Home

SYSTEM OVERVIEW

Description: The Model MHSA20FRM is a+24 to –48 volt DC-DC Converter Mounting Frame designed to populate one PCU mounting position in a compatible +24VDC Vortex PCU Mounting Shelf. Compatible shelves are listed in Table 1. The Converter Mounting Frame, when equipped with up to two Converter Modules, comprises a DC-DC Converter System that operates from the shelf +24VDC output bus to provide –48VDC load power. A compatible PCU Mounting Shelf can accept a maximum of one DC-DC Converter System. Converter systems may be paralleled. The DC-DC Converter System operates independently of the MCA.

Model	Spec. No.
V600/720ECAB	588704900

Table 1
Compatible Vortex PCU Mounting Shelves

Spec. No.:	588250000
Model:	MHSA20FRM
Output Voltage:	–48 Volts DC
Output Capacity:	
DC-DC Converter Module:	10 Amperes
Converter Frame:	20 Amperes
Agency Approval:	UL 1950
Mounting Type:	Mounts in compatible Vortex PCU Mounting Shelf
Access:	Front and Rear for Installation, Front for Operation and Maintenance
Color:	Off-White Front
Environment:	+65°C

TABLE OF CONTENTS

System Overview | Picture | Specifications | Physical Size Information | Related Documentation

ORDERING INFORMATION

The following information is provided for reference. When equipment described in this document is ordered as part of a Vortex Power System, refer to power system documentation for ordering information.

Converter Mounting Frame (Model MHSB20FRM)

Features

- The mounting frame accepts up to two (2) DC-DC Converter Modules.
- The frame occupies one PCU position in a compatible Vortex PCU Mounting Shelf.

Restrictions

Each PCU Mounting Shelf accepts a maximum of one Converter Mounting Frame.

Converter Modules (Model MHSA10B)

Ordering Notes

1) Order up to two (2) Spec. No. 486800127 DC-DC Converter Modules for each Converter Mounting Frame ordered.

CONNECTOR AND WIRE SIZE SELECTION

All connectors for customer connections must be ordered separately.

For connector selection, refer to the following.

Equipment Grounding (Frame Ground)

A Frame Ground connection is established when the Converter Frame is installed in the PCU Mounting Shelf. No additional grounding means is provided.

DC Input

DC Input connections are automatically made when the Converter Frame is installed in the PCU Mounting Shelf. No additional DC Input connections are required.

DC Output (J14)

Locking-type plugs are provided for installation of separately furnished DC output lugs and leads. The table below lists the recommended mating connector for the recommended wire size.

Connector Designation	Recommended Mating Plug				
	Vendor	Housing	Contact		
			Wire Capacity (AWG)	Part no.	Hand Crimping Tool (Anderson Pt. No.) [1]
J14 +	Emerson	101067 (red)	10-14	101068	1351G2
	Anderson	1327 (red)		261G2-LPBK	
J14 –	Emerson	101066 (black)		101068	
	Anderson	1327G6 (black)		261G2-LPBK	

1. Contacts should be crimped to the specification given in the manufacturer's instructions furnished with the crimp tool or connector.

External Alarms (J13)

A locking-type plug is provided for installation of separately furnished external alarm leads. The following table lists the recommended mating connector for J13.

CONVERTER FAIL ALARMS - J13 on the DC-DC Converter Frame					
Recommended Wire Size	Recommended Mating Plugs				
	Vendor	Housing	Contact [1]		
			Capacity	Part No.	Hand Crimping Tool [1]
22 AWG for Loop Lengths Up to 200 ft. or 18-20 AWG for Loop Lengths Over 200 ft.	Tyco	172167-1	22-18 AWG	770903-3 (strip) 770987-3 (loose)	Tyco 90711-2
	Emerson	247874900	22-18 AWG	245381700 (strip)	

1. Contacts should be crimped to the specifications given in the manufacturer's instructions furnished with crimp tool or connector.

SPECIFICATIONS

1.1 Output Ratings

1.1.1 Voltage: Nominal –48 volts DC, Positive Ground.

1.1.2 Current: 10 amperes per DC-DC Converter Module, up to a total of 20 amperes per frame with two modules installed.

1.1.3 Regulation

(A) Static: Steady state output voltage remains within ±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 dBrnC 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.

1.2 Input Ratings

1.2.1 Voltage: 24 volts DC nominal, with an acceptable range of from 21 to 28 volts DC.

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

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	0.91	--	21
	25	6.99	82.11	74
	50	13.23	86.38	112
	75	19.68	86.76	162
	100	26.39	85.95	228.
24 VDC	0	0.76	--	21
	25	6.17	81.39	77
	50	11.60	86.24	113
	75	17.22	86.78	162
	100	23.03	86.17	225
28 VDC	0	0.68	--	21
	25	5.40	79.70	83
	50	10.02	85.54	118
	75	14.77	86.70	163
	100	19.71	86.30	223

(B) Maximum Current: Maximum input current is 27 amperes at full load (10 amperes) and 21 volts DC input.

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

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

Input Voltage	Percent of Full Load	Total Input Current (Amps)	Efficiency (%)	Typical Heat Dissipation (BTU/Hr)
21 VDC	0	1.80	--	42
	25	13.98	82.09	147
	50	26.36	86.73	217
	75	39.30	86.91	320
	100	52.66	86.14	450
24 VDC	0	1.50	--	42
	25	12.28	81.81	150
	50	23.14	86.47	222
	75	34.36	87.00	318
	100	45.90	86.47	440
28 VDC	0	1.36	--	42
	25	10.74	80.16	163.
	50	20.00	85.71	234
	75	29.52	86.76	324
	100	39.32	86.51	438

(B) Maximum Current: Maximum input current is 53 amperes at full load (20 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 PCU Mounting Shelf in which the DC-DC Converter System is mounted 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 Audible Noise: With two Converter Modules installed and operating, the audible noise at any point 5 feet from any vertical surface of the PCU Mounting Shelf does not exceed 60 dBA when measured with a sound level meter conforming to ANSI S1.4.

1.3.7 EMI/RFI Suppression: This DC-DC Converter System, when mounted in a PCU Mounting Shelf listed in Table 1-1, conforms to the requirements of FCC rules Part 15, Subpart B, Class B for radiated and conducted noise.

1.3.8 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.

1.3.9 Safety Compliance:

(A) 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.

(B) 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.

1.4 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 Frame 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 and lock out 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: Alarm relay contacts are rated for 1 ampere at 30 volts DC or 0.3 ampere at 60 volts DC.

(A) Minor Alarm: A single set of Form A relay contacts closes in the event of an alarm condition in one Converter Module. Contacts remain closed in the event of a major alarm condition. Alarm conditions include:

- 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 or overtemperature condition.
- Cooling fan slows or stops due to fan failure or blocked rotor.

(B) Major Alarm: A single set of Form A relay contacts closes in the event of an alarm condition in more than one Converter Module. Alarm conditions are as in (A) above.

1.4.6 External Control Inputs: None provided.

1.4.7 Local Controls (See Operation section of the separate Vortex® Power System instructions for a complete description.)

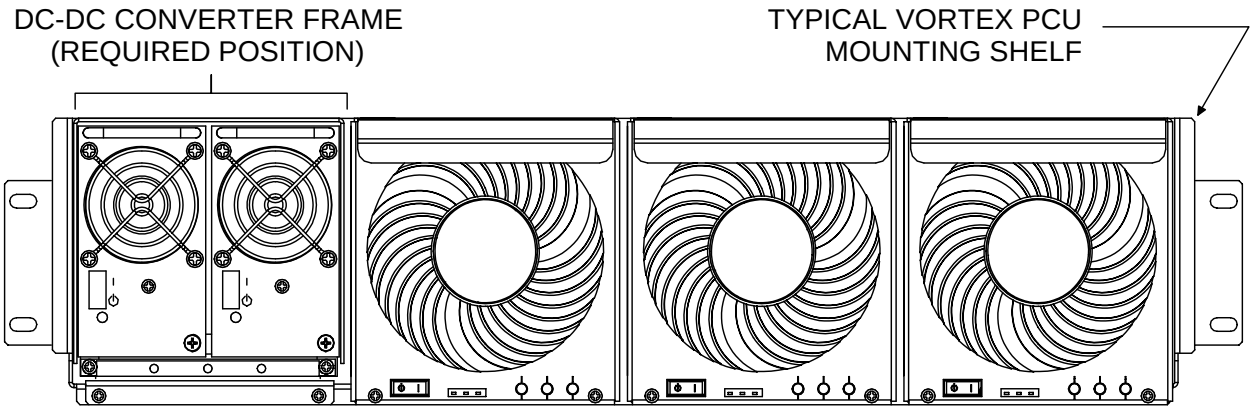
Location	NAME/Description	Type
Converter Module	ON / STANDBY (I / ⏻)	Rocker Switch

1.4.8 Local Status and Alarm Indicators: (See Operation section of the separate Vortex® Power System instructions for a complete description.)

Location	NAME/Description	Type
Converter Module	OUTPUT OK	LED – green
Converter Mounting Frame	INPUT OK	LED – green
	MINOR ALARM	LED – yellow
	MAJOR ALARM	LED – red

PHYSICAL SIZE INFORMATION

Overall Dimensions



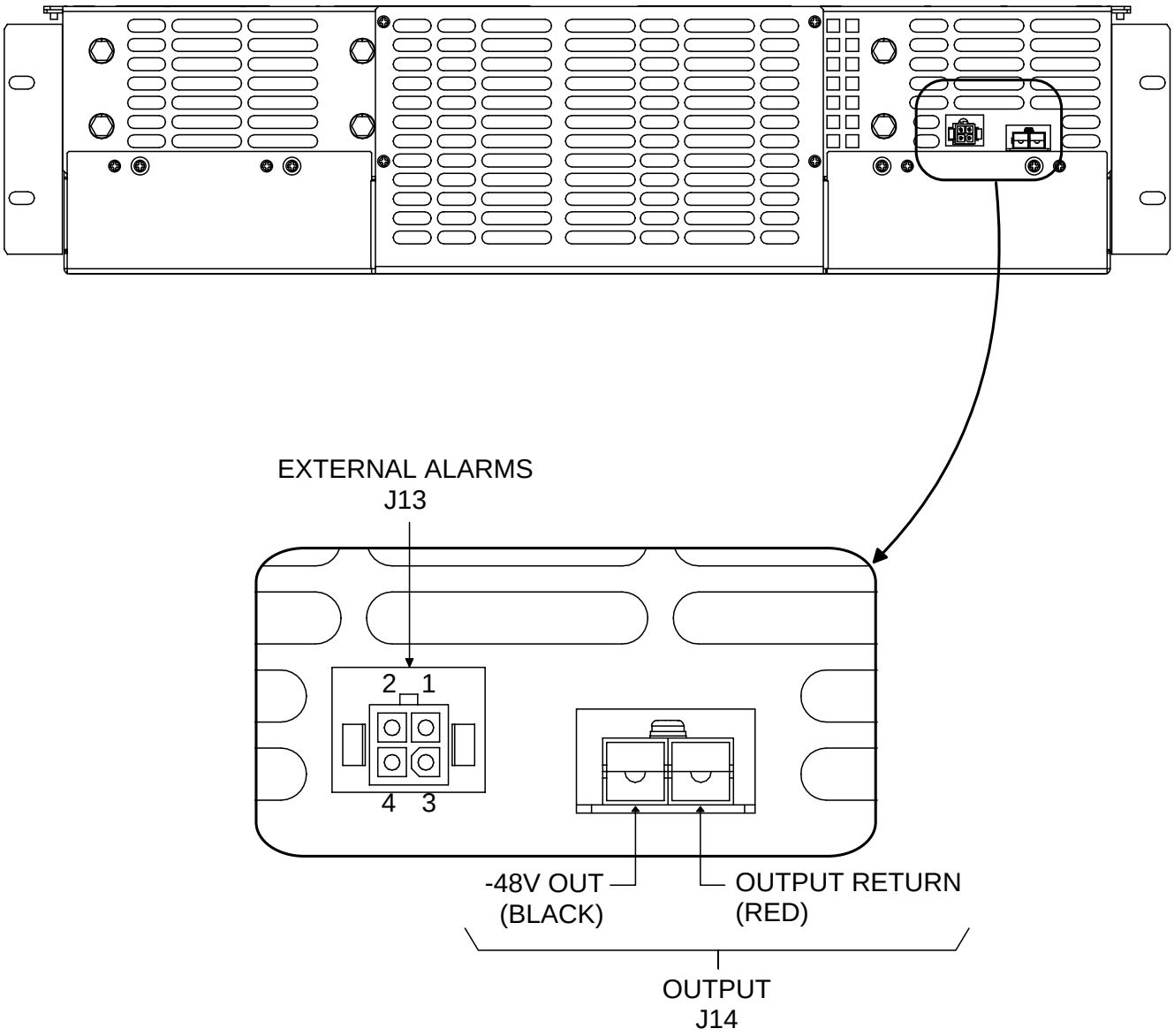
NOTES :

1. See PCU Mounting Shelf documentation for overall shelf dimensions.
2. Weights are in Lbs. and (Kilograms):

	Net	Shipping
DC-DC Converter Frame	5.3 (2.4)	10.3 (4.7)
DC-DC Converter Module	3.2 (1.5)	5 (2.3)

3. Finish:
   Frame & Converter Module Bodies: Galvanneal.
   Converter Module Front Panels: Off White

Electrical Connection Locations, Lug Mounting Dimensions



RELATED DOCUMENTATION

Schematic Diagram: SD588250000

REVISION RECORD

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP203486	New	06/24/05	J. Kirkpatrick
AB	LLP211260	J14 designations and plug color reversed in illustration.	09/02/08	John Jasko E-Signed by John Jasko 9/30/2008 using eApprovalT 9/30/2008 E-Signed by Dale Dembinski 10/1/2008 using eApprovalT 10/1/2008

Emerson Network Power, Energy Systems, North America, Inc.
1122 F Street / Lorain, Ohio 44052-2293 / (440) 288-1122

In Canada:
Emerson Electric Canada Limited
122 Edward St. / St. Thomas, Ontario N5P 1Z2 / (519) 637-4900
In Mexico:
Emerson Network Power de Mexico, S.A. de C.V.
Apartado Postal 77001 / Mexico 10 D.F., MX 11200 / (525) 576-8277