## AC-DC Isolated Converters

<table>
<thead>
<tr>
<th>SECTION</th>
<th>CLASSIFICATION</th>
<th>DC Pwr Out</th>
<th>DC V. Out</th>
<th>Cur. Out</th>
<th>SIZE</th>
<th>Input AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sec. 1</td>
<td>Low Voltage</td>
<td>1 to 3KW</td>
<td>1.2 to 9VDC</td>
<td>600A to 80A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 2</td>
<td>Medium Voltage</td>
<td>1KW to 10KW</td>
<td>12 to 60VDC</td>
<td>800A to 17A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 3</td>
<td>High Voltage</td>
<td>1KW to 10KW</td>
<td>70 to 300VDC</td>
<td>140A to 3A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 4</td>
<td>Programmable Low Voltage</td>
<td>1KW to 3KW</td>
<td>1.2 to 12VDC</td>
<td>600A to 80A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 5</td>
<td>Programmable Medium Voltage</td>
<td>1KW to 10KW</td>
<td>12 to 60VDC</td>
<td>800A to 17A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 6</td>
<td>Programmable High Voltage</td>
<td>1KW to 10KW</td>
<td>70 to 300VDC</td>
<td>140A to 3A</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 7</td>
<td>High Power</td>
<td>20KW to 30KW</td>
<td>32 to 360VDC</td>
<td>625A to 83A</td>
<td>2Ux19&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 8</td>
<td>Low Profile 1U</td>
<td>1KW to 3.5KW</td>
<td>12 to 60VDC</td>
<td>70A to 17A</td>
<td>1.65&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 9</td>
<td>Low Profile 2U</td>
<td>1KW to 1.3KW</td>
<td>12 to 60VDC</td>
<td>83A to 17A</td>
<td>3.5&quot;x5&quot;</td>
<td></td>
</tr>
<tr>
<td>Sec. 10</td>
<td>Multi Output</td>
<td>1KW to 3KW</td>
<td>1.2 to 60VDC</td>
<td>Up to 11 Outputs</td>
<td>5&quot;x5&quot;</td>
<td></td>
</tr>
</tbody>
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### AC-DC Non-Isolated Converters

<table>
<thead>
<tr>
<th>SECTION</th>
<th>CLASSIFICATION</th>
<th>DC Pwr Out</th>
<th>DC V. Out</th>
<th>Cur. Out</th>
<th>SIZE</th>
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<tbody>
<tr>
<td>Sec. 11</td>
<td>Single Output</td>
<td>1KW to 5KW</td>
<td>250 to 400VDC</td>
<td>20A to 4A</td>
<td>3.5&quot;x5&quot;</td>
</tr>
<tr>
<td>Sec. 12</td>
<td>Single Output</td>
<td>5KW to 20KW</td>
<td>250 to 400VDC</td>
<td>80A to 20A</td>
<td>5&quot;x5&quot;</td>
</tr>
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### DC/DC Converters

<table>
<thead>
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<th>SECTION</th>
<th>CLASSIFICATION</th>
<th>DC Pwr Out</th>
<th>DC V. Out</th>
<th>Cur. Out</th>
<th>SIZE</th>
<th>Input DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sec. 13</td>
<td>Isolated Single Output</td>
<td>.5KW to 1.2KW</td>
<td>24 to 48VDC</td>
<td>50A to 10A</td>
<td>3.5&quot;x5&quot;</td>
<td>36VDC to 72VDC</td>
</tr>
<tr>
<td>Sec. 14</td>
<td>Isolated Single Output</td>
<td>.5KW to 1.2KW</td>
<td>1.2 to 48VDC</td>
<td>240A to 10A</td>
<td>5&quot;x5&quot;</td>
<td>36VDC to 72VDC</td>
</tr>
</tbody>
</table>
Sec. 13-19 contd.  DC/DC CONVERTERS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>CLASSIFICATION</th>
<th>DC Pwr. Out</th>
<th>DC V. Out</th>
<th>Cur. Out</th>
<th>SIZE</th>
<th>Input DC</th>
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</thead>
<tbody>
<tr>
<td>Sec. 15</td>
<td>Isolated Single Output</td>
<td>1KW to 3KW</td>
<td>1.2V to 9V</td>
<td>600A to 100A</td>
<td>5” X 5”</td>
<td>90 to 350VDC</td>
</tr>
<tr>
<td>Sec. 16</td>
<td>Isolated Single Output Mid Voltage</td>
<td>1KW to 10KW</td>
<td>12V to 60V</td>
<td>800A to 17A</td>
<td>5” X 5”</td>
<td>90 to 350VDC Or 400 to 750VDC</td>
</tr>
<tr>
<td>Sec. 17</td>
<td>Isolated Single Output High Voltage</td>
<td>1KW to 10KW</td>
<td>70V to 300V</td>
<td>140A to 3A</td>
<td>5” X 5”</td>
<td>90 to 350VDC Or 400 to 750VDC</td>
</tr>
<tr>
<td>Sec. 18</td>
<td>Isolated Single Output</td>
<td>1KW to 5.2KW</td>
<td>24 to 48VDC</td>
<td>215A to 20A</td>
<td>5.73” X 10”</td>
<td>19VDC to 30VDC</td>
</tr>
<tr>
<td>Sec. 19</td>
<td>Non-Isolated Single Output</td>
<td>1KW to 10KW</td>
<td>5 to 120VDC</td>
<td>550A to 8A</td>
<td>5.73” X 10”</td>
<td>10VDC to 150VDC</td>
</tr>
</tbody>
</table>

Sec. 20  MAXIMUM POWER POINT TRACKING

- Maximizes power obtained from a varying energy source such as solar cells or wind power
- Applicable to most PMI AC to DC and DC to DC converter

Sec. 21  POWER RACKS

In the Process of Updating

Sec. 22  INTELLIGENT POWER SUPPLIES/SYSTEMS

All standard supplies and racks are designed to provide Intelligence

<table>
<thead>
<tr>
<th>Control Functions</th>
<th>Number of Remote or Local Power Supply Level</th>
<th>Control Functions Systems Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Functions</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Battery Mgmt. Functions</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Monitor Functions</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Data Storage Functions</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Sec. 23  POWER DISTRIBUTION UNITS - PDUs - MOBILE OR STATIONARY

Complete power distribution center
- EMO Control - Intelligent Monitor and Control
- Designed for a wide range of AC lines, single and three phase.
- Individual AC and DC outputs with plugs, breakers, etc.
### Sec. 24  HARSH ENVIRONMENTS

<table>
<thead>
<tr>
<th>Power:</th>
<th>All PMI standard ratings</th>
</tr>
</thead>
</table>
| Applications: | Corrosive atmosphere  
Conductive dust  
Unreliable AC sources |

### Sec. 25  BATTERY MANAGEMENT

- Powers any standard PMI Supply.
- Standard battery management includes:
  - Charging, equalizing charge current, battery temperature, low voltage detect and trip, battery voltage and current. Full DC distribution.

### Sec. 26  SELECTED OPTIONS

> > 70 Standard Options. Common functions and many uncommon functions.

### Sec. 27  PIONEER’S NUMBERING SYSTEM

<table>
<thead>
<tr>
<th>Model Number Description</th>
<th>Type Number for each output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Input</td>
</tr>
</tbody>
</table>
| Configuration | Number of Outputs  
Input, AC or DC |
| Power | Special Options  
Output Current |
| Case | Input Module  
Option List - section 22 |
| Pluggable | Output Module |
Pioneer’s low voltage high current series provides a wide range of single output PFC Models. The high current models come in the traditional 5”x 5” package configured as hot plug or non-plug. The premium Quality, high performance, high current switchers are rugged with high reliability. These units are featured with 20ms hold up time for the output, internal forced air-cooling and built-in protection from electrical overloads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single Phase or Three Phase AC input line ranging from 90 to 264VAC.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3346</th>
<th>PM3347</th>
<th>PM3348</th>
<th>PM3399</th>
<th>PM33910</th>
<th>PM33911</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>2500W</td>
<td>3000W</td>
</tr>
<tr>
<td>OUTPUT Volt</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>2V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>3.3V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>5V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>6V</td>
<td>167A</td>
<td>200A</td>
<td>250A</td>
<td>333A</td>
<td>416A</td>
<td>500A</td>
</tr>
<tr>
<td>9V</td>
<td>111A</td>
<td>133A</td>
<td>167A</td>
<td>222A</td>
<td>277A</td>
<td>333A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5”</td>
<td>5”</td>
<td>11.25”</td>
<td>5” x 6.25” x 13”</td>
<td>5” x 6.25” x 13”</td>
<td>5” x 8” x 13”</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5”</td>
<td>5”</td>
<td>14”</td>
<td>5” x 6.25” x 15”</td>
<td>5” x 6.25” x 15”</td>
<td>5” x 8” x 15”</td>
</tr>
<tr>
<td>AC INPUT</td>
<td>90V to 264V</td>
<td>180V to 264V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5).
2. All Models are available in AC Input, 1P or 3P.
3. Input current formula: 1φ Iin = Pout/(Vin x Efficiency x 0.99PFC) 
   3φ Iin = Pout/(Vin x Efficiency x 0.95PFC x √3)

**Features:**
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-12BL) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) +10% Output voltage swing
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

### Inputs

- **RANGE:** 90 to 264 VAC, 1φ or 3φ.
- **FREQUENCY:** 47 to 63 Hz. 400Hz also available as an option.
- **POWER FACTOR:**
  - 0.99 @ Full Load for 1φ
  - 0.95 @ Full Load for 3φ
- **INRUSH CURRENT:** < 25A when averaged over 1/2 cycle.
- **HARMONIC CURRENT:** < 5% for 1φ only.
- **HOLD UP TIME:** At least 20msec from loss of input to loss of regulation.

### Environmental

- **AUDIBLE NOISE:** 63dBA/70dbA max at 1 meter.
- **TEMPERATURE:** Operating: 0°C to +50°C at full load.
  - Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 75% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Output

- **ADJUSTMENT RANGE:** ±10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** 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% zero load 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.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1sec max from application of AC line.

### Internal Protection

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVERCURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVERTEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950.
- **CE Mark (LVD):**
- **EMI:** Conducted & Radiated: EN55022 Level A
- **CE Certification:** Optional

---

**5” x 5” x 11.25”**
Up to 1500W
DC Bus Bars
AC Terminal Block
Option Connector DB25

**5” x 5” x 14”**
Up to 1500W
Elcon Top Drawer
Hot Plug Connector

**5” x 8” x 13”**
Up to 3000W
DC Parallel Bus Bars
AC Terminal Block
Option Connector DB25
Pioneer’s introduces a new breed of High Efficiency Mid Voltage PFC Models that provide full output power with Single or Three Phase AC Input. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8 watts/in², these units are featured with internal forced air-cooling and built-in protection from electrical overloads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single or Three Phase AC Input line.

Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3326</th>
<th>PM3327</th>
<th>PM3328</th>
<th>PM3329</th>
<th>PM33210</th>
<th>PM33215</th>
<th>PM36217</th>
<th>PM36218</th>
<th>PM36219</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>3000W</td>
<td>2000W</td>
<td>2500W</td>
<td>5000W</td>
<td>6000W</td>
</tr>
<tr>
<td>Vout</td>
<td>lout</td>
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<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
</tr>
<tr>
<td>12V</td>
<td>83A</td>
<td>100A</td>
<td>125A</td>
<td>166A</td>
<td>250A</td>
<td>166A</td>
<td>208A</td>
<td>416A</td>
<td>500A</td>
</tr>
<tr>
<td>15V</td>
<td>67A</td>
<td>80A</td>
<td>100A</td>
<td>136A</td>
<td>200A</td>
<td>136A</td>
<td>167A</td>
<td>363A</td>
<td>400A</td>
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<tr>
<td>24V</td>
<td>42A</td>
<td>50A</td>
<td>63A</td>
<td>83A</td>
<td>125A</td>
<td>83A</td>
<td>104A</td>
<td>208A</td>
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<td>71A</td>
<td>107A</td>
<td>71A</td>
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<td>179A</td>
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<td>47A</td>
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<td>78A</td>
<td>156A</td>
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<tr>
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<td>30A</td>
<td>37A</td>
<td>50A</td>
<td>75A</td>
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<td>125A</td>
<td>150A</td>
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<tr>
<td>48V</td>
<td>21A</td>
<td>25A</td>
<td>31A</td>
<td>42A</td>
<td>63A</td>
<td>42A</td>
<td>52A</td>
<td>104A</td>
<td>135A</td>
</tr>
<tr>
<td>54V</td>
<td>18A</td>
<td>22A</td>
<td>28A</td>
<td>37A</td>
<td>56A</td>
<td>37A</td>
<td>46A</td>
<td>93A</td>
<td>111A</td>
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<tr>
<td>60V</td>
<td>17A</td>
<td>20A</td>
<td>25A</td>
<td>36A</td>
<td>50A</td>
<td>36A</td>
<td>42A</td>
<td>83A</td>
<td>108A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>11.25&quot;</td>
<td>5&quot;</td>
<td>11.25&quot;</td>
<td>5&quot;</td>
<td>15.5&quot;</td>
<td>5&quot;</td>
<td>15.5&quot;</td>
</tr>
<tr>
<td>Hot Plug</td>
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<td>5&quot;</td>
<td>11.5&quot;</td>
<td>5&quot;</td>
<td>11.5&quot;</td>
<td>5&quot;</td>
<td>17.5&quot;</td>
<td>5&quot;</td>
<td>17.5&quot;</td>
</tr>
<tr>
<td>AC Input</td>
<td>90V</td>
<td>to 264V</td>
<td>180V</td>
<td>to 264V</td>
<td>90V</td>
<td>90V</td>
<td>90V</td>
<td>180V</td>
<td>264V</td>
</tr>
</tbody>
</table>

Notes:
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5).
2. All Models are available in Single Phase or Three Phase AC Input.
3. Input Current formula: 1p In = Pout/(Vn x Efficiency x 0.96PFC)
4. 1000W & 1200W are also available in 2U packages. See section on 1U and 2U Power Supplies

Features:
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

Options:
- (-128L) DC OK with LED Indicator
- (-1CL) AC Fail with LED Indicator
- (-2T) Unit Enable/Disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
# SPECIFICATION

## Inputs
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RANGE:</strong></td>
<td>90 to 264 VAC, 1φ or 3φ. 365 to 528 VAC, 3φ.</td>
</tr>
<tr>
<td><strong>FREQUENCY:</strong></td>
<td>47 to 63 Hz. 400Hz also available as an option.</td>
</tr>
<tr>
<td><strong>POWER FACTOR:</strong></td>
<td>0.99 @ Full Load for 1φ 0.95 @ Full Load for 3φ</td>
</tr>
<tr>
<td><strong>INRUSH CURRENT:</strong></td>
<td>&lt; 25/40A when averaged over 1/2 cycle, depending on output power.</td>
</tr>
<tr>
<td><strong>HARMONIC CURRENT:</strong></td>
<td>&lt; 5% for 1φ only</td>
</tr>
<tr>
<td><strong>INTERNAL FUSE:</strong></td>
<td>One or three depending on 1φ or 3φ</td>
</tr>
</tbody>
</table>

## Environmental
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AUDIBLE NOISE:</strong></td>
<td>63dBA/70dbA max at 1 meter</td>
</tr>
<tr>
<td><strong>TEMPERATURE:</strong></td>
<td>Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.</td>
</tr>
<tr>
<td><strong>HUMIDITY:</strong></td>
<td>20% to 95% non-condensing.</td>
</tr>
<tr>
<td><strong>ALTITUDE:</strong></td>
<td>Operating: 5,000 feet. Non-operating: To 30,000 feet.</td>
</tr>
<tr>
<td><strong>VIBRATION:</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>COOLING:</strong></td>
<td>Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.</td>
</tr>
</tbody>
</table>

## Safety
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAFETY:</strong></td>
<td>UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)</td>
</tr>
<tr>
<td><strong>EMI:</strong></td>
<td>Conducted &amp; Radiated: EN55022 Level A CE Certification is Optional</td>
</tr>
</tbody>
</table>

## Output
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADJUSTMENT RANGE:</strong></td>
<td>±10% of nominal output voltage.</td>
</tr>
<tr>
<td><strong>POLARITY:</strong></td>
<td>Output is isolated. It may be referenced plus/minus as required.</td>
</tr>
<tr>
<td><strong>REMOTE SENSE:</strong></td>
<td>Compensates for up to 0.5V total loop drop, in the output line.</td>
</tr>
<tr>
<td><strong>STATIC REGULATION:</strong></td>
<td>Line: ±0.25% over full line range. Load: ±0.25% zero load to full load.</td>
</tr>
<tr>
<td><strong>VOLTAGE STABILITY:</strong></td>
<td>±0.1% for 24 hour period after 30 minute warm up.</td>
</tr>
<tr>
<td><strong>P-P RIPPLE AND NOISE:</strong></td>
<td>±0.02%/°C from 0°C to +50°C. 1% (20Hz to 50MHz Bandwidth).</td>
</tr>
<tr>
<td><strong>MINIMUM LOAD:</strong></td>
<td>Not Required.</td>
</tr>
<tr>
<td><strong>TURN ON DELAY:</strong></td>
<td>1sec max from application of AC line.</td>
</tr>
</tbody>
</table>

## Internal Protection
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVER VOLTAGE PROTECTION:</strong></td>
<td>125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.</td>
</tr>
<tr>
<td><strong>OVER CURRENT PROTECTION:</strong></td>
<td>Current Limit Point: 110% to 120% of full load.</td>
</tr>
<tr>
<td><strong>SHORT CIRCUIT CURRENT:</strong></td>
<td>Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.</td>
</tr>
<tr>
<td><strong>REVERSE VOLTAGE PROTECTION:</strong></td>
<td>Protected to rated load with the fan running.</td>
</tr>
<tr>
<td><strong>OVER TEMPERATURE PROTECTION:</strong></td>
<td>The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.</td>
</tr>
</tbody>
</table>

---

### 5” x 5” x 17”
- Up to 5000W
- Elcon Top Drawer
- Hot Plug Connector

### 5” x 5” x 11.25”
- Up to 3000W
- DC Bus Bars
- AC Terminal Block
- Option Connector DB25

### 5” x 5” x 15.5”
- Up to 8100W
- DC Bus Bars
- AC Terminal Block
- Option Connector DB25
Pioneer Magnetics introduces a new breed of High Efficiency High Voltage PFC Models that provide full output power with Single or Three Phase AC Input. Designed to support both stand alone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8 watts/in², these units are featured with internal forced air-cooling and built-in protection from electrical overloads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single or Three Phase AC Input line.

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3326</th>
<th>PM3327</th>
<th>PM3328</th>
<th>PM3329</th>
<th>PM33211</th>
<th>PM3329</th>
<th>PM33210</th>
<th>PM33215</th>
<th>PM36216</th>
<th>PM36218</th>
<th>PM36219</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>3000W</td>
<td>2000W</td>
<td>2500W</td>
<td>5000W</td>
<td>6000W</td>
<td>8100W</td>
<td>10000W</td>
</tr>
<tr>
<td>Vout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>70V</td>
<td>14A</td>
<td>17A</td>
<td>21A</td>
<td>29A</td>
<td>43A</td>
<td>29A</td>
<td>36A</td>
<td>71A</td>
<td>86A</td>
<td>116A</td>
<td>143A</td>
</tr>
<tr>
<td>90V</td>
<td>11A</td>
<td>13A</td>
<td>17A</td>
<td>22A</td>
<td>33A</td>
<td>22A</td>
<td>17A</td>
<td>56A</td>
<td>67A</td>
<td>90A</td>
<td>111A</td>
</tr>
<tr>
<td>100V</td>
<td>10A</td>
<td>12A</td>
<td>15A</td>
<td>20A</td>
<td>30A</td>
<td>20A</td>
<td>25A</td>
<td>50A</td>
<td>60A</td>
<td>80A</td>
<td>100A</td>
</tr>
<tr>
<td>150V</td>
<td>8.3A</td>
<td>8A</td>
<td>10A</td>
<td>13A</td>
<td>20A</td>
<td>13A</td>
<td>17A</td>
<td>34A</td>
<td>40A</td>
<td>53A</td>
<td>67A</td>
</tr>
<tr>
<td>200V</td>
<td>5A</td>
<td>6A</td>
<td>8A</td>
<td>10A</td>
<td>15A</td>
<td>10A</td>
<td>13A</td>
<td>25A</td>
<td>30A</td>
<td>40A</td>
<td>50A</td>
</tr>
<tr>
<td>250V</td>
<td>4A</td>
<td>5A</td>
<td>6A</td>
<td>8A</td>
<td>12A</td>
<td>8A</td>
<td>10A</td>
<td>20A</td>
<td>24A</td>
<td>32A</td>
<td>40A</td>
</tr>
<tr>
<td>300V</td>
<td>3A</td>
<td>4A</td>
<td>5A</td>
<td>7A</td>
<td>10A</td>
<td>7A</td>
<td>8A</td>
<td>17A</td>
<td>20A</td>
<td>27A</td>
<td>33A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5”</td>
<td>5”</td>
<td>11.25”</td>
<td>5”</td>
<td>5”</td>
<td>11.25”</td>
<td>5”</td>
<td>5”</td>
<td>15.5”</td>
<td>5”</td>
<td>5”</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5”</td>
<td>5”</td>
<td>11.5”</td>
<td>5”</td>
<td>5”</td>
<td>11.5”</td>
<td>5”</td>
<td>5”</td>
<td>17”</td>
<td>5”</td>
<td>5”</td>
</tr>
<tr>
<td>AC Input</td>
<td>90V to 264V</td>
<td>180V to 264V</td>
<td>90V to 264V</td>
<td>180V to 264V</td>
<td>or 365V 528VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5).
2. Models with prefix PM36 are high efficiency units.
3. All Models are available in Single Phase or Three Phase AC Input.
4. Input Current Formula: 1φ lin = Pout/(Vin x Efficiency x 0.99PFC)
   3φ lin = Pout/(Vin x Efficiency x 0.95PFC x √3)
5. 1000W & 1200W are also available in 2U packages. See section on 1U and 2U Power Supplies.

### Features:
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

### Options:
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Drift current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
## SPECIFICATION

### Inputs
- **RANGE:** 90 to 264 VAC, 1φ or 3φ. 385 to 528 VAC, 3φ
- **FREQUENCY:** 47 to 63 Hz. 400Hz also available as an option
- **POWER FACTOR:**
  - 0.99 @ Full Load for 1φ
  - 0.95 @ Full Load for 3φ
- **INRUSH CURRENT:** 25/40A when averaged over 1/2 cycle, depending on output power.
- **HARMONIC CURRENT:** < 5% for 1φ only
- **INTERNAL FUSE:** One or three depending on 1φ or 3φ

### Output
- **ADJUSTMENT RANGE:** ±10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** 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% zero load to full load.
- **VOLTAGE STABILITY:** ±0.1% for 24 hour period after 30 minute warm up.
- **P-P RIPPLE AND NOISE:**
  - Line: < 5% for 1φ only
  - Power Factor: 0.99 @ Full Load for 1φ

### Environmental
- **AUDIBLE NOISE:** 63dBA/70dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load.
  - Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

### Internal Protection
- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION**
  - Current Limit Point: 110% to 120% of full load.
  - SHORT CIRCUIT CURRENT: Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety
- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
- **CE Certification is Optional**
Pioneer’s programmable low voltage high current series provides a wide range of single output PFC Models. The high current models come in the traditional 5”x 5” package configured as hot plug or non-plug. Individual modules can be stacked to give up to 600A of load capacity. The premium Quality, high performance, high current switchers are rugged and highly reliable. These units are featured with 20ms hold up time for the output, internal forced air-cooling and built-in protection from electrical overloads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single Phase or Three Phase AC input line ranging from 90 to 264VAC.

Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3356</th>
<th>PM3357</th>
<th>PM3358</th>
<th>PM3359</th>
<th>PM33510</th>
<th>PM33511</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>2500W</td>
<td>3000W</td>
</tr>
<tr>
<td>OUTPUT Vout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
</tr>
<tr>
<td>0V to 2V</td>
<td>0A to 200A</td>
<td>0A to 240A</td>
<td>0A to 300A</td>
<td>0A to 400A</td>
<td>0A to 500A</td>
<td>0A to 600A</td>
</tr>
<tr>
<td>0V to 3.3V</td>
<td>0A to 200A</td>
<td>0A to 240A</td>
<td>0A to 300A</td>
<td>0A to 400A</td>
<td>0A to 500A</td>
<td>0A to 600A</td>
</tr>
<tr>
<td>0V to 5V</td>
<td>0A to 200A</td>
<td>0A to 240A</td>
<td>0A to 300A</td>
<td>0A to 400A</td>
<td>0A to 500A</td>
<td>0A to 600A</td>
</tr>
<tr>
<td>0V to 6V</td>
<td>0A to 167A</td>
<td>0A to 200A</td>
<td>0A to 250A</td>
<td>0A to 333A</td>
<td>0A to 416A</td>
<td>0A to 500A</td>
</tr>
<tr>
<td>0V to 9V</td>
<td>0A to 111A</td>
<td>0A to 133A</td>
<td>0A to 167A</td>
<td>0A to 222A</td>
<td>0A to 277A</td>
<td>0A to 333A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5&quot; x 5&quot; x 11.25&quot;</td>
<td>5&quot; x 5&quot; x 11.25&quot;</td>
<td>5&quot; x 5&quot; x 11.25&quot;</td>
<td>5&quot; x 6.25&quot; x 13&quot;</td>
<td>5&quot; x 6.25&quot; x 13&quot;</td>
<td>5&quot; x 8&quot; x 13&quot;</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5&quot; x 5&quot; x 14&quot;</td>
<td>5&quot; x 5&quot; x 14&quot;</td>
<td>5&quot; x 5&quot; x 14&quot;</td>
<td>5&quot; x 6.25&quot; x 15&quot;</td>
<td>5&quot; x 6.25&quot; x 15&quot;</td>
<td>5&quot; x 8&quot; x 15&quot;</td>
</tr>
<tr>
<td>AC Input</td>
<td>90V to 264 V</td>
<td>180V to 264 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5)
2. All Models are available in 1φ or 3φ AC Input.
3. Input Current formula: 1φ Iin = Pout/(Vin x Efficiency x 0.99PFC)
   3V Iin = Pout/(Vin x Efficiency x 0.95PFC x √3)

Features:
- Power Factor Correction
- 0°C to +50°C at full load
- De-rated @ 70°C
- Output fully floating
- Over current protection
- Over voltage protection
- Remote sense
- Over temperature protection
- Internal forced Air Cooling

Options:
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

**Inputs**

- **RANGE:** 90 to 264 VAC, 1φ or 3φ
- **FREQUENCY:** 47 to 63 Hz. 400Hz also available as an option
- **POWER FACTOR:** 0.99 @ Full Load for 1φ
  0.95 @ Full Load for 3φ
- **INRUSH CURRENT:** < 25A when averaged over 1/2 cycle.
- **HARMONIC CURRENT:** < 5% for 1φ only
- **HOLD UP TIME:** At least 20msec from loss of input to loss of regulation.

**Environmental**

- **AUDIBLE NOISE:** 63dBA/70dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load.
  Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 75% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end.

**Output**

- **ADJUSTMENT RANGE:** See Product matrix for Programmable Range
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** 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% zero load 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.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1sec max from application of AC line.

**Internal Protection**

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal.
  OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVERCURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVERTEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

**Safety**

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
  CE Certification is Optional

---

5" x 5" x 11.25"
Up to 1500W
DC Bus Bars
AC Terminal Block
Option Connector DB25

5" x 5" x 14"
Up to 1500W
Elcon Top Drawer
Hot Plug Connector
Pioneer Magnetics introduces a new breed of High Efficiency Programmable Mid Voltage PFC Models that provide full output power with Single or Three Phase AC Input. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8 watts/in³, these units are featured with internal forced air-cooling and built-in protection from electrical overloads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single or Three Phase AC Input line.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3356</th>
<th>PM3357</th>
<th>PM3358</th>
<th>PM3359</th>
<th>PM33511</th>
<th>PM3359</th>
<th>PM33510</th>
<th>PM33515</th>
<th>PM36516</th>
<th>PM36518</th>
<th>PM36519</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>3000W</td>
<td>2000W</td>
<td>2500W</td>
<td>5000W</td>
<td>6000W</td>
<td>8100W</td>
<td>10000W</td>
</tr>
<tr>
<td>Vout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
<td>lout</td>
</tr>
<tr>
<td>0 to 12V</td>
<td>0 to 83A</td>
<td>0 to 100A</td>
<td>0 to 125A</td>
<td>0 to 166A</td>
<td>0 to 250A</td>
<td>0 to 166A</td>
<td>0 to 208A</td>
<td>0 to 416A</td>
<td>0 to 500A</td>
<td>0 to 675A</td>
<td>0 to 833A</td>
</tr>
<tr>
<td>0 to 15V</td>
<td>0 to 67A</td>
<td>0 to 80A</td>
<td>0 to 100A</td>
<td>0 to 136A</td>
<td>0 to 200A</td>
<td>0 to 136A</td>
<td>0 to 42A</td>
<td>0 to 363A</td>
<td>0 to 400A</td>
<td>0 to 540A</td>
<td>0 to 665A</td>
</tr>
<tr>
<td>0 to 24V</td>
<td>0 to 42A</td>
<td>0 to 50A</td>
<td>0 to 63A</td>
<td>0 to 83A</td>
<td>0 to 125A</td>
<td>0 to 83A</td>
<td>0 to 46A</td>
<td>0 to 208A</td>
<td>0 to 271A</td>
<td>0 to 367A</td>
<td>0 to 416A</td>
</tr>
<tr>
<td>0 to 28V</td>
<td>0 to 36A</td>
<td>0 to 43A</td>
<td>0 to 54A</td>
<td>0 to 71A</td>
<td>0 to 107A</td>
<td>0 to 71A</td>
<td>0 to 52A</td>
<td>0 to 179A</td>
<td>0 to 232A</td>
<td>0 to 289A</td>
<td>0 to 357A</td>
</tr>
<tr>
<td>0 to 32V</td>
<td>0 to 30A</td>
<td>0 to 38A</td>
<td>0 to 47A</td>
<td>0 to 63A</td>
<td>0 to 94A</td>
<td>0 to 63A</td>
<td>0 to 63A</td>
<td>0 to 156A</td>
<td>0 to 203A</td>
<td>0 to 253A</td>
<td>0 to 312A</td>
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<tr>
<td>0 to 40V</td>
<td>0 to 25A</td>
<td>0 to 30A</td>
<td>0 to 37A</td>
<td>0 to 50A</td>
<td>0 to 75A</td>
<td>0 to 50A</td>
<td>0 to 78A</td>
<td>0 to 125A</td>
<td>0 to 150A</td>
<td>0 to 202A</td>
<td>0 to 250A</td>
</tr>
<tr>
<td>0 to 48V</td>
<td>0 to 21A</td>
<td>0 to 25A</td>
<td>0 to 31A</td>
<td>0 to 42A</td>
<td>0 to 63A</td>
<td>0 to 42A</td>
<td>0 to 89A</td>
<td>0 to 104A</td>
<td>0 to 135A</td>
<td>0 to 169A</td>
<td>0 to 208A</td>
</tr>
<tr>
<td>0 to 54V</td>
<td>0 to 18A</td>
<td>0 to 22A</td>
<td>0 to 28A</td>
<td>0 to 37A</td>
<td>0 to 56A</td>
<td>0 to 37A</td>
<td>0 to 104A</td>
<td>0 to 93A</td>
<td>0 to 111A</td>
<td>0 to 150A</td>
<td>0 to 185A</td>
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<tr>
<td>0 to 60V</td>
<td>0 to 17A</td>
<td>0 to 20A</td>
<td>0 to 25A</td>
<td>0 to 36A</td>
<td>0 to 50A</td>
<td>0 to 36A</td>
<td>0 to 167A</td>
<td>0 to 83A</td>
<td>0 to 108A</td>
<td>0 to 135A</td>
<td>0 to 167A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5” 5” 11.25”</td>
<td>5 5 11.25”</td>
<td>5 5 11.25”</td>
<td>5 5 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
<td>5” 5” 15.5”</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5” 5” 11.5”</td>
<td>5 5 11.5”</td>
<td>5 5 11.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
<td>5” 5” 17.5”</td>
</tr>
<tr>
<td>AC Input</td>
<td>90V to 264V</td>
<td>180V to 264V</td>
<td>90V to 264V</td>
<td>180V to 264V</td>
<td>365V to 528V</td>
<td>180V to 264V</td>
<td>365V to 528V</td>
<td>180V to 264V</td>
<td>365V to 528V</td>
<td>180V to 264V</td>
<td>365V to 528V</td>
</tr>
</tbody>
</table>

Notes:
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5)
2. Models with prefix PM36 are high efficiency units.
3. All Models are available in Single Phase or Three Phase AC Input.
4. Input Current formula 1p lin = Pout/(Vin x Efficiency x 0.99PFC)
   3p lin = Pout/(Vin x Efficiency x 0.95PFC x √3)
5. 1000W & 1200W are also available in 2U packages. See section on 1U and 2U Power Supplies

**Features:**
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
### Specification

#### Inputs

**RANGE:** 90 to 264 VAC, 1φ or 3φ, 365 to 528 VAC, 3φ  
**FREQUENCY:** 47 to 63 Hz. 400Hz also available as an option  
**POWER FACTOR:**  
0.99 @ Full Load for 1φ  
0.95 @ Full Load for 3φ  
**INRUSH CURRENT:** < 2540A when averaged over 1/2 cycle, depending on output power.  
**HARMONIC CURRENT:** < 5% for 1φ only  
**INTERNAL FUSE:** One or three depending on 1φ or 3φ.

#### Environmental

**DMTF:** Over 500,000 hrs  
**AUDIBLE NOISE:** 63dBA/70dBA max at 1 meter  
**TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.  
**HUMIDITY:** 20% to 95% non-condensing.  
**ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.  
**COOLING:** Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

#### Output

**ADJUSTMENT RANGE:** See Product Matrix for Programmable Range  
**POLARITY:** Output is isolated. It may be referenced plus/minus as required.  
**REMOTE SENSE:** 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% zero load to full load.  
**VOLTAGE STABILITY:** ±0.1% for 24 hour period after 30 minute warm up.  
**P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).

#### Internal Protection

**OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.  
**OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.  
**SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.  
**REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.  
**OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

#### Safety

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)  
**EMI:** Conducted & Radiated: EN55022 Level A  
**CE Certification:** Optional
Pioneer Magnetics introduces a new breed of High Efficiency High Voltage PFC Models that provide full output power with Single or Three Phase AC Input. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8watts/in³, these units are featured with internal forced air-cooling and built-in protection from electrical over-loads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single or Three Phase AC Input line.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3356</th>
<th>PM3357</th>
<th>PM3358</th>
<th>PM3359</th>
<th>PM33510</th>
<th>PM33515</th>
<th>PM36516</th>
<th>PM36518</th>
<th>PM36519</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>2000W</td>
<td>2500W</td>
<td>5000W</td>
<td>6000W</td>
<td>8100W</td>
</tr>
<tr>
<td>Vout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 70V</td>
<td>0 to 14A</td>
<td>0 to 17A</td>
<td>0 to 21A</td>
<td>0 to 29A</td>
<td>0 to 43A</td>
<td>0 to 29A</td>
<td>0 to 36A</td>
<td>0 to 71A</td>
<td>0 to 86A</td>
</tr>
<tr>
<td>0 to 90V</td>
<td>0 to 11A</td>
<td>0 to 13A</td>
<td>0 to 17A</td>
<td>0 to 22A</td>
<td>0 to 33A</td>
<td>0 to 22A</td>
<td>0 to 17A</td>
<td>0 to 56A</td>
<td>0 to 67A</td>
</tr>
<tr>
<td>0 to 100V</td>
<td>0 to 10A</td>
<td>0 to 12A</td>
<td>0 to 15A</td>
<td>0 to 20A</td>
<td>0 to 30A</td>
<td>0 to 20A</td>
<td>0 to 25A</td>
<td>0 to 50A</td>
<td>0 to 60A</td>
</tr>
<tr>
<td>0 to 150V</td>
<td>0 to 8A</td>
<td>0 to 8A</td>
<td>0 to 10A</td>
<td>0 to 13A</td>
<td>0 to 20A</td>
<td>0 to 13A</td>
<td>0 to 17A</td>
<td>0 to 34A</td>
<td>0 to 40A</td>
</tr>
<tr>
<td>0 to 200V</td>
<td>0 to 5A</td>
<td>0 to 6A</td>
<td>0 to 8A</td>
<td>0 to 10A</td>
<td>0 to 15A</td>
<td>0 to 10A</td>
<td>0 to 13A</td>
<td>0 to 25A</td>
<td>0 to 30A</td>
</tr>
<tr>
<td>0 to 250V</td>
<td>0 to 4A</td>
<td>0 to 5A</td>
<td>0 to 6A</td>
<td>0 to 8A</td>
<td>0 to 12A</td>
<td>0 to 8A</td>
<td>0 to 10A</td>
<td>0 to 20A</td>
<td>0 to 24A</td>
</tr>
<tr>
<td>0 to 300V</td>
<td>0 to 3A</td>
<td>0 to 4A</td>
<td>0 to 5A</td>
<td>0 to 7A</td>
<td>0 to 10A</td>
<td>0 to 7A</td>
<td>0 to 8A</td>
<td>0 to 17A</td>
<td>0 to 20A</td>
</tr>
</tbody>
</table>

**Non-Plug**

- 5”
- 5”
- 11.25”
- 5”
- 5”
- 11.25”
- 5”
- 5”
- 15.55”
- 5”
- 5”
- 15.5”

**Hot Plug**

- 5”
- 5”
- 11.50”
- 5”
- 5”
- 11.5”
- 5”
- 5”
- 17”
- 5”
- 5”
- 17”

**AC Input**

- 90V to 264V
- 180V to 264V
- 90V to 264V
- 180V to 264V or 365V 528VDC

**Notes:**
1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5)
2. Models with prefix PM36 are high efficiency units.
3. All Models are available in Single Phase or Three Phase AC Input.
4. Input Current formula: 1φIin = Pout/(Vin x Efficiency x 0.99PFC)
   
   3φIin = Pout/(Vin x Efficiency x 0.95PFC x √3)
5. 1000W & 1200W are also available in 2U packages. See section on 1U and 2U Power Supplies

**Features:**
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

### Inputs

- **RANGE:** 90 to 264 VAC, 1φ or 3φ. 365 to 528 VAC, 3φ
- **FREQUENCY:** 47 to 63 Hz. 400Hz also available as an option.
- **POWER FACTOR:** 0.99 @ Full Load for 1φ
  0.95 @ Full Load for 3φ
- **INRUSH CURRENT:** < 25A/40A when averaged over 1/2 cycle, depending on output power.
- **HARMONIC CURRENT:** < 5% for 1φ only
- **INTERNAL FUSE:** One or three depending on 1φ or 3φ

### Environmental

- **AUDIBLE NOISE:** 63dBA/70dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load.
  Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

### Output

- **ADJUSTMENT RANGE:** ±10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** 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% zero load 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.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).

### Internal Protection

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
  CE Certification is Optional
Pioneer introduces a new line of High Efficiency, High Power and Liquid Cooled Product Series that provides full output power with Three Phase AC Input ranging from 365V to 600V. Designed to support both standalone and parallel configurations, these models are configured in standard I/O interfaces with quick liquid disconnects with no spill. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 2U x 19” rack mount configuration. With optimum power density, excluding the I/O interface, water connection, input fuse case and holdup time, these units are featured with liquid cooling and built-in protection from electrical over-loads and over temperature.

A single unit provides continuous full power over ambient operating temperatures of 0°C to +50°C, Three Phase AC Input line and max inlet liquid temperature of +35°C.

Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM37222</th>
<th>PM37223</th>
<th>PM37224</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>20kW</td>
<td>25kW</td>
<td>30kW</td>
</tr>
<tr>
<td>Vout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>32V</td>
<td>625A</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>42V</td>
<td>475A</td>
<td>600A</td>
<td>-----</td>
</tr>
<tr>
<td>48V</td>
<td>415A</td>
<td>520A</td>
<td>625A</td>
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<tr>
<td>60V</td>
<td>335A</td>
<td>415A</td>
<td>500A</td>
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<td>100V</td>
<td>200A</td>
<td>250A</td>
<td>300A</td>
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<td>200V</td>
<td>100A</td>
<td>125A</td>
<td>150A</td>
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<tr>
<td>300V</td>
<td>70A</td>
<td>85A</td>
<td>100A</td>
</tr>
<tr>
<td>360V</td>
<td>55A</td>
<td>70A</td>
<td>83A</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2U x 17.4” x 24.4”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC Input</td>
<td>365VAC</td>
<td>to</td>
<td>600VAC</td>
</tr>
</tbody>
</table>

Notes: AC Input is Three Phase

Features:
- Power Factor Correction
- Ambient 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 2U x 19” Rack Mount
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Max Inlet Liquid Temperature +35°C
- Input Fuses With Safety Cover

Options:
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output Margining
- (-6B) Single wire current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-311) Isolated current monitor
- (-62B) 12V Aux Power Supply
- (-314) Max Inlet Liquid Temperature +60°C
- (-60/61) Voltage and Current Programming
- (-P) Pluggability
- (-E) Extended Hold up Time
# SPECIFICATION

## Inputs
- **RANGE:** 365 to 600VAC, 3P
  - Nominal 480VAC
- **FREQUENCY:** 47 to 63 Hz.
- **POWER FACTOR:** >0.94 @ Full Load.
- **EFFICIENCY:** Typical 92%

## Environmental
- **AUDIBLE NOISE:** < 50dBA at 1m max
- **MAX INLET WATER TEMPERATURE:** +35°C
- **AMBIENT TEMPERATURE:** 0°C to +50°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **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.
- **COOLING:** Cold Plate to Liquid cooling. Min Liquid Flow Rate 2.5g/min

## Safety
- **SAFETY:** TUV to EN60950-1. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A

## Output
- **POWER:** See Product Matrix
- **VOLTAGE & CURRENT:** See Product Matrix
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **STATIC REGULATION:**
  - Line: ±0.25% over full line range.
  - Load: ±0.25% from zero to full load.
- **VOLTAGE STABILITY:** ±0.1% for 24-hr period after 30-minute warm up.
- **P-P RIPPLE:** 1% Voutpp, 5% to 100% load
- **MINIMUM LOAD:** Not Required.

## Internal Protection
- **OVER VOLTAGE PROTECTION:** 115% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 105% to 110% of full load.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit.
- **INPUT FUSES:** Three 60A fuses are provided with safety cover
Pioneer’s introduces a 1U Low Profile High Efficiency PFC Series that provide full output power with 1φ AC Input. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the low profile 1U x 5” package. With power density up to 25 watts/in³, these units are featured with internal forced air-cooling and built-in protection from electrical over-loads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single AC Input line.

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3326</th>
<th>PM3327</th>
<th>PM3328</th>
<th>PM3329</th>
<th>PM33210</th>
<th>PM33211</th>
<th>PM33212</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>2500W</td>
<td>3000W</td>
<td>3500W</td>
</tr>
<tr>
<td>Vout 12V</td>
<td>73A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vout 15V</td>
<td>67A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vout 24V</td>
<td>42A</td>
<td>50A</td>
<td>63A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Vout 28V</td>
<td>36A</td>
<td>43A</td>
<td>54A</td>
<td>73A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vout 32V</td>
<td>30A</td>
<td>38A</td>
<td>47A</td>
<td>63A</td>
<td>73A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vout 40V</td>
<td>25A</td>
<td>30A</td>
<td>37A</td>
<td>50A</td>
<td>63A</td>
<td>75A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vout 48V</td>
<td>21A</td>
<td>25A</td>
<td>31A</td>
<td>42A</td>
<td>52A</td>
<td>63A</td>
<td>73A</td>
</tr>
<tr>
<td>Vout 54V</td>
<td>18A</td>
<td>22A</td>
<td>28A</td>
<td>37A</td>
<td>46A</td>
<td>56A</td>
<td>65A</td>
</tr>
<tr>
<td>Vout 60V</td>
<td>17A</td>
<td>20A</td>
<td>25A</td>
<td>36A</td>
<td>42A</td>
<td>50A</td>
<td>67A</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>1.62&quot;</td>
<td>X</td>
<td>5&quot;</td>
<td>X</td>
<td>17&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC Input</td>
<td>180VAC</td>
<td>To</td>
<td>264VAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Input Current Formula: \( 1\phi \text{ I} \text{in} = \frac{P_{\text{out}}}{(\text{Vin} \times \text{Efficiency} \times 0.99 \text{PFC})} \)

### Features:
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 1U x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

### Options:
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
## SPECIFICATION

### Inputs

- **RANGE:** 180 to 264 VAC, 1φ.
- **FREQUENCY:** 47 to 63 Hz.
- **POWER FACTOR:** 0.99 @ Full Load
- **INRUSH CURRENT:** < 25A when averaged over 1/2 cycle.
- **HARMONIC CURRENT:** < 5%
- **INTERNAL FUSE:** Provided

### Environmental

- **AUDIBLE NOISE:** 68.5dBA at 1 meter for a single unit and 73.5dBA for a rack.
- **TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

### Output

- **ADJUSTMENT RANGE:** +5% to -10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** Compensates for up to 0.5V total loop drop, in the output line.
- **STATIC REGULATION:** Line: ±0.1% for 24 hour period after 30 minute warm up.
- **VOLTAGE STABILITY:** ±0.02%/°C from 0°C to +50°C.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1sec max from application of AC line.

### Internal Protection

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, unit recovers automatically.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
  CE Certification is Optional
Pioneer’s introduces a 2U Low Profile High Efficiency PFC Series that provide full output power with Single AC Input. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the low profile 2U x 5” package. These low profile units are featured with internal forced air-cooling and built-in protection from electrical over-loads and over temperature.

A single module provides continuous full power over operating temperatures of 0°C to +50°C, from a Single AC Input line.

Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3326</th>
<th>PM3327</th>
<th>PM3328</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1334W</td>
</tr>
<tr>
<td>Vout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>12V</td>
<td>83A</td>
<td>100A</td>
<td>110A</td>
</tr>
<tr>
<td>15V</td>
<td>67A</td>
<td>80A</td>
<td>89A</td>
</tr>
<tr>
<td>24V</td>
<td>42A</td>
<td>50A</td>
<td>56A</td>
</tr>
<tr>
<td>28V</td>
<td>36A</td>
<td>43A</td>
<td>48A</td>
</tr>
<tr>
<td>32V</td>
<td>30A</td>
<td>38A</td>
<td>42A</td>
</tr>
<tr>
<td>40V</td>
<td>25A</td>
<td>30A</td>
<td>33A</td>
</tr>
<tr>
<td>48V</td>
<td>21A</td>
<td>25A</td>
<td>28A</td>
</tr>
<tr>
<td>54V</td>
<td>18A</td>
<td>22A</td>
<td>24A</td>
</tr>
<tr>
<td>60V</td>
<td>17A</td>
<td>20A</td>
<td>22A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>3.5”</td>
<td>5”</td>
<td>11.25”</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>3.5”</td>
<td>5”</td>
<td>12</td>
</tr>
<tr>
<td>AC Input</td>
<td>90V</td>
<td>To</td>
<td>264V</td>
</tr>
</tbody>
</table>

Notes: 1. All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5)  
2. Input Current Formula: \( I_{in} = \frac{P_{out}}{V_{in} \times \text{Efficiency} \times 0.99\text{PFC}} \)  
3. The dimension of 12V output unit is 4.1” x 5” x 11.25” for non-plug configuration

Features:
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 2U x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

Options:
- (-128L) DC OK with LED indicator
- (-1CL) AC Fail with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

### Inputs
- **RANGE:** 90 to 264 VAC, 1φ.
- **FREQUENCY:** 47 to 63 Hz.
- **POWER FACTOR:** 0.99 @ Full Load
- **INRUSH CURRENT:** < 25A when averaged over 1/2 cycle.
- **HARMONIC CURRENT:** < 5%
- **INTERNAL FUSE:** Provided

### Environmental
- **AUDIBLE NOISE:** 60dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load.
  Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

### Output
- **ADJUSTMENT RANGE:** +5% to -10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSE:** Compensates for up to 0.5V total loop drop, in the output line.
- **STATIC REGULATION:**
  - Line: ±0.1% for 24 hour period after 30 minute warm up.
  - Load: ±0.25% zero load to full load.
- **VOLTAGE STABILITY:** ±0.02%/°C from 0°C to +50°C.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1sec max from application of AC line.

### Internal Protection
- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal.
  OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety
- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
- **CE Certification is Optional**
The Multiple Output PFC series offers a variety of configurations of output power from 750W to 3000W with up to 11 outputs. The New PM3380 and PM3390 modular and flexible product line provides uninterrupted high performance at full output power. These multiple output units are featured with 20ms hold up time for the output, internal forced air-cooling and built-in protection from electrical overloads.

Compliant with International Safety and EMI standards, this broad selection of multiple output supplies support a wide range of applications including telecom and large multimedia computer systems.

### Features:
- Power Factor Corrected
- 0°C to +50°C at full load
- All Outputs Fully Floating
- Over Current Protection on all Outputs
- Over Voltage Protection on all Outputs
- Remote Sense on all Outputs
- Over Temperature Protection
- Self-contained Forced Air Cooling
- Safety UL, CSA, TUV
- CE Marking (LVD)

### Options:
- (-P) Hot Pluggable
- (-1) AC Power Fail - Primary Channel Only
- (-2) Remote Enable/Disable
- (-5) Margining/Programming
- (-6B) Single Wire Current Sharing
- (-8T) DC Power Good
- (-8UV) Undervoltage Detect
- (20C) Isolation Diodes
- (-33) Output Current Monitor - Primary Channel Only

### Note:
- All Models are available with wide input range 90 to 264VAC (option –6) or high input 180 to 264VAC (option –5)
- All Models are available in Single Phase or Three Phase AC Input.
- Input Current for Single Phase can be calculated using the formula
  \[ I_{in} = \frac{P_{out}}{(V_{in} \times \text{Efficiency} \times 0.99\text{PFC})} \]
- Input Current for Three Phase can be calculated using the formula
  \[ I_{in} = \frac{P_{out}}{(V_{in} \times \text{Efficiency} \times 0.99\text{PFC} \times \sqrt{3})} \]
### Product Matrix II – 1000W to 1500W

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3386B-5</th>
<th>PM3387B-5</th>
<th>PM3398E-5</th>
<th>PM3398D-5</th>
<th>PM3398D-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>1500W</td>
<td>1500W</td>
</tr>
<tr>
<td># of Channels</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>8</td>
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<tr>
<td>MAIN CHANNELS</td>
<td>CH1</td>
<td>CH1</td>
<td>CH1</td>
<td>CH1</td>
<td>CH2</td>
</tr>
<tr>
<td>Power Max</td>
<td>750W</td>
<td>875W</td>
<td>1000W</td>
<td>750W</td>
<td>750W</td>
</tr>
<tr>
<td>Voltage VDC</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Current Max</td>
<td>150A</td>
<td>175A</td>
<td>200A</td>
<td>150A</td>
<td>150A</td>
</tr>
<tr>
<td>SECONDARY(S)</td>
<td>CH2 &amp; CH3</td>
<td>CH2 &amp; CH3</td>
<td>CH3 &amp; CH4</td>
<td>CH3 &amp; CH4</td>
<td>CH3 &amp; CH4</td>
</tr>
<tr>
<td>Power Max</td>
<td>250W</td>
<td>250W</td>
<td>250W</td>
<td>250W</td>
<td>250W</td>
</tr>
<tr>
<td>Voltage VDC</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
</tr>
<tr>
<td>Current Max</td>
<td>15A</td>
<td>15A</td>
<td>15A</td>
<td>15A</td>
<td>15A</td>
</tr>
<tr>
<td>SECONDARY(S)</td>
<td>CH4 &amp; CH5</td>
<td>CH4 &amp; CH5</td>
<td>CH4 &amp; CH5</td>
<td>CH5 TO CH8</td>
<td>CH5 TO CH8</td>
</tr>
<tr>
<td>Power Max</td>
<td>125W</td>
<td>125W</td>
<td>125W</td>
<td>125W</td>
<td>125W</td>
</tr>
<tr>
<td>Voltage VDC</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
<td>2 to 28V</td>
</tr>
<tr>
<td>Current Max</td>
<td>7.5A</td>
<td>7.5A</td>
<td>7.5A</td>
<td>7.5A</td>
<td>7.5A</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>5” x 5” x 11.25”</td>
<td>5” x 7.25” x 12.8”</td>
<td>5” x 7.25” x 12.8”</td>
<td>5” x 6.5” x 12.8”</td>
<td>5” x 6.5” x 12.8”</td>
</tr>
</tbody>
</table>

* Outputs Available 2, 3.3, 5, 12, 15, 24, 28, 48 and 60VDC.

## SPECIFICATION

### Inputs

**RANGE:** From 90 to 264 VAC, 1φ or 3φ.  
**FREQUENCY:** 47 to 63 Hz.  
**POWER FACTOR:** 0.99 @ Full Load for 1φ only.  
**INRUSH CURRENT:** < 25A when averaged over 1/2 cycle.  
**HARMONIC CURRENT:** < 5% for 1φ  
**HOLD UP TIME:** At least 20msec from loss of input to loss of regulation.

### Environmental

**AUDIBLE NOISE:** 63dBA/70dBa max at 1 meter  
**TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.  
**HUMIDITY:** 20% to 95% non-condensing.  
**ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.  
**COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Safety

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)  
**EMI:** Conducted & Radiated: EN55022 Level A CE Certification is optional.

### Output

**POWER:** See Product Matrix  
**VOLTAGE & CURRENT:** See Product Matrix.  
**ADJUSTMENT RANGE:** ±10% of nominal output voltage for all channels.  
**POLARITY:** Outputs are isolated. They may be referenced plus/minus as required.  
**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% zero load 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.  
**P-P RIPPLE AND NOISE:** 1% on Primary Channels, 2% on Secondary Channels  
**POLARITY:** Outputs are isolated. They may be referenced plus/minus as required.  
**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% zero load 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.  
**P-P RIPPLE AND NOISE:** 1% on Primary Channels, 2% on Secondary Channels  
**MINIMUM LOAD:** 50 watts required on Primary Channel to support the Secondary Channels.

### Internal Protection

**OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.  
**OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.  
**SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.  
**REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.  
**OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.
Pioneer’s Modular PFC Product Series can also be used in applications where 400VDC non-isolated single output bulk power converter is required. With PFC, output power can be maintained with a 30% reduction in RMS line current. Other advantages include improved hold-up performance, reduced line harmonics (for 1φ input only), and insensitivity to voltage and frequency variations. Because they effectively eliminate harmonic currents, the converters are ideal for applications where neutral wire current exceeds recommended ratings due to waveform distortion caused by the typical off-line units.

Additional benefit of the bulk power converter is that it eliminates the need for switches and jumpers to adapt the supply for 110VAC or 220VAC operation, creating a “Universal Input” power unit. The input voltage on the bulk PFC converter is boosted to provide a nominal 400VDC output for conventional pulse width modulated (PWM) power supplies or distributed DC bus network. It meets the most stringent international safety and EMI standards, including the IEC555-2 which limits line current harmonic content to less than 5% (for 1φ input only).

With wide input range, the bulk power series can deliver up to 10,000 watts. Operating temperature ranges from 0°C to +50°C at full load. Improvements in electrical and heat transfer technology allow component stresses to be kept well within manufacturers’ rating, ensuring high reliability.

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3526</th>
<th>PM3529</th>
<th>PM35210</th>
<th>PM35211</th>
<th>PM35212</th>
<th>PM35213</th>
<th>PM35214</th>
<th>PM35215</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000W</td>
<td>2000W</td>
<td>2500W</td>
<td>3000W</td>
<td>3500W</td>
<td>4000W</td>
<td>4500W</td>
<td>5000W</td>
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<td>OUTPUT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0A</td>
<td>8.0A</td>
<td>10.0A</td>
<td>12.0A</td>
<td>14.0A</td>
<td>16.0A</td>
<td>18.0A</td>
<td>20.0A</td>
<td></td>
</tr>
<tr>
<td>250V</td>
<td>3.3A</td>
<td>6.6A</td>
<td>8.3A</td>
<td>10</td>
<td>11.7A</td>
<td>13.2A</td>
<td>15.0A</td>
<td></td>
</tr>
<tr>
<td>300V</td>
<td>2.6A</td>
<td>5.2A</td>
<td>6.5A</td>
<td>7.9A</td>
<td>9.2A</td>
<td>10.5A</td>
<td>13.0A</td>
<td></td>
</tr>
<tr>
<td>380V</td>
<td>2.5A</td>
<td>5.0A</td>
<td>6.3A</td>
<td>7.5A</td>
<td>8.8A</td>
<td>10.0A</td>
<td>11.3A</td>
<td></td>
</tr>
<tr>
<td>400V</td>
<td>2.25A</td>
<td>5.0A</td>
<td>6.3A</td>
<td>7.5A</td>
<td>8.8A</td>
<td>10.0A</td>
<td>11.3A</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>3.5”</td>
<td>5”</td>
<td>12” (15.5”)</td>
<td>3.5”</td>
<td>5”</td>
<td>12”</td>
<td>3.5”</td>
<td>5”</td>
</tr>
<tr>
<td>AC INPUT</td>
<td>90V</td>
<td>To</td>
<td>264V</td>
<td>180V</td>
<td>To</td>
<td>264V</td>
<td>180V</td>
<td>To</td>
</tr>
</tbody>
</table>

Product Matrix Notes:

1. All Models are available in Single Phase.
2. 4kW to 5kW Models are available with 400VAC or 480VAC nominal AC Input 3φ
3. Call factory for Three Phase Model.
4. 250V and 300V outputs require special AC Input. Call factory.

### Configuration Description

The converters are housed in a self-contained, forced-air, cooled enclosures. The DC output is brought out to a 6-32 screw terminal and is protected by an internal fuse. The AC input is via a 8-32 screw terminal barrier block and is protected by an internal fuse. Optional interface connections, where required, are available on a connector.

### Features:

- Power Factor (> 0.99) Corrected
- 0°C to +50°C at Full Load
- Input and Output Fuses
- Over Voltage Protection
- Over Temperature Protection
- Self-contained Forced Air Cooling
## SPECIFICATION

### Inputs

<table>
<thead>
<tr>
<th>RANGE</th>
<th>90 to 264VAC, 1φ or 3φ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180 to 264, 1φ or 3φ</td>
</tr>
<tr>
<td></td>
<td>365 to 528, 3φ</td>
</tr>
<tr>
<td>FREQUENCY</td>
<td>47 to 63 Hz.</td>
</tr>
<tr>
<td>INPUT CURRENT</td>
<td>Depends on Output Power, Number of Phases and PFC 0.99 or 0.95.</td>
</tr>
<tr>
<td>POWER FACTOR</td>
<td>0.95 @ Full Load, 1φ</td>
</tr>
<tr>
<td></td>
<td>0.95 @ Full Load, 3φ</td>
</tr>
<tr>
<td>HARMONIC CURRENT</td>
<td>&lt; 5%, 1φ only</td>
</tr>
<tr>
<td>EFFICIENCY</td>
<td>92% Typical @ full load and 240VAC</td>
</tr>
<tr>
<td>INTERNAL FUSE</td>
<td>Input fuses are provided</td>
</tr>
<tr>
<td>INITIAL OUTPUT LOAD CONDITION</td>
<td>No load should be applied during initial AC start-up. Output load should be enabled using the Logic Inhibit signal after the AC is applied.</td>
</tr>
</tbody>
</table>

### Environmental

| AUDIBLE NOISE         | 63dBA/70dbA max at 1 meter |
| TEMPERATURE           | Operating: 0°C to +50°C at full load. Storage: -5°C to +85°C. |
| HUMIDITY              | 20% to 95% non-condensing. |
| ALTITUDE              | Operating: 5,000 feet. De-rates to 70% at 15,000 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. |
| COOLING               | Forced air, internal fan. Airflow exits at connector end. Reverse airflow available. |

### Output

| VOLTAGE               | 400 VDC nominal with ±5% tolerance. Output load should be enabled using the Logic Inhibit signal, 2 sec after the AC is applied. |
| OUTPUT POWER          | See Product Matrix |
| P-P RIPPLE AND NOISE  | 15V peak (10Hz to 100KHz Bandwidth). |
| HOLD-UP ENERGY        | When the AC input is removed from the converter, depending on the output power, 86-300 Joules minimum are available on the output. |
| OUTPUT FUSING         | Provided per output requirement. |

### Internal Protection

| OVER VOLTAGE PROTECTION | The over voltage circuitry limits the maximum output voltage that the converter produces. Note: Peak value of AC Input voltage will appear at the output even if the converter is operating or not. This circuit protects only control loop failures. |
| OVER TEMPERATURE PROTECTION | The over temperature circuitry shuts off the boost converter in the event of an over temperature condition. It will restart automatically after cool down. Note: Peak value of AC Input voltage will appear at the output even if the converter is operating or not. |

### Safety

| SAFETY                | UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD) |
| EMI                   | Conducted & Radiated: EN55022 Level A |
| CE Certification      | Is Optional |

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3.5” X 5” NON-ISOLATED BULK, AC TO DC, 6/27/07, SECTION 11 PAGE 25
Pioneer’s Modular PFC Product Series can also be used in applications where 400VDC non-isolated single output bulk power converter is required. With PFC, output power can be maintained with a 30% reduction in RMS line current. Other advantages include improved hold-up performance, reduced line harmonics, (for 1φ input only) and insensitivity to voltage and frequency variations. Because they effectively eliminate harmonic currents, the converters are ideal for applications where neutral wire current exceeds recommended ratings due to waveform distortion caused by the typical off-line units.

Additional benefit of the bulk power converter is that it eliminates the need for switches and jumpers to adapt the supply for 110VAC or 220VAC operation, creating a “Universal Input” power unit. The input voltage on the bulk PFC converter is boosted to provide a nominal 400VDC output for conventional pulse width modulated (PWM) power supplies or distributed DC bus network. It meets the most stringent international safety and EMI standards, including the IEC555-2 which limits line current harmonic content to less than 5% (for 1φ input only).

With wide input range, the bulk power series can delivers up to 10,000 watts. Operating temperature ranges from 0°C to +50°C at full load. Improvements in electrical and heat transfer technology allow component stresses to be kept well within manufacturers’ rating, insuring high reliability.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3529</th>
<th>PM35210</th>
<th>PM35211</th>
<th>PM35213</th>
<th>PM35215</th>
<th>PM35216B</th>
<th>PM35218B</th>
<th>PM35220</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>2000W</td>
<td>2500W</td>
<td>3000W</td>
<td>4000W</td>
<td>5000W</td>
<td>6000W</td>
<td>8000W</td>
<td>10000W</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>250V</td>
<td>8.0A</td>
<td>10.0A</td>
<td>12.0A</td>
<td>16.0A</td>
<td>20.0A</td>
<td>24.0A</td>
<td>32.0A</td>
<td>40.0A</td>
</tr>
<tr>
<td>300V</td>
<td>6.6A</td>
<td>8.3A</td>
<td>10.0A</td>
<td>13.2A</td>
<td>16.6A</td>
<td>20.0A</td>
<td>16.4A</td>
<td>33.2A</td>
</tr>
<tr>
<td>380V</td>
<td>5.2A</td>
<td>6.5A</td>
<td>7.9A</td>
<td>10.5A</td>
<td>13.0A</td>
<td>15.8A</td>
<td>21.0A</td>
<td>26.3A</td>
</tr>
<tr>
<td>400V</td>
<td>5.0A</td>
<td>6.3A</td>
<td>7.5A</td>
<td>10.0A</td>
<td>12.6A</td>
<td>15.0A</td>
<td>20.0A</td>
<td>25.2A</td>
</tr>
<tr>
<td>Dimensions</td>
<td>5” 5” 12”(15.5”)</td>
<td>5” 5” 12”</td>
<td>5” 5” 15.5”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INPUT</td>
<td>90V to</td>
<td>264V</td>
<td>180V to</td>
<td>264V</td>
<td>180V to</td>
<td>264V</td>
<td>180V to</td>
<td>264V</td>
</tr>
</tbody>
</table>

Notes: 1. All Models are available in Single Phase.
2. 4kW to 10kW Models are available with 400VAC or 480VAC nominal AC Input 3φ
3. Call factory for Three Phase Models.
4. 250V and 300V outputs require special AC Input. Call factory.

**Configuration Description**

The converters are housed in a self-contained, forced-air, cooled enclosure. The DC output is brought out to a 6-32 screw terminal and is protected by a 10A fuse. The AC input is via a 8-32 screw terminal barrier block and is protected by an internal fuse. Optional interface connections, where required, are available on a connector.

**Features:**
- Power Factor (> 0.99) Corrected
- 0°C to +50°C at Full Load
- Input and Output Fuses
- Over Voltage Protection
- Over Temperature Protection
- Self-contained Forced Air Cooling
### Inputs

**RANGE:**
- 90 to 264VAC, 1φ or 3φ
- 180 to 264, 1φ or 3φ
- 365 to 528, 3φ

**FREQUENCY:** 47 to 63 Hz.

**INPUT CURRENT:**
- Depends on Output Power, Number of Phases and PFC 0.99 or 0.95.
- 0.99 @ Full Load, 1φ
- 0.95 @ Full Load, 3φ

**HARMONIC CURRENT:** < 5%, 1φ only

**EFFICIENCY:** 92% Typical @ full load and 240VAC

**POWER FACTOR:**
- Input fuses are provided

**INTERNAL FUSE:**
- No load should be applied during initial AC start-up. Output load should be enabled using the Logic Inhibit signal after the AC is applied.

### Output

**VOLTAGE:**
- 400 VDC nominal with ±5% tolerance. Output load should be enabled using the Logic Inhibit signal, 2 sec after the AC is applied.

**OUTPUT POWER:**
- See Product Matrix

**P-P RIPPLE AND NOISE:**
- 15V peak (10Hz to 100KHz Bandwidth).

**HOLD-UP ENERGY:**
- When the AC input is removed from the converter, depending on the output power, 86-300 Joules minimum are available on the output.

**OUTPUT FUSING:**
- Provided per output requirement.

### Internal Protection

**OVER VOLTAGE PROTECTION:**
- The over voltage circuitry limits the maximum output voltage that the converter produces. **Note:** Peak value of AC Input voltage will appear at the output even if the converter is operating or not. This circuit protects only control loop failures.

**OVER TEMPERATURE PROTECTION:**
- The over temperature circuitry shuts off the boost converter in the event of an over temperature condition. It will restart automatically after cool down. **Note:** Peak value of AC Input voltage will appear at the output even if the converter is operating or not.

### Environmental

**AUDIBLE NOISE:** 60dBA/70dBA max at 1 meter

**TEMPERATURE:**
- Operating: 0°C to +50°C at full load.
- Storage: -55°C to +85°C.

**HUMIDITY:** 20% to 95% non-condensing.

**ALTITUDE:**
- Operating: 5,000 feet. De-rates to 70% at 15,000 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:**

**COOLING:**
- Forced air, internal fan. Airflow exits at connector end. Reverse airflow available.

### Safety

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)

**EMI:**
- Conducted & Radiated: EN55022 Level A
- CE Certification is Optional
Pioneer Magnetics, Inc. releases the new DC to DC Product Series providing up to a 1,200 Watt, high density DC-DC converter. Full output is provided over a 36 to 75 VDC input and ambient from 0 to 50 degrees Celsius.

Standard features include over voltage, current and temperature protection; internal input fuse, remote sense, self-contained forced air cooling, and CSA, TUV safety. Typical options are input line monitor, DC output ok, remote enable/disable, single wire current share, output current monitor and isolation diodes for hot swap.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3332</th>
<th>PM3334</th>
<th>PM3335</th>
<th>PM3336</th>
<th>PM3337</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>500W</td>
<td>750W</td>
<td>875W</td>
<td>1000W</td>
<td>1200W</td>
</tr>
<tr>
<td>OUTPUTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>20A</td>
<td>31A</td>
<td>36A</td>
<td>42A</td>
<td>50A</td>
</tr>
<tr>
<td>28V</td>
<td>17A</td>
<td>27A</td>
<td>31A</td>
<td>35A</td>
<td>43A</td>
</tr>
<tr>
<td>32V</td>
<td>16A</td>
<td>23A</td>
<td>27A</td>
<td>31A</td>
<td>38A</td>
</tr>
<tr>
<td>48V</td>
<td>10A</td>
<td>16A</td>
<td>18A</td>
<td>20A</td>
<td>25A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>3.5&quot;</td>
<td>X</td>
<td>5&quot;</td>
<td>X</td>
<td>11.25&quot;</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>3.5&quot;</td>
<td>X</td>
<td>5&quot;</td>
<td>X</td>
<td>12&quot;</td>
</tr>
<tr>
<td>DC INPUT</td>
<td>36V</td>
<td>to</td>
<td></td>
<td>72V</td>
<td></td>
</tr>
</tbody>
</table>

**Features:**
- 0°C to +50°C at Full Load
- Standard 5" x 5" Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-128L) DC OK with LED indicator
- (-1UL) DC Line Monitor with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
## SPECIFICATION

### Inputs

- **RANGE:** 36 TO 75 VDC, 48VDC Nominal
- **INRUSH CURRENT:** Less than 75 amps peak for 5.6ms.
- **INPUT CURRENT, FULL LOAD:** Continuous input current 40 amps DC max at min line
- **REVERSE POLARITY PROTECTION:** Reverse voltage within rating will not damage power supply.

### Environmental

- **AUDIBLE NOISE:** 63dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A

### Output

- **VOLTAGE:** See Product Matrix
- **CURRENT:** See Product Matrix
- **OUTPUT POWER:** See Product Matrix
- **ADJUSTMENT RANGE:** ±10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSING:** Compensates for up to 0.5V total loop drop in the output line.
- **STATIC REGULATION:** Line: ±2% over full line range.
- **TEMP STABILITY:** ±0.1% for 24 hour period after 30 minute warm up.
- **P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1 sec. max from application of DC line.
- **HOLD-UP TIME:** 2ms after loss of DC line and before loss of output regulation.

### Internal Protection

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit.
Pioneer Magnetics, Inc. releases the new DC to DC Product Series providing up to a 1,200 Watt, high density DC-DC converter. Full output is provided over a 36 to 76 VDC input and ambient from 0 to 50 degrees Celsius. Standard outputs are 2 to 48 Volts and up to 240A. This unique power supply is configurable with hot plug connections using Elcon Top Drawer Connector in 5” x 5” x 14” package.

Standard features include over voltage, current and temperature protection; internal input fuse, remote sense, self-contained forced air cooling, and CSA, TUV safety. Typical options are input line monitor, DC output ok, remote enable/disable, single wire current share, output current monitor and isolation diodes for hot swap.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3332</th>
<th>PM3334</th>
<th>PM3335</th>
<th>PM3336</th>
<th>PM3337</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>500W</td>
<td>750W</td>
<td>875W</td>
<td>1000W</td>
<td>1200W</td>
</tr>
<tr>
<td>OUTPUTS</td>
<td>DC CURRENTS</td>
<td>DC CURRENTS</td>
<td>DC CURRENTS</td>
<td>DC CURRENTS</td>
<td>DC CURRENTS</td>
</tr>
<tr>
<td>2V</td>
<td>100A</td>
<td>150A</td>
<td>175A</td>
<td>200A</td>
<td>240A</td>
</tr>
<tr>
<td>3.3V</td>
<td>100A</td>
<td>150A</td>
<td>175A</td>
<td>200A</td>
<td>240A</td>
</tr>
<tr>
<td>5V</td>
<td>100A</td>
<td>150A</td>
<td>175A</td>
<td>200A</td>
<td>240A</td>
</tr>
<tr>
<td>12V</td>
<td>42A</td>
<td>63A</td>
<td>72A</td>
<td>85A</td>
<td>100A</td>
</tr>
<tr>
<td>24V</td>
<td>20A</td>
<td>31A</td>
<td>36A</td>
<td>42A</td>
<td>50A</td>
</tr>
<tr>
<td>28V</td>
<td>17A</td>
<td>27A</td>
<td>31A</td>
<td>35A</td>
<td>43A</td>
</tr>
<tr>
<td>32V</td>
<td>16A</td>
<td>23A</td>
<td>27A</td>
<td>31A</td>
<td>38A</td>
</tr>
<tr>
<td>48V</td>
<td>10A</td>
<td>16A</td>
<td>18A</td>
<td>20A</td>
<td>25A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td></td>
<td>11.25&quot;</td>
<td></td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td></td>
<td>14&quot;</td>
<td></td>
</tr>
<tr>
<td>DC INPUT</td>
<td>36V</td>
<td></td>
<td></td>
<td>to 72V</td>
<td></td>
</tr>
</tbody>
</table>

**Features:**
- 0°C to +50°C at Full Load
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-128L) DC OK with LED indicator
- (-1UL) DC Line Monitor with LED indicator
- (-2T) Unit enable/disable
- (-5O) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options.
**SPECIFICATION**

### Inputs

- **RANGE:** 36 TO 75 VDC, 48VDC Nominal
- **INRUSH CURRENT:** Less than 75 amps peak for 5.6ms.
- **INPUT CURRENT, FULL LOAD:** Continuous input current 40 amps DC max at min line
- **REVERSE POLARITY PROTECTION:** Reverse voltage within rating will not damage power supply.

### Environmental

- **AUDIBLE NOISE:** 63dBA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A

### Output

- **VOLTAGE:** See Product Matrix
- **CURRENT:** See Product Matrix
- **OUTPUT POWER:** See Product Matrix
- **ADJUSTMENT RANGE:** ±10% of nominal output voltage.
- **POLARITY:** Output is isolated. It may be referenced plus/minus as required.
- **REMOTE SENSING:** Compensates for up to 0.5V total loop drop in the output line.
- **STATIC REGULATION:**
  - Line: ±2% over full line range.
  - Load: ±2% zero load 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.
- **P-P RIPPLE AND NOISE:**
  - Line: 1% (20Hz to 50MHz Bandwidth).
- **MINIMUM LOAD:** Not Required.
- **TURN ON DELAY:** 1 sec. max from application of DC line.
- **HOLD-UP TIME:** 2ms after loss of DC line and before loss of output regulation.

### Internal Protection

- **OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.
- **OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.
- **SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit.
Pioneer Magnetics introduces a new breed of High Efficiency, Low Voltage and High Power DC to DC Series that provide full output power with DC Input ranging from 90VDC to 750VDC. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8 watts/in³, these units are featured with internal forced air-cooling and built-in protection from electrical over-loads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C.

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3336</th>
<th>PM3337</th>
<th>PM3338</th>
<th>PM3339</th>
<th>PM33310</th>
<th>PM33311</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>2500</td>
<td>3000</td>
</tr>
<tr>
<td>OUTPUT Vout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
<td>Iout</td>
</tr>
<tr>
<td>2V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>3.3V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>5V</td>
<td>200A</td>
<td>240A</td>
<td>300A</td>
<td>400A</td>
<td>500A</td>
<td>600A</td>
</tr>
<tr>
<td>6V</td>
<td>167A</td>
<td>200A</td>
<td>250A</td>
<td>333A</td>
<td>416A</td>
<td>500A</td>
</tr>
<tr>
<td>9V</td>
<td>111A</td>
<td>133A</td>
<td>167A</td>
<td>222A</td>
<td>277A</td>
<td>333A</td>
</tr>
<tr>
<td>Non-Plug</td>
<td>5”</td>
<td>5”</td>
<td>11.25”</td>
<td>5” x 6.25” x 13”</td>
<td>5” x 6.25” x 13”</td>
<td>5” x 8” x 13”</td>
</tr>
<tr>
<td>Hot Plug</td>
<td>5”</td>
<td>5”</td>
<td>14”</td>
<td>5” x 6.25” x 15”</td>
<td>5” x 6.25” x 15”</td>
<td>5” x 8” x 15”</td>
</tr>
<tr>
<td>DC Input</td>
<td>90V to 350V</td>
<td>180V to 350V</td>
<td>180V to 350V</td>
<td>180V to 350V</td>
<td>180V to 350V</td>
<td>180V to 350V</td>
</tr>
</tbody>
</table>

Notes: All Models are available with wide DC input range 90 to 350V or high input 180 to 350VDC

### Features:
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5” x 5” Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

### Options:
- (-128L) DC OK with LED indicator
- (-1UL) DC Input Monitor with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Drop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

### Inputs

**RANGE:**
- Up to 1500W - 90 To 350VDC
- > 1500W - 180 to 350VDC

**INRUSH CURRENT:** <25A/40A averaged over 10msec

**REVERSE POLARITY PROTECTION:** Reverse voltage within rating will not damage power supply.

**INPUT FUSING:** External Fuse Required

**HOLD UP TIME:** At least 20msec from loss of input to loss of regulation.

### Environmental

**AUDIBLE NOISE:** 63dBA/70dbA max at 1 meter

**TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.

**HUMIDITY:** 20% to 95% non-condensing.

**ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.


**COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Output

**ADJUSTMENT RANGE:** ±10% of nominal output voltage.

**POLARITY:** Output is isolated. It may be referenced plus/minus as required.

**REMOTE SENSE:** 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% zero load 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.

**P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).

**MINIMUM LOAD:** Not Required.

**TURN ON DELAY:** 1sec max from application of DC line.

### Internal Protection

**OVER VOLTAGE PROTECTION:** 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.

**OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.

**SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.

**REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.

**OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)

**EMI:** Conducted & Radiated: EN55022 Level A

CE Certification is Optional
Pioneer Magnetics introduces a new breed of High Efficiency, Mid Voltage and High Power DC to DC Series that provide full output power with DC Input ranging from 90VDC to 750VDC. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5” x 5” package. With power density up to 25.8 watts/in^3, these units are featured with internal forced air-cooling and built-in protection from electrical over-loads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3336</th>
<th>PM3337</th>
<th>PM3338</th>
<th>PM3339</th>
<th>PM33311</th>
<th>PM3339</th>
<th>PM33310</th>
<th>PM33315</th>
<th>PM36316</th>
<th>PM36318</th>
<th>PM36319</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>3000W</td>
<td>2000W</td>
<td>2500W</td>
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<td>6000W</td>
<td>8100W</td>
<td>10000W</td>
</tr>
<tr>
<td>Vout</td>
<td>48V</td>
<td>54V</td>
<td>60V</td>
<td>28V</td>
<td>24V</td>
<td>12V</td>
<td>24V</td>
<td>12V</td>
<td>24V</td>
<td>12V</td>
<td>24V</td>
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<td>166A</td>
<td>208A</td>
<td>416A</td>
<td>500A</td>
<td>675A</td>
<td>833A</td>
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<td>15V</td>
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<td>80A</td>
<td>100A</td>
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<td>24V</td>
<td>42A</td>
<td>50A</td>
<td>63A</td>
<td>83A</td>
<td>125A</td>
<td>83A</td>
<td>104A</td>
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<td>271A</td>
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<td>28V</td>
<td>36A</td>
<td>43A</td>
<td>54A</td>
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<td>71A</td>
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<td>150A</td>
<td>202A</td>
<td>250A</td>
</tr>
<tr>
<td>48V</td>
<td>21A</td>
<td>25A</td>
<td>31A</td>
<td>42A</td>
<td>63A</td>
<td>42A</td>
<td>52A</td>
<td>104A</td>
<td>135A</td>
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<td>54V</td>
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<td>37A</td>
<td>46A</td>
<td>93A</td>
<td>111A</td>
<td>150A</td>
<td>185A</td>
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<tr>
<td>60V</td>
<td>17A</td>
<td>20A</td>
<td>25A</td>
<td>36A</td>
<td>50A</td>
<td>36A</td>
<td>42A</td>
<td>83A</td>
<td>108A</td>
<td>135A</td>
<td>167A</td>
</tr>
</tbody>
</table>

**Options:**

- (-128L) DC OK with LED indicator
- (-1UL) DC Input Monitor with LED indicator
- (-2T) Unit enable/disable
- (-SLO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
**SPECIFICATION**

### Inputs

**RANGE:**
- Up to 1500W - 90 to 350VDC
- > 1500W - 180 to 350VDC

**INRUSH CURRENT:** < 25A/40A averaged over 10msec.

**REVERSE POLARITY PROTECTION:** Reverse voltage within rating will not damage power supply.

**INPUT FUSING:** External Fuse Required

**HOLD UP TIME:** At least 20msec from loss of input to loss of regulation.

### Environmental

**AUDIBLE NOISE:** 63dBA/70dBA max at 1 meter

**TEMPERATURE:** Operating: 0°C to +50°C at full load.
- Storage: -55°C to +85°C.

**HUMIDITY:** 20% to 95% non-condensing.

**ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.


**COOLING:** Forced air, internal fan. Airflow exits at connector end.

### Output

**ADJUSTMENT RANGE:** +5% to -10% of nominal output voltage.

**POLARITY:** Output is isolated. It may be referenced plus/minus as required.

**REMOTE SENSE:** 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% zero load 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.

**P-P RIPPLE AND NOISE:** 1% (20Hz to 50MHz Bandwidth).

**MINIMUM LOAD:** Not Required.

**TURN ON DELAY:** 1sec max from application of AC line.

### Internal Protection

**OVER VOLTAGE PROTECTION:** 125% ±5% of nominal.
- OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals.

**OVER CURRENT PROTECTION:** Current Limit Point: 110% to 120% of full load.

**SHORT CIRCUIT CURRENT:** Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed.

**REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.

**OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available.

### Safety

**SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950.

**CE Mark (LVD)**

**EMI:** Conducted & Radiated: EN55022 Level A

**CE Certification is Optional**
Pioneer introduces a new breed of High Efficiency, High Voltage and High Power DC to DC Series that provide full output power with DC Input ranging from 90VDC to 750VDC. Designed to support both standalone and parallel configurations, these models are configured in standard Non-Plug and Hot Plug I/O interfaces. The Premium Quality front ends are rugged, reliable, designed for high performance and come in the traditional 5" x 5" package. With power density up to 25.8 watts/in3, these units are featured with internal forced air-cooling and built-in protection from electrical over-loads.

A single module provides continuous full power over operating temperatures of 0°C to +50°C.

**Product Matrix**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3336</th>
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<th>PM36316</th>
<th>PM36318</th>
<th>PM36319</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX POWER</td>
<td>1000W</td>
<td>1200W</td>
<td>1500W</td>
<td>2000W</td>
<td>3000W</td>
<td>2000W</td>
<td>2500W</td>
<td>5000W</td>
<td>6000W</td>
<td>8100W</td>
<td>10000W</td>
</tr>
<tr>
<td>Vout</td>
<td>70V</td>
<td>14A</td>
<td>17A</td>
<td>21A</td>
<td>29A</td>
<td>43A</td>
<td>29A</td>
<td>36A</td>
<td>71A</td>
<td>86A</td>
<td>116A</td>
</tr>
<tr>
<td>90V</td>
<td>11A</td>
<td>13A</td>
<td>17A</td>
<td>22A</td>
<td>33A</td>
<td>22A</td>
<td>17A</td>
<td>56A</td>
<td>67A</td>
<td>90A</td>
<td>111A</td>
</tr>
<tr>
<td>100V</td>
<td>10A</td>
<td>12A</td>
<td>15A</td>
<td>20A</td>
<td>30A</td>
<td>20A</td>
<td>25A</td>
<td>50A</td>
<td>60A</td>
<td>80A</td>
<td>100A</td>
</tr>
<tr>
<td>150V</td>
<td>8.3A</td>
<td>8A</td>
<td>10A</td>
<td>13A</td>
<td>20A</td>
<td>13A</td>
<td>17A</td>
<td>34A</td>
<td>40A</td>
<td>53A</td>
<td>67A</td>
</tr>
<tr>
<td>200V</td>
<td>5A</td>
<td>6A</td>
<td>8A</td>
<td>10A</td>
<td>15A</td>
<td>10A</td>
<td>13A</td>
<td>25A</td>
<td>30A</td>
<td>40A</td>
<td>50A</td>
</tr>
<tr>
<td>250V</td>
<td>4A</td>
<td>5A</td>
<td>6A</td>
<td>8A</td>
<td>12A</td>
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<td>40A</td>
</tr>
<tr>
<td>300V</td>
<td>3A</td>
<td>4A</td>
<td>5A</td>
<td>7A</td>
<td>10A</td>
<td>7A</td>
<td>8A</td>
<td>17A</td>
<td>20A</td>
<td>27A</td>
<td>33A</td>
</tr>
</tbody>
</table>

**Non-Plug**
- 5"
- 5"
- 11.25"
- 5"
- 5"
- 11.25"
- 5"
- 5"
- 15.5"
- 5"
- 5"
- 15.5"

**Hot Plug**
- 5"
- 5"
- 11.50"
- 5"
- 5"
- 11.5"
- 5"
- 5"
- 17"
- 5"
- 5"
- 17"

**DC Input**
- 90V to 350V
- 180V to 350V
- 90V to 350V
- 180V to 350V or 400V to 750VDC

Notes:
1. All Models are available with wide DC input range 90 to 350V or high input 180 to 350VDC
2. Models with output ≥ 4000W are also available with DC Input range 400 to 750VDC

**Features:**
- Power Factor Correction
- 0°C to +50°C at Full Load
- De-rated @ 70°C
- Standard 5" x 5" Case
- Outputs Fully Floating
- Over Current Protection
- Over Voltage Protection
- Remote Sense
- Over Temperature Protection
- Internal Forced Air Cooling

**Options:**
- (-128L) DC OK with LED indicator
- (-1UL) DC Input Monitor with LED indicator
- (-2T) Unit enable/disable
- (-SLO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

Note: Refer to Section 26 for list of all standard options
SPECIFICATION

Inputs

<table>
<thead>
<tr>
<th>RANGE</th>
<th>Up to 1500W - 90 to 350VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 1500W - 180 to 350VDC</td>
</tr>
<tr>
<td>INRUSH CURRENT</td>
<td>&lt; 25A/40A averaged over 10msec.</td>
</tr>
<tr>
<td>REVERSE POLARITY PROTECTION</td>
<td>Reverse voltage within rating will not damage power supply.</td>
</tr>
<tr>
<td>INPUT FUSING</td>
<td>External Fuse Required</td>
</tr>
<tr>
<td>HOLD UP TIME</td>
<td>At least 20msec from loss of input to loss of regulation.</td>
</tr>
</tbody>
</table>

Environmental

| AUDIBLE NOISE | 63dBA/70dBa max at 1 meter |
| TEMPERATURE | Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C. |
| HUMIDITY | 20% to 95% non-condensing. |
| ALTITUDE | Operating: 5,000 feet. De-rates to 70% at 15,000 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. |
| COOLING | Forced air, internal fan. Airflow exits at connector end. |

Output

| ADJUSTMENT RANGE | +5% to -10% of nominal output voltage. |
| POLARITY | Output is isolated. It may be referenced plus/minus as required. |
| REMOTE SENSE | 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% zero load to full load. |
| VOLTAGE STABILITY | ±0.1% for 24 hour period after 30 minute warm up. |
| P-P RIPPLE AND NOISE | ±0.02%/°C from 0°C to +50°C. |
| MINIMUM LOAD | Not Required. |
| TURN ON DELAY | 1sec max from application of DC line. |

Internal Protection

| OVER VOLTAGE PROTECTION | 125% ±5% of nominal. OVP shutdown is latched until the input line is removed for 30 seconds and then reapplied. OVP sensing is done at the output terminals. |
| OVER CURRENT PROTECTION | Current Limit Point: 110% to 120% of full load. |
| SHORT CIRCUIT CURRENT | Fold back type to 40%-80% of full rated current. Unit will recover when overload is removed. |
| REVERSE VOLTAGE PROTECTION | Protected to rated load with the fan running. |
| OVER TEMPERATURE PROTECTION | The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit. Optionally, non-latchable protection is also available. |

Safety

| SAFETY | UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD) |
| EMI | Conducted & Radiated: EN55022 Level A |
| CE Certification | Is Optional |
Pioneer Magnetics introduces new isolated high power DC to DC Power Conditioning System (PCS) that are geared towards Fuel Cell Technology. These are specifically designed for soft DC voltage source generated from Hydrogen. The Unregulated DC voltage generated from Hydrogen Fuel Cell Stack is conditioned by the PCS to provide a regulated DC voltage output that can be used in Telecom Applications in place of conventional UPS systems. The PCS design is rugged and can also be used in conventional Industrial Utility Vehicles replacing the huge and heavy batteries.

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3336</th>
<th>PM3339</th>
<th>PM33311</th>
<th>PM33316</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>1000W</td>
<td>2000W</td>
<td>3000W</td>
<td>5200W</td>
</tr>
<tr>
<td>INPUT</td>
<td>19VDC</td>
<td>to 29VDC</td>
<td>30VDC</td>
<td></td>
</tr>
<tr>
<td>OUTPUTS</td>
<td>Current</td>
<td>Current</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>42A</td>
<td>84A</td>
<td>125A</td>
<td>217A</td>
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<tr>
<td>48V</td>
<td>21A</td>
<td>42A</td>
<td>62.5A</td>
<td>108A</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>5.73” x 10” x 16”</td>
<td></td>
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</table>

### Features:
- -10°C to +50°C at Full Load
- Input Under Voltage Protection
- Input Max Current Protection
- Input Reverse Current Protection
- Programmable Output Voltage and Current via Control Signal
- Over Temperature Protection
- Self-Contained Forced-Air Cooling
- Over Voltage Protection

### Options:
- Delayed Start up time
- Conformal Coating
- Isolated Output is available at extra cost

Note: Refer to Section 26 for list of all standard options
# SPECIFICATION

## Inputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
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<tbody>
<tr>
<td>RANGE</td>
<td>19V to 30V, Nominal 24V</td>
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<td>MAX INPUT POWER</td>
<td>6400W</td>
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<tr>
<td>INPUT CURRENT RANGE</td>
<td>0A TO 320A</td>
</tr>
<tr>
<td>FULL LOAD EFFICIENCY</td>
<td>85%</td>
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## Environmental

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDIBLE NOISE</td>
<td>73dbA max at 1 meter</td>
</tr>
<tr>
<td>TEMPERATURE</td>
<td>Operating: -10°C to +50°C at full load. Storage: -55°C to +85°C.</td>
</tr>
<tr>
<td>HUMIDITY</td>
<td>20% to 95% non-condensing.</td>
</tr>
<tr>
<td>ALTITUDE</td>
<td>Operating: 5,000 feet. De-rates to 70% at 15,000 feet. Non-Operating: To 30,000 feet.</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>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.</td>
</tr>
<tr>
<td>COOLING</td>
<td>Forced air, internal fan. Airflow exits at connector end.</td>
</tr>
</tbody>
</table>

## Safety

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY</td>
<td>Designed to meet UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)</td>
</tr>
</tbody>
</table>

## Output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER RANGE</td>
<td>0W to 5.2kW</td>
</tr>
<tr>
<td>VOLTAGE RANGE</td>
<td>42V to 57V, 21V to 28V</td>
</tr>
<tr>
<td>CURRENT RANGE</td>
<td>0A to 123A, 0A to 246A</td>
</tr>
<tr>
<td>STATIC REGULATION</td>
<td>Line: ±0.5% over full line range. Load: ±0.5%, min load to full load</td>
</tr>
<tr>
<td>POLARITY</td>
<td>Input and output negative is common</td>
</tr>
<tr>
<td>RIPPLE AND NOISE</td>
<td>&lt;1% RMS</td>
</tr>
<tr>
<td>TURN ON DELAY</td>
<td>&lt; 200msec after the output is enabled.</td>
</tr>
<tr>
<td>OVERSHOOT</td>
<td>No turn-on or turn-off overshoot</td>
</tr>
<tr>
<td>VOLTAGE STABILITY</td>
<td>±1% for 24-hour period after 30 minutes warm up</td>
</tr>
<tr>
<td>TEMP COEFFICIENT</td>
<td>±0.02%/°C. From -10°C to 50°C</td>
</tr>
</tbody>
</table>

## Internal Protection

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVER CURRENT PROTECTION</td>
<td>Current Limit Point: Programmable</td>
</tr>
</tbody>
</table>
Pioneer Magnetics introduces its new comprehensive non-isolated high power DC to DC Converter product line.

Designed to operate from 10V to 150V DC input, these converters are configurable for output voltages ranging from 5V to 120V. The following features make these converters the top of the line choice for all DC to DC non-isolated applications:

### Features:
- -10°C to +50°C at Full Load
- Wide Range Programmable Output & Input
- Over Current Protection
- Over Voltage Protection
- Over Temperature Protection
- Self-Contained Forced-Air Cooling
- Battery Charging
- Monitor Output Voltage & Current
- Monitor Input Voltage & Current
- Programmable Output Voltage & Current
- Over Voltage Protection
- Under Voltage Detect
- Compact Size and Weight
- Maximum Power Density
- Efficiency 95%
- Cost Effective
- Rugged and Versatile
- Battery Charging

### Common Options:
- (-128L) DC OK with LED indicator
- (-1UL) DC Line Monitor with LED indicator
- (-2T) Unit enable/disable
- (-5LO) ±10% Output voltage adjust
- (-6B) Single wire current sharing
- (-6D) Slope/Droop current sharing
- (-20C) Isolation diodes
- (-25) Constant current limit
- (-33) Current monitor

### Special Options:
- Maximum Power Point Tracking (MPPT) (for variable DC sources like batteries, photo cell arrays and wind turbines)
- RS232 interface will allow access to diagnostic routines and parameter modification as described in this specification. Power supply is configured as a DCE device using a DB9 connector. Set any VT100 emulator to 9600 baud, 8 bits, no parity, 1 stop bit, with flow control off.

Note: Refer to Section 26 for list of all standard options

### Product Matrix

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PM3536H-3</th>
<th>PM3539H-3</th>
<th>PM35311H-3</th>
<th>PM35315H-3</th>
<th>PM35317H-3</th>
<th>PM35317H-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>1000W</td>
<td>2000W</td>
<td>3000W</td>
<td>5000W</td>
<td>6500W</td>
<td>10000W</td>
</tr>
<tr>
<td>INPUT</td>
<td>10VDC to 150VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUTS</td>
<td>Current</td>
<td>Current</td>
<td>Current</td>
<td>Current</td>
<td>Current</td>
<td>Current</td>
</tr>
<tr>
<td>5V</td>
<td>100A</td>
<td>400A</td>
<td>550A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12V</td>
<td>84A</td>
<td>168A</td>
<td>250A</td>
<td>416A</td>
<td>541A</td>
<td>N/A</td>
</tr>
<tr>
<td>24V</td>
<td>42A</td>
<td>84A</td>
<td>125A</td>
<td>208A</td>
<td>271A</td>
<td>416A</td>
</tr>
<tr>
<td>30V</td>
<td>34A</td>
<td>68A</td>
<td>100A</td>
<td>167A</td>
<td>217A</td>
<td>334A</td>
</tr>
<tr>
<td>48V</td>
<td>21A</td>
<td>42A</td>
<td>63A</td>
<td>104A</td>
<td>135A</td>
<td>208A</td>
</tr>
<tr>
<td>60V</td>
<td>17A</td>
<td>34A</td>
<td>50A</td>
<td>83A</td>
<td>108A</td>
<td>167A</td>
</tr>
<tr>
<td>90V</td>
<td>11A</td>
<td>22A</td>
<td>33A</td>
<td>55A</td>
<td>72A</td>
<td>111A</td>
</tr>
<tr>
<td>120V</td>
<td>8A</td>
<td>16A</td>
<td>25A</td>
<td>42A</td>
<td>54A</td>
<td>83A</td>
</tr>
</tbody>
</table>

Dimensions: 5.73" X 10" X 16"
## SPECIFICATION

### DC Inputs

- **RANGE:** 10V to 150V.
- **INRUSH CURRENT:** <150A peak for 5.6 ms.
- **FULL LOAD EFFICIENCY:** 95%

### Environmental

- **AUDIBLE NOISE:** 70dbA max at 1 meter
- **TEMPERATURE:** Operating: 0°C to +50°C at full load. Storage: -55°C to +85°C.
- **HUMIDITY:** 20% to 95% non-condensing.
- **ALTITUDE:** Operating: 5,000 feet. De-rates to 70% at 15,000 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.
- **COOLING:** Forced air, internal fan. Airflow exits at connector end.

### DC Outputs

- **POWER:** Converter: Up To 10kW
- **OUTPUT RANGE:** Settable by user via RS232
  - \( V_{\text{OUT}} = 5V \) to 120V
- **VOLTAGE LIMIT SETTING:** 30V or 60V selectable via RS232
- **STATIC REGULATION:** Line: ±0.5% over full line range.
  - Load: ±0.5%, min load to full load
- **POLARITY:** Input and output negative is common
- **RIPPLE AND NOISE:** <1% RMS
- **TURN ON DELAY:** 2 seconds max from application of line
- **OVERSHOOT:** No turn-on or turn-off overshoot
- **VOLTAGE STABILITY:** ±1% for 24-hour period after 30 minutes warm up
- **TEMP COEFFICIENT:** ±0.02%/°C.
  - From -10°C to 50°C

### Internal Protection

- **OVER VOLTAGE PROTECTION:** Settable via RS232
- **OVER CURRENT PROTECTION:** Current Limit Point: 5% of maximum output current.
- **REVERSE VOLTAGE PROTECTION:** Protected to rated load with the fan running.
- **OVER TEMPERATURE PROTECTION:** The unit automatically shuts down in the event of an over temperature condition. After cool down, power must be recycled to restart unit.

### Safety

- **SAFETY:** UL1950, CSA22.2 No 950 and TUV to EN60950. CE Mark (LVD)
- **EMI:** Conducted & Radiated: EN55022 Level A
  - CE Certification is Optional

---

Ref: Proton Application
The Leader in High Power Switching Supplies

MAXIMUM POWER POINT TRACKING (MPPT)

Normally, switching power supplies go into current limit mode when the available power exceeds the load request. Unless the load is reduced, the power supply will continue to protect itself. However, for power applications that can operate with a variable input source, Pioneer’s unique, embedded, menu-drive application, which runs on our microcomputer controller (ICON™) inside the power supply, elegantly solves this problem.

The PMI ICON™ constantly monitors the input source and dynamically delivers the MAXIMUM power available to the load, regardless of the actual load demand. The Maximum Power Point firmware works throughout the entire operating range of the power supply, from minimum output, to the full 6.5 kw rating. As power is delivered, the power supply efficiency climbs quickly to 95%.

The embedded application provides full profile management, allowing the customer easily to tailor the supply to their specific application. With so many configurable options, the PMI ICON™ really offers the customer many power supplies in one.

Example: Battery Management

The power intake for the battery charger is controlled by a Maximum Power Point Tracking (MPPT) scheme provided by the built-in Intelligent Controller PMI ICON™ Model PM1703. The MPPT is such that the input power for the battery takes precedence over the main power supply output, hence at very low available power levels the input power to the battery is maximized while the main output is shut down. Only after the available power exceeds the power demanded by the battery charger is the Main Output enabled and MPPT applied to the Main Output.
Recognizing that power supplies can be monitored and controlled either as standalone units or in a large system has led us to the future once again. We offer the ability to remotely control and monitor all power supply functions and to record power supply data for tracking purposes.

**Control**
- Output Voltage
- Over Voltage
- Remote Enable/Disable
- Reset from Shutdown
- Fan Speed
- Local Inhibit

**Battery Management**
- Equalize
- Battery Charge Current
- Low/High Voltage Disconnect
- Float Voltage Temperature Compensation

**Monitor**
- Voltage
- Current
- Temperature
- AC Input Line
- Enable/Inhibit Mode
- Fan Speed
- Remote/Local Sense
- Input/Voltage/Frequency Monitor
- AC/DC OK LED
- Programmable Power Good/Fail
- Programmable Over Voltage Protection
- Programmable Over Temperature Protection
- EMO Switch
- AC Frequency
- Current Sense
- Frequency Monitor
- Major/Minor Alarms

**Data Storage**
- Model
- Serial #
- Barcode
- Maximum Temp.
- Maximum Voltage/Current
- Hours of Operation
- Repair History

**Communications**
- RS232
- RS485
- I2C
- Ethernet
Power Distribution Units are becoming an increasingly cost effective way of supplying power to complex systems. Integrating multiple power needs into a fully tested subsystem supplied by a single vendor can dramatically reduce the costs associated such requirements. Pioneer Magnetics has decades of experience in designing and manufacturing PDUs for the semiconductor, test equipment, and communications industries.

Common PDU specifications include redundant AC/DC power supplies, AC and DC distributions networks, circuit breakers, fuses, custom intelligence/processor boards, EMO circuits, specialized connectors, etc. all integrated into an enclosure that the customer installs into the final product as a fully approved/tested subsystem.

Contact Pioneer Magnetics with your PDU needs so that we can work with you in designing a flexible system that will last you throughout the life cycle of your product.

This contains four AC/DC switching power supplies, one linear power supply, and one high voltage power supply (325V). An extensive AC and DC distribution system with numerous circuit breakers, a main contactor and an EMO safety circuit.

A self contained 32KW power system with fans and heat exchangers to provide internal cooling. This 10” X 17” X 36” enclosure contains four 8.1KW AC/DC power supplies with the AC fed through the top and DC output bus bars on the front and rear. A power on button and EMO stop on the front panel for external control and an RS485 communication port for monitoring.

A 32KVA isolation transformer with taps for three different input voltages was required for this Field Replaceable Unit. The 15KW of 48V redundant power was supplied by four 5KW AC/DC power supplies.
Power supplies are used in a wide range of new applications exposing them to harsh environmental conditions. Pioneer Magnetics is committed to meeting the industry’s need whatever the challenge. Harsh environments for power supplies can include corrosive atmospheres/conductive dust, temperature extremes, high vibration, and unreliable AC sources.

**Corrosive Atmosphere/Conductive Dust**

Depending on the severity of the corrosive environment and life expectancy Pioneer Magnetics can offer two types of solutions. The first one consists of conformal coating the circuit boards, which will further protect and enhance the life of the power supply. The second is a longer-term solution and consists of installing the power supply in a Heat Exchanger.

The conformal coating solution consists of applying a layer of Acrylic coating (HumiSeal part number 1B73) to all the PC boards and to apply a layer of epoxy coating to all of the Hybrids (Hysol part number PC17M). The reason for different coatings is due to the materials used in the Hybrids (silver traces). The epoxy coating has been proven to provide additional protection to the silver in the event that the power supply is expose to sulfur vapors.

**Temperature Extremes**

Semiconductors typically have temperature ratings from 0-50°C but most are available in wide temperature versions from –40 to +70°C. Pioneer can integrate these wide temperature components in the supply and extend the operating range far beyond the typical 0-50°C.

**Vibration Immunity**

Vibration causes problems for all electronics but large power supplies with heavier through-hole mounted components are especially vulnerable. Such parts pose unique challenges to designers in terms of placement and mounting to withstand mechanical stresses and to ensure long-term reliability. Pioneer Magnetics has supplied vibration resistant power supplies in applications requiring this increased immunity to shock.

**Unreliable AC Sources**

MOV’s (metal oxide varisters) can be used along with gas discharge tubes to protect the power supply from surges in AC line voltage, one of the most common sources of power supply failure. These components may be mounted inside the power supply enclosure or on an external board. Another common source of power supply problems is exposure to an AC input line, either below or above the rated voltage level of the supply. Pioneer has a standard line sensor board that senses whether the AC line voltage is within the specified rating of the power supply and can be used in conjunction with a system level contactor to connect the line to the power supply only when it is within the band of specified voltages.
The Intelligent Battery Charger is a high-efficiency converter that takes its power from an unregulated, wide-ranging input voltage and current source. The unit charges the battery using a firmware-programmable current limit entered by a software command via an RS232 interface. The current limit can be set between 2 and 20 amps, up to a maximum of 500 watts.

Features:

- **VOLTAGE/CURRENT CONTROL**: Output as required by batteries.
- **MAXIMUM VOLTAGE OUTPUT**: Temperature compensation algorithm controls the maximum voltage between 24V and 30V.
- **CURRENT OUTPUT**: Current limit adjustable between 2A to 24A via firmware command.
- **CHARGING CAPABILITY**: 500W Maximum.
- **REMOTE ENABLE/DISABLE**: TTL signal supplied by customer turns the battery charger on or off. Additionally, the charger can be managed through software control.

**SOFTWARE CONTROLLED BATTERY MANAGEMENT (OPTIONAL):**
- Float Voltage
- Recharge
- Temperature Compensation
- Low Voltage Disconnect
- High Voltage Disconnect
- Equalize

**MAXIMUM POWER POINT TRACKING (MPPT):**

Normally, switching power supplies go into current limit mode when the available power exceeds the load request. Unless the load is reduced, the power supply will continue to protect itself. However, for power applications that can operate with a variable input source, Pioneer’s unique, embedded, menu-drive application, which runs on our microcomputer controller (ICON™) inside the power supply, elegantly solves this problem.

The PMI ICON™ constantly monitors the input source and dynamically delivers the MAXIMUM power available to the load, regardless of the actual load demand. The Maximum Power Point firmware works throughout the entire operating range of the power supply, from minimum output, to the full 6.5 kw rating. As power is delivered, the power supply efficiency climbs quickly to 95%.

The embedded application provides full profile management, allowing the customer easily to tailor the supply to their specific application. With so many configurable options, the PMI ICON™ really offers the customer many power supplies in one.

**Example: Battery Management**

The power intake for the battery charger is controlled by a Maximum Power Point Tracking (MPPT) scheme provided by the built-in Intelligent Controller PMI ICON™ Model PM1703. The MPPT is such that the input power for the battery takes precedence over the main power supply output, hence at very low available power levels the input power to the battery is maximized while the main output is shut down. Only after the available power exceeds the power demanded by the battery charger is the Main Output enabled and MPPT applied to the Main Output.
Power Fail Options

(-1) POWER FAIL: Upon loss of AC line, signal goes from high to low before loss of output regulation.

(-1C) POWER FAIL: Upon loss of AC line, signal goes from low to high before loss of output regulation.

(-1CL) POWER FAIL: Upon loss of AC line, signal goes from low to high before loss of output regulation. LED on is good and off indicates failure.

(-1CZ) POWER FAIL: Upon loss of AC line, signal goes from low to high before loss of output regulation. External pull up required, (open collector capable of sinking up to 40V and 40mA, 1K).

(-1CZL) POWER FAIL: Upon loss of AC line, signal goes from low to high before loss of output regulation. LED on is good and off indicates failure. No Internal Pull up provided. (open collector capable of sinking up to 40V and 40mA, 1K).

(-1L) POWER FAIL: Upon loss of AC line, signal pulls low before loss of output regulation. LED on is AC good and off is fault condition.

(-1U) DC LINE MONITOR: Power fail signal that senses the input voltage and goes high to low when input voltage drops less than or equal to 40VDC.

(-1Z) POWER FAIL: Upon loss of AC line, signal goes from high to low before loss of output regulation. External pull up required.

(-8GL) POWER SUPPLY FAIL: High TTL signal indicates output voltage is good and low indicates no output. LED on is good and off is bad. Works only with 2T Inhibit option.

(-48L) UNIT PRESENT: The power supply present pin is tied to logic return.

(-128) POWER SUPPLY FAIL: Provides output logic high signal when DC output is present. When the DC output is not present the output of this option will drop to logic ground. Note: When the units are used in parallel, a load of 3 amps per power supply must be on the system bus to insure that this signal is high for each power supply.

(-128F) POWER SUPPLY FAIL: Provides output logic low signal when DC output is present. When the DC output is not present the output of this option is open collector. Internal pull-up provided.
(-128L) POWER SUPPLY FAIL: Provides output logic high signal when DC output is present. When the DC output is not present the output of this option will drop to logic ground. Note: When the units are used in parallel, a load of 3 amps per power supply must be on the system bus to insure that this signal is high for each power supply.

LED on indicates output good.

(-128FZL) POWER SUPPLY FAIL: Provides output logic low signal when DC output is present. When the DC output is not present the output of this option is open collector. External pull-up is required. LED on indicates output good.

(-128ZL) POWER SUPPLY FAIL: Provides output logic high signal when DC output is present. When the DC output is not present the output of this option will drop to logic ground. External pull-up is required. LED on indicates output good.

(-158) POWER SUPPLY FAIL: Power Supply fail (DC Output) signal with a 300 ohms pull up resistor.

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**Logic Inhibit Options**

(-2) LOGIC INHIBIT: 2 volt or more will inhibit the supply, an open circuit or less than 0.5 volts will enable the supply. Logic inhibit return should be connected to system common.

(-2F) LOGIC INHIBIT: Two volts or more or an open circuit will inhibit the supply, less than 0.5 volts will enable the supply. Logic inhibit return should be connected to system common.

(-2N) LOGIC INHIBIT: Less than 0.5 volts or open will inhibit the supply. Two volts or more will enable the supply, Logic inhibit return should be connected to negative output.

(-2T) LOGIC INHIBIT: Less than 0.5 volts will inhibit the supply. Two volts or more or an open circuit will enable the supply. Logic inhibit return should be connected to system common.
Current Sharing Options

(-6B) CURRENT SHARING: Allows two or more similar power supply main outputs to load share using a single wire. A single wire scheme that averages the output current of all supplies. Each supply compares this signal to the output current it is producing. Any difference will cause the supply. Any difference will cause the supply to automatically re-adjust it’s output voltage until that value is zero. The output bus voltage will be the average of the individual power supply settings. As long as all supplies are adjusted to within 4% they all share. A failed power supply does not drag down the bus voltage because there is an internal switch that disconnects the option from the load share bus when the unit fails. The bus voltage will re-average among the remaining units. For units 3KW and smaller.

(-6C) CURRENT SHARING: Allows two or more identical units to current share when they are connected in parallel. Each unit provides an output consisting of a single wire which are tied together. This output produces a voltage that is proportional to the output current at all times, whether the unit is operating alone or in parallel with the other units. The control voltage specification is 5V at full load and 0.5V at 10% load. The control circuit for each unit integrates the error voltage and modifies the reference voltage for that unit to null the error. At equilibrium, all errors are nulled and, since the control voltage is common, all the currents are equalized. In the absence of other units the integration voltage goes to zero and the reference voltage is not modified. This means that during the current sharing, the unit with the highest voltage becomes the master and the other units become slaves or followers. The maximum perturbation on the reference voltage shall not cause the output voltage to increase or decrease more than 5% of the initial setting. A failure of a slave unit causes no increase in the current sharing balance. A failure of the “master” unit could cause a current unbalance of up to 4%. For units larger than 3KW.

(-6D) CURRENT SHARING: Droop load sharing is a method of increasing the output impedance of each converter so that when a load is applied the drop of the output voltage from each converter is proportional to the current drawn from each converter, i.e. the converter with the largest load has the most drop and the converter with the lightest load has the least drop. This has a tendency to equalize the output voltages of the units which in turn forces load sharing. No extra current sharing wires are needed for load sharing. The number following the D will indicate the droop percentage; 6D3 will indicate a 3% droop. At no-load the output will be 3% higher than the output at full load. The plain 6D denotes a 10% droop.

(-6I) INTERNAL CURRENT SHARING: Provides internal single wire current sharing when the two outputs are externally connected in parallel.

(-20C) DIODE ISOLATION: Built in isolation diodes in the positive output line to prevent a failed power supply from affecting the bus. This option is used when power supplies must current share.
Power Good/Power Quality Options

(-8) POWER GOOD: The power good monitors the channel output voltage via the remote sense leads. The signal goes from low to open collector when output is out of ±4% tolerance band. Internal Pull up provided.

(-8AL) POWER GOOD: The output voltage will be detected prior to the “OR’ing Diode”. Warning will be generated at 21/42 volts, depending on the output voltage. Low output will be indicated by a “Zero” or an “On” transistor FET. LED indicates “On” for the output above the detect point.

(-8Z) POWER GOOD: The power good monitors the channel output voltage via the remote sense leads. The signal goes from low to open collector when output goes out of ±4% tolerance band. External 1k pull up required.

(-8FZ) POWER GOOD: The power good monitors the channel output voltage via the remote sense leads. The signal goes from low to open collector when output goes out of ±4% tolerance band. External 1k pull up required.

(-8T) POWER GOOD: The power good monitors the channel output voltage via the remote sense leads. The signal sinks to logic return when output is out of a ±4% tolerance band.

(-8TL) POWER GOOD: The power good monitors the channel output voltage via the remote sense leads. The signal sinks to logic return when output is out of a ±4% tolerance band. LED on is good and off indicates failure.

(-8UV) UNDER VOLTAGE DETECT: Signal pulls low when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads.

(-8UVZ) UNDER VOLTAGE DETECT: Signal pulls low when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. External 1K Pull up is required. External pull up required. (Open collector capable of sinking up to 40V and 40mA, 1K)

(-8UVL) UNDER VOLTAGE DETECT: Signal pulls low when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. High good (LED on) and Low bad (LED off).

(-8FUVL) UNDER VOLTAGE DETECT: Signal pulls high when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. Low good (LED on) and High bad (LED off).

(-8FUV) UNDER VOLTAGE DETECT: Signal pulls high when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads.

(-8FUVZ) UNDER VOLTAGE DETECT: Signal pulls high when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. Low is good and High is bad. External pull up required. (open collector capable of sinking up to 40V and 40mA, 1K).
(-8UVLZ) UNDER VOLTAGE DETECT: Signal pulls low when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. High good (LED on) and low bad (LED off). External pull up required. (open collector capable of sinking up to 40V and 40mA, 1K)

(-8FUVLZ) UNDER VOLTAGE DETECT: Signal pulls high when output drops more than 15%±5% of the nominal. There is no upper trip point. Sensing occurs at the output terminals instead of the remote sense leads. Low good (LED on) and High bad (LED off). External pull up required. (open collector capable of sinking up to 40V and 40mA, 1K)

(-182) UNDER VOLTAGE DETECT, 7 TO 10%: Under voltage detection level is 7% to 10%. Signal is low for Output Good. Signal is High for Output Bad. The output voltage will be measured before the isolation diode. A separate lead must be brought out of the supply for testing and monitoring.

Current Limit/Current Monitor/Current Programming Options

(-25) CURRENT LIMIT: Power supply limits at maximum output current during a short circuit load condition. Current limit set between 105% to 115%. These limits apply to units smaller than 3.1KW.

(-25) CURRENT LIMIT: Power supply limits at maximum output current during a short circuit load condition. Current limit set between 102% to 108%. These limits apply to units larger than 3.1KW.

(-33) CURRENT MONITOR: The current monitor signal is referenced to the negative output. It is accurate to within +/- 10%, from 10% to 100% load. The analog signal 0V to 5V is proportional to the load when increased from no load to maximum load.

(-33Y) CURRENT MONITOR: The current monitor signal is referenced to the negative output. It is accurate to within +/- 10%, from 10% to 100% load. The analog signal 0V to 2.5V is proportional to the load when increased from no load to maximum load.

(-60) PROGRAMMABLE OUTPUT CURRENT LIMIT: Current limit is controlled over the range of 0 amps to full load with a 0 to 5V control voltage. Ripple and noise may increase below 50% of Current Programming Voltage. Accuracy and offset are not guaranteed below 5% of Current Programming Voltage.

(-60A) PROGRAMMABLE OUTPUT CURRENT LIMIT: Current limit is controlled over the range of half load to full load with a 0 to 5V control voltage.
(-60C) PROGRAMMABLE OUTPUT CURRENT LIMIT: Output current limit if programmable from 10% to 100% via a control signal of 0 to 5V.

(-142) PROGRAMMABLE OUTPUT CURRENT: Nominal Output is 48V @ 60A. Current Limit is controlled over the range of 25A to 60A via a 0 to 5V control voltage.

(-149) BURP CURRENT LIMIT: In the event of a short or overload condition on the output of the supply, the supply must shut off its output and attempt to power up its output at least every 7 to 10 seconds. After 10 to 16 retries the power supply will disable its output. Reset is accomplished by the inhibit line or recycling the AC line.

(-176) PROGRAMMABLE CURRENT LIMIT: Nominal output is 24D150. Current limit is controlled over the range of 5A to 150A via a 0 to 5VDC control voltage.

(-176A) CURRENT PROGRAMMING: With this option, the output current limit changes linearly with respect of an input programming voltage that varies from 0 to 5V, such that at 0.5V the current limit is at 10% of full load and at 5V it is a 100% of full load. The programming voltage, ideally, is 0 to 5V corresponding to zero to full load. Since it is not possible to guarantee zero current at 0V, due to tolerances and offset errors, currents are defined at 0.5V for 10% load and 5V at full load. If the load resistance is too high for the programmed current, the output voltage is limited to that specified by the customer. Otherwise the output voltage adjust itself to the product of the programmed current and output load resistance. The output load resistance can vary from zero, short circuit, to infinity, open circuit.

(-179) PROGRAMMABLE CURRENT LIMIT: The standard power supplies will be modified as follows: One supply will be connected to accept a 0 to 5V signal for a 0 to 150A output. This will be the lower supply (more negative) in a chain of power supplies connected in series. This supply’s transfer curve will not be linear below 20% load, but will be programmable down to at least 2.5A, maybe less. The power supply’s ripple may increase as the current is reduced, and the supply may even pulse skip. This option will also include an internal reverse protection diode across the output terminals.

Protection Options

(-4D) OVER TEMPERATURE PROTECTION: Non-latchable OVT. The unit shuts down in the event of over temperature and comes up automatically after it has cooled down. Standard OVT is configured as latchable where the ac power is recycled to restart.

(42M) INPUT VOLTAGE SUPPRESSION (MOV): MOV’s, Transorbs or the equivalent placed on a PCB connected internally to the input terminals to suppress input spikes. Normally there are three devices, 1 from each input line to chassis, and 1 from line to line.
(-151) BUILT-IN INTERNAL FUSE: A 30A input fuse is installed internally.

(-HB) HUMISEALED PC BOARDS

Voltage Adjustment/Voltage Programming Options

(-5L) MARGIN/PROGRAM: Allows ±5% change of primary channel.

(-5LO) MARGIN/PROGRAM: Allows ±10% change of primary channel.

(-61D) PROGRAMMABLE OUTPUT VOLTAGE LIMIT: Output voltage is programmable from 50% to 100% via a control signal of 0 to 5V.

(-127) SPECIAL VOLTAGE ADJUST: Provides for an adjustment of the output voltage from 12 (±0.5) to 48 VDC via the Margin Circuit with input of 0 to 5 VDC.

(-127A) SPECIAL VOLTAGE ADJUST: Provides for an adjustment of the output voltage from 21.5 (±0.5) to 53 VDC via the Margin Circuit with input of 0 to 5 VDC.

(-127B) SPECIAL VOLTAGE ADJUST: Provides for an adjustment of the output voltage from 12 (±0.5) to 56 VDC via the Margin Circuit with input of 0 to 5 VDC.

(-141) PROGRAMMABLE OUTPUT VOLTAGE: Nominal Output is 48V @ 60A. Output is controlled over the range of 12V to 50V via a 0 to 5V control voltage.

(-150) SPECIAL REMOTE SENSE: 2V of sense compensations.

(-154) 1.5 – 5.5V ADJUSTMENT RANGE: Takes a 5V, 150A power supply and modifies the adjustment network to allow an output voltage adjustment of 1.5 to 5.5Vdc.

(-171) PROGRAMMABLE OUTPUT VOLTAGE: Nominal Output is 5V @ 300A. Output is controlled over the range of 1V to 5V via a 0 to 5V control voltage.

(-180) VOLTAGE MIRROR: This option allows voltage equalization for a string of “seriesed” PS. The lower of the two PS’s becomes the controller for the upper one. That is, in a set of 3 PS’s connected in series, where PS1 is the most negative in the chain, PS1 will control the voltage of PS2 and PS2 will control the voltage of PS3. Any voltage adjustment, programming, margining, etc, must be done on the most negative power supply in the chain. The most negative PS in the chain will not have the Voltage Mirror option, ie, no (-180) in the type number. The voltage Mirror input pin, on the units with the (-180) in the type number, must be
connected to the remote sense pin of the PS immediately below it (lesser voltage) in the chain. The positive remote sense lead of the most negative PS should be connected to the positive load sense point while the negative remote sense lead of the most negative PS should be connected to the negative load sense point. All other PS remote sense leads should be tied to their respective output terminals. The current limit of all PS will be set to 105% of rated current. This option will also include an internal reverse protection diode across the output terminals.

(-199) PROGRAMMABLE OUTPUT VOLTAGE:

The output is programmed using
A control voltage from 0V to 4V. The voltage is adjusted per table below:

<table>
<thead>
<tr>
<th>Control (V)</th>
<th>Output (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>1.5</td>
<td>28</td>
</tr>
<tr>
<td>2.0</td>
<td>29</td>
</tr>
<tr>
<td>2.5</td>
<td>30</td>
</tr>
<tr>
<td>3.0</td>
<td>31</td>
</tr>
<tr>
<td>3.5</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>33</td>
</tr>
</tbody>
</table>

(235) MARGIN/PROGRAM: Allows +10% change in CH1. Connecting the margin pin to the positive side of CH1 provides +10% change in CH1

(-263) VOLTAGE ADJUST: Provides for an adjustment of the output voltage from 0% to 100% with an external 1k ohm potentiometer.

(-264) PROGRAMMABLE OUTPUT VOLTAGE: Output voltage is programmable from 75% to 100% via an external pot. Three pins will be provided for the voltage adjust pot.
MODEL NUMBER DESCRIPTION

SERIES
PM33 - POWERFACTOR™ (AC TO DC)
PM34 - THE NEW DEPENDABLES (DC TO DC)
PM35 - NON-ISOLATED BULK (AC to DC & DC to DC)
PM36 – HIGH EFFICIENCY (AC to DC & DC to DC)
PM37 – YELLOW BRICK ROAD HIGH POWER (AC TO DC)

U = CONFIGURATION
1. IFE (ISOLATED FRONT END) – DC INPUT
2. IFE (ISOLATED FRONT END) – AC INPUT
3. SINGLE OUTPUT – DC INPUT
4. SINGLE OUTPUT – AC INPUT
5. SINGLE OUTPUT - AC INPUT - PROGRAMMABLE
6. SINGLE OUTPUT - DC INPUT - PROGRAMMABLE
7. MULTIPLE OUTPUT – DC INPUT
8. MULTIPLE OUTPUT – AC INPUT
9. STACKER SERIES – AC INPUT

V = MAX OUTPUT POWER IN WATTS
2 = 500 11 = 3000 20 = 10000
3 = 625 12 = 3500 21 = 15000
4 = 750 13 = 4000 22 = 20000
5 = 875 14 = 4500 23 = 25000
6 = 1000 15 = 5000 24 = 30000
7 = 1200 16 = 6000 25 = 35000
8 = 1500 17 = 7000 26 = 40000
9 = 2000 18 = 8000 27 = 50000
10 = 2500 19 = 9000 28 = 60000

W = CASE CROSS SECTION
A = 5” X (2.5” to 3.5”)
B = 5” X (4.75” to 5.25”)
C = 5” X (5.5” to 6”)
D = 5” X (6.1” to 6.6”)
J = 1.75” x 8”

E = 5” X (6.5” to 7.25”)
F = 5” X (6.5” to 8”)
G = 5” X (8.1” to 8.9”)
H = 5” X (9.3” to 10.4”)
L = 1.75” x 5”

Z = # OF CHANNELS
1 = 1 CHANNEL
2 = 2 CHANNELS
3 = 3 CHANNELS
4 = 4 CHANNELS
5 = 5 CHANNELS
6 = 6 CHANNELS
7 = 7 CHANNELS
8 = 8 CHANNELS
9 = 9 CHANNELS
10 = 10 CHANNELS
11 = 11 CHANNELS

Y = INPUT VOLTAGE
DC INPUT
1 = 19V to 30V
2 = 36 TO 72VDC
3 = 40 TO 120VDC
7 = 90 to 350VDC
9 = 180 to 350VDC
10 = 400 to 700VDC

AC INPUT
SINGLE PHASE
4 = 90 to 138VAC
5 = 180 TO 264VAC
6 = 90 TO 264VAC
8 = 180-254/360-509VAC
(STRAPPABLE)

AC INPUT
THREE PHASE
3P = 180 to 264VAC (3KW)
5P = 180 TO 264VAC (6KW)
6P = 90 to 264VAC
7P = 325 to 477VAC
8P = 180 to 264VAC (8KW)
10P = 365 to 528VAC
11P = 323 to 418VAC

I/O INTERFACE
P = HOT PLUGGABLE
NO DESIGNATOR = NON-PLUG
**TYPE NUMBER DESCRIPTION**

Type Number defines the output voltage, type of input, output current and options for each output.

**TYPE NUMBER**

- **V** = Output Voltage  
  Example: 1.2 to 300

- **I** = AC or DC Input

- **D** = AC Input
  **F** = DC Input

- **C** = Output Current  
  Example: 10 to 1000

- **O1**
- **O2**
- **O3**
- **O4**

**Examples:**

**Typical Type Numbers for Single Output:**

- AC Input: 48D100-1C-6C-33-128
- DC Input: 12F100-1U-5LO-25-8T

**Typical Type Numbers for Multiple Output:**

- 5D150-2T-33-8T
- 12D10
- 12D12
- 48D2

**Available Options:**

Section 26 provides a complete list of standard options.