

# MBC40 Series

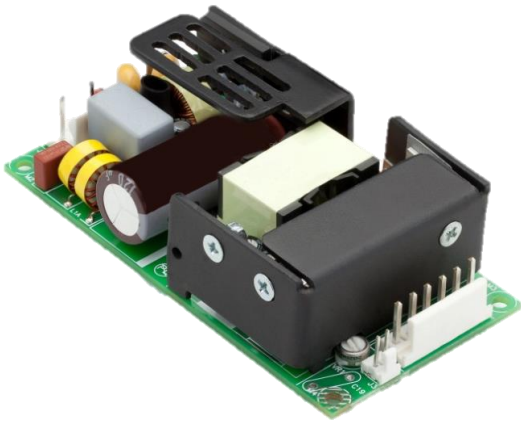
## AC-DC Open Frame Power Supplies

### Medical

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



**bel** POWER  
SOLUTIONS &  
PROTECTION

a bel group

[belfuse.com/power-solutions](http://belfuse.com/power-solutions)

## 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: 230 VAC:	0.85 A max. 0.45 A max.
No Load Power	Single output models Multi output models	< 0.3 W < 0.5 W
Inrush Current	120 VAC: 230 VAC:	30 A max. 60 A max.
Leakage Current	120 VAC: 230 VAC:	< 140 $\mu$ A < 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: V2 & V3:	± 0.5% ± 5%
Transient Response	50% to 100% load change, 50/60 Hz, 50% duty cycle, 0.1 A/μs	< 10%, recovery time < 5 ms
Rise Time		< 100 ms
Set Point Tolerance	V1: V2 & V3:	± 3% ± 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 -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: Non-Operating:	10,000 ft. 40,000 ft.
Reliability	MTBF according to Telcordia -SR332-Issue 3	1.87 million hours

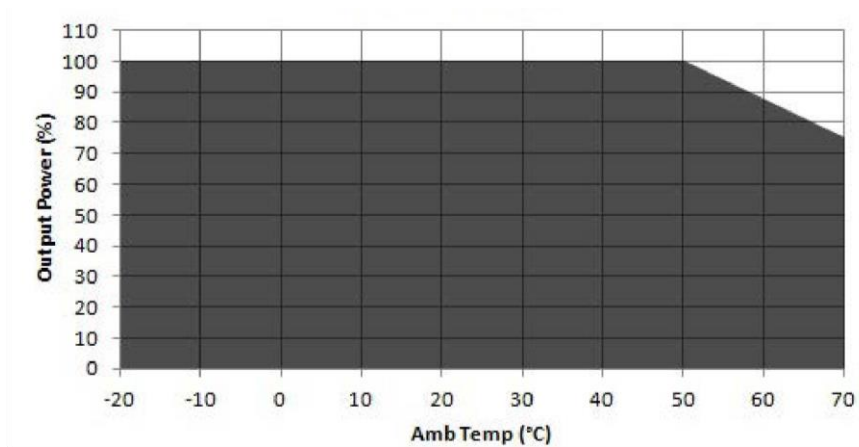


Figure 1. Derating Curve



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	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, 2MOPP Input to Ground, 1MOPP Output to Ground, 1MOPP	4000 VAC 1500 VAC 500 VAC
Safety Standards	EN 60601-1, IEC 60601-1 (ed.3), 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 Pin 2 AC Neutral	Molex: 26-60-4030 or equivalent Mating: 09-50-3031; Pins: 08-50-0106
DC Output Connector	J2	Pin 1,2 V1 Pin 3,4 RTN Pin 5 V3 Pin 6 V2	Tyco: 640445-6 or equivalent Mating: 647402-6; Pins: 3-647409-1
Signal Connector	J3	Pin 1 +V1 Sense Pin 2 -V1 Sense	Molex: 22-23-2021 or equivalent Mating: 22-01-2021
Earth (Spade Connector)	J4		Molex: 19705-4301 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)

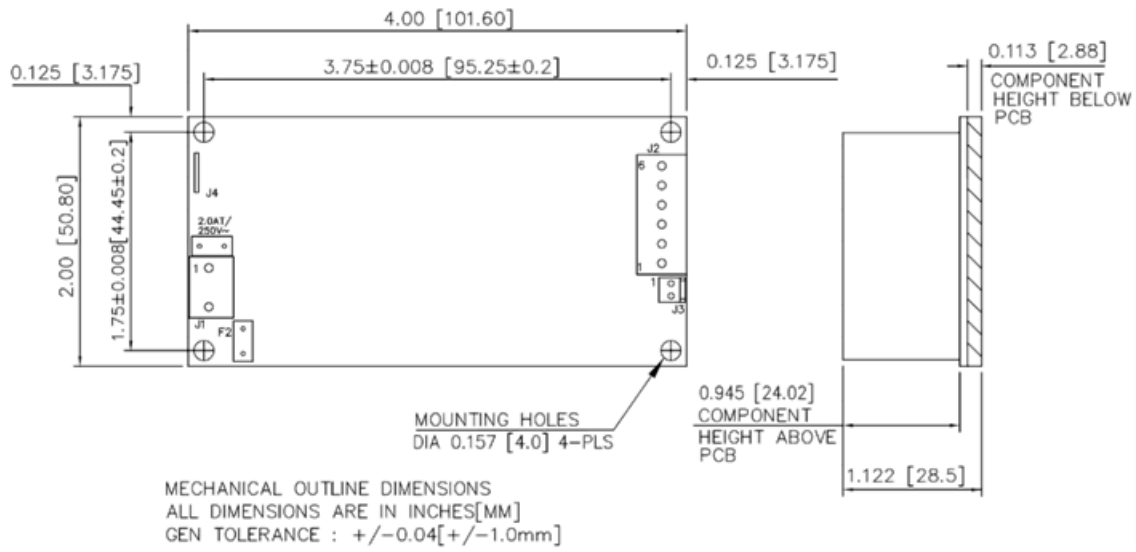


Figure 2. Mechanical Drawing MBC40-1xxxG

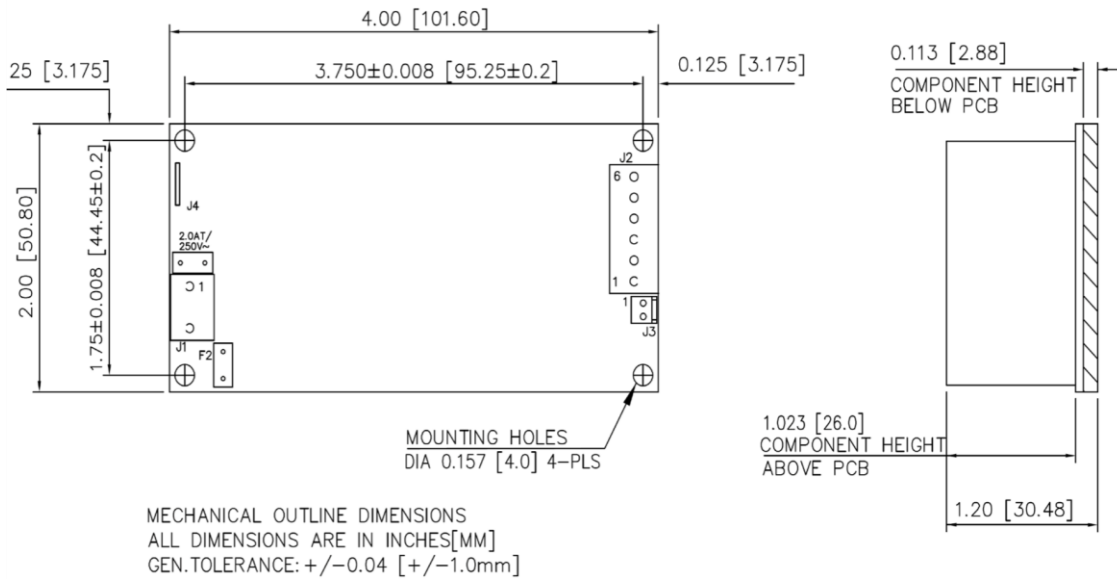
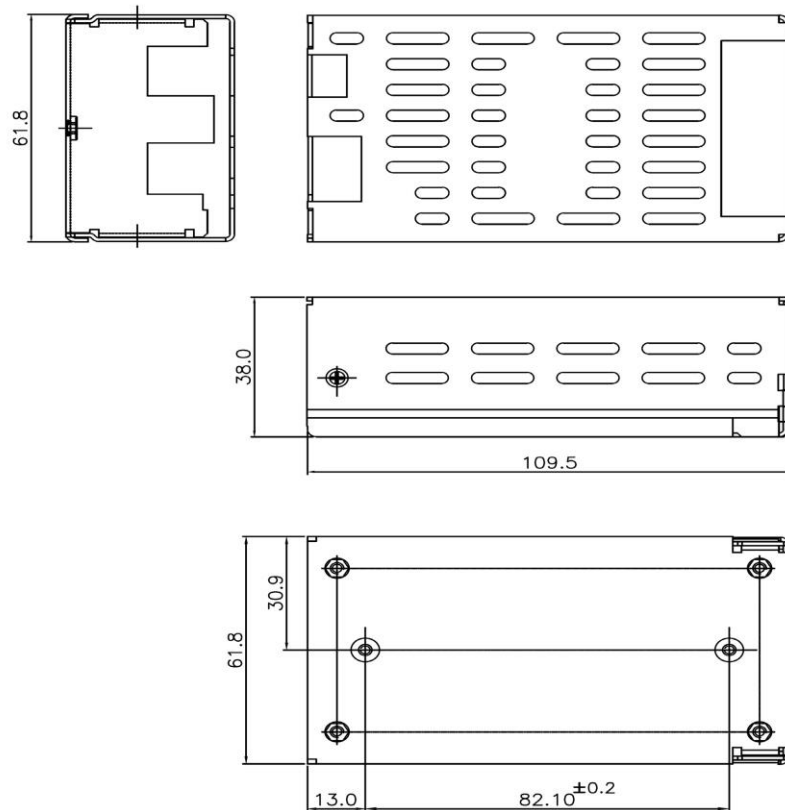


Figure 3. Mechanical Drawing MBC40-3xxxG



MECHANICAL OUTLINE DIMENSIONS  
 ALL DIMENSIONS ARE MM  
 GEN TOLERANCE :  $\pm 0.5$ mm

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.