

550W AC-DC Open frame Switching Power Supplies

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**RoHS
Compliant**

Features

- Universal 90V AC to 264V AC or 127V DC to 370V DC input voltage
- Compact size 5" × 3"
- Operating ambient temperature range: -40°C to +70°C
- Built-in active PFC function
- Output short circuit, over-current, over-voltage protection, over-temperature protection
- 320W with air cooling, 550W with 25CFM
- 5V DC Standby Output, 12V DC fan supply
- PG signal and remote sensing function
- Safety according to medical certification, suitable for BF application
- The base plate with conformal coating
- Operating Altitude upto 5000m
- Safety according to EN/UL/IEC62368, GB4943, EN/ES60601, EN60335

These series is one of AC-DC miniaturize open frame power supply and suitable for all kinds of BF type (be accessible to patients) medical system equipment. It features universal AC input and at the same time accepts DC input voltage, cost-effective, lowload power consumption, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC performance and meet IEC/EN61000, IEC/UL/EN62368, GB4943, EN60335, IEC/EN61558, IEC/EN/ES60601 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home, etc.

Selection Guide

| Certification | Part Number | Cooling Method | Output Power (W) | Nominal Output Voltage and Current (Vo/Io) | Output adj. Range (V) | Efficiency at 230V AC (%) Typ. | Max. Capacitive Load (μF) |
|---------------|---------------|----------------|------------------|--|-----------------------|--------------------------------|---------------------------|
| UL/EN | MPOF550-20B12 | Air cooling | 320.4 | 12V/26.7A | 11.4-12.6 | 91 | 6000 |
| | | 25CFM | 499.2 | 12V/41.6A | | | |
| UL/EN | MPOF550-20B24 | Air cooling | 321.6 | 24V/13.4A | 22.8-25.2 | 93 | |
| | | 25CFM | 549.6 | 24V/22.9A | | | |
| | MPOF550-20B48 | Air cooling | 321.6 | 48V/6.7A | 45.6-50.4 | 94 | 2000 |
| | | 25CFM | 550 | 48V/11.46A | | | |

Note: 1.*Under any conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power, when the output voltage is decreased, the output current cannot exceed the rated output current;
 2. *When measuring the full load efficiency, the fan should be connected to an external power supply. Fan loss is not included in the input power.
 3.*MPOF Products with shell is also available.

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| Input Specifications | | | | | | |
|----------------------|----------------------|------------------------|-------------|------|------|------|
| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
| Input Voltage Range | AC input | | 90 | -- | 264 | V AC |
| | DC input | | 127 | -- | 370 | V DC |
| Input Frequency | | | 47 | -- | 63 | Hz |
| Input Current | 115V AC | | -- | -- | 6.5 | A |
| | 230V AC | | -- | -- | 4 | |
| Inrush Current | 115V AC | Cold start | -- | 50 | -- | A |
| | 230V AC | | -- | 80 | -- | |
| Power Factor | 115V AC | Full Load | 0.98 | -- | -- | -- |
| | 230V AC | | 0.95 | -- | -- | |
| Leakage Current | 264V AC, 50Hz | Contact leakage curren | <0.1mA | | | |
| | | Earth leakage current | <0.5mA | | | |
| Hot Plug | | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|----------------------------|---|-------------|---|-------|---|------|
| Output Voltage Accuracy* | Full load | 12V/24V | -- | ±2 | -- | % |
| | | 48V | -- | ±1 | -- | |
| Line Regulation | Rated load | | -- | ±0.5 | -- | |
| Load Regulation | 0% - 100% load | | -- | ±1 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | | -- | -- | 200 | mV |
| Temperature Coefficient | | | -- | ±0.03 | -- | %/°C |
| Minimum Load | | | 0 | -- | -- | % |
| Hold-up Time | 115V AC input | | 10 | - | -- | ms |
| | 230V AC input | | 10 | - | | |
| Stand-by Power Consumption | Room temperature, 230V AC input (PS-ON low level) | 12V/24V/48V | -- | -- | 0.6 | W |
| Short Circuit Protection | Recover time <10s after the short circuit disappear | 12V/24V/48V | Hiccup mode, constant current works 1s, turnoff 10s, continuous, self-recover | | | |
| Over-current Protection | | | ≥105%Io, hiccup, self-recover | | | |
| Over-voltage Protection | 12V | | ≤15.6V DC | | Output voltage turn off, re-power on for recove | |
| | 24V | | ≤31.2V DC | | | |
| | 48V | | ≤60.0V DC | | | |







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| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|--|---|--|------|------|------|
| Over-temperature Protection | | | Protection when over-temperature, recover automatically after the temperature drops. | | | |
| Fan Power* | | | Offer output power of 12V/0.5A | | | |
| PS_ON Input Signal* | Power on | PS_ON High | 2 | -- | 5 | V |
| | Power off | PS_ON Low | 0 | -- | 0.5 | |
| PG Signal* | Power on | The PG signal goes high with 10ms to 500ms delay after power set up | 10 | -- | 500 | ms |
| | Power off/Power fail | The TTL signal goes low at least 1ms before output below 90% of rated value | 1 | -- | -- | |
| | High level | High | 2 | -- | 6 | V |
| | Low level | Low | 0 | -- | 0.6 | |
| Remote Sense* | When RS+ and RS- are connected to the system, with function of remote voltage compensation, if not needed, left RS+ and RS- Open | | | | | |
| 5V Standby | 5Vsb: The load capacity is 0.6A without fan; the load capacity is 1A with fan 25CFM, tolerance 2%, ripple: 120mVp-p(max.) | | | | | |
| <p>Note: 1.*Output Voltage Accuracy: including setting error, line regulation, load regulation; 2.*The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor (Low ESR) and 0.1uF ceramic capacitor. 3.*For fan power connection method, please refer to 5, 6 in the external dimension drawing; 4.*For PS_ON, 5V standby connection method, please refer to CN6 in the external dimension drawing; 5.*For PG standby connection method, please refer to CN2 in the external dimension drawing;</p> | | | | | | |

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| General Specifications | | | | | | | | |
|------------------------|--|---|----------------|---|------|------|--------|---------|
| Item | | Operating Conditions | | Min. | Typ. | Max. | Unit | |
| Isolation Test | Input - output | Electric strength test for 1min. leakage current <5mA | | 4000 | - | -- | V AC | |
| | Input -  | | | 2000 | | -- | | |
| | Output -  | | | 1500 | | -- | | |
| Insulation Resistance | Input - output | Environment temperature: 25 ± 5°C | | 100 | - | -- | MΩ | |
| | Input -  | Relative humidity: < 95%RH, noncondensing | | 100 | | -- | | |
| | Output -  | Test voltage: 500V DC | | 100 | | -- | | |
| Isolation level | Input - output | | | 2 × MOPP | | | | |
| | Input -  | | | 1 × MOPP | | | | |
| | Output -  | | | 1 × MOPP | | | | |
| Operating Temperature | | | | -40 | - | +70 | °C | |
| Storage Temperature | | | | -40 | | +85 | | |
| Storage Humidity | | Non-condensing | | 10 | | 95 | %RH | |
| Operating Humidity | | | | 20 | | 90 | | |
| Switching Frequency | | | | -- | | | KHz | |
| Power Derating | 25CFM | Operating temperature derating | | -40°C to +50°C | 0 | - | % / °C | |
| | | | | +50°C to +70°C | 2.5 | | | |
| | Air cooling | 230V/ 320W | | +45°C to +50°C | 4 | | - | W / °C |
| | | | | | | | | |
| | | 115V/310W | | +30°C to +40°C | 1 | | | |
| | | | | | | | | |
| | | | +50°C to +60°C | 4 | | | | |
| | Input voltage derating | 90VAC -115VAC | | | 1 | | - | % / VAC |
| 115VAC - 264VAC | | | 0 | | | | | |
| 127VDC -160VDC | | | 0.76 | % / VDC | | | | |
| 160VDC - 370VDC | | | 0 | | | | | |
| Safety Standard | | 12V/24V/48V | | UL62368-1 safety approved & EN62368-1(Report) Design refer to IEC62368-1, GB4943.1, EN60335-1, IEC/ES/ EN60601-1 | | | | |
| Safety Class | | | | CLASS I | | | | |
| MTBF | | MIL-HDBK-217F@25°C | | ≥200,000 h | | | | |

| Mechanical Specifications | |
|---|---|
| Case Material | Open frame |
| Dimensions | 127mm × 76.2mm × 40.5mm |
| Weight | 490g (Typ.) |
| Cooling Method* | Air cooling (310W/320W) / 25CFM (500W/550W) |
| Note: *Please refer to the product characteristic curve for cooling method and power derating | |

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Electromagnetic Compatibility (EMC)*

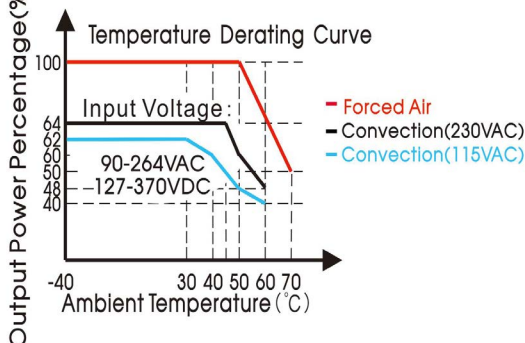
| | | | | |
|-----------|----------------------|---|---|------------------|
| Emissions | CE | EN55032(CISPR32)/EN55011(CISPR11) CLASS B | | |
| | RE | EN55032(CISPR32)/EN55011(CISPR11) CLASS B | | |
| | Harmonic current | IEC/EN61000-3-2 | CLASS A and CLASS D | |
| | Flicker | IEC/EN61000-3-3 | | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact $\pm 8\text{KV}$ /Air $\pm 15\text{KV}$ | Perf. Criteria A |
| | RS | IEC/EN61000-4-3 | 10V/m | Perf. Criteria A |
| | EFT | IEC/EN 61000-4-4 | $\pm 2\text{KV}$ | Perf. Criteria A |
| | Surge | IEC/EN61000-4-5 | line to line $\pm 2\text{KV}$, line to ground $\pm 4\text{KV}$ | Perf. Criteria A |
| | CS | IEC/EN61000-4-6 | 10 Vr.m.s | Perf. Criteria A |
| | DIP IEC/EN61000-4-11 | 0%, 70% | IEC/EN61000-4-11 | 0%, 70% |

Note: 1.*The power Should be considered as part of the components in the system, All EMC performance are been tested on a metal plate with a thickness of 1mm and a length of 360mm x 360mm. The power supply should be combined with the terminal equipment for electromagnetic compatibility confirmation

Product Characteristic Curve

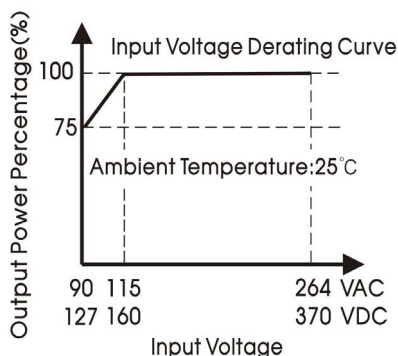
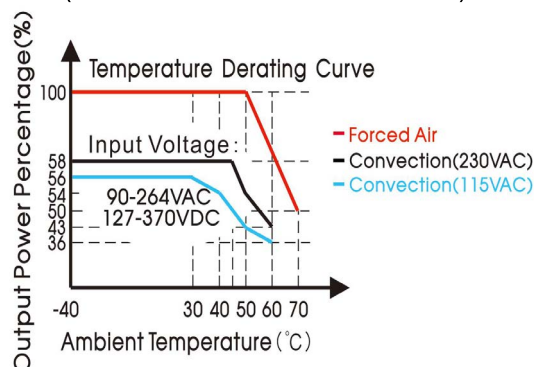
MPOF550-20B12

(full load 500W with Forced Air)



MPOF550-20B24/ MPOF550-20B48

(full load 550W with Forced Air)



Note: With an AC input voltage between 90 - 115V AC and a DC input between 127 - 160V DC the output power must be derated as per the temperature derating curves

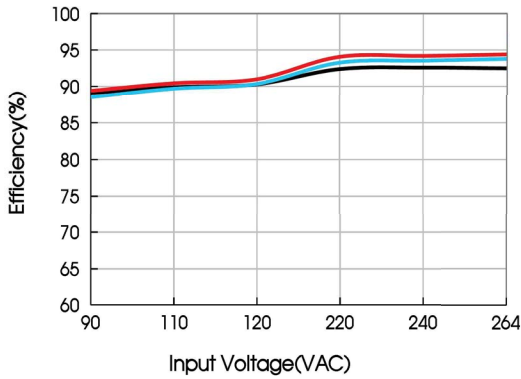
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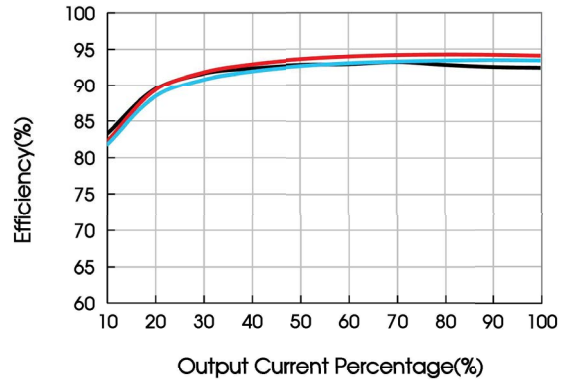
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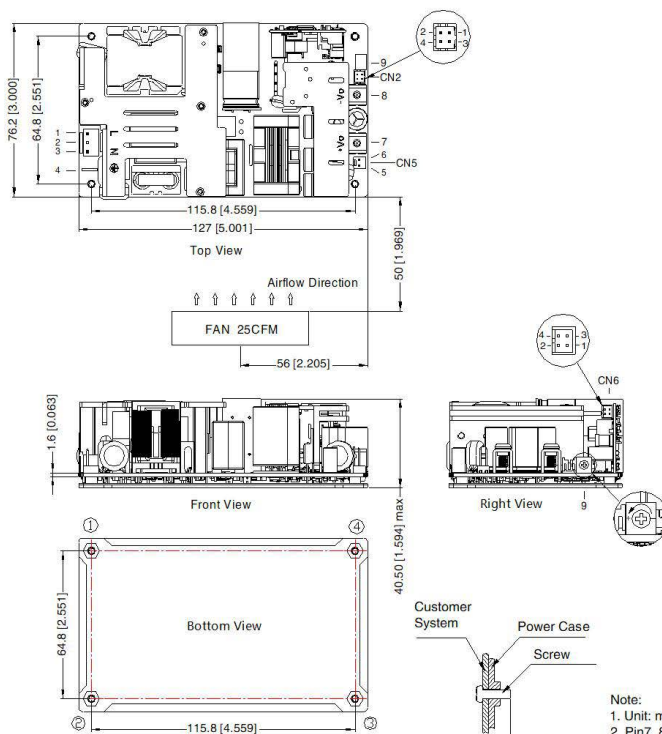
Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load



Dimensions and Recommended Layout



| Position | Screw Spec. | L(Recommend) | Torque(max) |
|----------|-------------|--------------|-------------|
| ①-④ | M3 | 2.5mm | 0.4N · m |

| Pin-Out | | Customer Connector |
|---------|-------|--|
| 1 | AC(L) | Housing: JST VHR-3 or equivalent |
| 2 | NC | Contact: JST SVH-21T-P1.1 or equivalent |
| 3 | AC(N) | |
| 4 | (⊕) | Contact: JST SPS-21T-250 |
| 5 | FAN+ | CN5: Fan power output port Housing: TKP 2502 or Molex0511910200 or equivalent |
| 6 | FAN- | Contact: TKP 54T or Molex0508028100 or equivalent |
| 7 | +Vo | |
| 8 | -Vo | |
| 9 | ADJ | Output adjustable resistor |

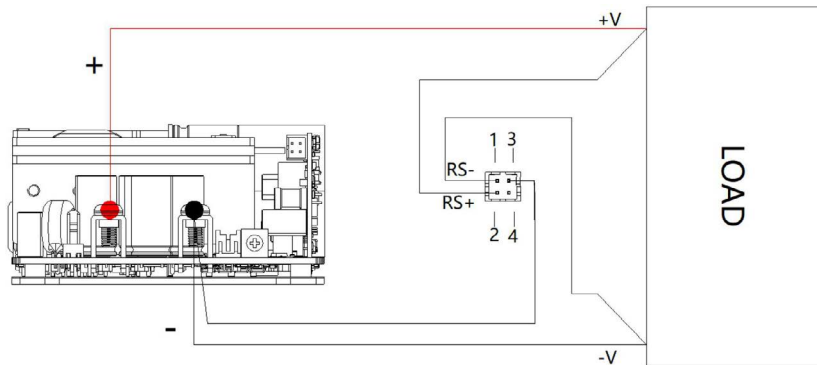
| Pin-Out | | Customer Connector |
|---------|-------|--|
| 1 | +5V | Housing: TKP DH2-4P or HRS DF11-4DS-2C or equivalent |
| 2 | GND | Contact: TKP DHT or HRS DF11-225C or equivalent |
| 3 | PS-ON | |
| 4 | GND | |

| Pin-Out | | Customer Connector |
|---------|-----|--|
| 1 | RS- | Housing: TKP DH2-4P or HRS DF11-4DS-2C or equivalent |
| 2 | RS+ | Contact: TKP DHT or HRS DF11-225C or equivalent |
| 3 | GND | |
| 4 | PG | |

- Note:
- Unit: mm[inch]
 - Pin7, 8 connector tightening torque: M4, 1.2N · m(max)
 - General tolerances: $\pm 1.00[\pm 0.039]$
 - The layout of the device is for reference only, please refer to the actual product
 - It is recommended 10mm distance between the PCB and other components for safety purpose
 - Class I system ①②④ positions must be connected to the earth (⊕)

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Remote sensing function wiring diagram

Note:

1. RS- and RS+ cannot be shorted or reversed, otherwise the power module will be damaged;
2. The remote compensation function can compensate the voltage drop on the output cable, which includes the sum of the cable drop connected to the output positive terminal and the output negative terminal;
3. If you need to use remote compensation function, the signal pin needs to be connected with the load and with a twisted pair,

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity < 75%RH with nominal input voltage and rated output load;
2. In order to improve the efficiency, there will be audible noise generated when work at light load, but it does not affect product performance and reliability;
3. The out case needs to be connected to PE (\oplus) of system when the terminal equipment in operating;
4. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing."/"ATTENTION: Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien;
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
6. The power supply is considered a component which will be installed into a terminal equipment.

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