# User Manual

# CQ6 Series

CQ6

In order to prevent improper operation before use, please carefully read this manual.

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# 1. Introduction

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

CQ6 series

Note: CQ6 = CQ6-M + CQ6-S

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.

# 2. Symbols

| | |
|---|---|
| CE | Symbol Explanation CE mark. The inverter complies with the requirements of the applicable CE guidelines. |
| UKCA | This mark indicates compound UK product safety certification requirements. |
|  | Caution, risk of electric shock. |
|  | 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 instruction manual before starting installation and operation. |
|  | 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(＜ 1 minute). |

# 3. 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.

### 3.1 Handling

- Do not expose battery to open flame.
- Store in a cool and dry place with ample ventilation.
- Do not store the product near water sources.
- Store the product on a flat surface.
- Recommend to 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.

### 3.2 Installation

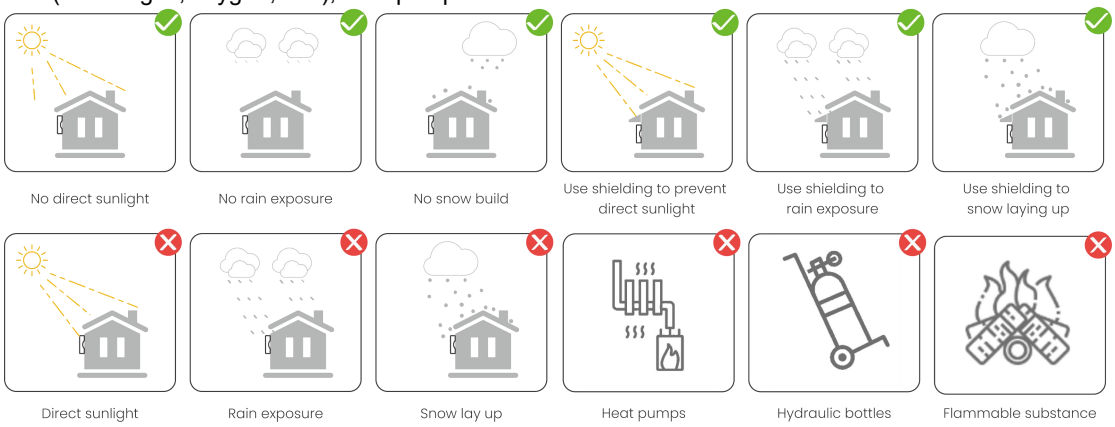
- Do not connect the battery directly to inverter conductors or PV conductors. This will damage the battery and may result in explosion.
- After unpacking, please check the product for damages and missing parts.
- Make sure that the inverter and battery is completely turned off before commencing installation.
- Do not interchange the positive and negative terminals of the battery.
- Ensure that there is no short circuit of the terminals or with any external device.
- Do not exceed the battery voltage rating of the inverter.
- Do not connect the battery to any incompatible inverter.
- Do not connect different battery types together.
- Please ensure that all the batteries are grounded properly.
- 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.
- Please refrain from installing the battery near any water source to prevent accidental submersion.

- Recommend to install the battery away from children or pets.
- 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 on installation site that the deviation of voltages between new batteries and every single present battery is less than 0.5V.
- Recommend to check the new batteries mounted on-site comply to the warranty scope or have ever been re-charged within 5 months; on top of that, please make sure the SOC of present battery system onsite is 50%±5%.

### 3.3 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.



# 4. 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.

**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.

# 5. Fire Protection Function

Despite the extremely stable chemical properties of lithium iron phosphate batteries and the multiple protections, each battery unit is equipped with a fire protection module to further ensure the safety and reliability of Fox ESS batteries. This innovative module utilizes a new type of aerosol fire extinguishing device with features such as pressure-free storage, no maintenance required, high extinguishing efficiency, non-toxic and harmless characteristics.

### 5.1 Fire Extinguishing Mechanism

The fire extinguishing mechanisms of common agents mainly include isolation, smothering, cooling, and chemical suppression, with different agents exhibiting varying mechanisms. The fire extinguishing mechanism of thermal aerosols involves two main mechanisms: the cooling effect from endothermic decomposition and the chemical suppression effects in both gas and solid phases, which work synergistically. Additionally, the gaseous components in the products of the aerosol extinguishing agent also play a supportive role.

**Cooling Fire Extinguishing Effect from Endothermic Decomposition**

The cooling effect of thermal aerosol extinguishing agents is primarily due to the endothermic decomposition of metal oxides and carbonates. When a fire occurs, the solid particles in the aerosol rapidly absorb heat from the fire source, resulting in a decrease in flame temperature. This reduction minimizes the heat radiating to the burning surface and lowers the energy required to dissociate vaporized combustible materials into free radicals. As a result, the combustion reaction is effectively suppressed.

**Gas Phase Chemical Suppression Effect**

Under thermal conditions, vaporized metal ions, such as strontium (Sr), potassium (K), and magnesium (Mg), exist as vapors and participate in multiple chain reactions with active combustion radicals, including hydrogen (H•), hydroxyl (•OH), and oxygen (O•). For example:

$Sr+2•OH \rightarrow Sr(OH)_2$

$Sr+O• \rightarrow SrO$

$Sr(OH)_2+2H• \rightarrow Sr+2H_2O$

Through continuous action, this process consumes active combustion groups, significantly reducing their concentration and effectively suppressing combustion.

**Solid Phase Chemical Suppression Effect**

The solid particles in thermal aerosol extinguishing agents can adsorb intermediates such as •OH, H•, and O• from chain reactions, catalyzing their recombination into stable molecules. This interrupts the essential branching chain reactions in the combustion process. For example:

$K_2O(s)+2H(g) \rightarrow 2KOH(s)$ $KOH(s)+OH(g) \rightarrow KO(s)+H_2O(g)$

$K_2O(s)+O(g) \rightarrow 2KO(s)$ $KO(s)+H(g) \rightarrow KOH$

### 5.2 Technical Specifications

Activation method: Thermal activation

Thermal activation temperature: ≥ 170°C

Discharge time: ≤ 5 seconds

**Notes:**

Please contact Fox ESS for immediate replacement if the fire protection module is activated.

Non-professionals should not disassemble the battery without authorization.

Do not touch the device until the casing has cooled after the internal fire extinguisher has been activated, to prevent burns.

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

# 6. Product Information

1. CQ6-S is the battery module, and CQ6-M includes system controller and battery module;
2. CQ6-M contains the controller of the entire system, so each system must have one CQ6-M;
3. Ensure that each system has only 1 CQ6-M and a maximum of 13 CQ6-S.

### 6.1 CQ6-S Specifications

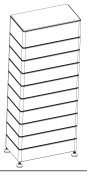
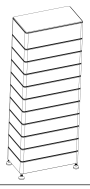
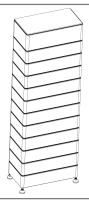
| Specifications for CQ6-S | |
|---|---|
| Model No. | CQ6-S |
| Max. charge/discharge current (A) | 50 |
| Operating charge/discharge temperature (°C) | 0~55/-10~55 |
| Storage temperature (°C) | -10~50 |
| Humidity (%) | 5~95 (No Condensing) |
| Nominal voltage (V) | 57.6 |
| Nominal capacity (Ah) | 104 |
| Nominal energy (kWh) | 5.99 |
| Battery voltage range (V) | 52.2~65.7 |
| Recommend charge/discharge current (A) | 50 |
| Short circuit current (kA) | 2.9 |
| Constant current and voltage charging cut-off current (A) | 2 |
| Battery pack round-trip efficiency(%) | 95 |
| Depth of discharge(%) | 100 |
| Peak discharge current (60s) (A) | 65 |
| Altitude (m) | ≤2000 |
| Dimensions (L*W*H) (mm) | 660*360*190 |
| Tolerance (L*W*H) (mm) | ±3/±3/±3 |
| Weight (kg ±5%) | 48.8 |
| Communication interfaces | CAN |

### 6.2 CQ6-M Specifications

| Specifications for CQ6-M | |
|---|---|
| Model No. | CQ6-M |
| Max. charge/discharge current (A) | 50 |
| Operating charge/discharge temperature (°C) | 0~55/-10~55 |
| Storage temperature (°C) | -10~50 |
| Humidity (%) | 5~95 (No Condensing) |
| Nominal voltage (V) | 57.6 |
| Nominal capacity (Ah) | 104 |
| Nominal energy (kWh) | 5.99 |
| Operating voltage (V) | 52.2~65.7 |
| Recommend charge/discharge current (A) | 50 |
| Short circuit current (kA) | 2.9 |
| Constant current and voltage charging cut-off current (A) | 2 |
| Battery pack round-trip efficiency(%) | 95 |
| Depth of discharge(%) | 100 |
| Peak discharge current (60s) (A) | 65 |
| Altitude (m) | ≤2000 |
| Dimensions (L*W*H) (mm) | 660*360*205 |
| Tolerance (L*W*H) (mm) | ±3/±3/±3 |
| Weight (kg ±5%) | 54.0 |
| Communication interfaces | CAN |

### 6.3 Battery System Specifications for CQ6

| Specifications for CQ6 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model No. | CQ6-L2 | CQ6-L3 | CQ6-L4 | CQ6-L5 | CQ6-L6 | CQ6-L7 | CQ6-L8 |
| Technical properties |  |  |  |  |  |  |  |
| Battery designation | IFpP53/149/113[(18S)2S]E/-10+50/90 | IFpP53/149/113[(18S)3S]E/-10+50/90 | IFpP53/149/113[(18S)4S]E/-10+50/90 | IFpP53/149/113[(18S)5S]E/-10+50/90 | IFpP53/149/113[(18S)6S]E/-10+50/90 | IFpP53/149/113[(18S)7S]E/-10+50/90 | IFpP53/149/113[(18S)8S]E/-10+50/90 |
| The number of batteries | 1CQ6-M+1CQ6-S | 1CQ6-M+2CQ6-S | 1CQ6-M+3CQ6-S | 1CQ6-M+4CQ6-S | 1CQ6-M+5CQ6-S | 1CQ6-M+6CQ6-S | 1CQ6-M+7CQ6-S |
| Nominal voltage (V) | 115.2 | 172.8 | 230.4 | 288.0 | 345.6 | 403.2 | 460.8 |
| Nominal energy (kWh) | 11.98 | 17.97 | 23.96 | 29.95 | 35.94 | 41.93 | 47.92 |
| Battery voltage range (V) | 104.4~131.4 | 156.6~197.1 | 208.8~262.8 | 261.0~328.5 | 313.2~394.2 | 365.4~459.9 | 417.6~525.6 |
| Nominal capacity (Ah) | 104 | | | | | | |
| Recommend charge/discharge current (A) | 50 | | | | | | |
| Constant current and constant voltage charging cut-off current (A) | 2 | | | | | | |
| Max. charge/discharge current (A)*1 | 50 | | | | | | |
| Peak discharge current (60s) (A) | 65 | | | | | | |
| Battery pack round-trip efficiency(%)*2 | 95 | | | | | | |
| Depth of discharge(%) | 100 | | | | | | |
| Storage Temperature (°C) | -10~50 | | | | | | |
| Operating charge/discharge temperature (°C) | 0~55/-10~55 | | | | | | |
| Discharge capacity (Ah) | 90@-20±2°C @1/3C<br>104@25±2°C @1/3C<br>104@55±2°C @1/3C | | | | | | |
| Cycle life*3 | ≥6000 | | | | | | |
| Ingress protection | IP65 | | | | | | |
| Protective class | Class Ⅰ | | | | | | |
| Dimensions (L*W*H) (mm) | 660*360*420 | 660*360*575 | 660*360*730 | 660*360*885 | 660*360*1040 | 660*360*1195 | 660*360*1350 |
| Tolerance (L*W*H) (mm) | ±3/±3/±6 | ±3/±3/±9 | ±3/±3/±12 | ±3/±3/±15 | ±3/±3/±18 | ±3/±3/±21 | ±3/±3/±24 |
| Weight (kg ±5%) | 102.8 | 151.6 | 200.4 | 249.2 | 298.0 | 346.8 | 395.6 |
| Communication interfaces | CAN | | | | | | |
| *1:The current is affected by temperature ,cell voltage and SOC;<br>*2:@25℃,0.3C charging/discharging;<br>*3:@25℃, @70% SOH，@90% DOD. | | | | | | | |

| Specifications for CQ6 | | | | | | |
|---|---|---|---|---|---|---|
| Model No. | CQ6-L9 | CQ6-L10 | CQ6-L11 | CQ6-L12 | CQ6-L13 | CQ6-L14 |
| Technical properties |  |  |  |  |  |  |
| Battery designation | IFpP53/149/113[(18S)9S]E/-10+50/90 | IFpP53/149/113[(18S)10S]E/-10+50/90 | IFpP53/149/113[(18S)11S]E/-10+50/90 | IFpP53/149/113[(18S)12S]E/-10+50/90 | IFpP53/149/113[(18S)13S]E/-10+50/90 | IFpP53/149/113[(18S)14S]E/-10+50/90 |
| The number of batteries | 1CQ6-M+8CQ6-S | 1CQ6-M+9CQ6-S | 1CQ6-M+10CQ6-S | 1CQ6-M+11CQ6-S | 1CQ6-M+12CQ6-S | 1CQ6-M+13CQ6-S |
| Nominal voltage (V) | 518.4 | 576.0 | 633.6 | 691.2 | 748.8 | 806.4 |
| Nominal energy (kWh) | 53.91 | 59.90 | 65.89 | 71.88 | 77.87 | 83.86 |
| Battery voltage range (V) | 469.8~591.3 | 522.0~657.0 | 574.2~722.7 | 626.4~788.4 | 678.6~854.1 | 730.8~919.8 |
| Nominal capacity (Ah) | 104 | | | | | |
| Recommend charge/discharge current (A) | 50 | | | | | |
| Constant current and constant voltage charging cut-off current (A) | 2 | | | | | |
| Max. charge/discharge current (A)[*1] | 50 | | | | | |
| Peak discharge current (60s) (A) | 65 | | | | | |
| Battery pack round-trip efficiency(%)[*2] | 95 | | | | | |
| Depth of discharge(%) | 100 | | | | | |
| Storage Temperature (°C) | -10~50 | | | | | |
| Operating charge/discharge temperature (°C) | 0~55/-10~55 | | | | | |
| Discharge capacity (Ah) | 90@-20±2°C @1/3C<br>104@25±2°C @1/3C<br>104@55±2°C @1/3C | | | | | |
| Cycle life[*3] | ≥6000 | | | | | |
| Ingress protection | IP65 | | | | | |
| Protective class | Class Ⅰ | | | | | |
| Dimensions (L*W*H) (mm) | 660*360*1505 | 660*360*1660 | 660*360*1815 | 660*360*1970 | 660*360*2125 | 660*360*2280 |
| Tolerance (L*W*H) (mm) | ±3/±3/±27 | ±3/±3/±30 | ±3/±3/±33 | ±3/±3/±36 | ±3/±3/±39 | ±3/±3/±42 |
| Weight (kg ±5%) | 444.4 | 493.2 | 542.0 | 590.8 | 639.6 | 688.4 |
| Communication interfaces | CAN | | | | | |

[*1]:The current is affected by temperature ,cell voltage and SOC;

[*2]:@25℃,0.3C charging/discharging;

[*3]:@25℃, @70% SOH，@90% DOD.

Note:The battery designation is a series of numbers that represent the battery's positive and negative electrode types, structure and size, charge and discharge rate, and operating temperature range.

# 7. Product Features

### 7.1 Battery System Features

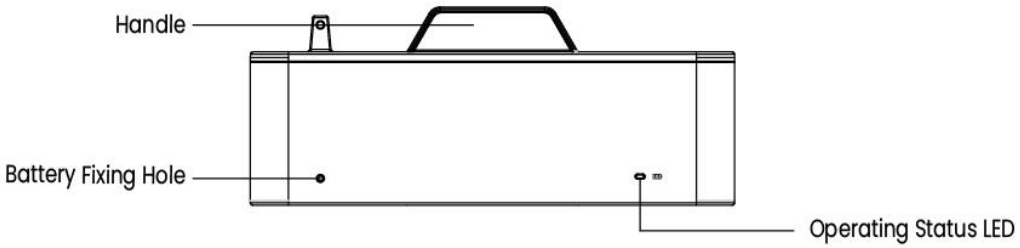
The batteries have been fitted with multiple protection systems to ensure the safe operation of the system. Some of the protection system includes:

- 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.

The battery system contains the following Interface to allow it to connect and operate efficiently.

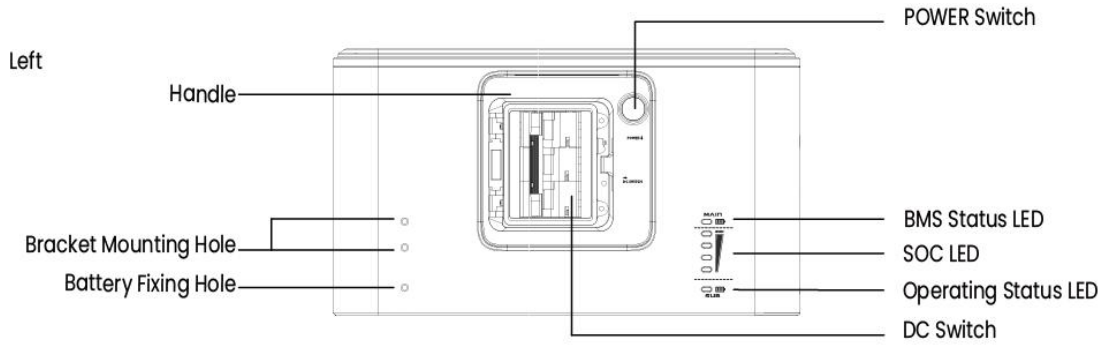
**CQ6-S Features:**

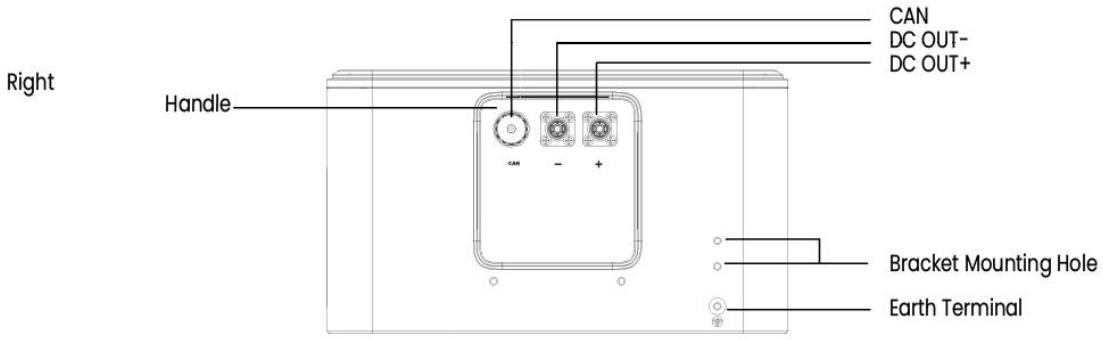
- interface:




**CQ6-M Features:**

- interface:



**DC Switch**

Power switch, battery charge and discharge circuit switch.

**DC OUT +**

Connect bat + of inverter.

**DC OUT -**

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.

**BMS Status LED and SOC LED**

LED display specific alarm information and battery system power.

**Operating status LED**

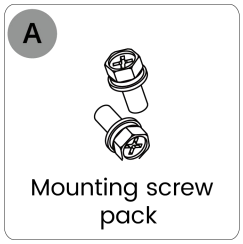
This LED is used to indicate if the battery is operating effectively. A green light on this LED means the battery is ON and operating normally. If the battery is operating failure, a red light on this LED means the battery is operating abnormally.

# 8. Installation

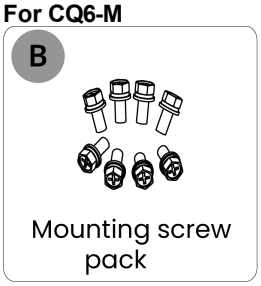
### 8.1 Items in the package

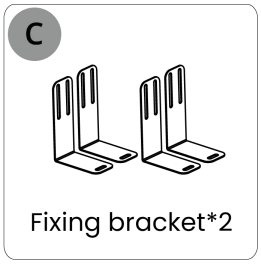
Please check if following items are including with the package:

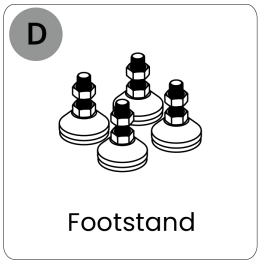
**For CQ6-S**

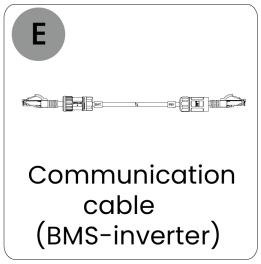


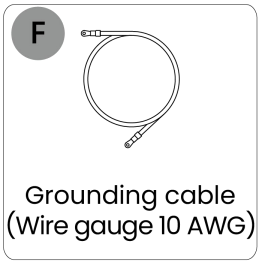

**For CQ6-M**

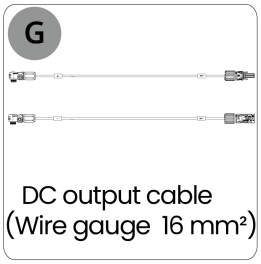


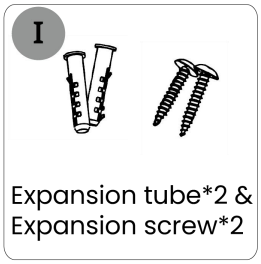



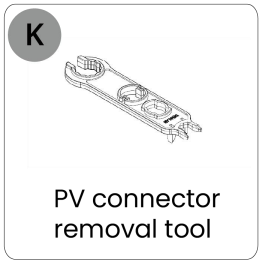



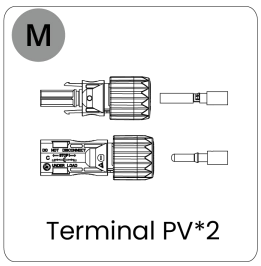




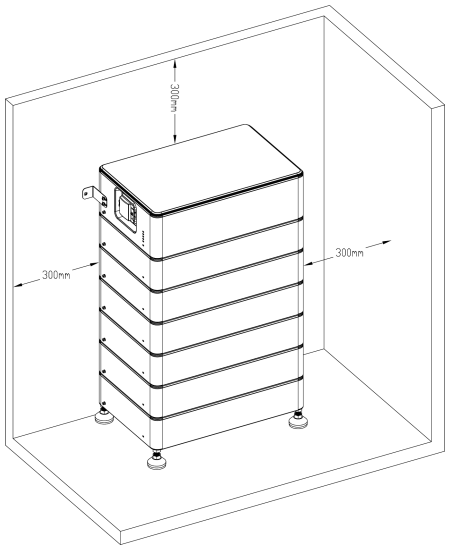








### 8.2 Clearance




Note:

- Make sure to leave a space of at least 300mm. A clearance of at least 300mm must be left around the battery pack for proper cooling.
- Make sure that the battery pack is always exposed to the ambient air. The battery pack is cooled by natural convection. If the battery pack is entirely or partially covered or shielded, it may cause the battery pack to stop operating.
- The safety clearance for equipment installation must comply with local regulations.
- For indoor installation scenarios, the installation area must be no less than 10 $m^2$ .
- For indoor installation, please refer to local installation regulations or fire safety regulations for specific provisions. The following methods are for reference only:
  a. Install smoke alarm devices;
  b. Install forced-start emergency ventilation devices, simultaneously shutting down the air conditioning/fresh air system (to prevent gas diffusion);
  c. Install audible and visual alarms.
- The battery system must be kept at least 2 meters away from heat sources.

### 8.3 Tools

The following tools will be required to install CQ6-M and CQ6-S.

6mm Magnetic Phillips Screwdriver

Crimpers

Safety Shoes

Multimeter

Safety Gloves

Safety Glasses

Plier

Cable Ties

Hammer Drill @φ8mm

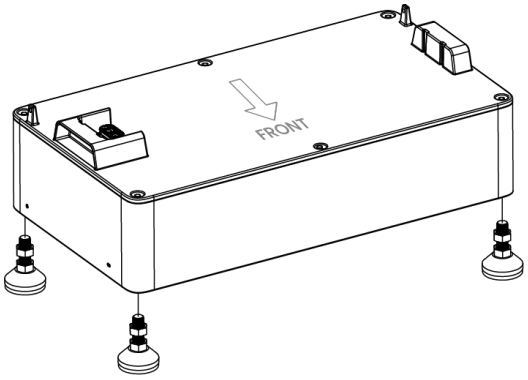
Spirit Level

Tape

Marker

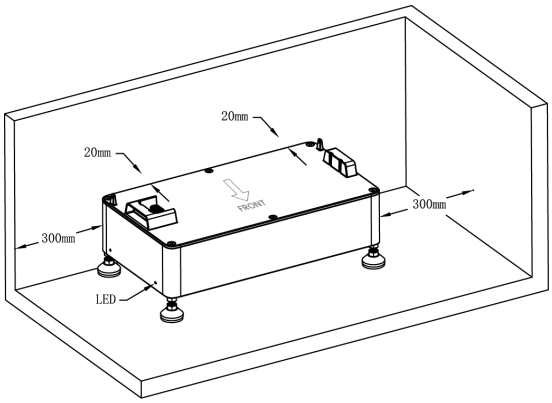
### 8.4 Installation Steps

Step 1: Install a CQ6-S with four footstand (Item D) and place it on the ground and adjust it to the level. After installing the footstand, use a track level bar to confirm the level.

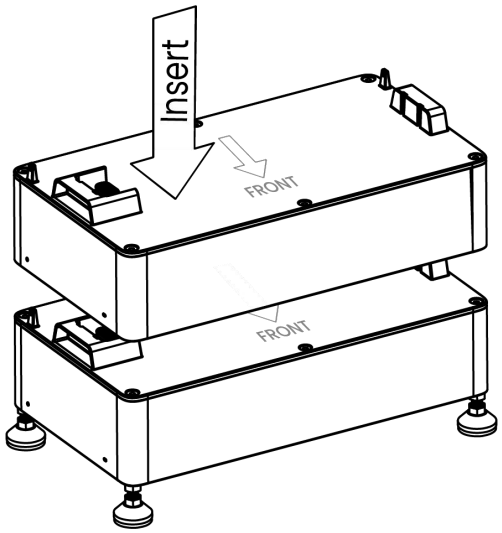



Step 2: Place the battery 20mm against the wall.

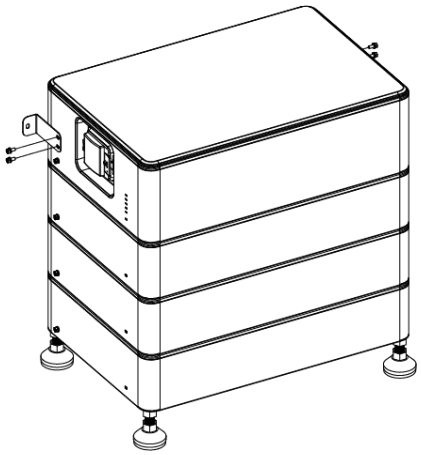
Note: Please make sure the Operating Status LED is on your left handside when you facing the battery model.



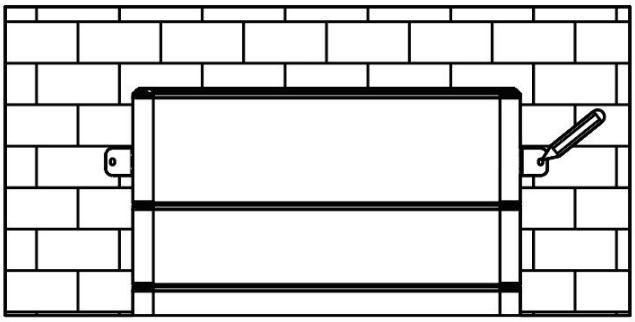
Step 3: Stack the batteries one by one.



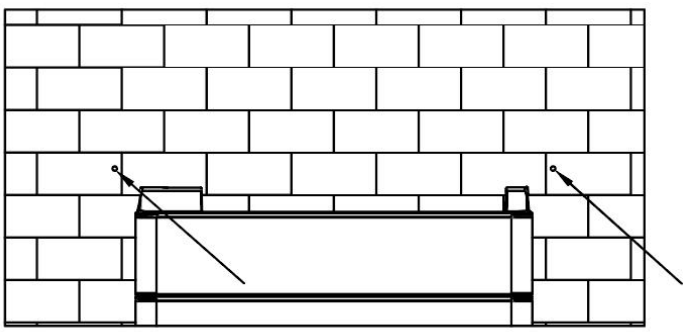

Step 4: Place the two fixing brackets (Item C) close to the wall and install them on both sides of the battery.



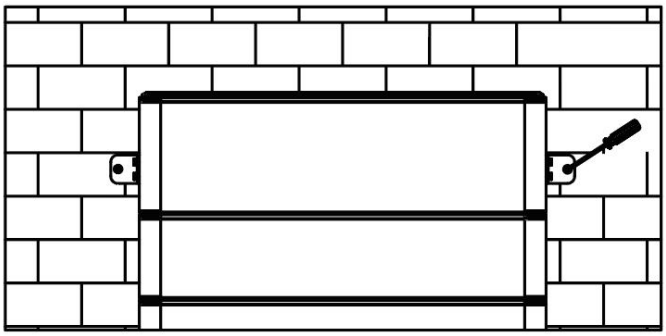
Step 5: Mark the wall through the bracket hole.



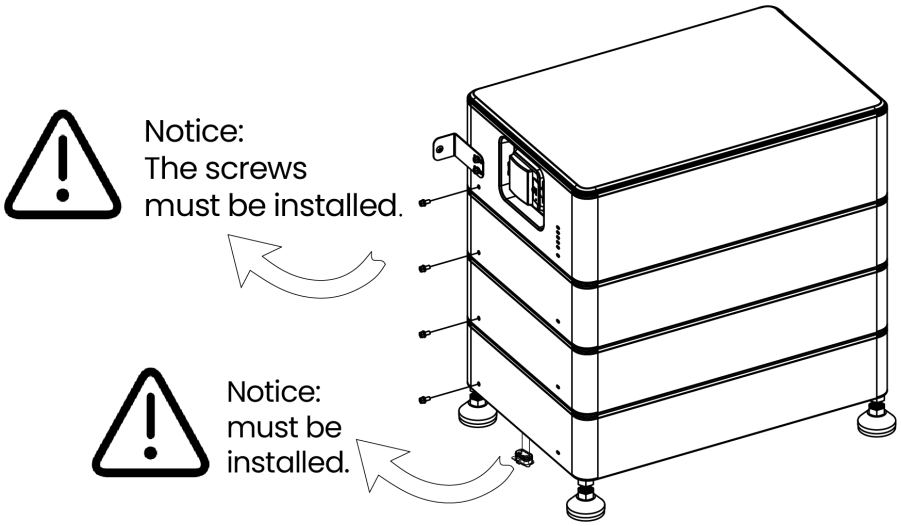
Step 6: Punch after removing the CQ6-M. Drill holes with electric drill, make sure the holes are at least 50mm deep, and then tighten the expansion tubes (Item I).



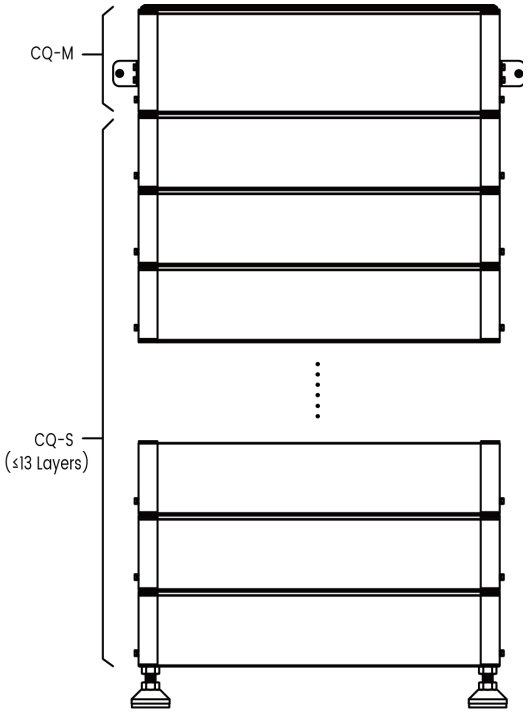
Step 7: After stacking CQ6-M again, fix the battery on the wall.



Step 8: Fix the mounting screw packs (Item C) on both sides of the battery, insert the waterproof cover(Item J) into the bottom of the battery and lock it in place with the clip, the installation is over.



Note: Please make sure each system is including one CQ6-M and at least one and at most thirteen CQ6-S.




Note: Installation Location Instructions for fixing brackets (Item C):

L : number of layers in the battery system.

When L ≤ 6, a pair of Item C is installed on CQ6-M;

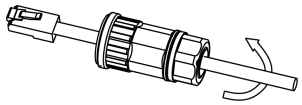
When L > 6, a pair of Item C is installed on CQ6-M, and install an additional pair of Item C in the middle layer of the CQ6-S modules.

Note: When used with an inverter, the battery system voltage must meet the inverter battery port voltage range.

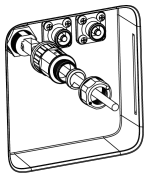
### 8.5 Wiring Steps

Step 1: Communication Cable (Item E) Installation Procedure.
Note: Please use the side labeled BAT to connect to the battery and the side labeled INV to connect to the inverter.

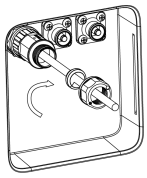
a) Open the tail lock wire nut.



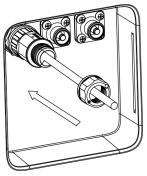
b) Plug communication cable RJ45 into the battery BMS port.



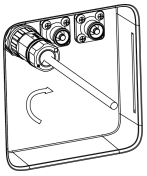
c) Use an open-end spanner to lock the body onto the RJ45 board end connector; torque: 1.2±0.2N·m.



d) Install the sealing plug into the main body.

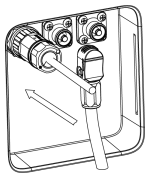


e) Use an open-end spanner to lock the thread locking nut onto the main body.

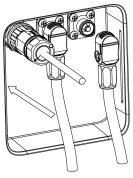


Step 2: Power cable installation and fixing steps.
Note: Please use the side labeled with “+” and “-” cable, i.e. right angle terminal to connect to the battery, and the side labeled with “BAT+” and “BAT-” cable to connect to the inverter.

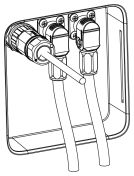
a) DC- output cable Installation.



b) DC+ output cable Installation.

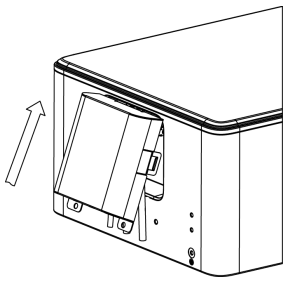


c) DC output cable installation complete.

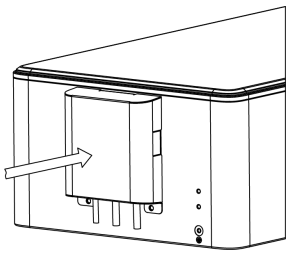


Step 3: Protective cover (Item L) installation Procedure.

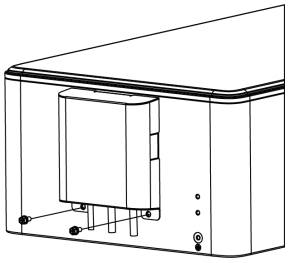
a) Put the communication cable and DC output cable into the wire slot of the protective cover and, at the same time. tilt the protective cover at a certain angle so that the clip on the top is clicking in to the housing slot.



b) Press down on the protective cover so that the tabs on both sides snap into the slots.

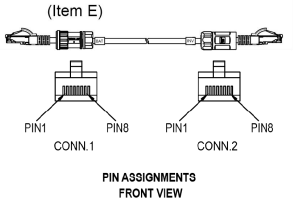


c) Secure the protective cover with screws.



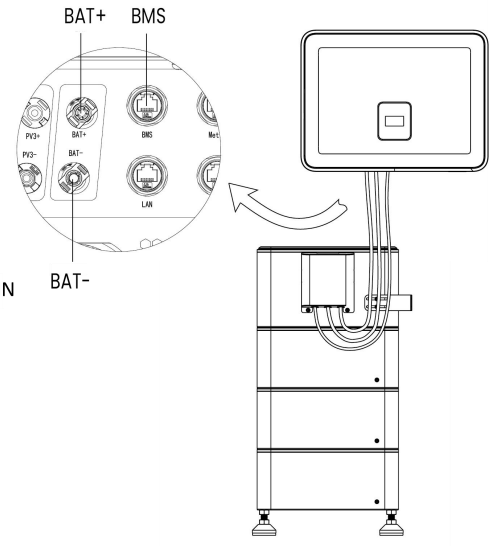
Step 4: Insert the connector at the other end of the cable into the BMS port at the base of the inverter and tighten securely.

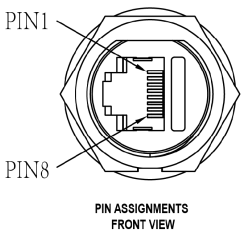
Note: Inverter wiring refer to the inverter user manual.




| CONN.1 PIN | CONN.2 PIN |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |

Note: Default wire harness PIN to PIN

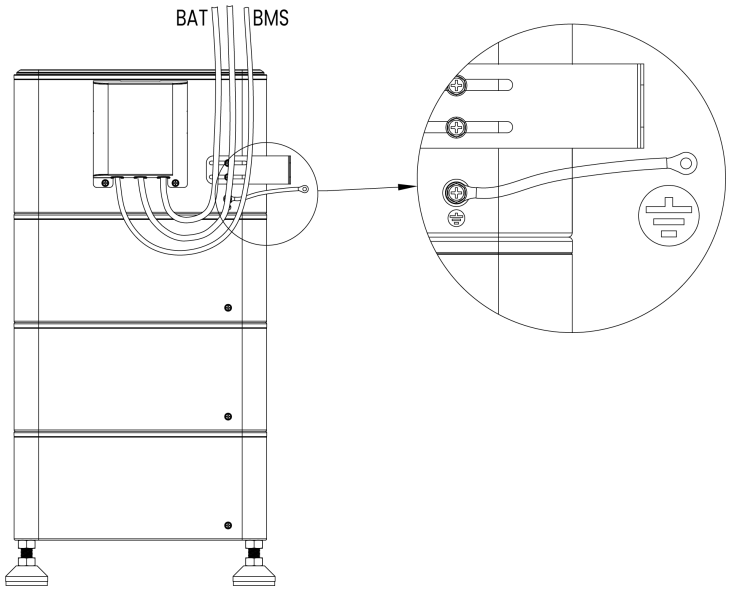



| PIN | Function Definitions |
|---|---|
| 1 | A-START |
| 2 | GND |
| 3 | / |
| 4 | BMS-CANL |
| 5 | BMS-CANH |
| 6 | BMS-CANH |
| 7 | BMS-CANL |
| 8 | / |

Note: If using a new RJ45 cable, the waterproof union nut can be removed from the communication cable (Item E) and placed into the new cable to ensure proper sealing.

Step5: Connect the grounding cable. The figure is shown in below.



### 8.6 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.

**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 is blinking green and indicates that the system is working normally.

**System Shut Down:**

Press and hold the POWER Switch for at least 5 seconds until all of the main 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.

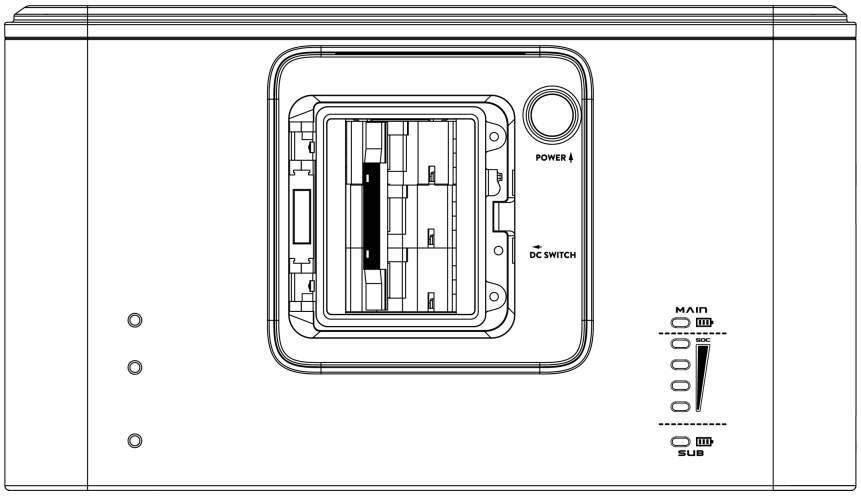
**System Black Start:**

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” button three times in succession within 4 seconds (Complete within 30 seconds after the battery system starts up).
- The Status LED remains solid green, indicating successful activation of Black Start mode.

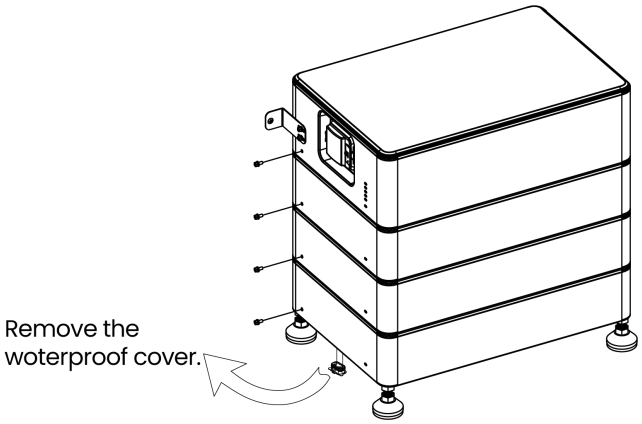
Note:

Ensure correct battery-inverter connection prior to Black Start. No wiring modifications during Black Start.



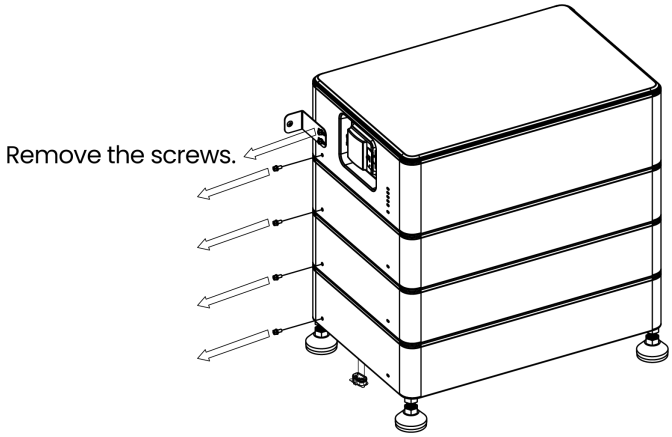
### 8.7 Disassembly Steps

Step 1: Shut down the battery system (refer to Section 8.6: System Shutdown), then disconnect the wiring harness connected to the inverter (refer to Section 8.5: Wiring Steps).
Step 2: Remove the waterproof cover.

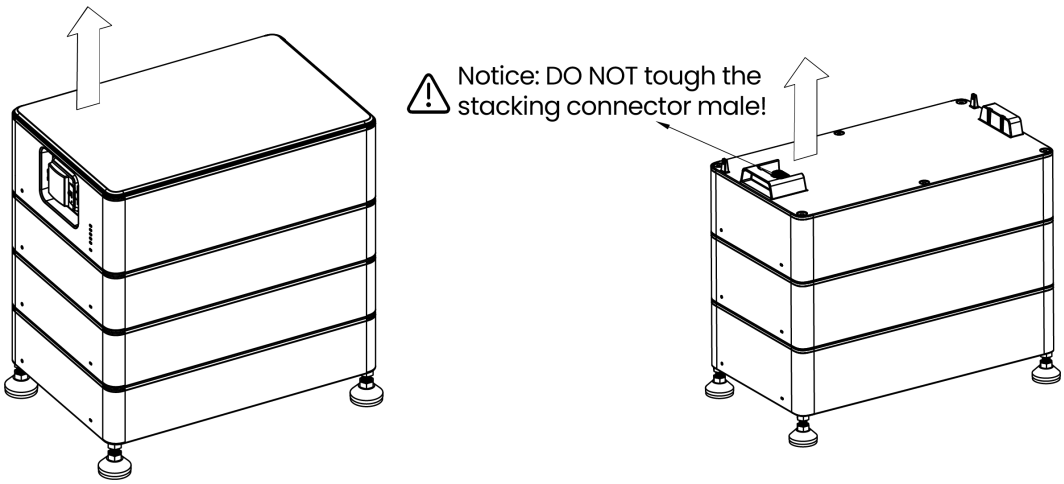



Note: Operators must wait 1 minute at least after disconnecting or removing the waterproof cover/ connector before accessing the module.

Step 3: Remove the screws (refer to Step 7 and Step 8 in Section 8.4).




Step 4: Remove the CQ6-M and CQ6-S modules, and store them properly according to the manufacturer's storage requirements.



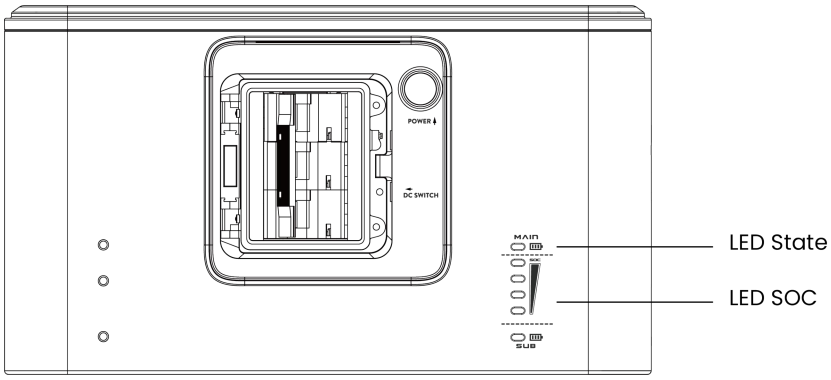
# 9. Commissioning

The operating status light on the left side of the battery pack shows its working status.

**For CQ6-S**

| Green LED | Red LED | Batteries Status |
|---|---|---|
| On for 0.5s, Off for 0.5s | On for 0.5s, Off for 0.5s | Running in boot |
| On for 0.1s, Off for 0.1s | On for 0.1s, Off for 0.1s | Upgrading |
| On for 1s, Off for 1s | Off | Normal Working |
| Off | On for 1s, Off for 1s | Alarm |

**For CQ6-M**




| SOC | System Status | LED State | LED SOC | | | |
|---|---|---|---|---|---|---|
| =100% | Standby | ■ | ● | ● | ● | ● |
| 100% > SOC >= 75% | | ■ | ● | ● | ● | ● |
| 75% > SOC >= 50% | | ■ | / | ● | ● | ● |
| 50% > SOC >= 25% | | ■ | / | / | ● | ● |
| 25% > SOC >= 0% | | ■ | / | / | / | ● |
| =100% | Discharge | ● | ● | ● | ● | ● |
| 100% > SOC >= 75% | | ● | ● | ● | ● | ● |
| 75% > SOC >= 50% | | ● | / | ● | ● | ● |
| 50% > SOC >= 25% | | ● | / | / | ● | ● |
| 25% > SOC >= 0% | | ● | / | / | / | ● |
| =100% | Charge | ● | ■ | ■ | ■ | ■ |
| 100% > SOC >= 75% | | ● | ■ | ■ | ■ | ■ |
| 75% > SOC >= 50% | | ● | / | ■ | ■ | ■ |
| 50% > SOC >= 25% | | ● | / | / | ■ | ■ |
| 25% > SOC >= 0% | | ● | / | / | / | ■ |

| Fault | LED State | LED SOC | | | |
|---|---|---|---|---|---|
| Under voltage fault | ■ | / | / | / | ● |
| Over voltage fault | ■ | / | / | ● | / |
| Over temperature fault | ■ | / | / | ● | ● |
| Under temperature fault | ■ | / | ● | / | / |
| Discharge over current | ■ | / | ● | / | ● |
| Charge over current | ■ | / | ● | ● | / |
| Warm up film switch adhesion | ■ | / | ● | ● | ● |
| Reserve | ■ | ● | / | / | / |
| Pre-Charge failed | ■ | ● | / | / | ● |
| Short circuit protection | ■ | ● | / | ● | / |
| AFE communication failed | ■ | ● | / | ● | ● |
| Module addressing failed | ■ | ● | ● | / | / |
| IVU communication failed | ■ | ● | ● | / | ● |
| BMU communication failed | ■ | ● | ● | ● | / |
| PCS communication failed | ■ | ● | ● | ● | ● |
| HVB FUSE fault | ● | / | / | / | ● |
| Module FUSE fault | ● | / | / | ● | / |
| Power failed | ● | / | / | ● | ● |
| Internal total voltage sampling failed | ● | / | ● | / | / |
| Temperature sampling failed | ● | / | ● | / | ● |
| Relay adhesion | ● | / | ● | ● | / |
| Relay not close | ● | / | ● | ● | ● |
| Relay drive failed | ● | ● | / | / | / |
| Single cell "0V" fault | ● | ● | / | / | ● |
| Temperature high permanent failed | ● | ● | / | ● | / |
| The Single voltage high permanently failed | ● | ● | / | ● | ● |
| SOH low protection | ● | ● | ● | / | / |
| AFE failed （UV/OV/UT/OT） | ● | ● | ● | / | ● |
| Shutdown failed | ● | ● | ● | ● | / |
| Other fault | ● | ● | ● | ● | ● |

**Remark:**

■: LED flash display (on: 0.5s, off: 0.5s)

●: LED on display

Note: For detailed battery monitoring information, please consult the accompanying inverter manual and monitor more detailed battery information through the FOXESS APP and cloud platform.

# 10. Exclusion

The warranty shall not cover the defects caused by normal wear and tear, inadequate maintenance, handling, storage faulty repair, modifications to the battery or pack by a third party other than Fox ESS or Fox ESS agent, failure to observe the product specification provided herein or improper use or installation, including but not limited to the following.

- Damage during transport or storage.
- Incorrect Installation of battery into pack or maintenance.
- Use of battery or pack in inappropriate environment.
- Improper, inadequate, or incorrect charge, discharge or production circuit other than stipulated herein.
- Incorrect use or inappropriate use.
- Insufficient ventilation.
- Ignoring applicable safety warnings and instructions.
- Altering or attempted repairs by unauthorized personnel.
- In case of force majeure (ex: lightning, storm, flood, fire, earthquake, etc.).
- There are no warranties-implied or express-other than those stipulated herein. Fox ESS or Fox ESS shall not be liable for any consequential or indirect damages arising or in connection with the product specification, battery or pack.

# 11. Troubleshooting and Maintenance

### 11.1 Maintenance

A. Regularly check whether the service environment of the battery meets the requirements, and the installation position should be far away from the heat source.

B. 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(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 month | 20%≤SOC≤50% |
| 0~35°C | 10%~90% | ≤ 6 months | 20%≤SOC≤50% |
| 35~55°C | 10%~90% | ≤ 1 month | 20%≤SOC≤50% |
| Above 55°C | / | Not allowed | / |

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

C. Regularly check whether the battery and its supporting terminals, connecting cables and indicator lights are normal.

**- Expanded capacity requirement**

If a battery is replaced or added for capacity expansion, each battery's SOC should be consistent. The max. SOC difference should be between ±5%.

If users want to increase their battery system capacity, please ensure that the SOC of the existing system capacity is about 50%. 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%.

### 11.2 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 over discharge, 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.

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% ≤ SOC < 5% | 7 days |

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

### 11.3 Troubleshooting

When the red / green LED on the panel is flashing or normally on, it does not mean that the CQ6 is abnormal, it may be just an alarm or protection. Please check the “LED status indicators” in chapter 10 for the detailed faulty definition before any trouble-shooting steps. In general, the alarm indication is normal without manual intervention. When the alarm triggering state is removed, CQ6 will automatically return to normal use.

**- Problem determination based on the following points**

1) Check if the red indicator light illuminates once the battery enters operation.
2) Whether the buzzer in CQ6-M on.
3) Whether the battery system can be communicated with inverter.
4) Whether the battery can be output voltage or not.

**- Preliminary determination steps**

Battery system cannot work, when DC Switch on and POWER on, the LED doesn’t light up or flash, please consider contact the local distributor.

1) The LED display of CQ6-M and CQ6-S is normal, but it cannot charge and discharge. Observe the display screen of inverter and there is no SOC. Please check whether the CAN communication between CQ6-M to inverter is well connected. If the connection is good, please replace a CAN communication cable. If the SOC is still not visible on the inverter display screen, please contact the local distributor.
2) 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.

### 11.4 System Lock Function Description

This battery system incorporates a System Lock feature. Upon detecting abnormal operating conditions or receiving external lock commands, the system will automatically cease charging and discharging operations and enter a secure standby state to safeguard equipment and operational environments.
The following scenarios will trigger the System Lock, with corresponding release procedures as follows:

**- During firmware upgrades**

When executing a firmware upgrade task, the system automatically enters a locked state to prevent charging/ discharging operations from interfering with the upgrade process. Upon completion, the lock is automatically released and normal operation resumes.

**- Upon receiving an external control system command**

When the battery receives a “Lock” command from an external control system (e.g., PCS, EMS, or monitoring platform), it ceases charging/discharging and enters standby mode. This locked state requires explicit “Unlock” commands from the external system to be released, ensuring the reliability and safety of control logic.

**- Detection of abnormal operating parameters**

The system continuously monitors critical parameters (such as overvoltage, overcurrent, high temperature, etc.). Upon detecting anomalies, it triggers a system lock and implements the following measures:

1) Displays the fault status via LED indicators.
2) Uploads alarm information to the inverter and cloud monitoring platform.
3) Cease charging/discharging and enter protective standby mode.

Typically, the system will automatically unlock and resume operation once the abnormal condition is resolved (refer to the “Troubleshooting” section). However, the lockout will persist even after resolution in the following scenarios:

1) Prolonged abnormal status duration requiring manual verification.
2) Occurrence of critical faults (e.g., severe undervoltage, severe overvoltage).

**Note:**

Please contact Fox ESS in the case of serious anomalies or emergencies.

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