



# NetSure™ ITS Series +12V DC Power Shelf

## Installation and User Manual

Specification Number: 588706100

Model Number: PSS12/2200-19BC, PSS12/2200-19B

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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.

## General Safety



**DANGER!** YOU MUST FOLLOW APPROVED SAFETY PROCEDURES.

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

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

## Voltages

### AC Input Voltages



**DANGER!** This system operates from AC input voltage capable of producing fatal electrical shock. AC input power must be completely disconnected from the branch circuits wiring used to provide power to the system before any AC electrical connections are made. Follow local lockout/tagout procedures to ensure upstream branch circuit breakers remain de-energized during installation. DO NOT apply AC input power to the system until all electrical connections have been completed and checked.

### DC Output and Battery Voltages



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



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

## Personal Protective Equipment (PPE)



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

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



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

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

## Hazardous Voltage



**DANGER!** HAZARD OF ELECTRICAL SHOCK.

More than one disconnect may be required to de-energize the system before servicing.

## Handling Equipment Containing Static Sensitive Components



**ALERT!** Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions contained on the Static Warning Page.

## Maintenance and Replacement Procedures



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



**NOTE!** When performing any step-in procedures that requires removal of existing hardware, retain all hardware for use in subsequent steps, unless otherwise directed.

## Static Warning



This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components. Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on static dissipative surfaces such as conductive foam or ESD bag. Do not use ordinary Styrofoam or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary, to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.



# 1 Customer Documentation Package

This document (UM588706100) provides *Installation and User Instructions* for the NetSure ITS +12 VDC Bulk Output Power System, Spec. No. 588706100.

The complete Customer Documentation Package consists of...

## **NetSure ITS +12 VDC Bulk Output Power System Installation and User Manual**

- NetSure ITS +12 VDC Bulk Output Power System Installation and User Instructions: UM588706100
- NetSure ITS +12 VDC Bulk Output Power System “System Application Guide”: SAG588706100
- NetSure ITS SCC Controller Instructions: UM1M520HNA
- NetSure ITS Rectifier Module Instructions: UM1R123000
- Engineering Drawings

# 2 System Description

## +12 VDC @ up to 2200 Amperes Power System

The NetSure ITS Model PSS12/2200-19BC 12 VDC Power System is an integrated power system containing a main module mounting assembly, rectifiers, intelligent control, and monitoring. The NetSure ITS Model PSS12/2200-19B is a companion expansion assembly.

A system consists of the following components.



**NOTE!** *The installation may consist of one (1) main module mounting assembly and up to two (2) expansion module mounting assemblies, or all main module mounting assemblies. In installations with one main module mounting assembly and up to two expansion module mounting assemblies, all module mounting assemblies are on one DC bus and are controlled by a single SCC controller. A common CAN bus is shared across all module mounting assemblies and all rectifiers load share and all rectifiers are load managed via the SCC. In installations with all main module mounting assemblies, each module mounting assembly is on a separate DC bus and each module mounting assembly is controlled by (contains) a separate SCC controller. A separate CAN bus exists per module mounting assembly, rectifiers load share per module mounting assembly, and rectifiers are load managed via an SCC per module mounting assembly.*

## **Main Module Mounting Assembly**

The main module mounting assembly houses up to nine (9) rectifier modules, plus the SCC controller.

SCC (System Control Card) Controller: The controller provides power system control, monitoring functions, and local/remote alarm functions. The controller also provides data acquisition, system alarm management. The controller provides an Ethernet port for remote access. It also comes with SNMP capability for remote system management. Operation of the SCC controller requires a master upstream supervisory and control unit, such as the Avocent UMG, connected to the system's Ethernet port and utilizing an SNMP interface. Refer to the SCC Controller Instructions (UM1M520HNA) for more information.



**NOTE!** *The rectifiers will continue to operate, if the SCC controller fails. The rectifiers will work, if the system is powered up without an SCC controller; however, an SCC controller is required to get any monitoring/status information from the system. The application should be designed with an SCC controller.*

## **Expansion Module Mounting Assembly**

The expansion module mounting assembly houses up to nine (9) rectifier modules.

**Rectifier Modules**

The system contains rectifier modules, which provide load power. Refer to the Rectifier Instructions (UM1R123000) for more information.

## 3 Installation Acceptance Checklist

Provided below 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 in this list. If the procedure is not required 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.



**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**

- ☐ Equipment Inspection Completed
- ☐ Module Mounting Assembly(s) Mounted in an IT Rack

**Making Electrical Connections**

- ☐ System Frame Grounding Connection Made
- ☐ +12 VDC Output Connections Made
- ☐ External Alarm, Reference, Monitoring, and Control Connections Made
- ☐ SCC Controller Ethernet Connection Made
- ☐ AC Input and AC Input Equipment Grounding Connections Made

**Installing the Modules**

- ☐ Rectifier Modules Installed, as required

**Initially Starting the System**

- ☐ System Started, Configured, and Checked

## 4 Installing the System

### 4.1 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 craft persons only.
- This product is intended for installation in data centers or network telecommunication facilities (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).

- This product is intended to be installed in a data center facility and be connected to a MESH-bonding network (MESH-BN) or to the common bonding network in a network telecommunication facility (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- This system is suitable for installation as part of the Common Bonding Network (CBN) or a data center building MESH-bonding network (MESH-BN).
- The installer should be familiar with the installation requirements and techniques to be used in mounting the module mounting assembly(s) onto the mounting rails of an IT rack.
- Rectifier module and module mounting assembly ventilating openings must not be blocked and temperature of air entering these must not exceed rated operating ambient temperature range found in SAG588706100.
- Clearance requirements are:
  - a) Recommended minimum space clearance for the front of each module mounting assembly is 80 mm (3 inches).
  - b) Recommended minimum space clearance for the rear of each module mounting assembly is 80 mm (3 inches).
  - c) Module mounting assemblies may be stacked together, with no space between them.

## 4.2 Inspecting the Equipment and Storing for Delayed Installations

### 4.2.1 Inspecting the Equipment

#### **General**

Compare the contents of the shipment with the bill of lading. Report any missing items to the carrier and your local Vertiv representative immediately.

While the system is still on the truck, inspect the equipment and shipping container(s) for any signs of damage or mishandling.

As the equipment is moved off the truck and unpacked, visually examine the system for transit damage.

Do not attempt to install the system if damage is apparent.

If any damage is noted, file a damage claim with the shipping agency within 24 hours and contact Vertiv to inform them of the damage claim and the condition of the equipment.

## 4.3 Securing the Module Mounting Assembly(s) to the Mounting Rails of an IT Rack

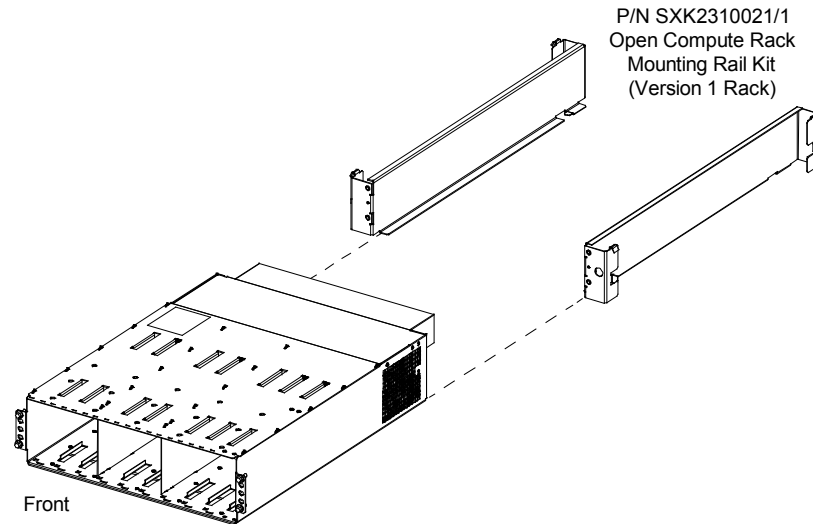
Install the module mounting assembly(s) into a 19" mounting frame of an IT rack as follows.

#### **P/N SXX2310021/1 Mounting Rail Kit Procedure**

Refer to **Figure 4-1**.

1. Install P/N SXX2310021/1 rack mounting rail kit onto the frames of an Open Compute IT rack (version 1 rack).
2. Slide the module mounting assembly into the front of the IT rack, resting the bottom of the module mounting assembly on the mounting rails installed in the IT rack.
3. Secure the front mounting flanges to the IT rack with the furnished cage nuts and screws.

**Figure 4-1: Mounting the Module Mounting Assembly with P/N SXX2310021/1 Mounting Rail Kit**

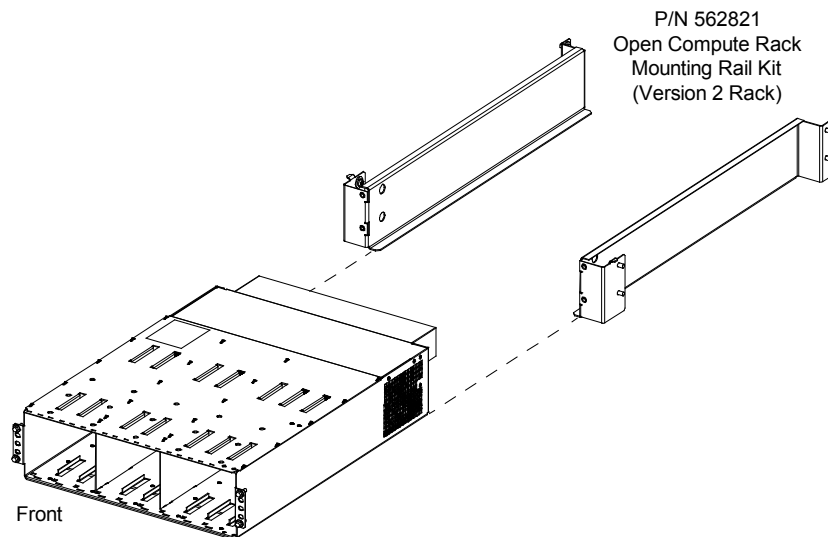


### **P/N 562821 Mounting Rail Kit Procedure**

Refer to **Figure 4-2**.

1. Install P/N 562821 rack mounting rail kit with the provided screws onto the frames of an Open Compute IT rack (version 2 rack).
2. Slide the module mounting assembly into the front of the IT rack, resting the bottom of the module mounting assembly on the mounting rails installed in the IT rack.
3. Secure the front mounting flanges to the IT rack with the furnished cage nuts and screws.

**Figure 4-2: Mounting the Module Mounting Assembly with P/N 562821 Mounting Rail Kit**



## 4.4 Installing Shipping Support Bracket

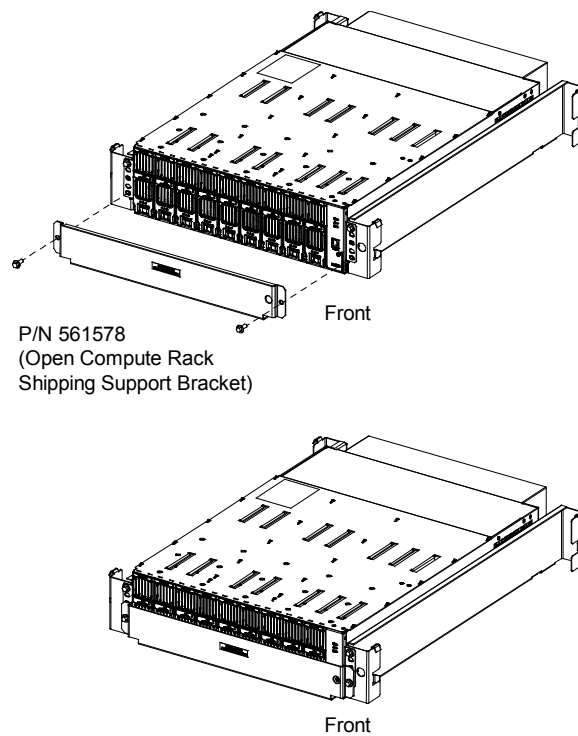
An Open Compute Rack shipping support bracket is available which allows a module mounting assembly to be integrated into an Open Compute Rack and then shipped to its final destination with rectifier modules installed.

REMOVE SHIPPING SUPPORT BRACKET BEFORE POWERING SYSTEM.

### **Procedure**

1. Insert rectifier modules and SCC controller into the module mounting assembly. For SCC controller installation instructions, refer to SCC Controller Instructions (UM1M520HNA). For rectifier module installation instructions, refer to rectifier module Instructions (UM1R123000).
2. Refer to **Figure 4-3** and install P/N 561578 Open Compute Rack shipping support bracket.

**Figure 4-3: Installing P/N 561578 Shipping Support Bracket**



## 5 Making Electrical Connections

### 5.1 Important Safety Instructions



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

### 5.2 Wiring Considerations

All wiring 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 SAG588706100.

### 5.3 Power System Frame Grounding Connection

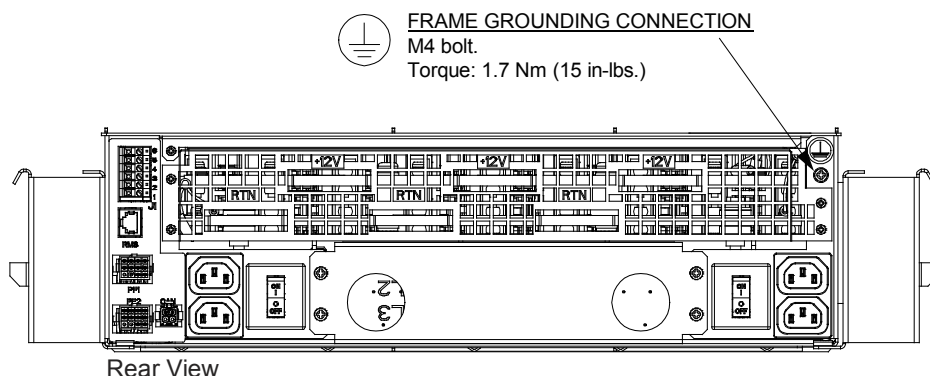
For system frame grounding requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), applicable local codes, and your specific site requirements. For operation in countries where the NEC is not recognized, follow applicable codes.

A customer's frame grounding network lead can be attached to the rear of each module mounting assembly as shown in **Figure 5-1**. Provision is made for installing a lead with a one-hole lug that has an M4 bolt clearance hole.

**NOTE!** This product is intended to be installed in a data center facility and be connected to a MESH-bonding network (MESH-BN) or to the common bonding network in a network telecommunication facility (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).

**NOTE!** This system is suitable for installation as part of the Common Bonding Network (CBN) or a data center building MESH-bonding network (MESH-BN).

**Figure 5-1: Power System Frame Grounding Connection**



## 5.4 +12 VDC Output Connections

### **Important Safety Instructions**



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



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

### **General**



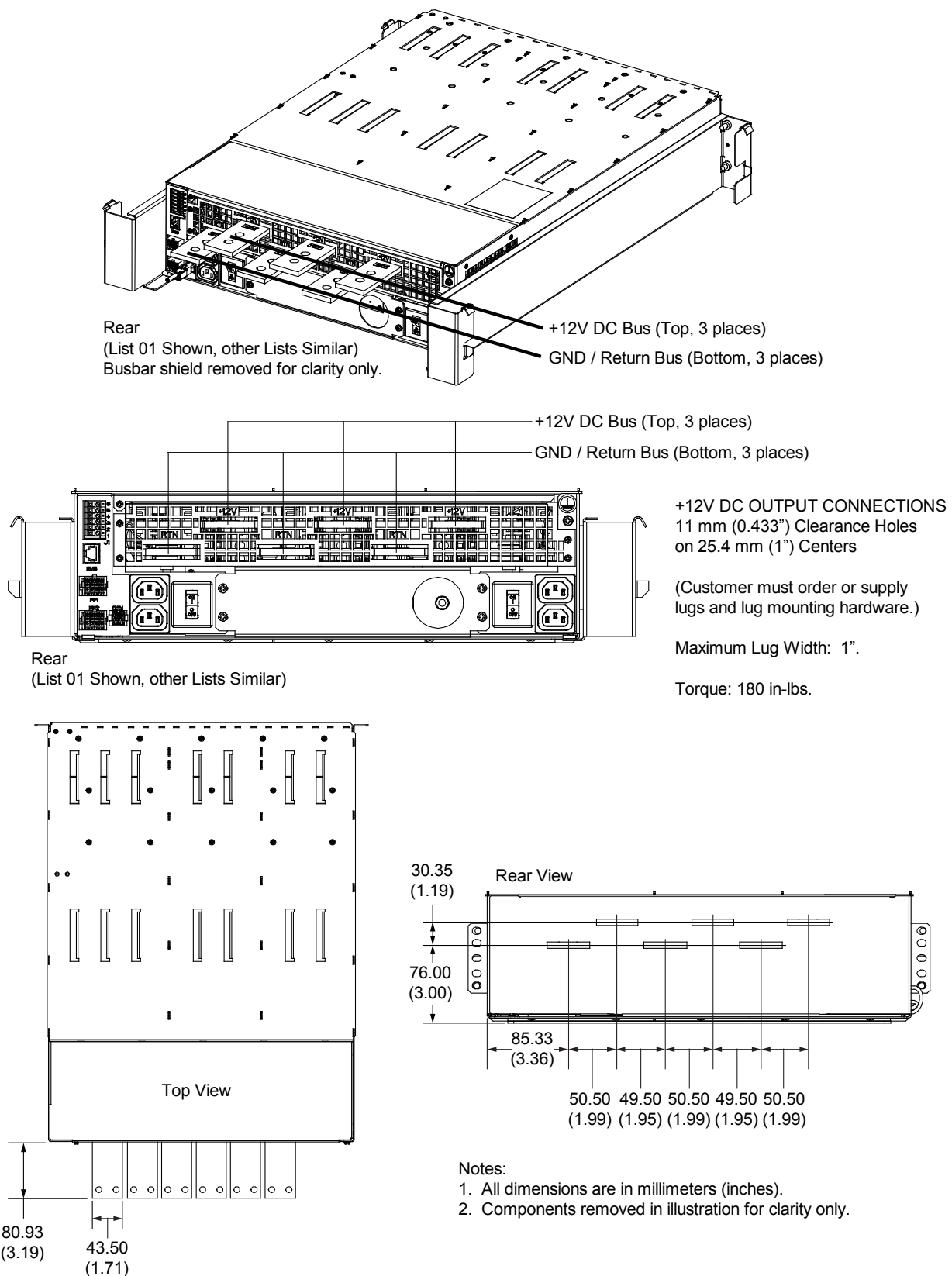
**NOTE!** The system is intended to be negative pole grounded (+12 VDC). Field provide a properly sized DC power return wire to earth reference from the GND/RETURN busbar to Earth.



**NOTE!** The installation may consist of one (1) main module mounting assembly and up to two (2) expansion module mounting assemblies, or all main module mounting assemblies. In installations with one main module mounting assembly and up to two expansion module mounting assemblies, all module mounting assemblies are on one DC bus and are controlled by a single SCC controller. A common CAN bus is shared across all module mounting assemblies and all rectifiers load share and all rectifiers are load managed via the SCC. In installations with all main module mounting assemblies, each module mounting assembly is on a separate DC bus and each module mounting assembly is controlled by (contains) a separate SCC controller. A separate CAN bus exists per module mounting assembly, rectifiers load share per module mounting assembly, and rectifiers are load managed via an SCC per module mounting assembly.

DC output leads are connected to the output busbars located on the back of the module mounting assembly(s) as shown in **Figure 5-2**. These busbars provide clearance holes for installation of customer-provided two hole lugs. Customer must order or supply lugs and lug mounting hardware.

**Figure 5-2: +12 VDC Output Connections**



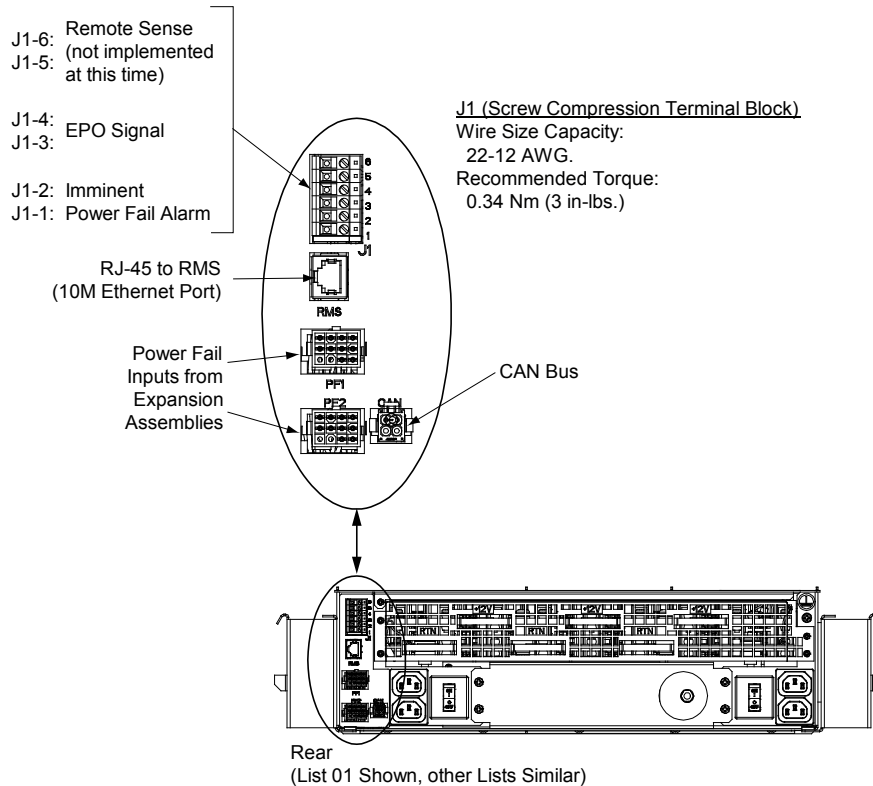


## 5.5 External Alarm, Reference, Monitoring, and Control Connections

### 5.5.1 External Alarm, Reference, Monitoring, and Control Connection Points Locations

Refer to **Figure 5-3**.

**Figure 5-3: External Alarm, Reference, Monitoring, and Control Connection Points Locations**



### 5.5.2 Remote Sense (not implemented at this time)

Connect remote sense leads to J1-5 and J1-6, if desired. Observe correct polarity. Refer to **Figure 5-3**.

### 5.5.3 EPO Signal

Connect a normally open external EPO (Emergency Power Off) switch to J1-3 and J1-4, if desired. Switch closure causes the SCC controller to send an SNMP trap, wait two (2) seconds, and then send a message to shut down the rectifiers. Refer to **Figure 5-3**.

### 5.5.4 Imminent Power Fail Alarm

Contacts close between J1-1 and J1-2 when an imminent power fail alarm occurs. This alarm signals when the combination of rectifiers and batteries on the bus can no longer support the load. Refer to **Figure 5-3** and SCC Controller Instructions (UM1M520HNA) for details.

### 5.5.5 SCC Controller Ethernet Connection

Connect the SCC controller's Ethernet port (labeled RMS) to an RMS (Rack Management System). Refer to **Figure 5-3**.



**NOTE!** The SCC controller supports a 10M Ethernet connection.

## 5.5.6 System Interconnections

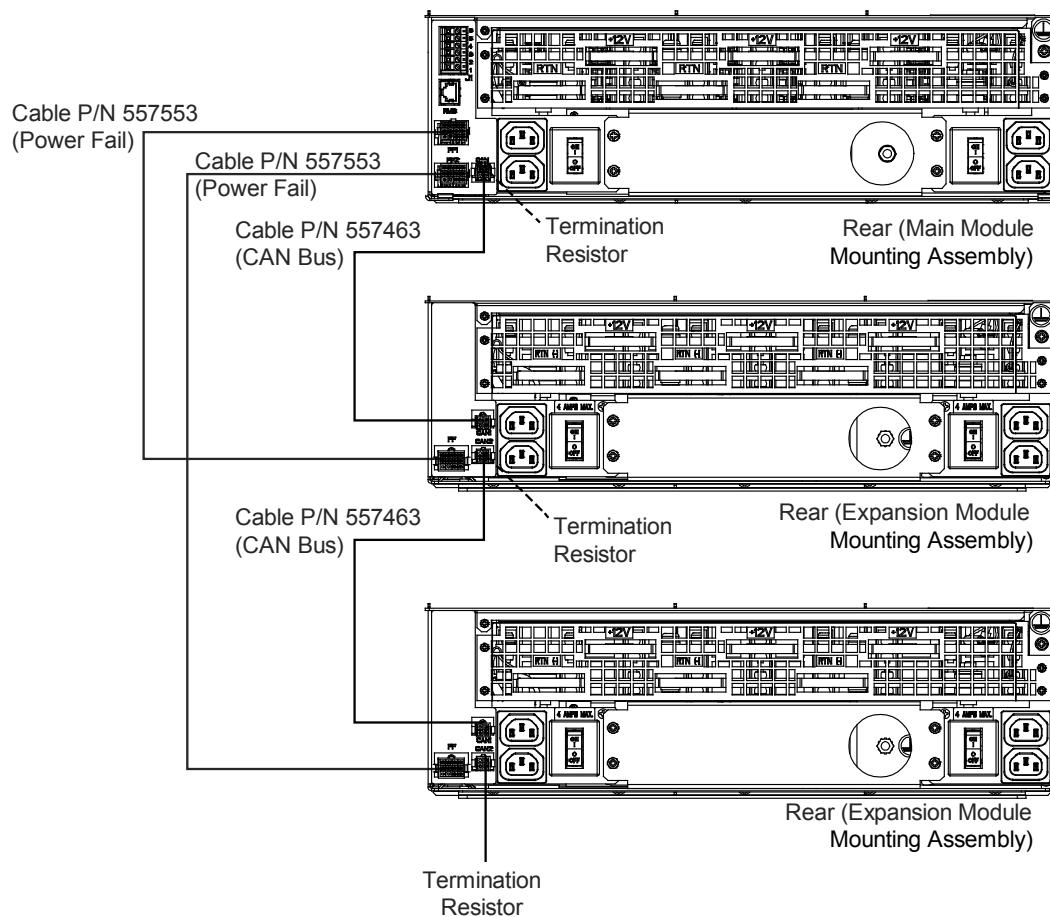
**NOTE!** The installation may consist of one (1) main module mounting assembly and up to two (2) expansion module mounting assemblies, or all main module mounting assemblies. In installations with one main module mounting assembly and up to two expansion module mounting assemblies, all module mounting assemblies are on one DC bus and are controlled by a single SCC controller. A common CAN bus is shared across all module mounting assemblies and all rectifiers load share and all rectifiers are load managed via the SCC. In installations with all main module mounting assemblies, each module mounting assembly is on a separate DC bus and each module mounting assembly is controlled by (contains) a separate SCC controller. A separate CAN bus exists per module mounting assembly, rectifiers load share per module mounting assembly, and rectifiers are load managed via an SCC per module mounting assembly.

**NOTE!** These connections are not to be made between multiple main module mounting assemblies (containing SCC controllers).

Refer to **Figure 5-4** for a system interconnection diagram.

As each module mounting assembly is interconnected, remove the termination resistor from the main module mounting assembly and plug it into the appropriate connector on the last module mounting assembly as shown in **Figure 5-4**.

**Figure 5-4: System Interconnection Diagram**



## 5.6 AC Input and AC Input Equipment Grounding Connections to Module Mounting Assembly(s)



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

### 5.6.1 Hardwired AC Input Connections



**NOTE!** A grounding conductor must be provided with each AC input feed.

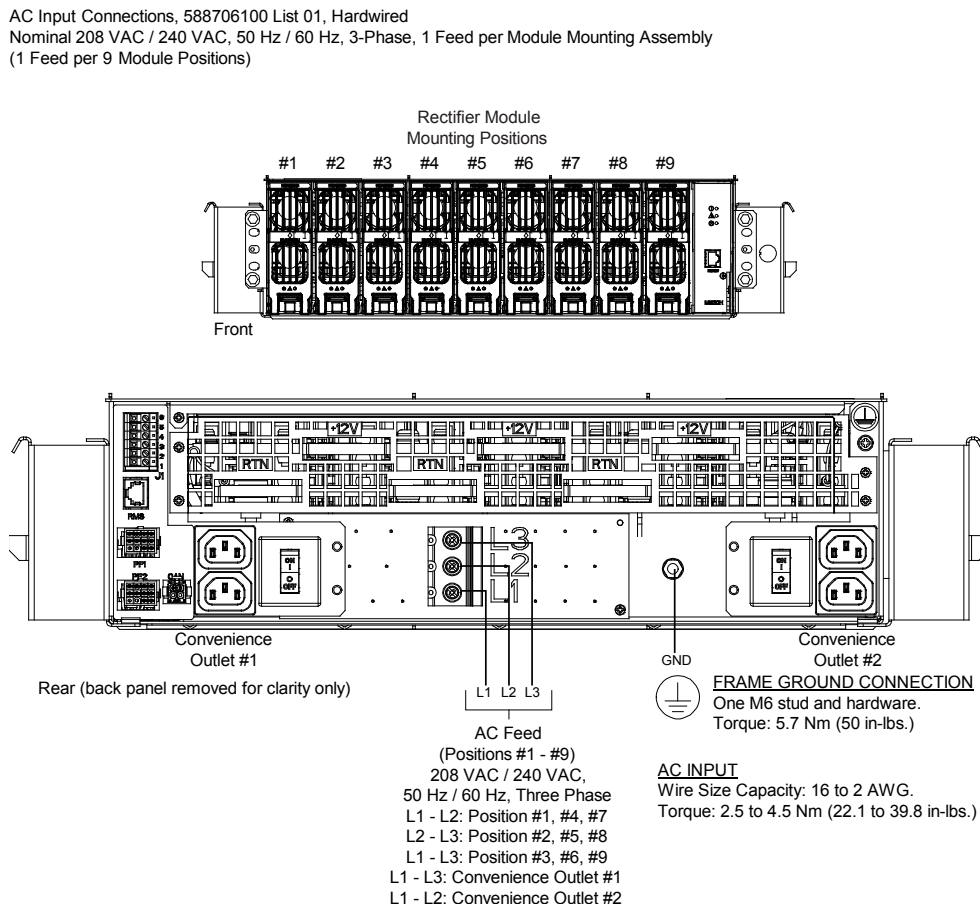
AC input cable(s) and plug(s) are factory provided and connected if ordered with a shelf. See “AC Input Cord Integration” starting on page 15.

#### Connections to List 01 Module Mounting Assembly

Spec. No. 588706100 List 01 Module Mounting Assembly is configured for one (1) 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-phase AC input feed per module mounting assembly. Feeds 208 VAC / 240 VAC input voltage to each module (9 modules per shelf) plus the convenience AC outlets.

If a cable was not ordered with the shelf, customer to install conduit or cord grips using the AC input access hole in the rear of the shelf, and wire to the AC input terminal block located behind the rear access cover. See **Figure 5-5**. See System Application Guide (SAG588706100) for recommended wire size and branch circuit protection device rating.

**Figure 5-5: AC Input Connections to a 588706100 List 01 Module Mounting Assembly (Hardwired)**



## Connections to List 02 Module Mounting Assembly

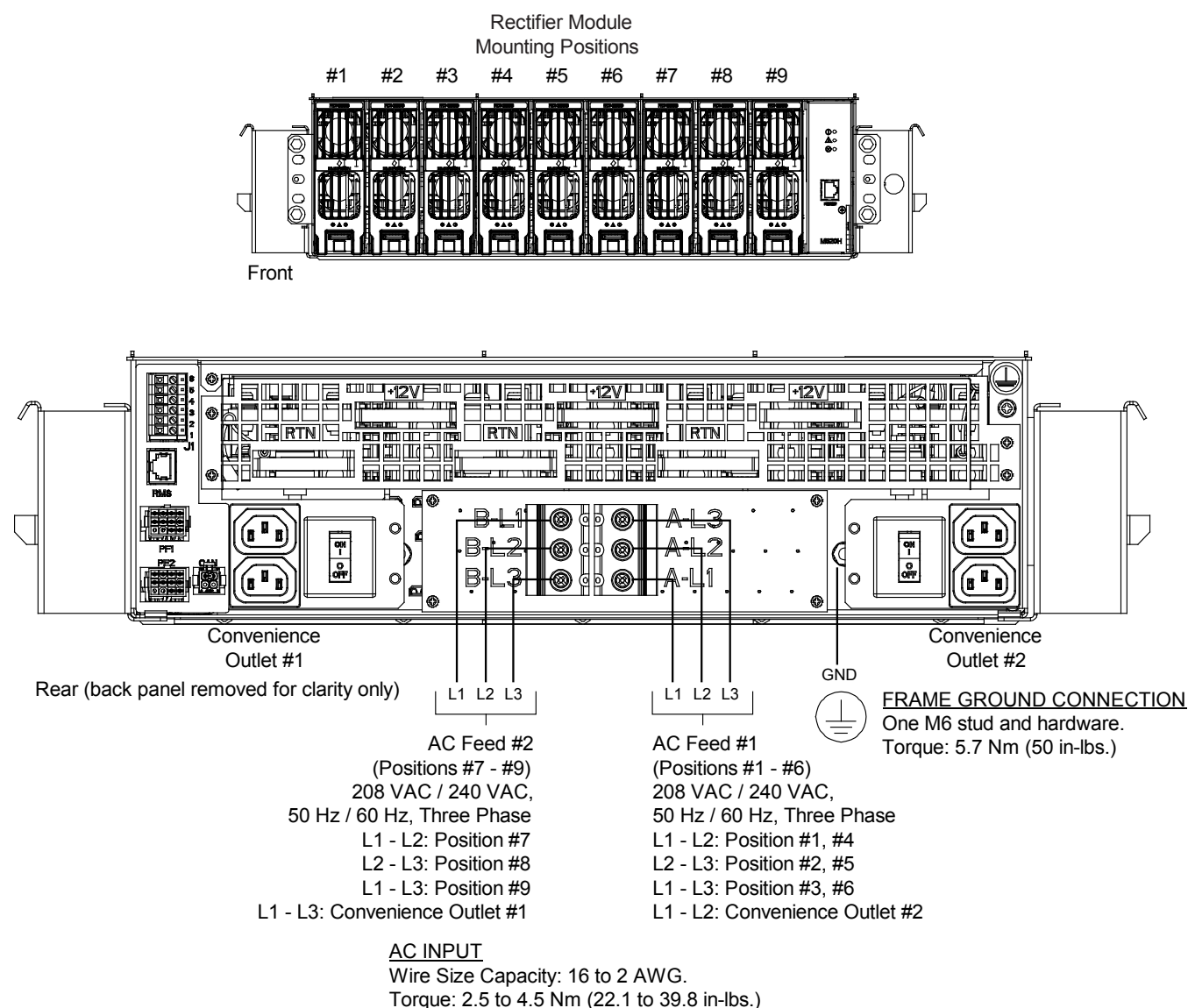
Spec. No. 588706100 List 02 Module Mounting Assembly is configured for two (2) 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-phase AC input feeds per module mounting assembly. One feeds 208 VAC / 240 VAC input voltage to six (6) modules plus the convenience AC outlets on one side; the other 208 VAC / 240 VAC input voltage to three (3) modules plus the convenience AC outlets on one side.

If a cable was not ordered with the shelf, customer to install conduit or cord grips using the AC input access hole in the rear of the shelf, and wire to the AC input terminal block located behind the rear access cover. See **Figure 5-6**. See System Application Guide (SAG588706100) for recommended wire size and branch circuit protection device rating.

**Figure 5-6: AC Input Connections to a 588706100 List 02 Module Mounting Assembly (Hardwired)**

AC Input Connections, 588706100 List 02, Hardwired

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 2 Feeds per Module Mounting Assembly  
(1 Feed per 6 Module Positions, 1 Feed per 3 Module Positions)



### Connections to List 03 / List 13 Module Mounting Assembly

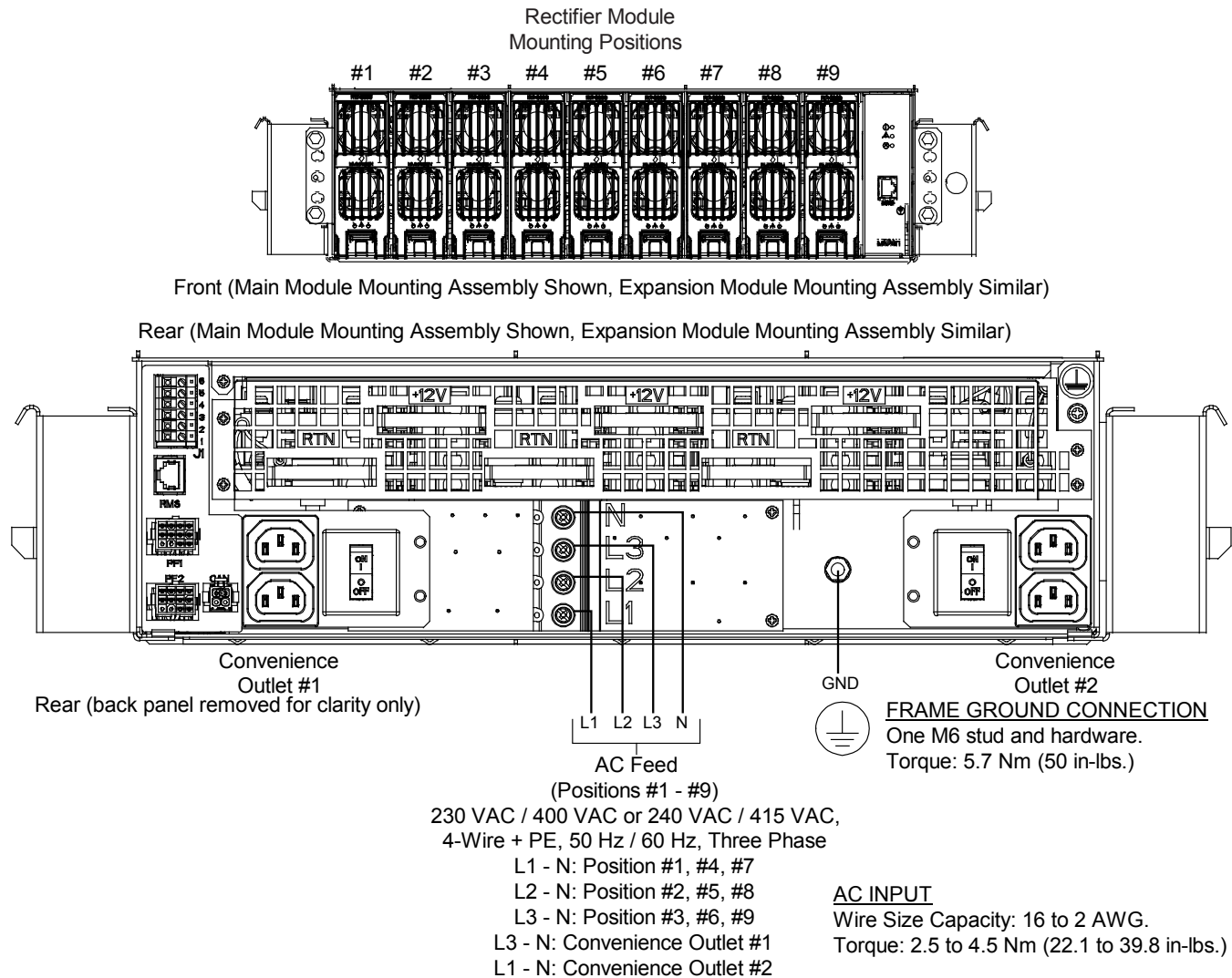
Spec. No. 588706100 List 03 / List 13 Module Mounting Assembly is configured for one (1) 230 VAC / 400 VAC or 240 VAC / 415 VAC, 4-wire + PE, 50 Hz / 60 Hz, 3-phase AC input feed per module mounting assembly. Feeds 230 VAC (Line to Neutral) or 240 VAC (Line to Neutral) input voltage to each module plus the convenience AC outlets. Each “Line to Neutral” (L1-N, L2-N, L3-N) feeds three (3) modules.

If a cable was not ordered with the shelf, customer to install conduit or cord grips using the AC input access hole in the rear of the shelf, and wire to the AC input terminal block located behind the rear access cover. See **Figure 5-7**. See System Application Guide (SAG588706100) for recommended wire size and branch circuit protection device rating.

**Figure 5-7: AC Input Connections to a 588706100 List 03 / List 13 Module Mounting Assembly (Hardwired)**

AC Input Connections, 588706100 List 03 / List 13, Hardwired

Nominal 230 VAC / 400 VAC or 240 VAC / 415 VAC, 4-Wire + PE, 50 Hz / 60 Hz, 3-Phase, 1 Feed per Module Mounting Assembly (1 Feed per 9 Module Positions)



## Connections to List 05 / List 15 Module Mounting Assembly

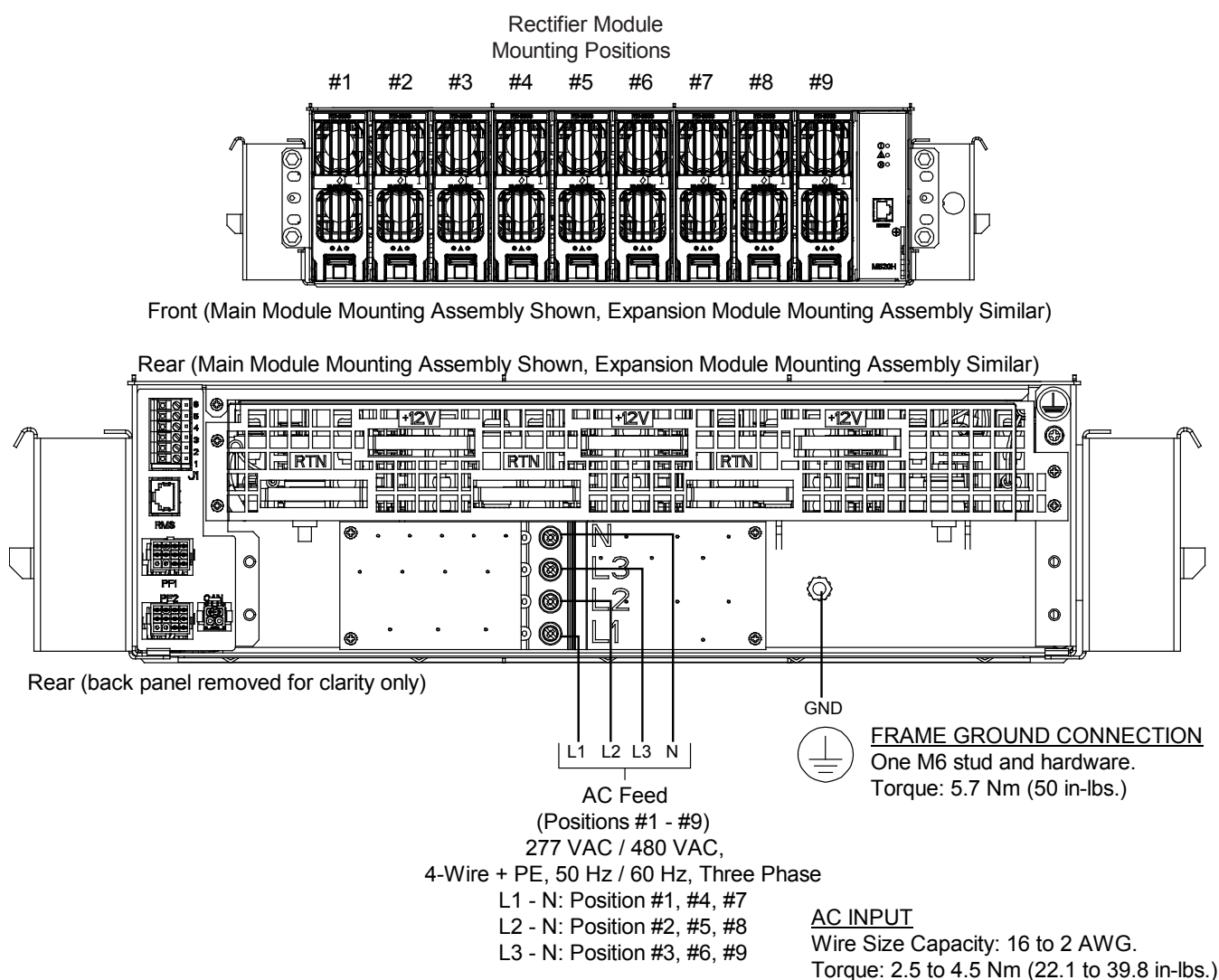
Spec. No. 588706100 List 05 / List 15 Module Mounting Assembly is configured for one (1) 277 VAC / 480 VAC, 4-wire + PE, 50 Hz / 60 Hz, 3-phase AC input feed per module mounting assembly. Feeds 277 VAC (Line to Neutral) input voltage to each module. Each “Line to Neutral” (L1-N, L2-N, L3-N) feeds three (3) modules.

If a cable was not ordered with the shelf, customer to install conduit or cord grips using the AC input access hole in the rear of the shelf, and wire to the AC input terminal block located behind the rear access cover. See **Figure 5-8**. See System Application Guide (SAG588706100) for recommended wire size and branch circuit protection device rating.

**Figure 5-8: AC Input Connections to a 588706100 List 05 / List 15 Module Mounting Assembly (Hardwired)**

AC Input Connections, 588706100 List 05 / List 15, Hardwired

Nominal 277 VAC / 480 VAC, 4-Wire + PE, 50 Hz / 60 Hz, 3-Phase, 1 Feed per Module Mounting Assembly  
(1 Feed per 9 Module Positions)



## 5.6.2 AC Input Cord Integration

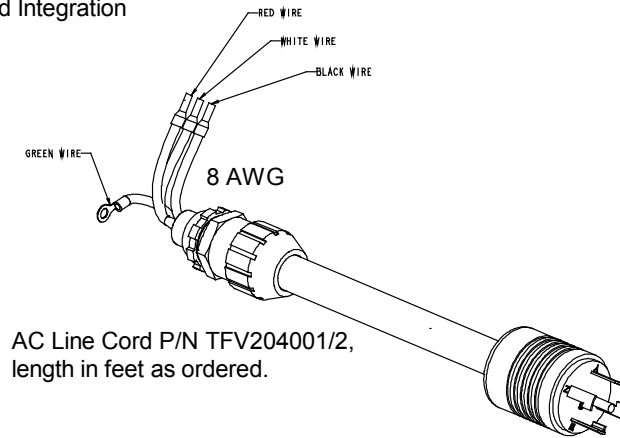
AC input cable(s) and plug(s) are factory provided and connected if ordered with a shelf.

Refer to “Maximizing Output Power and Optimizing AC Input Current Balancing” in SAG588706100 for output power capacities based on the use of the AC input cable integration and the number and position of rectifiers installed, with and without the convenience outlets providing rated output current (4 amps each).

### List 430 AC Input Cable Integration

**Figure 5-9: List 430 AC Input Cable Integration (cont'd on next page)**

AC Input Connections, 588706100 List 430, AC Line Cord Integration



AC Input Connections, 588706100 List 430, AC Line Cord Integration

For Use With 588706100 List 01

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 1 Feed per Module Mounting Assembly

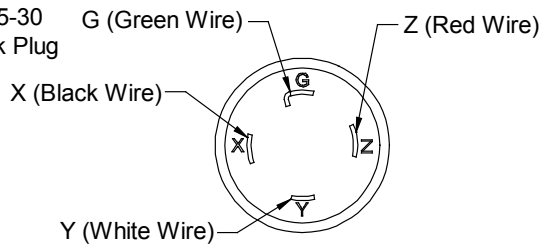
(1 Feed per 9 Module Positions)

RPT404002/1

NEMA L15-30

Twist-Lock Plug

30 A



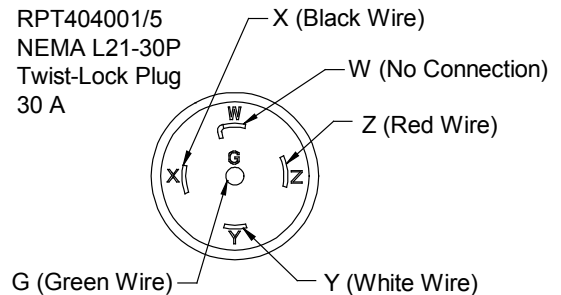
AC Feed  
(Positions #1 - #9)  
208 VAC / 240 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4, #7  
L2 - L3: Position #2, #5, #8  
L1 - L3: Position #3, #6, #9  
L1 - L3: Convenience Outlet #1  
L1 - L2: Convenience Outlet #2

RPT404001/5

NEMA L21-30P

Twist-Lock Plug

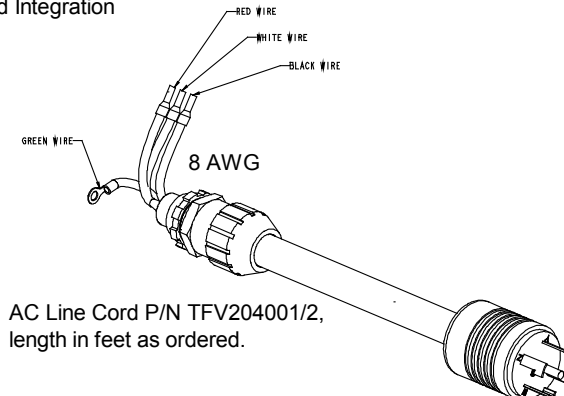
30 A



AC Feed  
(Positions #1 - #9)  
208 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4, #7  
L2 - L3: Position #2, #5, #8  
L1 - L3: Position #3, #6, #9  
L1 - L3: Convenience Outlet #1  
L1 - L2: Convenience Outlet #2

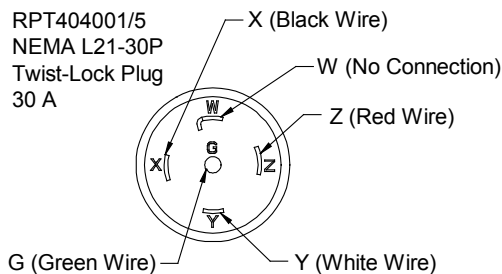
**Figure 5-9: List 430 AC Input Cable Integration (cont'd from previous page)**

AC Input Connections, 588706100 List 430, AC Line Cord Integration

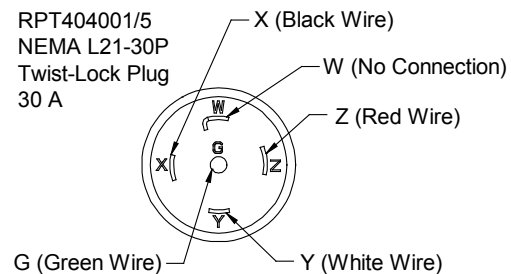


AC Input Connections, 588706100 List 430, AC Line Cord Integration

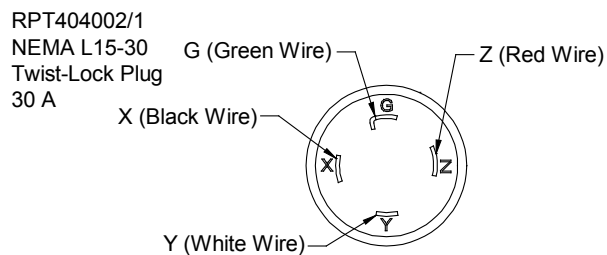
For Use With 588706100 List 02

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 2 Feeds per Module Mounting Assembly  
(1 Feed per 6 Module Positions, 1 Feed per 3 Module Positions)

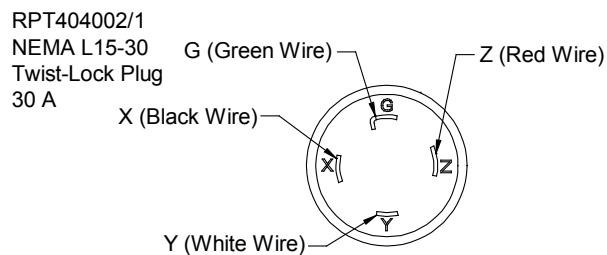
AC Feed #2  
(Positions #7 - #9)  
208 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #7  
L2 - L3: Position #8  
L1 - L3: Position #9  
L1 - L3: Convenience Outlet #1



AC Feed #1  
(Positions #1 - #6)  
208 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4  
L2 - L3: Position #2, #5  
L1 - L3: Position #3, #6  
L1 - L2: Convenience Outlet #2



AC Feed #2  
(Positions #7 - #9)  
208 VAC / 240 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #7  
L2 - L3: Position #8  
L1 - L3: Position #9  
L1 - L3: Convenience Outlet #1



AC Feed #1  
(Positions #1 - #6)  
208 VAC / 240 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4  
L2 - L3: Position #2, #5  
L1 - L3: Position #3, #6  
L1 - L2: Convenience Outlet #2



## List 450 AC Input Cable Integration

**Figure 5-10: List 450 AC Input Cable Integration (cont'd on next page)**

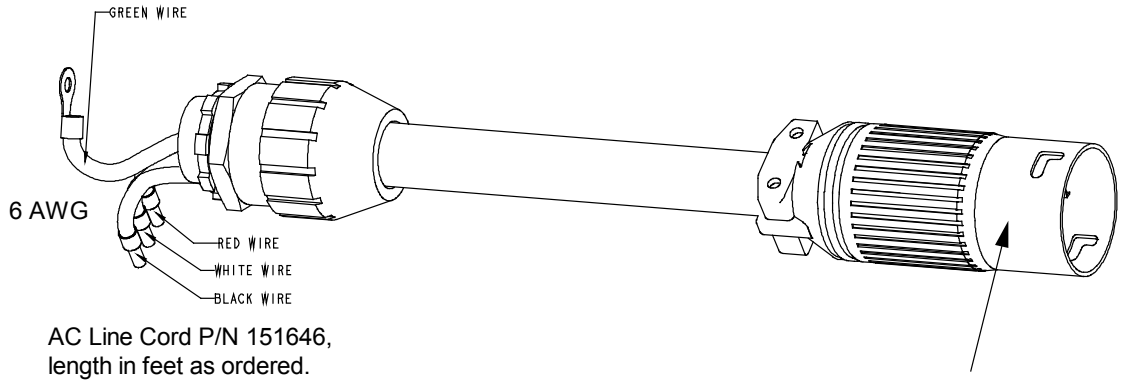
AC Input Connections, 588706100 List 450, AC Line Cord Integration

For Use With 588706100 List 01

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 1 Feed per Module Mounting Assembly

(1 Feed per 9 Module Positions)

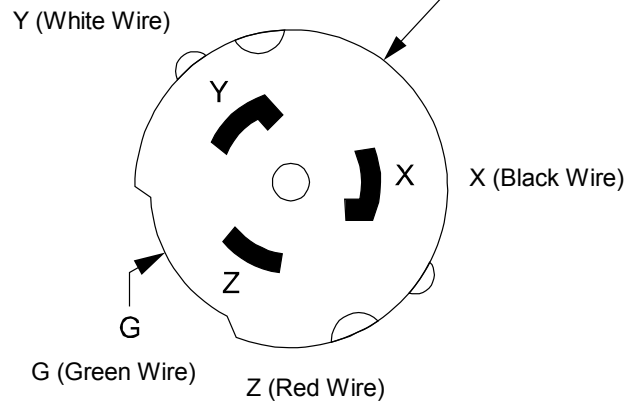
P/N 588706100 List 450



AC Line Cord P/N 151646,  
length in feet as ordered.

P/N 151635  
HUBBELL, CS8365C  
Twist-Lock Plug  
50 A

AC Feed  
(Positions #1 - #9)  
208 VAC / 240 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4, #7  
L2 - L3: Position #2, #5, #8  
L1 - L3: Position #3, #6, #9  
L1 - L3: Convenience Outlet #1  
L1 - L2: Convenience Outlet #2



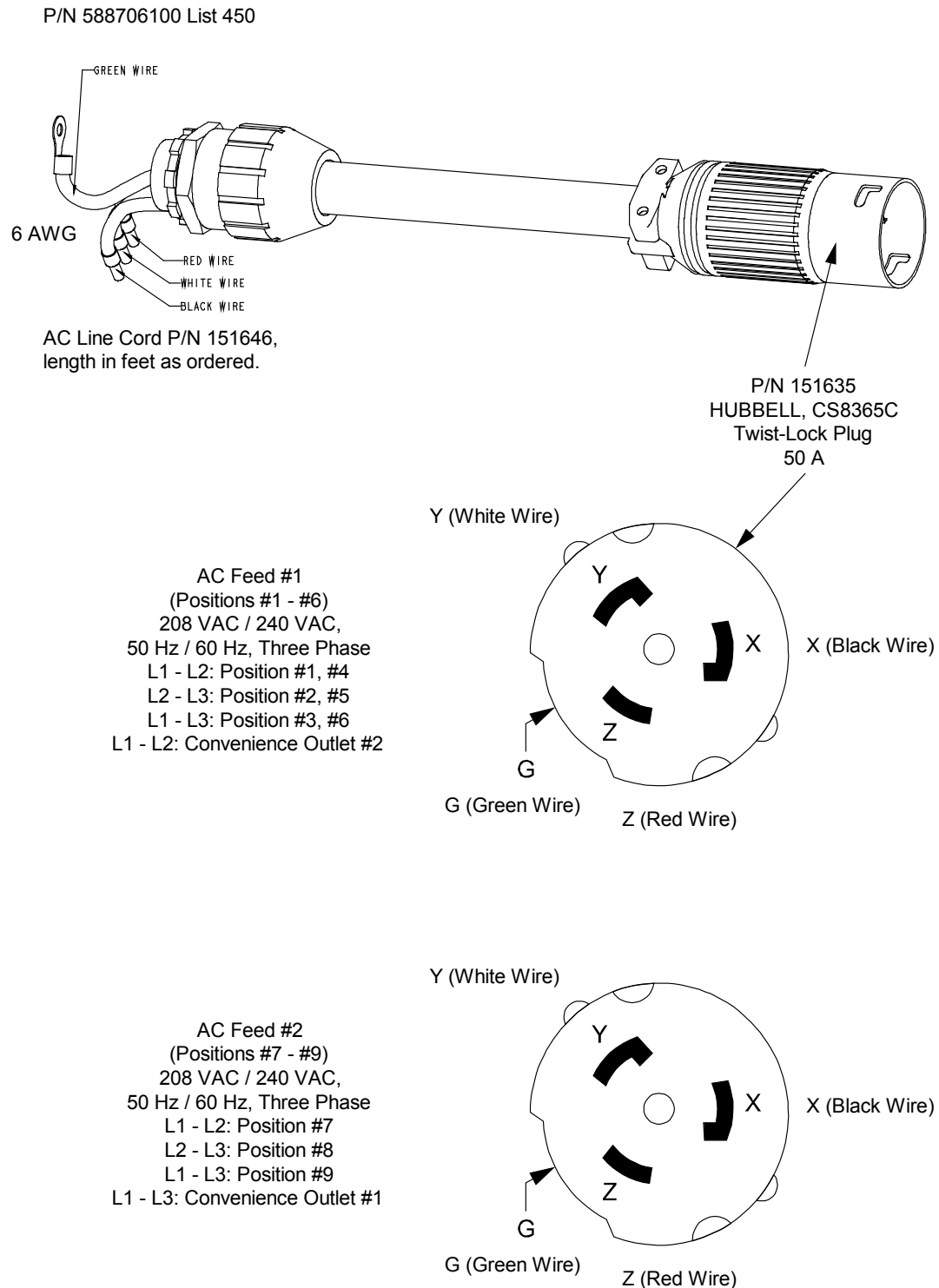
**Figure 5-10: List 450 AC Input Cable Integration (cont'd from previous page)**

AC Input Connections, 588706100 List 450, AC Line Cord Integration

For Use With 588706100 List 02

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 2 Feeds per Module Mounting Assembly

(1 Feed per 6 Module Positions, 1 Feed per 3 Module Positions)



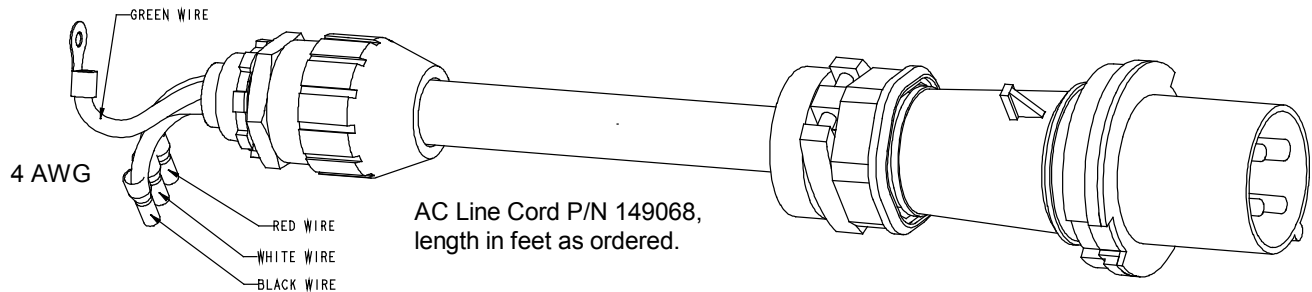
## List 460 AC Input Cable Integration

**Figure 5-11: List 460 AC Input Cable Integration**

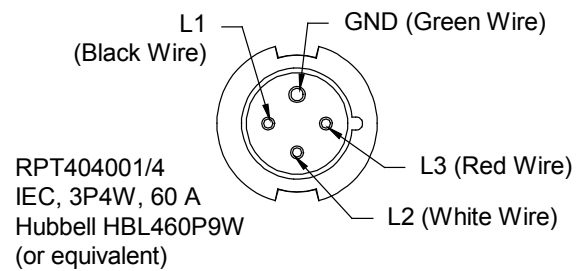
AC Input Connections, 588706100 List 460, AC Line Cord Integration

For Use With 588706100 List 01

Nominal 208 VAC / 240 VAC, 50 Hz / 60 Hz, 3-Phase, 1 Feed per Module Mounting Assembly  
(1 Feed per 9 Module Positions)



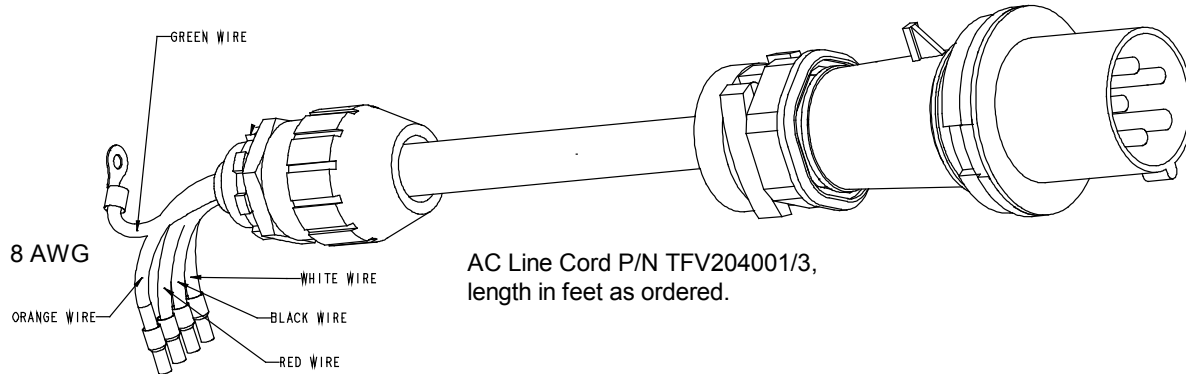
AC Feed  
(Positions #1 - #9)  
208 VAC / 240 VAC,  
50 Hz / 60 Hz, Three Phase  
L1 - L2: Position #1, #4, #7  
L2 - L3: Position #2, #5, #8  
L1 - L3: Position #3, #6, #9  
L1 - L3: Convenience Outlet #1  
L1 - L2: Convenience Outlet #2



## List 532 AC Input Cable Integration

**Figure 5-12: List 532 AC Input Cable Integration**

AC Input Connections, 588706100 List 532, AC Line Cord Integration



AC Input Connections, 588706100 List 532, AC Line Cord Integration

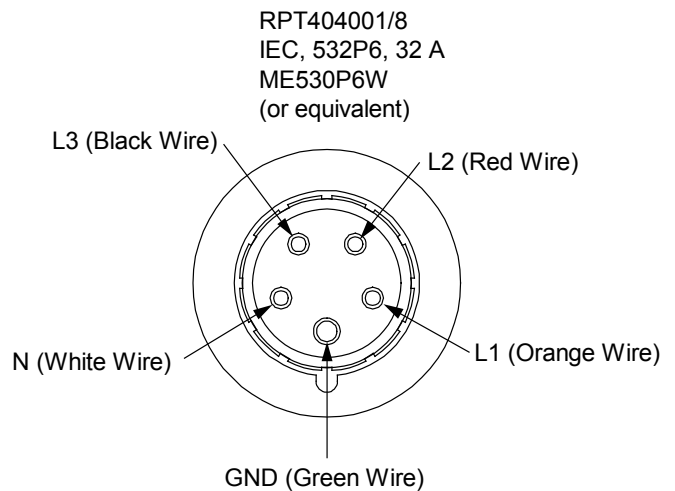
For Use With 588706100 List 03, 13

Nominal 230 VAC / 400 VAC or 240 VAC / 415 VAC, 4-Wire + PE, 50 Hz / 60 Hz, 3-Phase,

1 Feed per Module Mounting Assembly

(1 Feed per 9 Module Positions)

AC Feed  
(Positions #1 - #9)  
230 VAC / 400 VAC or 240 VAC / 415 VAC,  
4-Wire + PE, 50 Hz / 60 Hz, Three Phase  
L1 - N: Position #1, #4, #7  
L2 - N: Position #2, #5, #8  
L3 - N: Position #3, #6, #9  
L3 - N: Convenience Outlet #2  
L1 - N: Convenience Outlet #1

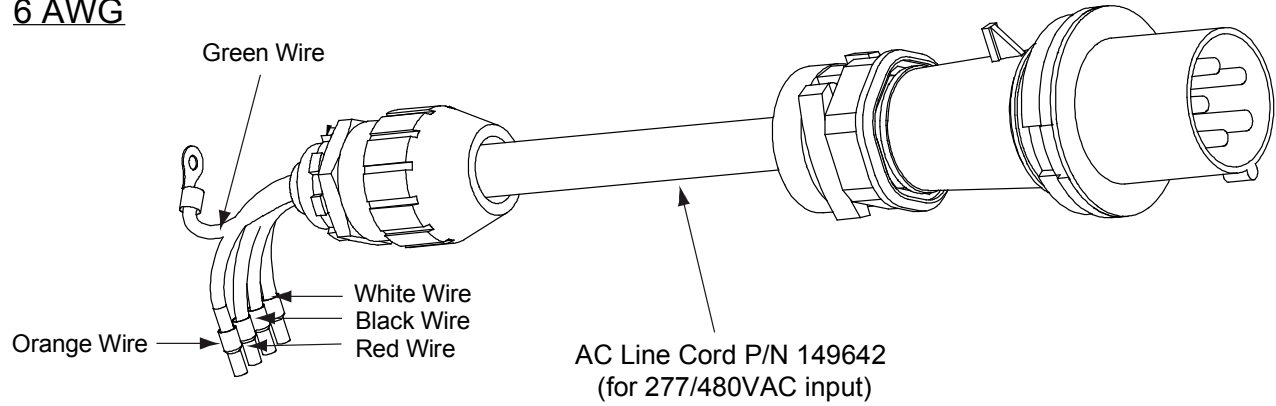


## List 560 AC Input Cable Integration

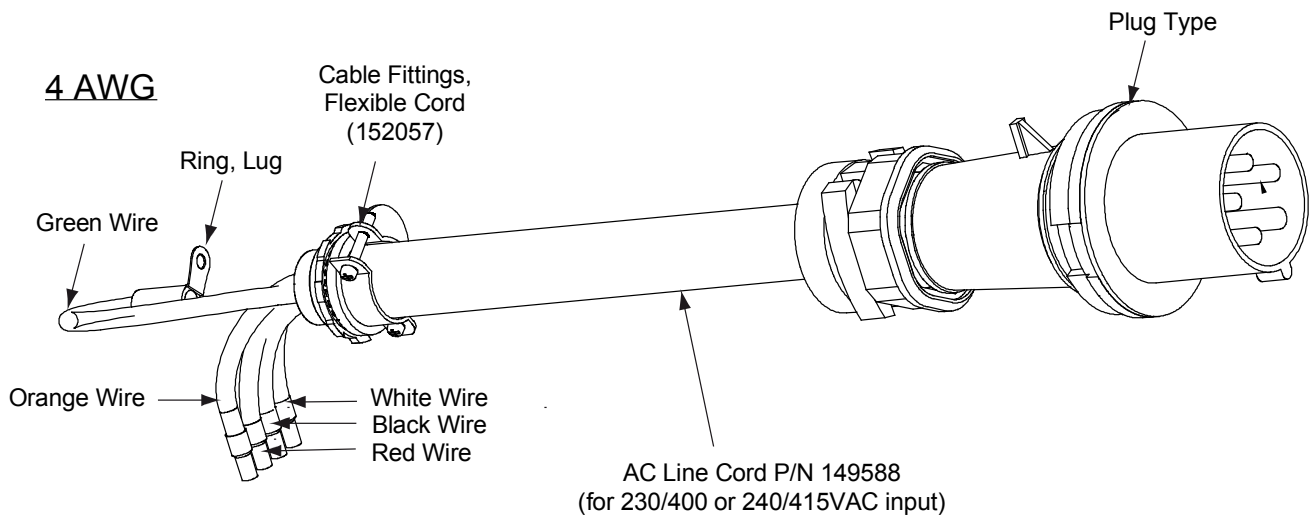
Figure 5-13: List 560 AC Input Cable Integration (cont'd on next page)

AC Input Connections, 588706100 List 560, AC Line Cord Integration

### 6 AWG



### 4 AWG



**Figure 5-13: List 560 AC Input Cable Integration (cont'd from previous page)**

### AC Input Connections, 588706100 List 560, AC Line Cord Integration

AC Input Connections, 588706100 List 560, AC Line Cord Integration

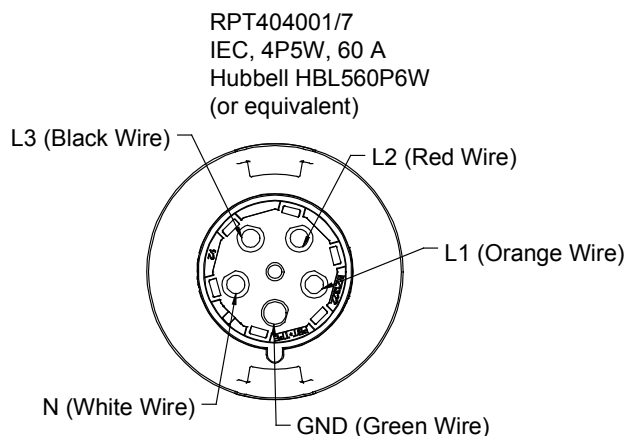
For Use With 588706100 List 03, 13

Nominal 230 VAC / 400 VAC or 240 VAC / 415 VAC, 4-Wire + PE, 50 Hz / 60 Hz, 3-Phase,

1 Feed per Module Mounting Assembly

(1 Feed per 9 Module Positions)

AC Feed  
(Positions #1 - #9)  
230 VAC / 400 VAC or 240 VAC / 415 VAC,  
4-Wire + PE, 50 Hz / 60 Hz, Three Phase  
L1 - N: Position #1, #4, #7  
L2 - N: Position #2, #5, #8  
L3 - N: Position #3, #6, #9  
L3 - N: Convenience Outlet #2  
L1 - N: Convenience Outlet #1



AC Input Connections, 588706100 List 560, AC Line Cord Integration

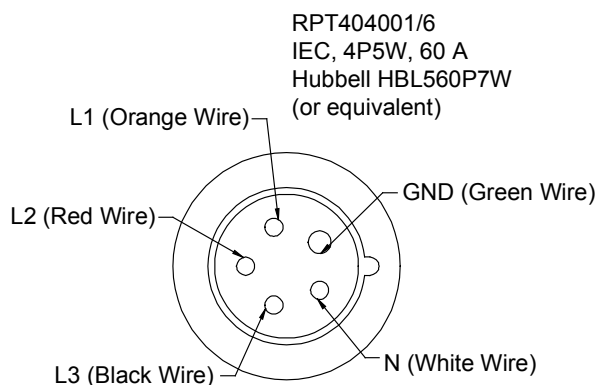
For Use With 588706100 List 05, 15

Nominal 277 VAC / 480 VAC, 4-Wire + PE, 50 Hz / 60 Hz, 3-Phase,

1 Feed per Module Mounting Assembly

(1 Feed per 9 Module Positions)

AC Feed  
(Positions #1 - #9)  
277 VAC / 480 VAC,  
4-Wire + PE, 50 Hz / 60 Hz, Three Phase  
L1 - N: Position #1, #4, #7  
L2 - N: Position #2, #5, #8  
L3 - N: Position #3, #6, #9



## 6 Installing SCC Controller and Rectifier Modules



**NOTE!** Install SCC controller and rectifier modules as directed in the “Initially Starting the System” procedure starting on page 24.

For SCC controller installation instructions, refer to SCC Controller Instructions (UM1M520HNA).

For rectifier module installation instructions, refer to rectifier module Instructions (UM1R123000).

## 7 Initially Starting, Configuring, and Checking System Operation

### 7.1 Important Safety Instructions

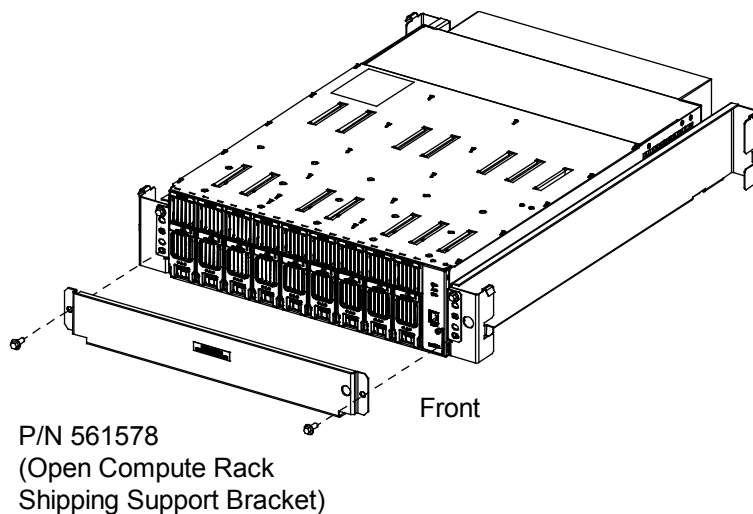


**CAUTION!** Performing various steps in the following procedures may cause a service interruption and/or result in the extension of alarms. Notify any appropriate personnel before starting these procedures. Also, notify personnel when these procedures are completed.

### 7.2 Initial Startup Preparation

- Ensure that all blocks, except the last one, in the “Installation Acceptance Checklist” starting on page 2 have been checked.
- If the system was integrated into an Open Compute IT Rack and shipped to its final destination with rectifiers pre-installed, REMOVE THE SHIPPING SUPPORT BRACKET BEFORE POWERING THE SYSTEM. See **Figure 7-1**.

**Figure 7-1: Removing Shipping Support Bracket**









## 7.3 Initially Starting the System

### Procedure

1. Apply AC input power to the system by closing ALL external AC disconnects or protective devices that supply AC power to the module mounting assembly.
2. Insert rectifier modules and SCC controller into the module mounting assembly, as required. Refer to the separate module instruction document for details.
3. Recommended to insert blank covers into empty slots. To install, place the tabs at the top of the blank cover into position and rotate the bottom of the cover down and press in until it snaps in place. To remove, press up on the bottom tab and swing the bottom of the cover out and up then slide down to release the top tabs.
4. The system is pre-configured. Refer to the master upstream supervisory and control unit (also known as the Rack Management System), such as the Avocent UMG, for system operation.
5. Observe the status of the indicators located on the SCC controller and rectifiers modules. If the system is operating normally, only the green LED will be illuminated for the rectifier modules and the SCC.
6. Verify all rectifier modules and the SCC controller are fully seated, latched, and the latch handle screws secured.
7. Verify there are no external alarms and the local indicators are normal. See **Table 7-1**.

**Table 7-1: Status and Alarm Indicators**

Component	Indicator	Normal State
SCC Controller		Status (Green)
		Warning (Yellow)
		Alarm (Red)
Rectifier		Power (Green)
		Protection/Warning (Yellow)
		Alarm (Red)



## 8 Operating Procedures

### 8.1 SCC Controller and Rectifier Module

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

- SCC Controller Instructions (UM1M520HNA)
- Rectifier Module Instructions (UM1R123000)

#### **Expected Number of Rectifiers**

You can set the number of rectifiers expected to be in the system via the controller. If the controller does not find the specified number of rectifiers, the controller will send an SNMP trap to notify the RMS.

#### **Detailed Status for Rectifiers**

When a yellow or red LED is illuminated on a rectifier, the SNMP data from the controller can be used to identify the specific problem.

### 8.2 Local Indicators

#### **SCC Controller and Rectifier Module**

Refer to the separate instruction documents for descriptions of the local indicators located on these units.

## 9 Maintenance

### 9.1 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in **Table 9-1** every 6-months to ensure continual system operation.

**Table 9-1: Maintenance Procedures to be Performed at 6-Month Intervals**

PROCEDURE	REFERENCED IN
Check ventilation openings for obstructions such as dust, papers, manuals, etc.	--
Inspect and tighten all installer's connections	Making Electrical Connections section of this document.

## 10 Troubleshooting and Repair

### 10.1 Contact Information

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

### 10.2 SCC Controller and Rectifier Module

For troubleshooting and repair instructions on these units, refer to their separate instruction document.

- SCC Controller Instructions (UM1M520HNA)
- Rectifier Module Instructions (UM1R123000)

### 10.3 System Troubleshooting Information

This system is designed for ease in troubleshooting and repair. The various indicators as described in the SCC Controller and Rectifier Module Instructions are designed to isolate failure to a specific element. Once the faulty element has been identified, refer to “Replacement Information” on page 26 and “Replacement Procedures” on page 26.

### 10.4 Replacement Information

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

Refer to SAG588706100 (System Application Guide) for replacement part numbers.

### 10.5 Replacement Procedures



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

#### **Replacing an SCC Controller or Rectifier Module**

For replacement instructions on these units, refer to their separate instruction document.

- SCC Controller Instructions (UM1M520HNA)
- Rectifier Module Instructions (UM1R123000)

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