



# NetSure™ 2100 Series -48 VDC Power System

## User Manual

Specification Number: 582138000

Model Number: 2100

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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 iv.

## **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.

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# 1 Customer Documentation Package

This document (UM582138000) provides *User Instructions* for the Vertiv™ NetSure™ 2100 Series -48 VDC Power System: Model 2100, Spec. No. 582138000.

The complete Customer Documentation Package consists of...

Document Number	Document Description	How Provided
IM582138000	Power System Installation Instructions	Printed Manual and PDF File
UM1M831ANA	Mini Control Unit User Instructions	Printed Manual and PDF File
(Per configuration file loaded into controller)	Mini Control Unit Configuration Drawing (C-drawing)	Printed Document and PDF File
UM582138000	Power System User Instructions	PDF files are provided on a supplied USB drive.  See also Note 1.
SAG582138000	Power System "System Application Guide"	
UM1R481000e3	Rectifier Instructions	
Section 4154	Contact Information Page	
SD582138000	Power System Schematic Diagram	
T582138000	Power System Wiring Diagram	

**Note 1:** Also provided on the USB drive is a controller configuration drawing and the controller configuration files loaded into the controller as shipped.

For factory settings of all configurable controller parameters, refer to the controller configuration drawing (C-drawing) supplied with your power system.

## 2 System Description

### -48 VDC @ up to 62.5 Amperes Power System

The Vertiv™ NetSure™ 2100 Series -48 VDC Power System is an integrated power system containing rectifiers, intelligent control, metering, monitoring, and distribution.

The power system is designed to power a load while charging a positive grounded battery. The power system is capable of operating in a batteryless installation or off battery for maintenance purposes.

The Vertiv NetSure 2100 Series -48 VDC Power System consists of the following components mounted in a 19" or 23" wide relay rack or cabinet rack. Wall mounting options are also available.

### **NetSure™ Mini Control Unit (Controller)**

The controller provides power system control (including optional Low Voltage Battery Disconnect [LVBD]), rectifier control (including a charge control function), metering functions, monitoring functions, local/remote alarm functions, and connections for binary inputs and programmable relay outputs. The controller also supports rectifier temperature compensation if the system is equipped with a temperature probe(s). Temperature probe(s) may also be designated to monitor ambient temperature and/or battery temperature. The controller also provides data acquisition, system alarm management, and advanced battery and energy management. The controller contains a front panel display and keypad for local access. The controller provides an Ethernet port and comes with comprehensive webpages for remote access. The controller has optional SNMP v3 capability for remote system management. Refer to the mini control unit instructions (UM1M831ANA) for more information.

### **Rectifier Modules**

The system contains rectifier modules which provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to the rectifier instructions (UM1R481000e3) for more information.

### **Distribution Unit**

Various distribution unit options are available. See SAG582138000 for descriptions. The distribution unit can be equipped with an optional Low Voltage Battery Disconnect (LVBD) contactor. The various distribution units provide DC distribution through circuit breakers and/or fuses.



## 3 Operating Procedures

### 3.1 Controller and Rectifier

For operation instructions on these units, refer to the following documents.

- Mini Control Unit Instructions: UM1M831ANA



**NOTE!** The controller's default "User Name" is "admin" and the default "Password" is "640275".

- Rectifier Instructions: UM1R481000e3

### 3.2 Controller Battery Charge Current Limit Feature

Functionality: After a failure of the input source or when some battery cells are permanently damaged, the current to the batteries can be quite extensive. To avoid overheating or further damages to the battery, the controller can be programmed to limit the battery current to a preset level by limiting the charging voltage of the rectifiers. Should the battery current still exceed a higher preset value, an alarm is issued.

The controller limits the current going to the batteries based on the "Battery Current Limit" set point which is a percentage of the battery capacity in C10. For example, 0.1C10 would mean 10% of the battery capacity.

Refer to the mini control unit Instructions (UM1M831ANA) to program this feature. Battery charge current is limited to the value set in the controller, as long as battery voltage is above 47 VDC.

### 3.3 Local Controls and Indicators

#### Controller and Rectifier

Refer to the controller and rectifier instructions for descriptions of the local controls and indicators located on these units.

# 4 Maintenance

## 4.1 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in Table 4.1 every 6 months to ensure continual system operation.

Table 4.1 Maintenance Procedures to be Performed at 6-Month Intervals

Procedure	Referenced In
Check ventilation openings for obstructions such as dust, papers, manuals, etc.	--
Inspect and tighten all installer's connections.	IM582138000

## 4.2 Adding a Rectifier

To increase system current capacity, a rectifier module can easily be added if an empty rectifier module mounting position is available.

Refer to rectifier instructions UM1R481000e3 for a rectifier installation procedure.

## 4.3 Field Installing Compact Type Load Distribution Circuit Breakers in a List BA and List BB Distribution Unit

Refer to "Installing Compact Type Load Distribution Circuit Breakers (List BA, BB)" in the Installation Manual (IM582138000).

## 5 Troubleshooting and Repair

### 5.1 Contact Information

Refer to Section 4.15.4 (provided with your customer documentation) for support contact information.

### 5.2 Controller and Rectifier

For troubleshooting and repair instructions on these units, refer to the following documents.

- Mini Control Unit Instructions: UM1M831ANA
- Rectifier Instructions: UM1R481000e3

### 5.3 Controller Configuration

If any controller configuration settings were changed, refer to the mini control unit instructions (UM1M831ANA) and save a copy of the SettingParam.tar file. This file can be used to restore the controller settings, if required, at a later date.



**NOTE!** Provided on a USB drive furnished with the system is a controller configuration drawing (C-drawing) and the controller configuration files loaded into the controller as shipped.

### 5.4 System Troubleshooting Information

#### 5.4.1 Contact Information

Refer to Section 4.15.4 (provided with your customer documentation) for support contact information.

#### 5.4.2 General

This system is designed for ease in troubleshooting and repair. The various indicators as described in the controller and rectifier instructions are designed to isolate failure to a specific element. Once the faulty element has been identified, refer to “Replacement Information” on page 6 and “Replacement Procedures” on page 6.

#### 5.4.3 Troubleshooting Alarm Conditions on the Controller

The controller displays alarm conditions as listed in the “Resolving Alarms” section of the controller’s user manual. Programmable external alarm relays are also available. Refer to the system installation instructions (IM582138000) and the controller configuration drawing (C-drawing) supplied with your power system documentation for your alarm relay configurations.

The controller’s Active Alarm and Alarm History submenus allow the user to view alarm details. Refer to the mini control unit instructions (UM1M831ANA) to access these menus.

#### 5.4.4 Checking the Controller’s Current Limit Point after Adding or Removing a Rectifier

If a rectifier module is added; the respective current limit point in amps will automatically increase to maintain the same percentage. For example, if the current limit was set to 100% of combined capacity and a rectifier module is added, the new current limit setpoint will be 100% of the combined capacity including the new rectifier module.

If a rectifier module is removed from the system (and the Rect Comm Fail is cleared), the current limit point will remain unchanged unless the capacity of the remaining rectifiers is not sufficient to maintain this current limit point. If that happens, the current limit point will automatically decrease to the maximum (121% of the remaining rectifiers).

It is recommended that the current limit point be checked whenever a rectifier is added to or removed from the power system.

When setting total rectifier current limit, the set point to each rectifier is the total set point divided by the number of rectifiers. For example, if the system contains three rectifiers and the current limit is set to 30 amps then each rectifier has a current limit set point

of 10 amps. If one or more rectifiers are removed or fails it will take several seconds for the individual set points to the remaining rectifiers to be reset. In the example given, if one rectifier is removed the current limit set point will drop to 20 amps (10 amps times two remaining rectifiers) until the controller can send updated set points to the remaining rectifiers.

This takes a couple communication cycles (several seconds) after which each rectifier would have a new set point of 15 amps for a total of 30 amps. The total current limit of the rectifiers should not be set such that the loss of the redundant rectifiers will cause this temporary set point to drop below the actual maximum expected load. If batteries are used on the rectifier output, the batteries should support the load until the current limit set points can be re-established due to loss of a rectifier.

Refer to the mini control unit instructions (UM1M831ANA) for a procedure.

### 5.4.5 Clearing a Rectifier Communications Fail Alarm after Removing a Rectifier

If a rectifier module is removed from the system, a rectifier communications failure alarm is generated. If the rectifier module will not be replaced, the alarm should be cleared.

Refer to the mini control unit instructions (UM1M831ANA) for a procedure to clear the alarm.

### 5.4.6 Clearing a Rectifier Lost Alarm

If the controller resets while a rectifier communications fail alarm is active, the rectifier communications fail alarm is replaced with a rectifier lost alarm.

Refer to the mini control unit instructions (UM1M831ANA) for a procedure to clear the alarm.

## 5.5 Replacement Information

### 5.5.1 Replacement Assemblies

When a trouble symptom is localized to a faulty rectifier, controller, or system circuit card; that particular device or circuit card should be replaced in its entirety. No attempt should be made to troubleshoot or repair individual components on any rectifier, controller, or circuit card.

Refer to system application guide SAG582138000 for replacement part numbers.

## 5.6 Replacement Procedures



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

### 5.6.1 Replacing a Rectifier

Refer to the rectifier instructions (UM1R481000e3) for a rectifier replacement procedure. Refer also to “System Troubleshooting Information” on page 5.

The rectifier being replaced is assigned by the mini control unit the lowest available identification number. If desired, you can change the identification number, see “Configuring the Mini Control Unit Identification of Rectifiers” in the separate power system installation manual (IM582138000).

### 5.6.2 Replacing the Mini Control Unit

Refer to the mini control unit instructions (UM1M831ANA) for a controller replacement procedure.

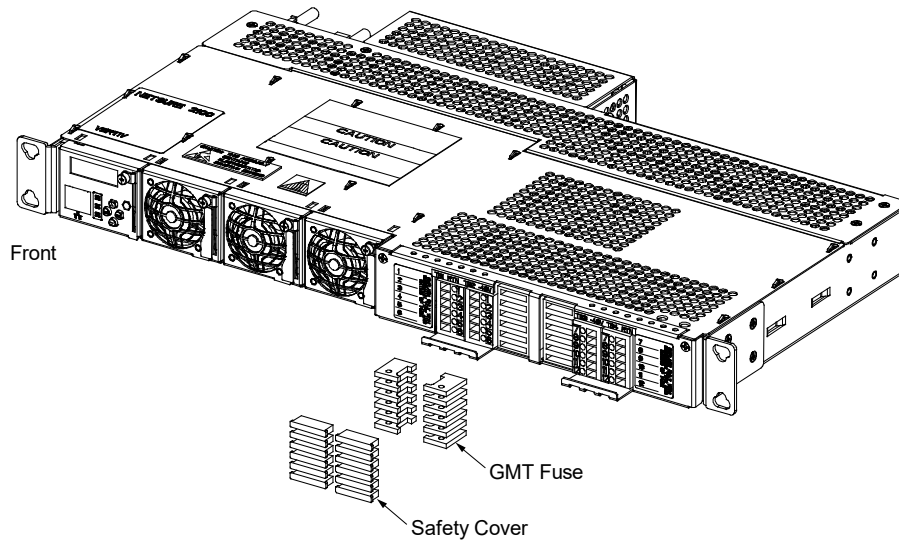
### 5.6.3 Replacing a GMT Distribution Fuse

Replace distribution devices with the same type and rating. Refer to system application guide SAG582138000 for part numbers.

#### Procedure

1. Refer to Figure 5.1, Figure 5.2, Figure 5.3, or Figure 5.4 and replace the fuse. Ensure a safety fuse cover is installed on the replacement fuse, as shown in Figure 5.5.
2. Verify no alarms are active.

**Figure 5.1 GMT Distribution Fuse Replacement (List AA)**



**Figure 5.2 GMT Distribution Fuse Replacement (List CA)**

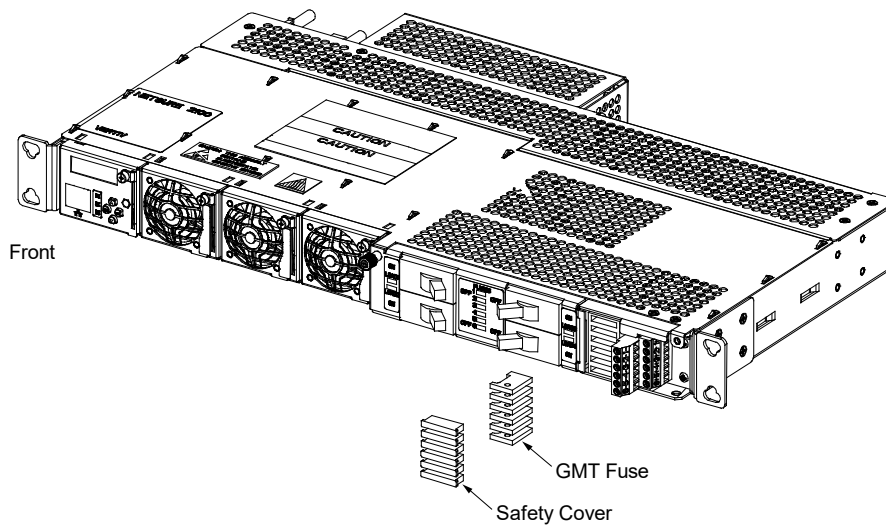


Figure 5.3 GMT Distribution Fuse Replacement (List BA)

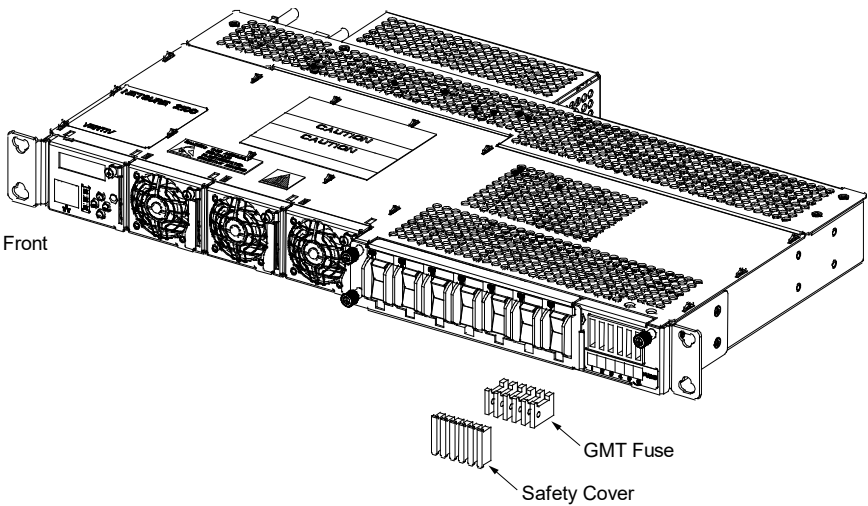


Figure 5.4 GMT Distribution Fuse Replacement (List BB)

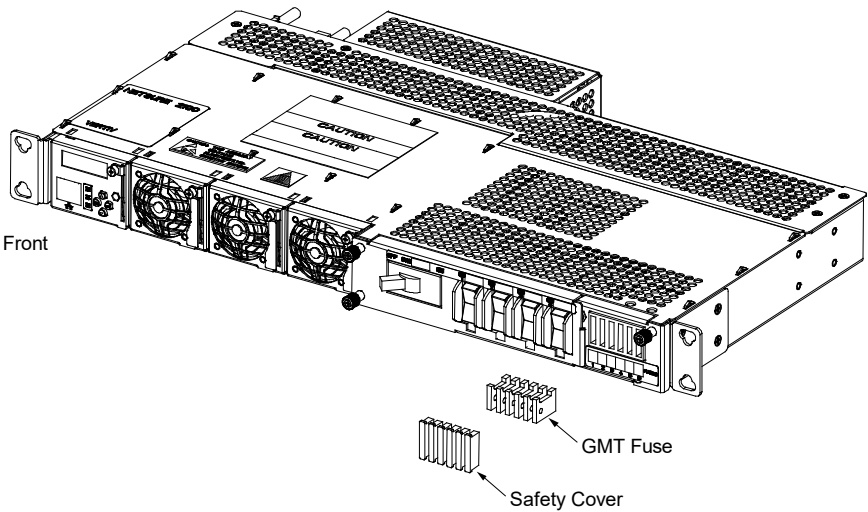
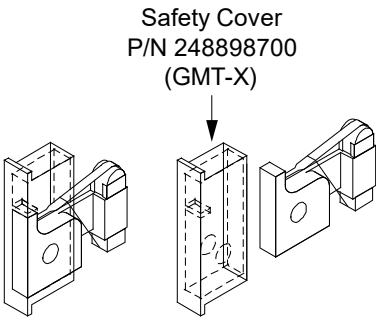


Figure 5.5 Installation of Safety Fuse Covers



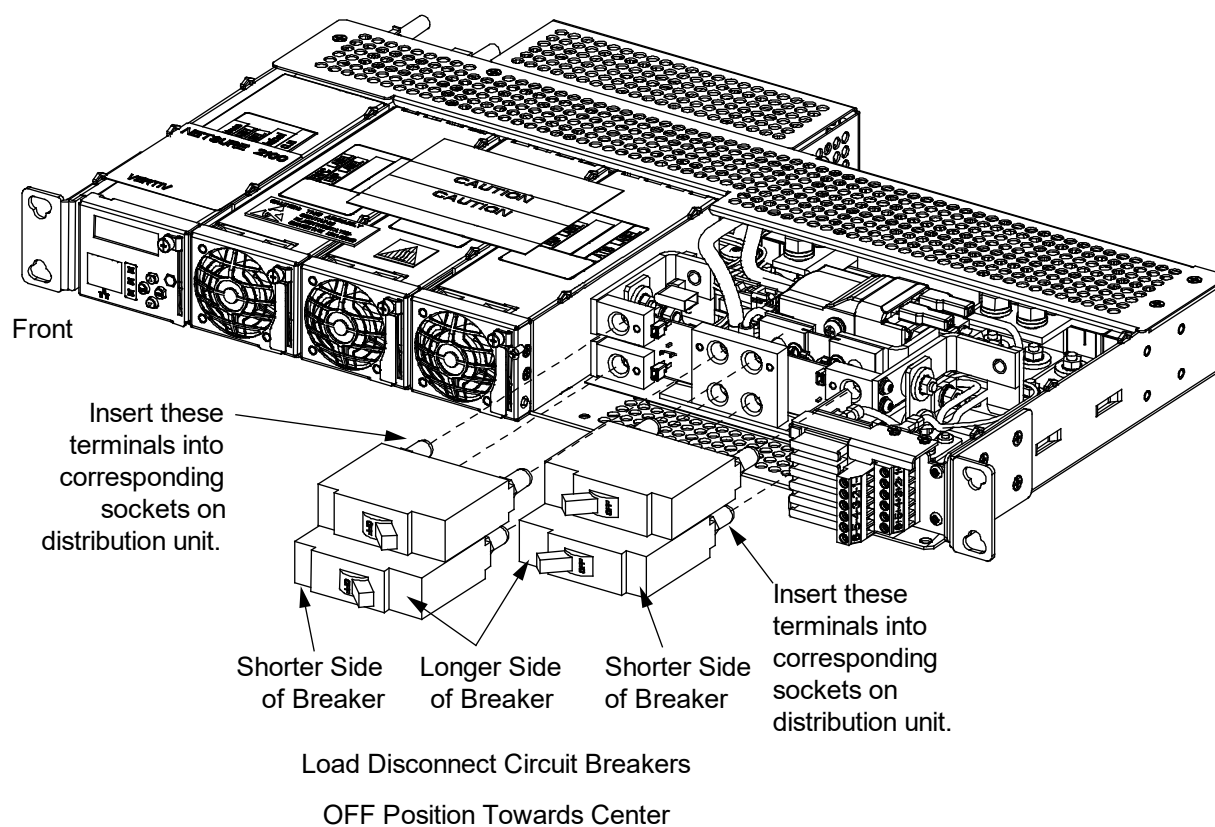
## 5.6.4 Replacing a Bullet Nose Circuit Breaker

Replace distribution devices with the same type and rating. Refer to system application guide SAG582138000 for part numbers.

### **Procedure**

1. Operate the defective circuit breaker to the OFF position.
2. Remove the cover from the circuit breaker mounting positions.
3. List BB: Loosen the distribution unit captive fastener and partially slide the distribution unit out from shelf to facilitate circuit breaker replacement.
4. Gently rock the defective circuit breaker back and forth while pulling firmly outward until the breaker is free from the distribution unit.
5. Ensure that the replacement circuit breaker is in the OFF position, and is of the correct rating.
6. Orient the replacement circuit breaker as shown in Figure 5.6 or Figure 5.7. Insert the terminals on the rear of the circuit breaker into their corresponding sockets on the distribution unit. Ensure the alarm contact on the back of the circuit breaker makes contact with the alarm terminal on the distribution unit. Push distribution device in firmly until fully seated in the distribution unit.
7. List BB: Slide the distribution unit back into the shelf and secure with the captive fastener.
8. Replace the cover over the circuit breaker mounting positions and tighten the captive fastener(s).
9. Operate the replacement circuit breaker to the ON position.
10. Verify no alarms are active.

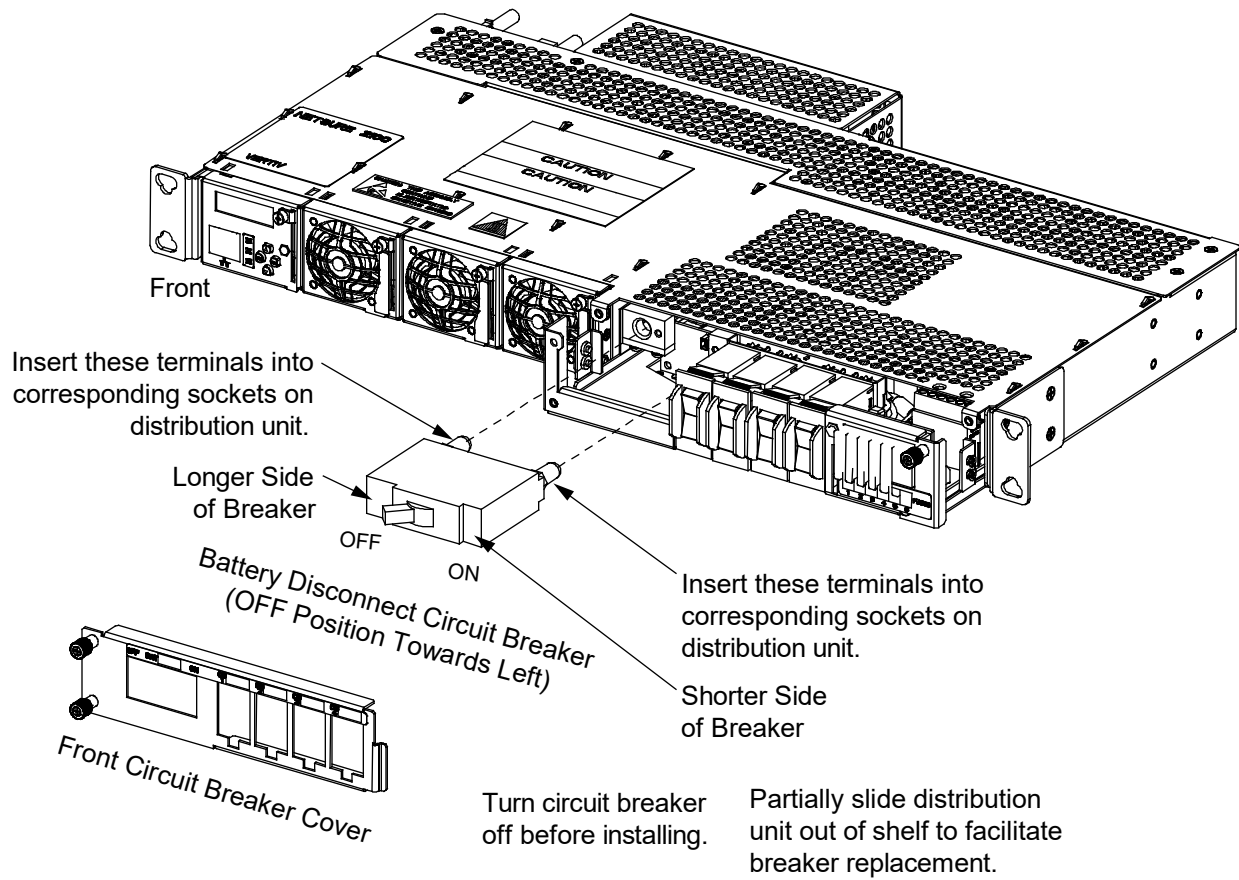
**Figure 5.6** Replacing a Bullet Nose Circuit Breaker (List CA)



Turn circuit breaker off before installing.

Components removed in illustration for clarity only.



**Figure 5.7 Replacing a Bullet Nose Circuit Breaker (List BB)**

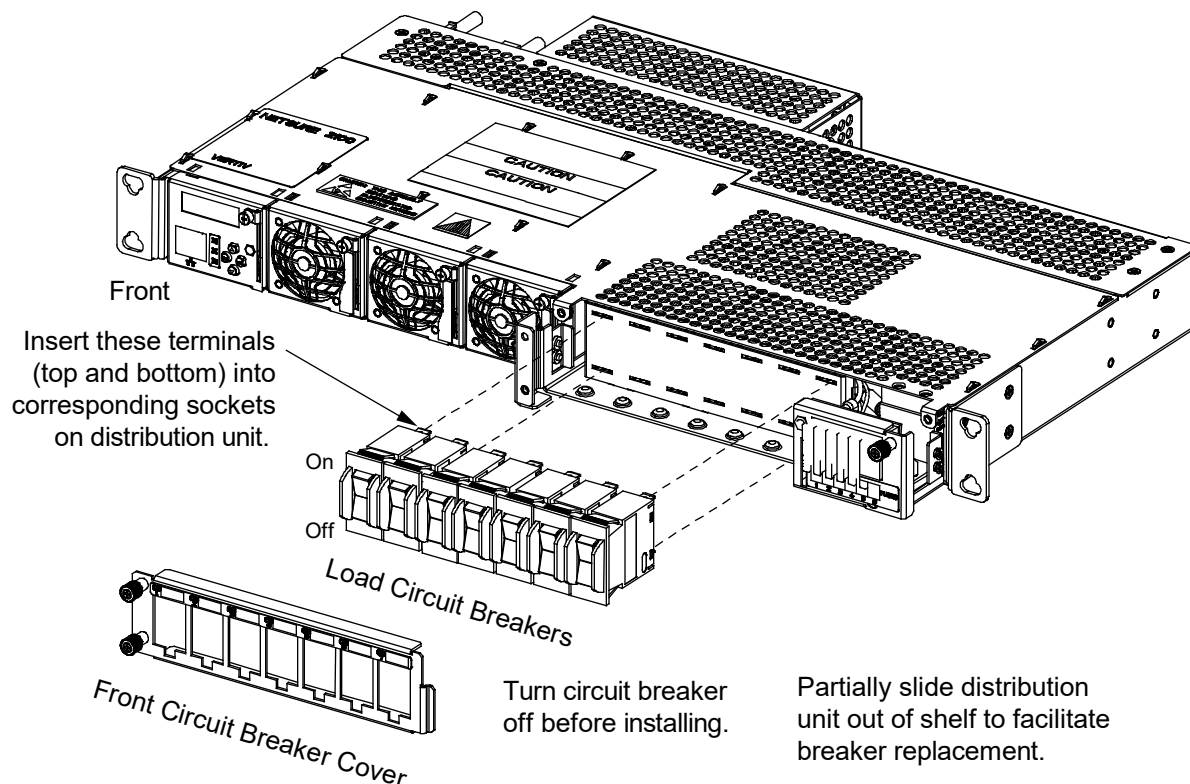
## 5.6.5 Replacing a Compact Circuit Breaker

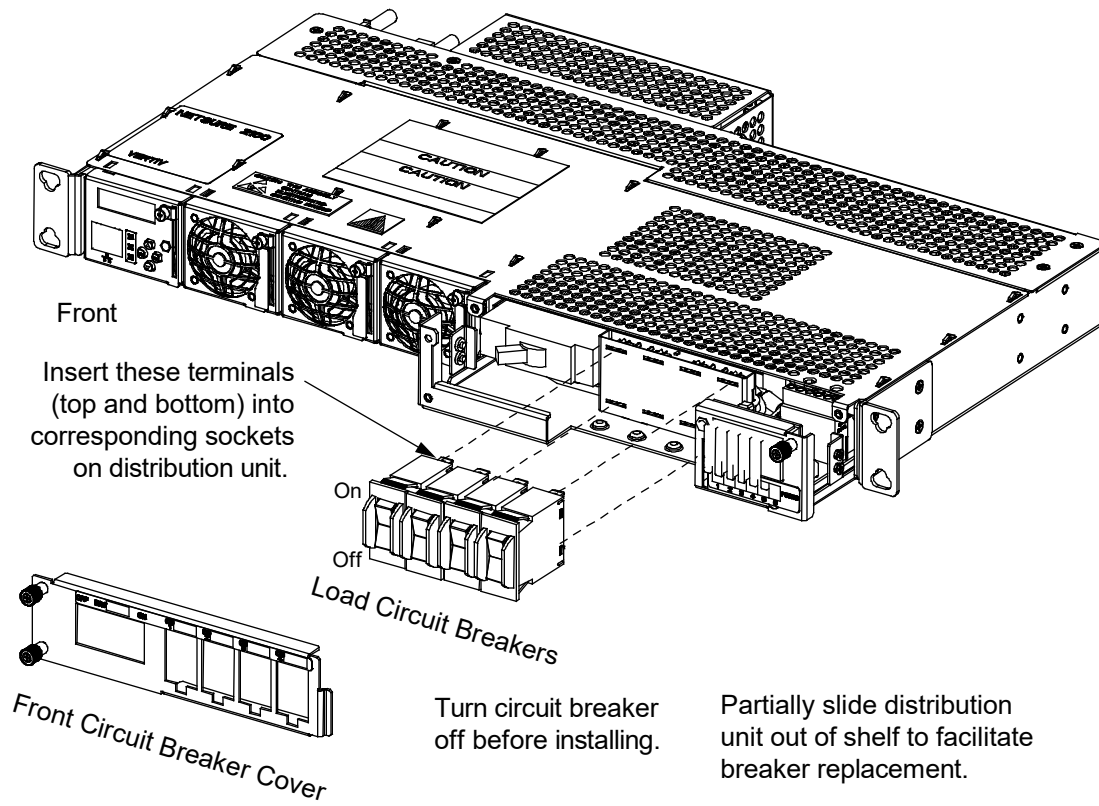
Replace distribution devices with the same type and rating. Refer to system application guide SAG582138000 for part numbers.

### Procedure

1. Operate the defective circuit breaker to the OFF position.
2. Remove the cover from the circuit breaker mounting positions.
3. Loosen the distribution unit captive fastener and partially slide the distribution unit out from shelf to facilitate circuit breaker replacement.
4. Gently rock the defective circuit breaker back and forth while pulling firmly outward until the breaker is free from the distribution unit.
5. Ensure that the replacement circuit breaker is in the OFF position, and is of the correct rating.
6. Orient the replacement circuit breaker as shown in Figure 5.8 and Figure 5.9. Insert the terminals on the rear of the circuit breaker into their corresponding sockets on the distribution unit. Push distribution device in firmly until fully seated in the distribution unit.
7. Slide the distribution unit back into the shelf and secure with the captive fastener.
8. Replace the cover over the circuit breaker mounting positions and tighten the captive fasteners.
9. Operate the replacement circuit breaker to the ON position.
10. Verify no alarms are active.

**Figure 5.8 Replacing a Compact Circuit Breaker (List BA)**



**Figure 5.9** Replacing a Compact Circuit Breaker (List BB)

## 5.6.6 Replacing the External IB4 Assembly (if furnished)



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



**WARNING!** Circuit cards used in this system contain static-sensitive devices. Refer to Section 4154 (provided with your customer documentation) for static-sensitive device precautions.

The external IB4 assembly can be replaced with the system operating.

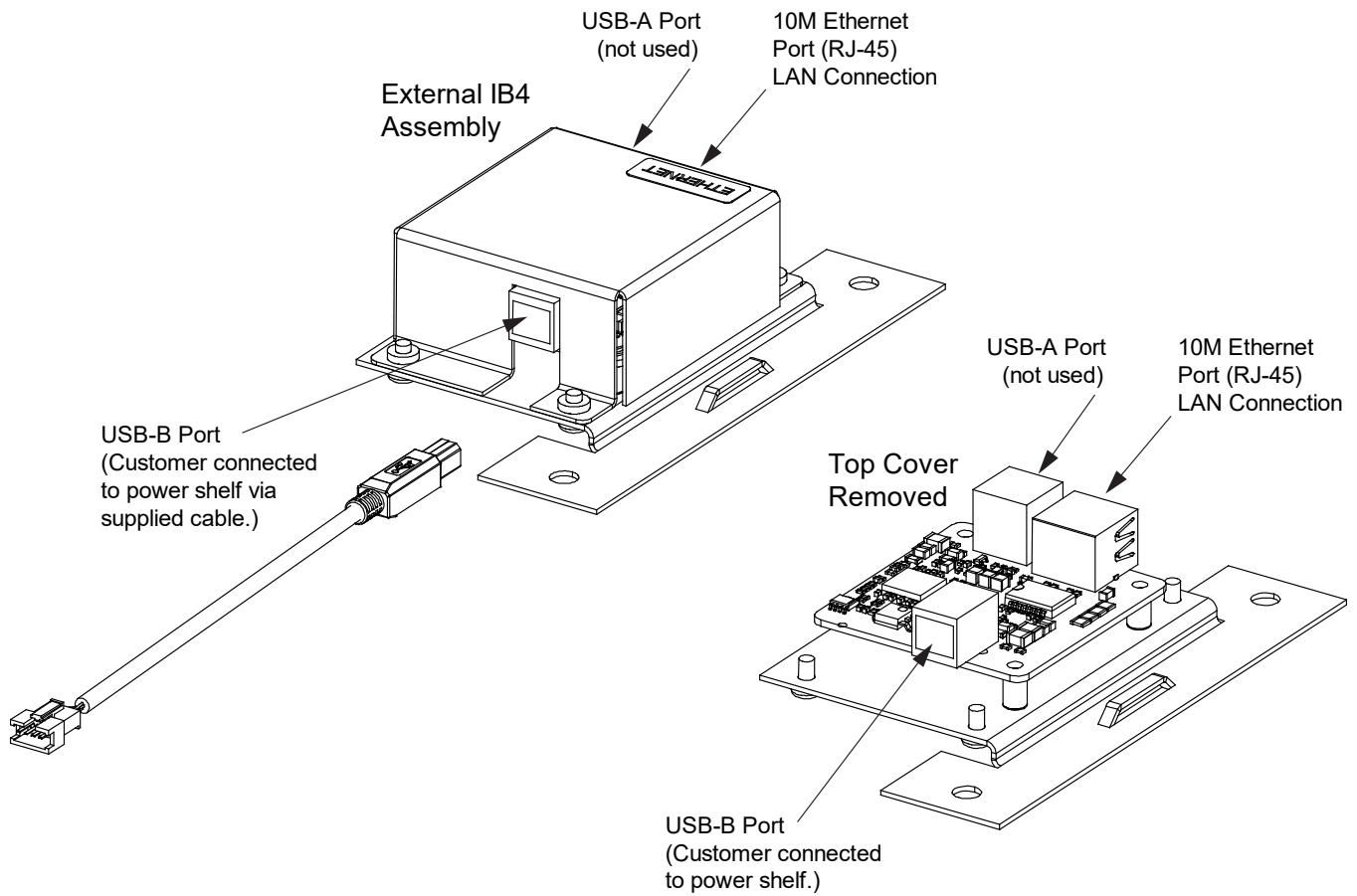
### **Procedure**

1. Performing this procedure may activate external alarms. Do one of the following. If possible, disable these alarms. If these alarms cannot be easily disabled, notify the appropriate personnel to disregard any future alarms associated with this system while the procedure is being performed.



**WARNING!** Damage to the circuit card may result if the next step is not followed.

2. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
3. Loosen the captive fastener securing the latch mechanism to the front of the mini control unit. Pull the latch mechanism away from the mini control unit (this will retract the latch mechanism located on the bottom of the mini control unit). This unlocks the mini control unit from the shelf. Slide the mini control unit partially out from the shelf.
4. Carefully label the connectors plugged into the assembly. These connectors must be plugged into the same connectors on the replacement assembly.
5. Unplug all connectors plugged into the assembly.
6. Replace the defective assembly with the new assembly.
7. Plug all connectors removed from the old assembly into the same position on the replacement assembly.
8. Slide the mini control unit completely into its mounting position. Push the latch mechanism into the front panel of the mini control unit, and secure by tightening the captive fastener. This locks the mini control unit securely to the shelf.
9. Remove the grounding wrist strap.
10. To verify that the IB4 board is functioning, verify the mini control unit IP address is 192.168.100.100 as follows. From the Main Screen on the mini control unit local display, press the ESC button, then the ENT key repeatedly until the IP address is displayed. Verify the displayed IP address is 192.168.100.100.
11. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
12. Ensure that there are no local or remote alarms active on the system.

**Figure 5.10 External IB4 Assembly**

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