

# MBC150 Series

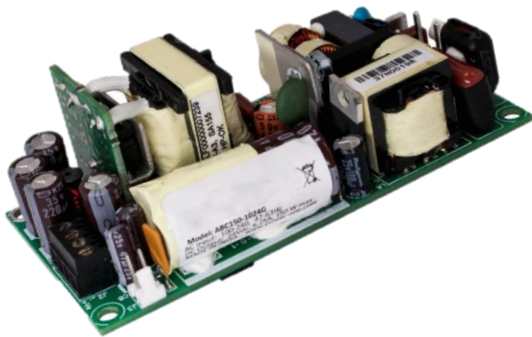
## Open Frame Power Supplies

### Medical

The MBC150 Series of open-frame medical power supplies, with its wide universal input range 90-264 VAC, is available at 150 W of output power with forced-air cooling and a variety of single output voltages.

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

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



### Key Features & Benefits

- 4 x 2 x 1.3 Inch Form Factor
- 150 W with Forced-Air Cooling
- Approved to EN/IEC 60601-1
- 12 V @ 0.5 A fan voltage auxiliary output
- High Efficiency > 86%
- Low conducted and radiated noise
- Light weight
- IEC Protection Class Options:
  - Class I: Earthing Tab J4 (no suffix)
  - Class II: No Earthing Tab (-2 suffix)
- Medical Safety Agency Approvals
- RoHS Compliant

### Applications

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

## 1. MODEL SELECTION

| MODEL <sup>1</sup>         | CONNECTOR                   | OUTPUT VOLTAGE | MAX LOAD <sup>2</sup> |         | MIN LOAD | POWER |
|----------------------------|-----------------------------|----------------|-----------------------|---------|----------|-------|
|                            |                             |                | CONVECTION            | 300 LFM |          |       |
| MBC150-1005G               | JST (Header)                | 5 VDC          | 16.0 A                | 16.0 A  | 0.0 A    | 80 W  |
| MBC150-1T05G               | Screw Terminal              |                |                       | 20.0 A  |          | 100 W |
| MBC150-1012G               | JST (Header)                | 12 VDC         | 8.33 A                | 12.5 A  | 0.0 A    | 150 W |
| MBC150-1T12G               | Screw Terminal              |                |                       |         |          |       |
| MBC150-1015G               | JST (Header)                | 15 VDC         | 6.67 A                | 10.0 A  | 0.0 A    | 150 W |
| MBC150-1T15G               | Screw Terminal              |                |                       |         |          |       |
| MBC150-1024G               | JST (Header)                | 24 VDC         | 4.17 A                | 6.25 A  | 0.0 A    | 150 W |
| MBC150-1T24G               | Screw Terminal              |                |                       |         |          |       |
| MBC150-1048G               | JST (Header)                | 48 VDC         | 2.08 A                | 3.13 A  | 0.0 A    | 150 W |
| MBC150-1T48G               | Screw Terminal              |                |                       |         |          |       |
| COVER-150-XBC <sup>3</sup> | Metal Cover Kit (accessory) |                |                       |         |          |       |

<sup>1</sup> Class I products have an Earthing tab. For Class II version (without Earthing tab) add suffix -2 (e.g.: MBC150-1012G-2).

<sup>2</sup> Combined output power from V1 and VFAN should not exceed the total output power rating.

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

## 2. INPUT SPECIFICATIONS

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

| PARAMETER           | DESCRIPTION / CONDITION                                   | SPECIFICATION                                                |
|---------------------|-----------------------------------------------------------|--------------------------------------------------------------|
| Input Voltage       | Universal                                                 | 90 – 264 VAC / 120 – 390 VDC                                 |
| Input Frequency     |                                                           | 47 – 63 Hz                                                   |
| Input Current       | 120 VAC:<br>230 VAC:                                      | 1.70 A max.<br>0.85 A max.                                   |
| No Load Power       |                                                           | 1.2 W                                                        |
| Inrush Current      | 120 VAC:<br>230 VAC:                                      | 35 A max.<br>65 A max.                                       |
| Leakage Current     | 120 VAC:<br>230 VAC:                                      | < 140 µA<br>< 250 µA                                         |
| No Load Power       |                                                           | 1.2 W                                                        |
| Switching Frequency | PFC converter (variable)<br>Resonant converter (variable) | 35 – 250 kHz, 90 kHz typical<br>35 – 250 kHz, 90 kHz typical |

### 3. OUTPUT SPECIFICATIONS

| PARAMETER                 | DESCRIPTION / CONDITION                                        | SPECIFICATION                                                                     |
|---------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Output Voltage            | Refer to Model Selection table                                 | 5 V to 48 V                                                                       |
| Output Power <sup>4</sup> | Peak Power: 170 W for 2 s                                      | 150 W                                                                             |
| Fan Output <sup>5</sup>   | @ 5 A                                                          | 12 V                                                                              |
| Efficiency                | 120 VAC:<br>230 VAC:                                           | 84% typical<br>86% typical                                                        |
| Hold Up Time              | 120 VAC:<br>230 VAC:                                           | 6 ms<br>10 ms                                                                     |
| Power Factor              | 120 VAC:<br>230 VAC:                                           | 0.99<br>0.95                                                                      |
| Line Regulation           |                                                                | ± 0.5%                                                                            |
| Load Regulation           |                                                                | ± 2.0%                                                                            |
| Transient Response        | 50 to 100% load change, 50 Hz, 50% duty cycle, 0.1 A / $\mu$ s | < 10%,<br>recovery time < 5 ms                                                    |
| Ripple <sup>6</sup>       | All outputs                                                    | 1.0 % max                                                                         |
| Rise Time                 |                                                                | < 100 ms                                                                          |
| Set Point Accuracy        | Main output                                                    | ± 1%                                                                              |
| Output Voltage Adjustment | V1                                                             | ± 3 %                                                                             |
| Over Current Protection   |                                                                | 110% typical above rating                                                         |
| Over Voltage Protection   | V1                                                             | 110 to 150%                                                                       |
| Short Circuit Protection  | Short term, Automatic recovery                                 |                                                                                   |
| Cooling                   | Convection<br>300 LFM                                          | 80 W (5 V model), 100 W (other models)<br>100 W (5 V model), 150 W (other models) |

<sup>4</sup> Derate output power linearly to 80% from 90 VAC to 80 VAC input.

<sup>5</sup> Fan output voltage tolerance is +/-20 %. Peak current for fan output is 1 A.

<sup>6</sup> Ripple is 2 % up to 20 % load and < 1 % above 20 % load. Ripple is peak to peak with 20 MHz bandwidth and 10  $\mu$ F (Electrolytic capacitor) in parallel with a 0.1  $\mu$ F capacitor at rated line voltage and load ranges.

### 4. EMC SPECIFICATIONS

| PARAMETER                          | DESCRIPTION / CONDITION             | SPECIFICATION        |
|------------------------------------|-------------------------------------|----------------------|
| Conducted Emissions                | EN 55011-B, CISPR22-B, FCC PART15-B | Pass                 |
| Radiated Emissions                 | EN 55011 B                          | Pass                 |
| 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 A & B      |

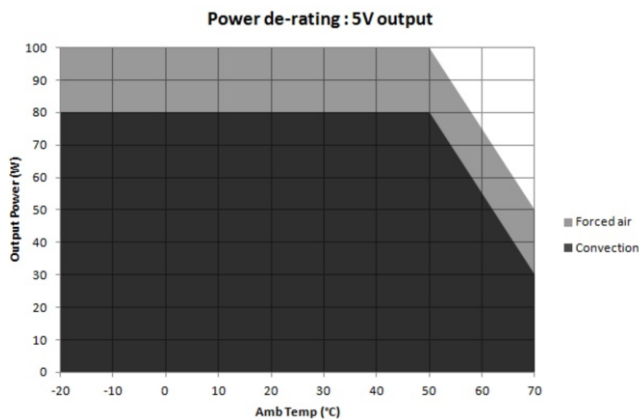
## 5. SAFETY SPECIFICATIONS

| PARAMETER         | DESCRIPTION / CONDITION                                                            | SPECIFICATION |
|-------------------|------------------------------------------------------------------------------------|---------------|
| Isolation Voltage | Input to Output:                                                                   | Min. 5900 VDC |
| Safety Standards  | EN 60601-1, IEC 60601-1 (ed.3),<br>ANSI / AAMI ES 60601 - 1, CSA C22.2 No. 60601-1 |               |
| Agency Approvals  | Nemko, UL, C-UL                                                                    |               |
| CE mark           | Complies with LVD Directive                                                        |               |

## 6. ENVIRONMENTAL SPECIFICATIONS

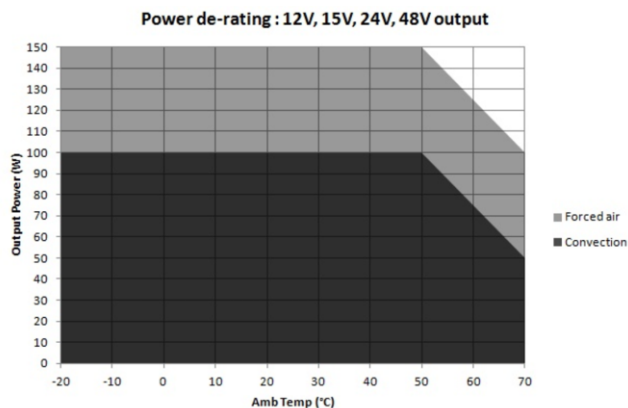
| PARAMETER                          | DESCRIPTION / CONDITION                    | SPECIFICATION            |
|------------------------------------|--------------------------------------------|--------------------------|
| Operating Temperature <sup>7</sup> | -20 to 0°C start-up is guaranteed          | -20 to 70°C              |
| Storage Temperature                |                                            | -40 to 70° C             |
| Humidity                           | Non Condensing                             | 95%                      |
| Altitude                           | Operating:<br>Non-Operating:               | 10,000 ft.<br>40,000 ft. |
| Reliability                        | MTBF according to Telcordia -SR332-Issue 3 | 2.4 million hours        |

<sup>7</sup> Refer to derating curves



Convection load: 80 W up to 50 °C  
De-rate above 50 °C @ 3.125% per °C

Forced air cooled load: 100W up to 50°C  
De-rate above 50 °C @ 2.5% per °C



Convection load: 100 W up to 50 °C  
De-rate above 50 °C @ 2.5% per °C

Forced air cooled load : 150 W up to 50°C  
De-rate above 50 °C @ 1.67% per °C

Figure 1. Derating Curves

## 7. CONNECTOR & PIN DESCRIPTION

| CONNECTOR                            | PIN | DESCRIPTION / CONDITION |                     | MANUFACTURER / PN                                                      |
|--------------------------------------|-----|-------------------------|---------------------|------------------------------------------------------------------------|
| AC Input Connector                   | J1  | Pin 1                   | AC Line             | Molex: 26-60-4030 or equivalent                                        |
|                                      |     | Pin 2                   | AC Neutral          | Mating: 09-50-3031; Pins: 08-50-0106                                   |
| DC Output Connector                  | J2  | Pin 1, 2                | V1                  | Option 1:<br>Tyco: 1776112-4 or equivalent                             |
|                                      |     | Pin 3, 4                | RTN                 | Mating: 13 AWG wire                                                    |
|                                      |     |                         |                     | Option 2:<br>JST: B4P-VH-B (LF) (SN) or B4P-VH (LF) (SN) or equivalent |
|                                      |     |                         |                     | Mating: VHR-4M; Pins: SVH-41T-P1.1                                     |
| Fan (Aux) Connector                  | J3  | Pin 1                   | VFAN (12 V / 0.5 A) | Tyco: 640456-2 or equivalent                                           |
|                                      |     | Pin 2                   | RTN                 | Mating: 640440-2                                                       |
| Earth <sup>8</sup> (Spade Connector) | J4  |                         |                     | Molex: 19705-4301 or equivalent                                        |
|                                      |     |                         |                     | Mating: 190030001                                                      |

<sup>8</sup> Class I product only

## 8. MECHANICAL SPECIFICATIONS

| PARAMETER  | DESCRIPTION / CONDITION                       |
|------------|-----------------------------------------------|
| Weight     | 150 g (0.33 lbs.)                             |
| Dimensions | 101.6 x 50.8 x 33.6 mm (4.0 x 2.0 x 1.3 inch) |

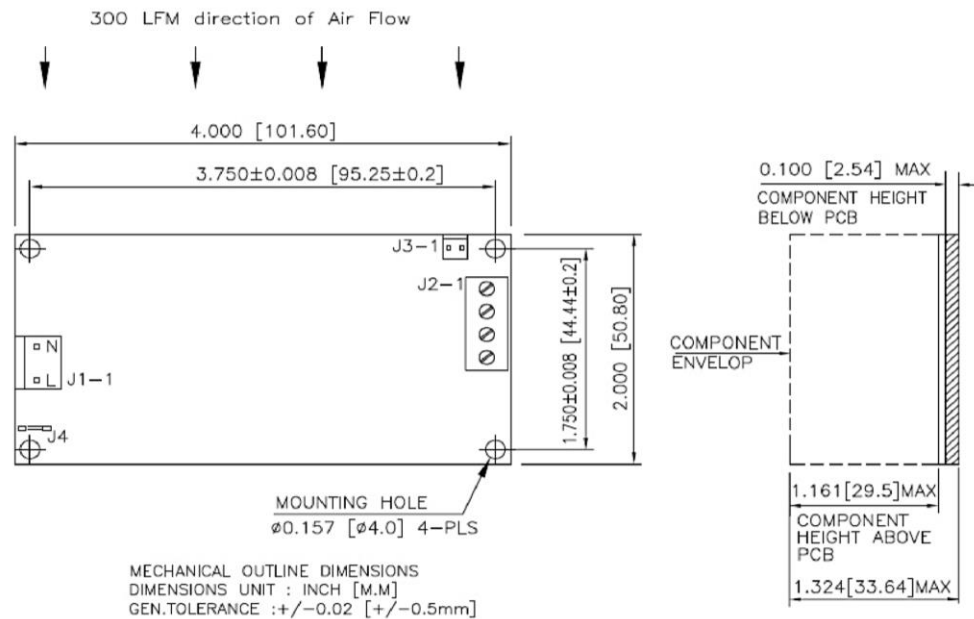


Figure 2. Mechanical Drawing

**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.

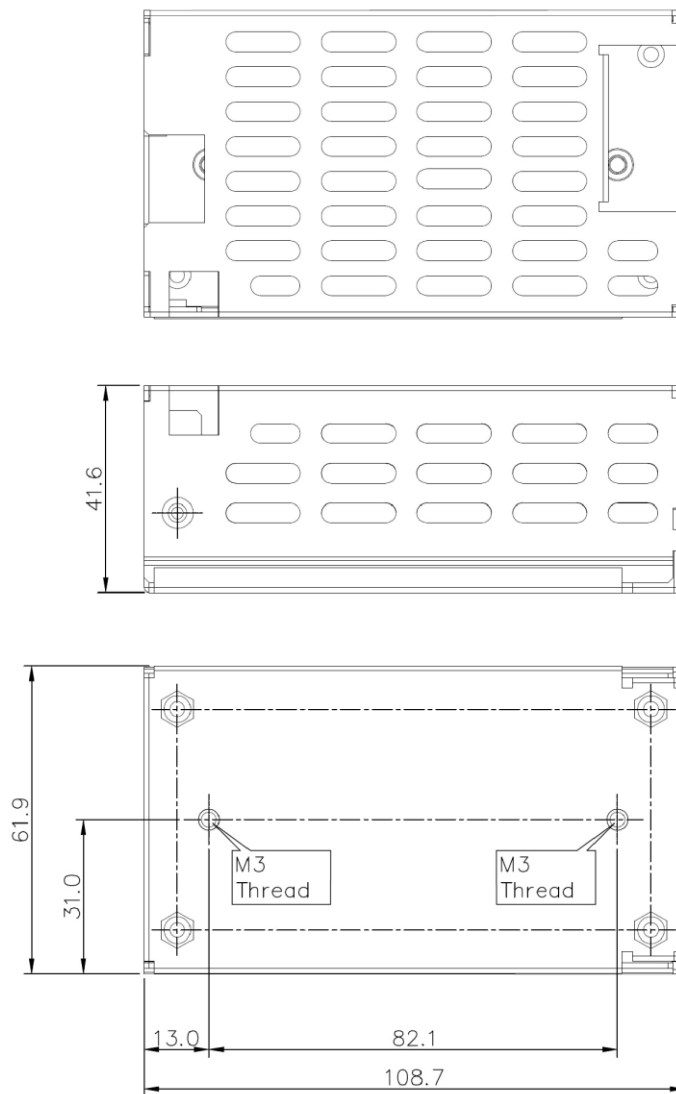


Figure 3. Mechanical Drawing with Cover Kit

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.