

# Switching Power Supply Type SPP1 60W Enclosed type

CARLO GAVAZZI



- 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.)
Single Output Models							
SPP1 05601	88~264 VAC	45 WATTS	+ 5 VDC	9000 mA	80%	82%	81%
SPP1 12601	88~264 VAC	60 WATTS	+12 VDC	5000 mA	86%	88%	87%
SPP1 15601	88~264 VAC	60 WATTS	+15 VDC	4000 mA	87%	89%	87%
SPP1 24601	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 ( $I_{O\text{nom}}$ )	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>5V Model</b> <b>12V Model</b> <b>15V Model</b> <b>24V Model</b>	9A @ 5VDC/8.1A @ 5.5VDC 5A @ 12VDC/4.5A @ 13.2 VDC 4A @ 15VDC/3.6A @ 16.5VDC 2.5A @ 24VDC/2.15A @ 27.6VDC	<b>Capacitor load</b>	7000µF
		<b>Voltage rise time</b> <b>Vi nom, Io nom</b> (full resistive load) <b>5V, 12V, &amp; 15V Models:</b> <b>24V Model:</b>	150ms 500ms with 7000µF CAP load 500ms with 3500µF CAP load
<b>Reverse voltage</b> <b>5V Model</b> <b>12V Model</b> <b>15V Model</b> <b>24V Model</b>	7.5VDC 18VDC 22VDC 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> ( $V_i$ : 230VAC, $I_o$ nom)	<b>5V Model</b> <b>12V Model</b> <b>15V Model</b> <b>24V Model</b>	11W 10W 9W 8W
<b>Voltage range</b> <b>AC IN</b> <b>DC IN</b>	88 - 264VAC 120 - 375VDC	<b>Frequency range</b>		47- 63Hz
<b>Rated input current</b> <b>Vi 115/230 VAC</b> $I_{onm}$ <b>Vi: 88 VAC,</b> $I_{onm}$	1100/600mA 1500mA	<b>Leakage current</b> <b>Input-Output</b> <b>Input-FG</b>		<0.25mA <1.00mA
<b>Inrush current</b> <b>Vi= 115VAC</b> <b>Vi= 230VAC</b>	30A 60A			

## 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> <b>12V Model</b> <b>15V Model</b> <b>24V Model</b>	5.75 13.8 17.25 28.8	6.75 16.2 20.25 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)

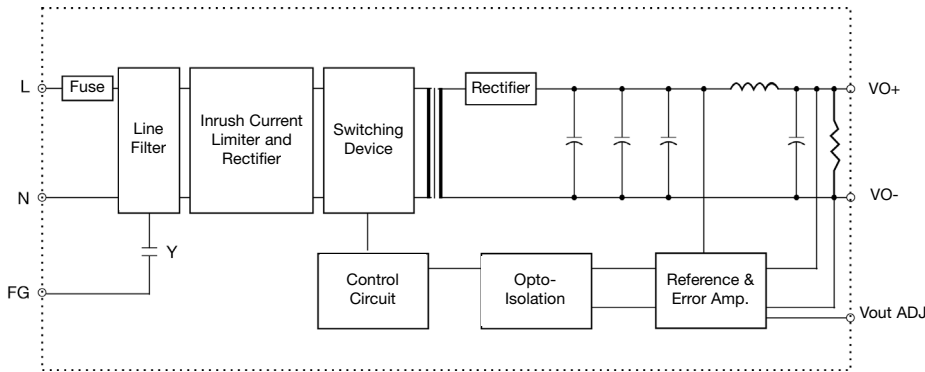
<b>Ambient temperature</b>	-40°C to +71°C	<b>MTBF</b> (Bellcore issue 6 @ 40°C, GB)	<b>5V Model</b> <b>12V Model</b> <b>15V Model</b> <b>24V Model</b>	570000 Hours 588000 Hours 602000 Hours 615000 Hours
<b>Derating (+56°C to +71°C)</b>	2.5%/°C (see curve)	<b>Case material</b>		Metal
<b>Relative humidity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



Norms and Standards

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

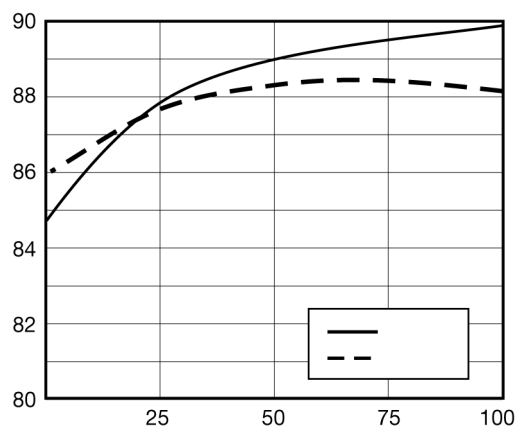
Block Diagrams



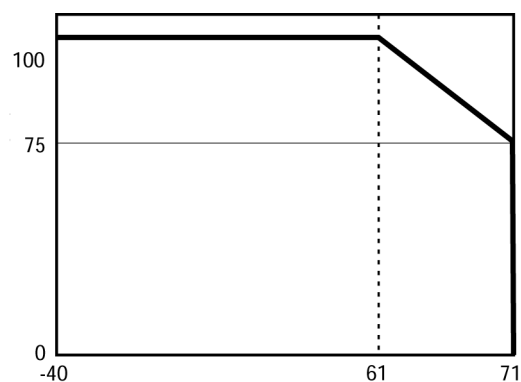
Pin Assignment and Front Controls

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-frequecy emissions
4	-	Negative output terminal
5	+	Positive output terminal
	Vout ADJ	Trimmer-potentiometer for Vout adjustment
	DC ON	Operation indicator LED

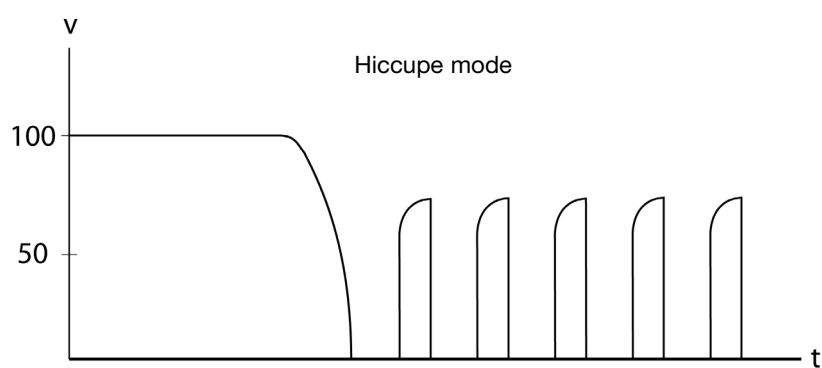
## Typ. Efficiency Curve



## Derating Diagram

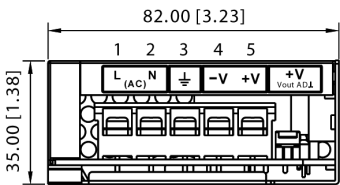
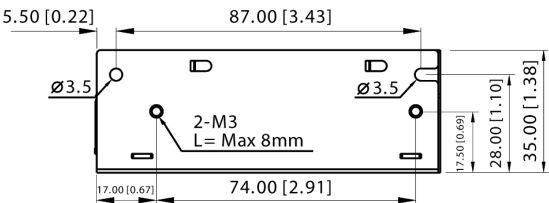
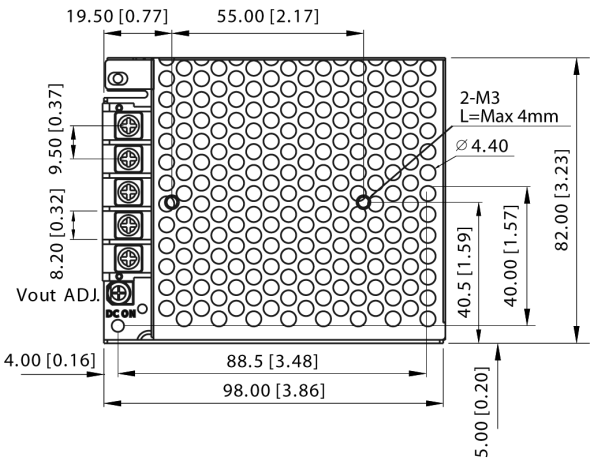


## Typ. Current Limited Curve





Mechanical Drawings mm (inches)



Installation

Ventilation and cooling	Ventilation/Cooling Normal convection
Connector size range 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)
Max. torque for terminal Input terminals Output terminals	0.56Nm (5.0lb-in) 0.56Nm (5.0lb-in)
General tolerances mm(in.) 0.00 (0.00) ÷ 30.00 (1.18) 30.00 (1.18) ÷ 120.00 (4.72)	±0.30 (0.01) ±0.50 (0.02)