SPECIFICATION

For

SWITCHING POWER SUPPLY

M/N: MPM-815H

Revision History

Version	Revise Date	Change Items
Rev. 01	Dec. 26 .2007	1.Adding TUV, CB, and UL logos as approved, part 5 updated. 2.Condition of the cover assembled is added with the derating curve.
Rev. 02	Feb. 14th 2008	Correct typing error from “convention” to “convection”.
Rev. 03	Apr. 29th 2008	Update mechanical drawing.
Rev. 04	Jul. 23rd 2008	Update Short Circuit Protection description.
Rev. 05	Oct. 27th 2008	Update info for the option with cover provided.
Rev. 06	Mar. 16th 2009	Update mechanical dimension (Height).
Rev. 07	Nov. 4th 2010	Update spec of fixed screws.
Rev. 08	Mar. 28th 2011	Update the safety approved status.
Rev. 09	Apr. 26th 2012	Update the safety approved status.
Rev. 10	Dec. 11.2017	Changed Form.
Rev. 11	Mar. 12. 2018	1.Added Designed to meet IEC 60601-1-2 4th ed. EMC. 2.Changed EMC and Safety Approvals.

MPM-815H

150W Medical AC / DC

FEATURES

- ✓ 1U 150W convection cooling with ATX.
- ✓ Input Active PFC for Medical purpose.
- ✓ Power Good / Power Fail signal.
- ✓ +5V Stand by & Remote On/Off.
- ✓ MTBF>130,000 hr. Mil-217F at 50°C.
- ✓ Thermal protection.
- ✓ IEC, EN 60601-1 3rd edition approved.
- ✓ Designed to meet IEC 60601-1-2 4th ed. EMC.

Models & Ratings

Model Number	Wattage (Rated / Max)	Output Voltage		Min. Current	Rated Current	Max. Current
MPM-815H	Note 1 & Note 2	V1	+5 V	1 A	11.0 A	14.0 A
		V2	+12 V	0 A	5.0 A	10.0 A
		V3	-12 V	0 A	0.5 A	1.0 A
		V4	+3.3V	0 A	7.5 A	12 A
		V5	+5VsB	0 A	0.75 A	1.5 A

Total Output Power: 150W at 50°C environment temperature.

Note:

1. The maximum total combined output power on the +3.3V and +5V rails is 90W.
2. The total DC continuous power shall be kept with 150W at input voltage at 110-264VAC. With input voltage 90-109VAC the total DC continuous power shall be kept with 120W max. The maximum total combined output power on the +3.3V and +5V rails is 90W. On condition of with the option cover, the maximum 150W is at 30°C environment temperature
3. Model no. coding:

M P M – 8 1 5 H – Z

(1)

Z=	**Mechanical**
blank	**Open frame**
C	**Optional cover kit**

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		75		%	Rated load, 115VAC. Varies with distribution of loads among output.
Operating Temperature without the option cover (open frame)	0		70	°C	Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load.
Operating Temperature with the top cover version Order no. MPM-815H-C	0		60	°C	30°C at 100% rated load, 40°C at 90% rated load and 50°C with the top cover at 70% rated load.
Weight		787		g	
Dimensions	198 (L) x 97 (W) x 40.5 (H) mm, Tolerance +/- 0.5mm.				
EMC	EN 60601-1-2, EN 61000-3-2, EN 61000-3-3, 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 60601-1,3rd edition. EN 60601-1,3rd edition. UL 60601-1, 1st Edition, 2006-04-26, CAN/CSA-C22.2 No.601.1-M90				

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			4 / 2	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 cold start.
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 (Note 1)	5.05		5.15	V	Output Voltage +5V
	11.6		12.6	V	Output Voltage +12V
	-11.4		-12.6	V	Output Voltage -12V
	3.2		3.4	V	Output Voltage +3.3V
	4.8		5.2	V	Output Voltage +5Vsb
Minimum Load		1		A	Output Voltage 5V
		0		A	Output Voltage 12V, -12V, 3.3V, +5Vsb
Start Up Delay	0.3		6	Sec	Time required for initial output voltage stabilization.
Hold Up Time	16			mS	Nominal AC Input Voltage (115VAC), rated load.
Line Regulation		±1(V1) ±1(V2) ±1(V3) ±1(V4) ±1(V5)		%	Less than ±1% at rated load with ±10% changing in input voltage.
Load Regulation		±2(V1) ±4(V2) ±5(V3) ±4(V4) ±4(V5)		%	Measured from 60% to 100% rated load and from 60% to 20% rated load (60% ±40% rated load) for each output, and others voltage setting at 60%.
Ripple & Noise		50(V1) 100(V2) 150(V3) 50(V4) 100(V5)		mV	Measured at rated road by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10μF Electrolytic Capacitor and a 0.1μF Ceramic Capacitor.
Overvoltage Protection	For some reason the power supply fails to control itself, the build-in over voltage protection circuit will shut down the outputs to prevent damaging external circuits. The trigger point is about 5.8-6.4V at +5V. If the OVP occur, PSU cannot be recovered.				
Over Temperature Protection	When the power supply operating over the temperature or over load limit, the power supply will be shut down automatically to protect itself. The protection point is at the temperature of the HS1 over 110°C. After the temperature of HS1 going down, the power supply will restart automatically.				
Short Circuit Protection	The power supply will go into hiccup mode against short circuit or over load conditions, and will auto-recovery while faulty conditions are removed.				

Note:
1. Initial setting accuracy is at input 110VAC and output at 60% rated load.

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		75		%	Rated load, 115VAC. Varies with distribution of loads among output.
Switching Frequency		65		KHZ	
MTBF			>130000	hrs.	MIL-HDBK-217F at 25°C
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 without the option cover (open frame)	0		+70	°C	Derate linearly above 50°C by 2.5% per °C to a maximum temperature of 70°C at 50% load.
Operating Temperature with the top cover version Order no. MPM-815H-C	0		+60		30°C at 100% rated load, 40°C at 90% rated load and 50°C with the top cover at 70% rated load.
Storage Temperature	-20		+70	°C	
Relative Humidity	5		95	%RH	Non-condensing.
Operating / Non-Operating Altitude		10000 / 40000		Feet	

EMC: Emissions

Phenomenon	Standard	Class	Notes & Conditions
Conducted	EN 60601-1-2	B	
Radiated	EN 60601-1-2	B	
Harmonic Current	EN 61000-3-2	D	
Voltage Flicker	EN 61000-3-3	D	

EMC: Immunity

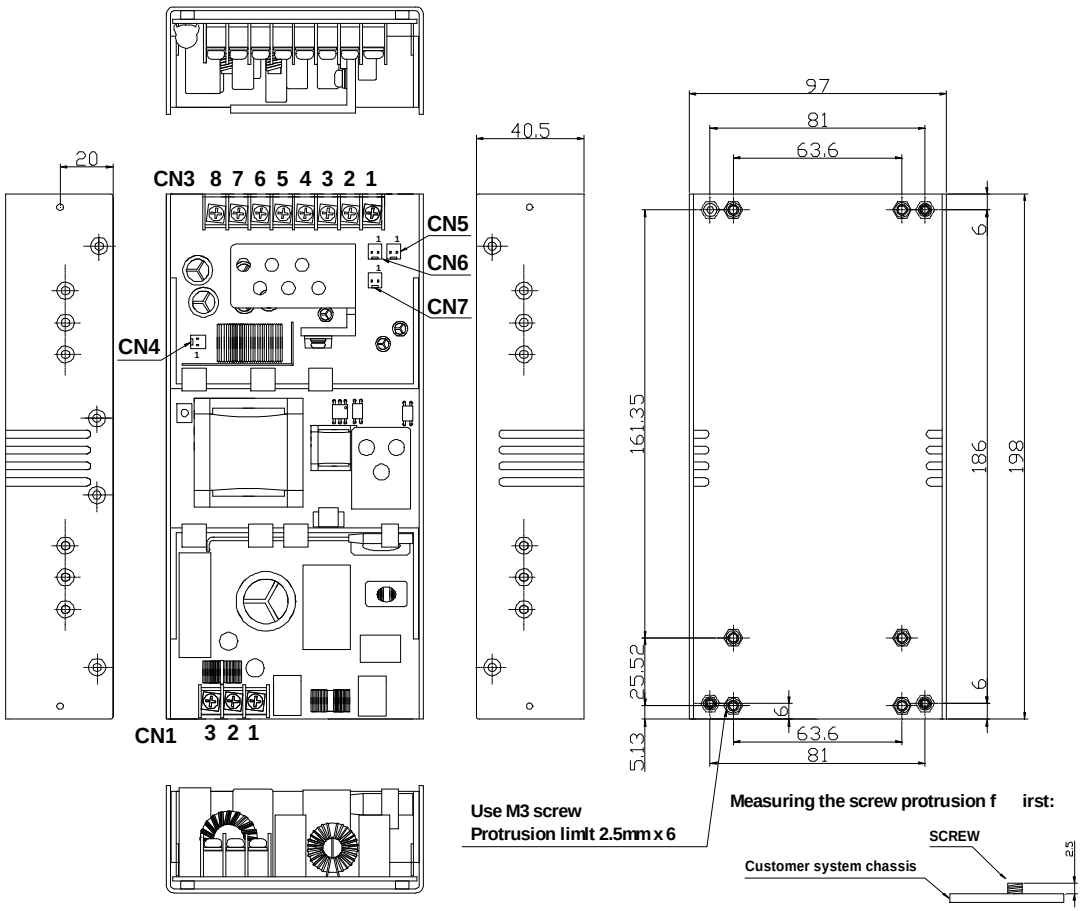
Phenomenon	Standard	Notes & Conditions
ESD	IEC 61000-4-2	±15KV air discharge, ±8KV contact discharge
Radiated	IEC 61000-4-3	10V/m, 80 – 2700MHz
EFT	IEC 61000-4-4	±2KV Line & PE, 100KHz
Surges	IEC 61000-4-5	1KV line to line, 2KV line to PE
Conducted	IEC 61000-4-6	10V/m
Power Magnetic	IEC 61000-4-8	30A/m
Dips and Interruptions	IEC 61000-4-11	

Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
TUV	EN 60601-1	Design to meet.
CB	IEC 60601-1	Approved (Medical 3.1rd)
UL/cUL	UL 60601-1, 1st Edition, 2006-04-26. CAN/CSA-C22.2 No.601.1-M90, 2005	Approved.

Mechanical Details

SIZE：198.0(L) x 97.0(W) x 40.5(H)mm, Tolerance +/-0.4mm.



Parameter	Conditions/Description					
Dimension	198 (L) x 97 (W) x 40.5 (H) mm, Tolerance +/- 0.4mm.					
Connector	CN1 --- AC input:		3 Positions Terminal blocks.			
	CN3 --- DC output:		8 Positions Terminal blocks.			
	CN4 --- Fan output:		Molex 5045-02A or equivalent			
	CN5 --- PG/PF:		Molex 5045-02A or equivalent			
	CN6 --- PS ON/OFF:		Molex 5045-02A or equivalent			
	CN7 --- +5Vsb output:		Molex 5045-02A or equivalent			
Pin Assignment	CN1	Pin	1. L	2. N	3. GND	
	CN3	Pin	1. -12V	2. GND	3. +3.3V	4. GND
			5. +5V	6. +5V	7. +12V	8. GND
	CN4	Pin	1. +12V	2. GND		
	CN5	Pin	1. +5V	2. GND		
	CN6	Pin	1. +5V	2. GND		
	CN7	Pin	1. +5Vsb	2. GND		

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℃
Q1	120℃
D6	120℃
C2	105℃
C12	105℃