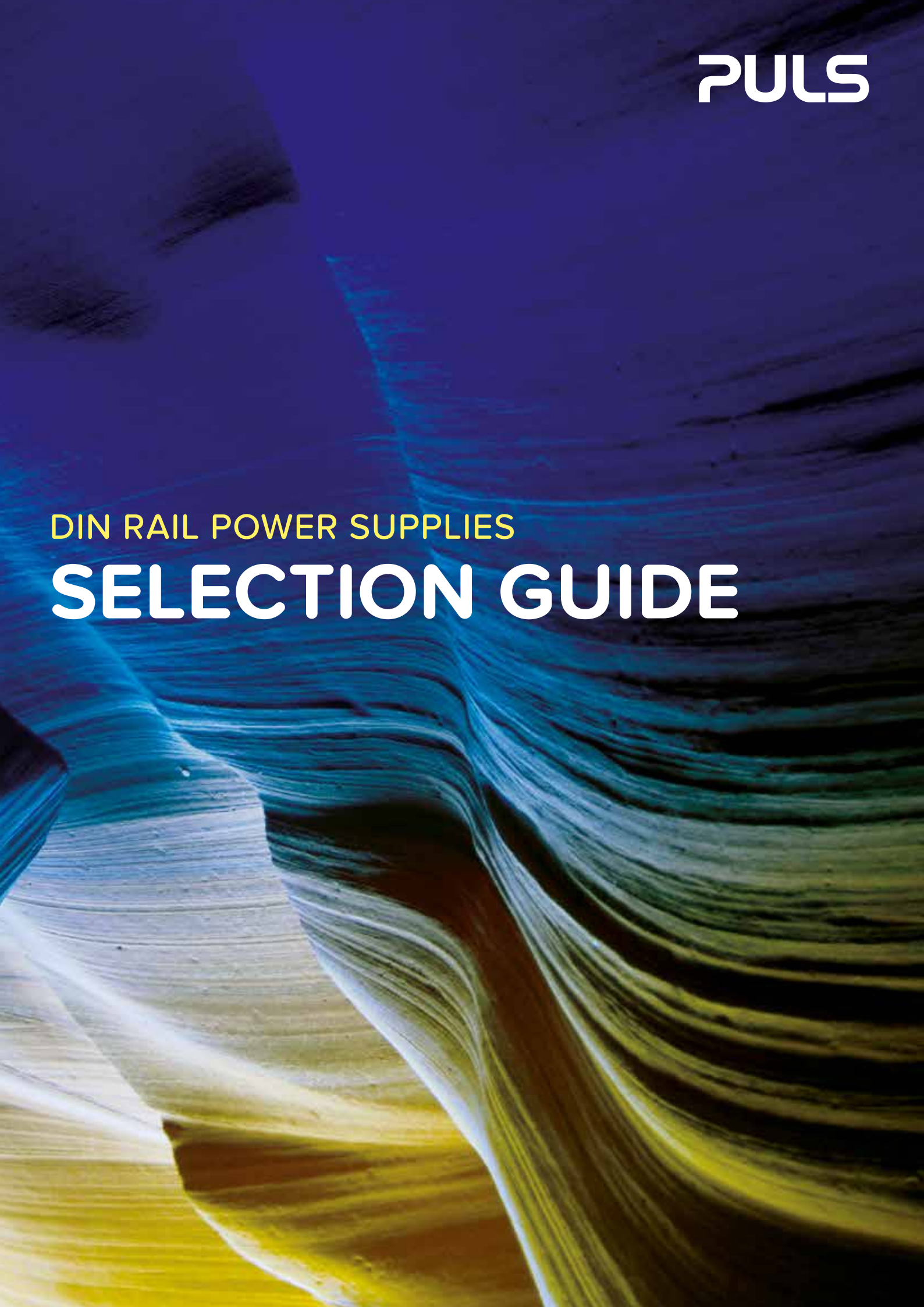


PULS

DIN RAIL POWER SUPPLIES

SELECTION GUIDE

Content

	Page
Introduction	4-5
Portfolio	6-7
New Products	8-11
Overview	12-16
Power Supplies	18-31
1-Phase Power Supplies	18-25
3-Phase Power Supplies	26-27
DC/DC-Converters	28-29
AS-Interface® Power Supplies	30
Mounting Brackets	31
Supplementary Units	32-39
Redundancy Modules	32-33
Protection Modules	34-35
24V DC-UPS with Batteries	36-38
DC-UPS and Buffer Modules with Capacitor Storage	39
Custom Built Solutions	40-41
Modifications	40
Value-Add System Solutions	41
Standards and Approvals	42-47
Contacts	48

Bernhard Erdl
Founder, President and Chief Developer

PULS Team Members

PULS Building China

Environmentally friendly Production in Czech Republic and China

PULS –
The Technology Leader

Reliable and Future-Proof Partner

PULS is the only company worldwide which focuses fully on DIN rail power supplies. As a result, our experienced team continues to pioneer the technological advancements of DIN rail power supplies making us the recognized technology leader in the industry who often also sets the market's standards.

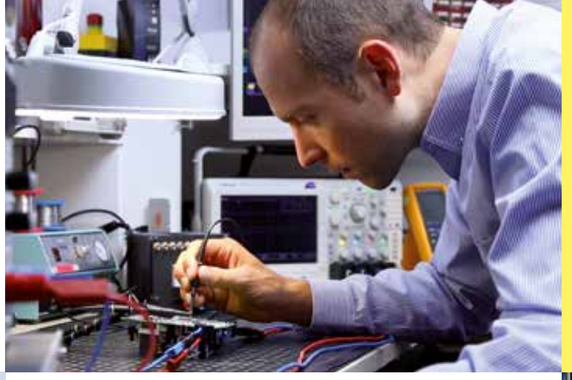
All PULS power supplies are developed in Germany and the entire value chain is under our direct control. Both our factories, located in Czech Republic and China, are identically equipped, organized and managed - and in our customer audits, their above-average standard is emphasized over and over again. Our offering has proven to be especially attractive as a result of our combination of efficient, mid-sized structures and direct global support for our customers.

PULS has produced DIN rail power supplies since 1991 but from 1997 onwards we have focused our efforts exclusively in this field. Our major successes started off with the SilverLine range and has since continued and flourished with the DIMENSION, PIANO and MiniLine families. Our broad product portfolio is available directly from stock and offers a highly credible solution for virtually all applications. If our standard units do not fulfill the specific requirements for your particular application, we can offer a standard unit modification or - together with our subsidiary MGV - a Value-Add system solution in order to fit your individual needs.

The easy, uncomplicated installation of our products is important to us. Because of this, we pay great attention to providing a simple assembly and wiring-in process as well as extensive and informative data sheets and application notes. Our sales force receives ongoing technical training and our highly competent application specialists are available to you for further consultation.

The best enterprises and companies all over the world put their trust in our team and in our products. You too?

Yours
Bernhard Erdl
Founder and CEO



Dependability

- High MTBF and long lifetime
- Outstanding energy efficiency
- Cool-Design for low temperatures
- Production-friendly setup
- Long product availability

Products

- At the forefront of technology
- Unique efficiency approx. 95%
- Small and lightweight
- High peak output current
- Easy to use
- Wide product portfolio

Focus

- All resources concentrated on DIN rail power supplies
- High-performance organisation structure
- Decades of competence

Portfolio

Power Supplies

MiniLine

PIANO

DIMENSION

MiniLine ML-Series
Compact and Installed in Seconds

These units, in their rugged plastic housing are highly efficient, compact, reliable and can be installed in seconds.

- 1- or 2-phase input
- 15-100W
- Several models with DC input
- Spring clamp terminals or screw terminals

PIANO PIC-Series
Simply Good

For applications where basic functionality is requested. High reliability at a very attractive price.

- 1-phase input
- 120W and 240W
- Best-in-Class lifetime
- Robust plastic housing
- Large screw connection terminals
- DC-OK relay contact

DIMENSION Q-Series
Premium Class Power Supplies

Suitable when you need state-of-the-art technology and flexibility for demanding tasks. With high efficiencies, minimal losses, a compact housing and many other features, this series is Best-in-Class.

- 1- or 3-phase Input
- 80-960W
- 50% BonusPower
- AC and DC wide range input
- Low inrush current surge
- DC-OK relay contact
- Quick-connect spring-clamp terminals
- Active power factor correction (PFC)
- Comprehensive approval package

DIMENSION C-Series
Effective Solution in a Compact Design

Power Supplies for users looking for highly reliable power supplies in a compact housing. Focusing only on the essential features of the premium class achieves advantages in price.

- 1- / 2- / 3-phase input
- 80-480W
- 20% PowerBoost
- Low inrush current surge
- Large screw connection terminals

DIMENSION X-Series
For Motors and Heavy Loads

Efficient and cost saving 960W 3-phase power supplies with semi-regulation.

Supplementary Units

PISA-Series
Protection Modules

The new and innovative solution to distribute and protect load circuits.
Low-price, space-saving alternative to electronic fuses.

Y-Series
Redundancy Modules

For building redundant power supply systems or to isolate sensitive circuits. Increases the reliability and availability of the DC voltage with minimal power losses and voltage drops.

U-Series
DC-UPS Systems

These modules improve safety and prevent downtime, loss of data and long restart sequences. If seconds, minutes, or hours of backup time are required, PULS Buffer Modules or DC-UPS controllers can provide a solution.

Z-Series
Mounting Brackets

Accessories suitable for wall or panel mounting and panel brackets for side mounting.

Custom Built Solutions

Modifications and Value-Add System Solutions

For special customer requests which may not be covered by standard products, PULS and MGV are offering solutions which combine modern technology with custom-designed needs.

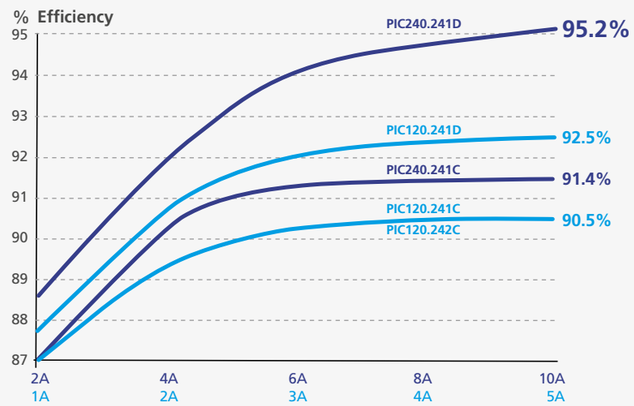
New Products

PIANO

Simply Good

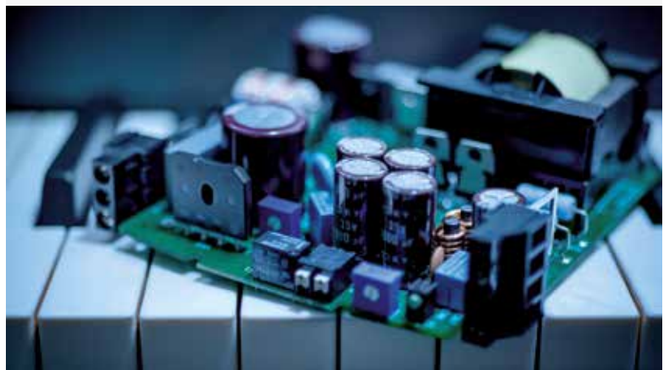
120W/240W 1-phase power supplies
High Reliability, Lower in Price

- Versions: 24V / 5A, 24V / 10A
- Best-in-Class reliability
- Best-in-Class lifetime
- Basic functionality
- Large, rugged screw terminals
- Full performance from -10°C to +55°C
- PIC240.241D: -25°C to +55°C
- Radio interference Class B
- DC-OK relay contact
- Redundancy module PIRD20.241



Best-in-Class Efficiency

At 230V, +25°C and full load



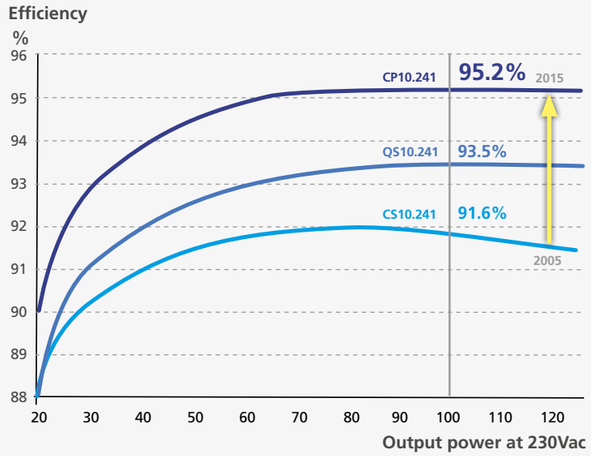
The Single Board Concept

High quality manufacturing and lower production costs mean price savings for the user.

CP10

DIMENSION CP10

240W 1-phase power supplies
High-End Innovation

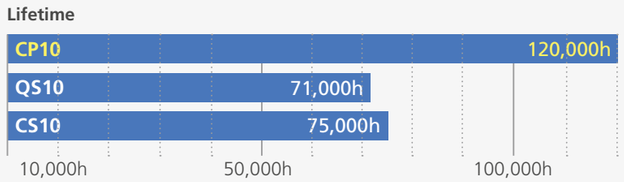


95,2% World Record in Efficiency

An efficiency level of 94% used to be seen as state-of-the-art. Through the replacement of traditional silicon with the new wide-bandgap material silicon carbide with a sophisticated LLC converter topology we now reach a record efficiency of 95,2%. This means a reduction of losses by 46% in comparison to CS10.

Versions:

- 24V 10A
- 48V 5.4A
- 12V 16A



The CP10 reaches a **minimum lifetime of 120,000 hours**, measured at +40°C ambient temperature and full load. Thus it is far above the usual market values.

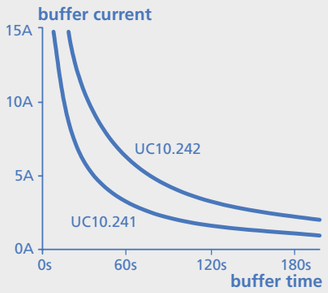
39mm instead of 60mm!

Due to an innovative circuit topology and a sophisticated thermal design the width has been reduced from previous 60mm to 39mm.

New Products

Control unit
with integrated
energy storage

UC10

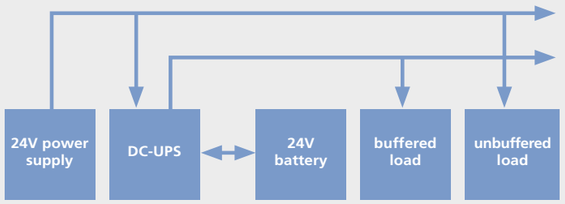


DC-UPS without Batteries 24V, 15A

- Built-in double layer capacitors as energy source – no replacement needed
- Operational lifetime expectancy typically over 10 years
- No generation of hydrogen as with VRLA batteries. Installation possible in enclosed control cabinets.
- Wide temperature range from -40°C to +60°C
- Supports PC-mode function for safe restart of PCs after power failure
- Two versions with different storage capacities – 6kWs and 12kWs

Control unit

UB20



Battery module
UZK24.121

DC-UPS, adjustable Voltage 24V, 20A / 30A

1-Battery-Concept
For longer battery lifetime: Each 12V battery is charged and monitored separately.

Regulated Output Voltage

- Stable output voltage independent of the battery voltage
- Adjustable output voltage from 22.5V to 26V for battery mode

Additional Features

- 50% BonusPower: 30A for max. 4s
- One control unit can be used for battery sizes from 3.9Ah to 150Ah
- High breaking capacity for branch protectors or for the startup of motors
- Smart battery diagnostic and monitoring functions

QS5.241-60 QS10.241-60 CPS20.241-60

EN 50155
TESTED

DIN Rail Power Supplies for Rail Vehicles

- Tested according to:
  - EN 50155 **Railways Applications – Electronic Equipment used on Rolling Stock** classified according to T3, TX, C2 and S2
  - EN 61373 **Rolling Stock Equipment – Shock and Vibration Tests** Cat. 1, Class B
  - EN 50121-3-2 **Electromagnetic Compatibility – Rolling Stock – Apparatus**
  - EN 45545-2 **Fire Protection on Railway Vehicle** classified according to Hazard Level HL3
- Input voltage: DC 110V (-30%/+40%), 0.1s 66Vdc (-40%)
- 100% higher buffer time than required in the railway standard EN 50155 (S2)
- All units with conformal coated circuit boards

	Power	DC-Input	AC-Input	EN 50155	Fire protection EN 45545-1	Conformal coated
QS5.241-60	100W	x		x	x	x
QS10.241-60	200W	x		x	x	x
CPS20.241-60	400W	x		x	x	x
QS10.241-C1	240W		x	x	x	x
CPS20.241-C1	480W		x	x	x	x
QT20.241-C1	480W		x	x	x	x

Power Supplies

100-240V AC/DC-Converters

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
5V	3A	ML15.051	18	5-5.5Vdc	15W	22.5	AC 100-240V	
	5A	ML30.101	18	5-5.5Vdc	25W	45.0	AC 100-240V	
12V	1.3A	ML15.121	18	12-15Vdc	15W	22.5	AC 100-240V	
	2.5A	ML30.102	18	10-12Vdc	30W	45.0	AC 100-240V	very low output noise
	4.2A	ML50.102	18	12-15Vdc	50W	45.0	AC 100-240V	
	4.5A	ML60.121	18	12-15Vdc	54W	45.0	AC 100-240V	
	4.5A	ML60.122	18	12-15Vdc	54W	45.0	AC 100-240V	-40°C operation
	7.5A	ML100.102	19	12-15Vdc	90W	72.5	AC 100-120 / 220-240V	
	15A	QS10.121	19	12-15Vdc	180W	60.0	AC 100-240V	
	16A	CP10.121	19	12-15Vdc	192W	39.0	AC 100-240V	
	30A	CPS20.121	19	12-15Vdc	405W	65.0	AC 100-240V	
±12V	2.5A	ML30.106	19	±12-15Vdc	36W	45.0	AC 100-240V	dual-output voltage
24V	0.63A	ML15.241	19	24-28Vdc	15W	22.5	AC 100-240V	
	1.3A	ML30.100	19	24-28Vdc	30W	45.0	AC 100-240V	
	1.3A	ML30.241	19	24-28Vdc	30W	22.5	AC 100-240V	
	2.1A	ML50.100	20	24-28Vdc	50W	45.0	AC 100-240V	
	2.1A	ML50.101	20	24-28Vdc	50W	45.0	AC 100-240V	optimised for parallel use
	2.1A	ML50.109	20	24-28Vdc	50W	45.0	AC 100-240V	conformal coated
	2.1A	ML50.111	20	24-28Vdc	50W	45.0	AC 100-240V	with plug connector
	2.5A	ML60.241	20	24-28Vdc	60W	45.0	AC 100-240V	
	2.5A	ML60.242	20	24-28Vdc	60W	45.0	AC 100-240V	-40°C operation
	3A	ML70.100	20	24-28Vdc	72W	45.0	AC 100-120 / 220-240V	
	3.3A	CS3.241	20	24-28Vdc	80W	32.0	AC 100-240V	
	3.4A	QS3.241	21	24-28Vdc	80W	32.0	AC 100-240V	
	3.8A	QS5.DNET	21	24Vdc	91W	40.0	AC 100-240V	DeviceNet® approved
	3.9A	ML95.100	21	24-28Vdc	95W	72.5	AC 100-120 / 220-240V	NEC CLASS 2
	4.2A	ML100.100	21	24-28Vdc	100W	72.5	AC 100-120 / 220-240V	
	4.2A	ML100.109	21	24-28Vdc	100W	72.5	AC 100-120 / 220-240V	conformal coated
	5A	CS5.241	21	24-28Vdc	120W	32.0	AC 100-120 / 200-240V	
	5A	CS5.241-C1	21	24-28Vdc	120W	32.0	AC 100-120 / 200-240V	conformal coated
	5A	CS5.241-S1	21	24-28Vdc	120W	32.0	AC 100-120 / 200-240V	spring terminals
	5A	CS5.243	21	24-28Vdc	120W	32.0	AC 100-120V	
	5A	CS5.244	21	24-28Vdc	120W	32.0	AC 200-240V	
	5A	PIC120.241C	22	24-28Vdc	120W	39.0	AC 200-240V	DC-OK relay contacts
	5A	PIC120.241D	22	24-28Vdc	120W	39.0	AC 100-120/ 200-240V	DC-OK relay contacts
	5A	PIC120.242C	22	24-28Vdc	120W	49.0	AC 200-240V	
	5A	QS5.241	21	24-28Vdc	120W	40.0	AC 100-240V	
	5A	QS5.241-A1	21	24-28Vdc	120W	40.0	AC 100-240V	conformal coated, ATEX
	8A	QS10.DNET	22	24-24.5Vdc	192W	60.0	AC 100-240V	DeviceNet® approved

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
24V	10A	CS10.241	22	24-28Vdc	240W	60.0	AC 100-120 / 200-240V	
	10A	CS10.241-S1	22	24-28Vdc	240W	60.0	AC 100-120 / 200-240V	spring-clamp terminals
	10A	CS10.242	22	24-28Vdc	240W	60.0	AC 100-120 / 200-240V	passive PFC
	10A	CS10.243	22	24-28Vdc	240W	60.0	AC 100-120V	
	10A	CS10.244	23	24-28Vdc	240W	60.0	AC 200-240V	
	10A	CP10.241	22	24-28Vdc	240W	39.0	AC 100-240V	
	10A	CP10.241-S1	22	24-28Vdc	240W	39.0	AC 100-240V	spring-clamp terminals
	10A	CP10.242	22	24-28Vdc	240W	39.0	AC 100-240V	enhanced DC input
	10A	PIC240.241C	23	24-28Vdc	240W	49.0	AC 200-240V	DC-OK relay contacts
	10A	PIC240.241D	23	24-28Vdc	240W	49.0	AC 100-240V	DC-OK relay contacts
	10A	QS10.241	23	24-28Vdc	240W	60.0	AC 100-240V	
	10A	QS10.241-A1	23	24-28Vdc	240W	60.0	AC 100-240V	conformal coated, ATEX
	10A	QS10.241-C1	23	24-28Vdc	240W	60.0	AC 100-240V	conformal coated
	10A	QS10.241-D1	23	24-28Vdc	240W	60.0	AC 100-240V	enhanced DC input
	20A	CPS20.241	23	24-28Vdc	480W	65.0	AC 100-240V	
	20A	CPS20.241-C1	23	24-28Vdc	480W	65.0	AC 100-240V	conformal coated
	20A	QS20.241	23	24-28Vdc	480W	82.0	AC 100-240V	
	20A	QS20.241-A1	23	24-28Vdc	480W	82.0	AC 100-240V	conformal coated, ATEX
	20A	QS20.241-C1	23	24-28Vdc	480W	82.0	AC 100-240V	conformal coated
	20A	QS20.244	23	24-28Vdc	480W	70.0	AC 200-240V	
	40A	QS40.241	23	24-28Vdc	960W	125.0	AC 100-240V	
	40A	QS40.244	23	24-28Vdc	960W	125.0	AC 200-240V	
30V	8A	QS10.301	24	28-32Vdc	240W	60.0	AC 100-240V	
36V	13.3A	CPS20.361	24	36-42Vdc	480W	65.0	AC 100-240V	
	13.3A	QS20.361	24	36-42Vdc	480W	82.0	AC 100-240V	
	26.7A	QS40.361	24	36-42Vdc	960W	125.0	AC 100-240V	
48V	1.1A	ML50.105	24	48-56Vdc	50W	45.0	AC 100-240V	
	2.1A	ML100.105	24	48-56Vdc	100W	72.5	AC 100-120 / 220-240V	
	5A	CS10.481	25	48-52Vdc	240W	60.0	AC 100-120 / 200-240V	
	5A	QS10.481	25	48-56Vdc	240W	60.0	AC 100-240V	
	5A	QS10.481-D1	25	48-56Vdc	240W	60.0	AC 100-240V	enhanced DC input
	5.4A	CP10.481	25	48-56Vdc	259W	39.0	AC 100-240V	
	10A	CPS20.481	25	48-56Vdc	480W	65.0	AC 100-240V	
	10A	QS20.481	25	48-55Vdc	480W	82.0	AC 100-240V	
	20A	QS40.481	25	48-54Vdc	960W	125.0	AC 100-240V	
	20A	QS40.484	25	48-54Vdc	960W	125.0	AC 200-240V	
360-460V	2.5A	PAS395	25	360-460Vdc	1025W	310.0	AC 220-240V	charger for electrochem. double-layer capacitors

Overview 2

Power Supplies

380-480V AC/DC-Converters

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
12V	8A	CT5.121	**26**	12-15Vdc	96W	40.0	2AC 380-480V	
24V	3.75A	ML90.200	**26**	24-28Vdc	90W	72.5	2AC 380-480V	NEC CLASS 2
	4.2A	ML100.200	**26**	24-28Vdc	100W	72.5	2AC 380-480V	
	5A	CT5.241	**26**	24-28Vdc	120W	40.0	2AC 380-480V	
	10A	CT10.241	**26**	24-28Vdc	240W	62.0	3AC 380-480V	
	20A	QT20.241	**26**	24-28Vdc	480W	65.0	3AC 380-480V	
	20A	QT20.241-C1	**26**	24-28Vdc	480W	65.0	3AC 380-480V	conformal coated
	40A	QT40.241	**26**	24-28Vdc	960W	110.0	3AC 380-480V	
	40A	XT40.241	**27**	24Vdc	960W	96.0	3AC 400V	semi-regulated
	40A	XT40.242	**27**	24Vdc	960W	96.0	3AC 480V	semi-regulated
36V	13.3A	QT20.361	**27**	36-42Vdc	480W	65.0	3AC 380-480V	
	26.6A	XT40.361	**27**	36Vdc	960W	96.0	3AC 400V	semi-regulated
	26.6A	XT40.362	**27**	36Vdc	960W	96.0	3AC 480V	semi-regulated
	26.7A	QT40.361	**27**	36-42Vdc	960W	110.0	3AC 380-480V	
48V	5A	CT10.481	**27**	48-56Vdc	240W	62.0	3AC 380-480V	
	10A	QT20.481	**27**	48-55Vdc	480W	65.0	3AC 380-480V	
	20A	QT40.481	**27**	48-54Vdc	960W	110.0	3AC 380-480V	
	20A	XT40.481	**27**	48Vdc	960W	96.0	3AC 400V	semi-regulated
	20A	XT40.482	**27**	48Vdc	960W	96.0	3AC 480V	semi-regulated
72V	13.3A	XT40.721	**27**	72Vdc	960W	96.0	3AC 400V	semi-regulated
	13.3A	XT40.722	**27**	72Vdc	960W	96.0	3AC 480V	semi-regulated

DC/DC-Converters

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
5V	8A	SLD2.100	**28**	5-5.5Vdc	40W	49.0	DC 24V	
12V	8A	CD5.121	**28**	12-15Vdc	96W	32.0	DC 24V	
24V	3.8A	CD5.241-L1	**28**	24Vdc	92W	32.0	DC 24V	NEC CLASS 2
	4A	CD5.243	**28**	23-28Vdc	96W	32.0	DC 12V	
	4.2A	QS5.241-60	**29**	24-28Vdc	100W	40.0	DC 110	railway applications
	5A	CD5.241	**28**	23-28Vdc	120W	32.0	DC 24V	
	5A	CD5.241-S1	**28**	24-28Vdc	120W	32.0	DC 24V	with signal contacts
	5A	CD5.242	**28**	24-28Vdc	120W	32.0	DC 48V	
	8.3A	QS10.241-60	**29**	24-28Vdc	200W	60.0	DC 110	railway applications
	10A	CP10.242	**29**	24-28Vdc	240W	39.0	DC 110-300V	
	10A	QS10.241-D1	**29**	24-28Vdc	240W	60.0	DC 110-300V	
	16.3A	CPS20.241-60	**29**	24.5Vdc	400W	65.0	DC 110	railway applications
	20A	CPS20.241-D1	**29**	24-28Vdc	480W	65.0	DC 110-300V	
	20A	QTD20.241	**29**	24-28Vdc	480W	65.0	DC 600V	for intermediate DC bus
30.6V	4A	SLAD4.100	**30**	30.6Vdc	120W	40.0	DC 24V	AS-Interface®
48V	5A	QS10.481-D1	**29**	48-56Vdc	240W	60.0	DC 110-300V	
	10A	CPS20.481-D1	**29**	48-56Vdc	480W	65.0	DC 110-300V	

For more power supplies with DC-input see overview on page 29.

Conformal Coated Power Supplies

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
24V	2.1A	ML50.109	**20**	24-28Vdc	50W	45.0	AC 100-240V	
	4.2A	ML100.109	**21**	24-28Vdc	100W	72.5	AC 100-120 / 220-240V	
	5A	CS5.241-C1	**21**	24-28Vdc	120W	32.0	AC 100-120 / 200-240V	
	5A	QS5.241-A1	**21**	24-28Vdc	120W	40.0	AC 100-240V	ATEX
	10A	QS10.241-C1	**23**	24-28Vdc	240W	60.0	AC 100-240V	
	10A	QS10.241-A1	**23**	24-28Vdc	240W	60.0	AC 100-240V	ATEX
	20A	CPS20.241-C1	**23**	24-28Vdc	480W	82.0	AC 100-240V	
	20A	QS20.241-A1	**23**	24-28Vdc	480W	82.0	AC 100-240V	ATEX
	20A	QS20.241-C1	**23**	24-28Vdc	480W	82.0	AC 100-240V	
	20A	QT20.241-C1	**26**	24-28Vdc	480W	65.0	3AC 380-480V	

AS-Interface® Power Supplies

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
30V	2.8A	SLA3.100	**30**	30.5Vdc	85W	49.0	AC 100-120 / 220-240V	
	4A	SLA4.100	**30**	30.5Vdc	120W	73.0	AC 100-120 / 220-240V	
	4A	SLAD4.100	**30**	30.5Vdc	120W	40.0	DC 24V	DC/DC-converter
	8A	SLA8.100	**30**	30.5Vdc	240W	91.0	AC 100-120 / 220-240V	
	8A	SLA8.300	**30**	30.5Vdc	240W	129.0	3AC 400-500V	

DeviceNet® Power Supplies

Output		Order number	Page	Output Range	Power	Width in mm	Input	Special Features
24V	3.8A	QS5.DNET	**21**	24Vdc	91W	40.0	AC 100-240V	NEC CLASS 2
	8A	QS10.DNET	**22**	24-24.5Vdc	192W	60.0	AC 100-240V	NEC CLASS 1

Mounting Brackets

Order number	Page	Description
ZM1 - ZM3.WALL, ZM1.UBC10	**31**	mounting brackets for a direct wall or panel mounting without a DIN rail
ZM11.SIDE - ZM15.SIDE	**31**	brackets for sideways installation with or without a DIN rail

Custom Built Solutions

Order Number	Page	Description
Modifications	**41**	modified standard units – examples
Value-Add System Solutions	**41**	standard units with customised elements

Overview 3

Redundancy, Buffering, Protection

Redundancy Modules

Order Number	Page	Input / Output	Width in mm	Special Features
MLY10.241	32	12-48V, 2x5A / 10A	45	dual-input diode redundancy module
MLY02.100	32	12-48V, 2x5A / 10A	45	dual-input diode redundancy module
YR2.DIODE	32	12-48V, 2x10A / 20A	32	dual-input diode redundancy module
YRM2.DIODE	32	24-48V, 2x10A / 20A	32	dual-input diode redundancy module with signal contacts
YR40.241	33	24-28V, 2x20A / 40A	36	dual-input MOSFET redundancy module, for all power supplies
YR40.242	33	12-28V, 2x20A / 40A	36	dual-input MOSFET redundancy module, not for QT20, QTD20
YR40.245	33	12-28V, 1x40A / 40A	46	single-input MOSFET redundancy module, not for QT40
YR40.482	33	24-56V, 2x20A / 40A	46	dual-input MOSFET redundancy module, for all power supplies
YR80.241	33	24-28V, 2x40A / 80A	46	dual-input MOSFET redundancy module, for all power supplies
YR80.242	33	12-28V, 2x40A / 80A	46	dual-input MOSFET redundancy module, not for QT40

DC-UPS and Batteries

Order Number	Page	Output	Width in mm	Special Features
UB10.241	36	24V, 10A	49	DC-UPS control unit for external batteries 3.9-40Ah
UB10.242	36	24V, 10A	49	DC-UPS control unit for external batteries 17-130Ah
UB10.245	36	24V, 10A	49	DC-UPS with additional 12V output
UB20.241	36	24V, 20A	46	DC-UPS control unit for external batteries 3.9-130Ah
UBC10.241	36	24V, 10A	123	DC-UPS with integrated 5Ah battery
UBC10.241-N1	36	24V, 10A	123	same as UBC10.241, but battery not assembled

DC-UPS and Buffer Modules with capacitor storage

Order Number	Page	Ratings	Width in mm	Special Features
UC10.241	39	24V, 15A, 6kWs	126	DC-UPS with capacitor storage, typ. 9s at 15A
UC10.242	39	24V, 15A, 12kWs	198	DC-UPS with capacitor storage, typ. 18s at 15A
UF20.241	39	24V, 20A, 0.2kWs	64	electrolytic capacitor buffer module, typ. 310ms at 20A
UF20.481	39	48V, 20A, 0.2kWs	64	electrolytic capacitor buffer module, typ. 150ms at 20A

Protection Modules

Order Number	Page	Width in mm	Special Features
PISA11.401	34	45	4-channel protection module; Outputs: 4x1A
PISA11.402	34	45	4-channel protection module; Outputs: 4x2A
PISA11.403	34	45	4-channel protection module; Outputs: 4x3A
PISA11.404	34	45	4-channel protection module; Outputs: 4x4A
PISA11.406	34	45	4-channel protection module; Outputs: 4x6A
PISA11.410	35	45	4-channel protection module; Outputs: 4x10A
PISA11.203206	35	45	4-channel protection module; Outputs: 2x3A and 2x6A
PISA11.206212	35	45	4-channel protection module; Outputs: 2x6A and 2x12A
PISA11.CLASS2	35	45	4-channel protection module; Outputs: 4x NEC CLASS 2 listed as „Limited Power Source“, < 100VA per channel

1-Phase Power Supplies

24V 15-30W

5V, 12V, 15V 15-405W

100-240V AC/DC-Converters

5V, 12V, 15V 15-405W
24V 15-30W

ML30.1 / ML50 ML100 ML15 / ML30.2 ML60 CP10

NEW

Output Voltage	5V		12V					12V				±12V	24V		
Output Current	**3A**	**5A**	**1.3A**	**3.4A**	**4.2A**	**4.5A**	**4.5A**	**7.5A**	**15A**	**16A**	**30A**	**2.5A**	**0.63A**	**1.3A**	**1.3A**
Adjustment Range	**5-5.5V**	**5-5.5V**	**12-15V**	**10-12V**	**12-15V**	**12-15V**	**12-15V**	**12-15V**	**12-15V**	**12-15V**	**12-15V**	**±12-15V**	**24-28V**	**24-28V**	**24-28V**
Output Current	3.0A	5.0A	1.3-1.0A	3-2.5A	4.2-3.4A	4.5-3.6A	4.5-3.6A	7.5-6A	15-13.5A	16-12.8A	30/27A	2.5A a)	0.63-0.54A	1.3-1.1A	1.3-1.1A
Output Power	15W	25W	15W	30W	50W	54W	54W	90W	180W	192W	360/405W	36W	15W	30W	30W
Power Reserves	-	-	-	-	-	-	-	-	50%	20%	20%	-	-	-	-
Ripple & Noise max. [mV_{PP}]	50mV	50mV	75mV	10mV	100mV	50mV	50mV	50mV	50mV	50mV	100mV	50mV	50mV	50mV	50mV
AC Input Voltage	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-120V/ 220-240V** -15%/+10% auto select	**AC 100-240V** ±15% wide range	**AC 100-240V** -15%/+10%	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range
Harmonic Correction	-	-	-	-	-	-	-	-	active	active	active	-	-	-	-
EN 61000-3-2 (PFC-Norm)	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled
Power Factor, typ.	0.44	0.53	0.44	0.53	0.52	0.5	0.44	0.55	0.92	0.96	0.95	0.53	0.44	0.53	0.49
Input Inrush Current Limiter	NTC	NTC	NTC	NTC	NTC	NTC	active	NTC	active	active	active	NTC	NTC	NTC	NTC
Input Inrush Current	16A/31A b)	17A/35A b)	16A/31A b)	17A/35A b)	17A/35A b)	16A/32A b)	6A/6A c)	22A/37A b)	4A/7A d)	6A/9A	9A/7A d)	17A/35A b)	16A/31A b)	17A/35A b)	18A/35A b)
External Input Fuse Recommendation	B - 6A or C - 3A	B - 10A or C - 6A	B - 6A or C - 3A	B - 10A or C - 6A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 3A	B - 10A or C - 6A	B - 6A or C - 4A	B - 6A or C - 6A	B - 10A or C - 10A	B - 10A or C - 6A	B - 6A or C - 3A	B - 10A or C - 6A	B - 6A or C - 3A
DC Input Voltage	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 290V -25%/+30%	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%
Efficiency, typ.	77.2%	80.0%	82.5%	84.0%	90.0%	87.2%	87.6%	88.5%	91.8%	94.3%	92.6%	86.0%	85.1%	87.5%	89.4%
Power Losses. typ.	4.5W	6.3W	3.2W	5.8W	6.0W	7.9W	7.6W	11.7W	16.1W	11.6W	28.8W	5.9W	2.7W	4.3W	3.7W
MTBF (+40°C, SN 29500)	2686 kh	1963 kh	3811 kh	650 kh	600 kh	1690 kh	1571 kh	500 kh	631 kh	t.b.d.	554 kh	600 kh	4369 kh	650 kh	2405 kh
Operat. Temperature Range	-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	-40°C to +70°C	-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	-10°C to +70°C	-10°C to +70°C
Derating +60°C to +70°C	0.4W/°C	0.5W/°C	0.4W/°C	0.8W/°C	1.3W/°C	1.4W/°C	1.4W/°C	2.5W/°C	5W/°C	4.8W/°C	0.75A/°C	1W/°C	0.4W/°C	0.8W/°C	0.8W/°C
Connection Terminals	screw terminals	spring terminals	screw terminals	spring terminals	spring terminals	screw terminals	screw terminals	spring terminals	spring terminals	screw terminals	screw terminals	spring terminals	screw terminals	spring terminals	screw terminals
Dimensions WxHxD	22.5x75x91mm	45x75x91mm	22.5x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	72.5x75x103mm	60x124x117mm	39x124x117	65x124x127mm	45x75x91mm	22.5x75x91mm	45x75x91mm	22.5x75x91mm
Weight	130g	240g	130g	250g	260g	250g	250g	360g	930g	600g	1000g	240g	130g	230g	140g
DC-OK Signal	-	-	-	-	-	-	-	-	yes	yes	yes	-	-	-	-
Special Features				very low output noise			-40°C version			shutdown input		dual-output voltage			
Order Number	**ML15.051**	**ML30.101**	**ML15.121**	**ML30.102**	**ML50.102**	**ML60.121**	**ML60.122**	**ML100.102**	**QS10.121**	**CP10.121**	**CPS20.121**	**ML30.106**	**ML15.241**	**ML30.100**	**ML30.241**

a) Both outputs can be flexibly loaded to this power as long as the output power of 36W retaining inter less current at lower load output should be at least 5% of the more highly loaded output. b) Peak current at 120Vac / 230Vac, ambient temperature of +40 ° C and cold start c) between -40°C and +70°C d) Peak current at 120Vac / 230Vac, independent of temperature

100-240V AC/DC-Converters

24V 50-120W

ML50 ML100 ML60 CS3 / CS5 QS3

Output Voltage	24V						24V							
Output Current	**2.1A**	**2.1A**	**2.5A**	**2.5A**	**3A**	**3.3A**	**3.4A**	**3.8A**	**3.95A**	**4.2A**	**5A**	**5A**	**5A**	**5A**
Adjustment Range	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**
Output Current	2.1-1.8A	2.1-1.8A	2.5-2.1A	2.5-2.1A	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
Output Power	50W	50W	60W	60W	72W	80W	80W	91.2W	95W	100W	120W	120W	120W	120W
Power Reserves	-	-	-	-	-	-	50%	-	-	-	20%	20%	20%	50%
Ripple & Noise max. [mV_{PP}]	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV
AC Input Voltage	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-120V/ 220-240V** -15%/+10% manual select	**AC 100-240V** ±10% wide range	**AC 100-240V** ±15% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-120V/ 220-240V** -15%/+10% auto select	**AC 100-120V/ 220-240V** -15%/+10% auto select	**AC 100-120/ 200-240V** ±10% auto select	**AC 100-120V** ±10%	**AC 200-240V** ±10%	**AC 100-240V** -15%/+10% wide range
Harmonic Correction	-	-	-	-	-	-	-	active	-	-	-	-	-	active
EN 61000-3-2 (PFC-Norm)	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	not fulfilled	not fulfilled	fulfilled	fulfilled	fulfilled	-	fulfilled	not fulfilled	fulfilled
Power Factor, typ.	0.52	0.52	0.5	0.44	0.54	0.56	0.47	0.90	0.55	0.55	0.47	0.59	0.50	0.91
Input Inrush Current Limiter	NTC	NTC	NTC	active	NTC	NTC	active	active	NTC	NTC	active	NTC	NTC	active
Input Inrush Current	17A/35A [d)]	17A/35A [d)]	16A/32A [d)]	16A/32A [e)]	26A/30A [d)]	23A/45A [d)]	5A/10A [d)]	9A/11A [e)]	22A/37A [d)]	22A/37A [d)]	3A/3A [e)]	45A [f)]	30A [g)]	9A/11A [e)]
External Input Fuse Recommendation	B - 10A or C - 6A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 3A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 6A	B - 6A or C - 3A	B - 10A or C - 6A	B - 10A or C - 6A	B - 10A or C - 6A	B - 16A or C - 10A	B - 16A or C - 10A	B - 6A or C - 3A
DC Input Voltage	DC 110-290V -25%/+30%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 290V -25%/+30%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V ±20%	DC 290V -25%/+30%	DC 290V -25%/+20%	-	-	-	DC 110-300V ±20%
Efficiency, typ.	89.0%	88.5%	89.7%	90.4%	89.0%	89.8%	90.0%	92.0%	90.0%	90.0%	90.2%	90.0%	90.2%	92.7%
Power Losses, typ.	6.2W	6.8W	6.9W	6.4W	8.7W	9.1W	9.1W	7.9W	10.5W	11.4W	13.2W	13.5W	13.2W	9.4W
MTBF (+40°C, SN 29500)	2613 kh	600 kh	1916 kh	1866 kh	600 kh	2243 kh	1451 kh	831 kh	500 kh	500 kh	869 kh	740 kh	940 kh	831 kh
Operat. Temperature Range	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C	-40°C to +70°C	-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
Derating +60°C to +70°C	1.3W/°C	1.3W/°C	1.5W/°C	1.5W/°C	1.8W/°C	1.8W/°C	2W/°C	2W/°C	2W/°C	2.5W/°C	3W/°C	3W/°C	3W/°C	3W/°C
Connection Terminals	spring terminals	spring terminals	screw terminals	screw terminals	spring terminals	screw terminals	spring terminals	spring terminals	spring terminals	spring terminals	screw terminals	screw terminals	screw terminals	spring terminals
Dimensions WxHxD	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	32x124x102mm	32x124x102mm	40x124x117mm	72.5x75x103mm	72.5x75x103mm	32x124x117mm	32x124x117mm	32x124x117mm	40x124x117mm
Weight	240g	240g	250g	250g	260g	430g	440g	620g	360g	360g	500g	500g	500g	620g
DC-OK Signal	yes	yes	-	-	-	-	-	yes	-	-	-	-	-	yes
Special Features		optimised for parallel use		-40°C version				DeviceNet®	NEC CLASS 2			regional version	regional version	
Order Number	**ML50.100** **ML50.109 a)**	**ML50.101** **ML50.111 b)**	**ML60.241**	**ML60.242**	**ML70.100**	**CS3.241**	**QS3.241**	**QS5.DNET**	**ML95.100**	**ML100.100** **ML100.109 a)**	**CS5.241** **CS5.241-C1 a)** **CS5.241-S1 c)**	**CS5.243**	**CS5.244**	**QS5.241** **QS5.241-A1 a)**

a) Conformal coated b) ML50.111 with pluggable screw, connected in parallel with load distribution and a depth of 98mm c) With spring terminals d) Peak current at 120Vac / 230Vac, ambient temperature +40°C and cold start e) Peak current at 120Vac / 230Vac, independent of temperature f) Peak current at 120Vac, ambient temperature +40°C and cold start g) Peak current at 230Vac, ambient temperature +40°C and cold start

100-240V AC/DC-Converters

24V 120-960W

PIC120 CP10 CPS20 QS5 QS10 QS40

	NEW	NEW		NEW						NEW	NEW					
Output Voltage	**24V**							**24V**								
Output Current	**5A**	**5A**	**8A**	**10A**	**10A**	**10A**	**10A**	**10A**	**10A**	**10A**	**10A**	**20A**	**20A**	**20A**	**40A**	**40A**
Adjustment Range	**24-28V**	**24-28V**	**24-24.5V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**
Output Current	5-4.3A	5-4.3A	8A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-9A	10-8.6A	10.0-8.6A	20-17.1A	20-17A	20-17A	40-34.4A	40-34.3A
Output Power	120W	120W	192W	240W	240W	240W	240W	240W	240W	240W	240W	480W	480W	480W	960W	960W
Power Reserves			-	20%	20%	20%	20%	20%	50%			20%	50%	50%	50%	50%
Ripple & Noise max. [mV_{PP}]	100mV	100mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	100mV	100mV	50mV	100mV	100mV	100mV	100mV
AC Input Voltage	**AC 200-240V** ±10%	**AC 100-120V/ 200-240V** ±10% auto select	**AC 100-240V** ±15% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-120V/ 200-240V** ±10% auto select	**AC 100-120V/ 200-240V** ±10% auto select	**AC 100-120V** ±10%	**AC 200-240V** ±10%	**AC 100-240V** ±15% wide range	**AC 200-240V** ±10%	**AC 100-240V** ±10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** ±15% wide range	**AC 200-240V** ±15%	**AC 200-240V** -15%/+10%	**AC 100-240V** -15%/+10% wide range
Harmonic Correction	-	-	active	active	-	PFC-Drossel	-	-	active	-	active	active	active	-	active	active
EN 61000-3-2 (PFC-Norm)	-	-	fulfilled	fulfilled	not fulfilled	fulfilled	fulfilled	not fulfilled	fulfilled	-	fulfilled	fulfilled	fulfilled	-	fulfilled	fulfilled
Power Factor, typ.	0.54	0.54	0.92	0.97	0.51	0.57	0.57	0.52	0.92	0.52	0.91	0.95	0.90	0.50	0.96	0.99
Input Inrush Current Limiter	NTC	NTC	active	active	active	active	NTC	NTC	active	NTC	active	active	active	active	active	active
Input Inrush Current	28A [i)]	22A/33A [f) k)]	4A/7A [g)]	6/9A	3A/3A [g)]	3A/3A [g)]	85A [h)]	48A [i)]	4A/7A [g)]	48A [i)]	12A/26A [f)]	9A/7A [g)]	9A/7A [g)]	40A [j)]	14A [j)]	17A/11A [g)]
External Input Fuse Recommendation	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 4A	B - 6A or C - 6A	B - 10A or C - 6A	B - 10A or C - 6A	B - 16A or C - 10A	B - 10A or C - 6A	B - 6A or C - 4A	B - 10A or C - 6A	B - 6A or C - 6A	B - 10A or C - 10A	B - 10A or C - 10A	B - 10A or C - 6A	B - 10A or C - 8A	B - 16A or C - 16A
DC Input Voltage	-	-	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	-	-	-	DC 110-150V -20%/+25%	-	-	-	DC 110-150V -20%/+25%	-	-	-
Efficiency, typ.	90.5%	92.3%	93.4%	95.2%	91.6%	91.2%	91.3%	91.3%	93.5%	91.4%	94.3%	94.0%	93.9%	94.5%	94.6%	94.6%
Power Losses, typ.	12.6W	10.0W	13.6W	12.1W	22.0W	23.2W	23.4W	23.4W	16.7W	22.6W	14.5W	30.6W	31.4W	28.3W	54.8W	54.8W
MTBF (+40°C, SN 29500)	1720 kh	t.b.d.	581 kh	667 kh	821 kh	821 kh	710 kh	910 kh	581 kh	791 kh	t.b.d.	537 kh	469 kh	577 kh	366 kh	300 kh
Operat. Temperature Range	-10°C to +70°C	-10°C to +70°C	-25°C to +70°C	-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	-10°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	3W/°C [k)]	3W/°C [k)]	5W/°C	6W/°C	6W/°C	6W/°C	6W/°C	6W/°C	6W/°C	6W/°C [k)]	6W/°C [k)]	12W/°C	12W/°C	12W/°C	24W/°C	24W/°C
Connection Terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals [b)]	screw terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals	screw terminals	spring terminals	spring terminals	screw terminals	screw terminals
Dimensions WxHxD	39x124x124mm	39x124x124mm	60x124x117mm	39x124x117mm	60x124x117mm	60x124x117mm	60x124x117mm	60x124x117mm	60x124x117mm	49x124x124mm	49x124x124mm	65x124x127mm	82x124x127mm	70x124x127mm	125x124x127mm	125x124x127mm
Weight	350g	370g	900g	600g	700g	800g	700g	700g	900g	550g	540g	1000g	1200g	880g	1800g	1900g
DC-OK Signal	yes	yes	yes	yes	-	-	-	-	yes	yes	yes	yes	yes	yes	yes	yes
Special Features			DeviceNet® approved			PFC version	regional version	regional version						regional version	regional version	
Order Number	**PIC120.241C** **PIC120.242C [e)]**	**PIC120.241D**	**QS10.DNET**	**CP10.241** **CP10.242 [d)]** **CP10.241-S1 [b)]**	**CS10.241** **CS10.241-S1 [b)]**	**CS10.242**	**CS10.243**	**CS10.244**	**QS10.241** **QS10.241-A1 [a)]** **QS10.241-C1 [c)]** **QS10.241-D1 [d)]**	**PIC240.241C**	**PIC240.241D**	**CPS20.241** **CPS20.241-C1 [c)]**	**QS20.241** **QS20.241-A1 [a)]** **QS20.241-C1 [c)]**	**QS20.244**	**QS40.244**	**QS40.241**

a) Conformal coated and ATEX approval b) With spring clamp terminals c) Conformal coated d) Using extended DC input 110-300V ±20% e) Without DC OK relay contact f) Peak current at 120Vac / 230Vac, ambient temperature of +40°C and cold start g) Peak current at 120Vac / 230Vac, independent of temperature h) Peak current at 120Vac, ambient temperature +40°C and cold start i) Peak current at 230Vac, ambient temperature +40°C and cold start j) Peak current at 230Vac, independent of temperature k) Derating over +55°C

100-240V AC/DC-Converters

30V, 36V, 48V 50-960W
410V 1025W

ML50 ML100 CPS20 QS40 PAS395

NEW

Output Voltage	30V	36V			48V		48V							410V
Output Current	**8A**	**13.3A**	**13.3A**	**26.7A**	**1.05A**	**2.1A**	**5A**	**5A**	**5.4A**	**10A**	**10A**	**20A**	**20A**	**2.5A**
Adjustment Range	**28-32V**	**36-42V**	**36-42V**	**36-42V**	**48-56V**	**48-56V**	**48-52V**	**48-56V**	**48-56V**	**48-56V**	**48-55V**	**48-54V**	**48-54V**	**360-460V**
Output Current	8.6-7.5A	13.3-11.4A	13.3-11.4A	26.7-22.9A	1.05-0.9A	2.1-1.8A	5-4.6A	5-4.3A	5.4-4.6A	10-8.6A	10-8.7A	20-17.8A	20-17.8A	2.5A
Output Power	240W	480W	480W	960W	50W	100W	240W	240W	259W	480W	480W	960W	960W	1025W
Power Reserves	50%	20%	50%	50%	-	-	20%	50%	20%	20%	50%	50%	50%	-
Ripple & Noise max. [mV_{PP}]	50mV	100mV	100mV	130mV	50mV	50mV	100mV	100mV	50mV	50mV	100mV	150mV	150mV	10mV
AC Input Voltage	**AC 100-240V** ±15% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** ±15% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** -15%/+10% wide range	**AC 100-120V/ 220-240V** -15%/+10% auto select	**AC 100-120V/ 200-240V** ±10% auto select	**AC 100-240V** ±15% wide range	**AC 100-240V** ±10%	**AC 100-240V** -15%/+10% wide range	**AC 100-240V** ±15% wide range	**AC 200-240V** -15%/+10%	**AC 100-240V** -15%/+10% wide range	**AC 220-240V** -20%/+10%
Harmonic Correction	active	active	active	active	-	-	-	active	active	active	active	active	active	active
EN 61000-3-2 (PFC-Norm)	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	-	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled
Power Factor. typ.	0.92	0.95	0.90	0.99	0.52	0.55	0.51	0.92	0.98	0.95	0.90	0.96	0.99	>0.9
Input Inrush Current Limiter	active	active	active	active	NTC	NTC	active	active	active	active	active	active	active	active
Input Inrush Current	4A/7A c)	9A/7A c)	9A/7A c)	17A/11A c)	17A/35A b)	22A/37A b)	3A/3A c)	4A/7A c)	6A/9A c)	9A/7A c)	9A/7A c)	14A d)	17A/11A c)	14A d)
External Input Fuse Recommendation	B - 6A or C - 4A	B - 10A or C - 10A	B - 10A or C - 10A	B - 16A or C - 16A	B - 10A or C - 6A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 4A	B - 6A or C - 6A	B - 10A or C - 10A	B - 10A or C - 10A	B - 10A or C - 8A	B - 16A or C - 16A	B - 10A or C - 8A
DC Input Voltage	DC 110-150V -20%/+25%	-	DC 110-150V -20%/+25%	-	DC 110-300V -20%/+25%	DC 290V -25%/+30%	-	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	DC 110-150V -20%/+25%	-	-	-
Efficiency, typ.	93.5%	94.3%	94.0%	94.6%	90.0%	91.0%	91.6%	92.0%	95.5%	93.9%	94.3%	95.0%	95.0%	94.4%
Power Losses, typ.	16.7W	29.0W	30.6W	54.8W	6.0W	10.0W	22.0W	20.9W	12.3W	31.2W	29.0W	50.5W	50.5W	60.8W
MTBF (+40°C, SN 29500)	581 kh	537 kh	469 kh	300 kh	600 kh	500 kh	830 kh	606 kh	t.b.d.	537 kh	469 kh	392 kh	300 kh	t.b.d.
Operat. Temperature Range	-25°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	-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	-40°C to +65°C
Derating +60°C to +70°C	6W/°C	12W/°C	12W/°C	24W/°C	1.3W/°C	2.5W/°C	6W/°C	6W/°C	6.5W/°C	12W/°C	12W/°C	24W/°C	24W/°C	-
Connection Terminals	spring terminals	screw terminals	spring terminals	screw terminals	spring terminals	spring terminals	screw terminals	spring terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals	spring terminals
Dimensions WxHxD	60x124x117mm	65x124x127mm	82x124x127mm	125x124x127mm	45x75x91mm	73x75x103mm	60x124x117mm	60x124x117mm	39x124x117mm	65x124x127mm	82x124x127mm	125x124x127mm	125x124x127mm	310x158x80mm
Weight	900g	1000g	1200g	1900g	240g	360g	700g	900g	600g	1000g	1200g	1800g	1900g	2300g
DC-OK Signal	yes	yes	yes	yes	-	-	-	yes	yes	yes	yes	yes	yes	yes
Special Features												regional version		charger f. electrochem. double layer capacit.
Order Number	**QS10.301**	**CPS20.361**	**QS20.361**	**QS40.361**	**ML50.105**	**ML100.105**	**CS10.481**	**QS10.481** **QS10.481-D1 a)**	**CP10.481**	**CPS20.481**	**QS20.481**	**QS40.484**	**QS40.481**	**PAS395**

a) Using the extended DC input b) Peak current at 120Vac / 230Vac, ambient temperature of +40°C and cold start c) Peak current at 120Vac / 230Vac, independent of temperature d) Peak current at 230Vac, independent of temperature

380-480V AC/DC-Converters

12V, 24V 90-960W
36V, 48V, 72V 240-960W

ML90 / ML100 CT5 QT20 QT40 XT40

Output Voltage	12V	24V						24V	36V			48V				72V
Output Current	**8A**	**3.75A**	**4.2A**	**5A**	**10A**	**20A**	**40A**	**40A**	**13.3A**	**26.6A**	**26.7A**	**5A**	**10A**	**20A**	**20A**	**13.3A**
Adjustment Range	**12-15V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24V**	**36-42V**	**36V**	**36-42V**	**48-56V**	**48-55V**	**48-54V**	**48V**	**72V**
Output Current	8-6.4A	3.75-3.2A	4.2-3.6A	5-4.3A	10-8.6A	20-17.5A	40-34.3A	40A	13.3A	26.6A	26.7-22.9A	5-4.3A	10A	20-17.8A	20A	13.3A
Output Power	96W	90W	100W	120W	240W	480W	960W	960W	480W	960W	960W	240W	480W	960W	960W	960W
Power Reserves	-	-	-	20%	20%	50%	50%	25%	50%	25%	50%	20%	50%	50%	25%	25%
Ripple & Noise max. [mV_{PP}]	100mV	50mV	50mV	50mV	50mV	100mV	100mV	1500mV	100mV	2000mV	130mV	100mV	100mV	150mV	2500mV	3000mV
AC Input Voltage	**2AC 380-480V** -15%/+20% wide range	**2AC 380-480V** ±15% wide range	**2AC 380-480V** ±15% wide range	**2AC 380-480V** -15%/+20% wide range	**3AC 380-480V** -15%/+20% wide range	**3AC 380-480V** ±15% wide range	**3AC 380-480V** -15%/+20% wide range	**3AC 400V b) 3AC 480V b)** ±15%	**3AC 380-480V** ±15% wide range	**3AC 400V b) 3AC 480V b)** ±15%	**3AC 380-480V** -15%/+20% wide range	**3AC 380-480V** -15%/+20% wide range	**3AC 380-480V** ±15% wide range	**3AC 380-480V** -15%/+20% wide range	**3AC 400V b) 3AC 480V b)** ±15%	**3AC 400V b) 3AC 480V b)** ±15%
Harmonic Correction	PFC inductor	-	-	PFC inductor	PFC inductor	active	active	active	active	active	active	PFC inductor	active	active	active	active
EN 61000-3-2 (PFC-Norm)	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled	fulfilled
Power Factor, typ.	0.44	0.60	0.60	0.45	0.53	0.94	0.88	0.93	0.94	0.93	0.88	0.53	0.94	0.88	0.93	0.93
Input Inrush Current Limiter	active	NTC	NTC	active	active	active	active	active	active	active	active	active	active	active	active	active
Input Inrush Current	4A/4A e)	36A/45A c)	36A/45A c)	4A/4A e)	4A/4A f)	3A/3A d)	4.5A/4.5A d)	2A g)	3A/3A d)	2A g)	4.5A/4.5A g)	4A/4A f)	3A/3A d)	4.5A/4.5A d)	2A g)	2A g)
External Input Fuse Recommendation	B - 6A or C - 3A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 3A	B - 6A or C - 3A	B - 6A or C - 3A	B - 6A or C - 6A	B - 6A or C - 3A	B - 6A or C - 3A	B - 6A or C - 3A	B - 6A or C - 6A	B - 6A or C - 3A	B - 6A or C - 3A	B - 6A or C - 6A	B - 6A or C - 3A	B - 6A or C - 3A
DC Input Voltage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Efficiency, typ.	85.4%	89.5%	89.5%	90.4%	92.8%	95.0%	95.3%	95.5%	94.8%	95.5%	95.3%	92.8%	95.4%	95.4%	96.0%	95.5%
Power Losses, typ.	16.4W	10.5W	11.7W	12.7W	18.6W	25.3W	47.3W	45.2W	26.3W	45.2W	47.3W	18.6W	23.1W	46.3W	40.0W	45.2W
MTBF (+40°C, SN 29500)	983 kh	1594 kh	1594 kh	1173 kh	975 kh	690 kh	375 kh	529 kh	690 kh	529 kh	375 kh	1051 kh	690 kh	375 kh	540 kh	539 kh
Operat. Temperature Range	-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	-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	-25°C to +70°C
Derating +60°C to +70°C	2.5W/°C	2W/°C	2.5W/°C	3W/°C	6W/°C	12W/°C	24W/°C	24W/°C	12W/°C	24W/°C	24W/°C	6W/°C	12W/°C	24W/°C	24W/°C	24W/°C
Connection Terminals	screw terminals	spring terminals	spring terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals	screw terminals	spring terminals	screw terminals	screw terminals	screw terminals
Dimensions WxHxD	40x124x117mm	72.5x75x103mm	72.5x75x103mm	40x124x117mm	62x124x117mm	65x124x127mm	110x124x127mm	96x124x159mm	65x124x127mm	96x124x159mm	110x124x127mm	62x124x117mm	65x124x127mm	110x124x127mm	96x124x159mm	96x124x159mm
Weight	500g	360g	360g	500g	750g	870g	1500g	1400g	870g	1400g	1500g	750g	870g	1500g	1400g	1400g
DC-OK Signal	-	-	-	-	-	yes	yes	-	yes	-	yes	-	yes	yes	-	-
Special Features		NEC CLASS 2						semi-regulated		semi-regulated					semi-regulated	semi-regulated
Order Number	**CT5.121**	**ML90.200**	**ML100.200**	**CT5.241**	**CT10.241** CT10.241-C1 a)	**QT20.241** QT20.241-C1 a)	**QT40.241**	**XT40.241 b) XT40.242 b)**	**QT20.361**	**XT40.361 b) XT40.362 b)**	**QT40.361**	**CT10.481**	**QT20.481**	**QT40.481**	**XT40.481 b) XT40.482 b)**	**XT40.721 b) XT40.722 b)**

a) Conformal Coated b) Separate units for 3AC 400V and 3AC 480V required, use XT40.241, XT40.361, XT40.481, XT40.721 for 3AC 400V mains and XT40.242, XT40.362, XT40.482, XT40.722 for 3AC 480V mains c) Peak current at 2x400Vac / 2x480Vac, ambient temperature +25°C and cold start d) At 3 x 400V, 50Hz / 3 x 480Vac, 60Hz, independent of temperature e) Peak current at 2 x 400Vac / 2 x 480Vac, independent of temperature f) Peak current at 3 x 400Vac / 3 x 480Vac, independent of temperature g) At 3 x 400Vac, independent of temperature

DC/DC-Converters

There are multiple applications for DC/DC-Converters.

- Stabilised control voltages in battery powered applications
- For galvanic isolation in mobile applications e.g. ships or fork-lifts
- To avoid earth loops
- To restore control voltage at the end of long cable runs, to compensate for voltage drops

CPS20, QS10, CD5

Converters for AC- and DC-Input

Several AC units also have an approved DC input voltage range.

Input: DC 110-300V

Order Number	Output		
ML15.015	5-5.5V	3A	15W
ML30.101	5-5.5V	5A	25W
ML15.121	12-15V	1.3A	15W
ML30.102	10-12V	2.5A	30W
ML50.102	12-15V	4.2A	50W
ML60.121	12-15V	4.5A	54W
ML15.241	24-28V	0.6A	15W
ML30.100	24-28V	1.3A	30W
ML30.241	24-28V	1.3A	30W
ML50.100	24-28V	2.1A	50W
ML60.241	24-28V	2.5A	60W
CS3.241	24-28V	3.3A	80W
QS3.241	24-28V	3.4A	82W
QS5.241	24-28V	5A	120W
QS10.241-D1	24-28V	10A	240W
ML50.105	48-56V	1.05A	50W
QS10.481-D1	48-56V	5A	240W

Input: DC 110-150V

Order Number	Output		
QS10.121	12-15V	15A	180W
QS10.241	24-28V	10A	240W
QS20.241	24-28V	20A	480W
QS10.301	28-32V	8A	240W
QS20.361	36-42V	13.3A	240W
QS10.481	48-56V	5A	240W
QS20.481	48-55V	10A	480W

										NEW	NEW	NEW		NEW		
Nominal Input Voltage	**DC 12V**	**DC 24V**					**DC 48V**	**DC 100-300V**		**DC 110V**			**DC 110-300V**			**DC 600V**
Output Voltage Range	**23-28V**	**5-5.5V**	**12-15V**	**23-28V**	**24V**	**24V**	**23-28V**	**24-28V**	**48-56V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**24-28V**	**48-56V**	**24-28V**
Input Voltage	DC 12V -30%/+35%	DC 24V -25%/+50%	DC 24V -25%/+35%[a)]	DC 24V -25%/+35%[a)]	DC 24V -25%/+35%[a)]	DC 24V -40%/+35%[a)]	DC 48V ±25%	DC 100-300V ±20%	DC 100-300V ±20%	DC 110V -30%/+40%	DC 110V -30%/+40%	DC 110V -30%/+40%	DC 110-300V -20%/+25%	DC 110-300V ±20%	DC 110-300V -20%/+25%	DC 600V -20%/+40%
Output Current	4-3.4A	8A	8-6.4A	5-4.3A	5-4.3A	3.8A	5-4.3A	20-17.1A	10-8.6A	4.2-3.6A	8.3-7.1A	16.3A	10-9A	10-8.6A	5-4.3A	20A
Output Power	96W	40W	96W	120W	120W	92W	120W	480W	480W	100W	200W	400W	240W	240W	240W	480W
Power Reserves	20%	-	20%	20%	20%	-	20%	20%	20%	-	-	-	50%	20%	50%	25%
Ripple & Noise max. [mV_{PP}]	50mV	50mV	75mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	70mV	50mV	50mV	100mV	100mV
Efficiency, typ.	87.7%	82.0%	88.2%	90.2%	90.3%	90.5%	90.3%	94.6%	94.6%	91.4%	92.5%	94%	93.5%	95.2%	92.0%	95.0%
Power Losses, typ.	13.5W	8.5W	12.8W	13.3W	12.9W	9.7W	12.9W	27.4W	27.4W	9.7W	16.7W	25.7W	16.7W	12.1W	20.9W	25.5W
MTBF (+40°C, SN 29500)	1056 kh	510 kh	1161 kh	1048 kh	1178 kh	1178 kh	951 kh	537 kh	537 kh	t.b.d.	t.b.d.	t.b.d.	581 kh	667kh	606 kh	446 kh
Operat. Temperature Range	-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	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-40°C to +70°C	-40°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	2.5W/°C	1.5W/°C	2.5W/°C	3W/°C	3W/°C	-	3W/°C	12W/°C	12W/°C	-	4W/°C	4W/°C	6W/°C	6W/°C	6W/°C	12W/°C
Connection Terminals	screw terminals	screw terminals	screw terminals	spring terminals	screw terminals	spring terminals	screw terminals	screw terminals	screw terminals	spring terminals	spring terminals	spring terminals	spring terminals	screw terminals	spring terminals	spring terminals
Dimensions WxHxD	32x124x102mm	49x124x102mm	32x124x102mm	32x124x102mm	32x124x102mm	32x124x102mm	32x124x102mm	65x124x127mm	65x124x127mm	40x124x117mm	60x124x117mm	65x124x127mm	60x124x117 mm	39x124x117mm	60x124x117mm	65x124x127mm
Weight	435g	470g	425g	450g	425g	425g	425g	940g	940g	620g	900g	940g	900g	600g	900g	890g
Special Features				DC-OK signal		NEC CLASS 2				for railway applications			AC- + DC-input	enhanced DC-input	AC- + DC-input	intermediate DC-bus
Order Number	**CD5.243**	**SLD2.100**	**CD5.121**	**CD5.241-S1**	**CD5.241**	**CD5.241-L1**	**CD5.242**	**CPS20.241-D1**	**CPS20.481-D1**	**QS5.241-60**	**QS10.241-60**	**CPS20.241-60**	**QS10.241-D1**	**CP10.242**	**QS10.481-D1**	**QTD20.241**

a) Extended input voltage range with derating allowed, see data sheet

AS-Interface® Power Supplies

The AS-Interface® field bus system is a network technology where power and data are provided by the same wire.

Therefore, special power supplies with an output voltage of 30.6V and an integrated data decoupling circuit are required which prevent 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 purposes.

To protect the AS-Interface® cable, all 8A units have an electronic fuse (FUSE-mode) which shuts down the output by overload after 2-5 seconds.

SLA4.100

Output	**30.6V**				**30.6V**
Output Current	**2.8A**	**4A**	**8A**	**8A**	**4A**
Output Voltage	**30.6V**	**30.6V**	**30.6V**	**30.6V**	**30.6V**
Ripple & Noise max. [mV_{PP}]	50mV	50mV	50mV	50mV	50mV
AC Input Voltage	**AC 100-120V/ 220-240V** -15% / +10% manual select	**AC 100-120V/ 220-240V** -15% / +10% manual select	**AC 100-120V/ 220-240V** -15% / +10% manual select	**3AC 400-500V** ±15% wide range	-
Harmonic Correction	-	-	-	PFC inductor	-
EN 61000-3-2 (PFC-Norm)	fulfilled	fulfilled	-	fulfilled	fulfilled
Power Factor, typ.	0.50	0.53	0.48	0.50	fulfilled
Input Inrush Current Limiter	NTC	NTC	active	NTC	active
DC Input Voltage	-	-	-	-	DC 24V *) -25%/+35%
Efficiency, typ.	90.5%	90.0%	92.0%	91.5%	90.5%
Power Losses, typ.	9.1W	13.5W	21.2W	22.5W	12.7W
MTBF (+40°C, SN 29500)	1942 kh	1222 kh	869 kh	1220 kh	1247 kh
Operat. Temperature Range	-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	2W/°C	3W/°C	6W/°C	6W/°C	3W/°C
Connection Terminals	screw terminals	screw terminals	screw terminals	screw terminals	screw terminals
Dimensions WxHxD	49x124x102mm	73x124x102mm	91x124x102mm	129x124x117mm	40x124x102mm
Weight	500g	670g	890g	1160g	500g
Special Features	NEC CLASS 2	ground-fault monitor included	FUSE-Mode	FUSE-Mode	DC/DC-converter
Order Number	**SLA3.100**	**SLA4.100**	**SLA8.100**	**SLA8.300**	**SLAD4.100**

*) Extended input voltage range with derating allowed, see data sheet

Mounting Brackets

Mounting brackets for direct wall or panel mounting without the need for DIN rail. Other brackets for sideways installation of the power supplies with or without DIN rail for control cabinets which do not have the required installation depth.

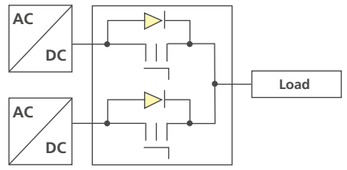
Order Number	Description
ZM1.WALL	Wall mounting bracket for light DIMENSION units
ZM2.WALL	Wall mounting bracket for QS20, QS40, QT40, CPS20, ...
ZM3.WALL	Wall mounting bracket forML60, PISA11 and MLY (VPE 25 pieces)
ZM4.WALL	Wall mounting bracket for CP10
ZM1.UBC10	Wall mounting bracket for UBC10
ZM11.SIDE	Side mounting bracket for CS3, CS5, QS3, YR2, YRM2
ZM12.SIDE	Side mounting bracket for CT5, QS5
ZM13.SIDE	Side mounting bracket for CS10, CT10, QS10, CPS20, ...
ZM14.SIDE	Side mounting bracket for QT20, QTD20, UF20
ZM15.SIDE	Side mounting bracket for QS20 (except QS20.244)

Redundancy Modules

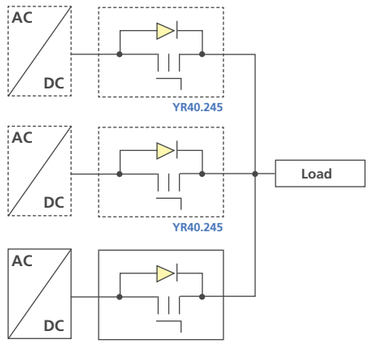
Using redundant systems can increase the reliability and availability of the DC voltage. To achieve redundancy, one extra power supply must be installed in order to supply the required current in case one unit in the system fails. Each individual standard power supply must be isolated from the others with a redundancy module.

This guarantees that a non-functional power supply (e.g. a short circuit at the output) does not prevent the working units from providing a DC voltage. New to PULS product offering is the utilisation of MOSFETs instead of diodes.

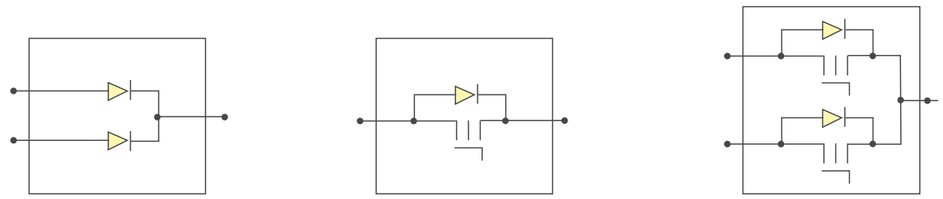
This reduces the heat generation and the voltage drop between input and output.



1+1-Redundancy



N+1-Redundancy



MLY10.241 YR2.DIODE YRM2.DIODE YR40.245 YR40.241 YR40.242 YR40.482 YR80.241 YR80.242

DIODE

Nominal Voltage	DC 12-48V			24-48V
Input / Output	**2x 5A / 10A**	**2x 5A / 10A**	**2x 10A / 20A**	**2x 10A / 20A**
Input Voltage Range	DC 9-60V	DC 9-60V	DC 9-60V	DC 18-60V
Nominal Current per Input a)	5A	5A	10A	10A
Output Current Nominal Current a) Short Circuit b)	10A max. 16A	10A max. 16A	20A max. 25A	20A max. 25A
Voltage Drop c) In- / Output	800mV	800mV	800mV	800mV
Power Losses c) No Load Nominal Load	0W 4.0W	0W 4.0W	0W 8.0W	1W 9.0W
MTBF (+40°C, SN 29500)	85 Mio. h	85 Mio. h	47 Mio. h	9.1 Mio. h
Operat. Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
Derating +60°C to +70°C	0.25A/°C	0.25A/°C	0.5A/°C	0.5A/°C
Dimensions WxHxD	45x75x91mm	45x75x91mm	32x124x102mm	32x124x117mm
Weight	140g	140g	290g	350g
Connection Terminals	screw terminals	spring terminals	spring terminals	screw terminals
Special Features				DC-OK- relay contacts
Order Number	**MLY10.241**	**MLY02.100**	**YR2.DIODE**	**YRM2.DIODE**

a) 50% higher currents are allowed up to 5s b) Current at voltage <6V c) 1+1-redundancy (= 50% of the nominal current) and symmetrical input currents

MOSFET

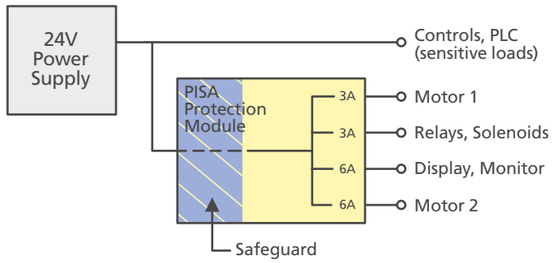
Nominal Voltage	DC 12-28V			DC 24-28V		DC 24-56V
Input / Output	**2x 20A / 40A**	**1x 40A / 40A**	**2x 40A / 80A**	**2x 20A / 40A**	**2x 40A / 80A**	**2x 20A / 40A**
Input Voltage Range	DC 8.4-36.4V	DC 8.4-36.4V	DC 8.4-36.4V	DC 8.4-36.4V	DC 8.4-36.4V	DC 20.4-64.4V
Nominal Current per Input a)	20A	40A	40A	20A	40A	20A
Output Current Nominal Current a) Short Circuit b)	40A max. 26A	40A max. 22A	80A max. 44A	40A max. 65A	80A max. 130A	40A max. 45A
Voltage Drop c) In- / Output	72mV	80mV (at 1x20A) 150mV (at 40A)	65mV	72mV	49mV	60mV
Power Losses c) No Load Nominal Load	0.2W 1.7W	0.1W 1.8W (at 1x20A) 6.2W (at 40A)	0.2W 2.9W	0.7W 2.15W	0.7W 2.7W	0.62W 1.8W
MTBF (+40°C, SN 29500)	4.5 Mio. h	6.4 Mio. h	2.5 Mio. h	2.7 Mio. h	2.1 Mio. h	4.1 Mio. h
Operat. Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
Derating +60°C to +70°C	1A/°C	1A/°C	2A/°C	not required	not required	1A/°C
Dimensions WxHxD	36x124x127mm	46x124x127mm	46x124x127mm	36x124x127mm	46x124x127mm	46x124x127mm
Weight	280g	340g	370g	340g	440g	360g
Connection Terminals	screw terminals	screw terminals, plug connector	screw terminals	screw terminals	screw terminals	screw terminals
Special Features	not suitable for QT20, QTD20, SilverLine	not suitable for QT40, SilverLine	not suitable for QT40, SilverLine			
Order Number	**YR40.242**	**YR40.245**	**YR80.242**	**YR40.241**	**YR80.241**	**YR40.482**

a) 50% higher currents are allowed up to 5s b) Current at voltage <6V c) 1+1-redundancy (= 50% of the nominal current) and symmetrical input currents

Protection Modules

PISA is a new and innovative low-cost concept for current distribution and protection of 24V load circuits. First, it distributes the current of a large power source to four lower current output channels and therefore allows for smaller wires to be used. The second function is to permit only as much current on the outputs so that the input voltage of this unit (which corresponds to the output voltage of the power supply) does not fall below 21V. This ensures a safe and uninterrupted supply voltage for sensitive equipment, such as PLCs, controls or sensors, when they are connected directly to the same power supply as the PISA module.

Less critical loads, that are not affected by short voltage interruptions or that could even be the cause of a fault on the 24V power supply are connected to one of the four current controlled output channels of the PISA module. The protection is independent of the length of the wires or of the power supplies' characteristics.



Output Current channel 1 channel 2 channel 3 channel 4	1A 1A 1A 1A	2A 2A 2A 2A	3A 3A 3A 3A	4A 4A 4A 4A	6A 6A 6A 6A
Nominal Voltage	DC24-28V	DC24-28V	DC24-28V	DC24-28V	DC24-28V
Input Voltage Range	18-30Vdc	18-30Vdc	18-30Vdc	18-30Vdc	18-30Vdc
Required Input Voltage for turning-on the Outputs, typ.	21.4Vdc	21.4Vdc	21.4Vdc	21.4Vdc	21.4Vdc
Turn-on Delay of Outputs	270ms	270ms	270ms	270ms	270ms
Input Voltage Protection Level min./max.	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc
Output Current (all 4 outputs together)	4A	8A	12A	16A	20A
Output Current Limitation min./max.	9A/12.7A	9A/12.7A	16.6A/23.6A	16.6A/23.6A	20.5A/30A
Shutdown-times at Short Circuit, typ.	110ms	110ms	10ms	10ms	8ms
Voltage Drop, typ.	41mV	83mV	75mV	101mV	124mV
Input Current at no Load, typ.	43mA	43mA	43mA	43mA	43mA
No-load Losses, typ	1.0W	1.0W	1.0W	1.0W	1.0W
Power Losses, typ.	1.0W	1.3W	1.4W	1.8W	2.4W
MTBF (+40°C, SN 29500)	2347 kh	2323 kh	2283 kh	2114 kh	1942 kh
Operat. Temperature Range	-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 each Channel	-	-	-	0.025A/°C	0.025A/°C
Dimensions WxHxD	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm
Weight	120g	120g	120g	120g	120g
Connection Terminals	screw terminals	screw terminals	screw terminals	screw terminals	screw terminals
Order Number	**PISA11.401**	**PISA11.402**	**PISA11.403**	**PISA11.404**	**PISA11.406**

Output Current channel 1 channel 2 channel 3 channel 4	10A 10A 10A 10A	3A 3A 6A 6A	6A 6A 12A 12A	3.7A (NEC CLASS 2) 3.7A (NEC CLASS 2) 3.7A (NEC CLASS 2) 3.7A (NEC CLASS 2)
Nominal Voltage	DC24-28V	DC24-28V	DC24-28V	DC24-28V
Input Voltage Range	18-30Vdc	18-30Vdc	18-30Vdc	18-30Vdc
Required Input Voltage for turning-on the Outputs, typ.	21.4Vdc	21.4Vdc	21.4Vdc	21.4Vdc
Turn-on Delay of Outputs	270ms	270ms	270ms	270ms
Input Voltage Protection Level min./max.	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc	21.0Vdc/21.8Vdc
Output Current (all 4 outputs together)	20A	18A	20A	14.8A at 24V; 12.8A at 28V
Output Current Limitation min./max.	20.5A/30A	20.5A/30A	20.5A/30A	16.6A/23.6A
Shutdown-times at Short Circuit, typ.	8ms	8ms	8ms	10ms
Voltage Drop, typ.	197mV	92mV (channel 1+2) 107mV (channel 3+4)	178mV (channel 1+2) 182mV (channel 3+4)	92mV at 24V, 81mV at 28V
Input Current at no Load, typ.	43mA	43mA	43mA	43mA
No-load Losses, typ	1.0W	1.0W	1.0W	1.0W
Power Losses, typ.	4.9W	1.9W	4.2W	1.6W
MTBF (+40°C, SN 29500)	1296 kh	2095 kh	1373 kh	2198 kh
Operat. Temperature Range	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Derating each Channel	0.025A/°C	0.025A/°C	0.025A/°C	-
Dimensions WxHxD	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm
Weight	120g	120g	120g	120g
Connection Terminals	screw terminals	screw terminals	screw terminals	screw terminals
Order Number	**PISA11.410**	**PISA11.203206**	**PISA11.206212**	**PISA11.CLASS2**

24V DC-UPS with Batteries

For the installation of a DC-UPS system there are three essential elements necessary: a power supply, a DC-UPS and a battery.
The DC-UPS is responsible for monitoring and charging the battery as well as controlling the seamless transition between normal and buffer mode.
The advantages of the PULS DC-UPS are:

- 1-Battery-Concept: each battery is individually charged and monitored which avoids the need for matched batteries
- Easy and self-explanatory plug and play
- Optimised battery management system for longest battery life
- 22.5-26V adjustable output voltage in buffer mode for the UB20
- Adjustable maximum buffer time to protect the battery

UB10 / UB20

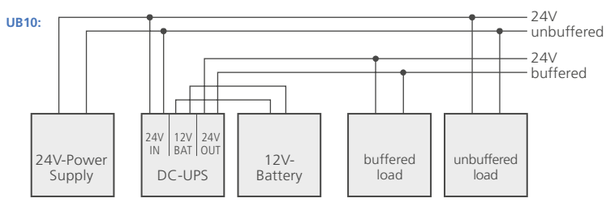
				NEW	
Nominal Current	**10A**	**10A**	**10A**	**20A**	**10A**
Nominal Voltage	**DC 24V**	**DC 24V**	**DC 24V**	**DC 24V**	**DC 24V**
Storage Element	external battery	external battery	external battery	external battery	built-in battery
Allowed Battery Size	**12V, 3.9 to 40Ah**	**12V, 17 to 130Ah**	**12V, 3.9 to 40Ah**	**24V, 3.9 to 150Ah**	**12V, 5Ah**
Output 1 in Normal-mode	15A	15A	15A	25A	15A
Buffer-mode	10A/15A a)	10A/15A a)	10A/15A a)	20A/30A a)	10A/15A a)
Output 2 in Normal-mode	-	-	12V 5A	-	-
Buffer-mode	-	-	12V 5A	-	-
Output Power in Normal-mode	360W	360W	360W	600W	360W
Output Power in Buffer-mode	240W/360W a)	240W/360W a)	240W/360W a)	480W/720W a)	240W/360W a)
Output Voltage in Normal-mode	minimal smaller than output voltage (Output 1)				
Output Voltage in Buffer-mode	regulated to: 22.5V	regulated to: 22.5V	regulated to: 22.5V and 12.0V	selectable: 22.5V/24V/25V/26V	regulated to: 22.5V
Temperature Tracking of the End-of-Charge Voltage	manual select	manual select/ automatically	manual select	automatically with temp. Sensor b)	automatically with temp. Sensor
Int. Current Consumption (incl. Charging Current)	1.3A	2.2A	1.3A	2.1A/4.0A c)	1.3A
MTBF (+40°C, SN 29500)	886 kh	886 kh	788 kh	649 kh	886 kh
Operat. Temperature Range	-25°C to +70°C	-25°C to +50°C	-25°C to +70°C	-40°C to +70°C	0°C to +40°C
Derating	>60°C 0.25A/°C	-	>50°C 0.25A/°C	>60°C 0.5A/°C	-
Dimensions WxHxD	49x124x117mm	49x124x117mm	49x124x117mm	46x124x127mm	123x124x119mm
Weight	530g	545g	650g	750g	2.85kg
Connection Terminals	spring terminals	spring terminals	spring terminals	screw terminals	spring terminals
Signals	Ready, Buffering, Inhibit, Replace Battery	Ready, Buffering, Inhibit, Replace Battery	Ready, Buffering, Inhibit, Replace Battery	Ready, Buffering, Inhibit, Replace Battery	Ready, Buffering, Inhibit, Replace Battery
Order Number	**UB10.241**	**UB10.242**	**UB10.245**	**UB20.241**	**UBC10.241** **UBC10.241-N1 d)**

a) 15A/360W resp. 30A/720W for up to 5s b) With PULS battery modules c) If adjusted to <10Ah / >10Ah d) Battery not included

Battery Modules for DC-UPS

Battery modules use maintenance-free VRLA batteries (Valve regulated Lead-Acid) and are charged at PULS before delivery. Battery modules can be ordered with (UZK) or without a battery (UZO). All battery modules from PULS support the 1-Battery-Concept. The 24V battery modules are equipped with a center-tap which protect against over-current and with an integrated temperature sensor.

Users who opt for using their own batteries and who still want to take advantage of the PULS-1-Battery-Concept, can use the sensor board with a PT1000 temperature sensor and center-tap fuse.



Order Number	Description	Dimensions
UZB12.051	12V, 5Ah Battery replacement for UBC10.241	90x106x70mm
UZB12.071	12V, 7Ah Battery replacement for UZK12.071 and UZK24.071 a)	151x98x65mm
UZB12.121	12V, 12Ah Battery replacement for UZK24.121 a)	151x98x98mm
UZB12.261	12V, 26Ah Battery replacement for UZK12.261	175x125x166mm
UZK12.071	12V, 7Ah Battery module with battery for UB10	155x124x112mm
UZK12.261	12V, 26Ah Battery module with battery for UB10	214x179x158mm
UZK24.071	24V, 7Ah Battery module with battery for UB20	137x186x143mm
UZK24.121	24V, 12Ah Battery module with battery for UB20	203x186x143mm
UZO12.07	Same as the UZK12.071 battery module but without battery	155x124x112mm
UZO12.26	Same as the UZK12.261 battery module but without battery	214x179x158mm
UZO24.071	Same as the UZK24.071 battery module but without battery	137x186x143mm
UZO24.121	Same as the UZK24.121 battery module but without battery	203x186x143mm
UZS24.100	Sensorboard with PT1000 temperature sensor and center-tap fuse	23x15x110,5mm

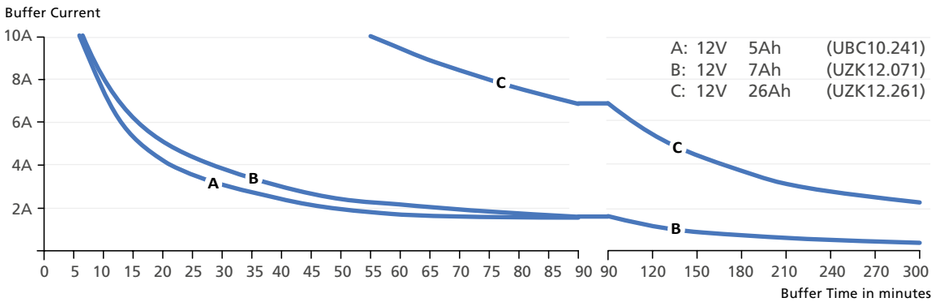
a) Two required

UZK12.071

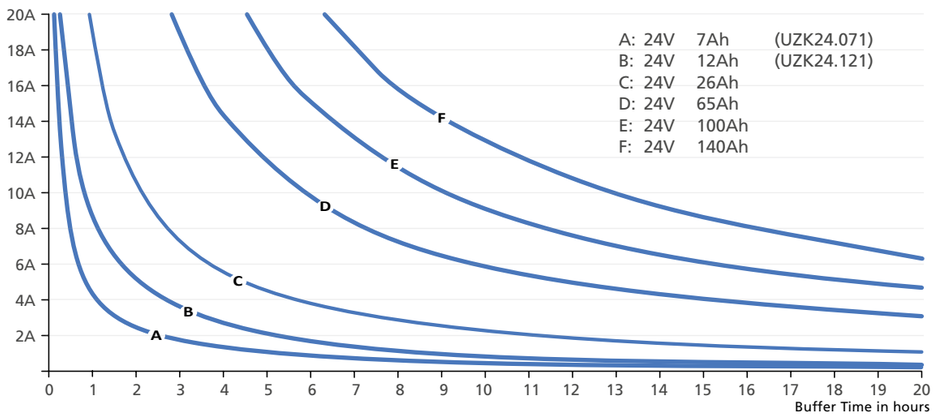
Buffer Times

Buffer Current	0A	0.2A	0.5A	1A	3A	5A	7A	10A	15A	20A
UBC10.241	1d 1h	7h 35min	3h 50min	2h	30min	16min 15s	11Min	6min 15s	5s	-
UB10 + 7Ah battery (12V)	1d 10h	11h 22min	5h 10min	2h 30min	38min	20min 30s	13min	6min 45s	5s	-
UB10 + 26Ah battery (12V)	5d 15h	2d 2h 50min	23h 6min 40s	11h 23min 20s	3h 40min	2h 10min	1h 30min	55min	5s	-
UB10 + 65Ah battery (12V)	14h 8h	5d 11h 52min	2d 11h 56min	1d 5h 56min	9h 53min 20s	5h 51min 40s	4h	2h 45min	5s	-
UB10 + 100Ah battery (12V)	23d 18h	8d 9h 54min	3d 19h 46min	1d 21h 36min	14h 53min 40s	8h 41min 40s	6h	4h 7min	5s	-
UB20 + 7Ah battery (24V)	1d 17h 40min	17h 13min 20s	9h 26min 40s	5h 16min 40s	1h 30min 16s	46min 30s	30min 11s	19min 11s	10min 35s	6min 45s
UB20 + 12Ah battery (24V)	2d 22h 50min	1d 6h 41min	17h 13min 20s	9h 51min 40s	3h 29min 54s	2h 2min 55s	1h 23min 50s	46min 2s	27min 34s	16min 47s
UB20 + 26Ah batteries (24V)	6d 19h 53min	2d 20h 3min	1d 13h 30min	21h 43min 20s	7h 32min 30s	4h 26min 40s	3h 7min 30s	2h 10min	1h 17min 40s	55min
UB20 + 65Ah batteries (24V)	16d 10h 26min	7d 3min 20s	3d 19h 40min	2d 4h 21min	20h 5min	11h 56min 40s	8h 25min 36s	5h 50min 15s	3h 49min 17s	2h 49min 29s
UB20 + 100Ah batteries (24V)	24d 7h 20min	10d 17h 5min	6d 3h 13min	3d 11h 20min	1d 6h 56min	18h 30min 40s	13h 10min	9h 11min 40s	6h 3min	4h 31min
UB20 + 140Ah batteries (24V)	34d 17h 20min	14d 11h 13min	8d 12h 10min	4d 21h 21min	1d 19h 18min	1d 1h 55min	18h 26min 9s	12h 52min 36s	8h 27min 44s	6h 19min 29s

UB10



UB20



The table above shows typical buffer times of standard battery modules. The aging effect during operation is not included. We recommend calculating a buffer time reduction of 30-50% for the life of the batteries.

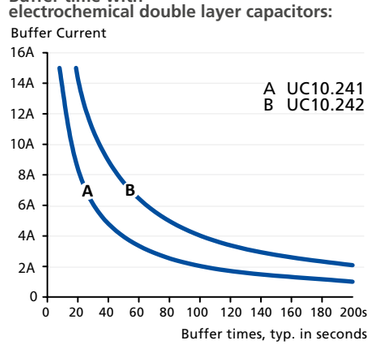
DC-UPS and Buffer Modules with Capacitor Storage

The DC-UPS with integrated electrochemical double layer capacitors are fully maintenance free and guarantee an uninterrupted power supply for periods measured in seconds. Buffer modules with electrolytic capacitors work similarly to a DC-UPS and can bridge power failures in the 24V or 48V net for periods measured in milliseconds (see graphs below).

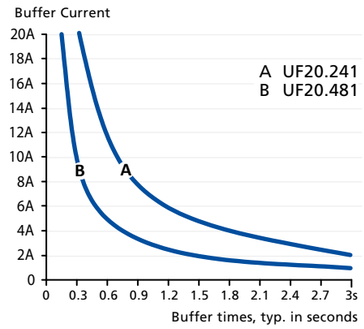
Contrary to the required replacement of DC-UPS systems based on batteries, a regular replacement of the capacitors is not necessary. In buffer mode, the output voltage is regulated and the change from normal to buffer mode is without interruptions. All modules are protected against overload and short-circuit.

UC10.241

Buffer time with electrochemical double layer capacitors:



Buffer time with electrolytic capacitors:



	NEW	NEW		
Nominal Voltage	**DC 24V**	**DC 24V**	**DC 24V**	**DC 48V**
Storage Element	Electrochemical Double Layer Capacitors	Electrochemical Double Layer Capacitors	Electrolytic Capacitors	Electrolytic Capacitors
Integegrated Storage Element	**6 kWs**	**12 kWs**	**0.2 kWs**	**0.2 kWs**
Nominal Current	15A	15A	not relevant	not relevant
Buffer Current, max.	15A	15A	20A	20A
Voltage in Buffer-mode	22.5V	22.5V	22.5V a)	45V a)
Separation of Input and Output	yes	yes	no	no
Charging Time	16 minutes	32 minutes	18 seconds	22 seconds
Buffer Time	typ. 16.5s at 10A typ. 9s at 15A	typ. 33s at 10A typ. 18s at 15A	310ms at 20A	150ms at 20A
Power Losses, typ.	4.6W at 10A	4.6W at 10A	1.9W in standby	1.9W in standby
MTBF (+40°C, SN 29500)	954 kh	850 kh	2327 kh	2348 kh
Operat. Temperature Range	-40°C to +60°C	-40°C to +60°C	-25°C to +70°C	-25°C to +70°C
Connection Terminals	spring terminals	spring terminals	spring terminals	spring terminals
Dimensions WxHxD	126x124x117mm	198x124x117mm	64x124x102mm	64x124x102mm
Weight	1150g	1720g	740g	740g
Signals	Ready, Buffering, Inhibit, PC-Mode	Ready, Buffering, Inhibit, PC-Mode	Ready, Buffering, Inhibit	Ready, Buffering, Inhibit
Order Number	**UC10.241**	**UC10.242**	**UF20.241**	**UF20.481**

a) Or selectable 1V (UF20.241) or 2V (UF20.481) smaller than input voltage

Modifications

PULS and MGV are developing customised solutions for special requirements, which are not covered by standard power supplies.

You can use and benefit from the know-how of our development teams.

DC/DC-converter for solar applications

- Input: 240-460Vdc
- Output: 24V
- Power: 480W

DC/DC-converter

- Input: 48-72Vdc
- Output: 23-25Vdc / 3.1A / 72W
- Operational temperature: -40 to +70°C
- DC-OK signal

DC/DC-converter with high DC-input voltage

- Input: 360-480Vdc
- Output: 24Vdc / 20A
- Operational temperature: -40 to +70°C
- Transient resistant input
- Signal contacts
- Return voltage immunity

Power Supply with two output voltages and fan

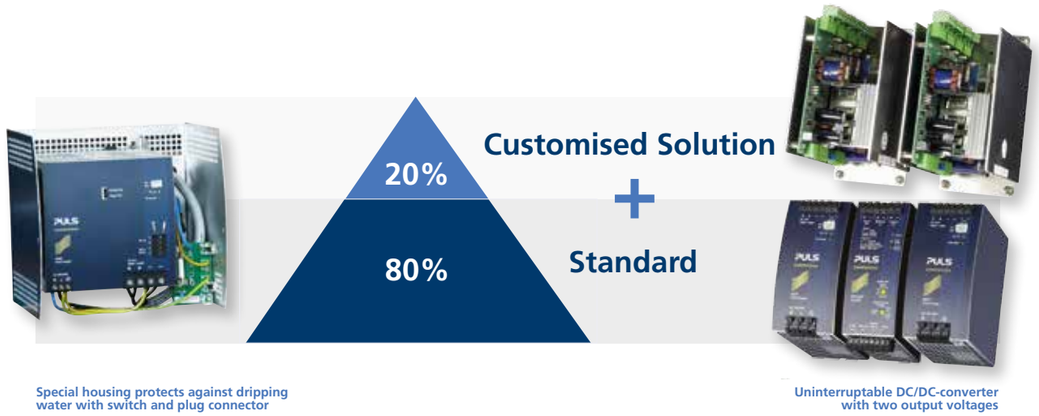
- Input: 3AC 400-480V
- Output: 162Vdc and 300Vdc
- Optimised for dynamic loads
- High lifetime expectation at +60°C environmental temperature because of integrated fan
- Communication interface

AC/DC-converter for railway applications

- Input: AC 110-230V
- Output: 24V / 3W
- Operational temperature: -40 to +70°C
- Impedance input lead: 200Ω

Value-Add System Solutions

PULS and MGV are offering services to combine standard units with an assembly and wiring package to provide a complete power supply system.The purpose is to create reliable, customised solutions based on current proven production units. Because of the high percentage of existing standard units, you will receive a cost-effective, customised solution in a timely manner.



Special housing protects against dripping water with switch and plug connector

Uninterruptable DC/DC-converter with two output voltages

PULS & mgv

The **PULS Group**, consisting of PULS and MGV, is the largest privately owned and managed supplier of DIN Rail Power Supplies in Germany.

PULS has an extensive product offering of standard power supplies and a strong global presence.

MGV has more than 30 years of professional experience in customised power supply solutions. MGV is characterised by short communication channels, high flexibility and an application-orientated consulting service.

With **PULS & MGV** you are supported by the best of both worlds. We combine the service of a small company and its customised developments with the technology, reliability and cost-optimisation of a high volume, global leader in power supply manufacturing.

Standards and Approvals

	Page	CE (LVD, EMC)	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEx	ATEX	Class I Div. 2 HazLoc	GL	ABS	EAC Registration	NEC Class 2	EN 50155 Railway	EN 61000-3-2 Harmonics (PFC)	EN 61000-6-1 Immunity f. residential environments	EN 61000-6-2 Immunity for industrial environments	EN 61000-6-3 Emission for residential environments	EN 61000-6-4 Emission for industrial environments	EN 55011 / EN 55022 classe B Disturbance characteristics
Power Supplies																			
CD5.121	28	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
CD5.241	28	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
CD5.241-L1	28	•	•	•	•	•	•	•	•		•	•		5	•	•	•	•	•
CD5.241-S1	28	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
CD5.242	28	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
CD5.243	28	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
CP10.121	19	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CP10.241	22	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CP10.241-S1	22	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CP10.242	22	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CP10.481	25	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.121	19	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.241	23	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.241-60	29	•									•		•	5		•		•	
CPS20.241-C1	23	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.241-D1	29	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
CPS20.361	24	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.481	25	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
CPS20.481-D1	29	•	•	•	•	•	•	•			•			5	•	•	•	•	•
CS3.241	20	•	•	•	•			•	•	•	•	•		1	•	•	•	•	•
CS5.241	21	•	•	•	•			•	•	•	•			-	•	•		•	•
CS5.241-C1	21	•	•	•	•				•	•	•			-	•	•		•	•
CS5.241-S1	21	•	•	•	•			•	•	•	•			-	•	•		•	•
CS5.243	21	•	•	•	•			•	•	•	•			4	•	•	•	•	•
CS5.244	21	•	•	•	•			•	•	•	•			1	•	•	•	•	•
CS10.241	22	•	•	•	•			•	•	•	•			-	•	•		•	•
CS10.241-S1	22	•	•	•	•			•	•	•	•			-	•	•		•	•
CS10.242	22	•	•	•	•			•	•	•	•			1	•	•	•	•	•
CS10.243	22	•	•	•	•			•	•	•	•			4	•	•	•	•	•
CS10.244	23	•	•	•	•			•	•	•	•			-	•	•		•	•
CS10.481	25	•	•	•	•			•	•	•	•			-	•	•		•	•
CT5.121	26	•	•	•	•			•	•	•	•			1	•	•	•	•	•
CT5.241	26	•	•	•	•			•	•	•	•			1	•	•	•	•	•
CT10.241	26	•	•	•	•			•	•	•	•			1	•	•	•	•	•
CT10.481	27	•	•	•	•			•	•	•	•			1	•	•	•	•	•

• fulfilled
(•) in preperation
- not fulfilled

1) meets class A limits (passive)
2) meets class A limits (active)
3) not applicable (<75VA)
4) not applicable (<220Vac)
5) not applicable for this type

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ML15.051	18	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML15.121	18	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML15.241	19	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML30.100	19	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML30.101	18	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML30.102	18	•	•	•	•			•			•	•		3	•	•	•	•	•
ML30.106	19	•	•	•	•				•	•	•	•		3	•	•	•	•	•
ML30.241	19	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML50.100	20	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML50.101	20	•	•	•	•			•			•	•		3	•	•	•	•	•
ML50.102	18	•	•	•	•			•			•	•		3	•	•	•	•	•
ML50.105	24	•	•	•	•						•	•		3	•	•	•	•	•
ML50.109	20	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML50.111	20	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML60.121	18	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML60.122	18	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML60.241	20	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML60.242	20	•	•	•	•			•	•	•	•	•		3	•	•	•	•	•
ML70.100	20	•	•	•	•			•	•	•	•	•		1	•	•	•	•	•
ML90.200	26	•	•	•	•				•	•	•	•		1	•	•	•	•	•
ML95.100	21	•	•	•	•			•			•	•		1	•	•	•	•	•
ML100.100	21	•	•	•	•			•	•	•	•			1	•	•	•	•	•
ML100.102	19	•	•	•	•			•	•	•	•			1	•	•	•	•	•
ML100.105	24	•	•	•	•				•	•	•			1	•	•	•	•	•
ML100.109	21	•	•	•	•			•	•	•	•			1	•	•	•	•	•
ML100.200	26	•	•	•	•				•	•	•			1	•	•	•	•	•
PAS395	25	•									•			-		•		•	
PIC120.241C	22	•	•	•	•				•		•			1	•	•	•	•	•
PIC120.241D	22	•	•	•	•						•			1	•	•	•	•	•
PIC120.242C	22	•	•	•	•				•		•			1	•	•	•	•	•
PIC240.241C	23	•	•	•	•				•		•			-	•	•		•	•
PIC240.241D	23	•	•	•	•						•			2	•	•	•	•	•
QS3.241	21	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS5.241	21	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS5.241-60	29	•									•		•	5	•	•	•	•	•
QS5.241-A1	21	•	•	•	•	•	•	•	•	•	•			2	•	•	•	•	•
QS5.DNET	21	•	•	•	•			•	•	•	•	•		2	•	•	•	•	•

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QS10.121	19	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS10.241	23	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS10.241-60	29	•									•		•	5	•	•	•	•	•
QS10.241-A1	23	•	•	•	•	•	•	•	•	•	•			2	•	•	•	•	•
QS10.241-C1	23	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS10.241-D1	23	•	•	•	•						•			2	•	•	•	•	•
QS10.301	24	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS10.481	25	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS10.481-D1	25	•	•	•	•						•			2	•	•	•	•	•
QS10.DNET	22	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS20.241	23	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS20.241-A1	23	•	•	•	•	•	•	•	•	•	•			2	•	•	•	•	•
QS20.241-C1	23	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS20.244	23	•	•	•	•			•	•	•	•			-	•	•	-	•	•
QS20.361	24	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS20.481	25	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QS40.241	23	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
QS40.244	23	•	•	•	•				•	•	•			-	•	•	•	•	•
QS40.361	24	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
QS40.481	25	•	•	•	•	•	•	•	•		•			2	•	•	•	•	•
QS40.484	25	•	•	•	•				•	•	•			-	•	•	•	•	•
QT20.241	26	•	•	•	•			•	•	•	•			1	•	•	•	•	•
QT20.241-C1	26	•	•	•	•			•	•	•	•			1	•	•	•	•	•
QT20.361	27	•	•	•	•			•	•	•	•			1	•	•	•	•	•
QT20.481	27	•	•	•	•			•	•	•	•			1	•	•	•	•	•
QT40.241	26	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QT40.361	27	•	•	•	•						•			2	•	•	•	•	•
QT40.481	27	•	•	•	•			•	•	•	•			2	•	•	•	•	•
QTD20.241	29	•	•								•			5	•	•		•	
SLA3.100	30	•	•	•	•	•	•	•			•	•		1	•	•	•	•	•
SLA4.100	30	•	•	•							•			1	•	•	•	•	•
SLA8.100	30	•	•	•	•						•			-	•	•		•	•
SLA8.300	30	•									•			1	•	•		•	
SLAD4.100	30	•	•	•	•						•			5	•	•	•	•	•
XT40.241	27	•	•	•	•						•			1	•	•	•	•	•
XT40.242	27	•	•	•	•						•			1	•	•	•	•	•
XT40.361	27	•	•	•	•						•			1	•	•	•	•	•
XT40.362	27	•	•	•	•						•			1	•	•	•	•	•
XT40.481	27	•	•	•	•						•			1	•	•	•	•	•
XT40.482	27	•	•	•	•						•			1	•	•	•	•	•
XT40.721	27	•	•	•	•						•			1	•	•	•	•	•
XT40.722	27	•	•	•	•						•			1	•	•	•	•	•

	Page	CE (LVD, EMC)	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEx	ATEX	Class I Div. 2 HazLoc	GL	ABS	EAC Registration	NEC-Class-2	EN 50155 Railway	EN 61000-3-2 Harmonics (PFC)	EN 61000-6-1 Immunity f. residential environments	EN 61000-6-2 Immunity for industrial environments	EN 61000-6-3 Emission for residential environments	EN 61000-6-4 Emission for industrial environments	EN 55011 / EN 55022 classe B Disturbance characteristics
Supplementary units																			
MLY02.100	32	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
MLY10.241	32	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
PISA11.203206	35	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.206212	35	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.401	34	•	•	•	•		•	•	•		•	•		5	•	•	•	•	•
PISA11.402	34	•	•	•	•		•	•	•		•	•		5	•	•	•	•	•
PISA11.403	34	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.404	34	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.406	34	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.410	35	•	•	•	•		•	•	•		•			5	•	•	•	•	•
PISA11.CLASS2	35	•	•	•	•		•	•	•		•	•		5	•	•	•	•	•
UB10.241	36	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
UB10.242	36	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
UB10.245	36	•	•	•	•	•	•	•			•			5	•	•	•	•	•
UB20.241	36	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
UBC10.241	36	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
UBC10.241-N1	36	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
UC10.241	39	•	•	•	•	•	•	•			•			5	•	•	•	•	•
UC10.242	39	•	•	•	•	•	•	•			•			5	•	•	•	•	•
UF20.241	39	•	•	•	•						•			5	•	•	•	•	•
UF20.481	39	•	•	•	•						•			5	•	•	•	•	•
UZB12.051	37	•									•			5	-	-	-	-	-
UZB12.071	37	•									•			5	-	-	-	-	-
UZB12.121	37	•									•			5	-	-	-	-	-
UZB12.261	37	•									•			5	-	-	-	-	-
UZK12.071	37	•					•	•	•	•	•			5	-	-	-	-	-
UZK12.261	37	•					•	•	•	•	•			5	-	-	-	-	-
UZK24.071	37	•	•	•		•	•	•			•			5	-	-	-	-	-
UZK24.121	37	•	•	•		•	•	•			•			5	-	-	-	-	-
UZO12.07	37	•				•	•	•	•	•	•			5	-	-	-	-	-
UZO12.26	37	•				•	•	•	•	•	•			5	-	-	-	-	-
UZO24.071	37	•	•	•		•	•	•	•		•			5	-	-	-	-	-
UZO24.121	37	•	•	•		•	•	•	•		•			5	-	-	-	-	-
UZS24.100	37	•				•	•	•						5					
YR2.DIODE	32	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
YR40.241	33	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
YR40.242	33	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
YR40.245	33	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
YR40.482	33	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
YR80.241	33	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•
YR80.242	33	•	•	•	•	•	•	•	•		•			5	•	•	•	•	•
YRM2.DIODE	32	•	•	•	•	•	•	•	•	•	•			5	•	•	•	•	•

• fulfilled
(•) in preperation
- not fulfilled

1) meets class A limits (passive) 2) meets class A limits (active)
3) not applicable (<75VA) 4) not applicable (<220Vac) 5) not applicable for this type

Standards and Approvals

Available Standards and Approvals – An Overview of PULS Products:

CE	Europe	CE mark: The CE mark in conjunction with the manufacturer's Declaration of Conformity confirms that the directives of the European Union stated in the manufacturer's declaration of conformity have been fulfilled. European standards (EN standards) provide the foundation for fulfilling the directives.
c UL us LISTED UL LISTED	USA	ICE Industrial Control Equipment: Instrumentation for control devices. This certification mark is based on the UL 508. Device approval (LISTED) for the USA UL (Underwriters Laboratories Inc.) is an independent testing and certification body, which also holds its own set of standards (UL standards). Under a reciprocal agreement with Canada, the approval is also recognised in Canada if the Canadian requirements are additionally taken into account in the approval process. This can be identified from the small „c" on the left-hand side of the certification mark.
c UL us	ITE	ITE (Information Technology Equipment): Safety of information technology equipment. This certification mark is based on the UL 60950-1.
IECEE CB SCHEME	International	CB Scheme: The CB scheme is an international agreement on the mutual recognition of test results between currently approximately 60 national testing organizations in more than 40 countries. It is based on the harmonised IEC standards in conjunction with national variations of these standards. PULS offers a CB scheme in accordance with IEC 60950-1 for many devices. A uniform report form and an inspection of the labs in accordance with established standards ensure that the testing methods are the same in all labs while guaranteeing the quality of test results. All participating countries have to recognise the CB report and award a national certification mark based on it.
IECEx	International	IECEx: International approval for the use of equipment in areas with potentially explosive atmospheres. This certification mark is based on the IEC 60079-0 and IEC 60079-15 standards.
Ex	ATEX	European approval for the use of equipment in areas with potentially explosive atmospheres. This certification mark is based on the EN 60079-0 and EN 60079-15 standards.
c SP us c UL us	Class I Div 2	US approval for use in areas with potentially explosive atmospheres (Haz. Loc.). This certification mark is based on the ANSI/ISA–12.12.01. The approval may be either provided by UL or CSA.
GL	GL	Germanischer Lloyd: Prototype testing for the shipbuilding and offshore sector
ABS	ABS	ABS American Bureau for Shipping: Type testing (PDA) for shipbuilding or offshore approvals for the USA.
EAC	Russia	TR EAC registration: Approval for Russia, Kazakhstan and Belarus
NEC-Class-2 <8A <100W	NEC CLASS 2	„NEC CLASS 2" electric circuits are deemed non-hazardous in terms of fire and electrical shock hazards. The advantage of such electric circuits is the significantly reduced effort needed for cabling during installation, which makes them more economical, and the significantly lower amount of testing work required for the approval of the entire system. The power source must either be constructed in accordance with UL 1310 or must be classified and listed as a Limited Power Source (LPS) in accordance with IEC 60950-1.
Power Standards Lab PSL. SEMI F47	SEMI F47	Requirements of the semiconductor industry in terms of mains voltage loss. For example, power supplies may not show signs of output voltage loss at 50% mains voltage for a duration of 200 ms. Such voltage loss may occur when heavy loads are switched on or when supply grids are switched from one to another.

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