# SPECIFICATION

For

SWITCHING POWER SUPPLY

## M/N: MPM-S100 Series

Revision history

| | | |
|---|---|---|
| REV. | Aug. 13th 2012 | Established. |
| REV. | Aug. 31th 2012 | Revised. |
| REV. | Oct. 11th 2012 | Added new model: MPM-S106 which is +48V output. |
| REV. | Dec. 6th 2012 | a) Derating curve<br>b) Dip Voltage dips 30%, 25 cycles from A to A/B. |
| REV. | Sep. 25th 2013 | a) Add mechanical drawing<br>b) Added max. output current<br>c) Efficiency up to 91% |
| REV. | Oct. 16th 2013 | Change derating curve. |
| REV. | Nov. 7th 2013 | Change derating curve for MPM-S106 |
| REV. | Feb. 18th 2014 | Add optional cover kit drawing and its derating curve |
| REV. | Jul. 1st 2015 | Add TUV logo |

BF direct patient contact rated

## FEATURES

- 100W with convection-cooled single output power supply
- High efficiency up to 91%
- No-load power consumption < 0.5W
- Class II design, additional class I functional ground connected
- Compact size 2 x 4 inch and low profile
- Design to meet medical standard IEC / EN / UL 60601-1 type BF rated patient contact leakage current
- Meets EMI CISPR/FCC class B
- Optional cover kit

## 1. Description

| Model No. (Note 3) | Output Voltage | Mini. Output Current | Rated Output Current | Max. Output Current | Line Regulation | Load Regulation | Ripple & Noise p-p (Note 1) | Initial Setting Accuracy (Note 2) |
|---|---|---|---|---|---|---|---|---|
| **MPM-S103** | **+12V** | 0 A | 8.4 A | 9.6A | ±1% | ±1% | ±1% | 11.8 V~ 12.2 V |
| **MPM-S105** | **+24V** | 0 A | 4.2 A | 4.8A | ±1% | ±1% | ±1% | 23.7 V~ 24.3 V |
| **MPM-S106** | **+48V** | 0 A | 2.1 A | 2.4A | ±1% | ±1% | ±1% | 47.5 V~ 48.5 V |

**Total Output Power:** Max. 100W convection cooled, above 101~115W with 7 CFM forced air-cooling at 50°C environment temperature (Note 4).

Note: 1) Measured by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10μF Electrolytic Capacitor and a 0.1μF Ceramic Capacitor.
2) Initial setting accuracy is adjusted at input 115VAC and output at 60% rated load.
3) See the detail model no. coding in paragraph 5.
4) Please see detail performance curves in paragraph 6.

## 2. Input Specification

| Parameter | Conditions/Description | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|
| Input Voltage | Universal input range. | 85 | 115 / 230 | 264 | VAC |
| Label Voltage | | 100 | | 240 | VAC |
| Input Frequency | AC input. | 47 | 50 / 60 | 63 | Hz |
| Input Current | Nominal AC Input Voltage (115VAC/230VAC), rated load. | | | 2 / 1.2 | A |
| Inrush Current | Nominal AC Input Voltage (115VAC/230VAC), one cycle at 25°C cold start. | | | 30 / 60 | A |
| Input Protect | Dual non-user serviceable internally located AC input line fuse. | | | | |
| No-load power consumption | Nominal AC Input Voltage (115VAC/230VAC). | | | <0.5 | W |

## 3. Output Specification

| Parameter | Conditions/Description | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|
| Efficiency | At input 230VAC, rated load (Note 1) | | 90 | | % |
| Minimum load | | | See Chart of Description | | |
| Ripple & Noise | Rated load, 20MHz bandwidth | | See Chart of Description | | |
| Output Current | Continuous output. | | See Chart of Description | | |
| Line Regulation | Less than ±1% at rated load with ±10% changing in input voltage. | | See Chart of Description | | |
| Load Regulation | Measured from 60% to 100% rated load and from 60% to 20%rated load (60% ±40% rated load). | | See Chart of Description | | |
| Hold Up Time | Nominal AC Input Voltage (115VAC/230VAC), rated load. | 12 / 20 | | | ms |
| Turn-on Delay | Nominal AC Input Voltage (115VAC/230VAC), rated load at 25 ℃.Time required for initial output voltage stabilization. | | 0.7 | | Sec |

Note: 1) Measured after 0.5 hr warm up.

## 4. Interface Signals and Internal Protection

| Parameter | Conditions/Description |
|---|---|
| Short Circuit Protection | Fully protected against output overload and short circuit. Automatic recovery upon of overload condition. |
| Over Voltage Protection | For some reason the power supply fails to control itself, the build-in over voltage protection circuit will auto recovery the outputs to prevent damaging external circuits. |

## 5. Model no. coding

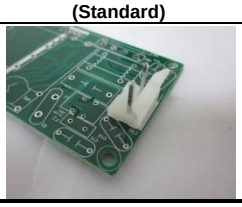
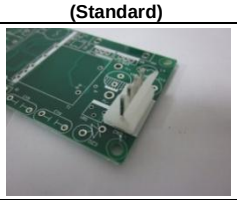
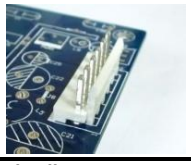
**MPM–S10 X – Y –Z**

① ② ③

①

| X = | Output (V) |
|---|---|
| 3 | +12 |
| 5 | +24 |
| 6 | +48 |

②

| Y= | Input Connector Type | Output Connector Type |
|---|---|---|
| blank | Molex Type Connector (Standard) | Molex Type Connector (Standard) |
| |  |  |
| J | JST Type Connector | JST Type Connector |
| |  |  |
| Please refer to paragraph 8 for detail. | | |

③

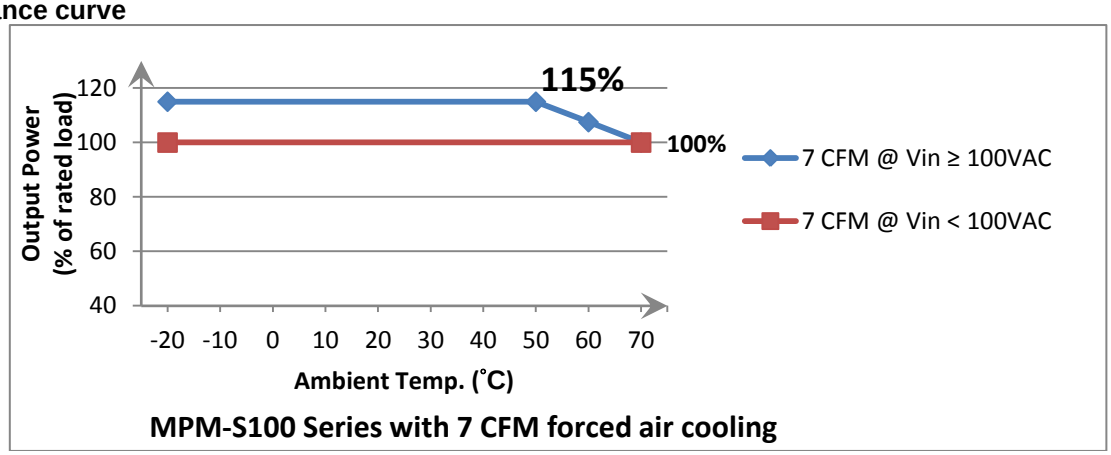
| Z = | Optional cover |
|---|---|
| Blank | Open fame |
| C | With optional cover kit |

## 6. Environment Specification

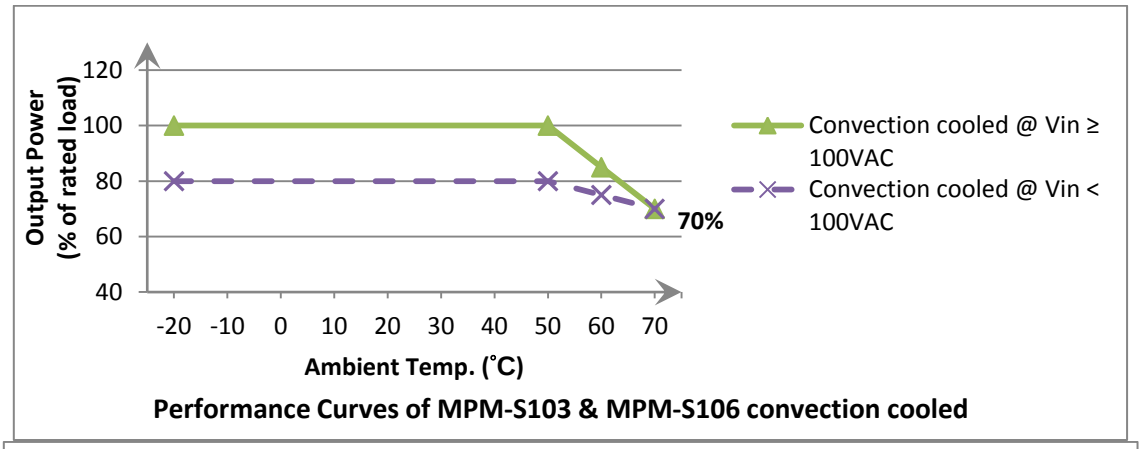
| Parameter | Conditions/Description | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|
| Operating Temperature | Derate linearly above 50˚C, please refer to the following performance curves. | -20 | | +70 | ˚C |
| Low temperature start up | Some specification parameters maybe exceeded until after 20 minutes warm up period. (Note 1) | -40 | | | ˚C |
| Storage Temperature | | -40 | | +85 | ˚C |
| Relative Humidity | Non-condensing. | 5 | | 95 | %RH |
| Altitude | Operating<br>Non-operating | | | 3K<br>4K | Meter |

Note: 1) To start up unit, the output power should be derated to 20% rated load @ Vin < 115VAC, or derated to 40% rated load @ Vin < 230VAC, and don't need derated @ Vin ≥ 230VAC.

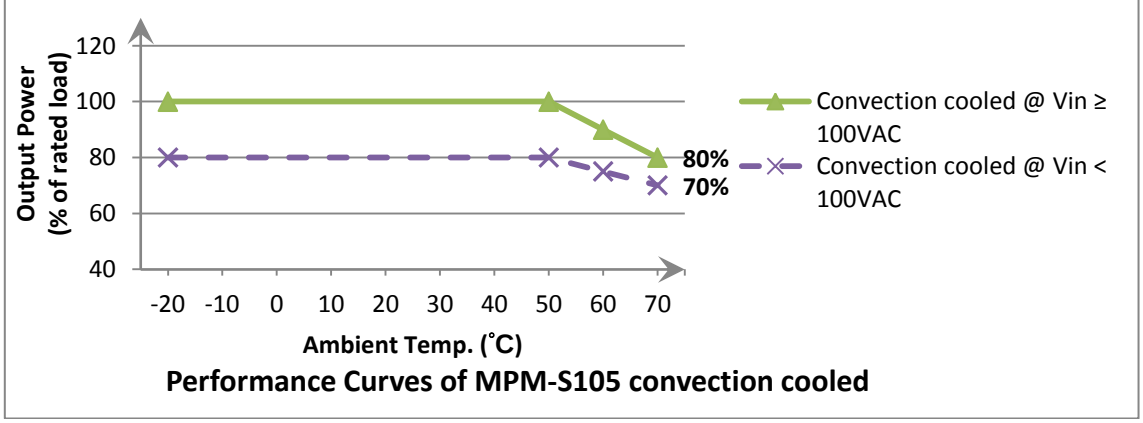
**Performance curve**



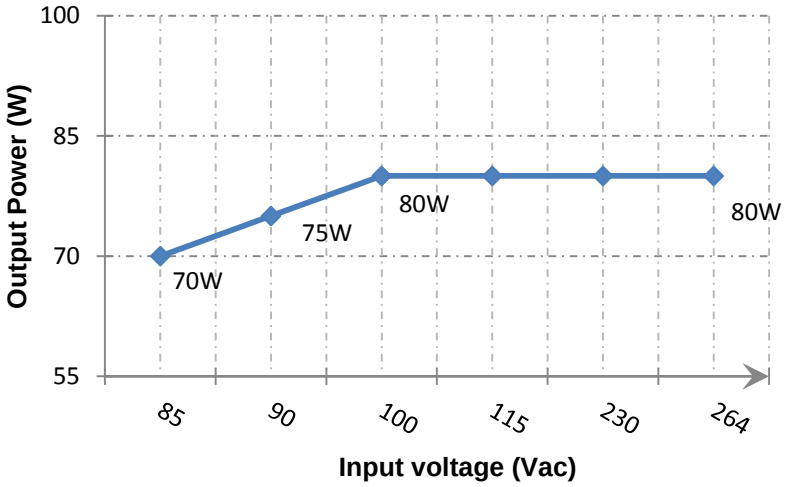

MPM-S100 Series with 7 CFM forced air cooling




Performance Curves of MPM-S103 & MPM-S106 convection cooled




Performance Curves of MPM-S105 convection cooled




**Derating curves of MPM-S10X-C**
**convection cooled below 50 degree C (X= 3, 5, 6)**

## 7. Safety Approvals, EMI and EMS Specification

| Parameter | Conditions/Description | | Min. | Nom. | Max. | Units |
|---|---|---|---|---|---|---|
| Approvals | IEC 60601-1: 2005, 3rd Edition | | | Design to meet | | |
| | EN 60601-1: 2006, 3rd Edition | | | TUV approved | | |
| | ANSI/AAMI ES60601-1:2005, 3rd ed. | | | Design to meet | | |
| | CAN/CSA-C22.2 No. 60601-1 (2008) | | | Design to meet | | |
| Hi-Pot | Reinforce or Double insulation (Primary to Secondary) | | 4000 | | | VAC |
| | Basic insulation (Primary, or Secondary, to Protective earth) | | 1500 | | | |
| Leakage Current | Patient Leakage Current at 264Vac, 63Hz normal condition | | BF | | | TYPE |
| | Primary to Secondary | | | | | |
| | Normal Condition / Single Fault Condition | | | | 100/300 | µA |
| | Primary to Earth GND (Note 1.) | | | | | |
| | Normal Condition / Single Fault Condition | | | | 100/300 | µA |
| EMI (Note 2~4.) | EN 60601-1-2 | | B | | | Class |
| | EN 55011 / CISPR 11 & FCC Part 18 | | B | | | |
| | EN 61000-3-2 | | A | | | |
| | EN 61000-3-3 | | | | | |
| EMS (Note 4.) | IEC 61000-4-2 | ±8KV air discharge, ±6KV contact discharge | A | | | Criteria |
| | IEC 61000-4-3 | 10V/m | A | | | |
| | IEC 61000-4-4 | ±2KV Line & PE | A | | | |
| | IEC 61000-4-5 | L-N:±1KV, L/N-PE:±2KV | A | | | |
| | IEC 61000-4-6 | 10Vrms | A | | | |
| | IEC 61000-4-8 | 10A/m | A | | | |
| | IEC 61000-4-11 | Voltage dips >95%, 0.5 cycle | A | | | |
| | | Voltage dips 30%, 25 cycles (Note 5.) | A / B | | | |
| | | Voltage dips 60%, 5 cycles (Note 5.) | A / B | | | |
| | | Voltage interruptions >95%, 250 cycles | B | | | |

Note: 1) Only exist when earth ground was connecting.
2) As a build-in type power supply, the power supply needs to be installed in a suitable enclosure to pass the EMI/EMC tests. The final assembly has to comply with the valid EMI/EMC and safety.
3) The mounting holes should be connected to each other to conforming the EMI limit.
4) Apply to output equal or below 100W, for higher output power, please re-confirm with us.
5) The test result of input 240Vac / 100Vac is criteria A / B.

## 8. Mechanical Specification

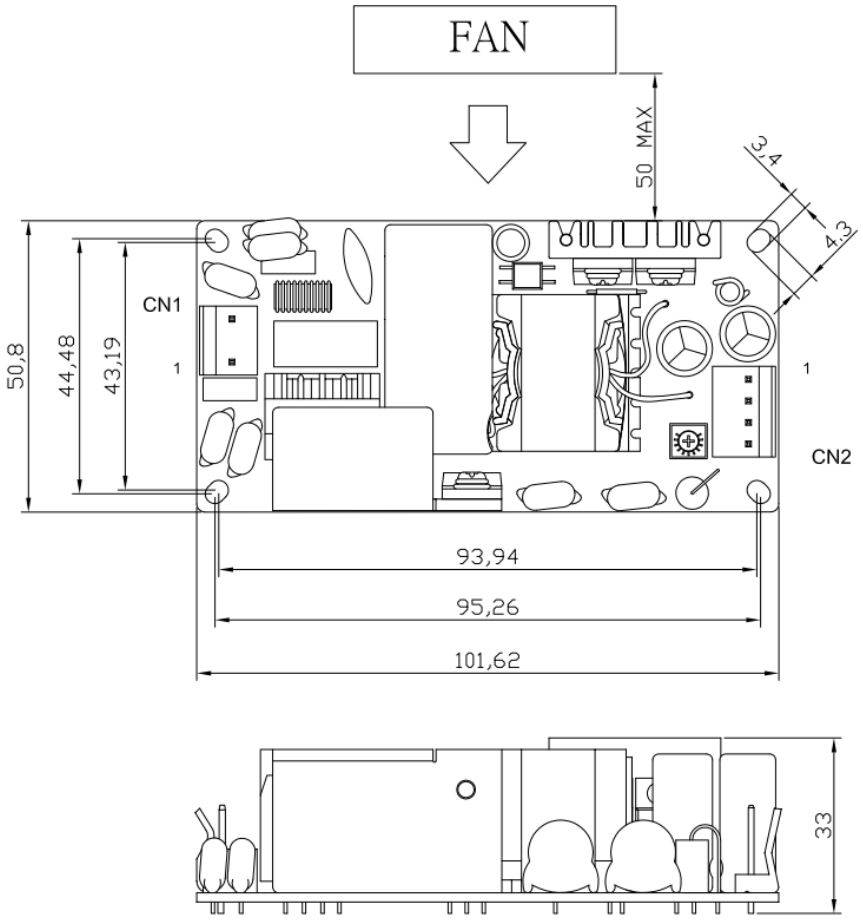
| Parameter | Conditions/Description | | | | |
|---|---|---|---|---|---|
| Dimension | 101.6 (L) x 50.8 (W) x 33.0 (H) mm, Tolerance +/- 0.4mm. | | | | |
| Connector & Pin Assignment | Location | Pin | Assignment | Proposed Housing | Proposed Terminals |
| | CN1 (Input) | 1 | AC in (L) | MOLEX: 09-05-1031 (5195-03) or 09-52-4034 (5239-03); JST: VHR-3N (Note 1) | MOLEX: 5194 or 5225 2478, 2578,5176 or 5168; JST: SVH-21T-P1.1 |
| | | 2 | AC in (N) | | |
| | CN2 (Output) | 1 | 0 V | MOLEX: 09-05-1061 (5195-04) or 09-52-4064 (5239-04); JST: VHR-4N (Note 1) | MOLEX: 5194 or 5225 2478, 2578,5176 or 5168; JST: SVH-21T-P1.1 |
| | | 2 | 0 V | | |
| | | 3 | + V | | |
| | | 4 | + V | | |

Note: 1) Exist with model no. suffixed -J, please see the comparison in paragraph 5.

### Mechanical drawing:

**MPM-S10X (X=3,5,6)**

**101.6 (L) x 50.8 (W) x 33.0 (H) mm, Tolerance +/- 0.4mm.**



**MPM-S10X-C (X= 3, 5, 6)**

**108.7 (L) x 58.0 (W) x 38.4 (H) mm, Tolerance +/- 0.4mm.**