

SYSTEM OVERVIEW

Preface: This document provides system application information on the following equipment.

Model	Spec. No.	Description
A50IFRM	588250400	Intelligent Frame
A50EFRM	588250300	Expansion Frame

Description: These frames provide a solution to allow new-generation Vertiv™ NetSure™ A50B50 DC Power Retrofit rectifiers to be installed in the -48V Modular Power Series (A-Series) rectifier shelves that house the older model A50B50 rectifiers (Spec. Nos. 486522200, 486523401, 486523403, 486523406, 486524801, and 486526401). The new rectifiers can operate with or without the original rectifiers in the same system and the same shelf.

The A50IFRM Intelligent Frame accommodates a Rectifier Module (1R483200E, or 1R483500E), a Controller Unit, a CAN Interface assembly, and IB2 assembly. The A50EFRM Expansion Frame accommodates a Rectifier Module and a CAN Interface assembly. One Intelligent Frame is required per power system. The Controller Unit may contain the standard configuration, or may contain an optional special application configuration. The Retrofit Solution typically consists of...

- **Intelligent Frame**

The system contains one front access intelligent frame, which houses a rectifier module and a controller unit, as shown in the image to the right.

- **Expansion Frame**

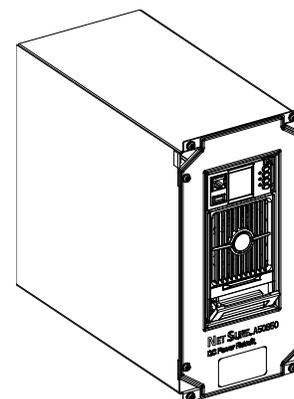
The system contains one or more front access expansion frames, which house rectifier modules.

- **Rectifier Modules ***

The system contains rectifier modules, which provide power, battery float current, and battery recharge current during normal operating conditions.

- **Controller Unit ***

The system contains one Controller Unit. The NCU controls the operation of all new-generation rectifiers in the system, and provides system metering, control, and alarm functions.



*- Refer to the specific manuals of these products for more information. See [Related Documentation](#).

Vertiv™ NetSure™ DC Power Retrofit System Application Guide

General Specifications

See detailed specifications on page 12.

Family:	Vertiv™ NetSure™ DC Power Retrofit
Spec. No.:	588250400 and 588250300
Model:	A50IFRM and A50EFRM
Output Voltage:	-48 Volts DC
Output Capacity:	73 Amperes, maximum
Rectifier Module:	R48-3200E: -48Vdc @ 66.6A / 3200W @ 45°C -48Vdc @ 48A / 2320W @ 65°C R48-3500E: -48Vdc @ 72.9A / 3500W @ 45°C -48Vdc @ 56.2A / 2700W @ 65°C -54Vdc @ 50A / 2700W @ 65°C
Agency Approval:	UL60950-1
Framework Type:	for Mounting in shelves designed to accommodate A50B50 rectifiers
Mounting Width:	6.31 Inches
Mounting Depth:	13.68 Inches
Mounting Height:	12.12 Inches
Access:	Front for Installation, Maintenance, and Operation
Control:	Microprocessor
Color:	Gray, Black
Environment:	-40°C to +65°C (-40°F to +149°F)

Vertiv™ NetSure™ DC Power Retrofit

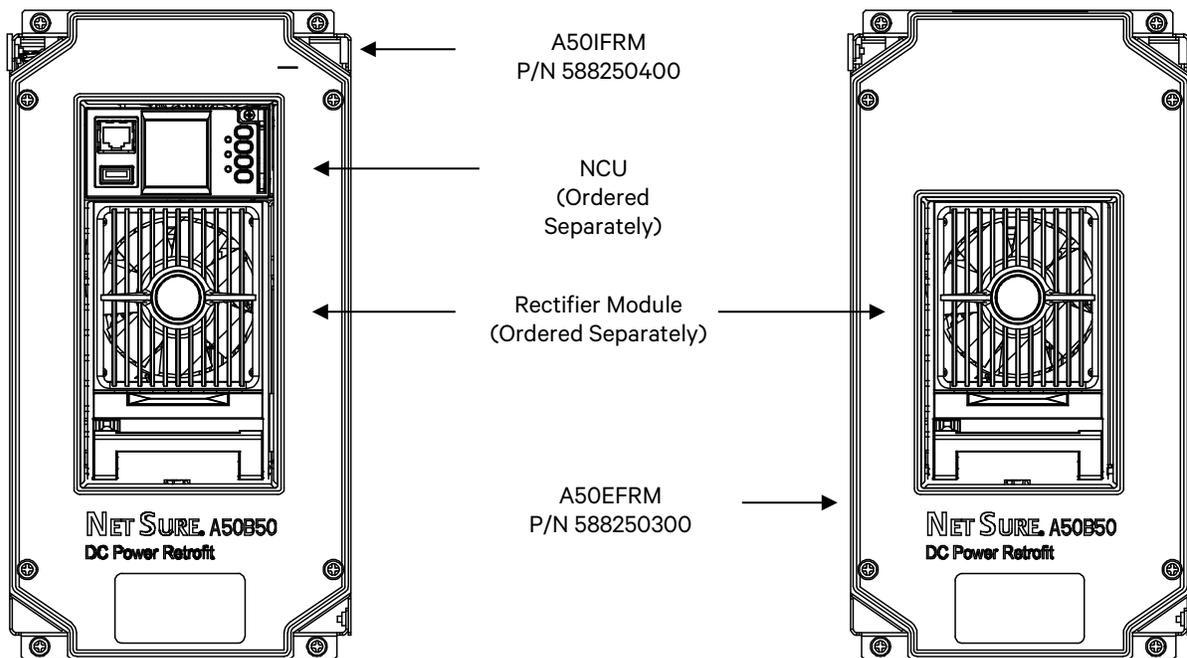
System Application Guide

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MAIN COMPONENTS ILLUSTRATIONS

588250400 and 588250300



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FRAME DESCRIPTIONS

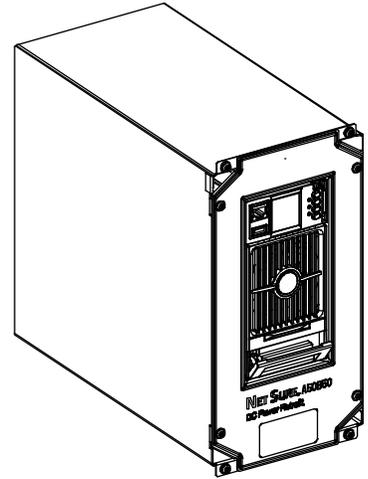
A50IFRM Intelligent Frame, P/N 588250400

Features

- ◆ Provides one (1) Model A50IFRM, Spec. No. 588250400 Intelligent Frame.
- ◆ Each Frame holds one (1) Rectifier Module, one (1) Controller Unit, one (1) CAN Interface assembly, and one (1) IB2 Customer Interface assembly.
- ◆ Provides AC and DC connections to mate directly to the AC and DC connections in a shelf that accommodates A50B50 rectifiers.
- ◆ Provides connection for CAN communication to an Expansion Frame.
- ◆ Includes one (1) CAN bus termination plug.

Ordering Notes

- 1) Order by P/N 588250400 as required.
- 2) Order one (1) Rectifier Module per frame.
- 3) Order one (1) Controller Unit per frame.



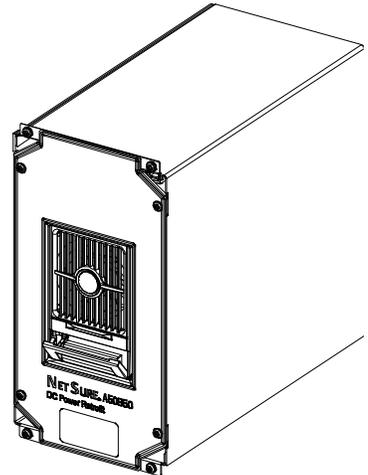
A50EFRM Expansion Frame, P/N 588250300

Features

- ◆ Provides one (1) Model A50EFRM, Spec. No. 588250300 Expansion Frame.
- ◆ Each Frame holds one (1) Rectifier Module, and one (1) CAN Interface assembly.
- ◆ Provides AC and DC connections to mate directly to the AC and DC connections in a shelf that accommodates A50B50 rectifiers.
- ◆ Provides connection for CAN communication to two Frames.

Ordering Notes

- 1) Order by P/N 588250300 as required.
- 2) Order one (1) Rectifier Module per frame.



ACCESSORIES DESCRIPTIONS

Power Conversion Units

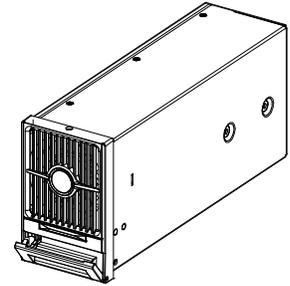
Rectifier Module, eSure, P/N 1R483500E

Features

- ◆ Provides one (1) Model R48-3500E, Spec. No. 1R483500E, 3500 watt / 48 volt eSure Rectifier Module.

Ordering Notes

- 1) Order by P/N (1R483500E) as required.



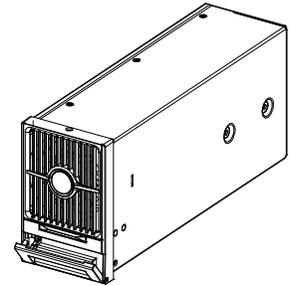
Rectifier Module, eSure, P/N 1R483200E

Features

- ◆ Provides one (1) Model R48-3200E, Spec. No. 1R483200E, 3200 watt / 48 volt eSure Rectifier Module.

Ordering Notes

- 1) Order by P/N (1R483200E) as required.



Controller Unit

NCU (Netsure™ Control Unit), P/N 1M830BNA

Features

- ◆ Provides one (1) NCU Controller.

Restrictions

For use with the Intelligent Frame only.

Use Configuration File C564646 as the standard configuration or contact Vertiv for availability of custom configurations.

Ordering Notes

- 1) Order one (1) NCU (P/N 1M830BNA) Controller for each Intelligent Frame.

CAN Cables

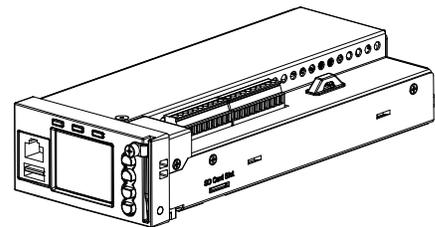
CAN Cables (6") P/N 548451 and (24") P/N 547520

Features

- ◆ The 6" long P/N 548451 CAN cable connects frames installed in the same shelf. The 24" long P/N 547520 CAN cable is used for longer wiring distance. Refer to the illustration on page 11 for a sample configuration of (1) A50IFRM and (8) A50EFRMs.

Ordering Notes

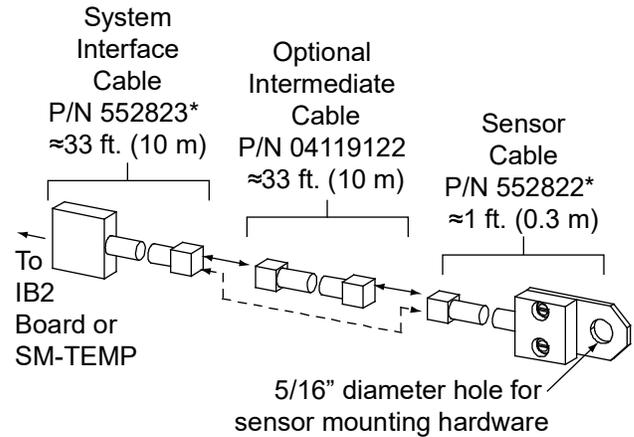
- 1) Order (1) P/N 548451 when connecting two frames installed in a single shelf.
- 2) Order (1) P/N 547520 when connecting two frames installed in different shelves.



Optional Temperature Probe

Features

- ◆ Up to two (2) temperature probes can be connected to the Customer Interface (IB2) Board. Either or both probes can be programmed to monitor ambient temperature or battery temperature.
- ◆ A temperature probe set as a battery probe can also be designated to be used for the battery charge temperature compensation feature. If the system is equipped with the NCU Controller, the battery charge temperature compensation feature can be programmed to use one probe or the average or highest value of all probes programmed to monitor battery temperature. The battery charge temperature compensation feature allows the controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained.
- ◆ If the system is equipped with the NCU Controller, a temperature probe set as a battery probe can also be used for controlling against battery thermal runaway (BTRM feature).
- ◆ Temperature probes can also be used with the optional [SM-TEMP Temperature Concentrator](#).



Restrictions

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

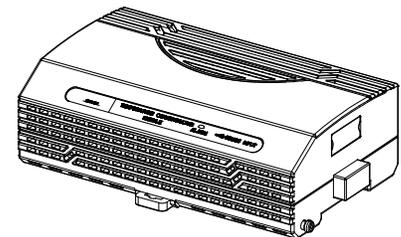
Ordering Notes

- 1) Refer to the illustration and order temperature probes as required. Note that each temperature probe consists of two pieces which plug together to make a complete probe. For a complete temperature probe, order one (1) P/N 552992 kit (total length ≈34 ft. or 10.3 m). If additional length is required, order temperature probe extension cable P/N 04119122 (≈33 ft. or 10 meters).
- 2) If more probes are desired, order one or more [SM-TEMP Temperature Concentrator](#), P/N 547490.

Optional SM TEMP Temperature Concentrator, P/N 547490

Features

- ◆ Allows for use of multiple temperature probes for temperature compensation. Compensation can be based on highest probe temperature or average probe temperature.
- ◆ Provides (8) temperature probe inputs per SM-TEMP.
- ◆ Can cascade up to (8) SM-TEMP modules, connecting up to 64 temperature probes.



Ordering Notes

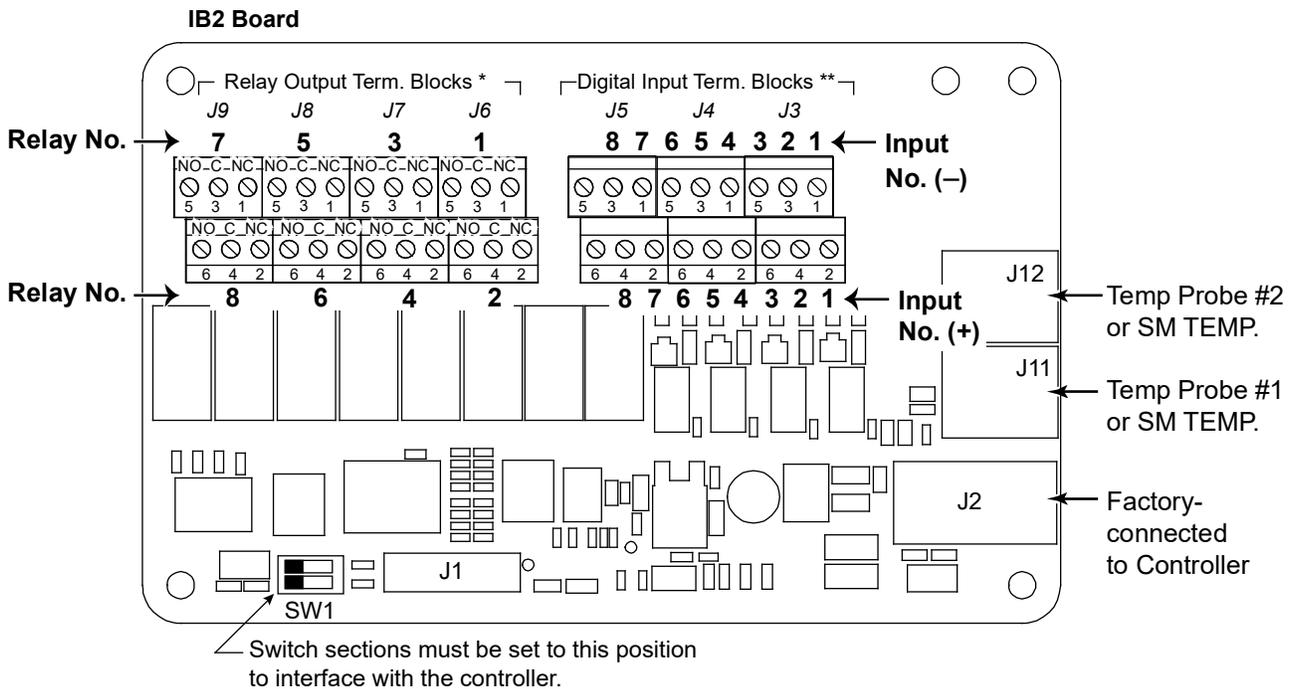
- 1) Order SM-TEMP Temperature Concentrator, P/N 547490, as required.
- 2) Order up to (8) temperature probes for each concentrator. See "[Optional Temperature Probe](#)" above.

REPLACEMENT ITEMS

Part Number	Description
MA4C5U31	Circuit Board, IB2 Customer Interface
545618	Circuit Board, CAN Interface, A50IFRM
545643	Circuit Board, CAN Interface, A50EFRM
547678	Plug, CAN bus termination

WIRING ILLUSTRATIONS

IB2 Board Connections

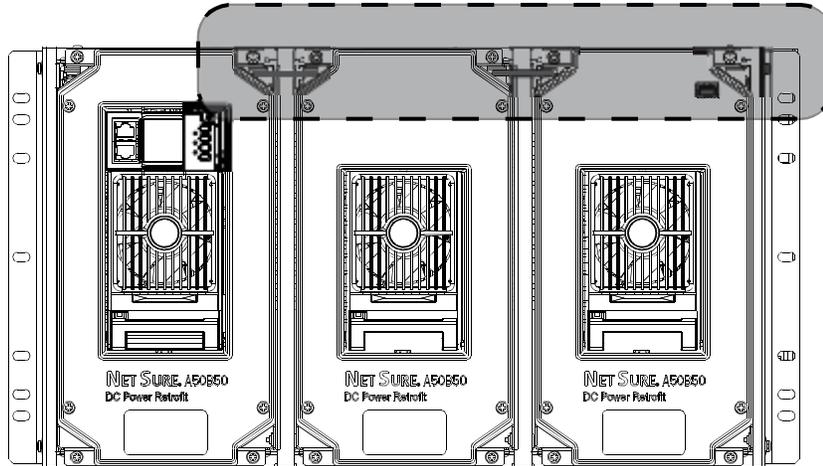


CAUTION: DO NOT disconnect any factory wiring when making connections.

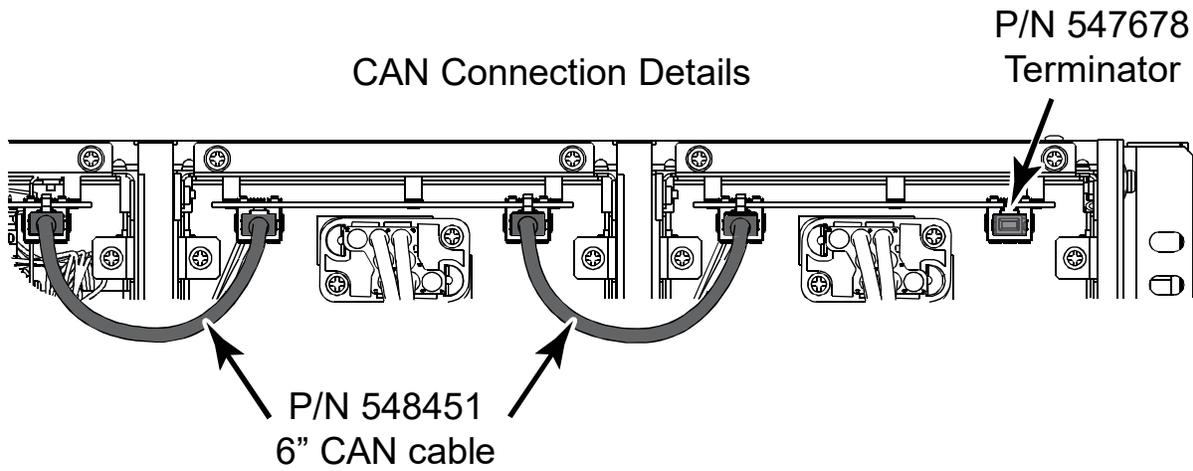
- * Alarm Relays 1 through 5 are available for customer use. Alarm Relays 6 through 8 are used internally. The relay assigned by the Controller to be the “Critical Summary” alarm or “Major Summary” alarm (relay 1 by default) will operate in the “Fail Safe Mode”. Fail Safe Mode means the relay is de-energized during an alarm condition, opening the contacts between the C and NO terminals, and closing the contacts between the C and NC terminals. The remaining seven (7) alarm relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.
- ** **WARNING:** Observe proper polarity when making Digital Input connections. Digital Inputs 1-6 can be programmed by the user. Digital Input 7 is predefined as the external Fuse Alarm input. Customer supplied -48V at J5-1 activates the alarm. Digital Input 8 is predefined as the ESTOP (Emergency Stop) input. Customer supplied RTN (+48V) at J5-4 activates ESTOP.

CAN Connections – Single A150CAB (A200CAB, Similar)

CAN Connection in (1) A150CAB Power Shelf



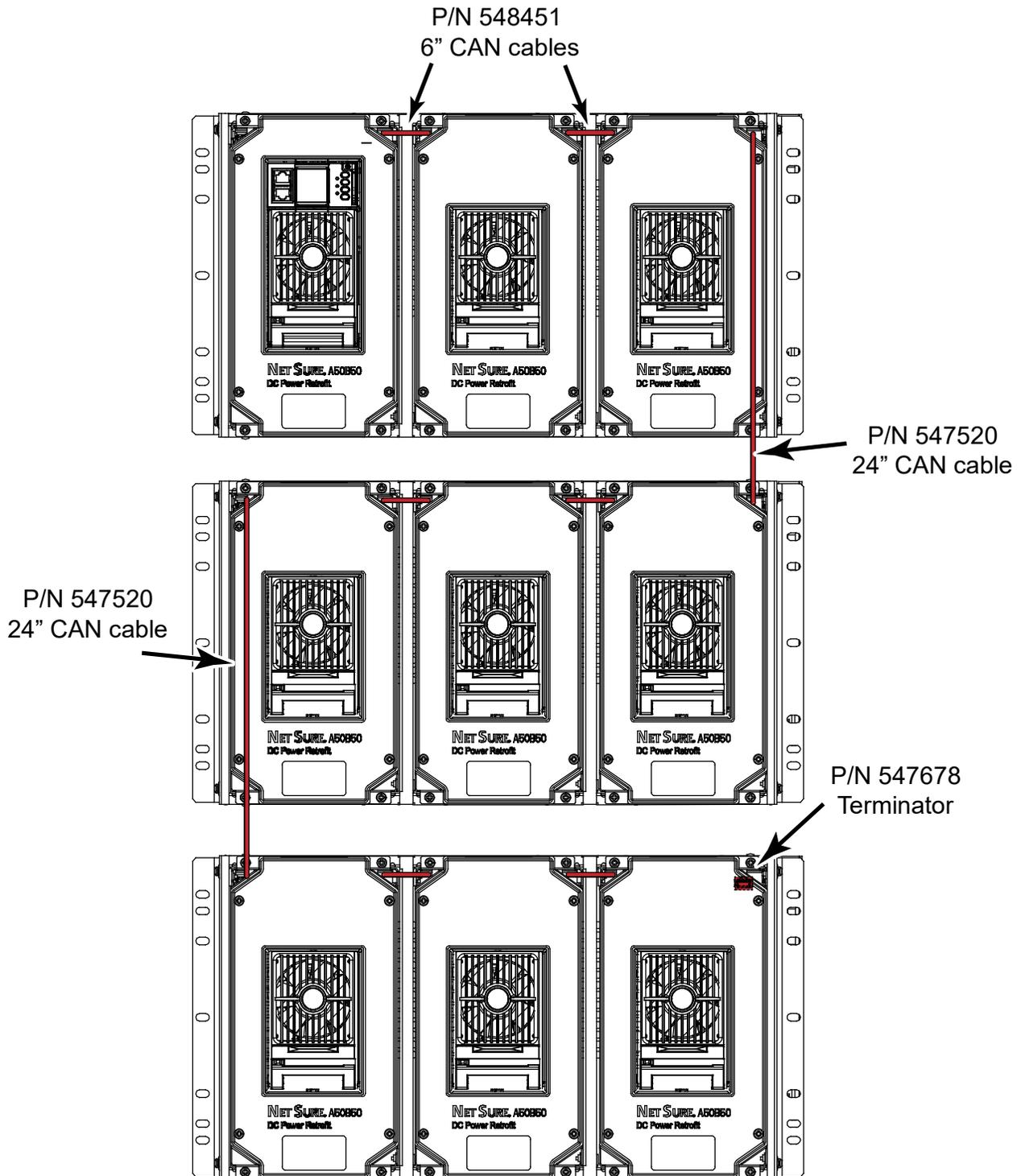
CAN Connection Details



** Front panel of frames removed
in illustration for clarity*

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CAN Connections – Multiple A150CABs (A200CABs, Similar)



See also CAN Connection in (1) A150CAB Power Shelf.

Note: The figure shows one way to make CAN bus connections between retrofit frames in systems with multiple shelves. You can use the supplied cables in any way that best fits your application. The only requirements are that all retrofit frames in the system must be connected in series (in any order) and the termination plug must be installed in the last available port.

SPECIFICATIONS

1. SYSTEM

1.1 Environmental Ratings

1.1.1 Operating Ambient Temperature Range:

(A) -40°C (-40°F) to +65°C (+149°F) with derated output.

(B) -40°C (-40°F) to +45°C (+113°F) with full power performance.

1.1.2 Storage Ambient Temperature Range: -40°C (-40°F) to +85°C (+185°F).

1.1.3 Humidity: This Power System is capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.

1.1.4 Altitude: 2000 m (6560 ft) at full power (power limited for heights above 2000 m).

1.1.5 Mounting: 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).

1.1.6 **Ventilation Requirements:** Rectifier and mounting shelf ventilating openings must not be blocked and **temperature of air entering rectifiers must not exceed rated Operating Ambient Temperature Range stated** above. Minimum space in front and back should be 2 inches.

1.2 Compliance Information

1.2.1 Refer to [Related Documentation](#) for specific compliance information.

1.2.2 Safety Compliance:

The R48-3200e, and R48-3500e rectifier modules and 1M830BNA control module are UL-recognized per UL60950-1 / Standard Information Technology Equipment. The A50IFRM and A50EFRM meet the requirements of UL60950-1 / Standard Information Technology Equipment.

1.2.3 EMC and Safety:

Complies with the Low-Voltage Directive, 73/23/EEC.

SAFETY	
EN 60950-1: 2001	Safety of Information Technology Equipment, including Electrical Business Equipment

1.3 Standard Features

1.3.1 IB2 Board Customer Interface Connections: Refer to [Wiring Illustrations](#) under [ACCESSORY DESCRIPTIONS](#).

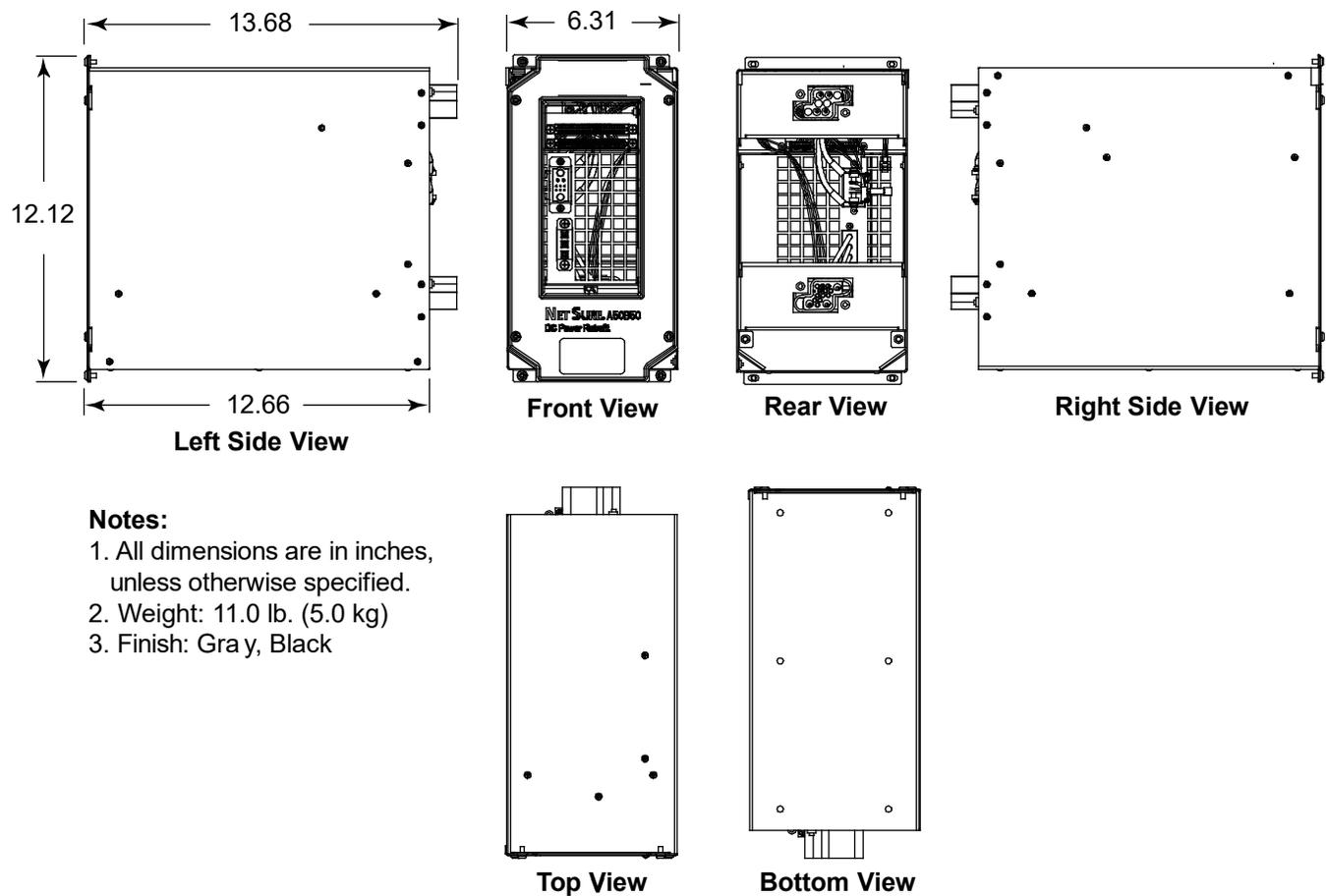
1.3.2 CAN Connections: Refer to [Wiring Illustrations](#) under [ACCESSORY DESCRIPTIONS](#).

1.3.3 Alarm and Monitoring Connections: Alarm output and monitoring input leads are connected to screw-type terminal blocks located on the IB2 Board located inside the A50IFRM.

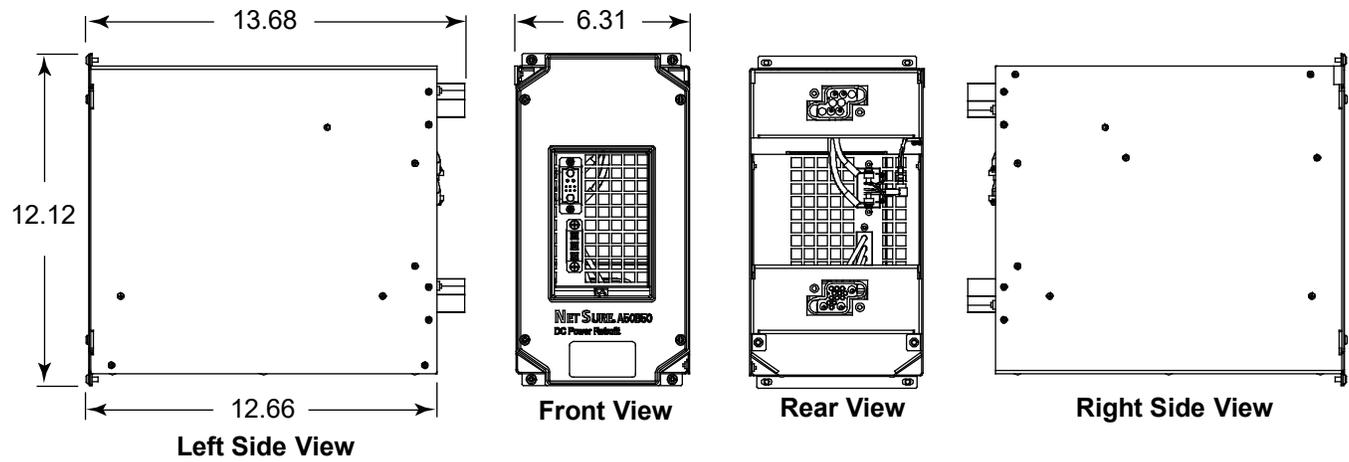
1.3.4 Dimensions and Weights: Refer to the illustrations under [Physical Size Information](#).

MECHANICAL SPECIFICATIONS

Overall Dimensions, A50IFRM Intelligent Frame

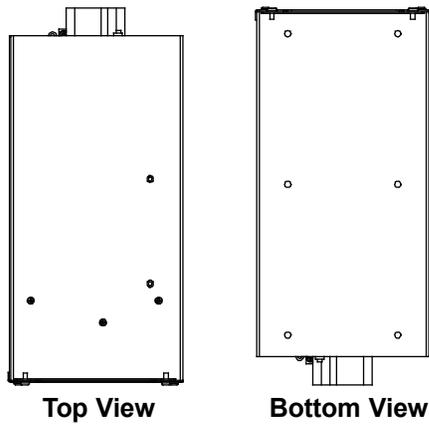


Overall Dimensions, A50EFRM Expansion Frame



Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight: 9.9 lb. (4.5 kg)
3. Finish: Gray, Black



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RELATED DOCUMENTATION

Schematic Diagram:	SD588250400/SD588250300
Wiring Diagram:	T588250400/T588250300
System Instructions:	UM588250400/588250300
Rectifier Instructions:	UM1R483500E
NCU Controller Instructions:	UM1M830BNA
SM-TEMP Installation and User Instructions:	UM547490

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