Surge protection for smoke and heat extraction systems

White Paper

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White Paper

To be able to safely leave a structure in case of fire, escape routes must be kept free of smoke which causes orientation and breathing problems.
Smoke and heat extraction systems are both equipped with manual call points and automatic detectors which detect the smoke or heat produced and extract it from the escape route via electromechanically or pneumatically driven windows or domelights. In addition to this main function, the windows or domelights are also used for ventilation. For this purpose, additional switching devices are available which are capable of issuing switching commands of lower importance. Since the availability of smoke and heat extraction systems must be ensured even in the event of power failure, the fire control panels are equipped with accumulators which supply the smoke and heat extraction systems. Therefore, the actuators of the windows and domelights are dimensioned for d.c. operation.

The surge protective devices in the examples described below are dimensioned based on a voltage of 24 V d.c. which is commonly used in this industry. Moreover, electromechanically driven domelights with a maximum nominal current of less than 1.8 A or 4 A d.c. are used.

Structure with non-metal roof and external lightning protection system

Embedded or protruding roof-mounted structures on structures with external lightning protection system must be located in the protected volume of air-termination systems as per IEC 62305-3 (EN 62305-3) under consideration of the separation distance s if the following limit values are exceeded:

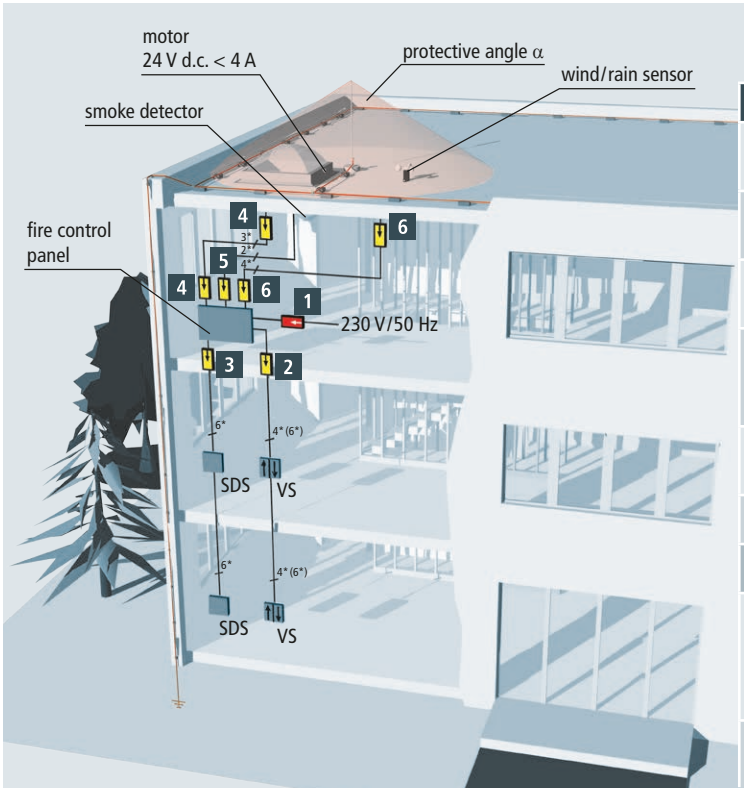
Embedded or protruding metal roof-mounted structures:

- Height above the roof level: 0.3 m
- Total area of the roof-mounted structure: 1.0 m²
- Length of the roof-mounted structure: 2.0 m

Embedded or protruding non-metal roof-mounted structures:

- Height above the air-termination system: 0.5 m

Due to the above requirements, domelights of a certain size must be protected against lightning strikes. If air-termination rods are installed, the domelights are located in LPZ 0_B which means that no lightning current is injected into the equipment



No.	Surge protective device	Part No.
1	DG M TN 275 (TN-S system) DG M TT 2 P 275 (TT system)	952 200 952 110
2	BXT ML4 BE 24 + BXT BAS	920 324 920 300
3	2 x BXT ML4 BE 24 + 2 x BXT BAS	920 324 920 300
4	BXT ML4 BE 36 (1.8 A) + BXT BAS or 2 x BVT ALD 36 (4 A)	920 336 920 300 918 408
5	BXT ML2 BE S 24 + BXT BAS	920 224 920 300
6 = 2		
Alternative 2 3 5 6		
	TL2 10DA CC DRL 10 B 180 FSD EF 10 DRL 8 x DRL RE 24	907 991 907 401 907 498 907 422

* Minimum number of required cores (observe manufacturers' instructions)

Figure 1 Domelight located in the protected volume of an air-termination rod on a non-metal roof of a structure with external lightning protection system

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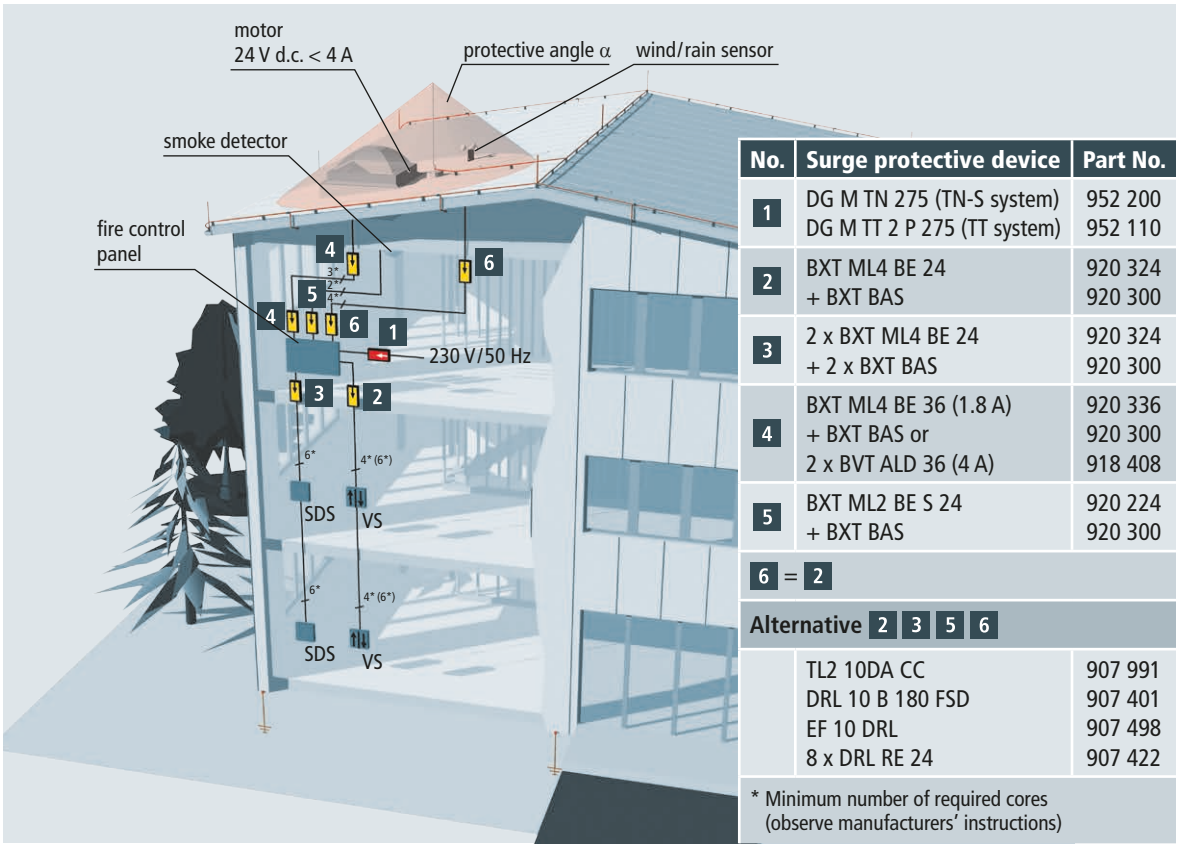

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1	DG M TN 275 (TN-S system) DG M TT 2 P 275 (TT system)	952 200 952 110
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6 = 2		
Alternative 2 3 5 6		
	TL2 10DA CC DRL 10 B 180 FSD EF 10 DRL 8 x DRL RE 24	907 991 907 401 907 498 907 422

* Minimum number of required cores (observe manufacturers' instructions)

Figure 2 Domelight located in the protected volume of an air-termination rod on a metal roof of a structure with metal down conductor (steel frame, interconnected reinforced concrete or earthed metal facade)

installed in this zone (**Figure 1**). A surge arrester prevents inductive coupling in this zone.

Structure with metal roof and external lightning protection system

In contrast to structures with non-metal roofs and external lightning protection system, different normative requirements are placed on the lightning current carrying capability of metal roofs which are used as air-termination system:

1. The metal roof can be used as natural air-termination system if the manufacturer confirms that it suited for this purpose (DIN EN 62305-3, Supplement 4).
2. The metal roof does not have the required thickness t' (IEC 62305-3 (EN 62305-3), Table 3) and must be protected against direct lightning strikes by means of air-termination systems since perforation can cause fire due to the highly flammable materials (or wooden boards) underneath the tin roof and the ingress of water can no longer be prevented. The air-termination systems must be interconnected by means of lightning current carrying conductors if there is no other lightning current carrying connection (e.g. by means of tested terminals, brazing, welding, squeezing, seaming, screwing or riveting).
3. The metal roof has the required thickness t (IEC 62305-3 (EN 62305-3), Table 3)

There are two types of down conductors for the metal roofs described before:

A. The walls consist of an interconnected lightning current carrying steel reinforcement or a steel frame construction. In both cases, the separation distance does not have to be considered since either the current is very low due to the high number of current paths (reinforcements) or the low inductance (steel beams) does not cause puncture to other metal systems. Metal façades which are connected to the earth-termination system at intervals of 15 m at the lowest point (ground) also meet the requirements described above.

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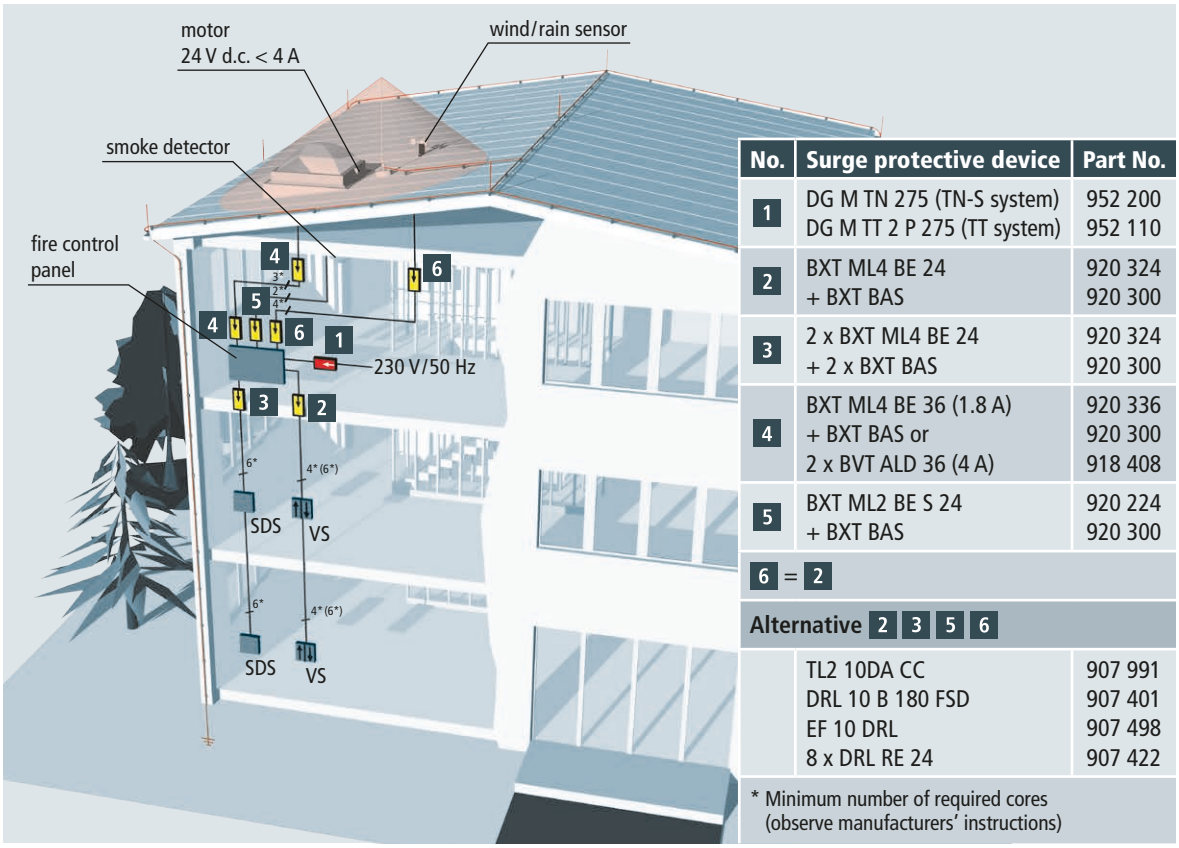

No.	Surge protective device	Part No.
1	DG M TN 275 (TN-S system) DG M TT 2 P 275 (TT system)	952 200 952 110
2	BXT ML4 BE 24 + BXT BAS	920 324 920 300
3	2 x BXT ML4 BE 24 + 2 x BXT BAS	920 324 920 300
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5	BXT ML2 BE S 24 + BXT BAS	920 224 920 300
6 = 2		
Alternative 2 3 5 6		
	TL2 10DA CC DRL 10 B 180 FSD EF 10 DRL 8 x DRL RE 24	907 991 907 401 907 498 907 422

* Minimum number of required cores (observe manufacturers' instructions)

Figure 3 Domelight located in the protected volume of an air-termination rod on a metal roof of a structure equipped with conventional arresters

B. The walls consist of non-conductive material (bricks, wood, etc.) and the down conductors are connected to the earth-termination system at the intervals required by the class of LPS.

Different combinations of air-termination systems (see 1., 2., 3.) and down conductors (see A., B.) can be used. Ignitable sparkover does not occur in structures with air-termination systems and down conductors in the combinations 1.+A., 2.+A. or 3.+A. Air-termination systems must be installed to prevent lightning strikes to the domelights. Thus, the domelights are protected against direct lightning strikes, however, they are not located in LPZ 0_B since the air-termination systems directly conduct the lightning current to the metal roof, thus spreading the lightning current over a large area. In view of the fact that lightning may also strike in the vicinity of the domelights, it is recommended to install a lightning current arrester (**Figure 2**).

A structure with a metal roof and conventional down conductors is considered to be critical (**Figure 3**). In case of a lightning strike, the lightning current will be evenly distributed between the down conductors. Nevertheless, the structure is still at risk and the relevant separation distance must be maintained. Air-termination systems must also be installed to prevent direct lightning strikes to this type of structure, however, the domelight is not located in LPZ 0_B. Since partial lightning currents may flow into the structure via the cable for the drive of the smoke and heat extraction system, a lightning current arrester must be installed. Due to their size, structures with domelights typically have several down conductors which prevent overload of the lightning current arrester.

Structure without external lightning protection system

No distinction has to be made between metal or non-metal roofs since every direct lightning strike to the structure pre-

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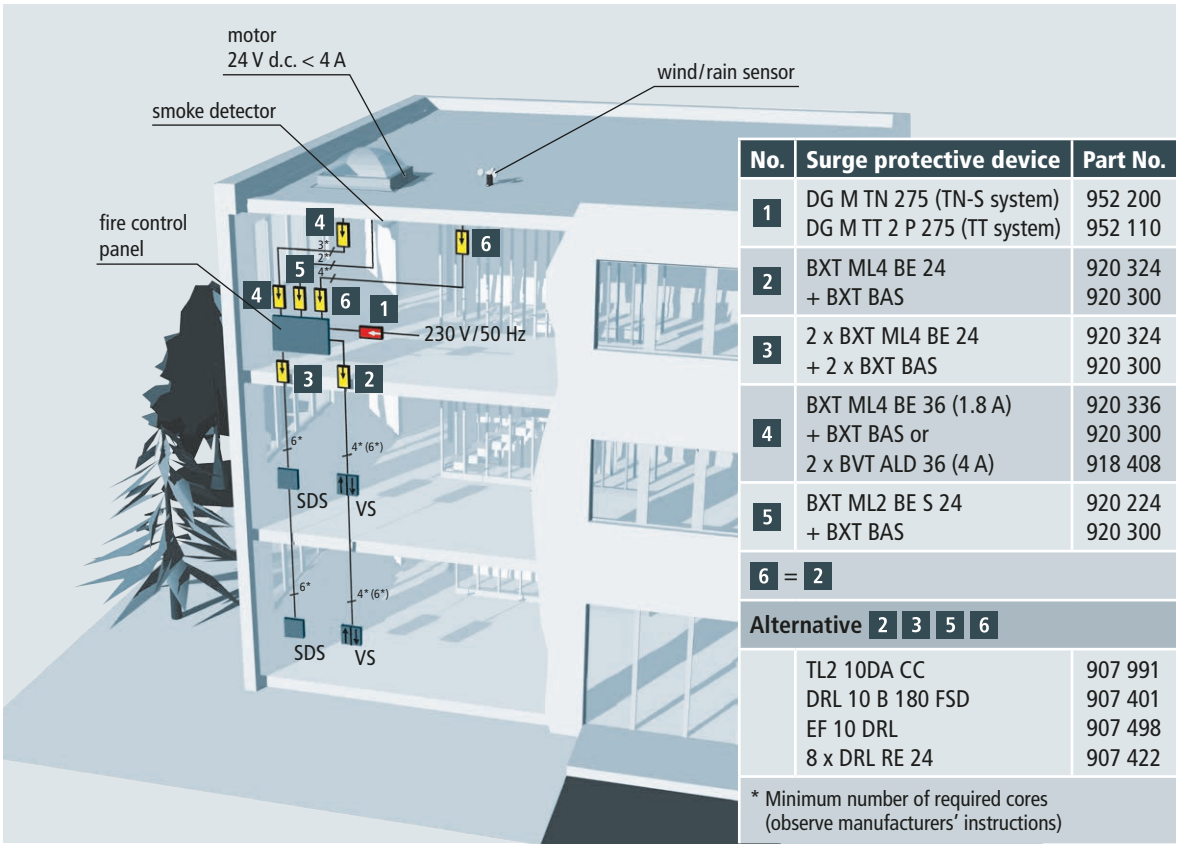


No.	Surge protective device	Part No.
1	DG M TN 275 (TN-S system) DG M TT 2 P 275 (TT system)	952 200 952 110
2	BXT ML4 BE 24 + BXT BAS	920 324 920 300
3	2 x BXT ML4 BE 24 + 2 x BXT BAS	920 324 920 300
4	BXT ML4 BE 36 (1.8 A) + BXT BAS or 2 x BVT ALD 36 (4 A)	920 336 920 300 918 408
5	BXT ML2 BE S 24 + BXT BAS	920 224 920 300
6 = 2		
Alternative 2 3 5 6		
	TL2 10DA CC DRL 10 B 180 FSD EF 10 DRL 8 x DRL RE 24	907 991 907 401 907 498 907 422

* Minimum number of required cores (observe manufacturers' instructions)

Figure 4 Domelight located on a non-metal roof of a structure without external lightning protection system

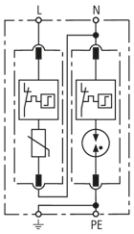
sents a fire hazard. Lightning current arresters are not capable of coping with direct lightning strikes to the domelights. Therefore, surge arresters must be installed to protect the structure from inductive coupling (**Figure 4**).

DEHNguard

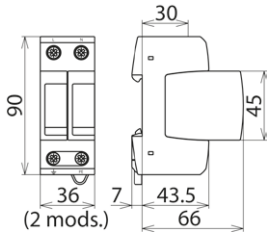
DG M TT 2P 275 (952 110)

- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device

Figure without obligation



Basic circuit diagram DG M TT 2P 275



Dimension drawing DG M TT 2P 275

Modular surge arrester for use in single-phase TT and TN systems ("1+1" circuit).

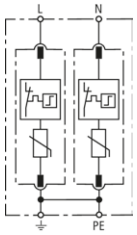
Type Part No.	DG M TT 2P 275 952 110
SPD according to EN 61643-11 / IEC 61643-11	type 2 / class II
Nominal a.c. voltage (U_N)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [L-N] (U_C)	275 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [N-PE] (U_C)	255 V (50 / 60 Hz)
Nominal discharge current (8/20 µs) (I_n)	20 kA
Max. discharge current (8/20 µs) (I_{max})	40 kA
Lightning impulse current (10/350 µs) [N-PE] (I_{imp})	12 kA
Voltage protection level [L-N] (U_P)	≤ 1.5 kV
Voltage protection level [L-N] at 5 kA (U_P)	≤ 1 kV
Voltage protection level [N-PE] (U_P)	≤ 1.5 kV
Follow current extinguishing capability [N-PE] (I_{fi})	100 A_{rms}
Response time [L-N] (t_A)	≤ 25 ns
Response time [N-PE] (t_A)	≤ 100 ns
Max. mains-side overcurrent protection	125 A gG
Short-circuit withstand capability for max. mains-side overcurrent protection (I_{SCCR})	50 kA_{rms}
Temporary overvoltage (TOV) [L-N] (U_T) – Characteristic	335 V / 5 sec. – withstand
Temporary overvoltage (TOV) [L-N] (U_T) – Characteristic	440 V / 120 min. – safe failure
Temporary overvoltage (TOV) [N-PE] (U_T) – Characteristic	1200 V / 200 ms – withstand
Operating temperature range (T_U)	-40 °C ... +80 °C
Operating state / fault indication	green / red
Number of ports	1
Cross-sectional area (min.)	1.5 mm^2 solid / flexible
Cross-sectional area (max.)	35 mm^2 stranded / 25 mm^2 flexible
For mounting on	35 mm DIN rails acc. to EN 60715
Enclosure material	thermoplastic, red, UL 94 V-0
Place of installation	indoor installation
Degree of protection	IP 20
Capacity	2 module(s), DIN 43880
Approvals	KEMA, VDE, UL, VdS
Weight	242 g
Customs tariff number	85363030
GTIN	4013364108417
PU	1 pc(s)

DEHNguard

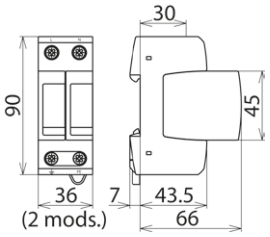
DG M TN 275 (952 200)

- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device

Figure without obligation



Basic circuit diagram DG M TN 275



Dimension drawing DG M TN 275

Modular surge arrester for use in single-phase TN systems.

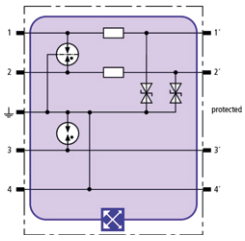
Type Part No.	DG M TN 275 952 200
SPD according to EN 61643-11 / IEC 61643-11	type 2 / class II
Nominal a.c. voltage (U_N)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage (U_C)	275 V (50 / 60 Hz)
Nominal discharge current (8/20 µs) (I_n)	20 kA
Max. discharge current (8/20 µs) (I_{max})	40 kA
Voltage protection level (U_P)	≤ 1.5 kV
Voltage protection level at 5 kA (U_P)	≤ 1 kV
Response time (t_A)	≤ 25 ns
Max. mains-side overcurrent protection	125 A gG
Short-circuit withstand capability for max. mains-side overcurrent protection (I_{SCCR})	50 kA_{rms}
Temporary overvoltage (TOV) (U_T) – Characteristic	335 V / 5 sec. – withstand
Temporary overvoltage (TOV) (U_T) – Characteristic	440 V / 120 min. – safe failure
Operating temperature range (T_U)	-40 °C ... +80 °C
Operating state / fault indication	green / red
Number of ports	1
Cross-sectional area (min.)	1.5 mm^2 solid / flexible
Cross-sectional area (max.)	35 mm^2 stranded / 25 mm^2 flexible
For mounting on	35 mm DIN rails acc. to EN 60715
Enclosure material	thermoplastic, red, UL 94 V-0
Place of installation	indoor installation
Degree of protection	IP 20
Capacity	2 module(s), DIN 43880
Approvals	KEMA, VDE, UL, VdS
Weight	229 g
Customs tariff number	85363030
GTIN	4013364108394
PU	1 pc(s)

BLITZDUCTOR XT

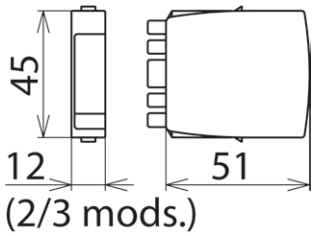
BXT ML2 BE S 24 (920 224)

- LifeCheck SPD monitoring function
- Optimal protection of two single lines and the cable shield
- For use in conformity with the lightning protection zone concept at the boundaries from 0_A –2 and higher

Figure without obligation



Basic circuit diagram BXT ML2 BE S 24



Dimension drawing BXT ML2 BE S 24

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting two single lines sharing a common reference potential as well as unbalanced interfaces, with direct or indirect shield earthing. If LifeCheck detects thermal or electrical overload, the arrester has to be replaced. This status is indicated contactlessly by the DEHNrecord LC / SCM / MCM reader.

Type Part No.	BXT ML2 BE S 24 920 224
SPD monitoring system	LifeCheck
SPD class	TYPE 1 P1
Nominal voltage (U_N)	24 V
Max. continuous operating d.c. voltage (U_C)	33 V
Max. continuous operating a.c. voltage (U_C)	23.3 V
Nominal current at 45 °C (I_L)	0.75 A
D1 Total lightning impulse current (10/350 µs) (I_{imp})	9 kA
D1 Lightning impulse current (10/350 µs) per line (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 µs) (I_n)	20 kA
C2 Nominal discharge current (8/20 µs) per line (I_n)	10 kA
Voltage protection level line-line for I_{imp} D1 (U_p)	≤ 102 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 66 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 90 V
Voltage protection level line-PG at 1 kV/µs C3 (U_p)	≤ 45 V
Series resistance per line	1.8 ohm(s)
Cut-off frequency line-PG (f_G)	6.8 MHz
Capacitance line-line (C)	≤ 0.5 nF
Capacitance line-PG (C)	≤ 1.0 nF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection (plugged-in)	IP 20
Pluggable into	BXT BAS / BSP BAS 4 base part
Earthing via	BXT BAS / BSP BAS 4 base part
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21, UL 497B
SIL classification	up to SIL3 *)
ATEX approvals	DEKRA 11ATEX0089 X: II 3 G Ex nA IIC T4 Gc
IECEx approvals	DEK 11.0032X: Ex nA IIC T4 Gc
CSA & USA Hazloc approvals (1)	2516389: Class I Div. 2 GP A, B, C, D T4
CSA & USA Hazloc approvals (2)	2516389: Class I Zone 2, AEx nA IIC T4
Approvals	CSA, GOST, VdS
Weight	37 g
Customs tariff number	85363010
GTIN	4013364117785
PU	1 pc(s)

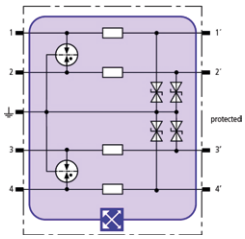
*)For more detailed information, please visit www.dehn-international.com.

BLITZDUCTOR XT

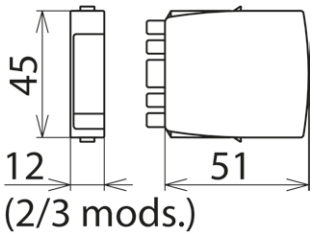
BXT ML4 BE 24 (920 324)

- LifeCheck SPD monitoring function
- Optimal protection of four single lines
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A – 2 and higher

Figure without obligation



Basic circuit diagram BXT ML4 BE 24



Dimension drawing BXT ML4 BE 24

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting four single lines sharing a common reference potential as well as unbalanced interfaces. If LifeCheck detects thermal or electrical overload, the arrester has to be replaced. This status is indicated contactlessly by the DEHNrecord LC / SCM / MCM reader.

Type Part No.	BXT ML4 BE 24 920 324
SPD monitoring system	LifeCheck
SPD class	TYPE 1 P1
Nominal voltage (U_N)	24 V
Max. continuous operating d.c. voltage (U_C)	33 V
Max. continuous operating a.c. voltage (U_C)	23.3 V
Nominal current at 45 °C (I_L)	0.75 A
D1 Total lightning impulse current (10/350 µs) (I_{imp})	10 kA
D1 Lightning impulse current (10/350 µs) per line (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 µs) (I_n)	20 kA
C2 Nominal discharge current (8/20 µs) per line (I_n)	10 kA
Voltage protection level line-line for I_{imp} D1 (U_p)	≤ 102 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 66 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 90 V
Voltage protection level line-PG at 1 kV/µs C3 (U_p)	≤ 45 V
Series resistance per line	1.8 ohm(s)
Cut-off frequency line-PG (f_G)	6.8 MHz
Capacitance line-line (C)	≤ 0.5 nF
Capacitance line-PG (C)	≤ 1.0 nF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection (plugged-in)	IP 20
Pluggable into	BXT BAS / BSP BAS 4 base part
Earthing via	BXT BAS / BSP BAS 4 base part
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21, UL 497B
SIL classification	up to SIL3 *)
ATEX approvals	DEKRA 11ATEX0089 X: II 3 G Ex nA IIC T4 Gc
IECEx approvals	DEK 11.0032X: Ex nA IIC T4 Gc
CSA & USA Hazloc approvals (1)	2516389: Class I Div. 2 GP A, B, C, D T4
CSA & USA Hazloc approvals (2)	2516389: Class I Zone 2, AEx nA IIC T4
Approvals	CSA, VdS, UL, GOST
Weight	38 g
Customs tariff number	85363010
GTIN	4013364109056
PU	1 pc(s)

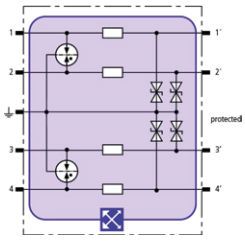
*) For more detailed information, please visit www.dehn-international.com.

BLITZDUCTOR XT

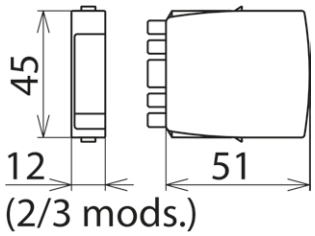
BXT ML4 BE 36 (920 336)

- LifeCheck SPD monitoring function
- Optimal protection of four single lines
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A – 2 and higher

Figure without obligation



Basic circuit diagram BXT ML4 BE 36



Dimension drawing BXT ML4 BE 36

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting four single lines sharing a common reference potential as well as unbalanced interfaces. If LifeCheck detects thermal or electrical overload, the arrester has to be replaced. This status is indicated contactlessly by the DEHNrecord LC / SCM / MCM reader.

Type Part No.	BXT ML4 BE 36 920 336
SPD monitoring system	LifeCheck
SPD class	TYPE 1 P1
Nominal voltage (U_N)	36 V
Max. continuous operating d.c. voltage (U_C)	45 V
Max. continuous operating a.c. voltage (U_C)	31 V
Nominal current at 45 °C (I_L)	1.8 A
D1 Total lightning impulse current (10/350 µs) (I_{imp})	10 kA
D1 Lightning impulse current (10/350 µs) per line (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 µs) (I_n)	20 kA
C2 Nominal discharge current (8/20 µs) per line (I_n)	10 kA
Voltage protection level line-line for I_{imp} D1 (U_p)	≤ 140 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 85 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 112 V
Voltage protection level line-PG at 1 kV/µs C3 (U_p)	≤ 56 V
Series resistance per line	0.43 ohm(s)
Cut-off frequency line-PG (f_G)	3.8 MHz
Capacitance line-line (C)	≤ 0.8 nF
Capacitance line-PG (C)	≤ 1.6 nF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection (plugged-in)	IP 20
Pluggable into	BXT BAS / BSP BAS 4 base part
Earthing via	BXT BAS / BSP BAS 4 base part
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
SIL classification	up to SIL3 *)
ATEX approvals	DEKRA 11ATEX0089 X: II 3 G Ex nA IIC T4 Gc
IECEx approvals	DEK 11.0032X: Ex nA IIC T4 Gc
CSA & USA Hazloc approvals (1)	2516389: Class I Div. 2 GP A, B, C, D T4
CSA & USA Hazloc approvals (2)	2516389: Class I Zone 2, AEx nA IIC T4
Approvals	VdS, UL, GOST
Weight	40 g
Customs tariff number	85363010
GTIN	4013364118539
PU	1 pc(s)

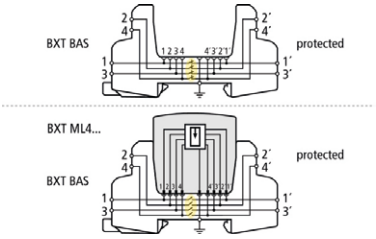
*) For more detailed information, please visit www.dehn-international.com.

BLITZDUCTOR XT

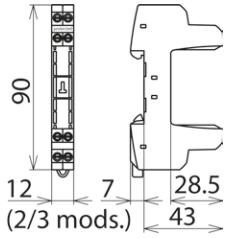
BXT BAS (920 300)

- Four-pole version for universal use with all types of BSP and BXT / BXTU protection modules
- No signal interruption if the protection module is removed
- Universal design without protection elements

Figure without obligation



Basic circuit diagram with and without plugged-in module



Dimension drawing BXT BAS

The BLITZDUCTOR XT base part is a very space-saving and universal four-pole feed-through terminal for the insertion of a protection module without signal interruption if the protection module is removed. The snap-in mechanism at the supporting foot of the base part allows the protection module to be safely earthed via the DIN rail. Since no components of the protective circuit are situated in the base part, only the protection modules must be maintained.

Type Part No.	BXT BAS 920 300
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
For mounting on	35 mm DIN rails acc. to EN 60715
Connection (input / output)	screw / screw
Signal disconnection	no
Cross-sectional area, solid	0.08-4 mm^2
Cross-sectional area, flexible	0.08-2.5 mm^2
Tightening torque (terminals)	0.4 Nm
Earthing via	35 mm DIN rails acc. to EN 60715
Enclosure material	polyamide PA 6.6
Colour	yellow
ATEX approvals	DEKRA 11ATEX0089 X: II 3 G Ex nA IIC T4 Gc *)
IECEx approvals	DEK 11.0032X: Ex nA IIC T4 Gc *)
Approvals	CSA, VdS, UL, GOST
Weight	34 g
Customs tariff number	85369010
GTIN	4013364109179
PU	1 pc(s)

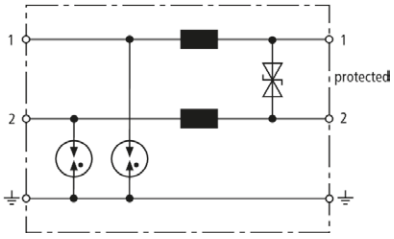
*) only in connection with an approved protection module

BLITZDUCTOR VT

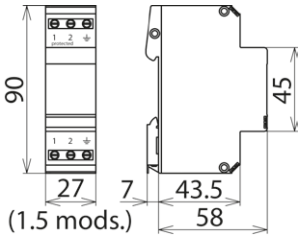
BVT ALD 36 (918 408)

- For d.c. supply systems up to nominal currents of 7 A
- Low voltage protection level
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A –2 and higher

Figure without obligation



Basic circuit diagram BVT ALD 36



Dimension drawing BVT ALD 36

Energy-coordinated, DIN rail mounted combined lightning current and surge arrester for protecting unearthed d.c. power supply systems.

Type Part No.	BVT ALD 36 918 408
SPD class	TYPE 1 P1
Nominal d.c. voltage (U_N)	36 V
Max. continuous operating d.c. voltage (U_C)	45 V
Nominal current at 80 °C (I_L)	4 A
Nominal current at 45 °C (I_L)	7 A
D1 Lightning impulse current (10/350 µs) per line (I_{imp})	2.5 kA
D1 Total lightning impulse current (10/350 µs) (I_{imp})	5 kA
C2 Nominal discharge current (8/20 µs) per line (I_n)	10 kA
C2 Total nominal discharge current (8/20 µs) (I_n)	20 kA
Voltage protection line-line for I_n C2 (U_p)	≤ 80 V
Voltage protection level line-PG for I_n C2 (U_p)	≤ 1000 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 60 V
Voltage protection level line-PG at 1 kV/µs C3 (U_P)	≤ 650 V
Series resistance per line	22 µH
Capacitance line-line (C)	≤ 1.5 pF
Capacitance line-PG (C)	≤ 100 pF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
For mounting on	35 mm DIN rails acc. to EN 60715
Connection (input / output)	screw / screw
Cross-sectional area, solid	0.5-6.0 mm^2
Cross-sectional area, flexible	0.5-4.0 mm^2
Tightening torque (terminals)	0.8 Nm
Earthing via	screw terminal
Enclosure material	thermoplastic, UL 94 V-0
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST
Weight	110 g
Customs tariff number	85363010
GTIN	4013364125292
PU	1 pc(s)

DEHNrapid LSA

DRL 10 B 180 FSD (907 401)

- Lightning current arrester for use as plug-in SPD block with integrated LSA disconnection block function
- Visual fault indicator of the gas discharge tubes
- Can be combined to a combined lightning current and surge arrester by means of a DRL protective plug
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A –1 and higher

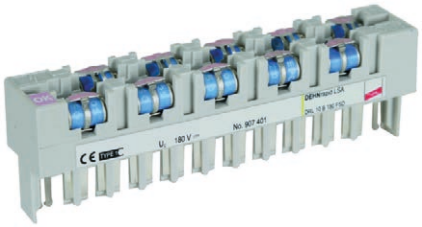
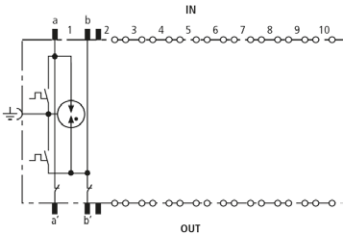
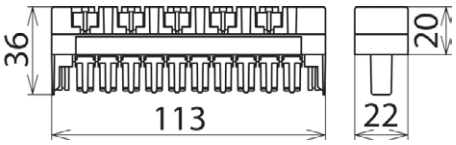


Figure without obligation



Basic circuit diagram DRL 10 B 180 FSD



Dimension drawing DRL 10 B 180 FSD

Lightning current carrying DRL plug-in SPD block (10 pairs) for almost all applications. Expandable to a combined lightning current and surge arrester by means of a DRL protective plug. The integrated disconnection block contacts allow testing, measuring and patching with plugged-in protection. The three-pole gas discharge tubes have a fail-safe function with visual fault indicator.

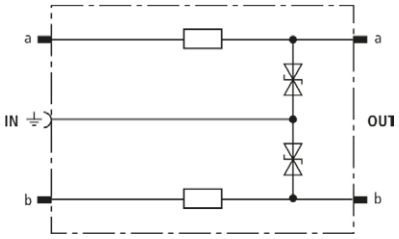
Type Part No.	DRL 10 B 180 FSD 907 401
SPD class	TYPE 1 C
Fault indication	visual, colour change
Nominal voltage (U_N)	180 V
Max. continuous operating d.c. voltage (U_C)	180 V
Max. continuous operating a.c. voltage (U_C)	127 V
Nominal current (I_L)	0.4 A
D1 Total lightning impulse current (10/350 µs) (I_{imp})	5 kA
D1 Lightning impulse current (10/350 µs) per line (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 µs) (I_n)	10 kA
C2 Nominal discharge current (8/20 µs) per line (I_n)	5 kA
Voltage protection level line-line for I_{imp} D1 (U_p)	≤ 500 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 500 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 500 V
Voltage protection level line-PG at 1 kV/µs C3 (U_p)	≤ 450 V
Series resistance per line	≤ 0.005 ohms
Capacitance line-line (C)	≤ 5 pF
Capacitance line-PG (C)	≤ 5 pF
Fail-safe function	gas discharge tube with spring contacts
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 10
Plugs into	LSA disconnection block 2/10
Earthing via	mounting frame
Enclosure material	polyamide PA 6.6
Colour	grey
Test standards	IEC 61643-21 / EN 61643-21
Approvals	VdS, GOST
Weight	69 g
Customs tariff number	85363010
GTIN	4013364107564
PU	10 pc(s)

DEHNrapid LSA

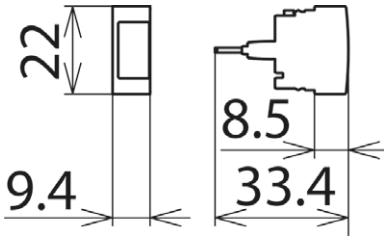
DRL RE 24 (907 422)

- Low voltage protection level for the protection of terminal equipment
- Energy-coordinated with DRL plug-in SPD block
- For installation in conformity with the lightning protection zone concept at the boundaries from 1 – 2 and higher

Figure without obligation



Basic circuit diagram DRL RE 24



Dimension drawing DRL RE 24

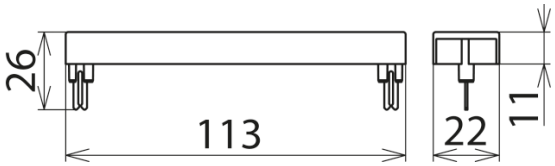
Protective plug (one pair), energy-coordinated with DRL plug-in SPD block, for use as single-stage protective device for terminal equipment with decoupling impedances. Ideally suited for signal circuits with common reference potential. Earthing via EF 10 DRL. For disconnection blocks or DRL plug-in SPD blocks only.

Type Part No.	DRL RE 24 907 422
SPD class	TYPE 3 P1
Nominal voltage (U_N)	24 V
Max. continuous operating d.c. voltage (U_C)	28 V
Max. continuous operating a.c. voltage (U_C)	19.5 V
Nominal current (I_L)	0.4 A
D1 Total lightning impulse current (10/350 µs) in combination with DRL 10 B... (I_{imp})	5 kA
D1 Lightning impulse current (10/350 µs) per line in combination with DRL 10 B... (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 µs) in combination with DRL 10 B... (I_n)	10 kA
C2 Nominal discharge current (8/20 µs) per line in combination with DRL 10 B... (I_n)	5 kA
C1 Nominal discharge current (8/20 µs) per line without DRL 10 B... (I_n)	0.5 kA
Voltage protection level line-PG for I_{imp} D1 in combination with DRL 10 B... (U_p)	≤ 65 V
Voltage protection level line-line at 1 kV/µs C3 (U_p)	≤ 72 V
Voltage protection level line-PG at 1 kV/µs C3 (U_p)	≤ 38 V
Series resistance per line	4.7 ohms
Cut-off frequency line-PG (f_G)	4.5 MHz
Capacitance line-line (C)	≤ 0.55 pF
Capacitance line-PG (C)	≤ 1.1 nF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20 (when plugged in)
Plugs into	LSA disconnection block 2/10 or DRL 10 B... plug-in SPD block
Earthing via	earthing frame
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	VdS, GOST
Weight	4 g
Customs tariff number	85363010
GTIN	4013364107625
PU	10 pc(s)

DEHNrapid LSA

EF 10 DRL (907 498)

Figure without obligation



Dimension drawing EF 10 DRL

Snap-on earthing frame for earthing and mounting max. 10 DRL protective plugs. Plugs into a 10-pair disconnection block or DRL plug-in SPD block.

Type Part No.	EF 10 DRL 907 498
Plugs into	LSA disconnection blocks or DRL SPD plug-in block
Earthing via	mounting frame or DRL SPD plug-in block
Enclosure material	polyamide PA 6.6
Colour	yellow
Weight	10 g
Customs tariff number	85389099
GTIN	4013364107540
PU	1 pc(s)

DEHNrapid LSA

TL2 10DA CC (907 991)

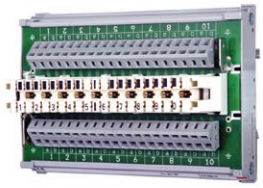


Figure without obligation

Dimension drawing TL2 10DA CC

DIN rail mounted routing module for disconnection blocks with LSA disconnection block of the 2/10 series as well as spring-loaded terminals for variable wire connection. DPL and DEHNrapid LSA surge arresters can be plugged into the routing module.

Type Part No.	TL2 10DA CC 907 991
Carrying capacity of connection components D1 Total lightning impulse current (10/350 µs) (I_{imp})	5 kA
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
For mounting on	35 mm DIN rails acc. to EN 60715
Connection (input / output)	spring or LSA / spring or LSA
Cross-sectional area of spring terminal, solid	0.08-2.5 mm^2
Cross-sectional area of spring terminal, flexible	0.08-2.5 mm^2
Earthing via	DIN rail / flat connector 6.3 mm
Enclosure material	PA / PBT
Diameter of solid conductors	0.40-0.80 mm
Conductor diameter with insulation	0.70-1.60 mm
Volume resistance of IPC terminal	< 10 mohms
Weight	181 g
Customs tariff number	85363090
GTIN	4013364112988
PU	1 pc(s)

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Hans-Dehn-Str. 1
Postfach 1640
92306 Neumarkt
Germany

Tel. +49 9181 906-0
Fax +49 9181 906-1100
info@dehn.de
www.dehn-international.com

www.dehn-international.com/partners

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