

## SYSTEM OVERVIEW

**Preface:** This document provides power data and system application information for the following Module Mounting Shelf Assemblies used in a NetSure™ Power System.

MODEL	SPEC. NO.	DESCRIPTION
PSS24/1000-23	588705100	8-Position Field-Expansion Module Mounting Shelf Assembly
PSS24/1000-23	588705101	8-Position Module Mounting Shelf Assembly
PSS24/2000-23	588705102	16-Position Module Mounting Shelf Assembly
PSS24/3000-23	588705103	24-Position Module Mounting Shelf Assembly
PSS24/4000-23	588705104	32-Position Module Mounting Shelf Assembly

For rectifier and converter modules, refer to their separate instruction document as indicated in the following table.

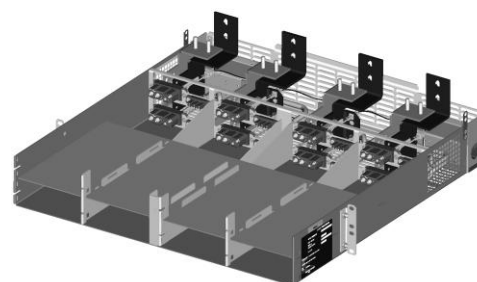
MODEL	SPEC. NO.	DESCRIPTION	Document Number
R24-2500	1R242500	Rectifier Module (2500 watts)	UM1R243000
R24-3000	1R243000	Rectifier Module (3000 watts)	
C24/48-1500	1C24481500	DC-DC Converter Module	UM1C24481500

**Description:** A Module Mounting Shelf Assembly and Rectifier Modules (PCUs), when used in a NetSure Power System equipped with a Meter-Control-Alarm (MCA) Assembly, comprise a +24V DC Power System designed to power a load while charging a negative grounded battery. This system is capable of operating in a batteryless installation or off battery for maintenance purposes. The system is designed for operation with the negative output grounded.

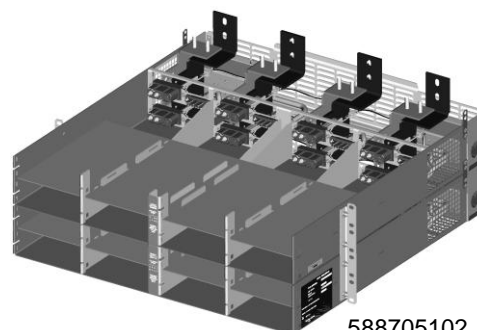
The NetSure Power System utilizing this equipment is a complete integrated power system containing rectifiers (PCUs), converters, intelligent control, metering, monitoring, and distribution. A NetSure Power System, utilizing this equipment, typically consists of...

- **Module Mounting Shelf Assembly**

The system contains one or more Module Mounting Shelf Assembly(s), which houses Rectifier Modules (PCUs) and optional DC-DC Converter Modules. The Module Mounting Shelf Assembly consists of one (1) to four (4) 8-position factory assembled Module Mounting Shelf(s).



588705101  
List 1



588705102  
List 1

- **Rectifier Modules (PCUs)**

The system contains Rectifier Modules (PCUs), which provide load power, battery float current, and battery recharge current during normal operating conditions. The Rectifier Modules (PCUs) are a constant power design. This means that, within the normal operating ambient temperature range, the maximum output power available is a constant 2500W (R24-2500) or 3000W (R24-3000). Within this ambient temperature range, the Rectifier Modules (PCUs) will operate in one of three modes, depending upon load demands. Transition between modes is completely automatic.

- **Constant Voltage Mode:** For any initial output voltage setting from 23.5 to 29.0 volts, output voltage remains constant regardless of load. This is the normal operating condition, in which loads are supplied and batteries are float charged. Rectifier Modules (PCUs) will operate in the Constant Voltage Mode unless load increases to the point where the product of load current and output voltage is approximately 2500W (R24-2500) or 3000W (R24-3000).
- **Constant Power Mode:** As load increases above approximately 2500W (R24-2500) or 3000W (R24-3000) (non-adjustable), output current continues to increase, but output voltage decreases as required to maintain constant output power. Rectifier Modules (PCUs) will operate in the Constant Power Mode unless load continues to increase to the point where the current limit setting is reached.
- **Constant Current Mode:** If load increases above the current limit setting, output voltage decreases linearly to maintain output current at current limit.

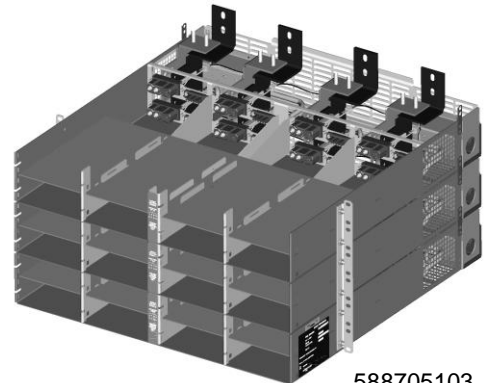
Rectifier Modules (PCUs) will continue to operate in above-normal ambient temperatures, but at reduced power.

- **DC-DC Converter Modules**

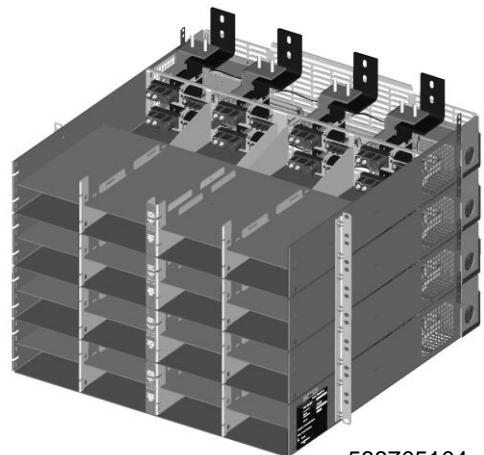
Where -48VDC load power is also required, DC-DC Converter Modules are available. The DC-DC Converter Modules can plug into up to four (4) of the module mounting positions in each 8-position shelf (when the shelf is equipped with a factory installed optional Converter Option Kit). These converters operate from the main +24V system bus to provide -48VDC load power.

- **Meter-Control-Alarm (MCA) Assembly**

The system contains one MCA. The MCA controls the operation of the Rectifier Modules (PCUs). The MCA also provides power system control, metering, monitoring, and alarm functions. **Note:** *This document does not describe the MCA. Refer to the Power System SAG (System Application Guide) for MCA information.*



588705103  
List 1



588705104  
List 1

Power Data Sheet  
Spec. No. 588705100 (Model PSS24/1000-23)  
Spec. No. 588705101 (Model PSS24/1000-23)  
Spec. No. 588705102 (Model PSS24/2000-23)  
Spec. No. 588705103 (Model PSS24/3000-23)  
Spec. No. 588705104 (Model PSS24/4000-23)

PD588705100  
PD588705101  
PD588705102  
PD588705103  
PD588705104

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- **NetSure™ Distribution**

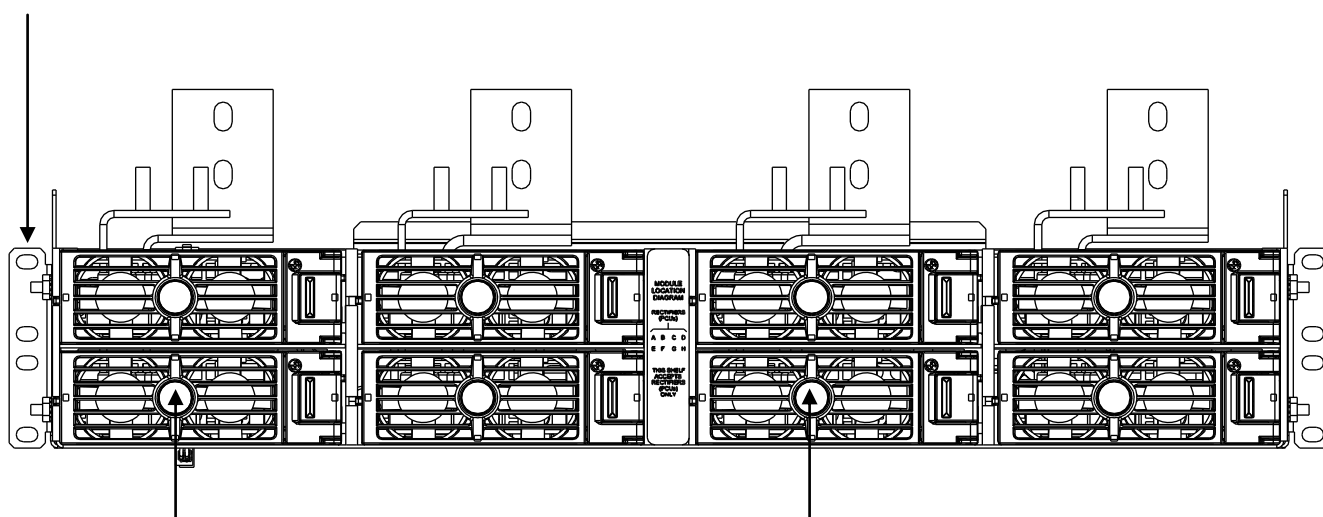
Provides DC distribution through fuses and/or circuit breakers. **Note:** *This document does not describe NetSure Distribution. Refer to the Power System SAG (System Application Guide) for distribution information.*

Family:	NetSure™
Spec. Nos.:	588705100, 588705101, 588705102, 588705103, 588705104
Model:	PSS24/1000-23, PSS24/2000-23, PSS24/3000-23, PSS24/4000-23
Rectifier Input Voltage	Nominal 208-240 volts AC, single phase, 50/60 Hz, with an operating range of 180 to 264 volts. Acceptable input frequency range is 47 to 65 Hz.
Rectifier Output Voltage:	+24 Volts DC
Converter Output Voltage:	-48 Volts DC
Rectifier Output Capacity:	
Rectifier Module (PCU) (R24-2500):	87.7A @ +28.5VDC to 104.2A @ +24.0VDC, 2500 Watts
Rectifier Module (PCU) (R24-3000):	105.3A @ +28.5VDC to 125.0A @ +24.0VDC, 3000 Watts
Module Mounting Shelf Assembly:	Varies - see individual List Descriptions
Optional DC-DC Converter	
Module Output Capacity:	
DC-DC Converter Module:	31 Amperes (1500W)
Module Mounting Shelf Assembly:	Varies - see individual List Descriptions
Agency Approval:	<a href="#">UL 60950 Recognized; CAN/CSA 22.2, No. 60950-00, NEBS</a>
Framework Type:	For Mounting in a 23-Inch Wide Relay Rack
Mounting Width:	23 Inch (Relay Rack Mounting)
Mounting Depth:	22.34 Inches
Front Projection:	6.23 Inches, fixed
Mounting Height:	588705100 and 588705101: 3-1/2 Inches (2RU) 588705102: 7 Inches (4RU) 588705103: 10-1/2 Inches (6RU) 588705104: 14 Inches (8RU)
Access:	Front and Rear for Installation and Maintenance, Front for Operation
Control:	Microprocessor
Color:	Bright Zinc Plating (Spec. M500-53) Body, Textured Gray (Spec. M500-147) Faceplates
Environment:	-40°C to +40°C (-40°F to +104°F)

## 588705100, 588705101, 588705102, 588705103, 588705104

### Module Mounting Shelf Assembly

[588705100, List 1](#) (8-position, expansion)  
[588705101, List 1](#) (8-position, shown)  
[588705102, List 1](#) (16-position)  
[588705103, List 1](#) (24-position)  
[588705104, List 1](#) (32-position)



**2500W Rectifier Module  
(PCU)**

[1R242500](#)

OR

**3000W Rectifier Module  
(PCU)**

[1R243000](#)

**Optional DC-DC Converter Module  
(requires Converter Option Kit)**

[1C24481500](#)

OR

**2500W Rectifier Module (PCU)**

[1R242500](#)

OR

**3000W Rectifier Module (PCU)**

[1R243000](#)

### See Also

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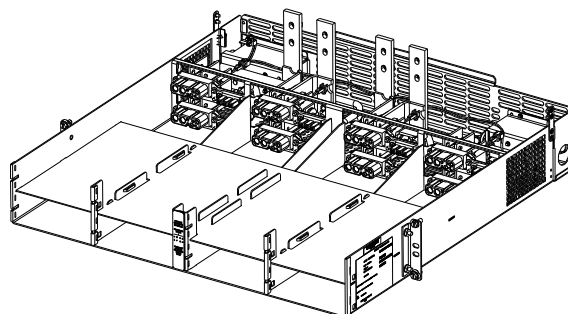
## LIST DESCRIPTIONS

### List Numbers

#### **588705100 List 1: Field Expansion Kit (8-Position Module Mounting Shelf Assembly)**

##### **Features**

- ◆ Provides one (1) 8-Position Module Mounting Shelf Assembly, and components required for field installation in an existing NetSure Power System.
- ◆ Expands capacity of a NetSure Power System equipped with a [588705101 List 1](#), [588705102 List 1](#), or [588705103 List 1](#).
- ◆ The assembly consists of one (1) 8-position Module Mounting Shelf. The shelf provides eight (8) module mounting positions (8 is the total for the assembly). Rectifier Modules (PCUs) can be installed in any of the eight (8) mounting positions. Also provided is DC-DC Converter Option Kit ([P/N 540806](#)). This allows the four (4) middle mounting positions to accept either Rectifier Modules (PCUs) or DC-DC Converter Modules.
- ◆ The 8-position Module Mounting Shelf is equipped with individual Rectifier Module (PCU) AC input feeds (one branch circuit per module mounting position, eight feeds total).



##### **Restrictions**

Module Mounting Shelf Assembly maximum output current:

Module Configuration	+24VDC	-48VDC
(8) 1R242500 Rectifiers	800A	0A
(8) 1R243000 Rectifiers	1000A	0A
(4) 1R242500 Rectifiers & (4) 1C24481500 Converters	400A	125A
(4) 1R243000 Rectifiers & (4) 1C24481500 Converters	500A	125A

For field installation only.

Cannot be used with a Spec No. [588705104 List 1](#) Assembly.

Maximum of one (1) Module Mounting Expansion Assembly (588705100 List 1) per equipment bay.

Total Rectifier Module (PCU) output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

##### **Ordering Notes**

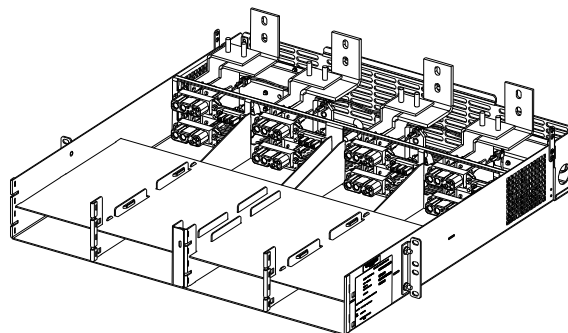
- 1) Order one (1) 588705100 List 1 per power system bay as required (see Restrictions above). Can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 2) Order Rectifier Modules (PCUs) per [1R242500](#) or by [1R243000](#) as required. Rectifier Modules (PCUs) can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 3) Order DC-DC Converter Modules per [1C24481500](#) as required. Converter Modules can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 4) Order one (1) Module Mounting Position Blank Cover ([P/N 540959](#)) for each empty module mounting position in the assembly. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.

5) Refer also to "[ACCESSORY DESCRIPTIONS](#)" for other available accessories.

## 588705101 List 1: 8-Position Module Mounting Shelf Assembly

### Features

- ◆ Provides one (1) 8-Position Module Mounting Shelf Assembly.
- ◆ The assembly consists of one (1) 8-position Module Mounting Shelf. The shelf provides eight (8) module mounting positions (8 is the total for the assembly). Rectifier Modules (PCUs) can be installed in any of the eight (8) mounting positions. When a DC-DC Converter Option Kit is ordered, the four (4) middle mounting positions accept either Rectifier Modules (PCUs) or DC-DC Converter Modules.
- ◆ The 8-position Module Mounting Shelf is equipped with individual Rectifier Module (PCU) AC input feeds (one branch circuit per module mounting position, eight feeds total).



### Restrictions

Module Mounting Shelf Assembly maximum output current:

Module Configuration	+24VDC	-48VDC
(8) 1R242500 Rectifiers	800A	0A
(8) 1R243000 Rectifiers	1000A	0A
(4) 1R242500 Rectifiers & (4) 1C24481500 Converters	400A	125A
(4) 1R243000 Rectifiers & (4) 1C24481500 Converters	500A	125A

Maximum of one (1) Module Mounting Shelf Assembly (588705101 List 1, 588705102 List 1, 588705103 List 1, or 588705104 List 1) per equipment bay.

When equipped with a DC-DC Converter Option Kit, the 8-position Module Mounting Shelf accepts a maximum of four (4) DC-DC Converter Modules.

Total Rectifier Module (PCU) output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

### Ordering Notes

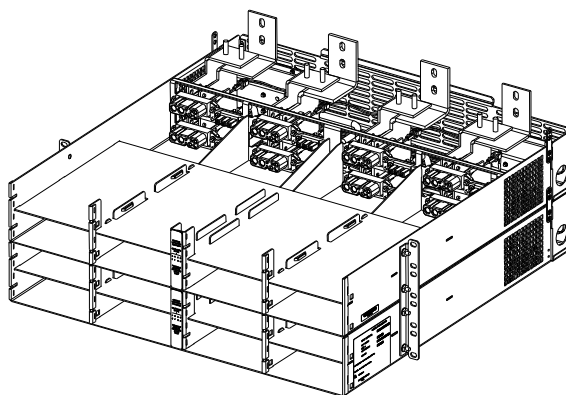
- 1) For eight (8) module mounting positions in a relay rack, order 588705101 List 1. If more than eight (8) module mounting positions are required, **do not** order multiples of 588705101 List 1; order [588705102 List 1](#), [588705103 List 1](#), or [588705104 List 1](#) instead.
- 2) Order Rectifier Modules (PCUs) per [1R242500](#) or by [1R243000](#) as required. Rectifier Modules (PCUs) can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 3) To use DC-DC Converters in the 8-position Module Mounting Shelf, order one (1) DC-DC Converter Option Kit ([P/N 540806](#)) for the 8-position Module Mounting Shelf. The kit allows the middle four (4) module mounting positions to accept DC-DC Converter Modules. This option can also be ordered from the System Application Guide (SAG) of the associated Power System.

- 4) Order DC-DC Converter Modules per [1C24481500](#) as required. Converter Modules can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 5) Order one (1) Module Mounting Position Blank Cover ([P/N 540959](#)) for each empty module mounting position in the assembly. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 6) Refer also to "[ACCESSORY DESCRIPTIONS](#)" for other available accessories.

### **588705102 List 1: 16-Position Module Mounting Shelf Assembly**

#### **Features**

- ◆ Provides one (1) 16-Position Module Mounting Shelf Assembly.
- ◆ The assembly consists of two (2) 8-position Module Mounting Shelves. Each shelf provides eight (8) module mounting positions (16 total for the assembly). Rectifier Modules (PCUs) can be installed in any of the eight (8) mounting positions per 8-position Module Mounting Shelf. When a DC-DC Converter Option Kit is ordered, the four (4) middle mounting positions of an 8-position Module Mounting Shelf accepts either Rectifier Modules (PCUs) or DC-DC Converter Modules.
- ◆ Each 8-position Module Mounting Shelf in the assembly is equipped with individual Rectifier Module (PCU) AC input feeds (one branch circuit per module mounting position, eight feeds total per shelf, sixteen feeds total per assembly).



#### **Restrictions**

Module Mounting Shelf Assembly maximum output current:

Module Configuration	+24VDC	-48VDC
(16) 1R242500 Rectifiers	1600A	0A
(16) 1R243000 Rectifiers	2000A*	0A
(8) 1R242500 Rectifiers & (8) 1C24481500 Converters	800A	250A
(8) 1R243000 Rectifiers & (8) 1C24481500 Converters	1000A	250A

\*-Maximum bay rating of associated Power System

Maximum of one (1) Module Mounting Shelf Assembly (588705101 List 1, 588705102 List 1, 588705103 List 1, or 588705104 List 1) per equipment bay.

When equipped with a DC-DC Converter Option Kit, each 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly accepts a maximum of four (4) DC-DC Converter Modules (8 total for the assembly).

Total Rectifier Module (PCU) output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

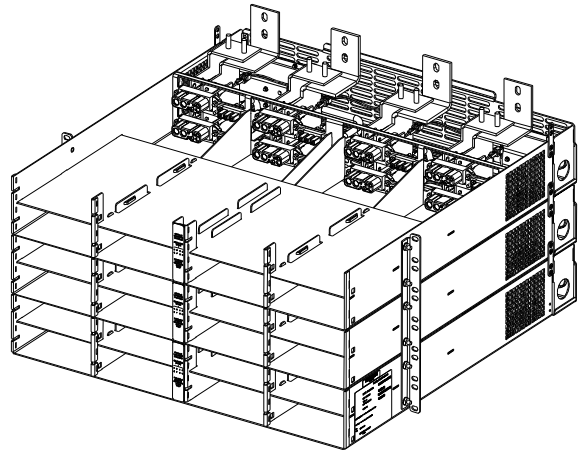
### Ordering Notes

- 1) For sixteen (16) module mounting positions in a relay rack, order 588705102 List 1. If more than sixteen (16) module mounting positions are required, **do not** order multiples of 588705102 List 1; order [588705103 List 1](#) or [588705104 List 1](#) instead.
- 2) Order Rectifier Modules (PCUs) per [1R242500](#) or by [1R243000](#) as required. Rectifier Modules (PCUs) can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 3) To use DC-DC Converters in any 8-position Module Mounting Shelf in this Module Mounting Shelf Assembly, order one (1) DC-DC Converter Option Kit ([P/N 540806](#)) for each 8-position Module Mounting Shelf in which Converters are required. Each kit allows the middle four (4) module mounting positions in one 8-position Module Mounting Shelf to accept DC-DC Converter Modules. When more than one kit is ordered, kits will be factory installed starting in the bottom 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly and working up. This option can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 4) Order DC-DC Converter Modules per [1C24481500](#) as required. Converter Modules can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 5) Order one (1) Module Mounting Position Blank Cover ([P/N 540959](#)) for each empty module mounting position in the assembly. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 6) Refer also to "[ACCESSORY DESCRIPTIONS](#)" for other available accessories.

### 588705103 List 1: 24-Position Module Mounting Shelf Assembly

#### Features

- ◆ Provides one (1) 24-Position Module Mounting Shelf Assembly.
- ◆ The assembly consists of three (3) 8-position Module Mounting Shelves. Each shelf provides eight (8) mounting positions (24 total for the assembly). Rectifier Modules (PCUs) can be installed in any of the eight (8) mounting positions per 8-position Module Mounting Shelf. When a DC-DC Converter Option Kit is ordered, the four (4) middle mounting positions of an 8-position Module Mounting Shelf accepts either Rectifier Modules (PCUs) or DC-DC Converter Modules.
- ◆ Each 8-position Module Mounting Shelf in the assembly is equipped with individual Rectifier Module (PCU) AC input feeds (one branch circuit per module mounting position, eight feeds total per shelf, twenty-four feeds total per assembly).



## Restrictions

Module Mounting Shelf Assembly maximum output current:

Module Configuration	+24VDC	-48VDC
(20) 1R242500 Rectifiers & (4) 1C24481500 Converters	2000A*	125A
(16) 1R243000 Rectifiers & (8) 1C24481500 Converters	2000A*	250A
(12) 1R242500 Rectifiers & (12) 1C24481500 Converters	1200A	375A
(12) 1R243000 Rectifiers & (12) 1C24481500 Converters	1500A	375A

\* - Maximum bay rating of associated Power System

Maximum of one (1) Module Mounting Shelf Assembly (588705101 List 1, 588705102 List 1, 588705103 List 1, or 588705104 List 1) per equipment bay.

When equipped with a DC-DC Converter Option Kit, each 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly accepts a maximum of four (4) DC-DC Converter Modules (12 total for the assembly).

Total Rectifier Module (PCU) output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

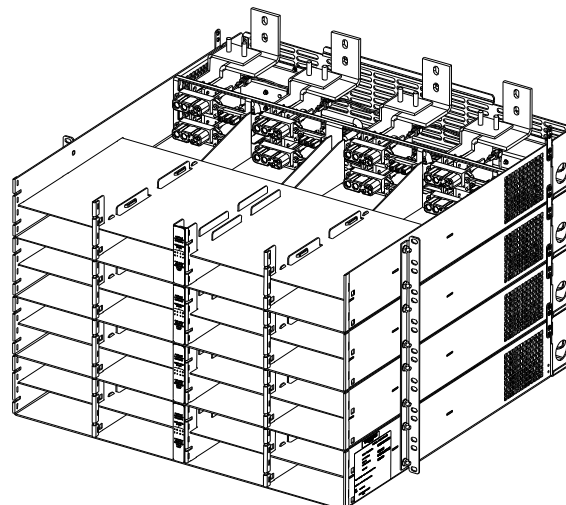
## Ordering Notes

- 1) For twenty-four (24) module mounting positions in a relay rack, order 588705103 List 1. If more than twenty-four (24) module mounting positions are required, **do not** order multiples of 588705103 List 1; order [588705104 List 1](#) instead.
- 2) Order Rectifier Modules (PCUs) per [1R242500](#) or by [1R243000](#) as required. Rectifier Modules (PCUs) can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 3) To use DC-DC Converters in any 8-position Module Mounting Shelf in this Module Mounting Shelf Assembly, order one (1) DC-DC Converter Option Kit ([P/N 540806](#)) for each 8-position Module Mounting Shelf in which Converters are required. Each kit allows the middle four (4) module mounting positions in one 8-position Module Mounting Shelf to accept DC-DC Converter Modules. When more than one kit is ordered, kits will be factory installed starting in the bottom 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly and working up. This option can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 4) Order DC-DC Converter Modules per [1C24481500](#) as required. Converter Modules can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 5) Order one (1) Module Mounting Position Blank Cover ([P/N 540959](#)) for each empty module mounting position in the assembly. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 6) Refer also to "[ACCESSORY DESCRIPTIONS](#)" for other available accessories.

## 588705104 List 1: 32-Position Module Mounting Shelf Assembly

### Features

- ◆ Provides one (1) 32-Position Module Mounting Shelf Assembly.
- ◆ The assembly consists of four (4) 8-position Module Mounting Shelves. Each shelf provides eight (8) module mounting positions (32 total for the assembly). Rectifier Modules (PCUs) can be installed in any of the eight (8) mounting positions per 8-position Module Mounting Shelf. When a DC-DC Converter Option Kit is ordered, the four (4) middle mounting positions of an 8-position Module Mounting Shelf accepts either Rectifier Modules (PCUs) or DC-DC Converter Modules.
- ◆ Each 8-position Module Mounting Shelf in the assembly is equipped with individual Rectifier Module (PCU) AC input feeds (one branch circuit per module mounting position, eight feeds total per shelf, thirty-two feeds total per assembly).



### Restrictions

Module Mounting Shelf Assembly maximum output current:

Module Configuration	+24VDC	-48VDC
(20) 1R242500 Rectifiers & (12) 1C24481500 Converters	2000A*	375A
(16) 1R243000 Rectifiers & (16) 1C24481500 Converters	2000A*	500A*
(16) 1R242500 Rectifiers & (16) 1C24481500 Converters	1600A	500A*

\* - Maximum bay rating of associated Power System

Maximum of one (1) Module Mounting Shelf Assembly (588705101 List 1, 588705102 List 1, 588705103 List 1, or 588705104 List 1) per equipment bay.

When equipped with a DC-DC Converter Option Kit, each 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly accepts a maximum of four (4) DC-DC Converter Modules (16 total for the assembly).

Total Rectifier Module (PCU) output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

### Ordering Notes

- 1) For thirty-two (32) module mounting positions in a relay rack, order 588705104 List 1.
- 2) Order Rectifier Modules (PCUs) per [1R242500](#) or by [1R243000](#) as required. Rectifier Modules (PCUs) can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 3) To use DC-DC Converters in any 8-position Module Mounting Shelf in this Module Mounting Shelf Assembly, order one (1) DC-DC Converter Option Kit ([P/N 540806](#)) for each 8-position Module Mounting Shelf in which Converters are required. Each kit allows the middle four (4) module mounting positions in one 8-position Module Mounting Shelf to accept DC-DC Converter Modules. When more than one kit is ordered, kits will be factory installed starting in the bottom 8-position Module Mounting Shelf in the

Module Mounting Shelf Assembly and working up. This option can also be ordered from the System Application Guide (SAG) of the associated Power System.

- 4) Order DC-DC Converter Modules per [1C24481500](#) as required. Converter Modules can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 5) Order one (1) Module Mounting Position Blank Cover ([P/N 540959](#)) for each empty module mounting position in the assembly. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 6) Refer also to "[ACCESSORY DESCRIPTIONS](#)" for other available accessories.

## ACCESSORY DESCRIPTIONS

### Rectifier and Converter Modules

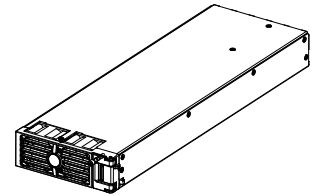
#### Part No. 1R242500: 2500W Rectifier Module

##### Features

- ◆ Provides one (1) Model R24-2500 (+24V, 104.2A, 2500W), Rectifier Module (PCU).

##### Ordering Notes

- 1) Order as required.



#### Part No. 1R243000: 3000W, Rectifier Module

##### Features

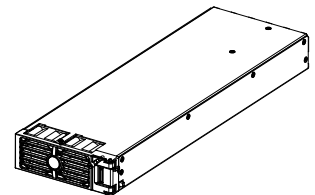
- ◆ Provides one (1) Model R24-3000, (+24V, 125.0A, 3000W). High Efficiency Rectifier Module.

##### Restrictions

Refer to the power systems SAG (System Application Guide) for any compatibility issues in using this rectifier in power systems manufactured before this rectifier was available.

##### Ordering Notes

- 1) Order as required for any List 1 Mounting Assembly in this document.



#### Part No. 1C24481500: 1500W Converter Module

##### Features

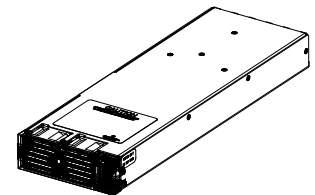
- ◆ Provides one (1) Model C24/48-1500 (-48V, 31A, 1500W), DC-DC Converter Module.

##### Restrictions

Requires kit P/N [540806](#). Note that this kit is furnished in 588705100 List 1 and does not need to be ordered separately.

##### Ordering Notes

- 1) Order as required. Each 8-position Module Mounting Shelf in a Module Mounting Shelf Assembly holds up to four (4) DC-DC Converter Modules when equipped with a DC-DC Converter Option Kit.



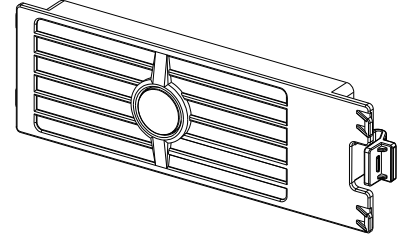
## Module Mounting Position Blank Cover Panel (P/N 540959)

### Features

- ◆ Covers one (1) unused module mounting position.

### Ordering Notes

- 1) Order one (1) blank cover panel, P/N 540959, for each empty module mounting position in the system. Blank Covers can also be ordered from the System Application Guide (SAG) of the associated Power System.



## DC-DC Converter Option Interface Component Kit (P/N 540806)

### Features

- ◆ Provides components to add DC-DC Converter capability to one (1) 8-position Module Mounting Shelf. When installed, the four middle mounting positions in an 8-position Module Mounting Shelf accepts DC-DC Converters or Rectifier Modules (PCUs).
- ◆ Includes cables for connection of converter output to a dual voltage bus distribution panel assembly in a Distribution Cabinet of an associated Power System.
- ◆ Note that this option is furnished in 588705100 List 1.

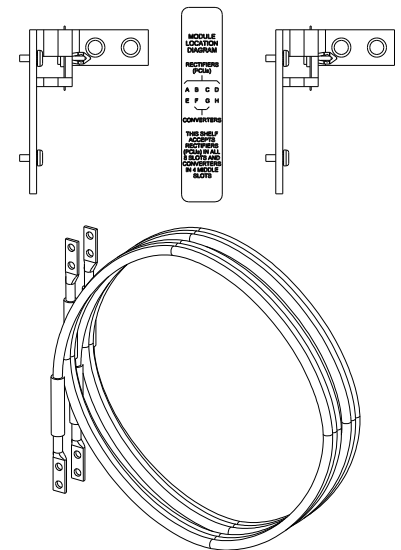
### Restrictions

MUST be factory installed only.

Total rectifier output power available for customer loads is reduced by the input power of each DC-DC Converter Module installed.

### Ordering Notes

- 1) Order one (1) kit, P/N 540806, for each 8-position Module Mounting Shelf in which DC-DC Converters are required. Note that some Module Mounting Shelf Assemblies consist of multiple 8-position Module Mounting Shelves. The kit permits the middle four (4) positions in an 8-position Module Mounting Shelf to accept DC-DC Converter Modules or Rectifier Modules (PCUs). The kit is factory installed within the 8-position Module Mounting Shelf. Multiple kits will be installed starting with bottom 8-position Module Mounting Shelf in the Module Mounting Shelf Assembly and working up. Kit can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 2) Order up to four (4) converter modules for each kit ordered.



## Battery Charge Temperature Compensation Probe for Single Probe Digital Compensation

### Features

- ◆ This system can be used with a Battery Charge Temperature Compensation Probe. This probe must be mounted near the battery to sense battery ambient temperature. The probe connects to and allows the MCA of the associated Power System to automatically increase or decrease the output voltage of the system to maintain battery float current as battery ambient temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. Two probes are available. Part No. 107021 has a 25-foot long cord. Part No. 106824 has a 100 foot-long cord. See [Overall Dimensions, Digital Battery Charge Temperature Compensation Probe \(P/N 107021 and 106824\)](#) under PHYSICAL SIZE INFORMATION for a dimensional drawing.
- ◆ Allows Rectifier Module Battery Charge Temperature Compensation.
- ◆ **Temperature Curve:** Refer to [Figure 1](#).

### Ordering Notes

- 1) Order one Battery Charge Temperature Compensation Probe per Power System, as required. Can also be ordered from the System Application Guide (SAG) of the associated Power System.

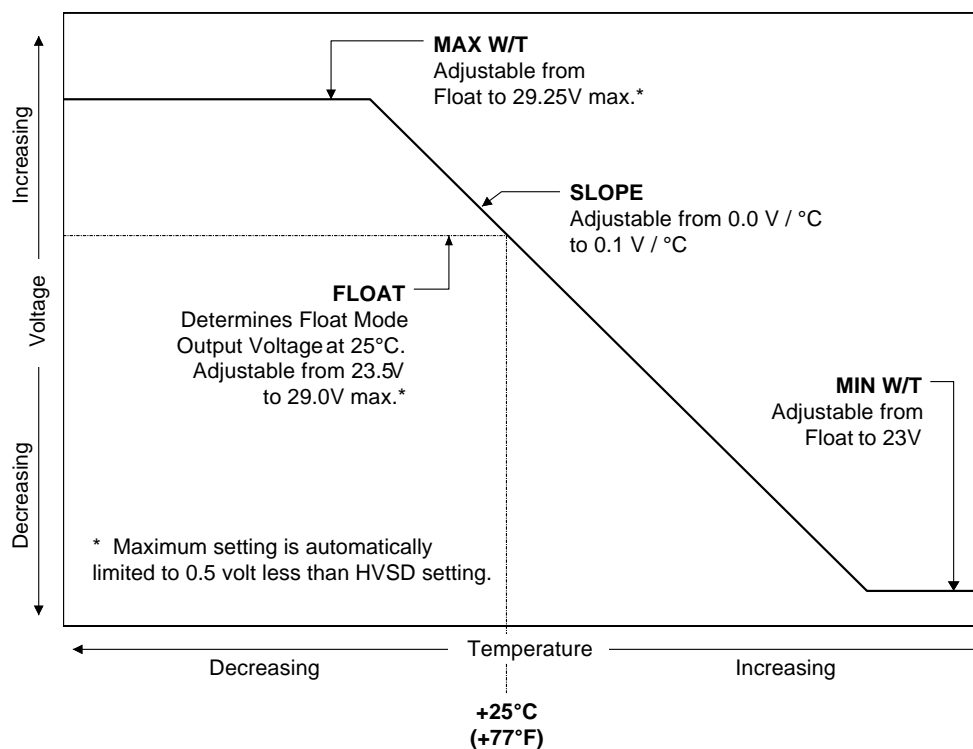


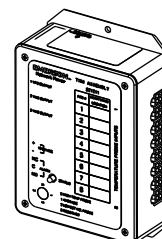
Figure 1  
 Typical Float Charge Thermal Characteristics  
 Using Optional Battery Charge Digital Temperature Compensation Probe  
 (Indicated parameters are user-adjustable via the associated MCA.)

## Battery Charge Temperature Compensation Probe Concentrator for Multiple Probe Use (TXM)

### Battery Temperature Probe Concentrator Kit (P/N 524570)

#### Features

- ◆ The Battery Temperature Probe Concentrator (TXM) expands battery temperature monitoring capabilities by providing a means of monitoring up to eight (8) analog battery temperature probes. The TXM provides a digital output for connection to the associated Power System's MCA's battery temperature probe connector. The MCA can be programmed to compensate for the hottest probe reading, the average temperature of all connected probes, or the probe connected to the lowest numbered connector. The kit includes one TXM (P/N 521211) and one 25 ft. interface cable (P/N 521228) for connecting the TXM to the MCA.



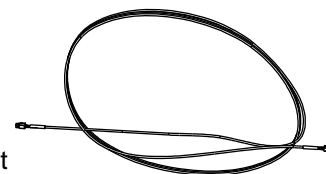
521211

#### Restrictions

Requires P/N 521262 analog probes. **Cannot** be used with digital probes (P/Ns 106824 and 107021).

#### Ordering Notes

- 1) Order one Battery Charge Temperature Compensation Probe Concentrator Kit (P/N 524570) per power system and up to eight (8) P/N 521262 probes, as required. Can also be ordered from the System Application Guide (SAG) of the associated Power System.
- 2) Order extension cable P/N 514153 as required. Can also be ordered from the System Application Guide (SAG) of the associated Power System.



521228

### Analog Battery Temperature Probe (P/N 521262)

#### Features

- ◆ An analog probe designed to sense internal battery temperature. Mounts on the negative terminal of the battery; mounting hole clears 5/16" hardware. Includes 15 ft. cable with connector. See [Overall Dimensions, Analog Battery Temperature Probe \(P/N 521262\)](#) under PHYSICAL SIZE INFORMATION for a dimensional drawing.

#### Ordering Notes

- 1) See above Ordering Notes.

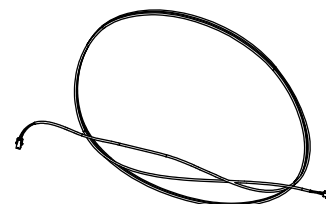
### TXM Extension Cable (P/N 514153)

#### Features

- ◆ 25 ft. long cable. Can be used between a P/N 521262 Analog Battery Temperature Probe and the TXM; or to extend a P/N 521228 interface cable between the TXM and MCA.

#### Ordering Notes

- 1) See above Ordering Notes.



514153

PD588705100  
PD588705101  
PD588705102  
PD588705103  
PD588705104  
Issue AF, July 11, 2012

Power Data Sheet  
Spec. No. 588705100 (Model PSS24/1000-23)  
Spec. No. 588705101 (Model PSS24/1000-23)  
Spec. No. 588705102 (Model PSS24/2000-23)  
Spec. No. 588705103 (Model PSS24/3000-23)  
Spec. No. 588705104 (Model PSS24/4000-23)

[Home](#)

## Replacement Cables

### Ordering Notes

- 1) Refer to the System Application Guide (SAG) of the associated Power System for part numbers.

## Replacement Components

### Ordering Notes

- 1) **Rectifier Module (PCU):** Order via [1R242500](#) (2500W), [1R243000](#) (3000W), or the Power System documentation.
- 2) **Rectifier Module Fan:** Part No. 32010156 (2 required per Rectifier Module).
- 3) **DC-DC Converter Module:** Order via [1C24481500](#) or the Power System documentation.
- 4) **DC-DC Converter Module Fan:** Part No. 534520 (2 required per Converter Module).

## Wiring Notes

Refer also to the next section, [Wiring Illustrations](#).

### AC Input Branch Circuit Protection and Wire Size Selection

#### Features

- ◆ Each 8-position Module Mounting Shelf in a Module Mounting Shelf Assembly contains rear mounted AC input terminal blocks and provides individual feeds to each Rectifier Module mounting position.

#### Restrictions

AC input terminal blocks are “tubular contact - screw compression” type and accept a wire size in the range of 10 to 24 AWG.

#### Ordering Notes

- 1) Refer to the following table.

THWN - 90°C Wire - Individual Feed Four Rectifiers (8 Current and 1 Ground Wire) per Conduit				
Input Voltage	Input Current	Overcurrent Protection <sup>(1)</sup>	30°C and 40°C Ambient Temperatures <sup>(2)</sup>	
			Wire AWG <sup>(2) (3)</sup>	Conduit Size (in.)
208	14	20A	12	1/2
240	12	15A	14	1/2

<sup>1</sup> The AC input branch circuit protective device should be of the time-delay or high inrush type.

<sup>2</sup> Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310-16 for copper wire at **90°C** conductor temperature; operating in ambients of **30°C** and **40°C** was used. For other operating ambient temperatures, refer to the National Electrical Code. For operation in countries where the NEC is not recognized, follow applicable codes.

<sup>3</sup> Equipment grounding conductors must be provided with the AC input conductors supplied to the shelf. Frame ground terminals must be connected to earth ground, not power system neutral. Equipment grounding conductor size based on recommendations of the NEC Table 250-122 for copper wire. If aluminum or copper clad aluminum grounding conductor is used, refer to Table 250-122 for increased conductor size. For operation in countries where the NEC is not recognized, follow applicable codes.

## **Shelf Frame Ground Wire Size Selection**

### **Features**

- ◆ Two 10-32 X 3/4" frame ground studs with hardware are provided on the rear of each 8-position Module Mounting Shelf.

### **Restrictions**

Recommended frame ground wire size is the same size as the AC input branch circuit wiring.

For relay rack grounding requirements, refer to the NEC, applicable local codes, and your specific site requirements.

## **DC Output Connections: +24VDC System Output**

### **Features**

- ◆ Busbars are provided within each Module Mounting Shelf Assembly for factory connection into a NetSure Power System.

### **Ordering Notes**

- 1) No wire size or lug recommendations are provided here. Shelf +24VDC output is connected via busbars to the distribution section of a NetSure Power System.

## **DC Output Connections: -48VDC Subsystem Output**

### **Features**

- ◆ Busbars are provided within each Module Mounting Shelf Assembly for factory connection into a NetSure Power System.

### **Ordering Notes**

- 1) No wire size or lug recommendations are provided here. Shelf -48VDC output is connected via factory-installed cabling to the distribution section of a NetSure Power System.

## **External Alarms Wire Size Selection**

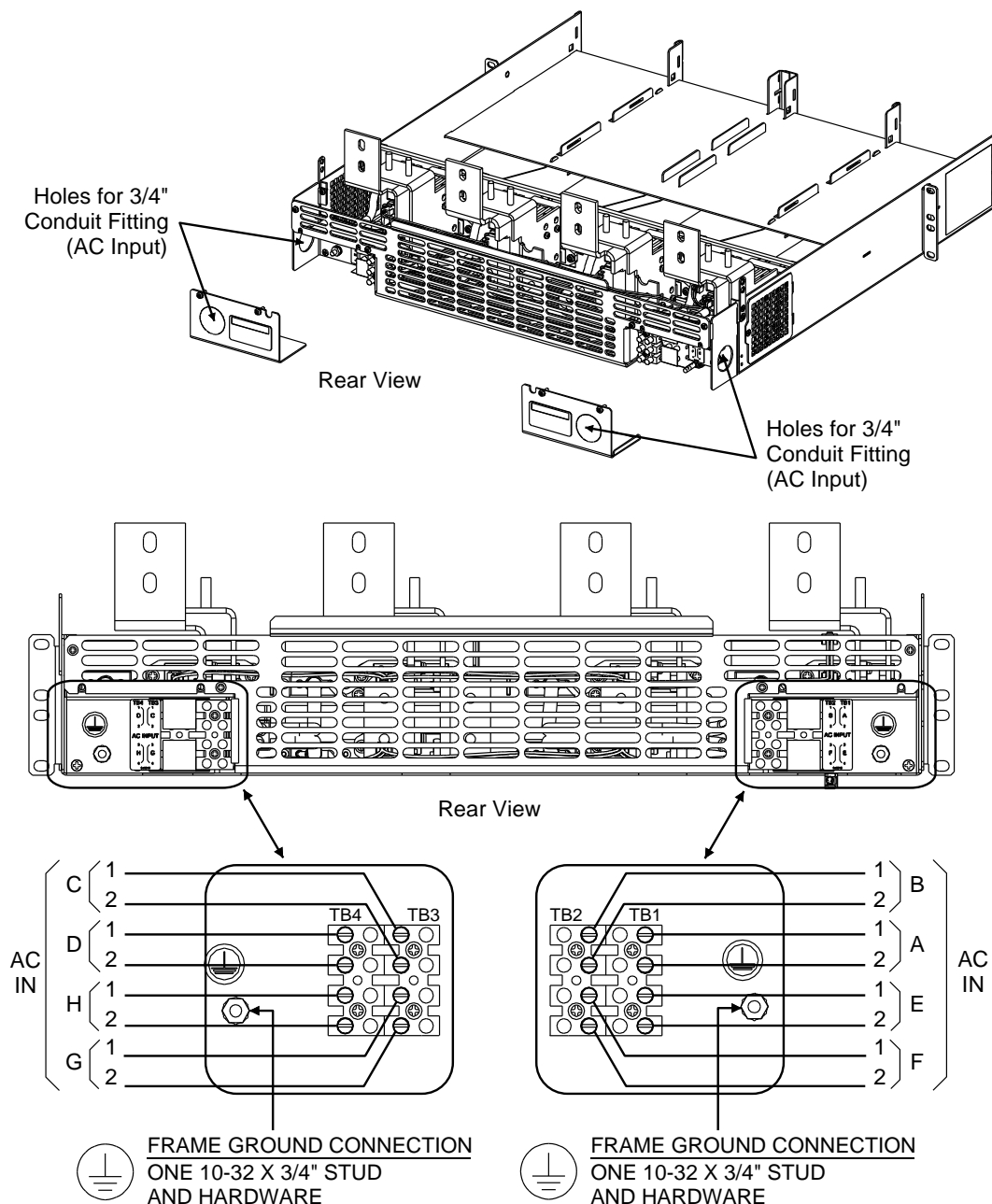
### **Ordering Notes**

- 1) No wire size recommendations are provided here. Shelf external alarms are provided via the MCA of an associated NetSure Power System.

## Wiring Illustrations

### AC Input and Frame Ground

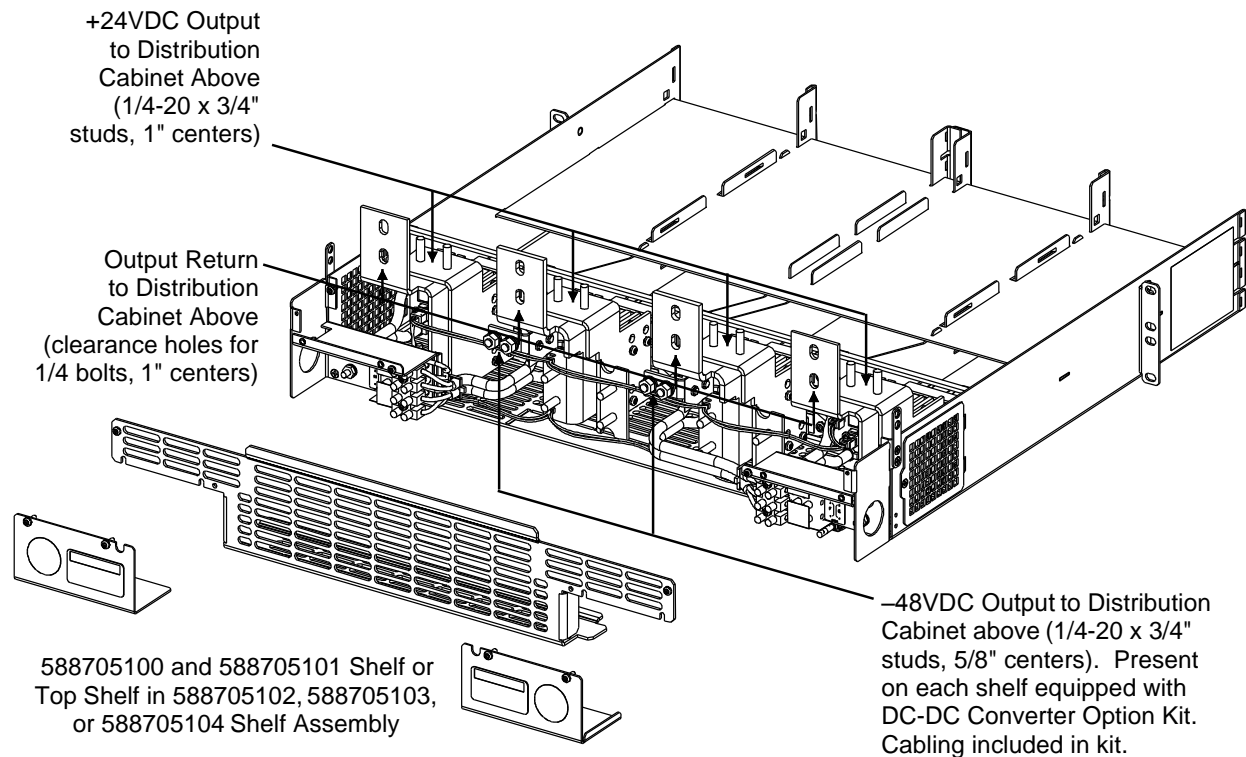
(for each 8-Position Module Mounting Shelf in the Module Mounting Shelf Assembly)



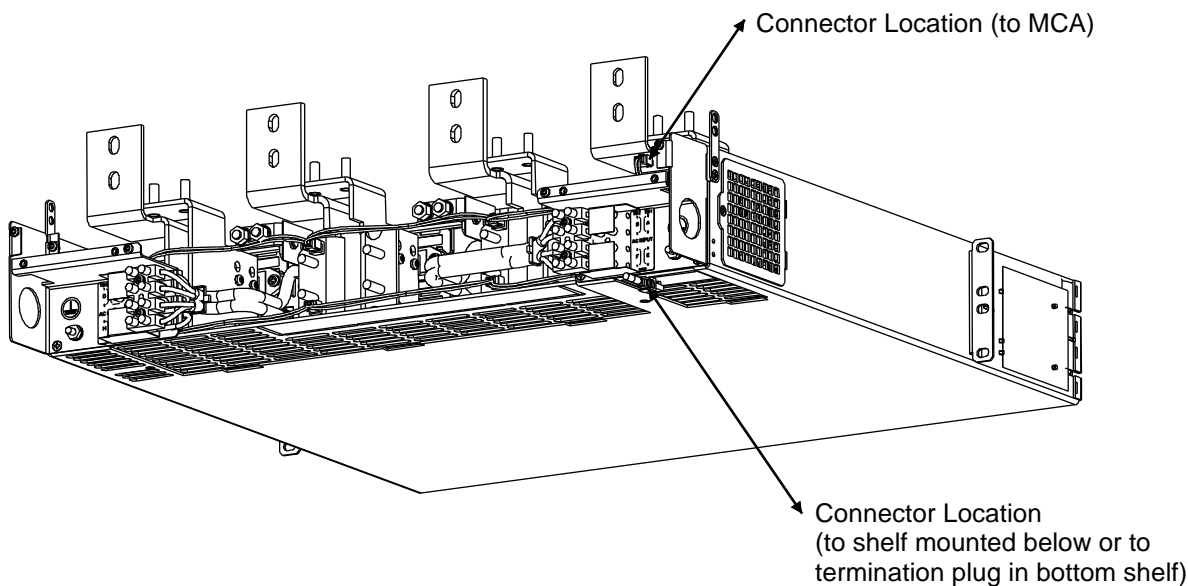
**Note:** Module mounting positions are lettered left to right as viewed from front of shelf, A-D in top row and E-H in bottom row.

**Note:** If mounting positions B, C, F, and G are intended for DC-DC Converter installation (Converter Option must be installed), AC input connections to these positions are not required.

## DC Output



## Alarm/Control to MCA



Control Bus Connections Between MCA and Shelves

## SPECIFICATIONS

**Note:** Refer to the separate System Application Guide (SAG) of the associated Power System for the following:

- MCA specifications and factory default settings.
- All external alarms.
- All external controls.
- Local status and alarm indicators other than those provided on the Rectifier Modules (PCUs) and DC-DC Converter Modules.

### 1. RECTIFIER SPECIFICATIONS

Refer to the separate Rectifier Instruction Document (UM1R243000).

### 2. DC-DC CONVERTER SPECIFICATIONS

Refer to the separate Converter Instruction Document (UM1C24481500).

### 3. MODULE MOUNTING SHELF SPECIFICATIONS

#### 3.1 Environmental Ratings

**3.1.1 Operating Ambient Temperature Range:** -40°C to +40°C (-40°F to +104°F)

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

**3.1.3 Humidity:** Capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.

**3.1.4 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 5000 feet.

#### 3.1.5 Ventilation Requirements:

**(A) Ventilation:** A Module Mounting Shelf must be mounted so ventilating openings are not blocked and temperature of the air entering the cabinet does not exceed the Operating Ambient Temperature Range stated above.

**(B) Stacking Considerations:** This system is designed for front to back ventilation to facilitate stacking of Module Mounting Shelves, one above the other, in a relay rack. There is no spacing requirement between stacked Module Mounting Shelves of a single system.

**3.1.6 Audible Noise (System):** The audible noise at any point two feet from any vertical surface of a Module Mounting Shelf (with Rectifier Modules installed and fans operating) does not exceed the following limits. The audible noise was measured with the fan control circuit enabled. A Sound Level Meter conforming to ANSI S1.4 was used.

#### (A) For One Rectifier Module:

- (1) 50dB-A maximum at less than 32°C ambient, half load or less.
- (2) 60dB-A maximum at less than 32°C ambient, full load.
- (3) 70dB-A maximum at greater than 32°C ambient, full load.

#### (B) For Eight Rectifier Modules:

- (1) 61dB-A maximum at less than 32°C ambient, half load or less.
- (2) 71dB-A maximum at less than 32°C ambient, full load.
- (3) 81dB-A maximum at greater than 32°C ambient, full load.

**3.1.7 Mounting:** The Module Mounting Shelf Assemblies are designed for mounting in a 23 inch wide relay rack with 1 inch or 1 3/4 inch multiple drilling.

### 3.2 Compliance Information

**3.2.1 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.

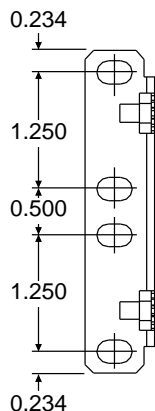
**3.2.2 NEBS Compliance:** Compliance verified by a Nationally Recognized Testing Laboratory (NRTL) per GR-1089-CORE and GR-63-CORE. Contact Emerson Network Power for NEBS compliance reports.

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.

## PHYSICAL SIZE INFORMATION

### Overall Dimensions

#### Module Mounting Shelf Assembly Spec. No. 588705100

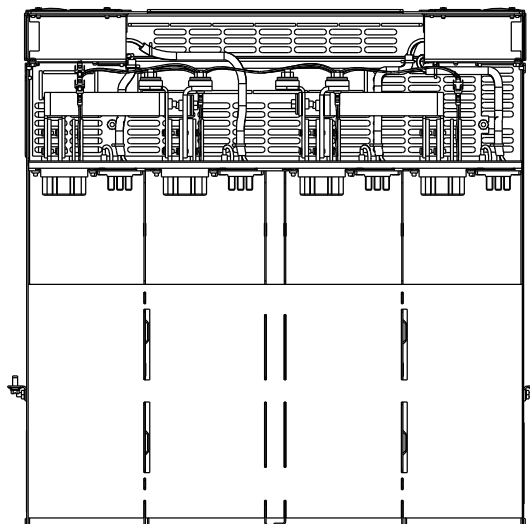


**Mounting  
Angle Detail**

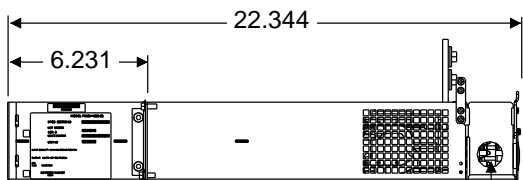
**Notes:**

1. All dimensions are in inches unless otherwise specified.
2. Weight (in lbs):
 

	Net	Shipping
588705100 Assy.:	26	
Rectifier Module:	6.4	
Converter Module:	5.5	
3. Finish:  
 Shelf and Module Bodies:  
 Bright Zinc Plating (M500-53)  
 Module Faceplates:  
 Textured Gray (M500-147)

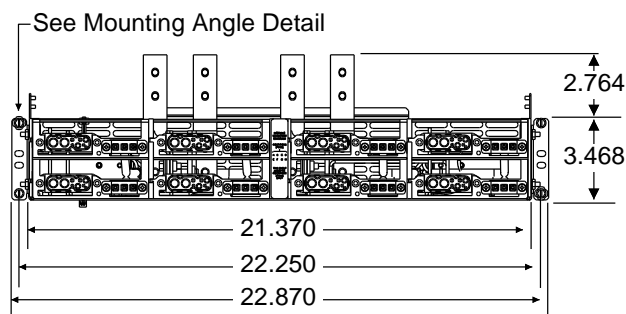


**Top View**

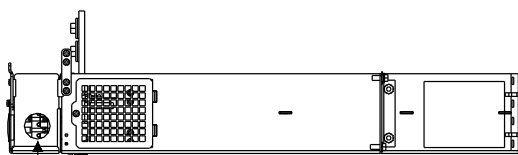


**Right Side View**

Hole for 3/4"  
Conduit Fitting  
(AC Input)

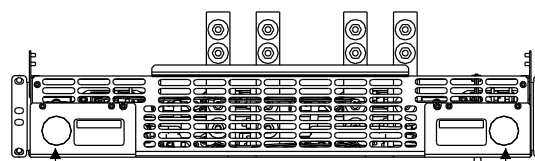


**Front View**



Hole for 3/4"  
Conduit Fitting  
(AC Input)

**Left Side View**



Hole for 3/4"  
Conduit Fitting  
(AC Input)

**Rear View**

Hole for 3/4"  
Conduit Fitting  
(AC Input)

PD588705100  
 PD588705101  
 PD588705102  
 PD588705103  
 PD588705104

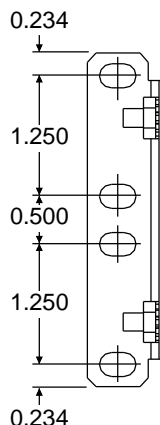
Issue AF, July 11, 2012

Power Data Sheet

Spec. No. 588705100 (Model PSS24/1000-23)  
 Spec. No. 588705101 (Model PSS24/1000-23)  
 Spec. No. 588705102 (Model PSS24/2000-23)  
 Spec. No. 588705103 (Model PSS24/3000-23)  
 Spec. No. 588705104 (Model PSS24/4000-23)

[Home](#)

# Module Mounting Shelf Assembly Spec. No. 588705101

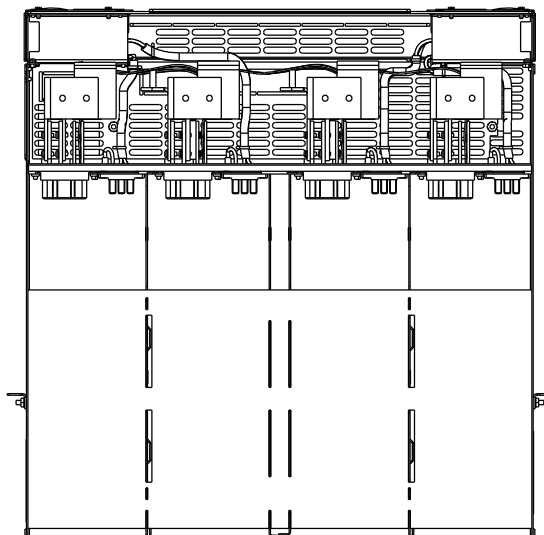


**Mounting  
 Angle Detail**

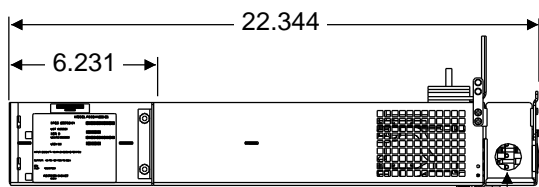
## Notes:

1. All dimensions are in inches unless otherwise specified.
2. Weight (in lbs):
 

	Net	Shipping
588705101 Assy.:	26	
Rectifier Module:	6.4	
Converter Module:	5.5	
3. Finish:  
 Shelf and Module Bodies:  
 Bright Zinc Plating (M500-53)  
 Module Faceplates:  
 Textured Gray (M500-147)

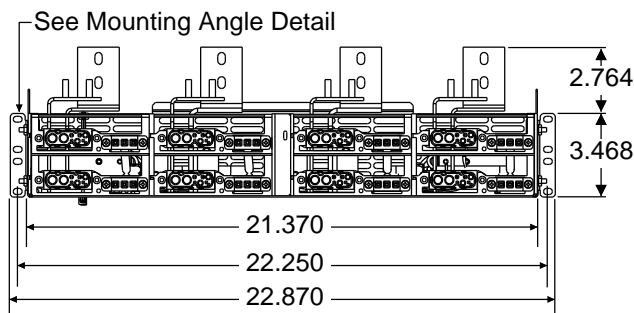


**Top View**



**Right Side View**

Hole for 3/4"  
 Conduit Fitting  
 (AC Input)

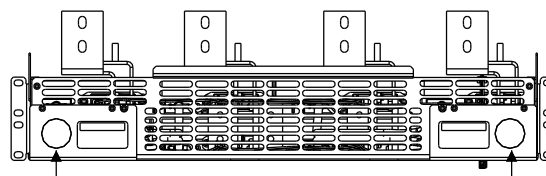


**Front View**



**Left Side View**

Hole for 3/4"  
 Conduit Fitting  
 (AC Input)

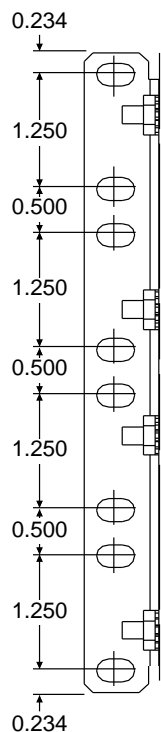


**Rear View**

Hole for 3/4"  
 Conduit Fitting  
 (AC Input)

Hole for 3/4"  
 Conduit Fitting  
 (AC Input)

## Module Mounting Shelf Assembly Spec. No. 588705102

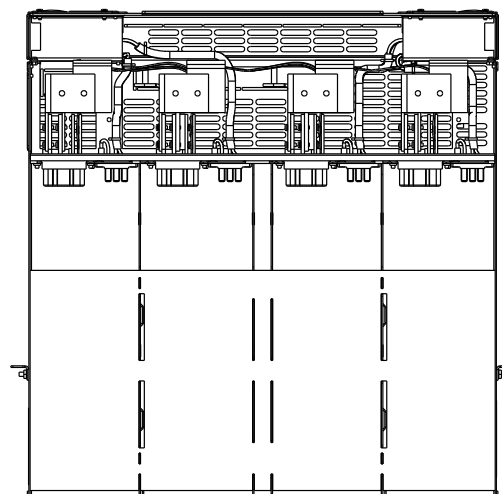


### Mounting Angle Detail

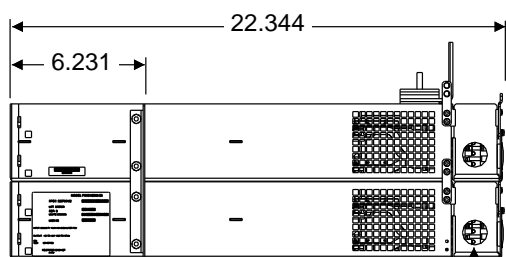
**Notes:**

1. All dimensions are in inches unless otherwise specified.
2. Weight (in lbs):

	<u>Net</u>	<u>Shipping</u>
588705102 Assy.:	50	
Rectifier Module:	6.4	
Converter Module:	5.5	
3. Finish:
  - Shelf and Module Bodies:
    - Bright Zinc Plating (M500-53)
  - Module Faceplates:
    - Textured Gray (M500-147)

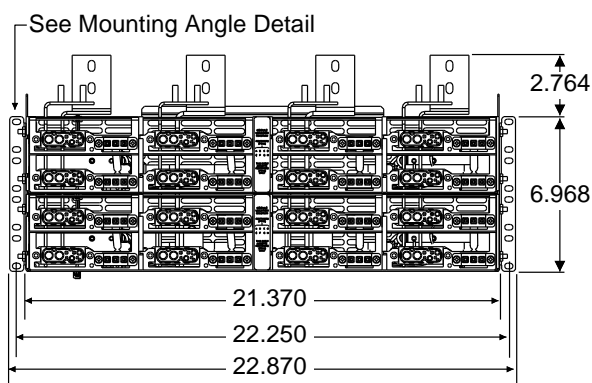


### Top View

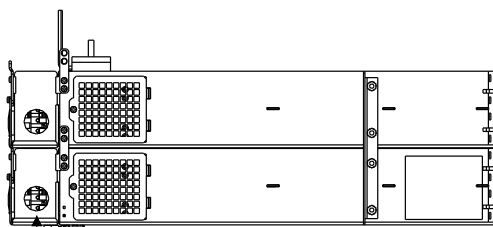


### Right Side View

Hole for 3/4"  
Conduit Fitting  
(AC Input)

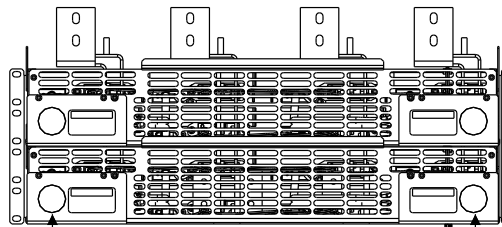


### Front View



### Left Side View

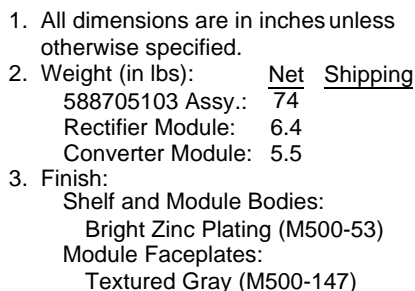
Hole for 3/4"  
Conduit Fitting  
(AC Input)



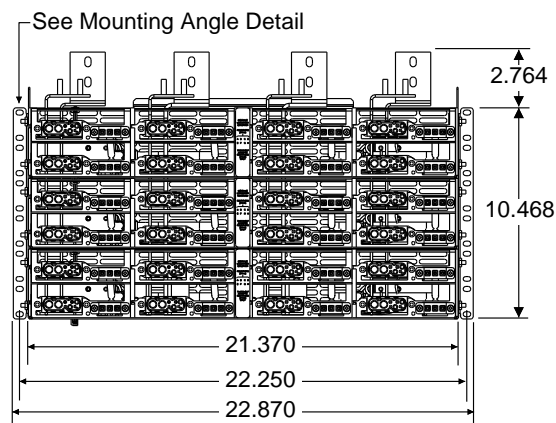
### Rear View

Hole for 3/4"  
Conduit Fitting  
(AC Input)

Hole for 3/4"  
Conduit Fitting  
(AC Input)

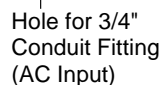


Hole for 3/4"  
Conduit Fitting  
(AC Input)

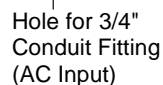


### Front View

### Mounting Angle Detail



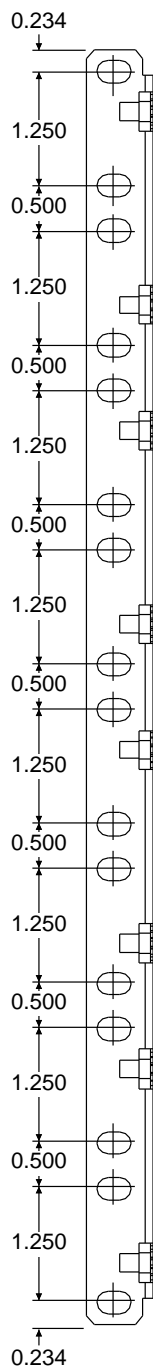
### Left Side View



### Rear View

Hole for 3/4"  
Conduit Fitting  
(AC Input)

## Module Mounting Shelf Assembly Spec. No. 588705104

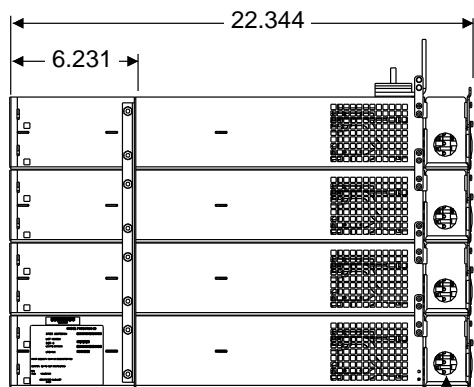


### Mounting Angle Detail

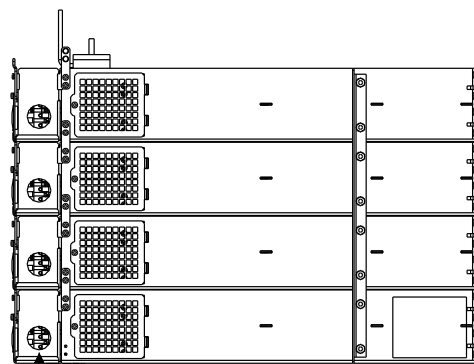
**Notes:**

1. All dimensions are in inches unless otherwise specified.
2. Weight (in lbs):

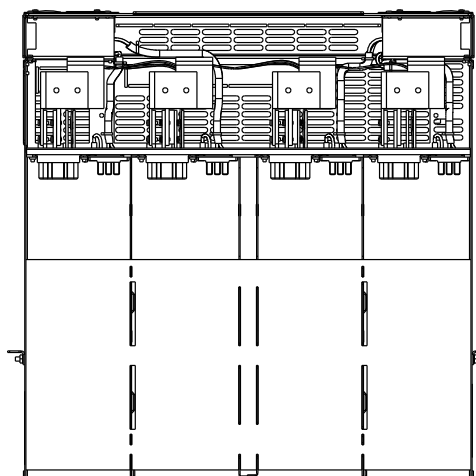
	<u>Net</u>	<u>Shipping</u>
588705104 Assy.:	98	
Rectifier Module:	6.4	
Converter Module:	5.5	
3. Finish:
  - Shelf and Module Bodies:
    - Bright Zinc Plating (M500-53)
  - Module Faceplates:
    - Textured Gray (M500-147)



**Right Side View**      Hole for 3/4"  
Conduit Fitting  
(AC Input)

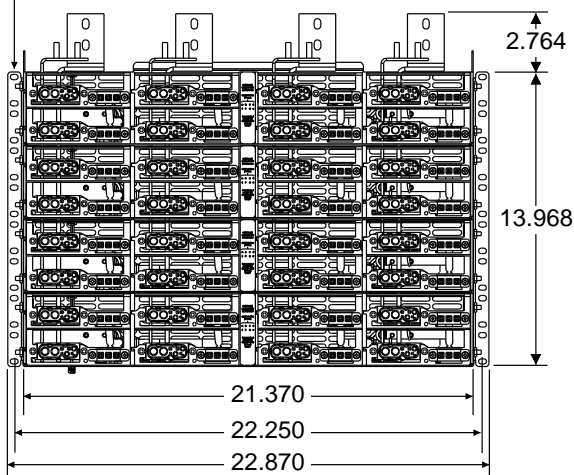


Hole for 3/4" Conduit Fitting (AC Input)

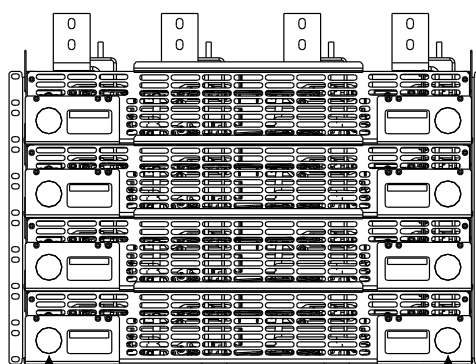


### Top View

—See Mounting Angle Detail

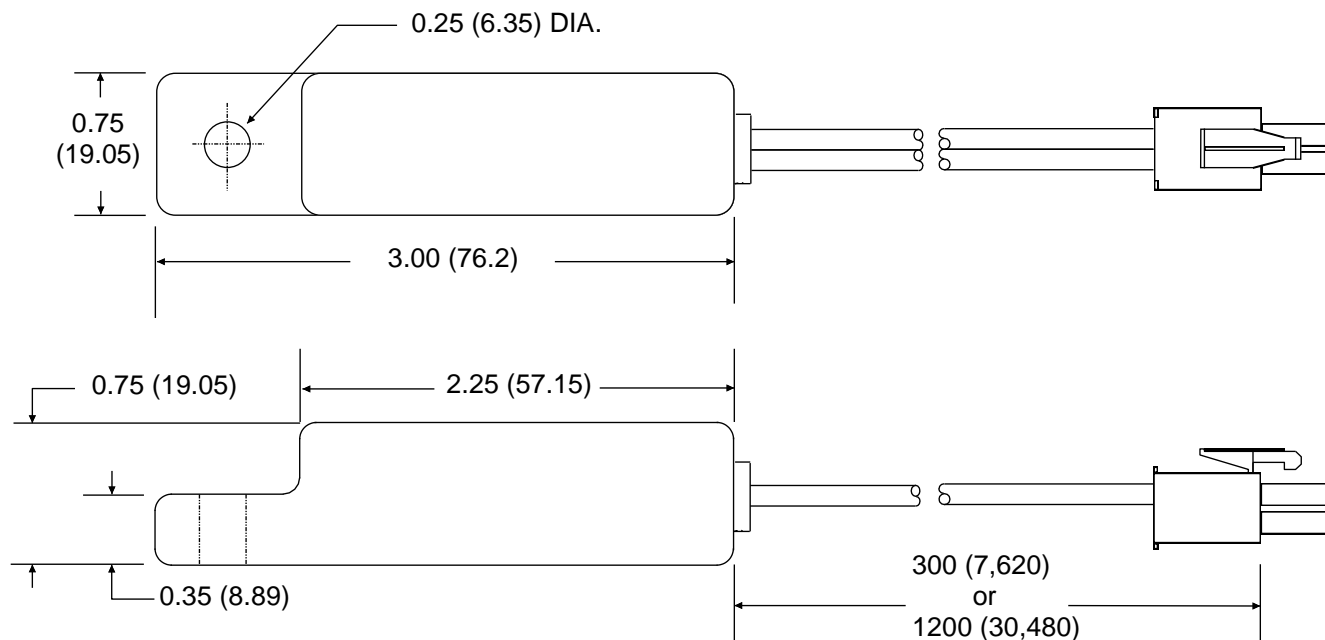


### Front View



Hole for 3/4" Conduit Fitting (AC Input)      **Rear View**      Hole for 3/4" Conduit Fitting (AC Input)

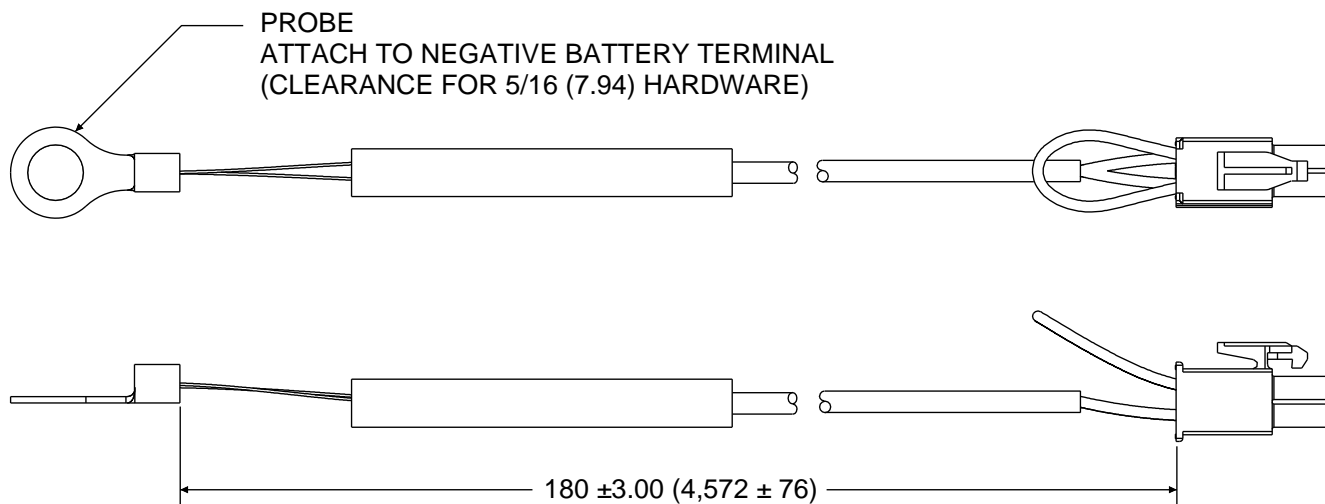
**Digital Battery Charge Temperature Compensation Probe (P/N 107021 and 106824)**



Part No. 107021 (25 foot)  
 Part No. 106824 (100 foot)

Note: All dimensions are in inches and (millimeters).

**Analog Battery Temperature Probe (P/N 521262)**



PROBE  
 ATTACH TO NEGATIVE BATTERY TERMINAL  
 (CLEARANCE FOR 5/16 (7.94) HARDWARE)

**NOTE:** All dimensions are in inches and (millimeters).

Power Data Sheet  
Spec. No. 588705100 (Model PSS24/1000-23)  
Spec. No. 588705101 (Model PSS24/1000-23)  
Spec. No. 588705102 (Model PSS24/2000-23)  
Spec. No. 588705103 (Model PSS24/3000-23)  
Spec. No. 588705104 (Model PSS24/4000-23)

**PD588705100**  
**PD588705101**  
**PD588705102**  
**PD588705103**  
**PD588705104**  
Issue AF, July 11, 2012

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## RELATED DOCUMENTATION

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**Spec. Nos. 588705100, 588705101, 588705102, 588705103,  
and 588705104 Module Mounting Shelf Assemblies**

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**Schematic Diagram:** SD588705100/SD588705101/SD588705102/SD588705103/SD588705104

**Wiring Diagram:** T588705100/T588705101/T588705102/T588705103/T588705104

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### **Rectifiers (1R242500 and 1R243000)**

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**Rectifier Instructions:** UM1R243000

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### **Converter (1C24481500)**

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**Converter Instructions:** UM1C24481500

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### **Spec. No. 581126000 NetSure Power System**

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**System Application Guide:** SAG581126000

**System Installation Instructions:** Section 6012

**System User Instructions:** Section 6013

**Color MCA Menu Tree:** Section 6022

PD588705100  
PD588705101  
PD588705102  
PD588705103  
PD588705104  
Issue AF, July 11, 2012

Power Data Sheet  
Spec. No. 588705100 (Model PSS24/1000-23)  
Spec. No. 588705101 (Model PSS24/1000-23)  
Spec. No. 588705102 (Model PSS24/2000-23)  
Spec. No. 588705103 (Model PSS24/3000-23)  
Spec. No. 588705104 (Model PSS24/4000-23)

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## REVISION RECORD

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP211093	New	06/30/08	John Jasko
AB	LLP212232	Updated heat dissipation values in Paragraph 2.2.5.	04/22/09	John Jasko
AC	LLP212882	Fan Failure statement added for NEBS.	09/28/09	John Jasko
AD	LLP214892	Added 1R243000 rectifier to the existing power system of 581126000. Added and updated charts for rectifier specifications.	12/09/10	Khristabelle Ilagan
AE	LLP215944	Adding compatibility information for 1R483500e rectifiers in systems with older software. Removing rectifier/converter module specs. from this document and referencing the separate rectifier/converter document.	08/11/11	John Jasko
AF	LLP217111	DC-DC Converter Option Kit P/N 540806 is included with 588705100 List 1. Description revised.	07/11/12	John Jasko John Jasko Jul 12, 2012 Ray Mann Jul 12, 2012

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