



NetSure™ 512NGBB -48 VDC Power System

Installation Manual

Specification Number: 582137000

Model Number: 512NGBB

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Technical Support Site

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

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

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Admonishments Used in this Document



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



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



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



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



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



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



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

Important Safety Instructions

Safety Admonishments Definitions

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

Safety and Regulatory Statements

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

Déclarations de Sécurité et de Réglementation

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

1 Customer Documentation Package

This document (IM582137000) provides *Installation Instructions* for Vertiv™ NetSure™ -48 VDC Power System Model 512NGBB, Spec. No. 582137000.

The complete Customer Documentation Package consists of...

NetSure™ -48 VDC Power System Installation Manual

- Power System Installation Instructions: IM582137000
- Power System Quick Start Guide: QS582137000

NetSure™ NCU Controller User Manual

- NCU Controller User Instructions: UM1M830BNA

USB Drive with All Customer Documentation

- Power System Installation Instructions: IM582137000
- Power System Quick Start Guide: QS582137000
- Power System User Instructions: UM582137000
- Power System “System Application Guide”: SAG582137000
- Module Mounting Shelf Power Data Sheet: PD588705300
- NCU Controller User Instructions: UM1M830BNA
- Rectifier Instructions: UM1R482000E3
- -48 VDC to +24 VDC Converter Instructions: UM1C48241500
- -48 VDC to -58 VDC Converter Instructions: UM1C48582000P3
- 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 Installation Acceptance Checklist

Provided in this section is an Installation Acceptance Checklist. This checklist helps ensure proper installation and initial operation of the system. As the procedures presented in this document are completed, check the appropriate box on this list. If the procedure is not required to be performed for your installation site, also check the box in this list to indicate that the procedure was read. When installation is done, ensure that each block in this list has been checked. Some of these procedures may have been factory performed for you.



NOTE! *The system is not powered up until the end of this checklist.*



NOTE! *Some of these procedures may have been performed at the factory for you.*

Installing the System

- System Components Mounted in an Equipment Rack
- Optional Lug Adapter Busbar Kits Installed
- Circuit Breakers Installed
- Fuses Installed
- Optional Transient Voltage Surge Suppressor (TVSS) Device Installed and Wired

Setting Jumper and Switch Options

- Jumpers on System Interface Circuit Card Set - List 27 Only
- Factory Switch Setting on IB2 Interface Board Verified
- Factory Switch Setting on EIB Extended Interface Board Verified

Making Electrical Connections

- Relay Rack / Cabinet Frame Grounding Connection Made
- Central Office Ground Connection Made
- AC Input and AC Input Equipment Grounding Connections Made
- External Alarm, Reference, Monitoring, and Control Connections Made
- Factory Control Bus Connections between Module Mounting Shelves Verified
- Load Connections Made
- Battery Connections Made

Installing the Modules

- Rectifier and Converter Modules Installed

Initially Starting the System

- System Started, Configured, and Checked

3 Installing the System

3.1 General Requirements

- This product is intended only for installation in a restricted access location on or above a non-combustible surface.
- This product must be located in a controlled environment with access to crafts persons only.
- This product is intended for installation in network telecommunication facilities (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- This product is intended for connection to the common bonding network in a network telecommunication facility (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- The DC return connection to this system can remain isolated from system frame and chassis (DC-I).
- This system is suitable for installation as part of the Common Bonding Network (CBN).
- The installer should be familiar with the installation requirements and techniques to be used in securing the shelf(s) to an equipment rack.
- Rectifier, converter, and mounting shelf ventilating openings must not be blocked and temperature of air entering rectifiers and converters must not exceed rated operating ambient temperature range found in SAG582137000.
- Clearance requirements are:
- The distance from the rear of the system to a wall or other solid structure must not be less than four (4) inches. This will assure proper airflow through the rectifier and converter modules.



NOTE! Minimum spacing specified for ventilation may not permit replacement of certain components such as busbars or module mounting shelves.

3.2 Mounting the System in an Equipment Rack

System with List 7 Distribution Cabinet

This system is designed to mount in a nominal 23" wide equipment rack having 1 3/4" multiple drillings. Refer to System Application Guide SAG582137000 for overall dimensions.

System with List 27 Distribution Cabinet

This system is designed to mount in a non-standard width (27") equipment rack having 1 3/4" multiple drillings. Refer to System Application Guide SAG582137000 for overall dimensions.

Mounting the Distribution Cabinet with Module Mounting Shelf(s)



NOTE! The distribution cabinet is factory connected to the module mounting shelf(s). The distribution cabinet with module mounting shelf(s) is mounted as a complete assembly.

The distribution cabinet with module mounting shelf(s) must be the top-most component in the rack. Perform the following steps to mount the distribution cabinet with module mounting shelf(s).



DANGER! If the system is mounted in a relay rack, the relay rack must be securely anchored to the floor before the distribution cabinet with module mounting shelf(s) is installed.

The distribution cabinet with module mounting shelf(s) is heavy. Use a hoist, battery lift, or other appropriate lifting device to raise and support the assembly during the installation. Take appropriate precautions to avoid injury.

Procedure

1. Remove the distribution cabinet with module mounting shelf(s) from its shipping brackets. Position the assembly in the equipment rack.



NOTE! Install the ground washers so the teeth dig into the paint on the mounting angles. Torque all screws to 65 in-lbs.

2. Mount the distribution cabinet to the rack using hardware as shown Figure 3.1 or Figure 3.2.
3. Mount the module mounting shelf(s) to the rack using hardware as shown Figure 3.1 or Figure 3.2.

Figure 3.1 Mounting the System - System with List 7 Distribution Cabinet

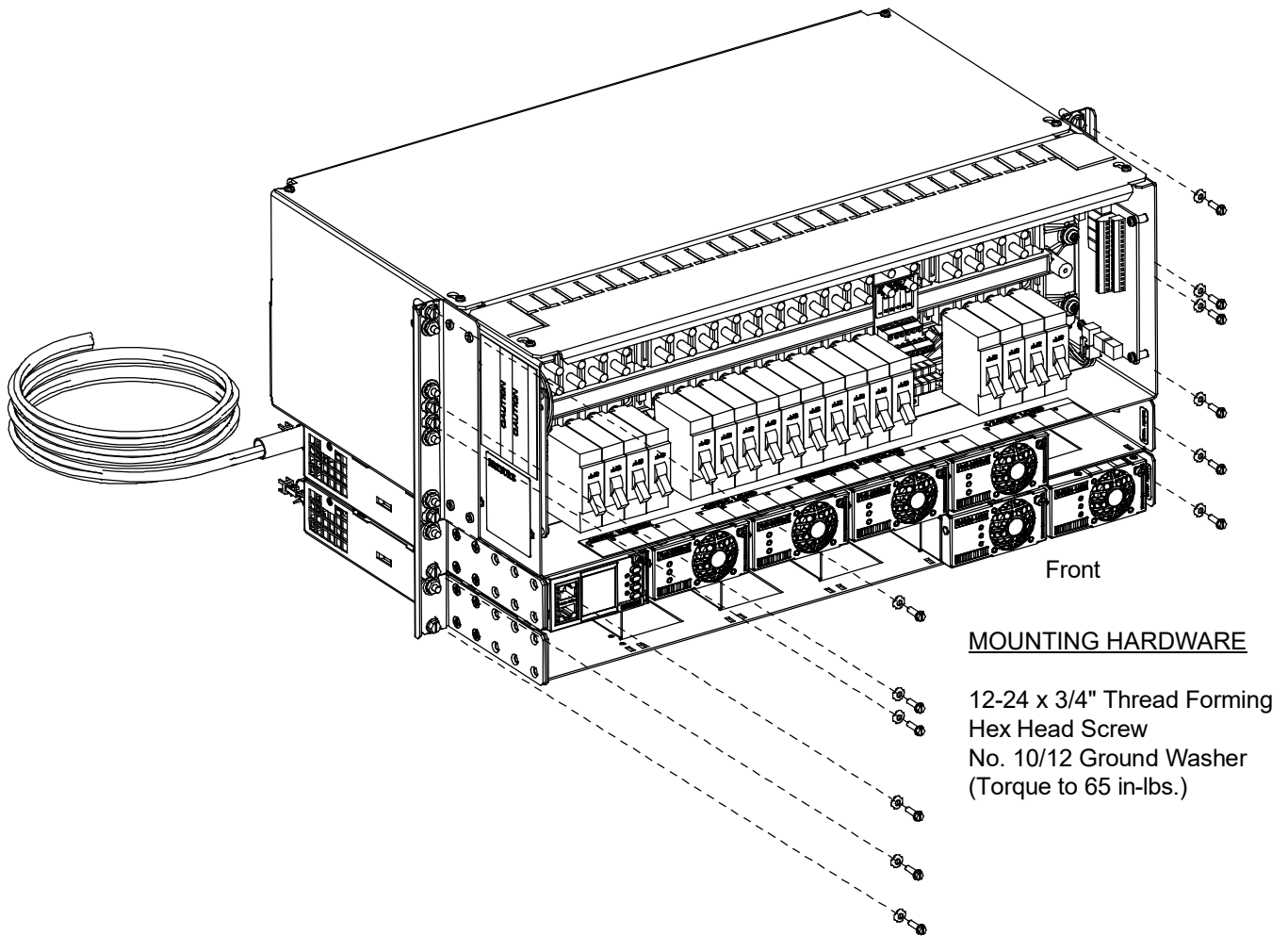
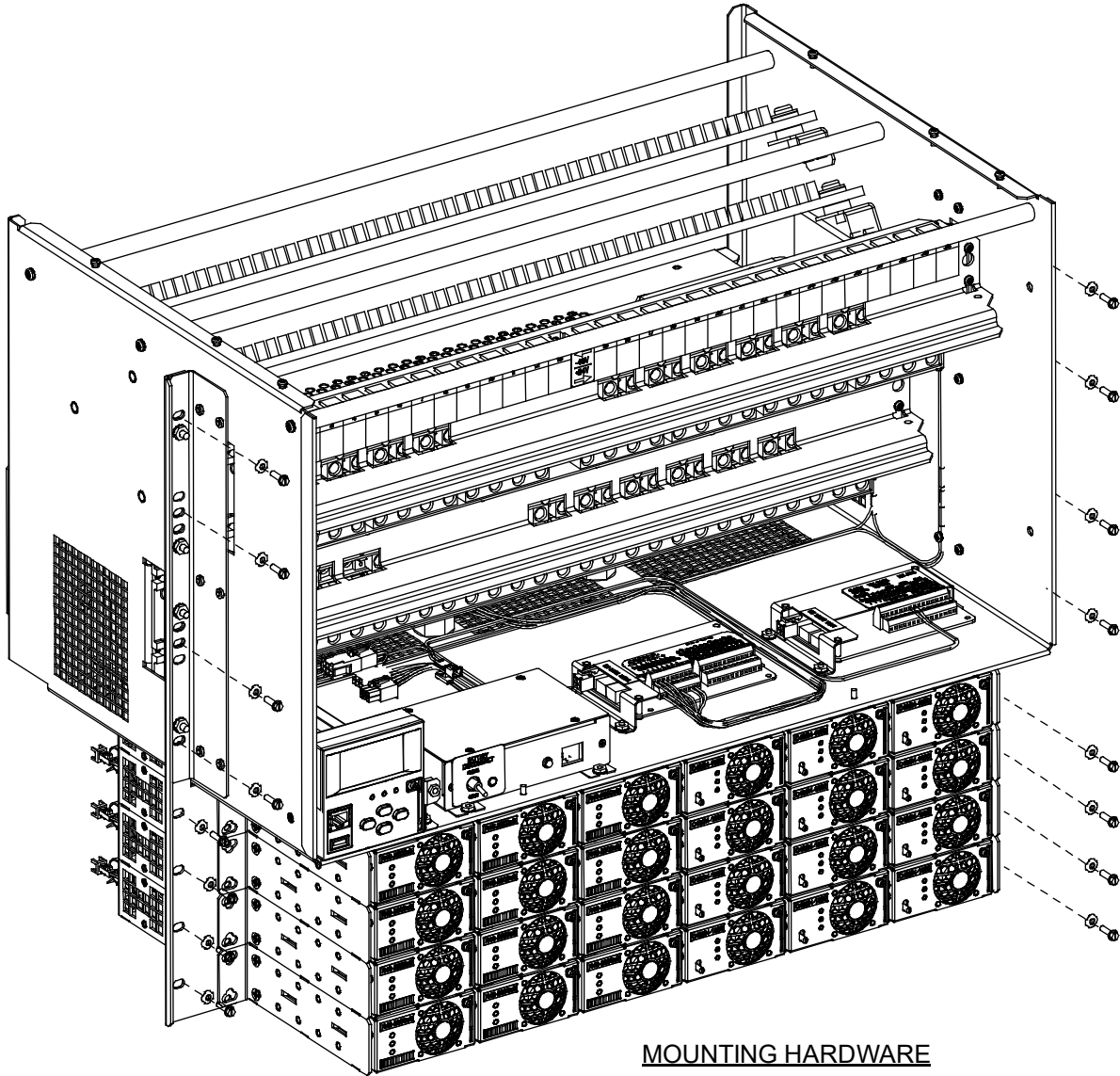


Figure 3.2 Mounting the System - System with List 27 Distribution Cabinet



Front

MOUNTING HARDWARE

12-24 x 3/4" Thread Forming
Hex Head Screw
No. 10/12 Ground Washer
(Torque to 65 in-lbs.)

3.3 Installing Optional Lug Adapter Busbar Kits

These kits provide lug adapter busbars plus hardware for use with 2-pole and 3-pole circuit breakers. A right angle kit is also available for 1-pole devices.

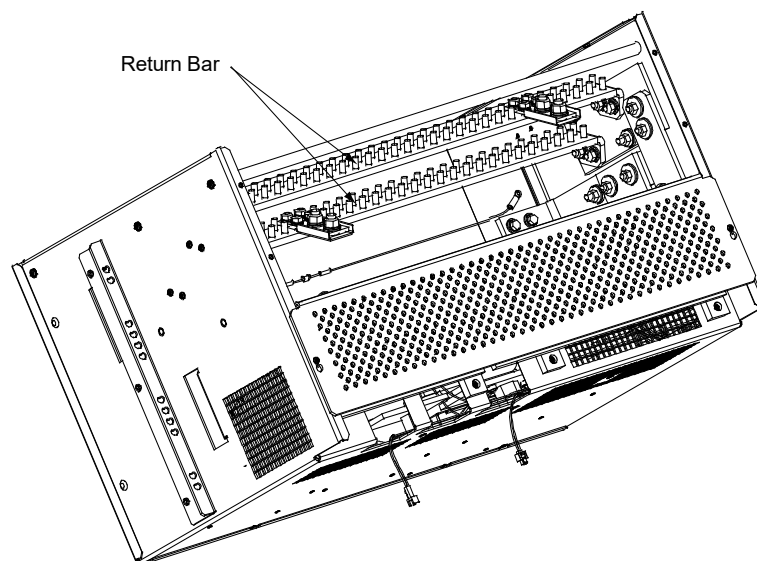
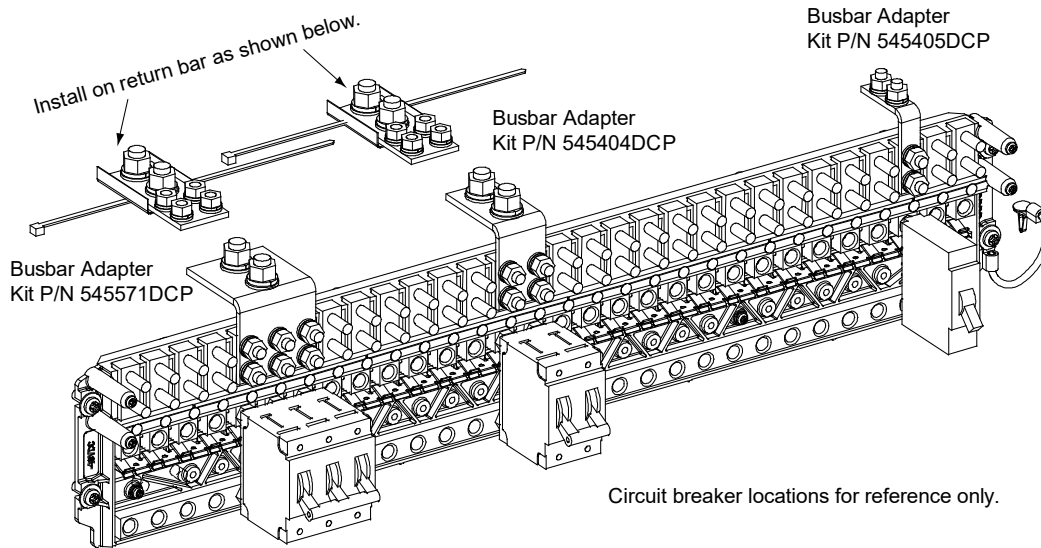
Procedure

1. Refer to Figure 3.3 to install the lug adapter busbars kits.

Figure 3.3 Installing Lug Adapter Busbar Kits

List 27 Distribution Cabinet Shown
List 7 Distribution Cabinet Similar

Apply anti-oxidizing compound to busbar mating surfaces before assembling.
Recommended torque is 72 in-lbs using the supplied 1/4" bolts and hardware.
Recommended torque is 300 in-lbs using the supplied 3/8" bolts and hardware.



3.4 Installing Circuit Breakers and Fuses

Circuit breakers and/or fuses may have been factory installed for you. If so, verify their positions and sizes.

Installing Bullet Nose Type Fuseholders and TPS/TLS Fuses



CAUTION! For List 27 only, a circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.



CAUTION! For List 7 only, a -48 VDC load distribution circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Refer to the following procedure and install bullet nose type fuseholders and appropriately sized TPS/TLS fuses into the proper mounting positions in the distribution cabinet.

Procedure



NOTE! Refer to Figure 3.4 as this procedure is performed.

1. Orient the fuseholder as shown in Figure 3.4. 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.
2. When all fuseholders are installed, install an appropriately sized TPS/TLS fuse in each. To do this, remove the fuse carrier from the mounted fuseholder body. Hold the fuseholder body while you pull the fuse carrier from the body. Slide the fuse in place between the contacts of the fuse carrier. When done, push the fuse carrier back into the fuseholder body. Note that a polarizing key on the bottom of the carrier prevents the carrier from being inserted upside down.
3. Verify that an 18/100 ampere alarm fuse is present in each fuseholder and that a plastic safety cover is installed on this fuse.
4. Record all fuse sizes on the label provided on the shield.

Installing Bullet Nose Type Circuit Breakers



CAUTION! For List 27 only, a circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.



CAUTION! For List 7 only, a -48 VDC load distribution circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Refer to the following procedure and install appropriately sized bullet nose type circuit breakers into the proper mounting positions in the distribution cabinet.

Procedure



NOTE! Refer to Figure 3.5 as this procedure is performed.

1. Ensure that the circuit breaker is in the OFF position and is of the correct rating. Orient the circuit breaker as shown in Figure 3.5. Insert the terminals on the rear of the circuit breaker into their corresponding sockets on the distribution panel. Ensure the alarm contact on the back of the circuit breaker makes contact with the alarm terminal on the spring strip. Push distribution device in firmly until fully seated in the distribution panel.
2. Record all circuit breaker sizes on the label provided on the shield.

Figure 3.4 Installing a Bullet Nose Type Fuseholder and TPS/TLS Fuse

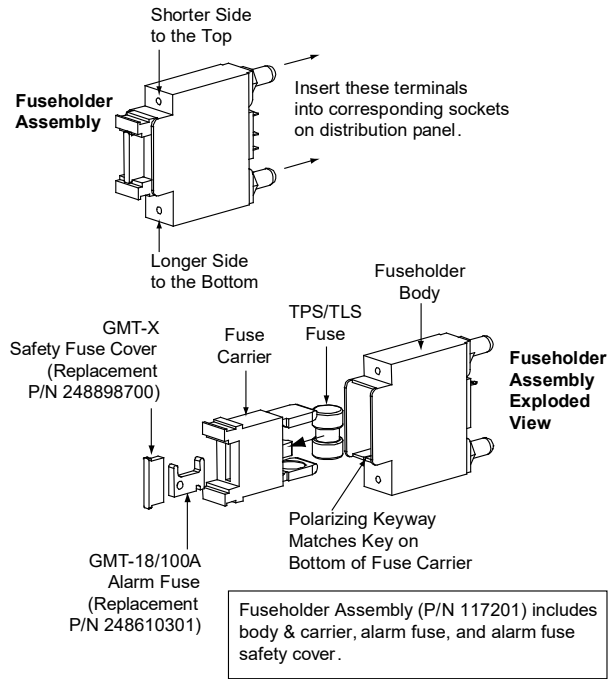
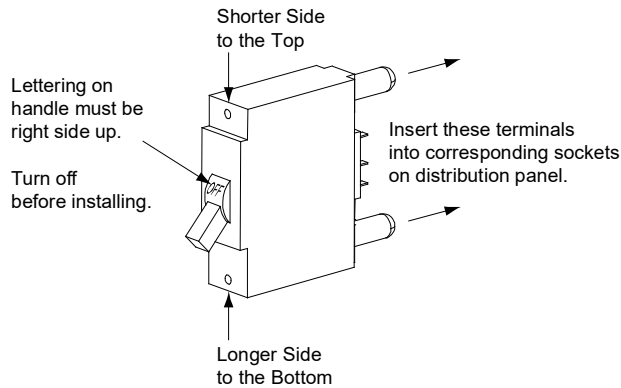


Figure 3.5 Installing a Bullet Nose Type Circuit Breaker



Installing an Optional Bullet Nose Type 6-Position GMT Distribution Fuse Block (P/N 545333DCP) in a List 7 Distribution Cabinet

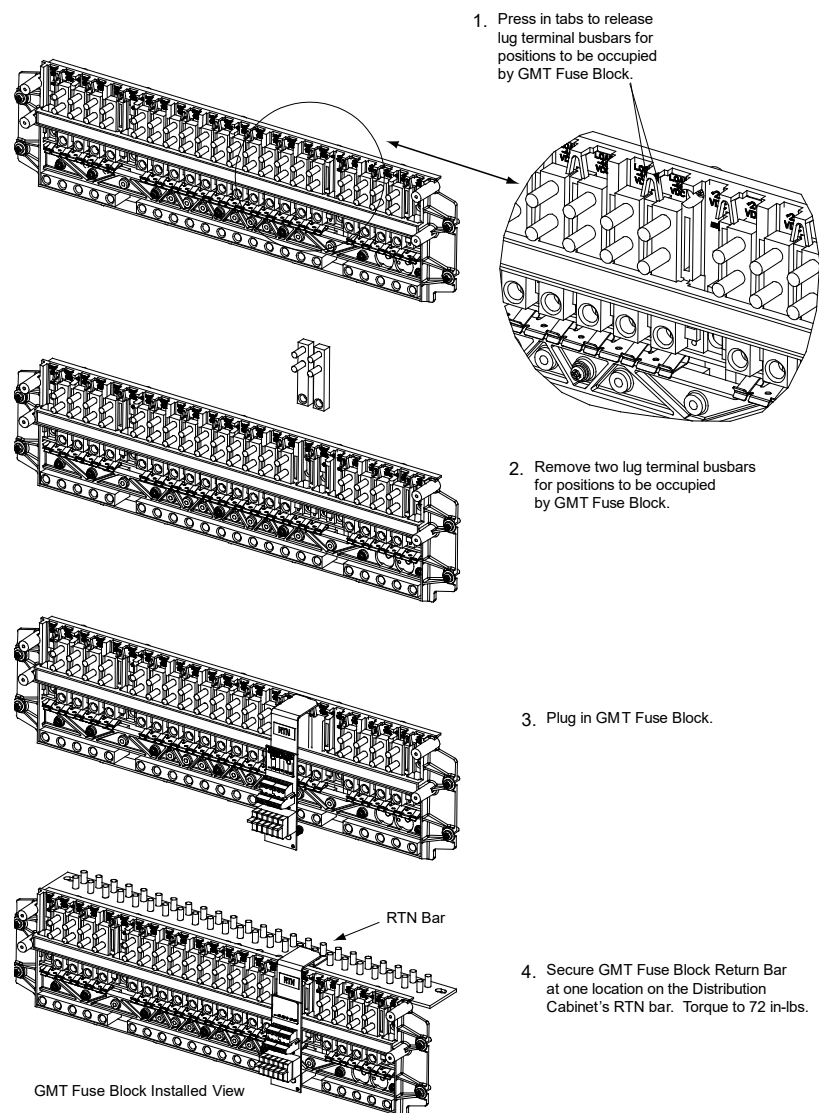


NOTE! CANNOT be installed in the 6, 7, 8, and 9 positions of the distribution panel.

Procedure

1. Refer to Figure 3.6 to install the GMT fuse block.
2. Install an appropriately sized GMT fuse in each fuse mounting position on the GMT fuse block as required. If dummy fuses are installed, first remove the dummy fuse.
 - a) Verify that dummy fuses are installed in all unused fuse positions on the GMT fuse block.
 - b) Verify that a plastic safety cover is installed on all GMT fuses on the GMT fuse block.
3. Record all fuse sizes installed in the GMT fuse block on the label provided on the GMT fuse block.

Figure 3.6 Installing an Optional Bullet Nose Type 6-Position GMT Distribution Fuse Block (P/N 545333DCP) in a List 7 Distribution Cabinet



Installing an Optional Bullet Nose Type 6-Position GMT Distribution Fuse Block (P/N 549017) in a List 27 Distribution Cabinet

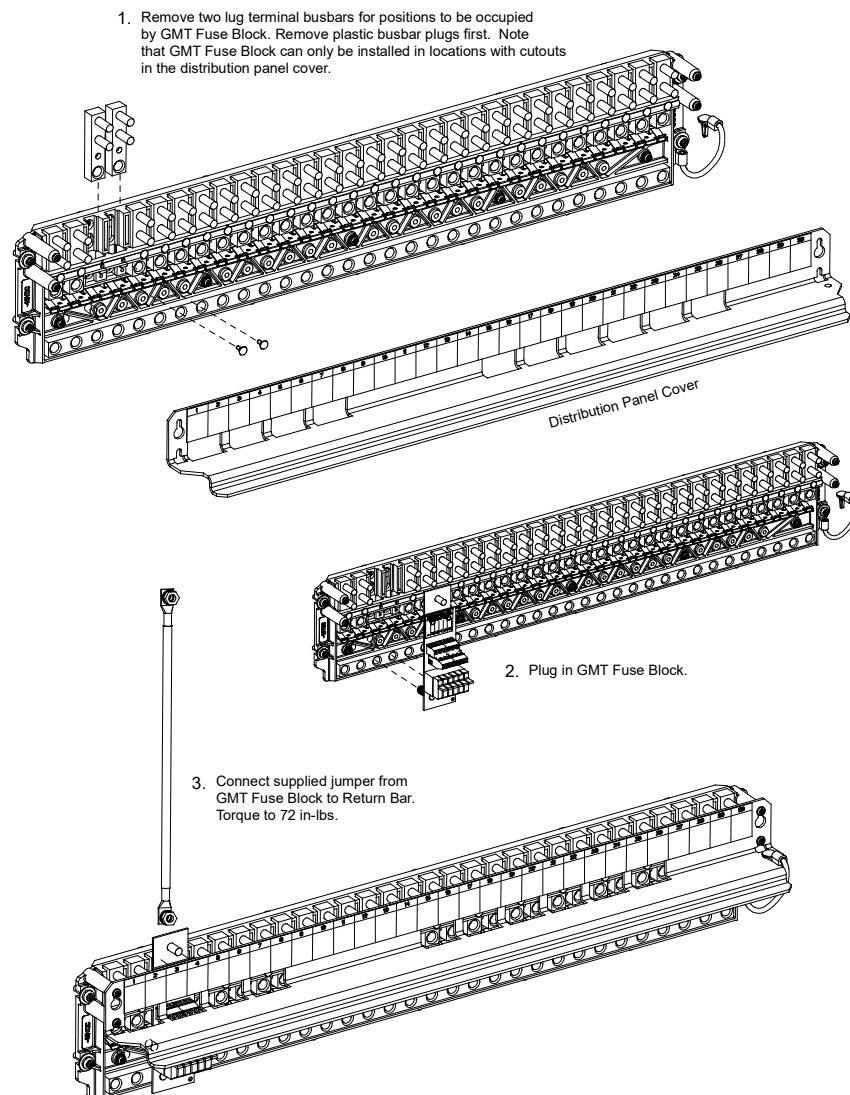


NOTE! Can only be installed in the 1-2, 3-4, 5-6, 7-8, 15-16, 17-18, 19-20, 21-22, 23-24, and 25-26 positions of the distribution panel.

Procedure

1. Refer to Figure 3.7 to install the GMT fuse block.
2. Install an appropriately sized GMT fuse in each fuse mounting position on the GMT fuse block as required. If dummy fuses are installed, first remove the dummy fuse.
 - a) Verify that dummy fuses are installed in all unused fuse positions on the GMT fuse block.
 - b) Verify that a plastic safety cover is installed on all GMT fuses on the GMT fuse block.
3. Record all fuse sizes installed in the GMT fuse block on the label provided on the GMT fuse block.

Figure 3.7 Installing an Optional Bullet Nose Type 6-Position GMT Distribution Fuse Block (P/N 549017) in a List 27 Distribution Cabinet



3.5 Installation and Wiring of a Transient Voltage Surge Suppressor (TVSS) Device

The Transient Voltage Surge Suppressor (TVSS) device is installed in “distribution device” mounting positions of a -48V or -58V distribution panel.



NOTE! The Transient Voltage Surge Suppressor (TVSS) device is to be installed on the -48V or -58V distribution bus only.

When required, all unparallelled distribution panels require a TVSS device. Only one (1) TVSS device is required per parallelled groups of distribution panels.

Unless otherwise specified, install the TVSS device in the mounting position closest to the distribution panel's input busbar.

Refer to SAG582137000 for more information.



CAUTION! The TVSS Device occupies two mounting positions. Leave an additional empty mounting position between the TVSS Device and any overcurrent protective device.

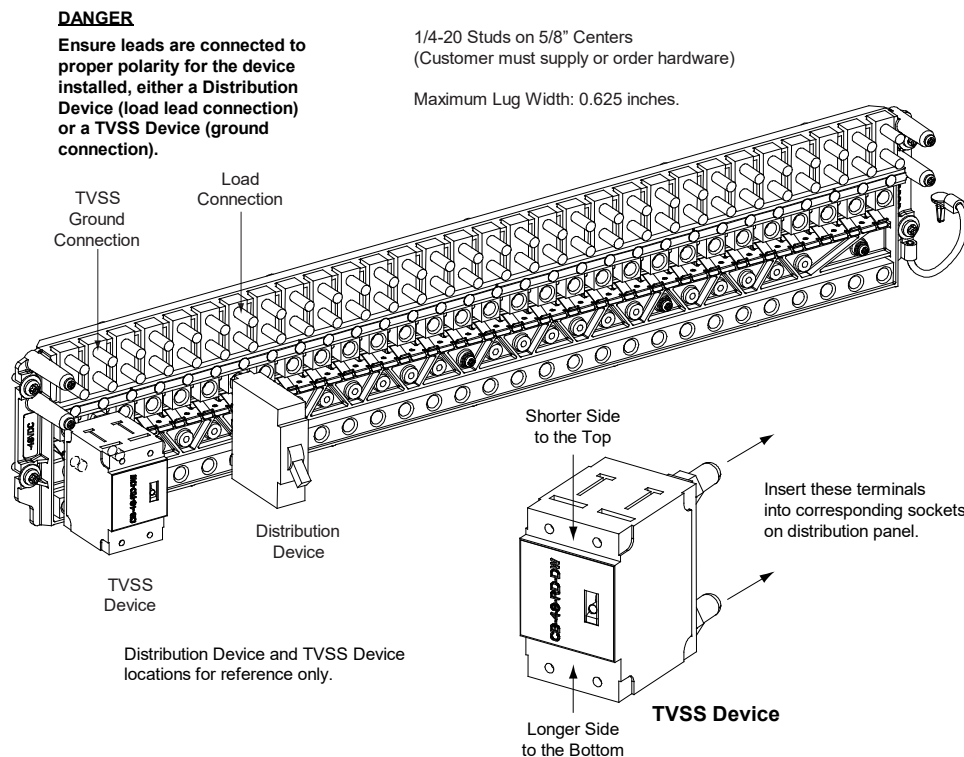
Procedure

1. Install the TVSS Device(s) as required. Refer to Figure 3.8.
2. Connect a customer provided cable from the distribution panel lug mounting busbar associated to the TVSS mounting position into a customer's grounding network. Refer to Figure 3.8. Wire to be sized so that the maximum wire resistance is less than 0.550 milliohms.



NOTE! The ground cable will be installed in a position normally used for distribution. It is recommended to use a Green cable and insulate the connection with shrink tubing to avoid incidental contact.

Figure 3.8 Installation and Wiring of Transient Voltage Surge Suppressor (TVSS) Devices



3.6 Vertiv™ NetSure™ SPD (Surge Protection Device) Field Installation Kit P/N 60056702 Installation Instructions

3.6.1 Kit Description

These instructions provide a step-by-step procedure to field install this kit and connect it to the power system if not already installed in the cabinet.

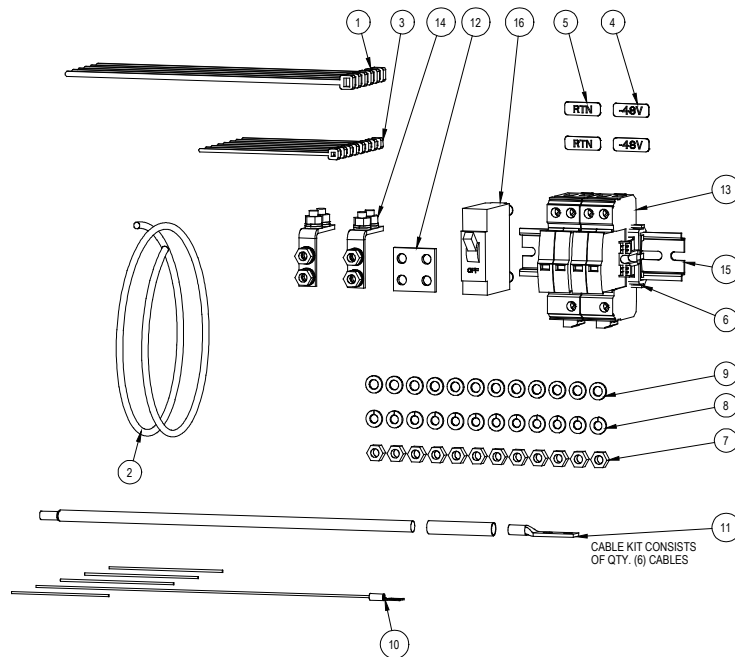
NOTE! These installation instructions apply to installing surge protection on 582137000ZZ001 or 582137000ZZ007 power systems that have been converted to 582137000500 plants. The 582137000ZZ001 and 582137000ZZ007 power systems are -48 V / +24 V output and the 582137000500 power systems are -48 V / -58 V output.

This kit provides SPD (Surge Protection Device) Assemblies which are installed external to the power system. Installation materials are also provided to connect the SPD devices to the power system.

3.6.2 Kit Contents

Figure 3.9 lists the items furnished as a part of these kits. Before installing the kit, check the items furnished against those listed to ensure that there are no shortages.

Figure 3.9 60056702 Kit Contents



16	101609	BRKR, BULLET NOSE, 75A, 80VDC	1
15	144991	DIN RAIL, 35MM X 7.5MM, 5.00" LONG	1
14	559803	KIT, ADAPTER, 1 POLE	2
13	10034885	SPD, VAL-SEC-T2-2+0-48DC-FM, 2907865 PHOENIX	2
12	60016097	ADAPTER, 2 LUG, PLATE	1
11	60056653	KIT, CABLES, 6GA, SPD FIELD INSTALLATION	1
10	60056635	KIT, JUMPERS, SPD ALARM	1
9	214110100	FW, 1/4, .500 OD, .063 THK	12
8	215111100	LW, 1/4, .489 OD, .062 THK	12
7	228557100	NUT, - HEX -, 1/4-20	12
6	118175DCP	END CLAMP, DIN RAIL	2
5	545676DCP	LABEL, BUSBAR, RTN	2
4	545677DCP	LABEL, POWER BUS, -48V	2
3	P18298	TY-RAP, 4.0" LONG, EXPENSE / BULK	8
2	P59888A	CABLE, 2PAIR/24 SOLID TINNED, INSIDE WIRE	8 R
1	P88555	CBL TIE, 8.5" LONG, 40 LBS, UV RESIST	6
INDEX	PART NO.	DESCRIPTION	QTY
PARTS/MATERIAL LIST			

3.6.3 Tools and Material Required

Table 3.1 lists the items required to install this kit.

Table 3.1 Tools and Material Required

Description
Wire Cutter (6 AWG, 24 AWG, 22 AWG)
Wire Insulation Strip Tool (6 AWG, 24 AWG, 22 AWG)
2-Hole Lug Crimp Tool for 6 AWG Flex Wire
7/16" Socket
Small Flat-Blade Screwdriver
#2 Phillips Screwdriver
Torque Wrench
Heat Gun (For Heat Shrink Tubing)

3.6.4 Installation Procedure

THESE INSTRUCTIONS SHOULD BE READ THROUGH COMPLETELY BEFORE INSTALLING THE KIT.

The following is a step-by-step procedure to install the kit. The procedure has been written for ease of use and to minimize the possibility of contact with potentially hazardous energy. This procedure should be performed in the sequence given, and each step should be completely read and fully understood before performing that step. Adhere to the “Important Safety Instructions” starting on page vi and also those presented in the following procedure. As each step of the procedure is completed, the box adjacent to the respective step should be checked. This will minimize the possibility of inadvertently skipping any steps. If the step is not required to be performed for your site, also check the box to indicate that it was read.

Procedure



DANGER! This procedure is performed on a LIVE system. Adhere to the “Important Safety Instructions” starting on page vi.



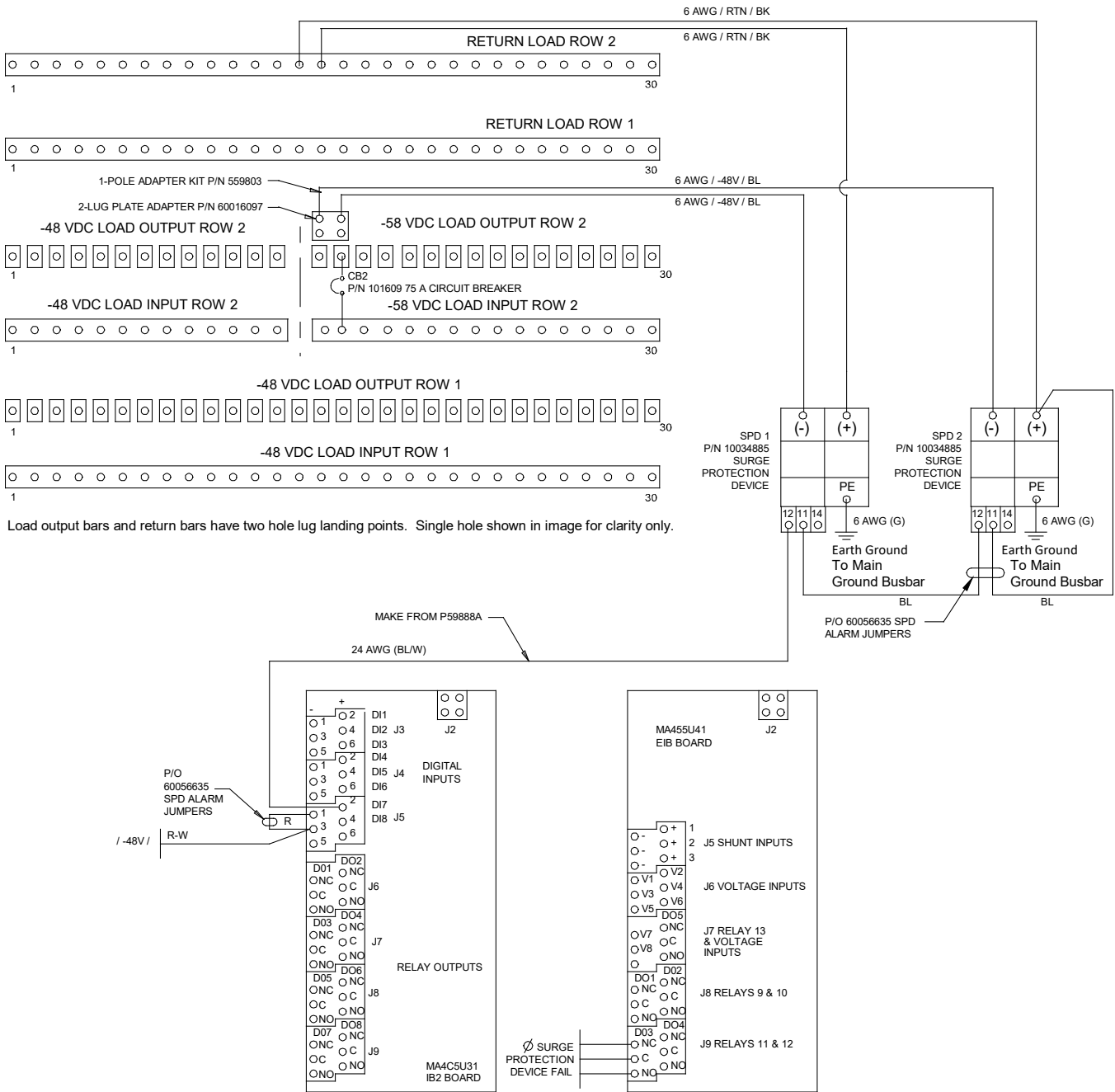
NOTE! As this procedure is performed, refer to Figure 3.10 for typical power system wiring diagrams.

- [] 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.
- [] 2. Ensure the enclosure the power system is mounted in has a proper site earth ground. Refer to the enclosure documentation.
- [] 3. Ensure the enclosure the power system is mounted in is properly grounded. Refer to the enclosure documentation.

Figure 3.10 P/N 60056702 Surge Protection Device (SPD) Field Installation Kit Power and Alarm Wiring Diagram for -58 VDC

P/N 60056702: Surge Protection Device (SPD) Field Installation Kit Power and Alarm Wiring (-58 VDC Row 2)

Note: For 582137000ZZ001 or 582137000ZZ007 power systems converted to a 582137000500 power system Only

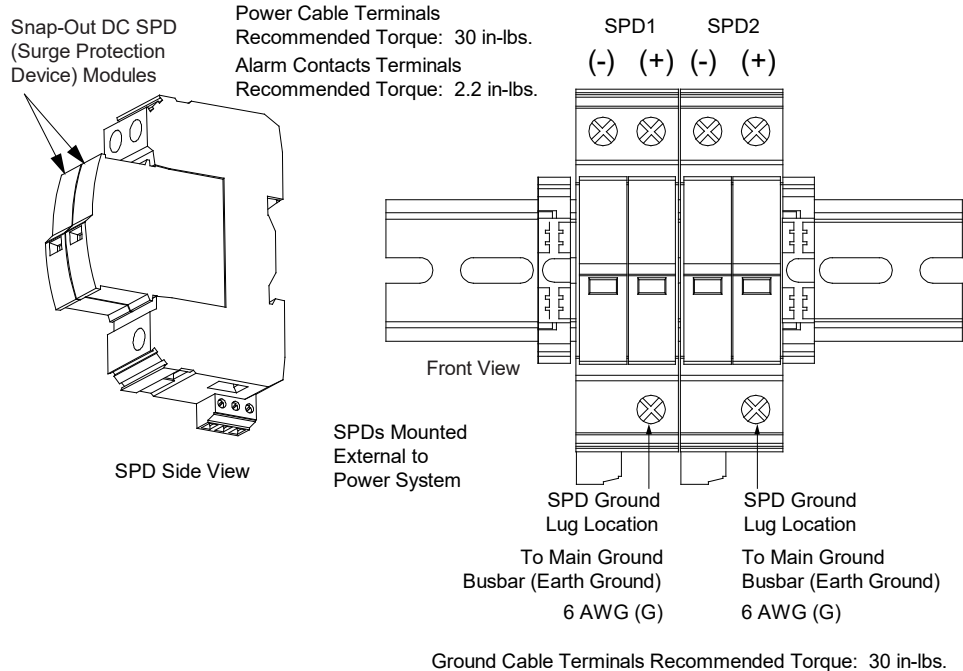


[] 4. Install the kit supplied DIN rail per site requirements. The SPDs will be mounted to the DIN rail. Typically install the DIN rail onto the enclosure the power system is mounted in. Customer must supply the DIN rail mounting hardware. Take the following into considerations when choosing a DIN rail mounting location:

- Wire lengths for "+", "-", and "Earth Ground" must be minimized.
- Tight bends in 6 AWG wire (less than 2" radius) must be avoided.

- [] 5. Slide the kit supplied SPD devices onto the DIN rail and secure at each end with a kit supplied DIN rail end clamp. Recommended torque for DIN rail end clamps is 15 in-lbs. Note that the two SPD devices are installed next to each other. See Figure 3.11 for a diagram.

Figure 3.11 Install SPD Devices to DIN Rail Kit P/N 60056702

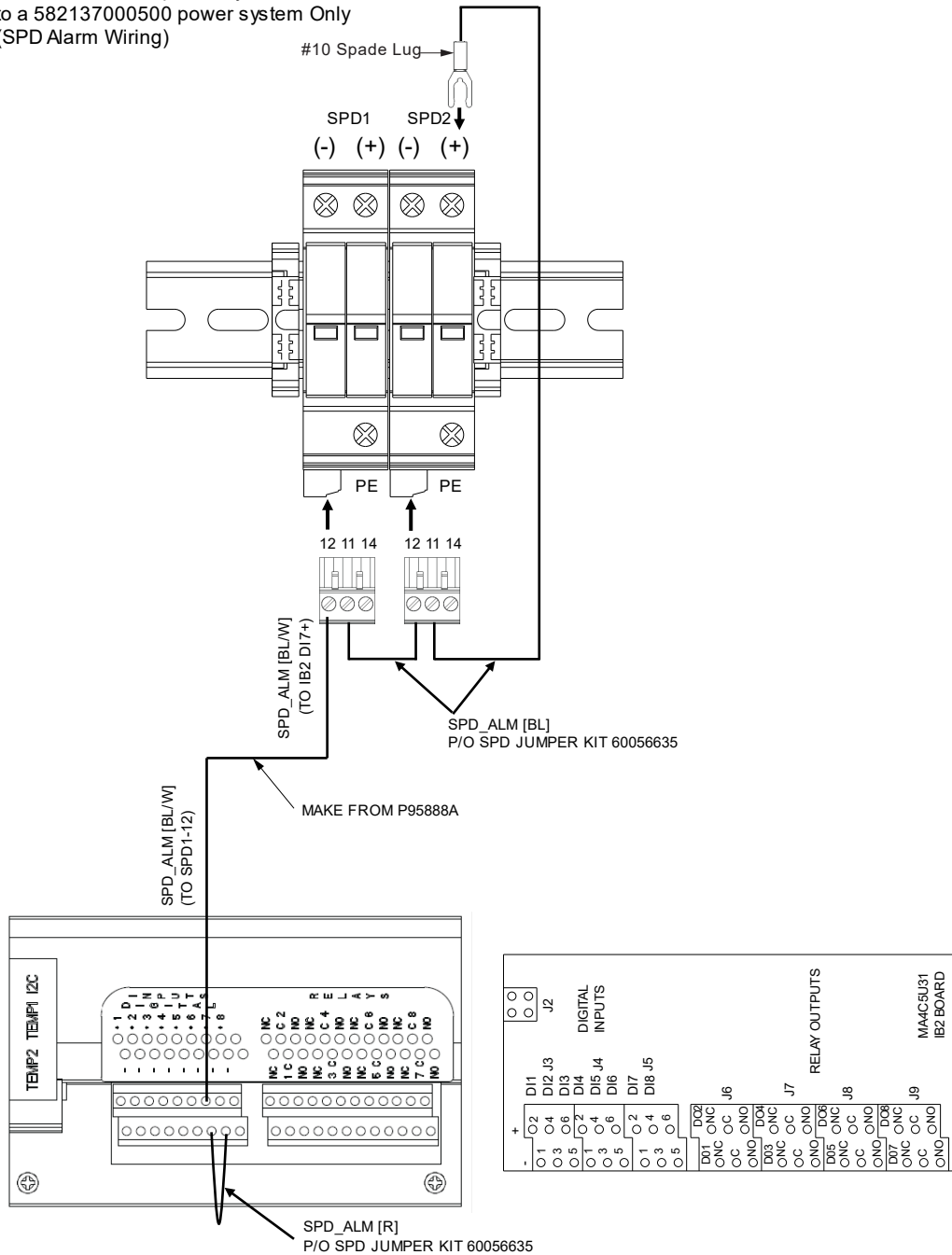


- [] 6. Install a kit supplied 75 A circuit breaker in the power system's -58 VDC distribution bus (typically Row 2 of the distribution cabinet). Take the following into considerations when choosing a circuit breaker mounting location: SPD location and the need to minimize SPD power cable lengths.
- [] 7. Connect the alarm jumpers provided in the P/N 60056635 alarm jumper kit supplied with the SPD kit as shown in Figure 3.12.
- Connect the SPD alarm contacts in series using the kit supplied blue alarm jumpers as shown in Figure 3.12. Recommended strip length is 0.25". Recommended torque is 2.2 in-lbs.
 - Connect SPD alarm contact terminal 11 of the last SPD to that SPD's "+" terminal as shown in Figure 3.12. Assemble blue alarm jumper with #10 spade lug to SPD "+" terminal slot (under the screw head). Terminal screw will be tightened later in the procedure after the black "+" 6 AWG wire is installed to the same terminal.
 - Jumper terminals J5-1 (DI7-) to J5-3 (DI8-) of the power system's IB2 controller interface board using the kit supplied red alarm jumper as shown in Figure 3.12. Recommended torque is 2.2 in-lbs.
- [] 8. Connect SPD alarm contact terminal 12 of the first SPD to the power system's IB2 controller interface board using the kit supplied alarm cable (P59888A) as shown in Figure 3.12.
- Trim cable insulation by 1.25" from cable end and discard insulation. Keeping the blue/white wire, trim back the other three wires and discard.
 - Strip the blue/white wire by 0.25".
 - Assemble blue/white wire to SPD alarm terminal 12. Recommended torque is 2.2 in-lbs.

- d) Route cable to IB2 board in the power system distribution unit. Cut the cable as required in order to reach IB2 DI7+ (IB2 terminal J5-2).
- e) Trim cable insulation by 1.25" from cable end and discard insulation. Keeping the blue/white wire, trim back the other three wires and discard.
- f) Strip the blue/white wire by 0.25".
- g) Assemble blue/white wire to IB2 DI7+ (IB2 terminal J5-2). Recommended torque is 2.2 in-lbs.

Figure 3.12 Connect SPD Alarm Contacts Wiring

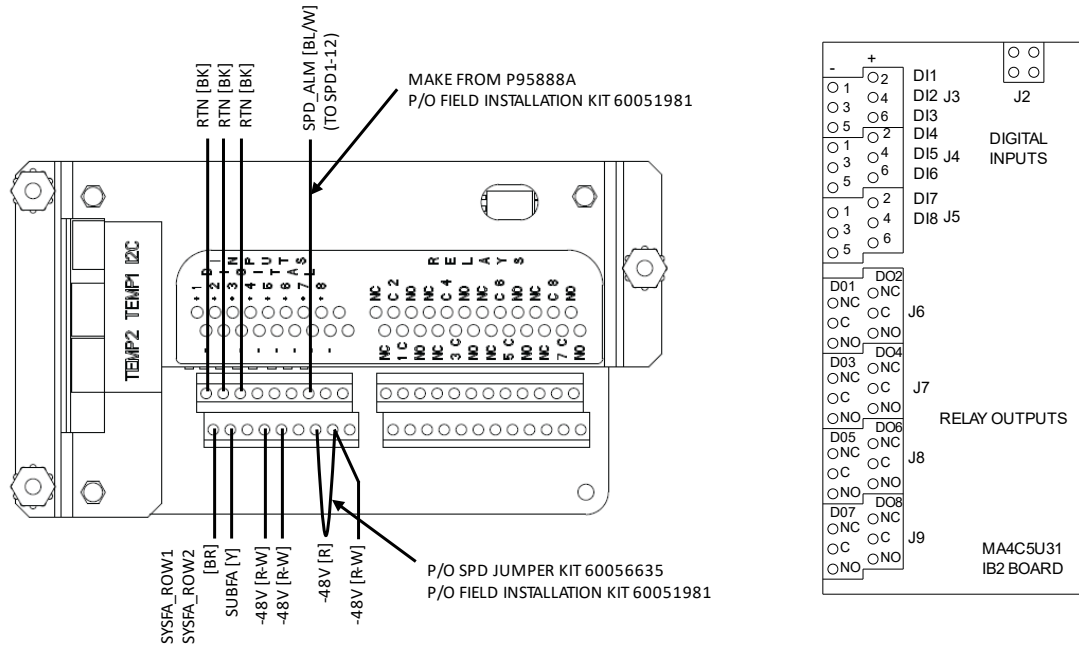
Kit P/N 60056702 for 582137000ZZ001 or 582137000ZZ007 power systems converted to a 582137000500 power system Only (SPD Alarm Wiring)



- [] 9. Refer to Figure 3.13 for typical IB2 controller interface board alarm connections.

Figure 3.13 Typical IB2 Controller Interface Board Alarm Connections

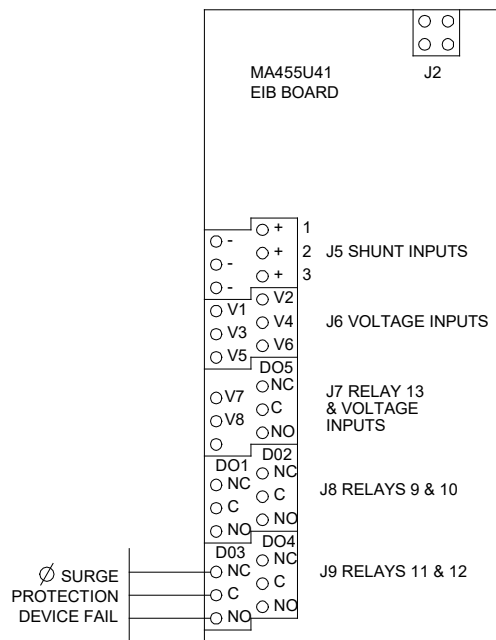
582137000500 SPD ALARM WIRING



- [] 10. Connect the EIB controller extended interface board to external surge protection device fail alarms as in Figure 3.14.

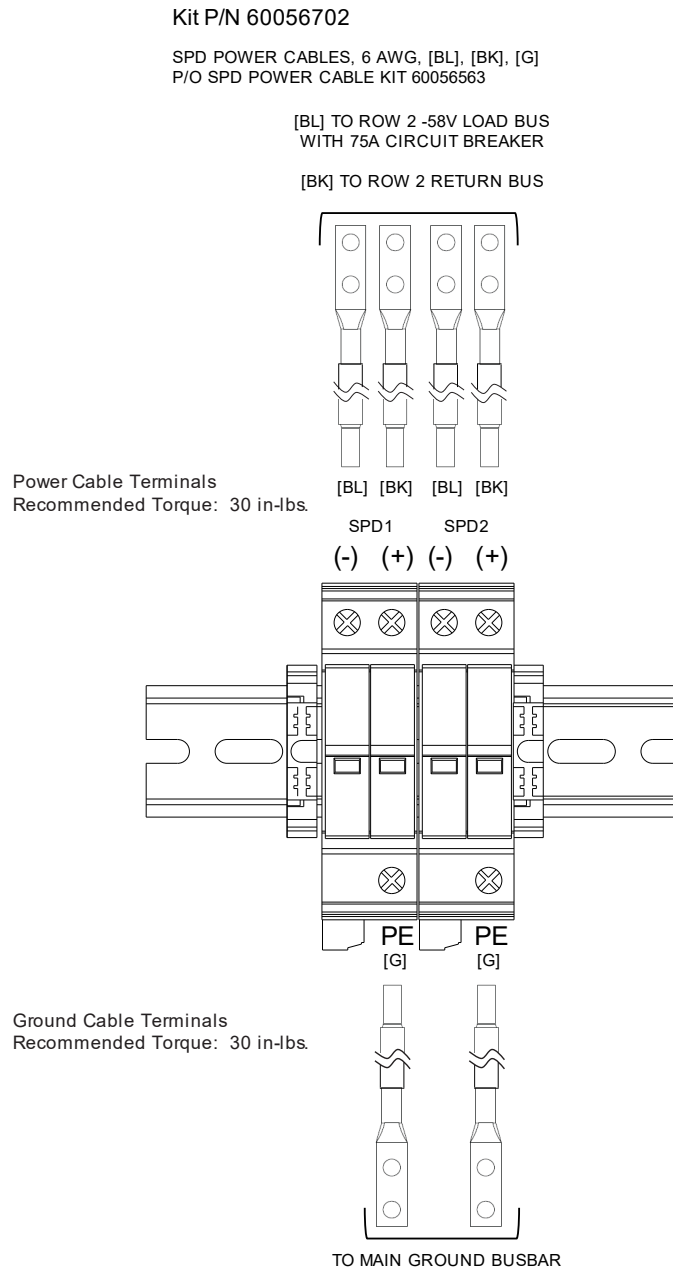
Figure 3.14 Connect EIB Controller Extended Interface Board to External Surge Protection Device Fail Alarms

Kit P/N 60056702 for 582137000500



- [] 11. Assemble the kit supplied 6 AWG SPD power and ground cables as follows. Refer to Figure 3.15.
 - a) Based on SPD mounting location, measure wire lengths from power system busbar to SPD. Cut the cable to length, strip 0.50" [12,7 mm] from the unterminated end, loosely assemble shrink tube (prior to 2-hole lug crimping), and crimp 2-hole lug onto the 6 AWG wire.
 - b) Apply heat to heat shrink tubing.
 - c) Assemble wire labels.
 - d) Repeat for each cable that needs assembled.

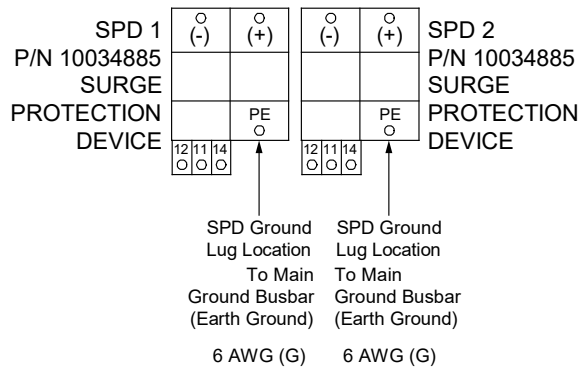
Figure 3.15 Assemble Kit Supplied 6 AWG SPD Power and Ground Cables



- [] 12. Connect each SPD device's PE terminal to the Main Ground Bar (Earth Ground) using the previously assembled kit supplied cables as shown in Figure 3.16.
 - a) Assemble 2-hole lugs to the Main Ground Bar (Earth Ground). Apply anti-oxidizing compound to busbar mating surfaces before assembling.
 - b) Assemble the other wire ends to the SPD as shown in Figure 3.16. The wire ends have factory-installed ferrules. Recommended torque is 30 in-lbs.

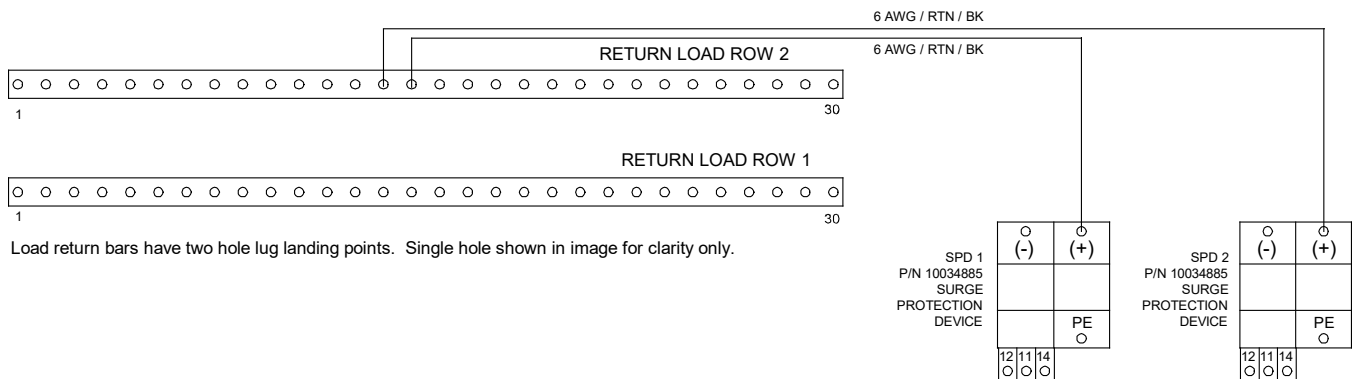
Figure 3.16 Installing SPD Ground Cables to Earth Ground

Kit P/N 60056702 for 582137000500



- [] 13. Connect each SPD device's (+) terminal to the power system's distribution load return bar using the previously assembled kit supplied cables as shown in Figure 3.17.
 - a) Assemble 2-hole lugs to power system load return busbar as shown in Figure 3.17. Apply anti-oxidizing compound to busbar mating surfaces before assembling. Recommended torque is 72 in-lbs using the kit supplied 1/4" flat washer, lock washers, and hex nuts.
 - b) Assemble the other wire ends to the SPD as shown in Figure 3.17. The wire ends have factory-installed ferrules. Recommended torque is 30 in-lbs.

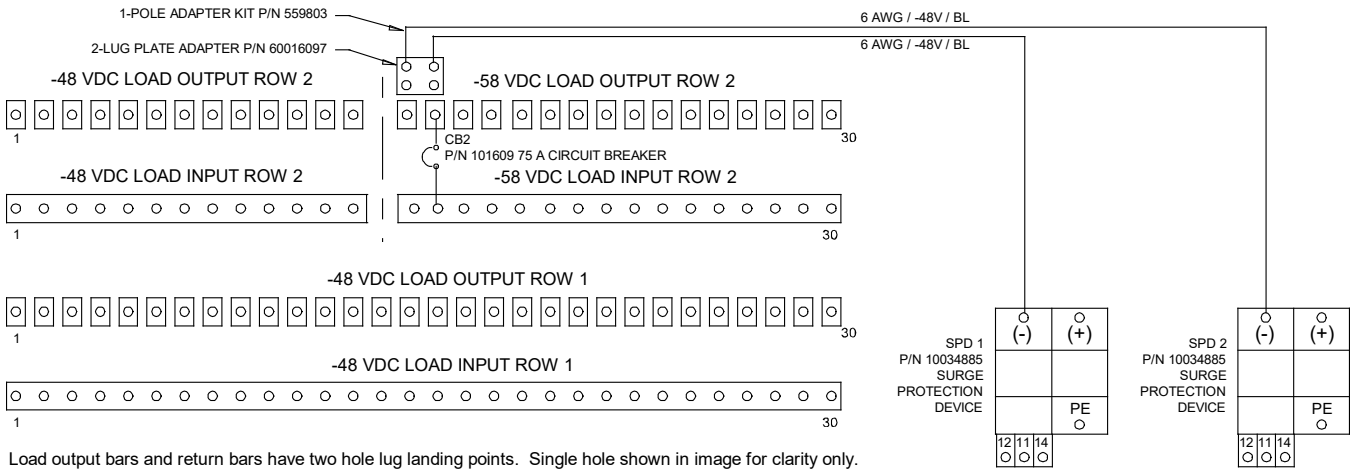
Figure 3.17 Installing SPD Power Cables to Return Bar



- [] 14. Connect each SPD device's (-) terminal to the 75 A circuit breaker previously installed on the power system's -58 VDC distribution bus using the previously assembled kit supplied cables as shown in Figure 3.18.
 - a) Assemble 2-hole lugs to power system bus bar as shown in Figure 3.18. Apply anti-oxidizing compound to busbar mating surfaces before assembling. Recommended torque is 72 in-lbs using the kit supplied 1/4" flat washer, lock washers, and hex nuts.
 - b) Assemble the other wire ends to the SPD as shown in Figure 3.18. The wire ends have factory-installed ferrules. Recommended torque is 30 in-lbs.

Figure 3.18 Installing SPD Power Cables to 75 A Circuit Breaker

Kit P/N 60056702 for 582137000500



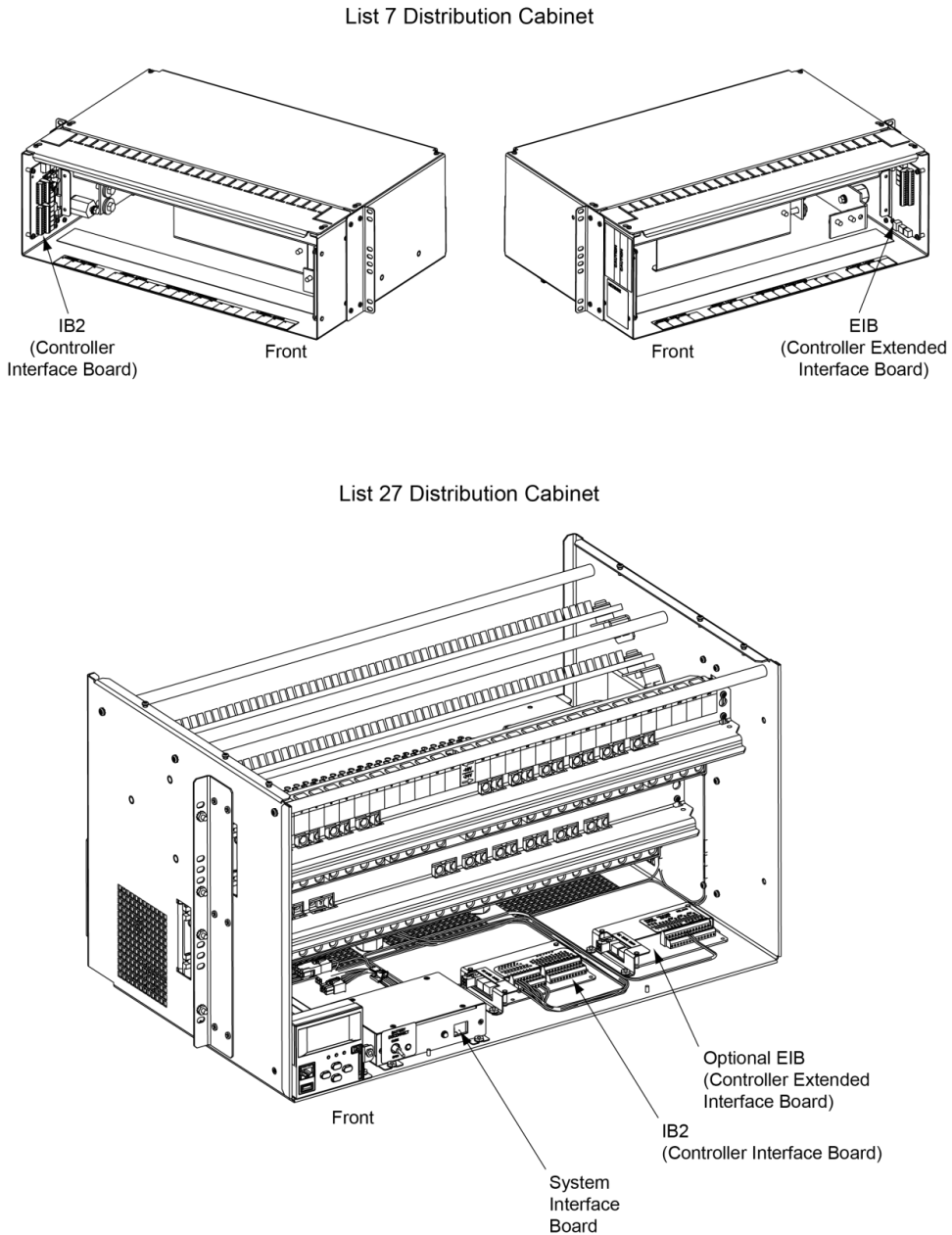
- [] 15. Dress and secure the installed cables with the kit supplied cable ties, as required.
- [] 16. Enable the external alarms or notify appropriate personnel that this procedure is finished.
- [] 17. Ensure that there are no local or remote alarms active on the system.

4 Setting Jumpers and Switch Options

4.1 Circuit Card Locations

Refer to Figure 4.1.

Figure 4.1 Circuit Card Locations



4.2 Jumpers on System Interface Circuit Card in a List 27 Distribution Cabinet

Perform the following procedures to verify the factory settings and/or make the required settings per your site requirements. These procedures can also be used to make adjustments on a replacement circuit card.

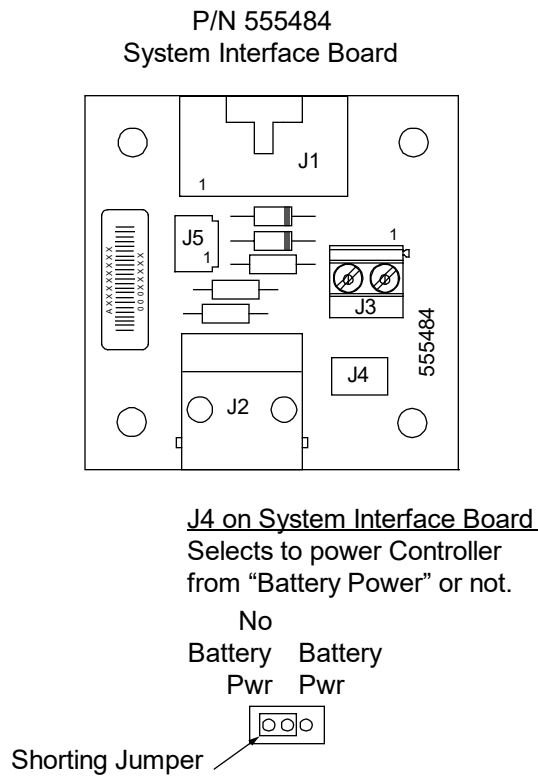
Controller Power Option

The controller is always powered from the internal “system” bus. A jumper option allows the controller to be also powered by battery. Battery power allows the controller to stay running in the event rectifiers are off or battery LVD opens (if installed). Note that if powering the controller from battery, the battery will drain if rectifiers are off or battery LVD opens (if installed). The controller’s power consumption is 5W.

Procedure

1. To access the jumper, remove the top cover from the System Interface Board housing. Refer to Figure 4.1 for location.
2. Refer to Figure 4.2 and place the jumper on J4 in the “Battery Pwr” or “No Battery Pwr” position.

Figure 4.2 System Interface Board Jumper Location and Settings



4.3 Switch Settings on IB2 (Controller Interface Board) in a List 7 or List 27 Distribution Cabinet

Dip Switch SW1 on the IB2 board is used to set the communications address for this board. Refer to Table 4.1 for SW1 settings. Refer to Figure 4.1 for circuit card location. Refer to Figure 4.3 for SW1 location.

Perform the following procedure to verify the factory settings. This procedure can also be used to make adjustments on a replacement circuit card.

Procedure

1. Ensure SW1 is set per Table 4.1. Refer to Figure 4.3 for location.

Table 4.1 IB2 Interface Board Switch Settings

Setting	DIP Switch SW1	
	1	2
IB2	OFF	OFF

4.4 Switch Setting on EIB (Controller Extended Interface Board) in a List 7 or List 27 Distribution Cabinet

Dip Switch SW1 on the EIB board is used to set the communications address for this board. Refer to Table 4.2 for SW1 settings. Refer to Figure 4.1 for circuit card location. Refer to Figure 4.4 for SW1 location.

Perform the following procedure to verify the factory settings.

This procedure can also be used to make adjustments on a replacement circuit card.

Procedure

1. Ensure SW1 is set per Table 4.2. Refer to Figure 4.4 for location.

Table 4.2 EIB Extended Interface Board Switch Settings

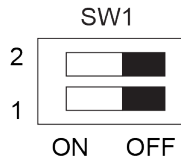
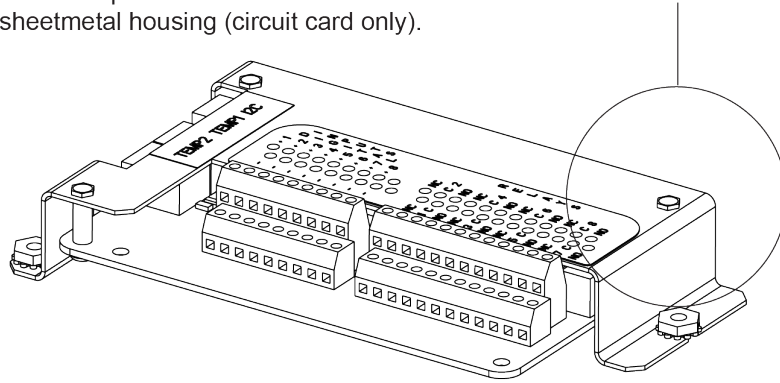
Setting	DIP Switch SW1	
	1	2
EIB	ON	OFF

Figure 4.3 IB2 Interface Board Switch Location and Settings

IB2 Assembly (ISO View)
 (Controller Interface Board)
 in a List 27 Distribution Cabinet

Note: In a List 7 Distribution Cabinet,
 the IB2 is provided without the
 sheetmetal housing (circuit card only).

Switch SW1 is located in
 this corner of the IB2 circuit card.



Setting	DIP Switch SW1	
	1	2
IB2	OFF	OFF

IB2 Circuit Card (Top View)
 (Controller Interface Board)

SW1
 In this system, switch settings
 must be in positions shown.

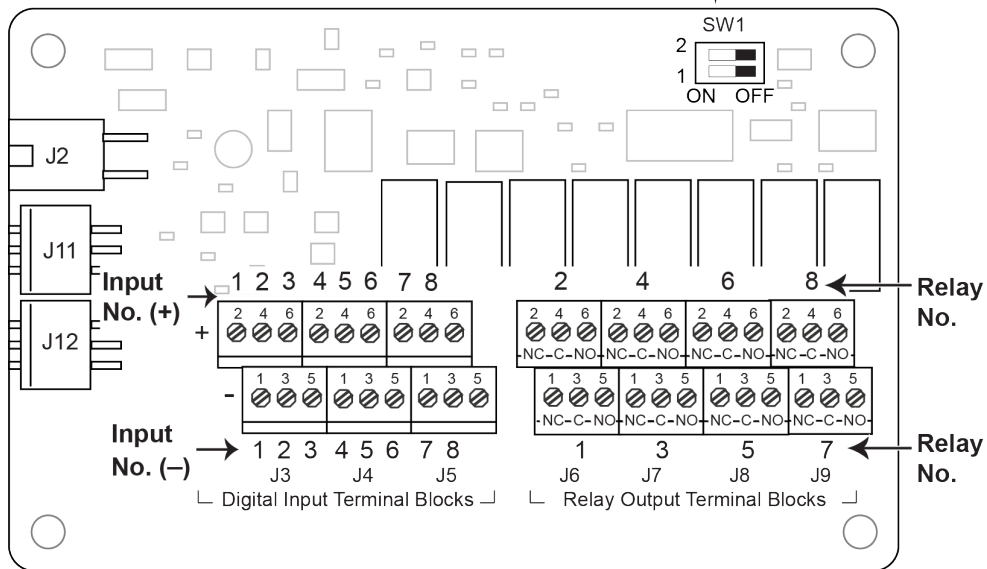
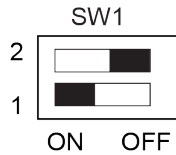
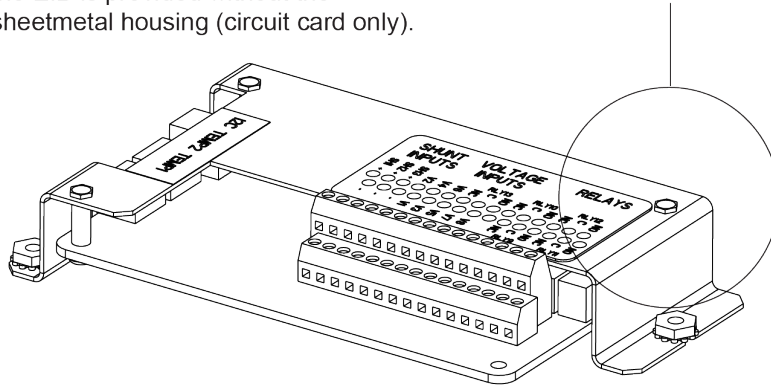


Figure 4.4 EIB Extended Interface Board Switch Location and Settings

EIB Assembly (ISO View)
 (Controller Extended Interface Board)
 in a List 27 Distribution Cabinet

Note: In a List 7 Distribution Cabinet,
 the EIB is provided without the
 sheetmetal housing (circuit card only).

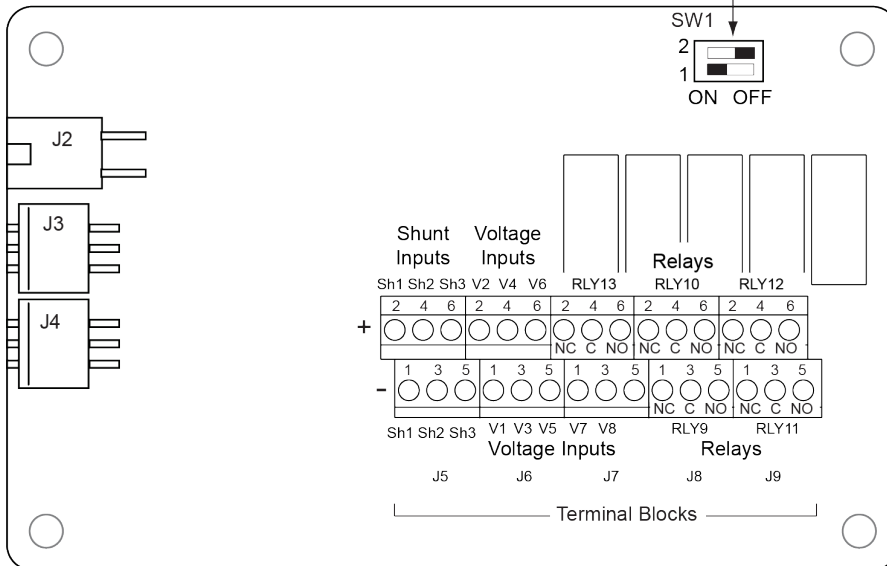
Switch SW1 is located in
 this corner of the EIB circuit card.



Setting	DIP Switch SW1	
	1	2
EIB	ON	OFF

EIB Circuit Card (Top View)
 (Controller Extended Interface Board)

SW1
 In this system, switch settings
 must be in positions shown.



5 Making Electrical Connections

5.1 Important Safety Instructions



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

5.2 Wiring Considerations

All wiring and branch circuit protection should follow the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), and applicable local codes. For operation in countries where the NEC is not recognized, follow applicable codes.

For wire size, branch circuit protection, crimp lug, and general wiring recommendations; refer to System Application Guide SAG582137000 and Power Data Sheet PD588705300.

Refer to Table 5.1 for supplemental lug crimping information when using the special application crimp lug / strap combination.

Table 5.1 Supplemental Lug Crimping Information when Using the Special Application Crimp Lug / Strap Combination

Crimp Lug Part No.		Crimp Tool Required ¹ , T&B Model TBM12 or TBM15 Hydraulic Heads		
		Color Key	Die Index/ Code No.	Die Cat. Number
245393500	Burndy: YA25L-4TCG1	Pink	42H	15508
245393600	Burndy: YA26L-4TCG1	Black	45	15526
245393700	Burndy: YA27L-4TCG1	Orange	50	15530
245393800	Burndy: YA28L-4TCG1	Purple	54H	15511
514872	T & B: 256-30695-1879	Yellow	62	15510
	Burndy: YA29L-4TCG1			
514873	T & B: 256-30695-1880	Red	71	15514
	Burndy: YA31L-4TCG1			

¹ The lugs should be crimped to the specifications given in the manufacturer's instructions furnished with the crimp tool or lug.

5.3 Relay Rack / Cabinet Frame Grounding Connection

For relay rack / cabinet grounding requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), applicable local codes, and your specific site requirements.



NOTE! The DC return connection to this system can remain isolated from system frame and chassis (DC-I).



NOTE! This system is suitable for installation as part of the Common Bonding Network (CBN).

5.4 Central Office Ground Connection

Landing points are provided on the battery return bus for a central office ground lead (see Figure 5.30 or Figure 5.31). For central office grounding requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), applicable local codes, and your specific site requirements.

5.5 Ground Connection to a Transient Voltage Surge Suppressor (TVSS) Devices

Refer to the procedure in “Installation and Wiring of a Transient Voltage Surge Suppressor (TVSS) Device” on page 11.

5.6 AC Input and AC Input Equipment Grounding Connections to 588705300 Module Mounting Shelf(s)

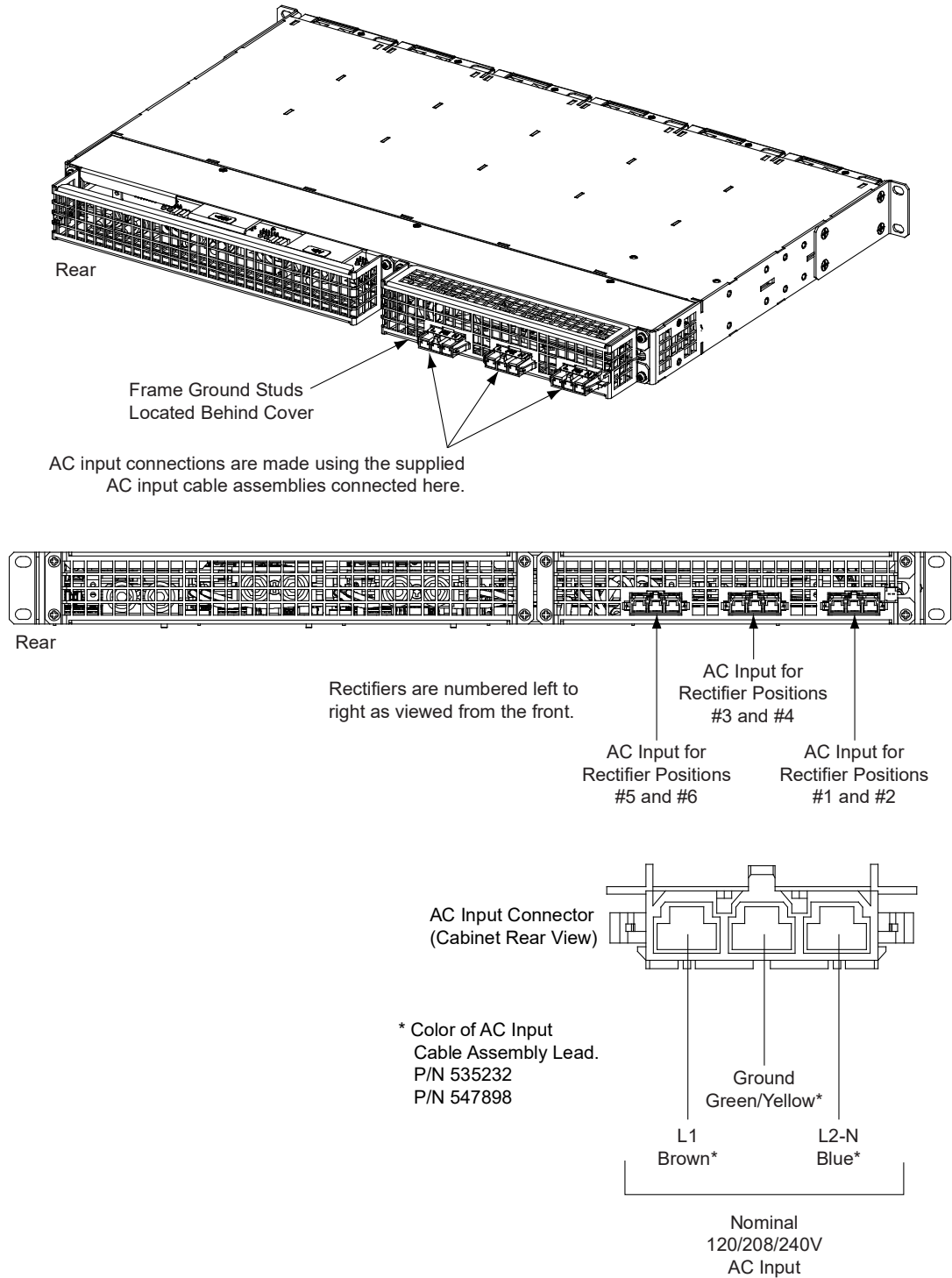


DANGER! Adhere to the “Important Safety Instructions” starting on page vi.

There are several options to provide AC inputs to the 588705300 module mounting shelf. See PD588705300.

1. For factory installed module mounting shelves without plug-in AC input connectors, AC input leads are factory connected from the module mounting shelf AC input terminals to an AC input termination assembly provided in the system/cabinet. Refer to the system/cabinet documentation for connection details to the AC input termination assembly. Refer to the system/cabinet documentation for recommended AC input branch circuit protection.
2. For a field installed module mounting shelf in a system with a List 27 distribution cabinet or if a List 7 distribution cabinet system is used in a relay rack and not a system cabinet, the module mounting shelf is equipped with plug-in AC input connectors located on the rear of the shelf. AC input cable assemblies with mating connectors are available (see Power Data Sheet PD588705300). Refer to Power Data Sheet PD588705300 for recommended AC input branch circuit protection. See PD588705300 and Figure 5.1.

Figure 5.1 AC Input Connections to Module Mounting Shelf with Plug-In AC Input Connectors



5.7 External Alarm, Reference, Monitoring, and Control Connections

5.7.1 Circuit Card Locations

Refer to Figure 5.2 or Figure 5.3.

Figure 5.2 Circuit Card Locations - List 27 Distribution Cabinets

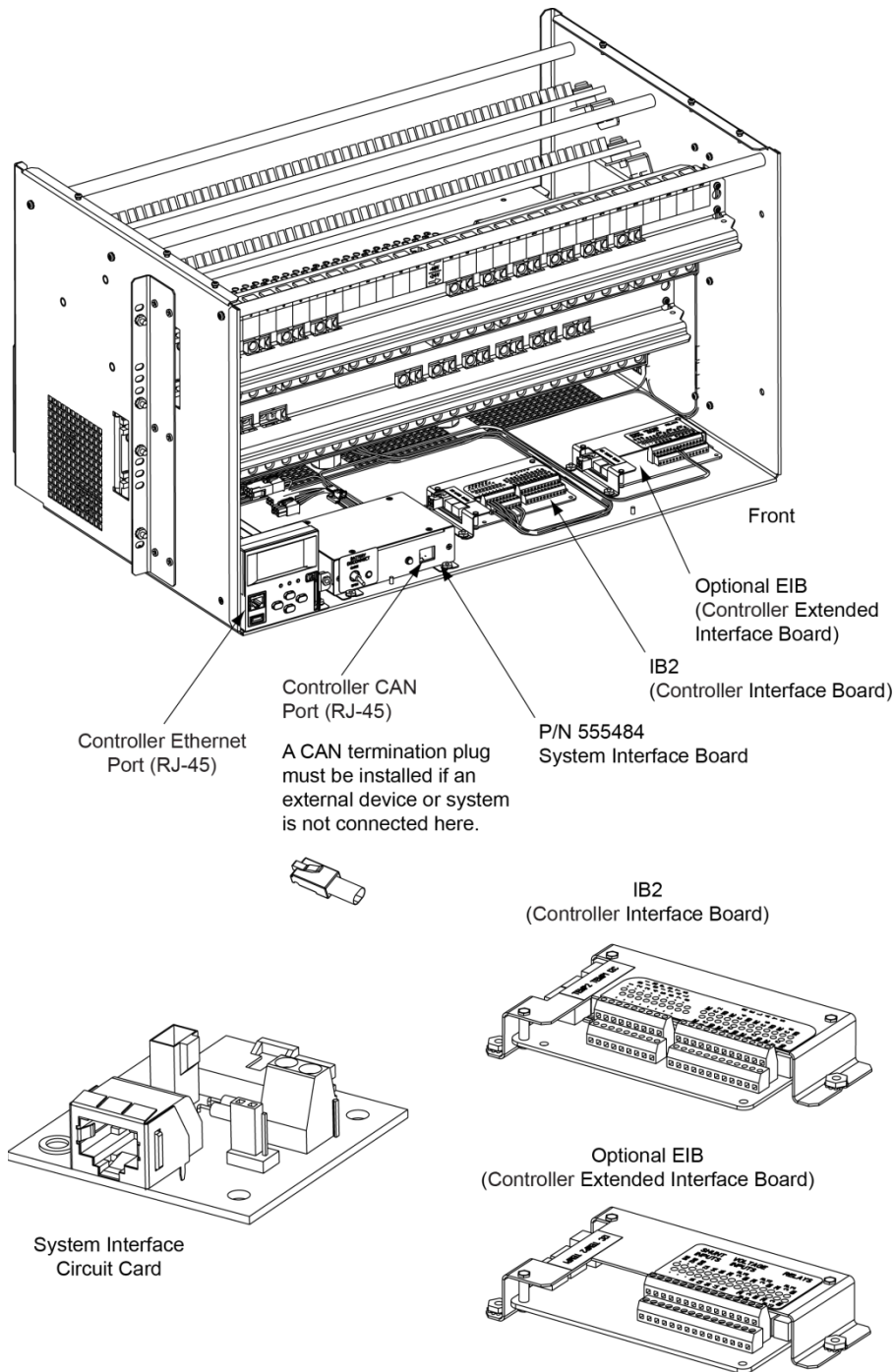
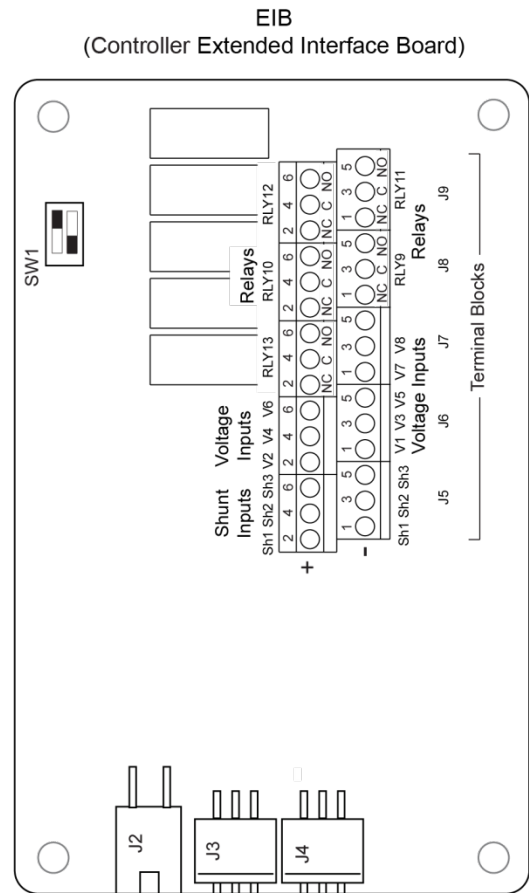
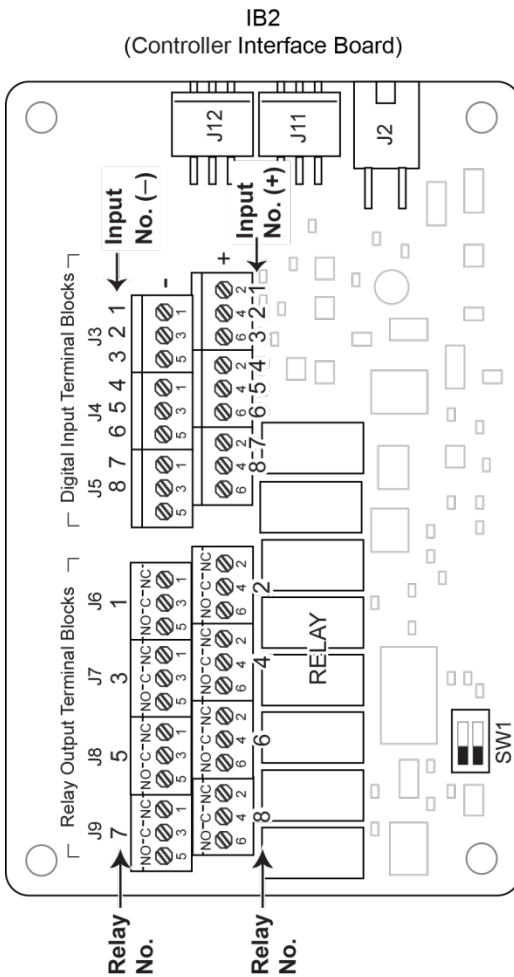
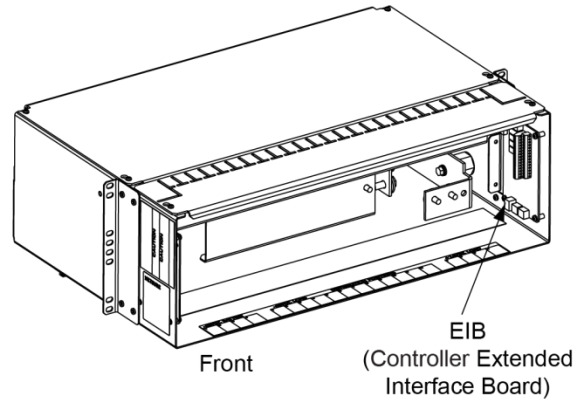
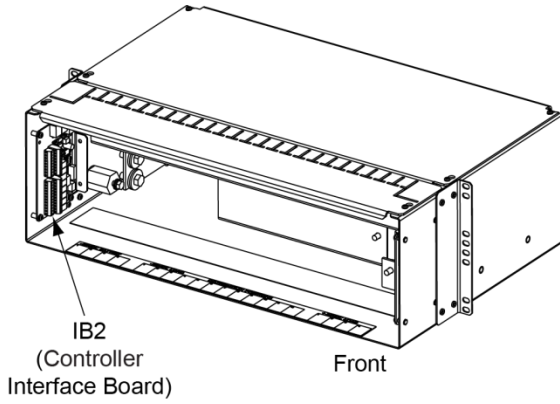


Figure 5.3 Circuit Card Locations - List 7 Distribution Cabinet

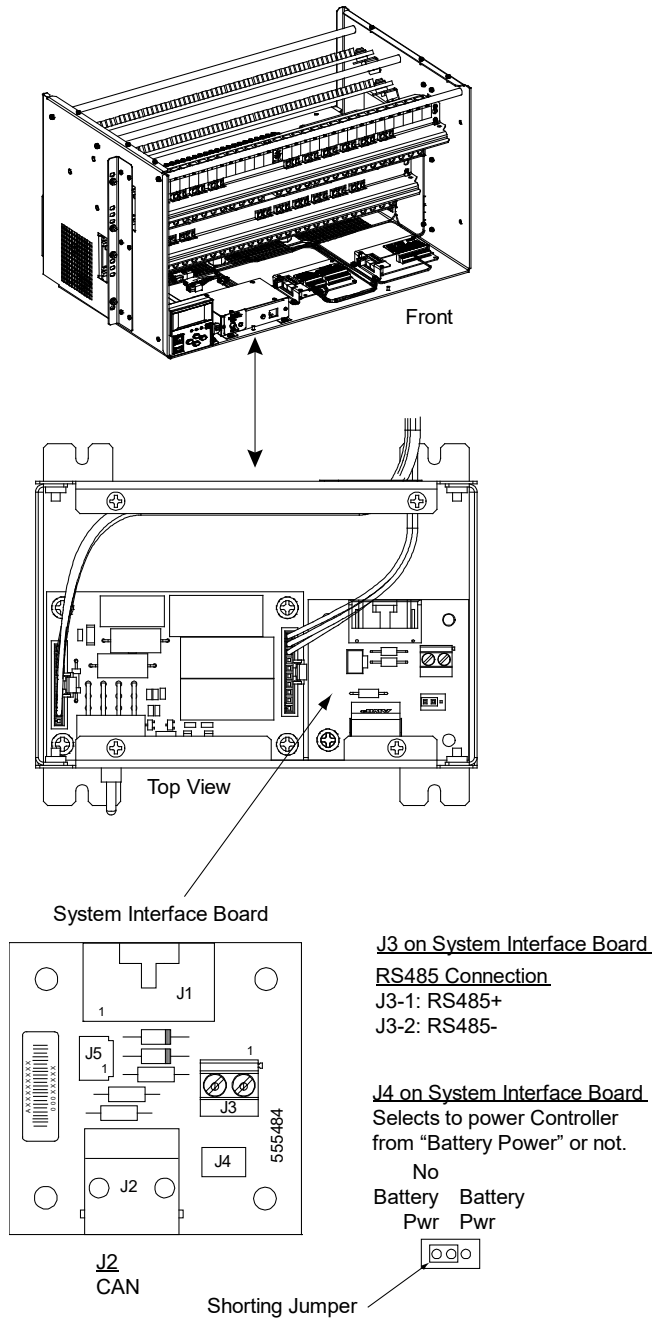


5.7.2 System Interface Circuit Card Connections (If Required) (List 27 Distribution Cabinet Only)

The System Interface Circuit Card provides connections for the following. Refer to Figure 5.2 for circuit card location. Refer to Figure 5.4 for connections location.

- RS-485 (used for communication with SM modules)

Figure 5.4 System Interface Circuit Card Connections



5.7.3 IB2 (Controller Interface Board) Connections (If Required)

The IB2 (Controller Interface Board) provides connection points for digital inputs, programmable relay outputs, and temperature probes. The IB2 interface board is mounted inside the distribution cabinet. Refer to Figure 5.2 or Figure 5.3.

Digital Inputs and Programmable Relay Outputs

Digital input and relay output leads are connected to screw-type terminal blocks located on the IB2. Recommended torque for these connections is 2.2 in-lbs. Refer to Figure 5.5 for terminal locations. Refer to Table 5.2 and Table 5.3 for pin-out information.

Digital Inputs

Connect up to eight (8) digital inputs to the IB2. Note that you must supply both paths for the digital input (either a positive or a negative signal and the opposite polarity return path). Observe proper polarity. Refer to Figure 5.5 for terminal locations and Table 5.2 for pin-out information.

The digital inputs can be programmed to provide an alarm when the signal is applied (HIGH) or removed (LOW). Refer to the Controller Instructions (UM1M830BNA) for programming information.

Digital Input Ratings: Refer to the following.

- a) Maximum Voltage Rating: 60 VDC.
- b) Active High: > 19 VDC.
- c) Active Low: < 1 VDC.

The digital inputs may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.

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, shuts down and locks out the optional -48 VDC to +24 VDC converters or optional -48 VDC to -58 VDC converters, 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 (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 and optional -48 VDC to +24 VDC converters or optional -48 VDC to -58 VDC converters 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). To restart the -48 VDC to +24 VDC converters or -48 VDC to -58 VDC converters: remove the converter, wait 30 seconds or more (until the LEDs on the converter extinguish), then re-insert the converter.

For Systems Containing a Battery LVD: When the ESTOP signal is removed, LVD contactors (battery and load type) will remain open. Rectifiers and optional -48 VDC to +24 VDC converters or optional -48 VDC to -58 VDC converters 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) and the -48 VDC to +24 VDC converters or -48 VDC to -58 VDC converters will restart.



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.*

Programmable Relay Outputs

The IB2 provides eight (8) programmable alarm relays with dry Form-C contacts. Connect up to eight (8) relay outputs to the IB2. Refer to Figure 5.5 for terminal locations and Table 5.3 for pin-out information.

Refer to the Controller Instructions (UM1M830BNA) for programming information.

Relay Ratings: Refer to the following.

- a) Steady State: 0.5 A @ 60 VDC; 1.0 A @ 30 VDC.
- b) Peak: 3 A @ 30 VDC.

The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.

Temperature Probes



NOTE! Each temperature probe consists of two or three pieces that plug together to make a complete probe. See SAG582137000 for part numbers and descriptions.

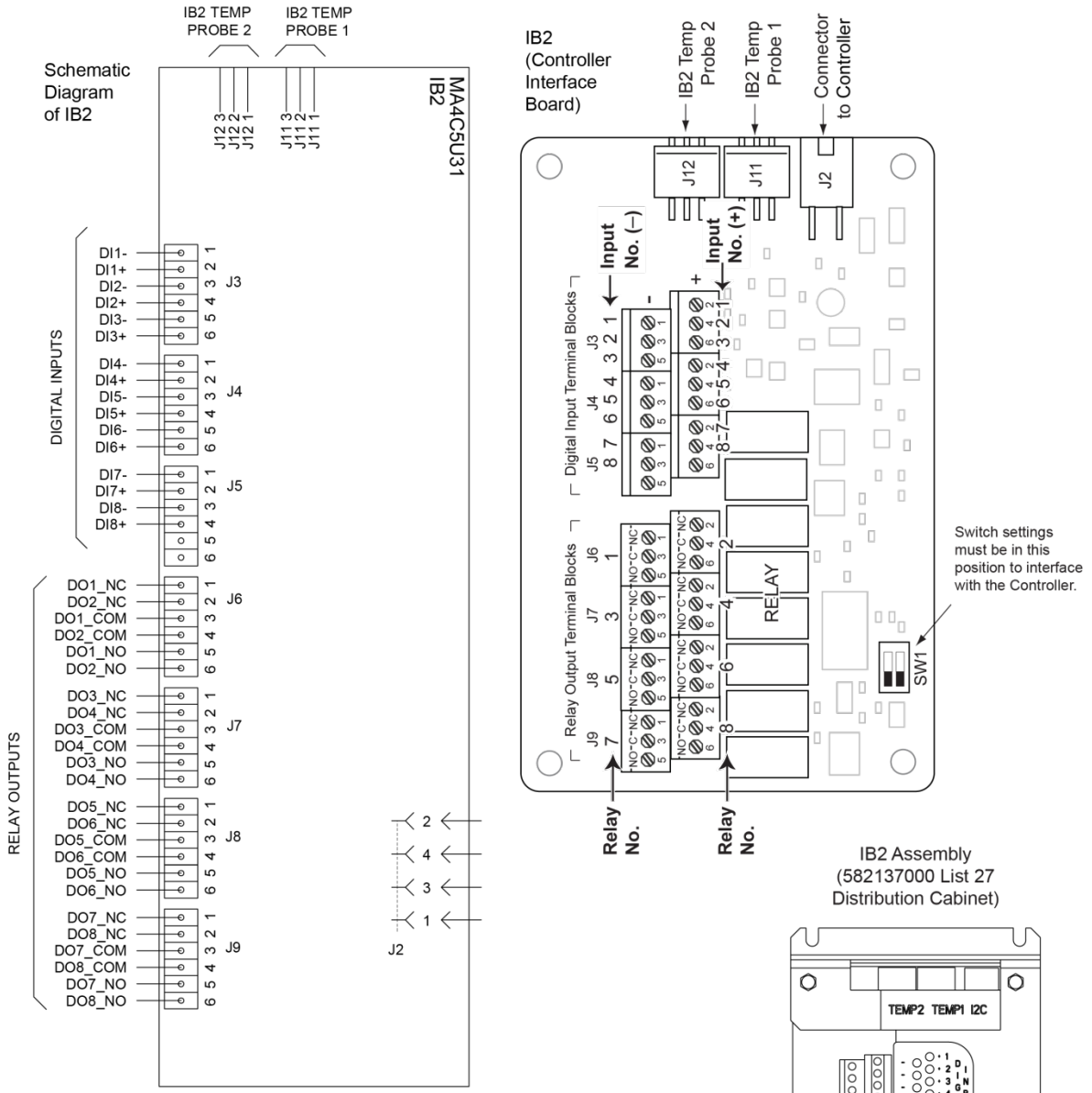
Temperature probes are connected to the IB2 (Controller Interface Board) and/or EIB (Controller Extended Interface Board) mounted inside the distribution cabinet.

Up to two (2) temperature probes can be connected to the IB2. Up to two (2) additional temperature probes can be connected to the EIB. Any combination of the four (4) temperature probes can be programmed to monitor ambient temperature and/or battery temperature. A temperature probe set to monitor battery temperature can also be used for the rectifier battery charge temperature compensation feature, or the battery charge temperature compensation feature can be programmed to use the average or highest value of all battery temperature probes. The battery charge temperature compensation feature allows the controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. A temperature probe set to monitor battery temperature can also be used for the BTRM (Battery Thermal Runaway Management) feature. The BTRM feature lowers output voltage when a high temperature condition exists to control against battery thermal runaway.

The temperature sensor end of the probe contains a tab with a 5/16" clearance hole for mounting.

A temperature probe programmed to monitor battery temperature should be mounted on the negative post of a battery cell to sense battery temperature. A temperature probe used for battery charge temperature compensation and/or BTRM (Battery Thermal Runaway Management) should also be mounted on the negative post of a battery cell. A temperature probe programmed to monitor ambient temperature should be mounted in a convenient location, away from direct sources of heat or cold.

Figure 5.5 IB2 (Interface Board) Connections



* The controller's relay assigned to "Critical Summary" alarm (relay 1 by default) will operate in the "Fail Safe Mode". "Fail Safe Mode" means Relay 1 is de-energized during an alarm condition, opening the contacts between the C and NO terminals, and closing the contacts between the C and NC terminals.

The controller's remaining seven (7) relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.

Not all I/O points are available for customer connection (some are used for factory system connections).

J3-J9:

Wire Size Capacity: 16-26 AWG.

Recommended Torque: 2.2 in-lbs.

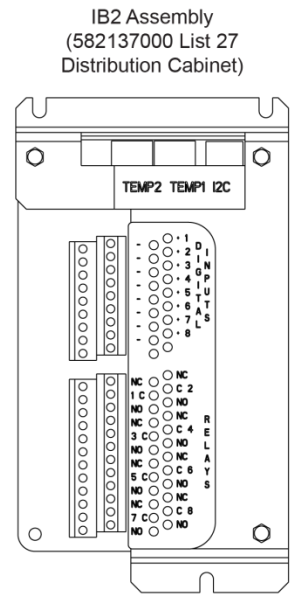


Table 5.2 Programmable Digital Inputs – IB2

Programmable Digital Input	IB2 Pin No.		Factory Wiring	Default Digital Input Function	Customer Defined Digital Input Function
1	J3-2	+	The digital inputs may be preprogrammed for specific functions and have factory wiring connected. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.	The digital inputs may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.	
	J3-1	-			
2	J3-4	+			
	J3-3	-			
3	J3-6	+			
	J3-5	-			
4	J4-2	+			
	J4-1	-			
5	J4-4	+			
	J4-3	-			
6	J4-6	+			
	J4-5	-			
7	J5-2	+			
	J5-1	-			
8	J5-4	+	(to customer ESTOP switch)	ESTOP	
	J5-3	-	-48 VDC		
--	J5-5		not used	not used	not used
--	J5-6				



NOTE! -48V is factory wired to the Digital Input #8 (-) terminal for your convenience and function predefined for ESTOP. Customer-furnished system ground applied to terminal Digital Input #8 (+) activates the ESTOP function. See “ESTOP Function” on page 32.

Table 5.3 Programmable Relay Outputs – IB2

Programmable Relay Output		IB2 Pin No.	Alarms Assigned to this Relay (Default)	Alarms Assigned to this Relay (Custom)							
1	NO	J6-5	The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.								
	COM	J6-3									
	NC	J6-1									
2	NO	J6-6		The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.							
	COM	J6-4									
	NC	J6-2									
3	NO	J7-5			The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.						
	COM	J7-3									
	NC	J7-1									
4	NO	J7-6				The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.					
	COM	J7-4									
	NC	J7-2									
5	NO	J8-5					The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.				
	COM	J8-3									
	NC	J8-1									
6	NO	J8-6						The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.			
	COM	J8-4									
	NC	J8-2									
7	NO	J9-5							The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.		
	COM	J9-3									
	NC	J9-1									
8	NO	J9-6								The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.	
	COM	J9-4									
	NC	J9-2									



NOTE! -The controller's relay assigned to "Critical Summary" alarm (relay 1 by default) will operate in the "Fail Safe Mode". "Fail Safe Mode" means Relay 1 is de-energized during an alarm condition, opening the contacts between the C and NO terminals, and closing the contacts between the C and NC terminals.

The controller's remaining 7 relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.

5.7.4 EIB (Controller Extended Interface Board) Connections (If Required)

The EIB (Controller Extended Interface Board) provides additional connection points for voltage and current inputs, programmable relay outputs, and temperature probes. The EIB extended interface board is mounted inside the distribution cabinet. Refer to Figure 5.2 or Figure 5.3.

Current Inputs, Voltage Inputs, and Programmable Relay Outputs

Current input, voltage input, and relay output leads are connected to screw-type terminal blocks located on the EIB. Recommended torque for these connections is 2.2 in-lbs. Refer to Figure 5.7 for terminal locations. Refer to Table 5.4, Table 5.5, and Table 5.6 for pin-out information.

Current Inputs

Connect up to three (3) shunt inputs to the EIB. Observe proper polarity. Refer to Figure 5.7 for terminal locations and Table 5.4 for pin-out information.

Refer to the Controller Instructions (UM1M830BNA) and program the shunt input parameters found in the EIB menu.



NOTE! The shunt needs to be installed in the hot (-48V) bus. Connect the plus side of the shunt to the positive shunt input on the EIB. Connect the negative side of the shunt to the negative shunt input on the EIB.

Voltage Inputs for Battery Block and Battery Midpoint Monitoring

The controller can monitor battery blocks (12V blocks) or midpoint battery voltage of battery strings connected to the EIB. The EIB provides a total of eight (8) DC voltage inputs for these connections. An alarm is issued when either battery block voltage or battery midpoint voltage is abnormal. Refer to Figure 5.7 for terminal locations and Table 5.5 for pin-out information.

Refer to Figure 5.6 for connection details. Refer to the Controller Instructions (UM1M830BNA) and program the following parameters.



NOTE! When using Battery Block Monitoring, you must make connections to all blocks.

- **Battery Block Monitoring**

Voltage Type: Set to "48 (Block 4)". This selects the EIB to monitor up to two (2) 48V battery strings with four (4) 12V blocks per string.

BlockVDiff(12V): This menu item appears if "48 (Block 4)" is selected above. Set to the alarm threshold for battery block monitoring per site requirements. The controller issues an alarm when any block voltage of any battery string has an abnormal value. The alarm is issued when the difference between any block voltage and a reference voltage is greater than the value of the block voltage difference setting.

Block In-Use: Set to the number of 12V battery blocks being used.

- **Midpoint Monitoring**

Voltage Type: Set to "Midpoint". This selects the EIB to monitor the midpoint voltage of up to eight (8) battery strings.

BlockVDiff(Mid): This menu item appears if "Midpoint" is selected above. Set to the alarm threshold for battery midpoint monitoring per site requirements. The controller issues an alarm when any battery midpoint voltage of any battery string has an abnormal value. The alarm is issued when the difference between any battery midpoint voltage and a reference voltage is greater than the value of the block voltage difference setting.

Block In-Use: Set to number of 12V battery blocks being used.

Programmable Relay Outputs

The EIB provides five (5) programmable alarm relays with dry Form-C contacts. Connect up to five (5) relay outputs to the IB2. Refer to Figure 5.7 for terminal locations and Table 5.5 for pin-out information.

Refer to the Controller Instructions (UM1M830BNA) for programming information.

Relay Ratings: Refer to the following.

- a) Steady State: 0.5 A @ 60 VDC; 1.0 A @ 30 VDC.
- b) Peak: 3 A @ 30 VDC.

The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.

Temperature Probes

Temperature probes can be connected to the EIB (Controller Extended Interface Board) mounted inside the distribution cabinet. Refer to "Temperature Probes" on page 33.

Figure 5.6 Sample Battery Block or Battery Midpoint Monitoring Connections

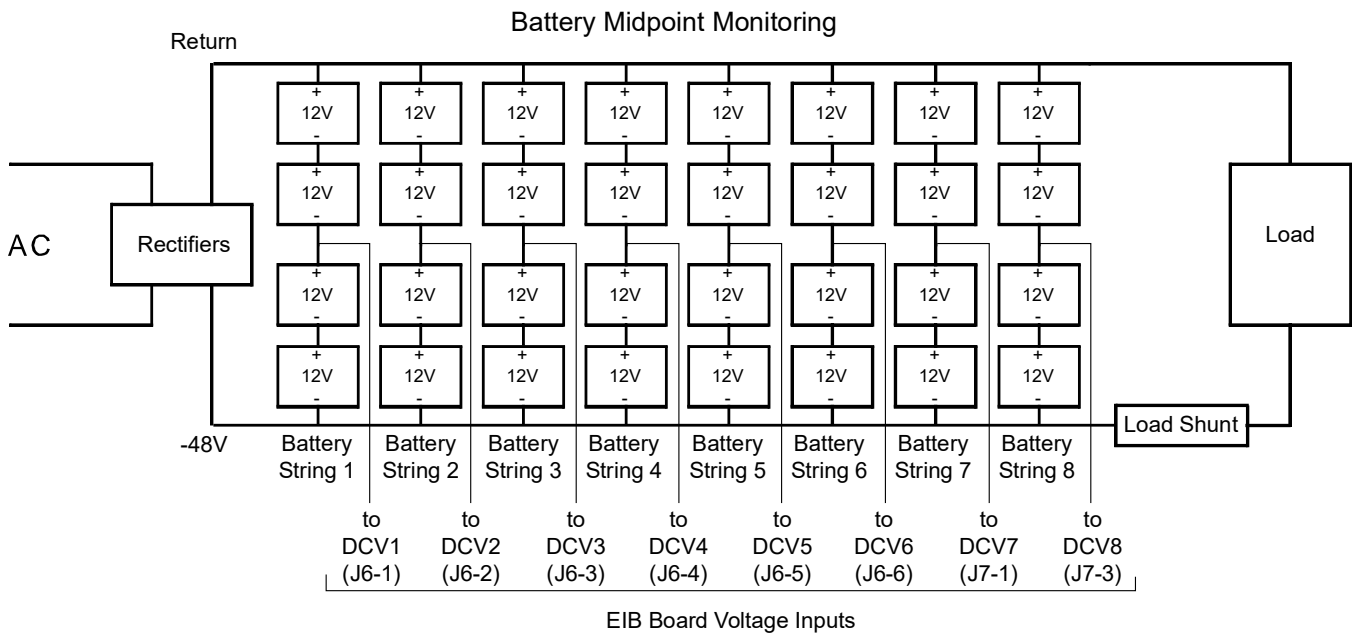
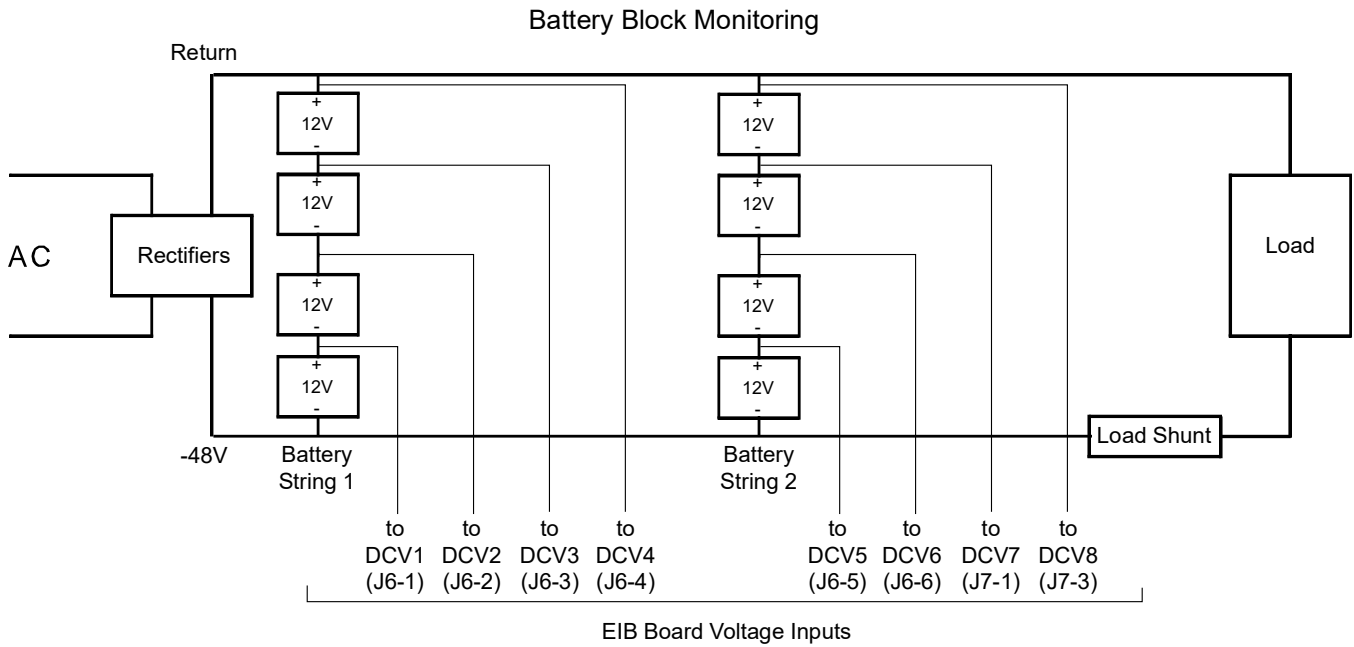


Figure 5.7 EIB (Extended Interface Board) Connections

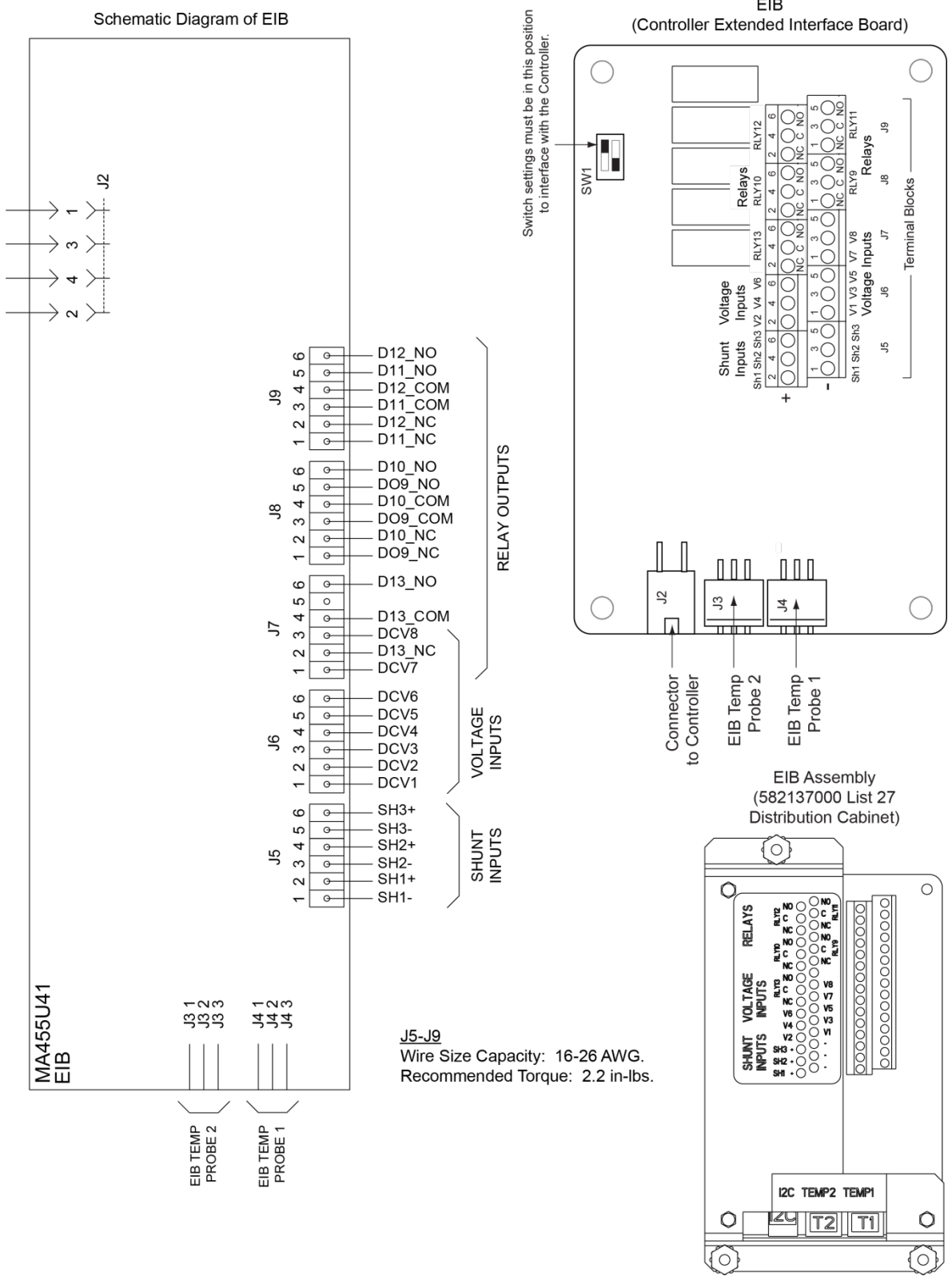


Table 5.4 Shunt Inputs – EIB


Shunt Input	EIB Pin No.		Factory Wiring	Default Function	Customer Defined Function
Sh1	J5-2	+	--	none	
	J5-1	-	--		
Sh2	J5-4	+	--	none	
	J5-3	-	--		
Sh3	J5-6	+	--	none	
	J5-5	-	--		

Table 5.5 Voltage Inputs – EIB

Voltage Input	EIB Pin No.	Default Function
1	J6-1	Battery Block Monitoring
2	J6-2	
3	J6-3	
4	J6-4	
5	J6-5	
6	J6-6	
7	J7-1	
8	J7-3	


Table 5.6 Programmable Relay Outputs – EIB


Programmable Relay Output		EIB Pin No.	Alarms Assigned to this Relay (Default)	Alarms Assigned to this Relay (Custom)	
9	NO	J8-5	The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.		
	COM	J8-3			
	NC	J8-1			
10	NO	J8-6			
	COM	J8-4			
	NC	J8-2			
11	NO	J9-5			
	COM	J9-3			
	NC	J9-1			
12	NO	J9-6			
	COM	J9-4			
	NC	J9-2			
13	NO	J7-6			
	COM	J7-4			
	NC	J7-2			

 **NOTE!** The relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.

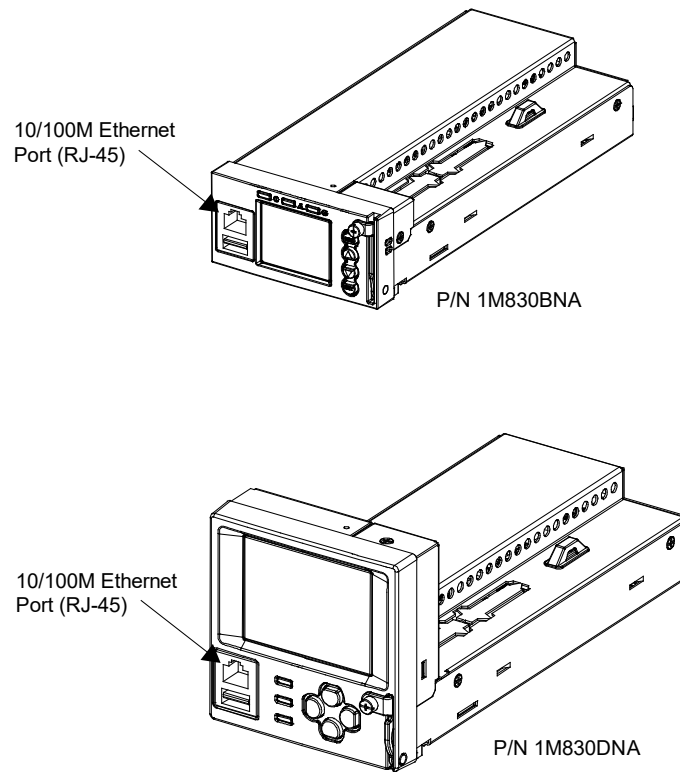
5.8 Controller Ethernet Connection (if required)

The controller provides a Web Interface via an Ethernet connection to a TCP/IP network. This interface can be accessed locally on a computer or remotely through a network. An RJ-45 10BaseT jack is provided on the front of the controller for connection into a customer's network. This jack has a standard Ethernet pin configuration scheme, twisted pair. Refer to Figure 5.8 for location and Table 5.7 for pin outs. Use shielded Ethernet cable (grounded at both ends). Note that the controller's RJ-45 jack is connected to chassis ground. Refer to the Controller Instructions (UM1M830BNA) for operational details.

 **NOTE!** You can access the Web pages of the power system locally by using a "crossover" or "straight" cable connected directly between your PC and the controller.

 **WARNING!** The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallicly connected to the interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallicly to OSP wiring.

The intra-building port (RJ-45) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.

Figure 5.8 Controller Ethernet Port**Table 5.7 Controller RJ-45 Ethernet Port Pin Configuration**

Port Pin Number	Name	Definition
1	Tx+	Write Signal +
2	Tx-	Write Signal -
3	Rx+	Read Signal +
4	--	no connection
5	--	no connection
6	Rx-	Read Signal -
7	--	no connection
8	--	no connection

5.8.1 Connecting a Device or System to the Controller CAN Bus (If Required) (List 27 Distribution Cabinet Only)

A supporting device or system may be connected to the Controller's CAN Port located inside a List 27 Distribution Cabinet. Refer to Figure 5.2 for location. Refer to Table 5.8 for pin-outs. Refer also to the external device's or system's instruction manual.

General Procedure

Remove the CAN termination plug from the CAN Port connector (see Figure 5.2 for location). Connect the device or system to the controller's CAN port. Refer to Table 5.8 for pin-outs. Ensure that the last device on the controller's CAN bus has a CAN termination plug. Refer also to the external device's or system's instruction manual.

Optional SM-Temp Module

The analog output of the SM-Temp Module may be connected to a controller temperature port input. In lieu of connecting the analog output of the SM-TEMP module to a controller temperature port input, the SM-TEMP module can simply be connected at the end of the controller's CAN bus (for system's equipped with an ACU+, requires ACU+ version 3.02 or later). Refer to the SM-Temp Module Instructions (UM547490) for details.

CAN Bus Procedure

1. Remove the CAN termination plug from the CAN Port connector (see Figure 5.2 for location). Connect the SM Temp Module CAN bus to the CAN Port connector. Refer to Table 5.8 for pin-outs. Ensure the last SM-Temp Module (or if only one) has a CAN termination strap as shown in the SM-Temp Module Instructions (UM547490).

Table 5.8 Controller CAN Port Connections

Controller CAN Port (RJ-45)		SM-Temp Module CAN Port Pin Number
Pin Number	Function	
1	CAN L	TB1-5 (CAN L)
2	CAN H	TB1-3 (CAN H)
3	--	--
4	--	--
5	--	--
6	--	--
7	--	--
8	--	--

5.9 Control Bus Connections between Controller and Module Mounting Shelves

General

Each module mounting shelf in the system is daisy-chained to the controller. Controller CAN bus connectors are located at the left and right rear of each shelf. These connectors are used to interconnect the shelves to the controller and to other shelves. Refer to Figure 5.9 or Figure 5.10 for connector locations and an interconnect diagram.

Systems with a List 27 Distribution Cabinet

The right side module mounting shelf controller CAN bus connector is factory jumpered so both connectors can be accessed from the left side of the module mounting shelf. Refer to Figure 5.9 for connector locations and an interconnect diagram. These connections are factory made for shelves factory installed. For field expansion, the new shelf must be tied into the interconnect scheme as shown in Power System User Instructions UM582137000.

Systems with a List 7 Distribution Cabinet

These connections are factory made. Refer to Figure 5.10 for connector locations and an interconnect diagram.

Figure 5.9 Control Bus Connections between Controller and Module Mounting Shelves - List 27 Distribution Cabinet

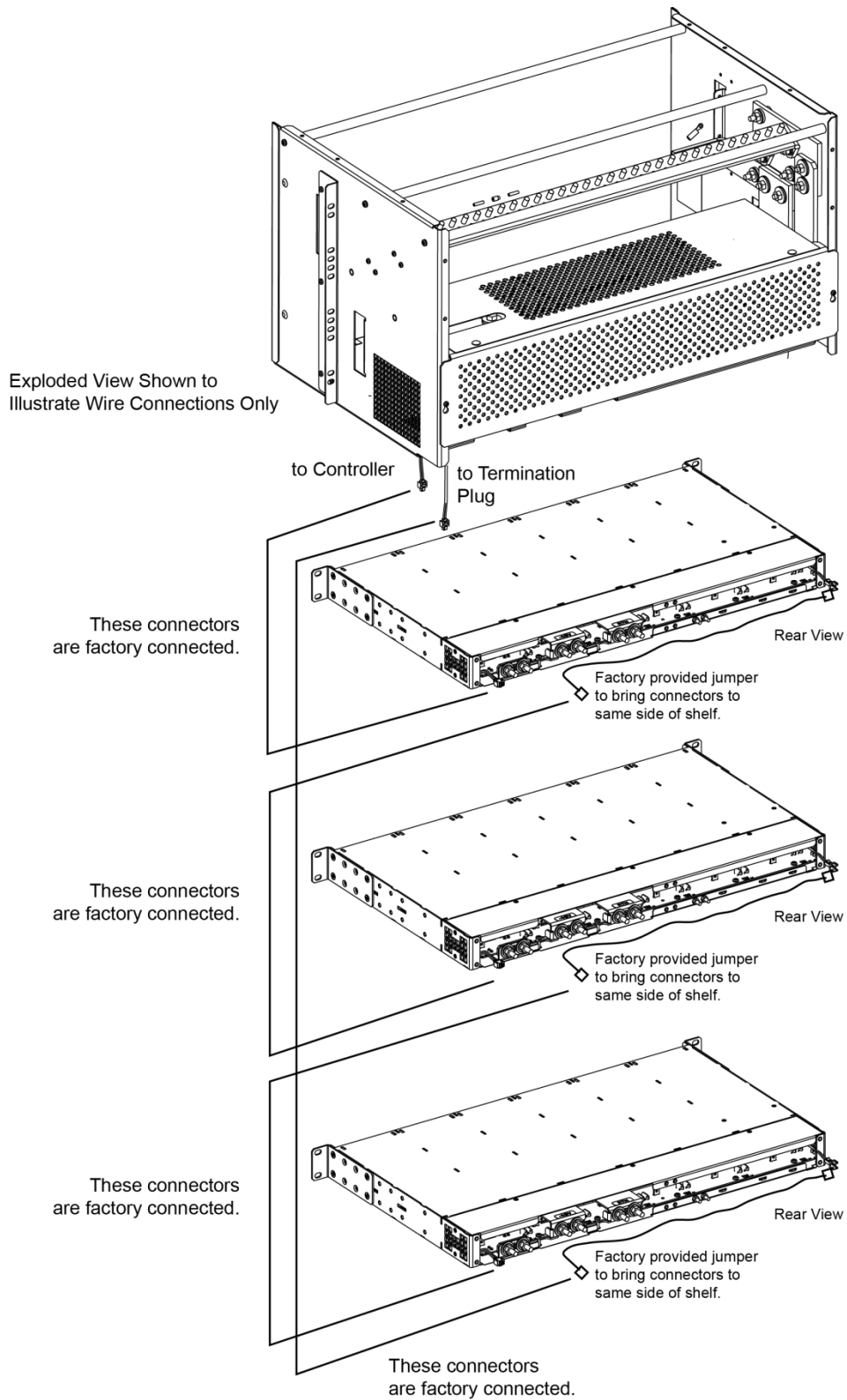
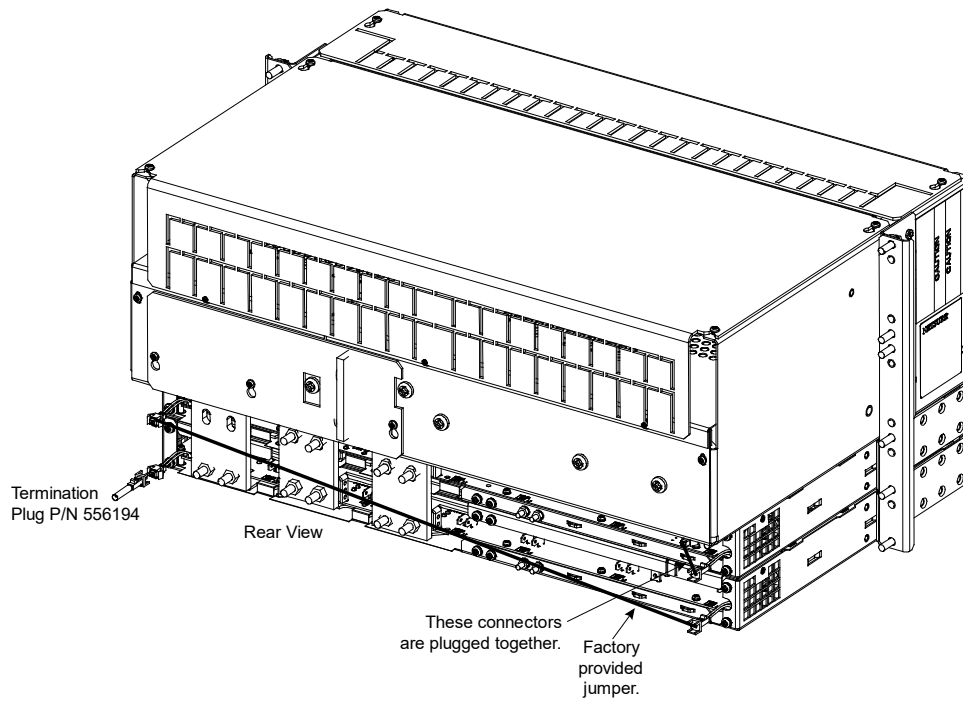


Figure 5.10 Control Bus Connections between Controller and Module Mounting Shelves - List 7 Distribution Cabinet

5.10 Load Connections to a List 27 Distribution Cabinet

Load leads are connected to the individual load busbars located on the distribution panels (refer to Figure 5.11). Load return leads are connected to separate return busbars located at the top of the distribution cabinet (refer to Figure 5.12). Refer to Figure 5.14 through Figure 5.27 for illustrations of the available distribution panels.

Refer to Figure 5.13 if an optional “Bullet Nose Type 6-Position GMT Distribution Fuse Block” is furnished.

Recommended Torque

- 72 in-lbs for 1/4-inch hardware (when using standard flat and lock washer).

Figure 5.11 Load Side Connections in a List 27 Distribution Cabinet

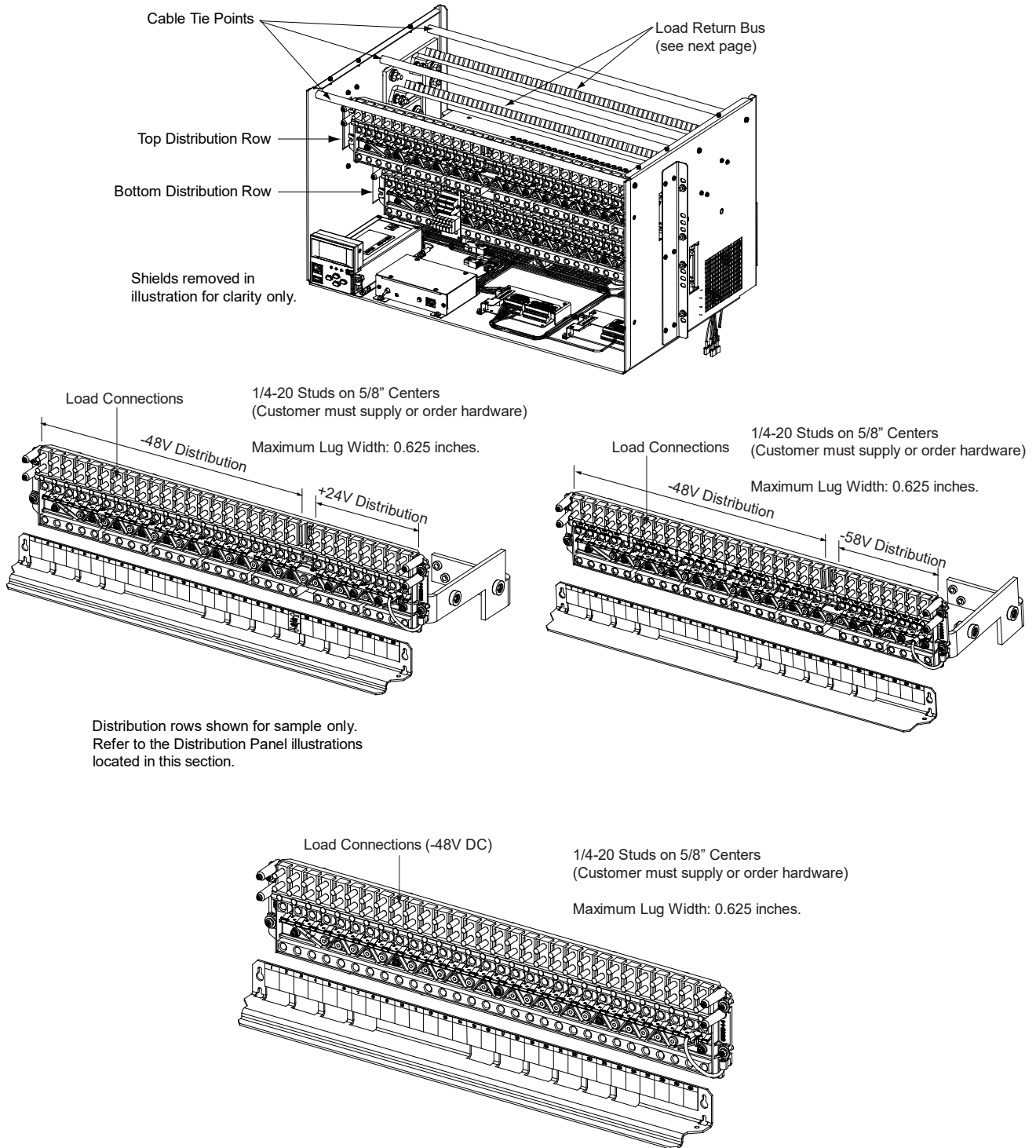


Figure 5.12 Load Return Side Connections in a List 27 Distribution Cabinet

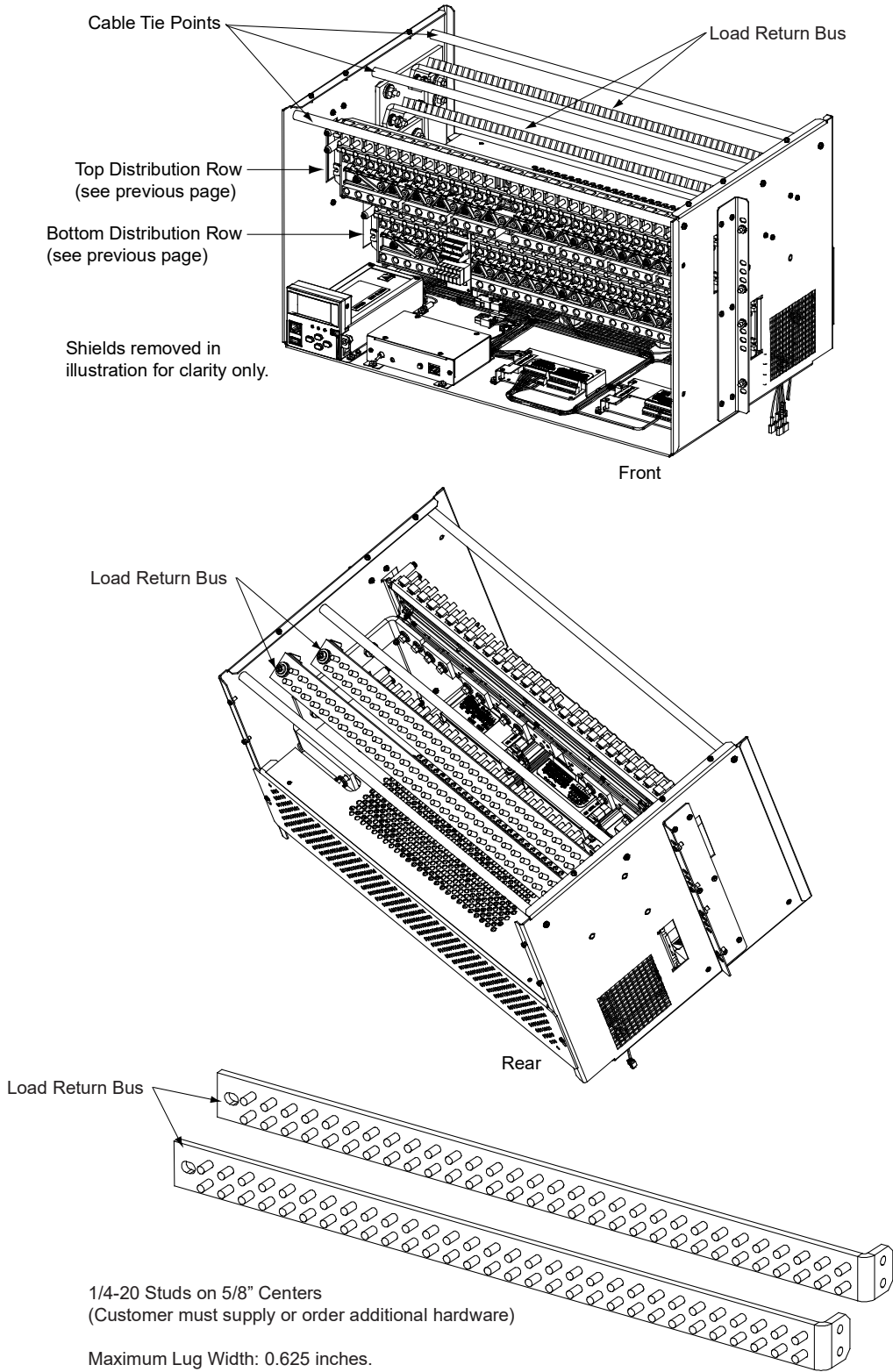
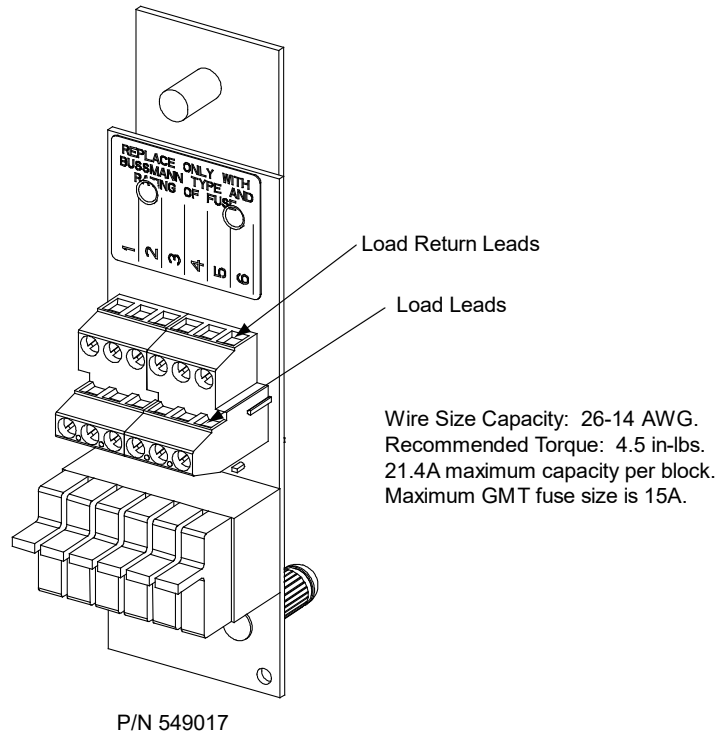


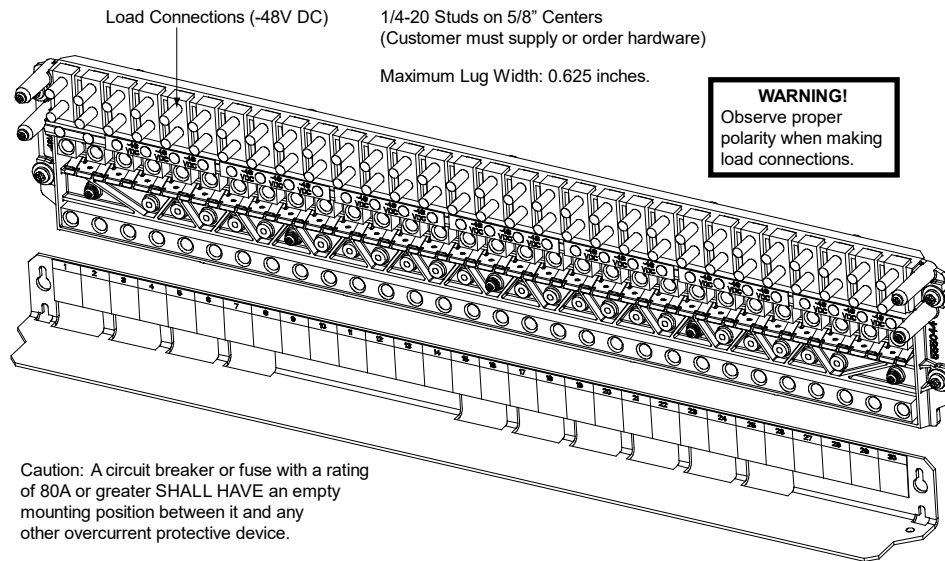
Figure 5.13 Load Connections to GMT Fuse Block (P/N 549017) in a List 27 Distribution Cabinet



Load Connections to Single Voltage Distribution Panels in a List 27 Distribution Cabinet

Figure 5.14 List AC Load Connections

(30) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



Load Connections to Dual Voltage Distribution Panels in a List 27 Distribution Cabinet

Figure 5.15 List DH Load Connections

- (21) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (8) +24 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

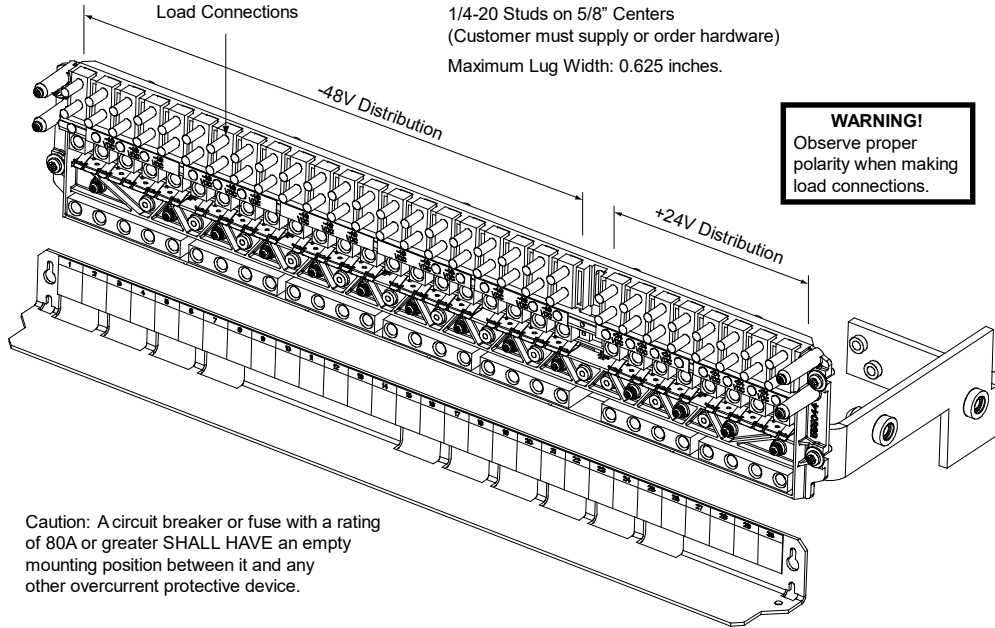


Figure 5.16 List DI Load Connections

- (17) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (12) +24 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

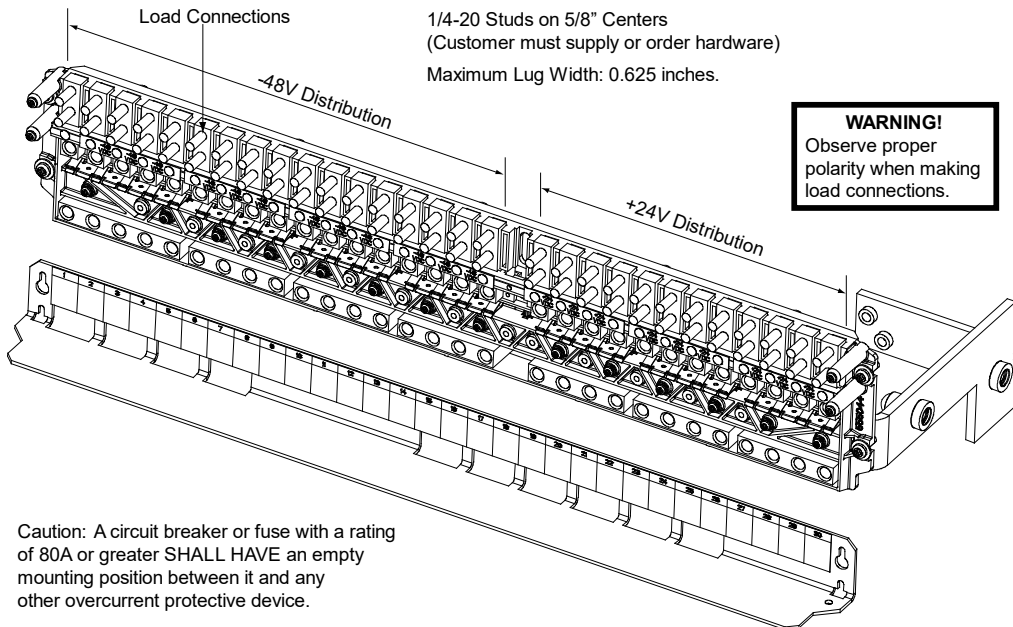


Figure 5.17 List DJ Load Connections

- (13) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (16) +24 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

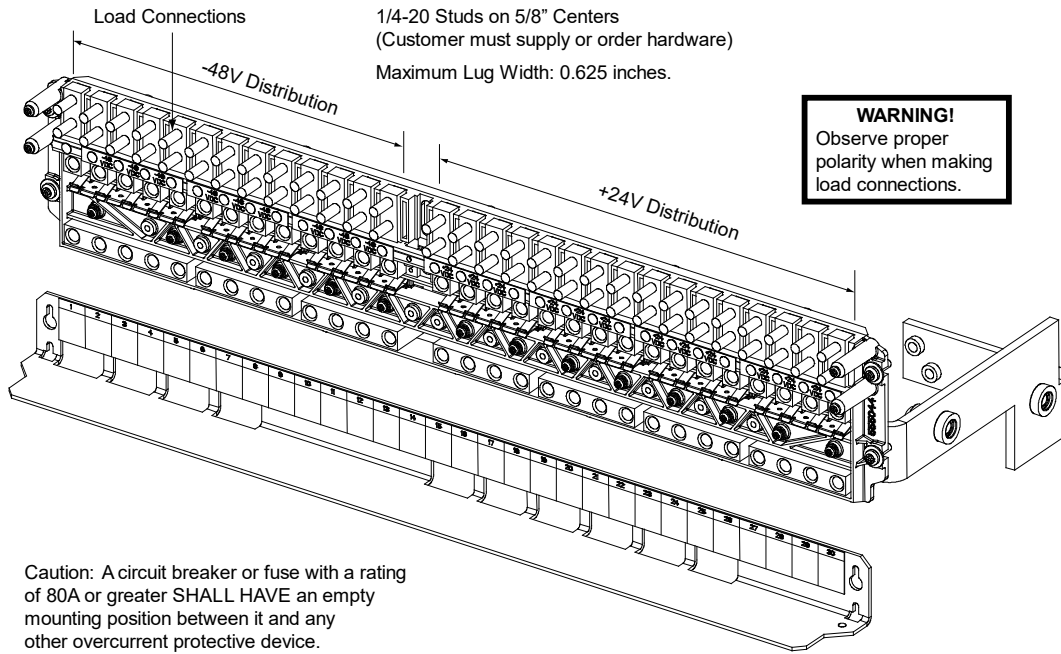


Figure 5.18 List DK Load Connections

- (9) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (20) +24 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

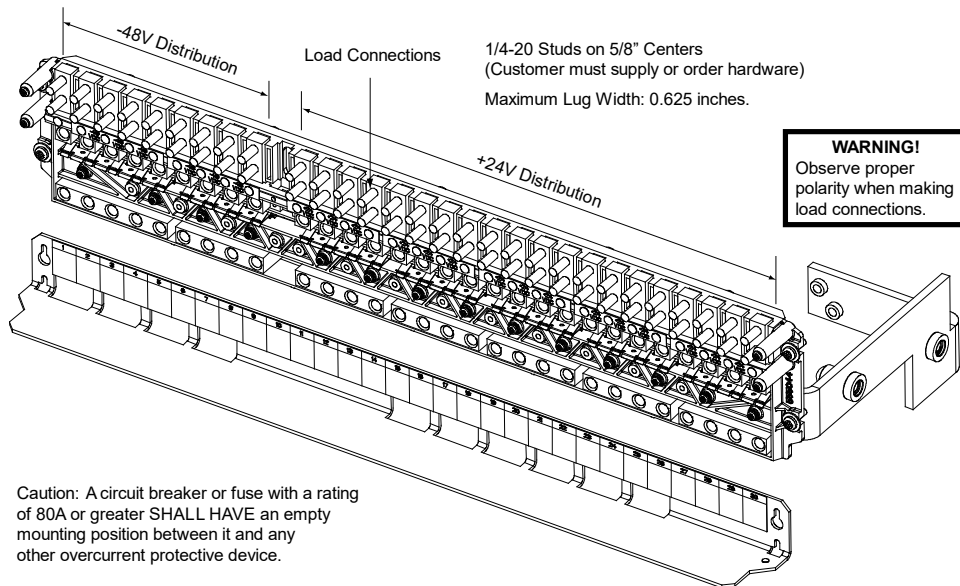
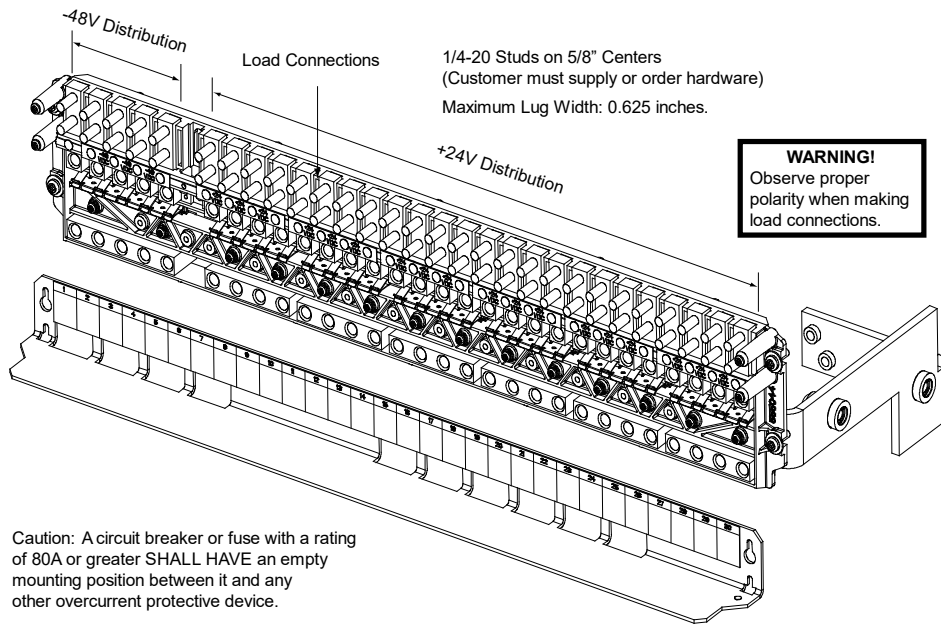


Figure 5.19 List DL Load Connections

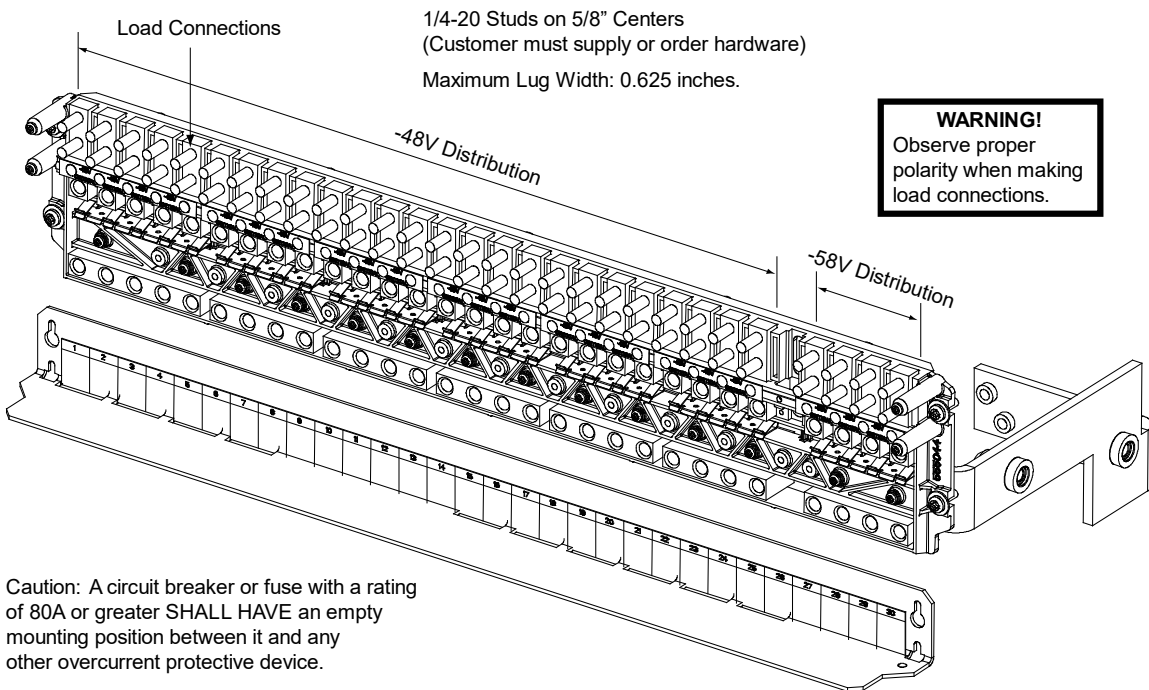
- (5) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (24) +24 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



Caution: A circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Figure 5.20 List FG Load Connections

- (25) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (4) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



Caution: A circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Figure 5.21 List FH Load Connections

- (21) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (8) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

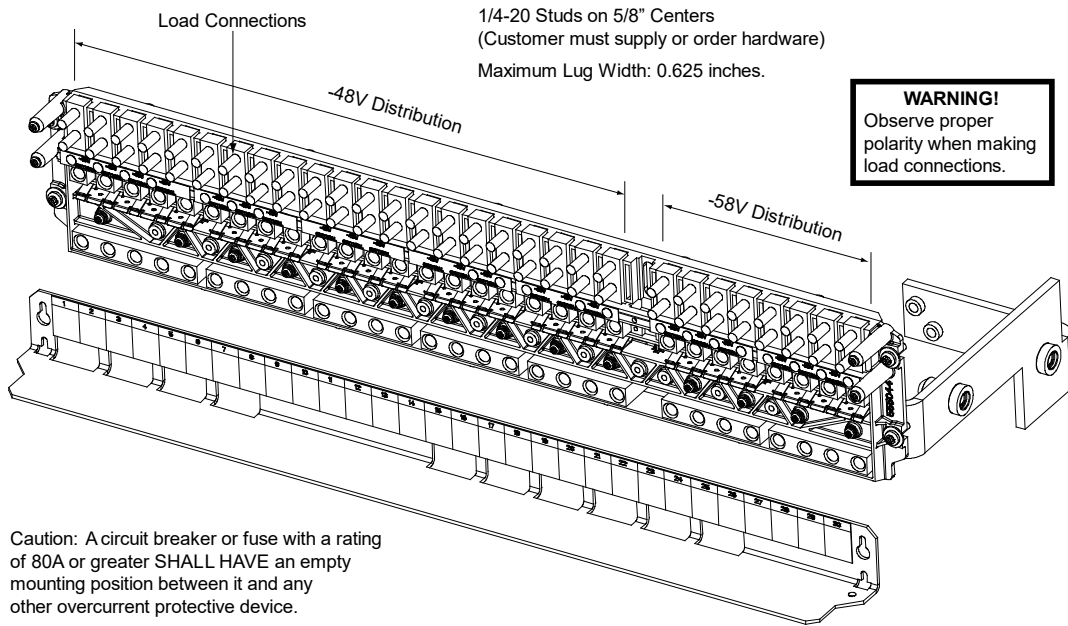


Figure 5.22 List FI Load Connections

- (17) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (12) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

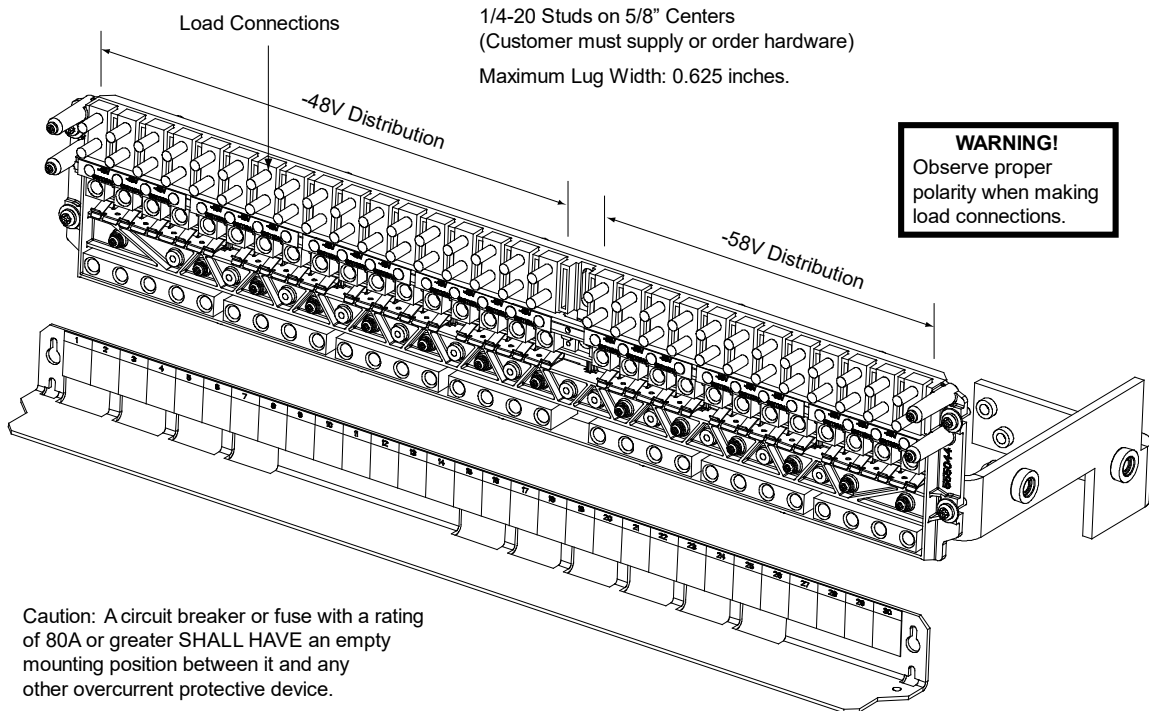
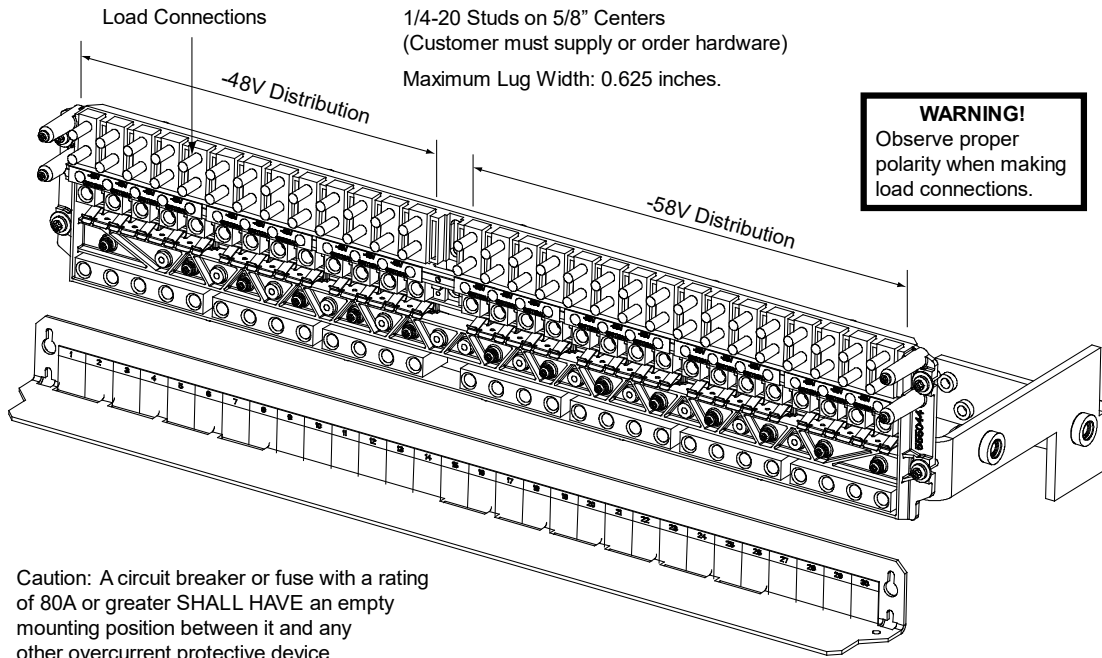


Figure 5.23 List FJ Load Connections

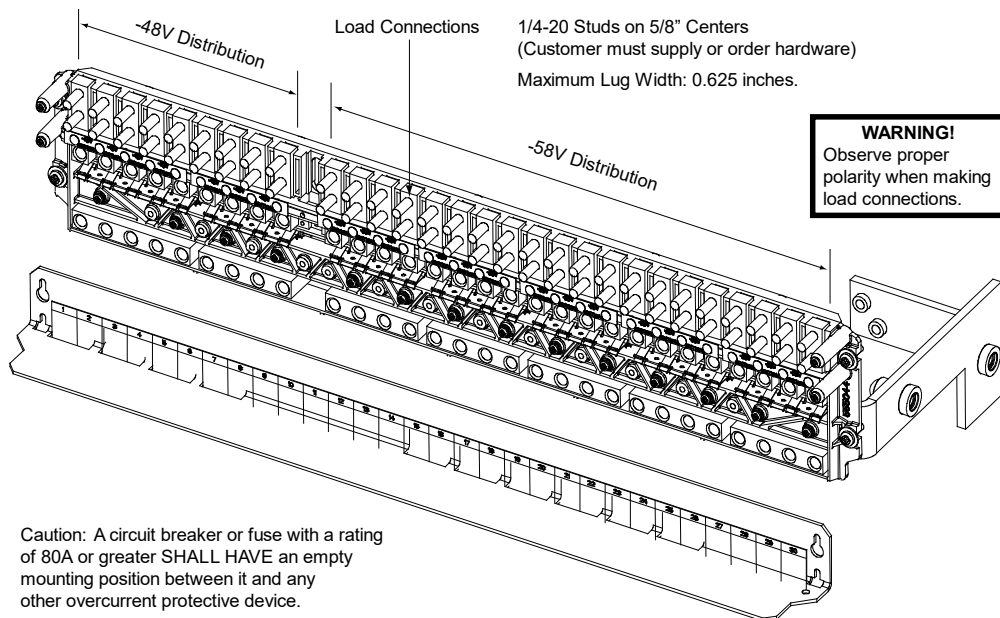
- (13) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (16) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



Caution: A circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Figure 5.24 List FK Load Connections

- (9) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (20) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



Caution: A circuit breaker or fuse with a rating of 80A or greater SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

Figure 5.25 List FL Load Connections

- (5) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (24) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

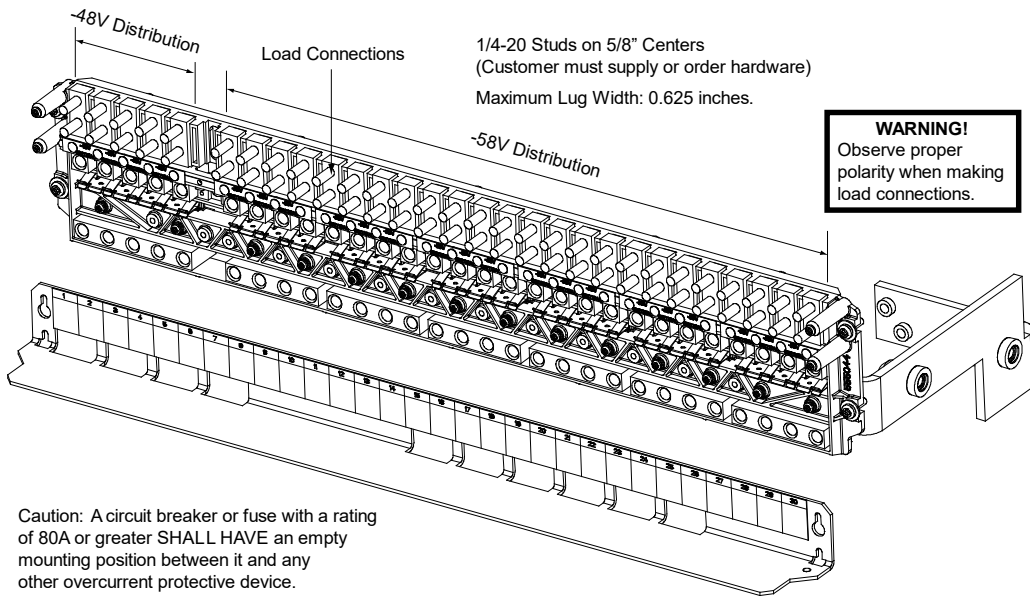


Figure 5.26 List FM Load Connections

- (0) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
- (29) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions

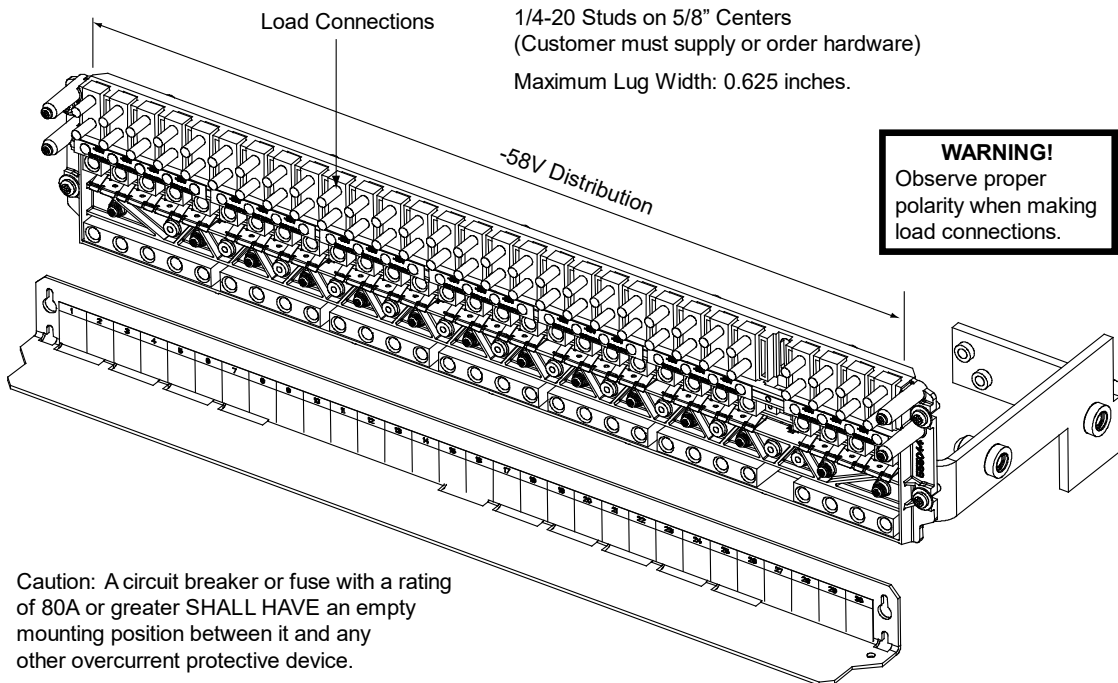
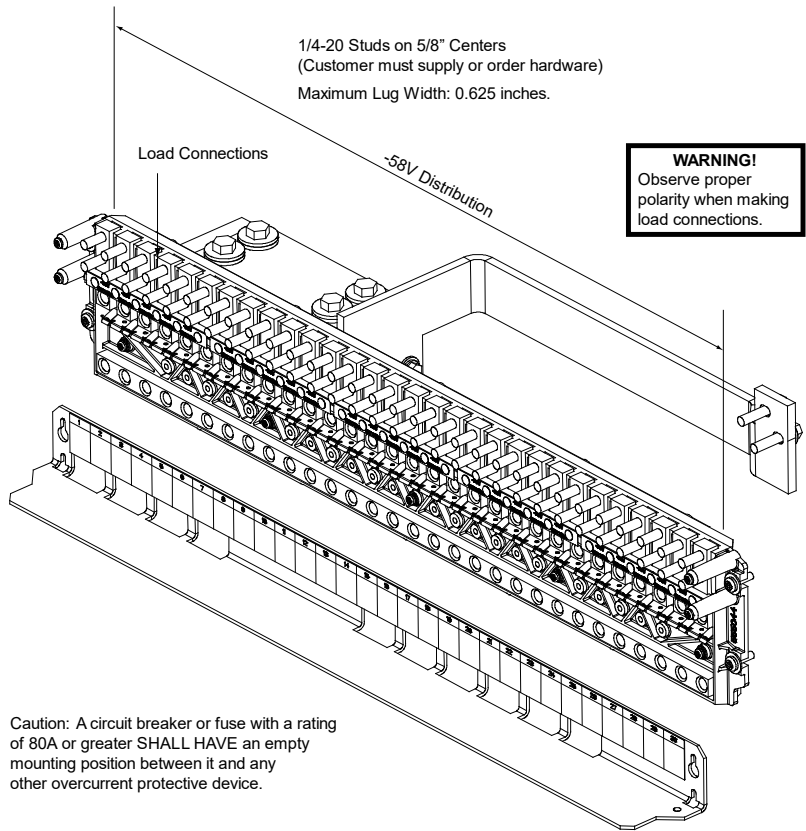


Figure 5.27 List GC Load Connections

(0) -48 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions and
(30) -58 VDC Bullet/TPS/TLS Circuit Breaker/Fuse Positions



5.11 Load Connections to a List 7 Distribution Cabinet

Load leads are connected to the individual load busbars located on the distribution panel (refer to Figure 5.28). Load return leads are connected to the return busbar located at the top of the distribution cabinet (refer to Figure 5.28).

Refer to Figure 5.29 if an optional “Bullet Nose Type 6-Position GMT Distribution Fuse Block” is furnished.

Recommended Torque

- 72 in-lbs for 1/4-inch hardware (when using standard flat and lock washer).

Figure 5.28 Load and Load Return Connections in a List 7 Distribution Cabinet

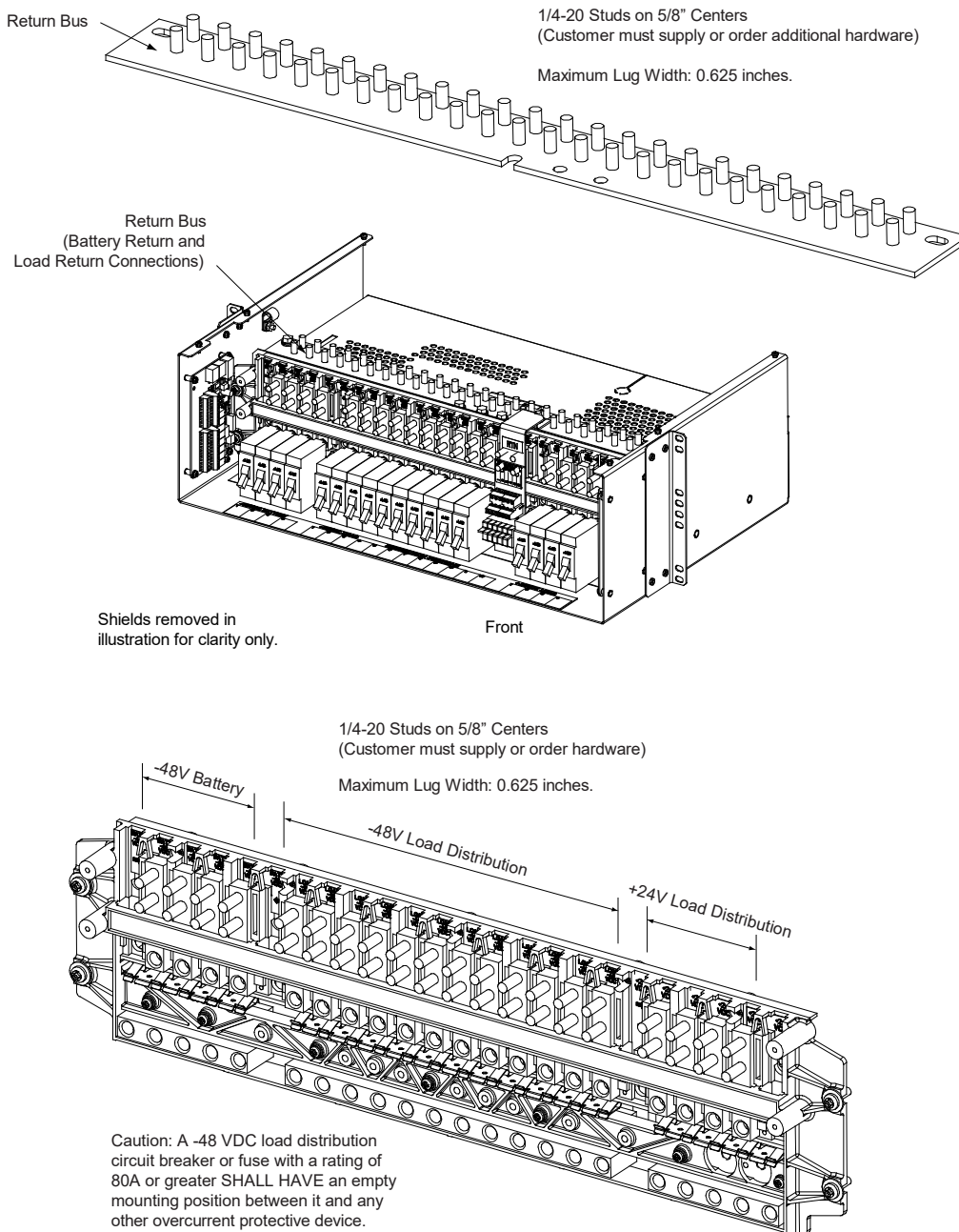
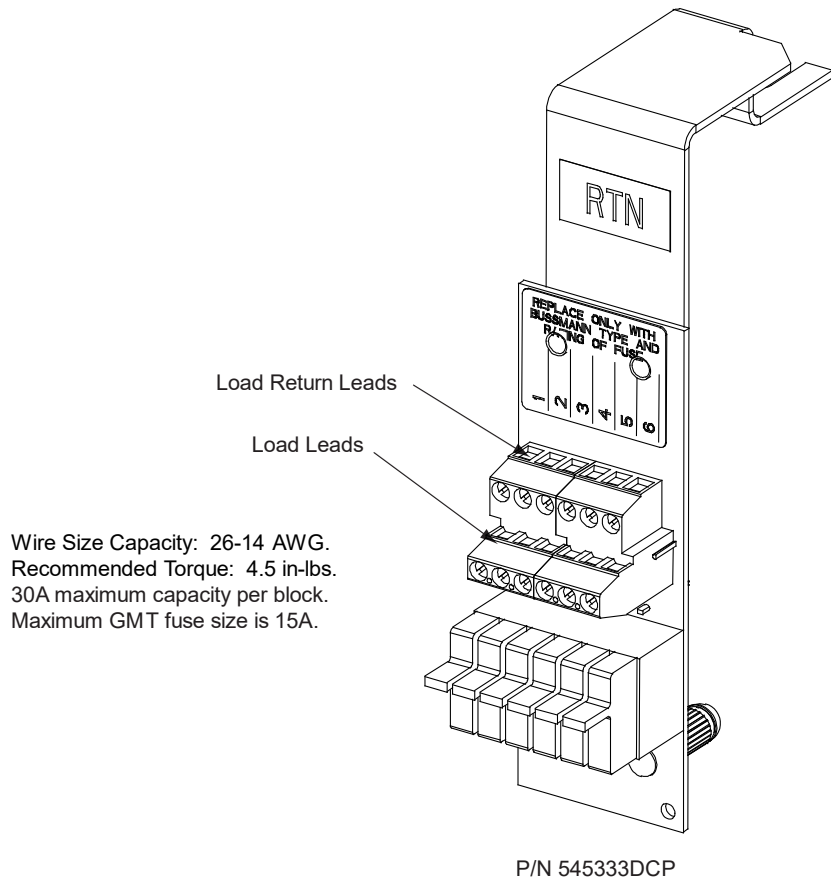


Figure 5.29 Load Connections to GMT Fuse Block (P/N 545333DCP) in a List 7 Distribution Cabinet



5.12 Battery Connections to a List 27 Distribution Cabinet

Input battery leads are connected to the battery busbar and battery return busbar. Customer must supply lug mounting hardware. Refer to Figure 5.30.

Important Safety Instructions



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

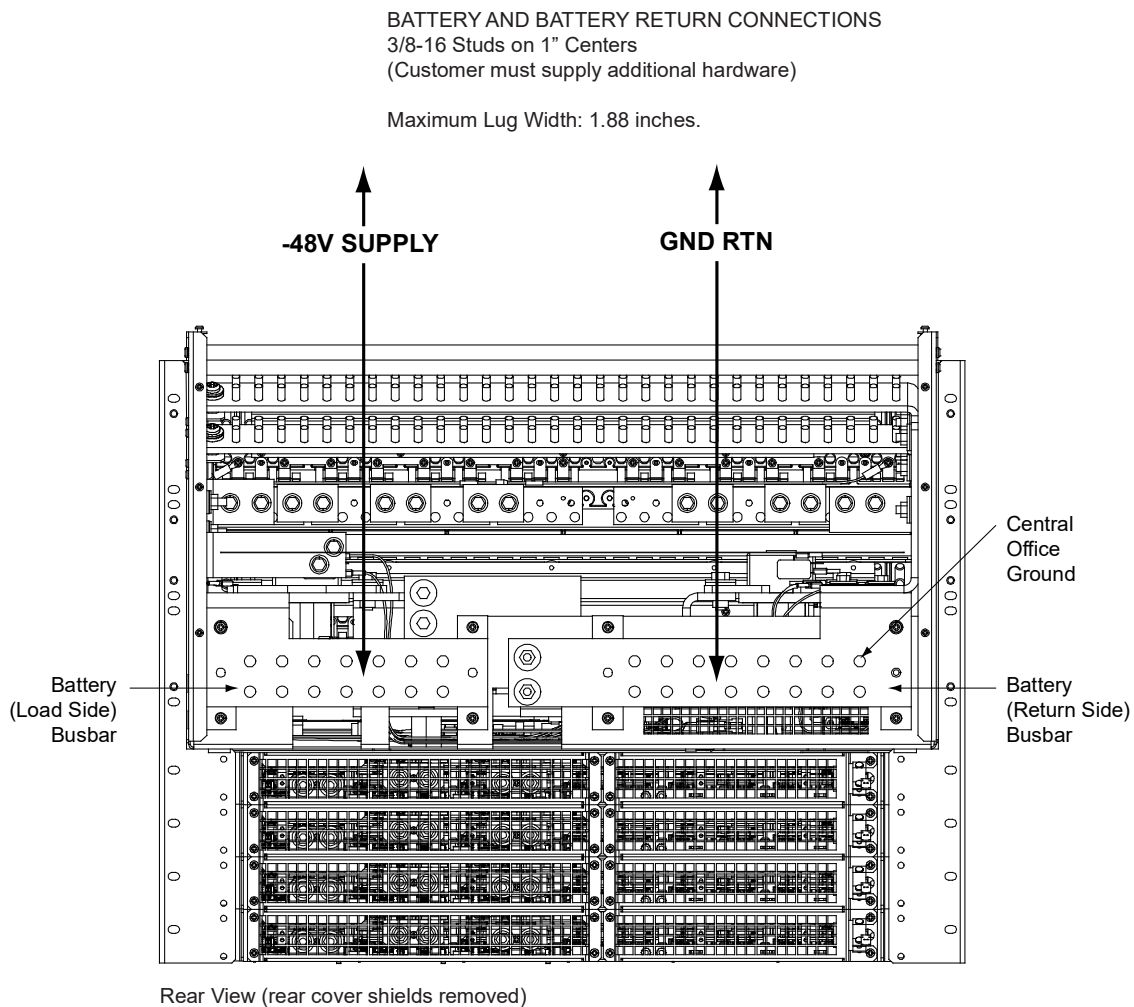


WARNING! Observe proper polarity when making battery connections.

Recommended Torques

- 300 in-lbs for 3/8-inch hardware (when using standard flat and lock washer).
- 180 in-lbs for 3/8-inch hardware (when using a Belleville lock washer).

Figure 5.30 Battery and Central Office Ground Connections in a List 27 Distribution Cabinet



5.13 Battery Connections to a List 7 Distribution Cabinet

Input battery leads are connected to the individual battery busbars located on the distribution panel. Battery return leads are connected to the return busbar located at the top of the distribution cabinet. Customer must provide (or order) lug mounting hardware. Refer to Figure 5.31.

Important Safety Instructions



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

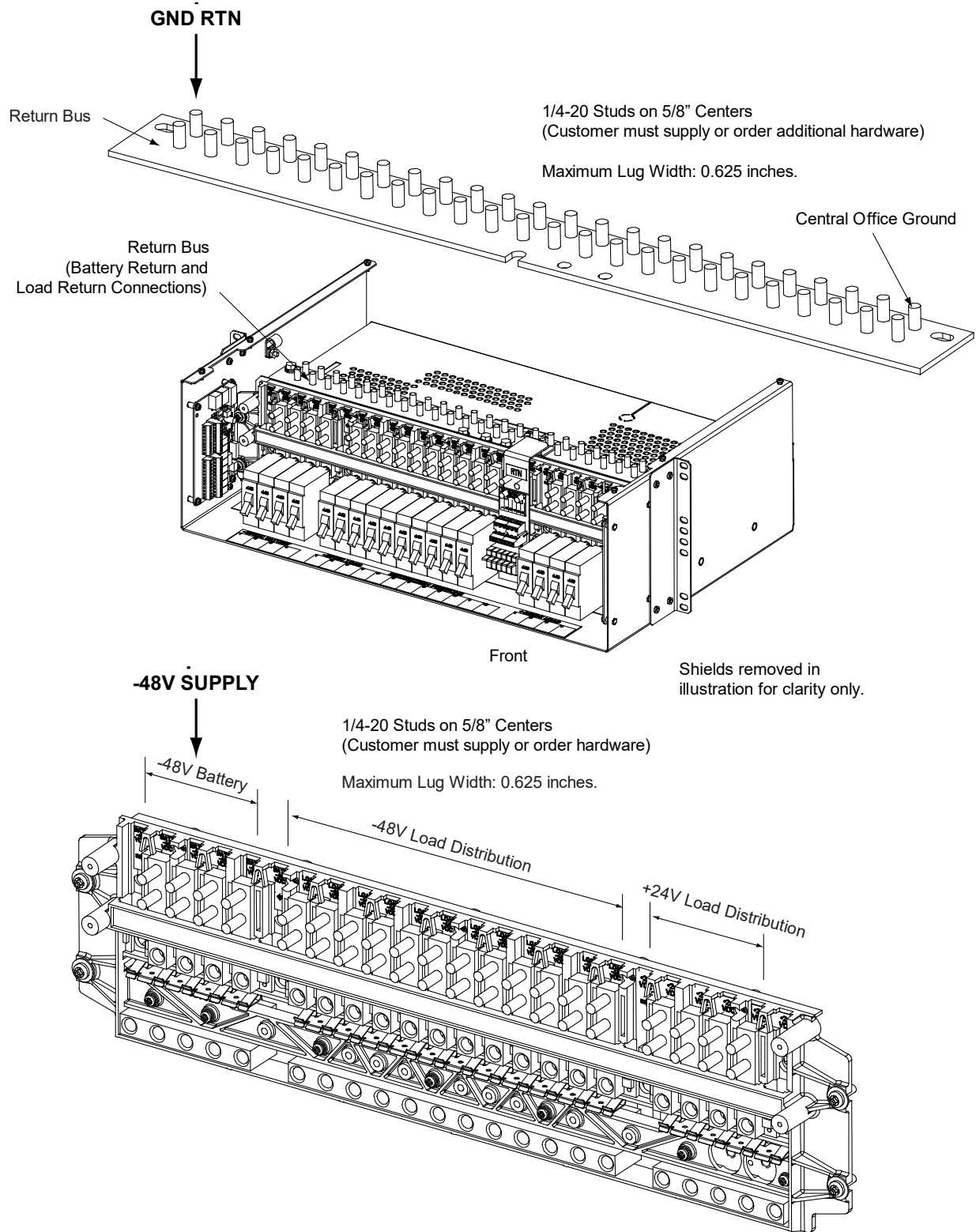


WARNING! Observe proper polarity when making battery connections.

Recommended Torques

- 72 in-lbs for 1/4-inch hardware (when using standard flat and lock washer).

Figure 5.31 Battery and Central Office Ground Connections in a List 7 Distribution Cabinet



6 Installing Rectifier and Converter Modules

6.1 General

Rectifier and converter modules can be inserted or removed with power applied (hot swappable).

6.2 System with List 7 Distribution Cabinet

In the top module mounting shelf, rectifier modules can be installed in any mounting position except the far left. Converter modules (-48 VDC to +24 VDC) CANNOT be installed in the top shelf. See Figure 6.3.

In the bottom module mounting shelf, rectifier modules can be installed in any mounting position. Converter modules (-48 VDC to +24 VDC) can be installed in any of the three far right mounting positions (as viewed from the front). See Figure 6.3.

6.3 System with List 27 Distribution Cabinet

Rectifier modules can be installed in any mounting position of each module mounting shelf as long as they are wired for AC. Converter modules can be installed in any of the three far right mounting positions of each module mounting shelf (as viewed from the front). See Figure 6.4. See Alerts below for restrictions.

6.4 Installing Rectifier and Converter Modules



NOTE! Each rectifier and converter module locks into the module mounting shelf by means of a latch located on the bottom of the module. The latch and module handle are interactive. Pushing the handle up into the module's front panel causes the latch to extend to the locking position; pulling the handle down out from the module's front panel causes the latch to retract. See Figure 6.3 or Figure 6.4.



WARNING! To prevent damage to the latching mechanism, ensure the handle is in the open position when installing or removing a module. NEVER hold the handle in the closed position when installing a module into a shelf.



ALERT! The system can either have +24V DC-DC converters installed or -58V DC-DC converters installed. The system cannot have both types of converters installed at the same time.



ALERT! The -48 VDC to +24 VDC converter modules must only be installed in a system position that accepts a +24V DC-DC converter. Refer to labeling on the system's module mounting shelf. A sample of this labeling is provided in Figure 6.1.

Figure 6.1 Sample Module Mounting Shelf Labeling

-48 OR +24 VDC	CAUTION! USE ONLY -48VDC OUTPUT RECTIFIERS OR +24VDC OUTPUT CONVERTERS. USE OF -58VDC OUTPUT CONVERTERS MAY DAMAGE EQUIPMENT.
-------------------------	--



ALERT! The -48 VDC to -58 VDC converter modules must only be installed in a system position that accepts a -58V DC-DC converter. Refer to labeling on the system's module mounting shelf. A sample of this labeling is provided in Figure 6.2.

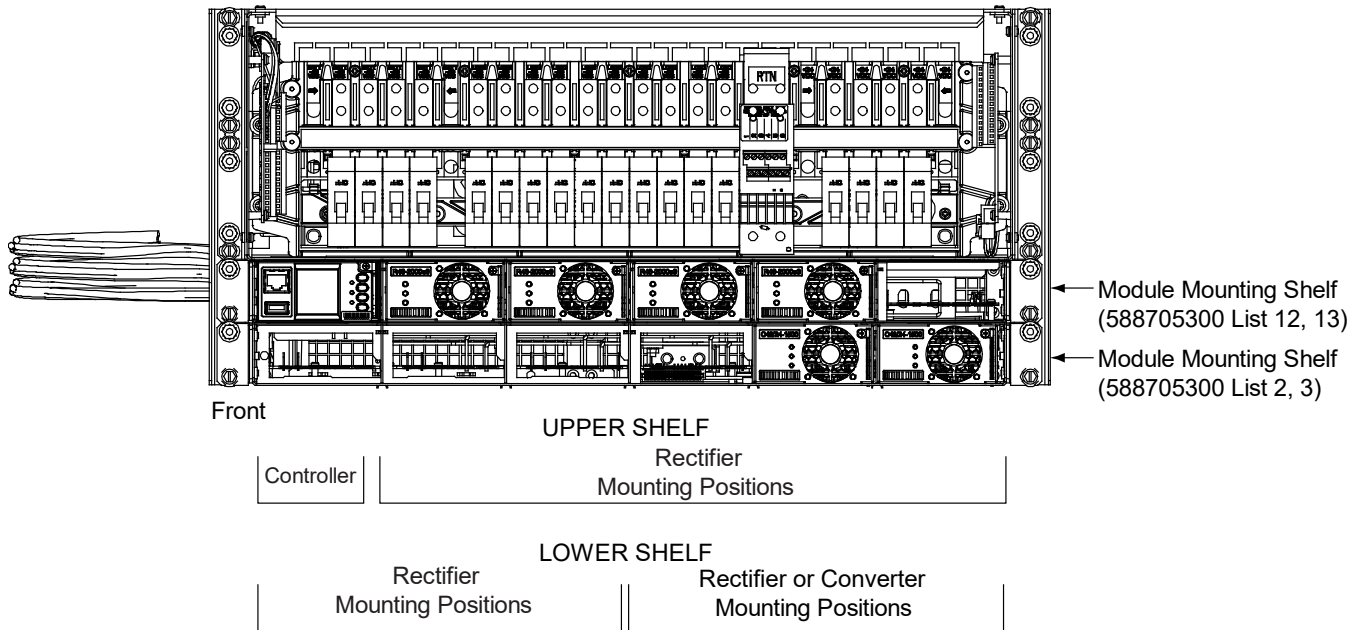
Figure 6.2 Sample Module Mounting Shelf Labeling



Procedure

1. Unpack the modules.
2. Note the model number located on the front of each module. Model numbers starting with the letter “R” are rectifier modules. Model numbers starting with the letter “C” are converter modules.
3. Place the module into an unoccupied mounting position without sliding it in completely. See Figure 6.3 or Figure 6.4 for acceptable positions.
4. Loosen the captive screw on the module’s handle. Pull the handle down out from the module’s front panel (this will also retract the latch mechanism). See Figure 6.3 or Figure 6.4.
5. Push the module completely into the shelf.
6. Push the handle up into the module’s front panel. This will lock the module securely to the shelf. Tighten the captive screw on the handle.
7. Repeat the above steps for each module being installed in the system.
8. After the modules are physically installed in the mounting shelf(s), they are ready for operation immediately after power is supplied to them.

Figure 6.3 Installing Rectifier and Converter Modules, System with List 7 Distribution Cabinet



Rectifier or Converter Module

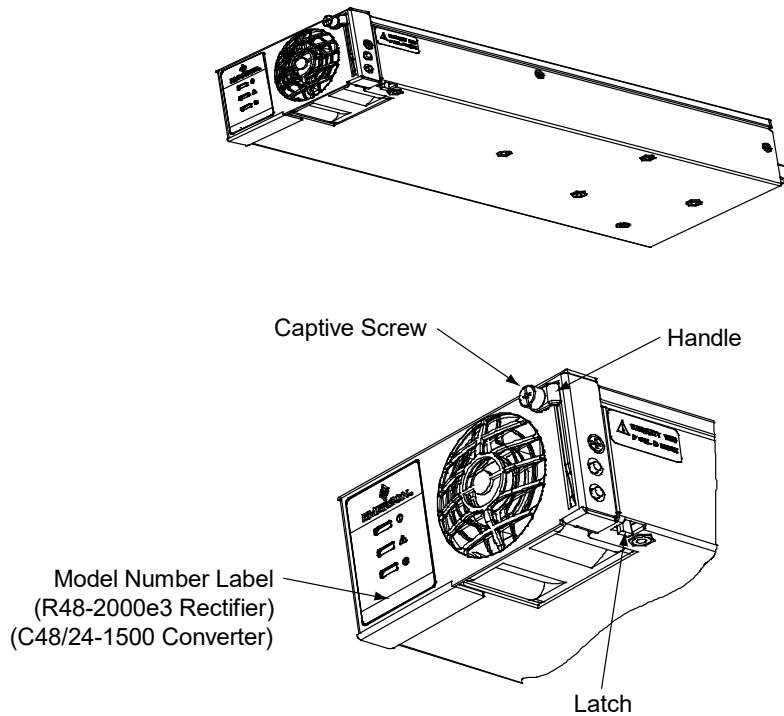
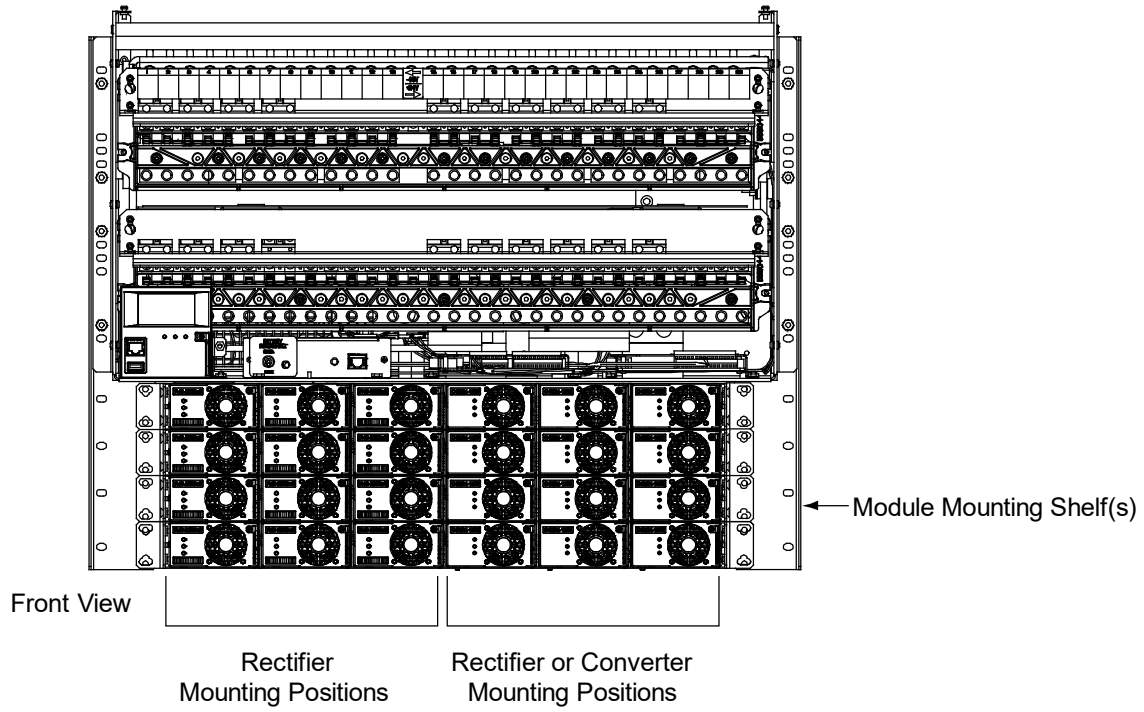
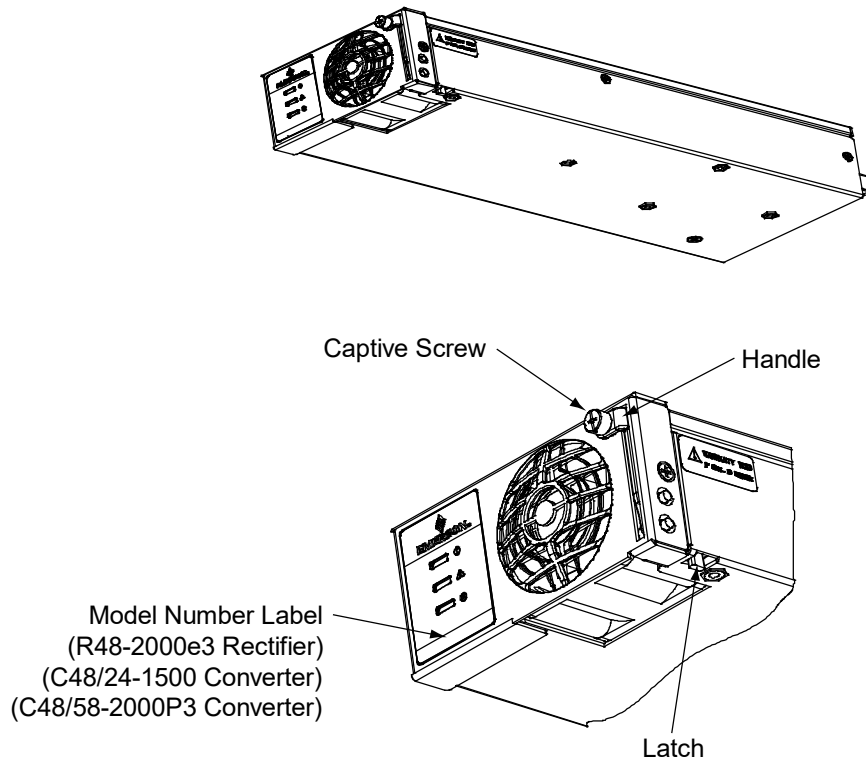


Figure 6.4 Installing Rectifier and Converter Modules, System with List 27 Distribution Cabinet



Rectifier or Converter Module



7 Initially Starting, Configuring, and Checking System Operation

7.1 Important Safety Instructions



CAUTION! Performing various steps in the following procedures may cause a service interruption and/or result in the extension of alarms. Notify any appropriate personnel before starting these procedures. Also, notify personnel when these procedures are completed.

7.2 Initial Startup Preparation

- Ensure that all blocks (except the last one) in the “Installation Acceptance Checklist” on page 1 have been checked.
- Ensure that module mounting positions are filled by a rectifier module or converter module as desired. It is acceptable for positions to be left vacant.
- Refer to the configuration drawing (C-drawing) supplied with your power system documentation for factory settings of adjustable parameters.

7.3 Initially Starting the System

Procedure

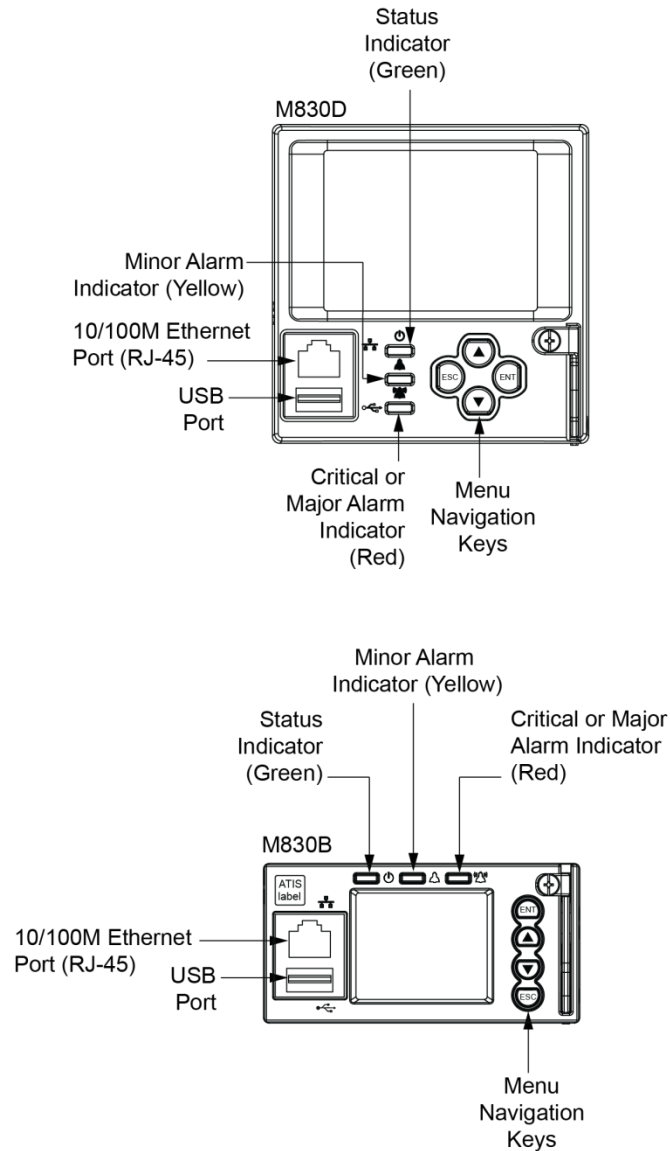
1. Apply DC input power to the system by closing the external DC disconnect(s) or protective device(s) that supplies battery power to the system, if furnished.
2. Place each battery disconnect circuit breaker (if furnished) to the ON position.
3. Apply AC input power to the system by closing ALL external AC disconnects or protective devices that supply AC power to the module mounting shelves. Rectifiers and converters (if furnished) automatically start.
4. Place each distribution circuit breaker (if furnished) to the ON position.

7.4 NCU Controller Procedure

Refer to the NCU Instructions (UM1M830BNA) for detailed instructions.

NCU Controller Initialization

Refer to Figure 7.1 for locations of the NCU local indicators and navigation keys.

Figure 7.1 NCU Local Indicators and Navigation Keys**Procedure**

NOTE! The initialization routine takes several minutes. During that time various alarm indicators may illuminate on the NCU front panel and an audible alarm may sound. Disregard all alarms. An audible alarm can be silenced at any time by momentarily depressing the **ENT** key on the NCU Controller.

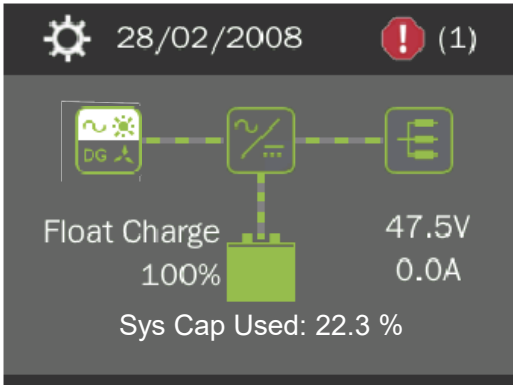
1. After the NCU is powered on, the display shows the “**logo**” screen. The controller is initializing.
2. When initialization is complete, the language screen appears. Press the up or down arrow key to select the desired language. Press the **ENT** key to confirm the selection.
3. The Main Menu displays.

Main Menu

Date and time are alternately displayed.

Green - No Alarm
Red - Alarm

The number in () indicates the total number of alarms.



Press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu.

Press the ENT key to enter the selected menu.

Graphics	Menu Name	Description
	Alarm (Green - No Alarm) (Red - Alarm)	View active alarms and alarm history.
	Settings	Gain access to the NCU Controller's settings menus.
	Input Power	View AC, Solar, DG, and Wind related information.
	Module	View rectifier, solar converter, and converter module related information.
	DC	View DC equipments related information.
	Battery	View battery related information.

To reboot the Controller, from the Main Menu press the ENT and ESC keys at the same time. Release both keys. Press ENT to confirm.



NOTE! "Sys Cap Used" is based on the number of installed rectifiers.

- System information is displayed in multiple screens. Press the ESC key to view other system information. Press the down arrow key to view the next screen. Press the ESC key to return to the Main Menu.
- From the Main Menu, press the UP and DOWN keys to highlight the desired Menu graphic in the Main Menu. Press the ENT key to enter the selected menu.



NOTE! Repeatedly press the "ESC" key to return in reverse order level by level from any submenu until the Main Menu appears.

- Verify and set the NCU controller as required for your application. Refer to the NCU Instructions (UM1M830BNA) for procedures. Note that you will have to program the NCU for any temperature probes and external inputs/outputs connected to the IB2 Interface Board and EIB Extended Interface Board. Refer also to "NCU Start Wizard" on page 69.



NOTE! When setting total rectifier current limit, the set point to each unit is the total set point divided by the number of units. 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 fail 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.

NCU Start Wizard

For initial startup, you can perform the Start Wizard from the local keypad and display to enter basic programmable parameters in one session. Refer to the "Start Wizard" section in the NCU Instructions (UM1M830BNA).

Verifying the Configuration File

Your NCU was programmed with a configuration file that sets all adjustable parameters. The version number of the configuration file can be found on the configuration drawing (C-drawing) that is supplied with your power system documentation, and on a label located on the NCU. You can verify that the correct configuration file has been loaded into your NCU by performing the following procedure.

Procedure

1. With the Main Menu displayed, press ESC. A screen displays the NCU name, serial number, IP number, software version, and hardware version.
2. Press the **DOWN** key. A screen displays the configuration version number, NCU file system, and MAC address.
3. Press **ESC** to return to the Main Menu.

Checking Basic System Settings

Navigate through the controller menus and submenus to check system settings. You can adjust any parameter as required. Note that these settings can also be checked (and changed if required) via the WEB Interface. Refer also to “NCU Start Wizard” on page 69.



NOTE! Repeatedly press the “ESC” key to return in reverse order level by level from any submenu until the Main Menu appears.

Procedure

1. **To Select a Sub-Menu:**
Press the UP and DOWN keys to highlight the desired sub-menu. Press the ENT key to enter the selected sub-menu.
2. **To Select a User:**
To select a User, use the UP and DOWN keys to move the cursor to the Select User field. Press ENT. Use the UP and DOWN keys to select a User previously programmed into the NCU. Press ENT to select the User. Note that only Users programmed into the NCU are shown. Users are programmed via the Web Interface. The default User is admin.
3. **To Enter a Password:**
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.
4. **To Change a Parameter:**
Press the UP and DOWN keys to move up and down the list of parameters. Press ENT to select the parameter. Press the UP and DOWN keys to change the parameter. Press ENT to make the change. Press ESC to cancel the change.
5. Table 7.1 shows the menu navigation for some basic settings. Refer to the separate NCU Manual (UM1M830BNA) supplied with your power system for complete Local Display menus.

Table 7.1 NCU Basic Settings Menu Navigation

Parameter	Menu Navigation
Date	Main Menu / Settings Icon / Sys Settings / Date.
Time	Main Menu / Settings Icon / Sys Settings / Time.
IP Communications Parameters (IP address, subnet mask address, gateway address)	Main Menu / Settings Icon / Comm Settings / enter parameters.
Float Voltage	Main Menu / Settings Icon / Batt Settings / Charge / Float Voltage.
Equalize Voltage	Main Menu / Settings Icon / Batt Settings / Charge / EQ Voltage.
Battery Current Limit	Main Menu / Settings Icon / Batt Settings / Charge / Curr Limit Mode and Batt Curr Limit.
Battery Capacity	Main Menu / Settings Icon / Batt Settings / Batt1 Settings or Batt2 Settings / Rated Capacity.
Reset Battery Capacity	Main Menu / Settings Icon / Batt Settings / Basic Settings / Reset Batt Cap
BTRM Feature	Web Menu Navigation Only: Settings Menu / Battery Tab.
Battery Charge Temperature Compensation	Main Menu / Settings Icon / Batt Settings / Temp Comp (enter parameters).
HVSD Limit	Web Menu Navigation Only: Settings Menu / Rectifiers Tab / HVSD (set to enabled) then set HVSD Limit.
Rectifier Current Limit	Main Menu / Settings Icon / Rect Settings / Current Limit (set to enabled) then set Curr Limit Pt.
Over Voltage Alarm 1	Main Menu / Settings Icon / Other Settings / Over Voltage 1.
Over Voltage Alarm 2	Main Menu / Settings Icon / Other Settings / Over Voltage 2.
Under Voltage Alarm 1	Main Menu / Settings Icon / Other Settings / Under Voltage 1.
Under Voltage Alarm 2	Main Menu / Settings Icon / Other Settings / Under Voltage 2.

Changing Battery Capacity Rating in the NCU



NOTE! After setting the battery capacity, the User should also reset the battery capacity (battery must be fully charged).

1. Change the battery capacity setting of the NCU to match the battery connected to the power system.

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Batt1 Settings or Batt2 Settings / Rated Capacity.

Web Menu Navigation:

Settings Menu / Battery Tab / Batt1 Rated Capacity and Batt2 Rated Capacity.

2. Reset the battery capacity (resets the battery capacity calculation).



NOTE! Only reset the battery capacity when the battery is fully charged; otherwise, the battery charge status may not be accurate.

Local Menu Navigation:

Main Menu / Settings Icon / Batt Settings / Basic Settings / Reset Batt Cap.

Web Menu Navigation:

Settings Menu / Battery Tab / Reset Battery Capacity.

Refer to the NCU Instructions (UM1M830BNA) for detailed instructions.

Configuring the NCU Identification of Rectifiers and Assigning which Input Feed is Connected to the Rectifiers

When rectifiers are all installed prior to applying power and starting the system, the order in which the NCU identifies the rectifiers is by serial number (lowest serial number is Rect 1, next lowest is Rect 2, etc.). If you prefer the NCU to identify the rectifiers by position in the system, perform the following procedure.

Upon power up, the NCU arbitrarily assigns Feed AC1, AC2, or AC3 to each rectifier. This assignment is used to display rectifier AC input feed voltage(s). The User may reassign the feed to each rectifier per your specific installation by following the procedure below.

Local Menu Navigation:

None.

Web Menu Navigation:

Refer to the NCU Instructions (UM1M830BNA) for detailed instructions.

Configuring the NCU Identification of -48 VDC to +24 VDC Converters or -48 VDC to -58 VDC Converters

When -48 VDC to +24 VDC converters or -48 VDC to -58 VDC converters are all installed prior to applying power and starting the system, the order in which the NCU identifies the -48 VDC to +24 VDC converters or -48 VDC to -58 VDC converters is by serial number (lowest serial number is Conv 1, next lowest is Conv 2, etc.). If you prefer the NCU to identify the -48 VDC to +24 VDC converters or -48 VDC to -58 VDC converters by position in the system, perform the following procedure.

Local Menu Navigation:

None.

Web Menu Navigation:

Refer to the NCU Instructions (UM1M830BNA) for detailed instructions.

NCU Alarm Relay Check

To verify operation of the external alarm relays, use the NCU alarm relay test feature. Refer to the NCU Instructions (UM1M830BNA) for instructions in using this feature.












NOTE! *The relays may be preprogrammed for specific functions. Refer to the configuration drawing (C-drawing) supplied with your system for your system's specific configuration.*

7.5 Checking System Status

Procedure

1. Observe the status of the indicators located on the controller, rectifiers, and converters (if furnished). If the system is operating normally, the status of these is as shown in Table 7.2.

Table 7.2 Status and Alarm Indicators

Component	Indicator	Indicator	Normal State
NCU		Status (Green)	On
		Minor (Yellow)	Off
		Critical or Major Alarm (Red)	Off
Rectifier Modules		Power (Green)	On
		Protection (Yellow)	Off
		Alarm (Red)	Off
Converter Modules		Power (Green)	On
		Protection (Yellow)	Off
		Alarm (Red)	Off

7.6 Final Steps

1. If any controller configuration settings were changed, refer to the 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 that 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.
2. Verify all rectifier and converter modules and the controller are fully seated, latched, and the latch handle screws secured.
3. Verify there are no external alarms and the local indicators are as shown in Table 7.2.

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