

# MBC550 Series

## Open Frame Power Supplies

### Medical

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



#### 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
- Approval to EN60601 3rd Edition (Pending)
- Medical (BF) Safety Approvals
- RoHS Compliant
- CE Marked

#### Applications

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

## 1. MODEL SELECTION

MODEL NUMBER	VOLTAGE	MAX. LOAD (CONVECTION)	MAX. LOAD (CONDUCTION)	MAX. LOAD (400 LFM)	MIN. LOAD	RIPPLE & NOISE <sup>1</sup>
MBC550-1T12	12 V	9.17 A	16.67 A	41.67 A	0.0 A	2%
MBC550-1T15	15 V	7.33 A	13.33 A	33.33 A	0.0 A	2%
MBC550-1T24	24 V	6.25 A	10.42 A	22.92 A	0.0 A	1%
MBC550-1T30	30 V	5.00 A	8.33 A	18.33 A	0.0 A	1%
MBC550-1T48	48 V	3.13 A	5.21 A	11.46 A	0.0 A	1%
MBC550-1T58	58 V	2.59 A	4.31 A	9.48 A	0.0 A	1%

<sup>1</sup> Ripple is peak to peak with 20 MHz bandwidth and 10  $\mu$ F (Tantalum capacitor) in parallel with a 0.1  $\mu$ F capacitor at rated line voltage and load ranges. Output ripple can be more than 10% of the output voltage.

## 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:	6.0 A max. 3.0 A max.
No Load Power	Typical	TBD
Inrush Current	115 VAC: 230 VAC: 264 VAC:	25 A 45 A 75 A
Leakage Current	Typical Touch current	500 $\mu$ A <100 $\mu$ A
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 <sup>2</sup>	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 > 30ms
Line Regulation		+/-0.5%
Load Regulation		+/-1%
Transient Response	50-100% step load change, at 0.1A/ $\mu$ S slew rate, 50% duty cycle, 50 Hz = 5%	recovery time < 5 ms
Voltage Adjustment		+/-3%
Rise Time	Typical	55 ms
Set Point Tolerance		+/-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	

<sup>2</sup> Combined output power of main output, fan supply shall not exceed max. Power rating.

<sup>3</sup> 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 <sup>4</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.
Reliability		TBD

<sup>4</sup> Thermal shutdown feature: The power supply goes in hiccup mode when the temperature of Substrate PCB exceeds 110 °C (+/-10 °C).

#### 5. EMC SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Conducted Emissions	EN55022-B, CISPR22-B, FCC PART15 – B	
Static Discharge	EN61000-4-2:	Level-3
RF Field Susceptibility	EN61000-4-3:	Level-3
Fast Transients/Bursts	EN61000-4-4:	Level-3
Radiated Emissions		Level A
Surge Susceptibility	EN61000-4-5:	Level-3
Harmonic Current	EN61000-3-2:	Class D

#### 6. SAFETY SPECIFICATIONS

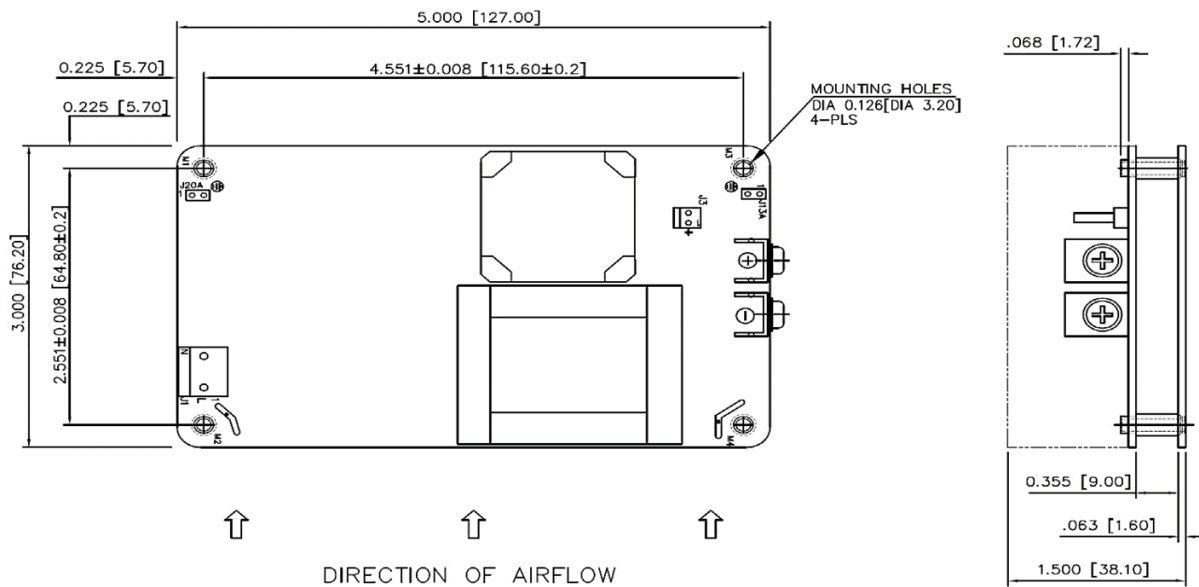
PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (for medical applications) Input to GND: Output to GND: for type BF for type B	4000 VAC 1500 VAC 1500 VAC 500 VAC
Safety Standard(s)	Approved to the latest edition of the following standards: CSA/UL60601-1, EN60601-1, IEC60601-1, ANSI / AAMI ES 60601-1.	
Agency Approvals	Nemko, UL, C-UL	Pending Approval
CE mark	Complies with LVD Directive	

### 7. CONNECTOR & PIN DESCRIPTION

CONNECTOR	PIN	DESCRIPTION / CONDITION	MANUFACTURER / PN
AC Input Connector	J1	Pin 1 AC Line Pin 2 Not Fitted Pin 3 AC Neutral	TE Connectivity : 1-1123723-3 Mating: 1-1123722-3; Pins: 1318912-2
DC Output Connector (Screw Terminal)	J2	Pin 1 V1 +VE Pin 2 V1 -VE	6-32 inch screw pan head Mating Connector: Ring Tongue Terminal, AMP 8-31886-1, wire size: 16 AWG max. Note: It is recommended to use only one Ring Tongue Terminal (16 AWG) for current up to 11 A. Use multiple tongue terminals with wire for more current.
Aux (Fan) Output	J3	Pin 1 FAN +VE Pin 2 FAN -VE	AMP: 640456-2 Mating: 640440-2
Earth	J4		Molex: 19705-4301 Mating: 19003-0001

### 8. MECHANICAL SPECIFICATIONS

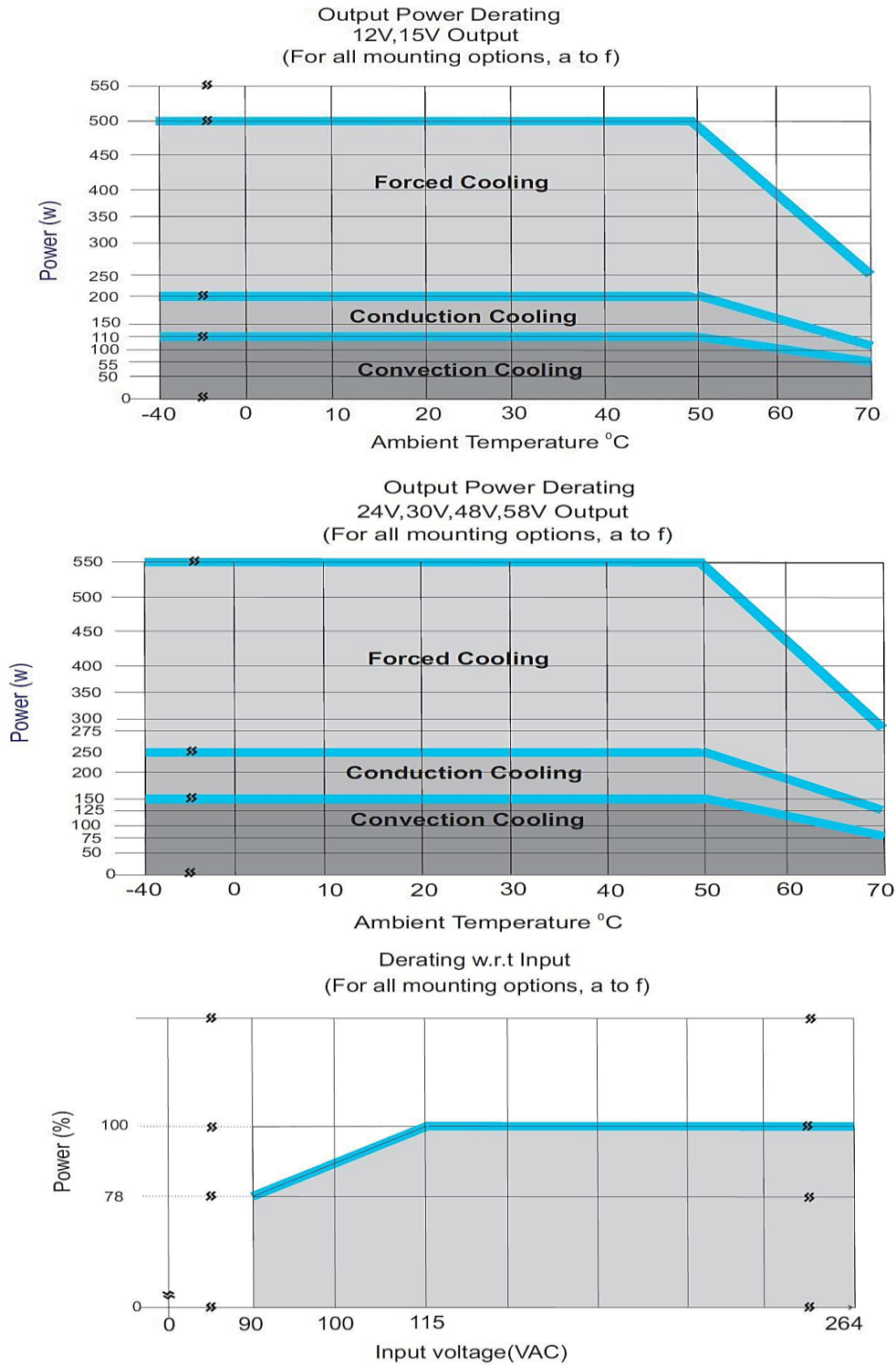
PARAMETER	DESCRIPTION / CONDITION
Weight	approx. 500 g
Dimensions	127 x 76.2 x 38.1 mm (5 x 3 x 1.5 inches)



MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN INCHES[MM]  
GEN TOLERANCE : +/-0.04[1.0MM]

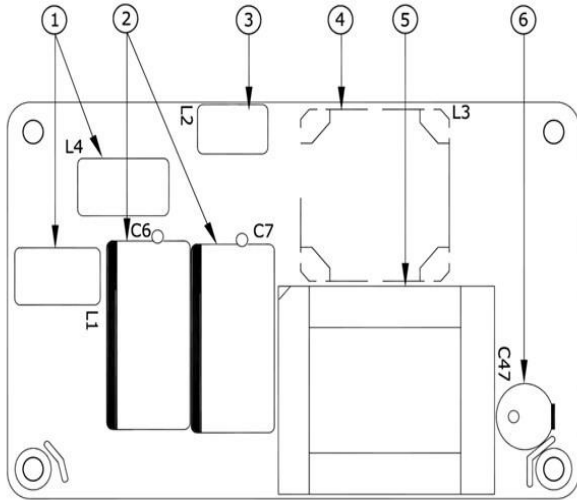
Mechanical Drawing

## DERATING CURVES

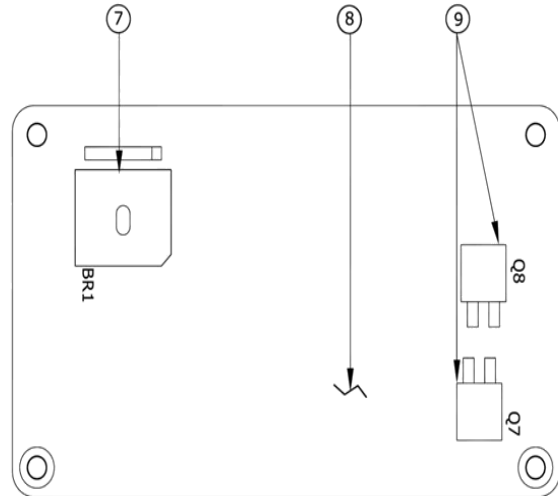


## MAXIMUM OPERATING TEMPERATURE

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

## MOUNTING OPTIONS

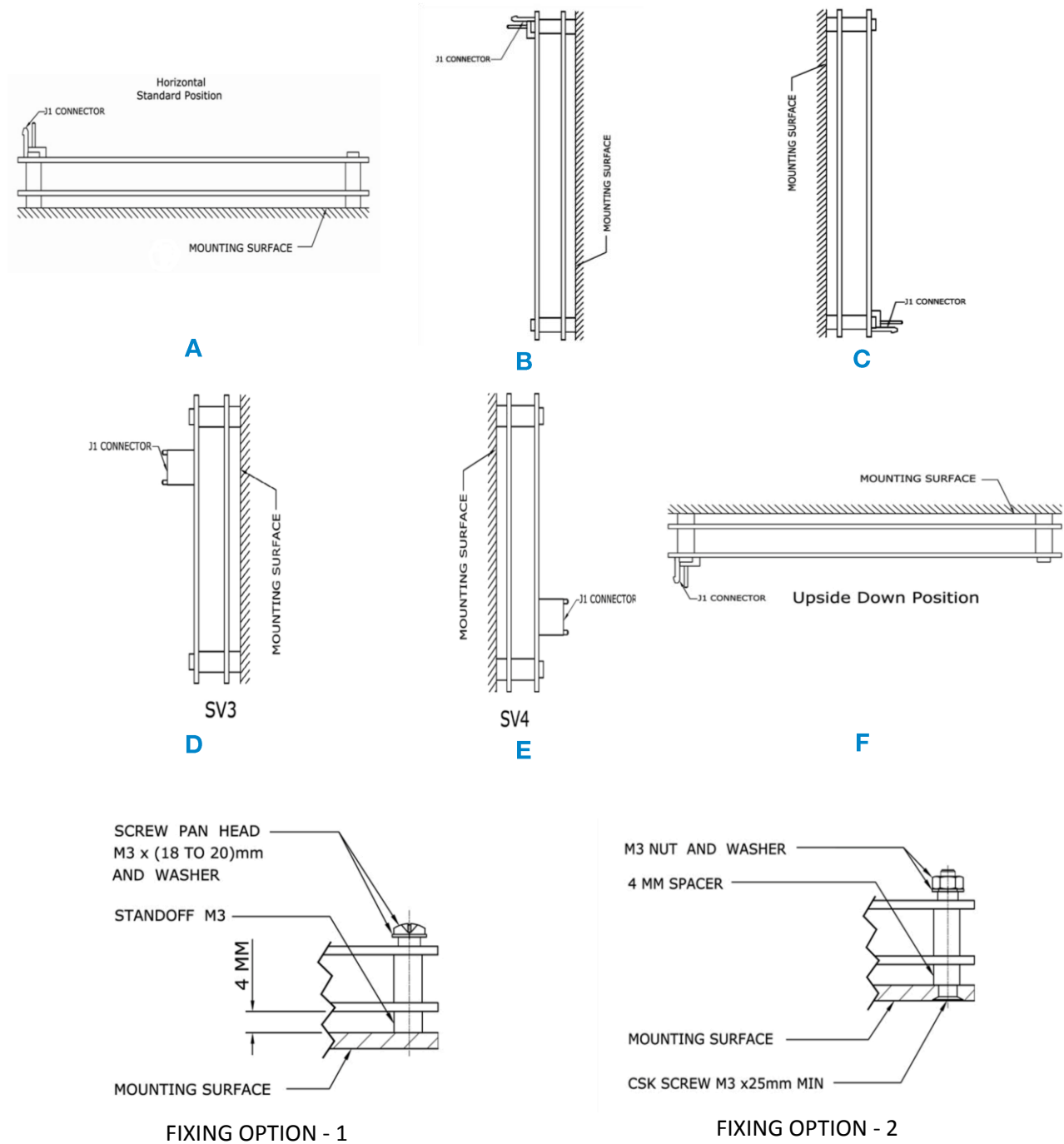
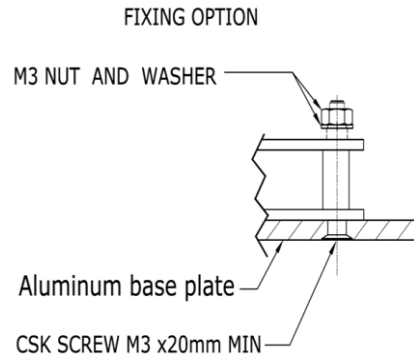
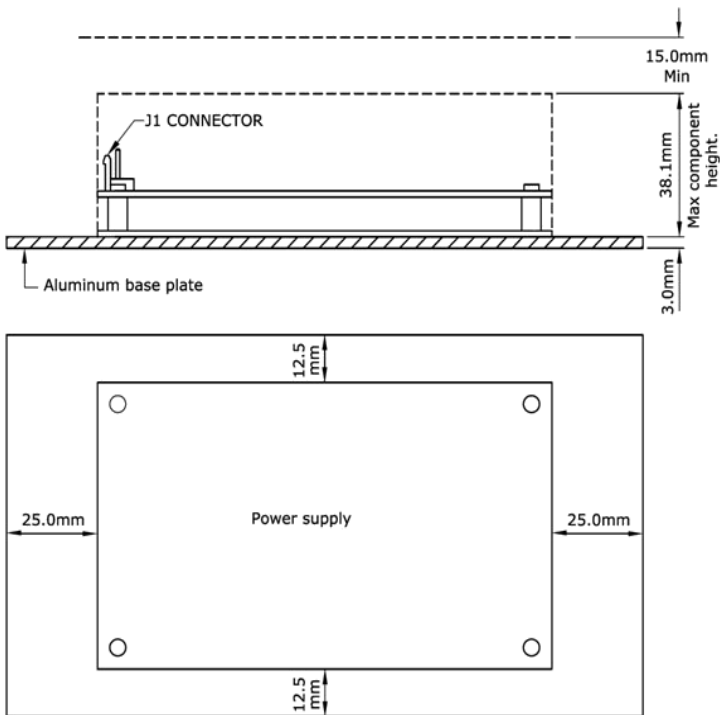


Figure 2. Mounting Options

## RECOMMENDED CONDUCTION PLATE & CLEARANCE

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

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



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