



Lightning and surge protection for overhead gantries – Example: Motorway overhead gantry

White Paper



Contents

Protection of:

- Power supply
- Radar devices
- RS 485 bus
- Induction loops

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White Paper



Traffic guidance systems for motorways are attached to cross-carriageway overhead gantries and ensure optimal traffic control on a global scale. They are supposed to prevent congestion and risks resulting from accidents, heavy rainfall and excessive speed.

Motorway overhead gantries are used to hold traffic-specific detection systems such as CCTV cameras, induction loops and radar detectors. On toll roads, additional detection devices are installed which allow fully automated toll data identification.

Direct lightning strikes to motorway overhead gantries, display modules and detection devices can be prevented by isolated air-termination rods. These air-termination rods are connected to the earth electrodes via high-voltage-resistant down conductors (DEHNcon-H, HVI light Conductor) (**Figure 1**). All buried earth electrodes are typically made of stainless steel (V4A) (material No. AISI/ASTM 316 Ti or equivalent).

The performance of the surge protective devices to be used depends on the distance between the motorway overhead gantry and the control cabinet. Type 2 or C2 surge arresters are used up to a distance of 5 m (**Table 1**) and type 1 or D1 combined arresters for distances of more than 5 m (**Table 2**). High-voltage-resistant down conductors have the advantage that the entire lightning current flows through this conduc-

tor. Thanks to this targeted lightning current discharge (from the point of strike to the soil), no uncontrolled partial lightning currents flow through conductive installations.

A stainless steel (V4A) radial earth electrode or earth rod is installed between the carriageways for both steel and concrete motorway overhead gantries. The earth electrode at the right edge of the carriageway is connected to the stainless steel (V4A) radial earth electrode or earth rod of the control cabinet via a buried stainless steel (V4A) conductor (10 mm Ø or 30 x 3.5 mm). This connection also protects the cables underneath the control cabinet from flashover in case of lightning strikes. The steel-reinforced foundation of the control cabinet, if any, is also connected to the radial earth electrode or earth rod of the control cabinet. The length of the earth electrodes depends on the lightning protection level set out in the lightning protection standard.

In general, all cables which are unshielded or earthed on both ends must be protected by surge protective devices. Type 1 combined arresters (e.g. DEHNventil M TT 255 FM) are used to protect the low-voltage-side supply of the roadside controller. The information technology cables of the roadside controller are typically connected to the traffic control centre via optical fibre cables whose metal sheath, if any, is to be connected to the equipotential bonding system.

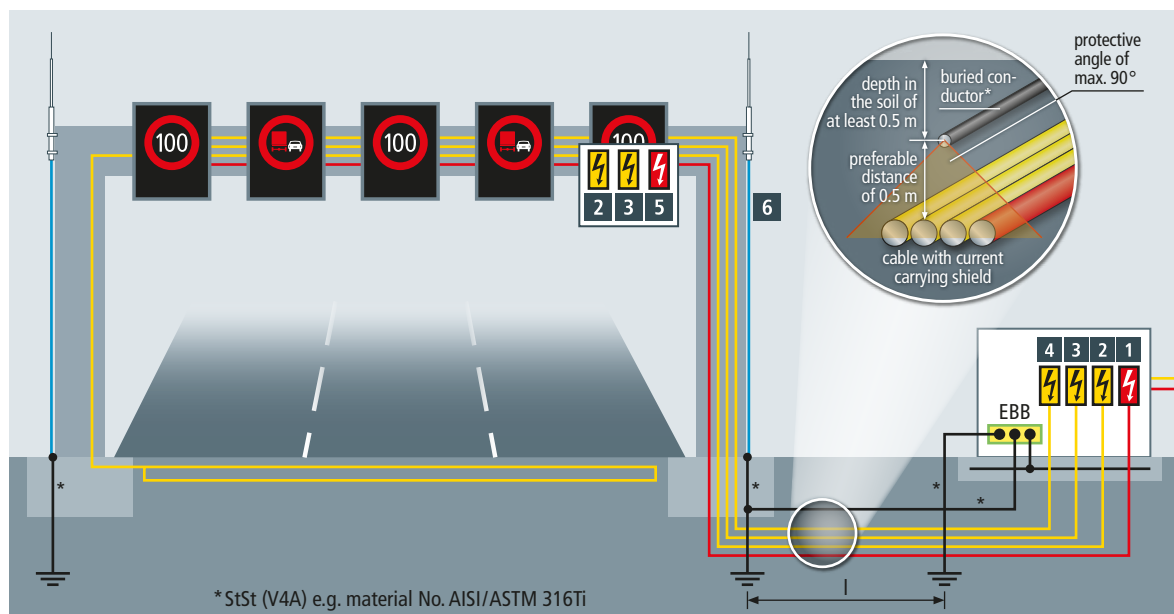


Figure 1 Example: Lightning and surge protection for traffic guidance systems of motorway overhead gantries

Lightning and surge protection for overhead gantries – Example: Motorway overhead gantry

White Paper



distance between the motorway overhead gantry and the switchgear cabinet l < 5 m			
No. in Fig. 1	Protection for...	Surge protective device	Part No.
1	Main power supply system 230 / 400 V	DEHNventil DV M TT 255 FM	951 315
2	Radar devices, 24 V d.c., max. 0.75 A	BLITZDUCTOR BSP M2 BE 24 + BXT BAS	926 224 920 300
3	RS 485 bus	BLITZDUCTOR BSP M2 BD HF 5 + BXT BAS	926 271 920 300
4	Induction loops	BLITZDUCTOR BSP M2 BD 5 + BXT BAS	926 240 920 300
5	Power supply for the SDB of the overhead gantry (230 V)	DEHNguard DG M TT 2P 275 FM	952 115
Lightning protection system			
6	DEHNcon-H HVI light Conductor I SET		819 253
	Holder for DEHNcon-H and D40 air-termination rods		105 342
	Conductor holder for CUI Conductors		275 229

Table 1 Lightning and surge protection for a motorway overhead gantry which is located at a distance < 5 m from the switchgear cabinet

distance between the motorway overhead gantry and the switchgear cabinet l > 5 m			
No. in Fig. 1	Protection for...	Surge protective device	Part No.
1	Main power supply system 230 / 400 V	DEHNventil DV M TT 255 FM	951 315
2	Radar devices, 24 V d.c., max. 0.75 A	BLITZDUCTOR BXT ML2 BE S 24 + BXT BAS	920 224 920 300
3	RS 485 bus	BLITZDUCTOR BXT ML2 BD HFS 5 + BXT BAS	920 271 920 300
4	Induction loops	BLITZDUCTOR BXT ML2 BD S 5 + BXT BAS	920 240 920 300
5	Power supply for the SDB of the overhead gantry (230 V)	DEHNventil DV M TT 2P 255 FM	951 115
Lightning protection system			
6	DEHNcon-H HVI light Conductor I SET		819 253
	Holder for DEHNcon-H and D40 air-termination rods		105 342
	Conductor holder for CUI Conductors		275 229

Table 2 Lightning and surge protection for a motorway overhead gantry which is located at a distance > 5 m from the switchgear cabinet

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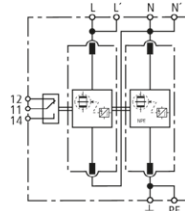
DEHNventil

DV M TT 2P 255 FM (951 115)

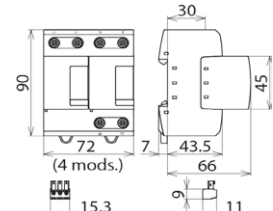
- Prewired spark-gap-based type 1 and type 2 combined lightning current and surge arrester consisting of a base part and plug-in protection modules
- Maximum system availability due to RADAX Flow follow current limitation
- Capable of protecting terminal equipment



Figure without obligation



Basic circuit diagram DV M TT 2P 255 FM



Dimension drawing DV M TT 2P 255 FM

Modular combined lightning current and surge arrester for single-phase TT and TN systems ("1+1" circuit).

Type Part No.	DV M TT 2P 255 FM 951 115
SPD according to EN 61643-11 / IEC 61643-11	type 1 + type 2 / class I + class II
Energy coordination with terminal equipment (≤ 5 m)	type 1 + type 2 + type 3
Nominal a.c. voltage (U_N)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [L-N] (U_C)	264 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [N-PE] ($U_{C(N-PE)}$)	255 V (50 / 60 Hz)
Lightning impulse current (10/350 μ s) [L+N-PE] (I_{total})	50 kA
Specific energy [L+N-PE] (W/R)	625.00 kJ/ohms
Lightning impulse current (10/350 μ s) [L-N]/[N-PE] (I_{imp})	25 / 50 kA
Specific energy [L-N]/[N-PE] (W/R)	156.25 / 625.00 kJ/ohms
Nominal discharge current (8/20 μ s) [L-N]/[N-PE] (I_n)	25 / 50 kA
Voltage protection level [L-N]/[N-PE] (U_P)	≤ 1.5 / ≤ 1.5 kV
Follow current extinguishing capability [L-N]/[N-PE] (I_R)	50 kA _{rms} / 100 A _{rms}
Follow current limitation / Selectivity	no tripping of a 20 A gL/gG fuse up to 50 kA _{rms} (prosp.)
Response time (t_A)	≤ 100 ns
Max. backup fuse (L) up to $I_K = 50$ kA _{rms}	315 A gG
Max. backup fuse (L-L')	125 A gG
Temporary overvoltage (TOV) [L-N] (U_T) – Characteristic	440 V / 120 min. – withstand
Temporary overvoltage (TOV) [N-PE] (U_T) – Characteristic	1200 V / 200 ms – withstand
Operating temperature range [parallel] / [series] (T_U)	-40 °C ... +80 °C / -40 °C ... +60 °C
Operating state / fault indication	green / red
Number of ports	1
Cross-sectional area (L, L', N, N', PE, $\frac{1}{2}$) (min.)	10 mm ² solid / flexible
Cross-sectional area (L, N, PE) (max.)	50 mm ² stranded / 35 mm ² flexible
Cross-sectional area (L', N', $\frac{1}{2}$) (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	4 module(s), DIN 43880
Approvals	KEMA, VDE, UL, VdS
Type of remote signalling contact	changeover contact
a.c. switching capacity	250 V / 0.5 A
d.c. switching capacity	250 V / 0.1 A; 125 V / 0.2 A; 75 V / 0.5 A
Cross-sectional area for remote signalling terminals	max. 1.5 mm ² solid / flexible
Extended technical data:	Use in switchgear installations with prospective short-circuit currents of more than 50 kA _{rms} (tested by the German VDE)
– Max. prospective short-circuit current	100 kA _{rms} (220 kA _{peak})
– Limitation / Extinction of mains follow currents	up to 100 kA _{rms} (220 kA _{peak})
– Max. backup fuse (L) up to $I_K = 100$ kA _{rms}	315 A gL/gG
Weight	664 g
Customs tariff number	85363030
GTIN	4013364108127
PU	1 pc(s)

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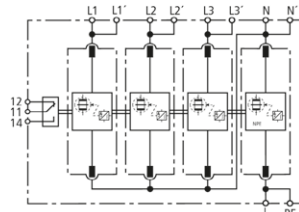
DEHNventil

DV M TT 255 FM (951 315)

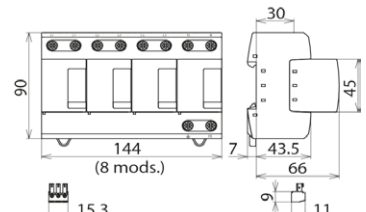
- Prewired spark-gap-based type 1 and type 2 combined lightning current and surge arrester consisting of a base part and plug-in protection modules
- Maximum system availability due to RADAX Flow follow current limitation
- Capable of protecting terminal equipment



Figure without obligation



Basic circuit diagram DV M TT 255 FM



Dimension drawing DV M TT 255 FM

Modular combined lightning current and surge arrester for TT and TN-S systems ("3+1" circuit).

Type Part No.	DV M TT 255 FM 951 315
SPD according to EN 61643-11 / IEC 61643-11	type 1 + type 2 / class I + class II
Energy coordination with terminal equipment (≤ 5 m)	type 1 + type 2 + type 3
Nominal a.c. voltage (U_N)	230 / 400 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [L-N] (U_C)	264 V (50 / 60 Hz)
Max. continuous operating a.c. voltage [N-PE] ($U_{C(N-PE)}$)	255 V (50 / 60 Hz)
Lightning impulse current (10/350 μ s) [L1+L2+L3+N-PE] (I_{total})	100 kA
Specific energy [L1+L2+L3+N-PE] (W/R)	2.50 MJ/ohms
Lightning impulse current (10/350 μ s) [L-N]/[N-PE] (I_{imp})	25 / 100 kA
Specific energy [L-N]/[N-PE] (W/R)	156.25 kJ/ohms / 2.50 MJ/ohms
Nominal discharge current (8/20 μ s) [L-N]/[N-PE] (I_n)	25 / 100 kA
Voltage protection level [L-N]/[N-PE] (U_p)	≤ 1.5 / ≤ 1.5 kV
Follow current extinguishing capability [L-N]/[N-PE] (I_n)	50 kA _{rms} / 100 A _{rms}
Follow current limitation / Selectivity	no tripping of a 20 A gL/gG fuse up to 50 kA _{rms} (prosp.)
Response time (t_A)	≤ 100 ns
Max. backup fuse (L) up to $I_K = 50$ kA _{rms}	315 A gG
Max. backup fuse (L-L')	125 A gG
Temporary overvoltage (TOV) [L-N] (U_T) – Characteristic	440 V / 120 min. – withstand
Temporary overvoltage (TOV) [N-PE] (U_T) – Characteristic	1200 V / 200 ms – withstand
Operating temperature range [parallel] / [series] (T_U)	-40 °C ... +80 °C / -40 °C ... +60 °C
Operating state / fault indication	green / red
Number of ports	1
Cross-sectional area (L1, L1', L2, L2', L3, L3', N, N', PE, \perp) (min.)	10 mm ² solid / flexible
Cross-sectional area (L1, L2, L3, N, PE) (max.)	50 mm ² stranded / 35 mm ² flexible
Cross-sectional area (L1', L2', L3', N', \perp) (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	8 module(s), DIN 43880
Approvals	KEMA, VDE, UL, VdS
Type of remote signalling contact	changeover contact
a.c. switching capacity	250 V / 0.5 A
d.c. switching capacity	250 V / 0.1 A; 125 V / 0.2 A; 75 V / 0.5 A
Cross-sectional area for remote signalling terminals	max. 1.5 mm ² solid / flexible
Extended technical data:	Use in switchgear installations with prospective short-circuit currents of more than 50 kA _{rms} (tested by the German VDE)
– Max. prospective short-circuit current	100 kA _{rms} (220 kA _{peak})
– Limitation / Extinction of mains follow currents	up to 100 kA _{rms} (220 kA _{peak})
– Max. backup fuse (L) up to $I_K = 100$ kA _{rms}	315 A gL/gG
Weight	1,28 kg
Customs tariff number	85363030
GTIN	4013364108189
PU	1 pc(s)

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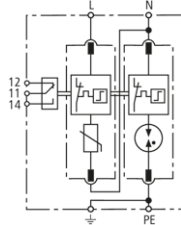
DEHNguard

DG M TT 2P 275 FM (952 115)

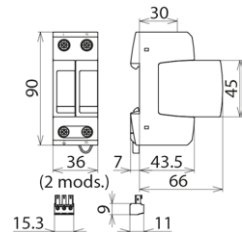
- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device



Figure without obligation



Basic circuit diagram DG M TT 2P 275 FM



Dimension drawing DG M TT 2P 275 FM

Modular surge arrester for single-phase TT and TN systems ("1+1" circuit); with floating remote signalling contact.

Type	DG M TT 2P 275 FM
Part No.	952 115
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 μ s) (I_n)	20 kA
Max. discharge current (8/20 μ s) (I_{max})	40 kA
Lightning impulse current (10/350 μ s) [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_n)	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
Type of remote signalling contact	changeover contact
a.c. switching capacity	250 V / 0.5 A
d.c. switching capacity	250 V / 0.1 A; 125 V / 0.2 A; 75 V / 0.5 A
Cross-sectional area for remote signalling terminals	max. 1.5 mm ² solid / flexible
Weight	228 g
Customs tariff number	85363030
GTIN	4013364108424
PU	1 pc(s)

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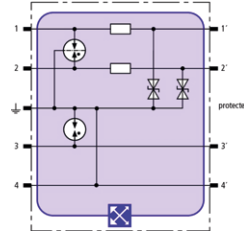
BLITZDUCTOR XT

BXT ML2 BE S 24 (920 224)

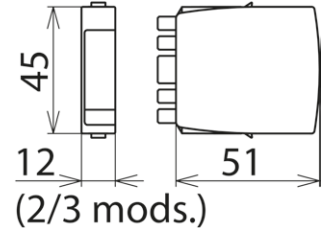
- LifeCheck SPD monitoring function
- Optimal protection of two single lines and the cable shield
- For use in conformity with the lightning protection zone concept at the boundaries from $0_A -2$ and higher



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 1P
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 μ s) (I_{imp})	9 kA
D1 Lightning impulse current (10/350 μ s) per line (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 μ s) (I_n)	20 kA
C2 Nominal discharge current (8/20 μ s) 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/ μ s C3 (U_p)	≤ 90 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 45 V
Series resistance per line	1.8 ohm(s)
Cut-off frequency line-PG (f_c)	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.

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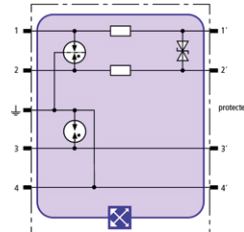
BLITZDUCTOR XT

BXT ML2 BD S 5 (920 240)

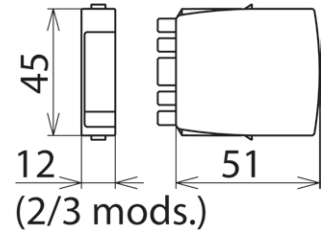
- LifeCheck SPD monitoring function
- Optimal protection of one pair and the cable shield
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A –2 and higher



Figure without obligation



Basic circuit diagram BXT ML2 BD S 5



Dimension drawing BXT ML2 BD S 5

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting one pair of unearthed balanced 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	BXT ML2 BD S 5
Part No.	920 240
SPD monitoring system	LifeCheck
SPD class	TYPE 1P
Nominal voltage (U _N)	5 V
Max. continuous operating d.c. voltage (U _C)	6.0 V
Max. continuous operating a.c. voltage (U _C)	4.2 V
Nominal current at 45 °C (I _N)	1.0 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)	≤ 25 V
Voltage protection level line-PG for I _{imp} D1 (U _p)	≤ 550 V
Voltage protection level line-line at 1 kV/µs C3 (U _p)	≤ 9 V
Voltage protection level line-PG at 1 kV/µs C3 (U _p)	≤ 550 V
Series resistance per line	1.0 ohm(s)
Cut-off frequency line-line (f _G)	1.0 MHz
Capacitance line-line (C)	≤ 5.4 nF
Capacitance line-PG (C)	≤ 25 pF
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	CSA, GOST, VdS
Weight	20 g
Customs tariff number	85363010
GTIN	4013364118348
PU	1 pc(s)

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

White Paper: Lightning and surge protection for overhead gantries – Example: Motorway overhead gantry

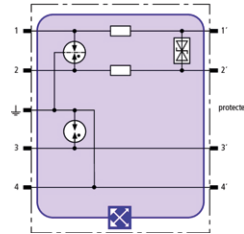
BLITZDUCTOR XT

BXT ML2 BD HFS 5 (920 271)

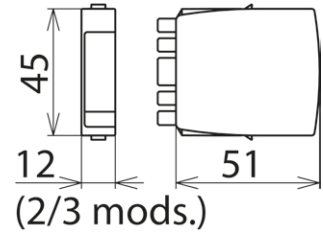
- LifeCheck SPD monitoring function
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A –2 and higher



Figure without obligation



Basic circuit diagram BXT ML2 BD HFS



Dimension drawing BXT ML2 BD HFS

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting one pair of unearthed high-frequency bus systems or video transmission systems, 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	BXT ML2 BD HFS 5
Part No.	920 271
SPD monitoring system	LifeCheck
SPD class	TYPE 1P
Nominal voltage (U _N)	5 V
Max. continuous operating d.c. voltage (U _C)	6.0 V
Max. continuous operating a.c. voltage (U _C)	4.2 V
Nominal current at 45 °C (I _L)	1.0 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)	≤ 25 V
Voltage protection level line-PG for I _{imp} D1 (U _p)	≤ 550 V
Voltage protection level line-line at 1 kV/µs C3 (U _p)	≤ 11 V
Voltage protection level line-PG at 1 kV/µs C3 (U _p)	≤ 550 V
Series resistance per line	1.0 ohm(s)
Cut-off frequency line-line (f _G)	100.0 MHz
Capacitance line-line (C)	≤ 25 pF
Capacitance line-PG (C)	≤ 25 pF
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, UL, GOST, VdS
Weight	22 g
Customs tariff number	85363010
GTIN	4013364117556
PU	1 pc(s)

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

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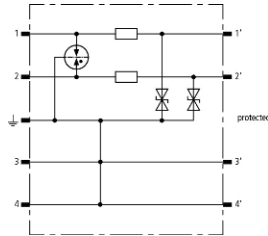
BLITZDUCTOR SP

BSP M2 BE 24 (926 224)

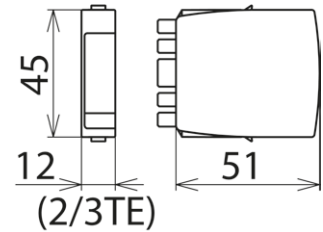
- High degree of protection for two single lines
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



Figure without obligation



Basic circuit diagram BSP M2 BE 24



Dimension drawing BSP M2 BE 24

Space-saving surge arrester module for protecting two single lines sharing a common reference potential and unbalanced interfaces.

Type Part No.	BSP M2 BE 24 926 224
SPD class	TYPE 2 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
C2 Total nominal discharge current (8/20 μ s) (I_n)	20 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	10 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 105 V
Voltage protection level line-PG for I_n C2 (U_p)	≤ 85 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 90 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 45 V
Series impedance per line	1.8 ohm(s)
Cut-off frequency line-PG (f_c)	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, UL 497B
SIL classification	up to SIL3 ^{*)}
Approvals	UL, CSA
Weight	21 g
Customs tariff number	85363010
GTIN	4013364127036
PU	1 pc(s)

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

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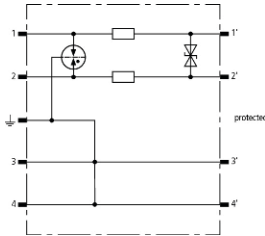
BLITZDUCTOR SP

BSP M2 BD 5 (926 240)

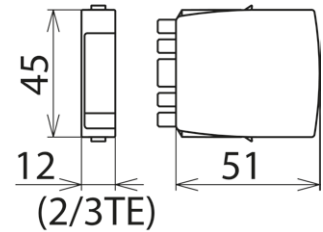
- High degree of protection for one pair
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



Figure without obligation



Basic circuit diagram BSP M2 BD 5



Dimension drawing BSP M2 BD 5

Space-saving surge arrester module for protecting one pair of balanced interfaces with galvanic isolation.

Type Part No.	BSP M2 BD 5 926 240
SPD class	TYPE 2 P1
Nominal voltage (U_N)	5 V
Max. continuous operating d.c. voltage (U_C)	6.0 V
Max. continuous operating a.c. voltage (U_C)	4.2 V
Nominal current at 45 °C (I_L)	1.0 A
C2 Total nominal discharge current (8/20 μ s) (I_n)	20 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	10 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 15 V
Voltage protection level line-PG for I_n C2 (U_p)	≤ 600 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 9 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 550 V
Series impedance per line	1.0 Ω (s)
Cut-off frequency line-line (f_G)	1.0 MHz
Capacitance line-line (C)	≤ 5.4 nF
Capacitance line-PG (C)	≤ 16 pF
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, UL 497B
SIL classification	up to SIL3 ^{*)}
Approvals	UL, CSA
Weight	21 g
Customs tariff number	85363010
GTIN	4013364127074
PU	1 pc(s)

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

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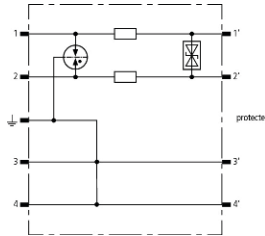
BLITZDUCTOR SP

BSP M2 BD HF 5 (926 271)

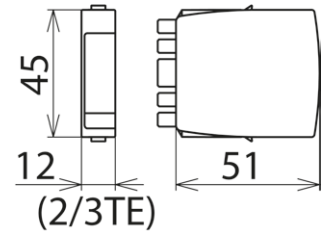
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_B-2 and higher



Figure without obligation



Basic circuit diagram BSP M2 BD HF 5



Dimension drawing BSP M2 BD HF 5

Space-saving surge arrester module for protecting one pair of high-frequency bus systems or video transmission systems with galvanic isolation.

Type Part No.	BSP M2 BD HF 5 926 271
SPD class	TYPE 2 P1
Nominal voltage (U_N)	5 V
Max. continuous operating d.c. voltage (U_C)	6.0 V
Max. continuous operating a.c. voltage (U_C)	4.2 V
Nominal current at 45 °C (I_L)	1.0 A
C2 Total nominal discharge current (8/20 μ s) (I_n)	20 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	10 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 35 V
Voltage protection level line-PG for I_n C2 (U_p)	≤ 600 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 11 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 550 V
Series impedance per line	1.0 ohm(s)
Cut-off frequency line-line (f_G)	100 MHz
Capacitance line-line (C)	≤ 25 pF
Capacitance line-PG (C)	≤ 25 pF
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, UL 497B
SIL classification	up to SIL3 ^{*)}
Approvals	UL, CSA
Weight	21 g
Customs tariff number	85363010
GTIN	4013364127142
PU	1 pc(s)

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

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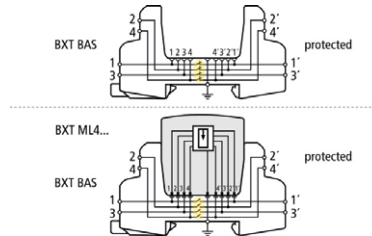
BLITZDUCTOR

BXT BAS (920 300)

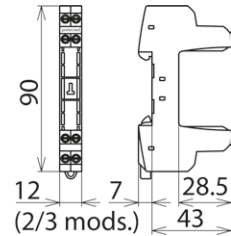
- Four-pole version for universal use with all types of BSP and BXT / BXTU protection modules
- No signal interruption if the protection module is removed
- Universal design without protection elements



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

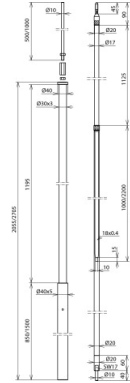
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DEHNcon-H

HVI LI I 20 L6M SR2705 FSP1000 AL (819 253)



Figure without obligation



Part No.	819 253
Material of conductor	Cu
Material of supporting tube	GRP / Al
Length of air-termination rod	1000 mm
Length of supporting tube	2705 mm
Diameter Ø conductor	20 mm
Colour of conductor	grey •
RAL colour	similar to 7000
Cross section of core	19 mm ²
Equivalent separation distance s (in air)	≤ 45 cm
Material of insulation	PE
Material of sheath	PVC
Characteristics of sheath	UV stabilized and weather resistant
Connection diameter	10 mm
EB connection cable	strip StSt 18 x 0.4 mm
Material of connection elements	StSt
Minimum order length	6 m
Max. gust wind speed	195 km/h
Max. free length	3105 mm
Min. clamping length	600 mm
Weight	6,83 kg
Customs tariff number	85389099
GTIN	4013364118263
PU	1 pc(s)

Conductor holder for CUI conductor

LH ZS 20 H10 B6.5X16 V2A (275 229)

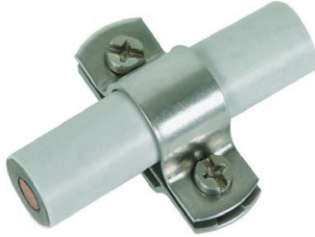
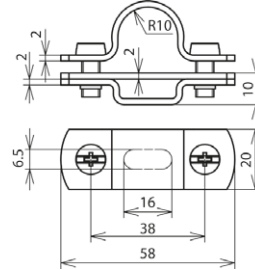


Figure without obligation



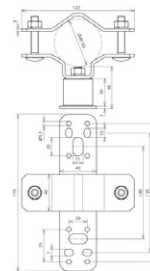
Part No.	275 229
Conductor leading	fixed
Material of screw	StSt
Material of conductor holder	StSt
Conductor holder support Rd	20 mm
Height of conductor holder	10 mm
Fixing	6.5 x 16 mm
Screw	⚙ M6 x 14
Weight	59 g
Customs tariff number	85389099
GTIN	4013364102040
PU	50 pc(s)

Supports for air-termination rods

WB D40.50 SE V2A (105 342)



Figure without obligation



Wall mounting bracket for vertical mounting, for air-termination rods D40, DEHNcon-H or DEHNiso-Combi supporting tubes.

Part No.	105 342
Material	StSt
Fixing	[8x] Ø5.1 / [4x] 7 x 10 / [2x] 11 x 20 mm
Wall distance	46 mm
Clamping range of air-termination rod	40-50 mm
Material of screw	StSt
Weight	514 g
Customs tariff number	85389099
GTIN	4013364111141
PU	1 pc(s)



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Lightning Protection
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