MBC550 Series

Open Frame Power Supplies
Medical

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Please refer to exact equivalent product series
MWLC550

The MBC550 Series of open frame medical power supplies feature a wide universal AC input range of 90 – 264 VAC, offering up to 550 W of output power with forced air cooling, or 250 W with conduction cooling in a compact footprint, with a variety of isolated single output voltages.

The MBC series is designed and approved to the latest Medical standards (EN/IEC 60601-1) for Class I applications.

The MBC550 range is ideally suited to a wide variety of medical applications, and where airflow is limited or not available.

RoHS Compliant

Key Features & Benefits

- 5 x 3 x 1.5 Inch Form Factor
- Up to 550 Watts with Forced Air Cooling
- Efficiencies up to 92%
- -40 to 70°C Operating Temperature
- 12 V / 0.5 A Fan Output, Thermal Shut-Down Feature
- Approved to EN/IEC 60601-1
- Medical (BF) Safety Approvals
- MTBF >3 million hours as per Telcordia SR-332, Issue 3
- RoHS Compliant
- CE Marked

Applications

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

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1. MODEL SELECTION

MODEL NUMBER	VOLTAGE	MAX. LOAD (CONVECTION)	MAX. LOAD [1] (CONDUCTION)	MAX. LOAD (400 LFM)	POWER
MBC550-1T12	12 V	9.17 A	16.67 A	41.67 A	500 W
MBC550-1T15	15 V	7.33 A	13.33 A	33.33 A	500 W
MBC550-1T24	24 V	6.25 A	10.42 A	22.92 A	550 W
MBC550-1T30	30 V	5.00 A	8.33 A	18.33 A	550 W
MBC550-1T48	48 V	3.13 A	5.21 A	11.46 A	550 W
MBC550-1T58	58 V	2.59 A	4.31 A	9.48 A	550 W

[1] Refer to "Recommended Conduction Plate & Clearance" details on page 8.

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 115 VAC to 78% at 90 VAC)	90-264 VAC / 390 VDC
Input Frequency		47-63 Hz
Input Current	115 VAC: 230 VAC:	6 A max. 3 A max.
No Load Power	115 VAC: 230 VAC:	< 0.5 W < 0.7 W
Inrush Current	115 VAC: 230 VAC: 264 VAC:	25 A 45 A 75 A
Leakage Current	115 VAC: 230 VAC: Touch current	< 200 µA < 400 µA <100 µA
Power Factor	@ Full Load	> 0.95
Switching Frequency	PFC Resonant	70 to 130 KHz 68 to 80 KHz

3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Power [2]	Forced air cooled: Conduction cooled: Convection cooled:	up to 550 W up to 250 W up to 150 W
Efficiency (typical @ 230 VAC full load)	48 V: 24 V: 12 V, 15 V:	92% 91% 90%
Hold-up Time (typical)	Full Load Convection Load Conduction Load	> 16 ms > 55 ms > 30 ms
Line Regulation [4]		+/-0.5%
Load Regulation [4]		+/-1%
Minimum Load		0.0 A
Transient Response	50-100% step load change, at 0.1A/µs slew rate, 50% duty cycle, 50 Hz = 5%	 recovery time < 5 ms
Ripple [3, 4]	12 V & 15 V 24 V, 30 V, 48 V & 58 V	2.0 % max 1.0 % max
Output Voltage Adjustment		+/-3%
Rise Time	Typical	55 ms

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Set Point Tolerance [4]		+/-1%
Over Current Protection	Hiccup mode / Auto recovery	> 110%
Over Voltage Protection	Hiccup mode / Auto recovery	110 to 140%
Short Circuit Protection	Hiccup mode / Auto recovery	
Cooling	Convection Cooled (refer to Derating Curve) Conduction Cooled (refer to Derating Curve) 400 LFM Forced Air Cooled (refer to Derating Curve)	Up to 150 W max Up to 250 W max Up to 550 W max

[2] Combined output power of main output, fan supply shall not exceed max. Power rating.
[3] 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.
[4] Fan supply output voltage tolerance including set point accuracy, line and load regulation is +/-10 % and Ripple and noise is less than 10 %.

4. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature [5]	-40 to 0°C startup guaranteed, with spec deviation [6]	-40 to +70°C
Storage Temperature		-40 to +85°C
Relative Humidity	Non-condensing	5% to 95%
Altitude	Operating: Non-operating:	16,000 ft. 40,000 ft.

[5] Thermal shutdown feature: The power supply goes in hiccup mode when the temperature of PCB exceeds 110 °C (+/-10 °C).
[6] Output ripple can be more than 10% of the output voltage.

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

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6. SAFETY SPECIFICATIONS

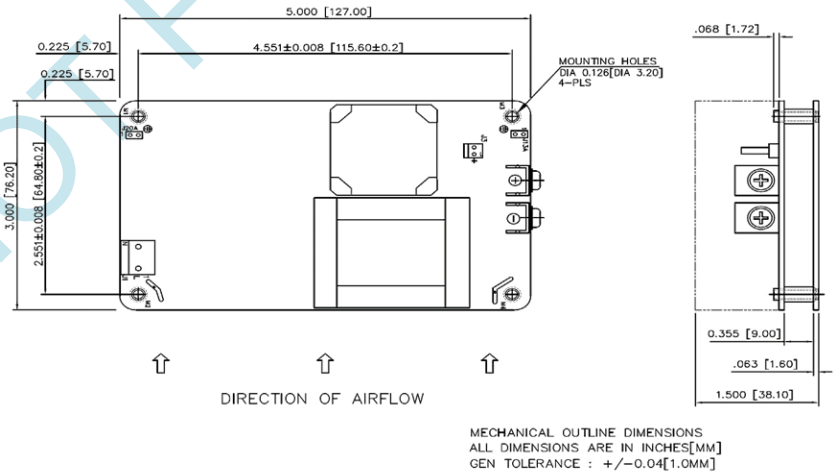
PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (for medical applications) Input to GND: Output to GND: for type BF for type B	4000 VAC 1500 VAC 1500 VAC 500 VAC
Safety Standard(s)	UL /CSA : ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) AMD1:2012; CORR1:2009; AMD2:2010, (CAN/CSA-C22.2 No. 60601-1 (2008)CAN/CSA C22.2 No. 60601-1:14 IEC : IEC 60601-1: 2005 + CORR. 1:2006 + CORR. 2:2007 + AM1:2012(or IEC 60601-1: 2012 reprint) EN : EN 60601-1:2006;A1	
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 Pin 2 Pin 3	AC Line Not Fitted AC Neutral	JST : B3P-VH-B(LF)(SN) or equivalent Mating: VHR-3M or equivalent Pins : SVH-41T-P1.1 or equivalent
DC Output Connector (Screw Terminal)	J2	Pin 1 Pin 2	V1 +VE V1 -VE	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 11A only. Use multiple tongue terminals with wire for more current.
Aux (Fan) Output	J3	Pin 1 Pin 2	FAN +VE FAN -VE	AMP: 640456-2 Mating: 640440-2
Earth	J4			Molex: 19705-4301 Mating: 19003-0001

8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION
Weight	approx. 500 g
Dimensions	127 x 76.2 x 38.1 mm (5 x 3 x 1.5 inches)



Mechanical Drawing

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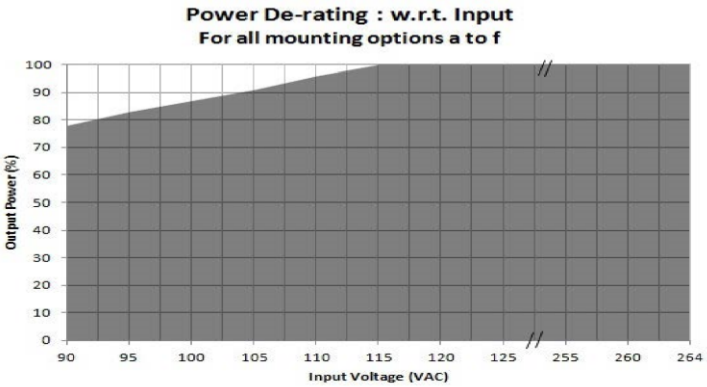
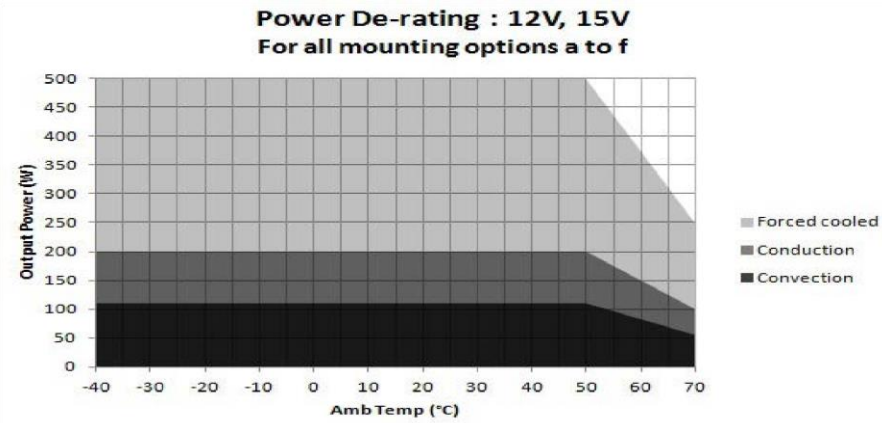
DERATING CURVES



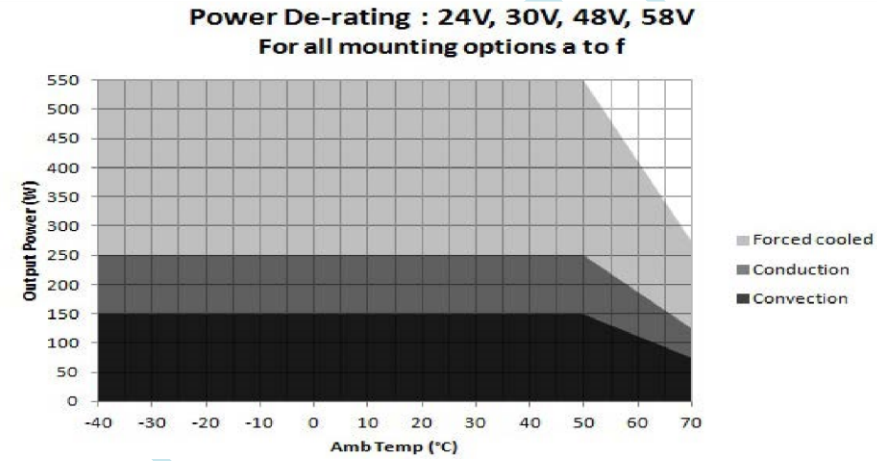
De-rate linearly from 100% at 110 VAC to 78% at 90 VAC



Convection load: 110 W up to 50 °C
De-rate above 50 °C @ 2.5% per °C

Conduction load: 200 W up to 50 °C
De-rate above 50 °C @ 2.5% per °C

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



Convection load: 150 W up to 50 °C
De-rate above 50 °C @ 2.5% per °C

Conduction load: 250 W up to 50 °C
De-rate above 50 °C @ 2.5% per °C

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

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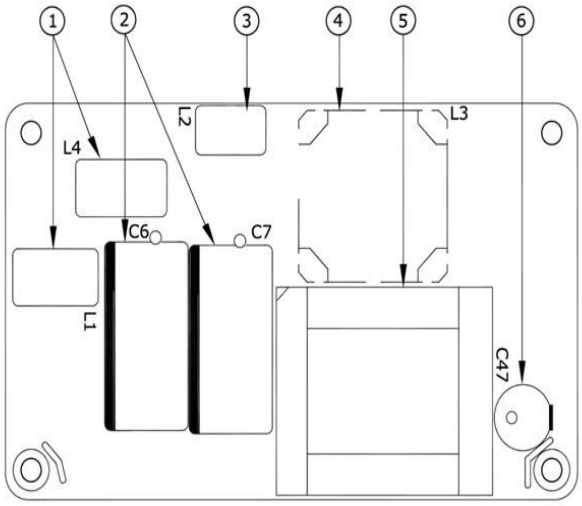
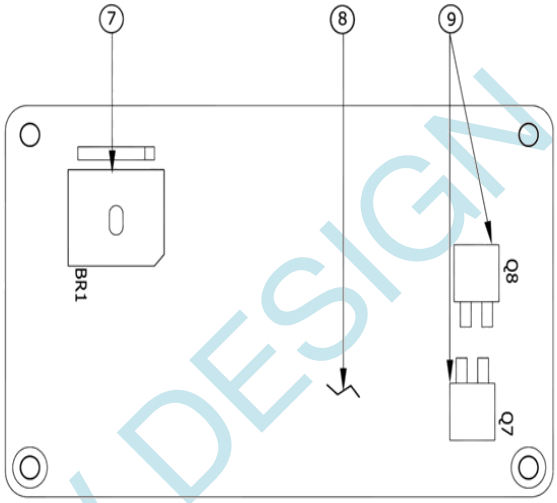
MAXIMUM OPERATING TEMPERATURE

For reliable and safe operation, please make sure the maximum component temperatures given in table below is not exceeded.



TOP PCB



BOTTOM PCB

INDENT NO	DESCRIPTION	MAXIMUM TEMP. ALLOWED (°C)
1	Common mode chokes	95
2	Input Bulk Capacitors	90
3	Differential choke	110
4	Boost Choke	110
5	Output Transformer	125 (for 12 V & 15 V) 110 (for 24 V, 30 V,48 V,58 V)
6	Output Capacitor	90
7	Bridge Rectifier	120
8	Aluminum Clad PCB	105
9	Output Rectifiers	110

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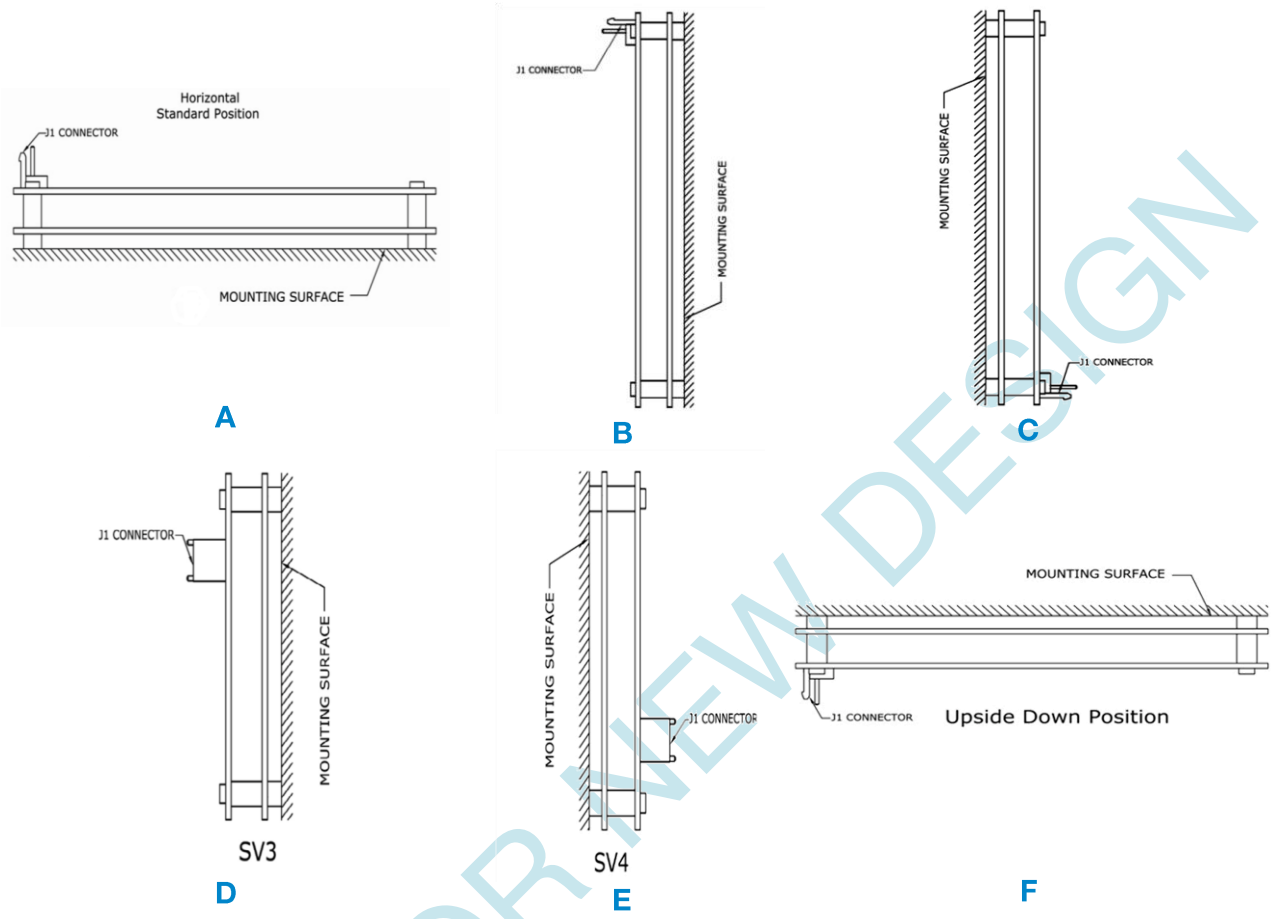
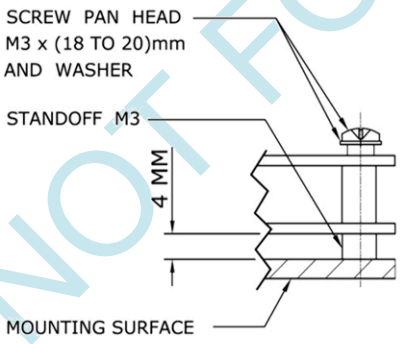
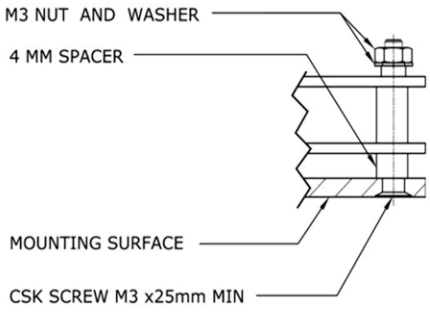
MOUNTING OPTIONS





FIXING OPTION - 1



FIXING OPTION - 2

Figure 2. Mounting Options

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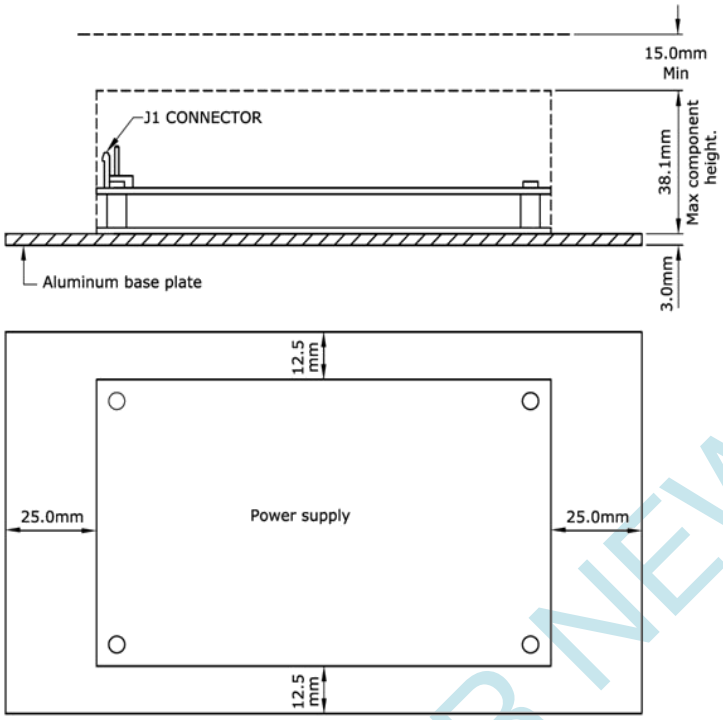
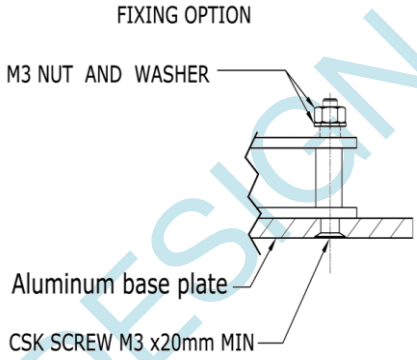
RECOMMENDED CONDUCTION PLATE & CLEARANCE

Conduction power rating mentioned in the table is with additional aluminum base plate of 3 mm thickness with 177.8 mm (7 in) length & 101.6 mm (4 in) width.

Clearance of minimum 15 mm above the component height is recommended for better thermal management.





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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.