

# MBC60 Series

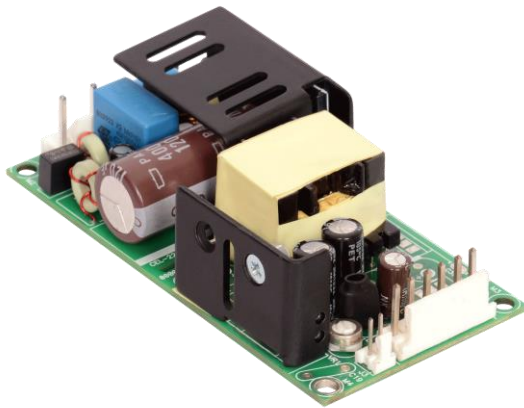
## AC-DC Open Frame Power Supplies

### 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%
	-12.5	0.5	0.0	1%	± 5.3%
MBC60-3001G	5.2	8.0	0.5	1.25%	± 0.8%
	23.8	1.5	0.1	1%	± 5.3%
	-12.5	0.5	0.0	1%	± 5.3%
MBC60-3002G	5.2	8.0	0.5	1.25%	± 0.8%
	14.6	2.5	0.1	1%	± 5.3%
	-16.2	0.5	0.0	1%	± 5.3%
MBC60-3003G	3.3	6.0	1.0	1.5%	± 0.8%
	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  $\mu$ F (Tantalum capacitor) in parallel with a 0.1  $\mu$ F 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: 230 VAC:	1.5 A max. 0.75 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 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: V2 & V3:	+/-0.5% +/-5%
Transient Response	50% to 100% load change, 50/60 Hz, 50% duty cycle, 0.1 A/ $\mu$ s	< 10%, recovery time < 5 ms
Rise Time		< 100 ms
Set Point Tolerance	V1: V2 & V3:	$\pm$ 3% $\pm$ 5%
Output Voltage Adjustment	V1	$\pm$ 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 Start-up is guaranteed	-20 to 70°C -20 to 0°C
Storage Temperature		-40 to +85°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
Cooling	Convection	

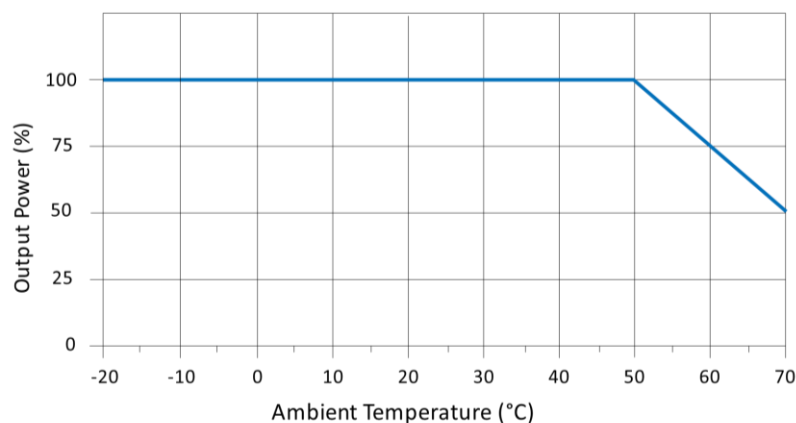


Figure 1. Output Power Vs. Temperature

## 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 Input to Ground, 1M0PP Output to Ground	Min. 5700 VDC 1500 VAC 500 VAC
Safety Standards	Approved to the latest edition of the following standards: 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 Pin 2 AC Line	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	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)

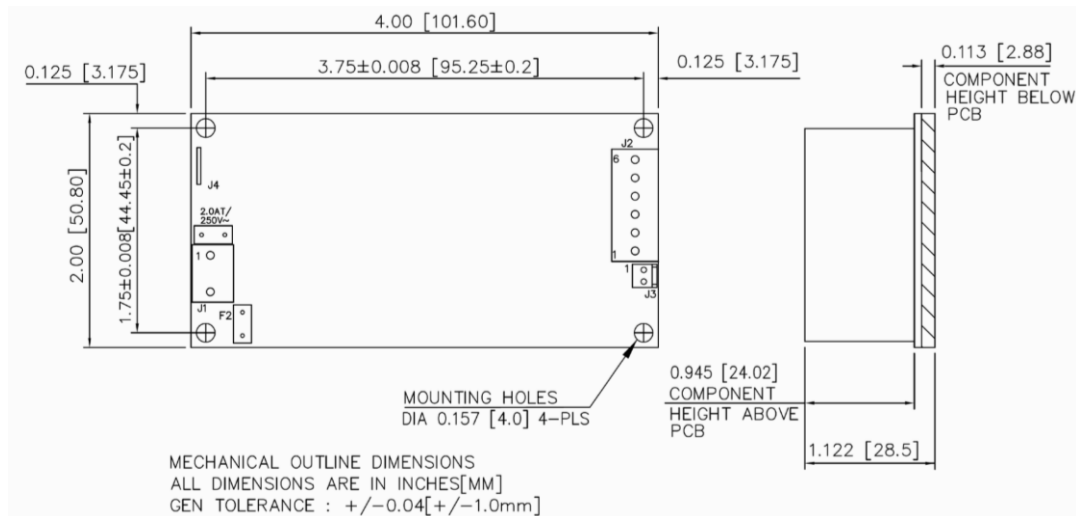


Figure 2. Mechanical Drawing MBC60-1xxxG

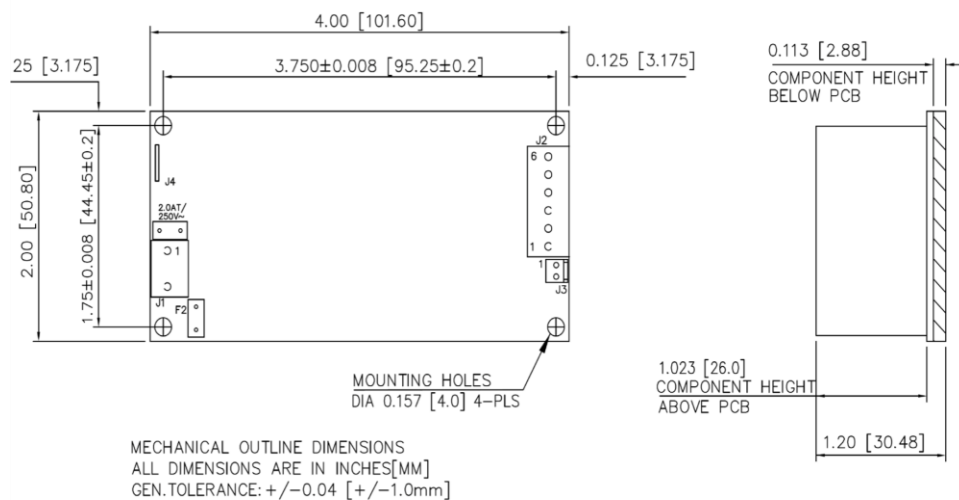


Figure 3. Mechanical Drawing MBC60-3xxxG

**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.

**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.