

# MBC275 Series

Ultra Low Profile

Open Frame Power Supplies

Medical

The MBC275 Series of ultra low open frame medical power supplies feature a wide universal AC input range of 85 V – 264 VAC, offering 275 W of output power with forced air cooling in a variety of isolated 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.

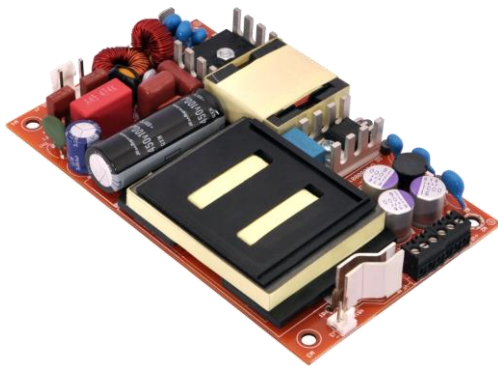
## Key Features & Benefits

- 5 x 3 x 0.75 Inches Form factor
- 275 Watts with Forced Air Cooling
- Approved to EN/IEC 60601-1
- Efficiencies up to 92%
- -40 to 70°C degree operating temperature
- Dual fusing
- 12 V / 0.5 A Fan Output
- Thermal Shut-Down feature
- 3.37 million Hours, Telcordia -SR332-issue 3 MTBF
- No Load Power < 0.5 W
- Medical (BF) Safety Approvals

## Applications

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

\* Class II means without input Earth pin.



## 1. MODEL SELECTION

| MODEL NUMBER <sup>1</sup>  | OUTPUT CONNECTOR            | VOLTAGE | MAX. LOAD                  |                            |                   | POWER |
|----------------------------|-----------------------------|---------|----------------------------|----------------------------|-------------------|-------|
|                            |                             |         | CONVECTION 50°C<br>(152 W) | CONVECTION 40°C<br>(160 W) | 13 CFM<br>(275 W) |       |
| MBC275-1T12L               | Screw Terminal              | 12 V    | 12.5 A                     | 13.33 A                    | 22.92 A           | 275 W |
| MBC275-1012L               | Header Molex Connector      |         |                            |                            |                   |       |
| MBC275-1T15L               | Screw Terminal              | 15 V    | 10 A                       | 10.66 A                    | 18.33 A           | 275 W |
| MBC275-1015L               | Header Molex Connector      |         |                            |                            |                   |       |
| MBC275-1T24L               | Screw Terminal              | 24 V    | 6.25 A                     | 6.67 A                     | 11.46 A           | 275 W |
| MBC275-1024L               | Header Molex Connector      |         |                            |                            |                   |       |
| MBC275-1T30L               | Screw Terminal              | 30 V    | 5 A                        | 5.33 A                     | 9.17 A            | 275 W |
| MBC275-1030L               | Header Molex Connector      |         |                            |                            |                   |       |
| MBC275-1T48L               | Screw Terminal              | 48 V    | 3.12 A                     | 3.33 A                     | 5.73 A            | 275 W |
| MBC275-1048L               | Header Molex Connector      |         |                            |                            |                   |       |
| MBC275-1T58L               | Screw Terminal              | 58 V    | 2.58 A                     | 2.76 A                     | 4.74 A            | 275 W |
| MBC275-1058L               | Header Molex Connector      |         |                            |                            |                   |       |
| COVER-275-XBC <sup>2</sup> | Metal Cover Kit (accessory) |         |                            |                            |                   |       |

<sup>1</sup> Class II version available. Add suffix "-2" at the end of the Model Number. Class II means without input Earth pin.

<sup>2</sup> 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<br>(Derate from 100% at 100 VAC to 72% for forced cooling and 69% for convection cooling at 80 VAC) | 80 – 264 VAC / 390 VDC      |
| Input Frequency     |                                                                                                               | 47 – 63 Hz                  |
| Input Current       | 115 VAC:<br>230 VAC:                                                                                          | 2.6 A max.<br>1.3 A max.    |
| No Load Power       | Typical                                                                                                       | < 0.5 W                     |
| Inrush Current      | 115 VAC:<br>230 VAC:<br>264 VAC:                                                                              | 25 A<br>45 A<br>75 A        |
| Leakage Current     | Typical (N/A for Class II Option)<br>Touch current                                                            | 300 µA<br>< 100 µA          |
| Switching Frequency | PFC<br>PWM                                                                                                    | 70 – 130 kHz<br>50 – 80 kHz |

### 3. OUTPUT SPECIFICATIONS

| PARAMETER                              | DESCRIPTION / CONDITION                                                                                                       | SPECIFICATION            |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Output Voltage                         | Refer to Model selection table                                                                                                | From 12 V to 58 V        |
| Output Power <sup>3</sup>              | 13 CFM (forced air cooling)<br>Convection (natural cooling)                                                                   | 275 W<br>up to 160 W     |
| Efficiency                             | 48 V, 58 V:<br>24 V, 30 V:<br>12 V, 15 V:                                                                                     | 92%<br>90%<br>88%        |
| Hold-up Time                           | At 275 W:<br>At 160 W:                                                                                                        | 8 ms<br>16 ms            |
| Power Factor                           | @ Full Load                                                                                                                   | > 0.95                   |
| Line Regulation <sup>4</sup>           |                                                                                                                               | ± 0.5%                   |
| Load Regulation <sup>4</sup>           |                                                                                                                               | ± 1%                     |
| Minimum Load                           |                                                                                                                               | 0.0 A                    |
| Transient Response                     | 25% step load change, at 0.1 A/μs slew rate,<br>50% duty cycle, 50 Hz = 4%                                                    | recovery time < 5 ms     |
| Ripple <sup>4,5</sup>                  | 24, 30, 48 & 58 V outputs<br>12 V & 15 V outputs                                                                              | 1.0 % max.<br>2.0 % max. |
| Output Voltage Adjustment <sup>6</sup> |                                                                                                                               | ± 3%                     |
| Rise Time                              | Typical                                                                                                                       | 55 ms                    |
| Set Point Tolerance <sup>4</sup>       |                                                                                                                               | ± 1%                     |
| Over Current Protection                |                                                                                                                               | > 110%                   |
| Over Voltage Protection                |                                                                                                                               | 110 to 140%              |
| Short Circuit Protection               | Hiccup mode                                                                                                                   |                          |
| Cooling                                | With 13 CFM forced air cooling (100 to 264 VAC) <sup>7</sup><br>With natural convection cooling (100 to 264 VAC) <sup>8</sup> | 275 W<br>Up to 160 W     |

<sup>3</sup> Combined output power of main output, fan supply shall not exceed max. power rating.

<sup>4</sup> Fan supply output voltage tolerance including set point accuracy, line and load regulation is ± 10% and ripple and noise is less than 10%.

<sup>5</sup> 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.

<sup>6</sup> Adjustment potentiometer is located on the SMT side of the PCB

<sup>7</sup> Refer to Mechanical Drawing

<sup>8</sup> Refer to Derating Curve

### 4. EMC SPECIFICATIONS

| PARAMETER                          | DESCRIPTION / CONDITION                                                       | SPECIFICATION        |
|------------------------------------|-------------------------------------------------------------------------------|----------------------|
| Conducted Emissions                | EN 55011-B, CISPR22-B, FCC PART15-B                                           | Pass                 |
| Radiated Emissions                 | EN 55011 A<br>with external core (King core K5B RC 25x12x15-M in input cable) | Pass<br>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 B          |

## 5. SAFETY SPECIFICATIONS

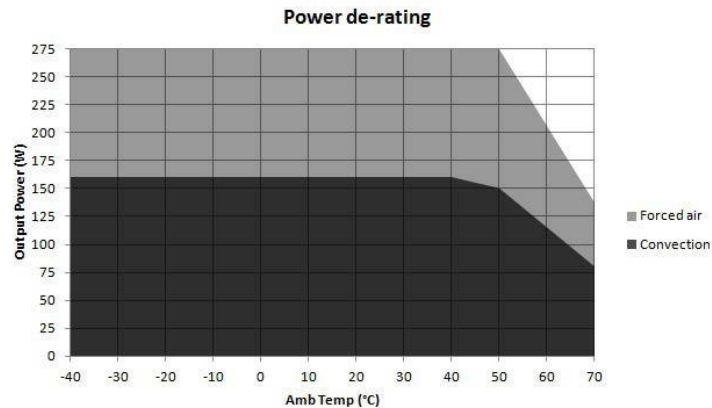
| PARAMETER          | DESCRIPTION / CONDITION                                                         | SPECIFICATION |
|--------------------|---------------------------------------------------------------------------------|---------------|
| Isolation Voltage  | Input to Output: (Medical applications)                                         | 4000 VAC      |
|                    | Input to GND: (N/A for Class II Option)                                         | 1500 VAC      |
|                    | Output to GND: for type BF                                                      | 1500 VAC      |
|                    | (for type B (N/A for Class II Option)                                           | 500 VAC       |
| Safety Standard(s) | EN 60601-1, IEC 60601-1 (ed.3), ANSI / AAMI ES 60601 - 1, CSA C22.2 No. 60601-1 |               |
| Agency Approvals   | Nemko, UL, C-UL                                                                 |               |
| CE mark            | Complies with LVD Directive                                                     |               |

## 6. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER                          | DESCRIPTION / CONDITION                            | SPECIFICATION            |
|------------------------------------|----------------------------------------------------|--------------------------|
| Operating Temperature <sup>9</sup> | -40 to 0°C startup guaranteed, with spec deviation | -40 to +70°C             |
| Storage Temperature                |                                                    | -40 to +85°C             |
| Relative Humidity                  | Non-condensing                                     | 5% to 95%                |
| Altitude                           | Operating:<br>Non-operating:                       | 16,000 ft.<br>40,000 ft. |
| MTBF                               | Telcordia -SR332-issue 3                           | 3.37 million hours       |

<sup>9</sup> Output ripple can be more than 10% of the output voltage.

## DERATING CURVES



Convection load: 160 W up to 40 °C  
De-rate between 40-50 °C @ 0.625% per °C  
De-rate above 50 °C @ 2.33% per °C

Forced air cooled load: 275 W up to 50°C  
De-rate above 50 °C @ 2.5% per °C

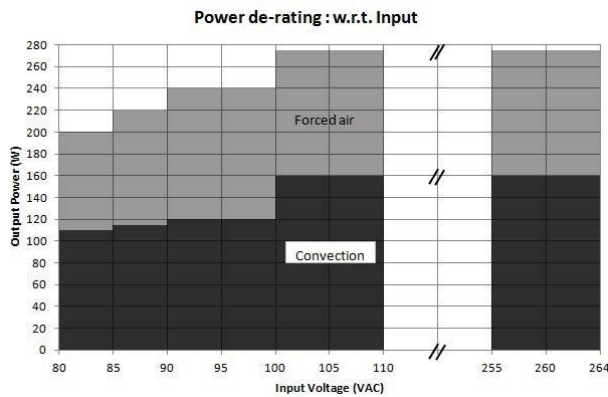


Figure1. Derating Curves

## 7. CONNECTOR & PIN DESCRIPTION

| CONNECTOR           | PIN | DESCRIPTION / CONDITION                               | MANUFACTURER / PN                                                                                                                                     |
|---------------------|-----|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC Input Connector  | J1  | Pin 1 AC Line<br>Pin 2 Not Fitted<br>Pin 3 AC Neutral | Molex: 26-60-4030<br>Mating: 09-50-3031; Pins: 08-50-0106                                                                                             |
| DC Output Connector | J2  | Pin 1, 2, 3 V1 +VE<br>Pin 4, 5, 6 V1 -VE              | Option 1 (Screw Terminal): Molex: 39357 Series or equivalent<br>Option 2 (Molex Connector): Molex: 26-60-4060<br>Mating: 09-50-3061; Pins: 08-50-0106 |
| Aux (Fan) Output    | J3  | Pin 1 FAN +VE<br>Pin 2 FAN -VE                        | AMP: 640456-2<br>Mating: 640440-2                                                                                                                     |

## 8. MECHANICAL SPECIFICATIONS

| PARAMETER  | DESCRIPTION / CONDITION                     |
|------------|---------------------------------------------|
| Weight     | approx. 250 g                               |
| Dimensions | 127 x 76.2 x 19.05 mm (5 x 3 x 0.75 inches) |

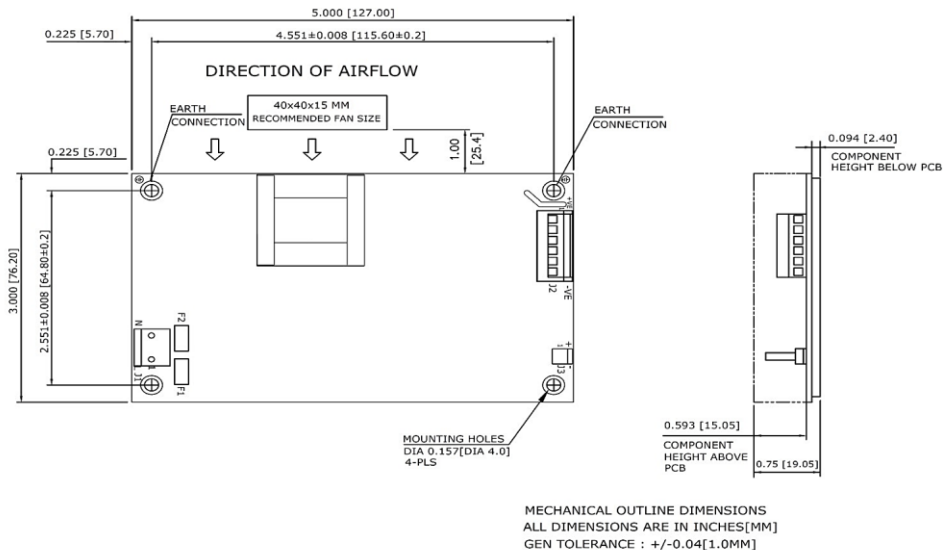


Figure 2. Mechanical Drawing – Option 1 (Output Connector – Screw Terminal)

**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.

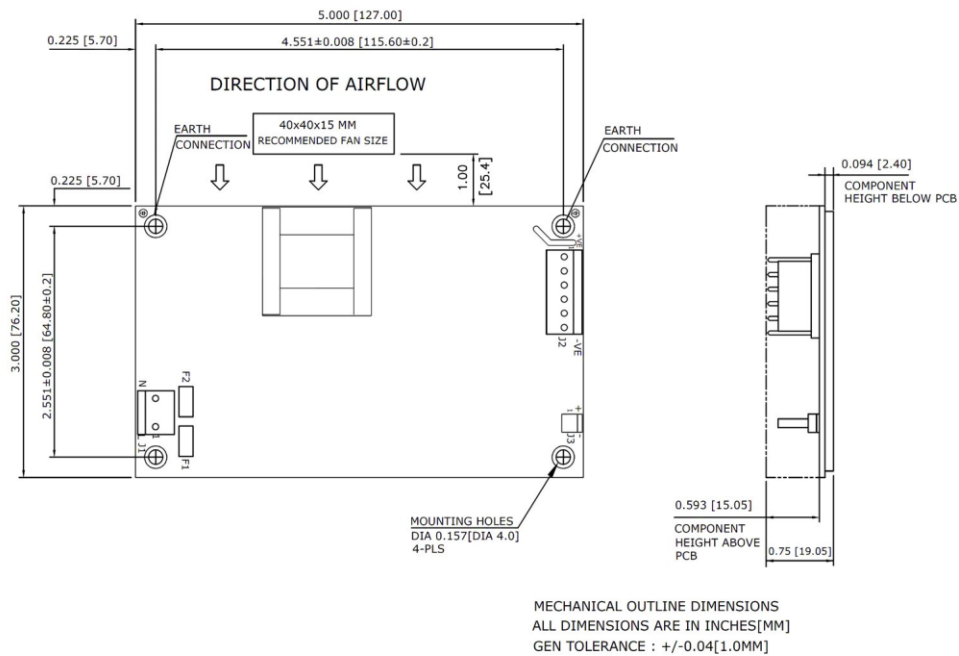


Figure 3. Mechanical Drawing – Option 2 (Output Connector – Header Molex)

**NOTES:** In case the PCB is mounted in a metal enclosure, using metal hardware ensure the following:

- 4 Stand off, used to mount PCB has OD of 5.4 mm max.
- 5 Screws, used to fix PCB on stand off, have head dia of 6.0 mm max.
- 6 Washer, if used, to have dia of 6.5 mm max.

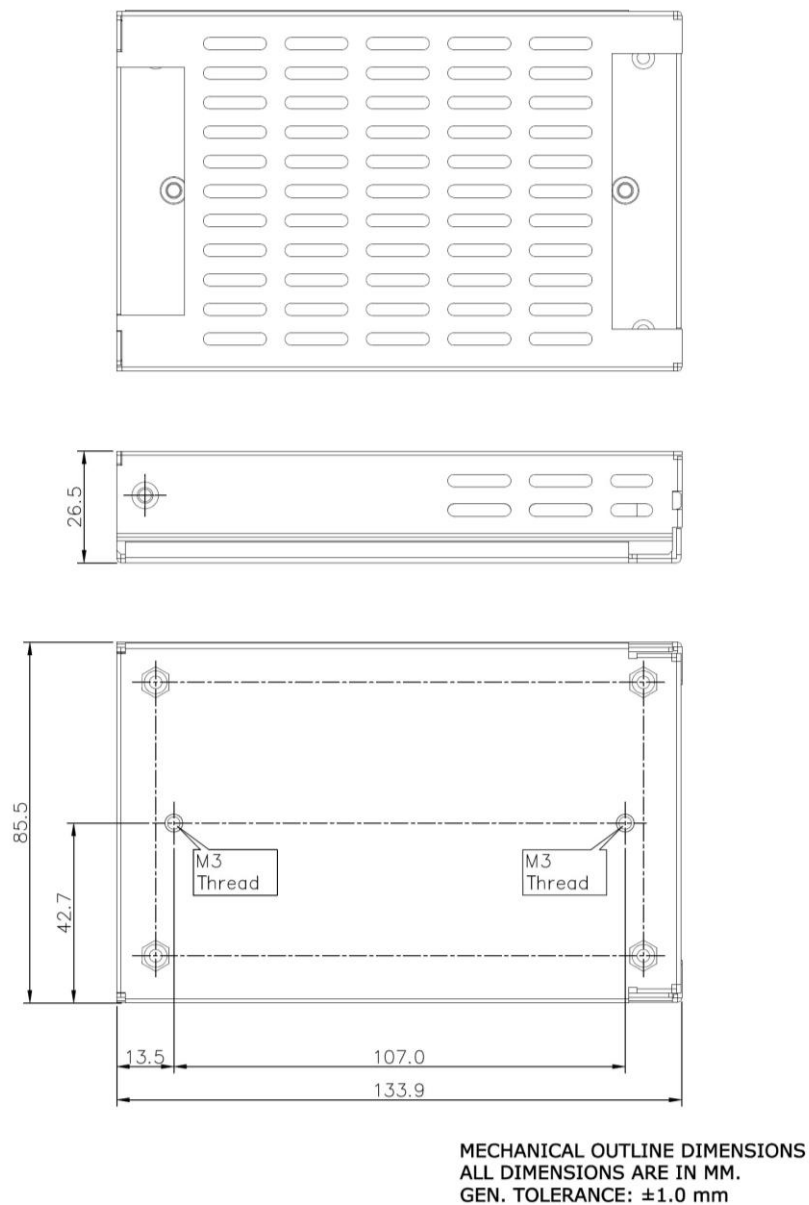


Figure 4. Mechanical Drawing – Cover Kit Option

For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)

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