# 200W Single Output Medical Type

## MSP-200 Series

### Features:
- Universal AC input / Full range
- Built-in active PFC function, PF>0.95
- High efficiency up to 89%
- Withstand 300VAC surge input for 5 seconds
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Built-in constant current limiting circuit
- 1U low profile 38mm
- Medical safety approved (MOOP level)
- Built-in remote ON-OFF control
- Standby 5V@0.3A
- Built-in remote sense function
- No load power consumption<0.5W (Note.6)
- 5 years warranty

## SPECIFICATION

### OUTPUT

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DC VOLTAGE</td>
<td>3.3V</td>
<td>5V</td>
<td>7.5V</td>
<td>12V</td>
<td>15V</td>
<td>24V</td>
<td>36V</td>
<td>48V</td>
</tr>
<tr>
<td>RATED CURRENT</td>
<td>40A</td>
<td>35A</td>
<td>26.7A</td>
<td>16.7A</td>
<td>13.4A</td>
<td>8.4A</td>
<td>5.7A</td>
<td>4.3A</td>
</tr>
<tr>
<td>CURRENT RANGE</td>
<td>0 ~ 40A</td>
<td>0 ~ 35A</td>
<td>0 ~ 26.7A</td>
<td>0 ~ 16.7A</td>
<td>0 ~ 13.4A</td>
<td>0 ~ 8.4A</td>
<td>0 ~ 5.7A</td>
<td>0 ~ 4.3A</td>
</tr>
<tr>
<td>RATED POWER</td>
<td>132W</td>
<td>175W</td>
<td>200.3W</td>
<td>200.4W</td>
<td>201W</td>
<td>201.6W</td>
<td>205.2W</td>
<td>208.4W</td>
</tr>
<tr>
<td>RIPPLE &amp; NOISE (max.)</td>
<td>80mVp-p</td>
<td>90mVp-p</td>
<td>100mVp-p</td>
<td>120mVp-p</td>
<td>150mVp-p</td>
<td>150mVp-p</td>
<td>250mVp-p</td>
<td>250mVp-p</td>
</tr>
<tr>
<td>VOLTAGE ADJ. RANGE</td>
<td>2.8 ~ 3.8V</td>
<td>4.3 ~ 5.8V</td>
<td>6.8 ~ 9V</td>
<td>10.2 ~ 13.6V</td>
<td>13.5 ~ 16V</td>
<td>21.6 ~ 28.8V</td>
<td>28.8 ~ 39.6V</td>
<td>40.8 ~ 55.2V</td>
</tr>
<tr>
<td>VOLTAGE TOLERANCE</td>
<td>±2.0%</td>
<td>±2.0%</td>
<td>±2.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
</tr>
<tr>
<td>LINE REGULATION</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.3%</td>
<td>±0.3%</td>
<td>±0.2%</td>
<td>±0.2%</td>
<td>±0.2%</td>
</tr>
<tr>
<td>LOAD REGULATION</td>
<td>±1.5%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
<td>±0.5%</td>
</tr>
</tbody>
</table>

### SETUP, RISE TIME

- 1000ms, 50ms/230VAC
- 250ms, 50ms/115VAC at full load

### HOLD UP TIME (Typ.)

- 16ms/230VAC
- 16ms/115VAC at full load

### FREQUENCY RANGE

- 47 ~ 63Hz

### POWER FACTOR (Typ.)

- PF>0.95/230VAC
- PF>0.99/115VAC at full load

### EFFICIENCY (Typ.)

- 80%
- 84%
- 86%
- 88%
- 88%
- 89%
- 89%

### AC CURRENT (Typ.)

- 2.2A/115VAC
- 1.1A/230VAC

### INRUSH CURRENT (Typ.)

- 35A/115VAC
- 70A/230VAC

### LEAKAGE CURRENT Note.3

- Earth leakage current < 300mA, Touch leakage current < 100mA

### OVERLOAD

- 105 ~ 135% rated output power

### OVER VOLTAGE

- 3.96 ~ 4.62V
- 9.4 ~ 10.9V
- 14.4 ~ 16.8V
- 18.8 ~ 21.8V
- 30 ~ 34.8V
- 41.4 ~ 48.6V
- 57.6 ~ 67.2V

### PROTECTION

- Protection type: Constant current limiting, recovers automatically after fault condition is removed

### OVER TEMPERATURE

- Shut down if over temperature

### FUNCTION

- 5V STANDBY
- 5VSB: 5V@0.3A; tolerance±5%, ripple: 50mVp-p(max.)

### REMOTE CONTROL

- RC+(RC-); 4 ~ 10V
- or open = power on; 0 ~ 0.6V or short = power off

### WORKING TEMP.

- -40 ~ +70°C (Refer to "Derating Curve")

### WORKING HUMIDITY

- 20 ~ 90% RH non-condensing

### STORAGE TEMP., HUMIDITY

- -40 ~ +85°C, 10 ~ 95% RH

### TEMP. COEFFICIENT

- ±0.03%/°C (0 ~ 95°C)

### VIBRATION

- 10 ~ 500Hz, 5G 10min./cycle, 60min. each along X, Y, Z axes

### SAFETY & EMC (Note 4)

- ANSI/AAMI EP660801-1, ICE660801-1, IEC61660-1, IEC/BS EN/IEC 62368-1
- COMPLIANCE: Primary-Secondary: 2xMOOP, Primary-Earth: 1xMOOP

### WITHSTAND VOLTAGE

- U/P-O/P: 4kVAC
- O/P-FG: 2kVAC
- O/P-FG: 0.5kVAC

### ISOLATION RESISTANCE

- U/P-O/P, I/P-FG, O/P-FG: 100M Ohms / 500VDC / 25°C / 70% RH

### EMC EMISSION

- Compliance to BS EN/IEC61566-1 (CISPR11) Class B, BS EN/IEC61800-3-2,-3, EAC TP TC 020

### EMC IMMUNITY

- Compliance to BS EN/IEC61000-4-2, 4, 34, 5, 6, 8, 11, BS EN/IEC60601-1-2, EAC TP TC 020

### MTBF

- 209.4k hrs min. MIL-HDBK-217F (25°C)

### DIMENSION

- 199*98*38mm (L*W*H)

### PACKING

- 0.77Kg; 15pcs/14.9Kg/0.8CUFT

### NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance – includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com)
5. Derating may be needed under low input voltages. Please check the derating curve for more details.
6. No load power consumption<0.5W when RC+ & RC- (CN100 pin1,2) 0 ~ 8V or short.
7. Touch current was measured from primary input to DC output.
8. The ambient temperature derating of 3.5%/1000m with fanless models and of 5%/1000m with fans models for operating altitude higher than 2000m(6500ft).

File Name: MSP-200-SPEC 2021-09-15
### Mechanical Specification

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Assignment</th>
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<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC/L</td>
<td>1</td>
<td>DC OUTPUT-V</td>
</tr>
<tr>
<td>2</td>
<td>AC/N</td>
<td>2</td>
<td>DC OUTPUT+V</td>
</tr>
<tr>
<td>3</td>
<td>FG</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Terminal Pin No. Assignment

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Assignment</th>
<th>Pin No.</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RC+</td>
<td>4.5</td>
<td>DC OUTPUT-V</td>
</tr>
<tr>
<td>2</td>
<td>RC-</td>
<td>6.7</td>
<td>DC OUTPUT+V</td>
</tr>
<tr>
<td>3</td>
<td>FG</td>
<td>3.5</td>
<td></td>
</tr>
</tbody>
</table>

Connector Pin No. Assignment (CN100):

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Assignment</th>
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<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HRS DF11-6DS or equivalent</td>
<td>4,5</td>
<td>DC OUTPUT-V</td>
</tr>
<tr>
<td>2</td>
<td>HRS DF11-**SC or equivalent</td>
<td>6.7</td>
<td>DC OUTPUT+V</td>
</tr>
<tr>
<td>3</td>
<td>AUX</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AUXG</td>
<td>13max.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>+S</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-S</td>
<td>150.75</td>
<td></td>
</tr>
</tbody>
</table>

### Block Diagram

- **EMI FILTER**
- **ACTIVE INRUSH CURRENT LIMITING**
- **RECTIFIERS & PFC**
- **O.T.P.**
- **PFC CONTROL**
- **AUX POWER**
- **POWER SWITCHING**
- **RECTIFIERS & FILTER**
- **DETECTION CIRCUIT**
- **REMOTE CONTROL**
- **PWM FOSC: 70KHz**
- **PWM CONTROL**

### Derating Curve

- **Ambient Temperature (°C) vs Load (%)**
- **Input Voltage (V) 60Hz vs Load (%)**

File Name: MSP-200-SPEC 2021-09-15
1. Remote Control
The PSU can be turned ON/OFF by using the "Remote ON/OFF" function

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Pin Name</th>
<th>Function Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RC+</td>
<td>Turns the output on and off by electrical or dry contact between pin 2 (RC-). Short: Power OFF, Open: Power ON.</td>
</tr>
<tr>
<td>2</td>
<td>RC-</td>
<td>Remote control ground.</td>
</tr>
<tr>
<td>3</td>
<td>AUX</td>
<td>Auxiliary voltage output, 4.75~5.25V, reference to pin 4(AUXG). The maximum load current is 0.3A. This output has the built-in oring diodes and is not controlled by the &quot;remote ON/OFF control&quot;.</td>
</tr>
<tr>
<td>4</td>
<td>AUXG</td>
<td>Auxiliary voltage output ground. The signal return is isolated from the output terminals (+V &amp; -V).</td>
</tr>
<tr>
<td>5</td>
<td>+S</td>
<td>Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.</td>
</tr>
<tr>
<td>6</td>
<td>-S</td>
<td>Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.</td>
</tr>
</tbody>
</table>

2. Remote Sense
The remote sensing compensates voltage drop on the load wiring up to 0.5V.

Fig 1.1
![Remote Control Diagram]

Fig 2.1
![Remote Sense Diagram]