



# Compact Power Line Shelves

Model: J85480S1

The 1U (1.75") high CPL family of shelves mount in 19-inch wide frames and provide up to 11kW of 48V output power per shelf. There are three or four slots for rectifiers, converters (PEMs). With the exception of L23, these rectifier shelves are capable of utilizing the higher power capacity of the CP2725 rectifier.

<ul style="list-style-type: none"> <li>▪ Only 16.81" wide fits inside equipment that is designed into a 19" rack</li> <li>▪ Two DC Outputs may be common or split. Each output bus is rated for 100A with two-hole lug landings for 2 AWG wire (L15 can be 148A at one side with two-hole lug landings for 1 AWG wire)</li> <li>▪ Independent IEC-320 AC input for each rectifier</li> <li>▪ Analog, RS485 or dual/redundant I<sup>2</sup>C communications.</li> <li>▪ Adjustable mounting ears for flush or set back positions.</li> <li>▪ Stackable up to 8 high with 32 paralleled power supplies.</li> <li>▪ Isolated output for common output shelves</li> </ul>	
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Rectifier Shelves (AC Input, DC Output)								
List	Max Power	# AC Input	AC Input Plug	DC Output Bus	Max Rectifier Size	Features		Ordering Codes
						Setpoint	Other	
4	8kW	4	IEC-320, C13	Common	CP2000	(±) 54Vdc	Analog, I <sup>2</sup> C, RS485	108994538
20	11kW		IEC-320, C19		Split	CP2725	(±) 54Vdc	Analog, I <sup>2</sup> C
20A				(±) 48.8Vdc <sup>1</sup>			1600087352A	
21							- 54Vdc	CC109147328
23	8kW	4	IEC-320, C13	Common	CP2000	(±) 54Vdc	POE, Analog, I <sup>2</sup> C	CC109150447
PEM Shelves (DC Input, DC Output)								
List	Capacity	# DC Input	DC Input Plug	DC Output Bus	Max PEM Size	Communications Features		Ordering Codes
						Controller	Protocol	
14	8kW	2	AMP Power-Blade	Split	CP2000	No	Analog, I <sup>2</sup> C	CC109124764
15	8kW	2	AMP Power-Blade	Common	CP2500	No	Analog, I <sup>2</sup> C	1600264406A

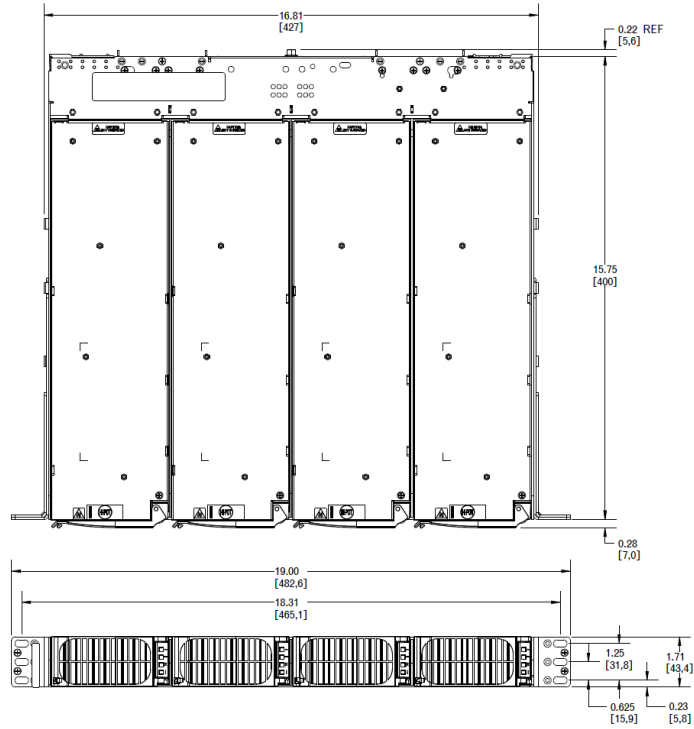
**Notes:**

Split shelf L21 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 CP1800 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.

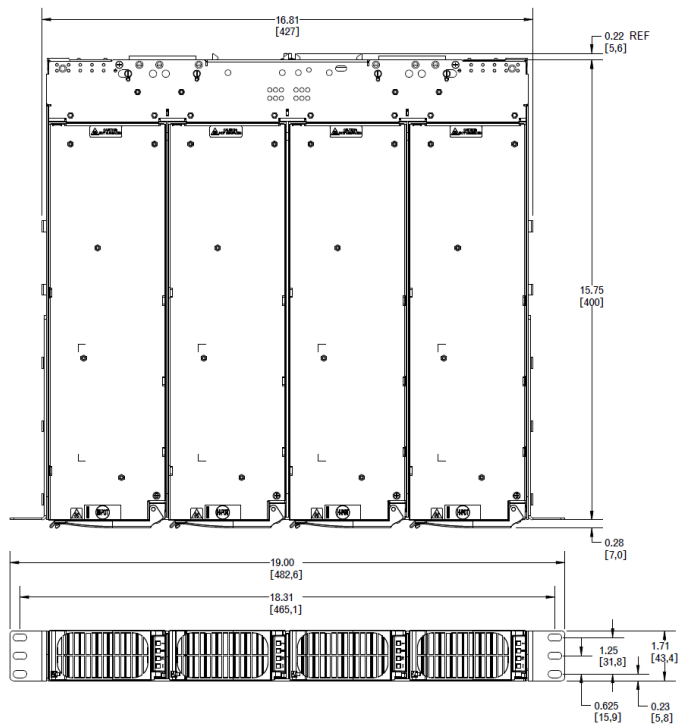
<sup>1</sup> L20A must use with CP2725-FB rectifier to get 48.8Vdc output.

**Consult the factory for product availability**

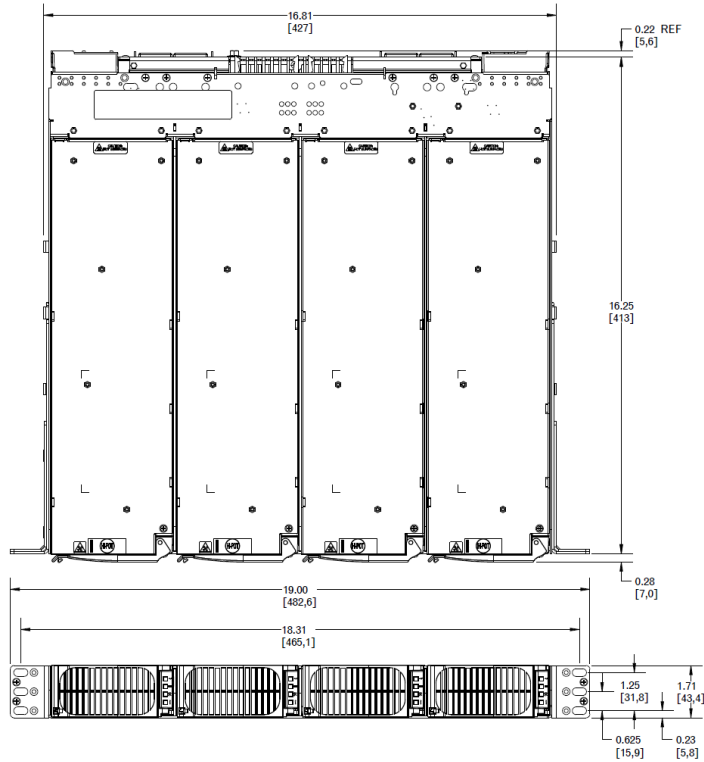
Package Outline



List 4



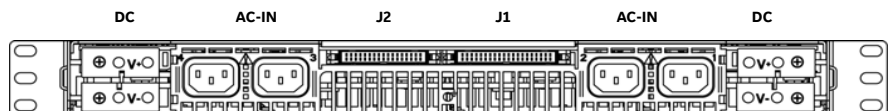
Lists 14, 15



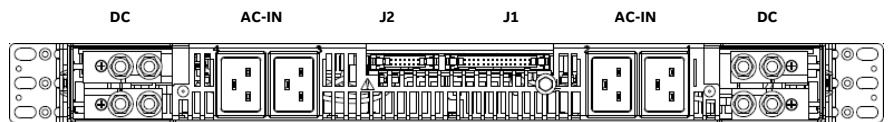
**Lists 20, 20A, 21, 23**

**Rear Views**

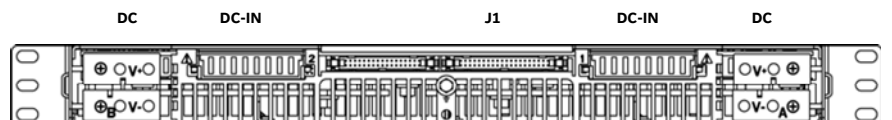
**List 4**



**Lists 20, 20A, 21, 23<sup>2</sup>**

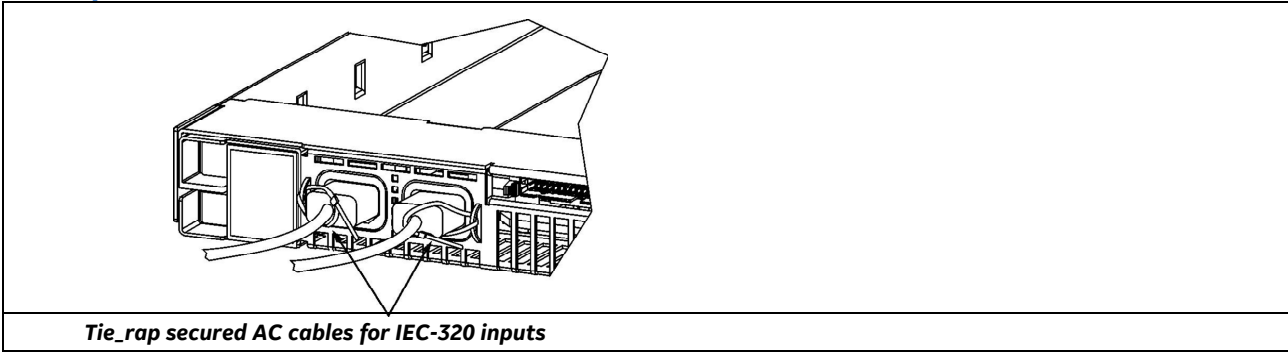


**Lists 14, 15**



<sup>2</sup> Input:  
 L20, L20A & L21: IEC 320-C20 sockets  
 L23: IEC 320-C14 sockets

**AC Input Connections**



**DC Input Connection - L14, L15 shelf**

				<p><b>Housing:</b> AMP 1600798-6 multi-beam XL  <b>Contacts:</b> AMP 1-1600960-8  <b>Wire:</b> 10 ga stranded - 30A rated capacity</p>																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pins</th> <th>Color</th> <th>Signal</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>1 - 2</td> <td>Black</td> <td>-48V</td> <td rowspan="2" style="text-align: center;">1</td> </tr> <tr> <td>3 - 4</td> <td>Red</td> <td>RTN</td> </tr> <tr> <td>5 - 6</td> <td>Black</td> <td>-48V</td> <td rowspan="2" style="text-align: center;">2</td> </tr> <tr> <td>7 - 8</td> <td>Red</td> <td>RTN</td> </tr> </tbody> </table>	Pins	Color	Signal	Unit	1 - 2	Black	-48V	1	3 - 4	Red	RTN	5 - 6	Black	-48V	2	7 - 8	Red	RTN	<p>Place near connector around wires 1 and 2</p> <p>P1 P2 P3 P4 P5 P6 P7 P8</p>		
Pins	Color	Signal	Unit																		
1 - 2	Black	-48V	1																		
3 - 4	Red	RTN																			
5 - 6	Black	-48V	2																		
7 - 8	Red	RTN																			

**DC Output Connections**

<ul style="list-style-type: none"> <li>Each Output Bus is rated for 100A and up to 2 gage two-hole lugs. (L15 can be 148A at one side with two-hole lug landings for 1 AWG wire)</li> <li>M6 nuts with conical washers provided.</li> <li>Touch-Safe plastic covers around output buses.</li> </ul>	<p>90° Lugs Torque to 62 in-lb (7 Nm)</p> <p>Touch-Safe Lug Landing Cover</p> <p>90° Lugs (Recommended) Torque to 62 in-lb (7 Nm)</p> <p>Touch-Safe Lug Landing Cover</p> <p>Knockouts if straight lugs are used.</p> <p>Note: Heat shrink tubing must cover entire barrel of lug</p>
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**DC Split Output Bus Option**

<ul style="list-style-type: none"> <li>Split Vout ( - ) buses on either side of the shelf. Vout ( + ) is common to both sections.</li> <li>+5V bias maintains I<sup>2</sup>C communications even during a feeder fault.</li> <li>Multiple shelves may not be paralleled together.</li> </ul>	<p>Rectifier or PEM</p> <p><b>Bus A Output</b>      <b>Bus B Output</b></p> <p>Two DC Output Busses</p> <p>AC or DC Input Feeds</p> <p>Feeder-A      Feeder-B</p>
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**Controllerless Operation**

<ul style="list-style-type: none"> <li>Lists 4 and 15 ship with a jumper installed on connector J1 pins 21 and 23. This allows the shelf to be powered without a controller.</li> </ul>	<table border="1"> <thead> <tr> <th>Plating</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>0.000076</td> <td></td> </tr> <tr> <td>0.000030</td> <td>881545-2</td> </tr> <tr> <td>Gold</td> <td></td> </tr> <tr> <td>0.00254</td> <td></td> </tr> <tr> <td>0.00100</td> <td>881545-1</td> </tr> <tr> <td>TIN</td> <td></td> </tr> </tbody> </table> <p>Shorting jumper between J1-21 and J1-23 Part Number: AMP 881545-2 or equivalent J1-21: ENABLE J1-23: Logic_GRD</p>	Plating	Part Number	0.000076		0.000030	881545-2	Gold		0.00254		0.00100	881545-1	TIN	
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<ul style="list-style-type: none"> <li>Lists 20, L20A &amp; L23 single output shelves, shorting jumper between J1 pins 19 and 20. Lists 21 split output shelf, second shorting jumper between J1 pins 21 and 22.</li> </ul>	<table border="1"> <thead> <tr> <th>Plating</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>0.000076</td> <td></td> </tr> <tr> <td>0.000030</td> <td>881545-2</td> </tr> <tr> <td>Gold</td> <td></td> </tr> </tbody> </table> <p>Shorting jumper between J1-19 and J1-20 for single output shelves, and a second shorting jumper between J1-21 and J1-22 for split output shelves Part Number: AMP 881545-2 or equivalent J1-19: ENABLE-A, J1-21 - ENABLE-B J1-20, 22: Logic_GRD</p>	Plating	Part Number	0.000076		0.000030	881545-2	Gold							
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0.000076															
0.000030	881545-2														
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<ul style="list-style-type: none"> <li>Lists 14 requires cc848836107 connector be installed in J1 to allow the shelf to power up without a controller.</li> </ul>															

**Notes:**

Jumpers to short ENABLE (turn ON) to Logic\_GRD are either in a separate bag or inserted into the J1 signal connector.  
 Jumper must be removed prior to inserting a mating connector into the J1 housing.  
 Applications that desire a remote ON/OFF feature should connect ENABLE-A to Logic\_GRD via an external switch. For split shelves ENABLE-A control the two leftmost rectifiers and ENABLE-B controls the two rightmost rectifiers.

**L14, L15 J1 Mating connector (pin out is standard 40 position like L4)**

Type	Housing	Mating pin	Crimping tool
Individual wire set	AMP 102387-9 RoHS	20-24 AWG: 6-87523-9	91517-1
40 position Ribbon cable	AMP 1658621-9 e/w 499252-1 (strain relief) RoHS	22-26 AWG: 6-87756-8	91517-1

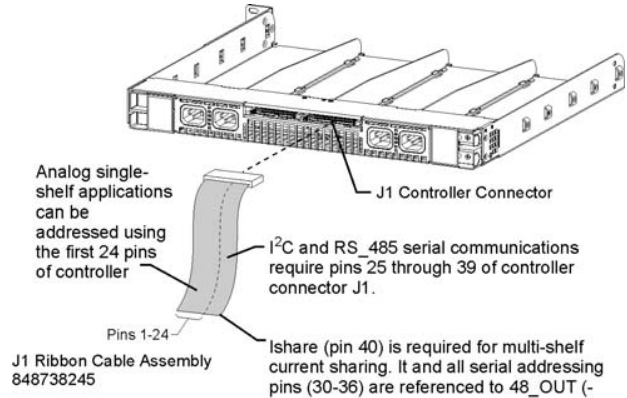
This connector set is different because it can accept either a ribbon cable or an individual wire mate.

**Communication Signals: J1 Connector** ( L4, L14, L15 )

Pin out

Pin	Signal	Pin	Signal
1	POWER_CAP_4	21	Enable side A
2	POWER_CAP_3	22	5VA
3	POWER_CAP_2	23	Logic_GRD
4	POWER_CAP_1	24	Interrupt_1
5	MOD_PRES_4	25	Reset
6	MOD_PRES_3	26	Enable Side B
7	MOD_PRES_2	27	Spacing
8	MOD_PRES_1	28	Spacing
9	PFW_4	29	RS_485_Select
10	PFW_3	30	Shelf_Addr_A
11	PFW_2	31	Shelf_Addr_B
12	PFW_1	32	Shelf_Addr_C
13	SCL_0	33	Shelf_Addr_D
14	SCL_1	34	Shelf_Addr_E
15	SDA_0	35	Shelf_Addr_F
16	SDA_1	36	Shelf_Addr_G
17	OTW	37	Protocol_S
18	Margin	38	RS-485+
19	Fault	39	RS_485-
20	Interrupt_0	40	Ishare

**Control Interface Connection (J1 - AMP 499913-9)**

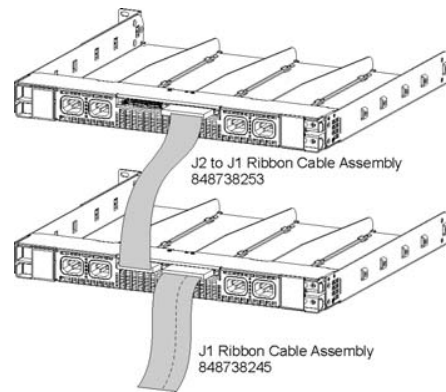


**Communication Signals: J2 Connector** ( L4, L15, except split shelf L14 )

Pin out

Pin	Signal	Pin	Signal
1	PFW_4	18	Enable Side B
2	PFW_3	19	Spacing
3	PFW_2	20	Spacing
4	PFW_1	21	RS_485_Select
5	SCL_0	22	Shelf_Addr_B
6	SCL_1	23	Shelf_Addr_C
7	SDA_0	24	Shelf_Addr_D
8	SDA_1	25	Shelf_Addr_E
9	OTW	26	Shelf_Addr_F
10	Margin	27	Shelf_Addr_G
11	Fault	28	Shelf_Addr_H
12	Interrupt_0	29	Protocol_S
13	Enable side A	30	RS-485+
14	5VA	31	RS_485-
15	Logic_GRD	32	Ishare
16	Interrupt_1	33	Spare
17	Reset	34	Spare

**Multi-shelf Connection (J2 - AMP 499913-8)**

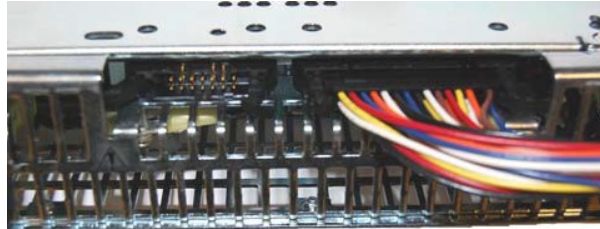


**Communication Signals: J1 Connector** ( L20, L20A, L21, L23 )

*Pin out*

Pin	Signal	Pin	Signal
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)**



**Communication Signals: J2 Connector** ( L20, L20A, L21, L23 )

*Pin out*

Pin	Signal	Pin	Signal
1	SCL_0	8	Alert#_1
2	SCL_1	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)**



**Notes:**

Shelf addressing, 8V\_INT, and current share are referenced to the most negative power output Vout(-) of the shelf. For paralleled shelves the Vout(-) terminations must be tied together in order to ensure proper operation of these functions. Modules could get damaged if this connection is not made.

For address A2=0, connect a voltage divider between 8V\_INT\_x [149K] and Vout(-)\_x[10K]. The midpoint of the two resistors should be connected to Shelf\_Addr\_x. For A2=1, connect Shelf\_Addr\_x to Vout(-). For all other signals refer to the rectifier data sheet.

**Signal connector part numbers**

( AMP – as specified or equivalent)

Connector	Positions	On shelf	Ribbon cable	Individual wires	Crimping tool
J1	30	5102159-7	1658621-7 header	102387-7 header	
		102320-1 latch	1-499252-2 retainer	6-87756-8 pin <sup>2</sup>	91517-1
J2	14	5102159-2	1658621-2 header	102387-2 header	
		102320-1 latch	499252-9 retainer	6-87756-8 pin	91517-1

**Specifications**

Parameter	Min	Max	Notes
<b>Input</b>			
AC Input Current, per module		15A	IEC-320, C13 type <sup>3</sup>
		20A	IEC-320, C13 type <sup>4</sup>
DC Input Current, per module		60A	
<b>Output</b>			
Programmable output set point	42Vdc	58Vdc	Minimum 44Vdc via hardware marginning
Max Output Current J85480S1		200A	lugs for 2/1 ga wires, 2/1 pairs, 100A/148A max <sup>5</sup>
Output Terminations			M6 threaded studs on 5/8-inch centers

<b>Environmental</b>	
Operating Temperature Range	-40°C to 65°C for UL recognition and 45°C for VDE certification
Operating Relative Humidity	0 - 95% (non-condensing)
Storage Temperature Range	-40°C to 85°C
EMC	FCC, EN 55022, CISPR22, Level A, conducted and radiated
Immunity	FCC and CISPR22 (EN55022) Class A2
<b>Safety/Standards Compliance</b>	
Safety Standards	UL1950, EN60950 (IEC950), CSA*234/950
Certification Marks	<b>Lists 14,15,20,20A,21,23:</b> VDE, UL Recognized (Canada and U.S.) <b>Lists 4:</b> VDE, UL Listed (Canada and U.S.)

Notes:


<sup>3</sup> IEC320 – C13 plugs are rated for 10A international and 15A in North America

<sup>4</sup> IEC320 – C19 plugs are rated for 16A international and 20A in North America

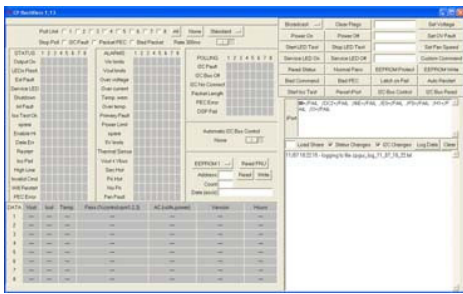
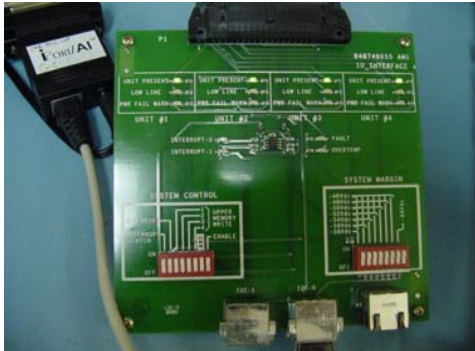

<sup>5</sup> L15 can be 148A at one side output with two-hole lug landings for 1 AWG wire



Ordering Information

Part number	Description	Comcode	Usage
<b>Blank Slot Fillers</b>			
Central Office White		CC848822263	
Raven Black		CC848781534	All
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>Cables / Connectors for J85480S1 Shelves</b>			
Ribbon cable for attaching a controller to the power shelf – 10 ft. One end mates into J1 the other end not terminated.		848738245	L4
Individual wire ser cable for attaching a controller to the power shelf – 6 ft. One end mates into J1 the other end not terminated.		CC848854034	L20, L20A, L21, L23
Cable set from J1 of the shelf to the CPL Interface Board		CC848848960	L20, L20A, L21, L23
Inter-shelf connector for daisy-chaining shelves – 9 in between J1 of 2 <sup>nd</sup> and J2 of 1 <sup>st</sup> shelf		848738253	L4
Inter-shelf cable set for interconnecting J2 signals between shelves		CC848848952	L20, L20A, L21, L23
2 AWG DC output cable set – 10 ft (1 RED and 1 BLACK cable)		848748987	All
1 AWG DC output cable set – 10 ft (1 RED and 1 BLACK cable)		8600279027P	L15
AC Input cable: High temperature IEC 320 C13 straight over-mold (one end), NEMA5-15P plug (one end), 14 AWG, 10 ft		CC848776105	L4
AC input cable: IEC 320 C13 plug (one end), other end not terminated, 14 AWG, 14 ft,		847861192	L4, L23
AC input cable: IEC320 C19 straight plug (one end), other end not terminated		CC848847368	L20, L20A, L21
AC input cable: IEC320 C19 right angle plug (one end), other end not terminated		848713376	L20, L20A, L21
DC input cable – 4 ft		CC848794908	L14, L15
Shorting jumper for J1 connector ENABLE for single output shelf (see locating picture)		AMP 881545-2	L4, L15
J1 connector ENABLE jumper for split shelf		CC848836107	L14
M6 screw with conical washer		901377010	L20, L20A, L21, L23
<b>Pulsar Controllers for J85480S1 Shelves</b>			
NE843G	1U standalone Controller (Display, DB9 craft port and RJ45 ethernet)	CC109139358	
<b>Cables for Pulsar Controllers</b>			
NE843G to CP Shelf Cable Kit (Includes 2ft power and communication cable)		CC109144820	
J4 Output Alarm Cable 50ft – 24ga solid twisted pair		CC848817635	
J4 Output Alarm Cable 150ft – 24ga solid twisted pair		CC848817643	
J3 Input Alarm Cable 50ft – 24ga Stranded		CC848817651	
J3 Input Alarm Cable 150ft – 24ga Stranded		CC848817668	

**Support Tools**

<p>Graphical User Interface</p>	<p>This program exercises the various commands and functions available via the I<sup>2</sup>C interface of the power supply.</p> <p>Two independent GUIs can demonstrate the two independent I<sup>2</sup>C multiplexed lines. Find out who is in control, take over control.</p> <p>The GUI has an automated polling feature and records all state changes in a time stamped automated fashion. Monitoring of the power system is therefore trivial for long periods of time.</p>	
<p>Interface Board</p>	<p>This board can be used independently or in combination with the GUI interface</p> <p>LEDs display the status of the analog signals and dip switches change the signal state to the power supply.</p> <p>In addition, two connectors are provided for interfacing to the two I<sup>2</sup>C lines of the power supplies.</p>	
<p>Total Communications Solution</p>	<p>This is a nuts and bolts complete hardware solution that starts from either the USB or RS232 port of a computer and ends with a cable set that connects into the J1 signal connector of the shelf.</p> <p>In between is the interface board and a commercially available converter that translates the computer signals into I<sup>2</sup>C and vice versa.</p> <p>The converter is an <b>MIIC-202</b> IPort manufactured by Micro Computer Control (mcc-us.com).</p>	

### 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.

### Product Labeling

Follow all warnings and instructions marked on the product. Some of the safety symbols used with the CP1800 Rectifier and J85480S1 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 up to 55°C and the application environment should not exceed 55°C.
- 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 (72/73/EEC) and EMC Directive (89/336/EEC), as amended by the CE Mark Directive (93/68/EEC).
- The J85480S1 shelf, when used with the CP1800 rectifiers, has been evaluated for hot swapping.
- A separate protective Earthing terminal is provided at the reach 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
  - a SERVICE PERSON shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective Earthing terminal to the protective earth wire in the building.

**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**

- AC branch circuits to this equipment must be protected with fuses or circuit breakers sized as required by the U.S. National Electric Code (NEC) and/or local codes. Up to four AC mains power cords are required to power the shelf (one for each rectifier). Each power cord should be connected to a separate AC mains branch circuit with an overcurrent protector rated at no more than 20A.
- The power supply mains inlet may be used as the means to provide AC protective earthing.
- An accessible AC disconnect/protection device to remove AC power from the equipment in the event of an emergency must be provided. An accessible socket-outlet/receptacle installed near the equipment is also acceptable as a disconnect.
- 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.

**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 Erdungsverbinding 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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