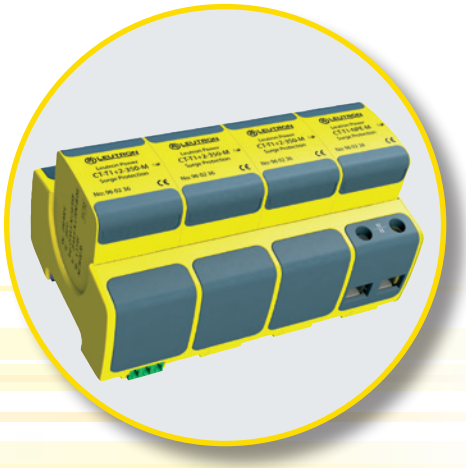
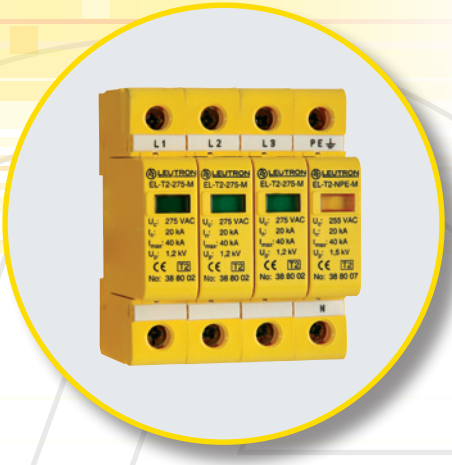
LEUTRON®





QUICK SELECTION GUIDE

2015

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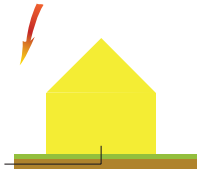
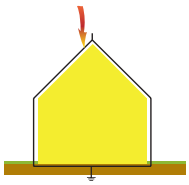
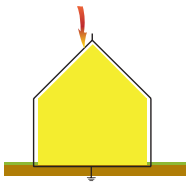
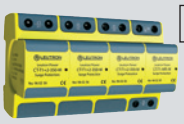
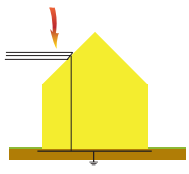
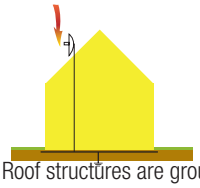
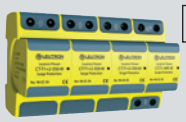
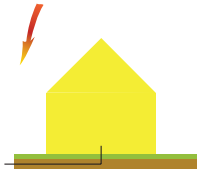
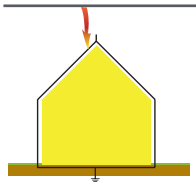
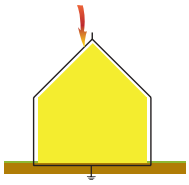
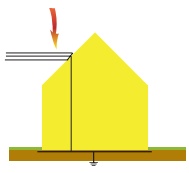
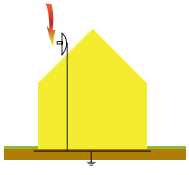
Situation	Point of installation	TNC	TNS
Risk of indirect lightning stroke			
 Building without external lightning protection system and ground wire connection. Starting with SPDs type 2 in the main distribution.	Apartment buildings/hospitals, industrial/ commercial Distance main / sub distribution or combined distribution: > 10 m	 T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV
	Apartment buildings/hospitals, industrial/ commercial Distance main / sub distribution or combined distribution: > 10 m		
Risk of direct lightning stroke			
 Building with external lightning protection system (according to EN 62305). Starting with SPDs type 1 + ... in the main distribution.	Buildings with lightning protection class III and IV (eg residential - commercial and office buildings) Distance from the main distribution / sub-distributor or combined distribution: > 10 m	 T1 T2 IPS BC TNC 12.5/275* (Part no. 38 16 46) • pluggable • 3 TE • Up at In: ≤ 1,4 kV	 T1 T2 IPS BC TNS 12.5/275* (Part no. 38 16 48) • pluggable • 4 TE • Up at In: ≤ 1,4 kV
	Building with lightning protection class III and IV (eg residential - commercial and office buildings) Distance from the main distribution / sub-distributor or combined distribution: < 10 m		
 Aerial line connection.	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: > 10 m	 T1 T2 CT-T1+2/3+0-350-FM (Part no. 96 00 03) • pluggable • 6 TE • U_p at I_{imp}: ≤ 1,5 kV	 T1 T2 CT-T1+2/3+1-350-FM (Part no. 96 00 01) • pluggable • 8 TE • U_p at I_{imp}: ≤ 1,5 kV
	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: < 10 m or combined distribution		
 Roof structures are grounded.	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: > 10 m or combined distribution	 T1 T2 CT-T1+2/3+0-350-FM (Part no. 96 00 03) • pluggable • 6 TE • U_p at I_{imp}: ≤ 1,5 kV	 T1 T2 CT-T1+2/3+1-350-FM (Part no. 96 00 01) • pluggable • 8 TE • U_p at I_{imp}: ≤ 1,5 kV

TT	TNC	TNS	TT
 T2 EL-T2/3+1-275* (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,4 kV	 T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/3+1-275*[1] (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,4 kV
	not needed for cable length < 10 m		
 T1 T2 IPS BC TT 12.5/275* (Part no. 38 16 50) • 4 TE, pluggable • Up at In: ≤ 1,4 kV (MOV) • Up at In: ≤ 1,5 kV (GDT)	 T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/3+1-275* (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,2 kV
	not needed for cable length < 10 m		
 T1 T2 CT-T1+2/3+1-350-FM (Part no. 96 00 01) • pluggable • 8 TE • U_p at I_{imp}: ≤ 1,5 kV	T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV 	T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV 	T2 EL-T2/3+1-275* (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,2 kV 
	not needed for cable length < 10 m		
 T1 T2 CT-T1+2/3+1-350-FM (Part no. 96 00 01) • pluggable • 8 TE • U_p at I_{imp}: ≤ 1,5 kV	T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV 	T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV 	T2 EL-T2/3+1-275* (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,2 kV 

* **Optional remote signal contact**

Situation	Point of installation	TNC	TNS	TT
Risk of indirect lightning stroke				
 Building without external lightning protection system and ground wire connection. Starting with SPDs type 2 in the main distribution.	Apartment buildings/hospitals, industrial/commercial Distance main / sub distribution or combined distribution: > 10 m	 T2 EL-T2/3+0-275* (Part no. 38 81 37) • pluggable • 3 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/4+0-275* (Part no. 38 81 09) • pluggable • 4 TE • Up at In: ≤ 1,2 kV	 T2 EL-T2/3+1-275* (Part no. 38 81 23) • pluggable • 4 TE • Up at In: ≤ 1,4 kV
	Apartment buildings/hospitals, industrial/commercial Distance main / sub distribution or combined distribution: > 10 m			
Risk of direct lightning stroke				
 Building with external lightning protection system (according to EN 62305). Starting with SPDs type 1 + ... in the main distribution.	Buildings with lightning protection class III and IV (eg residential - commercial and office buildings) Distance from the main distribution / sub-distributor or combined distribution: > 10 m	 T1 T2 IPS BC TNC 12.5/275* (Part no. 38 16 46) • pluggable • 3 TE • Up at In: ≤ 1,4 kV	 T1 T2 IPS BC TNS 12.5/275* (Part no. 38 16 48) • pluggable • 4 TE • Up at In: ≤ 1,4 kV	 T1 T2 IPS BC TT 12.5/275* (Part no. 38 16 50) • pluggable • 4 TE • Up at In: ≤ 1,4 kV (MOV) • Up at In: ≤ 1,5 kV (GDT)
	Building with lightning protection class III and IV (eg residential - commercial and office buildings) Distance from the main distribution / sub-distributor or combined distribution: < 10 m			
 Aerial line connection.	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: > 10 m	 PP BC TNC 25/75* (Part no. 37 39 80) T1 T2 Can be used pre-meter • 6 TE • U_p at I_{imp}: ≤ 2,5 kV	 PP BC TNS 25/100* (Part no. 37 39 50) T1 T2 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 2,5 kV	 PP BC TT 25/100* (Part no. 37 39 20) T1 T2 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 2,5 kV
	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: < 10 m or combined distribution	 PP BCD TNC 25/75* (Part no. 37 39 90) T1 T2 T3 Can be used pre-meter • 6 TE • U_p at I_{imp}: ≤ 1,0 kV	 PP BCD TNS 25/100* (Part no. 37 39 60) T1 T2 T3 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 1,0 kV	 PP BCD TT 25/100* (Part no. 37 39 30) T1 T2 T3 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 1,0 kV
 Roof structures are grounded.	Buildings with lightning protection class I to IV (eg data centers, industrial buildings and hospitals) Distance main distribution / sub-distribution: > 10 m or combined distribution	 PP BCD TNC 25/75* (Part no. 37 39 90) T1 T2 T3 Can be used pre-meter • 6 TE • U_p at I_{imp}: ≤ 1,0 kV	 PP BCD TNS 25/100* (Part no. 37 39 60) T1 T2 T3 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 1,0 kV	 PP BCD TT 25/100* (Part no. 37 39 30) T1 T2 T3 Can be used pre-meter • 8 TE • U_p at I_{imp}: ≤ 1,0 kV

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Sub distribution

TNC	TNS	TT

T2

EL-T2/3+0-275*
(Part no. 38 81 37)

- pluggable
- 3 TE
- Up at In: ≤ 1,2 kV

T2

EL-T2/4+0-275*
(Part no. 38 81 09)

- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

T2

EL-T2/3+1-275*
(Part no. 38 81 23)

pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

not needed for cable length < 10 m

T2

EL-T2/3+0-275*
(Part no. 38 81 37)
- pluggable
- 3 TE
- Up at In: ≤ 1,2 kV

T2

EL-T2/4+0-275*
(Part no. 38 81 09)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

T2

EL-T2/3+1-275*
(Part no. 38 81 23)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

not needed for cable length < 10 m

T2

EL-T2/3+0-275*
(Part no. 38 81 37)
- pluggable
- 3 TE
- Up at In: ≤ 1,2 kV

T2

EL-T2/4+0-275*
(Part no. 38 81 09)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

T2

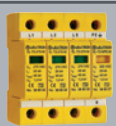
EL-T2/3+1-275*
(Part no. 38 81 23)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

not needed for cable length < 10 m

T2

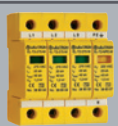
EL-T2/3+0-275*
(Part no. 38 81 37)
- pluggable
- 3 TE
- Up at In: ≤ 1,2 kV

T2



EL-T2/4+0-275*
(Part no. 38 81 09)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

T2



EL-T2/3+1-275*
(Part no. 38 81 23)
- pluggable
- 4 TE
- Up at In: ≤ 1,2 kV

* **Optional remote signal contact**

Terminal protection

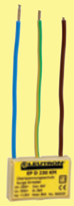
CPS-F 230
(Part no.: 32 50 08)

T3

Pluggable combined overvoltage protection for electrical and electronic devices with supply voltage of 230 V. Application for analogue and digital telephone lines, IT networks and SAT aerials input.

EP D 230 KM
(Part no. 36 20 35)

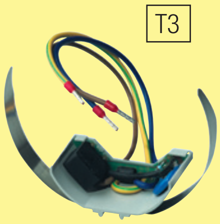
T3



Surge protection device with audible fault indicator for installation systems and terminal devices.

EnerPro 230 SDU
(Part no. 24 00 02)

T3

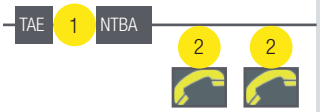
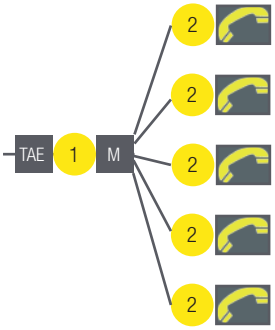
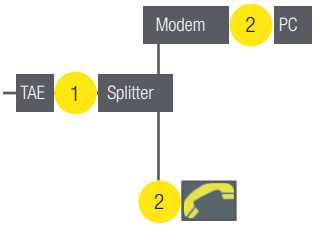
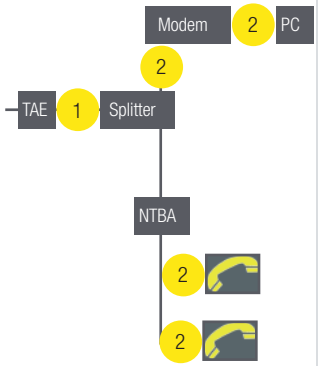


2-pole surge protection device to retrofit low-flush 230 V outlets.

EP D TN 24 V
(Part no. 38 12 54)

T3

2-pole, eg for 1-phase TN systems, DIN rail mounting (DIN EN 50 022).

Situation	1 behind the entrance into the building / transfer point	2 at the terminal equipment
Analog connection up to two pairs, eg for private connection 	IsoProData-Tr (without filter) (Part no. 27 30 02) 1DA (for two leads)	DataPro-TAE/NFN-aP (Part no. 24 00 04) Alternativ: CPS-F 230
ISDN connection 	IsoProData-Tr (without filter) (Part no. 27 30 02) 1DA (for two leads)	DataPro-ISDN-aP (Part no. 24 00 13) Alternativ: CPS-F 230
ISDN multiplex connection 	TelPro LSA 2-10-3EH230E-10kA (Part no. 24 01 19) and LSA 2/10-Tr (Part no. 24 01 02) and LSA 2/10-MW10-25/22 (Part no. 24 01 10)* Alternatively a combined protection device DP 1LSA-T110FS-PTC (Part no. 24 00 48) and LSA 2/10-Tr (Part no. 24 01 02) and LSA 2/10-ES (Part no. 24 01 33) and LSA 2/10-MW10-25/22 (Part no. 24 01 10) *	DataPro-ISDN-aP (Part no. 24 00 13) Alternatively: CPS-F 230 (Part no. 32 50 08) Cat. 5 DataPro-TAE/NFN-aP (Part no. 24 00 04) Alternatively: CPS-F 230
DSL connection and analog telephone connection 	IsoProData-Tr (without filter) (Part no. 27 30 02) 1DA (for two leads)	DP RJ45 f/f (Part no. 24 00 11) Cat. 5 DP-RJ45-CAT6-48V-Tr (Part no. 24 00 05) Cat. 6 DataPro-TAE/NFN-aP (Part no. 24 00 04) Alternatively: CPS-F 230 (Part no. 32 50 08)
DSL connection and ISDN 	IsoProData-Tr (without filter) (Part no. 27 30 02) 1DA (for two leads)	DP RJ45 f/f (Part no. 24 00 11) Cat. 5 DP-RJ45-CAT6-48V-Tr (Part no. 24 00 05) Cat. 6 DataPro-ISDN-aP (Part no. 24 00 13) Alternativ: CPS-F 230 (Part no. 32 50 08) Cat. 5

*(Customized mounting frame and suitable housing available)

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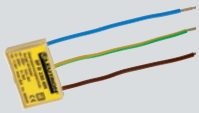
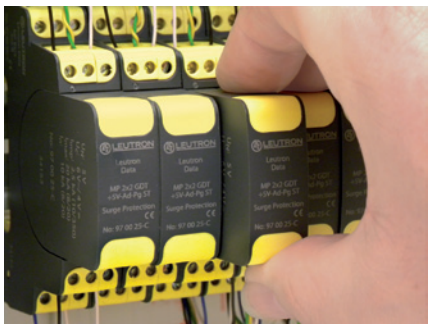
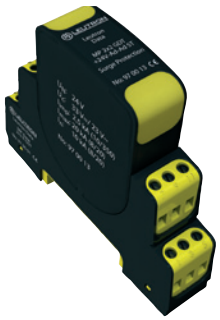
Situation	Installation at the server	Installation at the swtch/hub	Installation at the terminal
CAT 5 (6), CLASS D Data line	DP RJ45-f/f (Part no. 24 00 11) Cut-off frequency: 100 MHz  DP-RJ45-CAT6-48V-Tr (Part no. 24 00 05) Cut-off frequency: 250 MHz  DP-1xRJ45-PoE-ALU (Part no. 24 00 21) Cut-off frequency: 100 MHz  Alternativ: CPS-F 230 (Part no. 32 50 08) 	DP-8xRJ45-6V-WG (Part no. 19 40 50) Cut-off frequency: 100 MHz  DP 1x8RJ45-19“ (Part no. 19 40 13)  Patchpanel auch mit 8/16/32/40 und 48 Ports verfügbar  Cut-off frequency: 100 MHz	DP RJ45-f/f (Part no. 24 00 11) Cut-off frequency: 100 MHz  DP-RJ45-CAT6-48V-Tr (Part no. 24 00 05) Cut-off frequency: 250 MHz  DP-1xRJ45-PoE-ALU (Part no. 24 00 21) Cut-off frequency: 100 MHz  Alternativ: CPS-F 230 (Part no. 32 50 08) 
230 V-net power supply	CPS-F 230 (Part no. 32 50 08)  EP D 230 KM (Part no. 36 20 35) 	CPS-F 230 (Part no. 32 50 08)  The device is connected to the network side as an adapter plug into an outlet and on the equipment side with a power supply cable to the protected device.	CPS-F 230 (Part no. 32 50 08)  The device is connected to the network side as an adapter plug into an outlet and on the equipment side with a power supply cable to the protected device.

SURGE PROTECTION FOR TV, SAT, RADIO AND VIDEO EQUIPMENT

Situation	Point of installation	Point of installation
Broadband (cable TV)	• between transfer/connection point and amplifier DataPro-Radio/TV (Part no. 21 00 30) 	• before every terminal device (TV/Video/HiFi) CPS-F 230 (Part no. 32 50 08) 
SAT dish and receiver (eg detached house) SAT dish and multi switch or multi-LNB (eg appartment building)	• between LNB and receiver/multi switch, right at the device to be protected DataPro-SAT (Part no. 21 00 20) 	• before every terminal device (receiver or TV/Video/HiFi) CPS-F 230 (Part no. 32 50 08) 
Terrestrial receiverfor analog TV or DVB-T	• between antenna and amplifier DataPro-Radio/TV (Part no. 21 00 30) 	• before every terminal device (receiver or TV/Video/HiFi) CPS-F 230 (Part no. 32 50 08) 



Module: MP 2x2 GDT+5V-Ad-Pg ST (97 00 25)



Module : MP 2x2 GDT+24V-Ad-Ad ST (97 00 13)

Interface / Signal	Connection	Protected lines	Protection device	Item no.
0-20 mA, 4-20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27
(also with HART)	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Pg	97 10 13
	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34
4-20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
(also with HART) cc. NAMUR recommendation	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
NE 21 or acc. EN 61000-4-5,	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
Open-circuit voltage 1 kV Ad-Pg	LSA	2	DP 1LSA-24	24 00 34
	LSA	20	DP 10LSA-24V	24 00 27
3/4-Signal Measurement	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27
ADVANT	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad-Pg ST	97 00 39
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad-Pg ST	97 00 46
	Screw terminals	2	MP RK GDT+5V-Ad-Ad-Pg	97 10 18
Binary signals	Screw terminals	4	MP 2x2 GDT+XXV-Ad-Pg ST	97 00 25 - 97 00 31
	Screw terminals	2	MP 1x2 GDT+XXV-Ad-Pg ST	97 00 32 - 97 00 38
	Screw terminals	2	MP RK GDT+XXV-Ad-Pg	97 10 11 - 97 10 17
	Screw terminals	2	MP RK XXV-Ad-Pg	97 10 32 - 97 10 38
	LSA	2	DP 1LSA-XX	24 00 31 - 24 00 39
	LSA	20	DP 10LSA-24V	24 00 27
Bitbus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
BLN	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12
(Building Level Netzwerk)	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
	Screw terminals	2	MP RK GDT+12V-Ad-Ad	97 10 05
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08
CAN-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
(data line only)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
C-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
(Honeywell)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Data Highway Plus	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19
Delta Net Peer Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Device Net	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50

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Interface / Signal	Connection	Protected lines	Protection device	Item no.
(data line only)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Dupline	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
E-Bus	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
(Honeywell)	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
EIB	Screw terminals	4	MP 2x2 GDT ST	97 00 07
	Screw terminals	2	MP 1x2 GDT ST	97 00 10
	Screw terminals	2	MP RK GDT	97 10 03
	LSA	20	TelPro LSA-3EH230F1E-10kA	24 01 23
Electro acoustic system (ELA)	Screw terminals	4	MP 2x2 GDT ST	97 00 07
	Screw terminals	2	MP 1x2 GDT ST	97 00 10
	Screw terminals	2	MP RK GDT	97 10 03
	Screw terminals	4	MP 2x2 GDT+170V-Ad-Pg ST	97 00 31
	Screw terminals	2	MP 1x2 GDT+170V-Ad-Pg ST	97 00 38
	Screw terminals	2	MP RK GDT+170V-Ad-Pg	97 10 17
	LSA	2	DP 1LSA-110	24 00 39
	LSA	20	DP 10LSA-110	24 01 40
ET 200	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Fieldbus Foundation	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
	LSA	20	DP 10LSA-24V	24 00 27
FIPIO / FIPWAY	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
FIP I/O	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
FSK	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Genius I/O Bus	Screw terminals	4	MP 2x2 GDT+12V-Ad-Ad ST	97 00 12
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Ad ST	97 00 19
	Screw terminals	2	MP RK GDT+12V-Ad-Ad	97 10 05
DC power supply +24/30 V DC	Screw terminals	2	DP2x1-RLC/50V-Tr	28 70 50
IEC-Bus (RS 486)	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Industrial Ethernet	RJ45	8	DP RJ45-CAT6-48V-Tr	24 00 05
	RJ45	8	DP RJ45 f/f	24 00 11
	RJ45	8	DP 1xRJ45-PoE-Alu	24 00 21
	RJ45	8 x 8	DP 8xRJ45-6V-WG	19 40 50
	RJ45	8 x 8	DP 1x8RJ45-19"	19 40 13
	RJ45	16 x 8	DP 2x8RJ45-19"	19 40 23
	RJ45	24 x 8	DP 3x8RJ45-19"	19 40 33
	RJ45	32 x 8	DP 4x8RJ45-19"	19 40 43
	RJ45	40 x 8	DP 5x8RJ45-19"	19 40 53
	RJ45	48 x 8	DP 6x8RJ45-19"	19 40 63
	RJ45	8	CPS-F 230	32 50 08
INTERBUS-INLINE (I/O)	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08
INTERBUS-Loop	Screw terminals	2	MP 1x2 24V-Ad-Pg ST	97 00 76

Interface / Signal	Connection	Protected lines	Protection device	Item no.
	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34
Interbus INLINE Fernbus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
K-Bus	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
KBR-Energybus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
KNX-Bus	Screw terminals	4	MP 2x2 GDT ST	97 00 07
	Screw terminals	2	MP 1x2 GDT ST	97 00 10
	Screw terminals	2	MP RK GDT	97 10 03
	LSA	20	TelPro LSA-3EH230F1E-10kA	24 01 23
LON				
- TP/XF 78	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04
- TP/FTT10 und TP/LPT10	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08
- TP/FTT 10	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
LUXMATE-Bus	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
M-Bus	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08
MODBUS	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
MPI Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
N1 LAN	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
N2 Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
(Johnson Controls, LON, FTT 10)	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Optocoupler Interface	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad-Pg ST	97 00 41
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad-Pg ST	97 00 48
	Screw terminals	2	MP RK GDT+24V-Ad-Ad-Pg	97 10 20
Procontic SC31	Screw terminals	2	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26
(RS 232)				
Procontic T200	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
(RS 422)				
PROFIBUS-DP/FMS	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
PROFIBUS-PA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Ad ST	97 00 13
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Ad ST	97 00 20
	Screw terminals	2	MP RK GDT+24V-Ad-Ad	97 10 06
	LSA	2	DP 1LSA-C24FS-PTC	24 00 66
PROFIBUS SIMATIC NET	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50

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Interface / Signal	Connection	Protected lines	Protection device	Item no.
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
PSM-EG-RS 422	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
PSM-EG-RS 485	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Rackbus (RS 485)	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
R-Bus	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04
RS 485	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
	LSA	2	DP 1LSA-C24FS-PTC	24 00 66
RS 422, V11	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
S-Bus	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
SafetyBUS p	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
SDLC	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
Securilan-LON-Bus	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11
(LONWORKS Technology)	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04
SIGMASYS	Screw terminals	4	MP 2x2 GDT+48V-Ad-Ad ST	97 00 15
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Ad ST	97 00 22
	Screw terminals	2	MP RK GDT+48V-Ad-Ad	97 10 08
	Screw terminals	4	MP 2x2 GDT+48V-Ad-Pg ST	97 00 29
	Screw terminals	2	MP 1x2 GDT+48V-Ad-Pg ST	97 00 36
	Screw terminals	2	MP RK GDT+48V-Ad-Pg	97 10 15
SINEC L1	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
SINEC L2	Screw terminals	4	MP 2x2 5V-HF ST	97 10 50
	Screw terminals	2	MP 1x2 5V-HF ST	97 10 52
SS97 SIN/X (RS 232)	Screw terminals	4	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Pg ST	97 00 33
	Screw terminals	2	MP RK GDT+12V-Ad-Pg	97 10 12
SUCONET	Screw terminals	4	MP 2x2 GDT+5V-Ad-Ad ST	97 00 11
	Screw terminals	2	MP 1x2 GDT+5V-Ad-Ad ST	97 00 18
	Screw terminals	2	MP RK GDT+5V-Ad-Ad	97 10 04
Temperature measuring	Screw terminals	4	MP 2x2 GDT+5V-Ad-Pg ST	97 00 25
PT 100, PT 1000, Ni 1000, NTC, PTC	Screw terminals	2	MP 1x2 GDT+5V-Ad-Pg ST	97 00 32
	Screw terminals	2	MP RK GDT+5V-Ad-Pg	97 10 11
TTL	Screw terminals	4	MP 2x2 GDT+12V-Ad-Pg ST	97 00 26
	Screw terminals	2	MP 1x2 GDT+12V-Ad-Pg ST	97 00 33
	Screw terminals	2	MP RK GDT+12V-Ad-Pg	97 10 12
TTY 4 - 20 mA	Screw terminals	4	MP 2x2 GDT+24V-Ad-Pg ST	97 00 27
	Screw terminals	2	MP 1x2 GDT+24V-Ad-Pg ST	97 00 34
	Screw terminals	2	MP RK GDT+24V-Ad-Pg	97 10 13
	Screw terminals	2	MP RK 24V-Ad-Pg	97 10 34

IEC 60364-5-53/A2 (IEC 64/1168/CDV: 2001) therefore recommends to design the total cable length of surge protective devices in branch circuits to be not longer than 0.5 m, maximum length is 1 m.
Note: cable length of more than 1 m create unacceptable overvoltage conditions.
In case of V connection the use of pre-fuse has to be checked.

Figures 1 and 2 show the recommended max. cable lengths of surge protective devices in branch circuits.

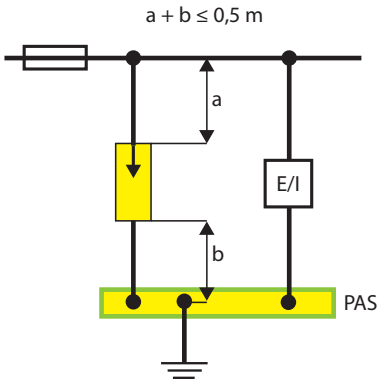


Fig. 1 Parallel wiring

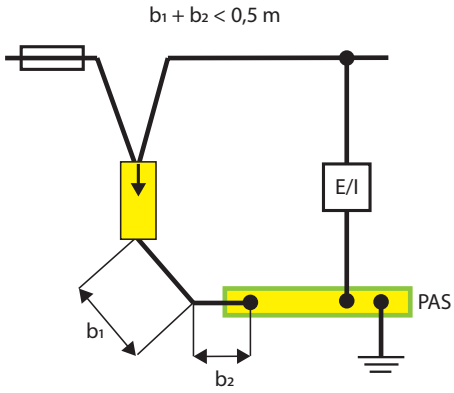
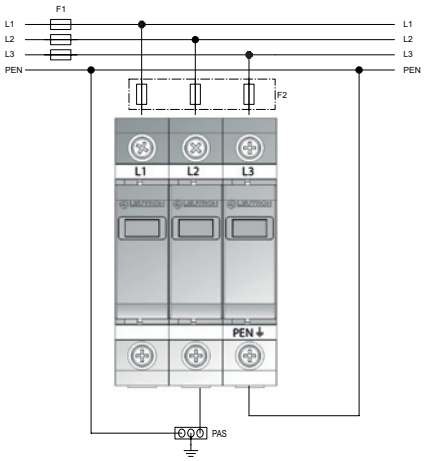
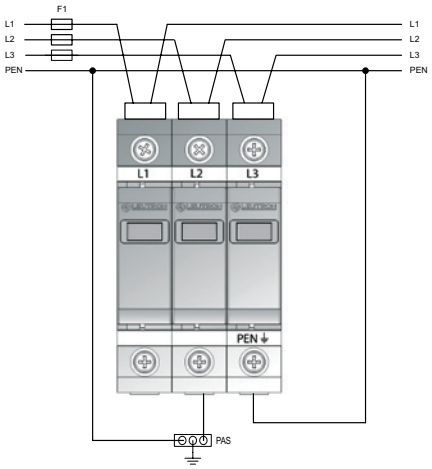


Fig. 2 Serial wiring or V-wiring





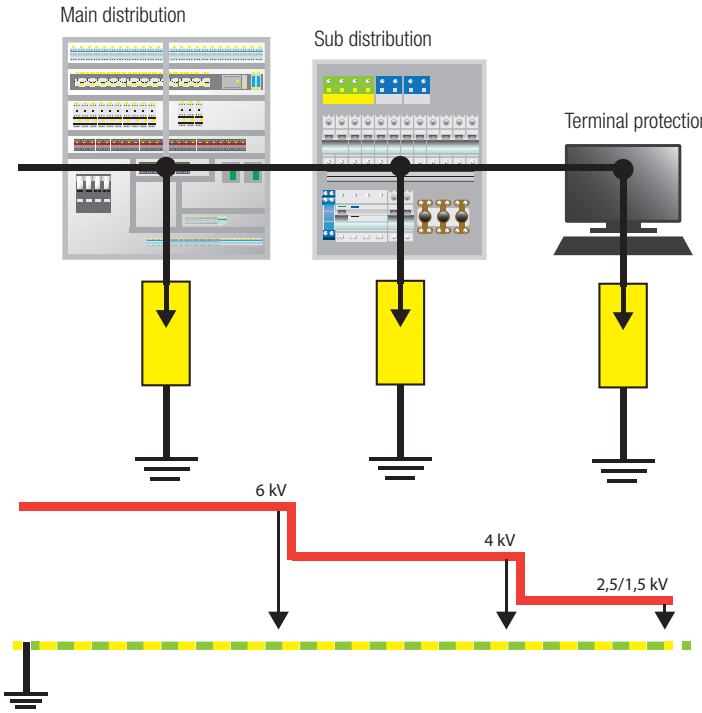
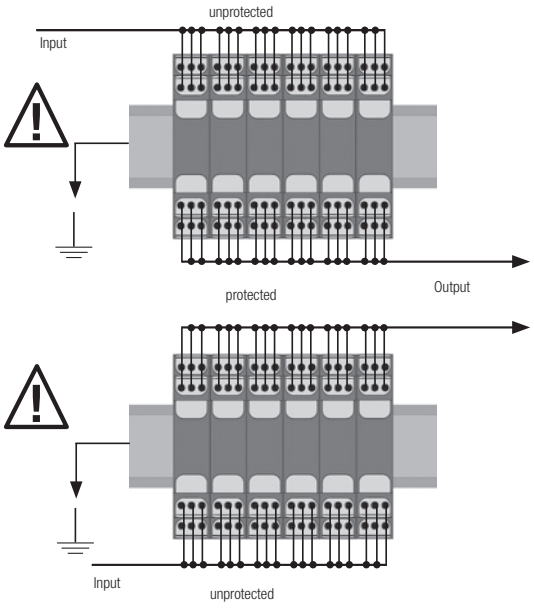


Fig. 3 Protection Level



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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.

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.

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

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.

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.

Earth
Earth signifies the ground or the soil.

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

Earthing (verb) or grounding
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.
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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.

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.

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.

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 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).

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.

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.

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.

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

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.

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.

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

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

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.

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.

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

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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