



PROTEK POWER

# PM60 Medical Power Supplies (37.5-64W)

## Features:

- BF Class insulation
- Medical and ITE approvals
- Compact size 2" x 4" x 1.18"
- Single, dual and triple outputs
- Wide-range input 90-264 VAC
- Low earth leakage current
- Level B emissions
- RoHS compliant
- Suitable for both Class I and Class II applications\*



## Description:

The PM60 series of compact, open PCB constructed, AC-DC switching power supplies are capable of delivering 37.5-64 watts of continuous output power at convection cooling. They operate at 90-264 VAC input voltage without the need of voltage selection, and are suited for medical, information technology and industrial applications. Approval to both EN60601-1 and EN60950-1 safety standards improves design-in time and reduces end equipment compliance costs.

| Model <sup>1</sup> | Output #1 |              |                            |                                    |      | Output #2 |              |              |      | Output #3 |              |              |      | Max. Output Power |
|--------------------|-----------|--------------|----------------------------|------------------------------------|------|-----------|--------------|--------------|------|-----------|--------------|--------------|------|-------------------|
|                    | V1        | Min. Current | Max. Current at convection | Max. Current At 5 CFM <sup>2</sup> | Tol. | V2        | Min. Current | Max. Current | Tol. | V3        | Min. Current | Max. Current | Tol. |                   |
| PM60-10A           | 5V        | 0A           | 11A                        | 11A                                | ±2%  | N/A       |              |              |      | N/A       |              |              |      | 55W               |
| PM60-12A           | 12V       | 0A           | 5A                         | 5A                                 | ±2%  | N/A       |              |              |      | N/A       |              |              |      | 60W               |
| PM60-13A           | 15V       | 0A           | 4.3A                       | 4.3A                               | ±2%  | N/A       |              |              |      | N/A       |              |              |      | 64W               |
| PM60-14A           | 24V       | 0A           | 2.7A                       | 2.7A                               | ±2%  | N/A       |              |              |      | N/A       |              |              |      | 64W               |
| PM60-18A           | 48V       | 0A           | 1.35A                      | 11A                                | ±2%  | N/A       |              |              |      | N/A       |              |              |      | 64W               |
| PM60-23A           | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 12V       | 0.1A         | 3A           | ±5%  | N/A       |              |              |      | 55W               |
| PM60-25A           | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 24V       | 0.1A         | 1.5A         | ±5%  | N/A       |              |              |      | 55W               |
| PM60-31A           | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 12V       | 0.1A         | 3A           | ±5%  | -12V      | 0A           | 0.5A         | ±4%  | 55W               |
| PM60-31-3A         | 3.3V      | 0.5A         | 6A                         | 8A                                 | ±3%  | 5.2V      | 0.1A         | 3A           | ±5%  | 12V       | 0A           | 0.5A         | ±4%  | 37.5W             |
| PM60-31-5A         | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 3.3V      | 0A           | 1.5A         | ±5%  | 12V       | 0A           | 0.5A         | ±4%  | 37.5W/<br>47.5 W  |
| PM60-32A           | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 15V       | 0.1A         | 2.4A         | ±5%  | -15V      | 0A           | 0.5A         | ±4%  | 55W               |
| PM60-39A           | 5V        | 0.5A         | 6A                         | 8A                                 | ±3%  | 24V       | 0.1A         | 1.5A         | ±5%  | -12V      | 0A           | 0.5A         | ±4%  | 55W               |

### Notes:

1. Safety approvals are for PCB form only. To order unit with cover fitted, change suffix "A" to "C".
2. Maximum current of output #1 of multi-output models can be 8 A at 5 CFM forced air provided by user.
3. PM60-31-5A is rated at 37.5 W maximum at convection cooling or 47.5 W maximum at 5 CFM forced air cooling by user.
4. The output voltages of a multiple output model may go outside of the stated tolerance when an output load current is out of stated limits. All models may be operated at no-load without damage.
5. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.



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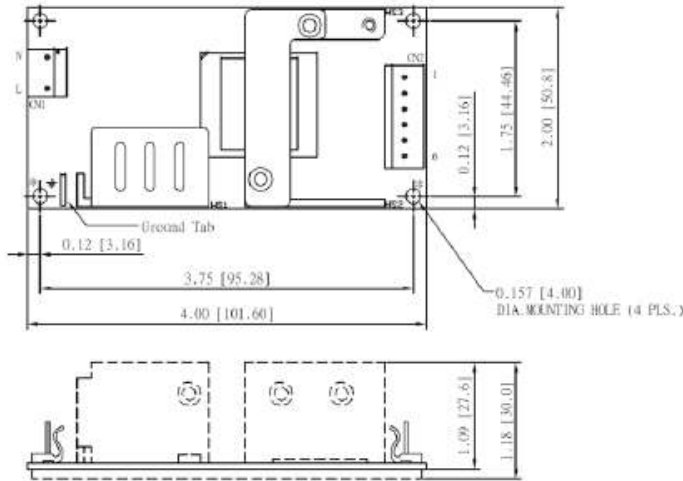
| Specifications  |  |
|---|--|
| Safety Standards & EMC Specifications   |  |
| Safety Standard Approvals   | UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020<br>TÜV EN 60601-1<br>UL 62368-1, CSA C22.2 No. 62368-1<br>TÜV EN 62368-1   |
| EMI Standard  | EN55011/EN55022, FCC, and VCCI Class B (radiated and conducted)  |
| EMC Performance   | EN61000-3-2: Harmonic distortion, Class A and D<br>EN61000-3-3: Line flicker<br>EN61000-4-2: ESD, $\pm 15$ KV air and $\pm 8$ KV contact<br>EN61000-4-3: Radiated immunity, 10V/m<br>EN61000-4-4: Fast transient/burst, $\pm 2$ KV<br>EN61000-4-5: Surge, $\pm 1$ KV diff., $\pm 2$ KV com.<br>EN61000-4-6: Conducted immunity, 10Vrms<br>EN61000-4-8: Magnetic field immunity, 30 A/m<br>EN61000-4-11: Voltage dip immunity, 30% reduction for 500ms, and 100% reduction for 10ms |
| *Consult with TT Electronics for information on additional country safety approvals |  |
| Input Specifications  |  |
| Input Voltage Range   | 90 to 264VAC   |
| Input Frequency Range   | 47 to 63Hz   |
| Input Current   | 1.3A (rms) @100VAC, 60 Hz<br>0.7A (rms) @240VAC, 50 Hz   |
| Earth Leakage Current   | 150 $\mu$ A max. @ 264VAC, 63Hz  |
| Touch Current   | 100 $\mu$ A max. @ 264 VAC, 63Hz   |
| Output Specifications   |  |
| Ripple & Noise  | 100 mV peak to peak on 3.3 V & 5.0 V models, 1% peak to peak on other models   |
| Overvoltage Protection  | Provided on output #1 only; set at 112-132% of its nominal output voltage  |
| Overcurrent Protection  | All outputs protected to short circuit conditions  |
| Temperature Coefficient   | All outputs $\pm 0.04\%$ /°C maximum   |
| Transient Response  | Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 $\mu$ s after a 25% step load change   |
| Environmental Specifications  |  |
| Operating Temperature   | -10°C to +70°C   |
| Storage Temperature   | -40°C to +85°C   |
| Relative Humidity   | 5% to 95% non-condensing   |
| Temperature Derating  | De-rate from 100% at +50°C linearly to 50% at +70°C  |
| General Specifications  |  |
| Switching Frequency   | 62 K $\pm 5$ KHz   |
| Efficiency  | 80-88% typical except PM60-31-3A and PM60-31-5 A at 75% typical  |
| Hold-up Time  | 12ms minimum at 110 VAC  |
| Line Regulation   | $\pm 0.5\%$ maximum at full load   |
| Inrush Current  | 30A @ 115VAC or 60A @ 230VAC at 25°C cold start  |
| Withstand Voltage   | 4000 VAC from input to output (2 MOPP)<br>1500 VAC from input to ground (1 MOPP)<br>1500 VAC from output to ground   |
| MTBF  | 400,000 hours at full load at 25°C ambient, calculated per MIL-HDBK-217F   |



# PM60 Medical Power Supplies (37.5-64W)

## Diagrams

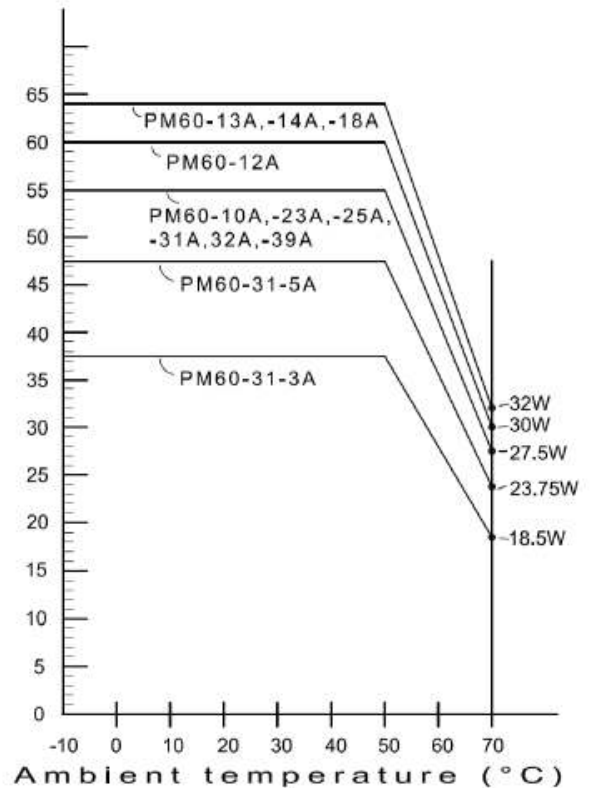
### MECHANICAL SPECIFICATIONS



#### NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector CN1: Molex header 09-65-2038 or equivalent, mating with Molex housing 09-50-1031 or equivalent.
4. Connector CN2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. Ground tab is 0.25 [6.35] x 0.032 [0.8] fast-on connector.
6. To ensure compliance with level B emissions, connect the two "\*" marked mounting holes with metallic standoffs to chassis.
7. Weight: 205 grams (0.45 lbs.) approx.

### OUTPUT POWER DERATING CURVE



### PIN CHART

| MODEL \ PIN |            |          | 1   | 2   | 3             | 4         | 5    | 6    |
|-------------|------------|----------|-----|-----|---------------|-----------|------|------|
| PM60-10A    | PM60-12A   | PM60-13A | +V1 | +V1 | V1 Return     | V1 Return | N.C. | N.C. |
| PM60-14A    | PM60-18A   |          |     |     |               |           |      |      |
| PM60-23A    | PM60-25A   |          | V1  | V1  | Common Return |           | N.C. | V2   |
| PM60-31A    | PM60-32A   | PM60-39A | V1  | V1  | Common Return |           | V3   | V2   |
| PM60-31-3A  | PM60-31-5A |          | V1  | V1  | Common Return |           | V3   | V2   |