EP CUBE

Installation Manual V2.3

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Revision History

S. No	Rev.	Update Description	Release Date	Author
1	V 0.0	Initial Draft		Argent Lee
2	V 1.0	First Version: Accessories section updated, Installation space requirements added, Wiring of CT's updated, Expansion of EP CUBE added, Wire Gauges Update	Nov-08-2022	Nadim
3	V 2.0	Accessories section updated, EP CUBE Commissioning section updated, Content order adjusted.	Feb-24-2023	Nadim/Gaara
4	V 2.1	Page 6: Updated email address Page 11: Warning Section updated Page 54: Step f. removed. Page 55: App figure updated Page 56: Note Added. Page 60: App figures updated Page 61: App figures updated Page 65: App figure updated Page 66: App figure updated, New step added. Page 67: LED Indications Description Updated.	April-07-2023	Nadim
5	V 2.2	Page 11-12: Text & Figures added related to installation in salt affected areas	April-20-2023	Nadim
6	V 2.3	Page 7-8: Note added related to Capacity Extend Kits for multiple Hybrid Connections. Page 9-10: System topology figures updated. Page 12: Text in figure updated. Page 13-14: Figure updated. Page 62: Image updated Page 53, 54, 67, 73: Text adjusted.	July-03-2023	Nadim

Contents

INTRODUCTION

This manual describes the installation process and provides a set of guidelines for EP Cube system installers. Please thoroughly read 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. For more information about the EP Cube products, please refer to the product-specific User Manual and Data Sheet. The safety warnings found in the above-mentioned documents also apply to this manual.

This manual is only valid for the EP Cube US series.

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

1.Warranty Registration

PRODUCT WARRANTY REGISTRATION IS A VERY IMPORTANT PART OF INSTALLATION. BE SURE TO COMPLETE THE COMMISSIONING PROCESS AND WARRANTY REGISTRATION.

For the detailed warranty policy, please refer to EP Cube LIMITED WARRANTY.

Document link: https://eternalplanetenergy.com/manuals.html

Login to the EP CUBE App to register and ensure system owner information is accurate to complete warranty registration.

Mobile APP download: https://eternalplanetenergy.com/app-download.html

2.Disclaimer

This document has gone thru 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.

3.Copyright

4. Abbreviated Terms

ABBR	Description
A	Ampere
AC	Alternating Current
CT	Current Transducer
COMM	Commissioning
DC	Direct Current
EV	Electric Vehicle
kW	Kilowatt
L (L1 L2)	Phase (1,2)
LED	Light-emitting Diode
LRA	Locked Rotor Amps
N	Neutral
RSD	Rapid Shutdown Device
PN	Part Number
PV	Photovoltaic
V	Voltage

5. Customer Services Contact

Contact EP via email below:

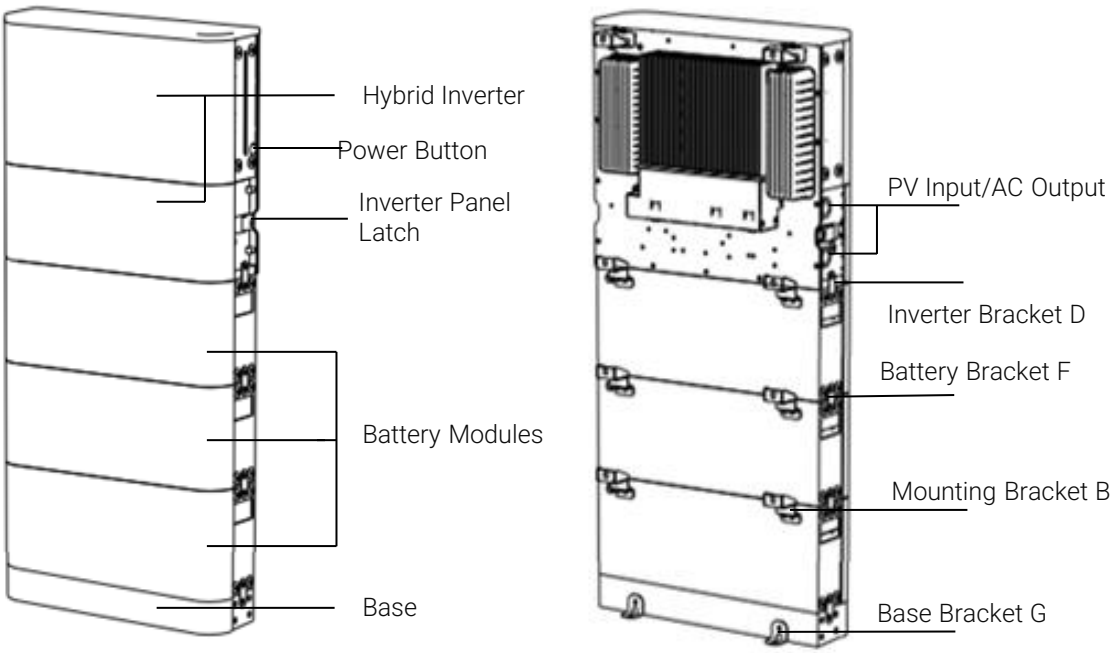
Email address: service.us@epcube.com

1.Standard Components

A. Hybrid

Hybrid is an integrated battery storage product that includes both Battery Modules and Hybrid Inverter. (Refer to US Specification for more details)

Reference Model:
Standard Hybrid + Battery modules*3Pcs

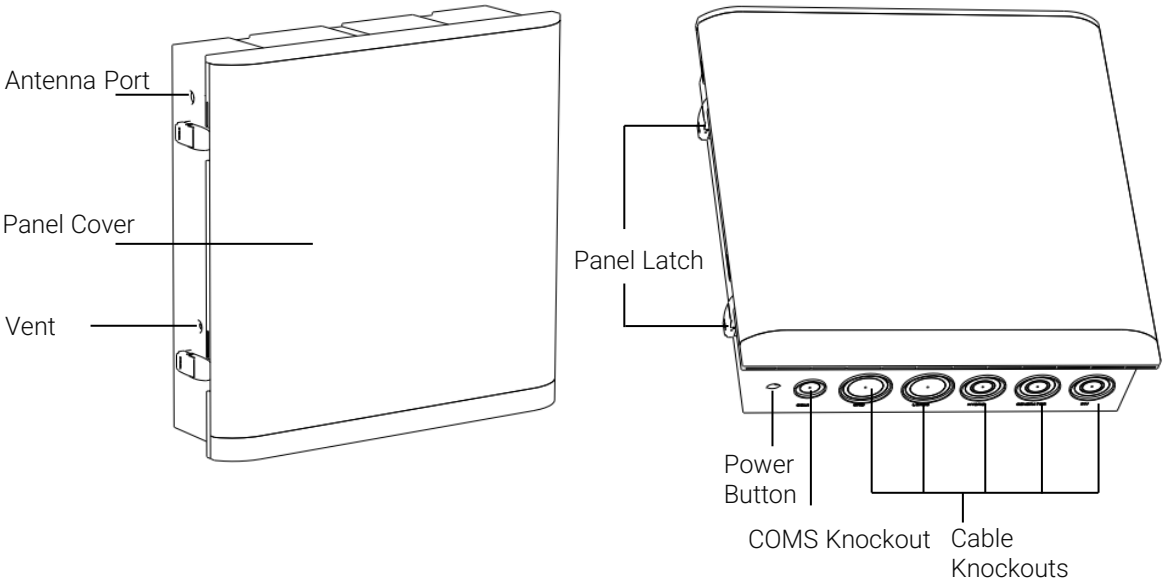


B. Smart Gateway

The Smart gateway works for home power generation and consumption management by connecting with the utility grid, PV Inverter, EP Cube Hybrid, and home appliances. (Ref. to US Specification for more details)

Note: Smart gateway includes a preinstalled circuit breaker for the Hybrid and the control kits for Generator input or PV inverter or EV charger. If multiple hybrids are connected in parallel with a single smart gateway, then additional Circuit breakers must be ordered separately.

For the complete list of compatible equipment like Gensets, PV inverters, EV chargers, please visit below link: https://eternalplanetenergy.com/certified-equipment.html



2. Optional Accessories

Description	Part Number	Model Name	Note
Capacity Extend Kit	1005-00011-00	MCBs Kit - NA40ASG	Optional for Smart gateway
Wall-mount Kit	1005-00023-00	Wall mounted Kit	Optional for Hybrid

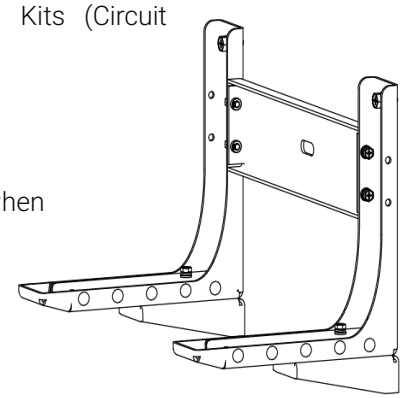
A. Capacity Extend Kit

Optional capacity extend kits may be added to the DIN rail for additional EP Cube Hybrid units. These should only be used when more than one Hybrid units are installed on a site with a single smart gateway.

Specification： Max Current : 40A.

Note: If multiple hybrids are connected in parallel with a single smart gateway, then additional Capacity Extend Kits (Circuit breakers) must be ordered separately.

B. Wall-mount Kit



Optional for Hybrid, used to install base and Hybrid when mounted on the Wall.

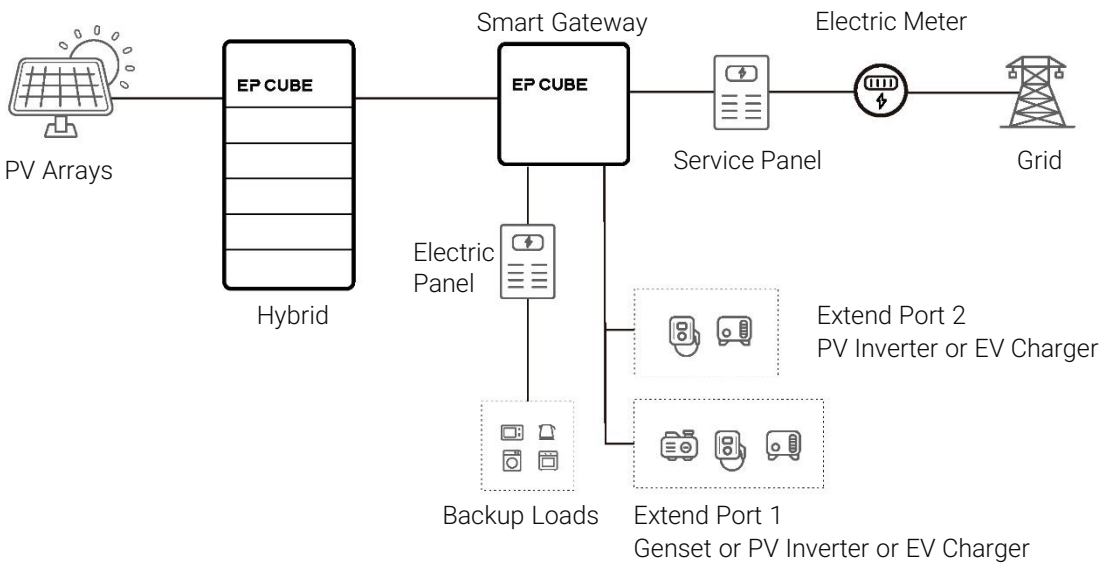
THE EP CUBE SYSTEM

The EP Cube system consists of two standard components: the Hybrid and Smart Gateway. In addition to these components, users have a wide range of optional accessories available to choose from according to site and customer-specific needs.

1.System Scenarios

A. Whole-Home Backup

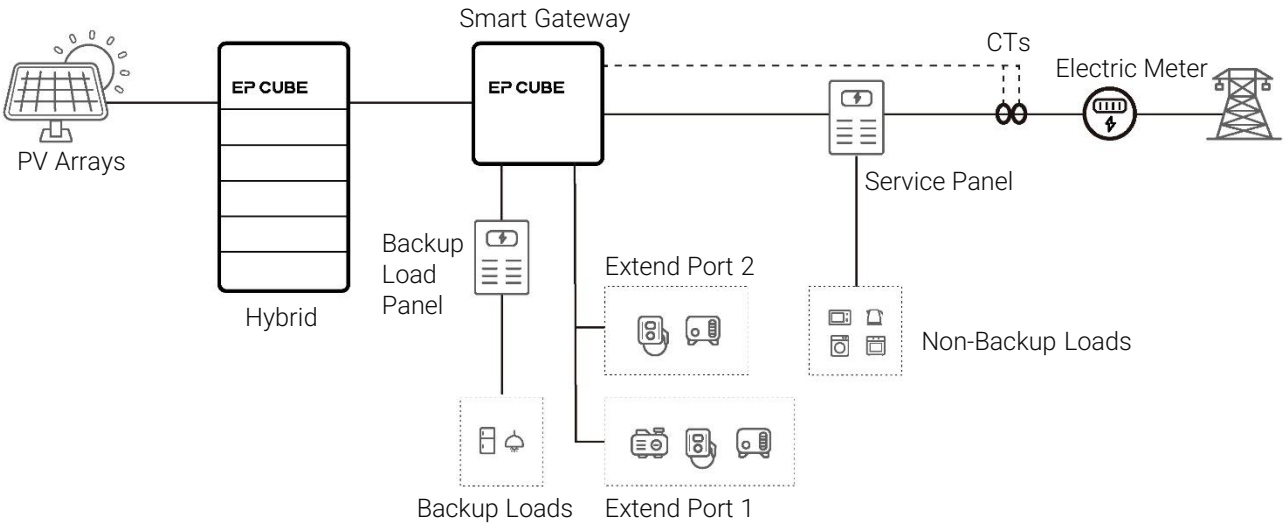
All home appliances can be powered by the EP Cube when a grid power outage occurs in the whole-home backup topology. With a whole home backup installation, the Smart gateway is installed between the meter with service panel and main load panel.



⚠ **NOTE:** The Smart Gateway is not rated to act as service entrance panel. If the utility meter doesn't have a circuit breaker (CB) or power panel between the Grid and Smart gateway, an MCB or power panel must be installed at the site.

B. Partial-Home Backup

In this type of system layout, the EP Cube manages and optimizes the power supply for part of the property owner's loads. Only the backup loads will be powered when a grid power outage occurs in partial- home backup topology.



EP CUBE INSTALLATION

EP Cube can be mounted on a floor or wall and comes with floor mounting brackets. For wall-mounted installation, an optional mounting kit should be ordered.

1.Site Survey

Complete site information by gathering data through a site survey.

⚠ **CAUTION:**

For EP Cube installation on exterior walls or near the openings (doors, windows), please refer to applicable local codes and UL 9540 23.2.

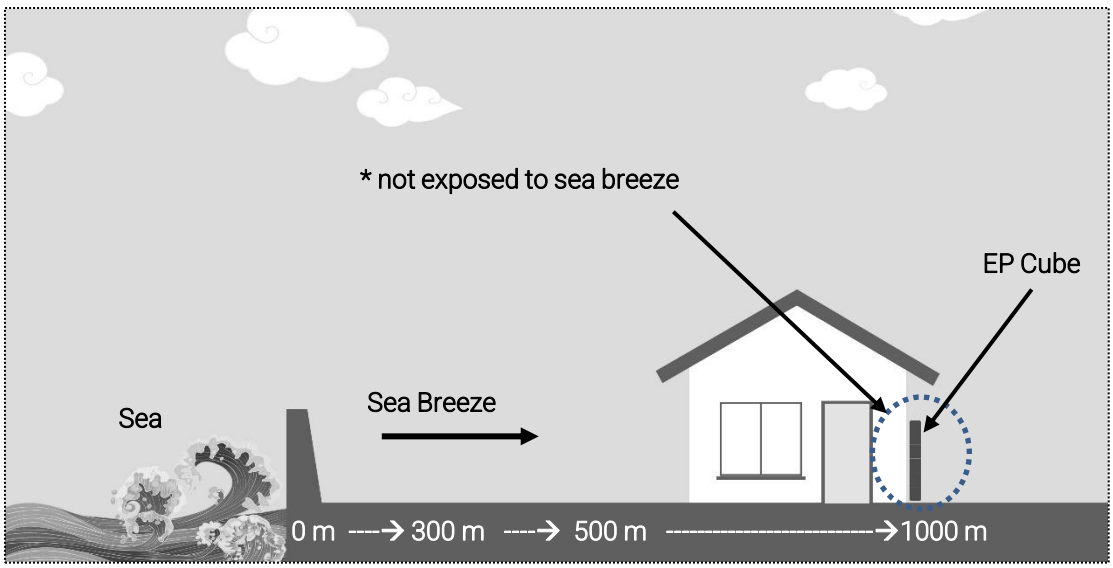
For EP Cube indoor installation, please refer to applicable local codes and UL 9540 42.6.

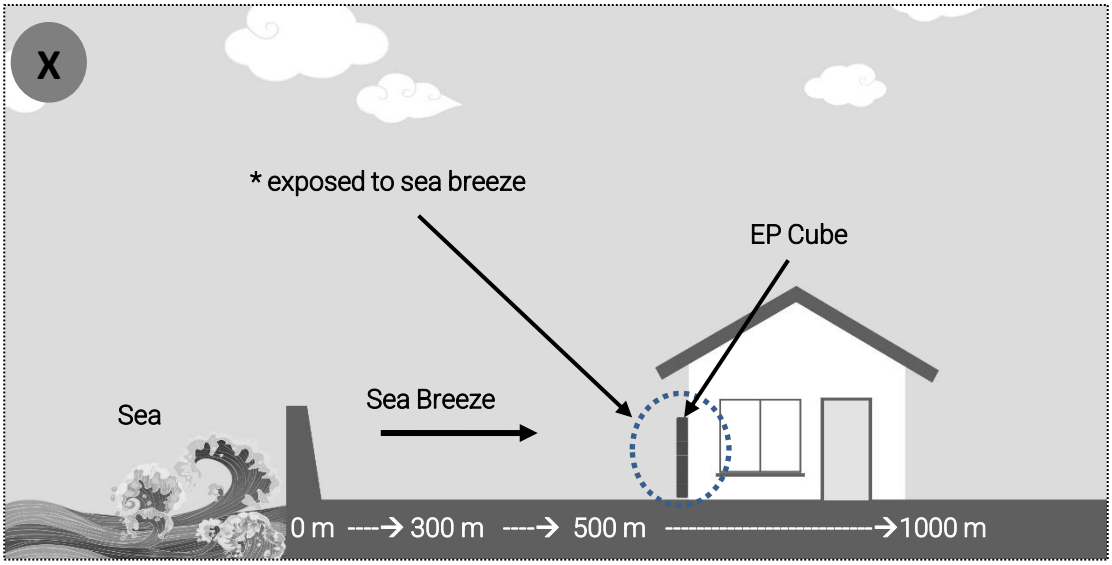
Note that the EP Cube Hybrid assembly is heavy! Installers should refer to the specifications for details about Hybrid weight and check with local regulations to confirm the wall mounting is viable.

For Caribbean islands i.e. Puerto Rico, EP Cube cannot be installed in outdoor places that are severely affected by high salt because it may corrode. A salt-affected area refers to the region within 1000 meters from the coast and in areas directly affected by scattered seawater or prone to sea breeze.

- It is highly recommended that EP Cube is installed at least more than 1000m away from sea.
- It is highly recommended to install EP Cube in places where it is not directly exposed to sea breeze i.e. sea breeze blocked by a building. (Ref. to figure below)

NOTE: Damage caused by outdoor installation in salt-affected areas is not covered in scope of limited warranties. A salt-affected area refers to the region within 1000 meters from the coast and in areas directly affected by scattered seawater or prone to sea breeze.





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 Hybrid, extreme care is required to avoid dropping, bumping, or stomping the modules. This can lead to damage to the paint or bent edges.

NOTE: Wall mounting bolts for Hybrid Bracket C and Smart Gateway Bracket A2 need to be provided by the installer. Ensure complete compliance with the regional building codes when choosing suitable anchor bolts. EP Cube doesn't provide these fasteners.

3. Installation of Hybrid

This section introduces the Hybrid assembly and installation process in sequence.

A. Preparation :

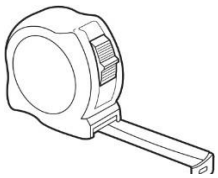
If the system design requires optional items, please review each associated instruction set to complete installation.

Make sure all necessary tools and materials are available before starting the installation process to avoid any inconvenience on site.

Table 1. Tools

Drill Set (with 3/8" drill bit)

Hammer



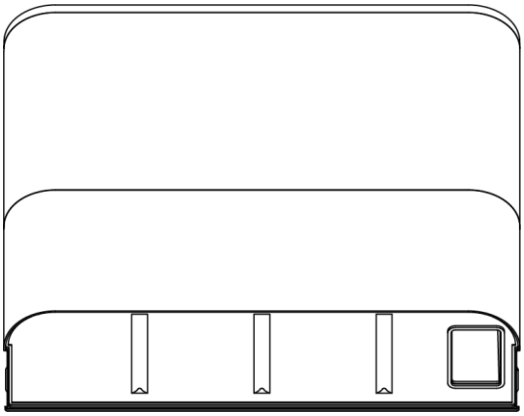
Tape Measure

Level Tool

Examine and ensure that the following quantities are correct per placed order, and that no parts were broken or damaged during transportation. You may check off the unpacking inspection guide provided below.

Hybrid Inverter Box

1.



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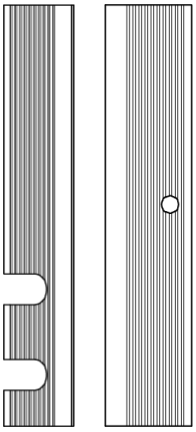

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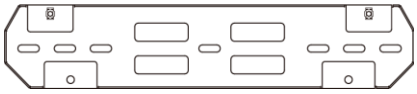

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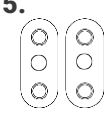

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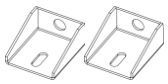

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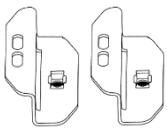
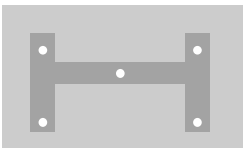


8.

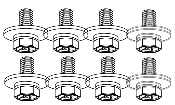
9.

10.



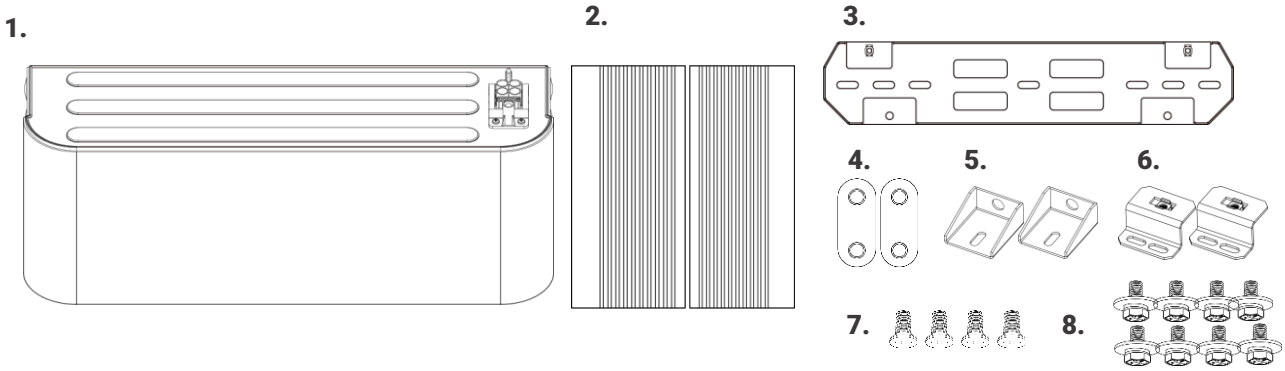
11.

12.



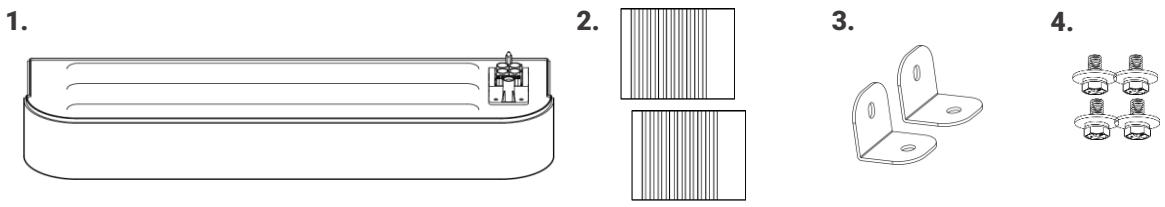
1. Hybrid Inverter
2. Inverter Side Cover A_1pcs
3. Inverter Side Cover B_1pcs
4. Hybrid Bracket C_1pcs
5. Inverter Side Bracket D_2pcs
6. Inverter Bracket B1_2pcs
7. Inverter Bracket B2_2pcs
8. Communication Cable_1pcs
9. Resistor_1pcs
10. Hybrid Drill template_1pcs
11. Inverter Side Bracket D_M5_4pcs
12. Inverter Bracket B _M6_8pcs

Battery Modules Box



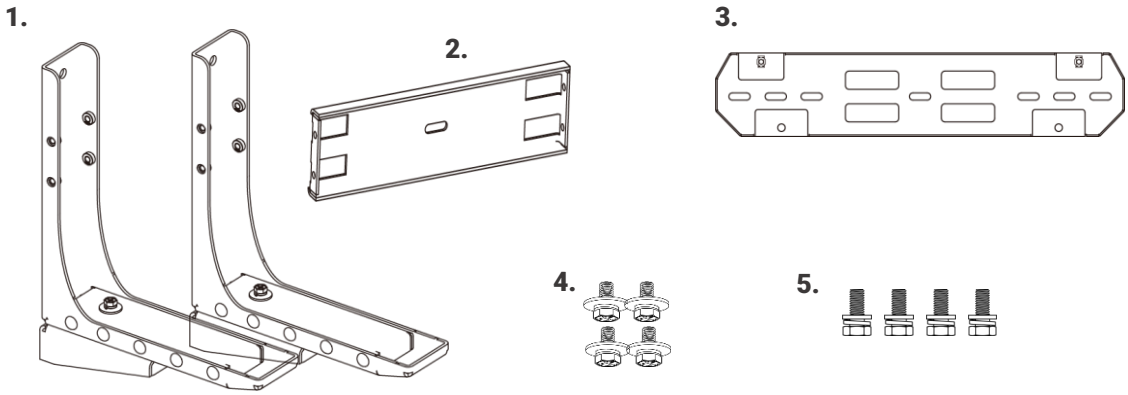
1. Battery module
2. Battery Side Cover B_2pcs
3. Hybrid Bracket C_1pcs
4. Bracket Side Bracket F_2pcs
5. Battery Bracket B1_2pcs
6. Battery Bracket B2_2pcs
7. Battery Side Bracket F_M5_4pcs
8. Battery Bracket B_M6_8pcs

Base Modules Box



1. Base
2. Hybrid Base Side Cover C_2pcs
3. Hybrid Base Bracket G_2pcs
4. Hybrid Base Bracket G_ M6_4pcs

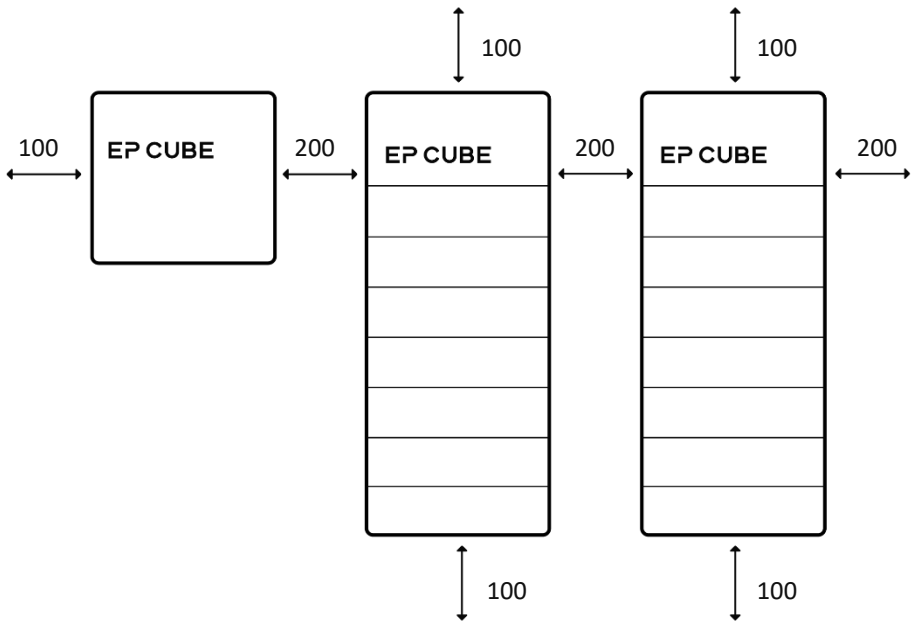
Optional Brackets Box



1. Wall Bracket E1_2pcs
2. Wall Bracket E2_1pcs
3. Hybrid Bracket C_1pcs
4. Wall Bracket E_M6_4pcs
5. Wall Bracket E_M8_4pcs

Installation Space

- The minimum space required for the heat sink on the back of the PCS is 3.346", but for exact dimensions of the distance between the base and wall during installation, please refer to Step 4 on page 18.
- The EP Cube is UL9540A certified to have spacing between each EP Cube Hybrid Stack at 200mm (8 inches) for tight compact locations but it is recommended to install system with 12 inches (300mm) or more spacing for easier access to hybrid latches, mounting hardware and conduit routing".
- For wall mounting installation, the minimum distance from the door, and windows should be 3 ft (914mm).



* Minimum clearance required from all sides.
* All the dimensions are in mm units.

B. Start Installation:

Step-1

Floor mounted - Place the drill template on the wall

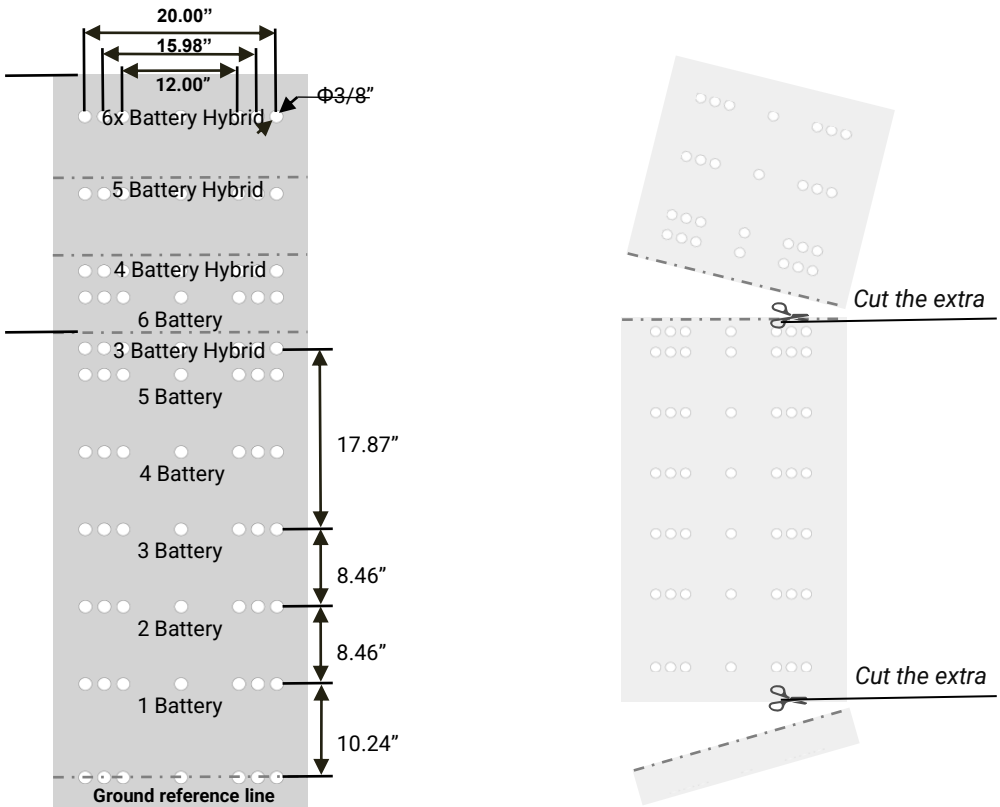
a. For floor mounted installation of standard EP Cube system, cut the extra piece of drill template on lower end (line marked above Ground reference line) and upper half (line marked above 3 Battery Hybrid).

b. Place the template on the wall in a way that lower edge is placed on floor surface.

c. Remove the adhesive tape on the edges, and stick template to the wall.

⚠ **CAUTION**: Please keep a safe distance between the Hybrid and other objects.

NOTE: It is recommended to have a minimum of 12" clearance from the Hybrid. All sides should have enough clearance for safe operation and installation and meet the National Electrical Code (NEC) 110.26 requirements.



Cutting and placing the drill template

Step-2

Floor mounted: Locating the mounting holes

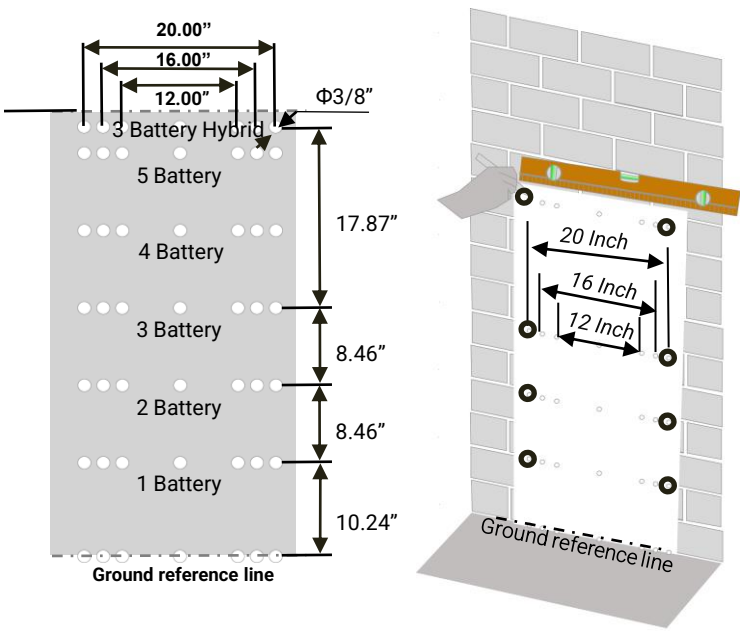
a. Make sure that drill template is straight with the help of level tool.

b. Using a pencil, mark the mounting holes on the wall as indicated by the drill template.

NOTE:

Each bracket C requires 2 anchor bolts to be installed on the wall. Drill template have 3 pairs of holes that are placed at the different distances. The distance between these 2 anchor bolts should be either 12 or 16 or 20 inches.

c. Choose any distance and mark the positions on the wall for drilling holes. Holes are marked at a distance of 20 inches in below figure.



Step-3

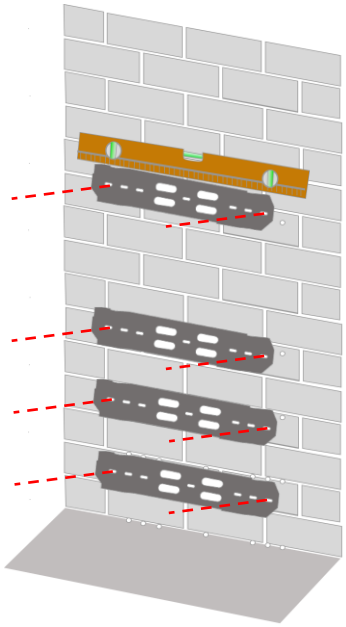
Install the Bracket C on the wall

a. Remove the drill template.

b. Place Hybrid Bracket C on wall to ensure the holes’ positions are correctly matched.

c. Select anchor bolts or wood screws with washers, and a minimum length of 1-1/2 inches to install Bracket C on the Wall.

d. Use a level tool to ensure bracket C is level, Tighten the anchor's nut to the specified values. (Ref. to Appendix-Torque Values)



⚠ **NOTE**: Select the suitable M8 (or similar) bolt/screw to mount the Bracket C depending on the type of wall.

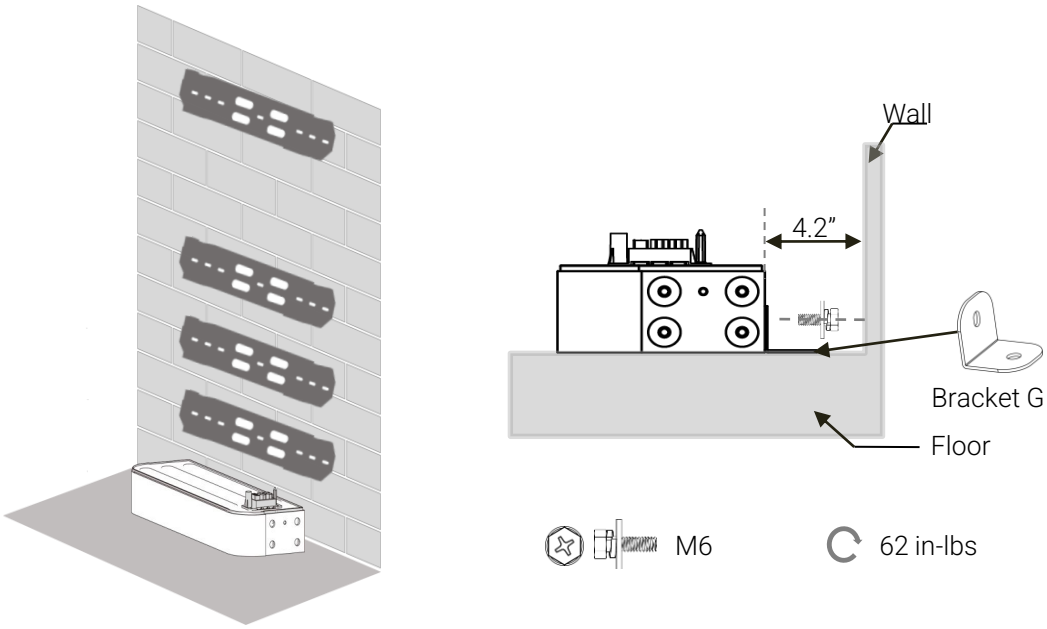
e.g. for concrete walls use a minimum length of M8*3-inch anchor bolts. For wooden walls use a minimum thread length of 1-1/2" wood screws.

Step-4

Floor mounted - Install the Base with mounting Bracket G:

a. Attach the base and Bracket G oval holes using bolts (M6* 0.63").

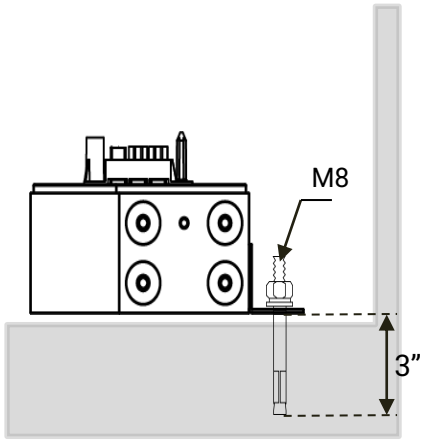
b. Then place the Base on the floor with a minimum distance of 4.2" between the wall and base, and mark the hole position required for the bracket G.



c. Use the drill set to drill φ 3/8” * 3” holes marked on the floor for Bracket G. Then use a hammer to lightly insert the hex sleeve anchor bolts (M8*3”) into the holes.

- Use the socket wrench to remove the nut and washers. Then place the Bracket G on the floor through hex sleeve anchor bolts.
- Put the nuts and washers back and manually tighten.

d. Measure to make sure that the Base is level using the level tool, then tighten the anchors’ nuts to specified torque values. (Ref. to Appendix-Torque Values).



Note: If you opt for floor mounted installation, then skip the next section on the instruction for wall mounted installation and jump to step 5.

Step-1

Wall mounted - Place the drill template on the wall

a. Mark a "start line" on the wall by using a tape measure, level tool, and pencil.

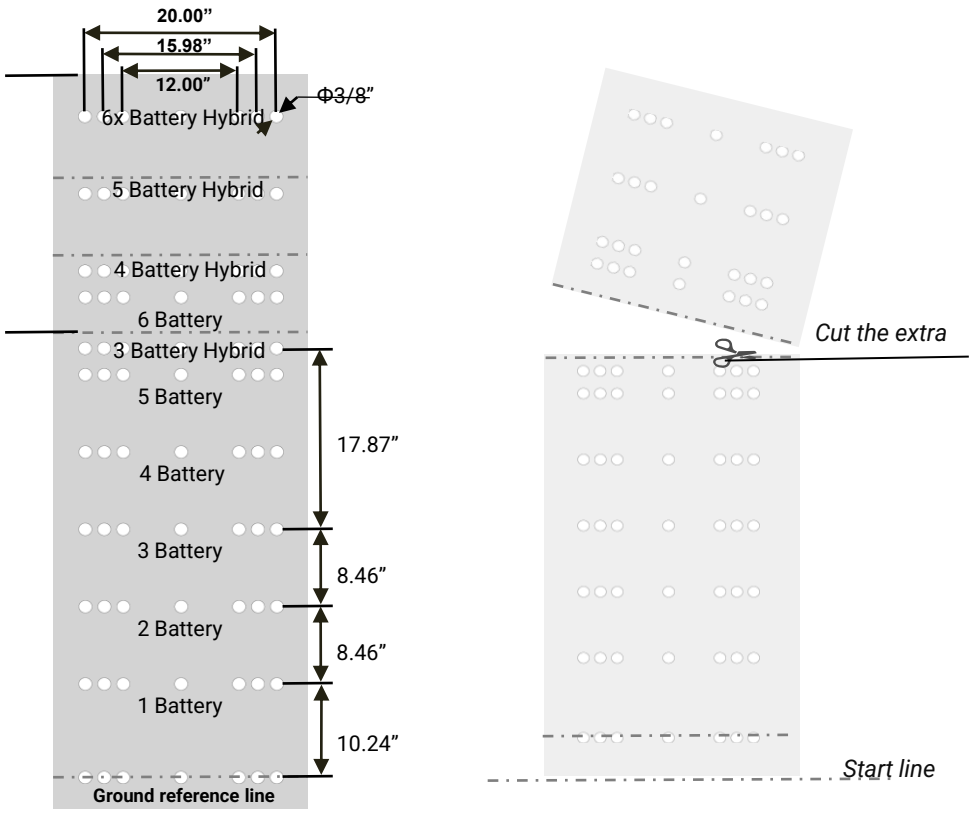
b. For wall mounted installation of standard EP Cube system, cut the extra piece of drill template on the upper half (line marked above 3 Battery Hybrid).

c. Place the template on the wall in a way that lower edge is aligned on marked start line.

d. Remove the adhesive tape on the edges, and stick template to the wall.

⚠ **CAUTION**: Please keep a safe distance between the Hybrid and other objects.

NOTE: It is recommended to have a minimum of 12" clearance from the Hybrid. All sides should have enough clearance for safe operation and installation and meet the National Electrical Code (NEC) 110.26 requirements.



Cutting and placing the drill template

Step-2

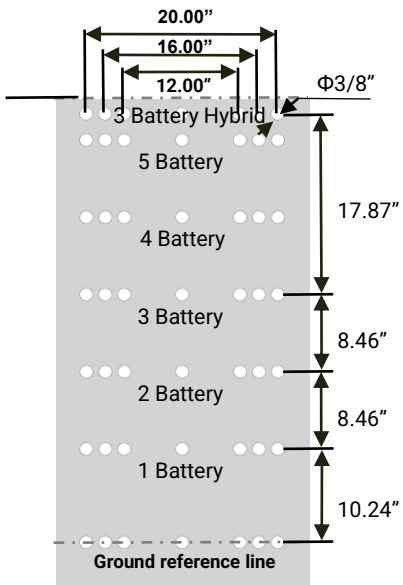
Wall mounted: Locating the mounting holes

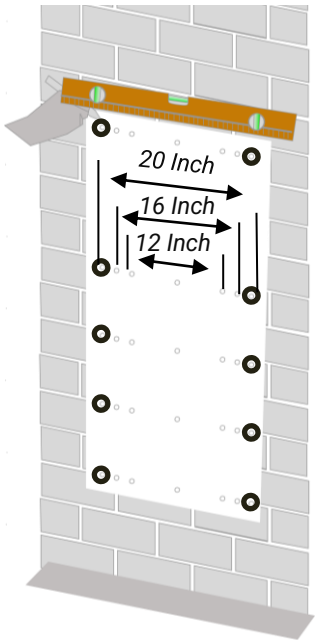
a. Make sure that drill template is straight with the help of level tool.

b. Using a pencil, mark the mounting holes on the wall as indicated by the drill template.

⚠ **Note**: Each bracket C requires 2 anchor bolts to be installed on the wall. Drill template have 3 pairs of holes that are placed at the different distances. The distance between these 2 anchor bolts should be either 12 or 16 or 20 inches.

c. Choose any distance and mark the positions on the wall for drilling holes. Holes are marked at a distance of 20 inches in below figure.





⚠ **Note:** The wall-mounted installation requires one additional bracket C compare to the floor-mounted installation.

Step-3

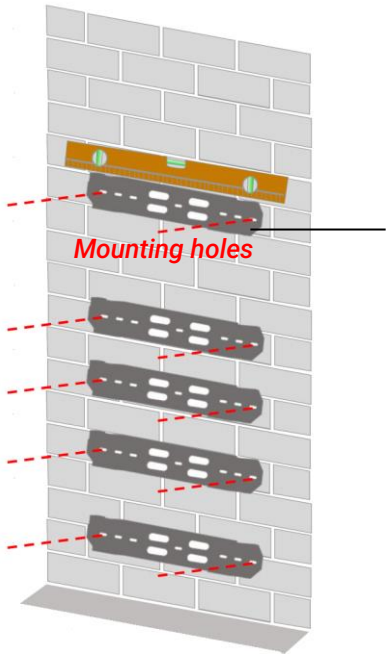
Install the Bracket C on the wall

a. Remove the drill template.

b. Place the Hybrid Bracket C to ensure the holes' positions are correctly matched.

c. Select anchor bolts or wood screws with washers, and a minimum length of 1-1/2 inches to install Bracket C on the Wall.

d. Use a level tool to ensure bracket C is level, Tighten the anchor's nut to the specified values. (Ref. to Appendix-Torque Values)



Install bracket C on wall

⚠ **NOTE**: Select the suitable M8 (or similar) bolt/screw to mount the Bracket C depending on the type of wall.

e.g. for concrete walls use a minimum length of M8*3-inch anchor bolts. For wooden walls use a minimum thread length of 1-1/2" wood screws.

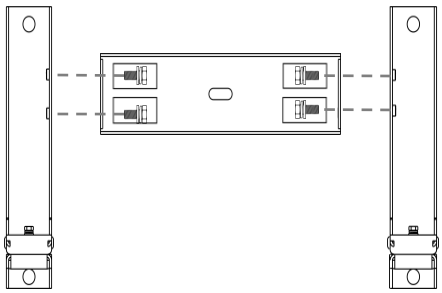
Note: If you opt for floor mounted installation, then jump to the step 1 for floor mounted installation instructions on the page 15.

Step-4

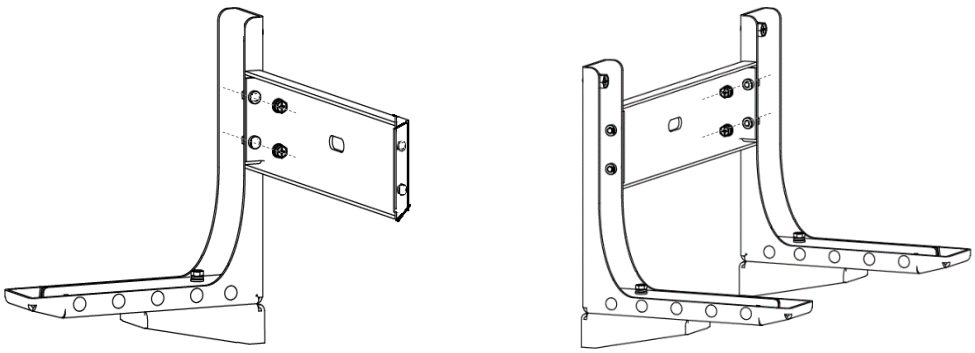
Wall mounted - Install the Base on Bracket E:

a. Assemble the Wall-Mount Kit (Bracket E), attach Bracket E1 to the Bracket E2 from the left and right sides with the bolts (M6* 0.63”). Tighten the bolts (M6* 0.63”) by using the socket wrench.

b. Place and align Bracket E and Bracket C to Check that the mounting holes match with Bracket C at the same position.



Assemble bracket E



c. Attach the Bracket E to the Bracket C with bolts (M8*0.79”), check that it is level using the level tool, and then tighten it with the socket wrench.

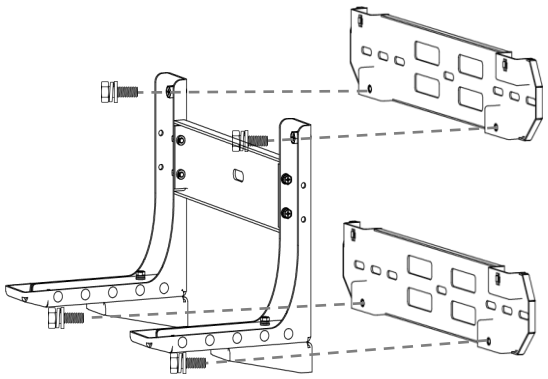


Fig. Attach bracket E and C

d. Attach the Bracket G oval hole and Base with bolts (M6*0.63"), place it on Bracket E, and attach the Bracket G round holes and Bracket E with Bolts(M6*0.63"). Verify that the Base is level using the level tool.

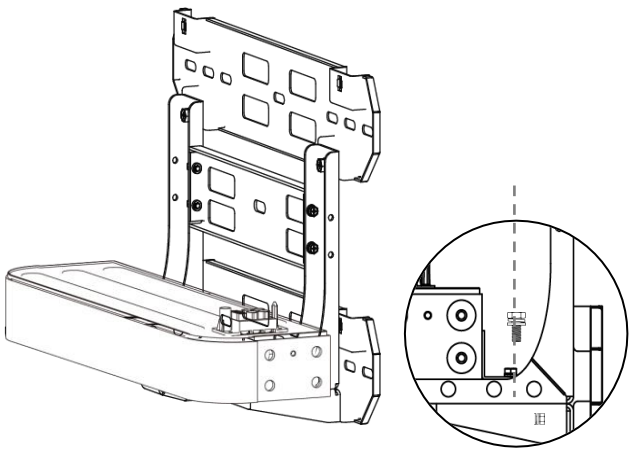


Fig. Attach Base on Bracket E

Step-5

Install the Battery module with battery brackets B and F

a. Carefully place the battery on top of the base and ensure that battery mating connector sockets are well aligned.

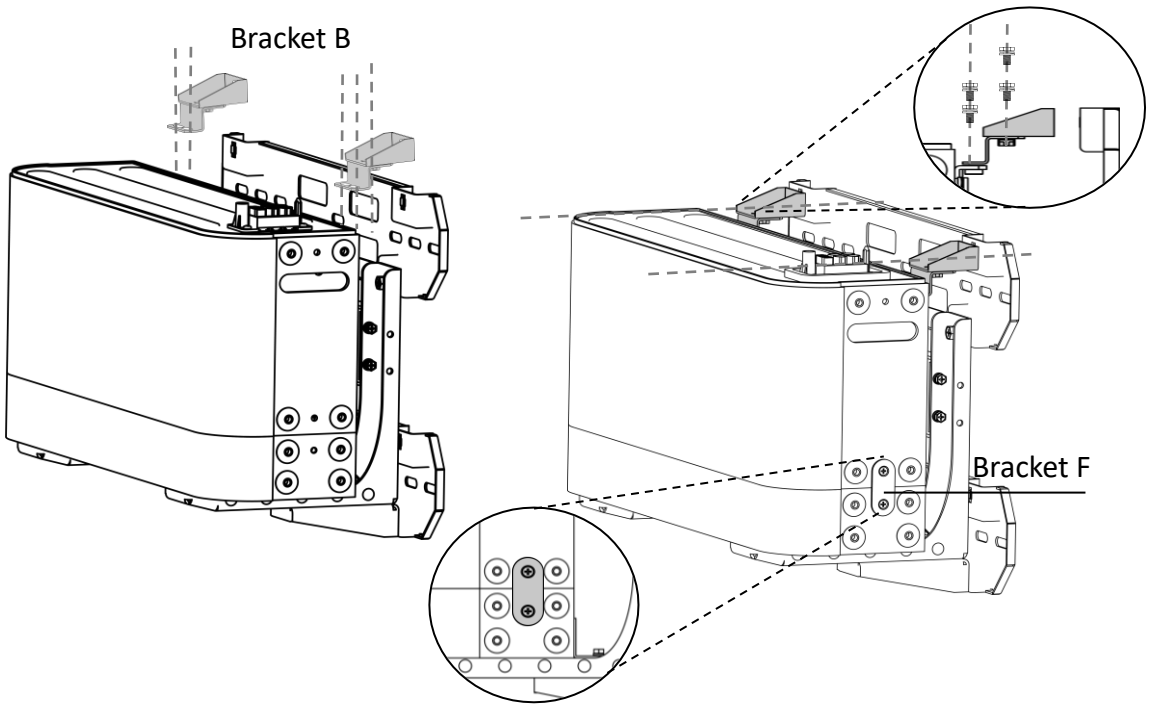
⚠ **CAUTION:** The battery module is heavy, Please use lifting tools or multiple people to lift it for your own safety. Make sure that the bracket C top screws hole matches with Bracket B1 mounting hole.

b. For Each Battery Module (1-20) :

- Attach Battery Bracket B2 and protruding brace on the back of the battery module using bolts (M6* 0.63"), and manually tighten.
- Attach Battery Bracket B1 to Hybrid Bracket C with bolts (M6*0.63"), and manually tighten.
- Attach Battery Brackets B1 and B2 with (M6*0.63") bolts.
- Tighten all bolts with electric screw driver to specified torque values. (Ref. to Appendix-Torque Values).

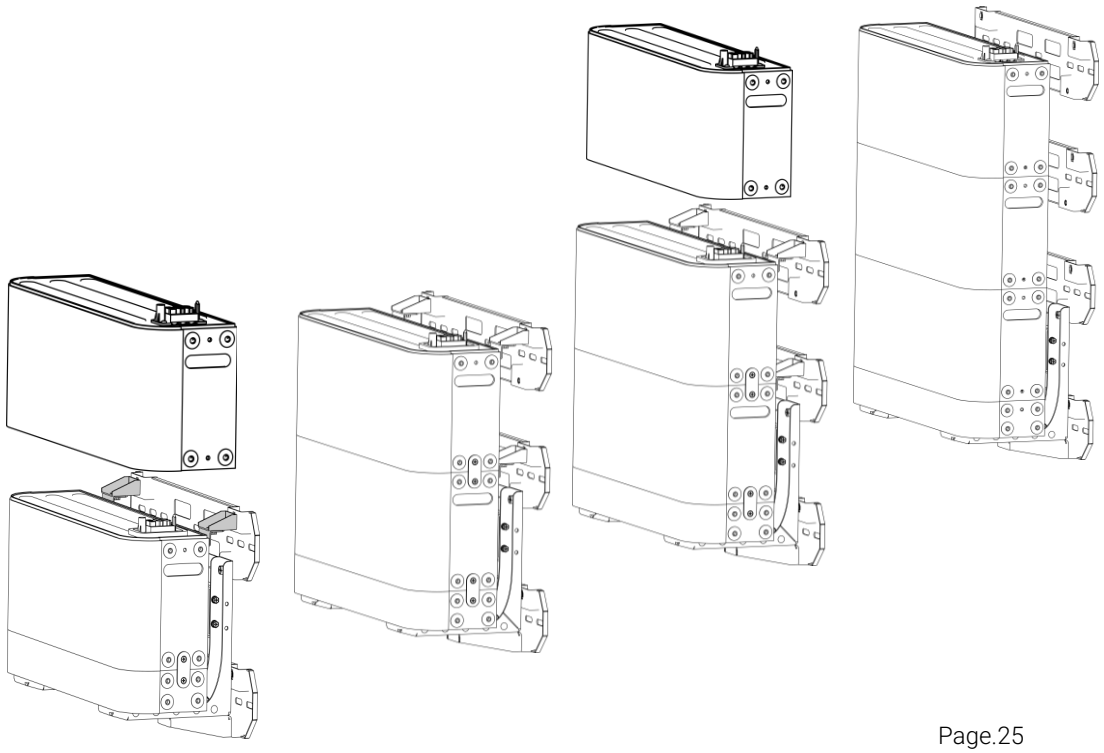
c. Repeat steps "a and b" to stack the required number of battery modules on top of the base according to the configuration.

d. Install and tighten bracket F :



- Attach Bracket F between all adjacent battery modules and base, on both the left and right sides with the bolts (M5* 0.47”).
- For instance, connect and tighten the bracket between base and battery module as shown in figure. Similarly repeat this step to connect every two modules.

e. Tighten all the bolts to specified torque values. (Ref. Appendix- Torque Values).

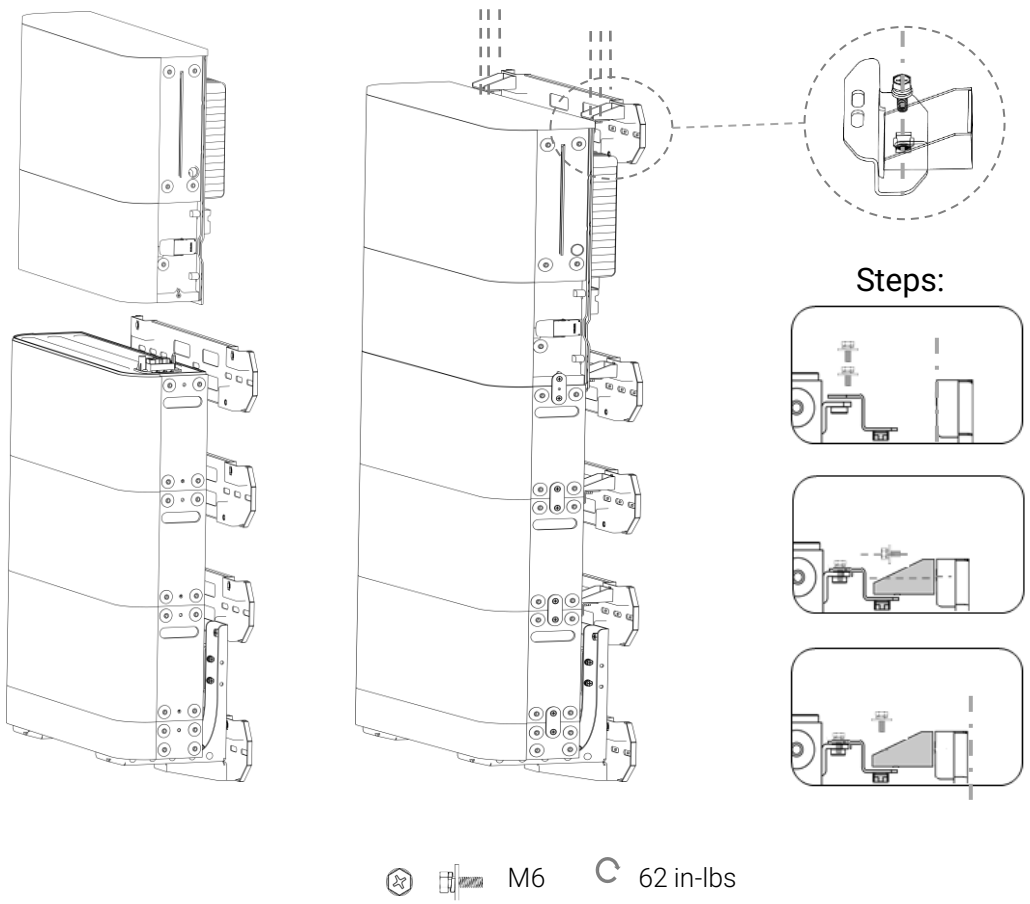


Step-6

Install the Hybrid Inverter on top of battery stacks with Inverter brackets B & D.

a. Carefully place the Hybrid Inverter on top of the stacked battery modules and connect the sockets well.

⚠ **CAUTION:** The Hybrid Inverter module is heavy, Lifting height can vary depending on the quantity of stacked battery modules. Please use lifting tools or multiple people to lift it for personnel safety. Make sure that the bracket C top screws hole matches with Inverter Bracket B1 mounting hole.



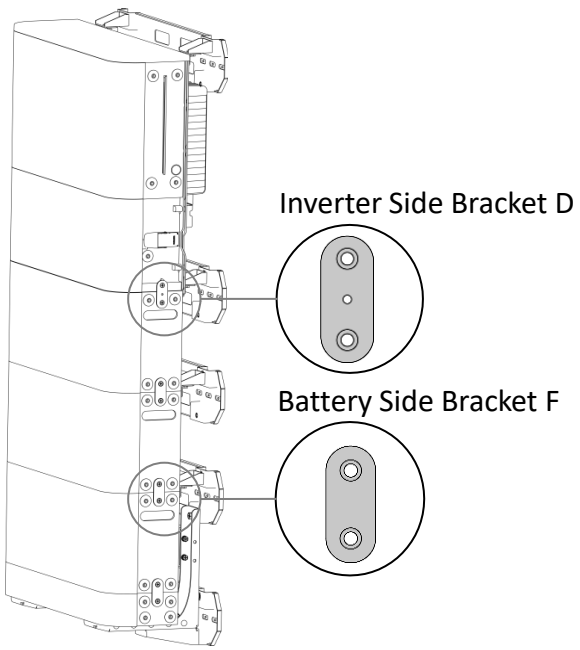
b. Repeat Steps in “4. b” to stack the Hybrid Invert and install with Bracket B.

- Attach Inverter Bracket B2 and protruding brace on the back of the Inverter module using bolts (M6* 0.63”), and manually tighten.
- Attach Inverter Bracket B1 to Hybrid Bracket C with bolts (M6*0.63”), and manually tighten.
- Attach Inverter Brackets B1 and B2 with (M6*0.63”) bolts.
- Tighten all bolts with electric screw driver to specified torque values. (Ref. to Appendix-Torque Values).
- Use a level tool to ensure that the Hybrid inverter is level.

c. Install and tighten bracket D :

- Attach the Bracket D between Hybrid inverter and adjacent battery module using bolts (M5* 0.47”), both on the left and right sides.

d. Tighten all the bolts to specified torque values. (Ref. to Appendix-Torque Values).



4. Installation of Smart Gateway

This section introduces the Smart gateway installation process in sequence.

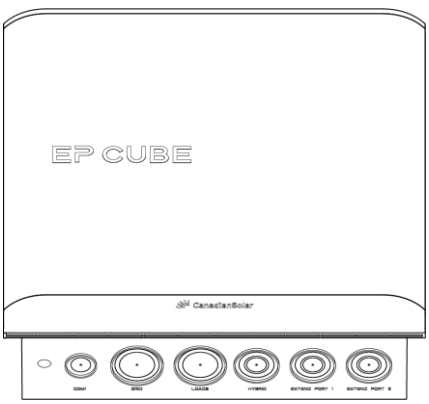
A. Preparation :

- Check if there are optional accessories that need to be installed. If so, please install the accessories first.
- Make sure all necessary tools and materials are available before starting installation.

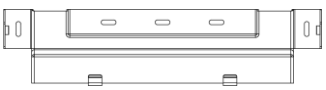
Examine and ensure that the following quantities are correct as per placed order, and that no parts were broken or damaged during transportation. You may check off the unpacking view provided below.

Smart Gateway Box

1.



2.

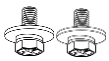


3.

4.

5.

6.



1. Smart Gateway 2. Smart Gateway Bracket A2_1pcs 3. CTs_2pcs
4. User Manual_1pcs 5. Warranty Letter_1pcs 6. Smart Gateway Bracket A_M6_2pcs

B. Start Installation :

Step-1

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 Smart gateway Bracket on the wall, choose and mark the appropriate hole positions through the bracket.

⚠ CAUTION: Please keep enough clearance between the smart gateway and other objects. e.g. On all sides of the smart gateway, the minimum clearance should satisfy ample space for safe operation and installation.

Step-2

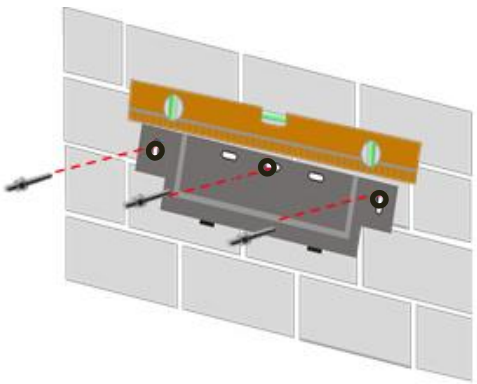
Install the Smart gateway bracket A2

⚠ **NOTE**: Select the suitable M8 (or similar) anchor sleeve bolts/screws to mount the Bracket A2 on different types of walls. e.g. minimum length M8* 3" anchor bolts are used for concrete walls and minimum thread length 1-1/2" bolt/screws are used for wooden walls.

a. Drill holes, insert the M8 anchor bolts and lightly stroke with hammer to properly insert if needed.

b. Use the socket wrench to remove washers and nuts and install the bracket A2 on M8 bolts or 1-1/2" wood screws with washers on the Wall.

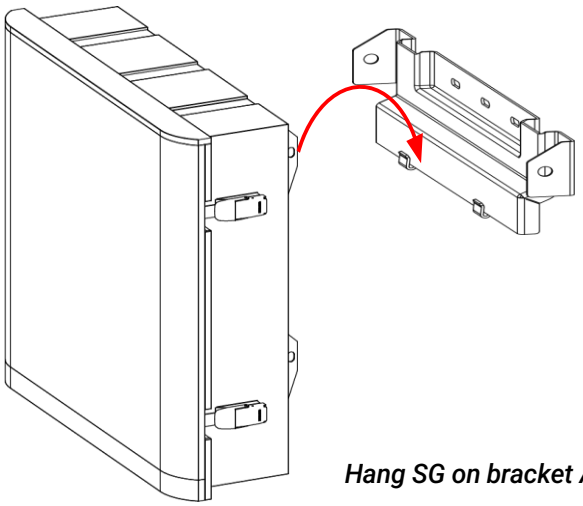
c. Place the level tool on bracket A2 to measure its level and tighten the anchor nuts to specified values. (Ref. to Appendix-Torque Values).



Step-3

Final installation step for the Smart gateway

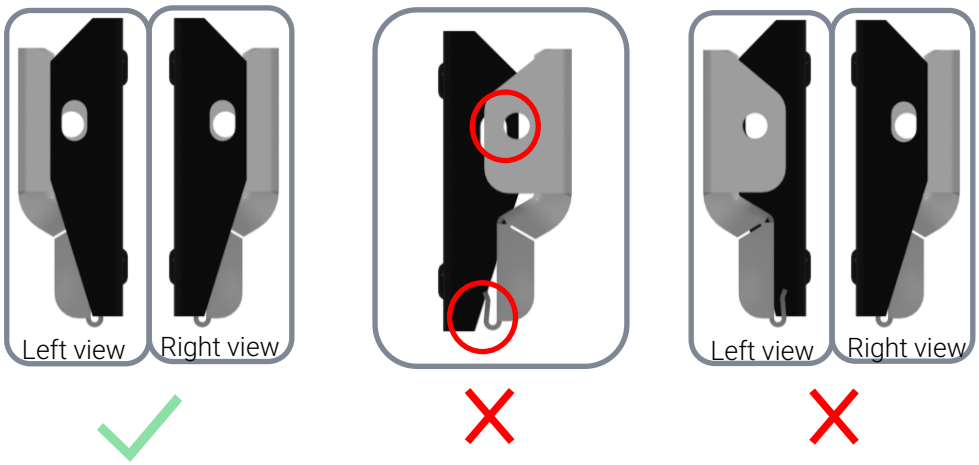
a. Carefully hang the Bracket A1 (pre-installed at the back of Smart gateway) on the Bracket A2 hooks.



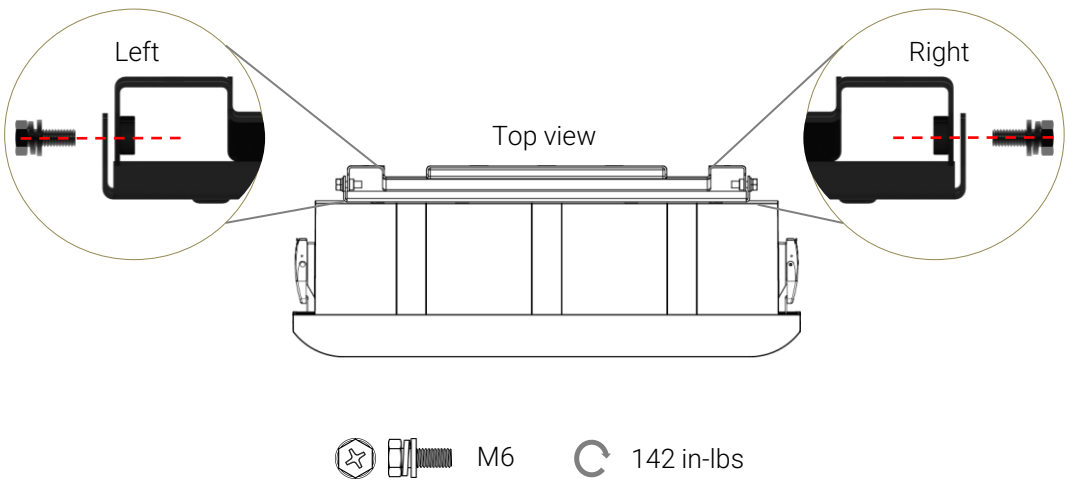
Hang SG on bracket A2

Step-4

b. Ensure that both brackets are interlocked correctly.



c. Then Fasten the Brackets A1 and A2 together with bolts on the both sides with bolts (M6* 0.63"), and tighten all the bolts to the specified torque values. (Ref. to Appendix-Torque Values).



Tighten and check bracket A installations

Note: Check with the level tool to make sure the Smart gateway is leveled, adjust it if it is not level. Ensure that it sets well on the wall. It can also be adjusted by using the supporting knobs if required due to uneven wall surfaces.

EP CUBE WIRING

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 hidden 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.

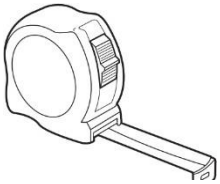
Preparation

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

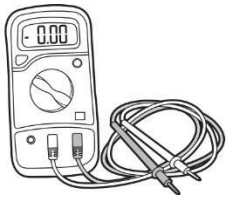
- Prepare the appropriate quantity and dimensions of electrical and installation materials.
- Prepare the appropriate auxiliary tools and equipment.

Tools & Materials

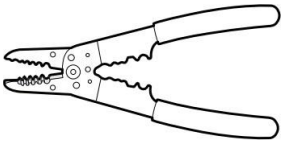
Drill Set (with 3/8" drill bit)



Tape Measure



Multimeter



Wire Stripper

Marking Pen

Hole Saws Set

Start Wiring & Connections

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

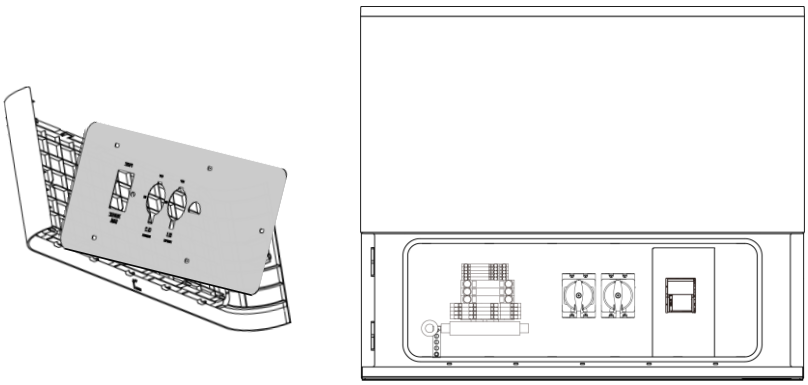
A. Wiring From the Solar Panels to the Hybrid

Step-1

Open the Hybrid Inverter for Wiring

a. Remove the Hybrid inverter panel covers:

- Open the two Hybrid panel latches and remove the inverter cover.
- Use the electric screw driver to detach the screws and remove inverter dead front cover.
- Use the socket wrench with hex head to remove the two port caps on the left side of the Hybrid for the conduit.



Step-2

Connect PV Wiring Cables to Hybrid Inverter

a. Prepare the conduit for PV wiring connections with the Hybrid.

- Install a threaded adapter or cable gland to tighten up the conduit to Hybrid. (Adapter OD thread must be NPT 3/4").

⚠ **NOTE**: Each set of PV cables, PV+ and PV-, must connect to the correct terminal of the Hybrid.

b. Route the PV cables through the conduit and connect to the designated terminal blocks in the Hybrid inverter. (Ref. Picture 1)

- Use a flat-head screwdriver to press the PV- and PV+ terminal blocks to open and insert cables and then release to terminate the PV wires in place.

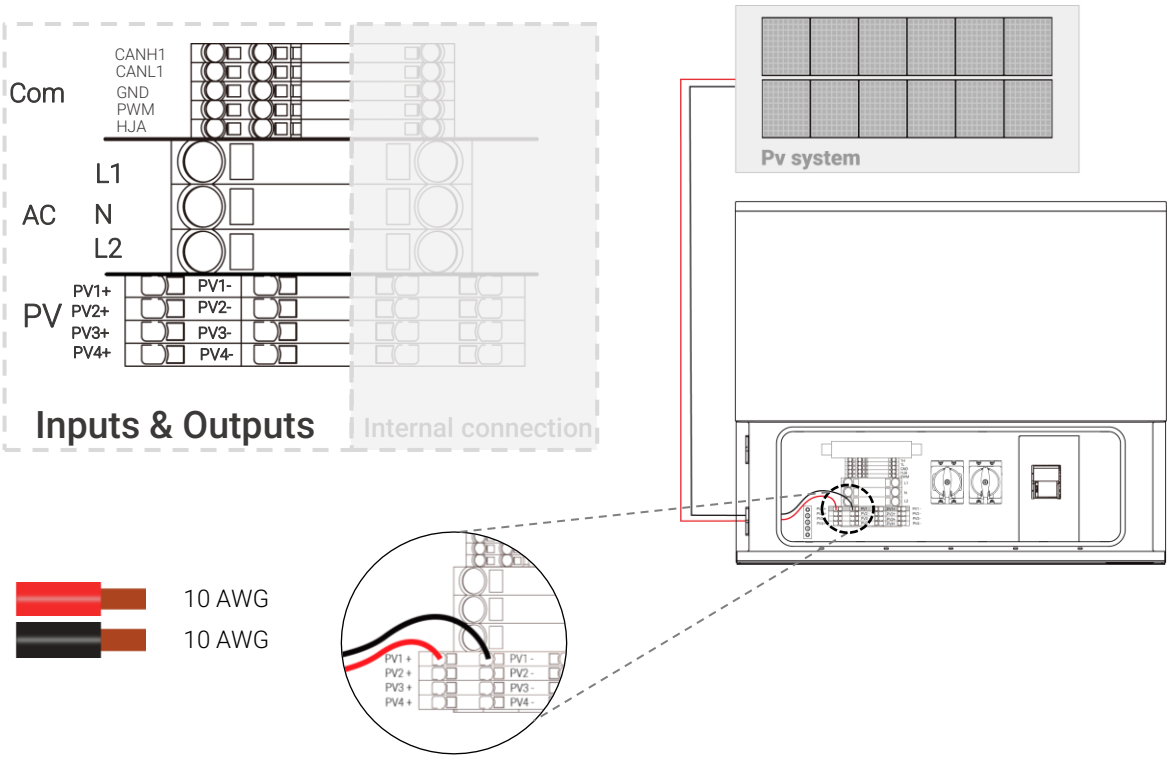


Figure 1. Hybrid to PV Array DC Input Wiring

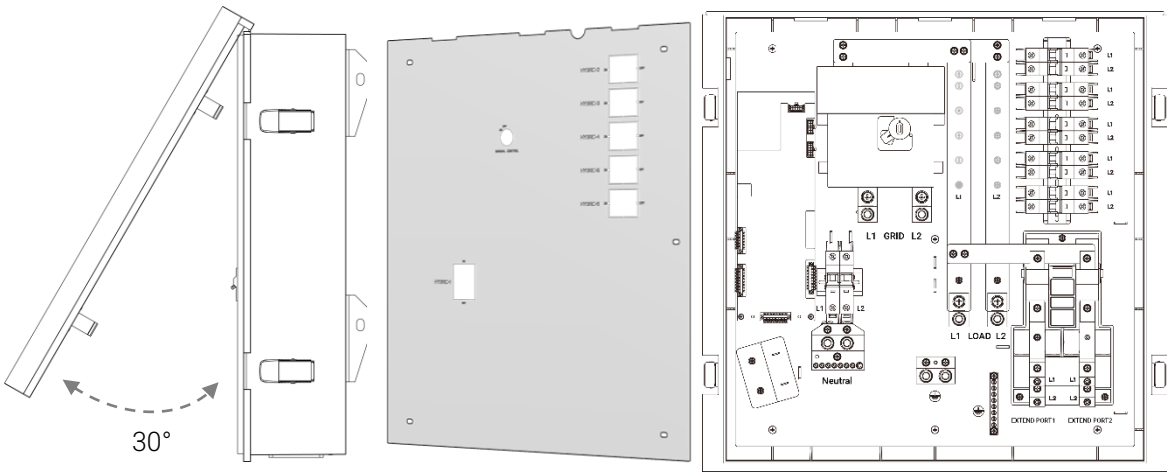
B. Wiring From the Hybrid to Smart Gateway

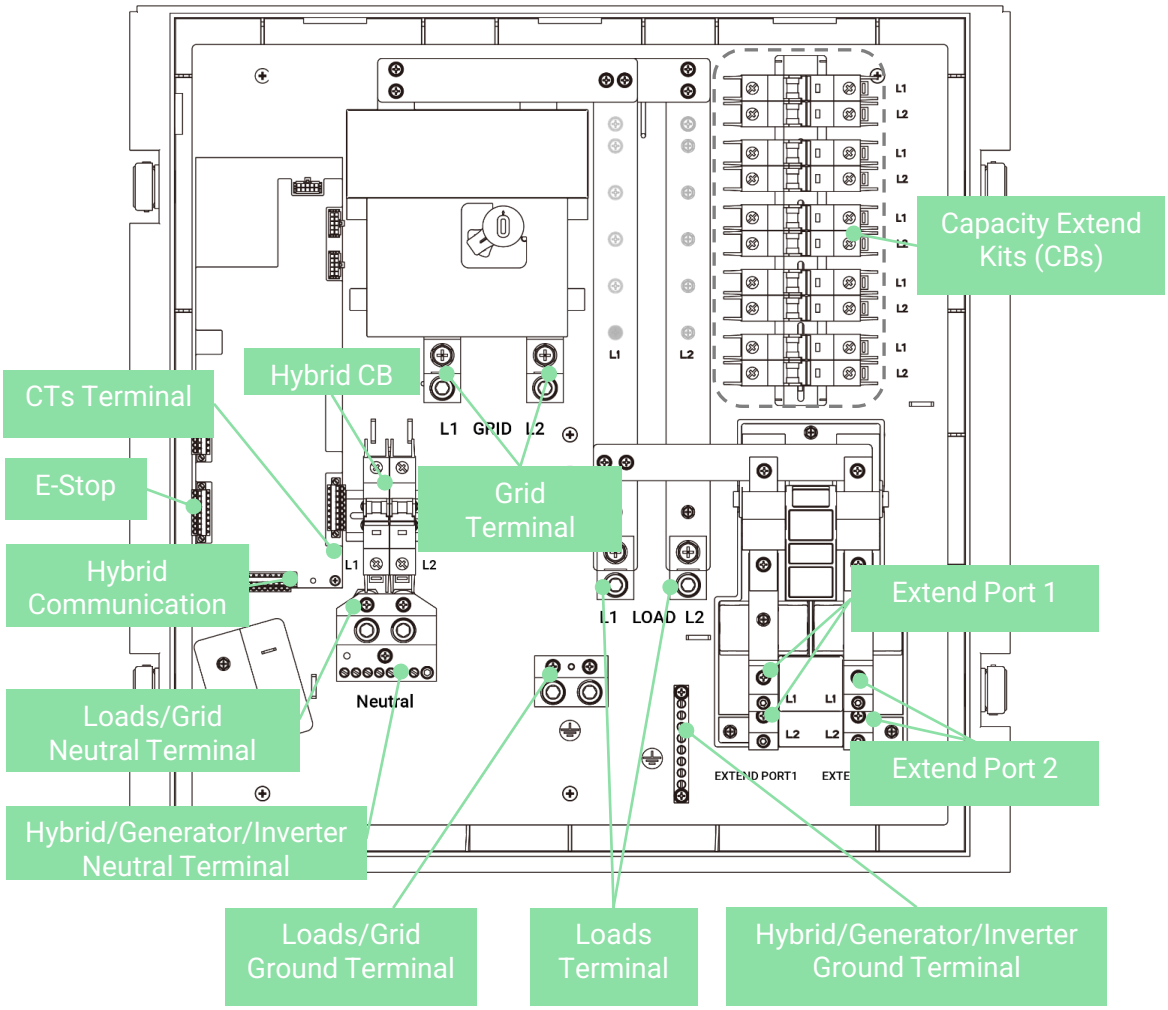
Step-1

Open the Smart gateway for wiring

a. Remove the Smart gateway panel covers:

- Open the four smart gateway panel latches and remove the cover.
- Use the electric screw driver to remove screws and remove the smart gateway dead front cover.





Step-2

Connect Hybrid Wires to Smart Gateway

a. Prepare the conduit for the hybrid power cables to the Smart gateway hybrid breaker and other terminals.

b. Route the Hybrid cables through the conduit to connect it to the Smart gateway hybrid breaker: （Ref. Figure 2）

- Follow the local standards to select different colours for AWG 6 cable for L1, N, L2, and ground between hybrid and the smart gateway.
- Strip the wire ends using a wire stripper, use a flat-head screwdriver to unscrew the breaker terminals, then insert the cables and fasten the screws.

- Refer to figure 2 for wiring the AC output L1, N, L2, and ground cable between the Hybrid and Smart gateway breaker.

⚠ Note: If more than one Hybrid is connected with the smart gateway, please refer to Chapter of Expansion of EP CUBE for instructions on wiring.

⚠ Note: While making connections on neutral terminal, ensure to terminate neutral cables on lower terminals first, and work your way from lower terminals to upper terminals. i.e. first connect neutral wires of Hybrids, Generator/PV inverter, and then connect neutral wires of Load and Grid.

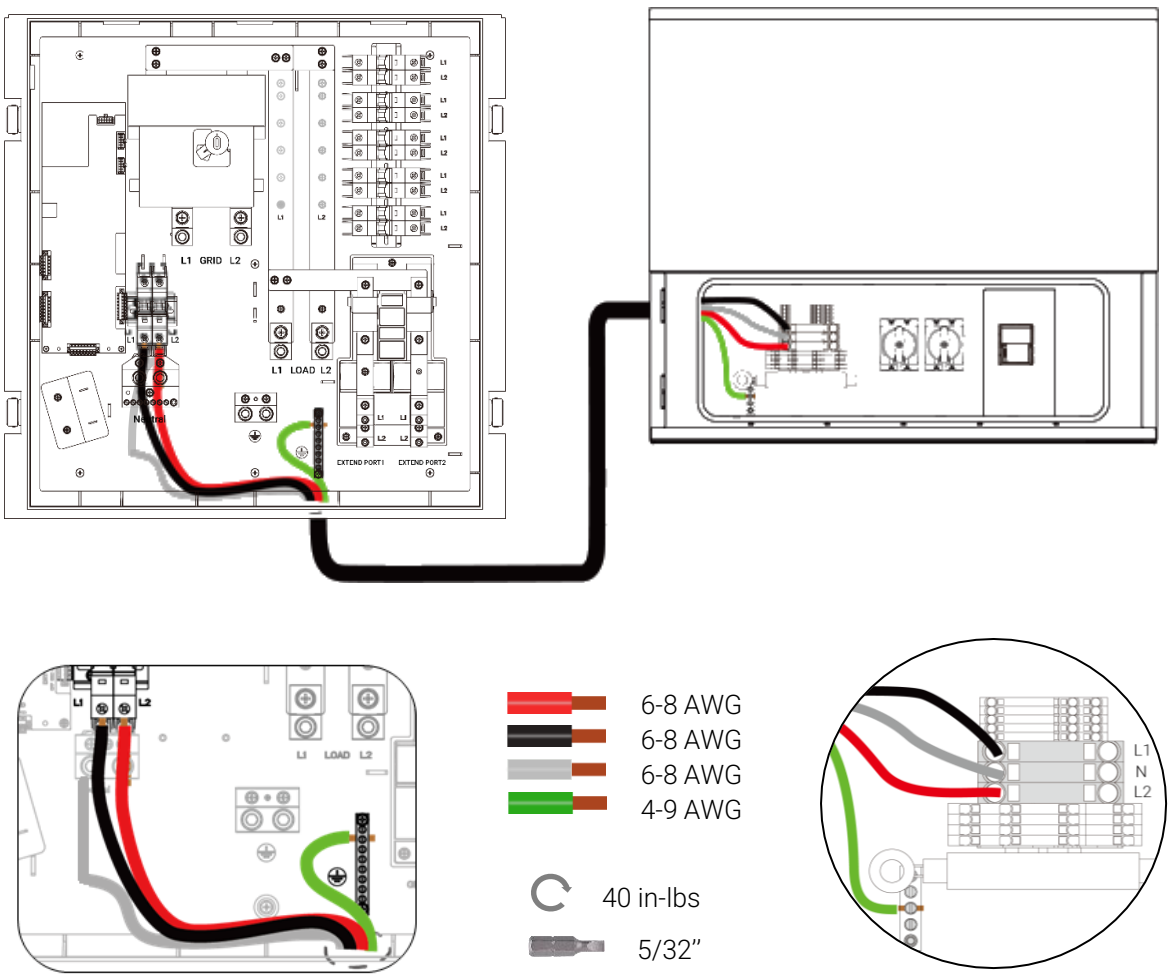


Figure 2. Smart Gateway to Hybrid AC Wiring

c. Route the Hybrid signal wires through the conduit to connect it to the Smart gateway CAN & RESS terminal:（Ref. Figure 3)

- Use a flat-head screwdriver to press the terminal to insert and lock the signal wires.
- Refer to Figure 3 for wiring the L2, H2, GND, PWM, and HJA terminals between the Hybrid and Smart gateway.

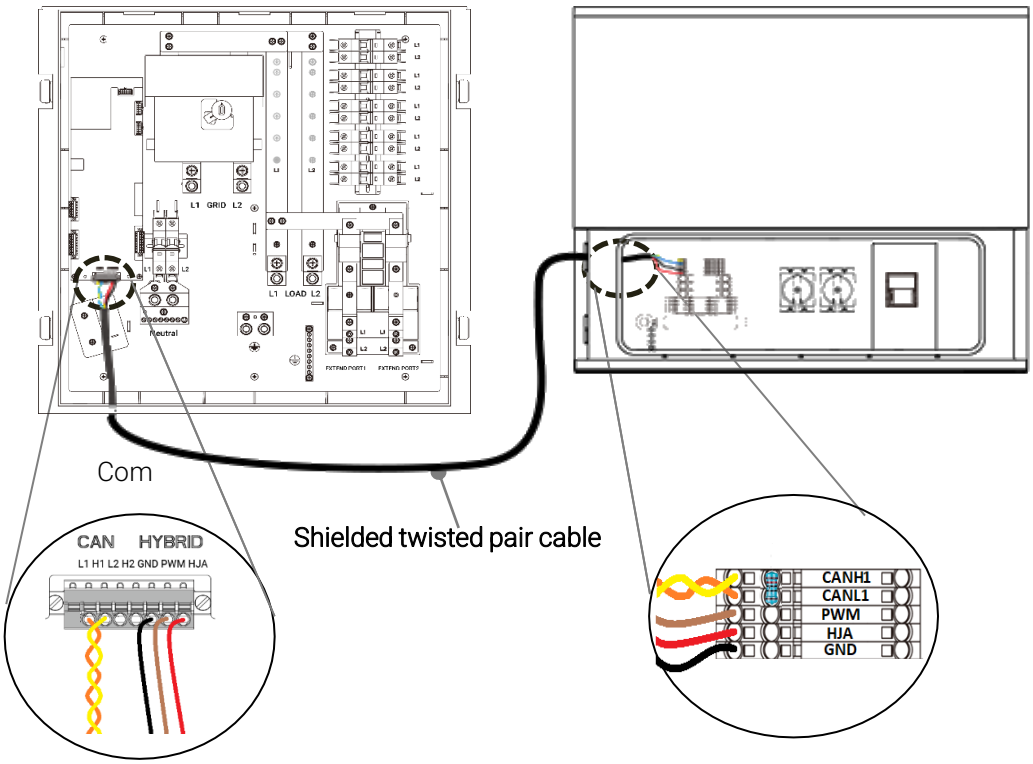


Figure 3. Smart Gateway to Hybrid Communication Wiring

d. Open the Smart gateway COMS and the Hybrid port to mount conduits:（Ref. Figure 4）

- Drill into the Smart gateway bottom “COMS port” and “HYBRID port” with a hole saw for cable gland installation.
- Install the cable gland and tighten up the conduit to the Smart gateway.
- Install a threaded adapter or cable gland to tighten up the conduit to the Hybrid.(Adapter OD thread must be NPT 3/4”).
- Affix the conduit onto the wall with the proper distance between clamps.

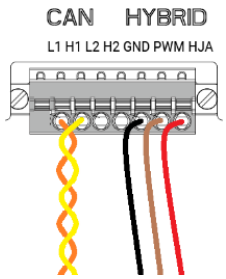
⚠ **NOTE:** Communication cable between hybrid and smart gateway is included in the package. Standard cable length is 10m. Cable length cannot be extended and may cause communication failure. Do not use any other cable to avoid any product malfunction. EP recommends to install SG and Hybrid in close vicinity

If more than one Hybrid units are connected with the smart gateway, please refer to Chapter of Expansion of EP CUBE for instructions on wiring.

⚠ **NOTE：** Knockout for Hybrid at the bottom of the smart gateway can be used to install a cable gland with a maximum diameter of 2-1/4” or less.

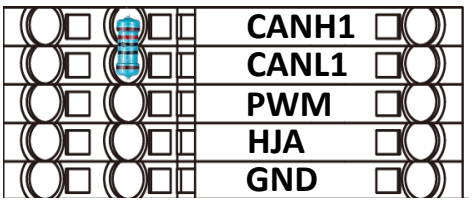
Knockout for COMS at the bottom of the smart gateway can be used to install a cable gland with a maximum diameter of 1-1/4” or less.

⚠ **CAUTION:** Pay attention to terminal labeling and connect the wires accordingly. Refer to the picture below for wiring the L1, H1, GND, PWM, and HJA terminals between the Hybrid and Smart gateway. During Comms wiring, you may also need to install a 120 ohm metal film resistor on the comms terminals (CANH1 & CANL1) of the hybrid unit in case it is not preinstalled. This resistor is included in package.



SG Comm. Terminals

Wire Color	SG Terminal	Hybrid Terminal
Orange	L1	CANL1
Yellow	H1	CANH1
Black	GND	GND
Brown	PWM	PWM
Red	HJA	HJA

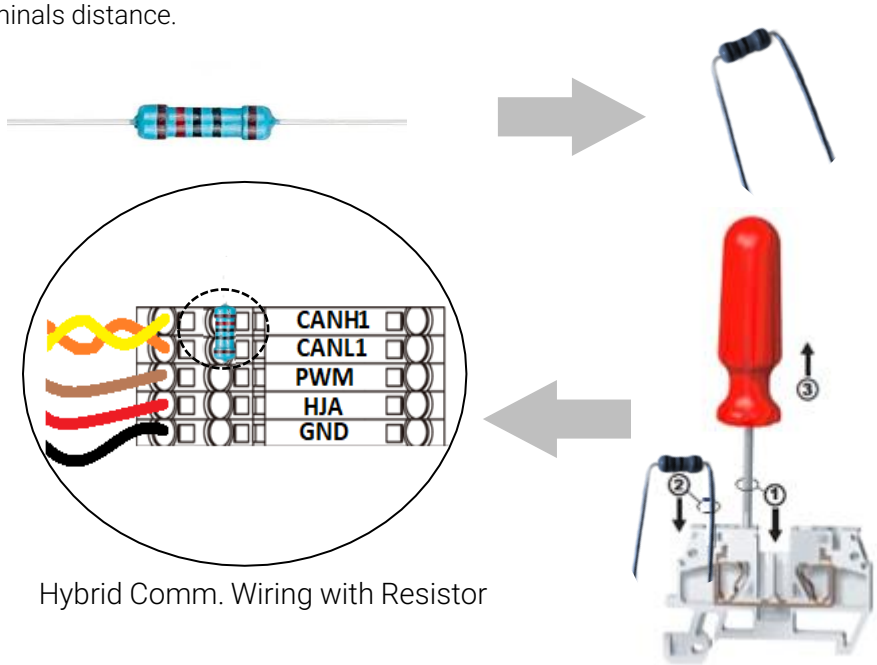


Hybrid Comm. Terminals

Case A: Hybrid Unit Without Pre-Installed Communication Resistor

If the hybrid unit don't have communication resistor pre-installed on CANL1 and CANH1 terminals, then find it in the hybrid's packaging box. Follow the below steps to install the resistor:

Step a: Bend the resistor legs to appropriate angle and distance between both legs should match with the terminals distance.



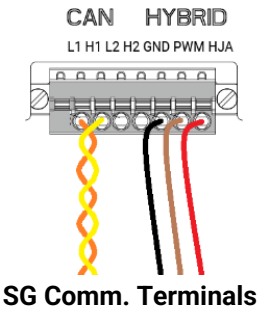
Hybrid Comm. Wiring with Resistor

Step b. Push the spring terminals with the help of a flat head screw driver.

Step c. Insert the resistor legs in the communication terminals, one leg in CANL1 and the second leg in CANH1 of the Hybrid2.

Case B: Hybrid Unit With Pre-Installed Communication Resistor

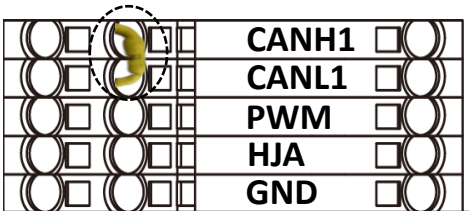
If the hybrid unit already has the communication resistor pre-installed on CANL1 and CANH1 Comm terminals, then no further action is required. Just complete the Comms wiring as per instructions given in earlier section.



SG Comm. Terminals

Wire Color	SG Terminal	Hybrid Terminal
Orange	L1	CANL1
Yellow	H1	CANH1
Black	GND	GND
Brown	PWM	PWM
Red	HJA	HJA

Pre-installed Comm. Resistor



Hybrid Comm. Terminals

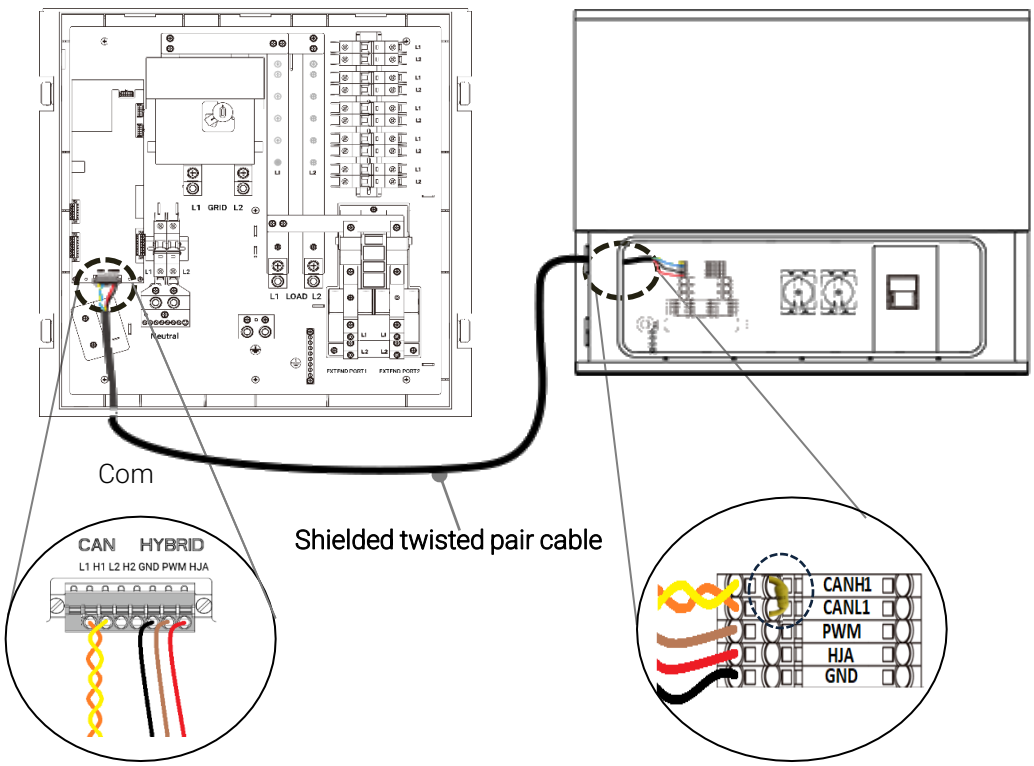


Figure 3. Smart Gateway to Hybrid Communication Wiring with Pre-installed Resistor

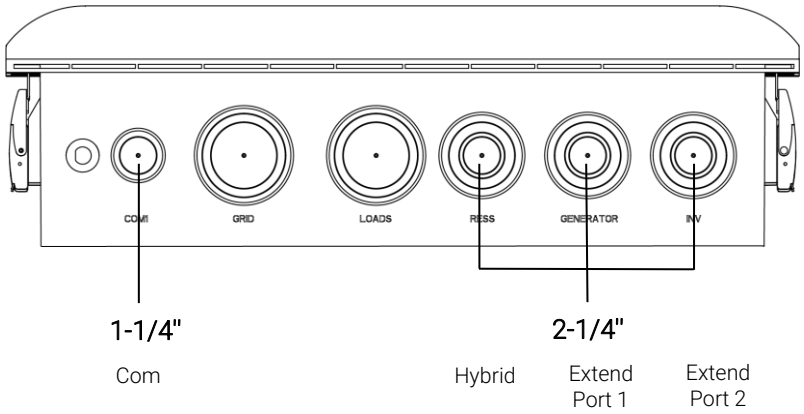


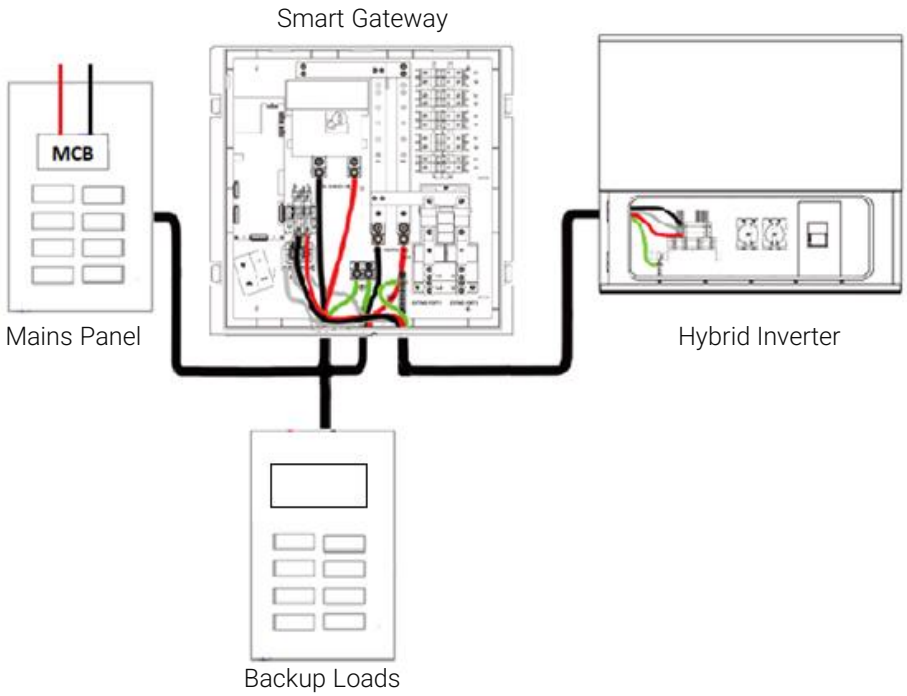
Figure 4. RESS and COM Knockouts

C. Wiring of Grid and Load Side Connections

⚠ CAUTION:

- Ensure all circuit breakers are turned off, and PPE is properly worn before getting started.
- Ensure that the property main breaker for the Grid connection is turned off and protected with Lockout/Tagout.
- For partial home backup, between the backup loads and the Smart gateway load terminal, there must be a power panel to combine all load connections, then this panel can connect to the Smart gateway load terminal.
- All cables between equipment need to be wired through conduits, The conduits must be affixed to the wall with clamps at the appropriate distance.

For Whole Home Back up Configuration：



Step-1

Wiring Connection of Grid

a. Prepare the conduit for the Grid power cable connection between the Grid power panel or the main breaker and Smart gateway, and install a cable gland to install the conduit to the smart gateway:

- Select a drill with an appropriate hole saw, and drill the knockout for Grid on the bottom of the Smart gateway to install the cable gland. (Ref. to Figure 7.)
- Install the cable gland and tighten up the conduit to the Smart gateway.

⚠ **NOTE:**

Knockout for the grid at the bottom of the Smart gateway can be used to install a cable gland with a maximum diameter of 2-3/4" or less.

b. Route the Grid power cable through the conduit and connect it to the Smart gateway Grid terminal. (Ref. to Figure 5.)

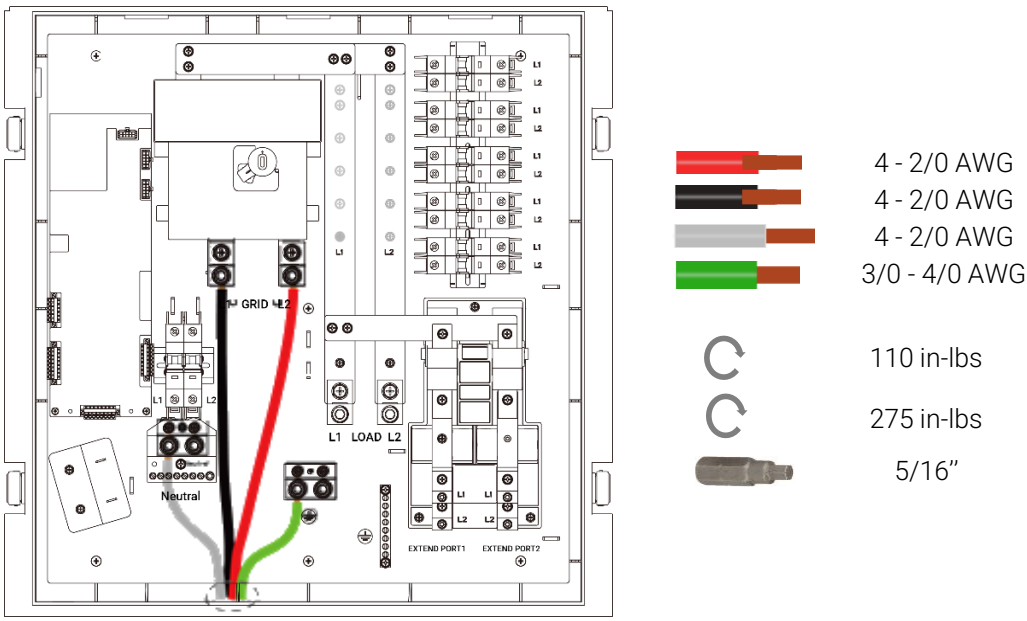


Figure 5. Smart Gateway Grid Wiring

Step-2

Wiring Connection of Load

a. Prepare the conduit for the Load power cable connection between the backed up loads power panel and the smart gateway, then install a cable gland to tighten the conduit to the smart gateway:

- Select a drill with an appropriate hole saw and drill the knockout for the load on the bottom of the Smart gateway to install the cable gland. (Ref. to Figure 7.)
- Install the cable gland and tighten the conduit to the smart gateway.

NOTE:

- Knockout for the load at the bottom of the Smart gateway can be used to install a cable gland with a maximum diameter of 2-3/4" or less.
- Please ensure the load power cable is well protected when combined with the grid power cable in one conduit.

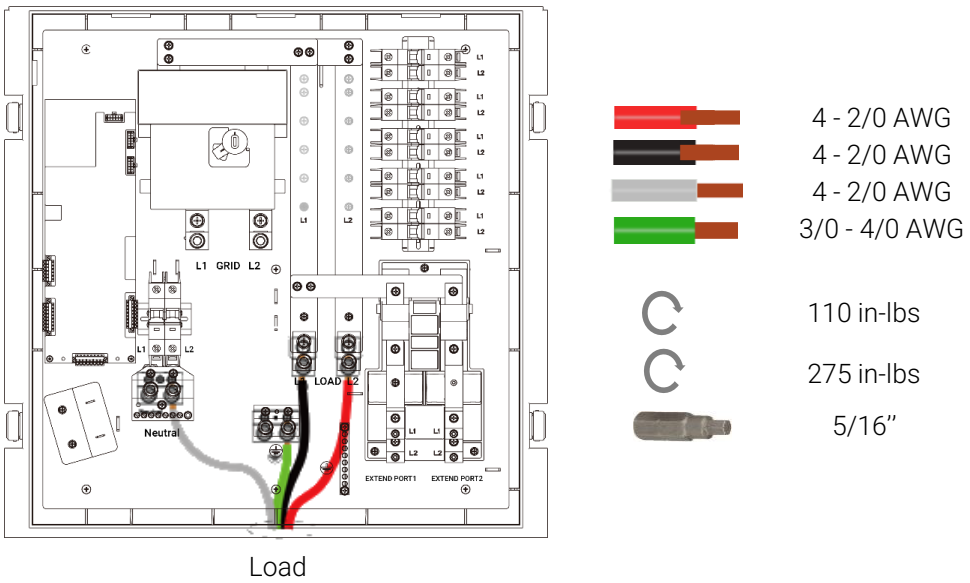


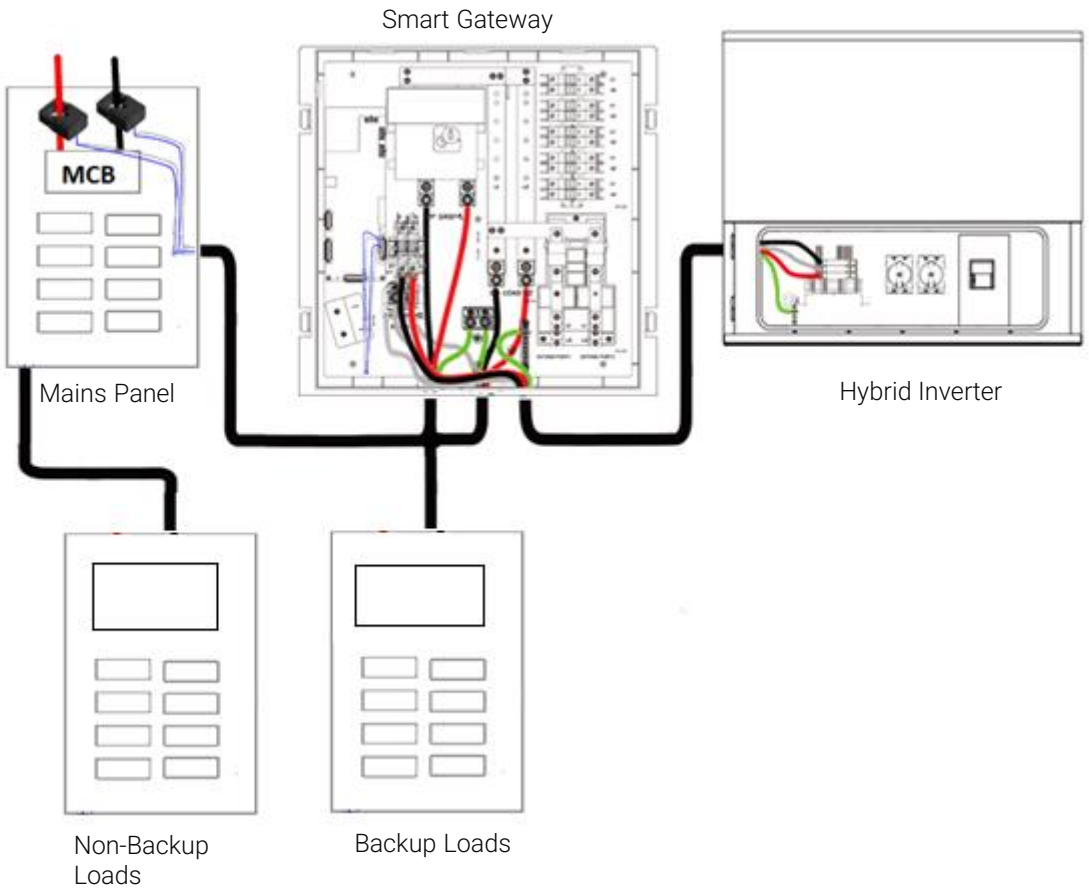
Figure 6. Smart Gateway Backup Load Wiring

b. Route the load power cable through the conduit and connect it to the smart gateway load terminal. (Ref. to Figure 6.)

c. Connect the load power cable and the backup load appliances on the backup load power panel.

For Partial Home Backup Configuration:

⚠ **NOTE**: In this configuration the "CT-Kit" is installed to monitor the non-backup load power consumption.



Step-1

Wiring of Grid

a. Prepare the conduit for the Grid power cable connection between the Grid power panel or main breaker and the smart gateway. Install a cable gland to tighten the conduit to the smart gateway:

- Select a drill with an appropriate hole saw, and drill the knockout for Grid on the bottom of the Smart gateway to install the cable gland. (Ref. to Figure 7.).
- Install the cable gland and tighten the conduit to the Smart gateway.

⚠ **NOTE**: Knockout for the grid at the bottom of the Smart gateway can be used to install a cable gland with a maximum diameter of 2-3/4" or less.

b. Route the Grid power cable through the conduit and connect it to the Smart gateway Grid terminal. (Ref. Figure 5.)

Step-2

Wiring of Load

a. Prepare the conduit for the backup load power cable connection between the backup load power panel and the Smart gateway. Install a cable gland to tighten the conduit to the Smart gateway:

- Select a drill with an appropriate hole saw, and drill the knockout for the load on the bottom of the Smart gateway to install the cable gland. (Ref. to Figure 7.)
- Install the cable gland and tighten the conduit to the Smart gateway.

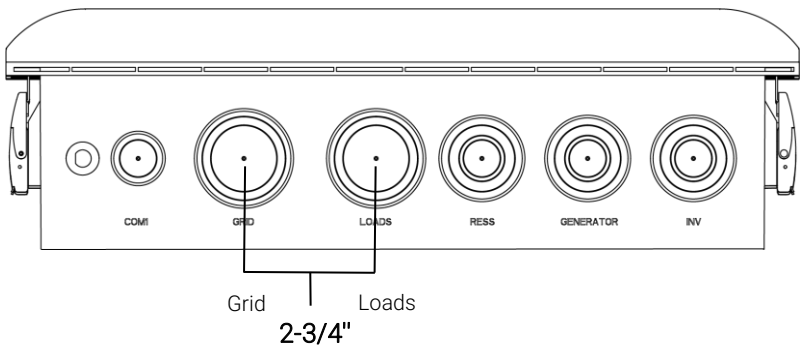


Figure 7. GRID and LOAD Knockouts

⚠ **NOTE**:

- Knockout for the load at the bottom of the Smart gateway can be used to install a cable gland with a maximum diameter of 2-3/4" or less.
- Ensure the load power cable is well protected when both the grid power cable and the backup load cable share the same conduit.
- Route the load power cable through the conduit and connect it to the smart gateway load terminal. (Ref. to Figure 6.)
- Connect the load power cable and backup load appliances to the backup load power panel.

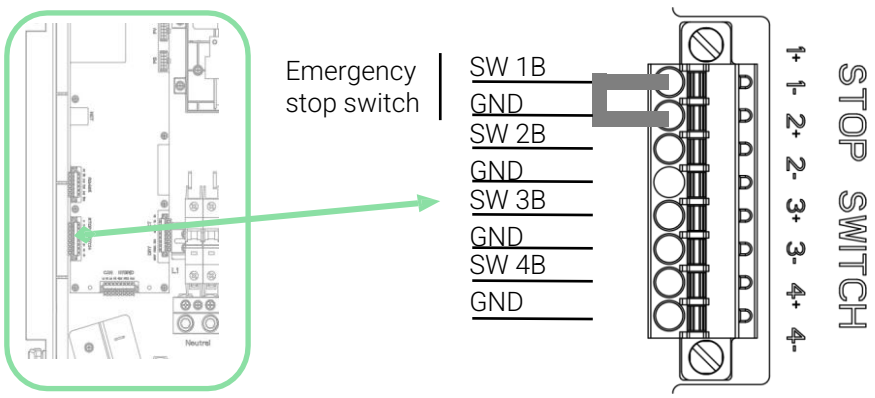
D. Wiring of Other Components

⚠ **CAUTION:**

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

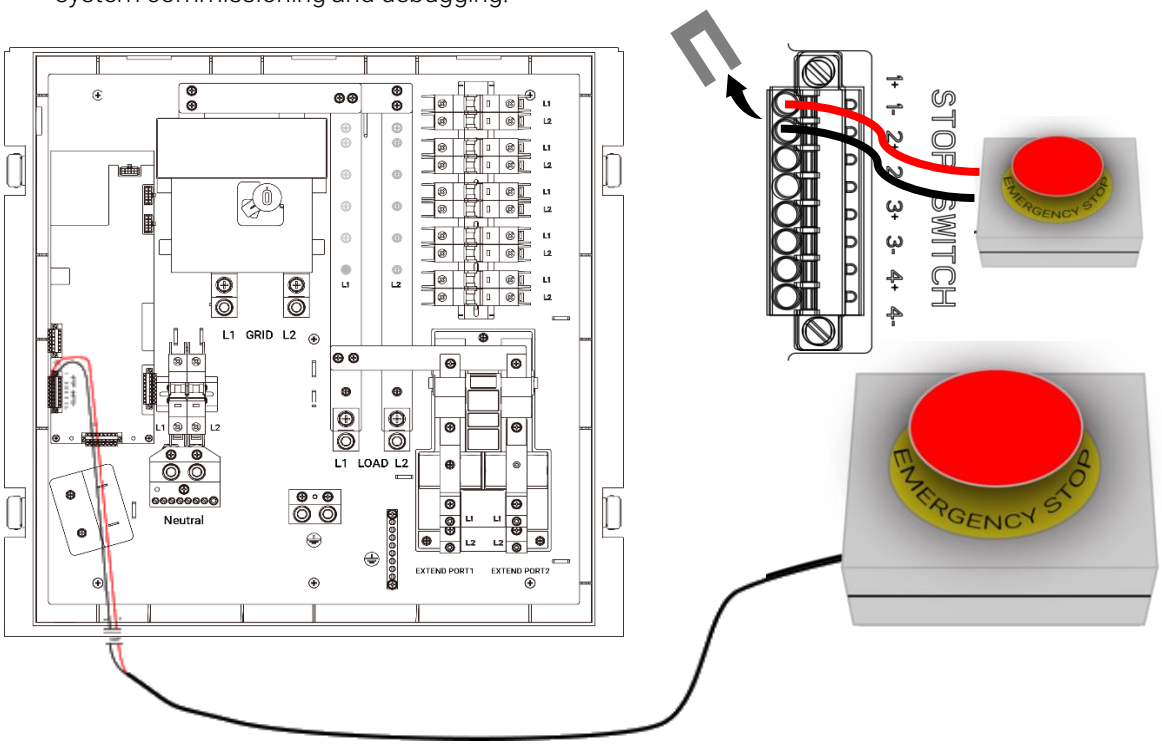
a. Wiring of Emergency Stop（Optional）

a. Remove the press-fit jumper on the smart gateway PCB board connector "CON8e" between terminals 1+ & 1-



Smart gateway PCB board

b. Connect emergency stop wires to terminals 1+ & 1- . Do the running test at least once during the system commissioning and debugging.



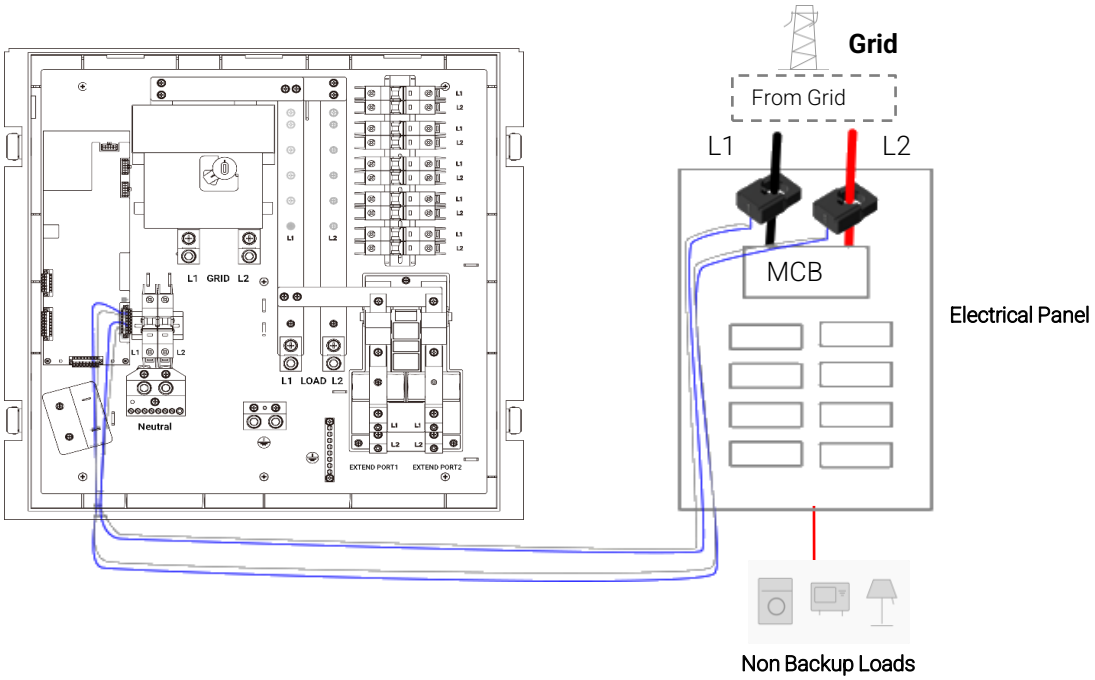
b. Wiring of " CT-Kit " (Optional)

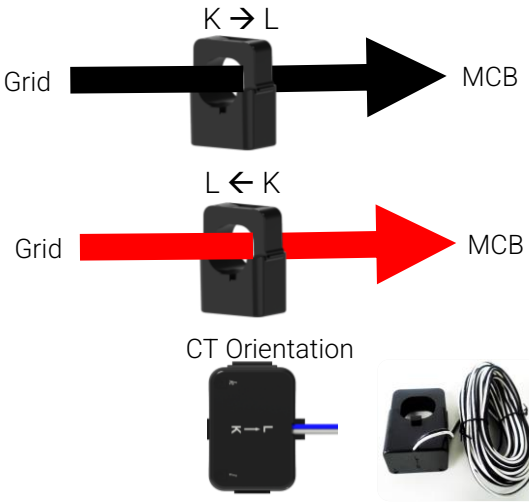
⚠ **NOTE**: Pay attention to the CT's orientation, otherwise the system will not work correctly. The CT's direction on L1 shall be from Grid to MCB (k → L), and for L2 shall be from MCB to Grid (k → L) as shown in picture below.

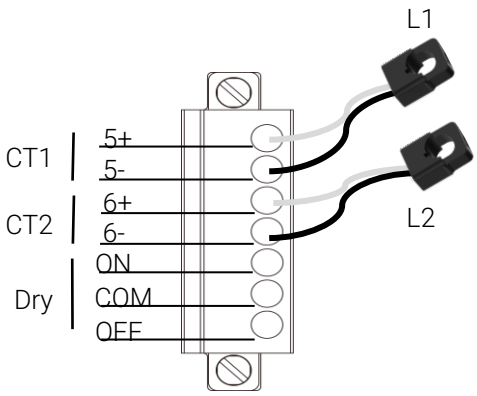
The CT provided with the smart gateway has a standard cable length of 10m (32.8 feet). But supports cable length extension up to 90m (295 feet).

The recommended cable gauge and cable standard: 22AWG and UL1015.

a. If needed, route the "CT-Kit" signal wires through the Grid power cable conduit and connect it to the Smart gateway CT terminal. (Ref. to the figure given below)





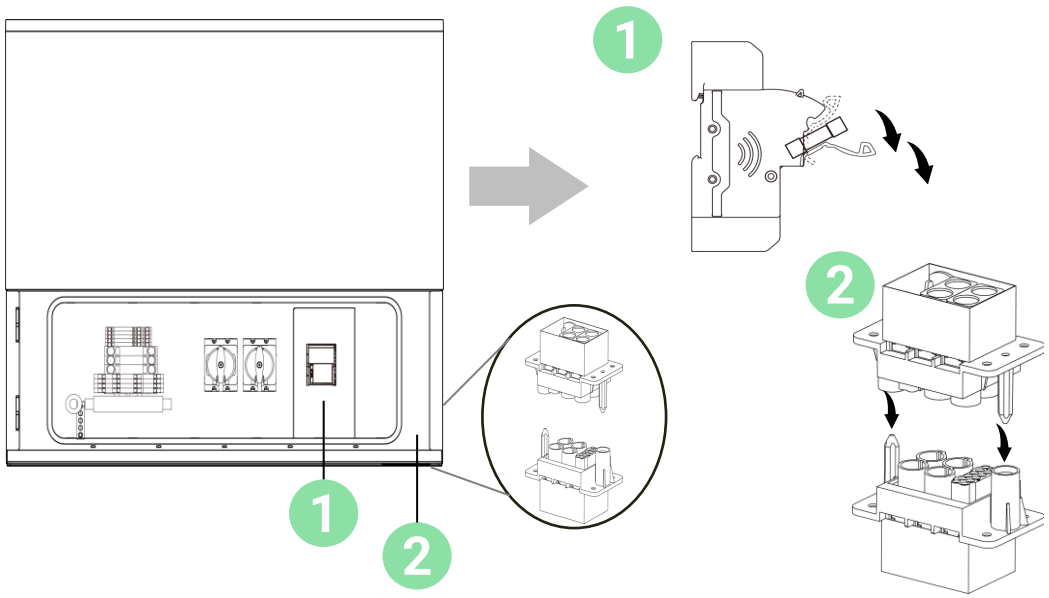


Terminal for CTs connection

c. Wiring of Hybrid Inverter Mating Connector

⚠ **CAUTION:** Do not dock the mating connector when the battery fuse is still connected to prevent electric shock.

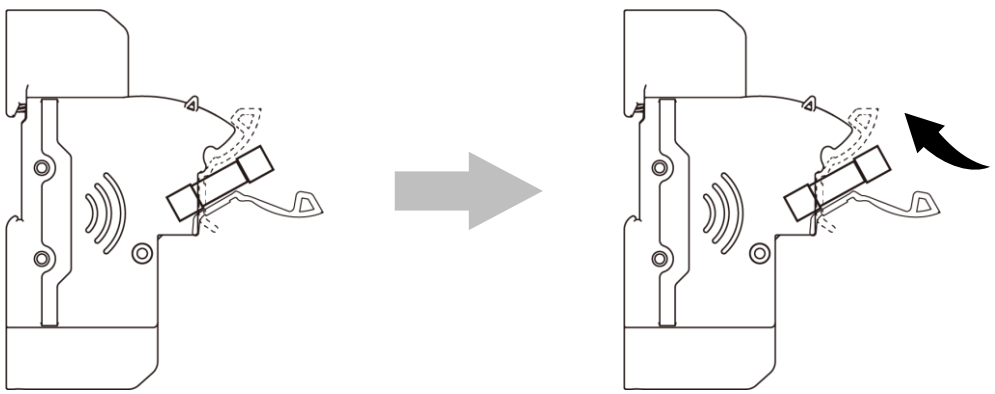
a. Pull down to open the Battery fuse to disconnect the internal connection of the battery fuse.



Dock the Hybrid Inverter Mating Connector

b. Dock the Hybrid inverter mating connector as picture shows.

c. Push upward to close the Battery fuse.



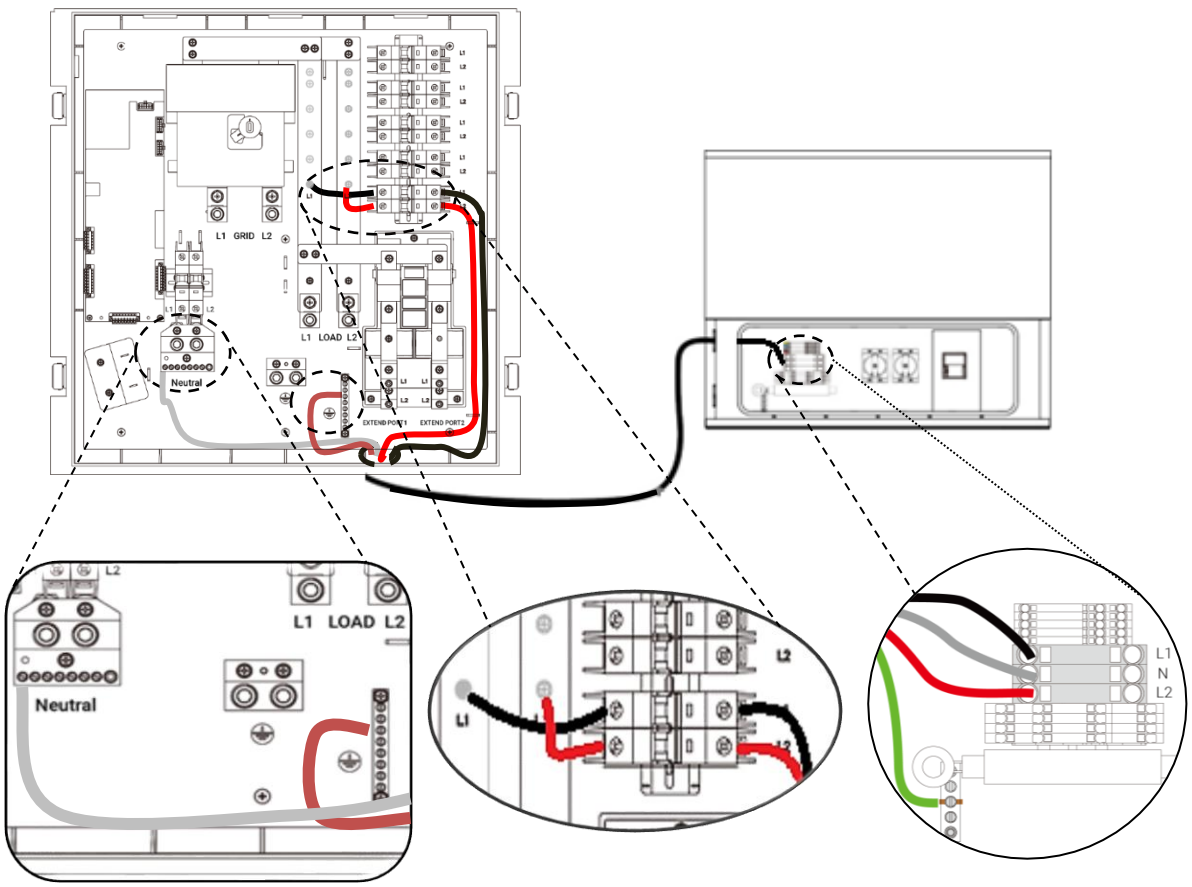
EXPANSION OF EP CUBE

EP Cube smart gateway can integrate a maximum no. of 6x hybrid units. In addition to that Extend port-1 supports connection with any of the three devices from the Generator, PV inverter, and EV charger. The Extend port 2 only supports the connection of either an EV charger or a PV inverter.

A. Wiring of Additional Hybrid (In parallel)

In an event when more than one hybrid is required to meet the power demand, additional hybrid units can be connected with the smart gateway through optional capacity extend kits (Circuit Breakers) that can be installed on the Din Rail. Below figure shows 5x additional capacity extend kits installed.

⚠ **CAUTION:** Standard smart gateway only has one hybrid circuit breaker pre-installed. Capacity Extend Kits (circuit breakers) for additional hybrid units must be ordered separately, and installed.



Neutral & Ground Cable **Hybrid 2 Circuit Breaker** **Hybrid 2 AC Output**

Second Hybrid to Smart Gateway Wiring (For AC Power)

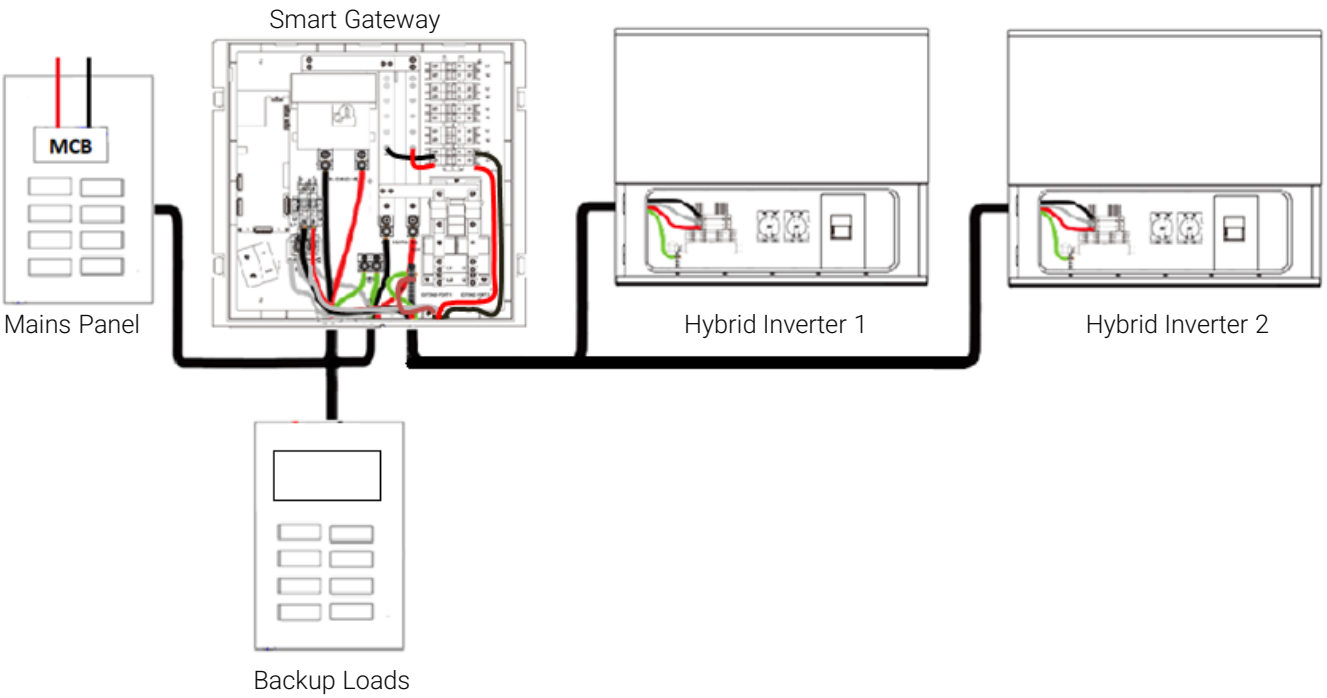
a. Prepare the conduit for the hybrid power cables to the Smart gateway RESS knockout.

b. Route the Hybrid cables through the conduit to connect it to the reserve capacity extend kit (hybrid circuit breaker) according to the system requirements:（Ref. to the Picture above）

c. Follow the local standards to select different colours for AWG 6 cable for L1, N, L2, and ground between hybrid and the smart gateway. On Hybrid side, press down the terminal using flat-head screws, insert the cables and release the pressure in terminal.

d. On the smart gateway side, strip the wire ends using a wire stripper, use a flat-head screwdriver to unscrew the breaker terminals, then insert the cables and fasten the screws. Refer to picture above for wiring the AC output L1, N, and L2 between the Hybrid and Smart gateway breaker

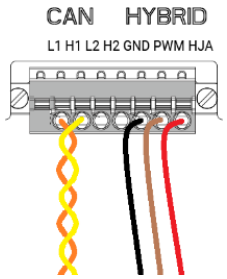
Below figure shows the general layout for 2x parallel Hybrid units connected with a single smart gateway.



Communication Wiring for Additional Hybrid

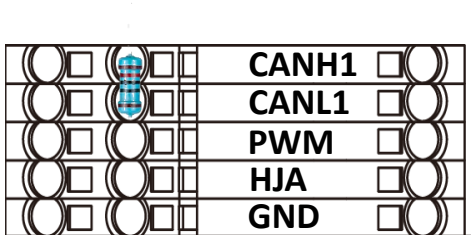
For communication cable connections, use the communication cable included in the Hybrid inverter box. Connect one end of the cable to the terminals of Hybrid 2 and the other end to the respective terminals of Hybrid 1. In the next step, connect Hybrid 1 to the Smart gateway communication terminals.

⚠ **CAUTION:** Pay attention to terminal labeling and connect the wires accordingly. Refer to the picture below for wiring the L1, H1, GND, PWM, and HJA terminals between the Hybrid and Smart gateway. During parallel connection when more than one Hybrid units are connected to single Smart gateway, communication cable runs in series among hybrid units. In this case, a 120 ohm metal film resistor need to be installed on the communication terminals (CANH & CANL) of the final hybrid unit (one the most far away from the smart gateway). This resistor is included in package.



SG Comm. Terminals

Wire Color	SG Terminal	Hybrid Terminal
Orange	L1	CANL1
Yellow	H1	CANH1
Black	GND	GND
Brown	PWM	PWM
Red	HJA	HJA

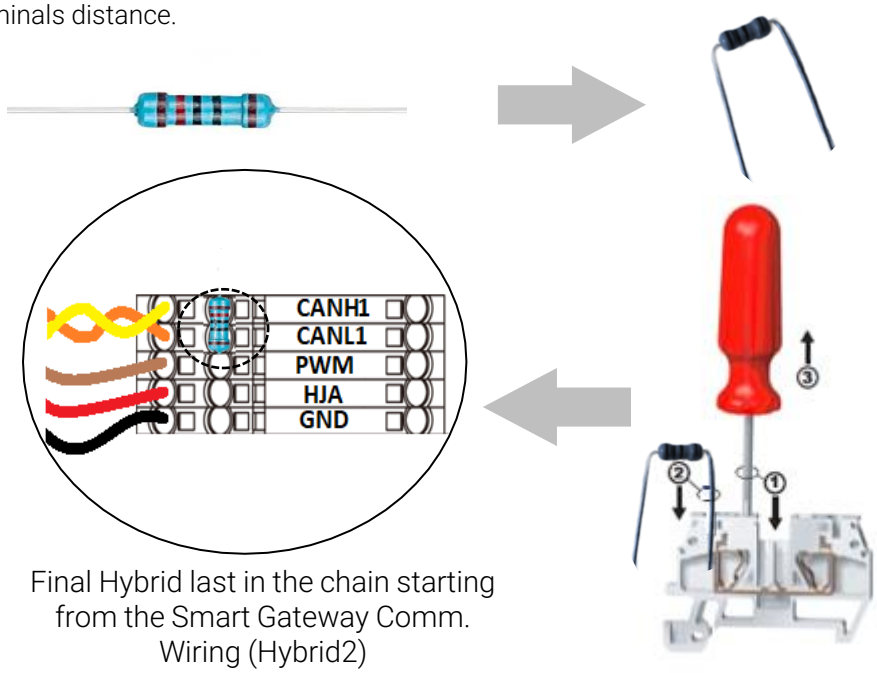


Hybrid Comm. Terminals

Case A: Hybrid Units Without Pre-Installed Communication Resistor

If the hybrid unit don't have communication resistor pre-installed on CANL1 and CANH1 terminals, then find it in the hybrid's packaging box. Follow the below steps to install the resistor:

Step a: Bend the resistor legs to appropriate angle and distance between both legs should match with the terminals distance.

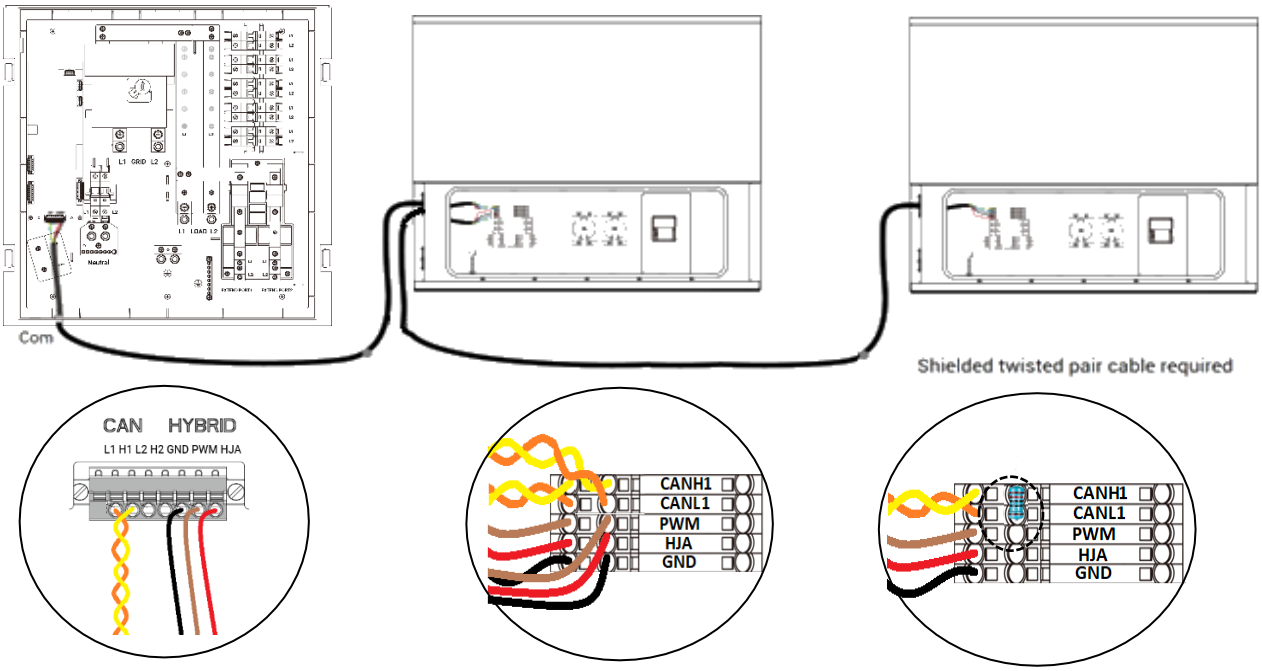


Final Hybrid last in the chain starting from the Smart Gateway Comm. Wiring (Hybrid2)

Step b. Push the spring terminals with the help of a flat head screw driver.

Step c. Insert the resistor legs in the communication terminals, one leg in CANL1 and the second leg in CANH1 of the Hybrid2.

⚠ Note: Only the final Hybrid unit that is connected last in the chain starting from the smart gateway needs the installation of resistor. Other connected hybrid units do not require any modifications.



Smart Gateway Comm. Wiring

Hybrid 1 Comm. Wiring Without Resistor

Hybrid 2 Comm. Wiring With Installed Resistor

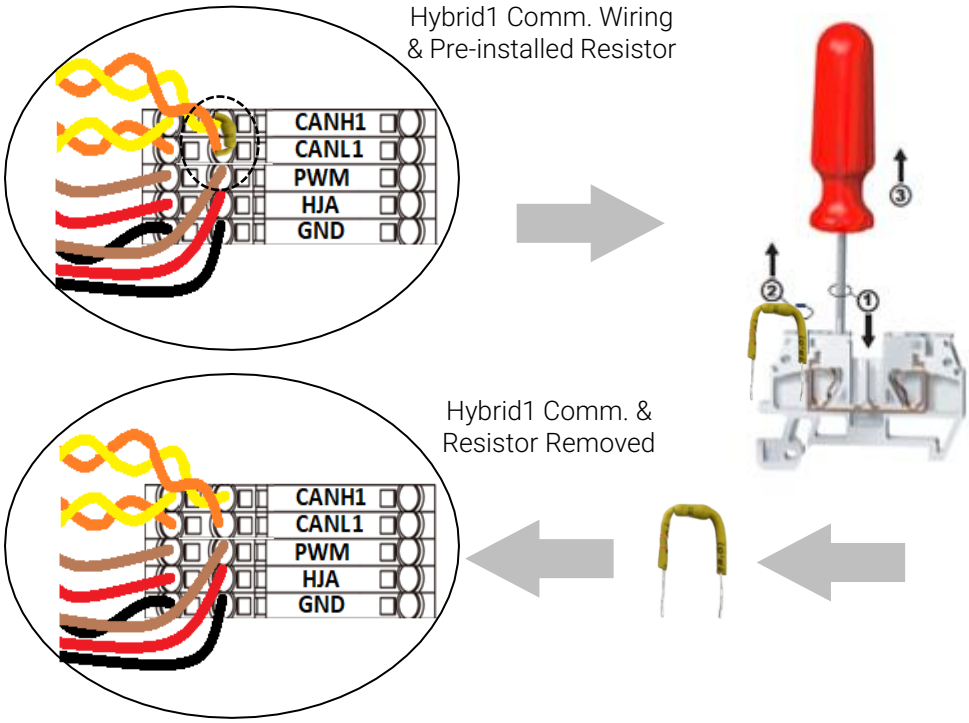
Case B: Hybrid Units With Pre-Installed Communication Resistor

If the hybrid units already have the communication resistor pre-installed on CANL1 and CANH1 Comm terminals, then during parallel connection of Hybrids remove it from all the hybrid units except the final Hybrid (Hybrid2) that is connected last in the chain starting from the Smart Gateway Comm terminals. Follow the below steps to remove the resistor:

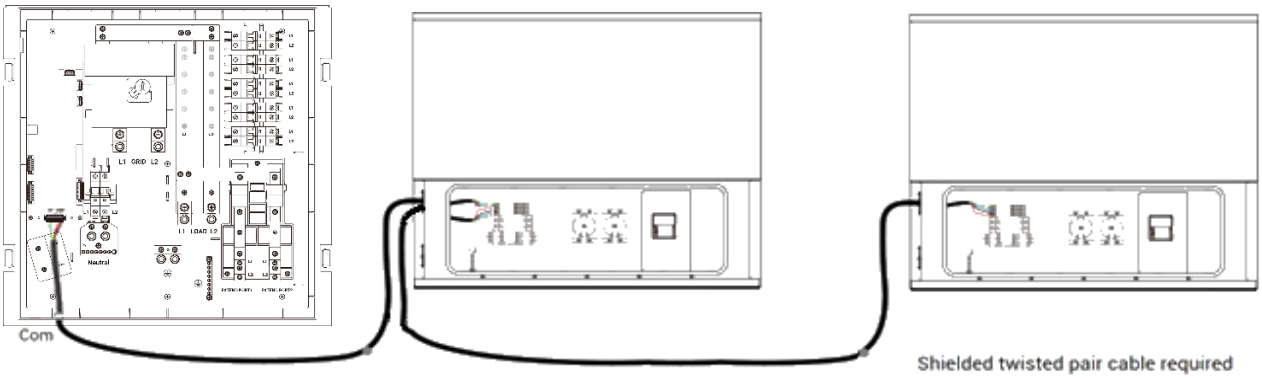
Step a: Locate the Comm terminals in the Hybrid unit, and check if the resistor is pre-installed.

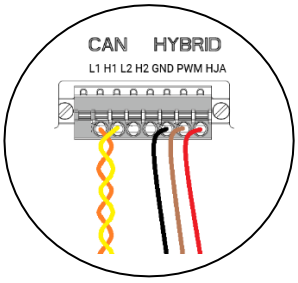
Step b: Push the spring terminals with the help of a flat head screw driver.

Step c. Pull out the resistor body and the resistor legs will come out from communication terminals. Once the resistor is completely removed, release the force on the spring terminals. Refer to the figure below:

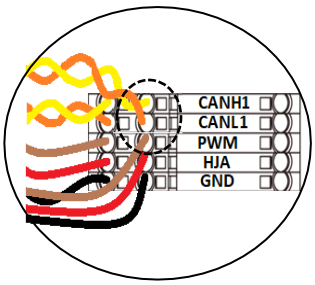


⚠ Note: The Final Hybrid (Hybrid2) unit that is last connected in the chain starting from the smart gateway communication terminals must need pre-installed resistor. Do not remove the resistor between the Comm terminals of the Final Hybrid (Hybrid2) unit.

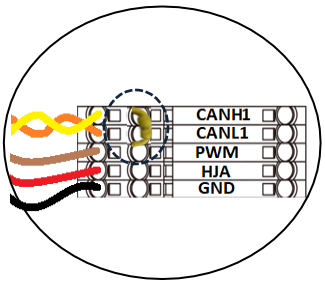




Smart Gateway Comm. Wiring



Hybrid 1 Comm. Wiring & Pre-installed Resistor Removed

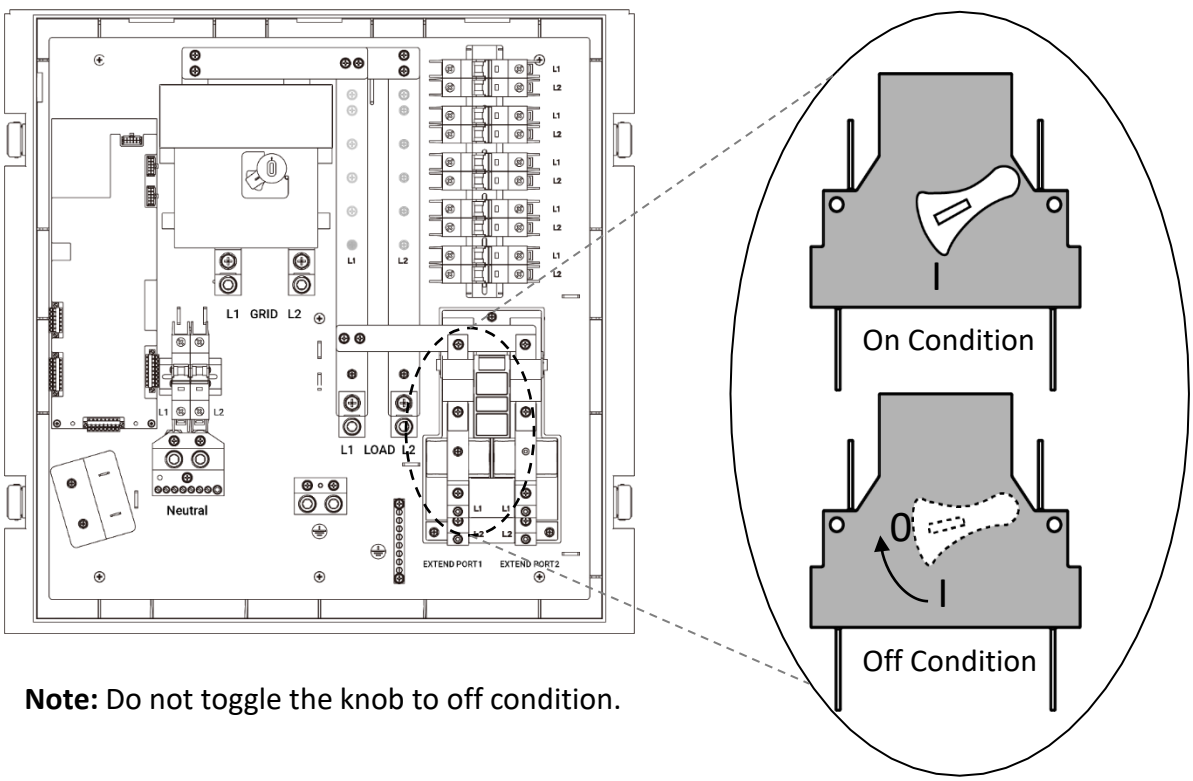


Hybrid 2 Comm. Wiring with Preinstalled Resistor

B. Extend Port 1 & 2

The smart gateway is equipped with two expansion ports called Extend port 1 and Extend port 2. Extend port 1 allows the connection with any one device from available devices such as a generator, PV inverter, and EV charger. Similarly, Extend port 2 allows the connection with either an EV charger or a PV inverter. Both expansion ports utilize electronically controlled relays generally referred to as control kits that are preinstalled in the smart gateway.

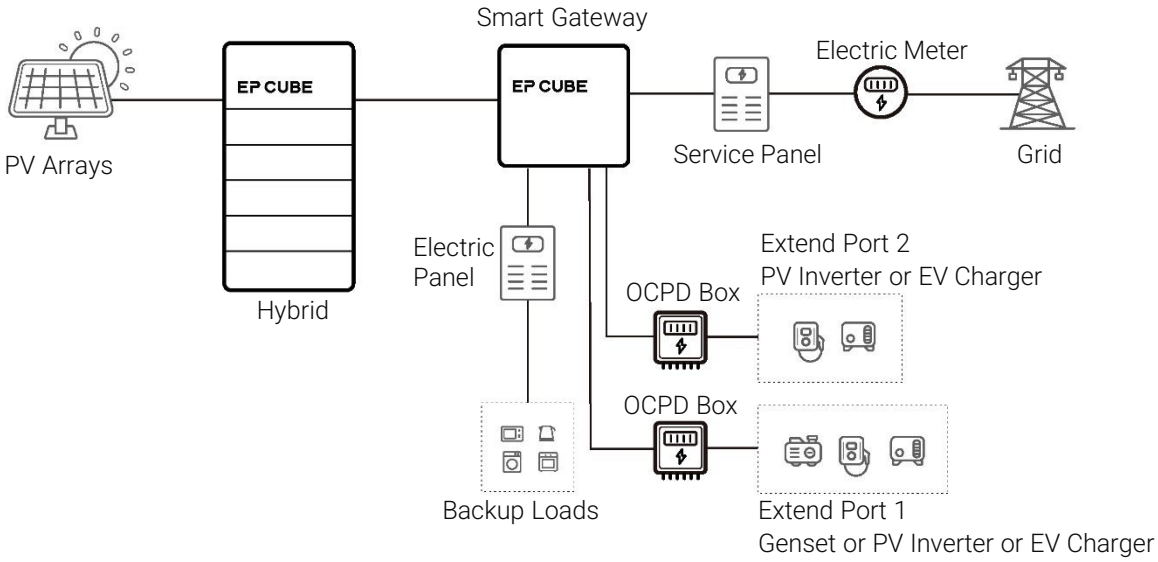
⚠ **CAUTION:** Pay attention to the position of the white mechanical knob on the control relays. The knob must be in the right position to work properly. On is indicated by "I" and the off position is indicated by "O". Ensure that it is always in the "On" position.



Note: Do not toggle the knob to off condition.

⚠ **CAUTION:** In accordance with the National Electrical Code (NEC), for Bus or Conductor Rating: The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120% of the rating of the busbar or conductor". The installer must ensure that the Bus or conductors are not overloaded during the expansion of the EP Cube system.

⚠ **CAUTION:** Both expansion ports are controlled electronically through relays. As per the NEC code, AC-generating or consuming devices require an over-current protection device (OCPD) before the busbar. So any connected devices, such as an EV charger, generator, or AC-coupled PV system will need an OCPD before it is connected to the port. It is recommended that the installer should add circuit breakers before connecting these devices to the smart gateway.



EP CUBE COMMISSIONING

EP CUBE System Commissioning

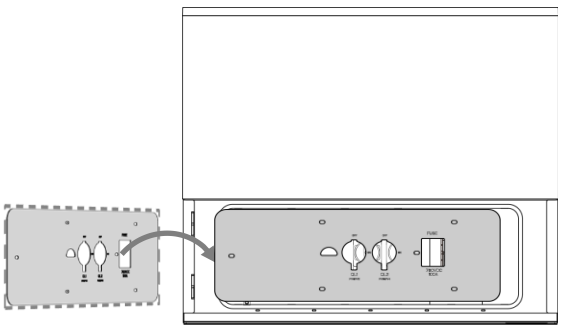
This section introduces the EP Cube system's initial commissioning and operating process.

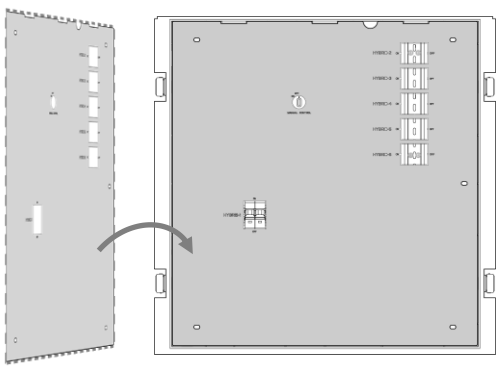
A. EP Cube Startup

⚠ **CAUTION:**

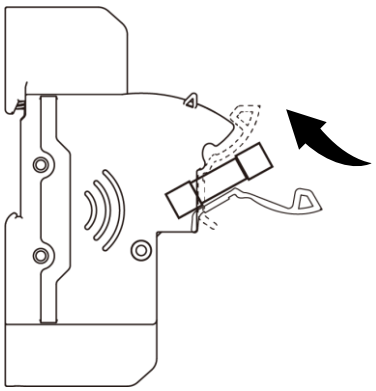
- Please ensure PPE is properly worn before getting started.
- For the initial startup, the smart gateway must have AC electrical power supply, otherwise there will be no start-up signal generated by the smart gateway to the Hybrid system.
- During commissioning or when changing commissioning settings in the EP Cube App, ensure that the Smart Gateway & Hybrid have a proper AC electrical power supply, However, the power buttons on the bottom of Smart Gateway & side of the Hybrid should NOT be turned on (i.e., buttons should be in their natural flush state).

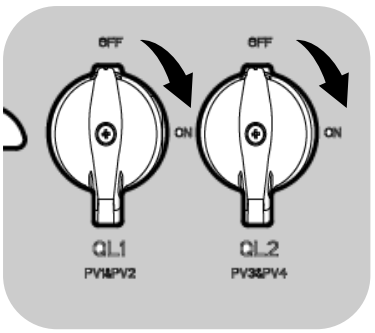
a. Install all equipment covers and ensure no live electrical components will be exposed during operation.



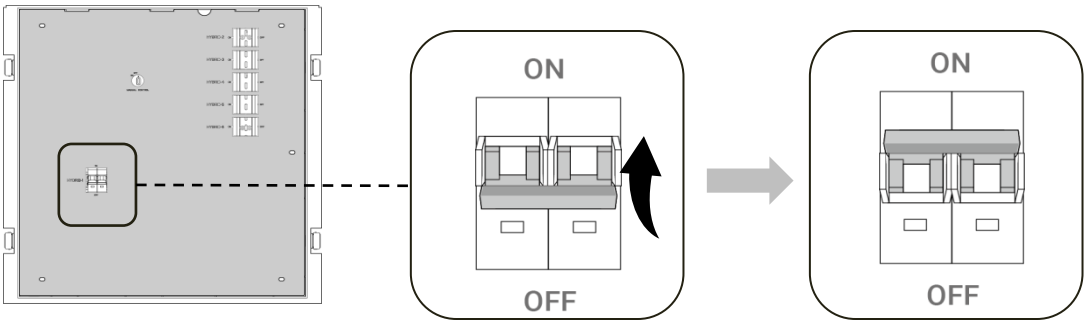


b. Connect the Battery Fuse, and then turn on the PV switches in the Hybrid Inverter.

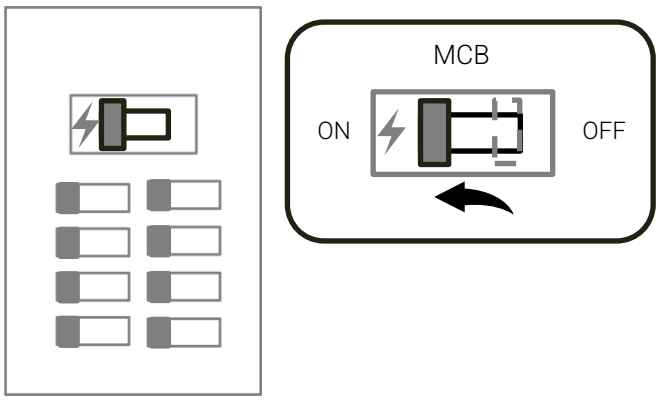




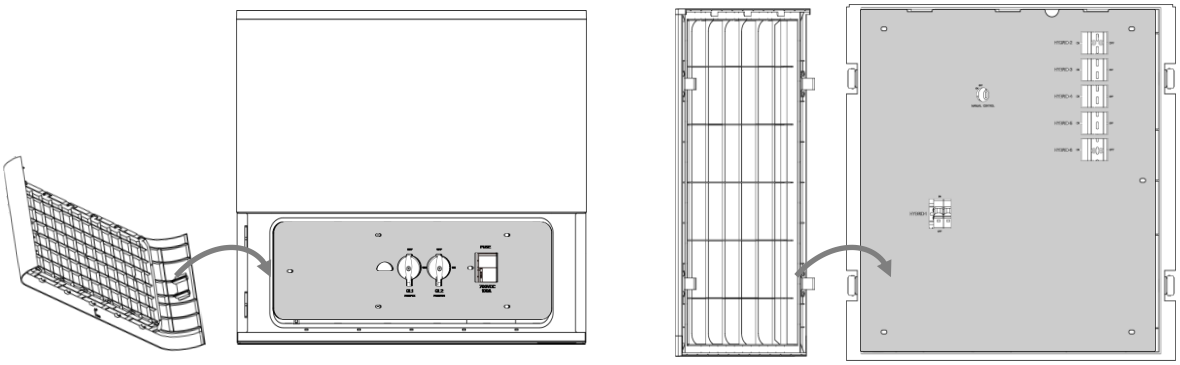
c. Turn on Hybrid-1 Circuit Breaker in the smart gateway.



d. Turn on Smart Gateway Grid input power MCB in the electric panel.



e. Install dead front boards and ensure no live electrical components will be exposed during operation. Do not put the covers at this stage.

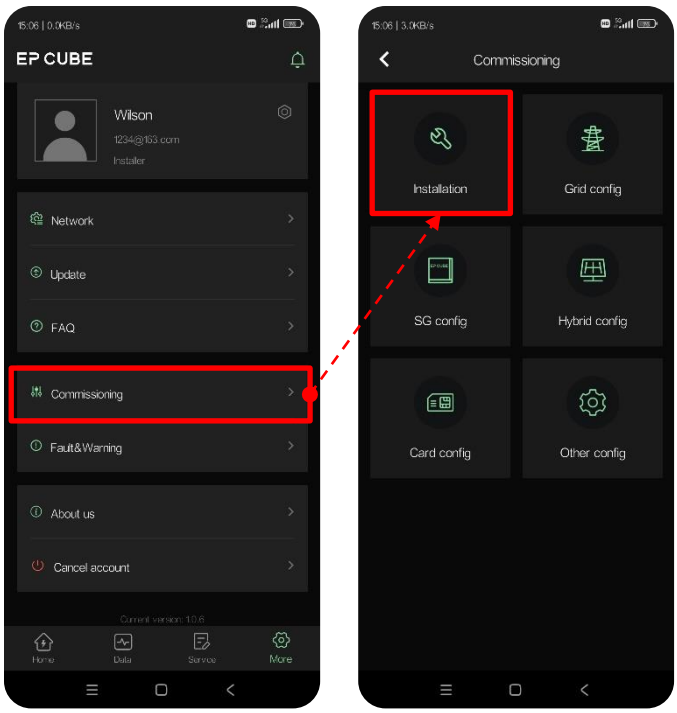


Note: Do not turn on the EP Cube Hybrid and Smart Gateway by pressing down the power on/off buttons on both Hybrid and Smart Gateway at this stage (prior or during commissioning process).

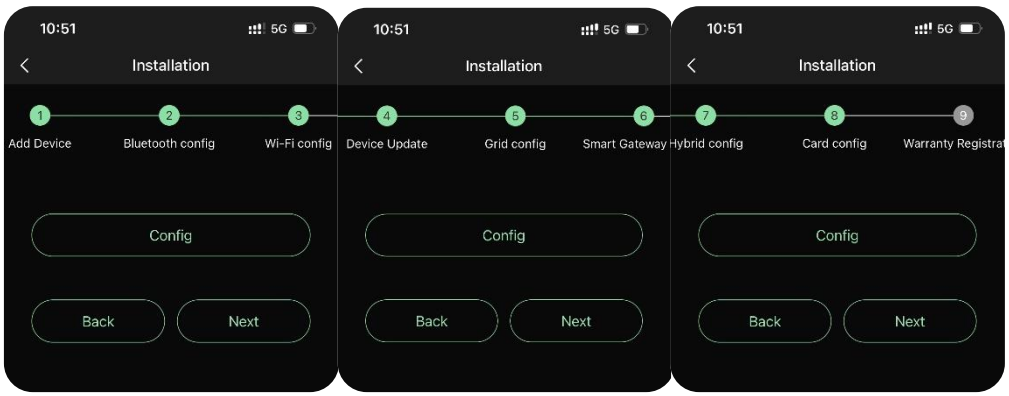
B. Commissioning via EP CUBE app

System commissioning and setup have been made easy by the EP CUBE app. It enables the user with system commissioning, monitoring and basic troubleshooting by providing errors and fault lists with the installer account.

Login with your installer account, Click More -----> click Commissioning -----> and click Installation.



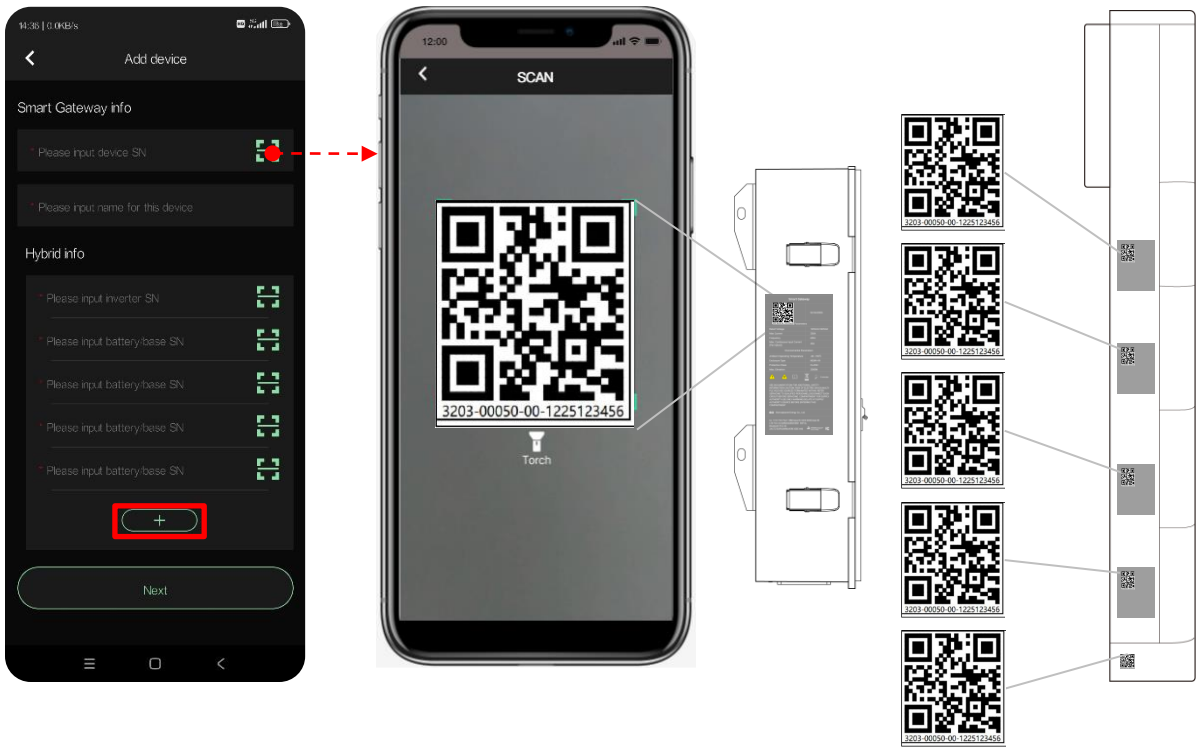
Follow the step by step process to configure all the connected devices within your EP Cube system. The steps include Add device, Bluetooth config, WIFI config, Device Update, Grid config, Smart Gateway config, Hybrid config, Card config, and Warranty Registration for final approval. Below fig shows the 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.



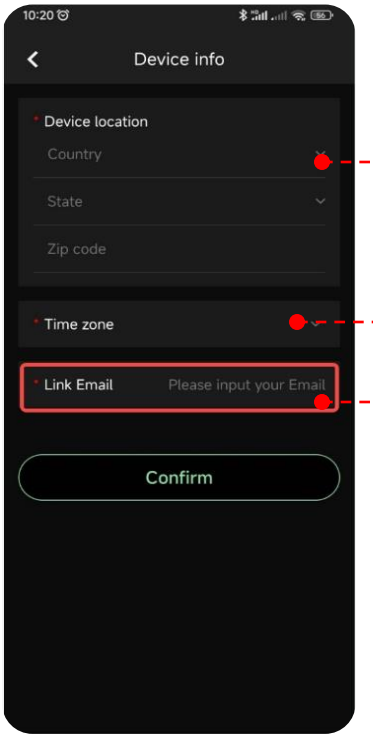
1 Add device
2 Bluetooth config
3 Wi-Fi config
4 Device update
5 Grid config
6 Smart Gateway config
7 Hybrid config
8 Card config
9 Warranty Registration

1. **Add Device:** Beginning with the add device step, Click "config" to start adding SG, Hybrid, 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 Serial Number. In this case, take the photos of the QR code labels on the devices and upload it at the end of process- at Finish step.



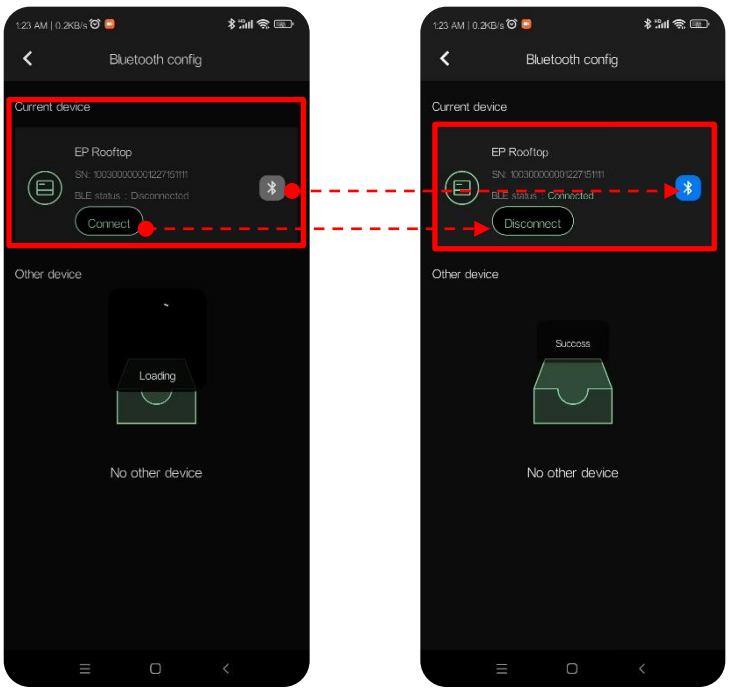
Click on the "+" button marked in red box to add more devices to the list. Once all devices are successfully added, Click on the next button to move to Device Information page to complete information related to location site, time zone and most importantly linking the email address for the end user's account. Finally, click submit.



Device Location	Country	Choose country name from the list
	State	Choose state name from the list
	Zip Code	Write area zip code
Time Zone	Time zone	Choose applicable time zone from the list
Link Email	Email	Input customer's email address

Note: Installer must ensure that End User Account has been already created on EP Cube App to successfully link it at add device step during the commissioning process.

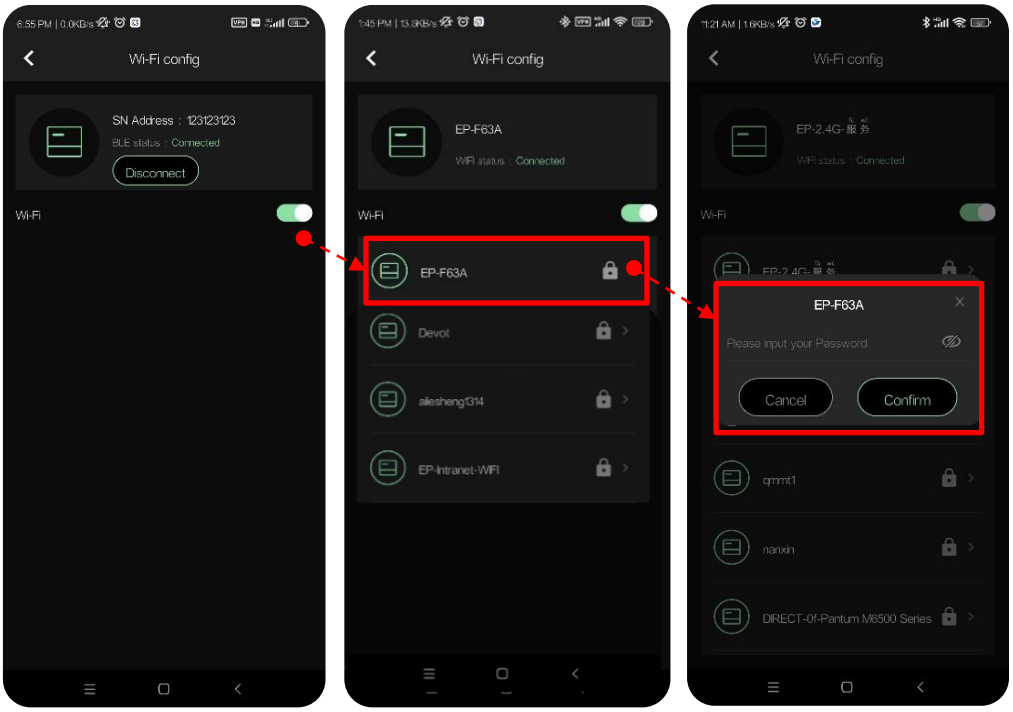
2. Bluetooth Config: In the second step, the Bluetooth configuration is completed. Click on your desired device to set it as the current device. Click on the connect button of the selected Smart Gateway. The Bluetooth status will change to connected, and BT icon will turn blue. A disconnect button will appear in place of connect button as shown in below figure.



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.

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

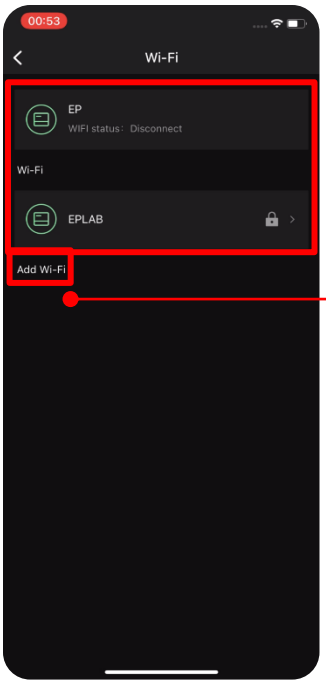
Note: EP Cube can only connect with 2.4Ghz WIFI Networks.



Turn on WIFI

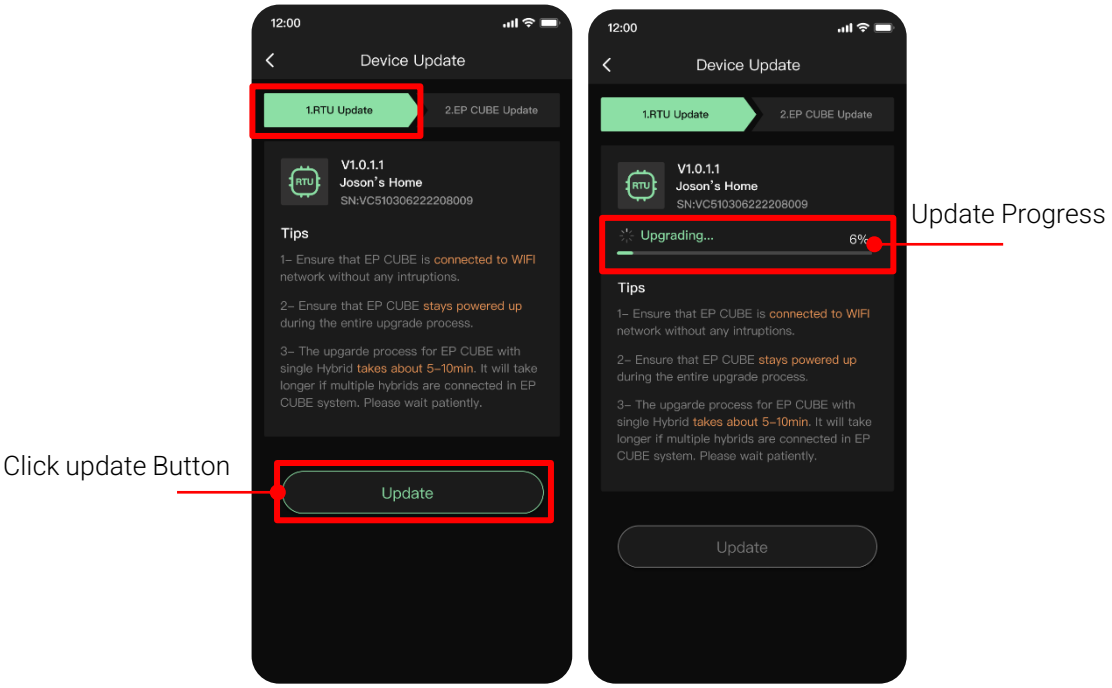
Input the password and confirm

There is a slight difference between iOS and android WIFI page interface. Android displays all WIFI networks available. But iOS displays only the network to which your phone is connected.

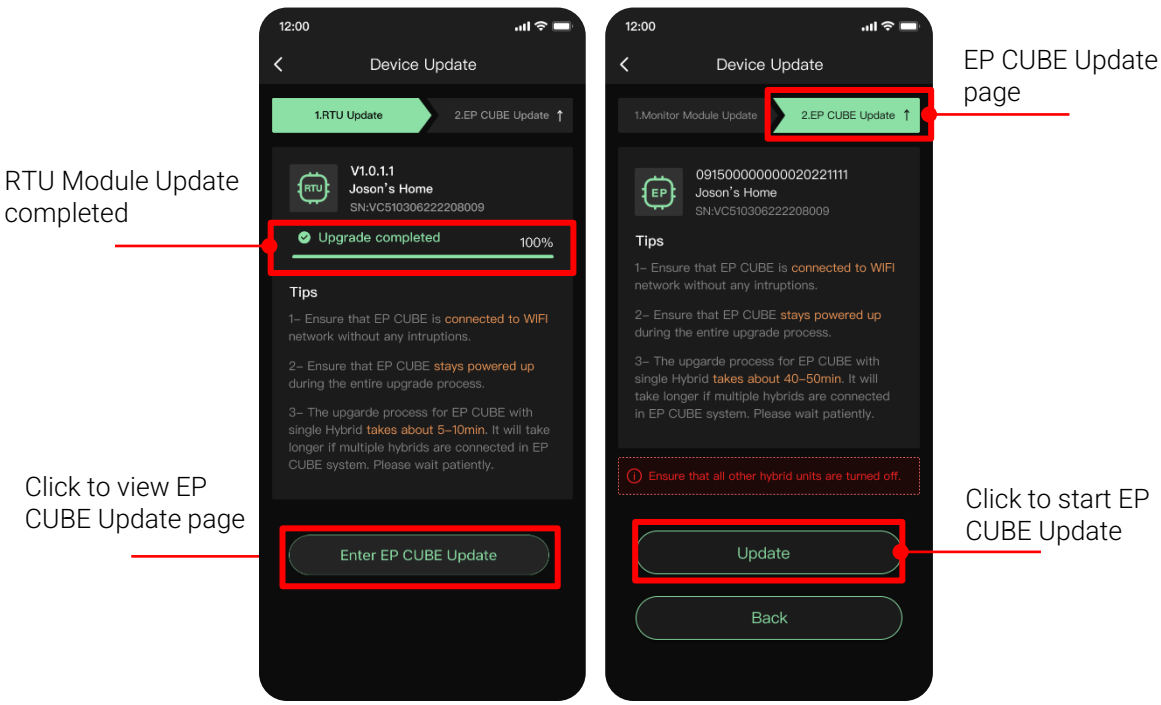


To add a new WIFI, click add WIFI Button to add desired WIFI name and Password.

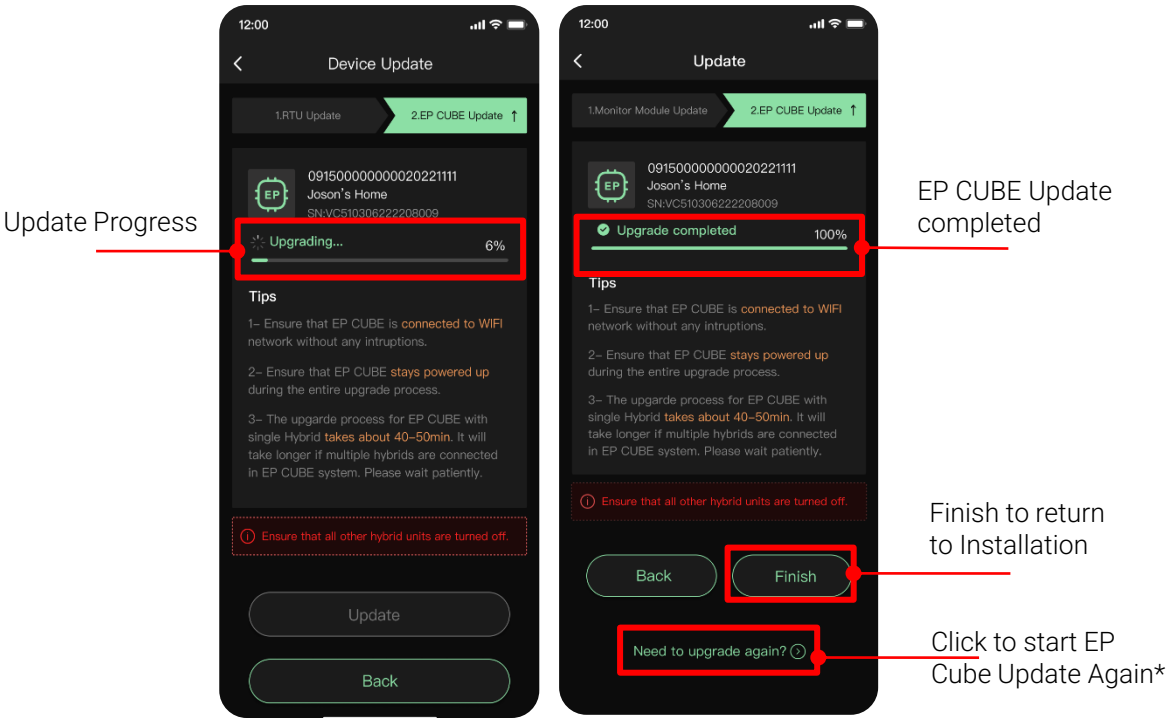
4- Device Update: In this step firmware of the RTU module and EPCUBE are updated to latest available versions automatically.
In 1st step, click the update button to start RTU module update process. Pay attention to the tips.



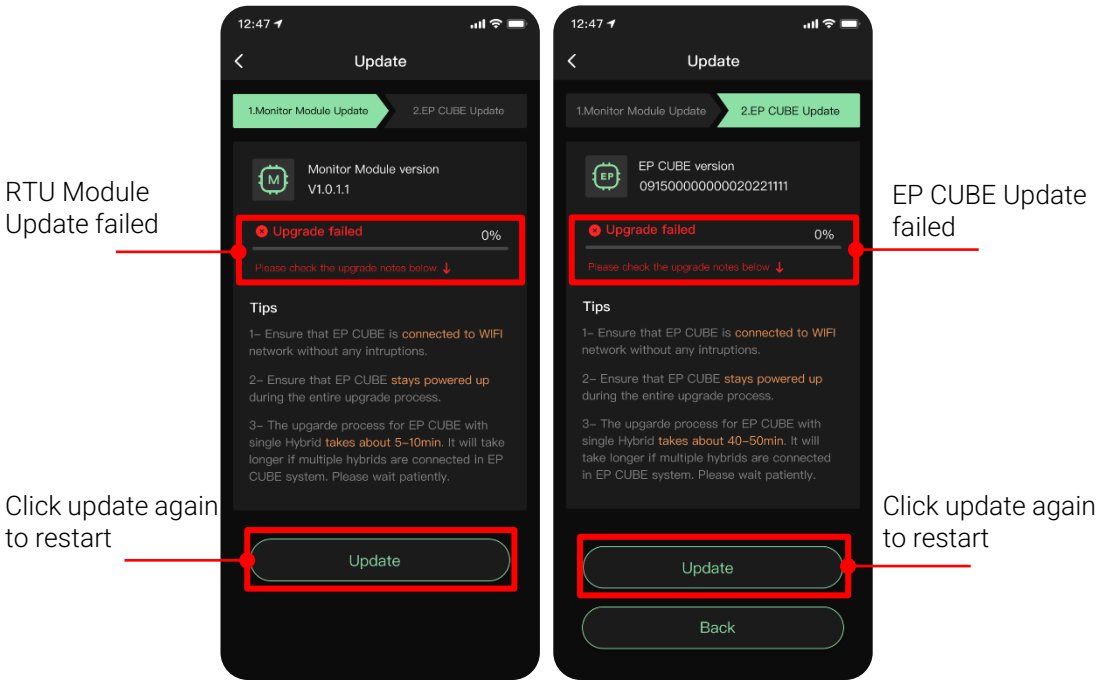
Once the update is completed successfully, Enter EP CUBE button will appear. Clicking on the button will start the second part of the update that's EP CUBE system firmware update.



Click update button on EP CUBE page to start the update. Once the update is completed successfully, click the finish button. . If there are multiple hybrids connected then click on the “Need to update again?” line item to proceed to second hybrid unit update process.

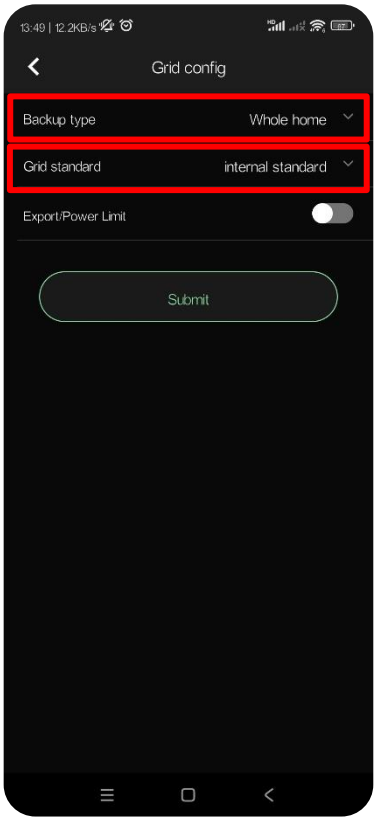


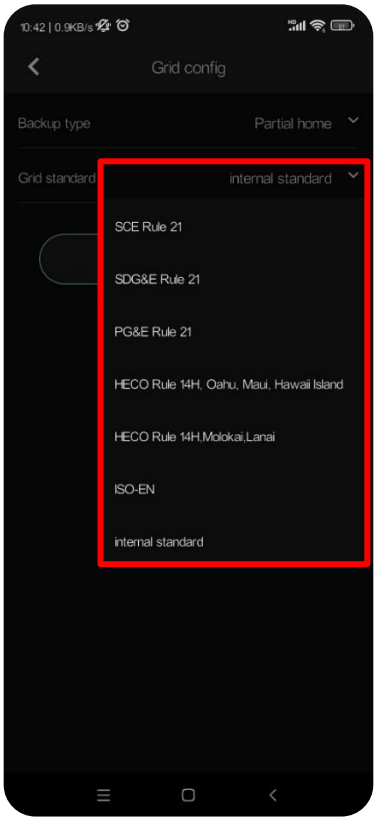
* If multiple hybrid units are connected in parallel with a single Smart Gateway, EP Cube app update step need to be repeated for each hybrid unit.
For any reason if update process failed, the Upgrade failed message will be displayed.
Click update button to restart the update process again.

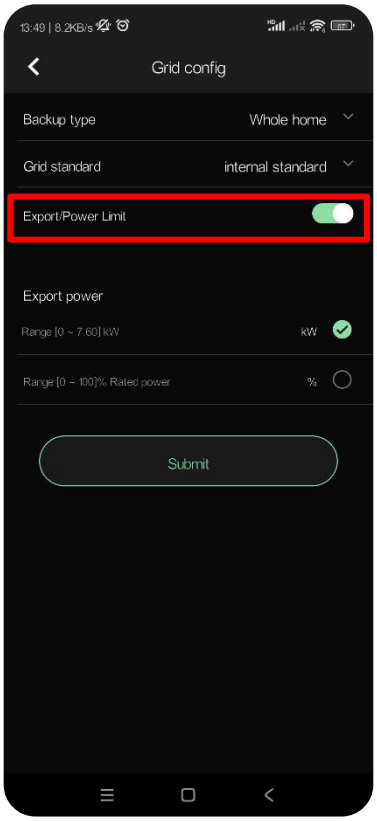


⚠ Note: It is critical to perform firmware update for all Hybrid Units one by one. Ensure that during firmware update of a certain Hybrid unit, all other Hybrid units power is disconnected by turning off the respective MCBs. This is done to ensure that the communication between the Smart Gateway and Hybrid unit that is being updated don't have any interference.
For example, If 2x Hybrid Units are connected then the EP Cube update step need to be performed twice. First, for Hybrid 1 and then second time for Hybrid 2.

5- Grid Config: choose your system's backup topology either as partial home or whole home as per actual scenario. Next in the line is the selection of applicable grid standard. Dropdown list already have various applicable standards listed. In next step, user can enable or disable the export power limit feature. User can limit the power export either by inputting a power value or a certain percentage of the rated power. After selection click submit and return to installation step.

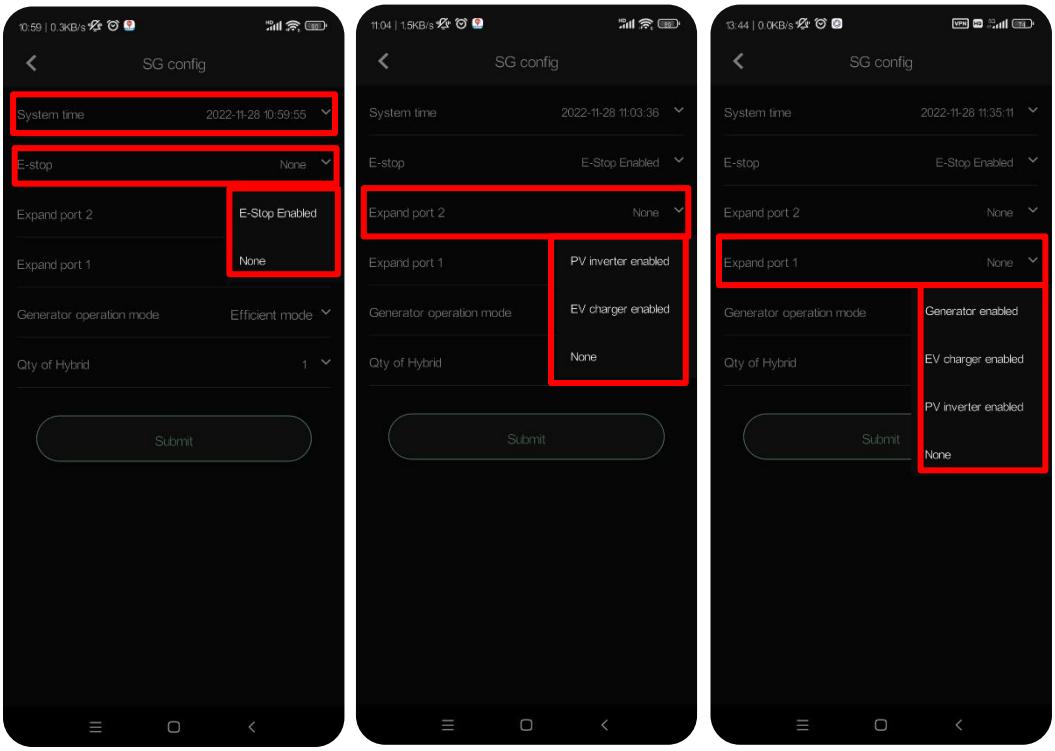




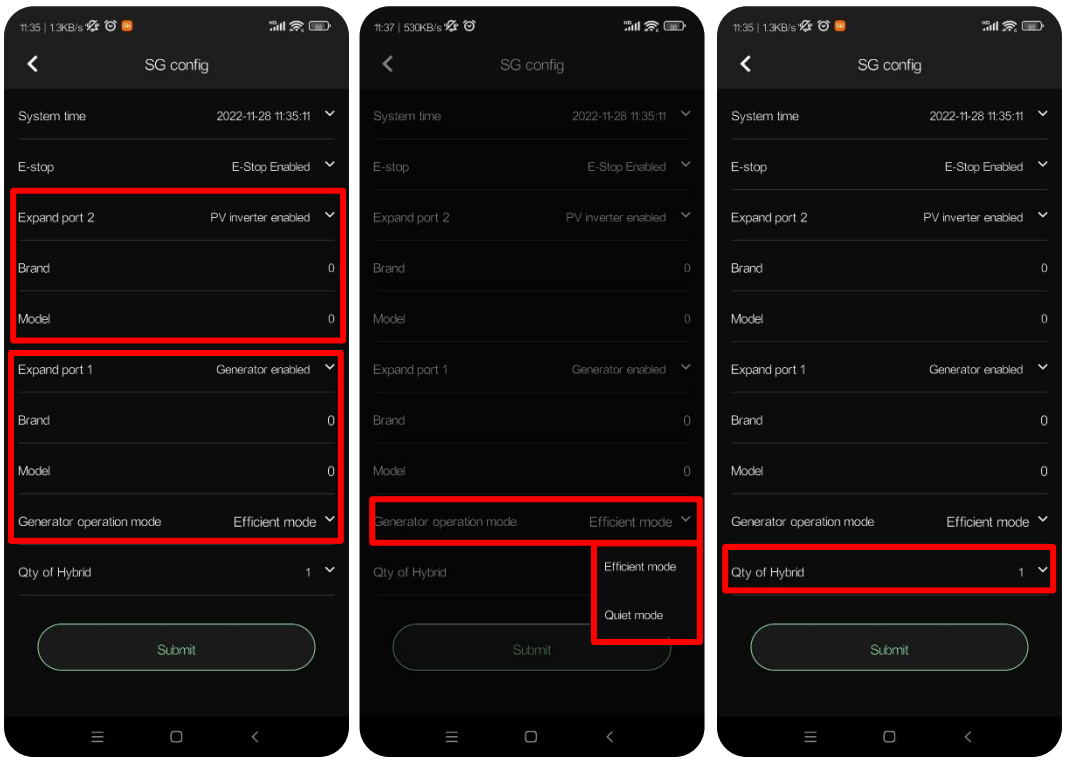


6- Smart Gateway Config: It allows the user to setup different parameters. i.e. system time, enable E Stop, setup connected device to Extend Port 2 and Extend Port 1, and number of hybrid units connected with the single smart gateway.

Extend Port 2 supports PV Inverter or EV charger. Extend Port 1 can also support connection to a generator in addition to supporting connection to PV inverter or EV charger. Only one device can be connected to each port, select connected devices from the list

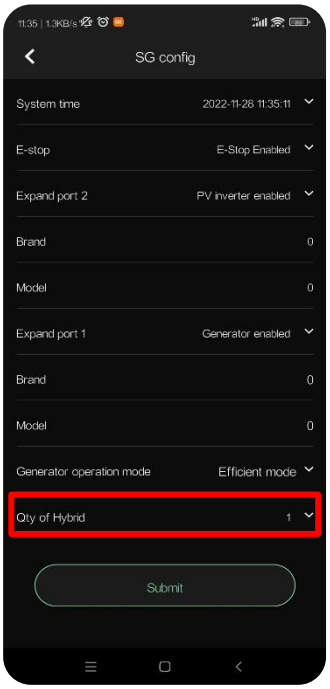


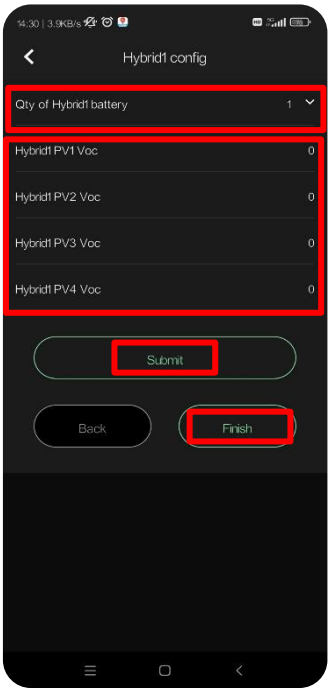
After selection of connected devices, provide brand and model information. If generator is connected then appropriate operation mode also need to be specified. Finally, add the no. of hybrids and click submit to save information



7- Hybrid Config: It allows add information about the connected PV strings Voc and No. of battery modules connected for each hybrid.

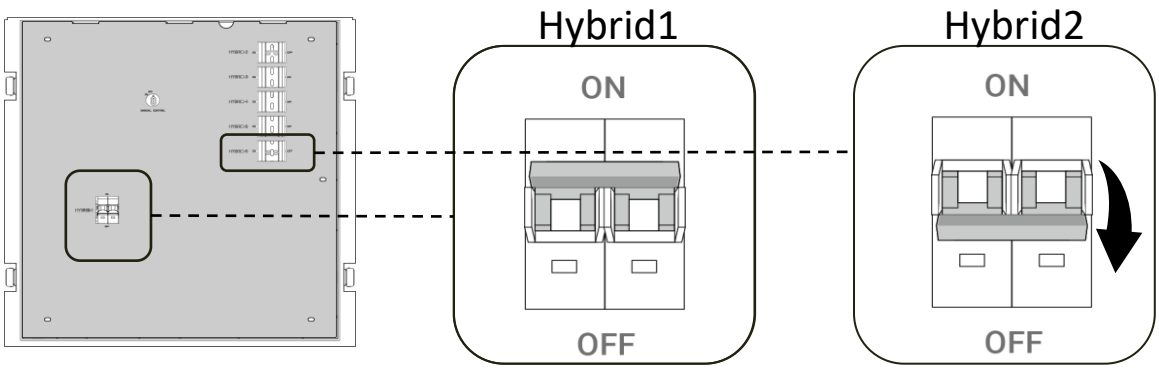
Step a. If a single hybrid connected to smart gateway, choose 1 from the dropdown list for the Qty of Hybrid during Smart Gateway config.
Step b. Then choose the number of batteries from the dropdown list as per actual scenario.
Step c. Finally, input open circuit voltage (Voc) for the connected PV strings.



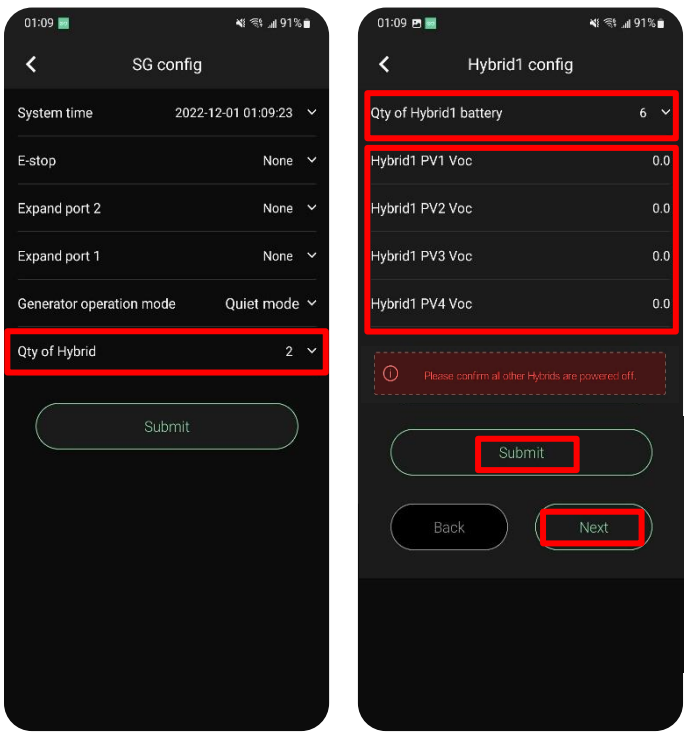


7- Multiple Hybrid Config:

If multiple Hybrids are connected with a single Smart Gateway in parallel, then it requires special attention to details as it also involves hardware operation. Follow the below steps in sequence:
Step a. Select the appropriate number from the dropdown list to input quantity of connected hybrids with the single Smart Gateway. In below example, we choose 2 Hybrids.
Step b. Go to the Hybrid config page, and Hybrid1 Config page will display.
Step c. Keep the MCB of Hybrid1 in the smart gateway in ON state, and turn off the MCBs of all other Hybrid units at this step.

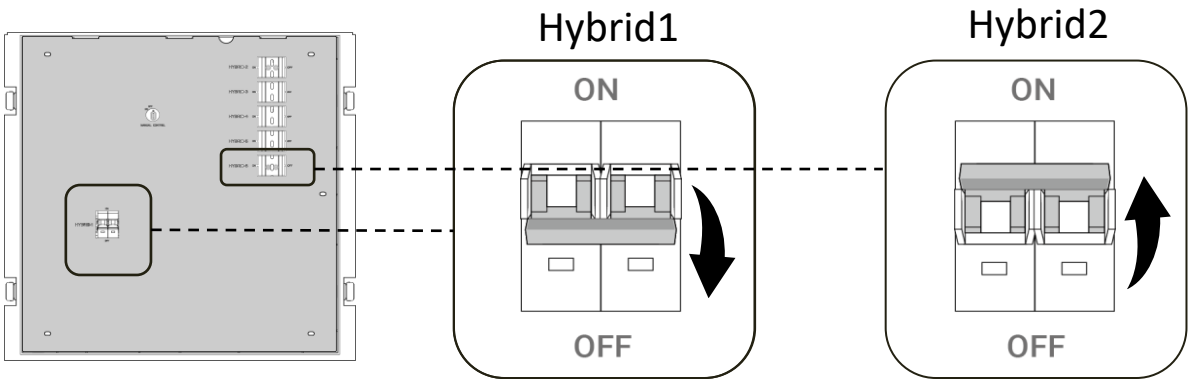


Step d. Start configuration for Hydrid1, Input the number of batteries connected with Hybrid1 and input open circuit voltages for the connected PV arrays. Click submit to save and click the next button.

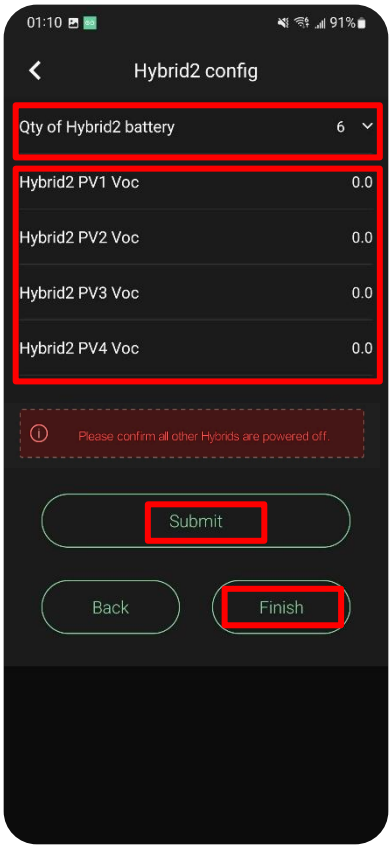


Multiple Hybrid Config:

Step e. Now, turn off the MCB of Hybrid1 in the Smart Gateway and turn on the MCB of Hybrid2 installed on the din rail. Wait a few sec for the hybrid1 to completely turn off.

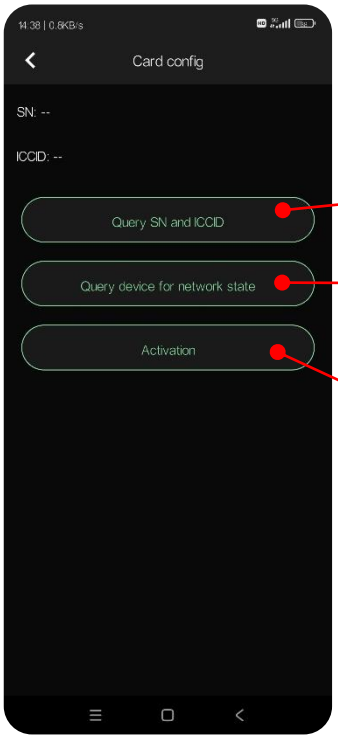


Step f. On the Hybrid2 config page, start the configuration of Hybrid2 now. Input the number of batteries connected with Hybrid2 and input open Circuit voltages for the connected PV arrays. Then click submit to save, and click finish to return to Installation steps.



⚠ Note: It is critical to configure all Hybrid Units one by one. Ensure that during configuration of a certain Hybrid unit, all other Hybrid units power is disconnected by turning off the respective MCBs. This is done to ensure that the communication between the Smart Gateway and Configured Hybrid unit don't have any interference.

8- Card Config: It allows activating the cellular internet (4G) for remote monitoring of the EP cube.

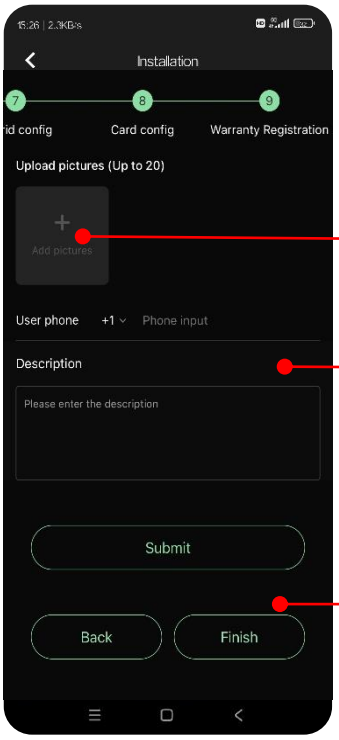


1. Click to read card information

2. Click to confirm that the card is connected to a network.

3. Activate the card if installed

9- Warranty Registration: In the final step, take and upload photos of the successful commissioning and submit for final approval by EP Team.

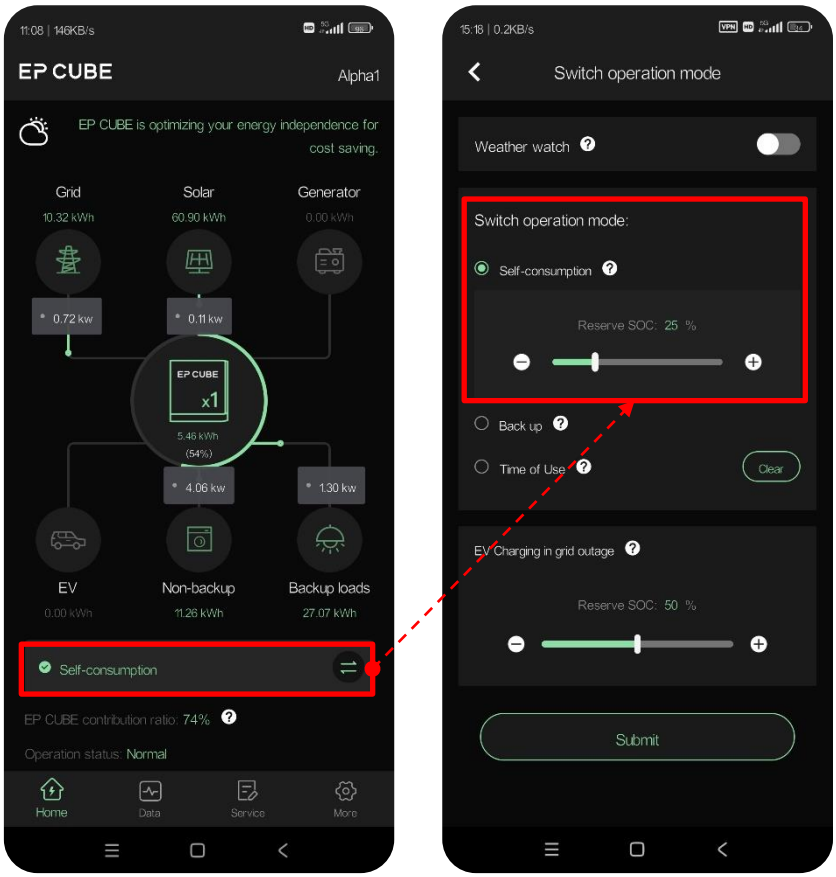


Click on the add photos section to upload photos

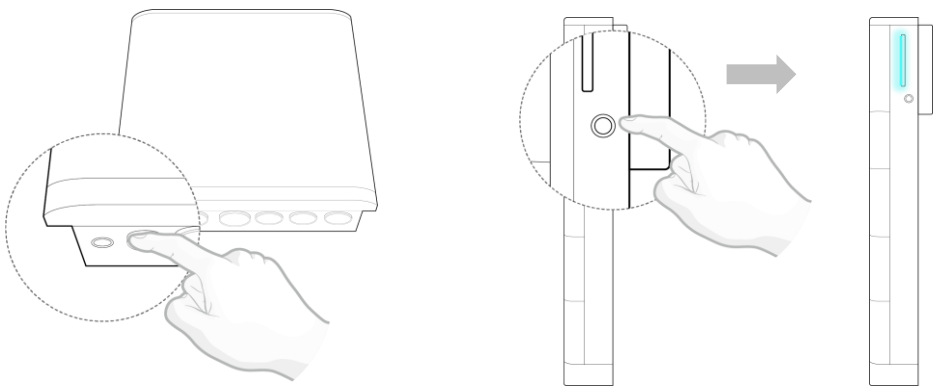
Add end user's phone number, and add any comments if needed.

Click submit 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.



Finally, switch on the Smart Gateway, and then switch on EP Cube Hybrid via the power button as shown in the pictures. Ensure that all the inputs and outputs are in normal range.



Observe and verify that EP CUBE is working as per desired settings. Refer to the following table to know different LED Indications that EP Cube Hybrid LED may have during operation.

Status	LED Indication	Description
Stand-By Mode	Bright & Solid	Stand-By
Run Mode	Faint & Solid	Normal Operation
Fault	Flash per 0.5s	Malfunction
Off	Off	Powered Off

IMPORTANT SAFETY INSTRUCTIONS

For personal protection and property safety, please read this section carefully and strictly implement its contents before installing and using the product. EP company is not liable for any loss caused due to violation of the instructions in this manual.

1. Safety Notice

In the event of any threat to health or safety, always begin with the following two steps before taking any other precautionary measures:

1. Immediately contact the fire department or other relevant emergency response team.

2. Notify all people who might be affected and ensure that they are able to evacuate this area.

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.

DANGER:

- EP Cube products are equipped with a battery that is heavy! The use of lifting equipment is recommended. Do not stack the unpacked products to avoid irreversible damage.
- It is prohibited to touch the EP Cube internal components when it's running. 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.
- This equipment complies with rules of FCC Part15, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- Do not squeeze, impact or puncture the battery.
- Do not operate the EP Cube out of the specified conditions and requirements. In addition, do not stand, lean on or sit on the product.
- Do not place the EP Cube or its components in water or other liquids, or expose EP Cube to flammable gases, other corrosive substances, and heating sources. Otherwise please refer to applicable local codes and UL 9540.

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.
- The packaged battery modules are forbidden to be stacked more than the specified quantity. Do not reverse the polarity of the battery during connections.
- High temperatures and 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, risking causing a fire. Please refer to applicable local residential building requirements, and fire and energy storage system installation codes.
- 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.

⚠ **Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, maybe cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help."

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

2. Personal Protective Equipment

Wear the following safety equipment properly to perform installations. Installers must meet the relevant requirements of standards, such as IEC, OSHA, State, and Local laws.

Safety goggles

Ear plugs

Insulated gloves

Safety gloves

Safety shoes

Troubleshooting & Maintenance

1- System Overload

Each EP CUBE can provide up to 5-7.6 kW of continuous power with peak outputs of 10kW and 22kVA (with and without sun). You can back up any number of appliances, so long as their combined power usage does not exceed the total power rating of your EP CUBE system.

Starting some loads with a high inrush current during a power outage, like air conditioners and motors, may overload EP CUBE and cause it to stop providing power to your home. If this occurs, turn off these loads, and EP CUBE will attempt to restart automatically. Otherwise, consider manually restarting EP CUBE.

During manual restart/cycling perform following steps:

1- Turn off the Hybrid, then turn off the SG by pressing the buttons to off state.

2- Turn off the Hybrid Circuit Breaker in the SG. (If multiple Hybrids are connected then turn off all)

3- Turn off the Main Grid Circuit Breaker.

4- Turn On the Main Grid Circuit Breaker.

5- Turn on the Hybrid Circuit Breaker in the SG. (If multiple Hybrids are connected then turn on all)

4- Turn on the SG, and then turn on the Hybrid (by pressing the power on button on both SG and Hybrid)

And system should be able to restart. In that case you can check on the HYBRID unit LEDs on the right side of Hybrid Inverter to see if LEDs are flashing or lit solid. If the system is in restart process, then LEDs will be flashing. EP CUBE have several warnings associated with this particular case. You may expect one of the following on EP CUBE App:

a- Overload

b- Severe Overload

c- Off Grid Overload! Please reduce the loads in 5 mins.

A soft start device should be used in combination with a large electrical appliance such as air conditioner to avoid frequent shut down due to high inrush current drawn by device at start up. While operating Off grid, EP CUBE can support normal backup loads that does not require high LRA. Your device may exceed supported LRA value in start up stage, leaving EP CUBE overloaded. Instead of drawing a massive amount of electric current instantly, the soft starter device increases the current supply gradually until the AC compressor starts working completely.

EP CUBE APP

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.

Frequently Asked Questions

1- Where can I find the EP CUBE Specifications?

You can find it in the help section of the EP CUBE app or please visit our website and download it from the support section. https://eternalplanetenergy.com/manuals.html

2- Where can I find the EP CUBE User Manual?

You can find it in the help section of the EP CUBE app or please visit our website and download it from the support section. https://eternalplanetenergy.com/manuals.html

3- Where can I find the EP CUBE Installation Manual & Quick Installation Guide?

Both documents are provided with the EP CUBE package. In addition, you can find it in the help section of the EP CUBE app, or please visit our website and download it from the support section.

4- Once EP CUBE is installed what happens during a power outage?

During a power outage, EP CUBE seamlessly switch from Grid to backup power and keep your electrical appliances running even when grid goes down.

5- During a power outage, can my solar recharge EP CUBE?

Your EP CUBE can recharge from your solar arrays and keep running your home from solar even when the grid is down. A traditional solar system without an EP CUBE does not function during a grid outage.

6- How large a PV system can I connect with one EP CUBE?

A single EP CUBE Hybrid supports 4x PV Array connections. The maximum allowable PV voltage is 600 VDC. EP CUBE have 4x MPPT trackers, each MPPT can support 16A current.

7- Which operation modes are supported by EP CUBE?

The EP CUBE currently supports 3 different operation modes to meet your energy preferences: Self-consumption, TOU, and Backup. In addition, the weather watch function allows EP CUBE to monitor the local weather conditions and automatically stores energy for hazard backup.

8- What's the use of reserve SOC value?

Reserve SOC Percentage allows EP CUBE to reserve the energy stored in the batteries that can be discharged only when a power outage occurs. you may manually increase your reserve soc percentage in the EP CUBE app to retain more energy in the event of a grid outage.

9- There are several best practices to extend your backup time before and during a potential outage, consider doing energy-intensive activities, including charging your car, running your air conditioner, or doing dishes and laundry before any such outage event. In addition, Weather Watch will automatically prepare your EP CUBE system for the possibility of a grid outage during some extreme weather events. You may also manually increase your reserve soc percentage in the EP CUBE app to retain more energy in the event of a grid outage. The best way to extend your use of EP CUBE during a grid outage is to reduce the use of non-essential and energy-intensive appliances like air conditioners, washing machines, car charging, and electric heaters.

10- What will happen if L1 has say draws 3600W and L2 draws 300W of power for the short or long-run durations?

The EP CUBE can support 100% imbalance for the split phase loads. So, it is okay to run with imbalanced loads in the short or long run.

11- What can I monitor through the EP CUBE app?

EP CUBE app allows users to monitor real-time power flow between connected devices. Users can see the power generation from different sources and consumption by connected devices. For example, values of power consumed from the grid and fed back to the grid are shown near the grid icon. Power consumption by different devices is shown near the respective icons.

12- Can I update my EP CUBE firmware through the EP CUBE app? How to know which firmware version is installed?

EP CUBE App automatically updates firmware remotely using the “over the Air” feature. If the remote update feature is disabled in the app, then the user can manually check and update the firmware. Go to the more page and click the update button to see the installed firmware version and check any available updates.

13- What happens if EP CUBE is not connected to the Internet?

If EP CUBE is not connected to the internet, it will continue to operate in the last operating mode set and provide backup power during an outage, but it will not provide remote monitoring via the EP CUBE app. Extended periods without an active internet connection will prevent firmware updates and may impact the product warranty.

14- What type of Internet connectivity options are supported by EP CUBE?

Connecting your EP CUBE to the internet allows you to monitor your system with the EP CUBE app and receive over-the-air firmware updates. We recommend configuring your EP CUBE to as many supported internet connection types as possible, such as a 2.4GHz Wi-Fi network and 4G cellular network.

15- What to do if you are facing Wi-Fi connection issues?

If you experience Wi-Fi connection issues, check that your network signal has at least two bars when standing next to your Gateway. If your Wi-Fi signal is weak, consider using Wi-Fi extenders

16- How the generator is integrated with EP CUBE?

A generator can be connected using Extend Port 1 of the EP CUBE Smart Gateway. It uses a relay control circuit, and a generator with a maximum rated current of 100A/24kW can be integrated into the system.

APPENDIX

1.Torque Values

A. Torque values for fasteners

Torque Values Table • N/m (lbs/inch)

Bolt Dia.(mm)	PCB Panel bolts	Countersunk bolts	Other bolts
M3	0.5 (4.5)	- N/A -	- N/A -
M4	1.1 (10)	2.2 (20)	
M5	- N/A -	4 (35)	6 (55)
M6		7 (60)	9.5 (85)
M8		- N/A -	25 (220)

B. Torque values for wires

Torque Values Table • N/m (lbs/inch)

Wire size AWG/kcmil	Slotted head no. 10 and larger		Hexagonal head	
	Slot width – 0.047” or less and slot length 1/4” or less	Slot width – over 0.047” or slot length-over 1/4”	Split-bolt connectors	Other connectors
18-10	2.3 (20)	4.0 (35)	9.0 (80)	8.5 (75)
8	2.8 (25)	4.5 (40)	9.0 (80)	8.5 (75)
6-4	4.0 (35)	5.1 (45)	18.6 (165)	12.4 (110)
3	4.0 (35)	5.6 (50)	31.1 (275)	16.9 (150)
2	4.5 (40)	5.6 (50)	31.1 (275)	16.9 (150)
1	-	5.6 (50)	31.1 (275)	16.9 (150)
1/0 – 2/0	-	5.6 (50)	43.5 (385)	20.3 (180)

APPENDIX

2. Recommended Wire Gauges

AWG Wire Gauge

Wiring Connection	Copper wire, AWG (90 ˚C Rated)
Grid Cable	2/0~4/0 AWG, Max. 200A
Load Cable	6~4/0 AWG
Hybrid AC Cable	6~8 AWG
PV Cable	10~14 AWG
Generator Cable	2/0 AWG, Max.100A
PV Inverter	1 AWG, Max. 80A