

DIN-RAIL POWER SUPPLIES



PRODUCTS
2009-2010



SUCCESS WITH INNOVATION AND QUALITY

QUALITY
INNOVATION

PULS is the only organisation solely focused on the design and manufacturing of DIN-Rail power supplies for industrial applications. This allows Bernhard Erdl and his experienced team to develop premium pioneered products.

Smallest sizes, industry leading efficiencies, easy integration in machines and systems, comprehensive datasheets, excellent overload behaviour, are only some of the strong features which make us the leader in technology for DIN-rail power supplies.

The success story with PULS DIN-rail power supplies started with the SilverLine units, which were launched over 12 years ago. This great success has continued with the MiniLine and DIMENSION units. The versatile utilizations in various fields of application of our power supplies as well as the international honours such as the Frost & Sullivan Technology Leadership Award confirm that PULS is on the right track.

PULS R&D departments are located in Germany. The high quality of the units is ensured by the company's own factories in the Czech Republic and China.

If you cannot find a standard unit for your needs in the current range of PULS products, then please contact our subsidiary company MGv. MGv has been a member of the PULS Group since 2004 and the MGv team will be happy to help with customised solutions.

OUR STRONG POINTS

Small

PULS power supplies are at the forefront of the market with the smallest and most powerful units for their size. The dimensions are as much as 50% smaller than other standard products which enables significant space reductions in control cabinets and machines. Be creative and take advantage of these new possibilities.

Until now, the efficiency of our units has been unrivalled due to minimal losses and our state-of-the-art technology. This basic requirement is essential to achieve small size without compromising in quality or reliability. We also guarantee high MTBF and long life expectancy figures as well as offering three year warranty.

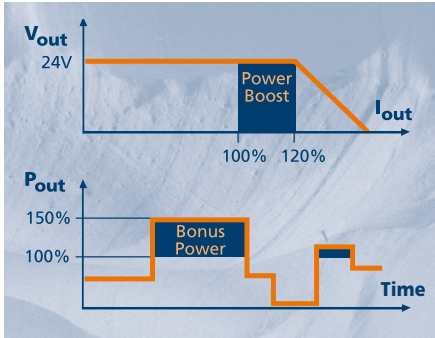


The small footprint enables large space reductions allowing you to be creative and take advantage of new possibilities.

Powerful

Large power reserves support the starting of heavy loads such as DC-motors or capacitive loads. With PULS, power supplies no longer have to be oversized to accommodate short-term peak loads of dynamic current demands.

Depending on the series, PULS guarantees BonusPower® of 50% or a Power Boost up to 25%. For the DIMENSION C-Series this extra current can be handled continuously for ambient temperatures below 45°C. With these power reserves, the user does not need to oversize but simply chooses a unit which meets the operating requirements. In some cases, a smaller unit can be selected saving both money and space.



Generous power reserves for loads with dynamic current demands. In many cases, you can rely on the next smaller unit which can save you money.

Easy

All signals and control elements are straightforward, self explanatory and easily accessible. The patented DIN-rail system and spring clamp terminals do not require tools and make the installation effortless.

Wide range or auto-select input voltages avoid user errors. The wide operating temperature range and the extraordinary EMI immunity enables trouble free operation, even under harsh conditions.

With an extensive approval package, universal input voltages and worldwide support, choosing PULS power supplies is made easy around the globe.



For a secure connection: Vibration proof quick-connect spring-clamp terminals, no tools required.

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OUR PRODUCT FAMILIES

SilverLine

The classic power supply family for general applications which has been proven over a million times. They will be gradually augmented by the DIMENSION series.

- Single- or three-phase-input
- Redundant power supplies
- AS-Interface® power supplies

The MiniLine series covers the lower power requirements in the range from 15W to 100W. The units in their rugged plastic housing are highly efficient, compact, can be installed in seconds and are extremely reliable. Apart from the standard 24V power supplies, many other output voltages are also available.

- Single-phase or 400/480V input
 - Robust plastic housing
 - Wide temperature range from -10°C to +60°C
- Output voltages from 5V to 56V
 - Quick-connect spring-clamp terminals
 - Diode module for redundancy

| | 1-Phase Supplies | 3-Phase Supplies | DC/DC Converter | DC-UPS | Buffer-modules | Redundancy and Diode Modules |
|------------|------------------|------------------|-----------------|---------|----------------|------------------------------|
| MiniLine | 15-100W | 90-100W | – | – | – | 10A |
| SilverLine | 60-240W | 120-960W | 40W | – | 24V | 2.5-40A |
| DIMENSION | C-Series | 80-240W | 96-240W | 92-120W | – | – |
| | Q-Series | 80-960W | 480-960W | 480W | – | – |
| | X-Series | – | 960W | – | – | – |
| | U-Series | – | – | – | 10A | 24V, 48V |
| | Y-Series | – | – | – | – | 20A |

MiniLine

Q-Series: Premium Class Power Supplies

Suitable when you need state-of-the-art technology and flexibility for demanding tasks. With outstanding efficiencies, 50% BonusPower® and many other features, this series is the “Best in Class”.

- 50% Power Reserves
- AC and DC wide-range input
- Low inrush current surge
- DC-OK relay contact (except QS3)
- Excellent power factor
- Active power factor correction (PFC)
- Active filter against input transients
- Quick-connect spring-clamp terminals
- Extensive approval package

U-Series: Bridging of Power Outages

Back-up systems: for minutes with a DC-UPS needing only one 12V-battery or for seconds with our battery-free buffer module. This improves safety and prevents downtime, loss of data and long restart sequences.

DIMENSION

DIMENSION offers you everything – from basic units with only essential functions to premium products for more demanding applications. Other DIMENSION units offer semi-regulation, buffer modules, DC-UPS's and a larger assortment of accessories. Thanks to the wide variety of options, you only pay for the features you need.

C-Series: Power Supplies and DC/DC Converters

For users looking for highly reliable power supplies in a compact housing which are easy to use. Focusing only on the essentials achieves significant price advantages.

- 20% Power reserves
- Low inrush current surge
- Large screw connection terminals

X-Series: Semi-regulated 3-Phase Power Supplies

For motors and other power-hungry loads. Small size, maximum efficiency, low price are the benefits with only minor compromises in output voltage regulation precision and buffer time.

- 25% Power reserves
- No inrush current surge
- Efficiencies up to 96%

Y-Series: Diode- and Redundancy Modules

For building redundant power supply systems or to isolate sensitive circuits.

- Redundancy modules with alarm contacts
- Diode modules without alarm contacts

Z-Series: Mounting Accessories

For installation in low profile cabinets or for panel installations where no DIN-rail is available.

Product Overview

Preferential Products

| 1-Phase Power Supplies | | | | | | |
|------------------------|-------|-------------|------|----------|-------------|----------------------------|
| | | | Page | Output | Input | Special Features |
| 5V | 3A | ML15.051 | 18 | 5-5.5V | AC 100-240V | |
| | 5A | ML30.101 | 18 | 5-5.5V | AC 100-240V | |
| 12V | 1.3A | ML15.121 | 18 | 12-15V | AC 100-240V | |
| | 2.5A | ML30.102 | 18 | 10-12V | AC 100-240V | very low output noise |
| | 4.2A | ML50.102 | 18 | 12-15V | AC 100-240V | |
| | 7.5A | ML100.102 | 19 | 12-15V | AC 115/230V | |
| | 15A | QS10.121 | 19 | 12-15V | AC 100-240V | |
| ±12V | 1.5A | ML30.106 | 19 | ±12-15V | AC 100-240V | dual-output voltage |
| 24V | 0.63A | ML15.241 | 12 | 24-28V | AC 100-240V | |
| | 1.3A | ML30.100 | 12 | 24-28V | AC 100-240V | |
| | 2.1A | ML50.100 | 12 | 24-28V | AC 100-240V | |
| | 2.1A | ML50.109 | 12 | 24-28V | AC 100-240V | conformal coated |
| | 2.1A | ML50.101 | 12 | 24-28V | AC 100-240V | optimized for parallel use |
| | 2.1A | ML50.111 | 12 | 24-28V | AC 100-240V | with screw terminals |
| | 2.5A | SL2.100 | 12 | 24V | AC 115/230V | |
| | 2.5A | SLR2.100 | 12 | 24V | AC 115/230V | for redundant applications |
| | 3A | ML70.100 | 14 | 24-28V | AC 115/230V | |
| | 3.3A | CS3.241 | 14 | 24-28V | AC 100-240V | |
| | 3.4A | QS3.241 | 14 | 24-28V | AC 100-240V | |
| | 3.8A | QS5.DNET | 14 | 24V | AC 100-240V | DeviceNet® approved |
| | 3.9A | ML95.100 | 14 | 24-28V | AC 115/230V | NEC Class 2 |
| | 4.2A | ML100.100 | 15 | 24-28V | AC 115/230V | |
| | 4.2A | ML100.109 | 15 | 24-28V | AC 115/230V | conformal coated |
| | 5A | CS5.241 | 15 | 24-28V | AC 115/230V | |
| | 5A | CS5.241-C1 | 15 | 24-28V | AC 115/230V | conformal coated |
| | 5A | CS5.241-S1 | 15 | 24-28V | AC 115/230V | spring-clamp terminals |
| | 5A | CS5.243 | 15 | 24-28V | AC 100-120V | |
| | 5A | CS5.244 | 15 | 24-28V | AC 200-240V | |
| | 5A | QS5.241 | 15 | 24-28V | AC 100-240V | |
| | 5A | SL5.100 | 15 | 24V | AC 115/230V | |
| | 5A | SLR5.100 | 15 | 24V | AC 115/230V | for redundant applications |
| | 8A | QS10.DNET | 16 | 24-24.5V | AC 100-240V | DeviceNet® approved |
| | 10A | CS10.241 | 16 | 24-28V | AC 115/230V | |
| | 10A | CS10.241-S1 | 16 | 24-28V | AC 115/230V | spring-clamp terminals |
| | 10A | CS10.242 | 16 | 24-28V | AC 115/230V | with PFC inductor |
| | 10A | CS10.243 | 16 | 24-28V | AC 100-120V | |
| | 10A | CS10.244 | 16 | 24-28V | AC 200-240V | |
| | 10A | QS10.241 | 17 | 24-28V | AC 100-240V | |
| | 10A | QS10.241-C1 | 17 | 24-28V | AC 100-240V | conformal coated |
| | 10A | SL10.100 | 17 | 24-28V | AC 115/230V | |
| | 10A | SLR10.100 | 17 | 24V | AC 115/230V | for redundant applications |
| | 20A | QS20.241 | 17 | 24-28V | AC 100-240V | |
| | 20A | QS20.241-C1 | 17 | 24-28V | AC 100-240V | conformal coated |
| | 20A | QS20.244 | 17 | 24-28V | AC 200-240V | |
| | 40A | QS40.244 | 17 | 24-28V | AC 200-240V | |
| 30V | 8A | QS10.301 | 20 | 28-32V | AC 100-240V | |
| 36V | 13.3A | QS20.361 | 20 | 36-42V | AC 100-240V | |
| 48V | 1.05A | ML50.105 | 20 | 48-56V | AC 100-240V | |
| | 2.1A | ML100.105 | 20 | 48-56V | AC 115/230V | |
| | 5A | CS10.481 | 20 | 48-52V | AC 115/230V | |
| | 5A | QS10.481 | 21 | 48-56V | AC 100-240V | |
| | 10A | QS20.481 | 21 | 48-55V | AC 100-240V | |
| | | | | | | |

Product Overview

| Power Supplies for the 3-Phase System | | | | | | |
|---------------------------------------|-------|-------------|------|---------------|---|---------------------------|
| | | | Page | Output | Input | Special Features |
| 12V | 8A | CT5.121 | 26 | 12-15V | 2AC 380-480V | |
| 24V | 3.75A | ML90.200 | 23 | 24-28V | 2AC 380-480V | |
| | 4.2A | ML100.200 | 23 | 24-28V | 2AC 380-480V | |
| | 5A | CT5.241 | 23 | 24-28V | 2AC 380-480V | |
| | 5A | SL5.300 | 23 | 24-28V | 3AC 400-500V | |
| | 10A | CT10.241 | 24 | 24-28V | 3AC 380-480V | |
| | 10A | SL10.300 | 24 | 24-28V | 3AC 400-500V | |
| | 10A | SL10.309 | 24 | 24-28V | 3AC 400-500V | conformal coated |
| | 20A | QT20.241 | 24 | 24-28V | 3AC 380-480V | |
| | 20A | QT20.241-C1 | 24 | 24-28V | 3AC 380-480V | conformal coated |
| | 20A | SL20.310 | 24 | 24-28V | 3AC 400-500V | |
| | 40A | QT40.241 | 24 | 24-28V | 3AC 380-480V | |
| | 40A | SL40.301 | 25 | 24-28V | 3AC 400-500V | with signal contacts |
| | 40A | XT40.241 | 25 | 24-28V | 3AC 400V | semi-regulated |
| | 40A | XT40.242 | 25 | 24-28V | 3AC 480V | semi-regulated |
| 36V | 13.3A | QT20.361 | 26 | 36-42V | 3AC 380-480V | |
| | 26.6A | XT40.361 | 26 | 36V | 3AC 400V | semi-regulated |
| | 26.6A | XT40.362 | 26 | 36V | 3AC 480V | semi-regulated |
| 48V | 5A | CT10.481 | 26 | 48-56V | 3AC 380-480V | |
| | 10A | QT20.481 | 26 | 48-55V | 3AC 380-480V | |
| | 20A | QT40.481 | 27 | 48-55V | 3AC 380-480V | |
| | 20A | XT40.481 | 27 | 48V | 3AC 400V | semi-regulated |
| | 20A | XT40.482 | 27 | 48V | 3AC 480V | semi-regulated |
| 72V | 13.3A | XT40.721 | 27 | 72V | 3AC 400V | semi-regulated |
| | 13.3A | XT40.722 | 27 | 72V | 3AC 480V | semi-regulated |
| AS-Interface® Power Supplies | | | | | | |
| 30.6V | 2.8A | SLA3.100 | 32 | 30.6V | AC 115/230V | |
| | 4A | SLA4.100 | 32 | 30.6V | AC 115/230V | with ground-fault monitor |
| | 8A | SLA8.100 | 32 | 30.6V | AC 115/230V | |
| | 8A | SLA8.300 | 32 | 30.6V | 3AC 400-500V | |
| | 4A | SLAD4.100 | 32 | 30.6V | DC 24V | DC/DC converter |
| DC/DC Converters | | | | | | |
| 5V | 8A | SLD2.100 | 30 | 5-5.5V | DC 24V | |
| 12V | 8A | CD5.121 | 30 | 12-15V | DC 24V | |
| 24V | 3.8A | CD5.241-L1 | 30 | 24V | DC 24V | NEC Class 2 |
| | 4A | CD5.243 | 30 | 24-28V | DC 12V | |
| | 5A | CD5.241 | 30 | 24-28V | DC 24V | |
| | 5A | CD5.241-S1 | 31 | 24-28V | DC 24V | with signal contacts |
| | 5A | CD5.242 | 31 | 24-28V | DC 48V | |
| | 20A | QTD20.241 | 29 | 24-28V | DC 600V | for intermediate DC-bus |
| Redundancy and Diode Modules | | | | | | |
| | | MLY02.100 | 40 | 10-60V, 2x5A | dual-input diode decoupling module | |
| | | YR2.DIODE | 40 | 10-60V, 2x10A | dual-input diode decoupling module | |
| | | YRM2.DIODE | 40 | 24-60V, 2x10A | dual-input redundancy module | |
| | | SLR01 | 40 | 24-28V, 1x40A | single-input redundancy module | |
| | | SLR02 | 40 | 24-28V, 2x30A | dual-input redundancy module | |
| DC-UPS and Buffer Modules | | | | | | |
| | | UB10.241 | 34 | 24V, 10A | DC-UPS control unit for ext. batteries 3.9-40Ah | |
| | | UB10.242 | 34 | 24V, 10A | DC-UPS control unit for ext. batteries 17-130Ah | |
| | | UB10.245 | 35 | 24V, 10A | DC-UPS with additional 12V output | |
| | | UBC10.241 | 34 | 24V, 10A | DC-UPS with integrated 5Ah battery | |
| | | UZK12.071 | 37 | 12V, 7Ah | battery module for DC-UPS | |
| | | UZK12.261 | 37 | 12V, 26Ah | battery module for DC-UPS | |
| | | SLV20.200 | 38 | 24V, 20A | capacitor buffer module, typ. 310ms at 20A | |
| | | UF20.241 | 38 | 24V, 20A | capacitor buffer module, typ. 310ms at 20A | |
| | | UF20.481 | 38 | 48V, 20A | capacitor buffer module, typ. 150ms at 20A | |

SLAD4.100

**DC/DC Converter for AS-Interface®**

Aside from AS-Interface® power supplies for 1- and 3-phase systems, a 4A DC/DC converter is now available. This converter is simply powered from the 24V-bus and avoids hazardous power line voltages on systems and machines. The SLAD4.100 provides the AS-Interface® voltage of 30.6V and already incorporates the required data decoupling circuit. See page 32.

| | |
|---------------|----------------|
| Input | DC 24V |
| Output | AS-i 30.6V, 4A |
| WxHxD | 40x124x102mm |

UBC10.241

**DC-UPS with integrated battery**

The UBC10 has the required single battery included and is a compact addition to our DC-UPS line. This saves space, minimises wiring effort and avoids wiring errors during installation. Perfect for cabinets and panels which do not get warmer than +40°C. See page 34.

| | |
|--------------------|-------------------|
| Input | DC 24V |
| Output | 24V, 10A (15A) |
| Battery | 12V, 5Ah included |
| Buffer Time | typ. 6 minutes |
| WxHxD | 123x124x119mm |

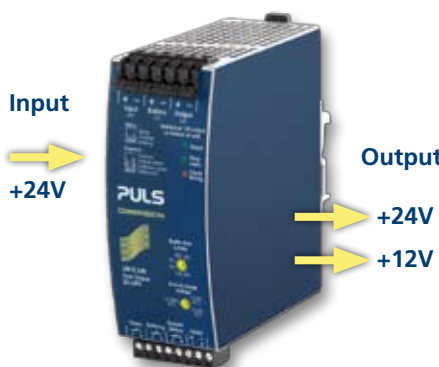
ML15

**Excellent cost/performance ratio: MiniLine with 15 Watt**

For low-power requirements, three new units have been added to the MiniLine family. With a width of only 22.5mm, three different output voltages are now available. See pages 12 and 18.

| | |
|--------------------|----------------------|
| Input | AC 100-240V |
| Output | 5V, 12-15V or 24-28V |
| Temperature | -10°C to +60°C |
| WxHxD | 22,5x75x91mm |

UB10.245

**24V DC-UPS with an additional 12V output**

For applications requiring supply voltages of 12V and 24V, a very simple-to-use dual output unit has been designed. With just one DC-UPS and one single battery, both output voltages can be provided during normal operation and in the event of power failures. See page 35.

| | |
|--------------------|----------------------|
| Input | DC 24V |
| Output | 24V, 10A and 12V, 5A |
| Total Power | max. 240W |
| WxHxD | 49x124x119mm |

NEW PRODUCTS 2009

Two new power supplies for 3-phase-systems

Two new DIMENSION power supplies extend the choice of available units for 3-phase systems in the lower power range. With a width of only 40mm for the 120W and 62mm for the 240W power supply, these two units are extremely small compared to the current market standard. See pages 23 and 24.

| | |
|---------------|---|
| Input | CT5: 2AC 380-480V CT10: 3AC 380-480V |
| Output | 12-15V, 24-28V or 48-56V |
| WxHxD | CT5: 40x124x117mm CT10: 62x124x117mm |

CT5, CT10



CT5: 40mm
CT10: 62mm

960W DIMENSION**1- and 3-phase power supplies**

All the winning features of the Q-Series are now also available in 40A versions. The DIMENSION 3-phase units only require 110mm and the 1-phase unit 125mm space on the DIN-rail. These dimensions set a new benchmark in DIN-rail space requirements. See pages 17, 25 and 27.

| | |
|---------------|--|
| Input | QS: AC 200-240V QT: 3AC 380-480V |
| Output | 24-28V or 48-55V |
| WxHxD | QS: 125x124x117mm QT: 110x124x117mm |

QS40, QT40



QS40: 125mm
QT40: 110mm

Versatile 120W DC/DC Converter

A whole new series of DC/DC converters for the DIN-rail is now available in the DIMENSION series. All DC/DC converters have a galvanically isolated output and are specified with full output power in the temperature range from -25°C to +60°C. See pages 30 and 31.

| | Input | Output |
|---------------------|--------------|---------------|
| CD5.121 | 18-32.4V | 12-15V, 96W |
| CD5.241 | 18-32.4V | 24-28V, 120W |
| CD5.242 | 36-60V | 24-28V, 120W |
| CD5.243 | 8.4-16.2V | 24-28V, 96W |
| CD5.241-S1* | 18-32.4V | 24-28V, 120W |
| CD5.241-L1** | 14-32.4V | 24-28V, 92W |

* Spring-clamp terminals, DC-OK and Input-Low-signal
** NEC-Class-2 approved

CD5



24V Power Supplies for 1-Phase-Systems

PULS offers the largest product range of 24V DIN-rail power supplies. The various features and output powers of the individual units allow for optimal selection for a wide range of applications and requirements. Choose a suitable power supply from the three product families MiniLine, SilverLine and Dimension.

| 1-Phase Power Supplies | | | 15W | 30W | 50W | 60W |
|--|--|--|---|---|---|---|
| Output: 24V | | | 0.63A | 1.3A | 2.1A | 2.5A |
| Family | | | MiniLine | MiniLine | MiniLine | SilverLine |
| Output Voltage | | | 24-28V | 24-28V | 24-28V | 24V |
| Output Current | | | 0.63-0.54A | 1.3-1.1A | 2.1-1.8A | 2.5A |
| Output Current | | | – | – | – | – |
| Output Power | | | 15W | 30W | 50W | 60W |
| Output Power | | | – | – | – | – |
| Power Reserves | | | – | – | – | – |
| Factory Setting ¹⁾ | | | 24.5V | 24.5V | 24.0V | 24.0V |
| Ripple & Noise Voltage ²⁾ | | | 50mVpp | 50mVpp | 50mVpp | 30mVpp |
| Overload Behaviour | | | Hiccup-mode | cont. current | cont. current | cont. current |
| AC Input Voltage | | | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-120V/ 200-240V #) -15%/+10% |
| Input Current ³⁾ | | | 0.3A | 0.6A | 1.0A | 1.3/0.7A |
| Harmonic Correction ⁸⁾ | | | – | – | – | – |
| EN 61000-3-2 (PFC Norm) | | | no | no | no | no |
| Power Factor 120/230Vac ¹⁾ | | | 0.51/0.44 | 0.61/0.53 | 0.56/0.52 | 0.6/0.51 |
| Hold-Up Time 120/230Vac ¹⁾ | | | 47/196ms | 46/200ms | 40/180ms | 53/54ms |
| Input Inrush Current Limiter | | | NTC | NTC | NTC | NTC |
| Input Inrush Current 120Vac ⁵⁾ | | | 13A; 0.1A²s | 17A; 0.3A²s | 17A; 0.4A²s | 15A; 1.1A²s |
| Input Inrush Current 230Vac ⁵⁾ | | | 26A; 0.4A²s | 35A; 1.1A²s | 35A; 1.5A²s | 28A; 1.6A²s |
| External Input Circuit Breaker ⁴⁾ | | | B-6A; C-3A | B-10A; C-6A | B-10A; C-6A | B-10A; C-6A |
| DC Input Voltage | | | DC 110-300V ^{5) T)} -20%/+25% | DC 110-300V ^{5) T)} -20%/+25% | DC 110-300V ^{5) T)} -20%/+25% | DC 200-300V ^{5) T)} -20%/+25% |
| Efficiency 120/230Vac ¹⁾ | | | 86.1/85.1% | 87.0/87.5% | 88.4/89.0% | 87.8/89.1% |
| Power Losses 120/230Vac ¹⁾ | | | 2.5/2.7W | 4.5/4.3W | 6.6/6.2W | 8.3/7.3W |
| MTBF ⁶⁾ | | | 4369 kh | 3603 kh | 2613 kh | 2575 kh |
| Operational Temperature Range | | | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C |
| Derating +60°C to +70°C | | | 0.4W/°C | 0.8W/°C | 1.3W/°C | 1.5W/°C |
| Dimensions WxHxD ⁷⁾ | | | 22.5x75x91mm | 45x75x91mm | 45x75x91mm | 49x124x102mm |
| Connection Terminals | | | screw terminals | spring terminals | spring terminals*) | screw terminals |
| Weight | | | 130g | 230g | 240g | 460g |
| DC-OK-Signal | | | no | no | yes ^{O)} | no |
| Parallel Use | | | yes ^{M)} | yes ^{M)} | yes ^{M)} | yes ^{M)} |
| Series Connection ⁹⁾ | | | yes | yes | yes | yes |
| Bracket for Wall/Panel Mounting | | | – | included | included | SLZ02 |
| Bracket for Side Mounting | | | – | – | – | – |
| Special Features | | | | | optimized for parallel use | redundant unit, decoupling diode |
| Order Number | | | ML15.241 | ML30.100 | ML50.100 ML50.109*) ML50.111*) | SL2.100 SLR2.100 |

*) ML50.109 with conformal coated PC-board, ML50.111 with screw terminals (plug connector,) depth 98mm, #) Manual-select by slide-switch
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.



1-Phase
Power Supplies
24V
72W - 120W

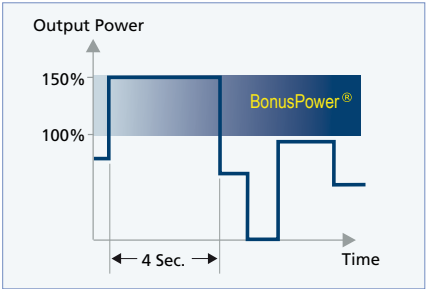
3

DIMENSION C-Series

| 100-120V | 200-240V | |
|----------|----------|---------------------|
| ✓ | ✓ | CS5.241 CS10.241 |
| | ✓ | CS5.244 CS10.244 |
| ✓ | | CS5.243 CS10.243 |

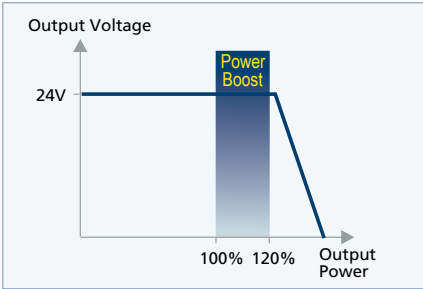
Save money:
For specific regions, use the optionally available units with only a 120V or 230V input.

DIMENSION Q-Series



BonusPower®:
150% Output power available up to 4 seconds for dynamic loads.

DIMENSION C-Series



Power Boost:
20% Extra output current for dynamic loads, continuous operation is available up to +45°C.

DIMENSION Q-Series

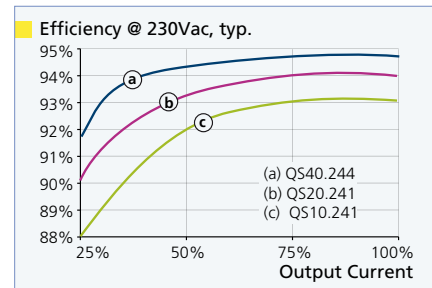


The DC-OK relay contact monitors the actual output voltage generated from the power supply. Perfect for redundant use.

| 1-Phase Power Supplies Output: 24V | | | 72-82W | | | 91-100W | | | 120W | | | | | |
|--|--|--|-------------|---|--|--|--|---|---|--|--|---|--|---|
| | | | 3.0A | 3.3A | 3.4A | 3.8A | 3.95A | 4.2A | 5A | 5A | 5A | 5A | 5A | 5A |
| Family | | | MiniLine | DIMENSION-C | DIMENSION-Q | DIMENSION-Q | MiniLine | MiniLine | DIMENSION-C | DIMENSION-C | DIMENSION-C | DIMENSION-Q | SilverLine | SilverLine |
| Output Voltage | | | nom. 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24V | 24V |
| Output Current | | | continuous | nom. 3-2.6A | 3.3-2.7A | 3.4-3A | 3.8A | 3.95-3.4A | 4.2-3.6A | 5-4.3A | 5-4.3A | 5-4.3A | 5-4.5A | 5A |
| Output Current | | | short-term | – | – | 5-4.5A ^{K)} | (5.7A after turn-on) | – | – | 6-5.1A ^{L) B)} | 6-5.1A ^{L) B)} | 6-5.1A ^{L)} | 7.5-6.7A ^{K)} | 6A ^{G)} |
| Output Power | | | continuous | nom. 72W | 80W | 82W | 91.2W | 95W | 100W | 120W | 120W | 120W | 120W | 120W |
| Output Power | | | short-term | – | – | 120W ^{K)} | – | – | – | 144W ^{L) B)} | 144W ^{L) B)} | 144W ^{L)} | 180W ^{K)} | 144W ^{G)} |
| Power Reserves | | | min. | – | – | +50% BonusPower® ^{K)} | – | – | – | +20% Power Boost ^{L) B)} | +20% Power Boost ^{L) B)} | +20% Power Boost ^{L)} | +50% BonusPower® ^{K)} | +20% Power Boost ^{G)} |
| Factory Setting ¹⁾ | | | typ. | 24.5V | 24.1V | 24.1V | 24.1V | 24.5V | 24.5V | 24.1V | 24.1V | 24.1V | 24.1V | 24.5V |
| Ripple & Noise Voltage ²⁾ | | | max. | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 30mVpp |
| Overload Behaviour | | | | continuous current | continuous current | continuous current | continuous current | continuous current | cont. current | continuous current | continuous current | continuous current | continuous current | continuous current |
| AC Input Voltage | | | nom. | AC 100-120V/ 200-240V ^{#)} -15%/+10% | AC 100-240V ±10% | AC 100-240V ±15% | AC 100-240V -15% / +10% | AC 100-120V/ 200-240V ^{◇)} -15%/+10% | AC 100-120V/ 200-240V ^{◇)} -15%/+10% | AC 100-120V/ 200-240V ^{◇)} ±10% | AC 100-120V/ 200-240V ^{◇)} ±10% | AC 200-240V ±10% | AC 100-240V -15% / +10% | AC 100-120V/ 200-240V ^{#)} -15%/+10% |
| Input Current ³⁾ | | | max. | 1.6/0.8A | 1.6A | 1.8A | 1.1A | 2.0/0.95A | 2.1/1.0A | 2.6/1.4A | 2.6A | 1.4A | 1.4A | 2.6/1.4A |
| Harmonic Correction ⁸⁾ | | | | – | – | yes | active | – | – | – | – | – | active | – |
| EN 61000-3-2 (PFC Norm) | | | | fulfilled | fulfilled | fulfilled | fulfilled | fulfilled | fulfilled | not fulfilled | not fulfilled | fulfilled | fulfilled | fulfilled |
| Power Factor 120/230Vac ¹⁾ | | | typ. | 0.63/0.54 | 0.61/0.56 | 0.53/0.47 | 0.98/0.9 | 0.62/0.55 | 0.62/0.55 | 0.56/0.47 | 0.59/– | –/0.5 | 0.99/0.91 | 0.56/0.49 |
| Hold-Up Time 120/230Vac ¹⁾ | | | typ. | 47/48ms | 30/128ms | 41/174ms | 44/85ms | 41/46ms | 38/44ms | 80/78ms | 80ms/– | –/78ms | 34/65ms | 57/58ms |
| Input Inrush Current Limiter | | | | NTC | NTC | active | active | NTC | NTC | active | NTC | NTC | active | NTC |
| Input Inrush Current 120Vac ⁵⁾ | | | typ. | 26A; 1.1A²s | 23A; 0.5A²s | 5A; 2A²s | 9A; 0.5A²s | 22A; 0.4A²s | 22A; 0.4A²s | 3A; 1A²s | 45A; 3A²s | – | 9A; 0.5A²s | 16A; 1.6A²s |
| Input Inrush Current 230Vac ⁵⁾ | | | typ. | 30A; 0.9A²s | 45A; 1.7A²s | 10A; 2A²s | 11A; 0.5A²s | 37A; 1.4A²s | 37A; 1.4A²s | 3A; 1A²s | – | 30A; 1A²s | 11A; 0.5A²s | 18A; 1.1A²s |
| External Input Circuit Breaker ⁴⁾ | | | min. | B-10A; C-6A | B-10A; C-6A | B-6A; C-6A | B-6A; C-3A | B-10A; C-6A | B-10A; C-6A | B-10A; C-6A | B-16A; C-10A | B-16A; C-10A | B-6A; C-3A | B-10A; C-6A |
| DC Input Voltage | | | nom. | DC 260-300V ^{5) 7)} -15%/+25% | DC 110-300V ⁷⁾ -20%/+25% | DC 110-300V ⁷⁾ -20%/+25% | DC 110-300V ⁷⁾ -20%/+20% | DC 260-300V ^{5) 7)} -15%/+25% | DC 260-300V ^{5) 7)} -15%/+25% | – | – | DC 250-300V ^{5) 7)} -15%/+25% | DC 110-300V ⁷⁾ -20%/+20% | DC 250-300V ^{5) 7)} -15%/+25% |
| Efficiency 120/230Vac ¹⁾ | | | typ. | 90.6/91.5% | 88.0/89.8% | 88.7/90.0% | 91.4/92.0% | 88.5/90.0% | 88.5/90.0% | 89.4/90.2% | 90.0%/– | –/90.2% | 91.6/92.7% | 88.7/89.3% |
| Power Losses 120/230Vac ¹⁾ | | | typ. | 7.5/6.7W | 11.1/9.1W | 10.4/9.1W | 8.6/7.9W | 11.6/9.9W | 13.0/11.1W | 14.5/13.2W | 13.5W/– | –/13.2W | 11.0/9.4W | 15.3/14.4W |
| MTBF ⁶⁾ | | | typ. | 2038 kh | 2243 kh | 1451 kh | 831 kh | 1551 kh | 1551 kh | 869 kh | 740 kh | 940 kh | 831 kh | 2109 kh |
| Operational Temperature Range | | | min. | -10°C to +70°C | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C | -10°C to +70°C | -10°C to +70°C | -25°C to +70°C | -10°C to +70°C | -10°C to +70°C | -25°C to +70°C | -10°C to +70°C |
| Derating +60°C to +70°C | | | min. | 1.8W/°C | 1.8W/°C | 2W/°C | 2W/°C | 2W/°C | 2.5W/°C | 3W/°C | 3W/°C | 3W/°C | 3W/°C | 3W/°C |
| Dimensions WxHxD ⁷⁾ | | | nom. | 45x75x91mm | 32x124x102mm | 32x124x102mm | 40x124x117mm | 72.5x75x103mm | 72.5x75x103mm | 32x124x117mm | 32x124x117mm | 32x124x117mm | 40x124x117mm | 64x124x102mm |
| Connection Terminals | | | | spring terminals | screw terminals | spring terminals | spring terminals | spring terminals | spring terminals | screw terminals | screw terminals | screw terminals | spring terminals | screw terminals |
| Weight | | | max. | 260g | 430g | 440g | 620g | 360g | 360g | 500g | 500g | 500g | 620g | 620g |
| DC-OK-Signal | | | | no | no | no | yes ^{P)} | no | no | no | no | no | yes ^{P)} | no |
| Parallel Use | | | | yes ^{M)} | no ^{J)} | yes | no | no | yes ^{N)} | no ^{J)} | no ^{J)} | no ^{J)} | yes ^{M)} | yes |
| Series Connection ⁹⁾ | | | | yes | yes | yes | no | no | yes | yes | yes | yes | yes | yes |
| Bracket for Wall/Panel Mounting | | | | included | ZM1.WALL | ZM1.WALL | ZM1.WALL | – | – | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL | SLZ02 |
| Bracket for Side Mounting | | | | – | ZM11.SIDE | ZM11.SIDE | ZM12.SIDE | – | – | ZM11.SIDE | ZM11.SIDE | ZM11.SIDE | ZM12.SIDE | – |
| Special Features | | | | | | | NEC-Class-2 DeviceNet® | NEC-Class-2 | | | 120V Version | 230V Version | | redundant unit with decoupling diode |
| Order Number | | | | ML70.100 | CS3.241 | QS3.241 | QS5.DNET | ML95.100 | ML100.100 ML100.109*) | CS5.241 CS5.241-C1*) CS5.241-S1*) | CS5.243 | CS5.244 | QS5.241 | SL5.100 |

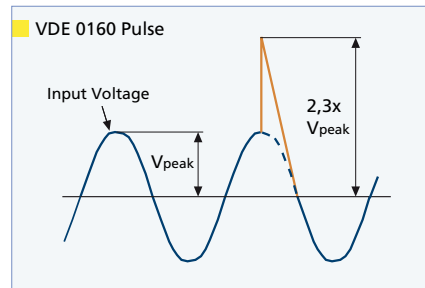
*) ML100.109 and CS5.241-C1 with conformal coated PC-board, CS5.241-S1 with spring-clamp terminals, #) Manual-select by slide-switch, ◇) Auto-select input
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.

DIMENSION Q-Series



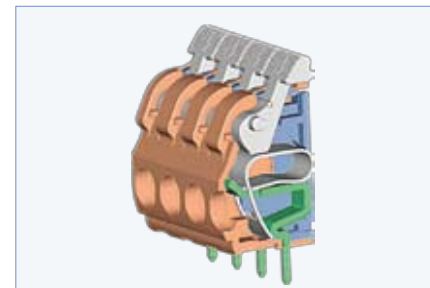
The premium class efficiency means that significantly less heat is produced. The service life of all components in the cabinet is extended.

DIMENSION, SilverLine, MiniLine



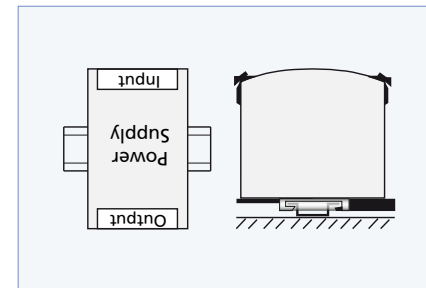
All power supplies are protected against high energy input transients.

DIMENSION Q-Series



For a secure connection:
Vibration proof quick-connect spring-clamp terminals. No tools required.

DIMENSION, SilverLine, MiniLine



Need different mounting orientations?
The maximum allowed output current for safe operation can be found in the datasheet.

| 1-Phase Power Supplies Output: 24V | | | 196W | 240W | | | | | 240W | | 480W | | 960W | |
|--|------------|------|---------------------|--|---|---|----------------------------------|--|--|--|--|--|--|--|
| | | | 8A | 10A | 10A | 10A | 10A | 10A | 10A | 10A | 20A | 20A | 40A | |
| Family | | | DIMENSION-Q | DIMENSION-C | DIMENSION-C | DIMENSION-C | DIMENSION-C | DIMENSION-Q | SilverLine | SilverLine | DIMENSION-Q | DIMENSION-Q | DIMENSION-Q | |
| Output Voltage | | | nom. | 24-24.5V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | |
| Output Current | continuous | nom. | 8A | 10-8.6A | 10-8.6A | 10-8.6A | 10-8.6A | 10-9A | 10-8.6A | 10A | 20-17A | 20-17A | 40-34.3A | |
| Output Current | short-term | | (12A after turn-on) | 12-10.3A ^L | 12-10.3A ^G | 12-10.3A ^L | 12-10.3A ^L | 15-13.5A ^K | 12-10.3A ^G | 12A ^G | 30-26A ^K | 30-26A ^K | 60-51.5A ^K | |
| Output Power | continuous | nom. | 196W | 240W | 240W | 240W | 240W | 240W | 240W | 240W | 480W | 480W | 960W | |
| Output Power | short-term | | – | 288W ^L | 288W ^G | 288W ^L | 288W ^L | 360W ^K | 288W ^G | 288W ^G | 720W ^K | 720W ^K | 1440W ^K | |
| Power Reserves | | | min. | – | +20% Power Boost ^L | +20% Power Boost ^G | +20% Power Boost ^L | +20% Power Boost ^L | 50% BonusPower® ^K | 20% Power Boost ^G | +20% Power Boost ^G | +50% BonusPower® ^K | +50% BonusPower® ^K | |
| Factory Setting ¹⁾ | | | typ. | 24.1V | 24.1V | 24.1V | 24.1V | 24.1V | 24.5V | 24.0V | 24.1V | 24.1V | 24.1V | |
| Ripple & Noise Voltage ²⁾ | | | max. | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp | 30mVpp | 30mVpp | 100mVpp | 100mVpp | 100mVpp | |
| Overload Behaviour | | | | continuous current | continuous current | continuous current | continuous current | continuous current | continuous current | continuous current | Hiccup-mode | Hiccup-mode | Hiccup-mode | |
| AC Input Voltage | | | nom. | AC 100-240V ±15% | AC 100-120V/ 200-240V ^Q ±10% | AC 100-120V/ 200-240V ^Q ±10% | AC 100-120V ±10% | AC 200-240V ±10% | AC 100-240V ±15% | AC 100-120V/ 210-240V [#] -15%/+10% | AC 100-120V/ 210-240V [#] -15%/+10% | AC 100-240V ±15% | AC 200-240V ±15% | AC 200-240V -15%/+10% |
| Input Current ³⁾ | | | max. | 2.3A | 5.0/2.7A | 5.0/2.4A | 5.0A | 2.4A | 2.8A | 6.0A/2.8A | 6.0A/2.8A | 5.4A | 4.8A | 5.4A |
| Harmonic Correction ⁸⁾ | | | | active | – | PFC inductor | – | – | active | – | – | active | – | active |
| EN 61000-3-2 (PFC Norm) | | | | fulfilled | not fulfilled | fulfilled | not fulfilled | not fulfilled | fulfilled | not fulfilled | not fulfilled | fulfilled | not fulfilled | fulfilled |
| Power Factor 120/230Vac ¹⁾ | | | typ. | 0.98/0.92 | 0.59/0.51 | 0.59/0.57 | 0.57/– | –/0.52 | 0.98/0.92 | 0.56/0.5 | 0.56/0.5 | 0.95/0.9 | –/0.5 | –/0.96 |
| Hold-Up Time 120/230Vac ¹⁾ | | | typ. | 33/34ms | 46/47ms | 46/42ms | 46ms/– | –/42ms | 27/28ms | 61/60ms | 61/60ms | 32/51ms | –/46ms | –/30ms |
| Input Inrush Current Limiter | | | | active | active | active | NTC | NTC | active | NTC | NTC | active | passiv ^{R)} | active |
| Input Inrush Current 120Vac ⁵⁾ | | | typ. | 4A; 0.6A²s | 3A; 1A²s | 3A; 1A²s | 85A; 8.5A²s | – | 4A; 0.6A²s | 45A; 6.8A²s | 45A; 6.8A²s | 9A; 5A²s | – | – |
| Input Inrush Current 230Vac ⁵⁾ | | | typ. | 7A; 0.6A²s | 3A; 1A²s | 3A; 1A²s | – | 48A; 3A²s | 7A; 0.6A²s | 51A; 4.2A²s | 51A; 4.2A²s | 7A; 5A²s | 40A; 4A²s | 14A; 4A²s |
| External Input Circuit Breaker ⁴⁾ | | | min. | B-6A; C-4A | B-10A; C-6A | B-10A; C-6A | B-16A; C-10A | B-16A; C-10A | B-6A; C-4A | B-10A; C-6A | B-10A; C-6A | B-10A; C-6A | B-10A; C-10A | B-10A; C-8A |
| DC Input Voltage | | | nom. | DC 110-300V ^{T)} -20%/+25% | – | – | – | DC 250-300V ^{S)} ^{T)} -15%/+25% | DC 110-300V ^{T)} -20%/+25% | DC 280-300V ^{S)} ^{T)} -15%/+25% | DC 280-300V ^{S)} ^{T)} -15%/+25% | DC 110-300V ^{T)} -20%/+25% | DC 250-300V ^{S)} ^{T)} ^{U)} -15%/+25% | DC 220-300V ^{S)} ^{T)} ^{U)} -20%/+25% |
| Efficiency 120/230Vac ¹⁾ | | | typ. | 92.3/92.7% | 91.0/91.6% | 91.0/91.2% | 91.3%/– | –/91.3% | 92.3/93.0% | 89.1/90.0% | 87.7/88.5% | 92.4/93.9% | –/94.5% | –/94.6% |
| Power Losses 120/230Vac ¹⁾ | | | typ. | 16.0/15.1W | 23.7/22.0W | 23.7/23.2W | 23.4W/– | –/23.4W | 20.0/18.1W | 30.0/27.2W | 33.7/31.2W | 39.6/31.4W | –/28.3W | –/54.8W |
| MTBF ⁶⁾ | | | typ. | 621 kh | 821 kh | 810 kh | 710 kh | 910 kh | 581 kh | 2024 kh | 1843 kh | 469 kh | 577 kh | 366 kh |
| Operational Temperature Range | | | min. | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C | 0°C to +70°C | 0°C to +70°C | -25°C to +70°C | 0°C to +70°C | 0°C to +70°C | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | | | min. | 5W/°C | 6W/°C | 6W/°C | 6W/°C | 6W/°C | 6W/°C | 6W/°C | 6W/°C | 12W/°C | 12W/°C | 24W/°C |
| Dimensions WxHxD ⁷⁾ | | | nom. | 60x124x117mm | 60x124x117mm | 60x124x117mm | 60x124x117mm | 60x124x117mm | 60x124x117mm | 120x124x102mm | 120x124x102mm | 82x124x127mm | 70x124x127mm | 125x124x127mm |
| Connection Terminals | | | | spring terminals | screw terminals | screw terminals | screw terminals | screw terminals | spring terminals | screw terminals | plug connectors | spring terminals | spring terminals | screw terminals |
| Weight | | | max. | 900g | 700g | 800g | 700g | 700g | 900g | 980g | 980g | 1200g | 880g | 1800g |
| DC-OK-Signal | | | | yes ^{P)} | no | no | no | no | yes ^{P)} | no | yes ^{P)} | yes ^{P)} | yes ^{P)} | yes ^{P)} |
| Parallel Use | | | | yes | no ^{J)} | no ^{J)} | no ^{J)} | no ^{J)} | yes | yes ^{M)} | yes | yes | yes | yes ^{N)} |
| Series Connection ⁹⁾ | | | | no | yes | yes | yes | yes | yes | no | no | yes | yes | yes |
| Bracket for Wall/Panel Mounting | | | | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL | – | – | ZM1.WALL | ZM1.WALL | ZM2.WALL |
| Bracket for Side Mounting | | | | ZM13.SIDE | ZM13.SIDE | ZM13.SIDE | ZM13.SIDE | ZM13.SIDE | ZM13.SIDE | – | – | ZM15.SIDE | – | – |
| Special Features | | | | DeviceNet® approved | | with PFC inductor | 120V Version | 230V Version | | | redundant unit with decoupling diode | | | with shut-down input |
| Order Number | | | | QS10.DNET | CS10.241 CS10.241-S1*) | CS10.242 | CS10.243 | CS10.244 | QS10.241 QS10.241-C1*) | SL10.100 | SLR10.100 | QS20.241 QS20.241-C1*) | QS20.244 | QS40.244 |

*) QS10.241-C1, QS20.241-C1 with conformal coated PC-board, CS10.241-S1 with spring-clamp terminals, #) Manual-select by slide-switch, Q) Auto-select input

Fold out the back page to find the appropriate footnotes.

Information regarding standards and approvals can be found on pages 42 to 44.

Visit www.pulspower.com for detailed datasheets.

1-Phase Power Supplies with Output Voltages other than 24V

Versatile applications:

Apart from standard 24V units of the MiniLine and DIMENSION family, other output voltages are also available. Typical applications include the supply of motors, drive systems, laser diodes, radio modems, building access control systems, ticket printers or simply the charging of batteries. Typical areas of application for these units are in facility control, the chemical industry, measurement equipment as well as in many other areas.

| 1-Phase Power Supplies Output: 5-15V | | | 5V | | 10-12V | 12-15V | | 12-15V | ±12-15V |
|--|------------|------|--|---|---|--|---|---|--|
| | | | 3A | 5A | 2.5A | 1.3A | 4.2A | 15A | 1.5A |
| Family | | | MiniLine | MiniLine | MiniLine | MiniLine | MiniLine | DIMENSION-Q | MiniLine |
| Output Voltage | | | nom. | 5-5.5V | 5-5.5V | 10-12V | 12-15V | 12-15V | 12-15V |
| Output Current | continuous | nom. | 3A | 5A | 3-2.5A | 1.3-1A | 4.2-3.3A | 7.5-6A | 15-13.5A |
| Output Current | short-term | | – | – | – | – | – | – | 22.5-20.3A ^{K)} |
| Output Power | continuous | nom. | 15W | 25W | 30W | 15W | 50W | 90W | 180W |
| Output Power | short-term | | – | – | – | – | – | – | 270W ^{K)} |
| Power Reserves | | min. | – | – | – | – | – | – | +50% BonusPower® ^{K)} |
| Factory Setting ¹⁾ | | typ. | 5.1V | 5.1V | 12.0V ^{#)} | 12.0V | 15.0V ^{#)} | 12.0V | 12.0V |
| Ripple & Noise Voltage ²⁾ | | max. | 50mVpp | 50mVpp | 10mVpp | 75mVpp | 50mVpp | 50mVpp | 50mVpp |
| Overload Behaviour | | | Hiccup-mode | continuous current | continuous current | Hiccup-mode | continuous current | conti. current | continuous current |
| AC Input Voltage | | | nom. | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% | AC 100-240V -15%/+10% |
| Input Current ³⁾ | | | max. | 0.3A | 0.5A | 0.6A | 0.3A | 1.0A | 1.9/0.9A |
| Harmonic Correction ⁸⁾ | | | | – | – | – | – | – | active |
| EN 61000-3-2 (PFC Norm) | | | | no | no | no | no | fulfilled | fulfilled |
| Power Factor 120/230Vac ¹⁾ | | typ. | 0.51/0.44 | 0.61/0.53 | 0.61/0.53 | 0.51/0.44 | 0.56/0.52 | 0.62/0.55 | 0.98/0.92 |
| Hold-Up Time 120/230Vac ¹⁾ | | typ. | 45/186ms | 52/230ms | 46/200ms | 46/191ms | 40/180ms | 41/46ms | 32/32ms |
| Input Inrush Current Limiter | | | | NTC | NTC | NTC | NTC | NTC | active |
| Input Inrush Current 120Vac ⁵⁾ | | typ. | 13A; 0.1A²s | 17A; 0.3A²s | 17A; 0.3A²s | 13A; 0.1A²s | 17A; 0.4A²s | 22A; 0.4A²s | 4A; 0.6A²s |
| Input Inrush Current 230Vac ⁵⁾ | | typ. | 26A; 0.4A²s | 35A; 1.1A²s | 35A; 1.1A²s | 26A; 0.4A²s | 35A; 1.5A²s | 37A; 1.4A²s | 7A; 0.6A²s |
| External Input Circuit Breaker ⁴⁾ | | min. | B-6A; C-3A | B-10A; C-6A | B-10A; C-6A | B-6A; C-3A | B-10A; C-6A | B-10A; C-6A | B-6A; C-4A |
| DC Input Voltage | | nom. | DC 110-300V ^{T)} -20%/+25% | DC 110-300V ^{S) T)} -20%/+25% | DC 110-300V ^{S) T)} -20%/+25% | DC 110-300V ^{T)} -20%/+25% | DC 110-300V ^{S) T)} -20%/+25% | DC 260-300V ^{S) T)} -15%/+25% | DC 110-300V ^{T)} -20%/+25% |
| Efficiency 120/230Vac ¹⁾ | | typ. | 76.8/77.2% | 79.0/80.0% | 82.6/84.0% | 83.0/82.5% | 87.5/90.0% | 87.7/88.5% | 91.5/91.8% |
| Power Losses 120/230Vac ¹⁾ | | typ. | 4.6/4.5W | 6.6/6.3W | 6.3/5.7W | 3.2/3.2W | 7.1/5.6W | 12.6/11.7W | 16.7/16.1W |
| MTBF ⁶⁾ | | typ. | 2686 kh | 1963 kh | 2507 kh | 3811 kh | 2365 kh | 1310 kh | 631 kh |
| Operational Temperature Range | | min. | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | | min. | 0.4W/°C | 0.8W/°C | 0.8W/°C | 0.4W/°C | 1.3W/°C | 2.5W/°C | 6W/°C |
| Dimensions WxHxD ⁷⁾ | | nom. | 22.5x75x91mm | 45x75x91mm | 45x75x91mm | 22.5x75x91mm | 45x75x91mm | 72.5x75x103mm | 60x124x117mm |
| Connection Terminals | | | screw terminals | spring terminals | spring terminals | screw terminals | spring terminals | spring terminals | spring terminals |
| Weight | | max. | 130g | 240g | 250g | 130g | 260g | 360g | 930g |
| DC-OK-Signal | | | no | no | no | no | no | no | yes ^{P)} |
| Parallel Use | | | yes ^{M)} | yes ^{M)} | yes ^{M)} | yes ^{M)} | yes ^{M)} | yes ^{N)} | yes |
| Series Connection ⁹⁾ | | | yes | yes | yes | yes | no | no | yes |
| Bracket for Wall/Panel Mounting | | | – | included | included | – | included | – | ZM1.WALL |
| Bracket for Side Mounting | | | – | – | – | – | – | – | ZM13.SIDE |
| Special Features | | | | | very low ripple&noise | | | | |
| Order Number | | | ML15.051 | ML30.101 | ML30.102 | ML15.121 | ML50.102 | ML100.102 | QS10.121 |
| | | | | | | | | | ML30.106 |

◇ Auto-select input, #) A missing or detached jumper adjusts the units to 10V (ML30.102), $\pm 12V$ (ML30.106) or 12V (ML50.102).
 Fold out the back page to find the appropriate footnotes.
 Information regarding standards and approvals can be found on pages 42 to 44.
 Visit www.pulspower.com for detailed datasheets.



Easy adjustment of the output voltage with the help of a jumper.

ML30.106
Two output voltages in one device.

Parallel and series connection of power supplies:

In case you cannot find what you need among the listed products, many units can be connected in series or in parallel. A series connection is allowed up to a total output voltage of 150Vdc on most of the power supplies. If higher output currents are needed, power supplies can be connected in parallel. More information can be found in the chapter “Technical Notes” on pages 50 and 51.

| 1-Phase Power Supplies Output: 30-56V | | | 30V | 36V | 48V | | 48V | |
|--|--|--|---|---|--|--|--|---|
| | | | 8A | 13.3A | 1.05A | 2.1A | 5A | 10A |
| Family | | | DIMENSION-Q | DIMENSION-Q | MiniLine | MiniLine | DIMENSION-C | DIMENSION-Q |
| Output Voltage | | | 28-32V | 36-42V | 48-56V | 48-56V | 48-52V | 48-55V |
| Output Current continuous | | | 8.6-7.5A | 13.3-11.4A | 1.05-0.9A | 2.1-1.8A | 5-4.6A | 10-8.7A |
| Output Current short-term | | | 12.8-11.3A ^{K)} | 20-17.1A ^{K)} | – | – | 6-5.5A ^{L)} | 15-13A ^{K)} |
| Output Power continuous | | | 240W | 480W | 50W | 100W | 240W | 480W |
| Output Power short-term | | | 360W ^{K)} | 720W ^{K)} | – | – | 288W ^{L)} | 720W ^{K)} |
| Power Reserves | | | +50% BonusPower [®] ^{K)} | +50% BonusPower [®] ^{K)} | – | – | +20% Power Boost ^{L)} | +50% BonusPower [®] ^{K)} |
| Factory Setting ¹⁾ | | | typ. 30.0V | 36.0V | 48.0V | 48.0V | 48.0V | 48.0V |
| Ripple & Noise Voltage ²⁾ | | | max. 50mVpp | 100mVpp | 50mVpp | 50mVpp | 100mVpp | 100mVpp |
| Overload Behaviour | | | continuous current | Hiccup-mode | continuous current | continuous current | cont. current | Hiccup-mode |
| AC Input Voltage | | | nom. AC 100-240V ±15% | AC 100-240V ±15% | AC 100-240V -15% / +10% | AC 100-120V/ 200-240V ^{Q)} -15%/+10% | AC 100-120V/ 200-240V ^{Q)} ±10% | AC 100-240V ±15% |
| Input Current ³⁾ | | | max. 2.8A | 5.4A | 1.0A | 2.1/1.0A | 5.0/2.7A | 2.8A |
| Harmonic Correction ⁸⁾ | | | active | active | – | – | – | active |
| EN 61000-3-2 (PFC Norm) | | | fulfilled | fulfilled | no | fulfilled | not fulfilled | fulfilled |
| Power Factor 120/230Vac ¹⁾ | | | typ. 0.98/0.92 | 0.95/0.9 | 0.56/0.52 | 0.62/0.55 | 0.59/0.51 | 0.98/0.92 |
| Hold-Up Time 120/230Vac ¹⁾ | | | typ. 22/23ms | 32/51ms | 40/180ms | 38/44ms | 46/47ms | 27/28ms |
| Input Inrush Current Limiter | | | active | active | NTC | NTC | active | active |
| Input Inrush Current 120Vac ⁵⁾ | | | typ. 4A; 0.6A²s | 9A; 5A²s | 17A; 0.4A²s | 22A; 0.4A²s | 3A; 1A²s | 4A; 0.6A²s |
| Input Inrush Current 230Vac ⁵⁾ | | | typ. 7A; 0.6A²s | 7A; 5A²s | 35A; 1.5A²s | 37A; 1.4A²s | 3A; 1A²s | 7A; 5A²s |
| External Input Circuit Breaker ⁴⁾ | | | min. B-6A; C-4A | B-10A; C-6A | B-10A; C-6A | B-10A; C-6A | B-6A; C-4A | B-10A; C-6A |
| DC Input Voltage | | | nom. DC 110-300V ^{T)} -20%/+25% | DC 110-300V ^{T)} -20%/+25% | DC 110-300V ^{S)} ^{T)} -20%/+25% | DC 260-300V ^{S)} ^{T)} -15%/+25% | – | DC 110-300V ^{T)} -20%/+25% |
| Efficiency 120/230Vac ¹⁾ | | | typ. 92.3/93.0% | 92.5/94.0% | 88.9/90.3% | 90.4/91.8% | 91.0/91.6% | 91.2/92.0% |
| Power Losses 120/230Vac ¹⁾ | | | typ. 20.0/18.1W | 38.9/30.6W | 6.2/5.4W | 10.6/8.9W | 23.7/22.0W | 23.2/20.9W |
| MTBF ⁶⁾ | | | typ. 571 kh | 469 kh | 1970 kh | 1671 kh | 835 kh | 606 kh |
| Operational Temperature Range | | | min. -25°C to +70°C | -25°C to +70°C | -10°C to +70°C | -10°C to +70°C | -25°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | | | min. 6W/°C | 12W/°C | 1.3W/°C | 2.5W/°C | 6W/°C | 12W/°C |
| Dimensions WxHxD ⁷⁾ | | | nom. 60x124x117mm | 82x124x127mm | 45x75x91mm | 72.5x75x103mm | 60x124x117mm | 60x124x117mm |
| Connection Terminals | | | spring terminals | spring terminals | spring terminals | spring terminals | screw terminals | spring terminals |
| Weight | | | max. 900g | 1200g | 240g | 360g | 700g | 900g |
| DC-OK-Signal | | | yes ^{P)} | yes ^{P)} | no | no | no | yes ^{P)} |
| Parallel Use | | | yes | yes | yes | yes ^{N)} | no ^{J)} | yes |
| Series Connection ⁹⁾ | | | yes | yes | yes | yes | yes | yes |
| Bracket for Wall/Panel Mounting | | | ZM1.WALL | ZM1.WALL | included | – | ZM1.WALL | ZM1.WALL |
| Bracket for Side Mounting | | | ZM13.SIDE | ZM15.SIDE | – | – | ZM13.SIDE | ZM15.SIDE |
| Special Features | | | | | | | | |
| Order Number | | | QS10.301 | QS20.361 | ML50.105 | ML100.105 | CS10.481 | QS10.481 |
| | | | | | | | | QS20.481 |

Q) Auto-select input
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.



24V Power Supplies for 3-Phase Systems

Designed for the harsh industrial environment:

Industrial three-phase systems present a special challenge when designing power supplies. High energy transients and superimposed disturbances on the input lines require special input filters and protection circuits. PULS units are equipped with special active and passive filters.

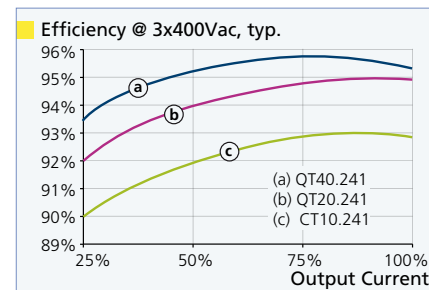


| 3-Phase Power Supplies | | | 90-100W | | 120W | |
|--|--|--|--|---------------------------------------|---------------------------------------|---------------------------------------|
| Output: 24V | | | 3.75A | 4.2A | 5A | 5A |
| Family | | | MiniLine | MiniLine | DIMENSION-C | SilverLine |
| Output Voltage | | | nom. 24-28V | 24-28V | 24-28V | 24-28V |
| Output Current | | | continuous nom. 3.75-3.2A | 4.2-3.6A | 5-4.3A | 5-4.3A |
| Output Current | | | short-term – | – | 6-5.2A ^{L)} | 6-5.2A ^{G)} |
| Output Power | | | continuous nom. 90W | 100W | 120W | 120W |
| Output Power | | | short-term – | – | 144W ^{L)} | 144W ^{G)} |
| Power Reserves | | | min. – | – | +20% Power Boost ^{L)} | +20% Power Boost ^{G)} |
| Factory Setting ¹⁾ | | | typ. 24.5V | 24.5V | 24.1V | 24.5V |
| Ripple & Noise Voltage ²⁾ | | | max. 50mVpp | 50mVpp | 50mVpp | 25mVpp |
| Overload Behaviour | | | continuous current | continuous current | continuous current | continuous current |
| AC Input Voltage | | | nom. 2AC 380-480V ±15% | 2AC 380-480V ±15% | 2AC 380-480V -15%/+20% | 3AC 400-500V ±15% |
| 2-Phase-Operation | | | 100% ^{A)} | 100% ^{A)} | 100% ^{A)} | 100% ^{A)} |
| Input Current ³⁾ | | | max. 0.5A | 0.6A | 0.75A | 0.4A |
| Harmonic Correction ⁸⁾ | | | – | – | PFC inductor | PFC inductor |
| EN 61000-3-2 (PFC Norm) | | | fulfilled | fulfilled | fulfilled | fulfilled |
| Power Factor 400/480Vac ¹⁾ | | | typ. 0.60/0.55 | 0.60/0.55 | 0.45/0.43 | 0.52/0.49 |
| Hold-Up Time 400/480Vac ¹⁾ | | | typ. 52/93ms | 48/85ms | 27/48ms | 30/45ms |
| Input Inrush Current Limiter | | | NTC | NTC | active | NTC |
| Input Inrush Current 400Vac ⁵⁾ | | | typ. 30A; 0.7A ² s | 30A; 0.7A ² s | 4A; 0.5A ² s | 16A; 1.1A ² s |
| Input Inrush Current 480Vac ⁵⁾ | | | typ. 36A; 1A ² s | 36A; 1A ² s | 4A; 0.5A ² s | 19A; 1.3A ² s |
| External Input Circuit Breaker ⁴⁾ | | | min. B-10A; C-6A | B-10A; C-6A | B-6A; C-4A | B-10A; C-6A |
| DC Input Voltage | | | nom. DC 600V ^{S) T) U)} -25%/+35% | DC 600V ^{S) T) U)} -25%/+35% | DC 600V ^{S) T) U)} -25%/+30% | DC 600V ^{S) T) U)} -25%/+35% |
| Efficiency 400/480Vac ¹⁾ | | | typ. 89.5/89.0% | 89.5/89.0% | 90.4/90.0% | 88.8/88.9% |
| Power Losses 400/480Vac ¹⁾ | | | typ. 10.5/11.1W | 11.7/12.3W | 12.7/13.3W | 15.1/15.0W |
| MTBF ⁶⁾ | | | typ. 1594 kh | 1594 kh | 1173 kh | 1798 kh |
| Operational Temperature Range | | | min. -10°C to +70°C | -10°C to +70°C | -25°C to +70°C | -10°C to +70°C |
| Derating +60°C to +70°C | | | min. 2W/°C | 2.5W/°C | 3W/°C | 3W/°C |
| Dimensions WxHxD ⁷⁾ | | | nom. 72.5x75x103mm | 72.5x75x103mm | 40x124x117mm | 73x124x117mm |
| Connection Terminals | | | spring terminals | spring terminals | screw terminals | screw terminals |
| Weight | | | max. 360g | 360g | 500g | 730g |
| DC-OK-Signal | | | no | no | no | no |
| Parallel Use | | | no | yes ^{M)} | yes ^{M)} | yes ^{M)} |
| Serial Use ⁹⁾ | | | no | yes | yes | no |
| Bracket for Wall/Panel Mounting | | | – | – | ZM1.WALL | SLZ02 |
| Bracket for Side Mounting | | | – | – | ZM12.SIDE | – |
| Special Features | | | 1-Ph 400/480V input. NEC-Class-2 | 1-Ph 400/480V input | 1-Ph 400/480V input | |
| Order Number | | | ML90.200 | ML100.200 | CT5.241 | SL5.300 |

Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.

Highest efficiencies care for the environment and save money at the same time

There is no doubt that the best contribution we can make to actively protecting the environment and climate is to avoid unnecessary energy consumption and to use resources responsibly. Advanced technologies employed by PULS in the design of power supply units allow the construction of highly efficient devices with reduced levels of loss and wasted heat. PULS consistently utilises, develops and evolves these technologies and passes the benefits onto its customers. The environment is protected while the reduced energy and system costs often allow substantial financial savings. Please refer to our “Saving Energy” brochure for facts and figures.



| 3-Phase Power Supplies Output: 24V | | | 240W | | 480W | | 960W | | | |
|--|------------|------|------------------------|--|--|--|--|--|--|---|
| | | | 10A | 10A | 20A | 20A | 40A | 40A | 40A | 40A |
| Family | | | DIMENSION-C | SilverLine | DIMENSION-Q | SilverLine | DIMENSION-Q | SilverLine | DIMENSION-X | DIMENSION-X |
| Output Voltage | | | nom. | 24-28V | 24-28V | 24-28V | 24-28V | 24-28V | 24V ±2% ^{†)} | 24V ±2% ^{†)} |
| Output Current | continuous | nom. | 10-8.6A | 10-8.6A | 20-17.5A | 20-17.1A | 40-34.3A | 40-34.3A | 40A | 40A |
| Output Current | short-term | | 12-10.3A ^{L)} | 12-10.3A ^{G)} | 30-26A ^{K)} | 25-21.5A ^{G)} | 60-51.5A ^{K)} | 45-38.6A ^{G)} | 50A ^{H)} | 50A ^{H)} |
| Output Power | continuous | nom. | 240W | 240W | 480W | 480W | 960W | 960W | 960W | 960W |
| Output Power | short-term | | 288W ^{L)} | 288W ^{G)} | 720W ^{K)} | 600W ^{G)} | 1440W ^{K)} | 1080W ^{G)} | 1200W ^{H)} | 1200W ^{H)} |
| Power Reserves | | | min. | +20% | +20% | +50% | +25% | +50% | +12.5% | +25% |
| | | | | Power Boost ^{L)} | Power Boost ^{G)} | BonusPower® ^{K)} | Power Boost ^{G)} | BonusPower® ^{K)} | Power Boost ^{G)} | BonusPower® ^{H)} |
| Factory Setting ¹⁾ | | | typ. | 24.1V | 24.5V | 24.1V | 24.5V | 24.1V | 24.0V | 24.1V |
| Ripple & Noise Voltage ²⁾ | | | max. | 50mVpp | 30mVpp | 100mVpp | 30mVpp | 100mVpp | 50mVpp | 1500mVpp |
| Overload Behaviour | | | | continuous current | selectable ^{C)} | continuous current | selectable ^{C)} | continuous current | continuous current | Fuse-mode ^{D)} |
| AC Input Voltage | | | nom. | 3AC 380-480V -15%/+20% | 3AC 400-500V ±15% | 3AC 380-480V ±15% | 3AC 400-500V ±15% | 3AC 380-480V -15%/+20% | 3AC 400-500V ±15% | 3AC 400V ±15% |
| 2-Phase-Operation | | | | 100% ^{A)} | 100% ^{A)} | 75% ^{A)} | 75% ^{A)} | 50% ^{A)} | 60% ^{A)} | 0% ^{A)} |
| Input Current ³⁾ | | | max. | 0.7A | 0.8A | 0.9A | 1.7A | 1.8A | 3A | 1.65A |
| Harmonic Correction ⁸⁾ | | | | PFC inductor | PFC inductor | active | PFC inductor | active | PFC inductor | active |
| EN 61000-3-2 (PFC Norm) | | | | fulfilled | fulfilled | fulfilled | fulfilled | fulfilled | fulfilled | fulfilled |
| Power Factor 400/480Vac ¹⁾ | | | typ. | 0.53/0.52 | 0.5/0.47 | 0.94/0.95 | 0.55/0.52 | 0.88/0.90 | 0.55/0.52 | 0.93/- |
| Hold-Up Time 400/480Vac ¹⁾ | | | typ. | 34/54ms | 34/55ms | 22/22ms | 13/23ms | 25/25ms | 16/30ms | 3ms ^{F)} /- |
| Input Inrush Current Limiter | | | | active | passive ^{R)} | active | passive ^{R)} | active | active | active ^{E)} |
| Input Inrush Current 400Vac ⁵⁾ | | | typ. | 4A; 0.5A ^{2s} | 15A; 0.3A ^{2s} | 3A; 1A ^{2s} | 6A; 1A ^{2s} | 4.5A; 1.5A ^{2s} | 23A; 3A ^{2s} | 2A; 5A ^{2s} |
| Input Inrush Current 480Vac ⁵⁾ | | | typ. | 4A; 0.5A ^{2s} | 15A; 0.4A ^{2s} | 3A; 1A ^{2s} | 6A; 1A ^{2s} | 4.5A; 1.5A ^{2s} | 27A; 3A ^{2s} | - |
| External Input Circuit Breaker ⁴⁾ | | | min. | B-6A; C-4A | B-10A; C-4A | B-6A; C-3A | B-10A; C-6A | B-6A; C-6A | B-10A; C-6A | B-6A; C-3A |
| DC Input Voltage | | | nom. | DC 600V ^{S)} ^{T)} ^{U)} -25%/+30% | DC 600V ^{S)} ^{T)} ^{U)} -25%/+35% | DC 600V ^{S)} ^{T)} ^{U)} -25%/+30% | DC 600V ^{S)} ^{T)} ^{U)} -25%/+35% | DC 600V ^{S)} ^{T)} ^{U)} -25%/+35% | DC 600V ^{S)} ^{T)} ^{U)} -25%/+35% | DC 540V ^{S)} ^{T)} ^{U)} ±15% |
| Efficiency 400/480Vac ¹⁾ | | | typ. | 92.8/92.9% | 91.9/92.1% | 95.0/94.8% | 92.2/92.2% | 95.3/95.2% | 92.6/92.8% | 95.5%/- |
| Power Losses 400/480Vac ¹⁾ | | | typ. | 18.6/18.3W | 24.2/23.7W | 25.3/26.6W | 41.3/41.3W | 47.3/48.4W | 77.4/74.5W | 45.2W/- |
| MTBF ⁶⁾ | | | typ. | 975 kh | 1362 kh | 501 kh | 1120 kh | 375 kh | 844 kh | 543 kh |
| Operational Temperature Range | | | min. | -25°C to +70°C | 0°C to +70°C | -25°C to +70°C | 0°C to +70°C | -25°C to +70°C | 0°C to +70°C | -25°C bis +70°C |
| Derating +60°C to +70°C | | | min. | 6W/°C | 6W/°C | 12W/°C | 12W/°C | 24W/°C | 24W/°C | 24W/°C |
| Dimensions WxHxD ⁷⁾ | | | nom. | 62x124x117mm | 89x124x117mm | 65x124x127mm | 150x124x121mm | 110x124x127mm | 275x124x117mm | 96x124x157mm |
| Connection Terminals | | | | screw terminals | screw terminals | spring terminals | screw terminals | screw terminals | screw terminals | screw terminals |
| Weight | | | max. | 750g | 980g | 870g | 1800g | 1500g | 3300g | 1400g |
| DC-OK-Signal | | | | no | no | yes ^{P)} | no | yes ^{P)} | yes ^{O)} | no |
| Parallel Use | | | | yes ^{N)} | yes ^{N)} | yes | yes ^{N)} | yes ^{N)} | yes ^{N)} | no |
| Series Connection ⁹⁾ | | | | yes | yes | yes | yes | yes | yes | yes |
| Bracket for Wall/Panel Mounting | | | | ZM1.WALL | SLZ02 | ZM1.WALL | SLZ02 | ZM2.WALL | SLZ02 | ZM2.WALL |
| Bracket for Side Mounting | | | | ZM13.SIDE | - | ZM14.SIDE | - | - | - | - |
| Special Features | | | | | | | | with shut-down input | with signal-port | semi-regulated power supply ^{O)} |
| Order Number | | | | CT10.241 | SL10.300 SL10.309*) | QT20.241 QT20.241-C1*) | SL20.310 | QT40.241 | SL40.301 | XT40.241 |
| | | | | | | | | | | XT40.242 |

*) With conformal coated PC-board. ⚡) A functional description of semi-regulated power supplies can be found on page 48.
†) Not adjustable and for output currents > 5% of the nominal current. Below 5%, a slightly higher output voltage is possible.
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.



3-Phase Power Supplies with Output Voltages other than 24V

Drive systems especially benefit from higher supply voltages and achieve better dynamic performance. Large electrolytic output capacitors help in acceleration and absorbing back-fed power in motor applications.

| 3-Phase Power Supplies Output: 12V, 36-72V | | | 12V | | 36V | | 48V | | 48V | | | 72V | | | | | | | | | | |
|---|-------------|------|------------------------------|-------|------------------------------------|-------|---|-----|---|-----|------------------------------------|-------|------------------------------------|--|------------------------------------|--|---|--|---|--|---|--|
| | | | 8A | 13.3A | 26.6A | 26.6A | 5A | 10A | 20A | 20A | 20A | 13.3A | 13.3A | | | | | | | | | |
| Family | DIMENSION-C | | DIMENSION-Q | | DIMENSION-X | | DIMENSION-X | | DIMENSION-C | | DIMENSION-Q | | DIMENSION-Q | | DIMENSION-X | | DIMENSION-X | | DIMENSION-X | | DIMENSION-X | |
| Output Voltage | nom. | | 12-15V | | 36-42V | | 36V ±2% ⁺⁾ | | 36V ±2% ⁺⁾ | | 48-56V | | 48-55V | | 48-54V | | 48V ±2% ⁺⁾ | | 48V ±2% ⁺⁾ | | 72V ±2% ⁺⁾ | |
| Output Current | continuous | nom. | 8-6.4A | | 13.3-11.4A | | 26.3A | | 26.3A | | 5-4.3A | | 10-8.7A | | 20-17.8A | | 20A | | 20A | | 13.3A | |
| Output Current | short-term | | – | | 20-17.1A ^{K)} | | 33.3A ^{H)} | | 33.3A ^{H)} | | 6-5.2A ^{L)} | | 15-13A ^{K)} | | 30-26.7A ^{K)} | | 25A ^{H)} | | 25A ^{H)} | | 16.7A ^{H)} | |
| Output Power | continuous | nom. | 96W | | 480W | | 960W | | 960W | | 240W | | 480W | | 960W | | 960W | | 960W | | 960W | |
| Output Power | short-term | | – | | 720W ^{K)} | | 1200W ^{H)} | | 1200W ^{H)} | | 288W ^{L)} | | 720W ^{K)} | | 1440W ^{K)} | | 1200W ^{H)} | | 1200W ^{H)} | | 1200W ^{H)} | |
| Power Reserves | | min. | – | | +50% BonusPower® ^{K)} | | +25% BonusPower® ^{H)} | | +25% BonusPower® ^{H)} | | +20% Power Boost ^{L)} | | +50% BonusPower® ^{K)} | | +50% BonusPower® ^{K)} | | +25% BonusPower® ^{H)} | | +25% BonusPower® ^{H)} | | +25% BonusPower® ^{H)} | |
| Factory Setting ¹⁾ | | typ. | 12.0V | | 36.0V | | 36.0V | | 36.0V | | 48.0V | | 48.0V | | 48.0V | | 48.0V | | 48.0V | | 72.0V | |
| Ripple & Noise Voltage ²⁾ | | max. | 100mVpp | | 100mVpp | | 2000mVpp | | 2000mVpp | | 100mVpp | | 100mVpp | | 150mVpp | | 2500mVpp | | 2500mVpp | | 3000mVpp | |
| Overload Behaviour | | | continuous current | | continuous current | | Fuse-mode ^{D)} | | Fuse-mode ^{D)} | | continuous current | | cont. current | | continuous current | | Fuse-mode ^{D)} | | Fuse-mode ^{D)} | | Fuse-mode ^{D)} | |
| AC Input Voltage | | nom. | 2AC 380-480V -15%/+20% | | 3AC 380-480V ±15% | | 3AC 400V ±15% | | 3AC 480V ±15% | | 3AC 380-480V -15%/+20% | | 3AC 380-480V ±15% | | 3AC 380-480V -15%/+20% | | 3AC 400V ±15% | | 3AC 480V ±15% | | 3AC 400V ±15% | |
| 2-Phase-Operation | | | 100% ^{A)} | | 75% ^{A)} | | 0% ^{A)} | | 0% ^{A)} | | 100% ^{A)} | | 75% ^{A)} | | 50% ^{A)} | | 0% ^{A)} | | 0% ^{A)} | | 0% ^{A)} | |
| Input Current ³⁾ | | max. | 0.64A | | 0.9A | | 1.65A | | 1.4A | | 0.7A | | 0.9A | | 1.8A | | 1.65A | | 1.4A | | 1.65A | |
| Harmonic Correction ⁸⁾ | | | PFC inductor | | active | | active | | active | | PFC inductor | | active | | active | | active | | active | | active | |
| EN 61000-3-2 (PFC Norm) | | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | | fulfilled | |
| Power Factor 400/480Vac ¹⁾ | | typ. | 0.44/0.42 | | 0.94/0.95 | | 0.93/– | | –/0.93 | | 0.53/0.52 | | 0.94/0.95 | | 0.88/0.90 | | 0.93/– | | –/0.93 | | 0.93/– | |
| Hold-Up Time 400/480Vac ¹⁾ | | typ. | 33/58ms | | 22/22ms | | 3ms ^{F)} /– | | –/3ms ^{F)} | | 34/54ms | | 22/22ms | | 25/25ms | | 3ms ^{F)} /– | | –/3ms ^{F)} | | 3ms ^{F)} /– | |
| Input Inrush Current Limiter | | | active | | active ^{E)} | | active ^{E)} | | active ^{E)} | | active | | active | | active | | active ^{E)} | | active ^{E)} | | active ^{E)} | |
| Input Inrush Current 400Vac ⁵⁾ | | typ. | 4A; 0.5A²s | | 3A; 1A²s | | 2A; 5A²s | | – | | 4A; 0.5A²s | | 3A; 1A²s | | 4.5A; 1.5A²s | | 2A; 5A²s | | – | | 2A; 5A²s | |
| Input Inrush Current 480Vac ⁵⁾ | | typ. | 4A; 0.5A²s | | 3A; 1A²s | | – | | 2A; 5A²s | | 4A; 0.5A²s | | 3A; 1A²s | | 4.5A; 1.5A²s | | – | | 2A; 5A²s | | – | |
| External Input Circuit Breaker ⁴⁾ | | min. | B-6A; C-4A | | B-6A; C-3A | | B-6A; C-3A | | B-6A; C-3A | | B-6A; C-4A | | B-6A; C-3A | | B-6A; C-6A | | B-6A; C-3A | | B-6A; C-3A | | B-6A; C-3A | |
| DC Input Voltage | | nom. | DC 600V ^{S) T) U)} | | DC 600V ^{S) T) U)} | | DC 540V ^{S) T) U)} | | DC 650V ^{S) T) U)} | | DC 600V ^{S) T) U)} | | DC 600V ^{S) T) U)} | | DC 600V ^{S) T) U)} | | DC 540V ^{S) T) U)} | | DC 650V ^{S) T) U)} | | DC 540V ^{S) T) U)} | |
| | | | -25%/+30% | | -25%/+30% | | ±15% | | ±15% | | -25%/+35% | | -25%/+30% | | -25%/+35% | | ±15% | | ±15% | | ±15% | |
| Efficiency 400/480Vac ¹⁾ | | typ. | 85.4/85.8% | | 94.8/94.6% | | 95.5%/– | | –/95.5% | | 92.8/92.9% | | 95.4/95.0% | | 95.4/95.2% | | 96.0%/– | | –/96.0% | | 95.5%/– | |
| Power Losses 400/480Vac ¹⁾ | | typ. | 16.4/15.9W | | 26.3/27.4W | | 45.2W/– | | –/45.2W | | 18.6/18.3W | | 23.1/25.3W | | 46.3/48.4W | | 40.0W/– | | –/40.0W | | 45.2W/– | |
| MTBF ⁶⁾ | | typ. | 983 kh | | 492 kh | | 565 kh | | 534 kh | | 975 kh | | 531 kh | | 395 kh | | 540 kh | | 578 kh | | 554 kh | |
| Operational Temperature Range | | min. | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | | -25°C to +70°C | |
| Derating +60°C to +70°C | | min. | 2.5W/°C | | 12W/°C | | 24W/°C | | 24W/°C | | 6W/°C | | 12W/°C | | 24W/°C | | 24W/°C | | 24W/°C | | 24W/°C | |
| Dimensions WxHxD ⁷⁾ | | nom. | 40x124x117mm | | 65x124x127mm | | 96x124x157mm | | 96x124x157mm | | 62x124x117mm | | 65x124x127mm | | 110x124x127mm | | 96x124x157mm | | 96x124x157mm | | 96x124x157mm | |
| Connection Terminals | | | screw terminals | | spring terminals | | screw terminals | | screw terminals | | screw terminals | | spring terminals | | screw terminals | | screw terminals | | screw terminals | | screw terminals | |
| Weight | | max. | 500g | | 870g | | 1400g | | 1400g | | 750g | | 870g | | 1500g | | 1400g | | 1400g | | 1400g | |
| DC-OK-Signal | | | no | | yes ^{P)} | | no | | no | | no | | yes ^{P)} | | yes ^{P)} | | no | | no | | no | |
| Parallel Use | | | yes ^{M)} | | yes | | no | | no | | yes ^{N)} | | yes | | yes ^{N)} | | no | | no | | no | |
| Series Connection ⁹⁾ | | | yes | | yes | | yes | | yes | | yes | | yes | | yes | | yes | | yes | | yes | |
| Bracket for Wall/Panel Mounting | | | ZM1.WALL | | ZM1.WALL | | ZM2.WALL | | ZM2.WALL | | ZM1.WALL | | ZM1.WALL | | ZM2.WALL | | ZM2.WALL | | ZM2.WALL | | ZM2.WALL | |
| Bracket for Side Mounting | | | ZM12.SIDE | | ZM14.SIDE | | - | | - | | ZM13.SIDE | | ZM14.SIDE | | – | | - | | - | | - | |
| Special Features | | | 1-Ph 400/480V input | | | | semi-regulated power supply ^{Q)} | | semi-regulated power supply ^{Q)} | | | | | | with shut-down input | | semi-regulated power supply ^{Q)} | | semi-regulated power supply ^{Q)} | | semi-regulated power supply ^{Q)} | |
| Order Number | | | CT5.121 | | QT20.361 | | XT40.361 | | XT40.362 | | CT10.481 | | QT20.481 | | QT40.481 | | XT40.481 | | XT40.482 | | XT40.721 | |
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DC/DC Converters for 120V, 220V and 600V DC-Bus Voltages

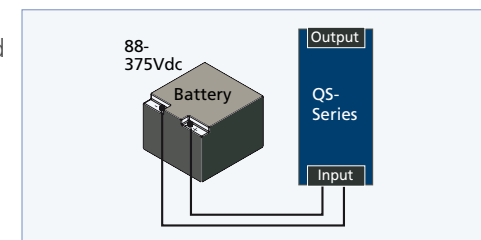
Such DC voltages are common in drive systems, in mobile applications, inductive power transfer systems or systems which are supplied from 120V or 220V back-up batteries.

| DC/DC Converter | | | Input DC 600V |
|--------------------------------------|------------|------|--|
| | | | 24V 20A |
| Family | | | DIMENSION-Q |
| Output Voltage | nom. | | 24-28V |
| Output Current | continuous | nom. | 20-17.5A |
| Output Current | short-term | | 25-21.4A ^{K)} |
| Output Power | continuous | nom. | 480W |
| Output Power | short-term | | 600W ^{K)} |
| Power Reserves | min. | | +25% BonusPower [®] ^{K)} |
| Factory Setting ¹⁾ | typ. | | 24.1V |
| Ripple & Noise Voltage ²⁾ | max. | | 100mVpp |
| Overload Behaviour | | | continuous current |
| Input | nom. | | DC 600V |
| Input Voltage Range | | | 480-840Vdc 360-960Vdc ^{*)} |
| Input Current ³⁾ | max. | | 1.0A |
| Hold-Up Time ¹⁾ | typ. | | 22ms |
| Input Inrush Current Limiter | | | active |
| Input Inrush Current ⁵⁾ | typ. | | negligible |
| Efficiency ¹⁾ | typ. | | 94.5% |
| Power Losses ¹⁾ | typ. | | 25.2W |
| MTBF ⁶⁾ | typ. | | 446 kh |
| Operational Temperature Range | min. | | -25°C to +70°C |
| Derating +60°C to +70°C | min. | | 12W/°C |
| Dimensions WxHxD ⁷⁾ | nom. | | 65x124x127mm |
| Connection Terminals | | | spring terminals |
| Weight | max. | | 890g |
| Input / Output Isolation | | | yes |
| DC-OK-Signal | | | yes ^{P)} |
| Input-Low Signal | | | no |
| Parallel Use | | | yes |
| Series Connection ⁹⁾ | | | yes |
| Bracket for Wall/Panel Mounting | | | ZM1.WALL |
| Bracket for Side Mounting | | | ZM14.SIDE |
| Special Features | | | |
| Order Number | | | QTD20.241 |

*) See datasheet for details
Fold out the back page to find the appropriate footnotes.
Infos regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.

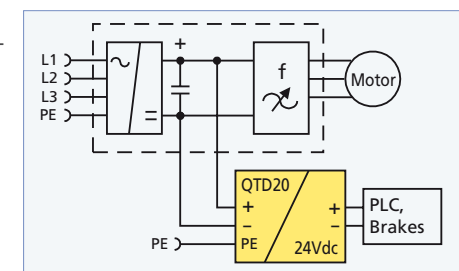
Input: 85Vdc, 120Vdc, 220Vdc:

Many AC-power supplies can also be powered from this DC voltage. For example: all DIMENSION QS-series units can be powered from a DC voltage between 88V and 375Vdc. Further information can be found in the individual product tables in this catalogue.



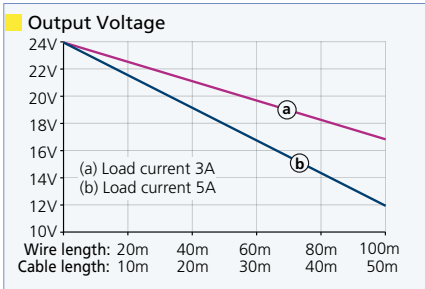
Input: 600Vdc

The QTD20.241 is a 24V-power-supply which is specially designed for the 600V intermediate-DC-bus of drive systems and frequency converters. Connecting the power supply of the 24V control voltage to the intermediate-DC-bus and not to the AC mains offers the following advantage. In case of a mains outage, the motor acts as a generator and keeps the DC-bus voltage alive until the motor stops spinning. The voltage that supplies the controls and brakes is ensured as long as the motor is spinning. Intermediate buses are usually not filtered. The frequency converters in a drive system, the cables to the motor and the motor itself generate high common mode noises which appear on the DC terminals where the power supply is supposed to be connected. This high EMI noise requires power supplies with a rugged input stage. Regular AC-power supplies can malfunction or be damaged in such cases. The QTD20 incorporates hardened input filters which can cope with these problems. Additionally, the QTD20 is equipped with two input fuses which are rated for 600Vdc. The unit is also UL Listed.

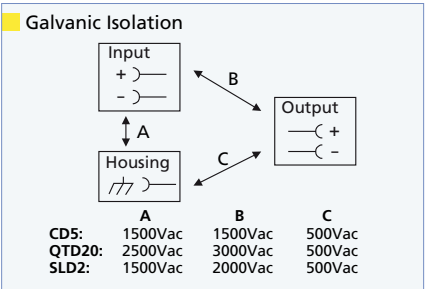




CD5.241-S1
Signal outputs report a discharged battery or a fault in the output voltage of the unit.



Typical voltage drop on a 0.75mm² (AWG 18) wire: The DC/DC converter can “refresh” the voltage at the end of long cable runs.



High galvanic isolation between input and output.

DC/DC Converters for the 12V, 24V and 48V DC-Bus

The field of applications for these units is very wide: stabilised control voltages in battery powered applications, in mobile applications such as ships, fork-lifts, trucks, for galvanic isolation to avoid earth (ground) loops or to restore the 24V control voltage at the end of long cable runs to compensate for voltage drops.

| DC/DC Converter | 12V Input | | | | | | |
|--------------------------------------|-------------------------------------|-------------------------|-----------------------------------|-----------------------------------|-----------------------------------|--|--------------------------------|
| | 24V 4A | 5V 8A | 12V 8A | 24V 3.8A | 24V 5A | 24V 5A | 48V Input 24V 5A |
| Family | DIMENSION-C | SilverLine | DIMENSION-C | DIMENSION-C | DIMENSION-C | DIMENSION-C | DIMENSION-C |
| Output Voltage | nom. 24-28V | 5-5.5V | 12-15V | 24V | 23-28V | 23-28V | 23-28V |
| Output Current continuous | nom. 4-3.4A | 8A | 8-6.4A | 3.8A | 5-4.3A | 5-4.3A | 5-4.3A |
| Output Current short-term | 4.8-4.1A ¹⁾ | – | 9.6-7.7A ¹⁾ | – | 6-5.1A ¹⁾ | 6-5.1A ¹⁾ | 6-5.1A ¹⁾ |
| Output Power continuous | nom. 96W | 40W | 96W | 92W | 120W | 120W | 120W |
| Output Power short-term | 116W ¹⁾ | – | 116W ¹⁾ | – | 144W ¹⁾ | 144W ¹⁾ | 144W ¹⁾ |
| Power Reserves | min. +20% Power Boost ¹⁾ | – | +20% Power Boost ¹⁾ | – | +20% Power Boost ¹⁾ | +20% Power Boost ¹⁾ | +20% Power Boost ¹⁾ |
| Factory Setting ¹⁾ | typ. 24.1V | 5.1V | 12.0V | 24.1V | 24.1V | 24.1V | 24.1V |
| Ripple & Noise Voltage ²⁾ | max. 50mVpp | 50mVpp | 75mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp |
| Overload Behaviour | continuous current | continuous current | continuous current | continuous current | continuous current | continuous current | continuous current |
| Input | nom. DC 12V | DC 24V | DC 24V | DC 24V | DC 24V | DC 24V | DC 48V |
| Input Voltage Range | 8.4-16.2Vdc | 18-36Vdc | 18-32.4Vdc 14-35Vdc ^{*)} | 14-32.4Vdc 14-35Vdc ^{*)} | 18-32.4Vdc 14-35Vdc ^{*)} | 18-32.4Vdc 14-35Vdc ^{*)} | 36-60Vdc |
| Input Current ³⁾ | max. 12A | 2.9A | 5.6A | 5.5A | 7A | 7A | 3.5A |
| Hold-Up Time ¹⁾ | typ. 3ms | 12ms | 7ms | 7ms | 6ms | 6ms | 6ms |
| Input Inrush Current Limiter | active | active | active | active | active | active | active |
| Input Inrush Current ⁵⁾ | typ. negligible | 5A; 1.5A ² s | negligible | negligible | negligible | negligible | negligible |
| Efficiency ¹⁾ | typ. 87.7% | 82.0% | 88.2% | 90.5% | 90.3% | 90.2% | 90.3% |
| Power Losses ¹⁾ | typ. 13.5W | 8.8W | 12.8W | 9.7W | 12.9W | 13.3W | 12.9W |
| MTBF ⁶⁾ | typ. 1100 kh | 1785 kh | 1161 kh | 1178 kh | 1178 kh | 1048 kh | 951 kh |
| Operational Temperature Range | min. -25°C to +70°C | 0°C to +70°C | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | min. 2.5W/°C | 1.5W/°C | 2.5W/°C | 0W/°C | 3W/°C | 3W/°C | 3W/°C |
| Dimensions WxHxD ⁷⁾ | nom. 32x124x102mm | 49x124x102mm | 32x124x102mm | 32x124x102mm | 32x124x102mm | 32x124x102mm | 32x124x102mm |
| Connection Terminals | screw terminals | screw terminals | screw terminals | spring terminals | screw terminals | spring terminals | screw terminals |
| Weight | max. 435g | 470g | 425g | 425g | 425g | 450g | 425g |
| Input / Output Isolation | yes | yes | yes | yes | yes | yes | yes |
| DC-OK-Signal | no | no | no | no | no | yes ^{P)} | no |
| Input-Low Signal | no | no | no | no | no | yes ^{P)} | no |
| Parallel Use | yes ^{M)} | yes | yes ^{M)} | no | yes ^{M)} | yes ^{M)} | yes ^{M)} |
| Series Connection ⁹⁾ | yes | no | yes | no | yes | yes | yes |
| Bracket for Wall/Panel Mounting | ZM1.WALL | SLZ02 | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL | ZM1.WALL |
| Bracket for Side Mounting | ZM11.SIDE | – | ZM11.SIDE | ZM11.SIDE | ZM11.SIDE | ZM11.SIDE | ZM11.SIDE |
| Special Features | | | | NEC-Class-2 | | optimised for mobile or battery powered applications | |
| Order Number | CD5.243 | SLD2.100 | CD5.121 | CD5.241-L1 | CD5.241 | CD5.241-S1 | CD5.242 |

*) See datasheet for details.
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.





AS-Interface® Power Supplies and DC/DC Converters

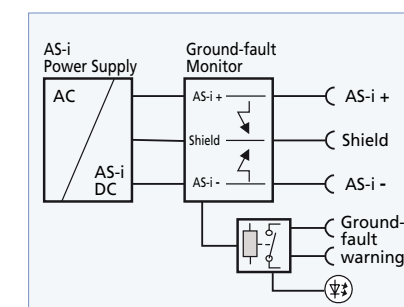
The AS-Interface® field bus system is a network technology where power and data are provided by the same single two-conductor wire. Therefore, special power supplies with an output voltage of 30.6V and an integrated data-decoupling circuit are required which prevents the modulated signal voltage on the AS-Interface® bus from being corrupted. The outputs of these power supplies are inductive and are not suitable for other purpose.

| AS-Interface® Power Supplies | 1-Phase | | | 3-Phase | DC/DC |
|--|--|---|---|---|-------------------------------|
| | 30.6V 2.8A | 30.6V 4A | 30.6V 8A | 30.6V 8A | 30.6V 4A |
| Family | SilverLine | SilverLine | SilverLine | SilverLine | SilverLine |
| Output Voltage | nom. 30.6V | 30.6V | 30.6V | 30.6V | 30.6V |
| Tolerance | ±3% | ±3% | ±3% | ±3% | ±3% |
| Output Current | nom. 2.8A | 4A | 8A | 8A | 4A |
| Output Power | nom. 85W | 120W | 240W | 240W | 120W |
| Ripple & Noise Voltage ²⁾ | max. 50mVpp | 50mVpp | 50mVpp | 50mVpp | 50mVpp |
| Overload Behaviour | continuous current | continuous current | Fuse-mode | Fuse-mode | continuous current |
| Input Voltage | nom. AC 100-120/200-240V #) | AC 100-120/200-240V #) | AC 100-120/200-240V #) | 3AC 400-500V ±15% | DC 24V 18-32.4Vdc 14-35Vdc *) |
| Input Current ³⁾ | max. 2.0A/0.9A | 2.7A/1.3A | 6.0A/2.8A | 0.8A | 7A |
| Harmonic Correction ⁸⁾ | – | – | – | PFC inductor | – |
| EN 61000-3-2 (PFC Norm) | fulfilled | fulfilled | not fulfilled | fulfilled | not applicable |
| Power Factor ⁹⁾ | typ. 0.58/0.53 | 0.58/0.53 | 0.53/0.48 | 0.5/0.47 | – |
| Hold-Up Time ¹⁰⁾ | typ. 55/58ms | 56/60ms | 26/28ms | 30/50ms | 6ms |
| Input Inrush Current Limiter | NTC | NTC | active | NTC | active |
| Input Inrush Current 120 or 400Vac ⁵⁾ | typ. 18A; 1.4A ² s | 45A; 3.7A ² s | 14A; 1.5A ² s | 45A; 1.4A ² s | negligible |
| Input Inrush Current 230 or 480Vac ⁵⁾ | typ. 32A; 1.6A ² s | 50A; 2.5A ² s | 26A; 1.5A ² s | 54A; 2.3A ² s | negligible |
| External Input Circuit Breaker ⁴⁾ | min. B-10A; C-6A | B-10A; C-6A | B-10A; C-6A | B-10A; C-4A | – |
| DC Input Voltage | nom. DC 270-300V ⁵⁾ ⁷⁾ -15%/+25% | DC 280-300V ⁵⁾ ⁷⁾ -15%/+25% | DC 270-300V ⁵⁾ ⁷⁾ -15%/+25% | DC 600V ⁵⁾ ⁷⁾ ¹⁾ -25%/+35% | 18-32.4Vdc 14-35Vdc *) |
| Efficiency ¹¹⁾ | typ. 89.5/90.5% | 89.0/90.0% | 91.0/92.0% | 91.5/91.6% | 90.5% |
| Power Losses ¹²⁾ | typ. 10.5/9.1W | 14.9/13.5W | 23.7/21.2W | 22.5/22.0W | 12.7W |
| MTBF ⁶⁾ | typ. 1942 kh | 1222 kh | 869 kh | 1220 kh | 1247 kh |
| Operational Temperature Range | min. -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -10°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | min. 2W/°C | 3W/°C | 6W/°C | 6W/°C | 3W/°C |
| Dimensions WxHxD ⁷⁾ | nom. 49x124x102mm | 73x124x102mm | 91x124x102mm | 129x124x117mm | 40x124x102mm |
| Connection Terminals | screw terminals | screw terminals | screw terminals | screw terminals | screw terminals |
| Weight | max. 500g | 650g | 890g | 1160g | 500g |
| Ground-Fault Monitor | no | yes | no | no | no |
| IR- Addressing Mode | yes | yes | yes | yes | no |
| Parallel Use | no | no | no | no | no |
| Series Connection ⁹⁾ | no | no | no | no | no |
| Bracket for Wall/Panel Mounting | SLZ02 | SLZ02 | SLZ02 | SLZ02 | ZM1.WALL |
| Bracket for Side Mounting | – | – | – | – | ZM12.SIDE |
| Special Features | | ground-fault monitor included | | | |
| Order Number | SLA3.100 | SLA4.100 | SLA8.100 | SLA8.300 | SLAD4.100 |

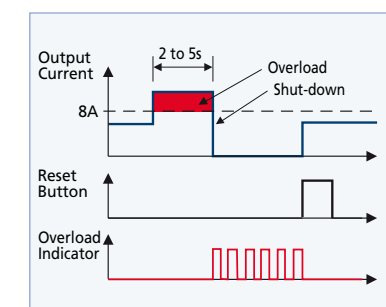
*) See datasheet for details. ¹⁾ Valid for 120/230Vac, 400/480Vac or 24Vdc (depending on the unit) and nominal load, ²⁾ Manual-select by slide-switch
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.

Protection:

To protect the relatively thin AS-Interface®-cable the 8A units are equipped with an electronic fuse which switches off the output in an overload situation. The output of the 4A power supply has an integrated ground fault monitor included which reports unsafe communication. The 2.8A unit fulfills the NEC Class 2 requirement which is important for applications within the USA.



SLA4.100 with ground-fault monitor for early failure recognition.



FUSE-Mode: All 8A units are equipped with an electronic fuse which switches off the output in an overload situation.

Fast addressing of slaves:

The "IR addressing mode" is selectable via a jumper and interrupts the data communication on the yellow AS-Interface®-cable. During this process, the slaves are still supplied with voltage and can be programmed locally with the infrared interface. This saves a lot of time during installation and service work.



Easy commissioning: Supports addressing via infrared programming device.

DC/DC converter:

Brand new: The 4A DC/DC converter for the AS-Interface® system, which can be supplied from the regular 24V-bus voltage. This means that hazardous power

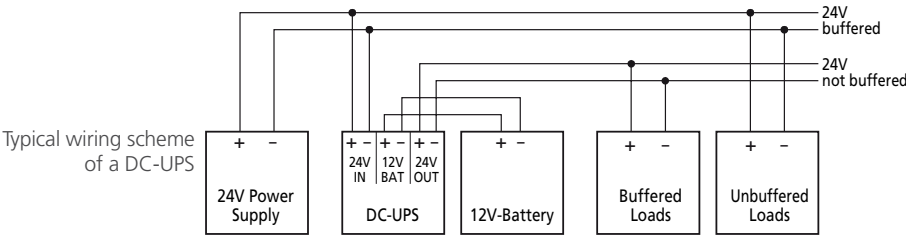


line voltages can be avoided on machines. Furthermore, large voltage drops on long cable runs can be restored. This converter provides the required AS-Interface® voltage and has a data-decoupling circuit included.

SLAD4.100 DC/DC converter with 24V input voltage for decentralized applications.

DC-UPS's

A DC-UPS (DC- Uninterruptable Power Supply) is a supplementary device for regulated power supplies and can bridge voltage interruptions on 24V-buses. The energy storage element is one external or integrated VRLA battery. The unique feature of the PULS DC-UPS is the “1-Battery-Concept”, which achieves the longest service life for batteries. For the individual demands of different applications, several DC-UPS controller units are available. PLC's or industrial PC's only require buffering for a few minutes. Therefore, the UBC10.241 or UB10.241 in combination with small batteries provide an optimal solution. Security systems and remote applications often require buffer times of up to 72 hours. For these purposes, the UB10.242 can be used with batteries up to 130Ah. A DC-UPS with an integrated 12V output is also available.



| DC-UPS's | | | | Internal Battery | | External Battery | | External Battery | |
|---|---------------|---------------|-----------|----------------------------------|--|----------------------------------|--|--------------------------------|----------------------------------|
| | | | | 24V 10A | | 24V 10A | | 24V 10A | |
| Family | | | | DIMENSION-U | | DIMENSION-U | | DIMENSION-U | |
| Input Voltage Range | | | | 22.5-30V | | 22.5-30V | | 22.5-30V | |
| Output Voltage | Normal-mode | nom. | | same as input voltage #) | | same as input voltage #) | | same as input #) | 12V±1% |
| | | | | | | | | | |
| Output Current | Normal-mode | nom. | | 15A | | 15A | | 15A ①) | 5A |
| Output Power | Normal-mode | nom. | | 360W | | 360W | | 360W ①) | 60W |
| Overload Behaviour | Normal-mode | | | continuous current | | continuous current | | cont. current | cont. current |
| Output Voltage | Buffer-mode | nom. | | 22.5V ③) | | 22.5V ③) | | 22.5V ③) | 12V ±1% |
| Output Current | Buffer-mode | continuous | nom. | 10A | | 10A | | 10A ①) | 5A |
| | Buffer-mode | < 5s | nom. | 15A | | 15A | | 15A ①) | 5A |
| Output Power | Buffer-mode | continuous | min. | 240W | | 240W | | 240W ①) | 60W |
| Overload Behaviour | Buffer-mode | | | Shut-down after 5s | | Shut-down after 5s | | Shut-down > 5s | cont. current |
| Battery | | | | intern: 1x 12V | | extern: 1x 12V | | extern: 1x 12V | |
| Allowed Battery Size | | | | approx. 5Ah (90x70x106mm) | | ≥3.9Ah; ≤40Ah ④) | | ≥3.9Ah; ≤40Ah ④) | |
| Charging Current into 12V Battery | | | typ. | 1.5A | | 1.5A | | 3.0A | 1.5A |
| Temperature Tracking of the End-of-Charge Voltage | | | | automatic | | manual | | manual / automatic | |
| Charging Time | | | typ. | 3h | | 5h / 17h (7Ah / 26Ah) | | 9h / 34h (26Ah / 100Ah) | 5h / 17h (7Ah / 26Ah) |
| Buffer Time | 5Ah Battery | Load 24V 10A | min./typ. | 4 minutes 54s / 6 minutes 15s ③) | | 4 minutes 54s / 6 minutes 15s ③) | | – | 4 minutes 45s / 6 minutes ③) |
| | 7Ah Battery | Load 24V 10A | Min./typ. | – | | 5 minutes 42s / 6 minutes 45s ③) | | – | 5 minutes 30s / 6 minutes 30s ③) |
| | 26Ah Battery | Load 24V 10A | min./typ. | – | | 39 minutes / 55 minutes ③) | | 39 minutes / 55 minutes ③) | 37 minutes / 53 minutes ③) |
| | 100Ah Battery | Load 24V 10A | min./typ. | – | | – | | 3h 5 minutes / 4h 7 minutes ③) | – |
| | 100Ah Battery | Load 24V 0.5A | min./typ. | – | | – | | 62h / 82h ③) | – |
| MTBF ⑤) | | | typ. | 886 kh (battery excluded) | | 886 kh | | 886 kh | 788 kh |
| Operational Temperature Range | | | min. | 0°C to +40°C | | -25°C to +70°C | | -25°C to +70°C | -25°C to +70°C |
| Derating | | | min. | – | | > 60°C: 0.25A/°C | | – | > 50°C: 0.25A/°C |
| Dimensions WxHxD ⑦) | | | nom. | 123x124x119mm | | 49x124x117mm | | 49x124x117mm | 49x124x117mm |
| Weight | | | max. | 2850g | | 530g | | 545g | 650g |
| Parallel Use | | | | no | | no | | no | |
| Bracket for Wall/Panel Mounting | | | | ZM1.UBC10 | | ZM1.WALL | | ZM1.WALL | ZM1.WALL |
| Bracket for Side Mounting | | | | – | | – | | – | – |
| Order Number | | | | UBC10.241 UBC10.241-N1*) | | UB10.241 | | UB10.242 | UB10.245 |

*) UBC10.241-N1 battery not included #) Minus the input to output voltage drop, see curves on the right page.
④) 40Ah are valid for units with a serial number higher than 5357527. Earlier units can be used with batteries up to 27Ah.
③) See curves on the right page and on page 37 ①) Lower when 12V-output is loaded. See datasheet for details.
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44.
Visit www.pulspower.com for detailed datasheets.



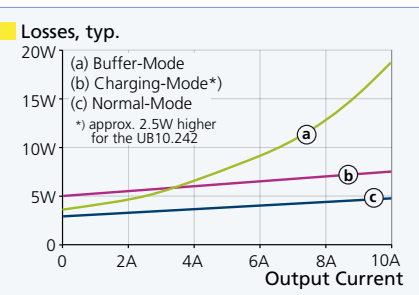
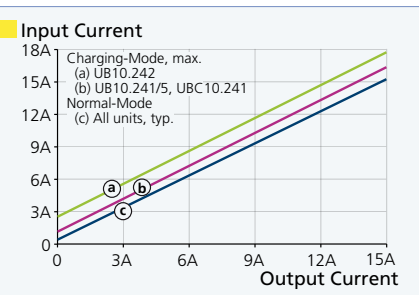
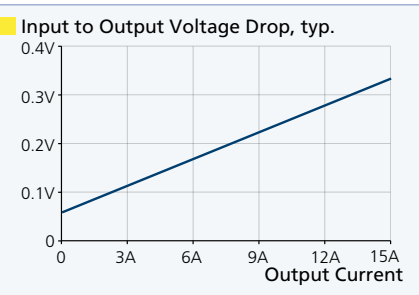
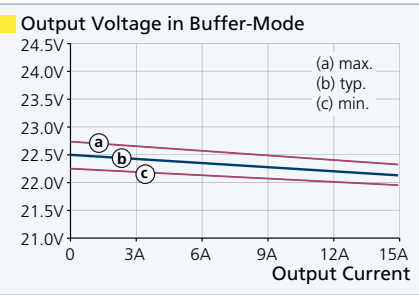
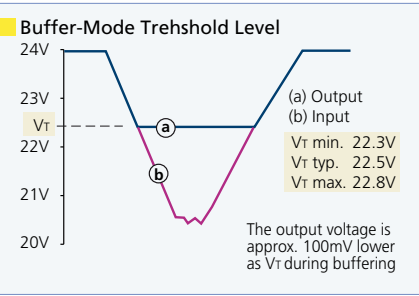
UB10.241
DC-UPS controller for external batteries



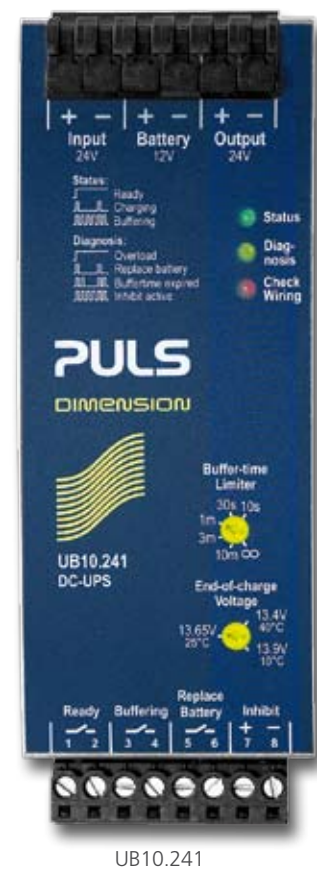
UBC10.241
DC-UPS with integrated battery

DC-UPS advantages:

- Requires only one 12V-battery to buffer 24V circuits
- Easy battery replacement, no matched batteries required
- Stabilised output voltage in buffer mode
- No dips of the DC-voltage during transition from normal to buffer mode
- Superior battery management for longest battery service life
- Output is decoupled from the input to separate load circuits into buffered and non buffered sections
- Electronically overload protected
- Reverse polarity protection for battery input
- Extensive and smart diagnostics and monitoring functions
- “Replace Battery” signal included
- Selectable buffer time limiter



Battery Service Life and the PULS “1-Battery-Concept”



Boosting the 12V to a 24V level is very beneficial. The end-of-charge-voltage can be precisely set to the battery needs and the overcharging that can occur with a series connected batteries can be eliminated. Battery replacement is also easy since it is not necessary to find matched batteries. To achieve the longest battery service life, the DC-UPS can be set to the expected battery temperature which optimises the end-of-charge-voltage. It is recommended to place the batteries in cool locations and not inside hot cabinets. The UBC10.241 and the UB10.242 units also have a temperature sensor included which automatically adjusts the end-of-charge-voltage according to the ambient temperature.

Battery monitoring

Thanks to the “1-battery-concept,” defective batteries can be detected much earlier and safer than if two batteries are used in series. Various battery and wiring tests periodically monitor the battery quality and report if the battery becomes defective.

Buffer time limiter extends battery life

Buffer only as long as you really need to. Each discharge of the battery reduces the number of discharging cycles. Therefore, the DC-UPS is equipped with a buffer time limiter, which prevents the battery from being discharged too much. The limitation can be selected with a rotary switch or be activated through the inhibit input.

Self explanatory user interface

Many parameters are fixed or automatically adjusted. This avoids accidental misuse or unwanted manipulation of the unit.

Diagnostic and monitoring functions

The green LED shows if the DC-UPS is in charging or in buffer mode. The yellow LED helps troubleshooting if something does not work as expected and the red LED reports if an immediate action is required (e.g. missing fuse or wiring error in the battery path). Several relay contacts are available for remote monitoring of the unit.

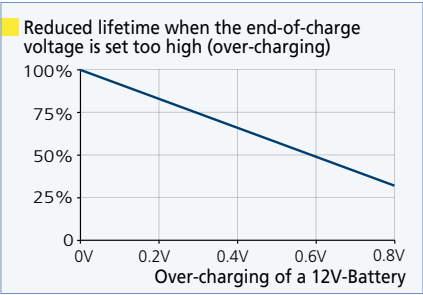
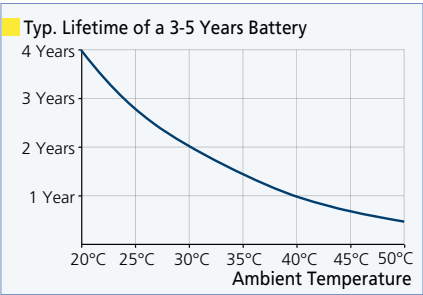
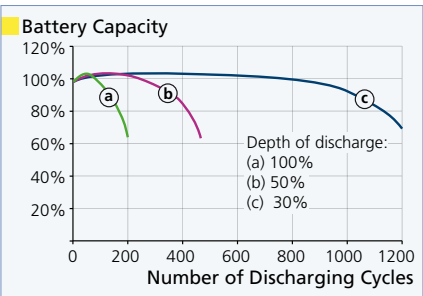
- Ready contact: reports correct input voltage, correct wiring and that the battery is more than about 85% charged.
- Buffering contact: DC-UPS is in buffer mode
- Replace Battery contact: reports that the battery needs to be replaced due to an unexpected battery failure or defective wiring in the battery path.

Protection features

A comprehensive protection package is built into the DC-UPS to detect reverse polarities, incorrect battery voltage or high temperatures and avoids deep-discharging of the battery. The output is electronically protected against overload and short-circuit.

Battery service life according to EUROBAT

The EUROBAT guideline may tempt you not to replace the batteries soon enough. The service life of batteries according to the EUROBAT guideline is valid for 20°C, exact end-of-charge voltage and without any discharging cycles. The EUROBAT number should be modified by taking the stress factors of the real application into consideration. For example, the battery life is halved when the temperature is 10°C warmer and 100 cycles are applied.



Batteries and Battery Modules

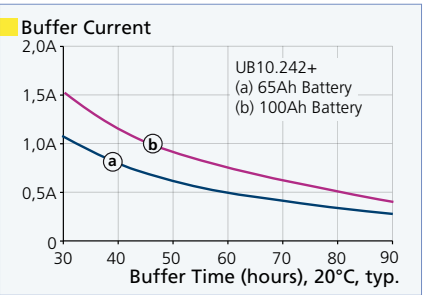
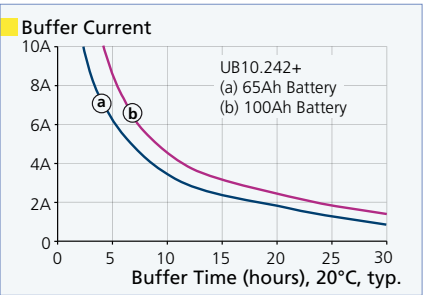
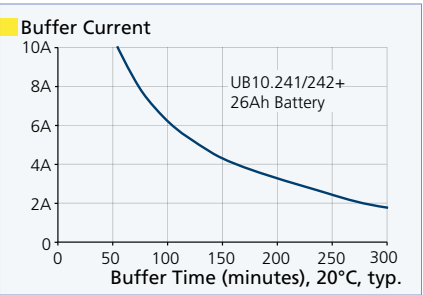
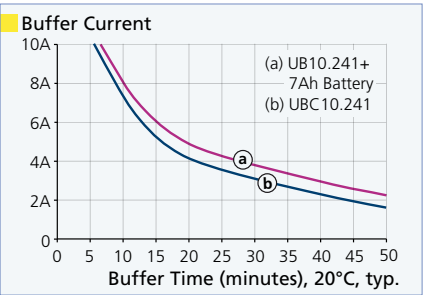
All battery modules use maintenance-free VRLA (Valve-Regulated Lead-Acid) batteries. Battery modules are available with or without batteries included. Batteries which are not in use age much slower when they are fully charged. Therefore, PULS recharges all batteries before delivery, saving the user from having to do so. Storage of up to 9 months is possible without any further recharging. A user can purchase batteries from different suppliers. In this case check the allowed battery sizes, the maximum charging and discharging currents and ensure to incorporate a fuse (close to the battery) between the battery and the controller unit. Optionally, even car batteries can be used but the performance can deviate slightly compared to VRLA batteries.



| | Battery Modules | | Battery Replacements | | |
|--------------------------|-------------------------|-------------------------|----------------------|-------------|---------------|
| Battery Voltage | 12V | 12V | 12V | 12V | 12V |
| Battery Size | 7Ah | 26Ah | 5Ah | 7Ah | 26Ah |
| DIN-Rail Mounting | yes | no | – | – | – |
| Wall / Panel Mounting | yes | yes | – | – | – |
| Dimensions WxHxD | 155x124x112mm | 214x179x158mm | 70x106x90mm | 151x95x65mm | 166x125x175mm |
| Weight | 3200g | 9920g | 2000g | 2700g | 9300g |
| Operational Temp. Range | 0 to +40°C | 0 to +40°C | 0 to +40°C | 0 to +40°C | 0 to +40°C |
| Battery Service Life **) | 3-5 years | 10-12 years | 3-5 years | 3-5 years | 10-12 years |
| Battery Replacement for | – | – | UBC10.241 | UZK12.071 | UZK12.261 |
| Order Number | UZK12.071 UZO12.07*) | UZK12.261 UZO12.26*) | UZB12.051 | UZB12.071 | UZB12.261 |

*) Module without battery included
**) According to EUROBAT guideline; Replacement intervals are temperature dependent, also see information on left page.

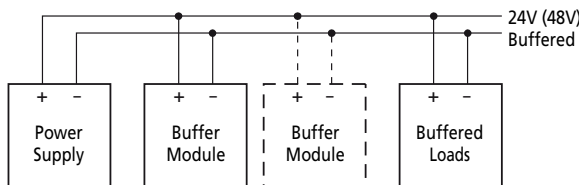
Achievable
Buffer
Times:





Capacitor Buffer Modules

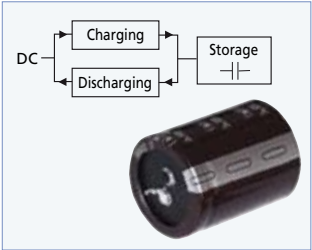
Buffer modules are supplementary devices for 24Vdc or 48Vdc regulated power supplies. They deliver power to bridge failures of the DC voltage supply or extend the hold-up time after loss of the AC power. Service-free electrolytic capacitors are used for storing the energy. This allows the use even at temperatures up to 70°C. A required periodic replacement of lead-acid-batteries is not necessary for these capacitors.



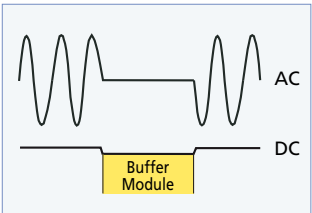
Typical wiring scheme of a buffer module. Multiple units can be used in parallel to increase the buffer current or to extend the buffer time.

| Capacitor Buffer Modules | | | 24V | 48V |
|--|---------------|------|--|--|
| Family | | | 24V 20A 310ms | 48V 20A 150ms |
| Input Voltage Range | | | 24-28.8V | 48-56V |
| Input Current | Stand-by-mode | typ. | 80mA | 40mA |
| | Charging-mode | max. | 600mA | 500mA |
| Buffer-mode Transition Threshold | | | selectable: 22.5V fixed or variable by a voltage drop of 1V = threshold voltage for buffering | selectable: 45V fixed or variable by a voltage drop of 2V = threshold voltage for buffering |
| Output Voltage in Buffer-mode | | | nom. | nom. |
| Buffer Current | | | 20A | 20A |
| Buffer Time | | | min. | min. |
| | | | typ. | typ. |
| Power Losses in Stand-by-mode | | | 1.9W | 1.9W |
| Charging Time | | | 18s | 21s |
| MTBF ⁶⁾ | | | 2327 kh | 2348 kh |
| Operational Temperature Range | | | -25°C to +70°C | -25°C to +70°C |
| Derating +60°C to +70°C | | | min. | min. |
| Dimensions WxHxD ⁷⁾ | | | 64x124x102mm | 64x124x102mm |
| Connection Terminals | | | spring terminals ^{*)} | spring terminals |
| Weight | | | 740g | 740g |
| Control Input | | | inhibit | inhibit |
| Output Signals | | | ready, active (buffering) | ready, active (buffering) |
| Parallel Use for Extended Current or Buffer Time | | | yes | yes |
| Bracket for Wall/Panel Mounting | | | UF20: ZM1.WALL | ZM1.WALL |
| Bracket for Side Mounting | | | UF20: ZM14.SIDE | ZM14.SIDE |
| Storage element | | | built-in electrolytic capacitors | built-in electrolytic capacitors |
| Order Number | | | UF20.241 SLV20.200*) | UF20.481 |

*) Unit in SilverLine look with power port (screw terminals) located on the bottom of the unit. Fold out the back page to find the appropriate footnotes. Information regarding standards and approvals can be found on pages 42 to 44. Visit www.pulspower.com for detailed datasheets.



The stored energy of the electrolytic capacitors is released slowly into the load when there is a loss on the DC-bus.



Statistically, 80% of all mains failures last less than 200ms.



The status LED reports if the unit is in ready, charging or in buffer mode.



Signal outputs and "Inhibit" input.

Buffer module advantages:

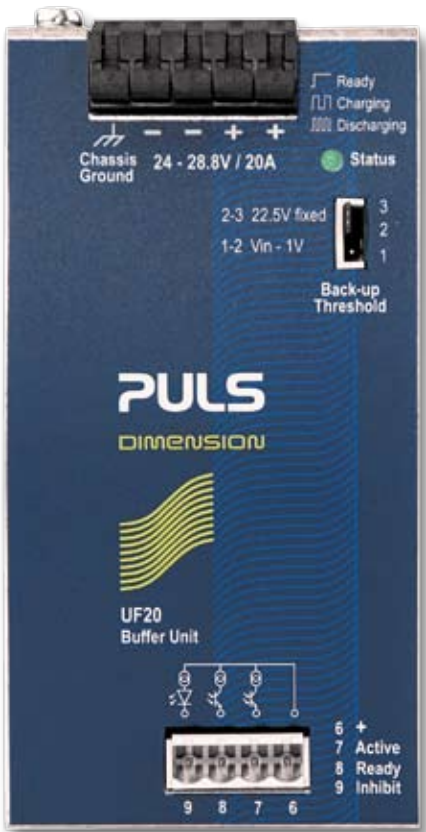
- Energy storage with electrolytic capacitors
- No service needed for the entire life span
- Can be used up to +70°C
- Stabilised output voltage in buffer mode
- No dips of the DC voltage during transition from normal to buffer mode
- Multiple units can be used in parallel to gain a longer buffer time or to increase the buffer current
- Selectable back-up behaviour: Buffering starts below a fixed voltage or by voltage decrease of a certain number of volts. LED and transistor outputs to report the status of the unit.
- "Inhibit" input to disable buffering

Suitable power supplies:

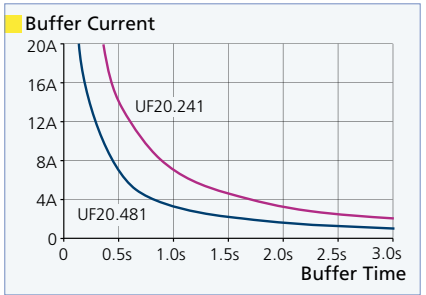
All 24V or 48V power supplies >15W are suitable to extend the hold-up time after loss of the AC-power or to deliver extra current to support peak load demands. Do not use the following power supplies in combination with buffer modules for bridging short mains outages:

CD5, CS5, CS10, QS20, QS40 and SL40

Capacitor Buffer Modules 24V and 48V



UF20.241

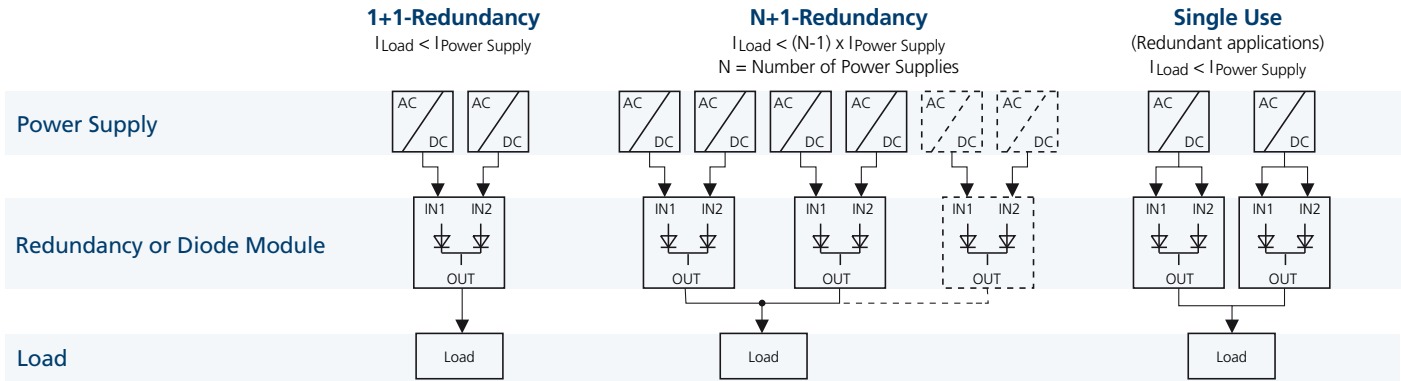




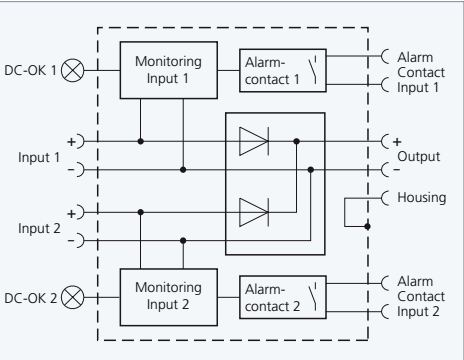
Redundant Power Supply Systems

| Redundancy Modules | | | Diode Modules | | Redundancy Modules | | |
|---------------------------------|-----------------|------|------------------|------------------|--------------------|-----------------------------|-----------------------------|
| | | | 2x 5A | 2x 10A | 2x 10A | 2x 30A | 1x 40A |
| Family | | | MiniLine | DIMENSION-Y | DIMENSION-Y | SilverLine | SilverLine |
| Nominal Voltage | nom. | | 10-60Vdc | 10-60Vdc | 24-60Vdc | 24-28Vdc | 24-28Vdc |
| Number of Inputs | | | 2 | 2 | 2 | 2 | 1 |
| Number of Outputs | | | 1 | 1 | 1 | 1 | 1 |
| Input Current | 1+1 Mode | nom. | 2x 8A | 2x 12.5A | 2x 12.5A | 2x 30A | 40A |
| | N+1 Mode | nom. | 2x 5A | 2x 10A | 2x 10A | 2x 15A | 40A |
| | Single Use | nom. | 10A | 20A | 20A | 30A | 40A |
| Output Current | Nominal | nom. | 10A | 20A | 20A | 30A | 40A |
| | Overload | max. | 16A | 25A | 25A | 64A*) | 54A |
| Voltage Drop | Input to Output | typ. | 0.9V | 0.85V | 0.85V | 0.5V | 0.5V |
| Power Losses | No Load | typ. | 0W | 0W | 1W | 1.6W | 1.1W |
| | Nominal Load | typ. | 9W at 10A | 17W at 20A | 18W at 20A | 13.2W at 30A | 19.2W at 40A |
| MTBF 6) | typ. | | 85 Mio. h | 47 Mio. h | 9.1 Mio. h | 4.7 Mio. h | 5.2 Mio. h |
| Operational Temperature Range | min. | | -40°C to +70°C | -25°C to +70°C | -25°C to +70°C | -10°C to +70°C | -10°C to +70°C |
| Derating +60°C to +70°C | min. | | 0.25A/°C | 0.5A/°C | 0.5A/°C | 0.7A/°C | 1A/°C |
| Dimensions WxHxD 7) | nom. | | 45x75x91mm | 32x124x102mm | 32x124x117mm | 48x124x102mm | 48x124x117mm |
| Connection Terminals | | | spring terminals | spring terminals | screw terminals | screw terminals | screw terminals |
| Weight | max. | | 140g | 290g | 350g | 640g | 650g |
| Under-Voltage Monitor | | | no | no | 21.5V | adjustable between 16 & 27V | adjustable between 16 & 27V |
| Over-Voltage Monitor | | | no | no | no | 30.7V ±5% | 30.7V ±5% |
| Alarm Signals | | | no | no | 2 relay contacts | 2 relay contacts | relay contact |
| Bracket for Wall/Panel Mounting | | | included | ZM1.WALL | ZM1.WALL | SLZ02 | SLZ02 |
| Bracket for Side Mounting | | | – | ZM11.SIDE | ZM11.SIDE | – | – |
| Order Number | | | MLY02.100 | YR2.DIODE | YRM2.DIODE | SLR02 | SLR01 |

*) Above 30A, both output terminals must be used.
Fold out the back page to find the appropriate footnotes.
Information regarding standards and approvals can be found on pages 42 to 44. Visit www.pulspower.com for detailed datasheets.



MLY02.100 YR2.DIODE YRM2.DIODE SLR01 SLR02



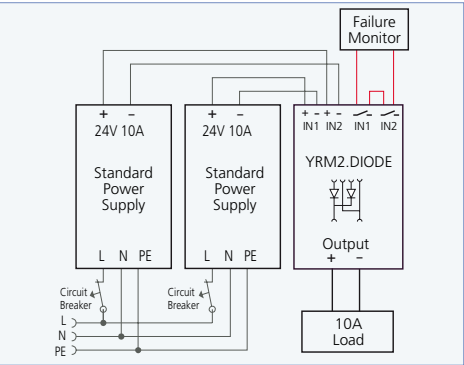
Functional diagram YRM2.DIODE

Diode modules

Diode modules only contain decoupling diodes and are the optimal solution to use in redundant systems, when the power supply itself is already equipped with a DC-OK signal contact.

Redundancy modules

Redundancy modules contain decoupling diodes as well as a monitoring circuit. LEDs and relay contacts signal when the input voltage of the module is not in range due to a power supply failure. This allows remote monitoring.



Wiring scheme of a 10A redundant system with the redundancy module YRM2.DIODE

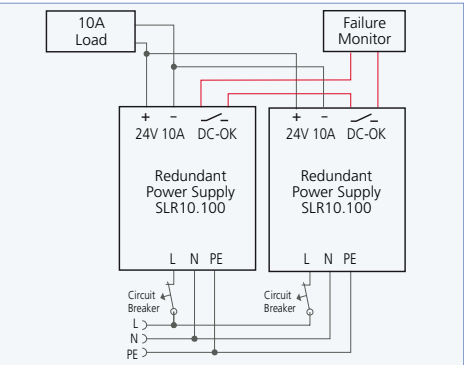
Parallel use of power supplies

All power supplies, even those which are not specified for parallel use in the product tables in this catalogue, can be used to build 1+1-redundancy applications. Please note that this is not valid for N+1 redundancy applications.

Redundant power supplies

Redundant power supplies have decoupling diodes. A DC-OK signal contact and plug-connectors are also included.

| | | | |
|-----------|---------|-----------|---------|
| SLR2.100 | 1-Phase | 24V, 2.5A | Page 13 |
| SLR5.100 | 1-Phase | 24V, 5A | Page 15 |
| SLR10.100 | 1-Phase | 24V, 10A | Page 17 |



Wiring scheme of a 10A redundant system with two redundant power supplies SLR10.100

| | CE | UL 508 (U.S.A.) | UL 508 (Canada) | CSA 22.2 No 107.1-01 | UL 60950-1 | UL1604 Class I Div 2 | UL 61010-1 | EN 60079-15 (ATEX) | NEC-Class-2 | CB-Scheme IEC 60950-1 | CB-Scheme IEC 60601 | GL Germanischer Lloyd | CCC (China) | Device Net, ODVA Approval | SEMI F47 | AS-Interface Approval | EN 61000-3-2 (PFC) | EN 61000-3-3 (Flicker) | EN 61000-6-1 (EMC-Immunity) | EN 61000-6-2 (EMC-Immunity) | EN 61000-6-3 (EMC-Emission) | EN 61000-6-4 (EMC-Emission) | EN 55011 / EN 55022 Class B |
|-------------|----|-----------------|-----------------|----------------------|------------|----------------------|------------|--------------------|-------------|-----------------------|---------------------|-----------------------|-------------|---------------------------|----------|-----------------------|--------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| CD5.121 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CD5.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CD5.241-L1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CD5.241-S1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CD5.242 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CD5.243 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| CS3.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS5.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS5.241-C1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS5.241-S1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS5.243 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • |
| CS5.244 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS10.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS10.241-S1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS10.242 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS10.243 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • |
| CS10.244 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CS10.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CT5.121 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CT5.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CT10.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CT10.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML15.051 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML15.121 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML15.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML30.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML30.101 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML30.102 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML30.106 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.101 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.102 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.105 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.109 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML50.111 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML70.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML90.200 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML95.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML100.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML100.102 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML100.105 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML100.109 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| ML100.200 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| MLY02.100 | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| QS3.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS5.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS5.DNET | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS10.121 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS10.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS10.241-C1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS10.301 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS10.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |

| | CE | UL 508 (U.S.A.) | UL 508 (Canada) | CSA 22.2 No 107.1-01 | UL 60950-1 | UL1604 Class I Div 2 | UL 61010-1 | EN 60079-15 (ATEX) | NEC-Class-2 | CB-Scheme IEC 60950-1 | CB-Scheme IEC 60601 | GL Germanischer Lloyd | CCC (China) | Device Net, ODVA Approval | SEMI F47 | AS-Interface Approval | EN 61000-3-2 (PFC) | EN 61000-3-3 (Flicker) | EN 61000-6-1 (EMC-Immunity) | EN 61000-6-2 (EMC-Immunity) | EN 61000-6-3 (EMC-Emission) | EN 61000-6-4 (EMC-Emission) | EN 55011 / EN 55022 Class B |
|-------------|----|-----------------|-----------------|----------------------|------------|----------------------|------------|--------------------|-------------|-----------------------|---------------------|-----------------------|-------------|---------------------------|----------|-----------------------|--------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| QS10.DNET | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS20.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS20.241-C1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS20.244 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS20.361 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS20.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QS40.244 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT20.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT20.241-C1 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT20.361 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT20.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT40.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QT40.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| QTD20.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| SL2.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL5.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL5.300 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL10.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL10.300 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL10.309 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL20.310 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SL40.301 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLA3.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLA4.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLA8.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLA8.300 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLAD4.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| SLD2.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| SLR01 | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| SLR02 | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| SLR2.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLR5.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLR10.100 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| SLV20.200 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| UB10.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| UB10.242 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| UB10.245 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| UBC10.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| UF20.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| UF20.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| XT40.241 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.242 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.361 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.362 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.481 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.482 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.721 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| XT40.722 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| YR2.DIODE | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |
| YRM2.DIODE | • | • | • | • | • | • | • | • | n.a. | • | • | • | • | • | • | • | n.a. | n.a. | • | • | • | • | • |

n.a.: not applicable

Approvals may be pending on new products. Please contact PULS for additional information.



Germanischer
Lloyd, Marine



China Compulsory
Certification

DeviceNet

SEMI F47

AS-Interface®



ATFX

Safety Standards

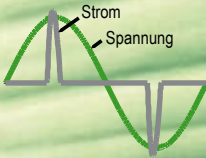
| | |
|------------------------|--|
| IEC 61203 / EN 50178 | Electronic equipment in power installations |
| EN 50272-2 | Safety requirements for secondary batteries and battery installations – Part 2: stationary batteries |
| IEC/EN 60204-1 | Safety of electrical equipment of machines |
| IEC/EN/UL 60950-1 | Safety of information technology equipment |
| IEC/EN/UL 60601-1 | Safety of medical equipment |
| IEC/EN 61204 | Low-voltage power supply devices, DC-output |
| IEC/EN 61800-5 | Adjustable speed electrical power drive systems – Part 5: Safety |
| IEC/EN 61131-2 | Programmable controllers – Part 2: Equipment requirements and tests |
| EN 61558-2-17 | Safety of power transformers for switch-mode power supplies |
| EN 60079-15 | Electrical apparatus for explosive gas atmospheres (ATEX) – Part 15: Construction, test and marking of type of protection “n” electrical apparatus |
| Class I Div 2 (HazLoc) | Approval for the use in Class I Division 2 Groups A, B, C, D hazardous locations. Certification according to UL 1604 or ANSI/ISA–12.12.01 |
| CSA 22.2 No. 107 | Canadian standard: CSA C22.2 No 107.1-01 Rectifying equipment, commercial and industrial power supplies |
| UL 508 | Industrial control equipment |
| UL 1310 | Class 2 power units |
| UL 1604 | Electrical equipment for use in Class I and II, Division 2 and Class III hazardous locations. |
| UL 61010 | Standard for safety; electrical equipment for measurement, control, and laboratory use |

EMC Standards

| | |
|------------------|---|
| IEC/EN 61000-3-2 | EMC, Limits for harmonic current emission (“PFC-Norm”) |
| IEC/EN 61000-3-3 | EMC, Limitation of voltage changes, voltage fluctuations and flicker |
| IEC/EN 61000-6-1 | EMC, Generic immunity standard for residential and commercial environment |
| IEC/EN 61000-6-2 | EMC, Generic immunity standard for industrial environment |
| IEC/EN 61000-6-3 | EMC, Generic emission standard for residential and commercial environment |
| IEC/EN 61000-6-4 | EMC, Generic emission standard for industrial environment |
| IEC/EN 61204-3 | Low-voltage power supply devices, DC-output – Part 3: electromagnetic compatibility |
| IEC/EN 61800-3 | Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods |
| EN 55011 | Industrial, scientific and medical (I.S.M.) radio frequency equipment – Radio disturbance characteristics |
| EN 55022 | Information technology equipment (I.T.E.) radio frequency equipment – Radio disturbance characteristic |
| EN 55024 | Information technology equipment – Immunity characteristics – Limits and methods of measurement; replaced by EN 61000-6-1 |
| EN 50081-1 | Emission standard for residential and commercial environment; replaced by EN 61000-6-3 |
| EN 50081-2 | Emission standard for industrial environment; replaced by EN 61000-6-4 |
| EN 50082-1 | Immunity standard for residential and commercial environment; replaced by EN 61000-6-1 |
| EN 50082-2 | Immunity standard for industrial environment; replaced by EN 61000-6-2 |
| FCC Part 15 | Federal Communications Commission; EMC requirements for radio frequency devices |

SEMI F47

Class 2
<100W <8A



SEMI F47

SEMI (Semiconductor Equipment and Materials International) is an organisation supporting the semiconductor industry worldwide. The SEMI F47 specification defines levels of input voltage sags with which a semiconductor tool must operate without interruption. For example, power supplies must be able to tolerate an input voltage drop of 50% of the nominal voltage for at least 200ms. Such voltage drops can occur when large loads start or during mains voltage switching. Compatibility with these requirements is also important for other industries. Only power supplies with state-of-the-art technologies fulfill the SEMI F47 requirements. Many PULS units are approved according to this standard and bear the “F47 Power Quality Star” approval mark.

NEC Class 2

The NEC (National Electrical Code) is a North American standard which is regarded as the guideline for all electrical installations in the USA. NEC Class 2 defines voltage, current and power limits which are considered to be safe from a fire ignition standpoint and provide an acceptable protection against electric shock. An NEC Class 2 circuit has reduced requirements regarding wiring methods, insulation, wire size and over-current protection. Furthermore, the approval process of the end-application is much easier. NEC Class 2 circuits need to be powered from a listed NEC Class 2 power supply which ensures, that the output current is always below 8A and the output power is always below 100VA. These limits need to be fulfilled even under overload or during fault conditions of the unit. Extensive tests and approvals are necessary.

RoHS

Restriction of the usage of hazardous substances

The European directive 2002/95/EC limits the maximum impurity levels of homogeneous materials such as lead, mercury, cadmium, chrome 6+, polybrominated flame retardants PBB and PBDE for the use in electrical and electronic equipment. RoHS is the abbreviation for “Restriction of the use of certain hazardous substances in electrical and electronic equipment”. All items in this catalog conform to this standard.

“PFC-Norm” EN 61000-3-2

Line current harmonic content.

Typically, the input current waveform is not sinusoidal due to the periodical peak charging of the input capacitor. In industrial environments, complying with EN 61000-3-2 is only necessary under special conditions. Complying to this standard can have some technical drawbacks, such as lower efficiency as well as some commercial aspects such as higher purchasing costs. Frequently, the user does not profit from fulfilling this standard, therefore, it is important to know whether it is mandatory to meet this standard for a specific application.

The EN 61000-3-2 is not mandatory when:

- the harmonic requirements are included in a product standard which applies to the end-product;
- the input power of the power supply is below 75W. The measurement of the harmonic input current allows averaging of the total load cycle including all breaks;
- the input power of the power supply is above 1000W;
- the power supply is connected to a mains below 220V;
- the power supply is used outside the European Union;
- the power supply is connected to a mains supply with its own transformer.

Such mains supplies are considered to be non-public.

Where individual self-contained items are installed in a rack or a case (e.g. power supplies, drive system) as an assembled piece of equipment, they are regarded to be individually connected to the mains. Alternatively, it is also permitted to assess the whole rack.

This short interpretation allows a rough guide for machine designers and system integrators. It is not comprehensive and does not replace studying the standard or an in-depth analysis of the individual application.

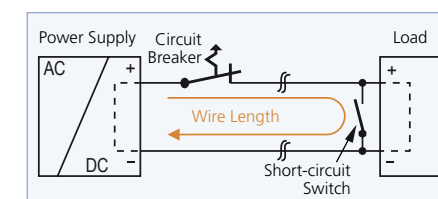
Protection of 24V Branches with Circuit Breakers



Standard miniature circuit breakers (MCB's or UL1077 circuit breakers) are without doubt, one of the most efficient and economical ways to open circuits to faulty branches. MCB's are designed to protect wires and circuits. If the ampere value and the characteristics of the MCB are

adapted to the wire size used, the wiring is considered to be thermally safe regardless of whether the MCB opens or not.

To avoid voltage dips and under-voltage situations in adjacent 24V branches which are supplied by the same source, a fast (magnetic) tripping of the MCB is desired. A quick shutdown within 10ms is necessary corresponding roughly to the ride-through time of PLC's. This requires power supplies with high current reserves and large output capacitors. Furthermore, the impedance of the faulty branch must be sufficiently small in order for the current to actually flow. The best current reserve in the power supply does not help if Ohm's law does not permit current flow. The table on the right shows typical test results of four frequently used power supplies. The test results reveal the max. wire length for a magnetic tripping depending on the wire cross section. If the use of a MCB does not bring the desired effect, an electronic circuit breaker should be used.



Test setup for tripping behaviour of circuit breakers. Don't forget that the distance to the load (= cable length) is usually half the total wire length (+ and - wire)!

Maximum wire length:

| | | 0.75mm² | 1.0mm² | 1.5mm² | 2.5mm² |
|----------------------------------|--------------|---------|--------|--------|--------|
| QS10.241 1-Phase 24V, 10A | | | | | |
| Circuit Breaker | C-2A | 20m | 30m | 46m | 78m |
| | C-3A | 17m | 25m | 33m | 50m |
| | C-4A | 11m | 16m | 21m | 37m |
| | C-6A | 5m | 7m | 11m | 16m |
| | C-8A | 2m | 3m | 4m | 7m |
| | C-10A | 1m | 2m | 3m | 5m |
| | B-6A | 13m | 18m | 26m | 47m |
| | B-10A | 4m | 6m | 10m | 16m |

| | | | | | |
|----------------------------------|--------------|-----|-----|-----|------|
| CS10.241 1-Phase 24V, 10A | | | | | |
| Circuit Breaker | C-2A | 21m | 26m | 37m | 68m |
| | C-3A | 15m | 21m | 30m | 51m |
| | C-4A | 10m | 14m | 20m | 38m |
| | C-6A | 4m | 6m | 9m | 16m |
| | C-8A | 1m | 2m | 4m | 5,5m |
| | C-10A | 1m | 2m | 3m | 4m |
| | B-6A | 13m | 18m | 26m | 42m |
| | B-10A | 4m | 5m | 9m | 11m |

| | | | | | |
|----------------------------------|--------------|-----|-----|-----|-----|
| QS20.241 1-Phase 24V, 20A | | | | | |
| Circuit Breaker | C-2A | 26m | 35m | 62m | 82m |
| | C-3A | 23m | 29m | 54m | 72m |
| | C-4A | 15m | 19m | 31m | 51m |
| | C-6A | 7m | 10m | 15m | 26m |
| | C-8A | 5m | 7m | 10m | 16m |
| | C-10A | 2m | 3m | 5m | 7m |
| | B-6A | 19m | 27m | 38m | 57m |
| | B-10A | 7m | 11m | 14m | 23m |

| | | | | | |
|----------------------------------|--------------|------|-----|-----|-----|
| QT20.241 3-Phase 24V, 20A | | | | | |
| Circuit Breaker | C-2A | 24m | 33m | 44m | 70m |
| | C-3A | 21m | 29m | 39m | 58m |
| | C-4A | 13m | 17m | 27m | 47m |
| | C-6A | 3m | 6m | 8m | 13m |
| | C-8A | 1m | 3m | 4m | 5m |
| | C-10A | 0,5m | 1m | 2m | 3m |
| | B-6A | 18m | 21m | 33m | 56m |
| | B-10A | 3m | 4m | 6m | 11m |

Power Supplies for DeviceNet® Systems

DeviceNet® is an open field bus which is used worldwide. This field bus is powered by two wires of a multi-core network cable. PULS supports the DeviceNet® system with two special power supplies. These two units are tested and approved according to the DeviceNet® Specification.

QS5.DNET 24V, 3.8A NEC-Class-2 power supply Page 14

QS10.DNET 24V, 8A NEC-Class-1 power supply Page 16

The special features of DeviceNet® power supplies:

- The nominal and overload currents are sized for the ratings of DeviceNet® cables.
- Large capacitors within the DeviceNet® network can be charged in the required time.
- After turn-on, the output voltage increases according to the DeviceNet® timing specification.
- The output voltage is adapted for the required DeviceNet® level.
- Our DeviceNet® power supplies are approved by the Open DeviceNet® Vendor Association (ODVA) and carry the approval mark "DeviceNet® Conformance Tested".

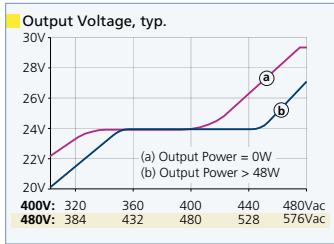


Characteristics of Semi-Regulated Power Supplies

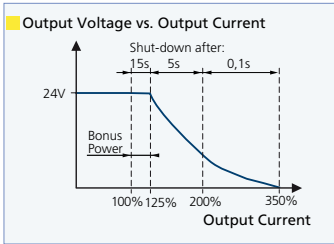
Power supplies in the PULS DIMENSION X-Series have a new and innovative concept for generating a DC voltage from a three-phase input voltage. Principal applications of the X-Series include supplies to motors, valves and other load circuits with a high power consumption, where an accurate output voltage regulation (standard on switch mode power supplies) is not required.

What does semi-regulated mean?

Transformer power supplies are normally unregulated. When the input voltage varies, the output voltage follows this change proportionally. Similar voltage fluctuations also occur when the load current changes. This is precisely where the semi-regulated concept used in the X-Series comes in. This series offers a stabilised output voltage in the core range of the input voltage (360 to 440Vac or 432 to 528Vac). The output voltage only starts to change proportionally with the input voltage if the input is outside of this core range. The minimum load requirement for a stabilised output is only 5% of the nominal load.



XT40: Output voltage versus input voltage and load current



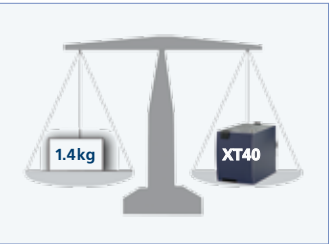
XT40: Large power reserves for dynamic consumers. A unit which has shut-down can be restarted with the reset button.

Exploit potential cost savings

The advantages of the X-Series over its competitors include its lower purchase price, and smaller enclosures allowing further savings on the total system cost. In addition transport and installation costs are significantly reduced, energy costs are lower and the cooling and ventilation requirements are reduced. These are all factors that have not been available in this form until now.

Available semi-regulated power supplies:

| | | | |
|----------|----------|------------|---------|
| XT40.241 | 3x400Vac | 24V, 40A | Page 25 |
| XT40.242 | 3x480Vac | 24V, 40A | Page 25 |
| XT40.361 | 3x400Vac | 36V, 26.6A | Page 26 |
| XT40.362 | 3x480Vac | 36V, 26.6A | Page 26 |
| XT40.481 | 3x400Vac | 48V, 20A | Page 27 |
| XT40.482 | 3x480Vac | 48V, 20A | Page 27 |
| XT40.721 | 3x400Vac | 72V, 13.3A | Page 27 |
| XT40.722 | 3x480Vac | 72V, 13.3A | Page 27 |



XT40: Weighing just 1.4 kg, the device provides 960 watts of continuous output power.



XT40: Easy diagnostic: The yellow LED reports overload, too low/high input voltage or a loss of a phase.

Conformal Coated Power Supplies

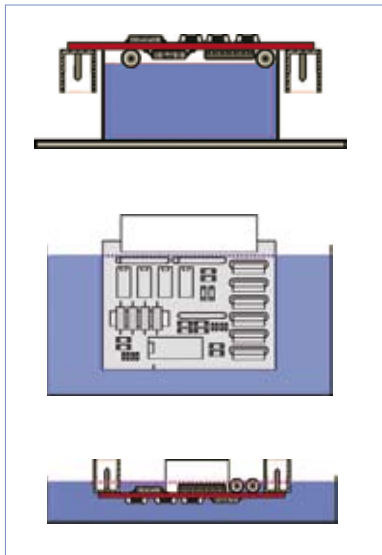
In environments where dust, contaminants, occasional high humidity, vibration or thermal shock can be expected, devices with conformal coated PC boards are recommended. A significantly higher operational safety level can be achieved by avoiding short circuits and corrosion of conductors and solder joints.

The protective coating is made with an acrylic varnish and the coating process is a dip method. Areas which are not allowed to be coated are protected by a mask (e.g. terminal blocks, fuses, potentiometers). The coating itself has no impact on the electrical performance of the power supply.

Above a certain order quantity, nearly all PULS power supplies can be equipped with conformal coating. Please contact your local PULS representative if you do not find the desired unit in the list below.

Available power supplies with conformal coated PC board:

| | | | |
|-------------|------------|-----------|---------|
| ML50.109 | 1-Ph-Input | 24V, 2.1A | Page 13 |
| ML10.109 | 1-Ph-Input | 24V, 4.2A | Page 15 |
| CS5.241-C1 | 1-Ph-Input | 24V, 5A | Page 15 |
| QS10.241-C1 | 1-Ph-Input | 24V, 10A | Page 17 |
| QS20.241-C1 | 1-Ph-Input | 24V, 20A | Page 17 |
| SL10.309 | 3-Ph-Input | 24V, 10A | Page 24 |
| QT20.241-C1 | 3-Ph-Input | 24V, 20A | Page 24 |



Dip coating process

Typical field applications are:

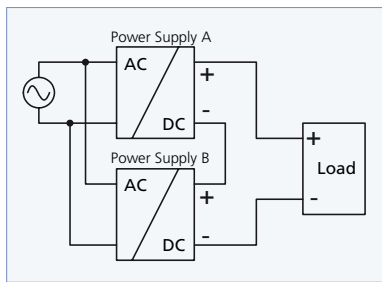
- Paper mills and paper processing industry which must be immune against all kinds of dust and electrostatic discharge.
- Railroads and construction machines with continuous vibrations and rapid temperature changes.
- Farms, where fumes (barns, silos, etc.) are present and resistance to insects is required.
- In protected outdoor areas, where moisture and condensation is occasionally present.
- Systems which are cooled with fans, resulting in extreme dust deposits.
- Subtropical regions with long lasting high humidity along with high ambient temperatures.
- Lighting, advertising displays and score boards which are located in protected outdoor areas.

Series Connection of Outputs

Many power supplies are allowed to be connected together in series to achieve higher output voltages. Check the relevant product tables in this catalogue to see if a unit is suitable for series connection or not.

Please follow these instructions for series operation:

- Use only power supplies of the same type.
- It is possible to connect as many units in series as needed, providing the sum of the output voltages dose not exceed 150Vdc.
- Voltages with a potential above 60Vdc are not SELV and can be dangerous. Such voltages must be installed with suitable protection from touching.
- Note that leakage current, EMI, inrush current and harmonics will increase when using multiple power supplies.
- Avoid installing power supplies on top of each other and keep the recommended lateral installation clearances.



Series connection of outputs to achieve higher output voltages

Mains Voltages Worldwide

| IEC 60038*) | 100V / 200V | 120V / 208V | 120/ 240V | 127V / 220V | 220V / 380V | 230V / 400V | 240V / 415V | 277V / 480V | 440V | 575V | 600V | 50, 60Hz |
|---------------|-------------|-------------|-----------|-------------|-------------|-------------|-------------|-------------|------|------|------|----------|
| Europe | | | | | | | | | | | | 50Hz |
| USA | | | | | | | | | | | | 60Hz |
| Canada | | | | | | | | | | | | 60Hz |
| Japan | | | | | | | | | | | | 50, 60Hz |
| China | | | | | | | | | | | | 50 Hz |
| India | | | | | | | | | | | | 50Hz |
| Taiwan | | | | | | | | | | | | 60Hz |
| Russia | | | | | | | | | | | | 50Hz |
| South America | | | | | | | | | | | | 60Hz |
| Africa | | | | | | | | | | | | 50Hz |

*) IEC 60038: Norm regarding IEC standard voltages

Parallel Use for Higher Output Power

Parallel use to increase the output power

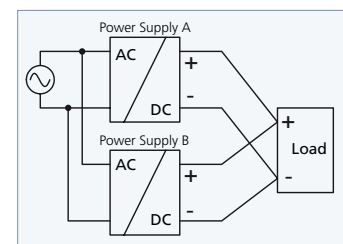
The paralleling of outputs for higher power needs is not permitted for all power supplies. Information as to which units are suitable for this purpose can be found in this catalogue in the relevant product tables. Only power supplies which are equipped with features to avoid a permanent overloading of one individual unit are suitable. Furthermore, the power supply is not allowed to enter into a "sleep mode" if a voltage is applied to the output terminals (which is automatically the case when units are connected in parallel). This could cause unexpected voltage dips when the load changes from a low level to a high level.

Why are special product features necessary?

The unit with the higher output voltage will draw as much current as it can deliver. When it then switches from the voltage-regulation-mode to current-regulation-mode, the voltage reduces and the remaining current will be delivered by the second unit. The first unit can be permanently overloaded when there are no measures to prevent this. Since many power supplies offer extra current (PowerBoost), a thermal shut-down could occur. Exact adjustment of the output voltage only helps at first, when putting the system into operation. However, after a period of time the voltages will drift (aging and thermal effects) and current sharing will no longer takes place.

Parallel use for 1+1 redundant systems or to deliver short term peak currents

For these purposes, there is no risk of a thermal overloading of one unit. All power supplies, even those which are not specified for parallel use in the product tables, can be used to build 1+1 redundant systems or to deliver short term peak current to the load when the average current is smaller than the current of one power supply. Please note that this is not valid for N+1 redundancy applications.



Parallel connection of outputs to achieve higher output power



Jumper to select between "single use" and "parallel use". Parallel use enables a current sharing between power supplies.

Features of PULS power supplies to avoid overloading of one individual unit.

■ BonusPower®:

The BonusPower® feature includes a power manager which actively limits the duration in which the power supply can deliver more than the nominal current. Since the power supply is designed for this current, there is no risk to the unit.

■ Passive current balancing:

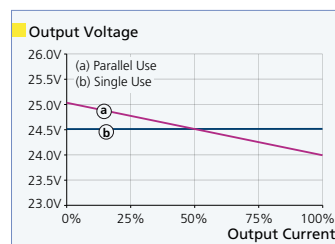
The passive current balancing feature can be activated by setting the single/parallel-use jumper into "parallel use". This feature is available on many units and results in a "soft" output characteristic. The output voltage at no load is a proximately 5% higher compared to full load. This allows the load current to be distributed equally between the individual units even when the output voltage is not adjusted to the exactly same value.

■ Active current balancing:

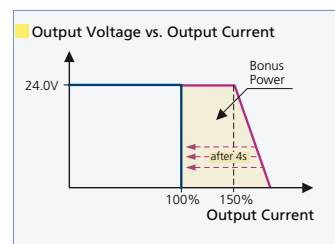
The active current balancing feature requires a current share bus on the power supply. This feature is only available on the SL40.301 unit. The current share signal terminal of all units must be linked together. An internal electronic circuit ensures exact current balancing.

Instructions for using power supplies in parallel:

- Use only power supplies of the same family.
- It is possible to connect as many units in parallel as needed. A fuse (or diode) on the output is only required if more than three units are connected in parallel. This avoids that a defective unit can become a load for the functional units.
- Note that leakage current, EMI, inrush current and harmonics will increase when using multiple power supplies.
- Avoid installing power supplies on top of each other and keep the recommended lateral installation clearances.



Parallel use: The output voltage at no load is approximately 5% higher compared to full load. The load current is distributed equally between the individual units.



The BonusPower® will be automatically reduced to the nominal output power after 4s. This avoids a permanent overloading of one of the paralleled units.

Mounting Accessories

No DIN-rail available? Is the cabinet too shallow?

Various mounting brackets are available for a direct wall or panel mounting of DIMENSION and SilverLine units. The mounting brackets ZM11.SIDE through to ZM15.SIDE are used to mount DIMENSION power supplies and other DIMENSION modules sideways to reduce the installation depth. All ordering numbers can be found in this catalogue in the product tables.



ZM1.WALL
Designed for direct panel or wall mounting of DIMENSION units



SLZ10 ... SLZ14
Mounting bracket for the S7-300 rail
Bracket: Width of unit:
SLZ10 up to 40mm
SLZ11 41 to 51mm
SLZ12 52 to 66mm
SLZ13 67 to 90mm
SLZ14 91 to 121mm



SLZ02
Designed for direct panel or wall mounting of SilverLine units

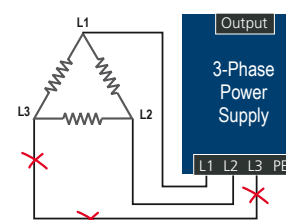


ZM11.SIDE ... ZM15.SIDE
Designed for sideways mounting of DIMENSION units. Can be used with or without DIN-rail



ZM2.WALL
Mounting bracket for panel or wall mounting of the QS40, QT40 or XT40 units

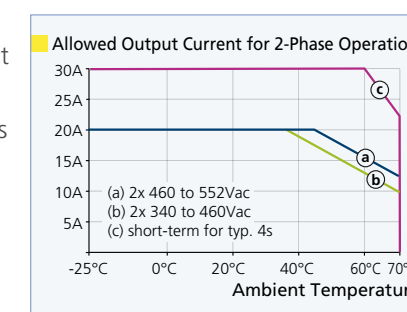
Using Only Two Legs of the Three-Phase System



There is no problem if one phase fails. All three-phase power supplies are protected against a loss of one phase. External protection circuits such as motor protectors are not required. Many units are allowed to run permanently on only two legs. For high-power units, a reduction of the output power or the maximum ambient temperature is required when the unit is permanently used on only two legs. Exceeding these limits results in a thermal shut-down. The product tables of the individual units describe the maximum output power as a percentage to which a unit can be loaded when used on only two

legs. This percentage is valid for the entire input voltage and temperature range. More details can be found in the datasheet.

Please note: An operation on only two legs slightly increases the losses. The lifetime expectancy and the MTBF figures are minimally reduced. Furthermore, the input current will be approximately 1.8-times higher.



Allowed output power for 2-phase operation (example: QT20.241)

FOOTNOTES

- 1) At nominal input voltage and nominal output load
 - 2) 50 Ohm measurement, bandwidth 20MHz
 - 3) At nominal load and the lower end of the input voltage range
 - 4) The given value describe the minimum required value of an external circuit breaker. If an external circuit breaker is required or not, can be found in the datasheet.
 - 5) Peak value and inrush energy at an ambient of 40°C and cold start
 - 6) According to SN 29500 (IEC 61709) and 230Vac (or 3x400Vac or nominal DC-voltage), nominal load and 40°C ambient temperature
 - 7) Depth without DIN-rail, dimensions without plug-connector
 - 8) Harmonic correction describes whether the input current waveform is electronically corrected (active) or smoothed with an inductor (passive) in order to reduce the amount of harmonic current. EN 61000-3-2 does not necessarily require a corrected unit.
 - 9) Valid only for the same units up to a total voltage of 150Vdc.
-
- A) The values given describe as a percentage of the maximum output power to which the unit can be loaded when one phase fails. The value is valid for the entire input voltage and temperature range. More details can be found in the datasheet and on page 51.
 - B) The unit can respond with a thermal shut-down when continuously loaded with >120W and operated with a mains voltage of 100V or below.
 - C) Selectable between continuous current and FUSE Mode® (shut-down).
 - D) During overload, unit shuts down after the following time periods:
 - 15s for output currents between 100 and 125%
 - 5s for output currents between 125 and 200%
 - 100ms for output currents > 200%To restart, press the reset button or cycle the input power.
 - E) No inrush current surge thanks to capacitor-free input stage.
 - F) After turn-off, the output voltage decreases continuously. E.g.: after 3ms and full load, 80% of the nominal output voltage is available.
 - G) Do not use the short term current / power longer than a duty cycle of 10% and/or not longer than 1 minute every 10 minutes.
 - H) Once the short term power is exceeded, the power supply responds with a time-delayed shut-down.
 - J) The power supply should not be used in parallel in order to increase the output power. However, units can be paralleled for building 1+1 redundancy systems or to deliver short-term peak currents to the load when the average current is smaller than the current of one power supply.
 - K) BonusPower® operates for typ. 4s. After this, the output power will automatically be reduced to the continuous output power level.
 - L) The short-term power is continuously allowed up to an ambient of 45°C. Do not use the short term power longer than a duty cycle of 10% and / or not longer than 1 minute every 10 minutes above 45°C.
 - M) No passive current share. One or more units can be permanently overloaded, which shortens the lifetime expectancy and MTBF. The overloaded unit can respond with thermal shut-down at temperatures above 45°C.
 - N) Set unit into parallel mode by changing the jumper position. The regulation of the output voltage is then load dependent. The output voltage at no load is approximately 5% higher compared to full load. This enables a current share between paralleled units.
 - O) Open collector transistor output, 30mA max.
 - P) Relay contact: 60Vdc 0.3A; 30Vdc 1A; 30Vac 0.5A
 - R) Resistor with automatic bypass
 - S) Additional tests might be necessary when the complete system has to be approved according to UL 508 or UL60950-1.
 - T) A supply from the intermediate DC-bus of a frequency converter is not recommended and can cause a malfunction or damage the unit.
 - U) Use appropriate external fuses in the + and – line which are suitable for the DC-voltage (e.g. KLKD from Littelfuse).



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The information presented in this catalogue is believed to be accurate and reliable and may change without notice.
All parameters are specified at the nominal input voltage, nominal output current, 25°C ambient and after a five minutes run-in time unless otherwise noted.

Products 2009-2010-EN-2 MP-300.001.16-10 B

Design by **YELLOBEE** www.yellobee.de
EAST. WEST. DESIGN.

PRODUCTS