

# MBC40 Series

## AC-DC Open Frame Power Supplies

### Medical

Not For New Design  
Please refer to exact equivalent product series  
**MWLT40**



The MBC40 Series of open-frame medical power supplies, with its wide universal 90-264 VAC input range, is available at 40 W of output power and a variety of single and multiple 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 medical power supplies are ideal for, monitoring, home health equipment as well as surgical devices.

#### Key Features & Benefits

- 4 x 2 x 1.2 Inch Form Factor
- Single to Triple Outputs
- Ultra High Efficiency > 85%
- Approved to EN/IEC 60601-1
- Low leakage current < 250  $\mu$ A
- No Load Power < 0.3 W
- IEC Protection Class Options:
  - Class I: Earth pin J4 (no suffix)
  - Class II: No Earth pin (-2 suffix)
- RoHS Compliant
- Cover Kit Accessory Available

#### Applications

- Dialysis
- Monitoring
- Pumps
- Surgical Devices
- Home Health
- Ultrasound



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## 1. MODEL SELECTION

| MODEL <sup>1</sup>        | VOLTAGE                   | MAX LOAD <sup>2</sup> | MIN LOAD <sup>3</sup> | RIPPLE <sup>4</sup> | POWER |
|---------------------------|---------------------------|-----------------------|-----------------------|---------------------|-------|
| MBC40-1005G               | 5.1 V                     | 8.0 A                 | 0.0 A                 | 1%                  | 40 W  |
| MBC40-1012G               | 12 V                      | 3.5 A                 | 0.0 A                 | 1%                  | 40 W  |
| MBC40-1015G               | 15 V                      | 2.7 A                 | 0.0 A                 | 1%                  | 40 W  |
| MBC40-1024G               | 24 V                      | 1.7 A                 | 0.0 A                 | 1%                  | 40 W  |
| MBC40-1048G               | 48 V                      | 0.83 A                | 0.0 A                 | 1%                  | 40 W  |
| MBC40-3000G               | V <sub>1</sub> = 5.2 V    | 6.0 A                 | 0.5 A                 | 1.5%                | 40 W  |
|                           | V <sub>2</sub> = 12.5 V   | 2.0 A                 | 0.1 A                 | 1%                  |       |
|                           | V <sub>3</sub> = -12.8 V  | 0.5 A                 | 0.0 A                 | 1%                  |       |
| MBC40-3001G               | V <sub>1</sub> = 5.2 V    | 6.0 A                 | 0.5 A                 | 1.5%                | 40 W  |
|                           | V <sub>2</sub> = 24 V     | 1.0 A                 | 0.1 A                 | 1%                  |       |
|                           | V <sub>3</sub> = -12.8 V  | 0.5 A                 | 0.0 A                 | 1%                  |       |
| MBC40-3002G               | V <sub>1</sub> = 5.2 V    | 6.0 A                 | 0.5 A                 | 1.5%                | 40 W  |
|                           | V <sub>2</sub> = 15 V     | 1.5 A                 | 0.1 A                 | 1%                  |       |
|                           | V <sub>3</sub> = -15 V    | 0.5 A                 | 0.0 A                 | 1%                  |       |
| MBC40-3003G               | V <sub>1</sub> = 3.3 V    | 6.0 A                 | 1.0 A                 | 1.5%                | 40 W  |
|                           | V <sub>2</sub> = 5 V      | 3.0 A                 | 0.1 A                 | 1.5%                |       |
|                           | V <sub>3</sub> = -12.8 V  | 0.5 A                 | 0.0 A                 | 1%                  |       |
| COVER-40-XBC <sup>5</sup> | Metal cover kit accessory |                       |                       |                     |       |

<sup>1</sup> Class II version available. Add suffix "-2" at the end of the Model Number

<sup>2</sup> Maximum current per output channel. Do not exceed total output power rating.

<sup>3</sup> Min Load specified to meet cross regulation.

<sup>4</sup> 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.

<sup>5</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                   |
| Input Frequency <sup>6</sup> |                                             | 47 to 400 Hz                   |
| Input Current                | 120 VAC:<br>230 VAC:                        | 0.85 A max.<br>0.45 A max.     |
| No Load Power                | Single output models<br>Multi output models | < 0.3 W<br>< 0.5 W             |
| Inrush Current               | 120 VAC:<br>230 VAC:                        | 30 A max.<br>60 A max.         |
| Leakage Current              | 120 VAC:<br>230 VAC:                        | < 140 $\mu$ A<br>< 250 $\mu$ A |
| Switching Frequency          | Typical                                     | 67 kHz                         |

<sup>6</sup> Safety approved: 47 to 63 Hz

### 3. OUTPUT SPECIFICATIONS

| PARAMETER                 | DESCRIPTION / CONDITION                                          | SPECIFICATION                  |
|---------------------------|------------------------------------------------------------------|--------------------------------|
| Efficiency <sup>7</sup>   | Typical                                                          | 85%                            |
| Hold Up Time              | @ 120 VAC typical                                                | >10 ms                         |
| Output Power <sup>8</sup> | Derate output power linearly to 80% from 90 VAC to 80 VAC input. | 40 W                           |
| Line Regulation           |                                                                  | ± 0.3%                         |
| Load Regulation           | V1:<br>V2 & V3:                                                  | ± 0.5%<br>± 5%                 |
| Transient Response        | 50% to 100% load change, 50/60 Hz, 50% duty cycle, 0.1 A/μs      | < 10%,<br>recovery time < 5 ms |
| Rise Time                 |                                                                  | < 100 ms                       |
| Set Point Tolerance       | V1:<br>V2 & V3:                                                  | ± 3%<br>± 5%                   |
| Output Voltage Adjustment | V1                                                               | ± 10%                          |
| Over Current Protection   | Typical above rating                                             | 130%                           |
| Over Voltage Protection   | Typical for V1 only                                              | 130%                           |
| Short Circuit Protection  | Short term, autorecovery                                         |                                |
| Cooling                   | Convection                                                       |                                |

<sup>7</sup> For MBC40-3003G efficiency is 75% typical

<sup>8</sup> Derate output power linearly to 80% from 90 VAC to 80 VAC input.

### 4. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER             | DESCRIPTION / CONDITION                                              | SPECIFICATION            |
|-----------------------|----------------------------------------------------------------------|--------------------------|
| Operating Temperature | Refer to derating curve, Fig. 1<br>-20 to 0°C start-up is guaranteed | -20 to 70°C              |
| Storage Temperature   |                                                                      | -40 to +70°C             |
| Relative Humidity     | Non Condensing                                                       | 95%                      |
| Altitude              | Operating:<br>Non-Operating:                                         | 10,000 ft.<br>40,000 ft. |
| Reliability           | MTBF according to Telcordia -SR332-Issue 3                           | 1.87 million hours       |

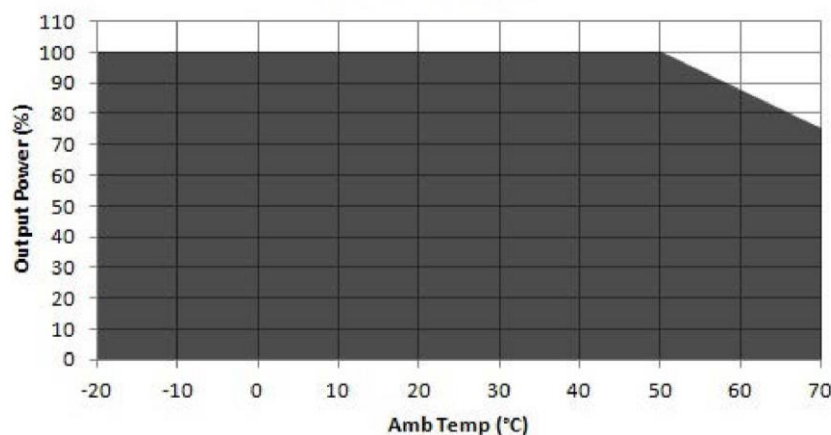


Figure 1. Derating Curve

## 5. 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 A              |
| 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      |

## 6. SAFETY SPECIFICATIONS

| PARAMETER         | DESCRIPTION / CONDITION                                                            | SPECIFICATION                   |
|-------------------|------------------------------------------------------------------------------------|---------------------------------|
| Isolation Voltage | Input to Output, 2M0PP<br>Input to Ground, 1M0PP<br>Output to Ground, 1M0PP        | 4000 VAC<br>1500 VAC<br>500 VAC |
| 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                                                        |                                 |

## 7. CONNECTOR & PIN DESCRIPTION

| CONNECTOR               | PIN | DESCRIPTION / CONDITION                           | MANUFACTURER / PN                                                       |
|-------------------------|-----|---------------------------------------------------|-------------------------------------------------------------------------|
| AC Input Connector      | J1  | Pin 1 AC Line<br>Pin 2 AC Neutral                 | Molex: 26-60-4030 or equivalent<br>Mating: 09-50-3031; Pins: 08-50-0106 |
| DC Output Connector     | J2  | Pin 1,2 V1<br>Pin 3,4 RTN<br>Pin 5 V3<br>Pin 6 V2 | Tyco: 640445-6 or equivalent<br>Mating: 647402-6; Pins: 3-647409-1      |
| Signal Connector        | J3  | Pin 1 +V1 Sense<br>Pin 2 -V1 Sense                | Molex: 22-23-2021 or equivalent<br>Mating: 22-01-2021                   |
| Earth (Spade Connector) | J4  |                                                   | Molex: 19705-4301<br>Mating: 190030001                                  |

## 8. MECHANICAL SPECIFICATIONS

| PARAMETER  | DESCRIPTION / CONDITION                    |
|------------|--------------------------------------------|
| Weight     | 150 g (0.33 lbs.)                          |
| Dimensions | 101.6 x 50.8 x 30.48 mm (4 x 2 x 1.2 inch) |

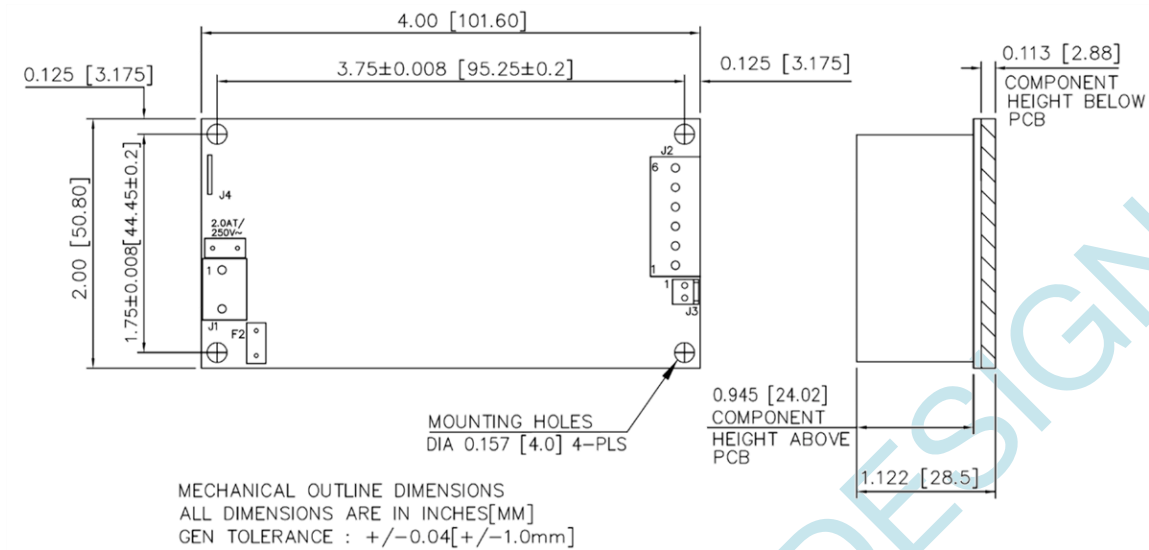


Figure 2. Mechanical Drawing MBC40-1xxxG

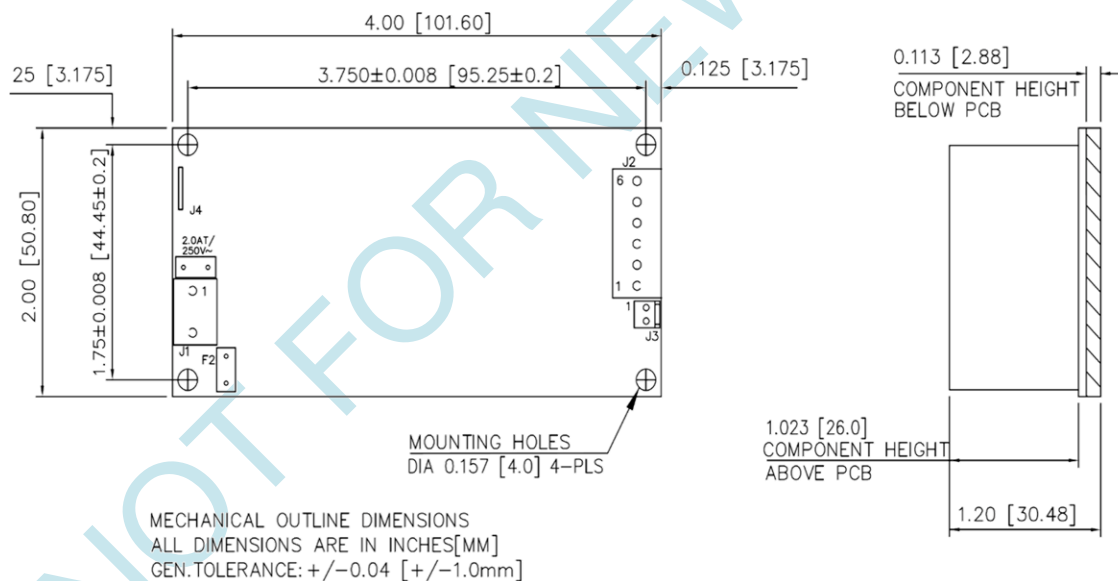


Figure 3. Mechanical Drawing MBC40-3xxxG

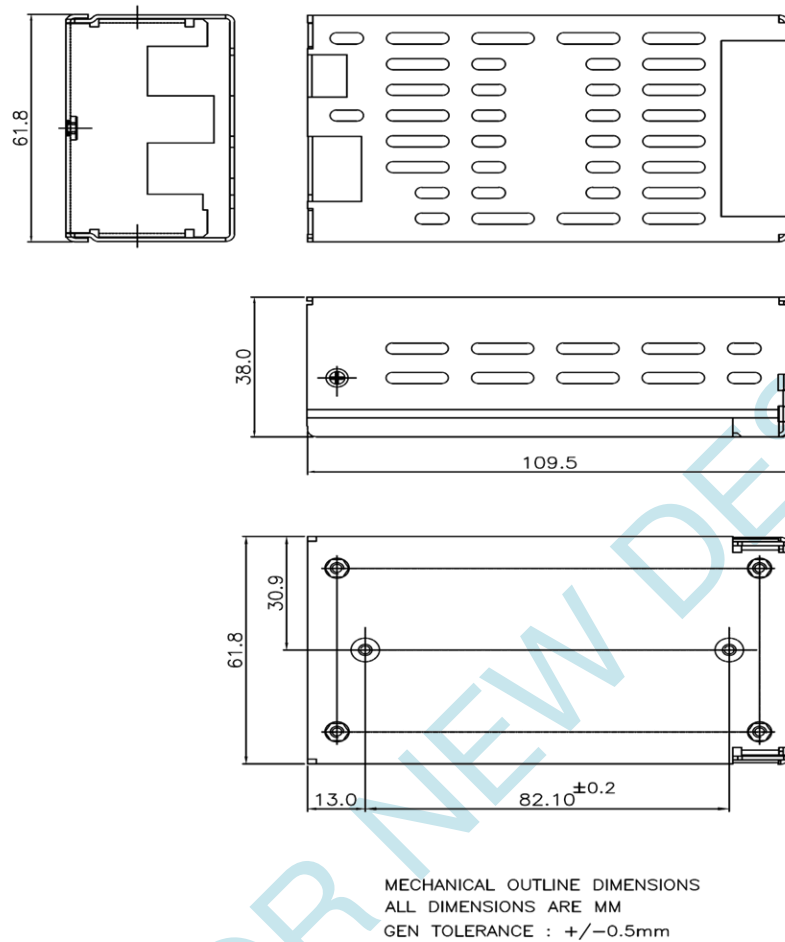


Figure 4. Mechanical Drawing with Cover Kit

**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.