

# Switching Power Supply Type SPD 60W DIN rail mounting

CARLO GAVAZZI



- Universal AC input full range
- Installation on DIN rail 7.5 or 15mm
- Short circuit protection
- Overload protection
- Class 2 output
- High efficiency
- LED indicator for DC power ON
- Power Ok output
- CE, TUV approved and cULus Listed

## Product Description

The Switching power supplies SPD series are specially designed to be used in all automation application where the installation is on a DIN rail and compact dimensions and performance are a must.

## Ordering Key

**SP D 24 60 1 B**

Model \_\_\_\_\_  
Mounting ( D = Din rail ) \_\_\_\_\_  
Output voltage \_\_\_\_\_  
Output power \_\_\_\_\_  
Input Type \_\_\_\_\_  
Optional features \_\_\_\_\_

Input type: 1= single phase

## Approvals



## Optional Features

| Description       | Code |
|-------------------|------|
| Spring connectors | B    |

## Output Performances

| Model | Rated output Voltage (VDC) | Output Power (W) | Output Current (A) | Voltage Trim Range |          | DC ON green LED at start up<br>DC LOW red LED after start up |          | Typical Efficiency |
|-------|----------------------------|------------------|--------------------|--------------------|----------|--------------------------------------------------------------|----------|--------------------|
|       |                            |                  |                    | Min. VDC           | Max. VDC | Min. VDC                                                     | Max. VDC |                    |
| SPD05 | 5                          | 50               | 10.0               | 5                  | 5.5      | 3.5                                                          | 4.5      | 79%                |
| SPD12 | 12                         | 60               | 5.0                | 12                 | 14       | 9.0                                                          | 10.8     | 86%                |
| SPD24 | 24                         | 60               | 2.5                | 24                 | 28       | 18                                                           | 21.6     | 89%                |
| SPD48 | 48                         | 60               | 1.25               | 48                 | 55       | 37                                                           | 43       | 89%                |

## Output Data

|                                              |            |                                                 |                             |
|----------------------------------------------|------------|-------------------------------------------------|-----------------------------|
| <b>Line regulation</b>                       | ± 0.5%     | <b>Rated continuous loading</b>                 |                             |
| <b>Load regulation</b>                       | ± 0.5%     | <b>5V Model</b>                                 | 10A @ 5VDC/9.0A @ 5.5VDC    |
| <b>Minimum load (A)</b>                      | 0          | <b>12V Model</b>                                | 5A @ 12VDC/4.25A @ 14VDC    |
| <b>Turn on time (full resistive load)</b>    | 1000ms max | <b>24V Model</b>                                | 2.5A @ 24VDC/2.1A @ 28VDC   |
| <b>Transient recovery time</b>               | 2ms        | <b>48V Model</b>                                | 1.25A @ 48VDC/1.08A @ 55VDC |
| <b>Ripple and noise BW = 20MHz</b>           | 50mVpp     | <b>Reverse voltage</b>                          |                             |
| <b>Output voltage accuracy</b>               | ± 1% max.  | <b>5V Model</b>                                 | 7.5VDC                      |
| <b>Temperature coefficient</b>               | ± 0.03%/°C | <b>12V Model</b>                                | 18VDC                       |
| <b>Hold up time Vi= 115VAC</b>               | 20ms       | <b>24V Model</b>                                | 35VDC                       |
| <b>Vi= 230VAC</b>                            | 30ms       | <b>48V Model</b>                                | 63VDC                       |
| <b>Voltage fall time (I<sub>on</sub>nom)</b> | 150ms max  | <b>Capacitor load</b>                           | 7000µF                      |
|                                              |            | <b>Voltage rise time at full resistive load</b> | 150ms max                   |

## Input Data

|                                   |              |                                                   |          |
|-----------------------------------|--------------|---------------------------------------------------|----------|
| <b>Rated input voltage</b>        | 100 - 240VAC | <b>Power dissipation</b><br>(Vi : 230VAC, Io nom) |          |
| <b>Voltage range</b>              |              | <b>5V Model</b>                                   | 12.5W    |
| <b>AC</b>                         | 85 - 264VAC  | <b>12V Model</b>                                  | 9.0W     |
| <b>DC</b>                         | 90 - 375VDC  | <b>24V Model</b>                                  | 8.8W     |
| <b>Rated input current</b>        |              | <b>48V Model</b>                                  | 7.8W     |
| <b>(Vi : 115VAC)</b>              | 1060mA       | <b>Frequency range</b>                            | 47- 63Hz |
| <b>(Vi : 230VAC)</b>              | 590mA        | <b>Leakage current</b>                            |          |
| <b>Input current (Vi : 85VAC)</b> | 1500mA       | <b>Input-Output</b>                               | 0.25mA   |
| <b>Inrush current</b>             |              | <b>Input-FG</b>                                   | 3.5mA    |
| <b>Vi= 115VAC</b>                 | 20A          |                                                   |          |
| <b>Vi= 230VAC</b>                 | 40A          |                                                   |          |

## Controls and Protections

|                                 |                                   |                                                             |             |             |
|---------------------------------|-----------------------------------|-------------------------------------------------------------|-------------|-------------|
| <b>Overload</b>                 | 110 – 150%                        | <b>Over voltage protection</b>                              | <b>VDC</b>  |             |
| <b>Input fuse</b>               | T2A/250VAC internal <sup>1)</sup> | <b>5V Model</b>                                             | <b>Min.</b> | <b>Max.</b> |
| <b>Output short circuit</b>     | Fold forward                      | <b>12V Model</b>                                            | 6.0         | 6.8         |
| <b>Power ready output (Rdy)</b> |                                   | <b>24V Model</b>                                            | 15          | 16.5        |
| <b>(only SPD 24)</b>            |                                   | <b>48V Model</b>                                            | 30          | 33          |
| <b>On threshold</b>             | Vout > 19,2V ± 2%                 |                                                             | 60          | 66          |
| <b>Off threshold</b>            | Vout < 19,1V ± 2%                 | <b>Internal surge voltage protection</b><br>(IEC 61000-4-5) |             | Varistor    |

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

## General Data (@ nominal line, full load, 25°C )

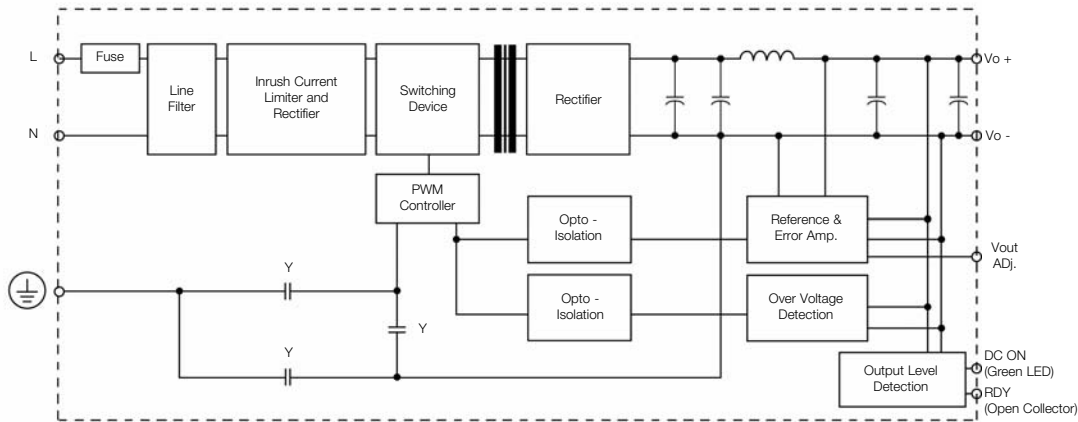
|                                     |                      |                                           |                               |
|-------------------------------------|----------------------|-------------------------------------------|-------------------------------|
| <b>Ambient temperature</b>          | -40°C to 71°C        | <b>MTBF (Bellcore issue 6 @ 40°C, GB)</b> |                               |
| <b>Derating (&gt;61°C to +71°C)</b> | 2.5%/°C              | <b>5V Model</b>                           | 498000 Hours                  |
| <b>Ambient humidity</b>             | 20 ~ 95%RH           | <b>12V Model</b>                          | 504000 Hours                  |
| <b>Storage temperature</b>          | -40°C to +85°C       | <b>24V Model</b>                          | 520000 Hours                  |
| <b>Protection degree</b>            | IP20                 | <b>48V Model</b>                          | 531000 Hours                  |
| <b>Cooling</b>                      | Free air convection  | <b>Case material</b>                      | Plastic: PC, UL94-V0          |
| <b>Insulation voltage</b>           |                      | <b>Pollution degree</b>                   | 2                             |
| <b>Input-Output</b>                 | 3.000VAC/4242VDC min | <b>Altitude</b>                           | 2000m                         |
| <b>Input-FG</b>                     | 1.500VAC/2121VDC min | <b>Dimensions LxWxD mm (inch)</b>         | 90(3.60)x40.5(1.59)x114(4.49) |
| <b>Insulation resistance I/O</b>    | 100MΩ min (@ 500VDC) | <b>Weight</b>                             | 340g                          |

## Norms and Standards

|                             |                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vibration resistance</b> | meet IEC 60068-2-6<br>(Mounting by rail: 10-500Hz,<br>2G, along X, Y, Z each Axis,<br>60 min for each Axis)                                                  | <b>CE</b> | EN 61000-6-3, EN 55022<br>Class B, EN 61000-3-2,<br>EN 61000-3-3,<br>EN 61000-6-2,<br>EN 55024,<br>EN 61000-4-2 Level 4,<br>EN 61000-4-3 Level 3,<br>EN 61000-4-4 Level 4,<br>EN 61000-4-5 L-Level 3,<br>L/N-FG Level 4,<br>EN 61000-4-6 Level 3,<br>EN 61000-4-8 Level 4,<br>EN 61000-4-11,<br>ENV 50204 Level 2,<br>EN 61204-3 |
| <b>Shock resistance</b>     | meet IEC 60068-2-27<br>(15G, 11ms, 3 Axis, 6 faces,<br>3 times for each face)                                                                                |           |                                                                                                                                                                                                                                                                                                                                  |
| <b>UL / cUL</b>             | UL508 listed, UL60950-1,<br>UL1310 Class 2 Power<br>(only 5V, 12V w/o Class 2)<br>Recognized, ISA 12.12.01<br>(Class 1, Division 2,<br>Groups A, B, C and D) |           |                                                                                                                                                                                                                                                                                                                                  |
| <b>TUV</b>                  | EN 60950-1, CB scheme<br>EN 61558-1, EN 61558-2-16<br>(meet EN 60204)                                                                                        |           |                                                                                                                                                                                                                                                                                                                                  |
| <b>CCC</b>                  | GB4943, GB9254, GB17625.1                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                  |



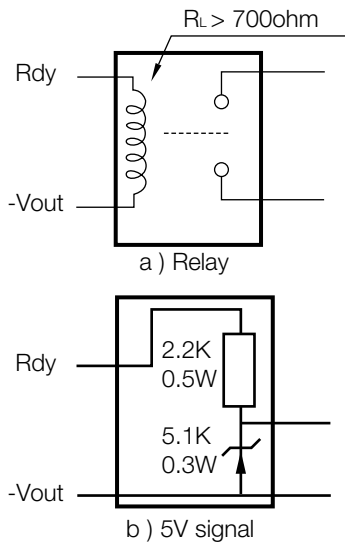
Block Diagrams



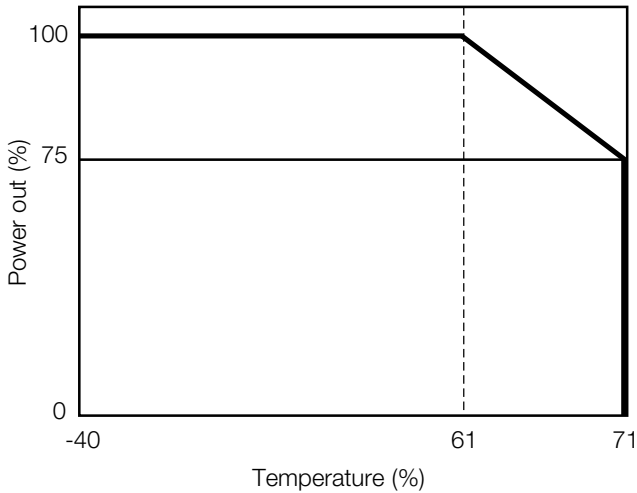
Pin Assignement and Front Controls

| Pin No. | Designation | Description                                          |
|---------|-------------|------------------------------------------------------|
| 1       | RDY         | DC OK, output for relay (only on SPD 24)             |
| 2       | +           | Positive output terminal                             |
| 3       | +           | Positive output terminal                             |
| 4       | -           | Negative output terminal                             |
| 5       | -           | Negative output terminal                             |
| 6       | GND         | Ground terminal to minimise High frequency emissions |
| 7       | L           | Phase input ( no polarity with DC input )            |
| 8       | N           | Neutral input ( no polarity with DC input )          |
| Pot1    | Vout ADJ.   | Trimmer for fine output voltage adjustment           |
| L1      | DC ON       | DC output ready LED                                  |

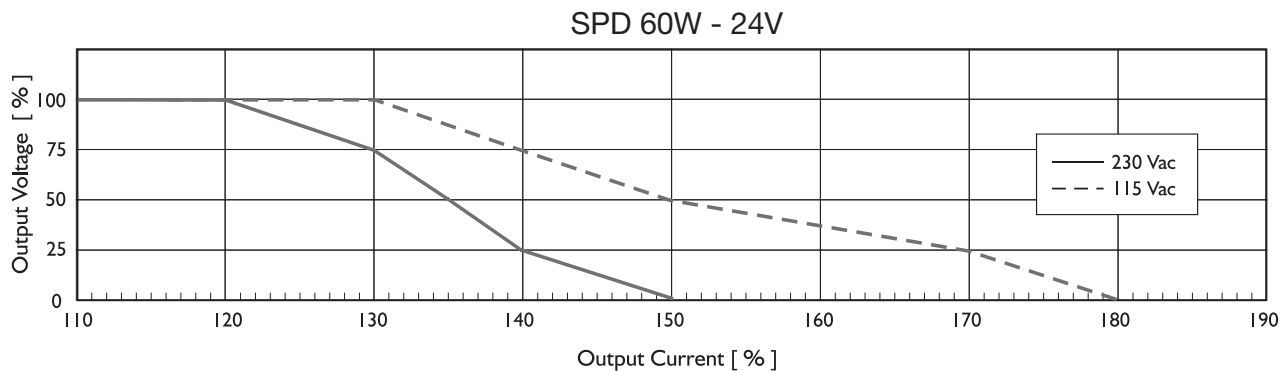
Output Rdy Wiring Diagram



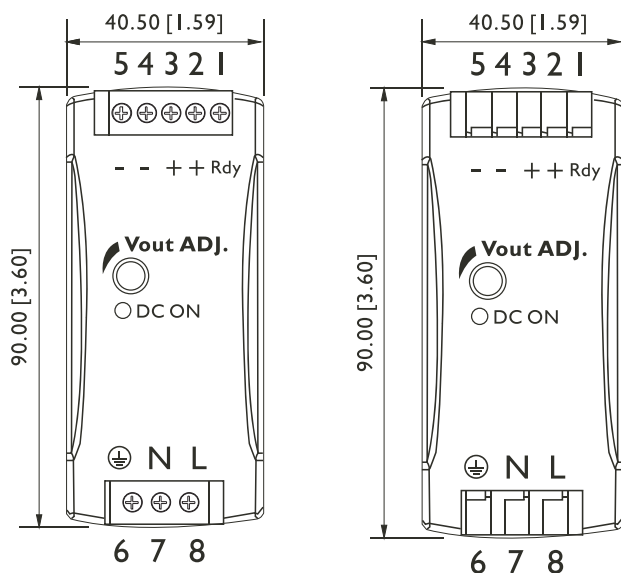
Derating Diagram



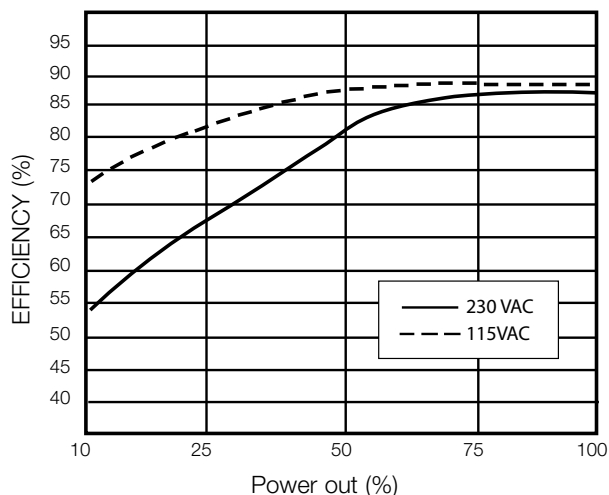
## Typ. Current Limited Curve



## Mechanical Drawings mm (inches)



## Typ. Efficiency Curve



## Installation

### Ventilation and cooling

Normal convection  
All sides 25mm free space  
for cooling is recommended

### Connector size range Spring terminal

AWG24-14 (0.2~2mm<sup>2</sup>)  
flexible/solid cable, 10mm  
stripping at cable and  
recommends use copper  
conductors only, 60/75°C

### Screw terminal

AWG26-12 (0.2~2.5mm<sup>2</sup>)  
flexible/solid cable, connector  
can withstand torque at  
max 0,56Nm (5 lbs-in).  
4~5 mm stripping at cable  
and recommends use copper  
conductors only, 60/75°C

### 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)