



PROTEK POWER

PM650 Medical & ITE Power Supplies (650-700W)

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 load
- Remote sense on output #1 and output #2
- Remote inhibit– TTL high to disable output
- Compliant with RoHS requirements



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.

Model ¹	Output #1 ^{(3) (5)}				Output #2 ⁽⁵⁾				Output #3 ⁽⁴⁾				Max. Output Power ⁴
	V1	Imin	I _{max}	Tol.	V2	Imin	I _{max}	Tol.	V3	Imin	I _{max}	Tol.	
PM650-12B	12V	0A	54.2A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325W/650W
PM650-13B	15V	0A	43.4A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325 W/650W
PM650-14B	24V	0A	27.1A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325W/ 650W
PM650-15B	27V	0A	24.1A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325W/ 650W
PM650-16B	30V	0A	21.7A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325W/600W
PM650-17B	36V	0A	18.1A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	325W/600W
PM650-18B	48V	0A	14.6A	±2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	350W/700W
PM650-20B	24V	1.50A	18.0A	±2%	12V	1.2A	22A	±5%	N/A	N/A	N/A	N/A	325W/600W
PM650-21B	24V	1.50A	18.0A	±2%	15V	1.0A	18A	±5%	N/A	N/A	N/A	N/A	325W/600W
PM650-22B	48V	0.75A	9.0A	±2%	24V	0.6A	12A	±5%	N/A	N/A	N/A	N/A	325W/600W
PM650-23B	48V	0.75A	9.0A	±2%	12V	1.2A	22A	±5%	N/A	N/A	N/A	N/A	325W/600W
PM650-24B	48V	0.75A	9.0A	±2%	15V	1.0A	18A	±5%	N/A	N/A	N/A	N/A	325W/600W
PM650-30B	24V	1.50A	18.0A	±2%	12V	1.2A	22A	±5%	3.3V	0A	10A	±3%	325W/600W
PM650-31B	24V	1.50A	18.0A	±2%	15V	1.0A	18A	±5%	3.3V	0A	10A	±3%	325W/600W
PM650-32B	24V	1.50A	18.0A	±2%	12V	1.2A	22A	±5%	5.1V	0A	10A	±3%	325W/600W
PM650-33B	24V	1.50A	18.0A	±2%	15	1.0A	18A	±5%	5.1V	0A	10A	±3%	325W/600W
PM650-34B	48V	0.75A	9.0A	±2%	12V	1.2A	22A	±5%	3.3V	0A	10A	±3%	325W/600W
PM650-35B	48V	0.75A	9.0A	±2%	15V	1.0A	18A	±5%	3.3V	0A	10A	±3%	325W/600W
PM650-36B	48V	0.75A	9.0A	±2%	12V	1.2A	22A	±5%	5.1V	0A	10A	±3%	325W/600W
PM650-37B	48V	0.75A	9.0A	±2%	15V	1.0A	18A	±5%	5.1V	0A	10A	±3%	325W/600W

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 with ±1/5% of their nominal voltage
- Output #3 can be adjusted with ±1/5% 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 ±1-10%.
- Ripple and noise is maximum peak to peak voltage value measured at output within 20MHz 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 Standards	UL ES 60601-1, CSA C22.2 No. 60601-1 TUV EN 60601-1, TUV EN 60950-1 UL 60950-1, CSA C22.2 No. 60950-1
EMI Standard	IEC 60601-1-2: 2014 EN55011: Class B conducted, Class A radiated
EMC Performance	EN61000-3-2: Harmonic distortion, Class A and D EN61000-3-3: Line Flicker EN61000-4-2: ESD, ± 2 KV contact EN61000-4-3: Radiated immunity, 10 V /m EN61000-4-4: Fast transient/burst , ± 2 KV EN61000-4-5: Surge, \pm KV diff., ± 2 KV com EN61000-4-6: Conducted immunity, 10 Vms EN61000-4-8: Magnetic field immunity, 30 A/m EN61000-4-11: Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10ms
*Consult with TT Electronics for information on additional country safety approvals	
Input Specifications	
Input Voltage Range	90-264 VAC
Input Frequency Range	47-63Hz
Input Current	10 A (rms) for 115 VAC 5 A (rms) for 230 VAC
Earth Leakage Current	240 μ A max. @ 264 VAC, 63 Hz
Touch Current	100 μ A max. @ 264 VAC, 63 Hz
Output Specifications	
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 an 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 $\pm 0.04\%/^{\circ}\text{C}$ maximum
Transient Response	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 μ s 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
Environmental Specifications	
Operating Temperature	0 $^{\circ}$ to + 70 $^{\circ}$ C
Storage Temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Relative Humidity	5% to 95% non-condensing
Temperature Derating	Derate from 100% at +50 $^{\circ}$ C linearly to 50% at +70 $^{\circ}$ C
General Specifications	
Switching Frequency	70KHz \pm 10KHz
Power Factor	0.98 typical
Efficiency	80% minimum on all models
Hold-up time	12ms minimum at 110VAC
Line Regulation	$\pm 0.2\%$ maximum at full load
Inrush Current	50 A @115 VAC or 100 A @ 230 VAC at 25 $^{\circ}$ 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
MTBF	300,000 hours minimum at full load at 25 $^{\circ}$ ambient, calculated per MIL-HDBK- 217F
Interface Signals	
PFD	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100ms after V1 output is within regulation
Inhibit	Requires an external TTL high level signal to inhibit outputs for standard models

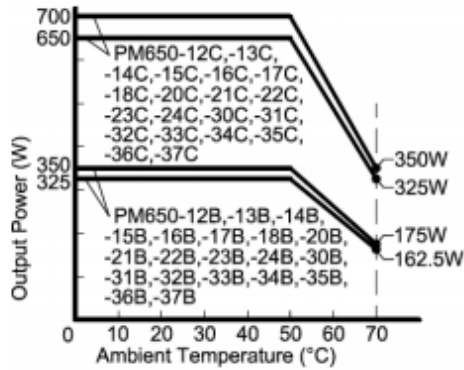


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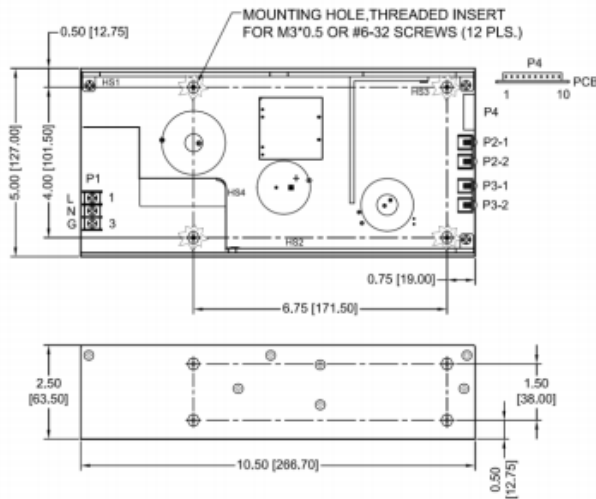
PM650 Medical & ITE Power Supplies (650-700W)

Diagrams

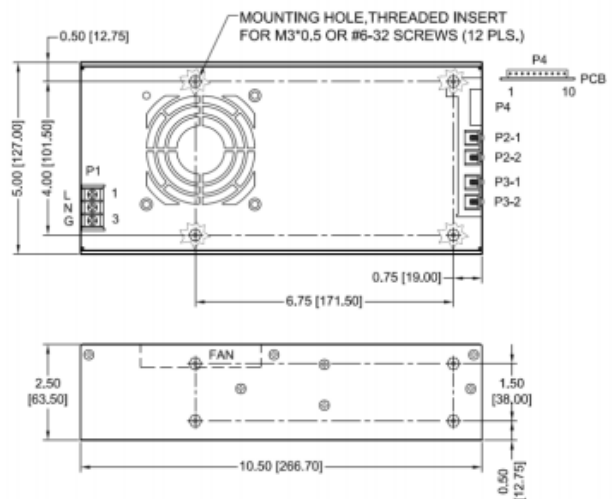
OUTPUT POWER DERATING CURVE



Single Output Models U-bracket Form



Enclosed Form





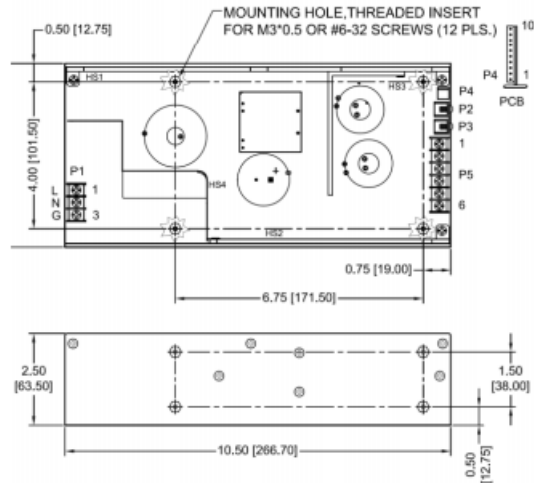
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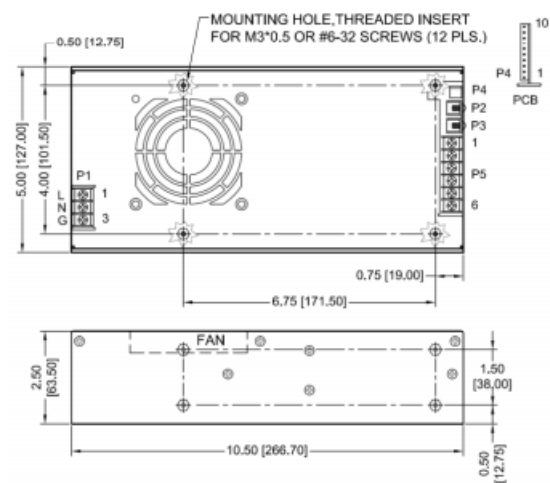
Diagrams

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

General Note

All data sheets are subject to change without notice.

TT Electronics | Power Partners, Inc
43 Broad Street Suite B206, Hudson, MA 01749, USA. t: +1 (978) 567-9600