

# MBC120 Series

Low Profile

Open Frame Power Supplies

Medical



The MBC120 Series of open frame medical power supplies feature a wide universal AC input range of 85 V – 264 VAC, offering 120 W of output power in a compact footprint, with a variety of isolated single output voltages.

The MBC series is designed and approved to the latest Medical standards (EN/IEC 60601-1), providing 2 x MOPP isolation for Class I & Class II applications.

These power supplies are ideal for medical, telecom, datacom, industrial equipment and other applications.

## Key Features & Benefits

- 3 x 2 Inch Footprint
- 120 Watts with Forced Air Cooling
- Approved to EN/IEC 60601-1
- Efficiencies up to 93%
- -40 To 70°C Operating Temperature
- Dual Fusing
- Thermal Shut-Down Feature
- >3.00 Million Hours, Telcordia -SR332-Issue 3
- Standby Power < 0.3 W
- Class II Option Available
- RoHS Compliant
- CE Marked

## Applications

- Diagnostic
- Drug Pump
- Dialysis
- Home Health Care
- Monitoring
- Portable Equipment

## 1. MODEL SELECTION

| MODEL NUMBER <sup>1</sup>  | DESCRIPTION               | VOLTAGE | MAX. LOAD (CONVECTION) | MAX. LOAD (200 LFM) | MIN. LOAD | RIPPLE & NOISE <sup>2</sup> |
|----------------------------|---------------------------|---------|------------------------|---------------------|-----------|-----------------------------|
| MBC120-1T12L               | Screw Terminal            | 12 V    | 8.33 A                 | 10.0 A              | 0.0 A     | 1%                          |
| MBC120-1012L               | Molex Header              |         |                        |                     |           |                             |
| MBC120-1T15L               | Screw Terminal            | 15 V    | 6.66 A                 | 8.0 A               | 0.0 A     | 1%                          |
| MBC120-1015L               | Molex Header              |         |                        |                     |           |                             |
| MBC120-1T24L               | Screw Terminal            | 24 V    | 4.16 A                 | 5.0 A               | 0.0 A     | 1%                          |
| MBC120-1024L               | Molex Header              |         |                        |                     |           |                             |
| MBC120-1T30L               | Screw Terminal            | 30 V    | 3.33 A                 | 4.0 A               | 0.0 A     | 1%                          |
| MBC120-1030L               | Molex Header              |         |                        |                     |           |                             |
| MBC120-1T48L               | Screw Terminal            | 48 V    | 2.08 A                 | 2.5 A               | 0.0 A     | 1%                          |
| MBC120-1048L               | Molex Header              |         |                        |                     |           |                             |
| MBC120-1T58L               | Screw Terminal            | 58 V    | 1.72 A                 | 2.07 A              | 0.0 A     | 1%                          |
| MBC120-1058L               | Molex Header              |         |                        |                     |           |                             |
| COVER-120-XBC <sup>3</sup> | metal cover kit accessory |         |                        |                     |           |                             |

## 2. INPUT SPECIFICATIONS

Specifications are for nominal input voltage, 25°C unless otherwise stated.

| PARAMETER           | DESCRIPTION / CONDITION                             | SPECIFICATION                     |
|---------------------|-----------------------------------------------------|-----------------------------------|
| Input Voltage       | Universal (see derating under output power)         | 85-264 VAC / 390 VDC <sup>4</sup> |
| Input Frequency     |                                                     | 47-63 Hz                          |
| Input Current       | 115 VAC:<br>230 VAC:                                | 1.2 A max.<br>0.65 A max.         |
| No Load Power       | Typical                                             | < 0.3 W                           |
| Inrush Current      | 115 VAC:<br>230 VAC:<br>264 VAC:                    | 25 A<br>45 A<br>75 A              |
| Leakage Current     | Typical (N.A. For Class II Option)<br>Touch current | 300 $\mu$ A<br><100 $\mu$ A       |
| Power Factor        | @ Full Load, Active PFC                             | > 0.95                            |
| Switching Frequency | Typical                                             | 60 KHz                            |

<sup>1</sup> For Class II Option (without input Earth pin) add suffix: -2 (e.g.: MBC120-1012L-2).

<sup>2</sup> Ripple is peak to peak with 20 MHz bandwidth and 10  $\mu$ F (Tantalum capacitor) in parallel with a 0.1  $\mu$ F capacitor at rated line voltage and load ranges.

<sup>3</sup> When used in Cover Kit, de-rate output power to 70 % under all operating conditions

<sup>4</sup> Functional, not approved.

### 3. OUTPUT SPECIFICATIONS

| PARAMETER                | DESCRIPTION / CONDITION                                                                                          | SPECIFICATION        |
|--------------------------|------------------------------------------------------------------------------------------------------------------|----------------------|
| Output Power             | Forced cooling (with 200 LFM):<br>Convection cooling (for input 100-264 VAC, de-rate linearly to 80 W @ 85 VAC): | 120 W<br>100 W       |
| Efficiency               | 48 V, 58 V:<br>24 V, 30 V:<br>12 V, 15 V:                                                                        | 93%<br>91%<br>90%    |
| Hold-up Time             | Typical                                                                                                          | >10 ms               |
| Line Regulation          |                                                                                                                  | +/-0.5%              |
| Load Regulation          |                                                                                                                  | +/-1%                |
| Transient Response       | 25% step load change, at 0.1A/uS slew rate,<br>50% duty cycle, 50 Hz = 4%                                        | recovery time < 5 ms |
| Voltage Adjustment       |                                                                                                                  | +/-3%                |
| Rise Time                | Typical                                                                                                          | 55 ms                |
| Set Point Tolerance      |                                                                                                                  | +/-1%                |
| Over Current Protection  |                                                                                                                  | > 110%               |
| Over Voltage Protection  | Latch type (AC recycling required)                                                                               | 110 to 140%          |
| Short Circuit Protection | Hiccup mode                                                                                                      |                      |

### 4. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER                          | DESCRIPTION / CONDITION                                                                                                  | SPECIFICATION              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Operating Temperature <sup>5</sup> | Startup guaranteed<br>(derate linearly above 50°C to 70°C as per Fig 1)                                                  | -40 to +70°C<br>-40 to 0°C |
| Storage Temperature                |                                                                                                                          | -40 to +85°C               |
| Cooling                            | Forced: with 300 LFM (Refer to Mech. Drawing)<br>Convection: for input 100-264 VAC<br>(derate linearly to 80 W @ 85 VAC) | 120 W<br>100 W             |
| Relative Humidity                  | Noncondensing                                                                                                            | 5% to 95%                  |
| Altitude                           | Operating:<br>Nonoperating:                                                                                              | 16,000 ft<br>40,000 ft.    |
| Reliability                        | MTBF according to Telcordia –SR332-Issue 3                                                                               | 3.00 million hours         |

### 5. EMC SPECIFICATIONS

| PARAMETER                          | DESCRIPTION / CONDITION                                                        | SPECIFICATION        |
|------------------------------------|--------------------------------------------------------------------------------|----------------------|
| Conducted Emissions                | EN 55011-B, CISPR22-B, FCC PART15-B                                            | Pass                 |
| Radiated Emissions                 | EN 55011 A;<br>with external core (King core K5B RC 25x12x15-M in input cable) | Pass<br>Level B      |
| Input Current Harmonics            | EN 61000-3-2                                                                   | Class D              |
| Voltage Fluctuation and Flicker    | EN 61000-3-3                                                                   | Pass                 |
| ESD Immunity                       | EN 61000-4-2                                                                   | Level 4, Criterion A |
| Radiated Field Immunity            | EN 61000-4-3                                                                   | Level 3, Criterion A |
| Electrical Fast Transient Immunity | EN 61000-4-4                                                                   | Level 3, Criterion A |
| Surge Immunity                     | EN 61000-4-5                                                                   | Level 3, Criterion A |
| Conducted Immunity                 | EN 61000-4-6                                                                   | Level 3, Criterion A |
| Magnetic Field Immunity            | EN 61000-4-8                                                                   | Level 4, Criterion A |
| Voltage Dips, Interruptions        | EN 61000-4-11                                                                  | Criterion B          |

<sup>5</sup> Output ripple can be more than 10% of the output voltage.

## 6. SAFETY SPECIFICATIONS

| PARAMETER          | DESCRIPTION / CONDITION                                                                             | SPECIFICATION |
|--------------------|-----------------------------------------------------------------------------------------------------|---------------|
| Isolation Voltage  | Input to Output: (For medical applications)                                                         | 4000 VAC      |
|                    | Input to GND: (Not Applicable For Class II Option)                                                  | 1500 VAC      |
|                    | Output to GND: for type BF                                                                          | 1500 VAC      |
|                    | for type B (N/A For Class II Option)                                                                | 500 VAC       |
| Protection Level   | Primary to Secondary:                                                                               | 2 MOPP        |
|                    | Primary to Earth:                                                                                   | 1 MOPP        |
|                    | Secondary to Earth:                                                                                 | 1 MOPP        |
| Safety Standard(s) | Approved to the latest edition of the following standards: CSA/UL60601-1, EN60601-1 and IEC60601-1. |               |
| Agency Approvals   | Nemko, cULus, CB                                                                                    |               |
| CE mark            | Complies with LVD Directive                                                                         |               |

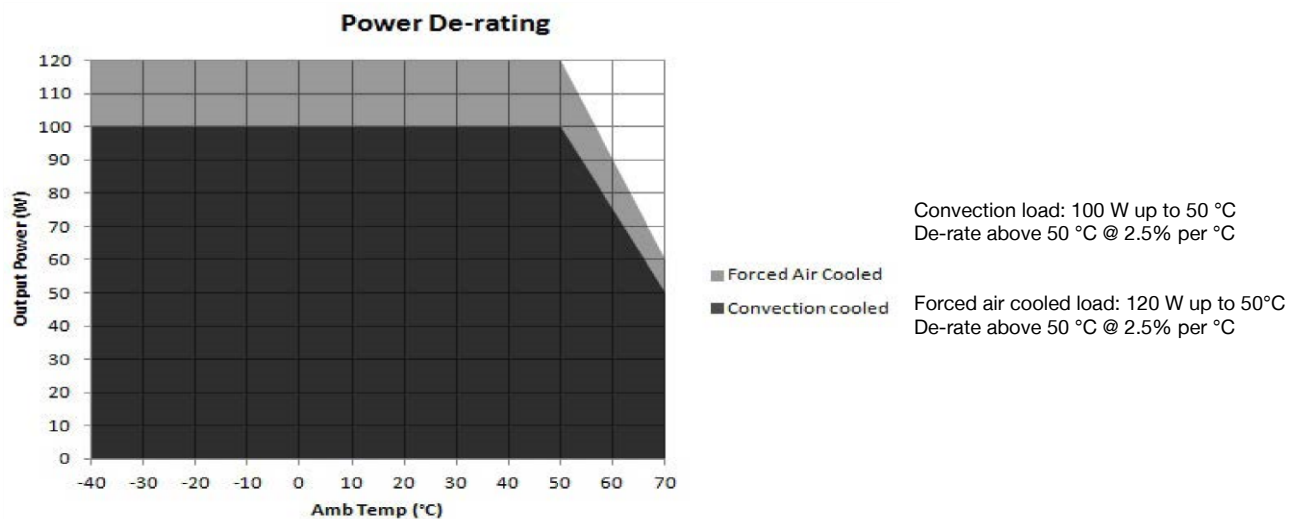


Figure 1. Derating Curve

## 7. CONNECTOR & PIN DESCRIPTION

| CONNECTOR           | PIN | DESCRIPTION / CONDITION | MANUFACTURER / PN |
|---------------------|-----|-------------------------|-------------------|
| AC Input Connector  | J1  | Pin 1                   | AC Line           |
|                     |     | Pin 2                   | Not Fitted        |
|                     |     | Pin 3                   | AC Neutral        |
| DC Output Connector | J2  | Pin 1, 2                | V1 -VE            |
|                     |     | Pin 3, 4                | V1 +VE            |
|                     |     |                         |                   |

## 8. MECHANICAL SPECIFICATIONS

| PARAMETER  | DESCRIPTION / CONDITION                   |
|------------|-------------------------------------------|
| Weight     | 150 g                                     |
| Dimensions | 76.2 x 50.8 x 30.1 mm (3 x 2 x 1.18 inch) |

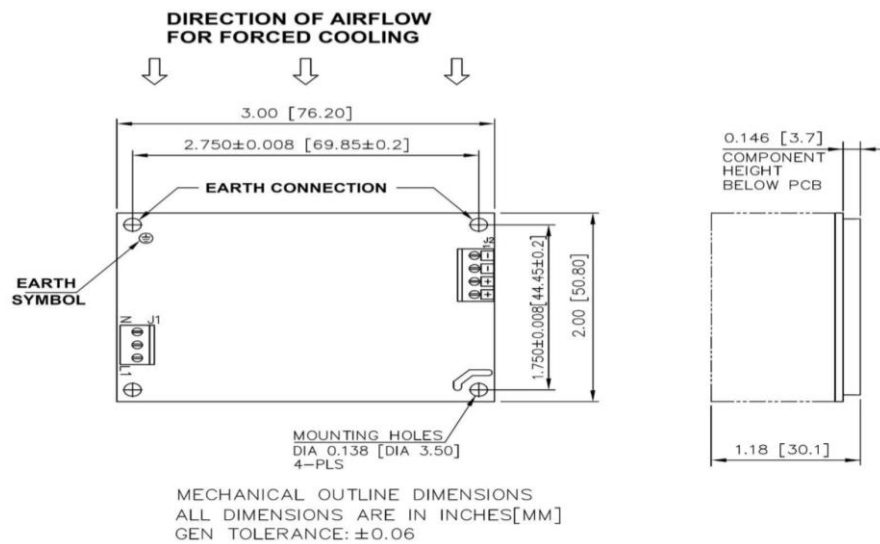


Figure 2. Mechanical Drawing - Screw Terminal (Option 1)

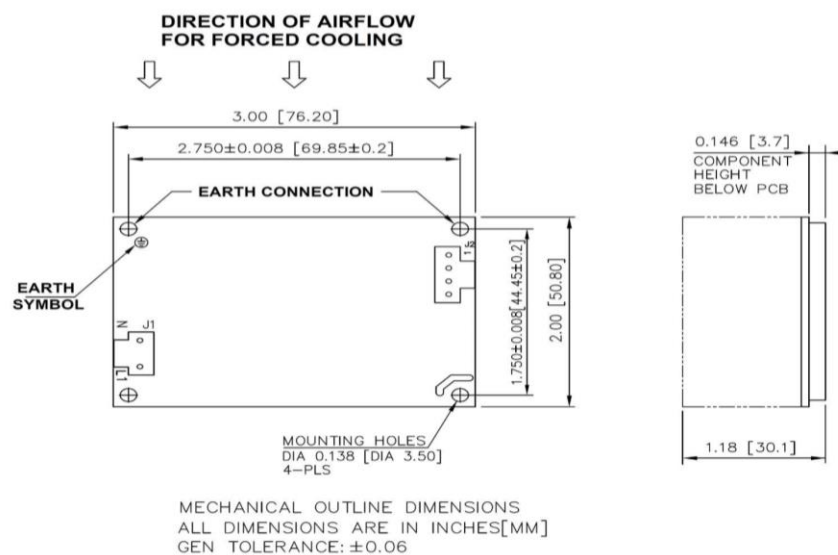


Figure 3. Mechanical Drawing - Molex Header (Option 2)

**NOTES:** In case the PCB is mounted in a metal enclosure, using metal hardware ensure the following:

- 1 Stand off, used to mount PCB has OD of 5.4 mm max.
- 2 Screws, used to fix PCB on stand off, have head dia of 6.0 mm max.
- 3 Washer, if used, to have dia of 6.5 mm max.

**For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)**

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

**TECHNICAL REVISIONS** - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.