

## Compact Power Line Shelves

### RS485 shelf for the CP3500 rectifier

Model: J2014004



## Features

- 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§
- Shock & Vibration: Meets IPC 9562 Class II standards

## 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.

\* 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.

§ 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



## 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 <sub>IN</sub> | 0   | 300             | V <sub>ac</sub> |
| Operating Ambient Temperature                               | TA              | -40 | 65 <sup>1</sup> | °C              |
| Storage Temperature   | Tstg            | -40 | 85              | °C              |
| I/O Isolation voltage to Frame (100% factory Hi-Pot tested) |                 |     | 2250            | V <sub>ac</sub> |


## 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 <sub>IN</sub> | 85  | 110/230 | 300 | V <sub>AC</sub> |
| Frequency Range              | F <sub>IN</sub> | 47  | 50/60   | 63  | Hz              |
| AC Input Current, per module | I <sub>IN</sub> |     |         | 20  | A <sub>AC</sub> |

| MAIN OUTPUT  |                  |   |     |        |                 |
|--|------------------|---|-----|--------|-----------------|
| Parameter  | Symbol           | Min                                       | Typ | Max    | Unit            |
| Output Power   | W                | V <sub>in</sub> > 200V <sub>AC</sub><br>0 | -   | 14,000 | W               |
|  |                  | V <sub>in</sub> ≤ 140V <sub>AC</sub><br>0 | -   | 6,000  | W               |
| Max output current                                   | I <sub>OUT</sub> |   |     | 270    | A <sub>DC</sub> |
| Isolation <sup>2</sup> Output/frame – other circuits | V                | non-POE<br>100                            |     |        | V <sub>DC</sub> |
|  |                  | POE<br>2250                               |     |        |                 |

| AUXILIARY OUTPUT                              |                  |               |     |     |                 |
|---|------------------|---------------|-----|-----|-----------------|
| Parameter                                     | Symbol           | Min           | Typ | Max | Unit            |
| Set point                                     | V <sub>OUT</sub> |               | 5.0 |     | V <sub>DC</sub> |
| Overall regulation (load, temperature, aging) | V <sub>OUT</sub> | -10           |     | +5  | %               |
| Output current                                | I <sub>OUT</sub> | 0             |     | 8   | A <sub>DC</sub> |
| Isolation Output/Frame                        | V                | 50            |     |     | V <sub>DC</sub> |
| Output/Main output                            | V                | non-POE<br>50 |     |     | V <sub>DC</sub> |
|   |                  | POE<br>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  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.

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## Preliminary Data Sheet

### General Specifications

| Parameter                          | Min  | Typ | Max | Units   | Notes  |
|------------------------------------|--|-----|-----|---------|--|
| Reliability                        |  | TBD |     | Hrs     | Full load, 25°C ; MTBF per SR232 Reliability protection for electronic 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                   | UL60950-1, CAN/CSA C22.2 No 60950-1, EN60950-1 |     |     |         |  |
| Certification Marks                | TUV Licensed, UL Recognized (Canada and U.S.)  |     |     |         |  |

### Environmental Specifications

| Parameter                        | Min              | Typ | Max | Units | Notes  |
|----------------------------------|------------------|-----|-----|-------|--|
| Ambient Temperature              |                  |     |     |       |  |
| Operating                        | -40 <sup>3</sup> |     | 65  | °C    |  |
| Storage                          | -40              |     | 85  | °C    |  |
| Humidity                         |                  |     |     |       |  |
| Operating                        | 5                |     | 95  | %     | Relative humidity, non-condensing  |
| Storage                          | 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

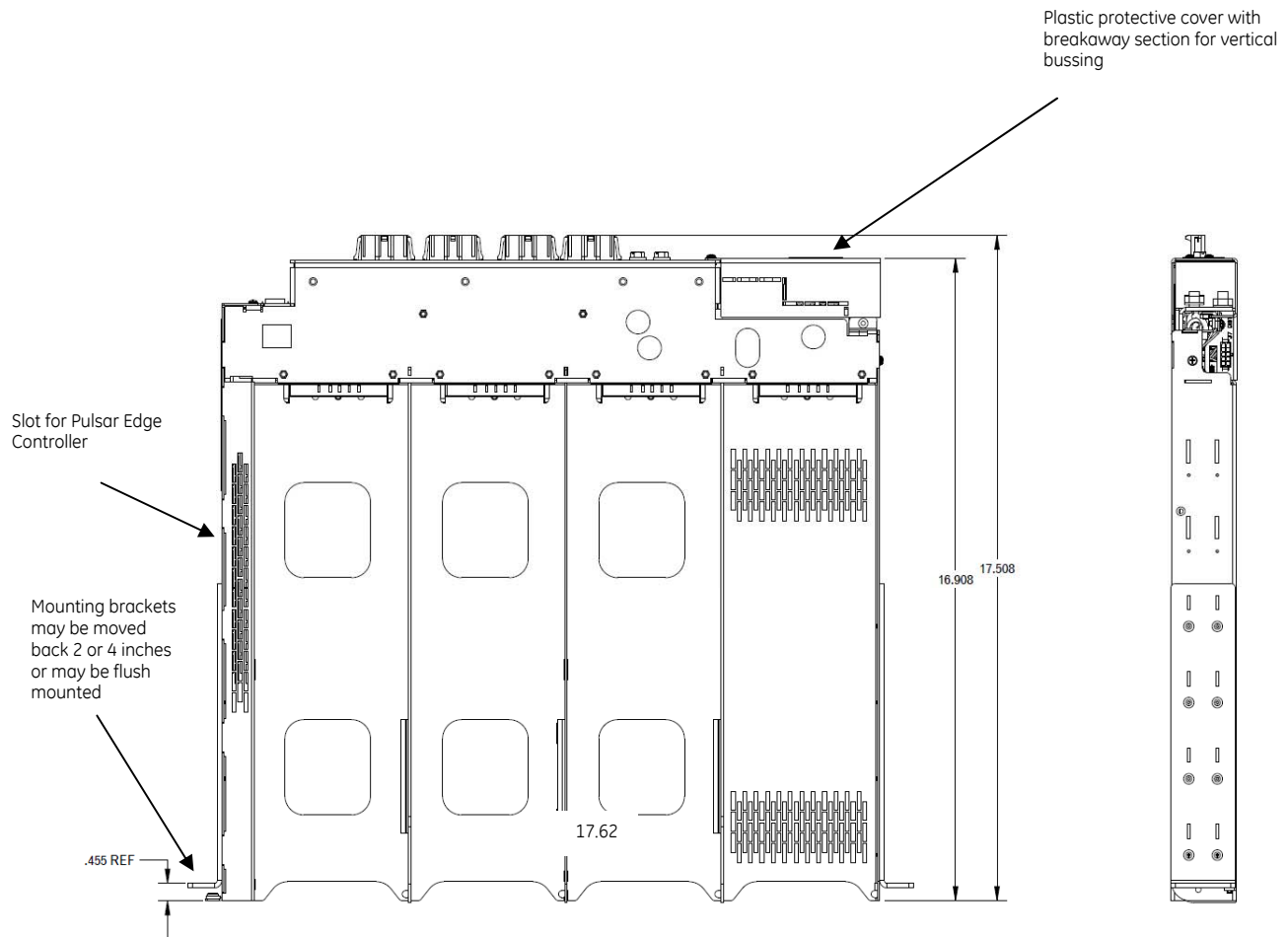
| Parameter           | Criteria             | Standard   | Level | Test                        |
|---------------------|----------------------|--|-------|-----------------------------|
| Conducted emissions | AC input & DC output | EN55022, FCC Docket 20780 part 15, subpart J<br>EN61000-3-2<br>Meets Telcordia GR1089-CORE by a 6dB margin | A     | 0.15 – 30MHz<br>0 – 2 KHz   |
| Radiated emissions  |                      | EN55022 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

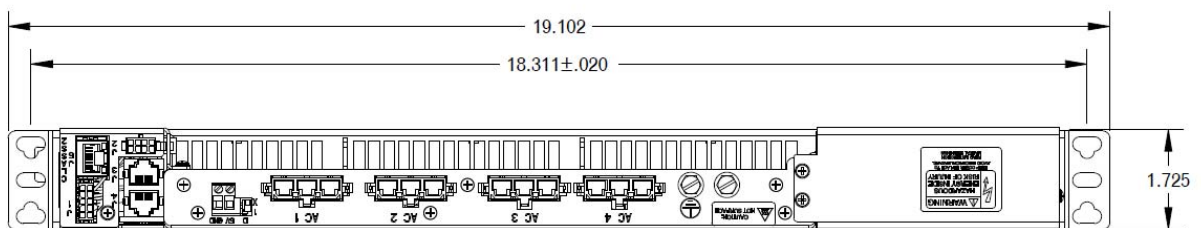
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Preliminary Data Sheet

## Package Outline



Top View



Rear View

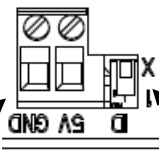
## Rear of shelf



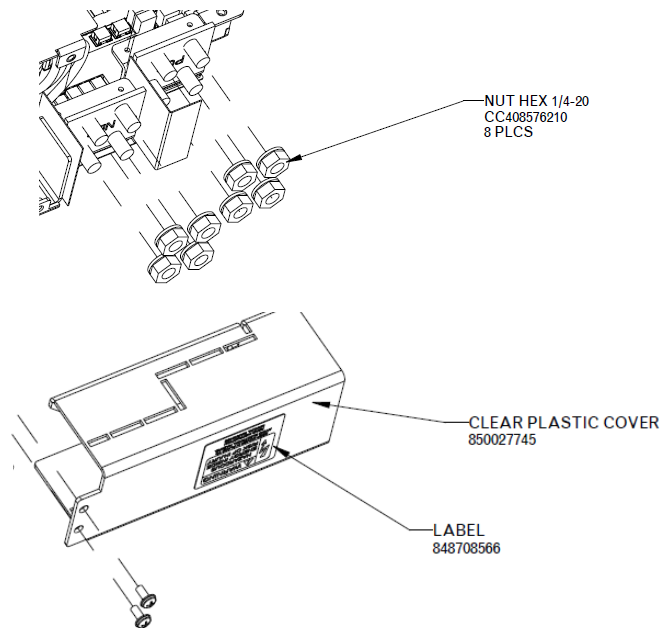
L - Line, G - frame ground, N - Neutral

L G N

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



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

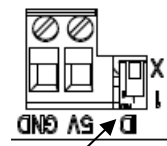
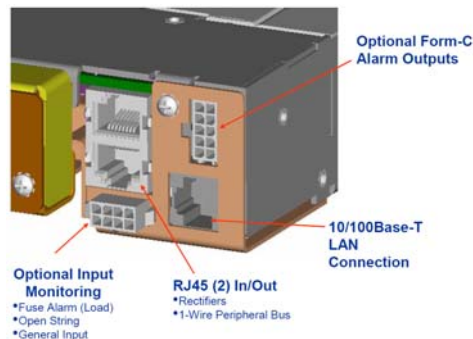


Output termination – 1/4-20 Hex Nuts with conical washers are provided  
Touch-safe plastic covers the output buses.

## Controller, Monitoring and Alarms Interface

| Pin | RJ45       | RJ45       |
|-----|------------|------------|
| 1   | RS485+     | RS485+     |
| 2   | RS485-     | RS485-     |
| 3   | 1_WIRE_RTN | 1_WIRE_RTN |
| 4   | Ishare     | Ishare     |
| 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<br>39-00-0087 Contact |        |
| Manufacturer | CVILUX      | MOLEX                                    |        |

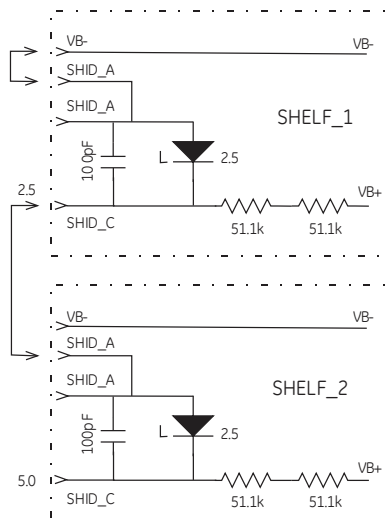


**Shelf\_ID (SHID):** Up to 10 shelves can be configured using the proposed scheme. The reference for this signal is Vout( - ).

| Shelf | V <sub>MIN</sub> | V <sub>NOM</sub> | V <sub>MAX</sub> |
|-------|------------------|------------------|------------------|
| 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             |

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.



### Signal Isolation

Signal pins columns 1 & 2 are referenced to Vout( - ), 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 Vout(-).

### 8V\_INT

This signal pin is interconnected between the four rectifier slots. The reference for this signal is Vout(-).

### Ishare

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

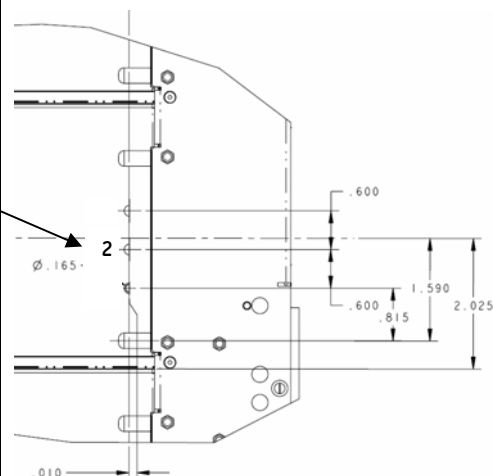
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#### Shelf Insertion Keying

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



#### Ordering Information

| Part Number  | Description   | Comcode     | 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   |



## 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 a split DC output feed setup 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.

### 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.

## Dual I<sup>2</sup>C shelves for the CP3500 rectifier

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- 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/EN60950-1.
- Die Ausgänge des Gerätes liegen über den Limits für Energiegefahr nach IEC/EN60950-1 (>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.

#### 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/EN60950 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.

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## Dual I<sup>2</sup>C shelves for the CP3500 rectifier

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## Contact Us

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