

## MPU50 series

V1.1

## 50W External Medical Grade Power Supply

The MPU50 series of AC/DC switching mode power supplies provide 50 Watts of continuous output power. All supplies are UL94V-1 min compliant. All models meet FCC Part-18 class B and CISPR-11 EN55011 class B emission Limits and are designed to comply with UL/c-UL(UL 60601-1:2nd Edition), TUV/T-mark(IEC 60601-1:2nd Edition) and conformity assessment in CE marking. All units are 100% burned in and tested.

**RoHS2**  
2011/65/EU



### FEATURES:

- \* Wide Operating Voltage, 80 to 275 VAC, 47 to 63 Hz
- \* IEC-320-C14 Input Inlet
- \* Single to Triple Output
- \* Crowbar Mode Over Voltage Protection
- \* Ultra low earth leakage current < 0.1mA
- \* High Altitude of 5000m
- \* 5 year warranty

### APPLICATIONS:

- \* Patient Monitor
- \* Blood Pressure system
- \* Portable medical device
- \* ECG、EEG
- \* Medical Tablet

### GENERAL SPECIFICATION:

- \* **Short Circuit Protection:** Auto Recovery
- \* **Cooling:** Free Air Convection
- \* **Flammability Rating:** UL94V-1
- \* **Protection Classes:** Class I
- \* **Safety:** UL/c-UL(UL 60601-1:2ndEdition), TUV/T-mark(IEC 60601-1:2ndEdition)

### APPROVALS:



### Electrical Characteristics:

| Symbol | Characteristic                        | Condition  | Min.             | Typ. | Max.  | Unit  |
|--------|---------------------------------------|--|------------------|------|-------|-------|
| Vins   | Safety Approval Input Voltage Range   | Safety Approval & Specification in Label   | 100              |      | 240   | VAC   |
| Vin    | Input Operate Voltage Range           | Detail to see Fig.1 (Derate linearly from 100% load at 90VAC to 80% load at 80VAC) | 80               |      | 275   | VAC   |
| Fi     | Input Frequency                       | Sine wave  | 47               |      | 63    | Hz    |
| Po     | Output Power Range                    | See Rating Chart   |                  |      | 50    | W     |
| Iil    | Low Line Input Current                | Full Load, Vin=100VAC  |                  | 1.35 |       | A     |
| Iih    | High Line Input Current               | Full Load, Vin=240VAC  |                  | 0.80 |       | A     |
| IrL    | Low Line Input Inrush Current         | Full Load, 25°C, Cool start, Vin=100VAC  |                  |      | 35    | A     |
| IrH    | High Line Input Inrush Current        | Full Load, 25°C, Cool start, Vin=240VAC  |                  |      | 70    | A     |
| Ik     | Safety Ground Leakage Current         | Vin=240VAC, Fi=60Hz  |                  |      | 0.1   | mA    |
| η      | Efficiency                            | Full Load, Vin=230VAC, Detail to see Rating Chart                                  | See Rating Chart |      |       |       |
| ΔVoi   | Line Regulation                       | Full Load, Vin=100~120VAC or 200~240VAC  |                  |      | 1     | %     |
| OVP    | Over Voltage Protection               |  | 112              |      | 132   | %     |
| OLP    | Over Load Protection                  | Recovers automatically after fault condition is removed                            | 110              |      | 150   | %     |
| ttr    | Time of Transient Response            | Io=Full Load to Half Load, Vin=110VAC  |                  |      | 4     | ms    |
| thu    | Hold-Up Time                          | Full Load, Vin=110VAC  | See Rating Chart |      |       |       |
| ts     | Start-up time                         | Full Load, Vin=100~240VAC  |                  |      | 2     | s     |
| Ris    | Insulation Resistance                 |  | 50               |      |       | MΩ    |
| Tc     | Temperature Coefficient               | All Condition  |                  |      | ±0.04 | %/°C  |
| HV     | Dielectric Withstanding Voltage (P-S) | Primary to Secondary, limit current <10mA  |                  |      | 4000  | VAC   |
| Vpg    | Dielectric Withstanding Voltage (P-G) | Primary to PE, limit current <10mA   |                  |      | 1500  | VAC   |
| EMI    | EMC Emission                          | Compliance to EN55011 (CISPR11), EN60601-1-2                                       | B                |      |       | Class |

### Environmental:

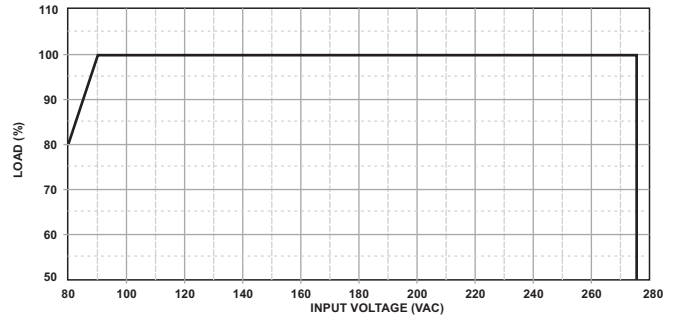
| Symbol | Characteristic                 | Condition  | Min. | Typ. | Max. | Unit |
|--------|--------------------------------|--|------|------|------|------|
| To     | Operating Temperature          | Detail to see Fig.2 (Derate linearly from 100% load at 50°C to 50% load at 70°C) | -10  |      | 70   | °C   |
| Ts     | Storage Temperature            | 10 ~ 95% RH  | -40  |      | 85   | °C   |
| Ho     | Operating Humidity             | non-condensing   | 0    |      | 95%  | RH   |
| Hs     | Storage Humidity               |  | 0    |      | 95%  | RH   |
| ESDa   | Electro Static Discharge       | Air Discharge, IEC61000-4-2  |      |      | 8    | kV   |
| ESDc   | Electro Static Discharge       | Contact Discharge, IEC61000-4-2  |      |      | 6    | kV   |
| MTBF   | Mean Time Between Failure      | Operating Temperature at 25°C, Calculated per MIL-HDBK-217F                      | 200k |      |      | h    |
| ELEV   | Operating Altitude (Elevation) | All condition  |      |      | 5000 | m    |
| VBR    | Vibration                      | 10 ~ 500Hz, 10min./1cycle, 60min. each along X, Y, Z axes                        |      |      | 5    | G    |
| Vsl    | Surge Voltage                  | Line-Neutral   |      |      | 1    | kV   |
| Vsg    | Surge Voltage                  | Line-PE & Neutral-PE   |      |      | 2    | kV   |

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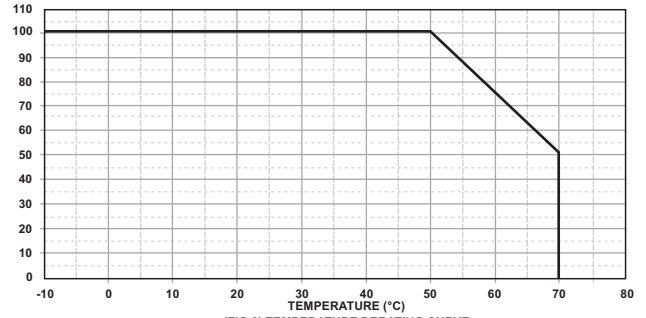
## 50W External Medical Grade Power Supply

### SPECIFICATION NOTE :

1. Output can provide up to peak load when the power supply starts up. Continuous staying in more than rated load is not allowed.
2. At factory, in 60% rated load condition, each output is checked to be within voltage accuracy.
3. Line regulation is defined by changing  $\pm 10\%$  of input voltage from nominal line at rated load.
4. Load regulation is defined by changing  $\pm 40\%$  of measured output load from 60% rated load.
5. Ripple & noise is measured by using 20MHz bandwidth limited oscilloscope and terminated each output with a 0.47uF capacitor at rated load and nominal line.
6. Hold up time is measured from the end of the last charging pulse to the time which the main output drops down to low limit of main output at rated load and nominal line.
7. Efficiency is measured at rated load, and nominal line.

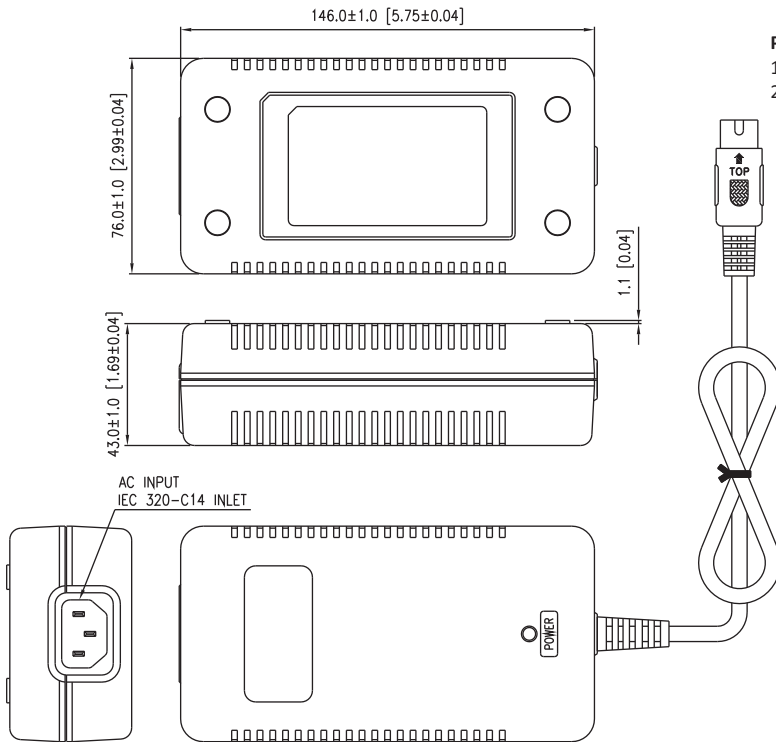


(FIG.1) INPUT VOLTAGE DERATING CURVE



(FIG.2) TEMPERATURE DERATING CURVE

### MECHANICAL DIMENSIONS: ( UNIT: mm )



### PACKING :

1. Net weight: 510~560g approx.
2. Optional output connectors available contact sales for details.

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### Rating Chart: (Single Output)

| MODEL NO. | Setting Voltage Range<br>(Factory setting, can't be adjusted) |       | Output Current<br>(Based on the output volt.) |       | Maximum<br>Output Power<br>(W) | Ripple & Noise<br>(mVp-p) | Total Regulation<br>(%) | Typ. Efficiency<br>(%) | Typ. No Load<br>Consumption<br>(W) | Hold-Up Time<br>(ms) | Protection Mode |
|-----------|---|-------|---|-------|--------------------------------|---------------------------|-------------------------|------------------------|------------------------------------|----------------------|-----------------|
|           | min   | max   | min   | max   |                                |                           |                         |                        |                                    |                      |                 |
|           | (VDC)   | (VDC) | (A)   | (A)   |                                |                           |                         |                        |                                    |                      |                 |
| MPU50-101 | 3.0   | 5.0   | 8.00  | 10.00 | 40                             | 100                       | ±5                      | 78.8                   | 2                                  | 16                   | Hiccup          |
| MPU50-102 | 5.0   | 6.0   | 6.66  | 8.00  | 40                             | 100                       | ±5                      | 78.8                   | 2                                  | 16                   | Hiccup          |
| MPU50-103 | 6.0   | 8.0   | 5.25  | 7.00  | 42                             | 100                       | ±5                      | 78.8                   | 3                                  | 16                   | Hiccup          |
| MPU50-104 | 8.0   | 11.0  | 4.00  | 5.63  | 45                             | 100                       | ±4                      | 78.8                   | 3                                  | 16                   | Hiccup          |
| MPU50-105 | 11.0  | 13.0  | 3.46  | 4.00  | 45                             | 100                       | ±3                      | 78.8                   | 3                                  | 16                   | Hiccup          |
| MPU50-106 | 13.0  | 16.0  | 2.81  | 3.46  | 45                             | 100                       | ±3                      | 78.8                   | 3                                  | 16                   | Hiccup          |
| MPU50-107 | 16.0  | 21.0  | 2.38  | 3.12  | 50                             | 100                       | ±3                      | 78.8                   | 3                                  | 16                   | Hiccup          |
| MPU50-108 | 21.0  | 27.0  | 1.85  | 2.30  | 50                             | 100                       | ±2                      | 78.8                   | 4                                  | 16                   | Hiccup          |
| MPU50-109 | 27.0  | 33.0  | 1.51  | 1.85  | 50                             | 100                       | ±2                      | 78.8                   | 4                                  | 16                   | Hiccup          |
| MPU50-110 | 33.0  | 40.0  | 1.25  | 1.51  | 50                             | 100                       | ±2                      | 78.8                   | 5                                  | 16                   | Hiccup          |
| MPU50-111 | 40.0  | 50.0  | 1.00  | 1.25  | 50                             | 100                       | ±2                      | 78.8                   | 6                                  | 16                   | Hiccup          |

### Rating Chart: (Multi Output)

| MODEL NO. | Setting Voltage Range<br>(Factory setting, can't be adjusted) |       | Output Current<br>(Based on the output volt.) |     | Maximum<br>Output Power<br>(W) | Ripple & Noise<br>(mVp-p) | Total Regulation<br>(%) | Typ. Efficiency<br>(%) | Typ. No Load<br>Consumption<br>(W) | Hold-Up Time<br>(ms) | Protection Mode |
|-----------|---|-------|---|-----|--------------------------------|---------------------------|-------------------------|------------------------|------------------------------------|----------------------|-----------------|
|           | min   | max   | min   | max |                                |                           |                         |                        |                                    |                      |                 |
|           | (VDC)   | (VDC) | (A)   | (A) |                                |                           |                         |                        |                                    |                      |                 |
| MPU50-200 | +3.3  |       | 0.5   | 5.0 | 40                             | 100                       | ±7                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +12.0   |       | 0.2   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-201 | +5.0  |       | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +12.0   |       | 0.2   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-202 | +5.0  |       | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +15.0   |       | 0.15  | 1.5 |                                | 100                       | ±6                      |                        |                                    |                      |                 |
| MPU50-203 | +5.0  |       | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +24.0   |       | 0.1   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-204 | +3.3  |       | 0.5   | 5.0 | 26.5                           | 100                       | ±7                      | 77.7                   | 3                                  | 16                   | Hiccup          |
|           | +5.0  |       | 0.2   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-209 | +12.0   |       | 0.3   | 3.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | -12.0   |       | 0.0   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-210 | +15.0   |       | 0.2   | 2.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | -15.0   |       | 0.1   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-215 | +5.0  |       | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | -24.0   |       | 0.1   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-216 | +5.1  |       | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +7.2  |       | 0.3   | 2.6 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-217 | +10.5   |       | 0.2   | 2.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | -10.5   |       | 0.0   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-218 | +5.0  |       | 0.5   | 5.0 | 35                             | 100                       | ±5                      | 77.7                   | 3                                  | 16                   | Hiccup          |
|           | -5.0  |       | 0.0   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |

### Rating Chart: (Multi Output)

| MODEL NO. | Setting Voltage Range<br>(Factory setting, can't be adjusted) | Output Current<br>(Based on the output volt.) |     | Maximum<br>Output Power<br>(W) | Ripple & Noise<br>(mVp-p) | Total Regulation<br>(%) | Typ. Efficiency<br>(%) | Typ. No Load<br>Consumption<br>(W) | Hold-Up Time<br>(ms) | Protection Mode |
|-----------|---|---|-----|--------------------------------|---------------------------|-------------------------|------------------------|------------------------------------|----------------------|-----------------|
|           |   | min   | max |                                |                           |                         |                        |                                    |                      |                 |
|           |   | (VDC)   | (A) |                                |                           |                         |                        |                                    |                      |                 |
| MPU50-300 | +3.3  | 0.5   | 5.0 | 42                             | 100                       | ±7                      | 77.7                   | 5                                  | 16                   | Hiccup          |
|           | +12.0   | 0.4   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -12.0   | 0.1   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-301 | +5.0  | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +12.0   | 0.2   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -5.0  | 0.0   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-302 | +5.0  | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +12.0   | 0.2   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -12.0   | 0.1   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-303 | +5.0  | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 4                                  | 16                   | Hiccup          |
|           | +15.0   | 0.4   | 2.0 |                                | 100                       | ±6                      |                        |                                    |                      |                 |
|           | -15.0   | 0.1   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-304 | +5.0  | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 6                                  | 16                   | Hiccup          |
|           | +24.0   | 0.2   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -24.0   | 0.0   | 0.5 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-305 | +5.0  | 0.5   | 5.0 | 42                             | 100                       | ±5                      | 77.7                   | 5                                  | 16                   | Hiccup          |
|           | +24.0   | 0.1   | 1.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -12.0   | 0.0   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
| MPU50-306 | +3.3  | 0.5   | 5.0 | 42                             | 100                       | ±7                      | 77.7                   | 5                                  | 16                   | Hiccup          |
|           | +12.0   | 0.4   | 2.0 |                                | 100                       | ±5                      |                        |                                    |                      |                 |
|           | -5.0  | 0.1   | 0.8 |                                | 100                       | ±5                      |                        |                                    |                      |                 |