

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



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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 | |

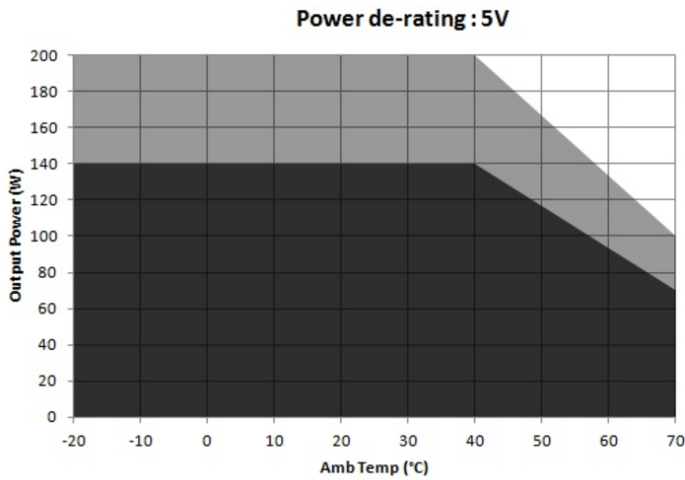
8. CONNECTOR & PIN DESCRIPTION

| CONNECTOR | PIN | DESCRIPTION / CONDITION | MANUFACTURER / PN |
|-----------------------------------|-----|---|---|
| AC Input Connector | J1 | Pin 1 AC LINE | Molex: 26-60-4030 |
| | | Pin 2 AC NEUTRAL | Mating: 09-50-3031; Pins: 08-50-0106 6-32 inches Screw Pan HD |
| DC Output Connector | J2 | Pin 1 RTN | Mating: Designed to accept Ring Tongue Terminal AMP : 8-31886-1, wherein one 16 AWG (max) wire can be crimped. |
| | | Pin 2 V1 | 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 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

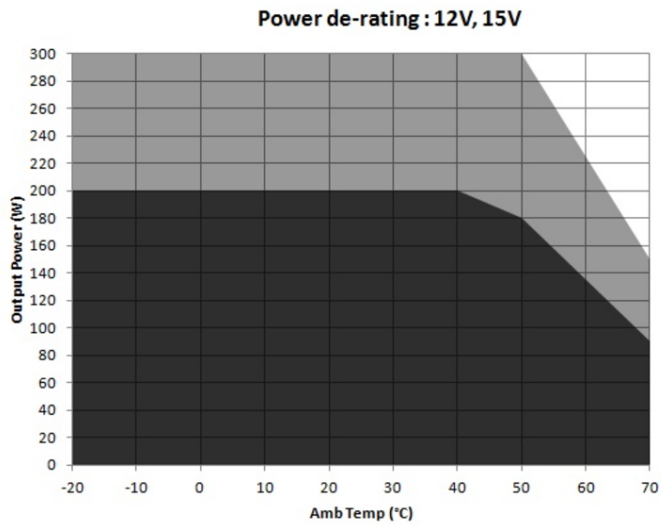
| PARAMETER | DESCRIPTION / CONDITION |
|------------|---|
| Weight | 450 g (0.99 lbs) |
| Dimensions | 127.0 x 76.2 x 38.1 mm (5.0 x 3.0 x 1.5 inch) |

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



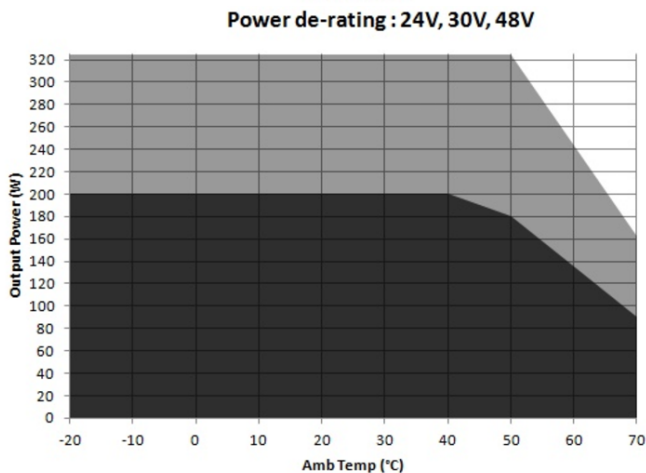
Convection load: 140 W up to 40 °C
De-rate above 40 °C @ 1.67% per °C

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

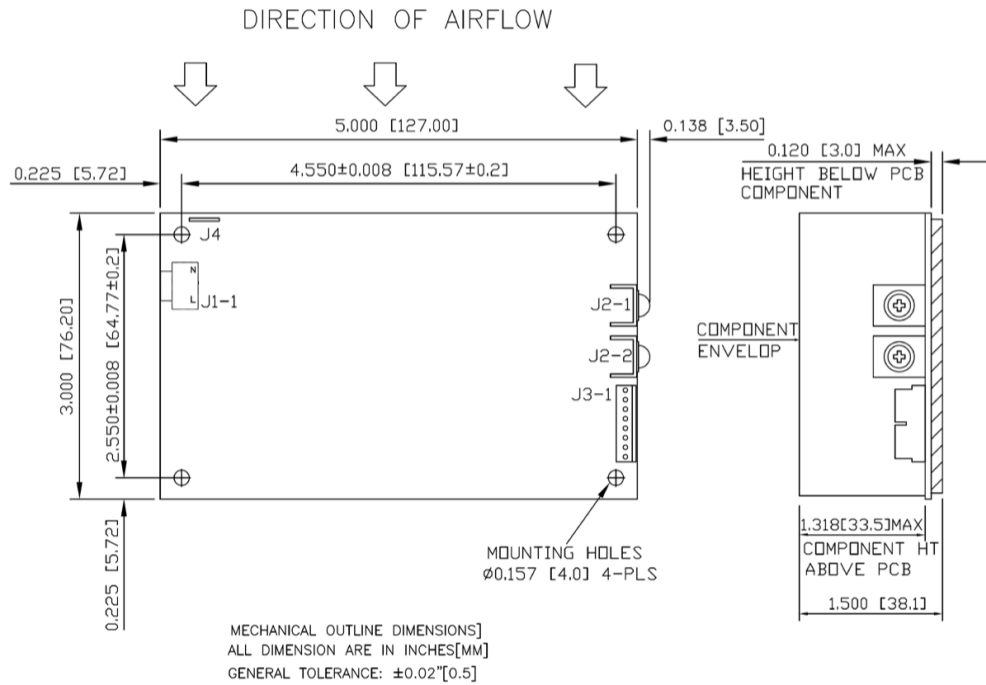


Figure 2. Mechanical Drawing

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.