



### FEATURES AND BENEFITS



2" x 4" x 1.25" Package, Ideal for 1U Applications

10-Year Life Design with Premium E-Caps

Designed to Meet New IEC 60601-1-2 4<sup>th</sup> Edition EMC Requirements

2 x MOPP Isolation

100 Watts Convection Cooled

<0.5 W Standby Power

Class B Conducted and Radiated EMI Performance

3 Year Warranty

BF Isolation Type Rated

Certified to UL/CSA/ IEC/ EN60601-1 3<sup>rd</sup> Edition

Class I and Class II Input Versions Available



### MODEL SELECTION

| Model Number <sup>2</sup> | Volts | Output Current  |            | Efficiency <sup>4</sup> | Ripple & Noise <sup>5</sup> | Initial Set Point | Total Load Regulation | OVP Threshold |
|---------------------------|-------|-----------------|------------|-------------------------|-----------------------------|-------------------|-----------------------|---------------|
|                           |       | 200 LFM Airflow | Convection |                         |                             |                   |                       |               |
| MB120S12K01               | 12V   | 10.0A           | 8.3A       | 92%                     | 1%                          | ±2%               | ±1%                   | 14.4V ±1.2V   |
| MB120S15K01               | 15V   | 8.0A            | 6.6A       | 93%                     | 1%                          | ±2%               | ±1%                   | 18V ±1.5V     |
| MB120S18K01               | 18V   | 6.6A            | 5.5A       | 94%                     | 1%                          | ±2%               | ±1%                   | 21.6V ±1.8V   |
| MB120S24K01               | 24V   | 5.0A            | 4.1A       | 94%                     | 1%                          | ±2%               | ±1%                   | 28.8V ±2.4V   |
| MB120S12C01               | 12V   | 10.0A           | 8.3A       | 92%                     | 1%                          | ±2%               | ±1%                   | 14.4V ±1.2V   |
| MB120S15C01               | 15V   | 8.0A            | 6.6A       | 93%                     | 1%                          | ±2%               | ±1%                   | 18V ±1.5V     |
| MB120S18C01               | 18V   | 6.6A            | 5.5A       | 94%                     | 1%                          | ±2%               | ±1%                   | 21.6V ±1.8V   |
| MB120S24C01               | 24V   | 5.0A            | 4.1A       | 94%                     | 1%                          | ±2%               | ±1%                   | 28.8V ±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. Replace the “K” in the part number to “C” for Class II input.
3. Efficiency, typical at 230VAC, 25°C. See charts below for load conditions.
4. Measured at 25°C 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.



### INPUT

|   |  |
|---|--|
| AC Input                                  | 80VAC–264VAC, single phase, 47Hz–63Hz. (Safety Approved to 90VAC–264VAC). Start up voltage for full power is 90VAC, power derates at 85VAC, see table below. |
| Input Current                             | 2.0A at 115VAC, 1A at 230VAC   |
| Inrush Current                            | 40 Arms Maximum within a half line cycle, cold start at 25°C, 230VAC. See application note.  |
| Input Fuses                               | 3.15A, 250VAC, line and neutral inputs   |
| Earth Leakage Current                     | <150 $\mu$ A@264VAC, 60Hz input, NC<br><300 $\mu$ A@264VAC, 60Hz input, SFC  |
| Patient Leakage Current (Output to Earth) | <90 $\mu$ A@264VAC, 60 Hz input, NC, also suitable for BF rating   |
| Efficiency                                | 92%–94% typical at 120VAC/240VAC, 25°C. See chart for additional details.  |
| No Load Input Power                       | <0.5W  |

### ISOLATION

|           |  |
|-----------|--|
| Isolation | Input-Output: 4000VAC, 2 x MOPP<br>Input-Ground: 1500VAC, 1 x MOPP (Class I only)<br>Output-Ground: 1500VAC, 1 x MOPP (Class I only) |
|-----------|--|

### RELIABILITY

|            |  |
|------------|--|
| MTBF       | 572,500 hours @ 115VAC/230VAC, 25°C Telcordia, Issue 3, Ground Benign  |
| E-Cap Life | >10 years in use condition of 40°C ambient, at 12 hours/day, 261 days/year. Additional information on other use profiles available on request. |

### PROTECTION

|                                   |  |
|-----------------------------------|--|
| Overvoltage Protection            | Latches off when output voltage is with range as shown in table. Requires AC Power cycle to reset.   |
| Short Circuit Protection          | Short across the output terminals will not cause damage to the unit. Hiccup Mode, Auto-recovery.   |
| Overtemperature Protection        | Power shuts down at temperature of 70°C (typical) at full load, without forced air. Hiccup Mode, Auto-recovery.  |
| Overload Protection               | 115%–180% of rated output current value. Hiccup Mode, Auto-recovery.   |
| 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. |

### OUTPUT

|                                 |   |
|---------------------------------|---|
| Output Voltage                  | 12V to 24VDC.<br>See models chart for part numbering.   |
| Output Power                    | 120W with 200 LFM airflow cooling, 100W convection cooling, -10°C to 50°C ambient. Power derates by 50% from 50°C to 70°C. See chart below. |
| Turn On Time                    | 1 second at 115VAC  |
| Hold-up Time                    | 20mS min. from loss of AC input, full load, 25°C  |
| Rise Time                       | <30mS, Typical (Load dependent)   |
| Ripple and Noise                | 1% pk-pk  |
| Total Load Regulation           | $\pm$ 1.0% for all models   |
| Minimum Load                    | Not required  |
| Turn-On & Operating Temperature | -10°C to +70°C.<br>Turn on Temperature = -20°C at $\geq$ 115VAC, allowing 30 seconds with 50%–100% load for stabilization.                  |
| Transient Response              | 500 $\mu$ S typ. response time for return to within 1% of final value for 25%–75%–25% load change   |
| Voltage Adjustment Range        | No voltage adjust potentiometer for higher reliability  |
| IPC 610                         | Class II  |

### SAFETY

|                  |   |
|------------------|---|
| Safety Standards | IEC 60601-1 3 <sup>rd</sup> Edition<br>ANSI/AAMI ES60601-1 (2008)<br>CAN/CSA - C22.2 No 60601-1 (2005)<br>DEMKO EN60601-1:2006<br>Designed to meet China Safety Doc. No. GB4943.1-2011 at 3Km, Tropical Standard at 40°C, 93% RH at 120 hours |
|------------------|---|



### ENVIRONMENT

|                        |   |
|------------------------|---|
| Relative Humidity      | 5% to 95%, non-condensing   |
| Weight                 | 225g, typical   |
| Dimensions             | W: 2.0" x L: 4.0" x H: 1.25"<br>W: 50.8mm x L: 101.6mm x H: 31.8mm  |
| Altitude               | Operating: -500m to 3000m<br>Non-operating: -500 feet to 40,000 feet  |
| Storage Temperature    | -40°C to +85°C  |
| Vibration              | Operating: Sinusoidal Frequency: 10–500Hz, Impact Acceleration: 1g, Sweep rate: 1 octave/min<br>Cycles: 10 times per axis in X, Y, Z direction<br>Random Vibration:<br>Operating: 0.003 g <sup>2</sup> /Hz, 1.224 grams overall, 3 axes, 10 min/axis, 1Hz–500Hz.<br>Non-Operating: 0.02g <sup>2</sup> /Hz, 3.1 grams overall, 3 axes, 1 hour/axis, 20Hz–500Hz |
| Shock (IEC 60068-2-27) | Operating: Half-sine shock waveform. Impact Acceleration: 20g, Pulse duration: 11mS.<br>Cycles: 3 times per axis in X,Y, Z direction<br>Non-Operating: Half-sine shock waveform. Impact Acceleration: 40g, Pulse duration: 6mS<br>Cycles: 3 times per direction on 3 axes (X,Y, Z)  |

#### Notes:

Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:

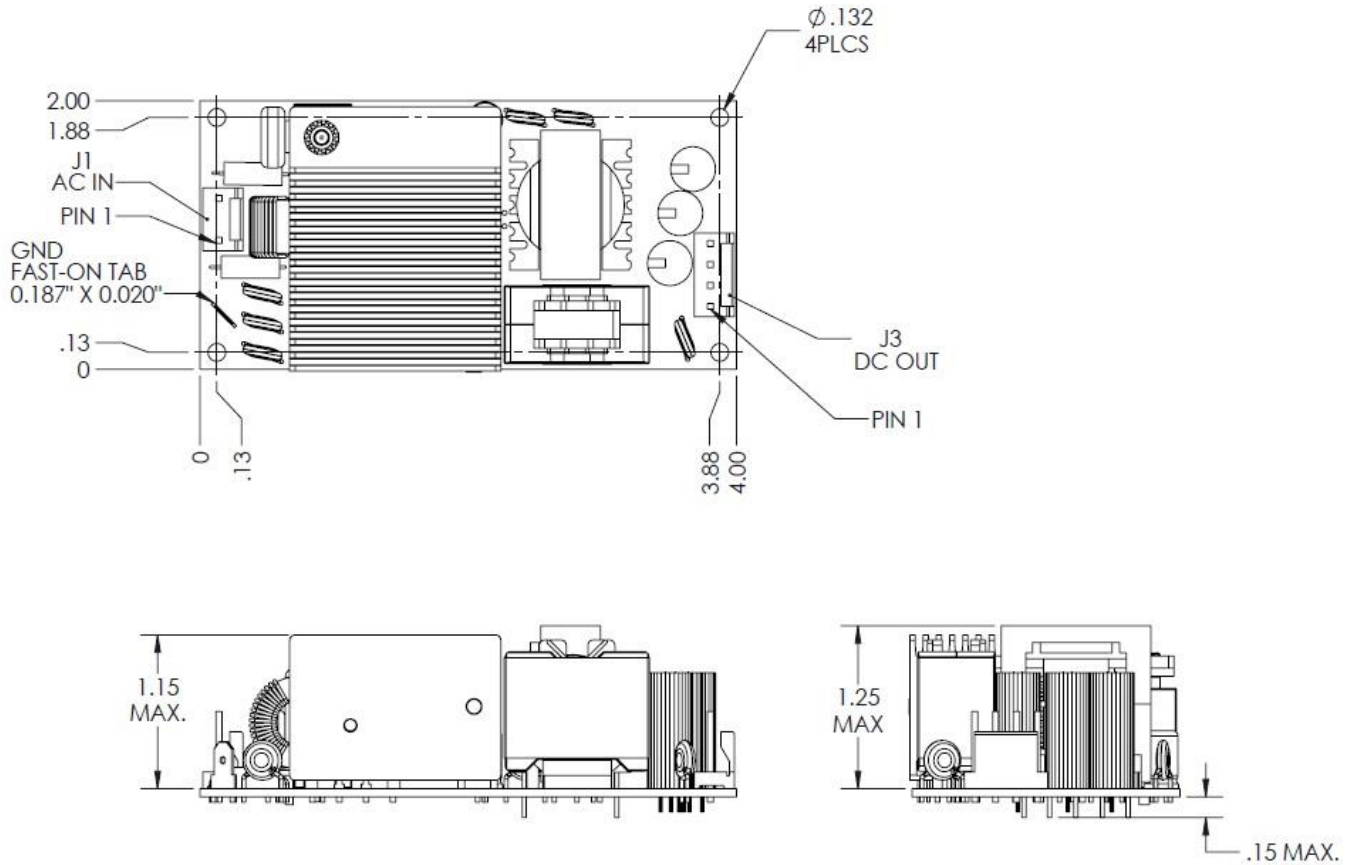
- A – Normal performance during and after the test
- B – Temporary degradation, self-recoverable
- C – Temporary degradation, operator intervention required to recover the operation
- D – Permanent damage

### EMI/EMC COMPLIANCE

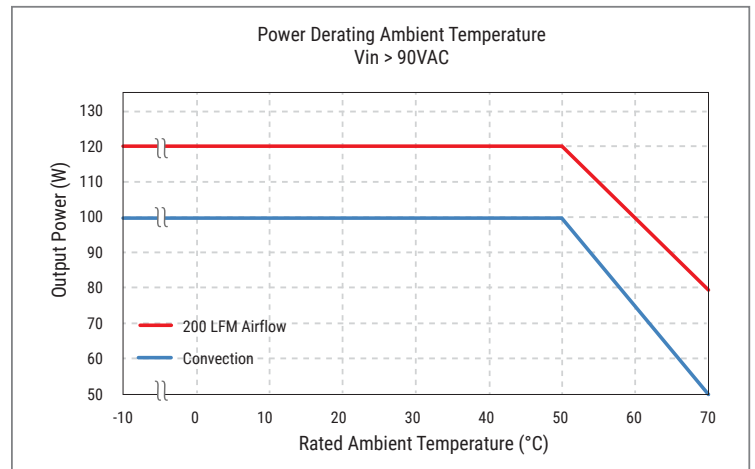
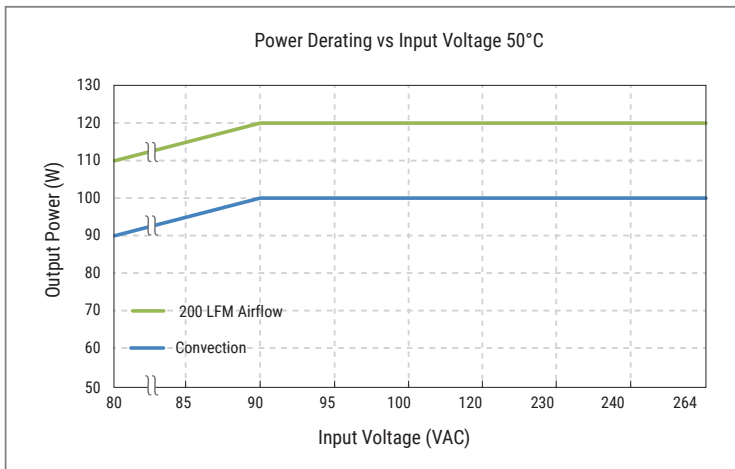
|   |   |
|---|---|
| Conducted Emissions   | EN55011/22: Class B, FCC Part 15. Class B: 6db margin typical   |
| Radiated Emissions  | EN55011/22: Class B, FCC Part 15. Class B: 3db margin typical   |
| Harmonic Current Emissions                                      | IEC61000-3-2: Class A   |
| Voltage Fluctuations & Flicker                                  | IEC 61000-3-3   |
| Electro Static Discharge Immunity                               | IEC61000-4-2: Level 4, 8kV Contact Discharge, 15kV air discharge, Criteria A.<br>Also meets proposed IEC60601-1-2 4 <sup>th</sup> Edition, Table 9  |
| Radiated RF EM Fields Susceptibility                            | IEC61000-4-3: Level 3, 10V/m, Criteria A.<br>80MHz-1000MHz and 3V/m 1.4Ghz to 2.7GHz.<br>80% AM at 1kHz. Also meets proposed IEC60601-1-2 4 <sup>th</sup> Edition, Table 9  |
| Proximity Fields from RF wireless communications Equipment      | IEC60601-1-2 4 <sup>th</sup> Edition, Table 9   |
| Rated Power Frequency magnetic fields                           | IEC61000-4-8 Level 5, 30A/m, 50/60Hz  |
| Electrical Fast Transients / Bursts                             | IEC61000-4-4: Level 3, 2KV, 100Khz rep rate, 40A (PS Output), Criteria A<br>Also meets proposed IEC60601-1-2 4 <sup>th</sup> 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<br>Also meets proposed IEC60601-1-2 4 <sup>th</sup> Edition standard, Table 5.  |
| Conducted Disturbances induced by RF Fields                     | IEC61000-4-6: 3V/m– 0.15 to 80Mhz and 6V/m in ISM bands between 0.15MHz and 80 MHz. 80% AM at 1KHz.   |
| Rated Power Frequency Magnetic Fields Test                      | IEC61000-4-8: Level 4 (30A/m), Criteria A<br>Also meets proposed IEC60601-1-2 4 <sup>th</sup> 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) 1Ø, and 0° for 500mS, Criteria A. Also meets proposed IEC60601-1-2 4 <sup>th</sup> Edition standard, Table 5. |
| Enclosure Port Immunity to RF wireless communications equipment | IEC61000-4-3  |



### MECHANICAL DRAWING

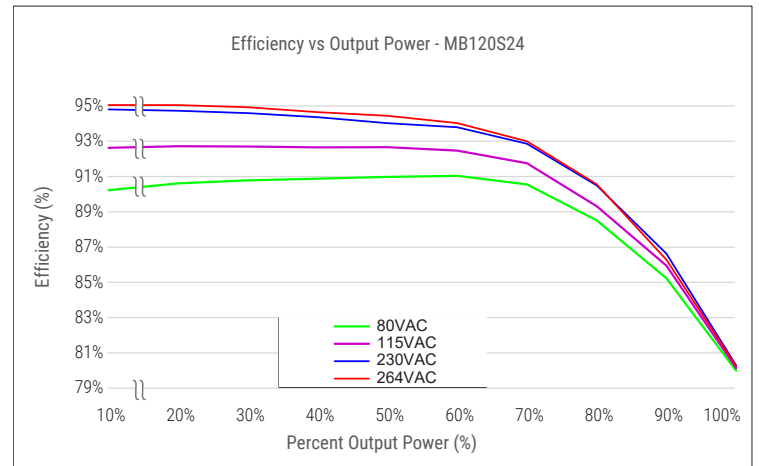
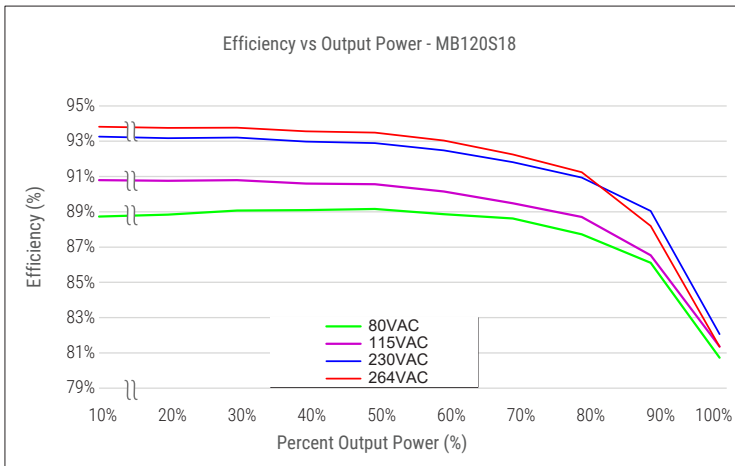
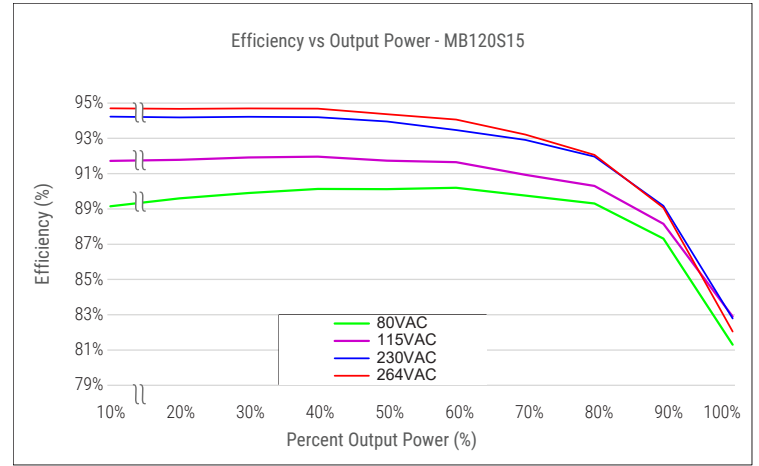
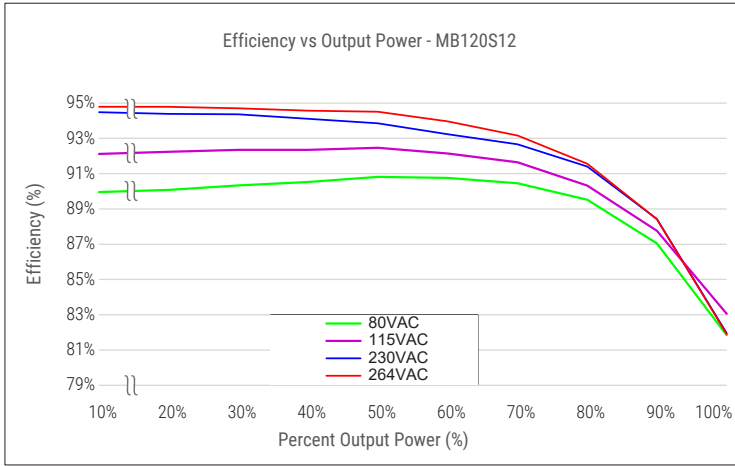


### DERATING CURVES





### EFFICIENCY INFORMATION



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

### CONNECTOR INFORMATION

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