

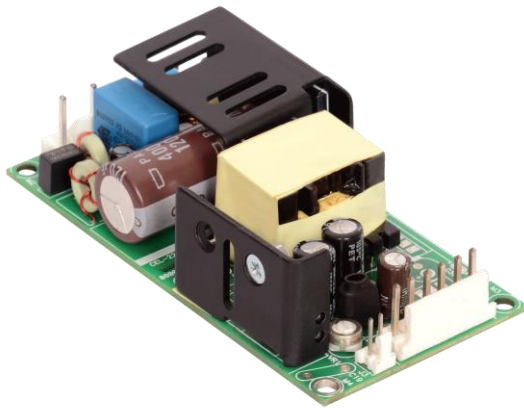
# MBC60 Series

## AC-DC Open Frame Power Supplies Medical

The **MBC60 Series** of open-frame medical power supplies, with its wide universal 90-264 VAC input range, is available at 60 W of output power and a variety of single and multiple output voltages.

The MBC series was designed to 4<sup>th</sup> edition medical approvals and provides 2x MOPP (Means of Patient Protection) isolation for Class I and Class II installations.

These medical power supplies are ideal for, monitoring, home health equipment as well as surgical devices.



### Key Features & Benefits

- 50 - 65 W Single to Triple Outputs
- Ultra High Efficiency > 85%
- Form Factor 4 x 2 x 1.2 inches (101.6 x 50.8 x 30.48 mm)
- Low leakage current < 250  $\mu$ A
- No Load Power < 0.3 W
- 2x MOPP
- IEC Protection Class Options:
  - Class I: Earth pin J4 (no suffix)
  - Class II: No Earth pin (-2 suffix)
- Conducted EMI EN 55022-B, FCC Part 15 Level B
- Medical Safety Agency Approvals
- RoHS Compliant
- Cover Kit Accessory Available

### Applications

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

## 1. MODEL SELECTION

| MODEL <sup>1</sup> | OUTPUT VOLTAGE (VDC) <sup>2</sup> | OUTPUT CURRENT MAX (A) | MINIMUM LOAD (A) <sup>3</sup> | RIPPLE & NOISE <sup>4</sup> | TOTAL REGULATION |
|--------------------|-----------------------------------|------------------------|-------------------------------|-----------------------------|------------------|
| MBC60-1005G        | 5.2                               | 10.0                   | 0.0                           | 1.25%                       | ± 0.8%           |
| MBC60-1012G        | 12                                | 5.4                    | 0.0                           | 1%                          | ± 0.8%           |
| MBC60-1015G        | 15                                | 4.33                   | 0.0                           | 1%                          | ± 0.8%           |
| MBC60-1024G        | 24                                | 2.7                    | 0.0                           | 1%                          | ± 0.8%           |
| MBC60-1048G        | 48                                | 1.35                   | 0.0                           | 1%                          | ± 0.8%           |
| MBC60-3000G        | 5.2                               | 8.0                    | 0.5                           | 1.25%                       | ± 0.8%           |
|                    | 12.5                              | 3.0                    | 0.1                           | 1%                          | ± 5.3%           |
| MBC60-3001G        | -12.5                             | 0.5                    | 0.0                           | 1%                          | ± 5.3%           |
|                    | 5.2                               | 8.0                    | 0.5                           | 1.25%                       | ± 0.8%           |
| MBC60-3002G        | 23.8                              | 1.5                    | 0.1                           | 1%                          | ± 5.3%           |
|                    | -12.5                             | 0.5                    | 0.0                           | 1%                          | ± 5.3%           |
| MBC60-3003G        | 5.2                               | 8.0                    | 0.5                           | 1.25%                       | ± 0.8%           |
|                    | 14.6                              | 2.5                    | 0.1                           | 1%                          | ± 5.3%           |
| MBC60-3003G        | -16.2                             | 0.5                    | 0.0                           | 1%                          | ± 5.3%           |
|                    | 3.3                               | 6.0                    | 1.0                           | 1.5%                        | ± 0.8%           |
| MBC60-3003G        | 5.2                               | 3.0                    | 0.1                           | 1%                          | ± 5.3%           |
|                    | -12.8                             | 0.5                    | 0.0                           | 1%                          | ± 5.3%           |
| Cover-60-XCB       | Metal cover kit accessory         |                        |                               |                             |                  |

### NOTES:

- <sup>1</sup> Single output models deliver 65 W, except MBC60-1005G (50 W).  
Triple output models deliver 60 W, except MBC60-3003G (45 W).
- <sup>2</sup> Maximum outputs for each output. Max power rating should not be exceeded.
- <sup>3</sup> Minimum load specified to meet cross regulation.
- <sup>4</sup> Ripple is peak to peak with 20 MHz bandwidth and 10 µF (Tantalum capacitor) in parallel with a 0.1 µF capacitor at rated line voltage and load ranges.

## 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>5</sup> |   | 47 to 400 Hz              |
| Input Current                | 120 VAC:<br>230 VAC:                        | 1.5 A max.<br>0.75 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 µA<br>< 250 µA      |
| Switching Frequency          | Typical                                     | 67 Hz                     |

<sup>5</sup> Safety Approved: 47 to 63 Hz

### 3. OUTPUT SPECIFICATIONS

| PARAMETER                 | DESCRIPTION / CONDITION                                     | SPECIFICATION                  |
|---------------------------|---|--------------------------------|
| Efficiency <sup>6</sup>   | Typical   | 85%                            |
| Hold Up Time              | @ 120 VAC typical   | >10 ms                         |
| Output Power <sup>7</sup> |   | 50 - 65 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                                    |                                |

<sup>6</sup> For MBC60-3003G efficiency is 75% typical.

<sup>7</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>Start-up is guaranteed | -20 to 70°C<br>-20 to 0°C |
| Storage Temperature   |   | -40 to +85°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        |
| Cooling               | Convection  |                           |

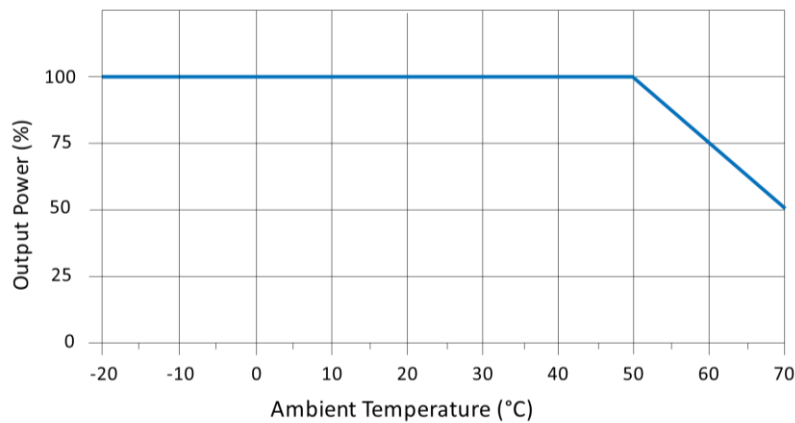


Figure 1. Output Power Vs. Temperature



Asia-Pacific  
+86 755 298 85888

Europe, Middle East  
+353 61 225 977

North America  
+1 408 785 5200

## 5. EMC SPECIFICATIONS

| PARAMETER               | DESCRIPTION / CONDITION            | SPECIFICATION                  |
|-------------------------|------------------------------------|--------------------------------|
| Conducted Emissions     | EN55022-B, CISPR22-B, FCC PART15-B |                                |
| Radiated Emissions      | EN55022-B, CISPR22-B, FCC PART15-B | To be controlled in end system |
| Harmonic Current        | EN61000-3-2                        | Class A                        |
| AC Flicker              | EN61000-3-3                        | Pass                           |
| Static Discharge        | EN61000-4-2                        | Level 3                        |
| RF Field Susceptibility | EN61000-4-3                        | Level 3                        |
| Fast Transients/Bursts  | EN61000-4-4                        | Level 3                        |
| Surge Susceptibility    | EN61000-4-5                        | Level 3                        |

## 6. SAFETY SPECIFICATIONS

| PARAMETER         | DESCRIPTION / CONDITION  | SPECIFICATION                        |
|-------------------|--|--------------------------------------|
| Isolation Voltage | Input to Output, 2M0PP<br>Input to Ground, 1M0PP<br>Output to Ground                                   | Min. 5700 VDC<br>1500 VAC<br>500 VAC |
| Safety Standards  | Approved to the latest edition of the following standards:<br>CSA/UL60601-1, EN60601-1 and IEC60601-1. |                                      |
| 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 Neutral<br>Pin 2 AC Line                 | 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               | 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) |

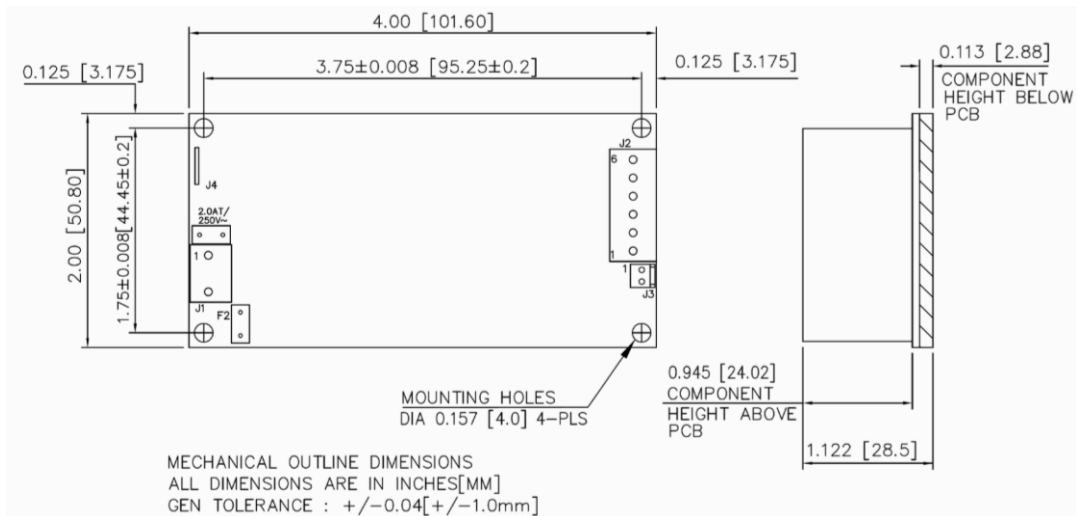


Figure 2. Mechanical Drawing MBC60-1xxxG

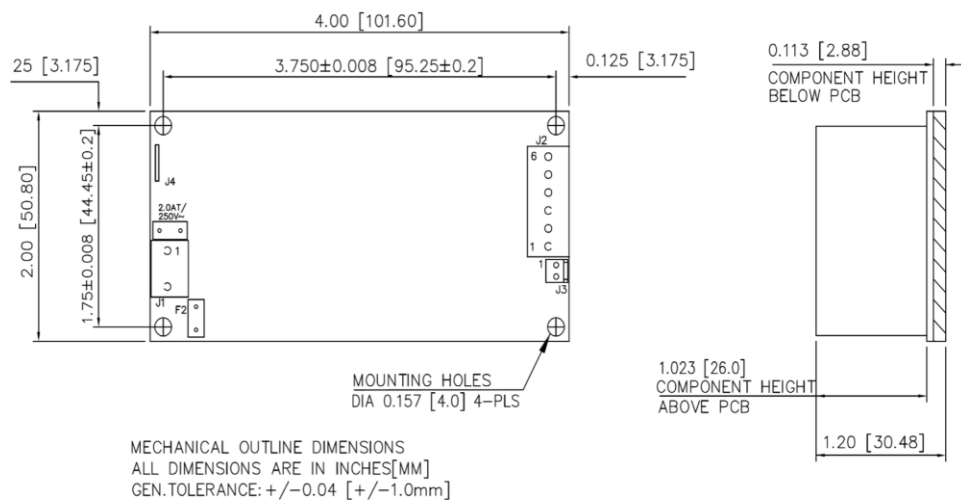


Figure 3. Mechanical Drawing MBC60-3xxxG

**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.

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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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