



NetSure™ 7200 Series -48 VDC Power System

User Manual

Specification Number: 582127200

Model Number: 7200

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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 (UM582127200) provides *User Instructions* for Vertiv™ NetSure™ -48 VDC Power System Model 7200, Spec. No. 582127200.

The complete Customer Documentation Package consists of...

Power System Installation Manual

- Power System Installation Instructions: IM582127200

NCU Controller User Manual

- NCU Controller User Instructions: UM1M830BNA

USB Drive with All Customer Documentation

- Power System Installation Instructions: IM582127200
- Power System User Instructions: UM582127200
- Power System “System Application Guide”: SAG582127200
- NCU Controller User Instructions: UM1M830BNA
- Rectifier Instructions: UM1R483500e
- Engineering Drawings
- 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 12000 Amperes Power System

The Vertiv™ NetSure™ 7200 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. The power system is designed for operation with the positive output grounded.

This system consists of the following components.

Power Bay

The system consists of one (1) primary power bay and up to two (2) additional secondary power bays.

The system can be expanded right or left.

Each power bay can be equipped with up to sixty (60) rectifier modules. The power bay can be ordered factory configured for various AC input options (refer to SAG582127200).

The primary power bay contains a front panel touch screen PC connected to the NCU controller. The primary power bay also includes an NCU interface board (IB2) which provides digital inputs, temperature inputs, and relay outputs for internal and external monitoring and alarms. An NCU extended interface board (EIB) is also provided for additional inputs/outputs connections. Also furnished is the IB4 board which provides a second Ethernet port. The Ethernet port located on the NCU Controller’s front panel is used to connect the front panel touch screen PC directly to the NCU. The Ethernet port located on the IB4 board can be used to connect the NCU to your Local Area Network (LAN) for remote access. An indicator is visible from the outside of the primary power

bay (at the top) which illuminates if a critical or major alarm condition occurs. An SM-DU module is mounted in the primary power bay for connection of the internal load shunts provided in each power bay. The SM-DU also provides an additional external shunt monitoring input.

Each secondary power bay contains a secondary control module.

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 (UM1R483500e) for more information.

NCU Controller:

The controller provides power system control, rectifier control (including a charge control function), metering functions, monitoring functions, and local/remote alarm functions. 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 LCD display and keypad for local access. The controller provides an Ethernet port and comes with comprehensive webpages for remote access. The controller has 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.



NOTE! In this system, the NCU Ethernet port is connected to a front panel touch screen PC for local access to the NCU webpages. An IB4 (second Ethernet port board) is also furnished which provides a connection point for a remote monitoring Ethernet connection.

Distribution Bay

The system can consist of up to five (5) distribution bays.

The system can be expanded right or left and may be top or bottom fed.

Each distribution bay contains an SM-DU+ for connection of the internal load shunts and FA signals provided in the various distribution panels, and for interface to the NCU Controller. An optional SM-DU+ is available for connection of additional load shunts and FA signals. A kit is available which allows the optional SM-DU+ to be mounted external to the power system.

An indicator is visible from the outside of the distribution bay (at the top) which illuminates if a fuse or circuit breaker in the bay opens.

Each distribution bay provides 39 RU of vertical rack space for mounting a variety of distribution panels. Distribution panel options include a TPL fuse panel, a TPH fuse panel, a bullet nose type panel that accepts bullet nose circuit breakers and TPS/TLS fuseholders, and two types of GJ/218 circuit breaker panels.

Transition Bay to Vertiv™ NetSure™ 802 (582140000 List 1 or List 11)

Allows the 582127200 distribution bay's -48 VDC internal top mount bus to be connected to the internal rear mount -48 VDC bus on a Spec. No. 582140000 List 1 or List 11.

3 Operating Procedures

3.1 Controller and Rectifiers

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

- NCU Controller Instructions (UM1M830BNA)
- Rectifier Instructions (UM1R483500e)

3.2 Front Panel Touch Screen PC

The NCU Controller's Ethernet port is factory connected to a front panel touch screen PC. This allows local access to the NCU Webpages via the front panel touch screen PC's internet browser.

Enter the address 192.168.100.100 in the Web browser of the front panel touch screen PC to access the NCU's Web Interface.

Refer also to the NCU Controller Instructions (UM1M830BNA) for webpage interface information.

Refer to "Front Panel Touch Screen PC Calibration" on page 10 for a calibration procedure.

3.3 Disabling the Audible Alarm Feature on a Secondary Control Module in a Secondary Power Bay

Procedure (Secondary Control Module Local Display and Keypad)

1. From the Main Menu, select the "Settings Icon".
2. If a password screen opens, a password must be entered to allow the User to make adjustments. If a password was previously entered and has not yet timed out, skip this step and proceed to step 3. Otherwise, to enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password. The default password is 640275.
3. Navigate to the "Other Settings" menu.
4. Navigate to "Rect Expansion" and set this parameter to "inactive".
5. Navigate to the "Alarm Settings" menu.
6. Navigate to "Audible Alarm" and set this parameter to "off".
7. Navigate to the "Other Settings" menu.
8. Navigate to "Rect Expansion" and set this parameter to "secondary".
9. After an automatic reboot, navigate to Settings Menu / Other Settings / Address and set this parameter to 201 for the 1st secondary bay and 202 for the 2nd secondary bay.

Procedure (NCU Webpages)

1. **DO NOT USE THE WEBPAGES.**



ALERT! DO NOT set a controller in a secondary power bay to Secondary from the Web Interface. You will not be able to log into the controller after it automatically reboots into secondary mode. Controllers to be designated as secondary controllers need to be set via the NCU's local keypad and display.

3.4 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. The controller will remain operational and the loads will be sustained by the battery voltage, if battery is connected.

When the ESTOP signal is removed, 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).



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.*

3.5 NCU 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 NCU 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.

In this system, the NCU Battery Charge Current Limit feature is set to be disabled. Refer to the NCU Controller Instructions (UM1M830BNA) to enable and program this feature, if desired. If enabled, battery charge current is limited to the value set in the NCU Controller, as long as battery voltage is above 47 VDC.

3.6 Local Controls and Indicators

3.6.1 Controller and Rectifiers

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

- NCU Controller Instructions (UM1M830BNA)
- Rectifier Instructions (UM1R483500e)

Primary Power Bay “System Alarm” Indicator

An indicator is visible from the outside of the primary power bay (at the top) which illuminates if a major or critical alarm condition occurs.

Distribution Bay “Fuse / Circuit Breaker Alarm” Indicator

An indicator is visible from the outside of each distribution bay (at the top) which illuminates if a fuse or circuit breaker inside the distribution bay opens.

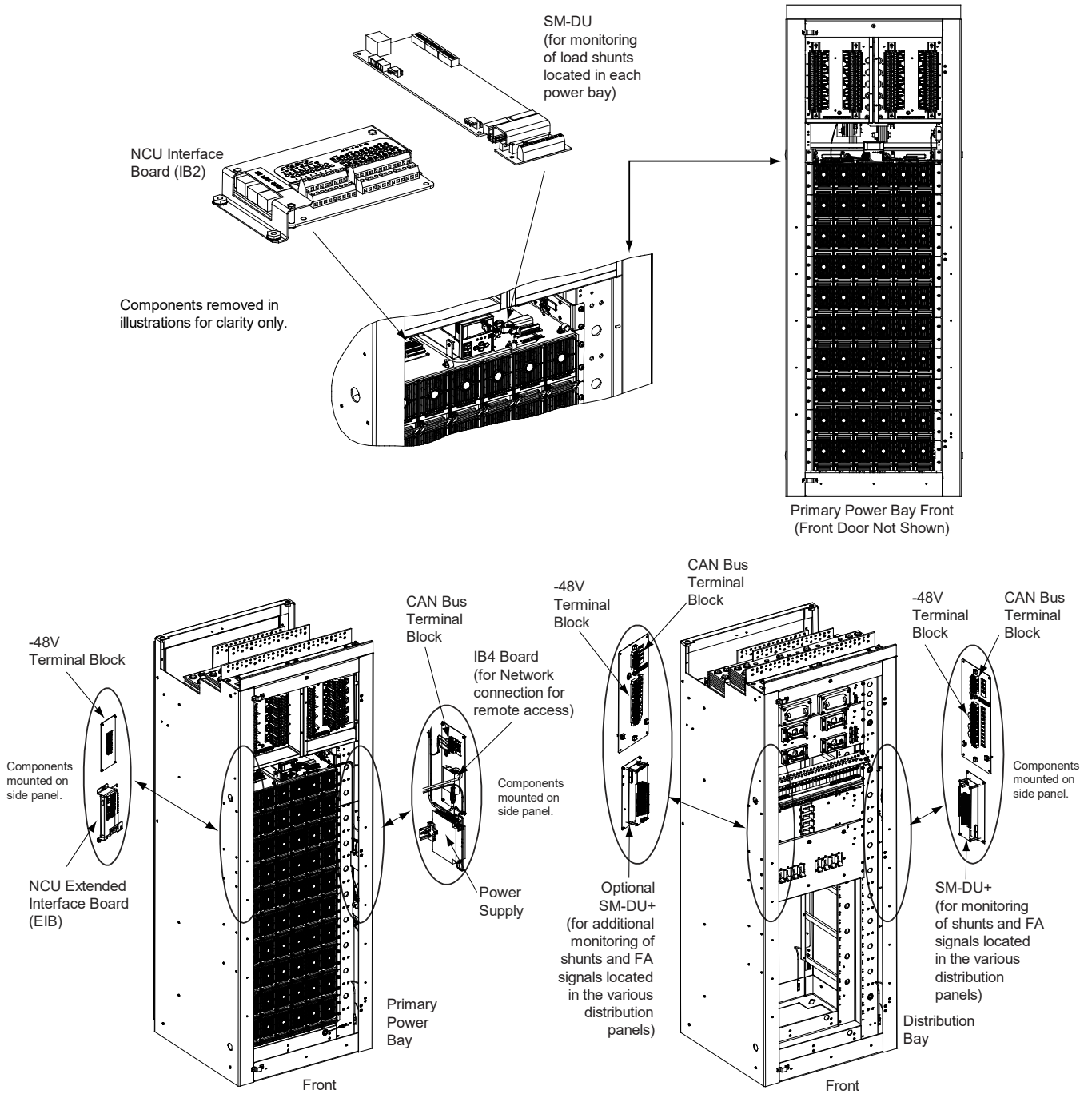
IB2 (NCU Interface Board) and EIB (NCU Extended Interface Board) Indicator

The IB2 and EIB board has a green LED indicator which is lit in normal operation and flashes when the IB2 or EIB board is communicating with the controller. Refer to Figure 3.1 for IB2 and EIB locations.

SM-DU and SM-DU+ Modules

An SM-DU is installed in the primary power bay for monitoring of the internal load shunts located in each power bay. An SM-DU+ is installed in each distribution bay for distribution panel shunt and FA monitoring. A second SM-DU+ can be installed in each distribution bay (up to a total of eight SM-DU+ modules) for additional distribution shunt and FA monitoring. Refer to Figure 3.1 for SM DU and SM-DU+ locations. Refer to the next sections for indicators descriptions.

Figure 3.1 IB2, EIB, SM-DU, and SM-DU+ Locations



SM-DU Module Indicators

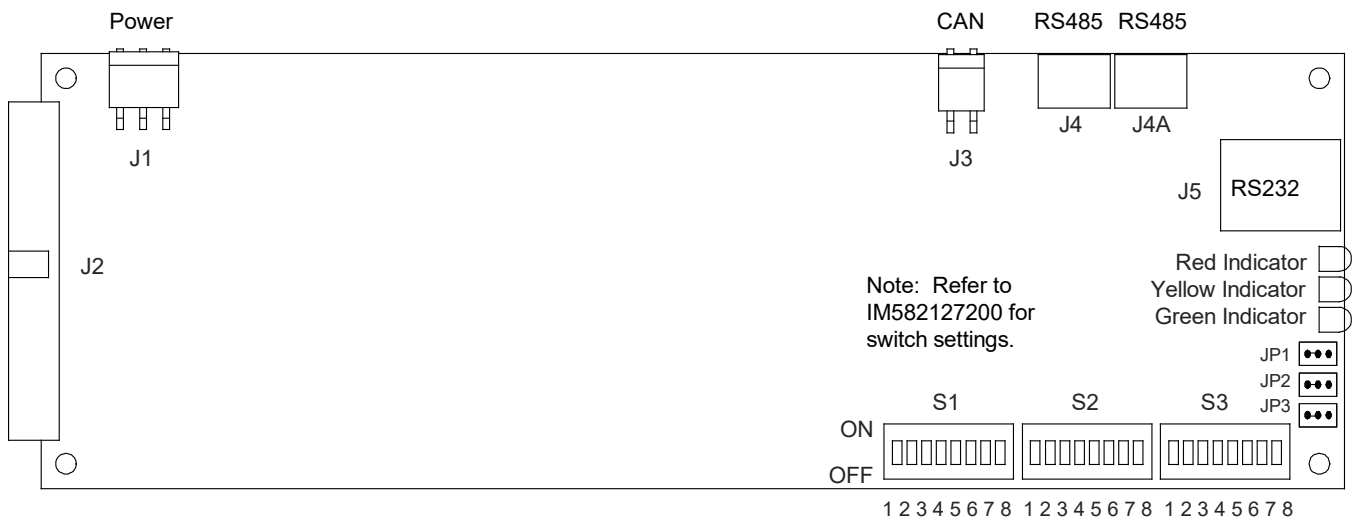
The SM-DU monitors the load shunts in the power bays and reports this data to the controller. The SM-DU also provides an additional external shunt monitoring input.

There are three (3) status and alarm indicators located on the SM-DU. The functions of these indicators are as shown in Table 3.1. Refer to Figure 3.2 for location.

Table 3.1 SM-DU Indicators

Indicator	Normal State	Fault State	Fault Cause
Alarm (Red)	Off	On	A critical or major alarm.
Alarm (Yellow)	Off	On	A minor alarm.
Operation (Green)	On	Off	SM-DU is non-operational.
		Flashing	A 1/3Hz flashing indicates the SM-DU is being identified by the Controller. A 1Hz flashing indicates a communication failure.

Figure 3.2 SM-DU Circuit Card



SM-DU+ Module Indicators

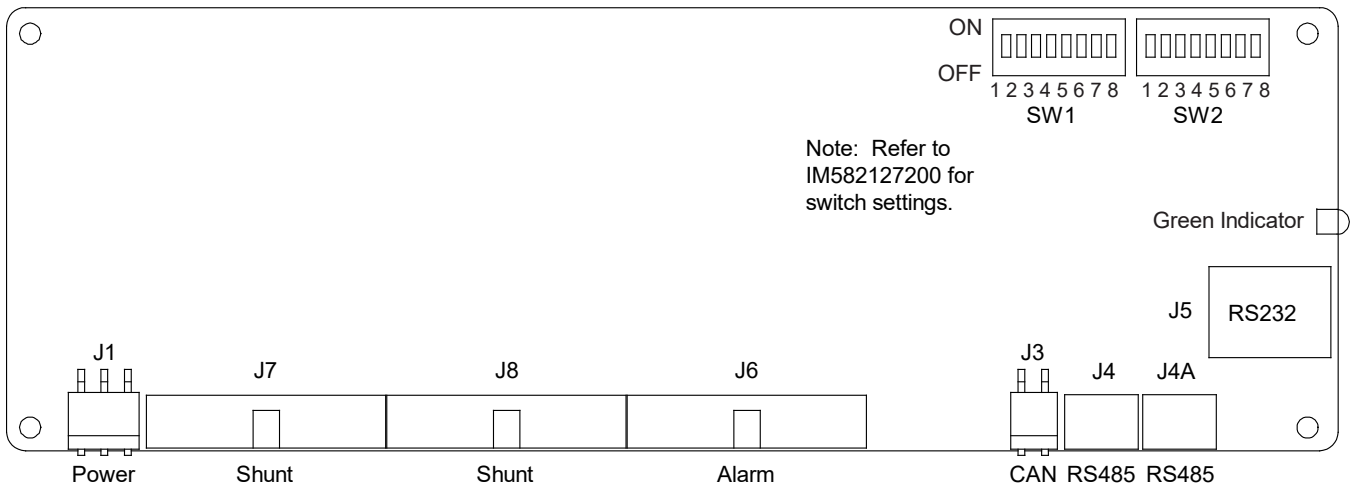
The SM-DU+ monitors the shunts and FA signals located on the individual distribution panels in the distribution bays and reports this data to the controller.

There is one (1) status and alarm indicator located on the SM-DU+. The function of this indicator is as shown in Table 3.2. Refer to Figure 3.3 for location.

Table 3.2 SM-DU+ Indicators

Indicator	Normal State	Fault State	Fault Cause
Operation (Green)	On	Off	SM-DU+ is non-operational.
		Flashing	A 1/3Hz flashing indicates the SM-DU+ is being identified by the Controller. A 1Hz flashing indicates a communication failure.

Figure 3.3 SM-DU+ Circuit Card



4 Maintenance

4.1 Important Safety Instructions



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

4.2 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in Table 4.3 every 6 months to ensure continual system operation.

Table 4.3 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.	IM582127200, Making Electrical Connections section.

4.3 Adding a Rectifier Module to a Power Bay

For rectifier module installation instructions, refer to Rectifier Instructions (UM1R483500e).

To increase system current capacity, a rectifier module can easily be added to an open rectifier module mounting position in a power bay.

It is recommended that the current limit point be checked whenever a rectifier module is added to or removed from a power bay. Refer to “Checking the NCU Current Limit Point after Adding or Removing a Rectifier Module” on page 12.

The rectifier module being added 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 Instructions (IM582127200).

4.4 Adding a Secondary Power Bay in the Field

Installing the Secondary Power Bay

Refer to the Power System Installation Instructions (IM582127200) for procedures detailing mounting and wiring of a secondary power bay.

Setting the System to Work with Secondary Power Bays



NOTE! Refer to the NCU Controller Instructions (UM1M830BNA) for further information to perform the following procedures.

To use secondary power bays with a primary power bay you must perform the following procedures. New configuration files must be loaded into the controllers and the controllers must be programmed for primary/secondary bay operation. Perform the following procedures exactly in the order listed.

Load a Secondary Power Bay's Configuration Package Procedure

After a secondary power bay has been wired up properly according to the installation manual, load the secondary power bay's configuration package (located on a USB memory device supplied with the secondary power bay) into the secondary power bay's “secondary control module”. This is configuration P/N 563198.

1. Connect the USB memory device (with P/N 563198 configuration) supplied with the secondary power bay to the USB port on the front of the bay's controller.
2. On the secondary power bay's controller, navigate to "Main Menu / Settings Icon / Sys Settings / Update App". Select yes. Once Yes is selected and confirmed, the configuration file located on the memory device located in the controller's USB port is loaded into the controller.
3. The controller enters an initialization routine, which takes a few minutes. The routine is complete and the controller is operational when normal system voltage is displayed on the screen.
4. Remove the memory device.

Set a Secondary Power Bay's Controller to "Secondary" and Assign an Address Procedure

1. On the secondary power bay's controller, navigate to "Main Menu / Settings Icon / Other Settings / Rect Expansion". Set to "secondary".



NOTE! When secondary is selected, the controller will start auto configure. This process may take more than three (3) minutes.

2. An "Address" menu item appears after the controller automatically reboots. Set the address to 201, 202, or 203. Note that each secondary controller (bay) must be set to a different address. Set this parameter to 201 for the 1st secondary power bay and 202 for the 2nd secondary power bay.

Additional Secondary Power Bays Procedure

1. Repeat the above two procedures if there are additional secondary power bays.

Load the Primary Power Bay's Configuration Package Procedure

After the above steps are performed, load the primary power bay's configuration package (located on a USB memory device supplied with the secondary power bay) into the primary power bay's "primary control module". This is configuration P/N 562997.

1. Connect the USB memory device (with P/N 562997 configuration) supplied with the secondary power bay to the USB port on the front of the primary power bay's controller.
2. Navigate to "Main Menu / Settings Icon / Sys Settings / Update App". Select yes. Once Yes is selected and confirmed, the configuration file located on the memory device located in the controller's USB port is loaded into the controller.
3. The controller enters an initialization routine, which takes a few minutes. The routine is complete and the controller is operational when normal system voltage is displayed on the screen.
4. Remove the memory device.

Set the Primary Power Bay's Controller to "Primary" Procedure

1. On the primary power bay's controller, navigate to "Main Menu / Settings Icon / Other Settings / Rect Expansion". Set to "primary".



NOTE! When primary is selected, the NCU will start auto configure. This process may take more than three (3) minutes.

2. The controller automatically reboots.

4.5 Adding a Distribution Bay in the Field

Refer to the Power System Installation Instructions (IM582127200) for procedures detailing mounting and wiring of a distribution bay.

NCU Programming

After the bay has been wired up properly and the SM-DU+ DIP switches have been set according to the separate Power System Installation Instructions (IM582127200), individually program the NCU for the shunt sizes and alarm thresholds for each distribution element that is to be monitored by the SM DU+. These settings can be done through the web pages shown on the touch screen panel on the primary power bay. Refer to the NCU Controller Instructions (UM1M830BNA) for programming information.

5 Troubleshooting and Repair

5.1 Important Safety Instructions



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

5.2 Contact Information

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

5.3 Controller and Rectifiers

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

- NCU Controller Instructions (UM1M830BNA)
- Rectifier Instructions (UM1R483500e)

5.4 NCU Controller Configuration

If any NCU Controller configuration settings were changed, refer to the NCU Instructions (UM1M830BNA) and save a copy of the configuration. The saved configuration can be used to restore the NCU Controller settings, if required, at a later date.



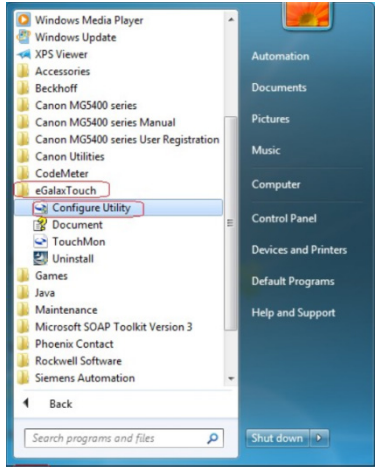
NOTE! Provided on a USB drive furnished with the system is an NCU configuration drawing (C drawing) and the NCU configuration files loaded into the NCU as shipped.

5.5 Front Panel Touch Screen PC Calibration

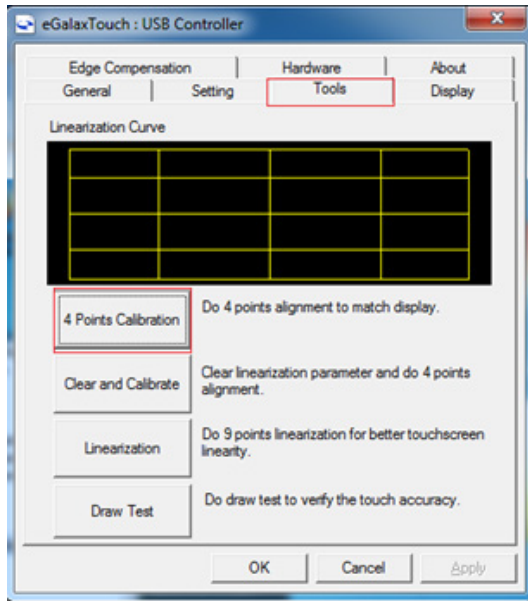
To calibrate the touch screen of the front panel PC, perform the following procedure.

Procedure

1. Click on the Window’s “Start” button.
2. Locate the “eGalaxTouch” folder.
3. Open “Configure Utility”.



4. You will now see the USB controller box as shown below.



5. Click on the "Tools" tab.
6. Click on the "4 Point Calibration" button.
7. The calibration program starts. Place you finger (and hold) on each cross that appears in each corner of the screen.



5.6 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 4 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 14 and “Replacement Procedures” on page 14.

Troubleshooting Alarm Conditions on the NCU Controller

The NCU Controller displays alarm conditions as listed in the “Resolving Alarms” section of the NCU Instructions (UM1M830BNA). Programmable external alarm relays are also available. Refer to the System Installation Instructions (IM582127200) and the configuration drawing (C-drawing) supplied with your power system documentation for your alarm relay configurations.

The NCU’s **Active Alarm** and **Alarm History** submenus allow the User to view alarm details. Refer to the NCU Instructions (UM1M830BNA) to access these menus.

Checking the NCU Current Limit Point after Adding or Removing a Rectifier Module

If a rectifier module is added to the power system, the system current limit point will automatically increase by the percentage each existing rectifier was set to provide prior to the addition.

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

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

Procedure (NCU Webpages)

1. Using the front panel touch screen PC, log into the NCU webpages.
2. Go to Settings Menu / Rectifiers Tab / Current Limit.
3. Enable the “Current Limit” parameter, if necessary.
4. Check the “Current Limit Point” setting and change if necessary.

Procedure (NCU Local Display and Keypad)

1. Go to Main Menu / Settings Icon / Rect Settings / Current Limit.



NOTE! If a password screen opens, a password must be entered to allow the User to make adjustments. To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password. The default password is 640275.

2. Enable the “Current Limit” parameter, if necessary.
3. Check the “Current Limit Point” setting and change if necessary.

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 as described in the following procedure.

Procedure (NCU Webpages)

1. Using the front panel touch screen PC, log into the NCU webpages.
2. Go to Settings Menu / Rectifiers Tab / Clear Rectifier Comm Fail Alarm.
3. Select “Yes” to clear the alarm.

4. Go to Settings Menu / Rectifiers Tab / G1 or G2 Clear Rectifier Comm Fail Alarm.



NOTE! G1 is for the 1st secondary bay rectifier comm fail, and G2 is for the 2nd secondary bay rectifier comm fail.

5. Select “Yes” to clear the alarm.

Procedure (NCU Local Display and Keypad)

1. Go to Main Menu / Settings Icon / Alarm Settings / ClrRectCommFail.



NOTE! If a password screen opens, a password must be entered to allow the User to make adjustments. To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password. The default password is 640275.

2. Select “Yes” to clear the alarm.
3. Go to Main Menu / Settings Icon / Alarm Settings / G1 or G2 ClrRectCommFail.



NOTE! G1 is for the 1st secondary bay rectifier comm fail, and G2 is for the 2nd secondary bay rectifier comm fail.

4. Select “Yes” to clear the alarm.

Clearing a Rectifier Lost Alarm

If the NCU Controller resets while a rectifier communications fail alarm is active, the rectifier communications fail alarm is replaced with a rectifier lost alarm. To clear the alarm, perform the following procedure.

Procedure (NCU Webpages)

1. Using the front panel touch screen PC, log into the NCU webpages.
2. Go to Settings Menu / Rectifiers Tab / Clear Rectifier Lost Alarm.
3. Select “Yes” to clear the alarm.
4. Go to Settings Menu / Rectifiers Tab / G1 or G2 Clear Rectifier Lost Alarm.



NOTE! G1 is for the 1st secondary bay rectifier comm fail, and G2 is for the 2nd secondary bay rectifier comm fail.

5. Select “Yes” to clear the alarm.

Procedure (NCU Local Display and Keypad)

1. Go to Main Menu / Settings Icon / Alarm Settings / Clear Rect Lost.



NOTE! If a password screen opens, a password must be entered to allow the User to make adjustments. To enter a password, use the UP and DOWN keys to move the cursor to the Enter Password field. Press ENT. Use the UP and DOWN keys to choose a character. Press ENT to accept and move to the next character. Continue this process until all characters are entered. Press ENT again to accept the password. The default password is 640275.

2. Select “Yes” to clear the alarm.
3. Go to Main Menu / Settings Icon / Alarm Settings / G1 or G2 Clear Rect Lost.



NOTE! G1 is for the 1st secondary bay rectifier comm fail, and G2 is for the 2nd secondary bay rectifier comm fail.

4. Select “Yes” to clear the alarm.

5.7 Replacement Information

User Replaceable Components

When a trouble symptom is localized to a faulty rectifier module, 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 module, controller, or circuit card.

Refer to SAG582127200 (System Application Guide) for replacement part numbers.

Replacement Cables

Refer to SAG582127200 (System Application Guide) for replacement part numbers.

5.8 Replacement Procedures



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

5.8.1 Replacing a Rectifier Module

Refer to the Rectifier Instructions (UM1R483500e) for a rectifier module replacement procedure. Refer also to “System Troubleshooting Information” on page 12.

The rectifier module 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 (IM582127200).

5.8.2 Replacing the NCU Controller or a Secondary Control Module

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

5.8.3 Replacing a Distribution Device

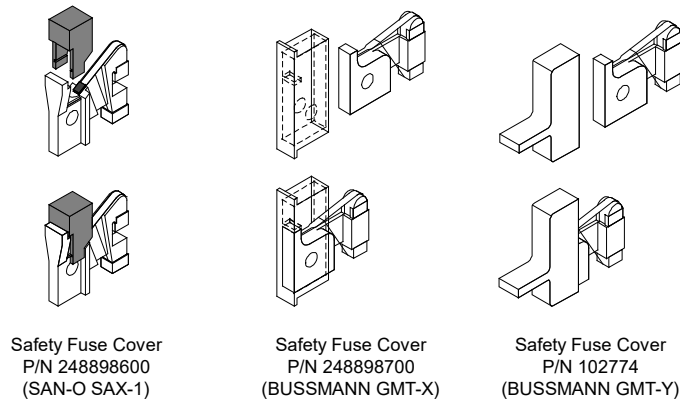
General

Replace distribution devices with the same type and rating. Refer to SAG582127200 (System Application Guide) for part numbers.

Safety Fuse Covers

Safety fuse covers are provided for all alarm-type fuses installed in the system. These covers snap onto the fuses and provide protection from exposed electrical terminations when a fuse opens. Ensure that the safety fuse cover is installed after replacing a fuse. Refer to Figure 5.4 for installation details. Note that there are different types of safety fuse covers for the different brand alarm-type fuses.

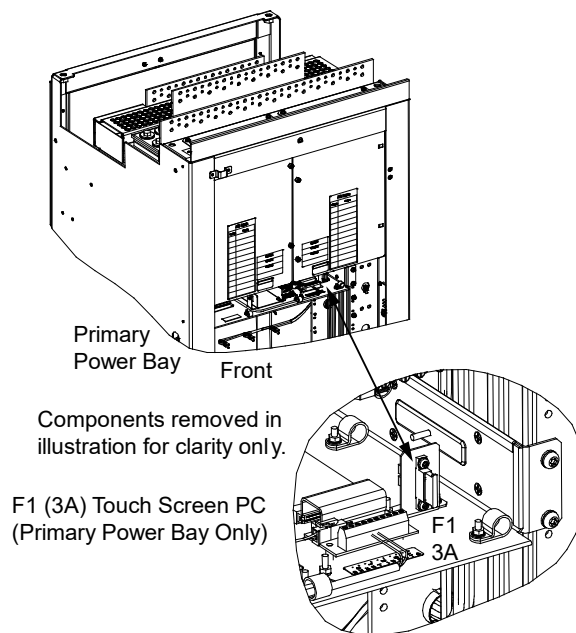
Figure 5.4 Installation of Safety Fuse Covers



Alarm, Reference, and Control Fuse Replacement

Refer to Figure 5.5 for alarm, reference, and control fuse locations.

Figure 5.5 Alarm, Reference, and Control Fuse Location



Distribution Fuse “Alarm Fuse” Replacement

If a distribution fuse opens, the associated alarm fuse opens. Replace the distribution fuse before replacing the alarm fuse. An alarm fuse is removed by pulling it straight out of the fuseholder. If the alarm fuse is located in a modular fuse carrier, hold the fuse carrier in place with your thumb while pulling on the alarm fuse to prevent the entire carrier from inadvertently being pulled out.

Replacing a TPL Fuse in a List A Distribution Panel

Procedure

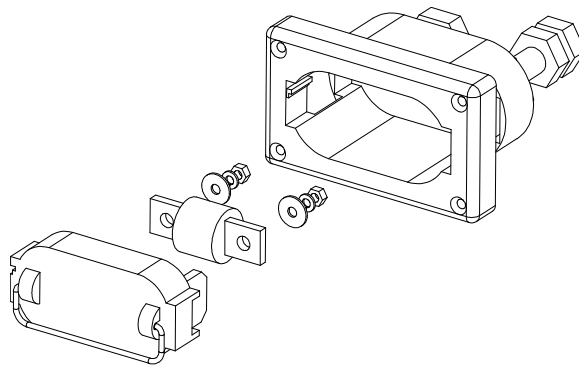


NOTE! Refer to Figure 5.6 as this procedure is performed.

1. Open the distribution bay's front door.
2. Remove the fuse carrier from the mounted fuseholder body by grasping its handle and pulling straight out.

3. Remove the open fuse from the fuse carrier by unbolting it.
4. Replace the open fuse with the same type and rating. Place the fuse into the fuse carrier. Secure the fuse with the flat washer, lock washer, and nut provided. Recommended torque is 168 in-lbs.
5. Push the fuse carrier securely back into the mounted fuseholder body.
6. On the distribution panel, locate the open alarm fuse associated with the TPL fuse being replaced. Replace the alarm fuse with the same type and rating. Ensure that a plastic safety cover is installed on the alarm fuse.
7. Verify no Fuse Alarms are active.
8. Close the distribution bay's front door and secure.

Figure 5.6 Replacing a TPL Fuse



Replacing a TPH Fuse in a List B Distribution Panel

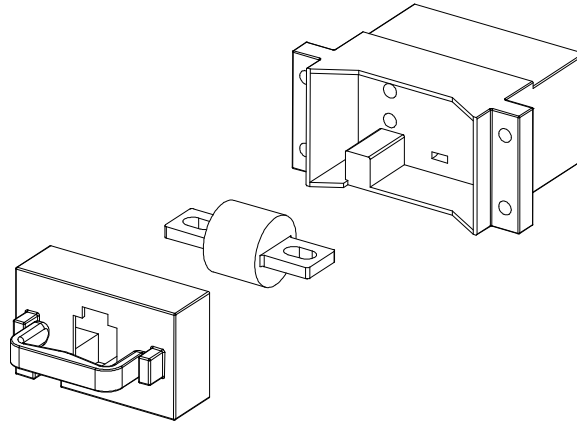
Procedure



NOTE! Refer to Figure 5.7 as this procedure is performed.

1. Open the distribution bay's front door.
2. Remove the fuse carrier from the mounted fuseholder body by grasping its handle and pulling straight out.
3. Remove the open fuse from the fuse carrier and replace it with the same type and rating.
4. Push the fuse carrier securely back into the mounted fuseholder body.
5. On the distribution panel, locate the open alarm fuse associated with the TPH fuse being replaced. Replace the alarm fuse with the same type and rating. Ensure that a plastic safety cover is installed on the alarm fuse.
6. Verify no Fuse Alarms are active.
7. Close the distribution bay's front door and secure.

Figure 5.7 Replacing a TPH Fuse



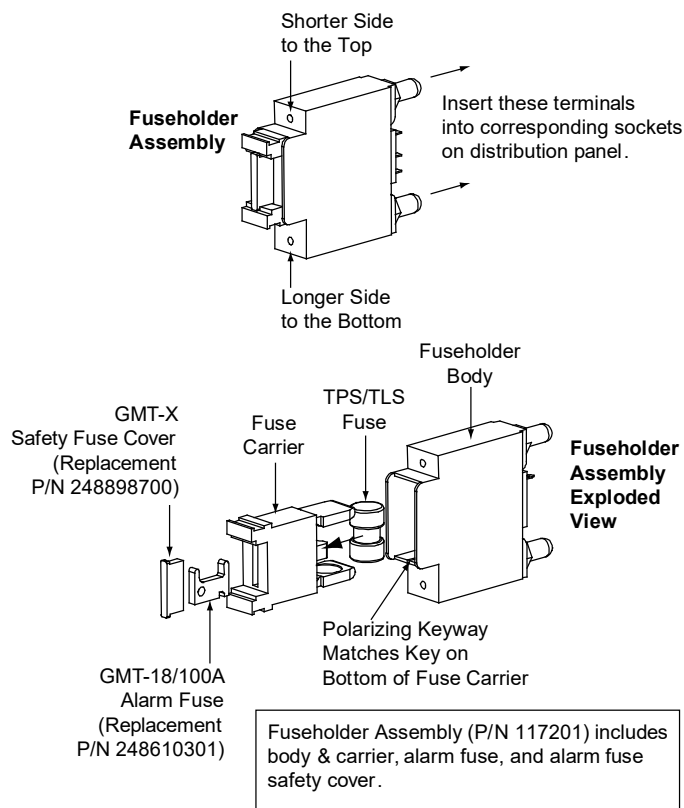
Replacing a TPS/TLS Fuse in a Bullet Nose Fuse Carrier in a List C Distribution Panel

Procedure



NOTE! Refer to Figure 5.8 as this procedure is performed.

1. Open the distribution bay's front door.
2. Remove the fuse carrier from the mounted fuseholder body by pulling it straight out. Hold the fuseholder body while you pull the fuse carrier from the body.
3. Remove the open fuse from the fuse carrier and replace it with the same type and rating.
4. Replace the alarm fuse located in the front of the fuse carrier with the same type and rating. Ensure that a plastic safety cover is installed on the alarm fuse.
5. Push the fuse carrier securely back into the mounted fuseholder body. Note that a polarizing key on the bottom of the carrier prevents the carrier from being inserted upside down.
6. Verify no Fuse Alarms are active.
7. Close the distribution bay's front door and secure.

Figure 5.8 Replacing a TPS/TLS Fuseholder and/or Fuse

Replacing a Bullet Nose Fuseholder in a List C Distribution Panel

Procedure



NOTE! Refer to Figure 5.8 as this procedure is performed.

1. Open the distribution bay's front door.
2. Remove the fuse carrier from the mounted fuseholder body by pulling it straight out. Hold the fuseholder body while you pull the fuse carrier from the body.
3. Gently rock the defective fuseholder up and down while pulling firmly outward until the fuseholder is free from the distribution panel.
4. Orient the fuseholder as shown in Figure 5.8. Insert the terminals on the rear of the fuseholder into their corresponding sockets on the distribution panel. Ensure the alarm contact on the back of the fuseholder makes contact with the alarm terminal on the spring strip. Push fuseholder in firmly until fully seated in the distribution panel.
5. Push the fuse carrier securely back into the mounted fuseholder body. Note that a polarizing key on the bottom of the carrier prevents the carrier from being inserted upside down.
6. Verify no Fuse Alarms are active.
7. Close the distribution bay's front door and secure.

Replacing a Bullet Nose Circuit Breaker in a List C Distribution Panel

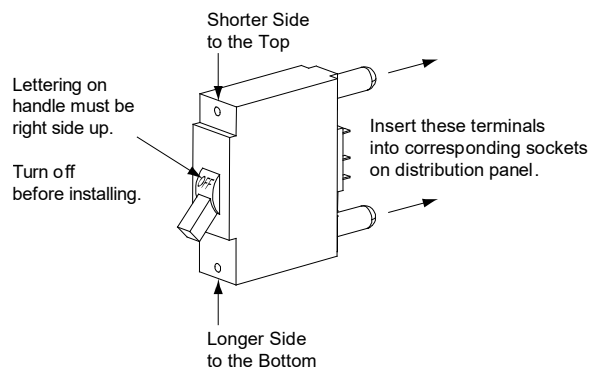
Procedure



NOTE! Refer to Figure 5.9 as this procedure is performed.

1. Open the distribution bay's front door.
2. Operate the defective circuit breaker to the OFF position.
3. Gently rock the defective circuit breaker up and down while pulling firmly outward until the breaker is free from the distribution panel.
4. Ensure that the replacement circuit breaker is in the OFF position, and is of the correct rating.
5. Orient the circuit breaker as shown in Figure 5.9. 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 circuit breaker in firmly until fully seated in the distribution panel.
6. Operate the replacement circuit breaker to the ON position.
7. Verify no Circuit Breaker Alarms are active.
8. Close the distribution bay's front door and secure.

Figure 5.9 Replacing a Bullet Nose Circuit Breaker



Replacing a GJ/218 Circuit Breaker in a List D, E Distribution Panel

Procedure



NOTE! Refer to Figure 5.10 and Figure 5.11 as this procedure is performed.



NOTE! Apply anti-oxidation compound and torque connections as indicated in Figure 5.10 and Figure 5.11.

1. Open the distribution bay's front and rear doors.
2. Operate the defective circuit breaker to the OFF position.



DANGER! The bolts being removed in the following step may be at system potential. Use insulated tools.

3. Record each alarm wire and shunt leads located on the back of the circuit breaker (color and location on circuit breaker). Wiring diagrams are provided in Figure 5.10 and Figure 5.11. Carefully disconnect the alarm wiring and shunt leads from the back of the circuit breaker, ensuring the exposed ends do not contact any energized circuit.
4. Remove the hardware securing the circuit breaker to the front of the distribution panel.
5. Remove the hardware securing the load lug bracket to the circuit breaker. Set the load lug bracket with load leads attached aside out of the way, ensuring it does not contact any energized circuit.
6. Remove the hardware securing the circuit breaker to the rear of the distribution panel and remove the circuit breaker.
7. Ensure that the replacement circuit breaker is in the OFF position, and is of the correct rating and type (electrical trip/mechanical trip or electrical trip only). Orient the circuit breaker over its mounting location and secure to the front of the distribution panel with the hardware previously removed.



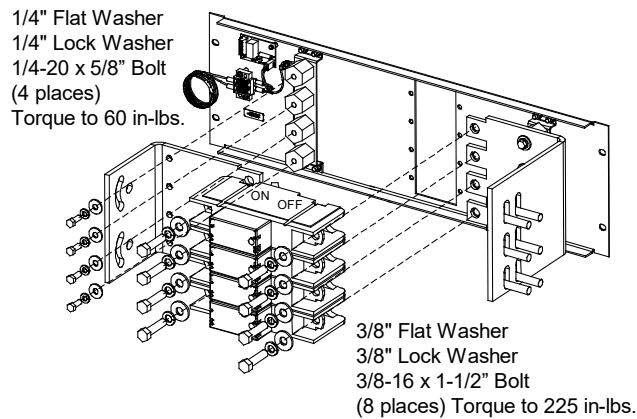
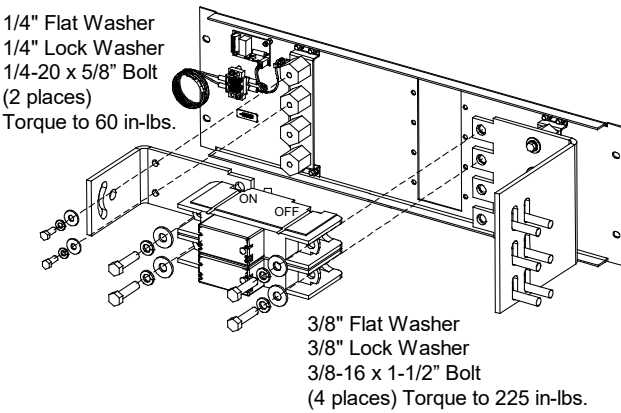
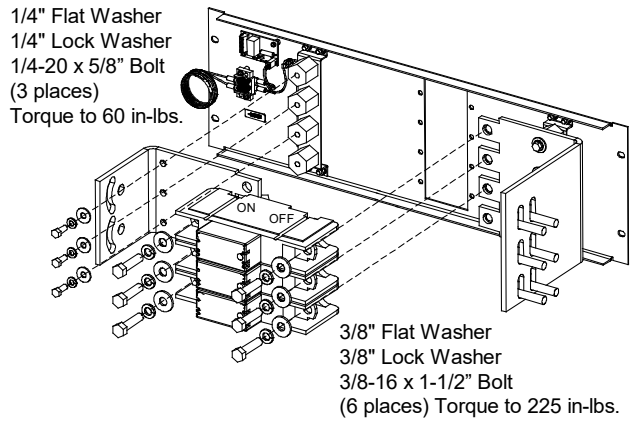
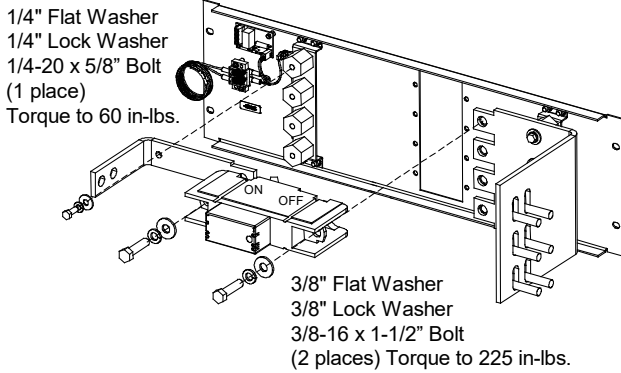
DANGER! The bolts being installed in the following step may be at system potential. Use insulated tools.

8. Secure the circuit breaker to the rear of the distribution panel with the hardware previously removed.
9. Re-install the load lug bracket with load leads with the hardware previously removed.
10. Re-attach the alarm wiring and shunt leads to the back of the circuit breaker as recorded above. Wiring diagrams are provided in Figure 5.10 and Figure 5.11.
11. Transfer the circuit breaker guard (if present) from the old circuit breaker to the new circuit breaker.
12. Operate the replacement circuit breaker to the ON position.
13. Verify no Circuit Breaker Alarms are active.
14. Close the distribution bay's front and rear doors and secure the doors.

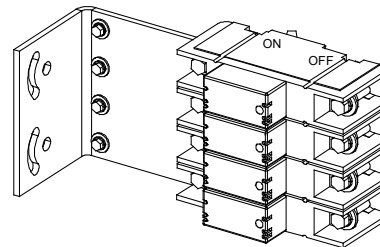
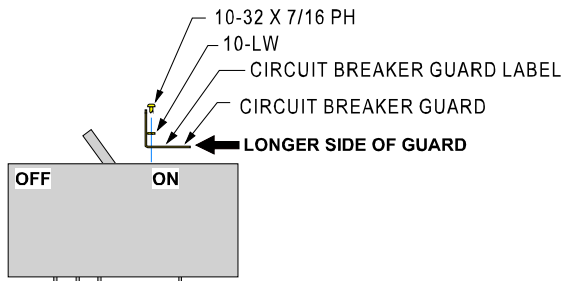
Figure 5.10 Replacing a GJ/218 Circuit Breaker in a List D Distribution Panel

INSTALLING CIRCUIT BREAKER

Apply anti-oxidizing compound to busbar mating surfaces before mounting circuit breakers.



INSTALLING CIRCUIT BREAKER GUARD



ALARM WIRING (BREAKERS WITH SHUNTS)

STANDARD TRIP BREAKER (BLACK HANDLE)
ELECTRICAL TRIP BREAKER (WHITE HANDLE)

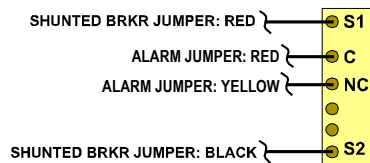
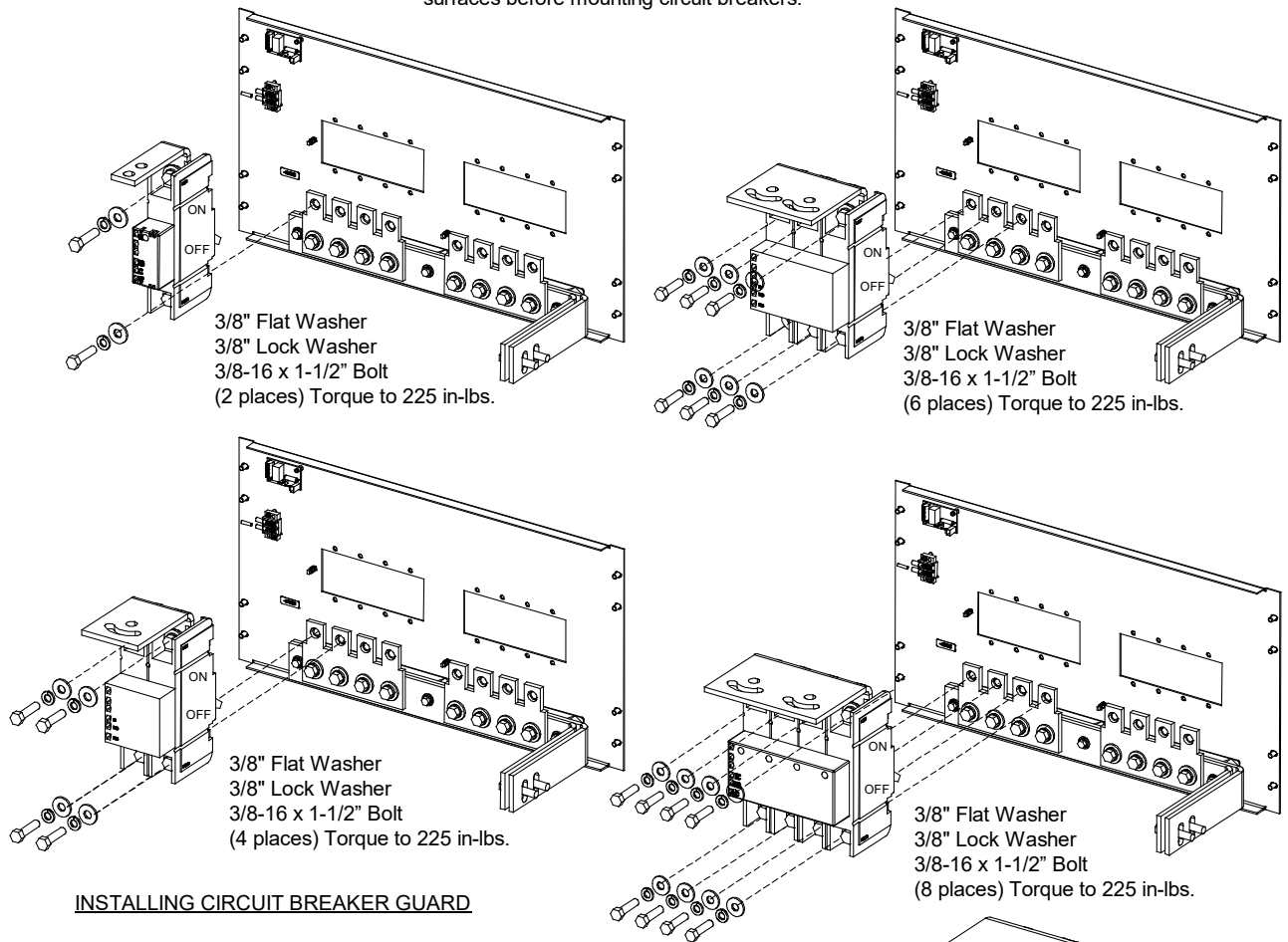


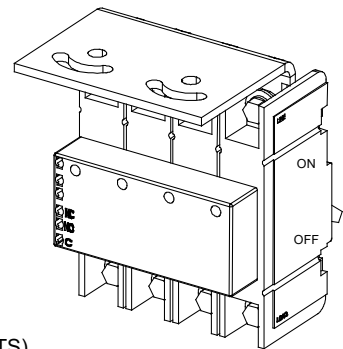
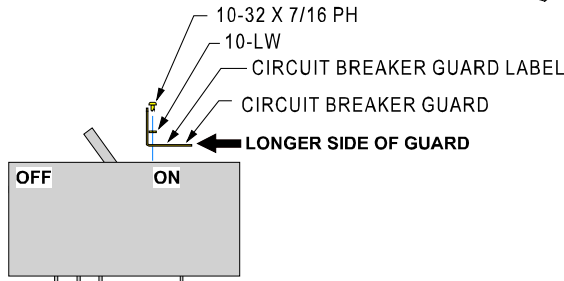
Figure 5.11 Replacing a GJ/218 Circuit Breaker in a List E Distribution Panel

INSTALLING CIRCUIT BREAKER

Apply anti-oxidizing compound to busbar mating surfaces before mounting circuit breakers.

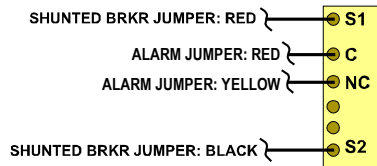


INSTALLING CIRCUIT BREAKER GUARD



ALARM WIRING (BREAKERS WITH SHUNTS)

STANDARD TRIP BREAKER (BLACK HANDLE)
ELECTRICAL TRIP BREAKER (WHITE HANDLE)



5.8.4 Circuit Card Replacement Procedures



WARNING! Circuit cards used in this power system contain static-sensitive devices. Read the Static Warning at the front of this document before performing any of the following procedures.

General

The following circuit card replacement procedures can be performed with the system operating.

Refer to Figure 3.1 for circuit card locations.



CAUTION! When performing any step in these procedures that requires removal or installation of hardware, use caution to ensure no hardware is dropped and left inside the cabinet; otherwise service interruption or equipment damage may occur.



NOTE! When performing any step in these procedures that requires removal of existing hardware, retain all hardware for use in subsequent steps.

SM-DU Circuit Card Replacement (Primary Power Bay Only)



NOTE! Refer to Figure 5.12 as this procedure is performed.

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.



DANGER! Performing the next steps may expose service personnel to hazardous potential. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact any energized electrical termination.

2. Open the primary power bay's front door.

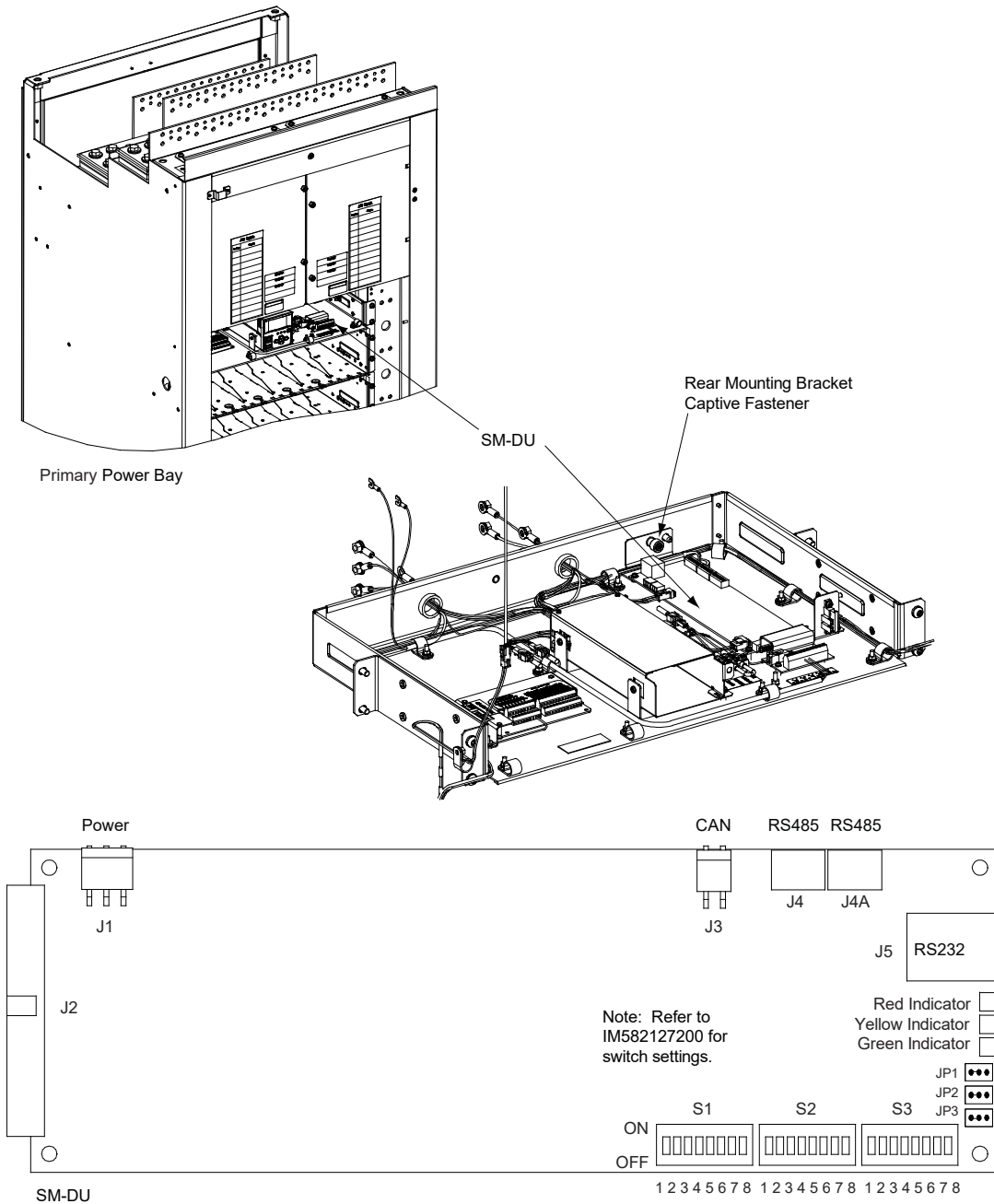


WARNING! Damage to the circuit card may result if the next step is not followed.

3. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
4. Remove connectors J1, J2, and J3 from the circuit card.
5. Remove the two M3x6mm screws securing the front of the circuit card to the bay. Loosen the captive fastener on the rear mounting bracket. With the circuit card and rear mounting bracket assembly outside of the bay, remove the two M3x6mm screws securing the circuit card to the rear mounting bracket.
6. In this step, ensure you do not intermix the old and replacement circuit cards. Set the switches on the replacement circuit card to the same setting as the old circuit card. Switch settings are documented in the "Making Switch Settings" section of the Power System Installation Instructions (IM582127200).
7. Replace the two M3x6mm screws securing the replacement circuit card to the rear mounting bracket.
8. Orient the replacement circuit card with rear mounting bracket into its mounting position and tighten the captive fastener on the rear mounting bracket. Replace the screws to secure the front of the circuit card to the bay.
9. Plug connectors J1, J2, and J3 into the circuit card.
10. Remove the grounding wrist strap.
11. Close the primary power bay's front door and secure.

12. Temporarily remove then re-insert the NCU. Wait for the NCU to initialize.
13. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
14. Ensure that there are no local or remote alarms active on the system.

Figure 5.12 SM-DU Circuit Card Replacement (Primary Power Bay Only)



IB2 (NCU Interface Board) and EIB (NCU Extended Interface Board) Replacement



NOTE! Refer to Figure 5.13 and Figure 5.14 as this procedure is performed.

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.



DANGER! Performing the next steps may expose service personnel to hazardous potential. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact any energized electrical termination.

2. Open the power bay's front door.



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

3. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
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. Refer to Figure 5.13 or Figure 5.14.
5. Carefully label the connectors plugged into the circuit card. These connectors must be plugged into the same connectors on the replacement circuit card. Refer to Figure 5.13 or Figure 5.14.



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 by removing the bracket the circuit card is mounted to. Remove the circuit card from the bracket.
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 "Making Switch Settings" section of the Power System Installation Instructions (IM582127200).
10. Secure the replacement circuit card to the bracket and re-install the circuit card and bracket into the primary power bay.
11. Plug all connectors removed from the old circuit card into the same position on the replacement circuit card.

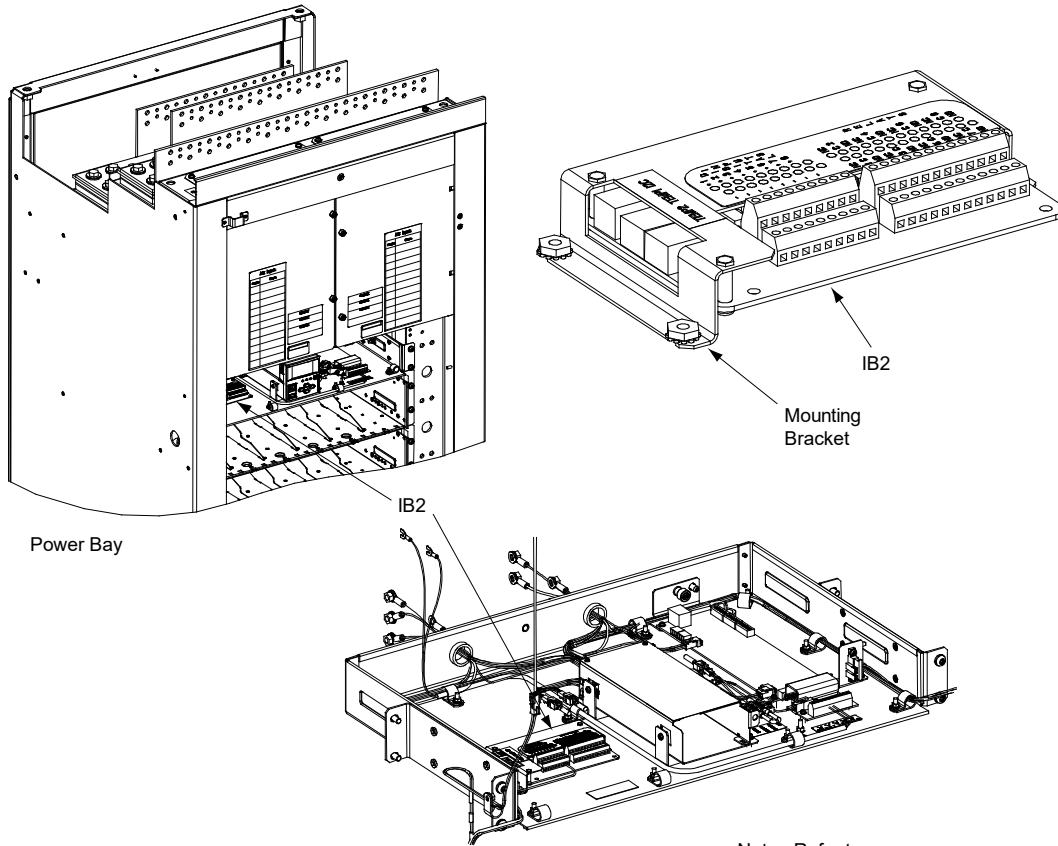


DANGER! In the next step, external alarm wiring may be energized from an external source. DO NOT allow bare wire ends to contact any grounded or energized object.

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. Remove the grounding wrist strap.
14. Close the power bay's front door and secure.

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.

Figure 5.13 IB2 (NCU Interface Board) Connector Locations



Note: Refer to IM582127200 for switch settings.

IB2 Board (Top View)

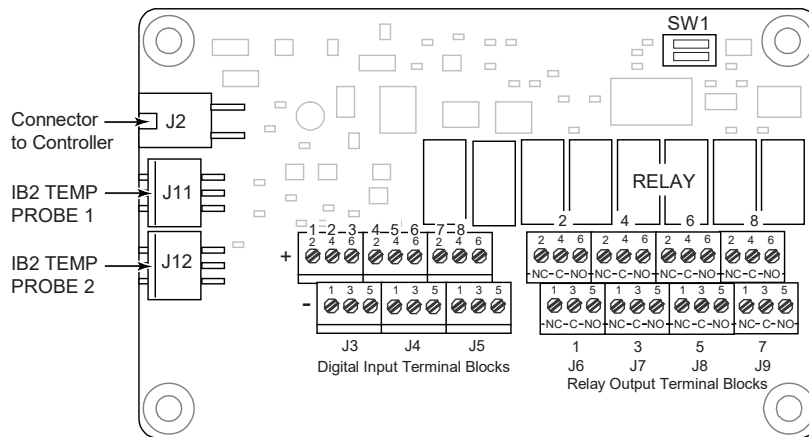
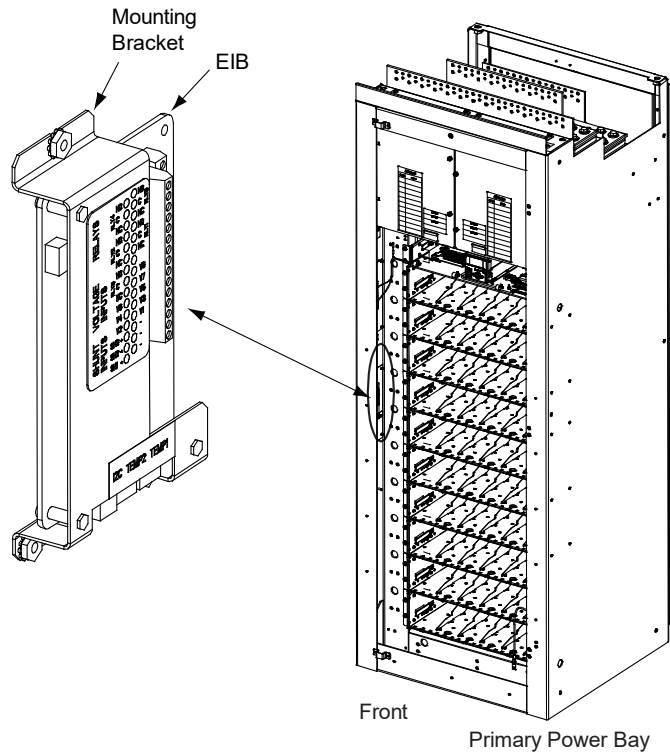
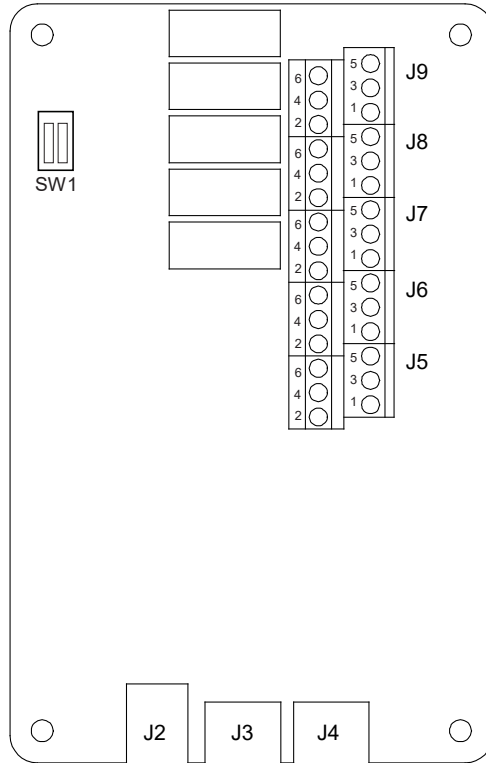


Figure 5.14 EIB (NCU Extended Interface Board) Connector Locations



Optional EIB Board (Top View)

Note: Refer to IM582127200 for switch settings.



SM-DU+ Circuit Card Replacement (Distribution Bay Only)



NOTE! Refer to Figure 5.15 as this procedure is performed. Refer to Figure 3.1 for circuit card locations.

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.



DANGER! Performing the next steps may expose service personnel to hazardous potential. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact any energized electrical termination.

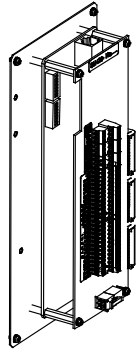
2. Open the distribution bay's front door.



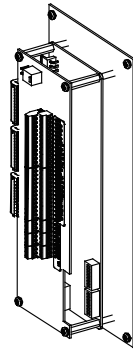
WARNING! Damage to the circuit card may result if the next step is not followed.

3. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
4. The distribution bay is always equipped with an SM-DU+ and Shunt Interface Assembly mounted on the right side wall as viewed from the front. The distribution bay may be equipped with a second optional SM-DU+ and Shunt Interface Assembly mounted on the left side wall as viewed from the front. These assemblies provide shunt and fuse alarm inputs. Refer to Figure 5.15.
5. Carefully label the connectors plugged into the SM-DU+. These connectors must be plugged into the same connectors on the replacement SM-DU+. Refer to Figure 5.15.
6. Unplug all connectors plugged into the SM-DU+.
7. Remove the screws securing the SM-DU+. Note that these screws also secure the Shunt Interface Board to the top of the SMDU+.
8. In this step, ensure you do not intermix the old and replacement SM-DU+. Set the switches on the replacement SM-DU+ to the same settings as the old SM DU+. Switch settings are documented in the "Making Switch Settings" section of the Power System Installation Instructions (IM582127200).
9. Orient the replacement SM-DU+ over its mounting position. Secure the SM-DU+ (and Shunt Interface Board) with the screws previously removed.
10. Plug all connectors removed from the old SM-DU+ into the same positions on the replacement SM-DU+.
11. Remove the grounding wrist strap.
12. Close the distribution bay's front door and secure.
13. Enable the external alarms, or notify appropriate personnel that this procedure is finished.
14. Ensure that there are no local or remote alarms active on the system.

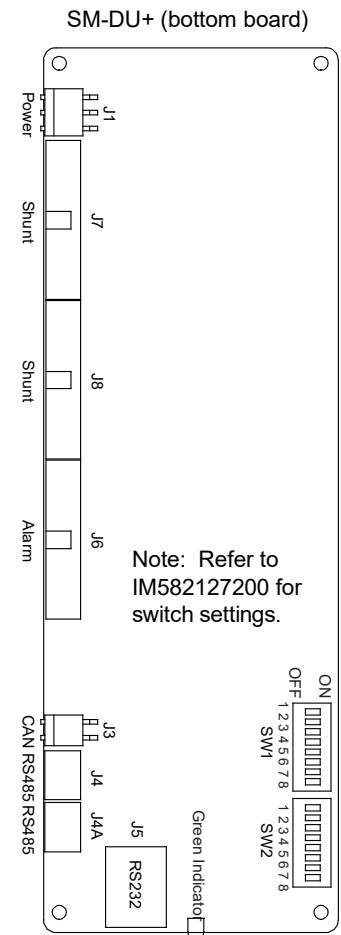
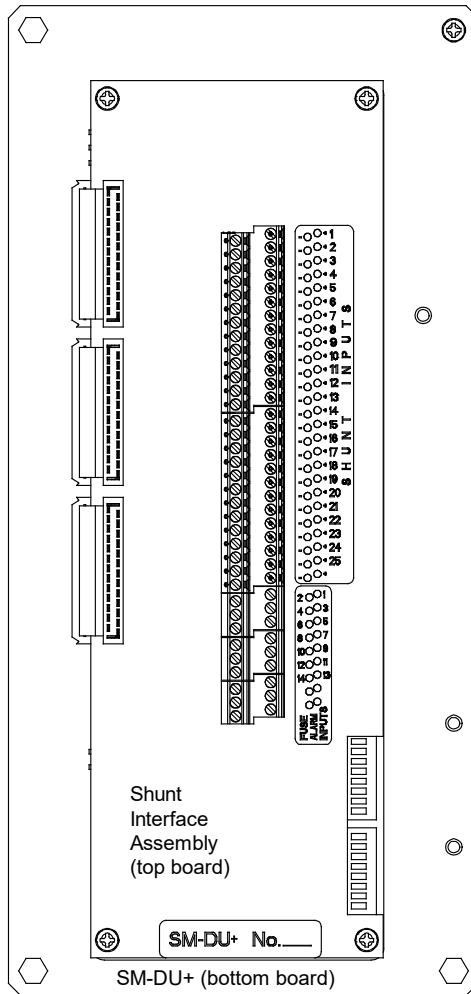
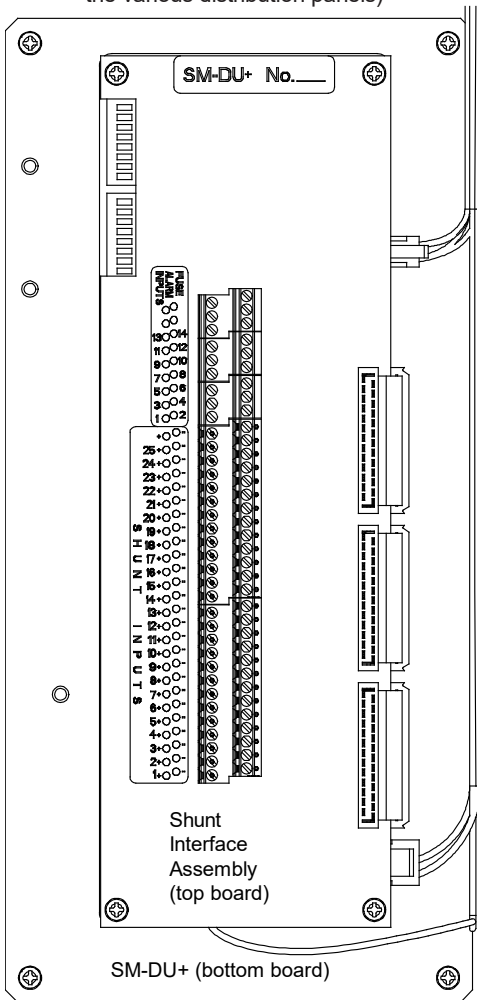
Figure 5.15 SM-DU+ and Shunt Interface Assembly Connector Locations



Optional SM-DU+ and Shunt/FA Interface Assembly (for additional monitoring of shunts and FA signals located in the various distribution panels)



SM-DU+ and Shunt/FA Interface Assembly (for monitoring of shunts and FA signals located in the various distribution panels)



Replacing the IB4 Board



NOTE! Refer to Figure 5.16 as this procedure is performed.

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.



DANGER! Performing the next steps may expose service personnel to hazardous potential. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact any energized electrical termination.

2. Open the power bay's front door.



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

3. Connect an approved grounding strap to your wrist. Attach the other end to a suitable ground.
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 (and shield) from the bay by removing the screws securing it to the bay.
7. Orient the replacement circuit card (and the shield) 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. Remove the grounding wrist strap.
10. Reboot the NCU.

Local Menu Navigation:

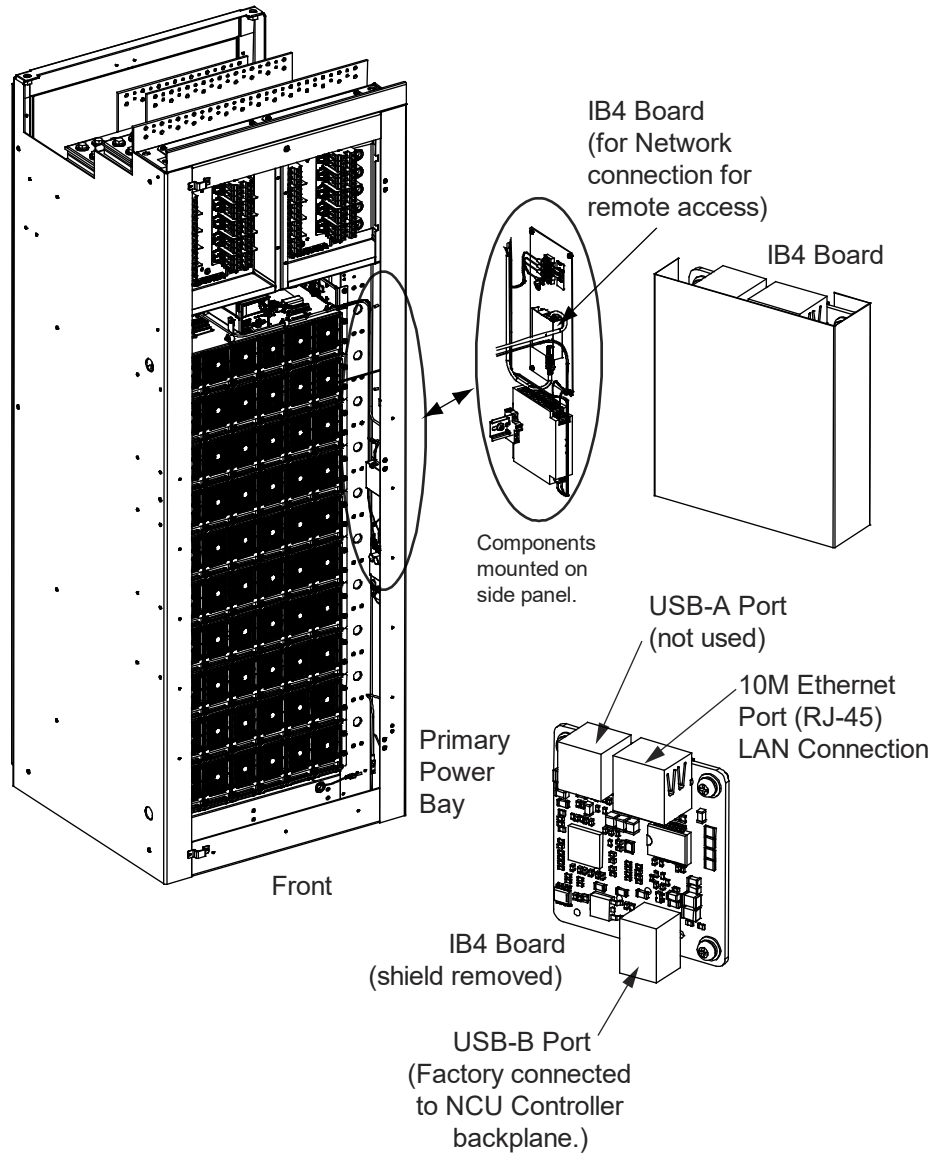
At the Main Screen, press ENT and ESC at the same time to reboot the NCU Controller.

Web Menu Navigation:

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

11. Close the primary power bay's front door and secure.
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 5.16 IB4 Circuit Card Replacement



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