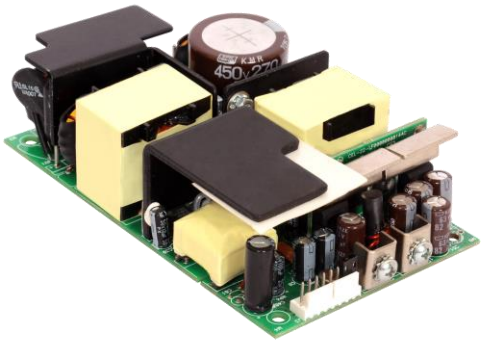
# MBC300 Series

## 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 was designed to 4th edition medical approvals and provides 2x MOPP (Means of Patient Protection) isolation for Class I and Class II installations.

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



RoHS Compliant

### Key Features & Benefits

- 200 W convection cooled
- -20 to 50°C full load operation
- 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** | Metal cover kit accessory | | | | | | |

**NOTES:**

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.

## 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<br>230 VAC | 3.2 A max<br>1.65 A max |
| Inrush Current | 120 VAC<br>230 VAC | 35 A max<br>65 A max |
| Leakage Current | 120 VAC<br>230 VAC | < 125 µA<br><250 µA |
| Switching Frequency | PFC converter (fixed)<br>Resonant converter (variable) | 80 kHz typical<br>35 to 250 kHz, 90 kHz typical |

## 3. OUTPUT SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Output Power | | 200 to 325 W |
| Efficiency | 120 VAC<br>230 VAC | 88% typical<br>92% typical |
| Hold Up Time | 120 / 230 VAC | 10 ms |
| Power Factor | 120 VAC<br>230 VAC | 0.98<br>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 |

**NOTES:**
1 Standby output voltage tolerance including set point accuracy, line and load regulation is +/-10%. Ripple and noise is less than 5%.
2 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%.

## 4. ENVIRONMENTAL SPECIFICATIONS

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

* Refer de-rating curves (Fig. 1) to determine output power over the entire operating temperature range

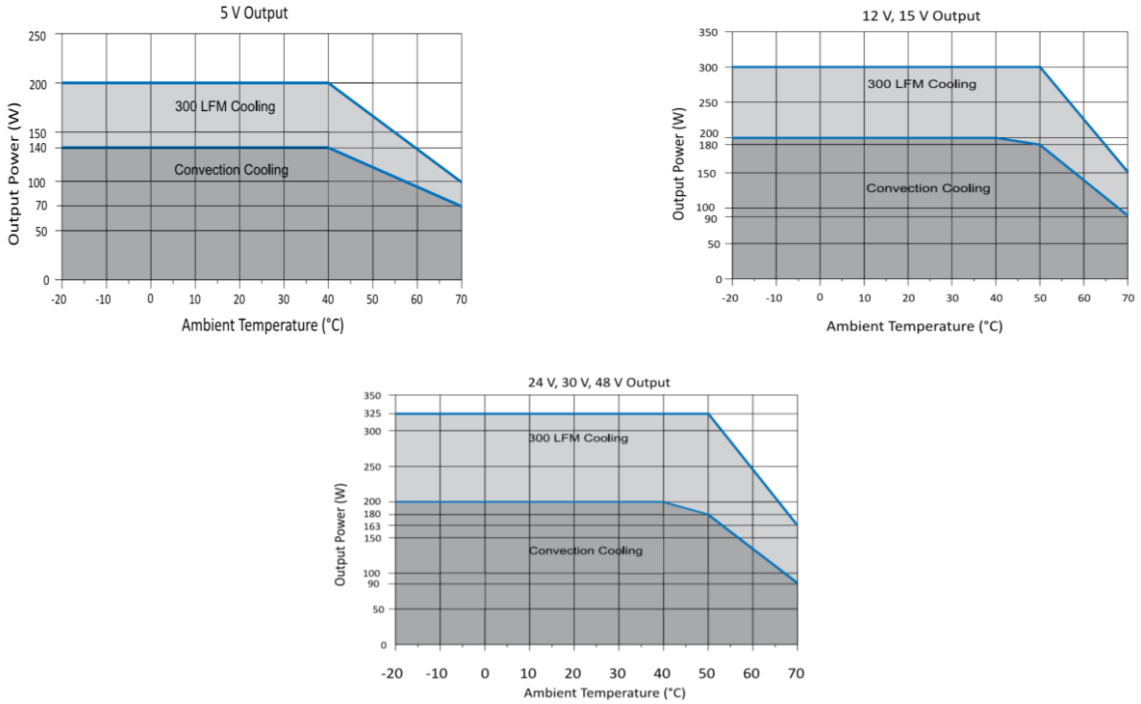



*Figure 1. Output Power Vs. Temperature Derating Curves*

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



## 5. EMC SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Conducted Emissions | EN55022-B, CISPR22-B, FCC PART15-B | Class II product meets Class A limit line for conducted emission. |
| Radiated Emissions | EN55022-B, CISPR22-B, FCC PART15-B | To be controlled in end system |
| Harmonic Current | EN61000-3-2 | Class D |
| Static Discharge | EN61000-4-2 | Level-3 |
| RF Field Susceptibility | EN61000-4-3 | Level-3 |
| Fast Transients/Bursts | EN61000-4-4 | Level-3 |
| Surge Susceptibility | EN61000-4-5 | Level 3 |
| Humidity | Non Condensing | 95% |
| Altitude | Operating:<br>Non-Operating: | 10,000 ft.<br>40,000 ft. |

## 6. SAFETY SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Isolation Voltage | Input to Output: | 4242 VDC min |
| Safety Standards | Approved to the latest edition of the following standards:<br>CSA/UL60601-1, EN60601-1 and IEC60601-1. | |
| Agency Approvals | Nemko, Nemko-CCL | |
| CE mark | Complies with LVD Directive | |

## 7. SIGNALS

| PARAMETER | DESCRIPTION / CONDITION |
|---|---|
| Power Good * | 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 |

**NOTE:** 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.

## 8. CONNECTOR & PIN DESCRIPTION

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

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

## 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) |

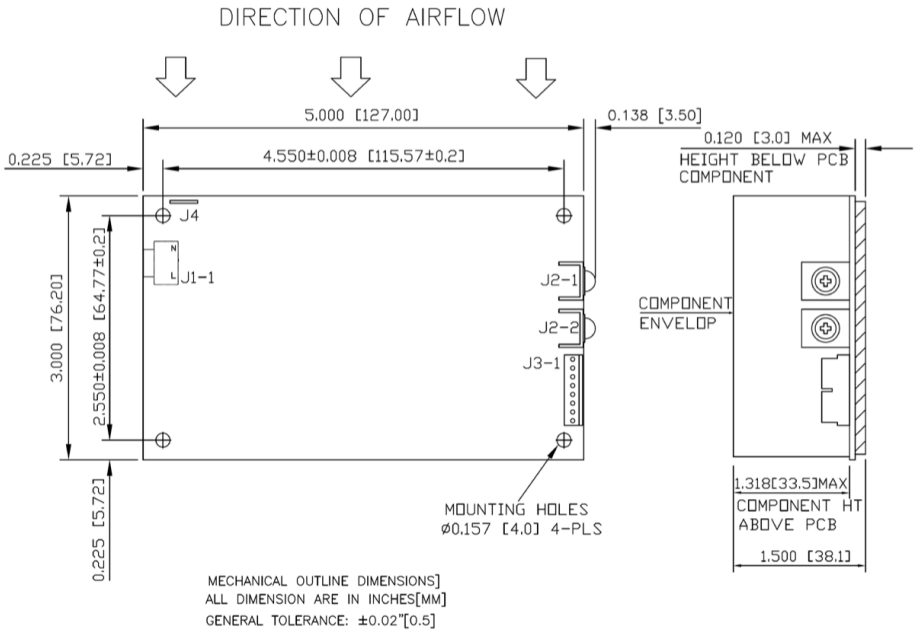



*Figure 2. Mechanical Drawing*

**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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