

## DATASHEET

# Compact Power Line Shelves

RS485 shelf for the CP3500 rectifier

Model: J2014004



## Description

The 1U (1.75") high family of J2014004 type shelves are designed to mount into 19-inch wide frames providing up to 14kW of 54V output power. There are four slots for modules. These shelves are designed for the CP3500AC54TE rectifier. The shelves are parallelable. A slide switch identifies the first shelf. Subsequent shelf addressing is automatically configured internally. These shelves are designed for RS485 communications.

## Features

- RoHS Directive 2011/65/EU and amended Directive (EU) 2015/863
- ANSI/UL\* 62368-1 and CAN/CSA† C22.2 No. 62368-1 Recognized, DIN VDE‡ 0868-1/A11:2017 (EN62368-1:2014/A11:2017)
- Mounts into standard 19" EIA-310-D racks
- Single main output feeder either grounded or isolated
- +5V standby power isolated from main output
- Adjustable mounting ears for flush or set back positions.
- Supports hot-swapping of modules
- Accommodates mechanical latching into the slot
- Communicates via RS485 using the Galaxy Protocol
- LAN/Ethernet remote connectivity
- Daisy chained RJ45 connections may configure up to 20 shelves of rectifiers in parallel
- Passes Zone 4 earthquake requirements
- CUR\*\* recognized
- TUV‡ certified
- CE Mark<sup>5</sup>
- Shock & Vibration: Meets IPC 9562 Class II standards

## FOOTNOTES

\* UL is a registered trademark of Underwriters Laboratories, Inc.

† CSA is a registered trademark of Canadian Standards Association.

‡ VDE is a trademark of Verband Deutscher Elektrotechniker e.V.

<sup>5</sup> This product is intended for integration into end-user equipment. All CE marking procedures of end-user equipment should be followed. (The CE mark is placed on selected products.)

\*\* ISO is a registered trademark of the International Organization of Standards

## Technical Specifications

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only, functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Symbol	Min	Max	Unit
Input Voltage: Continuous	$V_{IN}$	0	300	$V_{AC}$
Operating Ambient Temperature	$T_A$	-40	65 <sup>1</sup>	°C
Storage Temperature	$T_{stg}$	-40	85	°C
I/O Isolation voltage to Frame (100% factory Hi-Pot tested)			2250	$V_{AC}$

### Electrical Specifications

Unless otherwise indicated, specifications apply over all operating input voltage, load, and temperature conditions.

INPUT					
Parameter	Symbol	Min	Typ	Max	Unit
Operational Range	$V_{IN}$	85	110/230	300	$V_{AC}$
Frequency Range	$F_{IN}$	47	50/60	63	Hz
AC Input Current, per module	$I_{IN}$			20	$A_{AC}$

MAIN OUTPUT					
Parameter	Symbol	Min	Typ	Max	Unit
Output Power $V_{in} > 200V_{AC}$	$W$	0	-	14,000	$W$
		0	-	6,000	$W$
Max output current	$I_{OUT}$			270	$A_{DC}$
Isolation <sup>2</sup> Output/frame – other circuits	$V$				$V_{DC}$
non-POE		100			
POE		2250			

AUXILIARY OUTPUT					
Parameter	Symbol	Min	Typ	Max	Unit
Set point	$V_{OUT}$		5.0		$V_{DC}$
Overall regulation (load, temperature, aging)	$V_{OUT}$	-10		+5	%
Output current	$I_{OUT}$	0		8	$A_{DC}$
Isolation Output/Frame Output/Main output non-POE POE	$V$	50			$V_{DC}$
	$V$	50			$V_{DC}$
	$V$	2250			
The auxiliary output should be accessible to the user via a two position panel mounted connector capable of carrying 9A of current. The 5V and $\nabla$ ground symbol should be located near the connector to identify the two pins.					

<sup>1</sup> See the derating guidelines published in the rectifier data sheet

<sup>2</sup> The standard CP3500AC54TEZ currently in development is not designed for POE.

## Technical Specifications (continued)

### General Specifications

Parameter	Min	Typ	Max	Units	Notes
Reliability		TBD		Hrs	Full load, 25°C ; MTBF per SR232 Reliability protection forelectronic equipment, issue 2, method I, case III,
Service Life		10		Yrs	Full load, excluding fans
Unpacked Weight				Kgs/Lbs	
Packed Weight		TBD		Kgs/Lbs	
<b>Safety/Standards Compliance</b>					
Safety Standards	UL62368-1 , CAN/CSA C22.2 No 62368-1 , 62368-1				
Certification Marks	TUV mark, UL Recognized (Canada and U.S.)				

### Environmental Specifications

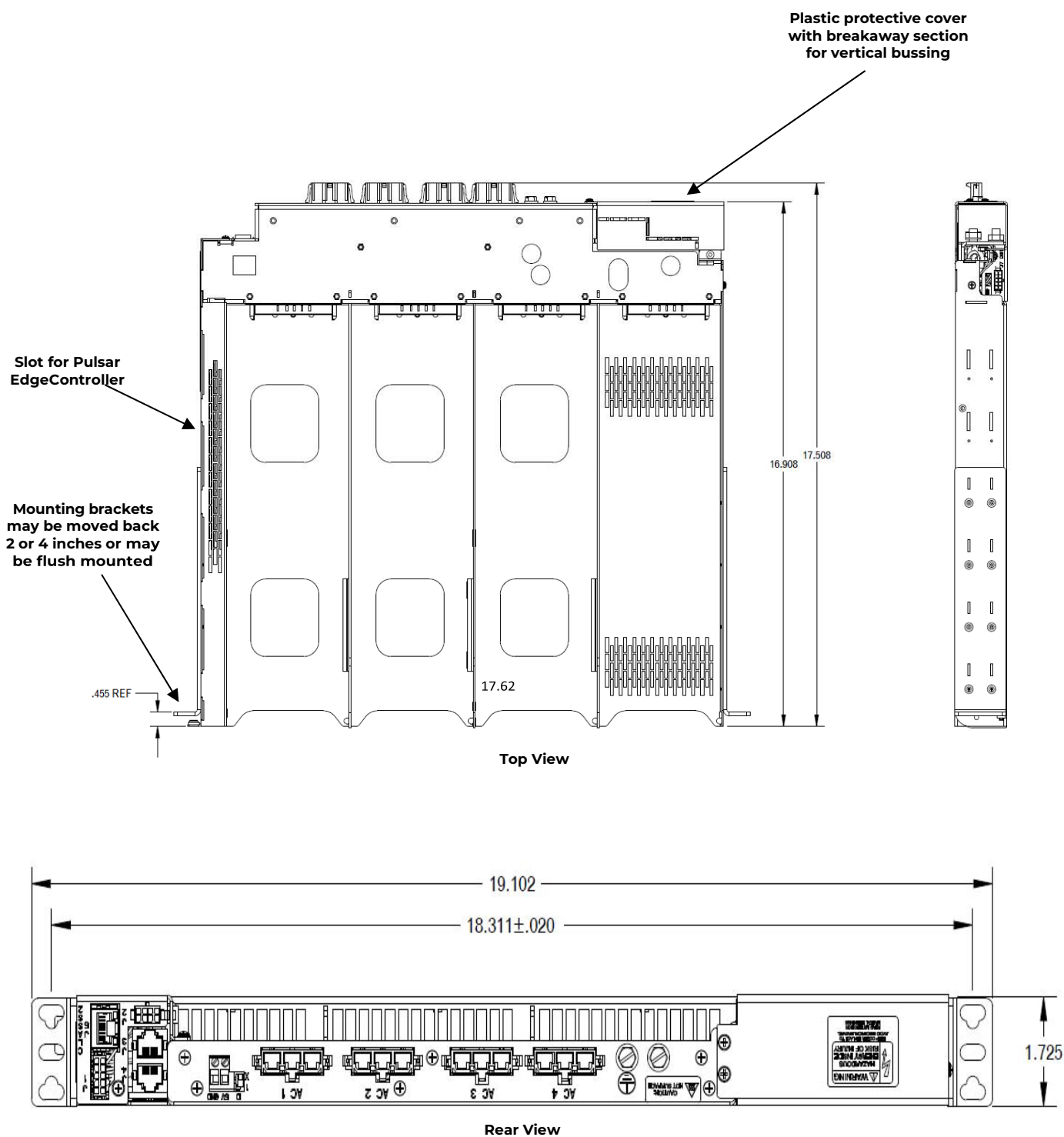
Parameter	Min	Typ	Max	Units	Notes
Ambient Temperature Operating	-40 <sup>3</sup>		65	°C	
	-40		85	°C	
Humidity Operating Storage	5		95	%	Relative humidity, non-condensing
	5		95		
Shock and Vibration acceleration			6	Grms	NEBS GR-63-CORE, Level 3, 20 -2000Hz, min 30 minutes
Earthquake Rating	4			Zone	NEBS GR-63-CORE, all floors, Seismic Zone 4 Designed and tested to meet NEBS specifications.

EMC				
Parameter	Criteria	Standard	Level	Test
Conducted emissions	AC input & DC Output	EN55032, FCC Docket 20780 part 15, subpart JEN61000-3-2 Meets Telcordia GR1089-CORE by a 6dB margin	A	0.15 – 30MHz 0 – 2 KHz
Radiated emissions		EN55032 by a 6dB margin	A	30 – 10000MHz
Lightning surge	AC input	EN61000-4-5, Level 4, 1.2/50µs – error free	A	4kV, common mode
			A	2kV, differential mode
		ANSI C62.41 - damage free	A3	6kV, common & differential
Fast transients	Input immunity	EN61000-4-4, Level 3	B	5/50ns, 2kV (common mode)
Conducted RF fields	Enclosure immunity	EN61000-4-6, Level 3	A	130dBµV, 0.15-80MHz, 80% AM
Radiated RF fields		EN61000-4-3, Level 3	A	10V/m, 80-1000MHz, 80% AM
		ENV 50140	A	
ESD	AC input & DC output	EN61000-4-2, Level 3	B	6kV contact, 8kV air

<sup>3</sup> Designed to start and work at an ambient as low as -40°C, but may not meet operational limits until above -5°C

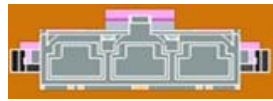
### Technical Specifications (continued)

## Package Outline



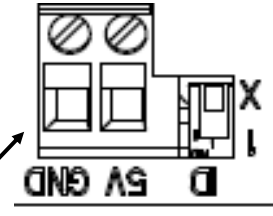
## Technical Specifications (continued)

### Rear of shelf

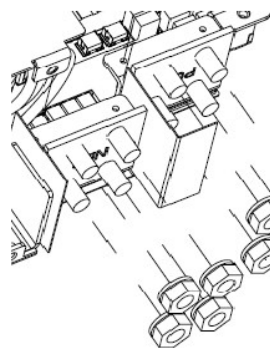


L - Line, G - frame ground, N - Neutral

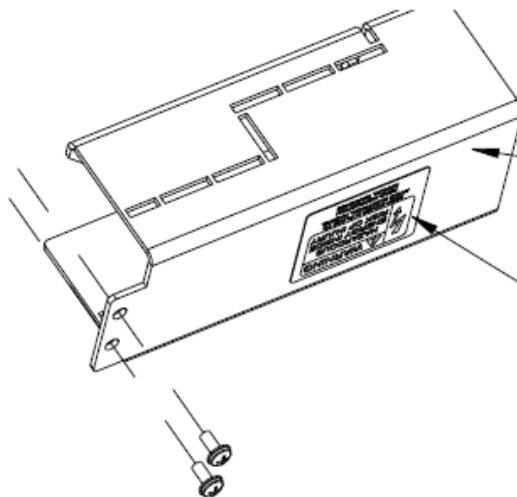
Polarized input connector pin-out  
Part No: Molex 42818-0312



5V Standby connector. Shelf\_ID selector switch for shelf 1: (See below )



NUT HEX 1/4-20  
CC408576210  
8 PLCS



CLEAR PLASTIC COVER  
850027745

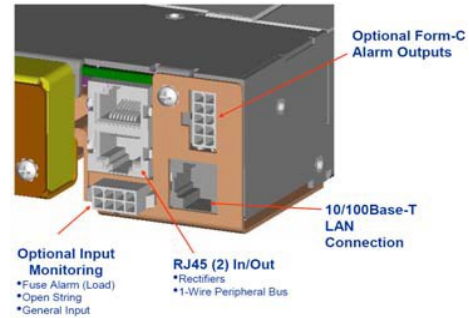
LABEL  
848708566

Output termination – 1/4-20 Hex Nuts with conical washers are provided  
Touch-safe plastic covers the output buses.

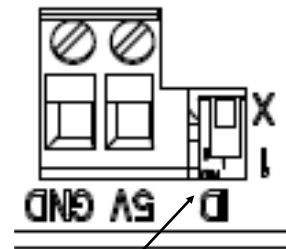
## Technical Specifications (continued)

### Controller, Monitoring and Alarms Interface

Pin	RJ45	RJ45
1	RS485+	RS485+
2	RS485-	RS485-
3	1_WIRE_RTN	1_WIRE_RTN
4	I <sub>share</sub>	I <sub>share</sub>
5	1_WIRE	1_WIRE
6	1_WIRE_+5	1_WIRE_+5
7		
8	SHID_A	SHID_C



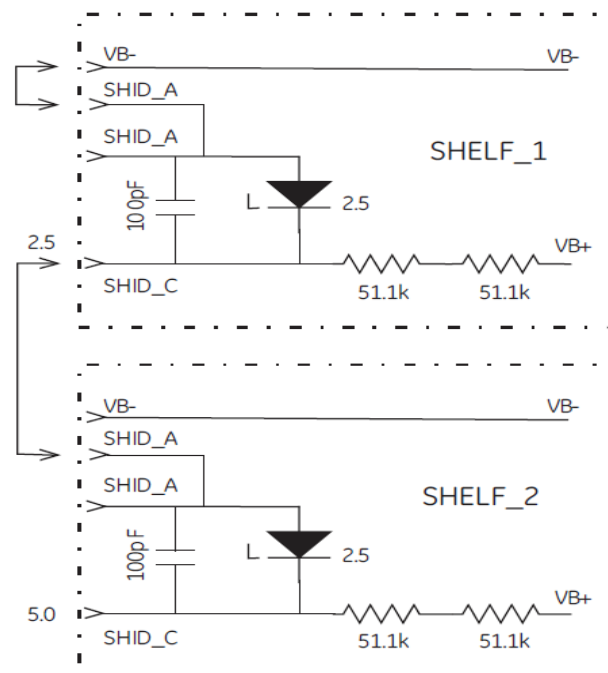
Pin	Alarm	Input Monitoring	Lan
1	ALM1	Shunt +	TX +
2	ALM2	Shunt -	TX -
3	ALM3	LVD_RTN	RX +
4	ALM4	LVD_NO	unused
5	ALM5	LVD_NC	unused
6	ALM_RTN	COIL -	RX -
7	ALM6	COIL +	unused
8	ALM7	-	unused
9	ALM8		
10	ALM9		
Part #	HDR10-CP35H	39-01-2086 Housing 39-00-0087 Contact	
Manufacturer	CVILUX	MOLEX	



In the first shelf, the slide switch should be moved to position

1. Pin SHID\_C is the Shelf\_ID signal sent in parallel to the 4 slots.

Successive shelves will get interconnected from SHID\_C TO SHID\_A by the daisy chained RJ45 connectors, as shown by the strapped connection below.



## Technical Specifications (continued)

### Shelf\_ID (SHID):

Up to 10 shelves can be configured using the proposed scheme. The reference for this signal is  $V_{out}(-)$ .

Shelf	$V_{MIN}$	$V_{NOM}$	$V_{MAX}$
1	2.3	2.5	2.7
2	4.7	5.0	5.3
3	7.4	7.5	7.6
4	9.5	10.0	10.5
5	11.8	12.5	13.2
6	14.2	15.0	15.8
7	16.6	17.5	18.4
8	19	20.0	21
9	21.3	22.5	23.6
10	23.8	25.0	26.3

### Signal Isolation

Signal pins columns 1 & 2 are referenced to  $V_{out}(-)$ , Signal pins columns 3 through 6 are referenced to LOGIC\_GRD. Signal pins that are not identified are used during I<sup>2</sup>C communications. These signal pins should be left a no-connect. POE isolation is optional. Standby output +5V is referenced to Logic\_GRD, it is isolated from  $V_{out}(-)$ .

### 8V\_INT

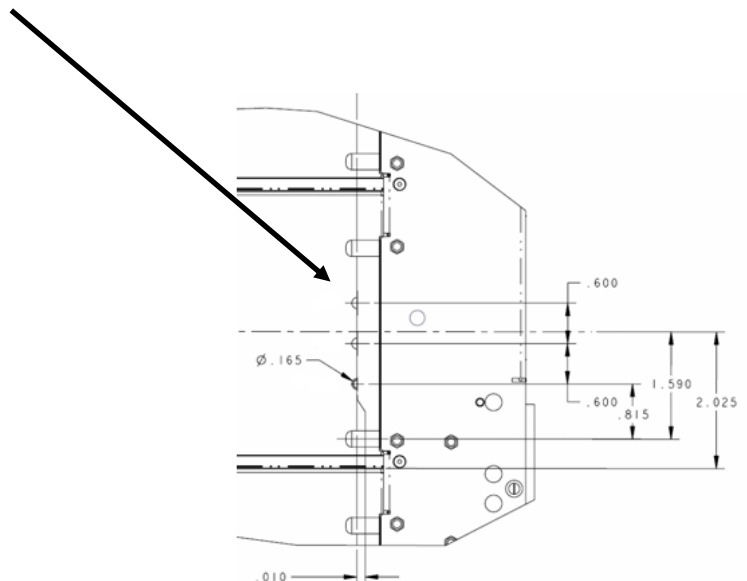
This signal pin is interconnected between the four rectifier slots. The reference for this signal is  $V_{out}(-)$ .

### I<sub>share</sub>

This signal pin is interconnected between the four rectifier slots and brought out through the RJ45 connector. The reference for this signal is  $V_{out}(-)$ .

### Shelf Insertion Keying

The notch has to be located to accept the key in position 2 location in the original design concept).



## Technical Specifications (continued)

### Ordering Information

Part Number	Description	Ordering Codes	Usage
<b>Shelves</b>			
J2014004L001	Single output, lug output terminations, no communication pull-ups	150040609	
<b>Blank Slot Fillers</b>			
Central Office White		CC848822263	All
Raven Black		CC848781534	
Graphite		CC848825233	
<b>Extensions and mounting brackets</b>			
1U high extension bracket kit for 23" cabinets (includes two brackets and mounting hardware)		CC848844803	All
2U high extension bracket kit for 23" cabinets (includes two brackets and mounting hardware)		848683009	All
<b>Cable sets</b>			
Shelf to shelf communications cable		CC848847780	All
Molex Mini-Fit Sr. unterminated 8awg, 10' (2 cables provided)		848710711	
150' alarm or distribution cable		CC848817668	All
50' alarm or distribution cable		CC848817651	
15' alarm or distribution cable		CC848865980	
Output cable set: 2 AWG DC Lug termination– 10 ft ( 1 RED and 1 BLACK cable)		848748987	All
DC Bus Bar strap (2 required)		CC848844324	All



## Technical Specifications (continued)

### Safety

#### Product Labeling

Follow all warnings and instructions marked on the product. Some of the safety symbols used with the CP3500 rectifier and this shelf may include the following. They may also be accompanied by instructions:

#### Mounting and Installation

- This product shall be installed in compliance with mounting requirements for the ultimate application.
- This product must be installed, serviced, and operated only by skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this type of equipment. This product is intended for use in a Restricted Access Location.
- This equipment is to be used in controlled environments (an area where the humidity is maintained at levels that cannot cause condensation on the equipment, the contaminating dust is controlled, and the steady-state ambient temperature is within the range specified).
- This equipment has been evaluated for use in a continuous ambient temperature of:
  - a. 50°C at full load with sharing the load across the two DC output feeds with 2%/°C de-rating from 50°C to 75°C at low range and 2.3%/°C de-rating from 50°C to 75°C at high range.
  - b. 44°C at full load with a single DC output feed setup with 1.6%/°C de-rating from 44°C to 75°C for low range and 1.8%/°C de-rating from 50°C to 75°C for high range.
- The CE mark if provided on the product is applied to show conformance to the requirements outlined in the European Union's Low Voltage Directive {2006/95/EC} and EMC Directive {2004/108/EC}.
- The internal AC-DC rectifier connectors have been evaluated for hot swapping. The four main AC input feed Mate-N-Lok connectors at the rear of the shelf have not been evaluated for hot swapping.
- A separate protective Earthing terminal is provided at the rear of the shelf
  - the building installation shall provide a means for connection to protective earth; and
  - the equipment is to be connected to that means; and

#### Output Connections

- All field wiring should comply with the U.S. National Electrical Code (NEC) and/or applicable local codes/standards.
- Routing of the DC output cables should guarantee that cables are not in contact with sources of heat and surfaces that may damage the cable insulation.
- The DC output is not provided with a fuse or circuit breaker suitable for branch circuit protection. Therefore, the power shelf should be mounted in the same rack or cabinet as the equipment being powered. Use interconnecting power cables suitable for the application and sized to carry the rated output current. The interconnecting cables should be capable of carrying the overload current and short circuit current without damage or risk of fire.
- The output for the system is SELV and has available power greater than 240VA.
- Insulation on output field-wired conductors should be rated no less than 90°C. Wiring internal to enclosed equipment cabinets should be rated at 105°C (minimum). The provided DC output cords (red and black wires) are rated for 105°C.
- Before opening the insulating cover to gain access to load and ground connections, ensure all power supplies are disconnected from the AC MAINS.

## Technical Specifications (continued)

### AC Input Connections

- This shelf is configured with primary internal wiring and Molex connectors, rated for internal factory wiring only. The Molex connector is not UL Recognized for direct connection to the AC mains. The internal wiring is not UL recognized to be directly accessible by a user. Consideration should be taken on the end product's Listing to comply with NEC requirement for AC mains installations.
- The subject equipment was evaluated for use with a maximum 30A branch circuit per feed. Consideration shall be taken in the end-product evaluation in the sizing of conductors per Annex NAE s.c. 3.3.4. If used on a branch circuit greater than this, additional testing may be necessary.
- An accessible AC disconnect/protection device to remove AC power from the equipment in the event of an emergency must be provided.
- The equipment is powered by multiple AC inputs (one per rectifier). Disconnect all AC sources of power before servicing.
- These units are to be used with TN-S power systems only.

### Safety Symbols and Guidelines

Read and understand all instructions before attempting any installation of this product. When installing, operating, or maintaining the J85480S1 Power System, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons. Such precautions include the following:

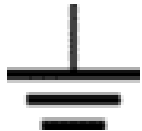


This symbol identifies the need to refer to the equipment instructions for important information.



This symbol identifies the presence of hazardous AC or DC voltages or hazardous energy levels. In the context of this product

- The DC output cables contain electrical energy levels capable of causing heating and arcing if shorted to metal objects. Make connections with the power disconnected.
- Hazardous AC voltage and DC electrical energy is contained within the enclosure of the power shelf. No user or field serviceable parts inside.



This symbol is used to identify safety earth ground connection points within the equipment.

### German Safety Guidelines

#### Installationsanleitung

- Alle Ausgänge des Gerätes erfüllen die Anforderungen für SELV nach IEC/EN62368-1.
- Die Ausgänge des Gerätes liegen über den Limits für Energiegefahr nach IEC/EN62368-1 (>240 VA). Das Gerät ist zum Einbau in ein Montage-Rack bestimmt. Siehe Einbaubestimmungen in der Montageanleitung, um eine Gefährdung des Benutzers während der Installation zu vermeiden.

## Technical Specifications (continued)

### ACHTUNG:

**Hoher Ableitstrom Vor Anschluss an den Versorgungsstromkreis unbedingt Erdungsverbindung herstellen**

- Das Produkt ist zum Gebrauch in einer Umgebungstemperatur von max. 55°C bestimmt.
- Die Gerätestecker des Produktes sind dazu bestimmt, eine sichere Erdung des Gerätes herzustellen.
- Das Produkt ist zum Gebrauch in einer Umgebung mit Verschmutzungsgrad 2 nach IEC/EN62368-1 bestimmt.
- Die Netzteile des Gerätes können während des Betriebes einzeln ausgetauscht werden (Hot Swapping).
- Das Gerät wurde zusammen mit den Anschlussleitungen (ohne Anschlussstecker) geprüft. Die Installation eines Steckers des jeweiligen Landes, sollte nur durch geschultes Service Personal durchgeführt werden. Als alternative könnte eine Vorinstallation des Steckers bereits bei der Herstellung erfolgt sein.

## Contact Us

For more information, call us at

1-877-546-3243 (US)

1-972-244-9288 (Int'l)

## Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
5.3	12/29/2021	Updated as per template and upgraded RoHS standard
5.4	12/01/2023	Updated as per OmniOn template

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