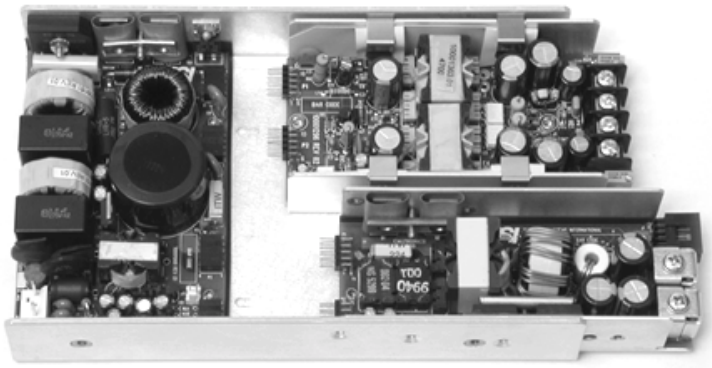
SMP Series
(250, 350 and 450 Watt)
Technical Specification



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1.0 Introduction

This document defines the product specification for the SMP series of power supplies rated 250, 350 and 450 Watts. This product consists of three input sections and a combination of output modules.

1.1 Input

Universal 90-264 VAC, 50 or 60 Hz.

1.2 Module Matrix (Output Modules):

See Table 1.

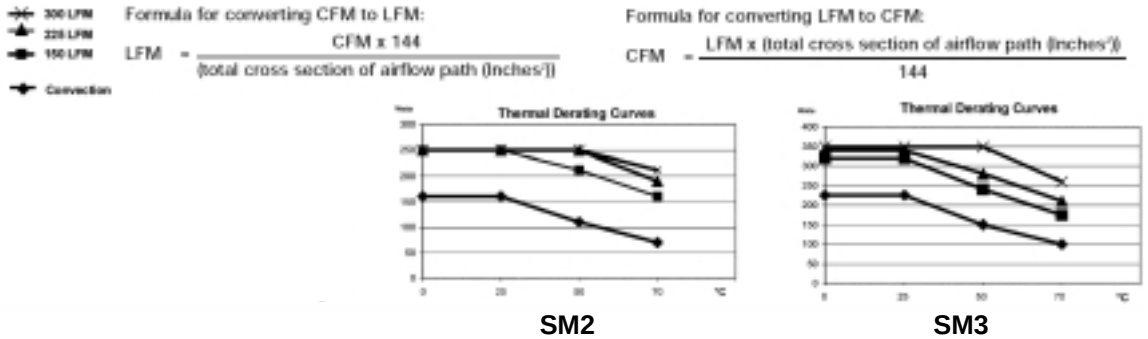
1.3 Cooling Requirements

A minimum of 300 lfm airflow is required across the length of the power supply to maintain full output capabilities.

Figure 1: Airflow and Cooling

SM2 SM3 SM4

Derating curves for SM2 and SM3 with no fan option



SM2 **SM3**

SM4 always ships with built in fans so derating curves are not required.

Table 1

Module Number	Output Configuration	Voltage and Current	Regulation	Topology	Slot Size (inches)
S1	Single	2.5V@50A	1%	FORWARD	2
S2	Single	3.3V@50A	1%	FORWARD	2
S3	Single	5V@50A	1%	FORWARD	2
S4	Single	12V@20A	1%	FORWARD	2
S5	Single	15V@17A	1%	FORWARD	2
S6	Single	24V@10A	1%	FORWARD	2
S7	Single	28V@9A	1%	FORWARD	2
S8	Single	36V@7A	1%	FORWARD	2
S9	Single	48V@5A	1%	FORWARD	2
SZ	Single	1.8V@50A	1%	FORWARD	2
R1	Dual	12V@6A, 12V@6A	1%	FLYBACK	2.65
R2	Dual	15V@5A, 15V@5A	1%	FLYBACK	2.65
R4	Dual	5V@8A, 24V@3A	1%	FLYBACK	2.65
R5	Dual	12V@6A, 24V@3A	1%	FLYBACK	2.65
R6	Dual	5V@8A, 12V@6A	1%	FLYBACK	2.65
T1	Triple	5V@20A, 12V@4A, 12V@4A	Main 1%, Aux2%	Note 1	2.65
T2	Triple	5V@20A, 15V@ 3A, 15V@3A	Main 1%, Aux2%	Note 1	2.65
T3	Triple	3.3V@20A, 12V@4A, 12V@4A	Main 1%, Aux2%	Note 1	2.65
T4	Triple	3.3V@20A, 15V@ 3A, 15V@ 3A	Main 1%, Aux2%	Note 1	2.65
T6	Triple	12V@10A, 12V@4A, 5V@4A	Main 1%, Aux2%	Note 1	2.65
T7	Triple	24V@4A, 15V@3A, 15V@3A	Main 1%, Aux2%	Note 1	2.65
T8	Triple	5V@20A, 12V@4A, 5V@4A	Main 1%, Aux2%	Note 1	2.65
T9	Triple	24V@4A, 15V@4A, 5 V@4A	Main 1%, Aux2%	Note 1	2.65
T10	Triple	12V@10A, 12V@4A, 15V@3A	Main 1%, Aux2%	Note 1	2.65
T11	Triple	24V@4A, 5V@4A, 5V@4A	Main 1%, Aux2%	Note 1	2.65
U1	Dual	5V@40A, 5V@4A	Main 1%, Aux2%	Note 1	2
U2	Dual	5V@40A, 12V@4A	Main 1%, Aux2%	Note 1	2
U3	Dual	5V@40A, 15V@4A	Main 1%, Aux2%	Note 1	2
U4	Dual	5V@40A, 24V@2.5A	Main 1%, Aux2%	Note 1	2
U5	Dual	3.3V@40A, 5V@4A	Main 1%, Aux2%	Note 1	2
U6	Dual	3.3V@40A, 12V@4A	Main 1%, Aux2%	Note 1	2
U7	DUAL	3.3V@40A, 15V@4A	Main 1%, Aux2%	Note 1	2
U8	DUAL	3.3V@40A, 24V@2.5A	Main 1%, Aux2%	Note 1	2

Note 1 - Main Output = Forward converter
Auxiliary = Buck regulators.
Requires minimum load on main output.

1.4 Options

1.4.1 Fan and Cover

Standard end-mount fan provides adequate airflow to run at full rated power with ambient temperature in the 0-50°C range.

Figure 3: Cover with End mounted fans

2.0 Configurations

Table 2

Output Power	Input V AC	Chassis Type	Outputs	I/O Configuration
250 watts	90-264 V AC	B	1 to 5	R/F, I – Terminal Block O – Terminals/Molex
350 watts	90-264 V AC	C	1 to 5	R/F, I – Terminals O – Terminals/Molex
450 watts	90-264 V AC	D	1 to 5	R/F, I – Terminals O – IEC 320 connector

2.1 Chassis

Table 3

Series	Chassis Code	Size	Power Density (Watts / cubic inch)
SM2	B	1.68 x 4 x 9.65 inches (250W)	4.2
SM3	C	1.68 x 5 x 10.6 inches (350W)	5.2
SM4	D	1.68 x 5 x 10.5 inches (450W)	5.2

2.1.1 Chassis Construction

The chassis is constructed out of aluminum with suitable thickness and material properties for the intended application, taking into account rigidity, weight and heat dissipation requirements.

2.1.2 Chassis Finish

All Aluminum parts are finished with a clear chemical film. Copper parts are electro tin-plated.

2.2 I/O Configurations

2.2.1 Input

Terminal Block

2.2.2 Output

High current outputs via M4 screw terminals.

Low current outputs via #6 terminal block screws.

Aux outputs via multi pin Molex connector. Requires Molex mating connector 39-01-2060 with Molex pins 39-00-0056 (18-24 AWG wire).

Table 4: I/O Configuration Types by Chassis

Chassis	Input	Output	Figure	Airflow (customer)
SM2 (250)	Rear	Front	4	Rear to Front, see Figure 1
SM3 (350)	Rear	Front	5	Rear to Front, see Figure 1
SM4 (450)	Rear	Front	6	Rear to Front, Fan cover included

Note: The above table denotes standard configurations. Customer specific I/O configurations & termination types will be addressed on a 'custom' basis as required to meet specific customer requirements.

4.0 Product Specifications

Value	Description
AC Input	90-264V AC, 47-63 Hz single phase
Inrush Current	Less than 20A peak
Efficiency	75% typical at nominal line. 24V+ single outputs 80%
EMI	Radiated and Conducted per CISPR 22 level B, CE compliant.
PFC and Harmonic Correction	All AC input models compliant with IEC1000-3-2, or current spec
Input Transient and ESD, AC	All modules compliant with IEC61000-4-2,3,4,5,6 (Level 3 minimum) And IEC year 2001 compliance specifications
Line Regulation AC input	Less than 0.1% for line variations from 90-264V AC Less than 0.3% for dual and triple output modules
Load Regulation	Less than 1.0% no load to full load and full load to no load, main output. Less than 2.0% for dual and triple aux. output modules (see 'min. load' note below)
Cross Regulation	Less than 0.1% between single output modules. Less than 2% between dual outputs with 25% step load change on main output.
Current share	Single wire on all main outputs, droop on secondary outputs
Temperature Coefficient	0.02 – 0.03%/degree Celsius
Output Adjustment Range	± 10% of nominal on all Main outputs 5 -15 volts on U and T module Auxiliary outputs
Thermal Protection	Power supply is self-protecting in the event of an over temperature condition. Normal operation may be restored once the unit has cooled down. AC must be recycled.
Over Current Protection, Input	All input converters are fuse protected (by suitable agency rated fuse)
Over Current Protection, Output	Output Module current limits are configured for N+1 redundant operation and Hot-Swap designs. They are fold-back, self-recovering and limited to a maximum of 120 to 140% nominal rating.
Over Voltage Protection	OVP is standard on all Main outputs. 120-130% of nominal.
Minimum Load	No preload is required on any Single (S) or Dual (R) output module. A 10% preload is required on main output of Triple (T) and Slim-Line Dual (U) outputs.
Dynamic Response	±25% load change from a steady state 75% of nominal at a rate of 1A/µsec will result in an output deviation no greater than 2% or 100mV peak. 125mV for outputs 4V or less. Outputs are to recover to within 1% of nominal voltage within 350µsec.
Holdup Time, AC Input	All AC Input units will maintain regulation within specifications for a period of not less than 16msec for 60Hz, (20msec for 50Hz) at full rated load from nominal 115/230 line voltage.
Remote Sense	All main outputs incorporate remote sense and are able to compensate for a total cable drop up to 0.5V DC.

Table 5 (continued)

Value	Description
Isolation Ratings	Consistent with Agency Requirements.
Cooling	Temperature performance curves are available for both convection and forced air cooling applications in Applications Note #1
Operating Temperature Range (Fan Cooled)	0 to +50°C @ 100% rated load in compliance with specification. Refer to de-rating curves for temperatures above 50°C.
(Convection)	Consult Engineering for details or refer to de-rating curves.
Turn-on Voltage	Power supplies will turn on over a range of 0 to +70 degrees C.
Storage Temperature	-40 to +85^{o}C
Operating Altitude	-350 to 7,500 feet with no de-rating
Shock	Commercial transportation ratings, suitable for International Air and Ground transport (see HALT test reports for more information)
Vibration	Commercial transportation ratings, suitable for International Air and Ground transport (see HALT test reports for more information)
Mounting	All platforms – two surfaces, bottom and one side
Physical Size	SM2 1.68 x 5 x 9.65 inches SM3 1.68 x 5 x 10.6 inches SM4 1.68 x 5 x 10.5 inches
Weight	SM2 2.3 Lbs net, 3.5 Lbs Ship SM3 2.9 Lbs net, 4.0 Lbs Ship SM4 3.8 Lbs net, 4.9 Lbs Ship

4.2.1 Table 6: Safety Agency Approvals

Safety Agency Approvals	UL 1950, CSA 22.2 No. 950, EN60950/IEC950, SELV (On modules up to 60VDC at maximum OVP set point).

4.2.2 Table 7: Warranty

Warranty	Two-years

4.2.3 Table 8: Signals

Signal	250 Watt	350 Watt	450 Watt
AC Power Fail	Standard	Standard	Standard
Output Inhibit, low	Standard, mains	Standard, mains	Standard, mains
DC Power Good	Standard, mains	Standard, mains	Standard, mains
Current Share	Main output (s)	Main output (s)	Main output (s)

4.3 Model Numbering System

SM _____ - _____ _____ - _____

Watt Code **Slot 1** **Slot 2** **Options**

Table 9

Power, & Input Voltage	Watt Code	Slots	Size
250 Watts, 90-264 VAC	2	2	1.5 x 5 x 9.5 inches
350 Watts, 90-264 VAC	3	2	1.5 x 5 x 10.6 inches
450 Watts, 90-264 VAC	4	2	1.68 x 5 x 10.5 inches

Option - **NF** for No Fan (SM2 and SM3 only)

Sample model numbers:

SM3-S2R6 rating of **350 watts** with **(S2)** 3.3V/50A, **(R6)** 5V/8A, 12V/6A

SM2-S3T7 rating of **250 watts** with **(S3)** 5V/50A, **(T7)** 24V/4A, 15V/3A, 15V/3A

SM2 Power Platform
End Fan

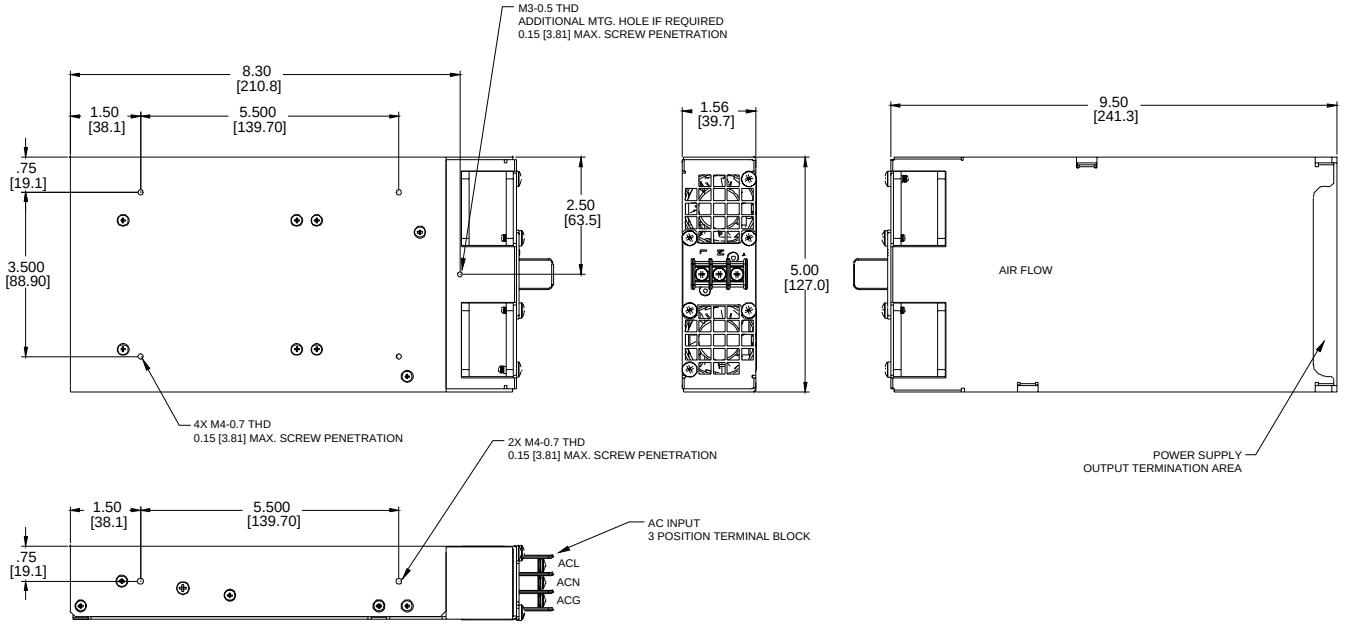


Figure 4 - SM2 I/O and Mounting

SM3 Power Platform
End Fan

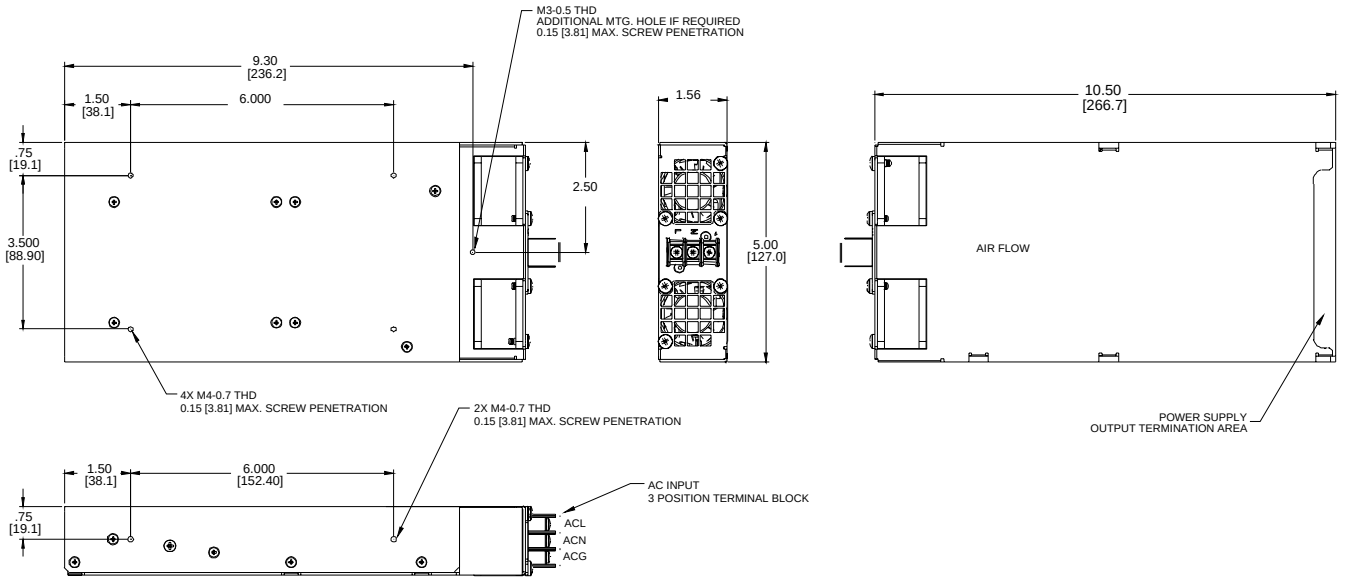


Figure 5 - SM3 I/O and Mounting

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SM4 Power Platform
End Fan

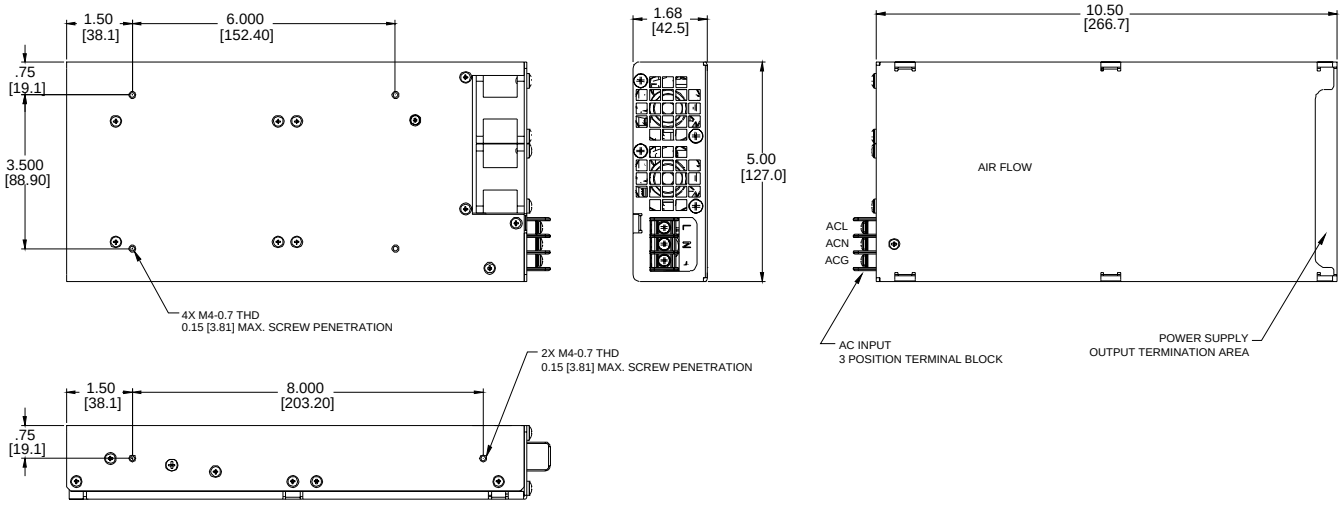

Figure 6 - SM4 I/O and Mounting