

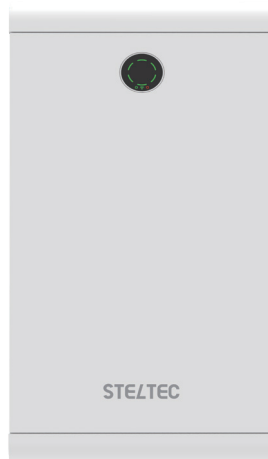
STELTEC

V2.3



STE-BWO-16000

STE-BWO-16000 Operation Manual



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01

TECHNICAL DATA

NOTE

Operating current derating according to cell voltage and battery temperature.



Product Type	Flex-L4
Battery Model	STE-BWO-16000
Battery System Capacity	16.07kWh
Cell Technology	Li-ion(LFP)
Battery Cell Capacity	314Ah
Configuration	1P16S
Nominal Voltage	51.2V
Operating Voltage Range	45.6~56.2V
Dimension(W*D*H)	480*245*957(mm)
Net Weight	137kg
Scalability	Max. 15 systems in parallel operation
Installation	Wall mounted or floor mounted
Depth of Discharge	90%
Charge/Discharge Current(Recommended)	157A
Charge/Discharge Current(Max)	200A
Cooling Method	Natural convection
Communication Port	RS232, RS485, CAN
Protection Class	IP65
Environment	Indoor or Outdoor Eaves
Charging Temperature	-20°C~55°C (with heating) 0°C~55°C (without heating)
Discharging Temperature	-20°C~55°C
Humidity	5%-95%
Max. Operating Altitude	2,500m
Cycle Life	>8000 @25°C, 0.5C, 90% DOD
Wi-Fi Module	Built in Wi-Fi module, APP OTA function
Extended Functions	Thermal aerosol fire extinguishing device(standard) Wheels(standard), Heating system (optional)
Certificates	IEC62619 / IEC61000 / CE / UN38.3 / MSDS

SAFETY INFORMATION

2.1 General Safety

Please carefully read the manual safety precautions and observe all the safety instructions on the equipment and in this document.

The "DANGER", "WARNING", and "NOTICE" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions.

For user safety and utilization efficiency of this manual, a list of symbols is designed to alert people from danger. You must understand and comply with the emphasized information to avoid personal injury and property damage. Relative safety symbols have been listed below.

 DANGER	DANGER indicates a hazardous situation which, if not avoided will result in serious injury and/or fire.
 WARNING	WARNING indicates a hazardous situation which, if not avoided, will result in property loss and/or void the warranty.
 NOTICE	NOTICE indicates normal situation which, if not avoided, will result in damage to the battery.

NOTICE

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

2.2 Personal Safety

Personal Requirements

People who plan to install or maintain battery equipment must be trained, understood all necessary safety precautions, and are able to correctly perform all operations. Only qualified professionals or trained people are allowed to install, operate, and maintain the equipment.

DANGER

- Do not connect in parallel with batteries of different models.
- Do not connect battery with AC power directly.
- Do not connect battery with PV wiring directly.
- Do not connect battery to faulty or unqualified inverter or charger.
- Do not place battery near open flame or flammable material.
- Do not short-circuit the external connection.
- Do not place battery under direct sunlight.
- Do not disassemble or repair by yourself.
- Do not drop, deform, impact, cut or spear with a sharp object.
- Do not put any objects onto the battery.
- Do not expose to liquids or moisture.

2.3 Electrical Safety

Symbols on Battery

There are some electrical symbols on battery relate to electrical safety. Please make sure you have fully understood them before installation.

	Electrical danger	Voltage exists when the battery is powered on. Only qualified engineers are allowed to operate.
	Earth connector	Earth connection.
	DC positive and negative connectors	Identify positive and negative connectors of DC power source.
	CE mark	The product meets CE certification.
	WEEEtag	Batteries must not be disposed with general waste. It must be appropriately recycled in accordance with local regulations.
	Recycle	Batteries can be recycled, please refer to your local regulations regarding the correct disposal methods.

Electrical Safety

DANGER

- Before installation, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.
- Do not connect or disconnect power cables when battery is power-on. Which may cause electric arcs and sparks more over fire or personal injury.
- Before connecting a power cable, check the positive or negative connectors are correct.
- Do not connect in parallel with batteries of different models.
- Do not connect battery with AC power directly.
- Do not connect battery with PV wiring directly.
- Do not connect battery to faulty or unqualified inverter or charger.
- Do not short-circuit the external connection.
- Do not disassemble or repair by yourself.
- Make sure the grid power is cut off and battery is powered off before installation.
- Make sure the earthing cable connect correctly before operation.

WARNING

- Recharge battery every six months if not in use.
- Recharge battery within 48 hours after battery is fully discharged.(SOC=0%)
- Connect inverter PV and AC before starting the battery.
- Connect the correct number of batteries according to the maximum charge and discharge current of the inverter.
- Power off battery and disconnect power connections before maintenance.

NOTICE

- Read use manual carefully before installation.
- Please use appropriately insulated tools for installation and maintenance.
- Please check the LED status when the battery is powered on.
- Please ensure the communication cable is connected correctly between the battery and the inverter.
- Please check for inverter alarms and the SOC reading once communication is established

Environmental Safety

WARNING

- Install the battery under a roof or cover.
- Keep out of reach of children, animals or insects.
- Do not place battery under direct sunlight.
- Do not disassemble or repair by yourself.
- Do not drop, deform, impact, cut or spear with a sharp object.
- Do not put any objects onto the battery.
- Do not expose to liquids or moisture.
- The operation and service life of the battery depends on the operating temperature. Operate the battery at a temperature equal to or better than the ambient temperature. The recommended operating temperature range is:
With heating function: From -20°C to 55°C
Without heating function: From 0°C to 55°C

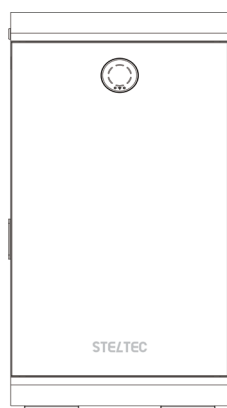
2.4 Transportation Safety

WARNING

- The products have passed UN38.3 certification.
- The products have MSDS documents available.
- The products belong to class 9 dangerous goods.
Please protect the packing case from the below situations:
- Being dampened by rains, snows, or falling into water.
- Falling down or mechanical impact.
- Being upside-down or tilted.

PRODUCT OVERVIEW

3.1 Brief Introduction



PRODUCT OVERVIEW

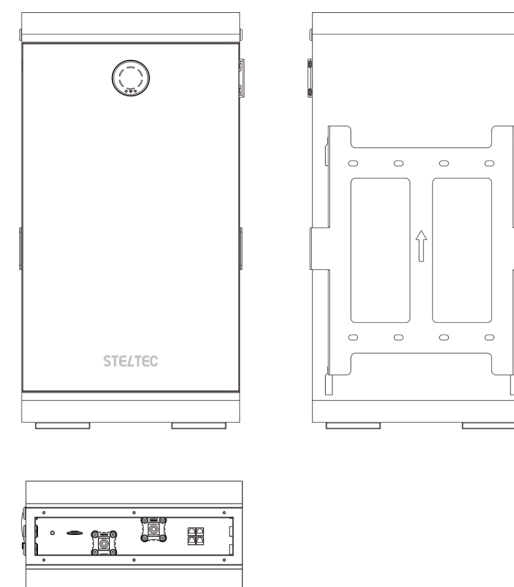
STE-BWO-16000 is a lithium battery with an operating voltage range between 45.6~56.16V. It is designed for residential energy storage applications and works together with a 48V battery hybrid inverter. **STE-BWO-16000 is not suitable for supporting life-sustaining medical devices.**

STE-BWO-16000 has built-in BMS (Battery Management System), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current and high/low temperature; the system can automatically manage charge state, discharge state and balance state.

Multiple STE-BWO-16000 can be connected in parallel to expand capacity and power, 15 pcs STE-BWO-16000 can be connected in parallel at most.

Note: For multiple batteries in parallel, only the Master battery SOC LED will be on to show the whole system SOC level, slave battery SOC LEDs are off, but the Normal&Alarm LED will show normally.

3.2 Interface Introduction



3.2.1 Switch ON/OFF

1. Switch ON

For single Battery Module, turn on the air switch, Long press (more than 3 seconds) Switch button, Normal LED will be lighted in the front panel then battery will operate normally. L1 to L6 shows battery SOC, L7/L8 shows battery status, L9 shows Wifi connection status.

For multiple Battery Modules in parallel, turn on the air switch of all batteries, long press (more than 3 seconds) Switch button of master battery (Which connect with inverter), normal LED will be lighted, battery system will automatically encode and assign ID to each slave battery, then battery system will operate normally.

2. Switch OFF

For multiple Battery Modules in parallel, turn off the air switch of all batteries, press Switch button of master battery (which connect with inverter) more than 3s, and then release the button, LED will flash in the front panel, the master battery will shut down after all slave batteries shut down (Sleep mode).

For single Battery Module, turn off the air switch, Long press (more than 3 seconds) Switch button, and then release the button, LED will flash in the front panel, the battery will shut down.

3.2.2 LED Indicator Definition

Note:

flash 1 - 0.25s light / 3.75s off

flash 2 - 0.5s light / 0.5s off

flash 3 - 0.5s light / 1.5s off

LED Indicators Instructions

Status		RUN	ALM	Battery Level Indicator						Descriptions
				L6	L5	L4	L3	L2	L1	
Shut down	Sleep Mode	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
	Normal	Flash 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Indicates Standby
Standby	Alarm	Flash 1	Flash 3	According to the battery level						Indicates Module Undervoltage Alarm
	Normal	Light	OFF	According to the battery level						The highest capacity indicator LED flashes (flash 2), ALM LED does not flash during overcharge alarm
Charging	Alarm	Light	Flash 3	According to the battery level						
	Full Charged Protection	Light	OFF	Light	Light	Light	Light	Light	Light	Turn to standby status when charger off
	Temperature, Overcurrent, Fault Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharging	Normal	Flash 3	OFF	According to the battery level						
	Alarm	Flash 3	Flash 3	According to the battery level						
	Under Voltage Protection	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
Fault	Temperature, Overcurrent, Short Circuit, Failure Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
		OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharging

L9 ON: Wifi connected successfully/ L9 OFF: Wifi connection failed or power OFF.

Charging/Discharging Battery Level Indicators Instructions

Status		Charging						Discharging					
Battery Level Indicator		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
Battery Level(%)	0%~17%	OFF	OFF	OFF	OFF	OFF	Flash 2	OFF	OFF	OFF	OFF	OFF	Light
	18%~33%	OFF	OFF	OFF	OFF	Flash 2	Light	OFF	OFF	OFF	OFF	Light	Light
	34%~50%	OFF	OFF	OFF	Flash 2	Light	Light	OFF	OFF	OFF	Light	Light	Light
	51%~66%	OFF	OFF	Flash 2	Light	Light	Light	OFF	OFF	Light	Light	Light	Light
	67%~83%	OFF	Flash 2	Light	Light	Light	Light	OFF	Light	Light	Light	Light	Light
	84%~100%	Flash 2	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light	Light
Running Indicator		Light						Flash 3					

3.2.3 CAN / RS485 Port

CAN / RS485 Communication Terminal (RJ45 port), connect to inverter, follow CAN / RS485 protocol.

PIN	Definition
Pin 1、Pin 8	RS485-B (to PCS, reserved)
Pin 2、Pin 7	RS485-A (to PCS, reserved)
Pin 3	NC
Pin 4	CANH (to PCS)
Pin 5	CANL (to PCS)
Pin 6	GND

3.2.4 RS232 Port

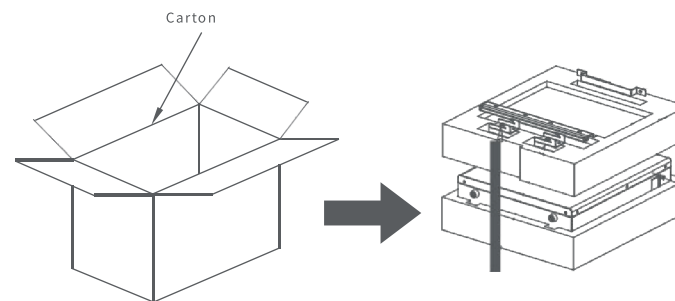
RS232 Communication Terminal (RJ45 port) follow RS232 protocol, for manufacturer or professional engineer to debug or service.

PIN	Definition
Pin 1、Pin 8	GND
Pin 2、Pin 7	RS232_TX
Pin 3、Pin 6	RS232_RX
Pin 4、Pin 5	NC

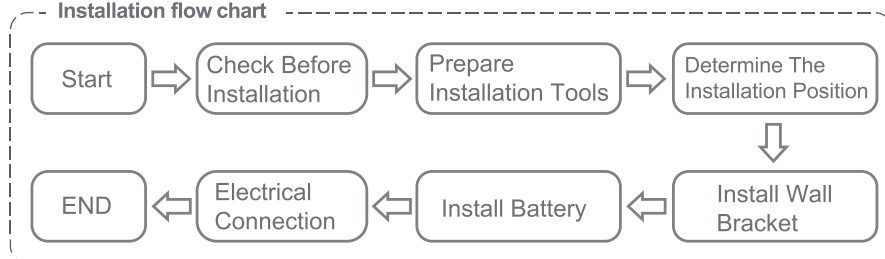
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INSTALLATION GUIDE

STELTEC



Installation flow chart



4.1 Check Before Installation

4.1.1 Check Packing Integrity

Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Check the surface of packing materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. It is recommended to remove packing materials only after confirming no damage.

4.1.2 Verify Components

After unpacking the battery, check whether components are intact and complete. If any component is missing or damaged, contact the dealer. The below table shows the components and mechanical parts that should be delivered.

STE-BWO-16000 Packing List					
No.	Part no.	Part name/size	Quantity	Photo	Used for
1	1.02.003	Battery pack	1		Battery box
2	3.01.0034	Screw Cross outer hexagon three combination screws _M6*15mm_8,8 grade 304 stainless steel	3		1 pcs for grounding screw, 2 pcs for fixing angle iron
3	3.01.0137	Yellow-green two-color grounding Cable	1		Grounding Cable
4	3.01.0138	Power cord, SC70-8 at one end, SC70-10 at the other end, AWG0# PVC cord 11627, L=1500mm, Red color	1		Power cable +
5	3.01.0139	Power cord, SC70-8 at one end, SC70-10 at the other end, AWG0# PVC cord 11627, L=1500mm, Black color	1		Power cable -
6	3.01.0098	Flat gasket M8 * 20 * 1,5mm_8,8 grade 304 stainless steel	2		Accessory gasket
7	3.01.0004	Waterproof Cable Gland M25 (13-18) (Single Hole)	2		Water intrusion prevention for equipment connectors
8	3.01.0005	Waterproof Cable Gland M25 (13-18) (Three Holes)	1		Water intrusion prevention for equipment connectors
9	3.01.0134	SC70-8_Purple Copper Tinned Terminals	2		To parallel with multiple packs
10	3.01.0064	T568B Lan cable Line length 2000mm_ RJ45 crystal plug	1		Communication cable between master pack and inverter or for parallel of multiple packs
11	3.01.0089	RJ45 Crystal head	2		RJ45 Crystal head
12	3.01.0094	Desiccant 20g moisture-proof desiccant	2		Moisture-proof

STE-BWO-16000 Packing List					
No.	Part no.	Part name/size	Quantity	Photo	Used for
13		Waterproof Hole Plug	8		Prevent water leakage and dust accumulation
14		Outgoing Inspection Report	1		Outgoing Inspection Report
15		Battery Networking Guide	1		Battery Networking Guide
16		Quick Installation Guide	1		Quick Installation Guide
17	Option 1	Fixed angle iron T=3mm	2		To secure the battery and the wall
18		Expansion bolt M8*80mm/8,8 grade /304 stainless steel expansion screws	3		Lock wall pendant
19	Option 2	Fixed support SPCC T=2,5mm,572*490*30(L*W*H), fine sand grain (optional)	1		Wall mounting bracket
20		Expansion bolt M10*80mm/8,8 grade /304 stainless steel expansion screws	8		Lock wall pendant

Caster Accessory Kit Packing List					
No.	Part no.	Part name/size	Quantity	Photo	Used for
1	3.01.0034	Screw Cross outer hexagon three combination screws _M6*15mm_8,8 grade 304 stainless steel	16		To fix the wheels
2	3.01.0010	Swivel wheel with brake	4		4 casters bearing capacity 800kg

4.2 Tools

Tools			
Installation	Knife 	Measuring tape 	Socket wrench (10/16mm) 
	Rubber mallet 	Cross Screwdriver 	Hammer drill (12/14mm) 
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

4.3 Installation Requirements

4.3.1 Installation Environment Requirements

Charging temperature range: -20°C - +55°C(Products with heating function)

Charging temperature range: 0°C - +55°C(Products without heating function)

Discharging temperature range: -20°C - +55°C

Relative humidity: 5%-85%RH

Elevation: no more than 2500m

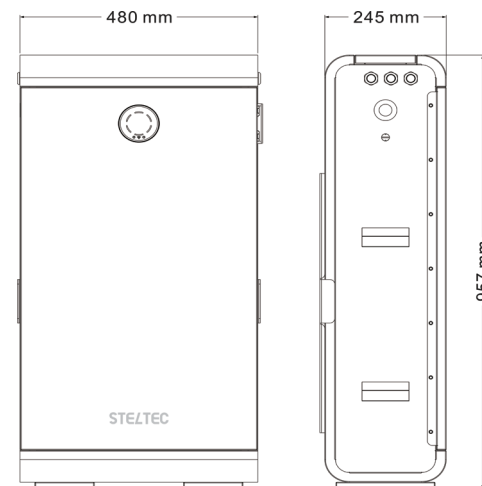
- Lithium battery may be installed indoors or outdoors. But please avoid direct sunlight, rain exposure or snow cover.
- Place battery under a roof or cover.
- Place battery in secure location away from children and animals.
- The ground for product arrangement shall be flat and level.
- Do not place battery near open flame or flammable material.
- Do not place battery near heat sources or fire sources.
- Keep away from dust and messy zones.
- The floor and walls are completely waterproof.

4.3.2 Installation Carrier Requirements

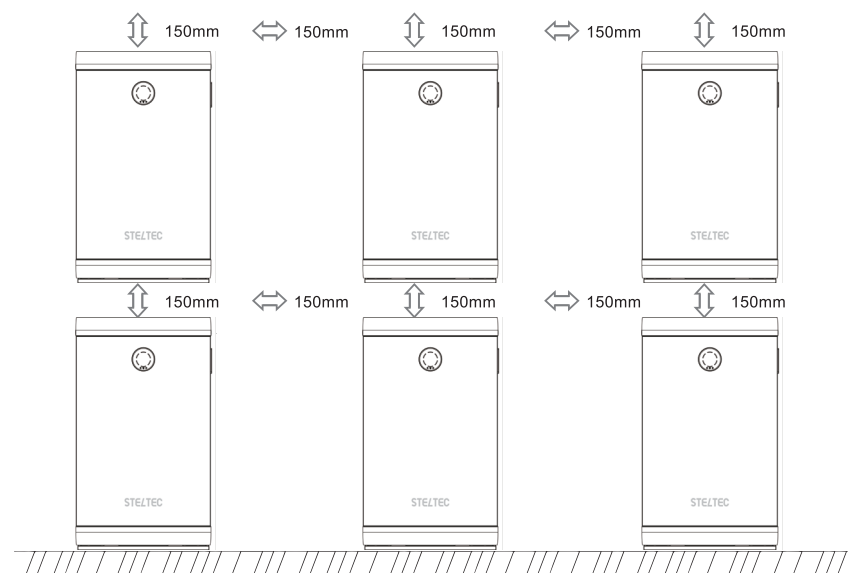
- Only mount battery on fire resistant building. Do not install batteries on flammable buildings.
- Battery is quite heavy, make sure the wall/ground can meet the load bearing requirements.

4.4 Installation Instructions

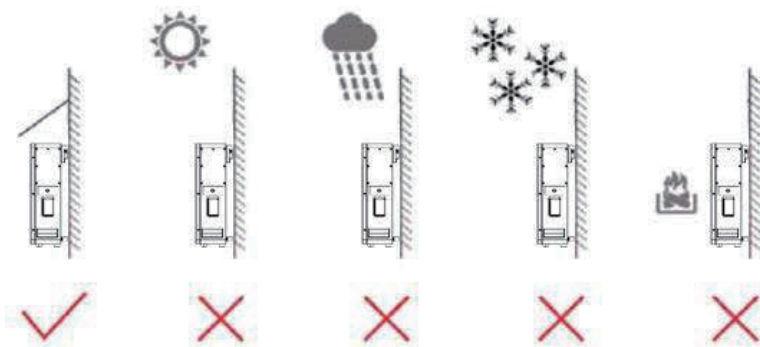
4.4.1 Dimensions



Minimum mounting distance between battery pack and equipment:



4.4.2 Installation Procedure



Angle iron installation (Option 1)

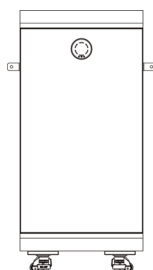
STEP 1

Place the battery on flat and firm ground.
Install four lockable swivel wheels on the battery, and lock the swivel wheels after positioning.



STEP 2

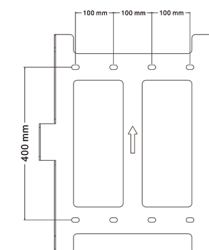
Drill the hole with an 12mm drill bit as follows and fix the angle iron to the wall and battery.



Bracket installation (Option 2)

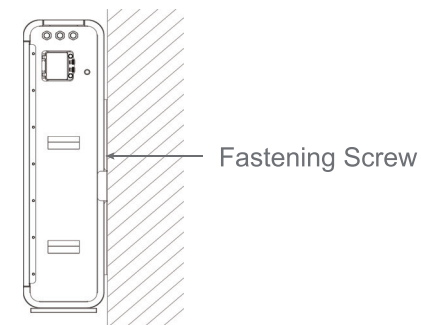
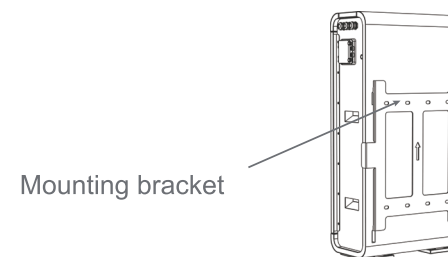
STEP 1

Drill the hole with an 14mm drill bit as follows and fix the wall bracket to the wall.



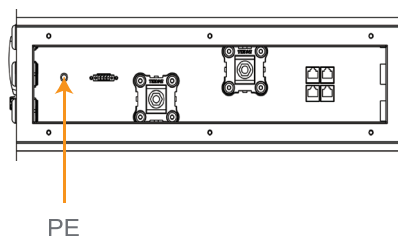
STEP 2

Secure the mounting bracket.
Hang the battery on the wall mounting bracket and secure it tightly.



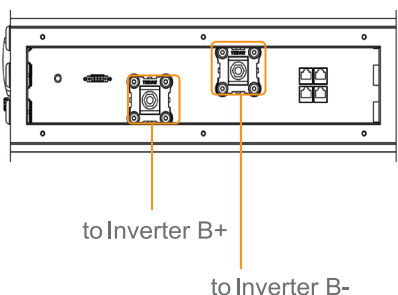
STEP 3

Connect to ground.



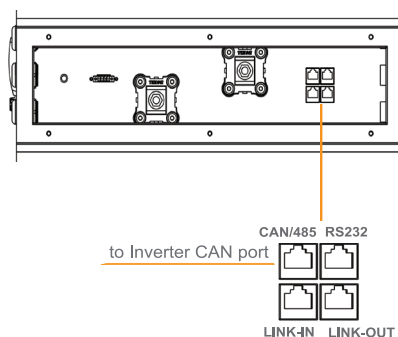
STEP 4

Connect power cable.



STEP 5

Connect communication cable.

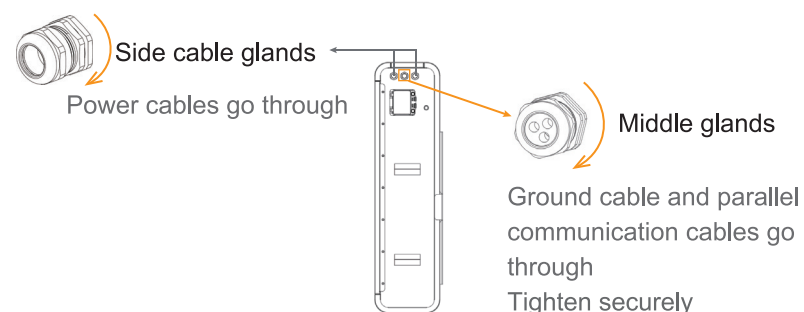


STEP 6

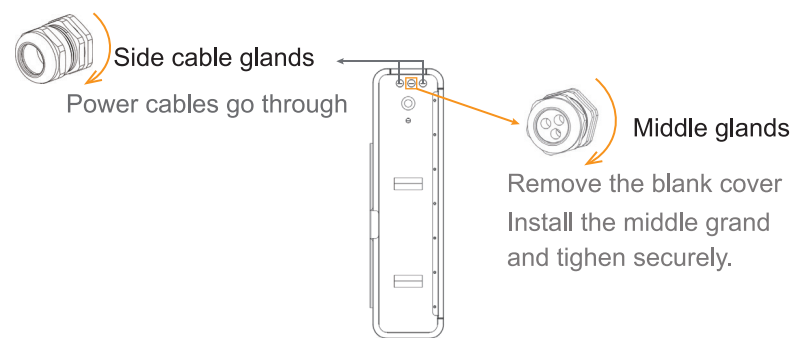
Route cables as follows:

1. Power cables go through the side cable glands.
2. Ground and communication cables go through the middle glands. (The remaining opening must be sealed with the provided plug and tightened.)
3. Tighten all glands after routing.

For parallel operation, remove the blank cover on the other side and install the gland from the accessory kit. Tighten securely after installation.



For Parallel Operation



STEP 7

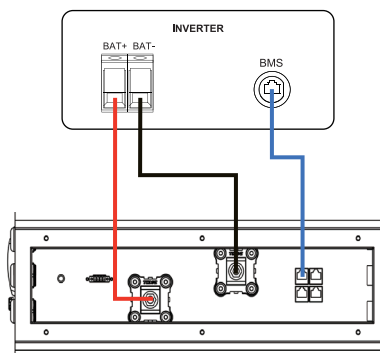
The wiring methods listed below are **recommended configurations**. For specific conditions, please refer to the manual of the inverter. Please contact the vendor if you have any questions.

1. For load power exceeding 10 kW, at least 2 units must operate in parallel.
 2. The maximum number of units that can operate in parallel is 15.
- For the battery module, the selected inverter's power rating must be less than the battery module's maximum output power.

Parallel operation	Load power	Connection mode
1unit	Below 10kW	7.1
2-15units	12kW or Below	7.2
2-15units	Over 12kW	7.3

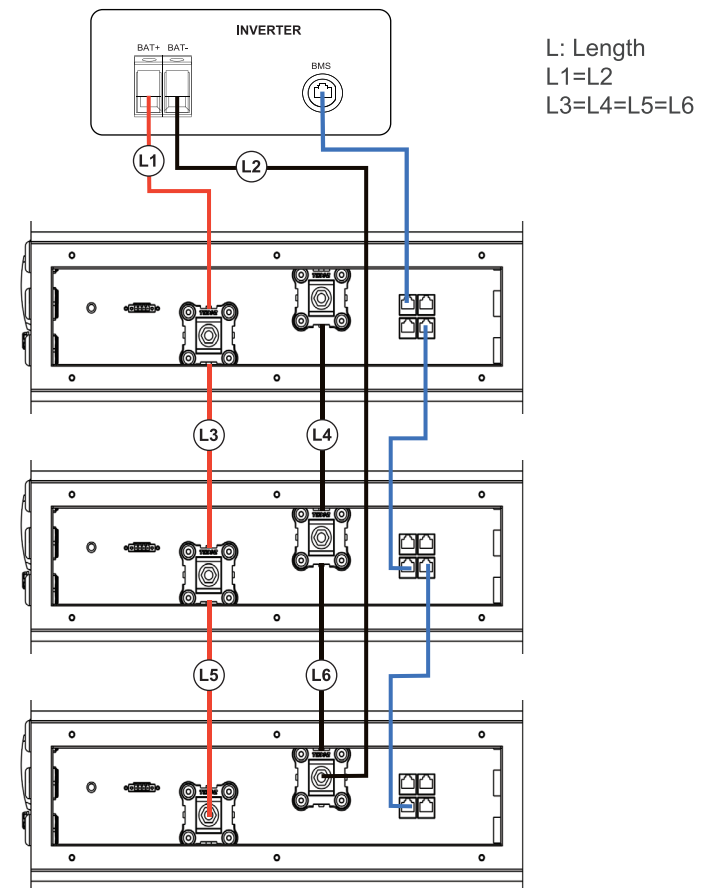
	Ensure power cables are installed with the correct polarity. A dangerous situation may arise if the polarities are reversed.
	Do not create a short circuit between the positive and negative terminals of the battery. Ensure the polarity is correct during installation.
	Incorrect communication cable connection will cause the battery system to operate in unexpected ways which may lead to system failure.

7.1	 Warning
	For a single unit module with power below 10 kW.



Cable connection in all the following views	
	Lithium battery positive power cable
	Lithium battery negative power cable
	Lithium battery communication cable

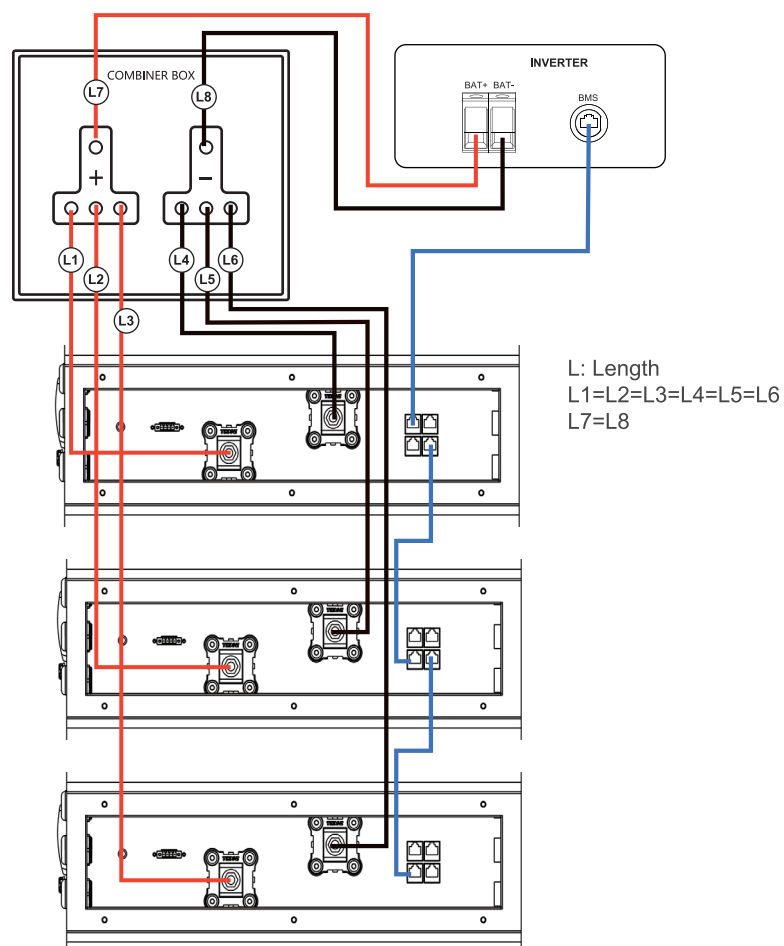
	 Warning
7.2	For 2 to 15 units: Use the single-layer module configuration with power of 12 kW or below. All positive and negative cables between the inverter and battery must be of equal length. Equal cable length is necessary for proper system balance and reliable operation. Note: The number of intermediate units is omitted in the diagram for simplicity.



7.3

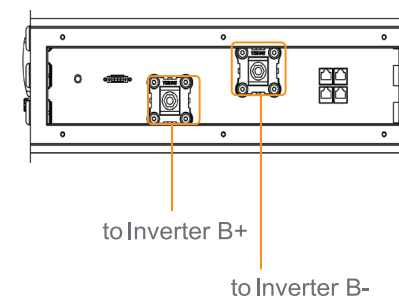
Warning

For 2 to 15 units where inverter power exceeds 12 kW:
Connect the positive and negative ports of each battery to the combiner cabinet as shown in the figure below.
All positive and negative connecting cables between each battery and the combiner cabinet must be of equal length.
Equal cable length is necessary to ensure equal current sharing and reliable operation.
Note: The number of intermediate units is omitted in the diagram for simplicity.



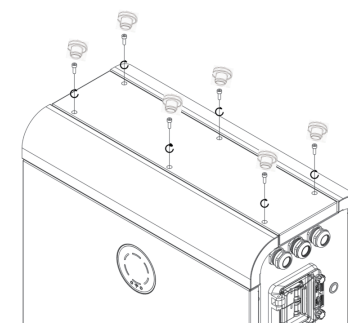
STEP 8 (optional)

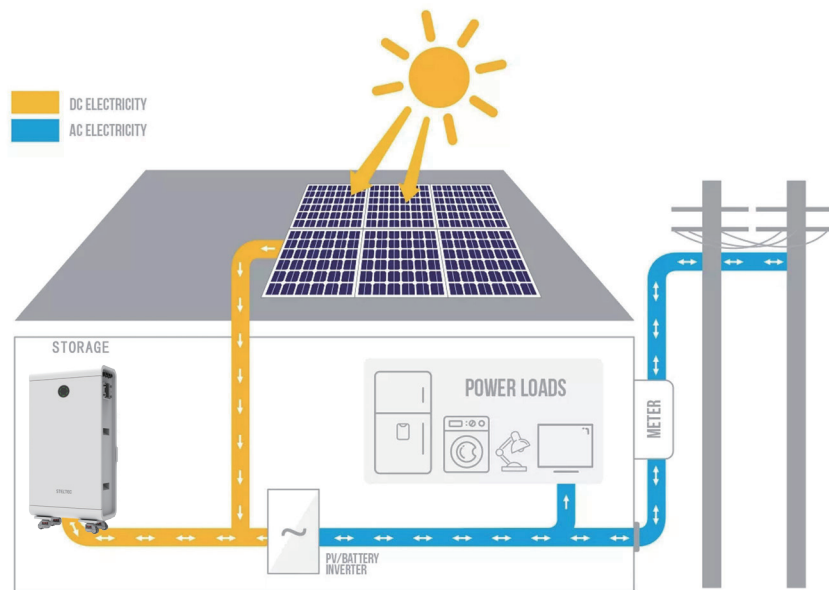
Connect the port with the monitor.



STEP 9

Install the cover and fully tighten all screws, then place the plugs over the screw heads.





05 COMMISSIONING PROCEDURE

After all the cable (power and communication) connections are completed, please ensure the following:

- Ensure the DC switch on the inverter is OFF
- Ensure the AC switch that is connected to the grid and EPS output (if used) of the inverter is OFF
- Ensure the DC switch is OFF

For commissioning we recommend the following steps:

- Refer to section 3.2.1 Start for turning on the battery
- Wait until the LED's on
- Wait until the inverter LED's on
- Turn the DC switch on the inverter ON
- Turn the AC switch that is connected to the grid and EPS output of the inverter ON
- Connect the battery to Wi-Fi following the App instructions, ensure L9 LED is ON to confirm successful connection.
- Set-up the battery and the inverter using the App.

06

MAINTENANCE

6.1 Recharge Requirements During Normal Storage

Battery should be stored in an environment with temperature range between -10°C $\sim +45^{\circ}\text{C}$, and maintained regularly according to following table with 0.5C (157A) current till 50% SOC after long storage time.

Recharge Conditions When In Storage

Storage Environment Temperature	Relative Humidity of storage Environment	Storage Time	SOC
Below -10°C	/	prohibit	/
$-10\sim 25^{\circ}\text{C}$	5%-70%	≤ 12 months	$30\%\leq \text{SOC}\leq 60\%$
$25\sim 35^{\circ}\text{C}$	5%-70%	≤ 6 months	$30\%\leq \text{SOC}\leq 60\%$
$35\sim 45^{\circ}\text{C}$	5%-70%	≤ 3 months	$30\%\leq \text{SOC}\leq 60\%$
Above 45°C	/	prohibit	/

6.2 Recharge Requirements When Over Discharged

Over discharged (90% DOD) battery should be recharged according to following table, otherwise over discharged battery will be damaged.

Recharge conditions when battery is over discharged

Storage Environment Temperature	Storage Time	Note
$-10\sim 25^{\circ}\text{C}$	≤ 7 days	Battery Pack Disconnected from the Inverter
$25\sim 35^{\circ}\text{C}$	≤ 5 days	
$-10\sim 45^{\circ}\text{C}$	≤ 24 hours	Battery Pack connected to Inverter