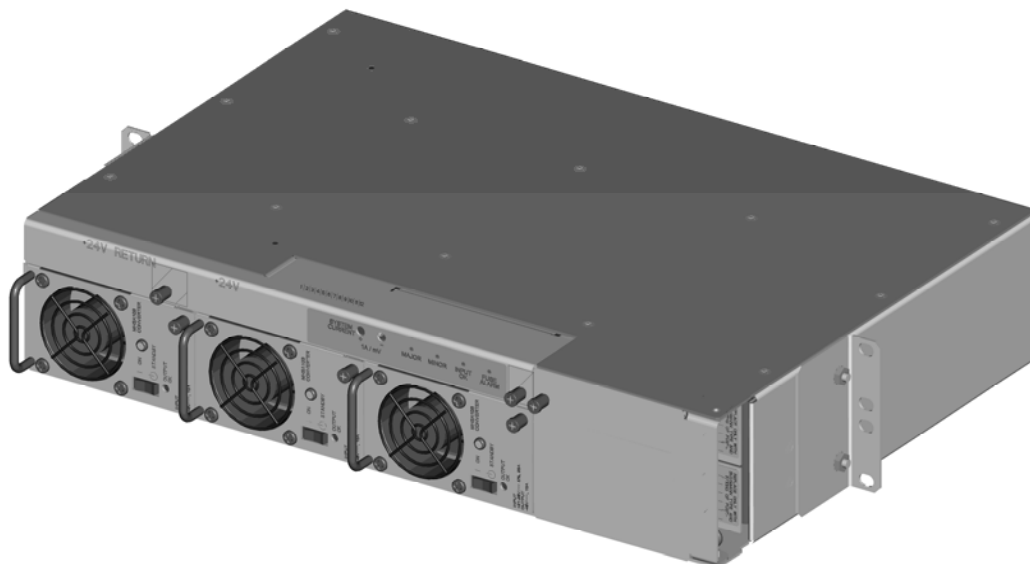


## SYSTEM OVERVIEW

**Description:** A DC-DC Converter Module Mounting Shelf designed to mount in a 19" or 23" (nominal) relay rack or equipment mounting rack (configured for 19" mounting unless otherwise specified). The Converter Module Mounting Shelf, when equipped with up to three separately ordered Converter Modules (Spec. No. 486800127), provides a DC-DC Converter System that operates from +24VDC to provide -48VDC load power.

Spec. No.:	584622000
Model:	DCS4830
Input Voltage:	+24 Volts DC
Output Voltage:	-48 Volts DC
Output Capacity:	
Converter Module:	10 Amperes
Mounting Shelf:	30 Amperes
Agency Approval:	<a href="#">UL 1950</a>
Mounting Type:	19" or 23" Relay Rack or Equipment Mounting Rack
Mounting Depth:	12.18"
Mounting Height:	3.5" (2RU)
Access:	Front for Installation, Operation, and Maintenance
Color:	Textured Gray
Environment:	<a href="#">-20°C to +65°C (-4°F to +149°F)</a>



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## ORDERING INFORMATION

### Converter Module Mounting Shelf (Model DCS4830)

#### Features

- ◆ The Converter Module Mounting Shelf accepts up to three (3) DC-DC Converter Modules.
- ◆ Two (2) blank panels are provided to cover unused Converter Module mounting positions.
- ◆ 19" rack mounting angles factory installed,  
23" rack mounting angles supplied loose  
(can be adjusted for a 5" or 6" front projection).

#### Ordering Notes

- 1) For each DC-DC Converter System, specify (1) Spec. No. 584622000 Converter Module Mounting Shelf.
- 2) Also order one (1) to three (3) Converter Modules per Converter Module Mounting Shelf (as specified next).

### Converter Modules (Model MHSA10B)

#### Ordering Notes

- 1) Order one (1) to three (3) Spec. No. 486800127 DC-DC Converter Module for each Converter Module Mounting Shelf ordered.

## Wiring Notes

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

### DC Input (+24V)

#### Features

- ◆ Front accessed 1/4-20 x 5/8" studs on 5/8" centers are provided for installation of customer provided DC input leads terminated in 2-hole lugs.

#### Ordering Notes

- 1) DC input lugs must be ordered separately. For lug selection, refer to the following table. Refer also to the following table for recommended DC input wire size. For additional lug information, refer to drawings 031110100 through 031110300.
- 2) Customer must provide 1/4-20 hardware to secure lugs to DC input busbars.

Recm 90°C Wire Size <sup>1</sup> (AWG)	Loop Length <sup>2</sup> (feet)	Recommended Crimp Lug <sup>3</sup>	
		Vendor	Part No.
4	47	T & B	54206
		Burndy	YA4CL-2TC14
		Emerson	245346800
2	74	T & B	54207
		Burndy	YA2CL-2TC14
		Emerson	245346900
1/0	118.9	T & B	--
		Burndy	YA25L-2TC14
		Emerson	245391400

- <sup>1</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 ambient of **30°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.
- <sup>2</sup> Wire sizes listed are sufficient to restrict voltage drop to 1.0 volt or less at rated full load output current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.
- <sup>3</sup> Two-hole lug, 1/4" bolt clearance hole, 5/8" centers. Refer to drawing 031110100 for lug crimping information.

## DC Output (-48V)

### Features

- ◆ Two (2) 6-position 0A to 15A GMT Fuse Modules (for a total of 12 fuse positions) are provided for load distribution.
- ◆ Load and load return leads are connected to a screw-type terminal block located on the front of each GMT Fuse Module.
- ◆ Each GMT Fuse Module is equipped with six (6) dummy fuses and safety fuse covers.

### Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

When used for power distribution, load should not exceed 80% of device rating, except 10 and 15 ampere fuses, for which load should not exceed 70% of device rating.

Terminal block wire size capacity is 24 to 14 AWG.

Each GMT Fuse Module has a 30A @ +65°C (+149°F) maximum capacity (combined load of both GMT Fuse Modules must not exceed shelf rating of 30A). Maximum GMT fuse size is 15A. Fuses are to be loaded from bottom of the shelf to top of the shelf with highest value in the lowest position.

**Caution: A fuse with a rating greater than 10 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.**

### Ordering Notes

- 1) Order GMT fuses as required per the following table.

<b>Ampere Rating</b>	<b>P/N</b>	<b>Fuse Color</b>
18/100 GMT-A	248610301	--
1/4	248610200	Violet
1/2	248610300	Red
3/4	248610500	Brown
1-1/3	248610700	White
2	248610800	Orange
3	248610900	Blue
5	248611000	Green
7-1/2	248611300	Black-White
10	248611200	Red-White
15	248611500	Red-Blue
Replacement Dummy Fuse	248872600	---
Replacement Safety Fuse Cover	102774	--

## **External Control and Alarms**

### **Features**

- ◆ An external control and alarm circuit card is located behind the shelf's top front access panel. This circuit card provides three sets of Form C relay contacts for external alarms, plus an ESTOP input. A terminal block is provided on the circuit card for customer connections.

### **Restrictions**

Terminal block wire size capacity is 14 to 26 AWG.

Relay contacts are rated for 1A at 30VDC or 0.3A at 60VDC.

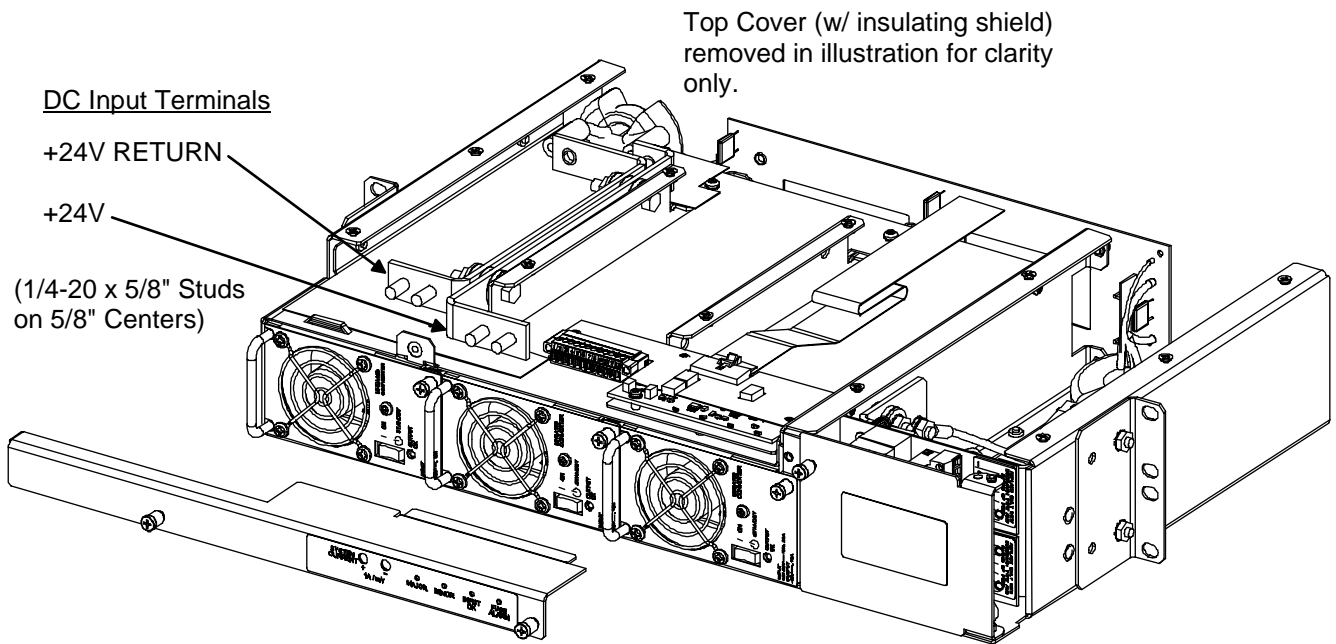
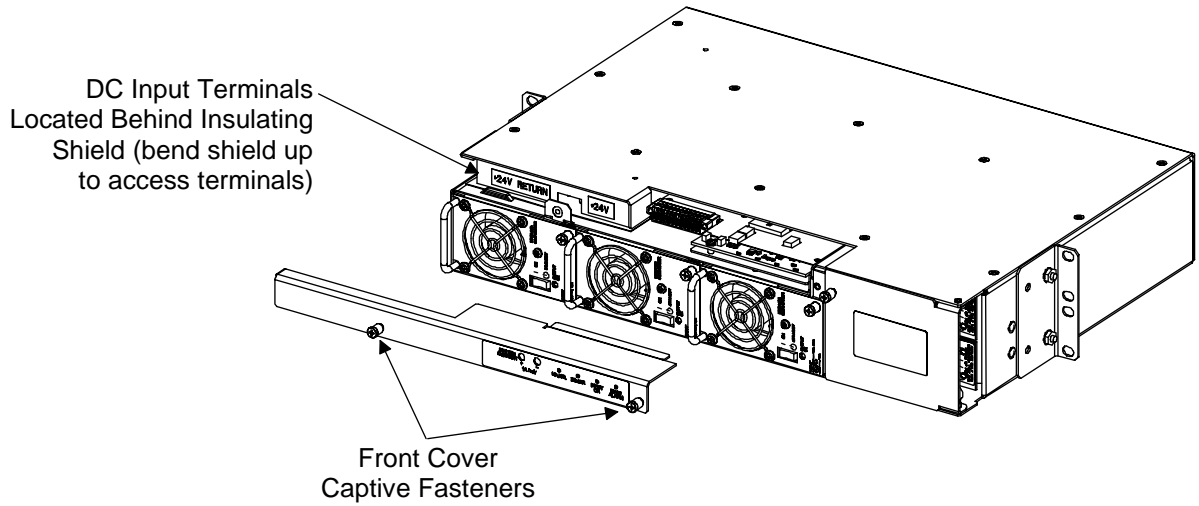
Relays are energized for normal operating conditions and de-energized for an alarm condition.

### **Ordering Notes**

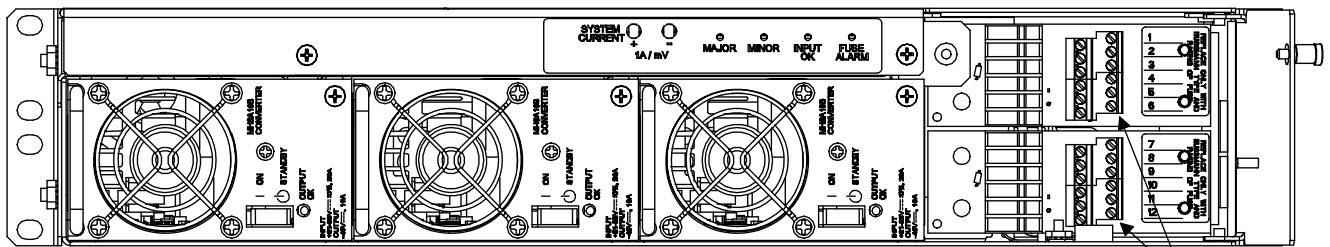
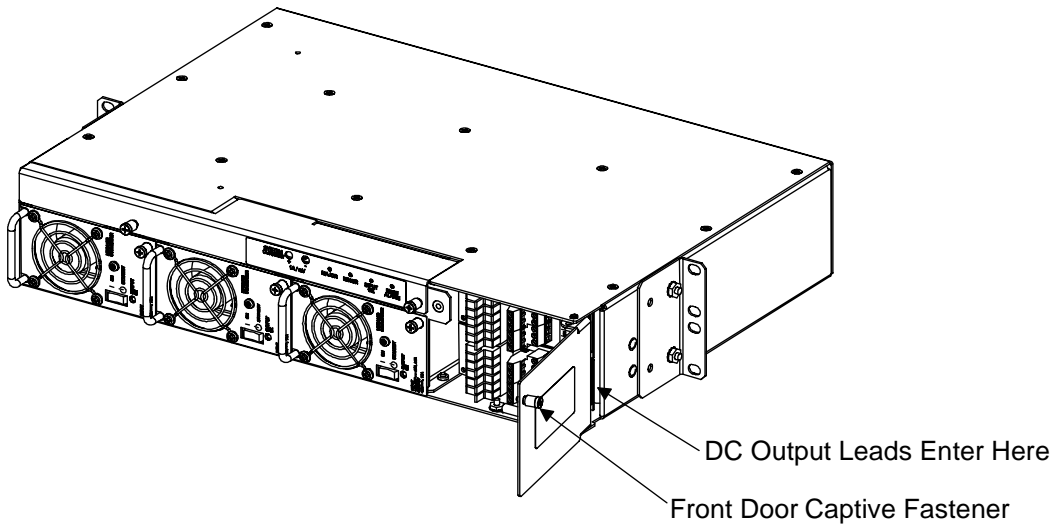
- 1) Recommended Wire Size: 22 AWG for Loop Lengths Up to 200 ft.  
18-20 AWG for Loop Lengths Over 200 ft.

## Wiring Illustrations

### DC Input (+24V)

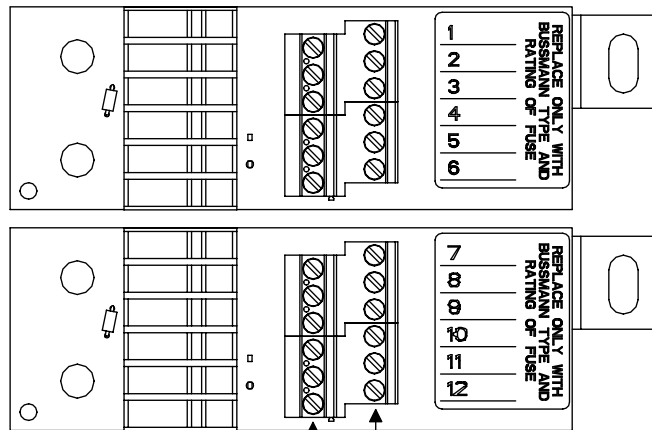


**DC Output (-48V)**



Front View

DC Output Terminal Blocks

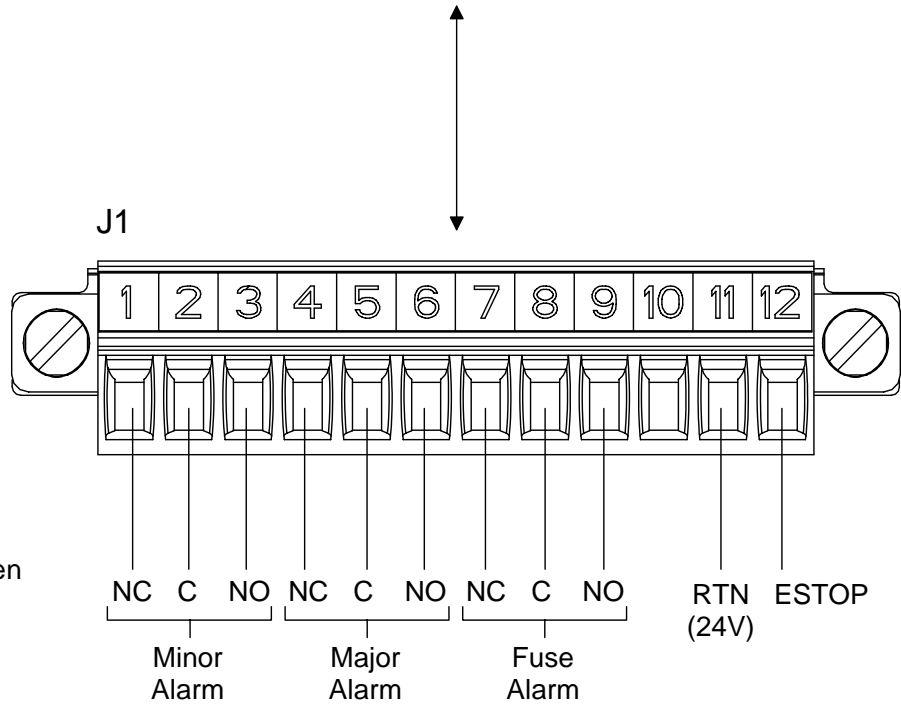
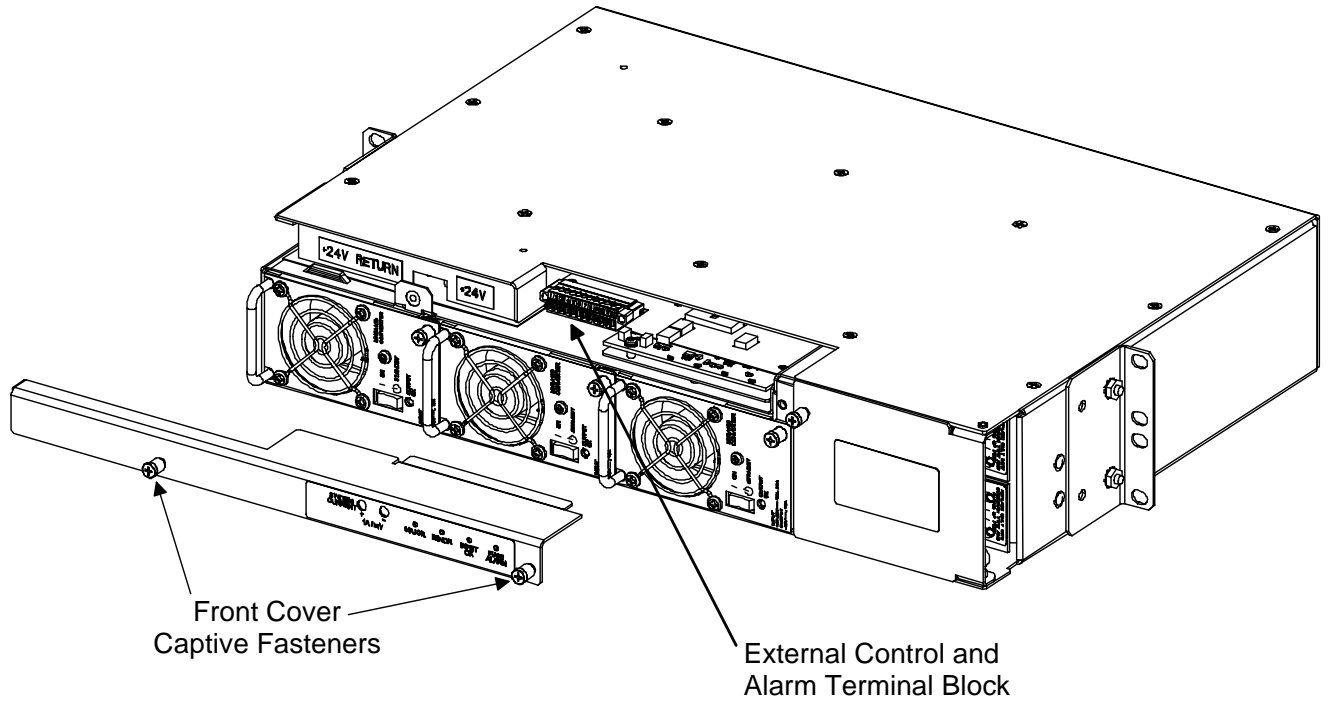


-48V Distribution Leads      Load Return Leads

DC Output Terminal Blocks



**External Control and Alarms**



All relay contacts are shown in the deenergized state. Relays are deenergized when in the alarm state.

## SPECIFICATIONS

### 1.1 Output Ratings

**1.1.1 Voltage:** Nominal -48 volts DC, positive ground, non-adjustable.

**1.1.2 Current:** 10 amperes per DC-DC Converter Module, up to a total of 30 amperes per DC-DC Converter Mounting Shelf when three (3) Converter Modules are installed.

#### 1.1.3 Regulation

**(A) Static:** Steady state output voltage remains within  $\pm 1$  volt of the pre-adjusted voltage for any load current from no load to full load and over the specified input voltage range.

**(B) Dynamic:** For a step load change of 50% within the range of 10% to 100% of full rated current, the maximum voltage transient will not exceed 5% of the initial steady state voltage.

**1.1.4 Filtering:** With at least 10% of rated full load on the output (-20°C to +65°C).

**(A)** Voice band noise is less than 32 dBmC when measured with a noise meter using 600 ohm bridged input and C-message weighting.

**(B)** Wide band noise does not exceed 250 millivolts peak to peak over the frequency range of 0 Hz to 20 MHz.

**(C)** Wide band noise does not exceed 30 millivolts rms over the frequency range of 0 Hz to 20 MHz (as measured with an HP3400A true rms voltmeter).

**(D)** Noise below -20°C is slightly higher.

**1.1.5 Output Distribution:** Two (2) 6-Position GMT Fuse Modules are provided for connecting DC output load leads.

**1.2 Input Ratings**

**1.2.1 Voltage:** 24 volts DC nominal. Input voltage range is 21 to 28 volts DC.

**1.2.2 Filtering:** Noise reflected back to the central office battery is less than 32 dBmC.

**1.2.3 Typical Input Data -** When equipped with **one** Converter Module.

**(A)** The output voltage of the DC-DC Converter Module is initially adjusted to 48 volts at 50% load and 24 volts DC input.

Input Voltage	Percent of Full Load	Input Current (Amps)	Efficiency (%)	Typical Heat Dissipation (BTU/Hr)
21 VDC	0	0.84	--	60
	25	6.99	82.1	90
	50	13.21	86.5	128
	75	19.71	86.6	190
	100	26.33	86.0	264
24 VDC	0	0.74	--	61
	25	6.17	81.4	94
	50	11.56	86.5	128
	75	17.16	87.0	183
	100	22.99	86.2	260
28 VDC	0	0.66	--	63
	25	5.37	80.2	102
	50	9.99	85.8	136
	75	14.77	86.7	188
	100	19.68	86.3	257

**(B) Maximum Current:** Maximum input current is 26.33 amperes at full load (10 amperes) and 21 volts DC input.

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**1.2.4 Typical Input Data** - When equipped with **three** Converter Modules.

**(A)** The output voltage of the DC-DC Converter Modules are initially adjusted to 48 volts at 50% load and 24 volts DC input.

Input Voltage	Percent of Full Load	Input Current (Amps)	Efficiency (%)	Typical Heat Dissipation (BTU/Hr)
21 VDC	0	2.42	--	173
	25	20.90	82.3	265
	50	39.59	86.4	385
	75	59.09	86.4	575
	100	79.23	85.4	828
24 VDC	0	2.12	--	174
	25	18.45	81.6	278
	50	34.67	86.4	387
	75	51.54	86.7	562
	100	69.10	85.7	810
28 VDC	0	1.88	--	180
	25	16.02	80.5	298
	50	29.77	86.2	392
	75	44.25	86.5	569
	100	59.11	85.9	799

**(B) Maximum Current:** Maximum input current is 79.23 amperes at full load (30 amperes) and 21 volts DC input.

### 1.3 Environmental Ratings

- 1.3.1 Operating Ambient Temperature Range:** -20°C to +65°C (-4°F to +149°F).
- 1.3.2 Storage Ambient Temperature Range:** -40°C to +85°C (-40°F to +185°F).
- 1.3.3 Humidity:** This DC-DC Converter System is capable of operating in an ambient relative humidity range of 0 to 95%, non-condensing.
- 1.3.4 Altitude:** The maximum operating ambient temperature should be derated by 10°C at an elevation of 10,000 feet. For elevations between sea level and 10,000 feet, derate the maximum operating ambient temperature linearly.
- 1.3.5 Ventilation Requirements:** Each Converter Module is fan cooled, using front to back ventilation. The Converter Mounting Shelf must be located such that ventilation openings are not blocked and temperature of the air entering the cabinet is not above or below the Operating Ambient Temperature Range stated in this document.
- 1.3.6 Heat Dissipation:** 16.98 Watts per square foot / foot maximum.
- 1.3.7 Audible Noise:** With three Converter Modules installed and operating, the audible noise at any point 5 feet from any vertical surface of the equipment shelf does not exceed 60 dBA when measured with a sound level meter conforming to ANSI S1.4.
- 1.3.8 EMI/RFI Suppression:** This DC-DC Converter System conforms to the requirements of FCC rules Part 15, Subpart B, Class B, for radiated and conducted noise.
- 1.3.9 Filtering:** Noise reflected back to the central office battery is within the parameters set forth in Telcordia Technical Reference TR-TSY-000009, paragraph 5.0, using test measurements in Telcordia Technical Reference PUB 43802, pages 5 and 6.

#### 1.3.10 Compliance Information:

**(A) Safety Compliance:** This unit meets the requirements of UL 1950, 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 CSA 22.2, No. 950 and is tested and Certified by UL ("c UR") as a Component Type Power Supply.

- 1.3.11 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 Craftspersons 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).

### 1.4 Standard Features

- 1.4.1 Type of Power Conversion Circuit:** High Frequency.
- 1.4.2 Input Protection:**
  - (A) Fusing:** A 35-ampere non-user replaceable fuse is located in the positive input lead of each Converter Module.
  - (B) Low Input Voltage Inhibit:** Operation of the Converter Modules will inhibit if the input voltage drops to within the range of 19.25 to 20.5 volts. While operation is inhibited, the Converter Shelf will draw no more than 20 mA. Operation will automatically resume after the input voltage returns to within normal operating limits.

**1.4.3 Output Protection:**

- (A) Overvoltage Protection:** Operation of a DC-DC Converter Module will automatically shut down and lock out if the output voltage of the module exceeds 115% to 125% of the nominal voltage. Manual restart is necessary after the overvoltage condition is corrected.
- (B) Overcurrent Protection:** When the output current of a DC-DC Converter Module increases to a preset overcurrent value between 102.5% and 115% of rated full load, the output voltage of the module will automatically decrease to limit current to this value. The output will recover to within specified limits when the overload condition is removed.
- (C) Over Temperature Protection:** The operation of a DC-DC Converter Module will automatically shut down if the internal temperature of the module exceeds a predetermined value. Operation will automatically resume after the over-temperature condition is corrected.

**1.4.4 Series Paralleling Output Diode:** A series paralleling output diode is provided in each Converter Module. This allows the Converter Modules to be paralleled for redundancy.

**1.4.5 External Alarm Circuits:** A set of Form-C relay contacts is provided for each of the following alarms. Relays are energized for normal operating conditions and de-energized for an alarm condition. Refer also to the *Wiring Notes* and *Wiring Illustrations* section in this document, and to the DC-DC Converter System "Installation and User Instructions" (Section 6035) for wiring information.

**(A) Converter Minor Alarm:** Alarms in the event of a failure in one or more Converter Modules. Converter failure alarm conditions are as follows.

- (1)** Converter output increases above 52 volts DC or decreases below 44 volts DC for any reason; including converter failure, high voltage shutdown, input voltage below 21 volts DC (low input inhibit), or an overload condition.
- (2)** Cooling fan slows or stops due to fan failure or blocked rotor.

**(B) Converter Major Alarm:** Alarms in the event of a failure in more than one Converter Module. Converter failure alarm conditions are as stated in (A) above.

**(C) Fuse Alarm:** Alarms if any GMT load fuse opens.

**1.4.6 Remote Shutdown Input (ESTOP):** The Converter Modules can be inhibited by applying an external ground signal (24V Return). Converter Modules automatically restart upon removal of the ground signal. Refer to the DC-DC Converter System "Installation and User Instructions" (Section 6035) for wiring information.

**1.4.7 Local Status and Alarm Indicators and Test Points:** Refer to the DC-DC Converter System "Installation and User Instructions" (Section 6035) for a complete description.

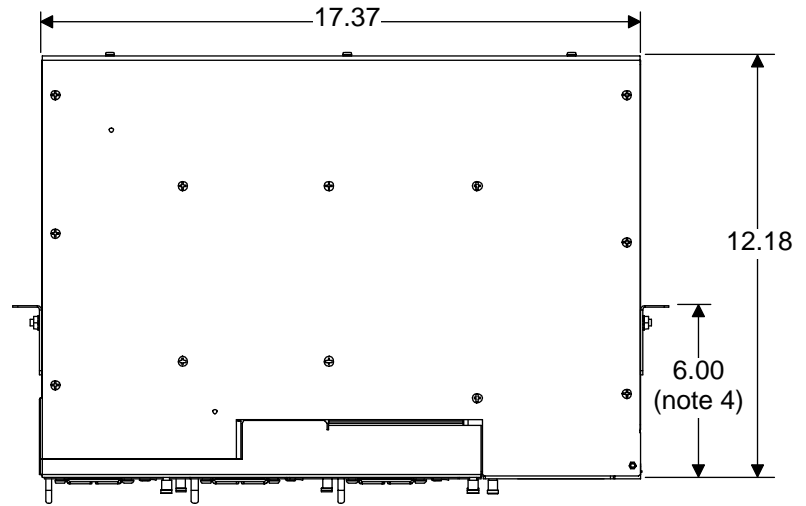
Location	NAME / Description	Type
Converter Module	ON / STANDBY Switch	Rocker Switch
	OUTPUT OK	LED - Green
Converter Module Mounting Shelf	MAJOR	LED - Red
	MINOR	LED - Yellow
	INPUT OK	LED - Green
	FUSE ALARM	LED - Red
	SYSTEM CURRENT (+, -) (1A/mV)	Test Points

## PHYSICAL SIZE INFORMATION

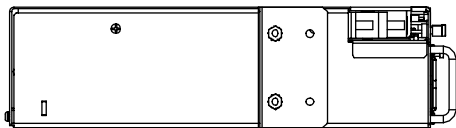
### Overall Dimensions

Notes:

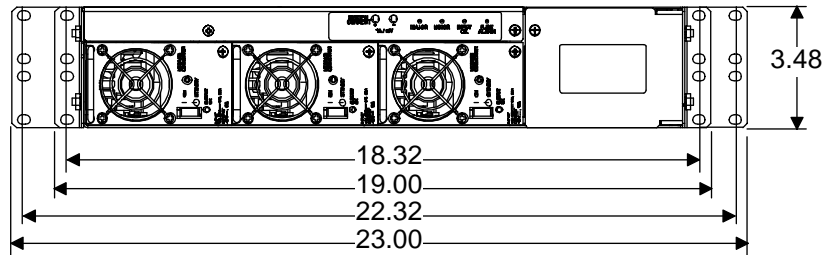
1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.  
 Shelf  
     Net: 17  
     Shipping: 21  
 Converter  
     Net: 3.2  
     Shipping: 5
3. Finish: Textured Gray.
4. Mounting angles adjustable for 5" or 6" front projection.



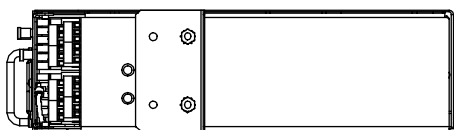
Top View



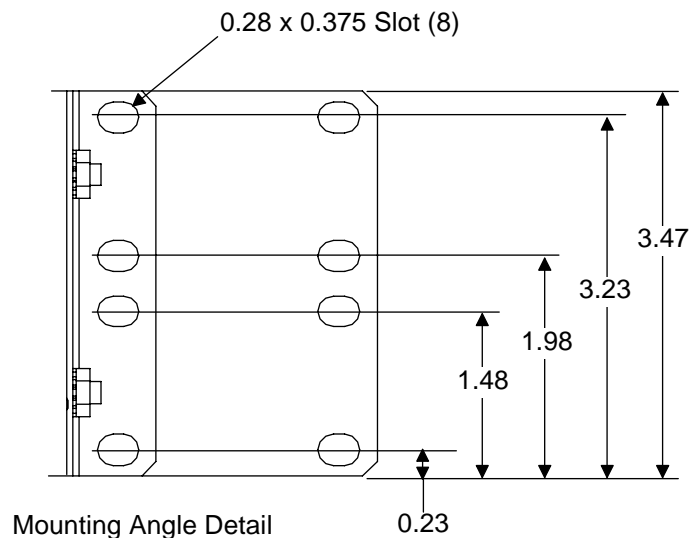
Left Side View



Front View



Right Side View



Mounting Angle Detail

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## RELATED DOCUMENTATION

<b>Schematic Diagram:</b>	SD584622000
<b>Wiring Diagram:</b>	T584622000
<b>Installation and User Instructions:</b>	Section 6035



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**REVISION RECORD**

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP213133	New	10/22/09	John Jasko
AB	LLP213431	Maximum heat dissipation value added.	11/18/09	John Jasko Joe Piwowar Jan 22, 2010 John Jasko Jan 25, 2010

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