

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.



Key Features & Benefits

- 200 W convection cooled
- -20 to 50°C full load operation
- Approved to EN/IEC 60601-1
- 2x MOPP
- 5.0 x 3.0 x 1.5 inch (127.0 x 76.2 x 38.1 mm)
- 12 V fan & 5 V standby outputs
- Inhibit and Power Good signals
- No minimum load required
- 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
- CE marked

Applications

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

1. MODEL SELECTION

MODEL	CONNECTOR	OUTPUT VOLTAGE	MAX LOAD CONVECTION ^{1,2,3}	MAX LOAD 300 LFM ^{1,2,3}	MINIMUM LOAD	RIPPLE & NOISE ⁴	TOTAL REGULATION
MBC300-1T05G	Screw Terminal	5 VDC	28.0 A	40.0 A	0 A	2%	± 2.5%
MBC300-1T05G-2	Screw Terminal	5 VDC	28.0 A	40.0 A	0 A	2%	± 2.5%
MBC300-1T12G	Screw Terminal	12 VDC	16.67 A	25.0 A	0 A	2%	± 2.5%
MBC300-1T12G-2	Screw Terminal	12 VDC	16.67 A	25.0 A	0 A	2%	± 2.5%
MBC300-1T15G	Screw Terminal	15 VDC	13.33 A	20.0 A	0 A	2%	± 2.5%
MBC300-1T15G-2	Screw Terminal	15 VDC	13.33 A	20.0 A	0 A	2%	± 2.5%
MBC300-1T24G	Screw Terminal	24 VDC	7.5 A	13.54 A	0 A	2%	± 2.5%
MBC300-1T24G-2	Screw Terminal	24 VDC	7.5 A	13.54 A	0 A	2%	± 2.5%
MBC300-1T30G	Screw Terminal	30 VDC	6.0 A	10.83 A	0 A	2%	± 2.5%
MBC300-1T30G-2	Screw Terminal	30 VDC	6.0 A	10.83 A	0 A	2%	± 2.5%
MBC300-1T48G	Screw Terminal	48 VDC	3.75 A	6.77 A	0 A	2%	± 2.5%
MBC300-1T48G-2	Screw Terminal	48 VDC	3.75 A	6.77 A	0 A	2%	± 2.5%
Cover-300-XCB ⁵	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	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

¹ Peak current rating on main output is 120% of max., lasting < 30 s with a maximum 10% duty cycle.

² Combined output power of main output, fan supply and standby supply shall not exceed max. power rating.

³ Derate output power linearly to 80% from 90 VAC to 80 VAC input.

⁴ 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.

⁵ When used in Cover Kit, de-rate output power to 70 % under all operating conditions.

3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Power ^{6,7}		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/ μ s,	< 10%, recovery time < 5 ms
Rise Time		< 100 ms
Set Point Tolerance ⁸		\pm 1%
Voltage Output Adjustment		\pm 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

4. SIGNALS

PARAMETER	DESCRIPTION / CONDITION
Power Good ⁹	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 cable drop

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 Fan supply output voltage tolerance including set point accuracy, line and load regulation is +/-30% and needs min. 1% load on main output to be within regulation band. Ripple and noise is less than 10%.

⁷ The de-rating curves are valid for input voltages of 115VAC to 264 VAC. Below 115 VAC to 90 VAC the convection rating is 180 W max.

⁸ Standby output voltage tolerance including set point accuracy, line and load regulation is +/-10%. Ripple and noise is less than 5%.

⁹ Power good signal cannot be used as a current source. Internal pull up resistor from PG signal to 5 V is 10K.
It is recommended to use external transistor if intended to source current.

6. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature	Refer to de-rating curves (Fig. 1) to determine output power over the entire operating temperature range. Start-up is guaranteed	-20 to 70°C -20 to 0°C
Storage Temperature		-40 to 85° C
Cooling	Convection:	5 V model 140 W max 12 V, 15 V, 24 V, 30 V & 48 V models 200 W max 5 V model 200 W max
	With 300LFM:	12 V and 15 V models 300 W max 24 V, 30V and 48 V models 325 W max
Relative Humidity	Non Condensing	95% Rh
Altitude	Operating:	10,000 ft.
	Non-Operating:	40,000 ft.
Reliability	MTBF according to Telcordia –SR332-issue 3	1.77 million hours

7. 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, Nemko-CCL	
CE mark	Complies with LVD Directive	

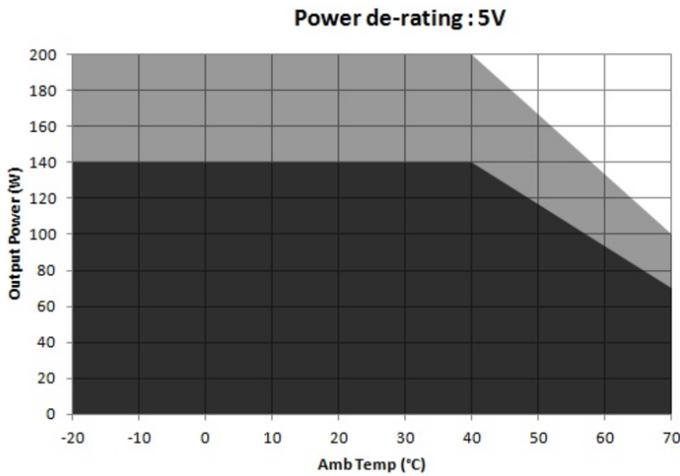
8. CONNECTOR & PIN DESCRIPTION

CONNECTOR	PIN	DESCRIPTION / CONDITION	MANUFACTURER / PN
AC Input Connector	J1	Pin 1 AC LINE	Molex: 26-60-4030 Mating: 09-50-3031; Pins: 08-50-0106 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.
		Pin 2 AC NEUTRAL	
DC Output Connector	J2	Pin 1 RTN	
		Pin 2 V1	
Signals & Aux Power ¹⁰	J3	Pin 1 REMOTE ON/OFF	Molex: 22-23-2081 Mating: 22-01-2087; Pins: 08-50-0113
		Pin 2 RTN	
		Pin 3 VFAN (+12 V/0.5 A)	
		Pin 4 -VE REMOTE SENSE	
		Pin 5 VSTBY (+5 V/2 A, +/-5%)	
		Pin 6 +VE REMOTE SENSE	
Earth	J4	Pin 7 RTN	Molex: 19705-4301 Mating: 190030001
		Pin 8 POWER GOOD Spade Connector (Class I product only)	

9. MECHANICAL SPECIFICATIONS

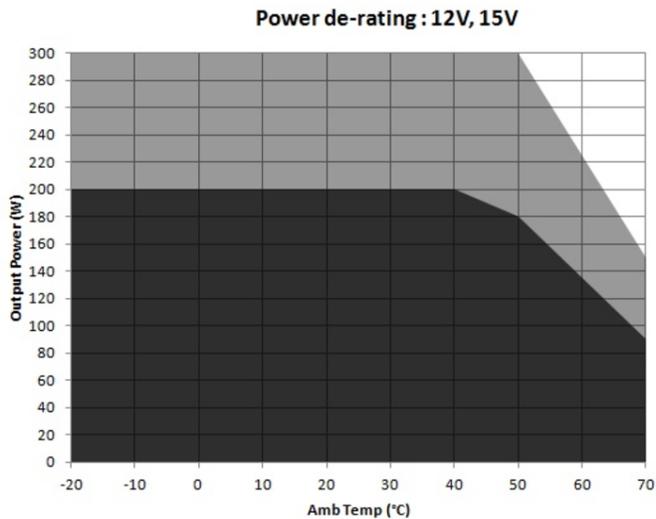
PARAMETER	DESCRIPTION / CONDITION
Weight	450 g (0.99 lbs)
Dimensions	127.0 x 76.2 x 38.1 mm (5.0 x 3.0 x 1.5 inch)

¹⁰ PSU is supplied with J3 housing, pin-1 and pin-2 shorted to enable main output without remote on/off feature.



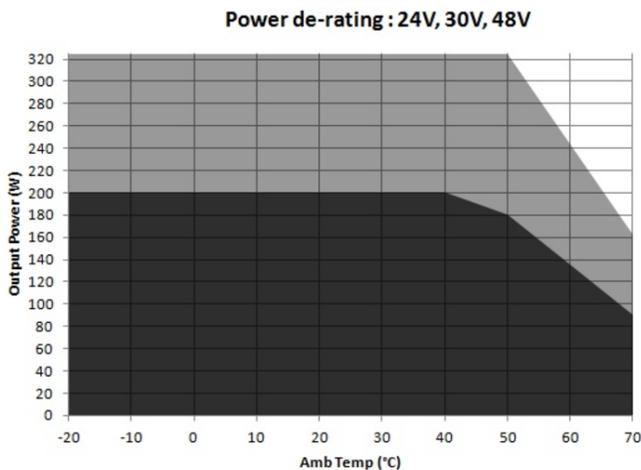
Convection load: 140 W up to 40 °C
De-rate above 40 °C @ 1.67% per °C

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

Figure 1. Derating Curves



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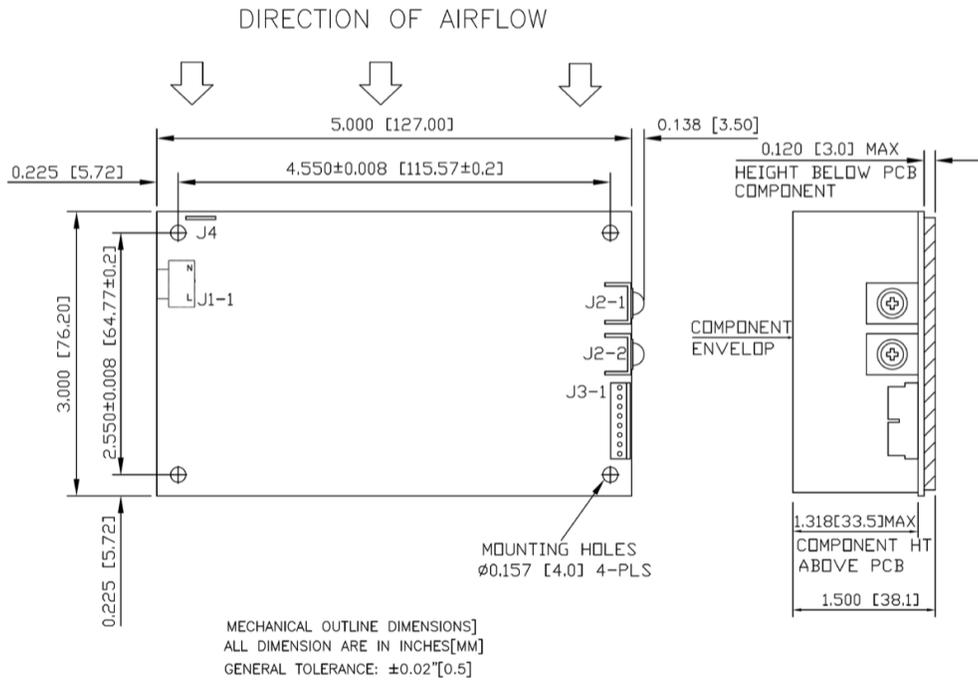


Figure 2. Mechanical Drawing

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

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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