

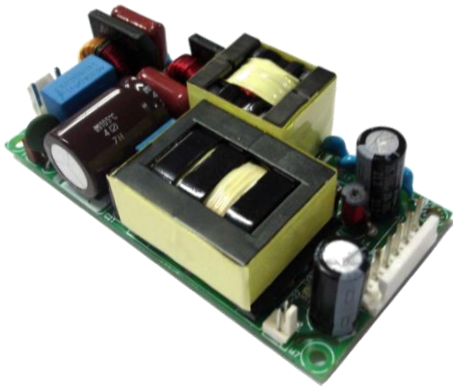
# MBC225 Series

## Low Profile Open Frame Power Supplies Medical

The MBC225 Series of open-frame medical power supplies, with its wide universal 90-264 VAC input range, is available at 225 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 power supplies are ideal for medical, telecom, datacom, industrial equipment and other applications.



### Key Features & Benefits

- 2 x 4 x 1 Inch Form Factor
- 225 W with Forced Air Cooling
- Approved to EN/IEC 60601-1
- Efficiencies up to 94%
- -40 to 70 °C Operating Temperature
- Dual Fusing
- 12 V Fan Output, Thermal Shut-Down Feature
- 3.37 Million Hours, Telcordia - SR332-Issue 3 MTBF
- Standby Power <0.5 W
- Medical (BF) Safety Approvals
- RoHS Compliant

### Applications

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

## 1. MODEL SELECTION

MODEL NUMBER <sup>1</sup>	DESCRIPTION	VOLTAGE	MAX. LOAD (CONVECTION) (112.5 W)	MAX. LOAD (CONVECTION) (120 W)	MAX. LOAD (13 CFM)	MIN. LOAD	RIPPLE & NOISE <sup>2</sup>
MBC225-1T12L MBC225-1012L	Screw Terminal Molex Connector	12 V	9.37 A	10.0 A	18.75 A	0.0 A	1%
MBC225-1T15L MBC225-1015L	Screw Terminal Molex Connector	15 V	7.5 A	8.0 A	15 A	0.0 A	1%
MBC225-1T24L MBC225-1024L	Screw Terminal Molex Connector	24 V	4.68 A	5.0 A	9.37 A	0.0 A	1%
MBC225-1T30L MBC225-1030L	Screw Terminal Molex Connector	30 V	3.75 A	4.0 A	7.5 A	0.0 A	1%
MBC225-1T48L MBC225-1048L	Screw Terminal Molex Connector	48 V	2.34 A	2.5 A	4.68 A	0.0 A	1%
MBC225-1T58L MBC225-1058L	Screw Terminal Molex Connector	58 V	1.94 A	2.07 A	3.88 A	0.0 A	1%
COVER-225-XBC <sup>3</sup>	metal cover kit accessory						

## 2. INPUT SPECIFICATIONS

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

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Input Voltage	Universal (Derate from 100% at 100 VAC to 90% at 85 VAC)	85-264 VAC / 390 VDC
Input Frequency		47-63 Hz
Input Current	115 VAC: 230 VAC:	2.2 A max. 1.1 A max.
No Load Power	Typical	< 0.5 W
Inrush Current	115 VAC: 230 VAC: 264 VAC:	25 A 45 A 75 A
Leakage Current	Typical (N.A. For Class II Option) Touch current:	300 $\mu$ A <100 $\mu$ A
Power Factor	With Full Load	>0.95
Switching Frequency	PFC: PWM:	70 to 130 kHz 50-80 kHz

<sup>1</sup> For Class II (without input Earth pin) add suffix -2 (e.g.: MBC225-1012L-2). Ensure non-metallic mounting stud when installing a Class II product.

<sup>2</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.

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

### 3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Power <sup>4</sup>	With 13 CFM: Convection:	225 W Up to 120 W
Efficiency	48 V: 24 V, 30 V: 12 V, 15 V:	94% 93% 92%
Hold-up Time	225 W: 110 W:	10 ms 16 ms
Line Regulation		+/-0.5%
Load Regulation		+/-0.5%
Transient Response	25% step load change, at 0.1A/uS slew rate, 50% duty cycle, 50 Hz = 4%	Recovery time < 5 ms
Rise Time	Typical	55 ms
Set Point Tolerance <sup>5</sup>		+/-1%
Output Voltage Adjustment <sup>6</sup>		+/-3%
Over Current Protection		>110%
Over Voltage Protection		110 to 140%
Short Circuit Protection	Hiccup mode	

### 4. EMC SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Conducted Emissions	EN 55011-B, CISPR22-B, FCC PART15-B	Pass
Radiated Emissions	EN 55011 A; with external core (King core K5B RC 25x12x15-M in input cable)	Pass Level B
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 B

### 5. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (Medical applications) Input to GND: (Not Applicable For Class II Option) Output to GND: For type BF For type B (Not Applicable For Class II Option)	4000 VAC 1500 VAC 1500 VAC 500 VAC
Safety Standard(s)	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	

<sup>4</sup> Combined output power of main output, fan supply shall not exceed max. Power rating.

<sup>5</sup> Fan supply output voltage tolerance including set point accuracy, line & load regulation is +/-10% and Ripple & noise is less than 10%.

<sup>6</sup> Adjustment potentiometer is located on the SMT side of the PCB.

6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature <sup>7</sup>	Start-up is guaranteed, with spec deviation, see Fig. 1	-40 to +70°C -40 to 0°C
Storage Temperature		-40 to +85°C
Cooling	With 13 CFM forced air cooling With natural convection cooling at 100 to 264 VAC	225 W Up to 120 W
Relative Humidity	Noncondensing	5% to 95%
Altitude	Operating: Nonoperating:	16,000 ft 40,000 ft.
Reliability	MTBF according to Telcordia -SR332-issue 3:	3.37 million hours

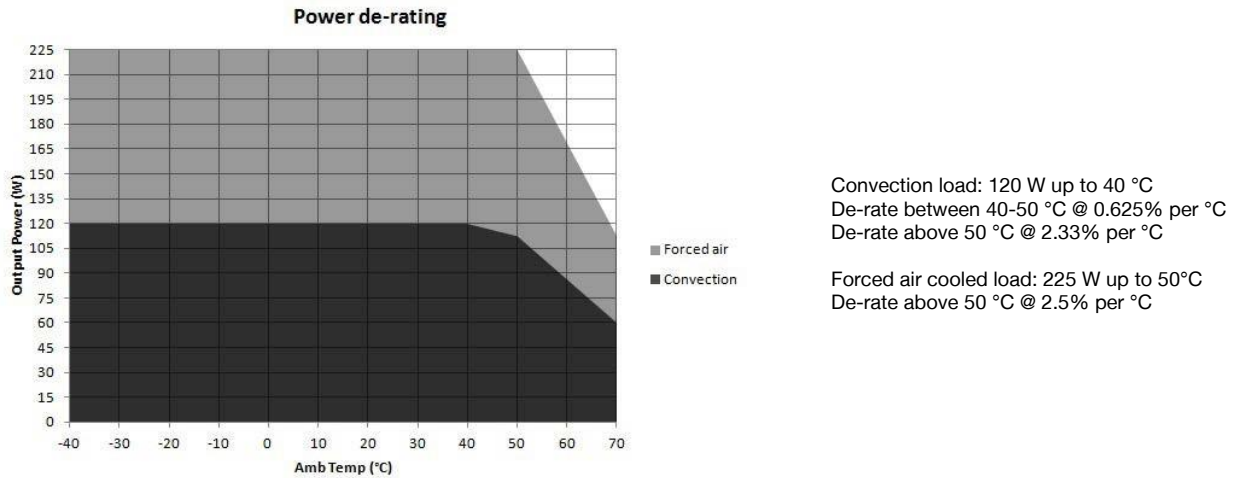


Figure 1. Derating Curve

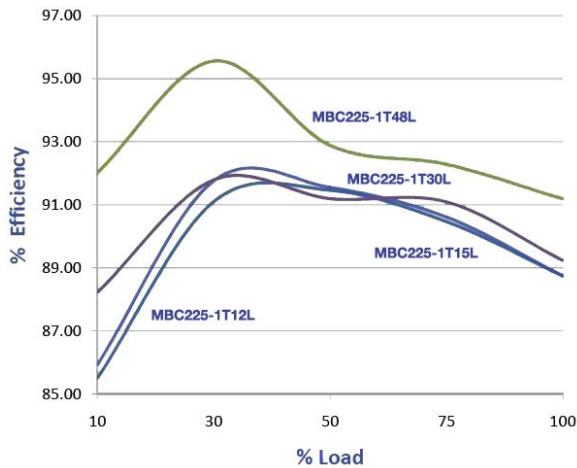


Figure 2 – Efficiency Graph at 115 VAC

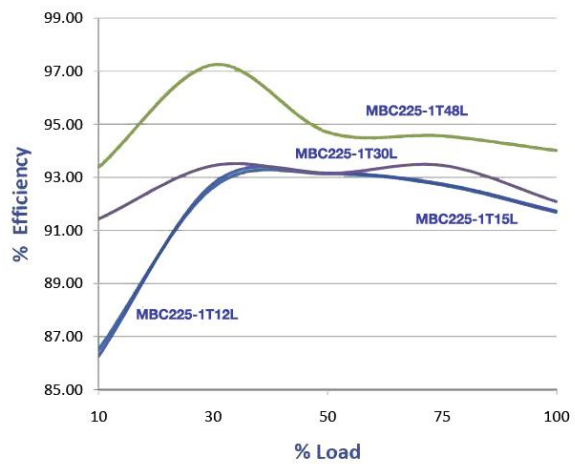


Figure 3 – Efficiency Graph at 230 VAC

<sup>7</sup> Output ripple can be more than 10% of the output voltage.

## 7. CONNECTOR & PIN DESCRIPTION

CONNECTOR	PIN	DESCRIPTION/CONDITION	MANUFACTURER / PN	
AC Input Connector	J1	Pin 1 AC Line Pin 2 Not Fitted Pin 3 AC Neutral	Molex: 26-60-4030 Mating: 09-50-3031; Pins: 08-50-0106	
DC Output Connector	J2	Pin 1,2,3 V1 +VE Pin 4,5,6 V1 - VE	Screw Terminal (Option 1)	Molex: 39357 Series or equivalent
			Molex Connector (Option 2)	Molex: 26-60-4060 Mating: 09-50-3061; Pins: 08-50-0106
Aux (Fan) Output	J3	Pin 1 FAN +VE Pin 2 FAN - VE	AMP :640456-2 Mating: 640440-2	

## 8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION/CONDITION
Weight	200 g approx.
Dimensions	50.8 x 101.6 x 25.4 mm (2 x 4 x 1 inch)
Cooling <sup>8</sup>	225 W with 13 CFM forced air cooling (refer Mechanical Drawing) Up to 120 W with natural convection cooling (refer Derating Curve)

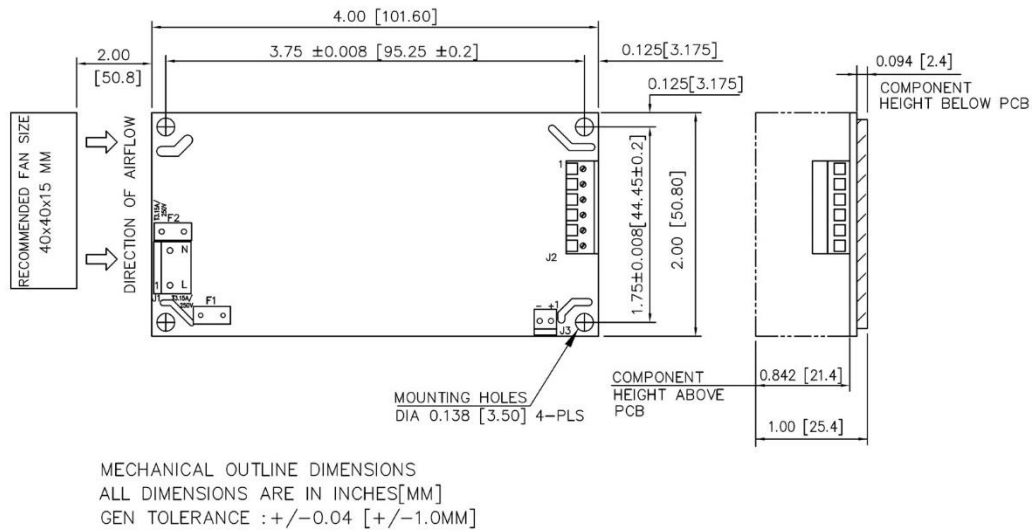


Figure 4 - Mechanical Drawing – Screw Terminal (Option 1)

<sup>8</sup> 225 W with 13CFM forced air cooling and 120 W with natural convection cooling at 100 to 264 VAC.

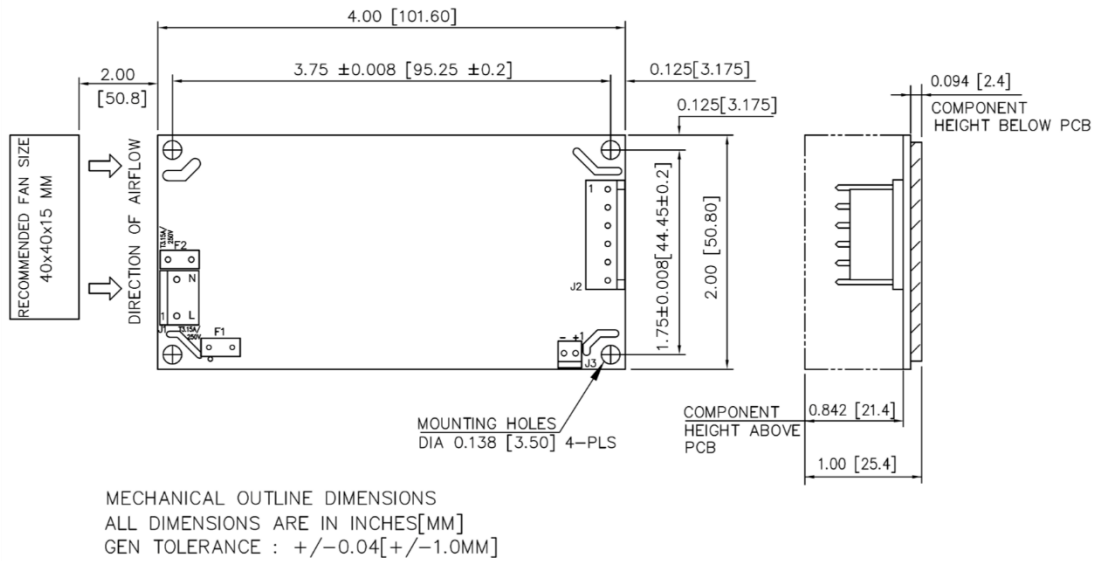


Figure 5 - Mechanical Drawing – Molex Connector (Option 2)

**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.