NetSure™ -48 VDC Bulk Output Rectifier System

Installation and User Manual

Specification Number: 58870530036
Model Number: PSS4840-3/19C

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Vertiv assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Refer to other local practices or building codes as applicable for the correct methods, tools, and materials to be used in performing procedures not specifically described in this document.

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.

TABLE OF CONTENTS

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 provides Installation and User Instructions for Vertiv™ NetSure™ -48 VDC bulk output rectifier system Model PSS4840 3/19C, Spec. No. 58870530036.

The complete Customer Documentation Package consists of…

System Installation and User Manual

- Installation and User Instructions: UM58870530036

Controller User Manual

- NCU Controller User Instructions: UM1M830BNA

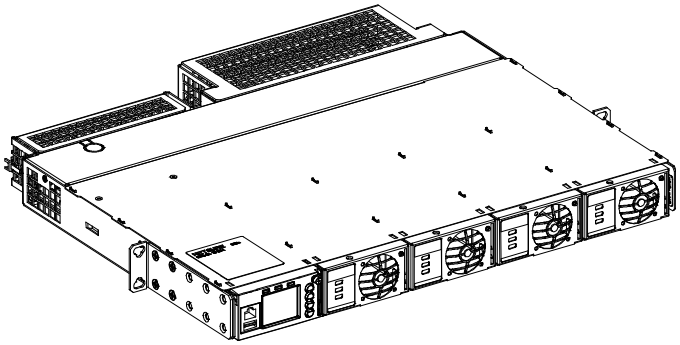
USB Drive with All Customer Documentation

- Power System Installation and User Instructions: UM58870530036
- NCU Controller User Instructions: UM1M830BNA
- Rectifier Instructions: UM1R482000e3
- Engineering Drawings
- Also provided on the USB drive is a Controller Configuration Drawing (C-drawing) and the controller configuration files loaded into the controller as shipped.

For factory settings of all configurable controller parameters, refer to the Configuration Drawing (C-drawing) supplied with your bulk output rectifier system.

2 System Description

-48 VDC @ Bulk Output Rectifier System



The Vertiv™ NetSure™ PSS4840 3/19C is a bulk output rectifier system containing a 1RU high by 19" wide shelf with a system controller mounting slot and four (4) rectifier module mounting slots.

This bulk output rectifier system is designed to power a load. This bulk output rectifier system is capable of operating in a batteryless installation. The bulk output rectifier system is designed for operation with the positive output grounded.

The bulk output rectifier system consists of the following components.

Controller

NCU (NetSure Control Unit): The controller provides bulk output rectifier system control, rectifier control (including a charge control function), metering functions, monitoring functions, and local/remote alarm functions. The controller also provides data acquisition, system alarm management, and advanced battery and energy management. The controller contains a color TFT display and keypad for local access. The controller provides an Ethernet port and comes with comprehensive webpages for remote access. The controller has optional SNMP v3 capability for remote system management. The controller supports software upgrade via its USB port. Refer to the NCU Controller Instructions (UM1M830BNA) for more information.

Rectifier Modules

The system contains rectifier modules, which provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to the Rectifier Instructions (UM1R482000e3) for more information.

3 Specifications

3.1 Input and Output Ratings

AC Input Rating: 208 VAC / 240 VAC, 20 A / 17.5 A, 50 Hz / 60 Hz, single-phase, 3 wire.

DC Output Rating: -48 VDC,

208 A (10000 W) maximum @ 45 °C.

187 A (10000 W) maximum @ 65 °C.

140 A (7500 W) maximum @ 70 °C.

AC Input Rating: 120 VAC, 18 A, 50 Hz / 60 Hz, single-phase, 3 wire.

DC Output Rating: -48 VDC,

104 A (5000 W) maximum @ 45 °C.

93 A (4500 W) maximum @ 65 °C.

70 A (3375 W) maximum @ 70 °C.

3.2 Environmental

Operating Ambient Temperature Range: -40 °C to +70 °C (-40 °F to +158 °F).

Storage Ambient Temperature Range: -40 °C to +70 °C (-40 °F to +158 °F).

Relative Humidity: Capable of operating in an ambient relative humidity range of 0% to 90%, non-condensing.

Altitude: Capable of operating in an altitude range of -200 feet to 10,000 feet. The maximum operating ambient temperature should be de-rated by 3 °C per 1000 feet above 6562 feet.

Audible Noise: Refer to UM1R482000e3.

Surge Protection: Refer to UM1R482000e3.

Ventilation Requirements: The system must be mounted so ventilating openings are not blocked and temperature of the air entering the system does not exceed the Operating Ambient Temperature Range stated above. Refer also to “Mounting” below.

Mounting: This power system is designed to mount in a standard 19” or 23” (with adapter plates) relay rack or equipment rack having 1” or 1 3/4” multiple drillings. Refer to “Dimensions and Weight” on page 3 for mounting dimensions.

- The installer should be familiar with the installation requirements and techniques to be used in securing the system to a relay rack or equipment rack.
- 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 to be connected 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).
- System ventilating openings must not be blocked and temperature of air entering rectifiers must not exceed the rated operating ambient temperature range.
- Clearance requirements are (relay rack):
  - Recommended minimum aisle space clearance for the front of each bay is 2' 6".
  - Recommended minimum aisle space clearance for the rear of each bay is 2’ 0”.
- Clearance requirements are (cabinet mounting):
  - Recommended minimum clearance for the rear of the system is 4”.

3.3 Compliance Information

Safety Compliance: This unit meets the requirements of UL 60950-1, Standard for Information Technology Equipment, and is UL Recognized as a power supply for use in Telephone, Electronic Data Processing or Information Processing Equipment. This unit meets the requirements of CAN/CSA 22.2, No. 60950-00 and is tested and Certified by UL ("c UR") as a Component Type Power Supply.

NEBS Compliance: Compliance verified by a Nationally Recognized Testing Laboratory (NRTL) per GR-1089-CORE and GR-63-CORE. Contact Vertiv for NEBS compliance reports.

Rectifier Modules: In order to remain compliant during a fan failure condition, the backup battery connection must be utilized to provide sufficient power to the loads for up to eight (8) hours when the system is operated at greater than 50% output power. If no backup battery connection is used, the system must operate with a redundant module installed.

3.4 Rectifier

Refer to the Rectifier Instructions (UM1R482000e3).

3.5 Controller

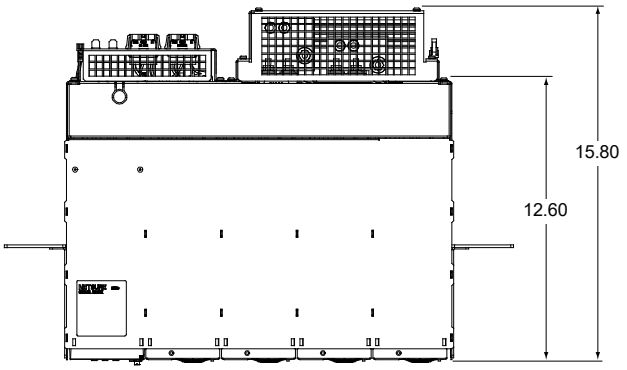
Refer to the NCU Controller Instructions (UM1M830BNA).

For controller factory settings, refer to the Controller Configuration Drawing (C-drawing).

3.6 Dimensions and Weight

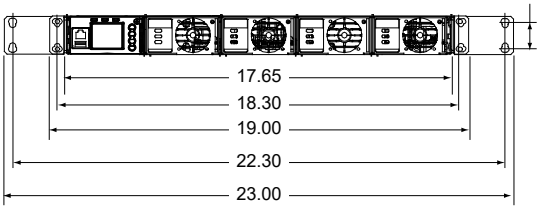
See **Figure 3.1**.

Figure 3.1: Dimensions and Weight



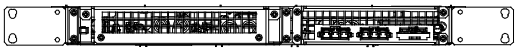
Top View

Left Side View



Front View

Right Side View



Rear View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   System
   Net: 9.5
   Shipping:
   Rectifier Module
   Net: 2.5
   Shipping:
   NCU Controller
   Net: 2.2
   Shipping:
3. Finish:
   Module Mounting Assembly and Module Bodies:
   Galvanized Steel
   Module Face Plates:
   Textured Gray
4. The standard 19” mounting angles are adjustable for front projection (flush, 1”, 2”, 3”, 4”, 5”, or 6”).
   23” mounting bracket adapter plates available.

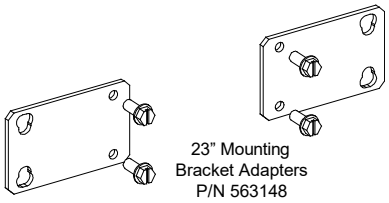
4 Accessory Descriptions

Order the following by part number / spec. number as required.

4.1 Mounting Adapter Plates

23" Mounting Bracket Adapter Plates, P/N 563148

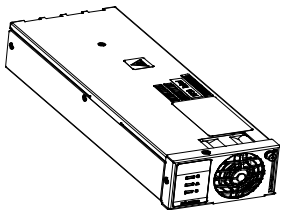
- Attaches to the 19" standard mounting brackets to allow 23" mounting.
- P/N 563148 provides two (2) mounting bracket adapter plates.



4.2 Rectifier Module

Rectifier Module, Spec. No. 1R482000e3

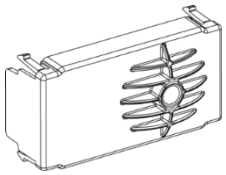
- Each 58870530036 Rectifier System accepts up to four (4) 2000 W / -48 VDC rectifier modules; Model R48-2000e3, Spec. No. 1R482000e3.
- Refer to the Rectifier Instructions (UM1R482000e3) for more information.



4.3 Rectifier Mounting Position Blank Cover Panel

Rectifier Mounting Position Blank Cover Panel, P/N SXA1100035/1

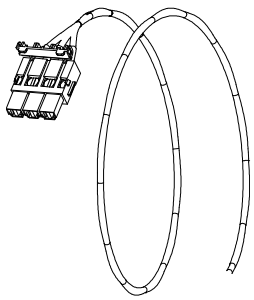
- Covers one (1) unused rectifier mounting position.
- Order a rectifier mounting position blank cover panel for each empty rectifier mounting position in the system, as desired.



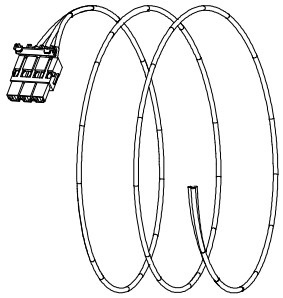
4.4 Rectifier AC Input Cable Assemblies and Rectifier AC Input Line Cords

Rectifier AC Input Cable Assembly, P/N 535232

- One (1) 30" long, 8 AWG, AC input cable assembly that is terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and un-terminated on the remaining end.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- Rated for 30 A.
- Order AC input cable assemblies or line cords as required.

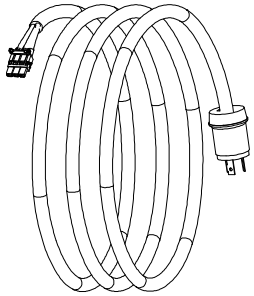


Rectifier AC Input Cable Assembly, P/N 553202



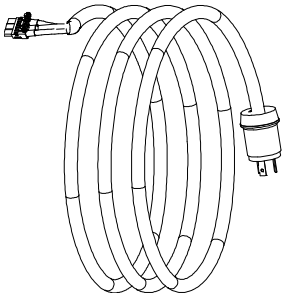
- One (1) 12' long, 8 AWG, AC input cable assembly that is terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and un-terminated on the remaining end.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- Rated for 30 A.
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 540946



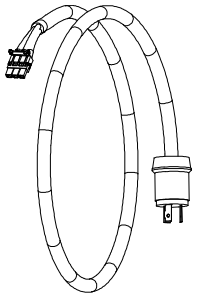
- One (1) 14' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L6-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 208 VAC / 240 VAC only (rated for 30 A at 208 VAC / 240 VAC).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 559301



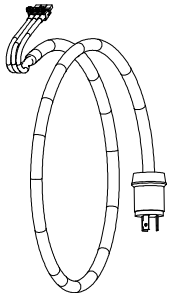
- One (1) 14' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug at a 90 degree angle bend which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L6 30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 208 VAC / 240 VAC only (rated for 30 A at 208 VAC / 240 VAC).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 545616



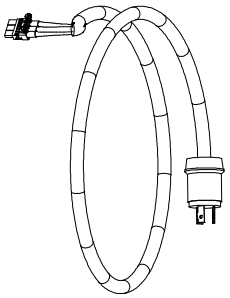
- One (1) 6' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L6-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 208 VAC / 240 VAC only (rated for 30 A at 208 VAC / 240 VAC).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 559842



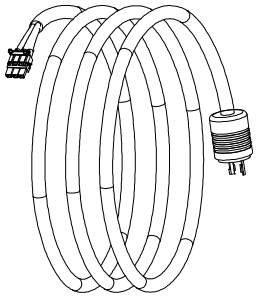
- One (1) 6' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug (wires molded 180° from plug orientation) which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L6-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 208 VAC / 240 VAC only (rated for 30 A at 208 VAC / 240 VAC).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 559302



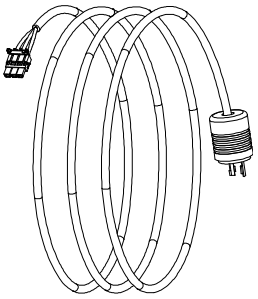
- One (1) 6' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug at a 90 degree angle bend which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L6-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 208 VAC / 240 VAC only (rated for 30 A at 208 VAC / 240 VAC).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 545252



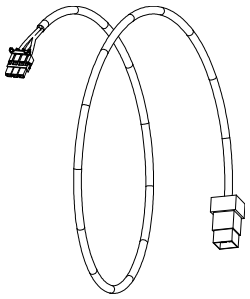
- One (1) 14' long, 8/3 AWG, AC input line cord that is terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L5-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 120 VAC only (rated for 30 A at 120 VAC @ 65 °C).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 547525



- One (1) 14' long, 12/3 AWG, AC input line cord terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and terminated on the remaining end with a NEMA L5-30P twist-lock plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- For 120 VAC only (rated for 20 A at 120 VAC @ 50 °C).
- Order AC input cable assemblies or line cords as required.

Rectifier AC Input Line Cord, P/N 548196



- One (1) 6' long, 12/3 AWG, AC input line cord terminated on one end with a Molex plug which mates with the AC input receptacle on the system, and terminated on the remaining end with a IEC320 C20 plug.
- Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.
- The C20 plug is rated 16 A @ 250 VAC (international rating) and 20 A @ 250 VAC (US rating).
  Can be used with rectifiers operating @ 120 VAC in +40 °C (+104 °F) or +65 °C (+149 °F) ambient.
  Can be used with rectifiers operating @ 208 VAC / 240 VAC in +40 °C (+104 °F) ambient.
  CANNOT be used with rectifiers operating @ 208 VAC / 240 VAC in +65 °C (+149 °F) ambient.
- Per UL 60950-1, 2nd Edition, when this cord is used with this power system, the following restrictions apply:
  - The power system must be used in a location having equipotential bonding (such as a telecommunications center, a dedicated computer room or a restricted access location).
  - The building installation shall provide a means for connection to protective earth; and the equipment is to be connected to that means; and a service person shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the service person shall arrange for the installation of a protective earthing conductor from the separated protective earthing terminal to the protective earth wire in the building.
- Order AC input cable assemblies or line cords as required.

4.5 Controller

NCU (NetSure Control Unit) Controller, P/N 1M830BNA

- Each 58870530036 Rectifier System accepts one (1) NCU Controller; Model M830B, Spec. No. 1M830BNA.
- Factory programmed with the configuration file specified when ordered.

NOTE! *The controller is provided with the factory default configuration unless otherwise specified.*

NOTE! *For custom NCU configurations, contact Vertiv.*

- Refer to the NCU Controller Instructions (UM1M830BNA) for more information.
- One (1) controller per system is required.
- Ordering an NCU for replacing an NCU or as a spare NCU.

  If the NCU is to be used as a replacement in a specific system it should be ordered with the same configuration file as the original NCU controller. This is identified by a six digit number. If the controller part number ends with a six digit number, for example, 1M830BNA559242, the configuration file number is the last six characters. If the part number does not have these characters, the configuration file number can be found on the controller nameplate – "Programmed with Configuration File ######". The controller may also have a Unique Identification Number (UIN). This number indicates that certain parameters were set at the factory to match the controller to the options selected with the power plant (such as low voltage disconnect, load and battery shunt ratings, etc.). If the controller has a UIN, the plant will have shipped with a USB drive labelled with the UIN. The UIN label may also be located near the controller slot in the system. If the controller has a UIN,

provide this UIN number, along with the configuration number, when ordering so that the new controller will match that of the original controller shipped with the system. The user manual provided with the controller provides instructions for replacing and programming the controller. It is important to follow these instructions carefully. The user manual also provides instructions for saving certain controller files that are created when changes are made to the system after leaving the factory. These files can be programmed into the replacement controller so it can match the latest saved state of the original controller.

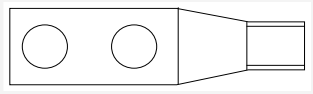
If the NCU is being ordered as a spare part for any of a group of power plants, the same procedure can be followed. If the replacement controller's configuration does not match that of the original controller, the original files can be retrieved from the USB drive shipped with the plant, if available. If the USB drive is not available, contact the factory or technical assistance center to obtain a copy of the original configuration file (all package) so it can be programmed into the new controller.

4.6 Lugs

Standard Crimp Lugs

DC output leads are connected to the output busbars located on the back of the system as shown in **Figure 7.4**. Order lugs per **Table 4.1**, as required.

Table 4.1 Crimp Lug, Two-Hole, 1/4" Bolt Clearance Hole, 5/8" Centers

Lead Size	Part Number	
14-10 AWG	245342300	
8 AWG	245390200	
6 AWG	245346700	
4 AWG	245346800	
2 AWG	245346900	
1/0	245391400	
2/0	245391500	

5 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 Secured to Relay Rack or Cabinet Equipment Rack

Making Electrical Connections

- ❑ Relay Rack / Cabinet Frame Grounding Connection Made
- ❑ Frame Grounding Connection Made
- ❑ NCU Controller Ethernet Port Connection Made
- ❑ Rectifier AC Input and AC Input Equipment Grounding Connections Made
- ❑ DC Output Connections Made

Installing Rectifier Modules

- ❑ Rectifier Modules Installed

Initially Starting the System

- ❑ System Started, Configured, and Checked

6 Installing the System

6.1 General Requirements

Refer to “Mounting” under “Environmental” starting on page 2.

6.2 Securing the System to a Relay Rack or a Cabinet Equipment Rack (if required)

DANGER! If the system is mounted in a relay rack, the relay rack must be securely anchored to the floor before the system is installed.

NOTE! *Refer to “Mounting” under “Environmental” starting on page 2 for mounting restrictions and ventilation requirements.*

This power system is designed to mount in a standard 19” relay rack or equipment rack having 1” or 1 3/4” multiple drillings. 23” mounting bracket adapter plates are available. Refer to **Figure 3.1** on page 4 for overall dimensions.

Procedure

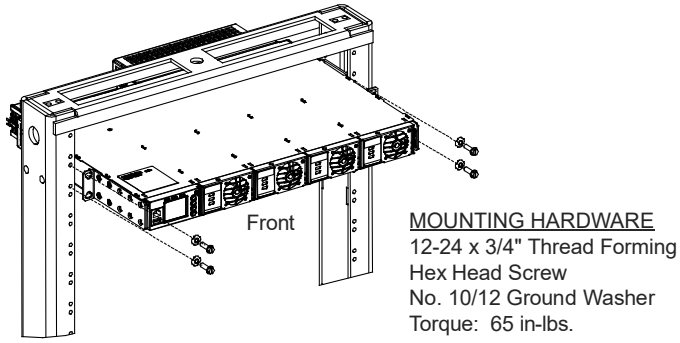
1. For 23” mounting, attached the 23” mounting bracket adapter plates to the standard 19” mounting brackets.
2. Position the system in the relay rack or cabinet equipment rack.
3. Secure the system to the relay rack or cabinet equipment rack using hardware as shown in **Figure 6.1** (see **Figure 6.1** for recommended torque). Use grounding washers as indicated in **Figure 6.1**.

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

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

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

Figure 6.1 Mounting the System in a Relay Rack or a Cabinet Equipment Rack



7 Making Electrical Connections

7.1 Important Safety Instructions

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

7.1.1 Wiring Considerations

All wiring, branch circuit protection, and grounding 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.

Refer to drawing 031110100 for lug crimping information. Refer to drawings 031110200 and 031110300 for additional lug information.

7.2 Relay Rack / Cabinet Frame Grounding Connection

For relay rack / cabinet 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.

7.3 Frame Grounding Connection

For 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).*

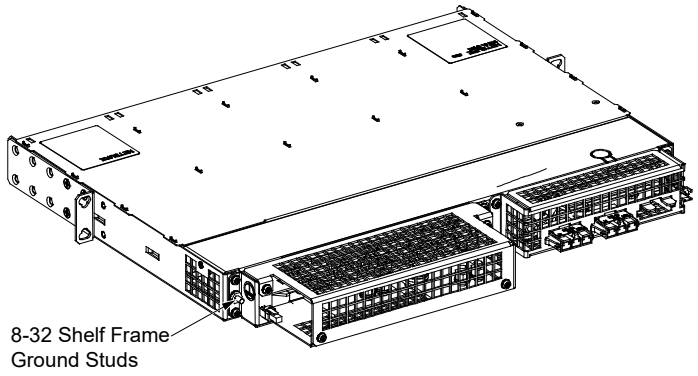
NOTE! *This system is suitable for installation as part of the Common Bonding Network (CBN).*

Procedure

1. The frame grounding connection to the shelf is made by using grounding washers with the mounting hardware used to secure the shelf to the relay rack or cabinet. Refer to “Securing the System to a Relay Rack or a Cabinet Equipment Rack (if required)” on page 10. Ensure that the relay rack or cabinet is properly grounded.

NOTE! *An 8-32 frame ground stud is located on the rear of the system. Provide a grounding lead to this connection point, if required. Refer to* ***Figure 7.1*** *for location.*

Figure 7.1 Bulk Output Rectifier System Frame Grounding Connection Points



7.4 NCU Controller Ethernet Connection (if required)

The NCU 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 NCU for connection into a customer's network. This jack has a standard Ethernet pin configuration scheme, twisted pair. Refer to **Figure 7.2** for location and **Table 7.1** for pin outs. Use shielded Ethernet cable (grounded at both ends). Note that the NCU RJ-45 jack is connected to chassis ground. Refer to the NCU 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 NCU.*

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 metallically 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 metallically 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 7.2 NCU Ethernet Port

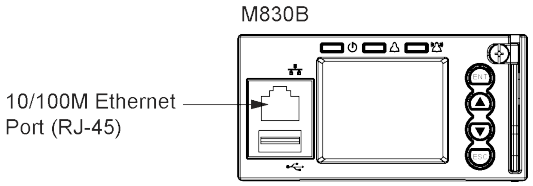


Table 7.1 NCU RJ-45 Ethernet Port Pin Configuration

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

7.5 Rectifier Nominal 120 VAC / 208 VAC / 240 VAC Input and AC Input Equipment Grounding Connections

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

General

The system is equipped with plug-in AC input connectors located on the rear of the system. Mating connectors and cable assemblies or line cords are available (see “Rectifier AC Input Cable Assemblies and Rectifier AC Input Line Cords” on page 5).

Each 58870530036 Rectifier System requires two (2) AC input cable assemblies or line cords. Each feeds two (2) rectifiers.

Refer to **Table 7.2** for recommended AC input branch circuit protection when using the supplied rectifier AC input cable assemblies.

Refer to **Table 7.3** for recommended AC input branch circuit protection when using the supplied rectifier AC input line cords.

Refer to **Figure 7.3** for an illustration.

Procedure

1. AC input connections are made using the AC input cable assemblies or line cords ordered with the system. These are connected to the plug-in Molex connectors located on the rear of the shelf. Connect the other end of the AC input cable assemblies or line cords to a properly wired AC outlet or distribution box. Refer to **Figure 7.3**.

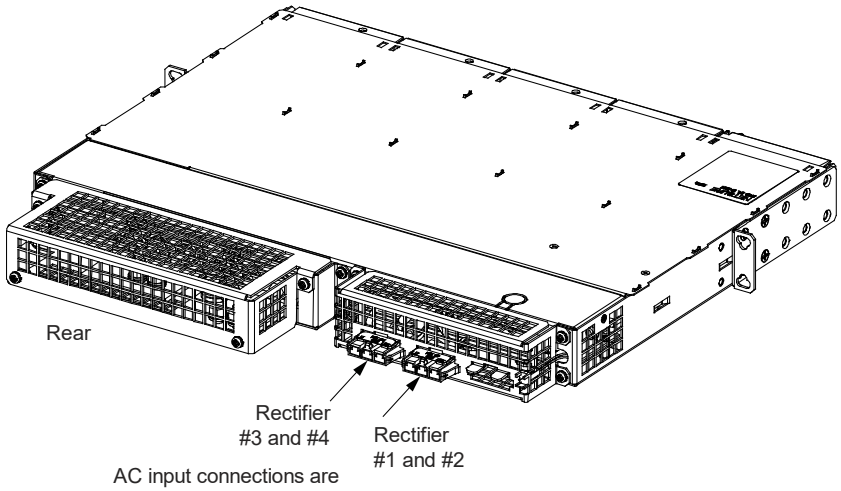
Table 7.2 Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Supplied Input Cable Assemblies

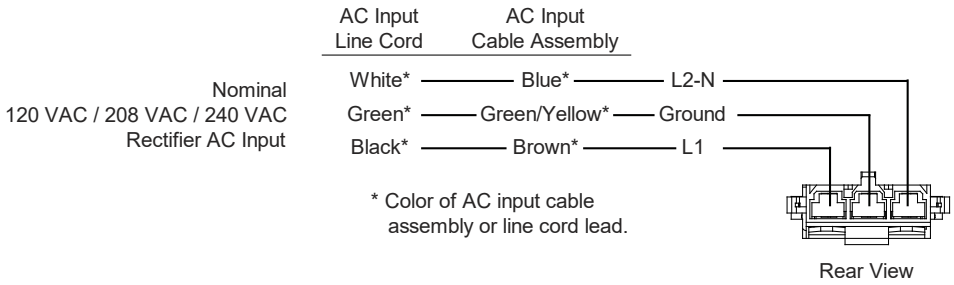
Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Supplied Input Cable Assemblies (see "Rectifier AC Input Cable Assemblies and Rectifier AC Input Line Cords" on page 5) (One AC Input Branch Circuit per Two Rectifier Modules)		
Input Voltage	**Input Current (2)**	**Overcurrent Protection (1)**
120 VAC	18 A	30 A
208 VAC	20 A	25 A
240 VAC	17.5 A	25 A
1 The AC input branch circuit protective device should be of the time-delay or high inrush type. 2 Input current based on R48-2000e3 rectifier module.		

Table 7.3 Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Supplied AC Input Line Cords

Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Supplied AC Input Line Cords (see "Rectifier AC Input Cable Assemblies and Rectifier AC Input Line Cords" on page 5) (One AC Input Branch Circuit per Two Rectifier Modules)		
Input Voltage	**Input Current (2)**	**Overcurrent Protection (1)**
120 VAC	18 A	Size per AC Line Cord Plug Rating
208 VAC	20 A	
240 VAC	17.5 A	
1 The AC input branch circuit protective device should be of the time-delay or high inrush type. 2 Input current based on R48-2000e3 rectifier module.		

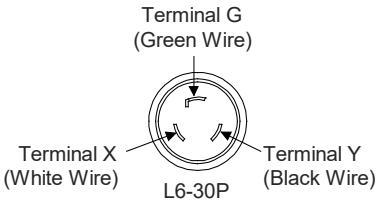
Figure 7.3 AC Input Connections

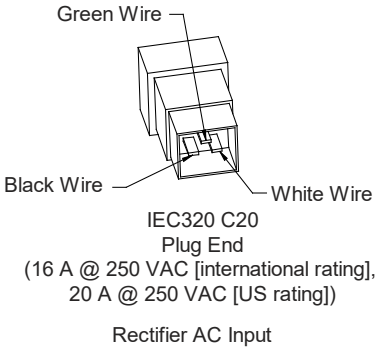


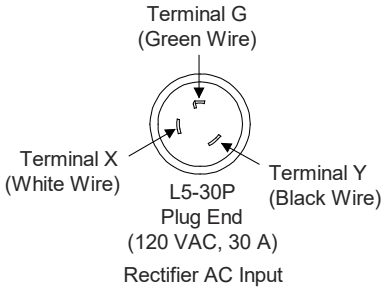


AC Input Cable Assembly / Line Cords

Part Number	Customer End
535232	unterminated
553202	unterminated
545252	L5-30P
540946	L6-30P
545616	L6-30P
547525	L5-30P
559301	L6-30P
559302	L6-30P
559842	L6-30P
548196	IEC320 C20







7.6 -48 VDC Output Connections

ALERT! Check for correct polarity before making connections.

DC output leads are connected to the output busbars located on the back of the system as shown in **Figure 7.4**. These busbars provide studs for installation of customer-provided two-hole lugs.

Output wire size and lug requirements are determined by site requirements. Refer to 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. All lugs for customer connections must be ordered separately. See **Table 4.1** for available lugs. For other available lugs and hardware, refer to drawings 031110100 through 031110300. For recommended wire sizes and lug selection at maximum rated output current, refer to **Table 7.4**.

Table 7.4 Recommended DC Output Wire Sizes and Lugs

Recommended DC Output Wire Sizes and Lugs		
Recm 90°C Wire Size (1) (AWG)	Loop Length (2) (feet)	Recommended Crimp Lug (4)
1/0 AWG	63.4 (3)	245391400
2/0 AWG	79.9 (3)	245391500

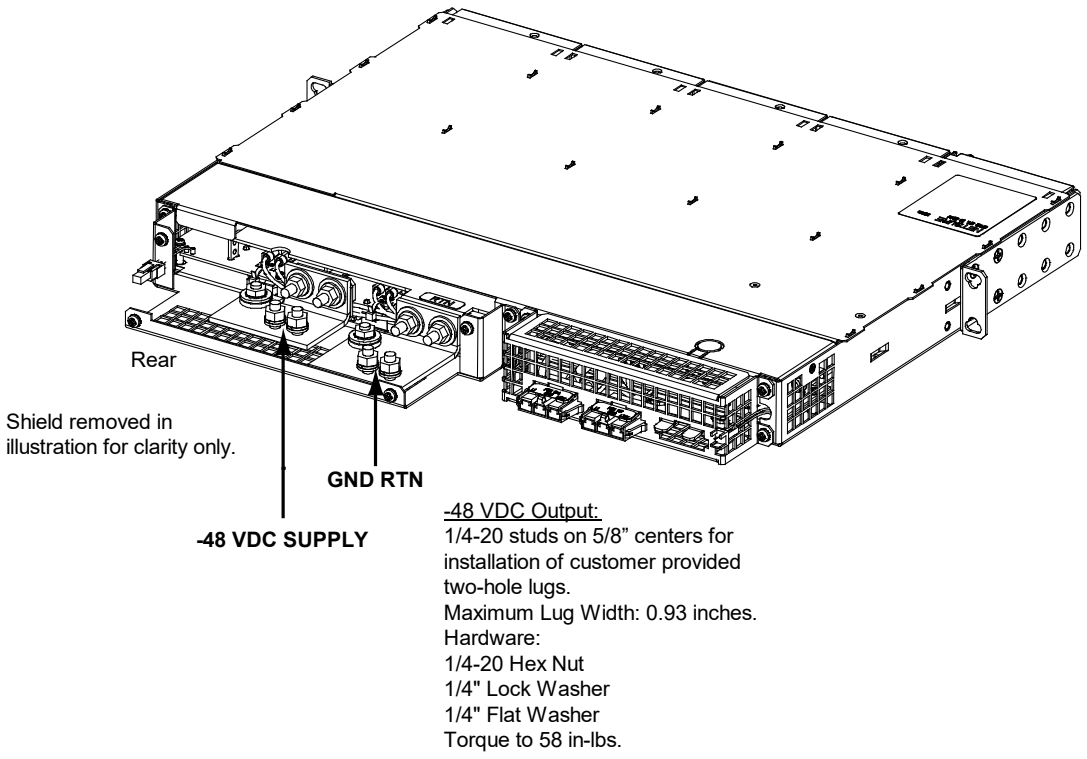
1 Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310.15 (B) (16) for copper wire at 90 °C conductor temperature. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 40 °C Ambient Operating Temperature.

4 These lugs are two-hole for 1/4" bolt clearance on 5/8" centers.

Figure 7.4 -48 VDC Output Connections



8 Installing Rectifier Modules

Refer to the rectifier instruction manual UM1R2000e3 for a rectifier installation procedure.

9 Initially Starting, Configuring, and Checking System Operation

ALERT! 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.

9.1 Initial Startup Preparation

- Ensure that all blocks (except the last one) in the “Installation Acceptance Checklist” on page 10 have been checked.
- Ensure that rectifier mounting positions are filled by a rectifier module or a blank panel as required.
- Refer to the separate NCU User Manual supplied with your power system for complete controller operating information.
- Refer to the configuration drawing (C-drawing) supplied with your power system documentation for factory settings of adjustable parameters.

9.2 Initially Starting the System

Procedure

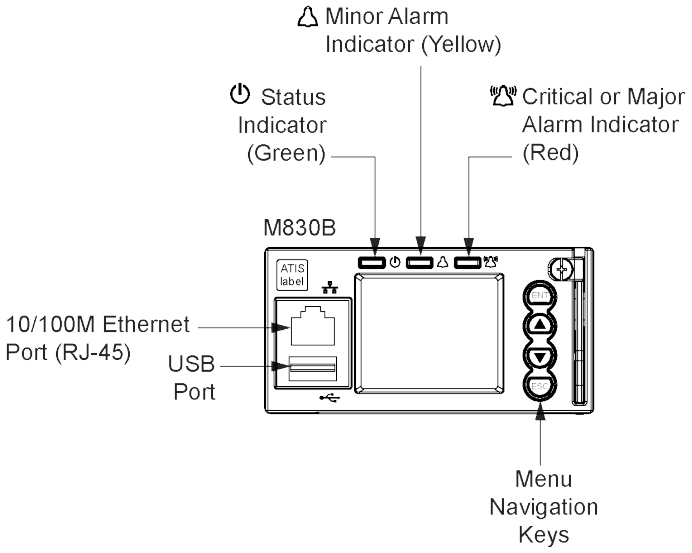
1. Apply rectifier AC input power to the system by closing ALL external AC disconnects or protective devices that supply rectifier AC power to the system. Rectifiers automatically start.

9.3 NCU Controller Initialization

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

Refer to **Figure 9.1** for locations of the NCU local indicators and navigation keys.

Figure 9.1 NCU Local Indicators and Navigation Keys

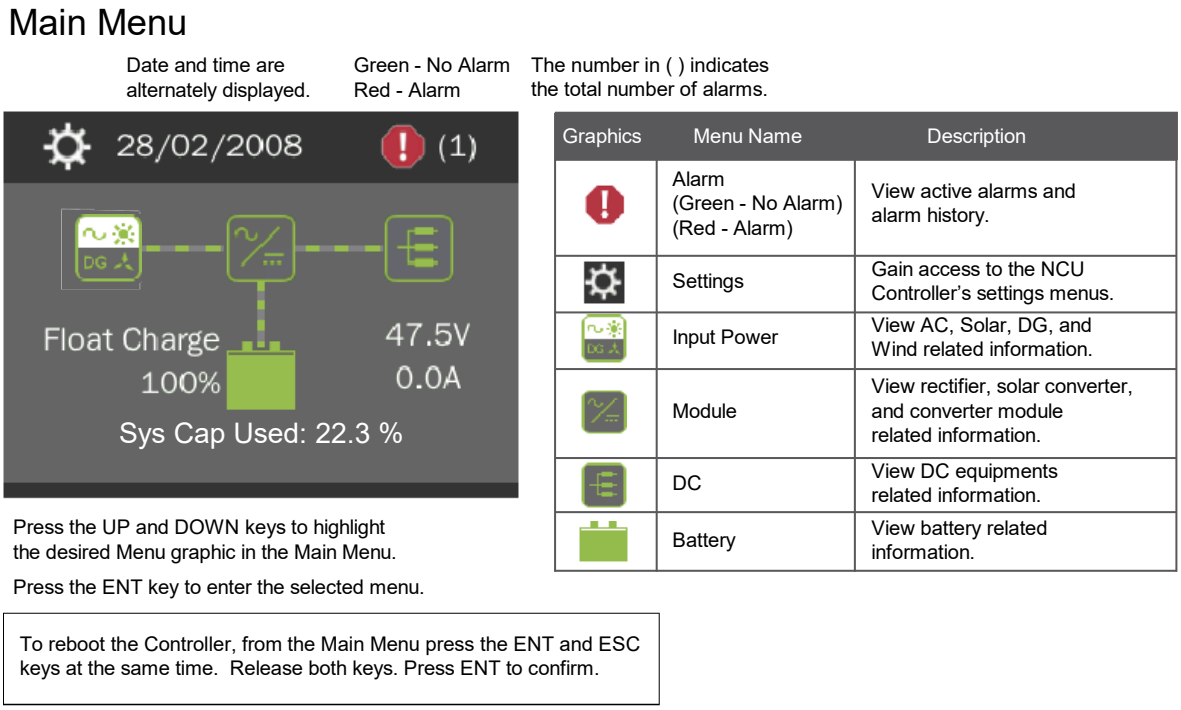


Procedure

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 "Vertiv" 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. See **Figure 9.2**.

Figure 9.2 NCU Local Display Main 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.

4. 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.
5. 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.*

6. Refer to the following procedures to verify and set the NCU controller as required for your application.

9.4 Verifying and Setting the NCU Controller as Required for Your Application

Refer to the NCU Instructions (UM1M830BNA) for additional information.

Refer also to "NCU Start Wizard" on page 19.

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 19.

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 9.1** 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 9.1 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 / 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
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.

NCU Alarm Relay Check

The following procedures can be used to verify operation of the external alarm relays in a power system equipped with an NCU with the factory default configuration. Note that alarm relays on an NCU with a custom configuration may operate differently.

NOTE! *There are two methods to check alarm relays. The first is by actually causing an alarm. The second is by using the NCU alarm relay check function. The first method is used in the following procedures. Refer to the NCU User Instructions (UM1M830BNA) for instructions using the NCU alarm relay check function.*

Checking the AC Fail Alarm

Procedure

NOTE! *Battery must be connected during this procedure.*

1. Verify system is operating and no alarms are present.
2. Verify the NCU displays the Main Menu. If not, press ESC repeatedly to return to the Main Menu.
3. Open the external AC disconnect(s) or protective device(s) that supply power to all of the rectifier modules.
   a) **Requirement:** An audible alarm sounds. Alarm will be silenced in Requirement d.
   b) **Requirement:** On subject rectifier module(s), the “Protection” indicator goes from off to yellow. After approximately 30 seconds, the green “Power” and yellow “Protection” indicators go off.
   c) **Requirement:** NCU “Critical/Major” alarm indicator goes from off to red.
   d) **Requirement:** NCU displays “Rect AC Fail” alarm.

      To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists two critical alarms. “**Power System CAN Comm Fail Critical**” is displayed. Scroll down by pressing the down arrow key. “**Rect Mains Failure Critical**” is displayed.
   e) **Requirement:** External “AC Fail” (Relay 6) and “Critical” (Relay 1) alarms activate.
4. Return external AC disconnect(s) or protective device(s) to the ON position.
   a) **Requirement**: “Power” indicator on subject rectifier modules goes from off to green.

NOTE! *A "Rect Group All Rect No Response" alarm may activate briefly.*

b) **Requirement**: NCU "Critical/Major" alarm indicator goes from red to off.

c) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "No Alarm".

d) **Requirement**: All external alarms deactivate.

Checking Rectifier Alarm

Procedure

1. Verify system is operating and no alarms are present.
2. Verify the NCU displays the Main Menu. If not, press ESC repeatedly to return to the Main Menu.
3. Pull one rectifier module half way out of the shelf. To do this, first loosen the captive fastener securing the top of the latch mechanism to the front of the rectifier module. Pull the top of the latch mechanism away from the rectifier module (this will retract the latch mechanism located on the underside of the rectifier module).

   a) **Requirement**: An audible alarm sounds. Alarm will be silenced in Requirement c.

   b) **Requirement**: NCU "Critical/Major" alarm indicator goes from off to red.

   c) **Requirement**: NCU displays "Alarm".

   To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The "Active Alarm" screen lists one major alarm. "**Rect (###) Comm Fail Major**" is displayed.

   d) **Requirement**: External "Rectifier" (Relay 8) and "Major" (Relay 2) alarms activate.

NOTE! *If the system is equipped with only one rectifier, skip step 4.*

4. Pull a second rectifier module half way out of the shelf, as described in Step 3.

   a) **Requirement**: An audible alarm sounds. The alarm will cancel in Requirement c.

   b) **Requirement**: NCU "Critical/Major" alarm indicator stays red.

   c) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**Alarm**".

   To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists one critical and two major alarms. "**Rect Group Multi-Rect Fail Critical**" is displayed. Use arrow keys to scroll through the list of alarms. "**Rect ### Comm Fail Major**" is displayed for each removed rectifier.

   d) **Requirement**: External "Rectifier" (Relay 8) and "Major" (Relay 2) alarms remain in alarm state and "Critical" (Relay 1) alarm activates.

5. Reinstall the rectifier module(s).

   a) **Requirement**: "Power" indicator on subject rectifier(s) goes from off to green.

   b) **Requirement**: NCU "Critical/Major" alarm indicator goes from red to off.

   c) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**No Alarm**".

d) **Requirement**: All external alarms deactivate.

Checking System Over Voltage Alarm 1 and Over Voltage Alarm 2

1. Verify system is operating and no alarms are present.
2. Verify the NCU displays the Main Menu. If not, press ESC repeatedly to return to the Main Menu.
3. Record the system voltage displayed on the NCU Main screen.
4. Navigate to the Settings Menu.
5. With the Settings menu screen displayed, navigate to "**Over Voltage 1**". Main Menu / Settings Icon / Other Settings / Over Voltage 1. Record the displayed voltage setpoint.
6. Press the Enter (ENT) key; then use the UP or DOWN keys to adjust the "Over Voltage 1" value to below the system voltage recorded in step 3. Press ENT.

   a) **Requirement**: An audible alarm sounds. The alarm will be silenced in Requirement c.

   b) **Requirement**: NCU "Critical/Major" alarm indicator goes from off to red.

   c) **Requirement**: Press ESC repeatedly to return to the Main Menu. NCU displays "**Alarm**".

      To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists one critical alarm. "**Power System Over Voltage 1 Critical**" is displayed.

   d) **Requirement**: External "DC Over Voltage 1" (Relay 3) and "Critical" (Relay 1) alarms activate.
7. Without readjusting the "Over Voltage 1" setpoint, navigate to "Over Voltage 2". Main Menu / Settings Icon / Other Settings / Over Voltage 2. Record the displayed voltage setpoint.
8. Press the Enter (ENT) key; then use the UP or DOWN keys to adjust the "Over Voltage 2" value to below the system voltage recorded in step 3. Press ENT.

   a) **Requirement**: An audible alarm sounds. Alarm will be silenced in Requirement d.

   b) **Requirement**: NCU "Critical/Major" alarm indicator stays red.

   c) **Requirement**: Press ESC repeatedly to return to the Main Menu. NCU displays "**Alarm**".

      To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists two critical alarms. "**Power System Over Voltage 2 Critical**" is displayed. Use arrow keys to scroll through the list of alarms. "**Power System Over Voltage 1 Critical**" is displayed.

   d) **Requirement**: External "DC Over Voltage 1" (Relay 3) alarm and "Critical" (Relay 1) alarm remain active.
9. Navigate to "Over Voltage 2". Main Menu / Settings Icon / Other Settings / Over Voltage 2.
10. Press ENT; then use the UP or DOWN keys to adjust the "Over Voltage 2" setting to the value recorded in step 7. Press ENT.

NOTE! *Over Voltage 2 alarm will retire. The audible alarm will be silenced in the next step.*

11. Use the UP or DOWN keys to scroll up to "**Over Voltage 1**".
12. Press **ENT**; then use the UP or DOWN keys to adjust the "Over Voltage 1" setting to the value recorded in step 5. Press ENT.

a) **Requirement**: NCU "Critical/Major" alarm indicator goes from red to off.

b) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**No Alarm**".

c) **Requirement**: All external alarms deactivate.

Checking System Under Voltage Alarm 1 and Under Voltage Alarm 2

1. Verify system is operating and no alarms are present.
2. Verify the NCU displays the Main Menu. If not, press ESC repeatedly to return to the Main Menu.
3. Record the system voltage displayed on the NCU Main screen.
4. Navigate to the Settings Menu.
5. With the Settings Menu screen displayed, navigate to "**Under Voltage 1**". Main Menu / Settings Icon / Other Settings / Under Voltage 1. Record the displayed voltage setpoint
6. Press the Enter (ENT) key; then use the UP or DOWN keys to adjust the "Under Voltage 1" value to above the system voltage recorded in step 3. Press **ENT**.

   a) **Requirement**: An audible alarm sounds. The alarm will be silenced in Requirement c.

   b) **Requirement**: NCU "Critical/Major" alarm indicator goes from off to red.

   c) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**Alarm**".

   To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists one critical alarm. "**Power System Under Voltage 1 Critical**" is displayed.

   d) **Requirement**: External "DC Under Voltage 1" (Relay 4) and "Critical" (Relay 1) alarms activate.
7. Without readjusting the "Under Voltage 1" setpoint, navigate to "**Under Voltage 2**". Main Menu / Settings Icon / Other Settings / Under Voltage 2. Record the displayed voltage setpoint.
8. Press the Enter (ENT) key; then use the UP or DOWN keys to adjust the "Under Voltage 2" value to above the system voltage recorded in step 3. Press ENT.

   a) **Requirement**: An audible alarm sounds. Alarm will be silenced in Requirement c.

   b) **Requirement**: NCU "Critical/Major" alarm indicator stays red.

   c) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**Alarm**".

   To see the specific alarm(s), navigate to the Alarm Menu and press **ENT**. The Active Alarm screen lists two critical alarms. "**Power System Under Voltage 2 Critical**" is displayed. Use arrow keys to scroll through the list of alarms. "**Power System Under Voltage 1 Critical**" is displayed.

   d) **Requirement**: External "DC Under Voltage 2" (Relay 5) alarm activates, "DC Under Voltage 1" (Relay 4) alarm resets, and "Critical" (Relay 1) alarm remains active.
9. Navigate to "**Under Voltage 2**".
10. Press **ENT**; then use the UP or DOWN keys to adjust the "Under Voltage 2" setting to the value recorded in step 7. Press ENT.

NOTE! *Low Voltage 2 alarm will retire. The audible alarm will be silenced in the next step.*

11. Use the UP or DOWN keys to scroll up to "**Under Voltage 1**".
12. Press **ENT**; then use the UP or DOWN keys to adjust the "Under Voltage 1" setting to the value recorded in step 5. Press ENT.
    a) **Requirement**: NCU "Critical/Major" alarm indicator goes from red to off.
    b) **Requirement**: Press ESC repeatedly to return to the Main screen. NCU displays "**No Alarm**".
    c) **Requirement**: All external alarms deactivate.

9.5 Checking System Status

Procedure

Observe the status of the indicators located on the controller and rectifiers. If the system is operating normally, the status of these is as shown in **Table 9.2**.

Table 9.2 Status and Alarm Indicators

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

9.6 Attaching the USB Drive Pouch to the System

The system is provided with a USB drive that contains the controller configuration files loaded into the controller as shipped. Also provided on the USB drive is a controller configuration drawing and all customer documentation. The USB drive is to be stored in the pouch provided. The pouch needs to be attached to the system or near the system by the customer.

Procedure

1. Customer must choose a location on or near the system to attach the USB drive pouch to.
2. Make sure the surface is clean, then peel the backing of the pouch fastener and adhere it to the surface.
3. Attach the pouch to the pouch fastener to secure the pouch to the system.

9.7 Final Steps

Procedure

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

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

2. Verify all rectifier 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 9.2**.

10 Operating Procedures

10.1 Controller and Rectifier

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

- NCU Controller Instructions (UM1M830BNA)

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

- Rectifier Instructions (UM1R482000e3)

10.2 Local Controls and Indicators

Controller and Rectifier

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

11 Maintenance

11.1 System Maintenance Procedures

It is recommended to perform the maintenance procedures listed in **Table 11.1** every 6 months to ensure continual system operation.

Table 11.1 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.	Installation section of these instructions.

11.2 Adding a Rectifier

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

Refer to Rectifier Instructions UM1R482000e3 for a rectifier installation procedure.

12 Troubleshooting and Repair

12.1 Contact Information

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

12.2 Controller and Rectifier

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

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

12.3 Controller Configuration

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

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

12.4 System Troubleshooting Information

This system is designed for ease in troubleshooting and repair. The various indicators as described in “Local Controls and Indicators” on page 26 and in the controller and rectifier instructions are designed to isolate failure to a specific element. Once the faulty element has been identified, refer to “Replacement Information” on page 28 and “Replacement Procedures” on page 28.

Troubleshooting Alarm Conditions on the Controller

The controller displays alarm conditions as listed in the “Resolving Alarms” section of the controller’s User Manual.

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

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

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

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

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

When setting total rectifier current limit, the set point to each rectifier is the total set point divided by the number of rectifiers. For example, if the system contains five rectifiers and the current limit is set to 150 amps then each rectifier has a current limit set point of 30 amps. If one or more rectifiers is removed or fails it will take several seconds for the individual set points to the remaining rectifiers to be reset. In the example given, if one rectifier is removed the current limit set point will drop to 120 amps (30 amps times four remaining rectifiers) until the controller can send updated set points to the remaining rectifiers. This takes a couple communication cycles (several seconds) after which each rectifier would have a new set point of 37.5 amps for a total of 150 amps. The total current limit of the rectifiers should not be set such that the loss of the redundant rectifiers will cause this temporary set point to drop below the actual maximum expected load. If batteries are used on the rectifier output, the batteries should support the load until the current limit set points can be re-established due to loss of a rectifier.

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

Clearing a Rectifier Communications Fail Alarm after Removing a Rectifier

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

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

Clearing a Rectifier Lost Alarm

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

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

12.5 Replacement Information

Replacement Assemblies

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

12.6 Replacement Procedures

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

Replacing a Rectifier

Refer to the Rectifier Instructions (UM1R482000e3) for a rectifier replacement procedure. Refer also to “System Troubleshooting Information” on page 27.

The rectifier being replaced is assigned by the NCU the lowest available identification number. If desired, you can change the identification number, see “Configuring the NCU Identification of Rectifiers and Assigning which Input Feed is Connected to the Rectifiers” on page 21.

Replacing the NCU Controller

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

Connect with Vertiv on Social Media


https://www.facebook.com/vertiv/


https://www.instagram.com/vertiv/


https://www.linkedin.com/company/vertiv/


https://www.twitter.com/vertiv/

Vertiv.com | Vertiv Headquarters, 505 N Cleveland Ave, Westerville, OH 43082, USA

UM588705300036_REVE