should be installed with a minimum safe clearance from surrounding equipment or other batteries. Please refer to the minimum clearance diagram below for details.

Clearance Requirements	
Min. clearance from left side	300 mm
Min. clearance from right side	300 mm
Min. clearance above ESS Battery System	300 mm
Min. clearance between side-by-side ESS Battery System	300 mm
Min. clearance from back	36 to 50 mm



3.3 Tools

The tools in the following table could be needed during the installation.

					
Network Wire Clamp	Wire Stripper	Crimping Pliers	Flat-Head Screwdriver	Torque Wrench	Hexagon Socket
					
Pen	Phillips Screwdriver Bit	Wrench	Tape Measure	Drill	Level

Note:

Use properly insulated tools to prevent accidental electric shock or short circuits.

If insulated tools are not available, wrap all exposed metal parts of the insulated alternative tool (except the tip) with electrical tape.

Use the M6 expansion screws (k) to fix the wall mounting bracket (e) to the wall.

If the length and quantity of the provided bolts do not fails to meet installation requirements, prepare M6 stainless steel expansion bolts by yourself. The expansion bolts supplied with the battery are mainly used for solid concrete walls and concrete floors. If other types of walls and floors are used, ensure they meet the load-bearing requirements (the weight of a single battery pack is approximately 49.5 kg.) and select the appropriate bolts independently..

3.4 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery system.

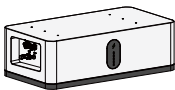
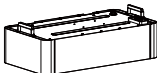
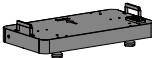
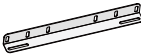
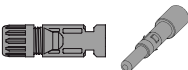
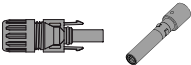
		
Insulated gloves	Safety goggles	Safety shoes

3.5 Unpacking Inspection

When the equipment arrives at the installation site, load and unload it in accordance with relevant rules and regulations, and prevent the equipment from being exposed to sunlight. Do not install the battery in direct sunlight either.

- Before unpacking, the total number of packages shall be indicated according to the shipping list attached to each package, and the case shall be checked for good condition.
- In the process of unpacking, handle with care and protect the surface coating of the object.
- Open the package, the installation personnel should read the technical documents, verify the list, according to the configuration table and packing list, ensure objects are complete and intact, if the internal packing is damaged, should be examined and recorded in detail.

Packing list

Item	Item name	Quantity	Picture	Remarks
a	Battery Controller	1 PC		
b	Battery Pack	N PCS		According to customer selection of electricity configuration
c	Base	1 PC		
d	Wall-mounted component adapter	2 PCS		
e	Wall mounting bracket	1 PC		
f	Communication cable	1 PC		L=3 m
g	GND cable	1 PC		L=1.5 m
h	PV connector wrench	1 PC		
i	Output cable connector " - "	1 PC		
j	Output cable connector " + "	1 PC		

Item	Item name	Quantity	Picture	Remarks
k	M6 expansion screw	2 PCS		The hole diameter is 8 mm and the depth is 60 mm
l	Screw M6*16 mm	4 PCS		
m	User manual, Packing list, Outgoing inspection report	1 PC		

3.6 Installation Steps

Step1	Installation preparation	The environment is meets all environmental requirements: "specified in Section 3.1"
Step2	Mechanical installation	1. Determine ESS battery system placement
		2. Place the Base (c)
		3. Install Battery Pack (b)
		4. Install Wall mounting bracket (e)
		5. Install Battery Controller (a)
		6. Mark the system configuration
Step3	Battery system self-test	1. Switch on the DC breaker of the Battery Controller (a)
		2. Switch on the ON/OFF Switch
		3. Press the ON/OFF Switch for about 3 s
		4. Check the system output voltage
		5. Shut down the battery system
Step4	Connecting inverter	1. Connect output power cable to the inverter
		2. Connect the output communication cable to the inverter
		3. Connect GND cable to the earth

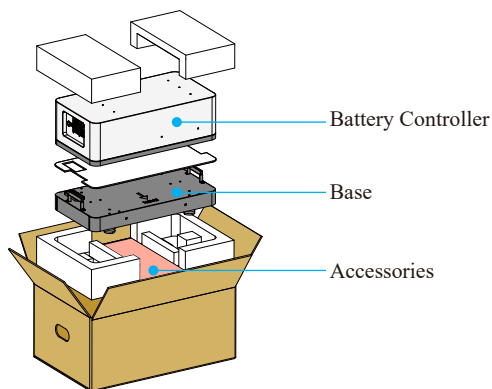
3.6.1 Installation Preparation

- Make sure the environment meets all environmental requirements specified in Section 3.1.
- Prepare equipment and tools for installation.
- Confirm that the DC breaker is in the OFF state to ensure no live-line operation.

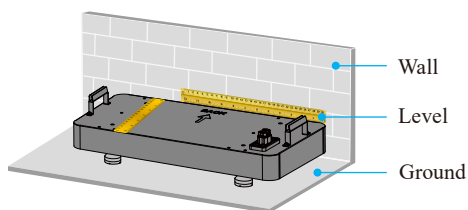
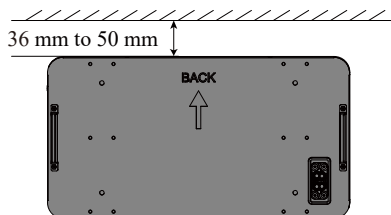
3.6.2 Mechanical Installation

3.6.2.1 Place the Base (c)

- Choose an appropriate place to set base (c).
- Take the battery controller (a) and base (c) out of the package.



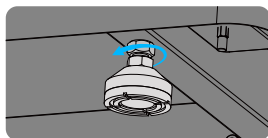
- Place the installed base (c) and feet against the wall, and keep a distance of 36 mm to 50 mm between the wall and the base (c).



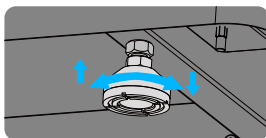
*Make the Base (c) level

*Use a level to ensure the Base (c) is level in the X and Y directions

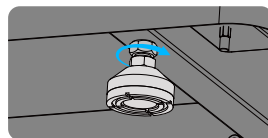
*Foot Cup Height Adjustment Guide:



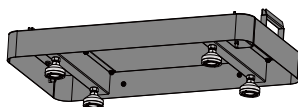
① Loosen the nut – Turn left.



② Adjust the foot cup height – Left = raise, right = lower.

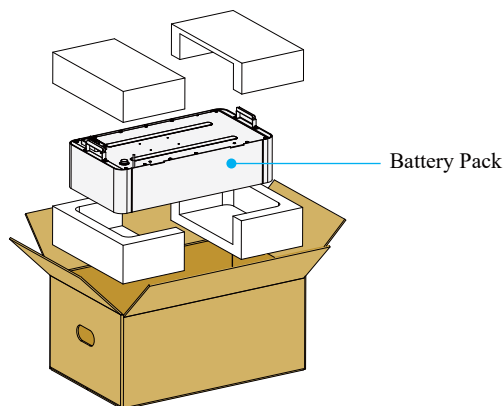


③ Ensure base is level, then tighten.

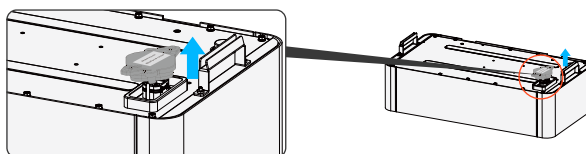


3.6.2.2 Install the Battery Pack (b)

- Take the battery pack (b) out of the package.

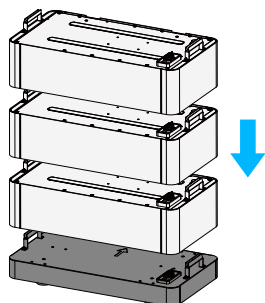


- The plastic protective cover must be removed before installing the battery pack (b).



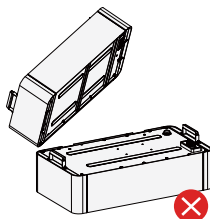
- Install all the ESS battery packs (b) and battery controller (a) on the base (c) from bottom to up, in the sequence B8~B1. Refer to the figure below.

Warning: The battery pack (b) weighs approximately 49.5 kg. It's necessary to arrange at least 2 persons to install battery pack (b) if no lifting equipment available.

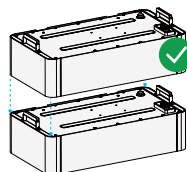


Place the battery pack (b) on the base (c) one by one from bottom to top

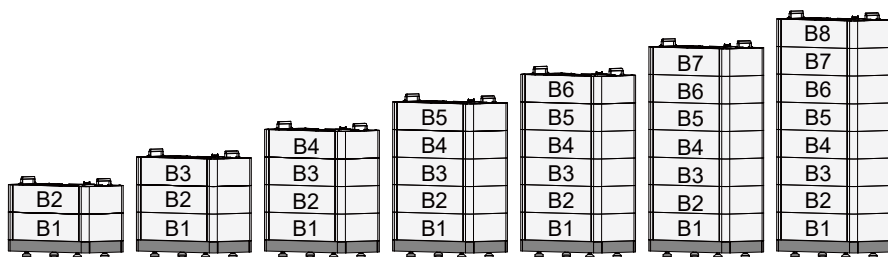
Do not tip the battery pack (b) on one side during installation.



(Prohibit)

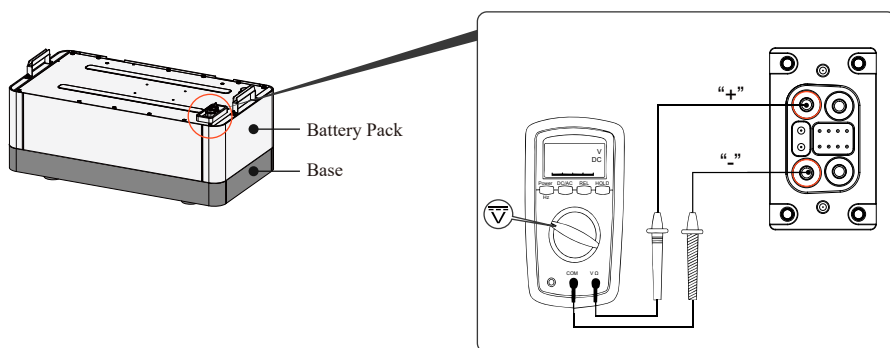


(Recommend)



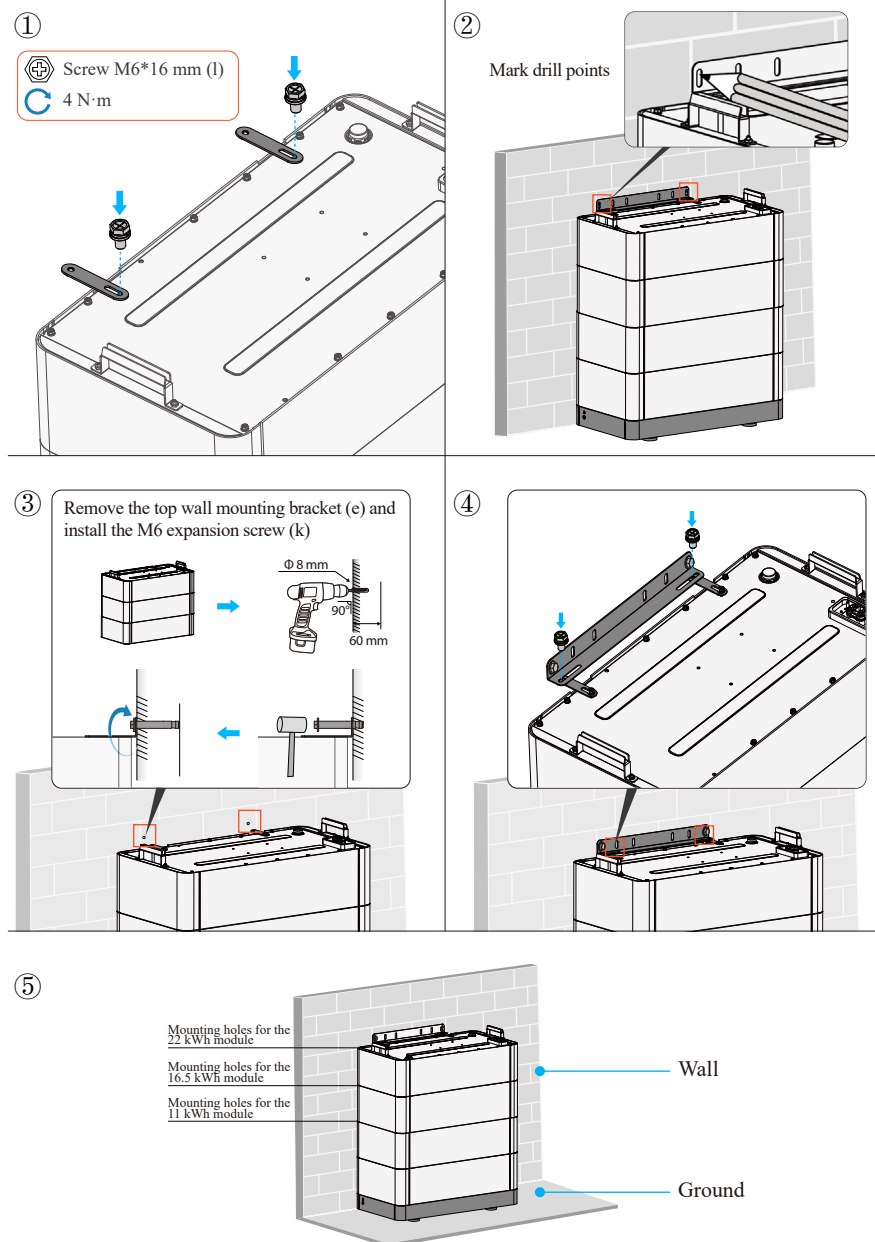
Warning: For the initial installation, the ΔV of a single cluster of Battery Packs (b) should be less than 0.15 V.

How to measure the Battery Pack (b) voltage



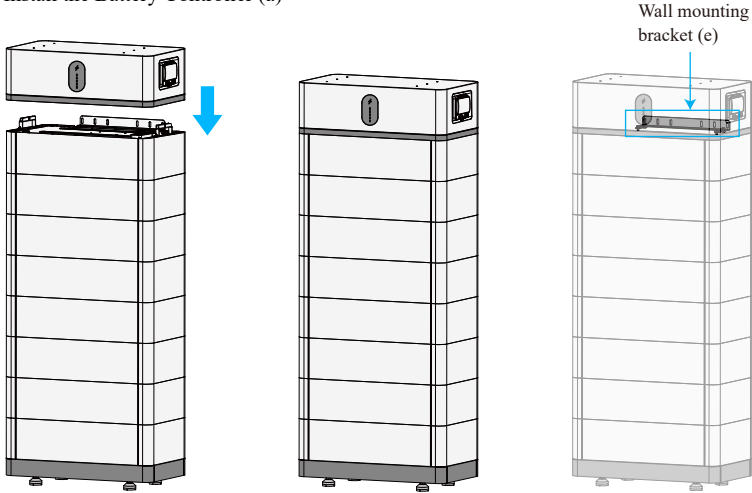
3.6.2.3 Install the Wall mounting bracket (e)

- Install the fixed wall mounting bracket (e) onto the battery pack (b).



The bracket must be mounted on the topmost pack. Example: For a 22 kWh bracket installation, mount it on Pack 4.

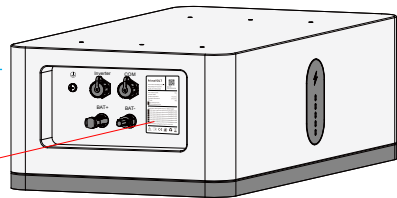
3.6.2.4 Install the Battery Controller (a)



- Align the wall mounting bracket (e) horizontally at the intended wall position and mark the drill holes. Please note that power cables or other service lines (e.g., gas pipes, water pipes) may be routed inside the wall. Ensure that no cables or pipes are in the wall that could be damaged when drilling holes.
- Set the wall mounting bracket (e) aside and drill the marked holes.
- Insert M6 expansion screw (k) anchors into the drill holes if the support surface requires them. Secure the hanger using screw M6 x 16 mm (l).
- Use the wall mount adapter (d) to combine the battery pack (b) to the wall mount bracket (e). Then attach the wall mount bracket (e) to the M6 expansion bolts (k) in the wall. Secure it with M6 x 16 mm bolts (l) and nuts, tightening them with a cylindrical screwdriver.

3.6.2.5 Mark the System configuration.

PrimeVOLT Product Name: ESS Battery Controller Product Model: PV 44.0C-614.4 Part No.: 9517-0500-0A0000		 Serial No.: X000-X00000000X							
Input / Output Current: 60 A Protection Class: I Charging Temperature: -10°C~55°C Discharging Temperature: -20°C~55°C IP Grade: IP65 ☐ With heating function ☐ Without heating function									
Product Name: Rechargeable Lithium-ion Battery System <table border="1"> <tr> <td>☐ 2*B PV 11.0B-H 11.0kWh 153.6V FSP41/149/111[(24S)2S]M1-20+50/90</td> </tr> <tr> <td>☐ 3*B PV 16.0B-H 16.0kWh 230.4V FSP41/149/111[(24S)3S]M1-20+50/90</td> </tr> <tr> <td>☐ 4*B PV 22.0B-H 22.0kWh 327.2V FSP41/149/111[(24S)4S]M1-20+50/90</td> </tr> <tr> <td>☐ 5*B PV 27.0B-H 27.0kWh 384.0V FSP41/149/111[(24S)5S]M1-20+50/90</td> </tr> <tr> <td>☐ 6*B PV 33.0B-H 33.0kWh 460.8V FSP41/149/111[(24S)6S]M1-20+50/90</td> </tr> <tr> <td>☐ 7*B PV 38.0B-H 38.0kWh 537.6V FSP41/149/111[(24S)7S]M1-20+50/90</td> </tr> <tr> <td>☐ 8*B PV 44.0B-H 44.0kWh 614.4V FSP41/149/111[(24S)8S]M1-20+50/90</td> </tr> </table>			☐ 2*B PV 11.0B-H 11.0kWh 153.6V FSP41/149/111[(24S)2S]M1-20+50/90	☐ 3*B PV 16.0B-H 16.0kWh 230.4V FSP41/149/111[(24S)3S]M1-20+50/90	☐ 4*B PV 22.0B-H 22.0kWh 327.2V FSP41/149/111[(24S)4S]M1-20+50/90	☐ 5*B PV 27.0B-H 27.0kWh 384.0V FSP41/149/111[(24S)5S]M1-20+50/90	☐ 6*B PV 33.0B-H 33.0kWh 460.8V FSP41/149/111[(24S)6S]M1-20+50/90	☐ 7*B PV 38.0B-H 38.0kWh 537.6V FSP41/149/111[(24S)7S]M1-20+50/90	☐ 8*B PV 44.0B-H 44.0kWh 614.4V FSP41/149/111[(24S)8S]M1-20+50/90
☐ 2*B PV 11.0B-H 11.0kWh 153.6V FSP41/149/111[(24S)2S]M1-20+50/90									
☐ 3*B PV 16.0B-H 16.0kWh 230.4V FSP41/149/111[(24S)3S]M1-20+50/90									
☐ 4*B PV 22.0B-H 22.0kWh 327.2V FSP41/149/111[(24S)4S]M1-20+50/90									
☐ 5*B PV 27.0B-H 27.0kWh 384.0V FSP41/149/111[(24S)5S]M1-20+50/90									
☐ 6*B PV 33.0B-H 33.0kWh 460.8V FSP41/149/111[(24S)6S]M1-20+50/90									
☐ 7*B PV 38.0B-H 38.0kWh 537.6V FSP41/149/111[(24S)7S]M1-20+50/90									
☐ 8*B PV 44.0B-H 44.0kWh 614.4V FSP41/149/111[(24S)8S]M1-20+50/90									
* Mark the system configuration-check the instruction									



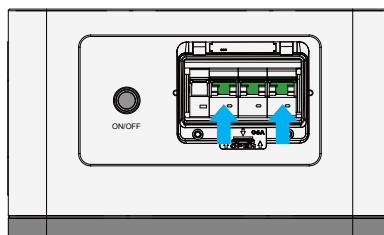
2*B PV 11.0B-H 11.0kWh 153.6V FSP41/149/111[(24S)2S]M1-20+50/90

Example

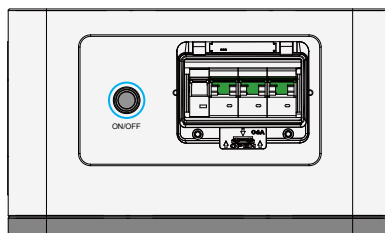
(Stack two batteries and put a dot in the corresponding box.)

3.6.3 Battery System Self-Test

- Switch the battery controller "DC BREAKER" to the "ON" state.



- Press and hold the ON/OFF switch for approximately 3 seconds. The SOC indicator lights LED1 to LED5 on the panel will illuminate in blue sequentially, 1 s for each. When the operational indicator changes to "Standby", this indicates that the system's self-check is complete.



- Use a multimeter to measure the output voltage on the positive and negative terminals of the controller.
- The output voltage should conform to the voltage range in "Table 2-1 The parameter of PV 44.0C-614.4 ESS Battery system". Otherwise, the system will be not work. properly.

Use a multimeter to check that the output voltage is within the normal range.

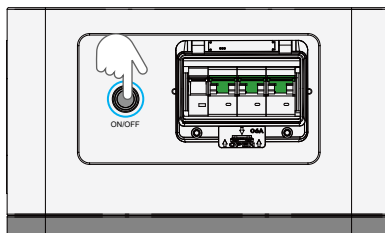


DANGER

The battery voltage is high; please take self-protection measures when measuring.

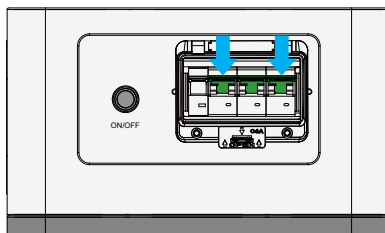
3.6.4 Shut Down the System

- Switch off the ON/OFF switch.



Press and hold on 3 s

- Switch the controller "DC Breaker" to the "OFF" state .

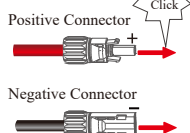
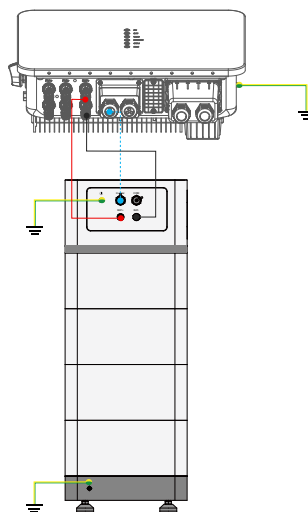


3.6.5 Connecting Inverter

Taking 4 battery modules as an example for a single cluster

Single-phase ESS Inverter (3K/3K6/4K6/5K/6K)

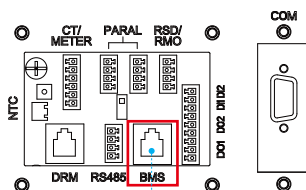
- Negative DC Power Cable (-)
- Positive DC Power Cable (+)
- - - - - Communication Cable to Inverter
- GND (The battery has two grounding ports, just connect one.)



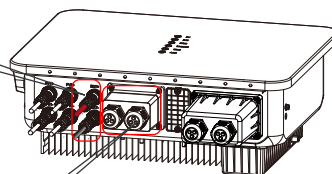
Insert the positive and negative connectors into the PV+/PV- ports or BAT+/BAT- ports until a "click" sound is heard.

Note:

For detailed inverter wiring information, please refer to the inverter user manual.

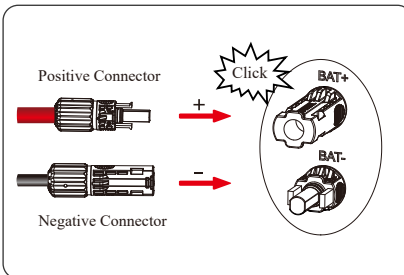
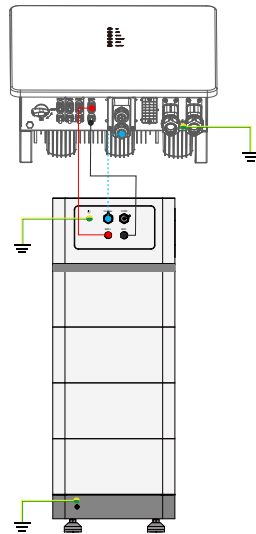


BMS Communication Cable



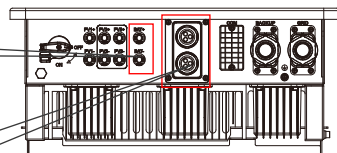
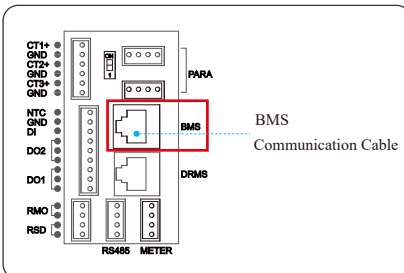
Three-phase ESS Inverter (5K/6K/8K/10K)

- Negative DC Power Cable (-)
- Positive DC Power Cable (+)
- - - Communication Cable to Inverter
- GND (The battery has two grounding ports, just connect one.)



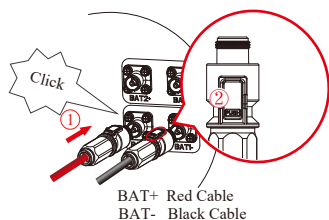
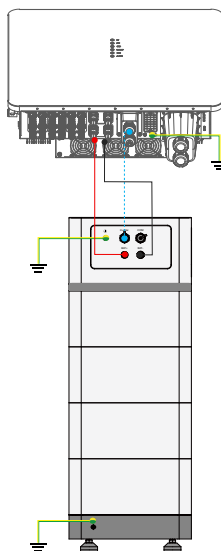
Note:

For detailed inverter wiring information, please refer to the inverter user manual.

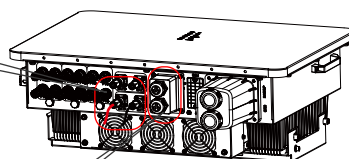
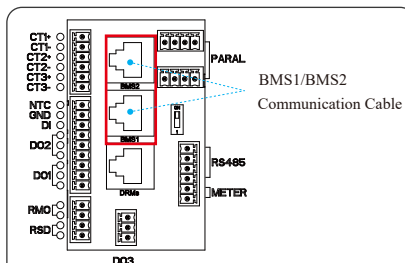


Three-phase ESS Inverter (12K/15K/20K/25K/30K)

- Negative DC Power Cable (-)
- Positive DC Power Cable (+)
- - - Communication Cable to Inverter
- GND (The battery has two grounding ports, just connect one.)



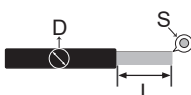
Note:
For detailed inverter wiring information, please refer to the inverter user manual.



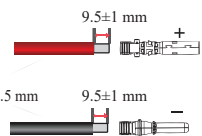
3.6.6 Battery Pack Connection

**DANGER**

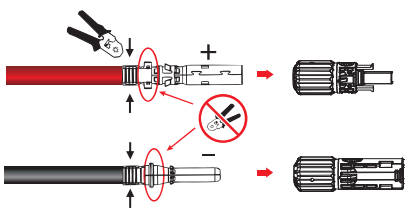
Please confirm that the Battery Pack system is in the off state before connecting. Otherwise, electric shock or inverter damage may result.



Battery cable	Specification
Item (recommendation)	
Diameter(D)	7.5 mm to 8.5 mm
Cross section(S)	16 mm ² / 6 AWG
Strip length (L)	~10 mm
Cable total length	≤ 3 m

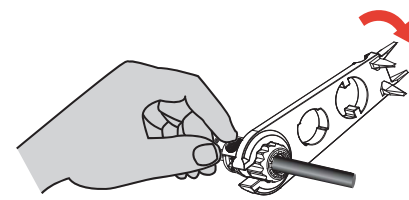


Note:
DC cable should be dedicated DC cable
(suggest using 16 mm² / 6 AWG DC cable).

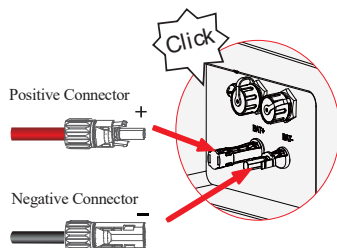


1 Wires making.

2



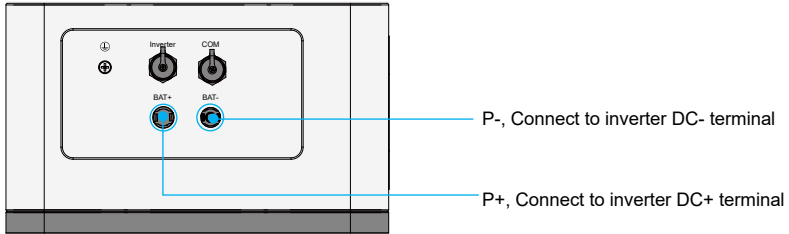
3 Tighten the waterproof nuts.



4

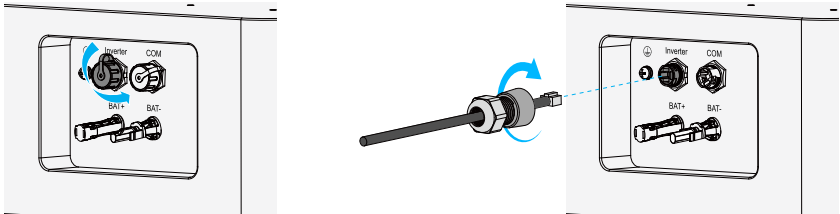
Insert the positive and negative connectors into the BAT+/BAT- ports until a “click” sound is heard.

- Connect output Power Cable to the inverter

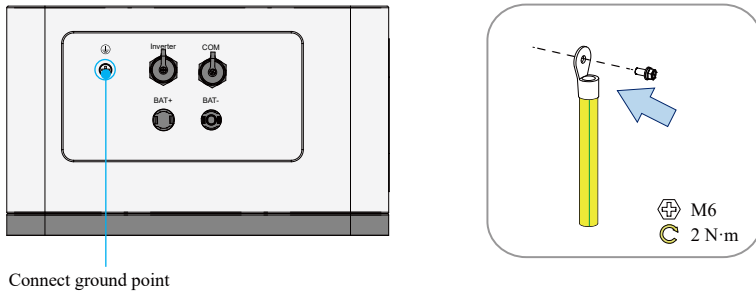


- Connect the output communication cable to the inverter RJ45 CAN port.

- (1) Take off the RJ45 waterproof cover.
- (2) Pass the communication cable through the RJ45 wiring cover.
- (3) Insert the communication cable to the corresponding RJ45 port.
- (4) Tighten RJ45 wiring cover.



- Connect external grounding cable



WARNING

Double-check all the power cables and communication cable. Ensure the inverter's voltage matches the battery system's voltage.

- Power on the inverter and verify normal operation of the battery and inverter system.

4 Maintenance

4.1 Troubleshooting

 DANGER	The ESS battery system is a high-voltage DC system, operated by professional and authorized person only. Before check for failure, check all the cables connections. Ensure switches are correct and that the battery system can be activated normally.
---	--

No	Problem	Possible Reason	Solution
1	The battery pack has no voltage output, and ON/OFF switch Light is off.	The DC breaker of the battery controller was not be turned on	Turn on the DC breaker of battery controller
2		The ON/OFF switch of the battery controller was not switched on	Long press the ON/OFF switch for about 3 s
3		Battery pack is in sleep state	Long press the ON/OFF switch for about 3 s
4		Battery pack has activated over-discharge protection	Charge the battery to deactivate the protection state
5		The relay in the battery controller is faulty	Replace a new battery controller
6	When the battery pack is connected to the inverter, the DC breaker trips automatically	There is a short circuit in the circuit between the Battery Pack and the inverter	Step 1: Check the connection between the battery and the inverter to ensure it is correct. If not, reconnect it properly. Step 2: Disconnect from the inverter and check if the battery is working. If it is, the inverter may be faulty. Please contact the inverter's after-sales service.
7	Communication failure between Battery Pack and inverter	The wrong battery pack type is selected on the inverter	Select correct battery pack type on the inverter
8		Communication cable interruption	Replace it with the cable corresponding to the CAN signal (the battery side CAN is 4H5L)

Note: If the above does not resolve the issue, please contact after-sales service.

4.2 Replacement of Main Component

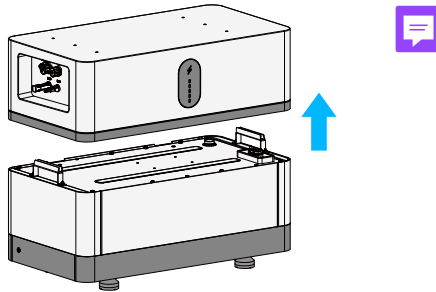


DANGER

The ESS battery system is a high voltage DC system, only can be operated by professional and authorized person.

4.2.1 Replacement of Controller

- Turn off the whole battery system. Ensure the negative terminal and positive terminal have no power.
- Remove the four screws on the controller, then remove the controller from the system.



- Change a new controller. Then fix four screws.

4.3 Battery Maintenance



DANGER

The maintenance of battery only can be operated by professional and authorized person. you need turn off the battery system firstly when you do some maintenance items.

4.3.1 Voltage Inspection

[Periodical Maintenance] Check the voltage of battery system through the monitor software. Check whether the system voltage is normal or not. For example: check Single cell's voltage is out of rated range or not.

4.3.2 SOC Inspection

[Periodical Maintenance] Check the SOC of battery system through the monitor software. Check the SOC of battery string is normal or not.

4.3.3 Cables Inspection

[Periodical Maintenance] Visual inspect all the cables of battery system. Check the cables have for breaks, aging, or looseness.

4.3.4 Balancing

[Periodical Maintenance] The battery system will become unbalanced if it is not fully charged for a long time. Solution: perform the balancing maintenance every 6 months. Generally this maintenance process needs to be completed when external devices, such as the monitor software and battery and inverter, are in good communication.

4.3.5 Output Relay Inspection:

[Periodical Maintenance] Under low load condition (low current), control the output relay OFF and ON. A clicking sound confirms normal switching.

5 Storage

- It is recommended that batteries not be stored for a long period. They should be used soon after being deployed onsite. The batteries should be handled according to the following requirements.

Required Storage Temperature	Actual Storage Temperature	Recharge Interval	Remarks
$-15^{\circ}\text{C} < T \leq 55^{\circ}\text{C}$	$T \leq -15^{\circ}\text{C}$	Not allowed	Not reaching the time for recharge: Use the batteries as soon as possible. Reaching the time for recharge: Recharge the batteries.
	$-15^{\circ}\text{C} < T \leq -10^{\circ}\text{C}$	6 months	
	$-10^{\circ}\text{C} < T \leq +25^{\circ}\text{C}$	12 months	
	$25^{\circ}\text{C} < T \leq 35^{\circ}\text{C}$	9 months	
	$35^{\circ}\text{C} < T \leq 55^{\circ}\text{C}$	6 months	
	$55^{\circ}\text{C} < T$	Not allowed	

 CAUTION	Failure to follow the above long-term storage instructions for the battery will result in a significant decrease in its cycle life.
--	---

6 Shipment

Battery module will pre-charged to 50% SOC or according to customer requirement before shipment. The remaining capacity of battery cell is determined by the storage time and condition after shipment.

- The battery modules meet the UN38.3 certificate standard.
- In particular, special rules for the carriage of goods on the road and the current dangerous goods law, specifically ADR (European Convention on the International Carriage of Dangerous Goods by Road), as amended, must be observed.

