

# 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
- Standby 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>	CONNECTOR	VOLTAGE	MAX. LOAD (CONVECTION) 152 W @ 50°C	MAX. LOAD (CONVECTION) 160 W @ 40°C	MAX. LOAD (13 CFM)	MIN. LOAD	RIPPLE & NOISE <sup>2</sup>
MBC275-1T12L	Screw Terminal	12 V	12.5 A	13.33 A	22.92 A	0.0 A	2%
MBC275-1012L	Molex Connector						
MBC275-1T15L	Screw Terminal	15 V	10 A	10.66 A	18.33 A	0.0 A	2%
MBC275-1015L	Molex Connector						
MBC275-1T24L	Screw Terminal	24 V	6.25 A	6.67 A	11.46 A	0.0 A	1%
MBC275-1024L	Molex Connector						
MBC275-1T30L	Screw Terminal	30 V	5 A	5.33 A	9.17 A	0.0 A	1%
MBC275-1030L	Molex Connector						
MBC275-1T48L	Screw Terminal	48 V	3.12 A	3.33 A	5.73 A	0.0 A	1%
MBC275-1048L	Molex Connector						
MBC275-1T58L	Screw Terminal	58 V	2.58 A	2.76 A	4.74 A	0.0 A	1%
MBC275-1058L	Molex Connector						
COVER-275-XBC <sup>3</sup>	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 (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: 230 VAC:	2.6 A max. 1.3 A max.
No Load Power	Typical for MBC275-1XXX Typical for MBC275-1XXX-PGPF	< 0.5 W < 0.85 W
Inrush Current	115 VAC: 230 VAC: 264 VAC:	25 A 45 A 75 A
Leakage Current	Typical (N.A. For Class II Option - without input Earth pin) Touch current	300 µA < 100 µA
Power Factor	At full load	> 0.95
Switching Frequency	PFC PWM	70 to 130 kHz 50 to 80 kHz

<sup>1</sup> For Class II Option (without input Earth pin) add suffix: -2 (e.g.: MBC275-1012L-2).

<sup>2</sup> 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.

<sup>3</sup> When used in Cover Kit, de-rate output power to 70 % under all operating conditions.

### 3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Power <sup>4</sup>	With 13 CFM forced air cooling With natural convection cooling at 100 to 264 VAC	275 W up to 160 W
Efficiency (typical @ 230 VAC full load)	48 V, 58 V: 24 V, 30 V: 12 V, 15 V:	92% 90% 88%
Hold-up Time	At 275 W: At 160 W:	8 ms 16 ms
Line Regulation		+/-0.5%
Load Regulation		+/-1%
Transient Response	25% step load change, at 0.1 A/ $\mu$ s slew rate, 50% duty cycle, 50 Hz = 4%	recovery time < 5 ms
Voltage Adjustment <sup>5</sup>		+/-3%
Rise Time	Typical	55 ms
Set Point Tolerance <sup>6</sup>		+/-1%
Over Current Protection		> 110%
Over Voltage Protection		110 to 140%
Short Circuit Protection	Hiccup mode	

### 4. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature <sup>7</sup>	Startup guaranteed with spec. deviation	-40 to +70°C -40 to 0°C
Storage Temperature		-40 to +85°C
Relative Humidity	Non-condensing	5% to 95%
Altitude	Operating: Non-operating:	16,000 ft. 40,000 ft.
MTBF	Telcordia -SR332-issue 3	3.37 million hours

### 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 B

<sup>4</sup> Combined output power of main output, fan supply shall not exceed max. Power rating.

<sup>5</sup> Adjustment potentiometer is located on the SMT side of the PCB.

<sup>6</sup> Fan supply output voltage tolerance including set point accuracy, line & load regulation is +/-10% and Ripple & noise is less than 10%.

<sup>7</sup> Output ripple can be more than 10% of the output voltage.

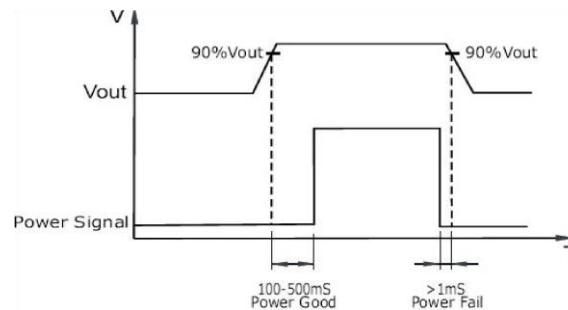
## 6. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (Medical applications)	4000 VAC
	Input to GND: (Not Applicable 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)	Approved to the latest edition of the following standards: CSA/UL60601-1, EN60601-1 and IEC60601-1.	
Agency Approvals	Nemko, UL, C-UL	
CE mark	Complies with LVD Directive	

## 7. 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	
		Pin 2	Not Fitted		
		Pin 3	AC Neutral		
DC Output Connector	J2	Pin 1, 2, 3	V1 +VE	Option 1 (Screw Terminal):	Molex: 39357 Series or equivalent Molex: 26-60-4060 Mating: 09-50-3061; Pins: 08-50-0106
		Pin 4, 5, 6	V1 -VE	Option 2 (Molex Connector):	
Aux (Fan) Output	J3	Pin 1	FAN +VE	AMP: 640456-2	
		Pin 2	FAN -VE	Mating: 640440-2	
Signal Output <sup>8</sup>	J4	Pin 1	Vs	AMP :640456-3 Mating: 640440-3	
		Pin 2	PGPF		
		Pin 3	GDN		

Fusing on neutral for ITE model is optional.



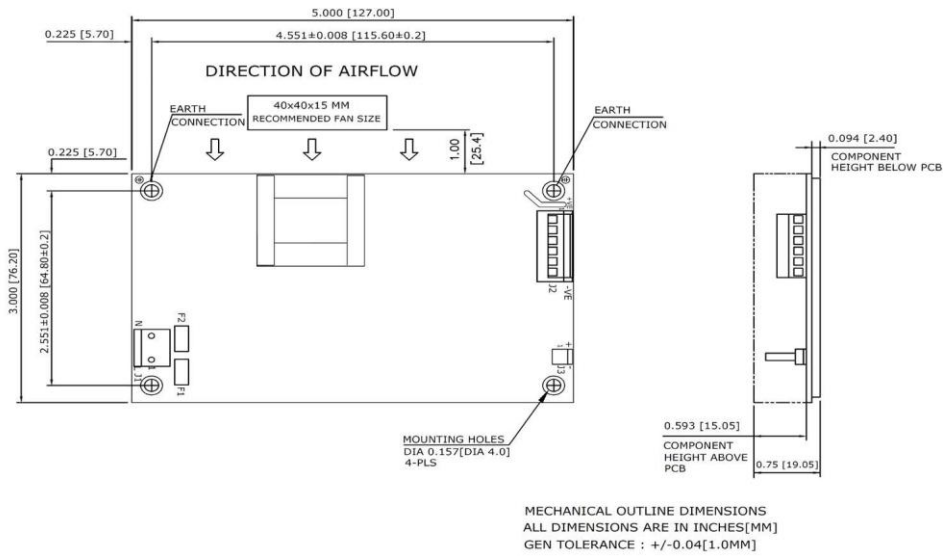
Power good / AC fail signal specs

## 8. MECHANICAL SPECIFICATIONS

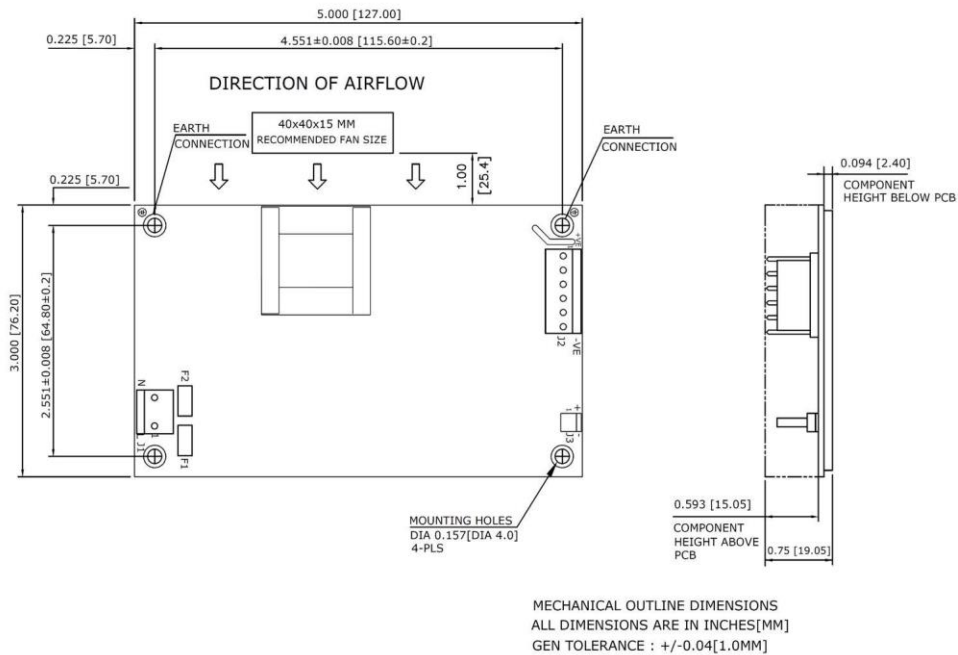
PARAMETER	DESCRIPTION / CONDITION
Weight	approx. 200 g
Dimensions	127 x 76.2 x 19.05 mm (5 x 3 x 0.75 inches)
Cooling <sup>9</sup>	275 W with 13 CFM forced air cooling (refer to Mechanical Drawing) Up to 160 W with natural convection cooling (refer to Derating Curve)

<sup>8</sup> A TTL signal is available at pin 2 of J4 which goes high 100-500 ms after output voltage reaches 90% of set value. It goes low a minimum of 1 ms before output falls below 90% of the set value, when input AC is switched off.

<sup>9</sup> 275 W with 13CFM forced air cooling and 160 W with natural convection cooling at 100 to 264 VAC.



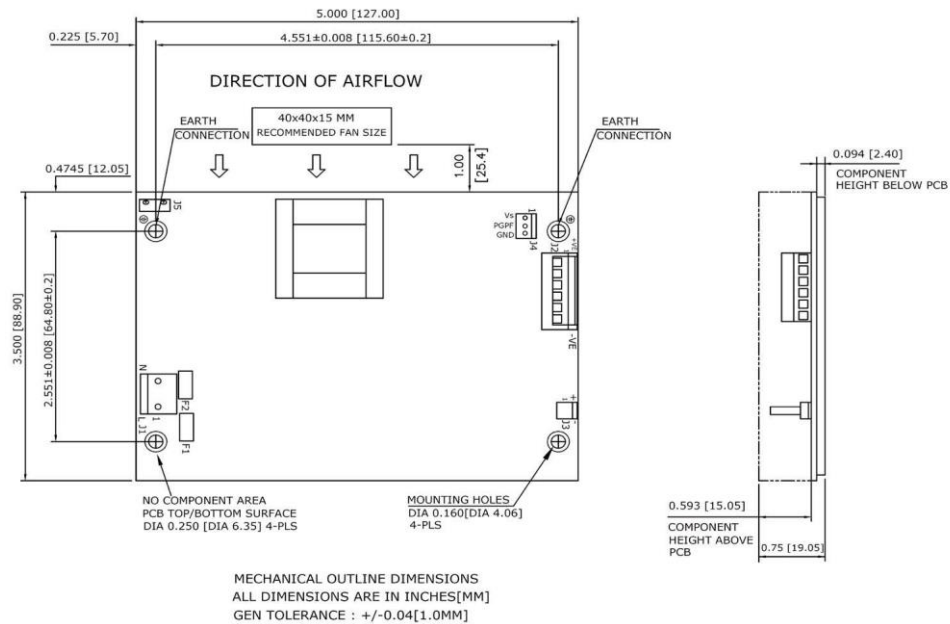
*Mechanical Drawing – Option 1 without PGPF*



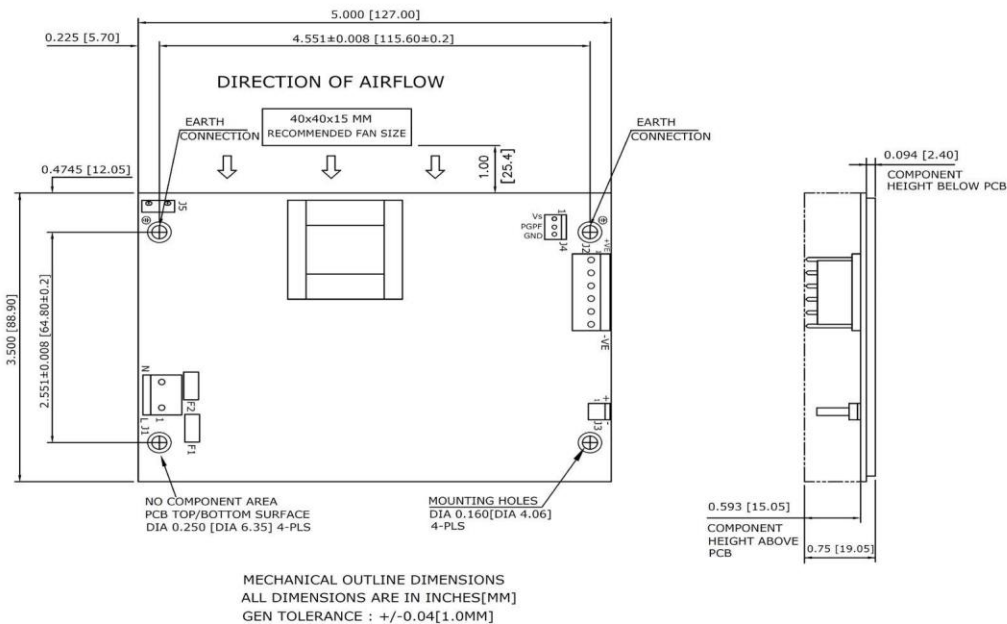
*Mechanical Drawing – Option 2 without PGPF*

**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.



*Mechanical Drawing – Option 1 with PGPF*

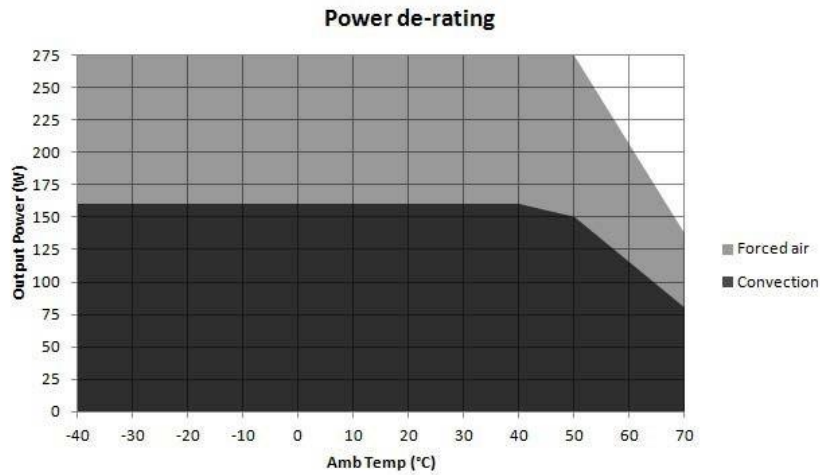


*Mechanical Drawing – Option 2 with PGPF*

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

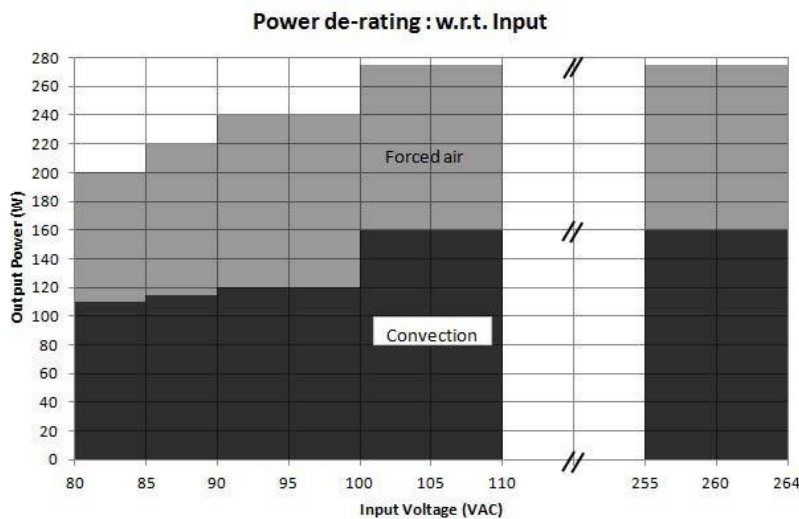
- 1 Stand off, used to mount PCB has OD of 5.4 mm max.
- 2 Screws, used to fix PCB on stand off, have head dia of 6.0 mm max.
- 3 Washer, if used, to have dia of 6.5 mm max.

## 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



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