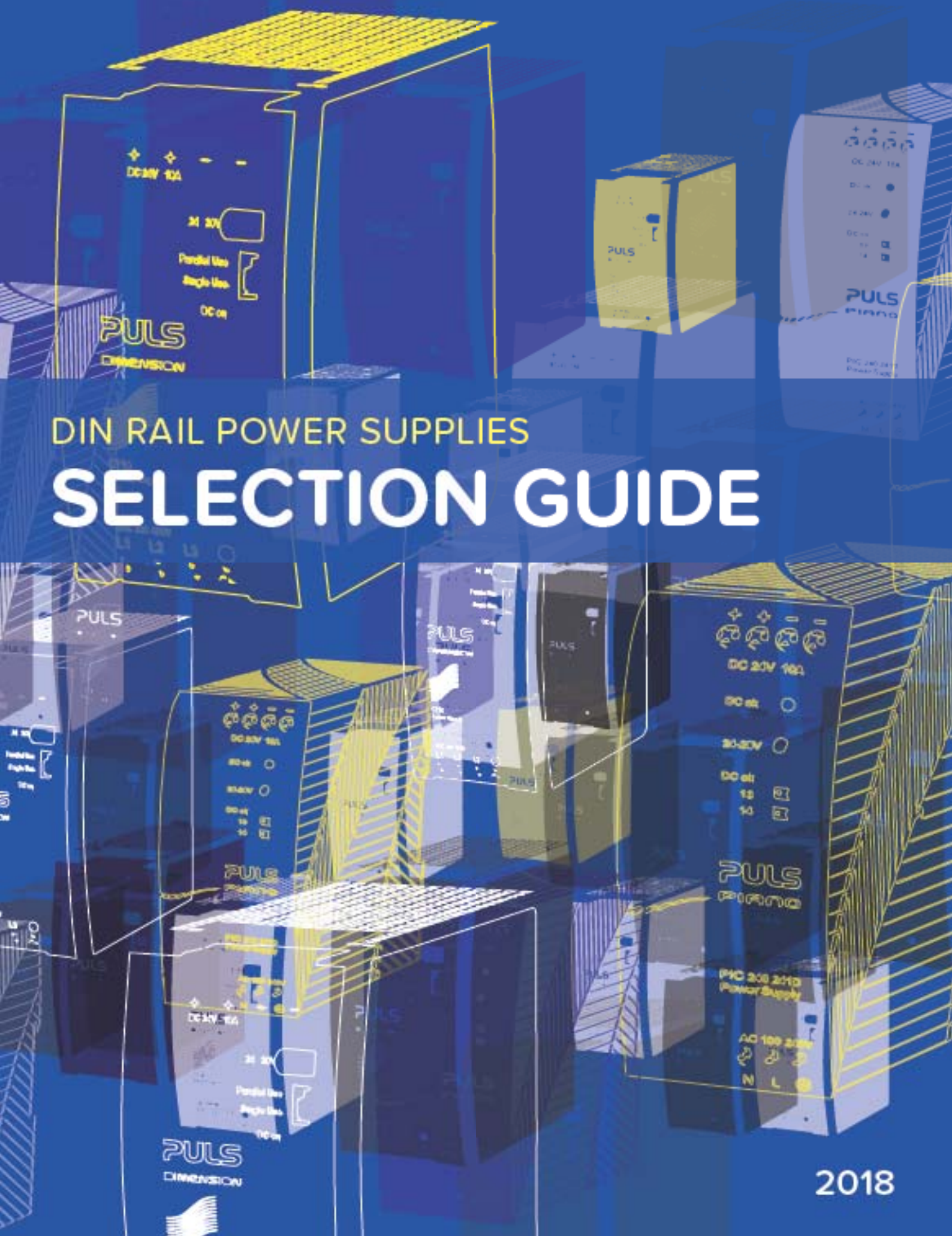


PULS

DIN RAIL POWER SUPPLIES

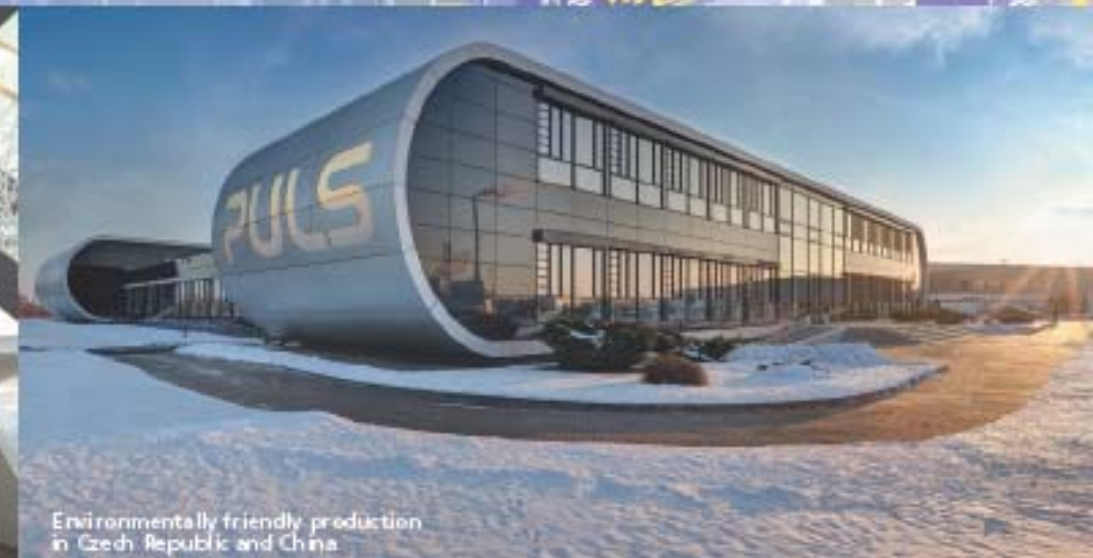
SELECTION GUIDE



2018

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PULS – The Technology Leader

Efficient. Innovative. Different.

When I founded PULS over 35 years ago, we were a handful of developers with a common goal: we wanted to revolutionise power supply technology.

Today PULS is a global market and technology leader in the field of DIN rail power supplies.

This was made possible by our focus and a great team that naturally strives for the next stage of innovation for every new PULS product. This ambition can be experienced by our customers in the maximum efficiency levels, longest lifetime, smallest dimensions and the absolute reliability of our power supplies.

The power supplies and relevant add-ons are developed at our inspiring headquarters in the heart of Munich. The efficient, family-like and value-oriented work environment, as well as the central location contribute to making PULS attractive for the best engineers, specialists and up-and-coming talents.

Production is carried out in our own smart and environmentally friendly plants in the Czech Republic and China. The entire value chain is kept under our full control, and this level of control is important to us. In customer audits, our plants are repeatedly praised for their efficiency, streamlined structure and environmentally friendly objectives.

We have established a broad range of standard power supplies available from stock at any time, offering the right solution for every application. We can modify standard devices or offer customised system solutions as required.

Our sales department can offer you expert advice at all times, providing ongoing technical support from our application specialists.

I am proud of what we have achieved for our customers over the past few decades. The future promises many more exciting innovations in the field of DIN rail power supplies. Be a part of it!

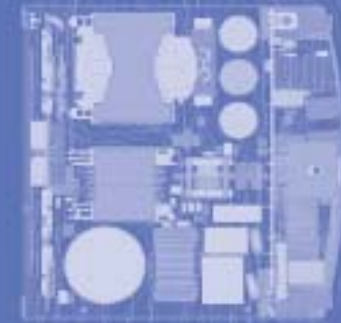
Bernhard Erdl
Founder and Managing Director

www.pulspower.com



Dependability

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



Headquarters
Munich



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 organisational structure
- Decades of competence



The perfect power supply for every application

DIMENSION
MiniLine
PIANO



DIMENSION

Highest performance with numerous variants, features and approvals.

PIANO

Focus on basic functionality. No compromises on quality and reliability.



MiniLine

Ultra compact design for low-power applications.

DIMENSION

Full featured

PIANO

Cost oriented

MiniLine

Low-power

INPUT / OUTPUT

Input voltage

1-phase, 3-phase, DC

1-phase

1-phase, 3-phase, DC

Output voltage (DC)

12 / 24 / 30 / 36 / 48V

24V

5 / 10 / 12 / 15 / 24 / 30 / 48V

Output power

80-960W

60-480W

15-100W

FEATURES

Power reserves

✓✓

—

—

Efficiency, 24V versions

96.0%

95.7%

91.0%

Housing material

Aluminium

Polycarbonate (PC)

PC / ABS blend

Parallel connection

✓✓

✓✓

✓✓

DC-OK relay contact versions

✓✓

✓✓

✓✓

Long lifetime

✓✓

✓✓

✓✓

Fuse breaking capability

✓✓

✓

—

Resists high power transient voltages

✓✓

✓✓

✓

ENVIRONMENT

Operational temperature range

-60°C ... +70°C*

-25°C ... +70°C*

-40°C ... +70°C*

Conformal coated versions

✓✓

—

✓

Hazardous environment

✓

—

✓

High mechanical stress (shock & vibration)

✓✓

✓✓

✓✓

* Special versions with broader temperature range available

New Products

PIANO

PIC Series



The perfect blend of value and quality

The growing PIANO product range offers high-end values at a mid-range price. The power supplies are focused on simplicity without making compromises on PULS' renowned qualities: high efficiency, absolute reliability and long lifetimes.

New low-power units

The very compact 60W and 90W DIN rail power supplies will complement the PIANO product line in Q1/2018. Both units are highly efficient and will be available with large screw or push-in terminals.

PIC90 – the smallest 90W unit ever

Efficiency: > 92.0%
Size record: 36x90x90mm (WxHxD)
AC 100-240V wide range input
Optional push-in or screw terminals
Will also be available with 60W: PIC60
Units available in Q1/2018



New 480W units

Two powerful 480W DIN rail power supplies are being added to the already successfully launched 120W (also available as a 12V, 10A version soon) and 240W versions.

PIC480.241D

Efficiency: > 95.0%
Minimum lifetime: > 11 years
Space saving design: 59mm wide

Also available without wide range input (AC 200-240V): PIC480.241C

More information on page 24

DIMENSION

CP Series



Efficient. Compact. Reliable.

The PULS CP series breaks all records in terms of efficiency, lifetime and dimensions. Thanks to a broad range of new CPs even more users can profit from the benefits of this innovative product series.

120W

Ultra-compact design WxHxD: 32x124x102mm			Page
CP5.121	12V, 10A		19
CP5.241	24V, 5A		21

480W

Maximum efficiency and lowest power losses			
CP20.241	24V, 20A	95.6% / 22W	24
CP20.481	48V, 10A	96.0% / 20W	27

Medical applications

IEC 60601-1 3rd edition, 2 MO PP, IEC 60601-1-2 4th edition		
CP5.241-M1	5A	35
CP10.241-M1	10A	35
CP20.241-M1	20A	35

Railway applications

EN 50155 certified, conformal coating, input voltage: DC 110V (-30%/+40%)		
CP10.241-60	10A	34

Conformal coating

Resistant to humidity, dust and vibrations			Page
CP10.241-C1	10A		23
CP20.241-C1	20A		24

Integrated decoupling

Energy-efficient MOSFET technology and active load sharing. No additional redundancy module required.

CP10.241-R1	10A	37
CP10.241-R2	Hot-swap connectors	37
CP20.241-R1	20A	37
CP20.241-R2	Hot-swap connectors	37

Push-in terminals

Time-saving installation without tools		
CP5.241-S2	5A	21
CP10.241-S2	10A	23
CP20.241-S2	20A	24

New Products



Power-over-Ethernet (PoE)



The new PoE solutions are available in combination with an integrated power supply (PoE injector with AC input) or as a standalone module (PoE injector with DC input). The devices are optimised for plug and play, and automatically detect the performance class of the connected components (IEEE 802.3at/af). Thanks to its high performance (PoE+ and Gigabit Ethernet), reliability and efficiency as well as the robust device design, the PoE power supplies and injectors are ideal for flexible use in numerous applications: e.g. process and production automation, medical technology as well as monitoring systems and infrastructure.

PoE Injector (AC input)

Output	
PoE Standard	PoE+ (IEEE 802.3at)
Output current	30W (25.5W on the load) per port
Output voltage	up to 56V per port
Input (integrated power supply: CP10.481)	
AC Input voltage nominal	100 – 240V
AC Input voltage range	90 – 264V
Power factor	0.98
AC Input current, typical	6A
DC Input voltage, nominal	110 – 150V
DC Input voltage range	88 – 187V
Efficiency (CP10.481)	95.5%
MTBF SN 29500, IEC 61709 (CP10.481)	699kh
Lifetime expectancy (CP10.481)	> 109kh
General data	
Data transfer rate	Gigabit Ethernet
Connection terminal type	Plug connector, RJ45 Ethernet
Number of ports	8
Dimensions WxHxD	77 x 131 x 117mm
Weight	900g
Operational temperature	-25°C to +70°C (from +60°C with derating)
DC-OK relay contact	integrated
Order Number	
POE.8AT-AC1	8 ports

PoE Injector (DC input)

Output	
PoE Standard	PoE+ (IEEE 802.3at)
Output power	30W (25.5W on the load) per port
Output voltage	48V to 56V per port
Input	
DC input voltage range	48 – 56V
Input current	6A
General data	
Data transfer rate	Gigabit Ethernet
Connection terminal type	Plug connector, RJ45 Ethernet
Number of ports	4 or 8
Dimensions WxHxD	39 x 128 x 117mm
Weight	360g
Operational temperature	-45°C to +85°C
Order Numbers	
POE.8AT-DC1	8 ports
POE.4AT-DC1	4 ports



AC Input 100 – 240V

DC Input 48 – 56V

New Service

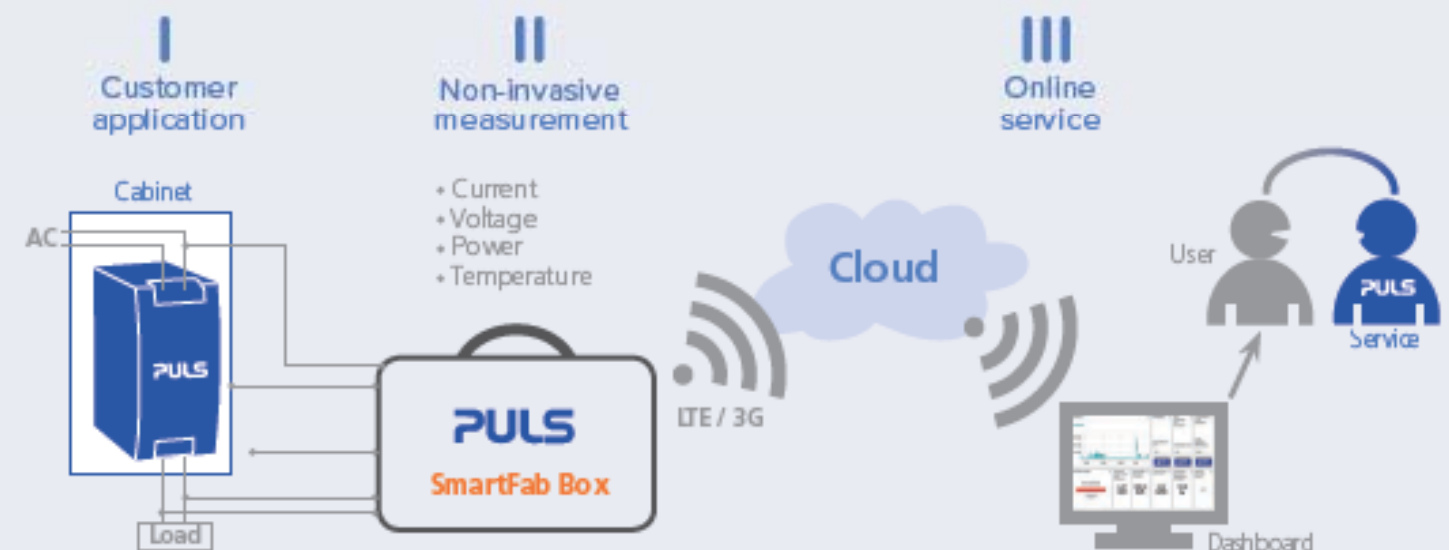


Application Analysis Tool

The new SmartFab Box was developed to bring more transparency to the power requirements and thermal challenges in applications. Users can now check and specify their power budgets directly in their application. This knowledge helps in selecting the right power supply and avoiding over-sized power reserves.



How the SmartFab Box works



Benefits of the SmartFab Box:

- **Transparent power data**
The temperature, voltage and current measurements are displayed nearly in real-time.
- **Fast and safe to operate**
VPN connection via LTE/3G. There is no need to connect the SmartFab Box to the local corporate network. The non-invasive installation and measurement do not influence the application.
- **Reliable and confidential**
No data loss in case of power failure. Data backup is anonymously stored on a cloud server located in Germany.

Rent or buy the SmartFab Box:

Email: smartfabbox@powersupply.cloud

Technical requirements:

- AC-mains
- LTE/3G network coverage
- Supported browsers: Google Chrome, Mozilla Firefox, Internet Explorer, Safari

Overview 1

Power Supplies

100-240V AC/DC-Converters

Output		Order Number	Page	Adjustment 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		
12V	1.3A	ML15.121	18	12-15Vdc	15W	22.5	AC 100-240V	
	2.5A	ML30.102	18	10-12Vdc	30W	45.0		very low output noise
	4.2A	ML50.102	18	12-15Vdc	50W	45.0		
	4.5A	ML60.121	18		54W	45.0		
		ML60.122	19			45.0		-40°C operation
	7.5A	ML100.102	19		90W	72.5		AC 100-120 / 220-240V
	10A	CP5.121	19		120W	32.0		AC 100-240V
	15A	QS10.121	19		180W	60.0		
		CP10.121	19		192W	39.0		shut-down Input
	30A	CP10.122	19			39.0		extended DC-Input
		CPS20.121	19		405W	65.0		
±12V	2.5A	ML30.106	19	±12-15Vdc	36W	45.0	AC 100-240V	dual-output voltage
24V	0.63A	ML15.241	20	24-28Vdc	15W	22.5	AC 100-240V	
	1.3A	ML30.100	20		30W	45.0		
		ML30.241	20			22.5		
	2.1A	ML50.100	20	24-28Vdc	50W	45.0		AC 100-240V
		ML50.101	20			45.0		optimised for parallel use
		ML50.111	20			45.0		with plug connector
	2.5A	ML60.241	20		60W	45.0		
		ML60.242	21			45.0		-40°C operation
	3A	ML70.100	21	24-28Vdc	72W	45.0		AC 100-120 / 220-240V
	3.3A	CS3.241	21		80W	32.0		AC 100-240V
	3.4A	QS3.241	21			32.0		
	3.8A	QS5.DNET	21	24Vdc	91W	40.0		DeviceNet approved
	3.9A	ML95.100	21	24-28Vdc	95W	72.5		AC 100-120 / 220-240V
	4.2A	ML100.100	21		100W	72.5		AC 100-120 / 220-240V
		5A	CP5.241	21	120W	32.0		AC 100-240V
						32.0		reduced depth
						32.0		push-in clamps
						32.0		AC 100-120 / 200-240V
						32.0		spring-clamps
						32.0		AC 100-120V
						32.0		AC 200-240V
						39.0		
						39.0		AC 200-240V
						39.0		AC 100-120 / 200-240V
						40.0		
	8A	QS10.DNET	22	24-24.5Vdc	192W	60.0		DeviceNet approved

Output		Order Number	Page	Adjustment Range	Power	Width in mm	Input	Special Features
24V	10A	CP10.241	23	24-28Vdc		39.0	AC 100-240V	
		CP10.241-S2	23			39.0		push-in clamps
		CP10.242	23			39.0		extended DC-Input
		PIC240.241C	23			49.0		AC 200-240V
		PIC240.241D	23			49.0		AC 100-240V
		CS10.241	23			60.0		AC 100-120 / 200-240V
		CS10.241-S1	23			60.0		spring-clamp terminals
		CS10.242	23			60.0		passive PFC
		CS10.243	23			60.0		AC 100-120V
		CS10.244	23			60.0		AC 200-240V
		QS10.241	23			60.0	AC 100-240V	
		QS10.241-D1	23			60.0		extended DC-Input
	20A	CP20.241	24	24-28Vdc	480W	48.0	AC 100-240V	
		CP20.241-S1	24			48.0		spring-clamp terminals
		CP20.241-S2	24			48.0		push-in clamps
		CP20.241-V1	24			48.0		remote shut-down
		PIC480.241C	24	24-28Vdc		49.0		AC 200-240V
		PIC480.241D	24			59.0		
		CPS20.241	24			65.0		AC 100-240V
		QS20.244	24			70.0		AC 200-240V
		QS20.241	24			82.0		AC 100-240V
	40A	QS40.241	24	24-28Vdc	960W	125.0	AC 100-240V	
		QS40.244	25			125.0		AC 200-240V
30V	8A	QS10.301	25	28-32Vdc	240W	60.0	AC 100-240V	
36V	6.7A	CP10.361	25	36-42Vdc	240W	39.0	AC 100-240V	
	13.3A	CPS20.361	25		480W	65.0		
		QS20.361	25			82.0		
	26.7A	QS40.361	25			960W		125.0
48V	1.1A	ML50.105	26	48-56Vdc	50W	45.0	AC 100-240V	
	2.1A	ML100.105	26		100W	72.5		AC 100-120 / 220-240V
	5A	CS10.481	26		240W	60.0		AC 100-120 / 200-240V
		QS10.481	26			60.0		AC 100-240V
		QS10.481-D1	26			60.0		extended DC-Input
	5.4A	CP10.481	26		259W	39.0		
	10A	CP20.481	27		480W	48.0		
		CPS20.481	27			65.0		
		QS20.481	27			82.0		
	20A	QS40.481	27		960W	125.0		
		QS40.484	27			125.0		AC 200-240V
360-460V	2.5A	PAS395	27	360-460Vdc	1025W	310.0	AC 220-240V	charger for electro-chem. double-layer capacitors

Overview 2

Power Supplies

380-480V AC/DC-Converters

Output		Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
12V	8A	CT5.121	28	12-15Vdc	96W	40.0	2AC 380-480V	
24V	3.75A	ML90.200	28	24-28Vdc	90W	72.5	2AC 380-480V	NEC-CLASS-2
	4.2A	ML100.200	28		100W	72.5		
	5A	CT5.241	28		120W	40.0		
	10A	CT10.241	28	240W	62.0	3AC 380-480V		
	20A	QT20.241	28	480W	65.0			
	40A	QT40.241	28	960W	110.0			
		QT40.242	28	960W	110.0		enhanced lifetime	
		XT40.241	29	24Vdc	960W	96.0	3AC 400V	semi-regulated
	XT40.242	29	96.0		3AC 480V	semi-regulated		
36V	13.3A	QT20.361	29	36-42Vdc	480W	65.0	3AC 380-480V	
	26.6A	XT40.361	29	36Vdc	960W	96.0	3AC 400V	semi-regulated
		XT40.362	29		96.0	3AC 480V	semi-regulated	
	26.7A	QT40.361	29	36-42Vdc	960W	110.0	3AC 380-480V	
	48V	5A	CT10.481	29	48-56Vdc	240W	62.0	3AC 380-480V
10A		QT20.481	29	48-55Vdc	480W	65.0		
20A		QT40.481	29	48-54Vdc	960W	110.0		
		XT40.481	29	48Vdc	960W	96.0	3AC 400V	semi-regulated
		XT40.482	29		96.0		semi-regulated	
72V	13.3A	XT40.721	29	72Vdc	960W	96.0	3AC 400V	semi-regulated
		XT40.722	29		96.0	3AC 480V	semi-regulated	

DC/DC-Converters

Output	Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
5V	8A	SLD2.100	30	5-5.5Vdc	40W	49.0	DC 24V
12V	8A	CD5.121	30	12-15Vdc	96W	32.0	DC 24V
24V	3.8A	CD5.241-L1	31	24Vdc	92W	32.0	DC 24V
	4A	CD5.243	30	23-28Vdc	96W	32.0	DC 12V
		CD5.241-S1	30		120W	32.0	DC 24V
		CD5.242	31			32.0	DC 48V
	5A	CD5.241	30	24-28Vdc	120W	32.0	DC 24V
	10A	CD10.241	31		240W	42.0	DC 24V
		CP10.242	23		39.0	DC 110-300V	extended DC-Input
		QS10.241-D1	23		60.0	DC 110-300V	
	20A	CPS20.241-D1	31		480W	65.0	DC 110-300V
		QTD20.241	31		65.0	DC 600V	for intermediate DC bus
30.6V	4A	SLAD4.100	33	30.6Vdc	120W	40.0	DC 24V
48V	5A	QS10.481-D1	26	48-56Vdc	240W	60.0	DC 110-300V
	10A	CD10.482	31		42.0	DC 24V	
		CPS20.481-D1	31		480W	65.0	DC 110-300V

For more power supplies with DC-input see overview on page 32.

Conformal Coated Power Supplies

Output	Order Number	Page	Adjustment 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		100W	72.5	AC 100-120 / 220-240V
	5A	CS5.241-C1	22		120W	32.0	
		QS5.241-A1	22		40.0	AC 100-240V	ATEX
	10A	CP10.241-C1	23		240W	39.0	AC 100-240V
		QS10.241-C1	23		60.0		
		QS10.241-A1	23		60.0		ATEX
		CT10.241-C1	28		62.0	3AC 380-480V	
	20A	CP20.241-C1	24		480W	48.0	AC 100-240V
		CPS20.241-C1	24		82.0		
		QS20.241-A1	24		82.0		ATEX
		QS20.241-C1	24		82.0		
		QT20.241-C1	28		65.0	3AC 380-480V	
48V	10A	CT10.481-C1	29	48-56Vdc	240W	62.0	3AC 380-480V

Power Supplies for Medical Applications

Output	Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
24V	5A	CP5.241-M1	35	24-28Vdc	120W	32.0	AC 100-240V
	10A	CP10.241-M1	35		240W	39.0	
	20A	CP20.241-M1	35		480W	48.0	

Power Supplies for Railway Applications

Output	Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
24V	4.2A	QS5.241-60	34	24-28Vdc	100W	40.0	DC 110V
	8.3A	CP10.241-60	34		200W	39.0	
		QS10.241-60	34		60.0		
24.5V	16.3A	CPS20.241-60	34	24.5Vdc	400W	65.0	DC 110V

AS-Interface Power Supplies

Output	Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
30V	2.8A	SLA3.100	33	30.5Vdc	85W	49.0	AC 100-120 / 220-240V
	4A	SLA4.100	33		120W	73.0	NEC-CLASS-2
		SLAD4.100	33		40.0	DC 24V	+ int. ground fault detector
	8A	SLA8.100	33		240W	91.0	DC 24V
		SLA8.300	33		129.0	AC 100-120 / 220-240V	D/CDC converter
						3AC 400-500V	FUSE-Mode

DeviceNet® Power Supplies

Output	Order Number	Page	Adjustment Range	Power	Width In mm	Input	Special Features
24V	3.8A	QS5.DNET	21	24Vdc	91W	40.0	AC 100-240V
	8A	QS10.DNET	22		192W	60.0	AC 100-240V

Overview 3

Redundancy

DIODE Redundancy Modules

Output	Order Number	Page	Width in mm	Input	Version
DC 12-28V	20A	PIRD20.241	38	39.0 DC 12-28V 2x10A	dual-input diode redundancy module
DC 12-48V	10A	MLY10.241	38	45.0 DC 12-48V 2x5A	dual-input diode redundancy module
		MLY02.100	38	45.0 DC 12-48V 2x5A	dual-input diode redundancy module
	20A	YR2.DIODE	38	32.0 DC 12-48V 2x10A	dual-input diode redundancy module
DC 24-48V	20A	YRM2.DIODE	38	32.0 DC 24-48V 2x10A	dual-input diode redundancy module

MOSFET Redundancy Modules

Output	Order Number	Page	Width in mm	Input	Version
DC 12-28V	20A	YR20.242	39	32.0 DC 12-28V 2x20A	dual-input MOSFET redundancy module
	40A	YR40.242	39	36.0 DC 12-28V 2x20A	dual-input MOSFET redundancy module
		YR40.241	39	36.0 DC 24-28V 2x20A	dual-input MOSFET redundancy module
		YR40.245	39	46.0 1x40A	single-input MOSFET redundancy module
	80A	YR80.241	39	46.0 DC 24-28V 2x40A	dual-input MOSFET redundancy module
DC 24-28V	20A	YR80.242	39	46.0 DC 12-28V 2x40A	dual-input MOSFET redundancy module
		YR20.246	39	32.0 DC 24-28V 2x10A	dual-input MOSFET redundancy module
DC 24-56V	40A	YR40.482	39	46.0 DC 24-56V 2x20A	dual-input MOSFET redundancy module

Power Supplies with Integrated Decoupling Function

Output	Order Number	Page	Adjustment Range	Power	Width in mm	Input	Special Features
24V	10A	CP10.241-R1	24Vdc	240W	39.0	AC 100-240V	hot-swap connectors conformal coated
		CP10.241-R2			39.0		
		CP10.241-R2C1			39.0		
	20A	CP20.241-R1		480W	48.0		hot-swap connectors conformal coated
		CP20.241-R2			48.0		
		CP20.241-R2C1			48.0		



DC-UPS and Buffer Modules

DC-UPS with Batteries

Output	Order Number	Page	Width in mm	Battery	Version
DC 24V	10A	UB10.241	42	49.0 external, 12V, 3.9-40Ah	battery DC-UPS
		UB10.242	42	49.0	for batteries 17-130Ah
		UB10.245	42	49.0	with additional 12V output
DC 24-48V	20A	UB20.241	42	46.0 external, 12V, 3.9-150Ah	battery DC-UPS
		UBC10.241	42	123.0 2x10A	battery DC-UPS
		UBC10.241-N1	42	32.0 built-in 12V, 5Ah	battery not assembled

DC-UPS with Capacitor Storage

Output	Order Number	Page	Width in mm	Capacitor Storage	Version
DC 24V	15A	UC10.241	45	126.0 6kW _s , typ. buffer time 9s at 15A	double capacity
		UC10.242	45	198.0 12kW _s , typ. buffer time 18s at 15A	

Buffer Modules with Capacitor Storage

Output	Order Number	Page	Width in mm	Capacitor Storage	Version
DC 24V	20A	UF20.241	45	64.0 0.2kW _s , typ. buffer time 310ms at 20A	
	40A	UF40.241	45	64.0 0.32kW _s , typ. buffer time 250ms at 40A	
DC 48V	20A	UF20.481	45	64.0 0.2kW _s , typ. buffer time 150ms at 20A	

Protection Modules

Order Number	Page	Width in mm	Special Features
PISA11.401	40	45	4-channel protection module; outputs: 4x1A
PISA11.402	40	45	4-channel protection module; outputs: 4x2A
PISA11.403	40	45	4-channel protection module; outputs: 4x3A
PISA11.404	40	45	4-channel protection module; outputs: 4x4A
PISA11.406	40	45	4-channel protection module; outputs: 4x6A
PISA11.410	41	45	4-channel protection module; outputs: 4x10A
PISA11.203206	41	45	4-channel protection module; outputs: 2x3A and 2x6A
PISA11.206212	41	45	4-channel protection module; outputs: 2x6A and 2x12A
PISA11.CLASS2	41	45	4-channel protection module; outputs: 4x NEC-CLASS2 listed as „Limited Power Source“, < 100VA per channel

Mounting Brackets

Order Number	Page	Description
ZM1 - ZM6.WALL, ZM1.UBC10	47	mounting bracket for a direct wall or panel mounting without a DIN rail
ZM11.SIDE - ZM15.SIDE	47	brackets for sideways installation with or without a DIN rail

100-240V AC/DC-Converters

5V, 12V

15-405W



NEW

Output Voltage	5V		12V		12V		12V		12V		12V		±12V
Output Current	3A	5A	1.3A	3.0A	4.2A	4.5A	4.5A	7.5A	10A	15A	16A	30A	2.5A
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	±12-15V
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	10-8A	15-13.5A	16-12.8A	30/27A	2.5A ^{a)}
Output Power	15W	25W	15W	30W	50W	54W	54W	90W	120W	180W	192W	360/405W	36W
Power Reserves	-	-	-	-	-	-	-	-	20%	50%	20%	20%	-
Ripple & Noise max. [mVpp]	50mV	50mV	75mV	10mV	100mV	50mV	50mV	50mV	50mV	50mV	50mV	100mV	50mV
AC Input Voltage	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-120V/220-240V auto select	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range
Power Factor, typ.	0.44	0.53	0.44	0.53	0.52	0.5	0.44	0.55	TBD	0.92	0.96	0.95	0.53
Input Inrush Current Limiter	NTC	NTC	NTC	NTC	NTC	NTC	active	NTC	NTC	active	active	active	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/3A ^{d)}	4A/7A ^{c)}	6A/9A ^{b)}	9A/7A ^{c)}	17A/35A ^{b)}
External Input Fuse Recommendation min.	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 - 6A	B - 6A or C - 4A	B - 6A or C - 6A	B - 10A or C - 10A	B - 10A or C - 6A
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 110-300V -25%/+30%	DC 110-150V	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	DC 110-300V -20%/+25%
Efficiency, typ.	77.2%	80.0%	82.5%	84.0%	90.0%	87.2%	87.6%	88.5%	TBD	91.8%	94.3%	92.6%	86.0%
Power Losses, typ.	4.5W	6.3W	3.2W	5.8W	6.0W	7.9W	7.6W	11.7W	TBD	16.1W	11.6W	28.8W	5.9W
MTBF (+40°C, SN 29500)	2686 kh	1963 kh	3811 kh	650 kh	600 kh	1690 kh	1571 kh	500 kh	TBD	631 kh	690 kh	554 kh	600 kh
Life time (min. at +40°C)	93 kh	TBD	125 kh	TBD	TBD	56 kh	56 kh	TBD	TBD	76 kh	97 kh	54 kh	TBD
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	-25°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	3W/°C	5W/°C	4.8W/°C	0.75A/°C	1W/°C
Connection Terminals	screw	spring	screw	spring	spring	screw	screw	spring	screw	spring	screw	screw	spring
Dimensions WxHxD	22.5x75x91mm	45x75x91mm	22.5x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	72.5x75x103mm	32x124x102	60x124x117mm	39x124x117	65x124x127mm	45x75x91mm
Weight	130g	240g	130g	250g	260g	250g	250g	360g	440g	990g	600g	1000g	240g
DC-OK Relay Contact	-	-	-	-	-	-	-	-	yes	yes	yes	yes	-
Special Features			very low output noise				-40°C operation				shut-down input		dual-output voltage
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item
Product Family	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MINISSION	MINISSION	MINISSION	MINISSION	MiniLine
Order Number	ML15.051	ML30.101	ML15.121	ML30.102	ML50.102	ML60.121	ML60.122	ML100.102	CP5.121	Q510.121	CP10.121 CP10.122 ^{e)}	CP520.121	ML30.106

a) Both outputs can be flexibly loaded up to this output current, as long as the output power is less than 36W. The output current at the lower load output should be at least 5% of the higher loaded output. 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 120Vac/230Vac, ambient temperature of +25°C and cold start. e) With extended DC input

100-240V AC/DC-Converters

24V

15-120W



NEW

Output Voltage	24V													
Output Current	0.63A	1.3A	1.3A	2.1A	2.1A	2.5A	2.5A	3A	3.3A	3.4A	3.8A	3.9A	4.2A	5A
Adjustment Range	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24V	24-28V	24-28V	24-28V
Output Current	0.63-0.54A	1.3-1.1A	1.3-1.1A	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
Output Power	15W	30W	30W	50W	50W	60W	60W	72W	80W	80W	91.2W	95W	100W	120W
Power Reserves	-	-	-	-	-	-	-	-	-	50%	-	-	-	20%
Ripple & Noise max. [mVpp]	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV
AC Input Voltage	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-120V/220-240V manual select	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-120V/220-240V auto select	AC 100-120V/220-240V auto select	AC 100-240V wide range
Power Factor, typ.	0.44	0.53	0.49	0.52	0.52	0.5	0.44	0.54	0.56	0.47	0.90	0.55	0.55	0.92
Input Inrush Current Limiter	NTC	NTC	NTC	NTC	NTC	NTC	active	NTC	NTC	active	active	NTC	NTC	NTC
Input Inrush Current	13A/26A ^d	17A/35A ^d	18A/35A ^d	17A/35A ^d	17A/35A ^d	16A/32A ^d	6A/6A ^e	26A/30A ^d	23A/45A ^d	5A/10A ^d	9A/11A ^d	22A/37A ^d	22A/37A ^d	4A/3A ^f
External Input Fuse Recommendation min.	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 - 10A or C - 6A	B - 6A or C - 3A	B - 6A or C - 3A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 6A
DC Input Voltage	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	DC 110-300V -20%/+25%	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 110-150V
Efficiency, typ.	86.1%	87.5%	89.4%	89.0%	88.5%	89.7%	90.4%	91.5%	89.4%	90.0%	92.0%	90.0%	90.0%	94.2%
Power Losses, typ.	2.7W	4.3W	3.7W	6.2W	6.8W	6.9W	6.4W	8.7W	9.1W	9.1W	7.9W	10.5W	11.4W	6.9W
MTBF (40°C, SN 29500)	4369 kh	650 kh	2405 kh	2613 kh	600 kh	1916 kh	1866 kh	600 kh	2243 kh	1451 kh	831 kh	500 kh	500 kh	TBD
Lifetime (min. at 40°C)	196 kh	-	174 kh	54 kh	-	128 kh	90 kh	TBD	77 kh	79 kh	94 kh	TBD	TBD	TBD
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	-25°C to +70°C
Derating +60°C to +70°C	0.4W/°C	0.8W/°C	0.8W/°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
Connection Terminals	screw	spring	screw	spring	screw/spring	screw	screw	spring	screw	spring	spring	spring	spring	screw/spring
Dimensions WxHxD	23x75x91mm	45x75x91mm	23x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	45x75x91mm	32x124x102mm	32x124x102mm	40x124x117mm	73x75x103mm	73x75x103mm	32x124x102
Weight	130g	230g	140g	240g	240g	250g	250g	260g	430g	440g	620g	360g	360g	440g
DC-OK Relay Contact	-	-	-	yes	yes	-	-	-	-	-	yes	-	-	yes
Special Features	optimised for parallel use						-40°C operation				DeviceNet approved	NEC-CLASS-2		reduced depth
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item
Product Family	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	MiniLine	dimension	dimension	dimension	MiniLine	MiniLine	dimension
Order Number	ML15.241	ML30.100	ML30.241	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)	CP5.241 CP5.241-S2 c)

a) Conformal coated b) ML50.111 with pluggable screws connected in parallel with load distribution and a depth of 98mm c) With push-in clamps 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 / 230Vac, ambient temperature of +25°C and cold start

100-240V AC/DC-Converters

24V

120-240W



NEW

Output Voltage	24V														
Output Current	5A	5A	5A	5A	5A	5A	8A	10A	10A	10A	10A	10A	10A	10A	10A
Adjustment Range	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-24.5V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V
Output Current	5-4.3A	5-4.3A	5-4.3A	5-4.3A	5-4.3A	5-4.5A	8A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-8.6A	10-9A
Output Power	120W	120W	120W	120W	120W	120W	192W	240W	240W	240W	240W	240W	240W	240W	240W
Power Reserves	20%	20%	20%	-	-	50%	-	20%	20%	20%	20%	20%	-	-	50%
Ripple & Noise max. [mVpp]	50mV	50mV	50mV	100mV	100mV	50mV	50mV	50mV	50mV	50mV	50mV	50mV	100mV	100mV	50mV
AC Input Voltage	AC 100-120/ 200-240V auto select	AC 100-120V	AC 200-240V	AC 200-240V	AC 100-120V/ 200-240V auto select	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-120V/ 200-240V auto select	AC 100-120V/ 200-240V auto select	AC 100-120V	AC 200-240V	AC 200-240V	AC 100-240V wide range	AC 100-240V wide range
Power Factor, typ.	0.47	0.59	0.50	0.54	0.54	0.91	0.92	0.97	0.51	0.57	0.59	0.52	0.52	0.93	0.92
Input Inrush Current Limiter	active	NTC	NTC	NTC	NTC	active	active	active	active	active	NTC	NTC	NTC	active	active
Input Inrush Current	3A/3A ^f	45A ^h	30A ^h	28A ^g	22A/33A ^h	9A/11A ^h	4A/7A ^g	6A/9A ^h	3A/3A ^h	3A/3A ^h	8.5A ^h	48A ^g	48A ^g	14A/26A ^h	4A/7A ^h
External Input Fuse Recommendation min.	B - 10A or C - 6A	B - 16A or C - 10A	B - 16A or C - 10A	B - 10A or C - 6A	B - 10A or C - 6A	B - 6A or C - 3A	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 - 16A or C - 10A	B - 16A or C - 10A	B - 10A or C - 6A	B - 6A or C - 4A
DC Input Voltage	-	-	-	-	-	DC 110-300V ±20%	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	-	-	-	-	-	DC 110-150V -20%/+25%
Efficiency, typ.	90.2%	90.0%	90.2%	90.5%	92.3%	92.7%	93.4%	95.2%	91.6%	91.2%	91.3%	91.3%	91.4%	95.2%	93.5%
Power Losses, typ.	13.2W	13.5W	13.2W	12.6W	10.0W	9.4W	13.6W	12.1W	22.0W	23.2W	22.9W	22.9W	22.6W	12.1W	16.7W
MTBF (+40°C, SN 29500)	869 kh	740 kh	940 kh	1720 kh	1379 kh	831 kh	581 kh	667 kh	821 kh	821 kh	710 kh	910 kh	791 kh	822 kh	581 kh
Lifetime (min. at +40°C)	72 kh	58 kh	72 kh	47 kh	70 kh	89 kh	81 kh	120 kh	82 kh	75 kh	50 kh	75 kh	38 kh	74 kh	71 kh
Operat. Temperature Range	-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	-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	0°C to +70°C	0°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	3W/°C ^k	3W/°C ^h	3W/°C ^h	3W/°C ^g	3W/°C ^g	3W/°C	5W/°C	6W/°C ^g	6W/°C ^g	6W/°C	6W/°C ^g	6W/°C ^g	6W/°C ^g	6W/°C ^g	6W/°C
Connection Terminals	screw/spring	screw	screw	screw	screw	spring	spring	screw/spring	screw/spring	screw	screw	screw	screw	screw	spring
Dimensions WxHxD	32x124x117mm	32x124x117mm	32x124x117mm	39x124x124mm	39x124x124mm	40x124x117mm	60x124x117mm	39x124x117mm	60x124x117mm	60x124x117mm	60x124x117mm	60x124x117mm	49x124x124mm	49x124x124mm	60x124x117mm
Weight	500g	500g	500g	350g	370g	620g	900g	600g	700g	800g	700g	700g	550g	540g	900g
DC-OK relay contact	-	-	-	yes	yes	yes	yes	yes	-	-	-	-	yes	yes	yes
Special Features							DeviceNet approved	PFC version							
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item
Product Family	DIMENSION	DIMENSION	DIMENSION	PIANO	PIANO	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	PIANO	PIANO	DIMENSION
Order Number	CS5.241 CS5.241-C1 c) CS5.241-S1 b)	CS5.243	CS5.244	PIC120.241C PIC120.242C e)	PIC120.241D	Q55.241 Q55.241-A1 a)	Q510.DNET	CP10.241 CP10.242 d) CP10.241-C1 c) CP10.241-S1 b) CP10.241-S2 m)	CS10.241 CS10.241-S1 b)	CS10.242	CS10.243	CS10.244	PIC240.241C	PIC240.241D	Q510.241 Q510.241-A1 a) Q510.241-C1 c) Q510.241-D1 d)

a) Conformal coated and ATEX approval b) With spring clamp terminals c) Conformal coated d) With extended DC-input 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) Derating over +55°C k) 1.6W/°C at +45°C to +60°C l) 3.2W/°C at +45°C to +60°C m) With push-in terminals

100-240V AC/DC-Converters

24V, 30V, 36V 240-960W



	NEW		NEW		NEW				NEW					
Output Voltage	24V								24V	30V	36V			
Output Current	20A	20A	20A	20A	20A	20A	40A	40A	8A	6.7A	13.3A	13.3A	26.7A	
Adjustment Range	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	24-28V	28-32V	36-42V	36-42V	36-42V	36-42V	
Output Current	20-17.1A	20-17.1A	20-17.1A	20-17.1A	20-17A	20-17A	40-34.3A	40-34.3A	8.6-7.5A	6.7-5.7A	13.3-11.4A	13.3-11.4A	26.7-22.9A	
Output Power	480W	480W	480W	480W	480W	480W	960W	960W	240W	240W	480W	480W	960W	
Power Reserves	20%	20%	-	-	50%	50%	50%	50%	50%	20%	20%	50%	50%	
Ripple & Noise max. [mVpp]	50mV	50mV	100mV	100mV	100mV	100mV	100mV	100mV	50mV	50mV	100mV	100mV	130mV	
AC Input Voltage	AC 100-240V wide range	AC 100-240V wide range	AC 200-240V	AC 100-240V wide range	AC 100-240V wide range	AC 200-240V	AC 100-240V wide range	AC 200-240V	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	
Power Factor, typ.	0.95	0.95	0.99	0.9	0.90	0.50	0.99	0.96	0.92	0.97	0.95	0.90	0.99	
Input Inrush Current Limiter	active	active	NTC	NTC	active	active	active	active	active	active	active	active	active	
Input Inrush Current	10A/4.5A ^d	9A/7A ^d	26A ^{e1}	26A ^e	9A/7A ^d	40A ^{e1}	17A/11A ^d	14A ^{e1}	4A/7A ^d	6A/9A ^e	9A/7A ^d	9A/7A ^d	17A/11A ^d	
External Input Fuse Recommendation min.	B - 10A or C - 10A	B - 10A or C - 10A	B - 10A or C - 6A	B - 10A or C - 6A	B - 10A or C - 10A	B - 10A or C - 6A	B - 16A or C - 16A	B - 10A or C - 8A	B - 6A or C - 4A	B - 6A or C - 6A	B - 10A or C - 10A	B - 10A or C - 10A	B - 16A or C - 16A	
DC Input Voltage	DC 110-150V ±20%	-	-	-	DC 110-150V -20%/+25%	-	-	-	DC 110-150V -20%/+25%	DC 110-150V ±20%	-	DC 110-150V -20%/+25%	-	
Efficiency, typ.	95.6%	94.0%	95.7%	95%	93.9%	94.5%	94.6%	94.6%	93.5%	95.4%	94.3%	94.0%	94.6%	
Power Losses, typ.	22.1W	30.6W	21.6W	25.3W	31.4W	28.3W	54.8W	54.8W	16.7W	11.6W	29.0W	30.6W	54.8W	
MTBF (+40°C, SN 29500)	590 kh	537 kh	482 kh	TBD	469 kh	577 kh	300 kh	366 kh	581 kh	661 kh	537 kh	469 kh	300 kh	
Lifetime (min. at +40°C)	94 kh	88 kh	51 kh	102kh	71 kh	62 kh	84 kh	59 kh	71 kh	130 kh	101 kh	84 kh	58 kh	
Operat. Temperature Range	-25°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	-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	12W/°C	12W/°C	8W/°C ^h	12W/°C ^h	12W/°C	12W/°C	24W/°C	24W/°C	6W/°C	6W/°C	12W/°C	12W/°C	24W/°C	
Connection Terminals	screw/spring	screw	screw	screw	spring	spring	screw	screw	spring	screw	screw	spring	screw	
Dimensions WxHxD	48x124x127mm	65x124x127mm	49x124x124mm	59x124x127mm	82x124x127mm	70x124x127mm	125x124x127mm	125x124x127mm	60x124x117mm	39x124x117mm	65x124x127mm	82x124x127mm	125x124x127mm	
Weight	830g	1000g	620g	810g	1200g	880g	1900g	1800g	900g	600g	1000g	1200g	1900g	
DC-OK Relay Contact	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	
Product Family	dimension	dimension	PIANO	PIANO	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	
Order Number	CP20.241 CP20.241-C1 ^g CP20.241-S1 ^h CP20.241-S2 ⁱ CP20.241-V1 ^j	CP520.241 CP520.241-C1 ^g	PIC480.241C	PIC480.241D	Q520.241 Q520.241-A1 ^a Q520.241-C1 ^g	Q520.244	Q540.241	Q540.244	Q510.301	CP10.361	CP520.361	Q520.361	Q540.361	

a) Conformal coated and ATEX approval 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 e) Peak current at 230Vac, ambient temperature +40°C and cold start f) Derating +55°C to +70°C g) Conformal coated h) With spring-damp terminals i) With push-in terminals j) Remote shut-down / built to order

100-240V AC/DC-Converters

48V
410V
50-960W
1025W



NEW

Output Voltage	48V					48V					410V
Output Current	1.05A	2.1A	5A	5A	5.4A	10A	10A	10A	20A	20A	2.5A
Adjustment Range	48-56V	48-56V	48-52V	48-56V	48-56V	48-56V	48-56V	48-55V	48-54V	48-54V	360-460V
Output Current	1.05-0.9A	2.1-1.8A	5-4.6A	5-4.3A	5.4-4.6A	10-8.6A	10-8.6A	10-8.7A	20-17.8A	20-17.8A	2.5A
Output Power	50W	100W	240W	240W	259W	480W	480W	480W	960W	960W	1025W
Power Reserves	-	-	20%	50%	20%	20%	20%	50%	50%	50%	-
Ripple & Noise max. [mV _{pp}]	200mV	50mV	100mV	100mV	50mV	50mV	50mV	100mV	150mV	150mV	10V
AC Input Voltage	AC 100-240V wide range	AC 100-120V/220-240V auto select	AC 100-120V/200-240V auto select	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range	AC 200-240V	AC 220-240V
Power Factor, typ.	0.95	-	0.51	0.92	-	0.95	0.95	0.90	0.99	0.96	0.9
Input Inrush Current	17A/35A ^{a)}	22A/37A ^{a)}	3A/3A ^{d)}	4A/7A ^{d)}	6A/9A ^{a)}	10A/4.5A ^{d)}	9A/7A ^{d)}	9A/7A ^{d)}	17A/11A ^{d)}	14A ^{a)}	10A ^{a)}
External Input Fuse Recommendation min.	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 - 10A	B - 16A or C - 16A	B - 10A or C - 8A	B - 10A or C - 8A
DC Input Voltage	DC 110-300V -20%/+25%	DC 290V -25%/+30%	-	DC 110-150V -20%/+25%	DC 110-150V ±20%	DC 110-150V ±20%	-	DC 110-150V -20%/+25%	-	-	-
Efficiency, typ.	90.0%	91.0%	91.6%	92.0%	95.5%	96.0%	93.9%	94.3%	95.0%	95.0%	94.4%
Power Losses, typ.	6.0W	10.0W	22.0W	20.9W	12.3W	20.0W	31.2W	29.0W	50.5W	50.5W	60.8W
MTBF (+40°C, SN 29500)	600 kh	500 kh	830 kh	606 kh	699 kh	TBD	537 kh	469 kh	300 kh	392 kh	-
Lifetime (min. at +40°C)	-	-	96 kh	81 kh	120 kh	118 kh	87 kh	92 kh	90 kh	65 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	-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	1.3W/°C	2.5W/°C	6W/°C	6W/°C	6.5W/°C	12W/°C	12W/°C	12W/°C	24W/°C	24W/°C	-
Connection Terminals	spring	spring	screw	spring	screw	screw	screw	spring	screw	screw	spring
Dimensions WxHxD	45x75x91mm	73x75x103mm	60x124x117mm	60x124x117mm	39x124x117mm	48x124x127mm	65x124x127mm	82x124x127mm	125x124x127mm	125x124x127mm	310x158x80mm
Weight	240g	360g	700g	900g	600g	820g	1000g	1200g	1900g	1800g	2300g
DC-OK Relay Contact	-	-	-	yes	yes	yes	yes	yes	yes	yes	yes
Special Features											charger for electrochem. double layer capacitor
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item
Product Family	MiniLine	MiniLine	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION	DIMENSION
Order Number	ML50.105	ML100.105	CS10.481	Q510.481	CP10.481	CP20.481	CP520.481	Q520.481	Q540.481	Q540.484	PAS395

a) Using 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



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. [mVpp]	100mV	50mV	50mV	50mV	50mV	100mV	100mV	1500mV	100mV	2000mV	130mV	100mV	100mV	150mV	2500mV	3000mV
AC Input Voltage	2AC 380-480V wide range	2AC 380-480V wide range	2AC 380-480V wide range	2AC 380-480V wide range	3AC 380-480V wide range	3AC 380-480V wide range	3AC 380-480V wide range	3AC 400V ^{b)} 3AC 480V ^{b)}	3AC 380-480V wide range	3AC 400V ^{b)} 3AC 480V ^{b)}	3AC 380-480V wide range	3AC 380-480V wide range	3AC 380-480V wide range	3AC 380-480V wide range	3AC 400V ^{b)} 3AC 480V ^{b)}	3AC 400V ^{b)} 3AC 480V ^{b)}
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 [#]	36A/45A ^{d)}	36A/45A ^{d)}	4A/4A [#]	4A/4A [#]	3A/3A [#]	4.5A/4.5A [#]	2A [#]	3A/3A [#]	2A [#]	4.5A/4.5A [#]	4A/4A [#]	3A/3A [#]	4.5A/4.5A [#]	2A [#]	2A [#]
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
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	1019 kh	690 kh	375 kh	541 kh	539 kh
Lifetime (min. at +40°C)	51 kh	-	-	92 kh	54 kh	105 kh	69 kh / 93 kh	51 kh	51 kh	55 kh	71 kh	114 kh	51 kh	86 kh	77 kh	55 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	spring	spring	screw	screw	spring	screw	screw	spring	screw	screw	screw	spring	screw	screw	screw
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
D-C-OK Relay Contact	-	-	-	-	-	yes	yes	-	yes	-	yes	-	yes	yes	-	-
Special Features		NEC-CLASS-2						semi-regulated	semi-regulated			semi-regulated				semi-regulated
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item
Product Family	dimension	MiniLine	MiniLine	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension	dimension
Order Number	CT5.121	ML90.200	ML100.200	CT5.241	CT10.241	QT20.241	QT40.241	XT40.241 ^{b)} XT40.242 ^{b)}	QT20.361	XT40.361 ^{b)} XT40.362 ^{b)}	QT40.361	CT10.481 CT10.481-C1 ^{a)}	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 2 x 400V ac / 2 x 480V ac, ambient temperature +25°C and cold start d) At 3 x 400V, 50Hz / 3 x 480V ac, 60Hz, independent of temperature e) Peak current at 2 x 400V ac / 2 x 480V ac, independent of temperature f) Peak current at 3 x 400V ac / 3 x 480V ac, independent of temperature g) At 3 x 400V ac, independent of temperature h) With extended lifetime

Power Supplies

DC/DC Power Supplies
12, 24, 48 VDC
110-300 VDC
600 VDC

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



Nominal Input Voltage	NEW					NEW						
	DC 12V	DC 24V		DC 24V		DC 24V		DC 48V		DC 110-300V		DC 600V
Output Voltage Range	23-28V	4.5-5.5V	12-15V	23-28V	23-28V	24V	23-28V	23-28V	48-56V	24-28V	48-56V	24-28V
Input Voltage	DC 12V -10%/+35%	DC 24V -25%/+50%	DC 24V -25%/+35% ^{a)}	DC 24V -25%/+35% ^{a)}	DC 24V -25%/+35% ^{a)}	DC 24V -40%/+35%	DC 24V -25%/+46%	DC 48V ±25% ^{a)}	DC 48V ±25%	DC 110-300V ±20%	DC 110-300V ±20%	DC 600V -20%/+40%
Output Current	4-3.4A	8A	8-6.4A	5-4.3A	5-4.3A	3.8A	10-8.6A	5-4.3A	5-4.3A	20-17.1A	10-8.6A	20-17.5A
Output Power	96W	40W	96W	120W	120W	92W	240W	120W	240W	480W	480W	480W
Power Reserves	20%	-	20%	20%	20%	-	20%	20%	TBD	20%	20%	25%
Ripple & Noise max. [mV _{pp}]	50mV	50mV	75mV	50mV	50mV	50mV	50mV	50mV	100mV	50mV	50mV	100mV
Efficiency, typ.	87.7%	82.0%	88.2%	90.3%	90.2%	90.5%	94.2%	90.3%	TBD	94.6%	94.6%	95.0%
Power Losses, typ.	13.5W	8.5W	12.8W	12.9W	13.3W	9.7W	14.8W	12.9W	TBD	27.4W	27.4W	25.5W
MTBF (+40°C, SN 29500)	1056 kh	510 kh	1161 kh	1178 kh	1048 kh	1487 kh	TBD	951 kh	TBD	537 kh	537 kh	446 kh
Lifetime (min. at +40°C)	73 kh	-	63 kh	65 kh	60 kh	134 kh	80 kh	64 kh	TBD	98 kh	110 kh	42 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	-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	-	6W/°C	3W/°C	6W/°C	12W/°C	12W/°C	12W/°C
Connection Terminals	screw	screw	screw	screw	spring	spring	screw	screw	screw	screw	screw	spring
Dimensions WxHxD	32x124x102mm	49x124x102mm	32x124x102mm	32x124x102mm	32x124x102mm	32x124x102mm	42x124x117mm	32x124x102mm	42x124x117mm	65x124x127mm	65x124x127mm	65x124x127mm
Weight	435g	470g	425g	425g	450g	425g	500g	425g	500g	940g	940g	890g
Special Features				DC-OK- and Input-low relay contacts		NEG-CLASS-2						Intermediate DC-bus
Order Info	stock item	stock item	stock item	stock item	stock item	stock item	stock item	stock item	Q2/18	stock item	stock item	stock item
Product Family	Dimension	SilverLine	Dimension	Dimension	Dimension	Dimension	Dimension	Dimension	Dimension	Dimension	Dimension	Dimension
Order Number	CD5.243	SLD2.100	CD5.121	CD5.241	CD5.241-S1	CD5.241-L1	CD10.241	CD5.242	CD10.482	CPS20.241-D1	CPS20.481-D1	QTD20.241

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

AC + DC Input

In addition to the DC/DC-converters, many AC/DC-converters are equipped with an approved DC input voltage range

Input: DC 110-150V 180-480W

Output	Order Number	Page	Special Features
12-15V	15A QS10.121	19	
	16A CP10.121	19	shut-down input
24-24.5V	8A QS10.DNET	22	Device-Net approved
24-28V	10A CP10.241	23	
	CP10.241-C1	23	conformal coating
	CP10.241-S1	23	spring clamps
	CP10.241-S2	23	push-in clamps
	CP10.241-M1	35	medical approval
	QS10.241	23	
	QS10.241-A1	23	conf. coating, ATEX
	QS10.241-C1	23	conformal coating
20A	CP20.241	24	
	CP20.241-C1	24	conformal coating
	CP20.241-S1	24	spring clamps
	CP20.241-S2	24	push-in clamps
	CP20.241-M1	35	medical approval
	QS20.241	24	
	QS20.241-A1	24	conf. coating, ATEX
	QS20.241-C1	24	conformal coating
28-32V	8A QS10.301	25	
36-42V	6.7A CP10.361	25	
	13.3A QS20.361	25	
48-56V	5A QS10.481	26	
	5.4A CP10.481	26	
	10A CP20.481	27	
48-55V	10A QS20.481	27	

Input: DC 110-290V 50W

Output	Order Number	Page	Special Features
24-28V	2.1A ML50.100	20	
	ML50.109	20	conformal coating

Input: DC 290V 72-100W -25%+30%

Output	Order Number	Page	Special Features
12-15V	7.5A ML100.102	19	
24-28V	3A ML70.100	21	
	3.9A ML95.100	21	NEC-CLASS-2
	4.2A ML100.100	21	
	ML100.109	21	conformal coating
48-56V	2.1A ML100.105	26	

Input: DC 110-300V 15-240W

Output	Order Number	Page	Special Features
5-5.5V	3A ML15.051	18	
	5A ML30.101	18	
10-12V	3A ML30.102	18	low output ripple
+12-15V	2.5A ML30.106	19	dual output
12-15V	1.3A ML15.121	18	
	4.2A ML50.102	18	
	4.5A ML60.121	18	
	ML60.122	19	-40°C operation
	16A CP10.122	19	
24-28V	0.63A ML15.241	20	
	1.3A ML30.100	20	
	ML30.241	20	
	2.1A ML50.101	20	parallel mode
	ML50.111	20	plug connectors
	2.5A ML60.241	20	
	ML60.242	21	-40°C operation
	3.3A CS3.241	21	
	3.4A QS3.241	21	
	3.95A QS5.DNET	21	Device-Net approved
	5A QS5.241	22	
	QS5.241-A1	23	conf. coating, ATEX
	10A CP10.242	23	
	QS10.241-D1	23	
48-56V	1.05A ML50.105	26	
	5A QS10.481-D1	26	

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 to 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	30.5V	30.6V	30.5V	30.6V
Ripple & Noise max. [mVpp]	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	0.5	0.52	fulfilled
Input Inrush Current Limiter	NTC	NTC	active	NTC	active
DC Input Voltage	DC 230-375V	DC 240-300V	DC 230-375V	DC 450-820V	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	screw	screw	screw	screw
Dimensions WxHxD	49x124x102mm	73x124x102mm	91x124x102mm	129x124x117mm	40x124x102mm
Weight	500g	650g	890g	1160g	500g
Special Features	NEC-CLASS-2	ground-fault monitor included	FUSE-Mode	FUSE-Mode	D/D/C-Converter
Order Info	stock item	stock item	stock item	stock item	stock item
Order Number	SLA3.100	SLA4.100	SLA8.100	SLA8.300	SLAD4.100

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

Special Markets



Railway



Reliable, efficient and robust

- Input voltage: DC 110V (-30%/+40%), 0.1s 66Vdc (-40%)
- 100% higher mains failure bridging time than required by railway standard EN 50155 (S2)
- Weather-resistant: All devices have PC boards with a conformal coating
- Minimal noise generation: 100% convection-cooled
- Flexible use, rapid replacement: DIN rail mounting

EN 50155-certified

- EN 50155 Electronic equipment used on rolling stock classified according to T3, TX, C2 and S2
- EN 61373 Shock and vibration tests classified according to Cat.1, Class B
- EN 50121-3-2 EMC requirements
- EN 45545-2 Fire protection on railway vehicle according to Hazard Level HL3

NEW

Nominal Input Voltage	DC 110V			
Output Voltage Range	24-28V	24-28V	24-28V	24.5V
Input Voltage	DC 110V -30%/+40%	DC 96-110V -30%/+40%	DC 110V -30%/+40%	DC 110V -30%/+40%
Output Current	4.2-3.6A	8.3-7.1A	8.3-7.1A	16.3A
Output Power	100W	200W	200W	400W
Power Reserves	50%	-	50%	-
Ripple & Noise max. [mVpp]	50mV	50mV	50mV	70mV
Efficiency, typ.	91.1%	94.5%	93%	93.7%
Power Losses, typ.	9.8W	11.6W	15W	26.9W
MTBF (+40°C, SN 29500)	956 kh	TBD	688 kh	571 kh
Lifetime (min. at +40°C)	127 kh	119 kh	266 kh	151 kh
Operat. Temperature Range	-25°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	-	-	-	-
Connection Terminals	spring	spring	spring	spring
Dimensions WxHxD	40x124x117mm	39x124x117mm	60x124x117mm	65x124x127mm
Weight	640g	600g	920g	980g
Special Features	for railway applications			
Order Info	stock item	stock item	stock item	stock item
Order Number	Q55.241-60	CP10.241-60	QS10.241-60	CPS20.241-60



Medical



Efficient, quiet and compact

- Continuous convection cooling thanks to high efficiency
- High flexibility due to uncomplicated DIN rail mounting
- High lifetime expectancy allows many years of use in technical medical devices.

Maximum protection for patients and users

- IEC 60601-1, 3rd Edition
Requirements for electrical safety on medical devices or systems
- 2 MOPP (Means Of Patient Protection)
A duplicate measure for patient protection
- IEC 60601-1-2, 4th Edition
Product standard for the EMC test on medical devices or systems

NEW

NEW

NEW

Output Voltage Range	24-28V	24-28V	24-28V
Output Current	5-4.3A	10-8.6A	20-17.1A
Output Power / Power Reserves	120W / 20%	240W / 20%	480W / 20%
Ripple & Noise max. [mVPP]	50mV	50mV	50mV
AC Input Voltage	AC 100-240V wide range	AC 100-240V wide range	AC 100-240V wide range
Power Factor, typ.	TBD	0.97	0.95
Input Inrush Current Limiter	NTC	active	active
Input Inrush Current	4A/3A	6A/9A	10A/4.5A
External Input Fuse Recommendation	B - 6A or C - 6A	B - 6A or C - 6A	B - 10A or C - 10A
DC Input Voltage	DC 110-150V	DC 110-150V	DC 110-150V
Efficiency, typ. / Power Losses, typ.	94.2% / 6.9W	95.2% / 12.1W	95.6% / 22.1W
MTBF (+40°C, SN 29500)	TBD	661 kh	590 kh
Lifetime (min. at +40°C)	TBD	120 kh	94 kh
Operat. Temperature Range	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Derating +60°C to +70°C	3W/°C	6W/°C	12W/°C
Connection Terminals	spring	spring	spring
Dimensions WxHxD / Weight	32x124x102mm / 440g	39x124x117mm / 620g	48x124x127mm / 820g
DC-OK Relay Contact	yes	yes	yes
Order Info	stock item Q2/18	stock item	stock item Q2/18
Order Number	CP5.241-M1	CP10.241-M1	CP20.241-M1

Redundancy

Power Supplies with
Integrated Decoupling
240-480W



Power Supplies with Integrated Decoupling Function

Set up redundant systems without redundancy modules.

With the CP series, PULS offers a unique feature: Power supplies with an integrated decoupling function based on efficient MOSFET technology. This means there is no need for additional redundancy modules in 1+1 and n+1 redundant systems. These units are available with plug connectors for hot-swap applications or with screwless terminals.

Space-savings

PULS managed to integrate the decoupling feature into the standard CP-housings. This means the dimensions of the units are identical to those of the standard CP10 (39mm) and CP20 (48mm). The slim units and the cancellation of the redundancy module allow space-savings of more than 45%.

Hot-swap

The new power supplies are available with hot-swap plug connectors or screwless terminals. The hot-swap connectors (CP10.241-R2 and CP20.241-R2) allow the replacement of devices during ongoing operation. If there is no need for this feature or if heavy shocks and vibrations occur regularly in the application, the screwless units (CP10.241-R1 and CP20.241-R1) are the perfect choice.

Keep the system simple

The power supplies reduce system complexity and costs due to shorter installation times. Less cabling effort also means a lower failure risk caused by faulty connections. In addition there is only one part number that has to be managed.



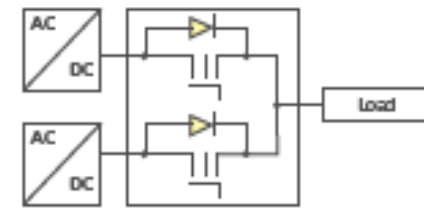
	NEW	NEW
Output Voltage	24V	24V
Output Current	12A	20A
Adjustment Range	fixed	fixed
Output Current at +60°C ambient	10A	20A
Output Power	240W	480W
Power Reserves	20 %	20%
Ripple & Noise max. [mVPP]	50mV	50mV
AC Input Voltage	AC 100-240V wide range	AC 100-240V wide range
Power Factor, typ.	0.97	0.95
Input Inrush Current Limiter	active	active
Input Inrush Current	6A/9A	10A/4.5A
External Input Fuse Recommendation	B - 6A or C - 6A	B - 10A or C - 10A
DC Input Voltage	DC 110-150V	DC 110-150V
Efficiency, typ.	94.9%	95.2%
Power Losses, typ.	12.9W	24.2W
MTBF (+40°C, SN 29500)	TBD	543 kh
Life time (min. at +40°C)	TBD	90 kh
Operat. Temperature Range	-25°C to +70°C	-40°C to +70°C
Derating +60°C to +70°C	6W/°C	12W/°C
Dimensions WxHxD	39x124x17mm	48x124x17mm
Weight	600g	820g 850g
DC-OK Relay Contact	yes	yes
Connection Terminals	spring plug	spring plug
Hot-swap	no yes	no yes
Order Info	built to order stock item	built to order stock item
Product Family	CONVERSION	
Order Number	CP10.241-R1 CP10.241-R2 CP10.241-R2-C1 ^{a)}	CP20.241-R1 CP20.241-R2 CP20.241-R2-C1 ^{a)}

a) Conformal coated / built to order

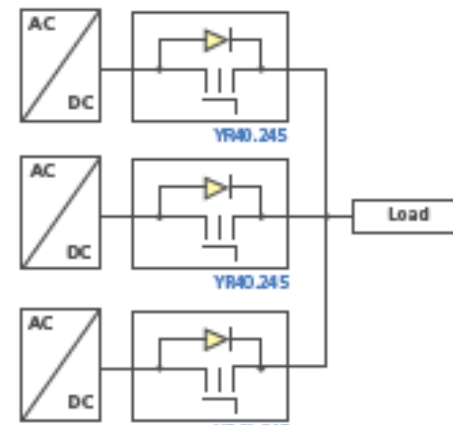
Highest System Reliability

In a redundant power supply system, two or more power supplies are wired in parallel to increase the reliability and availability of the DC voltage by having a second power supply as backup in case one power supply fails.

Both power supplies are decoupled by one or more redundancy modules to isolate each power supply and to guarantee that the non-functional power supply does not prevent the working units from providing the constant DC voltage for the demanding application.



1+1-Redundancy



N+1-Redundancy



DIMENSION YR20.246 | 24V, 2 x 10A

High-efficient decoupling

- **Automated load share feature**
Compensates a certain voltage unbalance between the two power supplies connected to the inputs. Benefits: Perfect temperature balance, longer lifetime and lower operational costs
- **Efficient MOSFET technology**
Very low power losses and reduced voltage drop
- **Redundancy OK signal**
Monitoring of the redundancy and signal in case of error



PIANO PIRD20.241 | 24V, 2 x 10A

Cost-oriented decoupling

- **Cost-oriented diode technology**
Economically priced 1+1 and n+1 redundancy
- **Compact and robust design**
39mm width and wide operational temperature range from -40°C to +55°C without derating

NEW

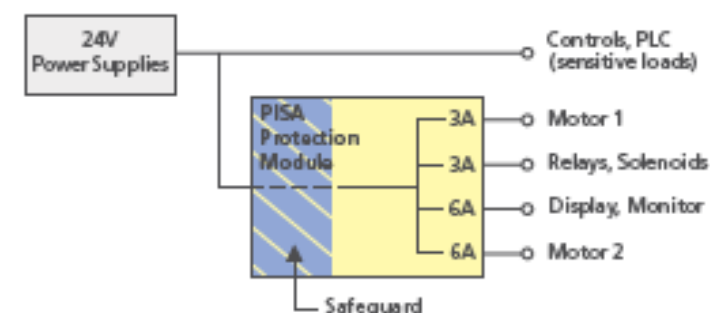
Nominal Voltage	DC 12-28V				DC 12-48V				DC 24-48V				DC 24-56V			
Input / Output	2x 10A / 20A				2x 5A / 10A				2x 10A / 20A				2x 10A / 20A			
Input Voltage Range	DC 9-35V				DC 9-60V				DC 18-60V				DC 18-35V			
Nominal Current per Input a)	10A				5A				10A				10A			
Output Current Nominal Current a) Short Circuit b)	20A max. 26A				10A max. 16A				20A max. 25A				20A max. 26A			
Voltage Drop c) In- / Output	460mV				800mV				780mV				100 - 500mV			
Decoupling	diode				diode				diode				MOSFET			
Power Losses No Load Nominal Load d)	0W 4.6W				0W 4.0W				1W 8.8W				1.7W 2.6 - 4.7W			
MTBF (+40°C, SN 29500)	7.8 Mio. h				85 Mio. h				9.1 Mio. h				2 Mio. h			
Lifetime (min. at +40°C)	113 kh				218 kh				218 kh				182 kh			
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	0.5A/°C				0.25A/°C				0.5A/°C				not required			
Dimensions WxHxD	39x124x124mm				45x75x91mm				32x124x117mm				32x124x117mm			
Weight	280g				140g				290g				310g			
Connection Terminals	screw				screw				spring				screw			
Special Features																
Order Info	stock item				stock item				stock item				stock item			
Product Family	PIANO				MiniLine				DIMENSION				DIMENSION			
Order Number	PIRD20.241				MLY10.241				YR2.DIODE				YR20.246			

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
d) At +55°C to +70°C ambient temperature

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.



PISA11

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)		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
Lifetime (min. at +40°C)		243 kh	233 kh	229 kh	216 kh	203 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	screw	screw	screw	screw
Order Info		stock item	stock item	stock item	stock item	stock item
Product Family		PISA				
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)		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
Lifetime (min. at +40°C)		115 kh	213 kh	171 kh	220 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	screw	screw	screw
Order Info		stock item	stock item	stock item	stock item
Product Family		PISA			
Order Number		PISA11.410	PISA11.203206	PISA11.206212	PISA11.CLASS2

24V DC-UPS with Batteries

For the installation of a DC-UPS system three essential elements are 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

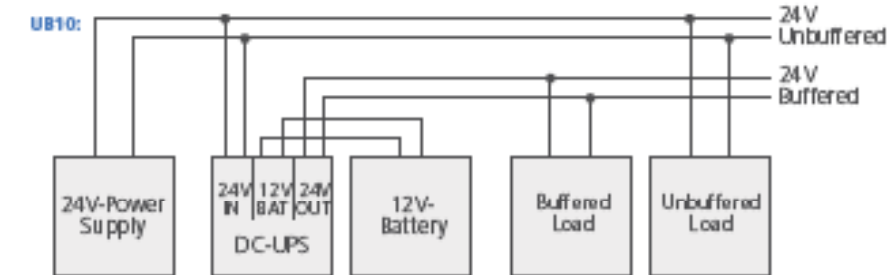
Nominal Current	10A	10A	10A	20A	10A
Nominal Voltage	DC 24V	DC 24V	DC 24V	DC 24V	DC 24V
Storage Element	external battery	external battery	external battery	external battery	built-in battery
Allowed Battery Size	12V, 3.9 to 40Ah	12V, 17 to 130Ah	12V, 3.9 to 40Ah	24V, 3.9 to 150Ah	12V, 5Ah
Output 1 in Normal-mode	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	minimally 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 ^{d)}	1.3A
MTBF (+40°C, SN 29500)	886 kh	886 kh	788 kh	649 kh	886 kh
Lifetime (min. at +40°C)	137.4 kh	min. 137 kh	min. 114 kh	122 kh	min. 137 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 in Buffer-mode	>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	750 g	2.85kg
Connection Terminals	spring	spring	spring	screw	spring
Signals	Ready, Buffering, Inhibit, Replace Battery				
Order Info	stock item				
Product Family	DIMENSION				
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 adjustable 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.



UZK12.071

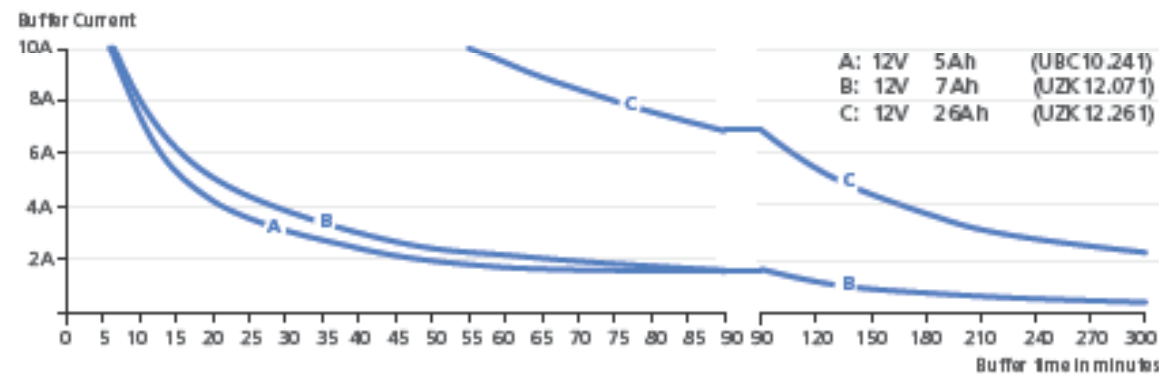
Order Number	Description	Dimensions
UB12.051	12V, 5Ah battery replacement for UBC10.241	90x106x70mm
UB12.071	12V, 7Ah battery replacement for UZK12.071 and UZK24.071 ^{a)}	151x98x65mm
UB12.121	12V, 12Ah battery replacement for UZK24.121 ^{a)}	151x98x98mm
UB12.261	12V, 26Ah battery replacement for UZK12.261	175x125x166mm
UZK12.071	12V, 7Ah battery module for UB10	155x124x112mm
UZK12.261	12V, 26Ah battery module for UB10	214x179x158mm
UZK24.071	24V, 7Ah battery module for UB20	137x186x143mm
UZK24.121	24V, 12Ah battery module for UB20	203x186x143mm
UZO12.07	Same as UZK12.071, battery module but without battery	155x124x112mm
UZO12.26	Same as UZK12.261, battery module but without battery	214x179x158mm
UZO24.071	Same as UZK24.071, battery module but without battery	137x186x143mm
UZO24.121	Same as UZK24.121, battery module but without battery	203x186x143mm
UZS24.100	Sensorboard with PT1000 temperature sensor and center-tap fuse	23x15x110.5mm

a) Two required

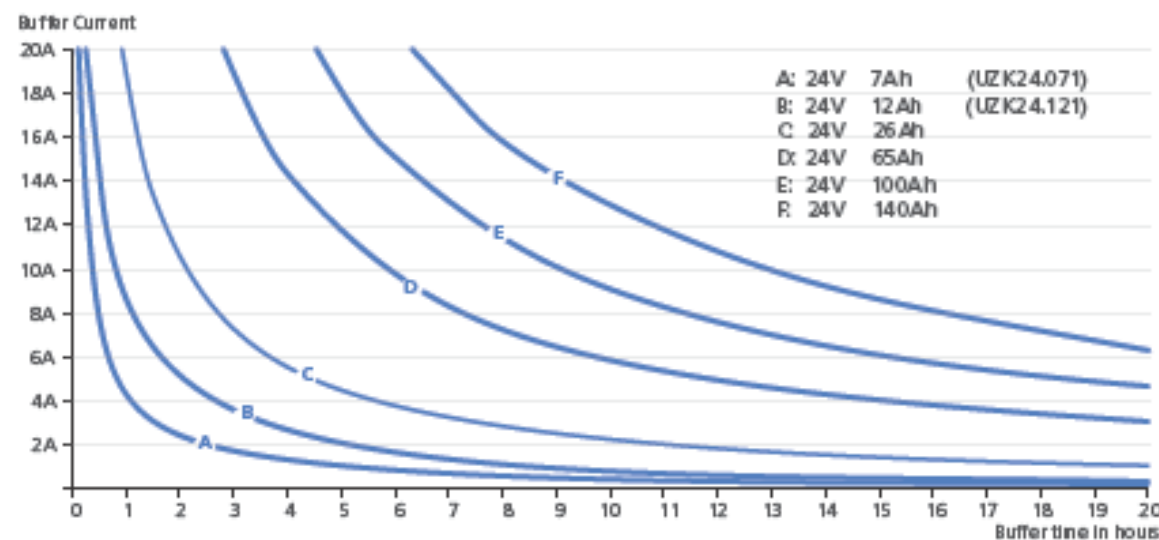
Buffer Times

Buffer current	0.5A	1A	3A	5A	7A	10A	15A	20A
UBC10.241	3h 50min	2h	30min	16min	11min	6min	5s	-
UB10 + 7Ah Battery (12V)	5h 10min	2h 30min	38min	20min	13min	6min	5s	-
UB10 + 12Ah Battery (24V)	10h 41min	5h 17min	1h 40min	46min	28min	16min	5s	-
UB10 + 26Ah Battery (12V)	23h 6min	11h 23min	3h 40min	2h 10min	1h 30min	55min	5s	-
UB10 + 65Ah Battery (12V)	2d 11h	1d 5h	9h 53min	5h 51min	4h	2h 45min	5s	-
UB10 + 100Ah Battery (12V)	3d 19h	1d 21h	14h 53min	8h 41min	6h	4h 7min	5s	-
UB10 + 130Ah Battery (12V)	4d 23h	2d 11h	19h 21min	11h 18min	7h 48min	5h 21min	5s	-
UB20 + 7Ah Battery (24V)	9h 26min	5h 16min	1h 30min	46min	30min	19min	10min	6min
UB20 + 12Ah Battery (24V)	17h 13min	9h 51min	3h 29min	2h 02min	1h 23min	46min	27min	16min
UB20 + 26Ah Battery (24V)	1d 13h	21h 34min	7h 32min	4h 26min	3h 7min	2h 10min	1h 17min	55min
UB20 + 65Ah Battery (24V)	3d 19h	2d 4h	20h 5min	11h 56min	8h 25min	5h 50min	3h 49min	2h 49min
UB20 + 100Ah Battery (24V)	6d 3h	3d 11h	1d 6h	18h 30min	13h 10min	9h 11min	6h 3min	4h 31min
UB20 + 140Ah Battery (24V)	8d 12h	4d 21h	1d 19h	1d 1h	18h 26min	12h 52min	8h 27min	6h 19min

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 occurs without interruptions. All modules are protected against overload and short-circuit and have a wide operating temperature range.



NEW

Nominal Voltage	DC 24V		DC 24V	DC 24V	DC 48V
Storage Element	Electrochemical Double Layer Capacitors		Electrolytic Capacitors		
Integrated Storage Element	6 kW s	12 kW s	0.2 kW s	0.32 kW s	0.2 kW s
Nominal Current	15A		not relevant		
Buffer Current, max.	15A		20A	40A	20A
Voltage in Buffer-mode	22.5V		22.5V ^{a)}	22.5V ^{a)}	45V ^{a)}
Separation of Input and Output	yes		no	no	no
Charging Time	16 minutes	32 minutes	18 seconds	34 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	250ms at 40A 500ms at 20A	150ms at 20A
Power Losses, typ.	4.6W at 10A		1.9W in stand-by	1.9W in stand-by	1.9W in stand-by
MTBF (+40°C, SN29500)	854 kh		850 kh	2327 kh	2114 kh
Lifetime (min. at +40°C)	96 kh ^{b)}		166 kh ^{d)}	189 kh ^{d)}	161 kh ^{c)}
Operat. Temperature Range	-40 °C to +60 °C		-25 °C to +70 °C		
Connection Terminals	spring		spring	screw	spring
Dimensions WxHxD	126x124x117mm	198x124x117mm	64x124x102mm	64x124x142	64x124x102mm
Weight	1150g	1720g	740g	1040g	740g
Signals	Ready, Buffering, Inhibit, PC-Mode		Ready, Buffering, Inhibit		
Order Info	stock items		stock items		
Product Family	dimension		dimension		
Order Number	UC10.241	UC10.242	UF20.241	UF40.241	UF20.481

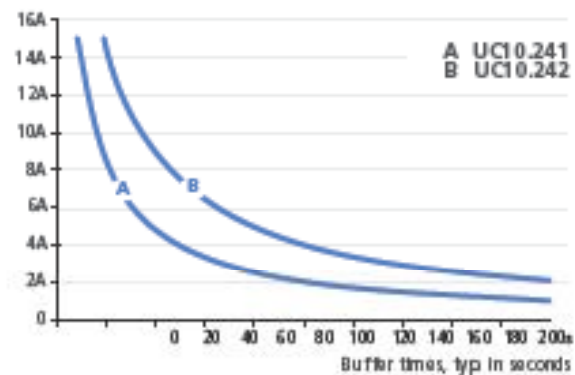
a) Or selectable 1V (UF20.241) or 2V (UF20.481) smaller than input voltage b) At a remaining capacity of 75% c) In stand-by mode

Buffering

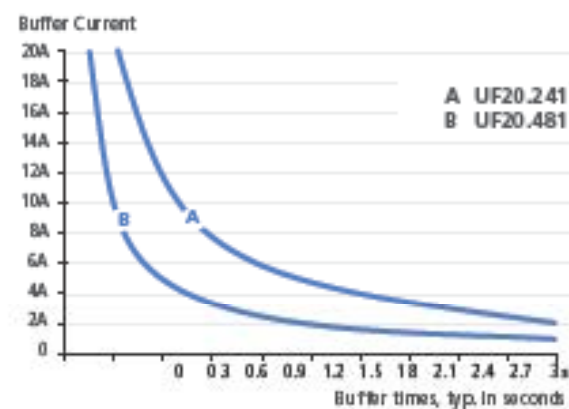
Buffer Times

Buffer current	0.5A	1A	3A	5A	7A	10A	15A	20A	30A	40A
UF20.481	6.4s	3.2s	1s	660ms	470ms	300ms	220ms	150ms	-	-
UF20.241	12.7s	6.5s	2.2s	1.3s	990ms	670ms	450ms	310ms	-	-
UF40.241	20s	10.6s	3.6s	2.1s	1.5s	1s	730ms	500ms	350ms	250ms
UC10.241	340s	200s	68s	39s	26s	16.5s	9s	-	-	-
UC10.242	680s	400s	136s	78s	53s	33s	18s	-	-	-

Buffer time with electrochemical double layer capacitors:
Buffer Current



Buffer time with electrolytic capacitors:



Mounting Brackets

Buffering Mounting Brackets

Mounting brackets for direct wall or panel mounting without the need for DIN rail.
Other brackets can be used 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	Wall mounting bracket
ZM1.WALL	for light DIMENSION units
ZM2.WALL	for QS20, QS40, QT40, CP520, ...
ZM3.WALL	for ML60, PISA11 and MLY (PU 25 pieces)
ZM6.WALL	for CP 5
ZM4.WALL	for CP 10
ZM5.WALL	for CP20
ZM1.UBC10	for UBC10

Order Number	Side mounting bracket
ZM11.SIDE	CS3, CS5, QS3, YR2, YRM2
ZM12.SIDE	CT5, QS5
ZM13.SIDE	CS10, CT10, QS10, CP520, ...
ZM14.SIDE	QT20, QTD20, UF20
ZM15.SIDE	QS20 (except QS20.244)



PULS Power House

The Single Source for Power Solutions



PULS Standard Products

- 1-phase and 3-phase power supplies
- Broad range of additional DC UPS, redundancy, protection and buffer modules

PULS Vario Custom Solutions

- Value-add solutions
- Modifications
- Complete power solutions

Custom Solutions

Value-add solutions

Innovative modular principle

The value-add systems are based on an 80/20 principle. This means that for the implementation of a value-add project, about 80% original or modified standard power supplies and only 20% purely customer-specific assemblies are used.



Power supply system for SMT placement machine

The value-add system for this application includes three standard power supplies, two modified power supplies and a customised buffer module. The system is optimised for powering dynamic loads and covers the high peak loads of up to 30kW with the energy from the buffer module which avoids undesirable effects on the grid.

Modifications

AC/DC-converter for fire protection systems

- Input: AC 100-240V
- Output: 36Vdc
- Power: 240W
- Parallel mode for load sharing
- Decoupling module at output

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 ambient temperature
- Communication interface

DC/DC-converter for solar applications

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



Complete power solutions

PULS always tries to generate a cost-efficient solution based on its proven standard products. Nevertheless, customer-specific power supplies or modules can be necessary to complement a Value-Add system or to match the special requirements of a customer. If you are interested in a complete power solution, please contact our support team.

Standards and Approvals

	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, 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 class B Disturbance characteristics
Power Supplies																				
CD5.121	30	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CD5.241	30	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CD5.241-L1	31	*	*	*	*	*	*	*	*	*	*	*			5	*	*	*	*	*
CD5.241-S1	30	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CD5.242	31	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CD5.243	30	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CD10.241	31	*	(*)	(*)	(*)	(*)	(*)	(*)			*				5	*	*	*	*	*
CD10.482	31	*	(*)	(*)	(*)	(*)	(*)	(*)			*				5	*	*	*	*	*
CP5.121	19	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP5.241	21	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP5.241-M1	35	*	(*)	(*)	(*)						*			(*)	2	*	*	*	*	*
CP5.241-S2	21	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.121	19	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP10.122	19	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.241	23	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP10.241-60	34	*									*		(*)		5	*	*	*	*	*
CP10.241-C1	23	*	*	*	*	*	*	*			*				2	*	*	*	*	*
CP10.241-M1	35	*	(*)	(*)	(*)						*			*	2	*	*	*	*	*
CP10.241-R1	37	*	(*)	(*)	(*)	*	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.241-R2	37	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.241-R2-C1	37	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.241-S1	23	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP10.241-S2	23	*	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP10.242	23	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP10.361	25	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP10.481	26	*	*	*	*	*	*	*	*		*				2	*	*	*	*	*
CP20.241	24	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-C1	24	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-M1	35	(*)	(*)	(*)	(*)						*			(*)	2	*	*	*	*	*
CP20.241-R1	34	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-R2	34	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-R2-C1	34	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-S1	24	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-S2	24	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.241-V1	24	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*
CP20.481	27	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		*				2	*	*	*	*	*

- * fulfilled
 - (*) in preparation
 - not fulfilled
- 1) meets class A limits (passive)
 2) meets class A limits (active)
 3) not applicable (<75VA)
 4) not applicable (<220V_{ac})
 5) not applicable for this type

	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, 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 class B Disturbance characteristics
CP520.121	19	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
CP520.241	24	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
CP520.241-60	34	*									*				5		*		*	
CP520.241-C1	24	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
CP520.241-D1	31	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CP520.361	25	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
CP520.481	27	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
CP520.481-D1	31	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
CS3.241	21	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
CS5.241	22	*	*	*	*			*	*	*	*				-	*	*		*	*
CS5.241-C1	22	*	*	*	*			*	*	*	*				-	*	*		*	*
CS5.241-S1	22	*	*	*	*			*	*	*	*				-	*	*		*	*
CS5.243	22	*	*	*	*			*	*	*	*				4	*	*	*	*	*
CS5.244	22	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CS10.241	23	*	*	*	*			*	*	*	*				-	*	*		*	*
CS10.241-S1	23	*	*	*	*			*	*	*	*				-	*	*		*	*
CS10.242	23	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CS10.243	23	*	*	*	*			*	*	*	*				4	*	*	*	*	*
CS10.244	23	*	*	*	*			*	*	*	*				-	*	*		*	*
CS10.481	26	*	*	*	*			*	*	*	*				-	*	*		*	*
CT5.121	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CT5.241	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CT10.241	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CT10.241-C1	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CT10.481	29	*	*	*	*			*	*	*	*				1	*	*	*	*	*
CT10.481-C1	29	*	*	*	*			*	*	*	*				1	*	*	*	*	*
ML15.051	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML15.121	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML15.241	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML30.100	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML30.101	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML30.102	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML30.106	19	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML30.241	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML50.100	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML50.101	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML50.102	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*

- * fulfilled
 - (*) in preparation
 - not fulfilled
- 1) meets class A limits (passive)
 2) meets class A limits (active)
 3) not applicable (<75VA)
 4) not applicable (<220V_{ac})
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Standards and Approvals

	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, 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 class B Disturbance characteristics
ML50.105	26	*	*	*	*						*	*			3	*	*	*	*	*
ML50.109	21	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML50.111	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML60.121	18	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML60.122	19	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML60.241	20	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML60.242	21	*	*	*	*			*	*	*	*	*			3	*	*	*	*	*
ML70.100	21	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
ML90.200	28	*	*	*	*				*	*	*	*			1	*	*	*	*	*
ML95.100	21	*	*	*	*			*			*	*			1	*	*	*	*	*
ML100.100	21	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
ML100.102	19	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
ML100.105	26	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
ML100.109	21	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
ML100.200	28	*	*	*	*			*	*	*	*	*			1	*	*	*	*	*
PAS395	27	*									*				-		*			
PIC120.241C	22	*	*	*	*				*	*	*	*			1	*	*	*	*	*
PIC120.241D	22	*	*	*	*						*	*			1	*	*	*	*	*
PIC120.242C	22	*	*	*	*				*	*	*	*			1	*	*	*	*	*
PIC240.241C	23	*	*	*	*				*	*	*	*			-	*	*		*	*
PIC240.241D	23	*	(*)	(*)	(*)						*	*			2	*	*	*	*	*
PIC480.241C	24	*	(*)	(*)	(*)						*	*			2	*	*	*	*	*
PIC480.241D	24	*	(*)	(*)	(*)						*	*			2	*	*	*	*	*
PIRD20.241	28	*	*	*	*						*	*			5	*	*	*	*	*
QS3.241	21	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS5.241	22	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS5.241-60	34	*									*		*		5	*	*	*	*	*
QS5.241-A1	22	*	*	*	*	*	*	*	*	*	*	*			2	*	*	*	*	*
QS5.DNET	21	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS10.121	19	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS10.241	23	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS10.241-60	34	*									*		*		5	*	*	*	*	*
QS10.241-A1	23	*	*	*	*	*	*	*	*	*	*	*			2	*	*	*	*	*
QS10.241-C1	23	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS10.241-D1	23	*	*	*	*						*	*			2	*	*	*	*	*
QS10.301	25	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*
QS10.481	26	*	*	*	*			*	*	*	*	*			2	*	*	*	*	*

- * fulfilled
- (*) in preparation
- 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

	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, 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 class B Disturbance characteristics
QS10.481-D1	26	*	*	*	*						*				2	*	*	*	*	*
QS10.DNET	22	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QS20.241	24	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QS20.241-A1	24	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
QS20.241-C1	24	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QS20.244	25	*	*	*	*			*	*	*	*				-	*	*	-	*	*
QS20.361	25	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QS20.481	27	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QS40.241	24	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
QS40.244	25	*	*	*	*			*	*	*	*				-	*	*	*	*	*
QS40.361	25	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
QS40.481	27	*	*	*	*	*	*	*	*	*	*				2	*	*	*	*	*
QS40.484	27	*	*	*	*			*	*	*	*				-	*	*	*	*	*
QT20.241	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
QT20.241-C1	28	*	*	*	*			*	*	*	*				1	*	*	*	*	*
QT20.361	29	*	*	*	*			*	*	*	*				1	*	*	*	*	*
QT20.481	29	*	*	*	*			*	*	*	*				1	*	*	*	*	*
QT40.241	28	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QT40.242	28	*	*	*	*						*				2	*	*	*	*	*
QT40.361	29	*	*	*	*						*				2	*	*	*	*	*
QT40.481	29	*	*	*	*			*	*	*	*				2	*	*	*	*	*
QTD20.241	31	*	*								*				5	*	*		*	*
SLA3.100	33	*				*	*	*			*	*			1	*	*	*	*	*
SLA4.100	33	*									*				1	*	*	*	*	*
SLA8.100	33	*									*				-	*	*		*	*
SLA8.300	33	*									*				1	*	*		*	*
SLAD4.100	33	*									*				5	*	*	*	*	*
XT40.241	29	*	*	*	*						*				1	*	*	*	*	*
XT40.242	29	*	*	*	*						*				1	*	*	*	*	*
XT40.361	29	*	*	*	*						*				1	*	*	*	*	*
XT40.362	29	*	*	*	*						*				1	*	*	*	*	*
XT40.481	29	*	*	*	*						*				1	*	*	*	*	*
XT40.482	29	*	*	*	*						*				1	*	*	*	*	*
XT40.721	29	*	*	*	*						*				1	*	*	*	*	*
XT40.722	29	*	*	*	*						*				1	*	*	*	*	*

- * fulfilled
- (*) in preparation
- 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

	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, 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 class B Disturbance characteristics
Supplementary units																				
MLY02.100	38	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
MLY10.241	38	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
PISA 11.203206	41	*	*	*	*		*	*	*	*	*				5	*	*	*	*	*
PISA 11.206212	41	*	*	*	*		*	*	*	*	*				5	*	*	*	*	*
PISA 11.401	40	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.402	40	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.403	40	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.404	40	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.406	40	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.410	41	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
PISA 11.CLASS2	41	*	*	*	*		*	*	*	*	*	*			5	*	*	*	*	*
SLD2.100	30	*									*				5	*	*	*	*	*
UB10.241	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UB10.242	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UB10.245	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UB20.241	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UBC10.241	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UBC10.241-N1	42	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UC10.241	45	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UC10.242	45	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
UF20.241	45	*	*	*	*						*				5	*	*	*	*	*
UF20.481	45	*	*	*	*						*				5	*	*	*	*	*
UF40.241	45	*	*	*	*						*				5	*	*	*	*	*
UZB12.051	43										*				5					
UZB12.071	43										*				5					
UZB12.121	43										*				5					
UZB12.261	43										*				5					
UZK12.071	43	7				*	*	*	*	*	*				5	*	*	*	*	*
UZK12.261	43	7					*	*	*	*	*				5	*	*	*	*	*
UZK 24.071	43	7	(*)	(*)		*	*	*			*				5	*	*	*	*	*
UZK 24.121	43	7	(*)	(*)		*	*	*			*				5	*	*	*	*	*
UZO 12.07	43	*				*	*	*	*	*	*				5	*	*	*	*	*
UZO 12.26	43	*				*	*	*	*	*	*				5	*	*	*	*	*

- * fulfilled
 - (*) in preparation
 - not fulfilled
- 1) meets class A limits (passive)
 2) meets class A limits (active)
 3) not applicable (<75VA)
 4) not applicable (<220V/ac)
 5) not applicable for this type

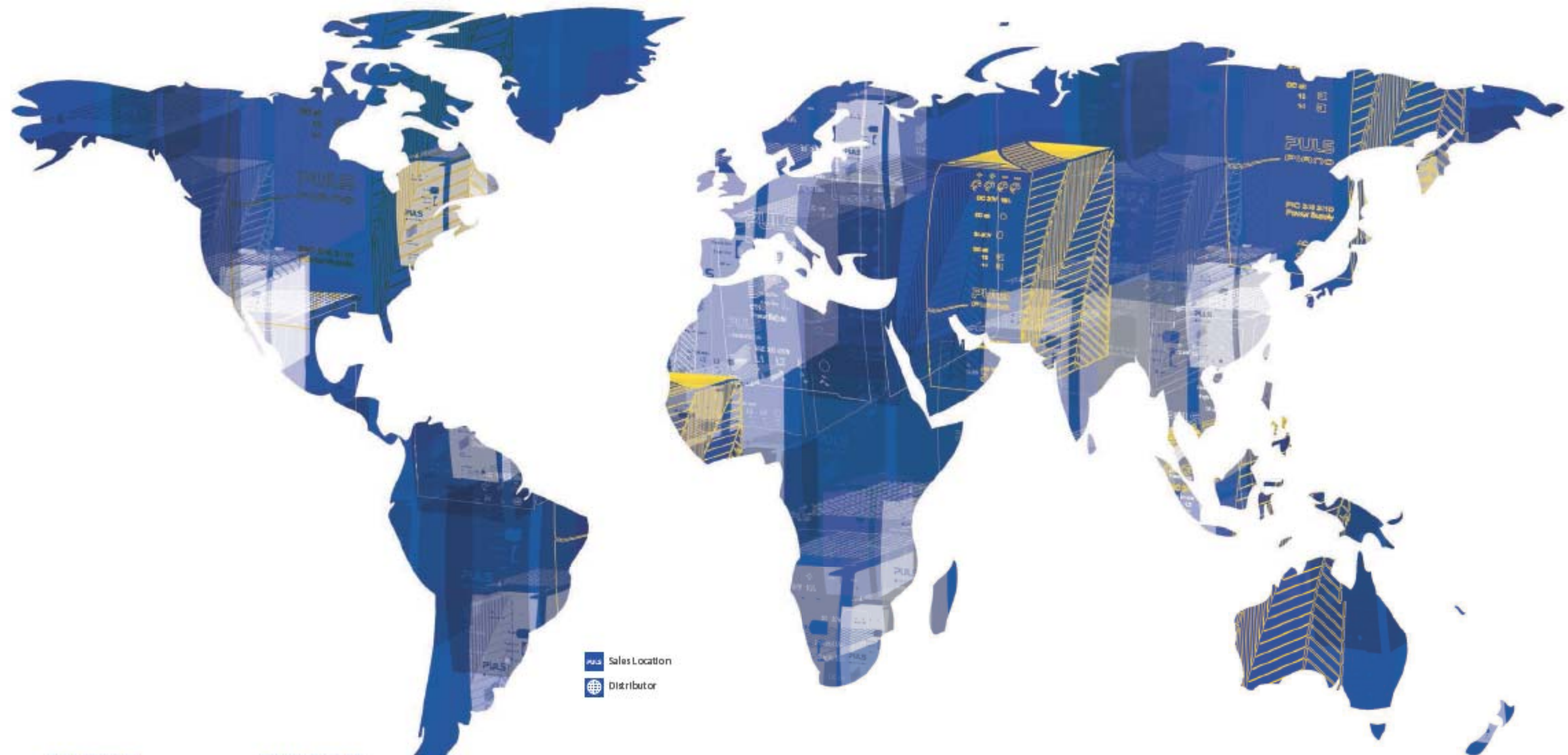
	Page	CE	UL 508	UL 60950-1	IEC 60950-1 CB-Scheme	IECEX	ATEX	Class I Div 2 HazLoc	GL Marine	ABS Marine	EAC Registration	NEC-Class-2	EN 50155 Railway	IEC 60601-1, 3rd edition, Medical	EN 61000-3-2 Harmonics (PFQ)	EN 61000-6-1 Immunity, residential environments	EN 61000-6-2 Immunity for industrial environments	EN 61000-6-3 Emission for residential environments	EN 61000-6-4 Emission for industrial environments	EN 55011 / EN 55022 class B Disturbance characteristics
UZO24.071	43	*	(*)	(*)	*	*	*	*			*				5	*	*	*	*	*
UZO24.121	43	*	(*)	(*)	*	*	*	*			*				5	*	*	*	*	*
UZS24.100	43	*			*	*	*	*			*				5	*	*	*	*	*
YR2.DIODE	38	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR20.242	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR20.246	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR40.241	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR40.242	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR40.245	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR40.482	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR80.241	39	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*
YR80.242	39	*	(*)	(*)	(*)	*	*	*	*	*	*				5	*	*	*	*	*
YRM2.DIODE	38	*	*	*	*	*	*	*	*	*	*				5	*	*	*	*	*

- * fulfilled
 - (*) in preparation
 - not fulfilled
- 1) meets class A limits (passive)
 2) meets class A limits (active)
 3) not applicable (<75VA)
 4) not applicable (<220V/ac)
 5) not applicable for this type

Standards and Approvals

Available Standards and Approvals – An Overview of PULS Products:

	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.
 	Canada, 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.
	International	ITE (Information Technology Equipment): Safety of information technology equipment. This certification mark is based on the UL 60950-1.
	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.
	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.
	Europe	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.
 	USA	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.
	International	Germanischer Lloyd: Prototype testing for the shipbuilding and offshore sector
	USA	ABS American Bureau for Shipping: Type testing (PDA) for shipbuilding or offshore approvals for the USA.
	Russia	TR EAC registration: Approval for Russia, Kazakhstan and Belarus
	International	„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.
	International	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.
	Europe	EN 50155: This standard applies to all electronic devices for the control, regulation, protection, supply, etc. that are installed on rail-going vehicles and connected to the accumulator battery of the vehicle or a low-voltage power supply with or without direct connection to the mains voltage.
	Europe	IEC 60601-1: This standard sets out the requirements for the electrical safety of electrical medical devices and electrical medical systems. Protective measures for patients and users are the primary focus. 2 MOPP (Means Of Patient Protection) here stands for two measures for patient protection.



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 www.puls-power.com



✦ ✦ - -
DC 24V 10A

24 20V

Parallel Use
Single Use
DC on

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DIMENSION

1000
PULS
Power Supply

24V 200 400W
L1 L2 L3 0
+ -

PULS

✦ ✦ ✦ ✦
DC 24V 16A
DC on
24V
DC on
16 17 18

PULS
DIMENSION

✦ ✦ ✦ ✦
DC 24V 16A
DC on

24-20V
DC on
16 17 18

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