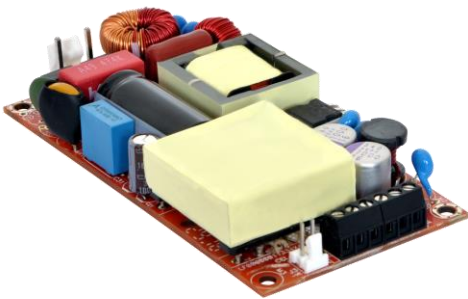


# MBC180 Series

Ultra Low Profile

Open Frame Power Supplies

Medical



The MBC180 Series of ultra low open frame medical power supplies feature a wide universal AC input range of 85 V – 264 VAC, offering output power 180 W with 13 CFM of forced air cooling or up to 120 W with natural convection cooling. They are available in a variety of isolated single 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

- 4 x 2 x 0.75 Inches Form factor
- 180 Watts with Forced Air Cooling
- Approved to EN/IEC 60601-1
- Efficiencies up to 92%
- -40 to 70°C degree operating temperature
- Dual Fusing
- 12 V / 0.5 A Fan Output, Thermal Shut-Down feature
- 3.37 million Hours, Telcordia -SR332-issue 3 MTBF
- Standby Power < 0.5 W
- Medical (BF) Safety Approvals

## Applications

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

## 1. MODEL SELECTION

MODEL NUMBER <sup>1</sup>	OUTPUT CONNECTOR	VOLTAGE	MAX. LOAD			POWER
			CONVECTION 50°C (112.5 W)	CONVECTION 40°C (120 W)	13 CFM (180 W)	
MBC180-1T12L	Screw Terminal	12 V	9.37 A	10 A	15 A	180 W
MBC180-1012L	Header Molex Connector					
MBC180-1T15L	Screw Terminal	15 V	7.5 A	8 A	12 A	180 W
MBC180-1015L	Header Molex Connector					
MBC180-1T24L	Screw Terminal	24 V	4.68 A	5 A	7.5 A	180 W
MBC180-1024L	Header Molex Connector					
MBC180-1T30L	Screw Terminal	30 V	3.75 A	4 A	6 A	180 W
MBC180-1030L	Header Molex Connector					
MBC180-1T48L	Screw Terminal	48 V	2.34 A	2.5 A	3.75 A	180 W
MBC180-1048L	Header Molex Connector					
MBC180-1T58L	Screw Terminal	58 V	1.94 A	2.07 A	3.1 A	180 W
MBC180-1058L	Header Molex Connector					
COVER-180-XBC <sup>2</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> 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 (Derate from 100% at 100 VAC to 77% at 80 VAC)	80 – 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 (models without PGPF) < 0.85 W (models with PGPF)
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 µA < 100 µA
Switching Frequency	PFC PWM	70 – 130 kHz 50 – 80 kHz

### 3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Voltage	Refer to Model selection table	From 12 V to 58 V
Output Power <sup>3</sup>	13 CFM (forced air cooling) Convection (natural cooling)	180 W up to 120 W
Efficiency	48 V, 58 V: 24 V, 30 V: 12 V, 15 V:	92% 90% 88%
Hold-up Time	At 180 W: At 120 W:	10 ms 16 ms
Power Factor	115 VAC: 230 VAC:	> 0.95 0.90
Line Regulation <sup>4</sup>		± 0.5%
Load Regulation <sup>4</sup>		± 1%
Minimum Load		0.0 A
Transient Response	25% step load change, at 0.1 A/μs slew rate, 50% duty cycle, 50 Hz = 4%	recovery time < 5 ms
Ripple <sup>4,5</sup>	24, 30, 48 & 58 V outputs 12 V & 15 V outputs	1.0 % max. 2.0 % max.
Output Voltage Adjustment <sup>6</sup>		± 3%
Rise Time	Typical	55 ms
Set Point Tolerance <sup>4</sup>		± 1%
Over Current Protection		> 110%
Over Voltage Protection		110 to 140%
Short Circuit Protection	Hiccup mode	
Cooling	With 13 CFM forced air cooling (100 to 264 VAC) <sup>7</sup> With natural convection cooling (100 to 264 VAC) <sup>8</sup>	180 W Up to 120 W

<sup>3</sup> Combined output power of main output, fan supply shall not exceed max. power rating.

<sup>4</sup> Fan supply output voltage tolerance including set point accuracy, line and load regulation is ± 10% and ripple and noise is less than 10%.

<sup>5</sup> Ripple is peak to peak with 20 MHz bandwidth and 10 μF (Electrolytic capacitor) in parallel with a 0.1 μF capacitor at rated line voltage and load ranges.

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

<sup>7</sup> Refer to Mechanical Drawing

<sup>8</sup> Refer to Derating Curve

### 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

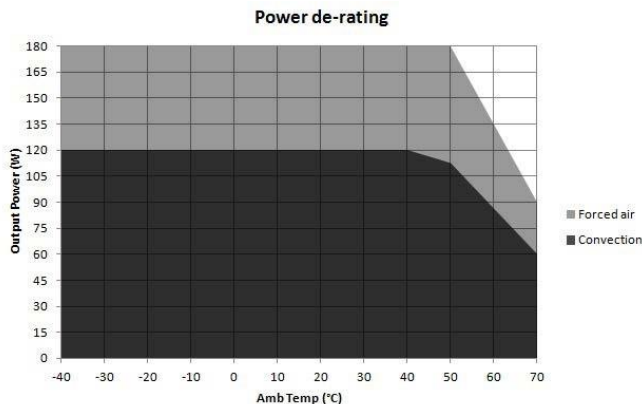
PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (Medical applications)	4000 VAC
	Input to GND: (N/A for Class II Option)	1500 VAC
	Output to GND: for type BF	1500 VAC
	(for type B (N/A for Class II Option))	500 VAC
Safety Standard(s)	EN 60601-1, IEC 60601-1 (ed.3), ANSI / AAMI ES 60601 - 1, CSA C22.2 No. 60601-1	
Agency Approvals	Nemko, UL, C-UL	
CE mark	Complies with LVD Directive	

## 6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature	-40 to 0°C startup guaranteed, with spec deviation <sup>9</sup>	-40 to +70°C
Storage Temperature		-40 to +85°C
Relative Humidity	Non-condensing	5% to 95%
Altitude	Operating:	16,000 ft.
	Non-operating:	40,000 ft.
MTBF	Telcordia -SR332-issue 3	3.37 million hours

<sup>9</sup> Output ripple can be more than 10% of the output voltage.

## DERATING CURVES



Convection load: 120 W up to 40 °C  
De-rate between 40-50 °C @ 0.625% per °C  
De-rate above 50 °C @ 2.33% per °C

Forced air cooled load: 180 W up to 50°C  
De-rate above 50 °C @ 2.5% per °C

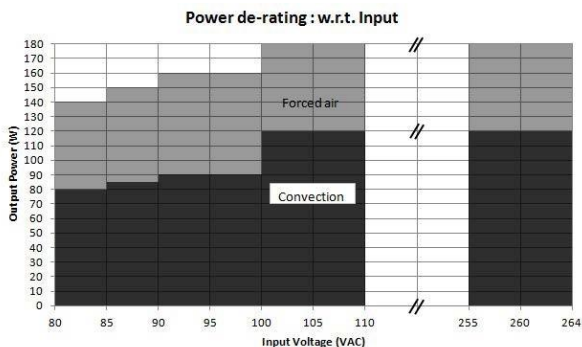


Figure 1. Power Derating Curves

## 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 <sup>10</sup>	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	Option 1 (Screw Terminal): Molex: 39357 Series or equivalent Option 2 (Molex Connector): 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

<sup>10</sup> Fusing on neutral for ITE model is optional.

## 8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	approx. 200 g
Dimensions	101.6 x 50.8 x 19.05 mm (4 x 2 x 0.75 inches)

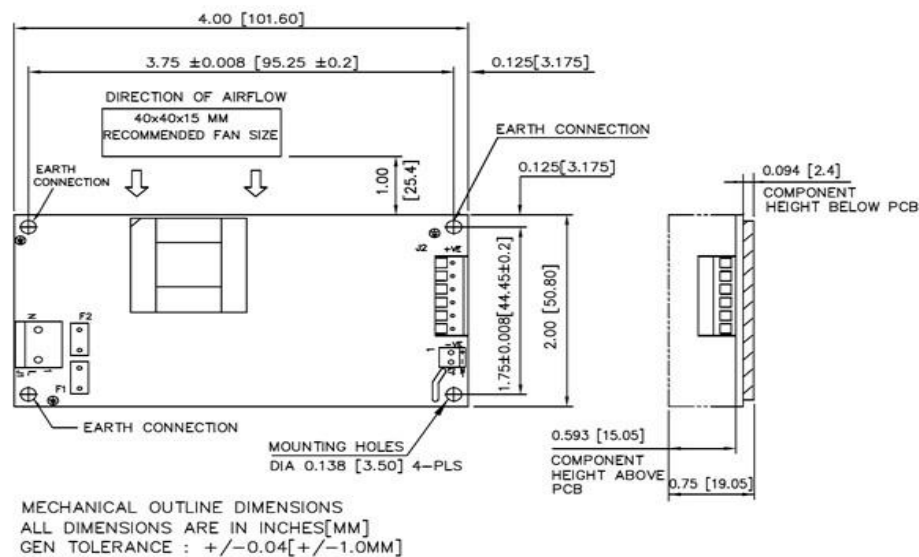


Figure 3. Mechanical Drawing – Option 1 (Output Connector – Screw Terminal)

**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.

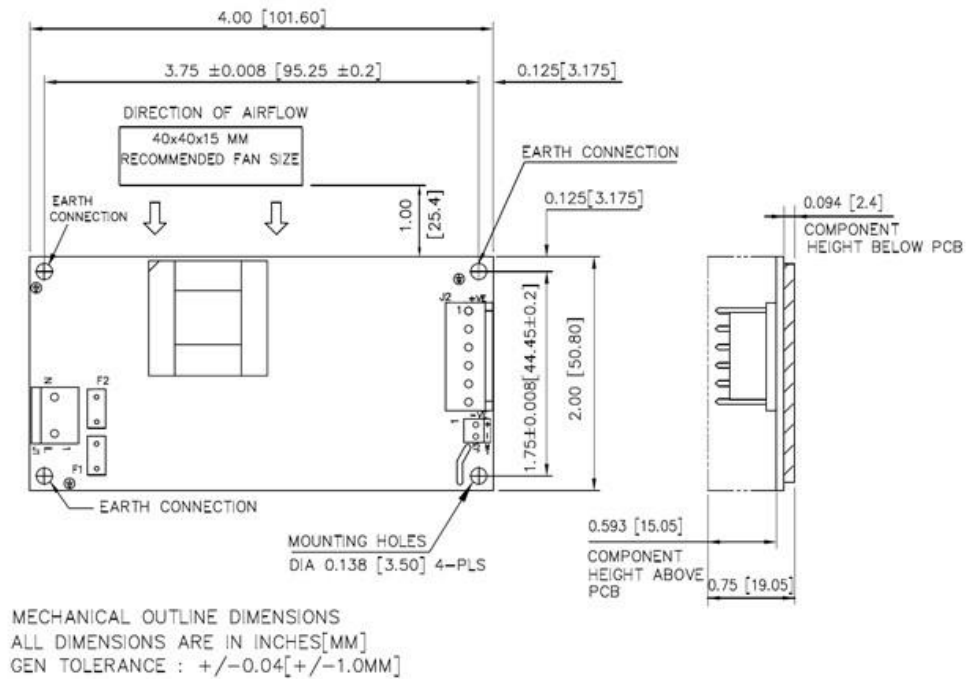
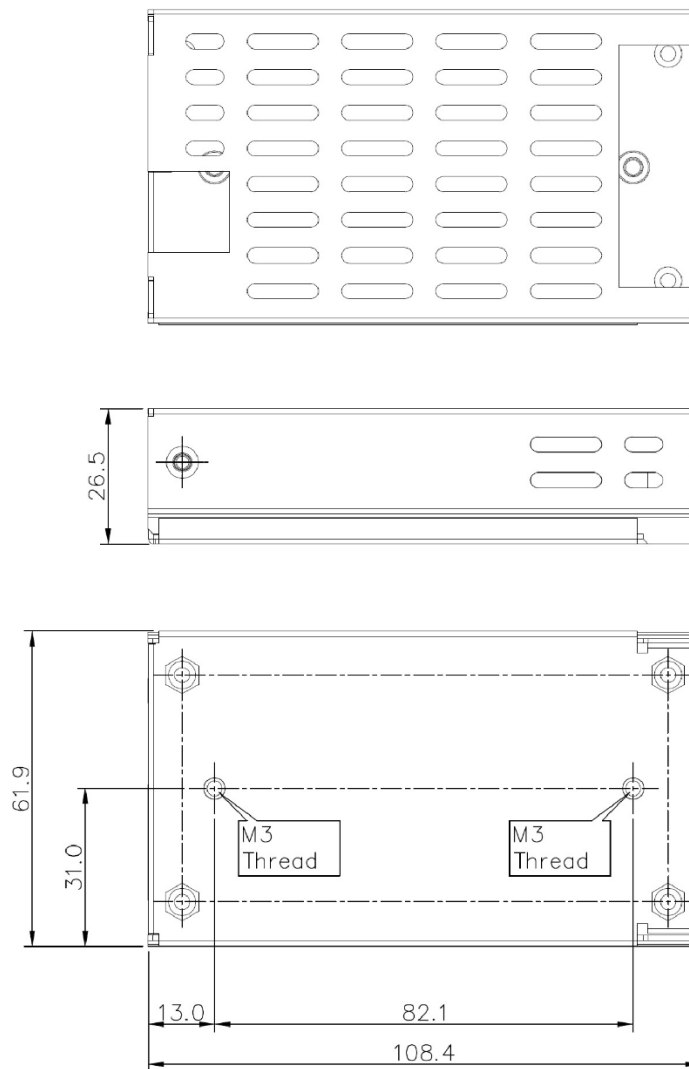


Figure 4. Mechanical Drawing – Option 2 (Output Connector – Header Molex)

**NOTES:** In case the PCB is mounted in a metal enclosure, using metal hardware ensure the following:

- 4 Stand off, used to mount PCB has OD of 5.4 mm max.
- 5 Screws, used to fix PCB on stand off, have head dia of 6.0 mm max.
- 6 Washer, if used, to have dia of 6.5 mm max.



**MECHANICAL OUTLINE DIMENSIONS**  
**ALL DIMENSIONS ARE IN MM.**  
**GEN. TOLERANCE:  $\pm 1.0$  mm**

*Figure 5. Mechanical Drawing – Cover Kit Option*

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**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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