Open Frame

Size: 5in x 3in x 1.58in

Enclosed

Size: 5in x 3.41in x 1.97in

Enclosed with Fan 1

Size: 5in x 3.41in x 1.97in

Enclosed with Fan 2

Size: 5.83in x 3.15in x 1.60in

## OPTIONS

- Package Type
  -Open Frame
  -Enclosed
- Fan Type
  -Top Fan
  -Side Fan
- Fan Speed
  -Fixed
  -Variable

## APPLICATIONS

- Medical
- Automation
- Datacom
- IPC
- Industrial
- Measurement
- Telecom

## FEATURES

- Input Voltage Range of 85~264VAC
- Adjustable Output Voltage
- Low Leakage Current
- Low Standby Current
- Power Good
- Very High Efficiency
- RoHS Compliant
- REACH Compliant
- 5 Year Warranty
- Over Load, Over Voltage, and Short Circuit Protection
- Input Protection
- Protection Class I
- Remote ON/OFF
- 2xMOPP
- 4000VAC Reinforced Insulation
- Designed to Meet IEC/EN/ANSI/AAMI ES 60601-1 & IEC/EN/UL 60950-1

## DESCRIPTION

The PSMAC450 series of AC/DC medical power supplies offers up to 450 watts of output power in an open frame or enclosed package. This series consists of adjustable single output models with a wide input voltage range of 85~264VAC. Features of this series include low leakage and standby current, high efficiency, power good, remote on/off, input protection, as well as over load, over voltage, and short circuit protection. This series is both RoHS and REACH compliant, has 2xMOPP, complies with protection class I, and is designed to meet IEC/EN/ANSI/AAMI ES 60601-1 & IEC/EN/UL 60905-1. Please contact factory for order details.

**MODEL SELECTION TABLE**

**Fan Connector Models**

| Model Number[1] | Input Voltage Range | Output Voltage | Output Current | | | Ripple & Noise | No Load Input Power | Efficiency | Output Power | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Natural Convection | Conduction Cooling | Forced Air 21 CFM External Fan | | | | Natural Convection | Conduction Cooling | Forced Air |
| PSMAC450-12Sx (Y) | 85~264VAC (120-370VDC) | 12VDC | 20.8A | 23.3A | 37.5A | 250mVp-p | 0.3W | 91% | 250W | 280W | 450W |
| PSMAC450-15Sx (Y) | | 15VDC | 16.6A | 18.6A | 30.0A | 300mVp-p | 0.3W | 92% | 250W | 280W | 450W |
| PSMAC450-24Sx (Y) | | 24VDC | 13.3A | 14.55A | 18.75A | 240mVp-p | 0.5W | 93% | 320W | 350W | 450W |
| PSMAC450-28Sx (Y) | | 28VDC | 11.4A | 12.5A | 16.1A | 280mVp-p | 0.5W | 93% | 320W | 350W | 450W |
| PSMAC450-48Sx (Y) | | 48VDC | 6.65A | 7.3A | 9.4A | 480mVp-p | 0.5W | 94% | 320W | 350W | 450W |
| PSMAC450-53Sx (Y) | | 53VDC | 6.05A | 6.6A | 8.55A | 530mVp-p | 0.5W | 94% | 320W | 350W | 450W |

**MODEL SELECTION TABLE**

**Top & Side Fan Models**

| Model Number[2] | Input Voltage Range | Output Voltage | Output Current | Ripple & Noise | No Load Input Power | Efficiency | Output Power |
|---|---|---|---|---|---|---|---|
| | | | Forced Air-Internal Fan | | | | |
| PSMAC450-12SEz | 85~264VAC (120~370VDC) | 12VDC | 37.5A | 250mVp-p | 0.4W | 91% | 450W |
| PSMAC450-15SEz | | 15VDC | 30.0A | 300mVp-p | 0.4W | 92% | |
| PSMAC450-24SEz | | 24VDC | 18.75A | 240mVp-p | 0.8W | 93% | |
| PSMAC450-28SEz | | 28VDC | 16.1A | 280mVp-p | 0.8W | 93% | |
| PSMAC450-48SEz | | 48VDC | 9.4A | 480mVp-p | 0.8W | 94% | |
| PSMAC450-53SEz | | 53VDC | 8.55A | 530mVp-p | 0.8W | 94% | |

## SPECIFICATIONS

All specifications are based on 25°C, Full Load, and 230VAC Input unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **INPUT SPECIFICATIONS** | | | | | | |
| Operating Input Voltage Range | AC Input | | 85 | | 264 | VAC |
| | DC Input | | 120 | | 370 | VDC |
| Input Frequency | AC Input | | 47 | | 63 | Hz |
| Input Current | 100VAC, Full Load | | | | 5.8 | A |
| | 240VAC, Full Load | | | | 2.4 | |
| No Load Input Power | 230VAC | | See Table | | | |
| Leakage Current | 264VAC | | | | 100 | µA |
| Power Factor | | | 0.95 | | | |
| Input Inrush Current | 230VAC | | | | 100 | A |
| Input Protection | Internal Fuse In Line and Neutral | | T6.3A/250VAC | | | |
| **OUTPUT SPECIFICATIONS** | | | | | | |
| Output Voltage | | | See Table | | | |
| Initial Set Voltage Accuracy | 230VAC, Full Load | | -1.0 | | +1.0 | % |
| Line Regulation | Low Line to High Line, Full Load | | -0.2 | | +0.2 | % |
| Load Regulation | No Load to Full Load | | -0.5 | | +0.5 | % |
| | 10% Load to 90% Load | | -0.4 | | +0.4 | |
| Voltage Adjustability | | | -8 | | +8 | % |
| Output Power[3] | Forced Air Cooling | All | | | 450 | Watts |
| | Conduction Cooling @230VAC | 12VDC, 15VDC Output Models | | | 280 | |
| | | Others | | | 350 | |
| | Natural Convection @230VAC | 12VDC, 15VDC Output Models | | | 250 | |
| | | Others | | | 320 | |
| Output Current | | | See Table | | | |
| Minimum Load | | | | 0 | | % |
| Ripple & Noise (20MHz BW) | With a 1µF/25V 1206 X7R MLCC | 12VDC Output | | 250 | | mVp-p |
| | | 15VDC Output | | 300 | | |
| | With a 1µF/50V 1206 X7R MLCC | 24VDC Output | | 240 | | |
| | | 28VDC Output | | 280 | | |
| | | 48VDC Output | | 480 | | |
| | With a 0.1µF/100V 1206 X7R MLCC | 53VDC Output | | 530 | | |
| Transient Response | Load step from 50~75% change at 2.5A/µs | Peak Deviation | | 3 | | %Vout |
| | | Recovery Time | | 600 | | µs |
| Start-Up Time | | | | | 2000 | ms |
| Rise Time | | | | 30 | | ms |
| Hold Up Time | 115VAC, Full Load | | | 14 | | ms |
| Temperature Coefficient | | | -0.02 | | +0.02 | %/ºC |
| Standby Power Supply | | | 5V at 2000mA | | | |
| Fan Power Supply | | | 12V at 500mA | | | |
| **PROTECTION** | | | | | | |
| Short Circuit Protection | Protection Level 1 (Nominal) | | Continuous, Automatic Recovery | | | |
| | Protection Level 2 (Instantaneous High Current) | | Latch | | | |
| Over Load Protection | % of Iout Rated; Hiccup Mode | | 115 | | 155 | % |
| Over Voltage Protection | % of Vout(nom); Latch Mode | | 110 | | 135 | % |
| **ENVIRONMENTAL SPECIFICATIONS** | | | | | | |
| Operating Temperature | With derating | Fan Connector Mode Models | -40 | | +85 | ºC |
| | | Top & Side Fan Models | -40 | | +80 | |
| Storage Temperature | Fan Connector Mode Models | | -40 | | +85 | ºC |
| | Top & Side Fan Models | | -40 | | +75 | |
| Operating Altitude | | | | | 5000 | m |
| Relative Humidity | Non-Condensing | | 5 | | 95 | %RH |
| Thermal Shock | | | MIL-STD-810F | | | |
| Shock | | | IEC60068-2-27 | | | |
| Vibration | | | IEC60068-2-6 | | | |
| MTBF | MIL-HDBK-217F, Ta=25ºC, Full Load | | | 409,300 | | Hours |

## SPECIFICATIONS

All specifications are based on 25°C, Full Load, and 230VAC Input unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **GENERAL SPECIFICATIONS** | | | | | | |
| Efficiency | | | | See Table | | |
| Switching Frequency | 230VAC, Full Load | 15VDC Output Models | | 75 | | kHz |
| | | Others | | 65 | | |
| Isolation Voltage | 1 minutes (2MOPP insulation) | Input to Output | 4000 | | | VAC |
| | | Input (Output) to F.G. | 2500 | | | |
| Isolation Resistance | 500VDC | | 0.1 | | | |
| **PHYSICAL SPECIFICATIONS** | | | | | | |
| Weight | Open Frame Models | | | 16.29oz (462g) | | |
| | Enclosed Fan Connector Mode Models | | | 17.77oz (504g) | | |
| | Top Fan Models | | | 18.48oz (524g) | | |
| | Side Fan Models | | | 19.47oz (552g) | | |
| Dimensions (L x W x H) | Open Frame Models | | | 5in x 3in x 1.58in (127mm x 76.2mm x 40.1mm) | | |
| | Enclosed Fan Connector Mode Models | | | 5in x 3.41in x 1.97in (127mm x 86.6mm x 50mm) | | |
| | Top Fan Models | | | 5in x 3.41in x 1.97in (127mm x 86.6mm x 50mm) | | |
| | Side Fan Models | | | 5.83in x 3.15in x 1.60in (148.2mm x 80mm x 40.6mm) | | |
| **SAFETY CHARACTERISTICS** | | | | | | |
| Safety Approvals | | Designed to Meet | | IEC/EN/ANSI/AAMI ES 60601-1 IEC/EN/UL 60950-1[5] | | |
| EMI[4] | EN55011, EN55032, EN60601-1-2 and FCC Part 18/15 | Conducted | | Class B | | |
| | | Radiated | | Class A | | |
| Harmonic Currents | EN61000-3-2 | Full Load | | Class A and D | | |
| Voltage Flicker | EN61000-3-3 | | | | | |
| EMS | EN55024 and EN60601-1-2 | | | | | |
| ESD | EN61000-4-2 | Air ±15kV and Contact ±8kV | | Perf. Criteria A | | |
| Radiated Immunity | EN61000-4-3 | 3V/m | | Perf. Criteria A | | |
| Fast Transient | EN61000-4-4 | ±2kV | | Perf. Criteria A | | |
| Surge | EN61000-4-5 | DM ±1kV and CM ±2kV | | Perf. Criteria A | | |
| Conducted Immunity | EN61000-4-6 | 20 Vr.m.s | | Perf. Criteria A | | |
| Power Frequency Magnetic Field | EN61000-4-8 | 30 A/m | | Perf. Criteria A | | |
| Dip and Interruptions | EN61000-4-11 | | | | | |

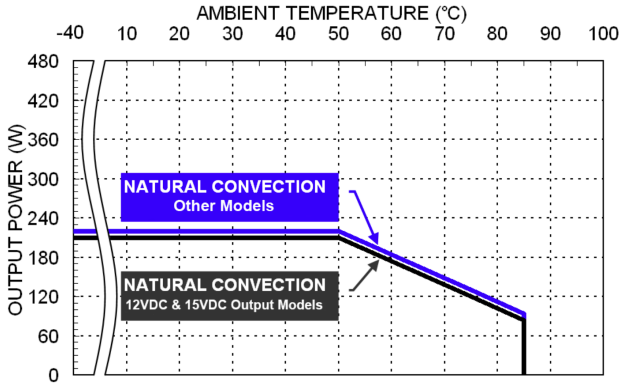
## NOTES

1. "x" in fan connector model numbers indicate either open frame or enclosed frame. "X" can either be "A" for open frame or "E" for enclosed case. No suffix on the model number indicates fan connector with fixed fan speed control.
   Add "Y" suffix to model number to indicate fan connector with variable fan speed control. Ex: PSMAC450-12SEY
2. "z" in top & side fan model numbers indicate fan type options. The fan options are as follows. Please note that top and side fan options are available for **enclosed models only:**
   F1: Fixed Fan Speed, Top Fan
   F2: Fixed Fan Speed, Side Fan
   Y1: Variable Fan Speed, Top Fan
   Y2: Variable Fan Speed, Side Fan
3. See derating curve for detailed rating.
4. For optimum EMI performance, the power supply should be mounted to a metal plate grounded to all 4 mounting holes of the power supply. To comply with safety standard, this plate must be properly grounded to protective earth.
5. This product is Listed to applicable standards and requirements by UL.

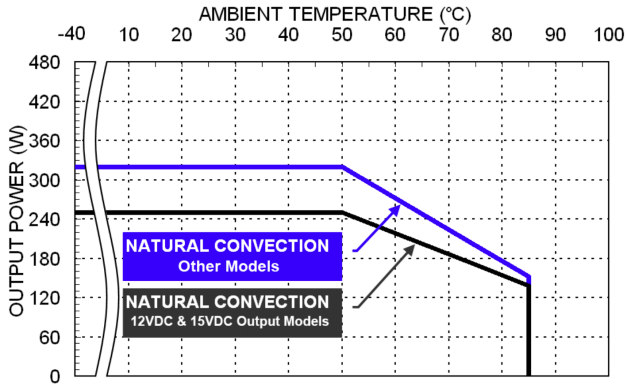
**Due to advances in technology, specifications subject to change without notice.*

## CHARACTERISTIC CURVES

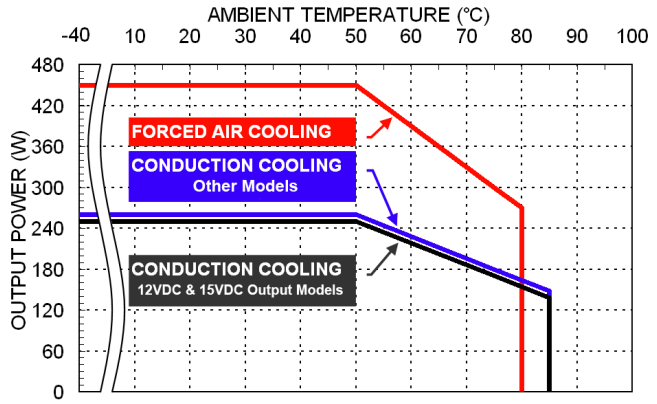
### Derating Curve vs. Ambient Temperature
Vin=115VAC and Natural Convection Open Frame & Enclosed



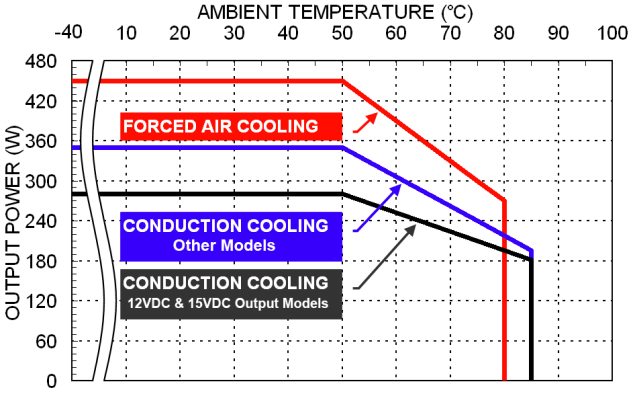

### Derating Curve vs. Ambient Temperature
Vin=230VAC and Natural Convection Open Frame & Enclosed



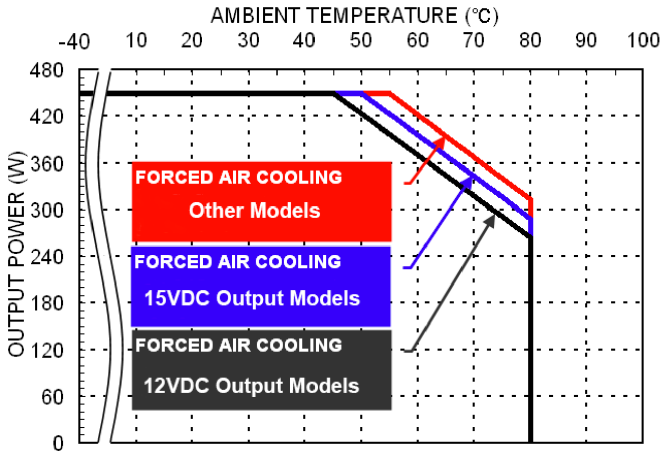

### Derating Curve vs. Ambient Temperature
Vin=115VAC and Conduction Cooling Open Frame & Enclosed
Forced Air Cooling with 21CFM (External Fan)



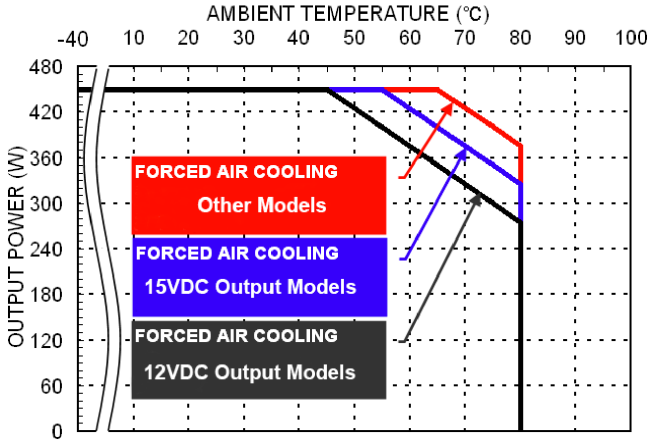

### Derating Curve vs. Ambient Temperature
Vin=230VAC and Conduction Cooling Open Frame & Enclosed
Forced Air Cooling with 21CFM (External Fan)



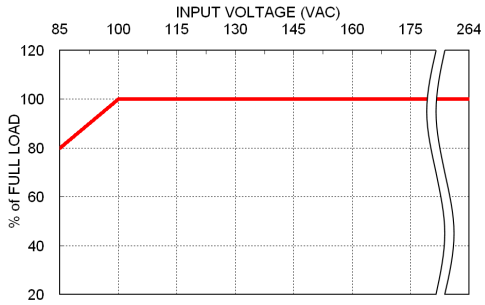

### Derating Curve vs. Ambient Temperature
Vin=115VAC and Forced Air Cooling (Internal Fan)
Top & Side Fan Models




### Derating Curve vs. Ambient Temperature
Vin=230VAC and Forced Air Cooling (Internal Fan)
Top & Side Fan Models

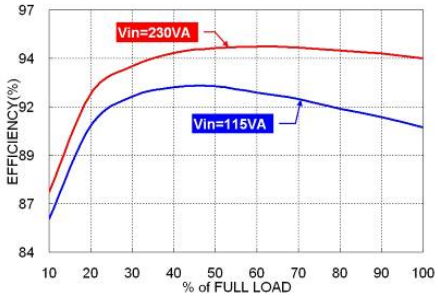


### Derating Curve vs. Input Voltage

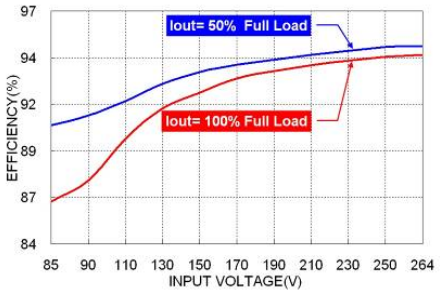



## EFFICIENCY GRAPHS

### Efficiency vs. Output Load
### 24VDC Output Models with Forced Air Cooling

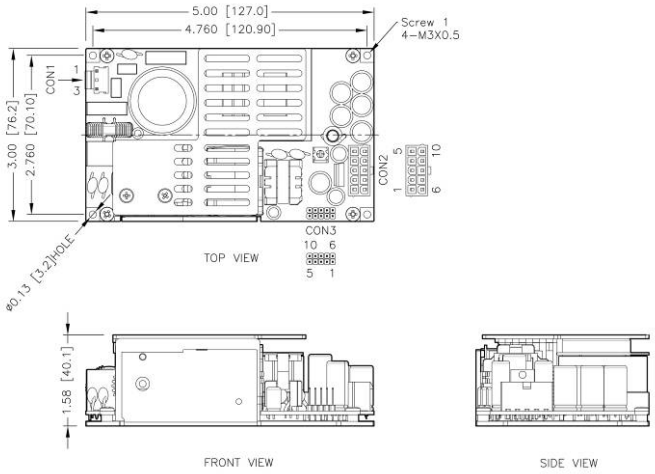



### Efficiency vs. Input Voltage
### 24VDC Output Models with Forced Air Cooling




## MECHANICAL DRAWINGS

### Open Frame Models




*Either one of four screw holes can be considered as PE connection for CLASS I application

Note:
1. All tolerances in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]
3. Screw 1 locked torque: MAX 5.2Kgf-cm/0.51N.m

### CONNECTORS

CON1-Input Connector

| | |
|---|---|
| Pin 1 | Line |
| Pin 3 | Neutral |

Mates with
Molex housing: **09-50-8031**
Molex crimp terminals: **2478,6838,45570**

CON2-Output Connector

| | |
|---|---|
| Pin 1,2,3,4,5 | +Vout |
| Pin 6,7,8,9,10 | -Vout |

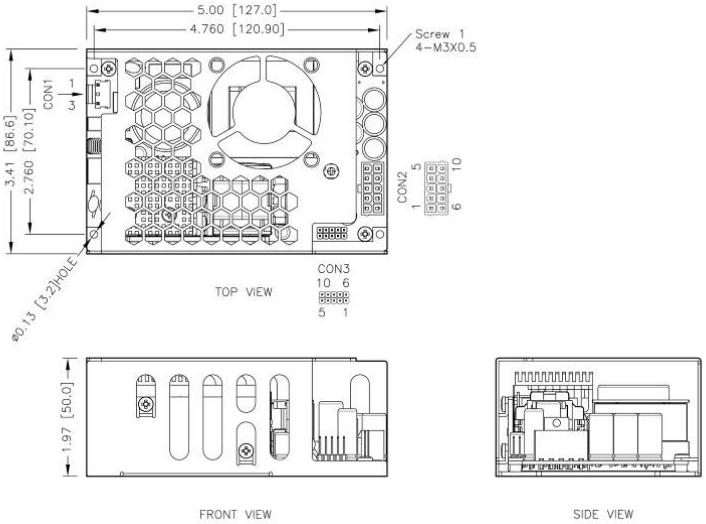
Mates with
Molex housing: **39-01-2105**
Molex crimp terminals: **5556,45750**

CON3-Aux Connector

| | | | |
|---|---|---|---|
| Pin 1 | +Fan | Pin 6 | -Fan |
| Pin 2 | +V Sense | Pin 7 | -V Sense |
| Pin 3 | +Control | Pin 8 | -Control |
| Pin 4 | +PG | Pin 9 | -PG |
| Pin 5 | +5V | Pin 10 | -5V |

Mates with
Molex housing: **90143-0008**
Molex crimp terminals: **900119**

## Enclosed Fan Connector Mode Models




* Either one of four screw holes can be considered as PE connection for CLASS I application

Notes:
1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02[x.x±0.5]
   x.xxx±0.01[x.xx±0.25]
3. Screw 1 locked torque: MAX 5.2Kgf-cm/0.51N.m

### CONNECTORS

CON1-Input Connector

| | |
|---|---|
| Pin 1 | Line |
| Pin 3 | Neutral |

Mates with
Molex housing: **09-50-8031**
Moles crimp terminals: **2478,6838,45570**

CON2-Output Connector

| | |
|---|---|
| Pin 1,2,3,4,5 | +Vout |
| Pin 6,7,8,9,10 | -Vout |

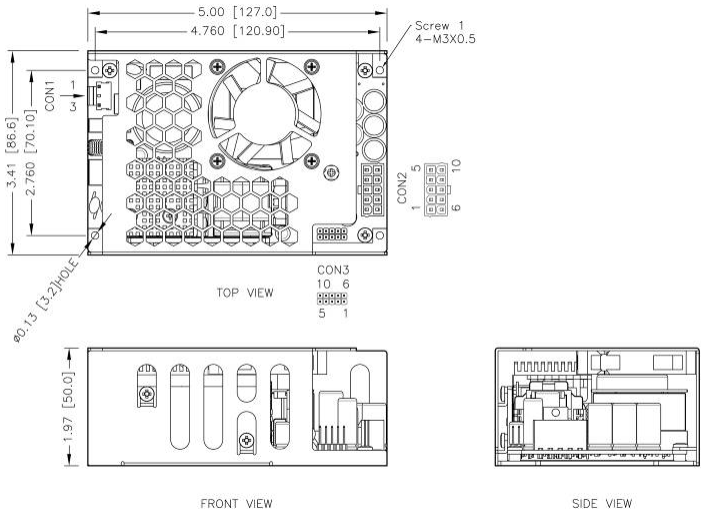
Mates with
Molex housing: **39-01-2105**
Molex crimp terminals: **5556,45750**

CON3-Aux Connector

| | | | |
|---|---|---|---|
| Pin 1 | +Fan | Pin 6 | -Fan |
| Pin 2 | +V Sense | Pin 7 | -V Sense |
| Pin 3 | +Control | Pin 8 | -Control |
| Pin 4 | +PG | Pin 9 | -PG |
| Pin 5 | +5V | Pin 10 | -5V |

Mates with
Molex housing: **90143-0008**
Molex crimp terminals: **90119**

## Top Fan Models




*Either one of four screw holes can be considered as PE connection for CLASS I application

Notes:
1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02[x.x±0.5]
   x.xxx±0.01[x.xx±0.25]
3. Screw 1 locked torque: MAX 5.2kgf-cm/0.51N.m
4. FAN dimension: 50x50x10mm, Air flow: 11.4CFM
5. The fan's life is shorter than the power supply and has only 2 years warranty.

### CONNECTORS

CON1-Input Connector

| | |
|---|---|
| Pin 1 | Line |
| Pin 2 | Neutral |

Mates with
Molex housing: **39-01-2105**
Molex Crimp Terminals: **2478,6838,45570**

CON2-Output Connector

| | |
|---|---|
| Pin 1,2,3,4,5 | +Vout |
| Pin 6,7,8,9,10 | -Vout |

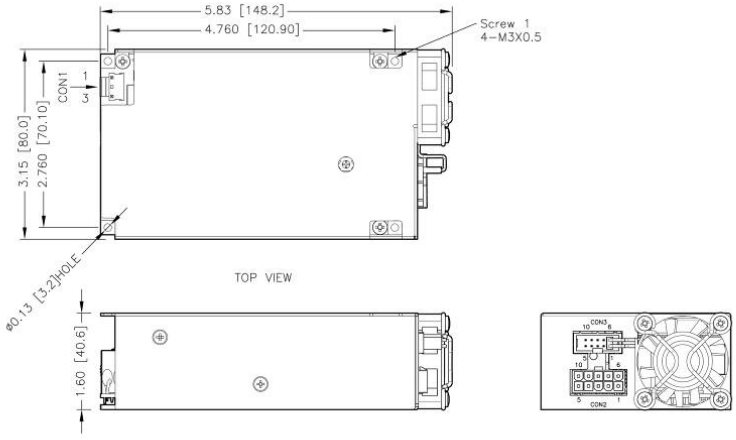
Mates with
Molex housing: **39-01-2105**
Molex crimp terminals: **5556,45750**

CON3-Aux Connector

| | | | |
|---|---|---|---|
| Pin 1 | +Fan | Pin 6 | -Fan |
| Pin 2 | +V Sense | Pin 7 | -V Sense |
| Pin 3 | +Control | Pin 8 | -Control |
| Pin 4 | +PG | Pin 9 | -PG |
| Pin 5 | +5V | Pin 10 | -5V |

Mates with
Molex housing: **90143-0008**
Molex crimp terminals: **90119**

Side Fan Models




*Either one of four screw holes can be considered as PE connection for CLASS I application

Notes:
1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
   x.xxx±0.01 [x.xx±0.25]
3. Screw 1 locked torque: MAX 5.2kgf-cm/0.51N.m
4. FAN dimension: 40x40x10mm, Air flow: 9.5CFM
5. The fan's life is shorter than the power supply and has only 2 years warranty.

**CONNECTORS**

CON1-Input Connectors

| | |
|---|---|
| Pin 1 | Line |
| Pin 3 | Neutral |

Mates with
Molex housing: **09-50-8031**
Molex crimp terminals: **2478,6838,45570**

CON2-Output Connector

| | |
|---|---|
| Pin 1,2,3,4,5 | -Vout |
| Pin 6,7,8,9,10 | +Vout |

Mates with
Molex housing: **39-01-2105**
Molex crimp terminals: **5556,45750**

CON3-Aux Connector

| | | | |
|---|---|---|---|
| Pin 1 | +Fan | Pin 6 | -Fan |
| Pin 2 | +V Sense | Pin 7 | -V Sense |
| Pin 3 | +Control | Pin 8 | -Control |
| Pin 4 | +PG | Pin 9 | -PG |
| Pin 5 | +5V | Pin 10 | -5V |

Mates with
Molex housing: **90143-0008**
Molex crimp terminals: **90119**

## MODEL NUMBER SETUP

| PSMAC | 450 | - | 12 | S | E | Y |
|---|---|---|---|---|---|---|
| Series Name | Output Power | | Output Voltage | Output Quantity | Package Type | Fan Options (See Note 1) |
| | | | **12:** 12VDC<br>**15:** 15VDC<br>**24:** 24VDC<br>**28:** 28VDC<br>**48:** 48VDC<br>**53:** 53VDC | **S:** Single | **A:** Open Type<br>**E:** Enclosed Type | **Blank:** Fan connector with fixed fan speed control<br>**Y:** Fan connector with variable fan speed control<br>**F1:** Top Fan, fixed fan speed<br>**F2:** Side Fan, fixed fan speed<br>**Y1:** Top Fan, variable fan speed<br>**Y2:** Side Fan, variable fan speed |

NOTES
1. F1, F2, Y1, & Y2 Fan options are only available with the enclosed package.

## COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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