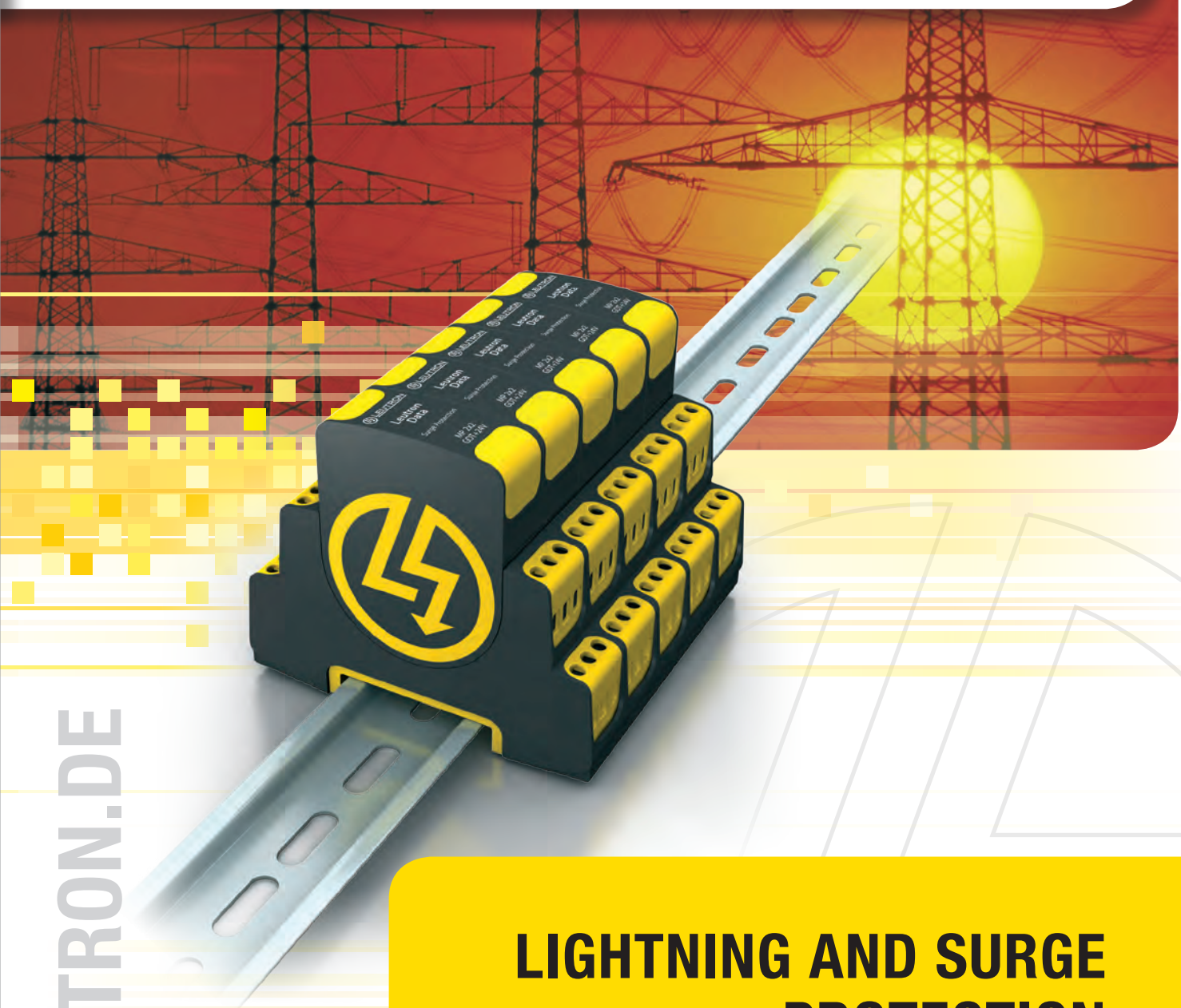
LEUTRON®



LIGHTNING AND SURGE PROTECTION

WWW.LEUTRON.DE

Leutron Main Catalogue 2015/2016

SURGE PROTECTION WITH A NEW DESIGN

The multi-pole combined modular arresters for protection against lightning strikes and transient surge voltages now have an even more attractive design. In addition to their outstanding technical properties, they are pluggable and provide a clearly readable function control indication and status display. The variable installation position – the base part can be plugged in two directions – enables a flexible and cost-saving wiring.

EASY SETUP, SECURE OPERATION:

- New: Easy changing of the protection module thanks to a two-part design with a vibration-resistant locking
- Remote signalling using only one signalling contact – even with 4-pole devices
- Robust and maintenance-free due to the hermetically closed rare-gas-filled isolating spark gap without internal or external trigger electronics

The new design developed together with product design specialists allows for an easier handling.

SURGE PROTECTION
FOR POWER SUPPLY SYSTEMS

TWO-PIECE PLUGGABLE SURGE PROTECTIVE DEVICES FOR AC POWER SUPPLY SYSTEMS

New product line »Leutron Power«: Powerful and standardized pluggable modules for almost every power supply system available.

- Optimized follow-on current extinguishing capability

Mechanical status indicator: State of the surge protective device is optically indicated

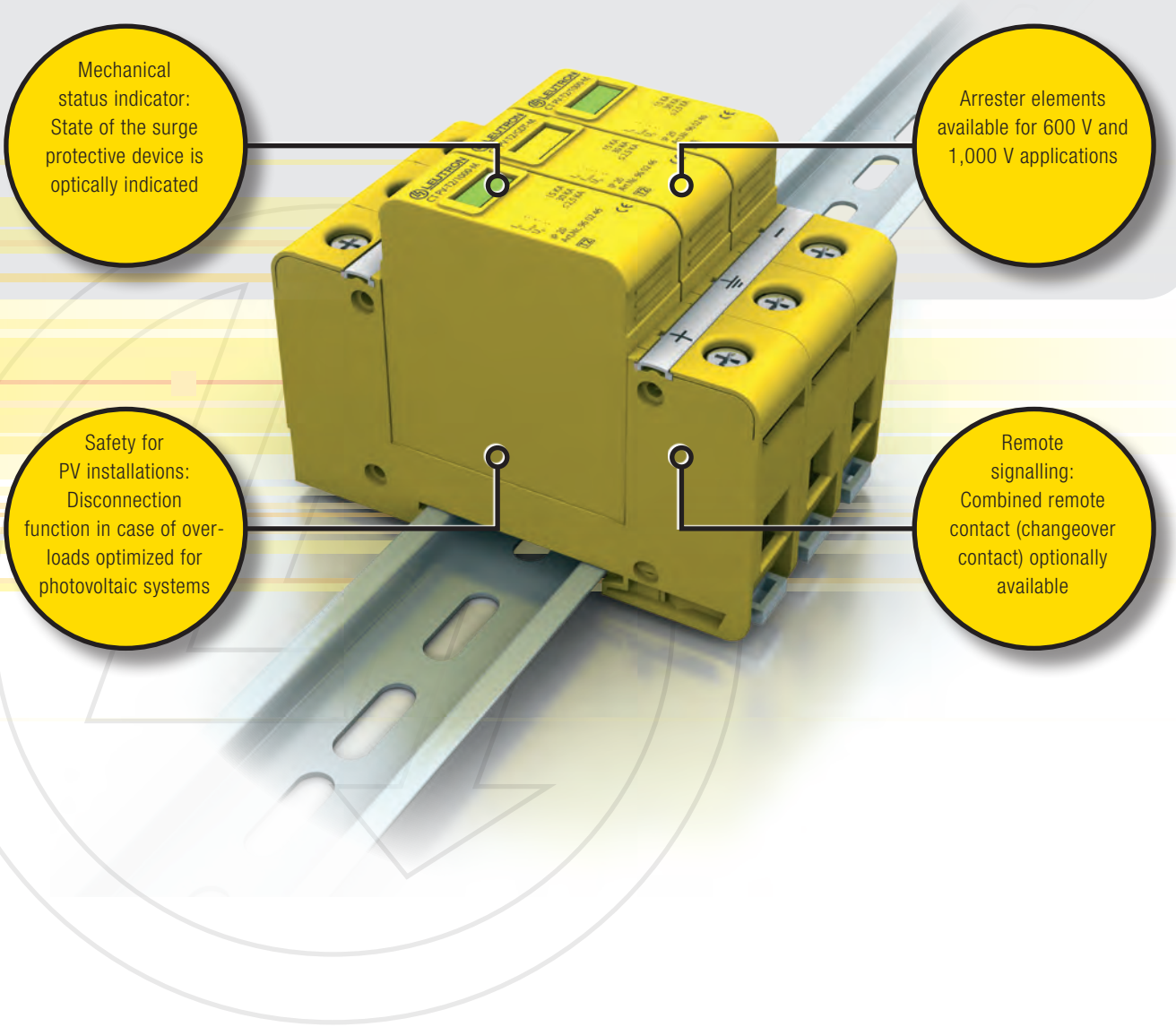
Locking function: Release of the latches by ergonomically shaped grip lugs

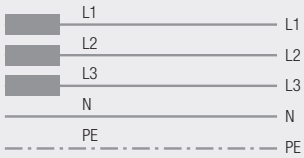
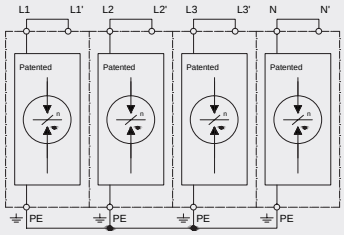
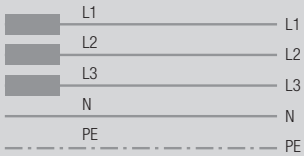
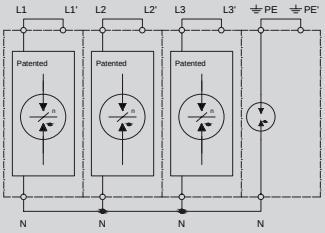
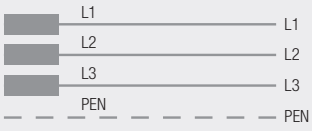
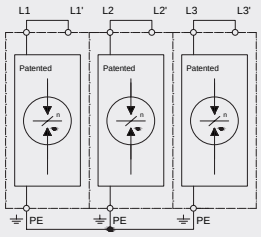
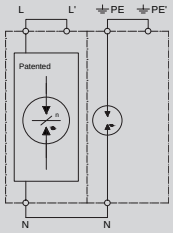
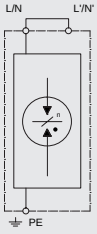
Protection against mismating: Optimized installation due to arresters with coding

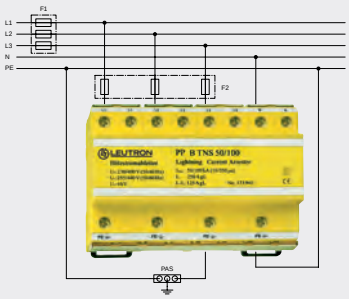
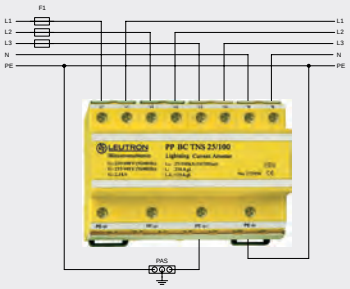
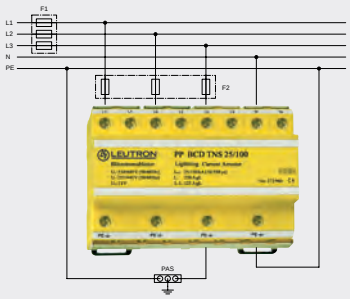
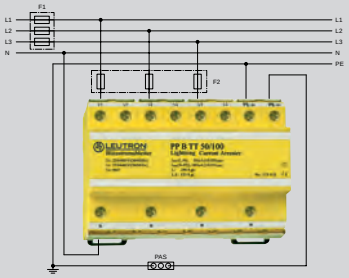
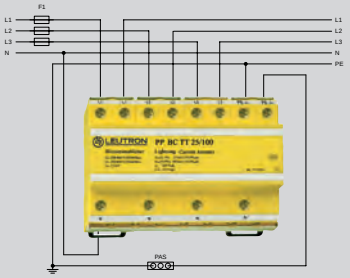
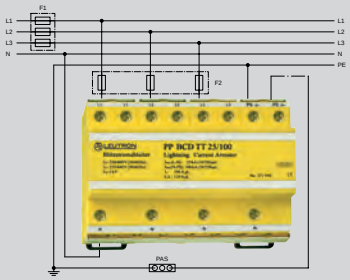
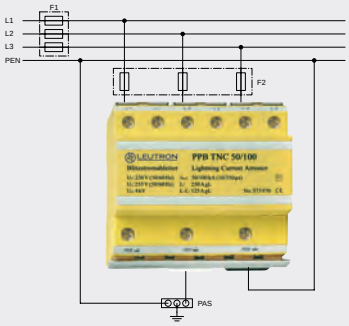
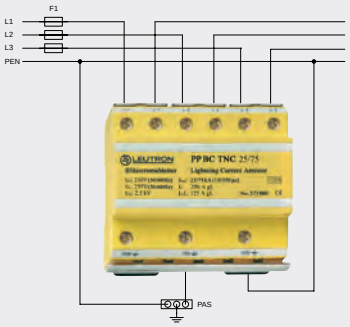
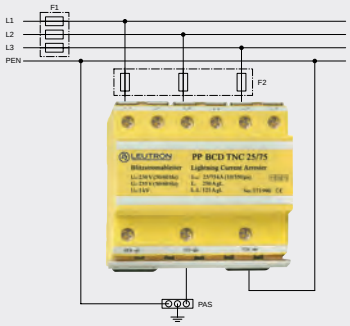
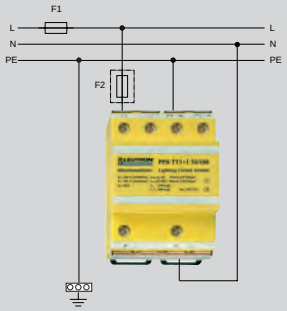
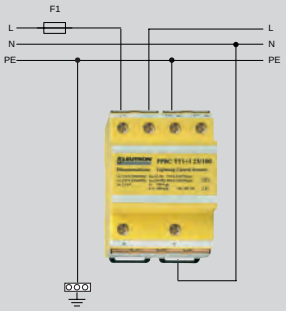
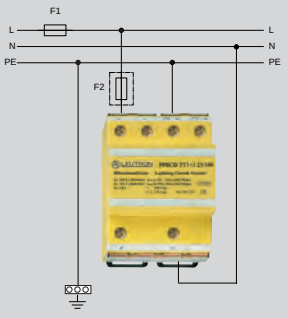
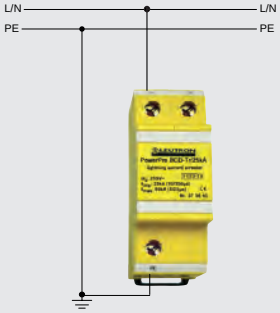
Remote signalling: Combined remote contact (changeover contact) optionally available

Turnable plug-in modules: The plug-in modules can be twisted on the basic module, thus, guaranteeing always good readability even with variable wiring

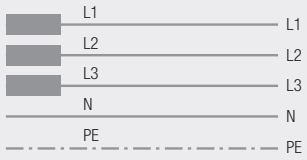
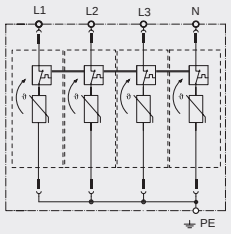
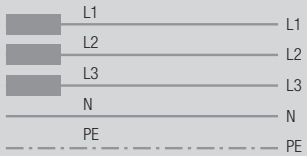
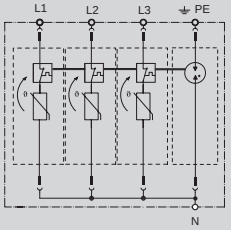
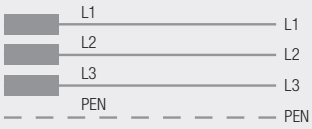
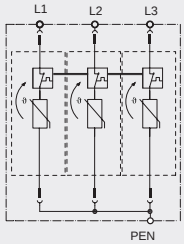
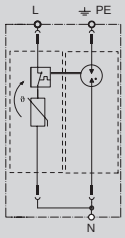
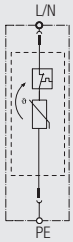
TWO-PIECE PLUGGABLE SURGE PROTECTIVE DEVICES FOR DC POWER SUPPLY SYSTEMS

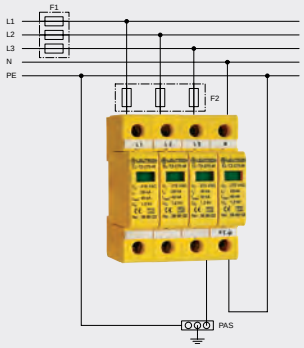
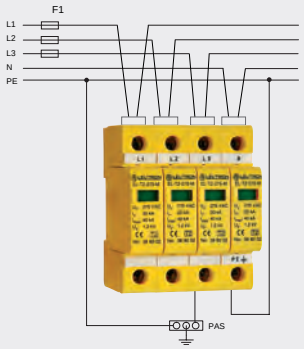
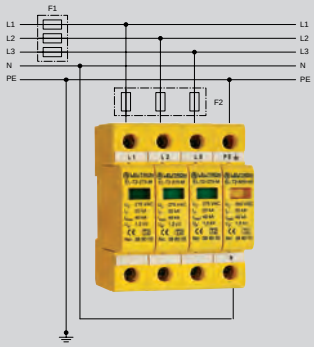
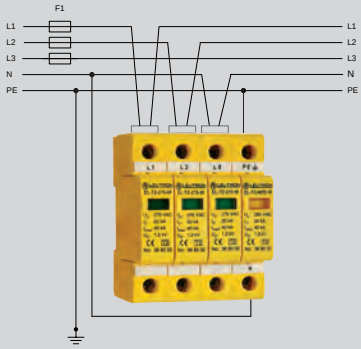
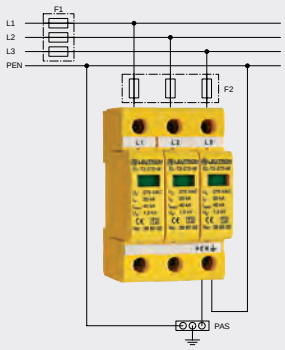
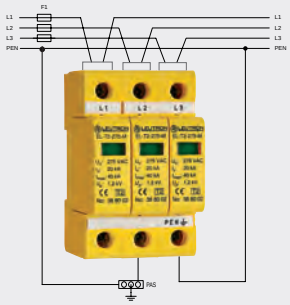
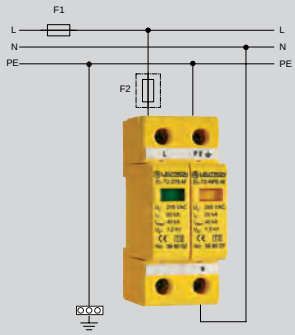
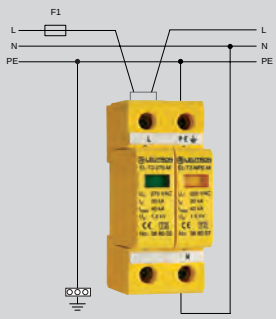
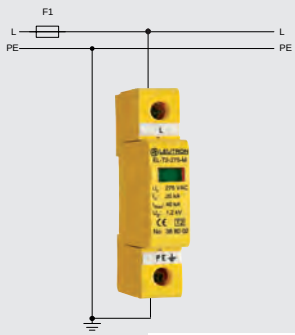
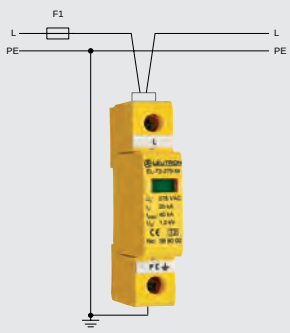


	Network type	Description		Adequate SPD circuit type Basic circuit diagram
3 PHASE POWER SUPPLY SYSTEMS	TN-S	3 phase power supply systems separated N and PE		4 + 0-circuits 
	TT/ TN-S	3 phase power supply systems separated N and PE		3 + 1-circuits 
	TN-C	3 phase power supply systems common PEN		3 + 0-circuits 
1 PHASE POWER SUPPLY SYSTEMS	TT/ TN-S	1 phase power supply systems separated N and PE		1 + 1-circuits 
	TN	1 phase power supply systems L/N to PE		1 + 0-circuits 

Lightning current arrester type 1, PowerPro B at the LPZ transition point 0_A – 1*	Combined arrester type 1+2 (V wiring) PowerPro BC at the LPZ transition point 0_A-2*	Combined arrester type 1+2+3 PowerPro BCD at the LPZ transition point 0_A-2*
		
		
		
		
		

* according to the lightning protection zones concept

	Network type	Description		Adequate SPD circuit type
3 PHASE POWER SUPPLY SYSTEMS	TN-S	3 phase power supply systems separated N and PE		4 + 0-circuits 
	TT/ TN-S	3 phase power supply systems separated N and PE		3 + 1-circuits 
	TN-C	3 phase power supply systems common PEN		3 + 0-circuits 
1 PHASE POWER SUPPLY SYSTEMS	TT/ TN-S	1 phase power supply systems separated N and PE		1 + 1-circuits 
	TN	1 phase power supply systems L/N to PE		1 + 0-circuits 

SPD type 2, Spur wiring at the LPZ transition point 0_B-1*	SPD type 2, V wiring at the LPZ transition point 0_B-1*
	
	
	
	
	

* according to the lightning protection zones concept

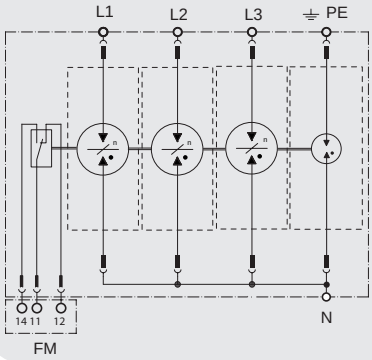
Lightning current arrester class 1 for AC power supplies / CT Series

CT-T1

Lightning current discharge arrester with rare-gas-filled spark gap. They provide extremely high discharge cappabilities with at the same time very low protection levels and they also do not need any damageable internal or external electronic trigger.

Example photo

Basic circuit diagram



- Applicable at the boundaries LPZ 0A - 1
- Test standard: IEC 61643-1 / EN 61643-11
- Available for all net systems
- Enclosure material: thermoplastic with the colors yellow and black
- Mounting on 35 mm DIN rail
- Degree of protection according to IEC EN 60529: IP 20
- Inflammability class according to UL 94 V0
- Remote changeover contact
- No leakage currents, thus, allowing installation upstream of power meters

					
Technical Data		**CT-T1/3+1-350-FM**	**CT-T1/3+0-350-FM**	**CT-T1/2+0-350-FM**	**CT-T1/1+1-350-FM**
Article-No.		96 02 07	96 02 09	96 02 13	96 02 15
EC category/EN type		type 1 / class I	type 1 / class I	type 1 / class I	type 1 / class I
Nominal voltage	UN	230/400 V	230/400 V	230/400 V	230/400 V
Max. continous operating voltage AC	Uc	350 V~	350 V~	350 V~	350 V~
Lightning impulse current (10/350) total	Itotal	100 kA	75 kA	50 kA	50 kA
Lightning impulse current (10/350) L-N/N-PE/L-PEN	Iimp	25 / 100 / - kA	- / - / 75 (3L-PEN) kA	25 / - / - kA	25 / 50 / - kA
Nominal discharge current (8/20) L-N/N-PE/L-PEN	In	25 / 100 / - kA	- / - / 75 (3L-PEN) kA	25 / - / - kA	25 / 50 / - kA
Voltage protection level at Iimp	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Follow current quenching capacity AC L-N (260V AC)	Ifi	10 kAeff	10 kAeff	10 kAeff	10 kAeff
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable backup fuse (V-type through wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible	10mm² solid/flexible	10mm² solid/flexible
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Dimension (DIN 43880)		147,2 mm	113,5 mm	76,5 mm	76,5 mm
Max. operating voltage remote contact		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating voltage remote contact		1 A AC/200 mA DC	1 A AC/200 mA DC	1 A AC/200 mA DC	1 A AC/200 mA DC
Composed of: number of moduls		3x 96 02 37 + 1x 96 02 38	3x 96 02 37	2x 96 02 37	1x 96 02 37 + 1x 96 02 38
Power supply system		3 phase TNS and TT systems	3 phase TNC systems	1 phase TN systems	1 phase TT and TNS systems

Dimension drawing, see pages 186 up to 190

Leutron GmbH · Humboldtstrasse 30 · 70771 Leinfelden-Echterdingen · Germany · Phone +49 711 94771-0 · www.leutron.de

			
Technical Data		**CT-T1/1+0-350-FM**	**CT-T1/0+1-FS-FM**
Article-No.		96 02 17	96 02 33
EC category/EN type		type 1 / class I	type 1 / class I
Nominal voltage	UN	230/400 V	230 V
Max. continous operating voltage AC	Uc	350 V~	260 V~
Lightning impulse current (10/350) total	Itotal	25 kA	100 kA
Lightning impulse current (10/350) L-N/N-PE/L-PEN	Iimp	25 / - / - kA	- / 100 / - kA
Nominal discharge current (8/20) L-N/N-PE/L-PEN	In	25 / - / 25 kA	- / 100 / - kA
Voltage protection level at limp	Up	≤ 2,5 kV	≤ 2,5 kV
Follow current quenching capacity AC L-N (260V AC)	Ifi	10 kAeff	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG
Max. acceptable backup fuse (V-type through wiring)		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Dimension (DIN 43880)		39,8 mm	39,8 mm
Max. operating voltage remote contact		250 V AC/125 V DC	250 V AC/125 V DC
Max. operating voltage remote contact		1 A AC/200 mA DC	1 A AC/200 mA DC
Composed of: number of moduls		1x 96 02 37	1x 96 02 378
Power supply system		between L und N	between N und PE

Accessories: Module		
	CT-T1-350-M	CT-T1-NPE-M
Article-No.	96 02 37	96 02 38

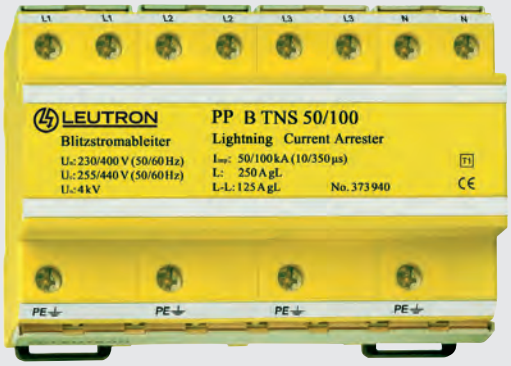
Replacement protective plug for lightning current discharge arresters.

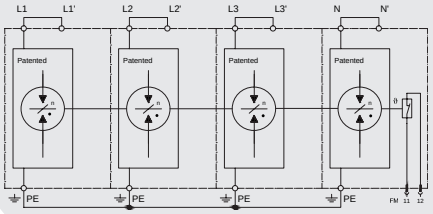
Dimension drawing, see pages 186 up to 190

Lightning current arrester type 1 for AC power supplies / PowerPro

PowerPro B

Multi-pole lightning current arrester type 1 (class I). The arresters can be installed at the transition 0A to 1 according to the lightning protection zones concept. The SPDs of the series PowerPro B feature a high thermal resistance and an outstanding discharge capability for lightning impulse currents of 50 kA (10/350 µs) per pole. Therefore, they can be applied according to DIN EN 62305 (VDE 0185-305).





Basic circuit diagram

- Test standard: IEC 61643-1 / EN 61643-11
- Discharge capacity up to 100 kA (10/350)
- Operates independently of atmospheric air pressure and ambient humidity
- Optional remote signalling contact (FM)
- NEW: only one remote signalling contact (FM) (internal wire connection)
- Remote signalling contact: break contact
- High quenching of follow-on short-circuit currents
- High TOV resistance
- High insulation resistance
- Degree of protection according to IEC EN 60529: IP 20
- Mounting on 35 mm DIN rail

					
Technical Data		**PP B TNS 50/100**	**PP B TNS 50/100-350**	**PP B TNS 440**	**PP B TNC 50/100**
Article-No.		37 39 40	37 41 20	37 39 43	37 39 70
Nominal voltage AC	UN	230/400 V~	230/400 V~	400/690 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	440 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Voltage protection level at limp [L-PE]	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Response time		<50 ns	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) [L1+L2+L3+N-PE]	Itotal	100 kA	100 kA	100 kA	75 kA
Lightning impulse current (10/350µs) (L,N-PE)	limp	50 kA	50 kA	25 kA	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	0,75 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG	63 A gL/gG	250 A gL/gG
Max. acceptable backup fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	63 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**PP B TNS 50/100/FM**	**PP B TNS 50/100/FM-350**	**PP B TNS 440/FM**	**PP B TNC 50/100 /FM**
Article-No.	37 39 42	37 41 25	37 39 44	37 39 72
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

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Technical Data		**PP B TNC 50/100-350**	**PP B TNC 440**	**PP B TN 50/100**	**PP B TN 440**
Article-No.		37 41 10	37 39 64	38 12 10	37 39 45
Nominal voltage AC	UN	230/400 V~	400/690 V~	230/400 V~	400 V~
Max. continous operating voltage AC	Uc	350 V~	440 V~	255 V~	440 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Voltage protection level at limp [L-PEN]	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Response time	tA	<50 ns	<50 ns	<50 ns	< 50 ns
Lightning impulse current (10/350µs) (L1+L2+L3-PEN)	Itotal	75 kA	75 kA	100 kA	50 kA
Lightning impulse current (10/350µs) (L-PEN)	limp	25 kA	25 kA	50 kA	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	63 A gL/gG	250 A gL/gG	63 A gL/gG
Max. acceptable backup fuse F1 (V wiring)		125 A gL/gG	63 A gL/gG	125 A gL/gG	63 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**PP B TNC 50/100-350/FM**	**PP B TNC 440/FM**	**PP B TN 50/100/FM**	**PP B TN 440/FM**
Article-No.	37 41 15	37 39 65	38 12 11	37 39 46
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

					
Technical Data		**PP B TT 50/100**	**PP B TT 50/100-350**	**PP B TT1+1 50/100**	**PP B TT2+1 50/100**
Article-No.		37 39 10	37 41 30	38 11 30	37 39 15
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	100/200 bzw. 110/220 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	>255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	<4,0 kV
Voltage protection level at limp (L-N)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	<4,0 kV
Response time	tA	<50 ns	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) [L1+L2+L3+N-PE]	Itotal	100 kA	100 kA	100 kA	100 kA
Lightning impulse current (10/350µs) [L-N]	limp	50 kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350µs) [N-PE]	limp	100 kA	100 kA	100 kA	100 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm

With remote signalling contact (FM)	**PP B TT 50/100/FM**	**PP B TT 50/100/FM-350**	**PP B TT1+1 50/100 /FM**	**PP B TT2+1 50/100 /FM**
Article-No.	39 39 12	37 41 35	38 11 31	37 39 17
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Technical Data		PP B IT 50/100
Article-No.		37 39 18
Nominal voltage AC	UN	230/400 V~
Max. continous operating voltage AC	Uc	>440 V~
Insulation resistance	Risol	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV
Voltage protection level at limp L-N	Up	≤ 4,0 kV
Response time	tA	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA
Lightning impulse current (10/350) L-N	limp	50 kA
Lightning impulse current (10/350) N-PE	limp	k. A.
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		63 A gL/gG
Max. acceptable back-up fuseF1 (V wiring)		63 A gL/gG
Operating temperature range	TU	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible
Recommended conductor cross section		min. 25 mm²
Max. connection torque for terminals		4,5 Nm

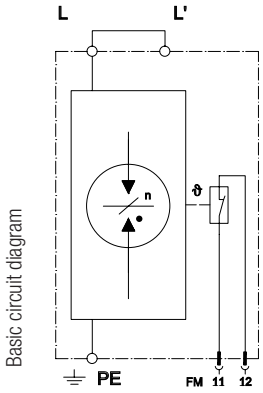
With remote signalling contact (FM)	PP B IT 50/100/FM
Article-No.	37 39 19
Switching capacity	250 V/2 A
Max. conductor cross section FM	1,5 mm²

Lightning current arrester type 1 for AC power supplies / Wind Energy Converter

PowerPro B 25-760

Lightning current arrester for wind energy applications for lightning protection equipotential bonding in 690 V IT systems.

- New developed ceramic isolating spark gap
- Optional remote signalling contact (FM)



Basic circuit diagram

Technical Data		PP B 25-760	PP B 25-760/FM
Article-No.		37 45 20	37 45 21
Nominal voltage AC	UN	690 V~	690 V~
Max. continous operating voltage AC	Uc	760 V~	760 V~
Insulation resistance	Risol	> 10 GΩ	> 10 GΩ
Protection level	Up	4,0 kV	4,0 kV
Response time	tA	100 ns	100 ns
Lightning impulse current limp (10/350 µs)	Ipeak	25 kA	25 kA
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Max. conductor cross section		50mm² stranded/35mm² fexible	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Enclosure material / colour		polyamide PA 6 30SV, UL94 V0 / yellow	
Mounting on		35 mm DIN rail form C (EN 50 022)	
Net weight / pc		ca. 300 g	ca. 320 g
FM contact / contact type			break contact
Switching capacity			250 V/2 A

without fig.

Dimension drawing, see pages 186 up to 190

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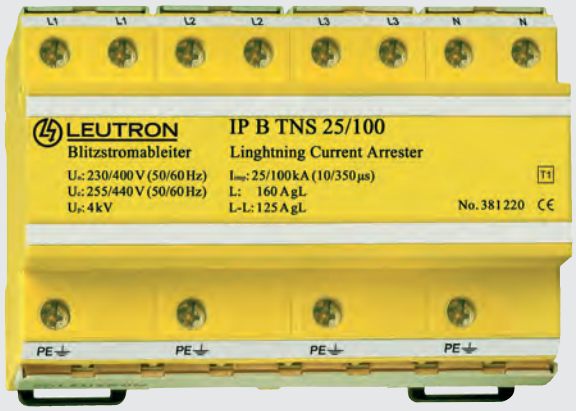
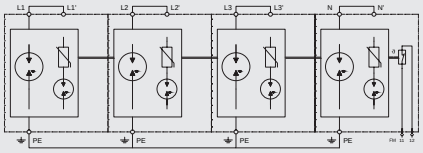
Lightning current arrester type 1 for AC power supplies / IsoPro

IsoPro B

Multi-pole lightning current arrester for the protection of low-voltage consumers' installations in business and residential areas against surges caused by lightning or switching actions in the network.



Basic circuit diagram



- Rare-gas-filled spark gap, hermetically sealed
- No leakage currents, thus, allowing installation upstream of power meters
- High TOV resistance
- Operates independently of atmospheric air pressure and ambient humidity
- High insulation resistance
- NEW: only one remote signalling contact (FM)

					
Technical Data		**IP B TNS 25/100**	**IP B TNS 60/100**	**IP B TNC 25/75**	**IP B TNC 60/100**
Article-No.		38 12 20	38 11 45	38 12 16	38 11 40
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	255 V~	255 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Voltage protection level at limp L-PE	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Response time	tA	<50 ns	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	75 kA	100 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	60 kA	25 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**IP B TNS 25/100/FM**	**IP B TNS 60/100/FM**	**IP B TNC 25/75/FM**	**IP B TNC 60/100 /FM**
Article-No.	38 12 21	38 11 46	38 12 17	38 11 41
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

					
Technical Data		**IP B TT 25/100**	**IP B TT 60/100**	**IP B TT1+1 25/50**	**IP B TT1+1 60/100**
Article-No.		38 12 24	38 11 50	38 12 28	38 11 55
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	255 V~	255 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Voltage protection level at limp L-N	Up	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV	≤ 4,0 kV
Response time	tA	<50 ns	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	50 kA	100 kA
Lightning impulse current (10/350) L-N	limp	25 kA	60 kA	25 kA	60 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	100 kA	50 kA	100 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**IP B TT 25/100/FM**	**IP B TT 60/100/FM**	**IP B TT1+1 25/50/FM**	**IP B TT1+1 60/100 /FM**
Article-No.	38 12 25	38 11 51	38 12 29	38 11 56
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

			
Technical Data		**IP B TN 25/50**	**IP B TN 60/100**
Article-No.		38 12 36	38 12 32
Nominal voltage AC	UN	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 4,0 kV	≤ 4,0 kV
Voltage protection level at limp L-PE	Up	≤ 4,0 kV	≤ 4,0 kV
Response time	tA	<50 ns	<50 ns
Lightning impulse current (10/350) L+N-PE	Itotal	50 kA	100 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0/yellow	polycarbonate (halogen-free) UL 94-V0 / yellow

With remote signalling contact (FM)	**IP B TN 25/50/FM**	**IP B TN 60/100/FM**
Article-No.	38 12 37	38 12 33
Switching capacity	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

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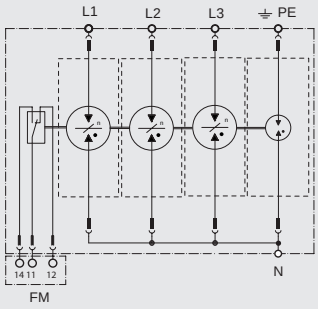
Combined arrester type 1 + 2 for AC power supplies / CT series

CT-T1+2

Lightning current discharge arrester with rare-gas-filled spark gap for one and three phase systems and very low protection level < 1.5 kV. They provide extremely high discharge cappabilities with at the same time very low protection levels and they also do not need any damageable internal or external electronic trigger.



Basic circuit diagram

- Applicable at the boundaries LPZ 0A - 2
- Test standard: IEC 61643-1 / EN 61643-11
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic with the colors yellow and black
- Degree of protection according to IEC EN 60529: IP 20
- Inflammability class according to UL 94 V0
- Remote changeover contact
- No leakage currents, thus, allowing installation upstream of power meters
- Available for all net systems

					
Technical Data		**CT-T1+2/3+1-350-FM**	**CT-T1+2/3+0-350-FM**	**CT-T1+2/2+0-350-FM**	**CT-T1+2/1+1-350-FM**
Article-No.		96 00 01	96 00 03	96 00 07	96 00 09
EC category/EN type		type 1+2/class I+II	type 1+2/class I+II	type 1+2/class I+II	type 1+2/class I+II
Nominal voltage	UN	230/400 V	230/400 V	230/400 V	230/400 V
Max. continous operating voltage AC	Uc	350 V~	350 V~	350 V~	350 V~
Lightning impulse current (10/350) total	Itotal	100 kA	75 kA	50 kA	50 kA
Lightning impulse current (10/350) L-N/N-PE/L-PEN	limp	25 / 100 / - kA	- / - / 75 (3L-PEN) kA	25 / - / - kA	25 / 50 / - kA
Nominal discharge current (8/20) L-N/N-PE/L-PEN	In	25 / 100 / - kA	- / - / 75 (3L-PEN) kA	25 / - / - kA	25 / 50 / - kA
Voltage protection level at limp	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Follow current quenching capacity AC L-N (260V AC)	Ifi	4 kAeff	4 kAeff	4 kAeff	4 kAeff
Follow current quenching capacity AC N-PE	Ifi	100 Aeff	50 kAeff	50 kAeff	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	k. A.	k. A.	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable backup fuse (V-type through wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible	10mm² solid/flexible	10mm² solid/flexible
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Dimension (DIN 43880)		147,2 mm	113,5 mm	76,5 mm	76,5 mm
Max. operating voltage remote contact		1 A AC/200 mA DC	1 A AC/200 mA DC	1 A AC/200 mA DC	1 A AC/200 mA DC
Max. operating voltage remote contact		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Composed of: number of moduls		3x 96 02 36 + 1x 96 02 38	3x 96 02 36	2x 96 02 36	1x 96 02 36 + 1x 96 02 38
Power supply system		3 phase TNS and TT systemse	3 phase TNC systemse	1 phase TN systemse	1 phase TT and TNS systems

Dimension drawing, see pages 186 up to 190

			
Technical Data		**CT-T1+2/1+0-350-FM**	**CT-T1/0+1-FS-FM**
Article-No.		96 00 11	96 02 33
EC category/EN type		type 1+2/class I+II	type 1 / class I
Nominal voltage	UN	230/400 V	230 V
Max. continous operating voltage AC	Uc	350 V~	260 V~
Lightning impulse current (10/350) total	Itotal	25 kA	100 kA
Lightning impulse current (10/350) L-N/N-PE/L-PEN	limp	25 / - / - kA	- / 100 / - kA
Nominal discharge current (8/20) L-N/N-PE/L-PEN	In	25 / - / 25 kA	- / 100 / - kA
Voltage protection level at limp	Up	≤ 1,5 kV	≤ 2,5 kV
Follow current quenching capacity AC L-N (260V AC)	Ifi	4 kAeff	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Max. acceptable backup fuse (branch wiring)		250 A gL/gG	250 A gL/gG
Max. acceptable backup fuse (V-type through wiring)		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Dimension (DIN 43880)		39,8 mm	39,8 mm
Max. operating voltage remote contact		250 V AC/125 V DC	250 V AC/125 V DC
Max. operating voltage remote contact		1 A AC/200 mA DC	1 A AC/200 mA DC
Composed of: number of moduls		1x 96 02 36	1x 96 02 378
Power supply system		between L und N	between N und PE

Accessories		
	CT-T1+2-350-M	CT-T1-NPE-M
Article-No.	96 02 36	96 02 38

Replacement protective plug for combined lightning current discharge and surge arresters.

Dimension drawing, see pages 186 up to 190

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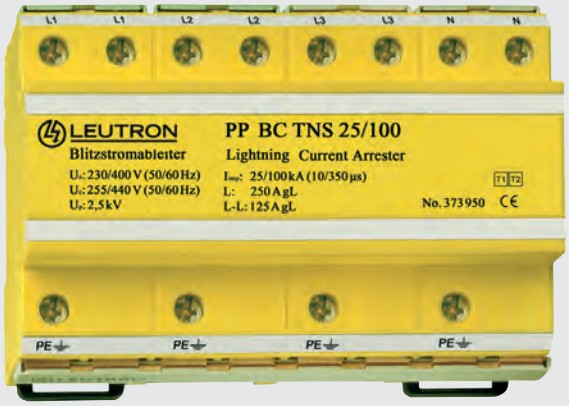
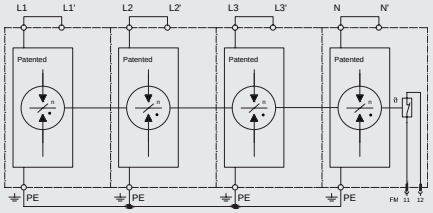
Combined arrester type 1 + 2 for AC power supplies / PowerPro

PowerPro BC

Multi pole arrester for one and three phase systems. Available for all net systems.



Basic circuit diagram



- Test standard: IEC 61643-1 / EN 61643-11
- NEW: only one remote signalling contact (FM) (internal wire connection)
- Optional remote signalling contact (FM)
- Remote signalling contact: break contact
- Degree of protection according to IEC EN 60529: IP 20
- Mounting on 35 mm DIN rail
- No leakage currents, thus, allowing installation upstream of power meters

					
Technical Data		**PP BC TNS 25/100**	**PP BC TNS 25/100-350**	**PP BC TNC 25/75**	**PP BC TNC 25/75-350**
Article-No.		37 39 50	38 51 40	37 39 80	38 51 20
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-PE	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	<50 ns	<50 ns	< 50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	75 kA	75 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	25 kA	25 kA	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**PP BC TNS 25/100/FM**	**PP BC TNS 25/100-350/FM**	**PP BC TNC 25/75/FM**	**PP BC TNC 25/75-350/FM**
Article-No.	37 39 52	38 51 50	37 39 82	38 51 30
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

					
Technical Data		**PP BC TNC 440**	**PP BC TT 25/100**	**PP BC TT 25/100-350**	**PP BC TT1+1 25/100**
Article-No.		37 39 81	37 39 20	38 51 60	38 11 32
Nominal voltage AC	UN	400/690 V~	230/400 V~	230 / 400 V~	230/400 V~
Max. continous operating voltage AC	Uc	440 V~	255 (275) V~	350 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2.0 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-PEN	Up	≤ 2.0 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3-PEN	Itotal	75 kA	100 kA	100 kA	100 kA
Lightning impulse current (10/350) L-PEN	limp	25 kA	25 kA	25 kA	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	0,75 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		63 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		63 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**PP BC TNC 440/FM**	**PP BC TT 25/100/FM**	**PP BC TT 25/100-350/FM**	**PP BC TT1+1 25/100/FM**
Article-No.	37 39 83	37 39 22	38 51 70	38 11 33
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

				
Technical Data		**PP BC TT1+1 25/100-350**	**PP BC TN 25/50**	**PP BC TN 25/50-350**
Article-No.		38 52 00	38 12 12	38 51 80
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	350 V~	255 V~	350 V~
Insulation resistance	Risol	> 10 GΩ	>10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-N	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	< 50 ns	<50 ns	< 50 ns
Lightning impulse current (10/350) L+N-PE	Itotal	100 kA	50 kA	50 kA
Lightning impulse current (10/350) L-N	limp	25 kA	25 kA	25 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	-	-
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4,0 (IEC:3.0) kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm

With remote signalling contact (FM)	**PP BC TT1+1 25/100-350/FM**	**PP BC TN 25/50/FM**	**PP BC TN 25/50-350/FM**
Article-No.	38 52 10	38 12 13	38 51 90
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²

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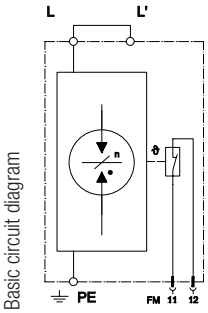
Combined arrester type 1 + 2 for AC power supplies / Wind Energy Converter

PowerPro BC 50

For lightning-protection equipotential bonding in 400 V TN-C systems e. g. Wind generator protection.

- One pole combined arrester class I+II
- New developed ceramical spark gap
- Low protection level
- High self-extinguishing capability without tripping fuses
- Optional remote signalling contact (FM)
- Remote signalling contact: break contact



Basic circuit diagram

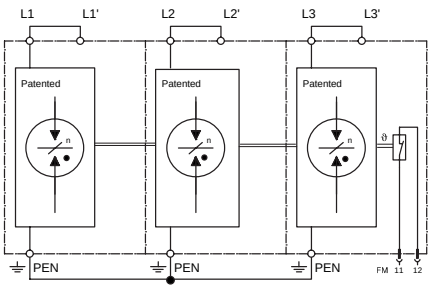
without fig.

Technical Data		PP BC 50-440	PP BC 50-440/FM
Article-No.		37 45 00	37 45 01
Nominal voltage AC	UN	400 V~	400 V~
Max. continous operating voltage AC	Uc	440 V	440 V
Insulation resistance	Risol	> 10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	2.5 kV	2.5 kV
Voltage protection level at limp (10/350)	Up	2.5 kV	2.5 kV
Response time	tA	100 ns	100 ns
Lightning impulse current (10/350) pro Pol	limp	50 kA	50 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	10 kA	10 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4.5 Nm	4.5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	
FM contact / contact type			break contact
Switching capacity			250 V/2 A

PP BC TNC 50-400/690

For lightning protection equipotential bonding in 400 V TN-C systems e. g. Wind generator protection.

- Combined three-pole SPD, fully prewired
- Für 440/690 V Starkstromnetzspannungen
- Low protection level
- Optional remote signalling contact (FM)
- NEW: only one remote signalling contact (FM) (internal wire connection)
- Remote signalling contact: break contact



Basic circuit diagram

without fig.

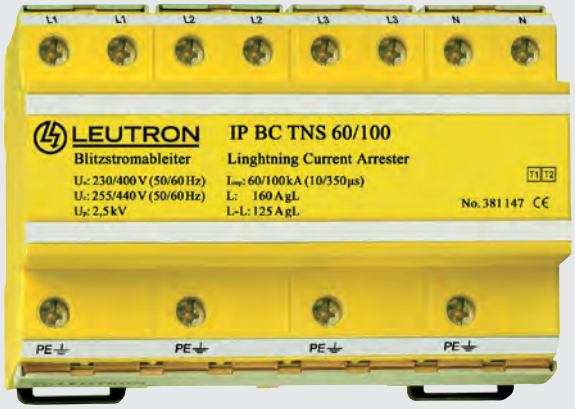
Technical Data		PP BC TNC 50-400/690	PP BC TNC 50-400/690/FM
Article-No.		37 45 04	37 45 05
Nominal voltage AC	UN	400/690 V~	400/690 V~
Max. continous operating voltage AC	Uc	440 V	440 V
Insulation resistance	Risol	> 10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	2.5 kV	2.5 kV
Voltage protection level at limp (10/350)	Up	2.5 kV	2.5 kV
Response time	tA	100 ns	100 ns
Lightning impulse current (10/350) pro Pol	limp	50 kA	50 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	10 kA	10 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4.5 Nm	4.5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	
FM contact / contact type			break contact
Switching capacity			250 V/2 A

Dimension drawing, see pages 186 up to 190

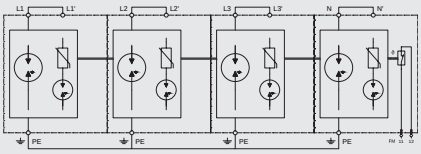
Combined arrester type 1 + 2 for AC power supplies / IsoPro

IsoPro BC

Multipole modular combined arrester for one and three phasige systems with discharge capacity up to 100 kA (10/350 µs). Available for all net systems. All-in-one modular protection unit, ready for connection.



Basic circuit diagram



- Test standard: IEC 61643-1 / EN 61643-11
- NEW: only one remote signalling contact (FM) (internal wire connection)
- Optional remote signalling contact (FM)
- Remote signalling contact: break contact
- No leakage currents, thus, allowing installation upstream of power meters
- Degree of protection according to IEC EN 60529: IP 20
- Mounting on 35 mm DIN rail

					
Technical Data		**IP BC TNS 25/100**	**IP BC TNS 25/100-350**	**IP BC TNS 60/100**	**IP BC TNS 60/100-350**
Article-No.		38 12 22	38 53 40	38 11 47	38 53 20
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	> 10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-PE	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	< 50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	100 kA	100 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	25 kA	60 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35 mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**IP BC TNS 25/100/FM**	**IP BC TNS 25/100-350/FM**	**IP BC TNS 60/100/FM**	**IP BC TNS 60/100-350/FM**
Article-No.	38 12 23	38 53 50	38 11 48	38 53 30
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

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Technical Data		**IP BC TNC 25/75**	**IP BC TNC 25/75-350**	**IP BC TNC 60/100**	**IP BC TNC 60/100-350**
Article-No.		38 12 18	38 53 00	38 11 42	38 52 80
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 (250/440) V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-PEN	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	<50 ns	<50 ns	< 50 ns
Lightning impulse current (10/350) L1+L2+L3-PEN	Itotal	75 kA	75 kA	100 kA	100 kA
Lightning impulse current (10/350) L-PEN	limp	25 kA	25 kA	60 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35 mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	10/25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow		polycarbonate (halogen-free) UL 94-V0 / yellow	

With remote signalling contact (FM)	**IP BC TNC 25/75 /FM**	**IP BC TNC 25/75-350/FM**	**IP BC TNC 60/100/FM**	**IP BC TNC 60/100-350/FM**
Article-No.	38 12 19	38 53 10	38 11 43	38 52 90
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

					
Technical Data		**IP BC TT 25/100**	**IP BC TT 25/100-350**	**IP BC TT 60/100**	**IP BC TT 60/100-350**
Article-No.		38 12 26	38 53 80	38 11 52	38 53 60
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	> 10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-N	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	< 50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	100 kA	100 kA
Lightning impulse current (10/350) L-N	limp	25 kA	25 kA	60 kA	60 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	100 kA	100 kA	100 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35 mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**IP BC TT 25/100 /FM**	**IP BC TT 25/100-350 /FM**	**IP BC TT 60/100 /FM**	**IP BC TT 60/100-350 /FM**
Article-No.	38 12 27	38 53 90	38 11 54	38 53 70
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

					
Technical Data		**IP BC TT1+1 25/100**	**IP BC TT1+1 25/100-350**	**IP BC TT1+1 60/100**	**IP BC TT1+1 60/100-350**
Article-No.		38 12 30	38 54 60	38 11 57	38 54 40
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	> 10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-N	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2.5 kV	≤ 2,5 kV
Response time	tA	<50 ns	< 50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L+N-PE	Itotal	100 kA	100 kA	100 kA	100 kA
Lightning impulse current (10/350) L-N	limp	25 kA	25 kA	60 kA	60 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	100 kA	100 kA	100 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +85 °C
Max. conductor cross section		stranded 50/fine stranded 35 mm²35mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow		polycarbonate (halogen-free) UL 94-V0 / yellow	

With remote signalling contact (FM)	**IP BC TT1+1 25/100/FM**	**IP BC TT1+1 25/100-350/FM**	**IP BC TT1+1 60/100 /FM**	**IP BC TT1+1 60/100-350**
Article-No.	38 12 31	38 54 70	38 11 58	38 54 50
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

					
Technical Data		**IP BC TN 25/50**	**IP BC TN 25/50-350**	**IP BC TN 60/100**	**IP BC TN 60/100-350**
Article-No.		38 12 38	38 54 20	38 12 34	38 54 00
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	> 10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp L-PE	Up	≤ 2,5 kV	≤ 2.5 kV	≤ 2,5 kV	≤ 2,5 kV
Response time	tA	<50 ns	50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L+N-PE	Itotal	50 kA	50 kA	100 kA	100 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	25 kA	60 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG	160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			

With remote signalling contact (FM)	**IP BC TN 25/50/FM**	**IP BC TN 25/50-350/FM**	**IP BC TN 60/100/FM**	**IP BC TN 60/100-350/FM**
Article-No.	38 12 39	38 54 30	38 12 35	38 54 10
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

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Technical Data		**IP BC 25**	**IP BC 60**
Article-No.		37 38 25	37 38 30
Nominal voltage AC	UN	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV	≤ 2,5 kV
Voltage protection level at limp (10/350)/5 kA (10/350) [L-PE]	Up	≤ 2,5 / ≤ 2,0 kV	≤ 2,5 / ≤ 2,0 kV
Response time	tA	<50 ns	<50 ns
Lightning impulse current (10/350) pro Pol	limp	25 kA	60 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		160 A gL/gG	160 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35mm²	stranded 50/fine stranded 35mm²
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0 / yellow	polycarbonate (halogen-free) UL 94-V0 / yellow

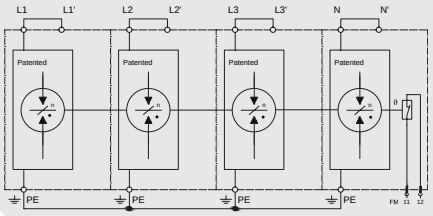
With remote signalling contact (FM)	**IP BC 25/FM**	**IP BC 60/FM**
Article-No.	37 38 26	55 05 18
Switching capacity	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

Combined arrester type 1 + 2 + 3 for AC power supplies

PowerPro BCD

Multi pole arresterf for one and three phase systems. The installation place of the PowerPro BCD is the main distribution board upstream or downstream of the power meter. According to the lightning protection zones concept in IEC DIN EN 62305 part 1-4 (VDE 0185-305-1-4), it can universally be installed at the transition 0A to 2.



Basic circuit diagram

- Combined Arresters Class I+II+III
- Optional remote signalling contact (FM)
- Remote signalling contact: break contact
- Discharge capacity up to 100 kA (10/350 µs)
- No leakage currents, thus, allowing installation upstream of power meters
- NEW: only one remote signalling contact (FM) (internal wire connection)

					
Technical Data		**PP BCD TNS 25/100**	**PP BCD TNS 25/100-350**	**PP BCD TNC 25/75**	**PP BCD TNC 25/75-350**
		37 39 60	38 50 20	37 39 90	38 50 00
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	> 10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1.0 kV
Voltage protection level at limp L-PE	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Response time	tA	<50 ns	<50 ns	< 50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	75 kA	75 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA	25 kA	25 kA	25 kA
Folgestromlöschvermögen bei Uc (50/60Hz)	Ifi	4 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50/fine stranded 35mm²			
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow

With remote signalling contact (FM)	**PP BCD TNS 25/100 /FM**	**PP BCD TNS 25/100-350 /FM**	**PP BCD TNC 25/75/FM**	**PP BCD TNC 25/75-350/FM**
Article-No.	37 39 62	38 50 30	37 39 92	38 50 10
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

Dimension drawing, see pages 186 up to 190

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Technical Data		**PP BCD TT 25/100**	**PP BCD TT 25/100-350**	**PP BCD TT2+1 25/100**
Article-No.		37 39 30	38 50 40	37 39 34
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Voltage protection level at limp L-N	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Response time	tA	<50 ns	<50 ns	<50 ns
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA	100 kA	100 kA
Lightning impulse current (10/350) L-N	limp	25 kA	25 kA	25 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	100 kA	100 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4,0 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse 250 A gL	Ik	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm

With remote signalling contact (FM)	**PP BCD TT 25/100/FM**	**PP BCD TT 25/100-350/FM**	**PP BCD TT2+1 25/100/FM**
Article-No.	37 39 32	38 50 50	37 39 36
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²

				
Technical Data		**PP BCD TT1+1 25/100**	**PP BCD TT1+1 25/100-350**	**PP BCD TT1+1 25/100/2LED**
Article-No.		38 11 34	38 50 80	38 11 36
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~
Insulation resistance	Risol	> 10 GΩ	> 10 GΩ	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Voltage protection level at limp L-N	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Response time	tA	< 50 ns	< 50 ns	< 50 ns
Lightning impulse current (10/350) L-N	limp	25 kA	25 kA	25 kA
Lightning impulse current (10/350) N-PE	limp	100 kA	100 kA	100 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow

With remote signalling contact (FM)	**PP BCD TT1+1 25/100/FM**	**PP BCD TT1+1 25/100-350/FM**
Article-No.	38 11 35	38 50 90
Switching capacity	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²

					
Technical Data		**PP BCD TN 25/50**	**PP BCD TN 25/50-350**	**PP BCD TN 25/50/LED**	**PP BCD TN 25/50/LED-350**
Article-No.		38 12 14	38 50 60	37 12 00	38 51 00
Nominal voltage AC	UN	230/400 V~	230/400 V~	230/400 V~	230/400 V~
Max. continous operating voltage AC	Uc	255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	> 10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Voltage protection level at limp L-PE	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Response time	tA	<50 ns	<50 ns	< 50 ns	<50 ns
Lightning impulse current (10/350) L+N-PE	Itotal	50 kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350) L,N-PE	Iimp	25 kA	25 kA	25 kA	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA	4 kA	4 kA	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff	50 kAeff	50 kAeff	
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow

With remote signalling contact (FM)	**PP BCD TN 25/50 /FM**	**PP BCD TN 25/50-350/FM**	**PP BCD TN 25/50/LED/FM**	**PP BCD TN 25/50/LED-350 FM**
Article-No.	38 12 15	38 50 70	37 12 02	38 51 10
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

					
Technical Data		**PowerPro BCD-Tr/25kA**	**PP BCD-Tr/25kA-350**	**PP PCD-Tr/25kA-VA**	**PP BCD 25-350**
Article-No.		37 38 50	37 38 52	37 38 51	37 38 88
EC category/EN type		type 1 + 2 + 3 (class I+II+III)	type 1 + 2 + 3 (class I+II+III)	type 1 + 2 + 3 (class I+II+III)	type 1 + 2 + 3 (class I+II+III)
Nominal voltage AC	UN	230 / 400 V~	230 / 400 - 240 / 415 V~	230/400 V~	230 / 400 - 240 / 415 V~
Max. continous operating voltage AC	Uc	min. 255 V~	350 V~	255 V~	350 V~
Insulation resistance	Risol	>10 GΩ	>10 GΩ	> 10 GΩ	>10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 1 kV	≤ 1 kV	≤ 1.0 kV	≤ 1 kV
Voltage protection level at limp 50 kA	Up	≤ 1 kV	≤ 1 kV	≤ 1.0 kV	≤ 1 kV
Response time bei 1kV/µs	tA	50 ns	50 ns	50 ns	50 ns
Lightning impulse current (10/350) pro Pol	Iimp	25 kA	25 kA	25 kA	25 kA
Max. Impulsstoßstrom (8/20µs)	Imax	80 kA	k. A.	k. A.	k. A.
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	17,5 kA	17,5 kA	17,5 kA	17,5 kA
Short-circuit withstand capability at max. back-up fuse 250 A gL	Ik	50 kAeff	50 kAeff	50 kAeff	50 kAeff
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG	250 A gL/gG	250 A gL/gG	250 A gL/gG
Max. acceptable back-up fuse F1 (V wiring)		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +85 °C	-40 - +85 °C	-40 – +85 °C	-40 - +85 °C
Max. conductor cross section		50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible	50mm² stranded/35mm² fexible
Recommended conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Enclosure material / colour		polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow	polycarbonate UL 94-V0/yellow

With remote signalling contact (FM)	**PowerPro BCD-Tr/25kA/PK**	**PP BCD-Tr/25kA/FM-350**	**PP PCD-Tr/25kA-VA/FM**	**PP BCD 25-350/FM**
Article-No.	37 38 60	37 38 62	37 38 61	37 38 89
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Max. conductor cross section FM	1,5 mm²	1,5 mm²	1,5 mm²	1,5 mm²

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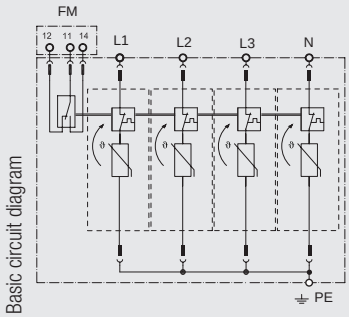
SPD type 2 for AC power supplies / EL series

EL-T2

Pluggable SPD type 2 / class II for one and three phase systems. Prewired complete unit consisting of base part and modules. Variants available of 75 up to 750 V .



Basic circuit diagram

- Test standard: IEC 61643-1 / EN 61643-11
- Mounting on 35 mm DIN rail
- Optional remote changeover contact

					
Technical Data		**EL-T2/4+0-130**	**EL-T2/4+0-275**	**EL-T2/4+0-350**	**EL-T2/4+0-440**
Article-No.		38 81 08	38 81 09	38 81 10	38 81 11
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	120 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	130 V~	275 V~	350 V~	440 V~
Nominal discharge current (8/20)	In	15 kA	20 kA	20 kA	20 kA
Max. impulse discharge current (8/20)	Imax	40 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV	≤ 2,0 kV
Protection level at 5kA	Up	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV	≤ 1,5 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		4 TE	4 TE	4 TE	4 TE
Composed of: number of moduls		4x 38 80 01	4x 38 80 02	4x 38 80 03	4x 38 80 04
Power supply system		3 phase TNS systems	3 phase TNS systems	3 phase TNS systems	3 phase TNS systems

With remote signalling contact (FM)	**EL-T2/4+0-130-FM**	**EL-T2/4+0-275-FM**	**EL-T2/4+0-350-FM**	**EL-T2/4+0-440-FM**
Article-No.	38 81 01	38 81 02	38 81 03	38 81 04
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

Accessories: Module								
	EL-T2-75-M	EL-T2-130-M	EL-T2-275-M	EL-T2-350-M	EL-T2-440-M	EL-T2-550-M	EL-T2-750-M	EL-T2-NPE-M
Article-No.	38 80 00	38 80 01	38 80 02	38 80 03	38 80 04	38 80 05	38 80 06	38 80 07

Dimension drawing, see pages 186 up to 190

					
Technical Data		**EL-T2/3+1-130**	**EL-T2/3+1-275**	**EL-T2/3+1-350**	**EL-T2/3+1-440**
Article-No.		38 81 22	38 81 23	38 81 24	38 81 25
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	120 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	130 V~	275 V~	350 V~	440 V~
Nominal discharge current (8/20)	In	15 kA	20 kA	20 kA	20 kA
Max. operating current	Imax	40 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV	≤ 2,0 kV
Protection level at 5kA	Up	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV	≤ 1,5 kV
Protection level N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Follow current quenching capacity AC N-PE	Ifi	100 Aeff	100 Aeff	100 Aeff	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		4 TE	4 TE	4 TE	4 TE
Composed of: number of moduls		3x 38 80 01 + 1x 38 80 07	3x 38 80 02 + 1x 38 80 07	3x 38 80 03 + 1x 38 80 07	3x 38 80 04 + 1x 38 80 07
Power supply system		3 phase TNS/TT systems	3 phase TNS/TT systems	3 phase TNS/TT systems	3 phase TNS/TT systems
With remote signalling contact (FM)		**EL-T2/3+1-130-FM**	**EL-T2/3+1-275-FM**	**EL-T2/3+1-350-FM**	**EL-T2/3+1-440-FM**
Article-No.		38 81 15	38 81 16	38 81 17	38 81 18
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

					
Technical Data		**EL-T2/3+0-130**	**EL-T2/3+0-275**	**EL-T2/3+0-350**	**EL-T2/3+0-440**
Article-No.		38 81 36	38 81 37	38 81 38	38 81 39
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	120 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	130 V~	275 V~	350 V~	440 V~
Nominal discharge current (8/20)	In	15 kA	20 kA	20 kA	20 kA
Max. impulse discharge current (8/20)	Imax	40 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV	≤ 2,0 kV
Protection level at 5kA	Up	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV	≤ 1,5 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		3 TE	3 TE	3 TE	3 TE
Composed of: number of moduls		3x 38 80 01	3x 38 80 02	3x 38 80 03	3x 38 80 04
Power supply system		3 phase TNC systemse	3 phase TNC systemse	3 phase TNC systemse	3 phase TNC systemse
With remote signalling contact (FM)		**EL-T2/3+0-130-FM**	**EL-T2/3+0-275-FM**	**EL-T2/3+0-350-FM**	**EL-T2/3+0-440-FM**
Article-No.		38 81 29	38 81 30	38 81 31	38 81 32
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

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Technical Data		**EL-T2/2+1-75**	**EL-T2/2+1-130**	**EL-T2/2+1-275**	**EL-T2/2+1-350**
Article-No.		38 81 49	38 81 50	38 81 51	38 81 52
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	60 V~	120 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	75 V~	130 V~	275 V~	350 V~
Nominal discharge current (8/20)	In	10 kA	15 kA	20 kA	20 kA
Max. operating current	Imax	25 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,4 kV	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV
Protection level at 5kA	Up	≤ 0,33 kV	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV
Protection level N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		3 TE	3 TE	3 TE	3 TE
Composed of: number of moduls		2x 38 80 00 + 1x 38 80 07	2x 38 80 01 + 1x 38 80 07	2x 38 80 02 + 1x 38 80 07	2x 38 80 03 + 1x 38 80 07
Power supply system		2 pole TT systems	2 pole TT systems	2 pole TT systems	2 pole TT systems
With remote signalling contact (FM)		**EL-T2/2+1-75-FM**	**EL-T2/2+1-130-FM**	**EL-T2/2+1-275-FM**	**EL-T2/2+1-350-FM**
Article-No.		38 81 42	38 81 43	38 81 44	38 81 45
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

				
Technical Data		**EL-T2/2+1-440**	**EL-T2/2+1-550**	**EL-T2/2+1-750**
Article-No.		38 81 53	38 81 54	38 81 55
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	230 V~	400 V~	400 V~
Max. continous operating voltage AC	Uc	440 V~	550 V~	750 V~
Nominal discharge current (8/20)	In	20 kA	20 kA	20 kA
Max. operating current	Imax	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 2,0 kV	≤ 2,5 kV	≤ 3,0 kV
Protection level at 5kA	Up	≤ 1,5 kV	≤ 1,8 kV	≤ 2,5 kV
Protection level N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Dimension (DIN 43880)		3 TE	3 TE	3 TE
Composed of: number of moduls		2x 38 80 04 + 1x 38 80 07	2x 38 80 05 + 1x 38 80 07	2x 38 80 06 + 1x 38 80 07
Power supply system		2 pole TT systems	2 pole TT systems	2 pole TT systems
With remote signalling contact (FM)		**EL-T2/2+1-440-FM**	**EL-T2/2+1-550-FM**	**EL-T2/2+1-750-FM**
Article-No.		38 81 46	38 81 47	38 81 48
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

					
Technical Data		**EL-T2/2+0-130**	**EL-T2/2+0-275**	**EL-T2/2+0-350**	**EL-T2/2+0-440**
Article-No.		38 81 64	38 81 65	38 81 66	38 81 67
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	120 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	130 V~	275 V~	350 V~	440 V~
Nominal discharge current (8/20)	In	15 kA	20 kA	20 kA	20 kA
Max. operating current	Imax	40 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV	≤ 2,0 kV
Protection level at 5kA	Up	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV	≤ 1,5 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		2 TE	2 TE	2 TE	2 TE
Composed of: number of moduls		2x 38 80 01	2x 38 80 02	2x 38 80 03	2x 38 80 04
Power supply system		1 phase TN systems	1 phase TN systems	1 phase TN systems	1 phase TN systems
With remote signalling contact (FM)		**EL-T2/2+0-130-FM**	**EL-T2/2+0-275-FM**	**EL-T2/2+0-350-FM**	**EL-T2/2+0-440-FM**
Article-No.		38 81 57	38 81 58	38 81 59	38 81 60
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

					
Technical Data		**EL-T2/1+1-130**	**EL-T2/1+1-275**	**EL-T2/1+1-350**	**EL-T2/1+1-440**
Article-No.		38 81 78	38 81 79	38 81 80	38 81 81
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	120 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	130 V~	275 V~	350 V~	440 V~
Nominal discharge current (8/20)	In	15 kA	20 kA	20 kA	20 kA
Max. operating current	Imax	40 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV	≤ 2,0 kV
Protection level at 5kA	Up	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV	≤ 1,5 kV
Protection level N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Follow current quenching capacity AC N-PE	Ifi	100 Aeff	100 Aeff	100 Aeff	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		2 TE	2 TE	2 TE	2 TE
Composed of: number of moduls		1x 38 80 01 + 1x 38 80 07	1x 38 80 02 + 1x 38 80 07	1x 38 80 03 + 1x 38 80 07	1x 38 80 04 + 1x 38 80 07
Power supply system		1 phase TT and TN systems	1 phase TT and TN systems	1 phase TT and TN systems	1 phase TT and TN systems
With remote signalling contact (FM)		**EL-T2/1+1-130-FM**	**EL-T2/1+1-275-FM**	**EL-T2/1+1-350-FM**	**EL-T2/1+1-440-FM**
Article-No.		38 81 71	38 81 72	38 81 73	38 81 74
Max. operating voltage		250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current		1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

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Technical Data		**EL-T2/1+0-75**	**EL-T2/1+0-130**	**EL-T2/1+0-275**	**EL-T2/1+0-350**
Article-No.		38 81 91	38 81 92	38 81 93	38 81 94
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	60 V~	120 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	75 V~	130 V~	275 V~	350 V~
Nominal discharge current (8/20)	In	10 kA	15 kA	20 kA	20 kA
Max. operating current	Imax	25 kA	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 0,4 kV	≤ 0,7 kV	≤ 1,2 kV	≤ 1,5 kV
Protection level at 5kA	Up	≤ 0,33 kV	≤ 0,5 kV	≤ 0,9 kV	≤ 1,0 kV
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		1 TE	1 TE	1 TE	1 TE
Composed of: number of moduls		1x 38 80 00	1x 38 80 01	1x 38 80 02	1x 38 80 03
Power supply system		between L-N	between L-N	between L-N	between L-N

With remote signalling contact (FM)	**EL-T2/1+0-75-FM**	**EL-T2/1+0-130-FM**	**EL-T2/1+0-275-FM**	**EL-T2/1+0-350-FM**
Article-No.	38 81 84	38 81 85	38 81 86	38 81 87
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

				
Technical Data		**EL-T2/1+0-440**	**EL-T2/1+0-550**	**EL-T2/0+1-NPE**
Article-No.		38 81 95	38 81 96	38 81 98
EC category/EN type		type 2 / class II	type 2 / class II	type 2 / class II
Nominal voltage AC	UN	230 V~	400 V~	230 V~
Max. continous operating voltage AC	Uc	440 V~	550 V~	260 V~
Nominal discharge current (8/20)	In	20 kA	20 kA	20 kA
Max. operating current	Imax	40 kA	40 kA	40 kA
Protection level at In	Up	≤ 2,0 kV	≤ 2,5 kV	≤ 1,5 kV
Protection level at 5kA	Up	≤ 1,5 kV	≤ 1,8 kV	100 Aeff
Short-circuit withstand capability at max. back-up fuse	Ik	25 kAeff	25 kAeff	25 kAeff
Max. allowed prefuse		125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Enclosure material / colour		thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0	thermoplastic, yellow, UL 97 V-0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Dimension (DIN 43880)		1 TE	1 TE	1 TE
Composed of: number of moduls		1x 38 80 04	1x 38 80 05	1x 38 80 07
Power supply system		between L-N	between L-N	between L-N

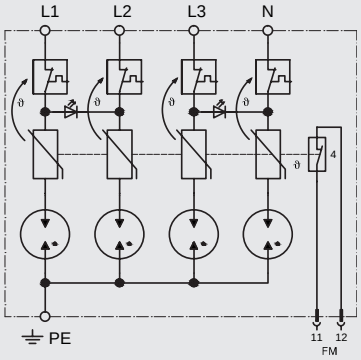
With remote signalling contact (FM)	**EL-T2/1+0-440-FM**	**EL-T2/1+0-550-FM**	
Article-No.	38 81 88	38 81 89	
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC	
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	

SPD type 2 for AC power supplies / EnerPro C

EnerPro C

Compact housing, no contact problems with plug-in connections. SPD type 2, leackage current free for one and three phase systems. Available for all net systems.

Basic circuit diagram



- Monitoring of conductor and arrester (LED)
- Up to four pole prewired modular units
- Optional remote signalling contact (FM)

					
Technical Data		**EP C TNS 275**	**EP C TNS 350**	**EP C TNC 275**	**EP C TNC 350**
Article-No.		38 11 78	38 55 80	38 11 76	38 55 60
Nominal voltage AC	UN	230/400 V~	350 V~	230/400 V~	350 V~
Max. continous operating voltage AC	Uc	275/480 V~	275/480 V~	275/480 V~	275/480 V~
Protection level at 5kA	Up	≤ 1,0 kV	≤ 1,3 kV	≤ 1,0 kV	≤ 1,3 kV
Protection level at In (8/20)	Up	≤ 1,4 kV	≤ 1,75 kV	≤ 1,4 kV	≤ 1,75 kV
Response time	tA	<25 ns	<25 ns	<25 ns	<25 ns
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA	15 kA
Max. operating current	Imax	40 kA	40 kA	40 kA	40 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 35/fine stranded 25 mm²			
Recommended conductor cross section		16 mm²	16 mm²	16 mm²	16 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP C TNS 275/FM**	**EP C TNS 350/FM**	**EP C TNC 275/FM**	**EP C TNC 350/FM**
Article-No.	38 11 79	38 55 90	38 11 77	38 55 70
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

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Technical Data		**EP C TT 275**	**EP C TT 350**	**EP C TT1+1 275**	**EP C TT1+1 350**
Article-No.		38 11 80	38 56 00	38 11 82	38 11 88
Nominal voltage AC	UN	230/400 V~	230/400 (240/415) V~	230/400 V~	230/400 (240/415) V~
Max. continous operating voltage AC	Uc	275/480 V~	350 V~	275/480 V~	350 V~
Protection level at 5kA	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Protection level at In	Up	≤ 1,4 kV	≤ 1,4 kV	≤ 1,4 kV	≤ 1,4 kV
Response time	tA	<25 ns	< 50 ns	<25 ns	< 50 ns
Nominal discharge current (8/20µs) Ader-Erde	In	15 kA	15 kA	15 kA	15 kA
Critical discharge current (8/20 µs)	Imax	40 kA	40 kA	40 kA	40 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 35/fine stranded 25 mm²			
Recommended conductor cross section		16 mm²	16 mm²	16 mm²	16 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP C TT 275/FM**	**EP C TT 350/FM**	**EP C TT1+1 275/FM**	**EP C TT1+1 350/FM**
Article-No.	38 11 81	38 56 10	38 11 83	38 11 91
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact	break contact

		
Technical Data		**EP C TT2+1 110**
Article-No.		38 09 10
Nominal voltage AC	UN	100/110 V~
Max. continous operating voltage AC	Uc	130 V~
Protection level at 5kA	Up	≤ 1.3 kV (PE-N) /≤ 0.7 kV (L1,L2-N)
Protection level at In	Up	≤ 1.5 kV (PE-N) / ≤ 1.0 kV (L1,L2-N)
Response time	tA	< 25 ns
Nominal discharge current (8/20µs)	In	20 kA (PE-N)/ 15 kA (L1,L2-N)
Max. discharge current (8/20 µs)	Imax	40 kA (L1,L2-N)
Max. acceptable fuse or back-up fuse		125 A gL/gG
Operating temperature range	TU	-40 - +80 °C
Max. conductor cross section		stranded 35/fine stranded 25 mm²
Recommended conductor cross section		25 mm²
Max. connection torque for terminals		4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow
Degree of protection (IEC EN 60529)		IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)

With remote signalling contact (FM)	**EP C TT2+1 110/FM**
Article-No.	38 09 11
Switching capacity	250 V/0.5 A
Remote signalling contact	break contact

Dimension drawing, see pages 186 up to 190

					
Technical Data		**EP C TN 75**	**EP C TN 275**	**EP C TN 350**	**EP C TN 275-D**
Article-No.		38 14 00	38 12 47	38 55 40	38 12 52
Nominal voltage AC	UN	60 V~	230/400 V~	350 V~	230 V~
Max. continous operating voltage AC	Uc	75 V~	275/480 V~	275/480 V~	275 V~
Protection level at 5kA	Up	≤ 0,3 kV	≤ 1,0 kV	≤ 1,3 kV	≤ 1,0 kV
Protection level at In (8/20)	Up	≤ 0,55 kV	≤ 1,4 kV	≤ 1,75 kV	≤ 1,4 kV
Response time	tA	<50 ns	<25 ns	<25 ns	< 50 ns
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA	15 kA
Max. operating current	Imax	40 kA	40 kA	40 kA	40 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG	125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 35/fine stranded 25 mm²			
Recommended conductor cross section		16 mm²	16 mm²	16 mm²	16 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP C TN 75/FM**	**EP C TN 275/FM**	**EP C TN 350**
Article-No.	38 14 05	38 12 48	38 55 50
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

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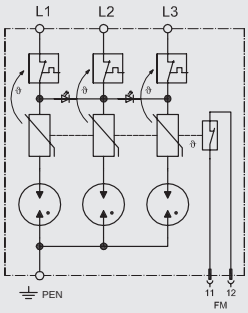
SPD type 2 for AC power supplies / EnerPro C

EnerPro C IT 2P/3P

Surge Protective Device type 2, class II



Basic circuit diagram

- Monitoring of conductor and arrester via LED
- Leakage current-free

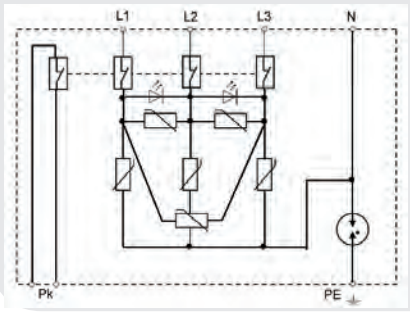
			
Technical Data		**EP C IT 2P 440**	**EP C IT 3P 440**
Article-No.		38 15 00	38 15 10
IEC category/EN type		Type 2 / class II	Type 2 / class II
Nominal voltage	UN	230 V	230 V
Max. continous operating voltage AC	Uc	440 V~	440 V~
Protection level at 5 kA	Up	≤ 1.5 kV	≤ 1.5 kV
Protection level at In (8/20)	Up	≤ 2.2 kV	≤ 2.2 kV
Response time	tA	< 25 ns	< 25 ns
Nominal impulse discharge current (10 x 8/20)	In	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	30 kA	30 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Recommended conductor cross section		25 mm²	16 mm²
Max. connection torque for terminals		4.5 Nm	4.5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)

With remote signalling contact (FM)	**EP C IT 2P 440/FM**	**EP C IT 3P 440/FM**
Article-No.	38 15 01	38 15 11
Switching capacity	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

SPD type 2 for AC power supplies / EnerPro C

EnerPro 282Tr-M and 284Tr-M



Basic circuit diagram

- SPD based on NPE isolating spark gap technology for TT sytems
- No blow-out vents, thus, not requiring any safety clearance to other installations
- Leakage current-free
- Optical function control display by LED
- Optional potential-free remote signalling contact (PK)

			
Technical Data		**EnerPro 282Tr-M**	**EnerPro 284Tr-M**
Article-No.		38 20 44	38 20 42
IEC category/EN type		Type 2 / class II	Type 2 / class II
Max. continous operating voltage AC	Uc	230 / 400 V~	230 / 400 V~
Max. continuous operating voltage DC	Uc	275 / 480 V	≤ 275 V
Response time 10 kV/µs	tA	< 5 ns	< 5 ns
Protection level at 1kV/µs (L(N)-PE)	Uas	< 1,4 kV	≤ 1,4 (N/PE ≤1,5) kV
Protection level at In [L(N)-PE] (Urest)	Ures	< 1,4 kV	-
Nominal discharge current L-PE (8/20 µs)		10x 15 kA	10x 15 kA
Nominal discharge current (8/20)	In	1 x 40 kA	1 x 40 kA
Service life test current (10/700µs)	IL	500x 100, 10x 500, 1x 40 A	-
Lightning impulse current N-PE (10/350 µs)		12 kA	12 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 35/fine stranded 25	stranded 35/fine stranded 25
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)
Insulation resistance	Risol	-	≥ 10 GΩ
DC spark-over voltage	Uag		≥ 500 V=

With remote signalling contact (FM)	**EnerPro 282Tr-M/Pk**	**EnerPro 284Tr-M/Pk**
Article-No.	38 20 45	38 20 43
Switching capacity	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

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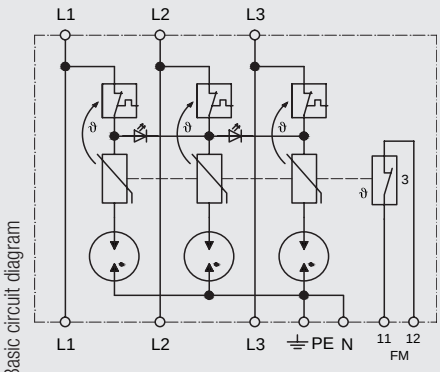
SPD type 3 for AC power supplies / EnerPro D

EnerPro D

Multipol compact surge protective device type 3 (class III) to protect one and three phase terminals of electonic of industries. The SPD is applicable at the transition 2-3 according to the lightning protection zones concept.



Basic circuit diagram

- No leakage currents to earth connection PE
- Line function and equipment control by LED/ Monitoring of conductor and arrester via LED
- Possible with parallel or spur wiring for 16 A
- Deepest protection against longitudinal and transverse voltages for loads up to 16 A
- Optional remote signalling contact (FM)

					
Technical Data		**EP D TNC 275**	**EP D TNS 275**	**EP D TT 275**	**EP D TT1+1 275**
Article-No.		38 05 24	38 05 30	38 05 35	38 05 38
Nominal voltage AC	UN	230 V~	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	275 V~	275 V~	275 V~	275 V~
Rated load current	IL	16 A	16 A	16 A	16 A
Protection level L-N	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Protection level L/N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Combined surge	Uoc	≤ 4 kV	≤ 4 kV	≤ 4 kV	≤ 4 kV
Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA	8 kA	8 kA
Response time L-N/L,N-PE		≤ 25/≤ 50 ns	≤ 25/≤ 50 ns	≤ 25/≤ 50 ns	≤ 25/≤ 50 ns
Max. acceptable fuse or back-up fuse		16 A gL/gG	16 A gL/gG	16 A gL/gG	16 A gL/gG
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve mm²			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Dimension (DIN 43880)		2TE	2TE	2TE	1TE
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP D TNC 275/FM**	**EP D TNS 275/FM**	**EP D TT 275/FM**	**EP D TT1+1 275/FM**
Article-No.	38 05 25	38 05 31	38 05 36	38 05 39
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

				
Technical Data		**EP D TT2+1 275**	**EP D IT 2P**	**EP D IT 3P**
Article-No.		38 05 40	38 05 70	38 05 76
Nominal voltage AC	UN	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	275 V~	440 V ~	440 V ~
Rated load current	IL	16 A	-	-
Protection level L-N	Up	≤ 1,0 kV	≤ 1,5 kV	≤ 1,5 kV
Protection level L/N-PE	Up	≤ 1,5 kV	≤ 1,5 kV	≤ 1,5 kV
Combined surge	Uoc	≤ 4 kV	≤ 4 kV	≤ 4 kV
Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA	8 kA
Response time L-N/L,N-PE		≤ 25/≤ 50 ns	≤ 25/≤ 50 ns	≤ 25/≤ 50 ns
Max. acceptable fuse or back-up fuse		16 A gL/gG	16 A gL/gG	16 A gL/gG
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve mm²		
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow		
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Dimension (DIN 43880)		2TE	2TE	2TE
Mounting on		35 mm DIN rail (DIN EN 50 022)		

With remote signalling contact (FM)	**EP D TT2+1 275/FM**	**EP D IT 2P/FM**	**EPO D IT 3P/FM**
Article-No.	38 05 41	38 05 71	38 05 77
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

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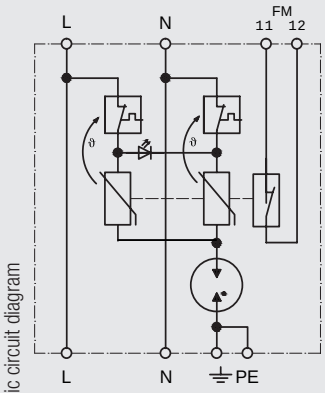
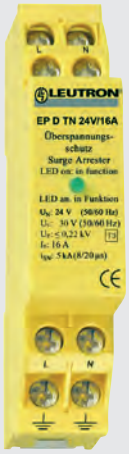
SPD type 3 for AC power supplies / EnerPro D

EnerPro D TN

Two pole, compact SPD for nominal voltage of 24 V up to 230 V.



Basic circuit diagram



- Practical compact housing with minimum space requirement
- Possible with parallel or spur wiring for 16 A
- No leakage currents to earth connection PE
- Line function and equipment control by LED/ Monitoring of conductor and arrester via LED
- Optional remote signalling contact (FM)

					
Technical Data		**EP D TN 24V/16A**	**EP D TN 48V/16A**	**EP D TN 60V/16A**	**EP D TN 120V/16A**
Article-No.		38 05 50	38 05 53	38 05 56	38 05 59
Nominal voltage AC	UN	24 V~	48 V~	60 V~	120 V~
Max. continous operating voltage AC	Uc	35 V~	60 V~	75 V~	150 V~
Rated load current	IL	16 A	16 A	16 A	16 A
Protection level L-N	Up	≤ 0,22 kV	≤ 0,35 kV	≤ 0,5 kV	≤ 0,7 kV
Protection level L/N-PE	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Combined surge	Uoc	≤ 2 kV	≤ 2 kV	≤ 2 kV	≤ 4 kV
Response time L-N/L,N-PE		≤ 25/≤ 100 ns	≤ 25/≤ 100 ns	≤ 25/≤ 100 ns	≤ 25/≤ 100 ns
Nominal discharge current (10 x 8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA	8 kA	8 kA
Max. acceptable fuse or back-up fuse		16 A gL/gG	16 A gL/gG	16 A gL/gG	16 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5 mm² single-wire / 1.0 mm² flexible with sleeve mm²			
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve mm²			
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP D TN 24V/16A /FM**	**EP D TN 48V/16A/FM**	**EP D TN 60V/16A /FM**	**EP D TN 120V/16A/FM**
Article-No.	38 05 51	38 05 54	38 05 57	38 05 60
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

			
Technical Data		**EP D TN 230V/16A**	**EP D TN 275**
Article-No.		38 05 62	38 12 54
Nominal voltage AC	UN	230 V~	230 V~
Max. continous operating voltage AC	Uc	255 V~	275 V~
Rated load current	IL	16 A	16 A
Protection level L-N	Up	≤ 1,0 kV	≤ 1,0 kV
Protection level L/N-PE	Up	≤ 1,5 kV	≤ 1,5 kV
Combined surge	Uoc	≤ 4 kV	≤ 4 kV
Response time L-N/L,N-PE		≤ 25/≤ 50 ns	≤ 25/≤ 50 ns
Nominal discharge current (8/20)	In	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA
Max. acceptable fuse or back-up fuse		16 A gL/gG	16 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		2x 2,5 mm² solid / 2x 1,5 mm² stranded	2x 2,5 mm² solid / 2x 1,5 mm² stranded
Enclosure material / colour		polycarbonate UL 94-V0 / yellow	polycarbonate (halogen-free) UL 94-V0 / yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)

With remote signalling contact (FM)	**EP D TN 230V/16A/FM**	**EP D TN 275/FM**
Article-No.	38 05 63	38 12 55
Switching capacity	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact

					
Technical Data		**EP D TN 24V/25A**	**EP D TN 48V/25A**	**EP D TN 60V/25A**	**EP D TN 120V/25A**
Article-No.		38 05 52	38 05 49	38 05 64	38 05 66
Nominal voltage AC	UN	24 V~	48 V~	60 V~	120 V~
Max. continous operating voltage AC	Uc	35 V~	60 V~	75 V~	150 V~
Rated load current	IL	25 A	25 A	25 A	25 A
Protection level L-N	Up	≤ 0,22 kV	≤ 0,35 kV	≤ 0,5 kV	≤ 0,7 kV
Protection level L/N-PE	Up	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV	≤ 1,0 kV
Combined surge	Uoc	≤ 2 kV	≤ 2 kV	≤ 2 kV	≤ 4 kV
Response time L-N/L,N-PE		≤ 25/≤ 100 ns	≤ 25/≤ 100 ns	≤ 25/≤ 100 ns	≤ 25/≤ 100 ns
Nominal discharge current (10 x 8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA	8 kA	8 kA
Max. acceptable fuse or back-up fuse		25 A gL/gG	25 A gL/gG	25 A gL/gG	25 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5 mm² single-wire / 1.0 mm² flexible with sleeve mm²			
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve mm²			
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow			
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)			

With remote signalling contact (FM)	**EP D TN 24V/25A-FM**	**EP D TN 48V/25A-FM**	**EP D TN 60V/25A-FM**	**EP D TN 120V/25A-FM**
Article-No.	38 05 55	38 05 58	38 05 65	38 05 67
Switching capacity	250 V/2 A	250 V/2 A	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact	break contact	break contact

Dimension drawing, see pages 186 up to 190

			
Technical Data		**EP D TN 230V/25A**	**EP D TN 275V/25A**
Article-No.		38 05 68	38 12 61
Nominal voltage AC	UN	230 V~	230 V~
Max. continous operating voltage AC	Uc	255 V~	275 V~
Rated load current	IL	25 A	25 A
Protection level L-N	Up	≤ 1,0 kV	≤ 1,0 kV
Protection level L/N-PE	Up	≤ 1,5 kV	≤ 1,5 kV
Combined surge	Uoc	≤ 4 kV	≤ 4 kV
Response time L-N/L,N-PE		≤ 25/≤ 100 ns	≤ 25/≤ 100 ns
Nominal discharge current (10 x 8/20)	In	5 kA	5 kA
Max. operating current	Imax	8 kA	8 kA
Max. acceptable fuse or back-up fuse		25 A gL/gG	25 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5 mm² single-wire / 1.0 mm² flexible with sleeve mm²	
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve mm²	
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	

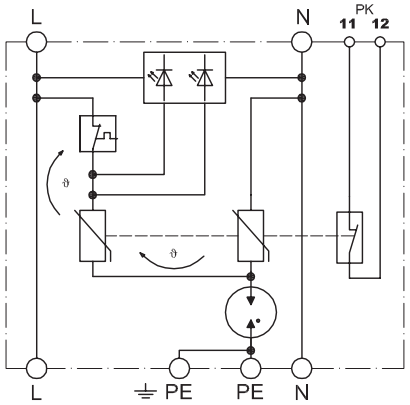
With remote signalling contact (FM)	**EP D TN 230V/25A-FM**	**EP D TN 275V/25A-FM**
Article-No.	38 05 69	38 12 48
Switching capacity	250 V/2 A	250 V/2 A
Remote signalling contact	break contact	break contact

SPD type 3 for AC power supplies

EnerPro 220Tr/20kA

Two-pole compact SPD with a discharge capacity of 20 kA (8/20 µs) and disconnection device without interruption of the power supply (red LED).

- Leackage current free
- Optional mit remote signalling contact (PK)
- Mounting on 35 mm DIN rail



Basic circuit diagram

		
Technical Data		**EnerPro 220Tr/20kA**
Article-No.		38 20 22
Nominal voltage AC	UN	230 V~
Max. continous operating voltage AC	Uc	275 V~
Rated load current	IL	16 A
Max. acceptable fuse or back-up fuse		16 A gL/gG
Protection level L-N	Up	≤ 1,2 kV
Protection level L/N-PE	Up	≤ 1,4 kV
Response time L-N/L,N-PE		≤ 25/≤ 50 ns
Nominal discharge current (8/20µs) [L(N)-PE]	In	20 kA
Critical discharge current (8/20 µs)	Imax	20 kA
Operating temperature range	TU	-40 - +80 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible
Recommended conductor cross section		1,5 / 2,5 mm²
Enclosure material / colour		polycarbonate UL 94-V0/yellow

Mit Remote signalling contact	**EnerPro 220Tr/20kA /Pk**
Article-No.	38 20 23
Switching capacity	250 V/2 A
Remote signalling contact	break contact

Dimension drawing, see pages 186 up to 190

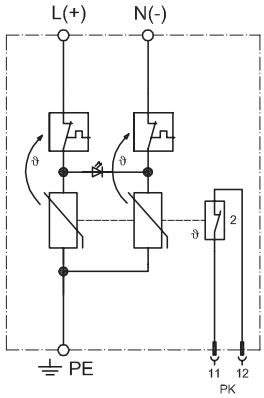
SPD type 3 for AC power supplies

EnerPro 150Tr/Pk

Surge protection for equipment and installations up to 100 A and 150 V.

- High performance arrester for 150 V operating voltage
- Function control indication via LED
- Signalling contact (break contact) with pluggable terminal (Pk)
- Valve arrester SPD (leakage-current free)

Basic circuit diagram



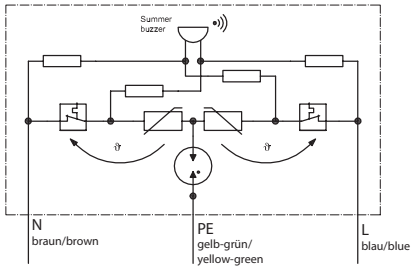
Technical Data		EnerPro 150Tr/Pk
Article-No.		38 20 25
Nominal voltage DC	UN	150 V=
Max. continous operating voltage AC	Uc	170 V~
Lightning impulse current (10/350) L,N-PE	Iimp	8 kA
Critical discharge current (8/20 µs)	Imax	40 kA
Voltage protection level at limp (10/350)	Up	≤ 1,0 kV
Max. acceptable fuse or back-up fuse		125 A gL/gG
Response time	tA	≤ 25 ns
Max. conductor cross section		50 mm² single wire / 35 mm² stranded / 25 mm² fine-stranded with sleeve
Operating temperature range	TU	-40 - +80 °C
Max. conductor cross section Pk		1.5 mm²
Max. current carrying capacity PK		250 V/2 A
Enclosure material / colour		polycarbonate UL 94-V0/yellow
Mounting on		35 mm DIN rail form C (EN 50 022)

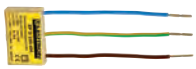
EnerPro D 230 KM

Surge arrester for installation systems and terminal equipment with acoustic fault indication.

- Applicable at the boundaries LPZ 1 - 2 and higher
- Test standard: IEC 61643-1 / EN 61643-11
- Universal device for use in cable ducts and holder boxes
- Class III 2-pole mini SPD (fine protection)
- Protection against longitudinal and transverse voltages for loads up to 16 A

Basic circuit diagram





Technical Data		EP D 230 KM
Article-No.		36 20 35
EC category/EN type		type 3 / class III
Nominal voltage AC	UN	230 V~
Max. continous operating voltage AC	Uc	255 V~
Max. allowed prefuse		16 A gL/gG
Rated load current	IL	16 A
Protection level L-N	Up	≤ 1,25 kV
Protection level L/N-PE	Up	≤ 1,5 kV
Response time L-N/L,N-PE		≤ 25/≤ 100 ns
Nominal discharge current (8/20)	In	3 kA
Max. operating current	Imax	6 kA
Operating temperature range	TU	-15 - +60 °C
Combined surge generator impulse	Uoc	6 kV
Conductor length		ca. 100 mm
Dimensions L x W x H		36 x 24 x 9 mm
Enclosure material / colour		polycarbonate UL 94-V0/yellow
Mounting on		under-floor systems, cable trys and device installation boxes

Dimension drawing, see pages 186 up to 190

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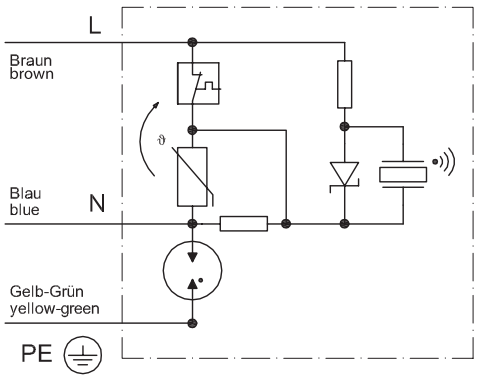
SPD type 3 for AC power supplies

EnerPro 230 SDU

Two-pole surge arrester for the protection of electronical devices, for the retrofitting of deep 220 V flush-mounted boxes.

- Applicable at the boundaries LPZ 1 - 2 and higher
- Test standard: IEC 61643-1 / EN 61643-11
- Acoustic failure signal
- Including disconnection mechanism

Basic circuit diagram



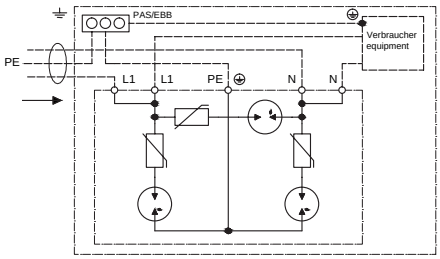
Technical Data		EnerPro 230 SDU
Article-No.		24 00 02
EC category/EN type		type 3 / class III
Nominal voltage AC	UN	230 V~
Rated load current	IL	16 A
Protection level L-N	Up	≤ 1,25 kV
Protection level L/N-PE	Up	≤ 1,5 kV
Response time	tA	< 25 ns
Nominal discharge current (8/20)	In	2,5 kA
Max. operating current	Imax	5 kA
Operating temperature range	TU	-20 - +80 °C
Type of connection		3-adrig
Mounting type		installation in 230V flush sockets

NM 220V/5kA

Surge voltage protection module for the protection of single-phase 230 V equipment with max. 16 A power consumption.

- Applicable at the boundaries LPZ 1 - 2 and higher
- Test standard: IEC 61643-1 / EN 61643-11
- Compact module for equipment installation
- Protection against longitudinal and transverse voltages
- No leakage current to PE (leakage current free)

Basic circuit diagram



Technical Data		NM 220V/5kA
Article-No.		36 05 22
EC category/EN type		type 3 / class III
Nominal voltage AC	UN	230 V~
Rated load current	IL	16 A
Protection level L-N	Up	≤ 1,0 kV
Protection level L/N-PE	Up	≤ 1,5 kV
Response time	tA	≤ 25 ns
Nominal discharge current (8/20µs) line-earth	In	5 kA
Nominal discharge current (8/20µs) line-line	In	2,5 kA
Max. current (8/20 µs) line-line	Ig	8 kA
Max. current (8/20 µs) line-earth	Ig	15 kA
Operating temperature range	TU	-20 - +80 °C
Mounting		2x M3-srews (25mm)
Type of connection		Screw terminals

Dimension drawing, see pages 186 up to 190

SPD type 3 for AC power supplies

CPS-F/-J/-E 230

CPS line is a plugable combined overvoltage protection unit for electronic devices with 230 Vac voltage.
Three different electrical connectors are available: type F (Germany), type J (Switzerland) and type E (France).

- Test standard: IEC 61643-1 / EN 61643-11
- Complete optical monitoring of conductor and arrester by LED
- Protection of ethernet or ISDN via RJ11-plug socket
- Protection of telephon/Fax/Modem via RJ45 plug socket
- Protectionof TV antenna or SAT via IEC antenna plug-in socket

Basic circuit diagram

				
Technical Data		**CPS-F 230**	**CPS-J 230**	**CPS-E 230**
Article-No.		32 50 07	32 50 08	32 50 09
Nominal voltage AC	UN	230 V~	230 V~	230 V~
Max. continous operating voltage AC	Uc	255 V~	255 V~	255 V~
Rated load current	IL	16 A	16 A	16 A
Protection level	Up	1,5 kV	1,5 kV	1,5 kV
Nominal discharge current (8/20)	In	2 kA	2 kA	2 kA
Max. operating current	Imax	4 kA	4 kA	4 kA
Combined surge generator impulse	Uoc	6 kV	6 kV	6 kV

Dimension drawing, see pages 186 up to 190

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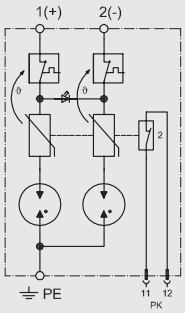
EnerPro 48V/100A-Tr

Surge voltage protector for equipment power supplies and installations up to 100 A and 48 V AC/DC.

Basic circuit diagram



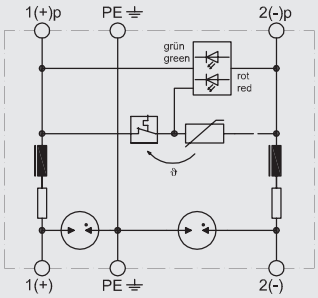
- High performance surge protector
- Valve arrester SPD (leakage-current free)
- Function control indication via LED
- Optional potential-free remote signalling contact (PK)

			without fig.
Technical Data		**EnerPro 48V/100A-Tr**	**EnerPro 48V/100A-Tr/Pk**
Article-No.		38 20 70	38 20 71
Nominal voltage DC	UN	48 V=	48 V=
Nominal voltage AC	UN	34 V~	34 V~
Max. continuous operating voltage DC	Uc	60 V=	60 V=
Max. continuous operating voltage AC	Uc	42 V~	42 V~
Protection level at 1kV/µs (1,2-PE)	Uas	≤ 0,2 kV	≤ 0,2 kV
Protection level at In (1, 2-PE)	Ures	≤ 0.3 kV	≤ 0.3 kV
Response time	tA	< 25 ns	< 25 ns
Nominal discharge current (8/20)	In	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	30 kA	30 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG
Max. conductor cross section at terminals		stranded 50/fine stranded 35 mm²	stranded 50/fine stranded 35 mm²
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate UL 94-V0 / yellow	polycarbonate (halogen-free) UL 94-V0 / yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)

Dimension drawing, see pages 186 to 190

EnerPro mit 6A/LED

Surge voltage arrester for electrical and electronical devices in looped-in wiring, with disconnection device without interruption of the power supply.



Basic circuit diagram

- Two-pole SPD for operating current up to 6 A
- With filter

				
Technical Data		**EnerPro 12V-6A/LED**	**EnerPro 24V-6A/LED**	**EnerPro 36V-6A/LED**
Article-No.		24 12 02	24 24 02	24 36 02
Rated voltage DC (1-2/1p-2p)	Uc	12 V	24 V	36 V
Rated voltage (between 1-2 resp. 1p-2p) AC	Uc	8 V	17 V	24 V
Max. operating voltage DC (1-2 / 1p-2p)	Umax	15 V	27 V	40 V
Max. operating voltage AC (1-2 /1p-2p)	Umax	10 V	20 V	29 V
Max. operating current	Imax	6 A	6 A	6 A
Protection level (Ader-Erde)		650 V	650 V	650 V
Response time	tA	< 25 ns	< 25 ns	< 25 ns
Series inductance, typ.	L	20 µH	20 µH	20 µH
Protection level line-line at 1kV/µs and limp	Urest	≤ 80 V	≤ 100 V	≤ 200 V
Short-circuit current extinguishing capacity line-line		≤ 6 A	≤ 6 A	≤ 6 A
Short-circuit current extinguishing capacity line-earth		≤ 1 A	≤ 1 A	≤ 1 A
Max. impulse discharge current (8/20)	Imax	40 kA	40 kA	40 kA
Service life test current (500 x 10/700 µs)	iI	200 A	200 A	200 A
Critical discharge current (10/700 µs)		1000 A	1000 A	1000 A
Max. alternating discharge current (50 Hz/ 5x 0,5s)	Iwn	50 A	50 A	50 A
Max. current 50 Hz/0.5 s	Ig	80 A	80 A	80 A
Conductor cross section		Cu, 35mm² flexible with sleeve	Cu, 35mm² flexible with sleeve	Cu, 35mm² flexible with sleeve
Dimensions (L x W x H)		52,5 x 90 x 64	52,5 x 90 x 64	52,5 x 90 x 64
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C

Dimension drawing, see pages 186 to 190

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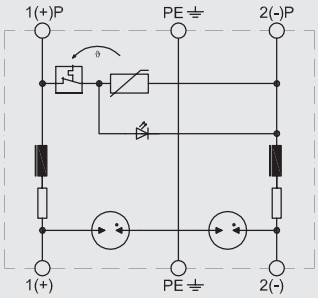
EnerPro mit 20A/LED

Two-pole SPD for operating current up to 20 A in looped-in wiring, with disconnection device without interruption of the power supply.



Basic circuit diagram

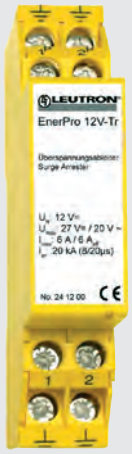
- Surge voltage protection for electrical and electronical devices
- With filter

		without fig.	without fig.	
Technical Data	**EP 12V-20A/LED**	**EP 24V-20A/LED**	**EP 36V-20A/LED**	**EP 48V-20A/LED**
Article-No.	24 12 03	24 24 03	24 36 03	24 48 03
Rated voltage DC (1-2/1p-2p) Uc	12 V	24 V	36 V	48 V
Rated voltage (between 1-2 resp. 1p-2p) AC Uc	8 V	17 V	24 V	30 V
Max. operating voltage DC (1-2 / 1p-2p) Umax	15 V	27 V	40 V	53 V
Max. operating voltage AC (1-2 /1p-2p) Umax	10 V	20 V	29 V	37 V
Max. operating current Imax	20 A	20 A	20 A	20 A
Protection level line-line at 1kV/µs and limp Urest	≤ 80 V	≤ 100 V	≤ 200 V	≤ 300 V
Response time tA	25 ns	25 ns	25 ns	25 ns
Short-circuit current extinguishing capacity line-line	≤ 6 A	≤ 6 A	≤ 6 A	≤ 6 A
Short-circuit current extinguishing capacity line-earth	≤ 1 A	≤ 1 A	≤ 1 A	≤ 1 A
Nominal discharge current L1, L2-PE (8/20µs)	20 kA	20 kA	20 kA	20 kA
Max. impulse discharge current L1, L2-PE (8/20µs) Imax	40 kA	40 kA	40 kA	40 kA
Max. impulse discharge current L1+L2-PE (8/20µs) Imax	80 kA	80 kA	80 kA	80 kA
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Conductor cross section	Cu, solid 50mm²/flexible 35mm² with sleeve		Cu, solid 50mm²/flexible 35mm² with sleeve	
Dimensions (L x W x H)	64 x 90 x 52,5 mm	64 x 52,5 x 90 mm	64 x 90 x 52,2 mm	64 x 90 x 52,5 mm
Degree of protection (IEC EN 60529)	IP 20	IP 20	IP 20	IP 20
Enclosure material / colour	polycarbonate (halogen-free) UL 94-V0 / yellow		polycarbonate (halogen-free) UL 94-V0 / yellow	

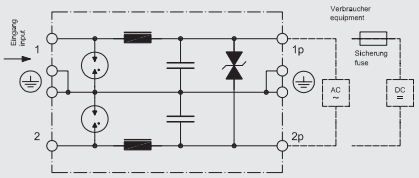
Dimension drawing, see pages 186 to 190

EnerPro V-Tr

Two-pole class II and III SPD with gas-filled surge arrester (GDT) and suppressor diodes for operating currents up to 6 A.



Basic circuit diagram



- Two-step protective circuit with integrated low-pass filter
- High performance surge protector for operating voltage of 24 V up to 60 V DC
- Mounting directly on mounting plate or on 35 mm DIN rail

						
Technical Data		**EnerPro 12V-Tr**	**EnerPro 24V-Tr**	**EnerPro 36V-Tr**	**EnerPro 48V-Tr**	**EnerPro 60 V-Tr**
Article-No.		24 12 00	24 24 00	24 36 00	24 48 00	24 60 00
Nominal voltage DC	UN	12 V=	24 V=	36 V=	48 V=	60 V=
Nominal voltage AC	UN	8 V~	17 V~	24 V~	30 V~	43 V~
Max. continuous operating voltage DC	Uc	15 V=	27 V=	40 V=	53 V=	85 V=
Max. continuous operating voltage AC	Uc	10 V~	20 V~	29 V~	37 V~	60 V~
Max. operating current	Imax	6 A	6 A	6 A	6 A	6 A
Leakage current at Umax DC	IL	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA
DC resistance	R	27 Ω	27 Ω	27 Ω	27 Ω	27 Ω
Series inductance, typ.	L	20 µH	20 µH	20 µH	20 µH	20 µH
Protection level line-earth at 1kV/µs and In		≤ 800, typ. 650 V	≤ 800, typ. 650 V	≤ 800, typ. 650 V	≤ 800, typ. 650 V	≤ 800 , typ. 650 V
Protection level line-line at 1 kV/µs and In	Urest	≤ 20 / 27 V	≤ 37 / 55 V	≤ 55 / 85 V	≤ 85 / 110 V	≤ 95/125 V
Short-circuit current extinguishing capacity line-line		≤ 6 A	≤ 6 A	≤ 6 A	≤ 1.0 A	≤ 1 A
Short-circuit current extinguishing capacity line-earth		≤ 1 A	≤ 1 A	≤ 1 A	≤ 0,75 A	≤ 0,75 A
Nominal impulse discharge current (10 x 8/20)	In	20 kA	20 kA	20 kA	20 kA	20 kA
Service life test current (500 x 10/700 µs)	il	200 A	200 A	200 A	200 A	200 A
Critical discharge current (10/700 µs)		1000 A	1000 A	1.000 A	1000 A	1000 A
Max. alternating discharge current (50 Hz/ 5x 0,5s)	Iwn	50 A	50 A	50 A	50 A	50 A
Max. current 50 Hz/0.5 s	Ig	80 A	80 A	80 A	80 A	80 A
Operating temperature range		-40 - +80°C	-40 - +80°C	-40 - +80°C	-40 - +80°C	-40 - +80°C
Conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve

Dimension drawing, see pages 186 to 190

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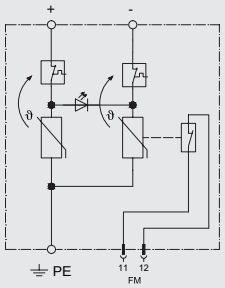
Combined arrester type 1 + 2 for DC power supplies

PowerPro PV

When applied in PV installations, these devices are placed inside the connection box of the solar generator and on the DC side of the inverter.



Basic circuit diagram

- Two-pole DC combined modular arrester, class I and II.
- Applicable at the LPZ transition point 0A-1 and higher
- Test standard: IEC 61643-1 / EN 61643-11
- Mounting on 35 mm DIN rail
- Optional remote signalling contact (FM)

			
Technical Data		**PP PV 800**	**PP PV 1000**
Article-No.		37 44 00	37 44 02
IEC category/EN type		type 1 + 2 / class I + II	type 1 + 2 / class I + II
PV voltage	UocSTC	800 V=	1000 V=
Max. continuous operating voltage DC	Uc	850 V=	1100 V=
Protection level at In	Up	≤ 2,2 kV	≤ 4,2 kV
Protection level at 5 kA	Up	≤ 1,8 kV	≤ 3.5 kV
Response time	tA	≤ 25 ns	≤ 25 ns
Lightning impulse current (10/350) per pole	limp	12,5 kA	12.5 kA
Max. impulse discharge current (8/20)	Imax	40 kA	40 kA
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10 mm²	10 mm²
Max. conductor cross section at terminals		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Max. connection torque for terminals		4,5 Nm	4.5 Nm
Enclosure material / colour		polycarbonate UL 94-V0 / yellow	polycarbonate (halogen-free) UL 94-V0 / yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20
Dimension (DIN 43880)		2 TE	3 TE

With remote signalling contact (FM)	**PP PV 800/FM**	**PP PV 1000/FM**
Article-No.	37 44 01	37 44 03
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

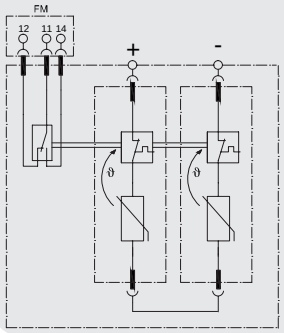
Accessories	
	DAK 2x 16
Article-No.	17 01 10

Adapter to enable feed-through wiring (V-wiring) for all surge protection modules with only one clamp per phase, such as PP PV 800 and 1000 and other SPDs for power supply systems.

SPD type 2 for DC power supplies

CT PV-T2

Fully pluggable surge protective arrester for the use in photovoltaic applications. Suitable fuse-free earthed photovoltaic applications with system voltages up to 600 or 1000 V DC.



Basic circuit diagram

- Applicable at the boundaries LPZ 0B - 1 and higher
- Test standard: IEC 61643-1 / EN 61643-11
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Enclosure material: thermoplastic (yellow)
- Inflammability class according to UL 94 V0
- Dimension: 36 mm and 54 mm
- Optional remote changeover contact

					
Technical Data		**CT PV-T2/2-0/600**	**CT PV-T2/2-0/1000**	**CT PV-T2/2+1/600**	**CT PV-T2/2+1/1000**
Article-No.		96 02 20	96 02 22	96 02 24	96 02 26
IEC category/EN type		Typ 2 / class II	Type 2 / class II	Type 2 / class II	Type 2 / class II
Open-circuit voltage	UOC max.	≤ 600 V=	≤ 1000 V=	≤ 600 V=	≤ 1000 V=
Max. continuous operating voltage DC	Uc	600 V=	1000 V=	600 V=	1000 V=
Max. short-circuit current	ISC max.	tbd.	tbd.	tbd.	tbd.
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	30 kA	30 kA	30 kA	30 kA
Protection level L+-L-	Up	3 kV	5 kV	3 kV	5 kV
Protection level L+/L- -PE	Up	-	-	3 kV	5 kV
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section at terminals		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Dimension (DIN 43880)		36 mm	36 mm	54 mm	54 mm

With remote signalling contact (FM)	**CT PV-T2/2-0/600-FM**	**CT PV-T2/2-0/1000-FM**	**CT PV-T2/2+1/600-FM**	**CT PV-T2/2+1/1000-FM**
Article-No.	96 02 21	96 02 23	96 02 25	96 02 27
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

Accessories (Moduls)		
	CT PV-T2-600-M	CT PV-T2-1000-M
Article-No.	96 02 46	96 02 47

Replacement protective plug for DC surge arresters typ 2.

Dimension drawing, see pages 186 to 190

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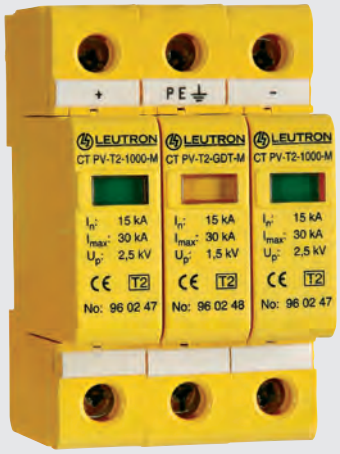
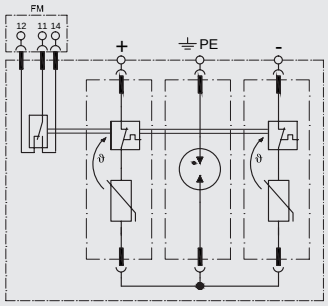
SPD type 2 for DC power supplies

CT PV-T2/2+GDT

Fully pluggable surge protective arrester for the use in photovoltaic applications. Suitable fuse-free earthed photovoltaic applications with system voltages up to 600 or 1000 V DC.





Basic circuit diagram

- Applicable at the boundaries LPZ 0B - 1 and higher
- Leackage current free
- Test standard: IEC 61643-1 / EN 61643-11
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Inflammability class according to UL 94 V0
- Dimension: 54 mm (3 TE)
- Optional remote changeover contact

			
Technical Data		**CT PV-T2/2+GDT/600**	**CT PV-T2/2+GDT/1000**
Article-No.		96 02 28	96 02 30
IEC category/EN type		Type 2 / class II	Type 2 / class II
Open-circuit voltage	UOC max.	≤ 600 V=	≤ 1000 V=
Max. continuous operating voltage DC	Uc	600 V=	1000 V=
Max. short-circuit current	ISC max.	tbd.	tbd.
Nominal discharge current (8/20)	In	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	30 kA	30 kA
Protection level L+-L-	Up	3 kV	5 kV
Protection level L+/L- -PE	Up	3 kV	3 kV
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		1.5mm² solid/flexible	1.5mm² solid/flexible
Max. conductor cross section at terminals		35mm² stranded/25mm² flexible	35mm² stranded/25mm² flexible
Dimension (DIN 43880)		54 mm	54 mm

With remote signalling contact (FM)	**CT PV-T2/2+GDT/600-FM**	**CT PV-T2/2+GDT/1000-FM**
Article-No.	96 02 29	96 02 31
Max. operating voltage	250 V AC/125 V DC	250 V AC/125 V DC
Max. operating current	1 A AC/ 200 mA DC	1 A AC/ 200 mA DC

Accessories (Moduls)			
	CT PV-T2-600-M	CT PV-T2-1000-M	CT PV-T2-GDT-M
Article-No.	96 02 46	96 02 47	96 02 48

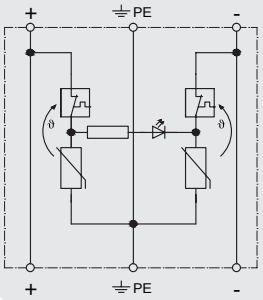
Replacement protective plug for DC surge arresters typ 2.

Dimension drawing, see pages 186 to 190

SPD type 2 for DC power supplies

EnerPro 803/1003-Tr

Surge arrester for PV installations, with looped-in wiring.



Basic circuit diagram

- When used in PV-installations, they are installed in the generator connection box and on the DC side of the AC converter.

			
Technical Data		**EP 803Tr**	**EP 1003Tr**
Article-No.		39 50 26	39 50 03
PV voltage	UocSTC	800 V=	1000 V=
Max. continuous operating voltage DC	Uc	895 V=	1000 V=
Protection level at In	Up	≤ 2,5 kV	≤ 3,5 kV
Protection level at 5 kA	Up	≤ 1,8 kV	≤ 3,5 kV
Response time	tA	≤ 25 ns	≤ 25 ns
Nominal discharge current (8/20)	In	10 kA	5 kA
Max. impulse discharge current (8/20 µs) line to PE	Imax	20 kA	10 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		2,5 mm²	2,5 mm²
Max. conductor cross section (L1, L2, PE)		50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Casting compound		Polyurethane	Polyurethane
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)

Dimension drawing, see pages 186 to 190

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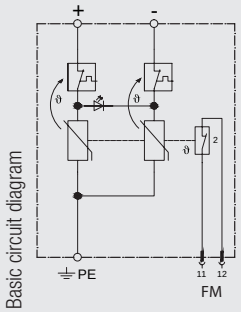
SPD type 2 for DC power supplies

EnerPro 802Tr and 1002Tr

These devices (class II) provide overvoltage protection for the dc part in PV installations.



Basic circuit diagram

- When used in PV-installations, they are installed in the generator connection box and on the DC side of the AC converter.
- Optional potential-free remote signalling contact (PK)

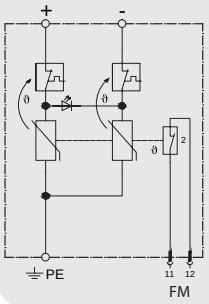
				
Technical Data		**EnerPro 802Tr**	**EnerPro 802Tr/Pk**	**EnerPro 1002Tr**
Article-No.		39 50 04	39 50 05	39 50 02
Max. continuous operating voltage DC	Uc	880 V=	880 V=	1000 V=
PV voltage	UocSTC	800 V=	800 V=	1000 V=
Protection level at In (8/20)	Up	≤ 2,5 kV	≤ 2,5 kV	≤ 3,5 kV
Protection level at 5 kA	Up	≤ 2,0 kV	≤ 2,0 kV	≤ 3,5 kV
Response time	tA	< 25 ns	< 25 ns	≤ 25 ns
Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG	125 A gL/gG
Max. impulse discharge current (8/20 µs) line to PE	Imax	10 kA	10 kA	10 kA
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		stranded 50 mm²/fine stranded 35 mm²		
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible	10mm² solid/flexible
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow		
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail form C (EN 50 022)
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
FM contact / contact type			break contact	
Switching capacity			250 V/2 A	

Dimension drawing, see pages 186 up to 190

SPD type 2 for DC power supplies

EnerPro 802/1002 with 20kA

These devices (class II) provide overvoltage protection for the dc part in PV installations.



Basic circuit diagram

- When used in PV-installations, they are installed in the generator connection box and on the DC side of the AC converter.

Technical Data		EP 802/20kA-Tr	EP 1002/20kA-Tr
Article-No.		39 50 14	39 50 16
PV voltage	UocSTC	800 V=	1000 V=
Max. continuous operating voltage DC	Uc	1000 V=	1000 V=
Protection level at In	Up	≤ 2,5 kV	≤ 4,2 kV
Protection level at 5 kA	Up	≤ 2,0 kV	≤ 3,5 kV
Response time	tA	< 25 ns	< 25 ns
Nominal discharge current (8/20)	In	20 kA	20 kA
Max. impulse discharge current (8/20 µs) line to PE	Imax	40 kA	40 kA
Max. acceptable fuse or back-up fuse		125 A gL/gG	125 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Min. conductor cross section at terminals		10mm² solid/flexible	10mm² solid/flexible
Max. conductor cross section (L1, L2, PE)		50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Casting compound		Polyurethane	Polyurethane
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		35 mm DIN rail (DIN EN 50 022)	35 mm DIN rail (DIN EN 50 022)

Dimension drawing, see pages 186 to 190

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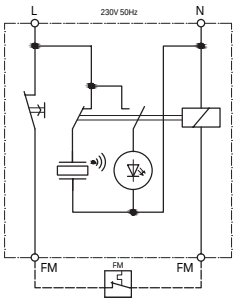
UAS 230-Tr

All-purpose acoustic signalling device with test key for all surge protection devices with the nominal voltage of UN 230 V.

- For monitoring of remote contacts of surge protection devices
- Mounting on 35 mm DIN rail (EN 60715)

Basic circuit diagram

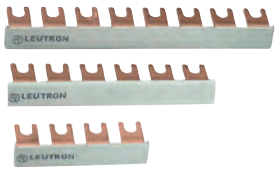


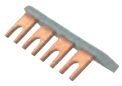
Technical Data		UAS 230-Tr
Article-No.		35 10 30
Nominal voltage AC	UN	230 V~
Max. continuous operating voltage DC	Uc	240 V=
Nominal current	IL	16 A
Max. power		530 (Relais) W
Coil resistance		26,9 Ω
Max. conductor cross section at terminals		35mm² stranded/25mm² flexible
Operating temperature range	TU	-25 - +65 °C
Max. conductor cross section at terminals FM		1,5 mm²
Degree of protection (IEC EN 60529)		IP 20
Enclosure material / colour		polycarbonate UL 94-V0 / yellow

Busbars

The all-purpose busbar is designed to connect the earthing of arrester class II and III lightning and surge voltage components.

- All-purpose busbar for multi-function terminals
- For an optimal bridging of the grounding terminals
- Available in different lengths



		without fig.		without fig.	without fig.		without fig.
	KA 1TE-1/2	**KA 1TE-1/3**	**KA 1TE-1/4**	**KA 1TE-1/6**	**KA 1TE-1/8**	**KA 2TE-1/3**	**KA 2TE-1/4**
Article-No.	17 00 15	17 00 13	17 00 25	17 00 31	17 00 42	17 00 35	17 00 41
Dimension (DIN 43880)	2x 1TE	3x 1TE	4x 1TE	6x 1TE	8x 1TE	2x 1TE	2x 1TE

AK35 GDT230

The solution allows for a subsequent high-resistance and leakage current-free earthing with a gas-filled surge arrester (GDT) against earth at the EP protective devices.

- Equipped with two-pole gas-filled surge arrester 2EL 230Q
- Screw-type terminal
- Terminals are internally bridged

Technical Data	AK35 GDT230
Article-No.	17 01 00
Type of connection	Screw-type terminal
Nominal discharge current (8/20)	20 kA
Dimension	50 x 20 x 10 mm

DAK 2x16

Pin-shaped terminal to enable feed-through wiring (V-wiring) for all surge protection modules with only one clamp per phase.

- Looped-in wiring for SPDs with only one teminal
- Connection of max. 2x 16 mm² fine stranded
- According to IEC 60364-5-53

Technical Data	DAK 2x 16
Article-No.	17 01 10
Type of connection	front (double terminal)
Max. Cross sectional area	2x 16 mm²
Dimension	17 x 38,5 x 21 mm

Dimension drawing, see pages 186 up to 190

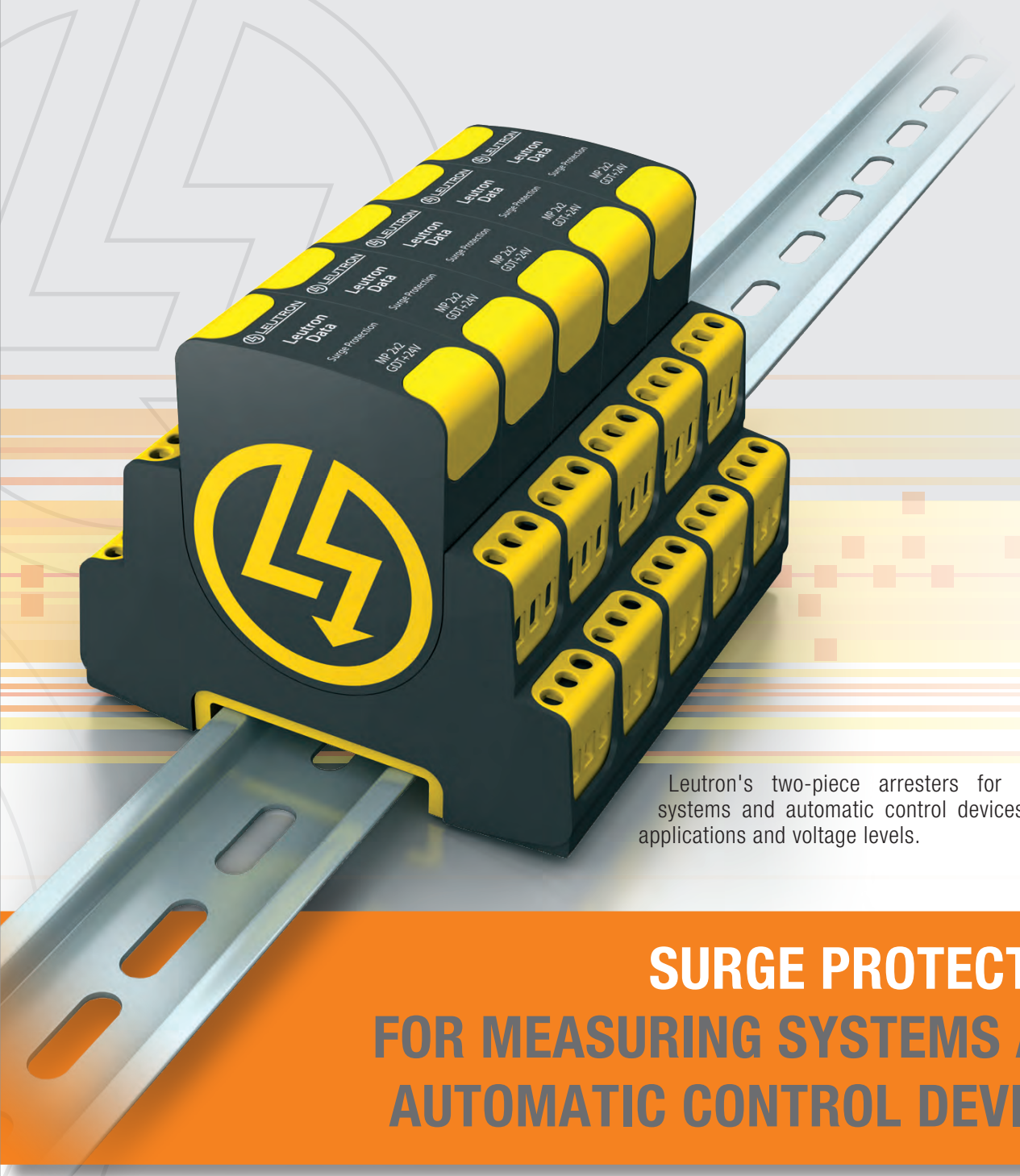
THE NEW ARRESTERS – INTERRUPTION-FREE AND IMPEDANCE-NEUTRAL PLUGGING AND UNPLUGGING WITHOUT INTERRUPTING THE SIGNAL

The two-part protection devices with a construction width of 17.5 mm cover up to seven voltage types. Devices with a one-piece terminal block design and a construction width of only 6.2 mm allow for a high packing density in control cabinets.

Convincing application advantages thanks to a symbiosis of design and optimized packing density – Leutron's new arresters for measuring systems and automatic control devices

MORE VERSATILE IN USE:

- Optimized basic modules for direct or indirect shield grounding via gas discharge tubes
- On pluggable surge protective devices the protection module can be detached and replaced without interrupting the signal
- Versions for one pair of wires (1DA) with two signal lines and for two pairs of wires (2DA) with four signal lines available



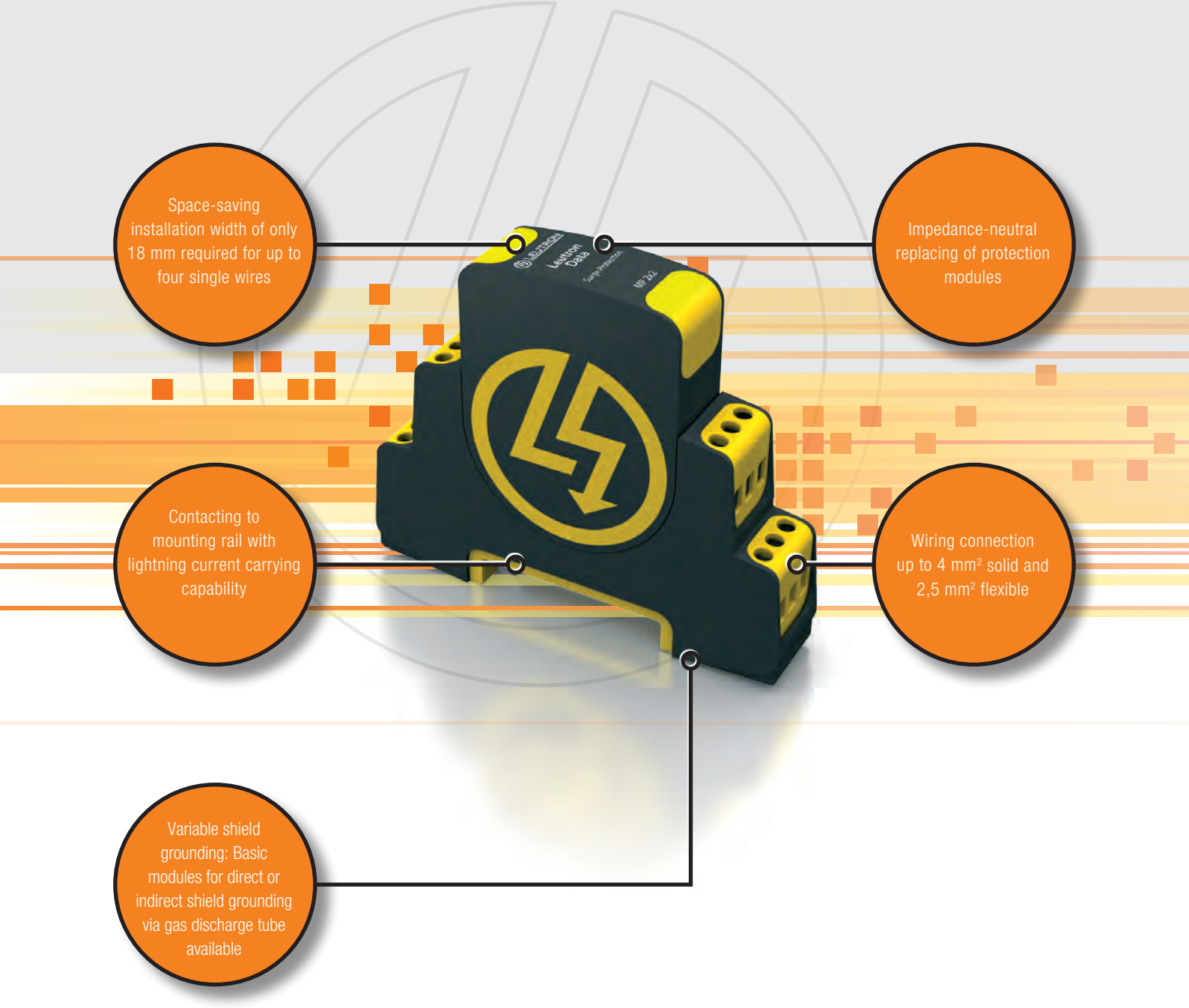
Leutron's two-piece arresters for measuring systems and automatic control devices – for all applications and voltage levels.

SURGE PROTECTION
FOR MEASURING SYSTEMS AND AUTOMATIC CONTROL DEVICES

TWO-PIECE, PLUGGABLE SURGE ARRESTERS

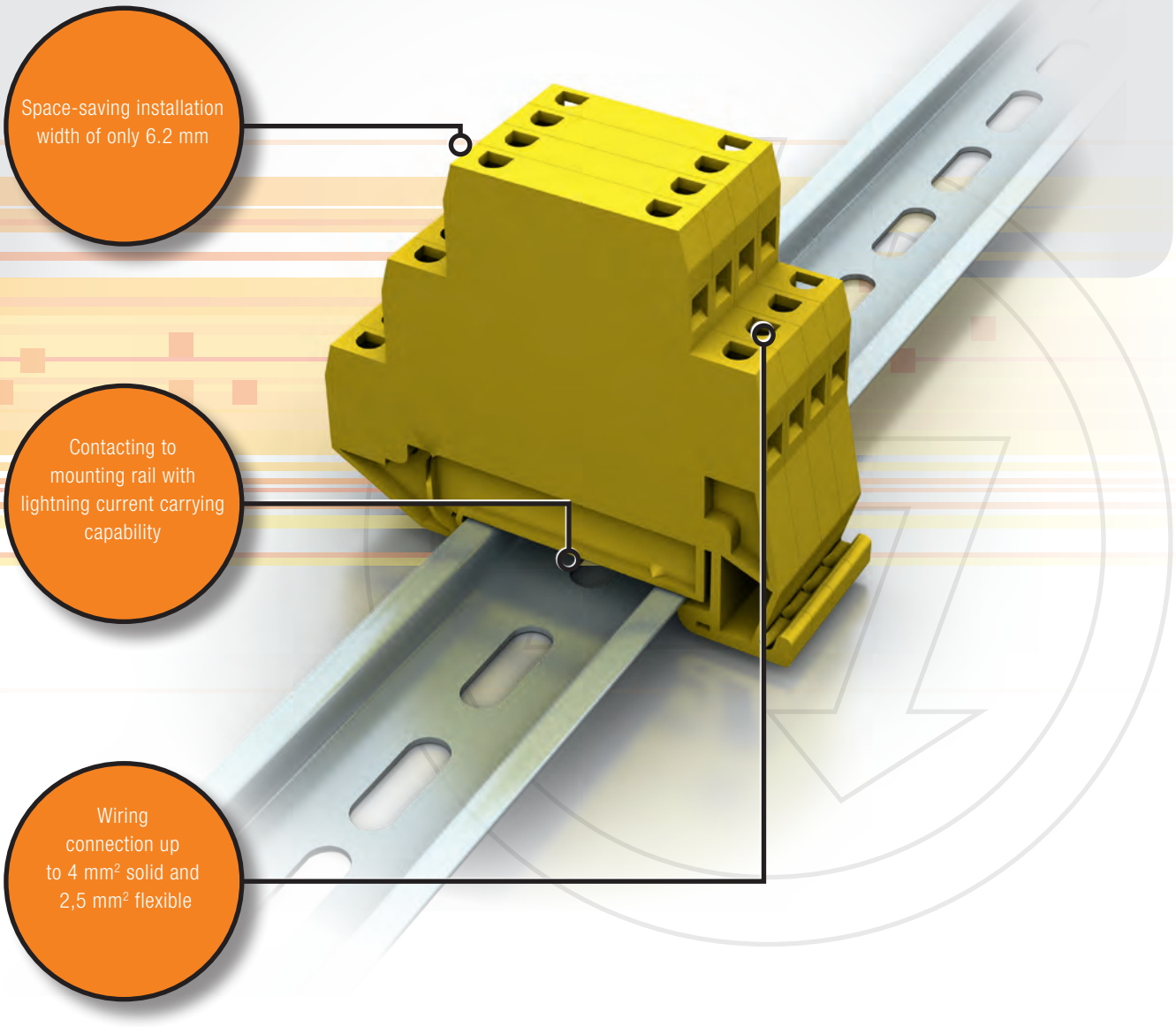
New product line »Leutron Data«:

- Voltage levels from 5 V to 180 V DC available
- Frequency range: Dependent on the voltage level up to 170 MHz



ONE-PIECE SURGE ARRESTERS

- Voltage levels from 5 V to 180 V DC available
- Frequency range: Dependent on the voltage level up to 25 MHz



Interface / Signal	Connection	Protected lines	Protection device	Article-No.	Page
0-20 mA, 4-20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27	70
(auch mit HART)	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Pg	97 10 13	83
	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34	86
4-20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
(also with HART) acc. to NAMUR recom-	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
mendation NE 21 or acc. to EN 61000-4-5,	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
Open-circuit voltage 1 kV Ad-Pg	LSA	2	DP 1LSA-24	24 00 34	104
	LSA	20	DP 10LSA-24V	24 00 27	109
3/4-Signal Measurement	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27	70
ADVANT	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad-Pg ST	97 00 39	73
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad-Pg ST	97 00 46	74
	Screw terminals	2	MP RK GDT+5V-Ad-Ad-Pg	97 10 18	81
Binary signals	Screw terminals	4	MP 2x2 GDT+XXV-Ad-Pg ST	97 00 25 - 97 00 31	70-71
	Screw terminals	2	MP 1x2 GDT+XXV-Ad-Pg ST	97 00 32 - 97 00 38	71-72
	Screw terminals	2	MP RK GDT+XXV-Ad-Pg	97 10 11 - 97 10 17	83-84
	Screw terminals	2	MP RK XXV-Ad-Pg	97 10 32 - 97 10 38	86
	LSA	2	DP 1LSA-XX	24 00 31 - 24 00 39	104-105
	LSA	20	DP 10LSA-24V	24 00 27	109
Bitbus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
BLN	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12	67
(Building Level Netzwerk)	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19	68
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
	Screw terminals	2	MP RK GDT+12V-Ad-Ad	97 10 05	82
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08	83
CAN-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
(data line only)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
C-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
(Honeywell)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Data Highway Plus	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12	67
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19	68
Delta Net Peer Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Device Net	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
(data line only)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Dupline	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
E-Bus	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
(Honeywell)	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
EIB	Screw terminals	4	MP 2x2 GDT ST	97 00 07	66
	Screw terminals	2	MP 1x2 GDT ST	97 00 10	66
	Screw terminals	2	MP RK GDT	97 10 03	80
	LSA	20	TelPro LSA-3EH230F1E-10kA	24 01 23	101
Electro acoustic system (ELA)	Screw terminals	4	MP 2x2 GDT ST	97 00 07	66
	Screw terminals	2	MP 1x2 GDT ST	97 00 10	66
	Screw terminals	2	MP RK GDT	97 10 03	80
	Screw terminals	4	MP 2x2 GDT+170V-Ad-Pg ST	97 00 31	71
	Screw terminals	2	MP 1x2 GDT+170V-Ad-Pg ST	97 00 38	72
	Screw terminals	2	MP RK GDT+170V-Ad-Pg	97 10 17	84
	LSA	2	DP 1LSA-110	24 00 39	105

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Interface / Signal	Connection	Protected lines	Protection device	Article-No.	Page
	LSA	20	DP 10LSA-110	24 01 40	109
ET 200	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Fieldbus Foundation	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
	LSA	20	DP 10LSA-24V	24 00 27	109
FIPIO / FIPWAY	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
FIP I/O	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
FSK	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Genius I/O Bus	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12	67
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19	68
	Screw terminals	2	MP RK GDT+12V-Ad-Ad	97 10 05	82
DC power supply +24/30 V	Screw terminals	2	DP2x1-RLC/50V-Tr	28 70 50	138
IEC-Bus (RS 486)	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Industrial Ethernet	RJ45	8	DP RJ45-CAT6-48V-Tr	24 00 05	94
	RJ45	8	DP RJ45 f/f	24 00 11	95
	RJ45	8	DP 1xRJ45-PoE-Alu	24 00 21	95
	RJ45	8 x 8	DP 8xRJ45-6V-WG	19 40 50	97
	RJ45	8 x 8	DP 1x8RJ45-19"	19 40 13	96
	RJ45	16 x 8	DP 2x8RJ45-19"	19 40 23	96
	RJ45	24 x 8	DP 3x8RJ45-19"	19 40 33	96
	RJ45	32 x 8	DP 4x8RJ45-19"	19 40 43	96
	RJ45	40 x 8	DP 5x8RJ45-19"	19 40 53	97
	RJ45	48 x 8	DP 6x8RJ45-19"	19 40 63	97
	RJ45	8	CPS-F 230	32 50 08	46
INTERBUS-INLINE (I/O)	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08	83
INTERBUS-Loop	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34	86
Interbus INLINE Fernbus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
K-Bus	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
KBR-Energy bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
KNX-Bus	Screw terminals	4	MP 2x2 GDT ST	97 00 07	66
	Screw terminals	2	MP 1x2 GDT ST	97 00 10	66
	Screw terminals	2	MP RK GDT	97 10 03	80
	LSA	20	TelPro LSA-3EH230F1E-10kA	24 01 23	101
LON					
- TP/XF 78	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11	67
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18	68
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04	82

Interface / Signal	Connection	Protected lines	Protection device	Article-No.	Page
- TP/FTT10 und TP/LPT10	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08	83
- TP/FTT 10	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
LUXMATE-Bus	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
M-Bus	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08	83
MODBUS	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
MPI Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
N1 LAN	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
N2 Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
(Johnson Controls, LON, FTT 10)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Optocoupler Interface	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad-Pg ST	97 00 41	73
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad-Pg ST	97 00 48	74
	Screw terminals	2	MP RK GDT+24V-Ad-Ad-Pg	97 10 20	81
Procontic SC31	Screw terminals	2	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26	70
(RS 232)					
Procontic T200	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
(RS 422)					
PROFIBUS-DP/FMS	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
PROFIBUS-PA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13	83
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20	68
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06	82
	LSA	2	DP 1LSA-C24FS-PTC	24 00 66	107
PROFIBUS SIMATIC NET	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
PSM-EG-RS 422	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
PSM-EG-RS 485	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Rackbus (RS 485)	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
R-Bus	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11	67
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18	68
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04	82
RS 485	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
	LSA	2	DP 1LSA-C24FS-PTC	24 00 66	107
RS 422, V11	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
S-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
SafetyBUS p	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76

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Interface / Signal	Connection	Protected lines	Protection device	Article-No.	Page
SDLC	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
Securilan-LON-Bus	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11	67
(LONWORKS Technology	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18	68
standard bus based on Echelon)	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04	82
SIGMASYS	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15	68
(Siemens Fire alarm systems)	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22	69
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08	83
	Screw terminals	4	MP 2x2 GDT+48V-Ad-Pg ST	97 00 29	71
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Pg ST	97 00 36	72
	Screw terminals	2	MP RK GDT+48V-Ad-Pg	97 10 15	84
SINEC L1	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
SINEC L2	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50	76
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52	76
SS97 SIN/X (RS 232)	Screw terminals	4	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26	70
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Pg ST	97 00 33	71
	Screw terminals	2	MP RK GDT+12V-Ad-Pg	97 10 12	83
SUCONET	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11	67
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18	68
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04	82
Temperature measuring	Screw terminals	4	MP 2x2 GDT+5V-Ad-Pg ST	97 00 25	70
PT 100, PT 1000, Ni 1000, NTC, PTC	Screw terminals	2	MP 1x2 GDT+5V-Ad-Pg ST	97 00 32	71
	Screw terminals	2	MP RK GDT+5V-Ad-Pg	97 10 11	83
TTL	Screw terminals	4	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26	70
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Pg ST	97 00 33	71
	Screw terminals	2	MP RK GDT+12V-Ad-Pg	97 10 12	83
TTY 4 - 20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27	70
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Pg ST	97 00 34	86
	Screw terminals	2	MP RK GDT+24V-Ad-Pg	97 10 13	83
	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34	86

Test Categories for SPDs in Information Technology acc. to table 3 of DIN EN 61643-21/VDE 0845-3-1: 2002

Category	Test type	Impulse voltage	Impuls current	Minimum number of impulses	Test for
C1	fast rising edge	0,5 kV or 1 kV (1,2/50 µs)	0,25 kA or 0,5 kA (8/20 µs)	300	Surge arrester
C2		2 kV, 4 kV or 10kV (1,2/50 µs)	1 kA, 2 kA or 5 kA (8/20 µs)	10	
C3		≥ 1 kV, 1 kV/µs	10A, 25 A or 100 A (10/1000 µs)	300	
D1	high energy	≥ 1 kV	0,5 kA, 1 kA or 2,5 kA (10/350 µs)	2	Lightning current combined arrester

Part 21: Product standard for surge protection devices for application in telecommunication and signal processing net works - performance requirements and test procedures.
According to the product standard DIN EN 61643-21 (VDE 0845 part 3-1:03-2002) all surge protection devices have to be tested during type tests with predefined minimum pulses according to the voltage and current pulses defined in table 3.

In doing so, the SPDs are classified into test categories with respect to their specification.

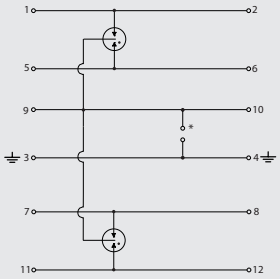
The category C represents disturbance pulses with steep rising edge and low energy level. The category D represents exposures to high energy levels, e.g. partial lightning currents.

Pluggable SPD with high discharge cappability

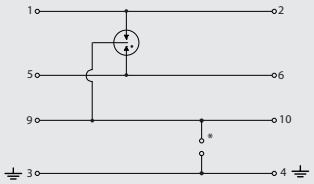
MP 2x2 GDT ST / MP 1x2 GDT ST

Fully pluggable two-parts lightning current discharge arrester for signal lines. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Protective circuit for 4 signal lines with common ground (MP2x2)
- Protective circuit for 2 signal lines without reference to ground potential (MP1x2)
- Test standard: IEC 61643-21 / EN 61643-21
- Applicable at the boundaries LPZ 0B - 1 and higher
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm



MP 2x2 GDT ST



MP 1x2 GDT ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines
MP1x2 1 Double line 2 Single lines

Technical Data		MP 2x2 GDT ST	MP 2x2 GDT ST-350	MP 1x2 GDT ST
Article-No.		97 00 07	97 00 08	97 00 10
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	180 V	350 V	180 V
Max. continous operating voltage (DC/AC)	Uc	180/120 V	350/255 V	180/120 V
Nominal current	IL	2 A	2 A	2 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-earth at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-line at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 100 MHz	typ. 100 MHz	typ. 100 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base)	for MP 2x2 GDT ST			for MP 1x2 GDT ST		
	MP Base 2x2	MP Base 2x2 GDT	MP Base 2x2 GND	MP Base 1x2	MP Base 1x2 GDT	MP Base 1x2 GND
Article-No.	97 00 03	97 00 04	97 00 92	97 00 97	97 00 98	97 00 94

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2 (1x2) is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2 (1x2) GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2 (1x2) GND is connected by a bridge to DIN rail (no galvanic insulation).

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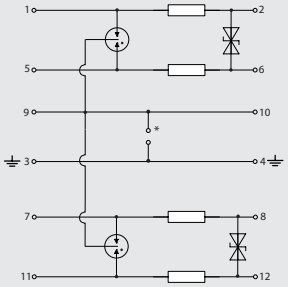
Pluggable SPD with high discharge cappability and low protection level

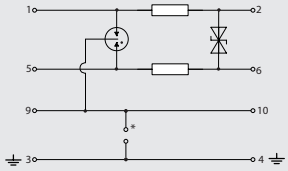
MP 2x2 GDT/Ad-Ad ST / MP 1x2 GDT/Ad-Ad ST

Fully pluggable two-parts lightning current discharge arrester for signal lines. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Protective circuit for 4 signal lines with common ground (MP2x2)
- Protective circuit for 2 signal lines without reference to ground potential (MP1x2)
- Test standard: IEC 61643-21 / EN 61643-21
- Applicable at the boundaries LPZ 0B - 1 and higher
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm



MP 2x2 GDT/Ad-Ad ST



MP 1x2 GDT/Ad-Ad ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines					
Technical Data		**MP 2x2 GDT+5V-Ad-Ad ST**	**MP 2x2 GDT+12V-Ad-Ad ST**	**MP 2x2 GDT+24V-Ad-Ad ST**	**MP 2x2 GDT+36V-Ad-Ad ST**
Article-No.		97 00 11	97 00 12	97 00 13	97 00 14
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 26 V	≤ 52 V	≤ 68 V
Protection level line-earth at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 2x2-R			
	MP Base 2x2-R	MP Base 2x2-R GDT	MP Base 2x2-R GND
Article-No.	97 00 00	97 00 01	97 00 91

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Dimension drawing, see pages 186 to 190

MP2x2 2 Double lines 4 Single lines



Technical Data		MP 2x2 GDT+48V-Ad-Ad ST	MP 2x2 GDT+60V-Ad-Ad ST	MP 2x2 GDT+170V-Ad-Ad ST
Article-No.		97 00 15	97 00 16	97 00 17
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 80 V	≤ 110 V	≤ 270 V
Protection level line-earth at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

MP1x2 1 Double line 2 Single lines




Technical Data		MP 1x2 GDT+5V-Ad-Ad ST	MP 1x2 GDT+12V-Ad-Ad ST	MP 1x2 GDT+24V-Ad-Ad ST	MP 1x2 GDT+36V-Ad-Ad ST
Article-No.		97 00 18	97 00 19	97 00 20	97 00 21
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 26 V	≤ 52 V	≤ 68 V
Protection level line-earth at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Dimension drawing, see pages 186 to 190

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MP1x2 1 Double line 2 Single lines



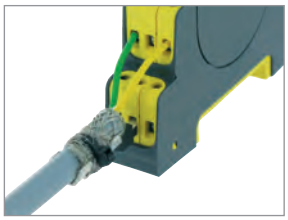
Technical Data		MP 1x2 GDT+48V-Ad-Ad ST 97 00 22	MP 1x2 GDT+60V-Ad-Ad ST 97 00 23	MP 1x2 GDT+170V-Ad-Ad ST 97 00 24
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 80 V	≤ 110 V	≤ 270 V
Protection level line-earth at limp D1	Up	≤ 550 V	≤ 550 V	≤ 550 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 1x2 GDT			
	MP Base 1x2-R	MP Base 1x2-R GDT	MP Base 1x2-R GND
Article-No.	97 00 95	97 00 96	97 00 93

Different base parts provide either direct or indirect earthing of the signal: The MP Base 1x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 1x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 1x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Accessorie MP and DataPro series	
	EMV-FKL
Article-No.	26 09 90

EMC spring terminal for protected and unprotected side of Leutron Data or DataPro series

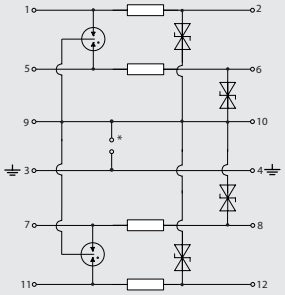
Dimension drawing, see pages 186 to 190

Pluggable SPD with high discharge cappability and low protection level

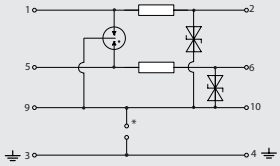
MP 2x2 GDT/Ad-Pg ST / MP 1x2 GDT/Ad-Pg ST

Fully pluggable two-parts lightning current discharge arrester for signal lines. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Protective circuit for 4 signal lines with common ground (MP2x2)
- Protective circuit for 2 signal lines without reference to ground potential (MP1x2)
- Test standard: IEC 61643-21 / EN 61643-21
- Applicable at the boundaries LPZ 0B-1 and higher
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm



MP 2x2 GDT/Ad-Pg ST



MP 1x2 GDT/Ad-Pg ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines




Technical Data		MP 2x2 GDT+5V-Ad-Pg ST	MP 2x2 GDT+12V-Ad-Pg ST	MP 2x2 GDT+24V-Ad-Pg ST	MP 2x2 GDT+36V-Ad-Pg ST
Article-No.		97 00 25	97 00 26	97 00 27	97 00 28
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 29 V	≤ 50 V	≤ 102 V	≤ 135 V
Protection level line-earth at limp D1	Up	≤ 27 V	≤ 37 V	≤ 66 V	≤ 85 V
Protection level line-line at 1 kV/µs C3	Up	≤ 20 V	≤ 38 V	≤ 90 V	≤ 116 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 2x2 GDT			
	MP Base 2x2-R	MP Base 2x2-R GDT	MP Base 2x2-R GND
Article-No.	97 00 00	97 00 01	97 00 91

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Dimension drawing, see pages 186 to 190

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MP2x2 2 Double lines 4 Single lines



Technical Data		MP 2x2 GDT+48V-Ad-Pg ST	MP 2x2 GDT+60V-Ad-Pg ST	MP 2x2 GDT+170V-Ad-Pg ST
Article-No.		97 00 29	97 00 30	97 00 31
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 160 V	≤ 220 V	≤ 520 V
Protection level line-earth at limp D1	Up	≤ 95 V	≤ 125 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 140 V	≤ 180 V	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

MP1x2 1 Double line 2 Single lines




Technical Data		MP 1x2 GDT+5V-Ad-Pg ST	MP 1x2 GDT+12V-Ad-Pg ST	MP 1x2 GDT+24V-Ad-Pg ST	MP 1x2 GDT+36V-Ad-Pg ST
Article-No.		97 00 32	97 00 33	97 00 34	97 00 35
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 29 V	≤ 50 V	≤ 102 V	≤ 135 V
Protection level line-earth at limp D1	Up	≤ 27 V	≤ 37 V	≤ 66 V	≤ 85 V
Protection level line-line at 1 kV/µs C3	Up	≤ 20 V	≤ 38 V	≤ 90 V	≤ 116 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Dimension drawing, see pages 186 to 190

MP1x2 1 Double line 2 Single lines



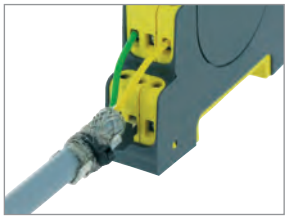
Technical Data		MP 1x2 GDT+48V-Ad-Pg ST	MP 1x2 GDT+60V-Ad-Pg ST	MP 1x2 GDT+170V-Ad-Pg ST
Article-No.		97 00 36	97 00 37	97 00 38
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 160 V	≤ 220 V	≤ 520 V
Protection level line-earth at limp D1	Up	≤ 95 V	≤ 125 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 140 V	≤ 180 V	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 1x2 GDT			
	MP Base 1x2-R	MP Base 1x2-R GDT	MP Base 1x2-R GND
Article-No.	97 00 95	97 00 96	97 00 93

Different base parts provide either direct or indirect earthing of the signal: The MP Base 1x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 1x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 1x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Accessorie MP and DataPro series	
	EMV-FKL
Article-No.	26 09 90

EMC spring terminal for protected and unprotected side of Leutron Data or DataPro series

Dimension drawing, see pages 186 to 190

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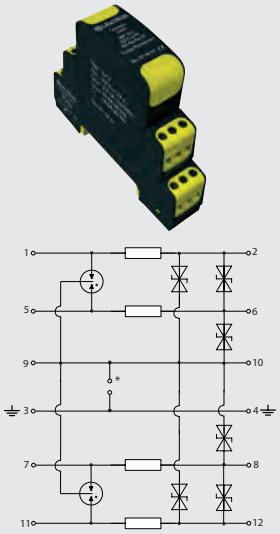
Pluggable SPD with high discharge cappability and low protection level

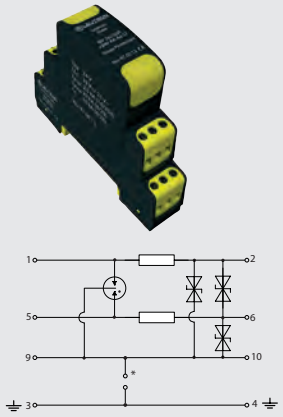
MP 2x2 GDT/Ad-Ad-Pg ST / MP 1x2 GDT/Ad-Ad-Pg ST

Fully pluggable two-parts lightning current discharge arrester for signal lines. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Protective circuit for 4 signal lines with common ground (MP2x2)
- Protective circuit for 2 signal lines without reference to ground potential (MP1x2)
- Test standard: IEC 61643-21 / EN 61643-21
- Applicable at the boundaries LPZ 0B-2 and higher.
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm



MP 2x2 GDT/Ad-Ad-Pg ST



MP 1x2 GDT/Ad-Ad-Pg ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines




Technical Data		MP 2x2 GDT+5V-Ad-Ad-Pg ST	MP 2x2 GDT+12V-Ad-Ad-Pg ST	MP 2x2 GDT+24V-Ad-Ad-Pg ST	MP 2x2 GDT+36V-Ad-Ad-Pg ST
Article-No.		97 00 39	97 00 40	97 00 41	97 00 42
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 26 V	≤ 52 V	≤ 68 V
Protection level line-earth at limp D1	Up	≤ 27 V	≤ 37 V	≤ 66 V	≤ 85 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 2x2 GDT			
	MP Base 2x2-R	MP Base 2x2-R GDT	MP Base 2x2-R GND
Article-No.	97 00 00	97 00 01	97 00 91

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Dimension drawing, see pages 186 to 190

MP2x2 2 Double lines 4 Single lines



Technical Data		MP 2x2 GDT+48V-Ad-Ad-Pg ST	MP 2x2 GDT+60V-Ad-Ad-Pg ST	MP 2x2 GDT+170V-Ad-Ad-Pg ST
Article-No.		97 00 43	97 00 44	97 00 45
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 80 V	≤ 110 V	≤ 270 V
Protection level line-earth at limp D1	Up	≤ 95 V	≤ 125 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

MP1x2 1 Double line 2 Single lines




Technical Data		MP 1x2 GDT+5V-Ad-Ad-Pg ST	MP 1x2 GDT+12V-Ad-Ad-Pg ST	MP 1x2 GDT+24V-Ad-Ad-Pg ST	MP 1x2 GDT+36V-Ad-Ad-Pg ST
Article-No.		97 00 46	97 00 47	97 00 48	97 00 49
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 26 V	≤ 52 V	≤ 68 V
Protection level line-earth at limp D1	Up	≤ 27 V	≤ 37 V	≤ 66 V	≤ 85 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Dimension drawing, see pages 186 to 190

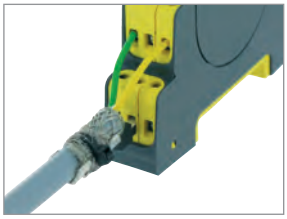
MP1x2 1 Double line 2 Single lines				
Technical Data		**MP 1x2 GDT+48V-Ad-Ad-Pg ST**	**MP 1x2 GDT+60V-Ad-Ad-Pg ST**	**MP 1x2 GDT+170V-Ad-Ad-Pg ST**
Article-No.		97 00 50	97 00 51	97 00 52
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 80 V	≤ 110 V	≤ 270 V
Protection level line-earth at limp D1	Up	≤ 95 V	≤ 125 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20

Accessories: Plug-in socket (Base) for MP 1x2 GDT			
	MP Base 1x2-R	MP Base 1x2-R GDT	MP Base 1x2-R GND
Article-No.	97 00 95	97 00 96	97 00 93

Different base parts provide either direct or indirect earthing of the signal: The MP Base 1x2-R is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 1x2-R GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 1x2-R GND is connected by a bridge to DIN rail (no galvanic insulation).

Accessorie MP and DataPro series	
	EMV-FKL
Article-No.	26 09 90

EMC spring terminal for protected and unprotected side of Leutron Data or DataPro series.



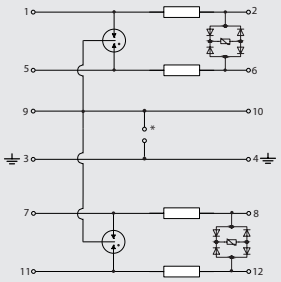
Dimension drawing, see pages 186 to 190

Pluggable SPD for high frequency MCR applications

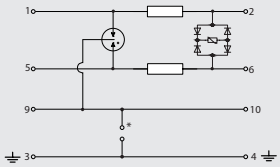
MP 2x2 HF ST / MP 1x2 HF ST

Fully pluggable two-parts combined surge arrester for signal lines for high frequency applications such as bus systems or video transmission. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Max. operating frequency: 70 MHz
- Nominal current: 0,5 A
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm
- Applicable at the boundaries LPZ 0B - 1 and higher



MP 2x2 HF ST



MP 1x2 HF ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines
MP1x2 1 Double line 2 Single lines




Technical Data		MP 2x2 5V-HF ST	MP 2x2 24V-HF ST	MP 1x2 5V-HF ST	MP 1x2 24V-HF ST
Article-No.		97 10 50	97 10 51	97 10 52	97 10 53
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	24 V	5 V	24 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	33/23 V	6/4 V	33/23 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 52 V	≤ 25 V	≤ 52 V
Protection level line-earth at limp D1	Up	≤ 350 V	≤ 350 V	≤ 350 V	≤ 350 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 45 V	≤ 10 V	≤ 45 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 450 V	≤ 450 V	≤ 450 V	≤ 450 V
Series resistance per line	Rs	1,5 Ω	1,5 Ω	1,5 Ω	1,5 Ω
Max. operating frequency (-3 dB)	fG	typ. 70 MHz	typ. 70 MHz	typ. 70 MHz	typ. 70 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Accessories: Bases	for MP 2x2-HF ST			for MP 1x2-HF ST		
	MP Base 2x2-R HF	MP Base 2x2-R GDT HF	MP Base 2x2-R GND HF	MP Base 1x2-R HF	MP Base 1x2-R GDT HF	MP Base 1x2-R GND HF
Article-No.	97 00 99	97 01 00	97 01 01	97 01 02	97 01 03	97 01 04

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2-R HF (1x2-R HF) is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2-R HF (1x2-R HF) GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2-R HF (1x2-R HF) GND is connected by a bridge to DIN rail (no galvanic insulation).

Dimension drawing, see pages 186 to 190

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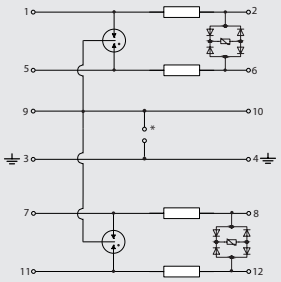
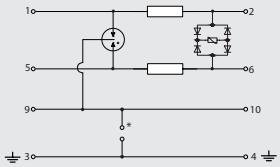
MP 2x2-170 HF ST / MP 1x2-170 HF ST

Fully pluggable two-parts combined surge arrester for signal lines for high frequency applications such as bus systems or video transmission. The protective module can be removed for test or maintenance purposes without changeing the line impedance and therefore influencing the signal level. The base part can remain in the instalation without manipulating or removing any wire.

- Max. operating frequency: 170 MHz
- Nominal current: 1 A
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting on 35 mm DIN rail
- Enclosure material: thermoplastic
- Space required for installation: 17.5 mm
- Applicable at the boundaries LPZ 0B - 1 and higher



MP 2x2-170 HF ST



MP 1x2-170 HF ST

Basic circuit diagram

MP2x2 2 Double lines 4 Single lines
MP1x2 1 Double line 2 Single lines




Technical Data		MP 2x2 5V-170-HF ST	MP 2x2 24V-170-HF ST	MP 1x2 5V-170-HF ST	MP 1x2 24V-170-HF ST
Article-No.		97 10 54	97 10 55	97 10 56	97 10 57
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	5 V	24 V	5 V	24 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	33/23 V	6/4 V	33/23 V
Nominal current	IL	1 A	1 A	1 A	1 A
D1 lightning impulse current (10/350) per wire	limp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA	10 kA	10 kA
Prorection level line-line at limp D1	Up	≤ 25 V	≤ 52 V	≤ 25 V	≤ 52 V
Protection level line-earth at limp D1	Up	≤ 350 V	≤ 350 V	≤ 350 V	≤ 350 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 45 V	≤ 10 V	≤ 45 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 450 V	≤ 450 V	≤ 450 V	≤ 450 V
Series resistance per line	Rs	1,5 Ω	1,5 Ω	1,5 Ω	1,5 Ω
Max. operating frequency (-3 dB)	fG	typ. 170 MHz	typ. 170 MHz	typ. 170 MHz	typ. 170 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Accessories: Bases	for MP 2x2-170 HF ST			for MP 1x2-170 HF ST		
	MP Base 2x2-R HF	MP Base 2x2-R GDT HF	MP Base 2x2-R GND HF	MP Base 1x2-R HF	MP Base 1x2-R GDT HF	MP Base 1x2-R GND HF
Article-No.	97 00 99	97 01 00	97 01 01	97 01 02	97 01 03	97 01 04

Different base parts provide either direct or indirect earthing of the signal: The MP Base 2x2-R HF (1x2-R HF) is not connected to 9/10 of DIN rail linked (galvanic insulation). The MP Base 2x2-R HF (1x2-R HF) GDT has a gas discharge tube linked between the connectors 9/10 and the DIN rail and earth connector. Therefore a galvanic insulation between the signal line and the earth connection (PE) can be reached. The MP Base 2x2-R HF (1x2-R HF) GND is connected by a bridge to DIN rail (no galvanic insulation).

Dimension drawing, see pages 186 to 190

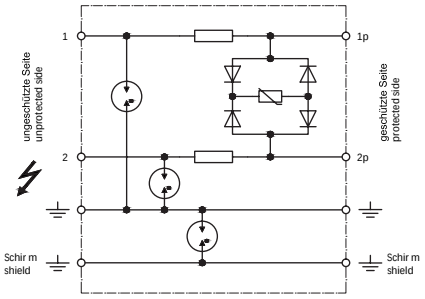
One-piece SPD for MCR applications for high frequency

DataPro2x1-SDSL-Tr

Surge voltage arrester with a two-step circuit to protect two single wires in data and signal lines. The arrester is especially designed for 24 V SPS input lines. It is suited for high-frequency and very fast data transmission. The arrester is applicable at the LPZ transition point 0B-2 and higher. Alternatively, direct and indirect earthing is possible.

- High performance surge protector
- Lightning impulse current 5 kA (10/350 µs)
- Transfer rate 100 Mbit/s
- Max. nominal current 500 mA
- fG > 300 MHz

Basic circuit diagram



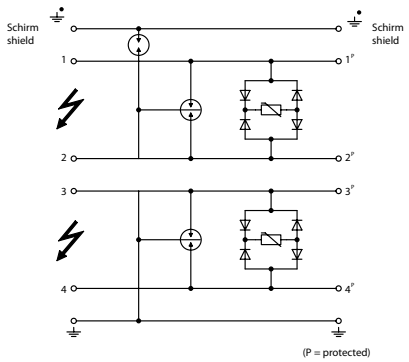
Technical Data		 DataPro 2x1-SDSL-Tr	 DataPro 2x1-24V-SDSL-Tr
Article-No.		24 00 18	24 00 24
Nominal voltage DC	UN	6 V=	24 V=
Nominal current	IL	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	20 kA	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA	10 kA
Protection level 1p-2p;1p,2p-PE (1kV/µs)	Up	≤ 0,6 kV	≤ 0,6 kV
Signal tranismission rate		100 Mbit/s	100 Mbit/s
Max. operating frequency (-3 dB)	fG	300 MHz	300 MHz
Operating temperature range	TU	- 25 - + 85 °C	- 25 - + 85 °C
Series resistance		0 Ω	0 Ω
Series inductance, typ.	L	0 µH	0 µH
Response time	tA	≤ 1 ns	≤ 1 ns
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Degree of protection (IEC EN 60529)		IP 20	IP 20
Housing size W x H x D		17,5 x 87(90) x 58 mm	17,5 x 87(90) x 58 mm
Terminals		2,5 mm²	2,5 mm²
Mounting on		35 mm DIN DIN rail	35 mm DIN DIN rail

DataPro 4x1-SDSL-Tr

Surge voltage arrester with a two-step circuit to protect two pairs of wires or four single wires with signal common. High-resistance shield grounding via shield terminal possible.

- High performance surge protector
- Signal tranismission rate 100 Mbit/s
- Max. nominal current 500 mA
- For fast dataline signals
- fG > 300 MHz

Basic circuit diagram



Technical Data		 DataPro 4x1-SDSL-Tr
Article-No.		24 00 20
Nominal voltage DC	UN	6 V=
Nominal current	IL	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	20 kA
C2 nominal discharge current (8/20 µs) per line	In	10 kA
Protection level 1p-2p;1p,2p-PE (1kV/µs)	Up	≤ 0,6 kV
Signal tranismission rate		100 Mbit/s
Max. operating frequency (-3 dB)	fG	300 MHz
Series resistance		0 Ω
Series inductance, typ.	L	0 µH
Response time	tA	≤ 1 ns
Terminals		2,5 mm²
Mounting on		35 mm DIN rail,

Dimension drawing, see pages 186 to 190

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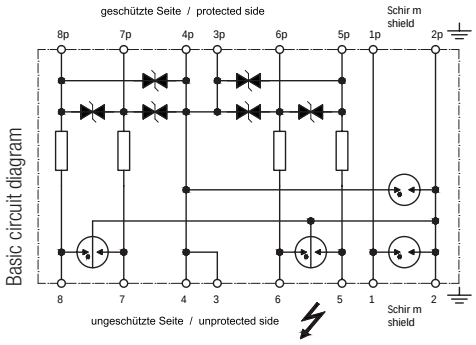
DataPro-RS 485-Tr

SPD for RS 485 interface.

- Mounting on DIN rail 35 mm (DIN EN 50 022)



Technical Data		DP-RS 485-Tr
Article-No.		27 04 85
Nominal voltage DC	UN	5 V=
Max. continuous operating voltage DC	Uc	6 V=
Leakage current at Umax DC	IL	≤ 5 µA
Max. allowed operating current		0,5 mA
Max. operating frequency (-3 dB)	fG	1000 kHz
Capacitance, line-earth	C	≤ 3 nF
DC resistance	R	1,8 Ω
Series inductance, typ.	L	10 µH
Protection level wire-wire	Up	≤ 8,5 V
Protection level (line-earth)		≤ 600 V
Response time	tA	≤ 1 ns
Nominal discharge current (8/20)	In	20 kA
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve
Operating temperature range	TU	-25 - +85 °C
Enclosure material / colour		polycarbonate UL 94-V0/yellow
Casting compound		Polyurethan soft

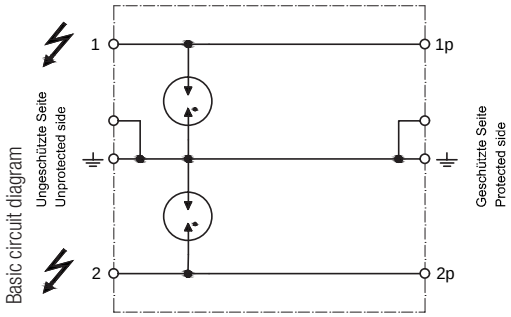
Dimension drawing, see pages 186 to 190

One-piece SPD with high discharge cappability

IsoProData-Tr

One-piece lightning current discharge arrester for signal lines with a discharge capabillity for use the at the building entry.

- Protection of one double or two single lines
- Applicable at the boundaries LPZ 0A - 1 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Space required for installation: 17.5 mm
- Mounting on 35 mm DIN rail
- Degree of protection according to IEC EN 60529: IP 20

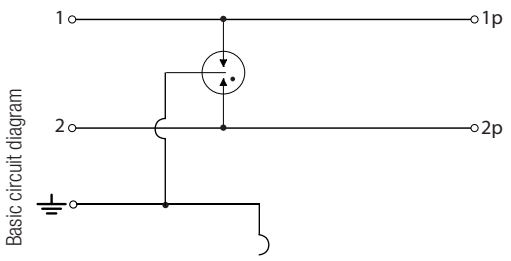


Technical Data		IsoProData-Tr
Article-No.		27 30 02
IEC category/EN type		D1 / C2 / C1 / C3
Nominal voltage DC	UN	150 V=
Max. continuous operating voltage DC	Uc	170 V=
Max. continous operating voltage AC	Uc	120 V~
Nominal current	IL	1,5 A
Leakage current at Uc DC	IL	≤ 0.001 µA
Response time	tA	≤ 50 ns
C2 Nominal impulse discharge current (8/20)	In	20 kA
D1 Lightning impulse current (10/350) total	Itotal	10 kA
D1 lightning impulse current (10/350) per wire	limp	5 kA
Protection level, residual voltage line-earth at In resp. 1 kV/µs	Up	≤ 800 V
Capacitance, line-earth	C	< 0.005 nF
Insulation resistance	Risol	>10 GΩ
Operating temperature range	TU	-40 - +80 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve
Installation dimensions (W × H × D)		17,5 x 87 x 58 mm
Enclosure material / colour		Polycarbonate UL 94-V0/yellow

MP RK GDT

Terminal blocks with integrated surge protection can optimize the used space in a control cabinet and at the same time provide high level protection for terminal equipment and devices.

- Protection of one double or two single lines
- Applicable at the boundaries LPZ 0B - 1 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting on 35 mm DIN rail
- Space required for installation: 6,2 mm
- Earthing via DIN rail or connector



Technical Data		MP RK GDT
Article-No.		97 10 03
IEC category/EN type		C2 / C1 / C3
Nominal voltage	UN	180 V
Max. continous operating voltage (DC/AC)	Uc	180/120 V
Nominal current	IL	2,0 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA
Protection level line-line at In C2	Up	≤ 500 V
Protection level line-earth at In C2	Up	≤ 500 V
Protection level line-line at 1 kV/µs C3	Up	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V
Series resistance per line	Rs	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 100 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C
Inflammability class according to UL 94		V0
Degree of protection (IEC EN 60529)		IP 20
Enclosure material / colour		PA6 / yellow

Dimension drawing, see pages 186 to 190

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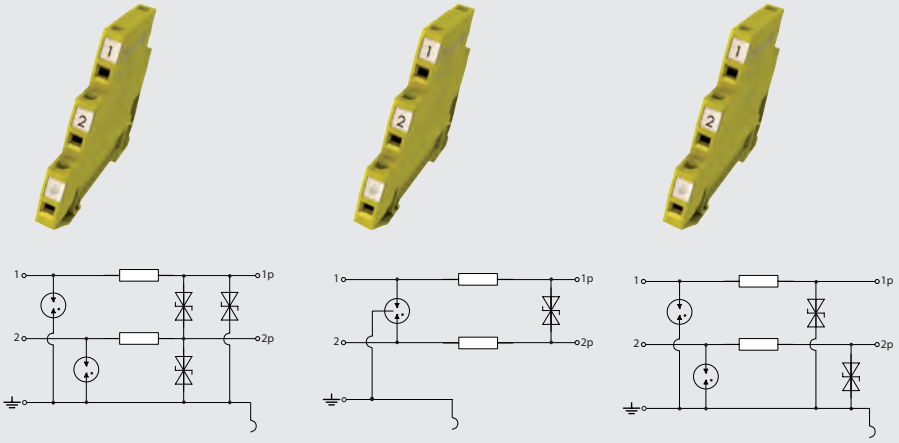
One-piece SPD with high discharge cappability and low protection level

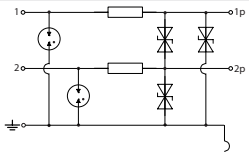
MP RK GDT/Ad-Ad-Pg / MP RK GDT/Ad-Ad / MP RK GDT/Ad-Pg

Terminal blocks with integrated surge protection can optimize the used space in a control cabinet and at the same time provide high level protection for terminal equipment and devices.

- Protective circuit for 2 signal lines with common ground (Ad-Ad-Pg)
- Protective circuit for 2 signal lines without reference to ground potential (Ad-Ad)
- Applicable at the boundaries LPZ 0B - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting on 35 mm DIN rail
- Space required for installation: 6,2 mm
- Earthing via DIN rail or connector

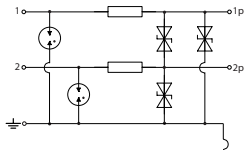


MP RK GDT/Ad-Ad-Pg **MP RK GDT/Ad-Ad** **MP RK GDT/Ad-Pg**

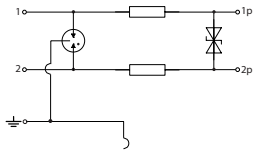


Technical Data		MP RK GDT+5V-Ad-Ad-Pg	MP RK GDT+12V-Ad-Ad-Pg	MP RK GDT+24V-Ad-Ad-Pg	MP RK GDT+36V-Ad-Ad-Pg
Article-No.		97 10 18	97 10 19	97 10 20	97 10 21
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3	C2 / C1 / C3	C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 13 V	≤ 25 V	≤ 59 V	≤ 75 V
Protection level line-earth at In C2	Up	≤ 13 V	≤ 25 V	≤ 59 V	≤ 75 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow

Dimension drawing, see pages 186 to 190



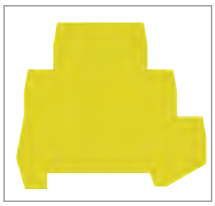
Technical Data		MP RK GDT+48V-Ad-Ad-Pg	MP RK GDT+60V-Ad-Ad-Pg	MP RK GDT+170V-Ad-Ad-Pg
Article-No.		97 10 22	97 10 23	97 10 24
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3	C2 / C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 90 V	≤ 120 V	≤ 320 V
Protection level line-earth at In C2	Up	≤ 90 V	≤ 120 V	≤ 320 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow



Technical Data		MP RK GDT+5V-Ad-Ad	MP RK GDT+12V-Ad-Ad	MP RK GDT+24V-Ad-Ad	MP RK GDT+36V-Ad-Ad
Article-No.		97 10 04	97 10 05	97 10 06	97 10 07
IEC category/EN type		C2 / C1 / C3	C1 / C2 / C3	C2 / C1 / C3	C2 / C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 13 V	≤ 25 V	≤ 59 V	≤ 75 V
Protection level line-earth at In C2	Up	≤ 500 V	≤ 500 V	≤ 500 V	≤ 500 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow

Accessories MP terminal block	
	MP RK-AB
Article-No.	97 10 02

Cover block terminal of MP series



Dimension drawing, see pages 186 to 190

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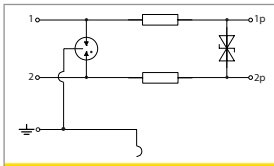
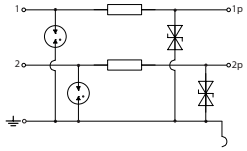
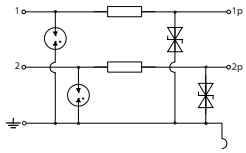


Technical Data		MP RK GDT+48V-Ad-Ad	MP RK GDT+60V-Ad-Ad	MP RK GDT+170V-Ad-Ad
Article-No.		97 10 08	97 10 09	97 10 10
IEC category/EN type		C2 / C1 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 90 V	≤ 120 V	≤ 320 V
Protection level line-earth at In C2	Up	≤ 500 V	≤ 500 V	≤ 500 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 500 V	≤ 500 V	≤ 500 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow



Technical Data		MP RK GDT+5V-Ad-Pg	MP RK GDT+12V-Ad-Pg	MP RK GDT+24V-Ad-Pg	MP RK GDT+36V-Ad-Pg
Article-No.		97 10 11	97 10 12	97 10 13	97 10 14
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C2 / C1 / C3	C1 / C2 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	0,5 A	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 26 V	≤ 50 V	≤ 118 V	≤ 150 V
Protection level line-earth at In C2	Up	≤ 13 V	≤ 25 V	≤ 59 V	≤ 75 V
Protection level line-line at 1 kV/µs C3	Up	≤ 20 V	≤ 38 V	≤ 90 V	≤ 116 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 1 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow

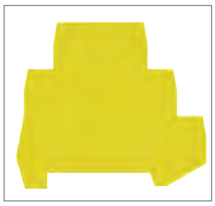
Dimension drawing, see pages 186 to 190



Technical Data		MP RK GDT+48V-Ad-Pg	MP RK GDT+60V-Ad-Pg	MP RK GDT+170V-Ad-Pg
Article-No.		97 10 15	97 10 16	97 10 17
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	0,5 A	0,5 A	0,5 A
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA	10 kA
C2 nominal discharge current (8/20 µs) per line	In	5 kA	5 kA	5 kA
Protection level line-line at In C2	Up	≤ 180 V	≤ 240 V	≤ 600 V
Protection level line-earth at In C2	Up	≤ 90 V	≤ 120 V	≤ 320 V
Protection level line-line at 1 kV/µs C3	Up	≤ 140 V	≤ 180 V	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	2,2 Ω	2,2 Ω	2,2 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow

Accessories MP terminal block	
	MP RK-AB
Article-No.	97 10 02

Cover block terminal of MP series



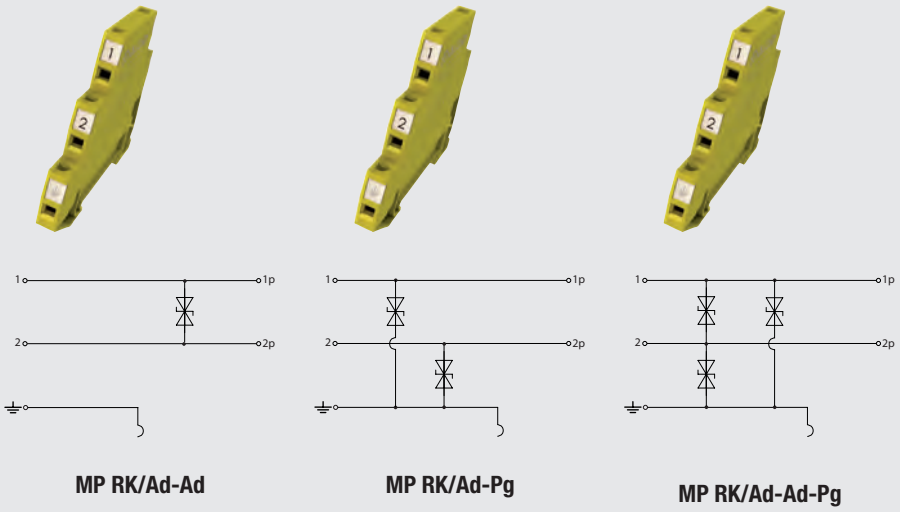
Dimension drawing, see pages 186 to 190

One-piece SPD with low protection level for MCR applications

MP RK/Ad-Ad / MP RK/Ad-Pg / MP RK/Ad-Ad-Pg

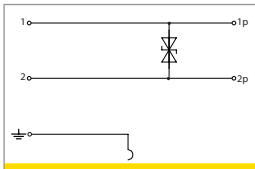
Terminal blocks with integrated surge protection can optimize the used space in a control cabinet and at the same time provide high level protection for terminal equipment and devices.

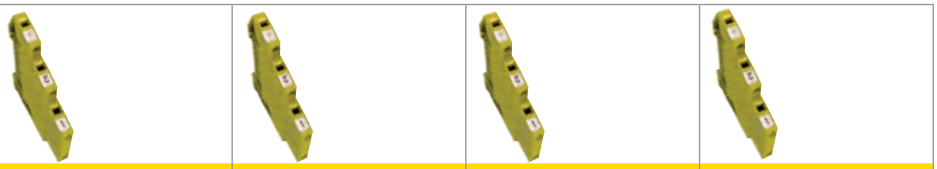
- Protective circuit for 2 signal lines without reference to ground potential (line-line)
- Protective circuit for 2 signal lines with common ground (line-earth)
- Applicable at the boundaries LPZ 1 - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting on 35 mm DIN rail
- Space required for installation: 6,2 mm
- Earthing via DIN rail or connector



MP RK/Ad-Ad **MP RK/Ad-Pg** **MP RK/Ad-Ad-Pg**

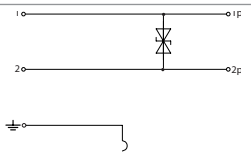
Basic circuit diagram





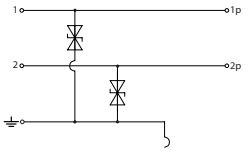
Technical Data		MP RK 5V-Ad-Ad	MP RK 12V-Ad-Ad	MP RK 24V-Ad-Ad	MP RK 36V-Ad-Ad
Article-No.		97 10 25	97 10 26	97 10 27	97 10 28
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	2,0 A	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,8 kA	0,8 kA	0,6 kA	0,4 kA
C1 Nominal discharge current (8/20) per wire	In	0,4 kA	0,4 kA	0,3 kA	0,2 kA
Protection level line-line at In C1	Up	≤ 13 V	≤ 25 V	≤ 48 V	≤ 70 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow
Installation width		6,2 mm	6,2 mm	6,2 mm	6,2 mm
Mounting on		35 mm DIN rail (EN 60715)	35 mm DIN rail (EN 60715)	35 mm DIN rail (EN 60715)	35 mm DIN rail (EN 60715)

Dimension drawing, see pages 186 to 190





Technical Data		MP RK 48V-Ad-Ad	MP RK 60V-Ad-Ad	MP RK 170V-Ad-Ad
Article-No.		97 10 29	97 10 30	97 10 31
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,3 kA	0,24 kA	0,2 kA
C1 Nominal discharge current (8/20) per wire	In	0,15 kA	0,12 kA	0,1 kA
Protection level line-line at In C1	Up	≤ 90 V	≤ 110 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow
Installation width		6,2 mm	6,2 mm	6,2 mm
Mounting on		35 mm DIN rail (EN 60715)	35 mm DIN rail (EN 60715)	35 mm DIN rail (EN 60715)






Technical Data		MP RK 5V-Ad-Pg	MP RK 12V-Ad-Pg	MP RK 24V-Ad-Pg	MP RK 36V-Ad-Pg
Article-No.		97 10 32	97 10 33	97 10 34	97 10 35
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	2,0 A	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,8 kA	0,8 kA	0,6 kA	0,4 kA
C1 Nominal discharge current (8/20) per wire	In	0,4 kA	0,4 kA	0,3 kA	0,2 kA
Protection level line-line at In C1	Up	≤ 26 V	≤ 50 V	≤ 96 V	≤ 140 V
Protection level line-earth at In C1	Up	≤ 13 V	≤ 25 V	≤ 48 V	≤ 70 V
Protection level line-line at 1 kV/µs C3	Up	≤ 20 V	≤ 38 V	≤ 90 V	≤ 116 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow

Accessories MP terminal block	
	MP RK-AB
Article-No.	97 10 02

Cover block terminal of MP series

Dimension drawing, see pages 186 to 190

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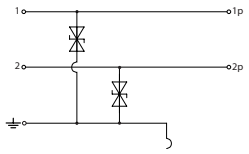
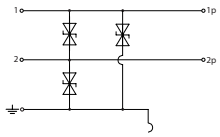
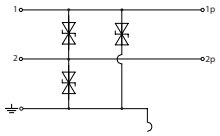


Technical Data		MP RK 48V-Ad-Pg	MP RK 60V-Ad-Pg	MP RK 170V-Ad-Pg
Article-No.		97 10 36	97 10 37	97 10 38
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,3 kA	0,24 kA	0,2 kA
C1 Nominal discharge current (8/20) per wire	In	0,15 kA	0,12 kA	0,1 kA
Protection level line-line at In C1	Up	≤ 180 V	≤ 220 V	≤ 600 V
Protection level line-earth at In C1	Up	≤ 90 V	≤ 110 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 140 V	≤ 180 V	≤ 500 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow



Technical Data		MP RK 5V-Ad-Ad-Pg	MP RK 12V-Ad-Ad-Pg	MP RK 24V-Ad-Ad-Pg	MP RK 36V-Ad-Ad-Pg
Article-No.		97 10 39	97 10 40	97 10 41	97 10 42
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	5 V	12 V	24 V	36 V
Max. continous operating voltage (DC/AC)	Uc	6/4 V	15/11 V	33/23 V	45/32 V
Nominal current	IL	2,0 A	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,8 kA	0,8 kA	0,6 kA	0,4 kA
C1 Nominal discharge current (8/20) per wire	In	0,4 kA	0,4 kA	0,3 kA	0,2 kA
Protection level line-line at In C1	Up	≤ 13 V	≤ 25 V	≤ 48 V	≤ 70 V
Protection level line-earth at In C1	Up	≤ 13 V	≤ 25 V	≤ 48 V	≤ 70 V
Protection level line-line at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 10 V	≤ 19 V	≤ 45 V	≤ 58 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 1,0 MHz	typ. 3,0 MHz	typ. 6,0 MHz	typ. 8,0 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow	PA6 / yellow

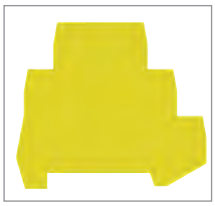
Dimension drawing, see pages 186 to 190



Technical Data		MP RK 48V-Ad-Ad-Pg	MP RK 60V-Ad-Ad-Pg	MP RK 170V-Ad-Ad-Pg
Article-No.		97 10 43	97 10 44	97 10 45
IEC category/EN type		C1 / C3	C1 / C3	C1 / C3
Nominal voltage	UN	48 V	60 V	170 V
Max. continous operating voltage (DC/AC)	Uc	54/38 V	70/49 V	170/120 V
Nominal current	IL	2,0 A	2,0 A	2,0 A
C1 Nominal discharge current (8/20) total	In	0,3 kA	0,24 kA	0,2 kA
C1 Nominal discharge current (8/20) per wire	In	0,15 kA	0,12 kA	0,1 kA
Protection level line-line at In C1	Up	≤ 90 V	≤ 110 V	≤ 300 V
Protection level line-earth at In C1	Up	≤ 90 V	≤ 110 V	≤ 300 V
Protection level line-line at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Protection level line-earth at 1 kV/µs C3	Up	≤ 70 V	≤ 90 V	≤ 250 V
Series resistance per line	Rs	0 Ω	0 Ω	0 Ω
Max. operating frequency (-3 dB)	fG	typ. 10 MHz	typ. 12 MHz	typ. 25 MHz
Conductor cross section (solid/stranded/AWG)		0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12	0.2-4.0/0.2-2.5 mm² / 24-12
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Inflammability class according to UL 94		V0	V0	V0
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Enclosure material / colour		PA6 / yellow	PA6 / yellow	PA6 / yellow

Accessories MP terminal block	
	MP RK-AB
Article-No.	97 10 02

Cover block terminal of MP series



Dimension drawing, see pages 186 to 190

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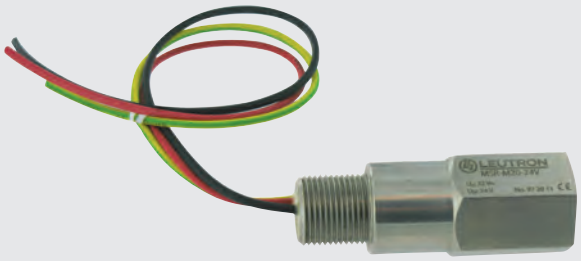
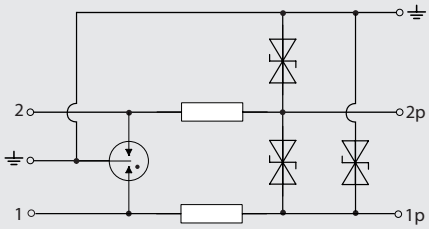
MSR-M20

The protection device is a unique unit providing a level of protection for field-mounted transmitters that is far in excess of the optional transient protection facilities available from the transmitter manufactors - without involving any additional wiring, conduit modifications or other expensive extras.



Basic circuit diagram

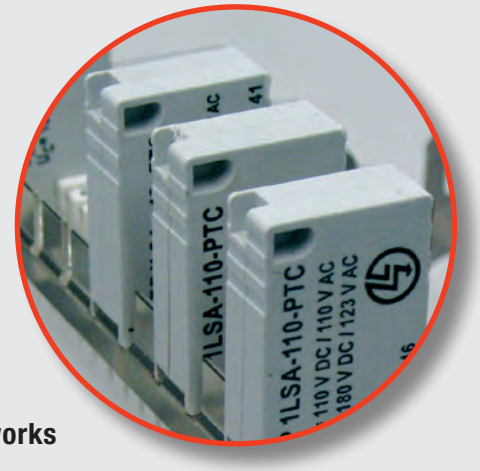


- Applicable at the LPZ transition point 0B-2 and higher
- Easy mounting directly
- Highest protection level with inline installation
- Low impedance series connection avoids signal degradation of the loop
- Intrinsically safe and flameproof
- Test standard: IEC 61643-21 / EN 61643-21
- Earthing via metal housing

			
Technical Data		**MSR-M20-24V**	**MSR-M20-24V-Fine**
Article-No.		97 20 11	97 20 12
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Nominal voltage	UN	24 V	24 V
Max. continuous operating voltage DC	Uc	32 V=	32 V=
Nominal current	IL	1,5 A	1,5 A
D1 lightning impulse current (10/350) per wire	limp	1,0 kA	1,0 kA
C2 nominal discharge current (8/20 µs) total	Imax	10 kA	10 kA
Protection level line-line at In C2	Up	-	≤ 65 V
Protection level line-earth at In C2	Up	-	≤ 65 V
Series resistance per line	Rs	0,5 Ω	0,5 Ω
Capacitance wire-wire	C	≤ 400 pF	≤ 400 pF
Capacitance line-earth	C	≤ 20 pF	≤ 20 pF
Max. operating frequency Ad-Ad	fG	14 MHz	14 MHz
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Terminal input/output		screw/line 1,5 mm²	screw/line 1,5 mm²
Conductor cross section single wire		0,08-2,5 mm²	0,08-2,5 mm²
Conductor cross section fine stranded		0,08-1,5 mm²	0,08-1,5 mm²
Length of connecting line		200 mm	200 mm

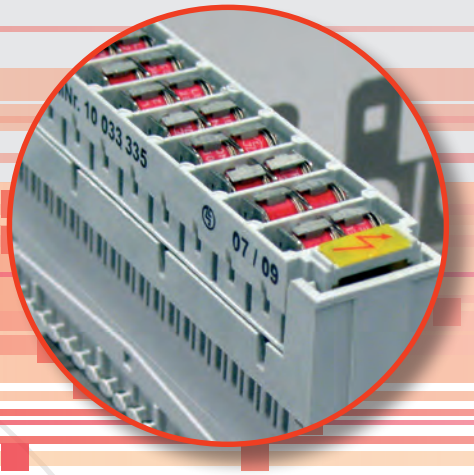
Dimension drawing, see pages 186 to 190

COMPREHENSIVE PROTECTION OF ALL COMMUNICATION NETWORKS



For an unobstructed data transmission it is vital to protect the communication networks against surge voltages. Leutron's products reliably protect server rooms, workstations, IT and telephone installations against surge voltages – protection concepts for large-scale as well as for small installations are offered.

Leutron offers an optimum protection for the communication networks of its clients.



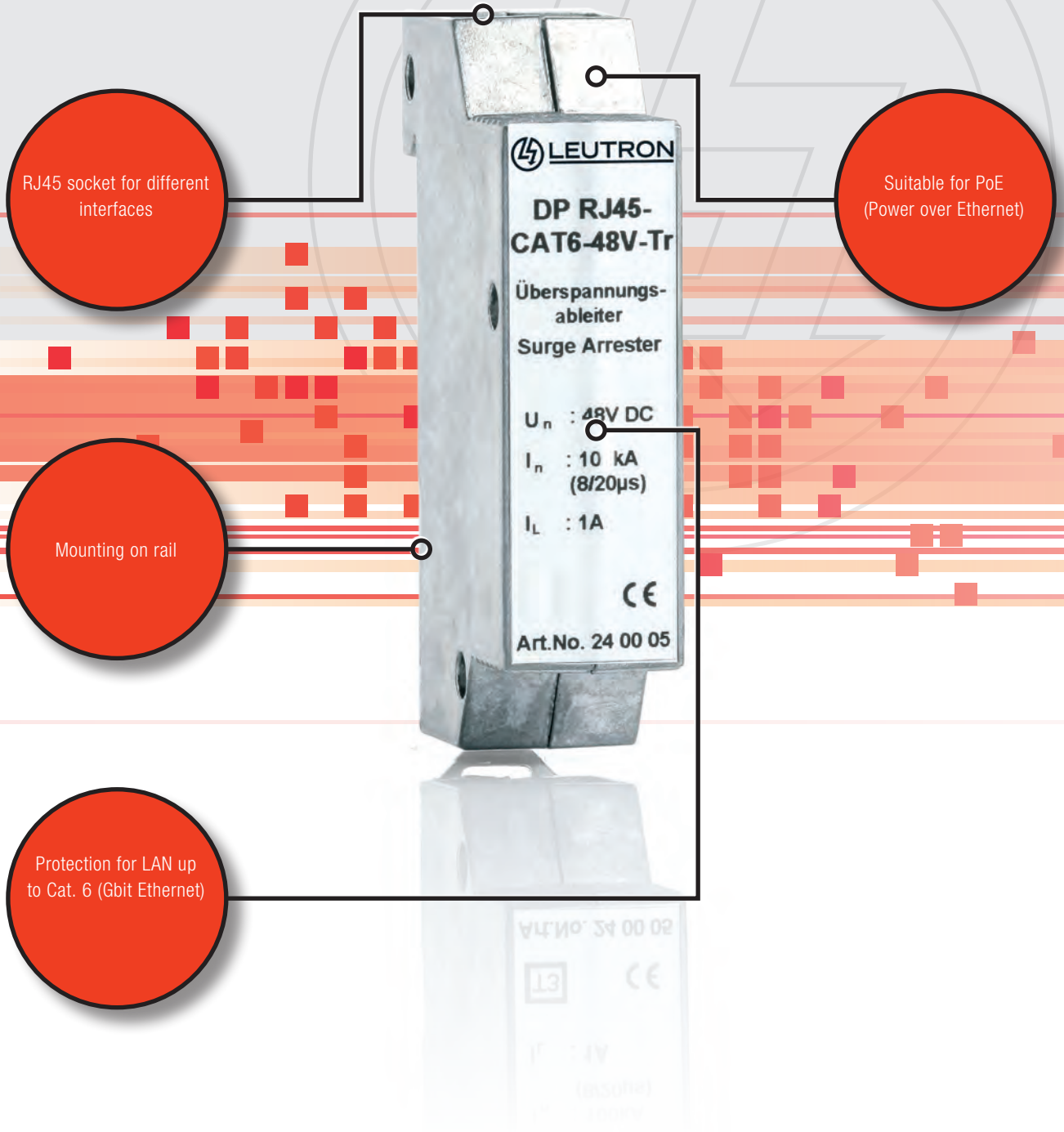
ENHANCED AVAILABILITY IN COMPLEX COMMUNICATION ENVIRONMENTS:

- All-purpose protection devices for all communication networks due to different interfaces and various bandwidths (up to 10 G Ethernet)
- The overvoltage is limited to non-hazardous values with protection levels adapted to the protection-needing equipment
- Plug-and-play units for IT installations improve the operational availability

Well-proven protection of telecommunication installations – scalable in size and layout

SURGE PROTECTION
FOR INFORMATION TECHNOLOGY AND TELECOMMUNICATION INSTALLATIONS

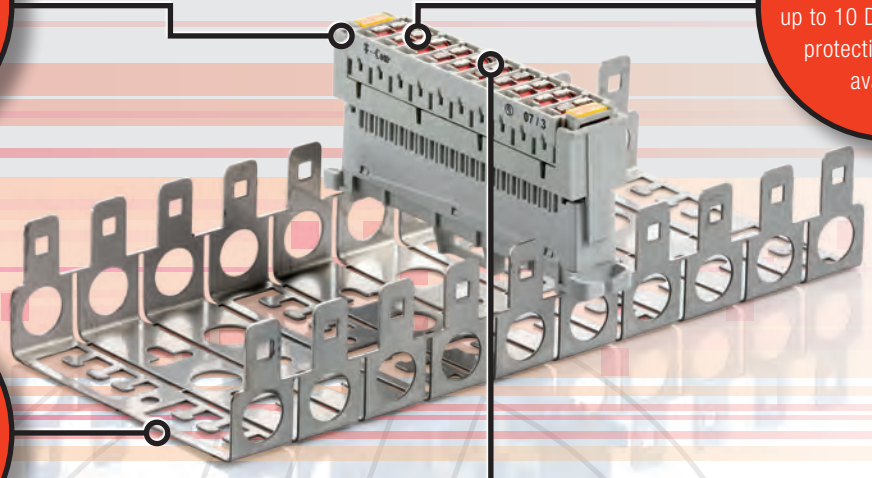
PROTECTION OF DATA NETWORKS, E.G. ETHERNET AND LAN



SSCT (LSA) MOUNTING TECHNOLOGY

Approval for use in Telekom installations

Arrester magazines with GDT (gas discharge tubes) up to 10 DA or with fine protection terminal available



Cascadable on backmount frames for widespread communication installations, e.g. telecommunication distributors

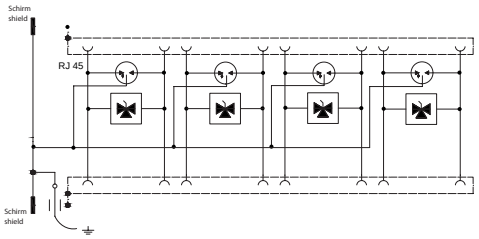
2-pole gas-filled surge arrester (GDT) with fail-safe characteristic

DataPro RJ45-CAT6

Compact surge protective module for the protection of data networks, and network devices such as hubs, switches, server and desktop computer. The adaptor plug style provides an easy application in cable ducts or directly at the terminal equipment.

- Suitable for Cat. 6 / class E applications (up to Gbit Ethernet)
- Applicable at the boundaries LPZ 0B - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- All 8 signal lines (4 pair of wires) are protected simultaneously.
- RJ45 SPD for PoE (Power over Ethernet)
- Mounting on 35 mm DIN rail

Basic circuit diagram



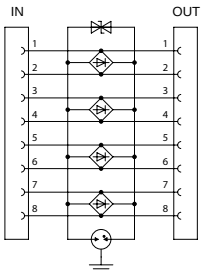
Technical Data		DP RJ45-CAT6-48V-Tr
Article-No.		24 00 05
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	48 V=
Max. continuous operating voltage DC	Uc	48 V
Operating current		1.000 mA
C2 nominal discharge current line-line	In	0,15 kA
C2 nominal discharge current (8/20 µs) total	In	10 kA
Protection level at In (line-line)	Up	150 V
Protection level at In (line-earth)	Up	550 V
Max. frequency	fG	250 MHz
Response time	tA	1 ns
Terminal input/output		RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20
Housing material		Metall

DataPro-RJ45-48V-Tr

Compact surge protective module for the protection of data networks, and network devices such as hubs, switches, server and desktop computer. The adaptor plug style provides an easy application in cable ducts or directly at the terminal equipment.

- Suitable for Cat. 5 / class E applications (up to Gbit Ethernet)
- Applicable at the boundaries LPZ 1 - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- All 8 signal lines (4 pair of wires) are protected simultaneously.
- RJ45 SPD for PoE (Power over Ethernet)
- Mounting on 35 mm DIN rail

Basic circuit diagram



Technical Data		DP RJ45-48V-Tr
Article-No.		23 90 00
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	48 V=
Nominal voltage DC	Uc	57 V
Protection level at In (8/20)	Up	≤ 600 V
Protection level at 1 kV/µs	Up	≤ 550 V
Max. frequency	fG	100 MHz
Terminal input/output		RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20
Operating temperature range		-40 - +80°C

Dimension drawing, see pages 186 to 190

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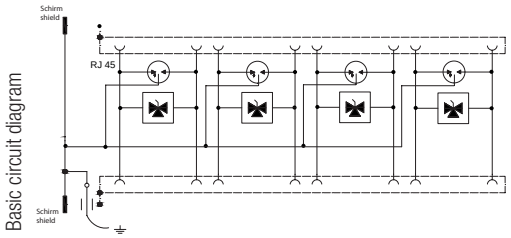
DataPro-1xRJ45-PoE-Alu

Compact surge protective module for the protection of data networks, and network devices such as hubs, switches, server and desktop computer. The adaptor plug style provides an easy application in cable ducts or directly at the terminal equipment.

- Suitable for Cat. 5 / class E applications (up to Gbit Ethernet)
- Applicable at the boundaries LPZ 0B - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Compatible to 10Base T / 100Base T
- RJ45 SPD for PoE (Power over Ethernet)
- All 8 signal lines (4 pair of wires) are protected simultaneously.



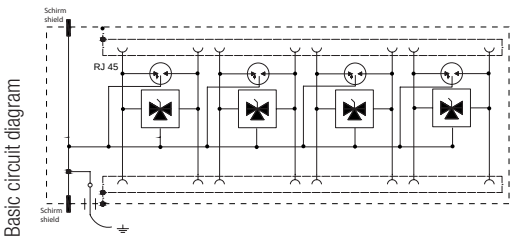
Basic circuit diagram

Technical Data		DP 1xRJ45-PoE-Alu
Article-No.		24 00 21
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	48 V=
Max. continuous operating voltage DC	Uc	60 V
Operating current		650 mA
Nominal discharge current (8/20 µs) line-line	In	0,5 kA
Nominal discharge current (8/20) line-earth	In	2,0 kA
Protection level line-line at 1 kV/µs C3	Up	≤ 180 V
Protection level line-Pg at 1 kV/µs C3	Up	≤ 600 V
Max. frequency	fG	≤ 100 MHz
Terminal input/output		RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20
Housing material		Metall

DataPro RJ45 (f/f)

Compact surge protective module for the protection of data networks, and network devices such as hubs, switches, server and desktop computer. The adaptor plug style provides an easy application in cable ducts or directly at the terminal equipment.

- Suitable for Cat. 5 / class E applications (up to Gbit Ethernet)
- Applicable at the boundaries LPZ 0B - 2 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Compatible to 10Base T / 100Base T
- All 8 signal lines (4 pair of wires) are protected simultaneously.



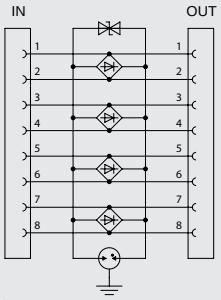
Basic circuit diagram

Technical Data		DP RJ45 f/f
Article-No.		24 00 11
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	6 V=
Max. continuous operating voltage DC	Uc	8 V=
C2 Nominal discharge current (8/20)	In	2,5 kA
Protection level at In (8/20)	Up	35 V
Max. frequency	fG	100 MHz
Operating temperature range	TU	-40 - +80 °C
Terminal input/output		RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20
Housing material		Metall

Dimension drawing, see pages 186 to 190

DataPro x8RJ45-19“

Compact surge protective module in 19“ housing with only 1 HE (45 mm) for the protection of data networks and network devices such as hubs, switches, server and desktop computer. Easy installation and wiring in all 19“ distribution and server racks possible.



Basic circuit diagram

- Applicable at the boundaries LPZ 1 - 2 and higher
- Fully shielded 19“ housing can be equipped with up to 48 RJ45 protection ports.
- Suitable for Cat. 5 / class D applications (up to Gbit Ethernet)
- Compatible to 10Base T / 100Base T
- Test standard: IEC 61643-21 / EN 61643-21
- Additional modules for the protection of up to 48 ports can be installed optionally
- All 8 signal lines (4 pair of wires) are protected simultaneously.

					
Technical Data		**DP 1x8RJ45-19“**	**DP 2x8RJ45-19“**	**DP 3x8RJ45-19“**	**DP 4x8RJ45-19“**
Article-No.		19 40 13	19 40 23	19 40 33	19 40 43
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3	C2 / C1 / C3	C2 / C1 / C3
Nominal voltage DC	UN	6 V=	6 V=	6 V=	6 V=
Max. continuous operating voltage DC	Uc	8,1 V=	8,1 V=	8,1 V=	8,1 V
Nominal current per line		100 mA	100 mA	100 mA	100 mA
C1 nominal discharge current (8/20µs) per line	In	200 A	200 A	200 A	200 A
C2 Total discharge current (8/20) line-earth (PE)	Imax	2,5 kA	2,5 kA	2,5 kA	2,5 kA
C1 protection level line-line at In	Up	≤ 45 V	≤ 45 V	≤ 45 V	≤ 45 V
C1 protection level line-PE at In	Up	≤ 350 V	≤ 350 V	≤ 350 V	≤ 350 V
C3 protection level line-line at 1kV/µs	Up	≤ 40 V	≤ 40 V	≤ 40 V	≤ 40 V
C3 protection level line-PE at 1kV/µs	Up	≤ 350 V	≤ 350 V	≤ 350 V	≤ 350 V
Response time Line-Line/Line-shield	tA	< 1 ns	< 1 ns	< 1 ns	< 1 ns
Response time Line-PE / PE-shield	tA	< 100 ns	< 100 ns	< 100 ns	< 100 ns
Max. frequency	fG	100 MHz	100 MHz	100 MHz	100 MHz
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Terminal input/output		8 x RJ 45, shielded	16 x RJ 45, shielded	24 x RJ 45, shielded	32 x RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20
Housing material		stainless steel	stainless steel	stainless steel	stainless steel

Dimension drawing, see pages 186 to 190

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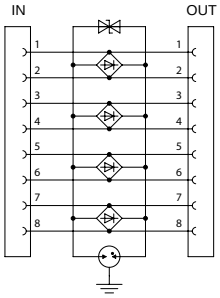
Technical Data		**DP 5x8RJ45-19“**	**DP 6x8RJ45-19“**
Article-No.		19 40 53	19 40 63
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3
Nominal voltage DC	UN	6 V=	6 V=
Max. permissible rated direct voltage	Uc	8,1 V	8,1 V
Nominal current per line		100 mA	100 mA
C1 nominal discharge current (8/20µs) per line	In	200 A	200 A
C2 Total discharge current (8/20) line-earth (PE)	Imax	2,5 kA	2,5 kA
C1 protection level line-line at In	Up	≤ 45 V	≤ 45 V
C1 protection level line-PE at In	Up	≤ 350 V	≤ 350 V
C3 protection level line-line at 1kV/µs	Up	≤ 40 V	≤ 40 V
C3 protection level line-PE at 1kV/µs	Up	≤ 350 V	≤ 350 V
Response time Line-Line/Line-shield	tA	< 1 ns	< 1 ns
Response time Line-PE / PE-shield	tA	< 100 ns	< 100 ns
Max. frequency	fG	100 MHz	100 MHz
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Terminal input/output		40 x RJ 45, shielded	48 x RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20	IP 20
Housing material		stainless steel	stainless steel

DataPro-8xRJ45-6V-WG

Compact surge protective module in a wall housing for the protection of data networks and network devices such as hubs, switches, server and desktop computer.

- Applicable at the boundaries LPZ 1 - 2 and higher
- RJ45 wall housing for eight ports
- Suitable for Cat. 5 / class D applications (up to Gbit Ethernet)
- Compatible to 10Base T / 100Base T
- Test standard: IEC 61643-21 / EN 61643-21
- All 8 signal lines (4 pair of wires) are protected simultaneously.

Basic circuit diagram



			
Technical Data		**DP 8xRJ45-6V-WG**	**DP-8xRJ45-6x6V/2x48V-WG**
Article-No.		19 40 50	19 40 51
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3
Nominal voltage DC	UN	6 V=	6 x 6 / 2 x 48 V=
Max. continuous operating voltage DC	Uc	8,1 V=	8,1 V=
Nominal current per line	In	100 mA	100 mA
C1 nominal discharge current (8/20µs) per line	In	200 A	200 A
C2 Total discharge current (8/20) line-PE	Imax	2,5 kA	2,5 kA
C1 protection level line-line at In	Up	≤ 45 V	≤ 76 V
C1 protection level line-PE at In	Up	≤ 350 V	≤ 243 V
C3 protection level line-line at 1kV/µs	Up	≤ 40 V	≤ 146 V
C3 protection level line-PE at 1kV/µs	Up	≤ 350 V	≤ 243 V
Response time Line-Line/Line-shield	tA	≤ 1 ns	≤ 1 ns
Response time Line-PE / PE-shield	tA	< 100 ns	< 100 ns
Max. frequency	fG	100 MHz	100 MHz
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Terminal input/output		8 x RJ 45, shielded	8 x RJ 45, shielded
Degree of protection (IEC EN 60529)		IP 20	IP 20
Housing material		stainless steel	stainless steel

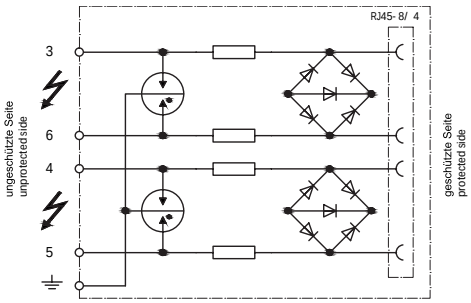
Dimension drawing, see pages 186 to 190

DataPro-ISDN-aP

Overvoltage protection for RJ45 for ISDN S0 interface.

- For ISDN interfaces
- Applicable at the boundaries LPZ 0B - 2 and higher
- RJ45 socket
- 2-stage, (5-point) coarse and fine protective circuit
- Without coding
- Test standard: IEC 61643-21 / EN 61643-21

Basic circuit diagram



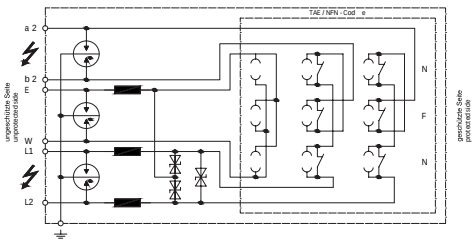
Technical Data		DataPro ISDN-aP
Article-No.		24 00 13
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	50 V=
Max. continuous operating voltage DC	Uc	± 6,2 V=
Nominal current	IN	1,5 A
C2 nominal discharge current (8/20)	In	5 kA
Protection level at In (line-line)	Up	≤ 36 V
Protection level at In (line-earth)	Up	≤ 460 V
Response time	tA	≤ 500/≤ 100 ns
Insertion loss in a 100 Ω system, typical		0.1 dB up to 10 MHz
Max. frequency (-3 dB)	fG	80 MHz
Capacitance/1 MHz, typ.	C	≤ 25/ ≤ 15 pF
Operating temperature range	TU	-40 - +80 °C
Type of connection		screw-type terminals / RJ45
Degree of protection (IEC EN 60529)		IP 20

DataPro-TAE/NFN-aP

Surge protective device in a housing for surface mounting for the protection of analog telecommunication wires such as analog TAE or DSL interfaces.

- For analog telephone lines
- Fax, modem, answering machine
- Emergency dialling devices
- Applicable at the boundaries LPZ 0B - 2 and higher
- TAE connector, code NFN
- Standard of the Deutsche Telekom
- Test standard: IEC 61643-21 / EN 61643-21
- 2-stage, (5-point) coarse and fine protective circuit

Basic circuit diagram



Technical Data		DataPro-TAE/NFN-aP
Article-No.		24 00 04
IEC category/EN type		C2 / C1 / C3
Nominal voltage DC	UN	60 V=
Max. continuous operating voltage DC	Uc	185 V=
Nominal current	IN	1,5 A
C2 nominal discharge current (8/20 µs) total	In	5 kA
Protection level at In (line-line)	Up	≤ 300 V
Protection level at In (line-earth)	Up	≤ 450 V
Response time (Line-Line)/(Line-Earth)	tA	≤ 10 / ≤ 50 ns
Max. frequency (3 dB)	fG	1,5 MHz
Resistance per path	R	1 Ω
Operating temperature range	TU	-40 - +80 °C
Type of connection		Screw-type terminal/TAE
Degree of protection (IEC EN 60529)		IP 20

Dimension drawing, see pages 186 to 190

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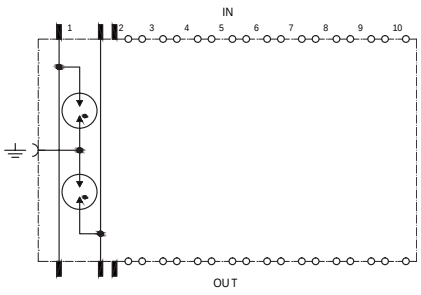
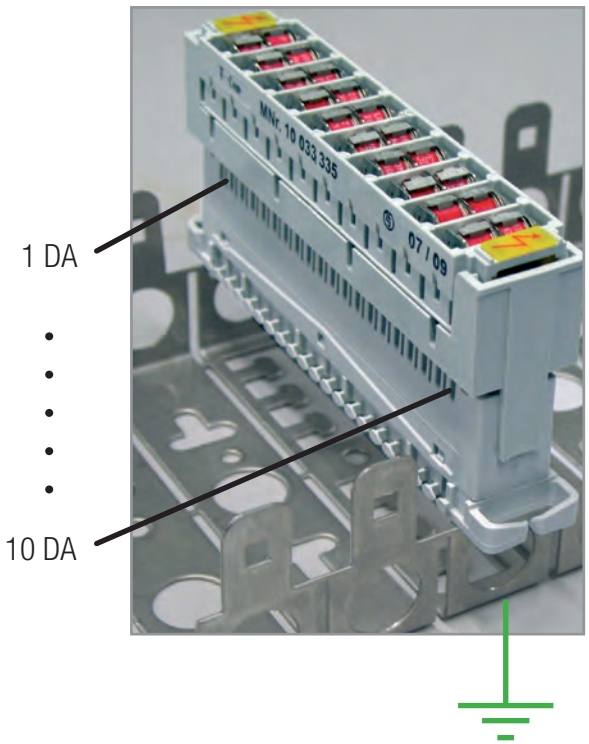
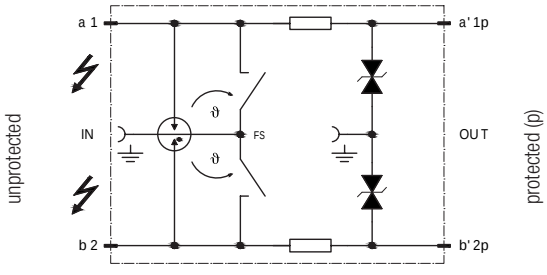
- LSA surge voltage magazines with 10 or 20 gas-filled surge arresters (coarse protection)
- Applicable at the LPZ transition point 0A-1 and higher, depending on type
- The magazines can be connected to both the connection and the disconnection module

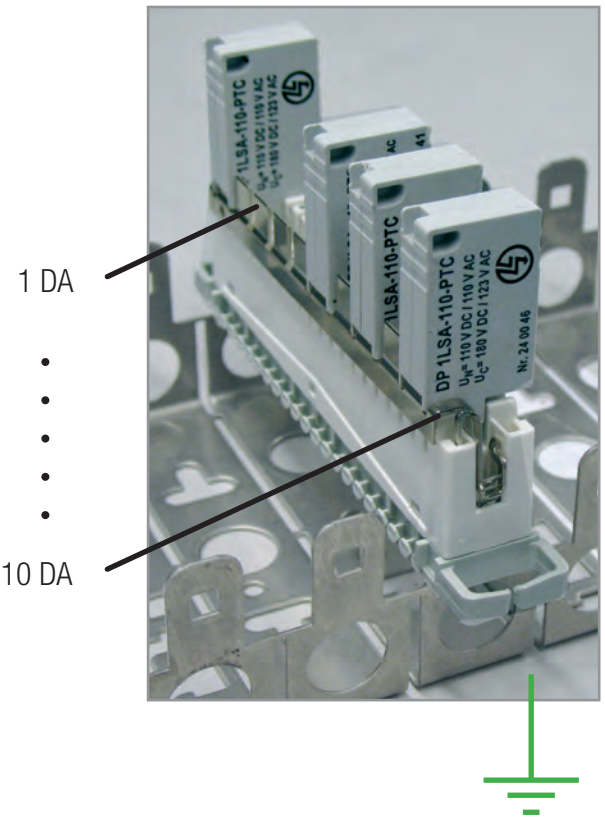




- Surge voltage protection connector (coarse and fine protection) DP 1LSA or DP 10LSA to equip the LSA disconnection module (white) of the construction form 2
- Applicable at the LPZ transition point 0A-1 and higher, depending on type
- The surge voltage protection connectors are only pluggable to the disconnection module
- Earthing by a grounding bar, which is connected to the backmount frame via the disconnection module.



example: DP 1LSA-12

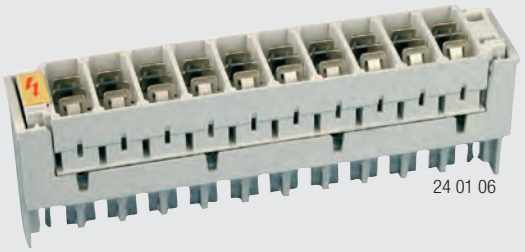


Dimension drawing, see pages 186 to 190

SPD according to test category D1+C2

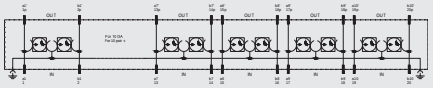
TelPro LSA 2/10-2E 8x6

LSA surge voltage protection for two-electrode arresters (8x6 mm) for LSA (IDC) connection and disconnection modules.

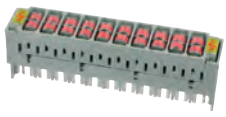
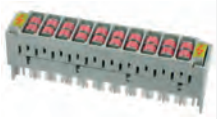
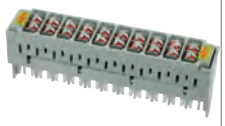

24 01 06

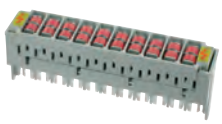

24 01 13

Basic circuit diagram



- Empty and filled magazines
- Magazines are fitted with 20 gas-filled surge arresters (GDT) each
- Integrated fail-safe function (24 01 14)

					
Technical Data		**TelPro LSA 2/10-2E 8x6**	**TelPro LSA-2EH90-10kA**	**TelPro LSA-2EH230-10kA**	**TelPro LSA-2EH230F-10kA**
Article-No.		24 01 06	24 01 17	24 01 13	24 01 14
Nominal DC sparkover voltage	UagN	- V=	90 V=	230 V=	230 V=
Impulse sparkover voltage at 1 kV/µs	Uas	- V	< 550 V	< 650 V	< 650 V
Nominal alternating discharge current	Iwn	- A	10 A	10 A	10 A
D1 lightning impulse current (10/350)	Iimp	- kA	2,5 kA	2,5 kA	2,5 kA
C2 Nominal discharge current (8/20)	In	- kA	10 kA	10 kA	10 kA
C3 protection level line-PE at 1kV/µs	Up	- V	≤ 550 V	≤ 650 V	≤ 650 V
Capacitance, line-earth	C	- nF	≤ 1,5 at 1MHz nF	≤ 1,5 pF at 1MHz nF	≤ 1,5 pF at 1MHz nF
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C

			
Technical Data		**TelPro LSA-2EL230-20kA**	**TelPro LSA-2EH350-10kA**
Article-No.		24 01 15	24 01 16
Nominal DC sparkover voltage	UagN	230 V=	350 V=
Impulse sparkover voltage at 1 kV/µs	Uas	< 550 V	< 800 V
Nominal alternating discharge current	Iwn	20 A	20 A
D1 lightning impulse current (10/350)	Iimp	5 kA	2,5 kA
C2 Nominal discharge current (8/20)	In	20 kA	10 kA
C3 protection level line-PE at 1kV/µs	Up	≤ 550 V	≤ 800 V
Capacitance, line-earth	C	≤ 1,5 pF at 1MHz nF	≤ 1,5 at 1MHz nF
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C

Dimension drawing, see pages 186 to 190

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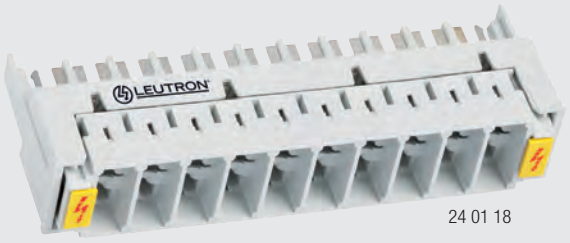
SPD according to test category D1+C2

TelPro LSA 2/10-3E 8x13

LSA surge voltage protection for three-electrode arresters (8x13 mm or 8x10 mm) for LSA (IDC) connection and disconnection modules.



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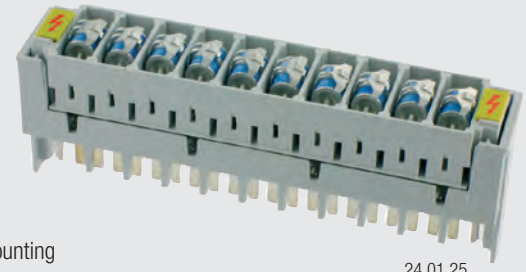
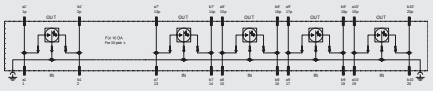
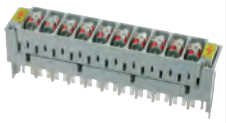
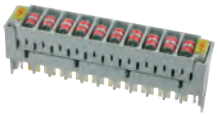
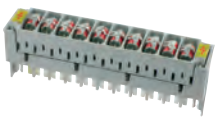

24 01 25

Basic circuit diagram



- Surge protective devices for LSA mounting
- Magazines are fitted with 10 gas-filled surge arrester (GDT) each
- Integrated fail-safe function (24 01 23, 24 01 25, 24 01 27)
- Operating temperature range: -40 - +80 °C

					
Technical Data		**TelPro LSA 2/10-3E 8x13**	**TelPro LSA-3EH90E-10kA**	**TelPro LSA-3EH90F1E-10kA**	**TelPro LSA 2/10-3EH230E-10kA**
Article-No.		24 01 18	24 01 26	24 01 27	24 01 19
Nominal DC sparkover voltage	UagN	- V=	90 V=	90 V=	230 V=
Impulse sparkover voltage at 1 kV/µs	Uas	- V	< 550 V	< 550 V	< 650 V
Nominal alternating discharge current	Iwn	- A	10 A	10 A	10 A
D1 lightning impulse current (10/350) gesamt	Itotal	- kA	5 kA	5 kA	5 kA
D1 lightning impulse current (10/350 µs) per line	Iimp	- kA	2,5 kA	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs) total	In	- kA	10 kA	10 kA	10 kA
C2 Nominal discharge current (8/20) per line	In	- kA	5 kA	5 kA	5 kA
C3 protection level line-line at 1kV/µs	Up	- V	≤ 450 V	≤ 500 V	≤ 500 V
C3 protection level line-PE at 1kV/µs	Up	- V	≤ 450 V	≤ 500 V	≤ 500 V
Capacitance, line-earth	C	- nF	≤ 1,5 at 1MHz nF	≤ 1,5pF at 1MHz nF	≤ 1,5 at 1MHz nF

				
Technical Data		**TelPro LSA-3EH230F1E-10kA**	**TelPro LSA-3EL230E-20kA**	**TelPro LSA-3EL230F1E-20kA**
Article-No.		24 01 23	24 01 24	24 01 25
Nominal DC sparkover voltage	UagN	230 V=	230 V=	230 V=
Impulse sparkover voltage at 1 kV/µs	Uas	< 650 V	< 550 V	< 550 V
Nominal alternating discharge current	Iwn	10 A	20 A	20 A
D1 lightning impulse current (10/350)	Itotal	5 kA	10 kA	10 kA
D1 lightning impulse current (10/350) per line	Iimp	2,5 kA	5 kA	5 kA
C2 nominal discharge current (8/20) total	In	10 kA	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	5 kA	10 kA	10 kA
C3 protection level line-line at 1kV/µs	Up	≤ 500 V	≤ 500 V	≤ 500 V
C3 protection level line-PE at 1kV/µs	Up	≤ 500 V	≤ 500 V	≤ 500 V
Capacitance, line-earth	C	≤ 1,5 at 1MHz nF	≤ 1,5 at 1MHz nF	≤ 1,5 at 1MHz nF

Dimension drawing, see pages 186 to 190

Magazine for HVT 71

MTH and MTL series

The surge protection magazines of series MTH and MTL are fitted with high quality gas discharge tubes. The are avaibable in variations of 90 V ac and 230 V ac executions.
They are designed specially for HVT 71 application of Siemens main distribution in telecom and datat line systems.
The integrated fail-safe behaviour protects agaist dangerous ac influences.

- impulse current resistance 10/ 20 kA per line
- Stable functioning
- Magazines are fitted with 10 gas-filled surge arrester (GDT) each
- Long service life
- For 5 double lines

				without fig.
Technical Data	**MTH 90**	**MTH 230**	**MTL 90**	**MTL 230**
Article-No.	95 15 00	95 15 01	95 15 02	95 15 03
Nominal DC sparkover voltage at 100 V/s UagN	90 V DC	230 V DC	90 V DC	230 V DC
Toleranze of VsdcN	± 20%	± 20%	± 20%	± 20%
Impulse sparkover voltage, typ. value at 100 V/µs Uas	< 450 V DC	< 500 V DC	< 450 V DC	< 500 V DC
Impulse sparkover voltage, typ. value at 1 kV/µs Uas	< 550 V DC	< 650 V DC	< 550 V DC	< 650 V DC
Nominal impulse discharge current (8/20)GDT/magazine In	10 / 5 kA	10 / 5 kA	20 / 5 kA	20 / 5 kA
Max. impulse discharge current (8/20) GDT/magazine Imax	12 / 7,5 kA	12 / 7,5 kA	25 / 7,5 kA	25 / 7,5 kA
Alternating discharge current 9 cycles, 50Hz GDT Iw	65 A	65 A	100 A	100 A
Nominal alternating discharge current IwN	5 A	5 A	5 A	5 A
Glow voltage (average at 10 mA) Ugl	~ 60 V	~ 60 V	~ 60 V	~ 60 V
Arc - voltage at 1 A Ubo	~ 15 V	~ 15 V	~ 15 V	~ 15 V
Max. Operating current magazine	2 A	2 A	2 A	2 A
Insulation resistance GDT/magazine Ris	> 10 A	> 10 A	> 10 A	> 10 A
Capacitance at 1 MHz GDT C	< 1,5 GΩ	< 1,5 GΩ	< 1,5 GΩ	< 1,5 GΩ
Climatic category / Relative humidity (DIN IEC 60068-1)	40/90/21, 10%...95% rh			
Operating temperature range TU	-40 - +90 °C	-40 - +90 °C	-40 - +90 °C	-40 - +90 °C
Net weight / pc	ca. 45 g	ca. 45 g	ca. 45 g	ca. 45 g
Dimensions (L x W x H)	ca. 95,8 mm x 48,6 mm x 9 mm			
Material magazine	up to 160°C solid plastic (PBF Crastin), increased with glass fiber			
Fitted GDT:	10x 2EH 90	10x 2EH 230	10x 2EL 90	10x 2EL 230

Dimension drawing, see pages 186 to 190

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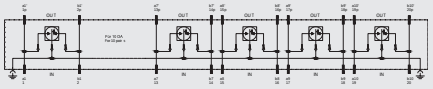
SPD according to test category D1+C2

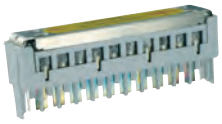
TelPro LSA 2/10-2E 8x20

LSA surge voltage protection for two-electrode arresters (8x20 mm) for LSA (IDC) connection and disconnection modules.

Basic circuit diagram



- Surge protective devices for LSA mounting
- Magazine sind mit je 20 ÜsAg bestückt
- Integrated fail-safe function

			without fig.	without fig.	
Technical Data		**TelPro LSA 2/10-2E 8x20**	**TelPro LSA-2EY90-20kA**	**TelPro LSA 2EY230-20kA**	**TelPro LSA-2EY350-20kA**
Article-No.		24 01 28	24 01 31	24 01 29	24 01 32
Nominal DC sparkover voltage	UagN	- V=	90 V=	230 V=	350 V=
Impulse sparkover voltage at 1 kV/µs	Uas	- V	< 550 V	< 550 V	< 700 V
Nominal alternating discharge current	Iwn	- A	20 A	20 A	20 A
D1 lightning impulse current (10/350 µs)	Iimp	- kA	5 kA	5 kA	5 kA
C2 Nominal discharge current (8/20)	In	- kA	20 kA	20 kA	20 kA
C3 protection level line-PE at 1kV/µs	Up	- V	≤ 550 V	≤ 550 V	≤ 700 V
Capacitance, line-earth	C	- nF	≤ 1,5 at 1MHz nF	≤ 1,5 at 1MHz nF	≤ 1,5 at 1MHz nF
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C

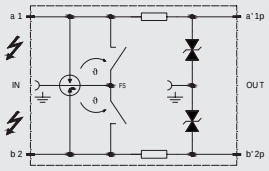
Dimension drawing, see pages 186 to 190

SPD according to test category C2+C1

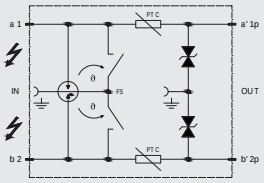
DataPro 1LSA / DataPro 1LSA-PTC / DataPro 1LSA-T110FS-PTC

Surge voltage and surge current protection for communication and data transmission lines. Protection connector (1DA) with surge current protection via PTC thermistors, for analogue, ISDN and ADSL lines. Integrated coarse and fine protection and fail-safe contact.

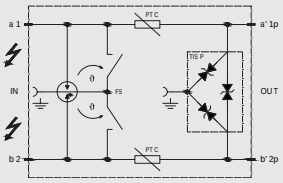
- Execution of various voltage
- PTC-execution: Surge current protection via PTC thermistors
- PTC-execution: Suitable for DC and AC application
- Two-step, coarse and fine protection
- Fail-safe thermal overload protection
- Grounding via connector or LSA backmount frame



DataPro 1LSA

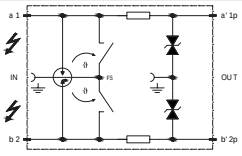


DataPro 1LSA-PTC



DataPro 1LSA-T110FS-PTC

Basic circuit diagram



Technical Data		DP 1LSA-5	DP 1LSA-12	DP 1LSA-15	DP 1LSA-24
Article-No.		24 00 31	24 00 32	24 00 33	24 00 34
Nominal voltage DC	UN	5 V=	12 V=	15 V=	24 V=
Max. continuous operating voltage DC	Uc	6 V=	14 V=	19 V=	29 V=
Nominal alternating voltage	UN	3 V~	8 V~	12 V~	15 V~
Max. continous operating voltage AC	Uc	4 V~	10 V~	12 V~	20 V~
Nom. Operating current at 25° C		150 mA	150 mA	150 mA	100 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-PG)	Up	≤ 15 V	≤ 28 V	≤ 40 V	≤ 60 V
Residual voltage at 1 kV/µs (line-PG)	Ures	≤ 12 V	≤ 22 V	≤ 31 V	≤ 46 V
Response time	tA	≤ 1 ns	≤ 1 ns	≤ 1 ns	≤ 1 ns
Capacitance, line-earth	C	≤ 4,5 nF	≤ 2,5 nF	≤ 2 nF	≤ 1,4 nF
Series impedance per line at 25°C	R	10 Ω	15 Ω	22 Ω	27 Ω
Max. transmission frequency	fg	1,6 MHz	2,4 MHz	3,1 MHz	4,2 MHz
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		Thermoplastic (POCAN) UL 94 V0, grey			

Dimension drawing, see pages 186 to 190

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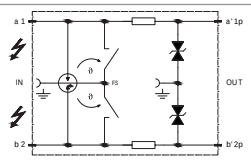
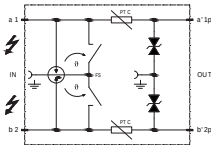


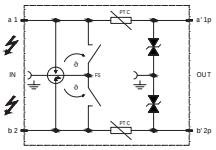
Technical Data		DP 1LSA-30	DP 1LSA-48	DP 1LSA-60	DP 1LSA-110
Article-No.		24 00 36	24 00 37	24 00 38	24 00 39
Nominal voltage DC	UN	30 V=	48 V=	60 V=	110 V=
Max. continuous operating voltage DC	Uc	33 V=	80 V=	100 V=	180 V=
Nominal alternating voltage	UN	21 V~	24 V~	48 V~	110 V~
Max. continous operating voltage AC	Uc	23 V~	56 V~	70 V~	123 V~
Nom. Operating current at 25° C		100 mA	150 mA	150 mA	150 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-PG)	Up	≤ 70 V	≤ 240 V	≤ 300 V	≤ 600 V
Residual voltage at 1 kV/µs (line-PG)	Ures	≤ 54 V	≤ 130 V	≤ 180 V	≤ 230 V
Response time	tA	≤ 1 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns
Capacitance, line-earth	C	≤ 1 nF	≤ 300 nF	≤ 250 nF	≤ 100 nF
Series impedance per line at 25°C	R	27 Ω	4,7 Ω	4,7 Ω	4,7 Ω
Max. transmission frequency	fg	4,5 MHz	5 MHz	5 MHz	10 MHz
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		Thermoplastic (POCAN) UL 94 V0, grey			



without fig.

Technical Data		DP 1LSA-5-PTC	DP 1LSA-12-PTC	DP 1LSA-15-PTC	DP 1LSA-24-PTC
Article-No.		24 00 40	24 00 41	24 00 42	24 00 43
Nominal voltage DC	UN	5 V=	12 V=	15 V=	24 V=
Max. continuous operating voltage DC	Uc	6 V=	14 V=	19 V=	29 V=
Nominal alternating voltage	UN	3 V~	8 V~	12 V~	15 V~
Max. continous operating voltage AC	Uc	4 V~	10 V~	12 V~	20 V~
Nom. Operating current at 25° C		150 mA	150 mA	150 mA	150 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-PG)	Up	≤ 15 V	≤ 28 V	≤ 40 V	≤ 60 V
Residual voltage at 1 kV/µs (line-PG)	Ures	≤ 12 V	≤ 22 V	≤ 31 V	≤ 46 V
Response time	tA	≤ 1 ns	≤ 1 ns	≤ 1 ns	≤ 1 ns
Thermal overload protection		Thermical fail-safe (short-circuit spring) and PTC			
Capacitance, line-earth	C	≤ 4,5 nF	≤ 2,5 nF	≤ 2 nF	≤ 1,4 nF
Series impedance per line at 25°C	R	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω
Max. transmission frequency	fg	1,6 MHz	2,4 MHz	3,1 MHz	4,2 MHz
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		Thermoplastic (POCAN) UL 94 V0, grey			

Dimension drawing, see pages 186 to 190

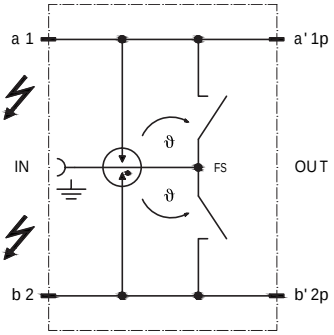


Technical Data		DP 1LSA-48-PTC	DP 1LSA-60-PTC	DP 1LSA-110-PTC	DP 1LSA-T110FS-PTC
Article-No.		24 00 44	24 00 45	24 00 46	24 00 48
Nominal voltage DC	UN	48 V=	60 V=	110 V=	110 V=
Max. continuous operating voltage DC	Uc	80 V=	100 V=	180 V=	180 V=
Nominal alternating voltage	UN	24 V~	48 V~	110 V~	110 V~
Max. continous operating voltage AC	Uc	56 V~	70 V~	123 V~	123 V~
Nom. Operating current at 25° C		150 mA	150 mA	150 mA	150 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-PG)	Up	≤ 240 V	≤ 300 V	≤ 600 V	≤ 300 V
Residual voltage at 1 kV/µs (line-PG)	Ures	≤ 130 V	≤ 180 V	≤ 230 V	≤ 300 V
Response time	tA	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 5 ns
Thermal overload protection		Thermical fail-safe (short-circuit spring) and PTC			
Capacitance, line-earth	C	≤ 300 nF	≤ 250 nF	≤ 100 nF	≤ 60 pF
Series impedance per line at 25°C	R	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω
Max. transmission frequency	fg	5 MHz	5 MHz	10 MHz	> 20 MHz
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		via grounding bar and isolation unit on LSA backmount frame			

DataPro 1LSA-180FS

Lightning and surge protection for telephone installations. Pluggable module for LSA (IDC) disconnection modules. Surge voltage protection connector for 1 DA, for ADSL, ISDN Uk0 or a/b lines, with fail-safe contact.

Technical Data		DP 1LSA-180FS	DP 1LSA-TK180FS
Article-No.		24 00 47	24 00 49
Nominal voltage DC	UN	110 V=	110 V=
Max. continuous operating voltage DC	Uc	180 V=	180 V=
Max. continous operating voltage AC	Uc	127 V~	127 V~
Nominal DC sparkover voltage at 100V/s	UagN	230 (±20%) V=	230 ±20% V=
C3 Protection level at 1 kV/µs (line-earth)	Up	≤450 V	≤ 600 V
Nom. Operating current at 25° C		150 mA	1000 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA
Alternating discharge current 9 cycles, 50 Hz	Iw	50 A	40 A
Response time Ad1-Ad2-PG	tA	≤ 50 ns	≤ 50 ns
Self-capacitance line-earth at 1MHz	C	≤ 3 pF	≤ 5 pF
Max. transmission frequency	fg	50 MHz	> 30 MHz
Thermal overload protection		Thermical fail-safe (short-circuit spring)	
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame	
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		Thermoplastic (POCAN) UL 94 V0, grey	



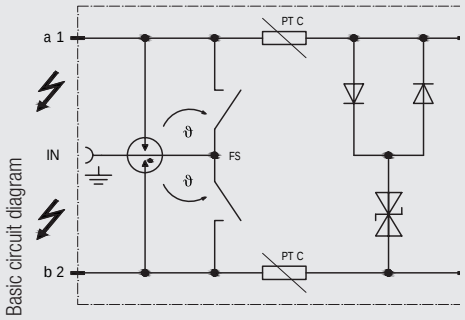
Basic circuit diagram

Dimension drawing, see pages 186 to 190

SPD according to test category C2+C1

DP 1LSA-CxxFS-PTC

Surge voltage protector for data and signal lines in measuring systems and automatic control devices. Surge voltage protection connector for 1 DA with surge current protection via PTC thermistors and fail-safe contact for higher frequency transmission range for measuring systems and automatic control devices, for LSA (IDC) disconnection modules.



Basic circuit diagram

- Surge current protection via PTC thermistors
- High impulse discharge current of 10 kA (8/20)
- Suitable for DC and AC application

Technical Data		DP 1LSA-C5FS-PTC	DP 1LSA-C12FS-PTC	DP 1LSA-C15FS-PTC	DP 1LSA-C24FS-PTC
Article-No.		24 00 63	24 00 64	24 00 65	24 00 66
Nominal voltage DC	UN	5 V=	12 V=	15 V=	24 V=
Max. continuous operating voltage DC	Uc	6 V=	14 V=	19 V=	29 V=
Nominal alternating voltage	UN	o.A. V~	8 V~	12 V~	15 V~
Max. continous operating voltage AC	Uc	o.A. V~	10 V~	12 V~	20 V~
Nom. Operating current at 25° C		150 mA	150 mA	150 mA	150 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-line)	Up	≤ 11 V	≤ 22 V	≤ 31 V	≤ 46 V
Protection level at In (line-PG)	Up	≤ 600 V	≤ 600 V	≤ 600 V	≤ 600 V
Response time a-b	tA	≤ 1 ns	≤ 1 ns	≤ 1 ns	≤ 1 ns
Response time a, b to PG		100 ns	< 100 ns	< 100 ns	< 100 ns
Transversal Capacitance	C	≤ 30 pF	≤ 30 pF	≤ 30 pF	≤ 30 pF
Series impedance per line at 25°C	R	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω
Max. transmission frequency	fg	≤ 30 MHz	≤ 30 MHz	≤ 30 MHz	≤ 30 MHz
Thermal overload protection		Thermical fail-safe (short-circuit spring) and PTC			
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame			
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C

Dimension drawing, see pages 186 to 190

			
Technical Data		**DP 1LSA-C48FS-PTC**	**DP 1LSA-C60FS-PTC**
Article-No.		24 00 61	24 00 62
Nominal voltage DC	UN	48 V=	60 V=
Max. continuous operating voltage DC	Uc	80 V=	100 V=
Nominal alternating voltage	UN	24 V~	48 V~
Max. continous operating voltage AC	Uc	56 V~	70 V~
Nom. Operating current at 25° C		150 mA	150 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA
Protection level at In (line-line)	Up	≤ 130 V	≤ 180 V
Protection level at In (line-PG)	Up	≤ 600 V	≤ 600 V
Response time a-b	tA	≤ 25 ns	≤ 25 ns
Response time a, b zu PG		< 100 ns	<100 ns
Transversal Capacitance	C	≤ 30 pF	≤ 30 pF
Series impedance per line at 25°C	R	9 - 11 Ω	9 - 11 Ω
Max. transmission frequency	fg	≤ 30 MHz	≤ 30 MHz
Thermal overload protection		Thermical fail-safe (short-circuit spring) and PTC	
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame	
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C

Dimension drawing, see pages 186 to 190

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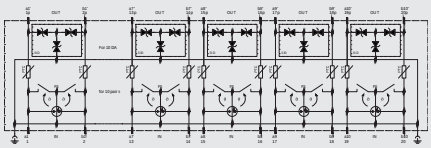
SPD according to test category C2+C1

DataPro 10LSA

Pluggable surge arrester for telecommunication lines with 10 pair of wires (DA) for LSA (IDC) disconnection modules.

Basic circuit diagram



- Surge arrester for telecommunications
- Protection for up to 10 pair of wires (DA)
- Integrated coarse and fine protection
- Surge voltage protection against longitudinal and transverse voltages

Technical Data		DP 10LSA-12V	DP 10LSA-24V	DP 10LSA-110
Article-No.		24 00 25	24 00 27	24 01 40
Nominal voltage DC	UN	12 V=	24 V=	110 V=
Max. continuous operating voltage DC	Uc	14 V=	29 V=	180 V=
Max. continous operating voltage AC	Uc	10 V~	21 V~	
Residual voltage at 1kV/µs	Ures	≤ 22 V	≤ 46 V	≤ 250 V
Nom. Operating current at 25° C		150 mA	150 mA	145 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA
Protection level at In	Up	≤ 28 V	≤ 60 V	220 V
Response time	tA	≤ 1 ns	≤ 1 ns	< 1 ns
Thermal fail-safe response time at 230VAC/23A and ambient temperature 25°C	TA	≤ 2 s	≤ 2 s	<2 s
Capacitance, line-earth	C	< 2,5 nF	< 1,4 nF	< 0,1 nF
Serial inductive impedance at 25°C	L	47 µH	47 µH	47 µH
Series impedance per line at 25°C	R	15 Ω	27 Ω	3-6 Ω
Max. transmission frequency	fg	< 2,4 MHz	≤ 4,2 MHz	≤ 1,2 MHz
Grounding/Earthing		LSA backmount frame		
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Enclosure material / colour		Thermoplast: grau oder gelb		

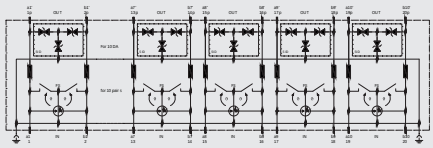
Dimension drawing, see pages 186 to 190

SPD according to test category C2+C1

DataPro 10LSA-PTC

Pluggable surge arrester for telecommunication lines with 10 pair of wires (DA) for LSA (IDC) disconnection modules.

Basic circuit diagram



- Surge arrester for telecommunications
- Protection for up to 10 pair of wires (DA)
- Integrated coarse and fine protection
- Surge voltage protection against longitudinal and transverse voltages
- Surge current protection via PTC thermistors

				
Technical Data		**DP 10LSA-PTC-12V**	**DP 10LSA-PTC-24V**	**DP 10LSA-PTC 110**
Article-No.		24 00 26	24 00 28	24 01 42
Nominal voltage DC	UN	12 V=	24 V=	110 V=
Max. continuous operating voltage DC	Uc	14 V=	29 V=	180 V=
Max. continous operating voltage AC	Uc	10 V~	21 V~	180 V~
Residual voltage 1kV/µs	Ures	≤ 22 V	≤ 46 V	≤ 250 V
Nom. Operating current at 25° C		150 mA	150 mA	145 mA
C2 Nominal discharge current (8/20)	In	5 kA	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA	10 kA
Protection level at In	Up	≤ 28 V	≤ 60 V	220 V
Response time	tA	≤ 1 ns	≤ 1 ns	≤ 1 ns
Capacitance, line-earth	C	< 2,5 nF	< 1,4 nF	< 0,1 nF
Series impedance per line at 25°C	R	9 - 11 Ω	9 - 11 Ω	9 - 11 Ω
Max. transmission frequency	fg	< 2,4 MHz	≤ 4,2 MHz	≤ 2 MHz
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Thermal overload protection		Thermical fail-safe (short-circuit spring) and PTC		
Dimensions (L x W x H)		110 x 22 x 72 mm	110 x 22 x 72 mm	110 x 22 x 72 mm
Grounding/Earthing		via grounding bar and isolation unit on LSA backmount frame		
Enclosure material / colour		Thermoplastic: grey or yellow		

Dimension drawing, see pages 186 to 190

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Accessories for LSA Technology

LSA Connection Module

Each module can hold 10 DA at the cable and allocation side for a permanent connection. LSA magazines filled with gas-filled surge arresters can be plugged in. The connection module is grey.

- Corresponds with IEC 60352-4 and DIN 41611-6
- Wiring with two wires of same diameter is possible
- Amply dimensioned elastic arrangement of the wiring

Technical Data		LSA 2/10-AN
Article-No.		24 01 00
Withstand voltage		2 kV
Volume resistance		< 10 mΩ
Conductor diameter, solid wire		0,4-0,8 AWG 26-20 mm
Insulation resistance	Ris	5x 10.000 MΩ
External diameter of insulation		0,7-1,5 mm

LSA Disconnection Module

Each module can hold 10 DA at the cable and allocation side. To be equipped with surge voltage protection connectors (coarse and fine protection) DP 1LSA or DP 10LSA. Applicable at the LPZ transition point 1-2 and higher.
The disconnection module is white.

Technical Data		LSA 2/10-TR
Article-No.		24 01 02
Withstand voltage		2 kV
Volume resistance		< 10 mΩ
Insulation resistance	Ris	5x 10.000 MΩ
Conductor diameter		0,4 -0,8 mm
External diameter of insulation		0,7-1,5 mm

Further LSA parts

LSA 2/10-ER38-rot (Art.No. 24 01 04)
LSA ground module to connect 38 earthing connectors and shields.

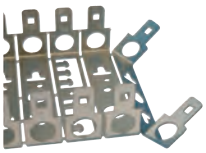
LSA 2/10 KSR (Art.No. 24 01 08)
LSA 2/10 hinged label holder (plastic)

LSA 2/10 AD (Art.No.24 01 09)
Magazine cover for protection against dust and unwanted contact; Transparent for visual inspection of the arrester Magazin

LSA 2/10-ES (Art.No. 24 01 33)
Pluggable grounding rail: For 10DA connection modules serving as connection between LSA backmount frame and 1 DA surge voltage (+surge current) protection connector Installation: Plug into front connection modules, bonding to ground via LSA backmount frame

LSA DIN ADAPT (Art.No. 24 01 37)
LSA 2/10 DIN rail adapter. Adapter metal line with M5 screw thread (without screw). Used to fix backmount frame or connection modules onto 35 mm DIN rails..

LSA 2/10 KS-120 (Art.No.24 01 36)
LSA edge protection profile for backmount frame (plastic)



LSA 2/10-MW10-25/22 (Art.No.24 01 10)
LSA backmount frame 10 x 10DA (modular) stainless metal. Plug space for 10 pcs of LSA 2/10 10DA connection modules 25 mm grid / depth 22 mm, easily detachable upon individual requirements, available up to a size of 78 connection modules.

Product	LSA 2/10 KSR	LSA 2/10 AD	LSA 2/10-MW10-25/22	LSA DIN ADAPT	LSA 2/10 KS-120	LSA 2/10-ES	LSA 2/10-ER38-rot
Article-No.	24 01 08	24 01 09	24 01 10	24 01 37	24 01 36	24 01 33	24 01 04

Dimension drawing, see pages 186 to 190

EVERYTHING FOR THE PROTECTION OF TRANSMISSION AND RECEIVING SYSTEMS

Due to an expansion of its product range Leutron now offers devices that cover all established interfaces and frequency ranges. Transmitting and receiving systems with broadband and narrowband signals up to 6 GHz as well as base stations for mobile communications and broadcasting systems can be protected. The protective devices combine a very low protection level with an optimum transmission of the wanted signal.

Special solutions for uncommon interfaces are available on request.

FAULT-FREE TRANSMITTING AND RECEIVING OPERATION:

- Protective devices with gas-filled surge protectors, impedance-adjusted for frequency ranges up to 6 GHz – simultaneous transmission of a DC supply voltage possible
- Protective devices for radio installations with narrowband signals with Lambda/4 Stubline technology. This results in a high damping of the interfering noise, whilst the wanted signal is transmitted without disturbance

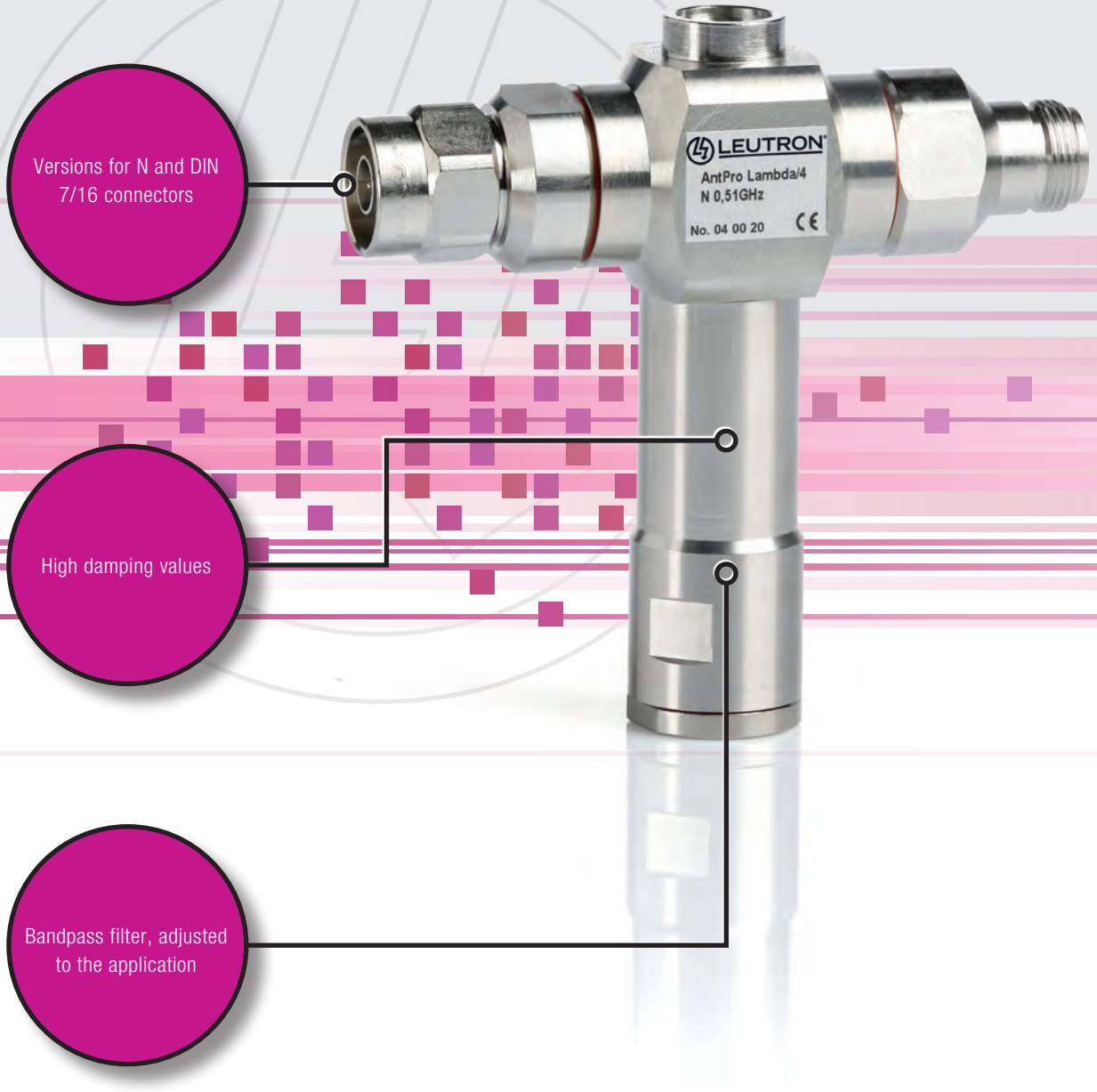
High-quality protective devices for base stations for mobile communications with high capacity of absorbing interference energy.

SURGE PROTECTION FOR TRANSMITTING AND RECEIVING SYSTEMS

AERIAL SYSTEM PROTECTION THROUGH LAMBDA/4 STUBLINE

Applications for different installation types:

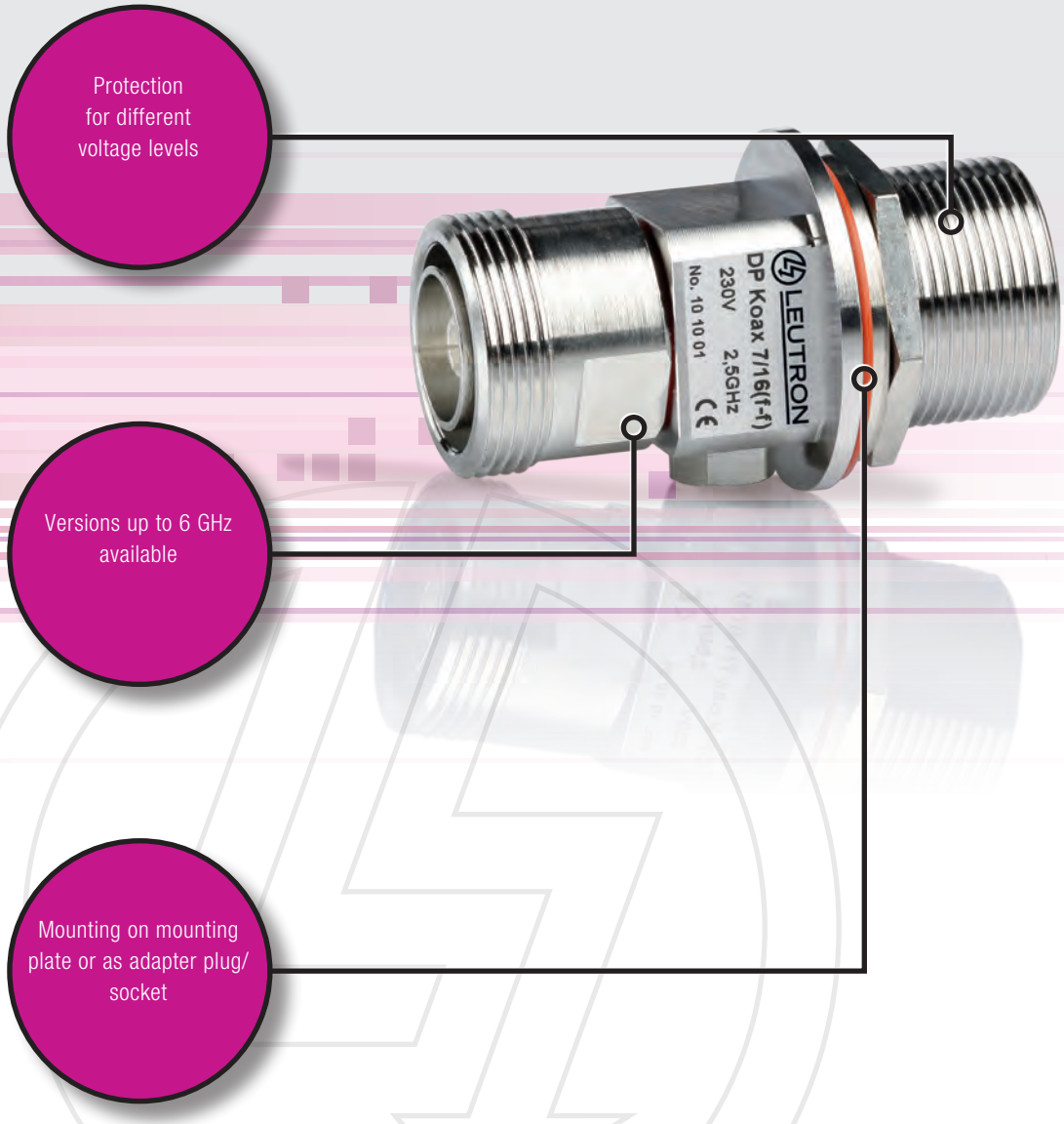
- GSM and UMTS installations
- Tri-band systems
- Terrestrial trunked radio (TETRA)



SURGE PROTECTION FOR COAXIAL INTERFACES

Versions for different interfaces:

- BNC connectors
- FME connectors
- SMA connectors
- N connectors
- DIN 7/16 connectors

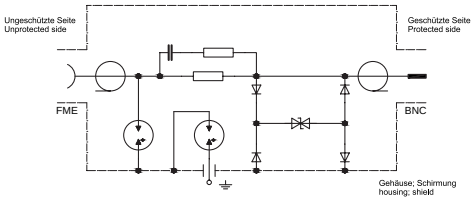


BNC connector

DataPro Koax-8V-BNC

Lightning and surge protection for coaxial signal lines with BNC connector for the use at the building entry.

- High performance surge protector
- Applicable at the building entry at the boudaries LPZ 0A-$_1$ and higher
- For video surveillance cameras
- Connector according to IEC 61169-8
- Grounding via connected earthing wire 0.75 mm², L=ca.30 mm
- Test standard: IEC 61643-21 / EN 61643-21



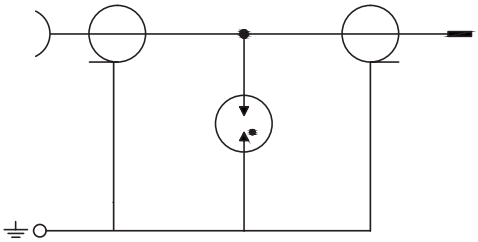
Basic circuit diagram

Technical Data		DataPro Koax-8V-BNC	DataPro Koax-8V-BNC-75 Ohm
Article-No.		54 43 46	54 43 40
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Plug connector		BNC (m/f)	BNC (m/f)
Max. continuous operating voltage DC	Uc	8 V=	8 V=
Max. power		0,7 W	0,7 W
Longitudinal impedance per wire	Z	10 Ω	10 Ω
Surge impedance	Z	50 Ω	75 Ω
Response time fine protection	tA	≤ 2 ns	≤ 2 ns
C2 nominal discharge current (8/20)	In	5 kA	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA	10 kA
D1 lightning impulse current (10/350)	Iimp	1 kA	1 kA
C2 protection level line-shield at In	Up	≤ 20 V	≤ 20 V
C3 protection level line-shield at 1kV/µs	Up	≤ 13 V	≤ 13 V
C3 protection level line-shield-PE at 1kV/µs	Up	≤ 600 V	≤ 600 V
Frequency range	fO	0 - 60 MHz	0 - 60 MHz
Return loss		bei 40 kHZ: > 20 dB	bei 40 kHZ: > 20 dB
Operating temperature range	TU	- 25 - +85 °C	-25 - +85 °C
Degree of protection (IEC EN 60529)		IP 20	IP 20

DataPro Koax BNC

Surge protection device for coaxial signal lines with BNC connectors and very high frequencies. The discharge current arrester can be mounted in and earthed in a mounting plate.

- Surge protection device for extremly high frequencies up to 6 GHz
- Applicable at the boundaries LPZ 0B - 1 and higher
- Connector according to IEC 61169-8
- Earthing via metal housing
- Test standard: IEC 61643-21 / EN 61643-21



Basic circuit diagram

Technical Data		DP Koax BNC 50 Ohm
Article-No.		54 43 30
IEC category/EN type		C2 / C1 / C3
Plug connector		BNC (m/f)
Surge impedance	Z	50 Ω
Frequency range	fO	0 - 6000 MHz
Return loss		≥ 20 dB
Breakdown voltage (100V/s)		150 - 250 V
C2 nominal discharge current (8/20 µs)	In	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA
Max. transmission capacity		25 W
Operating temperature range	TU	-40 - +85 °C
Degree of protection (IEC EN 60529)		IP 67

Dimension drawing, see pages 186 to 190

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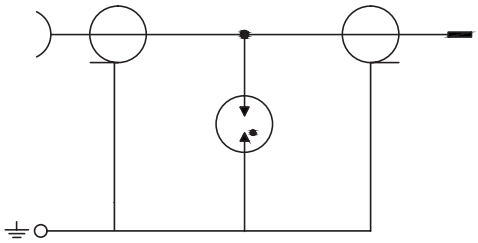
SMA connector

AntPro 5,8GHz-SMA

For coaxial signal lines with SMA connectors. Because of the high frequency range up to 6 GHz the device is to be applied also by WLAN and similar applcation.

- Surge protection device for extremly high freqeuncies up to 6 GHz
- Applicable at the boundaries LPZ 0B - 1 and higher
- Connector according to IEC 61169-8
- Earthing via metal housing
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting with angle bracket or in mounting plate possible
- Second version with inverse polarity (inner conductor is socket instead of plug)



Basic circuit diagram

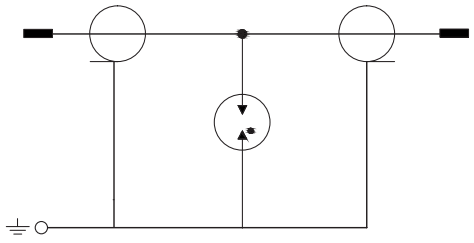
Technical Data		AntPro 5,8GHz-SMA	AntPro 5,8GHz-R-SMA
Article-No.		04 58 00	04 58 02
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3
Plug connector		SMA (m/f)	R-SMA (f/m)
Surge impedance	Z	50 Ω	50 Ω
Frequency range	fO	0 - 6000 MHz	0 - 6000 MHz
Return loss		≥ 20 dB	≥ 20 dB
Breakdown voltage (100V/s)		150 - 250 V	150 - 250 V
C2 nominal discharge current (8/20)	In	5 kA	5 kA
Max. impulse discharge current (8/20)		10 kA	10 kA
Max. transmission capacity		25 W	25 W
Operating temperature range	TU	-40 - +85 °C	-40 - +85 °C

FME connector

DataPro FME-AD

Surge voltage protection for sensitive GSM modems with FME antenna connector. The set contains an dischrage current arrester with SMA connector and a freqeuncy range up to 6 GHz and adapters for FME connectors.

- Surge protection device for extremly high freqeuncies up to 6 GHz
- Applicable at the boundaries LPZ 0B - 1 and higher
- Test standard: IEC 61643-21 / EN 61643-21
- Second version with inverse polarity (inner conductor is socket instead of plug)



Basic circuit diagram

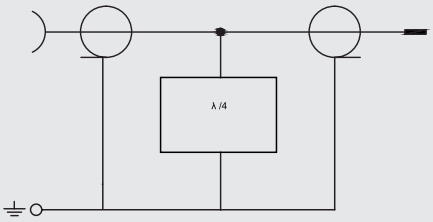
Technical Data		DP FME-AD
Article-No.		16 05 20
IEC category/EN type		C2 / C1 / C3
Plug connector		FME (m/m)
Surge impedance	Z	50 Ω
Frequency range	fO	0 - 6000 MHz
Return loss		≥ 20 dB
Breakdown voltage (100V/s)		150 - 250 V
C2 nominal discharge current (8/20 µs)	In	5 kA
Max. impulse discharge current (8/20)	Imax	10 kA
Max. transmission capacity		25 W
Operating temperature range	TU	-40 - +80 °C

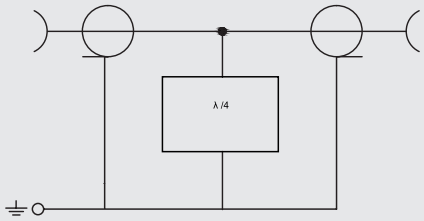
Dimension drawing, see pages 186 to 190

AntPro Lambda/4 N

Surge protective device in maintenance-free Lamba/4 style with band-pass filter characteristic. Therefore a very good transmission characteristic combined with high attenuation of the disturbances can be reached. Remote antenna power supply is not possible because of the short-circuit characteristic for low-frequency signals.

- High performance Lambda/4 Stubline for antenna protection without interruption of the useful signal
- Suitable for TETRA and GSM installations
- Applicable at the building entry at the boudaries LPZ 0A-1 and higher
- Connector according to IEC 61169-16
- Test standard: IEC 61643-21 / EN 61643-21





Basic circuit diagram

			without fig.	without fig.		without fig.
Technical Data		**AntPro Lambda/4 N 0.51GHz**	**AntPro Lambda/4 N 0.8GHz**	**AntPro Lambda/4 N 2.0GHz**	**AntPro Lambda/4 N 0.51GHz (f/f)**	**AntPro Lambda/4 N 2.0GHz (f/f)**
Article-No.		04 00 20	04 00 22	04 00 23	04 00 21	04 00 24
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Plug connector		N (m/f)	N (m/f)	N (m/f)	N (f/f)	N (f/f)
Surge impedance	Z	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Frequency range	fO	380 - 512 MHz	800 - 900 MHz	1700 - 2300 MHz	380 - 512 MHz	1700 - 2300 MHz
Return loss		< - 23 dB	< - 23 dB	< - 20,5 dB	< - 23 dB	< - 20,5 dB
Insertion loss		< 0,1 dB	< 0,1 dB	< 0,1 dB	< 0,1 dB	< 0,1 dB
Max. impulse discharge current (8/20)	Imax	min. 50 kA	min. 50 kA	min. 50 kA	min. 50 kA	min. 50 kA
Vertical resistance inner conductor	R	≤ 1,5 mΩ	≤ 1,5 mΩ	≤ 1,5 mΩ	≤ 1,5 mΩ	≤ 1,5 mΩ
Vertical resistance outer conductor	R	≤ 1 mΩ	≤ 1 mΩ	≤ 1 mΩ	≤ 1 mΩ	≤ 1 mΩ
Operating temperature range	TU	-30 - +100 °C	-30 - +100 °C	-30 - +100 °C	-30 - +100 °C	-30 - +100 °C
Degree of protection (IEC EN 60529)		IP 67	IP 67	IP 67	IP 67	IP 67

Dimension drawing, see pages 186 to 190

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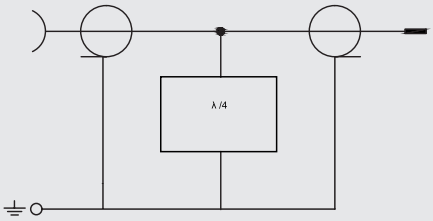
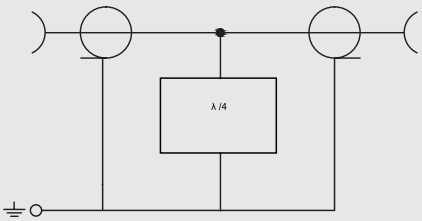
AntPro Lambda/4 7/16 TRI

Surge protective device in maintenance-free Lamba/4 style with band-pass filter characteristic. Therefore a very good transmission characteristic combined with high attenuation of the disturbances can be reached. Remote antenna power supply is not possible because of the short-circuit characteristic for low-frequency signals.

- High performance Lambda/4 Stubline for antenna protection without interruption of the useful signal
- Suitable for 800/900 MHz and 1800/1900 MHz-GSM and UMTS systems
- Connector according to IEC 61169-4
- Applicable at the building entry at the boudaries LPZ 0A-1 and higher
- Test standard: IEC 61643-21 / EN 61643-21





Basic circuit diagram

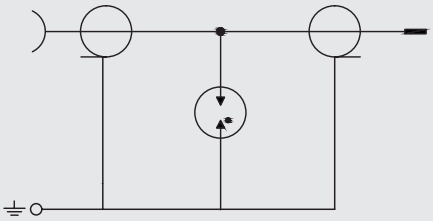
			without fig.	
Technical Data		**AntPro Lambda/4 7/16 TRI**	**AntPro Lambda/4 7/16 TRI (f/f)**	**AntPro Lambda 7/16 0.42GHz**
Article-No.		04 00 30	04 00 31	04 04 25
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Plug connector		DIN 7/16 (m/f)	DIN 7/16 (f/f)	DIN 7/16 (f/f)
Surge impedance	Z	50 Ω	50 Ω	50 Ω
Frequency range	fO	806 - 960 / 1710 - 2200 MHz	806 - 960 / 1710 - 2200 MHz	380 - 512 MHz
Return loss		typ.: <-23dB / 806-859 MHz; <-27dB / 860-960 MHz; <-27dB / 1710-1990 MHz; <-23 dB / 2000-2200 MHz		< -23 dB
Insertion loss		< 0,1 dB	< 0,1 dB	< 0,1 dB
Max. impulse discharge current (8/20)	Imax	min. 50 kA	min. 50 kA	min. 50 kA
Max. transmission capacity		W≤ 1,8 kW / 1 GHz	W≤ 1,8 kW / 1 GHz	5000 W
Vertical resistance inner conductor	R	≤ 0,4 mΩ	≤ 0,4 mΩ	≤ 0,4 mΩ
Vertical resistance outer conductor	R	≤ 0,2 mΩ	≤ 0,2 mΩ	≤ 0,2 mΩ
Operating temperature range	TU	-55 - +150 °C	-55 - +150 °C	-55 - +150 °C
Degree of protection (IEC EN 60529)		IP 67	IP 67	IP 67

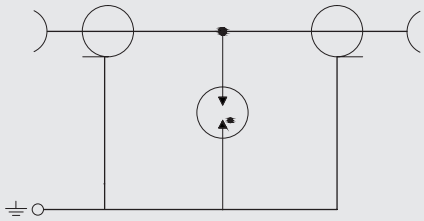
Dimension drawing, see pages 186 to 190

DataPro Koax 7/16

DataPro Koax 7/16 was developed for the coarse protection of highly sensitive RF amplifiers with DIN 7/16 connectors such as amplifiers for GSM antenna systems.

- High performance surge arrester for broad-band applications with frequency ranges from DC up to 2.5 GHz
- Applicable at the boundaries LPZ 0B - 1 and higher
- Connector according to IEC 61169-4
- Test standard: IEC 61643-21 / EN 61643-21
- Mounting with angle bracket or in mounting plate possible





Basic circuit diagram

Technical Data		DP Koax 7/16	DP Koax 7/16 (f/f)
Article-No.		10 10 00	10 10 01
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3
Plug connector		DIN 7/16 (m/f)	DIN 7/16 (f/f)
Surge impedance	Z	50 Ω	50 Ω
Frequency range	fO	0 - 2500 MHz	0 - 2500 MHz
Return loss		typ.: 1GHz - 32dB; 2GHz - 23dB; 2,2GHz - 23dB; 2,5GHz - 20dB; 2,7GHz - 17 dB	
Insertion loss		typ.: 2,2GHz <0,1dB; 2,5GHz <0,2 dB	
DC spark-over voltage		230 V	230 V
C2 nominal discharge current (8/20 µs)	In	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	20 kA	20 kA
Insulation resistance	Risol	≥ 10 GΩ	≥ 10 GΩ
Vertical resistance inner conductor	R	≤ 0,4 mΩ	≤ 0,4 mΩ
Vertical resistance outer conductor	R	≤ 0,2 mΩ	≤ 0,2 mΩ
Operating temperature range	TU	-55 - +155 °C	-55 - +155 °C
Degree of protection (IEC EN 60529)		IP 67	IP 67

Dimension drawing, see pages 186 to 190

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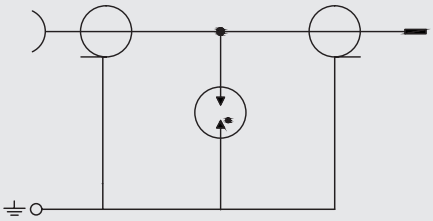
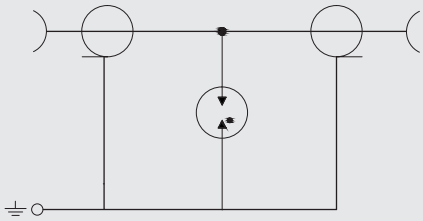
AntPro Koax-GSM-N/230

AntPro Koax-GSM-N was designed for the coarse protection of highly sensitive electronical HF amplifiers, e.g., for GSM aerial systems with GSM aerial cable RG213/U (max. 180 W at max. 1 GHz, Ø 10.5 mm).

- High performance surge arrester for broadband applications with frequency ranges from DC up to 2.5 GHz.
- Applicable at the boundaries LPZ 0B - 1 and higher
- Connector according to IEC 61169-8
- Test standard: IEC 61643-21 / EN 61643-21
- The f/f version can be mounted in a mounting plate or with an angle bracket.





Basic circuit diagram

			
Technical Data		**AntPro Koax-GSM-N/230**	**AntPro Koax-GSM-N-230(f/f)**
Article-No.		04 00 01	04 00 04
IEC category/EN type		C2 / C1 / C3	C2 / C1 / C3
Plug connector		N (m/f)	N (f/f)
Surge impedance	Z	50 Ω	50 Ω
Frequency range	fO	0 - 2500 MHz	0 - 2500 MHz
Return loss		dBtyp.: 1GHz: 30 dB/2,5 GHz: 23	
Insertion loss		dBtyp.:1GHz<0,1dB/2,5 GHz<0,2	
DC spark-over voltage		230 V	230 V
C2 nominal discharge current (8/20 µs)	In	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	20 kA	20 kA
Insulation resistance	Risol	≥ 5 GΩ	≥ 5 GΩ
Vertical resistance inner conductor	R	≤ 2 mΩ	≤ 2 mΩ
Vertical resistance outer conductor	R	≤ 0,5 mΩ	≤ 0,5 mΩ
Operating temperature range	TU	-30 - +100 °C	-30 - +100 °C
Degree of protection (IEC EN 60529)		IP 67	IP 67

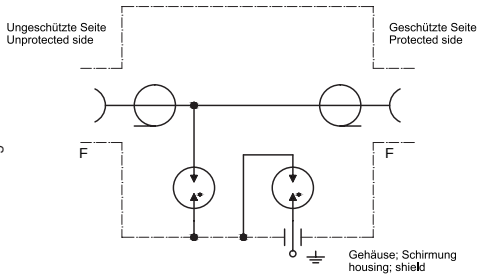
Dimension drawing, see pages 186 to 190

TV/Radio connector

DataPro-SAT and Radio/TV

Surge protection device for radio and television equipment for the use directly at the building entry.

- High performance antenna protection
- Applicable at the building entry at the boudaries LPZ 0A-1 and higher
- Equipped with GDT surge voltage protector
- Easy installation
- Test standard: IEC 61643-21 / EN 61643-21
- F connector (acc. to IEC 60169-24)



Basic circuit diagram

Technical Data		DataPro-SAT	DataPro-Radio/TV
Article-No.		21 00 20	21 00 30
IEC category/EN type		D1 / C2 / C1 / C3	D1 / C2 / C1 / C3
Plug connector		F connector	TV/Radio connector (acc. to IEC 60169-2)
Max. permissible rated direct voltage	Uc	75 V	75 V
Nominal current	IN	4 A	4 A
D1 lightning impulse current (10/350)	Iimp	2,5 kA	2,5 kA
C2 nominal discharge current (8/20 µs)	In	10 kA	10 kA
Protection level at 1kV/µs	Up	600 V	600 V
Impedance	Z	75 Ω	75 Ω
Insertion loss	fE	4 dB	4 dB
Frequency range	f0	0 - 2.150 MHz	0 - 862 MHz
Response time	tA	≤ 100 ns	≤100 ns
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Degree of protection (IEC EN 60529)		IP 20	IP 20
Installation dimensions (W × H × D)		40 x 44 x 22 mm	40 x 44 x 42 mm
Mounting type		wall mounting	wall mounting

Dimension drawing, see pages 186 to 190

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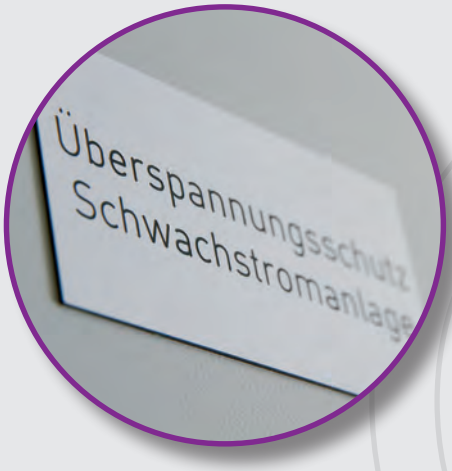
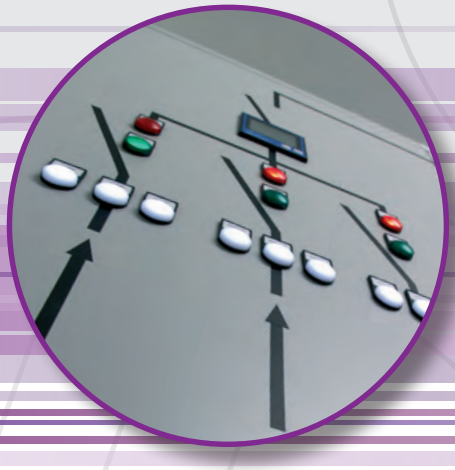
Dimension drawing, see pages 186 to 190

FILTER WITH INTEGRATED SURGE PROTECTION



For protection against overvoltages and harmonics Leutron offers EMC filters which are combined with a surge protection. These devices suppress harmonics and transient surges, hence, allowing equipment to operate smoothly even in high-interference environments. With the enhancement of its product range Leutron now offers protective devices for the area of measuring systems and automatic control, thus covering the complete field of industrial applications.

Leutron guarantees reliable signals due to EMC filters.



EMC FILTERS COMBINED WITH HARMONIZED SURGE PROTECTION:

- Protection against transient overvoltages and harmonics
- Leakage-current free
- Low residual voltages mean reduced stress for the system to be protected
- Outstanding differential-mode and common-mode damping of the filters

The EMC filters convince with their compact construction and the optimally harmonised protection components filter and surge protection.

EMC FILTERS WITH INTEGRATED SURGE PROTECTION

FILTERS WITH INTEGRATED SURGE PROTECTION UP TO 200 A

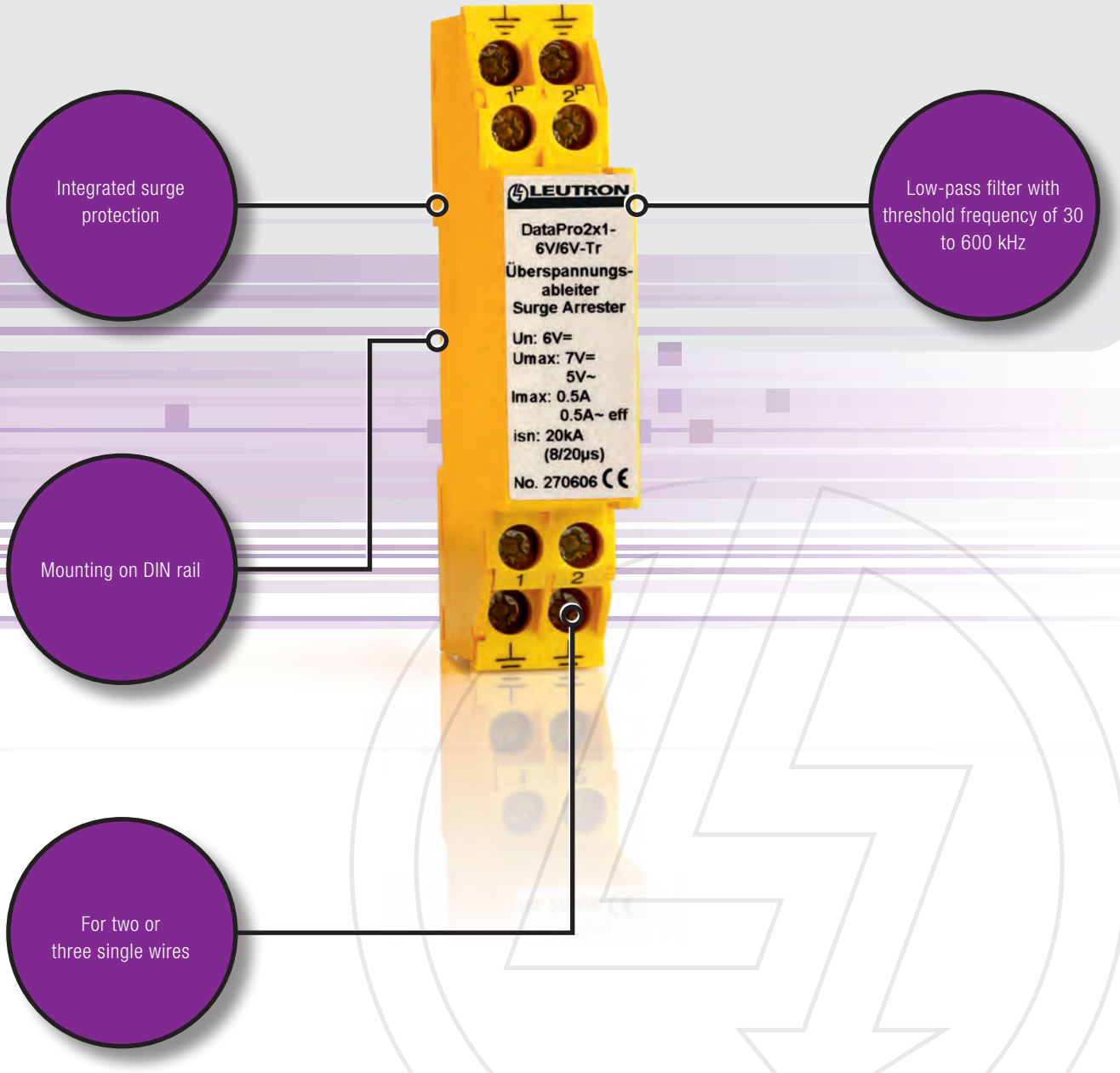
Robust and shielded design

Versions up to a nominal current of 200 A available

For one phase and three phase mains supplies

Harmonics filter, combined with surge protection

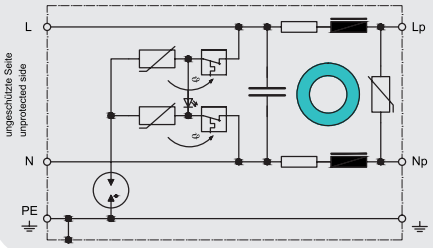
FILTERS WITH INTEGRATED SURGE PROTECTION FOR MEASURING AND CONTROL EQUIPMENT



EnerPro Filter for mounting rail

For overvoltage protection at single-pole TN systems with very sensitive electronical devices.

Basic circuit diagram



- Applicable at the boundaries LPZ 0B - 2 and higher
- All leakage current-afflicted elements are galvanically isolated from earth by a gas-filled surge arrester (GDT).
- The protective circuit with filter contains an optimal decoupling between its medium protection (varistors) and its fine protection (varistors).
- Test standard: IEC 61643-1 / EN 61643-11

Technical Data		EPF 230V/16A-Tr	EPF 230V/25A-Tr
Article-No.		25 30 16	25 30 17
IEC category/EN type		Type 2 + 3 / class II + III	Type 2 + 3 / class II + III
Nominal alternating voltage	UN	230 V~	230 V~
Max. continous operating voltage AC	Uc	275 V~	275 V~
Protection level at 5 kA (8/20 µs)	Up	≤ 1,4 kV	≤ 1,4 kV
Protection level at In (8/20)	Up	≤ 2 kV	≤ 2 kV
Response time L-N/L,N-PE		≤ 25 ns	≤ 25 ns
Nominal impulse discharge current (10 x 8/20)	In	15 kA	15 kA
Max. impulse discharge current (1x 8/20)	Imax	25 kA	25 kA
Max. acceptable fuse or back-up fuse		16 A gL/gG	25 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible
Recommended conductor cross section		25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		Polycarbonate UL 94-V0 / yellow/grey	Polycarbonate UL 94-V0 / yellow/grey
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		DIN rail 35 mm (DIN EN 50 022)	DIN rail 35 mm (DIN EN 50 022)
Installation dimensions (W × H × D)		88 x 107 x 67 mm	88 x 107 x 67 mm

Dimension drawing, see pages 186 to 190

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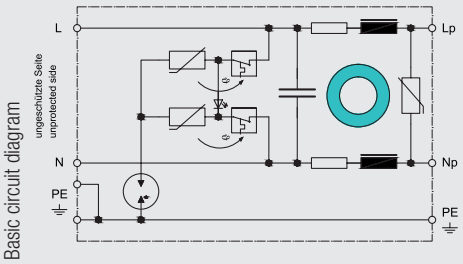
EnerPro Filter up to 35 A, two-pole

For overvoltage protection at single-pole TN systems with very sensitive electronical devices.

Basic circuit diagram



- Applicable at the boundaries LPZ 0B - 2 and higher
- The low-pass filter eliminates high-frequency electromagnetic interferences caused by lightning or switching actions in the network.
- Test standard: IEC 61643-1 / EN 61643-11
- Maximum impulse discharge current of 20 kA (8/20µs)
- To mount on a mounting plate.

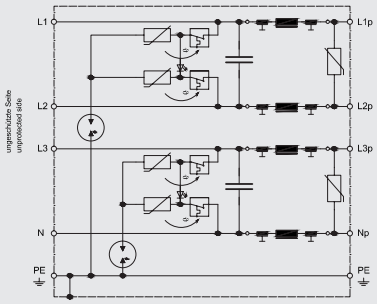
					without fig.	
Technical Data		**EPF 60V/16A-S**	**EPF 48V/25A-S**	**EPF 230V/16A-S**	**EPF 230V/35A-S**	**EPF 230V/16A-W**
Article-No.		25 30 22	25 30 53	25 30 20	25 30 85	25 30 25
IEC category/EN type		Type 2 + 3 / class II + III	Type 2 + 3 / class II + III	Type 2 + 3 / class II + III	Type 2 + 3 / class II + III	Type 2 + 3 / class II + III
Nominal voltage DC	UN	60 V=	48 V=	–	–	–
Max. continuous operating voltage DC	Uc	70 V=	70 V=	–	–	–
Nominal alternating voltage	UN	42 V~	42 V~	230 V~	230 V~	230 / 400 V~
Max. continous operating voltage AC	Uc	50 V~	50 V~	275 V~	275 V~	275 / 480 V~
Protection level (1kV/µs)	Up	≤ 1,5 kV	≤ 1,0 kV	≤ 1,4 kV	≤ 1,4 kV	≤ 1,4 kV
Protection level at In (8/20µs); worst case	Up	≤ 2,5 kV	≤ 1,5 kV	≤ 2 kV	≤ 2 kV	≤ 2 kV
Response time L-N/L,N-PE		≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	20 kA	20 kA	20 kA	20 kA	20 kA
Max. acceptable fuse or back-up fuse		16 A gL/gG	25 A gL/gG	16 A gL/gG	35 A gL/gG	16 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		4 mm²	4 mm²	single wire 10mm²/ flexible 6 mm²		
Recommended conductor cross section		2,5 mm²	2,5 mm²	2,5 mm²	2,5 mm²	2,5 mm²
Enclosure material / colour		Aluminium/silver	Aluminium/silver	Aluminium/silver	Aluminium/silver	Aluminium/silver
Installation dimensions (W × H × D)		211 x 71 x 106 mm	211 x 71 x 106 mm	211 x 71 x 106 mm	211 x 71 x 106 mm	211 x 71 x 106 mm
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20	IP 20

Dimension drawing, see pages 186 to 190

EnerPro Filter up to 35 A, four-pole

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment. Suitable for the application in three-phase 230/400V TN systems.

Basic circuit diagram



- Applicable at the boundaries LPZ 0B - 2 and higher
- Leakage current-free
- Test standard: IEC 61643-1 / EN 61643-11
- Protects foundation earthing electrode against AC-caused corrosion
- To protect the supply of sensible equipment and installations
- Max. impulse discharge current of 25 kA (8/20)

			without fig.	
Technical Data		**EPF 230/400V/16A-W**	**EPF 230/400V/25A-W**	**EPF 230/400V/35A-W**
Article-No.		25 30 45	25 30 80	25 31 00
IEC category/EN type		Type 2 + 3 / class II + III	Type 2 + 3 / class II + III	Type 2 + 3 / class II + III
Nominal alternating voltage	UN	230 / 400 V~	230 / 400 V~	230 / 400 V~
Max. continous operating voltage AC	Uc	275 / 480 V~	480 V~	275 / 480 V~
Protection level at 5 kA (8/20) or 1kV/µs	Up	≤ 1,4 kV	≤ 1,4 kV	≤ 1,4 kV
Protection level at In (8/20); worst case	Up	≤ 2 kV	≤ 2 kV	≤ 2 kV
Response time L-N/L,N-PE		≤ 25/ ≤ 50 ns	≤ 25 ns	≤ 25 ns
Response time	tA	< 25 ns	< 25 ns	< 25 ns
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	20 kA	25 kA	20 kA
Max. acceptable back-up fuse or circuit-breaker (MCB)		16 A gL/gG	25 A gL/gG	35 gL / gG A
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		single wire 10mm²/ flexible 6 mm²		
Installation dimensions (W × H × D)		209 x 106 x 71 mm	211 x 106 x 72 mm	209 x 106 x 71 mm
Enclosure material / colour		Aluminium/silver	Aluminium/silver	Aluminium/silver
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Mounting on		mouting plate	Mounting plate	Mounting plate

Dimension drawing, see pages 186 to 190

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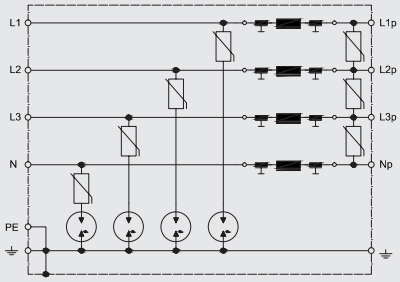
EnerPro Filter up to 200 A, four-pole

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment. Suitable for the application in three-phase 230/400V TN systems.



Basic circuit diagram

- Applicable at the boundaries LPZ 0B - 2 and higher
- 4-pole
- Leakage current-free
- Test standard: IEC 61643-1 / EN 61643-11
- Protects foundation earthing electrode against AC-caused corrosion
- To protect the supply of sensible equipment and installations



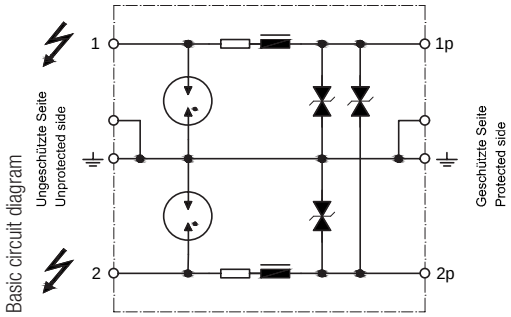
Technical Data		EPF 230/400V/63A-E	EPF 230/400V/100A-E	EPF 230/400V/200A-E
Article-No.		25 31 30	25 31 40	25 31 60
IEC category/EN type		Type 2 + 3 / class II + III	Type 2 + 3 / class II + III	Type 2 + 3 / class II + III
Nominal alternating voltage	UN	230 / 400 V~	230 / 400 V~	230 / 400 V~
Max. continous operating voltage AC	Uc	275 / 480 V~	275 / 480 V~	275 / 480 V~
Protection level at 5kA (8/20) or 1kV/µs	Up	≤ 1,4 kV	≤ 1,4 kV	≤ 1,4 kV
Protection level at In (8/20); worst case	Up	≤ 2 kV	≤ 2 kV	≤ 2 kV
Response time L-N/L,N-PE		≤ 25 ns	≤ 25 ns	≤ 25 ns
Nominal discharge current (8/20)	In	15 kA	15 kA	15 kA
Max. impulse discharge current (8/20)	Imax	25 kA	25 kA	25 kA
Max. acceptable back-up fuse or circuit-breaker (MCB)		63 A gL/gG	100 A gL/gG	200 A gL/gG
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		solid 25-95/flexible. 35-95 mm²	solid 25-95/flexible. 35-95 mm²	solid 25-95/flexible. 35-95 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm
Installation dimensions (W × H × D)		240 x 106 x 110 mm	420 x 380 x 170 mm	420 x 380 x 170 mm
Enclosure material / colour		Aluminium/silver	Aluminium/silver	Aluminium/silver
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20
Mounting on		Mounting plate	Mounting plate	Mounting plate

Dimension drawing, see pages 186 to 190

IsoProData 150V/150V-Tr

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment.

- Signal and data line protection with low-pass filter
- Protective circuit for 2 signal lines without reference to ground potential
- Lightning current 5 kA (10/350) per wire
- Applicable at the boundaries LPZ 0A - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Space required for installation: 17.5 mm



Technical Data		IsoProData 150V/150V-Tr
Article-No.		27 03 03
IEC category/EN type		C1 / C2 / C3 / D1
Nominal voltage DC	UN	150 V=
Max. continuous operating voltage DC	Uc	160 V=
Max. continous operating voltage AC	Uc	112 V~
Nominal current	IN	1,5 A
Leakage current at Uc DC	IL	≤ 5 µA
Longitudinal impedance (DC resistance) per wire	Z	0,3 Ω
Series inductance, typ.		130 µH
Response time	tA	≤ 2 ns
C2 Nominal discharge current (8/20)	In	20 kA
D1 lightning impulse current (10/350 µs)	Itotal	10 kA
D1 lightning impulse current (10/350) per line	Iimp	5 kA
Protection level, residual voltage line-ground at In resp. 1 kV/µs	Up	≤ 250 V
Capacitance, line-earth	C	< 1 nF
Max. operating frequency (-3 dB)	fG	600 kHz
Operating temperature range	TU	-25 - +85 °C
Max. conductor cross section		16 mm² massiv or 6 mm² flexible with sleeve

Dimension drawing, see pages 186 to 190

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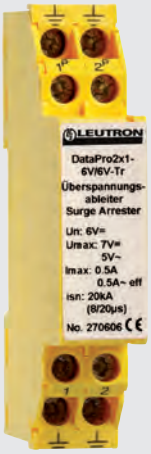
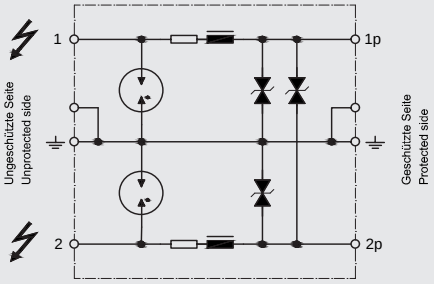
DataPro2x1 for DIN rail mounting

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment.



Basic circuit diagram



- Signal and data line protection with low-pass filter
- Protective circuit for 2 signal lines with common ground
- Max. operating current 500 mA
- Applicable at the boundaries LPZ 0B - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Space required for installation: 17.5 mm

					
Technical Data		**DP2x1-6V/6V-Tr**	**DP2x1-12V/12V-Tr**	**DP2x1-15V/15V-Tr**	**DP2x1-24V/24V-Tr**
Article-No.		27 06 06	27 12 12	27 15 15	27 24 24
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage DC	UN	6 V=	12 V=	15 V=	24 V=
Max. continuous operating voltage DC	Uc	7 V=	13,6 V=	17 V=	28 V=
Max. continous operating voltage AC	Uc	5 V~	10 V~	12 V~	20 V~
Nominal current	IN	0,5 A	0,5 A	0,5 A	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-earth)	Up	≤ 9 V	≤ 18 V	≤ 23 V	≤ 36 V
Leakage current at Umax	IL	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz	600 kHz	600 kHz
DC resistance	R	4,6 Ω	4,6 Ω	4.6 Ω	4.6 Ω
Series inductance, typ.	L	28 µH	28 µH	28 µH	28 µH
Response time	tA	≤ 2 ns	≤ 2 ns	≤ 2 ns	≤ 2 ns
Capacitance, line-earth	C	4 nF	< 2,3 nF	≤ 1.5 nF	≤ 1.3 nF
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow

Dimension drawing, see pages 186 to 190

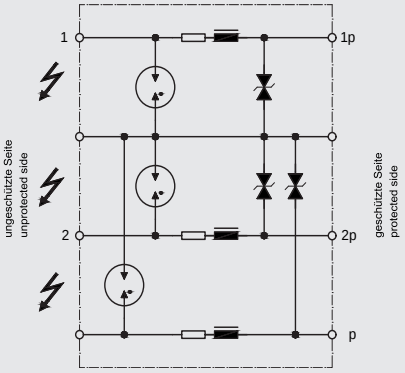
					
Technical Data		**DP2x1-30V/30V-Tr**	**DP2x1-36V/36V-Tr**	**DP2x1-48V/48V-Tr**	**DP2x1-60V/60V-Tr**
Article-No.		27 30 30	27 36 36	27 48 48	27 60 60
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage DC	UN	30 V=	36 V=	48 V=	60 V=
Max. continuous operating voltage DC	Uc	33 V=	40 V=	53 V=	64 V=
Max. continous operating voltage AC	Uc	22 V~	29 V~	37 V~	45 V~
Nominal current	IN	0,5 A	0,5 A	0,5 A	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-earth)	Up	≤ 45 V	≤ 55 V	≤ 72 V	≤ 90 V
Leakage current at Umax	IL	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz	600 kHz	600 kHz
DC resistance	R	4.6 Ω	4.6 Ω	4.6 Ω	4.6 Ω
Series inductance, typ.		28 µH	28 µH	28 µH	28 µH
Response time	tA	≤ 2 ns	≤ 2 ns	≤ 2 ns	≤ 2 ns
Capacitance, line-earth	C	≤ 1 nF	≤ 1 nF	≤ 0.8 nF	≤ 0.7 nF
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow

		without fig.	
Technical Data		**DP2x1-80V/80V-Tr**	**DP2x1-150V/150V-Tr**
Article-No.		27 80 80	27 04 04
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3
Nominal voltage DC	UN	80 V=	150 V=
Max. continuous operating voltage DC	Uc	85 V=	160 V=
Max. continous operating voltage AC	Uc	60 V~	112 V~
Nominal current	IN	0,5 A	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA	10 kA
Protection level at In (line-earth)	Up	≤ 140 V	≤ 250 V
Leckstrom bei Uc DC	IL	≤ 5 µA	≤ 5 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz
DC resistance	R	4,6 Ω	4.4 Ω
Series inductance, typ.		≤ 28 µH	28 µH
Capacitance, line-earth	C	≤ 1 nF	≤ 1 nF
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20

Dimension drawing, see pages 186 to 190

DataPro3x1 for DIN rail mounting

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment.



Basic circuit diagram

- Signal and data line protection with low-pass filter
- Protective circuit for 3 signal lines with common ground
- Applicable at the boundaries LPZ 0B - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Space required for installation: 17.5 mm
- Max. nominal current 500 mA

					
Technical Data		**DP3x1-12V/12V-Tr**	**DP3x1-15V/15V-Tr**	**DP3x1-24V/24V-Tr**	**DP3x1-30V/30V-Tr**
Article-No.		28 12 12	28 15 15	28 24 24	28 30 30
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage DC	UN	12 V=	15 V=	24 V=	30 V=
Max. continuous operating voltage DC	Uc	13,6 V=	17 V=	28 V=	33 V=
Max. continous operating voltage AC	Uc	12 V~	12 V~	20 V~	22 V~
Nominal current	IN	0,5 A	0,5 A	0,5 A	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA	10 kA	10 kA	10 kA
Protection level at In (line-earth)	Up	≤ 18 V	≤ 23 V	≤ 36 V	≤ 45 V
Leakage current at Umax DC	IL	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz	600 kHz	600 kHz
DC resistance	R	4.6 Ω	4.6 Ω	4.6 Ω	4.6 Ω
Series inductance, typ.		28 µH	28 µH	28 µH	28 µH
Capacitance, line-earth	C	≤ 2.3 nF	≤ 1,5 nF	≤ 1.3 nF	≤ 1 nF
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C
Max. conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

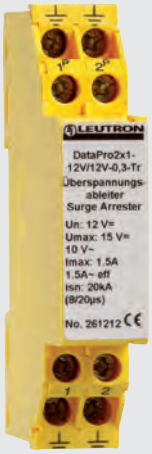
Dimension drawing, see pages 186 to 190

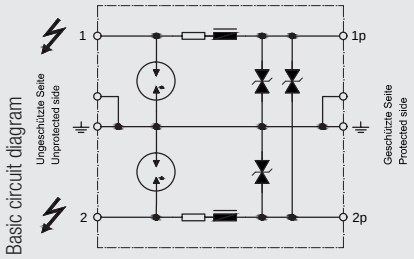
					
Technical Data		**DP3x1-36V/36V-Tr**	**DP3x1-48V/48V-Tr**	**DP3x1-60/60V-Tr**	**DP3x1-150V/150V-Tr**
Article-No.		28 36 36	28 48 48	28 60 60	28 04 04
IEC category/EN type		C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3	C1 / C2 / C3
Nominal voltage DC	UN	36 V=	48 V=	60 V=	150 V=
Max. continuous operating voltage DC	Uc	40 V=	53 V=	64 V=	160 V=
Max. continous operating voltage AC	Uc	29 V~	37 V~	45 V~	112 V~
Nominal current	IN	0,5 A	0,5 A	0,5 A	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA	10 kA	10 kA	20 kA
Protection level at In (line-earth)	Up	≤ 55 V	≤ 72 V	≤ 90 V	≤ 250 V
Leakage current at Umax DC	IL	≤ 5 µA	≤ 5 µA	≤ 5 µA	≤ 5 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz	600 kHz	600 kHz
DC resistance	R	4.6 Ω	4.6 Ω	4.6 Ω	4.4 Ω
Series inductance, typ.		28 µH	28 µH	28 µH	28 µH
Capacitance, line-earth	C	≤ 1 nF	≤ 0.8 nF	≤ 0.7 nF	≤ 1 nF
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C
Conductor cross section		2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve	2.5mm² solid or 1.5mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow	Polycarbonate (halogen-free) UL 94-V0/yellow
Degree of protection (IEC EN 60529)		IP 20	IP 20	IP 20	IP 20

Dimension drawing, see pages 186 to 190

DataPro2x1 0,30hm-Tr

Lightning current and surge voltage protection for particularly long signal and bus lines. Thanks to the extremely low volume resistance (impedance only 0.3 Ω) no noteworthy signal losses occur. It is a combined arrester to protect two single wires. Applicable at the LPZ transition point 0A-1 and higher.





- Signal and data line protection with low-pass filter
- Very low volume resistance
- Protective circuit for 2 signal lines with common ground
- Applicable at the boundaries LPZ 0A - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20
- Space required for installation: 17.5 mm

					
Technical Data		**DP 2x1-12V/12V-0,3Ω -Tr**	**DP 2x1-24V/24V-0,3Ω -Tr**	**DP 2x1-30V/30V-0,3Ω-Tr**	**DP 2x1-36V/36V-0,3Ω -Tr**
Article-No.		26 12 12	26 24 24	26 30 30	26 36 36
IEC category/EN type		C1 / C2 / C3 / D1	C1 / C2 / C3 / D1	C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
Nominal voltage DC	UN	12 V=	24 V=	30 V=	36 V=
Max. continuous operating voltage DC	Uc	28 V=	33 V=	35 V=	40 V=
Max. continous operating voltage AC	Uc	20 V~	22 V~	25 V~	29 V~
Nominal current	IL	1,5 A	1,5 A	1,5 A	1,5 A
Longitudinal impedance (DC resistance) per wire	Z	0,3 Ω	0,3 Ω	0,3 Ω	0,3 Ω
Series inductance, typ.		56 µH	56 µH	56 µH	56 µH
Response time fine protection	tA	≤ 2 ns	≤ 2 ns	≤ 2 ns	≤ 2 ns
C2 nominal discharge current (8/20 µs)	In	10 kA	10 kA	10 kA	10 kA
D1 lightning impulse current (10/350 µs)	Itotal	5 kA	5 kA	5 kA	5 kA
D1 lightning impulse current (10/350 µs) per line	Iimp	2,5 kA	2,5 kA	2,5 kA	2,5 kA
Protection level at In resp. 1 kV/µs (line-earth)	Up	≤ 18 V	≤ 36 V	≤ 42 V	≤ 55 V
Capacitance, line-earth	C	≤ 2,3 nF	≤ 1,3 nF	≤ 1,1 nF	≤ 1 nF
Max. operating frequency (-3 dB)	fG	<600 kHz	< 600 kHz	< 600 kHz	<600 kHz
Insulation resistance	Risol	>10 GΩ	> 10 GΩ	> 10 GΩ	>10 GΩ
Operating temperature range	TU	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C	-25 - +85 °C
Max. conductor cross section		2.5 mm² single-wire / 1.5 mm² flexible with sleeve	2.5 mm² single-wire / 1.5 mm² flexible with sleeve	2.5 mm² single-wire / 1.5 mm² flexible with sleeve	2.5 mm² single-wire / 1.5 mm² flexible with sleeve

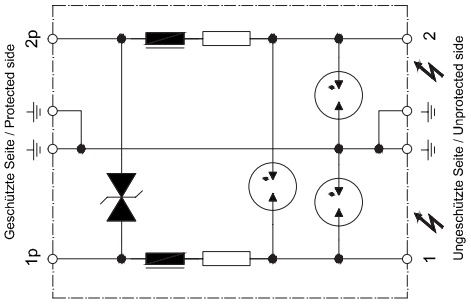
Dimension drawing, see pages 186 to 190

DataPro2x1-RLC/50V-Tr

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment. Surge voltage protector for electronical equipment with an operating voltage of up to 50 V DC, with an impulse current withstand strength of 20 kA (8/20 µs). The devices was designed to protect sensitive electronic equipment.

- Signal and data line protection with low-pass filter
- Protective circuit for 2 signal lines without reference to ground potential
- Max. nominal current 100 mA
- Applicable at the boundaries LPZ 0B - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)

Basic circuit diagram



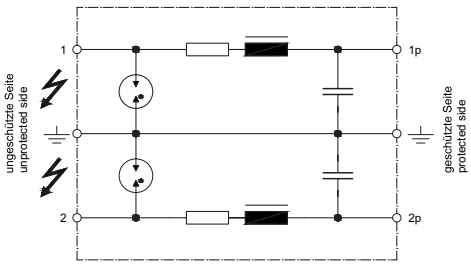
Technical Data		DP 2x1-RLC/50V-Tr
Article-No.		28 70 50
IEC category/EN type		C1 / C2 / C3
Max. continuous operating voltage DC	Uc	50 V=
Nominal current	IN	0,1 A
C2 Nominal discharge current (8/20)	Imax	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA
Protection level at 1kV/µs (1p-2p)	Up	≤ 60 V
Protection level at 1kV/µs (1p,2p-PE)	Up	≤ 650 V
Response time 1p-2p, 2-PE (at 1kV/µs)	tA	≤ 2/25 ns
Operating temperature range	TU	-25 +85 °C
Max. conductor cross section		2.5 mm² solid or 1.5 mm² flexible with sleeve
Enclosure material / colour		Polycarbonate (halogen-free), UL 94-V0 / yellow
Protection circuit casting compound		Polyurethan, flexible
Degree of protection (IEC EN 60529)		IP 20
Dimension (DIN 43880)		17.5 mm

DataPro2x1-RLC-Tr

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment.

- Signal and data line protection with low-pass filter
- Operating voltage up to 150 V DC
- Protective circuit for 2 signal lines with common ground
- Mounting on 35 mm DIN rail (EN 60715)
- Degree of protection according to IEC EN 60529: IP 20

Basic circuit diagram



Technical Data		DP 2x1-RLC-Tr
Article-No.		27 00 00
IEC category/EN type		C1 / C2 / C3
Nominal voltage DC	UN	150 V=
Max. continuous operating voltage DC	Uc	170 V=
Max. continous operating voltage AC	Uc	120 V~
Nominal current	IN	0,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA
C2 Nominal discharge current (8/20) per line	In	10 kA
Leakage current at Umax DC	IL	≤ 0,001 µA
Max. operating frequency (-3 dB)	fG	100 kHz
DC resistance	R	4,3 Ω
Series inductance, typ.		185 µH
Capacitance, line-earth	C	≤ 2,2 nF
Protection level line-earth at 1kV/µs and n	Up	≤ 800 V
Operating temperature range	TU	-25 - +85 °C
Max. conductor cross section		2.5 mm² solid or 1.5 mm² flexible with sleeve
Dimension (DIN 43880)		17.5 mm

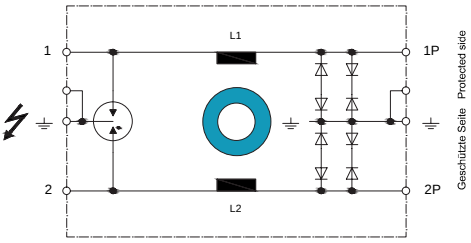
Dimension drawing, see pages 186 to 190

DataPro2-2MB-Tr

EMC filter for data and signal lines combined with surge protection enables smooth operation of sensitive electronic equipment in rough environment.

- Signal and data line protection with low-pass filter
- Applicable for transmission rates of 2 MBit/s (ISDN, PCM)
- Max. nominal current 500 mA
- Applicable at the boundaries LPZ 0B - 2 and higher
- Mounting on 35 mm DIN rail (EN 60715)
- Space required for installation: 17.5 mm

Basic circuit diagram



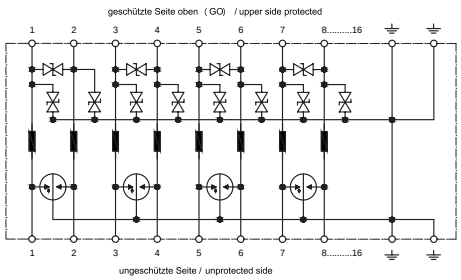
Technical Data		DP2-2MB-Tr
Article-No.		24 00 17
IEC category/EN type		C1 / C2 / C3
Nominal voltage DC	UN	150 V=
Max. continuous operating voltage DC	Uc	170 V=
Max. continous operating voltage AC	Uc	120 V~
Nominal current	IN	0,5 A
C2 Nominal discharge current (8/20)	Imax	10 kA
C2 Nominal discharge current (8/20) per line	In	5 kA
Protection level line-earth at 1 kV/µs	Up	≤ 600 V
Max. operating frequency (-3 dB)	fG	8 MHz
Operating temperature range	TU	-25 - +85 °C
DC resistance	R	0,5 Ω
Signal tranismission rate		up to 2 Mbit/s
Conductor cross section		2.5 mm² solid or 1.5 mm² flexible with sleeve
Dimension (DIN 43880)		17.5 mm

DataPro2x8-36V/36V-Tr

Designed to protect sensitive input and output interfaces at electronical devices. Suitable, e.g., for fire alarm systems. Alternatively, GO or GU version to provide clear wiring (GO = protected side on top, GU = protected side at the bottom).

- High performance surge protector
- Dimension: 45 x 110 x 121 mm
- Merging of eight lines
- Two-stage low-pass filter

Basic circuit diagram



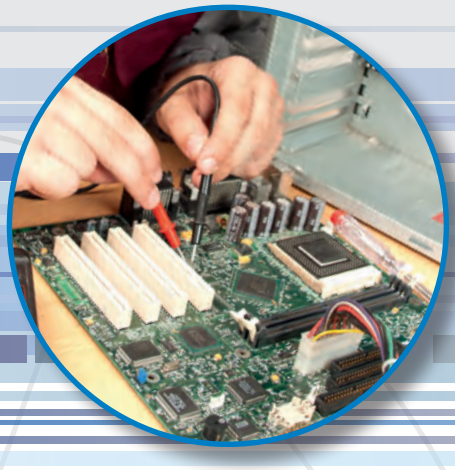
Technical Data		DP 2x8-36V/36V-Tr/GO	DP 2x8-36V/36V-Tr/GU
Article-No.		27 90 00	27 90 01
Nominal voltage DC	UN	< 36 V=	< 36 V=
Max. continuous operating voltage DC	Uc	40 V=	40 V=
Max. continous operating voltage AC	Uc	28 V~	28 V~
Nominal current	IL	1,5 A	1,5 A
C2 Nominal discharge current (8/20)	Imax	20 kA	20 kA
C2 Nominal discharge current (8/20) per line	In	2,5 kA	2,5 kA
Protection level at In (line-earth)	Up	≤ 75 V	≤ 75 V
Leakage current at Umax DC	IL	0,001 µA	0,001 µA
Max. operating frequency (-3 dB)	fG	600 kHz	600 kHz
DC resistance, typ.	R	4,6 Ω	4,6 Ω
Series inductance, typ.	L	28 µH	28 µH
Capacitance, line-earth	C	1 nF	1 nF
Operating temperature range	TU	-25 - +80 °C	-25 - +80 °C
Cross section for data line terminals		2.5 mm² flexible with sleeve	
Cross section for earth connection terminals		6 mm² flexible with sleeve	
Enclosure material / colour		Polycarbonate (halogen-free) UL 94-V0/yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20

Dimension drawing, see pages 186 to 190

SMOOTH OPERATION GUARANTEED

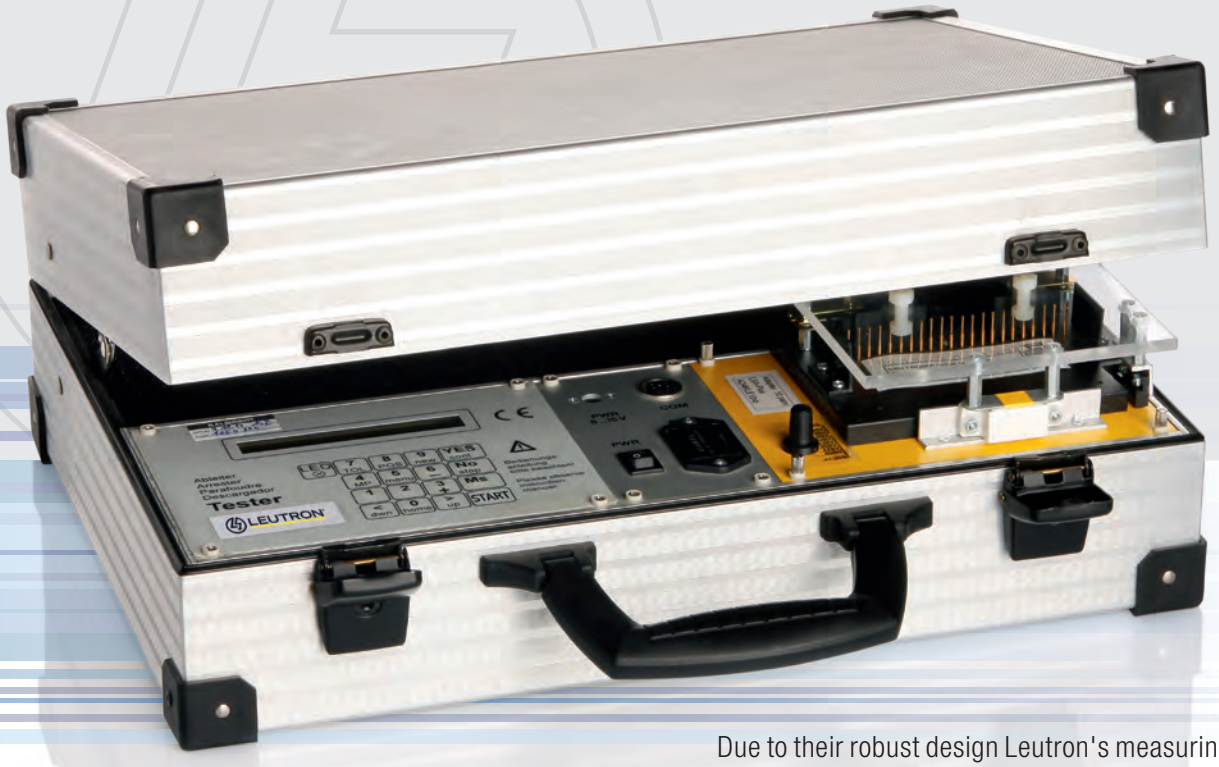
The measuring and testing devices are applied to check the sparkover voltage of lightning or surge protectors. These periodical tests of the protective function are demanded by the standards to ensure a steady and error-free operation.

Down-time caused by overload of the surge protection can be eliminated by periodical reviews – with measuring and testing devices from Leutron.



TESTED FOR SAFETY – MANUALLY OR AUTOMATICALLY:

- Manual measurement with the arrester tester, the varistor tester or the combined tester
- Fully automatic measurement with the portable test equipment for SSCT magazines
- Available adaptors for all types of gas-filled surge protectors



Due to their robust design Leutron's measuring and testing devices are perfectly suited for regular mobile use.

MONITORING

PORTABLE TEST EQUIPMENT FOR SSCT (LSA) MAGAZINES

Variable adapters for different types of magazines

Fully automated test of SSCT (LSA) magazines for overvoltage protection

PC interface for remote control and data archiving

Robust and mobile set-up in an easy to handle aluminium case

COMBINED TESTER

- To test the sparkover voltage of lightning or surge protectors, e.g. MOV and gas discharge tubes

FUNCTION TESTER FOR GDT AND GDT BASED SPARK-GAPS

H35, H45, H65

- Digital measuring instrument with large LCD display
- 9V battery operation or net work power unit
- Measuring adapter (optional) for all popular GDT
- Automatic fixing of indicated value
- Scope of delivery includes: 1 carrying case, 1 test leads (2 pieces 1m each), 2 test terminals, 1 external power supply 230V

H35 Function tester for GDT and GDT based spark-gaps

For the testing of spark over voltage of lightning and surge voltage arresters based on expulsion-type spark gap. Mobile, easy-to-handle digital meter with a large LCD display for maintenance.

H45 Function tester for MOV and overvoltage protection diodes.

For testing of the spark-over voltage of lightning- and surge voltage arresters. Digital measuring device with large LCD display. Mobile and easy-to-handle, usable for the service area.

H65 Universal function tester for GDT, MOV and diodes as well as mixed circuits

For the testing of spark over voltage of lightning and surge voltage arresters, e.g. metal oxide varistors (MOV) and gas-filled surge arrester (GDT) or individually MOV and GDT. It is a mobile, easy-to-handle and microprocessor operated digital meter with a large LCD display for maintenance.

Technical Data	H35	H45	H65
Article No.	87 00 10	16 02 00	87 01 50
Measured value display	LCD, digital [V]	LCD, digital [V]	LCD, digital [V]
Measuring range	40 - 1000 V	40 - 1100 V	40 - 1100 V
Max. testing voltage	1200 V	1200 V	1200 V
Test current	0,1mA	0,8-1,1 mA	0,8 - 1,1 mA
Display division	1 V	1 V	1 V
Testing period	min. 1s up to measuring value is seen	min. 1s up to measuring value is seen	min. 1s up to measuring value is seen
Rate-of-Rise (voltage)	1000 V /s	k. A.	1000 V/s
Batterie	9 V IEC 6F22/NEMA-1604-A	9 V IEC 6F22/NEMA-1604-A	9 V IEC 6F22/NEMA-1604-A
External AC/DC adapter	8 - 11 V DC/300 mA	230V AC / 8 -12 V DC / 200 mA	8 - 11 V DC / 200 mA
Typical current consumption in stand-by position	0,2 mA	0,2 mA	k.A.
Typical current consumption during measuring activity	35 mA	20 - 200 mA	20 - 200 mA
Typical current consumption display	k.A.	200 mA	ca. 1 mA
Test terminals (4mm banana jack)	Minus pole: black / Plus pole: red	Minus pole: black / Plus pole: red	Minus pole: black / Plus pole: red
Operating temperature range	-10 - +35 °C	-10 - +35 °C	-10 - +35 °C
Dimensions (L x W x H)	180 x 90 x 30 mm	180 x 90 x 30 mm	180 x 90 x 30 mm
Enclosure material / colour	self-extinguishing plastic / black	self-extinguishing plastic / black	self-extinguishing plastic / black
Net weight / pc	600 g	630 g	630 g

Accessories	Measuring adapter ADE/FGH:	Measuring adapter ADE/E :	Calibration
Article No.	87 00 60	87 00 70	87 00 30

Measuring adapter ADE/FGH:
For two pole gas discharge tubes
8x8mm,8x6mm, 8x20mm

Measuring adapter ADE/E :
For gas discharge tubes type E
Bauform E

Leutron GmbH · Humboldtstrasse 30 · 70771 Leinfelden-Echterdingen · Germany · Phone +49 711 94771-0 · www.leutron.de

Portable test equipment for GDT in LSA magazines

A46

For testing of LSA arrester magazines equipped with GDT. The whole test equipment is fixed in a portable case with place for a lot of accessories (e.g. AC- adapter, test adapter for different kindog GDT magazines). At each test cycle each GDT arrester inserted in a magazine, the spark-over voltage in both polarities is analysed and compared with the tolerance values, adjusted in the test program.

For the testing of GDT equipped LSA magazines. The test equipment is embedded in a metal case which has additional space for accessories like network adapters and test adapters for different arrester magazines.

Each GDT in the magazine is tested on both polarities, and the static dc sparkover voltage is compared with the tolerance values.

- PC connection
- Individual tester can be stored in a PC or printed via included software
- Other test adapters are available on request
- Mobile device in aluminium protection case

Technical Data	A46
Article No.	87 01 00
Slow ramp (CCITT/VDE)	100 V/s
Fast ramp	1000 V/s
Measuring range	5-800 V
Test current	50 mA
Resolution, internal	12 bit = 0,2 V
Display resolution	1 V
Accuracy	+/- 1 V +1 % rel.
Resolution	0,2
Batterie	9 V IEC 22
External AC/DC adapter	8-5 V / 50 mA
Typical current consumption in stand-by position	5 mA
Typical current consumption during measuring activity	30 mA
Max. usable positions	30 pos
Net weight / pc	5000 g

The A45 allows for an accurate measuring of the dc sparkover voltage, by detecting the first sparkover with a linear ramp. It is important to measure on both polarities in order to prevent damages to the gas-filled surge arrester.

The whole testing of the magazine takes place automatically, including the comparison of the measured values with the tolerance values and the fault detection. The test of a complete magazine filled with 20 GDTs takes about 13 seconds.

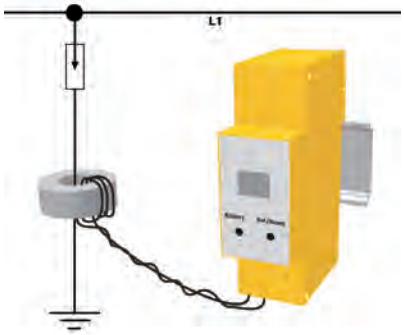
A quality assessment system can be set up with the software PRO-TEST.

The A46 can operate entirely remote controlled from a PC via its serial interface. A special optocoupler-based cable is necessary to provide an interference protection for the PC.

Pulse counter

For the potential-free measurement of discharge currents of surge protective devices. Easy snap-on installation on the earth conductor with the help of an two-piece ring core.

- Pulse counting assembly in 1.5 TE DIN rail-mounted device
- including twisted sensor cable (lenght 1 m)
- Batteries are included in the delivery scope
- Push button to adjust the meter reading (e.g. after battery change)



Technical Data		LC 1
Article No.		87 00 05
Impulse spark-over wave (rise time >8µs)		> 1 kA
Pulse frequence		< 1 s
LCD display		0 - 99
Power Supply		9 V-Batterie
Operating temperature range	TU	-10 - +50 C°
Mounting on		35 mm DIN rail
Enclosure material / colour		Thermoplastic, yellow
Degree of protection (IEC EN 60529)		IP 20
Lenght of connection cable (sensor)		max. 1 m
Dimension (L x B x H)		63 x 27 x 90 mm
Sensor max. cross section		25 mm²

Maßzeichnungen siehe Seiten 180 bis 184

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THE STRENGTHS OF LEUTRON SINCE 1947

The long experience and, therefore, the lead in research and development makes Leutron one of the leading manufacturers of isolation spark gaps. Intelligently designed components, compact constructions and an ideal choice of rare-gas fillings are only some elements that, in their totality, provide an optimal protection for various applications in the areas of electronics and electrical engineering.

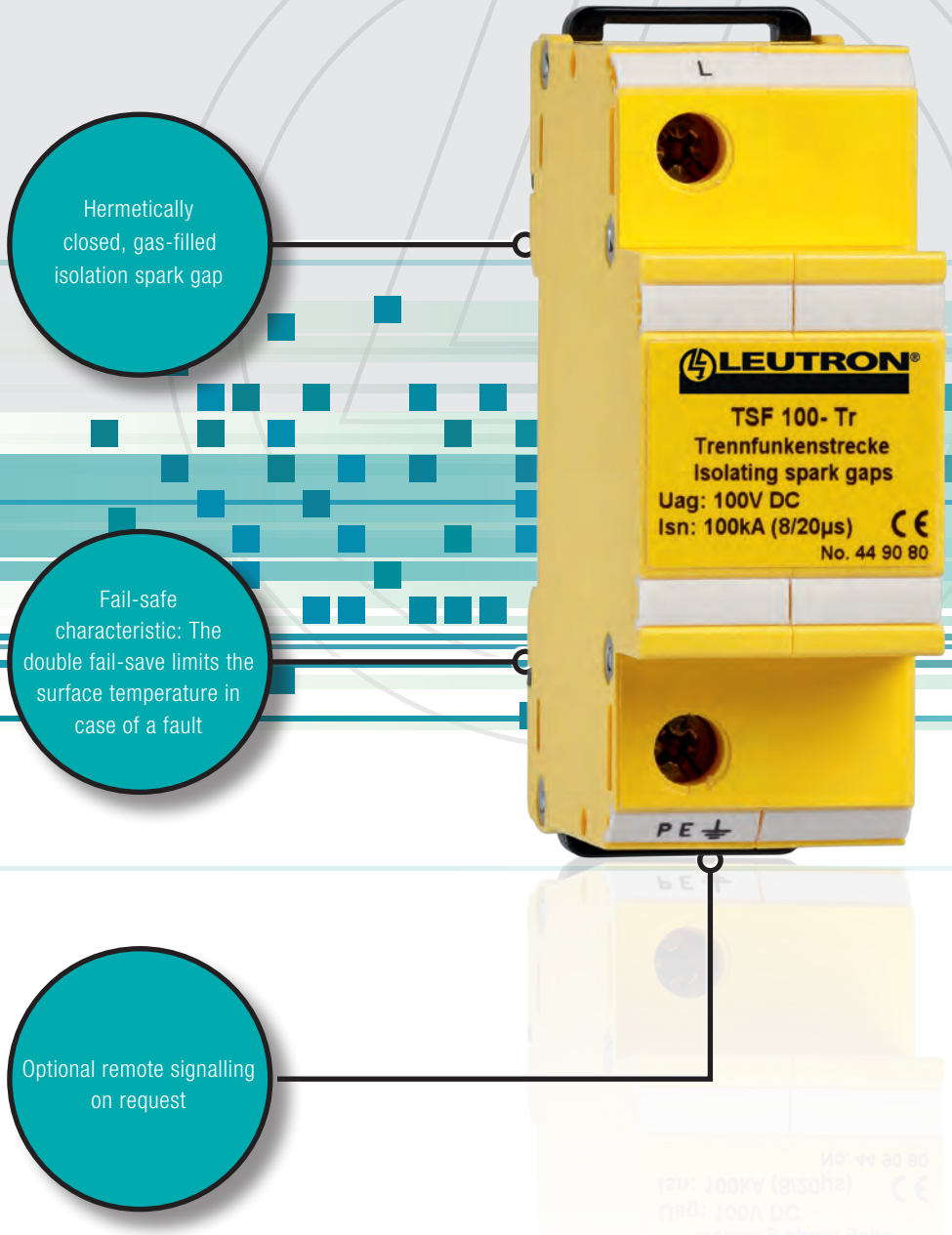
Robust and powerful protection against direct lightning strikes – Leutron's isolation spark gaps.

GAS-FILLED ISOLATING SPARK GAPS FOR MORE SAFETY:

- Low DC and AC voltage protection level
- Very high ignition constancy even in demanding environments
- Maintenance-free due to automatic signalization in case of an overload
- Ideally suited for application in explosion-hazard environments
- Improved operator protection due to low sparkover voltage

Secure application
even in explosion-hazard environments

ISOLATING SPARK GAPS
FILLED WITH RARE-GAS


Hermetically closed, gas-filled isolation spark gap
Fail-safe characteristic: The double fail-save limits the surface temperature in case of a fault
Optional remote signalling on request
L
LEUTRON
TSF 100- Tr
Trennfunkenstrecke
Isolating spark gaps
Uag: 100V DC
Isn: 100kA (8/20µs)
No. 44 90 80
PE

ISOLATION SPARK GAPS FOR AREAS IN DANGER OF EXPLOSION: ATEX

- High discharge capacity up to 100 kA (10/350 µs), class H
- Low sparkover voltage

Fail-safe characteristic: The double fail-safe limits the surface temperature in case of a fault

Hermetically closed, gas-filled isolation spark gap

Degree of protection IP 67 (according to IEC EN 60529), suited for outdoor application

TSF 100 and 500

Rare-gas-filled spark gap for the lightning protection equipotential bonding, the insulation of electrically separated parts and the bridging of insulating flanges of gas pipelines.

Basic circuit diagram

- High-quality industrial ceramics
- Rare-gas filled, hermetically sealed
- Free from radioactive substances
- High lightning current discharge capacity of 100 kA (10/350) (class H)
- High reliability, robust
- Stable performance, long service life
- Fail-safe characteristic
- Test standard EN 50164-3

Technical Data		TSF 100	TSF 500
Article-No.		44 90 69	48 78 01
IEC category/EN type		Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	100 ±20% V=	500 ±15% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	70 ±20% V	350 ±15% V
Typical impulse sparkover voltage	Uas	650 V	950 V
Max. impulse sparkover voltage	Uas	950 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	100 kA	100 kA
5x Nominal alternating discharge current at 50Hz, 1s, 3min pause	Iwn	100 / 1 A	100 / 1 A
Nominal alternating discharge current (50 Hz)		200 / 0,5 A	200 / 0,5 A
Spark-gap extinguishing conditions	Vlö	<70V / <20A V	<230V / <100A V
Insulation resistance at 10V, 100V		> 1 GΩ	>1 GΩ
Self-capacitance at 1 kHz		6 pF	4 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh
Degree of protection		IP 67	IP 67
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Terminals		M8 bolt/nut (NIROSTA stainless steel)	

Accessories	
Product	TSF-H1
Article-No.	44 91 75

For solid fixation of isolation spark gaps TSF 100 and TSF 500 at the installation.

Dimension drawing, see pages 186 to 190

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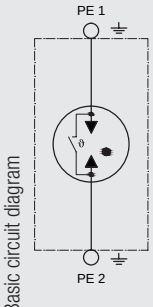
SGO 70 and 350

Rare-gas-filled spark gap for the lightning protection equipotential bonding, the insulation of electrically separated parts and the bridging of insulating flanges of gas pipelines. Weather-resistant, moulded metal/ceramic isolating spark gap with terminal lugs for M8 screw connection. Waterproof moulded in polyurethan diecast.



Basic circuit diagram

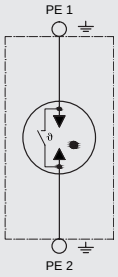
- High-quality industrial ceramics
- Rare-gas filled, hermetically sealed
- Free from radioactive substances
- High lightning current discharge capacity of 100 kA (10/350) (class H)
- Extremely low sparkover voltage
- High reliability, robust, waterproof
- Fail-safe characteristic
- Stable performance, long service life
- Test standard EN 50164-3


Technical Data		SGO 70	SGO 350
Article-No.		47 21 17	47 22 13
IEC category/EN type		Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	100 ±20% V=	500 ±15% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	70 ±20% V	350 ±15% V
Typical impulse sparkover voltage	Uas	650 V	950 V
Max. impulse sparkover voltage	Uas	950 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	100 kA	100 kA
5x Nominal alternating discharge current at 50Hz, 1s, 3min pause	Iwn	100 / 1 A	100 A
Nominal alternating discharge current (50 Hz)		200 / 0,5s A	200/0,5s A
Wechselstrom-Grenzbelastung (50Hz)	Iwgr	4.000 / 0,25 A/s	4.000 / 0,25 A/s
Insulation resistance at 10V, 100V		>1 GΩ	>1 GΩ
Spark-gap extinguishing conditions	Vlö	<70V/ <20A V	< 230 V
Self-capacitance at 1 kHz		9 pF	7 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh
Degree of protection		IP 67	IP 67
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C

Dimension drawing, see pages 186 to 190

TA 100 and 500 C

Rare-gas-filled spark gap for the lightning protection equipotential bonding, the insulation of electrically separated parts and the bridging of insulating flanges of gas pipelines. The product is for outdoor use where a high level of protection against lightning and other climatic influences as well as mechanical stress is needed.



Basic circuit diagram

- High-quality industrial ceramics
- Rare-gas filled, hermetically sealed
- Free from radioactive substances
- High lightning current discharge capacity of 100 kA (10/350) (class H)
- High reliability, robust, waterproof
- Extremely low sparkover voltage
- Stable performance, long service life
- Fail-safe characteristic
- Test standard EN 50164-3

			
Technical Data		**TA 100 C**	**TA 500 C**
Article-No.		48 78 14	48 78 27
IEC category/EN type		Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	100 ±20% V=	500 ±15% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	70 ±20% V	350 ±15% V
Typical impulse sparkover voltage	Uas	650 V	950 V
Max. impulse sparkover voltage	Uas	950 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	100 kA	100 kA
5x Nominal alternating discharge current at 50Hz, 1s, 3min pause	Iwn	100 A	100 A
Nominal alternating discharge current (50 Hz)		200 / 0,5 A	200/0,5 A
Wechselstrom-Grenzbelastung (50Hz)	Iwgr	4.000 / 0,25 A/s	4.000 / 0,25 A/s
Spark-gap extinguishing conditions	Vlö	<70V / <20A V	< 230V/<100A V
Insulation resistance at 10V, 100V		>1 GΩ	>1 GΩ
Self-capacitance at 1 kHz		9 pF	7 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh
Degree of protection		IP 67	IP 67
Operating temperature range	TU	-40 - + 80 °C	-40 - +80 °C

Accessories		
Product	IF3	IF1
Article-No.	82 30 16	82 30 11

Connecting brackets IF 1 (twin titled) and IF 3 (stretched) made from hot-dip zinc galvanized steel with 20 mm hole.

Dimension drawing, see pages 186 to 190

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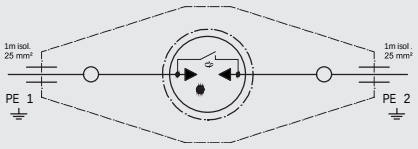
SGO 70 and 350 QA

Rare-gas-filled spark gap for the lightning protection equipotential bonding, the insulation of electrically separated parts and the bridging of insulating flanges of gas pipelines. Waterproof isolating spark-gap for underground installation (soil). Moulded in PU diecast, with cables.

Basic circuit diagram



- High-quality industrial ceramics
- Rare-gas filled, hermetically sealed
- Free from radioactive substances
- High lightning current discharge capacity of 100 kA (10/350) (class H)
- Extremely low sparkover voltage
- Stable performance, long service life
- Fail-safe characteristic
- Including 2m or 0.5.m connection cables with 25 mm² cross section
- SNAM execution
- Test standard EN 50164-3

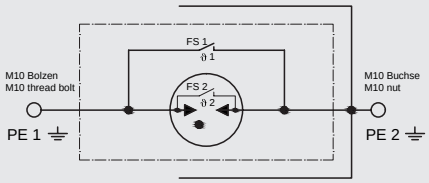
					
Technical Data		**SGO 70 QA**	**SGO 70 QA-S**	**SGO 350 QA**	**SGO 350 QA-S**
Article-No.		47 21 04	47 21 05	47 21 11	47 21 12
IEC category/EN type		Class H	Class H	Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	100 ±20% V=	100 ±20% V=	500 ±15% V=	500 ±15% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	70 ±20% V	70 ±20% V	350 ±15% V	350 ±15% V
Typical impulse sparkover voltage	Uas	650 V	650 V	950 V	950 V
Max. impulse sparkover voltage	Uas	950 V	950 V	1300 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	100 kA	100 kA	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	100 kA	100 kA	100 kA	100 kA
5x Nennableitwechselstrom 50 Hz, 1s/3min Pause	Iwn	100/1 A	100/1 A	100/1 A	100/1 A
Nennableitwechselstrom (50 Hz)		200 / 0,5 A	200 / 0,5 A	200 / 0,5s A	200 / 0,5s A
Wechselstrom-Grenzbelastung (50 Hz)	Iwgr	4.000 / 0,25 A/s	4.000 / 0,25 A/s	4.000 / 0,25 A/s	4.000 / 0,25 A/s
Spark-gap extinguishing conditions	Vlö	< 70V / <20A V	< 70V / <20A V	< 230V/< 100A V	< 230V/< 100A V
Isolationswiderstand bei 10 V, 100 V		>1 GΩ	>1 GΩ	>1 GΩ	>1 GΩ
Eigenkapazität bei 1 kHz		9 pF	9 pF	7 pF	7 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh	10%...95% rh	10%...95% rh
Degree of protection		IP 67	IP 67	IP 67	IP 67
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Connection cable length/cross section		2 m/ 25 mm²	0,5 m/ 25 mm²	2 m/ 25 mm²	0,5 m/ 25 mm²
Total length with terminals	TU	≤ 4340 mm	1340 mm	≤ 4340 mm	1340 mm

Dimension drawing, see pages 186 to 190

TC 100 and 500 A

ATEX approved Ex-protection category. Lightning-protective equipotential bonding in hazardous areas, e.g. insulating flanges at gas pipelines, at ca-thodic corrosion protection and protection of pressure transmitters.

Basic circuit diagram

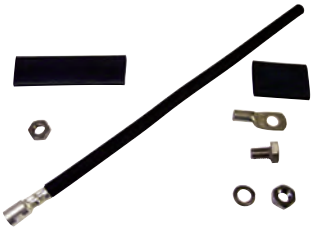


- High-quality industrial ceramics
- Rare-gas filled, hermetically sealed
- Free from radioactive substances
- Extremely low sparkover voltage
- High lightning current discharge capacity of 100 kA (10/350) (class H)
- High reliability, robust
- Stable performance, long service life
- Fail-safe behaviour (twofold)
- Patented product
- Test standard EN 50164-3

Technical Data		TC 100 A	TC 500 A
Article-No.		48 78 30	48 78 50
IEC category/EN type		Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	100 ±20% V=	500 ±15% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	70 ±20% V	350 ±15% V
Typical impulse sparkover voltage	Uas	650 V	950 V
Max. impulse sparkover voltage	Uas	950 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	10x 100 kA	100 kA
5x Nom. altern. disch. current at 50Hz, 1s, 3min pause	Iwn	100/s A	100 A
Nominal alternating discharge current (50 Hz)		200/0,5s A	200 / 0,5s A
Spark-gap extinguishing conditions	Vlö	< 70V / < 20A V	< 230 V/ 100A V
Insulation resistance at 10V, 100V		>1 GΩ	>1 GΩ
Self-capacitance at 1 kHz		20 pF	20 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh
Degree of protection		IP 67	IP 67
ATEX Degree of protection		Ex II 2G EEx m II T3 (ZELM 02 ATEX 0095X)	EX II 2G EEx m II T3 (ZELM 02 ATEX 0095x)
Operating temperature range	TU	-40 - +90 °C	- 40 - +90 °C

Accessories										
Product	K1/150	K1/300	K1/400	K1/500	K1/600	K1/750	K1/1000	K2/2000	IF3	IF1
Article-No.	49 51 06	49 51 08	49 51 05	49 51 04	49 51 11	49 51 12	49 51 13	49 51 14	82 30 16	82 30 11

Connecting cable sets K1/XXXX for TC 100A and TC 500A with cable length of 150 mm up to 1000 mm.



Connecting brackets IF 1 (twin titled) and IF 3 (stretched) made from hot-dip zinc galvanized steel with 20 mm hole.

Dimension drawing, see pages 186 to 190

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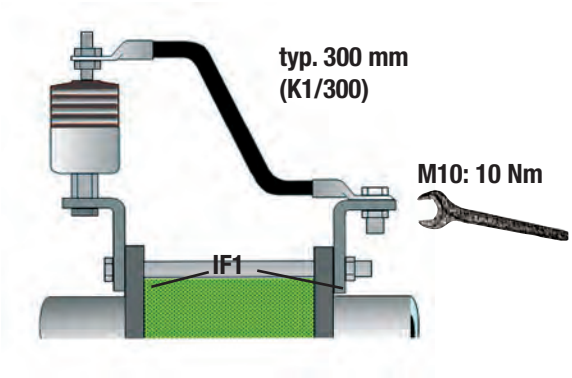
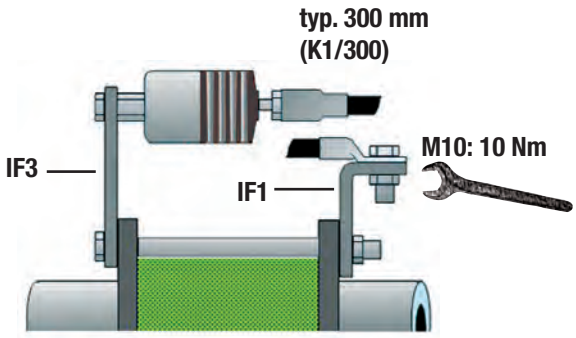
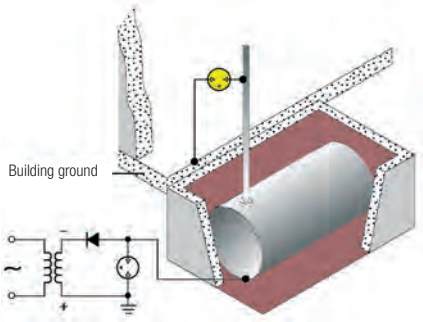
Mounting: to bridge insulating flanges

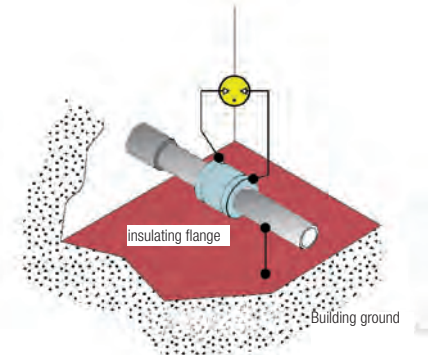


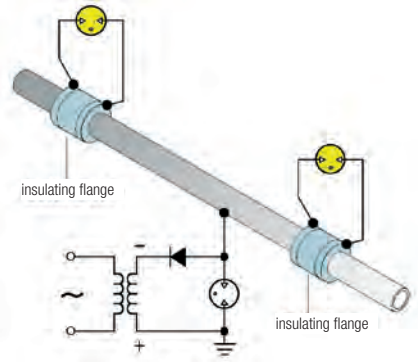


Use only tinned cable shoes or zinc plated connection parts (corrosion protection). All connections has to be safed by spring washer against shock and vibrations. For insulation parts, joint and flanges, as well as the GDT-Spark Gaps, it should not be able to be bridged by metal tools, metal parts, dirt, wast water or any current leading material.

Application examples







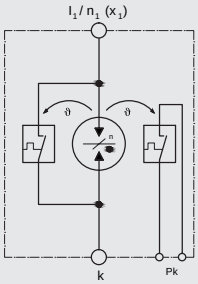
Description

Gasfilled spark gap for using in Ex areas.

- Filled with innert gas and hermetically sealed spark gap for Lightning protection equipotential bonding acc. to DIN EN 62305/VDE 0185 in Ex areas.
- For indirect lightning protective connection / grounding, of separate grounded electrical systems.
- To bridge insulation joints and parts, insulation flanges etc. in cathodic protected pipeline sections.
- For safe use in Ex-zones 1+2 (ex-hazardous gases up to temperature class T3) .

TF for DIN rail mounting

Protects measuring transformers; lightning and surge voltage protector for 1A respectively 5A cores in current transformers.



Basic circuit diagram

- Very high impulse and AC current resistivity
- No blow-out vents, thus, not requiring any safety clearance to other installations
- High insulation resistance: R_{iso} >10 GΩ
- Very long service life
- Lightning impulse current discharge capacity 100 kA (10/350 µs)
- Remote signal contact (PK)

					
Technical Data		**TF 100Tr/Th-Pk**	**TF 500-Tr**	**TF 500Tr/Th-Pk**	**TF 2000Tr/Th-Pk**
Article-No.		53 43 72	53 43 98	53 43 85	55 04 11
DC spark-over voltage	Uag	100 ±20% V=	500 ±20% V=	500 ±20% V=	2000 (-10% / +20%) V=
AC spark-over voltage	Uaw	70 ±20% V~	350 ±20% V~	350 ±20% V~	1414 (-10% /+-20%) V~
Impulse sparkover voltage at 1 kV/µs	Uas	typ. 650 / max. 900 V	typ. 1000 / max. 1300 V	typ. 1000 / max. 1300 V	< 3.000 V
Impulse sparkover voltage at 1 kV/ns (100 MHz)	Uas	typ. 1600 / max. 1900 V	typ. 2800 / max. 3000 V	typ. 2800 / max. 3000 V	n. d.
Capacitance	C	≤ 18 nF	≤ 6 nF	≤ 16 nF	≤ 16 nF
Insulation resistance at 10 V	Riso	≥ 1 GΩ	≥ 1 GΩ	≥ 1 GΩ	≥ 1 GΩ
Nominal discharge current (8/20)	In	10x 100 kA	10x 100 kA	10x 100 kA	10 x 60 kA
Lightning impulse current (10/350) (limp) + long-time current 200 A/0.5 s/100 As	Ipeak	1x 100 kA	1x 100 kA	1x 100 kA	1 x 60 kA
Lightning impulse current (10/350) (limp) + long-time current 200 A/0.5 s/100 As	Q	50 As	50 As	50 As	30 As
Lightning impulse current (10/350) (limp) + long-time current 200 A/0.5 s/100 As	W/R	2500 kJ/Ω	2500 kJ/Ω	2500 kJ/Ω	900 kJ/Ω
Lightning impulse current limp (10/45 µs) + half-wave 1.6 kA (DIN 48810)	Ipeak	20x 60 kA	20x 60 kA	20x 60 kA	20 x 60 kA
Lightning impulse current limp (10/45 µs) + half-wave 1.6 kA (DIN 48810)	Q	10 As	10 As	10 As	10 As
Lightning impulse current limp (10/45 µs) + half-wave 1.6 kA (DIN 48810)	W/R	100 kJ/Ω	100 kJ/Ω	100 kJ/Ω	100 kJ/Ω
5x Nominal alternating discharge current at 50Hz, 1s, 3min pause	Iwn	100 A	100 A	100 A	100 A
Operating temperature range	TU	-40 - +75 °C	-40 - +75 °C	-40 - +75 °C	-40 - +75 °C
Conductor cross section		25 mm²	25 mm²	25 mm²	25 mm²
Max. connection torque for terminals		4,5 Nm	4,5 Nm	4,5 Nm	4,5 Nm

Dimension drawing, see pages 186 to 190

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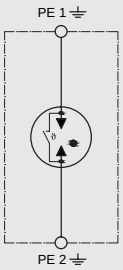
TSF for DIN rail mounting

Rare-gas-filled spark gap for the lightning protection equipotential bonding, the insulation of electrically separated parts and the bridging of insulating flanges of gas pipelines.



Basic circuit diagram

- Light. imp. current resistance (10/350µs): 100 kA
- Mounting on 35 mm DIN rail
- Test standard EN 50164-3
- Degree of protection nach IEC EN 60529: IP 20

				
Technical Data		**TSF 50-Tr**	**TSF 100-Tr**	**TSF 500-Tr**
Article-No.		44 90 76	44 90 80	44 90 85
IEC category/EN type		Class 1L	Class H	Class H
Nominal DC sparkover voltage at 100V/s	UagN	n. d.	100 ±20% V=	500 ±20% V=
Nominal AC sparkover voltage (50 Hz)	Uaw	50 ±15% V	70 ±20% V	350 ±20% V
Typical impulse sparkover voltage	Uas	n. d.	650 V	950 V
Max. impulse sparkover voltage	Uas	n. d.	950 V	1300 V
Lightning impulse current discharge capacity (10/350)	Ipeak	25 kA	100 kA	100 kA
Nominal impulse discharge current (10x 8/20)	In	25 kA	100 kA	100 kA
5x Nominal alternating discharge current at 50Hz, 1s, 3min pause	Iwn	n. d.	100 A	100/1 A
Nominal alternating discharge current (50 Hz)		n. d.	200 A / 0,5s A	200/0,5s A
Alternating current critical load (50 Hz)	Iwgr	n. d.	4.000 A / 0,25s A/s	4000/0,25 A/s
Spark-gap extinguishing conditions		n. d.	<70V / < 20A V	< 230 V / < 100 A V
Insulation resistance at 10V, 100V		>1 GΩ	>1 GΩ	> 1 GΩ
Self-capacitance at 1 kHz		6 pF	6 pF	4 pF
Test category/climatic category		DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21	DIN IEC 60068-1 / 40/90/21
Relative humidity		10%...95% rh	10%...95% rh	10%-95% rh
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Max. conductor cross section		50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible

Dimension drawing, see pages 186 to 190

SMALLER, MORE COMPACT AND MOST EFFICIENT

Extended metal structures like gas pipelines are endangered by induced AC voltages from high-voltage overhead lines and suchlike. These voltages can cause corrosion and pitting and, therefore, have to be diverted. Leutron's PLPro is the most compact and, at the same time, most robust solution available for such problems.

The application of Leutron's worldwide tried and tested technology saves time and money.

PROTECTION OF OUTDOOR INSTALLATIONS:

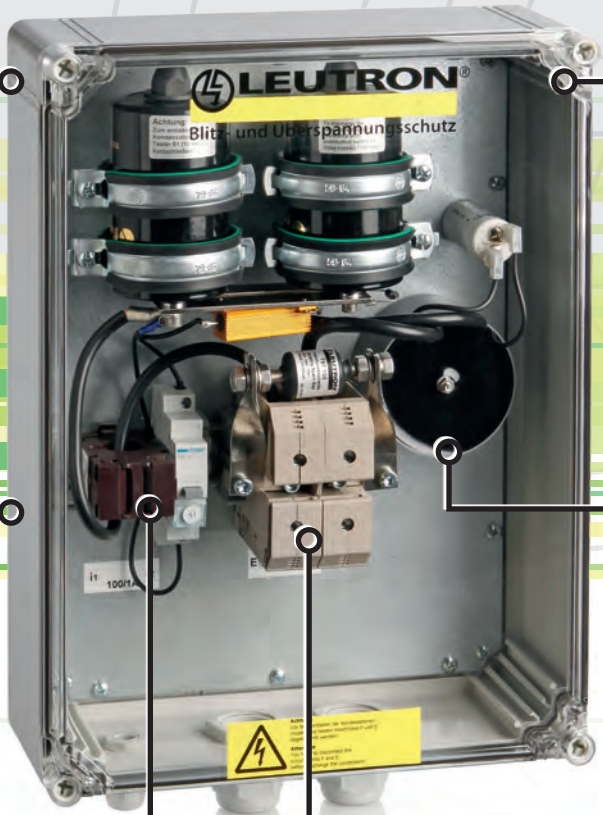
- Monitoring possible by remote measurement of the current flow
- Lightning current carrying capacity up to lightning protection level LPL 1
- No interference with detection signals on pipelines
- Cascadable, i.e., adaptable to the value of the current to divert
- Reliable diversion of harmful AC voltages in metal structures

Leutron's protective devices are
maintenance-free due to enclosed arresters

PROTECTIVE DEVICES
FOR AC ARRESTING

AC CURRENT DIVERTER FOR 80 A FOR THE PROTECTION OF CATHODIC CORROSION PROTECTION SYSTEMS (CCPS) OF PIPELINES

- High discharge capacity up to 100 kA (10/350 µs), class H
- Low sparkover voltage



Cascadable to divert higher currents

Lightning current up to 100 kA (10/350 µs), suited for lightning protection level LPL 1

Arresters up to 80 A AC

No interference with detection signals on pipelines due to a bandpass filter

Integrated current transformer to monitor the diverted current continuously

Connection terminal up to 150 mm²

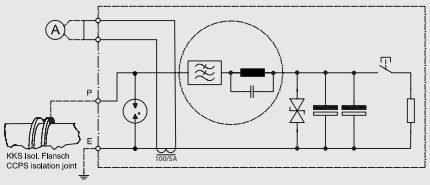
REFERENCE: V&C KATHODISCHER KORROSIONSSCHUTZ GES.M.B.H., AUSTRIA

»For a number of years we now use Leutron's PLPro system to divert alternating currents. The systems installed so far operate smoothly, and we never received any complaints from customers. At the insulating flanges of our cathodic corrosion protection systems we very often apply ATEX certified isolation spark gaps TC 100 A. They too work to the satisfaction of our customers. So far no malfunction or break-down occurred.«

PLPro

With an active cathodic corrosion protection the installation is permanently protected against the electrochemical process of corrosion. For that matter a grid supplied rectifier is inserted between the installation (e.g. a pipeline) and an anode that serves as earth electrode. By connecting two or three PLPro units in parallel the overall current can be elevated up to 80 A respectively 120 A.

Basic circuit diagram



- AC discharge current: 40 or 80 A
- Several PLPro devices can be connected in parallel to raise the total discharge current
- Maintenance-free, without liquids
- No disturbance of search signals
- Monitoring of discharge current with integrated current transformer possible
- Integrated lightning and surge current protection up to 100 kA (10/350 µs)
- Safety switch for discharging the capacitors

Technical Data		PLPro-40A-iV	PLPro-80A-iV
Article-No.		55 04 40	55 04 41
Rated voltage (P-E)	Umax	25 V=	25 V=
Max. continuous diverting current 50Hz (P-E)	IA	40 A~	80 A~
Short-time discharge current for 1s/50Hz (P-E)	Imax	400 A~	400 A~
Leakage current (P-E)	IL	≤ 1 mA	≤ 1 mA
Nominal discharge current (8/20 µs) (P-E)	In	10x 100 kA	10x 100 kA
Lightning impulse current (10/350)	limp	100 kA	100 kA
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Terminals (P/E)		min. 16 / max. 150 mm²	min. 16/max. 150 mm²
Current transformer		100:1 A	100:1 A
Terminals (current transformer i1, i2)		25 mm²	max. 2,5 mm²
Terminals (current transformer i1, i2)	T	-20 - +45 °C	-20 - +45 °C
Mounting type		wall mounting	wall mounting
Dimensions (L x W x H)		400 x 300 x 132 mm	600 x 400 x 132 mm
Degree of protection (IEC EN 60529)		IP 65	IP 65

Dimension drawing, see pages 186 to 190

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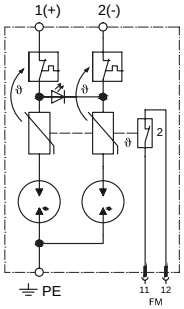
EnerPro CV 2P xxV/63A-LED

These devices are predominantly used for cathodic corrosion protection sys-tems at gas and oil pipelines with bitumen insulation layer.

- Mounting directly on DIN rail
- Operating current up to 63 A
- Version with and without LED available
- Leakage current-free

Basic circuit diagram



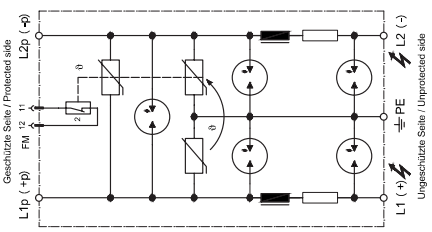
			
Technical Data		**EP CV 2P 65V/63A-LED**	**EP CV 2P 100V/63A-LED**
Article-No.		38 20 80	38 20 86
Nominal voltage DC	UN	30 V=	100 V=
Nominal voltage AC	UN	36 V~	75 V~
Max. continuous operating voltage DC	Uc	65 V=	125 V=
Max. continuous operating voltage AC	Uc	45 V~	95 V~
Max. allowed prefuse		63 A gL/gG	63 A gL
Voltage protection level (1kV/µs)	Up	≤ 0,55 kV	
Protection level at 1 kV/µs (1, 2-PE)	Uas	≤ 0,55 kV	≤ 0,6 kV
Response time	tA	50 ns	550 ns
Nominal impulse discharge current (8/20)	In	20 kA	20 kA
Max. impulse discharge current (8/20)	Imax	40 kA	50 kA
Lightning impulse current (10/350 µs) per pole	Iimp	5 (2,5 As) kA	5 (2,5 As) kA
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. Conductor cross section (1, 2 and PE)		50mm² stranded/35mm² flexible	
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		DIN rail 35 mm (DIN EN 50 022)	
with remote signalling contakt (FM)		**EP CV 2P 65V/63A/FM-LED**	**EP CV 2P 100V/63A/FM-LED**
Article-No.		38 20 83	38 20 87
Max. switching capacity of remote signal contact		AC: 250V/0,5A //DC: 250V/0,1A	AC: 250V/0,5A //DC: 250V/0,1A
Max. cross section of the remote signalling line		1,5 mm²	1,5 mm²

EnerPro 65V/12A-Tr

Two-pole USP for operating currents up to 12 A and a nominal impulse discharge current of 20 kA (8/20 µs) for sensitive electronical devices.

- Two-stage design
- High performance surge protector
- Mounting on 35 mm DIN rail
- Operating current: 12 A
- Maximum acceptable DC continuous operating voltage of 65 V DC
- With filter

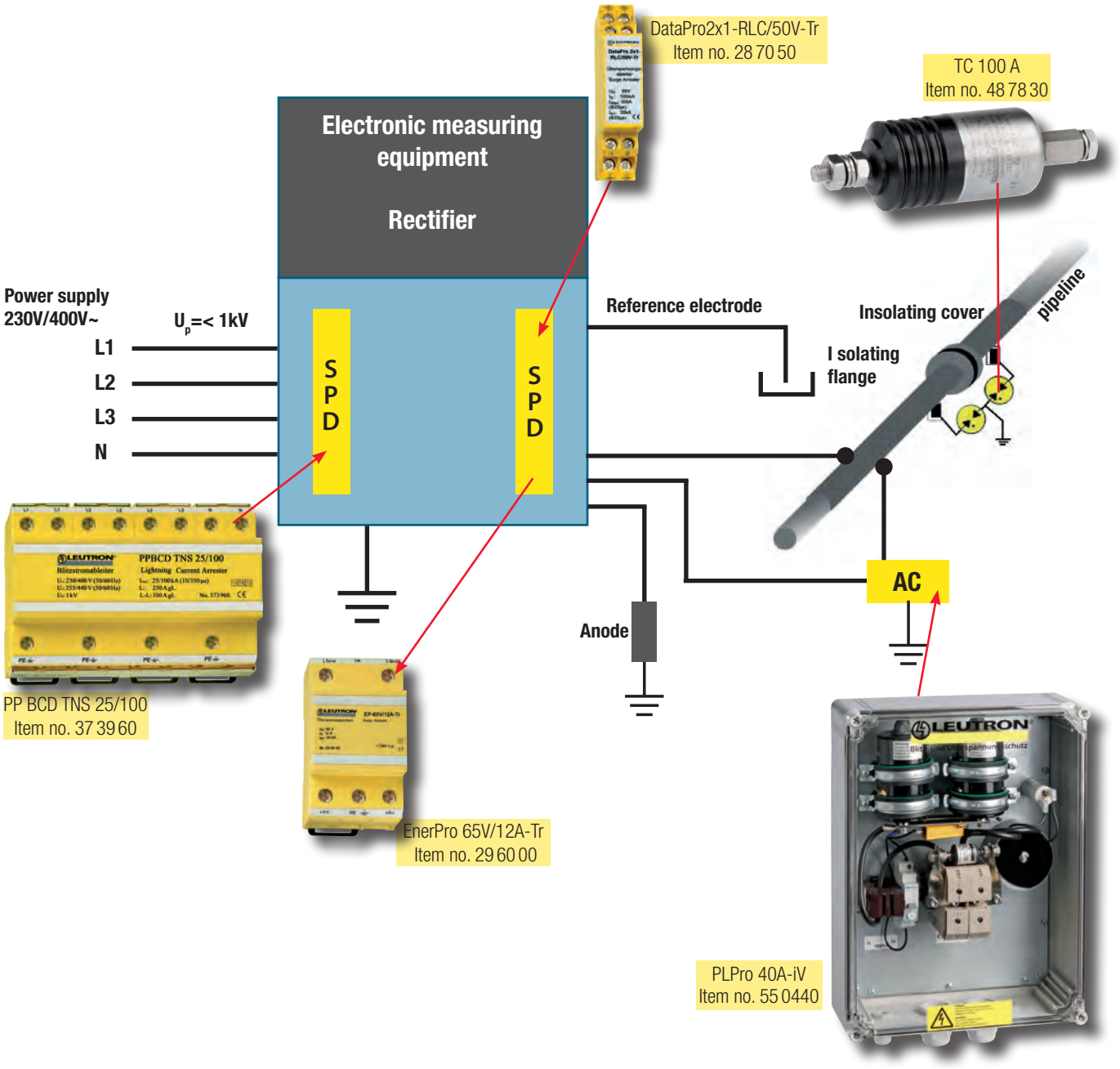
Basic circuit diagram



			without fig.
Technical Data		**EnerPro 65V/12A-Tr**	**EnerPro 65V/12A-Tr/FM**
Article-No.		29 60 00	29 60 02
Max. continuous operating voltage DC	Uc	65 V=	65 V=
Rated load current	IL	12 A	12 A
Protection level at 1kV/µs	Up	≤ 350 V	≤ 350 V
Nominal impulse discharge current (8/20)	In	20 kA	20 kA
Response time	tA	≤ 25 ns	≤ 25 ns
Max. impulse discharge current (8/20)	Imax	40 kA	40 kA
Lightning impulse current (10/350 µs) per pole	Iimp	5 (2,5 As) kA	5 (2,5 As) kA
Nominal alternating discharge current (50Hz)		20 (5x1s, 50Hz, 3min. Pause) A	20 (5x1s, 50Hz, 3min. Pause) A
Max. conductor cross section		50mm² stranded/35mm² flexible	50mm² stranded/35mm² flexible
Operating temperature range	TU	-40 - +80 °C	-40 - +80 °C
Max. connection torque for terminals		4,5 Nm	4,5 Nm
Enclosure material / colour		polycarbonate (halogen-free) UL 94-V0 / yellow	
Degree of protection (IEC EN 60529)		IP 20	IP 20
Mounting on		DIN rail 35 mm (DIN EN 50 022)	
FM contact / contact type			break contact
Switching capacity			250 V/2 A

Dimension drawing, see pages 186 to 190

Protection system for Cathodic Corrosion Protection
(schematic diagramm)



Properties of PLPro:

- Maintenance-free
- Integrated lightning and surge current protection up to 100 kA (10/350 µs)
- High impulse discharge current
- Safety switch for discharging the capacitors
- Does not have to be disconnected during leakage detection with HF detector (10 kHz)
- Can be mounted in a weather-proof outdoor cabinet or box without further protection measures
- Built-in measuring circuit with analogue display for ac discharge current
- No danger for operating personnel

In general, PLPro consists of five components:

- AC discharge unit, consisting of high-performance capacities (2 piecs per 40 A)
- Surge protection device (fine protection) for the capacitors
- Measurement of the discharge current 100/1 A, AC current transformer, indicating instrument (on request)
- 10 kHz band-elimination filter which prevents the diversion of the 10 kHz search frequency of the leakage detectors against earth
- Lightning protection (coarse protection) by rare-gas-filled isolating spark gap 100 kA (10/350 µs) with low sparkover voltage

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Test Standards

DIN EN 61643-11
VDE 0675-6-11:2013-04
Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and tests (IEC61643-1:1998 + corrigendum 1998, modified); German version
EN 61643-11:2013-04

IEC 61643-1:2011-03
Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods

DIN EN 61643-21
VDE 0845-3-1:2010-03
Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signalling networks - Performance requirements and test methods (IEC61643-21:2000 + Corrigendum 2001 + A1:2008, modified); German version EN 61643-21:2001 + A1:2009

IEC 61643-21 (2009-04) Ed. 1.1
IEC 61643-21:2000 + A1:2008
Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signalling networks - Performance requirements and testing methods

DIN EN 50164-3
VDE 0185-203:2009-09
Lightning Protection Components (LPC) - Part 3: Requirements for isolating spark gaps; German version EN 50164-3:2006 + A1:2009

DIN EN 60715:2001-09
Dimensions of low-voltage switchgear and controlgear - Standardized mounting on rails for mechanical support of electrical devices in switchgear and controlgear installations (IEC 60715:1981 + A1:1995); German version EN 60715:2001

DIN EN 60529
VDE 0470-1:2000-09
Degrees of protection provided by enclosures (IP code) (IEC 60529:1989 + A1:1999); German version EN 60529:1991 + A1:2000

IEC 60529 (2001-02) Ed. 2.1
Degrees of protection provided by enclosures (IP Code)

Application standards

DIN VDE 0100-443:2007-06,
Low voltage electrical installations, Part 4-44: Protection against voltage disturbances and electromagnetic disturbances - Clause 443: Protection against overvoltages of atmospheric origin or due to switching (IEC 60364-4-44:2001 + A1:2003, modified); German implementation HD 60364-4-443:2006

DIN VDE 0100-534:2009-02,
Low voltage electrical installations, Part 5-53: Selection and erection of electrical equipment - isolating, switching and control - clause 534: Devices for protection against ovrvoltages (IEC 60364-5-53:2001/A1:2002, modified); German implementation HD 60364-5-534:2008

DIN VDE 0100-100:2009-06
Low voltage electrical installations, Part 1: Fundamental principles, assessments of general characteristics, definitions (IEC 60364-1:2005, modified); German implementation HD 60364-1:2008

DIN VDE 0100-410:2007-06
Low voltage electrical installations, Part 4-41: Protection for safty - Protection against electic shock (IEC 60364-4-41:2005, modified); German implementation HD 60364-4-41:2007

DIN EN 62305-1
VDE 0185-305-1:2011-10
Protection against lightning - Part 1: General principles (IEC 62305-1:2010, modified); German version EN 62305-1:2011

DIN EN 62305-2
VDE 0185-305-2: 2006-10
Protection against lightning - Part 2: Risk management (IEC 62305-2:2006); German version EN 62305-2:2006

DIN EN 62305-3
VDE 0185-305-3: 2011-10
Protection against lightning - Part 3: Physical damage to structures and life hazard (IEC 62305-3:2010, modified); German version EN 62305-3:2011

DIN EN 62305-4
VDE 0185-305-4:2011-10
Protection against lightning - Part 4: Electrical and electronic systems within structures (IEC 62305-4:2010, modified); German version EN 62305-4:2011

IEC 62305-1 (2010-12) Ed. 2.0
Protection against lightning - Part 1: General principles

IEC 62305-2 (2010-12) Ed. 2.0
Protection against lightning - Part 2: Risk management

IEC 62305-3 (2010-12) Ed. 2.0
Protection against lightning - Part 3: Physical damage to structures and life hazard

IEC 62305-4 (2010-12) Ed. 2.0
Protection against lightning - Part 4: Electrical and electronic systems within structures

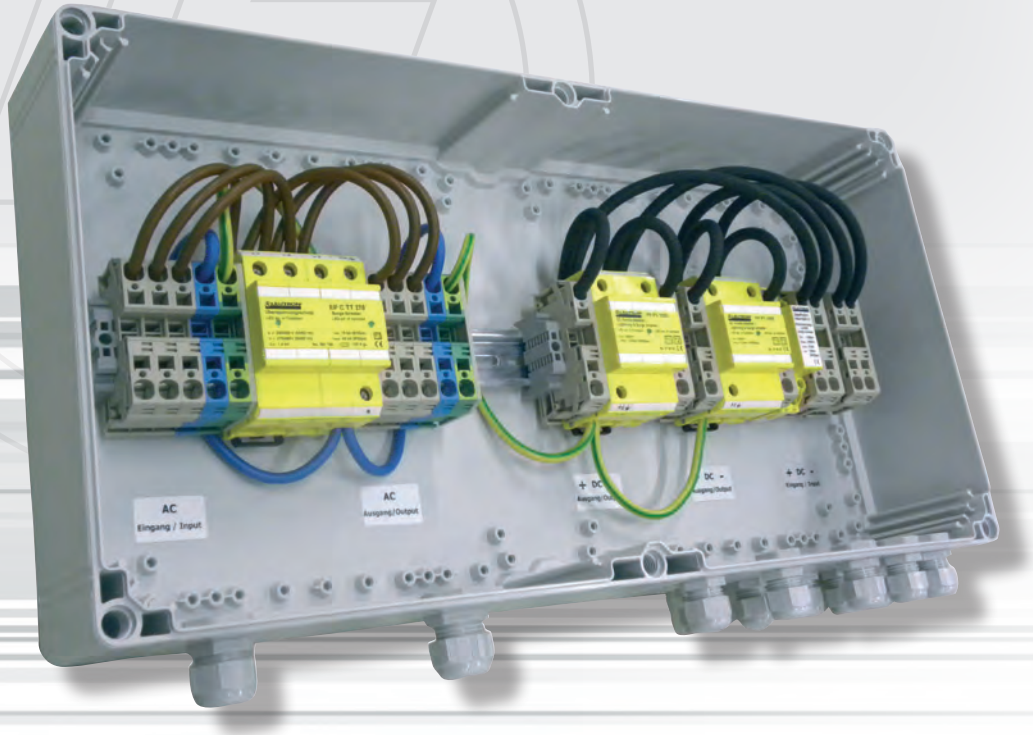
LEUTRON PROTECTS THE FUTURE

Because photovoltaic systems (among other things) are the future. Whether for new buildings or for renovations, for private residences or for office buildings: these systems are being installed on more and more roofs across the world.

In addition to the modules, the photovoltaic system is also integrated into the building‘s electrical systems, which are necessarily vulnerable todirect or indirect lightning strikes.
Lightning strikes and power surges have serious consequences: aside from production losses, there are also high repair costs - Costs that Leutron can keep down.

LEUTRON PROTECTS PHOTOVOLTAIC SYSTEMS UP TO 1000 V DC

- External lightning protection
- Use und dimensioning of Surge Protective Devices

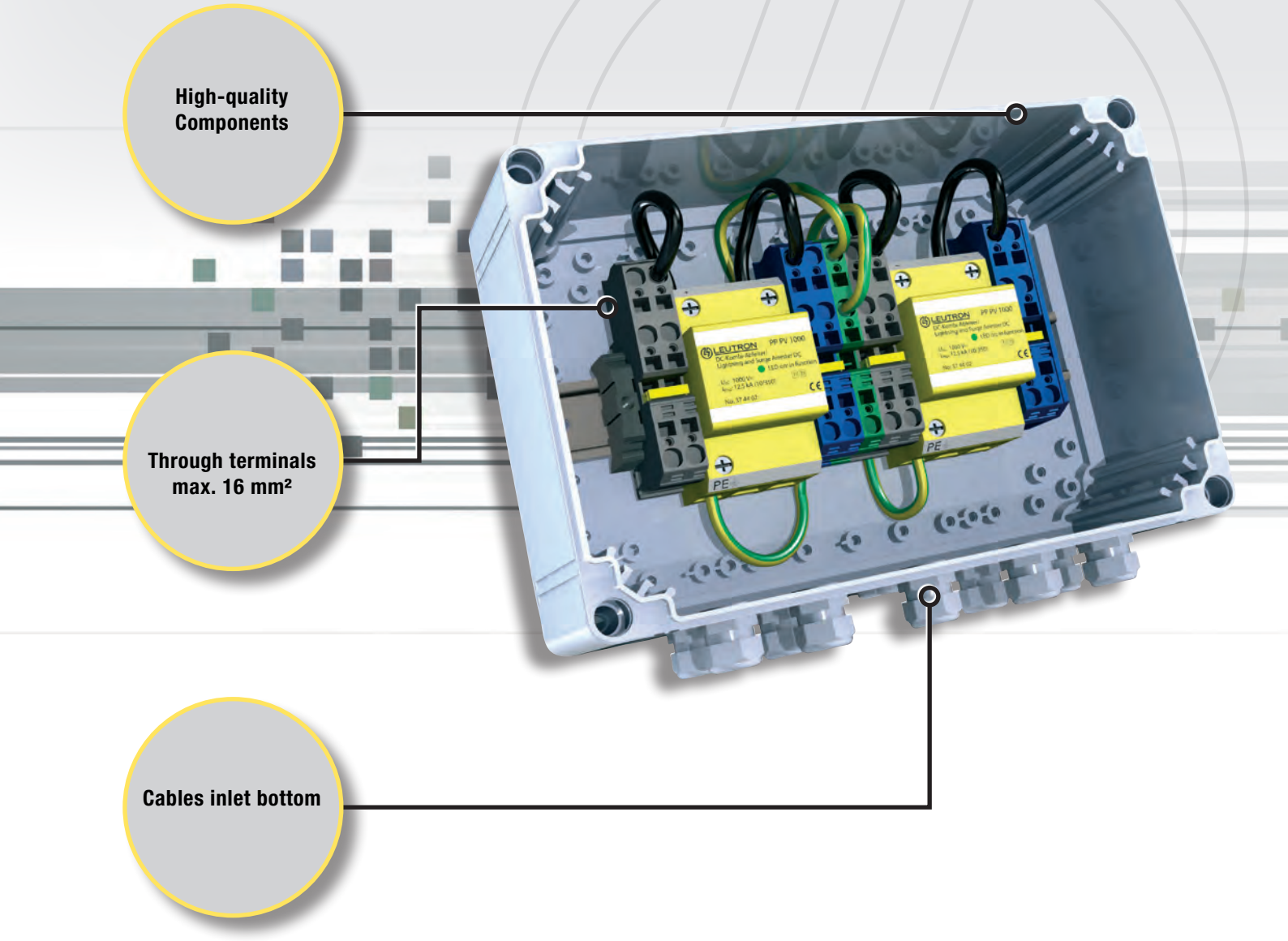


High-quality protection devises for Photovoltaic systems:
Generator Connection Box with Surge Protection Devicees

SURGE PROTECTION
OF PV SYSTEMS

ALL-ROUND PROTECTION WITH GENERATOR CONNECTION BOXES

- Efficient installation: Several strings of the PV arangement are brought togehter in one point
- Cable installation without effort
- Realization of projekts are flexible, safe and economical
- Thanks of SPD type 1+2 (class I+II) effective surge protection is real

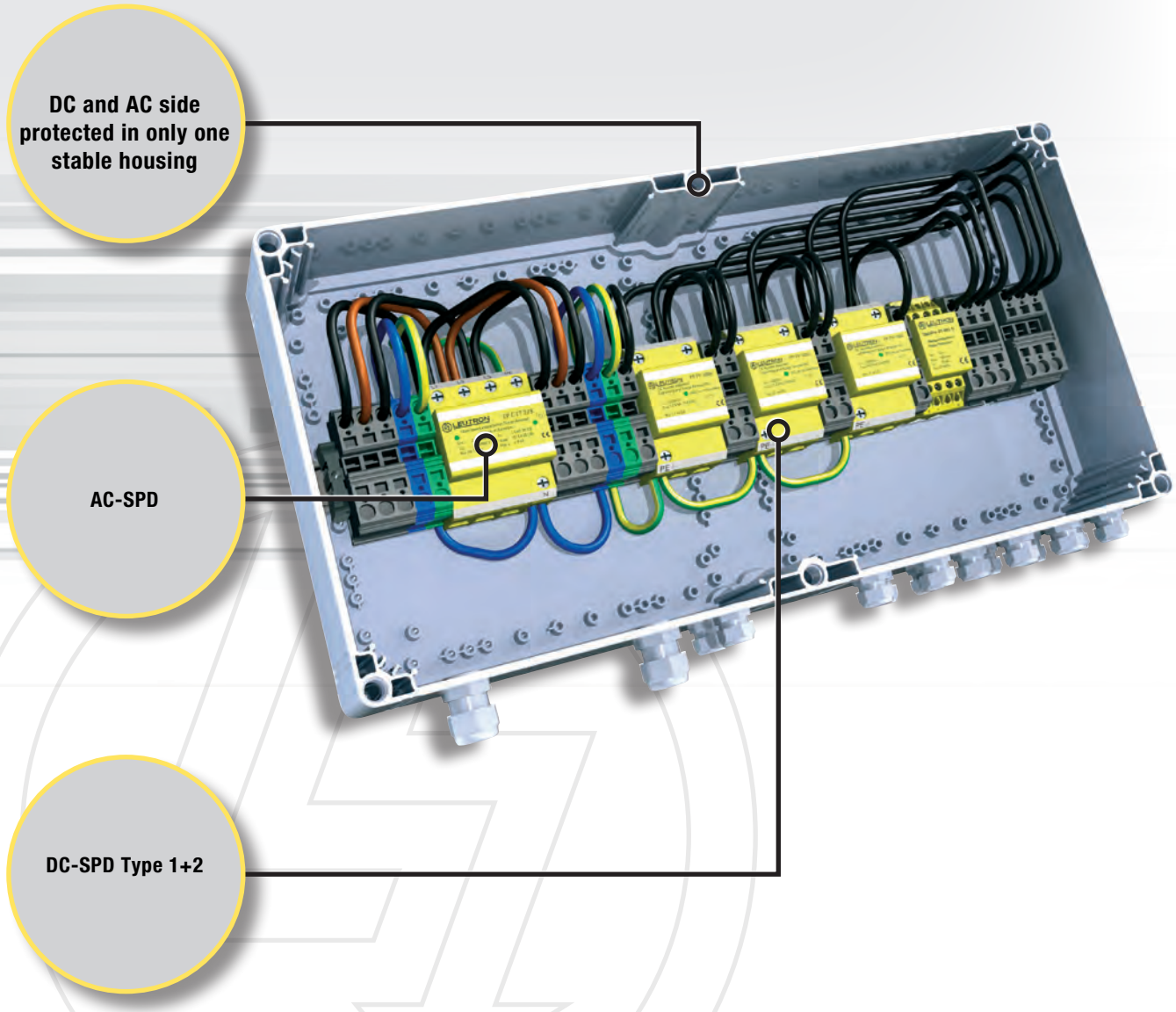


SELECTION GENERATOR CONNECTION BOXES

- Open-circuit voltage of the strings
- Number of the strings
- Number of the MPP tracker

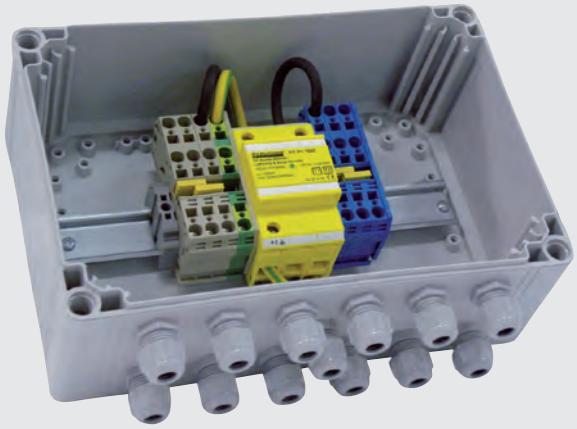
CHARACTERISTICS OF GENERATOR CONNECTION BOXES

- For DC or DC/AC installations
- With or without remote monitoring
- For the use with string fuses and string diodes
- For outdoor installation
- UV resistance
- Protection class II



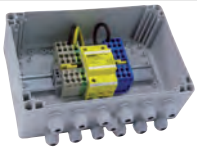
GAK 3/3

Generator connection box for one inverter with one MPP tracker and maximum eight terminal points per plus and minus pole.



Example image

- Housing of surface mounting (300 x 200 x 132 mm) / IP66
- 8 Terminal points are arbitrary (e. g. for 4x Input terminal and 4x output terminal)
- One SPD type 1+2 with 1000 V
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measure-ment



Technical Data	PV DC 4.1000-2-S1
Article-No.	80 00 82
Max. system voltage	1000 V=
Max. current per input terminal (+)	57 A
Max. current per output terminal	57 A
Operating temperature range TU	-40 - +80 °C
Cross section for E-termials (input)	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded
Cable feedthrough	13x M16
Degree of protection (IEC EN 60529)	IP 66
Installation dimensions (W × H × D)	300 x 200 x 132 mm
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

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GAK 4/4

Generator connection box with ten terminal points. The connected plus and minus pol terminals for the input and output strings are free selectable.
Application: to protect inverter with one MPP tracker in PV systems

Example image

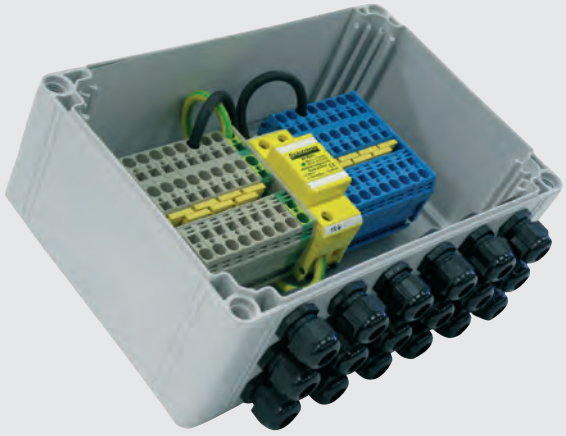
- Housing of surface mounting (300 x 200 x 132 mm) / IP66
- Degree of protection (IEC EN 60529)
- 10 Terminal points are arbitrary (e. g. for 5x input terminal and 5x output terminal)
- One arrester 800 or 1000 V, T2 or T1+ T2
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement

				
Technical Data	**GAK 4/4/1xT2 800V**	**GAK 4/4/1xT2 1000V**	**GAK 4/4/1xT1+T2 800V**	**GAK 4/4/1xT1+T2 1000V**
Article-No.	80 01 00	80 01 02	80 01 04	80 01 06
Max. system voltage	800 V=	1000 V=	800 V=	1000 V=
Max. current per input terminal (+)	57 A	57 A	57 A	57 A
Max. current per output terminal	57 A	57 A	57 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded
Cable feedthrough	10x M20	10x M20	10x M20	10x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Dimensions of housing (H × W × D)	300 x 200 x 132 mm	300 x 200 x 132 mm	300 x 200 x 132 mm	300 x 200 x 132 mm
SPD acc. to IEC 61643-11	Type 2 / class II	Type 2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

GAK 8/8

Generator connection box with 22 terminal points. The connected plus and minus pol terminals for the input and output strings are free selectable. Take attention to manufacturer's requirement about the maximum reverse current in any parallel connection of solar panels.



Example image

- Housing of surface mounting (300 x 200 x 132 mm) / IP66
- 22 terminal points are arbitrary: e. g. 11x input terminal and 11x output terminal
- One arrester 800 or 1000 V, T2 or T1+ T2
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement

				
Technical Data	**GAK 8/8/1xT2 800V**	**GAK 8/8/1xT2 1000V**	**GAK 8/8/1xT1+T2 800V**	**GAK 8/8/1xT1+T2 1000V**
Article-No.	80 01 10	80 01 12	80 01 14	80 01 16
Max. system voltage	800 V=	1000 V=	800 V=	1000 V=
Max. current per input terminal (+)	57 A	57 A	57 A	57 A
Max. current per output terminal	57 A	57 A	57 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - + 80 °C	-40 - + 80 °C	-40 - + 80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded
Cable feedthrough	18x M20	18x M20	18x M20	18x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Dimensions of housing (H × W × D)	300 x 200 x 132 mm	300 x 200 x 132 mm	300 x 200 x 132 mm	300 x 200 x 132 mm
SPD acc. to IEC 61643-11	Type 2 / class II	Type2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

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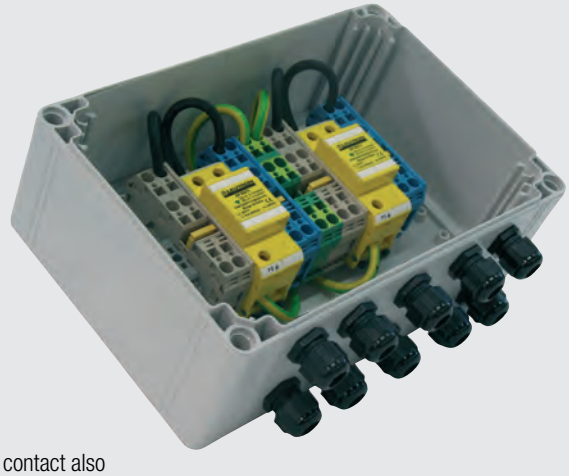
GAK 2+2

Generator connection box for maximum 2x five terminal points for two MPP tracker.
Application: to protect inverter with two MPP trackers or two inverter with each one MPP tracker.
Take attention to manufacturer's requirement about the maximum reverse current in any parallel connection of solar panels.



Example image

- Housing of surface mounting (300 x 200 x 132 mm) / IP66
- 2x 5 terminal points (e. g. 2x 2 input terminal and 2x 2 output terminal)
- Two arrester 800 or 1000 V, T2 or T1+ T2
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement

					
Technical Data	**GAK 2+2/2+2/2xT2 800V**	**GAK 2+2/2+2/2xT2 1000V**	**GAK 2+2/2+2/2xT1+T2 800V**	**GAK 2+2/2+2/2xT1+T2 1000V**	
Article-No.	80 01 20	80 01 22	80 01 24	80 01 26	
Max. system voltage	800 V=	1000 V=	800 V=	1000 V=	
Max. current per input terminal (+)	57 A	57 A	57 A	57 A	
Max. current per output terminal	57 A	57 A	57 A	57 A	
Operating temperature range	TU -40 - + 80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²	
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	
Cable feedthrough	10x M20	10x M20	10x M20	10x M20	
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66	
Dimensions of housing (H × W × D)	300 x 200 x 132 mm	132 x 200 x 300 mm	132 x 200 x 300 mm	132 x 200 x 300 mm	
SPD acc. to IEC 61643-11	Type 2 / class II	Type 2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	

	
Technical Data	**PV DC 2.800-2**
Article-No.	80 00 26
Max. system voltage	800 V=
Max. current per input terminal (+)	57 A
Max. current per output terminal	57 A
Operating temperature range TU	-40 - +80 °C
Cross section for E-termials (input)	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded
Cable feedthrough	9x M16
Degree of protection (IEC EN 60529)	IP 66
Dimensions of housing (H × W × D) /weight	132 x 200 x 300 mm / 3,0 kg
SPD acc. to IEC 61643-11	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

GAK 3+3

Generator connection box für maximal zwei mal sieben Klemmpunkte. Strings für zwei MPP-Tracker.
Application: to protect inverter with two MPP trackers or two inverters with each one MPP tracker.

Example image

- 2x 7 Terminal points are arbitrary (e. g. 2x 3 input terminal and 2x 3 output terminal)
- Two arresters: 800 up to 1000 V, T2 or T1+ T2 or both combined
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement


Technical Data	GAK 3+3/3+3/2xT1+T2 800V	GAK 3+3/3+3/2xT1+T2 1000V	GAK 3+3/3+3/2xT1+T2 800V/1000V
Article-No.	80 01 25	80 01 27	80 01 28
Max. system voltage	800 V=	1000 V=	800/1000 V=
Max. current per input terminal (+)	57 A	57 A	57 A
Max. current per output terminal	57 A	57 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 flex. mm²	16 flex. mm²	16 flex. mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire / stranded
Cable feedthrough	10x M20	13x M20	10x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66
Installation dimensions (W × H × D)	300 x 200 x 132 mm	400 x 200 x 132 mm	300 x 200 x 132 mm
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

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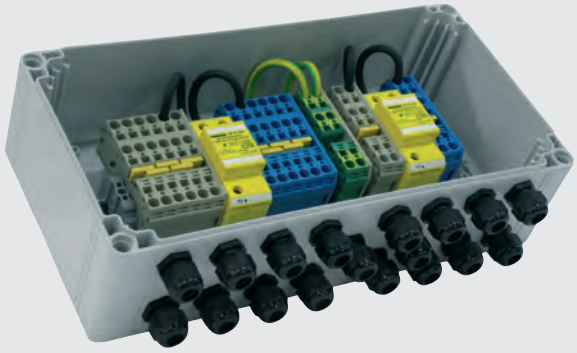
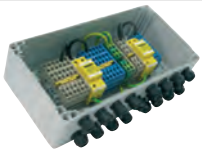
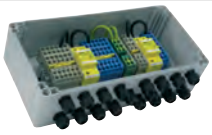
GAK 6+2

Generator connection box for 1x 17 + 1x 5 terminal points for two MPP tracker.
Application: to protect inverter with two MPP trackers and asynchronous power parts (e. g. SMA Tripower WR)



Example image

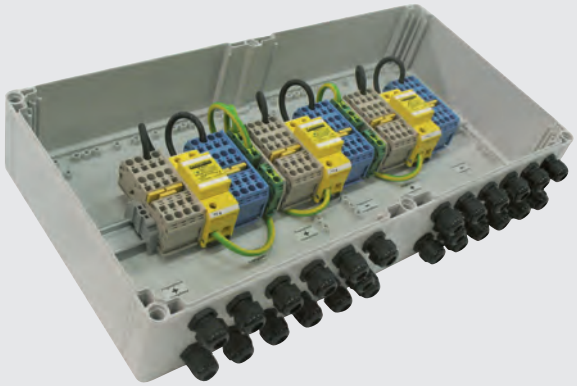
- Housing of surface mounting (400 x 200 x 132 mm) / IP66
- 1x 17 + 1x 5 terminal points are arbitrary (e. g. 1x 6 Input terminal and 1x 6 output terminal for power part A and 1x 2 input terminal with 1x 2 output terminal für power part B)
- Two arrester either 800 V or 1000 V, SPD type 2 or type 1+2 (depends on application)
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement

				
Technical Data	**GAK 6+2/6+2/2xT2 800V**	**GAK 6+2/6+2/2xT2 1000V**	**GAK 6+2/6+2/2xT1+T2 800V**	**GAK 6+2/6+2/2xT1+T2 1000V**
Article-No.	80 01 30	80 01 32	80 01 34	80 01 36
Max. system voltage	800 V=	1000 V=	800 V=	1000 V=
Max. current per input terminal (+)	57 A	57 A	57 A	57 A
Max. current per output terminal	57 A	57 A	57 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded
Cable feedthrough	18x M20	18x M20	18x M20	18x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Dimensions of housing (H × W × D)	132 x 200 x 400 mm	132 x 200 x 400 mm	132 x 200 x 400 mm	132 x 200 x 400 mm
SPD acc. to EN 61643-11	Type 2 / class II	Type 2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

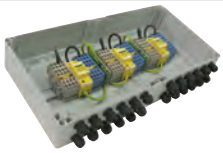
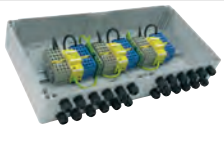
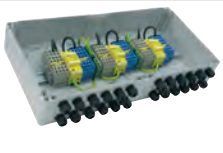
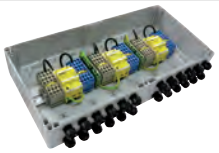
GAK 4+4+4

Generator connection box for 3x 11 terminal points for three MPP tracker.
Application: in PV systems; to protect the inverter with three MPP tracker or three single inverter.



Example image

- Housing of surface mounting (600 x 300 x 132 mm) / IP66
- 3x 11 Terminal points are arbitrary (e. g. 3x 5 input terminals and 3x 5 output terminals)
- Three arrester either 800 or 1000 V, type 2 or type 1+ 2 (depends on application)
- Variants with remote signalling contact also available (on request)
- Terminals can be used as points of measurement

				
Technical Data	**GAK 4+4+4/4+4+4/3xT2 800V**	**GAK 4+4+4/4+4+4/3xT2 1000V**	**GAK 4+4+4/4+4+4/3xT1+T2 800V**	**GAK 4+4+4/4+4+4/3xT1+T2 1000V**
Article-No.	80 01 40	80 01 42	80 01 44	80 01 46
Max. system voltage	800 V=	1000 V=	800 V=	1000 V=
Max. current per input terminal (+)	57 A	57 A	57 A	57 A
Max. current per output terminal	57 A	57 A	57 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded	16mm² single wire. / stranded
Cable feedthrough	26x M20	26x M20	26x M20	26x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Dimensions of housing (H × W × D)	132 x 200 x 600 mm	132 x 200 x 600 mm	132 x 200 x 600 mm	132 x 200 x 600 mm
SPD acc. to EN 61643-11	Type 2 / class II	Type 2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

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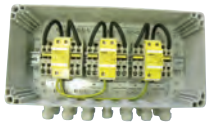
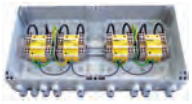
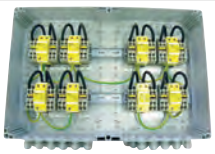
GAK 3x1 / GAK 6x1 / GAK 8x2 / GAK 9x1

Generator Connection Boxes for middle or big sized PV systems. They are free combinable and for high generator power.

Example image

- Housing of surface mounting are UV resistant / IP 66
- Terminals can be used as points of measurement
- Remote signal contacts are connected for use
- Variants with remote signalling contact also available (on request)

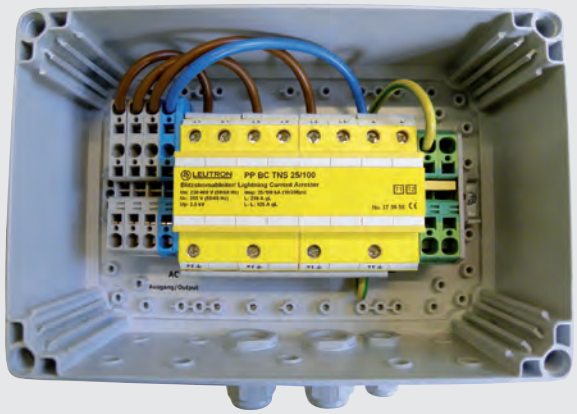
				
Technical Data	**PV DC 3.800-3-S2**	**PV DC 3.800-3**	**GAK 3x1/3x1/3xT1+2 1000V**	**GAK 4x3/4xT1+T2 1000V-FM**
Article-No.	80 00 43	80 00 39	80 01 48	80 01 64
Max. system voltage	800 V=	800 V=	1000 V=	1000 V=
Max. current per input terminal (+)	76 A	76 A	76 A	57 A
Max. current per output terminal	76 A	76 A	76 A	57 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - + 80 °C	-40 - + 80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16 mm²	16 mm²	16mm²	16mm²
Cable feedthrough	13x M16	13x M16	13x M16	26x M20
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Dimensions (L x W x H)	200 x 400 x132 mm	200 x 400 x132 mm	200 x 400 x 132 mm	200 x 600 x 132 mm
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II	Type 2 / class II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

				
Technical Data	**GAK 6x1/6x1/6x T1+T2 1000V**	**PV DC 8.800-8**	**GAK 8x2/8x2/8x T1+T2 1000V-FM**	**GAK 9x1/9x1/9x T1+T2 1000V**
Article-No.	80 01 49	80 00 56	80 01 56	80 01 50
Max. system voltage	1000 V=	800 V=	1000 V=	1000 V=
Max. current per input terminal (+)	76 A	76 A	57 A	76 A
Max. current per output terminal	76 A	76 A	57 A	76 A
Operating temperature range TU	-40 - +80 °C	-40- +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	16 mm² flex.	16 mm² flex.	16 mm² flex.	16 mm² flex.
Cable feedthrough	25x M16	33x M16	24x M20 / 13x M16	37x M16
Installation dimensions (W × H × D) /Gewicht	600 x 400 x 132 mm	400 x 600 x 132 mm / 6,0 kg	600 x 400 x 132 mm / 6,5 kg	600 x 400 x 132 mm/ 6,5 kg
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

GAK AC

Generator connection box for threephase TNS system.
Application: e. g. at PV systems to protect the AC side of the inverter.



Example image

- Housing of surface mounting (300 x 200 x 132 mm) / IP66
- Four pole SPD PP BC TNS 25/100 including
- Variant with remote signalling contact also available (on request)

Technical Data		GAK AC-3 T1+T2
Article-No.		80 01 57
Cross section for E-termials (input)		16 mm²
Cross section for A-terminals (output)		16mm² single wire. / stranded
Cable feedthrough		2x M25/1x M20
Degree of protection (IEC EN 60529)		IP 66
Installation dimensions (W × H × D)		300 x 200 x 132 mm
Weight		3,1 kg
SPD acc. to EN 61643-11		Type 1 + 2 / class I + II
Nominal alternating voltage	UN	230/400 V~
Max. continous operating voltage AC	Uc	255 V~
Insulation resistance	Risol	> 10 GΩ
Protection level at 100% lightn. imp. sparkover voltage (1.2/50µs)	Up	≤ 2,5 kV
Protection level at limp L-PE	Up	≤ 2,5 kV
Lightning impulse current (10/350) L1+L2+L3+N-PE	Itotal	100 kA
Lightning impulse current (10/350) L,N-PE	limp	25 kA
Follow-on current extinguishing capability at Uc (50/60 Hz)	Ifi	4 kA
Short-circuit withstand capability at max. back-up fuse	Ik	50 kAeff
Operating temperature range	TU	-40 - +80 °C
Max. acceptable back-up fuse F2 (spur wiring)		250 A gL/gG

Dimension drawing, see pages 186 to 190

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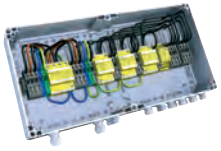
PV AC-DC

Complet overvoltage protection for inverters.
Mounting it directly nearly inverter is advantagous.

Example image

- AC side: SPD Type 2
- DC side: Combined arrester Type 1 + Type 2
- Signal line and data line:
  IEC category C1/C2/C3

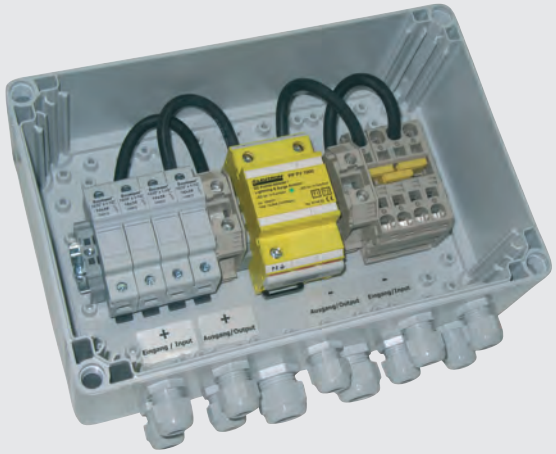
					
Technical Data	**PV AC-DC 1.1-800**	**PV AC-DC 3.1-1000**	**PV AC-DC 1.1-1000**	**PV AC-DC 1.2-800**	
Article-No.	80 00 31	80 00 32	80 00 33	80 00 34	
Max. system voltage	800 V=	1000 V=	1000 V=	800 V=	
Max. current per input terminal (+)	76 A	76 A	76 A	76 A	
Max. current per output terminal	30 A	30 A	30 A	30 A	
Operating temperature range	TU -40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²	
Cross section for A-terminals (output)	16 mm² flex.	16 mm² flex.	16 mm² flex.	16 mm² flex.	
Cable feedthrough	8x M20	8x M20	8x M20	8x M20	
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66	
Installation dimensions (W × H × D)	200 x 400 x 132 mm	200 x 400 x 132 mm	200 x 400 x 132 mm	200 x 400 x 132 mm	

	
Technical Data	**PV AC-DC 3.3-1000**
Article-No.	80 00 35
Max. system voltage	1000 V=
Max. current per input terminal (+)	76 A
Max. current per output terminal	30 A
Operating temperature range TU	-40 - +80 °C
Cross section for E-termials (input)	16 mm²
Cross section for A-terminals (output)	16 mm² flex.
Cable feedthrough	8x M20
Degree of protection (IEC EN 60529)	IP 66
Installation dimensions (W × H × D)	300 x 600 x 132 mm

Dimension drawing, see pages 186 to 190

PV DC 4 / PV DC 9 / PV DC 12

Generator connection boxes with fuse holder for dc string fuses (dimensions: 10 x 38 mm). Therewith single modul strings can be fixed together to satisfy requirements (max. reverse current) of producers of the moduls.



Example image

				
Technical Data	**PV DC 4.1000-2**	**PV DC 5.1000 T1+T2**	**PV DC 9.800**	**PV DC 9.1000**
Article-No.	80 00 27	80 01 65	80 00 28	80 00 29
Max. system voltage	1000 V=	1000 V=	800 V=	1000 V=
Max. current per input terminal (+)	30 A	30 A	30 A	30 A
Max. current per output terminal	125 A	125 A	125 A	125 A
String fuse	4x 15 A	5x 15 A	9x 15 A	9x 15 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²	16 mm²	16 mm²
Cross section for A-terminals (output)	35 mm² flex.	35 mm² flex.	35 mm²	35 mm²
Cable feedthrough	9x M16 / 2x M25	9x M16 / 2x M25	19x M16 / 2x M25	19x M16 / 2x M25
Degree of protection (IEC EN 60529)	IP 66	IP 66	IP 66	IP 66
Installation dimensions (W × H × D)	200 x 300 x 132 mm	200 x 300 x 132 mm	200 x 400 x 132 mm	200 x 400 x 132 mm
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

		
Technical Data	**PV DC 12.800-2**	**PV DC 12.1000-2**
Article-No.	80 00 23	80 00 30
Max. system voltage	800 V=	1000 V=
Max. current per input terminal (+)	30 A	30 A
Max. current per output terminal	220 A	220 A
String fuse	12x 15 A	12x 15 A
Operating temperature range TU	-40 - +80 °C	-40 - +80 °C
Cross section for E-termials (input)	16 mm²	16 mm²
Cross section for A-terminals (output)	120 mm² flex.	120 mm² flex.
Cable feedthrough	25x M16 / 4x M25	25x M16 / 4x M25
Degree of protection (IEC EN 60529)	IP 66	IP 66
Installation dimensions (W × H × D)	300 x 600 x 132 mm	300 x 600 x 132 mm
SPD acc. to EN 61643-11	Type 1 + 2 / class I + II	Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

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GAK 4+1

Generator connection box for maximum four plus one entry and one exit per arrester.
Application: For protection of inverter with two MPP trackers or two inverters with each one MPP tracker.

- Housing of surface mounting (400 x 200 x 132 mm) / IP66
- Input / Output: Parallel connection of four strings for one arrester and one string for a second MPP tracker or further inverters
- Two combined arrester type 1+type 2 with 1000 V
- For holding of dc string fuses (dimension 10 x 38 mm)
- For asynchronous circuits, e. g. SMA Tripower

Technical Data		GAK 4+1/2xT1+T2 1000V
Article-No.		80 01 55
Max. system voltage		1000 V=
Max. current per input terminal (+)		30 A
Max. current per output terminal		125 A
Operating temperature range	TU	-40 - +80 °C
Cross section for E-termials (input)		16 mm²
Cross section for A-terminals (output)		16mm² single wire. / stranded
Cable feedthrough		11x M16 / 4x M25
Degree of protection (IEC EN 60529)		IP 65
Installation dimensions (W × H × D)		400 x 200 x 132 mm
SPD acc. to EN 61643-11		Type 1 + 2 / class I + II

SPECIAL EDITION GAK

PV DC 1/1

Generator connection box for maximu one string for one MPP tracker. For connection with MC4 connectors.
Application: to protect inverter with one MPP tracker in PV systems.

- Housing of surface mounting (200 x 200 x 132 mm) / IP66
- Input / Output: one string for plus and one for minus
- Fitted with one SPD type 1+ 2 (class I+II)

Technical Data		PV DC 1/1 1xT1+2 1000V/MC4
Article-No.		80 00 92
Max. system voltage		1000 V=
Max. nominal current per MC4 connector		30 A
Max. nominal current per MC4 connector		30 A
Operating temperature range	TU	-40 - +80 °C
Cable feedthrough		1x M16 / 4x MC4
Degree of protection (IEC EN 60529)		IP 66
Dimensions (L x W x H)		200 x 200 x 132 mm
SPD acc. to EN 61643-11		Type 1 + 2 / class I + II

Dimension drawing, see pages 186 to 190

String diodes

String diodes for PV module: The diode is covered with EVA (Ethylenvinylacetat) and with PV line irreversible connected.


Technical Data	ST-D 1200	ST-D 1200-500
Article-No.	17 01 20	17 01 21
Nominal current IL	10 A	10 A
Repetitive peak off-state voltage	1200 V	1200 V
peak off-state voltage	1200 V	1200 V
limiting average on state current	10 A	10 A
Length of connection	400 mm	500 mm

Air-rating plug

Ventilation device, with membran to ventilate the generator connection box in an optimal way.

Technical Data	E-Membran M12
Article-No.	17 01 40
Dimension	Ø 19 x 17 mm
Membran material	Acrylicco-polimer on nylon support
Protection degree	IP 69
Working temperatures	-40° to +105°C
Recomended tightening torque	0.5 - 1.0 Nm

String fuses

String fuses for PV modules:





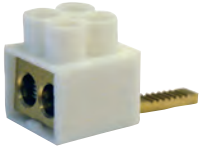


Technical Data	ST-Si/2A	ST-Si/4A	ST-Si/8A	ST-Si/10A	ST-Si/12A	ST-Si/15A	ST-Si/20A
Article-No.	17 01 50	17 01 51	17 01 52	17 01 53	17 01 54	17 01 55	17 01 56
Rated current	2 A	4 A	8 A	10 A	12 A	15 A	20 A
Rated voltage	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$	1000 $V_{AC/DC}$
Dimension	10 x 38 mm	10 x 38 mm	10 x 38 mm	10 x 38 mm	10 x 38 mm	10 x 38 mm	10 x 38 mm
piece/unit	10	10	10	10	10	10	10

DAK 2x 16

Pin-shaped terminal to enable feed-through wiring (V-wiring) for all surge protection modules with only one clamp per phase, such as PP PV 800 and 1000 and other SPDs for power supply systems.

- Looped-in wiring for SPD with only one connection terminal
- Connection of 2 lines at only one terminal possible
- Connection of max. 2x 16 mm² fine-stranded
- Conformed by standard looped-in wiring (V connected)
- Acc. to DIN VDE 0100-534



Technical Data	DAK 2x 16
Article-No.	17 01 10
Type of connection	front: double terminal, back: connection
Conductor cross section	2x 16 mm²
Dimension (L x B x H)	17 x 38,5 x 21 mm

Dimension drawing, see pages 186 to 190

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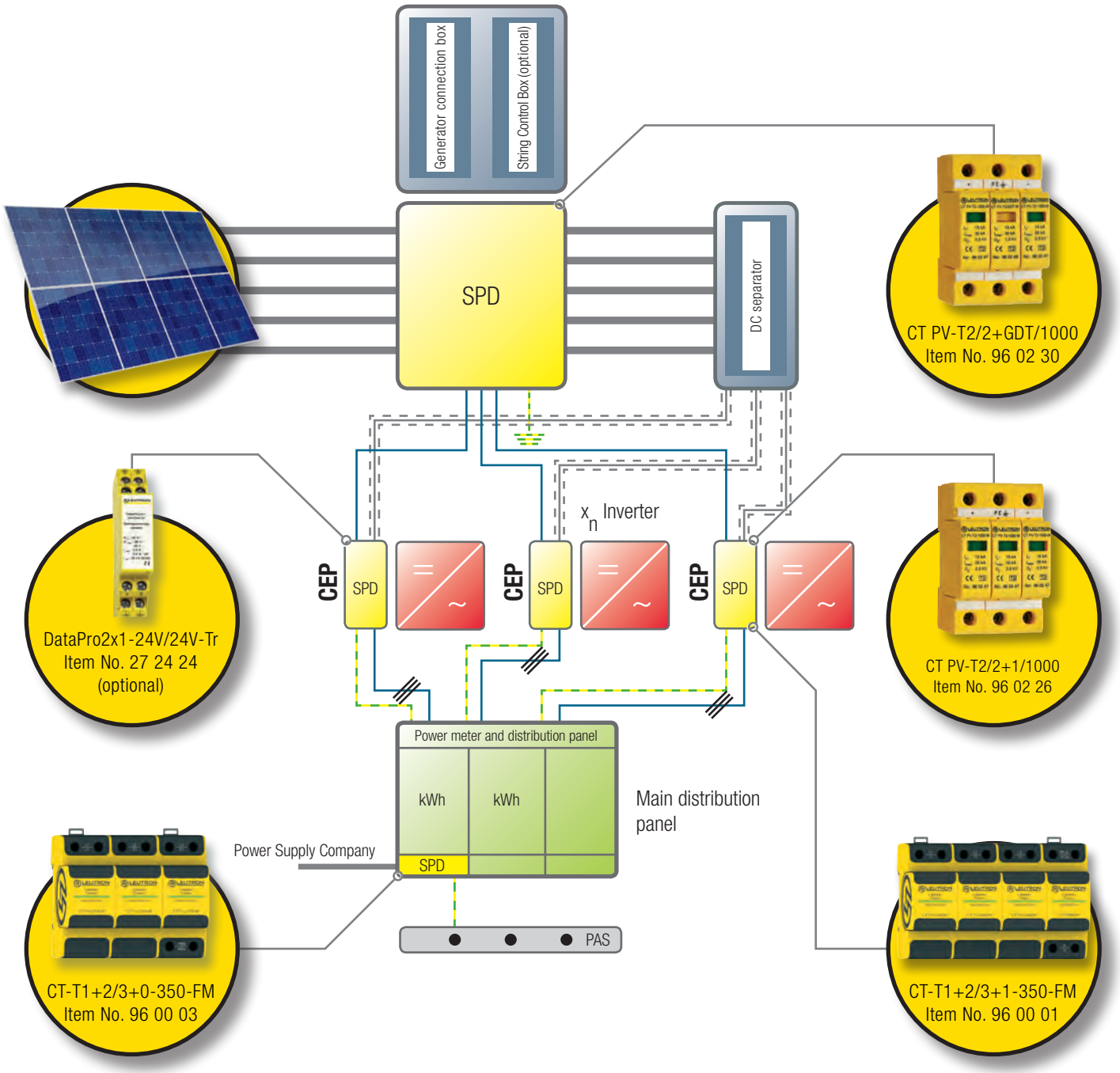
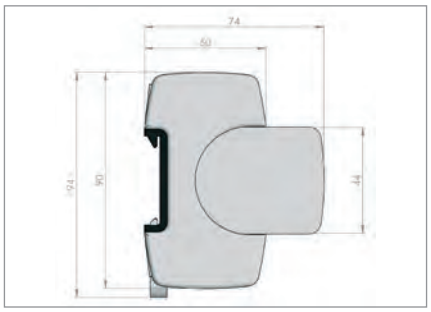
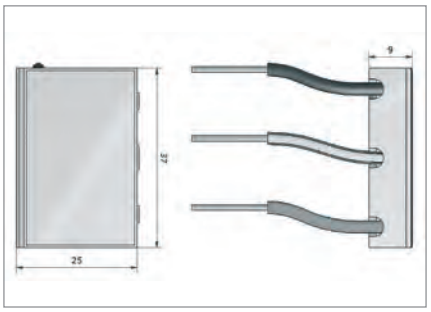


In addition to the modules, the photovoltaic system is also integrated into the building's electrical systems, which are necessarily vulnerable todirect or indirect lightning strikes. Lightning strikes and power surges have serious consequences: aside from production losses, there are also high repair costs - Costs that Leutron can keep down.

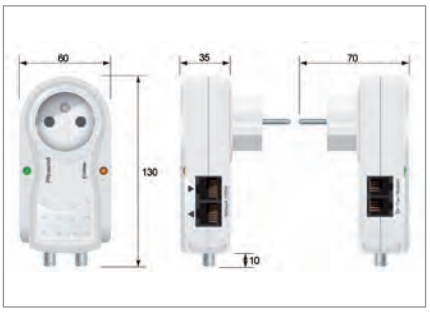
CEP: Central Entry Point



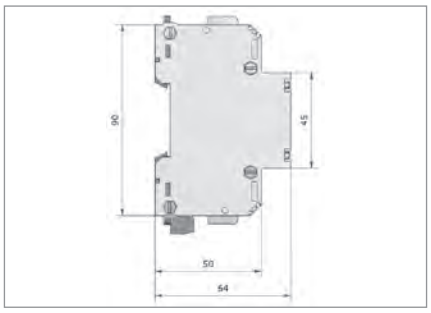
CT product line



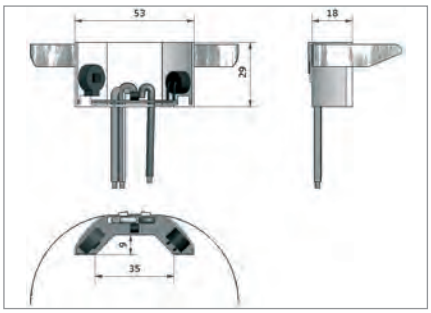
EnerPro D 230 KM



CPS-E 230



PowerPro/IsoPro



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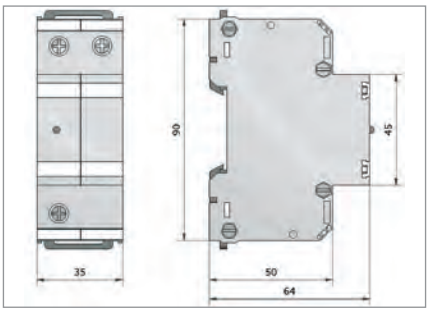
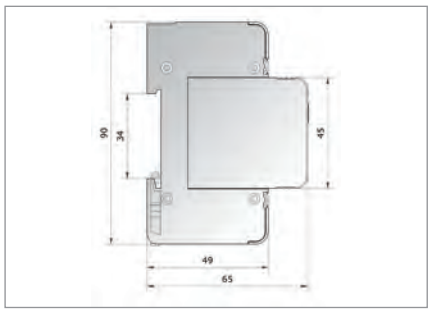
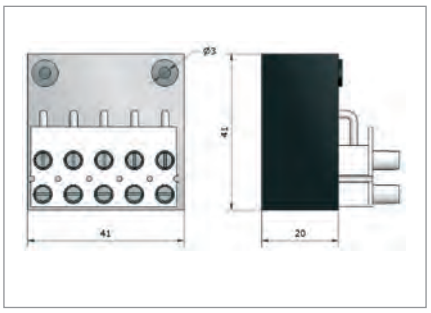


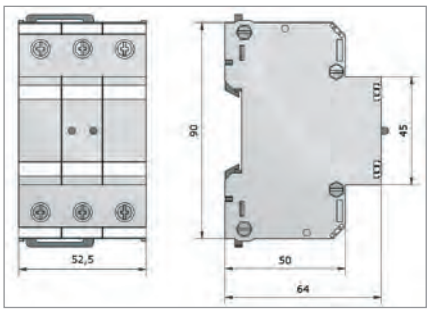
EnerPro 48V/100A-Tr



EL product line



NM 22V/5kA



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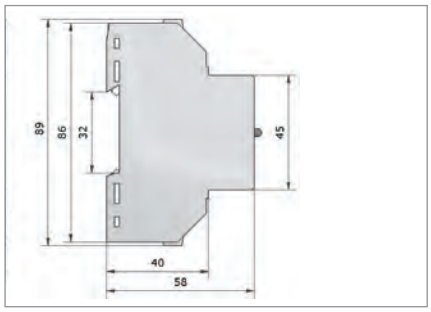

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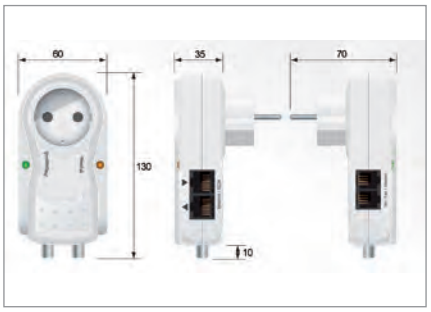
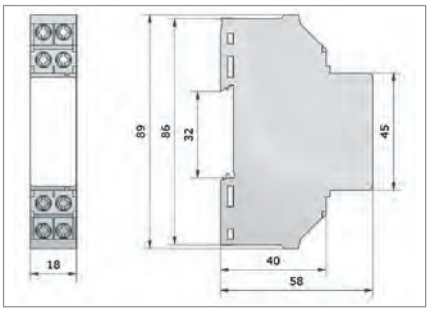


CPS-F 230



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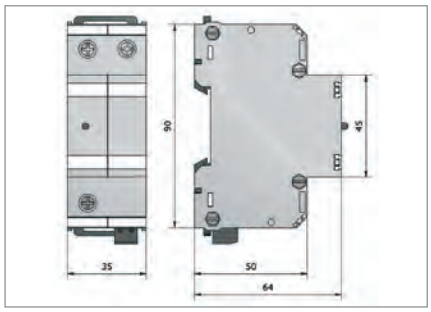
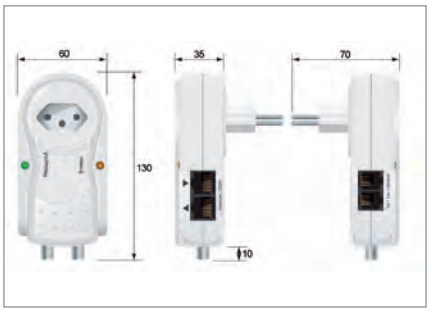
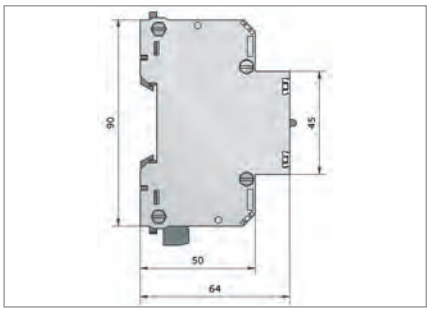


EnerPro 150Tr/Pk



CPS-J 230



PP PV 800 and PP PV 1000

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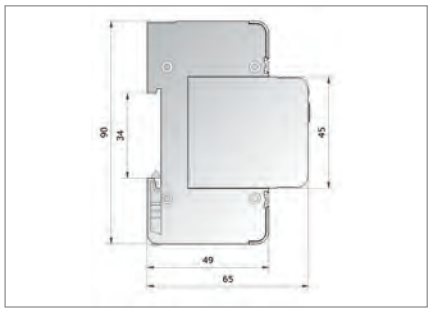
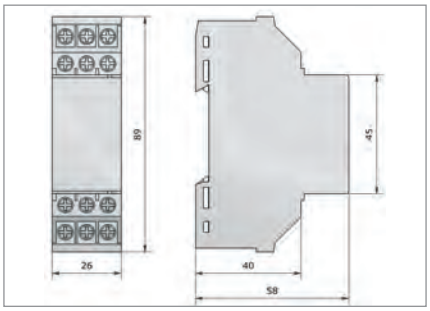
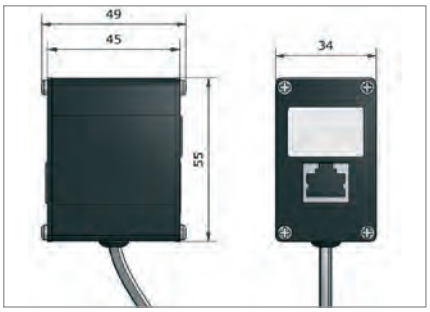


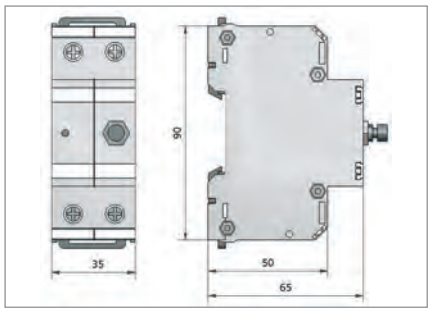
CT PV product line



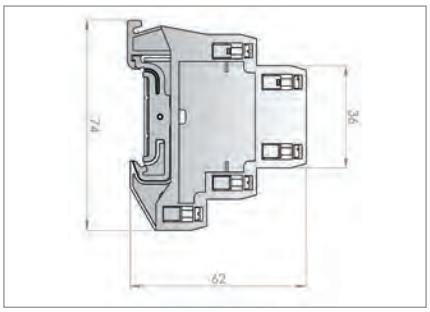
DataPro4x1-SDSL-Tr



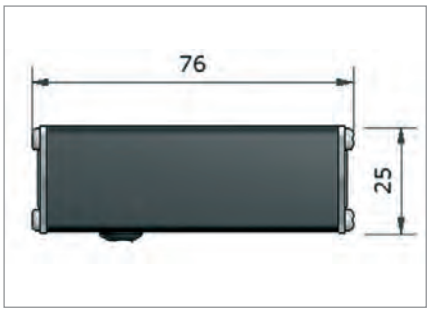
DataPro-1xRJ45PoE-Alu



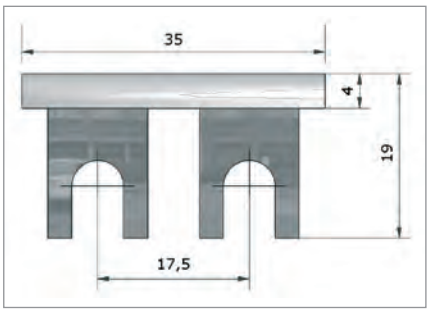
UAS 230-Tr



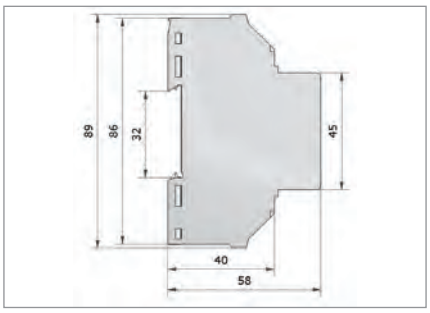
MP RK product line



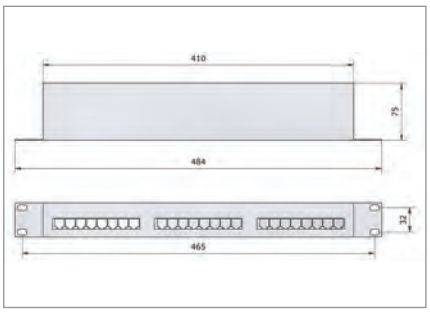
DataPro RJ45 f/f



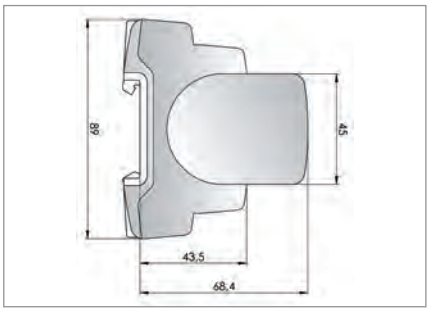
Kammschiene KA



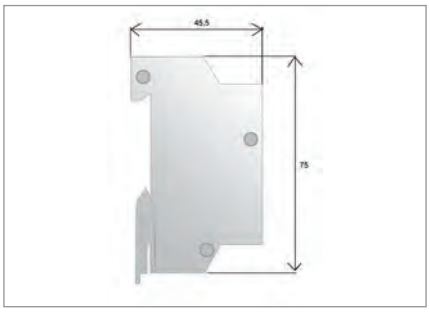
IsoProData-Tr



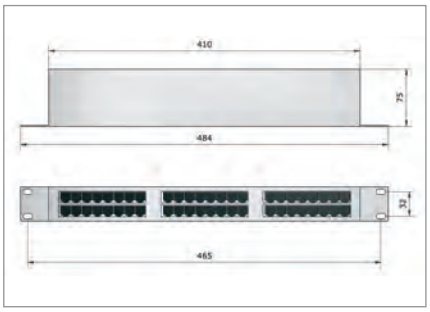
DataPro 1x8 bis 3x8RJ45-19“



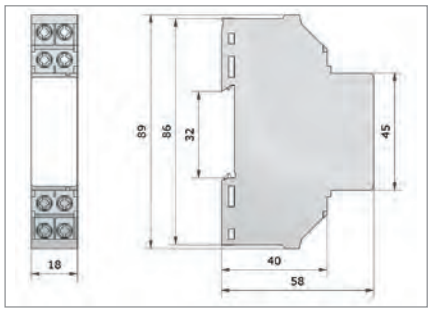
MP product line



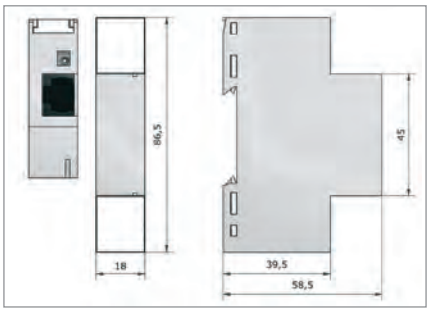
DataPro RJ45-CAT6



DataPro 4x8 bis 6x8RJ45-19“

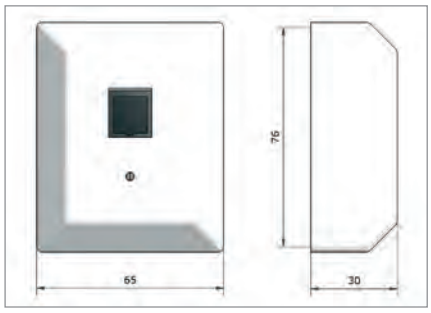


DataPro2x1-SDSL-Tr

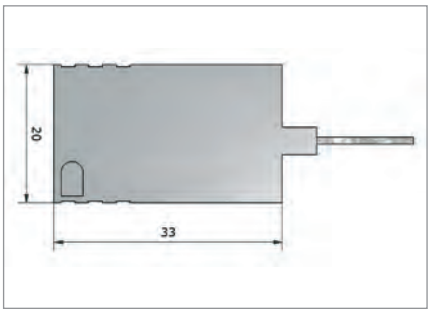


DataPro-RJ45-48V-Tr

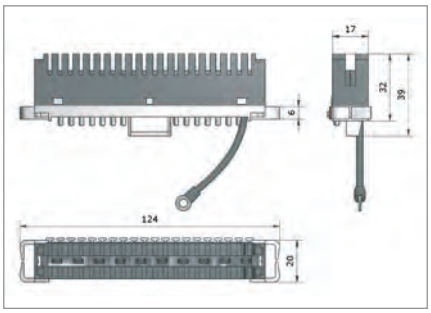
DataPro 8xRJ45-6V-WG



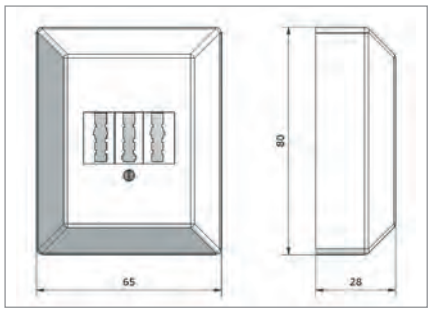
DataPro ISDN-aP



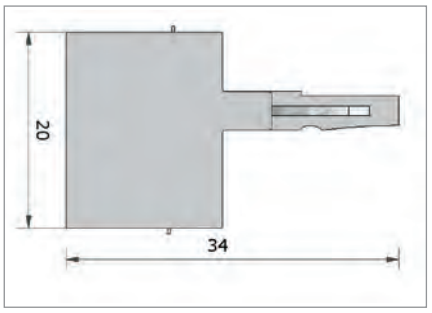
LSA – SSCT Connector fine and coarse protection



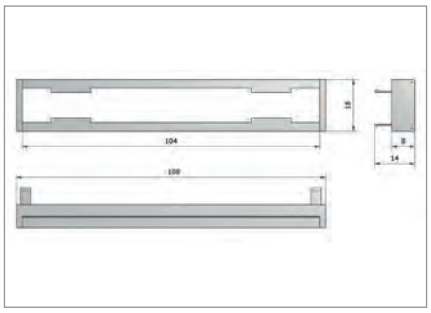
SSCT ground module LSA 2/10-ER38-rot



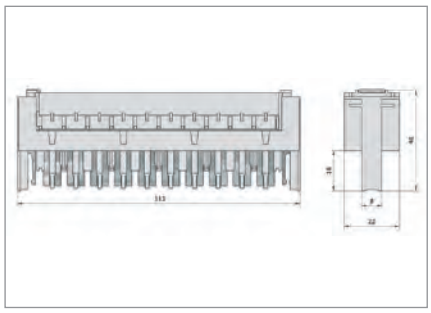
DataPro-TAE/NFN-aP



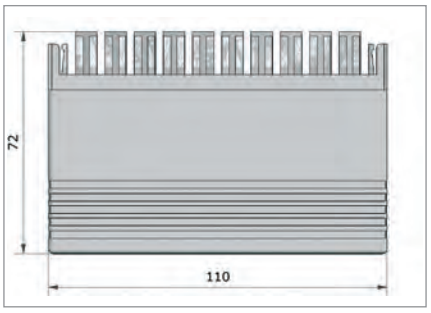
LSA – SSCT Connector coarse protection



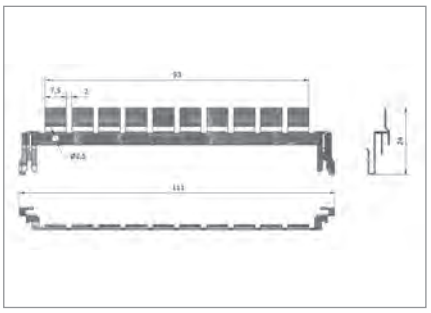
LSA – SSCT frame



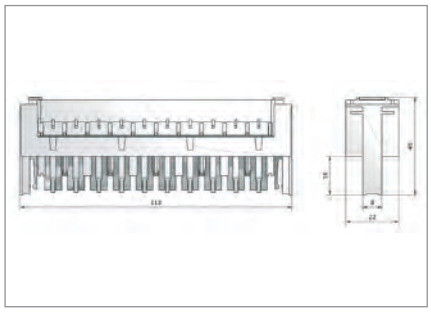
TelPro LSA – SSCT magazines



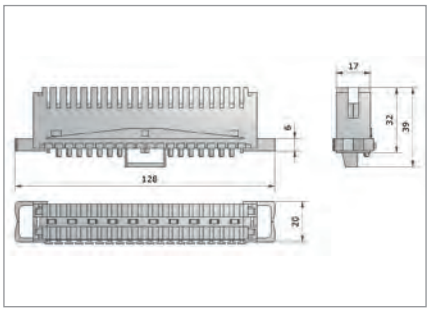
DataPro 10LSA (10 SSCT)



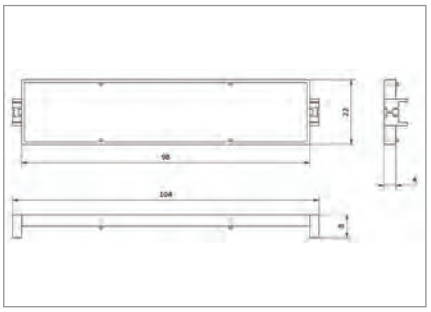
SSCT ground bar



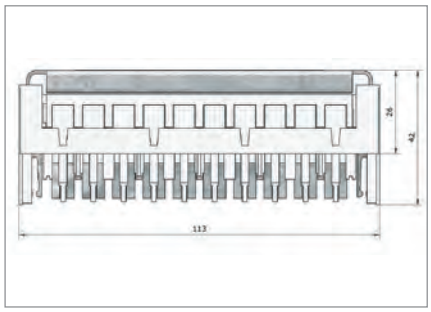
TelPro LSA – SSCT magazines



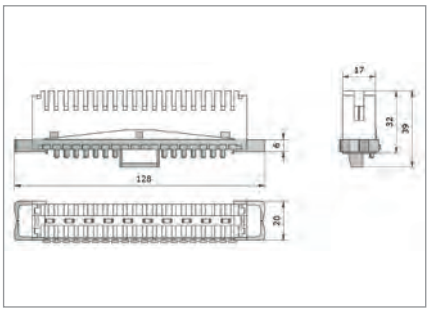
SSCT disconnection module LSA 2/10-TR



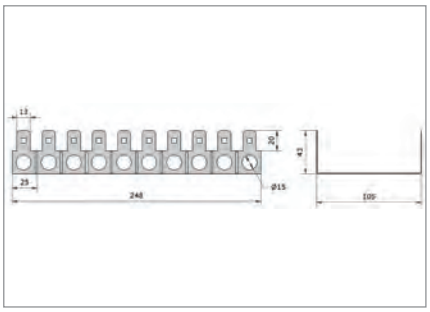
SSCT magazine cover



TelPro LSA – SSCT magazines



SSCT connection module LSA 2/10-AN



SSCT backmount frame

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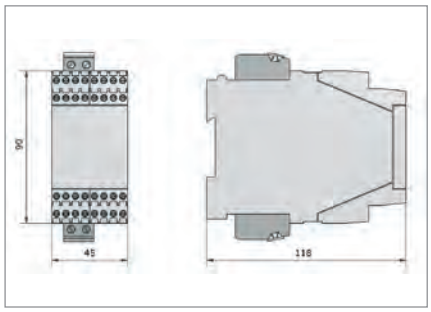
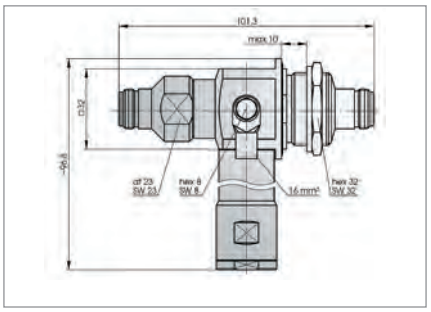
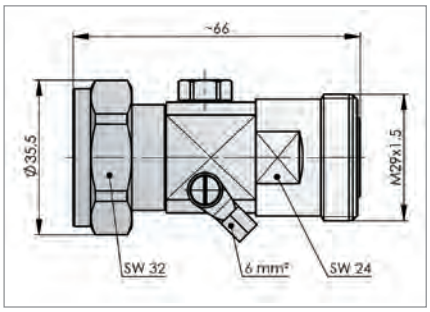


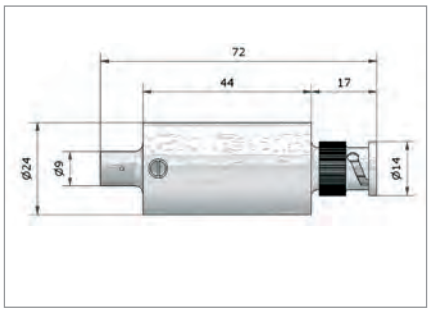
DataPro2x8 36V/36V-Tr/GO



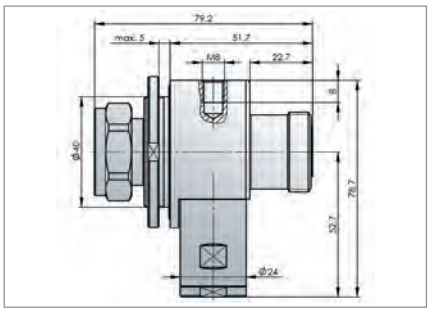
AntPro Lambda/4 N 0.51GHz (f/f)



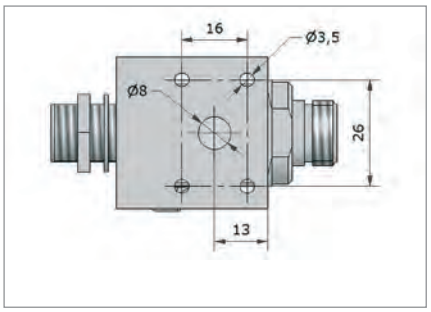
DataPro Koax 7/16



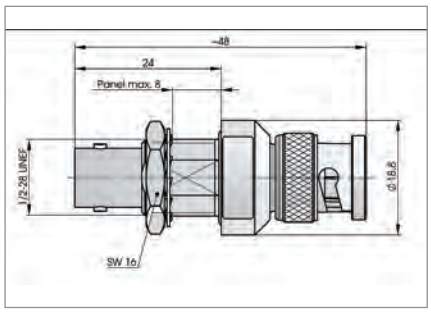
DataPro Koax-8V-BNC



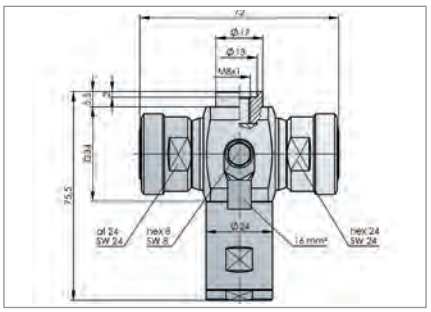
AntPro Lambda/4 7/16 TRI



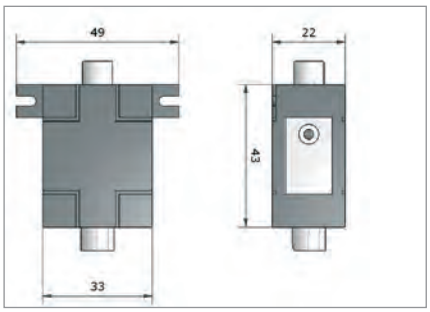
AntPro Koax-GSM-N/230 (f/f)



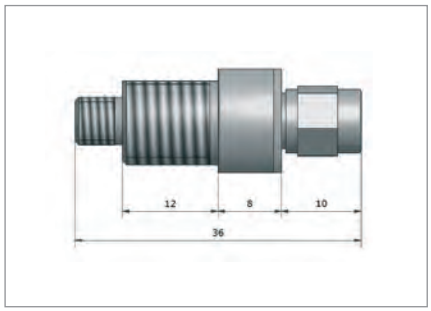
DataPro KOax BNC 50 Ohm



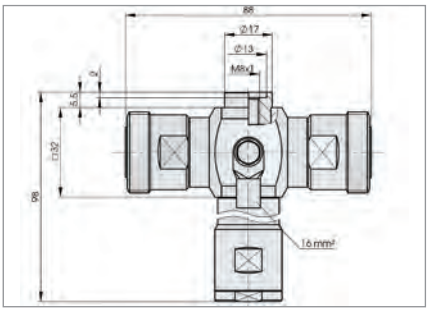
AntPro Lambda/4 7/16 TRI (f/f)



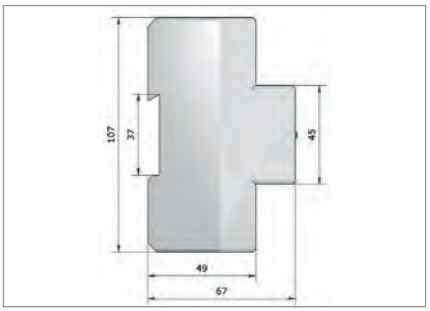
DataPro-SAT and -Radtio/TV



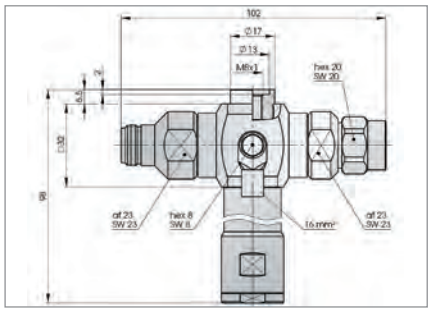
AntPro 5,8GHz SMA



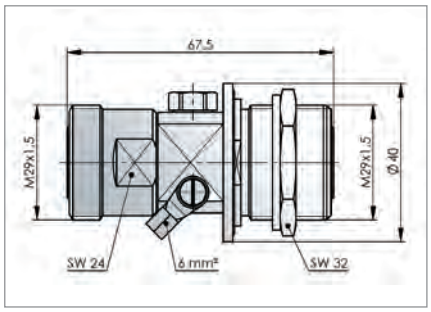
AntPro Lambda 7/16 0.42GHz



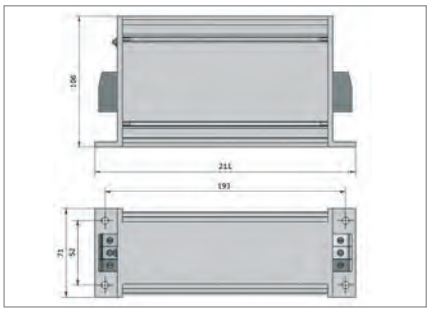
EnerProFilter 230-Tr, EMC Filter



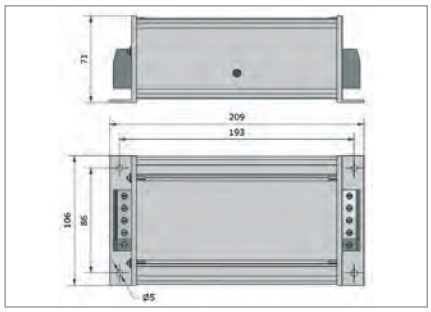
AntPro Lambda/4 N 0.51GHz



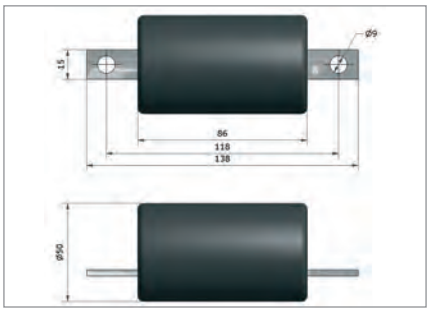
DataPro Koax 7/16 (f/f)



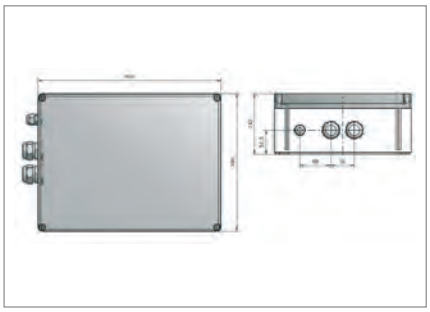
EnerProFilter, EMC Filter (single-phase)



EPF, EMC Filter (three-phase) up to 35 A

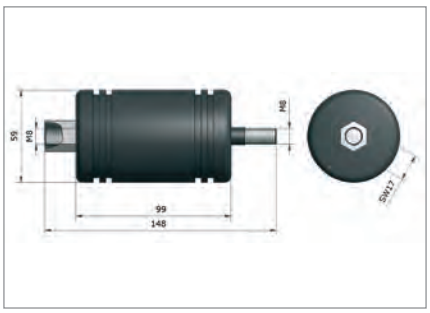


SGO 70 and 350

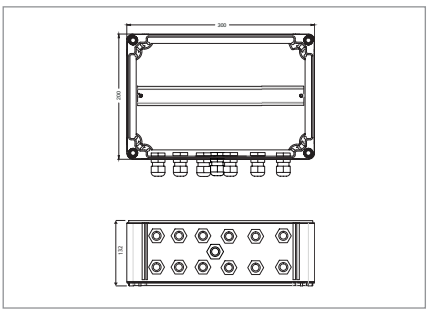


PLPro 40A-iV

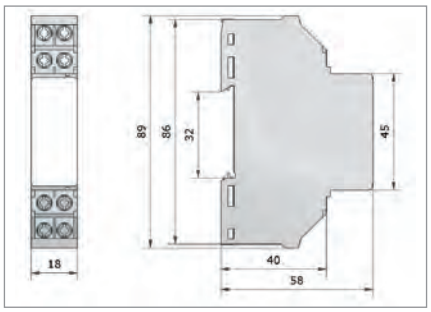
EPF, EMC Filter (three-phase) from 63 A



TA 100C and 500C

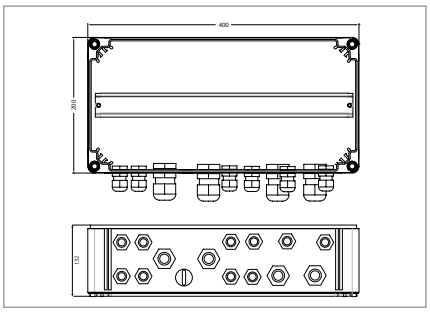


GAK 300 x 200 x 132 mm

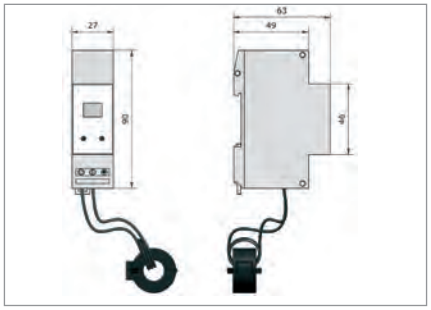


IsoProData 150V/150V-Tr/
DataPro 2x1 and DataPro 3x1

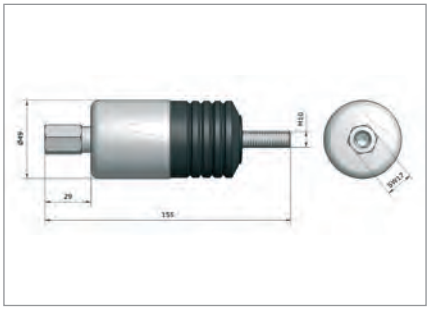
SGO 70QA and 350QA



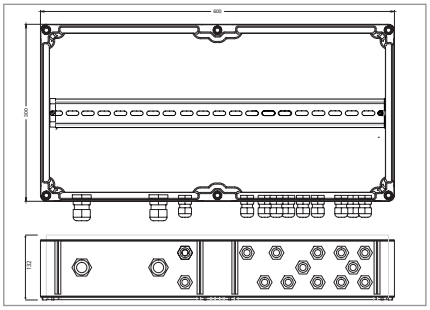
GAK 400 x 200 x 132 mm



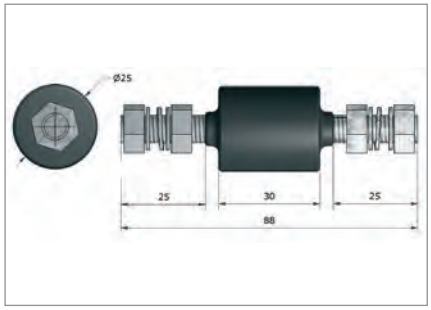
LC1 Lightning counter



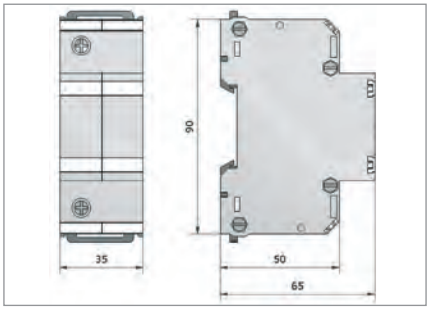
TC 100A and TC 500A



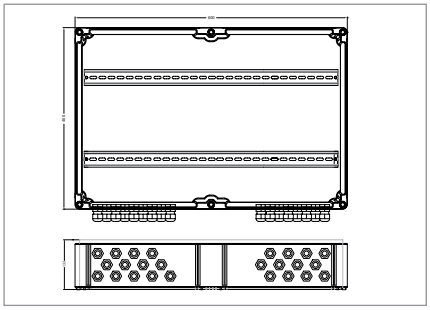
GAK 600 x 300 x 132 mm



TSF 100 and 500



TSF/TF for DIN rail mounting



GAK 600 x 400 x 132 mm

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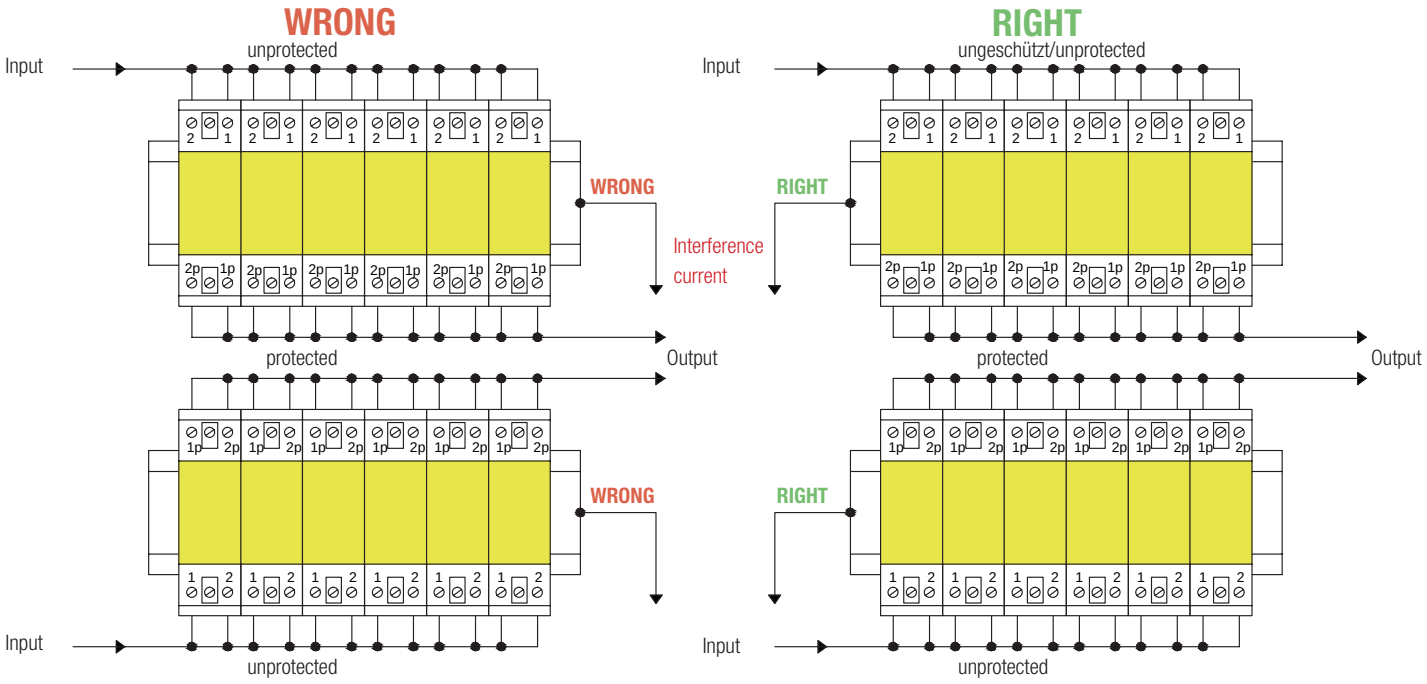
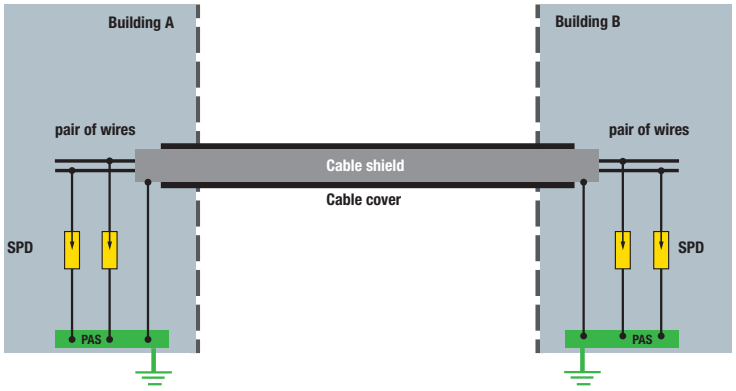
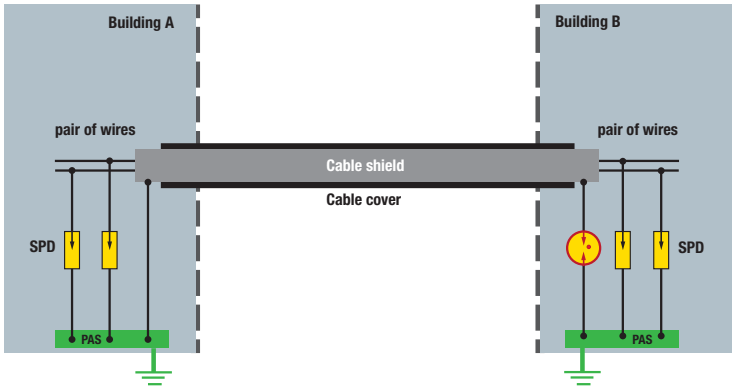
It should be noted that protected and unprotected line are separated.



Installation of cable shields



Bilateral directly shielded connection

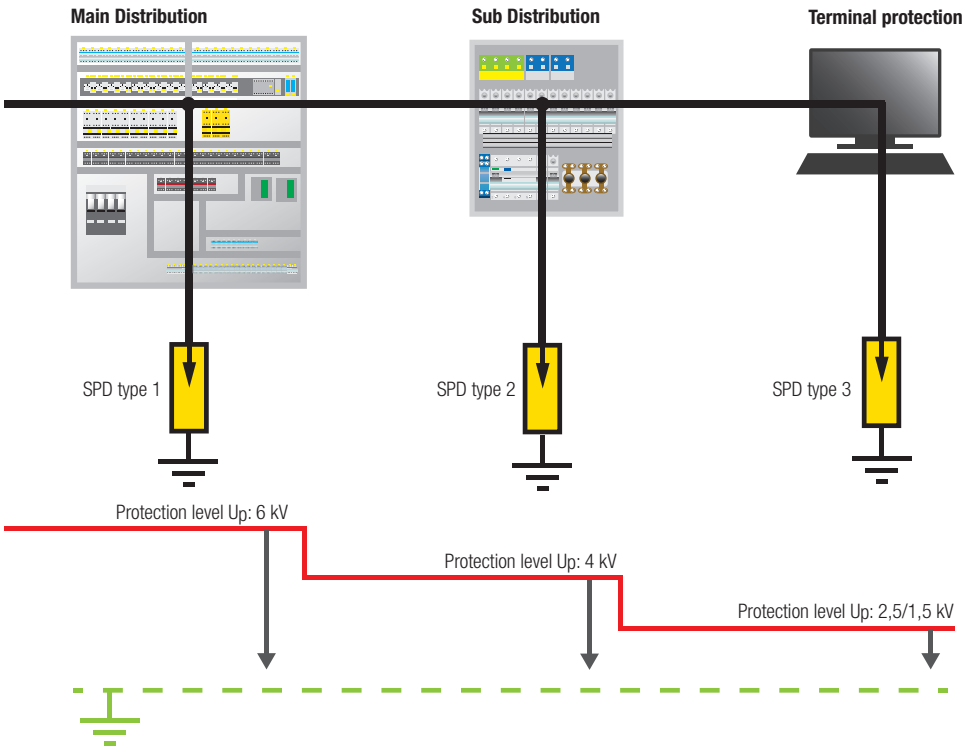


undirectly shielded connection – high resistance grounding

If there is no possibility of earthing the cable shield on both sides because of technological reasons, the non-earthed side has to be connected to the ground via a gas-filled surge arrester (GDT) or an isolation spark gap (up to 100 kA, 10/350 µs).

If a surge occurs, the shield will be connected to the ground via the gas discharge path diverting the en-ergy of the surge. This way, flashovers to the ground, to other cables or installation parts are avoided.

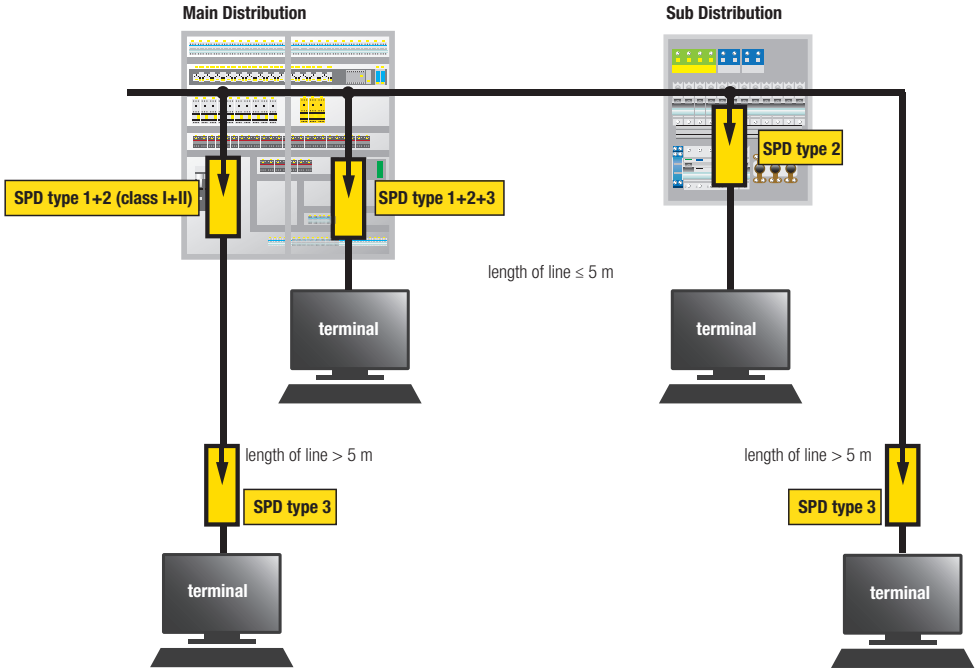
Overview protection level SPD



At power supply protection SPDs are always connected parallel to PE, that means: without influence of the lines.

(acc. to DIN VDE 0100-443, overview table 1)

Length of lines



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A

Active Parts
Active parts are conductors and conductive parts of equipment that are alive under normal operational conditions.

Aging
Aging is the alteration of the original conductivity. It is caused by disturbance pulses, normal operation or unfavourable environmental conditions.

Approach (today: Separation Distance)
An approach is a too narrow distance between the lightning protection installation and conductive installations or electrical installations with a risk of a flashover or breakdown at lightning strikes.

Arc Voltages Ubo
The arc voltage is the instantaneous value of the voltage over a discharge path during an arc discharge process.

Arresters
Equipment that in general consists of voltage-controlled resistors and/or spark gaps. Both items can be used separately or connected in series or in parallel. Arresters protect other electrical equipment or installations against unacceptable high surge voltages.

Asymmetrical Interference
"Asymmetrical" means that the interference source or drain is related to the ground. It exists a capacitive or galvanic connection to the protective conductor.

Asymmetrical Voltage, Common-Mode Voltage
Average voltage between every conductor and a specified reference point, usually reference earth or ground.

B

Burst
A burst consists of repeatedly occurring pulses within a certain time period.

C

Combined Arrester
The combined arrester is a surge-voltage protection device consisting of lightning current arrester and surge arrester.

Combined Impulse
A combined impulse is generated by a combination wave generator which generates a no-load impulse voltage (1.2/50), respectively, a short-circuit impulse current (8/20). The voltage, the amplitude of the current and the waveforms are determined by the generator and the impedance of the SPD. The ratio of the peak values of the no-load voltage and the short-circuit current is 2 Ω. This value is called the fictitious impedance Zf. The short-circuit current is referred to as Ics. Uoc is the no-load voltage of the generator.

Critical Discharge Current iSG
The critical discharge current is a current pulse of the waveform 8/20 µs which just about triggers the disconnection device and which does not yet lead to a mechanical damage of the arrester.

D

Direct or Close-up Strikes
Direct and close-up strikes cause surge voltages with an energy content that contains a considerable part of the total energy of a lightning discharge.

Disconnection Device
If an arrester fails to operate, the disconnection device separates it from the power grid to avoid a fire hazard and to report the defective arrester. Note: It is not the task of the disconnection device to ensure the protective measure „Protection at indirect contact".

Disturbance Voltage, symmetrical
The symmetrical disturbance voltage is a disturbance voltage between two wires of a conductor (e.g. at a double-circuit line) or between the terminals of an electrical installation for such a line.

E

Earth
Earth signifies the ground or the soil.

Earthing (noun)
Earthing refers to the total of all means and measures for earthing.

Earthing (verb)
To earth means to connect a conductive part, e.g. the lightning protection installation, via an earth-termination system to the earth.

Earthing Conductor
The earthing conductor connects the installation which has to be earthed with the earthing electrode, as far as the earthing conductor runs above soil or insulated in the soil.

Earthing Electrode
An earthing electrode is a conductor buried into the ground with an electrically conductive connection to the earth. Parts of connectors that run to the earthing electrode which are lying non-insulated in the ground are part of the earthing electrode as well.

Electromagnetic Compatibility (EMC)
The electromagnetic compatibility of a device or a system is its capability of a satisfactory operation in its electromagnetic environment, without causing unacceptable electromagnetic disturbances to other installations in this environment.

Electromagnetic Interference
The electromagnetic interference refers to a quality loss in operational behaviour, a malfunction or the breakdown of an electrical or electronically device caused by an electromagnetic disturbance.

Electrostatic Discharge (e.s.d.)
An electrostatic discharge is the transfer of electric charges between objects with different electrostatic potentials, which takes place at approximation or contact.

Endurance Test
In an endurance test the surge arrester has to undergo load tests, that simulate loads frequently occurring in practice.

Equipotential Bonding (Potential Equalization)
Potential equalization means to remove potential differences (at the operation of consumer's electrical installations), e.g. between the protective conductor of the electrical power installation and the pipes for the water, gas and heating supply, as well as between the individual pipes. The equipotential bonding at lightning effects requires measures beyond the specifications of VDE 0190. Therefore, the lightning protection installation is connected to other conductive installations via conductors or isolation spark gaps and, if necessary, to active parts of electrical installations via surge protection devices. These measures are called "lightning protection potential equalization".

Equipotential Bonding Bar
This bar connects protective conductors, potential equalization conductors and, where applicable, functional earthing conductors with the earthing conductor and the earth electrodes.

F

Follow-on Current If
The follow-on current flows through the SPD after the diverting process. It is supplied from the grid and differs fundamentally from the continuous operating current.

Foundation Earthing Electrode
The foundation earthing electrode is a conductor that is embedded into the concrete foundation of a construction.

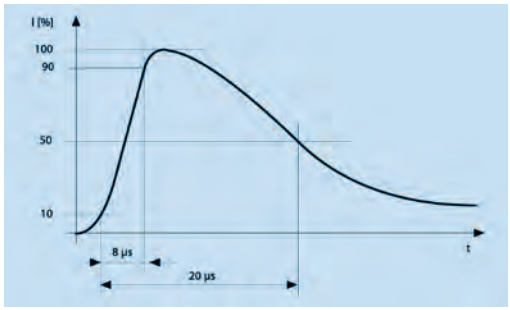
G

Gas-filled Surge Arrester (GDT)
A gas-filled surge arrester is a discharge path filled with another gas than air, normally rare gas.

Ground Resistance
The ground resistance is the resistance between the earthing system and the reference earth. The amount of the ground resistance depends on the interaction of the individual earthing electrodes.

I

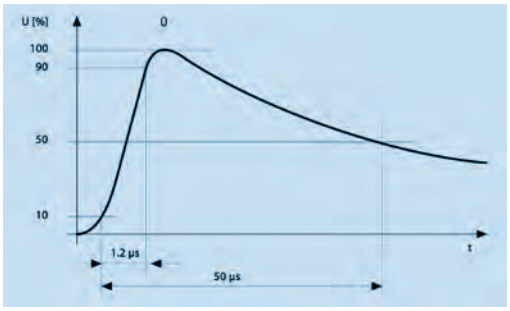
Impulse Current (8/20)
This impulse current has a front time of 8 µs and a time to half-value of 20 µs.



Impulse Discharge Current
Discharge current that flows through the arrester after it is triggered. It is given as a peak value. The nominal impulse discharge current is the peak value of an impulse current of the pulse form 8/20 µs.

Impulse Sparkover Voltage of a Surge Protection Device
Highest voltage value between the electrodes of the spark gap of a surge protection device, just before the sparkover occurs.

Impulse Voltage (1.2/50)
This impulse voltage has a front time (between 10 % and 90 % of its peak value) of 1,2 µs and a time to half-value of 50 µs (at Uoc = 6 kV).



Impulse Withstand Voltage Ust
The impulse withstand voltage is the peak value of the highest pulse voltage of a predefined waveform and polarity, which does not result in a breakdown under predefined test conditions. The impulse withstand voltage is equal to or higher as the rated impulse withstand voltage.

Insertion Loss
The insertion loss of an SPD is, at a given frequency, the ratio of the voltages at a supply network point immediately downstream to the SPD before and after the insertion of this SPD. The value is given in decibel.

Insulation Resistance Riso
The insulation resistance is the resistance of the surge arrester in the non-conductive state.

Interference Suppression
Interference suppression comprises all measures to abate or avoid electromagnetic interferences.

Isolation Spark Gap
The isolation spark gap is a spark gap to isolate conductive parts of an installation. When the spark gap is triggered by a lightning strike, the parts are temporarily conducted (lightning-protection equipotential bonding).

L

Lightning Current Arrester
The lightning current arrester is a surge-voltage protection device which is capable of carrying direct lightning currents.

Lightning Impulse Current Discharge (Lightning Impulse Current)
The 10/350 µs lightning impulse current has a front time of 10 µs and a time to half-value of 350 µs.

Lightning Impulse Current Iimp
The lightning impulse current Iimp is defined by its peak value Imax, its charge Q and the specific energy W/R with a 10/350 µs waveform.

The test is carried out according to the test procedure of the operation duty test. It is used to classify the test for class I surge protection devices.

Lightning Protection Installation
The lightning protection installation is the sum of all equipment for the external and internal lightning protection of the installation to be protected.

Lightning Surge Voltage
The lightning surge voltage is a surge voltage caused by a lightning discharge.

Longitudinal Voltage Drop
The longitudinal voltage drop is a means (instead of the insertion loss) to evaluate overvoltage arresters for d.c. voltages or low operating frequencies up to a maximum of 400 Hz. The longitudinal voltage drop is measured along the current path or paths at nominal current and, where applicable, operating frequency.

M

Main Supply Short-Circuit Current IK
The main supply short-circuit current is the short-circuit current which results from the impedance of the test network and the connecting cables at the installation point of the test object.

Measured Limiting Voltage
Maximum voltage that is measured at the terminals of an SPD while pulses with a preset form and amplitude are applied.

N

Nominal Alternating Discharge Current Iwn
The nominal alternating discharge current is the alternating current with frequencies between 15 and 62 Hz (primarily 50 Hz), which the test object is dimensioned for in a specific test procedure.

Nominal Impulse Discharge Current In
The nominal impulse discharge current is the peak value of a current with the waveform 8/20 that flows through a surge protection device. It is used to classify the test for class II surge protection devices.

Nominal Load Current IL
The nominal load current is the maximum continuous, alternating or direct current which can flow from the output of an SPD to the connected load.

Nominal Voltage UN
The nominal voltage, as a rounded voltage value, specified by the manufacturer of an electrical apparatus to identify it and to specify the voltage range for which it is designed.

O

Overvoltage Category
The overvoltage category is the classification of a piece of electrical equipment to the expected overvoltages.

P

Potential Equalization Conductor
The potential equalization conductor is a conductive link to achieve potential equalization.

Potential Equalization Installation
The potential equalization installation is the total of all interconnected potential equalization conductors, including all other conductive parts which work in the same way, e.g. housings or other conductive installations. The potential equalization installation can either be the earth-termination system or part of it.

Power-Frequency Withstand Voltage
The power-frequency withstand voltage is the r.m.s. value of the highest sinusoidal voltage at system frequency, which does not result in a breakdown under predefined test conditions.

Protection Level Up
The protection level is a parameter which characterizes the performance of an SPD to limit the voltage between its terminals. The protection level is chosen from a list of standard values and has to exceed the highest value of the measured limiting voltages.

Protection Path
The parts of an SPD can be connected as “conductor against conductor” or “neutral conductor against earth”, or a combination of these possibilities. These methods of connection are called protection paths.

Pulse
A pulse is a rapid, temporary change of a physical parameter followed by a fast change back to the original value.

R

Rate of Rise
The rate of rise is the average change rate of a parameter between two certain values, e.g. between 10 % and 90 % of the peak value.

Rated Voltage of an Arrester Uc
Maximum acceptable root-mean-square value of the power-frequency a.c. voltage that can be permanently applied to the terminals of the arrester.

Reference Earth
Reference earth is the reference ground (especially the earth’s surface) that is so far apart from the earthing electrodes that, if a current is diverted into the ground, no relevant voltage differences occur between the points of this area.

Remote Signalling Contact
Remote signalling contacts belong to a circuit which is separated from the main circuit of the SPD. The disconnection device of the SPD and/or an operation indication are part of the same circuit.

Remote Strikes
Remote strikes cause surges with a considerable smaller energy content compared to close-up strikes.

Residual Current Protective Device (RCD)
Residual current protective devices disconnect the circuit if the residual current against earth exceeds a certain value.

Residual Voltage Ures
The residual voltage is the peak value of the voltage that appears between the terminals of an SPD during the flow of a discharge current or immediately after it.

S

Short-circuit Withstand Capability
The short-circuit withstand capability is the highest unaffected short-circuit current the surge protection device can withstand.

Sparkover Voltage
The sparkover voltage is the highest instantaneous value of the voltage at the terminals of an arrester, just before it is triggered.

Specialist in Lightning Protection
A specialist in lightning protection has a professional training, knowledge and expertise as well as knowledge of the corresponding regulations that allow him to assess the work assigned to him as well as to identify possible dangers. (To judge the professional training, one can also consider several years of working in the corresponding field.)

Status Display
The status display indicates the state of operation of an SPD.

Surge Voltage
A surge voltage is a voltage that puts people and/or technical equipment like conductors and devices at risk. It can permanently (overvoltage) or temporarily (surge voltage) occur between conductor and earth in error-free installations (in disconnected conductors as well).

Surge-voltage Protection Device (SPD
A surge-voltage protection device limits transient surges and diverts impulse currents. It includes at least one non-linear component.

T

Temperature Range
The temperature range describes the lowest and highest temperatures that are allowed at or inside the housing. For devices without self-heating this range refers to the ambient temperature. For devices with self-heating it indicates the maximum operating temperature range.

TOV Characteristics
The TOV characteristics describe the behaviour of an SPD to which a temporary overvoltage (TOV) is applied for a certain period of time.

Transient
A transient is a non-periodic and very short positive or negative change of voltage or current between two steady states.

transient
A transient behaviour describes the behaviour of a phenomenon or value which changes between two consecutive steady states in a very short time in comparison to the considered timescale.

Transverse Voltage
The transverse voltage is the interference voltage which occurs between two conductors of the same circuit.

Triggering Current of the Disconnection Device
The triggering current of the disconnection device is the root-mean-square value of the current through the arrester, which causes the disconnection device to operate within 30 seconds.

Triggering
Triggering is referred to, if either the peak value of the ohmic component of the current through the arrester reaches 5 mA or a voltage drop caused by the rise of the peak value of the current through the arrester exceeds 5 mA.

V

Varistors
A varistor is a bipolar non-linear resistor with symmetrical voltage-current characteristics. Its resistance decreases with increasing voltage.

W

Withstand Voltage
The withstand voltage is the maximum voltage that can be applied to a current-limiting component of an SPD without affecting it. This voltage can be equal to the highest continuous operating voltage Uc of the SPD or higher, depending on the components inside the SPD.

Abbreviations

CCP	Cathodic Corrosion Protection
CCPS	Cathodic Corrosion Protection System
EBS	Equipotential Bonding Strip
ESD	Electrostatic Discharge
FM	Remote Signalling Contact (Changeover Contact)
FS	Fail-safe
GDT	Gas-Filled Surge Arrester
LEMP	Lightning Electromagnetic Impulse
LPL	Lightning Protection Level
LPMS	LEMP Protection Measures System
LPS	Lightning Protection System
LPZ	Lightning Protection Zone
MBC	Miniature Circuit Breaker
MOV	Metalloxyd Varistor
PK	Potential-free Contact (Break Contact)
RCD	Residual Current Device
SEMP	Switching Electromagnetic Pulse
SPD	Surge Protective Device
SSCT	Solderless and Screwless Connection Technology
SVE	Surge Voltage Protection Equipment
SVP	Surge Voltage Protector
TAB	Technical Connection Requirements for Electrical Power Installations
TOV	Temporary Overvoltage
VDEW	Vereinigung deutscher Elektrizitätswerke e.V. (German Association for the Power Supply Industry)
VdS	Verband der Sachversicherer (Property Insurer Association)

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In sector development, production and distribution of construction units and devices for lightning and over-voltage protection we have established and applied an Environmental Management System since August 2010. Therefore requirements according to ISO 14001: 2004 are fulfilled

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The Certification Body
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Humboldtstr. 30/32
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has established and applies
a Quality Management System for

Development, production and distribution
of construction units and devices for
lightning- and overvoltage protection.

An audit was performed, Report No. 70741699.
Proof has been furnished that the requirements
according to

ISO 9001:2008

are fulfilled. The certificate is valid from 2014-09-23 until 2017-09-22.
Certificate Registration No. 12 100 34520 TMS

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CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
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LEUTRON

Leutron GmbH
Humboldtstr. 30/32
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Proof has been furnished that the requirements
according to

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are fulfilled. The certificate is valid from 2013-07-11 until 2016-07-10.
Certificate Registration No. 12 104 34520 TMS

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Siemens and VDE

SIEMENS

Cerberus Division

Sehr geehrte Damen und Herren

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Cerberus Division

Thomas Capaul
Head Approvals

Dr. Horst Dittrich
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in Anerkennung
der 25jährigen Mitgliedschaft

die silberne VDE Ehrennadel

Frankfurt am Main,
den 24.04.2002

Der Vorsitzende

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