

User Manual



ET Series

ET10/ET10(w)

ET16/ET16(w)

To prevent damage to the product caused by improper use, please carefully read this manual before operation.

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Content

1 Notes on This Manual	1
2 Product Introduction	4
2.1 Battery Interface	5
2.2 Battery Function	7
3 Safety Precautions	9
3.1 Personnel Safety	9
3.2 Handling	10
3.3 Installation	10
3.4 Mounting	11
3.5 Response to Emergency Situations	11
4 Storage Requirement	13
5 Installation	14
5.1 Tools	14
5.2 Items in the Package	15
5.3 Clearance	17
5.4 Installation Steps	18
5.5 Wiring Steps	23
6 System Operation	27
6.1 Single Battery	27
6.2 Parallel Batteries	28
6.3 Monitoring Methods	29
7 Maintenance Guide	31
7.1 Routine Maintenance	31
7.2 Troubleshooting	32
7.3 FAQ	34

8 Product Specification	36
8.1 ET10 Specifications	36
8.2 ET10 (w) Specifications	37
8.3 ET16 Specifications	38
8.4 ET16 (w) Specifications	39
9 Contact Us	40

1 Notes on This Manual

The document describes the installation, commissioning, maintenance, troubleshooting of the following high voltage battery listed below.

ET10/ ET10 (w)

ET16/ ET16 (w)

The battery chemistry of these products is Lithium Iron Phosphate. This manual is designed for qualified personnel only. The tasks described in this document should be performed by authorized and qualified technicians only.

After Installation the Installer must explain the user manual to the end user.

All warranty-related information is subject to the product warranty documentation.

Symbols Used

The following symbols are used in the manual to highlight information in order to ensure the safety of the user's person and property when using the product, and to use the product more efficiently and optimally. The following symbols may appear in this manual, and the meanings they represent are listed below:

Danger!

“Danger” indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Warning!

“Warning” indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Note!

“Note” provides important tips and guidance.

Symbols	Explanation
	CE mark. The battery complies with the relevant EU directives.
	RCM mark.
	The battery meets the requirements of the UK product safety certification.
	Danger of high voltages. Danger to life due to high voltages in the battery!
	Do not place nor install near flammable or explosive materials.
	Install the product out of reach of children.
	Prohibit the use of water to extinguish fires.
	Prohibition of private maintenance.
	Prohibit Connector Reversal.
	Read the manual before performing any operations on the battery.
	Do not dispose of the product with household wastes.



Disconnect the equipment before carrying out maintenance or repair.



Observe precautions for handling electrostatic discharge sensitive devices.



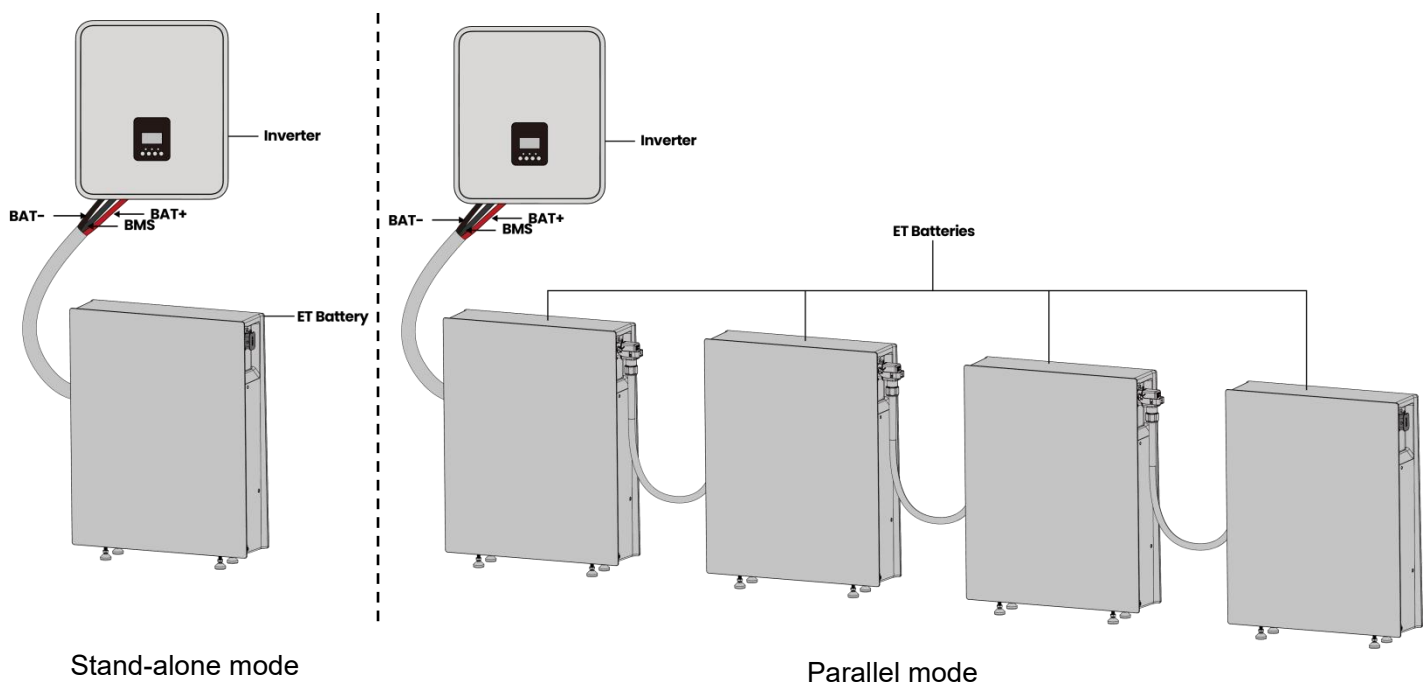
PE conductor terminal.



Caution, risk of electric shock, energy storage timed discharge(< 1minute).

2 Product Introduction

ET Battery photovoltaic energy storage system is a high-voltage energy storage system based on lithium-ion ferrous phosphate battery. It is equipped with a customized battery management system (BMS), which is designed for energy storage applications of household photovoltaic power generation users. In the daytime, the surplus power of photovoltaic power generation can be stored in the battery. At night or when necessary, the stored energy can be provided to the electrical equipment, it can improve the use efficiency of photovoltaic power generation, peak-load shifting, and provide emergency standby power.

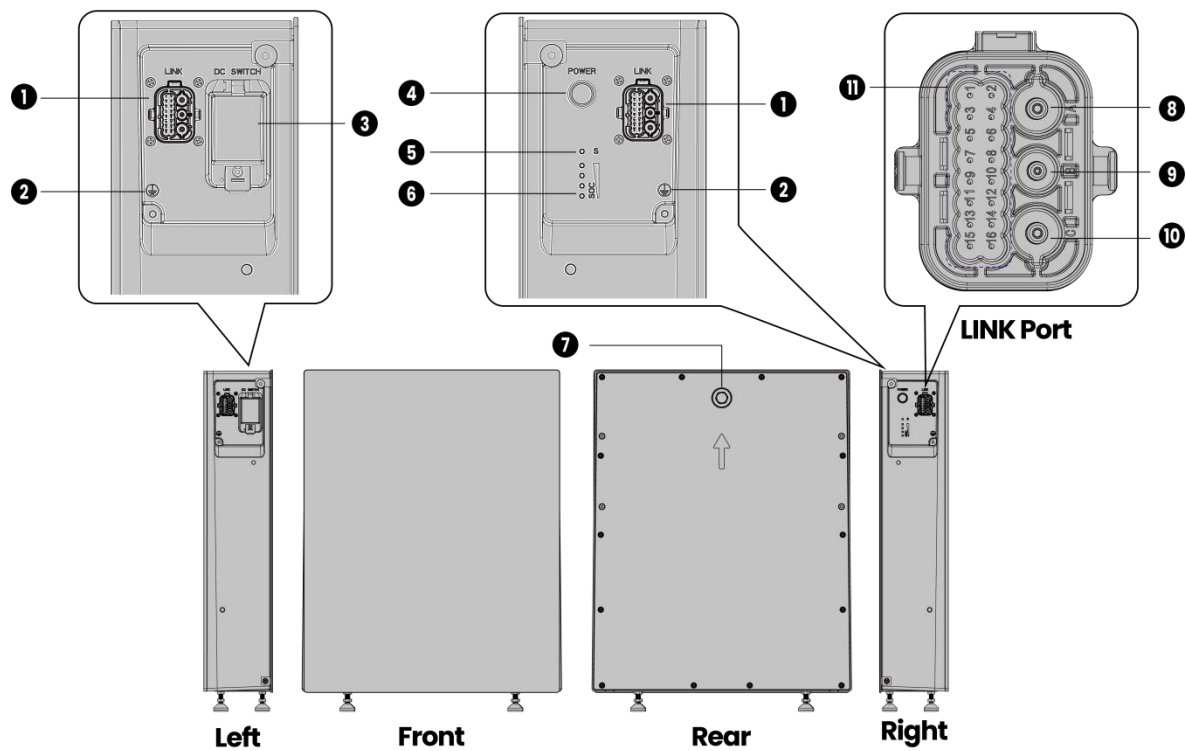


System diagram

Note!

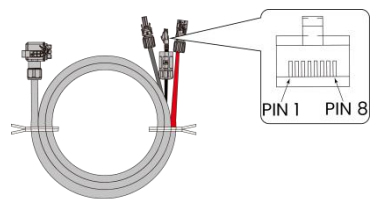
- The connections shown in the figures are for reference only, the actual configuration will depend on the specific project.
- In parallel installation scenarios, batteries can be arranged in front-back stacked or side-by-side layout according to the installation environment.

2.1 Battery Interface



Object	Description	Object	Description
①	LINK Port	⑦	Valve
②	Earth Terminal	⑧	BAT+
③	DC Switch	⑨	PE
④	POWER Button	⑩	BAT-
⑤	BMS State LED	⑪	Communication Port
⑥	SOC LED		

The interface of RJ45 is defined as follows:



Item P RJ45

RJ45 PIN 1~8	Description	RJ45 PIN 1~8	Description
①	A-START	⑤	PCS-CANH
②	ISO-GND	⑥	PCS-CANH
③	/	⑦	PCS-CANL
④	PCS-CANL	⑧	/

Note!

- The LINK port integrates power supply and communication functions and is used with a dedicated connector(Item P & Item Q & Item R).
 - Refer to the RJ45 pin description if needed.
-

Earth Terminal

This terminal is used to connect the battery to the earth for safety purposes.

In parallel mode, this terminal can also be used to connect to parallel battery.

DC Switch

Power switch, battery charge and discharge circuit switch.

BAT +

Connect bat + of inverter.

BAT -

Connect bat - of inverter.

POWER Button

System power on button, press and hold the button for 3 seconds, and then release the button, the system starts to work. It also has a Black Start function, when the system works repeat the previous step: press the "Power Button" button three times in succession within 4 seconds to enter the Black Start mode. Please complete it within 30 seconds.

BMS Status LED and SOC LED

LED display specific alarm information and battery system power.

2.2 Battery Function

2.2.1 Battery Protection Function

The batteries have been fitted with multiple protection systems to ensure the safe operation of the system. Some of the protection system includes:

- Inverter interface protection: Over Voltage, Over Current, External Short Circuit, Reverse Polarity, Ground Fault, Over Temp, In Rush Current.
- Battery protection: Internal Short Circuit, Over Voltage, Over Current, Over Temp, Under Voltage.

2.2.2 Battery Warm Up Function

In low-temperature climates at high altitudes or latitudes, particularly during winter, the charging and discharging performance of batteries can significantly decline due to cold temperatures. To address this Fox ESS has introduced a "Battery Warm up" feature, enabling the battery system to operate effectively extremely low temperatures. This feature is exclusively available in the warm-up versions.

(a) Battery Self Warm-Up State

If Battery SOC $\geq$ 10%, MinCell Temperature $<$ Start Temperature, and not in low-temperature protection state, and within the set warm-up time.

Then the battery is in a self warm-up state, and the warm up function is powered by the battery itself. At this time, the inverter power control is not affected.

(b) Inverter Controls Warm-Up State

If Battery SOC $<$ 10% or in low-temperature protection state, and MinCell Temperature $<$ Start Temperature and within the set warm-up time.

Then the battery is in an inverter controlled warm-up state, and the warm up function is powered by the inverter. In this state, the inverter can only provide power for warming up the battery and cannot respond to other charging and discharging requests.

Control Method:

The app or cloud platform transmits settings for the warm-up switch, warm-up activation temperature, shutdown temperature and warm-up activation time window to the PCS via the network; the PCS sends these settings to the BMS via the CAN protocol; the BMS controls the temperature based on these settings and uploads temperature-related status data to the PCS via CAN; the PCS then uploads this data to the app or cloud platform via the network.

- The battery can only discharge when the internal temperature of battery is above -10°C . It can only charge when the internal temperature of battery is above 0°C .
- Please check that the wiring is properly connected and that all batteries are the warm

up versions; otherwise, the Warming up function will not operate.

- Warming up control is based on the internal cell temperature of the battery, rather than the ambient temperature. Typically, the cell temperature will be higher than the ambient temperature under normal operating conditions.

For further assistance, please contact an authorized personnel or Fox ESS for further instructions.

3 Safety Precautions

3.1 Personnel Safety

Any work on the batteries should be handled by purchaser approved installer and hence it is understood that the purchaser approved installer should familiarize themselves with the contents of this manual before any maintenance or installation is carried out on the system.

Danger!

Operating Requirements

- High voltage exists inside the equipment. Unauthorized removal of necessary protective measures, improper use, and improper installation and operation may cause serious safety hazards, shock hazards, or equipment damage, and the resulting damage to the equipment is not covered by the warranty.
- Do not energize the equipment without completing the installation or without professional confirmation, and strictly prohibit operation with electricity.

Warning!

Operating Requirements

- Always use special insulated tools for wiring operations. Direct contact or contact with other conductors or indirect contact with the power supply equipment through wet objects is prohibited.
- During operation of the equipment, the enclosure temperature is high and there is a risk of burns. Before touching any part of the inverter, make sure that the equipment and its surfaces are at a contact-safe temperature and voltage before proceeding.

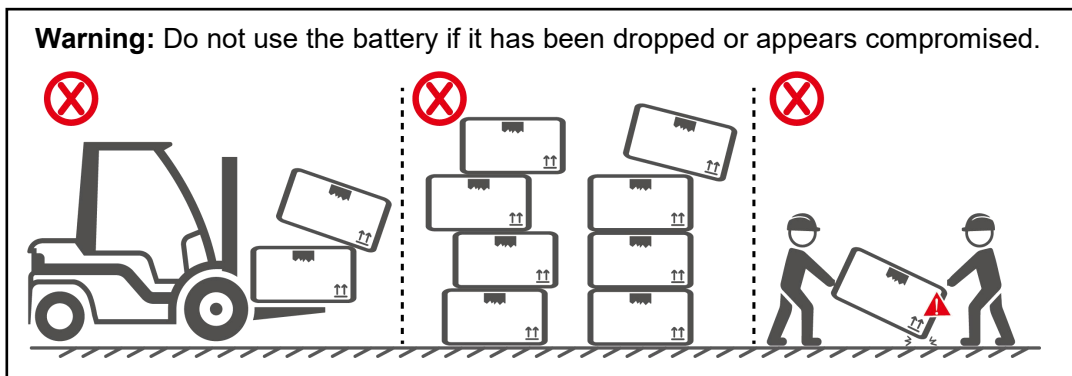
Note!

Personnel requirements

- All operations, including transportation, installation, start-up and maintenance, must be performed by qualified and trained personnel.

3.2 Handling

- Do not expose battery to open flame.
- Do not place the product under direct sunlight.
- Do not place the product near flammable materials. It may lead to fire or explosion in case of accident.
- Store in a cool and dry place with ample ventilation.
- Store the product on a flat surface.
- Store the product out of reach of children and animals.
- Do not damage the unit by dropping, deforming, impacting, cutting or penetrating with a sharp object. It may cause leakage of electrolyte or fire.
- Do not touch any liquid spilled from the product. There is a risk of electric shock or damage to skin.
- Always handle the battery wearing the insulated gloves.
- Do not step on the product or place any foreign objects on it. This can result in damage.
- Do not charge or discharge damaged battery.
- Do not store the battery near water sources.



3.3 Installation

- Do not exceed the battery voltage rating of the inverter.
- Do not connect the battery to any incompatible inverter.
- Do not open the battery to repair or disassemble. Only Fox ESS is allowed to carry out any such repairs.
- In case of fire, use only dry powder fire extinguisher. Liquid extinguishers should not be used.
- Do not use battery in high static environment where the protection device might be damaged.
- Do not install with other batteries or cells.
- Please ensure the new batteries mounted on-site comply to the warranty scope or have ever been re-charged within 6 months; on top of that, please make sure the SOC of present battery system onsite is 50%±5%.
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 1000 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

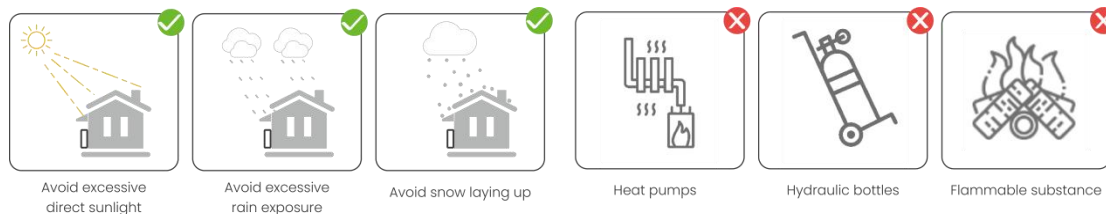
3.4 Mounting

Make sure the installation site meets the following conditions:

- Keep the installation area away from high-temperature sources, flammable or explosive materials, and other potential explosion hazards such as gas valves, LPG cylinders, heat pumps, firewood stacks, etc.
- The installation area must be completely waterproof, with a hard, level floor, and the wall should not have noticeable inclined angle.
- Maintain low and stable humidity with good ventilation; dust and dirt within the installation area must be minimized.
- Position the installation area away from television antennas or antenna cables to avoid lightning strikes and electromagnetic interference.
- Avoid the presence of flammable debris around the battery, such as cotton, fabric, haystacks, etc., which may be ignited by sparks and then lead the fire source to the battery, thus causing the battery to burn.
- Avoid the presence of hot or flammable objects around the battery, such as hydraulic bottles (natural gas, oxygen, etc.), heat pumps and so on.

Outdoor Installation

- The ingress protection rating for this product is IP65 and it is therefore suitable for outdoor use. Locations fully exposed to precipitation and/or extended periods of exposure to direct sunlight should, where possible, be avoided. A location where there is some direct exposure to the elements, or where complete protection cannot be achieved, are permissible and will not impact upon warranty claims providing reasonable measures have been taken. For more clarification, please contact your local Fox ESS service team.



3.5 Response to Emergency Situations

The battery module comprises of multiple batteries connected in series. It is designed to prevent hazards or failures. However, Fox ESS cannot guarantee their absolute safety.

Under exposure to the internal materials of the battery the following recommendations should be carried out by the user.

- If there has been inhalation, please leave the contaminated area immediately and seek medical attention.
- If there has been contact with eyes, rinse the eyes with running water for 15 minutes and seek medical attention immediately.
- If there has been contact with the skin, wash the contacted area with soap thoroughly and seek medical attention immediately.
- If there has been ingestion, induce vomiting and seek medical attention.

Fire Situation

In situations where the battery is on fire, if it is safe to do so, disconnect the battery pack by turn off the circuit breaker to shut off the power to the system. Use FM-200 or CO2 fire extinguisher for the battery and an ABC fire extinguisher for the other parts of the system.

Under any fire situation, please evacuate the people from the building immediately before trying to extinguish it.

 Warning!

Fox ESS batteries incorporate a thermal aerosol fire extinguishing device. This device deploys upon detection of thermal runaway and was capable of suppressing and restricting the spread of fire.

Water Situation

This product features dust protection and is resistant to powerful water jets, but it is not designed to be submerged. Hence care should be taken not to get it wet. If you find the battery completely or partially submerged in water do not try to open. Contact an authorized personnel or Fox ESS for further instructions.

4Storage Requirement

- It is recommended that the battery storage time is not more than 6 months.
- For the first installation, the interval among manufacture dates of battery modules shall not exceed 3 months.
- Regularly check whether the service environment of the battery meets the requirements, and the installation position should be far away from the heat source.
- The battery module should be stored in an environment with a temperature range between -20°C~55°C, and charged regularly according to the table below with no more than 0.5 C(A C-rate is a measure of the rate at which a battery is discharged relative to its maximum capacity) to the SOC of 50% after a long time of storage.

Storage environment temperature	Relative humidity of the storage environment	Storage time	SOC
Below -20°C	/	Not allowed	/
-20~0°C	10%~90%	≤ 1 months	20%≤SOC≤50%
0~35°C	10%~90%	≤ 6 months	20%≤SOC≤50%
35~55°C	10%~90%	≤ 1 months	20%≤SOC≤50%
Above 55°C	/	Not allowed	/

Note!

If the battery is stored over one year, 5%- 8% of the capacity may lose irreversibly.

- Every year after installation. The connection of power connector, grounding point, power cable and screw are suggested to be checked. Make sure there is no loose, no broken, no corrosion at connection point. Check the installation environment such as dust, water, insect etc.

5 Installation

5.1 Tools

The following tools will be required to install the battery.



Safety
Shoes



Safety
Gloves



Safety
Glasses



Phillips
Screwdriver
6mm Magnetic



Flat
Screwdriver
6mm



Crimpers



Plier



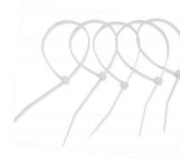
Wire Cutter



Hammer Drill
@φ8mm



Rubber Mallet



Ribbon



Multimeter



Spirit Level



Tape



Socket Wrench



Marker

5.2 Items in the Package

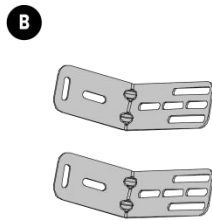
Note!

Please check if following items are including with the package. After unpacking, please check the product for damages and missing parts.

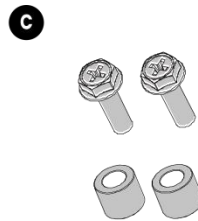
Standard List:



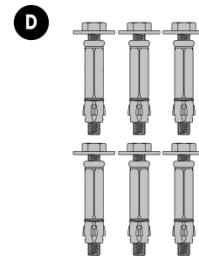
Wall Bracket



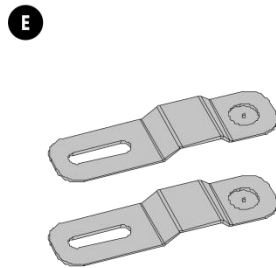
Fixing Bracket



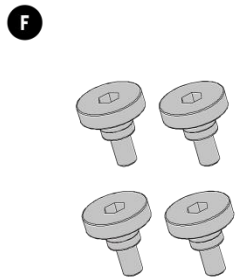
Mounting Screw (M6*20)
& Cylindrical Spacer
(for fixing bracket)



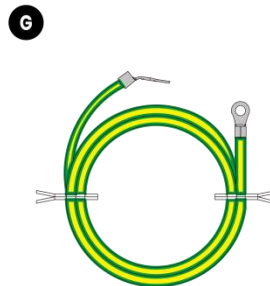
Expansion Screw
(M8*60)



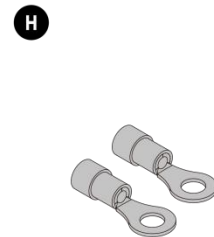
Parallel Mounting
Bracket



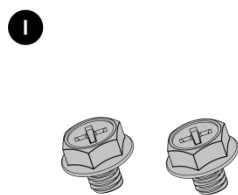
T-screw (M6*10)
(for parallel connection)



Grounding Cable



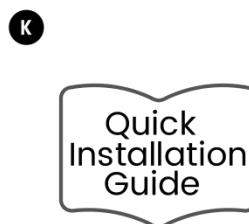
OT Terminal
(for grounding cable)



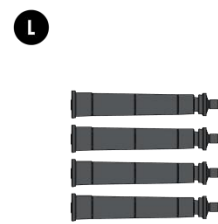
Mounting Screw (M6*6)
(for grounding cable)



Plug

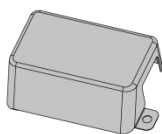


Installation Guide

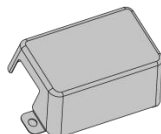


Handle

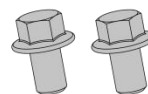
Optional List

M

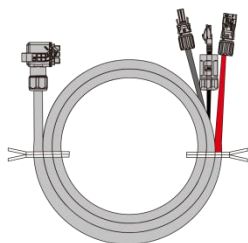
Cable Cover
(left)

N

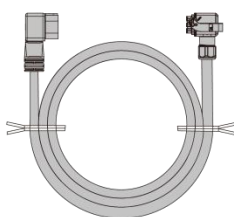
Cable Cover
(right)

O

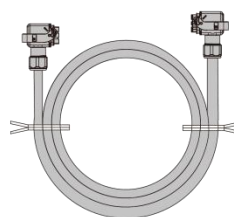
Mounting Screw
(M10*16)
(for cable cover)

P

DC Power Cable
(Bat~Inverter)

Q

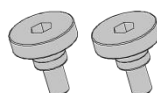
DC Power Cable
(Bat~All-in-one unit)

R

DC Power Cable
(Bat~Bat)

S

Glass Panel

T

T-screw (M6*10)
(for glass panel)

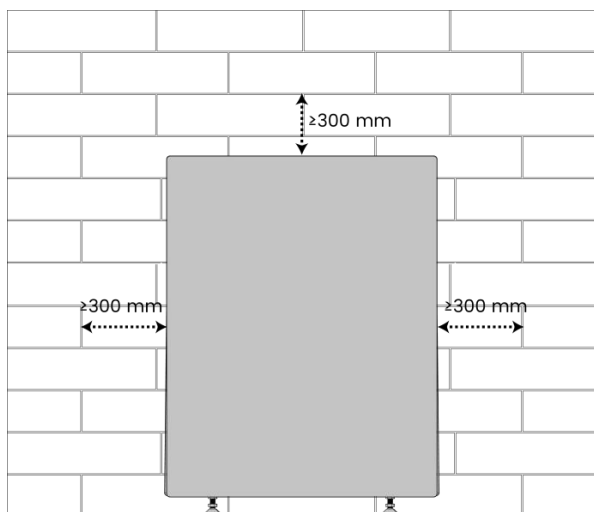
U

Mounting Screw
(M6*12)
(for glass panel)

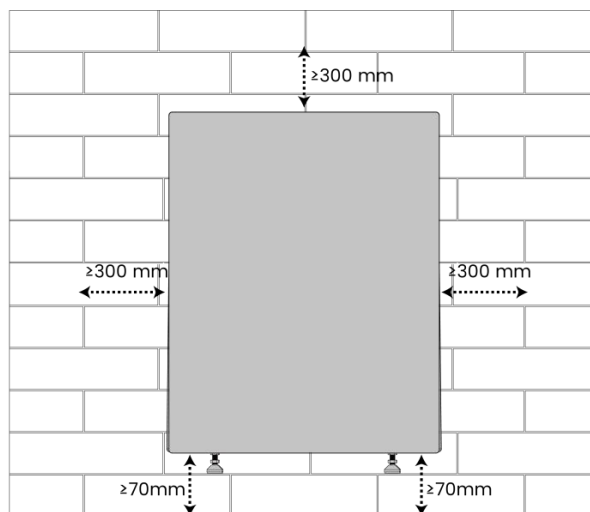
Note!

The above parallel connection kits are optional and should only be selected for parallel connection scenario.

5.3 Clearance



Standing mounting



Wall mounting

Note!

- The battery system can be installed indoors or outdoors.
- Make sure to leave a space of at least 300 mm. A clearance of at least 300 mm must be left around the battery pack for proper cooling.
- The safety clearance for equipment installation must comply with local regulations.
- For indoor installation scenarios, the installation area must be no less than 17 m².
- For indoor installation, please refer to local installation regulations or fire safety regulations for specific provisions. The following methods are for reference only:
 - Install smoke alarm devices;
 - Install forced-start emergency ventilation devices, simultaneously shutting down the air conditioning/fresh air system (to prevent gas diffusion);
 - Install audible and visual alarms.
- The battery system must be kept at least 2 meters away from heat sources.

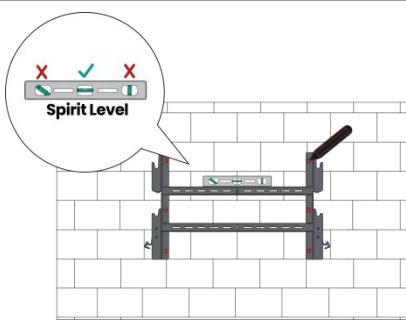
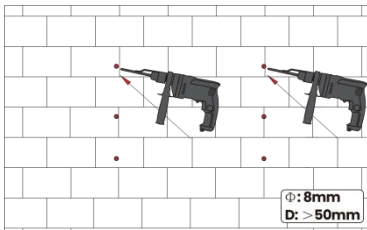
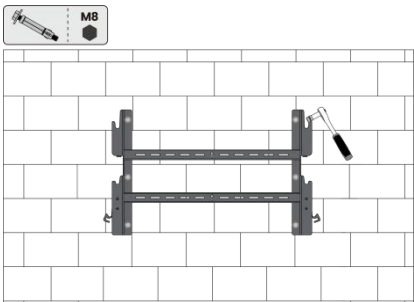
5.4 Installation Steps

Warning!

- All installation procedures must fully comply with all applicable regional and industry standards, covering cable selection, wiring, protective devices, and overall installation practices.
- Make sure that the inverter and battery is completely turned off before commencing installation.

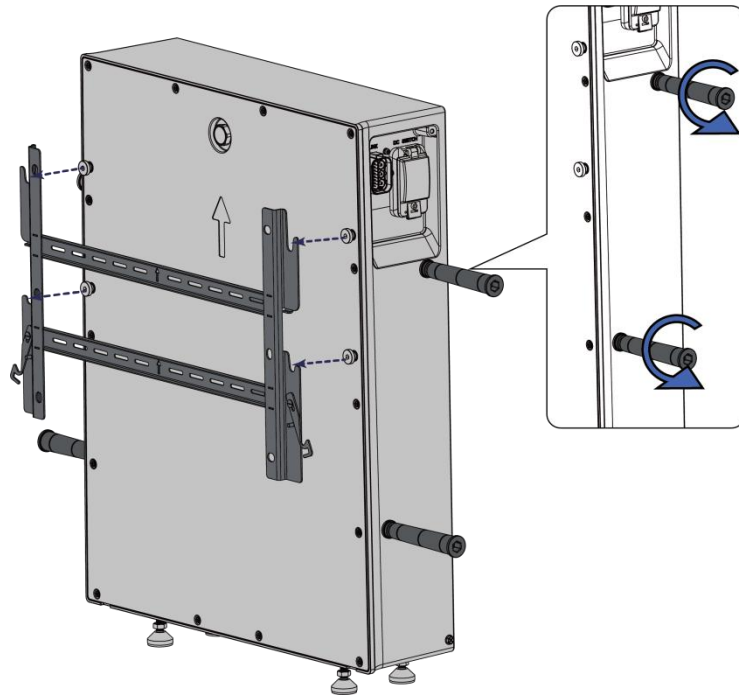
5.4.1 Single Battery

This section demonstrates the single battery installation procedures taking wall mounting installation as an example.

Installation procedures		
Step 1	Confirm the wall mounting position, ensure the Wall Bracket is horizontal, and mark drilling positions with a marker.	
	Warning! There should be minimal dust and dirt at the location. The building should be of solid brick and concrete structure for installation on walls or floors. If other types of walls and floors are used, they must be made of flame-retardant materials and meet the load requirements of battery.	
Step 2	Drill holes at the marked positions. ϕ : 8 mm, depth > 50 mm.	
Step 3	Install expansion screws.	

Step 4

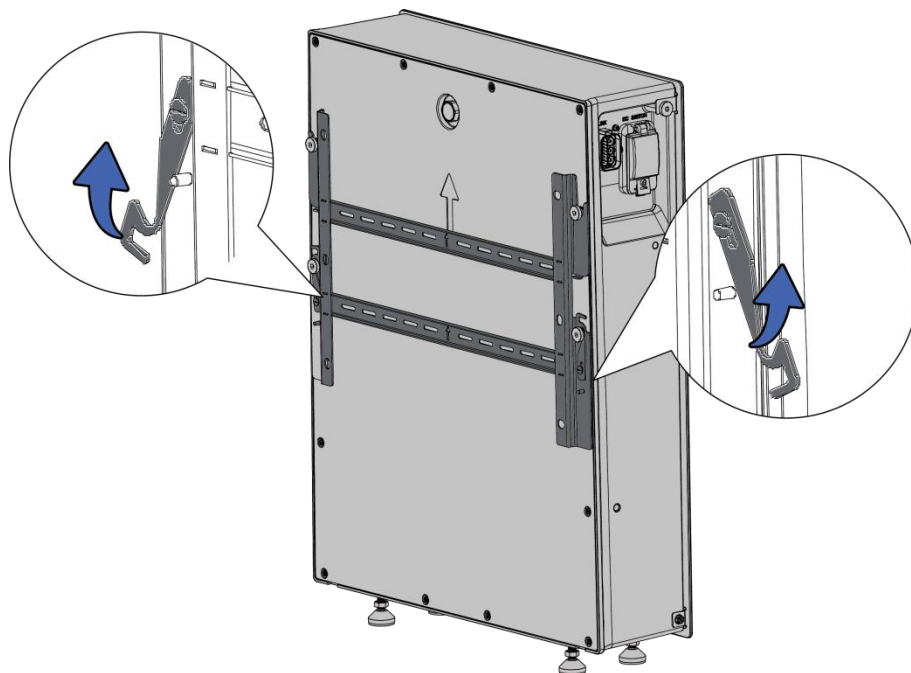
Install the handles (4 pcs in total on both sides) before hanging the battery on the wall. Hang the battery onto the Wall Bracket using the handles, and align with the reserved mounting positions on the rear of the battery.

**Note!**

- Mount the battery onto the bracket using the handles.
- After wall mounting, the footstands can be removed as an optional step.

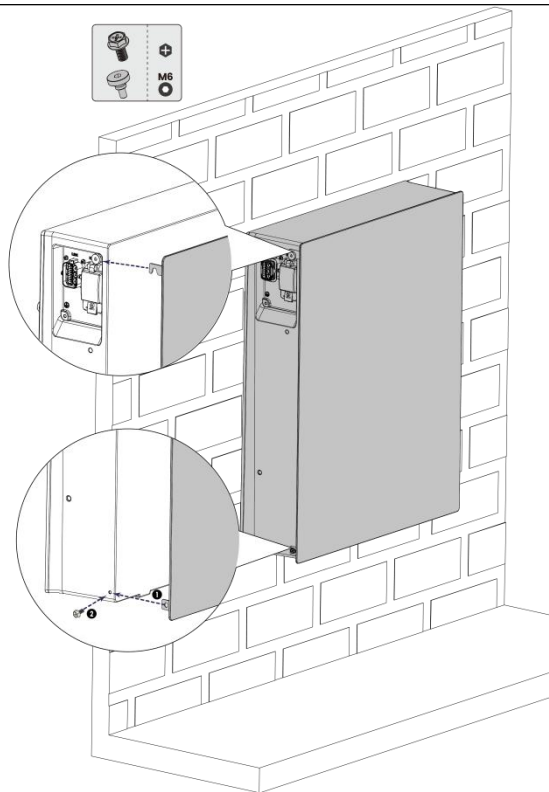
Step 5

After hanging the battery, securely fasten the Wall Bracket in place.



Step 6

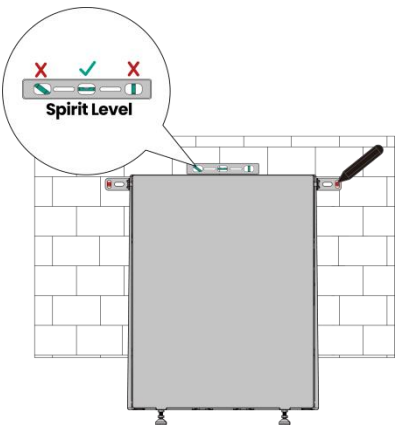
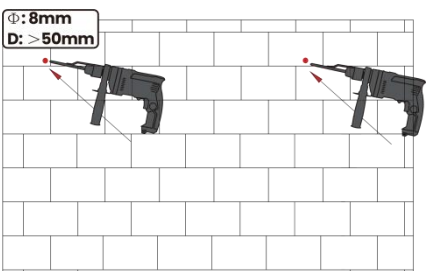
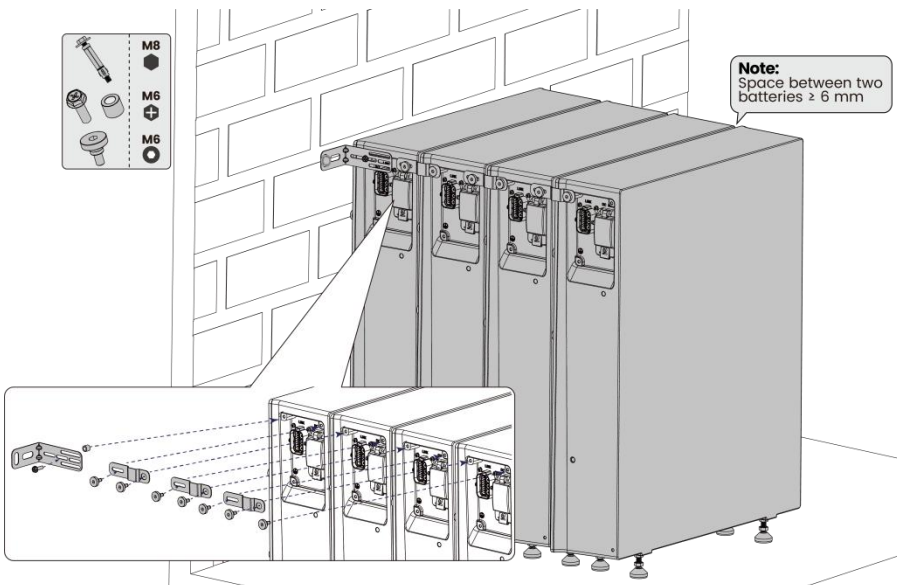
(Optional) Install the battery glass panel.

**Note!**

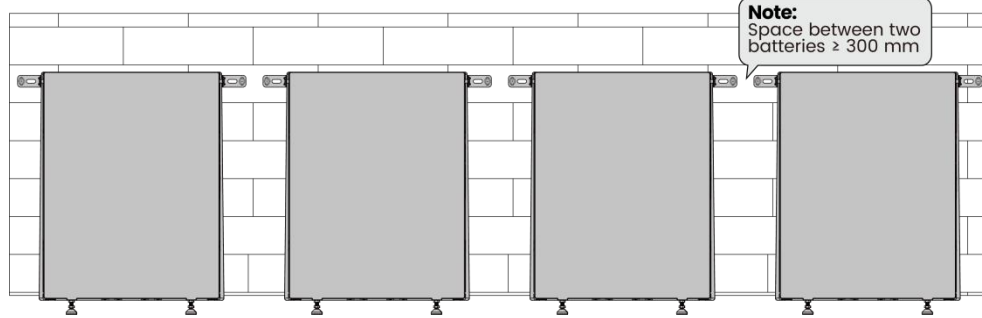
- After mounting the battery on the bracket, ensure the bracket is securely fastened.
- The glass panel (Item S) is optional.

5.4.2 Parallel Batteries

This section demonstrates the parallel batteries installation procedures, taking the front-back stacked layout (standing mounting) as an example.

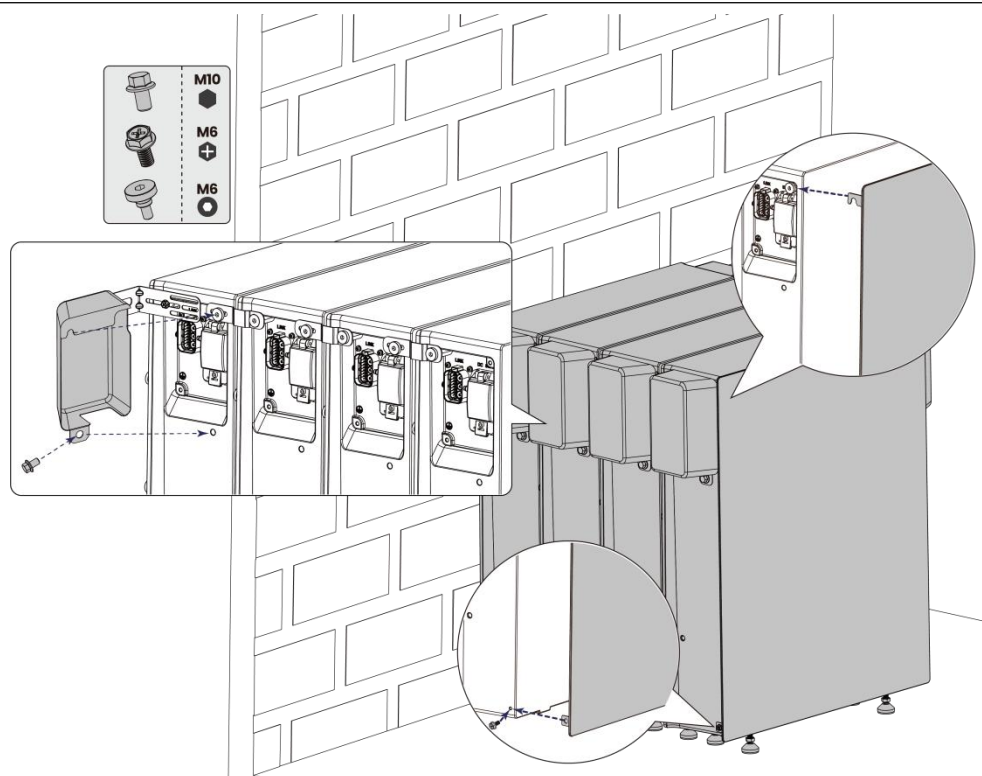
Installation procedures		
Step 1	Confirm the battery installation position, ensure the batteries are level (adjust via footstands), and mark drilling positions using the Fixing Bracket.	
Step 2	Drill holes at the marked positions. ϕ :8 mm, depth > 50 mm.	
Step 3	Secure the battery against the wall, then install the remaining batteries one by one and ensure front-back alignment. The wall-side battery shall be fixed with the Fixing Bracket, and batteries are connected to each other via the Parallel Mounting Bracket.	Front-back stacked layout: 

Side-by-side layout

**Note!**

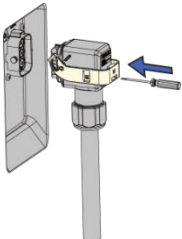
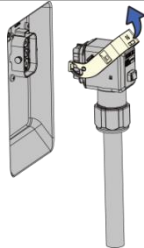
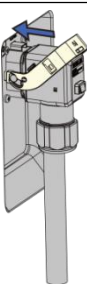
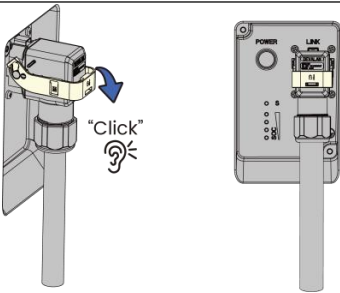
In parallel installation scenarios, batteries can be arranged in front-back stacked or side-by-side layout (as shown in this section) according to the installation environment.

(Optional) Install the cable covers on both sides and the battery glass panel.

Step 4

5.5 Wiring Steps

5.5.1 Connector Installation Procedures

Procedures		
Step 1	Ensure the ground connection is secure before wiring.	
Step 2	Use a flat screwdriver to open the connector latch.	
Step 3	Rotate to open the connector latch.	
Step 4	Align with the LINK port and insert the connector vertically.	
Step 5	Rotate to lock the latch until a "Click" sound is heard.	

Note!

- Left and right LINK ports share same functions.
- Select the appropriate port based on the actual installation positions of the battery and inverter.
- Securely connect grounding cable (Item G) before wiring.

5.5.2 Parallel System Diagrams

⚠ Warning!

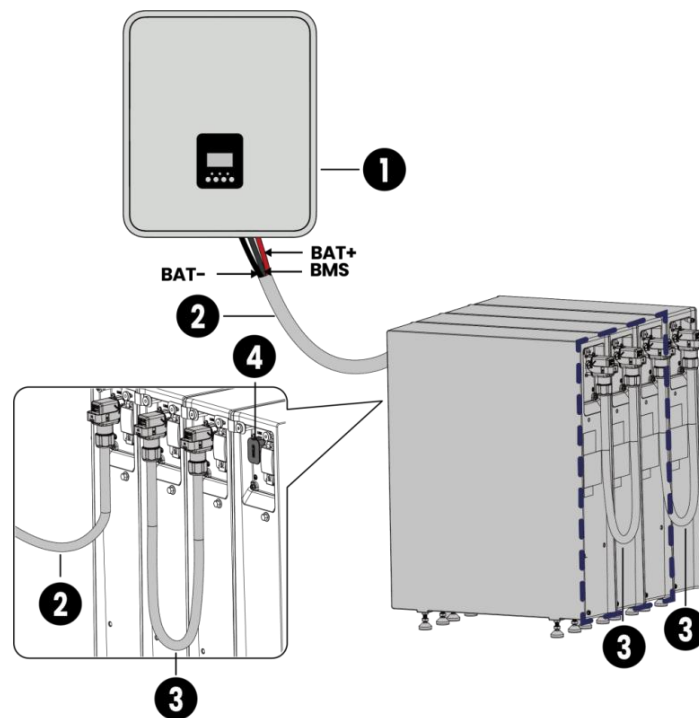
- ET battery max. parallel quantity ≤ 4 (1~4, with inverter).
- ET battery max. parallel quantity ≤ 3 (1~3, with all-in-one unit).
- Please ensure that all the batteries are grounded properly.
- Do not connect the pack to inverter conductors or Photo-Voltaic conductors. This will damage the battery and may result in explosion.
- Do not interchange the positive and negative terminals of the battery.
- Do not connect different battery types together.

⚠ Danger!

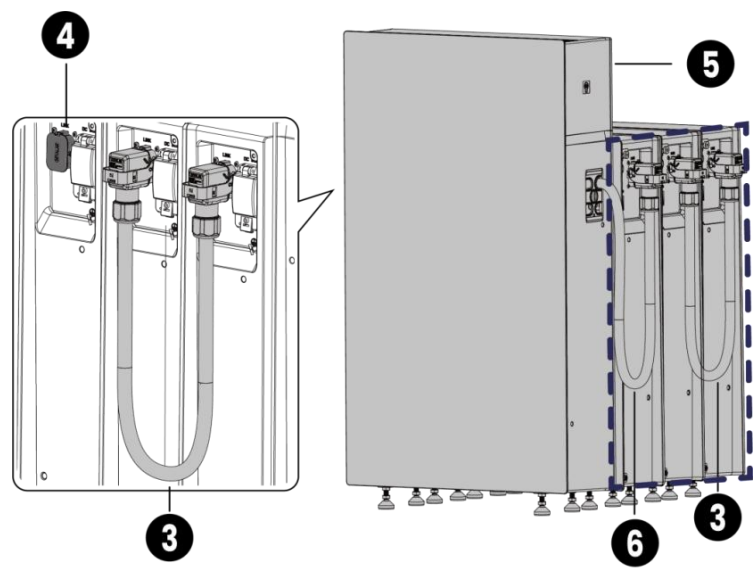
Ensure that there is no short circuit of the terminals or with any external device.

(a) Front-Back Stacked Parallel System Diagrams

- With Inverter:



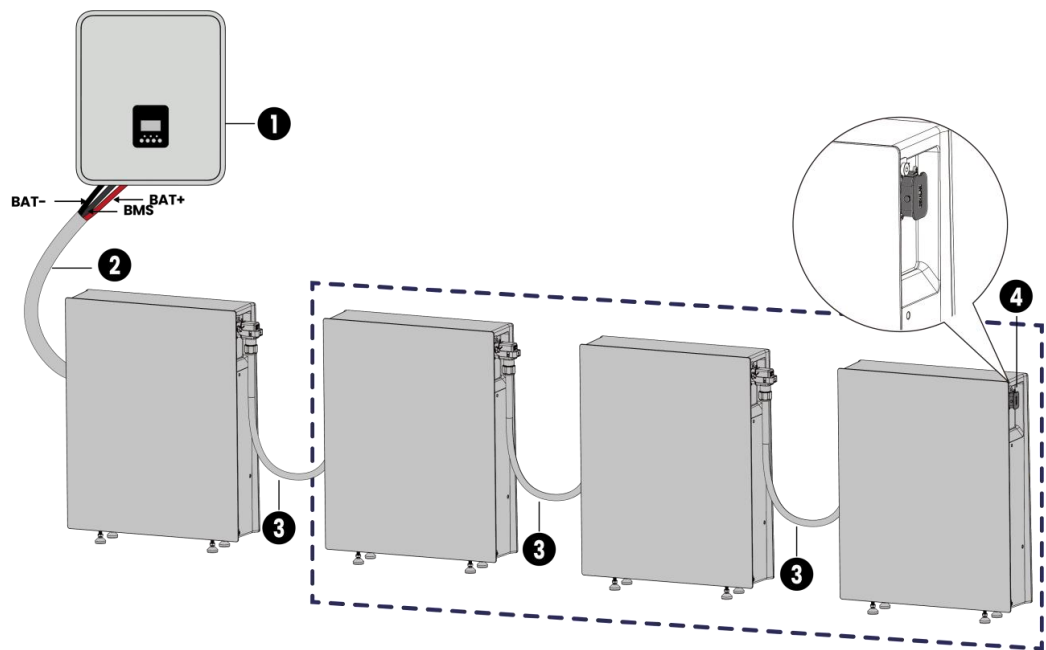
- With All-in-one Unit:

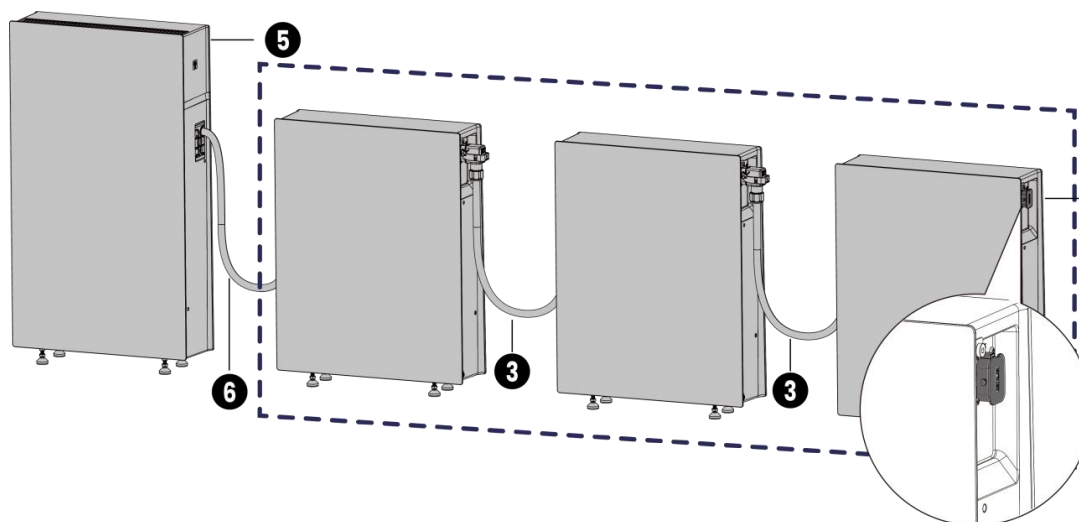


Object	Description	Object	Description
①	Inverter	④	Plug (for the last battery)
②	DC power cable (Item P)	⑤	All-in-one unit
③	DC power cable (Item R)	⑥	DC power cable (Item Q)

(b) Side-by-Side Parallel System Diagrams

- With Inverter:



- With All-in-one Unit:

Object	Description	Object	Description
①	Inverter	④	Plug (for the last battery)
②	DC power cable (Item P)	⑤	All-in-one unit
③	DC power cable (Item R)	⑥	DC power cable (Item Q)

Note!

Batteries in dashed box represent expandable quantity.

6 System Operation

Note!

- When the grid connected system is started, the inverter should be turned on first to avoid the current pulse of the inverter increasing to the battery pack.
- All installation and operation must comply with local electrical standards.
- Check all power cables and communication cables carefully.

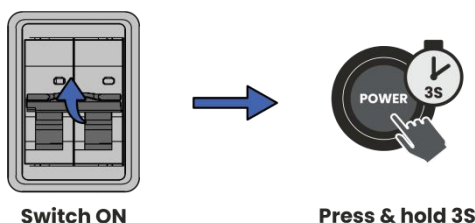
Warning!

- When used with an inverter, the battery system voltage must meet the inverter battery port voltage range.
- Ensure correct battery-inverter connection prior to black start. No wiring modifications during black start.

6.1 Single Battery

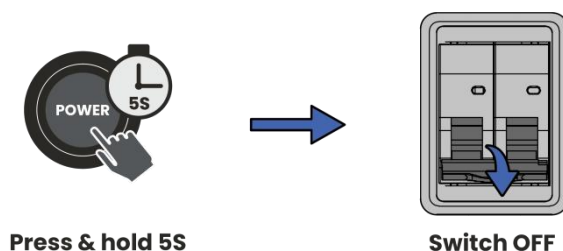
6.1.1 System Start Up

When the inverter or all-in-one unit is connected to the PV and the grid and both are operating normally, turn on the battery DC Switch. Press the POWER Button and hold it for 3 seconds, then release. The Status LED is blinking green and indicates that the system is working normally.



6.1.2 System Shut Down

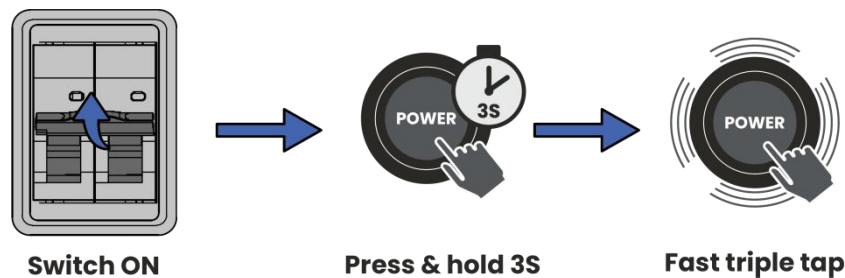
Press and hold the POWER button for at least 5 seconds until all of the battery LEDs (BMS Status LED and SOC LED) begin blinking. Once they start blinking, release the button. The lights will automatically turn off after 5 seconds. Then, turn off the DC Switch.



6.1.3 System Black Start

Under special circumstances when both PV and Grid power are out of order, the battery can be activated through the "Black Start" function. This means that the inverter or all-in-one unit and battery can continue to operate. The startup steps for Black Start are as follows:

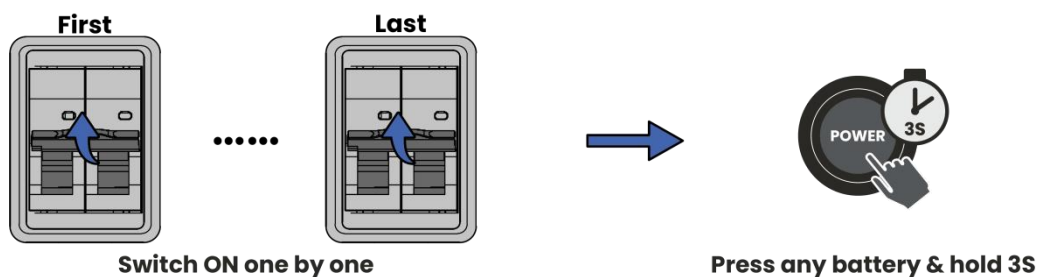
- Turn on the DC Switch, press and hold the POWER button for 3 seconds, then release.
- Press the POWER button three times in succession within 4 seconds (Complete within 30 seconds after the system starts up).
- The Status LED remains solid green, indicating successful activation of Black Start mode.



6.2 Parallel Batteries

6.2.1 System Start Up

When the inverter or all-in-one unit is connected to the PV and the grid and both are operating normally, turn on the battery DC Switches from the first to the last battery. Press any POWER Button and hold it for 3 seconds, then release. The Status LEDs are blinking green and indicate that the system is working normally.



6.2.2 System Shut Down

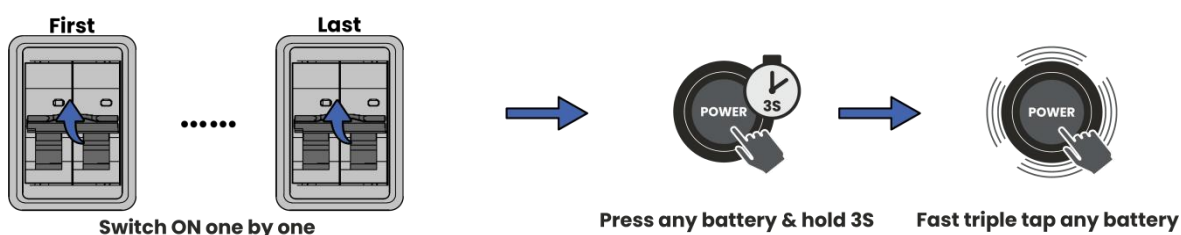
Press and hold any POWER button for at least 5 seconds until all of the battery LEDs (BMS Status LED and SOC LED) begin blinking. Once they start blinking, release the button. The lights will automatically turn off after 5 seconds. Then, turn off the DC Switches from the first to the last battery.



6.2.3 System Black Start

Under special circumstances when both PV and Grid power are out of order, the batteries can be activated through the "Black Start" function. This means that the inverter or All-in-one unit and batteries can continue to operate. The startup steps for Black Start are as follows:

- Turn on the DC Switches from the first to the last battery, press and hold any POWER button for 3 seconds, then release.
- Press any POWER button three times in succession within 4 seconds (Complete within 30 seconds after the system starts up).
- The Status LEDs remain solid green, indicating successful activation of Black Start mode.



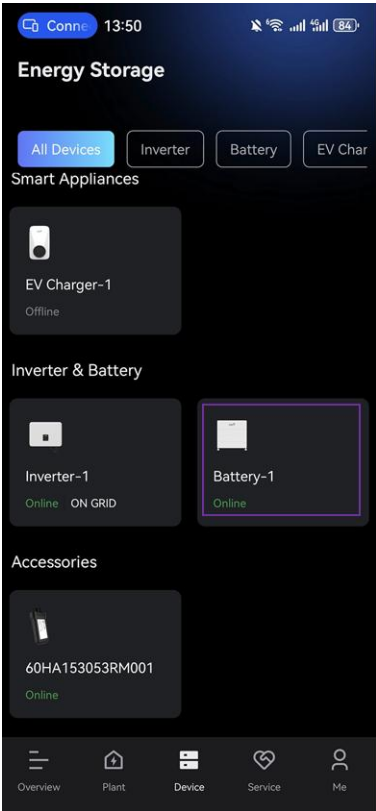
6.3 Monitoring Methods

Once the system has been successfully installed and commissioned, communication between the battery and the inverter is functioning correctly, and the battery can be monitored and controlled by the inverter. End users can view the monitoring page via the FoxCloud APP or the FoxCloud Web platform.

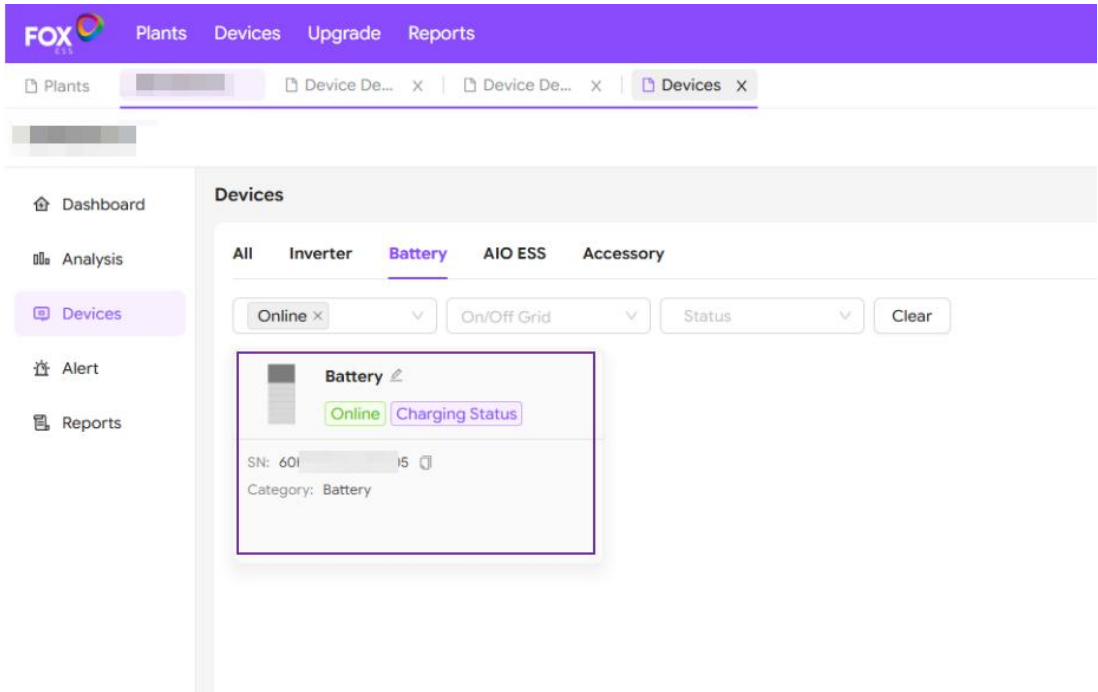
Note!

- Detailed information about the FoxCloud APP, please refer to the 《FoxCloud APP User Manual》.
- Detailed information about the FoxCloud Web platform, please refer to the relevant inverter manual.
- Terminal layout may vary between different inverters; the diagram above is for reference only. The actual wiring should be carried out in accordance with the manual for the specific inverter being used.

FoxCloud APP Interface Example:



FoxCloud Web Platform Interface Example:



Note!

The equipment details shown in the above images above are for reference only.

7 Maintenance Guide

7.1 Routine Maintenance

Note!

- To ensure long-term accuracy of the State of Charge (SOC), it is recommended to perform a full SOC calibration at regular intervals (for example, every two weeks).
- This calibration is completed by charging the battery until the charging power reaches zero, allowing the system to correctly re-align the SOC reference.

⚠ Warning!

- Before performing any cleaning work, disconnect the system from all power sources.
- Clean the housing, cover, and display using a soft, dry cloth only.

To guarantee stable and reliable operation over the system's service life, it is strongly recommended to carry out routine maintenance checks as described in this section.

Check Items	Acceptance Criteria	Maintenance Interval
Battery cleanliness	The battery is free of dust and obstructions, ensuring proper heat dissipation.	Every 6~12 months
Battery visible damage	The product shows no signs of damage or deformation.	Every 6 months
Battery operating status	1. The product operates without abnormal noise. 2. All system parameters are correctly configured. This maintenance should be performed while the product is running.	Every 6 months
Electrical connections	1. All cables are securely connected. 2. Cables are intact; in particular, cable jackets in contact with metallic surfaces show no scratches or damage. 3. Unused cable glands are sealed with rubber plugs and properly secured with pressure caps.	Perform the first inspection 6 months after initial commissioning. Thereafter, every 6~12 months.

7.2 Troubleshooting

When the S LED on the panel is flashing or normally on, it does not mean that the battery is abnormal, it may be just an alarm or protection. Please check the “Fault status indicated by indicator” in Chapter 7 for the detailed faulty definition before any troubleshooting steps. In general, the alarm indication is normal without manual intervention. When the alarm triggering state is removed, the battery will automatically return to normal use.

Problem determination based on the following points :

- Whether the green light on the power switch is on.
- Whether the battery system can be communicated with inverter.
- Whether the battery can be output voltage or not.

Preliminary Determination Steps

Battery system cannot work, When the DC Switch is turned on and the Power Switch is pressed, the LED doesn't light up or flash, please consider contact the local distributor.

- The LED display of BMS is normal, but it cannot charge and discharge. Observe the display screen of inverter and there is no SOC. Please check whether the communication between BMS to inverter is well connected. If the connection is good, please replace communication cable. If the SOC is still not visible on the inverter display screen, please contact the local distributor.
- After the battery system is powered on, if you can see the alarm information on the LED and inverter display screen at the same time, please contact the local distributor.

7.2.1 LED Indicators

There are five LED indicators to show its operating status.

Different symbols indicate different flashing modes, and the explanation is as follows:

Symbol	Status
■	LED flash display (on: 0.5S, off: 0.5S)
/	LED off display
●	LED on display

SOC Status Indicated by Indicators:

SOC	System Status	S	SOC(LED4-1)			
100% > SOC >= 75%	Standby	■	●	●	●	●
75% > SOC >= 50%		■	/	●	●	●
50% > SOC >= 25%		■	/	/	●	●
25% > SOC >= 0%		■	/	/	/	●
=100%	Charge	●	●	●	●	●
100% > SOC >= 75%		●	■	■	■	■
75% > SOC >= 50%		●	/	■	■	■
50% > SOC >= 25%		●	/	/	■	■
25% > SOC >= 0%		●	/	/	/	■
100% > SOC >= 75%	Discharge	●	●	●	●	●
75% > SOC >= 50%		●	/	●	●	●
50% > SOC >= 25%		●	/	/	●	●
25% > SOC >= 0%		●	/	/	/	●

7.2.2 Fault Indicators

Fault	S	SOC(LED4-1)			
Under voltage fault	■	/	/	/	●
Over voltage fault	■	/	/	●	/
Over temperature fault	■	/	/	●	●
Under temperature fault	■	/	●	/	/
Discharge over current	■	/	●	/	●
Charge over current	■	/	●	●	/
Heating switch failed	■	/	●	●	●
Parallel addressing failure	■	●	/	/	/
Pre-Charge failed	■	●	/	/	●
Hardware over current	■	●	/	●	/
AFE communication failed	■	●	/	●	●
Module addressing failed	■	●	●	/	/
Parallel communication failed	■	●	●	/	●
Power parallel failure	■	●	●	●	/
PCS communication failed	■	●	●	●	●
FUSE fault	●	/	/	/	●

Current sampling fault	●	/	/	●	/
Module matching fault	●	/	/	●	●
Internal total voltage sampling failed	●	/	●	/	/
Temperature sampling failed	●	/	●	/	●
Relay adhesion	●	/	●	●	/
Relay not close	●	/	●	●	●
Relay drive failed	●	●	/	/	/
Cell "0V" fault	●	●	/	/	●
Temperature high permanent failed	●	●	/	●	/
The single voltage high permanently failed	●	●	/	●	●
SOH low protection	●	●	●	/	/
AFE failed (UV/OV/UT/OT)	●	●	●	/	●
Charger over voltage	●	●	●	●	/
Other fault	●	●	●	●	●

7.3 FAQ

7.3.1 Expanded Capacity Requirement

If users want to increase their battery system capacity, please ensure that the manufacturer date of the new battery shall not exceed 12 months; in case of exceeding 12 months, please charge the new battery to around 50%.

7.3.2 Storage with Low SOC

After the product is powered off, static power consumption and self-discharge loss may occur in internal modules. Therefore, charge batteries in a timely manner and do not store the product in low SOC. Otherwise, the product may be damaged due to overdischarge, and battery modules need to be replaced.

Storage in low SOC may occur in the following scenarios:

- The DC SWITCH on the power control module is OFF.
- The power cables or signal cables are not connected.
- The batteries cannot be charged due to a system fault after discharge.
- The batteries cannot be charged due to incorrect configurations in the system.
- The batteries cannot be charged due to no PV input and long-term mains failure.
- The Link In and Link Out interface cables are not securely connected. Ensure proper attachment of both connectors during parallel operation.

Regardless of scenarios, the batteries must be charged within the longest interval corresponding to the SOC when the batteries are powered off. If the batteries are not

charged within the specified interval, they may be damaged due to over discharge

Storage Environment Temperature	Power-Off SOC Before Storage	Maximum Charge Interval
0~35°C	$0\% \leq \text{SOC} < 5\%$	7 days

Note!

When the battery SOC decreases to 0%, charge the batteries within 7 days. Permanent battery faults caused by delayed charge due to customer reasons are beyond the warranty scope.

7.3.3 Low-Temperature Battery Reserve

The battery system includes an automatic low-temperature protection feature. It proactively manages the battery to maintain adequate charge, extending standby time when temperatures drop.

7.3.4 How vulnerabilities are disclosed

Vulnerability Report: Please upload a detailed description of the product vulnerability to security@fox-ess.com.

After receiving the vulnerability report, we will analyze it and reply within 7 working days. After confirming the vulnerability, we will provide the vulnerability repair plan within 30 working days. After confirming the solution, we will implement the repair and verification within 30 working days.

8 Product Specification

8.1 ET10 Specifications

Specifications for Battery	
Battery module	ET10
Rated capacity (Ah)	50
Nominal energy (kWh)	10.24
Nominal voltage (V)	204.8
Voltage range (V)	185.6~233.6
Max. charge/discharge current (A)	50/50
Recommended charge current (A)	25
Peak charge/discharge current (60s) (A)	65
Battery pack round-trip efficiency (%)	≥95
Depth of discharge (%)	95
Communication	CAN
Operating charge/discharge temperature (°C)*1	-20~55/-20~55
Storage temperature (°C)	0~35
Humidity (%)	5 ~ 95 (No Condensation)
Altitude (m)	≤4000
Dimensions (W×H×D) (mm)	625*770*160
Weight (kg)	91.2
Standard	IEC 61000-6; IEC62619
Ingress protection	IP66
Protective class	Class I
*1 Charge power is reduced automatically below 0 °C to avoid irreversible cell damage. Performance may be de-rated at operating temperatures above 45 °C. While the product is IP66 rated, avoid sustained solar irradiation leading to excessive cabinet internal temperature.	

8.2 ET10 (w) Specifications

Specifications for Battery	
Battery module	ET10 (w)
Rated capacity (Ah)	50
Nominal energy (kWh)	10.24
Nominal voltage (V)	204.8
Voltage range (V)	185.6~233.6
Max. charge/discharge current (A)	50/50
Recommended charge current (A)	25
Peak charge/discharge current (60s) (A)	65
Battery pack round-trip efficiency (%)	≥95
Depth of discharge (%)	95
Communication	CAN
Operating charge/discharge temperature (°C)*3	-20~55/-20~55*1 -25~55/-25~55*2
Storage temperature (°C)	0~35
Humidity (%)	5 ~ 95 (No Condensation)
Altitude (m)	≤4000
Dimensions (W×H×D) (mm)	625*770*160
Weight (kg)	91.2
Standard	IEC 61000-6; IEC62619
Ingress protection	IP66
Protective class	Class I
*1 warm up function off *2 warm up function on *3 Charge power is reduced automatically below 0 °C to avoid irreversible cell damage. Performance may be de-rated at operating temperatures above 45 °C. While the product is IP66 rated, avoid sustained solar irradiation leading to excessive cabinet internal temperature.	

8.3 ET16 Specifications

Specifications for Battery	
Battery module	ET16
Rated capacity (Ah)	75
Nominal energy (kWh)	15.36
Nominal voltage (V)	204.8
Voltage range (V)	185.6~233.6
Max. charge/discharge current (A)	50/50
Recommended charge current (A)	25
Peak charge/discharge current (60s) (A)	65
Battery pack round-trip efficiency (%)	≥95
Depth of discharge (%)	95
Communication	CAN
Operating charge/discharge temperature (°C)*1	-20~55/-20~55
Storage temperature (°C)	0~35
Humidity (%)	5 ~ 95 (No Condensation)
Altitude (m)	≤4000
Dimensions (W×H×D) (mm)	625*770*218
Weight (kg)	123.7
Standard	IEC 61000-6; IEC62619
Ingress protection	IP66
Protective class	Class I
*1 Charge power is reduced automatically below 0 °C to avoid irreversible cell damage. Performance may be de-rated at operating temperatures above 45 °C. While the product is IP66 rated, avoid sustained solar irradiation leading to excessive cabinet internal temperature.	

8.4 ET16 (w) Specifications

Specifications for Battery	
Battery module	ET16 (w)
Rated capacity (Ah)	75
Nominal energy (kWh)	15.36
Nominal voltage (V)	204.8
Voltage range (V)	185.6~233.6
Max. charge/discharge current (A)	50/50
Recommended charge current (A)	25
Peak charge/discharge current (60s) (A)	65
Battery pack round-trip efficiency (%)	≥95
Depth of discharge (%)	95
Communication	CAN
Operating charge/discharge temperature (°C)*3	-20~55/-20~55*1 -25~55/-25~55*2
Storage temperature (°C)	0~35
Humidity (%)	5 ~ 95 (No Condensation)
Altitude (m)	≤4000
Dimensions (W×H×D) (mm)	625*770*218
Weight (kg)	123.7
Standard	IEC 61000-6; IEC62619
Ingress protection	IP66
Protective class	Class I
*1 warm up function off *2 warm up function on *3 Charge power is reduced automatically below 0 °C to avoid irreversible cell damage. Performance may be de-rated at operating temperatures above 45 °C. While the product is IP66 rated, avoid sustained solar irradiation leading to excessive cabinet internal temperature.	

9Contact Us

If you have any questions about the product, please contact us:

- Fox ESS Headquarters: No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China.
- Wuxi R&D Center: No. 37 Huaqing Avenue, Wuxi Economic Development Zone (Intersection of Huaqing Avenue and Huayun Road)
- Wuhan R&D Center: 6th Floor, Block A, Tower T4, CHINA PROCUREMENT CENTER, No. 789 Gaoxin Avenue, East Lake New Technology Development Zone, Wuhan City, Hubei Province, P.R. China
- Shanghai R&D Center: No.1255, Jinhai Road, Pudong New Area, Shanghai, China
- After-Sales Service Hotline: 400 1888 900
- Contact Telephone (Wenzhou): 0577-88159999
- Contact Telephone (Wuxi): 0510-68092998
- Contact Us: info@fox-ess.com
- Contact Us (EV Charger): ev@fox-ess.com
- After-Sales Service: service@fox-ess.com

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