



# EP CUBE



## Installation Manual EU2 (SA) V1.2

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## About this Manual

- Read this manual carefully in its entirety before installation / operation.
- Retain this manual for reference purposes.

### 1.1. Applicable Products

This manual is valid for the EP Cube HES Series Only. EP Cube HES series includes following products:

EP Cube HES-EU2-S7-10G;

EP Cube HES-EU2-S7-15G;

EP Cube HES-EU2-S7-20G;

### 1.2. Intended Target Group

The instructions contained in this installation manual must only be performed by qualified EP authorized personnel who must have completed installer training program provided by EP.

Prior skills required before taking installations are following:

- Understanding of how batteries and inverters work, and they are operated
- Understanding and complying with the local standards, directives and electrical connection requirements
- Training in dealing with the hazards associated with the installation and operation of electrical equipment and lithium batteries
- Training in the installation and commissioning of electrical equipment



WARNING: EP Cube products can only be installed, repaired, replaced and maintained by the EP authorized personnel for safety and warranty purposes.

### 1.3. Scope of this Manual

This manual describes the installation process and provides a set of guidelines for EP Cube system installers. It provides system's an overview of the system and installation instructions, electrical connections, commissioning, operation, expansion, decommissioning, troubleshooting, maintenance and storage. Please read thoroughly this manual before installation and follow the instructions during the entire installation process.

If you have any further queries regarding the product, please contact the EP Cube service team.

## 1.4. Copyright

All rights reserved. The disclosure, duplication, distribution, and editing of this document, or utilization and communication of the content are not permitted unless authorized in writing. All rights, including rights created by patent grant or registration of a utility model or a design, are reserved.

## 1.5. Disclaimer

This document has gone through rigorous technical review before being published to provide accurate information. However, EP believes in striving for continuous improvement of our products and specifications may change without prior notice. Thus, it will be revised regularly and any modifications and amendments will be included in subsequent issues. The illustrations and images in this manual are for demonstration purposes only. The responsibility of a safe and quality installation is of the qualified and licensed installation professional. Actual product details may vary in appearance on the installation site.

## 1.6. Declaration of Conformity

EP Cube system described in this manual complies with the applicable European directives. The certificate of compliance and completed certifications can be found in the download section of EP Cube website: <https://epcube.com/eu/documents.html>

## 1.7. Abbreviated Terms

ABBR	Description
AC	Alternating Current
CT	Current Transformer
DC	Direct Current
KW	Kilowatt
L	Line
N	Neutral
PV	Photovoltaic
SOC	State of charge

## 1.8. Contact Us

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## SAFETY INSTRUCTIONS

Please read this section carefully and strictly implement its contents for personal protection and property safety before installing and using the product. EP is not liable for any loss caused by the violation of the instructions in this manual and relevant instructions on the equipment. All descriptions in the manual are for guidance only.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, it may result in equipment malfunction, component damage, personal injuries, and/or property damage.

All installations and maintenance should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations. The safety instructions in this document are only supplemental to local laws and regulations.

 **DANGER:** Indicates the situation which, if not avoided, will lead to death or serious injury.

 **CAUTION:** Indicates the situation which, attention is necessary to avoid potential injury or property damage.

### 1. Conduct In case of fire

#### Caution

- Immediately contact the fire department or other relevant emergency response team.
- Notify all people who might be affected and ensure that they are able to evacuate this area.

In the event of fire or potential risk of battery modules or storage system catching fire:

1. Leave or do not enter the room in which the storage system and battery modules are located.
2. Avoid contact with escaping smoke or steam. If contact occurs, rinse the affected area thoroughly with water. In the case of irritation of the skin, eyes or mucous membranes, consult a doctor.
3. Contact the EP service team for more instructions on how to handle EP Cube system.
4. There is a danger of electrocution when extinguishing a fire while the storage system is switched on. In the event of a fire in the vicinity of the product or in the storage system itself, proceed as follows before beginning any extinguishing measures:
  - a. Switching the storage system off to electrically isolate it. The battery modules will still be carrying voltage and stored power.
  - b. Switch off the mains circuit breakers/fuses in the building.
  - c. Only firefighters with appropriate personal protective equipment are permitted to enter the room where the storage system is located.

d. If the storage system or mains fuses cannot be safely switched off: Observe the minimum distances applicable for the specific extinguishing means used.

The storage system works with a nominal voltage of 230 V (AC) and 230.4 V (DC).

## Extinguishing agents

1. A fire can be extinguished using conventional extinguishing agents. i.e. ABC or carbon dioxide.
2. Water is recommended as an extinguishing agent in order to cool the battery modules and therefore prevent thermal runaway in battery modules which are still intact.

## 2. General and Personal Safety

### **DANGER:**

- EP Cube consists of EP Cube PCS and battery modules that are considerably heavy! It is recommended to use lifting equipment to avoid any potential injuries.
- Do not stack the unpacked products to avoid irreversible damage.
- Ensure that the power switch and the breaker of the EP Cube are always turned off prior to all installation, replacement, and maintenance processes.
- Do not attempt to open, disassemble, tamper with, or modify the EP Cube without prior written approval from the EP company.
- Do not operate the EP Cube out of the specified conditions and requirements.
- It is prohibited to touch the EP Cube internal components when it's running.
- Do not place the EP Cube or its components in water or other liquids.
- Do not expose EP Cube to flammable gases, other corrosive substances, and heating sources.
- Do not short-circuit the terminals of the battery modules to avoid causing electric shock and fire.
- Do not stand on, lean on, or sit on the top of EP Cube.
- Do not use water to clean electrical components inside or outside of a cabinet.





## CAUTION:

- The transportation, installation, and commissioning of the EP Cube must be carried out under the specified conditions. Do not expose EP Cube to extreme conditions during these periods.
- EP Cube can only be installed, repaired, replaced, and maintained by the EP authorized personnel for safety and warranty purposes. PPE must be worn during any operations.
- Do not place foreign objects on top of the product or insert inside the product.
- Ensure there is enough space around EP Cube for ventilation.
- Be careful to protect the EP Cube from impact when installing it in a garage or near vehicles. If possible, install the EP Cube on a side wall or above the height of vehicle bumpers.
- Do not try reverse engineering, decompile, disassemble, adapt, implant, or perform other derived operations on the EP Cube firmware.
- Do not study the internal implementation of the product firmware source code and steal intellectual property rights.

## 3. Personnel Requirements

- Personnel who plan to install or maintain EP Cube equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

Professionals	personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, and maintenance
Trained personnel	personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
Operators	operation personnel who may come in contact with the equipment, except trained personnel and professionals

## 4. Personal Protective Equipment

Wear the following safety equipment properly to perform installations. Installers must meet the relevant requirements of applicable standards and local laws.



Safety goggles



Ear protection



Insulated gloves



Safety gloves



Safety shoes

## 5. Electrical Safety

### 5.1 General Requirements

1. Ensure that all electrical connections comply with local electrical standards.
2. Obtain approval from the local electric utility company before using the equipment in grid-tied mode.
3. Ensure that the cables you prepared meet local regulations.
4. Use dedicated insulated tools when performing high-voltage operations.

### 5.2 Cabling Requirements

1. When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
2. Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
3. Ensure that the cables used in a grid-tied PV power system are properly connected and insulated and meet specifications.
4. In sections where cables are routed through pipes or holes, these cables must be protected to prevent from being damaged by sharp edges or burrs.
5. When the temperature low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
  - a. Cables must be laid or installed only when the temperature is higher than 0° C. Handle cables with caution, especially at a low temperature.
  - b. Cables stored at sub-zero temperatures must be put at room temperature for at least 24 hours before they are laid out.

6. For the equipment that needs to be grounded, install the protective earthing (PE) cable first when installing the equipment and remove the PE cable last when removing the equipment.
7. Do not damage the ground conductor.
8. Do not operate the equipment in the absence of a properly installed ground conductor.
9. Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check the electrical connection to ensure that it is securely grounded.

## 5.3 Operation

1. Do not connect or disconnect power cables with power-on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.
2. Before connecting cables, switch off the breaker of the upstream equipment to cut off the power supply if people may contact energized components.
3. Before connecting a power cable, check that the label on the power cable is correct.
4. If the equipment has multiple inputs, disconnect all the inputs before operating the EP Cube.

## 5.4 Battery Safety

1. The packaged battery modules are forbidden to be stacked more than the specified quantity. In addition, do not stand, lean on or sit on the product.
2. High temperatures, heating equipment, or sources of extreme heat, may cause the battery to go in a thermal runaway, thereby exceeding the ignition point of its material, causing a fire hazard. Please refer to applicable local requirements and norms on residential buildings, fire and energy storage system.
3. To avoid leakage, overheating or fire, do not disassemble, alter, or damage batteries. For example, do not insert foreign objects into batteries or place batteries in water or other liquids.
4. Do not squeeze, impact or puncture the battery.
5. Do not short circuit the battery terminals.
6. Do not reverse the polarity of the battery during cable connections.
7. The fire hazard of the lithium-ion/sodium-ion battery energy storage system is high. Consider the following safety risks before handling batteries:
  - a. Battery electrolyte is combustible, toxic, and volatile.
  - b. Battery thermal runaway can generate flammable and harmful gases such as CO and HF.

## 5.5 Storage Requirements

1. The storage environment must comply with local regulations and standards.
2. If a battery has been stored for longer than the allowed period, it must be checked and tested by professionals before use.
3. Place batteries according to the signs on the packing case during storage. Do not put batteries upside down or sidelong.
4. Stack packed batteries in compliance with the stacking instructions on the external package.
5. Handle batteries with caution to avoid damage. The storage environment requirements are as follows:
  - a. Recommended storage temperature: : 0–35°C; for shelf life up to 1 year.
  - b. Ambient storage temperature: -20–0°C and/or 35-50°C; for shelf life of 1 month.
  - c. Relative humidity: 0% to 95%.

It is recommended that battery modules be charged after 6 months of storage to avoid any irreversible damage. Refer to the "Technical Note EP Cube EU Battery Module Storage document for more details regarding storage and charging.

6. The batteries must be stored in a clean, dry, and well-ventilated place and be protected from dust and water vapor corrosion. Keep batteries away from direct sunlight, rain and water.

## 5.6 Transportation Requirements

Before transportation:

1. Check that the batteries are intact and there is no obvious smell, smoke, or fire. Otherwise, the batteries cannot be transported.

During transportation:

1. The batteries cannot be transported by rail or air.
2. Maritime transport must comply with the International Maritime Dangerous Goods Code (IMDG Code).
3. Road transport must comply with the International Carriage of Dangerous Goods by Road (ADR).
4. Comply with the requirements of the transportation regulatory authorities in the countries of departure, route, and destination.
5. Comply with the international regulations on the transport of dangerous goods and the requirements of the transport regulatory authorities of the respective countries.
6. Protect the product packing box from the following situations:
  - a. Being dampened by rains, snows, or falling into water
  - b. Falling or mechanical impact.
  - c. Being upside-down or tilted.

## 5.7 Installation Environment Requirements

1. The installation and use environment must meet regarding international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations.
2. Ensure that the EP Cube is not accessible to children and installed away from daily working or living areas, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, study, game room, home theatre, sunroom, restroom, laundry, and attic.
3. When installing the EP Cube in a garage, keep it away from the drive way. It is recommended that the battery is mounted on the wall higher than the car bumper to prevent collision.
4. When installing the EP Cube in a basement, keep good ventilation. It is recommended that the battery is mounted on the wall to avoid contact with water.
5. Mandatory: Install the EP Cube in a dry and well-ventilated environment. Secure the EP Cube on a solid and flat surface.
6. Install the EP Cube in a sheltered place or install an awning over it to avoid direct sunlight or rain.
7. Install the EP Cube in a clean environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases.
8. For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons/hurricanes, take corresponding precautions for installation.
9. Keep the EP Cube away from fire sources. Do not place any flammable or explosive materials around the EP Cube .
10. Keep the EP Cube away from water sources such as taps, sewer pipes, and sprinklers to prevent water seepage.
11. Do not install the EP Cube in a position where it is easy to touch as the temperature of the chassis and heat sink is high when the EP Cube is running.
12. Do not install EP Cube in extremely low temperature outside the operating temperature range. EP Cube batteries cannot be charged in temperature below 0°C.
13. Do not expose the EP Cube to flammable or explosive gas or smoke. Do not perform any operation on the EP Cube in such environments.
14. Do not install the EP Cube on a moving object, such as ship, train, or car.
15. In backup power scenarios, do not use the EP Cube for the following situations: medical devices substantially important to human life, control equipment such as trains and elevators which may cause personal injury, locations near medical devices, other devices similar to those described above.
16. Do not install the EP cube outdoors in salt-affected areas directly exposed to sea breeze because it may corrode. A salt-affected area refers to the region within 500 meters from the coast or prone to sea breeze. Please consult the EP Cube technical support on the use of EP Cube in special climates (i.e. salt, sulphur, or ammonia areas) which may affect the product warranty.

## 5.8 Commissioning

When the equipment is powered on for the first time, ensure that an EP certified installer performs the configurations for the product correctly. Incorrect configuration may result in inconsistency with local regulations and affect the normal operation of the equipment.

## 5.9 Maintenance and Replacement

1. Maintain the equipment regularly with the help of the knowledge contained in this manual and using proper tools and testing equipment.
2. Before maintaining the equipment, power it off and follow the instructions on the High Voltage/Delayed Discharge label to ensure that the equipment is powered off(5 minutes after the shutdown).
3. Place temporary warning signs or build fences to prevent unauthorized access to the maintenance site.
4. If the equipment is faulty, contact your installer or distributor.
5. The equipment can be powered on only after all faults are rectified. Failing to do so may escalate in more faults or could damage the equipment.
6. Do not open the cover without prior authorization from EP. Otherwise, electric shocks may occur, and the resulting faults are beyond warranty scope.
7. Installation personnel, maintenance personnel, and technical support personnel must be trained to operate and maintain the equipment safely and correctly by taking comprehensive precautionary measures, and by being equipped with PPE.
8. Before moving or reconnecting the equipment, disconnect the main breakers and batteries, then wait for five minutes until the equipment powers off. Before maintaining the equipment, check that no dangerous voltages remain in the DC bus or components to be maintained by using a multi-meter.
9. Battery modules replacements should be carried out or supervised by personnel who are familiar with batteries and the precautions required.
10. When replacing battery modules, replace them with battery modules of the same type.
11. Take out all tools and parts used from the equipment after maintenance is complete.
12. If the equipment is not used for a long time, store and recharge battery modules according to this manual.

## PRODUCT DESCRIPTION

The EP Cube HES consists of EP Cube PCS and Battery Modules as standard component. Optional accessories are also available besides EP Cube HES and users can choose according to site and customer-specific needs.

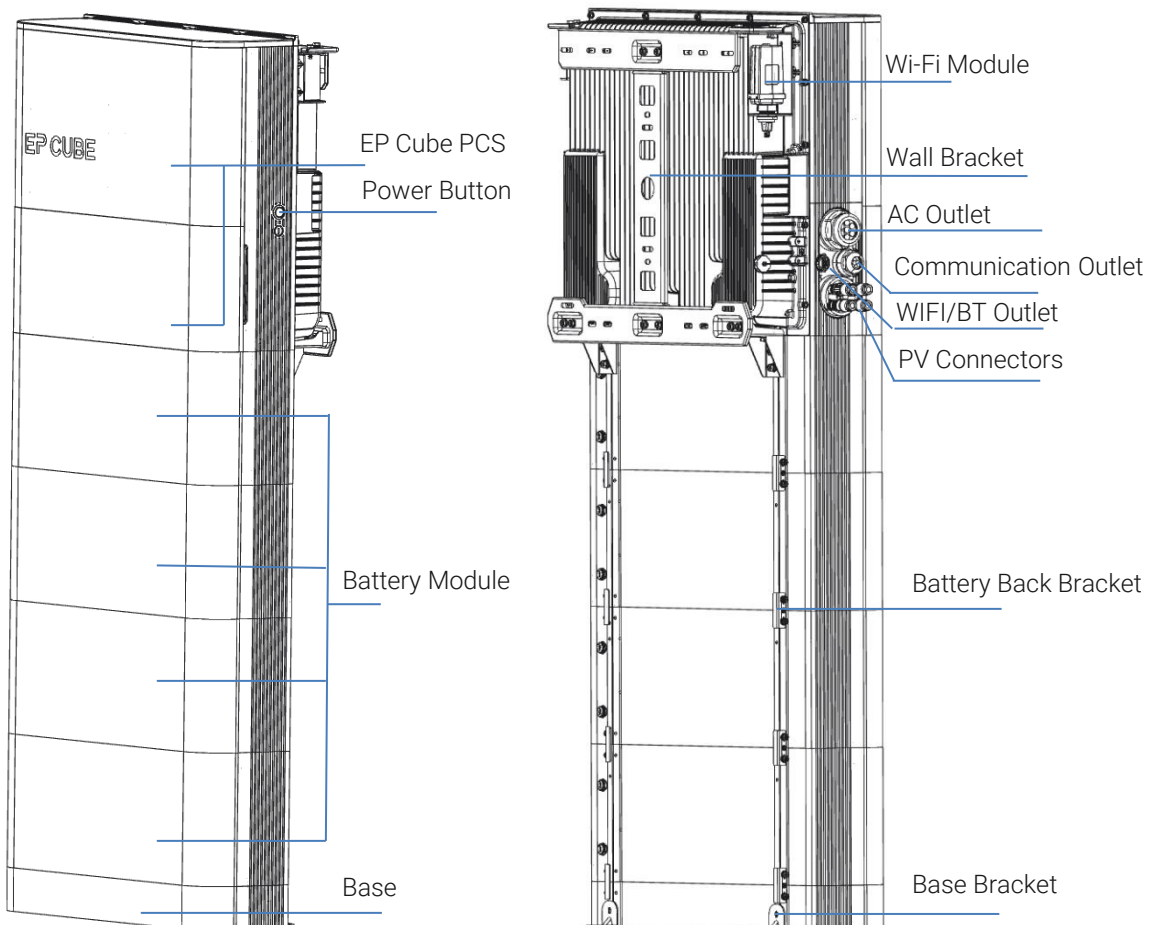
### 1. Appearance

#### 1.1 EP Cube HES

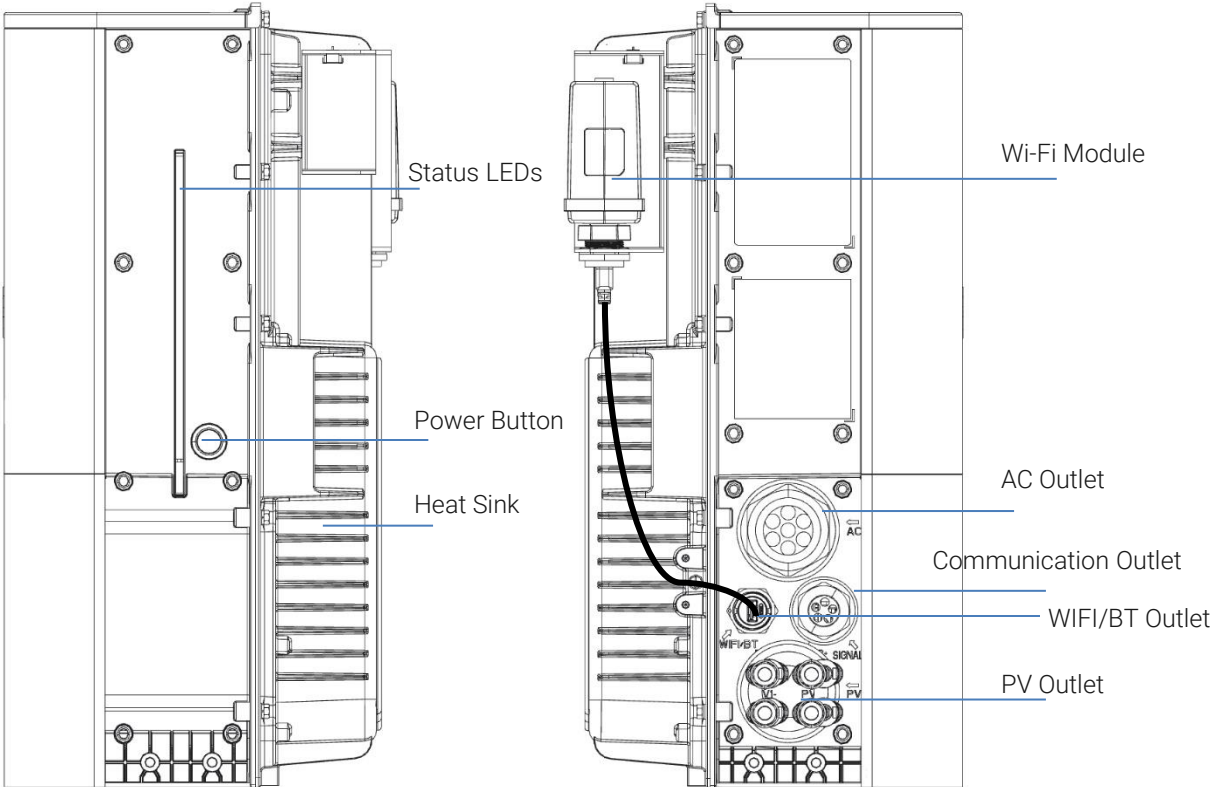
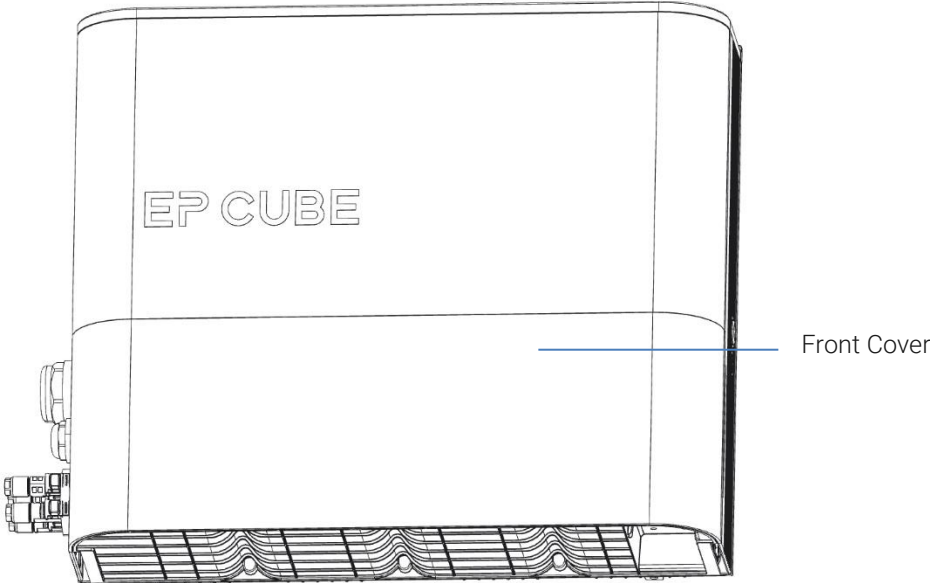
EP Cube HES is an integrated energy storage product that includes both EP Cube PCS and Battery Modules. The number of integrated battery modules can vary between a minimum of 2 modules to a maximum of 4 modules connected in series with EP Cube PCS. (Refer to EU Specification for more details)

Reference Model:

EP Cube PCS + 4x Battery Modules

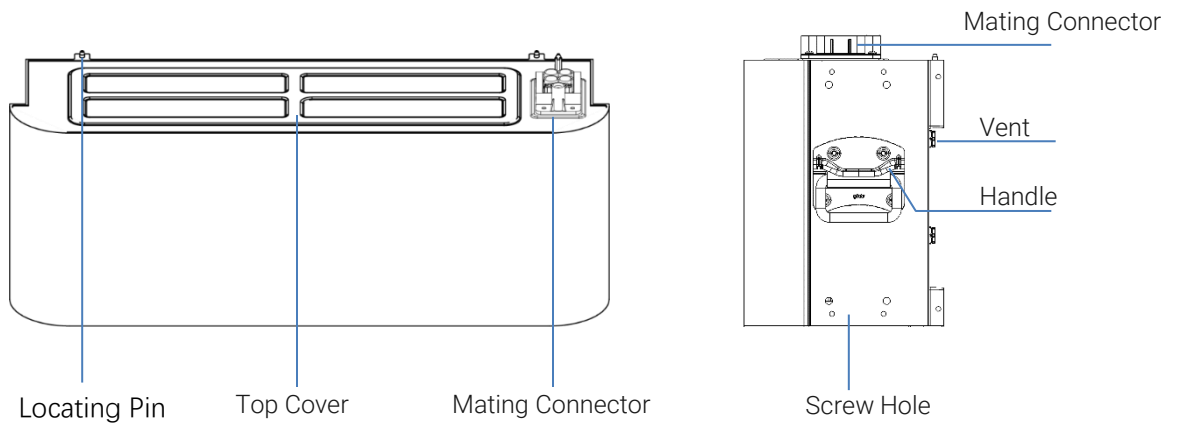


## A. EP Cube PCS

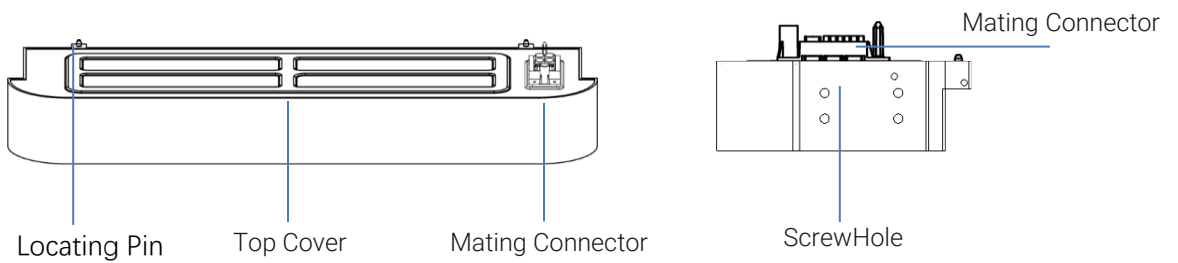




## B. EP Cube Battery Module



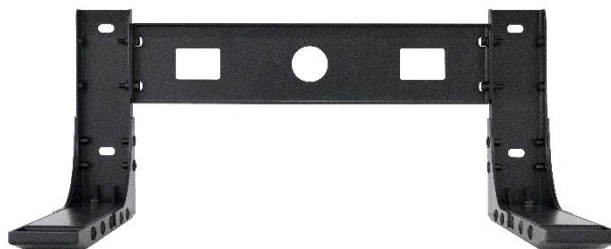
## C. EP Cube Base



## D. EP Cube AC Switch Box (optional)



## E. EP Cube Wall-mount Kit (optional)



## 2. Operation Modes

The EP Cube has 3 different operation modes designed to accommodate a wide range of energy preferences and different needs.

### 2.1. Self-Consumption Mode

During this mode power generated by PV is utilized to supply power to connected loads as a priority. In the daytime, the PV system supplies power to loads and battery modules. Any surplus power is then used to charge the battery modules. Only once battery modules are fully charged, power is exported to grid. At night, the batteries and power grid supply power to loads. This mode maximizes the use of PV power.

In self-consumption mode, the user can set the lowest threshold for the Reserve SOC value in order to save some energy for emergency use only.

If  $PV > \text{Loads}$ , the excess PV electricity will charge the battery. If the battery is fully charged, and the PV electricity is allowed to be exported to the grid, then the excess PV electricity is exported to the grid; If the PV electricity is not allowed to be exported, the PV will be restricted to the load only.

If  $PV < \text{loads}$ , then battery will not be charged, and grid power will be used to support the loads.

When battery reaches the reserve soc, it is not discharged to the loads.

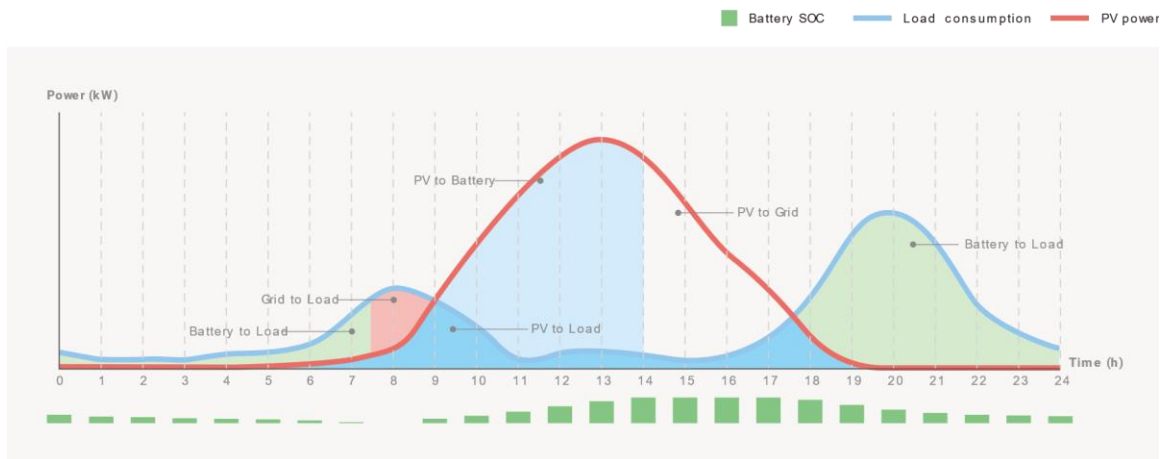
**Note:** During off-grid operation, the battery SOC can only be discharged to 15%. This is to ensure that battery does not completely drain during prolonged grid outage or in severe weather conditions.

PV Power Usage Priority: Load > Battery > Grid.

Load Energy Source Priority: PV > Battery > Grid

Battery Charging Source: PV only

Once the EP Cube SOC reaches the value of Reserve SOC - set through the app-household loads will be supported by grid power. The self-consumption mode is depicted in the following figure:



## 2.2. Backup Mode

During this mode, energy stored by the battery modules is reserved for backup only, and batteries only get discharged in case of grid blackout or other power failures.

This mode also offers the user to set a threshold value for Reserve SOC in order to use stored energy for emergency/backup use only.

**Note:** During off-grid operation, the battery SOC can only be discharged to 15%. So the value set by the user can't be lower than 15%, otherwise it can't enter the backup mode.

PV Power Usage Priority: Battery > Load > Grid

Load Energy Source Priority: Grid > PV > Battery

Battery Charging Source: PV > Grid

## 2.3. Time of Use Mode

This mode offers time-based control for best cost efficiency if the electricity cost varies throughout the day. TOU mode offers mainly 3 features to configure EP Cube to meet diverse power needs under different scenarios.

- a. Allows to input TOU time window.
- b. It allows to choose whether to charge the batteries via grid or not during off-peak hours.
- c. Allows to enable/disable Daylight Saving Time (DST) if TOU time window changes due to DST.

During Off-peak hours, the EP CUBE will be charged from PV as the priority power source. If PV power is not sufficient, then the end-user can allow the EP CUBE to charge from the grid at a low price of electricity, in order to ensure that battery modules are full charged before peak hours.

Battery Charging Source: PV > Grid  
Load Energy Source Priority: PV > Grid

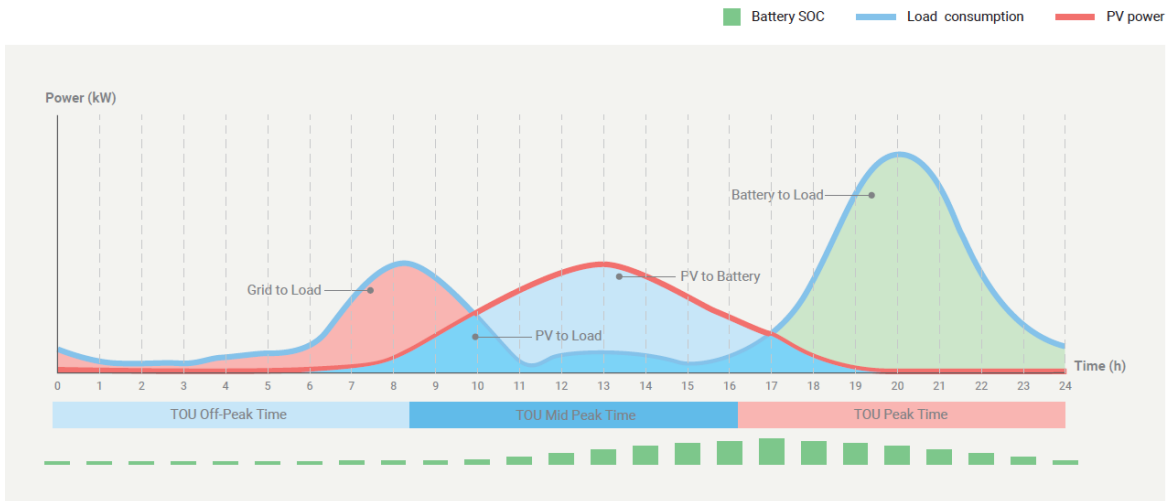
During mid peak hours, loads are supported by PV as priority power source. Any additional consumption is covered by grid. The battery does not discharge during the mid peak hours(Except off-grid operation). PV is the only battery charging source during mid peak hours.

In case PV is available, and PV > loads, surplus PV will be used to charge the battery as much as fully charged. When battery is fully charged, if electricity is allowed to be sold, the excess PV energy will enter the grid. If it is not allowed to enter the grid, the PV power will be limited to the load only.

PV Power Usage Priority: Load > Battery > Grid  
Load Energy Source Priority: PV > Grid  
Battery Charging Source: PV only

During peak hours, the EP CUBE supports the load's power consumption from PV power and battery to avoid using grid electricity at a high price. Loads are supported by PV and battery as priority power sources. Any additional consumption is covered by the grid. During peak hours, the system operation is similar to the "Self Consumption" mode. The following figure depicts the system operation during TOU mode.

PV Power Usage Priority: Load > Battery > Grid  
Load Energy Source Priority: PV > Battery > Grid  
Battery Charging Source: PV only



**Note:** During off-grid operation, in the case of no PV, there is a load, and the discharge will be carried out; the discharge ends at 15% of the off Grid reserve SOC, and the discharge will be stopped.

When there is DC PV, and PV power > load power loads, PV will charge the battery, and finally the battery can be fully charged, then PV will be current-limited and only used for load.

If there is PV < load, PV + battery will support the loads.

Additionally, the EP Cube carries a Day-Light Saving Time (DST) function in case your peak and off peak hours change when DST is active in your time zone. It allows the user to set different off-peak and peak hours for the months when DST is enabled.

## 3. Eskom Function Introduction (available only in South Africa)

South Africa will experience power outages during a fixed period of time, so it is necessary to switch the EP cube system to backup mode for storing electricity energy earlier before the power outage. After the power outage is over, the EP cube system will be switched back to its original mode. The duration of the power outage needs to be obtained through a third-party interface.

Eskom function will be automatically activated after first installation in South Africa. The default backup time is 60 minutes which is able to be changed by EP administration account if necessary. When Eskom function is activated, EP system will switch to back-up working mode and the PV and grid power will charge battery first before supplying loads.

### 3.1 Logics of Eskom Function

There are totally three different logics for Eskom function which are used for running before electricity blackout, during electricity blackout and after electricity blackout.

#### a. Before electricity blackout

Everyday EP cube system will query the outage time period of a region based on the location of all devices in the system. The system will execute once a minute, to detect whether the current time has reached the time to switch modes or not. If the current time + backup time  $\geq$  the start time of the electricity blackout, EP cube system will execute the switch to power backup mode task. The backup time is only able to be manually set and updated based on system capacity.

The system's responding time will be five seconds after receiving the order to switch to backup mode task.

#### b. During electricity blackout

EP cube system will continuously run under backup mode until either the battery soc reach 15% or power outage is over.

#### c. After electricity blackout


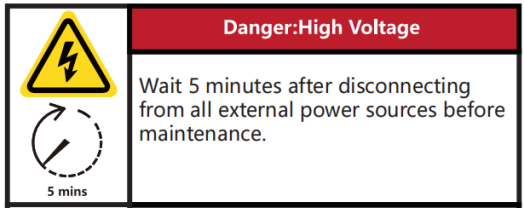

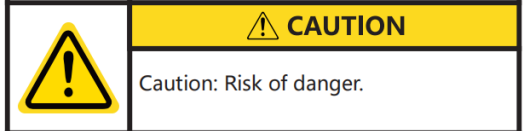
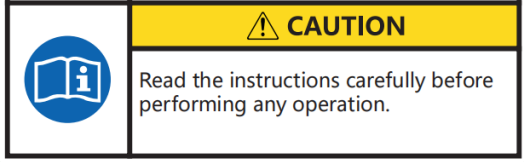

The system will also execute once a minute, to detect whether the current time has reached the time to recovery mode which is able to recover to original working mode automatically. For example, if the working mode is self-consumption before power outage, the system will switch back to self-consumption after power outage time is over.

If the current time  $\geq$  the power outage time, EP cube system will execute the switch to recovery mode task.

The system's responding time will also be five seconds after receiving the order to switch to recovery mode task.

## 4. Warning Labels Description

Below table lists down all the warning labels that are visible on product enclosure after unpacking. Please read the descriptions, and follow the instructions.





Label	Name	Description
	High Temperature	Burn Hazard! Do not touch the product surface to avoid being burnt as it can get hot
	High Voltage/Delayed Discharge	Risk of Electric shock! High voltage exists even after the EP Cube is powered off. Wait 5 minutes after power off until the components are completely discharged.
	Electrical Hazard	Risk of Electric shock! Only qualified and trained electricians authorised by EP Cube are allowed to install, operate and repair.
		
	Ref. to Documentation	Read Instruction! It reminds to read the instructions provided for proper installation and operation carefully before performing any actions.
	Ground	Indicates the position of connection point for PE wires on EP Cube PCS.







## 5. Product Labels

Figures given below show the product labels of EP Cube PCS, and EP Cube Battery Modules. These product labels provide key parameters for inverter and batteries including nominal voltages, currents, rated power, storage capacity, and operating conditions. This information is visible to qualified professionals during the installation and operation.

**Notice:** Please use the mark pen to mark the corresponding parameters.

EP CUBE	
EP Cube HES-EU1 706G <input type="checkbox"/> 710G <input type="checkbox"/> 713G <input type="checkbox"/> 716G <input type="checkbox"/> 720G <input type="checkbox"/>	
EP Cube HES-EU2 S7-10G <input type="checkbox"/> S7-15G <input type="checkbox"/> S7-20G <input type="checkbox"/>	
HYBRID INVERTER PARAMETERS	
Model	EP Cube PCS-EU1-7G
PV SPECIFICATIONS	
Max PV input voltage	600Vdc
MPPTs	2
Number of input per MPPT	1
Max. PV power per MPPT	5kWp
MPPT voltage range	90~550Vdc
Max. MPPT input current per MPPT	16Adc
Max. MPPT short circuit per MPPT	20Adc
AC SPECIFICATIONS	
Nominal grid voltage	1ph / L+N+PE / 230Vac
Nominal frequency	50Hz
Power factor	0.8ind.~0.8cap.
Max. continuous power (On-Grid side)	4.6kW <input type="checkbox"/> 5kW <input type="checkbox"/> 6kW <input type="checkbox"/> 7.3kW <input type="checkbox"/> 7.6kW <input type="checkbox"/>
Max. continuous current (On-Grid side)	20.0Aac <input type="checkbox"/> 21.7Aac <input type="checkbox"/> 26.1Aac <input type="checkbox"/> 31.7Aac <input type="checkbox"/> 33.0Aac <input type="checkbox"/>
Max. continuous power (AC-Backup side)	7.6kW
Max. continuous current (AC-Backup side)	33.0Aac
SYSTEM PARAMETERS (only available when the Batteries Modules are connected)	
Battery quantity	2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/>
Cell technology	LiFePO <sub>4</sub>
Rated capacity	90Ah <input type="checkbox"/> 100Ah <input type="checkbox"/>
Nominal capacity	6.6kWh <input type="checkbox"/> 10kWh <input type="checkbox"/> 13.3kWh <input type="checkbox"/> 15kWh <input type="checkbox"/> 16.6kWh <input type="checkbox"/> 20kWh <input type="checkbox"/>
Nominal voltage	76.8Vdc <input type="checkbox"/> 102.4Vdc <input type="checkbox"/> 115.2Vdc <input type="checkbox"/> 153.6Vdc <input type="checkbox"/> 192Vdc <input type="checkbox"/> 204.8Vdc <input type="checkbox"/> 230.4Vdc <input type="checkbox"/>
Max. charge / discharge current	55Adc
SYSTEM SPECIFICATIONS	
Ambient temperature (operating / recommended)	-20~50°C / 0~30°C
Ingress protection	IP65
Protective class	Class I
   	
Add:27th Floor,Building 3A,Longgang Intelligent Park,Shenzhen,China Web:www.eternal-planet.com	
Made in China	

BATTERY MODULE	
EP Cube B2-5G2	
Battery type	Rechargeable Li-ion Battery (LiFePO <sub>4</sub> )
Rated capacity	100Ah
Nominal capacity	5000Wh
Nominal voltage	51.2V
Weight	42kg
Ambient operating temperature (charging)	0~50°C
Ambient operating temperature (discharging)	-20~50°C
Ingress protection	IP65
Protective class	CLASS I
Maximum elevation	3000m
  	
	
Add:27th Floor,Building 3A,Longgang Intelligent Park,Shenzhen,China	
Made in China	

## EP Cube INSTALLATION

EP Cube can be mounted on the wall and comes with all required mounting brackets including the screws and fasteners needed for installation.

### 1. Installation Site Requirements

Complete site information by gathering data through a site survey

#### 1.1 General Environmental Condition:



#### WARNING

Do not install the EP Cube in places and conditions mentioned below:

- Places where it is difficult to install and operate the EP Cube system.
- Places exposed to rapid temperature changes and extreme weather conditions.
- Places exposed to volatile, flammable, corrosive and other harmful gases.
- Places exposed to significant vibrations or shock.
- Places exposed to water vapor, oil vapor, or condensation.
- Places exposed to strong electric fields.
- Places exposed to excessive direct rain and snow accumulation.
- Places where there is a risk of flooding.
- Places exposed to direct sunlight or near other heat sources.
- Temperature where the operation temperature range as followed: -20~50°C.
- Places affected by heavy salt damage as defined in this section.
- Places with altitude higher than 3000m above sea level.
- Places in salt-affected areas where it is directly exposed to sea breeze because it may corrode.



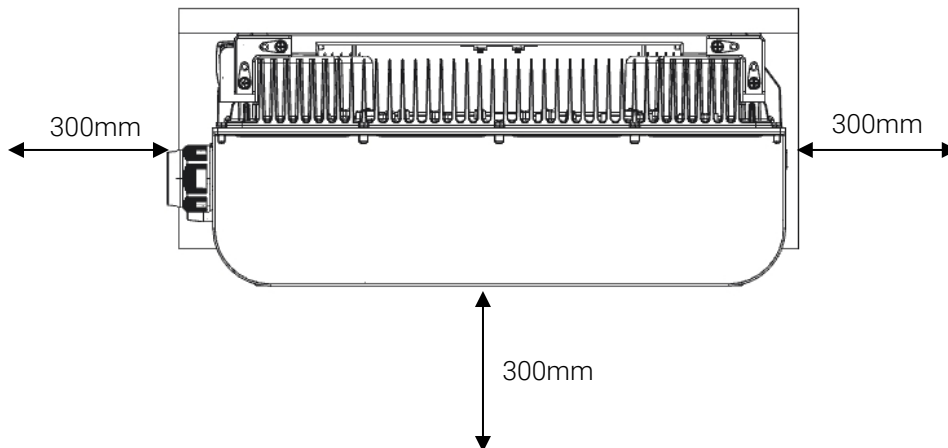
#### CAUTION

Installation considerations for the areas with extreme snow fall:

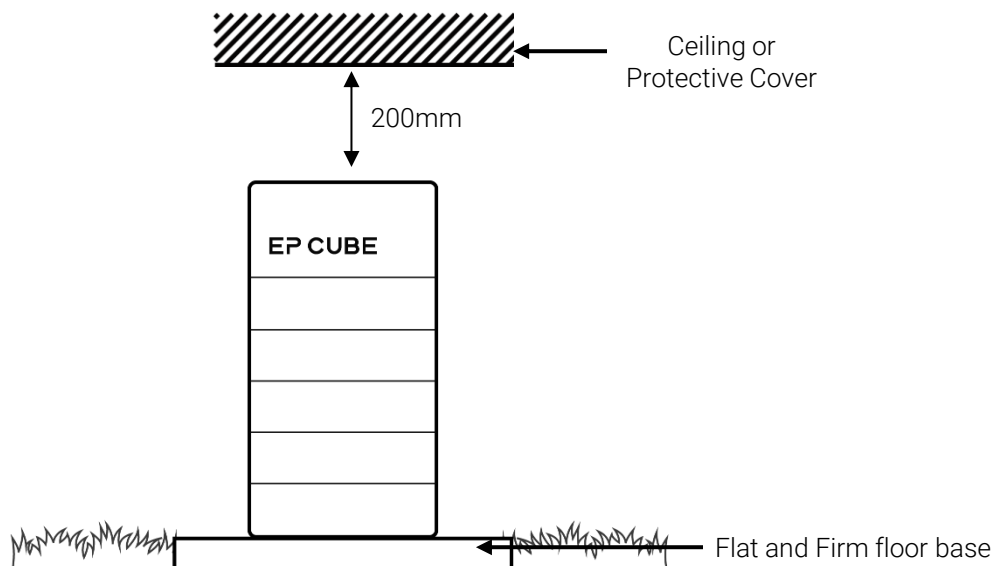
- It is highly recommended to not install EP Cube HES in places where it is directly exposed to snow or where snow can be accumulated in surrounding spaces.
- Ensure to install a protective roof cover and snow fence. If the installation must be performed outdoor in such conditions.
- Check the local regulations related to snow conditions, and ensure complete compliance to them.
- Choose appropriate foundation/base with enough height to avoid any accumulated water from melted snow.
- Keep the surrounding area free of accumulated snow.

**In order to ensure a convenient installation and operation, all sides should have enough clearance for safe operation and installation while meeting the local electrical codes and regulations.**

- The minimum space required from the back of the EP Cube to the mounting wall is adjusted by the wall bracket and PCS L bracket. Refer to the details on page 30 for the base installation.
- The minimum space from the sides and between any two units is 300mm.
- The minimum space between the ceiling/cover and the top of EP Cube is 200mm.
- For wall mounting installation, the minimum distance from the door, and windows should be at least 1000mm.



**Note:** All the dimensions are expressed in mm.

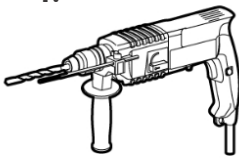


## 1.2 Required Tools

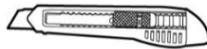
This section lists down the required tools and materials needed during the installation process of EP Cube HES.

### Tools & Materials

1.



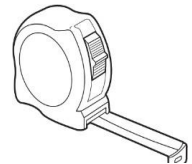
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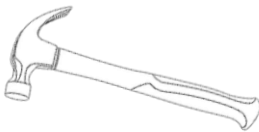
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4.



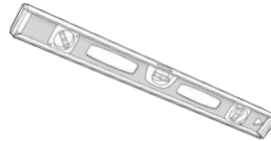
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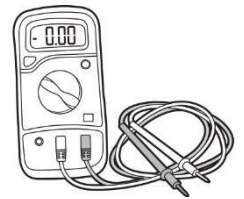
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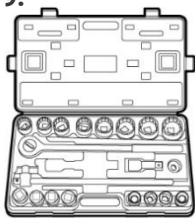
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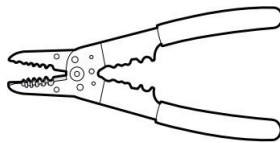
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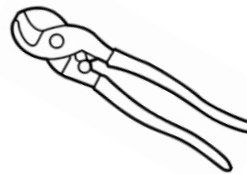
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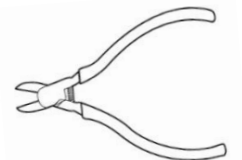
10.



11.



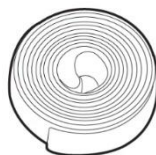
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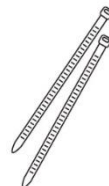
13.



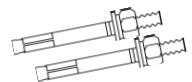
14.



15.



16.



17.



18.

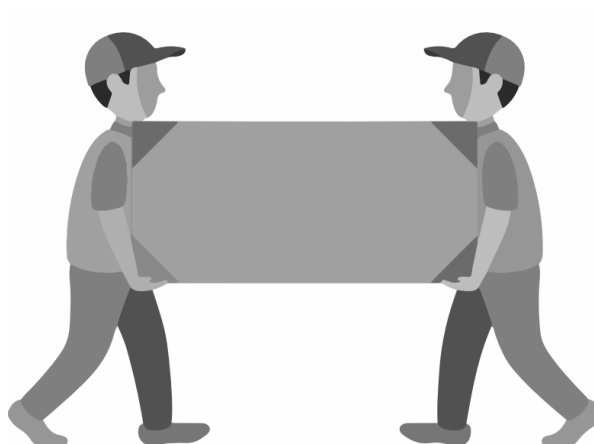


## Tools & Materials

S. No	Tool	Specs/Quantity
1	Drilling Machine	With Drill bits
2	Cutter	01
3	Marking Pen	01
4	Tape measure	01
5	Hammer	01
6	Electric Screwdriver	Cross head
7	Spirit Level	01
8	Digital Multimeter	01
9	Socket Set	01
10	Wire Stripper	01
11	Wire Cutter	01
12	Plier	01
13	Wrench	01
14	Insulation sleeve	As required
15	Cable Ties	As required
16	Anchor Bolts	As required, $\Phi 5.5 \times 8$ Pcs
17	Crimping Tool	01
18	Wires	2.5mm <sup>2</sup> , 6-8 mm <sup>2</sup>

### 1.3 Handling and Installation

**Note:** Two people are recommended.



## 1.4 Installation Space

In order to ensure a safe installation, please pay attention in choosing the right mounting method. The Installation surface should be able to support the product weight with suitable concrete strength and anchors specifications.

Ensure that the installation surface is flat by using a spirit level.

Ensure there is no gap between the installation surface and EP Cube brackets. Any gaps may lead to accumulated exposure of water. It can cause corrosion and therefore the product could fall .

Model No	Weight	Product Name	Weight
EP Cube HES-EU2-S7-10G	125.5 Kg	EP Cube PCS	38 Kg
EP Cube HES-EU2-S7-15G	167.5 Kg	EP Cube B2-5G2	42 Kg
EP Cube HES-EU2-S7-20G	209.5 kg	EP Cube Base	3.5 Kg

## 2.On-site Installation

### WARNING :

EP Cube can only be installed, repaired, replaced, and maintained by the EP authorized personnel for safety and warranty purposes. It is prohibited to install any third-party component or devices inside the EP Cube without prior approval from the EP service team.

For personal protection and property safety, please read the safety chapter and ensure complete compliance during the entire installation process.

Please ensure to avoid the installation of the EP Cube in environments where it is exposed to excessive rain, direct sunlight, dust, flooding, or accumulating snow.

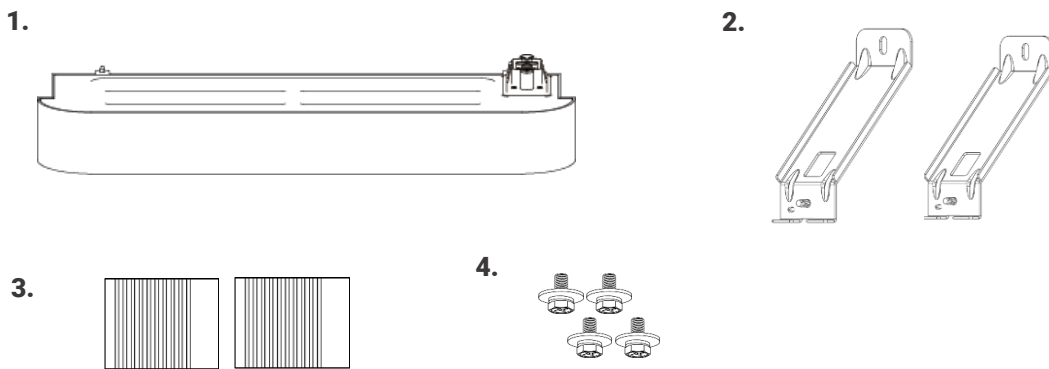
During the installation and handling of EP Cube batteries or PCS, extreme care is required to avoid dropping, bumping, or stomping the modules. This can lead to damage to the paint or bent edges.

**NOTE:** Anchor bolts and fasteners are needed for ground installation to fix the base to the wall, PCS wall bracket and for the optional wall mount kit, respectively, and they need to be provided by the installer. Installer must ensure to carry M6 and M8 anchor bolts for the installation of Base or wall mount kit, and if it is the Wooden wall, Wooden Screws\_5.5\*80mm should be prepared.

## Packing List

Below figure and table lists down all the components that should be available for successful installation. Please carefully unpack, locate and promptly contact EP if a component is misplaced or damaged during transportation.

### EP Cube Base Box



1. Base- 1pcs

2. Base Bracket B1- 2pcs

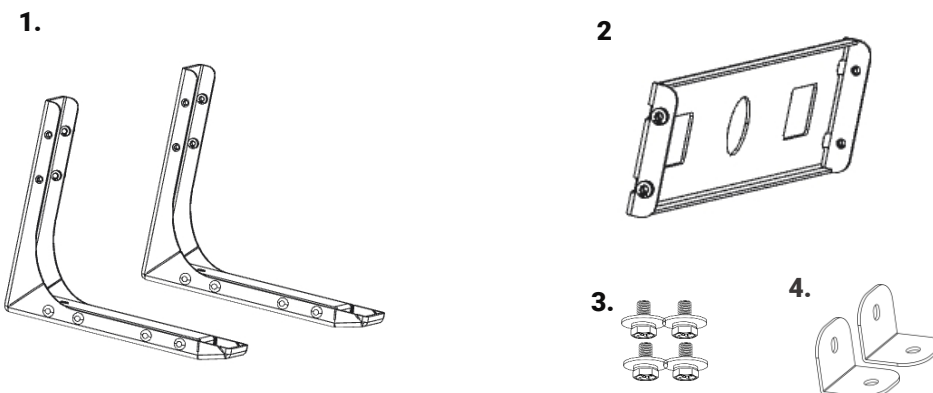
3. Base Side Cover- 2pcs

4. Base Bracket M6 Screws- 4pcs

Note: Base Back bracket no longer needed to be installed.

Note: Put the Side Covers aside until installation is complete.

### EP Cube Wall Mounting Kit Box (optional)



1. Wall Mount Bracket E1- 2pcs

2. Wall Mount-Bracket E2\_1pcs

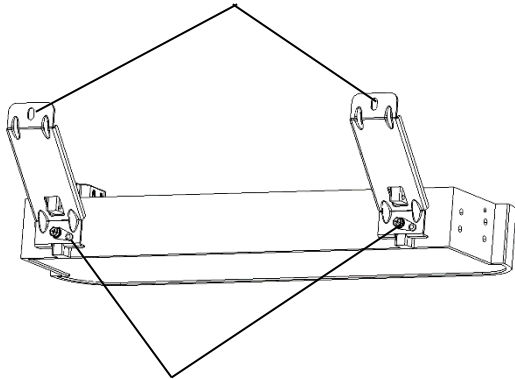
3. Wall Mount-Bracket M6 Screws- 4pcs

4. Base Bracket- 2pcs

## Floor mounted : Install the EP Cube Base on the floor

- a. Assemble the Base Bracket B1 and base with the M6 bolts. Tighten the bolts by using the screwdriver.

Holes for Wall Installation:  $\Phi 5.5 \times 80 \text{mm}$



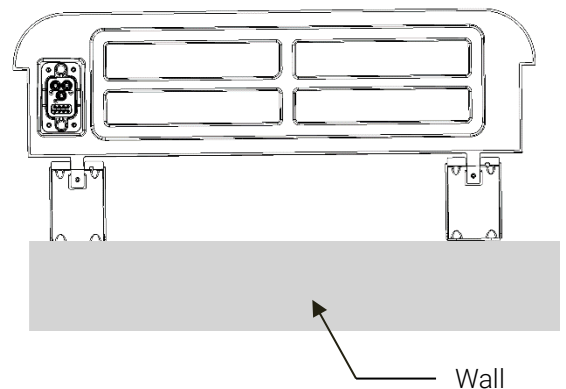
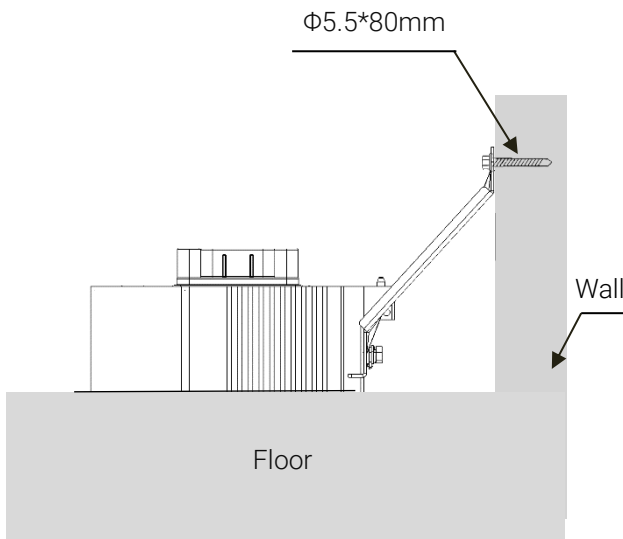
2x M6 \* 16   M6  7.0 N·M


**Note:**  $\Phi 5.5 \times 80 \text{mm}$  bolts for installation on the wall are not provided by EP .

- b. Align the Base Bracket B1 on the wall and mark the mounting holes positions. Ensure that the bracket is straight and level with the help of spirit level to avoid improper installation.

- c. Once drilling positions are marked, remove the base and use an appropriate drilling machine with a drill bit of  $\Phi$  M6 to drill through the concrete wall. In case of a wooden wall, drilling is not required.

- d. Check the leveling of installed base with spirit level, and use electric screwdriver to tighten screws to properly fix the base on the wall.

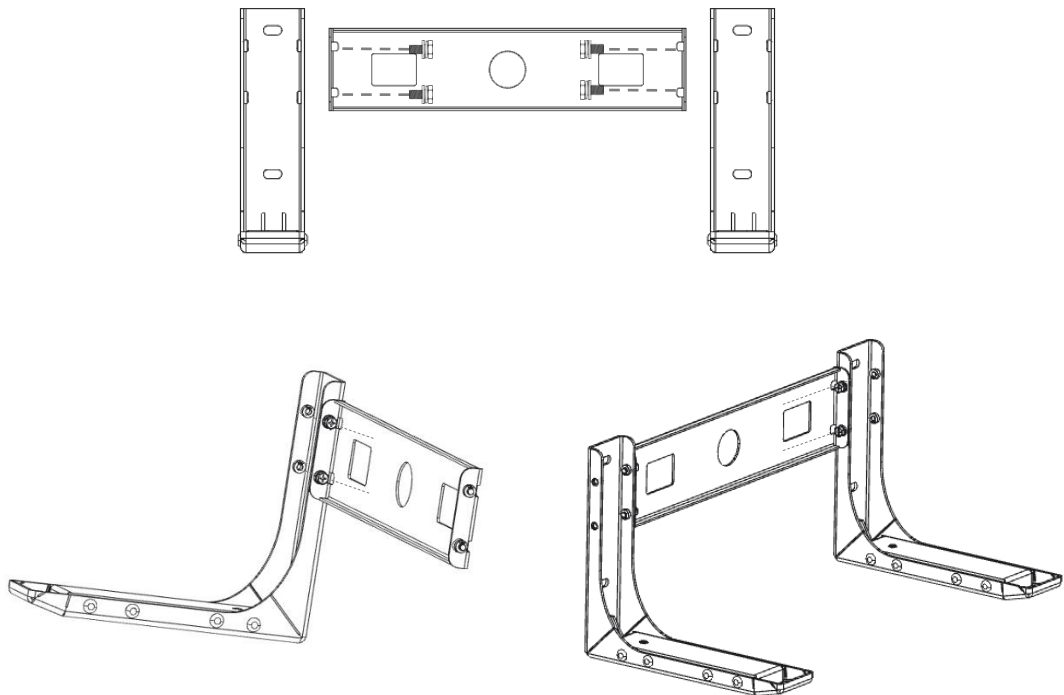


 **CAUTION:** Please keep a safe distance between the EP Cube HES and other objects.



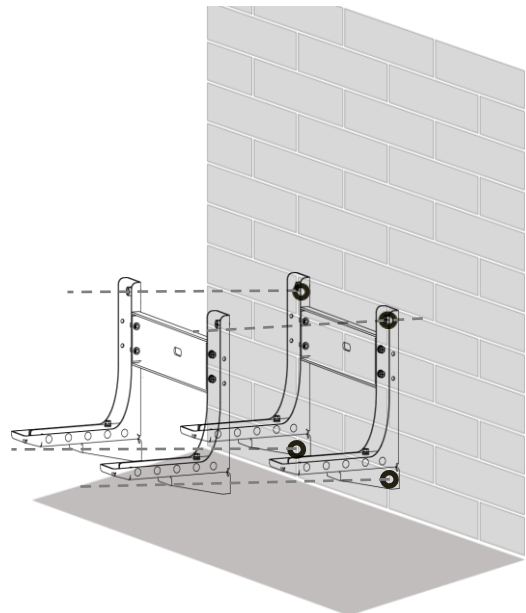
## Wall mounted B: Install Wall-mount Kit and Base

a. Assemble the Wall-Mount bracket ( referred as E ), attach Bracket E1 to the Bracket E2 from the left and right sides with the M6 bolts. Tighten the bolts by using the screwdriver.



b. Place and align wall-mount kit (Bracket E) on the wall and mark the mounting holes positions. Ensure that the bracket is straight and level with the help of spirit level to avoid improper installation.

c. Once drilling positions are marked, remove the base and use an appropriate drilling machine with a drill bit of  $\Phi$  M8 to drill through the concrete wall.



d. After drilling the holes, insert anchor bolts in the drilled holes. Remove the washers and nuts. Place the wall-mount bracket on the bolts, place the washers and fasten the nuts manually. Check the level of installed wall mount bracket with spirit level, and use electric screwdriver to tighten nuts to properly install the wall-mount kit on wall.

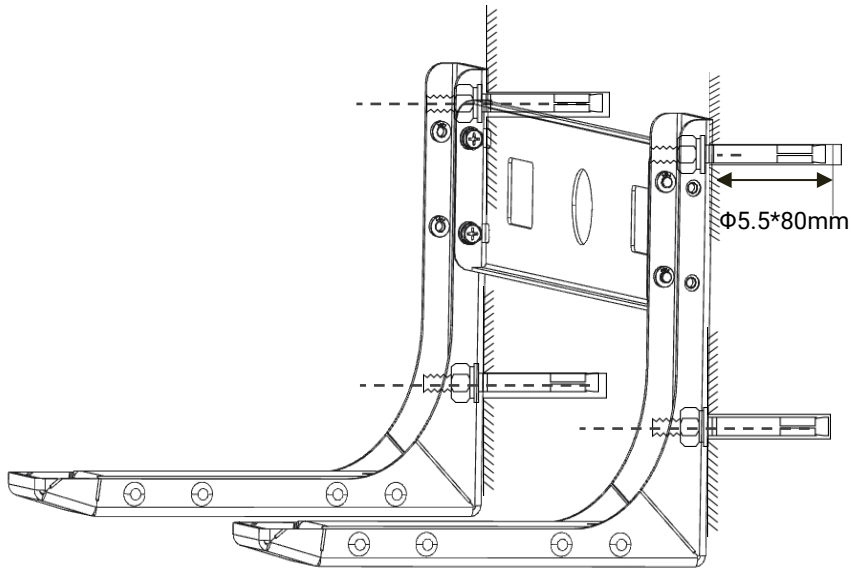


Fig. 4x  $\Phi 5.5$  anchor bolts to install the Wall-mount Kit.

e. Align the base bracket oval holes with the holes on the base, then use the screws ( $M6 \times 20\text{mm}$ ) to fasten together.

f. Now, place the base with pre-installed base bracket on the wall-mount kit. Align the round holes of the base brackets with the holes on the wall mount kit, and use screws ( $M6 \times 20\text{mm}$ ) to fasten base to the wall-mount kit. Verify that the Base is level using the level tool.

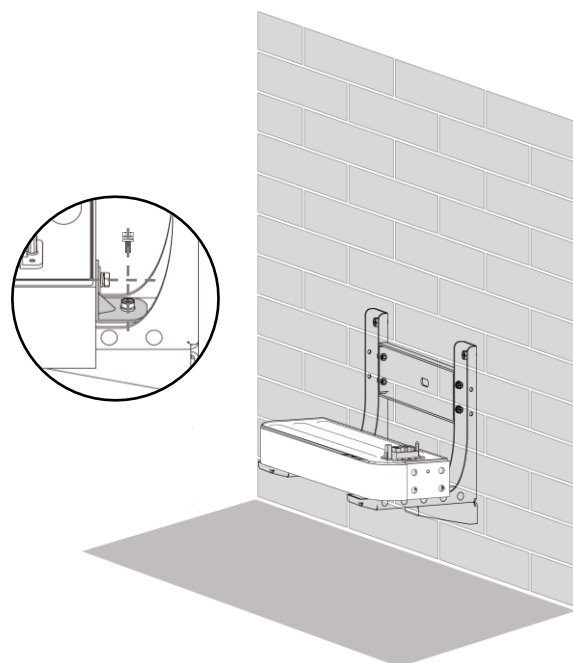
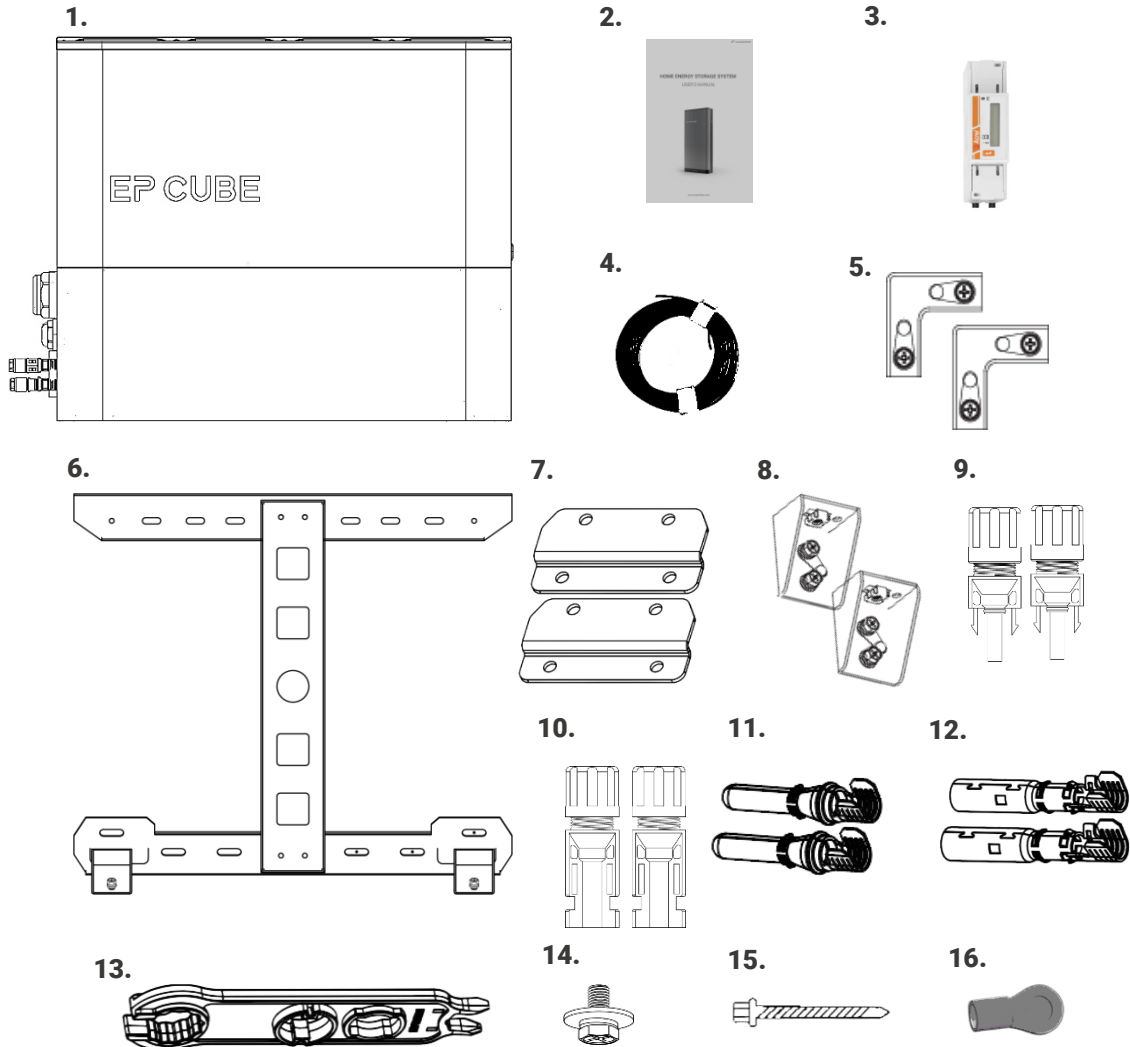


Fig. Fasten Base on Wall-mount Kit

## Packing List

Below figure and table lists down all the components that should be available for successful installation. Please carefully unpack, locate and promptly contact EP if a component is misplaced or damaged during transportation.

### EP Cube PCS Box



- |  |  |
|--|--|
| 1. EP Cube PCS- 1pcs                           | 9. Davelan PV Connectors (Male)- 2pcs                  |
| 2. EP CUBE HES Instruction Page- 1pcs          | 10. Davelan PV Connectors (Female)- 2pcs               |
| 3. Single Phase Smart Meter -1pcs              | 11. Davelan Connector Contact Pins (Male)- 2pcs        |
| 4. Smart Meter Communication Cable (10m)- 1pcs | 12. Davelan Connector Contact Pins (Female)- 2pcs      |
| 5. PCS L bracket- 2pcs                         | 13. Davelan PV Connector disassembly tool- 1pcs        |
| 6. PCS Wall Mount Bracket- 1pcs                | 14. M5 Screws- 8pcs                                    |
| 7. PCS Side Bracket- 2pcs                      | 15. Self-drilling Self-tapping Screws $\phi$ 5.5-10pcs |
| 8. Battery Top Bracket- 2pcs                   | 16. OT-Shaped Termination- 3pcs                        |

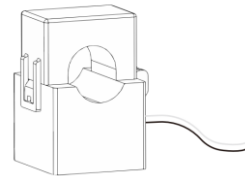
## Single Phase Smart Meter (small box inside the PCS packaging)

1.



1. Single Phase Meter - 1pcs

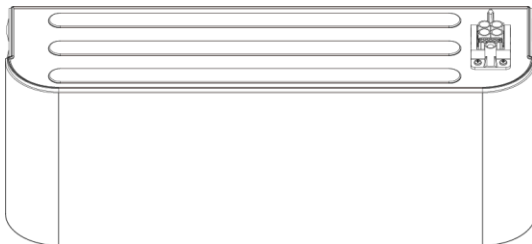
2



2. CT(with 5m cables)- 1pcs

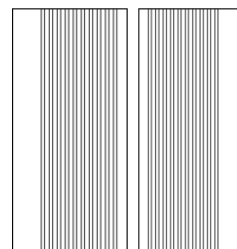
## EP Cube Battery Module Box

1.

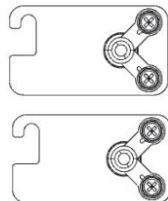


1. EP Cube Battery Module- 1pcs  
2. Battery Module Side Cover- 2pcs

2.



3.



4.



3. Battery Side Bracket- 2pcs  
4. Battery Back Bracket- 2pcs

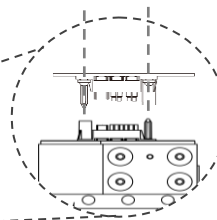
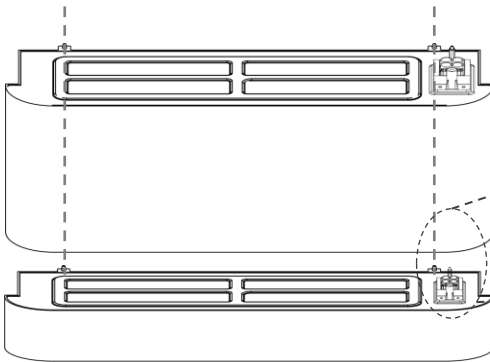
### Note:

Battery Back Bracket is optional when doing the installation.

Put the Side Covers aside until installation is complete.

## Install the Frist Battery Module

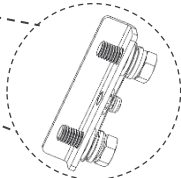
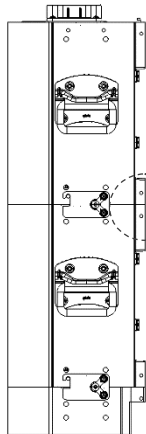
- a. Carefully place the **Frist Battery Module** on top of the base and ensure that battery mating connector sockets are well aligned.



Matting Connectors

- b. Fasten the back brackets between the battery module and base using screws, and manually tighten them. The sockets for screws are on the protruding columns on both the left and right sides.

Note: Battery Back Bracket is optional when do the installation.

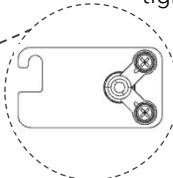
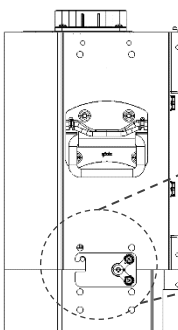


Back Bracket (Optional)



5 N·M

- c. Fasten Side Brackets between adjacent battery module and base, on both the left and right sides with the screws, and manually tighten them.



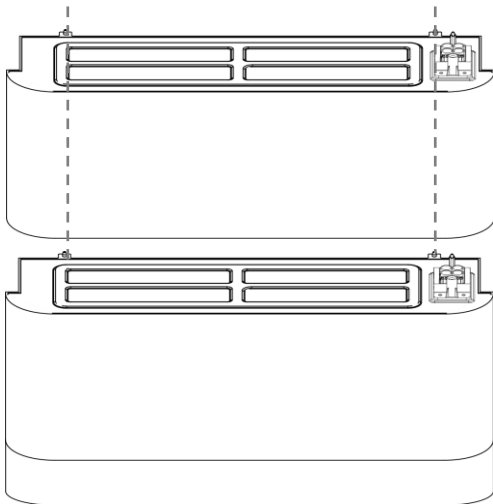
Side Bracket



5 N·M

- d. Tighten all the screws with an electric screwdriver according to the specified torque values.

**Note:** Both side brackets and back brackets have the screws latched with the brackets.



## Install the Second Battery Module

a. Carefully place the **Second Battery Module** on top of the first Battery module and ensure that battery mating connector sockets are well aligned.

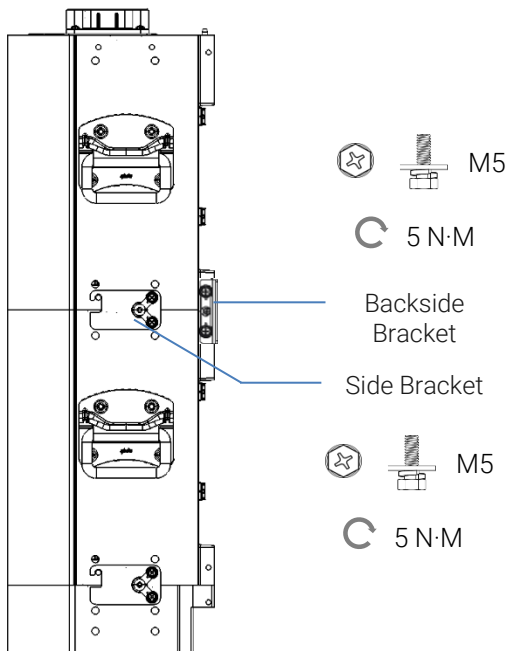
b. Fasten the back bracket between adjacent battery modules, on the protruding column at the back of the battery modules using screws (on both the left and right sides), and manually tighten them.

Note: Battery Back Bracket is optional when do the installation.

c. Attach side brackets between adjacent battery modules, on both the left and right sides with the screws, and manually tighten them.

d. Tighten all screws with electric screwdriver according to the specified torque values.

Repeat steps and to stack the required number of battery modules on top of the base according to the configuration.



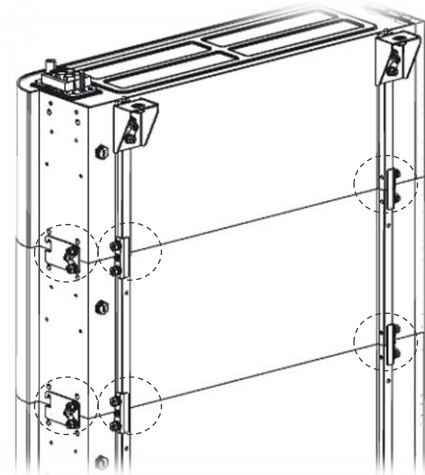
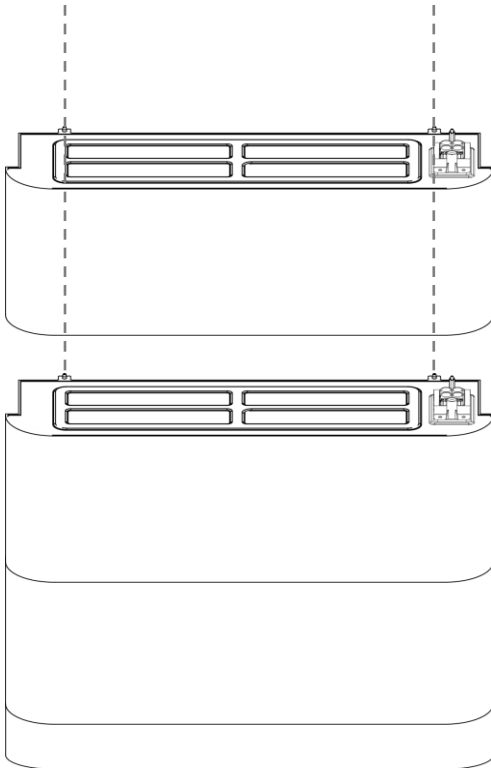
**CAUTION:** The battery module is heavy. For safety reasons, use lifting tools or multiple people to lift it, especially when doing the installation of the top modules.

## Install the remaining Battery Modules

Carefully install the remaining **Battery Modules** one by one by repeating the steps "a and d". Ensure that battery mating connector sockets are well aligned for each battery module.

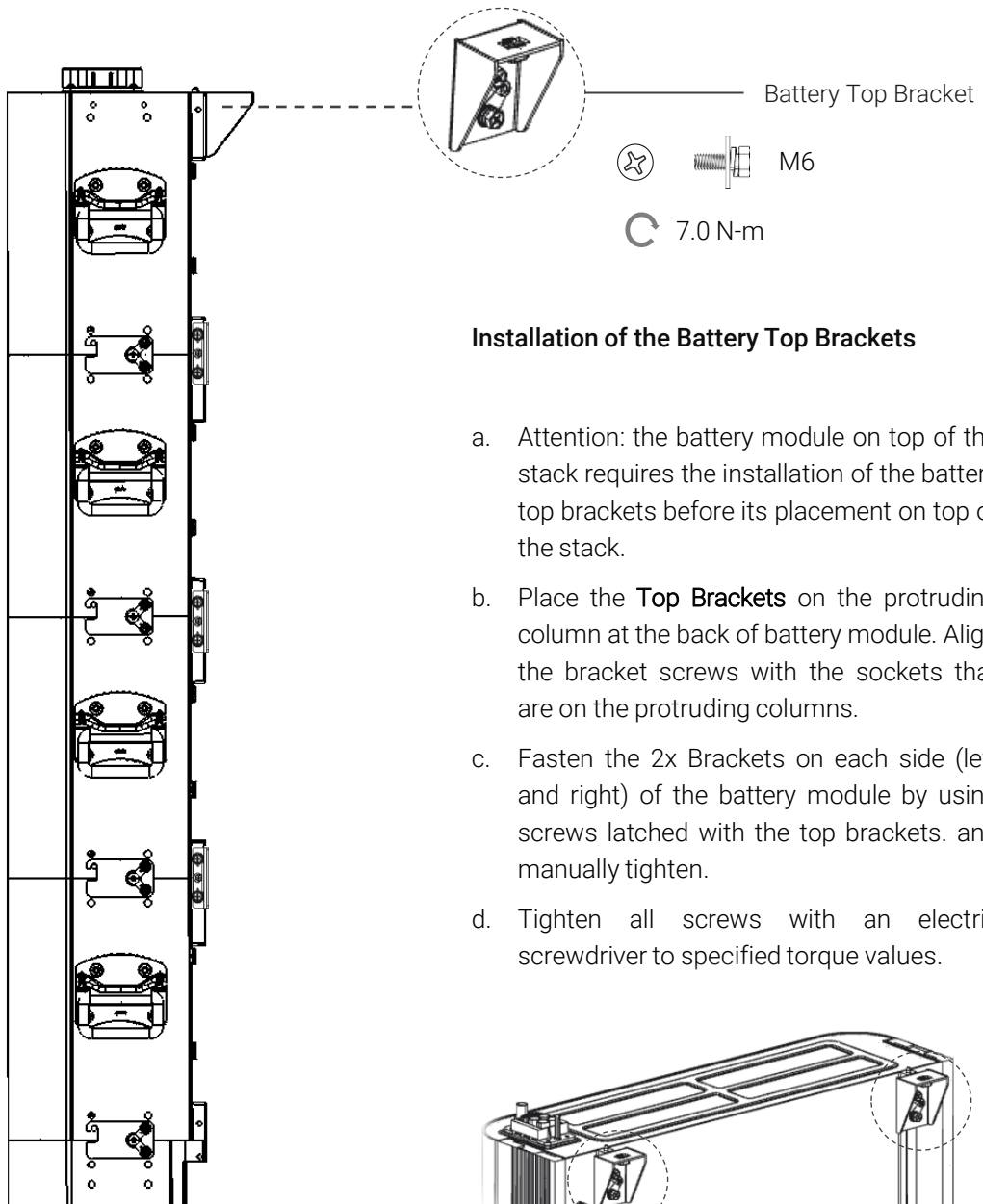
The pair of protruding columns at the back of each module also have a locating pin on top to help with the alignment of adjacent modules.

Tighten all screws with an electric screwdriver to specified torque values.



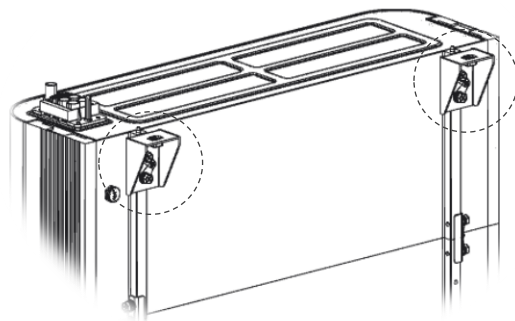
**Note:** Only the battery module on top of the stack needs additional brackets. Refer to the next page for more details.

**CAUTION:** The battery module is heavy, use lifting tools or multiple people to lift it for personnel safety especially when doing installation for top modules.



## Installation of the Battery Top Brackets

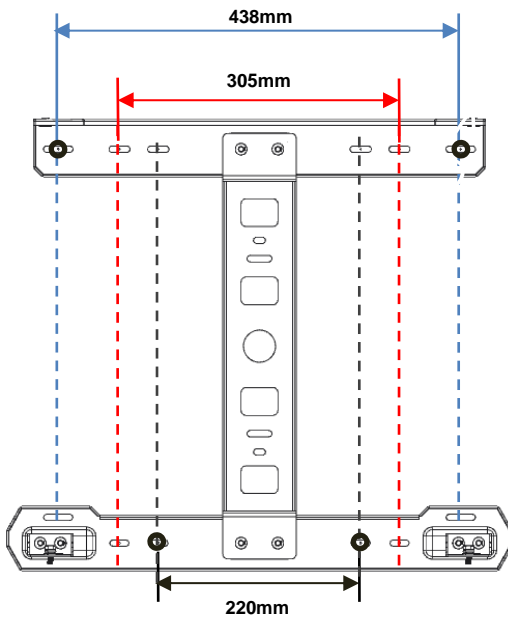
- a. Attention: the battery module on top of the stack requires the installation of the battery top brackets before its placement on top of the stack.
- b. Place the **Top Brackets** on the protruding column at the back of battery module. Align the bracket screws with the sockets that are on the protruding columns.
- c. Fasten the 2x Brackets on each side (left and right) of the battery module by using screws latched with the top brackets. and manually tighten.
- d. Tighten all screws with an electric screwdriver to specified torque values.



- f. Finally, install the battery module by repeating the steps a to d on page 36.



## An overview on the Wall Bracket



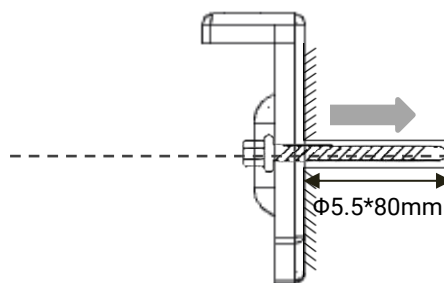
The wall bracket supports different spacing based on selection of mounting holes positions. Choose any 2 holes on both upper and lower branch of the wall bracket.

Choose the holes and mark them on the wall through the bracket using a pencil.

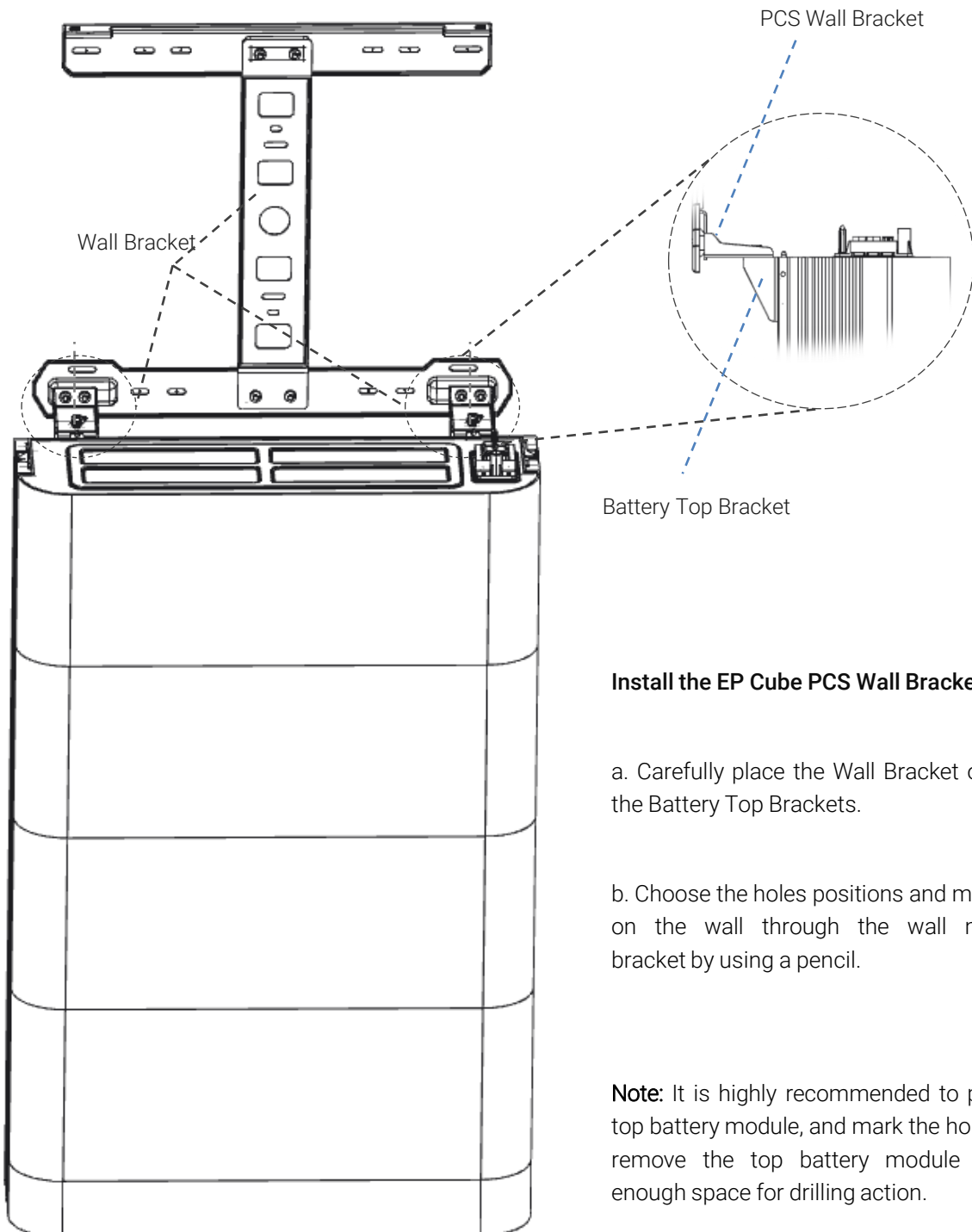
Drill the holes to mount the EP Cube PCS Wall Bracket.

For Concrete walls: Use anchor bolts  $\Phi 5.5 \times 80 \text{mm}$  or use the  $\Phi 5.5 \times 80 \text{mm}$  hex flange head self-drilling tapping screws with wall plugs.

For wooden wall: Use the  $\Phi 5.5 \times 80 \text{mm}$  hex flange head self-drilling tapping screw wooden screws.



Use anchor bolts or wooden screws to install the Wall Bracket on concrete or wooden walls.

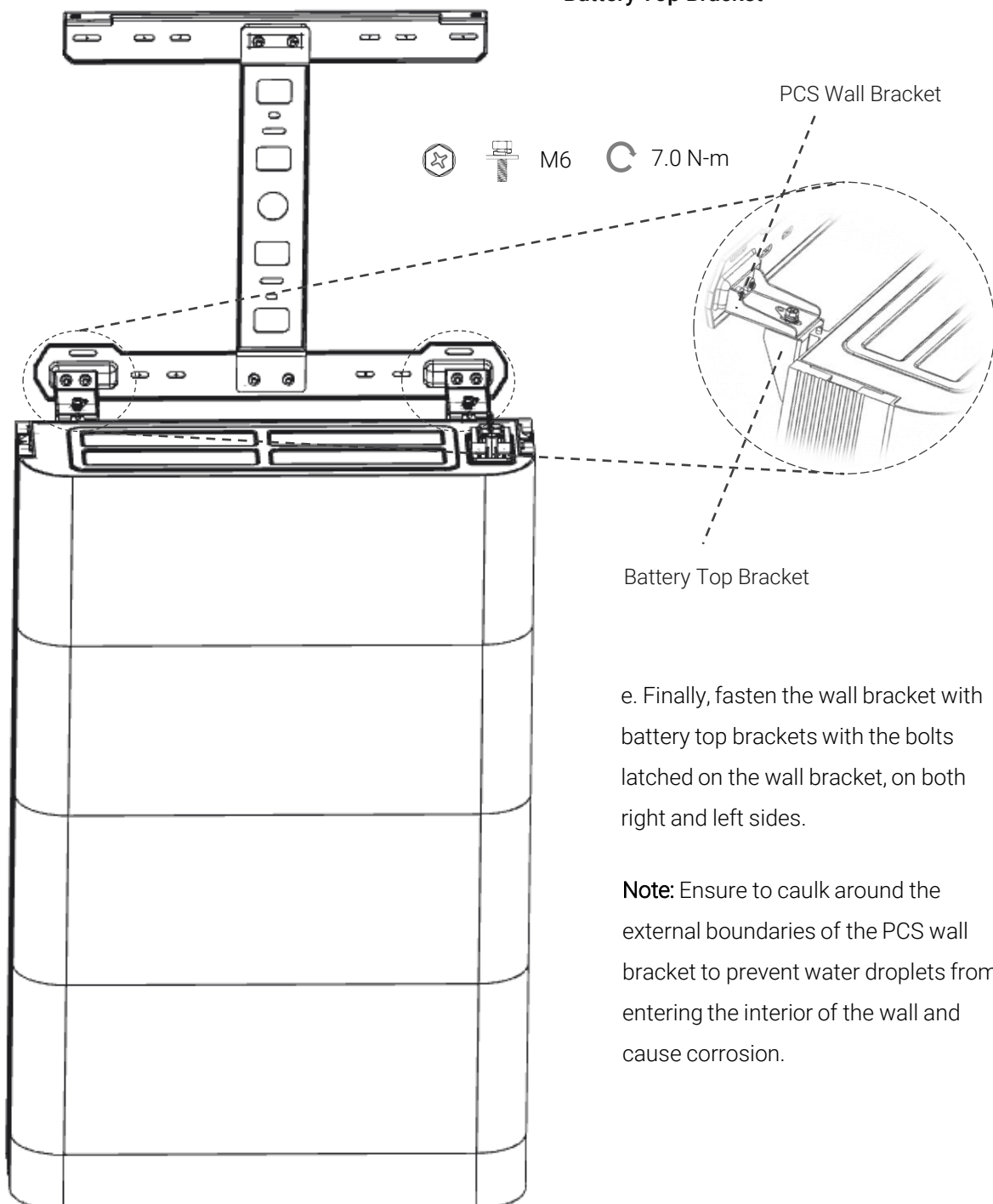


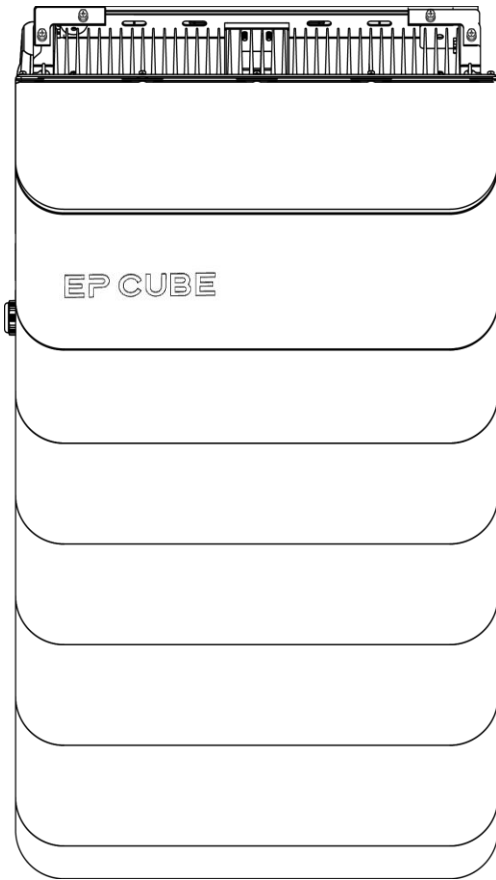
## Install the EP Cube PCS Wall Bracket

- Carefully place the Wall Bracket on top of the Battery Top Brackets.
- Choose the holes positions and mark them on the wall through the wall mounting bracket by using a pencil.

**Note:** It is highly recommended to place the top battery module, and mark the holes. Then remove the top battery module to have enough space for drilling action.

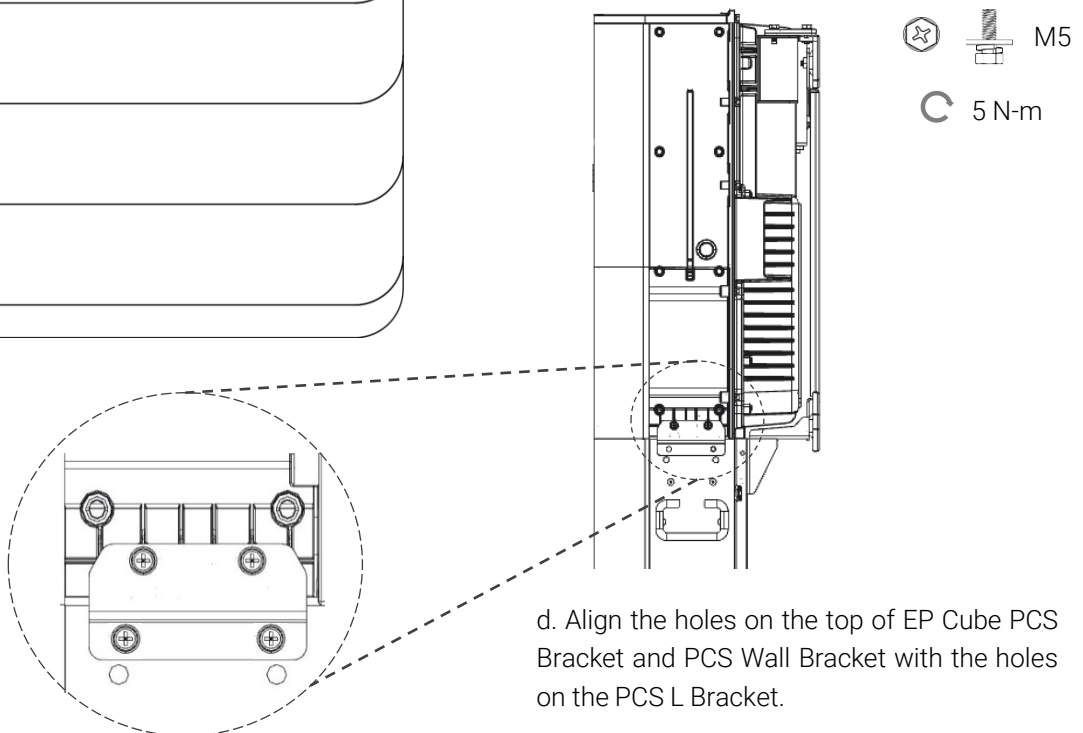
## Fasten the EP Cube PCS Wall Bracket to the Battery Top Bracket





## Install the EP Cube PCS

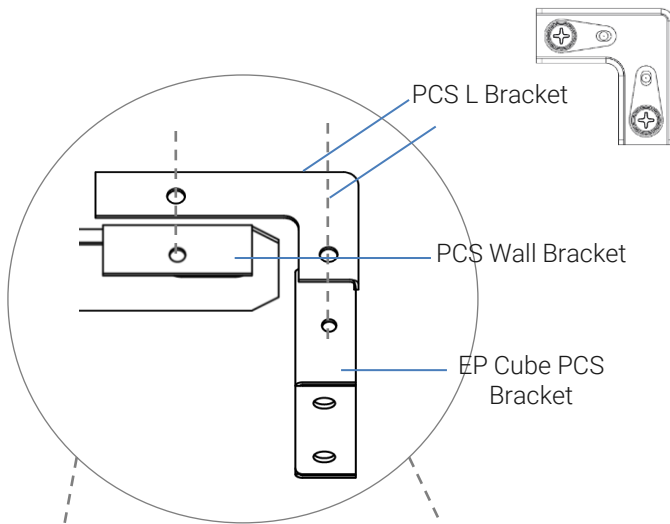
- Carefully place the EP Cube PCS on top of the Battery stack.
- Align the edges of both the EP Cube PCS and the Battery Module.
- Fasten PCS Side Brackets between the EP Cube PCS and adjacent top battery module, on both the left and right sides with the two M5 screws, and manually tighten.



- Align the holes on the top of EP Cube PCS Bracket and PCS Wall Bracket with the holes on the PCS L Bracket.

**CAUTION:** The Side Brackets between the EP Cube PCS and top battery module must be installed first, only after that fasten the EP Cube PCS Bracket & PCS Wall Bracket with the help of PCS L Bracket.

The EP Cube PCS is heavy, Please use lifting tools or multiple people to lift it for your own safety.



## Fasten the EP Cube PCS on the wall

- Place the L Bracket on the PCS Wall-Mount Bracket and EP Cube PCS Bracket.
- Align the holes of L Bracket with the PCS Wall Bracket and the EP Cube PCS Bracket.
- Tighten all screws to fasten the EP Cube PCS with the PCS Wall Bracket by using an electric screwdriver to specified torque values.
- After finishing installation, make sure there is no visible gap between the PCS and the battery top module.

**⚠ CAUTION: NON-FLAT WALL ALERT!!** Do not fix the last two screws (right and left L-brackets to the wall side) until you make that check.

The EP Cube PCS is heavy, Please use lifting tools or multiple people to lift it for your own safety.

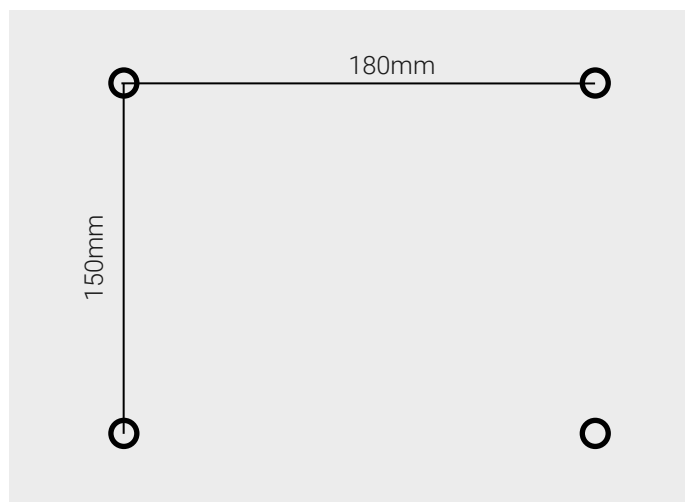
### 3.Installation of the AC Switch Box(Optional)

This section introduces the AC Switch Box installation process in sequence..

#### Start Installation :

##### Locating the mounting holes

- a. Mark the drill positions for the holes on the installation area by using a tape level tool, and pencil. Place the AC switch Box on the wall, choose and mark the appropriate hole positions.



- CAUTION:** Please keep enough clearance between the AC Switch Box and other objects. e.g. On all sides of the AC switch box, the minimum clearance should satisfy ample space for safe operation and installation.

#### Install the AC Switch Box

**NOTE:** Select suitable M5\*20 (or similar) screws to mount the AC Switch Box on different types of walls.

- a. Drill holes if needed, insert the M5 screws with washers and lightly stroke with hammer to properly insert if needed.
- b. Then hang the switch box on the inserted screws, and tighten the screws manually..
- c. Place the level tool on box to measure its level and tighten the anchor nuts to specified values.

## THE EP Cube System

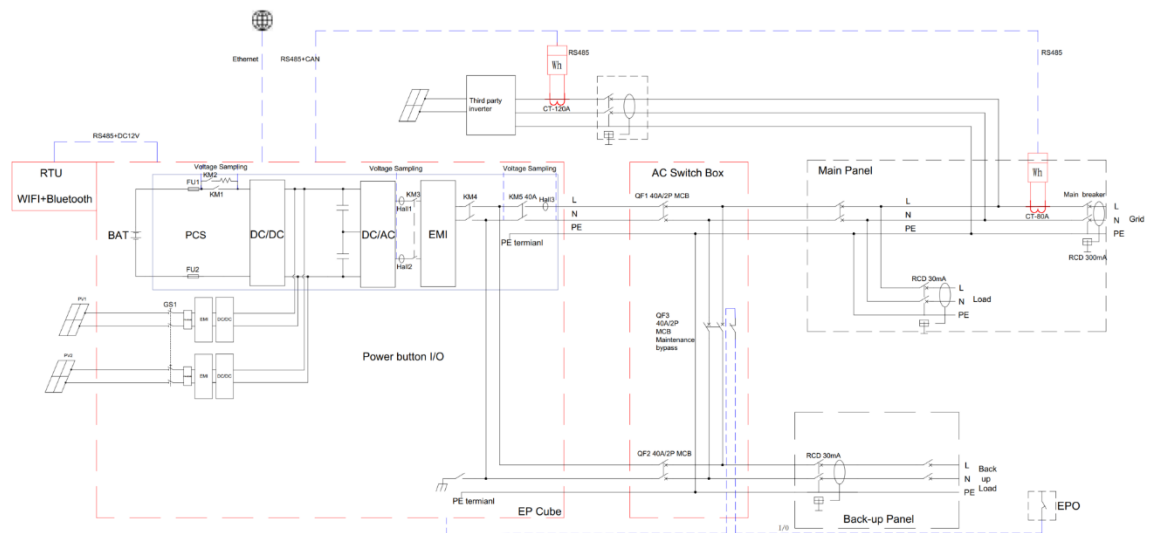
### 1. System Topology with EP Cube AC Switch Box

EP Cube HES has a full backup port to support connected loads up to 7.6 KW\*, which can be powered at any time, remain powered in the event of a grid outage, and support the full load (7.6 KW\*).

\*: please refer to the datasheet for the max. power output available (model and country).

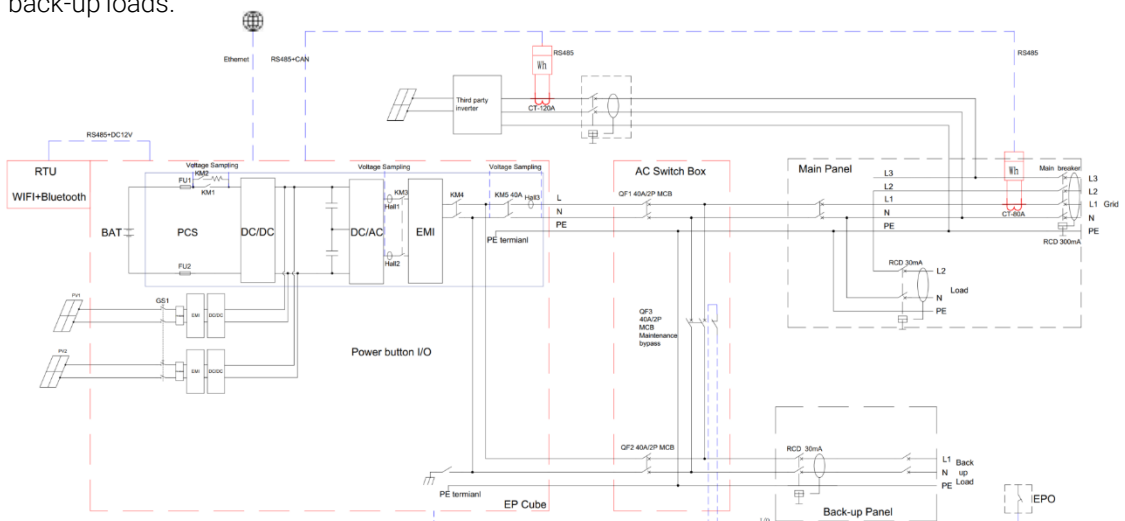
#### Single Phase System Topology

**NOTE:** Ensure to follow any applicable local Electrical codes and Standards.



#### Three Phase System Topology

**NOTE:** EP recommends installation of 30mA RCD devices for EP Cube, back-up and non-back-up loads.

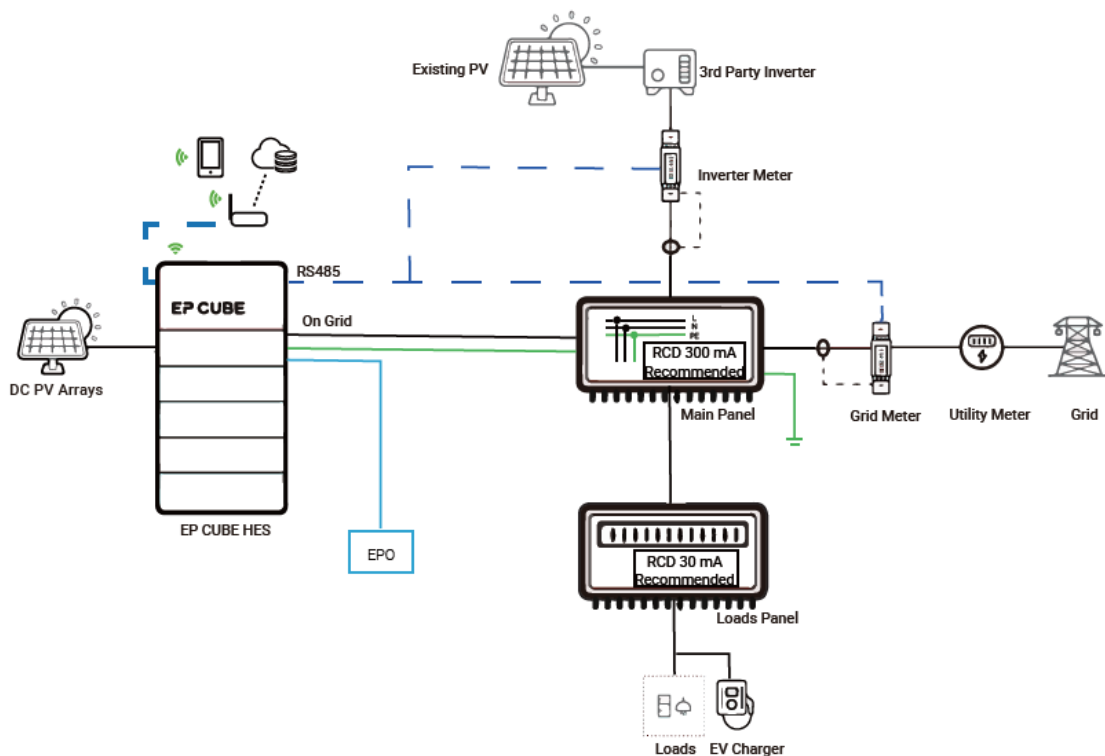


## 2. System Topology Without EP Cube AC Switch Box

The EP Cube AC switch box is an optional component. If a homeowner chooses not to install it then it is the installer's responsibility to ensure that wiring the connections are carried out in a manner that guarantees the same functionality as with the optional EP Cube AC switch box.

Installers may choose to use a customized subpanel to install the extra needed circuit breakers i.e. Breaker for On-Grid, AC Boost and Bypass Breaker. An alternate approach may have these breakers installed in the main panel as well. The below figure shows a simplified topology without the optional AC switch box combining all the breakers into the AC main panel.

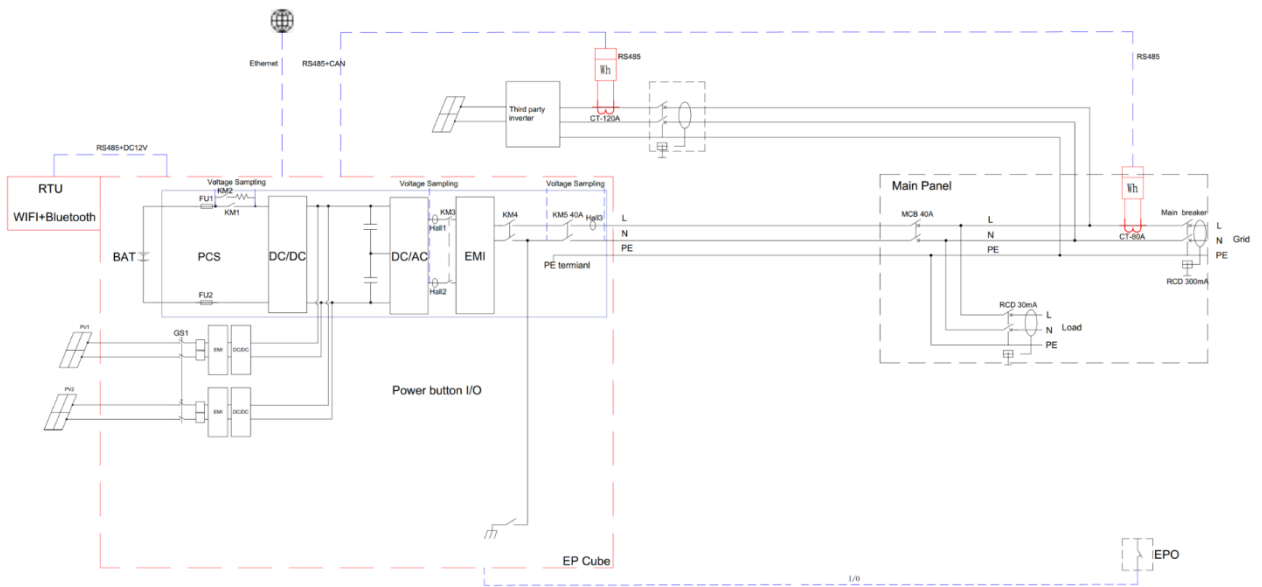
### Wiring the EP CUBE PCS without EP Cube AC Switch Box



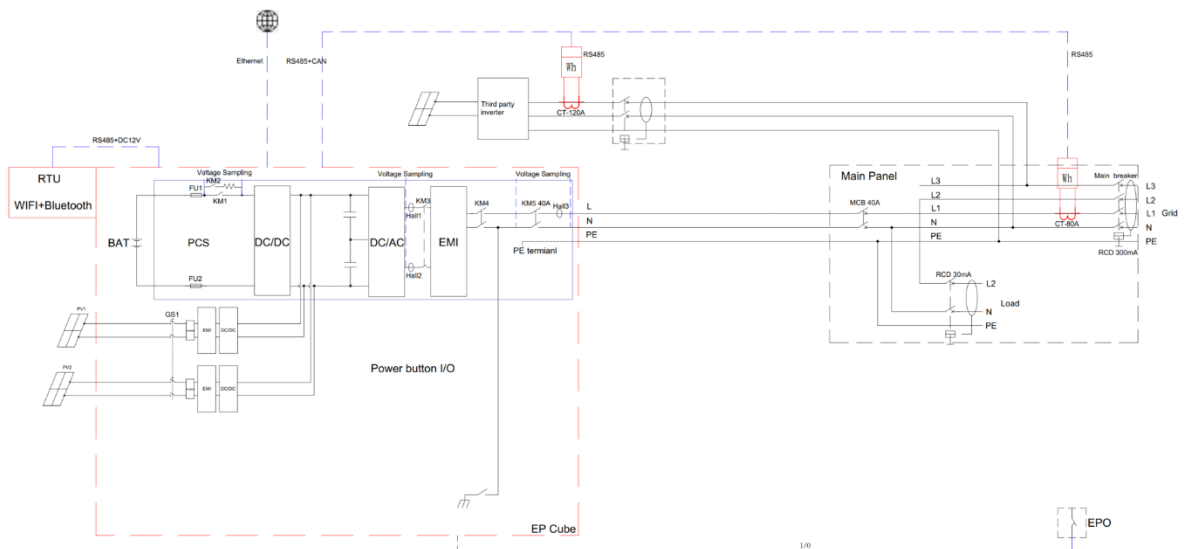


The EP Cube AC switch box is an optional component. If a homeowner chooses not to install it then EP Cube only can support the on grid function. In this scenario, back-up port will not be connected. The below figure shows a simplified topology without the optional AC switch box and back-up loads.

## Single Phase System Topology



## Three Phase System Topology



**NOTE:** Please add the RCD devices as recommended and ensure to follow any applicable local Electrical codes and Standards.

## WIRING & COMMISSIONING

This section introduces the EP Cube system wiring connections and commissioning steps.

### **WARNING :**

The EP Cube does not require any annual maintenance. If a malfunction or error occurs, the product may only be installed, repaired, or replaced by the EP authorized personnel for safety and warranty purposes.

For personal protection and property safety, please read the safety chapter and ensure complete compliance during the entire installation process.

### 1. EP Cube System Wiring

This section introduces the EP Cube system wiring process.


#### Preparation


According to the formulated EP Cube system configuration and wiring scheme:

- Prepare the appropriate quantity and dimensions of electrical and installation materials.
- Prepare the appropriate auxiliary tools and equipment.

#### Recommended Wire Gauges

Wiring Connection	Wire Type/Wire Size	Length
ON-Grid AC Power Wire	90°C 3-Core cable /10mm <sup>2</sup>	Custom
AC-Boost (Back-up) AC Power Wire	90°C 3-Core cable /10mm <sup>2</sup>	Custom
PV Wires	PV system Cable/4mm <sup>2</sup> -6mm <sup>2</sup>	Custom
RS485 Meter	2-core shielded twisted pair cable/20-22AWG	10m
EPO	2-core signal cable/20-22AWG	Custom
Ethernet Wire	CAT5E, 24 AWG	Custom

 **CAUTION:** For safe operation during installation, maintenance and operation, it is a good practice to install over-current protection device(OCPD). All AC-generating or consuming devices require an OCPD before the integration into the system. So any connected devices, such as an EP Cube, DC, or AC-coupled PV system will need an OCPD before it is connected with the EP Cube. It is recommended that the installer should add circuit breakers before connecting these devices to the system. Please add the RCD devices according the local rules.

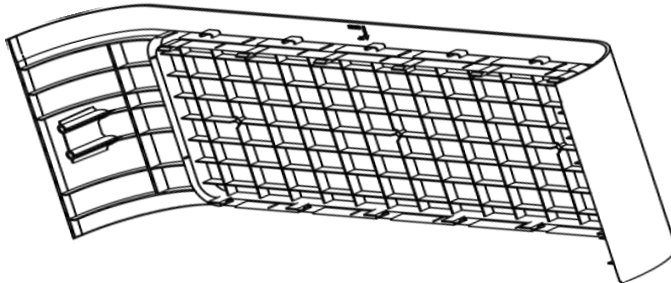
 **CAUTION:** Please ensure all circuit breakers are turned off. Wear the appropriate PPE before beginning.

## 1.1. Wiring From Solar Panels to EP Cube PCS

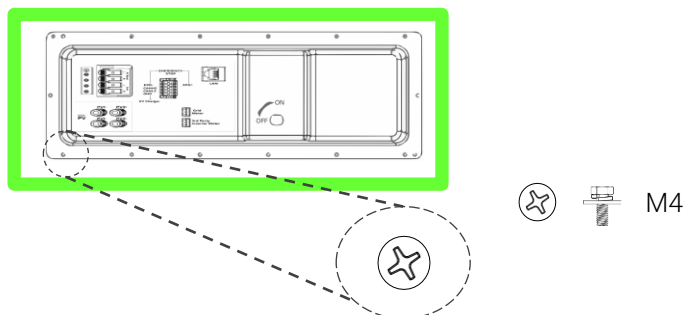
### Step-1

#### Open the EP Cube PCS Panel for Wiring

- Remove the EP Cube PCS front panel by slightly pulling up from the edges on both left and right sides.



- Use an electric screwdriver to unfasten the 14x screws on **the dead-front cover** of the EP Cube PCS.



## Step-2

### Connect PV Wiring Cables to EP Cube PCS

- a. Prepare the flexible PVC conduit for PV wires between the EP Cube PCS and PV installation.
  - Route the wires through the conduit, and connect the wires to the PV Davelan terminals of EP Cube PCS.

**▲ NOTE:** Each set of PV wires, PV+ and PV-, must be connected to the correct terminal of the EP Cube PCS.

- b. EP Cube PCS supports the connection with 2x PV strings. Each string is connected to the EP Cube PCS via a pair of standard industrial Davelan PV connectors. Carefully connect the PV+ and PV- wires to the corresponding terminals of the EP Cube PCS. (Refer to the figure on the next page)

- Push the Davelan PV connector into the mating connectors on the EP Cube PCS until both connectors are locked into proper place. The Davelan connectors need to be prepared on site. Refer to the figure on the next page.

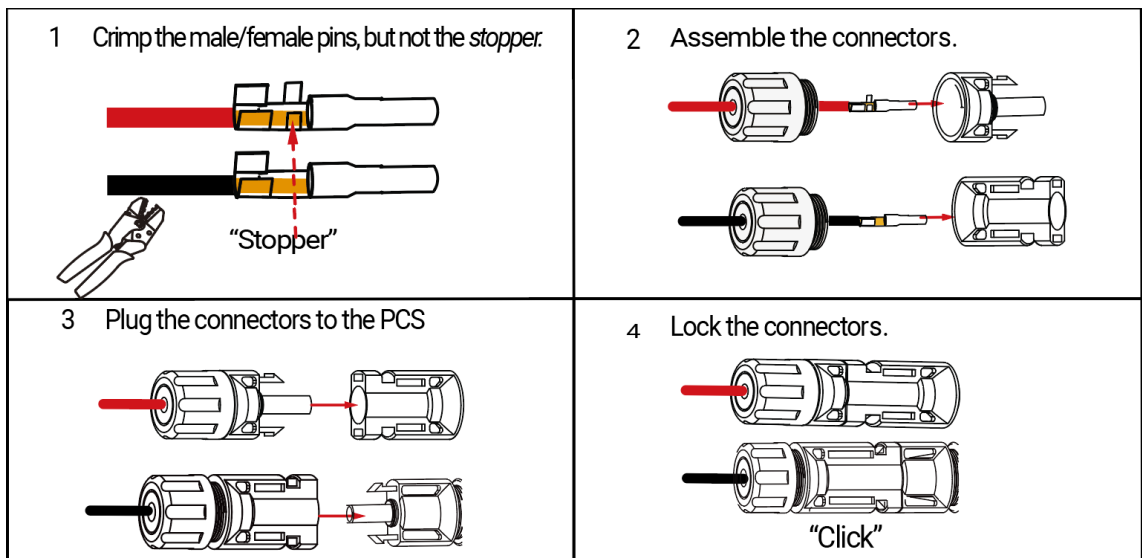
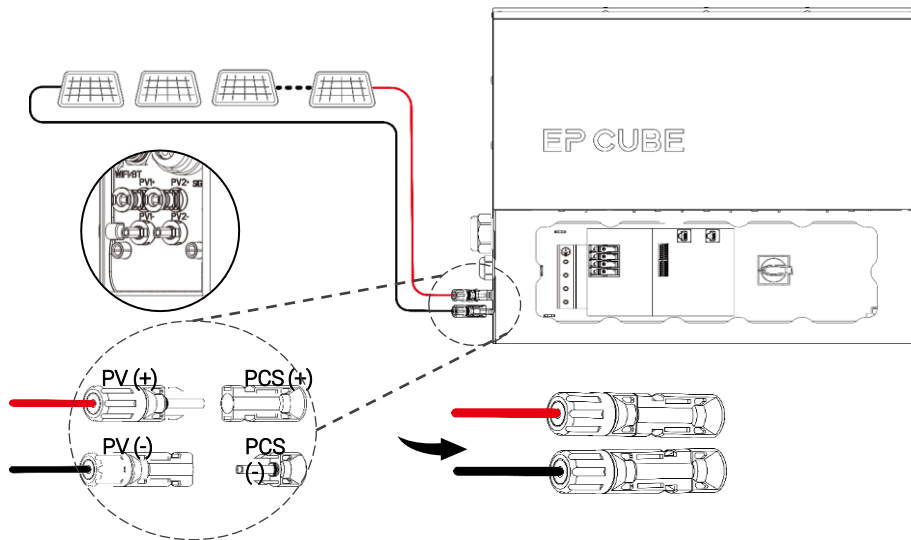


Figure. Preparing Davelan connectors for PV Strings

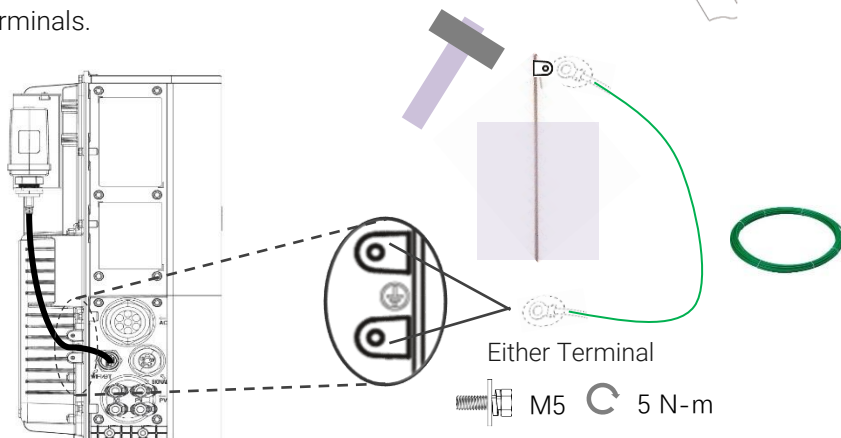
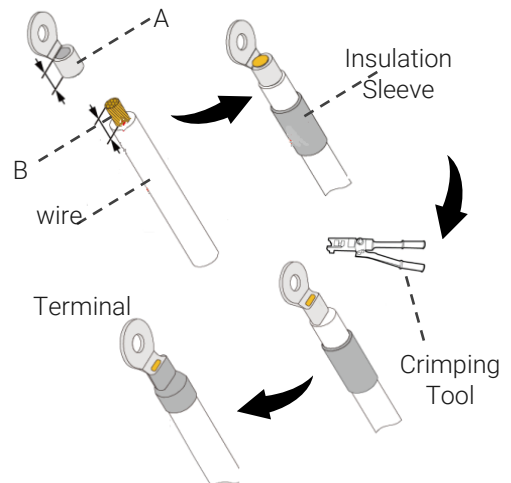


Recommended wire gauge: Davelan connector PV cable 4mm<sup>2</sup>-6mm<sup>2</sup>

**Figure. EP Cube PCS to PV Array DC Input Wiring**

## 1.2 Preparing Cables for External Ground Wire

- Take appropriate OT/OD terminals according to the wire gauge size.
- Strip the wire, and conductor length (B) should be few 2-3 mm longer than OT/OD length (A).
- Insert conductor inside the OT/OD terminal and crimp the terminal.
- Move insulation sleeve to insulate the terminals, and secure terminals with screws.
- Connect PCS grounding terminal to home electrical grounding terminals.

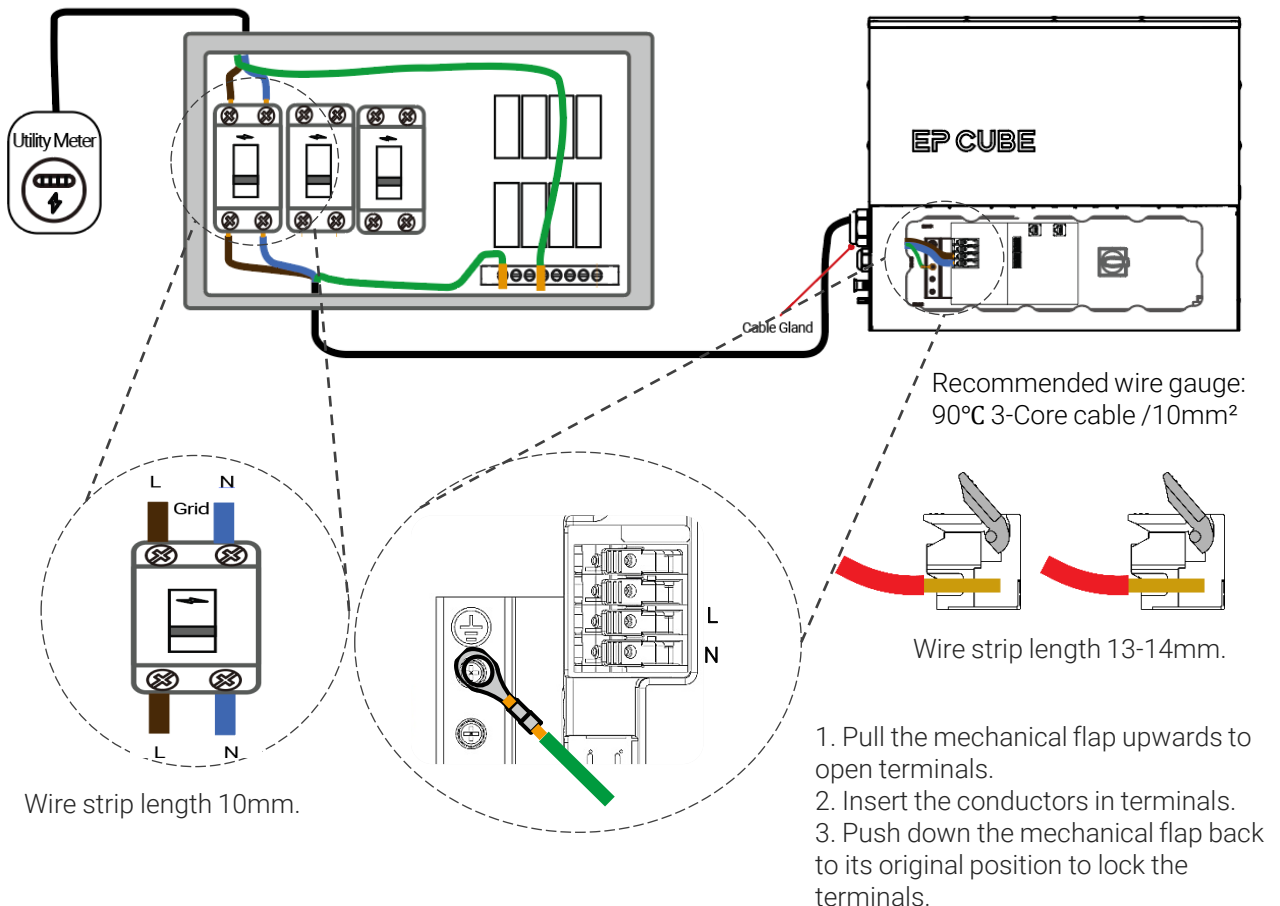


## 1.3. AC Wiring From EP Cube PCS to Grid (Without AC Switch Box)

### Step-1

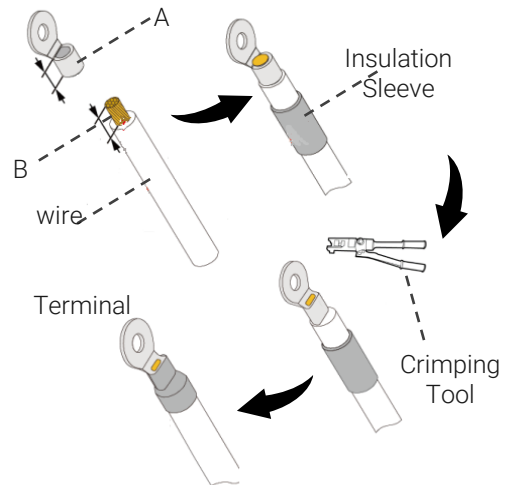
#### Connect EP Cube PCS AC Wires to AC Mains panel Terminals

- Prepare the wires for connection between the EP Cube PCS and Grid MCB terminals in AC Mains panel.
- Route the wire through the cable entry point on the AC Mains panel, and carefully connect the wires to L and N terminals of Grid MCB.
- Use a flat-head screwdriver to loosen the terminal screws, insert the cables and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wires through the cable gland dedicated for the AC power, and connect the wires to the terminals labelled as L and N of Grid terminals inside EP Cube PCS.
- Connect the ground wire to the grounding busbar on both ends. (Refer. to figure below)



## Preparing Cables with Crimping OTs for Ground Wire

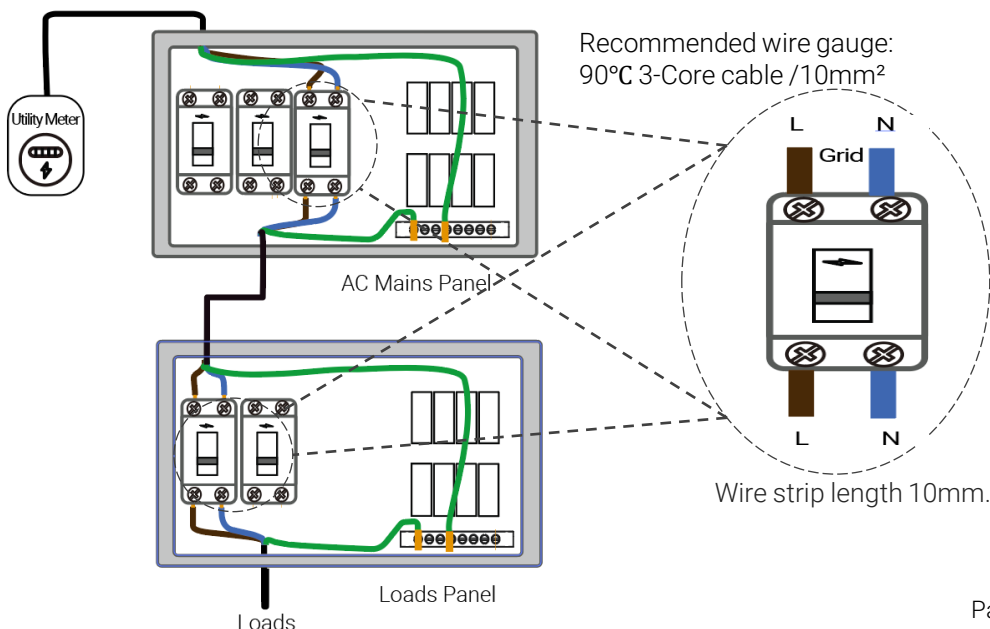
- Take appropriate OT/OD terminals according to the wire gauge size.
- Strip the wire, and conductor length (B) should be few 2-3 mm longer than OT/OD length (A).
- Insert conductor inside the OT/OD terminal and crimp the terminal.
- Move insulation sleeve to insulate the terminals, and secure terminals with screws.



### Step-2

#### Connect Loads Panel to AC Mains Panel

- Prepare the wires for connection between Loads Panel and AC Mains Panel.
- Route the wires through cable gland on the bottom of AC Mains Panel, and connect it to terminals labelled as L and N of Loads port.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wires through the cable gland dedicated for the AC power, and connect the wires to terminals labelled as L and N of loads terminals inside loads panel.
- Connect the ground wire to the grounding busbar on both ends. (Refer. to figure below)



## 1.4. AC Wiring From EP Cube PCS to AC Switch Box(Optional)

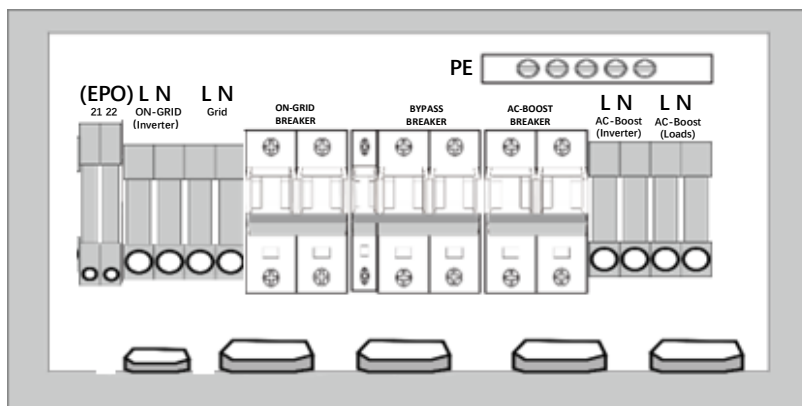
### Step-1

#### Open the AC Switch Box for Wiring

a. Remove the Switch box cover:

- Open the AC Switch Box 's semi-transparent cover.
- Once the cover is open, use the screwdriver to remove 4x screws and remove the dead front cover to access the wiring terminals. Refer to the figure below for details of the wiring terminal blocks.

**AC Switch Box Terminals**



**NOTE:** The AC Switch Box is optional.

### Step-2

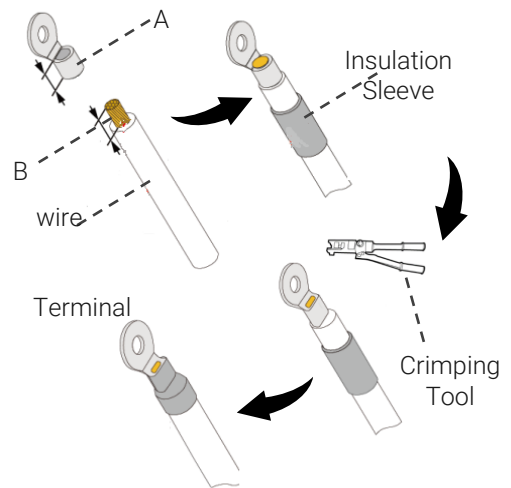
#### Connect EP Cube PCS AC Wires to AC Switch Box Terminals– ON-GRID

- Prepare the wires for connection between the EP Cube PCS and the AC switch box terminals.
- Route the wires through the cable gland on the bottom of AC switch box, and connect them to the terminals labelled as L and N of On-Grid (inverter) port.
- Use a flat-head screwdriver to loosen the terminal screws, insert the cables and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wires through the cable gland dedicated for the AC power, and connect the wires to the terminals labelled as L and N of Grid terminals inside EP Cube PCS.
- Connect the ground wire to the grounding busbar on both ends. (Refer. to figure below)



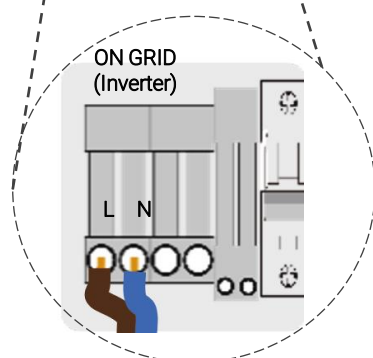
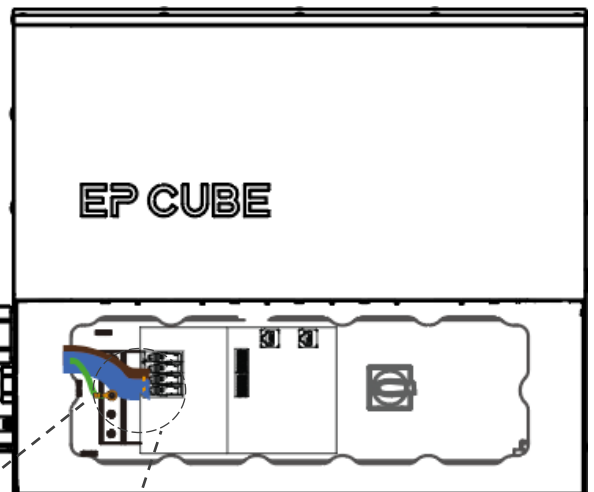
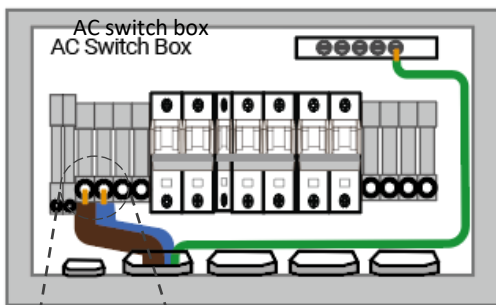
## Preparing Cables with Crimping OTs for Ground Wire

- Take appropriate OT/OD terminals according to the wire gauge size.
- Strip the wire, and conductor length (B) should be few 2-3 mm longer than OT/OD length (A).
- Insert conductor inside the OT/OD terminal and crimp the terminal.
- Move insulation sleeve to insulate the terminals, and secure terminals with screws.

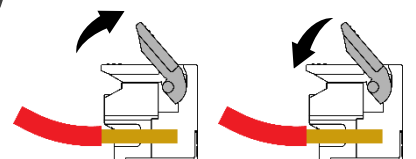
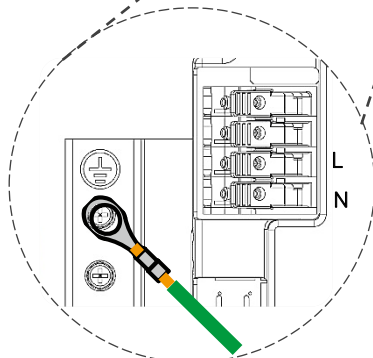


**Notice: Please do the measurement before wiring, the L-N voltage is  $230 \pm 10\%V$**

Recommended wire gauge:  
90°C 3-Core cable /10mm<sup>2</sup>



Wire strip length 10mm.



Wire strip length 13-14mm.

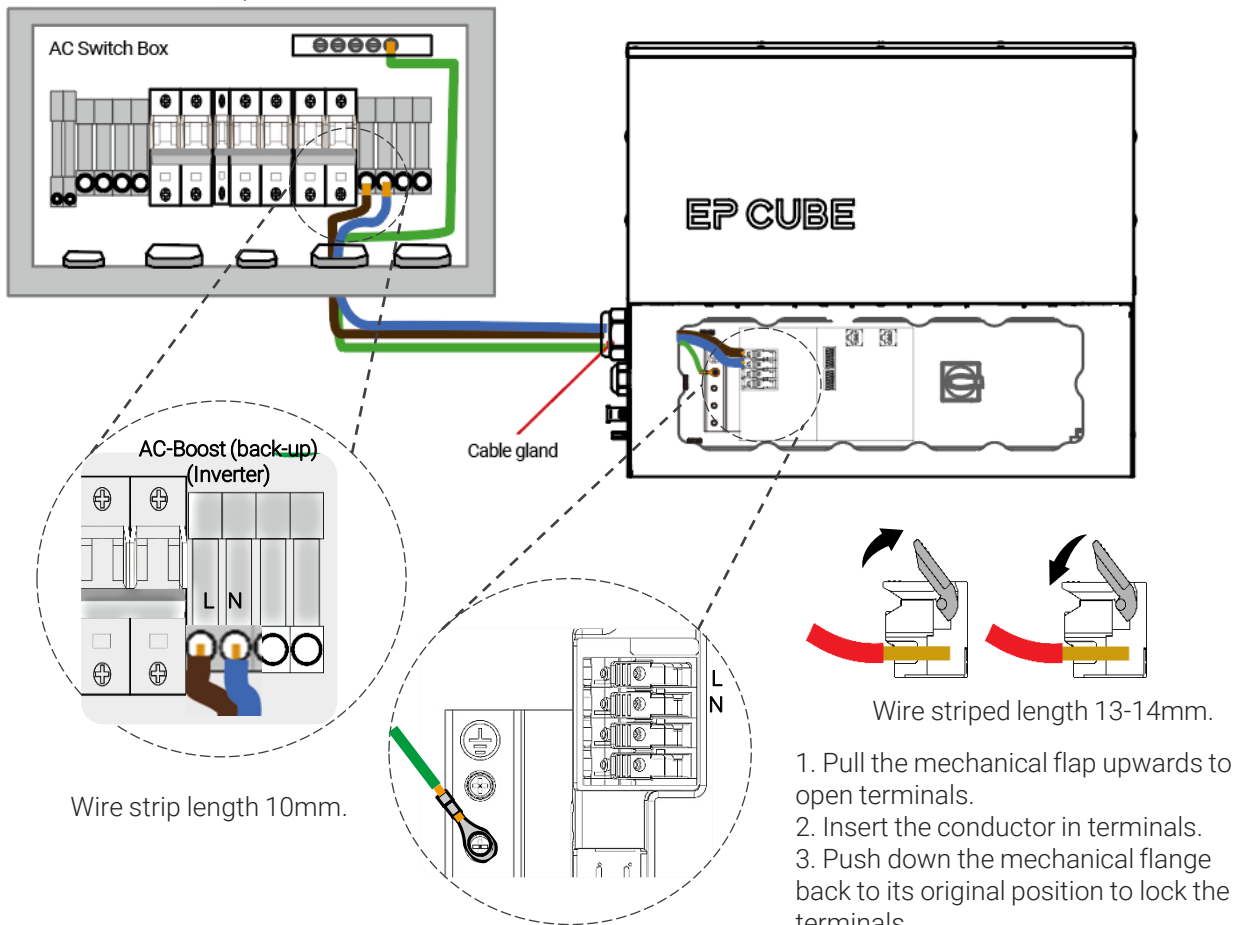
1. Pull the mechanical flap upwards to open terminals.
2. Insert the conductors in terminals.
3. Push down the mechanical flap back to its original position to lock the terminals.

## Step-3

### Connect EP Cube PCS AC Wires to AC Switch Box Terminals-AC BOOST (Back-up)

- Prepare the wires for connection between EP Cube PCS and the AC switch box terminals.
- Route the wires through cable gland on the bottom of AC switch box, and connect it to terminals labelled as L and N of AC Boost (back-up) port.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wires through the cable gland dedicated for the AC power, and connect the wires to terminals labelled as L and N of AC Boost terminals inside EP Cube PCS.
- Connect the ground wire to the grounding busbar on both ends. (Ref. to figure below)

Recommended wire gauge:  
90°C 3-Core cable /10mm<sup>2</sup>

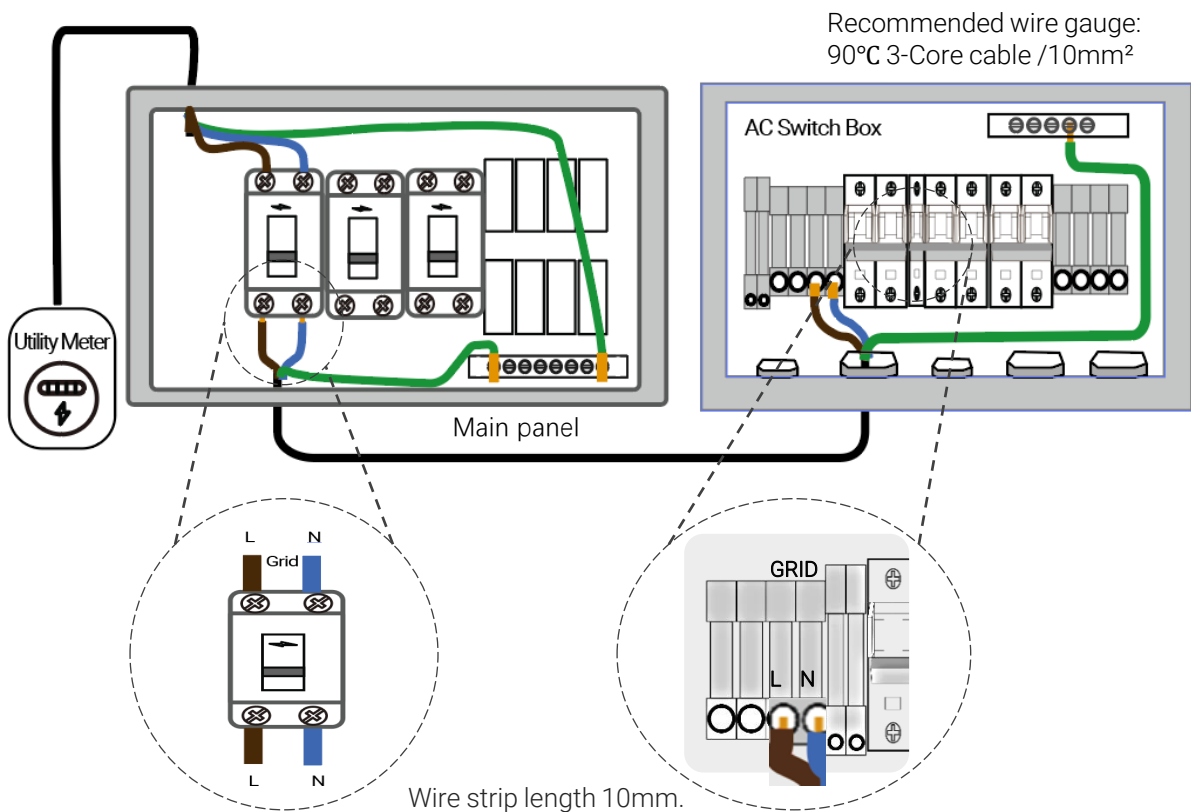


Refer to picture above for wiring the AC power L, N, and ground cable between the EP Cube PCS and AC switch box terminals.

## Step-4

### Wiring Connections of Grid

- Prepare the wires for connection between Grid MCB terminals in AC Mains panel and the AC switch box grid terminals.
- Route the wires through cable gland on the bottom of AC switch box, and connect it to terminals labelled as L and N of GRID port.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wire through the cable entry point on the AC Mains panel, and carefully connect the wires to L and N terminals of Grid MCB.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Connect the ground wire to the grounding busbar on both ends. (Ref. to figure below)

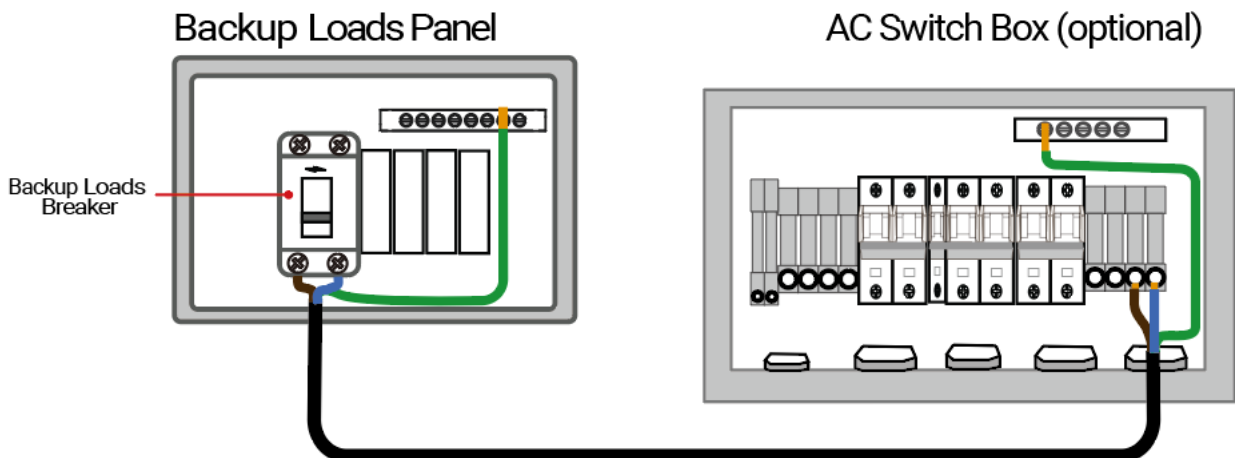


## Step-5

### Wiring Connections of Loads

- Prepare the wires for connection between Home Loads MCB terminals in AC Mains panel and the AC switch box Loads terminals.
- Route the wires through cable gland on the bottom of AC switch box, and connect it to terminals labelled as L and N of AC Boost (back-up) Loads port.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Route the other end of the wire through the cable entry point on the Back-up loads distribution panel, and carefully connect the wires to L and N terminals of Back-up Loads MCB terminals.
- Use a flat-head screwdriver to loosen the terminal screws, insert the conductors and fasten the screws to properly secure the connections. Use the appropriate wire colours for live and neutral wires according to local regulations and standards.
- Connect the ground wire to the grounding busbar on both ends.(Ref. to figure below)

Recommended wire gauge:  
90°C 3-Core cable /10mm<sup>2</sup>



Wire strip length 10mm.

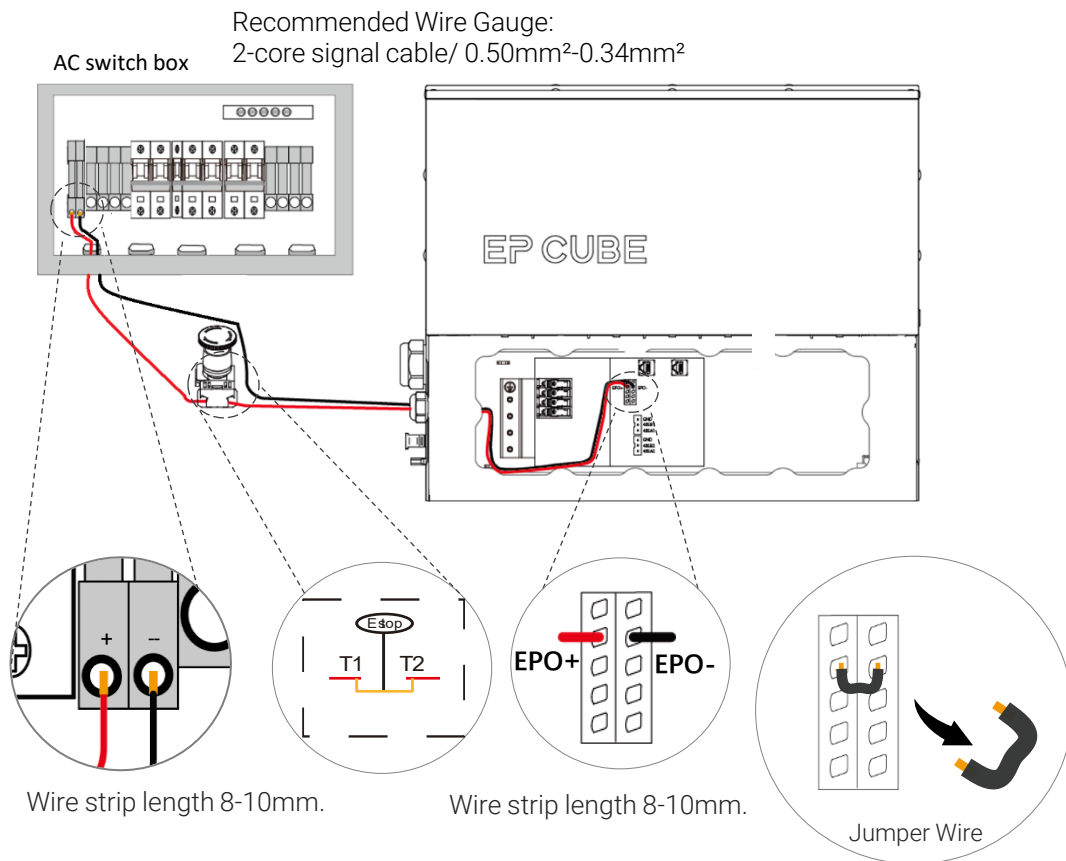
## 1.5. Wiring of Other Components (Optional)

**CAUTION:** Please ensure all circuit breakers are turned off and PPE is properly worn before getting started. Please ensure that the main breaker of the Grid is turned off and protected with Lockout/Tagout.

### A. Wiring of Emergency Stop(With AC Switch Box)

- a. Remove the press-fit jumper or jumper wire on the EP Cube PCBA connector between the EPO+ & EPO- terminals.

**Note:** If the E-Stop is not installed, ensure that the EPO+ and EPO- terminals are short circuited with a wire. Otherwise it may lead to system not able to turn on once commissioning is completed.



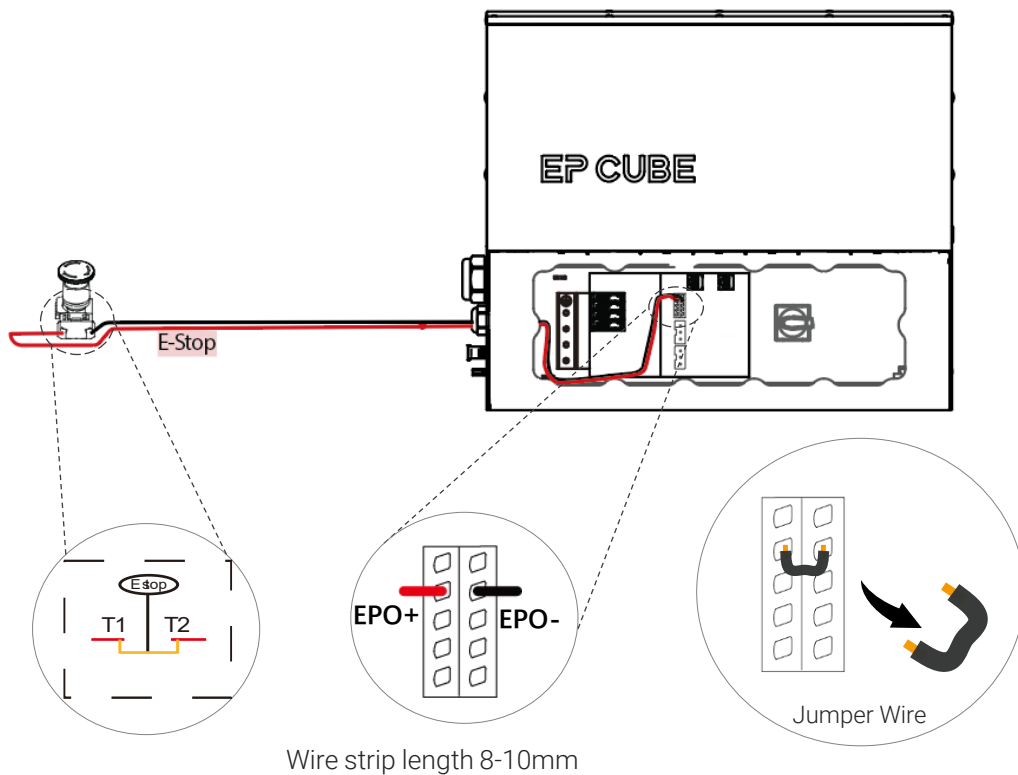
- b. Connect emergency stop wires to terminals EPO+ & EPO-.
- c. Connect the wires to EPO signal terminals inside the AC Switch Box through the E-Stop button.
- d. Do a test run at least once during the system commissioning and debugging to ensure that its functioning properly.

## B. Wiring of Emergency Stop(Without AC Switch Box)

- a. Remove the press-fit jumper or jumper wire on the EP Cube PCBA connector between the EPO+ & EPO- terminals.

**Note:** If the E-Stop is not installed, ensure that the EPO+ and EPO- terminals are short circuited with a wire. Otherwise it may lead to system not able to turn on once commissioning is completed.

Recommended Wire Gauge:  
2-core signal cable/ 0.50mm<sup>2</sup>-0.34mm<sup>2</sup>



### ***E-Stop Wiring Connections***

- b. Connect emergency stop wires to terminals EPO+ & EPO-.
- c. Connect the wires to the E-Stop button.
- d. Do a test run at least once during the system commissioning and debugging to ensure that its functioning properly.

## C. Wiring Connections of Grid CT & Inverter CT (For Grid and AC Inverter)

- Pay attention to the CT's orientation, otherwise the system will not work correctly. The CT's arrow direction on phase wire (L phase) shall be from Grid to MCB (Grid → MCB).
- The CTs provided with the EP Cube has a standard cable length of 5m.
- The recommended cable size & gauge values are 2-core signal cable/20-22AWG.
- Connect the CT's wires to the CT terminals (+ & -) inside the Meter. (Refer to figure. a)
- Connect the AC power/Grid Terminals to the AC Input Terminals (L & N) inside the Meter. (Refer to figure. b)
- Finally, connect the RS485 wire between the Meter terminals and EP Cube PCS RS485 Terminals. terminate the one end of the RS485 wire inside the Smart Meter, and connect the other end onto the EP Cube PCS connector on the PCBA. (Refer to figure. c)
- EP Cube PCBA hosts 2x 3-pin JST connectors male connector, upper connector is dedicated for Grid Meter while lower one is dedicated for AC Inverter Meter.
- Simply plugin the mating 3-pin JST female connectors of the RS-485 wire into the slot.
- Perform these steps for both Meter (for Grid) and Meter (for Inverter)

CT's Wire Gauge: 2-core signal cable/0.50mm<sup>2</sup>-0.34mm<sup>2</sup>

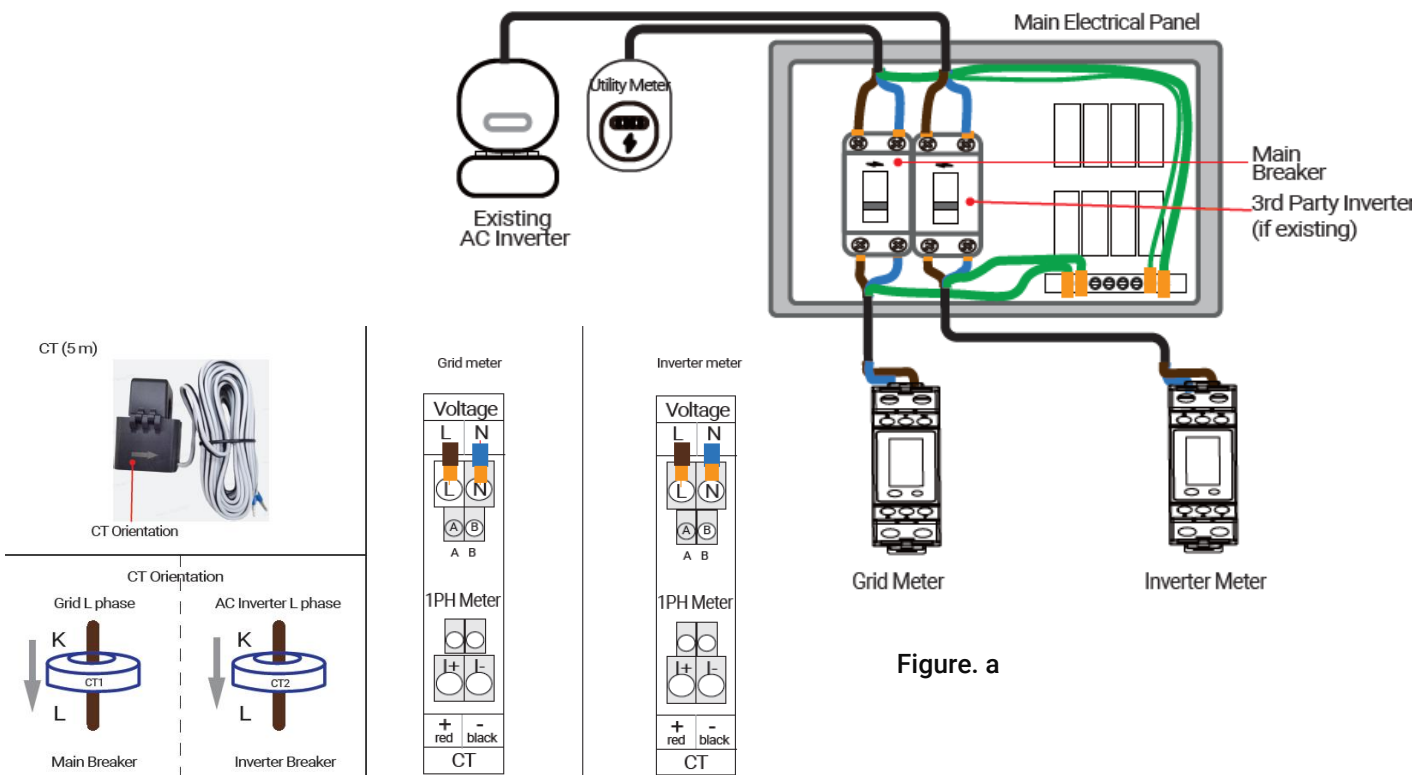


Figure. a

## Meter AC Power Wiring

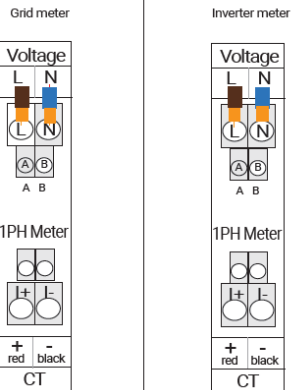
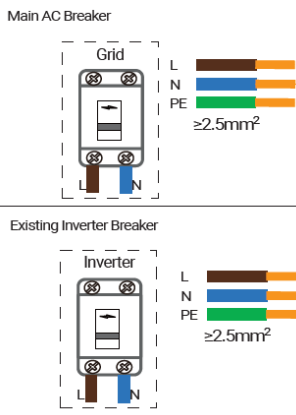
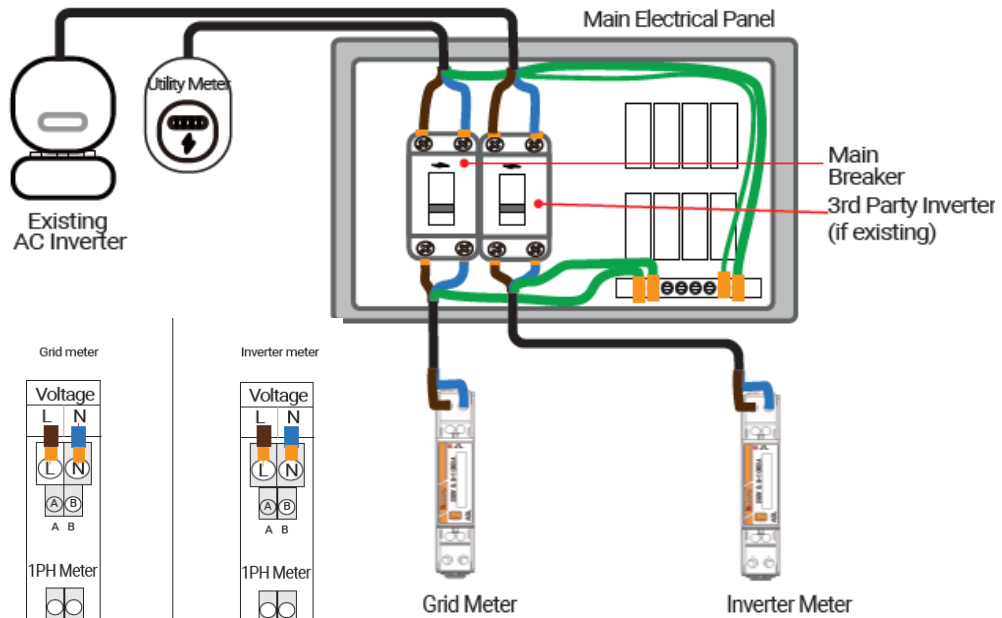


Figure. b

## RS 485 Signal Wiring Between Meter and PCS

RS485 Wire Gauge:  
 2-core shielded twisted pair cable/0.50mm<sup>2</sup>-0.34mm<sup>2</sup>

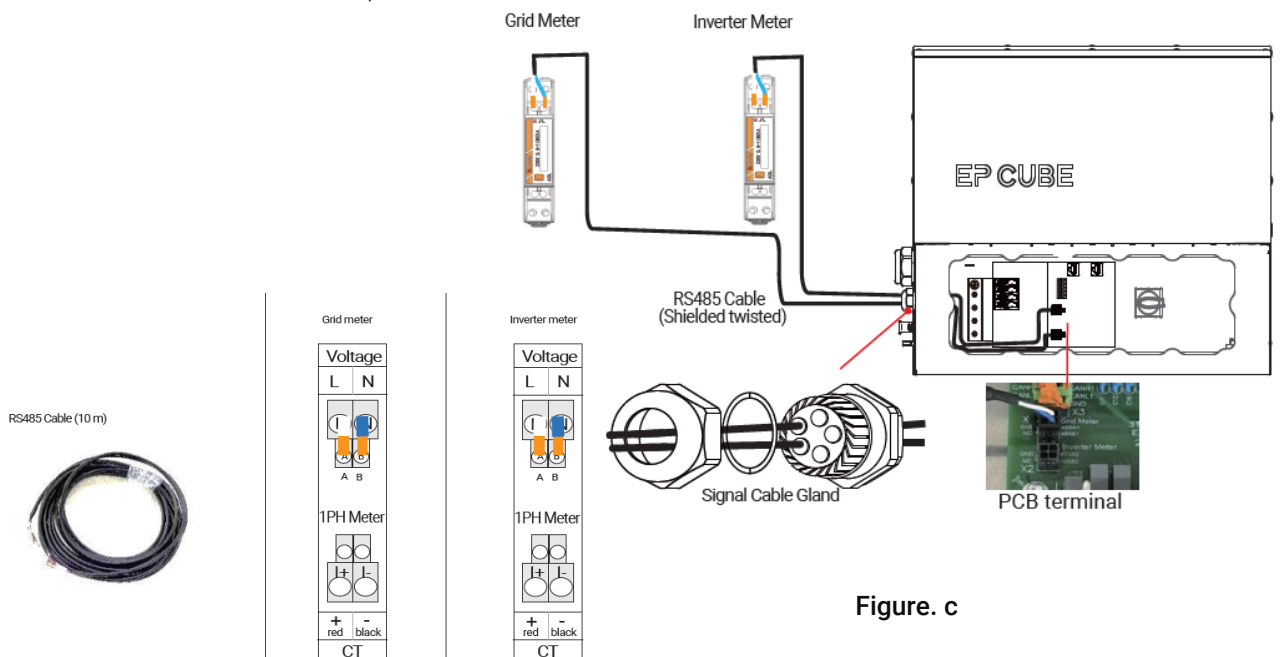


Figure. c



## D. Wiring Ethernet wire(optional)

- Notice: please make sure EP Cube have upgrade to the relative FW before doing the connection. For more details, please contact our aftersales team.



## 2. EP Cube System Commissioning

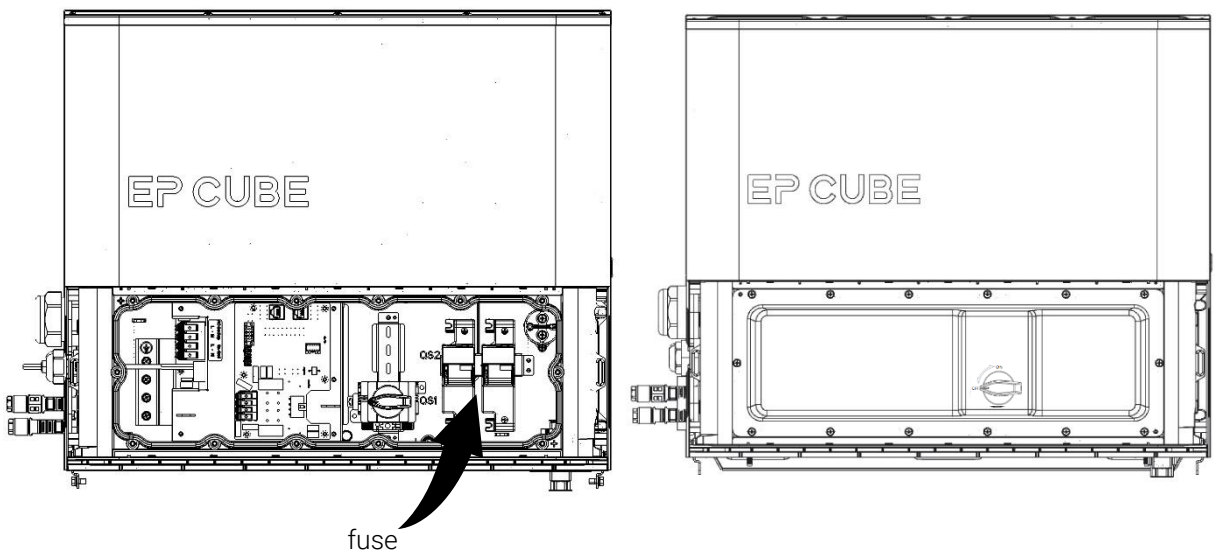
This section introduces the EP Cube system's initial commissioning and operating process.

### 2.1. EP Cube Startup

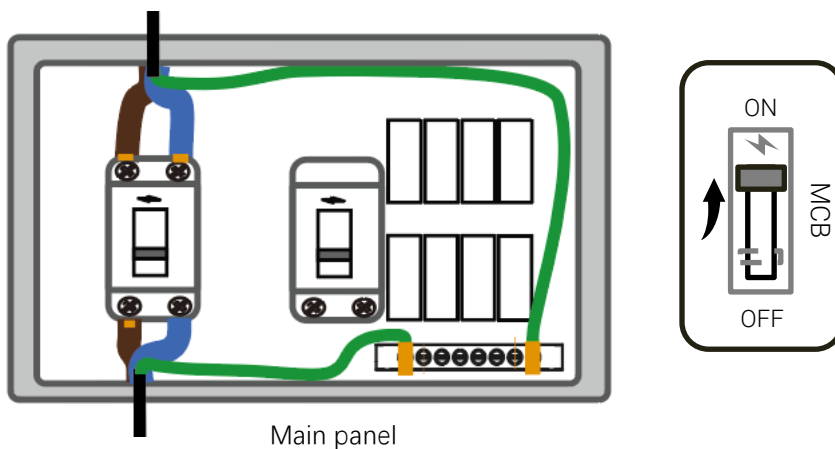
**⚠ CAUTION:**

- Please ensure PPE is properly worn before getting started.
- EP Cube commissioning requires EP Cube PCS to have AC Power. It must be ensured that Grid MCB is at on state. But Do not press the power on/off button on the right side of the EP Cube PCS

a. Make sure the battery fuse holder of PCS are with fuses and closed, install the dead-front cover using the screws, and ensure no live electrical components will be exposed during operation. then install the knob of the PV switch using a screwdriver.



b. Turn on the Grid MCB inside the Main Home Electrical panel.

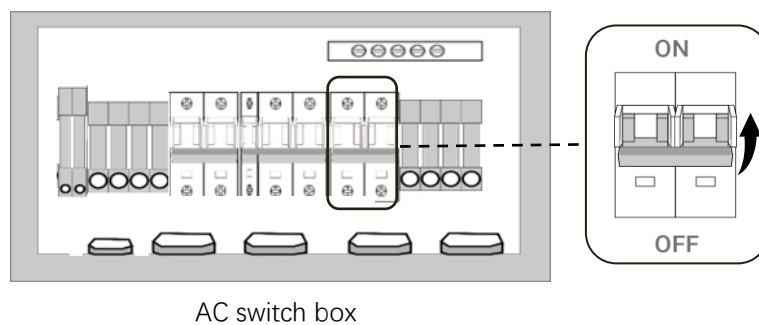
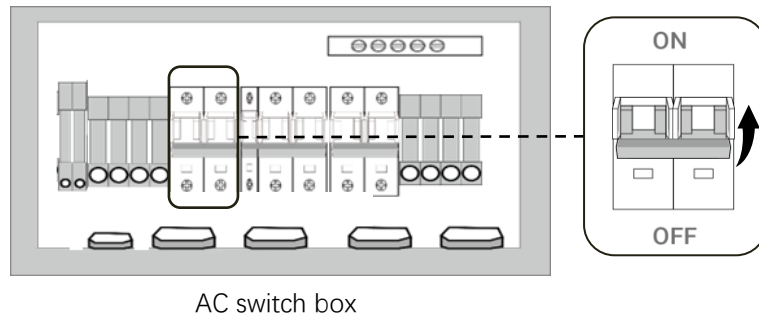


c. In case the AC Switch Box(Optional )is present follow the below instruction.

Turn on the MCBs (ON GRID Breaker & AC Boost (Back-up) Breaker) inside the AC Switch Box. Ensure that the Bypass MCB is turned **off**, and locked out & Tagged out.

**Note:** The AC Switch Box is optional, if we don't have AC Switch Box, please skip this step.

The LED lights on the WI-FI module will turn on upon completion of start-up steps.



## 2.2. Commissioning via EP Cube app

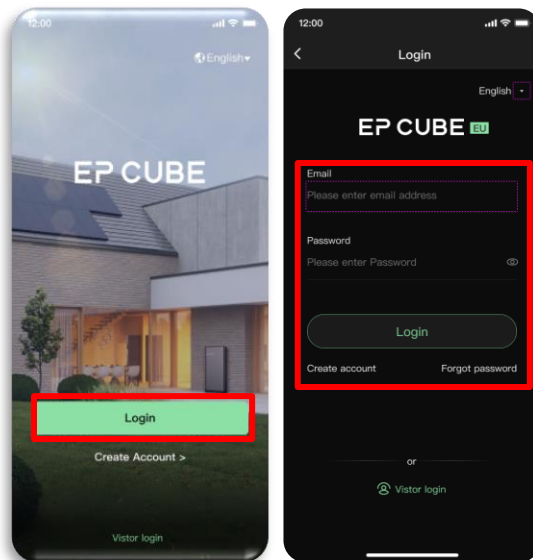
The System commissioning and the setup of the EP Cube have to be made with the EP Cube app. A installer account is mandatory needed to be able to start the easily use of the EP Cube App to commissioning, monitoring and service procedures( troubleshooting and error analysis).

The App is available under iOS and Android.

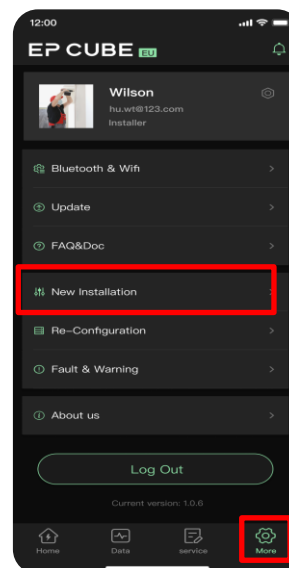
Apply a Note: you can receive a installer account for EP Cube visiting our EP University(EP Cube University) and perform the free of charge installer training that includes many helpful advantages.



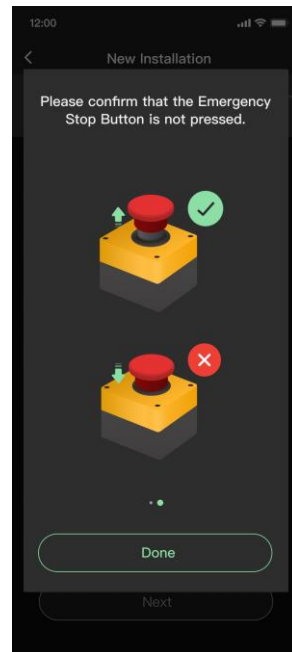
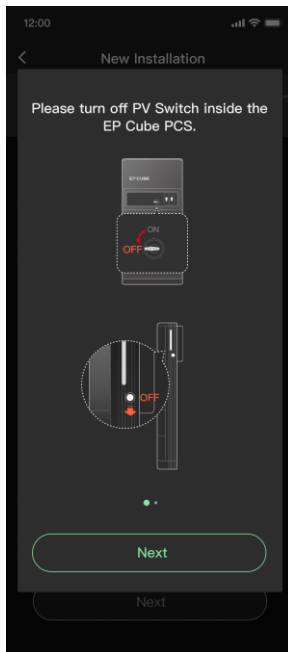
iOS / Android App



Click Login----> Login with your installer account

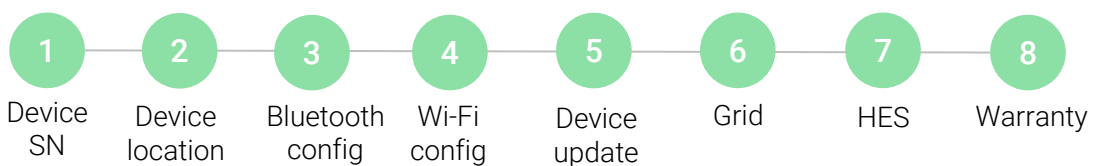


Click More ----> click New installation



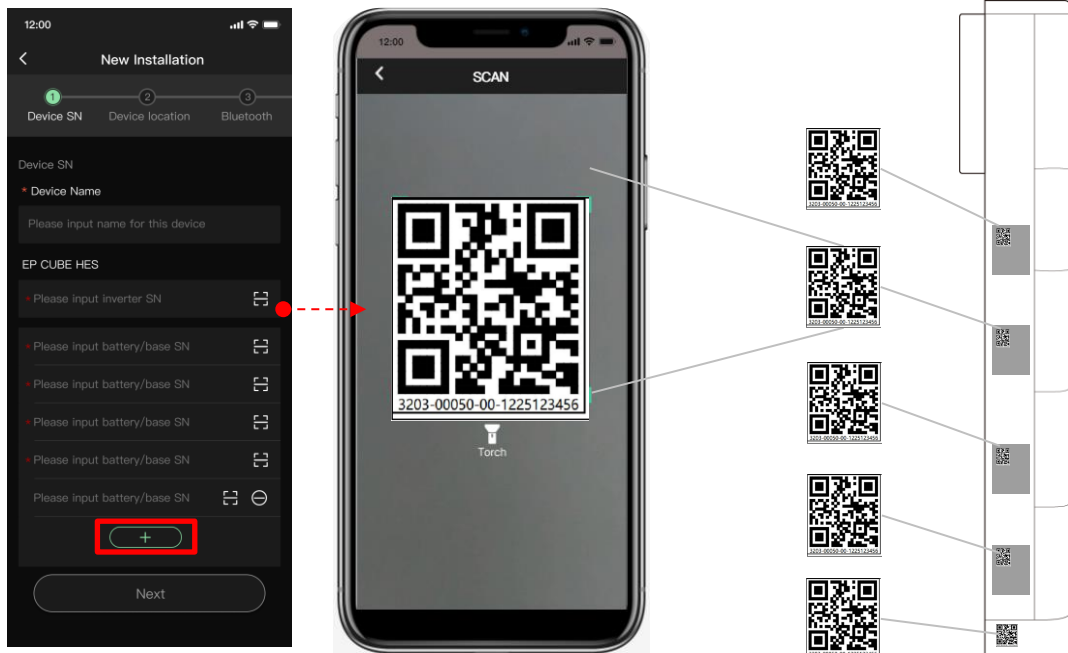
**Note:** Before commissioning, we need to confirm these button's states.

Follow the step by step process to configure all the connected devices within your EP Cube system including Network i.e. Bluetooth/Wi-Fi, Grid, HES config, and warranty registration. Below fig shows the order of configuration steps. At each step, there are 3 navigation buttons to enter "Config", and move to "Next" or go "Back" to any step.



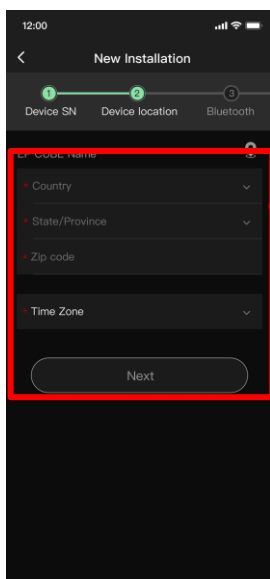
**1. Device SN:** Beginning with the add device step, Click "config" to start adding device name, EP CUBE PCS, battery modules and base according to connected devices in the system. Scan the QR code to add the SN of each module.

**⚠ Note:** If the QR code of a certain device cannot be recognized and scanned then input the SN individually by manually inputting the SN to continue with the Installation process. In this case, take the photos of the QR code label on the device and upload it in step 7.

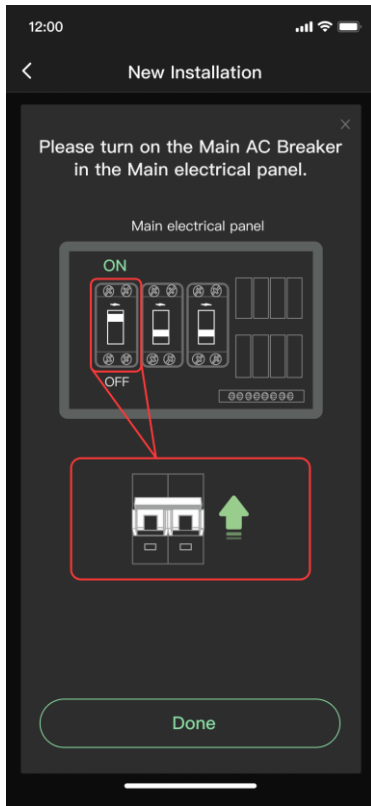


Click on the “+” button marked in red box to add more devices to the list. Once all devices are successfully added, Click on the next button.

**2.Device location:** Implement information related to the location and time zone. Finally, click Next.

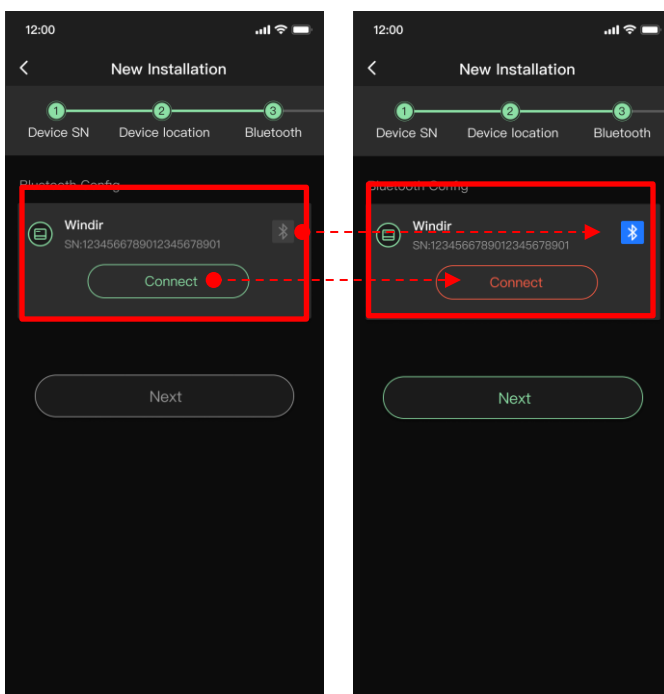


Device Location	Country	Choose country name from the list
	Province	Choose Province name from the list
	Zip Code	Write area zip code
Time Zone	Time zone	Choose applicable time zone from the list



**Note:** before we go to next step, please make sure the breaker is power on.

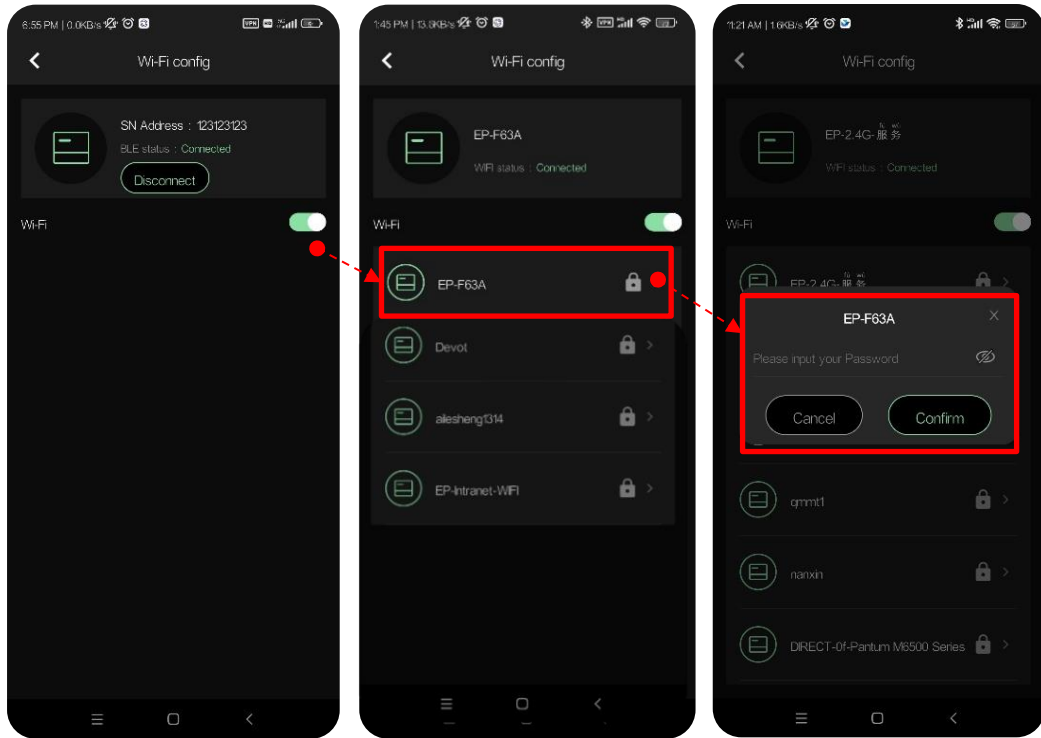
**3. Bluetooth Config:** In the step, the Bluetooth configuration is completed. Click on your desired device to set it as the current device. And click connect button to pair your phone with the newly added device. Upon success, Bluetooth status will change to connected and colour of the Bluetooth icon will turn blue.



1. Turn on your phone's Bluetooth
2. Choose your added device
3. Click on connect button
4. Upon success, Bluetooth icon will turn blue.
5. Connect button will be replaced by the Disconnect button.

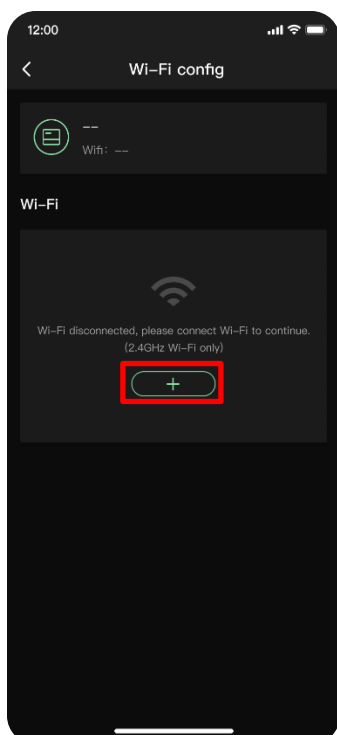
**4. Wi-Fi Config:** it allows you to choose your home Wi-Fi network to connect your device with it. Input the password and click confirm.

**Note:** EP Cube can only connect with 2.4Ghz Wi-Fi Networks.



Turn on Wi-Fi

Input the password and confirm



**Attention :** Ensure that your installation site must have Wi-Fi coverage and strong signal strength. EP Cube only supports 2.4GHz Networks only.

5G ❌

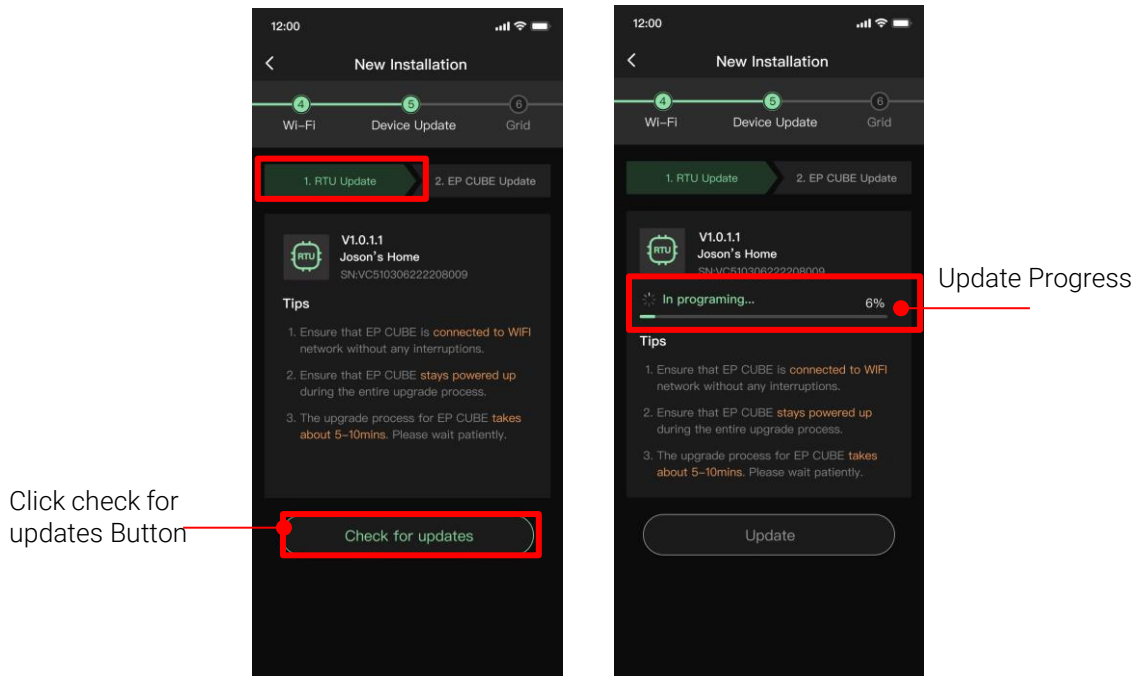


2.4G ✅

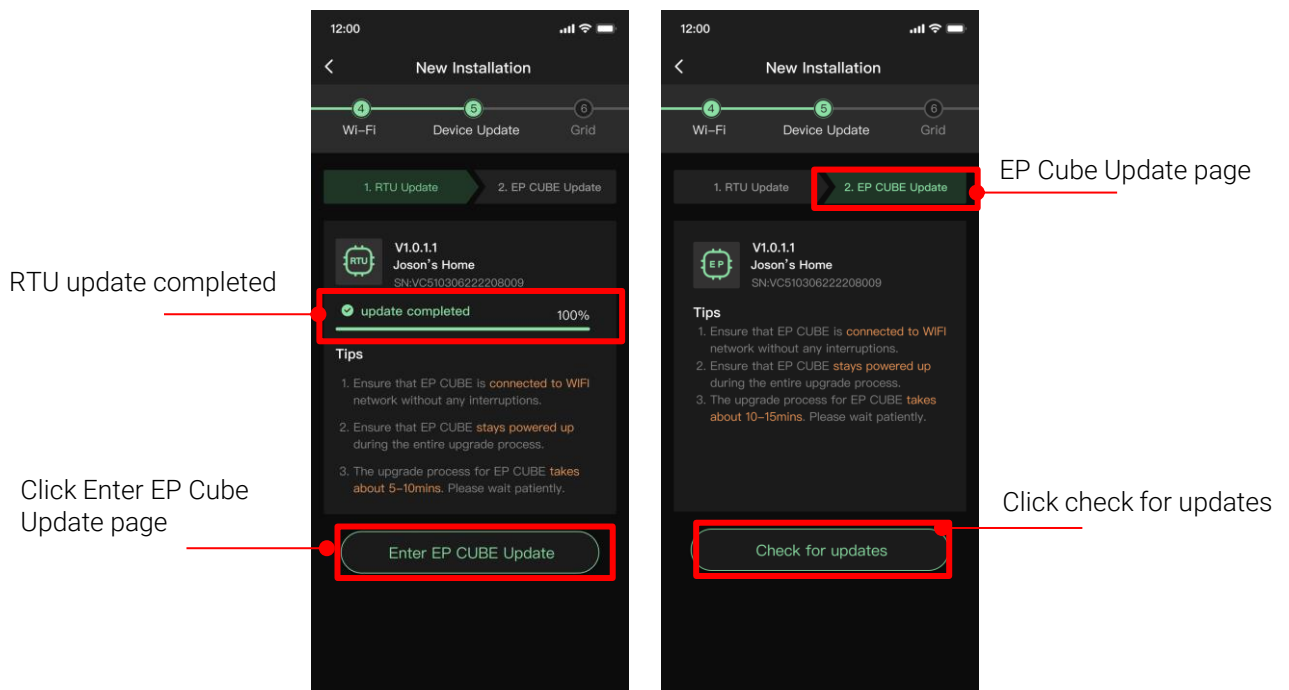


**5. Device Update:** In this step firmware of the RTU and EPCUBE are updated to latest available versions automatically.

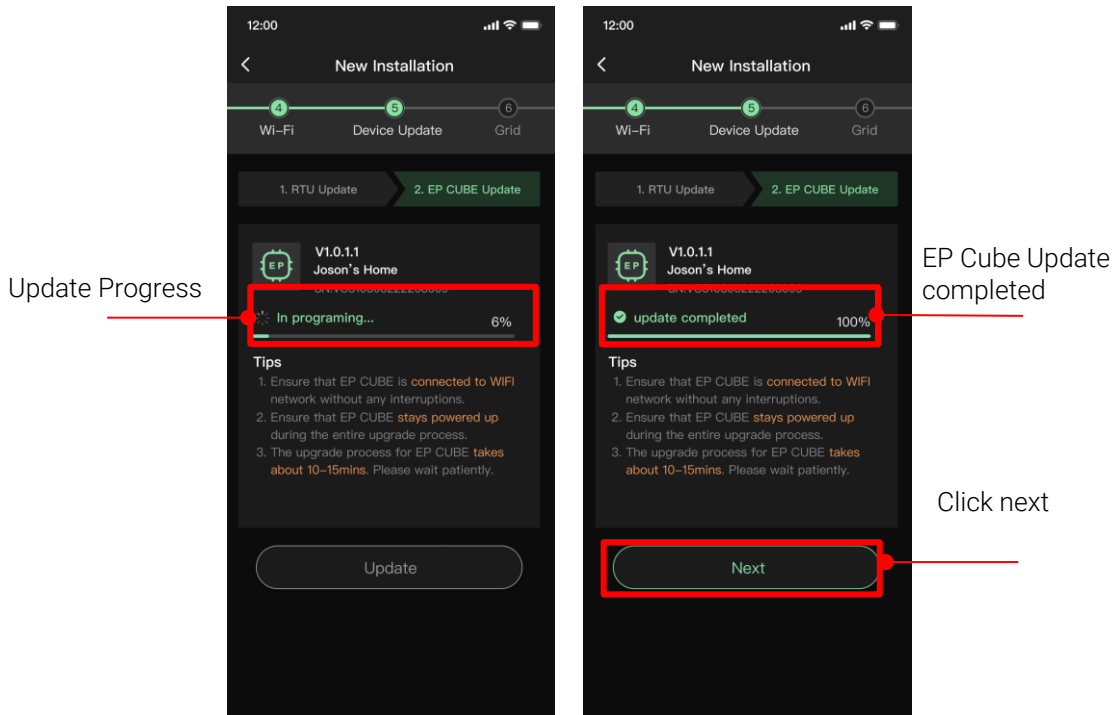
In 1st step, click check for updates button to start RTU update process. Pay attention to the tips.



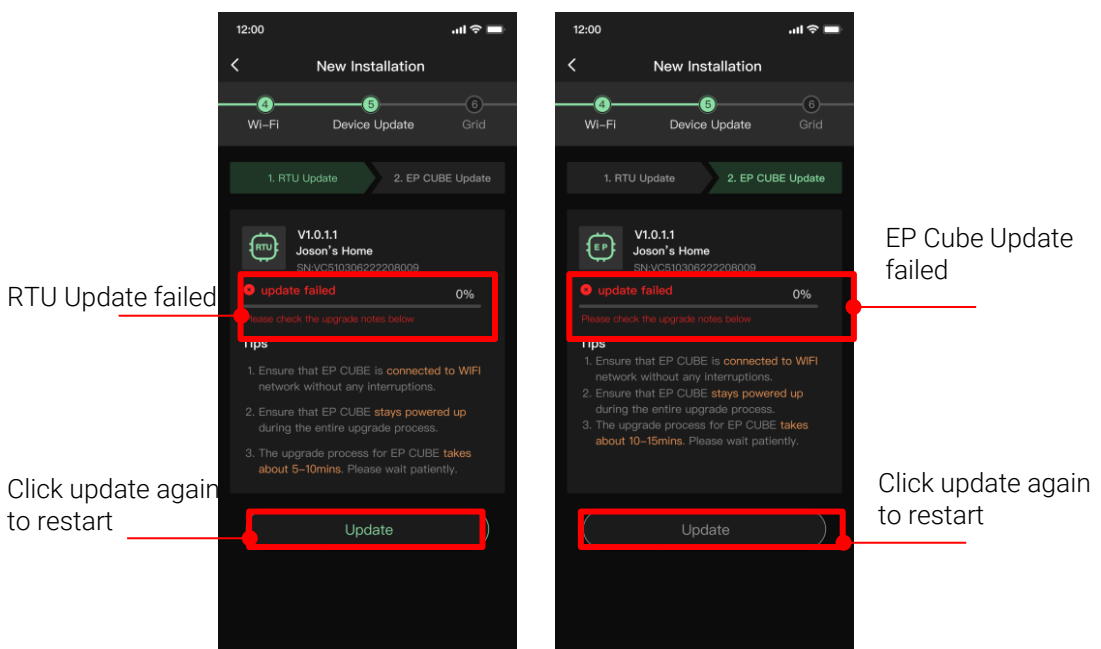
Once the update is completed successfully, Enter EP Cube button will appear. Clicking on the button will start the second part of the update that's EP Cube system firmware update.



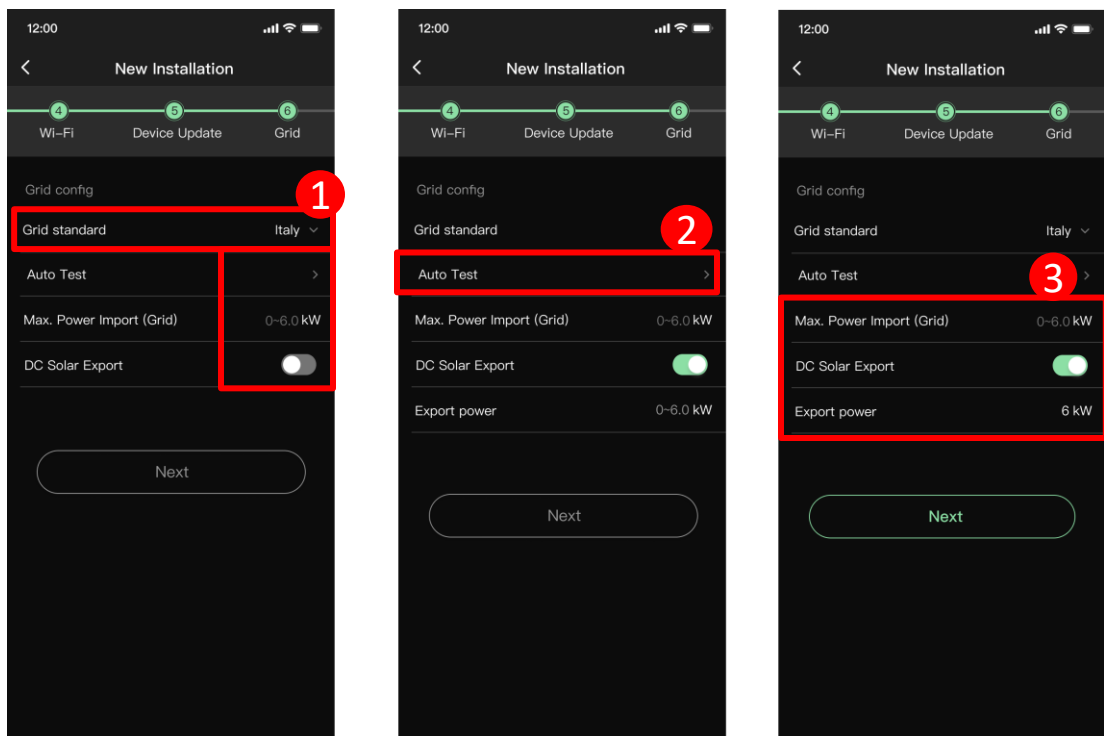
Click check for updates button on EP Cube page to start the update. Once the update is completed successfully, click next button.



For any reason if update process failed, the Upgrade failed message will be displayed. Click update button to restart the update process again.



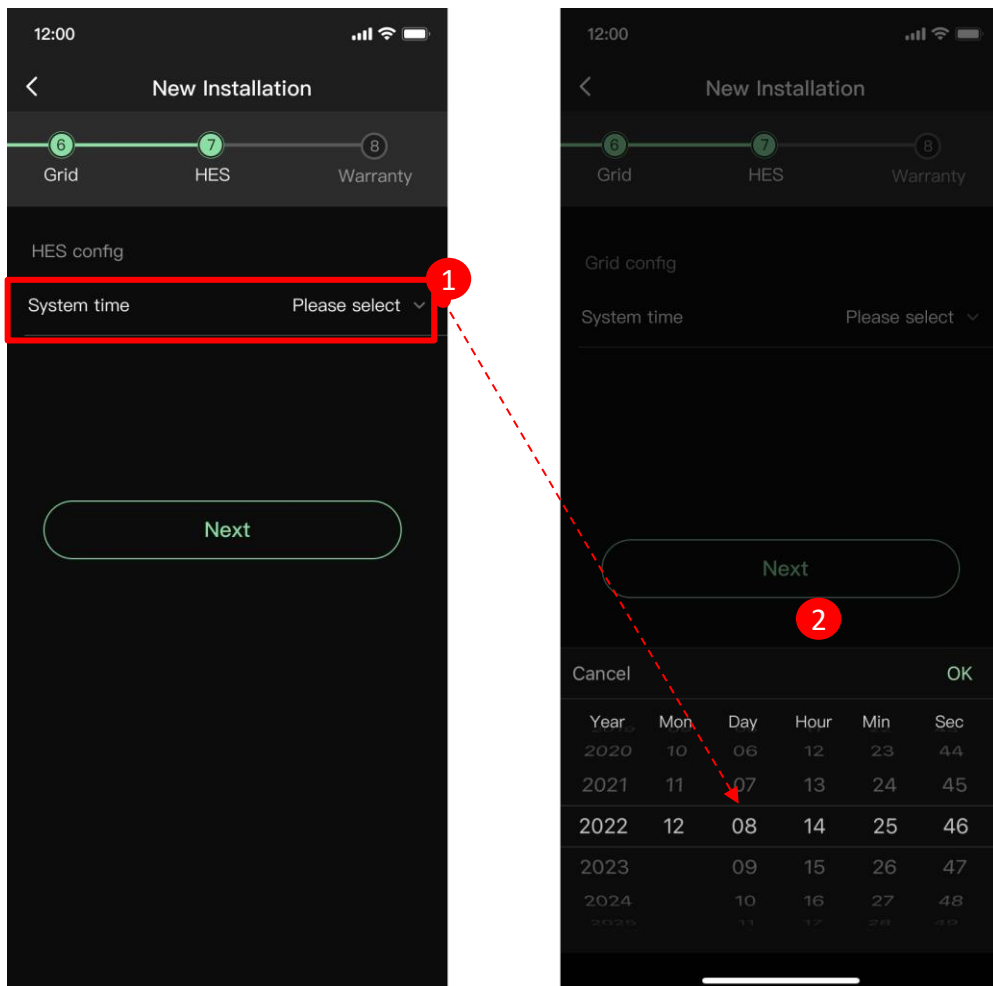
**6. Grid Config:** choose your system's applicable grid standard. Dropdown list already include grid standards listed for Italy, Spain, UK and Germany. Upon selection of Italy, next in the line is the auto test feature that's a standard requirement for Italian grid. Further down the list is the setting for max, power import (from grid) that let's the user input any value within the applicable range. Last item on the list is the enable or disable button for DC Solar Export, and it allows to input any value of power export within the applicable range for each country. After selection click submit and return to installation step.



**7. HES :** HES config step allows the user to setup and input different system related information and connected devices. i.e.

Step 1. Set system time as per local standard time.

Step 2. Click next & return to installation steps.

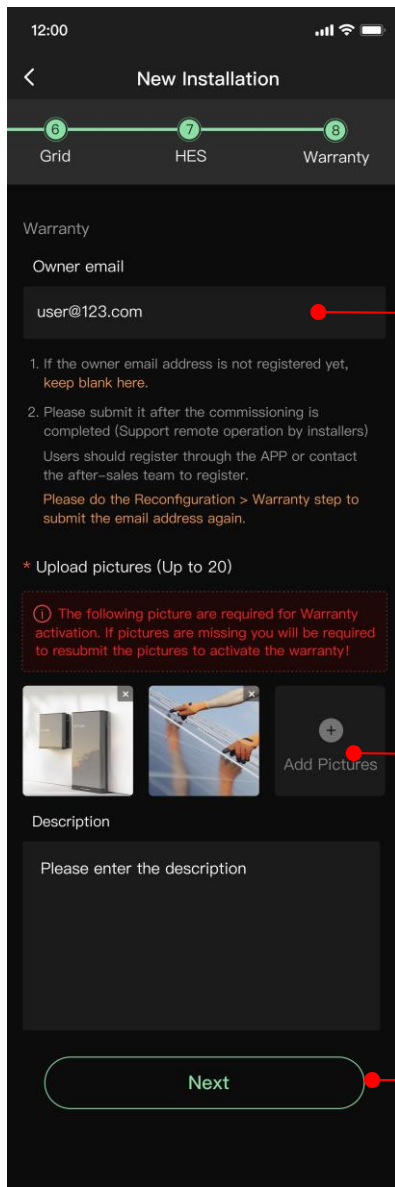


**8. Warranty Registration:** In the final step, take photos of the completed installation from different aspects and upload using add button. Maximum 20 pictures can be added.

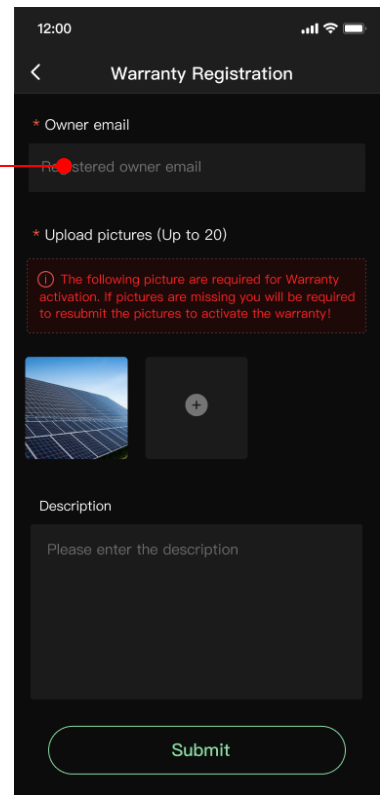
**Note:** If you had trouble with scanning any QR codes at add device step, then manually input the device SNs, take photos of the QR code and upload the photos of the problematic QR code here.

Add any remarks or comments if needed and click the submit button for EP Team’s review and approval .

Then click the next button to close installation process.



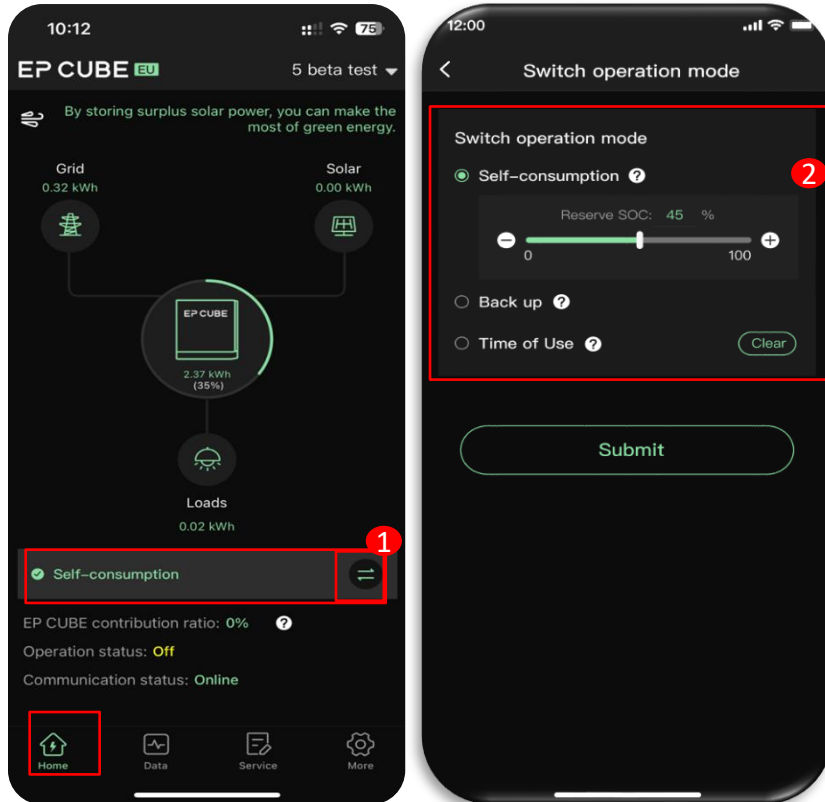
Input the owner email.  
**Note:** there is not mandatory, you can go to re-configuration and input this information again. The owner mail account need to be created before fill in.



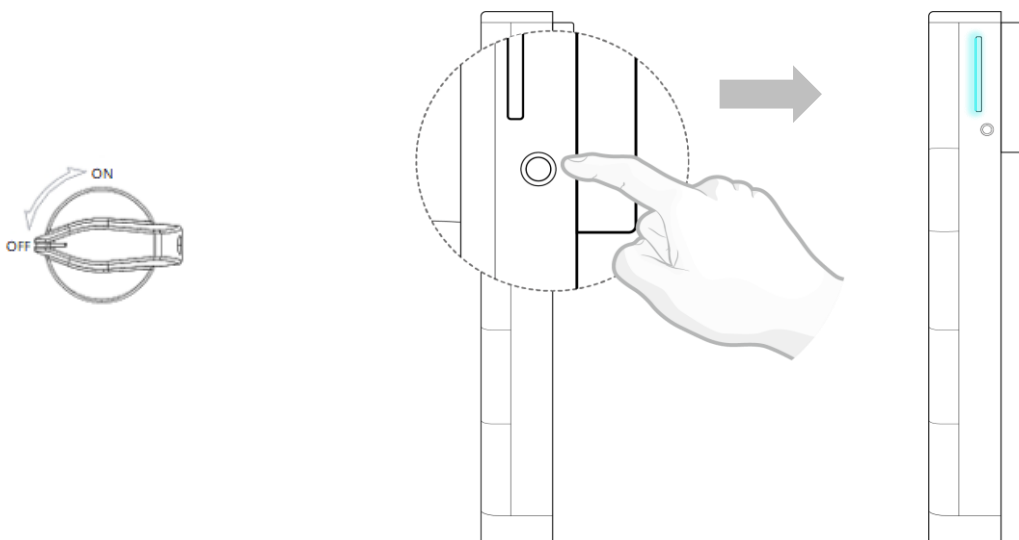
Click on the add pictures section to upload photos

Click next button & then click finish to return to home page.






After completing the finish step, return to home page. Select an appropriate operation mode and Reserve SOC value according to energy usage preferences.



Now, install the side covers, turn on the PV switch on the panel and switch on the EP Cube PCS via the power button by pressing it for 3 sec as shown in the figure below.



Observe and verify that EP Cube is working as per desired settings. Pay attention to EP Cube indication LED and energy flow on the EP Cube App.

Color	Description
	On&Working
	Flashing 05 sec./ malfunction
	Stand-by
	Flashing 10 sec./ Back-up On – Grid outage
	Off

In an event of fault occurrence, EP Cube app can help narrow down the possible reasons behind a fault. Your EP Cube App Installer account gives you access to Warning and Fault sections. Login and set your desired device as current device to see logged warnings and faults. If you find out a certain fault logged in the list of faults, please refer to EP Cube Guidelines on Troubleshooting Codes for more information on relevant errors, maintenance and corrective actions to be performed to restart the system.

## 3. EP Cube System Power-ON & Power-OFF

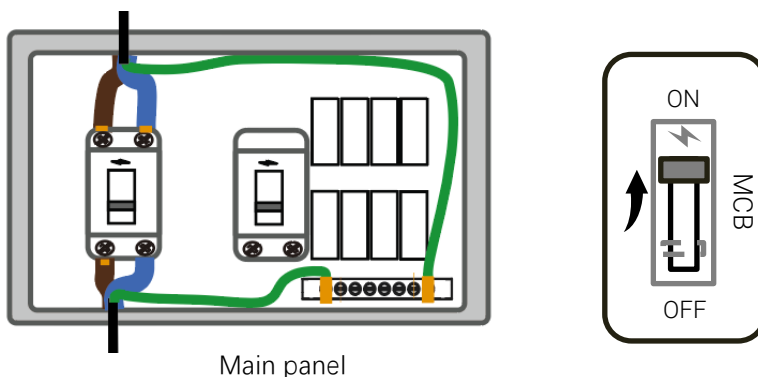
This section introduces the EP Cube system's Power-ON & Power-OFF process.

### 3.1. EP Cube Power-ON

**⚠ CAUTION:**

- Please ensure all the cables are connected well before getting started.

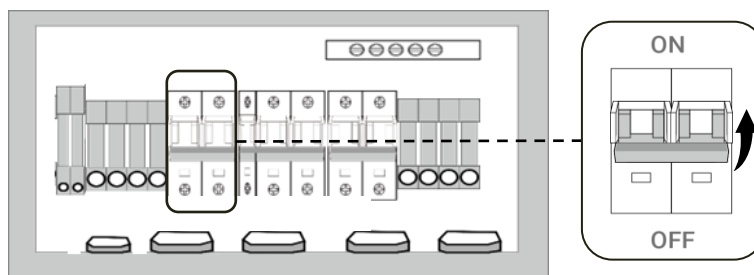
a. Turn on the Grid MCB inside the Main Home Electrical panel.



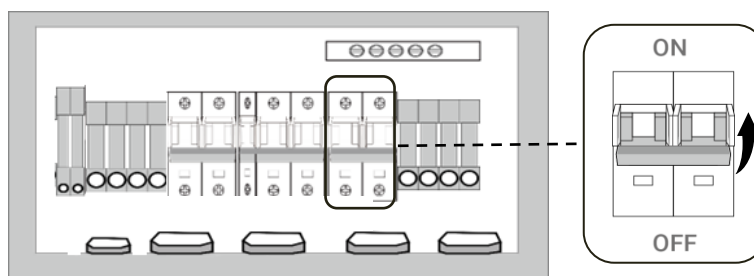
Main panel

b. Turn on the MCBs (ON GRID Breaker & AC Boost (Back-up) Breaker) inside the AC Switch Box. Ensure that the Bypass MCB is turned off, and locked out & Tagged out.(Optional for installed the AC switch box)

**Note:** The AC Switch Box is optional, if we don't have AC Switch Box, please skip this step.



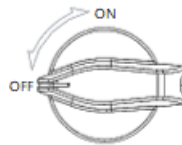
AC switch box



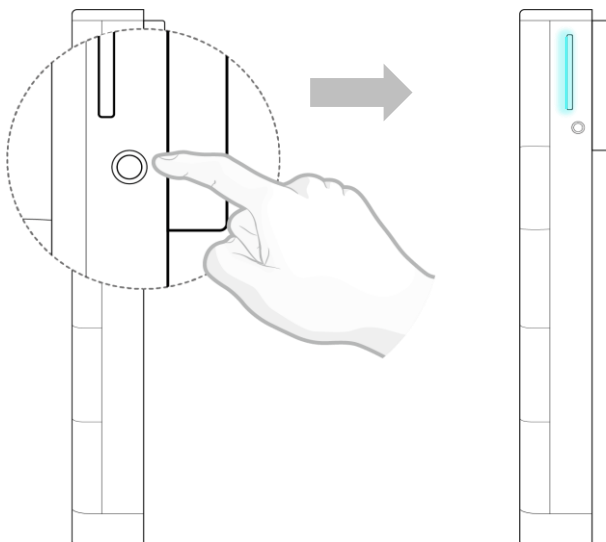
AC switch box



c. Turn on the PV Switch by turning knob from OFF to ON. Both PV1 & PV2 are controlled through a single switch.

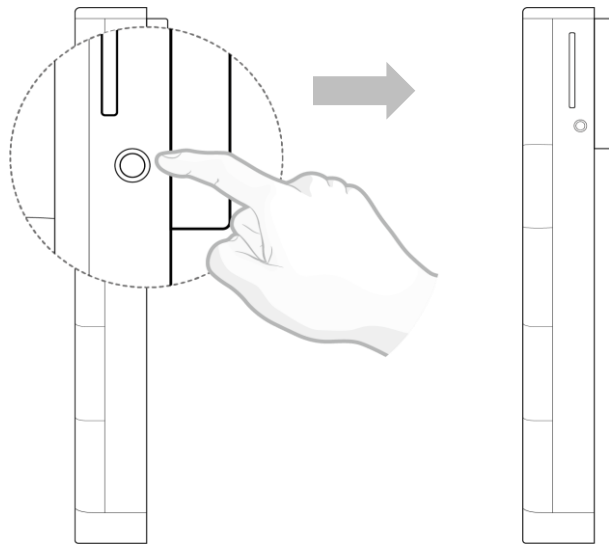


d. Switch on the EP Cube PCS via pressing the power button for ( 3 sec.) as shown in the figure below.

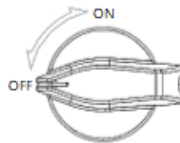


## 3.2. EP Cube Power-OFF

a. Switch off the EP Cube PCS via pressing the power button for 3 seconds as shown in the figure below.

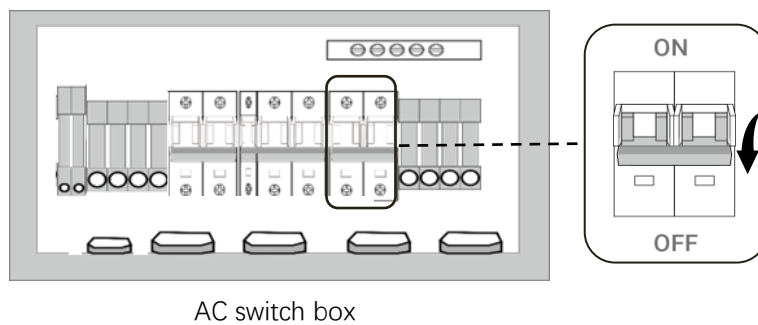
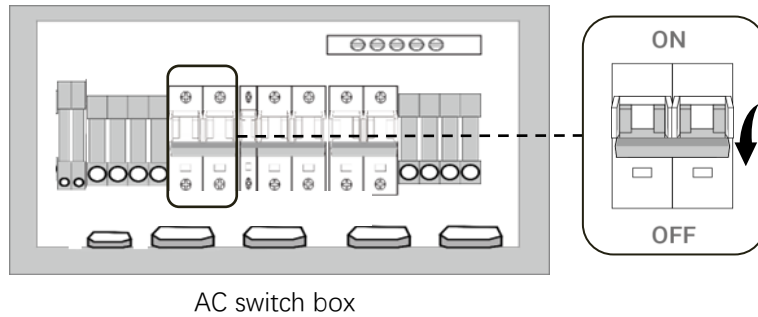


b. Turn off the PV Switch by turning knob from ON to OFF. Both PV1 & PV2 are controlled through a single switch.

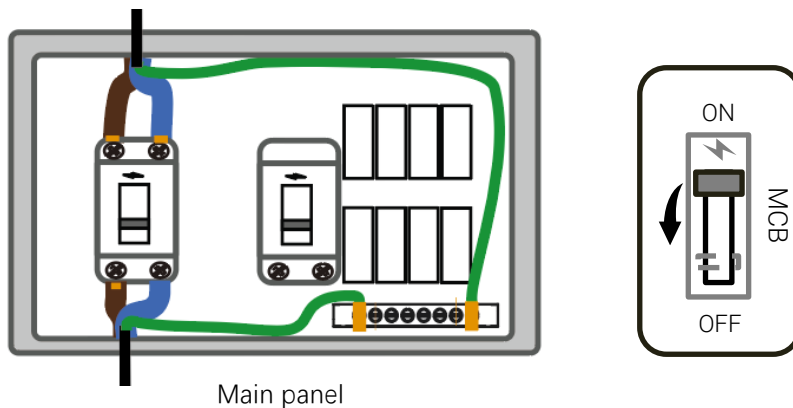


c. Turn off the MCBs (ON GRID Breaker & AC Boost (Back-up) Breaker) inside the AC Switch Box. Ensure that the Bypass MCB is turned off, and locked out & Tagged out..(Optional for installed the AC switch box)

**Note:** The AC Switch Box is optional, if we don't have AC Switch Box, please skip this step.



d. Turn off the Grid MCB inside the Main Home Electrical panel.



## **APPENDIX1 TROUBLE SHOOTING**

For more detail, you can check our trouble shooting guide here. Link is below:  
<https://epcube.com/eu/documents.html>

## APPENDIX2 Battery Parameters

Technical Specs: Please refer to Technical datasheet for more specific parameters.

Battery System Parameters	EP Cube HES-S7-10G	EP Cube HES-S7-15G	EP Cube HES-S7-20G
Batt. Modules quantity	2	3	4
Battery Capacity	10	15	20
Std. Power charge & discharge	5	6.5	7.6
Charge-Discharge Period	>2h	>2h	>2h
Efficiency	93%	94%	95%
Reference Conditions: At $(25 \pm 2)^\circ$ C: 0.5C charge & 0.5C discharge			