Application Note

1606-XL60DR

- World-wide approvals (Ce, UL, cUL) for industry
- Input: AC 230V/115V, DC 160...375V
- Output: 24V/2.5A

Input

| Input | AC100...120/200...240V (switchable), 47...63 Hz (85...132V AC / 176...264V AC, 160...375V DC, see also “Output: Continuous Loading”) |

Wide-Range Input: With the switch in the 230V position the power-supply unit operates at low and moderate loads at any input voltage between 95 and 264V AC (see ‘Output’ at the right side).

Note: At DC input, always leave the switch in the 230V position

| Input current | < 1.3 A (switch in 115V position) |
| DC input current | typ. 5.3 mA at 110V DC, 3.9 mA at 300V DC (preserves battery sources) |
| Inrush current | typ. < 25 A at 264V AC and cold start |

If you intend to protect the primary side of the power supply with a fuse or a circuit breaker, a 10 A slow acting fuse (HBC) or a supplementary protector 1492-SPU1C100 is recommended. In order to meet local requirements, please consult local codes and regulations for proper installation.

Efficiency, Reliability etc.

| Efficiency | typ. 86.5 % (230V AC, 24V/2.5 A) |
| Losses | typ. 9.4 W (230V AC, 24V/2.5 A) |
| MTBF | 700,000 h acc. to Siemensnorm SN 29500 (24V/2.5 A, 230V AC, Tamb = +40 °C) |
| Life cycle (electrolytics) | The unit exclusively uses longlife electrolytics, specified for +105°C |

Construction / Mechanics

Housing dimensions and Weight

| W x H x D | 49 mm x 124 mm x 102 mm (+ DIN rail) |
| Free space for ventilation | above/below 25 mm recommended (front view) |
| Weight | 470 g |

Design advantages:

- Input and output pluggable by means of CombiCon® plug connector.
- Wire Size Input/Output: Stranded 22...12 AWG (0.2...2.5 mm²), Solid 22...12 AWG (0.2...2.5 mm²)
- Tightening Torque: 3.5 lbs in (0.4 Nm) recommended (pluggable)

Output

- High overload current, no switch-off
- Wide-Range Input
- N+1 redundancy, RDY relay contact

| Output | 24V DC |

For balanced current sharing during parallel operation:

Soft characteristic (25.2V DC ±2% at no-load, 24V DC ±0.5% at nominal load, almost linear characteristic curve)

Quiet operation: Radiated EMI values below EN50081-1, even when using long, unscreened output cables.

Ambient temperature range

| Tmin | -10°C...+70°C (>60°C: Derating) |
| Tmax | -25°C...+85°C |

Continuous loading

<table>
<thead>
<tr>
<th>Switch</th>
<th>AC/DCin</th>
<th>Iout</th>
</tr>
</thead>
<tbody>
<tr>
<td>230V</td>
<td>176...264V</td>
<td>ACin 2.5 A</td>
</tr>
<tr>
<td></td>
<td>95...176V</td>
<td>ACin 1.5 A</td>
</tr>
<tr>
<td>160...375V</td>
<td>DCin 2.5 A</td>
<td></td>
</tr>
<tr>
<td>120...160V</td>
<td>DCin 2.0 A</td>
<td></td>
</tr>
<tr>
<td>80...120V</td>
<td>DCin 1.5 A</td>
<td></td>
</tr>
<tr>
<td>115V</td>
<td>85...132V</td>
<td>ACin 2.3 A</td>
</tr>
</tbody>
</table>

Output protected against short circuit, open circuit and overload

- Derating typ. 1.5 W/K (at Tamb=+60°C...+70°C)
- Voltage regulation better than 2% Vout overall
- Ripple / Noise < 30 mVpp, (20 MHz bandwidth, 50 Ω measurement)
- Overvolt. protection typ. 32V
- Parallel operation yes; current sharing via soft characteristic (see diagram)
- Power back immunity 26V

Front panel indicator: Green LED

RDY relay contact

- Type normally open contact
- closes when output voltage > 22.1V ±4% |
- opens when output voltage < 19.8V ±4%
- Electrical isolation 500V DC to output voltage
- Contact rating 1A at 28V DC
Start / Overload Behavior

Start-up delay  
Rise time  
Overload Behavior  
- Special Overload Design  
- no disconnection, no hiccup if overloaded 
- high overload current (up to 1.5 I_{Nom}), V_out is gradually reduced with increasing current.

Advantages:  
- High short-circuit current, giving large ‘start-up window’: unit starts reliably even with awkward loads (DC-DC converters, motors).  
- No ‘sticking’ such as can occur with fold-back characteristics  
- Secondary fuses operate reliably

Specifications valid for 230V AC input voltage, +25°C ambient temperature, and 5 min run-in time, unless otherwise stated. They are subject to change without prior notice

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