



# MBC201 Series

## Open Frame Power Supplies

### Medical

The MBC201 Series of open-frame medical power supplies, with its wide universal input range 90-264 VAC, is available at 200 W of output power with forced-air cooling and a variety of 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

- 5 x 3 x 1.5 Inch Form Factor
- 200 W with Forced-Air Cooling
- Approved to EN/IEC 60601-1
- High Efficiency > 88%
- 12 V Fan & 5 V Standby Outputs
- Remote Sense
- IEC Protection Class Options:
  - Class I: Earthing Tab J4 (no suffix)
  - Class II: No Earthing Tab (-2 suffix)
- Medical Safety Agency Approvals
- RoHS Compliant
- CE Marked

### Applications

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



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## 1. MODEL SELECTION

MODEL <sup>1</sup>	CONNECTOR	OUTPUT VOLTAGE	MAX LOAD CONVECTION <sup>2</sup>	MAX L2AD 300 LFM <sup>2,3,4</sup>	MINIMUM LOAD	RIPPLE & NOISE <sup>5</sup>
MBC201-1005G	JST	5.0 VDC	26.0 A	26.0 A	0.0 A	1%
MBC201-1T05G	Screw Terminal	5.0 VDC	26.0 A	35.0 A	0.0 A	1%
MBC201-1012G	JST	12 VDC	13.33 A	16.67 A	0.0 A	1%
MBC201-1T12G	Screw Terminal	12	13.33 A	16.67 A	0.0 A	1%
MBC201-1015G	JST	15	10.66 A	13.33 A	0.0 A	1%
MBC201-1T15G	Screw Terminal	15	10.66 A	13.33 A	0.0 A	1%
MBC201-1024G	JST	24	6.66 A	8.33 A	0.0 A	1%
MBC201-1T24G	Screw Terminal	24	6.66 A	8.33 A	0.0 A	1%
MBC201-1030G	JST	30	5.33 A	6.66 A	0.0 A	1%
MBC201-1T30G	Screw Terminal	30	5.33 A	6.66 A	0.0 A	1%
MBC201-1048G	JST	48	3.33 A	4.17 A	0.0 A	1%
MBC201-1T48G	Screw Terminal	48	3.33 A	4.17 A	0.0 A	1%
COVER-201-XBC <sup>6</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	90-264 VAC / 120-390 VDC
Input Frequency		47 to 63 Hz
Input Current	120 VAC: 230 VAC:	2.4 A max. 1.2 A max.
Inrush Current	120 VAC: 230 VAC:	35 A max. 65 A max.
Leakage Current	120 VAC: 230 VAC:	< 150 µA < 300 µA
Power Factor	120 VAC: 230 VAC:	0.99 0.95
Switching Frequency	PFC converter (variable) Resonant converter (variable)	35 to 250 kHz, 90 kHz typical 35 to 250 kHz, 90 kHz typical

<sup>1</sup> For Class II (without input Earth pin) add suffix -2 (e.g.: MBC201-1012G-2).

<sup>2</sup> Combined output power from V1, VSTBY and VFAN should not exceed the total output power rating.

<sup>3</sup> Fan output voltage tolerance is +/-20%. During V1 full load, VFAN needs min. 20 mA load to be within regulation band.

<sup>4</sup> Peak current for fan output is 1 A.

<sup>5</sup> Ripple is 2% up to 20% load and < 1% above 20% load. 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.

<sup>6</sup> When used in Cover Kit, de-rate output power to 70 % under all operating conditions.

### 3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Efficiency	120 VAC: 230 VAC:	84% typical 86% typical
Hold Up Time	120 / 230 VAC	10 ms
Output Power	Derate output power linearly to 80% from 90 V to 80 VAC input. Peak Power: 250 W for 0.2 s	160 W to 200 W
Line Regulation		+/-0.5%
Load Regulation		+/-2.0%
Transient Response	Main output 50 to 100% load change, 50 Hz, 50% duty cycle, 0.1A / $\mu$ s	< 10%, recovery time < 5 ms
Rise Time		< 100 ms
Set Point Accuracy		$\pm$ 1%
Voltage Adjustment	V1	$\pm$ 3 %
Over Voltage Protection	V1 only	110 to 150 %
Over Current Protection		110% typical above rating
Short Circuit Protection	Short term, auto recovery	

### 4. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature	Refer to derating curve ( <i>Figure 1</i> ) Start-up is guaranteed	-20 to 70°C -20 to 0°C
Storage Temperature		-40 to 70° C
Cooling	5 V model Other models	Convection: 300 LFM: 130 W 175 W Convection: 300 LFM: 160 W 200 W
Humidity	Non Condensing	95%
Altitude	Operating: Non-Operating:	10,000 ft. 40,000 ft.
Reliability	MTBF according to Telcordia –SR332-Issue 3	1.6 million hours

### 5. 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 A & B

## 6. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output:	Min. 5900 VDC
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. SIGNALS

PARAMETER	DESCRIPTION / CONDITION
Power Good Signal	TTL signal goes high after main output is in regulation band. Delay is 0.1 to 0.3 sec.
Power Fail Signal	TTL signal goes low 1 ms advance before output goes out of regulation due to mains failure
Remote ON / OFF	To turn-on power supply short J3 pin 4 to pin 6 (PSU is shipped in this configuration)
Remote Sense	Compensates for 200 mV cable drop

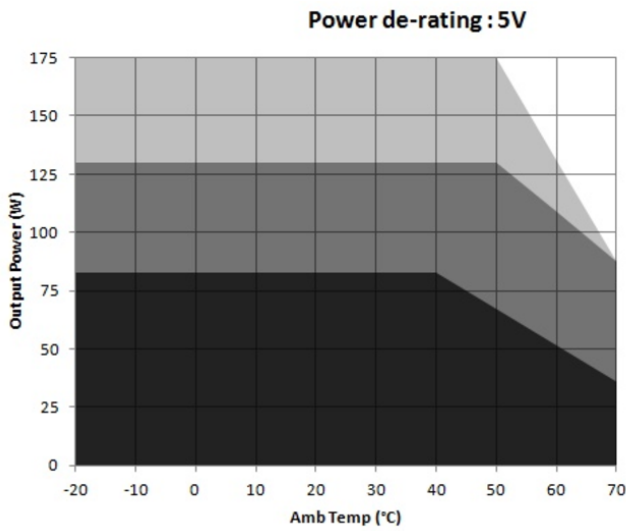
## 8. CONNECTOR & PIN DESCRIPTION

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 1,2,3 RTN Pin 4,5,6 Vout	Option 1: Tyco: 2-1776112-3 or equivalent Mating: 13 AWG wire Option 2: JST: B6P-VH-B (LF) (SN) or B6P-VH (LF) (SN) or equivalent Mating: VHR-6M; Pins: SVH-41T-P1.1
Signals & Aux Power <sup>7</sup>	J3	Pin 1 +VE Remote Sense Pin 2 VFAN (+12 V/0.5 A) Pin 3 -VE Remote Sense Pin 4 Remote ON/OFF Pin 5 VSTBY (+5 V/1 A, +/-5%) Pin 6 RTN (Signal) Pin 7 Power Fail Pin 8 Power Good	Molex: 22-23-2081 or equivalent Mating: 22-01-2087, Pins: 08-50-0113
Earthing Tab	J4		Molex: 19705-4301 or equivalent Mating: 190030001

## 9. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	325 g (0.72 lbs.)
Dimensions	127.0 x 76.2 x 38.1 mm (5 x 3 x 1.5 inch)
Cooling	Convection: 83 W; 300 LFM: 175 W (5 V model) Convection: 160 W; 300 LFM: 200 W (other models)

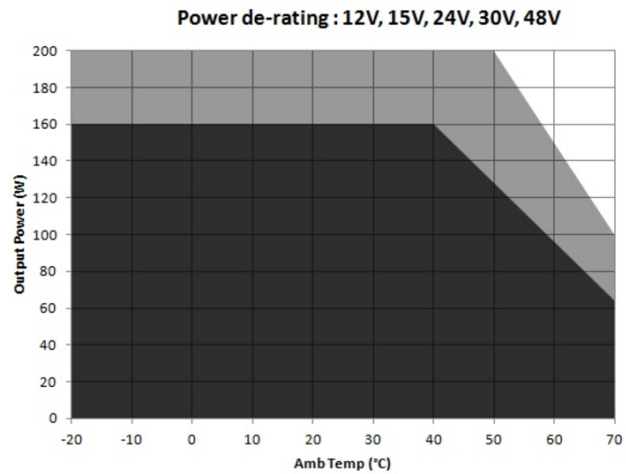
<sup>7</sup> PSU is supplied with J3 housing, pin-4 and pin-6 shorted to enable main output without remote on/off feature



Convection load: 83 W up to 40 °C  
De-rate above 40 °C @ 1.89% per °C

Forced air cooled load: 130 W up to 50°C  
(for screw terminal version)  
De-rate above 50 °C @ 1.63% per °C

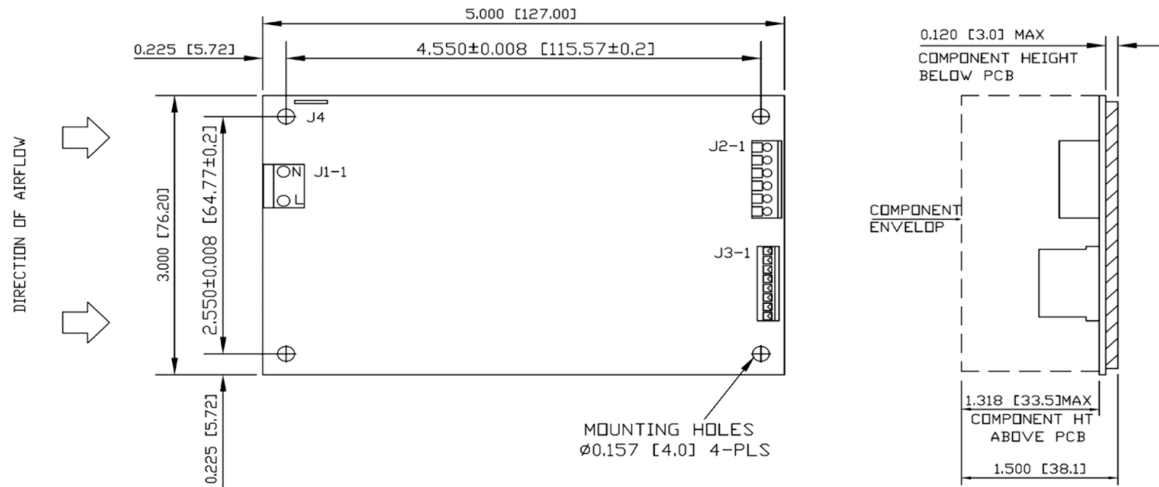
Forced air cooled load: 175 W up to 50°C  
(for JST connector version)  
De-rate above 50 °C @ 2.5% per °C



Convection load: 160 W up to 40 °C  
De-rate above 40 °C @ 2% per °C

Forced air cooled load: 200 W up to 50°C  
De-rate above 50 °C @ 2.5% per °C

Figure 1. Derating Curves



MECHANICAL OUTLINE DIMENSIONS  
 ALL DIMENSION ARE IN INCHES[MM]  
 GENERAL TOLERANCE: ±0.02[0.5mm]

Figure 2 - Mechanical Drawing

**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.

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## JONHON

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