MB120S

120W Single Output
Medical Series

Features

- **2” x 4” x 1.25” Package, Ideal for 1U Applications**
- **10-year Life design with Premium E-Caps**
- **100 Watts convection cooled**
- **Class B Conducted and Radiated EMI performance**
- **BF Isolation Type Rated**
- **Designed to meet new IEC 60601-1-2 4th Edition EMC requirements**
- **[Approvable] to AAMI ES/CSA C22.2 /EN/IEC60601-1 3rd Edition**
- **2 x MOPP Isolation**
- **<0.5 W Standby Power**
- **3 Year Warranty**

Description

A superior performance 120 Watt AC to DC power supply designed for next generation medical applications. Feature rich and highly efficient, MB120 product family can easily fit in a 1U chassis and provides 100 Watts of convection power. Input & output and internal temperature monitoring/alarms are features of the MB120 family. All models are CE marked to low voltage directive and approved to AAMI ES/CSA C22.2 No./EN/IEC60601-1, 3rd edition. The design takes into consideration the pending international release of the new IEC 60601-1-2, 4th Edition EMC requirements[1]. With low leakage current performance, the power supplies are BF rated.

Model Selection

Model Number[2]	Volts	Output Current		Efficiency[4]	Ripple & Noise[5]	Initial Set Point	Total Load Regulation	OVP Threshold
		200 LFM Airflow	Convection					
MB120S12K01	12V	10.0A	8.3A	92%	1%	± 2%	± 1%	14.4 ± 1.2V
MB120S15K01	15V	8.0A	6.6A	93%	1%	± 2%	± 1%	18 ± 1.5V
MB120S18K01	18V	6.6A	5.5A	94%	1%	± 2%	± 1%	21.6 ± 1.8V
MB120S24K01	24V	5.0A	4.1A	94%	1%	± 2%	± 1%	28.8 ± 2.4V

Notes:

1) Power supply is tested according to Table 9 – Test Specification for Enclosure Port Immunity for Professional and Home Health care.
2) Part number suffix to include “K” for Class-1 AC input
4) Efficiency, Typical at 230Vac, 25°C. See Charts below for load conditions.
5) Measured at 25C using 6 inch twisted pair wires with noise probe directly across output terminals, and load terminated with 0.1µF ceramic and 10µF low ESR capacitors.

General Specifications

AC Input	80-264Vac, single phase, 47 – 63 Hz. (Safety Approved to 90-264Vac). Start up voltage for full power is 90Vac, power derates at 85Vac, see table below.	**Hold-up Time**	20mS min. from loss of AC input , full load, 25°C.
Input Current	2.0A at 115Vac, 1A at 230Vac	**Over Load Protection (OCP)**	115% - 180% of rated output current value. Hiccup Mode, Auto-recovery
Inrush Current	40Arms Maximum within a half line cycle, cold start at 25C, 230Vac See application note.	**Short Circuit Protection (SCP)**	Short across the output terminals will not cause damage to the unit. Hiccup Mode , Auto-recovery
Input Fuses	3.15A, 250Vac, line and neutral inputs	**Over Voltage Protection (OVP)**	Latches off when output voltage is with range as shown in table. Requires AC Power cycle to reset
Earth Leakage Current	< 150 µA@264Vac, 60Hz input, NC <300 µA@264Vac, 60Hz input, SFC	**Over Temperature Protection (OTP)**	Power shuts down at temperature of 70℃ (typical) at full load, without forced air. Hiccup Mode , Auto-recovery
Patient Leakage Current (Output to Earth)	<90 µA@264Vac, 60 Hz input, NC, also suitable for BF rating	**Output Reverse Voltage Protection**	Outputs protected against momentary reverse current less than 20A peak for less than 10mS with 0.5A average. Sustained reverse current at high levels may damage unit.
No Load Input Power	<0.5W	**Isolation**	Input-Output: 4000Vac, 2 x MOPP Input-Ground: 1500Vac, 1 x MOPP Output-Ground: 1500Vac, 1 x MOPP
Efficiency	92% - 94% typical at 120/240Vac, 25°C. See chart for additional details	**Turn-On & Operating Temperature**	-10°C to +70°C. Turn on Temperature = -20°C at >=115Vac, allowing 30 seconds with 50-100% load for stabilization.
Output Power	120W with 200 LFM airflow cooling, 100W convection cooling, -10C to 50°C ambient. Power derates by 50% from 50C to 70C. See chart below.	**Storage Temperature**	-40°C to +85°C
Transient Response	500µS typ. response time for return to within 1% of final value for 25%-75%-25% load change	**Altitude**	Operating: -500m to 3000m Non-operating: -500 to 40,000 feet
Ripple and Noise	1% pk-pk	**Relative Humidity**	5% to 95%, non-condensing
Output Voltage	12V to 24Vdc. See models chart for part numbering.	**Shock (IEC 60068-2-27)**	Operating: Half-sine shock waveform. Impact Acceleration: 20g, Pulse duration: 11mS. Cycles: 3 times per axis in X,Y, Z direction Non-Operating: Half-sine shock waveform. Impact Acceleration: 40g, Pulse duration: 6mS Cycles: 3 times per direction on 3 axes (X,Y. Z)
Voltage Adjustability	No voltage adjust potentiometer for higher reliability	**Vibration (IEC 60068-2-6) (IEC 60068-2-64)**	Operating: Sinusoidal Frequency: 10-500Hz, Impact Acceleration: 1g, Sweep rate: 1 octave/min Cycles: 10 times per axis in X, Y, Z direction Random Vibration: Operating: $0.003g^2$/Hz, 1.224grms overall, 3 axes, 10 min per axis, 1-500Hz. Non-Operating: $0.02g^2$/Hz, 3.1grms overall, 3 axes, 1 hour per axis, 20-500 Hz
Turn On Time	1 Second at 115Vac.	**MTBF**	572,500 hours @ 115/230Vac, 25°C Telcordia, Issue 3, Ground Benign.
Rise Time	<30mS, Typical (Load dependent)	**E-Cap Life**	>10 Years in use condition of 40°C ambient, at 12h/day, 261 days/year. Additional information on other use profiles available on request.

General Specifications (continued)

Overshoot	<4% overshoot at turn-on, <1% overshoot at turn-off, under all conditions.	**IPC 610**	Class 2
		Safety Standards	IEC 60601-1, 3rd Edition ANSI/AAMI ES60601-1 (2008) CAN/CSA – C22.2 No 60601-1 (2005) DEMKO EN60601-1:2006 Designed to meet China Safety Doc. No. GB4943.1-2011 at 3Km, Tropical Standard at 40°C, 93% RH at 120 hours.
Total Load Regulation	±1.0 % for all models.	**Weight**	225g, typical
Minimum Load	Not required.	**Dimensions**	W: 2.0" x L: 4.0" x H: 1.25" W: 50.8mm x L: 101.6mm x H: 31.8mm

EMI/EMC Compliance

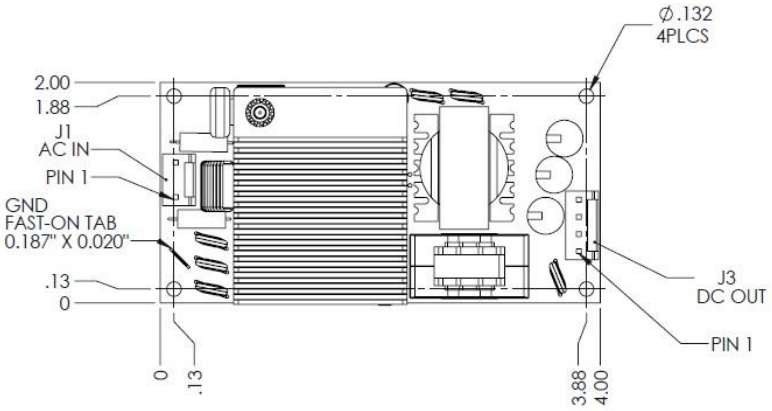
Conducted Emissions	EN55011/22: Class B, FCC Part 15. Class B: 6db margin typical
Radiated Emissions	EN55011/22: Class B, FCC Part 15. Class B: 3db margin typical
Harmonic Current Emissions	IEC61000-3-2: Class A
Voltage Fluctuations & Flicker	IEC 61000-3-3
Electro Static Discharge Immunity	IEC61000-4-2: Level 4, 8kV Contact Discharge, 15kV air discharge, Criteria A. Also meets proposed IEC60601-1-2, 4th edition, Table 9
Radiated RF EM Fields Susceptibility	IEC61000-4-3: Level 3, 10V/m, Criteria A. 80MHz-1000 MHz and 3V/m 1.4Ghz to 2.7 GHz. 80% AM at 1kHz. Also meets proposed IEC60601-1-2, 4th edition, Table 9
Proximity Fields from RF wireless communications Equipment	[IEC60601-1-2: 4th edition, Table 9
Rated Power Frequency magnetic fields	IEC61000-4-8: Level 5, 30A/m, 50/60 Hz
Electrical Fast Transients /Bursts	IEC61000-4-4: Level 3, 2KV, 100Khz rep rate, 40A (PS Output), Criteria A Also meets proposed IEC60601-1-2, 4th edition standard, Table 5 & 6.
Surges Line to Line (DM) and Line to Ground (CM)	IEC61000-4-5: Level 3, +/-1kV DM, +/-2kV CM, Criteria A Also meets proposed IEC60601-1-2, 4th edition standard, Table 5.
Conducted Disturbances induced by RF Fields	IEC61000-4-6: 3V/m & 10 V/m – 0.15 to 80Mhz and 10V/m in ISM and amateur radio bands between 0.15 MHz and 80 MHz, 80% AM at 1 KHz Also meets proposed IEC60601-1-2, 4th edition standard, Table 5 & 6 & 8.
Rated Power Frequency Magnetic Fields Test	IEC61000-4-8: Level 4 (30A/m), Criteria A Also meets proposed IEC60601-1-2, 4th edition standard, Table 9 enclosure port.
Voltage Dips	IEC61000-4-11: 100% dip for 10mS, at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°, Criteria A; 60% dip for 100mS, Criteria B; 30% dip for 500mS (25/30 cycles) 1∅, and 0° for 500mS, Criteria A. Also meets proposed IEC60601-1-2, 4th edition standard, Table 5.
Enclosure Port Immunity to RF wireless communications equipment	IEC61000-4-3

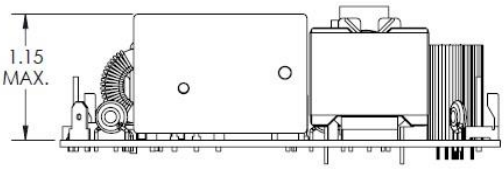
Notes: Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:
A – Normal performance during and after the test
B – Temporary degradation, self-recoverable
C – Temporary degradation, operator intervention required to recover the operation
D – Permanent damage

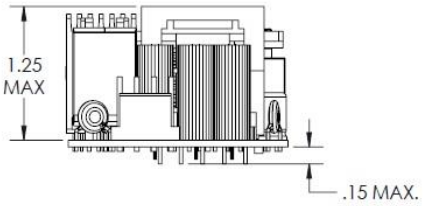
Isolation Specifications

Parameter	Conditions/Description	Min	Nom	Max	Units
Insulation Safety Rating	Input/Ground Input/Output Output/Ground		1 MOPP 2 MOPP 1 MOPP		
Electric Strength Test Voltage	Input/Ground Input/Output Output/Ground	1500 4000 1500	-	-	Vac Vac Vac

Mechanical Drawing



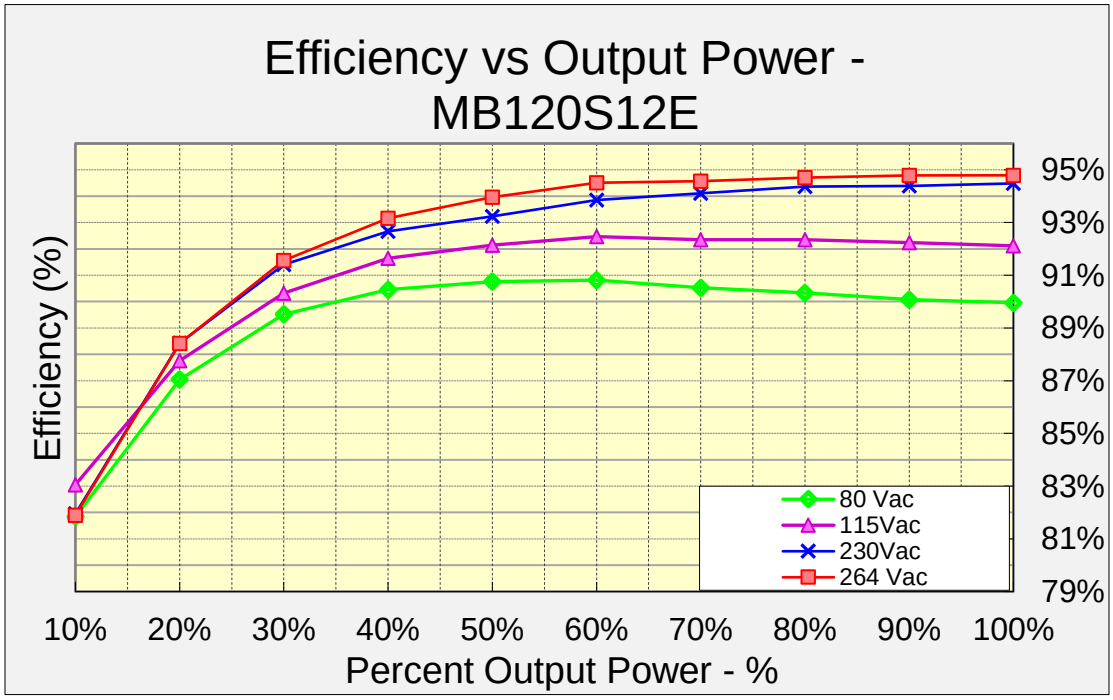




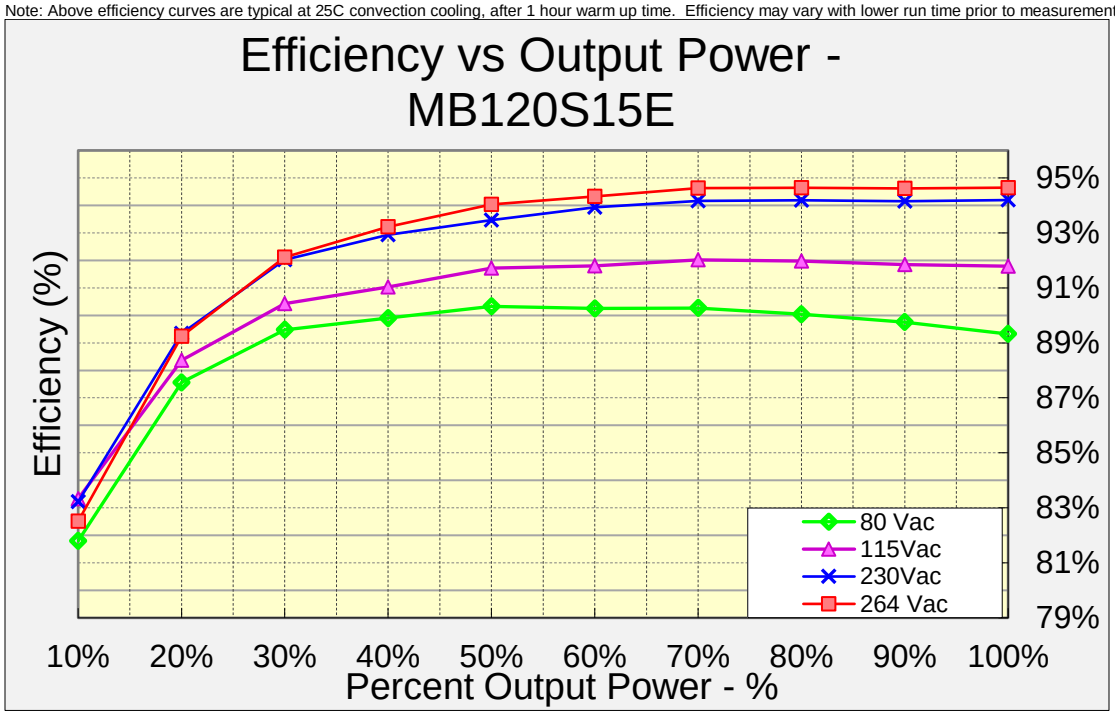
Connector Information

CONNECTOR INFORMATION						
INPUT	CONN.	PIN#	ASSIGNMENT	CONNECTOR	MATING CONNECTOR	MATING PIN
	J1	1	LINE	TE-CONNECTIVITY 641937-1	TE CONNECTIVITY 640250-3	TE CONNECTIVITY 640252-2
		2	NEUTRAL			
OUTPUT	J3	1	DC OUTPUT	TE-CONNECTIVITY 640445-4	TE CONNECTIVITY 640250-4	TE CONNECTIVITY 640252-2
		2	RETURN			
		3	DC OUTPUT			
		4				

Efficiency Information



Note: Above efficiency curves are typical at 25C convection cooling, after 1 hour warm up time. Efficiency may vary with lower run time prior to measurement.



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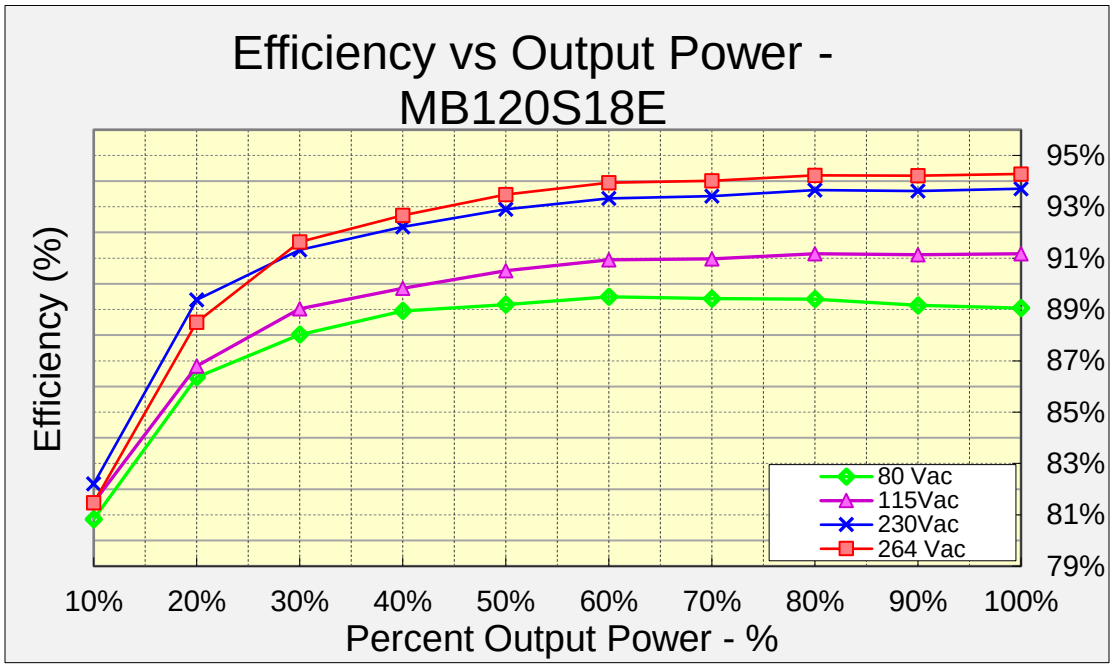

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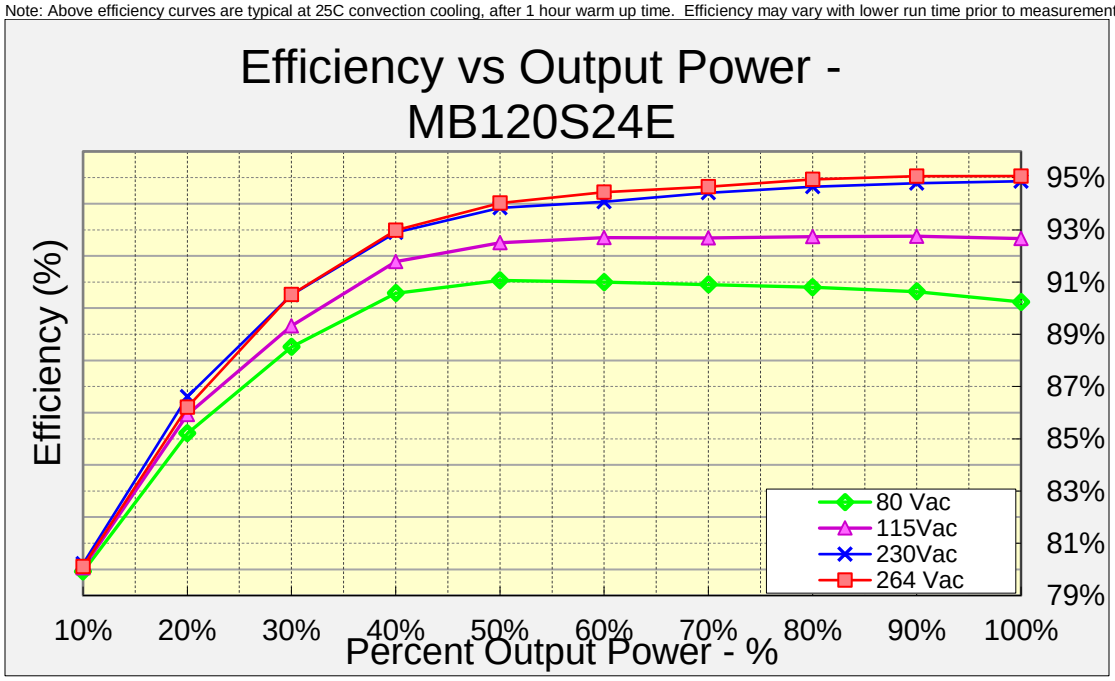

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Power Derating Information