



# XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures

## Description and Installation Manual

Specification Number: F2013092, F2014058, F1010712, F2016040, F2015002, F2015018

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Vertiv assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Refer to other local practices or building codes as applicable for the correct methods, tools, and materials to be used in performing procedures not specifically described in this document.

The products covered by this instruction manual are manufactured and/or sold by Vertiv. This document is the property of Vertiv and contains confidential and proprietary information owned by Vertiv. Any copying, use or disclosure of it without the written permission of Vertiv is strictly prohibited.

Names of companies and products are trademarks or registered trademarks of the respective companies. Any questions regarding usage of trademark names should be directed to the original manufacturer.

### **Technical Support Site**

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

## TABLE OF CONTENTS

<b>Admonishments Used in this Document.....</b>	<b>v</b>
<b>Important Safety Instructions.....</b>	<b>vi</b>
Safety Admonishments Definitions.....	vi
Safety and Regulatory Statements.....	vi
Déclarations de Sécurité et de Réglementation.....	vi
<b>1 About this Document.....</b>	<b>1</b>
1.1 Purpose.....	1
1.2 Information Not Provided in this Document.....	1
1.3 Safety.....	2
<b>2 Description.....</b>	<b>2</b>
2.1 Application.....	2
2.1 Environmental.....	2
2.2 Standards Compliance.....	2
2.3 Safety Listed AC and DC Components.....	2
2.4 Commercial AC Service.....	3
2.5 Enclosure Dimensions, Weights and Physical Specifications.....	3
2.6 Enclosure Features and Options.....	5
2.6.1 Mechanical.....	5
2.6.2 Cooling System.....	8
2.6.3 Battery Options.....	8
2.6.4 AC Power.....	8
2.6.5 19" Vertiv™ NetSure™ 502, Rack Mounted DC Power System.....	9
2.6.6 Enclosure Alarms.....	9
2.6.7 Mounting Options.....	10
2.6.8 Cable Entry.....	11
<b>3 Opening and Closing the Enclosure Doors.....</b>	<b>12</b>
3.1 Available Latch Types.....	12
3.2 Opening a Door.....	12
<b>3.3 Closing a Door.....</b>	<b>12</b>
<b>4 Site Selection.....</b>	<b>14</b>
<b>5 Transportation and Storage.....</b>	<b>15</b>
<b>6 Preparing for Pole Mount Installation.....</b>	<b>15</b>
6.1 Ground Preparation of Small Cell Enclosures.....	15
6.2 Unpacking the Enclosure.....	15
6.3 Lifting Preparation.....	15
6.4 Joining of Power and Battery Enclosures.....	16
6.5 Installation of Pole Side and Outside Hang Brackets.....	18
<b>7 Pole-Mounting.....</b>	<b>20</b>
7.1 Pole-Mount Bracket Kit Components.....	20
7.2 Pole-Mount Bracket Kit Installation.....	21
7.2.1 Procedure for Drilling Holes in Wooden Utility Poles.....	21
7.2.2 Procedure for Installation of Threaded Rods.....	22

- 7.2.3 Procedure for Installation of Pole-Mount on Threaded Bolts.....23
- 7.3 Installation of Enclosures on Pole-Mount Bracket.....23
  - 7.3.1 If Lifting Enclosures with Bucket Truck.....24
  - 7.3.2 If Lifting Enclosures with a Hoist.....24
- 8 Wall-Mounting .....26**
- 8.1 Wall-Mount Kit Components.....26
- 8.2 Wall-Mount Kit Installation.....26
- 9 AC Power.....27**
- 9.1 Safety Precautions.....27
- 9.2 Enclosure AC Schematic.....27
- 9.3 Grounding the Enclosure.....27
- 9.4 AC Input Connections.....30
  - 9.4.1 General.....30
- 10 Installing and Connecting Batteries.....31**
- 10.1 Safety Precautions.....31
- 10.2 General.....31
- 10.3 Use of Digital Multimeter.....32
- 10.4 Installing Batteries.....33
  - 10.4.1 Installation Procedure.....33
- 10.5 Connecting Batteries to Vertiv™ NetSure™ Power System.....43
- 11 Maintenance Procedures.....45**
- 11.1 Battery Enclosure Ventilation Openings.....45
- 11.2 Battery Troubleshooting and Maintenance.....45
- 11.3 Battery Replacement.....45
- 12 Related Documentation .....46**
- 13 Accessories and Replacement Parts .....46**
- 14 DC Power, Outdoor Enclosure & Service Contacts .....46**

## Admonishments Used in this Document



**DANGER!** Warns of a hazard the reader *will* be exposed to that will *likely* result in death or serious injury if not avoided. (ANSI, OSHA)



**WARNING!** Warns of a potential hazard the reader *may* be exposed to that *could* result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



**CAUTION!** Warns of a potential hazard the reader *may* be exposed to that *could* result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



**ALERT!** Alerts the reader to an action that *must be avoided* in order to protect equipment, software, data, or service. (ISO)



**ALERT!** Alerts the reader to an action that *must be performed* in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



**FIRE SAFETY!** Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



**SAFETY!** Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

# **Important Safety Instructions**

## **Safety Admonishments Definitions**

Definitions of the safety admonishments used in this document are listed under “Admonishments Used in this Document” on page v.

## **Safety and Regulatory Statements**

Refer to Section 4154 (provided with your customer documentation) for Safety and Regulatory Statements.

## **Déclarations de Sécurité et de Réglementation**

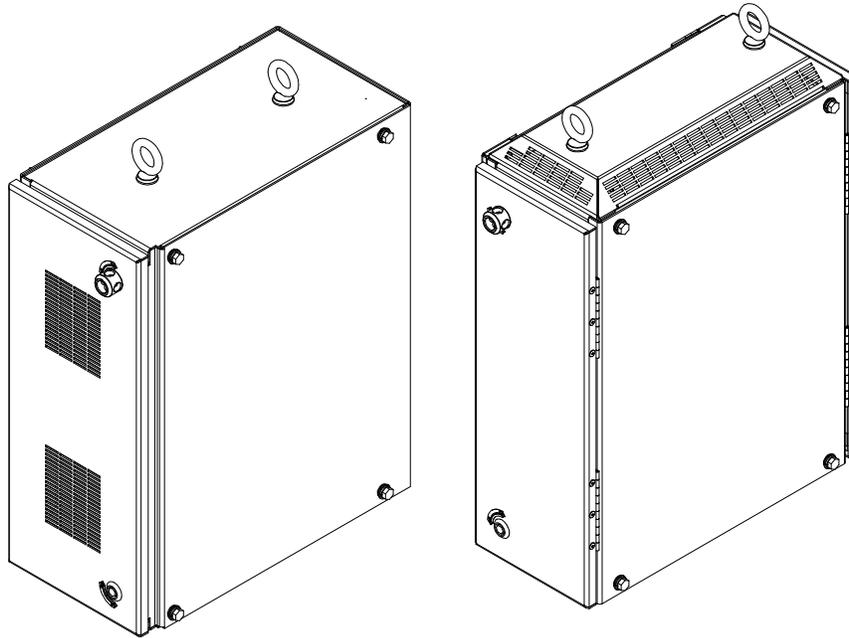
Reportez-vous à la Section 4154 (fourni avec les documents de votre client) pour les déclarations de sécurité et de réglementation.

# 1 About this Document

## 1.1 Purpose

This practice provides a detailed description of and installation instructions for Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures. This collection of separate power and battery enclosures can be combined in a variety of configurations to satisfy the power and backup requirements seen in small cell node applications. See Table 1.1.

**Figure 1.1 Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure**



**Table 1.1 Enclosure Part Numbers and Descriptions**

Part Number	Description
F2013092	Small Cell 120V Power Enclosure with NS502 System
F2014058	Small Cell 120/208V or 120/240V 1PH Power Enclosure with NS502 System
F1010712	Small Cell Battery Enclosure



**NOTE!** If holes are drilled into the exterior of this enclosure and not filled using a seal tight connector, the manufacturer's warranty will be void.

## 1.2 Information Not Provided in this Document

Procedures related to the provisioning, start-up, and acceptance of associated telecom equipment are not covered in this document. This includes, but is not limited to:

- Setup and maintenance of rectifiers, controller, and batteries.
- OSP cable fishing, sealing, grounding, splicing, and termination.

Documents that supplement the information in this document are referenced in "Related Documentation" on page 46.

## 1.3 Safety

Please refer to “Standards Compliance” on page 2 for listing of safety regulated components.

# 2 Description

## 2.1 Application

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures are designed to provide secure and protected environment for power and batteries.

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure uses a field proven structural system, integrated mechanical components and sealing system that will protect equipment against severe weather, rain, dirt and snow.

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures are passively cooled to optimize reliability and ease of maintenance while maintaining a controlled environment for power and batteries.

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures can be pad, pole or wall mounted.

## 2.1 Environmental

- Operating Ambient Temperature Range: -40 °F to +115 °F (-40 °C to +46 °C).
- Relative Humidity: Capable of operating in an ambient relative humidity range of 5% to 95%, non-condensing.

## 2.2 Standards Compliance

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures are designed to meet the following standards:

- Telecordia, GR-487-CORE Issue4, April 2009
- Underwriters Laboratory, UL 2416/NWIN, Type 3R.
- The equipment shall be installed or serviced by trained service personnel in accordance with the applicable requirements of the National Electrical Code, ANSI/NFPA 70 or Canadian Electrical Code and the applicable sections of ANSI C2, the National Electrical Safety Code.

Battery Outgas: The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure is capable of venting 20 mL/min of hydrogen to maintain a maximum concentration of 1% or less per the requirements of Telecordia GR487 CORE Issue 4. Any installed battery plant must not exceed a total of 20 mL/min of hydrogen generation, otherwise there is risk of exceeding 1% safe concentration level in the battery compartment and or enclosure.

## 2.3 Safety Listed AC and DC Components

A typical Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure includes listed or recognized components for United States. Example of these types of components are identified below:

- AC Terminal Blocks
- GFI AC Receptacle
- AC-DC Rectifiers

## 2.4 Commercial AC Service

AC power to be provided by customer via an upstream power source, load center or Power Pedestal.

Power Service Required: 120VAC, 120/208VAC or 120/240VAC, 1 phase, 60Hz with upstream fuse protection and upstream surge protection.

## 2.5 Enclosure Dimensions, Weights and Physical Specifications

Standard Sizes - The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures are available in two (2) sizes. See Table 2.1.

Dimensions and Weights - Refer to Table 2.1 and Figure 2.1 and Figure 2.2.

Color - Off-White/Cool White

Finish - Finished in multistage dry powder polyester paint for maximum durability and performance against corrosion.

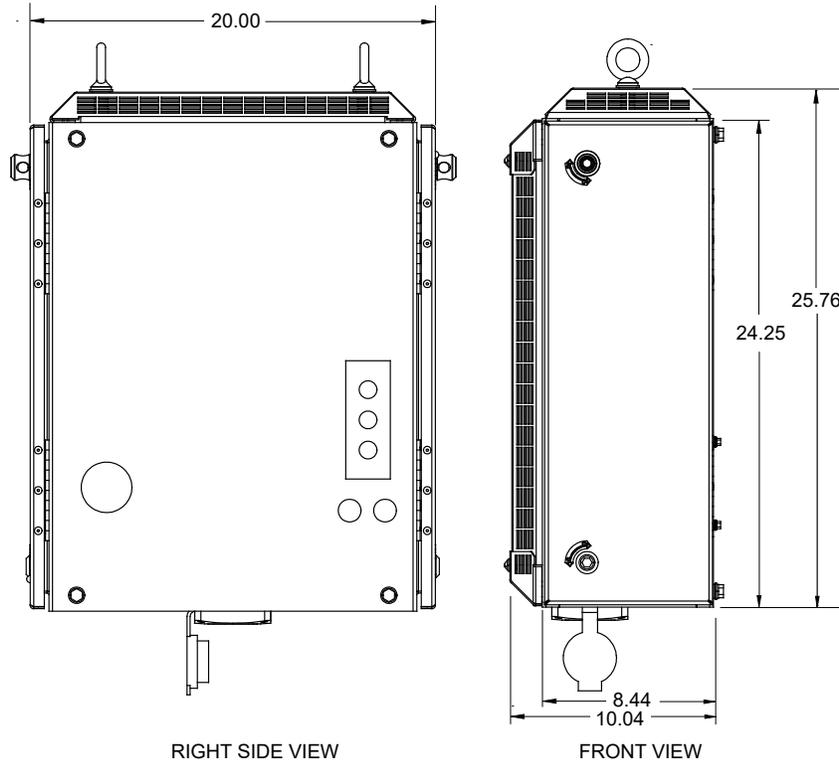
**Table 2.1 Dimensions and Weights**

Configurations	Enclosure Application	Height [inches (mm)]	Depth [inches (mm)]	Width [inches (mm)]	Estimated Weight [lbs (kgs)]
F2013092	Power	25.76"	20"	10"	64
F2014058	Power	25.76"	20"	10"	64
F1010712	Battery	24.25"	20"	10"	51

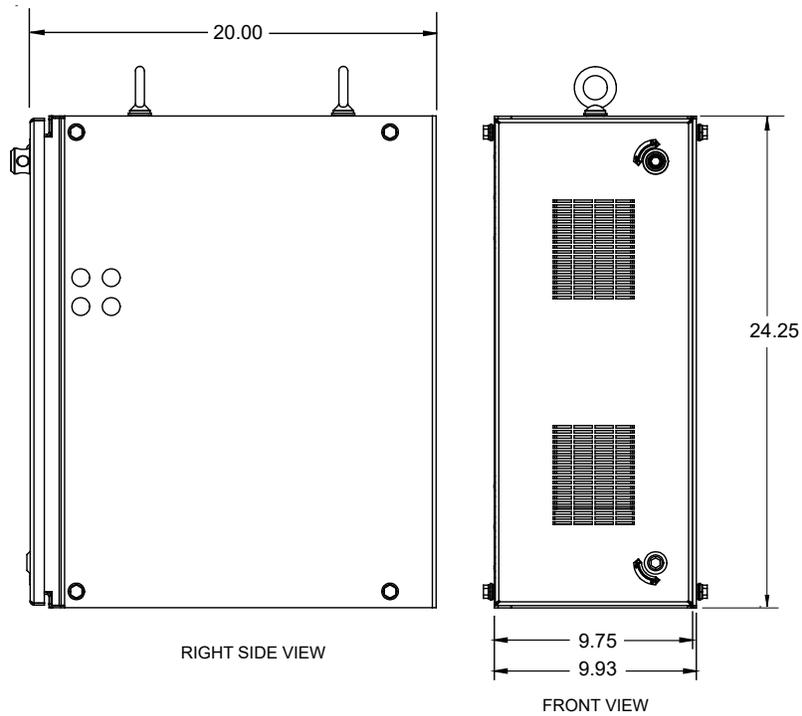


**NOTE!** Power enclosure dimensions and weights includes the solar shields.

**Figure 2.1 Power Enclosure Dimensions**



**Figure 2.2 Battery Enclosure Dimensions**



## 2.6 Enclosure Features and Options

### 2.6.1 Mechanical

Construction - Side walls, panels, floors and front door are 0.09" (2.28mm) aluminum.

Ground Bar - every enclosure is equipped with a single point, screw down style 7 position ground bar. The enclosure frame ground system is factory wired. The ground bar is located on the left side wall.

Door - The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure has two environmentally sealed doors. The front door provides access to the equipment chamber containing the system equipment. The rear door provides access to AC electrical equipment.

- Enclosure doors are equipped with 1/4-turn security bolt locking mechanisms and one that will allow for the installation of a customer supplied padlock.
- The enclosure door is hinged and has an environmental seal gasket. EPDM rubber is used for door and seam seals.



**CAUTION!** Enclosure doors are not equipped with a wind latch system.

Power Equipment Chamber - Standard equipment chamber has a 19" (482.6 mm) vertical rack.

Battery Chamber - two (2) shelves and is vented.

Power Enclosure Features:

- 19" Vertiv™ NetSure™ 502 Power System,
- DC surge protector,
- AC surge protector,
- generator inlet,
- intrusion alarm switch,
- solar shields,
- cable entry knockouts,
- 6 - position ground bar,
- (20) position alarm block,
- front and rear door,
- Din Rail mounted AC electrical components.

Battery Enclosure Features:

- (2) shelves,
- perforated front door,
- intrusion alarm switch,
- cable entry knockouts.

**Figure 2.3 Power Enclosure Features for F2013092 and F2014058**

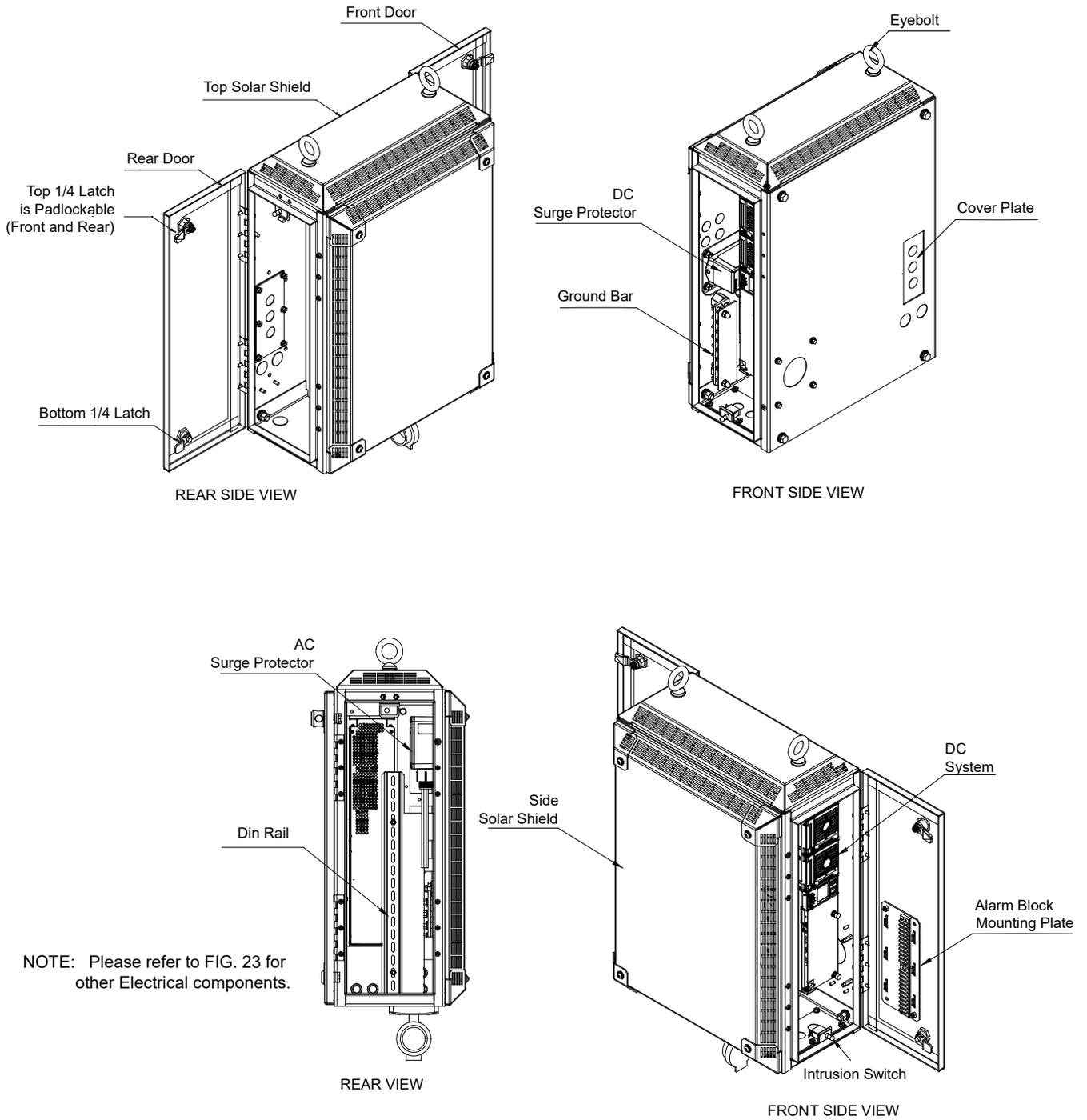
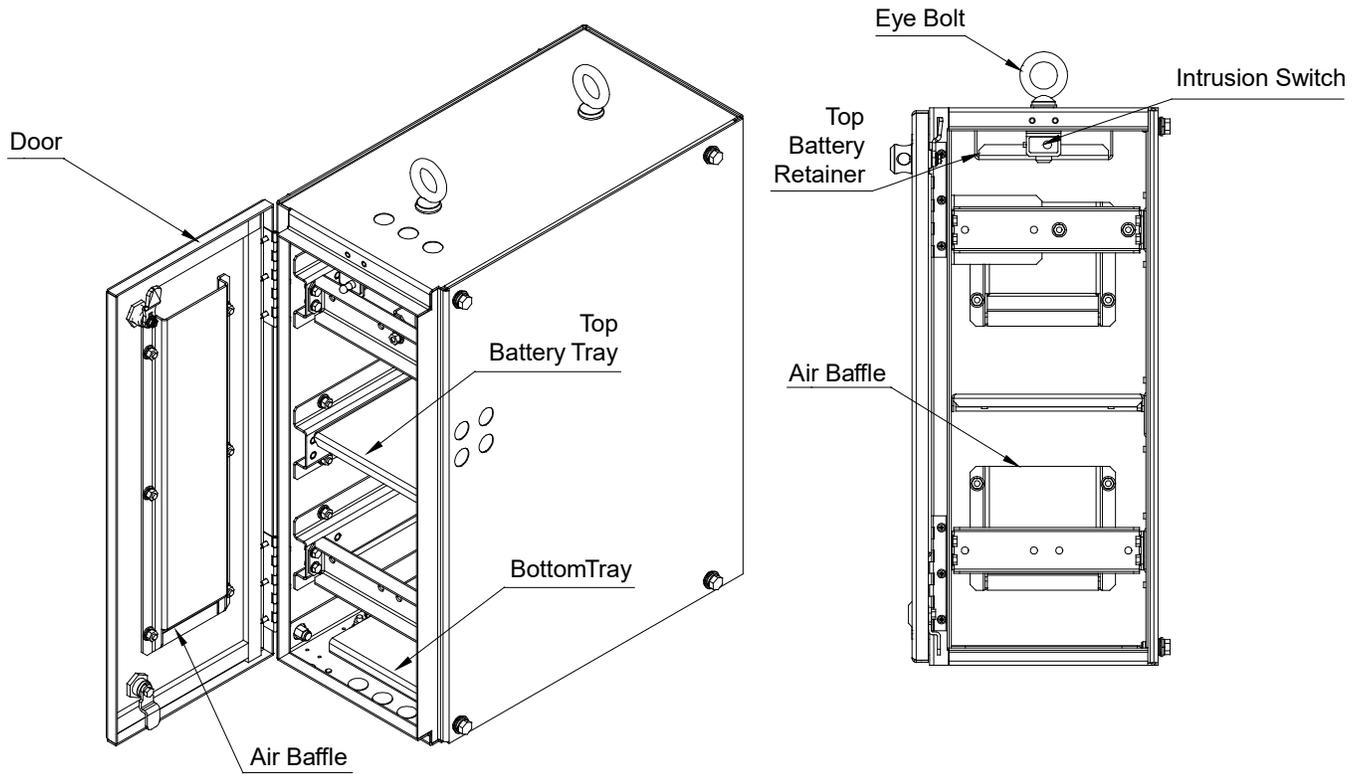


Figure 2.4 Battery Enclosure Features for F1010712

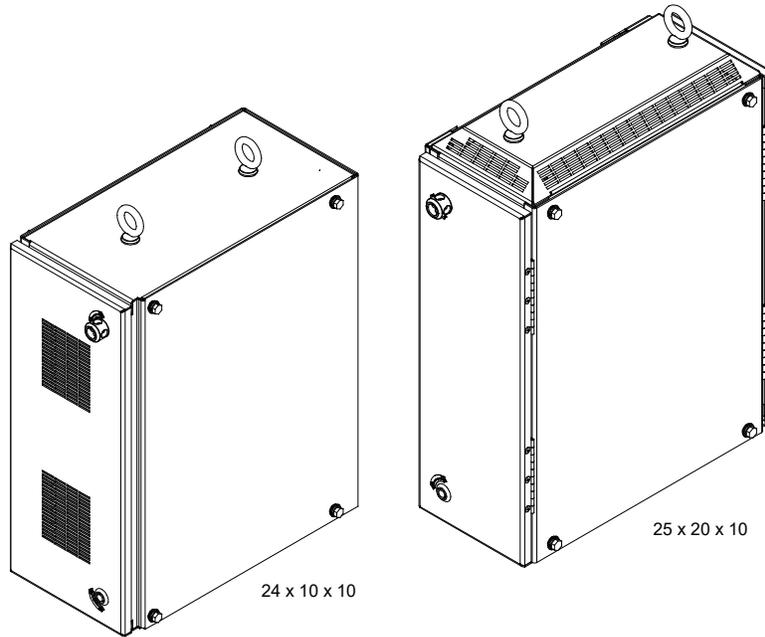


## 2.6.2 Cooling System

Passive Cooling - A Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure is a completely sealed design, passively cooled by convection of heat to the metal wall, conduction through the wall and then convection to the air outside.

The Ni-Cd battery enclosure is passively cooled through fresh-air vents, which also allow for the escape of battery outgassing products.

**Figure 2.5 Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures with Convection Vents**



## 2.6.3 Battery Options

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures provide options for Ni-Cd.

- The Ni-Cd battery enclosure is designed to securely house (1) -48V string of SAFT Tel.X 80 batteries.

## 2.6.4 AC Power

The Power Enclosure is equipped with DIN Rail mounted AC distribution components located in the rear of the enclosure, see Figure 9.1 or Figure 9.2.

The Power Enclosure is configured as 120VAC (F2013092), 120/208VAC or 120/240VAC (F2014058) and is NOT rated for service entrance. A dedicated circuit breaker must be provided in a separate service entrance enclosure located at this site and providing power to this enclosure, feeding the main breaker.

### AC Components

- AC RECEPTACLE
  - Ground Fault Circuit Interrupter (GFCI) Convenience Receptacle - a DIN rail mount 15A GFCI duplex receptacle is accessible in the rear of the enclosure.

- AC SURGE PROTECTION - a VZW approved AC SPD is integrated into the enclosure, and pre-wired into the AC distribution. The device may be viewed and accessed from the rear of the enclosure. The included device is for 120VAC (F2013092), or 208/240VAC (F2014058).

## 2.6.5 19" Vertiv™ NetSure™ 502, Rack Mounted DC Power System

See separately included documentation for product features.

### 2.6.6 Enclosure Alarms

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure is equipped with alarms to monitor the enclosure and system operation and report abnormalities as needed. All alarm wiring is factory terminated to a screw down, alarm termination strip. The termination strip is mounted to the enclosure front door.

Alarms include: Power System Critical, Major, Battery On Discharge, AC Fail, Fuse Alarm, Power Enclosure Intrusion Alarm, Battery Enclosure Intrusion Alarm, AC and DC SPD Fail.

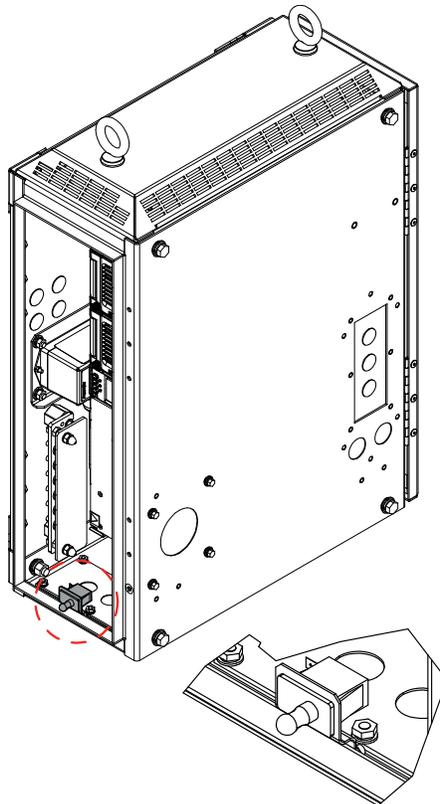
- Door Intrusion Alarm - Doors can be equipped with standard intrusion alarm switches that, when connected to an alarm sending device, can send an alarm where a door is ajar or opened. See Figure 2.6.

This switch assembly will monitor the front door. When the door is opened and alarm will be activated. During normal access to the enclosure, the door alarm can be cancelled while the door is open. Pull the door switch plunger out to cancel the door alarm. The switch will automatically reset when the door is closed.



**NOTE!** If the switch is "pulled to defeat" to cancel the alarm, there will be no alarm if the door is mistakenly left open.

**Figure 2.6** Door Intrusion Switch (typical view)



## 2.6.7 Mounting Options

All mounting kits are optional and must be ordered and installed separately at the site, by the installer.

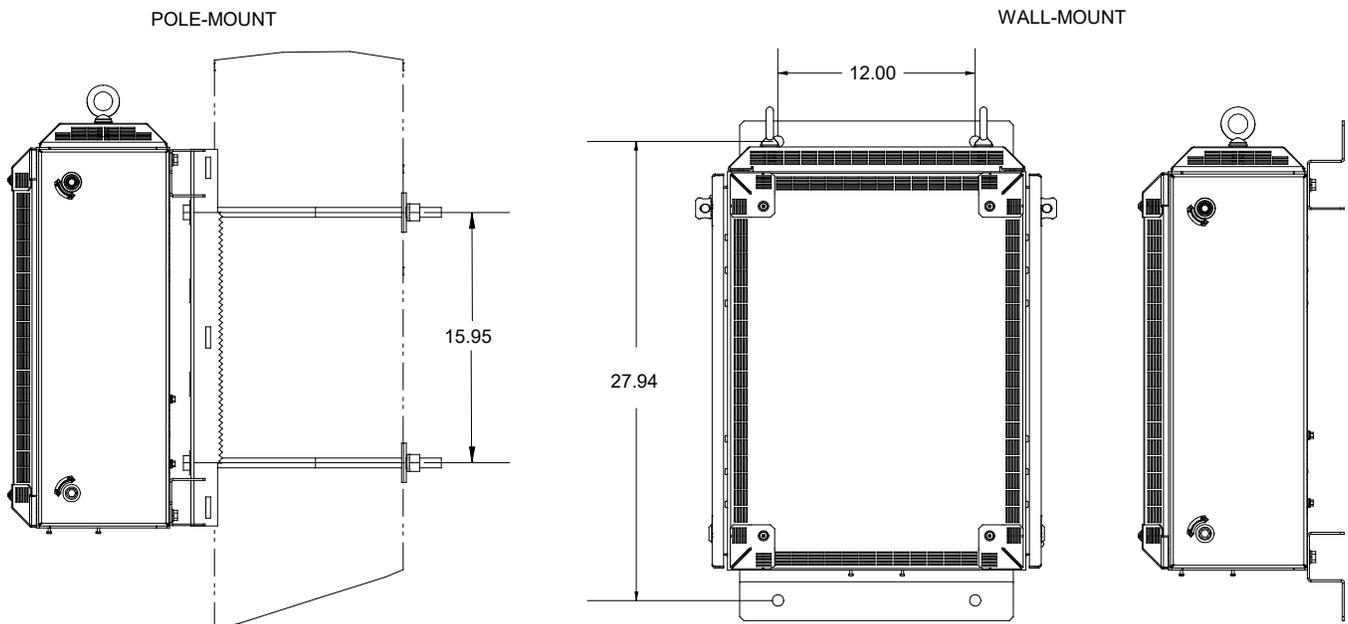
- Pole-Mount Kits - A pole-mount kit (F1010715) is available for mounting separate power and battery enclosures or integrated power and battery enclosures to a standard utility pole.

Refer to “Pole-Mounting” on page 20 and Figure 7.3 for details on this option.

- Wall-Mount Kits - A wall-mount kit (F1010716) is available for mounting separate power and battery enclosures to walls of suitable rigidity to support this use.

Refer to “Wall-Mounting” on page 26 and Figure 8.1 for details on this option.

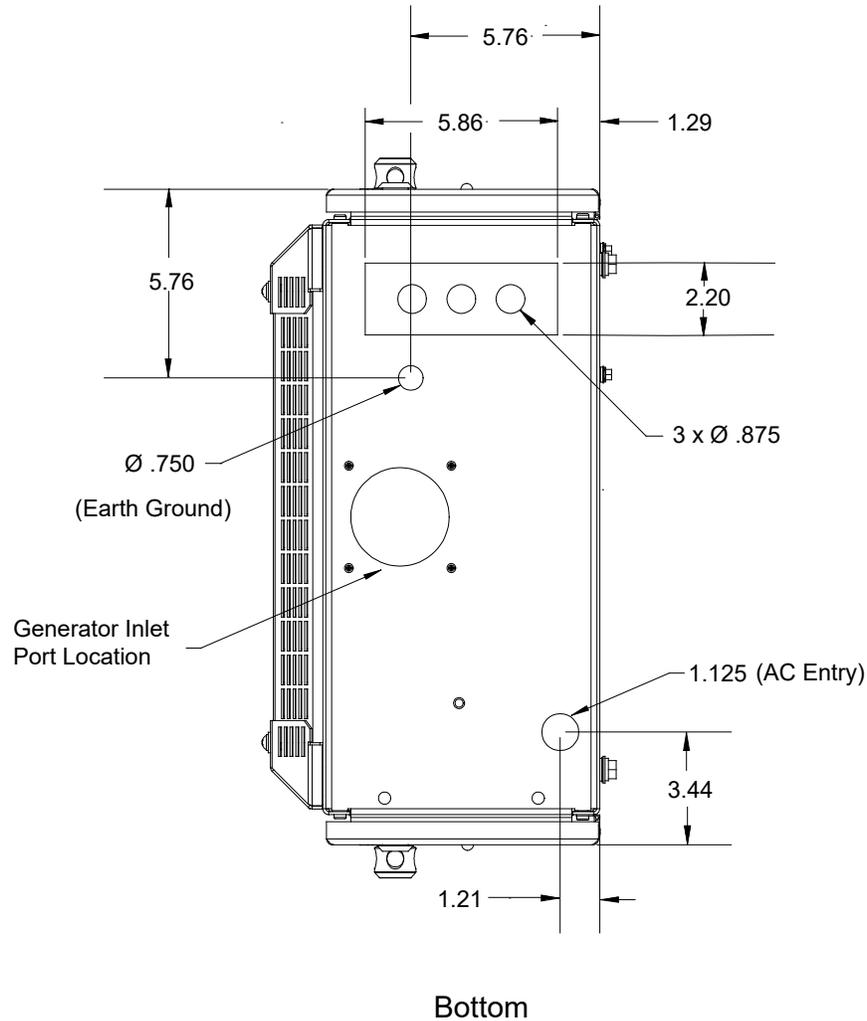
**Figure 2.7 Pole- and Wall- Mount Dimensions**



## 2.6.8 Cable Entry

Knockouts - The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures have a total of five knockouts on the bottom of the enclosure along the back wall. The knockouts are provided for cable entry. One knockout is 1.125" (28.58mm) in diameter, the other one is 0.750" (19.05mm) and three knockouts which are 0.875" (22.22mm) in diameter. The knockouts are spaced to allow the installation of standard conduit and conduit locking rings.

**Figure 2.8 Knockouts Dimensions**



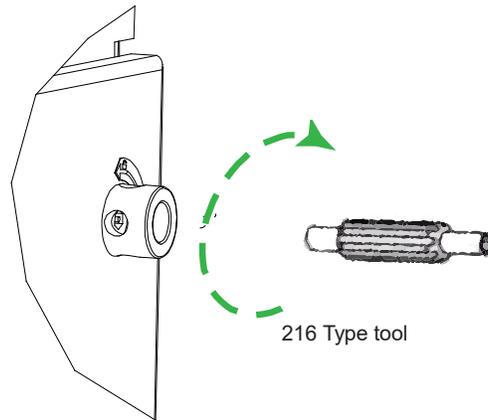
## 3 Opening and Closing the Enclosure Doors

This section describes the locking mechanisms on the doors of the enclosure and explains how to open and close the doors. Refer to this section whenever instructed to open or close enclosure doors.

### 3.1 Available Latch Types

Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures are equipped with one  $\frac{1}{4}$ -turn security latch locking mechanism (Figure 3.1). When  $\frac{1}{4}$ -turn security latches are specified, one latch per door will be equipped with a bracket for customer-supplied padlock.

**Figure 3.1**  $\frac{1}{4}$ -Turn Security Latches



### 3.2 Opening a Door

Perform the following steps to open a door:

#### **Procedure**

1. If required, unlock and remove the padlock from the front door latch.
2. Use the appropriate tamper-resistant wrench and turn the bolt a few degrees counter-clockwise to release the latch.

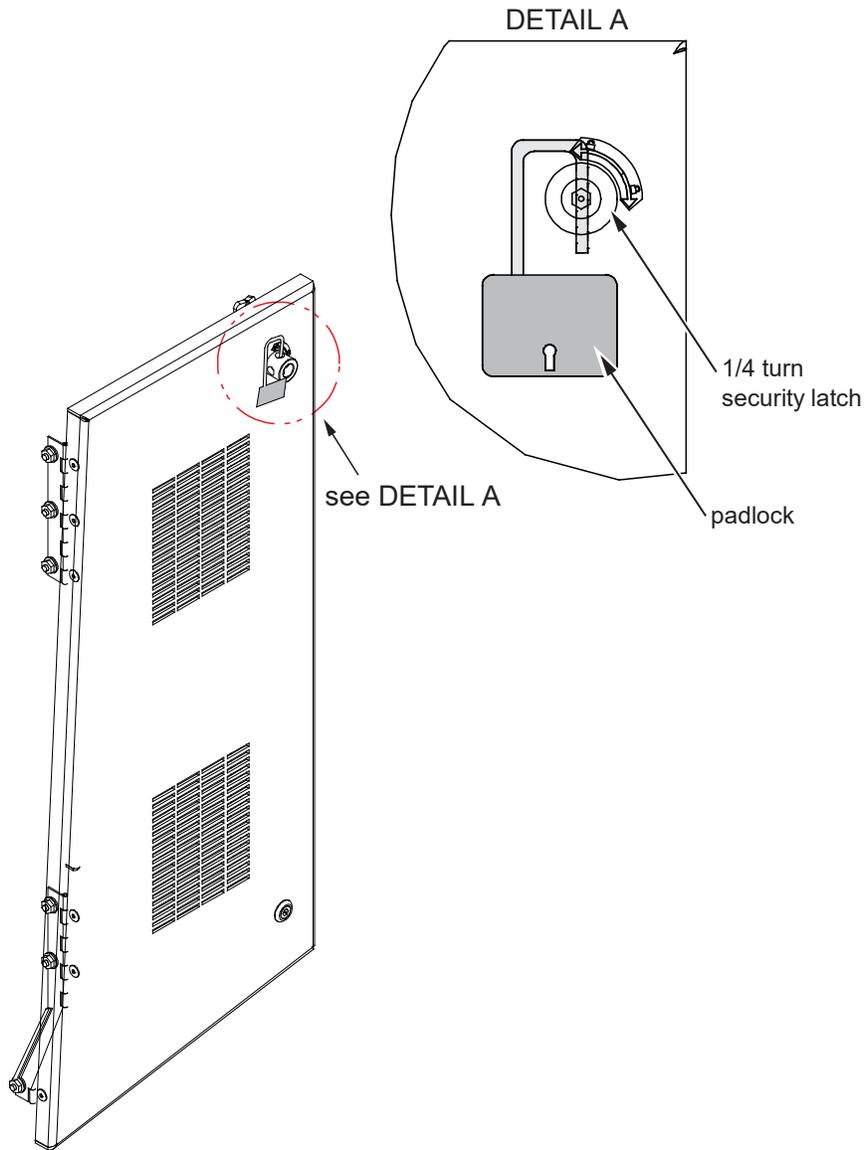
### 3.3 Closing a Door

Perform the following steps to close the door:

#### **Procedure**

1. Close the door.
2. While holding the door closed, rotate the  $\frac{1}{4}$ -turn security bolt one-quarter turn (90 degrees) toward top or bottom of the enclosure.
3. Lock the door as required.
4. If required, replace padlock. Refer to Figure 3.2.

Figure 3.2 1/4-Turn Security Latch and Padlock



## 4 Site Selection

Consider the following when selecting an existing pad, pole or wall for enclosure placement:

- The enclosure may be installed on a new or existing concrete pad, pole or wall. Obtain rights-of-way and other permits (building permit, electrical permit, etc.), depending on local codes and authorities, prior to installing the enclosure.
- The mounting pad, pole or wall must be installed (according to local practices) before the enclosure can be installed.

Consider the following when deciding on the location for the rooftop site:

- Obtain all necessary building permits and other local approvals as necessary.
- Select locations that will provide enough space to place any mounting equipment and enclosure, and provide safe working conditions.
- Select locations where there are no electrical lines that could touch the enclosure and energize it.

Consider the following when deciding on the location for the concrete pad, pole or wall mount installations:

- Place the enclosure on servitudes, on dedicated (recorded) easements, or on property owned by the company. Avoid any unrecorded easements.
- Use public safety road and street rights of way only where there is enough space to place the enclosure and provide safe working conditions. The enclosure should be easily accessible with adequate parking to ensure safety for people and vehicles. Place the enclosure where it will not create a visual or physical obstruction to either vehicles or pedestrians.
- Select locations that will minimize accidental or intentional vandalism. Consider the use of protective posts when the enclosure is located near parking areas where vehicles could back into it. Do not place the enclosure in ditches or areas subject to flooding. Do not place the enclosure in an area where the pad is subject to vehicle loads.
- Place the enclosure away from any obstruction, fence, hedge, etc. Include adequate area for craft personnel to perform maintenance procedures.
- If an area is subject to frost, choose a site free of heaving.



**ALERT!** All enclosure grounding and ground ring must be installed prior to turn up of enclosure. Grounding should be accomplished according to local practices.

## 5 Transportation and Storage



**WARNING!** UNSECURED ENCLOSURES CAN TIP OVER PRESENTING A RISK OF INJURY OR EQUIPMENT DAMAGE.

Follow all appropriate local safety and handling practices when transporting the enclosure to a staging or installation site, or when storing it.



**ALERT!** To avoid possible damage to the enclosure, do not remove the packaging or pallet from the enclosure until it is delivered to the installation or staging site. Do not stack units for transportation or during storage.



**ALERT!** Do not stack enclosures while in transportation or storage as damage may result.



**ALERT!** If the covering on the package appears excessively damaged, do not accept the enclosure from the shipper. The damaged packaging may be an indicator that the interior of enclosure is damaged even though the exterior may seem fine.



**NOTE!** *The enclosure is shipped in protective packaging on a wooden pallet. If ordered, batteries will be shipped on a separate pallet.*

## 6 Preparing for Pole Mount Installation

### 6.1 Ground Preparation of Small Cell Enclosures

The customer can select to install the power and battery enclosures in two ways: with battery enclosure nearest the utility pole (preferred method), and power enclosure attached to the outside of the battery enclosure; or with power enclosure nearest the pole, and battery enclosure attached to the outside of it.

The latter method allows customer to deploy the power enclosure without the battery enclosure, and to add the battery enclosure at a later time.

The customer can choose to lift each enclosure individually up to the pole-mount bracket, and take steps to join the enclosures together in the air; or can join the power and battery enclosures at ground level, and lift the joined enclosures as a single unit.

### 6.2 Unpacking the Enclosure

Inspect the outside of the enclosure to be sure there is no shipping damage. If there is damage, note where the damage is and how much damage there is. Follow local practices for reporting and handling damaged good and do not proceed with the installation. If the enclosure appears undamaged, go on to unpack and install the enclosure.

Remove the enclosure from the cardboard box. Dispose of the packaging according to local practices. **DO NOT REMOVE THE ENCLOSURE FROM THE PACKAGING UNTIL IT IS ON SITE AND READY TO BE INSTALLED.**

### 6.3 Lifting Preparation



**CAUTION!**

- Follow all local safety practices while lifting the enclosure. Wear all locally approved safety gear.
- Keep bystanders away from work operations at all times.
- Do not lift the enclosure over people. Do not let anyone work, stand, or pass under a lifted enclosure.
- **RISK OF ELECTROCUTION.** Do not allow the lifting equipment or enclosure to touch any electrical wiring or equipment.

## 6.4 Joining of Power and Battery Enclosures



**NOTE!** Follow these steps whether joining enclosures on the ground or in the air.

1. With both the front of the battery enclosure (door side) and front of the power enclosure (side with direct access to power system rectifiers and distribution) facing forward, position the battery enclosure to the left side and power enclosure to the right side.
2. Remove three of the four (4) battery cable entry knockouts from the battery and power enclosure side walls. See Figure 6.1.
3. If the battery enclosure is going to mount on pole side, move the solar shield on the right side of the power enclosure. If power enclosure is going to mount on pole side, remove the side solar shield and keep it aside.
4. Join the two enclosures together with (4) sets of 3/8-16 bolts and sealing washers inserted through wall of power enclosure into the fixed inserts of the battery enclosure. See Figure 6.2.
5. Install three cable grips into the battery cable pass-thru holes. The main body of the cable grip will be inside the power enclosure. Securely tighten the lock-nuts within the battery enclosure. Loosen the heads of the cord grips to enable later pass-thru of the battery cables.

**Figure 6.1 Removing the Battery Cable Entry Knockouts**

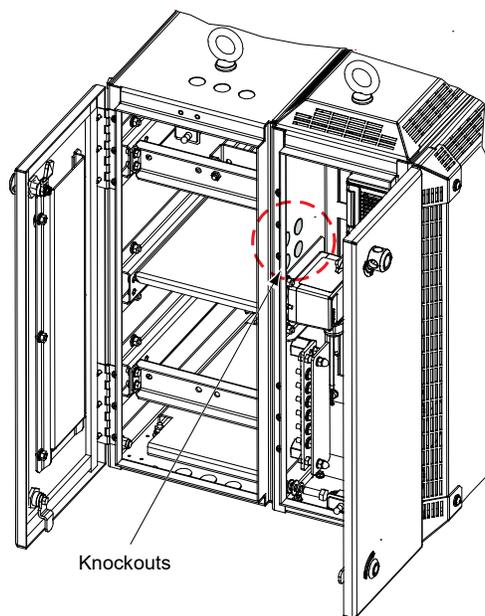
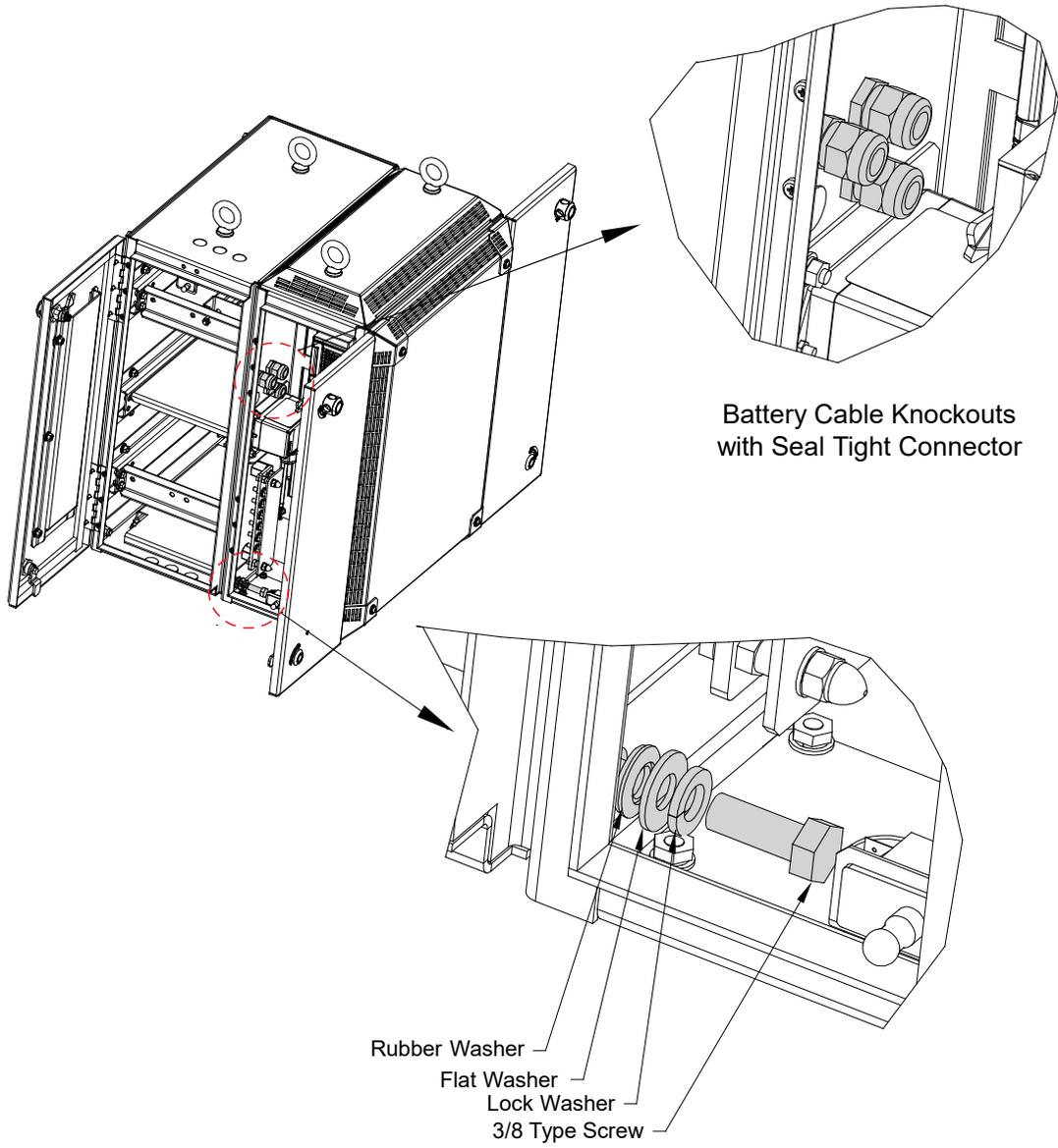


Figure 6.2 Joining the Two Enclosures Together



## 6.5 Installation of Pole Side and Outside Hang Brackets

1. Determine final orientation of enclosures on pole. Refer to the previous paragraphs in this section.
2. Install hang brackets to power and battery enclosures, orienting such that the pole side hang bracket will be facing the pole when lifted into position placing the desired enclosure closest to the pole. See Figure 7.2.



**NOTE!** The pole-side hang bracket is included with the power cabinet, and the outside hang bracket is included with the battery cabinet.

3. If the power and battery enclosures are joined on the ground and to be lifted together, the pole side hang bracket only needs to be added to the enclosure that will be closest to the pole.
4. If the power and battery enclosures are being installed and hoisted separately then install the hang brackets according to Figure 6.4 and Figure 6.5 depending upon which enclosure will be closest to the pole side.

**Figure 6.3 Pole Side Hang Bracket Installation for Mounting Joined Enclosures with Power or Battery Enclosure closest to the Pole Side**

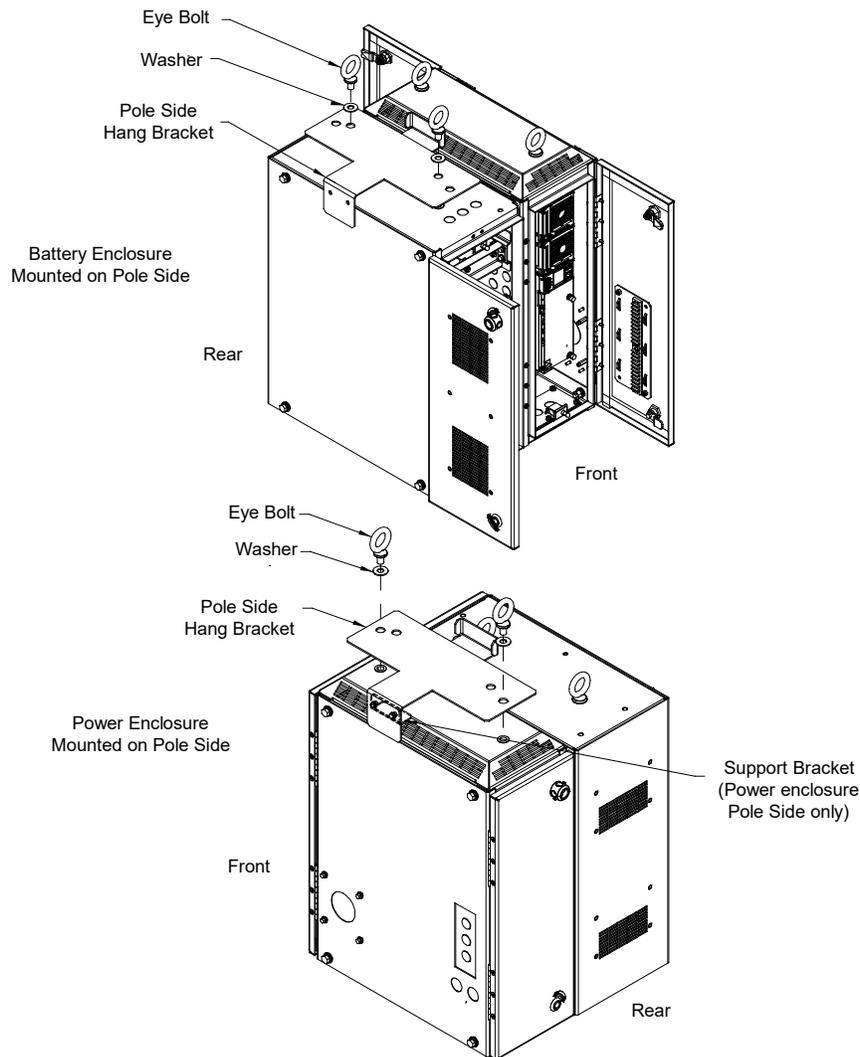
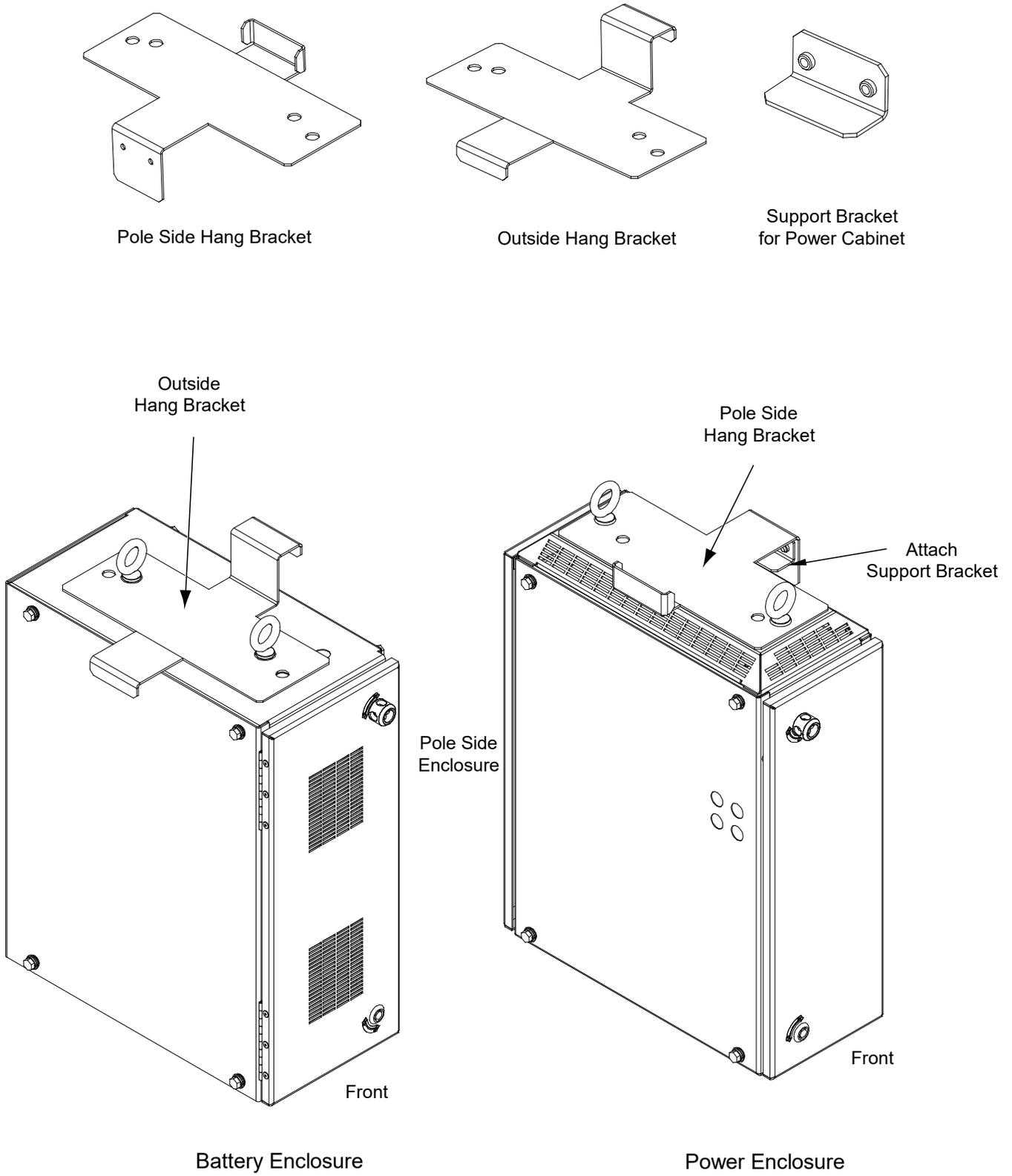
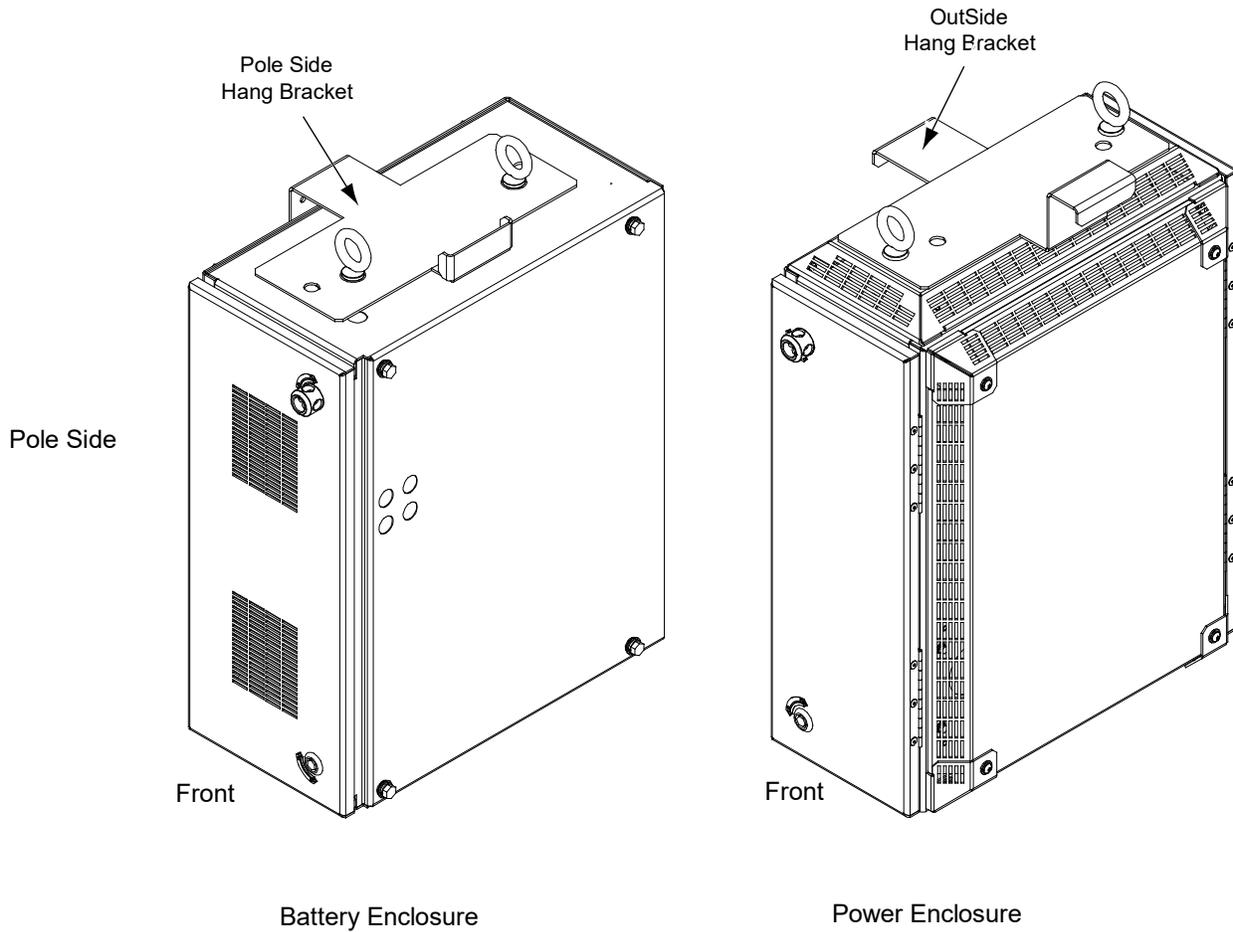


Figure 6.4 Hang Bracket Installation when mounting enclosures separately with Power Enclosure closest to Pole Side



**Figure 6.5 Hang Bracket Installation when mounting enclosures separately with Battery Enclosure closest to Pole Side**



## 7 Pole-Mounting

### 7.1 Pole-Mount Bracket Kit Components

Verify that the F1010715 kit contains all of the required components and hardware:

- (1) pole-mount bracket kit assembly,
- (2) 5/8" sq. curve washer,
- (2) 5/8" lock washer,
- (2) 5/8" flat washer.



**NOTE!** 5/8-11" threaded rods are required for installation. These need to be supplied by customer and cut to size.

## 7.2 Pole-Mount Bracket Kit Installation

Perform the following steps when installing the Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures on a wooden utility pole:

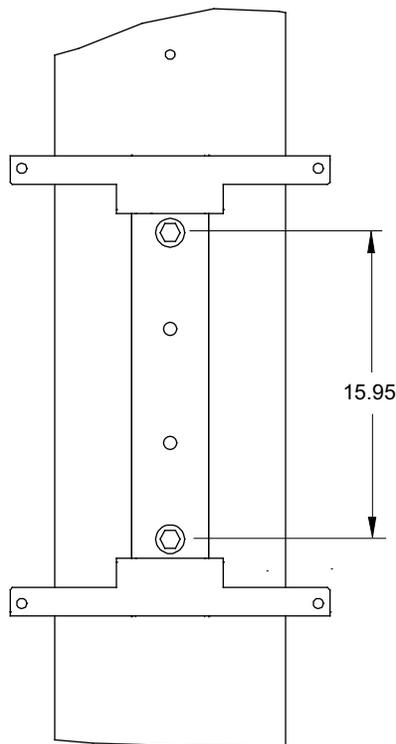


**DANGER!** Use of a bucket truck to assist in pole-mount installation is strongly suggested.

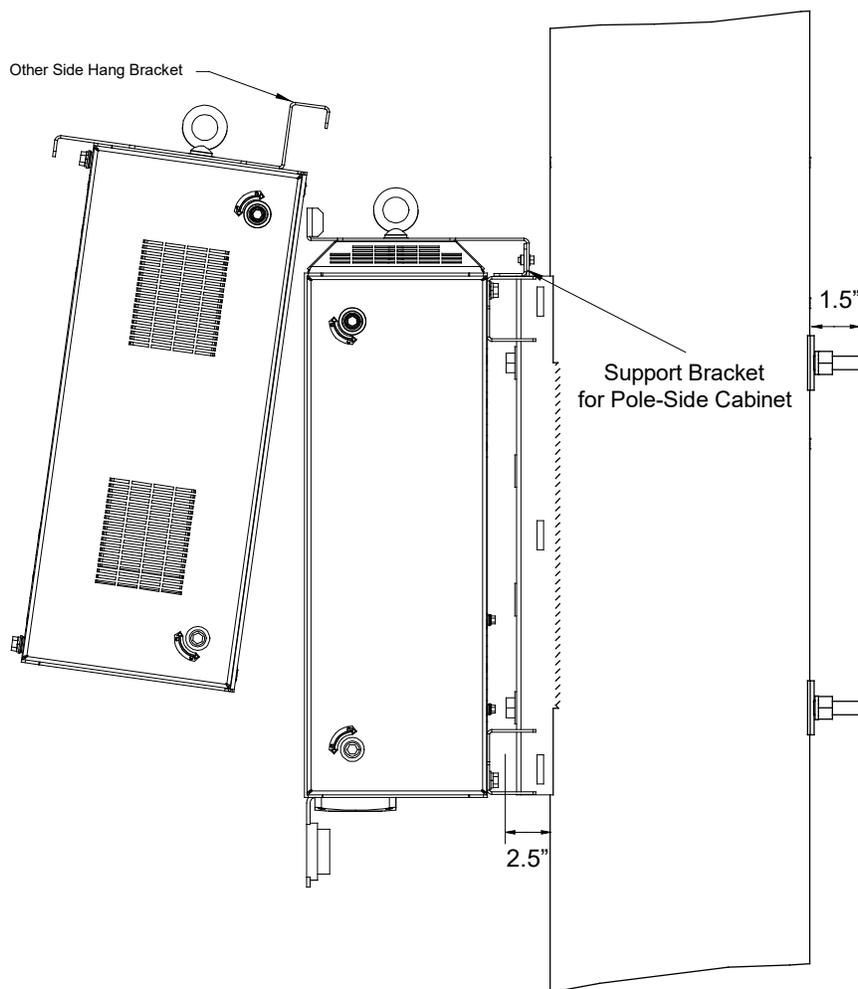
### 7.2.1 Procedure for Drilling Holes in Wooden Utility Poles

1. At the location on the pole selected for the enclosure mount, hold pole-mount up to pole and make note of hole locations that will allow pole-mount to hang vertically, level, and as centered as possible, keep track of levelness in all directions. Mark location for top hole. See Figure 7.1.
2. Drill top hole to (0.75") diameter. Make sure to drill hole as level as possible - suggest use of drill with built-in level.
3. Install top threaded bolt per procedure below. Hang pole-mount using threaded bolt through the top hole. Temporarily secure the pole-mount to bolt with hardware -- allow pole-mount to hang vertically. Tighten the hardware to the point where the pole-mount is level in all directions, and mark the location for the bottom hole.
4. Remove the pole-mount and drill the bottom hole to 0.75" diameter. Make sure to drill hole as level as possible.

**Figure 7.1 Pole Mount Bracket Mounting Hole Dimension**



**Figure 7.2 Support Bracket for Power and Battery Enclosure**



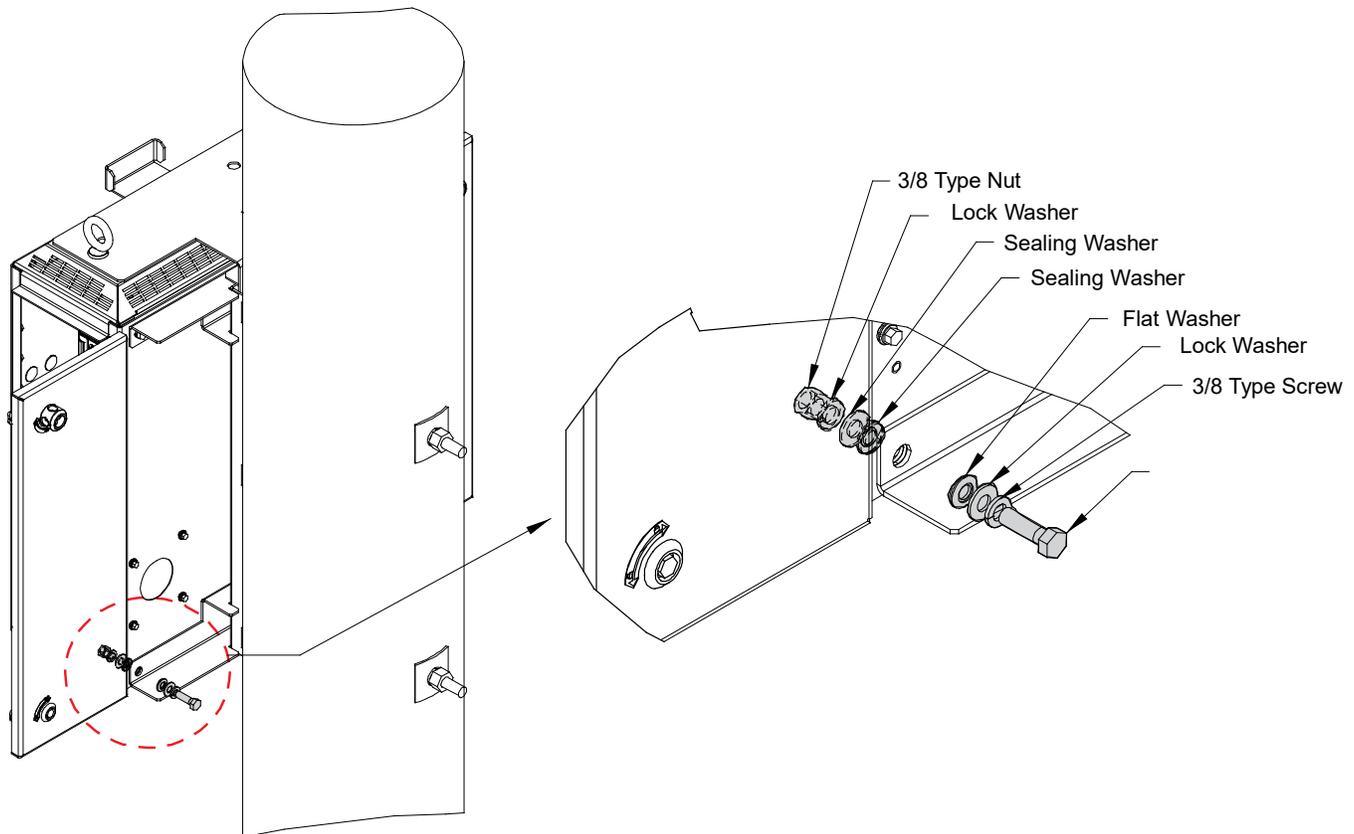
### 7.2.2 Procedure for Installation of Threaded Rods

1. Insert threaded rod through the pole until the end opposite the mounting location is even with the outside surface of the pole (mounting location). On the other side of the pole, it measures 4" in length of rod extension from the surface of the pole, and mark the rod in this location.
2. Cut the rod at the marked location.
3. Re-insert the rod into the drilled hole, until 1.5" of rod extends from the side of the pole opposite where the enclosure will be hung. While holding rod in this location, install curved washer, flat washer, lock washer, and nut; and finger-tighten against pole.
4. Holding the rod in this position, measure that there is a 2.5" extension of rod on the other side of the pole, where the enclosure will be hung. (A rod extending further than 2.5" from the pole will interfere with the enclosure installation.). Install curved washer, flat washer, lock washer and nut on 4" rod extension and tighten fully against pole. Tighten hardware securely.
5. Repeat procedure for all threaded rods to be used.

### 7.2.3 Procedure for Installation of Pole-Mount on Threaded Bolts

1. Secure pole-mount to threaded bolts with flat washers, lock washers, and nuts. Lightly tighten top set of hardware to point where pole-mount is level in all directions, then lightly tighten bottom set of hardware. Incrementally tighten top and bottom sets of hardware, alternating between top and bottom, while making sure to maintain levelness of pole-mount in all directions. See Figure 7.3.
2. Tighten hardware securely.

**Figure 7.3** Assembling Enclosure to the Pole Mount Kit Bracket



## 7.3 Installation of Enclosures on Pole-Mount Bracket



**DANGER!** Vertiv strongly suggests the use of a bucket truck for installation of enclosures on the pole mount bracket.



**NOTE!** A hoist (either pole or truck mounted) rated for a load of 600 lbs. can be used to assist in lifting the small cell enclosures. Lifting slings (adjustable-length slings advised) rated for 600 lbs. must also be used for hoist-lifting.



**NOTE!** The weight of the small cell power enclosure is 80 lbs. as installed. The weight of the battery enclosure is 60 lbs without batteries.

### 7.3.1 If Lifting Enclosures with Bucket Truck

1. Raise bucket to appropriate height for the installation.
2. A single individual can lift a single power or battery enclosure, with the pole side hang bracket installed, onto the pre-installed pole-mount bracket by applying a small tilt of the top of the enclosure towards the pole and carefully lowering the pole side hang bracket hook into the channel on the top of the pole-mount bracket, allowing the rest of the enclosure to gently swing into position against the pole-mount bracket.
3. Secure the enclosure to the pole-mount bracket using the appropriate hardware. See Figure 7.3.
4. If installing a second enclosure, with hang brackets installed on both enclosures, tilt the top of the 2nd enclosure towards the first enclosure. Carefully lower the outside hang bracket hook on the 2nd enclosure into the bracket hook on the first. Allow the enclosure to swing gently into position against the first enclosure. See Figure 7.2.
5. If not already performed, follow the procedure for joining the 2 enclosures in “Joining of Power and Battery Enclosures” on page 16. Removing knockouts, adding seal tight connectors and joining the equipment enclosures.
6. If installing both power and battery enclosures pre-joined as a single unit, follow Step 2 above to set the pole side hook bracket into the top of the pole mount bracket but two individuals would be required to lift the joined enclosures and the place into position.
7. Tighten all the mounting bracket hardware securely.
8. Remove the lifting slings.
9. If not already performed, remove the eye bolts and hang brackets and assemble the eyebolts back into the inserts.

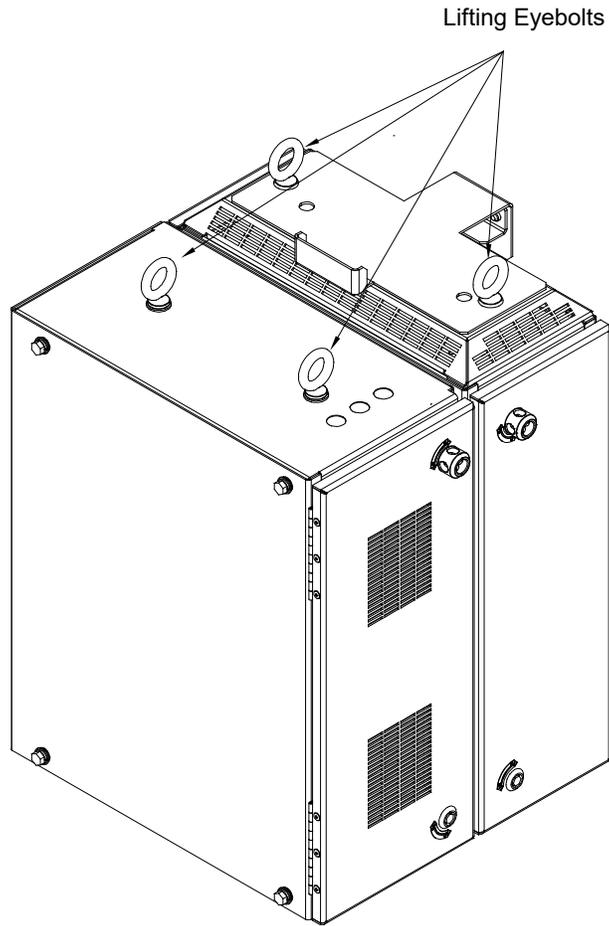
### 7.3.2 If Lifting Enclosures with a Hoist



**NOTE!** Vertiv suggests use of a bucket truck for installation of enclosures, even if using a hoist to lift the enclosures.

1. Raise bucket to height for installation. Locate safely out of the lifting path of the enclosure.
2. If lifting a single enclosure with hoist, connect two (2) slings to the lifting eyebolts in the top of the enclosure. If lifting two pre-joined enclosures, connect four (4) slings to the lifting eyebolts in the tops of both enclosures. Raise the enclosure(s) slowly to installation height. See Figure 7.4.
3. The technician in the bucket truck can guide the enclosure(s) into position; also applying a small tilt to the enclosure(s) so that the hang bracket hook will engage with the pole-mount bracket.
4. Once the first enclosure is in place, follow all previous applicable steps 3 through 9 above for completing the installation.

**Figure 7.4** Lifting the Assembled Enclosures with a Hoist



## 8 Wall-Mounting

### 8.1 Wall-Mount Kit Components

Verify that the kit contains all of the required components and hardware:

- (1) F1010716 wall-mount kit assembly
- (2) wall-mount brackets.

### 8.2 Wall-Mount Kit Installation

Perform the following steps when installing the Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosures on a wall:



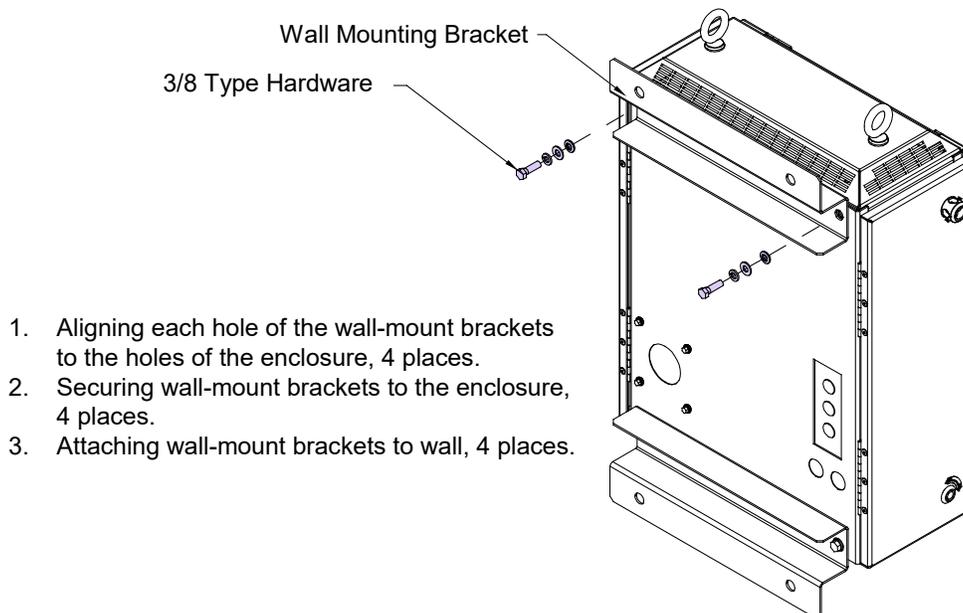
**DANGER!** Two persons are needed to perform the wall mount installation.

1. Assemble wall mounting brackets on enclosure with four (4) sets of 3/8 type hardware provided with enclosure.
2. Drill four holes in the wall per dimension as shown in Figure 2.7. Hole diameter should be as per the anchor fastener suppliers recommendations (use 3/8 type fastener). See Figure 8.1.
3. Fit anchors in the holes.
4. Lift the enclosure and align the holes on the wall with the holes on the mounting brackets.
5. Tighten the anchor bolts on all four locations to torque specified by manufacturer.



**NOTE!** Any anchor type fastener to be provided by the customer.

**Figure 8.1** Installing Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure to Wall



## 9 AC Power

### 9.1 Safety Precautions



**DANGER!** Risk of Electrical Shock, General

All ground connections must be installed and verified, prior to connecting any power cables (AC or DC) and turning-up of enclosure.

Before installation, the AC grounding electrode system must be bonded to an AC main service power neutral/ground bus. Contact your local power company or local practices for information about codes or restrictions for your installation.

Appropriate wearing of Personal Protective Equipment such as heavy gloves, safety glasses, boots etc shall be worn at all times due to electrical hazards such as electrocution.

When connecting any discrete power connection, make the connection first with the ground/return and break last with ground/return.

Remove rings, metallic wrist bands, or bracelets, etc.



**DANGER!** Risk of Electrical Shock, AC

Proper actions, include, but not limited to:

Verify before contacting the enclosure that no current leakage or ground fault condition is present.

Verify a proper ground is in place.

Verify for AC hook-up, all enclosure circuit breakers are OFF and the utility incoming feed is OFF.

Use a trained licensed electrician.



**DANGER!** Electrical Hazard

Observe all safety precautions as specified by local building codes and the National Electrical Code (NEC). All procedures should be performed by a licensed electrician. If local building codes specify procedures different from those in this section, follow local codes.

### 9.2 Enclosure AC Schematic

The complete system schematics are included with each enclosure.

### 9.3 Grounding the Enclosure



**ALERT!** Grounding should be accomplished according to local practices and in accordance with the latest NEC codes.

All enclosure grounding and ground ring must be installed prior to turn up of enclosure.

The enclosure should be grounded to an external ground ring.

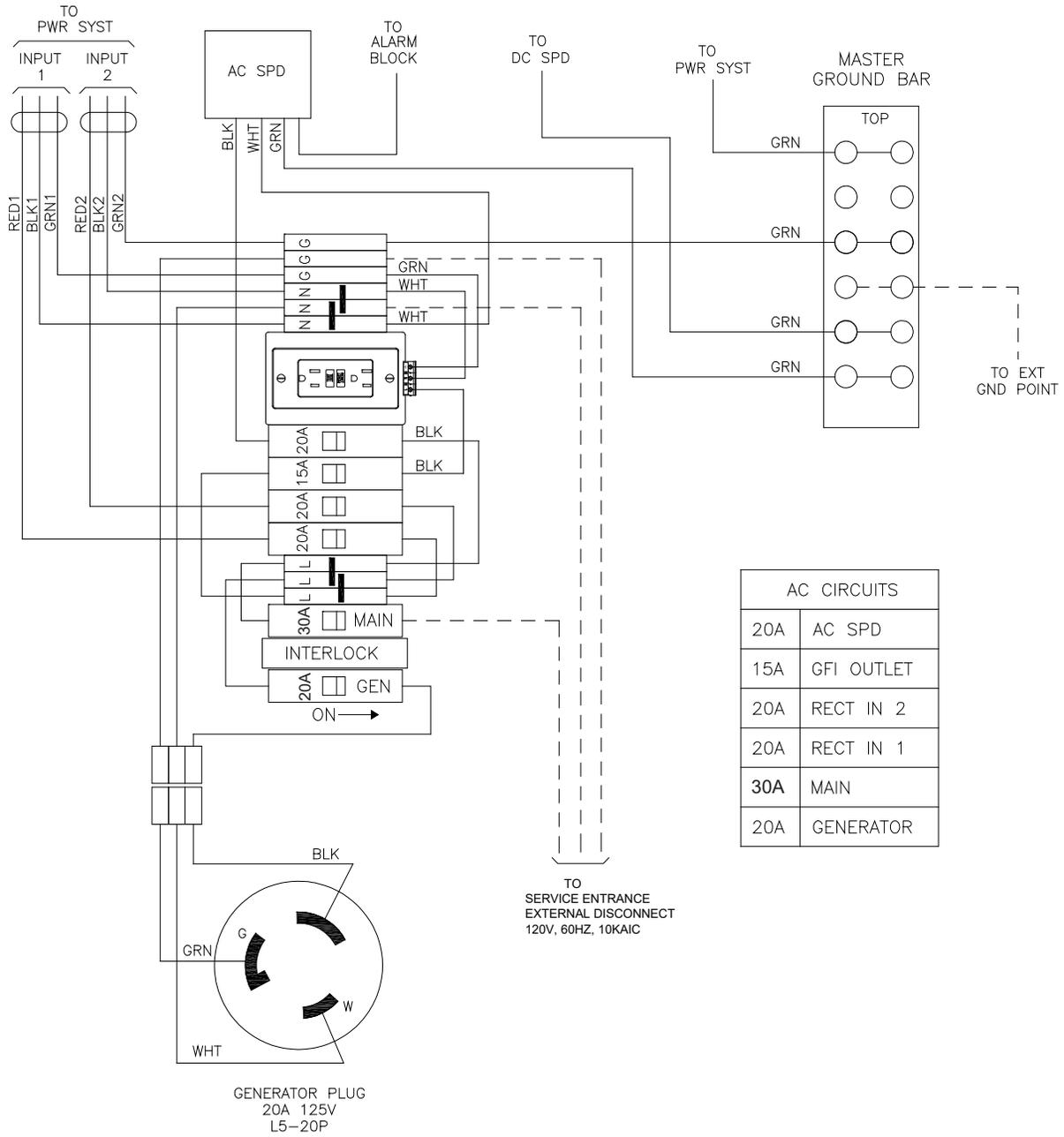
#### **Ground Bar Locations**

Small Cell and Remote Radio Head Enclosures are equipped with a ground bar located on the left wall of the enclosure. This ground bar may be designated as the enclosure's Master Ground Bar (MGB) (depending on local practices).

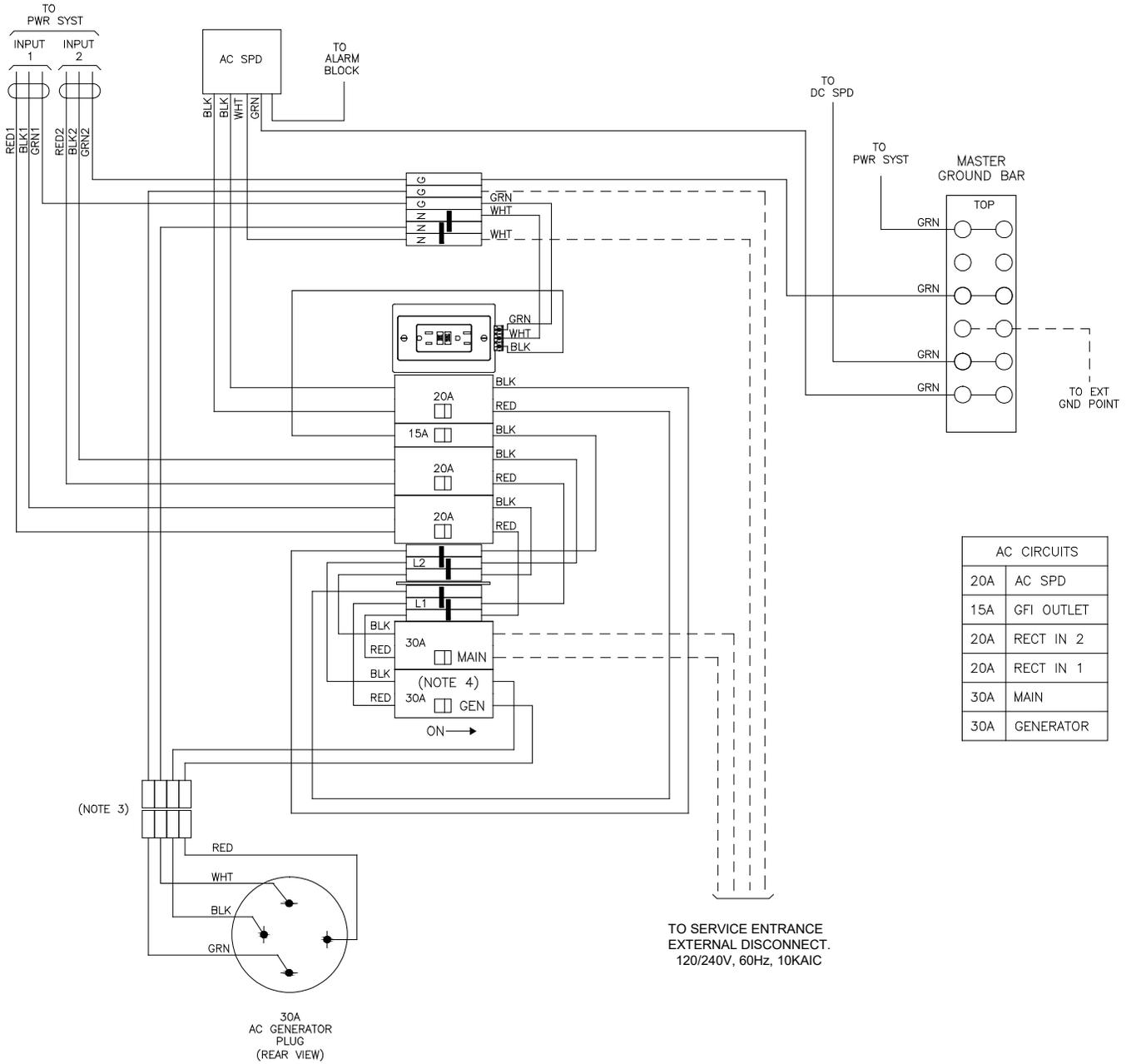
**Procedure**

- For enclosures with one 6-position ground bar, the ground bar is to be connected to the ground ring.

**Figure 9.1 AC Wiring for 120V Enclosure**



**Figure 9.2 AC Wiring for 120/208V or 120/240V Enclosure**



## 9.4 AC Input Connections



**DANGER!** Adhere to “Enclosure AC Schematic” on page 27.

### 9.4.1 General

Make connections per the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA 70) National Electrical Code (NEC) 2014 Issue, and applicable local codes.

The following procedure shall be performed by a trained licensed electrician.

#### **General Procedure**

1. Use a non-contact voltage detector to verify the enclosure is safe.
2. Verify that the enclosure is properly grounded.
3. Verify that all breakers feeding the enclosure and all breakers within the enclosure are in the OFF position.
4. Refer to the schematic drawings shipped with your enclosure for a detailed AC wiring diagram. See also the typical illustrations provided after this general procedure.
5. Determine the AC cabling route into the enclosure for your installation site. Remove access panels as required to access the AC input routing and connection points.
6. Pull the AC Power and Ground Cables into the enclosure.
7. Connect the required feeds per the schematic drawings shipped with your enclosure and the typical illustrations provided with this general procedure. See Figure 9.1 and Figure 9.2.

# 10 Installing and Connecting Batteries

## 10.1 Safety Precautions



**DANGER!** ELECTRICAL HAZARD. Risk of serious injury and/or equipment damage.

Exercise extreme care when handling the batteries and connecting them to the string. Two people are recommended for lifting and placing batteries. Wear heavy gloves and safety glasses while lifting the batteries. Handle each battery ONLY by its lifting slot. Keep hands well away from the connector posts.

Arcing is possible during battery connection procedures. Use face shields and heavy gloves during all procedures involving the batteries to avoid potential injury. Do not wear rings, metallic wrist bands or bracelets when working on batteries. Do not allow metal objects to rest on the batteries or to fall across the terminals.

Post no smoking signs. Use non sparking tools. Prevent open flames, sparks or electrical arcs in the battery charging area to minimize the danger of explosion.

If equipped, make sure that any battery disconnect breaker is set in the “OFF” position or that any battery disconnect connector has been plugged from the rectifier.



**DANGER!** Electrical and Explosion Hazard.

Batteries can be a lethal source of electrical power under certain conditions. Batteries are electrically live at all times.

Although the voltages are not hazardous, the batteries can deliver large amounts of current. Even if the case is damaged, the battery is capable of supplying high short-circuit current.

## 10.2 General

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure can accommodate a single -48VDC battery string of SAFT Tel.X 80-94857-02 Ni-Cd batteries.

The Vertiv™ XTE 201 Series Small Cell Power and Ni-Cd Battery Enclosure is capable of venting 20 mL/min of hydrogen to maintain a maximum concentration of 1% or less per the requirements of Telecordia GR-487 CORE Issue 4. Any installed battery plant must not exceed a total of 20 mL/min of hydrogen generation, otherwise there is risk of exceeding 1% safe concentration level in the battery compartment and or enclosure.

### **Before installing batteries, refer to:**

- The schematic drawings shipped with your enclosure for a wiring diagram.
- The battery vendor’s documentation set for installation and testing instructions.
- Battery vendors documentation set for battery safety precautions and notices.

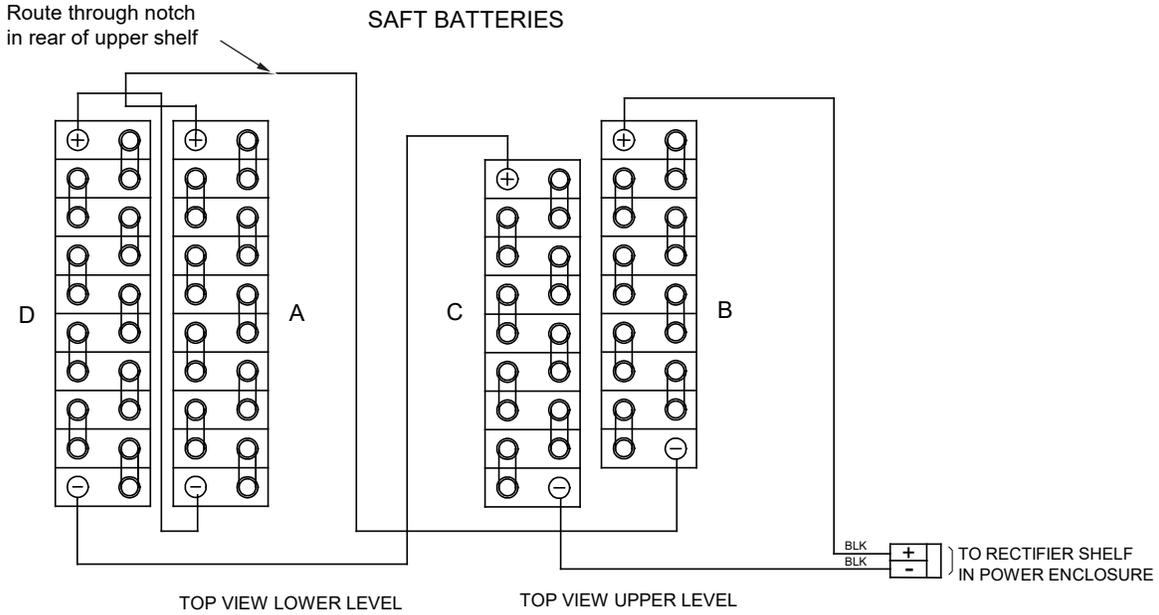
### **Tools and Equipment**

Prepare the following tools and equipment needed for installing the batteries:

- Insulated torque wrench (150in-lbs),
- Insulated socket 10mm (to fit torque wrench),
- Digital Multimeter (DMM),
- Sockets wrench, 7/16" (for battery shelf front braces),
- Standard Telecom tools, snips and wrenches,

- Electrician's tape and,
- Cable ties.

**Figure 10.1 Battery Wiring**



### 10.3 Use of Digital Multimeter



**NOTE!** Reversing the polarity of the battery string connections to the power system can seriously damage the power system. Take special care in making and verifying the proper connections.

Make sure to connect the red probe to the voltage (V) input on the DMM, connect the black probe to the common (COM) input.

Test the probe connections by measuring the voltage of one of the battery blocks. With the red probe contacting the (+) positive battery terminal, and the black probe contacting the (-) negative battery terminal; the voltage reading should be positive. Reversing the probe contacts should result in a negative reading, with a negative sign in front of the numeric value.

**Figure 10.2 Digital Multimeter**



## 10.4 Installing Batteries



**NOTE!** The enclosure is not shipped with batteries installed. The batteries are to be installed in the field.

### 10.4.1 Installation Procedure

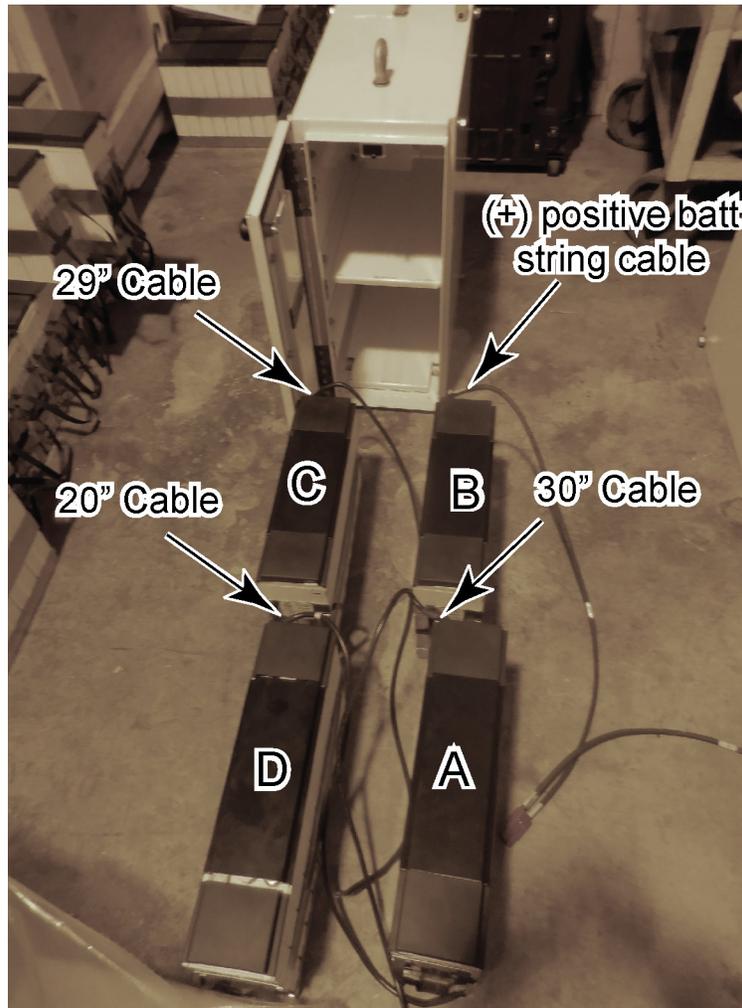
Refer to the following steps in installing SAFT Ni-Cd batteries into the enclosure.

1. While on the ground, stage the battery blocks following the block orientation and polarity as shown in Figure 10.1.
2. Place the battery (-) end (block B) with a bar code to the rightmost front position, as shown in Figure 10.1.
3. Remove all block-end covers (front and back) to access battery block terminals.
4. Measure and record on the SAFT Installation Instruction Sheet 80-94857-02 I/O sheet all block voltage readings.
5. Remove all end-terminal bolts and wave washers used to connect the blocks and apply No-Ox to terminals surface.
6. Temporarily insulate each cables end either using the tube provided or electrician's tape end to prevent accidental electrical shock.
7. Connect the angled lug of the 33" battery interconnect cable to the (+) terminal of block A, so that the cable routes to the left coming off the rear of the battery (viewed from front). Connect one end of the 29" cable to the (+) terminal of block C, so that cable routes straight off the back of the battery. Connect the angled lug of the 20" cable to the (+) terminal of block D, so that cable routes to the right coming off the rear of the battery (viewed from front). Connect the positive (+) battery string cable to the (+) terminal of block B. Re-install the block end covers on the rear of blocks A-D. See Figure 10.3.



**NOTE!** Torque at 96 in-lbs and apply No-Ox to all exposed metal surface.

**Figure 10.3 Cable Connections Prior to Installation**

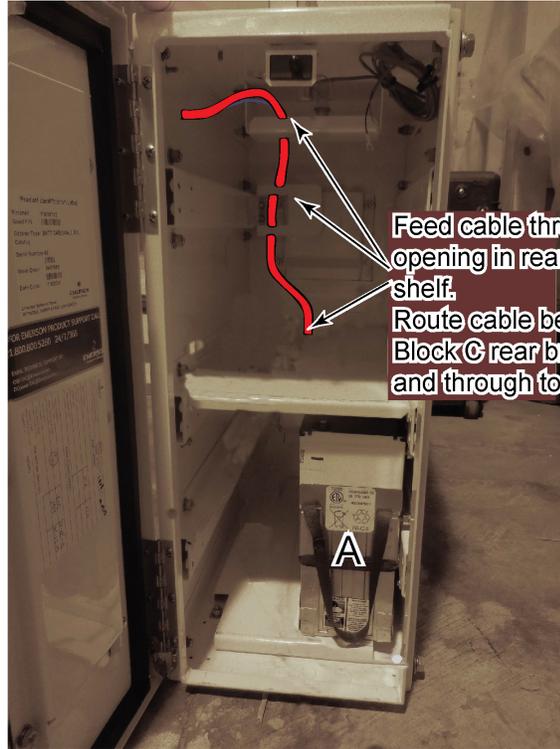


8. Open front door to enclosure.
9. Remove both battery shelf front braces, and set aside braces and hardware.
10. Battery blocks must be lifted upright, with a minimal amount of tilting, to avoid leaking of battery electrolyte.
11. Lift block A to the enclosure, making sure that the loose end of the battery interconnect cable is safely insulated. Push block A to the rear of the enclosure. See Figure 10.4. Reach to the rear of the enclosure to route the rear interconnect cable up through the opening in the rear of the top shelf. Route the cable behind the block C rear bracket and through the opening in the bracket at the top of the cabinet. Rest the cable to the left side of the cabinet.



**NOTE!** Keep battery handles in rear upright for easier installation.

Figure 10.4 Installing Block A



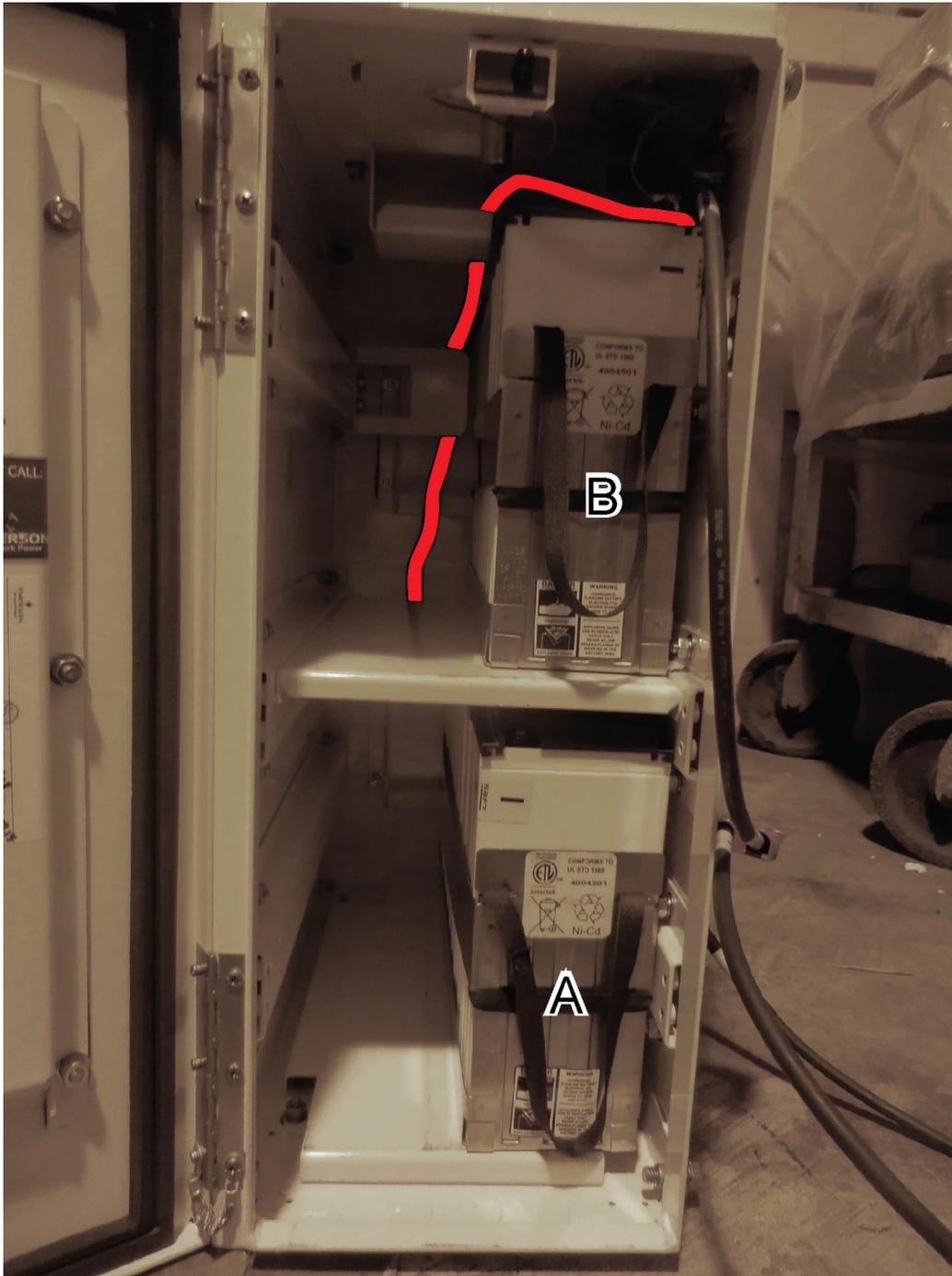
Feed cable through opening in rear of top shelf.  
Route cable behind Block C rear bracket and through top restraint.

12. Lift block B to the enclosure, making sure that the loose end of the positive (+) battery string cable is safely insulated. While keeping the positive (+) battery cable routed to the right side and top of the battery, push block B into the enclosure. See Figure 10.5.



**NOTE!** It may help to tape the interconnect cable to the groove formed in the block B terminal covers prior to lifting block B to the enclosure.

Figure 10.5 Installing Block B



13. Measure voltage between the (-) terminal of block B and the cable connected at the rear of block A. Reading should be 0VDC. Pull block B several inches forward, so that the negative (-) terminal is exposed. Connect the cable from the rear of block A to the (-) negative terminal of block B. Use the bolt and wave washer previously removed. Re-install the block end cover on the front of block B and push block B fully into the enclosure.

14. Torque at 96 in-lbs and apply No-Ox to all exposed metal surface. Measure voltage between the (-) terminal of block A and the loose end of the positive (+) battery string cable connected at the rear of block B. Reading should be equal to the sum of the two block's total voltage (refer to I/O sheet).
15. Lift block C to the enclosure, making sure that the loose end of the battery interconnect cable is safely insulated. While carefully routing the interconnect cable from block C into the groove between the top covers of blocks C & B, push block C into the enclosure. Rest the end of the interconnect cable where it will not interfere with the installation of block D.



**NOTE!** It may help to tape the interconnect cable to the groove on block C prior to lifting block C to the enclosure.

**Figure 10.6** Installing Block C

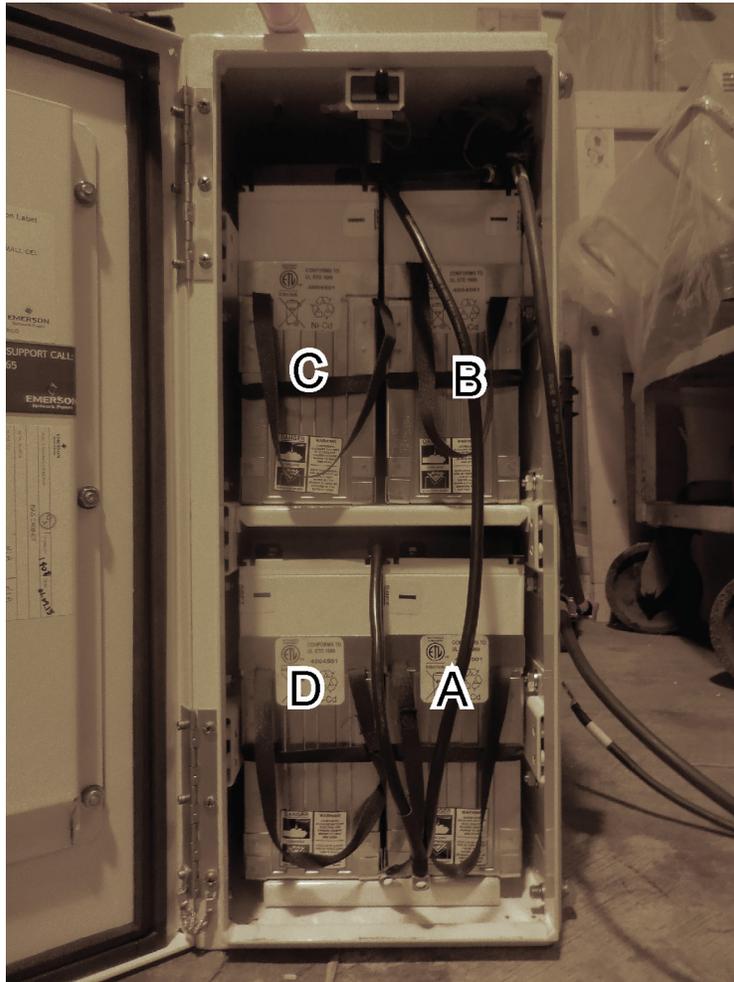


16. Lift block D to the enclosure, making sure that the loose end of the battery interconnect cable is safely insulated. While carefully routing the interconnect cable from block D into the groove between the top covers of blocks A & D, push block D into the enclosure. See Figure 10.7.



**NOTE!** It may help to tape the interconnect cable to the groove formed in the block D terminal covers prior to lifting block D to the enclosure.

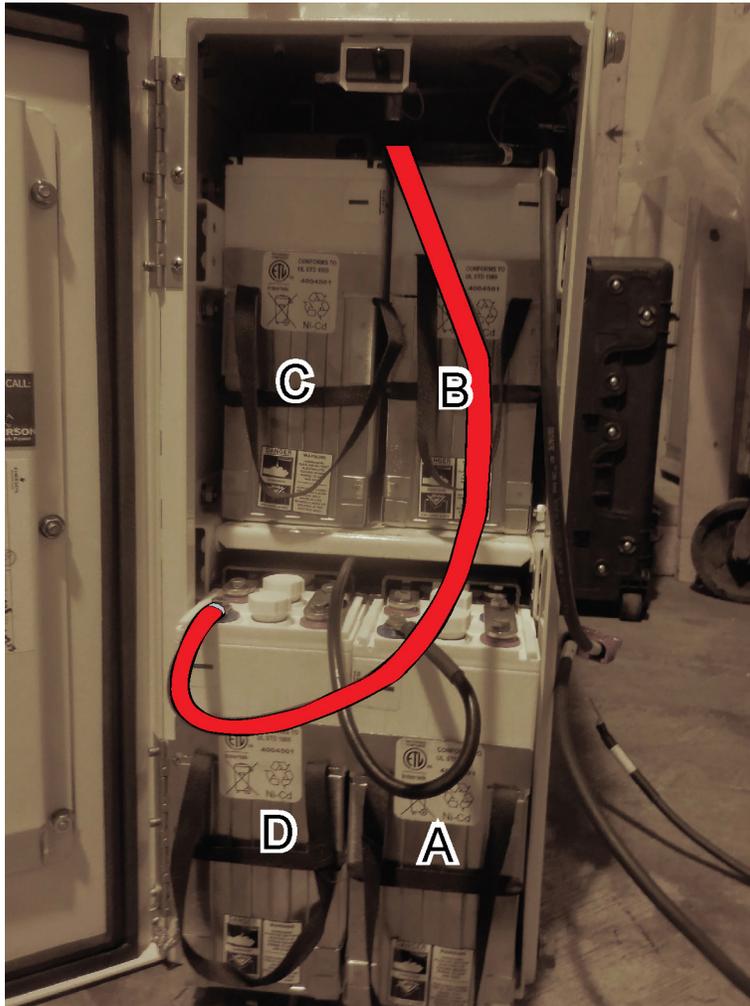
Figure 10.7 Installing Block D



17. Measure voltage between the (-) terminal of block D and the cable connected at the rear of block C. Reading should be 0VDC. Pull block D several inches forward, so the negative (-) terminal is exposed and connect the cable from the rear of block C to the (-) terminal on block D, using the bolt and wave washer previously removed (Cable will pass over the front of the top shelf). Re-install the block end cover on the front of block D and push block D fully into the enclosure. See Figure 10.8.

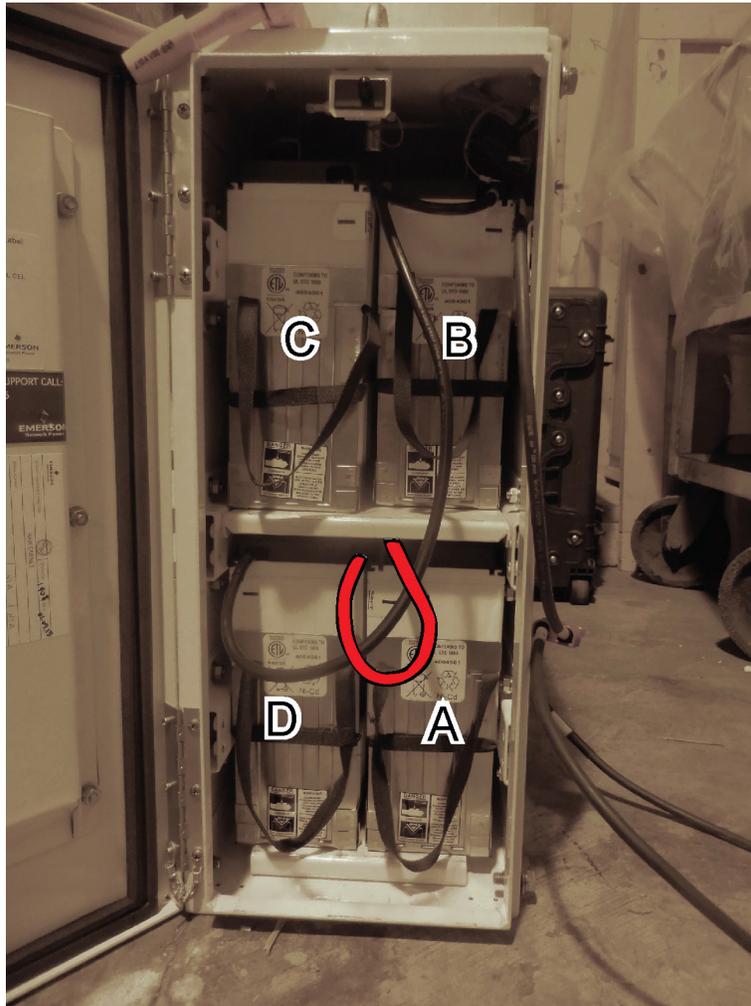


**NOTE!** Torque at 96 in-lbs and apply No-Ox to all exposed metal surface.

**Figure 10.8** Installing the Interconnect Cable between Blocks C & D

18. Measure voltage between the (-) terminal of block C and the loose end of the interconnect cable connected at the rear of block D. Reading should be equal to the sum of the two block's total voltage (refer to I/O sheet).
19. Measure voltage between the (-) terminal of block A and the cable connected at the rear of block D. Reading should be OVDC. Pull block A several inches forward, so the negative (-) terminal is exposed, and connect the cable from the rear of block D to the (-) terminal on block A, using the bolt and wave washer previously removed. Re-install the block end cover on the front of block A and push block A fully into the enclosure. See Figure 10.9.

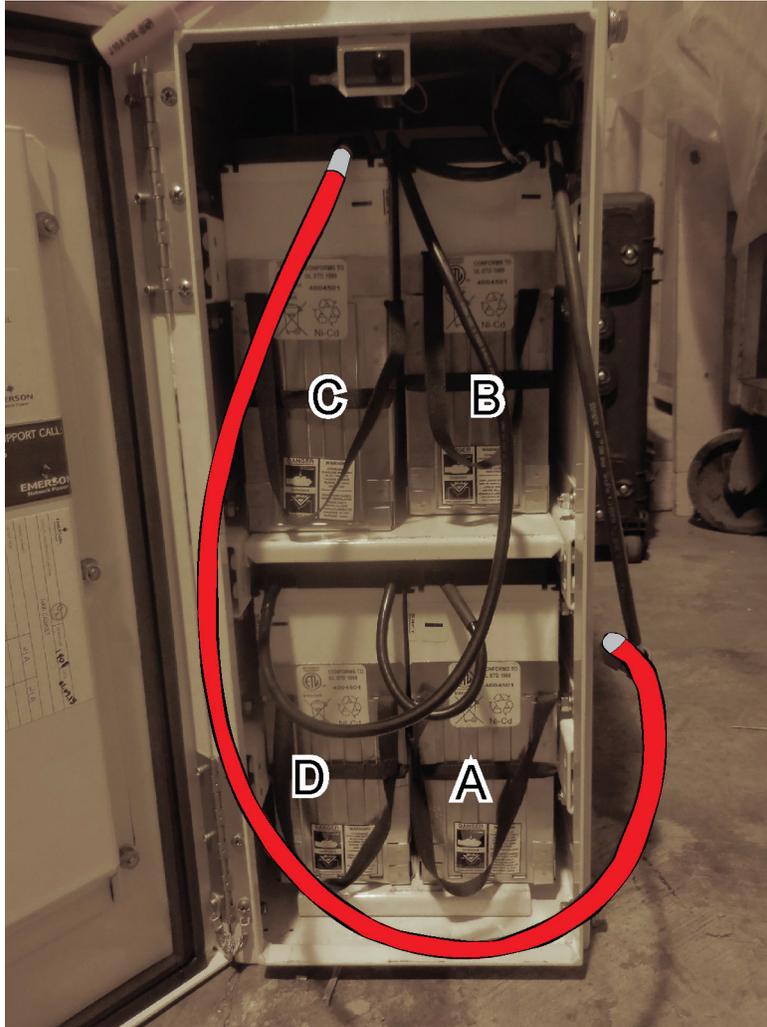
**Figure 10.9** Installing the Interconnect Cable between Blocks A & D



20. Pull block C several inches forward, so the negative (-) terminal is exposed, and connect the negative (-) battery string cable to the (-) terminal of block C. Re-install the block end cover on the front of block C, and push block C fully into the enclosure. See Figure 10.10.



**NOTE!** Torque at 96 in-lbs and apply No-Ox to all exposed metal surface.

**Figure 10.10** Connecting the negative battery string cable to terminal of Block C

21. Measure voltage between the loose end of the negative (-) battery string cable connected to block C and the loose end of the positive (+) battery string cable connected at the rear of block B. Reading should be equal to the sum of the four block's total voltage (nominal 48V).
22. With both loose ends still insulated, pass the loose ends of the battery string cables into the power enclosure, one each going through the pre-installed cable fittings running between the enclosures (use the two fittings towards the front). Run about 12" of each cable into the power enclosure, and tighten the cable fittings to securely hold cables in place.

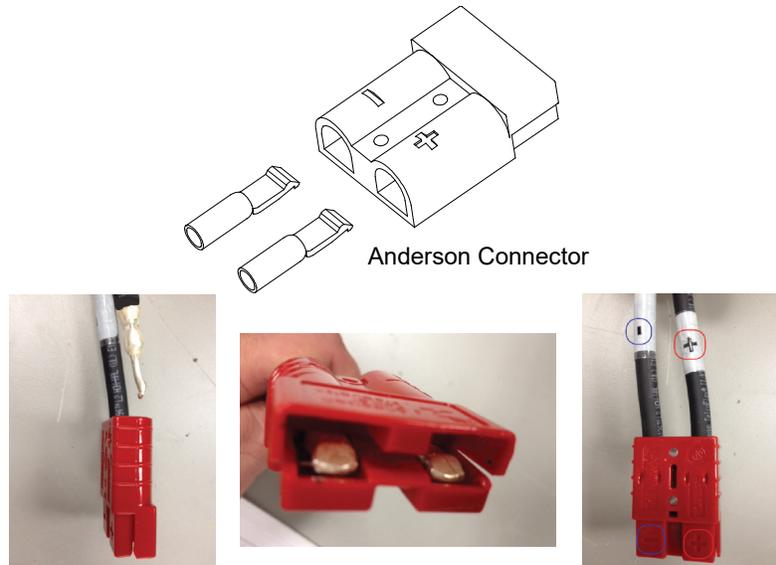


**CAUTION!** The Anderson Powerpole terminal **MUST** snap into place onto the internal stainless steel spring clip in the **PROPER ORIENTATION**.

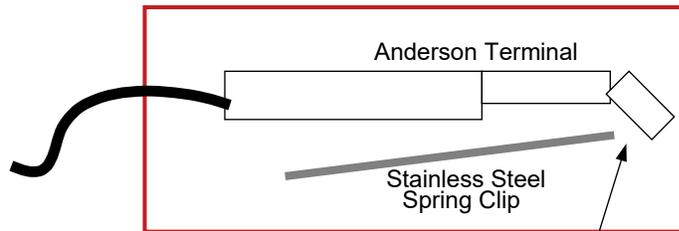
23. Within the power enclosure, remove the insulation from the end of the negative (-) battery string cable and insert that end of the cable into the negative (-) port on the connector included with the battery enclosure. The terminal on the end of the cable needs to be inserted in the correct orientation, and should click into place. The cable should not be able to be pulled out of the interlock without disengaging the clip inside the connector. Make sure the terminal is installed in the negative (-) port on the connector, then measure the voltage between this terminal and the negative (-) terminal on the front of Block C.

Reading should be 0VDC. Repeat the same steps for inserting the positive (+) battery string cable into the connector. See Figure 10.11.

**Figure 10.11 Cable Orientation**



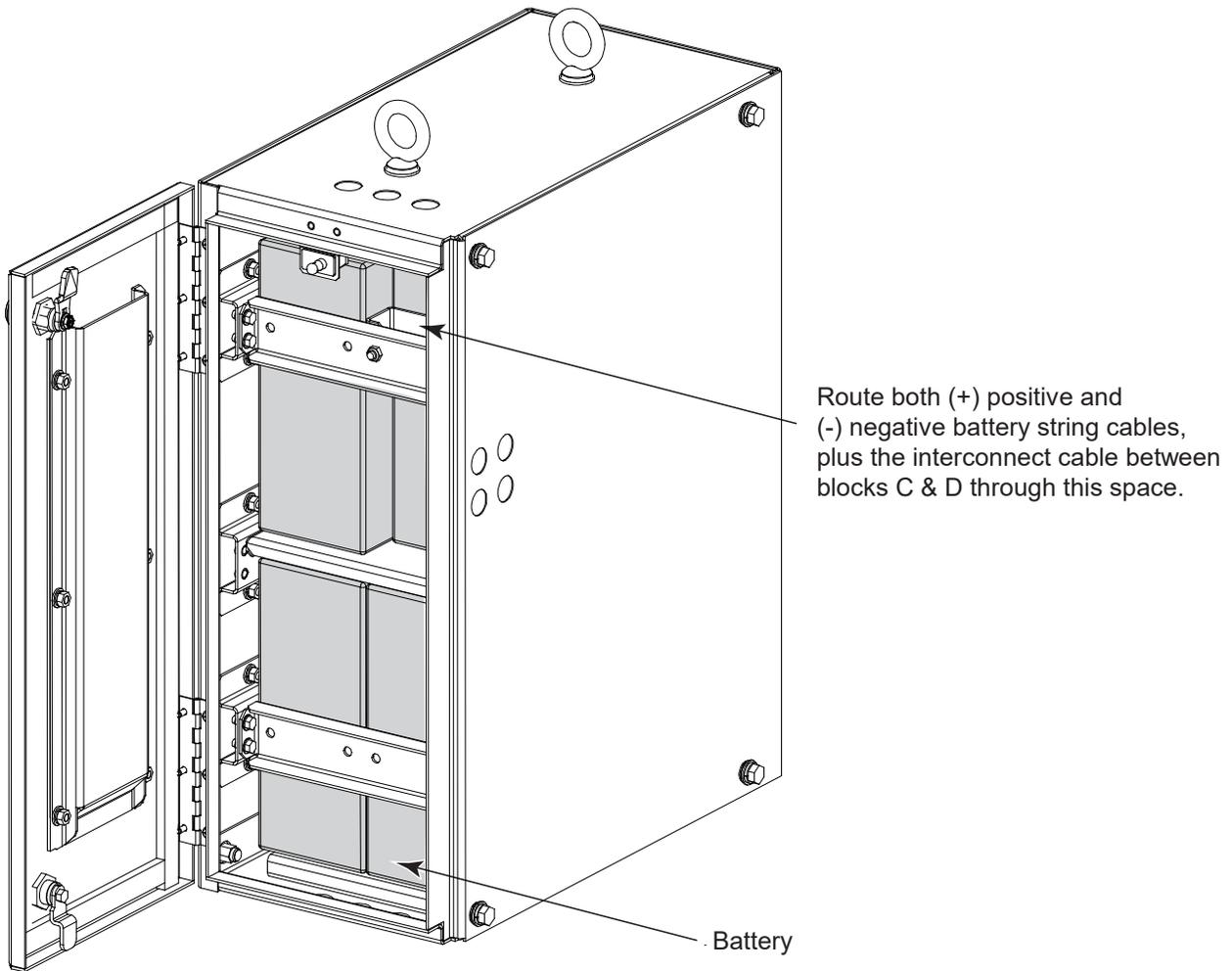
**SIDE VIEW OF ANDERSON HOUSING**



**NOTICE**  
Proper Orientation of Terminal onto Spring Clip

24. Refer to Step 2 in “Connecting Batteries to Vertiv™ NetSure™ Power System” on page 43 for instructions on measuring the voltage between the terminals within the connector. The voltage reading should be equal to the sum of the four blocks' total voltage (nominal 48V).
25. Reinstall both battery shelf front braces with hardware saved from previous step. Carefully guide both (+) positive and (-) negative battery string cables, plus the interconnect cable between blocks C & D, into the bracket attached to the rear side of the top shelf front brace, in front of block B. Refer to Figure 10.12.

Figure 10.12 Battery Placement in Battery Shelves



## 10.5 Connecting Batteries to Vertiv™ NetSure™ Power System

**ENCLOSURE IS PRE-WIRED FOR -48VDC  
BATTERY STRING INSTALLATION ONLY.**



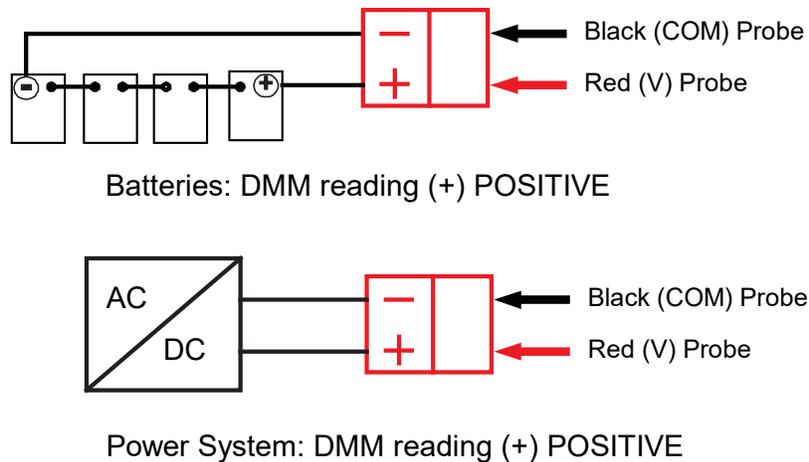
**CAUTION!** To prevent arcing, the positive (+) battery cables must be connected to the positive (+) battery terminals and the negative (-) battery cables must be connected to the negative (-) battery terminals.

Refer to “Use of Digital Multimeter” on page 32 regarding use of a Digital Multimeter.

## Procedure

1. Confirm that the battery cables from the power system labeled positive (+) and negative (-) are inserted into the correct ports in the connector included with the power enclosure. Confirm the same for the cables from the battery enclosure passed into the power enclosure, and inserted into the other mechanical connector that was included with the battery enclosure.
2. Measure the voltage between the terminals within the connectors. Take care that the probes do not come in contact with each other or with other metal objects during the actual process of measuring the voltage. Insert the red (V) probe into the (+) positive port on the connector, and the black (COM) probe into the (-) negative port on the connector: the resultant reading MUST show (+) positive voltage. If either reading shows (-) negative voltage, immediately stop all other steps and ensure that the negative and positive battery cables are correctly connected to the negative and positive terminals of the battery string, and are correctly inserted into the negative and positive ports of the connector. Likewise, ensure that the negative and positive power system cables are correctly inserted into the negative and positive ports of that connector. Do not proceed until the voltage reading is (+) positive.

**Figure 10.13 Battery and Power System DMM Reading**



3. With the power system turned off, join the two Anderson connectors to complete the battery circuit with the power system.
4. Turn off all loads in the power system distribution, and remove all but one rectifier from the power system. Turn on the power system, and ensure that everything is still operational with the batteries connected. If not, there may be issues with reverse polarity. If everything appears to be operating correctly, the other rectifiers may be "hot-plugged" into the power system.
5. Turn off the power system. Close and secure the front door.



**CAUTION!** To prevent arcing, the positive (+) battery cables must be connected to the positive (+) battery terminals and the negative (-) battery cables must be connected to the negative (-) battery terminals.

# 11 Maintenance Procedures

## 11.1 Battery Enclosure Ventilation Openings

At each visit, check that there is no obstruction inside or outside the enclosure blocking the enclosure ventilation openings.

## 11.2 Battery Troubleshooting and Maintenance

Refer to the appropriate battery manufacturer's maintenance manual for information on troubleshooting battery problems.

Battery life is determined by a variety of factors, including the technology deployed, the charge/discharge cycle history, operating temperature, peak current draw, etc. Battery string replacement is governed by carrier policies, but should be performed regularly at the end of the expected lifetime of the battery.

Battery health should be checked at a regular intervals per battery manufacturer's instructions, which should include a verification of the float voltage and open circuit voltage.

### **Battery Maintenance Procedure**

1. Make sure that the batteries and battery area are clean and dry.
2. Inspect the battery terminals. Make sure that the battery terminals are clean and the connections are tight. If necessary, clean and tighten the terminals in accordance with local practices, using approved cleaning solution. Reapply antioxidant compound (NO-OX-ID™ or equivalent).
3. In high discharge rate applications, or in areas subject to high vibration, periodically check battery terminal tightness.



**NOTE!** Tighten all battery terminal adapter post nuts to the torque specifications specified by the battery manufacturer only.

4. Keep records of battery and cell voltages as required by battery manufacturer and local practices to monitor long-term changes in battery condition. To ensure battery warranty protection, keep any additional records as required by the battery manufacturer. Refer to the Battery Installation and Maintenance Record supplied with the batteries.

## 11.3 Battery Replacement

The following considerations must be taken when replacing a battery.

- Follow all previously tested warning and precautions.
- Review all the documentation, including the battery manufacturer's instructions and MSDS.
- Never mix different battery technologies, manufacturers or models within the cabinet.
- Before proceeding, isolate the battery from the DC Power Plant.
- Though isolated, potential for hazardous current remains, act accordingly.
- The removal procedure is the reverse of the installation procedure.
- Any and all spillage must be dealt with completely and immediately.
- To install the replacement, follow the previous installation and battery manufacturer's instructions.
- Ensure to-reapply NO-OX-ID-A (or approved equivalent) on all the terminals and lugs.

## 12 Related Documentation

Vertiv™ NetSure™ 502 DC Power System:

System Application Guide	SAG582136700
Installation Instructions	Section 6025
User Instructions	Section 6026
Rectifier User Instructions	UM1R482000e
ACU+ Controller User Instructions	UM1M820BNA

## 13 Accessories and Replacement Parts

Refer to Table 13.1 for list of accessories (AC) and replacement parts (RP).

**Table 13.1 Accessories and Replacement Parts**

Part Number	Description
F1010715	Pole Mount Kit (AC)
F1010716	Wall Mount Kit (AC)
F1010717	H-Frame Kit (AC)
F1010760	6" Mounting Plinth (AC)
F003205	216-Type Tool (AC)
F529732	Tamper-prof wrench 5/16 Hex Pin (AC)
P92538	Intrusion Switch (RP)
141569	Latch 1/4" Turn without Padlock (RP)
145383	Latch 1/4" Turn with Padlock Hasp (RP)
149090	AC Surge Protection Device, 120V (RP)
147589	AC Surge Protection Device, 208/240V (RP)
149029	DC Surge Protection Device, 48V (RP)

## 14 DC Power, Outdoor Enclosure & Service Contacts

Refer to Section 4.154 (provided with your customer documentation) for support contact information.

## Connect with Vertiv on Social Media



<https://www.facebook.com/vertiv/>



<https://www.instagram.com/vertiv/>



<https://www.linkedin.com/company/vertiv/>



<https://www.twitter.com/vertiv/>



---

Vertiv.com | Vertiv Headquarters, 1050 Dearborn Drive, Columbus, OH, 43085, USA

© 2022 Vertiv Group Corp. All rights reserved. Vertiv™ and the Vertiv logo are trademarks or registered trademarks of Vertiv Group Corp. All other names and logos referred to are trade names, trademarks or registered trademarks of their respective owners. While every precaution has been taken to ensure accuracy and completeness here, Vertiv Group Corp. assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions. Specifications, rebates and other promotional offers are subject to change at Vertiv's sole discretion upon notice.