650–1200 Watts
MHP Series

**Specification**

**Input**
- Input Voltage: 650 W: 80-264 VAC, derate output power 10% <90 VAC, and 20% <85 VAC, 1000 W: 85-264 VAC, derate output power 10% <90 VAC
- Input Frequency: 47-63 Hz
- Input Current: 650 W: 6.5 A at 115 VAC typical, 3.2 A at 230 VAC full load, 1000 W: 10.9 A at 115 VAC typical, 5.1 A at 230 VAC full load
- Inrush Current: 650 W: 40 A max at 264 VAC, 1000 W: 60 A max at 264 VAC
- Power Factor: >0.9
- Earth Leakage Current: 250 µA max at 264 VAC/60 Hz
- Input Protection: 650 W: T16 A/250 V, 1000 W: T20 A/250 V internal fuse in line and neutral

**Output**
- Output Voltage: 12-48 VDC (see tables)
- Output Voltage Trim: ±10% V1
- Initial Set Accuracy: 650 W: ±1% V1, ±5% V3, 1000 W: ±1% V1, ±5% V2
- Minimum Load: No minimum load required
- Start Up Delay: 500 ms max
- Start Up Rise Time: 50 ms typical
- Hold Up Time: 20 ms minimum
- Drift: ±0.2% after 20 min warm up
- Line Regulation: ±0.5%
- Load Regulation: 650 W: ±1% V1, ±5% V3, 1000 W: ±1% V1, ±5% V2
- Transient Response: 4% max. deviation, recovery to within 1% in 500 µs for a 50-75-50% load change
- Ripple & Noise: 1% pk-pk V1, 20 MHz bandwidth
- Overvoltage Protection: 115-145% Vnom, recycle input to reset
- Overload Protection: 110-140%, V1 only
- Overtemperature Protection: Auto reset
- Short Circuit Protection: Constant current characteristic
- Temp. Coefficient: 0.05% /°C
- Remote Sense: Compensates for 0.5 V total voltage drop
- Remote On/Off: Uncommitted isolated optocoupler diode, powered diode inhibits V1 and fan supply
- Current Share: Single wire current share

**General**
- Efficiency: 85% typical
- Isolation: 4000 VAC In to Out, 2 x MOPP, 1500 VAC In to Earth, 1 x MOPP, 500 VDC Out to Earth
- Switching Frequency: PFC 70 kHz, main converter 200 kHz, standby 130 kHz typical
- Power Density: 650 W: 8.2 W/in³, 1000 W: 8.9 W/in³
- Signals: AC OK, remote on/off, current share
- MTBF: 260 Khrs to MIL-HDBK-217F at 25°C, GB

**Environmental**
- Operating Temperature: -20°C to +70°C, derate linearly from +50°C at 2.5%/°C to 50% at +70°C, 1000 W: -40°C start up
- Cooling: 650 W: Forced cooled, -TF & -EF models have integral dual voltage level fan, which is load dependant, U Channel requires 5.5 m/s minimum airflow, 1000 W: Forced cooled via integral quad voltage level fan which is load dependant
- Operating Humidity: 95% RH, non-condensing
- Storage Temperature: -40°C to +85°C
- Operating Altitude: 3000 m
- Shock: 30 g pk, half sine, 6 axes
- Vibration: 2 g rms, 5 Hz to 500 kHz, 3 axes

**EMC & Safety**
- Emissions: EN55022/EN55011 class B conducted, EN55022/EN55011 class A radiated
- Harmonic Currents: EN61000-3-2 class A, 650 W: class C for loads ≥20%, 1000 W: class C for loads ≥10%
- Voltage Flicker: EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B, EN60601-1-2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, B, Consult longform for 115 VAC operation
- ESD Immunity: EN61000-4-2, level 3 contact, level 3 air, Perf Criteria A
- Radiated Immunity: EN61000-4-3, level 3 Perf Criteria A
- EFT/Burst: EN61000-4-4, level 3 Perf Criteria A
- Surge: EN61000-4-5, installation class 3, Perf Criteria A
- Conducted Immunity: EN61000-4-6, level 3, Perf Criteria A
- Dips & Interruptions: EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B, EN60601-1-2, 30% 500 ms, 60% 100 ms, 100% 10 ms, 100% 5000 ms, Perf Criteria A, A, A, B. Consult longform for 115 VAC operation

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**Models and Ratings**

<table>
<thead>
<tr>
<th>Output Voltage V1</th>
<th>Output Current V1</th>
<th>Fan Supply V2&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Standby Supply V3</th>
<th>Output Power&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Model Number&lt;sup&gt;1,2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V</td>
<td>50 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>607 W</td>
<td>MHP650PS12-EF</td>
</tr>
<tr>
<td>15 V</td>
<td>40 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>607 W</td>
<td>MHP650PS15-EF</td>
</tr>
<tr>
<td>24 V</td>
<td>27 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>655 W</td>
<td>MHP650PS24-EF</td>
</tr>
<tr>
<td>28 V</td>
<td>23 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>655 W</td>
<td>MHP650PS28-EF</td>
</tr>
<tr>
<td>36 V</td>
<td>18 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>655 W</td>
<td>MHP650PS36-EF</td>
</tr>
<tr>
<td>48 V</td>
<td>13.5 A</td>
<td>12 V / 0.5 A</td>
<td>5 V / 0.2 A</td>
<td>655 W</td>
<td>MHP650PS48-EF</td>
</tr>
</tbody>
</table>

**Notes**

1. For top fan version replace ‘-EF’ in model number with ‘-TF’, e.g. MHP650PS12-TF
2. For U Channel version remove suffix.
3. U Channel models require a minimum of 5.5 m/s airflow from the system.
4. Not available for ‘-TF’ and ‘-EF’ models as used by integral fan.

**Mechanical Details**

**End Fan (See Longform Datasheet for U Channel Version)**

**Standard Terminal Block, M4 Screw, 6 Pins, 9.5 mm Center
torque 10.62 lbs-in (1.2 Nm)**

2 x M3 THD both side faces  
0.15 (3.8) max screw penetration  
max torque 4.0-5.0 lbs-in (0.45-0.57 Nm)

4 x M3 THD  
0.15 (3.8) max screw penetration  
max torque 4.0-5.0 lbs-in (0.45-0.57 Nm)

**J2 Logic Connector (JST B10B-PHDDSS)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ Sense</td>
<td>- Sense</td>
</tr>
<tr>
<td>2</td>
<td>- Sense</td>
<td>- Sense</td>
</tr>
<tr>
<td>3</td>
<td>AC OK/Power Fail</td>
<td>Current Share</td>
</tr>
<tr>
<td>4</td>
<td>- Sense</td>
<td>Current Share</td>
</tr>
<tr>
<td>5</td>
<td>Current Share</td>
<td>Current Share</td>
</tr>
<tr>
<td>7</td>
<td>+ Inhibit (Anode)</td>
<td>+5 V Standby (V3)</td>
</tr>
<tr>
<td>8</td>
<td>- Inhibit (Cathode)</td>
<td>5 V Standby Return (V3)</td>
</tr>
<tr>
<td>9</td>
<td>+5 V Standby (V3)</td>
<td>5 V Standby Return (V3)</td>
</tr>
</tbody>
</table>

**Notes**

1. Dimensions shown in inches (mm).
2. Weight: 2.8 lb (1.27 kg).
3. J2 Mating plug: JST part no. PHDR-10VS,  
contact: 26-22 AWG JST part no. SPHD-001T-P0.5.

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**Mechanical Details**

**Top Fan (Suffix -TF)**

- Standard Terminal Block, M3.5 Screw 3, Pins 9.5 mm Center torque 10.62 lbs-in (1.2 Nm)
- Standard Terminal Block, M4 Screw, 6 Pins, 9.5 mm Center torque 10.62 lbs-in (1.2 Nm)

**Notes**
1. Dimensions shown in inches (mm).
2. Weight: 2.8 lb (1.27 kg).
3. J2 Mating plug: JST part no. PHDR-10VS, contact: 26-22 AWG JST part no. SPHD-001T-P0.5.

**Signals**

**AC OK/Power Fail**

**Remote On/Off (Inhibit)**

For U Channel and Thermal Considerations please see longform datasheet.

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### Models and Ratings

<table>
<thead>
<tr>
<th>Output Voltage V1</th>
<th>Output Current V1</th>
<th>Standby Supply V2</th>
<th>Output Power</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;180 VAC</td>
<td>&gt;180 VAC</td>
<td>&lt;180 VAC</td>
<td>&gt;180 VAC</td>
<td></td>
</tr>
<tr>
<td>12 V</td>
<td>83.0 A</td>
<td>5 V / 1.0 A</td>
<td>1000 W</td>
<td>MHP1000P12</td>
</tr>
<tr>
<td>15 V</td>
<td>67.0 A</td>
<td>5 V / 1.0 A</td>
<td>1010 W</td>
<td>MHP1000P15</td>
</tr>
<tr>
<td>24 V</td>
<td>42.0 A</td>
<td>5 V / 1.0 A</td>
<td>1013 W</td>
<td>MHP1000P24</td>
</tr>
<tr>
<td>28 V</td>
<td>36.0 A</td>
<td>5 V / 1.0 A</td>
<td>1013 W</td>
<td>MHP1000P28</td>
</tr>
<tr>
<td>36 V</td>
<td>28.0 A</td>
<td>5 V / 1.0 A</td>
<td>1013 W</td>
<td>MHP1000P36</td>
</tr>
<tr>
<td>48 V</td>
<td>21.0 A</td>
<td>5 V / 1.0 A</td>
<td>1013 W</td>
<td>MHP1000P48</td>
</tr>
</tbody>
</table>

### Mechanical Details

- Standard Terminal Block, M6 Screw, 4 Pins 0.62 (16.0) center Torque 26.0 lbs-in (2.94 Nm)
- Standard Terminal Block, M4 Screw, 3 Pins 0.37 (9.5) center Torque 10.62 lbs-in (1.2 Nm)

### Notes
1. Dimensions shown in inches (mm).
2. Weight: 4.6 lb (2.08 kg)
3. J3 Mating plug: JST part no. PHDR-10 VS, contact: 26-22 AWG JST part no. SPHD-001T-P0.5.

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