



# NetSure™ 5100 Series -48 VDC Power System

## User Manual

Specification Number: 582137200

Model Number: 5100

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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 (UM582137200) provides *User Instructions* for the Vertiv™ NetSure™ 5100 Series -48 VDC Power System: Model 5100, Spec. No. 582137200.

The complete Customer Documentation Package consists of...

## **Power System Installation Manual**

- Power System Installation Instructions: IM582137200

## **Power System User Manual**

- Power System User Instructions: UM582137200

## **Controller User Manual**

- NCU Controller User Instructions: UM1M830BNA

## **USB Drive with All Customer Documentation**

- Power System Installation Instructions: IM582137200
- Power System User Instructions: UM582137200
- Power System “System Application Guide”: SAG582137200
- NCU Controller User Instructions: UM1M830BNA
- Rectifier Instructions: UM1R482000e3
- Engineering Drawings
  - SD582137200
  - T582137200
- Also provided on the USB drive is a controller configuration drawing and the controller configuration files loaded into the controller as shipped.

# 2 System Description

## -48 VDC @ up to 150 Amperes Power System

The Vertiv™ NetSure™ 5100 DC Power System is an integrated power system containing rectifiers, intelligent control, metering, monitoring, and distribution.

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

The Vertiv™ NetSure™ 5100 consists of the following components mounted in a 19" or 23" wide relay rack or cabinet rack. Wall mounting options are also available.

## **Controller**

NCU (NetSure Control Unit): The controller provides power system control (including optional low voltage battery disconnect [LVBD] and low voltage load disconnect [LVLDD] control), rectifier control (including a charge control function), metering functions, monitoring functions, local/remote alarm functions, and connections for binary inputs and programmable relay outputs via a controller interface board. 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 color TFT 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. The controller supports software upgrade via its USB port. Refer to the NCU Controller Instructions (UM1M830BNA) 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 (UM1R482000e3) for more information.

### **Distribution Unit**

Various distribution unit options are available. See SAG582137200 for descriptions. The distribution unit can be equipped with an optional Low Voltage Battery Disconnect (LVBD) or Low Voltage Load Disconnect (LVLD) contactor. The distribution unit provides DC distribution through circuit breakers and/or fuses.

## **3 Physical Security**

This product is designed and intended to be deployed and operated in a physically secure and network firewall-protected location. Vertiv recommends a review of the physical security and operating environment of the unit. Since an attacker or disgruntled user can cause serious disruption, below are some recommended best practices that include, but are not limited to:

- Restrict access to areas, racks, and units with encrypted card RFID/badges, unique multi-factor passcode authentication for access, man traps, and biometric scanners for physical access to the equipment.
- Have trusted and background-checked security guards with 24x7x365 physical presence and written logs to help document and note physical access to a data center, building, rack, and so on.
- Restrict physical access to telecommunications equipment and network cabling. Physical access to the telecommunications lines and network cabling should be restricted to protect against attempts to intercept or sabotage communications. Best practices include use of metal conduits for the network cabling running between equipment cabinets.
- All USB, RJ45, and/or any other physical ports should be restricted on the units.
- Do not connect removable media (such as USB devices, SD cards, and so on) for any operation (such as firmware upgrade, configuration change, or boot application change) unless the origin of media is known and trusted. Before connecting any portable device through a USB port or SD card slot, scan the device for malware and viruses.

## **4 Operating Procedures**

### **4.1 Controller and Rectifier**

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

- NCU Controller Instructions (UM1M830BNA)



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

- Rectifier Instructions (UM1R482000e3)

## 4.2 ESTOP Function

If an ESTOP switch is wired to the IB2-1 Controller Interface Board, customer-furnished system ground applied to terminal DI8+ activates the ESTOP function. The ESTOP function shuts down and locks out the rectifiers and opens the optional low voltage disconnect (LVD) contactors (battery and load type). If the system has battery connected and does not contain a battery LVD or the controller power option is set to Battery Pwr (jumper J4 on the system interface board is set to Battery Pwr), the controller will remain operational. If the system does not contain battery or load LVD(s) and has battery connected, the loads will be sustained by the battery voltage.

For Systems NOT Containing a Battery LVD: When the ESTOP signal is removed, LVD contactors (battery and load type) will close after the “LVD Reconnect Delay” has elapsed (customer configurable via the controller) if battery voltage is present on the bus. Rectifiers will remain off. The rectifiers will restart when the input power is removed and restored after 30 seconds or more (until the LEDs on the modules extinguish).

For Systems Containing a Battery LVD: When the ESTOP signal is removed, LVD contactors (battery and load type) will remain open. Rectifiers will remain off. The rectifiers will restart when the input power is removed and restored after 30 seconds or more (until the LEDs on the modules extinguish). When the rectifiers restart, LVD contactors (battery and load type) will close after the “LVD Reconnect Delay” has elapsed (customer configurable via the controller).



**NOTE!** *If a customer-furnished method to disconnect the input power to the system is not provided, the rectifiers will stay locked OFF until the input power is recycled. If the ESTOP signal is removed without recycling the input power, the rectifiers will remain off and have a local alarm visible on the module. The ESTOP alarm from the controller will extinguish. The controller will not issue an alarm for this condition.*

## 4.3 Controller Battery Charge Current Limit Feature

Functionality: After a failure of the input source (commercial AC) 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 NCU Controller Instructions (UM1M830BNA) 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.

## 4.4 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.

## 5 Maintenance

### 5.1 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in **Table 5.1** every 6 months to ensure continual system operation.

**Table 5.1 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.	IM582137200

### 5.2 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 UM1R482000e3 for a rectifier installation procedure.

### 5.3 Installing a Field Expansion Rectifier Shelf



**DANGER!** Adhere to the “Important Safety Instructions” presented at the front of this document.



**NOTE!** Refer to **Figure 5.1** and **Figure 5.2** as this procedure is performed.

#### Procedure

1. Remove the rear shield from the main module mounting assembly. This shield will not be re-used.
2. When the main module mounting assembly is configured with the front AC option, replace the mounting angle on the left side (as viewed from the front) of the expansion module mounting assembly with the longer mounting angle shipped loose with the expansion module mounting assembly.
3. Install the expansion module mounting assembly directly below the main module mounting assembly. Use the mounting hardware provided with the expansion module mounting assembly. See **Figure 5.1**. Refer also to **Figure 5.1** for hardware build-up and recommended torque.



**NOTE!** Install (orient) the ground washers so the teeth dig into the mounting angles for a secure ground connection.



**NOTE!** Compliance with Telcordia GR-1089-CORE requires that prior to mounting the system to the equipment rack:

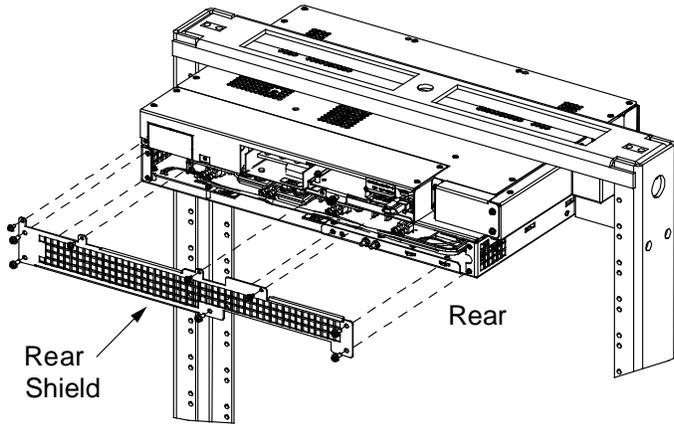
- All paint must be removed from the front surface of each equipment rack rail where it mates with a shelf-mounting bracket, so that good metal-to-metal contact can be established between the shelf and rack.
  - The shelf-to-rack mating surfaces must be cleaned.
  - Electrical anti-oxidizing compound must be applied to the shelf-to-rack mating surfaces.
4. Remove the rear shield from the expansion module mounting assembly.



**NOTE!** Apply electrical anti-oxidizing compound to busbar mating surfaces before performing the next step.

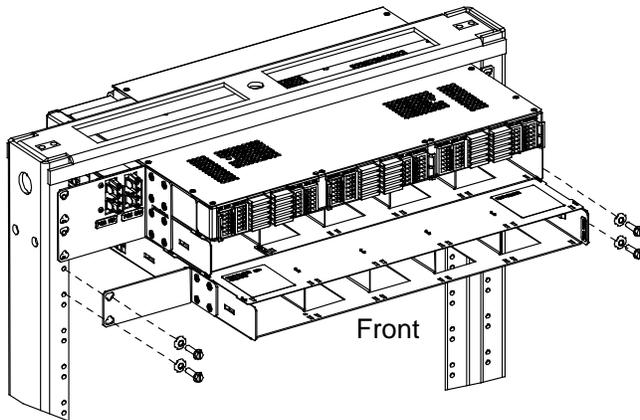
5. Remove the hardware from the main module mounting assembly's -48V and return busbars.
6. Loosen the hardware from the expansion module mounting assembly's -48V and return busbars.
7. Slide the busbars provided with the expansion module mounting assembly into position. These busbars are installed between the busbar studs on the expansion module mounting assembly and the busbar studs on the main module mounting assembly. Secure these busbars to the expansion module mounting assembly with the hardware provided with the expansion module mounting assembly. Secure these busbars to the main module mounting assembly with the hardware provided with the main module mounting assembly. Refer to **Figure 5.1** for hardware build-up and torque.
8. Disconnect the cable coming from the distribution unit that is connected to the left side (as viewed from the rear) connector on the main module mounting assembly. Connect this cable to the left side (as viewed from the rear) connector on the expansion module mounting assembly. See **Figure 5.2**.
9. Connect the cable provided with the expansion module mounting assembly between the left side (as viewed from the rear) connector on the main module mounting assembly and the right side (as viewed from the rear) connector on the expansion module mounting assembly. See **Figure 5.2**.
10. Install the new rear shields supplied with the expansion module mounting assembly to the rear of the main module mounting assembly. See **Figure 5.1**.
11. Re-install the busbar shield previously removed from the expansion module mounting assembly. See **Figure 5.1**.
12. Refer to the Power System Installation Instructions (IM582137200) and connect input power to the expansion module mounting assembly.
13. Refer to the Power System Installation Instructions (IM582137200) and install rectifier modules into the expansion module mounting assembly as required.

Figure 5.1 Installing a Field Expansion Rectifier Shelf (cont'd on next page)



23" Front AC Option Shown.  
19" Rear AC Option Similar.

1. Remove rear shield from the main module mounting assembly. This shield will not be reused.

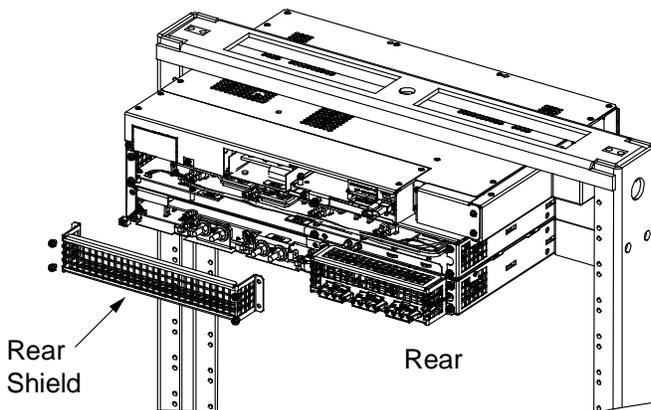


2. When the main module mounting assembly is configured with the front AC option, replace the mounting angle on the left side of the expansion module mounting assembly with the longer mounting angle shipped loose with the expansion module mounting assembly.

3. Install the expansion module mounting assembly into the rack.

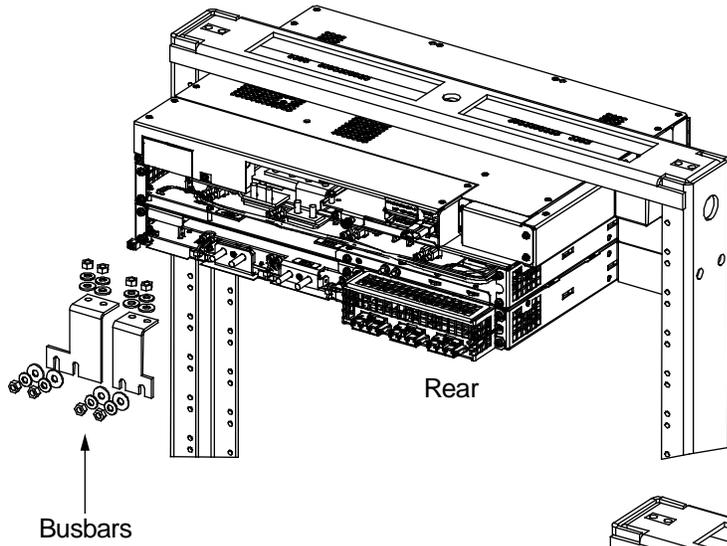
MOUNTING HARDWARE  
12-24 x 3/4" Thread Forming  
Hex Head Screw  
No. 10/12 Ground Washer  
Torque: 65 in-lbs.

Install the ground washers so the teeth make contact with the metal on the mounting angles.



4. Remove rear shield from the expansion module mounting assembly.

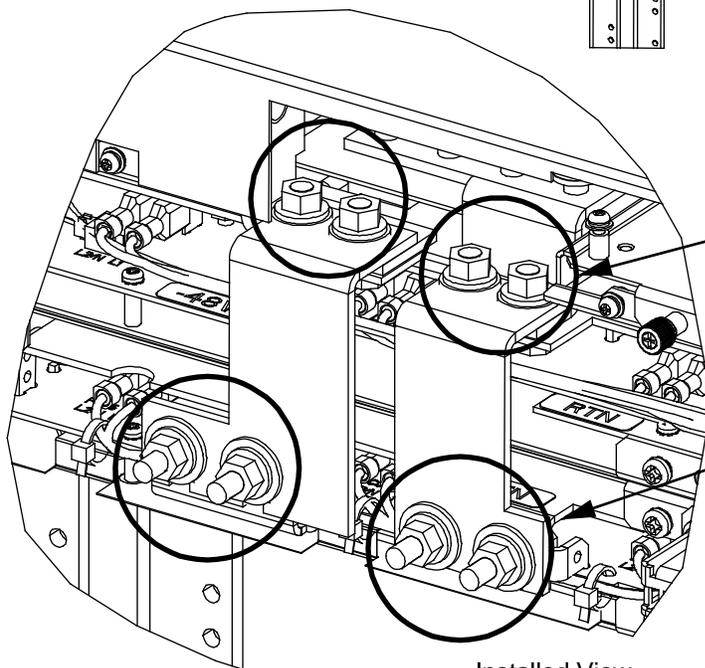
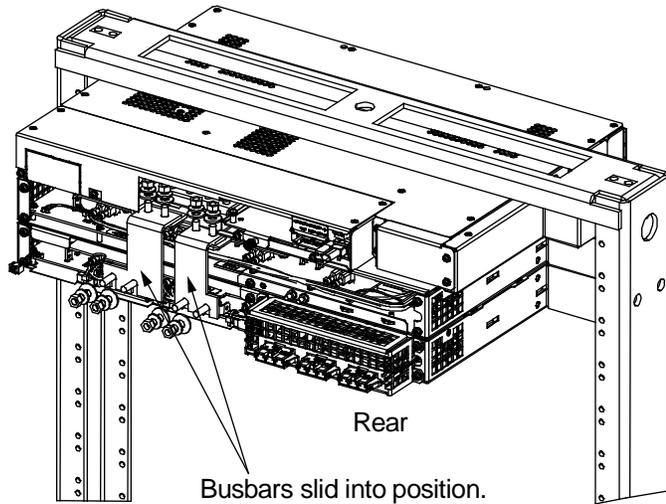
Figure 5.1 Installing a Field Expansion Rectifier Shelf (cont'd from previous page, cont'd on next page)



5. Install the busbars provided with the expansion module mounting assembly between the shelves. Torque to 52 in-lbs.

Do this by removing the hardware from the main shelf busbars, loosening the hardware on the expansion shelf busbars, and sliding the busbars into position.

Apply electrical anti-oxidizing compound to busbar mating surfaces.



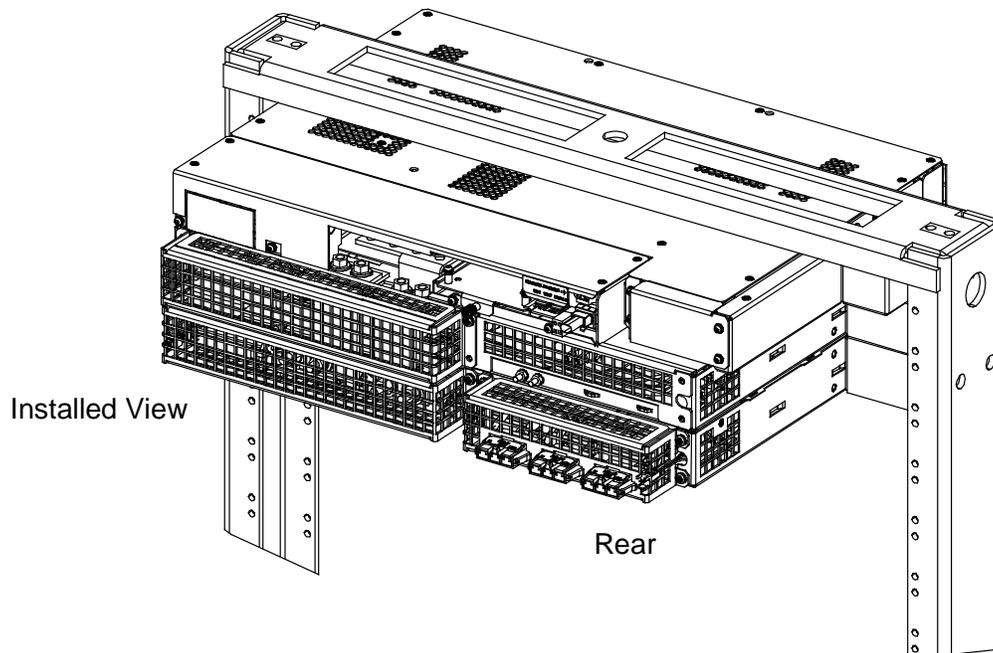
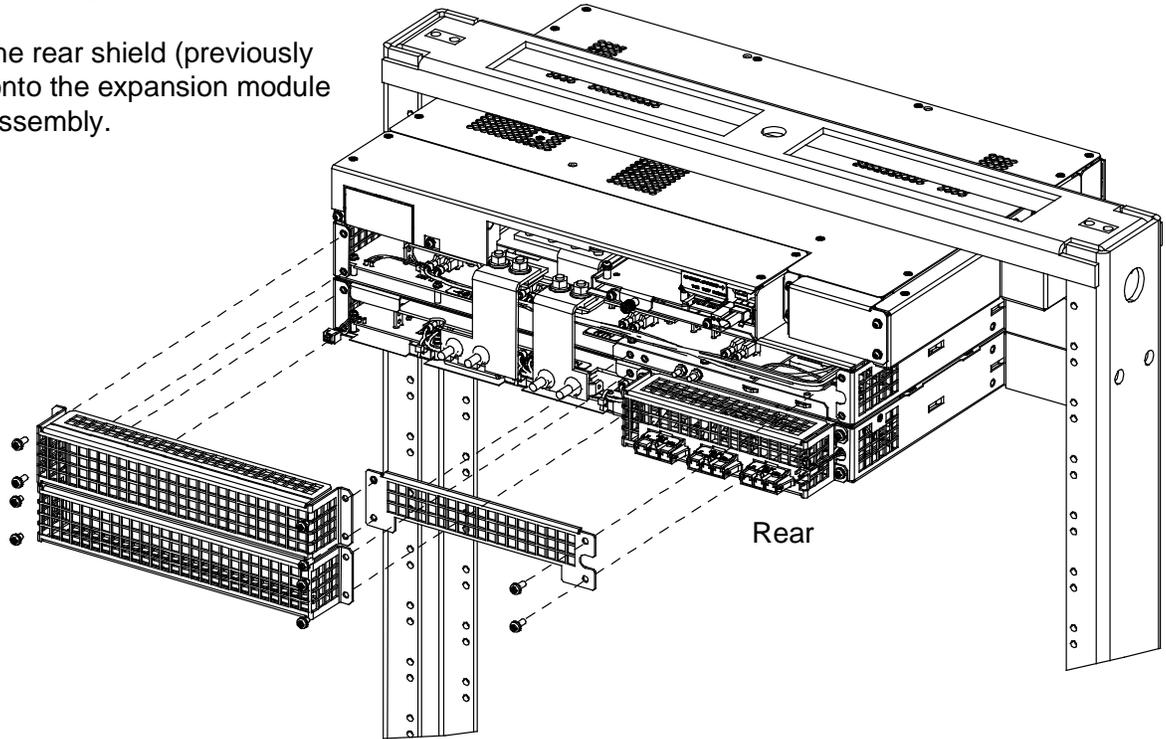
Hardware Build-Up:  
 Busbar  
 M6 Flat Washer  
 M6 Lock Washer  
 M6 Hex Nut  
 Torque to 52 in-lbs.

Hardware Build-Up:  
 Busbar  
 M6 Flat Washer  
 M6 Lock Washer  
 M6 Hex Nut  
 Torque to 52 in-lbs.

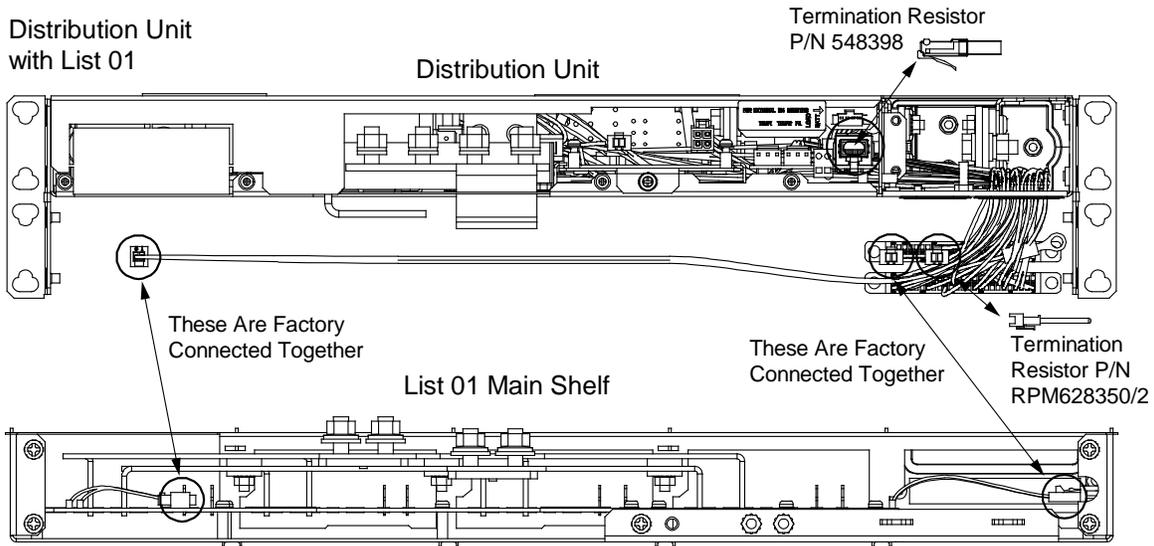
Installed View

**Figure 5.1** Installing a Field Expansion Rectifier Shelf (cont'd from previous page)

6. Install the new rear shields supplied with the expansion module mounting assembly to the main module mounting assembly.
7. Re-install the rear shield (previously removed) onto the expansion module mounting assembly.

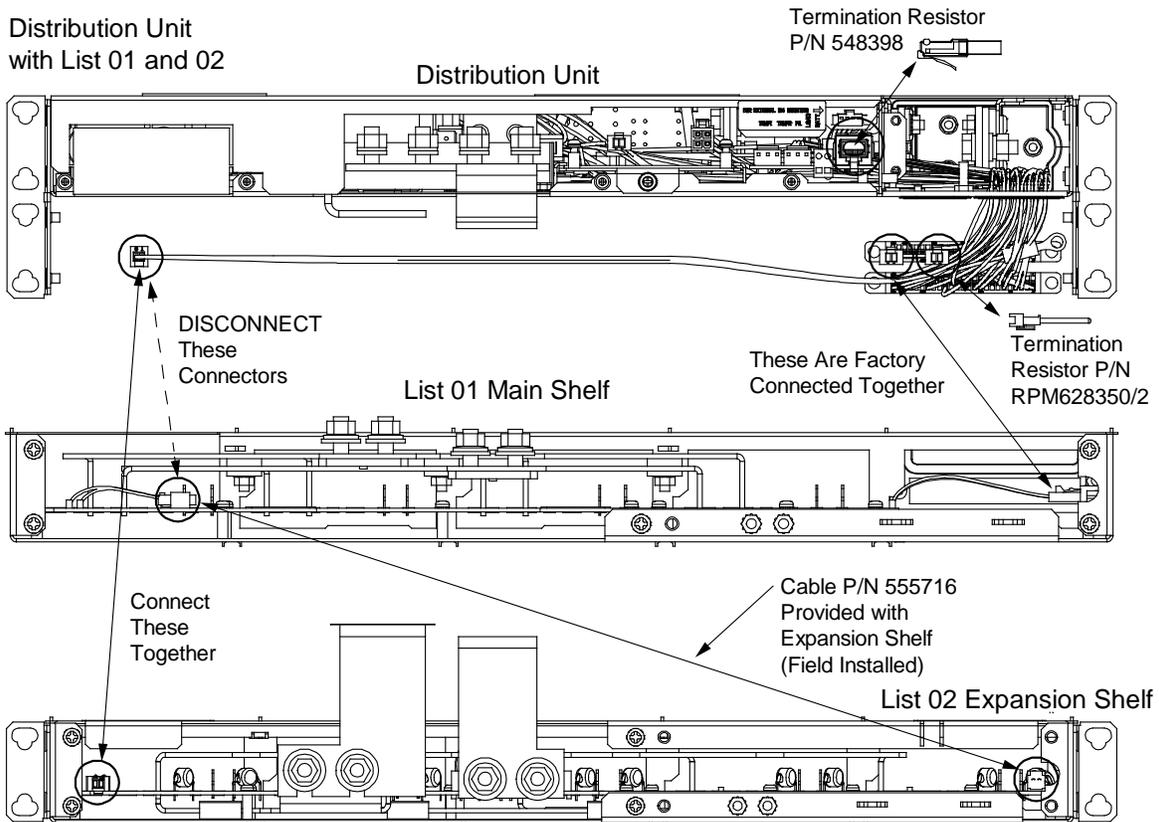


**Figure 5.2** Installing a Field Expansion Rectifier Shelf - Controller CAN Bus



Exploded View Shown to Illustrate Wire Connections Only

Components removed in illustration for clarity only.



## 6 Troubleshooting and Repair

### 6.1 Contact Information

Refer to Section 4154 (provided with your customer documentation) for support contact information.

### 6.2 Controller and Rectifier

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

- NCU Controller Instructions (UM1M830BNA)
- Rectifier Instructions (UM1R482000e3)

### 6.3 Controller Configuration

If any controller configuration settings were changed, refer to the NCU Controller Instructions (UM1M830BNA) and save a copy of the configuration 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.

### 6.4 System Troubleshooting Information

This system is designed for ease in troubleshooting and repair. The various indicators as described in “Local Controls and Indicators” on page 3 and 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 11 and “Replacement Procedures” on page 11.

#### **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 (IM582137200) 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 NCU Controller Instructions (UM1M830BNA) to access these menus.

#### **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 five rectifiers and the current limit is set to 150 amps then each rectifier has a current limit set point of 30 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 120 amps (30 amps times four 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 37.5 amps for a total of 150 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 NCU Controller Instructions (UM1M830BNA) for a procedure.

### **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 NCU Controller Instructions (UM1M830BNA) for a procedure.

### **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 NCU Controller Instructions (UM1M830BNA) for a procedure to clear the alarm.

## **6.5 Replacement Information**

### **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 SAG582137200 for replacement part numbers.

## **6.6 Replacement Procedures**



**DANGER!** Adhere to the “Important Safety Instructions” presented at the front of this document.

### **6.6.1 Replacing a Rectifier**

Refer to the Rectifier Instructions (UM1R482000e3) for a rectifier replacement procedure. Refer also to “System Troubleshooting Information” on page 10.

The rectifier being replaced is assigned by the NCU the lowest available identification number. If desired, you can change the identification number, see “Configuring the NCU Identification of Rectifiers” in the separate Power System Installation Manual (IM582137200).

### **6.6.2 Replacing the NCU Controller**

Refer to the NCU Controller Instructions (UM1M830BNA) for a controller replacement procedure.

### **6.6.3 Replacing a Distribution Device**

Replace distribution devices with the same type and rating. Refer to System Application Guide SAG582137200 for part numbers.

### **Replacing a GMT Distribution Fuse**

#### **Procedure**

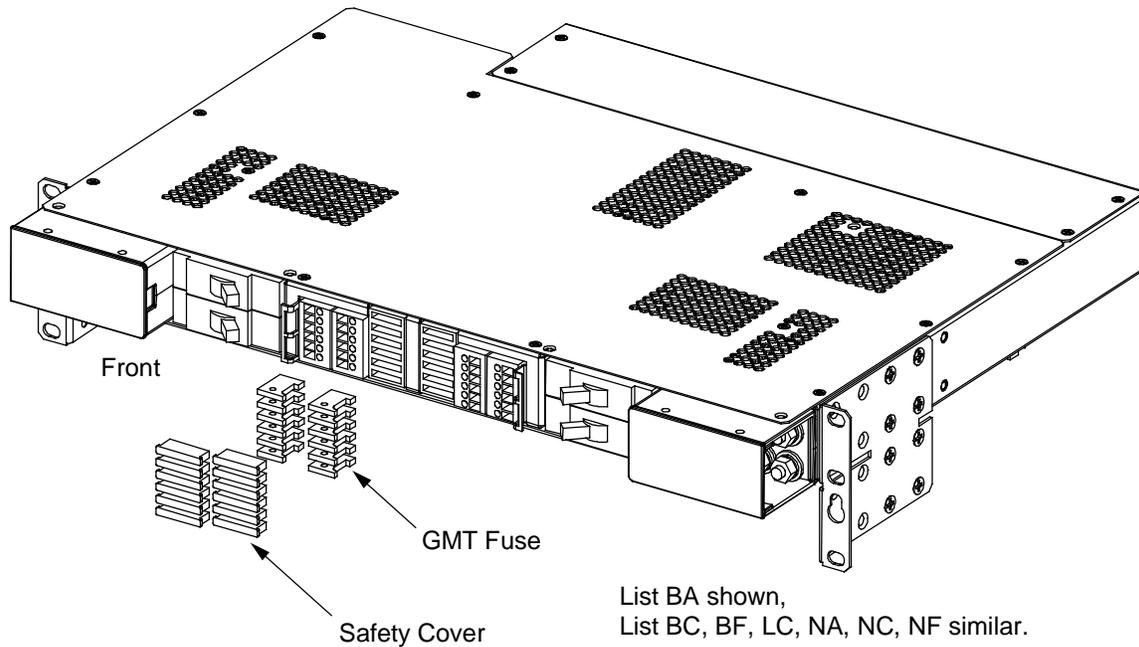
1. Refer to **Figure 6.1** and replace the fuse. Ensure a safety fuse cover is installed on the replacement fuse, as shown in **Figure 6.2**.
2. Verify no alarms are active.

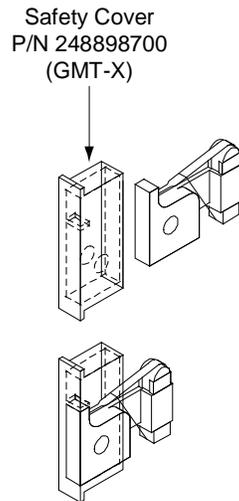
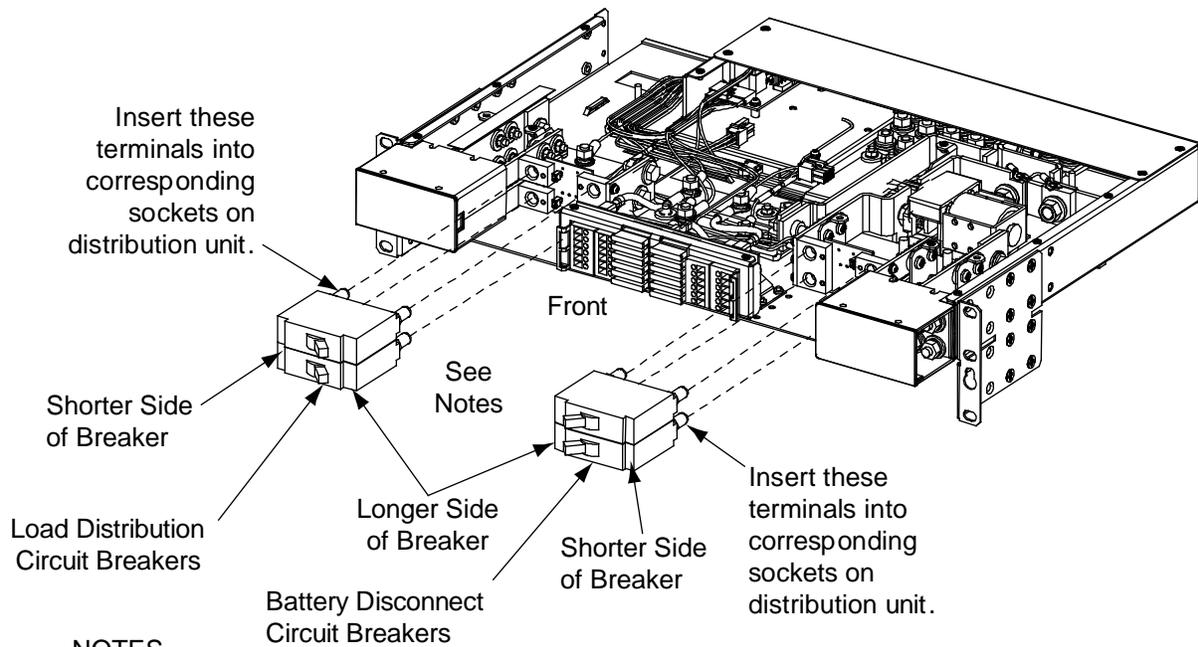
## Replacing a Bullet Nose Circuit Breaker

### Procedure

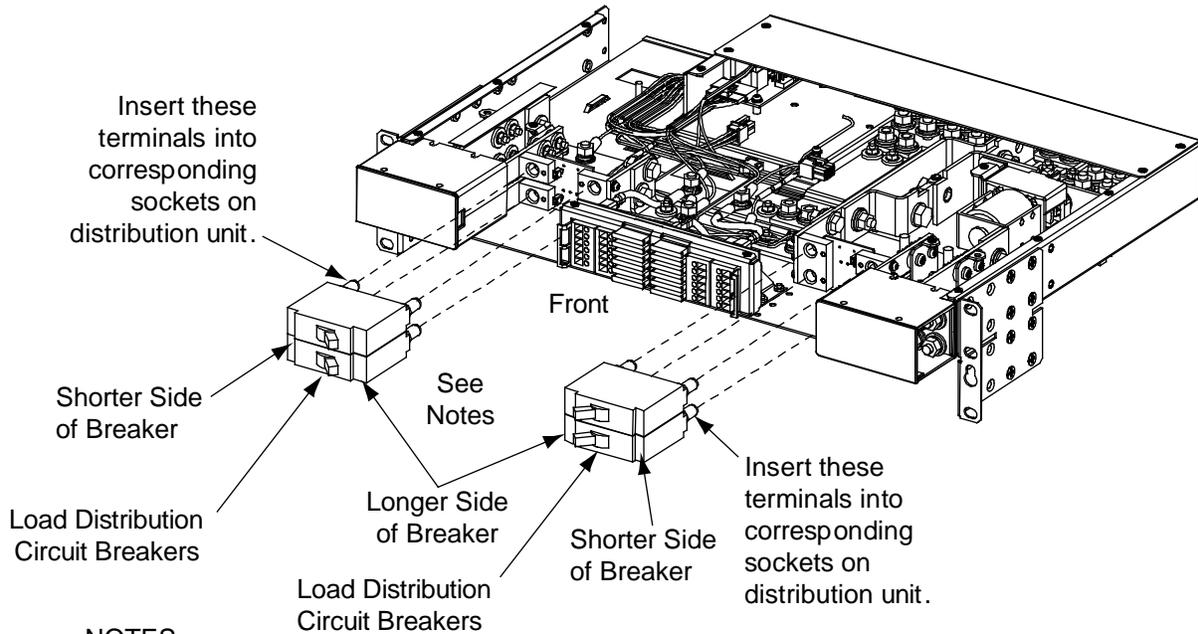
1. Operate the defective circuit breaker to the OFF position.
2. Gently rock the defective circuit breaker back and forth while pulling firmly outward until the breaker is free from the distribution unit.
3. Ensure that the replacement circuit breaker is in the OFF position, and is of the correct rating.
4. Orient the replacement circuit breaker as shown in **Figure 6.3** or **Figure 6.4**. 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.
5. Operate the replacement circuit breaker to the ON position.
6. Verify no alarms are active.

**Figure 6.1** GMT Distribution Fuse Replacement (List BA, BC, BF, LC, NA, NC, NF)



**Figure 6.2 Installation of Safety Fuse Covers****Figure 6.3 Replacing a Bullet Nose Circuit Breaker (List BA, NA)****NOTES**

1. Turn circuit breaker off before installing.
2. When installing breakers, orient breaker so that when in off position the handle is towards the center (as shown in the illustration).
3. List BA shown, List NA similar.
4. Components removed in illustration for clarity only.

**Figure 6.4** Replacing a Bullet Nose Circuit Breaker (List BC, LC, NC)**NOTES**

1. Turn circuit breaker off before installing.
2. When installing breakers, orient breaker so that when in off position the handle is towards the center (as shown in the illustration).
3. List BC shown, List LC, NC similar.
4. Components removed in illustration for clarity only.

## 6.6.4 Circuit Card Replacement Procedures



**DANGER!** Adhere to the “Important Safety Instructions” presented at the front of this document.



**WARNING!** Circuit cards used in this power system contain static-sensitive devices. Read the Static Warning in Section 4154 (provided with your customer documentation) before performing any of the following procedures.

### General

The following circuit card replacement procedures can be performed with the system operating. Refer to **Figure 6.5** for circuit card locations.

### Replacing the System Interface Circuit Card

#### Procedure



**NOTE!** Refer to **Figure 6.6** as this procedure is performed.

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. Remove the rear/top cover from the distribution unit to access the circuit card.
4. Carefully label the connectors plugged into the circuit card. These connectors must be plugged into the same connectors on the replacement circuit card.
5. Unplug all connectors plugged into the circuit card.
6. Remove the circuit card from the distribution unit by removing the screws securing it.
7. In this step, ensure you do not intermix the old and replacement circuit cards. Set the shorting jumper on the replacement circuit card to match the location on the old circuit card. Jumper settings are documented in the “Setting Jumper and Switch Options” section of the Power System Installation Instructions (IM582137200).
8. Orient the replacement circuit card over its mounting position, and secure with the screws removed from the old circuit card.
9. Plug all connectors removed from the old circuit card into the same position on the replacement circuit card.
10. Reinstall the rear/top cover to the distribution unit.
11. Remove the grounding wrist strap.
12. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
13. Ensure that there are no local or remote alarms active on the system.

### **Replacing the IB2 (Controller Interface Board) (if furnished)**

#### **Procedure**



**NOTE!** Refer to **Figure 6.7** as this procedure is performed.

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 screw securing the slide out tray on the rear of the distribution unit. Slide the tray out to access the circuit card.
4. Carefully label the wires connected to the customer connection terminal blocks on the circuit card. These wires must be connected to the same terminals on the replacement circuit card.
5. Carefully label the connectors plugged into the circuit card. These connectors must be plugged into the same connectors on the replacement circuit card.



**DANGER!** In the next step, external alarm wiring may be energized from an external source. DO NOT allow bare wire ends to contact any grounded or energized object.

6. Remove the external wiring from the customer connection terminal blocks. DO NOT allow the bare wire end to contact any grounded or energized object. Isolate the wire end with electrical tape. Repeat for each wire to be removed.
7. Unplug all connectors plugged into the circuit card.

8. Remove the circuit card from the distribution unit by removing the screws securing it to the slide out tray.
9. In this step, ensure you do not intermix the old and replacement circuit cards. Set the switch on the replacement circuit card to the same setting as the old circuit card. Switch settings are documented in the “Setting Jumper and Switch Options” section of the Power System Installation Instructions (IM582137200).
10. Orient the replacement circuit card over its mounting position, and secure with the screws removed from the old circuit card.
11. Plug all connectors removed from the old circuit card into the same position on the replacement circuit card.



**DANGER!** In the next step, external alarm wiring may be energized from an external source. DO NOT allow bare wire ends to contact any grounded or energized object.

12. Reconnect the external wiring to the correct terminals on the customer connection terminal block. First remove the electrical tape that was applied to the bare wire end in a previous step. DO NOT allow the bare wire end to contact any grounded or energized object. After securing the wire, gently tug on the wire to ensure that it cannot be pulled out of the terminal block. Repeat for each wire to be reconnected.
13. Reinstall the slide out tray and secure by tightening the screw.
14. Remove the grounding wrist strap.
15. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
16. Ensure that there are no local or remote alarms active on the system.

### **Replacing the IB5 Board (if furnished)**



**NOTE!** IB5 boards with a 10M/100M/1G Ethernet port replaced IB4 boards with a 10M/100M Ethernet port. This transition enables the support of connected devices that communicate up to 1G. While both boards are physically interchangeable, the IB5 board does require the NCU to have V1.2.80 or higher software loaded.

### **Procedure**



**NOTE!** Refer to **Figure 6.7** as this procedure is performed.

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 screw securing the slide out tray on the rear of the distribution unit. Slide the tray out to access the circuit card.
4. Carefully label the connectors plugged into the circuit card. These connectors must be plugged into the same connectors on the replacement circuit card.
5. Unplug all connectors plugged into the circuit card.
6. Remove the circuit card from the distribution unit by removing the screws securing it to the slide out tray.
7. Orient the replacement circuit card over its mounting position, and secure with the screws removed from the old circuit card.
8. Plug all connectors removed from the old circuit card into the same position on the replacement circuit card.

9. Reinstall the slide out tray and secure by tightening the screw.
10. Remove the grounding wrist strap.
11. Reboot the NCU.

**Local Menu Navigation:**

At the Main Screen, press ENT and ESC at the same time to reboot the NCU Controller.

**Web Menu Navigation:**

Advance Settings Menu / SW Maintenance Tab / Reboot Controller button.

12. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
13. Ensure that there are no local or remote alarms active on the system.

**Figure 6.5 Circuit Card Locations**

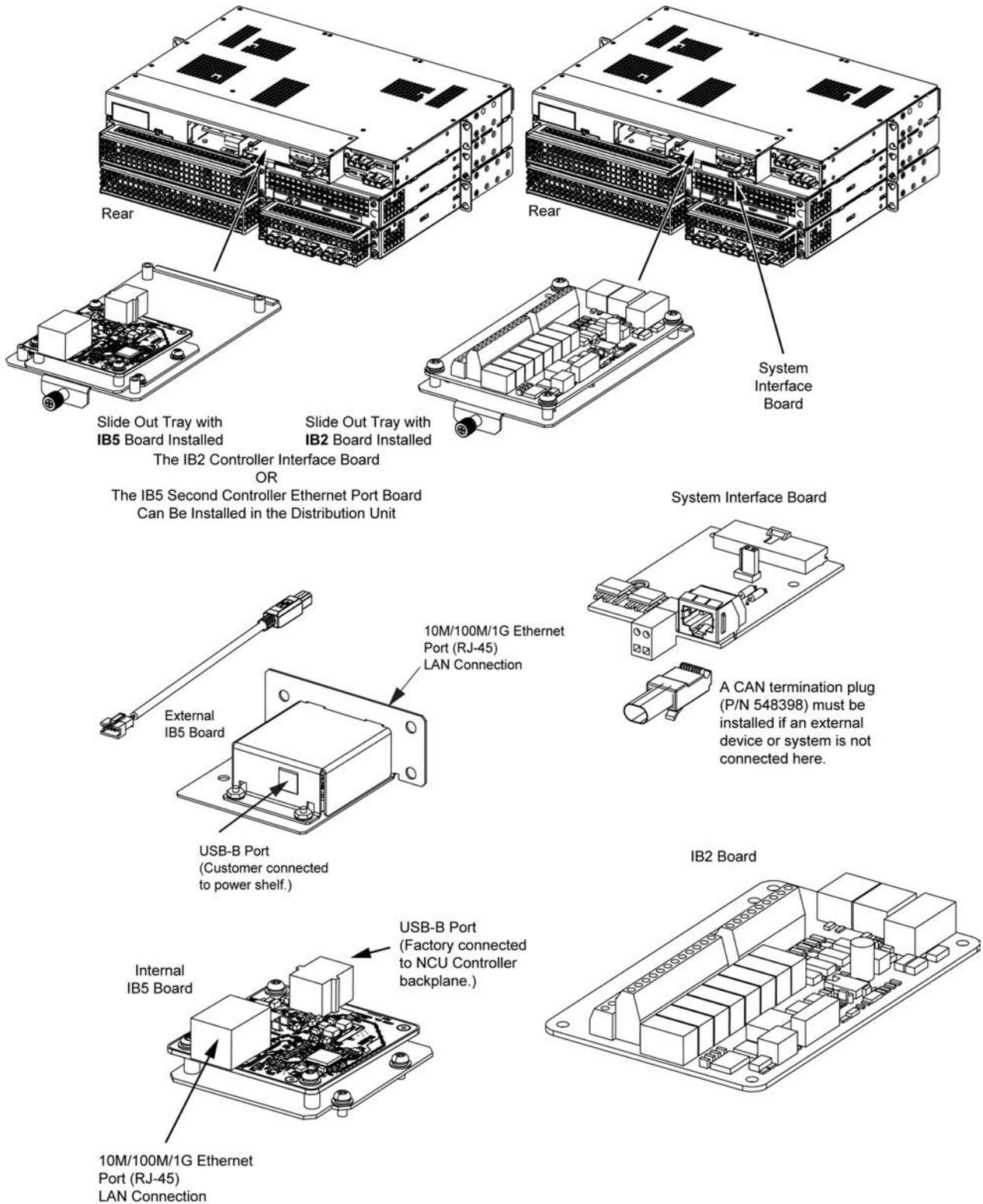
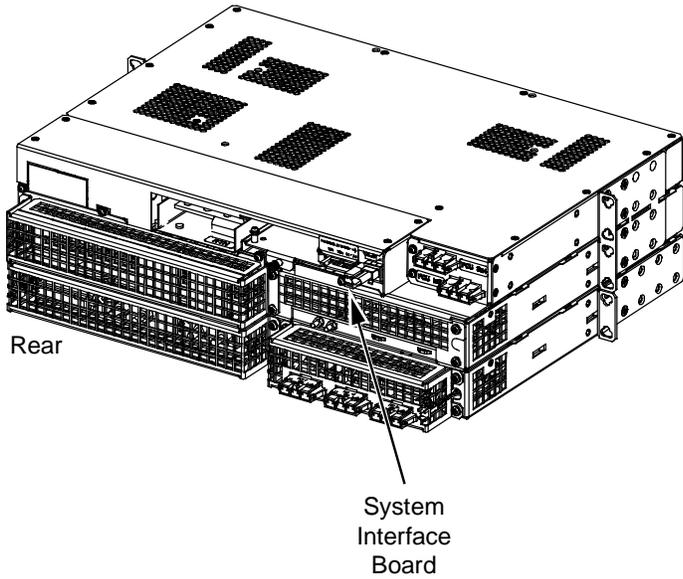
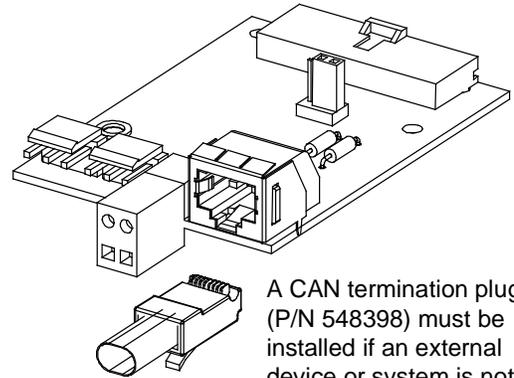


Figure 6.6 System Interface Circuit Card Replacement

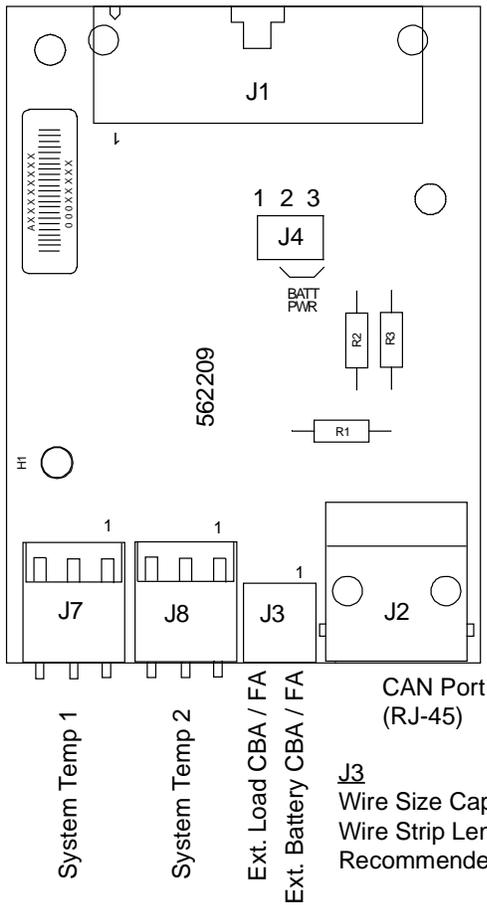


System Interface Board



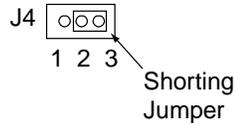
A CAN termination plug (P/N 548398) must be installed if an external device or system is not connected here.

System Interface Board P/N 562209



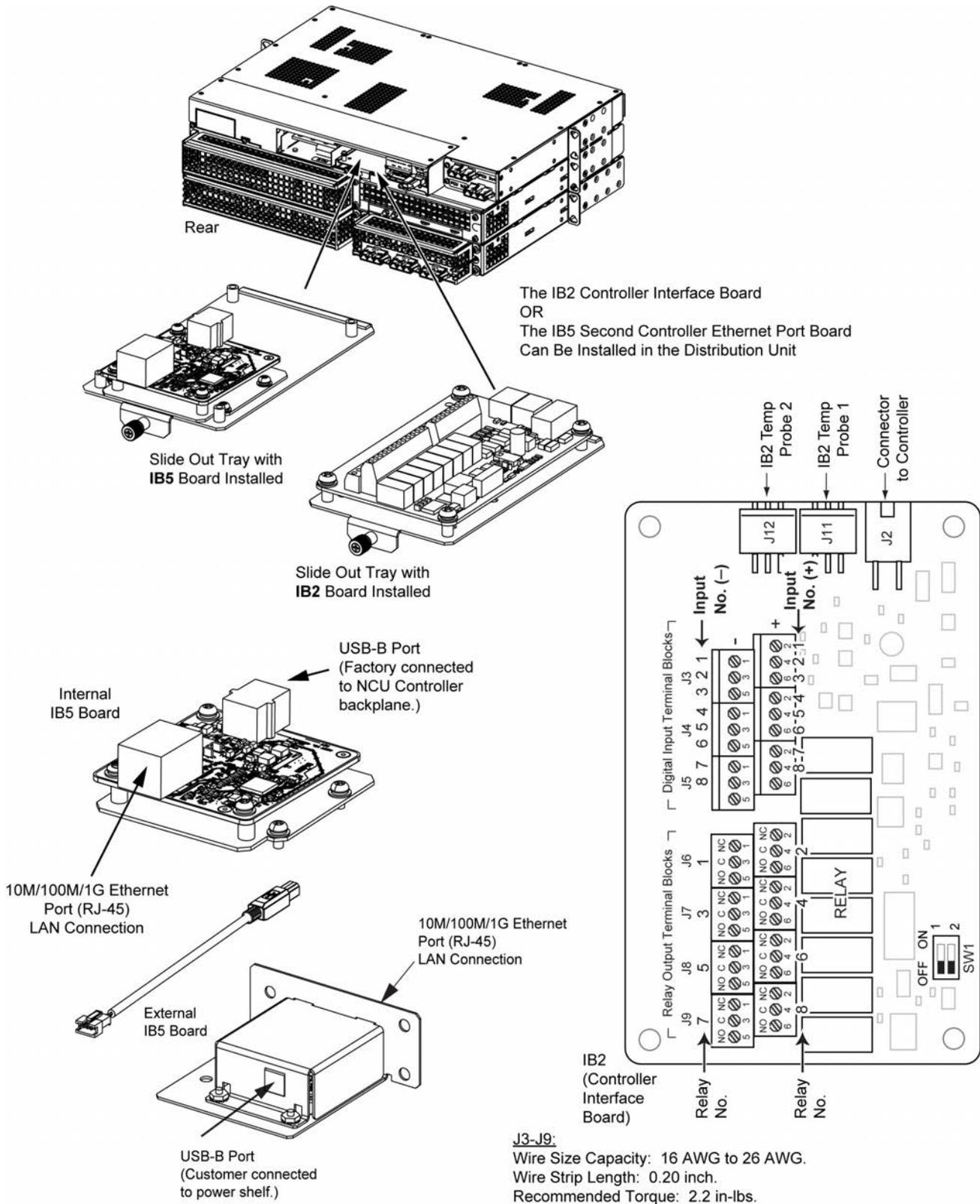
**J4**  
Selects to power controller from “Battery Power” or not if a battery LVD contactor is furnished.

No  
Battery Battery  
Pwr Pwr



**J3**  
Wire Size Capacity: 16 AWG to 30 AWG.  
Wire Strip Length: 0.32 inch.  
Recommended Torque: 2.3 in-lbs.

**Figure 6.7 IB2 or IB5 Circuit Card Replacement**



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