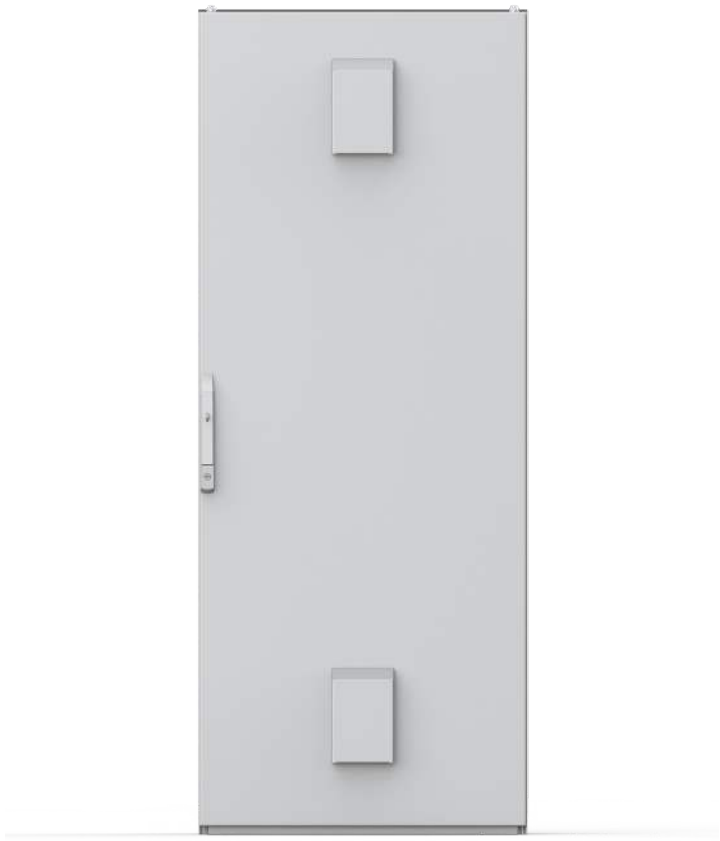
Power Hub

Express Plus DC Fast Charging Platform

Site Design Guide



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Power Hub that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® charging station.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint charging station and adhere to all national and local building codes and standards.** Before installing the ChargePoint charging station, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the charging station for proper installation before use.
3. **Always ground the ChargePoint charging station.** Failure to ground the charging station can lead to risk of electrocution or fire. The charging station must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint charging station on a concrete pad using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the charging station can result in death, personal injury, or property damage. Inspect the charging station for proper installation before use.
5. **The product components are not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Use only copper conductor wire, as specified, rated for 90 °C (194 °F).**

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

Copyright and Trademarks

Symbols

This guide and product use the following symbols:

DANGER: Risk of electric shock

WARNING: Risk of personal harm or death

CAUTION: Risk of equipment or property damage

IMPORTANT: Crucial step for installation success

Read the manual for instructions

Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Contents

Site Design Guidelines 1

This document describes how to design a project site for the ChargePoint® Power Hub distribution cabinet. This includes guidelines and best practices for electrical infrastructure and capacity planning, construction, and concrete work required prior to installation of distribution cabinets.

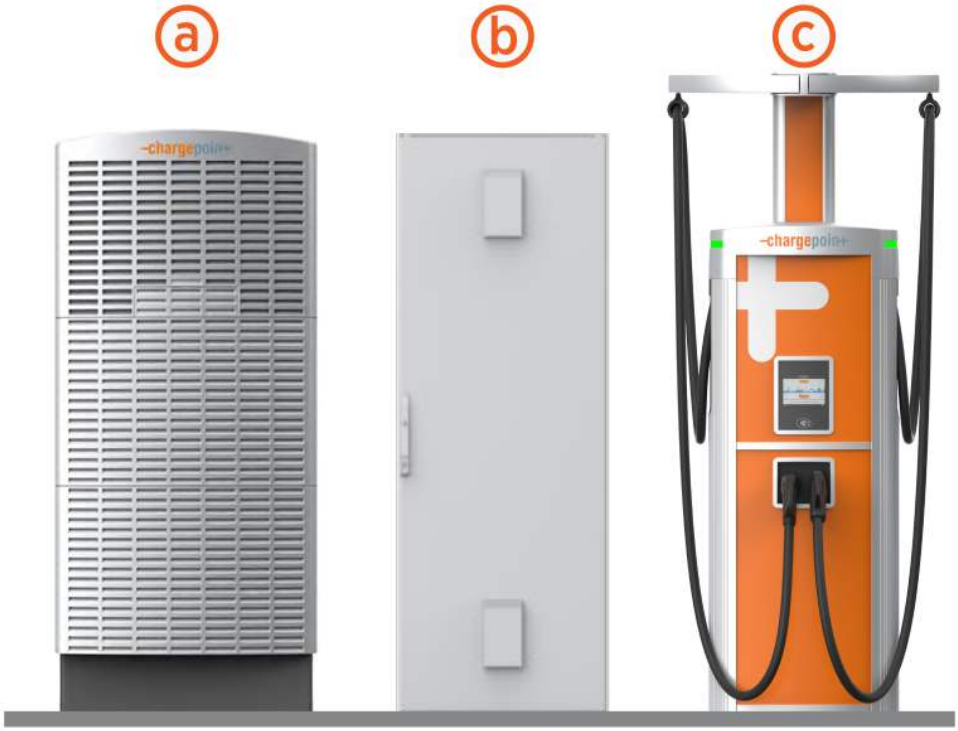
The Power Hub is a modular part of the Express Plus product family. Use this guide together with the *Express Plus Power Block and Power Link Site Design Guide* to design the full project site. Full specifications and system certifications for the Express Plus product family can be found in the product datasheets.

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

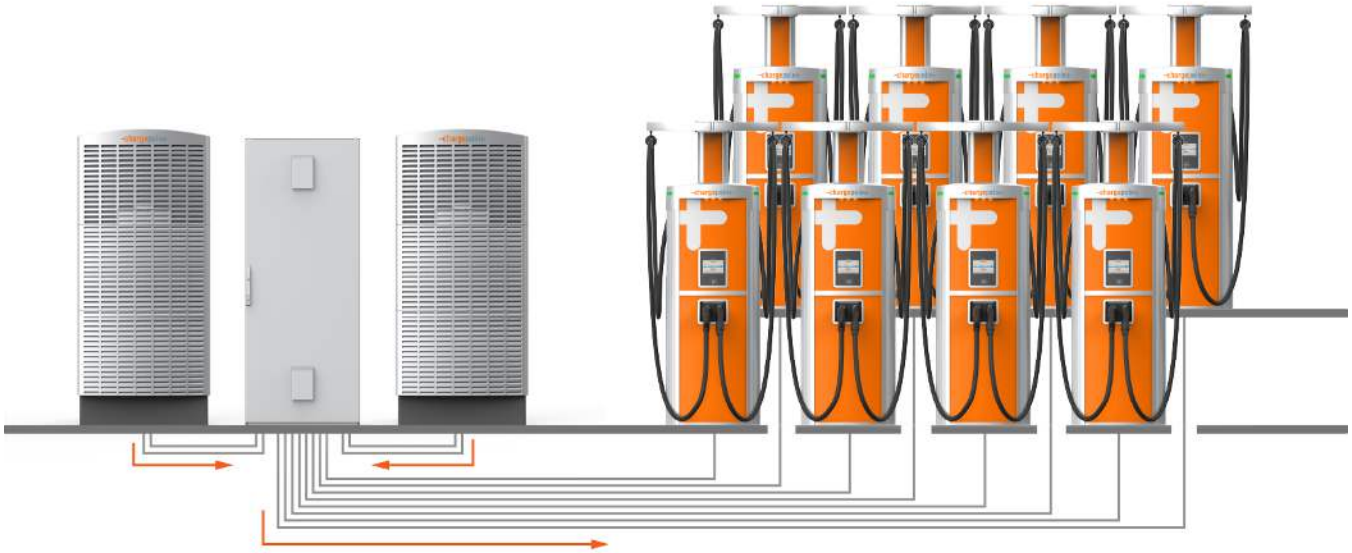
IMPORTANT: ChargePoint recommends consulting with an engineer to create site specific drawings. Ensure the installation complies with all applicable codes and ordinances.

Product Components



The Power Hub is a component of the Express Plus product family. Express Plus is a modular solution for scalable fast charging of electric vehicles, comprising the following product components:

- **(a)** Power Block: Power cabinet that converts AC power to DC power. Supplies DC output power to Power Links, either directly or through a Power Hub. Each Power Block has two DC outputs.
- **(b)** Power Hub: Distribution cabinet that enables one or more Power Blocks to distribute charging power to more Power Links than a single Power Block could support by itself.
- **(c)** Power Link: Dispenser for electric vehicles, available in single or dual input variants. Can support up to two output cables or automatic connection devices with sequential or simultaneous charging.



The Power Hub is used in fleet charging architectures. Each Power Hub can accept input power from up to two Power Blocks, and then distribute that power to as many as eight Power Links (two or four of which can actively charge at a time, depending on configuration). The configuration shown above can charge two vehicles at a time and supports sequential charging of 16 vehicles.

Internal disconnect switches enable high voltage shutoff between the Power Hub and each of its connected Power Blocks. Low voltage and Ethernet connectivity are fed from the Power Blocks to the Power Hub, and from the Power Hub to Power Links.

Initial Site Guidelines

Designing electrical infrastructure to support current and future EV charging demand can help avoid costly upgrades later as EV adoption grows.

Complete an on-site evaluation to determine conduit and wiring requirements between the planned Power Blocks, Power Hubs, and Power Links.

If you have pre-existing infrastructure or are using your own preferred electrical contractor to prepare your site, a *Power Hub Construction Signoff Form* completed by a ChargePoint Operations and Maintenance (O&M) partner is required to certify compliance with electrical specification requirements, and to ensure everything was prepared to ChargePoint specifications.

IMPORTANT: You must be a licensed electrician and complete online training to become a ChargePoint certified installer. If you do not complete training, you cannot access the ChargePoint network to complete installation.

Find online training at: chargepoint.com/installers

If the charging station is not installed by a ChargePoint certified installer, using a ChargePoint approved method, it is not covered under warranty and ChargePoint is not responsible for any malfunctions.

Power Hub Placement

WARNING: The Power Hub must be installed on a level concrete base rated for the weight of the cabinet. Asphalt cannot support the full weight of the cabinet. Failure to install on a level concrete base may cause the cabinet to tip over, resulting in death, personal injury, or property damage.

Layout considerations:

- Determine appropriate installation locations where concrete exists or can be installed (no asphalt surfaces).
- Consider locations where it will be convenient to add future stations.
- Determine the best conduit layout to minimize linear conduit costs to multiple parking spaces. If possible, avoid or minimize trenching requirements, especially more costly trenching to run conduit under asphalt surfaces.
- Comply with regional regulations, and ordinances.

Civil and Mechanical Design 2

Component Dimensions and Weight

The Power Hub is a vertical enclosure with the following dimensions and weight:

Generic Specifications	
Cabinet Height (H)	2.006 m (79 in)
Cabinet Width (W)	800 mm (31-1/2 in)
Cabinet Depth (D)	605 mm (23-3/4 in)
Cabinet Weight (as shipped)	181 kg (400 lb)

Mounting Specifications for Pads

The Power Hub is secured to a concrete pad using four embedded anchor bolts. The Power Hub can be installed on either a newly poured concrete pad or an existing concrete surface. Its input and output cables can run under the grade surface in trenches, protected by conduits, and enter the cabinet through its base. Alternatively, the cables can be run along the grade surface, protected by wireways, and enter the cabinet through its side or rear walls.

The Power Hub concrete mounting surface must be smooth and cannot exceed a slope of 20 mm per meter (0.25 inches per foot).

IMPORTANT: If an existing pad does not meet the slope requirement given above, then a localized pad must be poured and leveled to meet the slope requirement.

WARNING: If not installed correctly, ChargePoint® charging components may pose a crushing hazard, leading to death, personal injury, or property damage. Always use a ChargePoint approved surface mounting method. Always install in accordance with applicable codes and standards using licensed professionals. Non-approved installation methods are performed at the risk of the contractor and void the Limited One-Year Parts Exchange Warranty.

Pad Stability Specifications

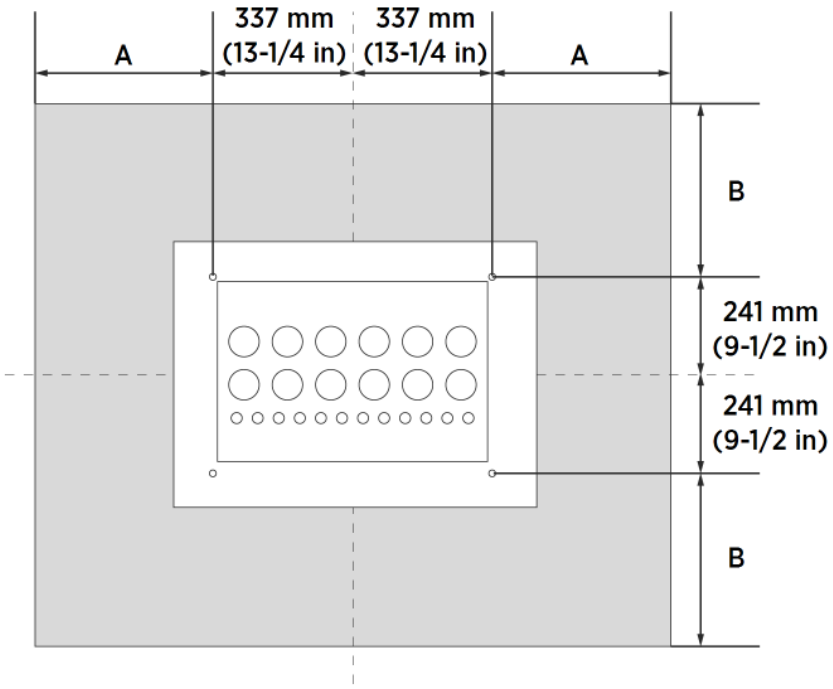
Conservative stability specifications for the Power Hub are listed below for the following design scenarios:

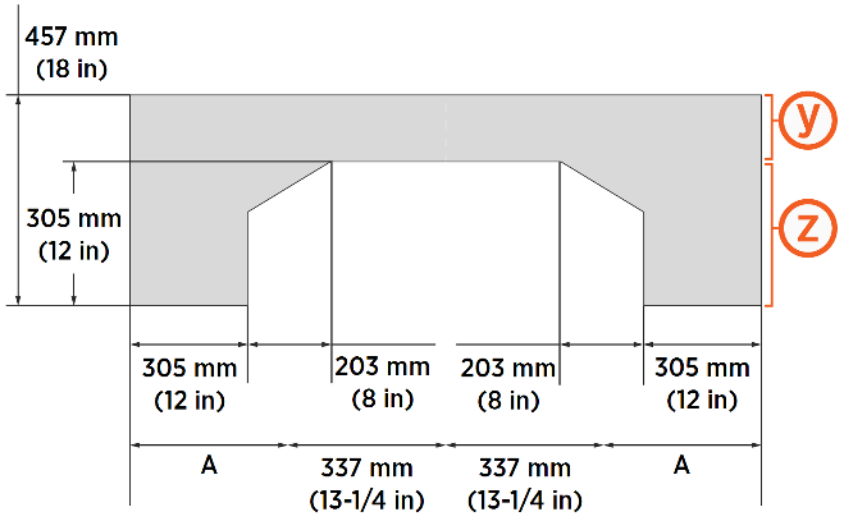
1. 170mph wind, high seismic, Class 3 Soil
2. 170mph wind, high seismic, Class 4 Soil
3. 170mph wind, high seismic, Class 5 Soil
4. 140mph wind, lower seismic, Class 3 Soil
5. 140mph wind, lower seismic, Class 4 Soil
6. 140mph wind, lower seismic, Class 5 Soil

All scenarios assume:

- Minimum concrete rating of 4,000 PSI
- An anchor bolt embedment of 102 mm (4 in) using 5/8 in diameter HILTI HAS-R 316 SS all-threaded anchor rod, epoxied with HIT-HY-200
- 305 mm (12 in) mechanically compacted granular fill subgrade beneath the pad
- #4 rebar @ 305 mm (12 in) O.C. centered in top surface of slab with standard ACI 90^{o} hook at ends of bars (see **(y)** in diagram below)
- #3 stirrup rebar @ 610 mm (24 in) O.C. maximum in perimeter base of slab (see **(z)** in diagram below)
- #4 rebar @ 305 mm (12 in) O.C. T&B within corners of rebar stirrups in perimeter base of slab

Conservative pad dimensions:





Design Scenario	Dimension A	Dimension B
1	806 mm (2 ft 7-3/4 in)	902 mm (2 ft 11-1/2 in)
2	806 mm (2 ft 7-3/4 in)	902 mm (2 ft 11-1/2 in)
3	806 mm (2 ft 7-3/4 in)	902 mm (2 ft 11-1/2 in)
4	654 mm (2 ft 1-3/4 in)	749 mm (2 ft 5-1/2 in)
5	654 mm (2 ft 1-3/4 in)	749 mm (2 ft 5-1/2 in)
6	654 mm (2 ft 1-3/4 in)	749 mm (2 ft 5-1/2 in)

Note: The Power Hub must be centered within the designed stability area.

The concrete pad for the Power Hub must either be designed to be site-specific or must meet the specifications above. In some extreme conditions, a larger pad would be required. For sites with less stringent seismic, soil, or wind conditions, a smaller pad might be possible.

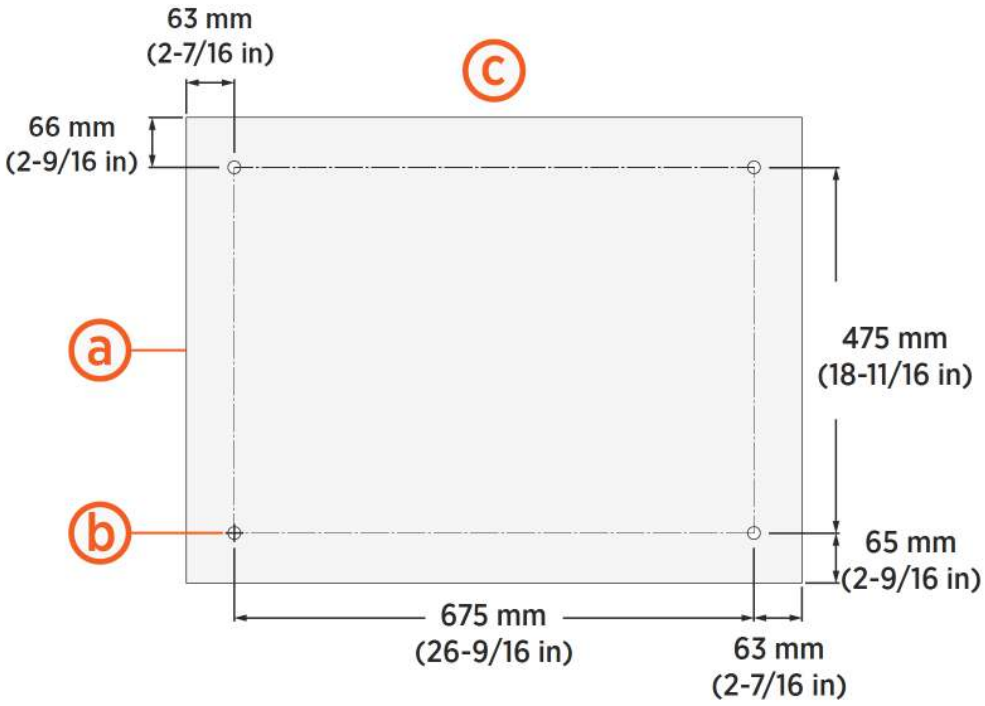
If using an existing pad that does not meet the specifications above, the pad must be inspected and approved by a structural engineer for each component's dimensions and weight. If needed, give these structural design specifications to the structural engineer for verification:

Product Weight	181 kg (400 lb)
Product Height from Ground	2.006 m (79 in)
Product Width	800 mm (31-1/2 in)
Product Frontal Area	Height * Width
CG Height	918 mm (36-5/32 in)
Number of Anchor Bolts	4
Bolt Pattern	See Concrete Pad Mount
Anchor Bolt Size and Type	5/8 in diameter HILTI HAS-R 316 SS all-threaded rod
Anchor Bolt Embedment	102 mm (4 in)

If an existing pad does not meet the site specific specifications determined by a civil engineering analysis, it must be inspected and approved by a structural engineer based on the parameters above.

Concrete Pad Mount

The Power Hub is secured to a concrete pad using four embedded anchor bolts, positioned as shown below in a top-down view.



(a) Power Hub cabinet footprint

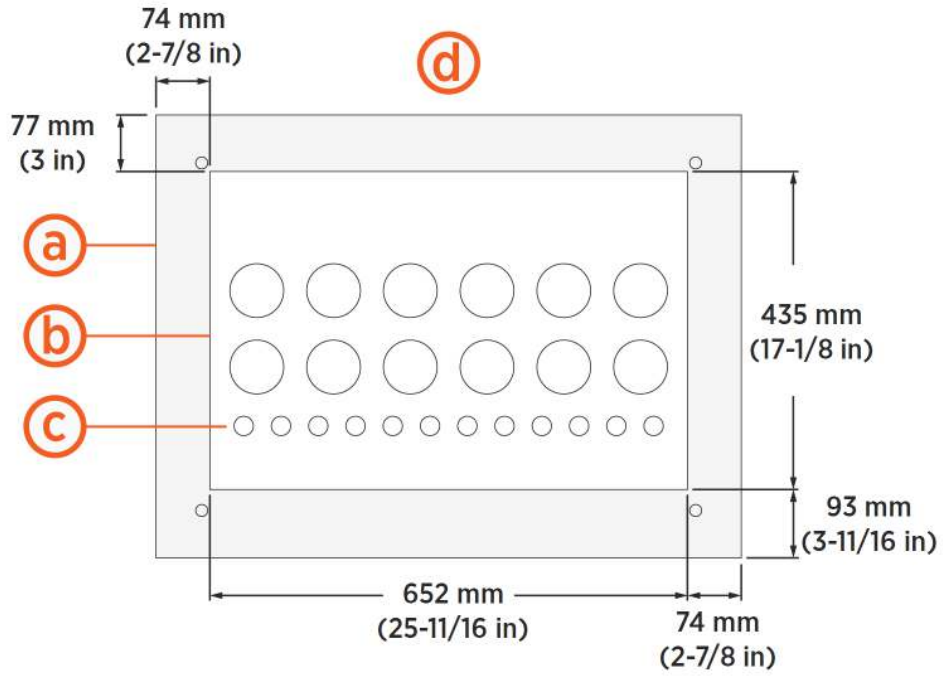
(b) 5/8 in embedded anchor bolts (x4) with 76 mm (3 in) length exposed above concrete

(c) Cabinet rear side

IMPORTANT: The anchor bolts will slot into 20 mm (13/16 in) diameter bolt holes at the base of the Power Hub cabinet. Design for appropriate tolerance in the placement of the anchor bolts.

Stub-up Conduit Entry

A new pad installation with stub-up conduit entry through the cabinet floor is the most common mounting method for the Power Hub. A top-down view of the conduit stub-up and cable entry location is shown below.



(a) Power Hub cabinet footprint

(b) Floor opening for conduit and wire entry

(c) Conduits

Note: Conduits shown are for illustrative purposes only. Conduits may be positioned in any arrangement within the floor opening. Consider wire routing when designing conduit placement. See Appendix: Wire Landing Locations. A gland plate that covers the opening may be equipped with conduit fittings.

(d) Cabinet rear side

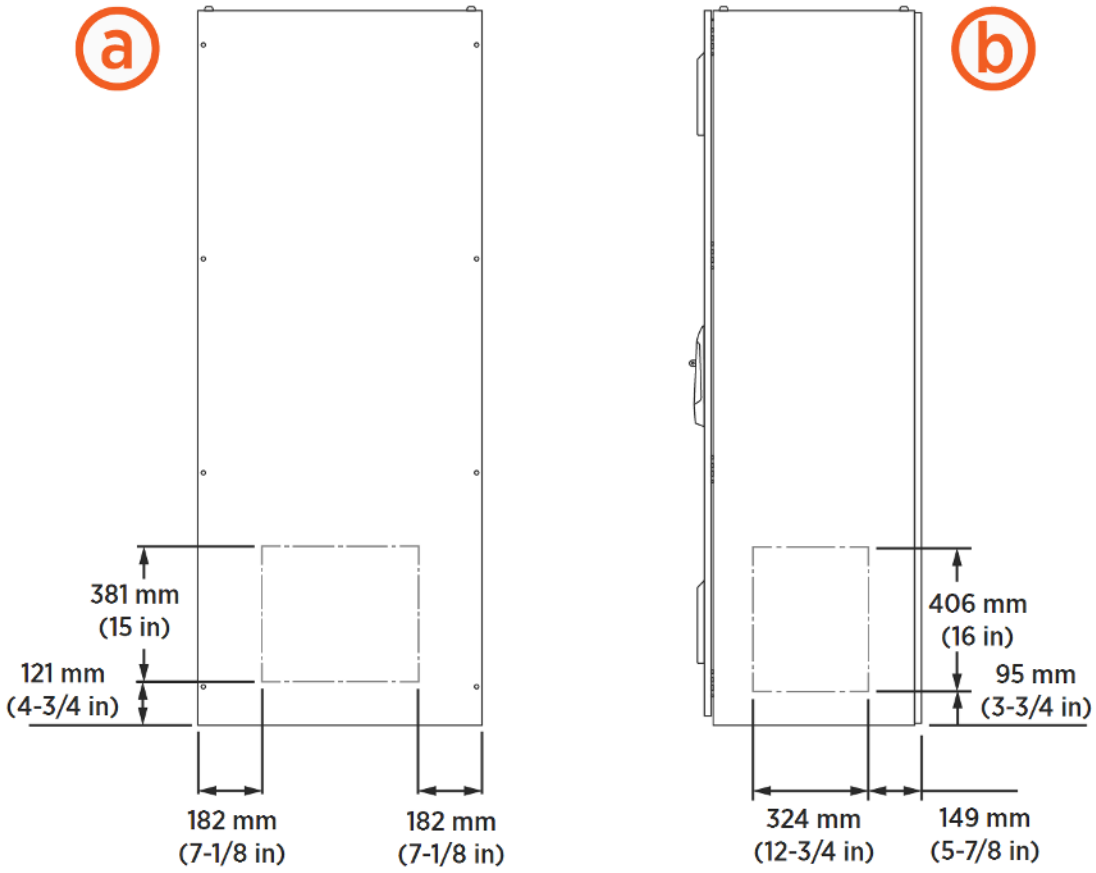
For maximum wire and conduit size limits, see Conduit and Wiring Requirements.

Riser Kit

A Riser Kit is available for installations requiring additional space beneath the Power Hub cabinet for conduit fittings or cable glands. The Riser Kit raises the Power Hub cabinet by 100 mm (4 in).

Surface Conduit Entry

Power Hub supports wiring that is run above ground in protected wireways, for locations where no underground wiring access exists (parking garages, etc.). Surface wires may enter at the rear **(a)** or sides **(b)** of the cabinet, within the areas indicated below. Wires may be arranged in any position within the allowed area, and the cabinet wall may be equipped with conduit fittings.



If cables are run above grade, they must be housed in wireways that conform to local code. Select a surface conduit entry solution that:

- Supports the weight of conduits and components without compromising panel integrity
- Ensures all terminations meet ingress requirements where they meet the component

To prepare the site for above grade wiring:

- Ensure the plans for the concrete pad and access area allow full service access to all components. Surface conduit entry might require larger clearance areas than underground conduit entry installations.
- Prepare the concrete surface where the components will be anchored so that the concrete is solid and smooth, with no old hardware or stub-ups extending above grade.

Drainage

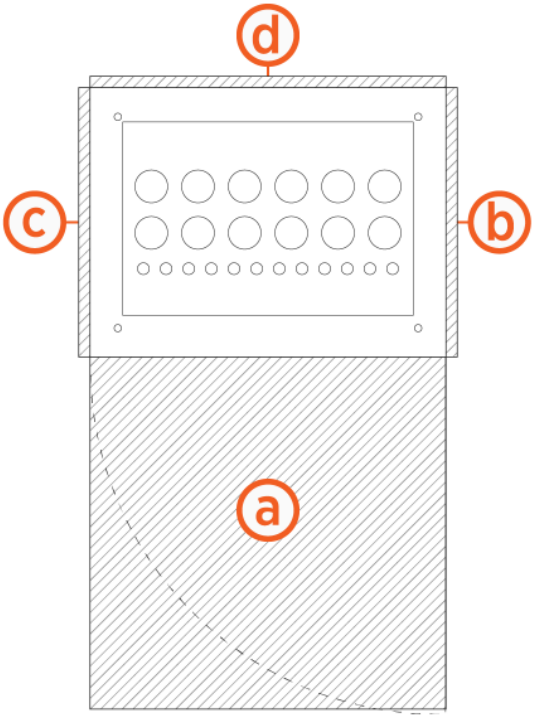
Ensure any site slopes, walls, or fencing do not trap water around the cabinet installation site.

WARNING: Exposing the ChargePoint® charging components to over 457 mm (18 in) of standing water could create an electrocution, shock, or fire hazard.

If the component has been exposed to standing water, cut power to the component and contact ChargePoint before the component is powered on.

Clearances

A Power Hub configured for stub-up conduit entry requires minimum site and service clearances listed below.



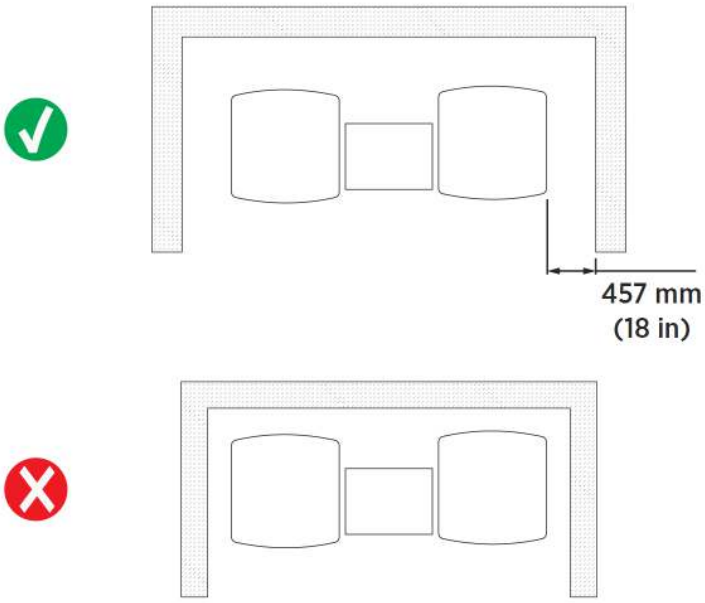
- **(a)** Front: 792 mm (31-1/4 in) required
- **(b)** Right side: 51 mm (2 in) required
- **(c)** Left side: 51 mm (2 in) required
- **(d)** Rear: 51 mm (2 in) required

  Note: See Disconnect Switch and Second Input Kit for additional information related to rear clearance.

Front and rear clearances must be at grade level +/- 13 mm (1/2 in).

Side clearances can be shared between Power Blocks and Power Hubs as long as:

- Front and rear clearances are maintained
- At least 457 mm (18 in) of clearance exists at each end of a row of Power Blocks and Power Hubs
- Access to the back of each Power Block exists for maintenance



Note: For any questions about allowable layouts, contact ChargePoint.

A Power Hub configured for surface conduit entry may require additional clearance at any side of the cabinet hosting conduit entry. Allow sufficient space for cable bend and pull.

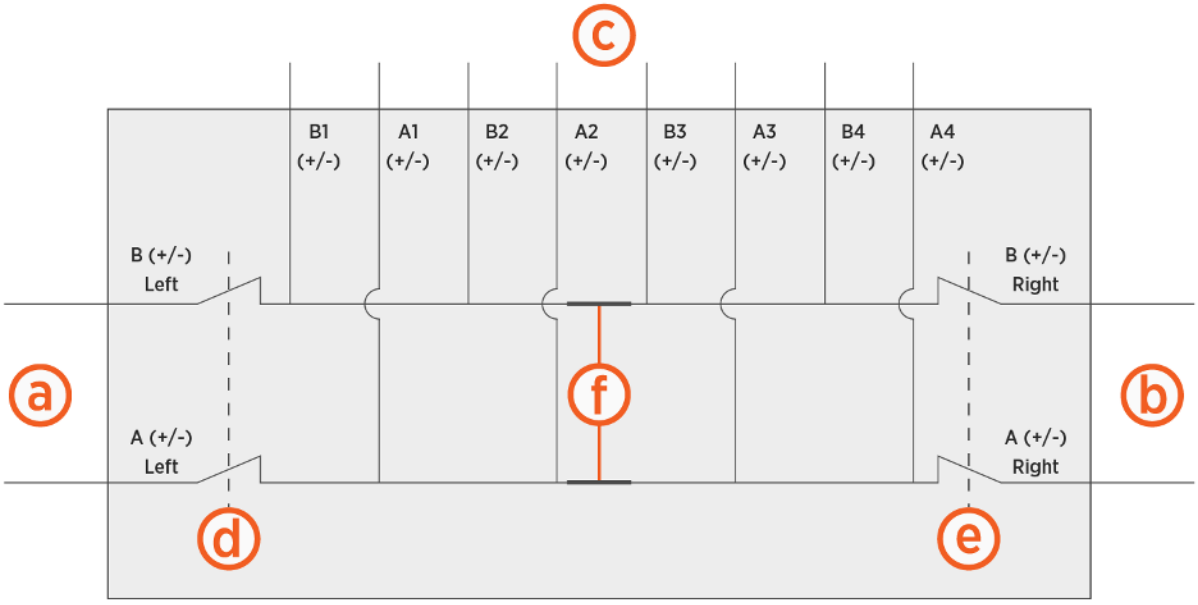
IMPORTANT: Check local and regional code for any additional clearance requirements regarding safety and high voltage equipment.

Accessibility

Comply with regional accessibility laws, regulations, and ordinances. The Power Hub must not block ramps or pathways.

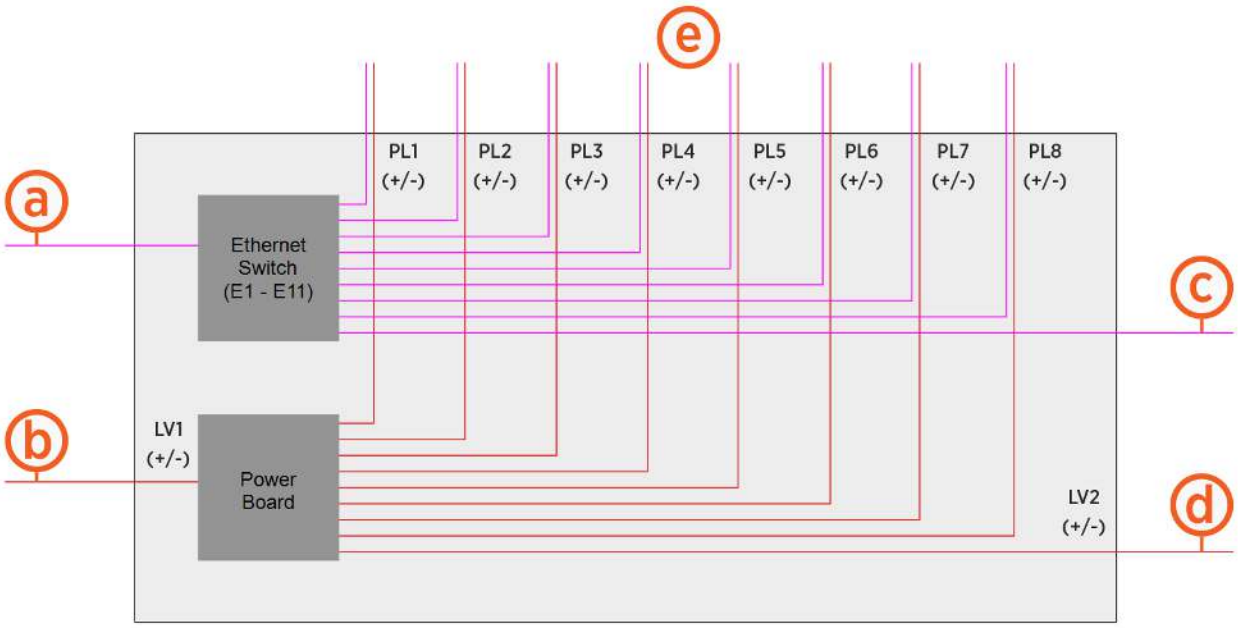
Electrical Design 3

Input Output Line Diagrams



The Power Hub is configured with two high voltage buses with the following elements:

- **(a)** Two left side high voltage DC inputs
- **(b)** Two right side high voltage DC inputs (optional)
- **(c)** Eight high voltage DC outputs that connect to Power Links
  - One high voltage DC output per single input Power Link, or
  - Two high voltage DC outputs per dual input Power Link
- **(d)** Left disconnect switch
- **(e)** Right disconnect switch
- **(f)** Removable bus jumpers



The Power Hub is configured for the following 48 VDC and Ethernet inputs and outputs:

- **(a)** One left side Ethernet input
- **(b)** One left side 48 VDC input
- **(c)** One right side Ethernet input
- **(d)** One right side 48 VDC input
- **(e)** Eight pairs of 48 VDC and Ethernet outputs

Grounding Requirements

Different charging components must be bonded to one another in sequence: Power Block to Power Hub to Power Links. The Power Block must be connected to a grounded, metal, permanent wiring system. An equipment-grounding conductor must be run with circuit conductors and connected to an equipment-grounding terminal or lead on the Power Hub.

Note: Some regions also require a grounding rod to be installed adjacent to each component. Check local code to ensure compliance.

Disconnect Switch and Second Input Kit

The disconnect switch provides high voltage DC shutoff between a Power Hub and its input Power Block. This functionality improves system up-time during maintenance, as it allows servicing of the Power Links without powering off the Power Blocks.

The Power Hub ships equipped for high voltage DC inputs from one Power Block, denoted Power Block Left. This default configuration includes hardware for landing high voltage DC cables from Power Block Left, and a disconnect switch for high voltage DC power shutoff from Power Block Left.

The Power Hub can be configured to accept high voltage inputs from a second Power Block, denoted Power Block Right, by installing a Second Input Kit. The Second Input Kit includes hardware for landing high voltage DC input cables from Power Block Right, as well as a second disconnect switch for power shutoff from Power Block Right. Adding a second Power Block to a Power Hub doubles the power available to share across connected Power Links.

The Second Input Kit must be ordered separately, and is field installed into the Power Hub. Installation of the Second Input Kit can be performed solely from the front side of the cabinet; however it is more easily installed when there is both front and rear acess to the cabinet. In cases where the rear clearance of an installed Power Hub shall be less than 812.8 mm (32 in), it is easiest to install the Second Input Kit prior to mounting the Power Hub into its final location. For example, it may be installed in the field while the Power Hub is still attached to its shipping and transport pallet. For the case in which an installed Power Hub may be connected to a second Power Block at a future time, consider pre-installing a Second Input Kit prior to initial cabinet mount.

Split Bus Configuration

The Power Hub ships configured as a dual bus system that supports charging of two vehicles at a time, one vehicle per bus. When used with two Power Block inputs, the Power Hub can be configured in a split bus configuration that supports charging of four vehicles at a time. This configuration is achieved by removing a set of bus jumpers from the high voltage DC output terminals. Jumper removal is done in the field from the front of the cabinet.

Note: The Power Hub must have two Power Block inputs to be used in split bus configuration.

IMPORTANT: If a Power Hub is used in split bus configuration, the designation "Split Bus" must be made on the single line diagram provided to installers.

Power Link Configuration

All Power Links connected to a Power Hub must be configured with a DC Input Kit. For more information, refer to the *Express Plus Power Link Service Guide*.

Additionally, ChargePoint highly recommends installing a maintenance switch on each Power Link connected to a Power Hub to improve system uptime during maintenance. For Power Links that do not have a maintenance switch, servicing the station requires the upstream Power Block (or Power Blocks) be powered off. This can affect system uptime and fleet scheduling. Maintenance switches are an orderable option for pedestal stations.

If an external maintenance switch is used, the switch must be configured with Normally Closed (NC) contact feedback wired into each Power Link.

Conduit and Wiring Requirements

The default Power Hub installation utilizes stub-up conduit entry, although surface conduit entry is also supported. Service wiring must be run through conduit or ducting, or use armored cable, as required to comply with local electrical codes. Consult national and local codes or a project engineer to determine the grade, quality, and size of the conduits and cables.

Note: All wiring and conduit are supplied by the contractor unless otherwise indicated.

For full product specifications, refer to the *Express Plus Power Hub Datasheet*. Using that data, ensure the installation location is equipped with service wiring that supports the Power Hub site's power requirements.

IMPORTANT: All AC and HV DC conductors landing on Express Plus equipment shall be copper and rated to 90°C (194°F) minimum. All 48 VDC conductors must be rated to 75°C (167°F) minimum and 90°C (194°F) is recommended.

In regions that use conduit, the outer diameter of conduit must not exceed the trade sizes listed below. In regions that do not use conduit, armored cable may be used.

Notes for all wiring regions:

- 48 VDC wiring must be rated for 1000 V.
- Ethernet communication between Power Hub, Power Blocks, and Power Links must be outdoor rated Cat6 Shielded Twisted Pair (STP) cable. Lesser grades of cable do not have the required noise immunity. The shield wire must be terminated at only one end, the source end:
    - For Ethernet cables connecting between Power Block and Power Hub, terminate the shield wire only at the Power Block.
    - For Ethernet cables connecting between the Power Hub and Power Links, terminate the shield wire only at the Power Hub.
- All sizes are generic and provided for reference only. The installation contractor must perform site-specific wire sizing, taking into account installation method, current carrying capacities, site conditions, and applicable codes.
- For surface conduit entry, use only conduit fittings rated for Type 3R or IP56 to connect the conduit to the cabinet wall.

Conduit and Wire Size Requirements

Note: The tables below provide wire sizes assuming a maximum ambient temperature of 50°C (122°F). Actual wire sizing, quantity, and types should be designed to be site-specific.

Low Voltage Gauge and Quantity

Type	Wire Voltage Rating	Wire Quantity x Size	Min. Conduit Trade Size
48 VDC Input	1000 VDC	2 x 16 mm^2 (6 AWG)* (one per pole)	21 mm (3/4 in) (two LV wires and one Ethernet wire in one conduit from each Power Block)
Ethernet Input		1 x Cat6 STP, straight-through T568-B pattern, outdoor rated	
48 VDC Output	1000 VDC	2 x 16 mm^2 (6 AWG)* (one per pole)	21 mm (3/4 in) (two LV wires and one Ethernet wire in one conduit to each Power Link)
Ethernet Output		1 x Cat6 STP, straight-through T568-B pattern, outdoor rated	

***Note:** 48 VDC wire size may not be smaller than listed specification. The specified size accommodates voltage drops that can occur when there are long runs between the Power Hub and Power Links.

High Voltage Gauge and Quantity

Type	Max. Wire Quantity x Size	Max. Conduit Trade Size	Lug
350 A, 1000 V DC Input	6 x 95 mm^2 (3/0 AWG) per input (six per input and three per pole)* (two inputs from each Power Block)	63.5 mm (2-1/2 in) (six HV and one ground wire per conduit)* (one conduit per input)	Long tongue with two holes spaced 44.5 mm (1-3/4 in) apart, must fit 13 mm (1/2 in) stud
350 A, 1000 V DC Output	6 x 95 mm^2 (3/0 AWG) per output (six per output and three per pole)* (each Power Hub supports up to eight outputs)	63.5 mm (2-1/2 in) (six HV and one ground wire per conduit)* (one conduit per output)	
Ground	Size in accordance with local codes	See above	Single hole, must fit M6 stud

*This wire configuration is specific to the case of using the maximum wire size.

Note: The DC high voltage output of the Power Hub is the DC high voltage input for Power Link. Design wire sizing based on the Power Link DC input rating. Refer to the *Express Plus Site Design Guide* for specifications on maximum number of wires per Power Link DC high voltage input.

Wire, Voltage, and Current Ratings

-	HVDC	48 VDC	Ethernet
Circuit Voltage	100-1000 V	48 V	--
Max Current	350 A	28 A for input 26 A for output	--
Notes	Rated for 1000 V	Rated for 1000 V	Outdoor rated Cat6 STP

Concrete Pad Preparation 4

Prepare each Power Hub installation site for cabinet mount by installing four anchor bolts into the concrete surface. The Power Hub can be mounted on either a newly poured concrete pad or an existing concrete surface.

To safely mount a Power Hub, the concrete pad must meet the specifications listed in Pad Stability Specifications.

IMPORTANT: If the existing pad does not meet the specifications above, a structural engineer must inspect and approve the pad for Power Hub dimensions and weight.

IMPORTANT: Always check local codes to ensure compliance. You may need to adjust these instructions to comply with codes that apply at your installation location.

WARNING: Do not use expanding anchor bolts. Do not install the Power Hub on an asphalt surface.

Parts Required

5/8 in anchor bolts (x4)

Tools and Consumables Required

The following table lists and describes tools and consumable items that you will need. The quantity listed in the table is based on installation of one Power Hub cabinet.

Note: The consumption rate of these products varies depending on conditions at the installation site.

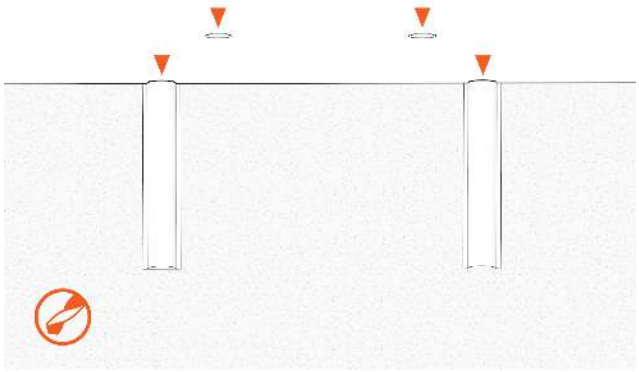
Quantity	Description	Purpose
1	Epoxy adhesive for concrete such as HIT-HY 200 adhesive	Fill drilled holes
1	Electrical cleaning and maintenance aerosol, any angle spray duster, 235 ml (8 oz) (Alternative: Compressed air)	Clean drilled holes
1	Industrial vacuum cleaner	Clean drilled holes
1	Slow spiral round-shank masonry drill bit • 19 mm (3/4 in) diameter • 12.5 mm (1/2 in) shank • 254 mm (10 in) drill depth • 152 mm (6 in) length overall	Drill 19 mm (3/4 in) holes in concrete
1	Electric hammer drill with 12 mm (1/2 in) or larger chuck.	Drive drill bits
1	Drill bit for concrete embedded rebar, round • 19 mm (3/4 in) bit size • 12.5 mm (1/2 in) shank diameter • 152 mm (6 in) length overall	Drill 19 mm (3/4 in) holes through rebar
1	Nylon loop handle brush • 19 mm (3/4 in) brush diameter • 75 mm (3 in) length brush • 216 mm (8-1/2 in) length overall	Clean drilled holes
1	Push-on round cap, fits 16 mm (5/8 in) - 17.5 mm (11/16 in) OD, 12.7 mm (1/2 in) inside height, quantity four required per Power Hub	Hazard protection

Installation Instructions

1. Consult the site plan and mark the locations for the four anchor bolts.

   IMPORTANT: Place the anchor bolt location marks accurately, especially in relation to each other. The cross-marks should precisely define the corners of a rectangle. Refer to Concrete Pad Mount.

2. Drill four 19 mm (3/4 in) diameter holes to a minimum depth of 102 mm (4 in) at the marked locations.

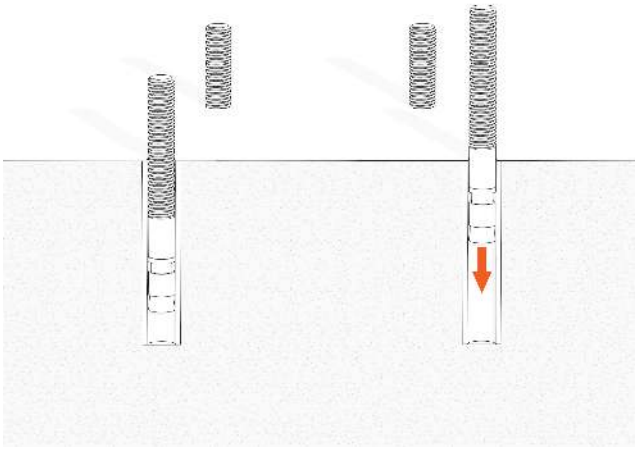


   Note: You may need two drill bits: one for the concrete (with the pilot) and another for the rebar (without the pilot). Always start the hole using the standard drill bit, and then switch to the rebar drill bit only if drilling through rebar.

3. Remove all dust from inside the drilled holes using compressed air, a vacuum, or a brush.
4. Fill each hole with epoxy to about 50 to 65 mm (2 to 2-1/2 in) below the top of the hole. Continue immediately to the next step because the epoxy sets quickly.

   Note: Inserting the threaded bolts displaces the epoxy, causing it to fill the holes to the grade level. If the epoxy is below grade level after the next step, add more epoxy.

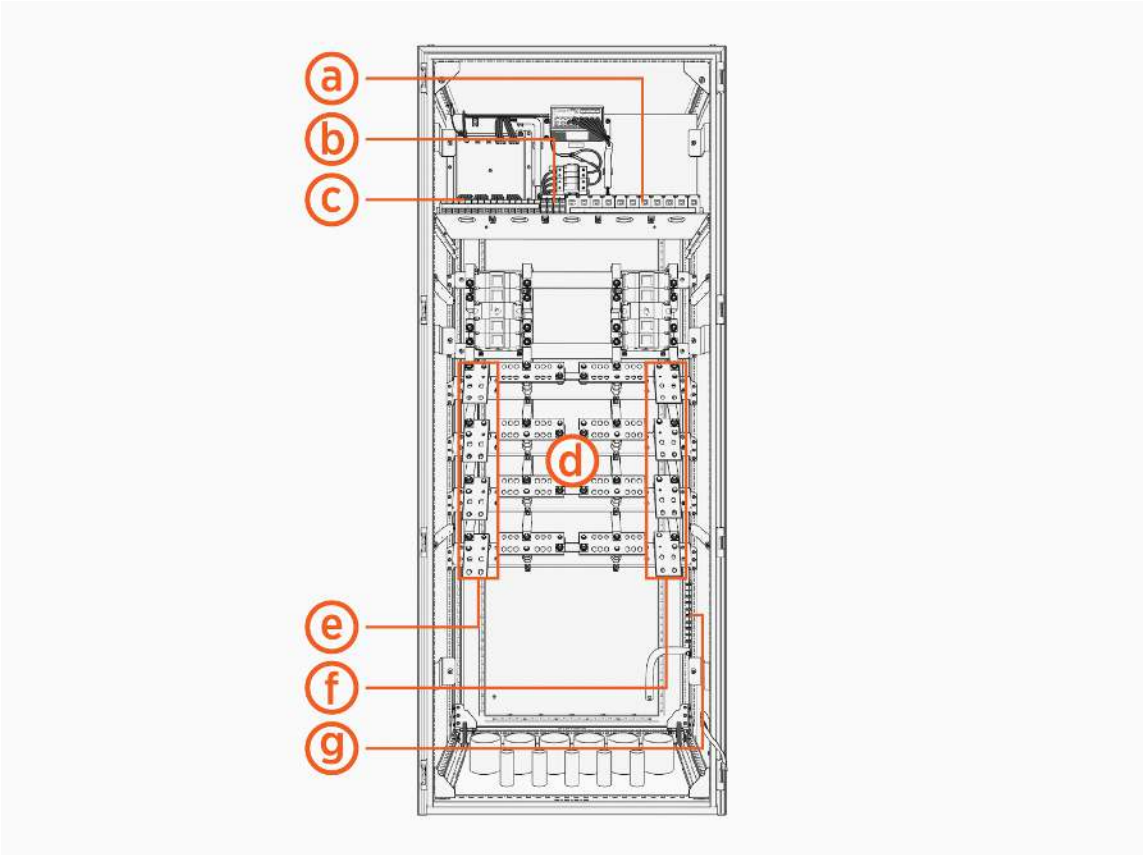
5. Insert the bolts into the holes, leaving 75 mm (3 in) of each bolt exposed above concrete.



IMPORTANT: Rotate the bolts as you insert them. This allows the epoxy to fully coat the threads of the bolts, reducing the amount of trapped air.

6. Use a bubble level to ensure the bolts are plumb.
7. Allow the epoxy to cure (depending on cure times recommended by the epoxy manufacturer).
8. Install caps over the bolts.

Appendix: Wire Landing Locations A



(a) Ethernet ports, all ports equivalent

(b) 48 VDC input terminals, LV1 (+/-) and LV2 (+/-)

(c) 48 VDC output terminals, PL1 (+/-) through PL8 (+/-)

(d) High voltage DC output terminals, A1 (+/-) through A4 (+/-) and B1 (+/-) through B4 (+/-)

(e) High voltage DC input terminals left, Input A (+/-) Left and Input B (+/-) Left

(f) High voltage DC input terminals right, Input A (+/-) Right and Input B (+/-) Right

Note: These terminals are absent if the Power Hub connects to only one Power Block.

(g) Ground studs

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