



# NetSure™ External Distribution Box (EDB)

## Description and Installation Manual

Specification Number: F1011259, F1011265, F1011266

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### **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.

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## 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.

## You Must Follow Approved Safety Procedures



**DANGER!** Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

- a) The tasks should be performed in the order indicated.
- b) Remove watches, rings, and other metal objects.
- c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.
- d) Wear eye protection.
- e) Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

## DC Input/Output Voltages



**DANGER!** This system has a DC source connected to it and provides DC distribution. Although the DC voltage is not hazardously high, the DC source can deliver large amounts of current. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an input or output terminal or exposed wire connected to an input or output terminal. NEVER allow a metal object, such as a tool, to contact more than one termination at a time, or to simultaneously contact a termination and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury.



**DANGER!** Follow local lockout/tagout procedures to ensure DC branch circuit protection devices remain de-energized during installation at loads, as required.

## Buried Utilities



**CAUTION!** When installing the enclosure, ensure the site is free of any buried utilities. Call 811 before installation. Severe damage, serious injury, or death can occur if buried utilities are not identified prior to installation.

## Personal Protective Equipment (PPE)



**DANGER!** ARC FLASH AND SHOCK HAZARD.

Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done to determine the “hazard/risk” category, and to select proper PPE.



Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the equipment.

Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority, per NFPA 70E “Standard for Electrical Safety in the Workplace”.

## General Safety Precautions

The following precautions shall be observed at all time when handling and installing the enclosure:

- Observe all safety precautions against personal injury and equipment damage.
- The procedures outlined in this manual are only recommended guidelines. Ensure that all NEC (National Electric Code) and local codes for safety and wiring are followed.
  - Use listed two-hole compression connectors (lugs) to terminate all ground connections. Selected lug shall match wire and type, and crimped applied as specified by the lug manufacturer.
  - Apply NO-OX-ID-A to all ground connections.
  - Insulation of field-wire conductors should be rated no less than 90 °C and sized in a manner that is consistent with the NEC and local codes.
- Always use an approved voltage detector, when approaching an enclosure, to verify no leaks or shorts are presents on the external body.
- Read “Specific Safety Precautions” starting on page viii in its entirety prior to attempting to handle or secure the enclosure.
- A minimum of two persons are required to safely install the enclosure.
- Hard hats and steel-toed boots should be worn while maneuvering the enclosure.
- Safety glasses should always be on while on-site.
- Safety gloves should be on when working in temperature extremes, with batteries, or with sharp objects.
- All electricians, operators, and technicians have been trained for the task at hand.
- Keep bystanders away.
- Ensure that all personnel on site are familiar with the first-aid kit location and emergency procedures in the event of an injury.

## Specific Safety Precautions



### **DANGER!** ELECTRICAL HAZARD

The equipment shall be installed and serviced by trained service personnel in accordance with the applicable requirements of the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) (NFPA 70) or Canadian Electrical Code; and the applicable sections of the National Electrical Safety Code (NESC) (ANSI C2). For operation in countries where the NEC or NESC is not recognized, follow applicable codes.

All electrical procedures should be performed by a licensed electrician.

Observe all safety precautions as specified by local building codes. If local building codes specify procedures different from those in this section, follow local codes.



### **DANGER!** RISK OF ELECTRICAL SHOCK, GENERAL

All enclosure grounding must be installed and verified prior to connecting any power cables and turning-up of enclosure.

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

Do not install equipment showing any physical damage.

If packaging is damaged, do not accept receipt from the shipper.



### **DANGER!** RISK OF ELECTRICAL SHOCK, AC

Proper actions, include, but not limited to:

- a) Verify before contacting the enclosure that no current leakage or ground fault condition is present.
- b) Verify a proper ground is in place.



### **DANGER!** RISK OF ELECTRICAL SHOCK, DC

An OFF battery switch / breaker does not isolate the batteries, nor do the batteries have a protective fuse. Thus, handle accordingly and use only insulated tools when working around batteries or any DC potential.

In addition, be sure that all connection points have been de-energized.



### **DANGER!** RISK OF ELECTRICAL SHOCK, OSP CABLES

If joint buried cables are used, check the cable sheath for voltage in accordance with local standards. If voltage is detected, do not proceed with the installation. Contact the supervisor and do not proceed until the voltage hazard is eliminated.



### **DANGER!** RISK OF ELECTRIC SHOCK

The DC bus may be powered by DUAL power sources – rectifiers and DC batteries.

To properly work on the system, de-energize by disconnecting BOTH power sources. Even with the batteries turned off by using a local battery (circuit breaker) disconnect, batteries are still “LIVE” and hazardous, including a voltage >50 VDC, and a source of high short circuit current.

Use extreme caution around the batteries and terminals.



### **WARNING!** RISK OF INJURY TO EYES AND SKIN, FROM OPTIC DEVICES

Do not look into a fiber cable or device, nor hold such cable or device against body, fabric or other material.



**WARNING!** RISK OF HAZARDOUS SUBSTANCES

After handling of the enclosure or any such component, such as batteries, cables, busbars, etc., always wash hands immediately after.



**DANGER!** RISK OF CHEMICAL EXPOSURE

A battery can present harmful chemicals. Refer to the battery installation manuals and MSDS supplied with the batteries. Work in a ventilated area and follow all safety procedures.

At a minimum, wear safety glasses and gloves when working with batteries.

Do not smoke.



**CAUTION!** PREVENT EQUIPMENT DAMAGE, OPERATING TEMPERATURE

The enclosure is approved for operation in an environment with an expected temperature range of -40 °F to +115 °F (-40 °C to +46 °C) and 0% to 95% relative humidity range, non-condensing. Do not use at temperatures or humidity exceeding these ranges.

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# 1 About this Document

This document provides description and installation instructions for Vertiv™ NetSure™ External Distribution Box (EDB); Spec. Nos. F1011259, F1011265, and F1011266.

Procedures related to the provisioning, start-up, and acceptance of associated telecom equipment are not covered in this document.

Documents that supplement the information in this document are referenced in “Sequence of Procedures” on page 10.

## 2 Product Description

### 2.1 General

The Vertiv™ NetSure™ External Distribution Box (EDB) provides an enclosure housing two (2) DC distribution panels and alarm cards, a fiber termination and storage chamber, and a cable entry chamber. Spec. No. F1011259 contains no Low Voltage Disconnect (LVD). Spec. No. F1011265 contains a Low Voltage Disconnect (LVD) contactor on the left side DC distribution panel’s DC input. Spec. No. F1011266 contains Low Voltage Disconnect (LVD) contactors on the left side and right side DC distribution panels’ DC input. See Figure 2.1 for overall views of the enclosure.

The Vertiv™ NetSure™ External Distribution Box (EDB) is to be mounted on the side of a companion enclosure made of a minimum of 0.125-inch aluminum or 14-gauge galvanized steel. A companion enclosure is a Vertiv™ XTE series enclosure equipped with a Vertiv™ NetSure™ series power system.

### 2.2 Part Numbers

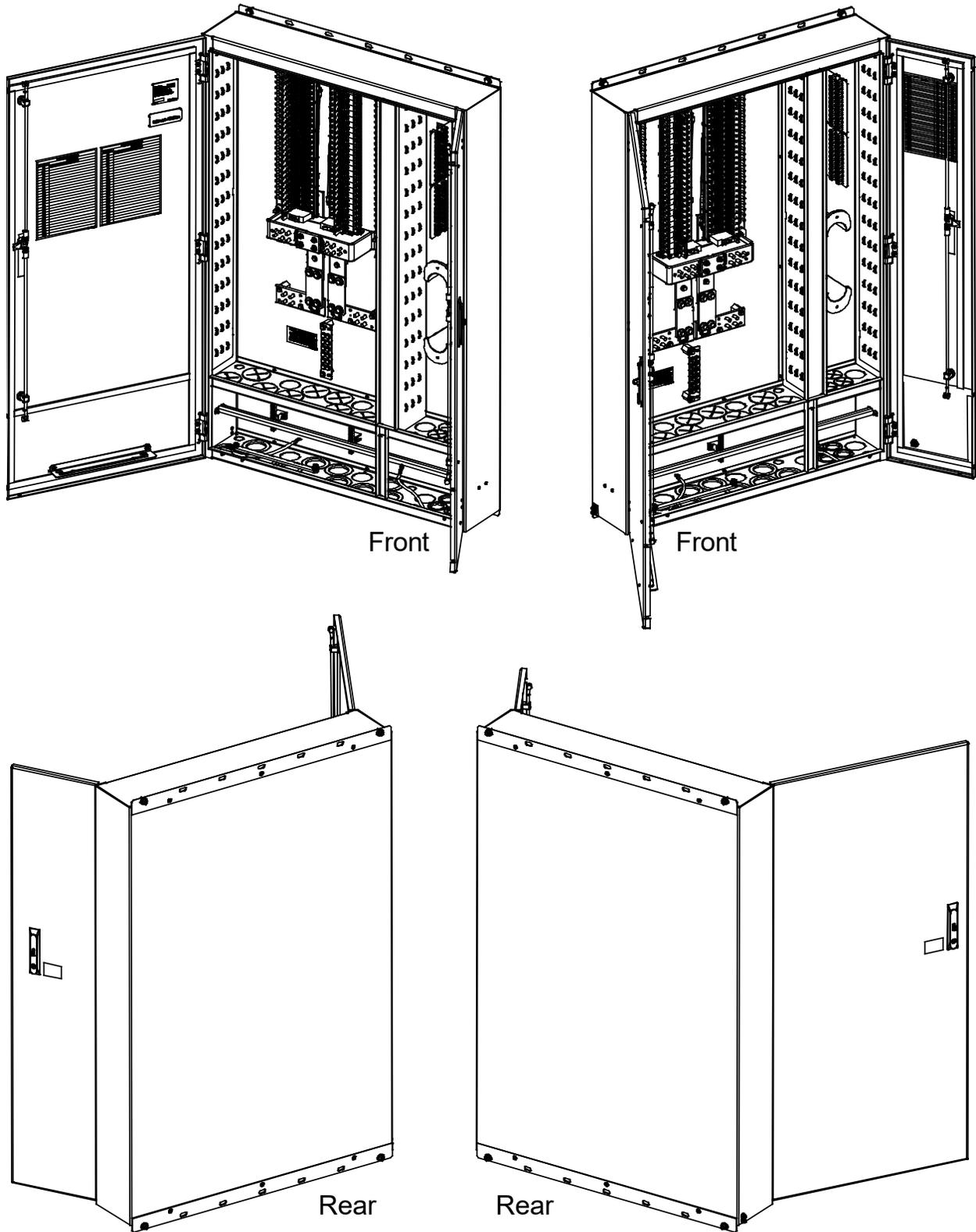
#### 2.2.1 Enclosure

Refer to Table 2.1 for applicable product part numbers.

**Table 2.1 Vertiv™ NetSure™ External Distribution Box (EDB) Part Numbers and Descriptions**

Part Number	Description
F1011259	External Distribution Box (EDB) Providing DC Distribution and Fiber Termination, No LVD.
F1011265	External Distribution Box (EDB) Providing DC Distribution and Fiber Termination, One (1) LVD.
F1011266	External Distribution Box (EDB) Providing DC Distribution and Fiber Termination, Two (2) LVDs.
F1011267	LVD Contactors Kit (Field Installed)

Figure 2.1 Vertiv™ NetSure™ External Distribution Box (EDB) Overall Views



## 2.2.2 Circuit breakers

Refer to Table 2.2 for the part numbers of compatible circuit breakers to be used in the enclosure's distribution panels. Each distribution panel holds up to twenty-six (26) single-pole bullet nose-type load distribution circuit breakers.

Circuit Breaker Derating: 1A to 60A circuit breakers shall be loaded up to 80% of rated value.

**Table 2.2 Circuit Breaker Part Numbers**

Ampere Rating	Number of Poles	Number of Mounting Positions Required	Part Number	
			Electrical Trip <sup>1</sup> (White Handle)	Electrical / Mechanical Trip <sup>2</sup> (Black Handle)
1	1	1	102272	101596
3	1	1	102273	101597
5	1	1	102274	101598
10	1	1	102275	101599
15	1	1	102276	101600
20	1	1	102277	101601
25	1	1	102278	101602
30	1	1	102279	101603
35	1	1	102280	101604
40	1	1	102281	101605
45	1	1	121998	121997
50	1	1	102282	101606
60	1	1	102283	101607

Circuit Breaker Alarm Operation:

- <sup>1</sup> Provides an alarm during an electrical trip condition only.
- <sup>2</sup> Provides an alarm during an electrical or manual trip condition.

## 2.3 Application

The Vertiv™ NetSure™ External Distribution Box (EDB)...

- provides a stable, secure, and water-tight environment for DC distribution and fiber management supporting both wireline and wireless telecommunications applications.
- depends upon a proven structural system, integrated mechanical components, and a sealing system that withstands rain, dust, and snow.
- can be mounted to the side of a companion enclosure.

## 2.4 Specifications

### 2.4.1 Electrical

- Input / Output Voltage: -48 VDC / -58 VDC, ±0%
- Maximum Input Current: 480 A.
- Input / Output Bus A Maximum Current: 240 A.
- Input / Output Bus B Maximum Current: 240 A.

- Short Circuit Current: 10000 ADC.
- Maximum Load Distribution Circuit Breaker Size: 60 A.
- Circuit Breaker Alarm (CBA) Circuit: A set of Form-C alarm relay contacts and resistive battery are provided for connection to external CBA alarms. Relay contacts rated for 2 A @ 30 VDC, 0.6 A @ 110 VDC, and 0.6A @ 125 VAC.

## 2.4.2 Environmental

- Operating Ambient Temperature Range: -40 °F to +115 °F (-40 °C to +46 °C).
- Storage Ambient Temperature Range: -40 °F to +185 °F (-40 °C to +85°C).
- Relative Humidity: Capable of operating in an ambient relative humidity range of 0 % to 95 %, non-condensing.
- Altitude: Capable of operating in an altitude range of 0 feet to 10,000 feet.

## 2.4.3 Compliance information

The Vertiv™ NetSure™ External Distribution Box (EDB) complies with the following standards:

- UL Listed to UL 62368-1 (2nd Edition), UL Subject 1801, and CAN/CSA C22.2 No. 62368-1-14 (2nd Edition) under Vertiv file no. E97066 (QPQY/QPQY7 categories).
- UL-50E Rain Test.

## 2.4.4 Safety listed AC and DC components

A typical Vertiv™ NetSure™ External Distribution Box (EDB) includes listed or recognized components for the United States.

## 2.4.5 Enclosure dimensions, weights, and physical specifications

### Dimensions

- See Figure 2.2 for overall dimensions.
- See Figure 2.3 for mounting hole dimensions.

### Physical Specifications and Weight

- Height: 60.82 inches.
- Width: 40.00 inches.
- Depth: 9.12 inches.
- Weight: 135 lbs.
- Color: Cool White.

## 2.5 Local DC Power Source

DC power to be provided by customer via an upstream power source, typically from an adjacent enclosure.

Figure 2.2 Enclosure Dimensions

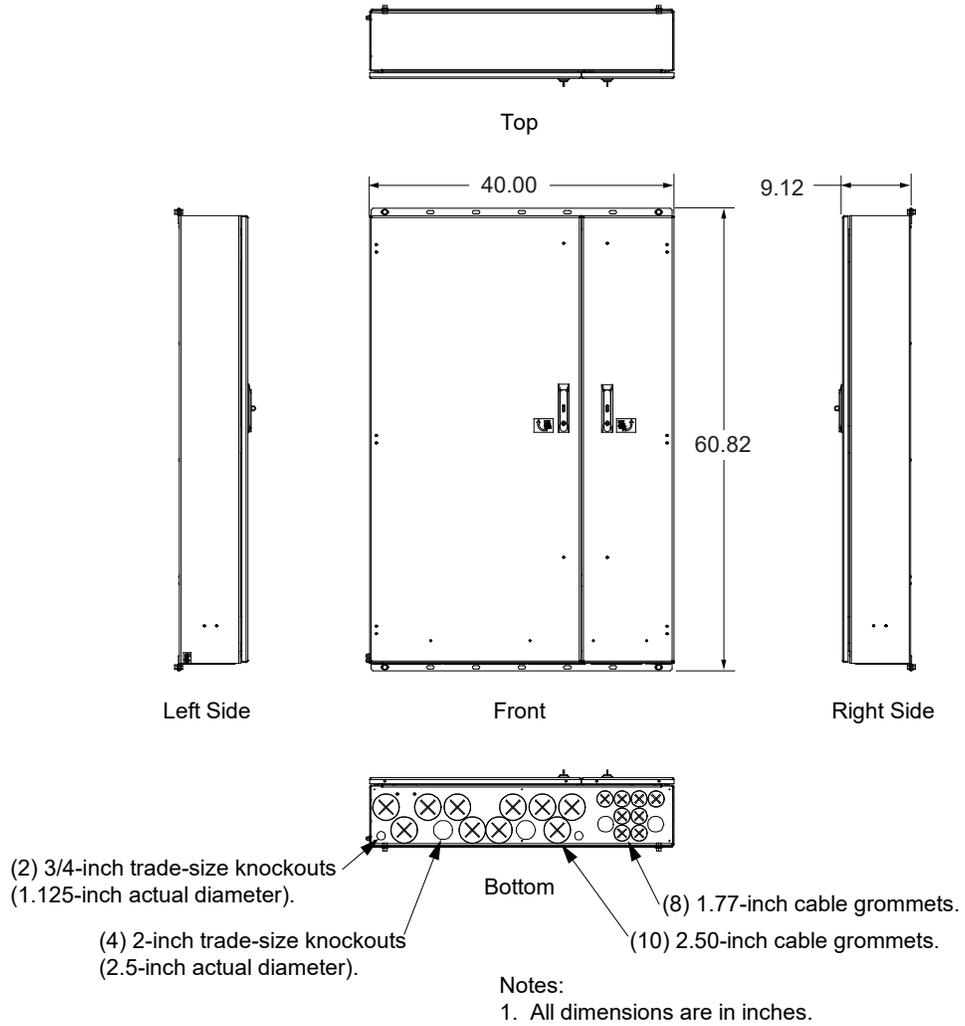
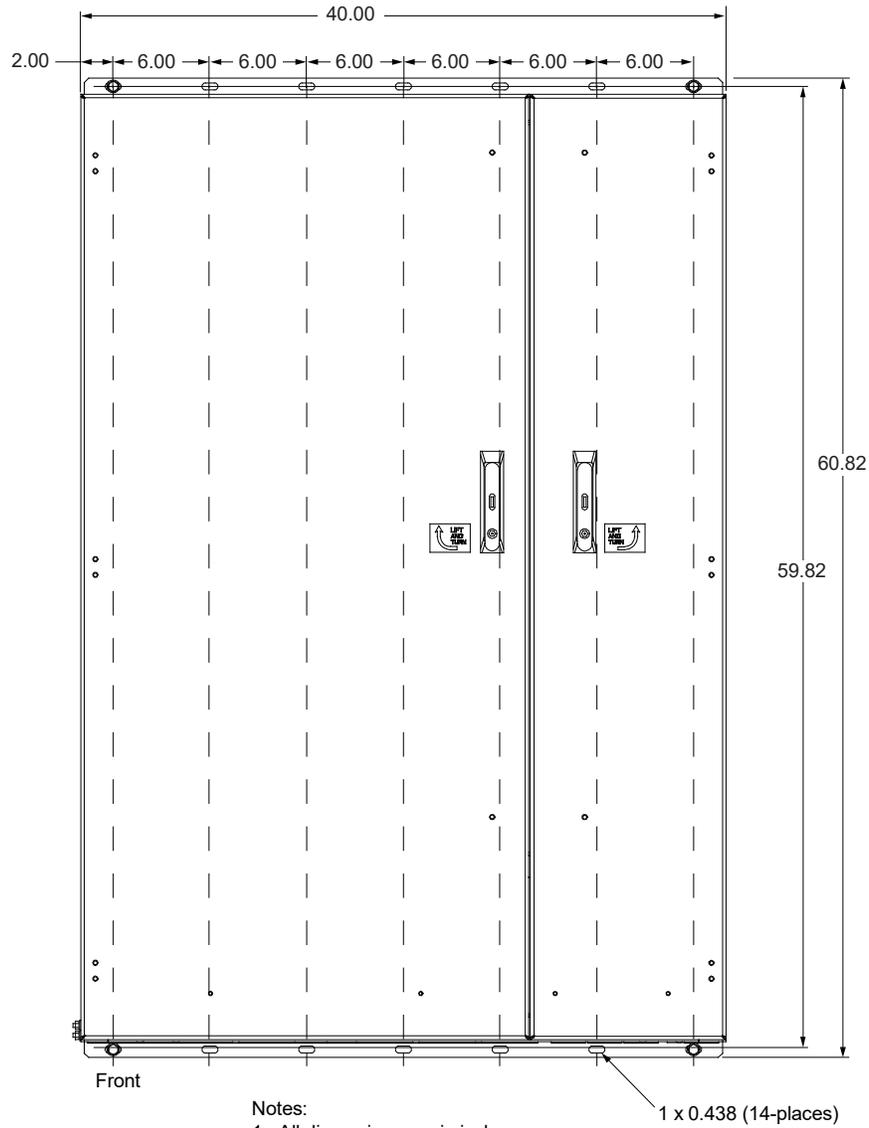


Figure 2.3 Enclosure Mounting Dimensions



## 2.6 Enclosure Features and Options

**Perspective Views:** Refer to Figure 2.4 for enclosure perspective views with major features identified.

**Mounting Options:** The enclosure is designed to be mounted to the side of a companion enclosure.

**Exterior Finish:** The enclosure is finished in multistage dry powder polyester paint (cool white) for maximum durability and performance against corrosion.

**Sealed DC Distribution Chamber / Sealed Fiber Termination and Storage Chamber / Cable Entry Chamber:** The enclosure provides three chambers. A sealed DC distribution chamber, a sealed fiber termination and storage chamber, and a cable entry chamber.

**Front Doors:** The enclosure has two (2) front environmentally sealed doors that provide access to the DC distribution chamber, fiber termination and storage chamber, and cable entry chamber.

- The front doors securing mechanism is a swing handle with multi-point rod-latch mechanism.
- The swing handle locking mechanism is equipped with a padlock hasp that supports a lock.
- The front doors require a hex/pin security tool (T-handle tool) to open.
- The front doors have a self-locking wind latch that secures the door open during installation or maintenance activities. Door wind latch secures at 90° and 120°.
- The front doors have EPDM rubber environmental seals.

**DC Distribution Chamber:** The DC distribution chamber is equipped with...

- **DC Distribution Panels:** Two (2) 26-position DC distribution panels are provided inside the enclosure.
- **Alarm Cards:** Two (2) alarm cards are provided to connect circuit breaker alarms into the alarm circuits of the companion enclosure. The alarm cards are factory wired to the enclosure's alarm blocks.
- **Alarm Blocks:** Two (2) alarm blocks are provided for connecting alarm circuits and LVD control wiring to the enclosure.
- **Main Ground Bar:** A five (5) position main ground bar is located inside of the enclosure.
  - The main ground bar is mounted on isolators.
  - The default ground lug geometry is two hole with 1/4 inch post and 5/8 inch spacing.
- **Low Voltage Disconnect (LVD):**
  - Spec. No. F1011259 contains no Low Voltage Disconnect (LVD).
  - Spec. No. F1011265 contains a Low Voltage Disconnect (LVD) contactor on the left side DC distribution panel's DC input.
  - Spec. No. F1011266 contains Low Voltage Disconnect (LVD) contactors on the left side and right side DC distribution panels' DC input.

**Fiber Termination and Storage Chamber:** The fiber termination and storage chamber is equipped with...

- **Fiber Termination:** Forty-Eight (48) LC Duplex fiber connectors are provided.
- **Fiber Storage:** Two (2) fiber storage spools are provided.

**Cable Entry Chamber:** The cable entry chamber is equipped with...

- **Tower Cable Ground Bars:** Two (2) tower cable ground bars are provided.
- **Cable Tie Bar:** A cable tie bar is provided.

**Grounding:** Two 1/4-20 studs on 5/8" centers are located on the outside side panel of the enclosure for connecting the enclosure into the site grounding network.

**Cable Entry/Exit:** Cable entry/exit is made into a dedicated chamber (splash zone) at the bottom of the enclosure. Ten (10) 2.50-inch cable grommets and eight (8) 1.77-inch cable grommets are provided on the bottom of the enclosure for cable entry. There are four (4) 2-inch trade size knockouts provided for power cable entry and fiber exit, along with two (2) 3/4-inch trade size knockouts for alarm wiring. See Figure 2.2.

Figure 2.4 Perspective Views with Major Features Identified (cont'd on next page)

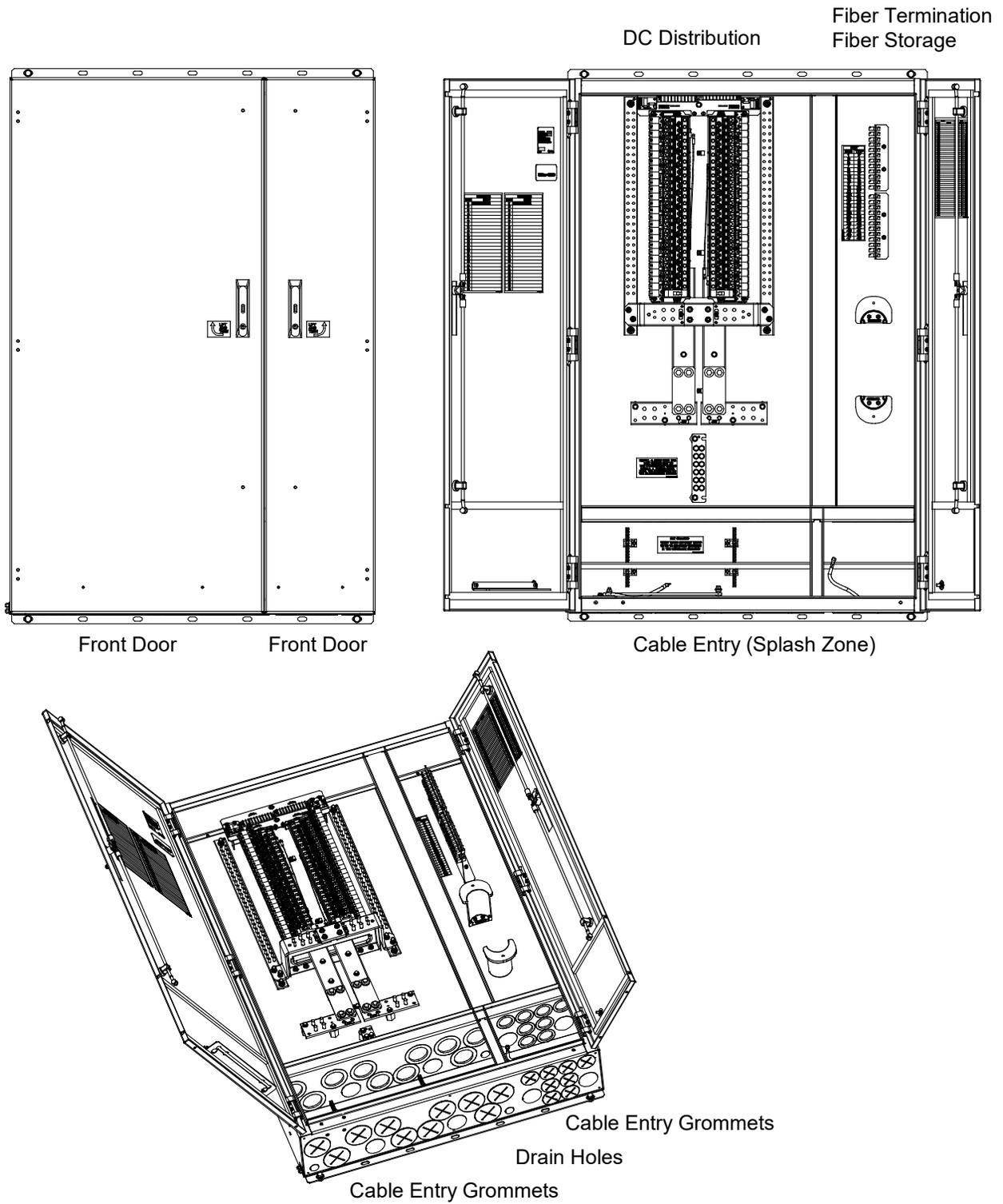
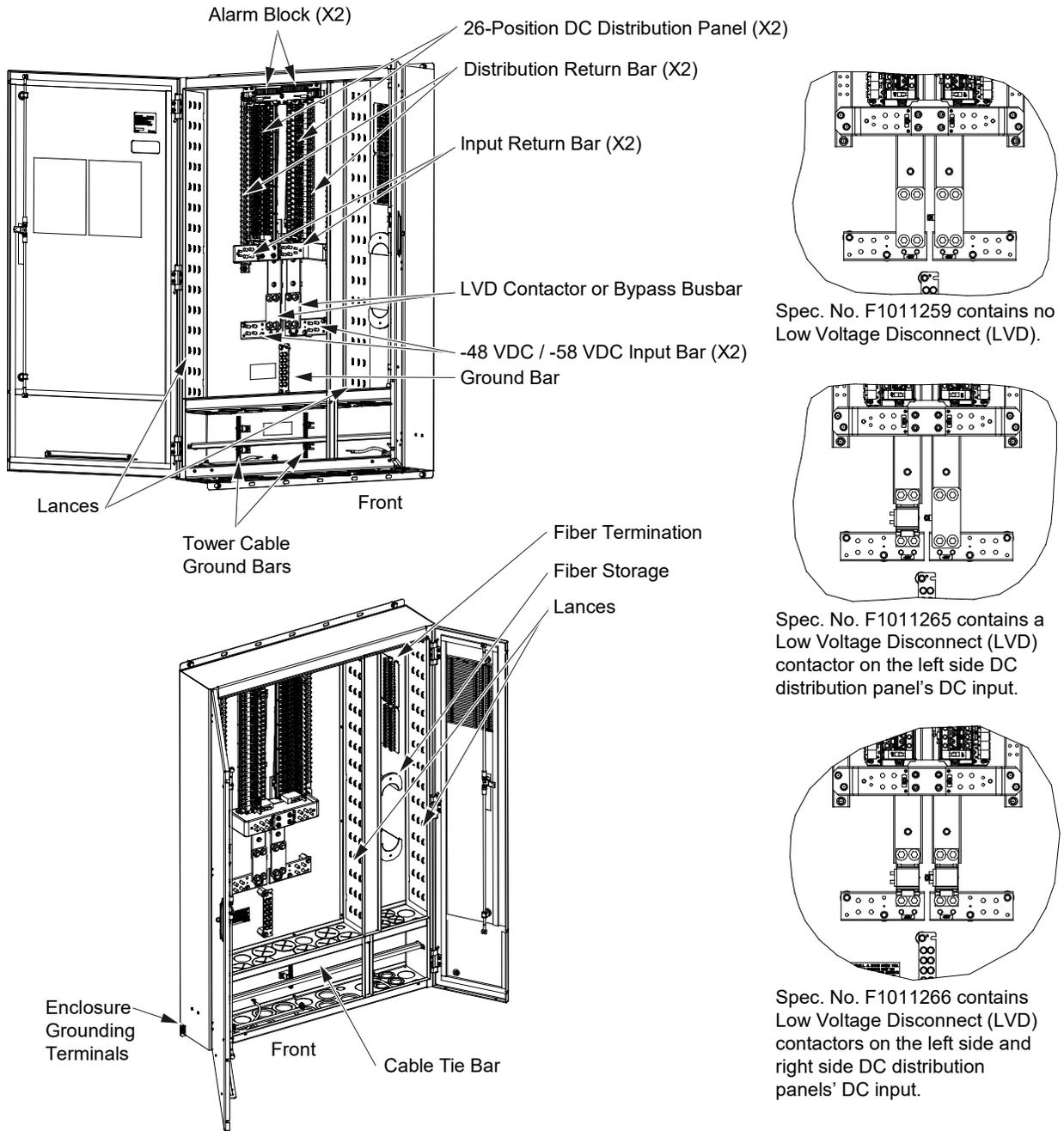


Figure 2.4 Perspective Views with Major Features Identified (cont'd from previous page)



## 3 Sequence of Procedures

### 3.1 General

Perform the procedures in Table 3.1 (in the order listed) to fully install the enclosure.

Other documents and manufacturer's documents may be required to complete the installation of the system. This includes, but is not limited to:

- OSP cable fishing, sealing, grounding, splicing, and termination.
- Equipment manufacturer's drawings and documentation.
- Refer also to...
  - SD-1011259-01 (enclosure schematic drawings).
  - SD-1011265-01 (enclosure schematic drawings).
  - SD-1011266-01 (enclosure schematic drawings).

**Table 3.1 Sequence of Procedures**

Section in this Document	Starting on Page	Description
Product Description	1	Provides information that will help the project engineer determine an appropriate use and location for the enclosure.
Front Doors and Locks	11	Describes how to access the inside of the enclosure.
Installation Considerations	14	Provides installation overview and recommended tools and test equipment.
Transportation and Storage	15	Describes the transportation and storage requirements.
Mounting the Enclosure	15	Describes the safe handling of the enclosure and the procedures to install the enclosure.
Installing Bullet Nose Type Circuit Breakers	16	Provides a procedure to install the circuit breakers into the enclosure.
Grounding the Enclosure	18	Describes the grounding requirements for the enclosure.
Cable Routing	20	Provides cable routing information.
Making Electrical Connections	21	Provides the following wiring information. RRH (Remote Radio Head) Cables Alarm and LVD (Low Voltage Disconnect) Cables Fiber Cables DC Input Power Cables
Sealing Enclosure Cable Entries	33	Provides methods for sealing the cable entries.
Initial Power Up	34	Describes the power up sequence for the enclosure.
Maintenance and Replacement Procedures	34	Provides maintenance and replacement information.

## 4 Front Doors and Locks

### 4.1 Important Safety Instructions



**DANGER!** Adhere to the “Important Safety Instructions” starting on page vi.

### 4.2 Front Doors

The enclosure front doors are equipped with swing handle, multi-point rod-latch systems. The swing handle latch includes provisions for a customer supplied padlock.

The enclosure’s left side front door is equipped with a wind latch to keep the door secure when open.

Refer to the next section for instructions to open and secure the doors with the wind latch.

### 4.3 Opening and Closing the Enclosure Front Doors

Open and close the enclosure front doors as described in the following procedures.

#### **Opening a Front Door**

##### **Procedure**

1. Is the environment safe? Use an approved voltage detector to assist in determining if access to the enclosure is safe.
2. If required, unlock and remove the padlock from the front door latch.
3. Use a T-handle hex w/pin security tool to unlock the door.
4. Lift the swing-latch and rotate approximately 90° clockwise for the left side door and approximately 90° counterclockwise for the right side door to disengage door closing mechanism. Open the door. See Figure 4.1. Note a label is provided on each door depicting the direction to turn the swing-latch to open the door.
5. Enclosure’s Left Side Front Door: To secure the door in the open position, swing the enclosure door open wide enough so that the shoulder of the wind latch slides along the bar slot and into the first hole at the other end of the bar. Note that latch will first fall into position at 90-degrees and must be lifted again to open to 120-degrees. See Figure 4.2.

#### **Closing a Front Door**

##### **Procedure**

1. Enclosure’s Left Side Front Door: Lift the wind latch arm to release the shoulder from the hole in the bar so it can slide along the bar slot as the door is closed. If the door was open to the 120-degree position, the latch must be lifted again at the 90° position to fully close the door. See Figure 4.2.
2. Close the door.
3. While holding the door closed, rotate and lower the swing-latch into the lock bed. See Figure 4.1.
4. If required, replace padlock.

Figure 4.1 Front Door Swing-Latch

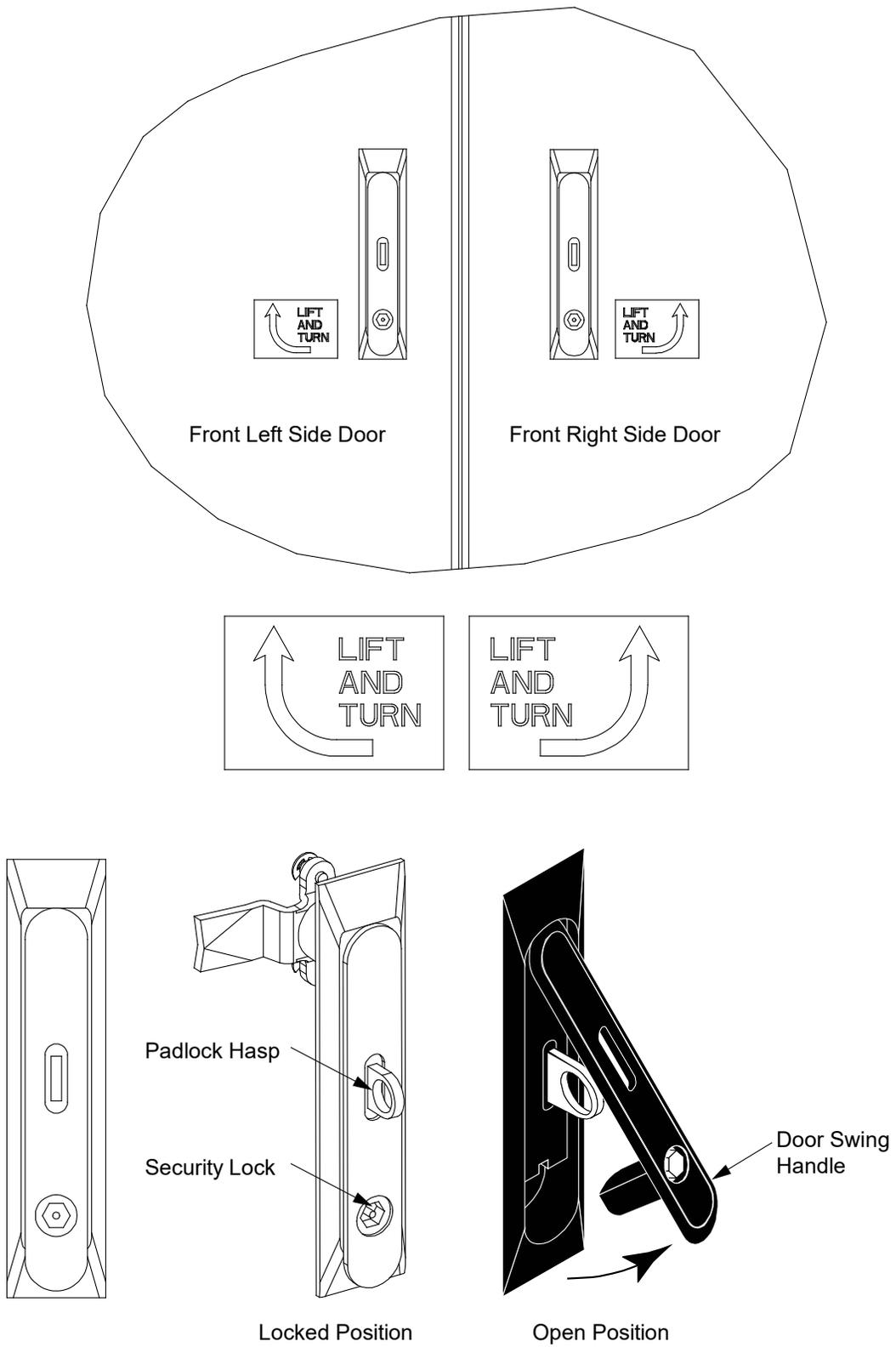
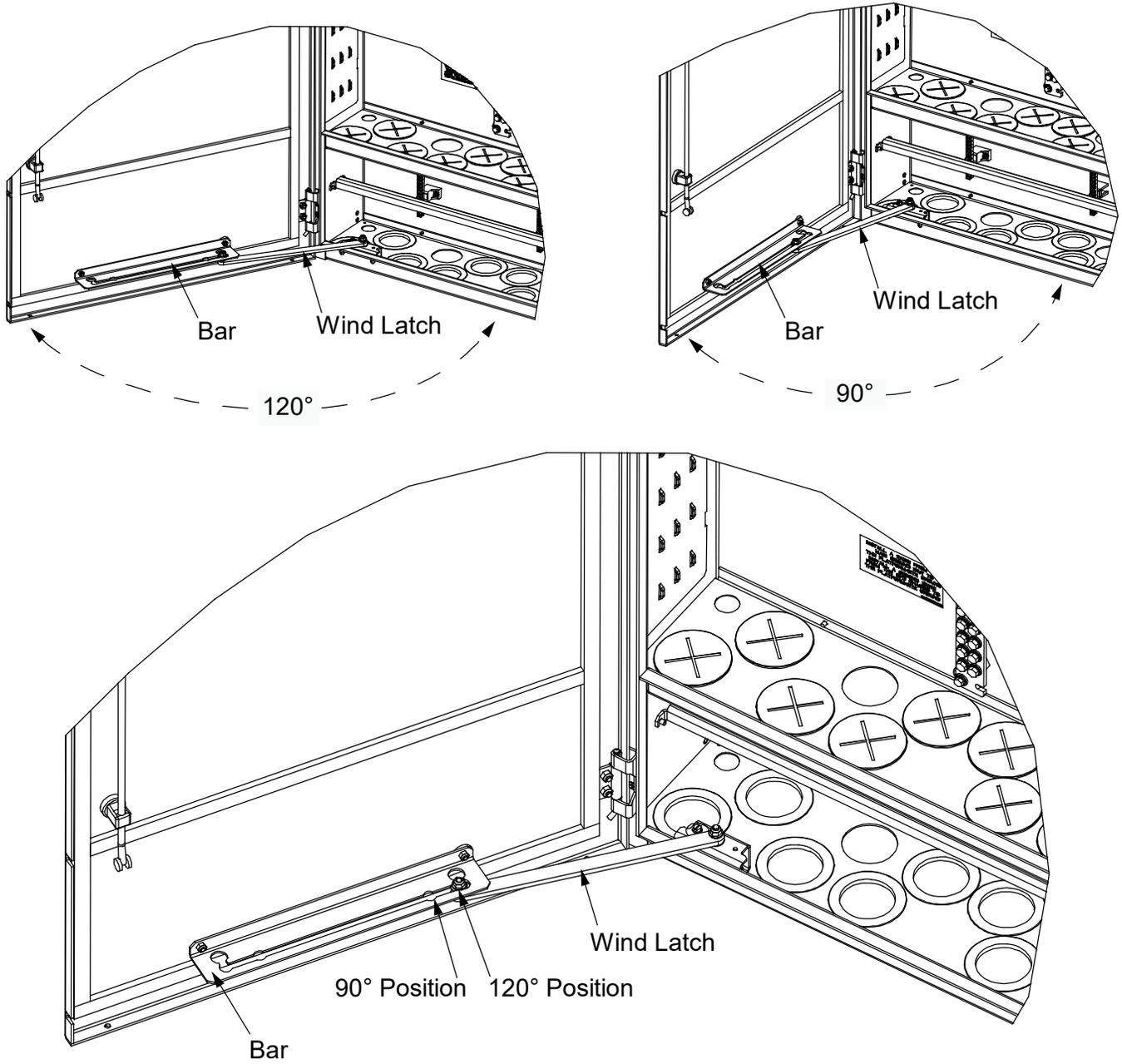


Figure 4.2 Enclosure's Left Side Front Door Wind Latch



## 5 Installation Considerations



**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.

### 5.1 Installation Overview

The following is the recommended sequence for the installation and start-up procedures. The sequence may change according to job and site conditions.

- Ensure all site drawings and approvals are in place.
- Obtain the recommended tools and test equipment.
- Read "Important Safety Instructions" starting on page vi carefully.
- Check that all the equipment and materials have been delivered.
- Proceed with the physical installation of the enclosure.
- Install circuit breakers inside the enclosure.
- Install and verify enclosure grounding cable.
- Connect and verify RRH (Remote Radio Head) cables.
- Connect and verify alarm and LVD (Low Voltage Disconnect) cables.
- Connect and verify fiber cables.
- Connect and verify DC input power cables.
- Turn-up the system.

### 5.2 Tools, Test Equipment, and Materials Recommended for Installation

The following tools, test equipment, and materials are recommended for the physical installation of the enclosure:

- Approved voltage detector.
- T-handle hex w/pin security tool to open/close enclosure front door.
- Digital multimeter (DMM), 0 to 200 VDC, 0 to 300 VAC.
- Torque wrench.
- Ratchet drive, extensions, sockets.
- Carpenter's level.
- Lineman's scissors.
- Lineman's strippers.
- Lineman's cutters.
- Appropriate crimping tool with dies.

- Electrician's insulated screwdrivers, Phillips, No. 1 and 2.
- Electrician's insulated screwdrivers, flat-blade, small and large.
- Silicone sealant.
- Duct putty.
- NO-OX-ID-A or approved equivalent.



**NOTE!** Outside the scope of this document, are the tools to fish, splice and terminate OSP Cables.

## 6 Transportation and Storage

### 6.1 Important Safety Instructions

Read the "Important Safety Instructions" starting on page vi.

### 6.2 Transportation

All enclosures can be purchased for field installation. Field installed units are shipped on a pallet.

### 6.3 Storage

To avoid possible damage to the unit, the enclosure should always be shipped and stored on the pallet.

Storage Ambient Temperature Range: See "Environmental" on page 4.

## 7 Mounting the Enclosure



**NOTE!** Unit must be mounted at a height no greater than 2 meters from the bottom of the unit to ground.

### 7.1 Important Safety Instructions



**DANGER!** Adhere to the "Important Safety Instructions" starting on page vi.

### 7.2 Specific Safety Precautions



**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. Control moisture and condensation inside the enclosure until it is turned up for service.



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

### 7.3 General

The enclosure is to be mounted on the side of a companion enclosure made of a minimum of 0.125-inch aluminum or 14-gauge galvanized steel. The companion enclosure must be installed (according to local practices) before this enclosure can be installed.

Equipment is intended for installation in a Restricted Access Area.

## 7.4 Inspecting and Unpacking the Enclosure at the Installation Site

The enclosure is shipped in protective packaging on a wooden pallet.

### **Procedure**

1. Check the packing slip to make sure all components ordered were received. Report any missing items to the carrier and your local sales representative immediately.
2. 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 goods. Do not proceed with the installation. If the enclosure appears undamaged, go on to the next step.
3. Carefully remove all packaging material from around the enclosure and the pallet. Dispose of the packaging according to local practices.
4. Repeat “Step 2.” with the packaging material removed.
5. With the enclosure still on the pallet, carefully open the front doors and inspect the enclosure interior for damage. In case of damage, follow local procedures for reporting and resolving damage..
6. Close and latch the front doors.
7. If the enclosure appears undamaged, proceed with the installation. **DO NOT REMOVE THE PALLET UNTIL THE ENCLOSURE IS READY TO BE MOUNTED.**

## 7.5 Mounting the Enclosure on the Outside of a Companion Enclosure

Perform the following steps to install the enclosure on the outside of a companion enclosure.

### **Procedure**

1. Prepare the companion enclosure per site requirements to allow the Vertiv™ NetSure™ External Distribution Box (EDB) to be attached to the outside of a side wall. Refer to Figure 2.3 on page 6 for mounting hole locations.
2. Use appropriate lifting equipment to raise the Vertiv™ NetSure™ External Distribution Box (EDB) to the mounting position on the companion enclosure.
3. Secure the Vertiv™ NetSure™ External Distribution Box (EDB) to the companion enclosure using the provided 3/8” stainless steel hardware. Follow company policies for securing the Vertiv™ NetSure™ External Distribution Box (EDB) to the companion enclosure.

## 7.6 Installing Field LVD Contactor Kit P/N F1011267

This kit provides a LVD contactor and associated components. Refer to the separate kit installation manual (furnished with each kit) for installation instructions.

# 8 Installing Bullet Nose Type Circuit Breakers

Perform the following steps to install circuit breakers into the distribution positions inside the enclosure.

### **Procedure**

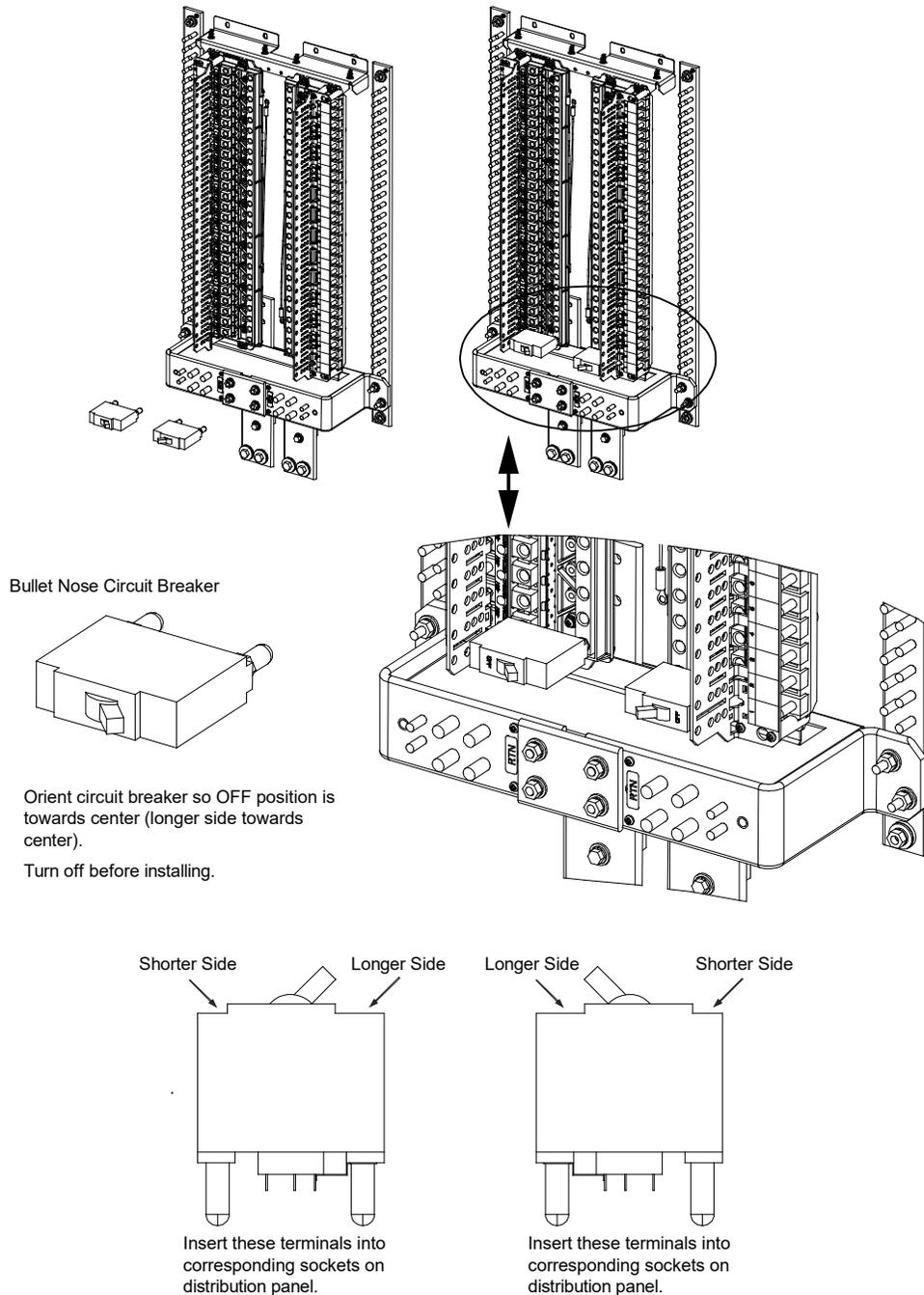


**NOTE!** Refer to Figure 8.1 as this procedure is performed.

1. Open the left front door. Refer to “Opening and Closing the Enclosure Front Doors” on page 11 for a procedure.

2. Ensure that the circuit breaker is in the OFF position and is of the correct rating. Orient the circuit breaker as shown in Figure 8.1. Insert the terminals on the rear of the circuit breaker into their corresponding sockets on the distribution panel. Ensure the alarm contact on the back of the circuit breaker makes contact with the alarm terminal on the spring strip. Push distribution device in firmly until fully seated in the distribution panel.
3. Record all circuit breaker sizes on the labels provided.
4. Close the left front door. Refer to “Opening and Closing the Enclosure Front Doors” on page 11 for a procedure.

**Figure 8.1 Installing a Bullet Nose Type Circuit Breaker**



## 9 Grounding the Enclosure

### 9.1 Important Safety Instructions



**DANGER!** Adhere to the “Important Safety Instructions” starting on page vi.

### 9.2 General

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

### 9.3 Enclosure Grounding Terminals

Enclosure grounding terminals (1/4-inch studs on 5/8-inch centers) are located on the exterior of the enclosure’s lower left side panel. Refer to Figure 9.1 for location and recommended torque.

#### **Procedure**

1. Install a 2 AWG cable from this termination to the platform/site ground.

### 9.4 Main Ground Bar

A main ground bar is located inside the enclosure. Refer to Figure 9.2 for location and recommended torque. The main ground bar provides 1/4-inch bolts on 5/8-inch centers for installation of customer provided lugs.

#### **Procedure**

1. Install a 2 AWG cable from the main ground bar to the platform/site ground.

Figure 9.1 Enclosure Grounding Termination Location

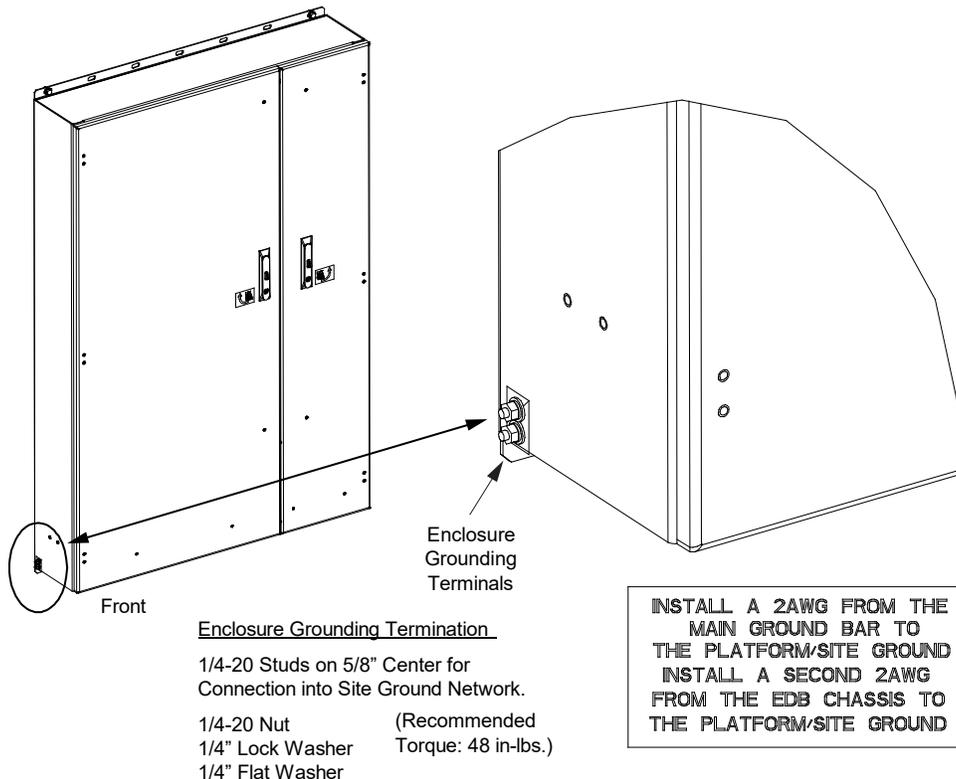
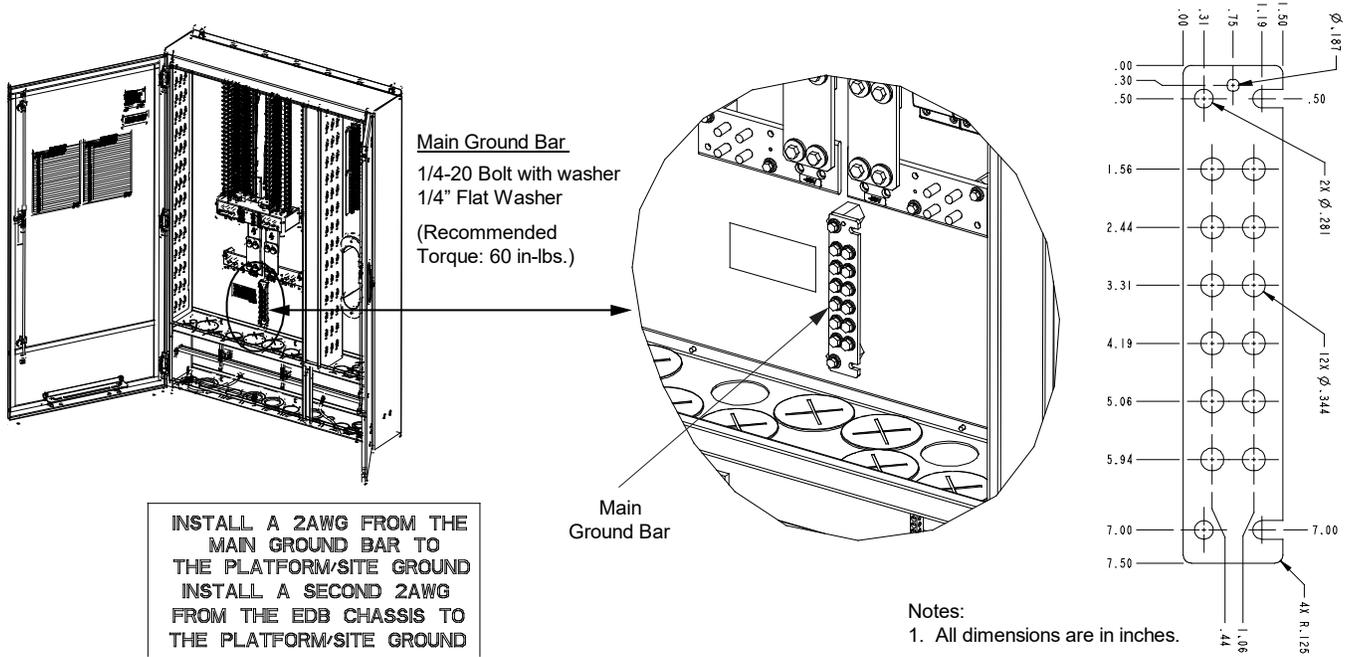


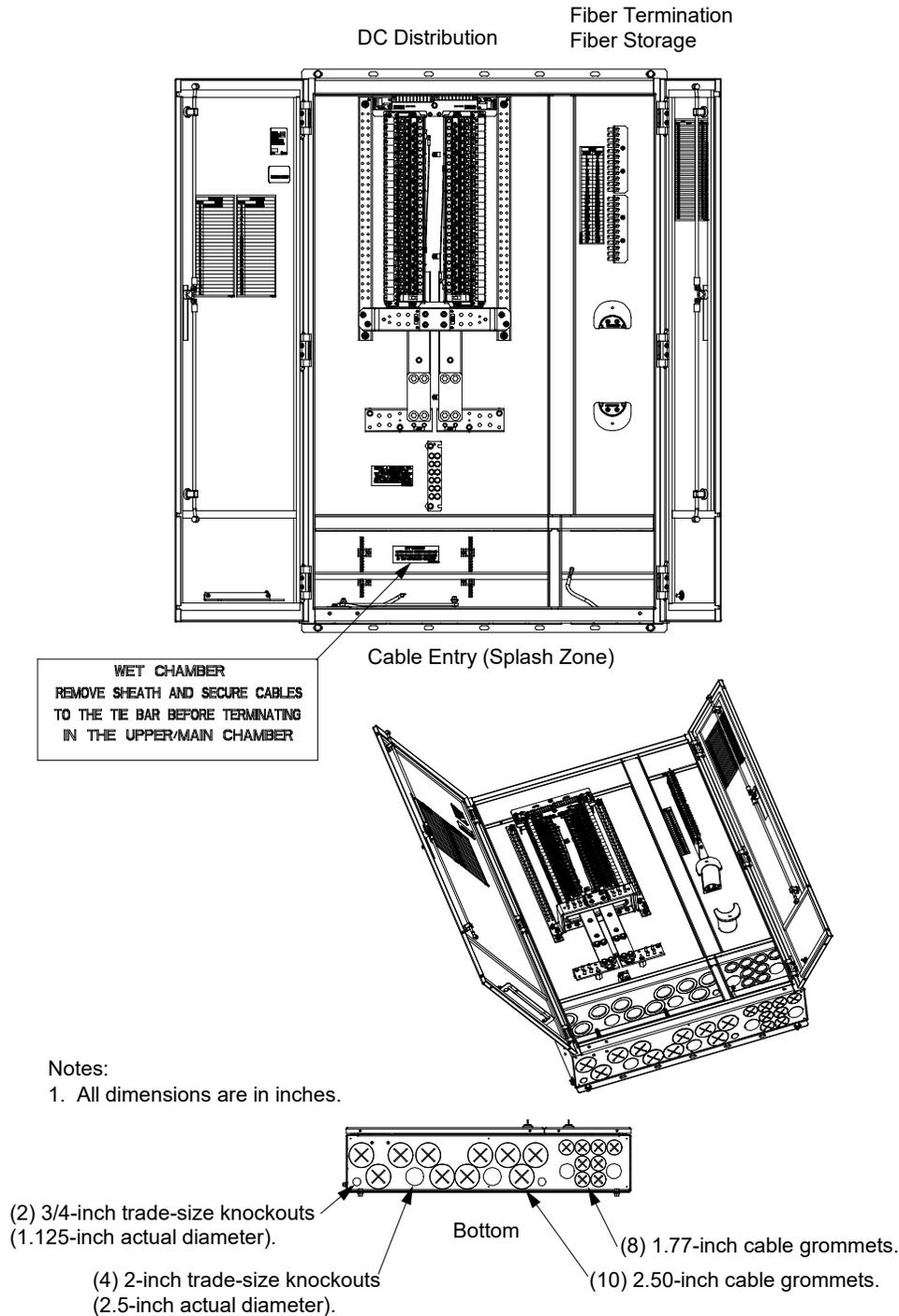
Figure 9.2 Enclosure Main Ground Bar Location



# 10 Cable Routing

Cable entry/exit is made into a dedicated chamber at the bottom of the enclosure. Ten (10) 2.50-inch cable grommets and eight (8) 1.77-inch cable grommets are provided on the bottom of the enclosure for cable entry. There are four (4) 2-inch trade size knockouts provided for power cable entry and fiber exit, along with two (2) 3/4-inch trade size knockouts for alarm wiring. Refer to Figure 10.1. The DC distribution and fiber chambers provide tie-wrap lance panels on both side walls. The cable entry chamber provides a cable tie bar. Secure wires/cables to the lace bar according to AT&T standards.

Figure 10.1 Cable Routing



# 11 Making Electrical Connections

## 11.1 Important Safety Instructions



**DANGER!** Adhere to the “Important Safety Instructions” starting on page vi.

## 11.2 General

- The enclosure provides terminations for two (2) -48 VDC / -58 VDC input power sources (see Figure 2.4 on page 8).
- The enclosure provides two (2) 26-position DC distribution panels (see Figure 2.4 on page 8).
- A fiber termination and storage chamber (see Figure 2.4 on page 8) is provided to terminate all trunk fibers.
- The DC distribution and fiber chambers provide tie-wrap lance panels. The cable entry chamber provides a cable tie bar. Refer to Figure 2.4 on page 8. Secure wires/cables to the lace bar according to AT&T standards.

## 11.3 Cable Routing

See “Cable Routing” on page 20.

## 11.4 Sealing Cable Entries

After cables are installed, refer to “Sealing Enclosure Cable Entries” on page 33 and seal all cable grommets.

## 11.5 Connecting RRH (Remote Radio Head) Cables

### 11.5.1 General

RRHs cables are routed into the bottom chamber of the enclosure through the provided grommets. The cable sheath is removed, and the trunk cable ground wires are terminated to the tower cable ground bars located in the bottom chamber of the enclosure. The trunk cable power leads are routed up through the second level of grommets into the DC distribution chamber of the enclosure. These are then connected to the load circuit breakers and return bars. The trunk cable fiber leads are routed up through the second level of grommets into the fiber termination chamber. These are then connected to the fiber termination blocks located at the top of the fiber termination chamber.

There is a cable tie bar located in the bottom chamber of the enclosure. There are lance points on all side walls of the DC distribution and fiber termination chambers for cable management. Secure wires/cables to the lace bar according to AT&T standards.

### 11.5.2 Routing RRHs Cables into the Enclosure

RRHs cables are routed into the bottom chamber of the enclosure through the provided grommets. The cable sheath is removed, and the trunk cable ground wires are terminated to the tower cable ground bars located in the bottom chamber of the enclosure. Refer to the following procedure.

#### **Procedure**

1. Verify that the enclosure is properly grounded.
2. Determine the RRHs cable route into the enclosure for your installation site. See also “Cable Routing” on page 20.
3. Pull the RRHs cables into the bottom chamber of the enclosure through the provided grommets. The RRHs cables power leads will be routed up through the second level of grommets into the DC distribution chamber of the enclosure as described in a subsequent procedure. The RRHs cables fiber leads will be routed up through the second level of grommets into the

fiber termination chamber of the enclosure as described in a subsequent procedure. Ensure adequate length of cable is pulled into the enclosure before performing the next step.

4. For each cable, remove the cable sheath and terminate the ground wire to a tower cable ground bar located in the bottom chamber of the enclosure.
5. Secure the cables to the tie bar provided in the cable entry chamber according to AT&T standards.
6. After all cables are installed, refer to "Sealing Enclosure Cable Entries" on page 33 and seal all cable grommets.
7. Continue with the next procedure.

### 11.5.3 Connecting RRHs Cable Power Leads to the -48 VDC / -58 VDC Distribution Panels

The RRHs cables power leads are routed up through the second level of grommets into the DC distribution chamber of the enclosure. These are then connected to the individual load distribution busbars located on the distribution panels and the return busbars located adjacent to the distribution panels. Customer must supply lug mounting hardware. See Figure 11.1 for connection points locations. Torque connections as shown in the illustration. Refer to the following procedure.

#### **Procedure**



**WARNING!** Observe proper polarity when making connections.

1. Verify each DC distribution circuit breaker is in the OFF position.
2. Remove the DC distribution panel shield covering the load lead connection points.
3. Route the RRHs cables power leads up through the second level of grommets into the DC distribution chamber of the enclosure.
4. Connect the RRHs cables power leads per Figure 11.1.
5. Secure cables to the lace bar in the DC distribution chamber according to AT&T standards.
6. Replace the shields removed above.
7. Continue with the next procedure.

### 11.5.4 Connecting RRHs Cable Fiber Leads to the Fiber Termination Blocks

The RRHs cables fiber leads are routed up through the second level of grommets into the fiber termination chamber. These are then connected to the fiber termination blocks located at the top of the fiber termination chamber. Refer to the following procedure.

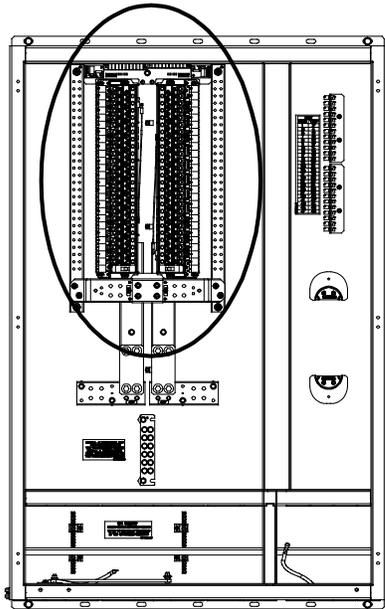
#### **Procedure**



**NOTE!** Minor excess fiber trunk cable can be coiled on the spool; however, any large bundle of excess shall be stored in an external fiber management box.

1. Route the RRHs cables fiber leads up through the second level of grommets into the fiber termination chamber of the enclosure.
2. Connect the RRHs cables fiber leads to the fiber connectors located at the top of the fiber termination and storage chamber.
3. Secure the cables to the lace bar in the fiber termination and storage chamber according to AT&T standards.

Figure 11.1 DC Load Distribution Connections



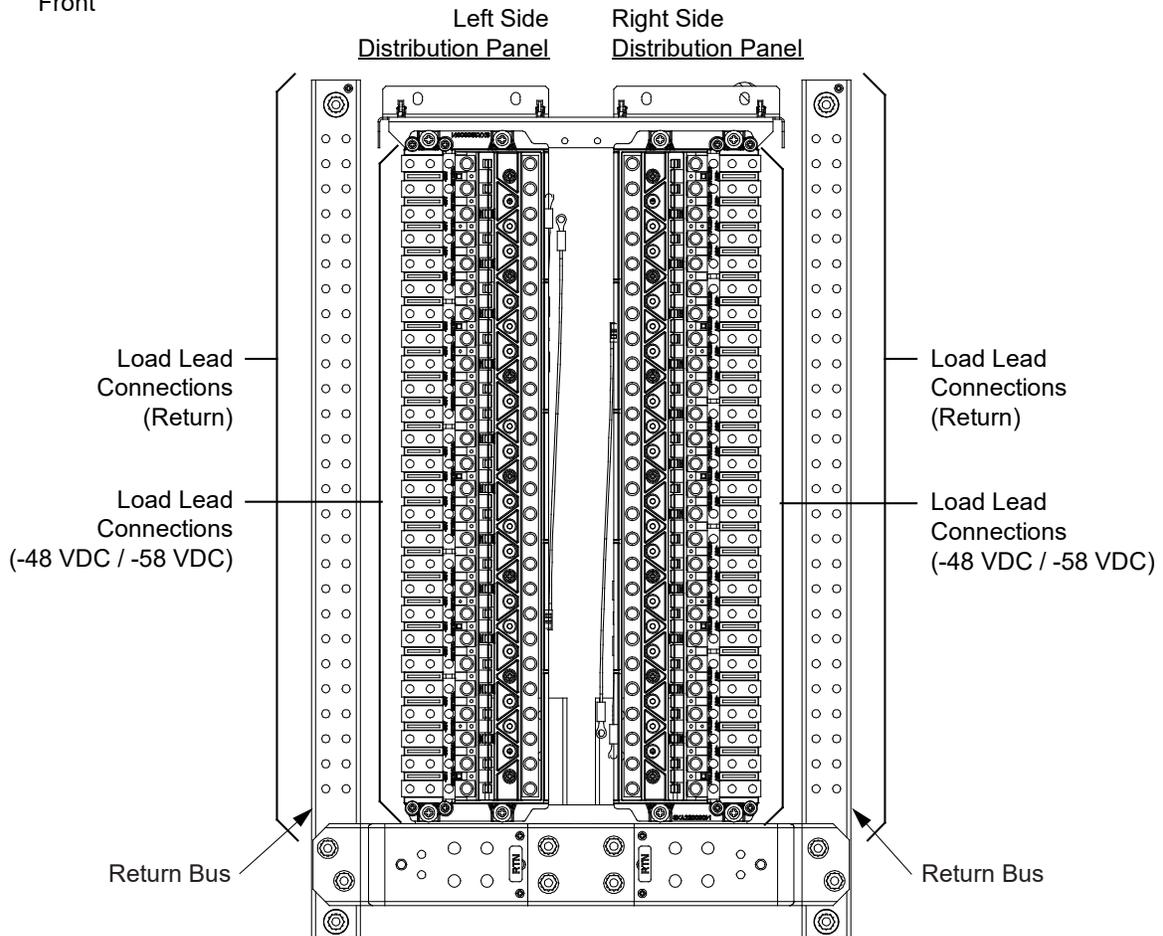
Front doors remove in illustration for clarity only.

-48 VDC / -58 VDC  
Load and Return Connections  
 1/4-20 Studs on 5/8" Centers  
 (Customer must supply or order additional hardware)

Maximum Lug Width: 0.625 inches.

Recommended Torque: 72 in-lbs.

Front



## 11.6 Connecting Alarm and LVD (Low Voltage Disconnect) Cables

### General

Refer to Figure 11.2 for alarm block locations. For alarm and LVD connections, refer to Figure 11.3, Figure 11.4, and Figure 11.5. For connections to typical Vertiv™ Power Systems, refer to Figure 11.6, Figure 11.7, and Figure 11.8. Refer to the following procedure.

### Procedure

1. Verify that the enclosure is properly grounded.
2. Determine the cabling route into the enclosure for your installation site. See also “Cable Routing” on page 20.
3. Pull the alarm and LVD cables into the bottom of the enclosure through the provided grommets and route up through the second level of grommets into the DC distribution chamber of the enclosure.
4. Connect the alarm and LVD cables per Figure 11.3, Figure 11.4, or Figure 11.5.
5. Secure the cables to the lace bar in the DC distribution chamber according to AT&T standards.
6. Secure the cables to the tie bar provided in the cable entry chamber according to AT&T standards.
7. After all cables are installed, refer to “Sealing Enclosure Cable Entries” on page 33 and seal all cable grommets.

Figure 11.2 Alarm Block Locations

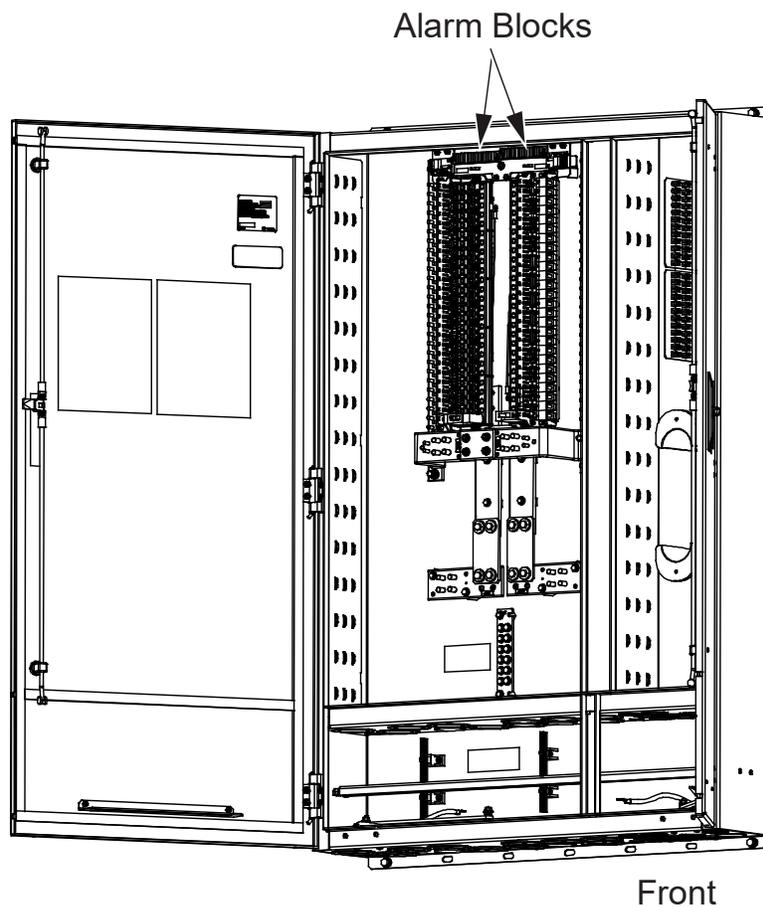
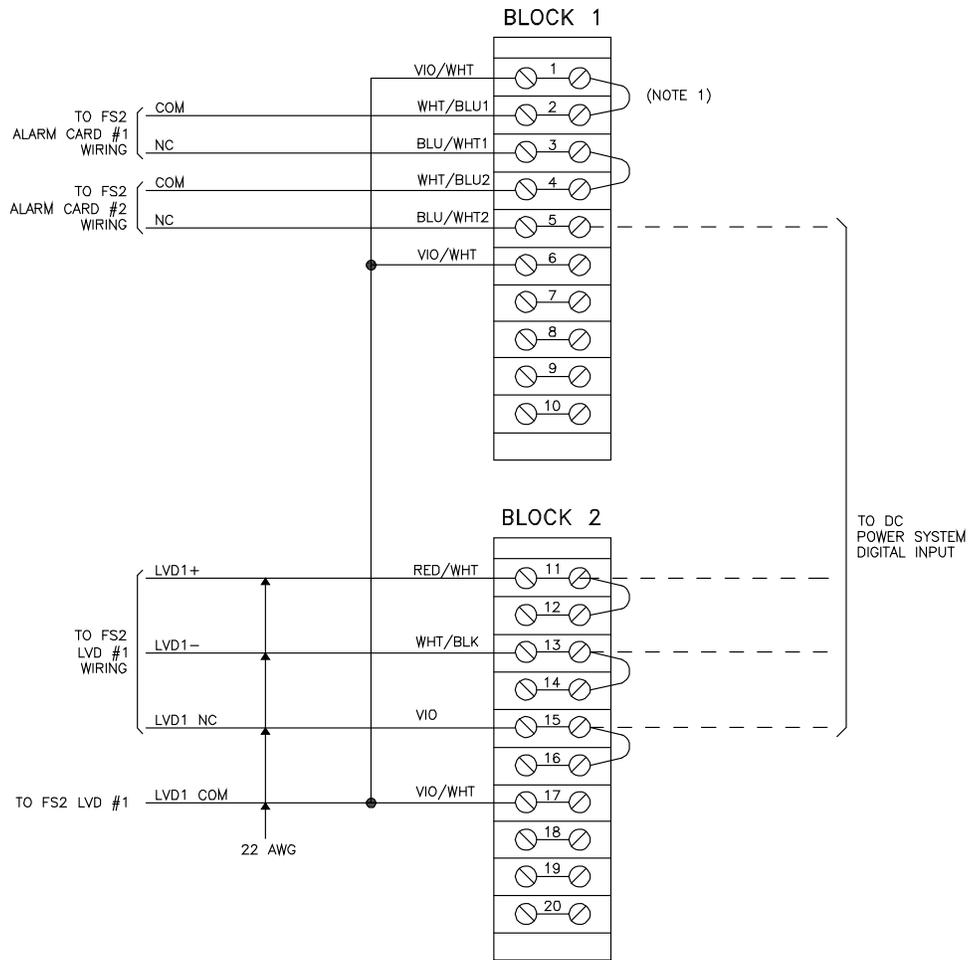




Figure 11.4 Alarm Block Connections – F1011265

## ALARM WIRING

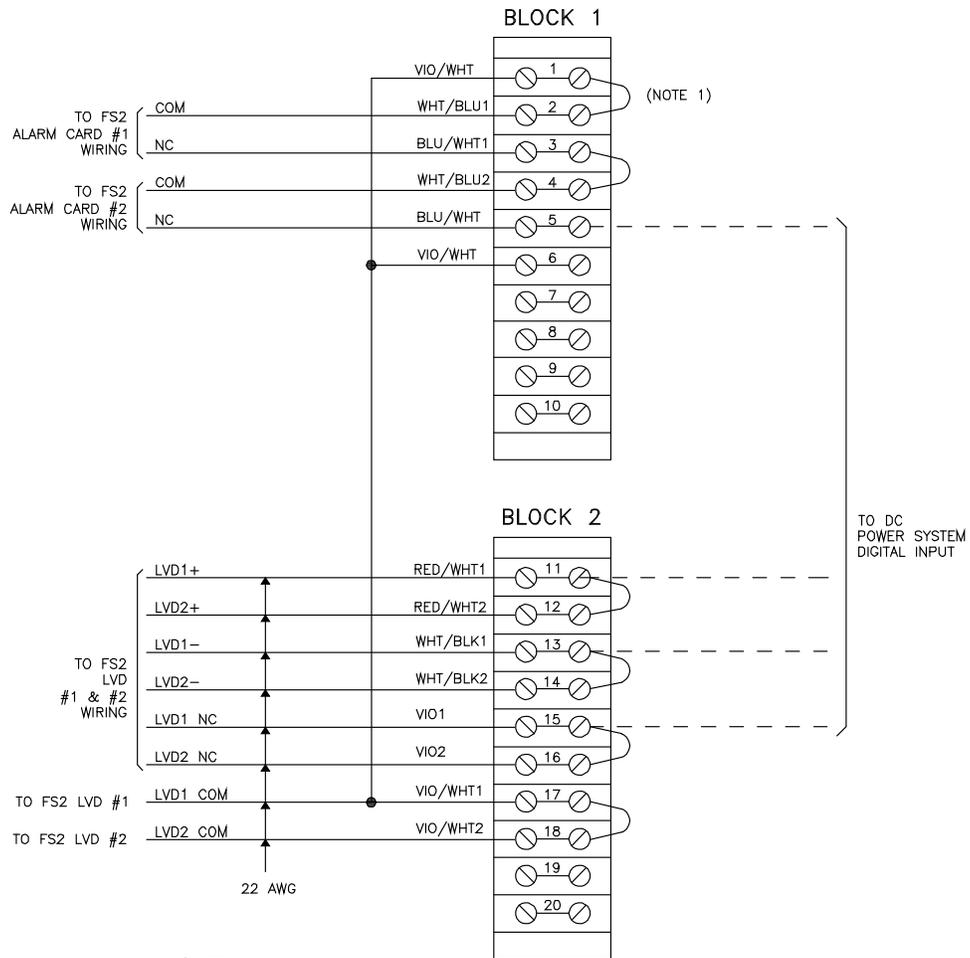


NOTES:

1. INSTALL LINK ON THE FACTORY WIRING SIDE OF THE TERMINAL.

Figure 11.5 Alarm Block Connections – F1011266

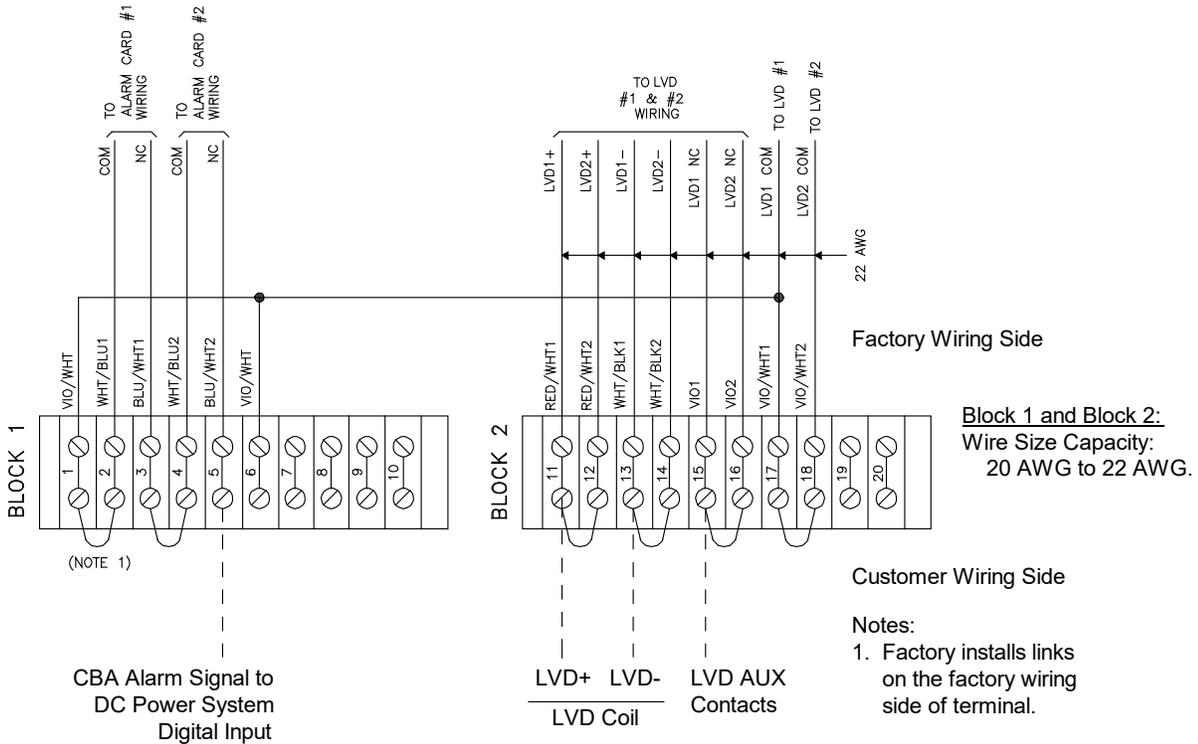
## ALARM WIRING



NOTES:

1. INSTALL LINK ON THE FACTORY WIRING SIDE OF THE TERMINAL.

**Figure 11.6 Typical Power System LVD Connections to Alarm BLOCK 2 (Vertiv™ NetSure™ 512 DC Power System, Spec. No. 582137000 List 27, 582137000ZZ007 Shown. Others Similar.)**



Strip the wire and crimp P/N 140968 spade lug to end of each wire.

Red Wire to LVD+  
Black Wire to LVD-  
White Wire to LVD AUX Contacts

P/N 60031373  
(30 Feet)

Plug the two wire harness connectors labeled LVD1 together.

P/N 60031372

Orange Wire to Orange Wire  
Slate Wire to Slate Wire  
Blue/White Wire to Blue/White Wire

Vertiv™ NetSure™ 512 DC Power System,  
Spec. No. 582137000 List 27 (582137000ZZ007)  
Shown. Others Similar.

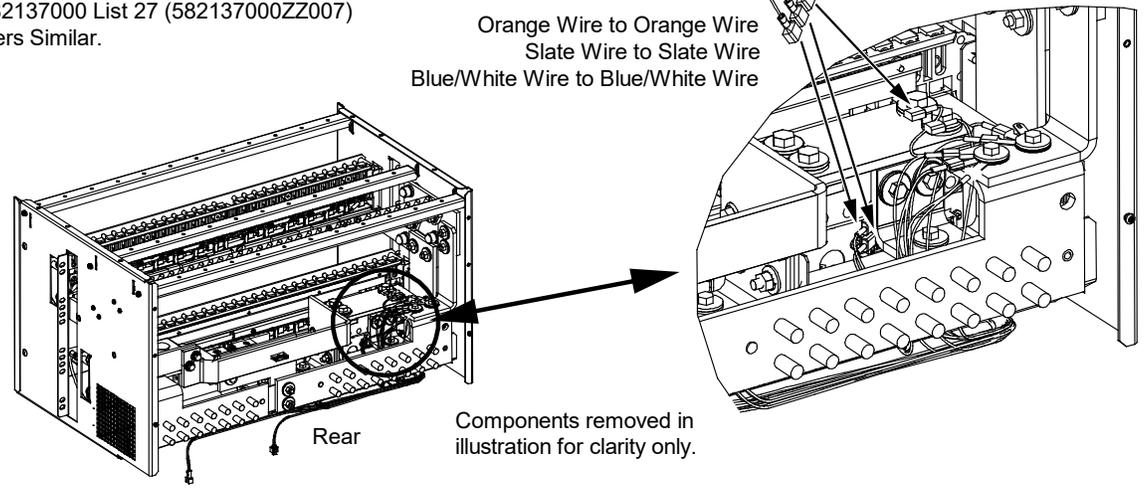
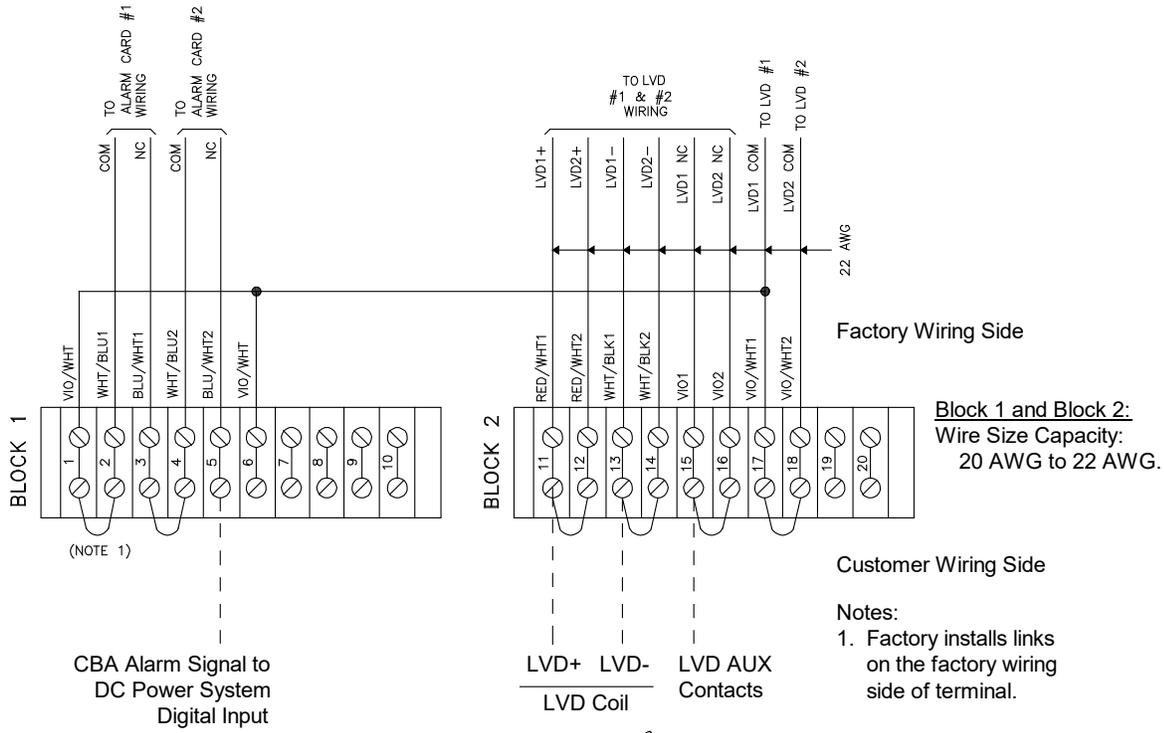


Figure 11.7 Typical Power System LVD Connections to Alarm BLOCK 2 (Vertiv™ NetSure™ 5100 DC Power System, Spec. No. 582137100 List 26, 582137100ZZ028 Shown. Others Similar.)

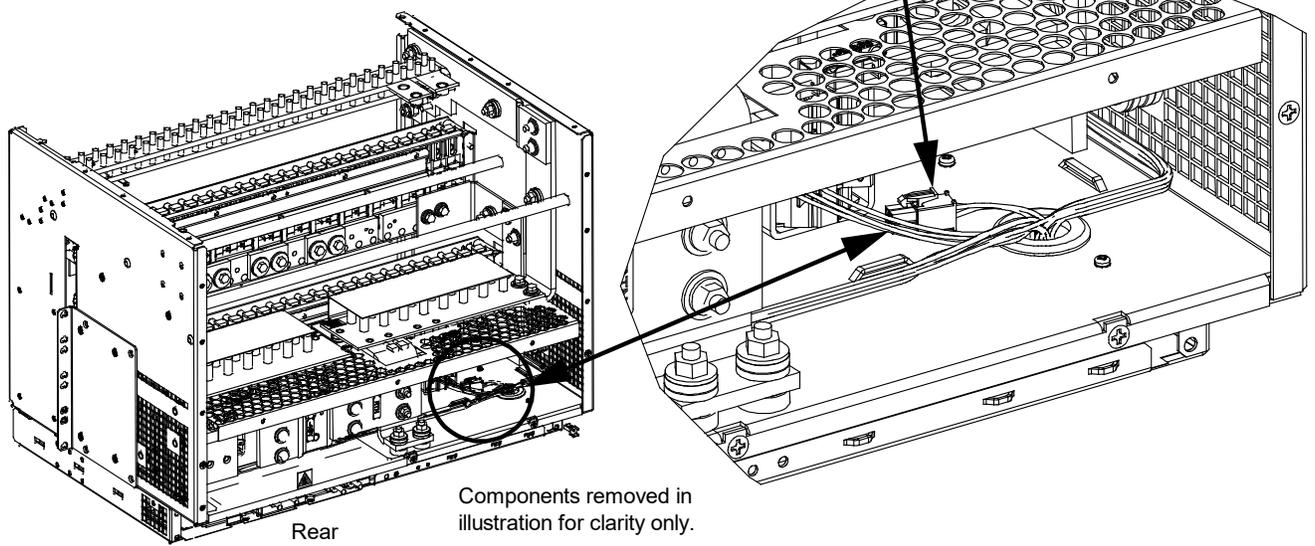


Strip the wire and crimp P/N 140968 spade lug to end of each wire.

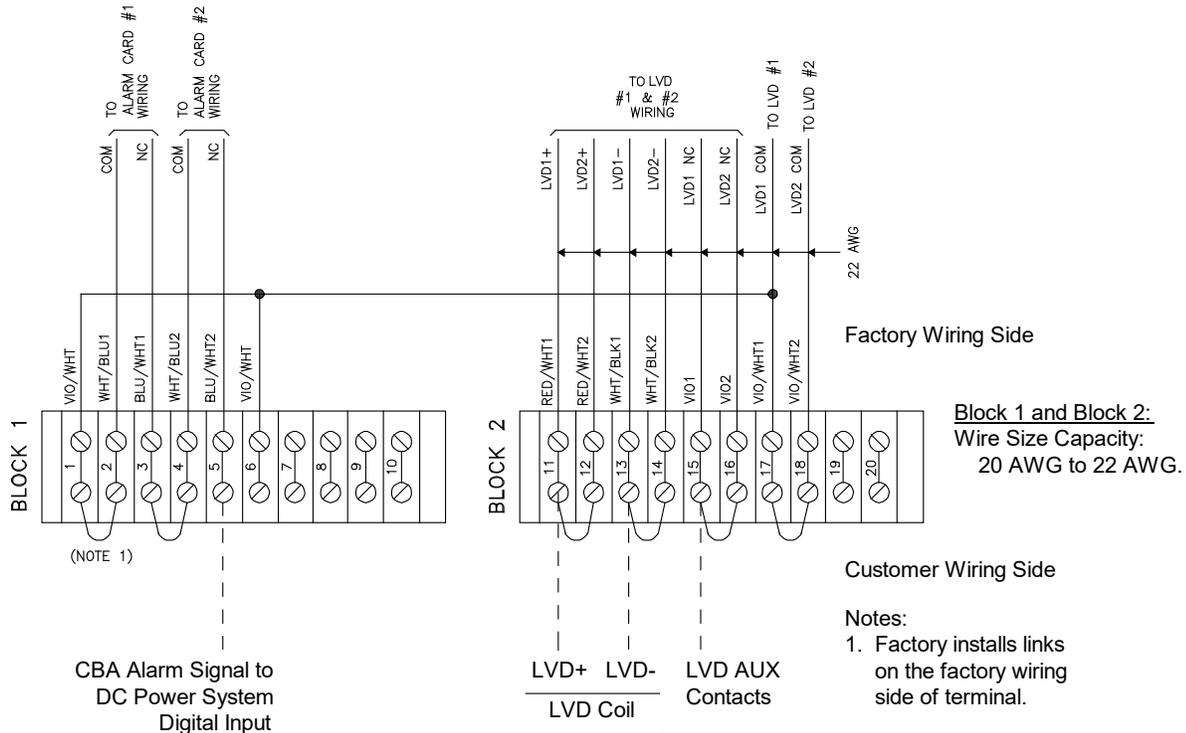
Red Wire to LVD+  
Black Wire to LVD-  
White Wire to LVD AUX Contacts

P/N 60031373 (30 Feet)  
Plug the two wire harness connectors labeled LVD1 together.

Vertiv™ NetSure™ 5100 DC Power System,  
Spec. No. 582137100 List 26 (582137100ZZ028)  
Shown. Others Similar.



**Figure 11.8 Typical Power System LVD Connections to Alarm BLOCK 2 (Vertiv™ NetSure™ 7100 DC Power System, Spec. No. 582127000203 Shown. Others Similar.)**



CBA Alarm Signal to DC Power System Digital Input

Red Wire to LVD+  
Black Wire to LVD-  
White Wire to LVD AUX Contacts

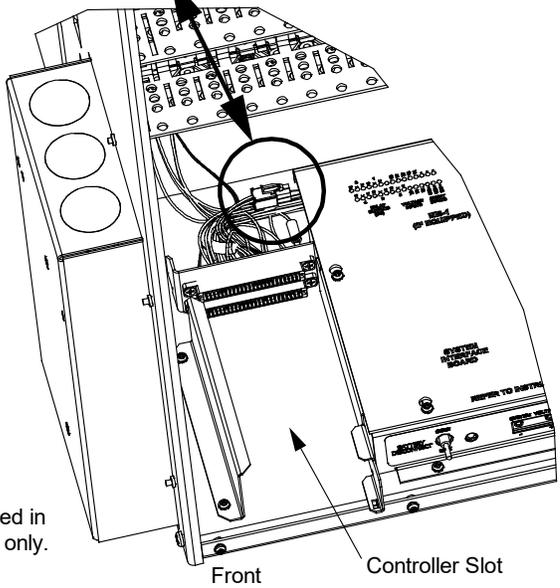
Strip the wire and crimp P/N 140968 spade lug end of each wire.

P/N 60031373 (30 Feet)

Plug the two wire harness connectors labeled LVD1 together.

Vertiv™ NetSure™ 7100 DC Power System, Spec. No. 582127000203 Shown. Others Similar.

Components removed in illustration for clarity only.

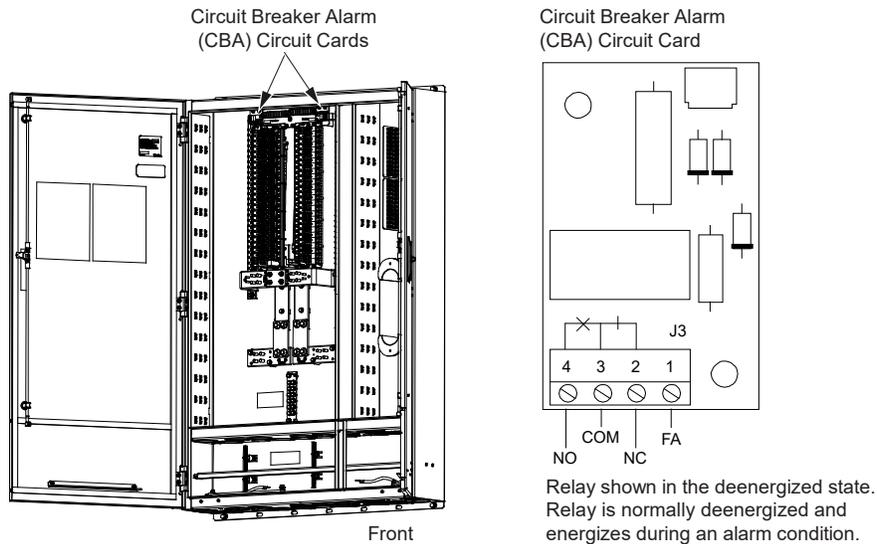


## Alarm Circuit Cards P/N 541183 Description (For Reference Only)

Two (2) alarm cards (one per distribution panel) are provided to connect circuit breaker alarms into the alarm circuits of the companion enclosure. External circuit breaker alarm (CBA) alarm wiring is factory connected from terminal block J3 located on alarm circuit cards P/N 541183 to the enclosure's alarm blocks. Refer to Figure 11.9 for alarm circuit cards P/N 541183 locations. Terminal block J3 accepts a wire size in the range of 26 AWG to 14 AWG. Recommended torque is 0.5 Nm to 0.6 Nm.

- If a circuit breaker on the respective distribution panel opens, relay contacts open between terminals 2 and 3 of J3 and relay contacts close between terminals 3 and 4 of J3. Normal operation provides closed relay contacts between terminals 2 and 3 of J3 and open relay contacts between terminals 3 and 4 of J3.
- If a circuit breaker on the respective distribution panel opens, -48 VDC / -58 VDC is provided at terminal 1 of J3.

Figure 11.9 Alarm Circuit Cards P/N 541183 Locations



## 11.7 Connecting Fiber Cables to the Enclosure

### 11.7.1 Optical Fiber Cables Precautions

When you work with optical fibers, you must take the following precautions:

- Wear safety glasses when you install optical fibers.
- Do not look into the opening of an optical fiber, or the opening of an optical fiber connector, if the optical fiber is active or the unit has the power turned on.
- Avoid direct exposure to optical fiber ends or optical connector ends where you can access the laser signal directly.
- Clean your hands after you handle optical fibers. Small pieces of glass are not always visible and can damage your eyes.
- Protect all optical fiber connectors with clean dust caps at all times.
- Follow the bend radius rule when you route the fibers or store excess slack. Do not exceed the minimum bend radius for the type of fibers being installed. Refer to manufacturer recommendations.
- Do not stretch fibers when wrapping them around the fiber storage spools.

## 11.7.2 Installing Fiber Cables

Refer to the following procedure.

### Procedure



**NOTE!** Minor excess fiber trunk cable can be coiled on the spool; however, any large bundle of excess shall be stored in an external fiber management box.

1. Verify that the enclosure is properly grounded.
2. Determine the fiber cabling route into the enclosure for your installation site. See also “Cable Routing” on page 20.
3. Pull the fiber cables into the bottom of the enclosure through the provided grommets and route up through the second level of grommets into the fiber termination and storage chamber of the enclosure.
4. Terminate the cables to the fiber connectors located at the top of the fiber termination and storage chamber.
5. Secure the cables to the lace bar in the fiber termination and storage chamber according to AT&T standards.
6. Secure the cables to the tie bar provided in the cable entry chamber according to AT&T standards.
7. After all cables are installed, refer to “Sealing Enclosure Cable Entries” on page 33 and seal all cable grommets.

## 11.8 Connecting -48 VDC / -58 VDC Input Power to the Enclosure



**WARNING!** Observe proper polarity when making connections.

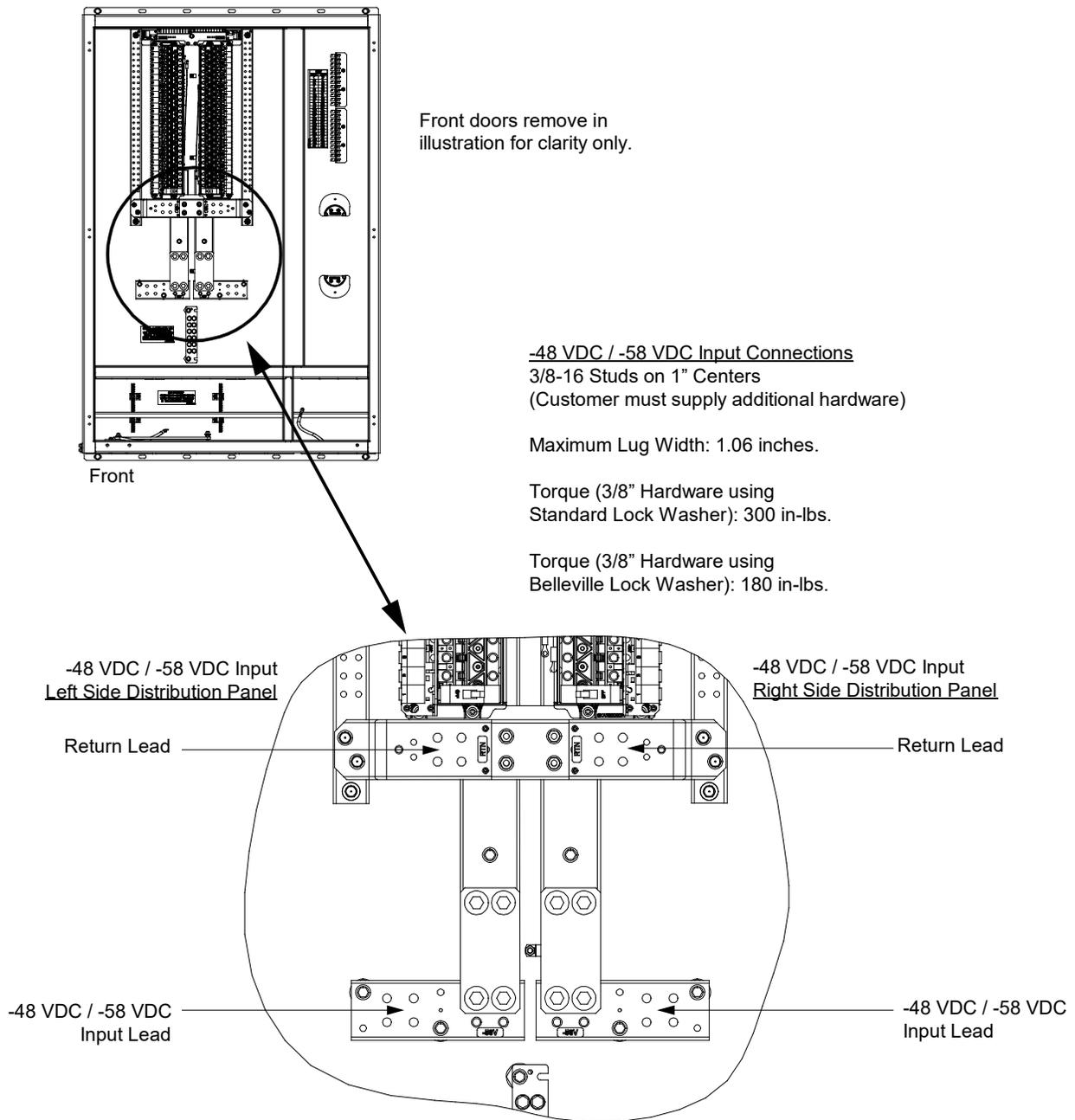
DC input power leads are connected to the input busbars and input return busbars. Customer must supply lug mounting hardware. See Figure 11.10 for busbar locations. Torque connections as shown in the illustration. Refer to the following procedure.

Example of Wire Size and Main Breaker Size for DC Feeds to the Enclosure: A 300 A breaker must be used with (2) 1/0 AWG cables (per side).

### Procedure

1. Verify that the enclosure is properly grounded.
2. DC input power must be completely disconnected from the leads being connected.
3. Determine the DC cabling route into the enclosure for your installation site. See also “Cable Routing” on page 20.
4. Pull the DC input power cables into the bottom of the enclosure through the provided grommets and route up through the second level of grommets into the DC distribution chamber of the enclosure.
5. Connect the DC input power cables per Figure 11.10.
6. Secure the cables to the lace bar in the DC distribution chamber according to AT&T standards.
7. Secure the cables to the tie bar provided in the cable entry chamber according to AT&T standards.
8. After all cables are installed, refer to “Sealing Enclosure Cable Entries” on page 33 and seal all cable grommets.

Figure 11.10 -48 VDC / -58 VDC Input Power Connections



## 12 Sealing Enclosure Cable Entries

In keeping with best industry practices, seal all cable grommets against weather, rodent and insect intrusions.

It is extremely important to maintain a well-sealed enclosure. Failure to do so can jeopardize the equipment housed in the enclosure. All cable interfaces into the enclosure must be properly sealed after installation of cables.

### Procedure

1. Seal all cable entries with duct putty after passing cables through the cable grommets.

## 13 Initial Power Up

### 13.1 Important Safety Instructions



**DANGER!** Adhere to the “Important Safety Instructions” starting on page vi.

### 13.2 Prerequisite

All procedures and safety notices previous to this section have been observed, with the respect to the installation of the enclosure, installation of circuit breakers, and making electrical connections.

Similarly, all procedures and safety notices accompanying other installed equipment have been observed.

### 13.3 Initial Power Up Sequence

#### **Procedure**

1. Use an approved voltage detector to verify enclosure is not unsafe.
2. Verify all circuit breakers inside the enclosure are Off.
3. Verify no open power leads are present.
4. Verify all cables and connections are secure.
5. Apply DC input power to the enclosure.
6. Use an approved voltage detector to verify enclosure safety.
7. Place each distribution circuit breaker to the ON position.
8. Verify there are no alarms being generated by the system.
9. Close and secure the front doors.

## 14 Maintenance and Replacement Procedures

### 14.1 Important Safety Instructions



**DANGER!** Adhere to the “Important Safety Instructions” starting on page vi.

### 14.2 Contact Information

Refer to “DC Power, Outdoor Enclosure & Service Contacts” on page 36 for support contact information.

### 14.3 Enclosure Identification

Prior to contacting the manufacturer for support and/or replacement parts, note the enclosure part number and serial number which can be found on the ID label located on the inside of the front door.

## 14.4 Routine Maintenance

### 14.4.1 Freezing rain and ice

A primary issue with freezing rain and ice is:

- Difficulty of access to the inside of the enclosure.
  - The selected lock hasp has been designed to minimize hidden ice build-up and provide for the removal of ice.

Ice will often break in sheets, so the use of a soft mallet or hand onto a surface will create the stress cracks necessary to push the ice off.

In the unlikely event of a severe freezing rain, immediately followed by severe drop in temperature, the ice may be extremely thick and hard. In this case, it is recommended a tent be used to isolate the enclosure and an external, no spark heat source, be used to warm the enclosure.

Ice and snow should be removed from the front door and all ventilation areas.

Practices and tools to avoid include:

- use of salt,
- use of ice scraper, screwdrivers or other tools that would dig into the ice and ultimately into the metal surface,
- use of an open flame, or any device that may create an open spark, and
- use of de-icing fluid(s).

## 15 Accessories and Replacement Parts

Refer to Table 15.1 for list of accessories (AC) and replacement parts (RP).

**Table 15.1 Accessories and Replacement Parts**

Part Number	Description	Type
116104	3.00" Grommet (2.50" ID)	RP
10026330	2.00" Grommet (1.75" ID)	RP
132068	Wind Latch	RP
10024304	Door Handle Assembly, Rod/Cam, Hex-Pin (Left or Right Door)	RP
10020893	24-Port Fiber Bracket Assembly (Includes LC Duplex Connectors)	RP
135611	Single LC Duplex Connector, Fiber Port	RP
10023998	Fiber Optic Cable Storage Spool	RP
137588DCP	Door Hinge	RP
P29732	Tamper-Proof Wrench	RP
10030159W3	Debris Shield	RP
555827	Shorting Busbar, LVD Bypass	RP
541183DCP	Fuse Alarm Card	RP
See Table 2.2	Circuit Breakers	AC

## 16 DC Power, Outdoor Enclosure & Service Contacts

CUSTOMER SERVICE (PRE-SHIPMENT)		
Email	CustomerService.ESNA@Vertiv.com	Call Customer Service for purchase order status, expediting requests and order tracking.
Phone	1.800.800.1280 option 1	
CUSTOMER SUPPORT CENTER (POST-SHIPMENT)		
Email	ESNACustomerSupportCenter@Vertiv.com	After an order has shipped, contact our Customer Support Center with post-shipment related questions, concerns or claims.
Phone	1.800.800.1280 option 9	
PRODUCTS		
Email	AccountManagement.ESNA@Vertiv.com	Customers and Channel Partners (Reps, VARs & Distributors): Please contact Account Management for product pricing <sup>[1]</sup> and bid responses for custom configured DC power systems and outdoor enclosures. Local Vertiv Offices (LVOs): Send inquiries to DCpowerReps.ESNA@Vertiv.com.
Phone	1.800.800.1280 option 2	
SPARE PARTS		
Email	DCpower.Spares@Vertiv.com OSP.Spares@Vertiv.com	Pricing and purchase orders for spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors and switches, etc.
Phone	1.800.800.1280 option 5	
DC POWER DEPOT REPAIR		
Email	DCpower.Repair@Vertiv.com	Creates and processes RMAs for depot repair and refurbishment. Determines repair and refurbishment lead times and pricing based on warranties/contractual agreements. Provides repair shipping information and status.
Phone	1.800.800.1280 option 5	
Website	Vertiv.com/DCpowerRMA	
INSTALLATION & AFTER MARKET SERVICES		
Phone	1.800.800.1280 option 5	Provides quotes for engineering, furnishing and installation of DC power systems, telecom & IT equipment, cabling infrastructure, and field services of existing DC equipment.
TECHNICAL SUPPORT		
Email	DCpower.TAC@Vertiv.com	Answers technical product questions about DC power systems and outdoor enclosures; determines status of warranties and contractual agreements for repair.
Phone	1.800.800.5260	

[1] Contact Spare Parts for parts and accessories.

## Connect with Vertiv on Social Media



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



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



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



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