

PULS MiniLine:  
practical, versatile and reliable like  
the SilverLine – yet small like no other:

**PULS**



Data sheet

# MiniLine with plug-in screw terminals



- 24-28 V DC/50 W output power
- 100-240 V Wide Range Input (85-264 V AC permitted)
- DCok output
- PULS Overload Design™ (does not switch off at overload but delivers up to 1.5 times nominal current)
- with load sharing for reliable parallel operation
- NEC Class 2 Power Supply

PULS GmbH, Arabellastrasse 15, D-81925 Munich  
Tel. +49.(0)89.9278-244, Fax: +49.(0)89.9278-199  
sales@puls-power.com, <http://www.puls-power.com>

**Mini is more.**

# Technical Data ML50.111

**PLUG Connectors**

## Input

|                                  |                                                                                                                     |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Input voltage                    | AC100-240V (Wide Range), 47...63 Hz<br>Admiss. limits: AC 85...264V (DC 85...375V)                                  |
| Input current                    | <1.0A (@ AC 100V <sub>in</sub> , 50W P <sub>out</sub> )<br><0.6A (@ 196 V AC <sub>in</sub> , 50W P <sub>out</sub> ) |
| External Fusing                  | Not required, unit provides internal fuse (T3AH, not accessible)                                                    |
| Transient immunity               | Transient resistance acc. to VDE 0160 / W2 (750V / 1.3ms), over entire load range                                   |
| Hold-up time (see diagram below) | >171ms @ AC 230V, 24V / 2.1A<br>>97ms @ AC 196V, 24V / 2.1A<br>>17ms @ AC 100V, 24V / 2.1A                          |

## Efficiency, Reliability

|                    |                                                                                          |
|--------------------|------------------------------------------------------------------------------------------|
| Efficiency         | typ. 88.5% (AC 230V, 24V / 2.1A)<br>(see also diagram below)                             |
| Losses             | typ. 6.8W (AC 230V, 24V / 2.1A)                                                          |
| MTBF (Reliability) | ca. 600.000 h acc. to Siemensnorm SN 29500 (24V/2.1A, AC 230V, T <sub>amb</sub> = +40°C) |

Prior to shipment, every unit undergoes the following tests in order to isolate any defective units which might suffer an early failure:

- Run-in / burn-in (Full load, T<sub>amb</sub> = +60°C, on/off cycle)
- Functional test (100 %)

## Construction, Mechanics, Installation

Robust plastic housing (US Patent No. D442, 9235), fine ventilation grid on three housing sides to keep out small parts (e.g. screws), IP20

Dimensions and weight

- W x H x D 45mm x 75mm x 91mm (+ DIN rail)  
Depth incl. connectors: 98mm (+ DIN rail)
- Weight 240g

Mounting orientation  (cf. 'Output')

Ventilation/Cooling Normal convection, no fan required

- Free space f. cooling recom'd.: 25mm on sides with ventilation grid

Easy snap-on mounting onto the DIN-rail (TS35/7,5 or TS35/15).

Unit sits safely and firmly on the rail; no tools required even to remove

Connection by plug connectors, 2 terminals/output; mating connectors enclosed

Connector size range – input:

- flexible/solid cable 0.5 - 2.5mm<sup>2</sup> (22-12 AWG)
- Wire strip length Ferrules admissible, 7mm recommended

Connector size range – output:

- flexible cable 0.3 - 2.5mm<sup>2</sup> (28-12 AWG)
- solid cable 0.3 - 4mm<sup>2</sup> (28-12 AWG)
- Wire strip length Ferrules admissible, 6mm recommended

Design details – for your advantage:

- Standard plugs, meet various connector families (e.g. CombiCon)
- Plugs allow measurement access

## Output (incl. Logic)

|                          |                                                                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output voltage           | DV 24-28V, adj. by front panel potentiometer                                                                                                                                    |
| • preset                 | 24V ±0.5% @ 2.1A<br>(25V at no load, see 'Parallel operation')                                                                                                                  |
| Voltage regulation       | stat. ±2.5% V <sub>out</sub> (see 'Parallel operation')<br>dyn. ±2% V <sub>out</sub> overall                                                                                    |
| Ripple/Noise             | <50mV <sub>pp</sub> (20MHz bandw., 50Ω measur.)                                                                                                                                 |
| Overvoltage prot. (OVP)  | <40V                                                                                                                                                                            |
| Output noise suppression | Radiated EMI values below EN 61000-6-3, even when using long (>2m), unscreened output cables                                                                                    |
| Rated continuous loading | up to 2.1A @ 24V / up to 1.8A @ 28V depending on built-in orientation, V <sub>in</sub> and T <sub>amb</sub> (convection cooling); for details see derating diagram below        |
| Overload behaviour       | <b>PULS Overload Design™:</b> No switch-off at overload/short-circuit, instead: up to 1.5 · I <sub>rated</sub> . So you need no oversizing to start awkward loads.              |
| Protection               | Unit is protected against (also permanent) short-circuit, overload and open-circuit                                                                                             |
| Derating                 | see diagram below                                                                                                                                                               |
| Parallel operation       | Yes; load sharing by inclined characteristic curve (ΔV = -1V between I <sub>out</sub> = 0A and I <sub>out</sub> = I <sub>rated</sub> )                                          |
| Power back immunity      | 35V                                                                                                                                                                             |
| Operation indicator      | Green LED (DC OK), threshold: V <sub>out</sub> = 20V                                                                                                                            |
| DC OK output             | To feed a 24V relay (R <sub>coil</sub> > 700Ω). Relay operates, if output voltage exceeds threshold value<br>Free-wheeling diode for relay is included in the power supply unit |
| • Threshold              | V <sub>out</sub> = 20V ±4%                                                                                                                                                      |

## Environmental Data, EMC, Safety

|                                                      |                                                                      |
|------------------------------------------------------|----------------------------------------------------------------------|
| Ambient temperature range (measured 25mm below unit) |                                                                      |
| • storage, transport                                 | -25°C ... +85°C                                                      |
| • operation                                          | -10°C ... +70°C (for derating see diagram below)                     |
| Humidity                                             | max. 95% (without condensation)                                      |
| Electromagnetic emissions (EME)                      | EN 61000-6-3 (includes EN 61000-6-4)<br>Class B (EN 55011, EN 55022) |
| Electromagnetic immunity (EMI)                       | EN 61000-6-2 (includes EN 61000-6-1)                                 |
| Safe low voltage:                                    | SELV (EN60950, VDE0100/T.410), PELV (EN50178)                        |
| Prot. class/degree:                                  | Class I (EN60950) / IP20 (EN60529)                                   |

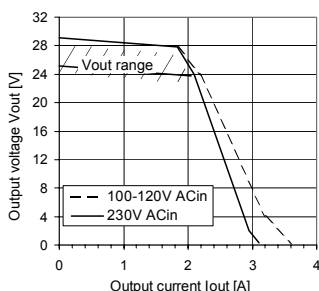
The PSU complies with all major **safety approvals** for EU (EN 60950, EN 60204-1, EN 50178), USA (UL 60950, E137006, UL508 LISTED, E198865), Canada (CAN/CSA-C22.2 No 60950 [CUR], CAN/CSA-C22.2 No. 14 [CUL]), CB Scheme (IEC 60950).

Further design details – for your advantage:

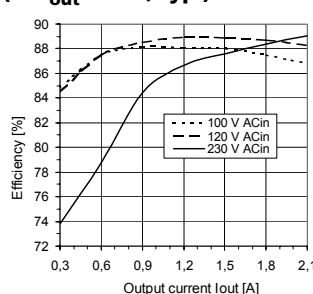
- All terminals are easy to reach as mounted on the front panel.
- Input and output are strictly apart from each other (below/above) and have different wire access (90°/270° wiring), so cannot be mixed up

## Diagrams

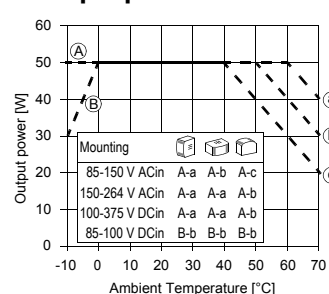
**Output characteristic V<sub>out</sub>/I<sub>out</sub> (min.)**



**Efficiency (@ V<sub>out</sub> = 24V, typ.)**



**Derating of output power**



**Hold-up time with ACin (@ V<sub>out</sub> = 24V, typ. + min.)**

