

# Switching Power Supply Type SPP1 60W Enclosed type



- Universal AC input full range
- Short circuit protection
- Internal input filter
- High efficiency
- High average efficiency (meets ErP)
- Low stand-by power consumption
- CE, TUV, and cURus approved

## Product Description

Enclosed Switching Power Supply meets your needs for AC DC and DC DC power requirements. SPP provides the most flexible OEM system power solutions from 5V to 24V at 60W for industrial control and automation applications. All the range carries full certification and offers a wide range of universal input and screw terminal connections. It has been designed for its performance and compact dimensions.

## Ordering Key

**SP P1 24 60 1 X**

Model \_\_\_\_\_  
 Mounting (P1 = Panel) \_\_\_\_\_  
 Output voltage \_\_\_\_\_  
 Output power \_\_\_\_\_  
 Input Type \_\_\_\_\_  
 Optional features \_\_\_\_\_

Input type: 1= single phase

## Approvals



## Output Performance

MODEL NO.	INPUT VOLTAGE	OUTPUT POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	EFF. (avg.)
<b>Single Output Models</b>							
<b>SPP1 05601</b>	88~264 VAC	45 WATTS	+ 5 VDC	9000 mA	80%	82%	81%
<b>SPP1 12601</b>	88~264 VAC	60 WATTS	+12 VDC	5000 mA	86%	88%	87%
<b>SPP1 15601</b>	88~264 VAC	60 WATTS	+15 VDC	4000 mA	87%	89%	87%
<b>SPP1 24601</b>	88~264 VAC	60 WATTS	+24 VDC	2500 mA	87%	89%	87%

## Output Data (All specifications are at nominal values, full load, 25°C unless otherwise stated)

Line regulation	± 0.5%	Temperature coefficient	± 0.03%/°C
Load regulation	±1%	Hold up time $V_i = 115VAC$	10ms
Minimum load	0%	$V_i = 230VAC$	80ms
Turn on time (full resistive load)		Voltage fall time ( $I_{0nom}$ )	150ms max
5V, 12V & 15V Model	1500 ms	Voltage trim range	
24V Model	2000 ms	5V Model	4.75 - 5.5 VDC
5V, 12V, & 15V Model	2000 ms with 7000µF CAP	12V Model	10.8 - 13.2 VDC
24V Model	2500 ms	15V Model	13.5 - 16.5 VDC
Transient recovery time	2ms	24V Model	24.6 - 27.6 VDC
Ripple and noise	100mVpp		
Output voltage accuracy	+ 1%		



## Output Data (All specifications are at nominal values, full load, 25°C unless otherwise stated)

<b>Rated continuous loading</b>		<b>Capacitor load</b>	7000µF
<b>5V Model</b>	9A @ 5VDC/8.1A @ 5.5VDC	<b>Voltage rise time</b>	
<b>12V Model</b>	5A @ 12VDC/4.5A @ 13.2 VDC	<b>Vi nom, Io nom</b> (full resistive load)	150ms
<b>15V Model</b>	4A @ 15VDC/3.6A @ 16.5VDC	<b>5V, 12V, &amp; 15V Models:</b>	500ms with 7000µF CAP load
<b>24V Model</b>	2.5A @ 24VDC/2.15A @ 27.6VDC	<b>24V Model:</b>	500ms with 3500µF CAP load
<b>Reverse voltage</b>			
<b>5V Model</b>	7.5VDC		
<b>12V Model</b>	18VDC		
<b>15V Model</b>	22VDC		
<b>24V Model</b>	35VDC		

## Input Data (All specifications are at nominal values, full load, 25°C unless otherwise stated)

<b>Rated input voltage</b> $I_{nom}$	100 - 240VAC	<b>Power dissipation</b>	
<b>Voltage range</b>		( $V_i$ : 230VAC, $I_o$ nom)	
<b>AC IN</b>	88 - 264VAC	<b>5V Model</b>	11W
<b>DC IN</b>	120 - 375VDC	<b>12V Model</b>	10W
<b>Rated input current</b>		<b>15V Model</b>	9W
<b>Vi 115/230 VAC</b> $I_{onom}$	1100/600mA	<b>24V Model</b>	8W
<b>Vi: 88 VAC,</b> $I_{onom}$	1500mA	<b>Frequency range</b>	47- 63Hz
<b>Inrush current</b>		<b>Leakage current</b>	
<b>Vi= 115VAC</b>	30A	<b>Input-Output</b>	<0.25mA
<b>Vi= 230VAC</b>	60A	<b>Input-FG</b>	<1.00mA

## Controls and Protection (All specifications are at nominal values, full load, 25°C unless otherwise stated)

<b>Overload</b>	110 – 150%	<b>Over voltage protection</b>	<b>VDC</b>	
<b>Input fuse</b>	T2A/250VAC internal <sup>1)</sup>		<b>Min.</b>	<b>Max.</b>
<b>Output short circuit</b>	Hiccup mode	<b>5V Model</b>	5.75	6.75
		<b>12V Model</b>	13.8	16.2
		<b>15V Model</b>	17.25	20.25
		<b>24V Model</b>	28.8	32.4

<sup>1)</sup> Fuse not replaceable by user

## General Data (All specifications are at nominal values, full load, 25°C unless otherwise stated)

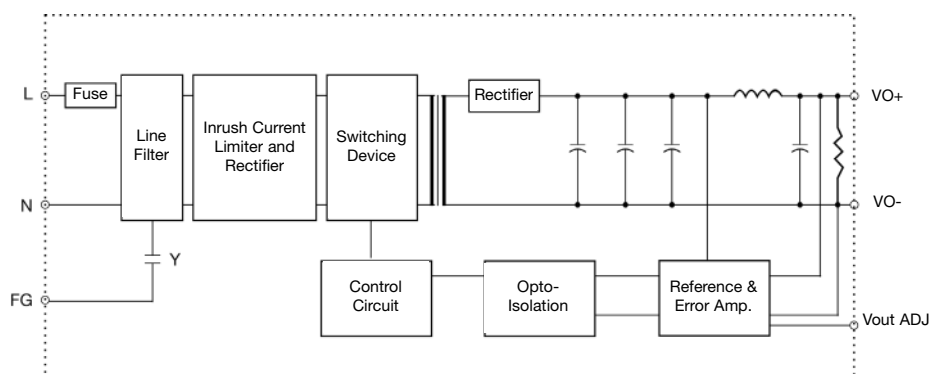
<b>Ambient temperature</b>	-40°C to +71°C	<b>MTBF</b> (Bellcore issue 6 @ 40°C, GB)	
<b>Derating (+56°C to +71°C)</b>	2.5%/°C (see curve)	<b>5V Model</b>	570000 Hours
<b>Relative humidity</b>	20 ~ 95%RH	<b>12V Model</b>	588000 Hours
<b>Storage</b>	-40°C to +85°C	<b>15V Model</b>	602000 Hours
<b>Protection degree</b>	IP20	<b>24V Model</b>	615000 Hours
<b>Cooling</b>	Free air convection	<b>Case material</b>	Metal
<b>Insulation voltage</b>		<b>Altitude IEC 60068-2-13</b>	4850m
<b>Input-Output</b>	3.000VAC/4242VDC min	<b>Stand-by power consumption</b>	0.3 W
<b>Input-FG</b>	1.500VAC/2121VDC min	<b>Dimensions LxWxD mm(inch)</b>	98(3.86)x82(3.23)x35(1.38)
<b>Insulation resistance I/O</b>	100MΩ min (@ 500VDC)	<b>Weight</b>	310g
<b>Switching Frequency</b>	65 Khz		

## Norms and Standards


<b>Vibration resistance</b>	meet IEC 60068-2-6 (10-500Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)
<b>Shock resistance</b>	meet IEC 60068-2-27 (15G, 11ms, 3 Axis, 6 faces, 3 times for each face)
<b>UL / cUL</b>	UL60950-1, Recognized
<b>TUV</b>	EN 60950- 1CB scheme

<b>CE</b>	EN 61000-6-3, EN 55022 Class B, EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 55024, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11, ENV 50204, EN 61204-3
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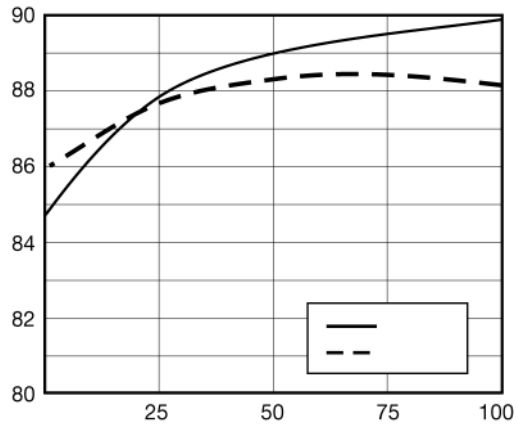
## Block Diagrams



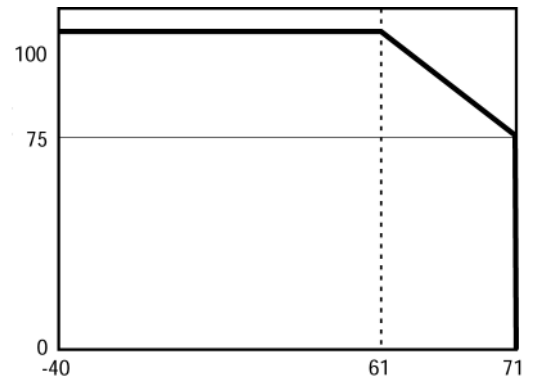
## Pin Assignment and Front Controls

Pin No.	Designation	Description
1	L	Input terminals (phase conductor, no polarity at DC input)
2	N	Input terminals (neutral conductor, no polarity at DC input)
3		Ground this terminal to minimize high-frequency emissions
4	-	Negative output terminal
5	+	Positive output terminal
	<b>Vout ADJ</b>	Trimmer-potentiometer for Vout adjustment
	<b>DC ON</b>	Operation indicator LED

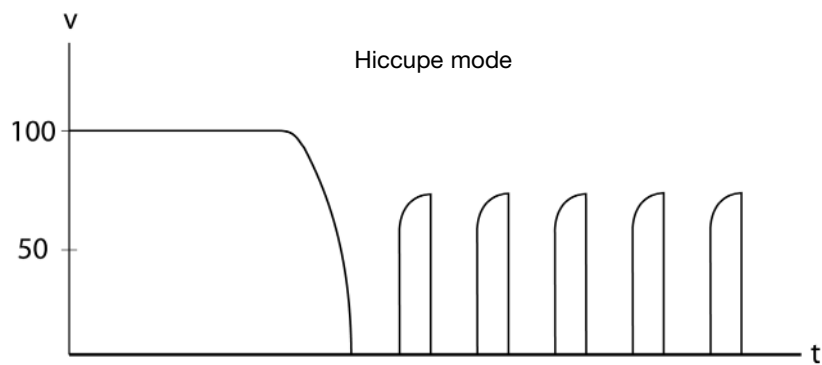
## Typ. Efficiency Curve



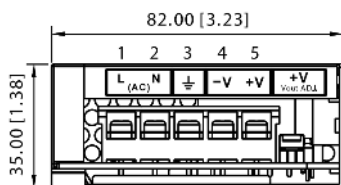
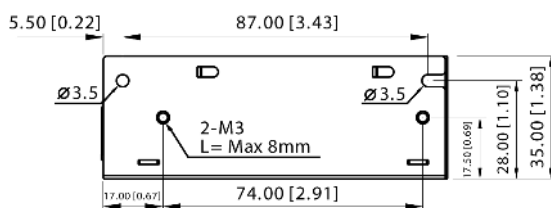
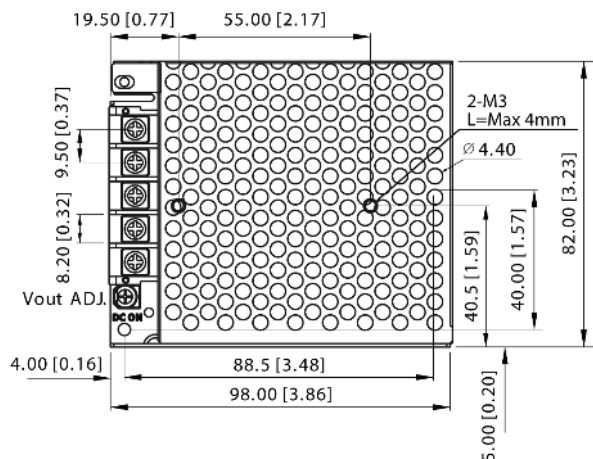
## Derating Diagram



## Typ. Current Limited Curve



## Mechanical Drawings mm (inches)



## Installation

<b>Ventilation and cooling</b>	Ventilation/Cooling Normal convection
<b>Connector size range</b> Spring terminal	AWG22-12 (0.2~2.5mm <sup>2</sup> ) flexible/solid cable, connector can withstand torque at maximum 0.90 Nm (8 lb/in)
<b>Max. torque for terminal</b> Input terminals Output terminals	0.56Nm (5.0lb-in) 0.56Nm (5.0lb-in)
<b>General tolerances mm(in.)</b> 0.00 (0.00) ÷ 30.00 (1.18) 30.00 (1.18) ÷ 120.00 (4.72)	±0.30 (0.01) ±0.50 (0.02)