User Manual

EP12 Plus (w)

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

FOXESS CO., Ltd

Add:

No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China

Tel: 0510- 68092998

Postcode: 325024

WWW.FOX-ESS.COM

Version V1.0.0

Date 2026-05

Content

1 Notes on This Manual

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

EP12 Plus (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!

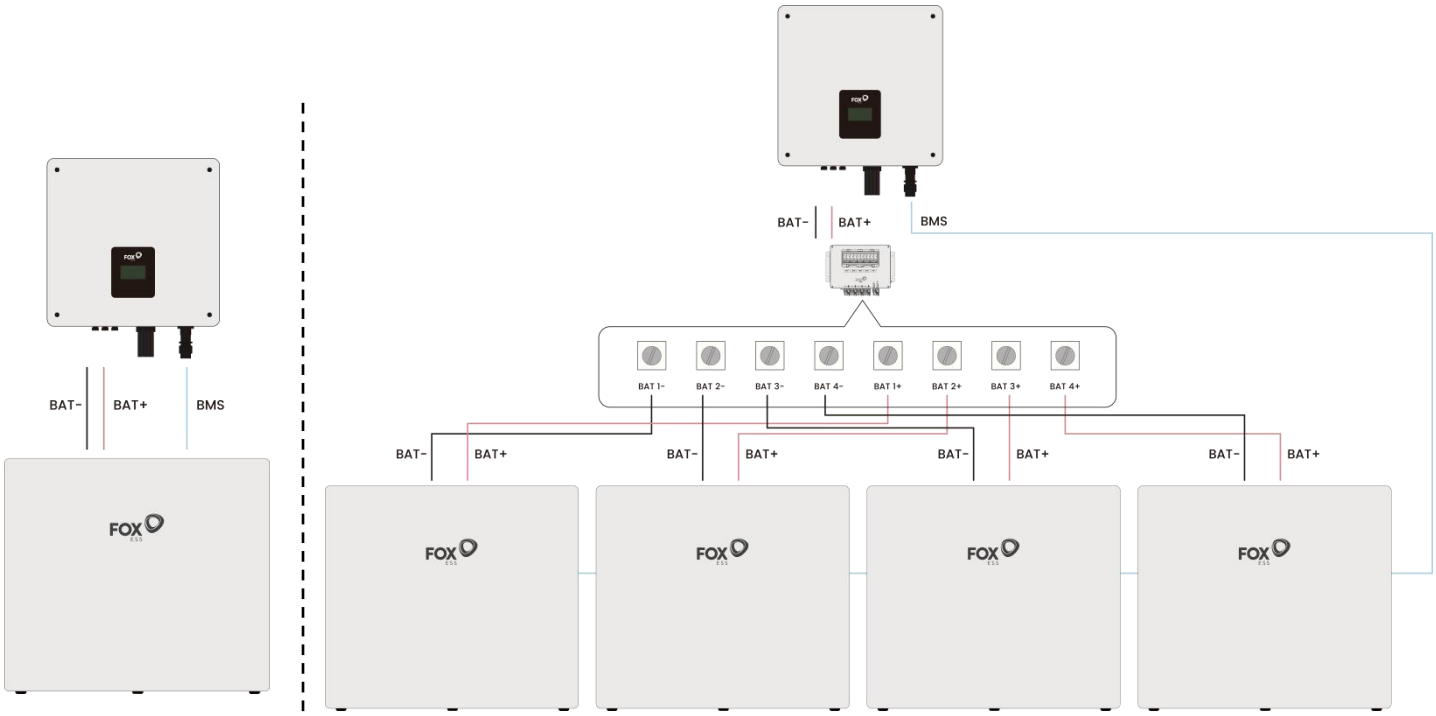
"Note" provides important tips and guidance.

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

EP12 Plus (w) 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.



Stand-alone mode

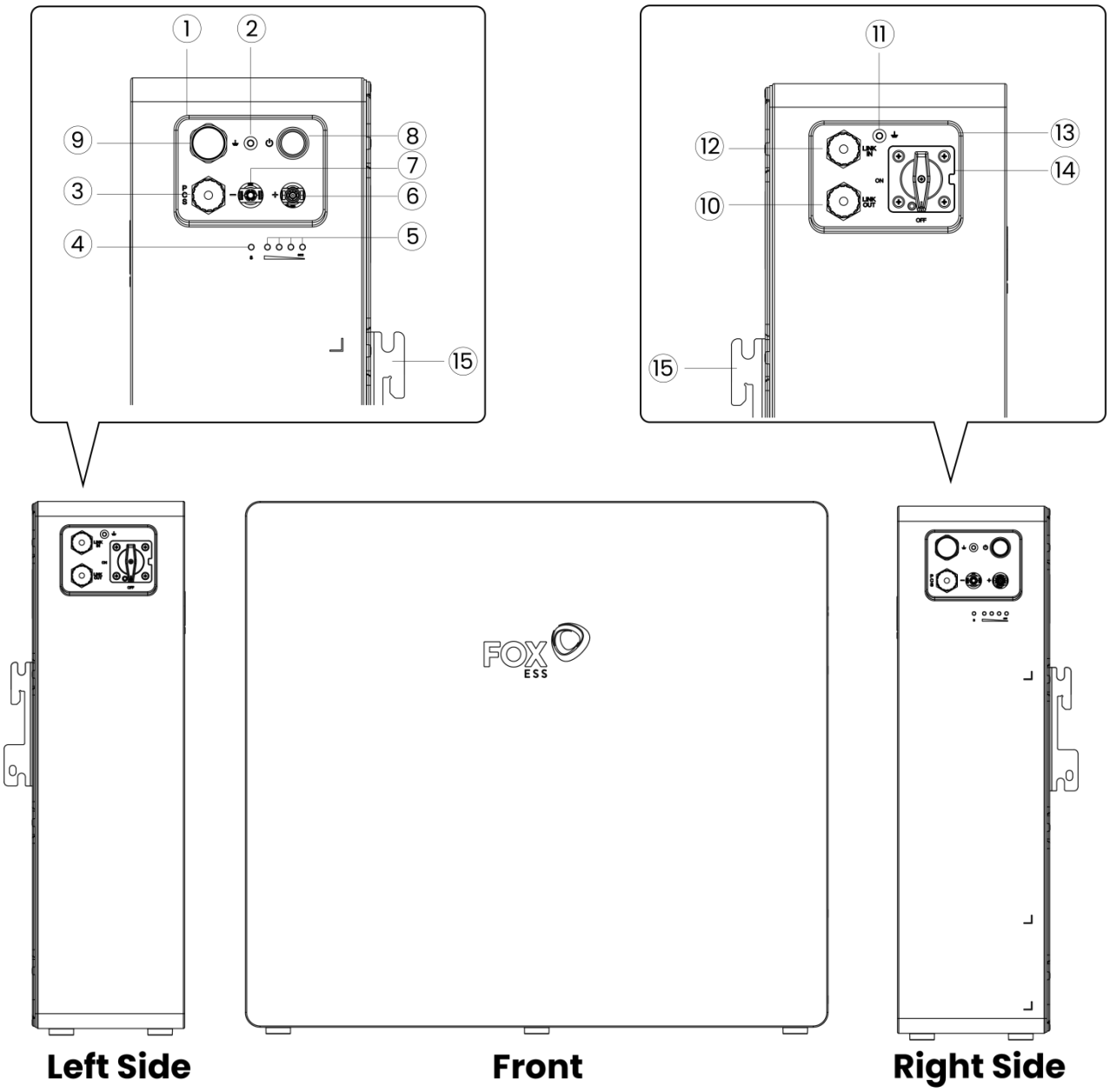
Parallel mode

Note!

The connections shown in the figures are for reference only, the actual configuration will depend on the specific project.

2.1 Battery Interface

Battery interface [EP12 Plus (w)]:

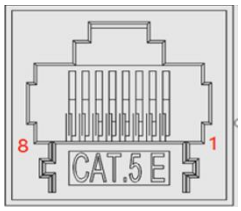


Object	Description	Object	Description	Object	Description
①	Handle	⑥	DC+	⑪	Ground Terminal
②	Ground Terminal	⑦	DC-	⑫	LINK IN
③	PCS COM	⑧	Power Switch	⑬	Handle
④	BMS Status LED	⑨	Valves	⑭	DC Switch
⑤	SOC LED	⑩	LINK OUT	⑮	Battery Bracket

Communication parallel interface (LINK IN, LINK OUT) and communication interface to inverter (CAN)

Network interface description: LINK IN is connected to the upper battery module, LINK OUT is connected to the lower battery module. PCS is the communication interface to the inverter.

The interface is defined as follows:



Pin configuration is as follows:

-LINK IN

PIN	Function definitions	Function declaration
1	Main_SL	Main_SL
2	RACK_CANL	CANL
3	N/A	N/A
4	N/A	N/A
5	RACK_CANH	CANH
6	ISO_GND	GND
7	Sync_WKEOUT	WakeupIn
8	Encode_IN	Encode_IN

-LINK OUT

PIN	Function definitions	Function declaration
1	Last_SL	Last_SL
2	RACK_CANL	CANL
3	N/A	N/A
4	N/A	N/A
5	RACK_CANH	CANH
6	ISO_GND	GND
7	Sync_WKEOUT	WakeupOut
8	Encode_OUT	Encode_OUT

-PCS

PIN	Function definitions	Function declaration
1	PCS_Wake+	Wakeup+
2	PCS_Wake-	Wakeup-
3	N/A	N/A
4	PCS_CANL	CANL

5	PCS_CANH	CANH
6	PCS_CANH	CANH
7	PCS_CANL	CANL
8	N/A	N/A

Ground 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.

Handle

The handle is used to carry or move the battery.

DC Switch

Power switch, battery charge and discharge circuit switch.

DC+

Connect bat + of inverter.

DC -

Connect bat - of inverter.

POWER Switch

System power on switch, press and hold switch for 3 seconds, and then release the switch, the system starts to work. It also has a Black Start function, when the system works repeat the previous step: press the "Power Switch" 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 >= 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℃. It can only charge when the internal temperature of battery is above 0℃.
- 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!

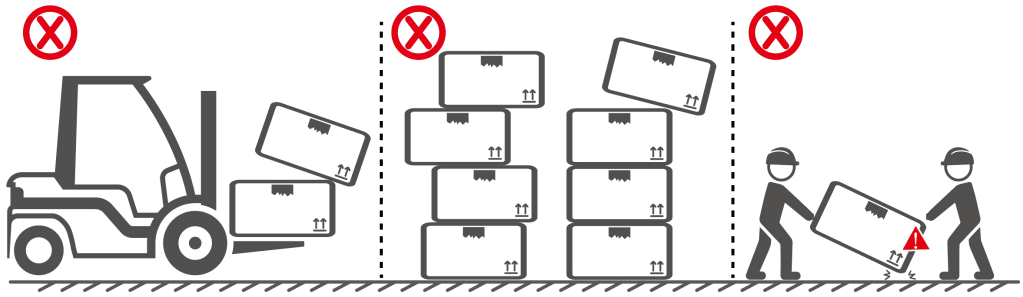
Personnel requirements

- 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.

Warning: Do not use the battery if it has been dropped or appears compromised.



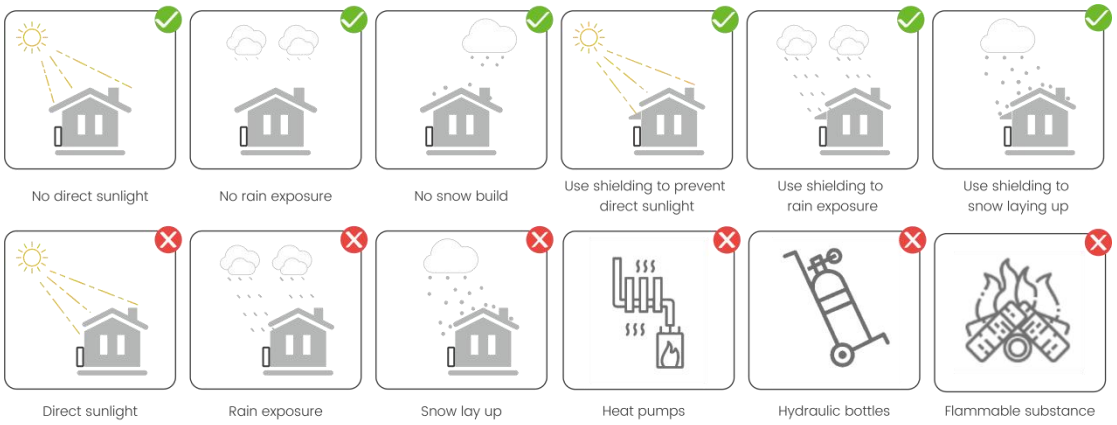
3.3 Installation

- 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%.

3.4 Mounting

Make sure the installation site meets the following conditions:

- Ensure the installation area is protected from direct sunlight, rain, and snow accumulation, a shelter(e.g., rain canopy)is recommended.
- 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.



3.5 Response to Emergency Situations

The batteries comprise 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 CO_2 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

The battery modules are not water resistant. 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℃	/	Not allowed	/
-20~0℃	10%~90%	≤ 1 months	20%≤SOC≤50%
0~35℃	10%~90%	≤ 6 months	20%≤SOC≤50%
35~55℃	10%~90%	≤ 1 months	20%≤SOC≤50%
Above 55℃	/	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.

6mm Magnetic Phillips Screwdriver(A1)

Crimpers(B1)

Safety Shoes(C1)

Safety Gloves(D1)

Safety Glasses(E1)

Rubber Mallet(F1)

Marker(G1)

8mm External Hexagonal Socket(H1)

Cable Ties(I1)

Hammer Drill @φ8mm(J1)

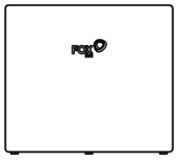
Spirit Level(K1)

Multimeter (Vdc>500)(L1)

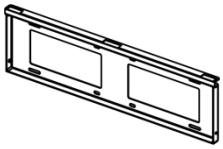
5.2 Items in the package

Note!

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

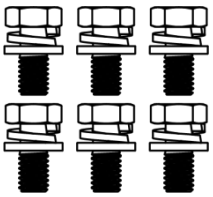


Battery ×1(A2)

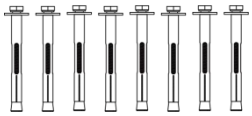


Bracket(wall) ×1(B2)

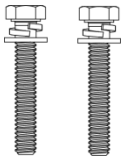
Bracket(battery) ×3(C2)



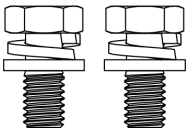
M6×12 Screw ×6(D2)



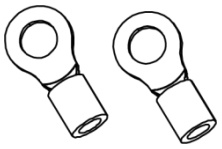
D8 Plastic Expansion Tube×8(E2)



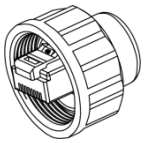
M5×30 Screws×2(F2)



M5×10 Screws×1(G2)

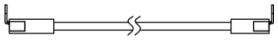


OT Terminal×2(H2)



Parallel Plug×2(I2)

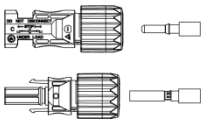
PCS Communication Cable (3m)×1(J2)



Ground Cable(3m)×1(K2)

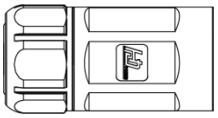
Power Cable(3m)×1(L2)

Power Connector Puller×1(M2)



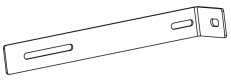
Terminal PV×2(N2)

Quick Installation Guide×1(N2)

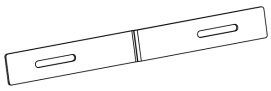


PCS RJ45 Waterproof Connector(P2)

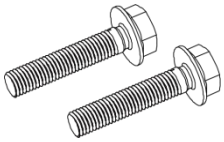
Parallel connection kits:



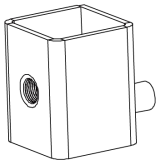
Wall bracket×1(R2)



Parallel extention bracket×1(S2)



Parallel connection screw M6*30 x2 (T2)



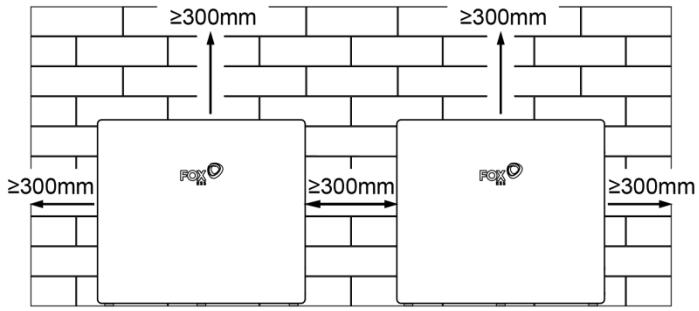
Parallel connection lock x2(U2)

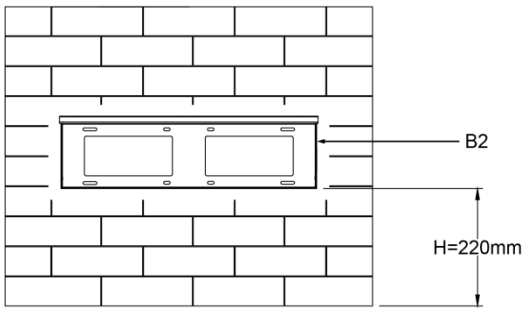
Note!

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

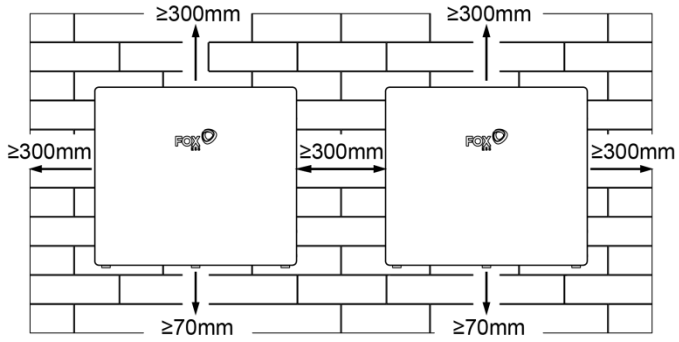
5.3 Clearance

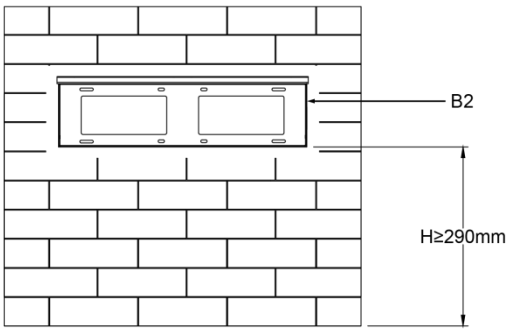
Standing mounting:





Wall mounting:





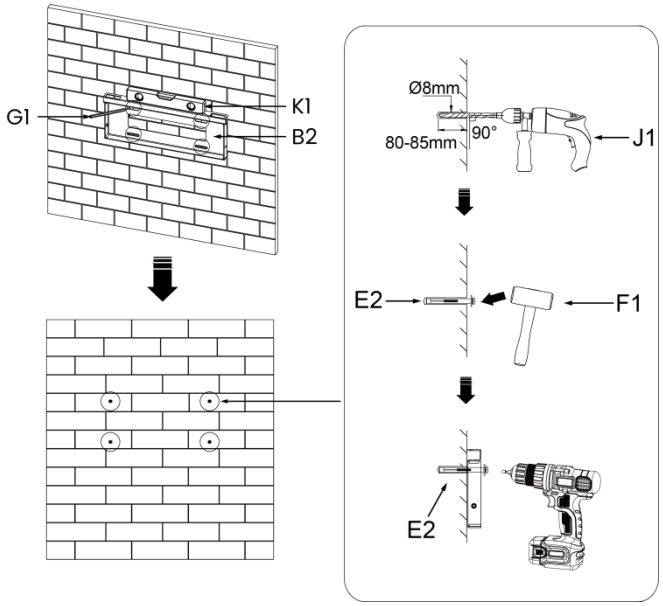
Note!

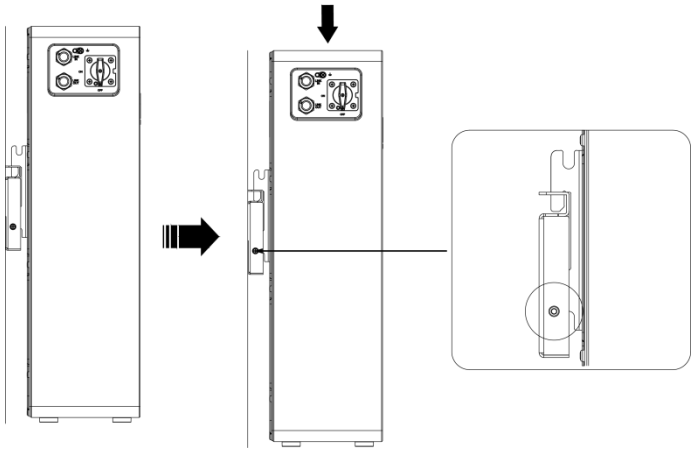
- The battery system can be installed indoors or outdoors.
- Make sure to leave a space of at least 300 mm. A clearance of at least 300 mm must be left around the battery pack for proper cooling.
- The safety clearance for equipment installation must comply with local regulations.
- For indoor installation scenarios, the installation area must be no less than 17 m^2.
- 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!

Make sure that the inverter and battery is completely turned off before commencing installation.

Procedures	
Step 1	The steps for installing the bracket are as follows: **a.** Place the bracket against the wall, adjust the hole position with a Spirit Level (K1) , and mark the positions of the 4 holes. **b.** Remove the bracket, drill the holes with a hammer drill (φ8mm, depth range 45-50mm), and tighten the expansion bolts to ensure that the bracket is securely installed. **c.** Fix the bracket to the wall with ST6×40 screws (E2) , ensuring that the bracket is installed in a horizontal position.
	 **⚠ 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	The steps for installing the battery on the wall are as follows: **a.** Align the buckle of the battery bracket with the holes of mounting bracket on the wall, then place the battery from top to bottom. **b.** Observe the left and right sides of the bracket to ensure that the holes of the battery bracket and mounting bracket on the wall are aligned.

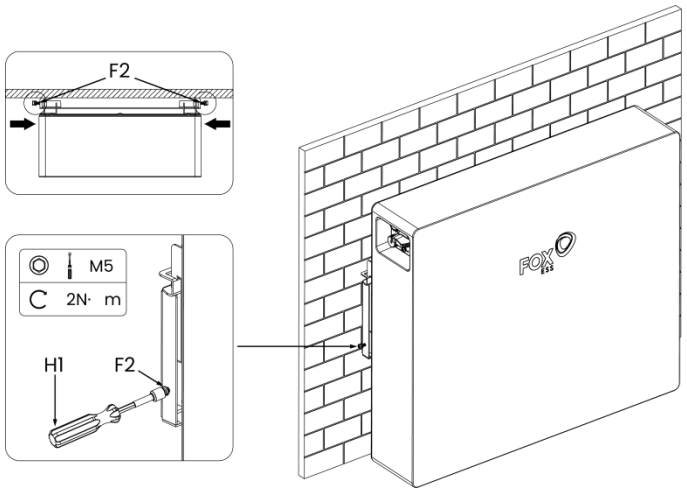


Note!

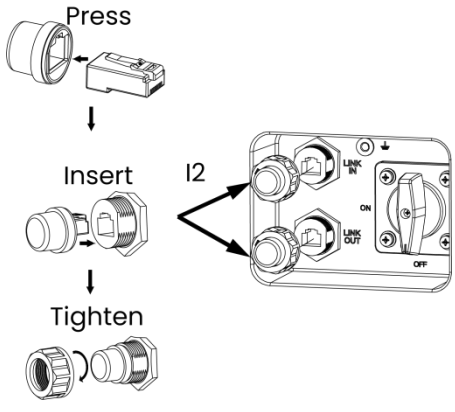
Do not install the battery in a forward tilt, backward tilt, lateral tilt, horizontal position, or upside- down position.

Step 3

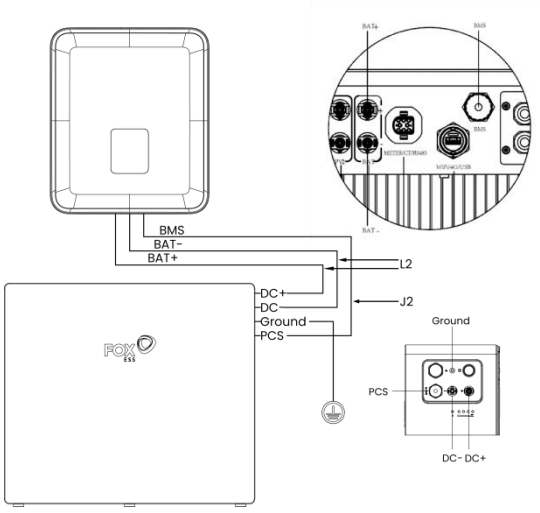
Insert 2 pcs of M5×30 screws (F2) into the holes on the left and right sides of the mounting bracket then tighten the screws.



Stand-alone Mode:

Procedures	
Step 1	Insert the 2 Parallel Plugs (I2) into the LINK IN and LINK OUT ports respectively.
	

Step 2	Connect the inverter cables:



⚠ Warning!

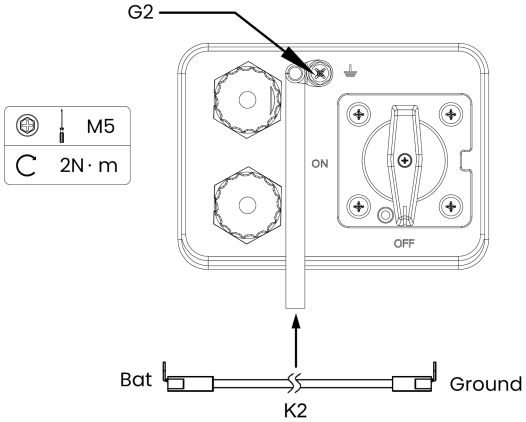
Power Cable (L2) must be pulled straight from the battery DC+/- for more than 80mm before bending.

Make sure that the power cable connected to the inverter is connected vertically and that the vertical length is greater than 30 cm. If the cable is bent close to the terminals, it may cause poor line contact and result in burnt terminals.

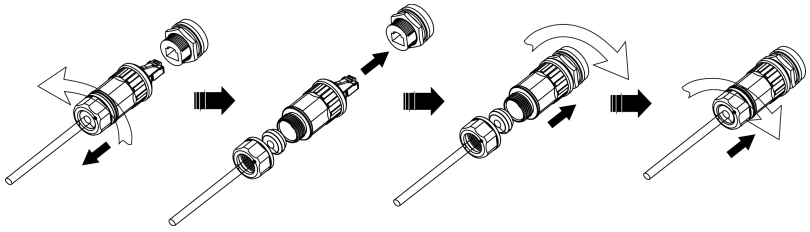
⚠ Warning!

Please ensure that all the batteries are grounded properly.

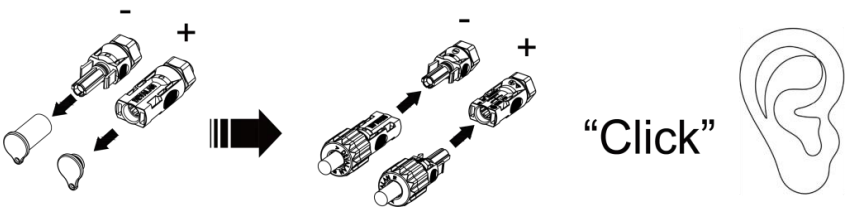
a. Use screw (G2) to connect ground cable (K2) to the ground point.



b. Connect the PCS Communication Cable (J2) to the BMS port on the inverter.



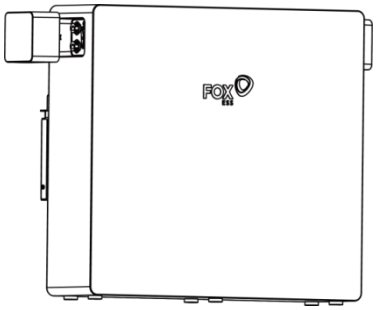
c. Use power cable(L2) to connect the battery's DC+ and DC- terminals to the inverter's BAT+ and BAT- terminals.



⚠ Warning!

- 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.

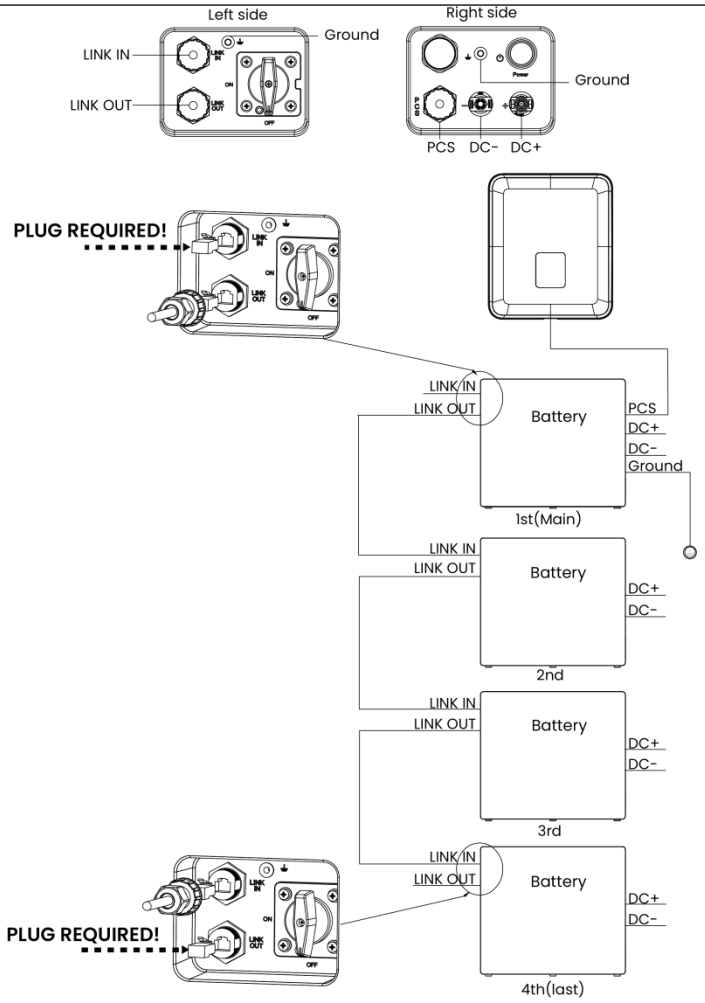
(Optional) Install the cable covers. Install the cable covers on the battery sides after wiring. Their magnetic base allows for direct attachment and a secure fit.



Parallel Mode:

⚠ Warning!

Do not connect different battery types together.

Procedures	
Step 1	Connect the parallel communication cables: 

The steps for parallel connection of batteries is as follows:

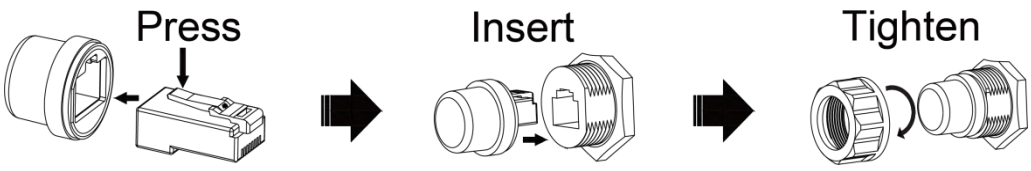
a. Insert the Parallel Plug (I2) into the LINK IN port, this battery is defined as the Main battery (whichever battery can be set as the Main).

b. Connect the Ground Cable (K2) from the ground terminal of the Main battery (left side of the battery) to the ground terminal of the next battery (right side of the battery), and continue the same connection until the ground terminal of the last battery (left side of the battery).

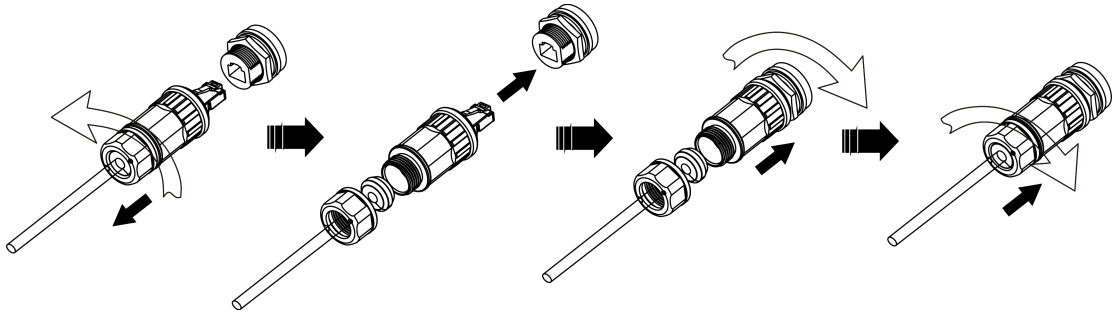
c. Use the PCS Communication Cable(J2) to cross-connect the LINK OUT of the previous battery with the LINK IN of the next battery. Start from the LINK OUT of the Main and continue until reaching the LINK IN port of the last battery.

d. Insert the Parallel Plug (I2) into the LINK OUT port of the last connected battery.

Note 1: The steps of inserting the Parallel Plug (I2) are as follows:

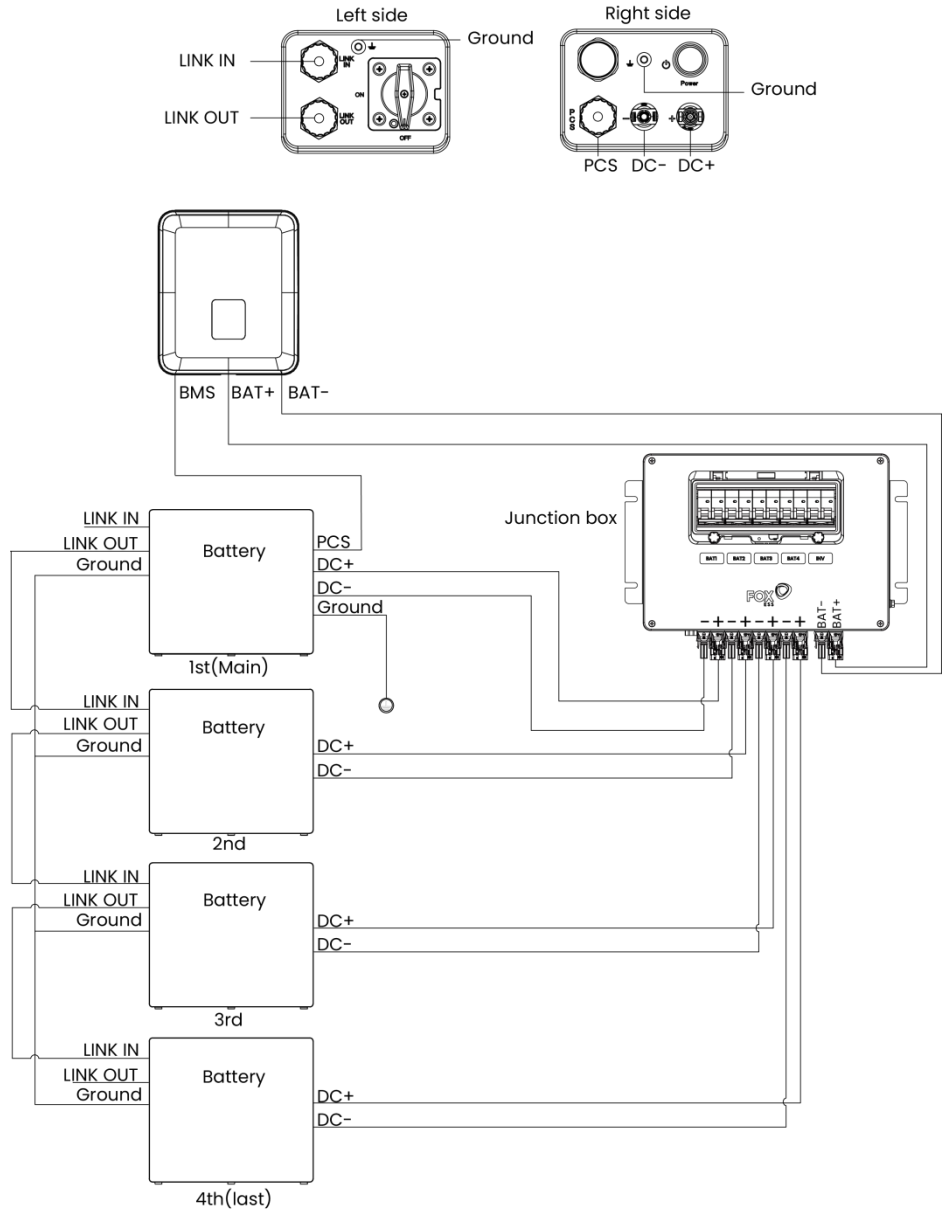


Note 2: The steps of installing the parallel communication wire are as follows:



⚠ Danger!

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

Procedures	
Step 2	Connect the power cables: 

Note!

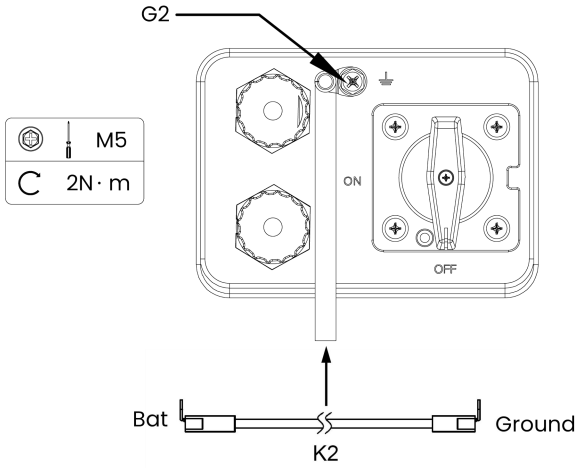
Keep a distance of 300-600mm from the battery to the junction box. Power Cable (L2) must be pulled straight from the battery DC+/- for more than 80mm before bending.

Make sure that the power cable connected to the inverter is connected vertically and that the vertical length is greater than 30 cm. If the cable is bent close to the terminals, it may cause poor line contact and result in burnt terminals.

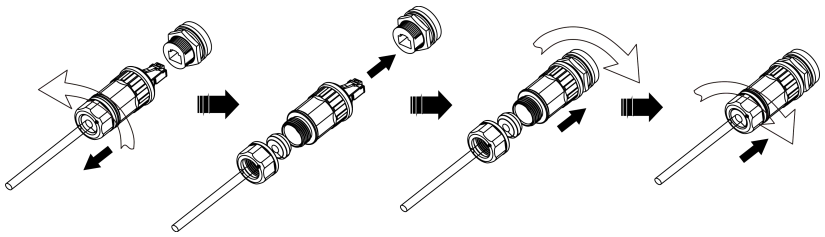
⚠ Warning!

Please ensure that all the batteries are grounded properly.

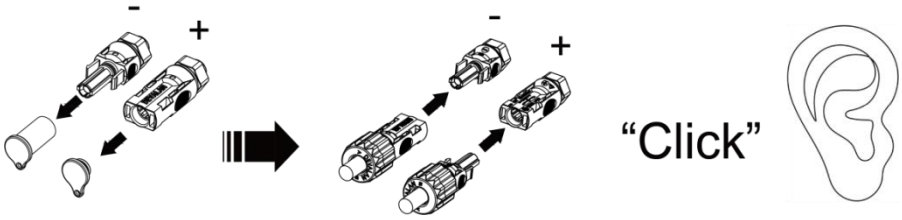
a. Use screw (G2) to connect ground cable (K2) to the ground point.

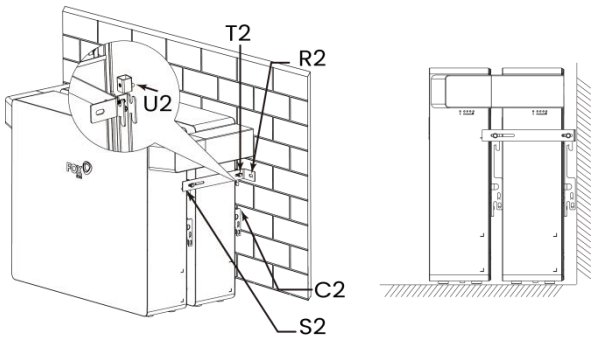
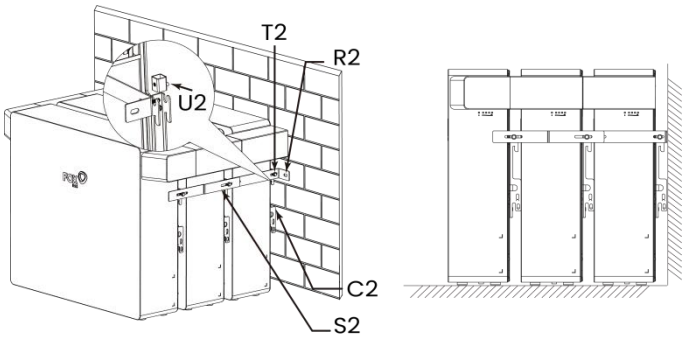
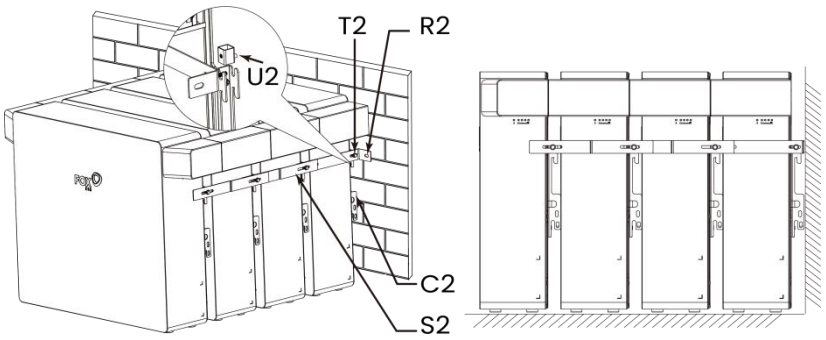


b. Connect the PCS Communication Cable (J2) of the Main battery to the BMS communication port of the inverter.



c. Connect the Power Cable (L2) of each battery to the junction box (need to purchase separately). Connect the output power cable of the junction box to the battery port of the inverter.



Procedures	
Step 3	The following parallel connection scenarios involve 2, 3, and 4 batteries, respectively. The actual configuration will depend on the specific project.
	
	
	
	Note: Parallel connection scenario requires the kits to fasten the connection between the front and back batteries. The battery bracket (C2) provides a heat dissipation channel between the front and back batteries, please ensure it is installed correctly. Please refer to the parallel connection instruction for exact installation for a secure connection. Additional magnetic side covers can be order separately.

6 System Operation

- 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.

6.1 System Start Up

When the inverter is connected to the PV and the grid and both are operating normally, turn on the battery DC Switch.

Press the POWER Switch and hold it for 3 seconds, then release. The Status LED of each battery is blinking green and indicates that the system is working normally.

6.2 System Shut Down

Press and hold the POWER Switch 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 switch. The lights will automatically turn off after 5 seconds. Then, turn off the DC Switch.

6.3 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 our energy storage inverter 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 Switch" button three times in succession within 4 seconds (Complete within 30 seconds after the battery system starts up).
- At least one battery's Status LED remains solid green, indicating successful activation of Black Start mode.

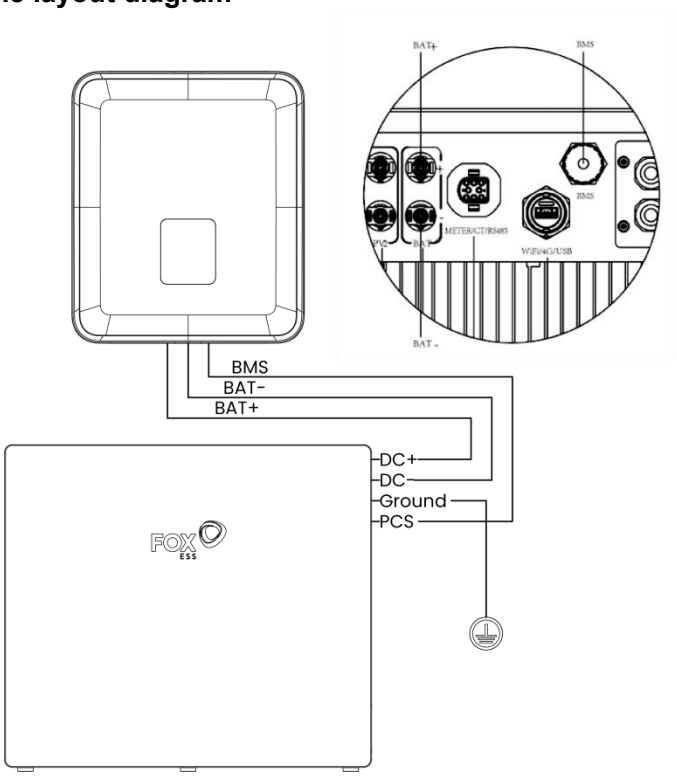
⚠ Warning!

Ensure correct battery-inverter connection prior to black start. No wiring modifications during black start.

6.4 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.

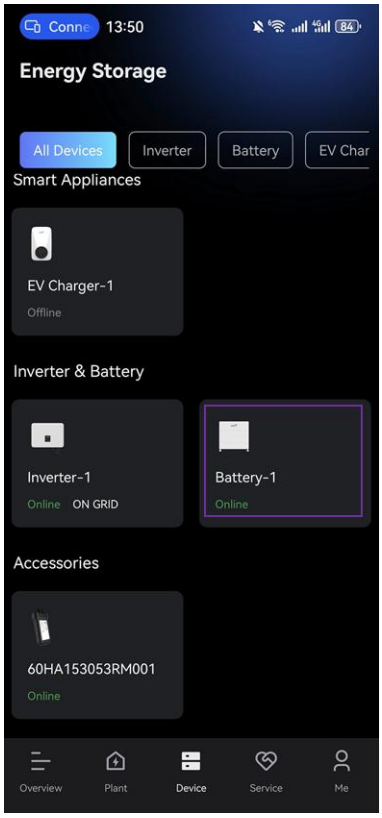
Battery system cable layout diagram



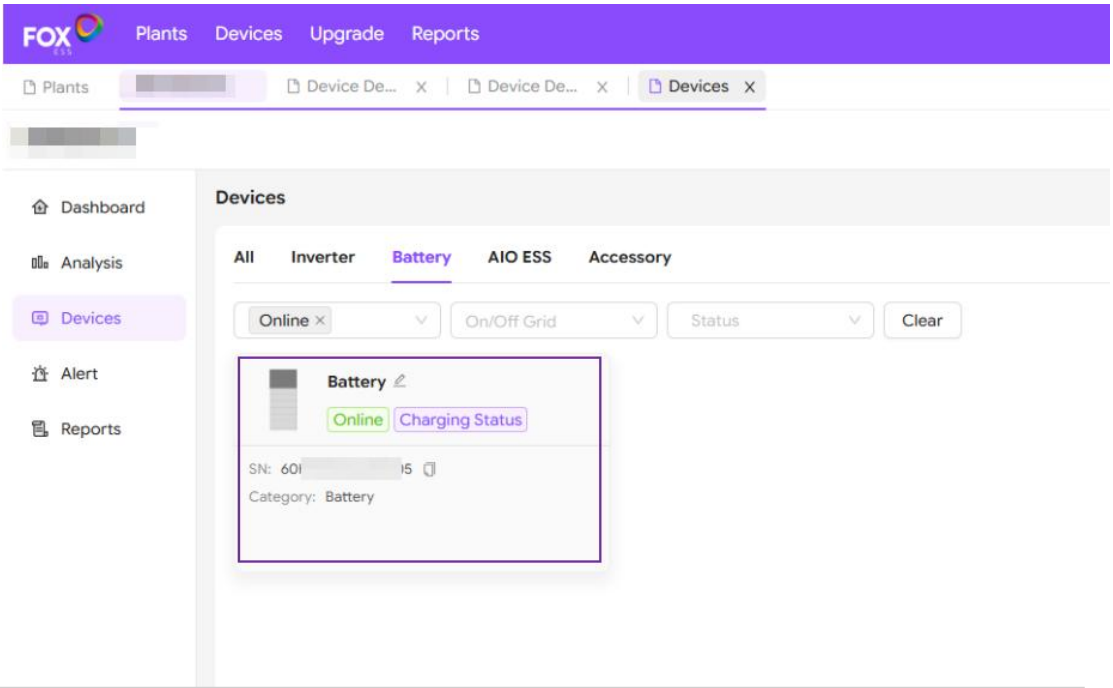
Note!

- 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 indicator:

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	■	●	/	/	●
Short circuit Protection	■	●	/	●	/
AFE communication failed	■	●	/	●	●
Module addressing failed	■	●	●	/	/
Internal Communication failed	■	●	●	/	●
Power parallel failure	■	●	●	●	/
PCS Communication failed	■	●	●	●	●
HVB 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 overvoltage	●	●	●	●	/
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 overdischarge.

Storage environment temperature	Power-Off SOC Before Storage	Maximum Charge Interval
0~35℃	0% ≤ 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.

8 Product Specification

8.1 EP12 Plus (w) Specifications

Specifications for Battery	
Battery module	EP12 Plus (w)
Rated capacity (Ah)	30
Nominal voltage (Vdc)	384.0
Nominal energy (kWh)	11.52
Battery voltage range (Vdc)	348.0~438.0
Max. continuous discharging/charge current (A)	30/30
Short circuit current (kA)	3.0
Recommended charging current (CC-CV) (A)	15
Charging cut off current(constant current and constant voltage) (A)	2
Peak charging current (5s) (A)	36
Peak discharging current (30s) (A)	65
Depth of discharge(%)	100
Storage temperature (°C)	0~35
Operating charge/discharge temperature (°C)	0~55/-10~55*1 -25~55/-25~55*2
Ingress protection	IP65
Communication	CAN
Altitude (m)	≤3000
Weight (kg)	98*±2
Dimensions (W×H×D) (mm)	710×640×185
Protective class	Class I
Standard	IEC 62477-1;IEC 62619
*1 warm up function off *2 warm up function on	

9 Contact 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

10-500-10548-00