



Lightning and surge protection for gantries – Example: overhead traffic signs

White Paper



Contents

Protection of:

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

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Traffic guidance systems for motorways and highways are attached to cross-carriageway overhead gantries and ensure optimal traffic control on a global scale. They are supposed to prevent congestion and reduce the risks resulting from accidents, heavy rainfall and excessive speed. Traffic detection systems such as CCTV cameras, sensors and radar detectors are attached to gantries. On toll roads, additional

detection devices are installed which allow fully automated toll collection. Direct lightning strikes to 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

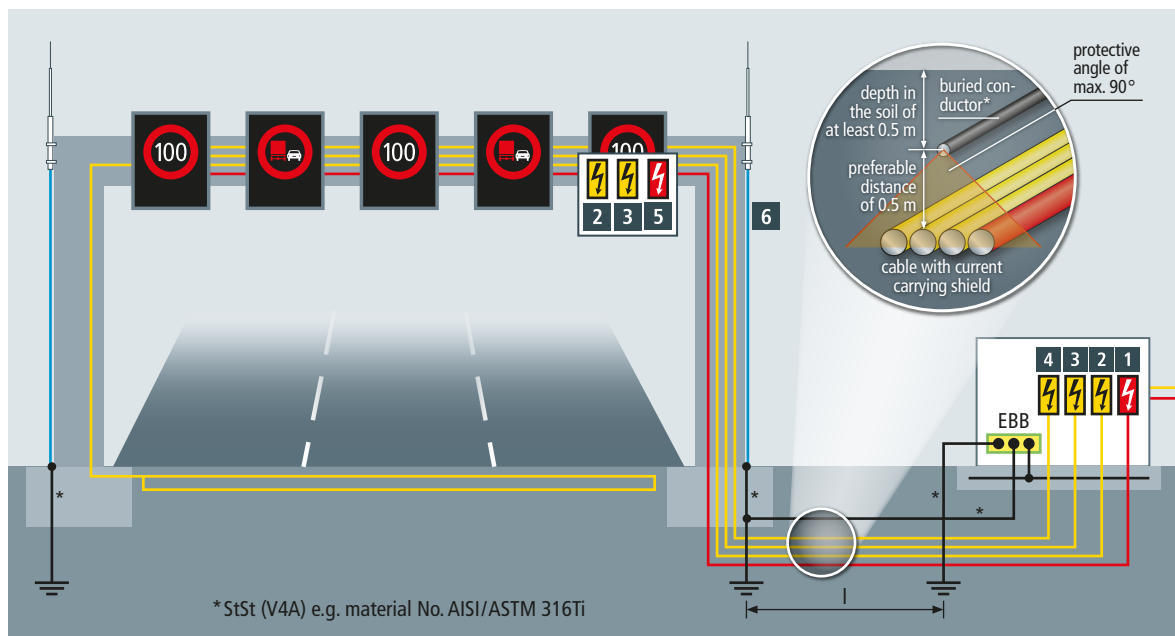


Figure 1 Example: Lightning and surge protection for traffic guidance systems on sign gantries on motorways and highways

Distance between the motorway overhead gantry and the control 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/sensors	BLITZDUCTOR BSP M2 BD 5 + BXT BAS	926 240 920 300
5	Power supply for variable traffic signs (230 V)	DEHNguard DG M TT 2P 275 FM	952 115
Lightning protection system			
6	DEHNcon-H HVI light Conductor inside of supporting tube with air-termination rod		819 258
	Holder for DEHNcon-H and D40 air-termination rods		105 342
	Conductor holder		275 229

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

Lightning and surge protection for gantries – Example: overhead traffic signs

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Distance between the motorway overhead gantry and the control 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/sensors	BLITZDUCTOR BXT ML2 BD S 5 + BXT BAS	920 240 920 300
5	Power supply for variable traffic signs (230 V)	DEHNventil DV M TT 2P 255 FM	951 115
Lightning protection system			
6	DEHNcon-H HVI light Conductor inside of supporting tube with air-termination rod		819 258
	Holder for DEHNcon-H and D40 air-termination rods		105 342
	Conductor holder		275 229

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

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 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).

The advantage of a high-voltage resistant down conductor is that the entire lightning current flows through this conductor. This precise discharge of the lightning current (from the point of strike to the soil), means that 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 gantries. The earth electrode on the right edge of the carriageway is connected to the stainless steel (V4A) radial earth elec-

trode or earth rod of the control cabinet via a buried stainless steel (V4A) conductor (10 mm \varnothing 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, should be connected to the equipotential bonding system.

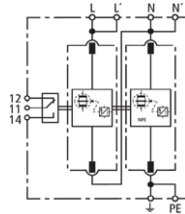
DEHNventil

DV M TT 2P 255 FM (951 115)

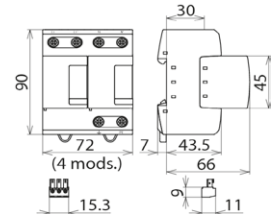
- Prewired spark-gap-based type 1 and type 2 combined lightning current and surge arrester consisting of a base part and plug-in protection modules
- Maximum system availability due to RADAX Flow follow current limitation, Capable of protecting terminal equipment



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 configuration).

Type	DV M TT 2P 255 FM
Part No.	951 115
SPD according to EN 61643-11 / IEC 61643-11	type 1 + type 2 / class I + class II
Energy coordination with terminal equipment (≤ 10 m)	type 1 + type 2 + type 3
Nominal voltage (a.c.) (U_N)	230 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [L-N] (U_C)	264 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [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_f)	50 kA _{rms} / 100 A _{rms}
Follow current limitation / Selectivity	no tripping of a 20 A 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, \pm) (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', \pm) (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 / Degree of protection	indoors / IP 20
Capacity	4 module(s), DIN 43880
Approvals	KEMA, VDE, UL
Type of remote signalling contact	changeover contact
Switching capacity (a.c.)	250 V / 0.5 A
Switching capacity (d.c.)	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:	-----
Voltage protection level [L-PE] (U_p)	2.2 kV
For 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 gG
Weight	664 g
Customs tariff number (Comb. Nomenclature EU)	85363090
GTIN	4013364108127
PU	1 pc(s)

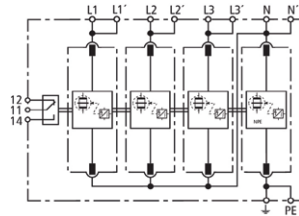
DEHNventil

DV M TT 255 FM (951 315)

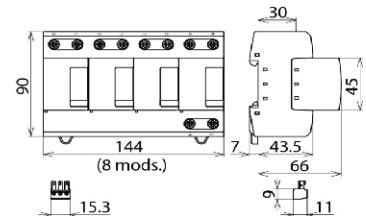
- Prewired spark-gap-based type 1 and type 2 combined lightning current and surge arrester consisting of a base part and plug-in protection modules
- Maximum system availability due to RADAX Flow follow current limitation, Capable of protecting terminal equipment



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 configuration).

Type	DV M TT 255 FM
Part No.	951 315
SPD according to EN 61643-11 / IEC 61643-11	type 1 + type 2 / class I + class II
Energy coordination with terminal equipment (≤ 10 m)	type 1 + type 2 + type 3
Nominal voltage (a.c.) (U_N)	230 / 400 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [L-N] (U_C)	264 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [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_f)	50 kA _{rms} / 100 A _{rms}
Follow current limitation / Selectivity	no tripping of a 20 A 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, \pm) (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', \pm) (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 / Degree of protection	indoors / IP 20
Capacity	8 module(s), DIN 43880
Approvals	KEMA, VDE, UL
Type of remote signalling contact	changeover contact
Switching capacity (a.c.)	250 V / 0.5 A
Switching capacity (d.c.)	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:	-----
Voltage protection level [L-PE] (U_p)	2.2 kV
For 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 gG
Weight	1,28 kg
Customs tariff number (Comb. Nomenclature EU)	85363090
GTIN	4013364108189
PU	1 pc(s)

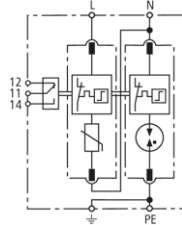
DEHNguard

DG M TT 2P 275 FM (952 115)

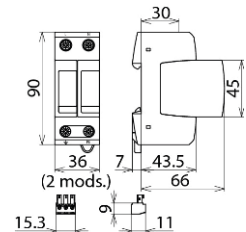
- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device



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 configuration); 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
Energy coordination with terminal equipment (≤ 10 m)	type 2 + type 3
Nominal voltage (a.c.) (U_N)	230 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [L-N] (U_C)	275 V (50 / 60 Hz)
Max. continuous operating voltage (a.c.) [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]/[N-PE] (U_p)	≤ 1.5 / ≤ 1.5 kV
Voltage protection level [L-N] / [N-PE] at 5 kA (U_p)	≤ 1 / ≤ 1.5 kV
Follow current extinguishing capability [N-PE] (I_R)	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
Type of remote signalling contact	changeover contact
Switching capacity (a.c.)	250 V / 0.5 A
Switching capacity (d.c.)	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:	-----
Voltage protection level [L-PE] (U_p)	1.5 kV
Weight	228 g
Customs tariff number (Comb. Nomenclature EU)	85363030
GTIN	4013364108424
PU	1 pc(s)

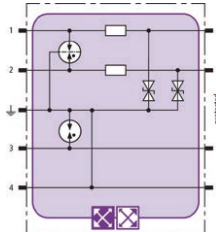
BLITZDUCTOR XT

BXT ML2 BE S 24 (920 224)

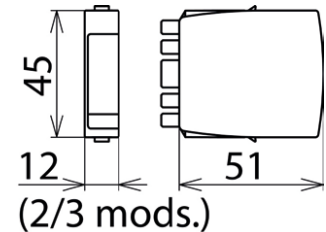
- LifeCheck SPD monitoring function
- Optimal protection of two single lines and the cable shield
- For use in conformity with the lightning protection zone concept at the boundaries from $0_A -2$ and higher



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	BXT ML2 BE S 24
Part No.	920 224
SPD monitoring system	LifeCheck
SPD class	TYPE 1 PD
Nominal voltage (U_N)	24 V
Max. continuous operating voltage (d.c.) (U_c)	33 V
Max. continuous operating voltage (a.c.) (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 (with plugged-in protection module)	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
Approvals	CSA, EAC, ATEX, IECEx, CSA & USA Hazloc, SIL
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
Weight	37 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364117785
PU	1 pc(s)

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

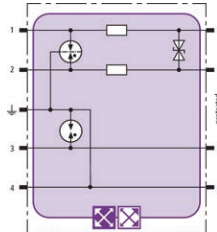
BLITZDUCTOR XT

BXT ML2 BD S 5 (920 240)

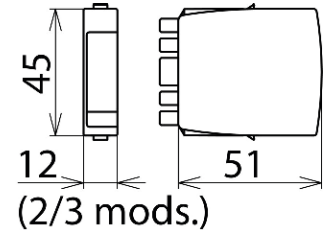
- LifeCheck SPD monitoring function
- Optimal protection of one pair and the cable shield
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_A -2$ and higher



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 1 PI
Nominal voltage (U_N)	5 V
Max. continuous operating voltage (d.c.) (U_c)	6.0 V
Max. continuous operating voltage (a.c.) (U_c)	4.2 V
Nominal current at 45 °C (I_L)	1.0 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)	≤ 25 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 550 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 resistance per line	1.0 ohm(s)
Cut-off frequency line-line (f_c)	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 (with plugged-in protection module)	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
Approvals	CSA, EAC, ATEX, IECEx, CSA & USA Hazloc, SIL
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
Weight	20 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364118348
PU	1 pc(s)

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

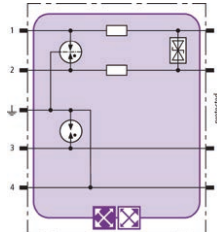
BLITZDUCTOR XT

BXT ML2 BD HFS 5 (920 271)

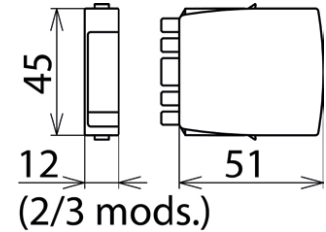
- LifeCheck SPD monitoring function
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_A -2$ and higher



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 1 PE
Nominal voltage (U_N)	5 V
Max. continuous operating voltage (d.c.) (U_c)	6.0 V
Max. continuous operating voltage (a.c.) (U_c)	4.2 V
Nominal current at 45 °C (I_L)	1.0 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)	≤ 25 V
Voltage protection level line-PG for I_{imp} D1 (U_p)	≤ 550 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 resistance per line	1.0 ohm(s)
Cut-off frequency line-line (f_c)	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 (with plugged-in protection module)	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
Approvals	CSA, UL, EAC, ATEX, IECEx, CSA & USA Hazloc, SIL
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
Weight	22 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364117556
PU	1 pc(s)

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

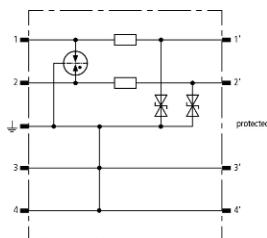
BLITZDUCTOR SP

BSP M2 BE 24 (926 224)

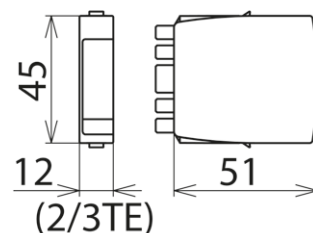
- High degree of protection for two single lines
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



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 voltage (d.c.) (U_C)	33 V
Max. continuous operating voltage (a.c.) (U_C)	23.3 V
Nominal current at 45 °C (I_L)	0.75 A
D1 Lightning impulse current (10/350 μ s) per line (I_{imp})	1 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_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 (with plugged-in protection module)	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
Approvals	UL, CSA, SIL, EAC
SIL classification	up to SIL3 *)
Weight	21 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364127036
PU	1 pc(s)

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

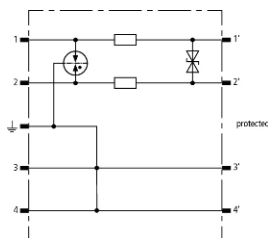
BLITZDUCTOR SP

BSP M2 BD 5 (926 240)

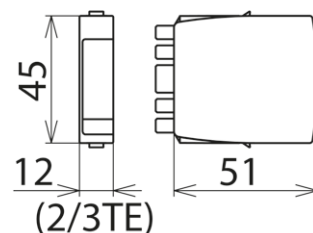
- High degree of protection for one pair
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



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	BSP M2 BD 5
Part No.	926 240
SPD class	TYPE 2P1
Nominal voltage (U_N)	5 V
Max. continuous operating voltage (d.c.) (U_C)	6.0 V
Max. continuous operating voltage (a.c.) (U_C)	4.2 V
Nominal current at 45 °C (I_L)	1.0 A
D1 Lightning impulse current (10/350 μ s) per line (I_{imp})	1 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_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 ohm(s)
Cut-off frequency line-line (f_c)	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 (with plugged-in protection module)	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
Approvals	UL, CSA, SIL, EAC
SIL classification	up to SIL3 *)
Weight	21 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364127074
PU	1 pc(s)

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

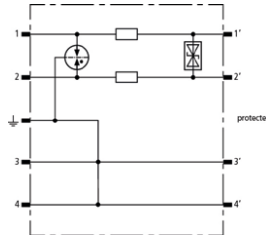
BLITZDUCTOR SP

BSP M2 BD HF 5 (926 271)

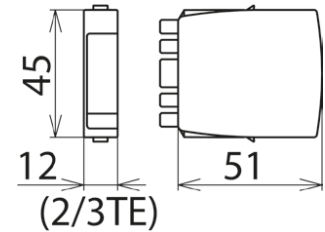
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_B-2 and higher



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	BSP M2 BD HF 5
Part No.	926 271
SPD class	TYPE 2 P1
Nominal voltage (U_N)	5 V
Max. continuous operating voltage (d.c.) (U_C)	6.0 V
Max. continuous operating voltage (a.c.) (U_C)	4.2 V
Nominal current at 45 °C (I_L)	1.0 A
D1 Lightning impulse current (10/350 μ s) per line (I_{imp})	1 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_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_c)	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 (with plugged-in protection module)	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
Approvals	UL, CSA, SIL, EAC
SIL classification	up to SIL3 *)
Weight	21 g
Customs tariff number (Comb. Nomenclature EU)	85363010
GTIN	4013364127142
PU	1 pc(s)

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

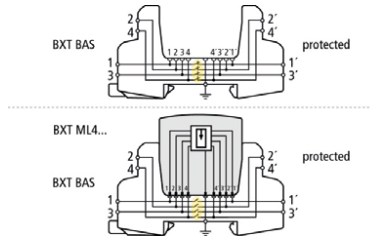
BLITZDUCTOR

BXT BAS (920 300)

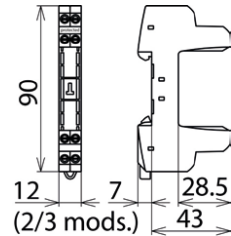
- Four-pole version for universal use with all types of BSP and BXT / BXTU protection modules
- No signal interruption if the protection module is removed
- Universal design without protection elements



Figure without obligation



Basic circuit diagram with and without plugged-in module



Dimension drawing BXT BAS

The BLITZDUCTOR XT base part is an extremely space-saving and universal four-pole feed-through terminal for the insertion of a protection module without signal disconnection 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, maintenance is only required for the protection modules.

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, UL, EAC, ATEX, IECEx ^{*)}
Weight	34 g
Customs tariff number (Comb. Nomenclature EU)	85369010
GTIN	4013364109179
PU	1 pc(s)

^{*)} only in connection with an approved protection module

DEHNcon-H

HVI LI 20 L6M SR2640 FSP1000 GFK AL V2A (819 258)



Figure without obligation



Type	HVI LI 20 L6M SR2640 FSP1000 GFK AL V2A
Part No.	819 258
Material of supporting tube	GRP / Al
Length of supporting tube	2640 mm
Transport length	2640 mm
Material of air-termination rod	StSt
Length of air-termination rod	1000 mm
Diameter Ø conductor	20 mm
Colour of conductor	grey ●
Material of conductor	Cu
RAL colour	similar to 7000
Cross section of core	19 mm ²
Equivalent separation distance s (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 2200 x 18 x 0.4 mm
Material of connection elements	StSt
Minimum order length	6 m
Max. gust wind speed	198 km/h
Max. free length	3040 mm
Min. clamping length	600 mm
Weight	6,97 kg
Customs tariff number (Comb. Nomenclature EU)	85389099
GTIN	4013364255418
PU	1 pc(s)

Conductor holder for CUI Conductor

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

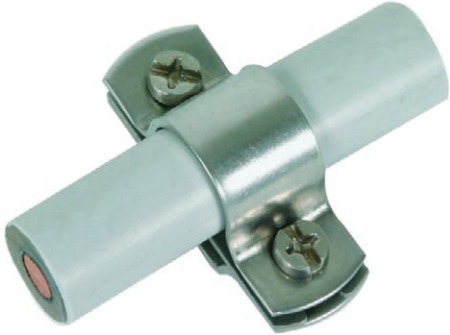
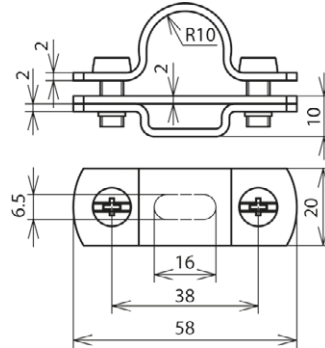


Figure without obligation

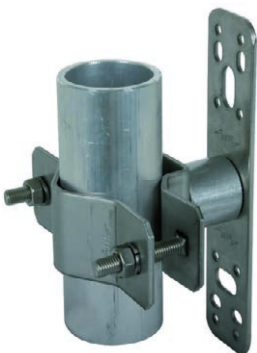


Type Part No.	LH ZS 20 H10 B6.5X16 V2A 275 229
Conductor leading	fixed
Material of screw	StSt
Material of conductor holder	StSt
Conductor holder support Rd	20 mm
Height of conductor holder	10 mm
Fixing	6.5 x 16 mm
Screw	☒ M6 x 14
Standard	DIN EN 62561-4
Weight	59 g
Customs tariff number (Comb. Nomenclature EU)	85389099
GTIN	4013364102040
PU	50 pc(s)

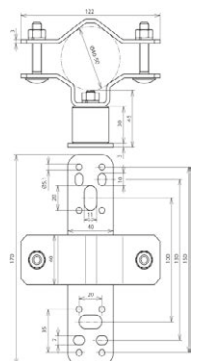
Mounting bracket for air-termination rods

WB D40.50 SE WA46 V2A (105 342)

For fastening the supporting tubes or air-termination rods D40 / D50 on superstructures or walls.



Type Part No.	WB D40.50 SE WA46 V2A 105 342
Material of bracket	StSt
Fixing	[8x] Ø5.1 / [4x] 7 x 10 / [2x] 11 x 20 mm
Clamping range of supporting tube	40-50 mm
Wall distance	46 mm
Material of screw	StSt
Weight	514 g
Customs tariff number (Comb. Nomenclature EU)	85389099
GTIN	4013364111141



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Safety Equipment
DEHN protects.

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