

## DESCRIPTION

The PM400 series of AC-DC switching power supplies in a package of 4 x 7 x 1.58 inches are capable of delivering 400 watts of continuous power at 7 CFM forced air cooling or 300 watts at convection cooling. 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 for 400 watt output without the change of any dimension. They are designed for medical applications, but not for life-supporting equipment. The units are certified also to IEC/EN/UL 60950-1 and suitable for data networking, computer and telecommunication applications.

## FEATURES

- BF Class insulation
- Operation up to 5000 meters
- 100-240 VAC input with active PFC
- Less than 300  $\mu$ A leakage current
- Standby output 5VDC at 100mA
- EN55011 / 55022 Class B conducted emissions
- Inhibit - TTL low to disable output
- Standard PS Off and DC OK signals
- Efficiency greater than 88%
- Compliant with RoHS requirements

## INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.2 A (rms) @ 115 VAC, 60 Hz 2.1 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 $\mu$ A max. @ 264 VAC, 63 Hz

## OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	Set at 115-140% of nominal output voltage
Overcurrent protection:	Protected to output short circuit conditions
Thermal shutdown	Protected to overtemperature conditions
Temperature coefficient:	All outputs $\pm 0.04\%$ / $^{\circ}$ C maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 $\mu$ s after a 25% step load change
Standby power	5 V at 100 mA maximum
Fan power	12 V at 250 mA maximum

## ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10 $^{\circ}$ C to +70 $^{\circ}$ C
Storage temperature:	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50 $^{\circ}$ C linearly to 50% at +70 $^{\circ}$ C, applicable to convection and forced-air cooling conditions

## PM400 SERIES



CE

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

## GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Efficiency:	Typical 89% @ 115 VAC, 92% @ 230 VAC
Hold-up time:	12 ms minimum at 110 VAC & 400 W
Line regulation:	$\pm 0.5\%$ maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25 $^{\circ}$ C cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	350,000 hours at full load at 25 $^{\circ}$ C ambient, calculated per MIL-HDBK-217F

## EMC Performance

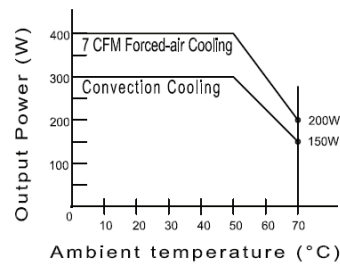
EN55011/EN55022:	Class B conducted, class A radiated
FCC:	Class B conducted, class A radiated
VCCI:	Class B conducted, class A radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, $\pm 8$ KV air and $\pm 6$ KV contact
EN61000-4-3:	Radiated immunity, 3 V/m
EN61000-4-4:	Fast transient/burst, $\pm 2$ KV
EN61000-4-5:	Surge, $\pm 1$ KV diff., $\pm 2$ KV com
EN61000-4-6:	Conducted immunity, 3 Vrms
EN61000-4-8:	Magnetic field immunity, 3 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 60% reduction for 100 ms and >95% reduction for 10 ms

### INTERFACE SIGNALS

**PF:** TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to master output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after master output is within regulation.

**Inhibit:** TTL low to turn off output  
**DC OK:** TTL high when output voltage >95%  
**PS OFF:** TTL high to turn off output

### OUTPUT POWER DERATING CURVE



### OUTPUT VOLTAGE/CURRENT RATING CHART

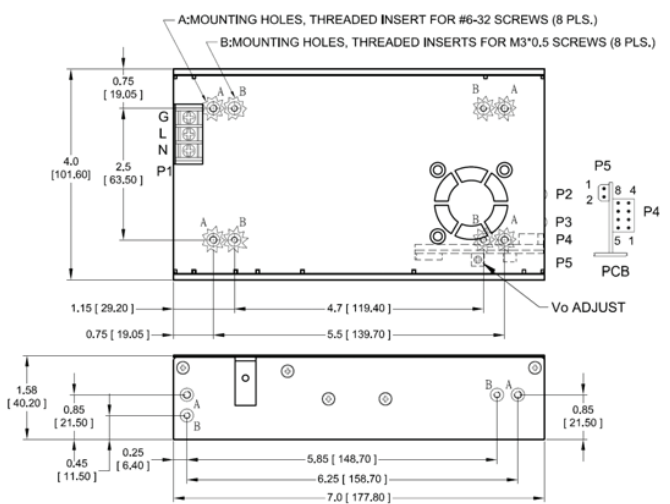
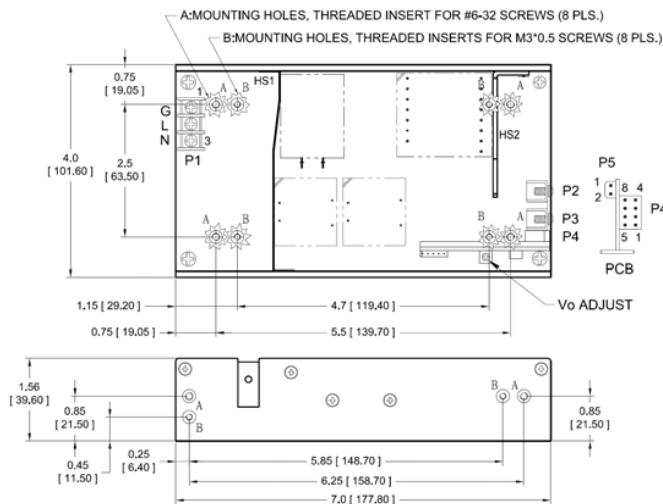
Model <sup>(1)</sup>	Output							Efficiency (typical)	
	V1	Min. Current <sup>(4)</sup>	Max. Current at convection	Max. Current at 7 CFM <sup>(2)</sup>	Tol.	Ripple & Noise <sup>(3)</sup>	Max. Output Power	@ 300 W 115/230 Vac	@ 400 W 115/230 Vac
PM400-12B	12 V	0.1 A	25.00 A	33.34 A	±2%	120 mV	300 W /400 W	90 /92%	88 /91%
PM400-13B	15 V	0.1 A	20.00 A	26.67 A	±2%	150 mV	300 W /400 W	90 /92%	88 /91%
PM400-13-1B	18 V	0.1 A	16.67 A	22.23 A	±2%	180 mV	300 W /400 W	90 /92%	88 /91%
PM400-14B	24 V	0.1 A	12.50 A	16.67 A	±2%	240 mV	300 W /400 W	90 /92%	89 /92%
PM400-15B	28 V	0.1 A	10.72 A	14.29 A	±2%	280 mV	300 W /400 W	90 /92%	89 /92%
PM400-17B	36 V	0.1 A	8.34 A	11.12 A	±2%	360 mV	300 W /400 W	90 /92%	89 /92%
PM400-18B	48 V	0.1 A	6.25 A	8.34 A	±2%	480 mV	300 W /400 W	90 /92%	90 /92%

- NOTES:
- Change suffix "B" for U-Bracket form to "C" for enclosed form with cover and fan assembly, e.g. PM400-14C.
  - 300 W without moving air or 400 W with 7 CFM forced air provided by user for "B" version, 400 W for "C" version with cover and fan assembly
  - 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.
  - All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.

### MECHANICAL SPECIFICATIONS

U-bracket Form

Enclosed Form



NOTES:

- Dimensions shown in inches [mm]
- Tolerance 0.02 [0.5] maximum
- Input connector P1 is Dinkle terminal P/N DT-35-B01W-03, with nickel plated M3 screws.
- P2, P3: M4 x 0.7 screw connectors
- Connector P4: Molex header 87833-08 or equivalent, mating with Molex housing 51110-0850 or equivalent.
- Fan connector P5: JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
- Weight: 1.0 Kg (2.23 lbs.) approx. for U-bracket form, 1.14 Kgs. (2.52 lbs.) approx. for enclosed form
- Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

Specifications are subject to change without notice. It is responsibility of each customer to thoroughly test each product and part number under their unique parameters and environments to ensure a product will work properly and reliably.

**PIN CHART**

CONN PIN		P1 (AC)			P2	P3	P5	
		1	2	3			1	2
PM400-12B	PM400-15B	Ground	Live	Neutral	+V1	Common Return	+12V Fan	Common Return
PM400-13B	PM400-17B							
PM400-13-1B	PM400-18B							
PM400-14B								

CONN PIN		P4							
		1	2	3	4	5	6	7	8
PM400-12B	PM400-15B	Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit	+5V Standby	DC OK	PS OFF
PM400-13B	PM400-17B								
PM400-13-1B	PM400-18B								
PM400-14B									

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Click below for more details, to buy on-line or request volume pricing:

<http://power.sager.com/protek-PM400-power-supply.html>

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