

## SilverLine

Product Family Overview 2005



**40-960W**  
Reliability  
through  
Technology

# Switched Mode Power Supplies from PULS

## Install and Forget ...

... at least until you need a new power supply. When the time comes, you may recall the excellent experience you have had with PULS' first-class units, the global sales and the helpful Design-In-Support and how good it makes you feel to know that today and in the future you can count on PULS' top quality products.

Specialized in Innovation and Quality	3
PULS Power Supplies are Always the Best Choice	4
Applications from A-Z	8
SilverLine 1-phase AC/DC Units	9
SilverLine 3-phase AC/DC Units	13
DC/DC Converter	15
SilverLine Redundancy Units	15
SilverLine AS-Interface Units	17
Accessories	18
Glossary and Product Overview	19

# PULS GmbH – Power Supplies

## Specialized in Innovation and Quality

**The focus of PULS GmbH is to deliver technologically advanced power supplies to the DIN-rail market that are of the highest quality.**

As a pioneer in the field of switched-mode power supplies, PULS has set the standards in innovative technology developed into a functional design since 1980. The company founder and owner Mr. Bernhard Erdl, together with his highly motivated colleagues, guarantee specialized competence and creativity. Rarely are the strengths of a company so openly reflected in its products as with PULS.

The SilverLine and MiniLine product lines stand in the middle of the wide range of switched-mode DIN-rail power supplies. Both lines offer several applications for ready-to-use standard products with an above average lifetime and extraordinary reliability.

Being above average is a standard for PULS. With this prerogative in mind, PULS has become Germany's biggest owner-managed manufacturer of power supplies and is a leader in the technology for switched-mode DIN-rail power supplies. In all three of its



production sites (headquarters in Munich, SMD production in Chemnitz and largescale production in Chomutov/Czech Republic), PULS has adopted the same high quality standards, successfully meeting customers' high demands in the industry and in the automation field worldwide.

# PULS Power Supplies

## are Always the Best Choice



### SilverLine – Top Reliability and Best Product Quality

PULS SilverLine power supplies are "engineered in Germany", look good and are particularly fail-safe with an efficiency level that is far above the average. PULS has consequently reduced the amount of critical components and consistently uses only the highest quality elements and materials. The highly automated production provides for outstanding processing at all production sites. Most SilverLine units are preset for parallel operation, thereby safely reaching high output ranges up to over 1,000 W.

## 1 Attractive and Compact Mechanics

PULS power supplies are among the smallest and most efficient power supplies on the market and are delivered in a particularly compact and balanced size (height x width x depth). A perfect volume/performance ratio is achieved, while keeping the weight incredibly light. This allows more space and a better overview of the switching cabinet. The patented retaining system ensures easy and tool-free mounting and removal from the DIN-rail with an absolutely safe and firm base - even with DIN-rails of different sheet thickness. The robust screw terminals, easily accessible from the front (two for each pole), allow not only for very rapid, tool-free mounting but are also resistant to shock and vibration. A plastic cover prevents involuntary contact with the live input terminals through metallic tools.

## 2 Ergonomic Design

From an ergonomic standpoint, the PULS SilverLine technology is delivered in a metal housing that is both nicely shaped and stable. The unit's LED displays and controls are conveniently arranged on the front panel. They are directly accessible and therefore easy to maintain. The label is easy to read and unequivocally marked. The special PULS grid on the bottom and lid of the unit not only provide enough cooling air but also prevent the entrance of foreign bodies such as screws and other small pieces.



### 3 Flexible Input

The SilverLine power supplies have a wide input range, in-rush current limitation and, depending on the model, an integrated input protection. In order to obtain a higher efficiency level units are available both with and without power factor correction (PFC), as the regulation on the compliance with harmonic content on the input current of a power supply is not universally valid and does not apply to all applications. The hold-up time to bridge interferences lies above the market's typical values and contributes to making the unit even more robust.

### 4 Output Characteristics

... are characterised by very stable control, give very low ripple and noise, and high power reserves. It also effortlessly starts up large step load changes and it enables the start-up of heavier loads such as DC-motors and capacitive loads. As a result, the otherwise usual over-specification of the power supply is no longer necessary, thereby saving space and money. Some units are also provided with an electronic and permanent turnoff (FUSE Mode) for cases of overload for a period longer than 3 to 5 seconds and/or in case of over-temperature. This offers additional protection of the connected inputs and loads and prevents unintended restarts in fault situations. An additional contribution to system safety by PULS.

▶ Ask also for the MiniLine product overview

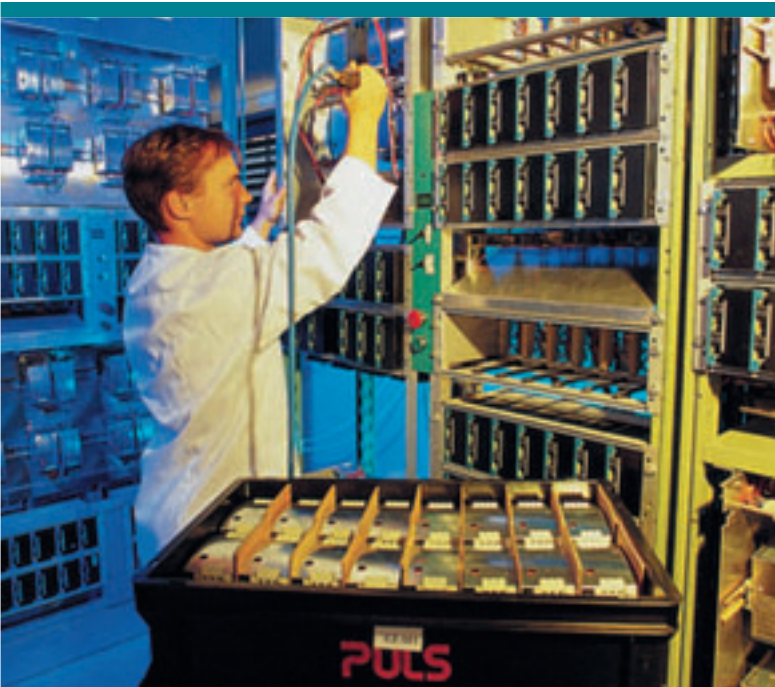
▶ Product information can also be found on the internet at [www.pulspower.com](http://www.pulspower.com)

**InfoLine: +49 (0) 89/92 78-0**



# PULS Power Supplies

„Best in Class“



## 5 Unbeatable Efficiency and High Environmental Friendliness

With over 92% efficiency, the SilverLine units are top class worldwide. This means small size, little thermal loss in the switching cabinet, a long life expectancy and a low fault rate. All units are convection cooled thereby replacing forced air ventilation and fans that are susceptible to faults. The guaranteed working temperature range is from -10 to +60°C for most models; a slightly reduced power even allows an ambient operating temperature of even +70°C.

## 6 Reliability Far Above Average

The life expectancy of PULS units exceeds 70,000 hours at full-load operation. This corresponds to a 24h/day operation for 8 years, 365 days/year. No system runs constantly without a break for this period, so in practice the unit's lifetime is even longer.

### PULS Locations + Worldwide Partners

*Austria*

*China*

*Czech Republic*

*France*

*Germany*

*North America*

*Switzerland*

*United Kingdom*

*Americas*

*Australia*

*Asia / Singapore*

*Europe*

*South Africa*



The value for statistical faults, the so-called Mean Time Between Failure (MTBF), also reaches a particularly high level with over one million hours.

# 7

## ■ PULS Quality

At PULS the high quality prerogative starts right from the development of the units. We only use components and circuit designs that have undergone and successfully passed a number of stress and conditional tests. During production every unit is tested: before performing functional and high-voltage tests a visual inspection followed by an In-Circuit-Test ensures that all components are on board and soldered properly. To eliminate early faults, before delivery all PULS power supplies undergo a Burn-In-Test lasting several hours. To finalize and prove their high quality, an individually produced and unit-specific measurement protocol is attached to all units. Furthermore, the high quality of PULS units is also easily proven by the fact that worldwide all the repairs for about

2 million units delivered are carried out at our Munich headquarters by only 3 employees. All PULS facilities are naturally ISO 9000:2001 certified. This means that all procedures are perfectly fine tuned at company and department level.

# 8

## ■ Worldwide Approvals and Global Sales

PULS units are available all over the globe through our international sales network and partners worldwide. Comprehensive approvals (CE, CB-Scheme, UL60950 and UL508, CSA-C22.2 etc.) are standard and ensure a worldwide, problem-free use.

# 9

## ■ More Services than you Expect

Applications are individual - as individual as people. If you are not sure which power supply optimally meets the requirements of your applications, PULS specialists are at your complete disposal with their Design-In-Supports. PULS also offers special units, for example, with measurement sensors and relevant interpretation of the results. Therefore, in critical situations you can be sure that the selected power supply efficiently supports your application. Contact us or our partners!



# Applications from A – Z

## 10. PULS offers the Greatest Product Range of Switched-Mode Power Supplies

PULS offers you the most comprehensive product range in terms of switched-mode DIN-rail power supplies. The SilverLine series covers the upper power range up to 960 W per single unit, while the lower power range from 25 W to 100 W is covered by the purposely optimised MiniLine range.

Higher ranges can be reached through parallel connection, while redundancy applications are made possible through specially developed units and modules. DC/DC converters and a buffer module to report and bridge interferences complement the range. In addition to the DIN-rail units, the comprehensive PULS portfolio includes several 19" products.

## DIMENSION

## A new world of Power

### NEW – Product launch 2005



#### The latest generation of DIN rail switch mode power supplies is here:

We have optimized and expanded our portfolio with respect to technology, innovation and reliability and are ready to go to market, beginning with the Q-series.

For further information about DIMENSION please contact us or visit:

[www.pulspower.com](http://www.pulspower.com)

#### Reliable

- Active filtering of input transients
- Full output power up to +60°C
- MTBF > 600 000h, specified capacitor lifetime > 50,000h
- Short-term operation down to 60Vac and up to 300Vac
- 3 year extended warranty

#### Amazingly Small

- Up to 55% savings in panel space
- Unmatched efficiency up to 95%

#### Powerful

- 150% peak load capability up to +60°C
- Large output capacitors

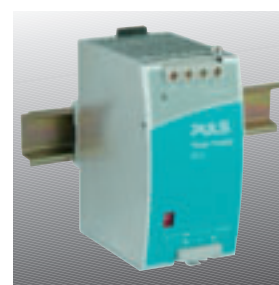
#### Additional Features

- Power factor 0.9 even for 3-phase input
- DC-OK relay contact
- -25°C to +60°C operation, no derating
- DC input from 88V to 370V
- Output voltages: 12V, 24V, 36V & 48V

#### Easy

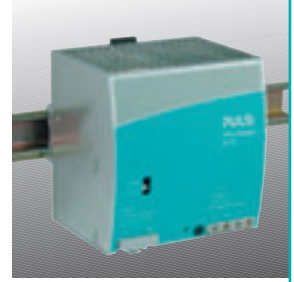
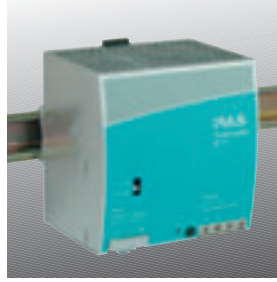
- 100-240V wide-range input
- Extra low inrush current
- Intelligent output power manager
- Quick-connect spring clamp terminals

# ▶ 1-phase AC/DC Power Supplies

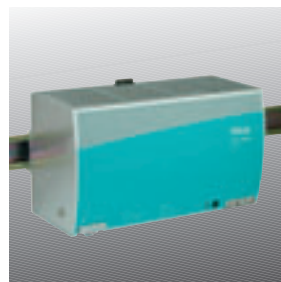
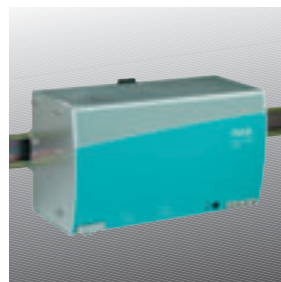
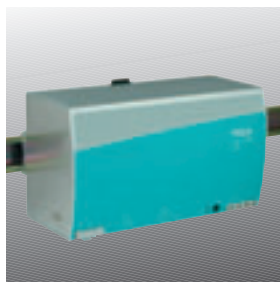
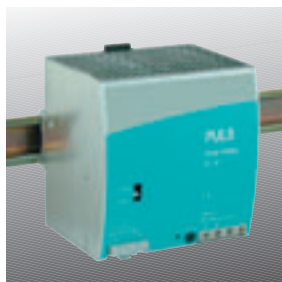


Model	SL2.103	SL2.100	SL4.100	SL 5.100
	<b>12-15V / 3-2.7A / 40W</b>	<b>24V / 2.5A / 60W</b>	<b>24V / 4A / 96W</b>	<b>24V / 5A / 120W</b>
<b>Input voltage range</b>	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 160...375V	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 160...375V	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 210...375V	AC 100-120V / 200-240V 85...132 / 176...264Vac manual select DC 210...375V
<b>Hold-up time</b>	>30ms (AC 196V)	>20ms (AC 196V)	>20ms (AC 196V)	>37ms (AC 196V)
<b>Rated input current</b>	<0.9A / <0.5A	<1.3A / <0.7A	<2A / <1.1A	<2.6A / <1.4A
<b>Efficiency</b>	85%	87.5%	88%	90%
<b>Output voltage</b> preset	12-15V 12V	24V	24V	24V
<b>Rated output current</b>	3A @ 12V; 2.7A @ 15V	2.5A	4A	5A
<b>Power Boost</b>				6A
<b>Ripple/Noise</b> (@ 20MHz/50Ω)	<25mV <sub>pp</sub>	<25mV <sub>pp</sub>	<25mV <sub>pp</sub>	<50mV <sub>pp</sub>
<b>Operating temperature range</b> (T <sub>amb</sub> )	-10...+70°C >60°C: 1W/K Derating	-10...+70°C >60°C: 1.5W/K Derating	-10...+70°C >60°C: 3W/K Derating	-10...+70°C >60°C: 3W/K Derating
<b>Dimensions</b> (W x H x D) <b>Weight</b>	49 x 124 x 102mm 460g	49 x 124 x 102mm 460g	65 x 124 x 102mm 620g	64 x 124 x 102mm 620g
<b>Approvals/standards</b> cULus LISTED / CE / CCC CB SCHEME / cURus	CE			
<b>Safety standards</b> IEC/EN 60950-1, EN 50178 UL 60950, UL 508	✓	✓ ✓	✓ ✓	✓ ✓
<b>EMC standards</b> EN 61000-6-2 EN 61000-4-2,-3,-4,-5,-6,-11 EN 61000-6-3 EN 61000-3-2 EN 55011/EN55022 class B	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓
<b>Special features</b>		NEC Class 2 Limited Power Source	NEC Class 2 Limited Power Source	

# ► 1-phase AC/DC Power Supplies



Model	SL5.102	SL10.104	SL10.100	SL10.105
	24-28V / 5-4.3A / 120W	12-15V / 15-12A / 180W	24-28V / 10-8.6A / 240W	24-28V / 10-8.6A / 240W PFC
<b>Input voltage range</b>	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 210...375V	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 240...375V	AC 100-120 / 210-240V 85...132 / 176...264Vac manual select DC 240...375V	AC 100-120 / 210-240V 85...132 / 176...264Vac manual select DC 240...375V
<b>Hold-up time</b>	>37ms (AC 196V)	>25ms (AC 196V)	>25ms (AC 196V)	>20ms (AC 196V)
<b>Rated input current</b>	<2.6A / <1.4A	<5A / <2.3A	<6A / <2.8A	<6A / <2.8A
<b>Efficiency</b>	90%	87%	90%	89%
<b>Output voltage</b>	24-28V	12-15V	24-28V	24-28V
preset	24.5V	12V	24.5V	24.5V
<b>Rated output current</b>	5A @ 24V; 4.3A @ 28V	15A @ 12V; 12A @ 15V	10A @ 24V; 8.6A @ 28V	10A @ 24V; 8.6A @ 28V
<b>Power Boost</b>	6A	18A	12A	12A
<b>Ripple/Noise</b> (@ 20MHz/50Ω)	<25mV <sub>pp</sub>	<50mV <sub>pp</sub>	<30mV <sub>pp</sub>	<30mV <sub>pp</sub>
<b>Operating temperature range</b> (T <sub>amb</sub> )	-10...+70°C >60°C: 3W/K Derating	0...+70°C >60°C: 5W/K Derating	0...+70°C >60°C: 6W/K Derating	0...+70°C >60°C: 6W/K Derating
<b>Dimensions</b> (W x H x D)	64 x 124 x 102mm	120 x 124 x 102mm	120 x 124 x 102mm	120 x 124 x 102mm
<b>Weight</b>	620g	980g	980g	1195g
<b>Approvals/standards</b> cULus LISTED / CE CB SCHEME / cURus				
<b>Safety standards</b> IEC/EN 60950-1, EN 50178 UL 60950, UL 508	✓ ✓	✓ ✓	✓ ✓	✓ ✓
<b>EMC standards</b> EN 61000-6-2 EN 61000-4-2,-3,-4,-5,-6,-11 EN 61000-6-3 EN 61000-3-2 EN 55011/EN55022 class B	✓ ✓ ✓ ✓ ✓	✓ ✓ EN 61000-6-4 ✓	✓ ✓ EN 61000-6-4 ✓	✓ ✓ ✓ ✓ ✓
<b>Special features</b>				PFC choke



**SL10.101**

**SL10.106**

**SL20.100**

**SL20.101**

**SL20.110/SL20.111**

**48-56V / 5-4.3A / 240W**

**48-56V / 5-4.3A / 240W  
PFC**

**24-28V / 20-18A / 480W**

**24-28V / 20-18A / 480W  
PFC**

**24-28V / 20-18A / 480W  
auto select, SL20.111 PFC**

AC 100-120 / 210-240V  
85...132 / 176...264Vac  
manual select  
DC 240...375V  
>25ms (AC 196V)  
  
<6A / <2.8A

AC 100-120 / 210-240V  
85...132 / 176...264Vac  
manual select  
DC 240...375V  
>25ms (AC 196V)  
  
<6A / <2.8A

AC 200-240V  
184...264Vac  
  
DC 270...370V  
>20ms (AC 196V)  
  
<5A

AC 200-240V  
184...264Vac  
  
DC 270...370V  
>20ms (AC 196V)  
  
<5A

AC 100-120 / 200-240V  
85...132 / 184...264Vac  
auto select  
  
>30ms (AC 230V)  
  
<10A / <5A

90%

90%

91%

91%

90%

48-56V

48-56V

24-28V

24-28V

24-28V

48V

48V

24V

24V

24V

5A @ 48V; 4.3A @ 56V

5A @ 48V; 4.3A @ 56V

20A @ 24V; 18A @ 28V

20A @ 24V; 18A @ 28V

20A @ 24V; 18A @ 28V

6A

6A

25A

25A

25A (22A)

<50mV<sub>pp</sub>

<50mV<sub>pp</sub>

<20mV<sub>pp</sub> (single operation),  
<40mV<sub>pp</sub> (parallel operation)

<20mV<sub>pp</sub> (single operation),  
<40mV<sub>pp</sub> (parallel operation)

<20mV<sub>pp</sub> (single operation),  
<40mV<sub>pp</sub> (parallel operation)

0...+70°C  
>60°C: 6W/K Derating

0...+70°C  
>60°C: 6W/K Derating

0...+70°C  
>60°C: 12W/K Derating

0...+70°C  
>60°C: 12W/K Derating

0...+70°C  
>60°C: 12W/K Derating

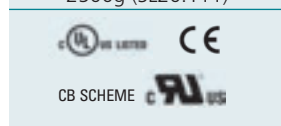
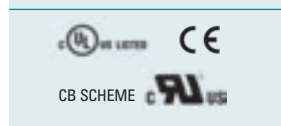
120 x 124 x 102mm  
980g

120 x 124 x 102mm  
1195g

220 x 124 x 102mm  
1800g

220 x 124 x 102mm  
2400g

220 x 124 x 102mm  
1800g (SL20.110),  
2500g (SL20.111)



✓  
✓

✓  
✓

✓  
✓

✓  
✓

✓  
✓

✓  
✓  
EN 61000-6-4  
✓

✓  
✓  
✓  
✓  
✓

✓  
✓  
EN 61000-6-4  
✓

✓  
✓  
✓  
✓  
✓

✓  
✓  
(only SL20.111)  
(only SL20.111)  
✓

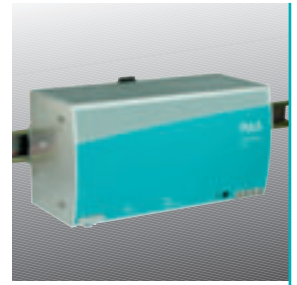
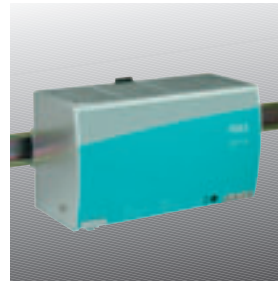
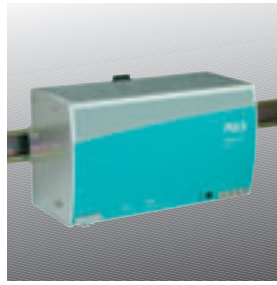
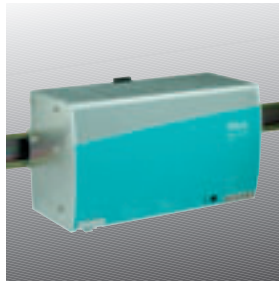
PFC choke

Single/parallel operation  
(inclined characteristic)  
selectable (jumper on the front),  
active inrush current limiting

Single/parallel operation  
(inclined characteristic)  
selectable (jumper on the front),  
PFC choke,  
active inrush current limiting


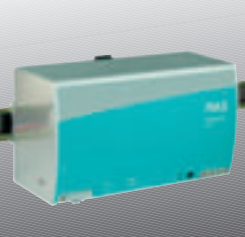



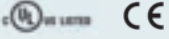


Single/parallel operation  
(inclined characteristic)  
selectable (jumper on the front),  
SL20.111 with PFC choke,  
active inrush current limiting

# ► 1-phase AC/DC Power Supplies

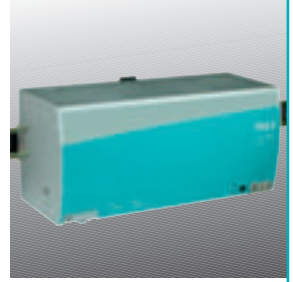
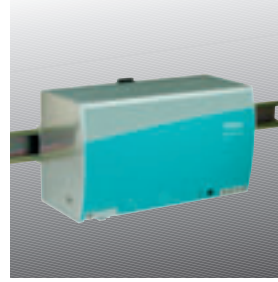
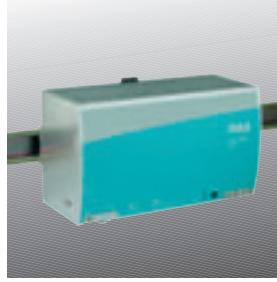
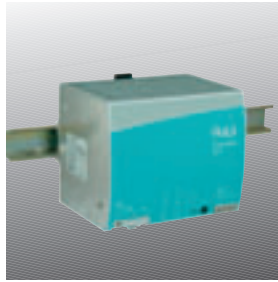










Model	SL20.115	SL20.112	SL20.113	SL30.100
	<b>24-28V / 20-18A / 480W</b> auto select, PFC, remote shutdown	<b>36-43V / 13.3-11.2A / 480W</b>	<b>48-56V / 10-8.6A / 480W</b>	<b>24-28V / 30-26A / 720W</b>
<b>Input voltage range</b>	AC 100-120 / 200-240V 85...132 / 184...264Vac auto select	AC 100-120 / 200-240V 85...132 / 184...264Vac auto select	AC 100-120 / 200-240V 85...132 / 184...264Vac auto select	AC 208-240 V 180...276Vac
<b>Hold-up time</b>	>30ms (AC 230V)	>27ms (AC 230V)	>30ms (AC 230V)	>20ms (AC 230V)
<b>Rated input current</b>	<10A / <5A	<10A / <5A	<12A / <6A	<9A
<b>Efficiency</b>	90.5%	92%	93%	92.5%
<b>Output voltage</b> preset	24-28V 24V	36-43V 36V	48-56V 48V	24-28V 24V
<b>Rated output current</b>	20A @ 24V; 18A @ 28V	13.3A @ 36V; 11.2A @ 43V	10A @ 48V; 8.6A @ 56V	30A @ 24V; 26A @ 28V
<b>Power Boost</b>	25A	16.6A	12.5A	
<b>Ripple/Noise</b> (@ 20MHz/50Ω)	<20mV <sub>pp</sub> (single operation), <40mV <sub>pp</sub> (parallel operation)	<30mV <sub>pp</sub> (single operation), <80mV <sub>pp</sub> (parallel operation)	<40mV <sub>pp</sub> (single operation), <80mV <sub>pp</sub> (parallel operation)	<50mV <sub>pp</sub> (single operation), <100mV <sub>pp</sub> (parallel operation)
<b>Operating temperature range</b> (T <sub>amb</sub> )	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 18W/K Derating
<b>Dimensions</b> (W x H x D) <b>Weight</b>	220 x 124 x 102mm 2500g	220 x 124 x 102mm 2500g	220 x 124 x 102mm 1800g	240 x 124 x 112mm 2000g
<b>Approvals/standards</b> cULus LISTED / CE CB SCHEME / cURus	 CB SCHEME	 CB SCHEME	 CB SCHEME	 CB SCHEME
<b>Safety standards</b> IEC/EN 60950-1, EN 50178 UL 60950, UL 508	✓ ✓	✓ ✓	✓ ✓	✓ ✓
<b>EMC standards</b> EN 61000-6-2 EN 61000-4-2,-3,-4,-5,-6,-11 EN 61000-6-3 EN 61000-3-2 EN 55011/EN55022 class B	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ EN 61000-6-4 ✓	✓ ✓ EN 61000-6-4 ✓
<b>Special features</b>	Single/parallel operation (inclined characteristic) selectable (jumper on the front), PFC choke, Remote Shutdown, active inrush current limiting	Single/parallel operation (inclined characteristic) selectable (jumper on the front), PFC choke, active inrush current limiting	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting

# ► 3-phase AC/DC Power Supplies

				
<b>SL5.300</b>	<b>SL10.300</b>	<b>SL10.305</b>	<b>SL20.300</b>	<b>SL20.301</b>
<b>24-28V / 5-4.3A / 120W</b>	<b>24-28V / 10-8.6A / 240W</b>	<b>48-52V / 5-4.6A / 240W</b>	<b>24-28V / 20-18A / 480W 3 AC 400V</b>	<b>24-28V / 20-18A / 480W 3 AC 480V</b>
3 AC 400-500V 340...576Vac wide range DC 450...820V >16ms (3AC 400V)  <3 x 0.5A	3 AC 400-500V 320...576Vac wide range DC 450...820V >24ms (3AC 400V)  <3 x 0.8A	3 AC 400-500V 320...576Vac wide range DC 450...820V >36ms(3AC400V)  <3 x 0.8A	3 AC 400V 340...479Vac  DC 450...700V >11ms  <3 x 1.5A	3 AC 480V 408...576Vac  DC 550...820V >11ms  <3 x 1.5A
89%	92%	93.9%	92%	92%
24-28V	24-28V	48-52V	24-28V	24-28V
24.5V	24.5V	48V	24V	24V
5A @ 24V; 4.3A @ 28V	10A @ 24V; 8.6A @ 28V	5A @ 48V	20A @ 24V; 18A @ 28V	20A @ 24V; 18A @ 28V
6A	12A	6A	25A	25A
<25mV <sub>pp</sub>	<30mV <sub>pp</sub>	<30mV <sub>pp</sub>	<20mV <sub>pp</sub>	<20mV <sub>pp</sub>
-10...+70°C >60°C: 6W/K Derating	0...+70°C >60°C: 6W/K Derating	0...+70°C >60°C: 6W/K Derating	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 12W/K Derating
73 x 124 x 117mm 730g	89 x 124 x 117mm 980g	89 x 124 x 117mm 1040g	220 x 124 x 102mm 1800g	220 x 124 x 102mm 1800g
 CB SCHEME 	 CB SCHEME 	 CB SCHEME 	 CB SCHEME 	 CB SCHEME 
✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓
PFC choke	Overload behaviour selectable (FUSE-Mode/continuous current), 2-phase operation admissible, Single/parallel operation (inclined characteristic) selectable (jumper on the front), PFC choke, active inrush current limiting	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting, PFC choke	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting, PFC choke	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting, PFC choke

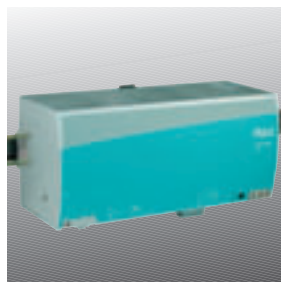
## ▶ 3-phase AC/DC Power Supplies



Model	SL20.310	SL20.303	SL30.300	SL40.300
	<b>24-28V / 20-18A / 490W FUSE Mode</b>	<b>48-56V / 10-9A / 480W 3 AC 400V</b>	<b>24-28V / 30-26A / 720W</b>	<b>24-28V / 40-35A / 960W</b>
<b>Input voltage range</b>	3 AC 400-500V 340...576Vac wide range DC 450...820V	3 AC 400V 340...479Vac	3 AC 400-500V 340...576Vac wide range DC 450...820V	3 AC 400-500V 340...576Vac wide range
<b>Hold-up time</b>	>11ms (3 x AC 400V)	>11ms	>10ms (3 x AC 400V)	>15ms (3 x AC 400V)
<b>Rated input current</b>	<3 x 1.5A	<3 x 1.5A	<3 x 2.0A	<3 x 3.0A
<b>Efficiency</b>	92%	92%	92.5%	92.5%
<b>Output voltage</b> preset	24-28V  24.5V	48-56V  48.1V	24-28V  24V	24-28V  24V
<b>Rated output current</b>	20A @ 24V; 18A @ 28V	10A @ 48V; 9A @ 56V	30A @ 24V; 26A @ 28V	40A @ 24V; 35A @ 28V
<b>Power Boost</b>	25A	12.5A		45A
<b>Ripple/Noise</b> (@ 20MHz/50Ω)	<30mV <sub>pp</sub>	<50mV <sub>pp</sub>	<20mV <sub>pp</sub> (single operation), <40mV <sub>pp</sub> (parallel operation)	<50mV <sub>pp</sub>
<b>Operating temperature range</b> (T <sub>amb</sub> )	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 12W/K Derating	0...+70°C >60°C: 18W/K Derating	0...+70°C >60°C: 24W/K Derating
<b>Dimensions</b> (W x H x D) <b>Weight</b>	150 x 124 x 121mm 1800g	220 x 124 x 102mm 1800g	240 x 124 x 112mm 2000g	275 x 124 x 117mm 3300g
<b>Approvals/standards</b> cULus LISTED / CE CB SCHEME / cURus	 CB SCHEME 	 CB SCHEME 	 CB SCHEME 	 CB SCHEME 
<b>Safety standards</b> IEC/EN 60950-1, EN 50178 UL 60950, UL 508	✓ ✓	✓ ✓	✓ ✓	✓ ✓
<b>EMC standards</b> EN 61000-6-2 EN 61000-4-2,-3,-4,-5,-6,-11 EN 61000-6-3 EN 61000-3-2 EN 55011/EN55022 class B	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ EN 61000-6-4 ✓ radiated noise class A	✓ ✓ ✓ ✓ ✓
<b>Special features</b>	Single/parallel operation (inclined characteristic) selectable (jumper on the front), Overload behaviour selectable (FUSE-Mode/continuous current), active inrush current limiting, PFC choke	Single/parallel operation (inclined characteristic) selectable (jumper on the front), active inrush current limiting, PFC choke	Single/parallel operation (inclined characteristic) selectable (jumper on the front), PFC choke, active inrush current limiting	Single/parallel operation (inclined characteristic) selectable (jumper on the front), Passive load sharing, PFC choke, active inrush current limiting

▶ **DC/DC Converter**

▶ **Redundancy Modules (SLR)**



<b>SL40.301</b>	<b>SLD2.100</b>	<b>SLR2.100</b>	<b>SLR5.100</b>	<b>SLR10.100</b>
<b>24-28V / 40-35A / 960W</b> Output signals	<b>DC 5.1V ±1% / 8A / 40W</b>	<b>24V / 2.5A / 60W</b>	<b>24V / 5A / 120W</b>	<b>24V / 10A / 240W</b>
3 AC 400-500V 340...576Vac wide range	DC 24V 18...36Vdc	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 160...375V >20ms (AC 196V)	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 210...375V >37ms (AC 196V)	AC 100-120 / 200-240V 85...132 / 176...264Vac manual select DC 240...375V >25ms (AC 196V)
>15ms (3 x AC 400V)	>10ms (DC 24Vin)	>20ms (AC 196V)	>37ms (AC 196V)	>25ms (AC 196V)
<3 x 3.0A	<2.9A / <1.5A	<1.3A / <0.7A	<2.6A / <1.4A	<6A / <2.8A
92.5%	82%	86.5%	89%	89%
24-28V 24V	DC 5.1V ±1% selectable from 4.5 to 5.5V	24V	24V	24V
40A @ 24V; 35A @ 28V 46A	8A	2.5A	5A 6A	10A 12A
<50mV <sub>pp</sub>	<50mV <sub>pp</sub>	<30mV <sub>pp</sub>	<30mV <sub>pp</sub>	<30mV <sub>pp</sub>
0...+70°C >60°C: 24W/K Derating	0...+70°C >60°C: 1.5W/K Derating	-10...+70°C >60°C: 1.5W/K Derating	-10...+70°C >60°C: 3W/K Derating	0...+70°C >60°C: 12W/K Derating
275 x 124 x 117mm 3300g	49 x 124 x 102mm 470g	49 x 124 x 102mm 470g	64 x 124 x 102mm 620g	120 x 124 x 102mm 980g
✓ ✓	✓	✓ ✓	✓ ✓	✓ ✓
✓ ✓ ✓ ✓ ✓	✓ ✓ EN 61000-6-4 radiated noise class A	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ EN 61000-6-4 ✓
Parallel operation through active current sharing. Output signals (Power-Fail, Shut-Down, internal current measurement, overtemperature warning), active inrush current limiting, PFC choke	MOSFET inverse battery protection, active inrush current limiting	RDY relay contact, N+1 redundancy, plug connectors	RDY relay contact, N+1 redundancy, plug connectors	RDY relay contact, N+1 redundancy, plug connectors

## ▶ Redundancy Modules (SLR)

## ▶ Buffer Unit (SLV)



### Model

**SLR01**

**Redundancy Module Single  
for max. 50A**

**SLR02**

**Redundancy Module Dual  
for 2x35A**

### Input voltage range

DC 24V-28V  
18...36Vdc

DC 24V-28V  
18...36Vdc

### Hold-up time

### Rated input current

0-40A (max. 50A)

0-30A (max. 35A)

### Efficiency

97%

97%

### Output voltage

preset

Vin -0.6V typ.

Vin -0.5V typ.

### Rated output current

0-40A (max. 50A)

0-30A (max. 35A)

### Power Boost

### Ripple/Noise (@ 20MHz/50Ω)

-10°C...+70°C

-10°C...+70°C

### Operating temperature range (T<sub>amb</sub>)

### Dimensions (W x H x D)

48 x 124 x 117mm

48 x 124 x 102mm

### Weight

646g

625g

### Approvals/standards

cULus LISTED / CE  
CB SCHEME / cURus



### Safety standards

IEC/EN 60950-1, EN 50178  
UL 60950, UL 508

✓

✓

✓

✓

### EMC standards

EN 61000-6-2  
EN 61000-4-2,-3,-4,-5,-6,-11  
EN 61000-6-3  
EN 61000-3-2  
EN 55011/EN55022 class B

✓

✓

✓

✓

✓

✓

✓

✓

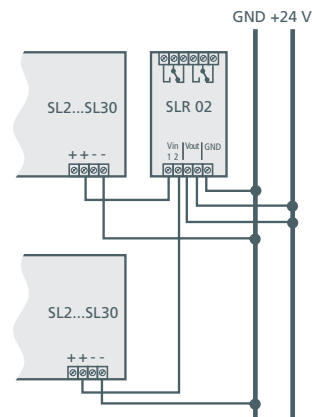
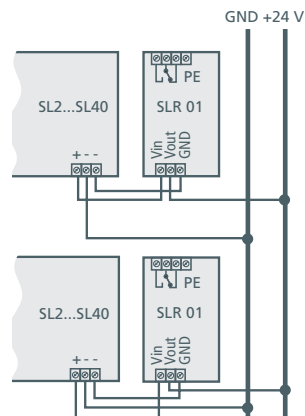
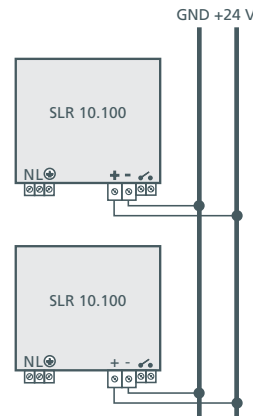
✓

✓

### Special features

Single redundancy module for 2.5-50A,  
N+1 redundancy

Dual redundancy module for 2x35A,  
N+1 redundancy



**SLV20.200**

**22.5V-27.8V / 0-20A/ 480W**

DC 24-28,8V  
23...35Vdc

>0,2s (20A), 3,6s (1A)  
charging current <600mA

Vin -1V: 23-27,8V resp.  
22.5V fixed

0-20A

<200mV<sub>pp</sub>  
(buffer operation, only)

-10°C...+70°C

64 x 124 x 102mm

740g



CB SCHEME cULus

✓

✓

✓

✓

✓

✓

Selectable buffered voltage,  
parallel operation, signalling terminals,  
add-on for power supply units,  
signals and buffers power failures

## ► AS-Interface Power Supplies (SLA)

			
<p><b>SLA3.100</b></p>	<p><b>SLA4.100</b></p>	<p><b>SLA8.100</b></p>	<p><b>SLA8.300</b></p>
<p><b>30.5V / 2.8A / 85W</b></p>	<p><b>30.5V / 4A / 120W</b></p>	<p><b>30.5V / 8A / 240W</b></p>	<p><b>30.5V / 8A / 240W</b></p>
<p>AC 100-120 / 220-240V 85...132 / 184...264Vac manual select DC 230...375V</p> <p>&gt;26ms (AC 100V) &lt;2.0A / &lt;0.9A</p>	<p>AC 100-120 / 220-240V 85...132 / 184...264Vac manual select DC 240...300V</p> <p>&gt;30ms (AC 100V) &lt;2.7A / &lt;1.3A</p>	<p>AC 100-120 / 220-240V 85...132 / 184...264Vac manual select DC 230...375V</p> <p>&gt;10ms (AC 100V) &lt;6A / &lt;2.8A</p>	<p>3 AC 400-500V 340...575Vac wide range DC 450...820V</p> <p>&gt;18ms (340V) &lt;3 x 0.8A / 0.7A</p>
<p>90.5%</p>	<p>90%</p>	<p>92%</p>	<p>91.5%</p>
<p>30.5V</p>	<p>30.5V</p>	<p>30.5V</p>	<p>30.5V</p>
<p>2.8A</p>	<p>4A</p>	<p>8A</p>	<p>8A</p>
<p>&lt;50mV<sub>pp</sub></p>	<p>&lt;50mV<sub>pp</sub></p>	<p>50mV<sub>pp</sub></p>	<p>50mV<sub>pp</sub></p>
<p>-10°C...+70°C &gt;60°C: 2W/K Derating</p>	<p>-10°C...+70°C &gt;60°C: 3W/K Derating</p>	<p>-10°C...+70°C &gt;60°C: 6W/K Derating</p>	<p>-10°C...+70°C &gt;60°C: 6W/K Derating</p>
<p>49 x 124 x 102mm 500g</p>	<p>73 x 124 x 102mm 650g</p>	<p>91 x 124 x 102mm 890g</p>	<p>129 x 124 x 117mm 1160g</p>
<p>  CB SCHEME </p>	<p></p>	<p>  CB SCHEME </p>	<p></p>
<p>✓ ✓</p>	<p>✓</p>	<p>✓ ✓</p>	<p>✓</p>
<p>✓ ✓ ✓ ✓ ✓</p>	<p>✓ ✓ ✓ ✓ ✓</p>	<p>✓ ✓ EN 61000-6-4 ✓</p>	<p>✓ ✓ EN 61000-6-4 radiated noise class A</p>
<p>NEC Class 2 Limited Power Source, AS-Interface data decoupling, IR Infrared addressing mode</p>	<p>AS-Interface data decoupling, IR Infrared addressing mode, passive inrush current limiting, ground-fault detector</p>	<p>AS-Interface data decoupling, IR Infrared addressing mode, active inrush current limiting, FUSE Mode</p>	<p>AS-Interface data decoupling, IR Infrared addressing mode, passive inrush current limiting, FUSE Mode</p>

## ► Accessories

### SLZ11-14

#### DIN-rail Adaptors for S7-300 Simatic Rails

PULS power supplies and other snap-on devices can be mounted on the different S7-300 rail by means of an adaptor from SLZ11 to SLZ14. The additional assembly of a mounting rail is therefore not required. The adaptors serve as a support hanging on the S7-300 rail and fixed at the back with two screws (provided).

#### Technical data and scope of delivery

Thickness of material	1.5 mm
Kind of material	steel plate, passivated in chromatic acid (zinc coating)
Scope of delivery	- S7 adapter + DIN-rail (mounted) - screws

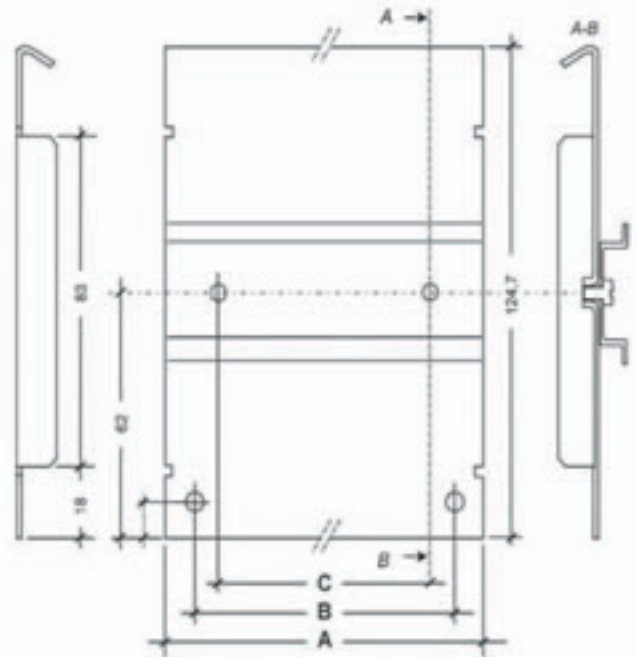
#### Table of dimensions A...C (mm)

	SLZ11	SLZ12	SLZ13	SLZ14
e.g. for	SL2.100	SL5.100	SL5.300, SL10.300	SL10.100
<b>A</b>	51	66	90	121
<b>B</b>	35	50	74	105
<b>C</b>	36	36	60	86



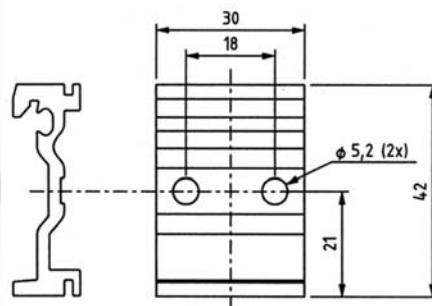
A mounting rail piece of relevant length is fixed to this support, onto which the mounting rail power supply or unit can then be assembled. PULS adapters are available for units of various sizes (see table) in different widths.

#### Dimensions and distances



### SLZ02

#### DIN-rail Adaptor for Wall Mounting



The SLZ02 is a mounting bracket that is used when no DIN-rail is available. A SLZ02 set includes two brackets, to replace the existing DIN-rail fix for the wall mounting of the power supply. This ensures a safe and reliable fix.

# Glossary

## Power-Boost

With the Power Boost the unit supplies a higher current for a short period of time (usually one minute and even longer with forced ventilation), without the output voltage breaking down. If still more current is needed, then the PULS-Overload-Design™ becomes effective and reduces the output voltage. This avoids the otherwise typical over-specifying of power supplies (and extra costs).

## PULS-Overload-Design™

PULS SilverLine units feature a characteristic with extended curve and a relevant extraordinary overload behaviour: the output current can rise up to the 2.5 times the rated current. The output voltage is gradually reduced as the current increases, in order to protect the unit from damage. Therefore, when the rated current is exceeded the units do not switch off and can reliably start even heavy loads, such as DC-motors or capacitive loads.

## FUSE-Mode

Certain SilverLine units are provided with the FUSE-Mode, an integrated electronic fuse protection on the output, which permanently switches off 3 to 5 seconds after a precisely set overload or over-temperature. This mode is signalled by a red blinking LED on the front panel of the unit. The unit can be switched on again through the reset button. Until switching off the units provide an over-current according to the Power Boost and Overload-Design. Alternatively, some units can be switched to the continuous mode and continuously supply up to 250% more current with reduced output power.

## Lifetime

With time passing and components becoming worn, power supply units fail with increasing probability. To ensure a long, reliable service life of the power supply, PULS supply units that only contain high quality components. As the service life heavily depends on electrolytic capacitors, only 105°C components with a particularly long lifetime are used. Furthermore, PULS avoids – despite higher costs and space requirements – the installation of smaller electrolytic capacitors.

## MTBF (reliability)

MTBF stands for Mean Time Between Failures. MTBF indicates when, according to statistics, a device will fail due to manufacturing faults or component defects, before wear sets in.

## Power Factor Correction (PFC)

In conformance with EN 61000-3-2 all appliances plugged into the mains power supply that have an average power input of between 75 and 1.000 W must only contain harmonic waves to a limited extent in the input current. The regulation refers to the entire system rather than to single system components, e.g. a power supply in a plant or machine. The aim of this regulation is to limit the reactive power absorption from the mains and thus to relieve public supply networks. The regulation became binding in Europe on January 1, 2001.

## Parallel operation

Parallel operation serves for increasing the power or for increasing the

safety from failure (see "Redundancy"). Power supply units are better suited for parallel operation when they also have a mechanism for equal current sharing (symmetry or balancing facility) and ideally are also designed for start-up and overload behaviour.

## Redundancy

To increase the operational safety of equipment, it is possible to double up on important components in a system, thus ensuring that if one of the components fails, the other will immediately kick in. This form of doubling up is called redundancy. Care needs to be taken that, in case of a fault, the failed components cannot become a load on the equipment. With power supplies this means that two units are operated in parallel via what are known as decoupling diodes. So if one power supply unit fails, the other takes over the power supply without a break, and the diodes ensure that the defective unit cannot short-circuit the replacement.

## TIP:

**A detailed glossary is available on the Internet under [www.pulspower.com](http://www.pulspower.com) (Know-how).**

# The PULS product range

including the new Q-series

	25-40W	50-60W	72-85W	90-100W	120-180W	240W	480W	720W	960W	>960W	
5-5,5V	ML30.101									via parallel mode operation	
10-12V	ML30.102										
12-15V	SL2.103	ML50.102		ML100.102	SL10.104 QS10.121*						
±12-15V	ML30.106										
24-28V 1-ph	ML30.100	ML50.100 ML50.101 ML50.111 SL2.100	ML70.100 QS3.241*	ML100.100 ML95.100 SL4.100	SL5.100 SL5.102 SL5.105 QS5.241*	SL10.100 SL10.105 QS10.241*	SL20.100 SL20.101 SL20.110 SL20.111 SL20.115	SL30.100			
24-28V 3-ph/2-ph					SL5.300	SL10.300	SL20.300 SL20.301 SL20.310 QT20.241*	SL30.300	SL40.300 SL40.301		
36-43V 1/3-ph							SL20.112 QT20.361*				
48-56V		ML50.105		ML100.105		SL10.101 SL10.106 QS10.481*	SL20.303 SL20.113 QT20.481*				
24V redundant		SLR2.100			SLR5.100	SLR10.100					
31,5V AS-interface			SLA3.100		SLA4.100	SLA8.100 SLA8.300					
Red.modules	dual input – SLR02						single input – SLR01				
Accessories	decoupling modules – MLY2.100, YR2.Diode*										
24V buffer unit	buffer unit – SLV20										

\*New

**NEW**

## DIMENSION Q-series

- 80W to 480W
- 1- and 3-phase
- Metal housing
- Quick-connect spring clamp terminal
- Output voltages from 12V to 56V
- 150% peak load capacity
- DC-OK relay contact
- Operation from -25°C to +60°C
- Active PFC, as well at 3-phase input
- 100-240V wide-range input
- DC input from 88V to 370V
- Extra low inrush current
- Amazingly small size of the housings

## SL-Product Family

- 40W to 960W
- 1- and 2-, bzw. 3-phase
- Metal housing
- Screw terminals
- Output voltages from 12V to 56V
- Up to 25% Power Boost
- Special measures for parallel operation
- Redundant units and modules
- AS-interface units
- Buffer modules und DC/DC converter
- Largest product range

## ML-Product Family

- 25W to 100W
- 1-phase
- Plastic housing
- Quick-connect spring clamp terminal
- Output voltages from 5V to 56V
- Special measures for parallel operation
- Module for decoupling of current sources and the creation of redundancies

For more information on DIMENSION and other PULS-Products visit:  
[www.pulspower.com](http://www.pulspower.com)

# The PULS Services

## 1. Which products do PULS supply?

You can find product overviews for the MiniLine and SilverLine families in our brochures

Or use our quick Internet search: [www.pulspower.com](http://www.pulspower.com). In the **Products** section under **DIN-Rail** you will find a complete overview, or you can search for products using the **Selection Guide** in the products section and choosing the desired data. The system will show you all the suitable PULS products. If you already know the precise PULS product name it's even faster. Just type in the product name in the "**Search**" field, e.g. SL10.300 or SL10 for all SL10-variations.

## 2. Current data sheets for the products

Are available to you on our homepage under **Downloads/Data Sheets** or directly from the product details (refer to Point 1).

## 3. Certificates

You can find the CE declaration of conformity online: under **Product Details** (refer to Point 1). All other certificates are available at any time from your sales engineer or PULS partner.

## 4. Instruction manuals

It goes without saying that each product comes with a detailed and comprehensive instruction manual in printed form.

And if required they are also easy to find on the Internet under **Product Details** (refer to Point 1).

## 5. Device-specific measurement protocol

As a sign of quality, every product is shipped with its own specific measurement protocol.

From July 2003 onwards you can find your specific measurement protocol on our homepage, in the **Download/Test Protocol** section by entering the product code (e.g. SL10.300) and serial number (listed on the back of the device).

## 6. Interesting facts on all aspects of switched-mode power supplies

We have put together expertise and background information on our homepage in the **Know How/Technical Articles** section. In the **Know How/Glossary**, you will find further, detailed definitions of terms.

And of course our sales engineers and PULS partners are always available to answer your questions!

## 7. Sample and test devices

On request your PULS sales engineer or partner will provide sample devices for testing. And you can also request our well-known Design-In-Support from them: the professional use of test devices with measuring sensor and subsequent evaluation and recommendation by PULS.

## 8. PULS contacts and addresses (worldwide)

You can find international contacts on the cover of the PULS brochures and are always updated on the Internet under **Contact & Service**.

## PULS DIRECT

### Germany

PULS GmbH – Headquarters  
Power Supplies  
Arabellastraße 15  
D-81925 München  
Tel. +49 89 9278-0  
Fax +49 89 9278-299  
info@puls-power.com  
www.puls-power.com

### North America

PULS L.P.  
2560 Foxfield Drive,  
Suite 320  
St. Charles, IL 60174  
Tel. +1 630 587 9780  
Fax +1 630 587 9735  
info@puls-us.com  
www.puls-power.com/us

### United Kingdom

PULS UK Ltd.  
The Rufus Centre  
Steppingly Road, Flitwick  
Bedfordshire, MK45 1AH, GB  
Tel. +44 1525 720099  
Fax +44 1525 720088  
sales@puls.co.uk  
www.puls.co.uk

### Switzerland

PULS Electronic GmbH  
Lindenrain 2  
CH-5108 Oberflachs  
Tel. +41 56 450 18 10  
Fax +41 56 450 18 11  
info@puls-power.ch  
www.puls-power.ch

### France

PULS SARL  
49, chemin vert  
F-69760 Limonest  
Tel. +33 478 66 89 41  
Fax +33 478 35 27 92  
hubert.chapelle@puls-power.fr  
www.puls-power.com/fr

### China

China Delegation  
Shanghai Everbright  
Convention & Exhibition  
Center  
No. 70 Cabao Road,  
Room C1401  
200233 Shanghai  
Tel. +86 21 6432 7680  
Fax. +86 21 6432 5706  
pinsheng.du@puls-power.com  
www.puls-power.cn

### Austria

PULS Österreich  
Bernreit 26  
A-3163 Rohrbach  
Tel. +43 27 64 32 13  
Fax +43 27 64 32 66  
otto.schreiner@puls-power.at  
www.puls-power.at

### Czech Republic

PULS EP k.s.  
Zadni Vinohrady  
ul. Alfonse Muchy 5473  
CZ-43001 Chomutov  
Tel. +420 474 637011  
Fax +420 474 624116  
www.puls-power.com

## PULS DISTRIBUTORS

### Australia

Control Logic Pty. Ltd.  
34 Thompson Street  
Bowen Hills QLD 4006  
PO Box 1302  
AUS-Fortitude Valley 4006  
Tel. +61 7 3252 9611  
Fax +61 7 3252 8776  
sales@control-logic.com.au  
www.control-logic.com.au

### Benelux

Elipse Benelux N.V.  
Turnhoutsebaan 511  
B-2110 Wijnegem  
Tel. +32 3 354 5180  
Fax +32 3 354 5184  
Freefone Netherlands:  
Tel. 0800-3547738  
Fax 0800-3547733  
info@elipse-power.com  
www.elipse-power.com

### Denmark

OEM Automatic A/S  
Frydensbergvej 20  
DK-3660 Stenløse  
Tel. +45 70 270527  
Fax +45 70 270627  
info@dk.oem.se  
www.oem-automatic.dk

### Finland

OEM Finland Oy  
PL 9 / P.O. Box 9  
Telekatu 8  
FIN-20101 Turku  
Tel. +358 2 4120-400  
Fax +358 2 4120-499  
info@fi.oem.se  
www.oem.fi

### Iceland

Samey  
Lyngas 13  
IS-210 Gardabaer  
Tel. +354 51052-00  
Fax +354 51052-01  
info@samey.is  
www.samey.is

### Italy

Piero Bersanini S.p.A.  
Via Giacosa 1  
I-20127 Milano  
Tel. +39 02 261671  
Fax +39 02 2895007  
commerciale@pierothersanini.com  
www.pierothersanini.com

### Norway

OEM Automatic AS Norge  
Tomtegata 20  
Postboks 564  
Brakerøya  
N-3002 Drammen  
Tel. +47 32 8972-70  
Fax +47 32 8972-80  
info@no.oem.se  
www.oem.no

### Poland

OEM Automatic Sp. z o.o.  
ul. Parowcowa 6B  
PL-02-445 Warszawa  
Tel. +48 22 86327-22  
Fax +48 22 86327-24  
info@pl.oem.se  
www.oemautomatic.com.pl

### Portugal

MVA Electrotecnica, Ltd.  
Rua das Lapas  
140 - Loja 6  
P-2750-772 Cascais  
Tel. +351 21 48 79 000  
Fax +351 21 48 79 007  
info@mva.pt  
www.mva.pt

### Sweden

OEM Automatic AB  
Dalagatan 4 - Box 1011  
S-573 28 Tranås  
Tel. +46 140 36 00 00  
Fax +46 140 36 01 99  
info@aut.oem.se  
www.oemautomatic.se

### Singapore

Futron Electronics PTE LTD.  
530 Balestier Road  
#01-02 Monville Mansion  
Singapore 329857  
Tel. +65 6250 2456  
Fax +65 6250 6592/6255 3245  
futron@magix.com.sg  
www.futronelectronics.com

### Slovenia

Robotina d.o.o.  
Industrijska cesta 2b  
SLO-6310 Izola  
Tel. +386 566 32420  
Fax +386 566 32439  
info@robotina.com  
www.robotina.com

### Spain

Electrónica Olfer, S.L.  
Pol. Ind. Casablanca II  
Avda. Severo Ochoa, 37 - C/B  
Local 4D  
28100 Alcobendas  
Madrid  
Tel. +34 91 4840850  
Fax +34 91 4840851  
info@olfer.com  
www.olfer.com

### South Africa

Current Automation  
16 Staal Street  
Kya Sands  
ZA-Randburg, Gauteng  
Tel. +27 11 462-4253  
Fax +27 11 462-4310  
sales@switches.co.za  
www.switches.co.za

### Turkey

Robosistem Elektronik San.  
ve Tic. Ltd. Sti.  
Organize Sanayi Bölgesi  
Eskoop Sanayi Sitesi  
B1 Blok, No: 32  
TR-34670 İkitelli, İstanbul  
Tel. +90 212 6710007  
Fax +90 212 6710008  
bilgi@robosistem.com  
www.robosistem.com