MBC300 Series

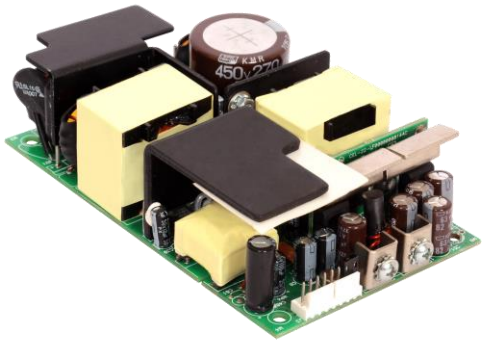
AC-DC Open Frame Power Supplies

Medical

The MBC300 Series of open-frame medical power supplies, with its wide universal 90-264 VAC input range, is available at 300 W of output power 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 (Means of Patient Protection) isolation for Class I & Class II applications.

These medical power supplies are ideal for monitoring, home health equipment as well as surgical devices.



RoHS Compliant

Key Features & Benefits

- 5.0 x 3.0 x 1.5 in (127.0 x 76.2 x 38.1 mm)
- Approved to EN/IEC 60601-1
- 2x MOPP
- 12 V fan output
- 5 V standby output
- IEC Protection Class Options:
  - Class I: Earth pin J4 (no suffix)
  - Class II: No Earth pin (-2 suffix)
- EMI Class B
- Medical Safety Agency Approvals
- RoHS Compliant
- CE marked

Applications

- Diagnostic
- Drug Pump
- Dialysis
- Home Health Care
- Monitoring
- Imaging

1. MODEL SELECTION

MODEL [1]	CONNECTOR	OUTPUT VOLTAGE	MAX LOAD		MINIMUM LOAD	RIPPLE & NOISE [2]	POWER
			CONVECTION	300 LFM			
MBC300-1T05G	Screw Terminal	5 VDC	28.0 A	40.0 A	0.0 A	2%	200 W
MBC300-1T12G	Screw Terminal	12 VDC	16.67 A	25.0 A	0.0 A	2%	300 W
MBC300-1T15G	Screw Terminal	15 VDC	13.33 A	20.0 A	0.0 A	2%	300 W
MBC300-1T24G	Screw Terminal	24 VDC	8.33 A	13.54 A	0.0 A	2%	325 W
MBC300-1T30G	Screw Terminal	30 VDC	6.67 A	10.83 A	0.0 A	2%	325 W
MBC300-1T48G	Screw Terminal	48 VDC	4.17 A	6.77 A	0.0 A	2%	325 W
Cover-300-XBC [3]	Metal cover kit accessory						

[1] Class II means without input Earth pin. Add suffix "-2" at the end of the Model Number to order Class II version.
[2] 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.
[3] 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 / 120 – 390 VDC
Input Frequency		47 to 63 Hz
Input Current	120 VAC 230 VAC	3.2 A max 1.65 A max
Inrush Current	120 VAC 230 VAC	35 A max 65 A max
Leakage Current	120 VAC 230 VAC	< 125 µA < 250 µA
Switching Frequency	PFC converter (fixed) Resonant converter (variable)	80 kHz typical 35 to 250 kHz, 90 kHz typical

3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION		SPECIFICATION
Output Voltage [4]			12 to 48 V
Stand-by Output 5			5 VDC
Output Power [6, 7]	Derate linearly to 80% from 90 VAC to 80 VAC input.		200 to 325 W
Efficiency	120 VAC 230 VAC		88% typical 92% typical
Hold Up Time	120 / 230 VAC		10 ms
Power Factor	120 VAC 230 VAC		0.98 0.95
Line Regulation			± 0.5 %
Load Regulation			± 2 %
Transient Response	50% to 100% load change, 50 Hz, 50% duty cycle, 0.1 A/µs,		< 10 %, recovery time < 5 ms
Rise Time			< 100 ms
Set Point Tolerance			± 1 %
Voltage Output Adjustment			± 3 %
Over Voltage Protection	Automatic recovery		110 to 150 %
Over Current Protection			110 to 150 %
Short Circuit Protection	Short term, automatic recovery		
Over Temperature Protection	Automatic Recovery		110° C primary heat sink
Cooling [8]	Convection	5 V model 12, 15, 24, 30 & 48 V models	140 W max 200 W max
	With 300 LFM	5 V model 12 &15 V models 24, 30 & 48 V models	200 W max 300 W max 325 W max

4 Peak current rating on main output is 120% of max., lasting < 30 s with a maximum 10% duty cycle.
5 Standby output voltage tolerance including set point accuracy, line and load regulation is +/-10%. Ripple and noise is less than 5%.
6 Combined output power of main output, fan supply and standby supply shall not exceed max. power rating.
7 Derate output power linearly to 80% from 90 VAC to 80 VAC input.
8 Refer de-rating curves to determine output power over the entire operating temperature range

4. EMC SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Conducted Emissions [9]	EN 55011-B, CISPR22-B, FCC PART15-B	Pass
Radiated Emissions	EN 55011 B	Pass
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

9 Class II product meets Class A limit line for conducted emission.

5. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output (2 MOPP) Input to Earth (1 MOPP) Output to Earth (1 MOPP)	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	
CE mark	Complies with LVD Directive	

6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature	Refer to de-rating curves -20 to 0°C start-up is guaranteed	-20 to 70°C
Storage Temperature		-40 to 85° C
Relative Humidity	Non Condensing	95% Rh
Altitude	Operating: Non-Operating:	10,000 ft. 40,000 ft.
Reliability	MTBF according to Telcordia –SR332-issue 3	1.77 million hours

7. SIGNALS

PARAMETER	DESCRIPTION / CONDITION
Power Good [10]	TTL signal goes high after main output is within regulation band, delay is 0.1 to 0.3 s
Remote On/ Off	To turn on PSU short remote pin to ground
Remote Sense	Compensates for 200 mV drop

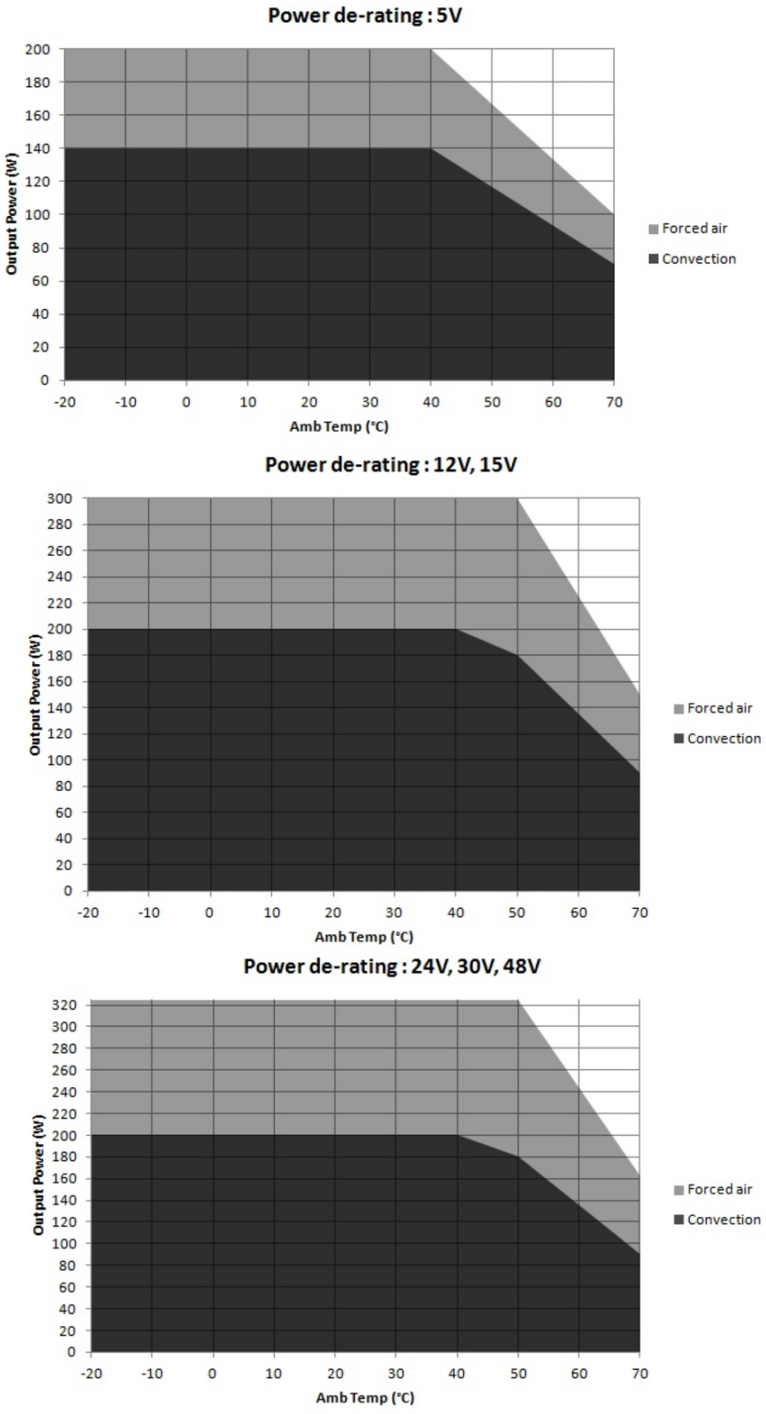
[10] Power good signal cannot be used as a current source. Internal pull up resistor from PG signal to 5V is 10K. It is recommended to use external transistor if intended to source current.

8. CONNECTOR & PIN DESCRIPTION

CONNECTOR	PIN	DESCRIPTION / CONDITION		MANUFACTURER / PN
AC Input Connector	J1	Pin 1 Pin 2	AC LINE AC NEUTRAL	Molex: 26-60-4030 Mating: 09-50-3031; Pins: 08-50-0106
DC Output Connector	J2	Pin 1 Pin 2	RTN V1	6-32 inches Screw Pan HD Mating: Designed to accept Ring Tongue Terminal AMP : 8-31886-1, wherein one 16 AWG (max) wire can be crimped. Note: One Ring Tongue Terminal with 16 AWG is recommended for current up to 11 A only. Use multiple tongue terminals with wire for more current.
Signals & Aux Power	J3 [11]	Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8	REMOTE ON/OFF RTN VFAN (+12 V/0.5 A) -VE REMOTE SENSE VSTBY (+5 V/2 A, +/-5%) +VE REMOTE SENSE RTN POWER GOOD	Molex: 22-23-2081 Mating: 22-01-2087; Pins: 08-50-0113
Earth (Spade Connector)	J4 [12]			Molex: 19705-4301 Mating: 190030001

[11] PSU is supplied with J3 housing, pin-1 and pin-2 shorted to enable main output without remote on/off feature.
[12] Class I models only.

9. DERATING CURVES



Forced air cooled load: 200 W up to 40°C
De-rate above 40 °C @ 1.67% per °C

Convection load: 140 W up to 40 °C
De-rate above 40 °C @ 1.67% per °C

Forced air cooled load: 300 W up to 50°C
De-rate above 50 °C @ 2.5% per °C

Convection load: 200 W up to 40 °C
De-rate between 40-50 °C @ 1% per °C
De-rate above 50 °C @ 2.5% per °C

Forced air cooled load: 325 W up to 50°C
De-rate above 50 °C @ 2.5% per °C

Convection load: 200 W up to 40 °C
De-rate between 40-50 °C @ 1% per °C
De-rate above 50 °C @ 2.5% per °C

Figure 1. Derating Curves

10. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	450 g (0.99 lbs)
Dimensions	127.0 x 76.2 x 38.1 mm (5.0 x 3.0 x 1.5 inch)

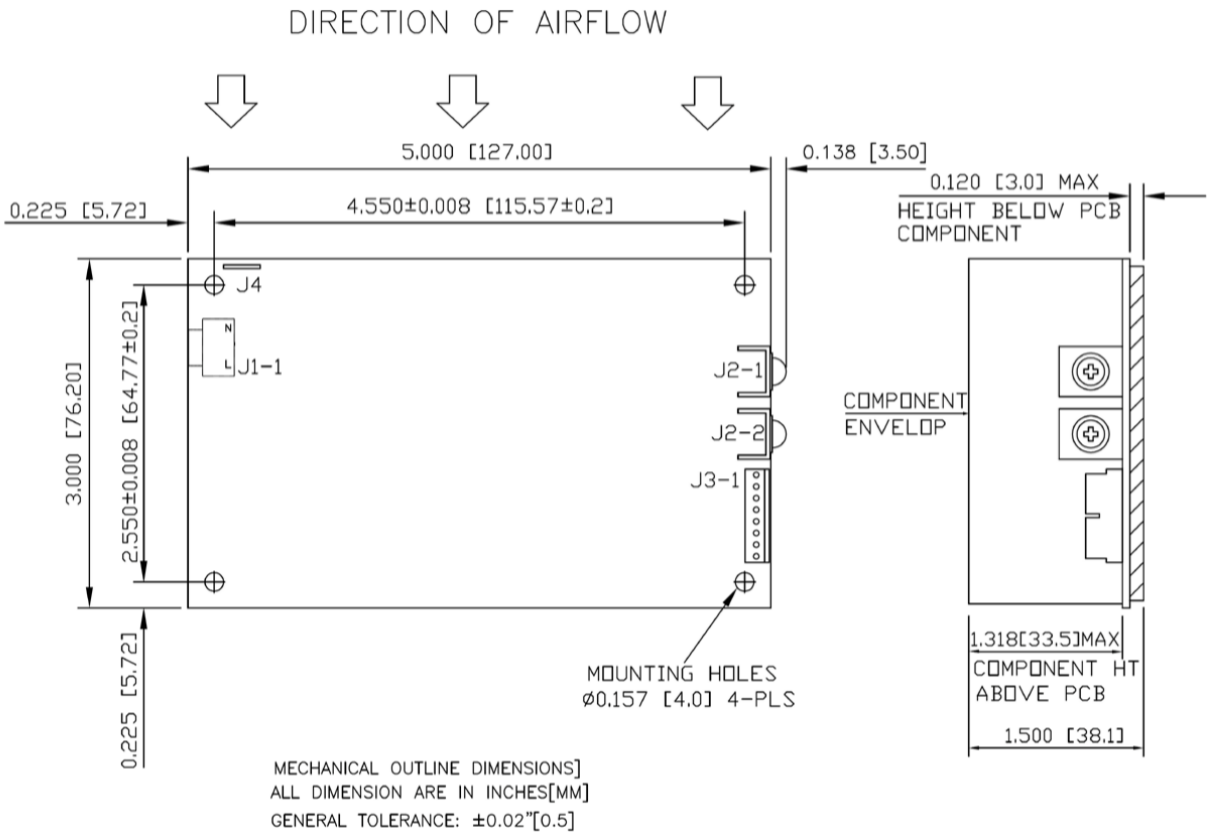


Figure 2. Mechanical Drawing

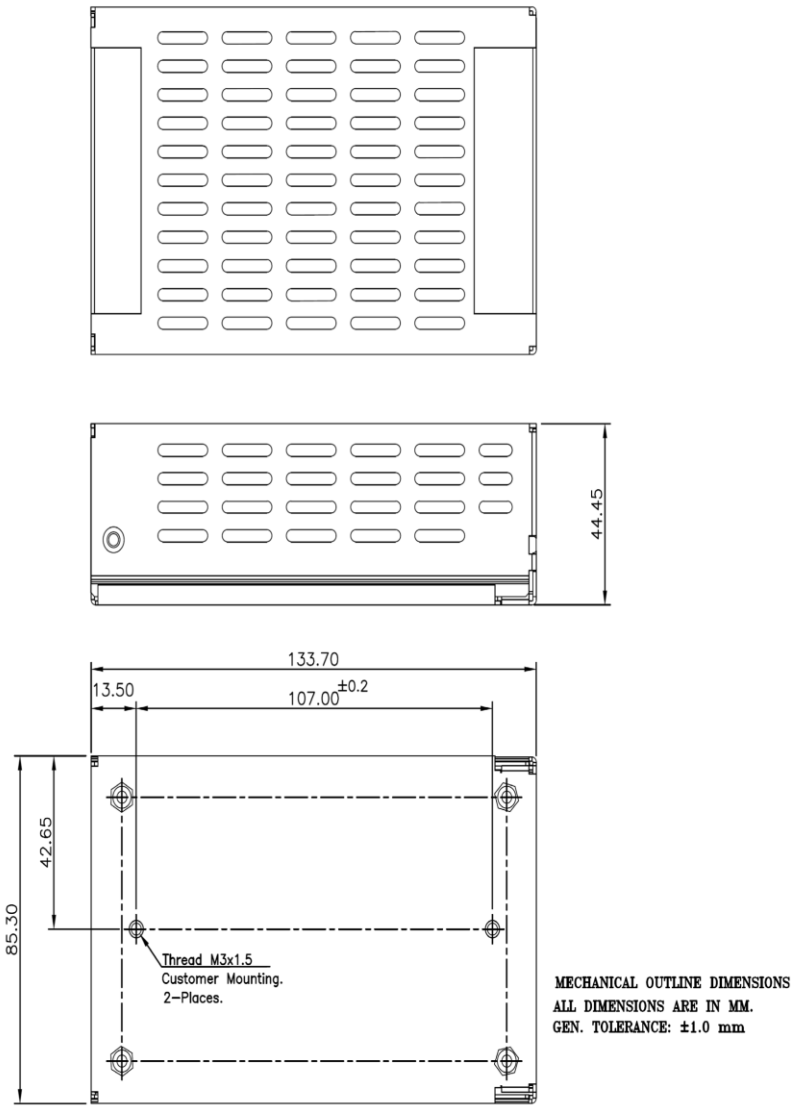


Figure 3. Mechanical Drawing with Cover Kit

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

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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