# 300A to 1200A PATH Power System

# 300A to 1200A P3ath Power System

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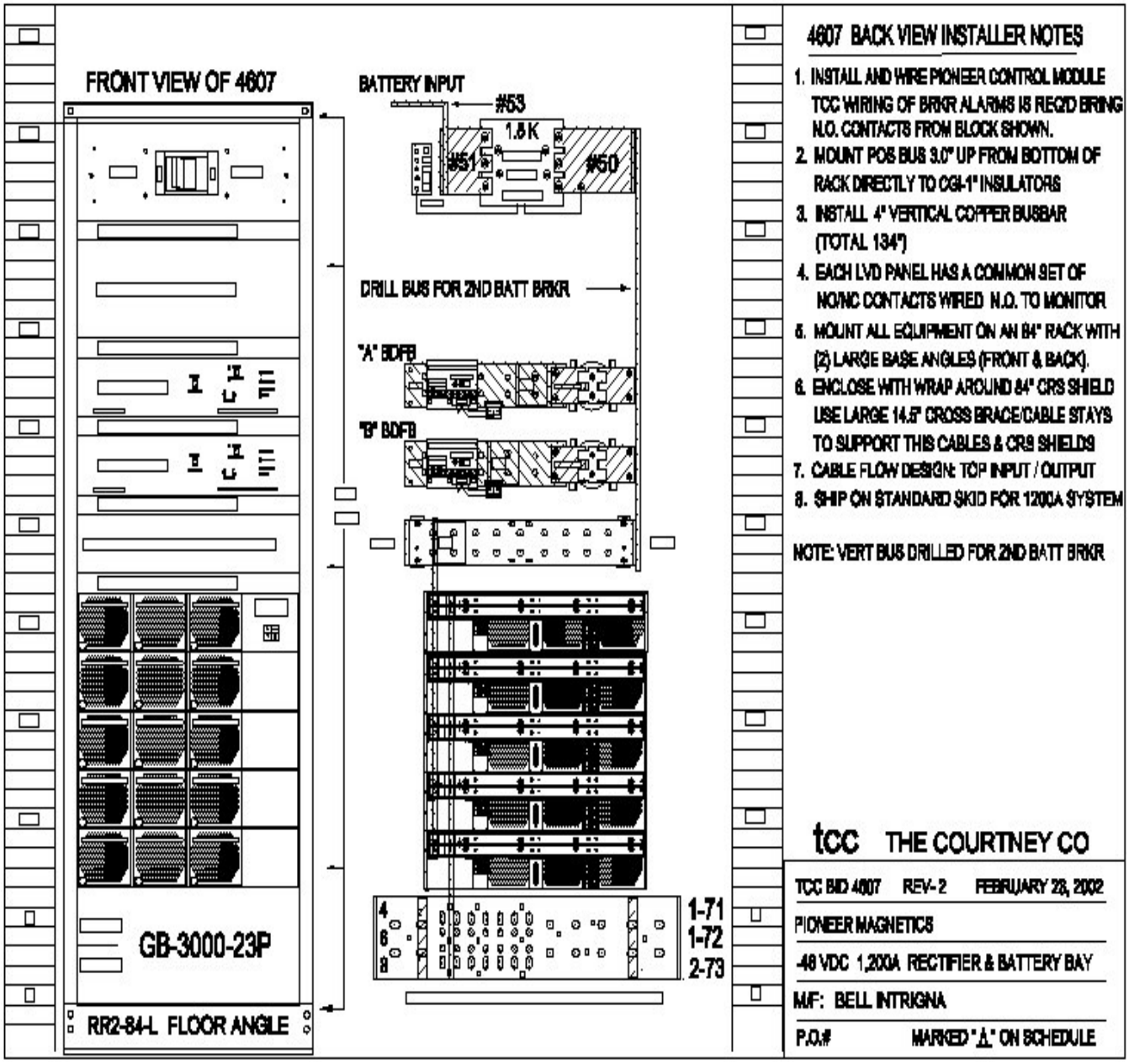
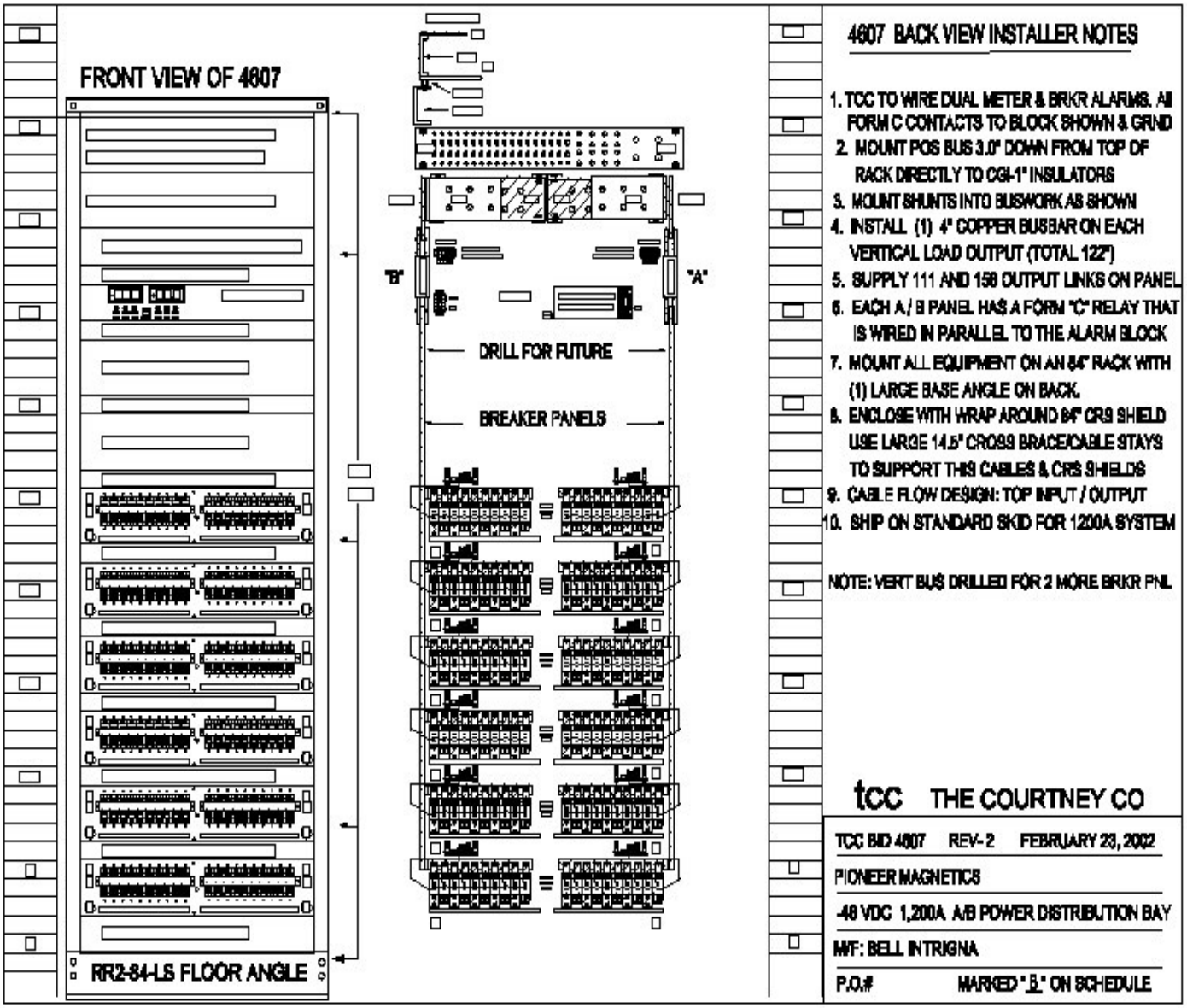


# 48VDC 1200A Rectifier & Battery Bay Components

- **(1) RR2-84L, Standard Relay Rack, 23”W x 84”H**
- **(1) CR2-84S-2-D, Perforated Plexiglas Back & Side Shields**
- **(1) GB-3000-23, Ground bar with standoff’s and insulators**
- **(1) CTPF-1.2K-23, Negative Termination panel**
- **(2) CTPL2-1.2K-S, Output Termination to BDFB panel**
- **(2) LVD2-1.2K-C, 1,200 Low voltage Disconnect Load side**
- **(1) CBJ2-1800-C, 1800 amp Battery Disconnect Breaker**
- **(6) Blank Panels**
- **(LOT) Buswork, 4” copper buswork**

# 48VDC 1200A A/B Power Distribution Bay



## 48VDC 1200A BDFB A/B Power Distribution Components

- **(1) RR2-84LS, Standard Relay Rack, 23”W x 84”H**
- **(1) CR2-84S-2-D, Clear Plexiglas Back & Side Shields**
- **(1) GB-2400-23, Ground bar with standoff’s and insulators**
- **(1) CTPD-1.2K-23A/B, Dual Negative Termination panel**
- **(6) CB2-10PD, 10 Position A, 10 Position B Breaker Panel**
- **(6) CB2-1A, Dual alarm card Panel**
- **(1) CMD2-110-110-B, 1200 AMP *Digital Meter Panel***
- **(2) C-1200-50, 1200 amp bus mounted shunt**
- **(8) Blank Panels**
- **(LOT) Buswork, 4” copper buswork**

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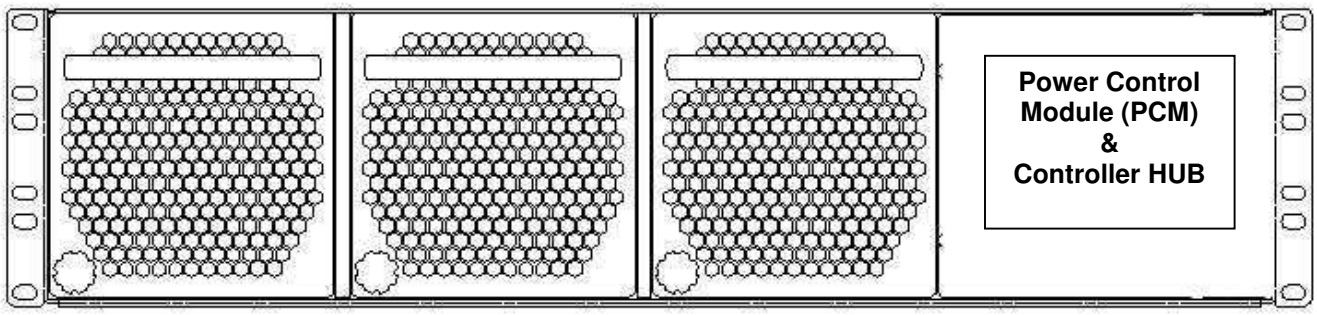
# 300A P³ath

## Power System & Control Module




**Three Hot Plug Rectifiers** | **Maximum Occupied Space: 5.25"H x 23"W x 20"D**

- **Super High Power Density**
- **3U, 3 Rectifiers, 300A**
- **Hot Plug Rectifiers for Redundancy**
- **Programmability**
- **>0.99 Power Factor Correction**
- **Built-in Intelligence**
- **Universal, 3φ AC Input**
- **Standard 3U , 23" Rack Mount**
- **Battery Control & Monitor**
- **Modular & Flexible**
- **Local & Remote Access**
- **User Friendly Operation**
- **Easy I/O Interface**

***Pioneer Magnetics***, the leader of high density switching power supplies continues to keep the ***unique tradition of compact power*** with the ***300A P³ath*** power system in a 3U, 23" power shelf with built-in local and remote intelligence. Easy access to all I/O interface, battery controls and user-friendly operation makes this power delivery system a ***front runner*** for all telecommunication and networking applications.

### Reliable Rectifiers

The ***300A P³ath*** system is configured with three 5kW Hot Plug, top of the line rectifiers. These 5" x 5" x 17" unique power packages provide non-stop power in a minimum space.

### Intelligent Power Control Module (PCM)

The ***300A P³ath*** is built with a PCM and a Controller HUB. This unique configuration is software driven and allows multiple shelves to be stacked with just a ***single master PCM*** and a dedicated Controller HUB for each stacked power shelf. Local and remote access provides flexibility in implementation and operation. The ***300A P³ath*** also provides extensive battery and system management including, battery charging supervision, low and high voltage disconnect, float voltage temperature compensation, battery discharge and auto equalize capability. In case of ***PCM failure,*** the rectifiers are ***defaulted automatically to 54VDC output,*** so the system continues to operate without interruption..

### Controller HUB

This unique control I/O interface bus allows the Power Control Module to control and monitor individual power shelves with three rectifiers. The HUBs are daisy chained and talk to the master PCM over the RS485 bus.

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# 300A P³ath Specifications

## FEATURES

### System

- Active Current Sharing
- Constant Current Limit
- Unit Enable/Disable
- Remote Sense
- Self-contained Forced Air Cooling
- Programmable Voltage & Current
- Power Supply Control & Monitor
- Programmable Minor and Major Alarms
- Event Logging

### Protection

- Over Current/Short Circuit
- Over Voltage Shutdown
- Over Temperature
- Isolation Diodes
- Fuses
- AC High Line Surge

### Local Control

- 16-key Keypad

### Remote Control

- RS485 and/or RS232 Communication Bus

### Battery Management

- Float Voltage Temperature Compensation
- Battery Charge Current
- Low Voltage Disconnect
- High Voltage Disconnect
- Auto Equalize

### Alarms

- Rectifier AC Fail
- Rectifier DC OK
- Rectifier Present in the Rack
- System High & Low Voltage Disconnect
- System High & Low Temperature
- Battery High & Low Voltage Disconnect
- Battery High & Low Temperature
- Battery Disconnect
- Battery Present
- DC Distribution Fuses/Breakers

### Indicators

- Minor Alarm – Amber LED
- Major Alarm – Red LED
- System OK – Green LED
- 4 x 20 Character LCD Display
- HUB OK

### Input

| | |
|---|---|
| • AC Input | Delta Connection:<br>Operating 176 to 264VAC<br>Nominal 200 to 240VAC<br>Wye Connection:<br>Operating 306 to 457VAC<br>Nominal 346 to 416VAC |
| • Frequency | 47 to 63Hz |
| • Efficiency | 90% Typical at Nominal input, 80% load |
| • Power Factor | >0.99 @ full load |
| • Harmonics (THD) | <5% @ full load |

### Output

| | |
|---|---|
| • Output Voltage | Range 42V to 59V |
| • Output Current | 280A @ 54VDC<br>300A @ 50VDC |
| • Max Output Power | 15kW |
| • Voltage Regulation | ±0.25% over full line range<br>±0.25% zero load to full load |
| • Ripple & Noise | 50MHz Bandwidth: <1% $Vout_{pp}$<br>10Hz – 100kHz: <10m$V_{rms}$<br>Voice Band: <28dBrnc w/o Batteries |
| • Transients | Less than ±2% deviation for load step from 10% to 90% within 10µs. Recovery within the static regulation limits within 1ms |
| • Current Limit | 102% to 108% of Nominal |

### Mechanical

| | |
|---|---|
| • System Size | 5.25"H x 23"W x 20"D |
| • I/O Interface | System DC Bus Bars, Box type terminal block. Bus communication using RJ 12 |

### Environmental

| | |
|---|---|
| • Temperature | 0°C to +50°C |
| • Humidity | 0 to 95% non-condensing |
| • Altitude | 10,000 Ft |

### Standards

The Path is Designed to meet

| | |
|---|---|
| • EMI | EN55022 Level A |
| • EMC | EN50082-1 |
| • Safety | UL 1950, CSA C22.2 No. 950, TUV to EN60950, and CE |

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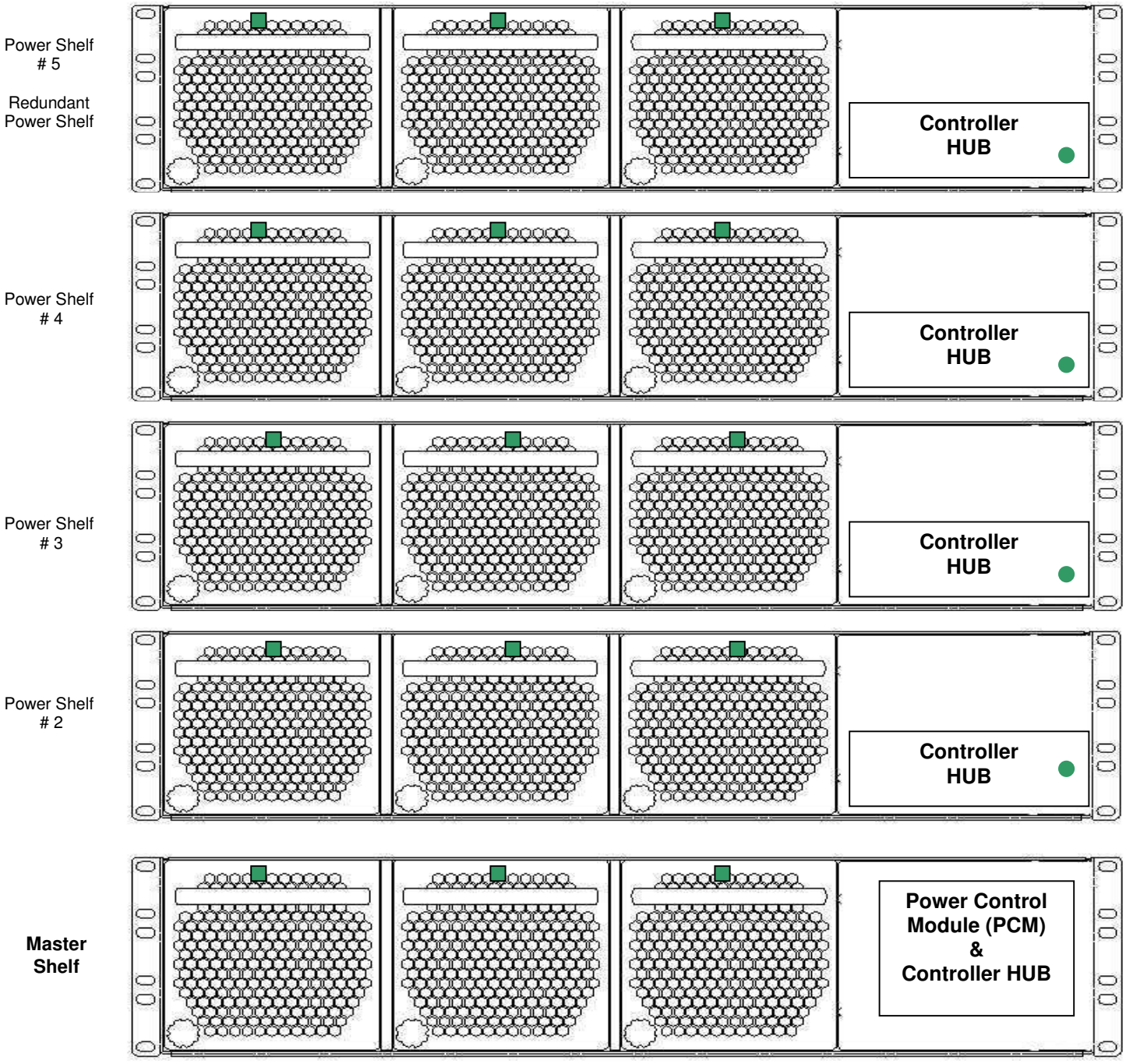
# 1200A P³ath

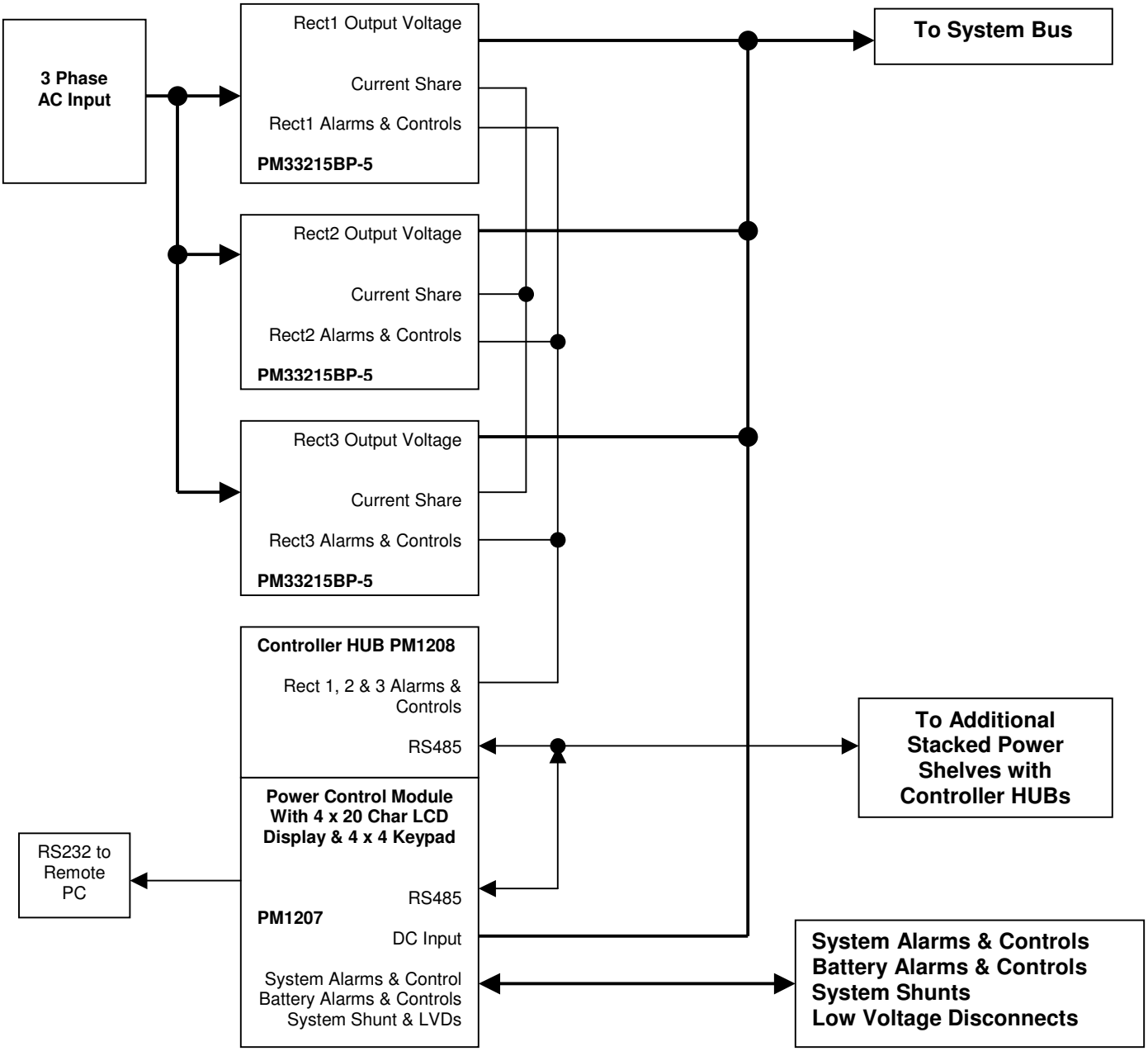
## 1200A N+1 Redundant Power & Control System

**The 300A configuration is the Master Shelf with three 100A Hot Plug Rectifiers and a Power Control Module with LCD Display and Keypad. The System can be easily expanded for higher power by adding additional Power Shelves. Each shelf can have a capacity of 300A. The 1200A System can be configured with one Master Shelf and three Power Shelves. The fourth Power Shelf is used for redundancy.**

**Maximum Occupied Space: 26.25"H x 23"W x 20"D**



# 300A Master Shelf System Block



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# PowerFactors

| 48V 5kW Telecom Rectifier | | | |
|---|---|---|---|
| **PM33215BP-5** | **5000W** | **0°C to +50°C** | **5″ x 5″ x 17″** |

## *FEATURES*

- Power Factor (> 0.99) Corrected
- 0°C to +50°C at Full Load
- Output Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Self-contained Forced Air Cooling

## *SPECIFICATIONS*

### INPUTS:

**INPUTS:**
**RANGE:** 176 to 264 VAC, Single Phase. 208-240VAC Nominal
**FREQUENCY:** 47 to 63 Hz.
**POWER FACTOR:** @ Full Load >0.99.
**HARMONIC CURRENT:** < 5% @ full load.
**FUSE:** Internal fuse provided.

### OUTPUTS:

**VOLTAGE & CURRENT:**
50VDC @ 100A
54VDC @ 93A
**POLARITY:** Output is isolated.
**REMOTE SENSING:** Compensates for up to 0.5V total loop drop in the output line.
**STATIC REGULATION:**
Line: ±0.25% over full line range.
Load: ±0.25%, min to full load.
**VOLTAGE STABILITY:** ±0.1% for 24 hour period after 30 minute warm up.
**TEMP COEFFICIENT:** ±0.02%/°C from 0°C to +50°C.
**DYNAMIC REGULATION:** Less than ±2% deviation for load step from 10% to 90% within 10µs. Recovery within the static regulation limits within 1ms

**RIPPLE AND NOISE:**
50MHz Bandwidth: < 1% $Vout_{pp}$
10Hz – 100kHz: <10$mV_{rms}$
Voice Band: <28dBrnc w/o Batteries.
**MINIMUM LOAD:** Not Required.
**OVER VOLTAGE PROTECTION:** 115% ±5% of nominal. OVP shutdown is latched until the input line is removed for 5 secs and then reapplied. OVP sensing is done at the output terminals.
**OVERCURRENT PROTECTION:**
Current Limit Point: 102% to 108% of full load. Auto recovery on removal of fault.

**ENVIRONMENTAL:**
**OVERTEMPERATURE PROTECTION:**
Automatically shuts down in the event of an over temperature condition.
**TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.
**HUMIDITY:** 20% to 95% non-condensing.
**ALTITUDE:** Operating: 10,000 feet. Non-Operating: To 30,000 feet.
**VIBRATION:** Operating: From 5 to 27 Hz, 0.02 in double amplitude; from 27 Hz to 500 Hz, 0.75G, 3 Axes, 3 min per octave sweep, dwell 15 min at resonance. Non-operating: From 5 to 17 Hz, 0.10 in double amplitude, from 17 to 500Hz, 1.5G peak; 3 axes, 5 min per octave sweep; dwell 15 min at resonance.
**SHOCK:** Operating: 5G, half sine, 11msec, 3 axes. Non-Operating: 15G, half sine, 11msec, 3 axes.
**COOLING:** Internal fan. Airflow exits at connector end.

**STANDARDS:**
The Rectifier is designed to meet

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950.
**EMI:** Conducted & Radiated: EN55022 Level A.
**EMI:** EN50082-1

### MECHANICAL:

**DIMENSIONS:** Case: 5” x 5” x 17”. Exclusive of the I/O Connectors.
**WEIGHT:** 16.4 lbs.
**MOUNTING:** Designed to lock into matching shelf.
**I/O CONNECTORS:** Elcon Top Drawer blind mate hot plug connector
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Model PM33215BP-5

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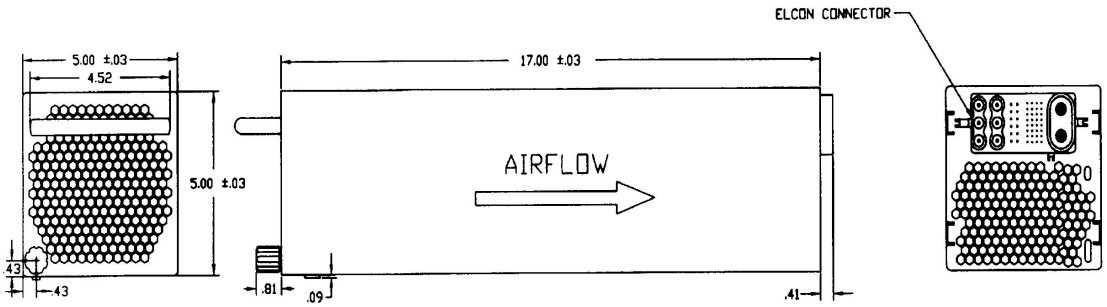
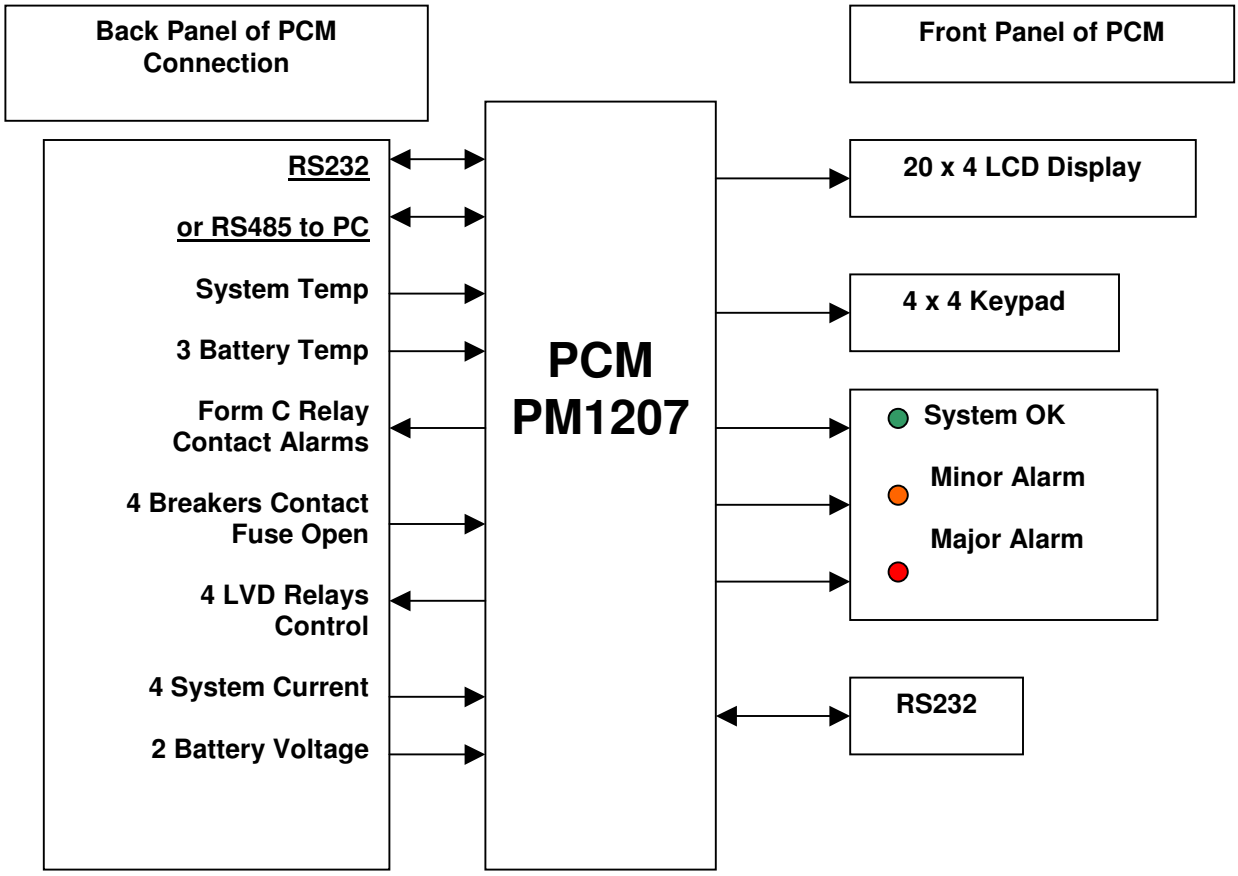
# 5kW Rectifer

## Mechanical & Outline Drawing Model PM33215BP-5

**DIMENSIONS:** Case: 5” x 5” x 17”. Not including the I/O Connectors.
**WEIGHT:** 16.4 lbs.
**MOUNTING:** Designed to lock into matching rack.
**I/O CONNECTORS:** Elcon Top Drawer blind mate hot plug connector.



Power Control Module Block Diagram



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## Control HUB PM1208 Block Diagram