

DESCRIPTION

The PM650 series comprising single and multiple output models for 650-700 watts of continuous output power is specially designed for medical and ITE applications. They operate at 90-264 VAC input voltage without the need of a selector strap. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing.

FEATURES

- EN61000-3-2 class A and D compliant
- Power Factor 0.98 typical
- Overvoltage protection
- Short-circuit protection
- Thermal protection
- Power Fail Detect (PFD) signal
- 100% burn-in at full rated load
- Remote sense on output #1 and output #2
- Remote inhibit – TTL high to disable output
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

| | |
|------------------------|---|
| Input voltage: | 90-264 VAC |
| Input frequency: | 47-63 Hz |
| Input current: | 10 A (rms) for 115 VAC 5 A (rms) for 230 VAC |
| Earth leakage current: | 240 µA max. @ 264 VAC, 63 Hz |
| Touch current: | 100 µA max. @ 264 VAC, 63 Hz |

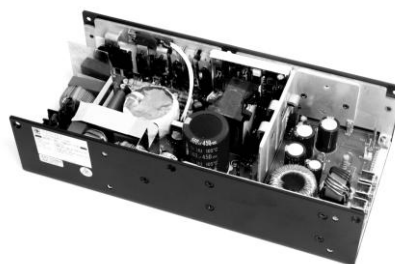
OUTPUT SPECIFICATIONS

| | |
|--------------------------|---|
| Output voltage/current: | See rating chart. |
| Maximum output power: | See rating chart. |
| Ripple and noise: | 2% peak to peak maximum on 3.3 V & 5.1 V and 1% peak to peak maximum on other voltage outputs |
| Overvoltage protection: | Provided on output #1 only; set at 115-140% 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 µs after a 25% step load change |
| Fan power: | 12 V at 400 mA maximum for B version, 12 V at 100 mA maximum for C version |

INTERFACE SIGNALS

| | |
|----------|---|
| PFD: | TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 output is within regulation. |
| Inhibit: | Requires an external TTL high level signal to inhibit outputs for standard models |

PM650 SERIES



RoHS

SAFETY STANDARD APPROVALS



UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020



TÜV EN 60601-1



UL 60950-1, CSA C22.2 No. 60950-1



TÜV EN 60950-1

ENVIRONMENTAL SPECIFICATIONS

| | |
|------------------------|---|
| Operating temperature: | 0°C to +70°C |
| Storage temperature: | -40°C to +85°C |
| Relative humidity: | 5% to 95% non-condensing |
| Derating: | Derate from 100% at +50°C, linearly to 50% at +70°C |

GENERAL SPECIFICATIONS

| | |
|----------------------|---|
| Switching frequency: | 70 KHz ± 10 KHz |
| Power factor: | 0.98 typical |
| Efficiency: | 80% minimum on all models |
| Hold-up time: | 12 ms minimum at 110 VAC |
| Line regulation: | $\pm 0.2\%$ maximum at full load |
| Inrush current: | 50 A @ 115 VAC or 100 A @ 230 VAC at 25°C cold start |
| Withstand voltage: | 5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) |
| MTBF: | 300,000 hours minimum at full load at 25°C ambient, calculated per MIL-HDBK-217F |

EMC Performance (IEC60601-1-2:2014)

| | |
|---------------|--|
| EN55011: | Class B conducted, Class A radiated |
| EN61000-3-2: | Harmonic distortion, Class A and D |
| EN61000-3-3: | Line flicker |
| EN61000-4-2: | ESD, ± 15 KV air and ± 8 KV contact |
| EN61000-4-3: | Radiated immunity, 10 V/m |
| EN61000-4-4: | Fast transient/burst, ± 2 KV |
| EN61000-4-5: | Surge, ± 1 KV diff., ± 2 KV com |
| EN61000-4-6: | Conducted immunity, 10 Vrms |
| EN61000-4-8: | Magnetic field immunity, 30 A/m |
| EN61000-4-11: | Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms |

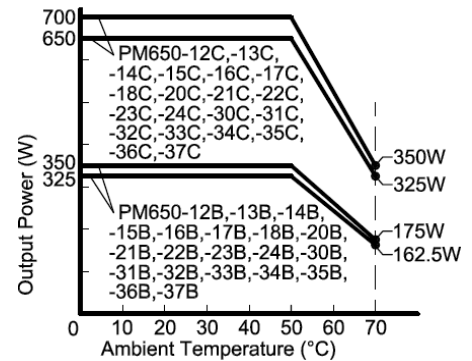
OUTPUT VOLTAGE/CURRENT RATING CHART

| Model ⁽¹⁾ | Output #1 ⁽³⁾⁽⁵⁾ | | | | Output #2 ⁽⁵⁾ | | | | Output #3 ⁽⁴⁾ | | | | Max. Output Power ⁽⁵⁾ |
|----------------------|-----------------------------|--------|--------|------|--------------------------|-------|-------|------|--------------------------|-------|-------|------|----------------------------------|
| | V1 | Imin. | Imax. | Tol. | V2 | Imin. | Imax. | Tol. | V3 | Imin. | Imax. | Tol. | |
| PM650-12B | 12 V | 0 A | 54.2 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-13B | 15 V | 0 A | 43.4 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-14B | 24 V | 0 A | 27.1 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-15B | 27 V | 0 A | 24.1 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-16B | 30 V | 0 A | 21.7 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-17B | 36 V | 0 A | 18.1 A | ±2% | (N/A) | | | | (N/A) | | | | 325 W /650 W |
| PM650-18B | 48 V | 0 A | 14.6 A | ±2% | (N/A) | | | | (N/A) | | | | 350 W /700 W |
| PM650-20B | 24 V | 1.50 A | 18.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | (N/A) | | | | 325 W /650 W |
| PM650-21B | 24 V | 1.50 A | 18.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | (N/A) | | | | 325 W /650 W |
| PM650-22B | 48 V | 0.75 A | 9.0 A | ±2% | 24 V | 0.6 A | 12 A | ±5% | (N/A) | | | | 325 W /650 W |
| PM650-23B | 48 V | 0.75 A | 9.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | (N/A) | | | | 325 W /650 W |
| PM650-24B | 48 V | 0.75 A | 9.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | (N/A) | | | | 325 W /650 W |
| PM650-30B | 24 V | 1.50 A | 18.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | 3.3 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-31B | 24 V | 1.50 A | 18.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | 3.3 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-32B | 24 V | 1.50 A | 18.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | 5.1 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-33B | 24 V | 1.50 A | 18.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | 5.1 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-34B | 48 V | 0.75 A | 9.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | 3.3 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-35B | 48 V | 0.75 A | 9.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | 3.3 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-36B | 48 V | 0.75 A | 9.0 A | ±2% | 12 V | 1.2 A | 22 A | ±5% | 5.1 V | 0 A | 10 A | ±3% | 325 W /650 W |
| PM650-37B | 48 V | 0.75 A | 9.0 A | ±2% | 15 V | 1.0 A | 18 A | ±5% | 5.1 V | 0 A | 10 A | ±3% | 325 W /650 W |

NOTES:

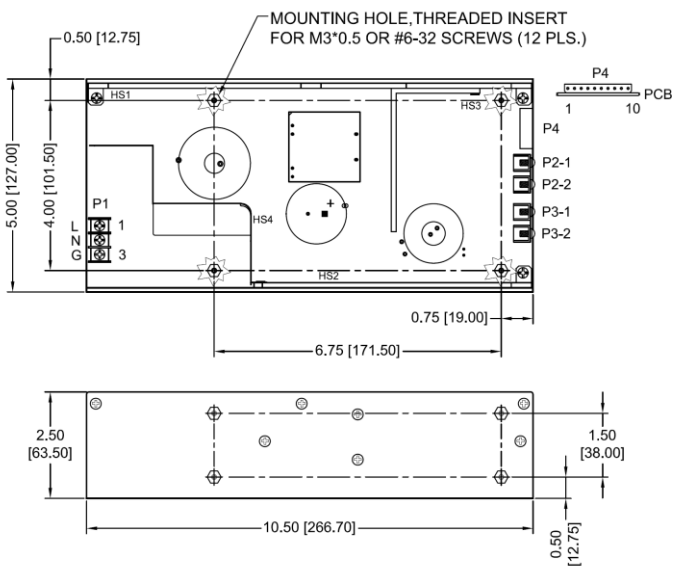
- Suffix "B" in model numbers denotes U-bracket form. Change "B" to "C" for enclosed form with cover and fan assembly, e.g. PM650-14C.
- All outputs are floating. They can be connected externally for positive or negative output.
- Output #1 can be adjusted within +/-5% of their nominal voltage.
- Output #3 can be adjusted within +/-15% of their nominal voltage.
- 650-700 watts for "C" version with cover and fan assembly. 325-350 watts for "B" version without moving air (maximum current of output #1 and #2 derated to 70%), or 650-700 watts with 50 CFM forced air provided by user.
- All models may be operated at no-load. At no-load, output voltage tolerance increases to +/-10%.
- 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.

OUTPUT POWER DERATING CURVE

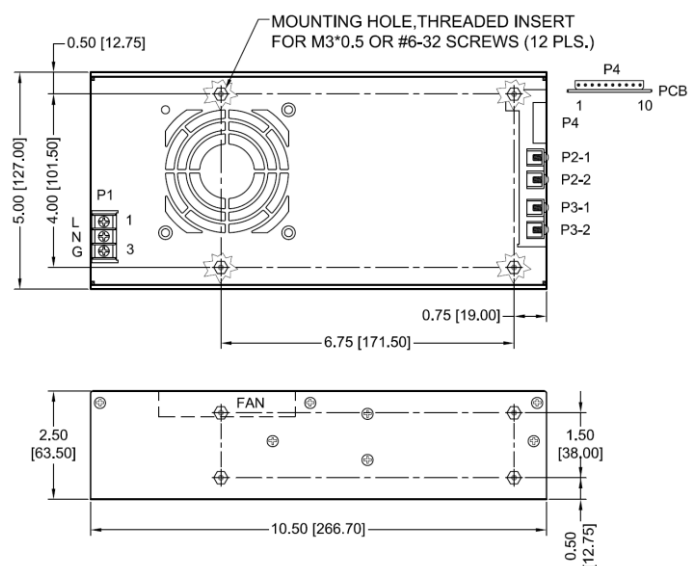


MECHANICAL SPECIFICATIONS

Single Output Models U-bracket Form

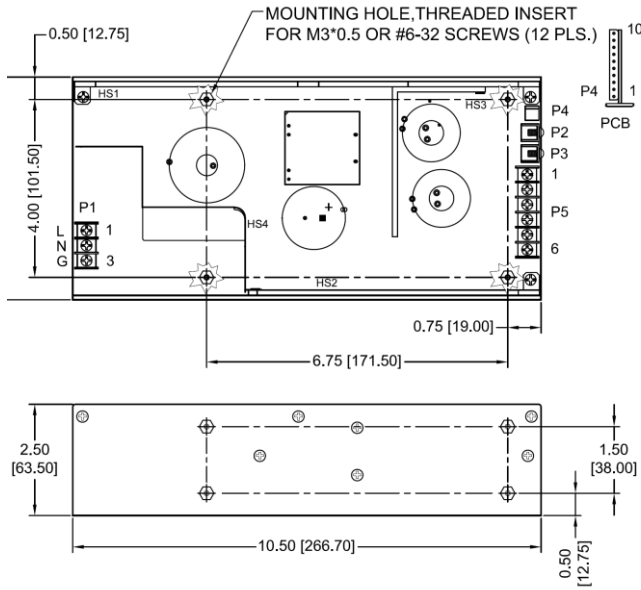


Enclosed Form

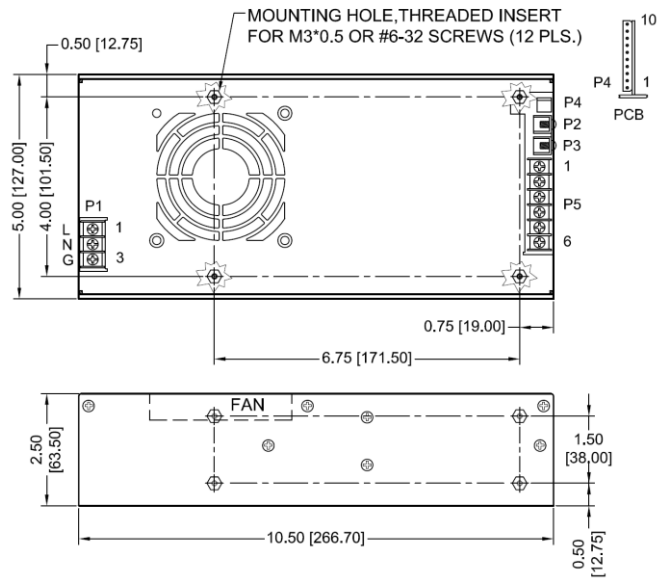


MECHANICAL SPECIFICATIONS

Multiple Output Models
U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-4C-B01W-03 with M3, nickel-plated screws.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. Connector P2-1, P2-2, P3-1 & P3-2: M3*0.5 screw connections.
6. Connectors P2, P3: M3*0.5 screw connections
7. Output connector P5 is Dinkle DT-35-B01W-06. Screws are M3, nickel plated.
8. Weight: 2.0 Kgs. (4.4 lbs.) approx. for U-bracket form, 2.2 Kgs. (4.84 lbs.) approx. for enclosed form.
9. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

| MODEL | CONN PIN | P1 (AC) | | | P2 | P3 | P5 | | | | | |
|--|--|---------|---------|--------|-----|-----------|------|-----------|------|-----------|---|---|
| | | 1 | 2 | 3 | | | 1 | 2 | 3 | 4 | 5 | 6 |
| PM650-12B PM650-13B PM650-14B PM650-15B | PM650-16B PM650-17B PM650-18B | Live | Neutral | Ground | +V1 | V1 Return | N.A. | | | | | |
| PM650-20B PM650-21B PM650-22B | PM650-23B PM650-24B | Live | Neutral | Ground | +V1 | V1 Return | +V2 | V2 Return | N.A. | N.A. | | |
| PM650-30B PM650-31B PM650-32B PM650-33B | PM650-34B PM650-35B PM650-36B PM650-37B | Live | Neutral | Ground | +V1 | V1 Return | +V2 | V2 Return | +V3 | V3 Return | | |

| MODEL | CONN PIN | P4 | | | | | | | | | |
|--|--|------------|-----------|-----------|-----|------------|------------|-----------|-----------|------------|----------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| PM650-12B PM650-13B PM650-14B PM650-15B | PM650-16B PM650-17B PM650-18B | PFD Return | +V1 Sense | -V1 Sense | PFD | Inhibit +V | Inhibit -V | N.C. | N.C. | Fan Return | +12V Fan |
| PM650-20B PM650-21B PM650-22B | PM650-23B PM650-24B | PFD Return | +V1 Sense | -V1 Sense | PFD | Inhibit +V | Inhibit -V | +V2 Sense | -V2 Sense | Fan Return | +12V Fan |
| PM650-30B PM650-31B PM650-32B PM650-33B | PM650-34B PM650-35B PM650-36B PM650-37B | PFD Return | +V1 Sense | -V1 Sense | PFD | Inhibit +V | Inhibit -V | +V2 Sense | -V2 Sense | Fan Return | +12V Fan |