

**SPECIFICATION**  
**For**  
**SWITCHING POWER SUPPLY**

**M/N: MPM-706H**

**Revision History**

Version	Revise Date	Change Items
Rev. 1.0	Nov. 8. 2007	While input voltage below 100V (90-99V), an accessory heat sink (min. 440 cm <sup>2</sup> ) is recommend to be added at the bottom of the power supply itself.
Rev. 1.1	Dec. 11. 2007	Adding TUV and CB logos as approved.
Rev. 1.2	Jan. 17. 2008	Revise Hi-Pot regulation from min. 5656VDC to min. 6173VDC.
Rev. 1.3	Feb. 20. 2008	1. Correct pin assignment of CN1 and location from CN2, CN3 to CN3, CN5. 2. Update Efficiency from 70% to 75% and mechanical drawing of side view.
Rev. 1.4	Jul. 3. 2008	Update OVP description.
Rev. 1.5	Jan. 21. 2009	Photo update and typo corrected.
Rev. 1.6	Apr. 28. 2009	Correct maximum output current of +12V is 3A, the rated output current of +5Vsb is 0.75A.
Rev. 1.7	Aug. 20. 2010	Revise Hi-Pot regulation from min. 6173VDC to min.3000VAC.
Rev. 1.8	Mar. 28. 2011	Update the safety approved status.
Rev. 1.9	Oct. 28. 2011	Revised the specification of turn-on delay.
Rev. 2.0	Jan. 04. 2018	1. Changed form. 2. Add Designed to meet IEC 60601-1-2 4th ed. EMC.



**CB**

### FEATURES

- ✓ ATX output, 80W with 8.6CFM forced air- cooling, 60W convection cooled.
- ✓ U-shape chassis with 52 x 170 x 39 mm ultra-slim size.
- ✓ Medical regulations IEC/EN 60601-1 approved, EMI EN 60601-1-2 compliant.
- ✓ Designed to meet IEC 60601-1-2 4th ed. EMC.
- ✓ Design to meet 2 X MOPP.

### Models & Ratings

Model Number	Wattage (Rated / Max)	Output Voltage		Min. Current	Rated Current	Max. Current
MPM-706H	60 W / 80 W	V1	+5 V	0.2 A	5.0 A	8.0 A
		V2	+12 V	0 A	1.5 A	3.0 A
		V3	-12 V	0 A	0.5 A	-
		V4	+3.3 V	0 A	4.0 A	6.0 A
		V5	+5VsB	0 A	0.75 A	-

Total Output Power: 80W at 50°C environment temperature. (Note 2)

Note:

1. The maximum total combined output power on the +3.3V and +5V rails is 40W.
2. Total maximum load cannot exceed 80W with 8.6 CFM forced air-cooling and 60W convection cooled.
3. While input voltage below 100V (90-99V), an accessory heat sink (min. 440 cm<sup>2</sup>) is recommend to be added at the bottom of the power supply itself.

### Summary

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Range	90	115 / 230	264	VAC	Continuous input range.
Input Frequency	47		63	Hz	AC input.
Efficiency		76		%	Rated load, 230VAC. Varies with distribution of loads among output.
Operating Temperature	0		70	°C	Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load.
Weight		292.8		g	
Dimensions	170 (L) x 52 (W) x 39 (H) mm, Tolerance +/- 0.4mm.				
EMC	EN 60601-1-2, EN 55022 / CISPR 22 & FCC Part 15, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11				
Safety Approvals	IEC 60601-1: 1988+A1+A2, EN 60601-1: 1990+A1+A2+A13				

### Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	90	115 / 230	264	VAC	Continuous input range.
Input Frequency	47		63	Hz	AC input.
Input Current			2 / 1	A	Nominal AC Input Voltage (115VAC/230VAC), rated load.
Inrush Current			30 / 60	A	Nominal AC Input Voltage (115VAC/230VAC), one cycle at 25°C.
Input Protection	Non-user serviceable internally located AC input line fuse. Fuse : 5A / 250VAC * 2pcs				

### Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage		+5 V		DC	
		+12 V			
		-12 V			
		+3.3 V			
		+5VsB			
Initial Set Accuracy <sup>(Note 1)</sup>	5.08		5.13	V	Output Voltage +5V
	11.4		12.6	V	Output Voltage +12V
	-11.4		-12.6	V	Output Voltage -12V
	3.10		3.50	V	Output Voltage +3.3V
	4.80		5.20	V	Output Voltage +5Vsb
Minimum Load		0.2		A	Output Voltage +5V
		0		A	Output Voltage +12V, -12V, +3.3V, +5Vsb
Start Up Delay			4	Sec	Time required for initial output voltage stabilization.
Hold Up Time	20			mS	Nominal AC Input Voltage (230VAC), rated load.
Line Regulation		1 <sup>(V1)</sup> 1 <sup>(V2)</sup> 1 <sup>(V3)</sup> 1 <sup>(V4)</sup> 1 <sup>(V5)</sup>		%	Less than $\pm 1\%$ at rated load with $\pm 10\%$ changing in input voltage.
Load Regulation		2 <sup>(V1)</sup> 4 <sup>(V2)</sup> 5 <sup>(V3)</sup> 4 <sup>(V4)</sup> 4 <sup>(V5)</sup>		%	Measured is done by changing the measured output loading +/-40% from 60% rated load, and keep other output is at 60% rated load.
Ripple & Noise		50 <sup>(V1)</sup> 120 <sup>(V2)</sup> 120 <sup>(V3)</sup> 50 <sup>(V4)</sup> 120 <sup>(V5)</sup>		mV	Measured at rated load by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10 $\mu$ F Electrolytic Capacitor and a 0.1 $\mu$ F Ceramic Capacitor.
Overvoltage Protection	For some reason the power supply fails to control itself, the build-in over voltage protection circuit will protect auto-recovery model and to prevent damaging external circuits. The trigger point is about 6.5-8.5V at +5V.				
Overload Protection	Fully protected against output overload and short circuit. Automatic recovery upon of overload condition.				

Note:

1. The +5V output is set between 5.08V to 5.13V by variable resistor and all output at 60% rated load and the other outputs are checked to be within the accuracy range.

### General

Characteristic		Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			76		%	Rated load, 230VAC. Varies with distribution of loads among output.
Isolation	IP to OP	3000			VAC	
Switching Frequency			60		KHZ	
Power Good Signal (Only with –SB model)		When power is turned on, the power good signal will go high 100ms to 500ms after all output DC voltages are within regulation limits.				
Power Fail Signal (Only with –SB model)		The power fail signal will go low at least 1 mS before any of the output voltages fall below the regulation limits.				
Power On/Off		The power supply will be turned on when the power On/Off pin is connected to secondary GND.				

### Environmental

Characteristic		Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature		0		70	°C	Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load.
Storage Temperature		-40		+70	°C	
Relative Humidity		5		95	%RH	Non-condensing.
Cooling			8.6		CFM	Forced-cooled @ 80W
Operating / Non-Operating Altitude			10000 / 40000		Feet	

### EMC: Emissions

Phenomenon	Standard	Class	Notes & Conditions
Conducted	EN 60601-1-2, EN 55022 / CISPR 22 & FCC Part 15	B	
Radiated	EN 60601-1-2, EN 55022 / CISPR 22 & FCC Part 15	B	

### EMC: Immunity

Phenomenon	Standard	Criteria	Notes & Conditions
ESD	IEC 61000-4-2	A	±15KV air discharge, ±8KV contact discharge
Radiated	IEC 61000-4-3	A	10V/m, 27MHz
EFT	IEC 61000-4-4	A	±2KV, 100KHz
Surges	IEC 61000-4-5	A	L-N:±2KV, L/N-PE:±2KV
Conducted	IEC 61000-4-6	A	10V
Power Magnetic	IEC 61000-4-8	A	30A/m
Dips and Interruptions	IEC 61000-4-11	A A / B B / B B	Dip:>100%, 0.5 cycle Dip:>100%, 1 cycle <sup>(Note 2)</sup> DIP:>70%, 25/30 cycle <sup>(Note 2)</sup> INT.:>100%, 5 seconds

Note:

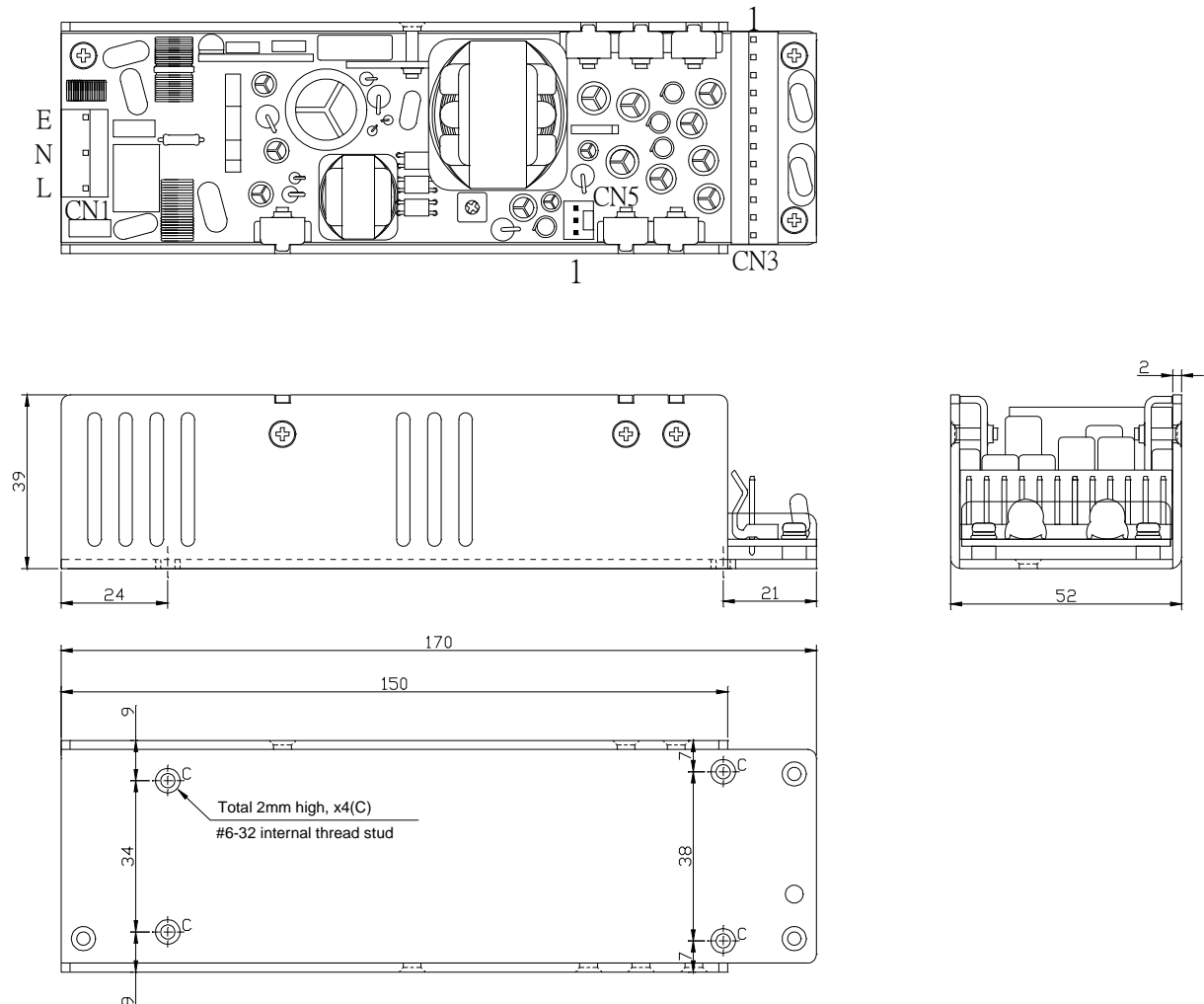
- Above specification is applied with output equal or below 60W. For higher output power, please re-confirm with us.
- The test result of input 230Vac / 115Vac is criteria A / B.

### Safety Approvals

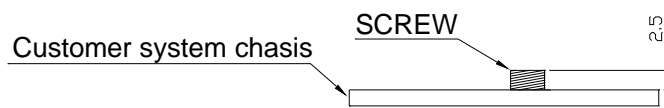
Safety Agency	Safety Standard	Notes & Conditions
TUV	EN 60601-1: 1990+A1+A2+A13	TUV approved
CB	IEC 60601-1: 1988+A1+A2	TUV, CE approved

### Mechanical Details

SIZE : 170.0(L) x 52.0(W) x 39.0(H)mm, Tolerance +/-0.4mm.



Measuring the screw protrusion first:



Parameter	Conditions/Description					
Dimension	170(L) x 52(W) x 39(H) mm, tolerance +/- 0.4mm.					
Connector	CN1 --- AC input: Molex 5273-05A withdrew 2 pins or equivalent.					
	CN3 --- DC output: Molex 5273-12A or equivalent.					
	CN5 --- DC output: Molex 5045-03A or equivalent.					
Pin Assignment	CN1	Pin	1. L	2. N	3. GND	
	CN3	Pin	1. +3.3V	4. GND	7. +5V	10. PG/PF
			2. +3.3V	5. GND	8. +5V	11. +12V
			3. GND	6. GND	9. +5V	12. -12V
	CN5	Pin	1. +5Vsb	2. GND	3. PS on/off	

### Thermal Considerations

In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded.

Temperature should be monitored using J type thermocouples placed on the hottest part of the component (out of any direct air flow). See Mechanical Details for component locations.

Temperature Measurements at max. amb.	
Component	Max Temperature
T1	110°C
Q1	120°C
D7	120°C
C2	105°C
C25	105°C