

# DEHNguard MU Modular DIN-Rail Surge Protectors For Power Systems



## Red / Line Surge Arrester Type 2



### Features

- Prewired complete unit consisting of a base part and plug-in protection modules
- No need for additional overcurrent protection devices
- Short circuit current rating (SCCR) 200kA
- ANSI / UL 1449 – 4th Ed. Open-Type 1 SPD
- High discharge capacity due to heavy-duty zinc oxide varistors (Imax 50kA, 8x 20µs)
- High reliability due to “Thermo Dynamic Control” SPD monitoring device



- DEHNguard SU 1Pxxx: Modular single-pole surge arrester for application in single-phase electrical systems
- DEHNguard MU 3PYxxx: Modular surge arrester for application in 3-phase Wye electrical systems
- DEHNguard MU 3PDxxx: Modular surge arrester for application in 3-phase Delta electrical systems
- DEHNguard MU 3PHxxx: Modular surge arrester for application in 3-phase High-leg Delta systems

• The DEHNguard Red / Line SU/MUxxx surge arresters are modular DIN rail mounted SPDs that set new standards in terms of safety and user-friendliness. The SPDs are UL 1449 4th Edition certified as Type 1 and are designed for all common electrical power systems. These devices have optimized Voltage Protection Ratings and therefore provide ideal surge protection for the United States and Canadian electrical panel markets. They offer maximum discharge capacity of 50kA and a high short circuit current rating (SCCR) of 200kA without the need for additional overcurrent protection devices.

• Reliable surge protection and equipment safety are key elements of the modular DEHNguard surge arresters. The application-based product designation makes it considerably easier to choose the correct device for the relevant application, and the module locking system firmly fixes the protection modules to the base part. Neither vibration during transport nor the enormous electromagnetic forces of discharge can loosen the protection modules. Yet they can be easily replaced without tools by simply pressing the user-friendly module release buttons. Each protective circuit of the multipole surge arresters and each protection module is mechanically coded to ensure against installing an incorrect module.

- The dual “Thermo Dynamic Control” monitoring device was not only developed on the basis of national and international product standards but also reflects decades of experience in the world market of surge protective devices and considers practical applications where arresters might be damaged. As with all DEHN surge arresters with “Thermo Dynamic Control,” the intensity of the discharge current and the surface temperature of the heavy-duty varistor are evaluated. The visual status indicator with green and red indicator flags shows the availability of every protective circuit.
- In addition to this standard visual indication, DEHNguard M SU/ MUxxxFM devices feature a Form C contact (SPDT).
- With its floating changeover contact, the remote signal can be used as a make or break contact according to the particular circuit concept. The surge arresters of the multipole modular DEHNguard MU family feature multifunctional terminals on a standardized spacing of one module for the connection of wires and busbars, allowing easy wiring with other DIN rail mounted devices. Thus, a wide range of applications can be easily connected in series for optimal protection.

# DEHNguard MU Modular DIN-Rail Surge Protectors For Power Systems



## Red / Line Surge Arrester Type 2

### DEHNguard MU 3PY – 3W+G R 277/480 Wye, 3-Pole SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection modules for application in 3-phase Wye electrical systems. Floating Form C (SPDT) remote status contacts.



DEHNguard MU 3PY – 3W+G R 277/480 Wye, 3-Pole SPD Selection Chart	
Type DG MUxxx	3PY 480 3W+G R
Part Number	908319
Price	\$162.00
<b>SPD Classification Acc. To ANSI/UL 1449 4th Ed.</b>	Open-Type 1 SPD
<b>SPD Classification Acc. To CSA - C22.2 No. 269.1-14</b>	Type 4-1 Component Assembly
<b>Max. Continuous Operating Voltage AC [L-G] / [L-L] (MCOV)</b>	385VAC / 770VAC
<b>Nominal Discharge Current (8x20µs) (I<sub>n</sub>)</b>	20kA
<b>Max. Discharge Current (8/20) (I<sub>max</sub>)</b>	50kA
<b>Voltage Protection Rating [L-G] / [L-L] (VPR)</b>	1200V <sub>pk</sub> / 2500V <sub>pk</sub>
<b>Max. Mains-side Overcurrent Protection</b>	Not needed
<b>Approvals</b>	UL, CSA
<b>Remote Status Contact</b>	Floating (dry), Form C (SPDT)
<b>Dimensional Drawing</b>	<a href="#">PDF</a>

### DEHNguard MU 3PD – 3W+G R 240V or 480V Delta, 3-Pole SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection modules for application in 3-phase Delta electrical systems. Floating Form C (SPDT) remote status contacts.



DEHNguard MU 3PD – 3W+G R 240V or 480V Delta, 3-Pole SPD Selection Chart		
Type DG MUxxx	3PD 480 3W+G R	3PD 240 3W+G R
Part Number	908355	908356
Price	\$162.00	\$162.00
<b>SPD Classification Acc. To ANSI/UL 1449 4th Ed.</b>	Open-Type 1 SPD	Open-Type 1 SPD
<b>SPD Classification Acc. To CSA - C22.2 No. 269.1-14</b>	Type 4-1 Component Assembly	Type 4-1 Component Assembly
<b>Max. Continuous Operating Voltage AC [L-G] / [L-L] (MCOV)</b>	550VAC / 1100VAC	275VAC / 550VAC
<b>Nominal Discharge Current (8x20µs) (I<sub>n</sub>)</b>	20 kA	20 kA
<b>Max. Discharge Current (8/20) (I<sub>max</sub>)</b>	50 kA	50 kA
<b>Voltage Protection Rating [L-G] / [L-L] (VPR)</b>	1800V <sub>pk</sub> / 3000V <sub>pk</sub>	800V <sub>pk</sub> / 1500V <sub>pk</sub>
<b>Max. Mains-side Overcurrent Protection</b>	Not needed	Not needed
<b>Approvals</b>	UL, CSA	UL, CSA
<b>Remote Status Contact</b>	Floating (dry), Form C (SPDT)	Floating (dry), Form C (SPDT)
<b>Dimensional Drawing</b>	<a href="#">PDF</a>	<a href="#">PDF</a>

### DEHNguard MU 3PY – 4W+G R 120/208, 277/480 or 347/600 Wye, 4-Pole SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection modules for application in 3-phase Wye systems. Floating Form C (SPDT) remote status contacts.



DEHNguard MU 3PY – 4W+G R 120/208, 277/480 or 347/600 Wye, 4-Pole SPD Selection Chart			
Type DG MUxxx	3PY 208 4W+G R	3PY 480 4W+G R	3PY 600 4W+G R
Part Number	908345	908346	908347
Price	\$215.00	\$215.00	\$215.00
<b>SPD Classification Acc. To ANSI/UL 1449 4th Ed.</b>	Open-Type 1 SPD	Open-Type 1 SPD	Open-Type 1 SPD
<b>SPD Classification Acc. To CSA - C22.2 No. 269.1-14</b>	Type 4-1 Component Assembly	Type 4-1 Component Assembly	Type 4-1 Component Assembly
<b>Max. Continuous Operating Voltage AC [L-N] / [L-G] / [L-L] / [N-G] (MCOV)</b>	180VAC / 360VAC / 360VAC / 180VAC	385VAC / 565VAC / 770VAC / 180VAC	510VAC / 690VAC / 1020VAC / 180VAC
<b>Nominal Discharge Current (8x20µs) (I<sub>n</sub>)</b>	20kA	20kA	20kA
<b>Max. Discharge Current (8/20) (I<sub>max</sub>)</b>	50kA	50kA	50kA
<b>Voltage Protection Rating [L-N] / [L-G] / [L-L] / [N-G] (VPR)</b>	600V <sub>pk</sub> / 1200V <sub>pk</sub> / 1200V <sub>pk</sub> / 600V <sub>pk</sub>	1200V <sub>pk</sub> / 1800V <sub>pk</sub> / 2500V <sub>pk</sub> / 600V <sub>pk</sub>	1500V <sub>pk</sub> / 2000V <sub>pk</sub> / 3000V <sub>pk</sub> / 600V <sub>pk</sub>
<b>Max. Mains-side Overcurrent Protection</b>	Not needed	Not needed	Not needed
<b>Approvals</b>	UL, CSA	UL, CSA	UL, CSA
<b>Remote Status Contact</b>	Floating (dry), Form C (SPDT)	Floating (dry), Form C (SPDT)	Floating (dry), Form C (SPDT)
<b>Dimensional Drawing</b>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>

# DEHNguard MU Modular DIN-Rail Surge Protectors For Power Systems



## Red / Line Surge Arrester Type 2

### DEHNguard MU 3PH – 4W+G R 120/240 High-Leg Delta, 4-Pole SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection modules for application in split-phase systems. Floating Form C (SPDT) remote status contacts.



DEHNguard MU 3PH – 4W+G R 120/240 High-Leg Delta, 4-Pole SPD Selection Chart	
Type DG MUxxx	3PH 240 4W+G R
Part Number	<b>908348</b>
Price	\$215.00
SPD Classification Acc. To ANSI/UL 1449 4th Ed.	Open-Type 1 SPD
SPD Classification Acc. To CSA - C22.2 No. 269.1-14	Type 4-1 Component Assembly
Max. Continuous Operating Voltage AC [L-N] / [H-N] / [L-G] / [H-G] / [L-L] / [L-H] / [N-G]	230VAC / 275VAC / 410VAC / 455VAC / 460VAC / 505VAC / 180VAC
Nominal Discharge Current (8x20µs) (I <sub>n</sub> )	20kA
Max. Discharge Current (8/20) (I <sub>max</sub> )	50kA
Voltage Protection Rating [L-N] / [H-N] / [L-G] / [H-G] / [L-L] / [L-H] / [N-G] (VPR)	700V <sub>pk</sub> / 800 V <sub>pk</sub> / 1200 V <sub>pk</sub> / 1500 V <sub>pk</sub> / 1500V <sub>pk</sub> / 1500V <sub>pk</sub> / 600V <sub>pk</sub>
Max. Mains-Side Overcurrent Protection	Not needed
Approvals	UL, CSA
Remote Status Contact	Floating (dry), Form C (SPDT)
Dimensional Drawing	<a href="#">PDF</a>

### DEHNguard MU SP – 3W+G R 120/240 Split-Phase, 2-Pole 3W+G (USA) SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection modules for application in split-phase systems. Floating Form C (SPDT) remote status contacts.



DEHNguard MU SP – 3W+G R 120/240 Split-Phase, 2-Pole 3W+G (USA) SPD Selection Chart	
Type DG MUxxx	SP 240 3W+G R
Part Number	<b>908195</b>
Price	\$135.00
SPD Classification Acc. To ANSI/UL 1449 4th Ed.	Open-Type 1 SPD
SPD Classification Acc. To CSA - C22.2 No. 269.1-14	Type 4-1 Component Assembly
Max. Continuous Operating Voltage AC [L-G] / [L-L] (MCOV)	230VAC / 460VAC
Nominal Discharge Current (8x20µs) (I <sub>n</sub> )	20kA
Max. Discharge Current (8/20) (I <sub>max</sub> )	50kA
Voltage Protection Rating [L-G] / [L-L] (VPR)	700V / 1500V
Max. Mains-Side Overcurrent Protection	Not needed
Approvals	UL, CSA
Remote Status Contact	Floating (dry), Form C (SPDT)
Dimensional Drawing	<a href="#">PDF</a>

### DEHNguard SU 1P R 120V Single-Phase, 1-Pole SPD

DIN rail mount, pluggable surge arrester consisting of a base part and plug-in protection module for application in single-phase electrical systems. Floating Form C (SPDT) remote status contacts.



DEHNguard SU 1P R 120V Single-Phase, 1-Pole SPD Selection Chart	
Type DG SUxxx	1P 120 R
Part Number	<b>908090</b>
Price	\$62.00
SPD Classification Acc. To ANSI/UL 1449 4th Ed.	Open-Type 1 SPD
SPD Classification Acc. To CSA - C22.2 No. 269.1-14	Type 4-1 Component Assembly
Max. Continuous Operating Voltage AC [L-L] (MCOV)	230VAC
Nominal Discharge Current (8x20µs) (I <sub>n</sub> )	20kA
Max. Discharge Current (8/20) (I <sub>max</sub> )	50kA
Voltage Protection Rating [L-G] / [L-L] (VPR)	700V <sub>pk</sub>
Max. Mains-Side Overcurrent Protection	Not needed
Approvals	UL, CSA
Remote Status Contact	Floating (dry), Form C (SPDT)
Dimensional Drawing	<a href="#">PDF</a>

# DEHNrail Modular DIN-Rail Surge Protectors For Power Systems



## Red / Line Surge Arrester Type 3



### Features

- Two-pole surge arrester consisting of a base part and a plug-in protection module
- High discharge capacity due to heavy-duty zinc oxide varistor/spark gap combination
- Energy coordination with other arresters of the Red / Line product family
- Operating state / fault indication by green/red indicator flag in the inspection window
- Narrow (modular) design according to DIN 43880
- Easy replacement of protection modules due to module locking system with module release button
- Vibration and shock-tested according to EN 60068-2



UL file numbers: E319777  
CSA file number: 215727

**DEHNrail M 2Pxxx:** Two-pole surge arrester consisting of a base part and a plug-in protection module

**DEHNrail M 2PxxxFM:** With remote signalling contact for monitoring device (floating changeover contact)

The modular devices of the DEHNrail M product family stand out due to their high performance parameters and straightforward Red / Line design. The devices combine safety and ease of use in a single module. The low voltage protection level and the comprehensive protection against common-mode and differential-mode interference make them ideal for protecting communications equipment in industrial electronics environments. The input and output terminals for series connection and the protective circuit designed for high load currents underline this concept.

The very compact design of the DEHNrail M surge arresters includes the fault-proof Y protective circuit and a combined SPD monitoring and disconnection device.

The base part and protection module are coded to ensure against installing an incorrect module.

The unique module locking system of the DEHNrail M product family fixes the protection module to the base part. Neither vibration during transport nor the electrodynamic forces of discharge can loosen the connection.

In the event of the protective circuit being overloaded, the protection modules can be easily replaced without tools by simply pressing the module release button.

In addition to the standard visual indication with green and red indicator flags, DEHNrail MxxxFM devices feature a three-pole remote signalling terminal. With its floating changeover contact, the remote signal can be used as a break or make contact according to the particular circuit concept.

# DEHNrail Modular DIN-Rail Surge Protectors For Power Systems



## Red / Line Surge Arrester Type 3

### DEHNrail M 2P 48V Hybrid DIN LV SPD

Two-pole surge arrester consisting of a base part and a plug-in protection module.



DEHNrail M 2P 48V Hybrid DIN LV SPD Selection Chart	
Type DR M 2Pxxx	<b>60</b>
Part Number	<b>953202</b>
Price	\$54.00
SPD According To EN 61643-11 / IEC 61643-11	Type 3 / Class III
SPD According To UL 1449 and CSA C22.2	UL Type 4 component assembly and CSA Type 5 component assembly
Max. Mains-side Overcurrent Protection	25A gG or B 25A (gG or B only)
Max. Continuous Operating Voltage (AC) ( $U_C$ )	60V (50/60 Hz)
Max. Continuous Operating Voltage (DC) ( $U_C$ )	60V
Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ )	1kA
Nominal Load Current (AC) ( $I_L$ )	25A
Total Discharge Current (8/20 $\mu$ s) [L+N-PE] ( $I_{total}$ )	2kA
Voltage Protection Level [L-N] / [L/N-PE] ( $U_p$ )	$\leq 350 / \leq 730V$
Approvals	KEMA, VDE, UL, CSA
Dimensional Drawing	PDF

### DEHNrail M 2P – FM 24V Hybrid DIN LV SPD

Two-pole surge arrester consisting of a base part and a plug-in protection module; with floating remote signalling contact.



DEHNrail M 2P – FM 24V Hybrid DIN LV SPD Selection Chart	
Type DR M 2Pxxx	<b>30 FM</b>
Part Number	<b>953206</b>
Price	\$57.00
SPD According To EN 61643-11 / IEC 61643-11	Type 3 / Class III
SPD According To UL 1449 and CSA C22.2	UL Type 4 component assembly and CSA Type 5 component assembly
Max. Mains-side Overcurrent Protection	25A gG or B 25A (gG or B only)
Max. Continuous Operating Voltage (AC) ( $U_C$ )	30V (50/60 Hz)
Max. Continuous Operating Voltage (DC) ( $U_C$ )	30V
Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ )	1kA
Nominal Load Current (AC) ( $I_L$ )	25A
Total Discharge Current (8/20 $\mu$ s) [L+N-PE] ( $I_{total}$ )	2kA
Voltage Protection Level [L-N] / [L/N-PE] ( $U_p$ )	$\leq 180 / \leq 630V$
Type of Remote Signalling Contact	Changeover contact
Approvals	KEMA, VDE, UL, CSA
Dimensional Drawing	PDF

### DEHNrail M 2P – FM 150V or 230V Hybrid DIN LV SPD

Two-pole surge arrester consisting of a base part and a plug-in protection module; with floating remote signalling contact.



DEHNrail M 2P – FM 150V or 230V Hybrid DIN LV SPD Selection Chart		
Type DR M 2Pxxx	<b>150 FM</b>	<b>255 FM</b>
Part Number	<b>953209</b>	<b>953205</b>
Price	\$57.00	\$57.00
SPD According To EN 61643-11 / IEC 61643-11	Type 3 / Class III	Type 3 / Class III
SPD According To UL 1449 and CSA C22.2	UL Type 4 component assembly and CSA Type 5 component assembly	UL Type 4 component assembly and CSA Type 5 component assembly
Max. Mains-side Overcurrent Protection	25A gG or B 25A	25A gG or B 25A (gG or B only)
Max. Continuous Operating Voltage (AC) ( $U_C$ )	150V (50/60 Hz)	255V (50/60 Hz)
Max. Continuous Operating Voltage (DC) ( $U_C$ )	150V	255V
Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ )	2kA	3kA
Nominal Load Current (AC) ( $I_L$ )	25A	25A
Total Discharge Current (8/20 $\mu$ s) [L+N-PE] ( $I_{total}$ )	4kA	5kA
Voltage Protection Level [L-N] / [L/N-PE] ( $U_p$ )	$\leq 640 / \leq 800V$	$\leq 1250 / \leq 1500V$
Type of Remote Signalling Contact	Changeover contact	Changeover contact
Approvals	KEMA, VDE, UL, CSA	KEMA, VDE, UL, CSA
Dimensional Drawing	PDF	PDF

# DEHNpipe Surge Protectors For Installations and Devices



## Yellow / Line SPDs for Field Devices

### Features

#### Surge arresters to be screwed onto field devices

- Parallel connection
- Made of corrosion-resistant stainless steel
- Arrester for protecting a second interface (data or power side) available
- IP67

#### Types for Ex (i) and Ex (d) applications

- For protecting intrinsically safe measuring circuits and bus systems Ex (i)
- Type in a flameproof enclosure Ex (d)

The devices of the DEHNpipe family are made of corrosion-resistant stainless steel and can be directly screwed onto a field device. The permanently connected lines are connected to the terminals of the field device. These surge protective devices are designed for parallel circuit connections.

Arresters for parallel connection are attached to the spare cable gland of the field devices or in the field bus distributor and are situated in parallel to the cable run. Both versions have an IP67 degree of protection.

#### Variety of approvals

- Approvals depending on the arrester: IECEX, ATEX, FISCO, CSA Hazloc



CSA file number: 215727

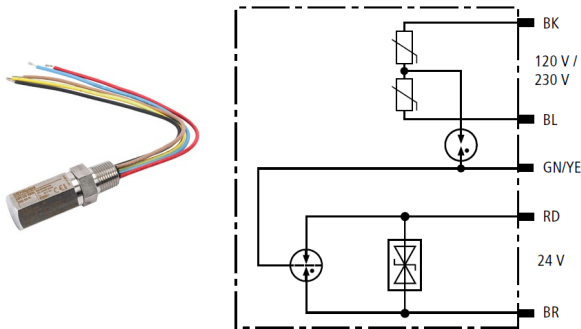
Ex(i) and Ex(d) versions are available for field devices in potentially explosive atmospheres. Depending on the type, the arresters can thus be installed on field devices in intrinsically safe measuring circuits Ex(i) or on devices with flameproof enclosure and are suitable for use in Ex zone 1 or 2.

The surge arresters are ideally suited for installation in process environments, for example on transducers or field bus devices. 4-20 mA measuring circuits or bus systems up to 30 V are typical fields of application.

### DPI CD EXD 230 24 N

Power, data and signal surge protective device (SPD), 230/120 VAC 1-Phase & 24V, parallel circuit, 2 lines or 1 pair, IP67.

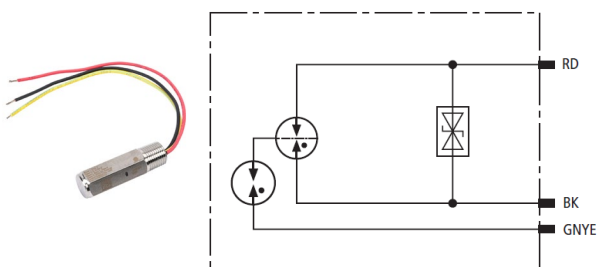
Surge arrester in a flameproof enclosure for protecting 120/230 V terminal equipment and 0/4-20 mA interfaces in potentially explosive atmospheres.



### DPI CD EXI

Parallel Type mA Loop Arrester For Class 1 / Div 2 Haz Loc 24VDC

Surge arrester for protecting intrinsically safe measuring circuits and bus systems according to FISCO.



### DEHNpipe DPI Power, Data and Signal SPD Selection Chart

Type DPIxxx	CD EXD 230 24 N
Part Number	<b>929970</b>
Price	\$166.00
<b>D1 Lightning Impulse Current (10/350 <math>\mu</math>s) Per Line (<math>I_{imp}</math>)</b>	1kA
<b>C2 Total Nominal Discharge Current (8/20 <math>\mu</math>s) (<math>I_n</math>)</b>	10kA
<b>SPD Class</b>	Type 2 P2
<b>Max. Continuous Operating Voltage (DC) (<math>U_C</math>)</b>	32V
<b>Nominal Current At 80°C (<math>I_L</math>)</b>	0.55 A
<b>For Mounting On Field/Device Side</b>	1/2in-14 NPSM
<b>Approvals (Not UL)</b>	EACEx, ATEX, IECEX, CSA & USA Hazloc, SIL
<b>Dimensional Drawing</b>	<a href="#">PDF</a>

### DEHNpipe DPI Parallel Type mA Loop Arrester SPD Selection Chart

Type DPIxxx	CD EXI 24 N
Part Number	<b>929963</b>
Price	\$110.00
<b>D1 Lightning Impulse Current (10/350 <math>\mu</math>s) Per Line (<math>I_{imp}</math>)</b>	1kA
<b>C2 Total Nominal Discharge Current (8/20 <math>\mu</math>s) (<math>I_n</math>)</b>	10kA
<b>SPD Class</b>	Type 2 P1
<b>Max. Continuous Operating Voltage (DC) (<math>U_C</math>)</b>	32V
<b>Nominal Current (<math>I_L</math>)</b>	0.55 A
<b>Cut-Off Frequency Line-PG (<math>f_G</math>)</b>	67MHz
<b>For Mounting On Field/Device Side</b>	1/2in-14 NPSM
<b>Approvals (Not UL)</b>	EACEx, ATEX, IECEX, CSA & USA Hazloc, SIL
<b>Dimensional Drawing</b>	<a href="#">PDF</a>

# DEHNpatch SPDs for Telecommunication and Data Networks



## Yellow / Line DEHNpatch SPDs

### Features

- Cat. 6 according to ISO / IEC 11801
- CAT 6A in the channel according to ANSI / TIA / EIA-568
- Power over Ethernet IEEE 802.3 compliant (up to PoE++ / 4PPoE)
- IP66 variant for outdoor applications
- Easy to retrofit

Surge arresters of the DEHNpatch family fulfill various requirements for a universal application for Ethernet, Industrial Ethernet, Power over Ethernet (IEEE 802.3 compliant up to PoE++ / 4PPoE) as well as general applications in structured cabling up to the Gbit range. The SPDs are suitable for indoor and outdoor installation in different environmental conditions.

The space-saving design of the DEHNpatch surge arrester as patch cable or as compact socket-socket design is especially easy to install. New systems can be equipped easily, and easy retrofitting is possible anytime. Due to its fully shielded design, DEHNpatch can be used in shielded and unshielded networks.

DEHNpatch is installed between patch panel and active component (e.g. switch). A safe equipotential bonding is provided by the surge current



UL file numbers: E156818  
CSA file number: 215727

resistant DIN rail supporting foot with snap-in mechanism.

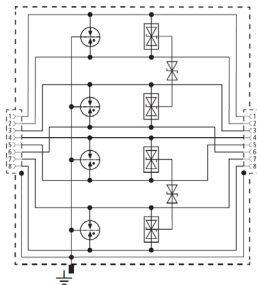
The width of the DIN rail mounting devices is similar to that of an RJ45 socket, allowing up to 24 devices to be installed next to one another in a 19in rack. For multiple application in 19in distribution boards a DEHNpatch mounting set is recommended which is available as accessory.

The IP66 version of DEHNpatch with its universal mounting device, specially developed for outdoor applications, can be installed on poles as well as on walls. The arrester is directly earthed via the metal enclosure. Screws in the enclosure cover are secured against falling out which facilitates installation also at great heights (e.g. on poles). Special cable seals enable an easy and low-effort installation of the arrester with pre-assembled patch cables. An additional effort of mounting RJ45 plugs on the building entry cable can be omitted.

### DPI CLE IP66

DEHNpatch, Outdoor Ethernet

Universal surge arrester for GBit Ethernet applications, Power over Ethernet (IEEE 802.3 compliant up to PoE++ / 4PPoE) and similar applications in structured cabling systems in indoor and outdoor areas in an IP66 rated enclosure impervious to dust and water jets. Protection of all pairs with gas discharge tubes and one adapted filter matrix for each pair. Fully shielded surge protective solution with RJ 45 sockets. Universal mounting bracket for pole and wall mounting.



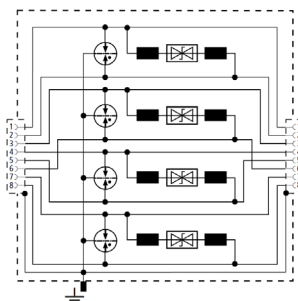
### DEHNpatch Outdoor Ethernet SPD Selection Chart

Type DPAXxx	CLE IP66
Part Number	929221
Price	\$359.00
D1 Lightning Impulse Current (10/350 $\mu$ s) Per Line ( $I_{imp}$ )	0.8 kA
C2 Total Nominal Discharge Current (8/20 $\mu$ s) ( $I_n$ )	10kA
SPD Class	Type 2 P1
Max. Continuous Operating Voltage (DC) Pair-Pair (PoE) ( $U_c$ )	60V
Nominal Current ( $I_L$ )	1A
Cut-Off Frequency ( $f_G$ )	250MHz
Connection (Input/Output)	RJ45 socket / RJ45 socket
Degree of Protection (With Installed Cables)	IP66
Approvals	UL, CSA, EAC
Dimensional Drawing	PDF

### DEHNpatch Class E

Ethernet 48V Data Signal DIN Rail RJ45 SPD

Universal arrester ideally suited for Industrial Ethernet, Power over Ethernet (IEEE 802.3 compliant up to PoE++ / 4PPoE) and similar applications in structured cabling systems according to class E up to 250MHz. Fully shielded adapter with sockets for DIN rail mounting.



### DEHNpatch Class E Ethernet 48V Data Signal SPD Selection Chart

Type DPAXxx	M CLE RJ45B 48
Part Number	929121
Price	\$120.00
D1 Lightning Impulse Current (10/350 $\mu$ s) Per Line ( $I_{imp}$ )	0.5 kA
C2 Total Nominal Discharge Current (8/20 $\mu$ s) Line-PG ( $I_n$ )	10kA
SPD Class	Type 2 P1
Max. Continuous Operating Voltage (DC) ( $U_c$ )	48V
Max. Continuous Operating Voltage (DC) Pair-Pair (PoE) ( $U_c$ )	57V
Nominal Current ( $I_L$ )	1A
Cut-Off Frequency ( $f_G$ )	250MHz
Connection (Input/Output)	RJ45 socket / RJ45 socket
Degree of Protection (With Installed Cables)	IP10
Approvals	CSA, UL, GHMT, EAC
Dimensional Drawing	PDF

# DEHN Surge Protectors Accessories Replacement Modules



## Red / Line Surge Arrester Type 2

### Protection Modules for DEHNguard M UL Series

The varistor based protection modules of the DEHNguard SU/MU surge arresters distinguish themselves through their outstanding performance and sophistication.

The compact protection modules incorporate the complete protective circuit as well as the monitoring and disconnection device. A green flag in the inspection window indicates the

availability of the protection modules.

All protection modules are mechanically coded to ensure against installing an incorrect module. The protection modules can be easily replaced without tools by simply pressing the user-friendly module release button.

### Features

- High discharge capacity due to heavy-duty zinc oxide varistors ( $I_{max}$  50 kA,  $8 \times 20 \mu s$ )
- ANSI / UL 1449 – 4th Ed. Open-Type 1 SPD (908xxx)
- High reliability due to “Thermo Dynamic Control” SPD monitoring device



UL file numbers:  
E319777  
CSA file number: 215727

### DEHNguard M UL Series Replacement Module Selection Chart

Part Number	Price	Type	Nominal Discharge Current (8/20 $\mu s$ ) ( $I_n$ )	Max. Discharge Current ( $I_{max}$ )	Max. Continuous Operating Voltage (AC) (UC)	Dimensional Drawing
<a href="#">908011</a>	\$59.00	DG PLU 180	20kA	50kA	180V	<a href="#">PDF</a>
<a href="#">908012</a>	\$56.00	DG PLU 230	20kA	50kA	230V	<a href="#">PDF</a>
<a href="#">908010</a>	\$59.00	DG PLU 275	20kA	50kA	275V	<a href="#">PDF</a>
<a href="#">908014</a>	\$59.00	DG PLU 385	20kA	50kA	385V	<a href="#">PDF</a>
<a href="#">908013</a>	\$59.00	DG PLU 510	20kA	50kA	510V	<a href="#">PDF</a>
<a href="#">908015</a>	\$59.00	DG PLU 550	20kA	50kA	550V	<a href="#">PDF</a>



### DEHNrail M 2P Series Replacement Module Selection Chart

Part Number	Price	Type	Nominal Discharge Current (8/20 $\mu s$ ) ( $I_n$ )	Total Discharge Current (8/20 $\mu s$ ) [L+N-PE] ( $I_{total}$ )	Max. Continuous Operating Voltage (AC) (UC)	Dimensional Drawing
<a href="#">953011</a>	\$42.50	DR MOD 30	1kA	2kA	30V	<a href="#">PDF</a>
<a href="#">953012</a>	\$42.50	DR MOD 60	1kA	2kA	60V	<a href="#">PDF</a>
<a href="#">953014</a>	\$42.50	DR MOD 150	2kA	4kA	150V	<a href="#">PDF</a>
<a href="#">953010</a>	\$42.50	DR MOD 255	3kA	5kA	255V	<a href="#">PDF</a>

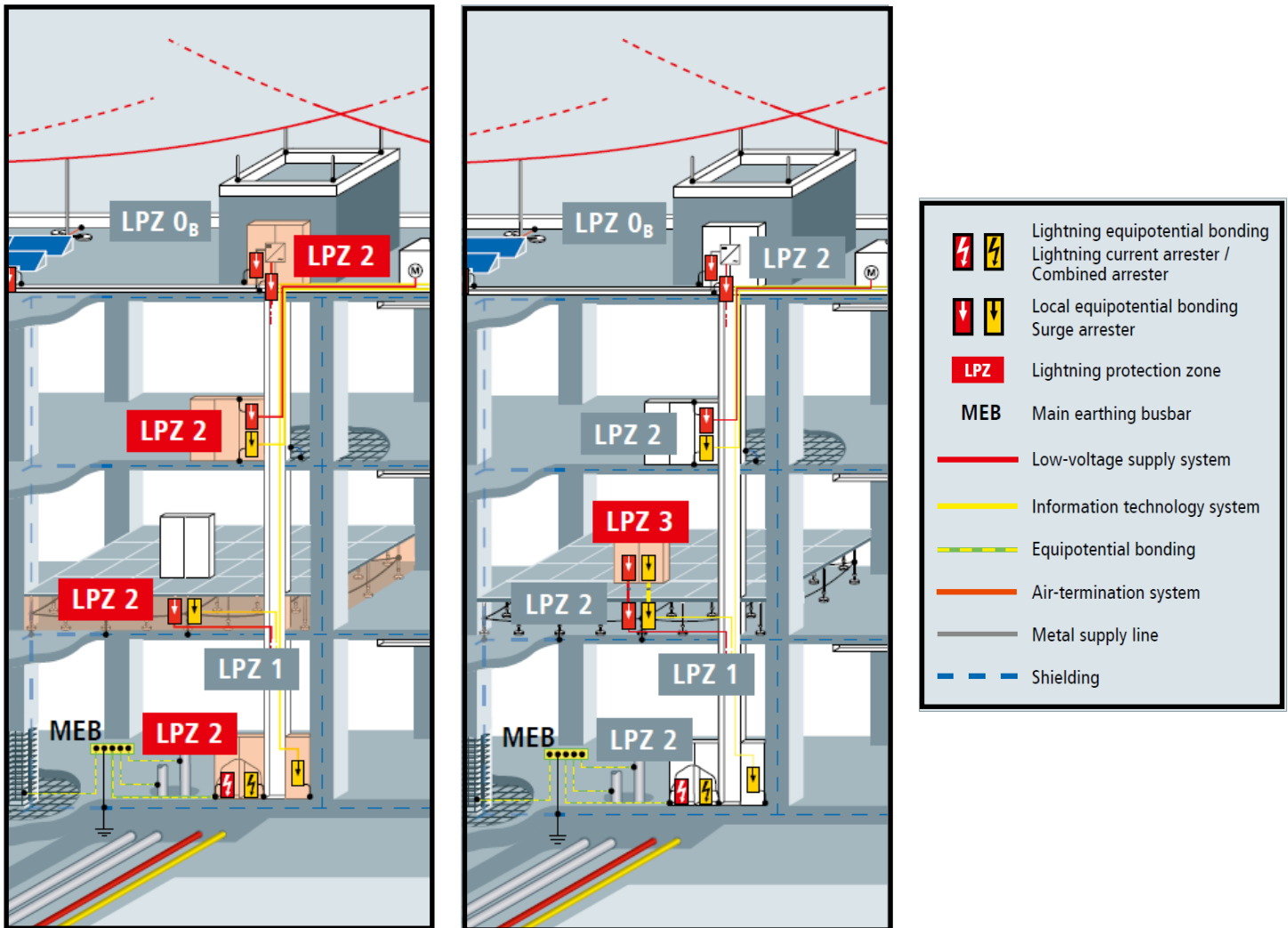




# DEHN Surge Protectors Definition of Terms



## Lightning Protection Zones



## IEC 62305-4:2010

### Outer zones:

**LPZ 0** Zone where the threat is due to the unattenuated lightning electromagnetic field and where the internal systems may be subjected to full or partial lightning surge current.

LPZ 0 is subdivided into the following:

**LPZ 0A** Zone where the threat is due to the direct lightning flash and the full lightning electromagnetic field. The internal systems may be subjected to full lightning surge current.

**LPZ 0B** Zone protected against direct lightning flashes but where the threat is the full lightning electromagnetic field. The internal systems may be subjected to partial lightning surge currents.

### Inner zones

(protected against direct lightning flashes):

**LPZ 1** Zone where the surge current is limited by current sharing and isolating interfaces and/or by SPDs at the boundary. Spatial shielding may attenuate the lightning electromagnetic field.

**LPZ 2xxxn** Zone where the surge current may be further limited by current sharing and isolating interfaces and/or by additional SPDs at the boundary. Additional spatial shielding may be used to further attenuate the lightning electromagnetic field.

# DEHN Surge Protectors Definition of Terms



## Continued

### Surge Protective Devices (SPDs)

Surge protective devices are devices consisting mainly of voltage-controlled resistors (varistors, suppressor diodes) and / or spark gaps (discharge paths). Surge protective devices are used to protect other electrical equipment and installations against impermissibly high surges and/or to establish equipotential bonding.

Surge protective devices are classified as follows:

#### 1) According to their use:

- Surge protective devices for power supply systems and equipment (Red/Line product family) for nominal voltage ranges up to 1000V
  - (According to EN 61643-11:2012 in type 1 / 2 / 3 SPDs)
  - (According to IEC 61643-11:2011 in class I / II / III SPDs)
- Surge protective devices for IT systems and equipment (Yellow/Line product family) for protecting modern electronic systems in telecommunications and signal-processing networks with nominal voltages up to 1000 VAC [root-mean-square value (rms)] and 1500 V d.c. against the indirect and direct effects of lightning strikes and other transients.
  - (According to IEC 61643-21:2012, EN 61643-21:2013 and DIN VDE 0845-3-1)
- Isolating spark gaps for earth-termination systems or equipotential bonding (Red/Line product family)
- Surge protective devices for use in photovoltaic installations (Red/Line product family) for nominal voltage ranges up to 1500 V
  - (According to EN 50539-11:2013 as type 1 / 2 SPDs)

#### 2) According to their impulse current discharge capacity and protective effect:

- Lightning current arresters / Coordinated lightning current arresters for interference resulting from direct or nearby lightning strikes for protecting installations and equipment [for use at the boundaries between lightning protection zones (LPZ) 0A and 1].
- Surge arresters for remote lightning strikes, switching overvoltages as well as electrostatic discharges for protecting installations, equipment and terminal devices (for use at the boundaries downstream of LPZ 0B).
- Combined lightning current and surge arresters for interference resulting from direct or nearby lightning strikes for protecting installations, equipment and terminal devices (for use at the boundaries between LPZ 0A and 1 as well as 0A and 2).

### Technical data

The technical data of surge protective devices comprise information defining their conditions of use according to:

- Use (e.g. installation, power supply conditions, temperature)
- Performance in case of interference (e.g. impulse current discharge capacity, follow current extinguishing capability, voltage protection level, response time)
- Performance during operation (e.g. nominal current, attenuation, insulation resistance)
- Performance in case of failure (e.g. backup fuse, disconnection device, fail-safe, remote signalling option).

### Surge arrester

Term meaning as determined by the National Electrical Code® (NEC®) ([www.nfpa.org](http://www.nfpa.org)), the UL listing, and applicable IEEE/ANSI standards. Surge arresters less than 1000V have been called secondary surge arresters. Going forward they are now considered a Type 1 SPD and listed in Article 242 of the 2020 NEC. Surge arresters were originally developed and applied to the power distribution system to protect utility supplied equipment and building wiring. Surge arresters were intended to protect the system structure and not necessarily the connected equipment and loads. Secondary surge arresters (now known as Type 1 SPDs)

are generally intended to be installed on the line side of the main service disconnect overcurrent device (service equipment).

### Breaking capacity, follow current extinguishing capability $I_{ft}$

The breaking capacity is the uninfluenced (prospective) r.m.s. value of the mains follow current which can automatically be extinguished by the surge protective device when connecting  $U_c$ . It can be proven in an operating duty test according to IEC/EN 61643-11.

### Categories according to IEC 61643-21:2012

A number of impulse voltages and impulse currents are described in IEC 61643-21:2012 for testing the current carrying capability and voltage limitation of impulse interference. Table 3 of this standard lists these into categories and provides preferred values. In Table 2 of the IEC 61643-22 standard the sources of transients are assigned to the different impulse categories according to the decoupling mechanism. Category C2 includes inductive coupling (surges), category D1 galvanic coupling (lightning currents). The relevant category is specified in the technical data.

DEHN surge protective devices surpass the values in the specified categories. Therefore, the exact value for the impulse current carrying capability is indicated by the nominal discharge current (8/20  $\mu$ s) and the lightning impulse current (10/350  $\mu$ s).

### Combination wave $U_{oc}$

A combination wave is generated by a hybrid generator (1.2/50  $\mu$ s, 8/20  $\mu$ s) with a fictitious impedance of 2  $\Omega$ . The open-circuit voltage of this generator is referred to as  $U_{oc}$ .  $U_{oc}$  is a preferred indicator for type 3 arresters since only these arresters may be tested with a combination wave (according to IEC/EN 61643-11).

### Cut-off frequency $f_G$

The cut-off frequency defines the frequency-dependent behavior of an arrester. The cut-off frequency is equivalent to the frequency which induces an insertion loss ( $a_p$ ) of 3 dB under certain test conditions (see EN 61643-21:2013). Unless otherwise indicated, this value refers to a 50  $\Omega$  system.

### Degree of protection

The IP degree of protection corresponds to the protection categories described in IEC/EN 60529.

### Disconnecting time $t_d$

The disconnecting time is the time passing until the automatic disconnection from power supply in case of a failure of the circuit or equipment to be protected. The disconnecting time is an application-specific value resulting from the intensity of the fault current and the characteristics of the protective device.

### Energy coordination of SPDs

Energy coordination is the selective and coordinated interaction of cascaded protection elements (= SPDs) of an overall lightning and surge protection concept. This means that the total load of the lightning impulse current is split between the SPDs according to their energy carrying capability. If energy coordination is not possible, downstream SPDs are insufficiently relieved by the upstream SPDs since the upstream SPDs operate too late, insufficiently or not at all. Consequently, downstream SPDs as well as terminal equipment to be protected may be destroyed.

DIN CLC/TS 61643-12:2010 describes how to verify energy

# DEHN Surge Protectors Definition of Terms



## Continued

coordination. Spark-gap-based type 1 SPDs offer considerable advantages due to their voltage-switching characteristic (see WAVE BREAKER FUNCTION).

### **Frequency range**

The frequency range represents the transmission range or cut-off frequency of an arrester depending on the described attenuation characteristics.

### **Integrated backup fuse**

According to the product standard for SPDs, overcurrent protective devices/backup fuses must be used. This, however, requires additional space in the distribution board, additional cable lengths, which should be as short as possible according to IEC 60364-5-53, additional installation time (and costs) and dimensioning of the fuse. A fuse integrated in the arrester ideally suited for the impulse currents involved eliminates all these disadvantages. The space gain, lower wiring effort, integrated fuse monitoring and the increased protective effect due to shorter connecting cables are clear advantages of this concept which is integrated in the DEHNvenCI, DEHNbloc Maxi S, DEHNguard ... CI and V(A) NH product families.

### **LifeCheck**

Repeated discharge processes which exceed the specification of the device can overload arresters in information technology systems. In order to ensure high system availability, arresters should therefore be subjected to systematic tests. LifeCheck allows quick and easy testing of arresters.

### **Lightning impulse current $I_{imp}$**

The lightning impulse current is a standardized impulse current curve with a 10/350  $\mu$ s wave form. Its parameters (peak value, charge, specific energy) simulate the load caused by natural lightning currents. Lightning current and combined arresters must be capable of discharging such lightning impulse currents several times without being destroyed.

### **Mains-side overcurrent protection / arrester backup fuse**

Overcurrent protective device (e.g. fuse or circuit breaker) located outside of the arrester on the infeed side to interrupt the power-frequency follow current as soon as the breaking capacity of the surge protective device is exceeded. No additional backup fuse is required since the backup fuse is already integrated in the SPD.

### **Maximum continuous operating voltage $U_c$**

The maximum continuous operating voltage (maximum permissible operating voltage) is the r.m.s. value of the maximum voltage which may be connected to the corresponding terminals of the surge protective device during operation. This is the maximum voltage on the arrester in the defined non-conducting state, which reverts the arrester back to this state after it has tripped and discharged. The value of  $U_c$  depends on the nominal voltage of the system to be protected and the installer's specifications (IEC 60364-5-534).

### **Maximum discharge current $I_{max}$**

The maximum discharge current is the maximum peak value of the 8/20  $\mu$ s impulse current which the device can safely discharge.

### **Maximum transmission capacity**

The maximum transmission capacity defines the maximum high-frequency power which can be transmitted via a coaxial surge protective device without interfering with the protection component.

### **Nominal discharge current $I_n$**

The nominal discharge current is the peak value of a 8/20  $\mu$ s impulse current for which the surge protective device is rated in a certain test program and which the surge protective device can discharge several times.

### **Nominal load current (nominal current) $I_L$**

The nominal load current is the maximum permissible operating current which may permanently flow through the corresponding terminals.

### **Nominal voltage $U_N$**

The nominal voltage stands for the nominal voltage of the system to be protected. The value of the nominal voltage often serves as type designation for surge protective devices for information technology systems. It is indicated as an RMS value for AC systems.

### **N-PE arrester**

Surge protective devices exclusively designed for installation between the N and PE conductor.

### **Operating temperature range $T_o$**

The operating temperature range indicates the range in which the devices can be used. For non-self-heating devices, it is equal to the ambient temperature range. The temperature rise for self-heating devices must not exceed the maximum value indicated.

### **Protective circuit**

Protective circuits are multi-stage, cascaded protective devices. The individual protection stages may consist of spark gaps, varistors, semiconductor elements or gas discharge tubes (see energy coordination).

### **Protective conductor current $I_{PE}$**

The protective conductor current is the current which flows through the PE connection when the surge protective device is connected to the maximum continuous operating voltage  $U_c$ , according to the installation instructions and without load-side consumers.

### **Remote signalling contact**

A remote signalling contact allows easy remote monitoring and indication of the operating state of the device. It features a three-pole terminal in the form of a floating changeover contact. This contact can be used as break and / or make contact and can thus be easily integrated in the building control system, controller of the switchgear cabinet, etc.

### **Response time $t_A$**

Response times mainly characterise the response performance of individual protection elements used in arresters.

# DEHN Surge Protectors Definition of Terms



## Continued

### **Return loss**

In high-frequency applications, the return loss refers to how many parts of the "leading" wave are reflected at the protective device (surge point). This is a direct measure of how well a protective device is attuned to the characteristic impedance of the system.

### **Series resistance**

Resistance in the direction of the signal flow between the input and output of an arrester. The series resistance is normally used to coordinate the protection stages in a multi-stage SPD.

### **Shield attenuation**

Relation of the power fed into a coaxial cable to the power radiated by the cable through the phase conductor.

### **Short-circuit withstand capability**

The short-circuit withstand capability is the value of the prospective power-frequency short-circuit current handled by the surge protective device when the relevant maximum backup fuse is connected upstream.

### **Temporary overvoltage (TOV)**

Temporary overvoltage may be present at the surge protective device for a short period of time due to a fault in the high-voltage system. This must be clearly distinguished from a transient caused by a lightning strike or a switching operation, which last no longer than about 1 ms. The amplitude  $U_T$  and the duration of this temporary overvoltage are specified in EN 61643-11 (200ms, 5s or 120min) and are individually tested for the relevant SPDs according to the system configuration (TN, TT, etc.). The SPD can either a) reliably fail (TOV safety) or b) be TOV-resistant (TOV withstand), meaning that it is completely operational during and following temporary overvoltages.

### **Thermal disconnecter**

Surge protective devices for use in power supply systems equipped with voltage-controlled resistors (varistors) mostly feature an integrated thermal disconnecter that disconnects the surge protective device in case of overload and indicates this operating state. The disconnecter responds to the "current heat" generated by an overloaded varistor and disconnects the surge protective device if a certain temperature is exceeded. The disconnecter is designed to disconnect the overloaded surge protective device in time to prevent a fire. It is not intended to ensure protection against indirect contact. The function of these thermal disconnecters can be tested by means of a simulated overload / ageing of the arresters.

### **Total discharge current $I_{total}$**

Current which flows through the PE, PEN or earth connection of a multipole SPD during the total discharge current test. This test is used to determine the total load if current simultaneously flows through several protective paths of a multipole SPD. This parameter is decisive for the total discharge capacity which is reliably handled by the sum of the individual paths of an SPD.

### **Voltage protection level $U_p$**

The voltage protection level of a surge protective device is the maximum instantaneous value of the voltage at the terminals of a surge protective device, determined from the standardized

individual tests:

- Lightning impulse sparkover voltage 1.2/50  $\mu$ s (100%)
- Sparkover voltage with a rate of rise of 1 kV/ $\mu$ s
- Measured limit voltage at a nominal discharge current  $I_n$

The voltage protection level characterizes the capability of a surge protective device to limit surges to a residual level. The voltage protection level defines the installation location with regard to the overvoltage category according to IEC 60664-1 in power supply systems. For surge protective devices to be used in information technology systems, the voltage protection level must be adapted to the immunity level of the equipment to be protected (IEC 61000-4-5: 2015).

### **Wave breaker function**

Due to the technical design of type 1 SPDs, energy coordination of SPDs considerably varies. Experience has shown that even small amplitudes of the 10/350  $\mu$ s lightning impulse current overload downstream SPDs or even destroy them if varistor-based type 1 lightning current arresters are used. In case of spark-gap-based type 1 arresters, in contrast, virtually the total current flows through the type 1 arrester. Similar to a wave breaker the energy is reduced to an acceptable level. The advantage is that the time to half value of the 10/350  $\mu$ s impulse current is reduced due to the reduction of the impulse time and the switching behavior of type 1 SPDs. This considerably relieves downstream SPDs. All devices of the DEHN Red/Line and Yellow/Line product family are energy-coordinated. Moreover, all type 1 arresters of the Red/Line family are based on spark gaps and thus feature this WAVE BREAKER FUNCTION.

### **Yellow/Line SPD class**

All DEHN arresters for use in information technology systems are categorized into a Yellow/Line SPD class and are marked with the corresponding symbol in the data sheet and on the rating plate.