



AUTORANGING INPUT

SM201P SERIES 150-200 WATT MEDICAL SWITCHING POWER SUPPLIES

GENERAL SPECIFICATIONS

| | |
|-----------------------------|--|
| Construction | PCB open frame, cover-and-fan option |
| Connectors / Terminals | PCB header pins |
| Switching Frequency | 88K to 112KHz |
| Efficiency | 70% minimum all models |
| Dielectric Isolation | 4000VAC from input to output 1500VAC from input to ground 500VAC from output to ground |
| MTBF (per MIL-HDBK-217F) | 350,000 hours minimum at full load at 25 °C ambient |

FEATURES

- ◆ Low safety ground leakage current
- ◆ Power Fail Detect (PFD) signal
- ◆ Remote inhibit input disables DC output
- ◆ Meets EN55011, FCC Class B, EN60601-1-2, EN61000
- ◆ Compact size 4" x 7" PCB x 1.5" height
- ◆ Optional cover-and-fan assembly
- ◆ 100% burn-in at full rated load
- ◆ Wide range input 90 to 264VAC
- ◆ Overcurrent, Short-circuit and Overvoltage protections
- ◆ Power Factor 0.98 typical
- ◆ Compliant with RoHS requirements

DESCRIPTION

This series of switching power supplies are specially designed for non-patient contact medical applications. They are capable of delivering 150 to 200 watts of continuous DC output power. Construction is open PCB construction with a U-bracket for mechanical support and heat sinking. They operate at 90 to 264VAC input voltage without the need for voltage selection. All auxiliary outputs are equipped with magnetic amplifiers or linear regulators for keeping regulation. A cover-and-fan assembly can be added during manufacturing.

INPUT SPECIFICATIONS

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|--|--|
| Input Voltage | 90 to 264 VAC (auto select). |
| Input Frequency | 47 to 63 Hz |
| Input Current | 3.2A rms @ 115VAC 1.6A rms @ 230 VAC |
| Inrush Current (at 25°C cold start) | 20 amps @ 115VAC 40 amps @ 230VAC |
| Leakage Current (Touch current) | 90µA max @ 115VAC 60Hz 150µA max @ 230VAC 50Hz |
| Remote Inhibit | TTL 'high' external input to inhibit outputs for standard models. |

ENVIRONMENTAL

| | |
|-----------------------|--|
| Operating Temperature | 0 °C to +70 °C. |
| Storage Temperature | -40 °C to +85 °C |
| Operating Humidity | 5% to 95% RH, non-condensing |
| Cooling | 10.8 CFM forced air provided on "C" version. 25 CFM forced air to be provided by user for "B" version. |

OUTPUT SPECIFICATIONS

| | |
|--|---|
| Total Output Power | Refer to Rating Chart for each model |
| Derating Output Power | Derate from 100% @ +50 °C linearly to 50% @ +70 °C |
| Output Voltage / Current, Adjustability, Peak Current | Refer to Rating Chart for each model |
| Minimum Load | No minimum load required |
| Hold Up Time | 20 mSec min @ 110 VAC |
| Line Regulation | ±0.5% max at full load |
| Over / Undershoot | None at turn on or turn off |
| Ripple and Noise | 2% peak to peak max |
| Overvoltage Protection | Only on Output #1. Setting at 112-132% of Vnom output voltage. |
| Overcurrent / Short Circuit Protection | Continuous protection with automatic recovery. |
| Temperature Coefficient | ±0.04% / °C max for all outputs |
| Transient Response | Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 uS after a 25% step load change |
| PFD Signal | TTL 'high' for normal or 'low' upon loss of input power. Valid < 1mS before +5V output drops 5% below nominal value. Valid 100 mS delayed after +5V is within regulation. |

EMC and SAFETY (1)

| | |
|------------------------------------|--|
| EMC Performance Standard | EN60601-1-2: 2001 |
| | EN61000-3-2, -3-3, -4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11 |
| EN55011, FCC-15, VCCI | Class-B Conducted, Radiated |
| Safety Standards (certified to) | UL508, EN60950-1 (TUV), CE, UL60601-1, CSA C22.2 No 601.1 |

(1) Products are rated for industrial environments and are not to be used nor are warranted in aerospace or life-support medical applications.

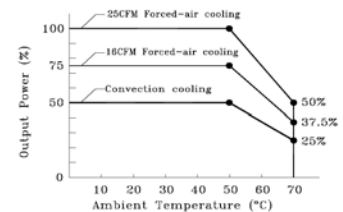


OUTPUT VOLTAGE / CURRENT RATINGS

| MODEL | Output #1 | | | | Output #2 | | | | Output #3 | | | | Output #4 | | | | Max Output Power |
|------------|-----------|------|-------|-----|-----------|------|------|-----|-----------|------|------|-----|-----------|------|------|-----|------------------|
| | Vnom | Imin | Imax | Tol | Vnom | Imin | Imax | Tol | Vnom | Imin | Imax | Tol | Vnom | Imin | Imax | Tol | |
| SM201P10 | +5.1V | 3.0A | 35A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 175W |
| SM201P10-3 | +3.3V | 3.0A | 46A | 3% | - | - | - | - | - | - | - | - | - | - | - | - | 150W |
| SM201P12 | +12V | 1.2A | 16.7A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 200W |
| SM201P13 | +15V | 1.0A | 13.4A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 200W |
| SM201P14 | +24V | 0.6A | 8.4A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 200W |
| SM201P16 | +30V | 0.5A | 6.7A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 200W |
| SM201P18 | +48V | 0.5A | 4.2A | 2% | - | - | - | - | - | - | - | - | - | - | - | - | 200W |
| SM201P23 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | - | - | - | - | - | - | - | - | 200W |
| SM201P24 | +5.1V | 3.0A | 30A | 2% | +15V | 0A | 6A | 4% | - | - | - | - | - | - | - | - | 200W |
| SM201P25 | +5.1V | 3.0A | 30A | 2% | +24V | 0A | 4A | 4% | - | - | - | - | - | - | - | - | 200W |
| SM201P27 | +12V | 1.0A | 8.7A | 2% | +24V | 0A | 4A | 4% | - | - | - | - | - | - | - | - | 200W |
| SM201P30 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -5V | 0A | 6A | 4% | - | - | - | - | 200W |
| SM201P31 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -12V | 0A | 4A | 4% | - | - | - | - | 200W |
| SM201P32 | +5.1V | 3.0A | 30A | 2% | +15V | 0A | 6A | 4% | -15V | 0A | 4A | 4% | - | - | - | - | 200W |
| SM201P33 | +5.1V | 3.0A | 30A | 2% | +15V | 0A | 6A | 4% | -12V | 0A | 4A | 4% | - | - | - | - | 200W |
| SM201P36 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | +24V | 0A | 4A | 4% | - | - | - | - | 200W |
| SM201P40 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -12V | 0A | 4A | 4% | +5V | 0A | 6A | 4% | 200W |
| SM201P41 | +5.1V | 3.0A | 30A | 2% | +15V | 0A | 6A | 4% | -15V | 0A | 4A | 4% | +24V | 0A | 4A | 4% | 200W |
| SM201P42 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -12V | 0A | 4A | 4% | +12V | 0A | 4A | 4% | 200W |
| SM201P44 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -15V | 0A | 4A | 4% | +15V | 0A | 4A | 4% | 200W |
| SM201P45 | +5.1V | 3.0A | 30A | 2% | +12V | 0A | 8A | 4% | -12V | 0A | 4A | 4% | +24V | 0A | 4A | 4% | 200W |
| SM201P40-3 | +3.3V | 3.0A | 30A | 3% | +5.1V | 0A | 8A | 4% | -12V | 0A | 4A | 4% | +12V | 0A | 4A | 4% | 175W |

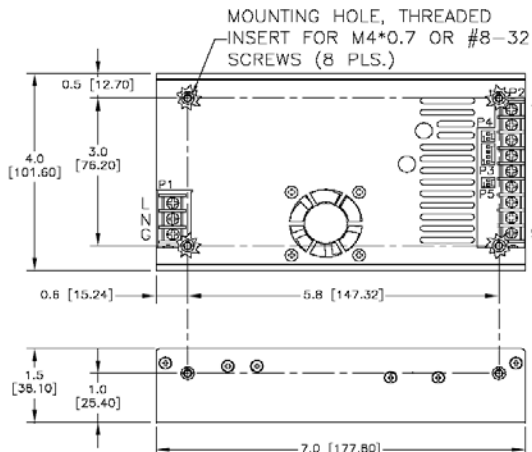
NOTES

1. Add suffix "B" for U-bracket format and "C" for enclosed format with option fan control, e.g. SM201-45C.
2. Peak current is 12A on +12V, 9A on +15V and 6A on +24V.
3. Output #4 is floating. It can be connected externally for positive or negative output.
4. 200 watts for "C" version with a cover-and-fan assembly. 100 watts for "B" version without moving air (maximum current of output #1 & #2 derated to 50%), or 200 watts with 25 CFM forced air provided by user.
5. When the remote Sense facility is not used, +Sense must be connected to +V, and -Sense to return, on P2 connector.
6. All models may be operated at no-load. At no-load, output voltage tolerance increases to 10%.



DERATING CURVE

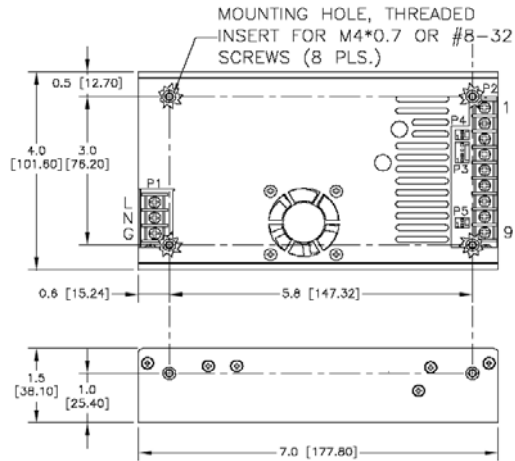
MECHANICAL SPECIFICATIONS (mm / inches)



Single Output Models

NOTES:

1. Dimensions shown in inch [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03 output connector P2 is Dinkle DT-35-B01W-09 screws are M3, Nickel plated.
4. Connector P3 mates with Molex housing 22-01-1043 and Molex 40445 series crimp terminal.
5. Connectors P4, P5 mates with Molex housing 22-01-1023 and Molex 40445 series crimp terminal.
6. P4 is for DC fan rated 12V/0.2A, Pin1 +V and Pin2 COM.
7. Weight:
0.82 kgs. (1.83 lbs.) approx. for "B" version,
0.96 kgs. (2.14 lbs.) approx. for "C" version



Multiple Output Models

NOTES:

1. Dimensions shown in inch [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03 output connector P2 is Dinkle DT-35-B01W-09 screws are M3,Nickel plated.
4. Connector P3 mates with Molex housing 22-01-1043 and Molex 40445 series crimp terminal.
5. Connectors P4, P5 mates with Molex housing 22-01-1023 and Molex 40445 series crimp terminal.
6. P4 is for DC fan rated 24V/0.2A (models SM201-25/27) or 5V/0.38A (models SM201-40-3), and 12V/0.2A (other models, Pin1 +V and Pin2 COM).
7. Weight:
0.82 kgs. (1.83 lbs.) approx. for "B" version,
0.96 kgs. (2.14 lbs.) approx. for "C" version

PIN ASSIGNMENTS

All Models: P1 is AC INPUT: (1) L-Line, (2) N-Neutral, (3) G-Ground.

| MODEL | CONN.: PIN: | | | P 2 | | | | | | P 3 | | | | P 5 | |
|--|----------------|--------|--------------|--------------|--------------|--------|--------|---------------|--------|-----|--------------|--------------|-----|--------------|--------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 1 | 2 |
| SM201P10 SM201P12 SM201P14 SM201P18 SM201P10-3 SM201P13 SM201P16 | - SENSE | RET. | RET. | RET. | RET. | OUT #1 | OUT #1 | OUT #1 | + | FAN | COM. RET. | COM. RET. | PFD | INHIBIT + | INHIBIT - |
| SM201P23 SM201P25 SM201P24 SM201P27 | OUT #1 | OUT #1 | COM. RET. | COM. RET. | COM. RET. | OUT #2 | N.C. | N.C. | N.C. | FAN | COM. RET. | COM. RET. | PFD | INHIBIT + | INHIBIT - |
| SM201P30 SM201P32 SM201P31 SM201P33 | OUT #1 | OUT #1 | COM. RET. | COM. RET. | COM. RET. | OUT #2 | OUT #3 | N.C. | N.C. | FAN | COM. RET. | COM. RET. | PFD | INHIBIT + | INHIBIT - |
| SM201P36 | OUT #1 | OUT #1 | COM. RET. | COM. RET. | COM. RET. | OUT #2 | N.C. | OUT #3 RET | OUT #3 | FAN | COM. RET. | COM. RET. | PFD | INHIBIT + | INHIBIT - |
| SM201P40 SM201P41 SM201P44 SM201P40-3 SM201P42 SM201P45 | OUT #1 | OUT #1 | COM. RET. | COM. RET. | COM. RET. | OUT #2 | OUT #3 | OUT #4 RET | OUT #4 | FAN | COM. RET. | COM. RET. | PFD | INHIBIT + | INHIBIT - |