

EP Cube

Installation Manual



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INTRODUCTION

This manual describes the installation process and provides a set of guidelines for EP Cube system installers. Please read this manual thoroughly before installing and follow the instructions during the entire installation process. If you have any questions regarding the product, please contact the EP Cube Service Team where contact information can be found in the Contact Us section of this manual. For more information about the EP Cube products, please refer to the product-specific User Manual and Data Sheet which can be viewed on our EP Cube website. 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 THE INSTALLATION PROCESS. BE SURE TO COMPLETE THE COMMISSIONING PROCEDURES AND WARRANTY REGISTRATION.

For the detailed warranty policy, please refer to EP Cube LIMITED WARRANTY. Document link: <https://epcube.com/en-US/support/document>

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

Mobile APP download: <https://epcube.com/en-US/installers/ep-app>

2. Disclaimer

This document has gone thru rigorous technical review before being published to provide accurate information. However, Canadian Solar (CSI) and Eternal Planet Ltd (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

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

4. Abbreviated Terms

ABBR	Description
A	Ampere
AC	Alternating Current
CT	Current Transformer
CX	Commissioning
DC	Direct Current
EV	Electric Vehicle
kW	Kilowatt
L (L1 L2)	Phase Service Line (1, 2)
LED	Light-emitting Diode
LRA	Locked Rotor Amps
N	Neutral
RSD	Rapid Shutdown Device
PN	Part Number
PV	Photovoltaic
V	Voltage
NFPA	National Fire Protection Agency
NEC	National Electric Code
UL	United Laboratories
AHJ	Authority Having Jurisdiction
MSB	Main Service Breaker
CB	Circuit Breaker
MID	Microgrid Interconnect Device
ATS	Automatic Transfer Switch
OCPD	Over Current Protection Device
SN	Serial Number
SG	EP Cube's Smart Gateway
BT	Bluetooth Connection

5. Customer Services Contact

The EP Cube Service Team can be reached through:

- The EP Cube App under Service Tab
- EP Cube Service Support Phone Number 1-800-761-2990
- Email address: service.us@epcube.com

There are FAQ sections that can also assist in answering any of your questions in the Appendix of this Manual, in the EP Cube App, and on our EP Cube website (www.epcube.com)

THE EP CUBE SYSTEM

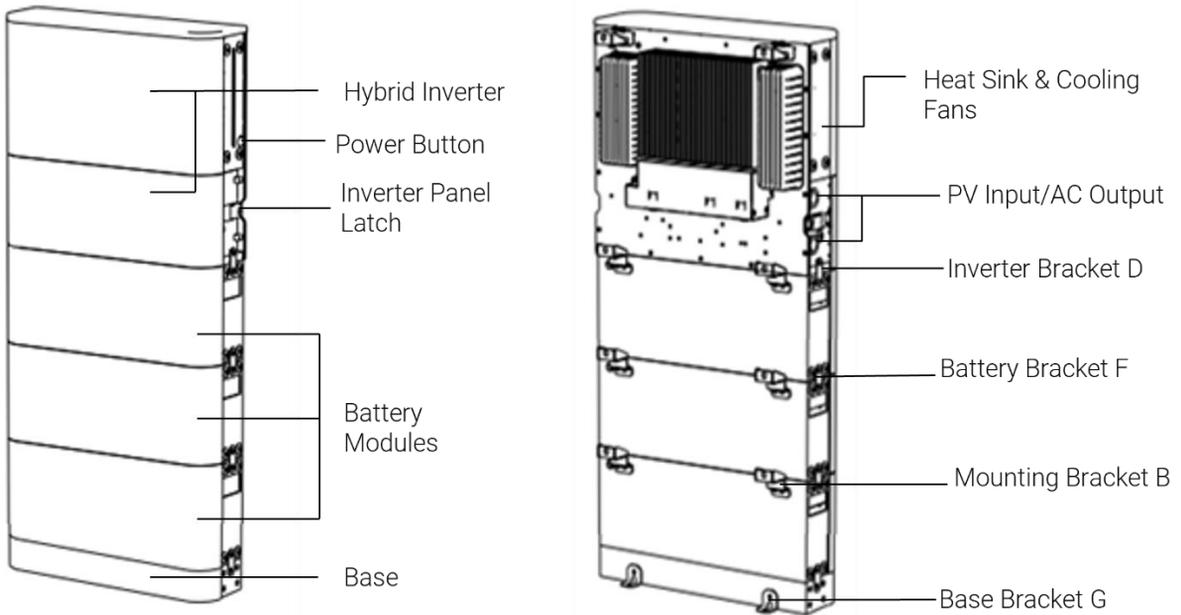
1. Standard Components

A. Hybrid

Hybrid, also referred to as Hybrid Stack, is an integrated battery storage system that include both Battery Modules and Hybrid Inverter. (Refer to Specification section for more details)

Reference Model:

Standard Hybrid + Battery modules*3Pcs

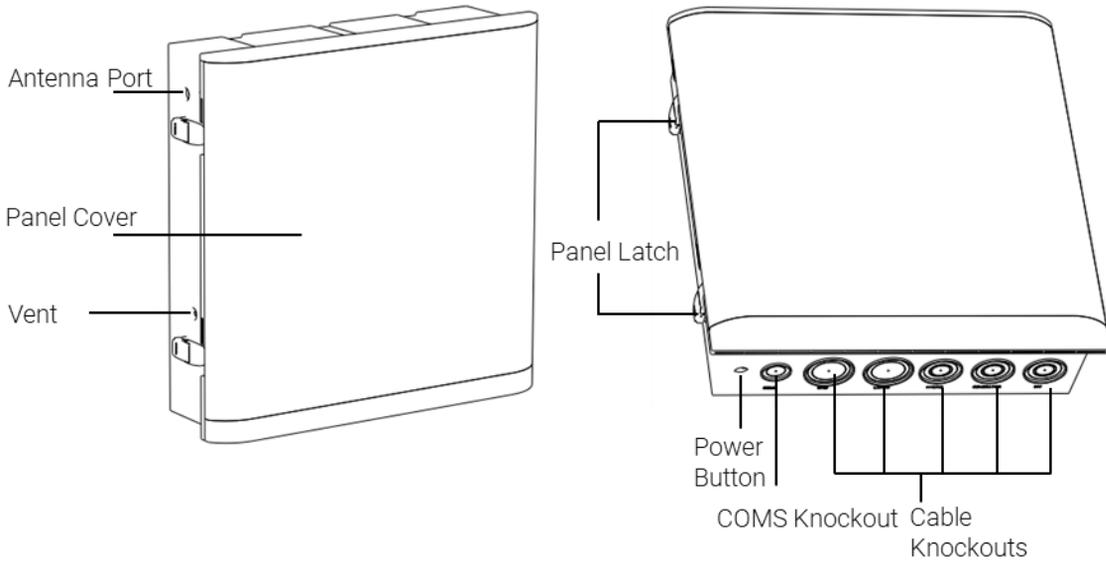


B. Smart Gateway

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. (Refer to Specification section 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://epcube.com/en-US/installers/certified-equipment>



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
E - Stop Button	Prepared by insatller	Prepared by insatller	12V DC 1 Circuit Normally Closed

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.

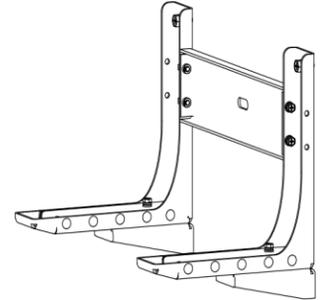


Note: If multiple hybrids are connected in parallel with a single smart Gateway, then additional CapacityExtend Kits (Circuit breakers) must be ordered separately.

Refer to Appendix Section 3 for Specifications on Capacity Extend Kits for Alternate Product if extendkits availability are limited.

B. Wall-mount Kit

Optional for Hybrid, EP Cube Hybrid(s) can be installed above grade level and mounted on the wall using a L bracket shaped, Wall-Mount Kit.



C. E-Stop Button

The emergency stop button is a very convenient device that can be integrated to EP Cube System through a 12V communication wire to an on/off switch device of your choosing where “on” is in the normal closed position. This switch will perform a rapid shutdown of all equipment connected to the Smart Gateway except for the utility grid and generator. Be sure to check your adopted NEC Code for the site, for 2023 NEC Code Section 706.15 requires a remote rapid shutdown switch located outside that is properly labeled and lockable for family homes.



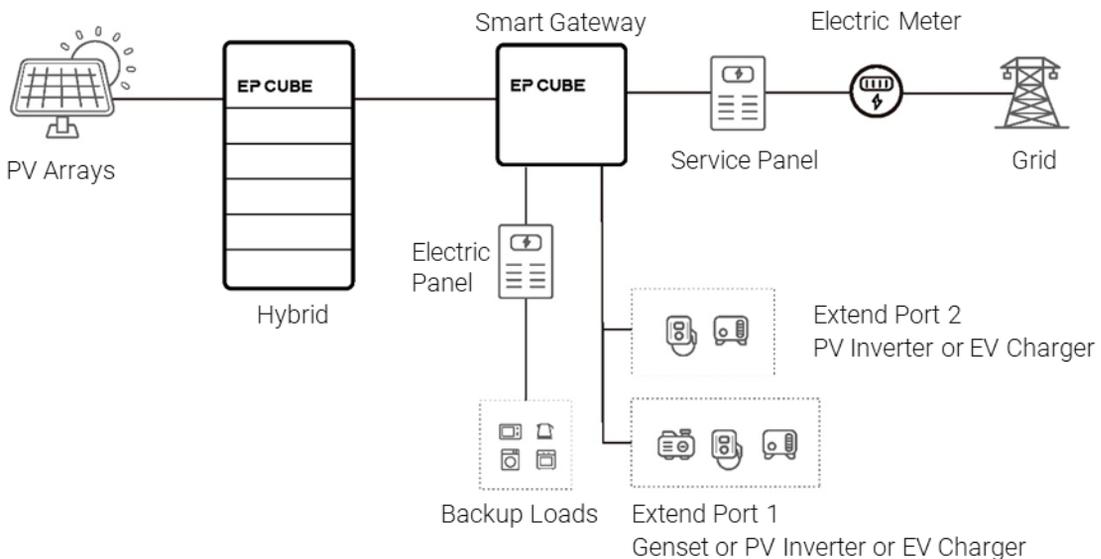
THE EP CUBE SYSTEM

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. The EP Cube System is designed to run in parallel with residence's utility electric grid service and independently of the grid through Smart Gateway's Automatic Transfer Switch

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. Proper sizing of whole home backup system with sufficient amount of EP Cube Hybrid Inverters & EP Cube Batteries is an important part of the design and needs to be considered to meet Backup power demands during power outage.

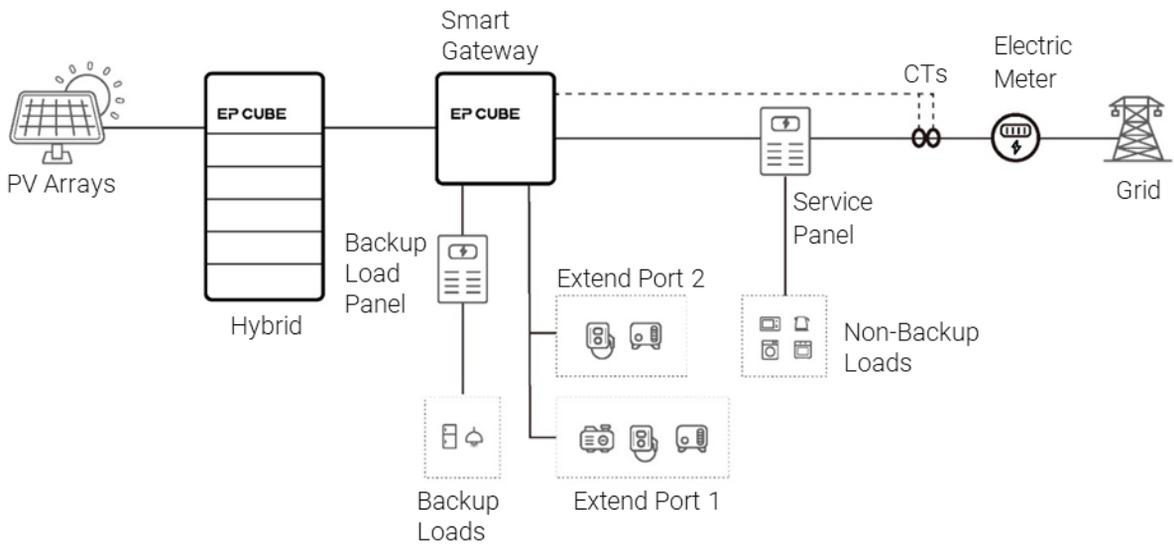


NOTE: The Smart Gateway is not rated to act as service entrance panel. A service entrance rated circuit breaker or fused disconnect in a service entrance rated panel (UL-67 Listed) is required between Utility Meter and Smart Gateway.

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 connected to the Smart Gateway busbar terminal or extend ports will be powered when a grid power outage occurs in partial-home backup topology.

Proper sizing of partial home backup system with sufficient amount of EP Cube Hybrid Inverters & EP Cube Batteries is an important part of the design and needs to be considered to meet backup power demands during power outage.



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 needs to 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 NFPA 855.

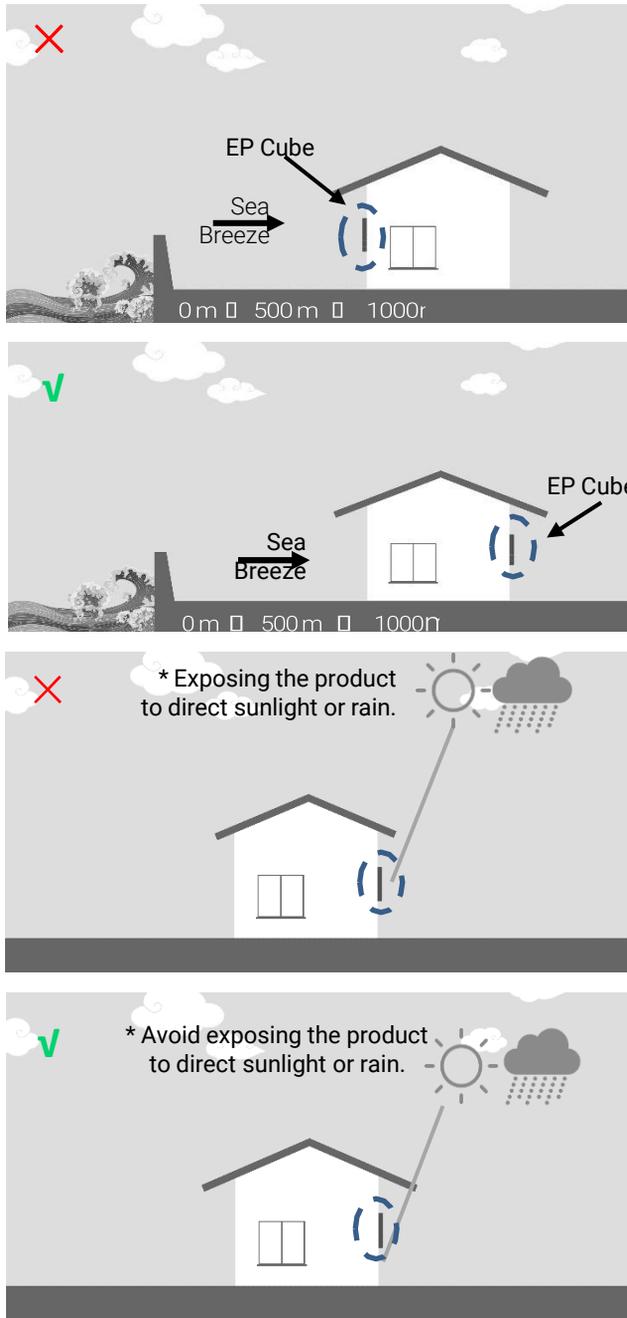
For EP Cube indoor installation, please refer to applicable local codes and UL 9540 46.6 where EP Cube or any ESS system is not intended for installation in habitable spaces and living spaces in dwelling units.

Note that the EP Cube Hybrid assembly is heavy! Installers should refer to the specifications for details about Hybrid weight and check structural integrity and conduct structural load calculations of wall and/or framing along with.

For installations near or along the oceanic coastline, such as Puerto Rico, California, and Florida, 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 required to install EP Cube in places where it is not directly exposed to sea breeze, sunlight or rain. i.e. sea breeze blocked by a building or home. (Ref. to figure below) If the conditions cannot be met, please install the EP CUBE indoors.

NOTE: Improperly installation is not covered in scope of limited warranties. 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 excessiverain, 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 stepping on equipment as this can cause damage to the paint or create bent edges.

NOTE: The installer needs to provide the wall mounting anchor bolts or woods screws for Hybrid Bracket C and all brackets. Ensure complete compliance with the regional building codes when choosing suitable anchor bolts or wood screws. EP Cube doesn't provide these fasteners. Refer to ourtemplate Structural Stamp Drawing & Calculations on different wall surface types of reference.

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



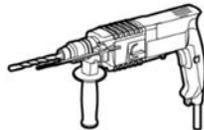
Tape Measure



Level Tool



Metric Socket Wrenches



Hammer Drill



Flat head Screwdriver

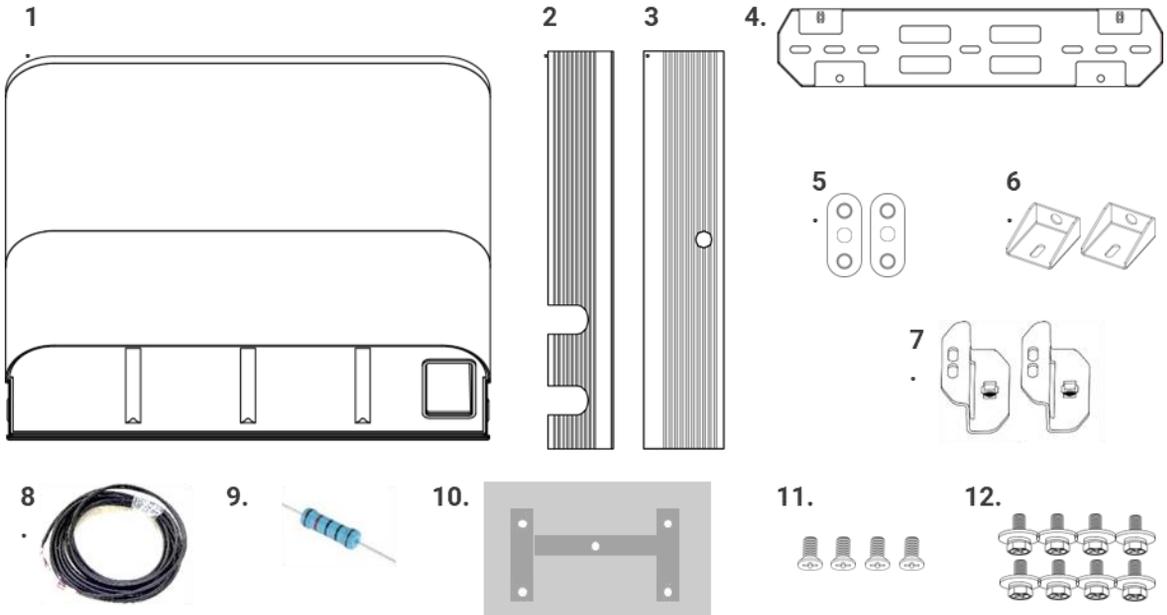


Phillips head Screwdriver

Examine each placed order to ensure that the following quantities are correct per placed order, and

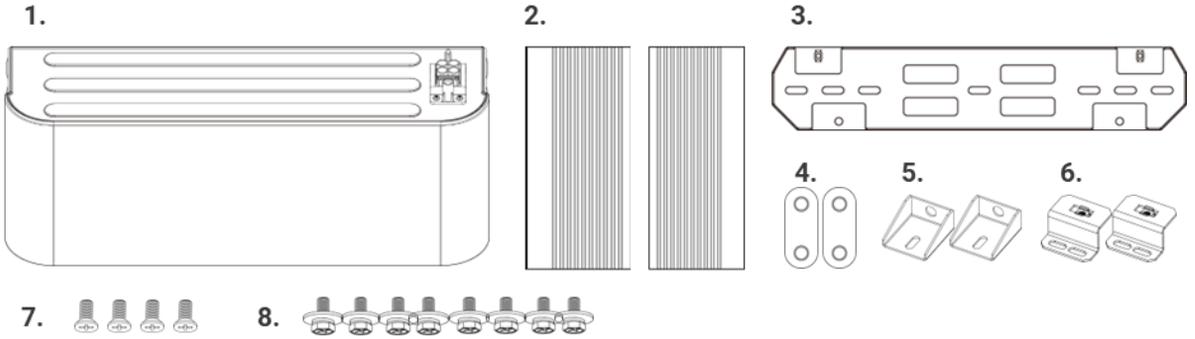
that no parts were broken or damaged during transportation. You may check off the unpacking inspection guide provided below.

Hybrid Inverter Box



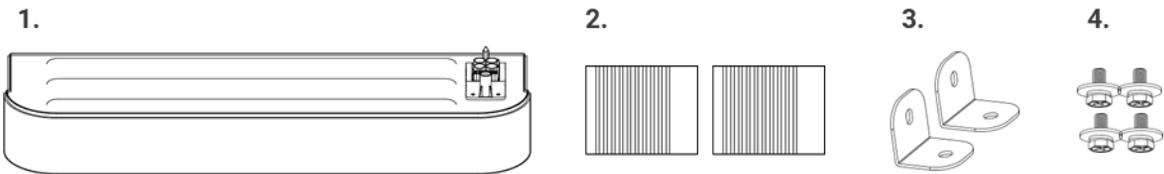
1.	Hybrid Inverter	7.	Inverter Bracket B2_2pcs
2.	Inverter Side Cover A_1pcs	8.	Communication Cable_1pcs
3.	Inverter Side Cover B_1pcs	9.	Resistor_1pcs
4.	Hybrid Bracket C_1pcs	10.	Hybrid Drill template_1pcs
5.	Inverter Side Bracket D_2pcs	11.	Inverter Side Bracket D_M5_4pcs
6.	Inverter Bracket B1_2pcs	12.	Inverter Bracket B_M6_8pcs

Battery Modules Box



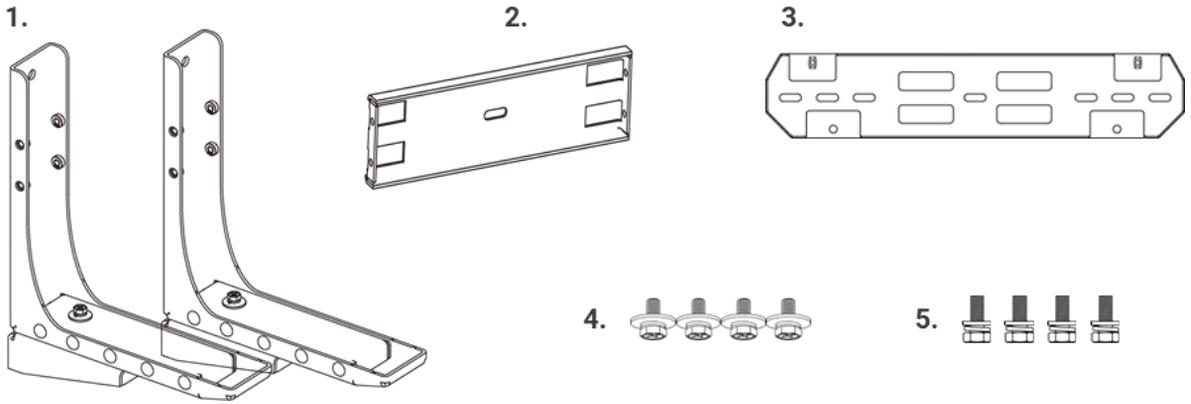
1.	Battery module	5.	Battery Bracket B1_2pcs
2.	Battery Side Cover B_2pcs	6.	Battery Bracket B2_2pcs
3.	Hybrid Bracket C_1pcs	7.	Battery Side Bracket F_M5_4pcs
4.	Bracket Side Bracket F_2pcs	8.	Battery Bracket B_M6_8pcs

Base Modules Box



1.	Base	3.	Hybrid Base Bracket G_2pcs
2.	Hybrid Base Side Cover C_2pcs	4.	Hybrid Base Bracket G_M6_4pcs

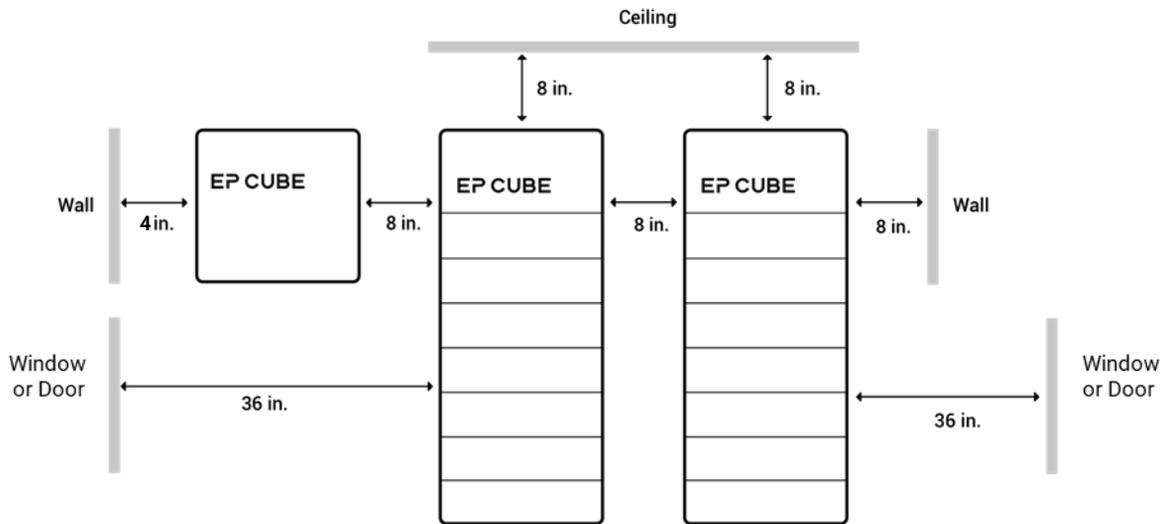
Optional Brackets Box



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

B. Installation Space

- The heat sink and cooling fans located on the back of the hybrid inverter protrudes an extra 3.4 inches from the back of the hybrid inverter. The mounting brackets are designed to already provide 4- 4 ¼ inch spacing between the mounted wall and the back of battery giving heat sink ½ to ¾ inch space between the wall. A diagram and distance between the base and wall during installation is shown in Step 4 on page 24.
- The EP Cube is UL9540A certified and is exempt from the 3 feet spacing minimum and past UL9540a's battery thermal runaway prevention certification to allow installation spacing of 8 inches (203 mm) between each EP Cube Hybrid Stack 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) in compliance with NFPA 855 for Residential Energy Storage Systems.



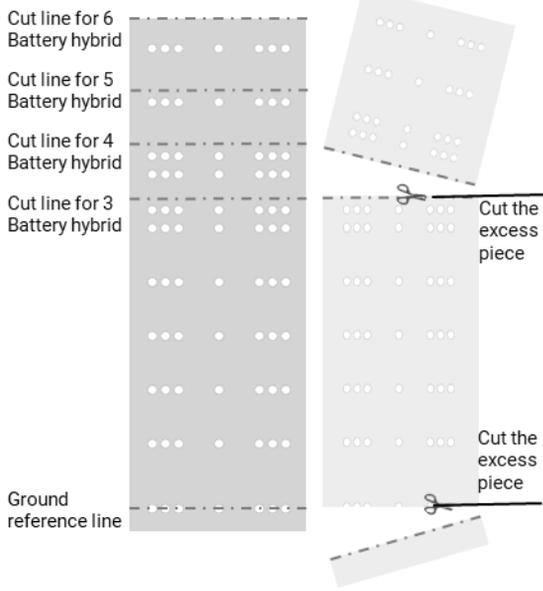
* Minimum clearance required from all sides.

C. Installation Process

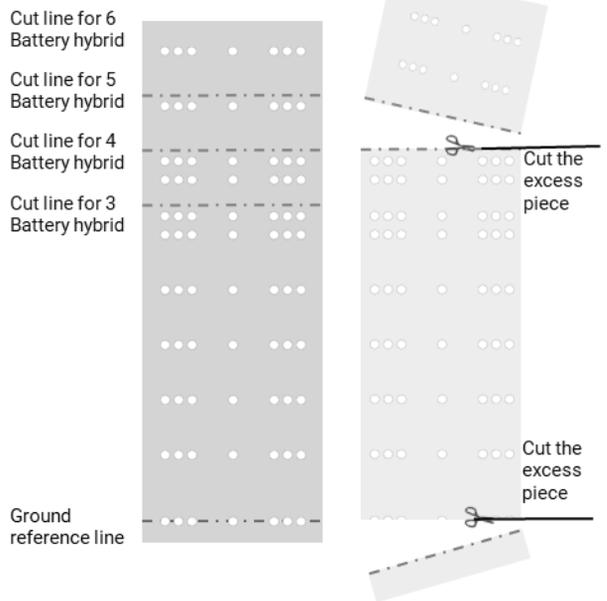
Step-1

Floor mounted - cut the extra piece of drill template

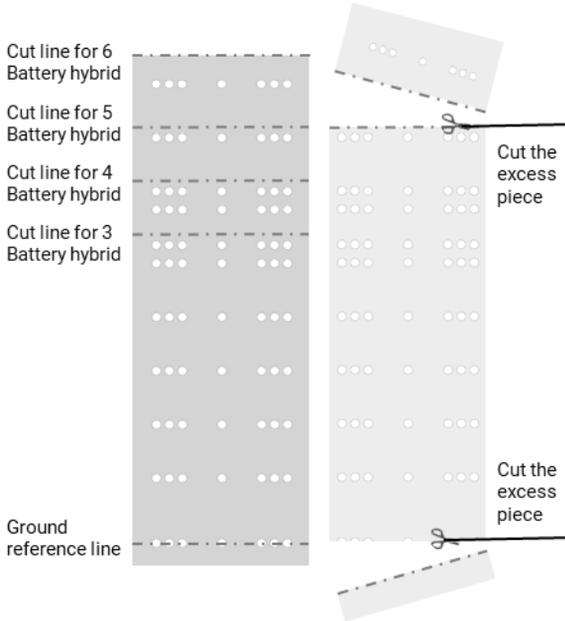
a. For floor-mounted installation of the standard EP Cube system, cut the extra piece of the drill template as shown in the figure below.



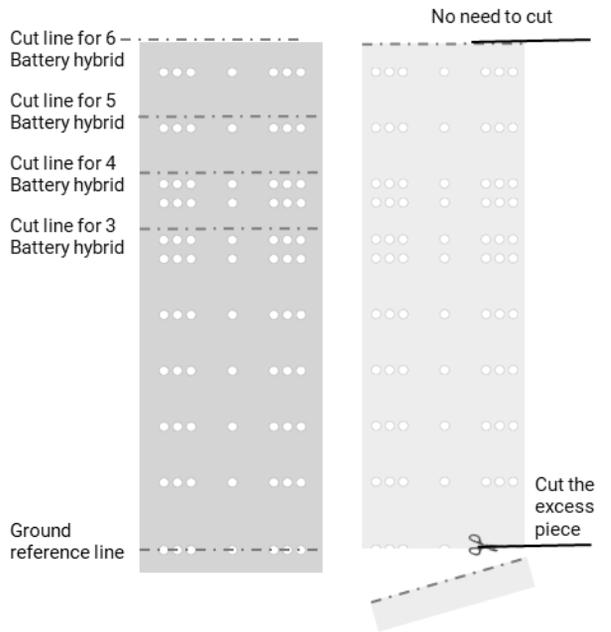
Cutting and placing the drill template for 3 Battery modules system



Cutting and placing the drill template for 4 Battery modules system



Cutting and placing the drill template for 5 Battery modules system



Cutting and placing the drill template for 6 Battery modules system

Step-2

Floor mounted - Position the mounting holes

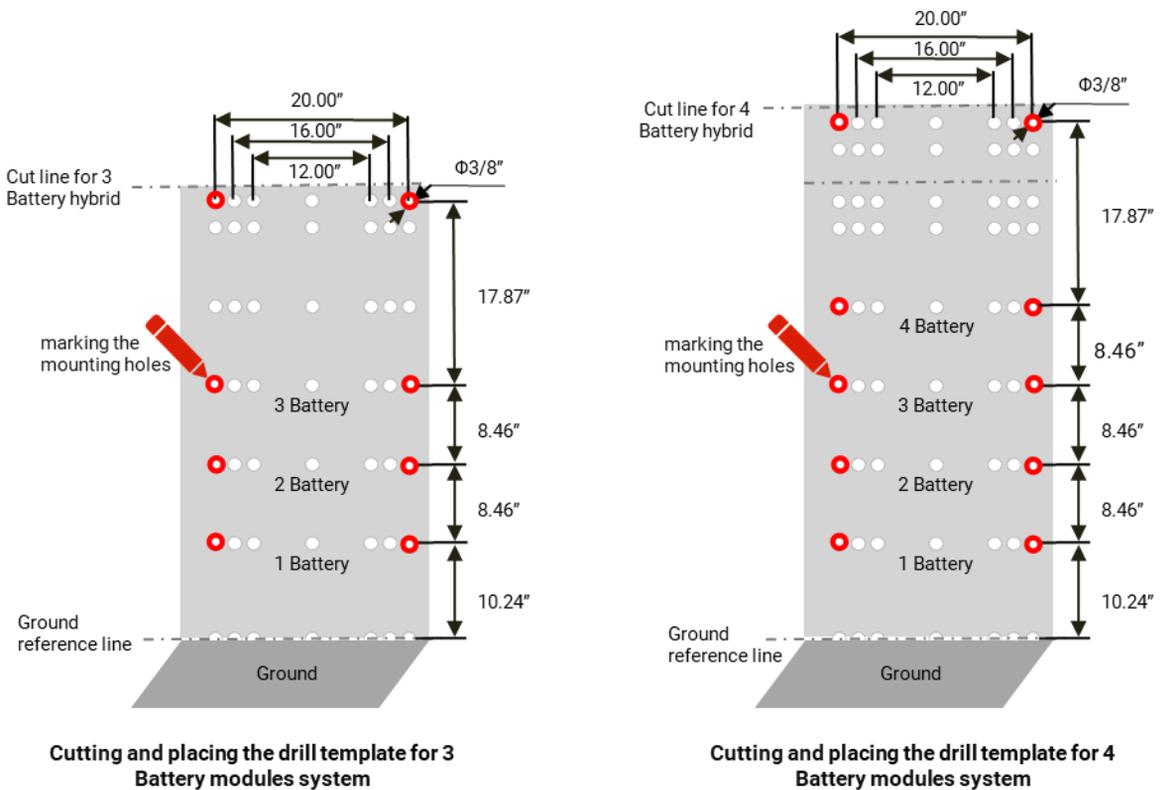
- Place the template on the wall with the lower edge aligned with the floor surface.
- Remove the adhesive tape from the edges of the template and affix it to the wall.
- Use a level tool to ensure that the drill template is straight.
- Use a pencil to mark the wall at the indicated mounting hole locations on the drill template.

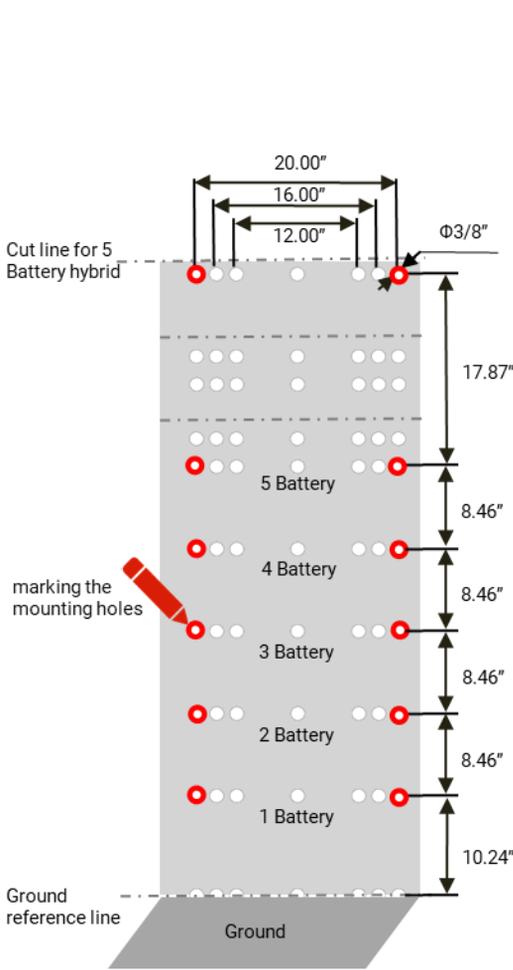
⚠ CAUTION: Please ensure a safe distance is maintained between the Hybrid and other objects.

NOTE: It is recommended to maintain a minimum clearance of 12 inches from the Hybrid. Ensure that all sides have sufficient clearance to ensure safe operation and installation, in compliance with the National Electrical Code (NEC) 110.26 requirements.

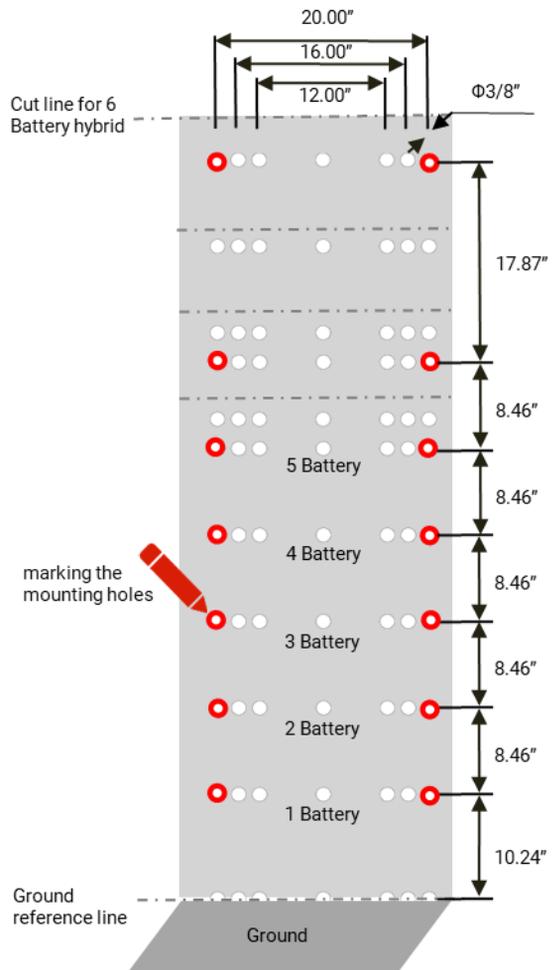
Each bracket C requires the installation of 2 anchor bolts on the wall. The drill template has 3 pairs of holes placed at different distances. The distance between these 2 anchor bolts should be either 12 or 16 or 20 inches.

- Choose a desired distance and mark the positions on the wall for drilling holes. In the figure below, the holes are marked at a distance of 20 inches.





Cutting and placing the drill template for 5 Battery modules system

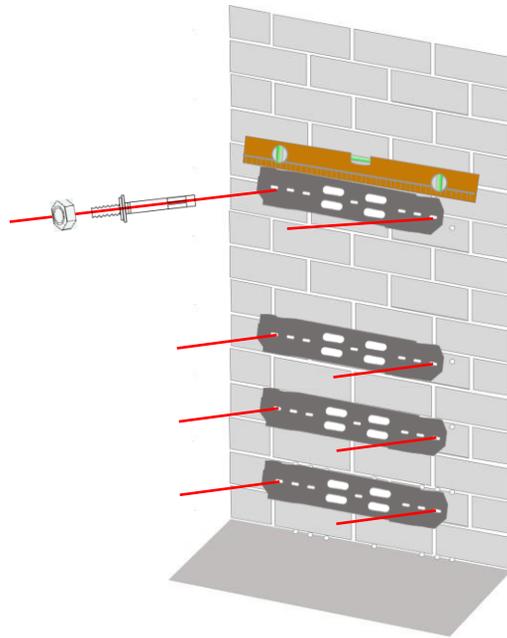


Cutting and placing the drill template for 6 Battery modules system

Step-3

Install Bracket C on the wall (3 Battery modules system shown as an example below)

- Remove the drill template.
- Position Hybrid Bracket C on the wall, ensuring that the holes align correctly.
- elect anchor bolts or wood screws with washers, with a minimum length of 1-1/2 inches, to install Bracket C on the wall.
- Use a level tool to ensure Bracket C is level. Tighten the anchor nut to the specified values. (See Appendix-Torque Values for reference)



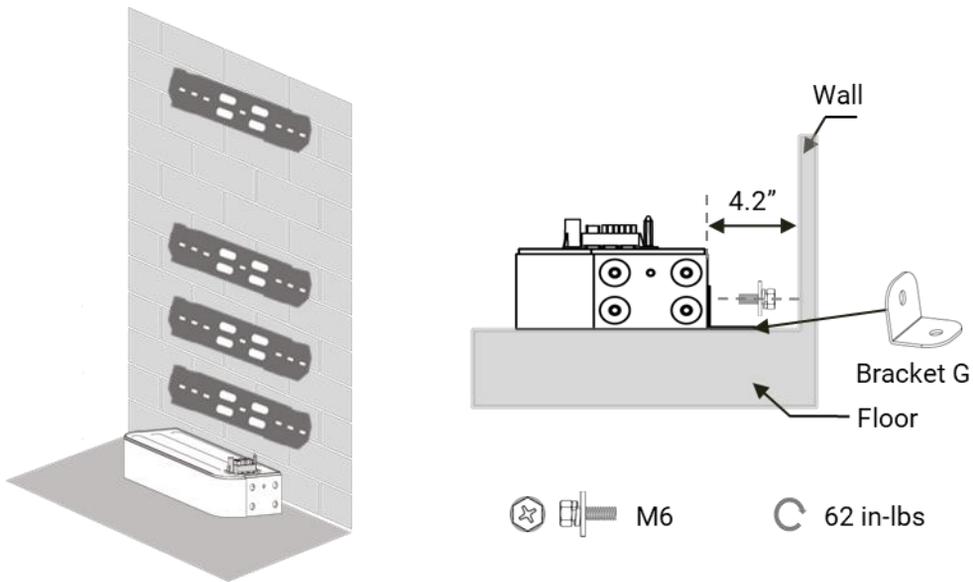
NOTE: Select a suitable M8 (or similar) bolt/screw to mount Bracket C based on the type of wall.

For concrete walls, use a minimum length of M8*3-inch anchor bolts. For wooden walls, use woodscrews with a minimum thread length of 1-1/2 inches.

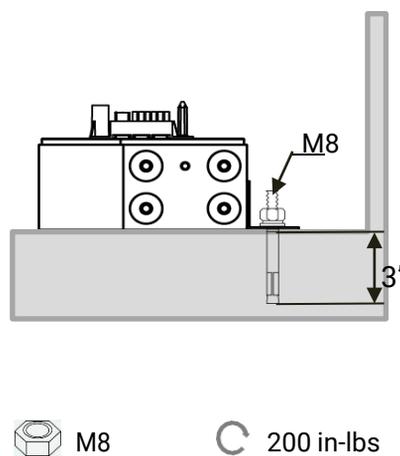
Step-4

Floor mounted - Install the Base with Mounting Bracket G

- a. Attach the base and Bracket G using bolts (M6*0.63").
- b. Place the Base on the floor with a minimum distance of 4.2" between the wall and base. Mark the hole positions required for the Bracket G.



- c. Use the drill set to drill 3/8" diameter holes, marked on the floor for Bracket G, with a depth of 3". After drilling, gently insert the sleeve anchor hex bolts (M8*3") into the holes using a hammer.
- Use a socket wrench to remove the nuts and washers from the anchor bolts. Next, position the Bracket G on the floor, aligning it with the hex sleeve anchor bolts.
- Replace the washers and nuts, and manually tighten them.
- d. Use a level tool to check that the Base is level. Once confirmed, tighten the nuts on the anchors to the specified torque values. (See Appendix - Torque Values for reference).



NOTE: If you choose floor-mounted installation, please skip the following section on instructions for wall-mounted installation and proceed to step 5.

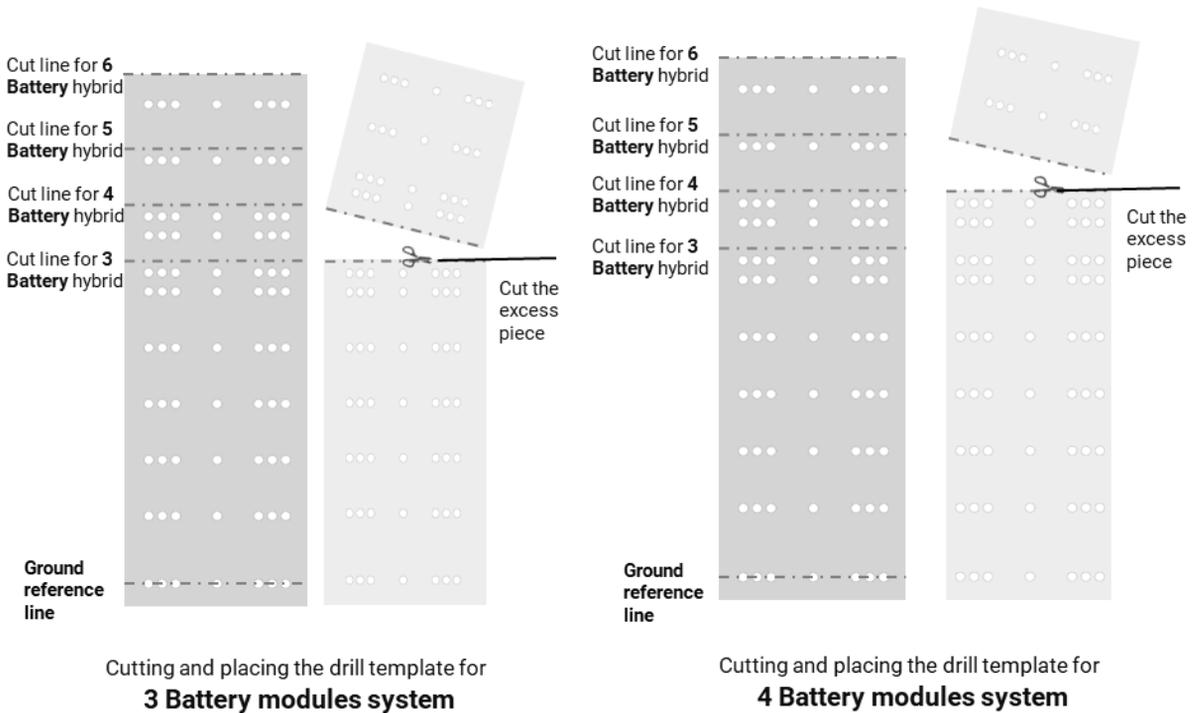
Step-1

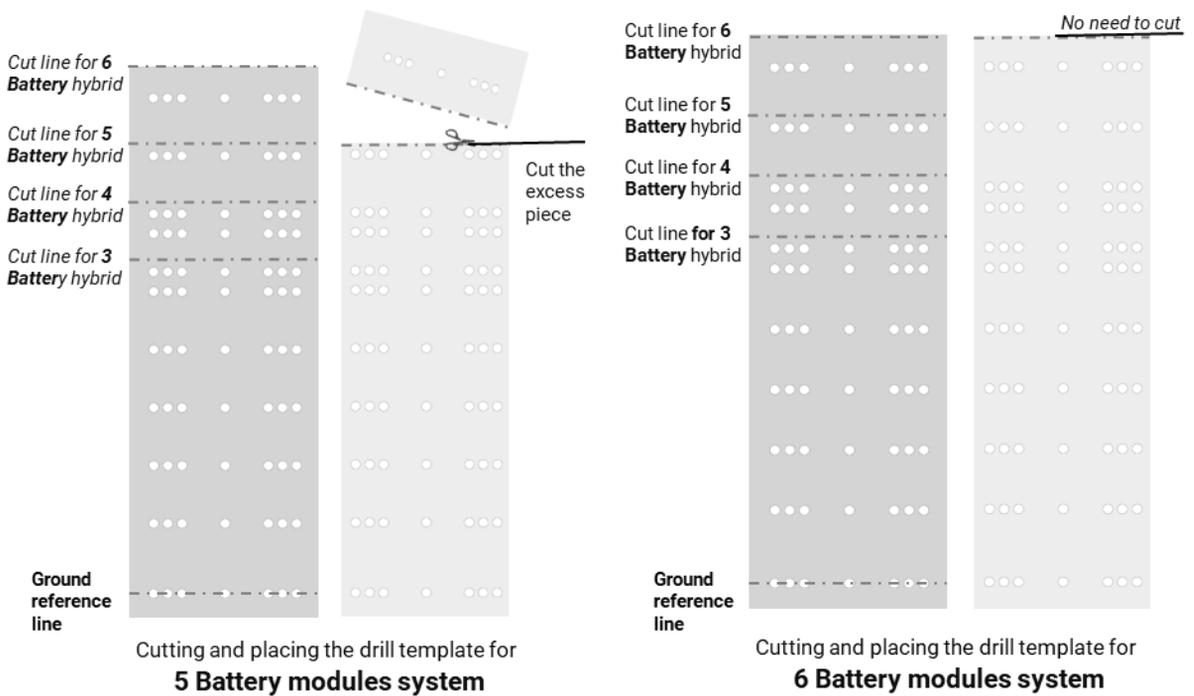
Wall mounted - cut the extra piece of drill template

a. For wall-mounted installation of the standard EP Cube system, cut the extra piece of the drill template as shown in the figure below.

⚠ CAUTION: Please ensure a safe distance is maintained between the Hybrid and other objects.

NOTE: It is recommended to maintain a minimum clearance of 12 inches from the Hybrid. Ensure that all sides have sufficient clearance to ensure safe operation and installation, in compliance with the National Electrical Code (NEC) 110.26 requirements.





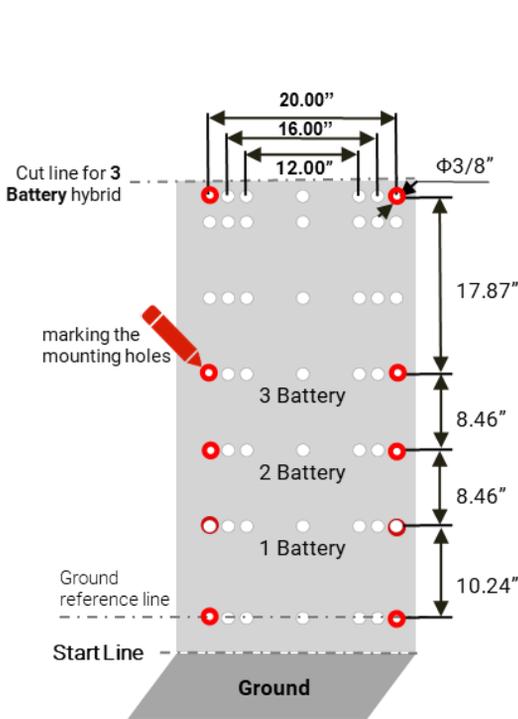
Step-2

Wall mounted - Position the mounting holes

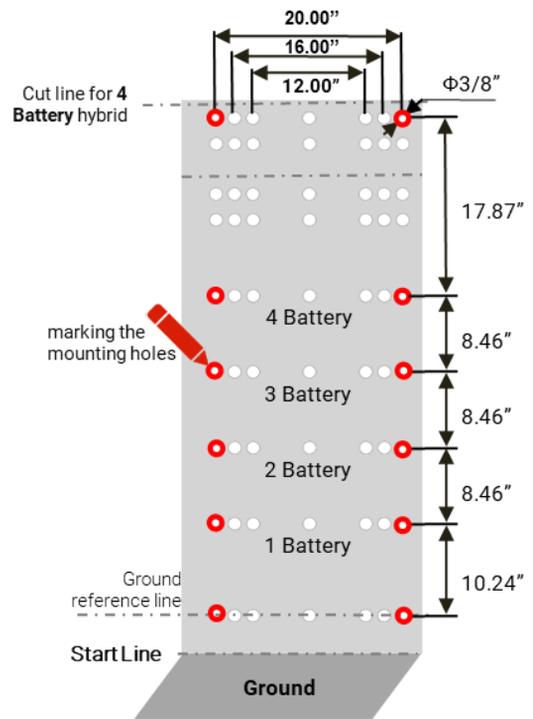
- a. Use a tape measure, level tool, and pencil to mark a "start line" on the wall.
- b. Align the lower edge of the template with the marked start line and place it on the wall.
- c. Remove the adhesive tape from the edges of the template and affix it to the wall.
- d. Ensure that the drill template is straight by using a level tool.
- e. Use a pencil to mark the mounting holes on the wall as indicated by the drill template.

NOTE: Each bracket C requires the installation of 2 anchor bolts on the wall. The drill template has 3 pairs of holes placed at different distances. The distance between these 2 anchor bolts should be either 12 or 16 or 20 inches.

- f. Choose your desired distance and mark the positions on the wall for drilling holes. In the figure below, the holes are marked at a distance of 20 inches.



Cutting and placing the drill template for
3 Battery modules system



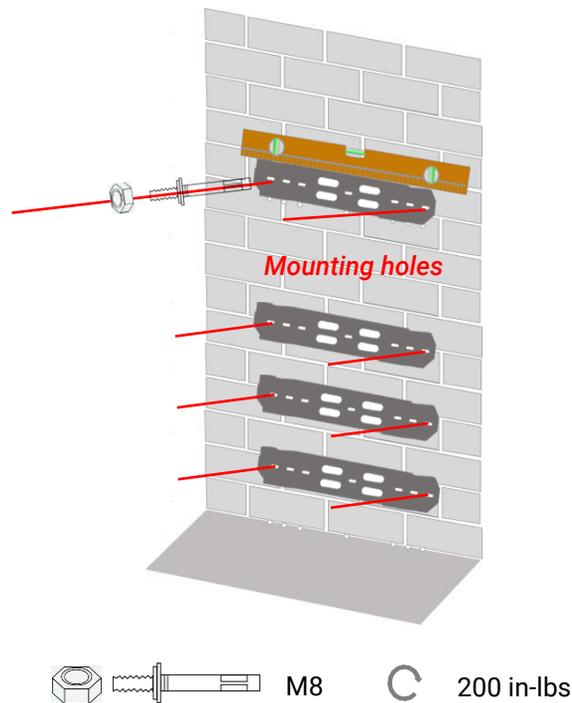
Cutting and placing the drill template for
4 Battery modules system

NOTE: The wall-mounted installation requires one additional bracket C compared to the floor-mounted installation.

Step-3

Install Bracket C on the wall (3 Battery modules system shown as an example below)

- a. Remove the drill template.
- b. Position the Hybrid Bracket C to ensure the correct alignment of the holes.
- c. Choose anchor bolts or wood screws with washers, with a minimum length of 1-1/2 inches, to securely install Bracket C on the wall.
- d. Utilize a level tool to ensure that Bracket C is level. Tighten the anchor nut to the specified values. (See Appendix-Torque Values for reference)



Install bracket C on wall

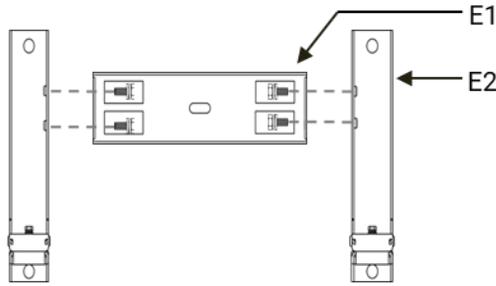
NOTE: Select a suitable M8 (or similar) bolt/screw to mount Bracket C based on the type of wall. For concrete walls, use a minimum length of M8*3-inch anchor bolts. For wooden walls, use wood screws with a minimum thread length of 1-1/2 inches.

NOTE: If you choose floor-mounted installation, please proceed to step 1 on page 15 for floor-mounted installation instructions.

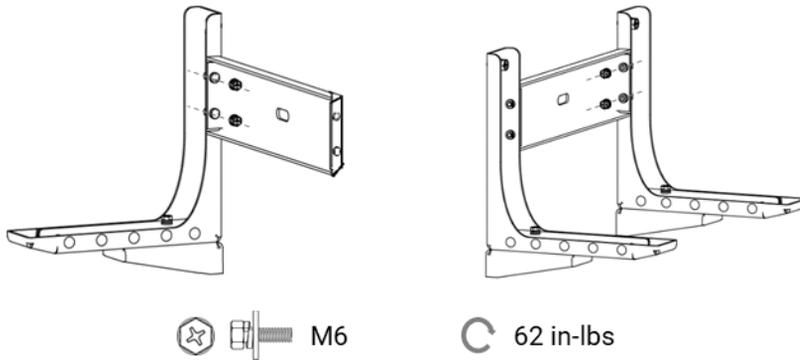
Step-4

Wall mounted - Install the Base on Bracket E

- Assemble the Wall-Mount Kit (Bracket E) by attaching Bracket E1 to Bracket E2 on both the left and right sides using bolts (M6*0.63"). Use a socket wrench to tighten the bolts securely.
- Position and align Bracket E and Bracket C to ensure the mounting holes on Bracket C align with the corresponding positions on Bracket E.



Assemble bracket E accordingly.



c. Attach Bracket E to Bracket C using bolts (M8*0.79"). Use a level tool to check for proper alignment, and then tighten the bolts securely with a socket wrench.

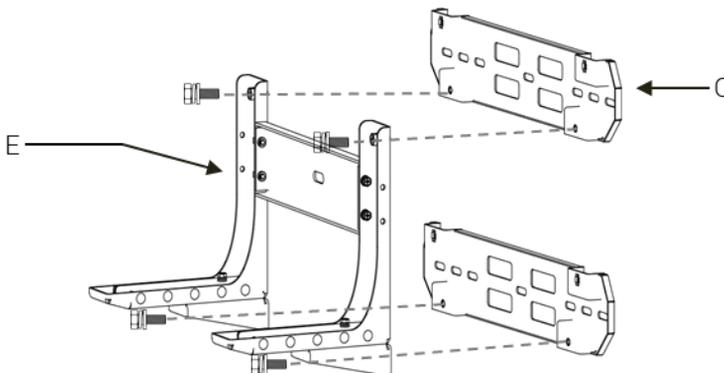


Fig. Attach bracket E and C



d. Attach the Base to Bracket E using bolts (M6*0.63") through the oval holes of Bracket G. Place the assembled Base on Bracket E and secure it by attaching Bracket G to Bracket E using bolts (M6*0.63") through the round holes. Verify that the Base is level using a level tool.

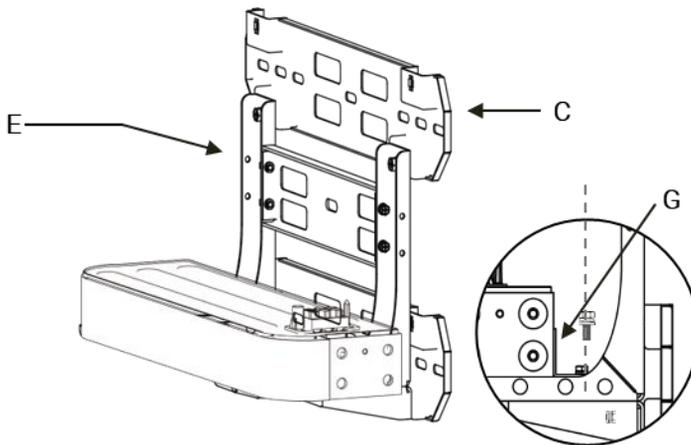


Fig. Attach Base on Bracket E



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 the battery mating connector sockets are properly aligned.

⚠ CAUTION: The battery module is heavy. Please use lifting tools or seek assistance from multiple people to safely lift it. Ensure that the top screw hole of Bracket C aligns with the mounting hole of Bracket B1.

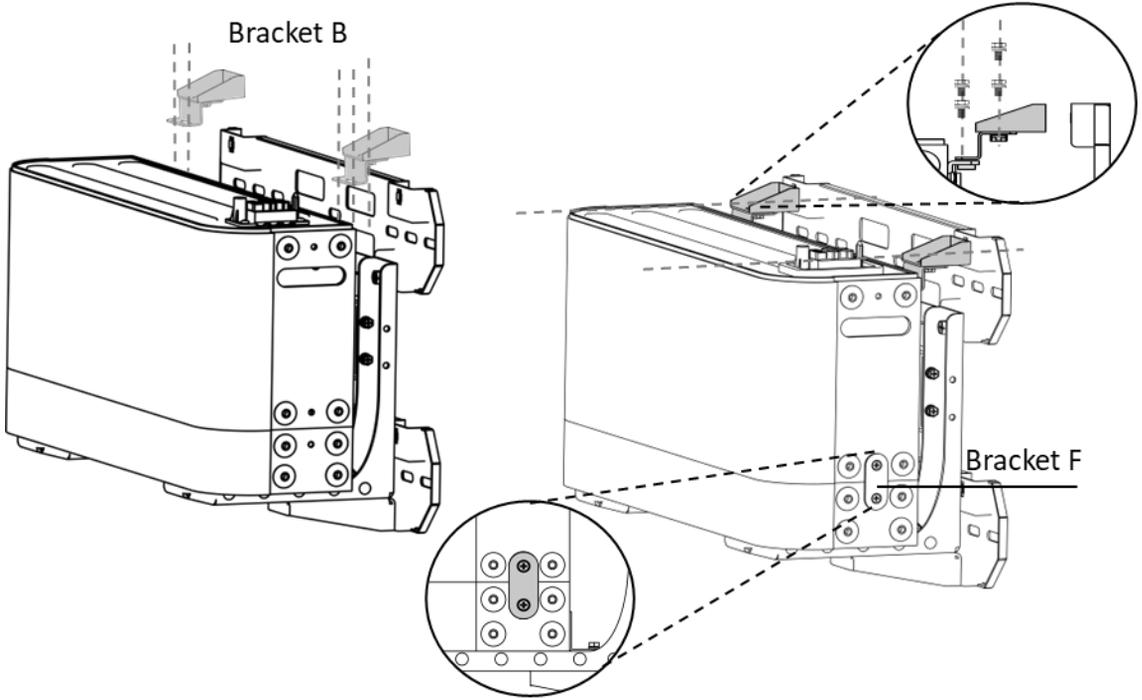
b. Install and tighten bracket F

- Attach Bracket F between each adjacent battery module and the base on both the left and right sides using bolts (M5*0.47").
- For instance, connect and tighten the bracket between the base and battery module as shown in the figure. Repeat this step for each pair of modules.

c. For Each Battery Module

- Attach Battery Bracket B2 and the protruding brace on the back of the battery module using bolts (M6*0.63") and tighten them manually.
- Attach Battery Bracket B1 to Hybrid Bracket C using bolts (M6*0.63") and tighten them manually.
- Connect Battery Brackets B1 and B2 using (M6*0.63") bolts.
- Use an electric screwdriver to tighten all bolts to the specified torque values. (See Appendix -Torque Values for reference).

d. Repeat steps "a, b, c" to stack the necessary number of battery modules on top of the base, following the specified configuration.

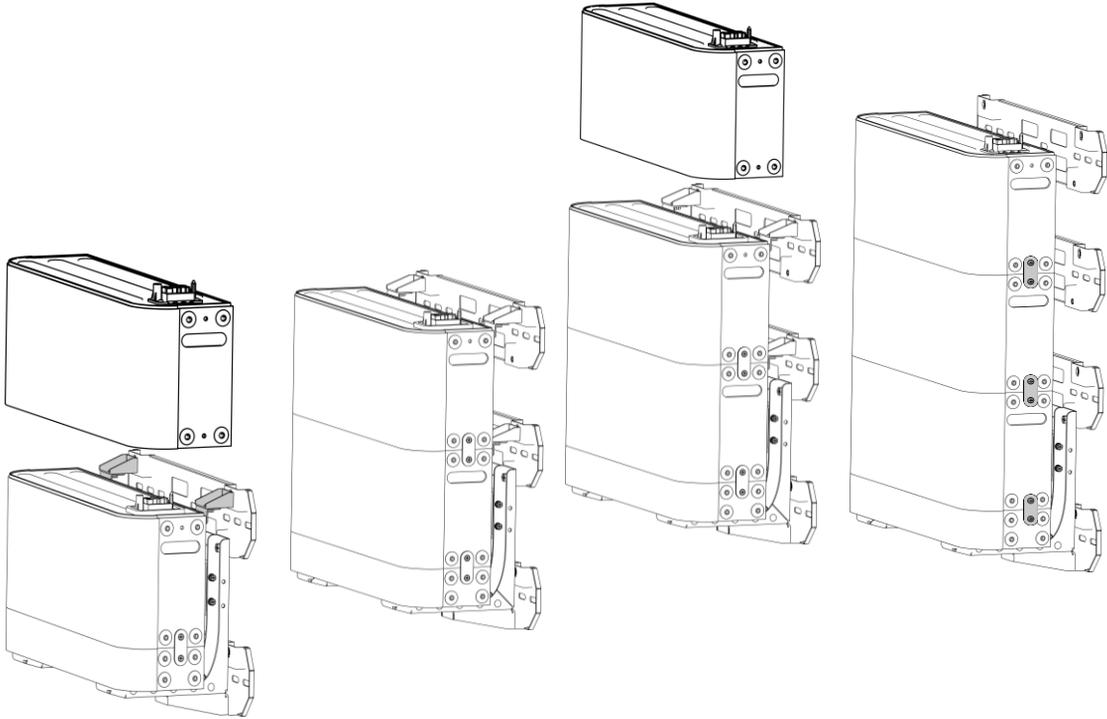


  M5  45 in-lbs

  M6  62 in-lbs

 **NOTE:** Please tighten Bracket F first, and then tighten Bracket B.

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

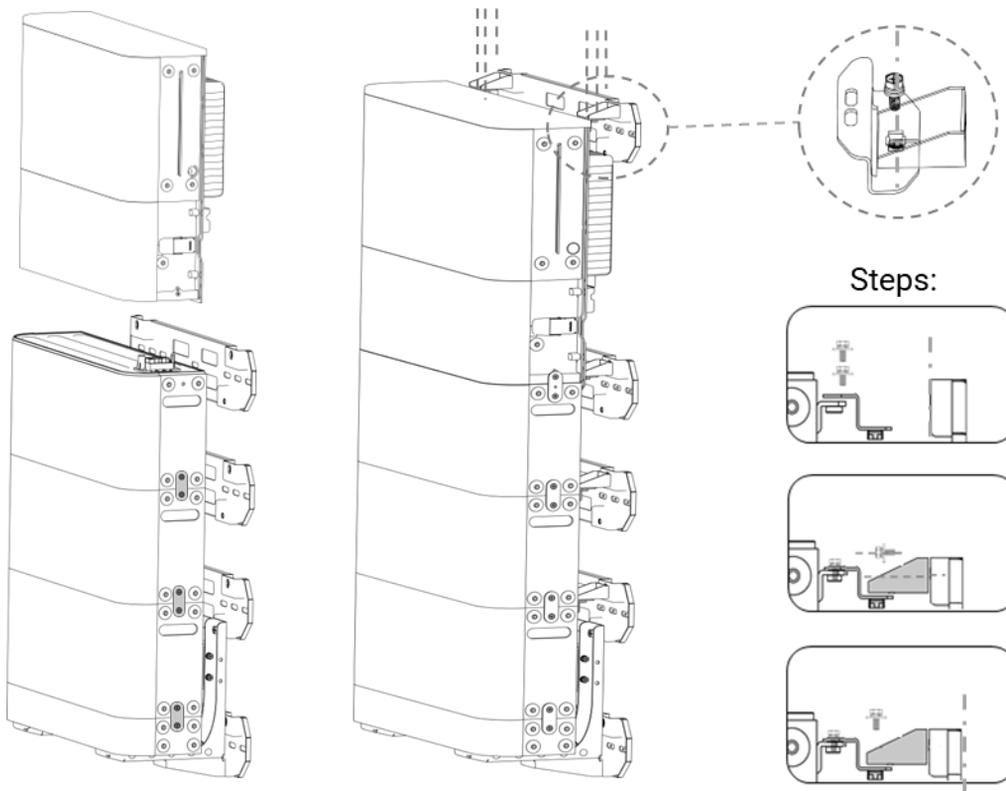


Step-6

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

a. Carefully place the Hybrid Inverter on top of the stacked battery modules and ensure that the sockets are properly connected.

⚠ CAUTION: The Hybrid Inverter module is heavy, and the lifting height may vary depending on the number of stacked battery modules. Please use lifting tools or seek assistance from multiple people to ensure personal safety while lifting. Ensure that the top screw hole of Bracket C aligns with the mounting hole of Inverter Bracket B1.



⊗  M6 C  62 in-lbs

b. Install and tighten bracket D

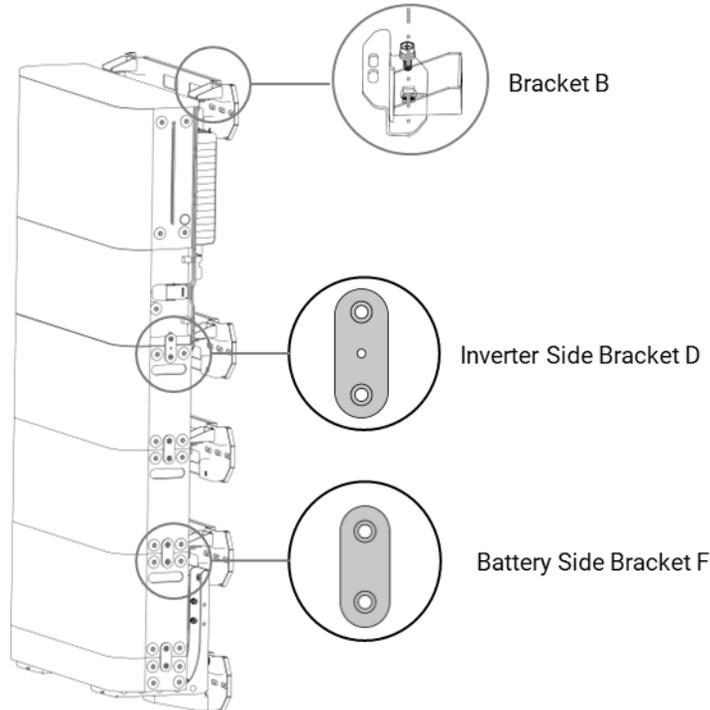
- Attach Bracket D between the Hybrid Inverter and the adjacent battery module on both the left and right sides using bolts (M5*0.47").

c. Install Bracket B

- Attach Inverter Bracket B2 and the protruding brace on the back of the Inverter module using bolts (M6*0.63") and manually tighten them.
- Attach Inverter Bracket B1 to Hybrid Bracket C using bolts (M6*0.63") and manually tighten them.
- Connect Inverter Brackets B1 and B2 using bolts (M6*0.63").
- Use an electric screwdriver to tighten all bolts to the specified torque values. (See Appendix -Torque Values for reference).
- Use a level tool to ensure that the Hybrid Inverter is properly leveled.

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

NOTE: Please tighten Bracket F first, and then tighten Bracket B.



CAUTION: Please check the gap between the base, battery, and inverter modules after completing the installation. The dimension of the gap should be less than 1mm.

4. Installation of Smart Gateway

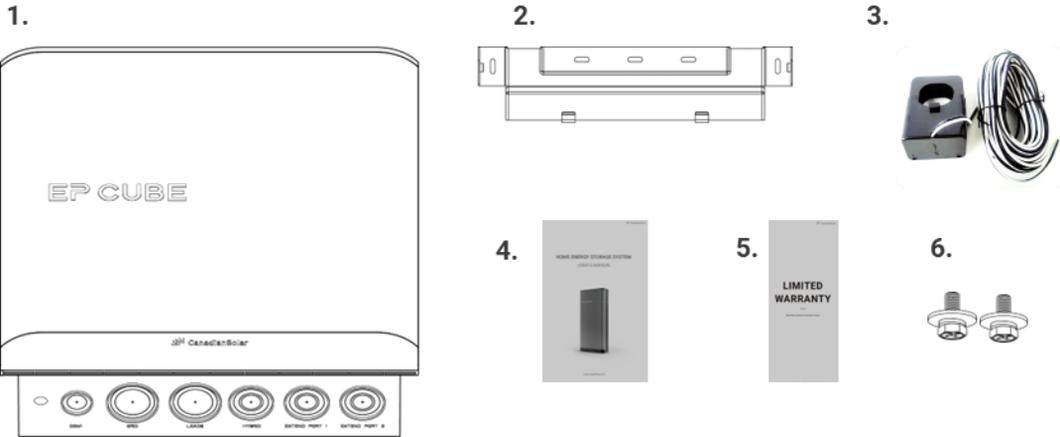
This section introduces the Smart Gateway installation process in sequence.

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.	Smart Gateway	4.	User Manual_1 pcs
2.	Smart Gateway Bracket A2_1pcs	5.	Warranty Letter_1 pcs
3.	CTs_2pcs	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.

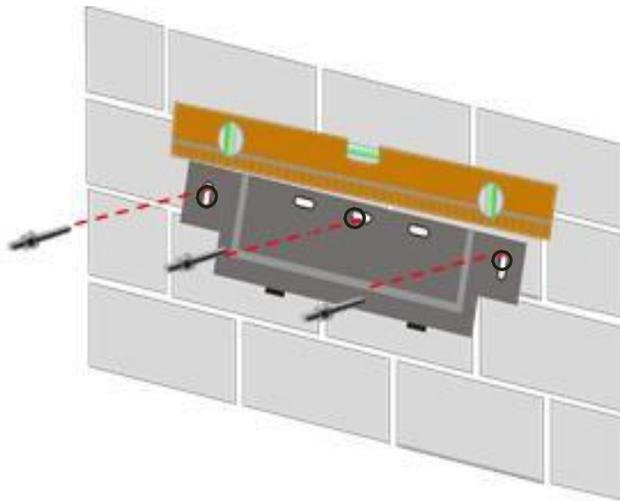
⚠ CAUTION: Please keep enough clearance between the smart Gateway and other objects. e.g. On all sides of the smart Gateway, the minimum clearance should satisfy ample space for safe operation and installation.

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.

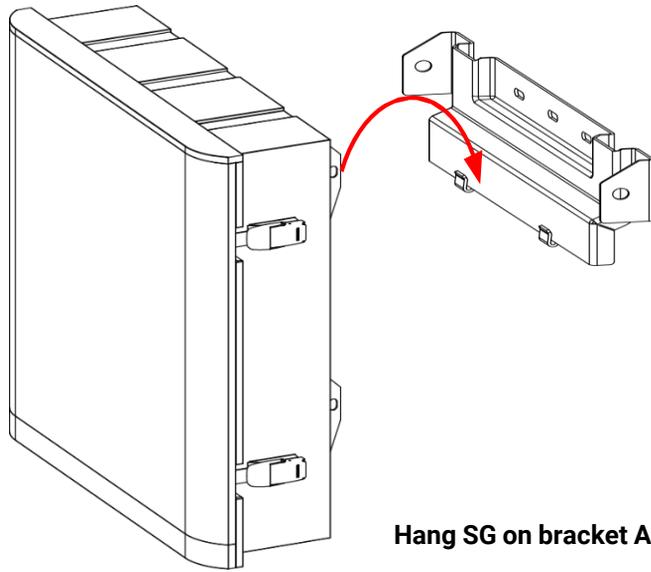
- a. Drill holes, insert the M8 anchor bolts and lightly stroke with hammer to properly insert if needed.
- b. Use the socket wrench to remove washers and nuts and install the bracket A2 on M8 bolts or 1-1/2" wood screws with washers on the Wall.
- c. Place the level tool on bracket A2 to measure its level and tighten the anchor nuts to specified values. (Ref. to Appendix-Torque Values).



Step-3

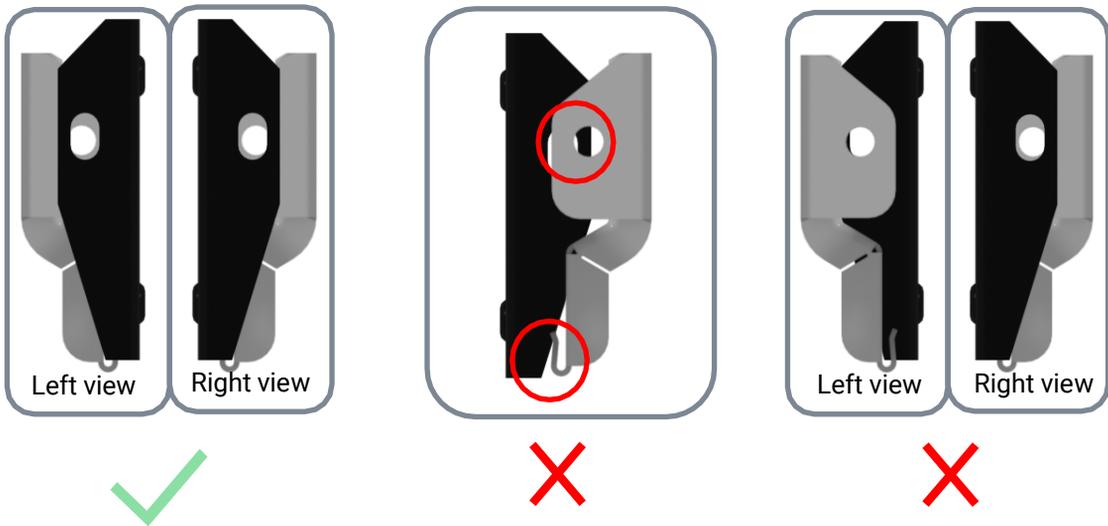
Final installation step for the Smart Gateway

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

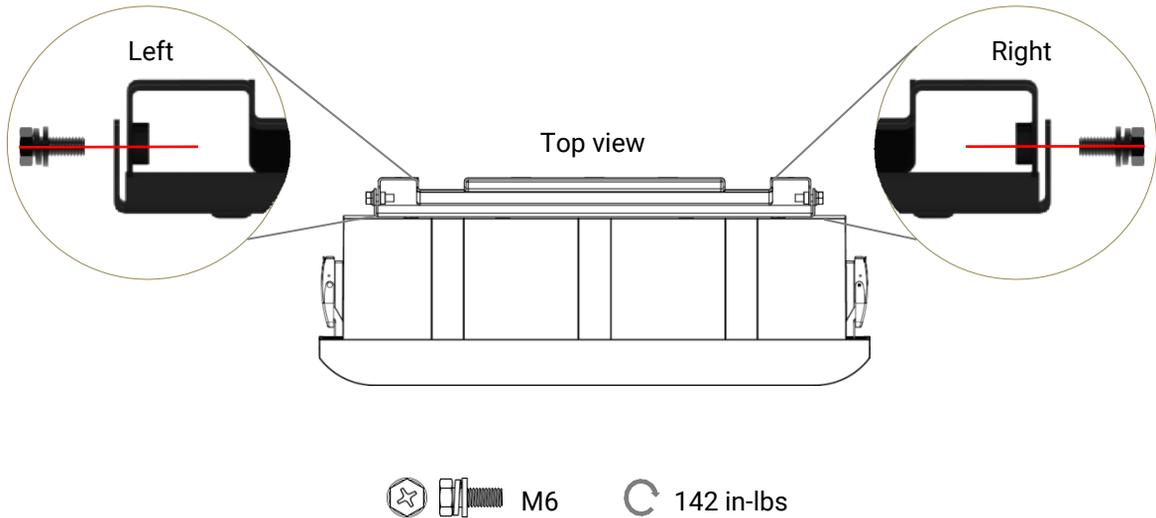


Step-4

a. Ensure that both brackets are interlocked correctly.



b. 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.

A. 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



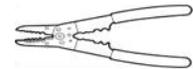
Drill Set (with 3/8" drill bit)



Tape Measure



Multimeter



Wire Stripper



Marking Pen



Hole Saws Set



Hammer



Socket Wrench



Ammeter



Phillips Head Screwdriver
 & Mini Screwdrivers



Metric Allen Wrenches



Wrenches

B. 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

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

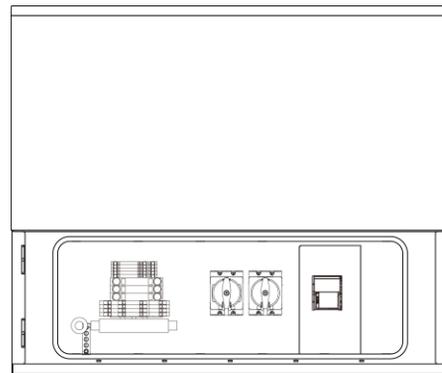
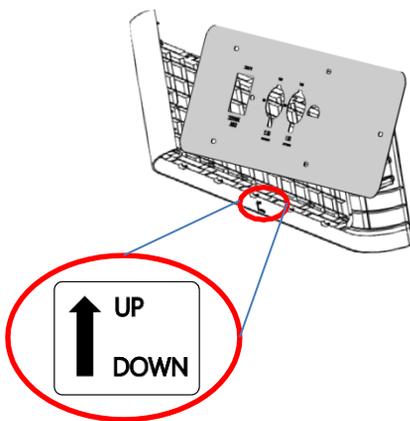
2. Wiring From the Solar Panels to the Hybrid

Step-1

Open the Hybrid Inverter for Wiring

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 or crescent wrench with hex head to remove the two port caps on the left side of the Hybrid for the conduit.



There is a label to show the direction.

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 Inverter. (Hybrid InverterPort/Bushing is 3/4" NPT Female threaded).

⚠ NOTE: Each set of PV cables, PV+ and PV-, must connect to the correct terminal of the Hybrid Inverter. This Port/Bushing can be removed carefully with channel locks if 1" conduit is needed for 4 PV string systems. Be sure to fully seal new 1" bushing and leave white interference ring inside hybridinverter with wire passing through it.

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

- Use a mini 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.

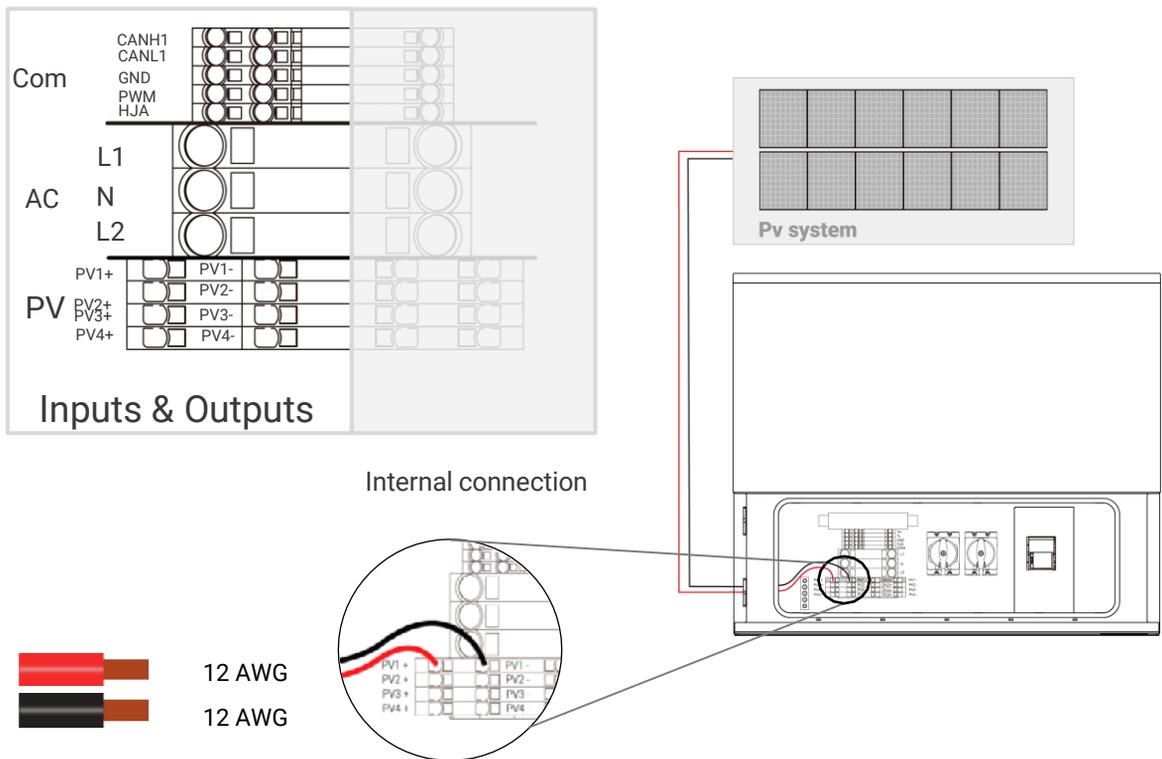


Figure 1. Hybrid to PV Array DC Input Wiring

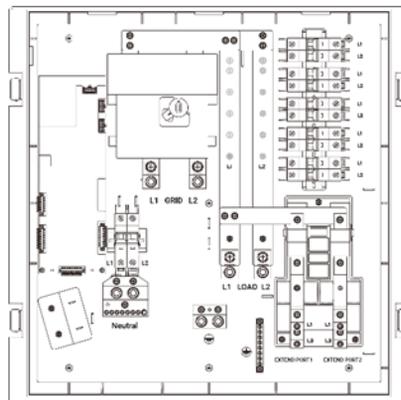
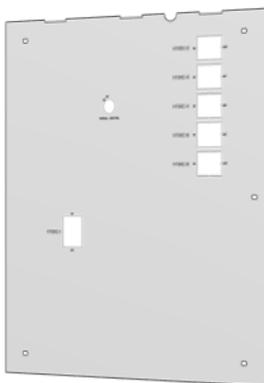
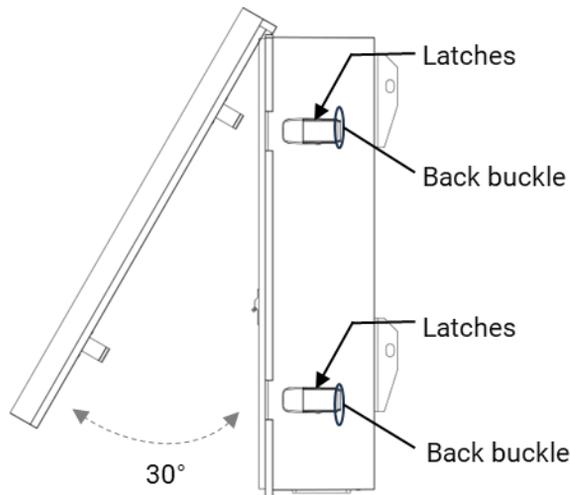
3. Wiring From the Hybrid Inverter to Smart Gateway

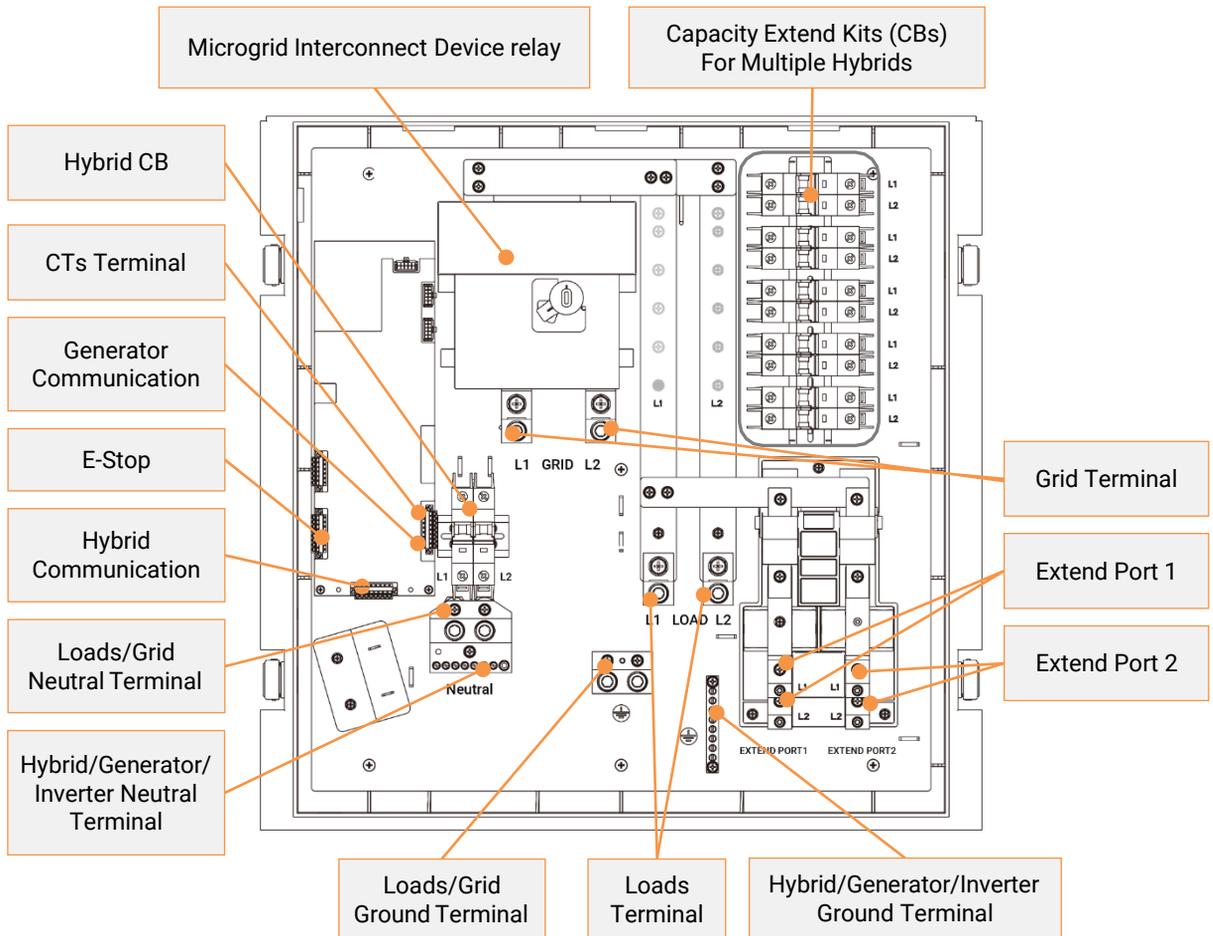
Step-1

Open the Smart Gateway for wiring

Remove the Smart Gateway panel covers:

- Open the four smart Gateway panel on the side latches and remove the cover by pressing backbuckle towards the front.
- Use the electric insulated screw driver to remove screws and remove the smart Gateway dead frontcover.





Step-2

Connect Hybrid Wires to Smart Gateway

- a. Prepare the conduit for the hybrid power cables to the Smart Gateway hybrid inverter 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 and NEC Code for proper wire insulation color for 8 AWG or 6 AWG cable for L1, N, L2, and ground between hybrid and the smart Gateway.
 - Strip the wire ends using a wire stripper, use a electrically insulated 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 Inverter 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.

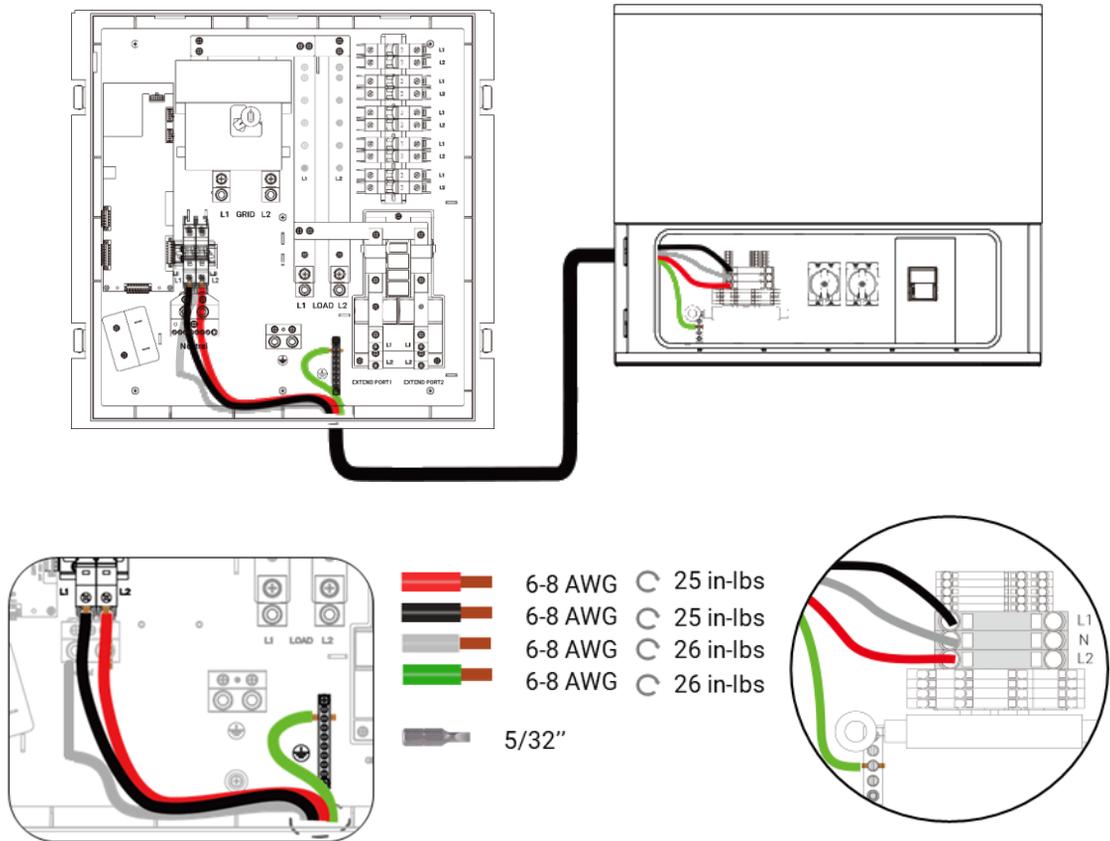


Figure 2. Smart Gateway to Hybrid AC Wiring

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

- Use a mini 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 SmartGateway.

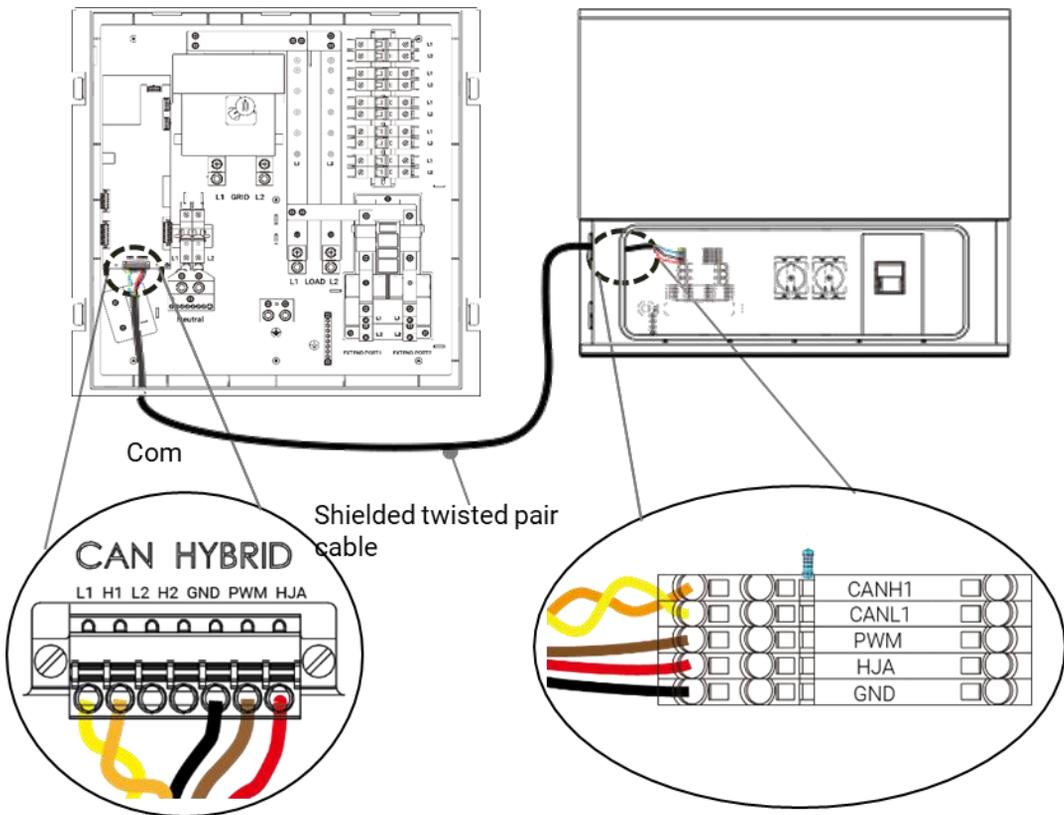


Figure 3. Smart Gateway to Hybrid Communication Wiring

d. Drill out 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.(Hybrid InverterPort/Bushing is 3/4" NPT Female threaded).

- Affix the conduit onto the wall with the proper distance between clamps.

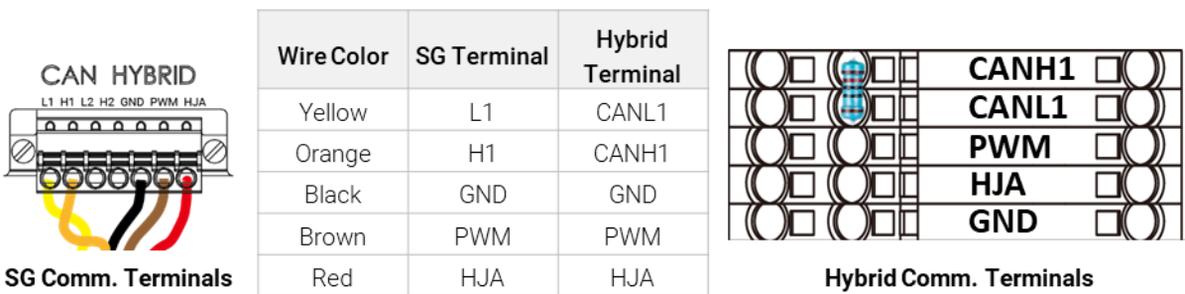
NOTE: Communication cable between hybrid and smart Gateway is included in the package. Standard cable length is 10m. If Hybrid and Smart Gateway can not be installed with 33 feet (10 m), Additional length may compromise consistent communication. We recommend using 3 twisted pair (6 wire) 300V rated 18 AWG communication wire that is shielded. Refer to Appendix for specifications.. EPrecommends 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 the Hybrid connection 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 if it hasn't already been pre-installed. This resistor is included in package inside the Hybrid Inverter packaged box.

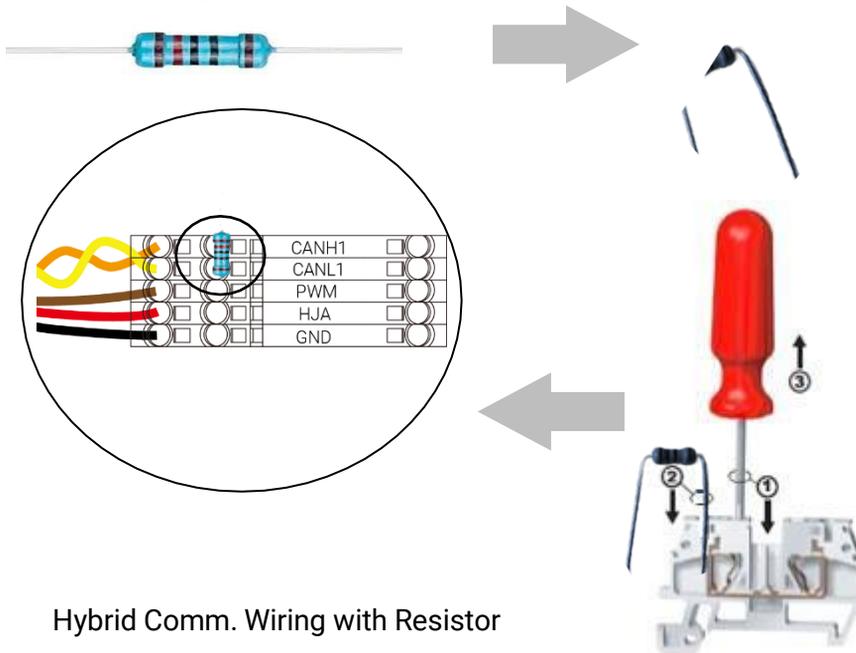


Case A: Hybrid Unit Without Pre-Installed Communication Resistor

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

the gap distance between the two terminals.



Step b. Push the spring terminals with the help of a mini 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 Hybrid #2.

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.

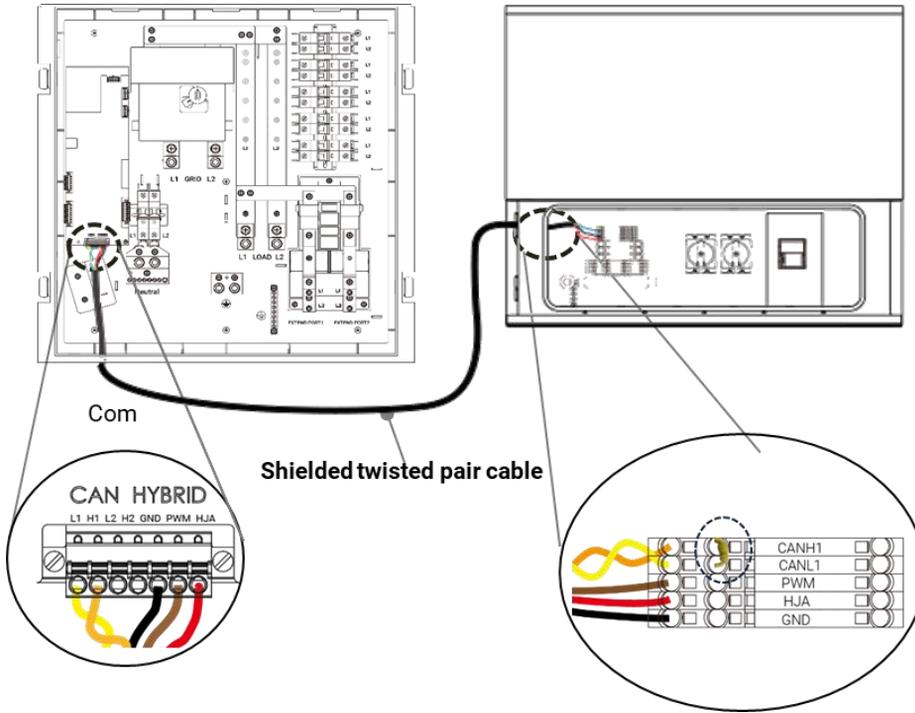
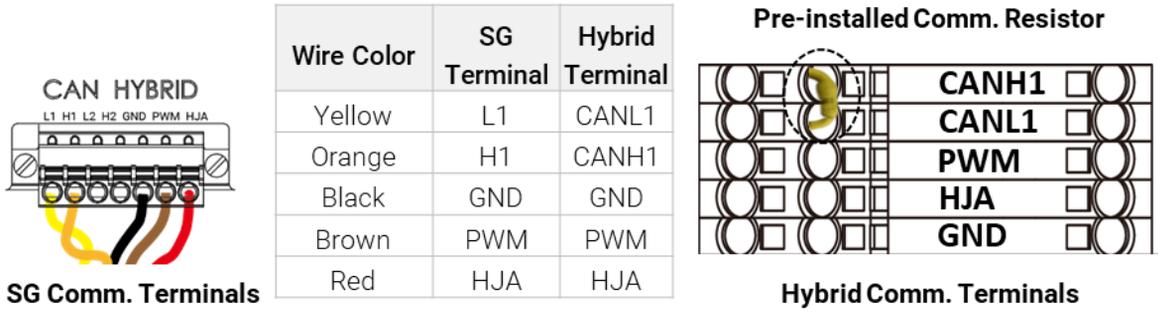


Figure 3. Smart Gateway to Hybrid Communication Wiring with Pre-installed Resistor

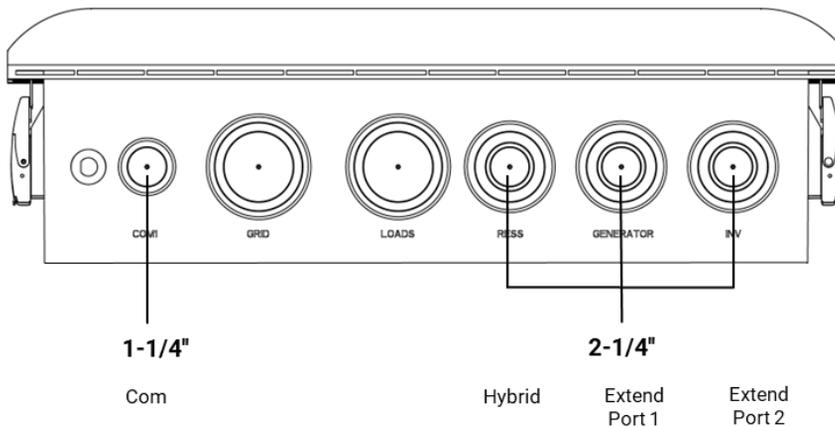


Figure 4. RESS and COM Knockouts

4. 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 that are exposed to room or outside need to be wired through conduits or gutters, The conduits or gutters must be affixed to the wall with clamps at the appropriate distance. Cables inside walls are not required to be in conduit but should be jacketed. However Per NEC code section 690, DC PV wiring needs to be metallic conduit or enclosure for residential interior and exterior exposure applications.

A. For Whole Home Back up Configuration

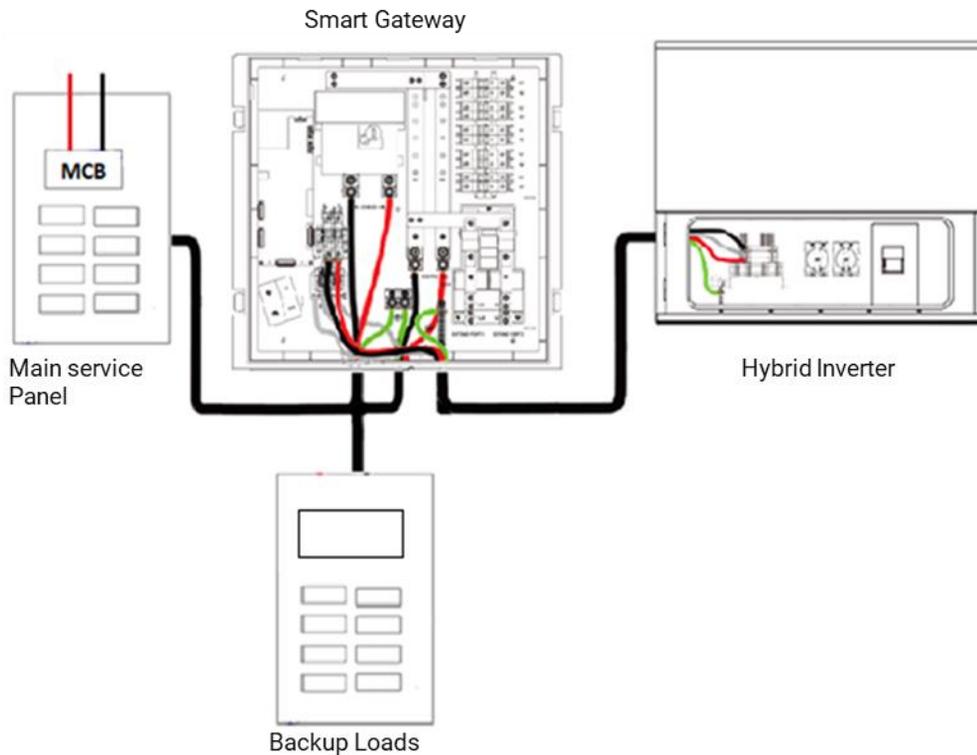


Figure 5. Smart Gateway Grid Wiring

Step-1

Wiring Connection of Grid

a. Prepare the conduit for the Utility Grid wiring connection between the Grid psite's Main ServicePanel or Subpanel and Smart Gateway, and install a cable gland to install the conduit to the smartGateway:

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

NOTE:

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

b. Route the Grid wiring through the conduit and connect it to the Smart Gateway Grid terminal. (Ref.to Figure 5.)

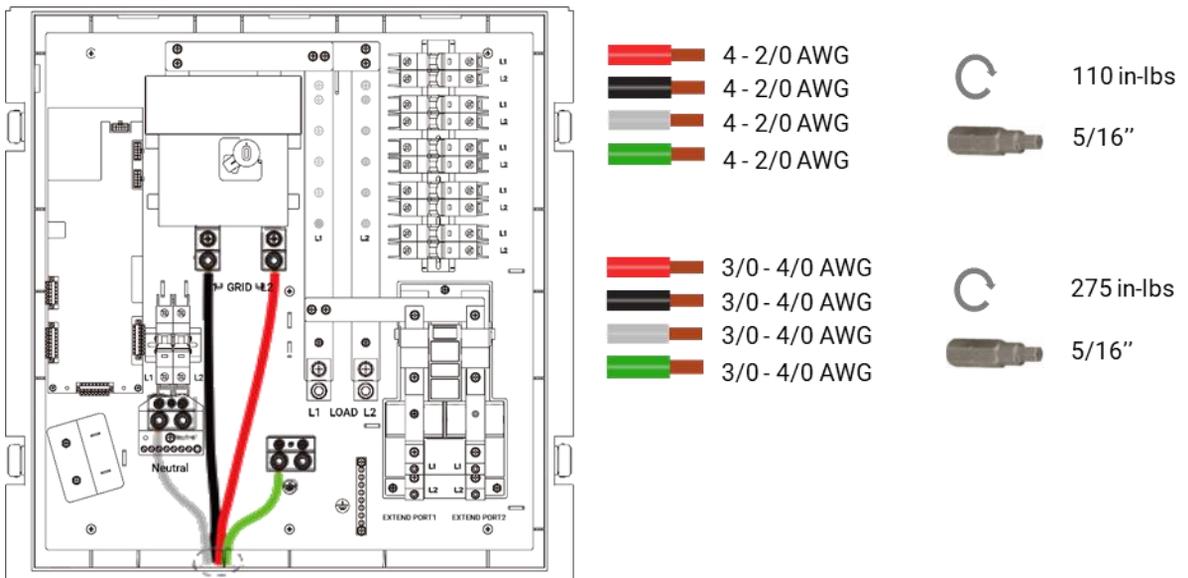


Figure 5. Smart Gateway Grid Wiring

Step-2

Wiring Connection of Load

a. Prepare the conduit for the Load wiring connection between the backed up loads power subpanel and the smart Gateway, then install a cable gland and bushing 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 bushing 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.

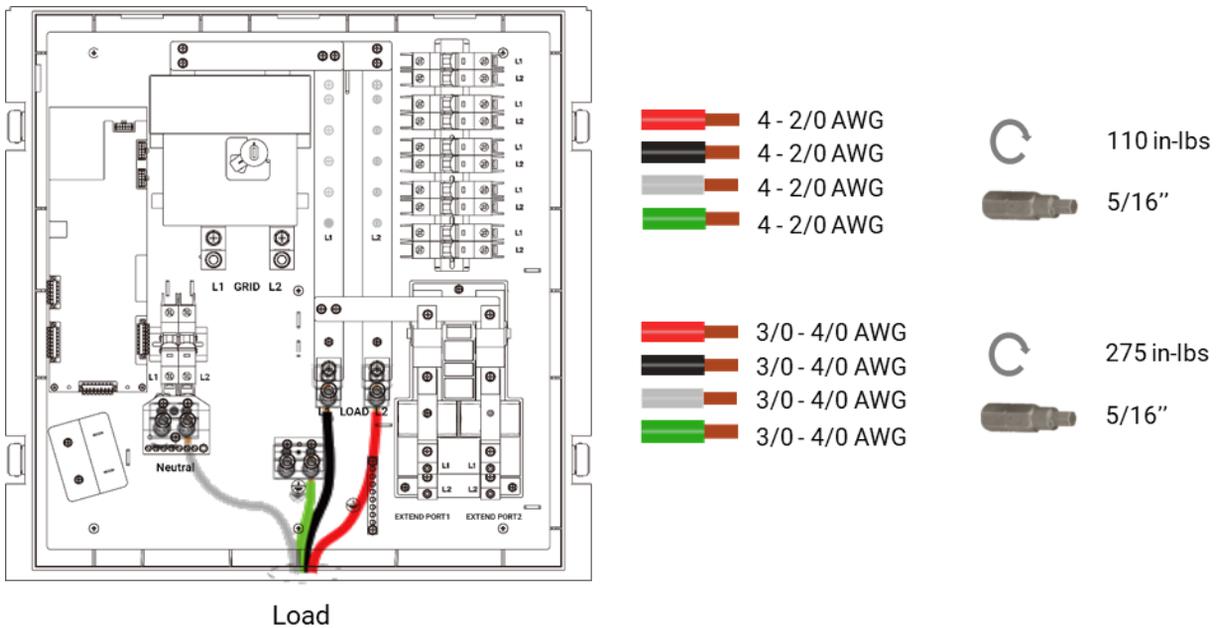


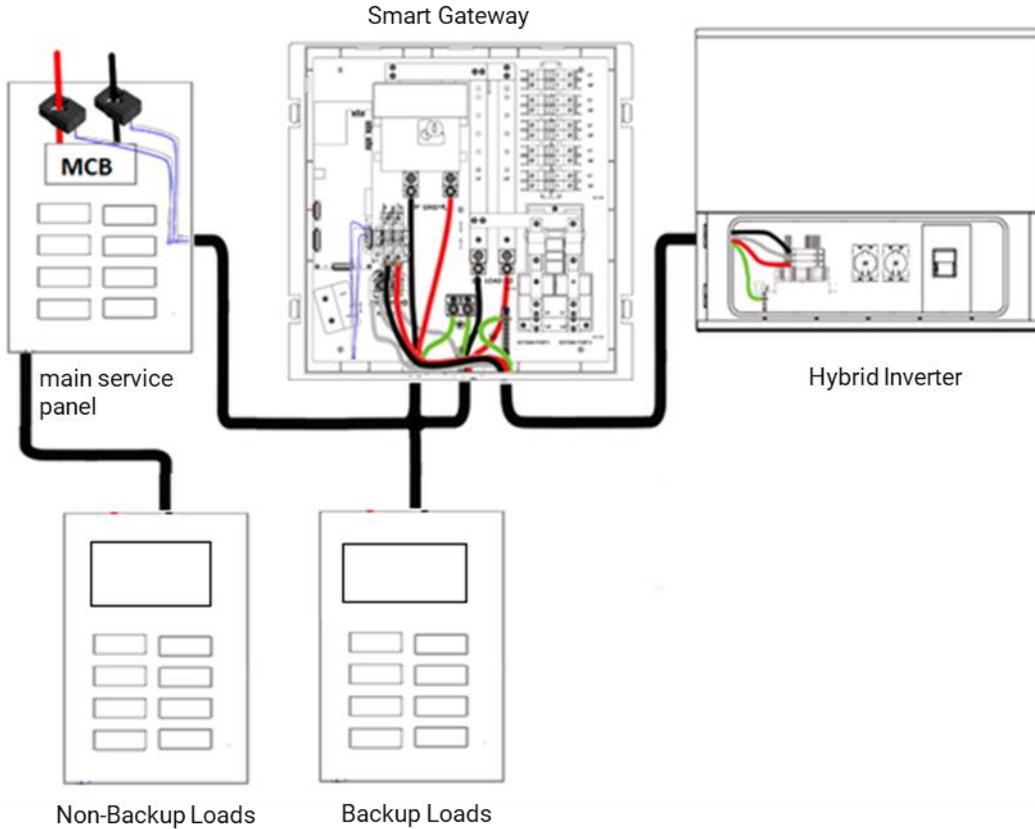
Figure 6. Smart Gateway Backup Load Wiring

b. Route the load wiring through the conduit and connect it to the smart Gateway 's load terminal. (Ref.to Figure 6.)

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

B. For Partial Home Backup Configuration

NOTE: In this configuration the “CT-Kit” is installed to monitor the non-backup load powerconsumption.



Step-1

Wiring of Grid

- a. Prepare the conduit for the Grid wiring connection between the Grid site's Main Service Panel or Subpanel and the smart Gateway. Install a cable gland and bushing to tighten the conduit to the smartGateway:
 - 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 bushing and tighten the conduit to the Smart Gateway.

⚠ NOTE: Knockout for the grid connection 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 wiring through the conduit and connect it to the Smart Gateway's 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 powersubpanel and the Smart Gateway. Install a cable gland and bushing 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 bushing and tighten the conduit to the Smart Gateway.

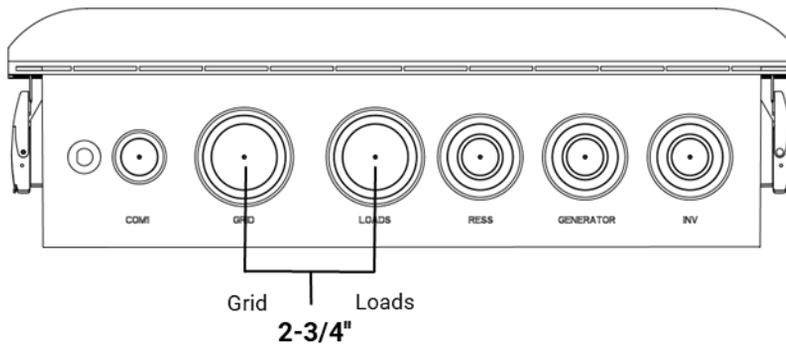


Figure 7. GRID and LOAD Knockouts

⚠ 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.
- Route the load wiring 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.
- Wiring Appliances, EV Chargers, AC PV, and Generators at Extend Port
- same diagrams like other sections & Generator Coms Wiring & Refer to Website & Tech docs

Wiring Connection	Wire – AWG	Torque Values
Extend port 1	#3~2AWG Ground #9-#4 AWG	Line:50 in-lbs Neutral:50 in-lbs Ground:26 in-lbs
Extend port 2	#6~4AWG Ground #9-#4 AWG	Line 45 in-lbs Neutral:26 in-lbs Ground:26 in-lbs

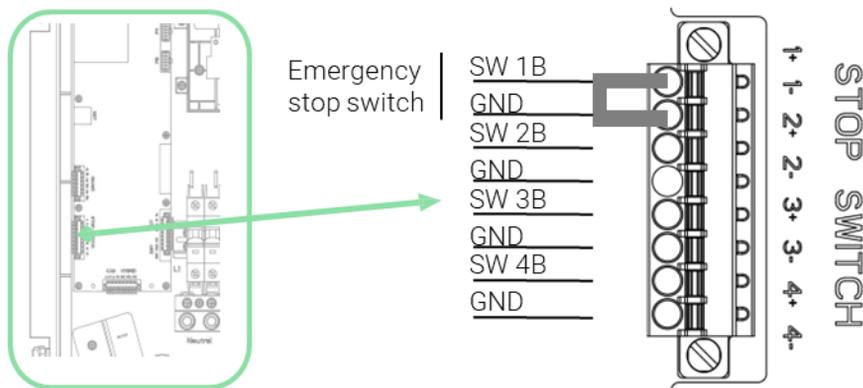
5. Wiring of Other Components

CAUTION:

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

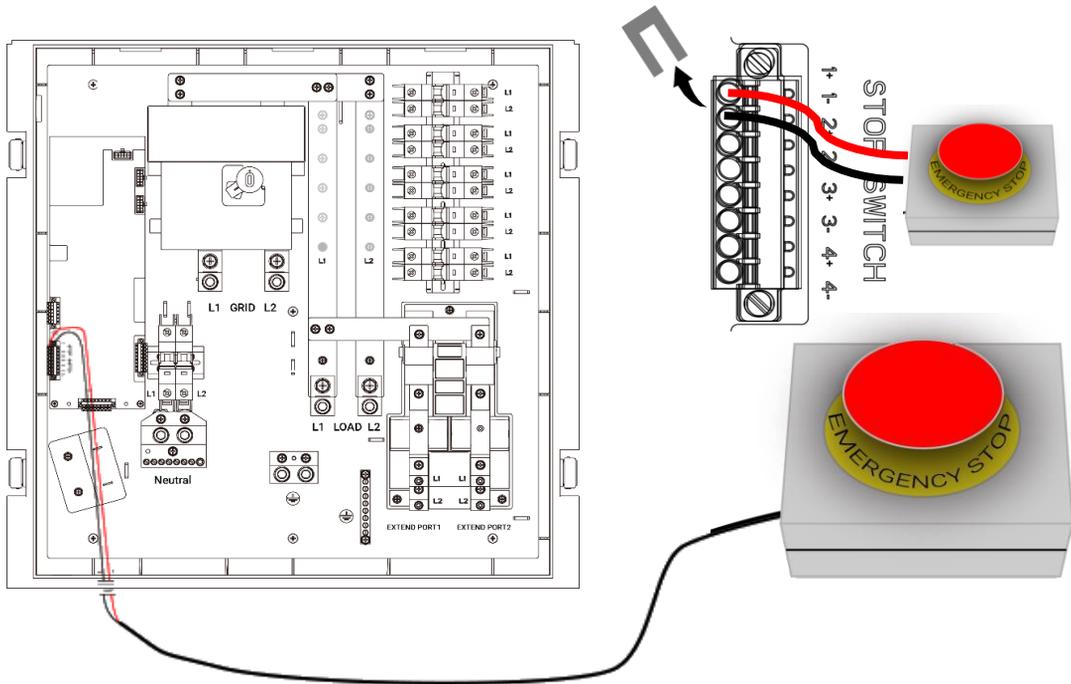
A. Wiring of Emergency Stop (Optional)

Remove the press-fit jumper on the smart Gateway PCB board connector “CON8e” between terminals 1+ & 1-. The Emergency Stop wiring is a 12V circuit where EP Cube system remains on when circuit is closed (Normally Closed)



Smart Gateway PCB board

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



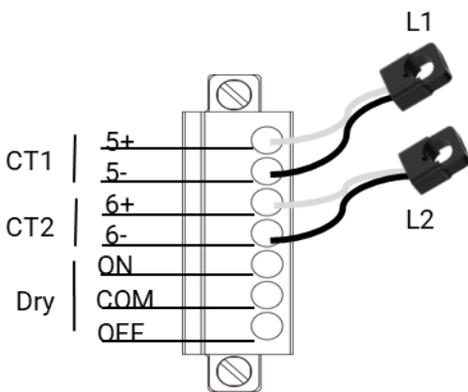
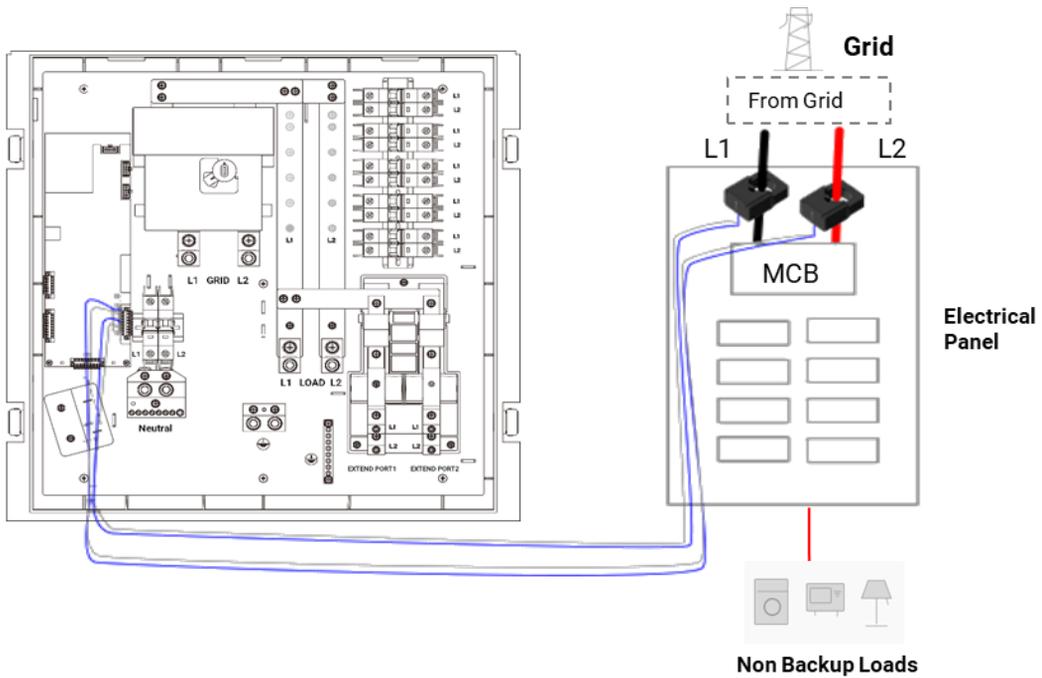
B. Wiring of “CT-Kit ” (Optional)

⚠ 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 ($k \rightarrow L$), and for L2 shall be from MCB to Grid ($k \rightarrow L$) as shown in picture below.

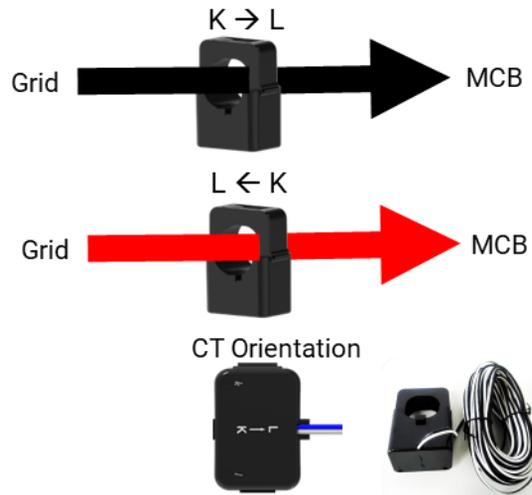
The CT provided with the smart Gateway has a standard cable length of 10m (32.8 feet). But supports cable length extension up to 90m (295 feet).

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)



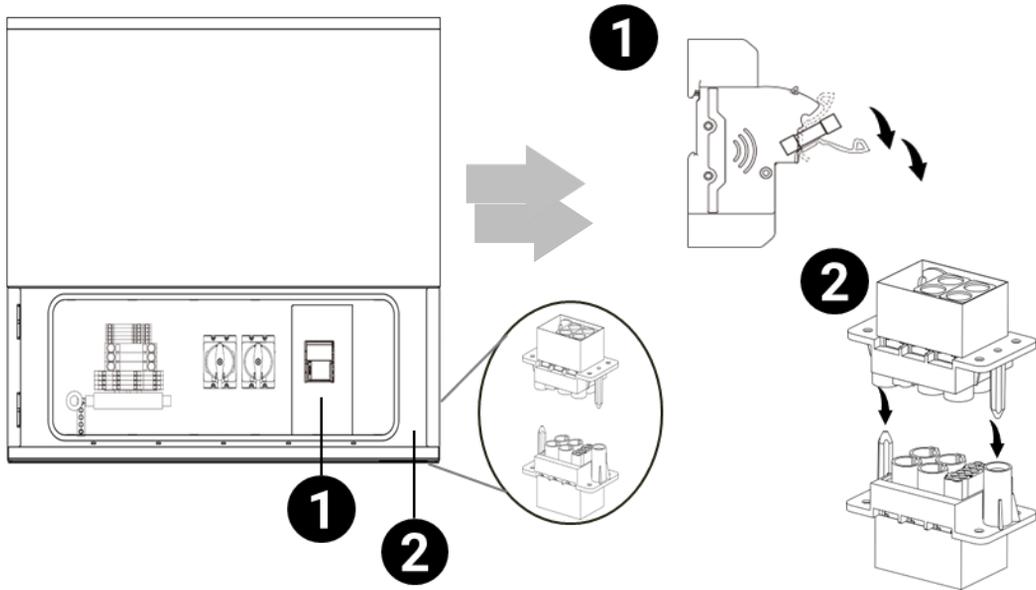
Terminal for CTs connection



C. Wiring of Hybrid Inverter Mating Connector

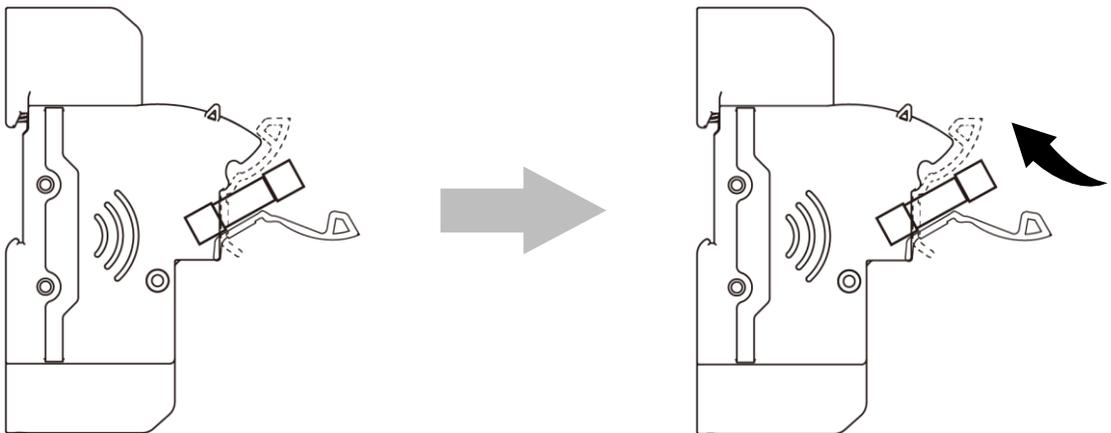
⚠ CAUTION: Do not dock the mating connector when the battery fuse is still connected to prevent electric shock.

- a. Pull down to open the Battery fuse to disconnect the internal connection of the stacked battery connected in series.



Dock the Hybrid Inverter Mating Connector

- b. Dock the Hybrid inverter mating connector as picture shows.
- c. Push upward to close the Battery fuse.



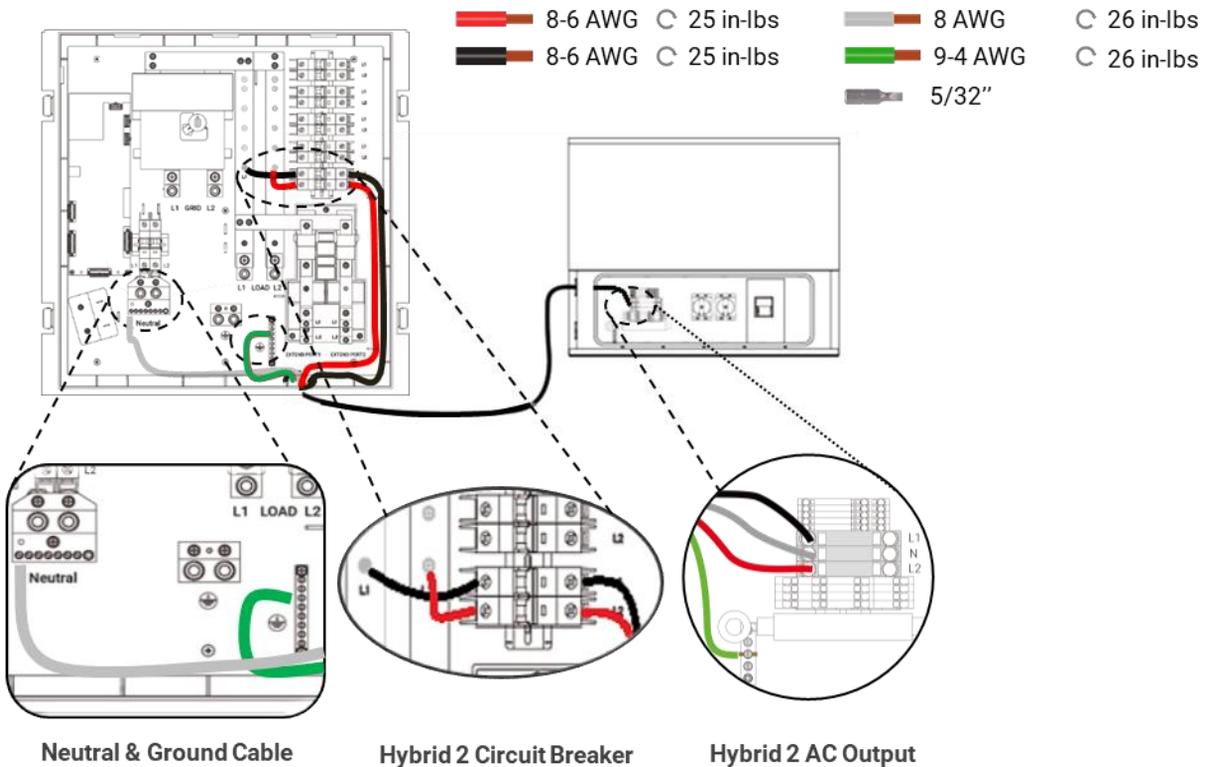
EXPANSION OF EP CUBE

EP Cube smart Gateway can integrate a maximum of 6 hybrid units in parallel. In addition, Port 1 (left port) supports connection with any of the three devices from the Generator, PV inverter, and EV charger or home appliance load. The Extend port 2 only supports the connection of either an EV charger or a PV inverter. Each Extend Port contains a 240V 100A rated relay that is internally & electronic controlled.

1. 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 Din Rail. Below figure shows 5 additional capacity extend kits installed.

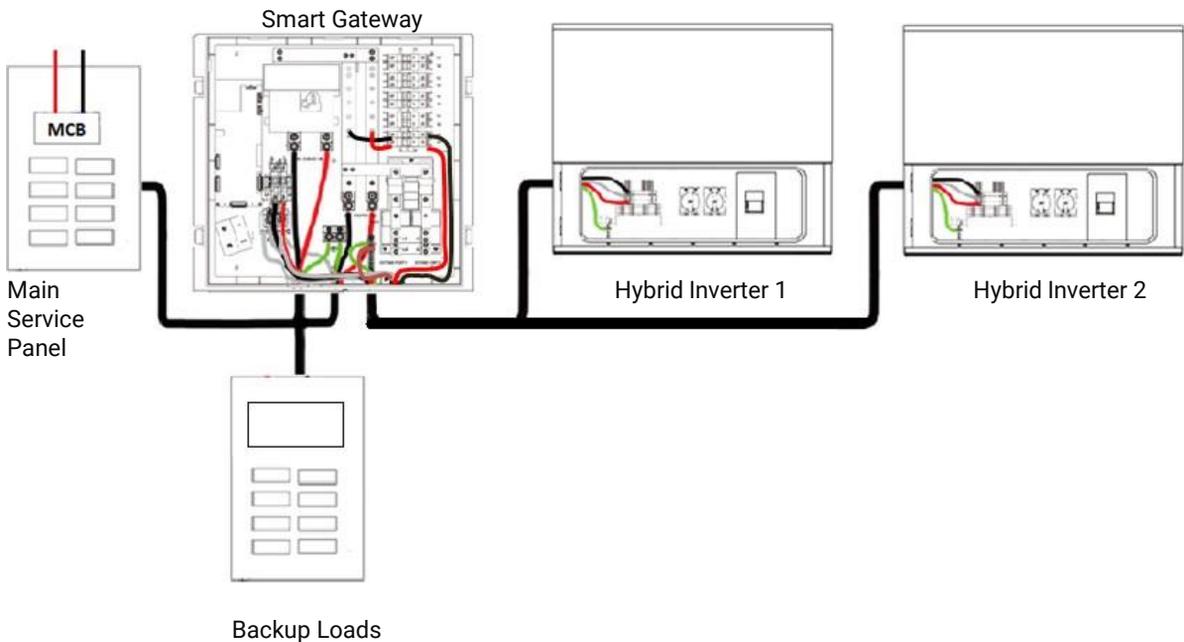
⚠ CAUTION: Standard smart Gateway only has one hybrid circuit breaker pre-installed. Capacity Extend Kits (circuit breakers) for additional hybrid units must be ordered separately, and installed.



A. Second Hybrid to Smart Gateway Wiring (For AC Power)

- a. Prepare the conduit for the hybrid inverter AC output power wire 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 or #8 cable for L1, N, L2, and ground between hybrid and the smart Gateway. On Hybrid side, press down the terminal using mini 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 insulated 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

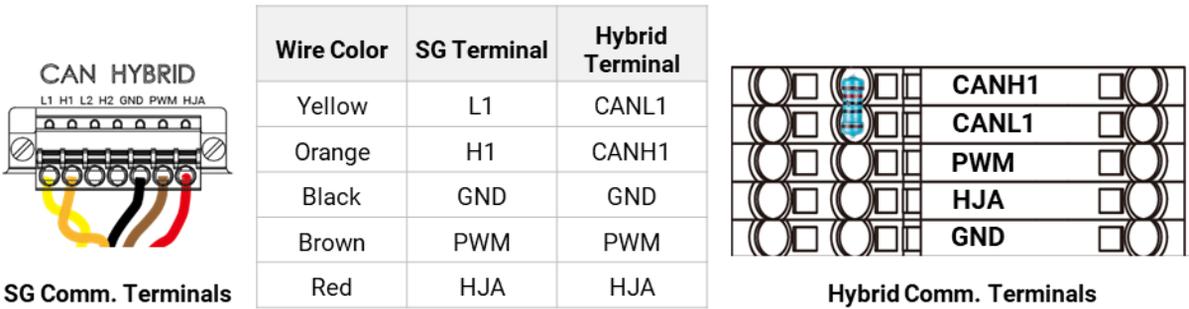
Below figure shows the general layout for 2x parallel Hybrid units connected with a single smartGateway.



B. 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, with a separate communication cable connect Hybrid 1 to the Smart Gateway communication terminals.

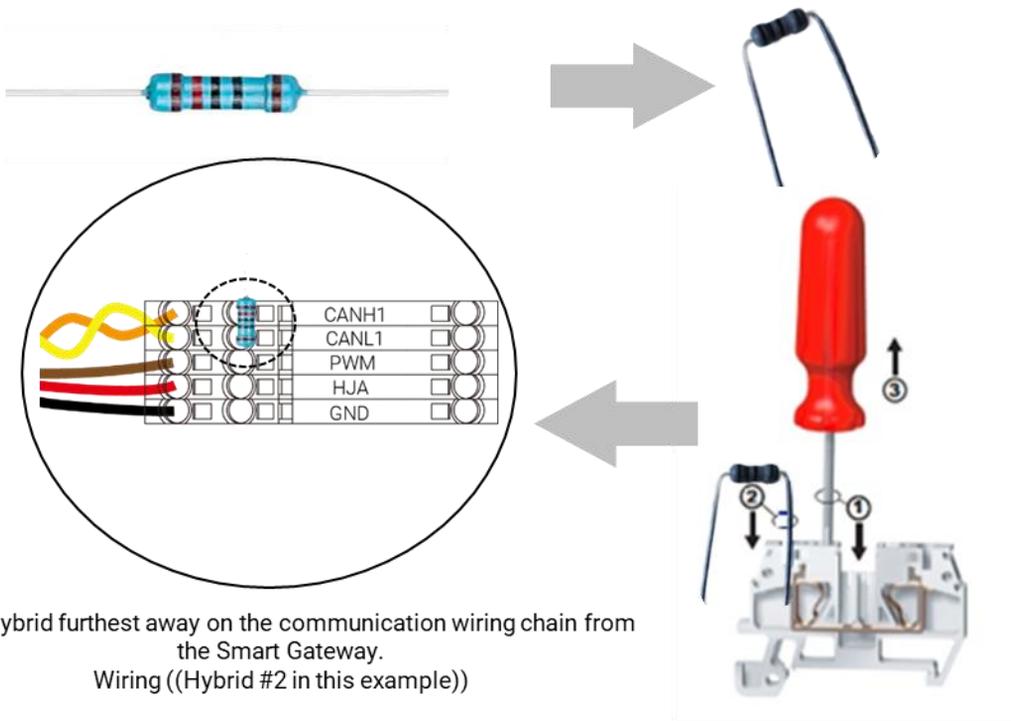
⚠ CAUTION: Pay attention to terminal labeling and connect the wires accordingly. Refer to the picture below for wiring the L1, H1, GND, PWM, and HJA terminals between the Hybrid and Smart Gateway. During parallel connection when more than one Hybrid units are connected to single Smart Gateway, communication cable runs in series among hybrid units. In this case, a 120 ohm metal film resistor needs 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 either in a separate plasticbag in each hybrid inverter box or already installed inside the hybrid inverter.



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:

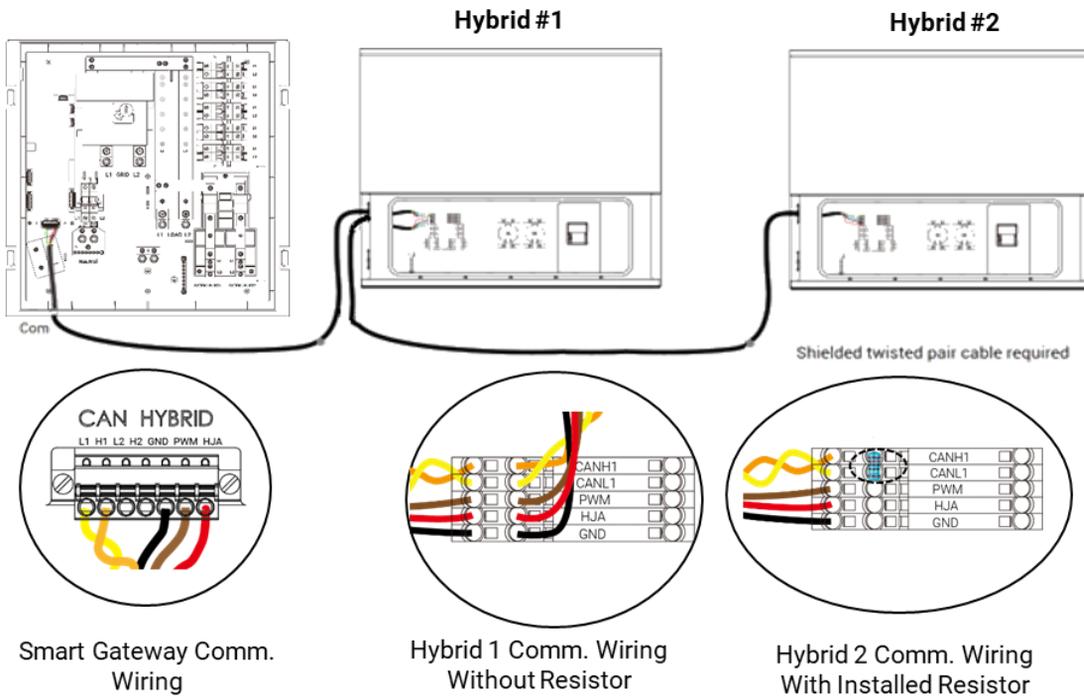
Step a: Bend the resistor legs to appropriate angle and distance between both legs to match the distance gap between terminal slots.



Step b. Push the spring terminals with the help of a mini electric 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 Hybrid #2.

⚠ Note: Only the final Hybrid unit that is connected furthest away in the chain from the Smart Gateway requires the installation of the resistor. Other connected hybrid units do not require any modifications.



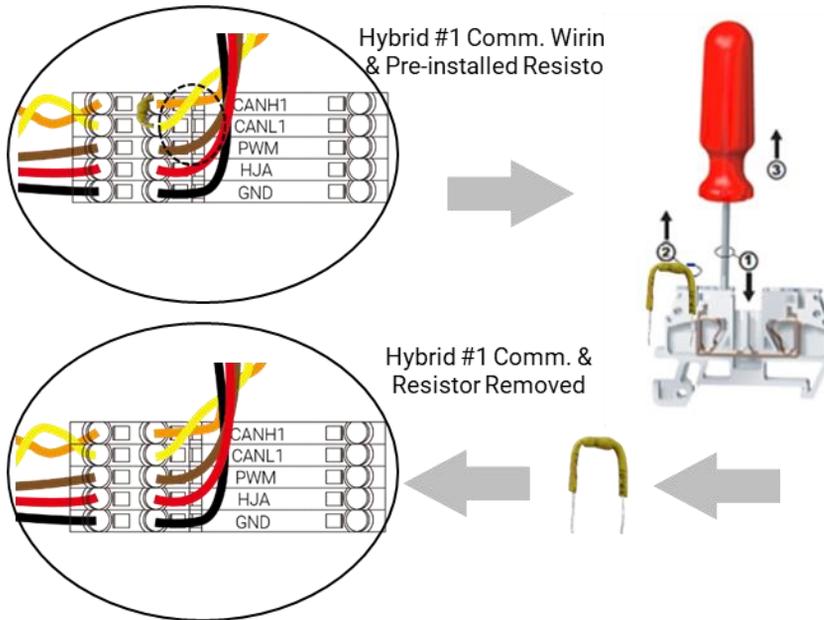
Case B: Hybrid Units With Pre-Installed Communication Resistor

If the hybrid units already have the communication resistor pre-installed on CANL1 and CANH1 Commterminals, then during parallel connection of Hybrids remove it from all the hybrid units except the finalHybrid (Hybrid #2) that is connected furthest from the Smart Gateway Comm terminals. Follow the below steps to remove the resistor:

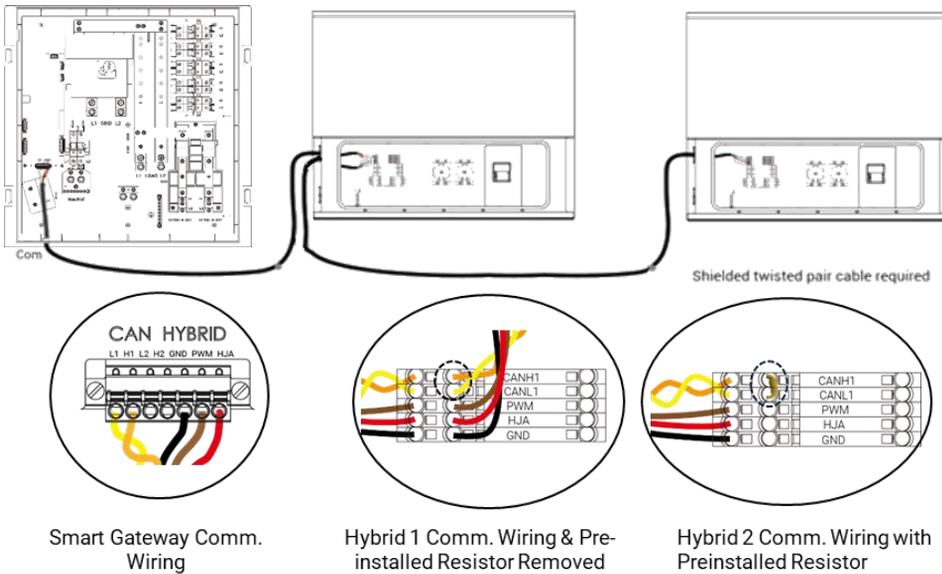
Step a: Locate the Comm terminals in the Hybrid unit, and check if the resistor is pre-installed.

Step b: Push the spring terminals with the help of a mini 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 figurebelow:



⚠ Note: The Final Hybrid (Hybrid #2) unit furthest away from the smart Gateway communication terminals requires the pre-installed resistor. Do not remove the resistor between the Comm terminals of the Final Hybrid (Hybrid #2) unit.

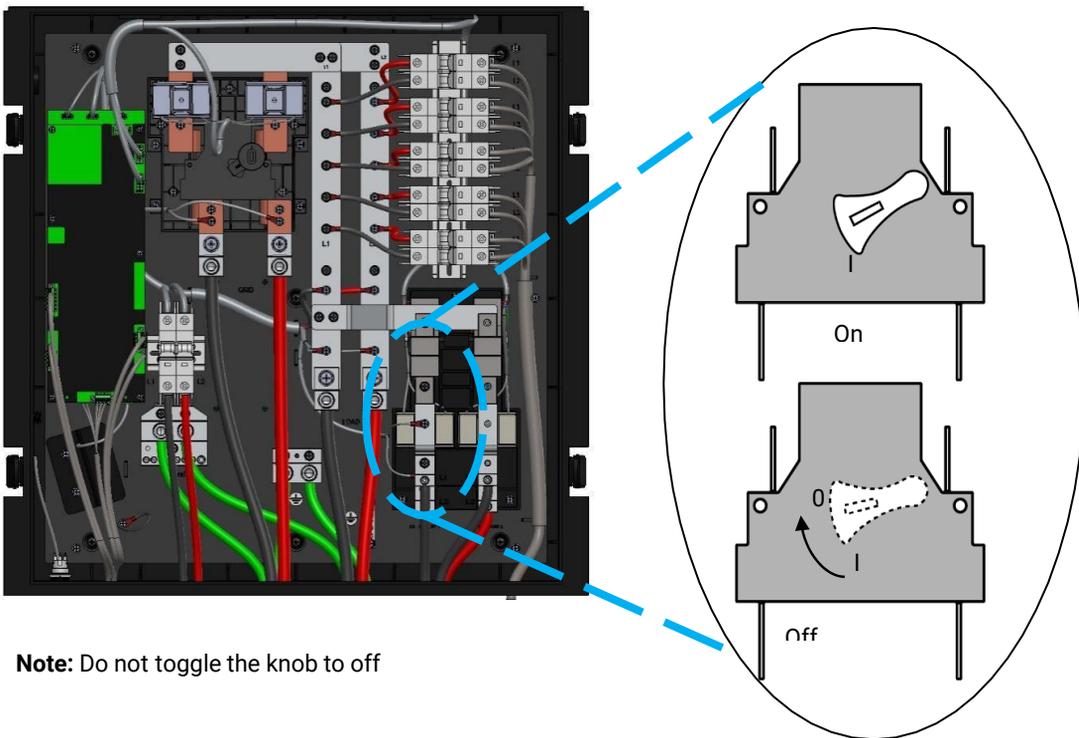


2. Extend Port 1 & 2

The smart Gateway is equipped with two expansion ports called Extend Port #1 and Extend Port #2. Each Extend Port is rated for a maximum 240V 100A. With NEC Code. 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. A closed extend port relay or also known as the on position is on is indicated by "I" and the off position is indicated by "O". Ensure that it is always in the "On" position. When the Extend Port is commissioned and enabled on the App commissioning process, check to make sure Extend Port is in the "ON" position.

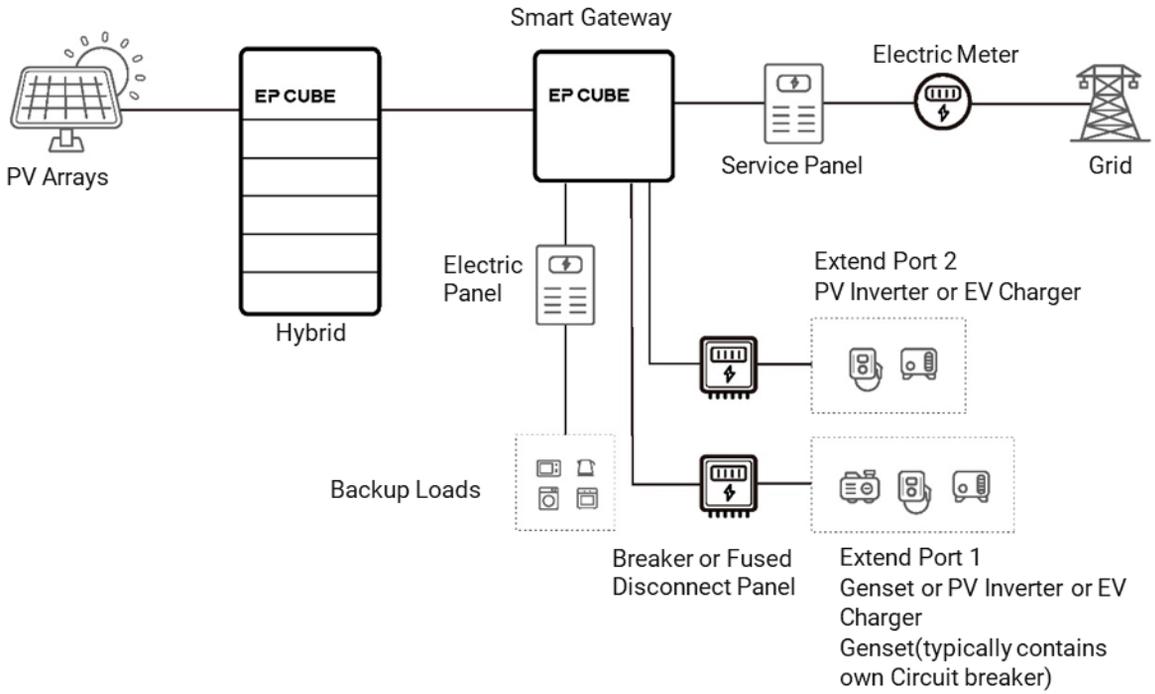


Note: Do not toggle the knob to off

The installer is responsible for following and abiding to local, utility, and National Electrical code which ensures protection and safety of all electrical equipment involved at the residence when the EP Cube is retrofitted or newly installed at the site.

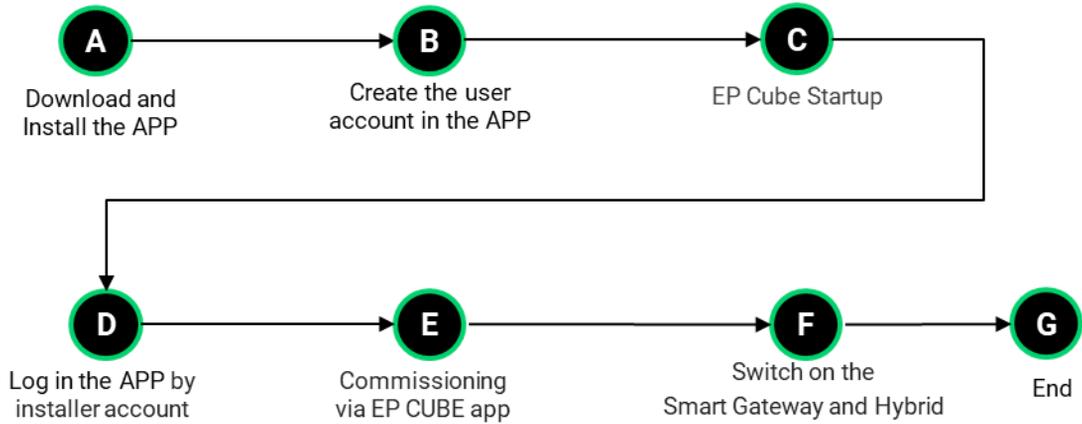
The installer must ensure that during load side or supply side interconnection with the utility, that all busbars and conductors are protected and not overloaded during the installation & design of the EP Cube system.

⚠ 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 or fused disconnects before connecting these devices to the smart Gateway.



EP CUBE System Commissioning

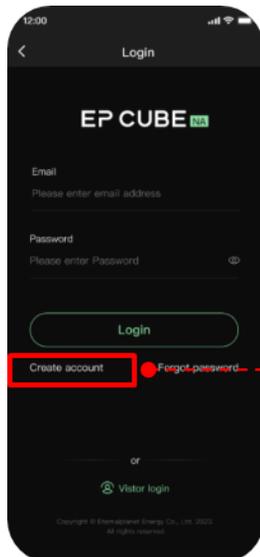
This section introduces the EP Cube system's initial commissioning and operating process.



1. Download and Install the APP

Download and install the EP Cube app on the Google Play Store or Apple Store.

2. Create the user account in the APP



Click 'Create account' to create account for homeowner.

3. 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 and 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).

Preparing before EP CUBE startup.

Please confirm that the communication wiring is correct. As below figure 1 shows.

Please confirm that the Emergency Stop Button is not pressed. As below figure 2 shows.

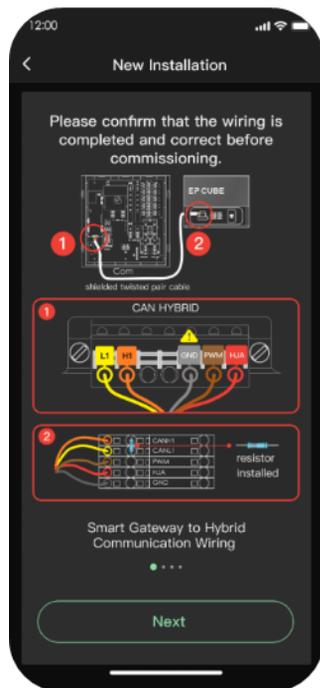


Figure 1. communication wiring

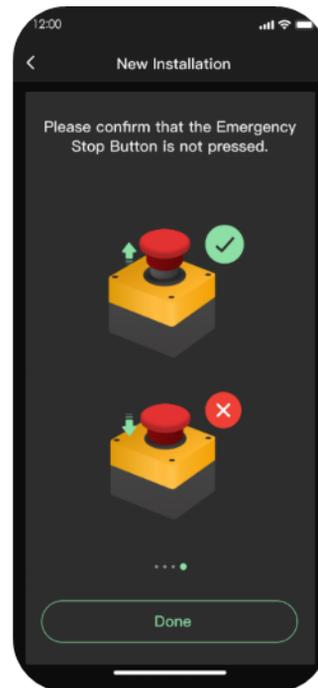
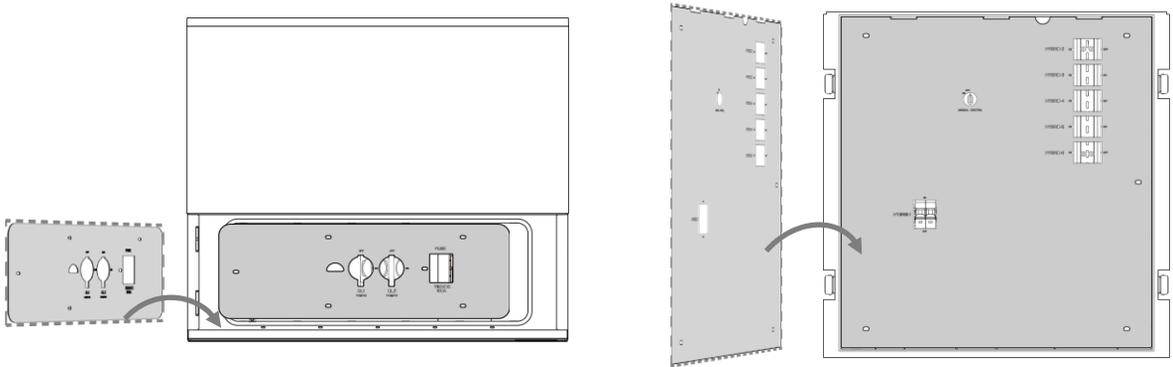
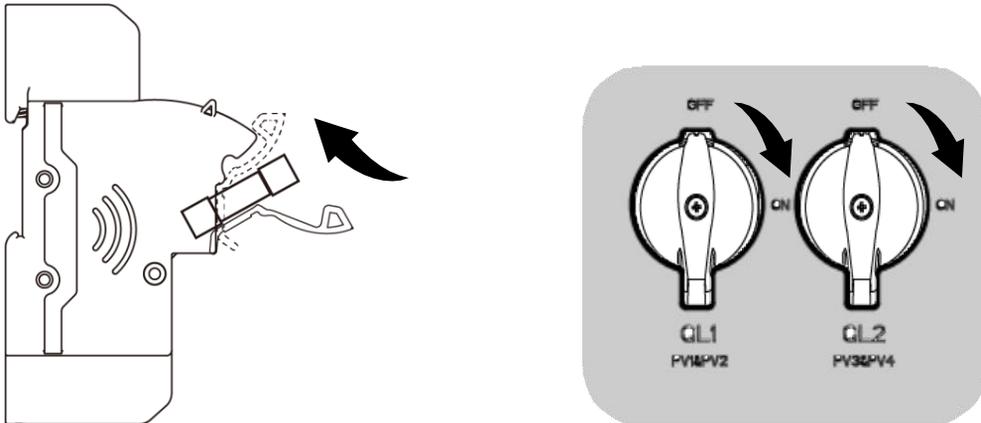


Figure 2. Emergency Stop Button

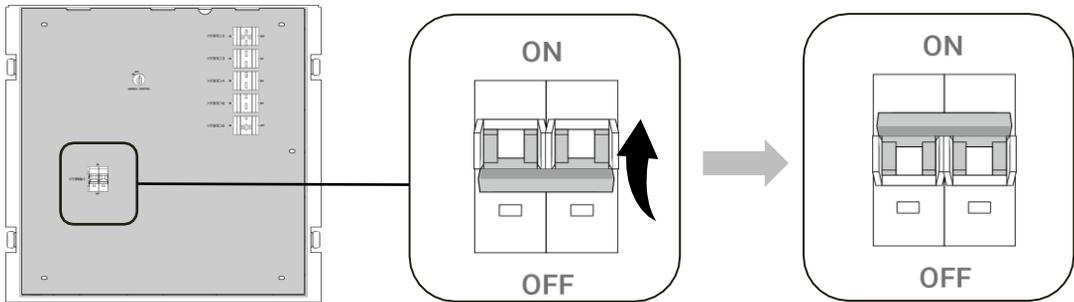
- a. Install all equipment covers and ensure no live electrical components will be exposed during operation.



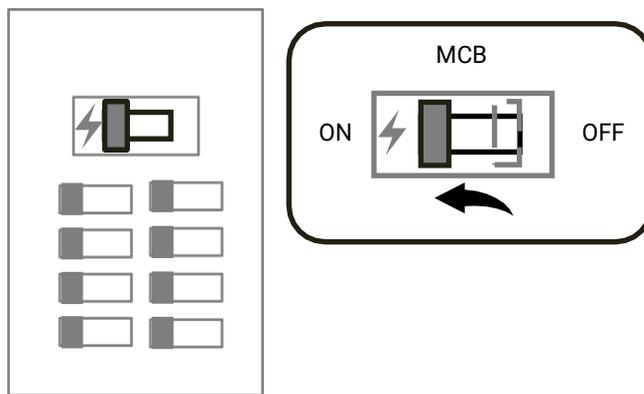
- b. Connect the Battery Fuse, and then turn on the PV switches in the Hybrid Inverter.



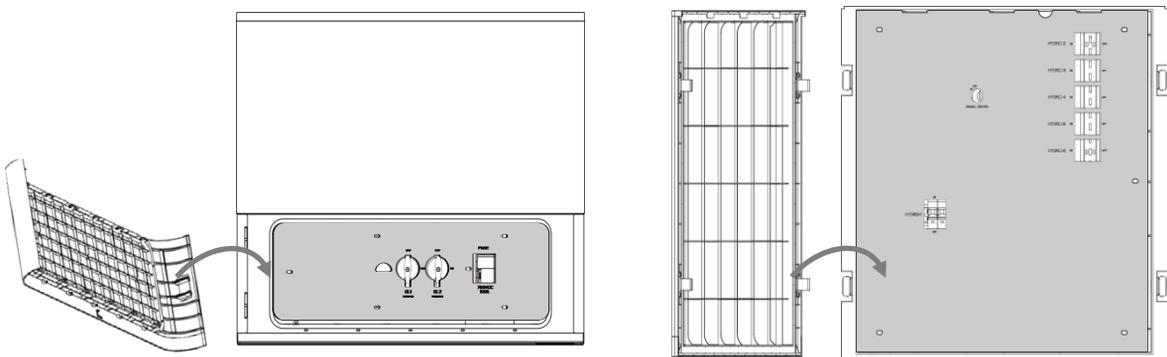
- c. Turn on Hybrid #1 Circuit Breaker in the smart Gateway.



d. Turn on Smart Gateway's 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 on this stage.



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

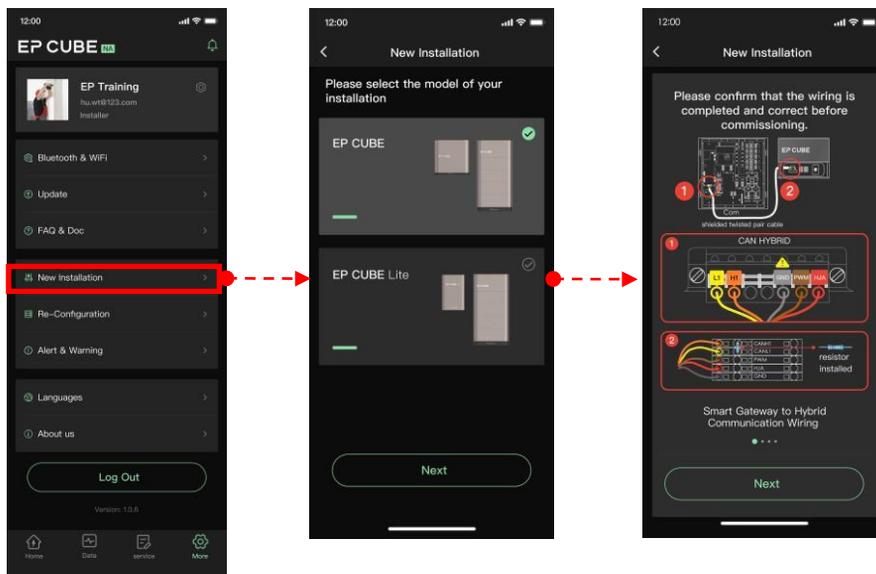
4. Log in the APP by installer account

Login with the installer account in the login page.

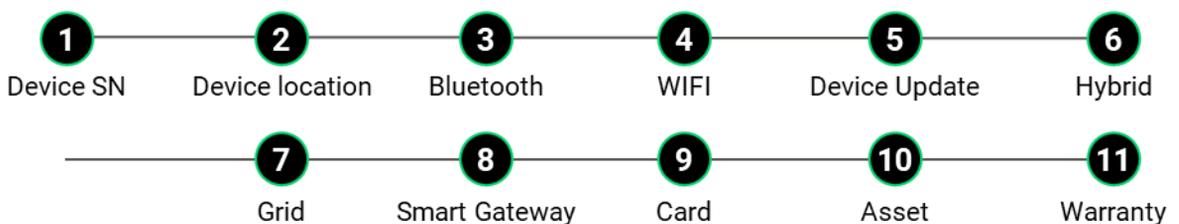
5. Commissioning via EP CUBE app

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.

After Login with your installer account, Click New Installation > Choose the device model(EP CUBE)
----> Double check the wiring then start the commissioning.

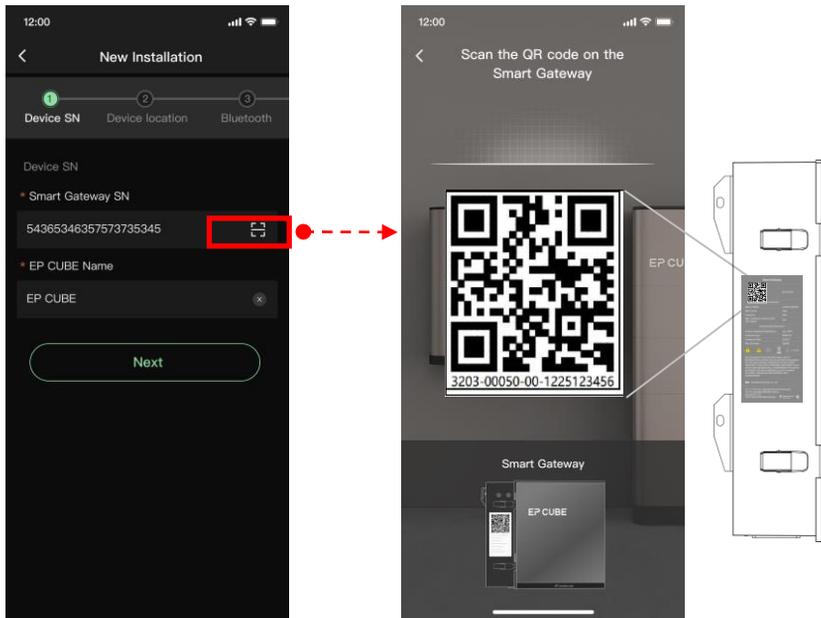


Follow the step by step process to configure all the connected devices within your EP Cube system. The steps include Device SN, Device location, Bluetooth, WIFI, Device Update, Grid, Smart Gateway, Hybrid, Card, Warranty 1 and Warranty 2 Registration for final approval. Below fig shows the order of configuration steps. At each step.



1. Device SN: Scan the QR code to add the Smart Gateway SN on the lable of.

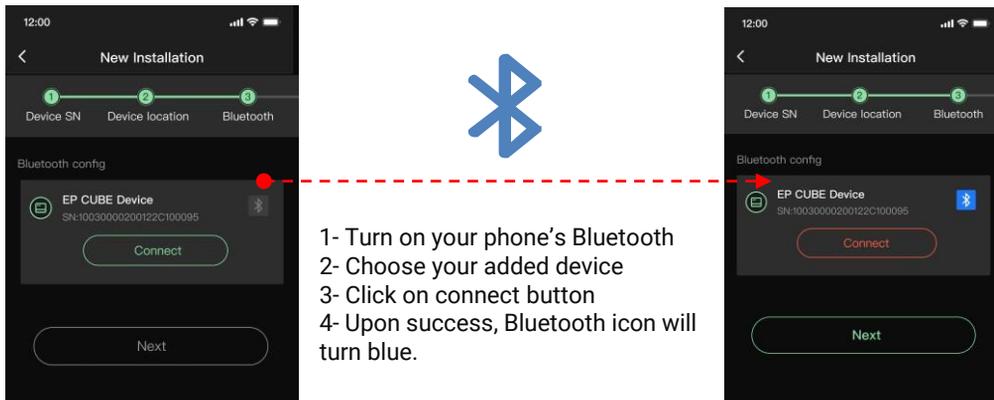
⚠ Note: If the QR code of a certain device cannot be recognized and scanned then input the SN individually by manually typing in inputting the Serial Number.



2. Device location: To complete information related to location site, time zone

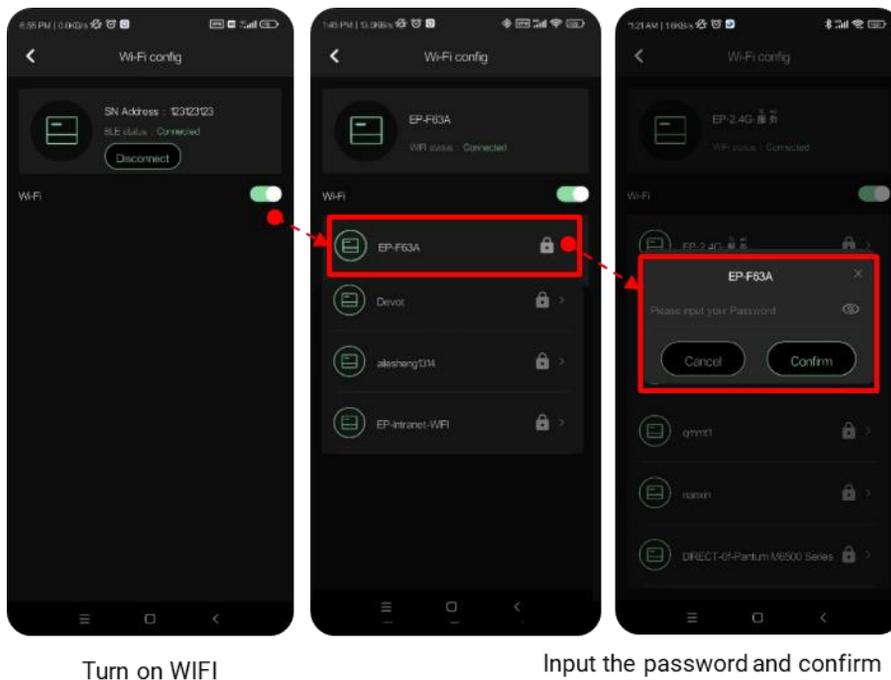
Device Location	Country	Choose country name from the list
	State	Choose state name from the list
	Zip Code	Write area zip code
	Street Address	Write the system address
Time Zone	Time zone	Choose applicable time zone from the list

3. Bluetooth: 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 Bluetooth (BT) icon will turn blue. A disconnect button will appear in place of connect button as shown in below figure.



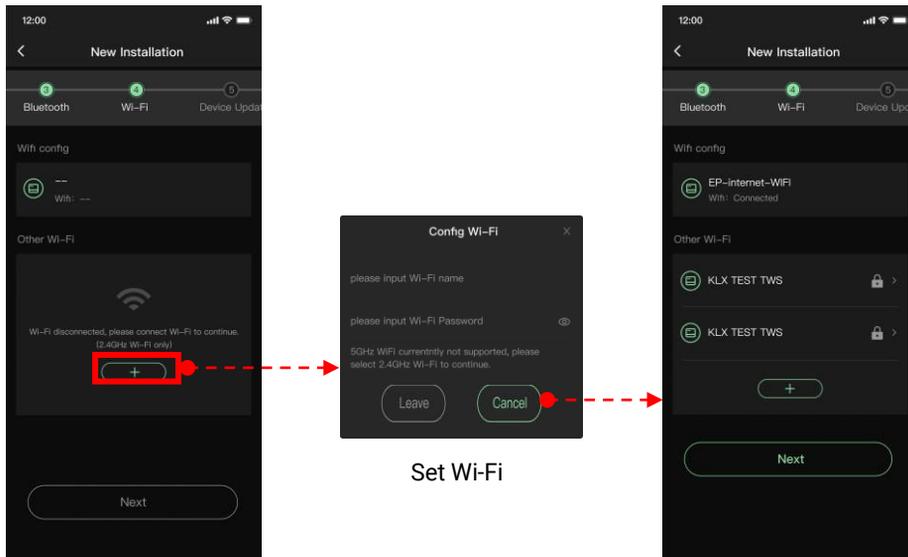
4-Wi-Fi Config for Android: it allows you to choose your home WIFI network to connect your device with it. Find your home WIFI from the populated list and input its password and click confirm.

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



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

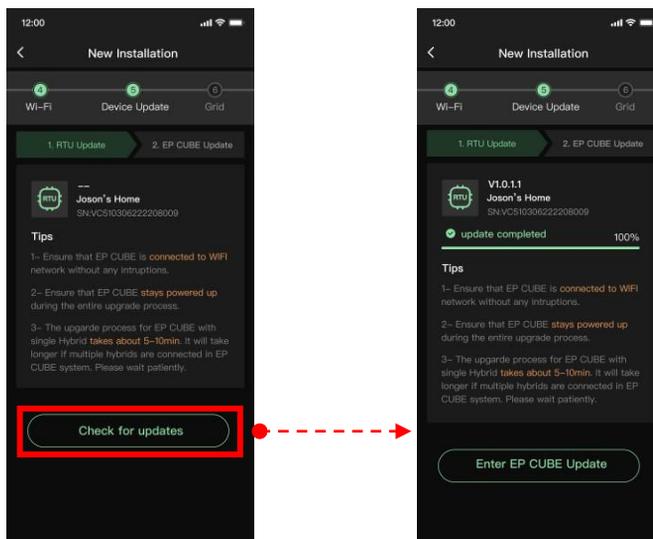
Note: EP Cube can only connect with 2.4Ghz WIFI Networks.



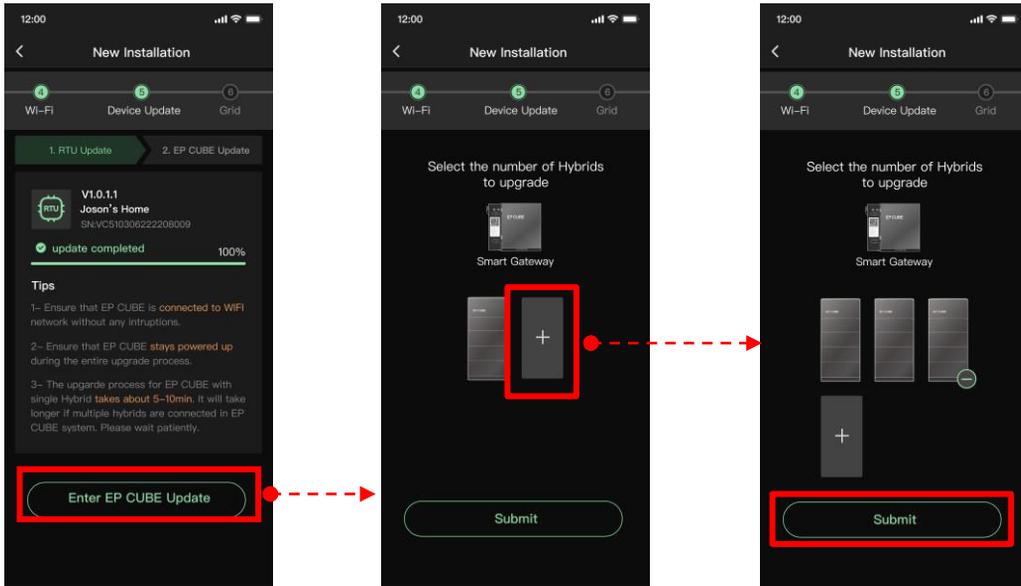
Add a new Wi-Fi

5. Device Update: Step 1 for RTU update, and step 2 for EP CUBE update.

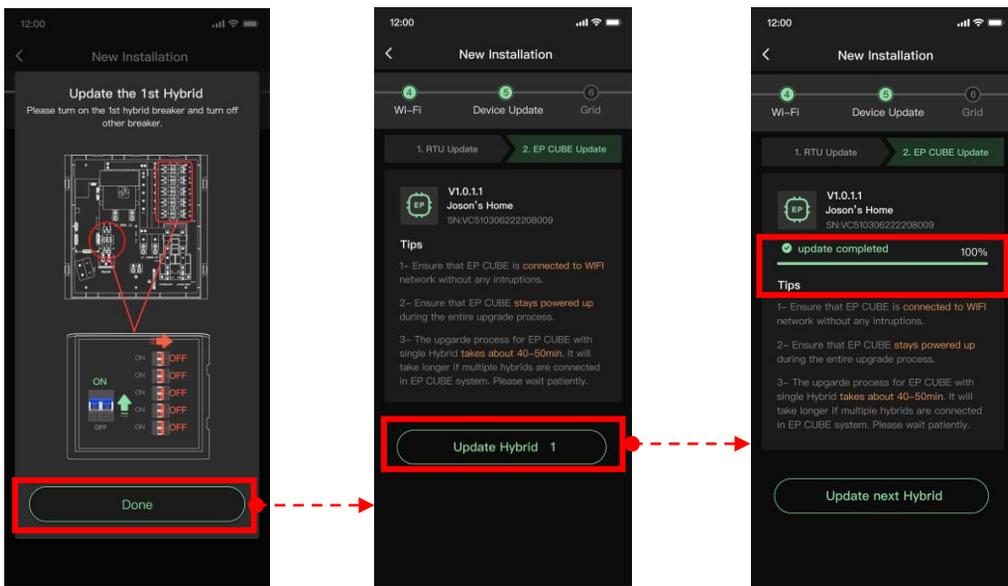
Step 1: Click the “Check for updates” button to start RTU module update process.



Step 2 EP CUBE update: Click the “Enter EP CUBE Update” button to set the Quantity of the Hybrid. Enter EP CUBE Update -----> Add(Quantity of installed hybrids) -----> Submit



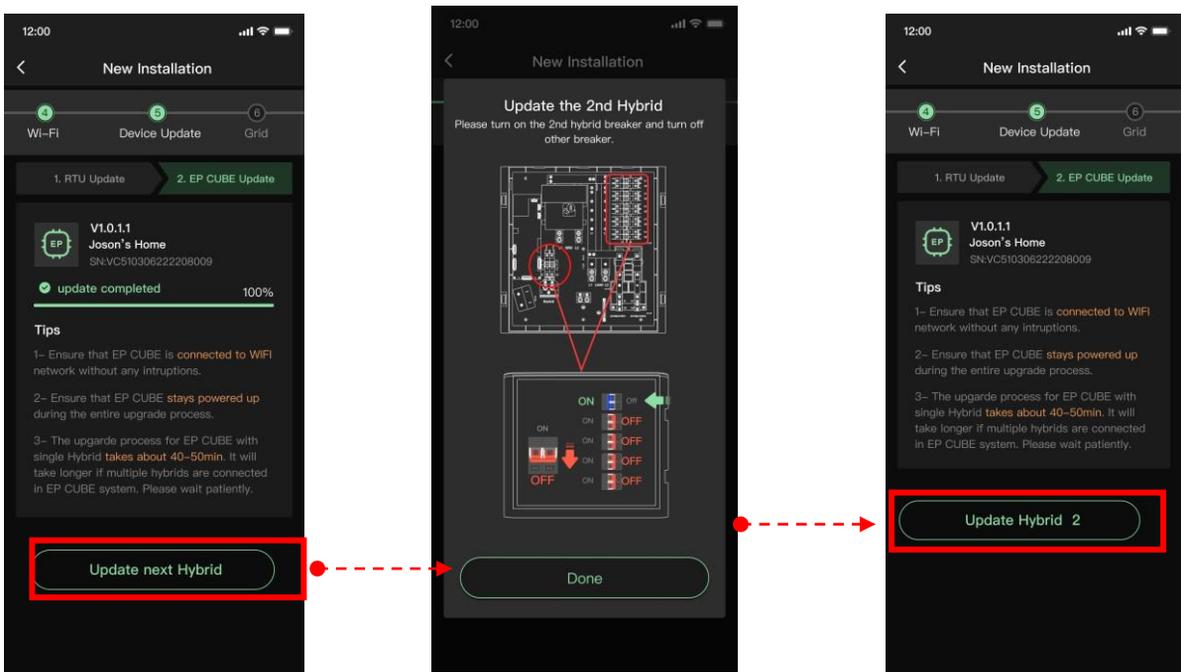
Update hybrid 1: Finish the hybrid quantity setting. Start to Update Hybrid 1. Done -----> Update Hybrid 1 -----> Update completed



Device 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.

Update hybrid 2: If there are multiple hybrids connected then click “Update next Hybrid” to hybrid 2 unit update process.

Update next Hybrid -----> Turn on/off breaker as instruction ----->Update Hybrid 2.

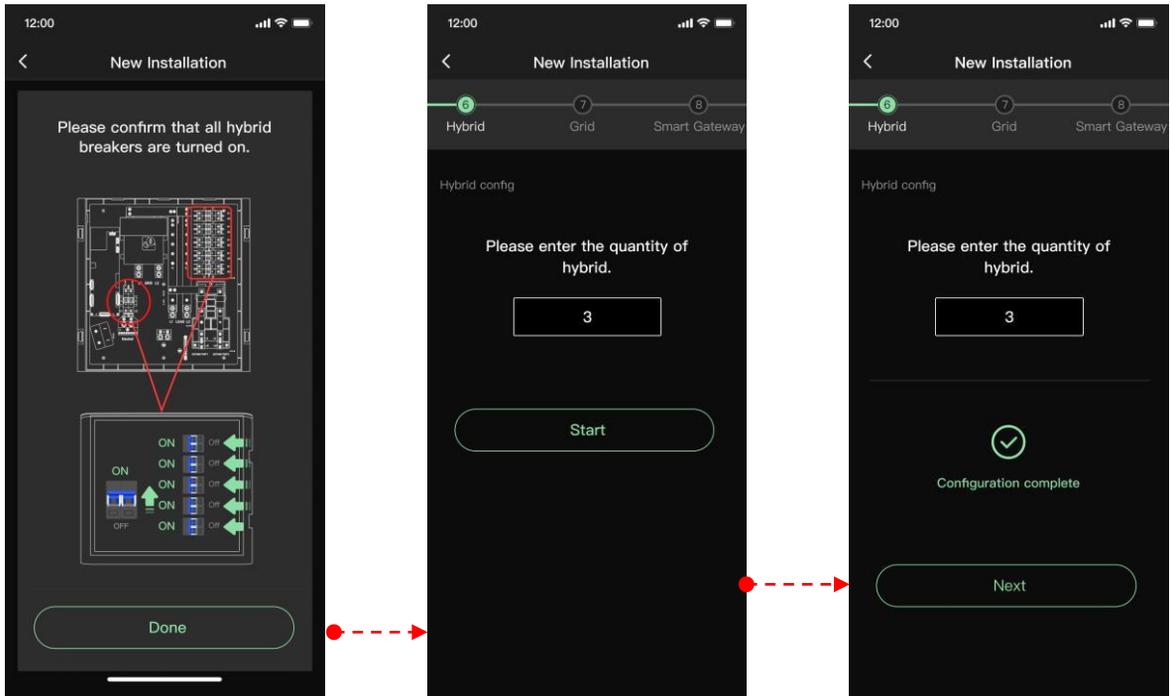


⚠ Note: It is critical to perform firmware update for all Hybrid Units one by one. Ensure that during firmware update of a certain Hybrid unit, all other Hybrid units power is disconnected by turning off the respective MCBs circuits breakers located inside the Smart Gateway. It needs wait for 1 minute after turn off the respective MCBs, then we can turn on the respective MCBs of the next Hybrid. This is done to ensure that the communication between the Smart Gateway and Hybrid unit that is being updated isn't interrupted by interference by other Hybrids.

For example, if two Hybrids are installed at a site, there will be 2 separate firmware update procedures, one for Hybrid #1 and then repeated again for Hybrid #2.

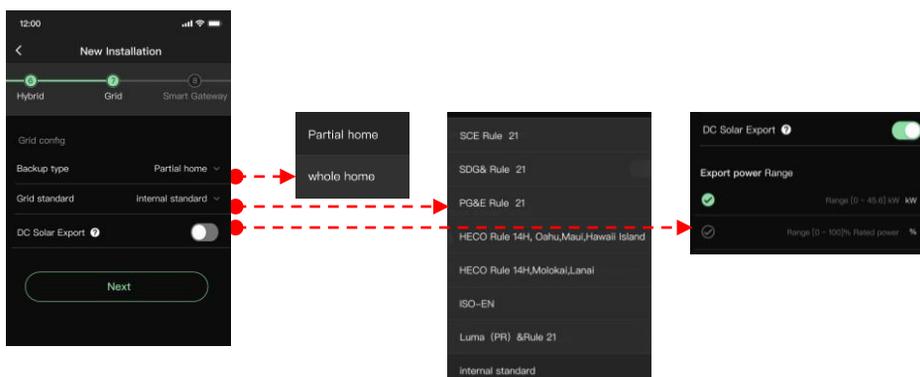
6- Hybrid Config: If there are 3 hybrids connected to smart Gateway, choose 3 from the dropdownlist for the Qty of Hybrid during Hybrid config.

Set the Qty of Hybrid



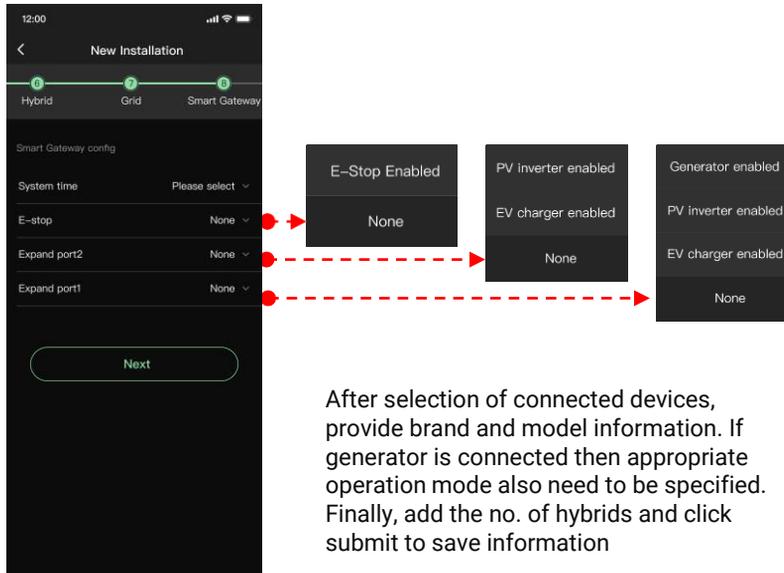
7- Grid:

Choose your system’s backup topology either as partial home or whole home as per actual scenario. Selection of applicable grid standard. Dropdown list already have various applicable standards listed. Export power limit feature Backup type -----> Grid standard > DC Solar Export.

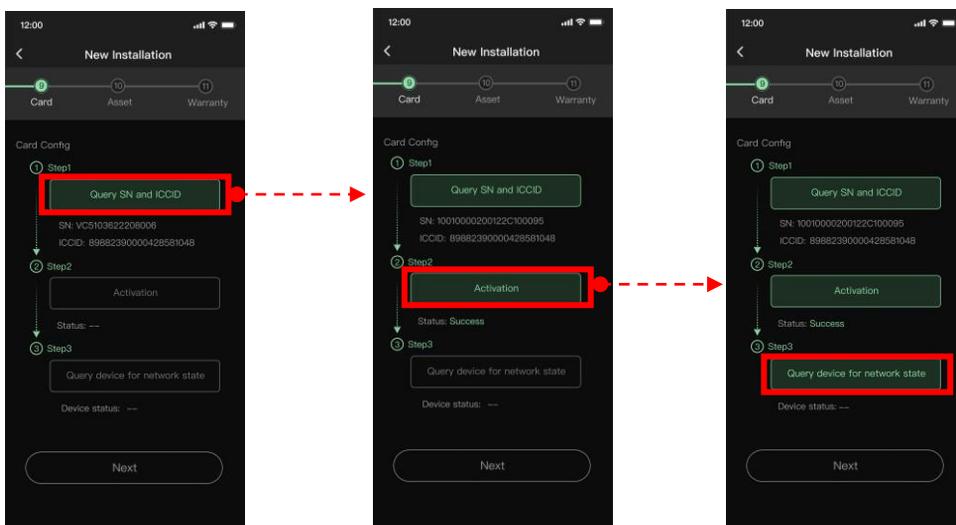


8- Smart Gateway: It allows the user to setup different parameters. i.e. enable E Stop, setup connected device to Extend Port 2 and Extend Port 1, and number of hybrid units connected with the single smartGateway.

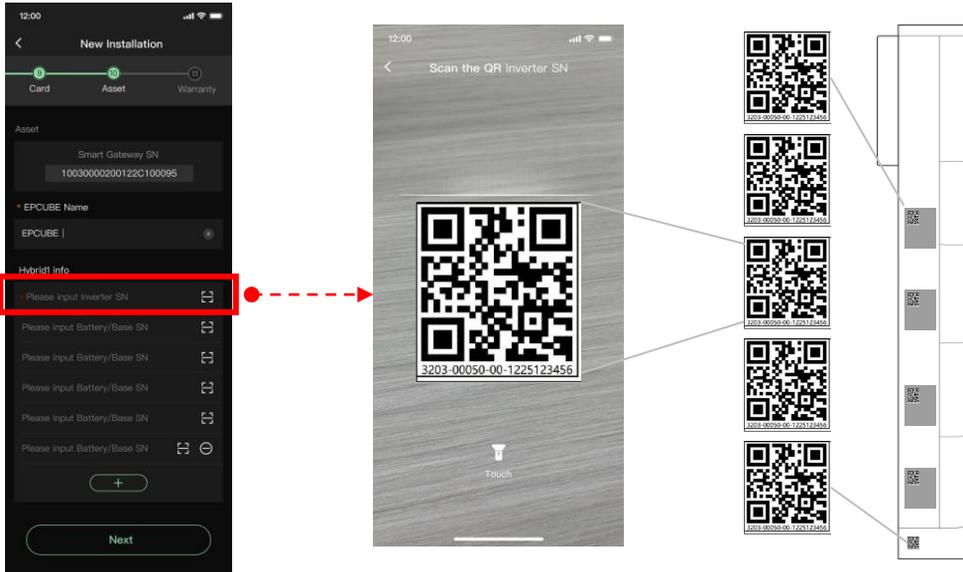
Extend Port 2 supports PV Inverter or EV charger. Extend Port 1 can also support connection to a generator in addition to supporting connection to PV inverter or EV charger. Only one device can be connected to each port, select connected devices from the list



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



10- Asset: Add Hybrid, battery modules and base according to connected devices in the system. Scan the QR code to add the SN of each module.

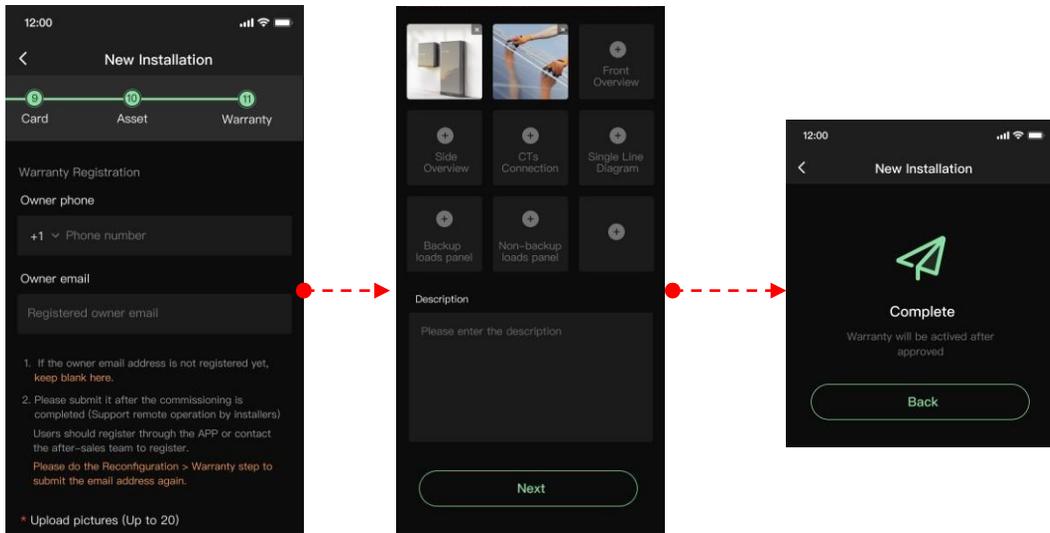


Note: If the QR code of a certain device cannot be recognized and scanned then input the SN individually by manually inputting the Serial Number. In this case, take the photos of the QR code label on the devices and upload it at the end of process- at Finish step.

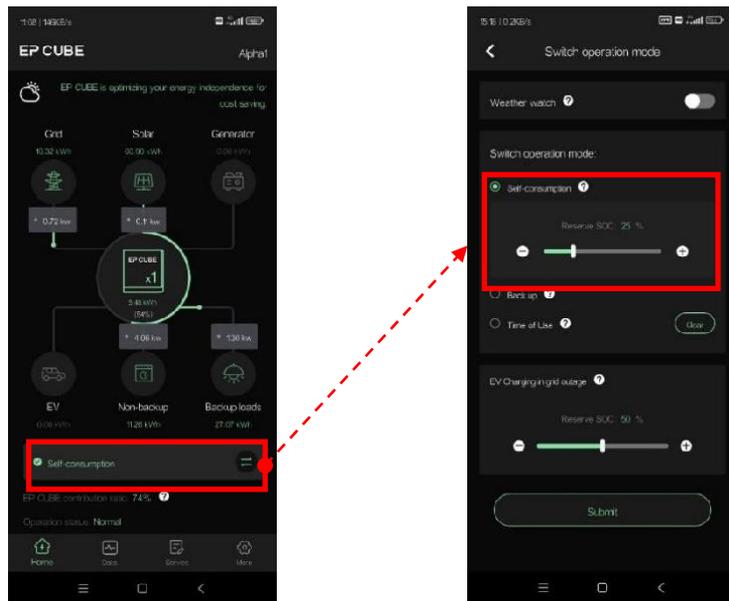
11- Warranty : Add the owner email, the owner phone number.

Take and upload the pictures as required. (Overview, Hybrid wiring, Front Overview, Side Overview, CTs Connection, Single Line, Diagram, Backup loads panel and Non-backup loads panel.)

Submit for final approval by EP Team.

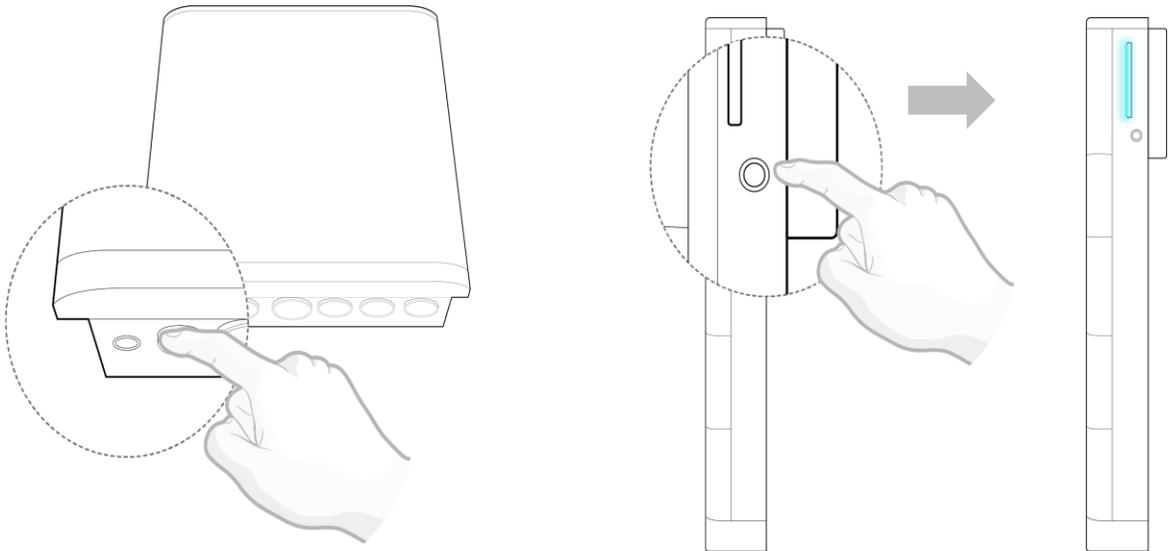


After completing the finish step, return to home page. Select an appropriate operation mode and Reserve SOC value according to energy usage preferences.



6. Switch on the Smart Gateway and Hybrid

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



7. End

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
Standby - 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. Canadian Solar, Inc and Eternal Planet Energy, Ltd. 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.
3. Push the Emergency Stop button that connected with the Smart Gateway.

 **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 weighs 70 pounds or more for each battery module! 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 Canadian Solar or Eternal Planet team.
- This equipment complies with rules of FCC Part 15, 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 all operations.
- Do not place foreign objects on top of the product or insert inside the product.
- Ensure there is enough space around the EP Cube Smart Gateway and Hybrid(s) for ventilation.
- Be careful to protect the EP Cube from impact when installing it in a garage or near vehicles. A bollard may be required to be installed based on local AHJ law with the position of EP Cube in relation to vehicle parking and pathway. 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 into 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, system may 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
- (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



Proper Attire

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.

Large appliance loads like air conditioners, well or pool pump, or appliances with electric motor contain high initial draw of current 3 to 5 times its normal draw of current in the first second of turning on the compressor, pump, or motor inside the appliance. This initial draw of current in the first second of running appliance may overload the 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/power cycling perform following steps:

- 1- Depress button on side of Hybrid and depress button on bottom of SG.
- 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- Press in button on bottom of SG and press in button on side of Hybrid

The EP Cube system should be able to restart. There are two ways you can check the status of the EP Cube system, the LED indicator on the side of the Hybrid(s) or on the EP Cube App. 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.

To reduce instant massive electric current draw (in-rush current) from large appliances like air conditioners, motors, and pumps, a soft start device is recommended to be installed on these devices. The soft start device reduces the instantaneously current draw from these appliances and instead, it gradually supplies the current demand to the appliance and reduces stress on the EP Cube system. This device can potentially eliminate overloading and shutdown of EP Cube system. While operating Offgrid, 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.

2. 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:// www.epcube.com/en-US/ support/document](https://www.epcube.com/en-US/support/document)

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:// www.epcube.com/en-US/ support/document](https://www.epcube.com/en-US/support/document)

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, the EP Cube seamlessly switches battery to backup power and keeps your electrical appliances running even when grid goes down.

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

Your EP CUBE system batteries can be recharged from your solar arrays and keep running your home from solar even when the grid is down. Hardware, software, ATS switch, inverter, and batteries like the EP Cube does not have this function.

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 on each PV string .

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, Time of Use (TOU), and Backup. In addition, the weather watch function allows EP CUBE to monitor the local weather conditions and automatically stores energy for emergency in preparation for a potential future power outage.

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

Reserve SOC Percentage allows EP CUBE to reserve a specific quantity of energy measured in percentage of batteries' full capacity energy stored in the batteries that can only be discharged 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 well before the potential high wind or severe storm is forecasted to hit. 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's battery backup supply 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 term.

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

EP CUBE App allows users to monitor real-time power flow between connected devices every 5 to 7 minutes. 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" (OTA) 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 on main screen on the App 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. Be Sure to Check with EP Service Team & Generator Compatibility list on the EP Cube website to verify if generator is an approved model.

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” orless	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)

2. Recommended Wire Gauges

* Note - Follow Manufacturer’s instructions for proper wire size and overcurrent protection breakersize.

Wiring Connection	Wire – AWG
Utility Grid AC Wiring	#8-4/0AWG Ground #9 – 2/0 AWG
Backup Loads AC Wiring	#8-4/0AWG Ground #9 – 2/0 AWG
Hybrid Inverter AC Wiring	#8-6 AWG Ground #8 AWG
PV DC Wiring	#12 AWG
Generator AC Wiring*	#8-2AWG Ground #8 - #6 AWG
3rd Party PV Inverter AC Wiring*	#12-2AWG Ground #8 - #6 AWG
EV Charger AC Wiring*	#12-4 AWG Ground #8 - #6 AWG

IF EP CUBE GATEWAY AND HYBRID TERMINAL ARE ALUMINUM COMPATIBLE

 **Note** :Aluminum is less conductive and uses 1 wire size up from Copper and check panelboard andbreaker terminal label to see if they accept aluminum wire and put anti oxidant lubricant.

3. Troubleshooting

If the EP CUBE System works abnormally, please check and operate the system as below.

4. Check List

The table below is mainly help us find the possible cause of the issue.

NO.	Item	Requirements
A	Communication Wiring and resistor check	Wiring should be correct. Resistor should be installed
B	Commissioning check	Commissioning should be correct.
C	Exterior check	There should be no big gap between batteries modules and PCS.
D	E-STOP check	E-STOP should in unpressed status.
E	Grid voltage check	should be about $240 \times 105\% = 252\text{Vac}$
F	CT orientation check (partial home backup only)	CT orientation should be correct
G	Backup load	The backup load should not exceed the system requirement.

5. Power Cycle the System

a. Turn off the system.

Turn off SG button> Turn off Hybrid button> Turn off Hybrid breaker> Turn off AC breaker in mainpanel> Turn off DC PV switch> waiting 30s.

b. Turn on the system.

Turn on SG button> Turn on hybrid breaker> Turn on hybrid button> waiting for 30 sec. > Turn on DC PV switch.

 **Note:** Please contact the after-sales team if the EP CUBE system still works abnormally.