

## 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 ±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





## 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:	±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)	
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

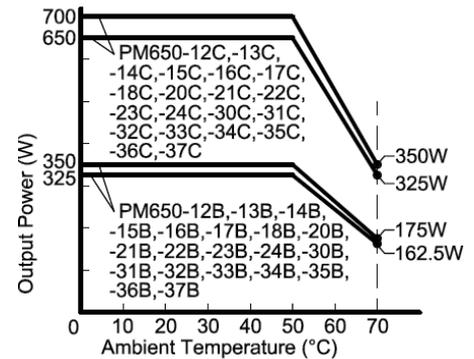
## OUTPUT VOLTAGE/CURRENT RATING CHART

Model <sup>(1)</sup>	Output #1 <sup>(3)(5)</sup>				Output #2 <sup>(5)</sup>				Output #3 <sup>(4)</sup>				Max. Output Power <sup>(5)</sup>
	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.

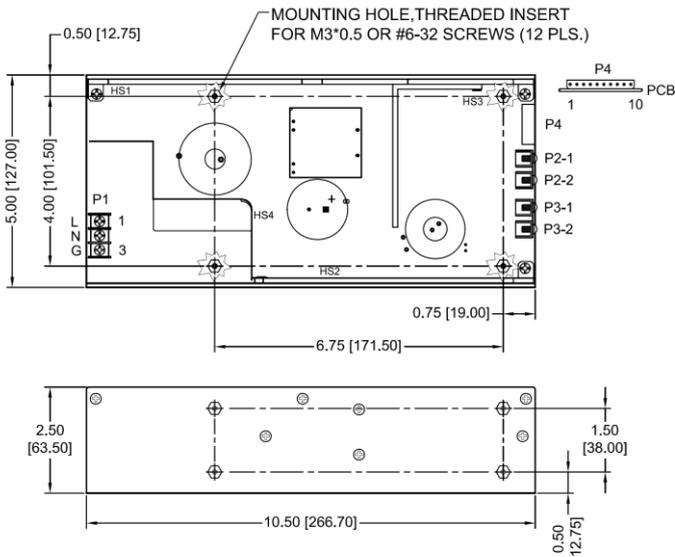
### OUTPUT POWER DERATING CURVE



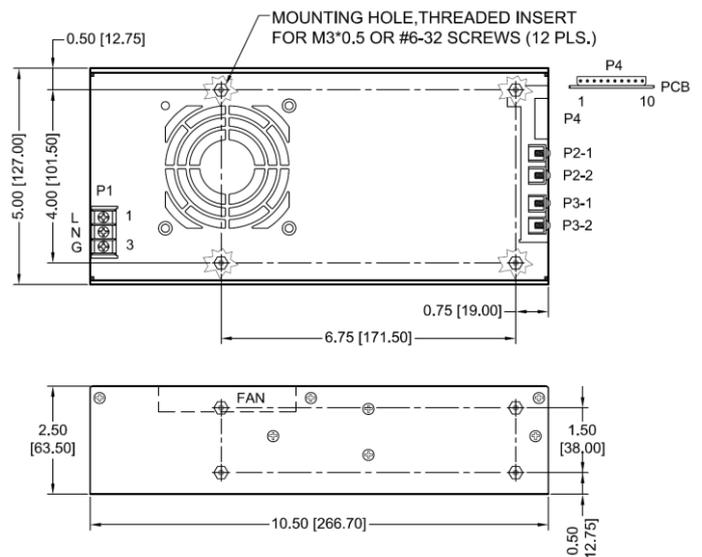
## MECHANICAL SPECIFICATIONS

### Single Output Models

#### U-bracket Form

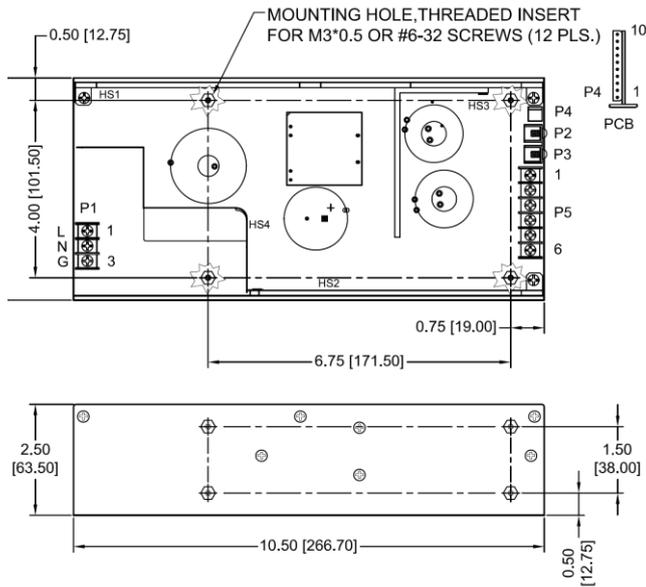


#### Enclosed Form

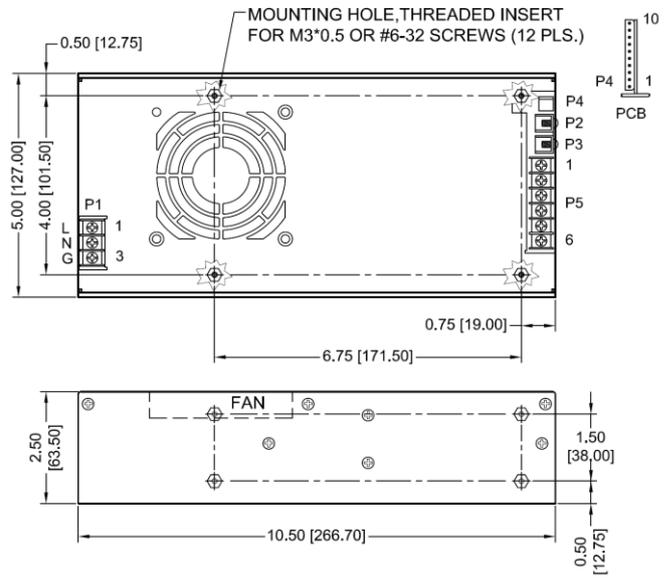


## MECHANICAL SPECIFICATIONS

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