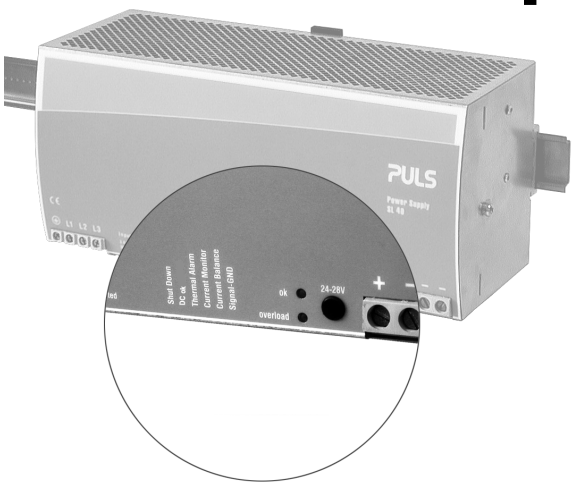
Data sheet

# Clever Power

# SL40.300/.301

- Input: 3 AC 400...500V
- Output: 24...28V / 960W (1080W)
- No switch-off at overload
- Ideal for parallel operation
- Output for measurement and logical signals (.301)




CB Scheme IEC60950

c UL us UL508 LISTED IND. CONT. EQ. 18 WM, 60°C

c UL us UL60950 E137006 CUL/CSA-C22.2 No 950-M90

CE EMC and Low Volt. Directive

## Input

| | |
|---|---|
| Input voltage | 3 AC 400...500 V, – 15 %, + 15 %<br>47-63 Hz, Suitable for IT power systems |
| Rated Tolerances<br>• Continuous operat.<br>• Short term (1 min) at 24 V/40 A | <br>340-575 V AC<br>300-620 V AC |
| Input current | 3.0 A |
| Inrush current | < 30 A |

Inrush current limiting done with a fixed 23R resistor (not a thermistor) which is bridged after the unit is running, so losses are minimized. That means no reset time even at a warm-start.

Fuse loading 3 $A^2s$

To be fused with a 3 x 10A, B-type 'circuit-breaker' switch based on the usual thermomagnetic overload sensing principle (used anyway to fuse the input lines; unit has no internal fuses).

| | |
|---|---|
| Harmonic current emissions (PFC) | acc. EN 61000-3-2 |
| Transient handling | Active transient filter incorporated, so transient resistance acc.to VDE 0160 / W2 (1300 V / 1.3 ms), for *all* load conditions. |
| Hold up time | min. 15 ms<br>at 400 V AC, 24 V / 40 A |

## Construction / Mechanics *

| | |
|---|---|
| Housing dimensions and Weight | |
| • W x H x D | 275 mm x 124 mm x 117 mm (+ DIN rail) |
| • Free space for ventilation | above/below each 70 mm recommended<br>left/right each 25 mm recommended |
| • Weight | 3.3kg |
| Connections (input and output) | robust screw terminals, connector size range:<br>• solid: 1.5...6 $mm^2$ (Outp.: 0.5...16 $mm^2$)<br>• flexible: 1.5...4 $mm^2$ (Outp.: 0.5...10 $mm^2$)<br>Output: Minus terminal with 2 connectors, current handling per output: 40 A (max. acc. to UL) resp. 56 A (max. acc. to VDE) |

Design advantages:
- All connection blocks mounted on front panel for ease of access.
- PVC insulated cable can be used for all connections, as the connection blocks are mounted in the cooler area on the underside of the unit.
- Power density: 230 W per litre housing volume.

## Output (signal outputs see overleaf)

| | |
|---|---|
| Output voltage | 24...28 V DC, adjustable by (covered) front panel potentiometer. Adj. range guaranteed |
| Output noise suppression | Radiated EMI values below EN 61000-6-3, even when using long, unscreened output cables. |
| Ambient temperature range $T_{amb}$ | Operation: 0°C...+70°C (>60°C: Derating)<br>Storage: -25°C...+85°C |
| Rated continuous loading with convection cooling | |
| • $T_{amb}$=0°C - 60°C | 24 V / 40 A (960 W) resp. 28 V / 35 A (980 W) |
| • $T_{amb}$=0°C - 45°C | 24 V / 45 A (1080 W) resp. 28 V / 38 A (1064 W)<br>short-term (< 1 min.) also at 60°C admissible |
| Derating | typ. 24 W/K (at $T_{amb}$=+60°C...+70°C) |
| Voltage regulation | better than 2% over all |
| Ripple (incl. spikes) | < 50 $mV_{PP}$ (20 MHz bandw., 50 Ω measurem.) |
| Over-voltage protection | At 32 V ± 10%: switch to hiccup mode |
| Front panel indicators: | • Green LED on, when $V_{out} > U_T$, where $U_T$ is ca. 2 V below Vout adjusted (24V...28V)<br>• Red LED on, when $V_{out} < U_T$ |
| Parallel operation | SL40.300: yes, no active current sharing<br>SL40.301: yes, active current sharing, please refer to "Output Signaling" - "Current Balance" |

Current sharing by balancing line (active sharing principle, SL40.301) or 'soft' output characteristic (passive sharing principle, SL40.300; characteristic switch-over by jumper as in SL20/SL30 without opening the unit)

| | |
|---|---|
| Power Back Immunity | < 35 V |

## Efficiency, Reliability etc. *

| | |
|---|---|
| Efficiency | typ. 92.5% (400 VAC, 24 V / 40 A) |
| Losses | typ 78 W (400 VAC, 24 V / 40 A) |
| MTBF | SL40.300: 305,000 h SL40.301: 268,000 h<br>acc. to Siemensnorm SN 29500<br>(24 V/40 A, 400 VAC, $T_{amb}$ = +40 °C) |
| Life cycle (electrolytics) | The unit exclusively uses longlife electrolytics, specified for +105°C (cf. 'The SilverLine', p.2).<br>High reliability and lifetime, as<br>• only 6 aluminum electrolytics and<br>• no small aluminum electrolytics are used. |

## Order information

| Order number | Description |
|---|---|
| SL40.300 | basic version, passive load sharing |
| SL40.301 | with signal/measurement outputs, signal output connector included: Order number XFB-S-W8-MSTB 06-W8) |
| SLZ01 | Screw mounting set, two needed per unit |

## Start / Overload Behaviour

| | |
|---|---|
| Startup delay | < 0.5 s |
| Rise time | < 0.1 s (40 A, 20,000 µF) |
| Overload behaviour | PULS Overload Design (see diagram at the right), thus neither switch-off nor hiccup at overload |

Advantages:
- High short-circuit current, giving large 'start-up window': unit starts reliably even with awkward loads (DC-DC converters, motors). No 'sticking' as can occur with fold-back characteristics.
- Even longer overload possible as unit does not switch off.

## Output for measurements and signalling

(SL40.301 only)

'Shut-Down': Shut-down input: units switches off, if
- Input is connected to 'Signal GND' (ΔU < 1V) or
- +20...28 V Voltage are applied to this input and 'Signal GND' (max. 20 mA).

'Power Good': Power-Fail / -Good
- Signal: High (24 V) at correct operation (no overload, over-temp., short-circuit). At 'low' signal and nominal load, output remains at nominal voltage for at least 5 ms.
- Corresponding ground is 'Signal GND' output (current source)
- Permissable load resistance: ≥ 300 Ω, e.g. 24V relais, control lamp (no dropping resistor needed for LED), scoring logic. To get 5V level: connect this output and 'Signal GND' via 5V zener diode (0.5W) + 1kΩ resistor switched in parallel

'Thermal Alarm': warning signal at over-temperature
- Signal: High (24 V) at correct operation (no over-temperature). If signal switches to 'low' and temperature increases further, output current is lowered,
- Ground and permissable load resistance: see 'Power Good' output

'Current Monitor': Current measurement output, usable with
- Voltmeter: 1 V per 10 A output current (to 'Signal GND' output, $R_{in}$(voltmeter) > 100 kΩ)
- Ammeter: 1 mA per 10 A output current (to 'Signal GND' output, $R_{in}$(ammeter) < 100 Ω)

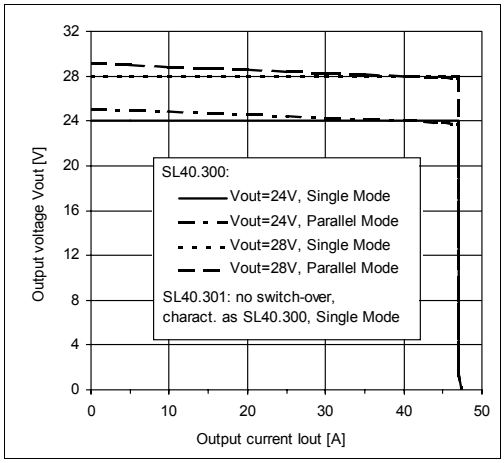
'Current Balance': balancing output for current sharing
- For active current sharing at parallel operation interconnect the "Current Balance" output terminals of all paralleled units. The corresponding ground is the ⊖ pole. Do not interconnect the "Signal GND" outputs. Exact output voltage regulation is effective when the output current is greater than 0.4A. Current sharing also works reliable with decoupling diodes and modules for redundancy applications.

'Signal GND': Ground terminal for all signal outputs of this unit (not 'Current Balance')
- Do not connect this terminal to the ⊕ terminal of this unit (not even across a load: risk of overload)
- Do not connect this terminal to any output of another unit (not even with 'Signal GND' of another unit)
- max. load current: 0.3 A
  Signal ground is internally fused by a self-curing fuse (polyswitch)

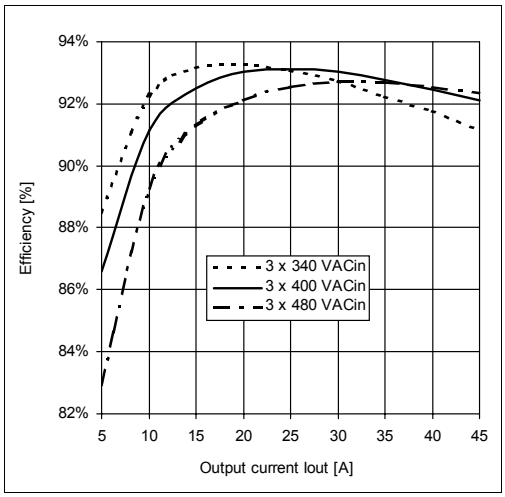
## Further Information

For further information, especially about EMC, Connections, Safety, Approvals, Mechanics und Mounting see page 2 of the „The SilverLine" data sheet. For detailed dimensions please see the SilverLine mechanics data sheet SL40.

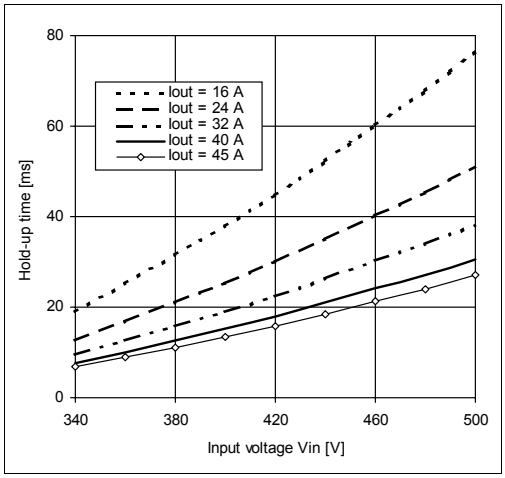
**Output V/I characteristic** (typ.)




**Efficiency** (typ., at $V_{out}$=24V)




**Hold-up time** (min., at $V_{out}$=24V)




Specifications valid for 3 x AC 400V input voltage, +25°C ambient temperature, and 5 min run-in time, unless otherwise stated. They are subject to change without prior notice.

**Your partner in power supply:**

EPSMA European Power Supply Manufacturers Association

AWARDED Bayerns Best 50 Czech 100 Best EuropeÕs 500

**PULS GmbH**
Arabellastraße 15
D-81925 München
Tel.: +49 89 9278-0
Fax: +49 89 9278-199
www.puls-power.com