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# Compact Power Line

## 48V DC Critical Power Solution



### Overview

The Compact Power Line platform is designed to provide highly reliable DC power for 48V distributed power architectures. A single shelf configuration provides up to 14kW of 48V output power in 1U high and mounts in 19-inch or 23-inch wide frames. The CPL product platform is easily expandable for future growth, and is a reliable DC power solution for mission-critical enterprise and telecommunications network equipment.

### Shelf Options

The CP product line provides several shelf options with common or split DC output configurations. There are two families of CPL shelves; one used with a Pulsar Edge controller, the other used without a controller or with a customer's own controller using industry standard PMBus/I<sup>2</sup>C communications. J85480S1 and J2014003 shelves have four slots for rectifiers or converters (PEMs) and use PMBus/I<sup>2</sup>C for communications. J2007001 and J2014004 shelves have four slots with an additional space for a full-feature Pulsar Edge Controller. The Pulsar Edge controller has secure Ethernet connectivity to facilitate remote network management to monitor and control rectifiers, batteries, and distribution. CPL is ideal for a broad range of applications requiring highly efficient 48V DC power.

### Rectifier Options

CPL family of rectifiers are single phase, constant power rectifiers with rear power entry that provide from 2000 Watts to 3500 Watts of highly reliable DC power. The class leading density, constant output power characteristics, extended temperature range, universal AC input, and compact size are key attributes that make this rectifier the right choice for your power needs. CPL converters share the same form factor as CPL rectifiers and provide wide range 40V-72V DC input and regulated 48-54V DC output. Airflow direction is front to rear.

### Pulsar Edge Controller

CPL family of products support the Pulsar Edge controller delivering large system intelligence in a small system form factor. Secure Ethernet connectivity with SNMP helps facilitate remote network management.

### Shelf Options

J85480S1 and J2007001 shelves provide 1RU rack density up to 11kW and support appliance connector (C13 or C19) AC connection options. The shelves support 2kW, 2.5kW and 2.7kW power supplies. Up to four modules can be installed in a single 1RU shelf. J2014003 and J2014004 shelves provide 1RU rack density up to 14kW with AC connectivity provided

by high reliability Molex connectors. Up to four modules can be installed in a single 1RU shelf. The shelves support 3kW and 3.5kW power supplies.

### Advantages

- Compact 48V DC distributed power system
- Efficiency approaching 97%
- Maximum power in minimal space
- Scalable to 80 kW
- Powering enterprise and telecommunications networks

# CPL Power Supplies

The CPL series of rectifiers are specifically designed to operate as an integral part of a complete distributed power system or can be easily integrated into an OEM design. The high-density, front-to-back airflow rectifier is designed for minimal space utilization and is highly expandable for future growth.



The power modules are available with many features including PoE isolation, RS485 communications bus for use with GE battery plant controllers in forming an energy reserve system and redundant I<sup>2</sup>C communications bus for use with a customer's embedded controller. This flexible and sophisticated feature set makes this front end power supply an excellent choice for power in a variety of application spaces.

## Applications

- Enterprise Networks
- OEM Telecom Equipment
- Power Over Ethernet
- VoIP/Soft Switches
- SAN/NAS/iSCSI Applications
- LAN/WAN/MAN Applications
- Indoor Wireless
- Routers and Switches
- Industrial
- Laser
- Broadcast
- Test and Measurement
- Mission Critical
- High Reliability

## Key Features

- Compact 1RU Form Factor
- PMBus Compliant Dual I<sup>2</sup>C and RS485 Serial Bus Communications
- Front Panel LED Indicators
- Internal Variable-Speed Fan Control
- Constant Power; 52 – 58 Vdc
- Programmable Output Voltage; 44 – 58 Vdc
- Universal AC Input
- PoE Compliant Versions Available
- CE Marked
- RoHS 6 Compliant
- Hot Pluggable

## Specifications: AC-DC Power Supplies

| INPUT                                      | 2000   | 2725 | 3000   | 3500 |
|--|--|------|--|------|
| Voltage Range<br>- Low-Line<br>- High-Line | 120Vac Nominal (1200W)<br>208, 240, 277Vac Nominal |      | 120Vac Nominal (1500W)<br>208, 240, 277Vac Nominal |      |
| Input Frequency                            | 47 – 63 Hz   |      | 47 – 66 Hz   |      |
| Input Current                              | 11.9 Arms @ 110Vac<br>13.1 Arms @ 240Vac           |      | 15.5 Arms @ 110Vac<br>16 Arms @ 240Vac             |      |
| Inrush Transient                           | 25Apk Typical                                      |      | 25Apk Typical                                      |      |
| Power Factor                               | 0.98 from 50% to 100% Load                         |      | 0.97 Min, 0.995 Typical                            |      |
| Ride through (at <sup>1</sup> 240VAC, 25C) | 1/2 Cycle Min, Full Cycle Typical                  |      |  |      |
| <sup>2</sup> EMI/EMC                       | Exceeds FCC and CISPR22 (EN55022) - Class A        |      |  |      |
| High Accuracy AC Measurement               | No   |      | Optional   |      |

<sup>1</sup> measurement starts at zero crossing of the ac voltage, and voltage devayed to 40V

<sup>2</sup> for loads below 1200W

## Specifications: AC-DC Power Supplies (Cont.)

| OUTPUT  | 2000   | 2725           | 3000           | 3500           |
|---|--|----------------|----------------|----------------|
| Voltage Adjust Range<br>- Hardware set via Margin Pin<br>- Set by either I <sup>2</sup> C for | 44-58Vdc<br>42-58Vdc   |                |                |                |
| Rated Output Current<br>- Low Line<br>- High Line <sup>1</sup>                                | 25<br>38.4   | 25<br>52.4     | 28.9<br>57.8   | 28.9<br>67.3   |
| Rated Output Power<br>- Low Line<br>- High Line   | 1200W<br>2000W   | 1200W<br>2725W | 1500W<br>3000W | 1500W<br>3500W |
| Psophometric Noise  | 9mVrms   |                |                |                |
| Ripple (5Hz to 20MHz)<br>- RMS<br>- Peak to Peak  | 100mVrms max<br>250mVp-p max   |                |                |                |
| Over Voltage Protection<br>- Delayed<br>- Immediate   | <60Vdc<br>>65Vdc<br>Three restart attempts are implemented within a 1 minute window prior to a latched shutdown. |                |                |                |
| Over Temperature<br>- Warning<br>- Shutdown<br>- Restart Attempt Hys-                         | 5C<br>20C<br>10C   |                |                |                |
| PoE Isolation per IEEE 802.3  | Optional   |                | No             |                |

<sup>1</sup>at full power @ 52V @ 200-240Vac

## Specifications: DC-DC Power Supplies

| OUTPUT  | 2000  | 2500         |
|---|---|--------------|
| Voltage Range                                       | -40 to -72 Vdc                              |              |
| Input Current                                       | 60Adc max                                   | 75Adc max    |
| Inrush Current                                      | 60Adc max                                   | 100Adc max   |
| Holdup Time   | 6ms   |              |
| EMI/EMC   | Exceeds FCC and CISPR22 (EN55022) - Class A |              |
| Voltage Default                                     | 54Vdc                                       |              |
| Voltage Adjust Range                                | 44 - 58 Vdc                                 |              |
| Rated Output Current                                | 0.1 to 37A                                  | 0.1 to 46.3A |
| Rated Output Power                                  | 2000W                                       | 2500W        |
| Ripple (5Hz to 20MHz)<br>- RMS<br>- Peak to Peak    | 250mVrms<br>500mVpk-pk                      |              |
| Over Voltage Protection<br>- Delayed<br>- Immediate | 60Vdc<br>65Vdc                              |              |
| Over Temperature<br>- Warning<br>- Shutdown         | 5C<br>20C                                   |              |
| PoE Isolation                                       | Yes   | Yes          |

## Specifications: All AC-DC Models and All DC-DC Models

| MECHANICAL       |               |
|------------------|---------------|
| Length (in./mm)  | 13.85 / 351.2 |
| Width (in./mm)   | 4 / 101.6     |
| Height (in./mm)  | 1.63 / 41.4   |
| Weight (lb / kg) | 5 / 2.27      |

## Specifications: All AC-DC Models and All DC-DC Models (Cont.)









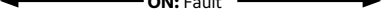
| ENVIRONMENTAL                      | 2000/2725  | 3000/3500                       |
|------------------------------------|--|---------------------------------|
| Operating Temperature <sup>1</sup> | -40°C to +75°C (-40°F to 167°F)                                  | -40°C to +55°C (-40°F to 131°F) |
| Storage Temperature                | -40°C to +85°C (-40°F to 185°F)                                  |                                 |
| Power De-Rating                    | > +55°C (derates @ 2% per °C)                                    |                                 |
| Relative Humidity                  | 95% max, non-condensing  |                                 |
| Altitude                           | 4,000m max (13,000 ft)   |                                 |
| Altitude De-Rating                 | Above 1524/5000 m/ft; 3962/13000 m/ft max (derates at 2C/1000ft) |                                 |
| Audible Noise                      | 55dBA, full load   |                                 |

<sup>1</sup> designed to start at an ambient as low as -40°C but may not meet operational limits until above -5°C

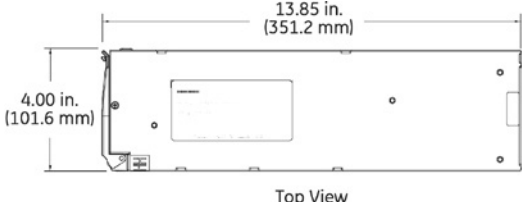
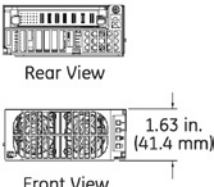
| GENERAL                                  | 2000/2725   | 3000/3500   |
|--|---|---|
| Cooling                                  | Internal variable speed fan cooled, microprocessor fan speed control  |   |
| Air Flow Direction                       | Front to Rear   |   |
| Efficiency (30-80% of FL, 240VAC @ 25°C) | 94.5% Min<br>96.5% Typical  | 94.2% Min<br>96.1% Typical  |
| Heat Dissipation                         | AC-DC 2000/2725 100 W/341 BTU @ 80% load<br>153 W/522 BTU @ 100% load<br><br>DC-DC 2000 -> 176W / 601 BTU<br>2500 -> 220W / 751 BTU | AC-DC 3000/3500 190 W/648 BTU @ 80% load<br>250 W/853 BTU @ 100% Load |

| SAFETY AND STANDARDS COMPLIANCE | 2000/2725  | 3000/3500 |
|---------------------------------|--|-----------|
| Zone 4                          | Per Telcordia GR-63-CORE, all floors when installed in CPL shelf   |           |
| Safety                          | CE mark to Low Voltage Directive 2006/95/EC UL 609501-1 Recognized<br>CAN/CSA C22.2 No. 60950-1-03 Certified VDE 0805-1 Licensed to IEC60950-1 |           |
| RoHS                            | Compliant to RoHS EU Directive 2002/95/EC  |           |
| EMC                             | FCC and CISPR22 (EN 55022) Class A   |           |
| ESD                             | EN/IEC 61000-4-2 Level 3   |           |

## Front Panel LEDs

| SYMBOL  | ANALOG MODE   | I <sup>2</sup> C MODE   | RS485 MODE  |
|---|---|---|---|
|  |                    | <b>ON:</b> Input OK<br><b>BLINKING:</b> Input Out of Limits     |  |
|  |                    | <b>ON:</b> Output OK<br><b>BLINKING:</b> Overload               |  |
|  | <b>ON:</b> Over-temperature Warning   | <b>ON:</b> Over-temperature Warning<br><b>BLINKING:</b> Service | <b>ON:</b> Over-temperature Warning   |
|  |  <b>ON:</b> Fault |   | <b>ON:</b> Fault<br><b>BLINKING:</b> Not Communicating                                |

## Outline Drawings

| DIMENSIONS  |   |
|---|---|
|  <p>Top View</p> |  <p>Rear View</p> <p>Front View</p> |

# Pulsar Edge Controller (For Applications in J2007001 and J2014004 shelves)

The CPL Pulsar Edge controller delivers large system intelligence in a small system form factor. This family of controllers functions as a network interface controller (NIC) and as a full-featured battery plant controller to the Compact Power Line (CPL) platform. Its thin modular plug-in form factor minimizes shelf space. The Pulsar Edge CP841A controller is utilized in bulk power applications in data centers and enterprise applications. Ethernet connectivity with SNMP facilitates remote network management access through its front-accessible RS232 or USB port and is aided by the EasyView2 graphical user interface.

As a battery plant controller, it provides a complete set of features to monitor and control rectifiers, batteries, and distribution. A flexible set of configurable inputs allow the CP841A to monitor a wide variety of system equipment and incorporate appropriate state information enabling a centralized point of management. The controller utilizes secure network management protocols allowing for advanced network supervision. GE Galaxy Manager\* software is the centralized visibility and control component of a comprehensive power management system designed to meet engineering, operations, and maintenance needs. The Galaxy Manager client-server architecture enables remote access to system controllers across the power network.



## Applications

- Telecommunications Networks
- Transmission Equipment
- Fiber in the Loop
- Routers/Switches
- Data Networks
- PBX
- Enterprise Networks - Voice, Data, PoE

## Key Features

### Remote Access and Features

- Integrated 10/100Base-T Ethernet Network
  - TCP/IP
  - SNMP V2c for management
  - SMTP for email
  - Telnet for command line interface
  - DHCP for plug-n-play
  - FTP for rapid backup and upgrades
  - HTTP for standard web pages and browsers
  - Compatible with Galaxy Manager and other management packages
  - Shielded RJ-45 interface referenced to chassis ground
- Password protected security levels: User, Super-User, Administrator for all access Ground-referenced RS232 system port ANSI T1.317 command-line interface
- Modem access support
  - Remote via external modem
  - Callback security
- EasyView2, Windows-based GUI software for local terminal or Modem access

### Secure Protocols:

- SNMP V3
- SSL
- SSH
- IPv6

### Standard System Features

- Monitor and control of more than 40 connected devices
  - Maximum of 32 rectifiers
  - Maximum of 6 distribution control cards
  - Robust RS485 system bus
- Standard and user defined system alarms
  - Alarm test
  - Assignable alarm severity: Critical, Major, Minor, Warning, and Record-only
- Rectifier management features
  - Automatic rectifier restart
  - Active Rectifier Management (energy efficiency)
  - Remote rectifier (on/off)
  - Reserve Operation
  - Automatic rectifier sequence control
  - N + X redundancy check

- Multiple Low Voltage Load and Low Voltage Battery Disconnect thresholds (4)
- Configuration, statistics, and history
  - All stored in non-volatile memory
  - Remote/local backup and restore of configuration data
- Industry standard defaults
  - Customer specific configurations available
- Remote/ local software upgrade
- Basic, busy hour, and trend statistics
- Detailed event history
- User defined events and derived channels

### Standard Battery Management Features

- Float/boost mode control
  - Manual boost
  - Manual timed boost locally, T1.317, and remotely initiated
  - Auto boost terminated by time or current
- Battery discharge testing
  - Manual (local/remote)
  - Periodic

### Pulsar Edge Controller Key Features (Cont.)

- Plant Battery Test (PBT) input driven
- Configurable threshold or 20% algorithm
- Graphical discharge data
- Rectifiers on-line during test
- Slope thermal compensation
  - High temperature
  - Low temperature
  - Step temperature
  - STC Enable/Disable, low temperature Enable/Disable
  - Configurable mV/°C slopes
- State of charge indication
- High temperature disconnect setting
- Reserve-time prediction
- Recharge current limit
- Emergency Power-Off input

### Integrated Monitoring Inputs/Outputs

- System plant voltage (accuracy  $\pm 0.5\%$ , resolution 0.01V)
- One system shunt (accuracy  $\pm 1\%$  full scale, resolution 1A)
  - Battery or load
  - Mounted in the return side of DC bus
- Up to 15 binary inputs
  - Six inputs close/open to battery
  - 9 input close/open to return (number is dependent upon number of output alarms)
  - User assignable
- Up to 5 user assignable Form-C output alarms (50VDC @ .3A)
- 1-Wire\* bus devices
  - Up to 16 temperature probes (QS873)
  - Up to 6 mid-string monitors (ES771)

### Galaxy Manager Compatible

- Centralized web server and database with multiple user access to live or managed data with drill down to problem details
- Monitor and control of more than 40 connected devices
- Management information from polling or alarms received from alarm traps from multiple sites are available on one screen via the inter/intranet
- Trend user selected data over time
- Automatic or manual report generation
- Standard engineering tools like reserve time calculators and cable voltage drop analyzer

## Specifications

| CONTROLLER GENERAL          |  |
|-----------------------------|--|
| Operating Voltage           | $\pm 24$ Vdc, $\pm 48$ Vdc<br>(Range: $\pm 18$ to $\pm 60$ Vdc)            |
| Input Power                 | Less than 7W   |
| Operating Temperature Range | -40°C to +75°C (-40°F to 167°F)  |
| Storage Temperature Range   | -40°C to +85°C (-40°F to 185°F)  |
| Operating Relative Humidity | 0 - 95% (non-condensing)   |
| Physical Specifications     | 1.75 in. H, 0.75 in. W, 8.00 in. D; 0.5lb<br>45mm H, 20mm W, 204mm D; 227g |

| CONTROLLER AGENCY CERTIFICATIONS |  |
|----------------------------------|--|
| Radiated Emissions               | FCC, Class B; EN 55022, Class B                          |
| Safety                           | UL Unlisted Component as Part of CPL or SPS Power System |
| RoHS                             | Compliant to RoHS EU Directive 2002/95/EC                |
| EMC                              | FCC/EN55022 Class B, CISPR22 Level B                     |
| ESD                              | EN 61000-4-2 level 4                                     |

# Ordering Information – Compact Power Line

## 48V DC Critical Power Solution

The Compact Power Line platform is designed to provide highly reliable DC power for 48V distributed power architectures. When embedded into an OEM design, GE can assist with the integration into the OEM design. Otherwise an external shelf can be used to provide power. A single shelf configuration provides up to 14kW of 48V output power in 1U high and mounts in 19-inch or can be adapted to 23-inch wide frames. The CPL product platform is easily expandable for future growth by stacking multiple shelves. CPL is a reliable DC power solution for mission-critical enterprise and telecommunications network equipment.

The CPL product line provides several shelf options. J85480S1 and J2014003 shelves have four slots for either rectifiers or converters (PEMs). These shelves are primarily used without a controller or with a customer’s controller using PMBus or I<sup>2</sup>C communications. J2007001 and J2014004 shelves have four slots with space for a full-feature Pulsar Edge Network Interface Controller (NIC). The Pulsar Edge controller has secure Ethernet connectivity with SNMPv3 to facilitate remote network management to monitor and control rectifiers, batteries, and distribution. These shelves are used with either shelf mounted distribution or external distribution panels for small battery plant applications.

## Simplified Shelf Identification Matrix

| SHELF SERIES  | USAGE         | COMMUNICATIONS                   | POWER SUPPLY INPUT CONNECTOR |
|---------------|---------------|----------------------------------|------------------------------|
| J85480S1      | CP2000/CP2725 | PM Bus/I <sup>2</sup> C          | Rear                         |
| J2007001      | CP2000/CP2725 | RS485                            | Rear                         |
| J2014004      | CP3000/CP3500 | RS485                            | Rear                         |
| J2014003      | CP3000/CP3500 | PM Bus/I <sup>2</sup> C          | Rear                         |
| Embedded Only | CP3000AC-Fxx  | PM Bus/I <sup>2</sup> C or RS485 | Front                        |
| Embedded Only | CP2500DC-Fxx  | PM Bus/I <sup>2</sup> C or RS485 | Front                        |

### Features – Model J85480S1 and J2014003

- Fits into a standard 19” rack
- Two DC Outputs may be common or split. Each output bus is rated for 100A with two-hole lug landings for 2 AWG wire.
- Choose between IEC-320 C13 or C19 or other AC input connections
- Analog or dual/redundant I<sup>2</sup>C communications
- Adjustable mounting ears for near flush front or multiple set back positions



J2007 or J2014004  
Rectifier Shelf



J2007 Converter Shelf



J85480 or J2014003  
Rectifier Shelf



J85480 Converter Shelf

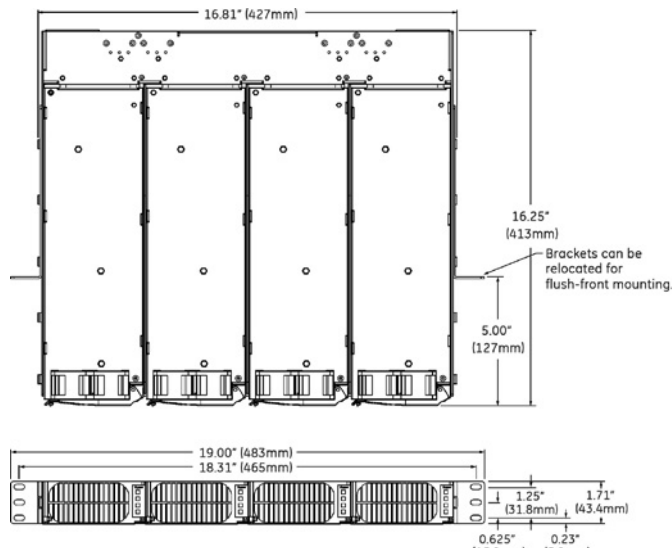
### Features – Model J2007001 and J2014004

- Fits into a standard 19” rack
- Single DC output rated for 200A with two-hole lug landings for up to 2/0 AWG cable
- Choose between IEC-320 or Molex Mini-Fit SR for AC input  
Single, dual or quad input feeds
- RS485 communications
- Adjustable mounting ears with multiple set back positions
- Up to 3 shelves may be interconnected with bus straps for DC outputs for a 600A system
- Plug-N-Play CP841A controller with front access craft port, rear access LAN and alarm connections
- Select Shelves include distribution modules



# Outline Drawings - J85480S1 Shelves

## DIMENSIONS



## J8540S1 Converter Shelf Options

| LIST | MAX POWER | DC INPUT PLUG              | DC OUTPUT |   | MAX POWER SUPPLY | FEATURES  |                               | ORDER CODE  |
|------|-----------|----------------------------|-----------|---|------------------|-----------|-------------------------------|-------------|
|      |           |                            | BUS       | TERMINATION                               |                  | SETPOINT  | OTHER                         |             |
| 14   | 10kW      | Qty 2 (1 per 2 rectifiers) | Split     | Double Hole Lugs<br>1/4in x 5/8in Spacing | CP2500DC         | (+) 48Vdc | POE, Analog, I <sup>2</sup> C | CC109124764 |



## J85480S1 Rectifier Shelf Options

| LIST | MAX POWER | AC INPUT PLUG | DC OUTPUT |             | MAX RECTIFIER SIZE | FEATURES  |                               | ORDER CODE  |
|------|-----------|---------------|-----------|-------------|--------------------|-----------|-------------------------------|-------------|
|      |           |               | BUS       | TERMINATION |                    | SETPOINT  | OTHER                         |             |
| 20   | 11kW      | IEC-320, C19  | Common    | DH Lugs     | CP2725             | (+) 54Vdc | Analog, I <sup>2</sup> C      | CC109147344 |
| 21   |           |               | Split     |             |                    | -54Vdc    |                               | CC109147328 |
| 23   | 8kW       | IEC-320, C13  | Common    |             | CP2000             | (+) 54Vdc | POE, Analog, I <sup>2</sup> C | CC109150447 |

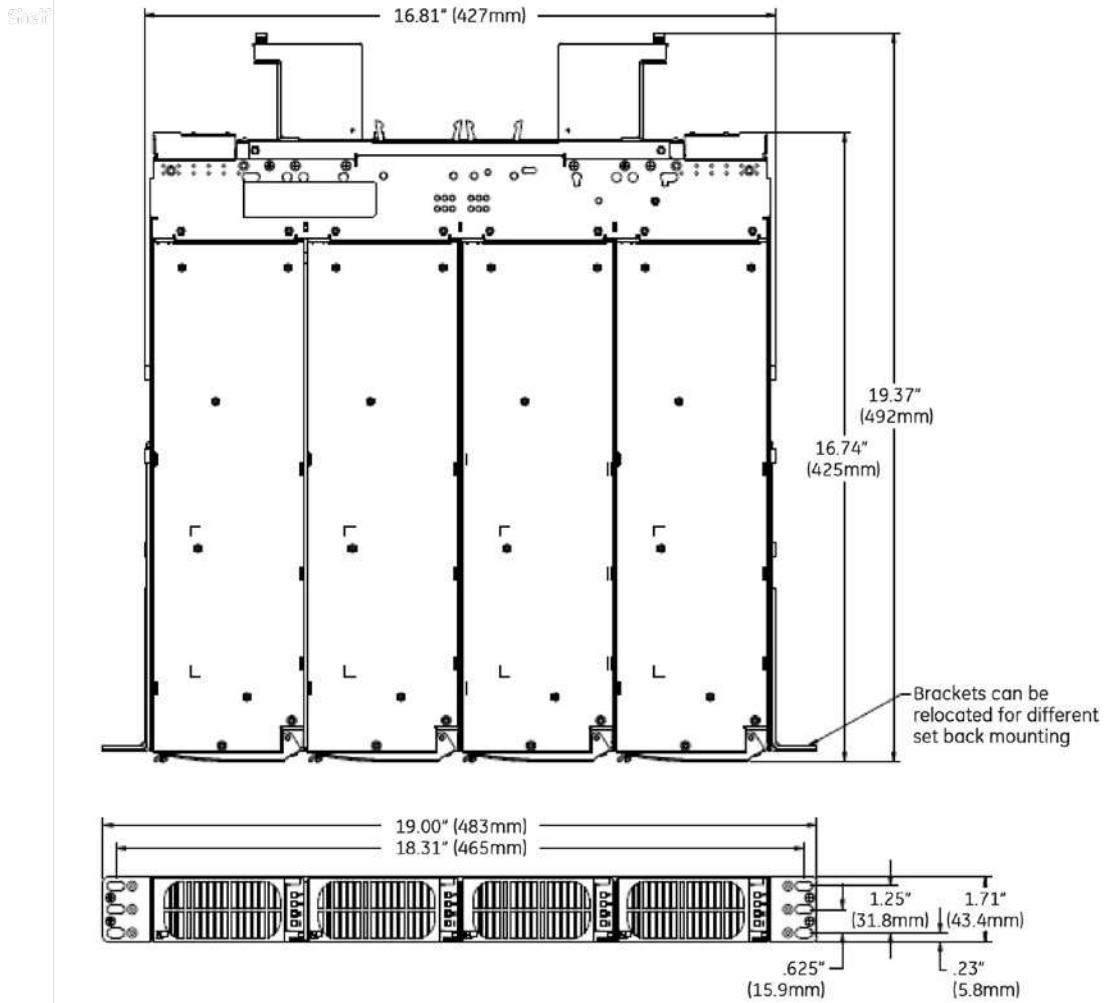


### Notes

- Split shelves L21 and Vout (-) is split, however Vout (+) is paralleled among the 4 rectifiers. Vout (+) should be grounded.
- All lists, up to 2 shelves can be paralleled for a single I<sup>2</sup>C line. Up to eight shelves may be paralleled for current shared power delivery.
- All lists, shelf configured set point ensures inter-operability among all rectifiers from CP2000 to CP2725. Rectifiers will proportionately current share relative to their output power capacity.
- All Shelves are RoHS 6 compliant. Order should reflect J85480S1LxxZ where xx is the list number and Z indicates compliance to RoHS 6.

# Outline Drawings - J2014003 Shelves

## DIMENSIONS

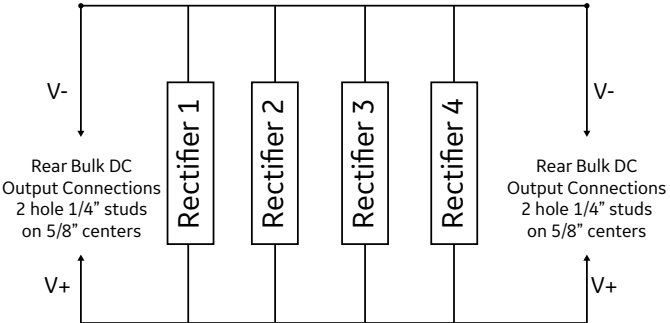


## J2014003 Rectifier Shelf Options

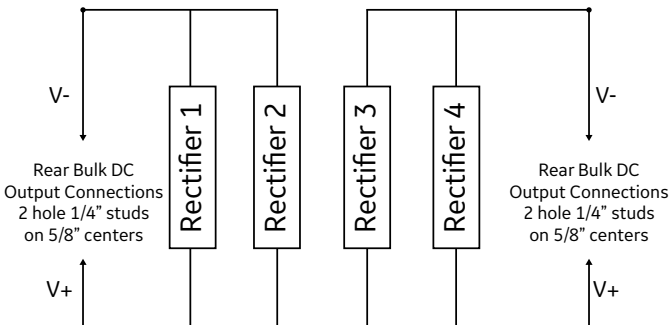
| LIST | MAX POWER | AC INPUT CONNECTOR | DC OUTPUT |   | FEATURES          |           | OTHER                   | ORDER CODE |
|------|-----------|--------------------|-----------|---|-------------------|-----------|-------------------------|------------|
|      |           |                    | BUS       | TERMINATION                               | RECTIFIER SIZE    | SET POINT |                         |            |
| 1    | 14kW      | Molex Mini-Fit Sr  | Common    | Double Hole Lugs<br>1/4in x 5/8in Spacing | CP3000/<br>CP3500 | 54Vdc     | Analog I <sup>2</sup> C | 150040608  |



## DC Output Types: Common Output Bus for Terminal Lug Connection

| DESCRIPTION   | SCHEMATIC  |
|---|--|
| <ul style="list-style-type: none"> <li>Each Lug Connection rated for 100A with 2 gauge wire (200A for shelf)</li> </ul> |  |

## DC Output Types: Split Output Bus for Terminal Lug Connection


| DESCRIPTION  | SCHEMATIC   |
|--|---|
| <ul style="list-style-type: none"> <li>Vdc (-) has Split buses Vdc (+) is common to both sections.</li> <li>Each bus may be independently controlled</li> <li>Multiple shelves may not be paralleled together.</li> <li>Each Lug Connection rated for 100A with 2 gauge wire (200A for shelf)</li> </ul> |  |

## J1 Communication Signals – J85480S1 (J1 Connector – Pin Out)

| PIN | SIGNAL      | PIN | SIGNAL           | PHOTO   |
|-----|-------------|-----|------------------|---|
| 1   | POWER_CAP_1 | 16  | SDA_1            |  |
| 2   | POWER_CAP_2 | 17  | Fault            |   |
| 3   | POWER_CAP_3 | 18  | Alert#_0         |   |
| 4   | POWER_CAP_4 | 19  | Enable side B    |   |
| 5   | MOD_PRES_1  | 20  | Logic_GRD        |   |
| 6   | MOD_PRES_2  | 21  | Enable Side A    |   |
| 7   | MOD_PRES_3  | 22  | Logic_GRD        |   |
| 8   | MOD_PRES_4  | 23  | Alert#_1         |   |
| 9   | PFW_1       | 24  | 5VA              |   |
| 10  | PFW_2       | 25  | OTW              |   |
| 11  | PFW_3       | 26  | Reset            |   |
| 12  | PFW_4       | 27  | Iso. barrier n/c |   |
| 13  | SCL_0       | 28  | Iso. barrier n/c |   |
| 14  | SCL_1       | 29  | Shelf_Addr_B     |   |
| 15  | SDA_0       | 30  | Shelf_Addr_A     |   |


Control Interface cable (part # CC848854034)

## J2 Communication J85480S1 and J2014003 Shelves (J2 Connector – Pin Out)

| PIN | SIGNAL    | PIN | SIGNAL        | PHOTO  |
|-----|-----------|-----|---------------|--|
| 1   | SCL_0     | 8   | Alert#_1      |  |
| 2   | SCL_0     | 9   | Isolation n/c |  |
| 3   | SDA_0     | 10  | Isolation n/c |  |
| 4   | SDA_1     | 11  | Ishare - B    |  |
| 5   | Alert#_0  | 12  | Ishare - A    |  |
| 6   | 5VA       | 13  | 8V_INT - B    |  |
| 7   | Logic_GRD | 14  | 8V_INT - A    |  |

Shelf-to-shelf cable connection (part # CC848848952)

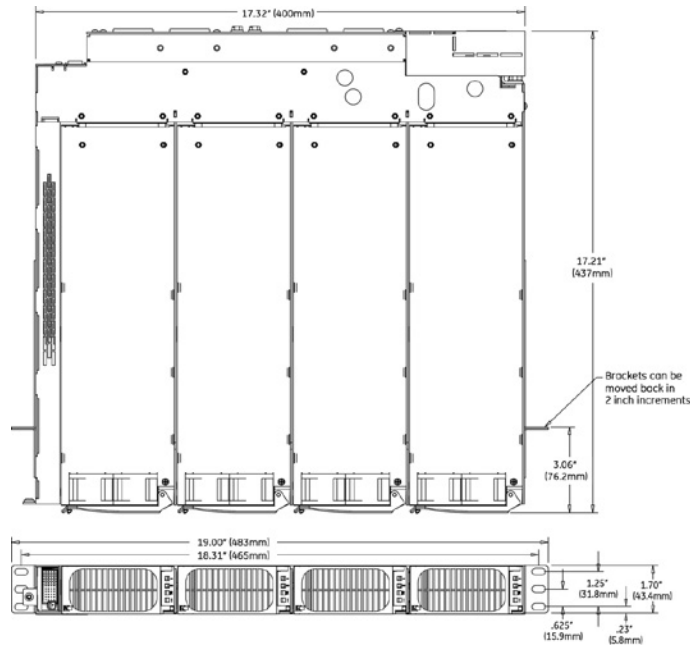
## J1 Communication Signals – J2014003 Shelves (J1 Connector – Pin Out)

| PIN | SIGNAL      | PIN | SIGNAL           | PHOTO   |
|-----|-------------|-----|------------------|---|
| 1   | POWER_CAP_1 | 16  | SDA_1            |  |
| 2   | POWER_CAP_2 | 17  | Fault            |   |
| 3   | POWER_CAP_3 | 18  | Alert#_0         |   |
| 4   | POWER_CAP_4 | 19  | Enable side B    |   |
| 5   | MOD_PRES_1  | 20  | Logic_GRD        |   |
| 6   | MOD_PRES_2  | 21  | Enable Side A    |   |
| 7   | MOD_PRES_3  | 22  | Logic_GRD        |   |
| 8   | MOD_PRES_4  | 23  | Alert#_1         |   |
| 9   | PFW_1       | 24  | 5VA              |   |
| 10  | PFW_2       | 25  | OTW              |   |
| 11  | PFW_3       | 26  | Reset            |   |
| 12  | PFW_4       | 27  | Iso. barrier n/c |   |
| 13  | SCL_0       | 28  | Iso. barrier n/c |   |
| 14  | SCL_1       | 29  | VProg            |   |
| 15  | SDA_0       | 30  | Rack ID          |   |

Control Interface cable (part # CC848854034)

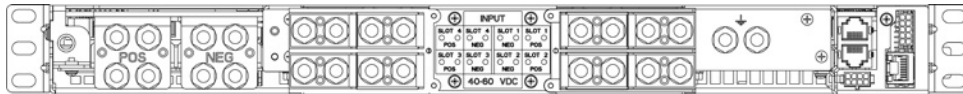
# Outline Drawings - J2007001 Shelves

## DIMENSIONS



## J2007001L14 DC PEM Shelf Options

| LIST | MAX POWER | DC INPUT PLUG              | DC OUTPUT |                            | MAX POWER SUPPLY | FEATURES                         |       | ORDER CODE  |
|------|-----------|----------------------------|-----------|----------------------------|------------------|----------------------------------|-------|-------------|
|      |           |                            | BUS       | TERMINATION                |                  | SETPOINT                         | OTHER |             |
| 14   | 10kW      | 2 x 1/4-20 x 5/8 in DH Lug | Common    | 2 x 1/4-20 x 5/8 in DH Lug | CP2500DC         | Variable, set by Edge Controller | RS485 | CC109157657 |



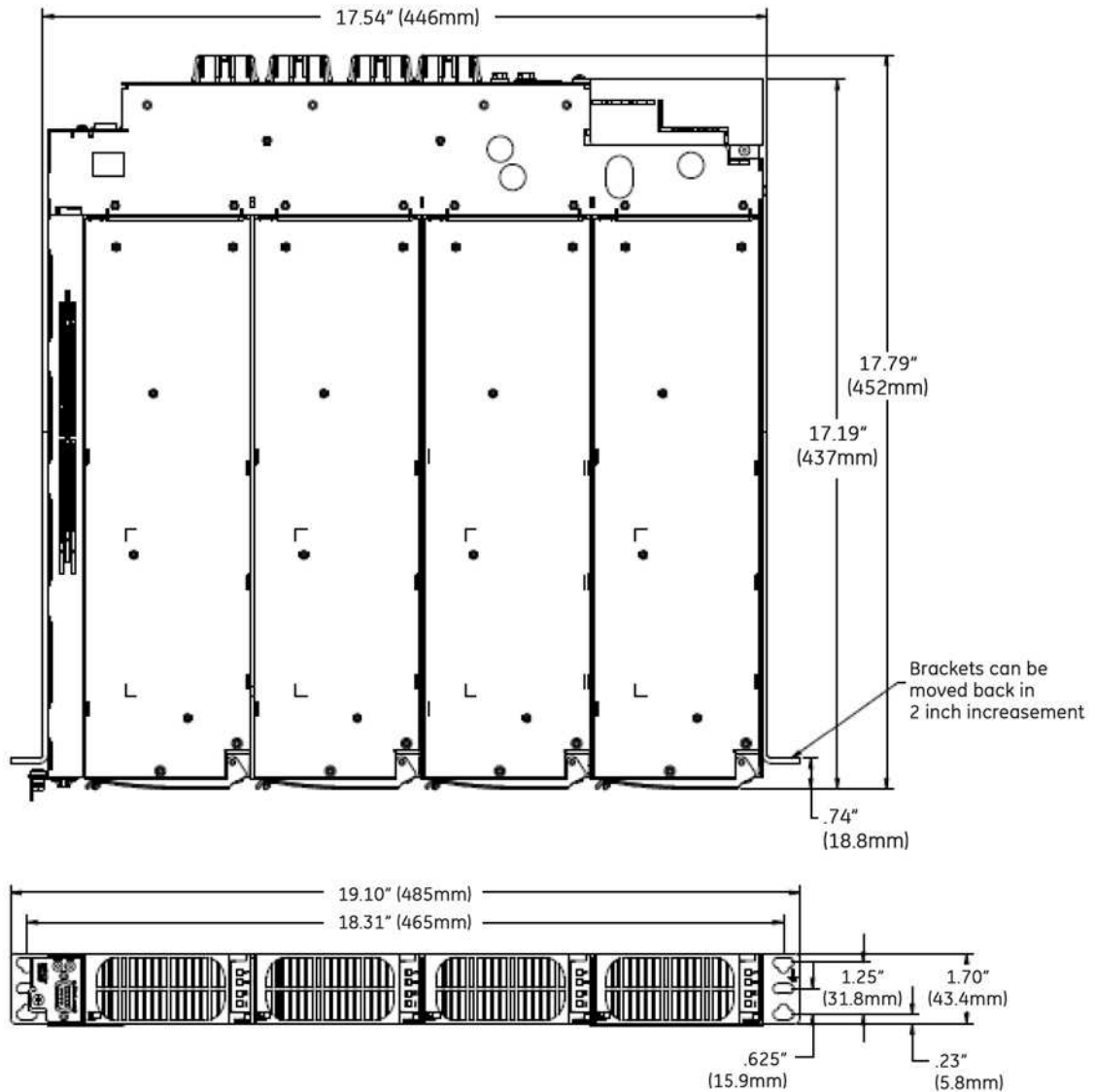
## J2007001 Rectifier Shelf Options

| LIST          | MAX RECTIFIER SIZE | AC INPUT   | DC OUTPUT  | REAR VIEW OF SHELF   |               |    |        |  |  |  |
|---------------|--------------------|--|--|--|---------------|----|--------|--|--|--|
| 3             | 2725 Watts         | Single AC feed (terminal blocks for 6ga wire and 3/4" conduit fitting) | DC output bus is rated for 200A for two 2ga or one 2/0 gauge two-hole lugs (1/4-20 studs on 5/8" centers). | <table border="0"> <tr> <td>DC Output Bus</td> <td>AC</td> <td>Signal</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> | DC Output Bus | AC | Signal |  |  |  |
| DC Output Bus | AC                 | Signal   |  |  |               |    |        |  |  |  |
|               |                    |  |  |  |               |    |        |  |  |  |
| 4             | 2725 Watts         | Individual feed (Molex Mini-Fit SR)                                    |  |  |               |    |        |  |  |  |
| 6             | 2725 Watts         | Individual feed (IEC-320 C19 Cords)                                    |  |  |               |    |        |  |  |  |

- Notes:
1. CP841A Pulsar Edge Controller ships separately.
  2. Up to 3 shelves may be interconnected.

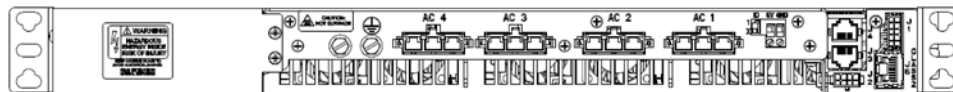
# Outline Drawings - J2014004 Shelves

## DIMENSIONS




## J2014004 Rectifier Shelf

| LIST | MAX POWER | AC INPUT PLUG     | DC OUTPUT |                              | MAX POWER SUPPLY | FEATURES                         |       | ORDER CODE |
|------|-----------|-------------------|-----------|------------------------------|------------------|----------------------------------|-------|------------|
|      |           |                   | BUS       | TERMINATION                  |                  | SETPOINT                         | OTHER |            |
| 1    | 14kW      | Molex Mini Fit Sr | Common    | 2pr x 1/4-20 x 5/8 in DH Lug | CP3500           | Variable, set by Edge Controller | RS485 | 150040609  |



Notes: 1. CP841A Pulsar Edge Controller ships separately. 2. Up to 3 shelves may be interconnected.

# J2007001 and J2014004 Shelves System Controller Overview

| EDGE CONTROLLER |  | PHOTO   |
|-----------------|--|---|
| CP841A_3C3R_S   | J1 has 3 alarm inputs with a common return and 3 output relays; Power Major, Power Minor, 1 Selectable |  |

## Communication Signals for J2007001 and J2014004 Shelves

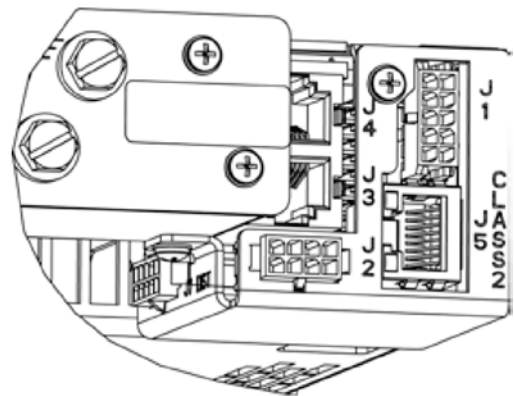
J1 provides alarm outputs and inputs based on the controller installed (see table on next page). Inputs are "Dry", no voltage, contact Closures or Opens to a common return on pin 6. Outputs are relay contacts. Both input and output alarms are customer defined on the controller's web pages.

J2 provides alarm inputs (see table on next page). Alarm inputs are contact Closures or Opens to the non-grounded side of the dc bus [-48V]. Pins 6, 7, 8 provide -48V for these alarm inputs.

J3 battery thermal probe (QS873A) or battery mid-string voltage monitor (ES771) with battery thermal probe.

J4 shelf to shelf communication connection J5 LAN/Ethernet.

J7 provides distribution control for shelves with external distribution. See table on next page.



## J1 Connector – Pin Out

| PIN | SIGNALS FOR SPS841A_3C3R | SIGNALS FOR SPS841A_015R |
|-----|--------------------------|--------------------------|
| 1   | ALM1 Input               | Alarm Relay 3 Rtn        |
| 2   | ALM2 Input               | Alarm Relay 2 Rtn        |
| 3   | Alarm Relay 1 Rtn        | Alarm Relay 1 Rtn        |
| 4   | Power Minor Rtn          | Power Minor Rtn          |
| 5   | Power Major Rtn          | Power Major Rtn          |
| 6   | ALM1, 2, 6C RTNS         | Alarm Relay 3            |
| 7   | ALM6 Input               | Alarm Relay 2            |
| 8   | Alarm Relay 1            | Alarm Relay 1            |
| 9   | Power Minor              | Power Minor              |
| 10  | Power Major              | Power Major              |

## J2 Connector

| PIN | SIGNAL     |
|-----|------------|
| 1   | ALM6 Input |
| 2   | -          |
| 3   | ALM3 Input |
| 4   | ALM4 Input |
| 5   | ALM5 Input |
| 6   | -48V       |
| 7   | -48V       |
| 8   | -48V       |

## J7 Connector

| PIN | SIGNAL         |
|-----|----------------|
| 1   | FAJ            |
| 2   | Coil Rtn       |
| 3   | LVD_NC         |
| 4   | LVD_NO         |
| 5   | Shunt-         |
| 6   | OS             |
| 7   | Coil1          |
| 8   | Coil2          |
| 9   | LVD Status Rtn |
| 10  | Shunt+         |

## Battery Monitoring

Temperature/Voltage probes are needed for battery monitoring. They are connected to each battery or battery string to provide slope thermal compensation, temperature alarms and voltage imbalance alarms. Refer to ordering guide for diagram and part numbers.



# CP2000/CP2725 Shelves

## J85480S1 Family Shelves Ordering Guide

| MOUNTING BRACKETS              |             | COMMUNICATION CABLES               |             | AC INPUT, DC OUTPUT CABLES     |             |
|--------------------------------|-------------|------------------------------------|-------------|--------------------------------|-------------|
| 1U bracket for 23" frame mount | CC848844803 | 10' Communication Cable (J1)       | CC848854034 | C13 plug with 5-15P plug, 10'  | CC848776105 |
| 2U bracket for 23" frame mount | 848683009   | Shelf to shelf communication cable | CC848848952 | C13 plug with L6-20P plug, 10' | CC848820317 |
| Wall mount bracket             | CC848864504 |                                    |             | C13 plug, unterminated, 10'    | 847861192   |
|                                |             |                                    |             | C19 plug, with 5-15P plug, 8'  | CC848850792 |
|                                |             |                                    |             | C19 plug, with L6-20P plug, 8' | CC848850842 |
|                                |             |                                    |             | C19 plug, unterminated, 8'     | CC848847368 |
|                                |             |                                    |             | DC output cable, 2 GA, 10'     | 848748987   |

| RECTIFIER SHELF OPTIONS |             | RECTIFIER     |             | RECTIFIER SLOT FILLER |             |
|-------------------------|-------------|---------------|-------------|-----------------------|-------------|
| List 20                 | CC109147344 | CP2000AC54TEZ | CC109158440 | Central Office White  | CC848822263 |
| List 21                 | CC109147328 | CP2000AC54TEP | CC109167565 |                       |             |
| List 23                 | CC109150447 | CP2725AC54TEP | CC109167532 |                       |             |
|                         |             | CP2725AC54TEZ | CC109149423 |                       |             |

The diagram shows a perspective view of the J85480S1 Family Shelf. Arrows point from the tables to specific components: mounting brackets to the front and back edges, communication cables to the top edge, AC and DC cables to the rear edge, and rectifier shelf options to the main body of the shelf.

## J85480S1 Converter Shelf Ordering Guide

| MOUNTING BRACKETS              |             | DC INPUT CABLES           |             | DC OUTPUT CABLES                                |             |
|--------------------------------|-------------|---------------------------|-------------|---|-------------|
| 1U bracket for 23" frame mount | CC848844803 | DC input cable, 10 GA, 4' | CC848794908 | DC output cable, 2 GA 10'                       | 848748987   |
| Wall mount bracket             | CC848864504 |                           |             | DC Bus for 1/4" Faston Connections (2 required) | CC848886192 |

| CONVERTER SHELF OPTIONS |             | CONVERTER (PEM) OPTIONS |             | RECTIFIER SLOT FILLER |             |
|-------------------------|-------------|-------------------------|-------------|-----------------------|-------------|
| List 14                 | CC109124764 | CP2000DC54PEZ           | CC109162104 | Central Office White  | CC848822263 |
|                         |             | CP2500DC54PEZ           | CC109170528 |                       |             |

The diagram shows a perspective view of the J85480S1 Converter Shelf. Arrows point from the tables to specific components: mounting brackets to the front and back edges, DC input cables to the top edge, DC output cables to the rear edge, and converter shelf options to the main body of the shelf.

# CP2000/CP2725 Shelves (Cont.)

## J2007001 Family Shelves Ordering Guide

| MOUNTING BRACKETS              |             | ALARM AND COMMUNICATION CABLES              |             | AC INPUT, DC OUTPUT CABLES                                     |             |
|--------------------------------|-------------|---|-------------|--|-------------|
| 1U bracket for 23" frame mount | CC848844803 | 15' Alarm or distribution cable (J1 or J7)  | CC848865980 | C19 plug, with 5-15P plug, 8'                                  | CC848850792 |
| 2U bracket for 23" frame mount | 848683009   | 50' Alarm or distribution cable (J1 or J7)  | CC848817651 | C19 plug, with L6-20P plug, 8'                                 | CC848850842 |
| Wall mount bracket             | CC848864504 | 150' Alarm or distribution cable (J1 or J7) | CC848817668 | C19 plug, unterminated, 8'                                     | CC848847368 |
|                                |             | 15' Alarm input cable (J2)                  | CC848853614 | Molex Mini-Fit SR, unterminated, 8awg, 10' (2 cables provided) | 848710711   |
|                                |             | Shelf to shelf communication cable (J3, J4) | CC848847780 | DC output cable, 2ga, 10'                                      | 848748987   |
|                                |             |   |             | DC Bus Bar Strap (2 required)                                  | CC848844324 |

| CONTROLLER    |             | RECTIFIER     |             | RECTIFIER SLOT FILLER |             | RECTIFIER SHELF OPTIONS |  |
|---------------|-------------|---------------|-------------|-----------------------|-------------|-------------------------|--|
| CP841A_3C3R_S | 150032047   | CP2000AC54TEZ | CC109158440 | Central Office White  | CC848822263 | List 3                  | CC109147542                              |
| Slot Filler   | CC848847871 | CP2000AC54TEP | CC109167565 |                       |             | List 4                  | CC109140043                              |
|               |             | CP2725AC54TEP | CC109167532 |                       |             | List 6 (Shown)          | CC109140027 (Rohs5)<br>150047190 (Rohs6) |
|               |             | CP2725AC54TEZ | CC109149423 |                       |             |                         |  |

## J2007001L014 Converter Shelf Ordering Guide

| MOUNTING BRACKETS              |             | DC OUTPUT CABLES                                |             |
|--------------------------------|-------------|---|-------------|
| 1U bracket for 23" frame mount | CC848844803 | DC output cable, 2 GA 10'                       | 848748987   |
| Wall mount bracket             | CC848864504 | DC Bus for 1/4" Faston Connections (2 required) | CC848886192 |

| CONVERTER SHELF OPTIONS |             | CONVERTER (PEM) OPTIONS |             |
|-------------------------|-------------|-------------------------|-------------|
| List 14                 | CC109157657 | CP2000DC54PEZ           | CC109162104 |
|                         |             | CP2500DC54PEZ           | CC109170528 |

| CONTROLLER    |             | RECTIFIER SLOT FILLER |             | RECTIFIER SLOT FILLER |             |
|---------------|-------------|-----------------------|-------------|-----------------------|-------------|
| CP841A_3C3R_S | 150032047   | Central Office White  | CC848822263 | Central Office White  | CC848822263 |
| Slot Filler   | CC848847871 |                       |             |                       |             |

# CP3000/CP3500 Shelves

## J2014003 Shelf Ordering Guide

| MOUNTING BRACKETS              |             |
|--------------------------------|-------------|
| 1U bracket for 23" frame mount | CC848844803 |
| 2U bracket for 23" frame mount | 848683009   |
| Wall mount bracket             | CC848864504 |

| AC INPUT, DC OUTPUT CABLES                                     |             |
|--|-------------|
| Molex Mini-Fit SR, unterminated, 8awg, 36" (Single Cable)      | CC848763301 |
| Molex Mini-Fit SR, unterminated, 8awg, 10' (Single Cable)      | CC848793026 |
| Molex Mini-Fit SR, unterminated, 8awg, 10' (2 cables provided) | 848710711   |
| DC output cable, 2ga, 10'                                      | 848748987   |
| DC Bus Bar Strap (2 required)                                  | CC848844324 |

| RECTIFIER      |           |
|----------------|-----------|
| CP3000AC54TEZ  | 150033916 |
| CP3000AC54TECZ | 150041904 |
| CP3500AC54TEZ  | 150030396 |
| CP3500AC54TECZ | 150041901 |

| RECTIFIER SLOT FILLER |             |
|-----------------------|-------------|
| Central Office White  | CC848822263 |

| RECTIFIER SHELF OPTIONS |           |
|-------------------------|-----------|
| J2014003001 List 1      | 150040608 |

## J2014004 Shelf Ordering Guide

| MOUNTING BRACKETS              |             |
|--------------------------------|-------------|
| 1U bracket for 23" frame mount | CC848844803 |
| Wall mount bracket             | CC848864504 |

| ALARM AND COMMUNICATION CABLES              |             |
|---|-------------|
| 15' Alarm or distribution cable (J1 or J7)  | CC848865980 |
| 50' Alarm or distribution cable (J1 or J7)  | CC848817651 |
| 150' Alarm or distribution cable (J1 or J7) | CC848817668 |
| 15' Alarm input cable (J2)                  | CC848853614 |
| Shelf to shelf communication cable (J3, J4) | CC848847780 |

| AC INPUT, DC OUTPUT CABLES                                     |             |
|--|-------------|
| Molex Mini-Fit SR, unterminated, 8awg, 36" (Single Cable)      | CC848763301 |
| Molex Mini-Fit SR, unterminated, 8awg, 10' (Single Cable)      | CC848793026 |
| Molex Mini-Fit SR, unterminated, 8awg, 10' (2 cables provided) | 848710711   |
| DC output cable, 2ga, 10'                                      | 848748987   |
| DC Bus Bar Strap (2 required)                                  | CC848844324 |

| SHELF OPTIONS |             |
|---------------|-------------|
| List 1        | CC109157657 |

| RECTIFIER      |           |
|----------------|-----------|
| CP3000AC54TEZ  | 150033916 |
| CP3000AC54TECZ | 150041904 |
| CP3500AC54TEZ  | 150030396 |
| CP3500AC54TECZ | 150041901 |

| RECTIFIER SLOT FILLER |             |
|-----------------------|-------------|
| Central Office White  | CC848822263 |

| RECTIFIER SHELF OPTIONS |           |
|-------------------------|-----------|
| J2014004001 List 1      | 150040609 |

| CONTROLLER    |            |
|---------------|------------|
| CP841A_3C3R_S | 150032047  |
| Slot Filler   | CC84884781 |

| BATTERY MANAGEMENT ACCESSORIES                |             | PHOTO |
|---|-------------|-------|
| A: QS873A Thermal Probe                       | CC109142980 |       |
| B: 10' probe to controller wireset            | CC848817024 |       |
| C: 1' probe to probe wireset                  | CC848822560 |       |
| C: 5' probe to probe wireset                  | 848719803   |       |
| C: 10' probe to probe wireset                 | CC848822321 |       |
| ES771A Voltage Monitor Card                   | 108958422   |       |
| D: 2 1/2' ES771A to probe wireset             | CC848791517 |       |
| D: 6' ES771A to probe wireset                 | CC848797290 |       |
| D: 10' ES771A to probe wireset                | 848719829   |       |
| G: 4' ES771A to ES771A or controller wireset  | CC848791500 |       |
| G: 10' ES771A to ES771A or controller wireset | 848652947   |       |

## Specifications

### Rectifiers

| POWER MODULE       | OUTPUT POWER/INPUT VOLTAGE               | OUTPUT VOLTAGE   | PROTECTION                 | PHYSICAL  |
|--------------------|--|--|----------------------------|---|
| CP2000AC54TEZ/TEP  | 2000W / 200-277VAC<br>1200W / 100-120VAC | Hardware set<br>44 - 58Vdc<br>Software set<br>42 - 58Vdc | 15A breaker, 14 gauge wire | Length: 13.85"/351.8mm<br>Width: 4.00"/101.6mm<br>Height: 1.66"/42.2mm<br>Weight: 4.6lb/2.1kg |
| CP2500DC54PEZ      | 2500W / 40-72VDC                         |  | 70A breaker, 8 gauge wire  |   |
| CP2725AC54TEZ/TEP  | 2725W / 200-277VAC<br>1200W / 100-120VAC |  | 20A breaker, 12 gauge wire |   |
| CP2000DC54-PEZ     | 2000W / 40-72VDC                         |  | 60A breaker, 8 gauge wire  |   |
| CP3000AC54TEZ/TECZ | 3000W / 200-277VAC<br>1500W / 100-120VAC |  | 30A breaker, 10 gauge wire |   |
| CP3500AC54TEZ/TECZ | 3500W / 200-277VAC<br>1500W / 100-120VAC |  | 20A breaker, 12 gauge wire |   |

Notes: PE suffix denotes PoE compliance. Z suffix denotes RoHS 6 compliance. TE suffix denotes Total Efficiency\* architecture.

### Shelves

| MECHANICAL                  | J85480S-1          | J2014003           | J2007001L014       | J2007001           | J2014004           |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Height                      | 1.71 inches/43.4mm | 1.71 inches/43.4mm | 1.71 inches/43.4mm | 1.71 inches/43.4mm | 1.71 inches/43.4mm |
| Width (with mounting ears)  | 19 inches/483mm    | 19 inches/483mm    | 19 inches/483mm    | 19 inches/483mm    | 19 inches/483mm    |
| Depth                       | 16.25 inches/413mm | 17.25 inches/438mm | 19.5 inches/497mm  | 17.06 inches/433mm | 16.9 inches/429mm  |
| Weight (without rectifiers) | 9.25lbs/4.2kg      | 9.5lbs/4.3kg       | 9.5lb/4.3kg        | 8.75lbs/4.0kg      | 9lbs/4.1kg         |

Note: dimensions of specific model numbers may vary

## Reliability

- Proven field performance
- Advanced alarming
- N+1 modularity

## Intelligence

- Industry leading controller features
- Ethernet interface for remote access
- Centralized network management

## Investment Protection

- Minimal space requirements
- Versatile configurations
- Efficient operation

## On Time Delivery

- Standard building blocks
- 8-16 week availability
- 24/7 support

## Management Visibility

Galaxy Manager\* software is the centralized visibility and control component of a comprehensive power management system designed to meet engineering, operations and maintenance needs. The Galaxy Manager client-server architecture enables remote access to system controllers across the power network.

- Dashboard display with one-click access to management information database
- Trend analysis
- Scheduled or on demand reports
- Fault, configuration, asset, and performance management

## Training

GE offers on-site and classroom training options based on certification curriculum. Technical training can be tailored to individual customer needs. Training enables customers and partners to more effectively manage and support the power infrastructure. We have built our training program on practical learning objectives that are relevant to specific technologies or infrastructure design objectives.

## Service & Support

GE field service and support personnel are trusted advisors to our customers – always available to answer questions and help with any project, large or small. Our certified professional services team consists of experts in every aspect of power conversion with the resources and experience to handle large turnkey projects along with custom approaches to complex challenges. Proven systems engineering and installation best practices are designed to safely deliver results that exceed our customers' expectations.

## Warranty

GE is committed to providing quality products and solutions. We have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired or replaced as soon as possible.

For full warranty terms and conditions please go to [www.gecriticalpower.com](http://www.gecriticalpower.com).