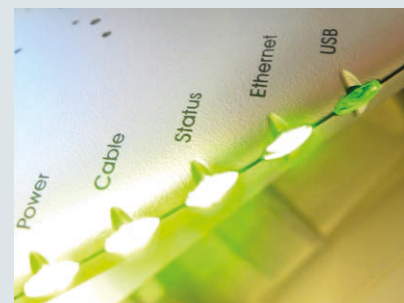




Surge protection for telecommunication connections

White Paper



Contents

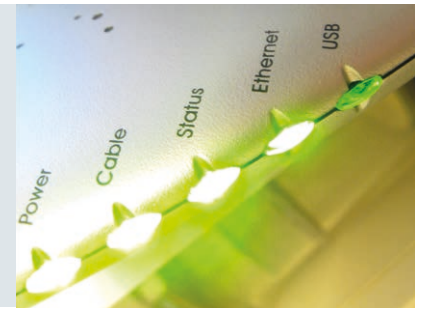
Lightning and surge protection
for an analogue connection
with ADSL

Lightning and surge protection
for an ISDN connection with
ADSL

Surge protection for
telecommunication systems
with "ISDN primary multiplex
connection"

Surge protection for telecommunication connections

White Paper



In addition to power supply lines, telecommunication lines are the most important lines. Permanently functioning interfaces to the "outside world" are vital for the highly technical processes in today's industrial plants and offices. Telecommunication line networks frequently extend over some km². Therefore, it is quite likely that surges are injected into such widespread networks.

The safest solution to protect a structure from the negative consequences of lightning effects is to install a complete lightning protection system consisting of an external and internal lightning protection system.

Risks

Copper cables with a low shielding effect are used as connecting cables to the local exchange and in a company's internal cabling system. High potential differences can occur between the building installation and the incoming lines since the incoming lines extend beyond several buildings. Potential rise of the cores caused by galvanic and inductive coupling must be expected. If high-power and low-power lines are routed in parallel, switching overvoltages in the power system can also cause failure which interferes with the low-power lines.

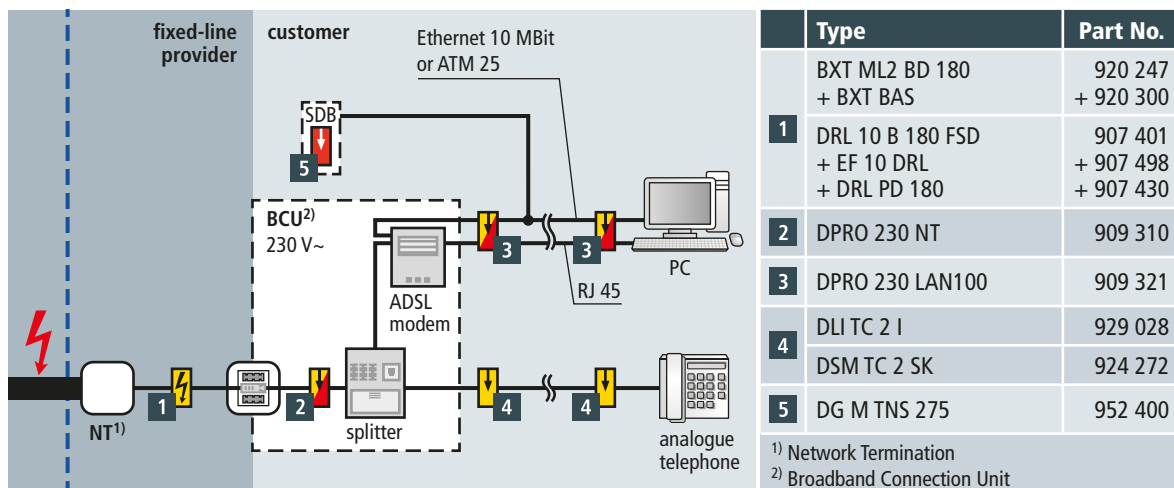


Figure 1 Lightning and surge protection for an analogue connection with ADSL

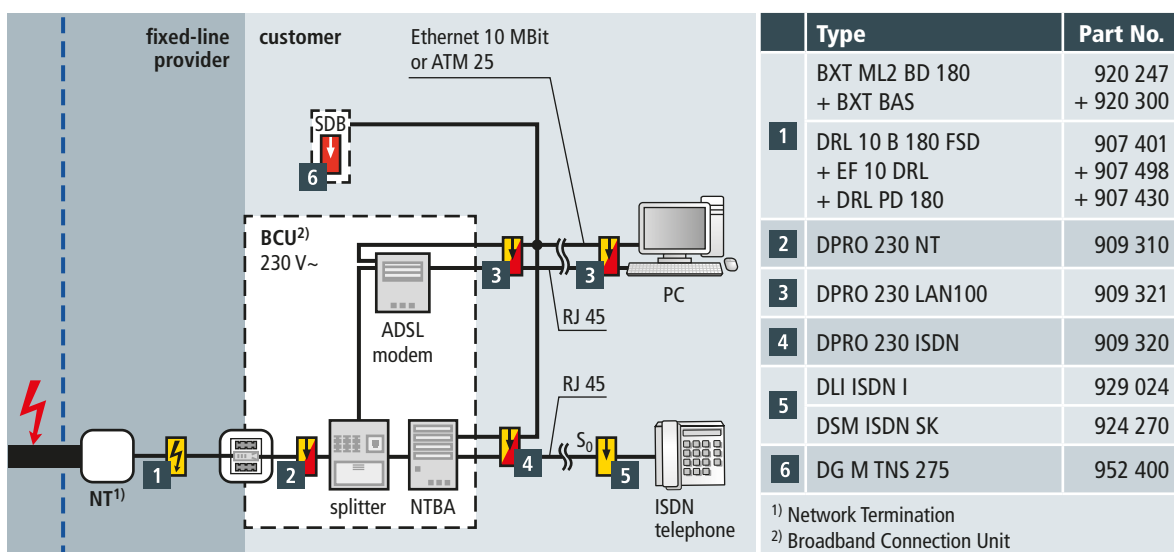


Figure 2 Lightning and surge protection for an ISDN connection with ADSL

Surge protection for telecommunication connections

White Paper

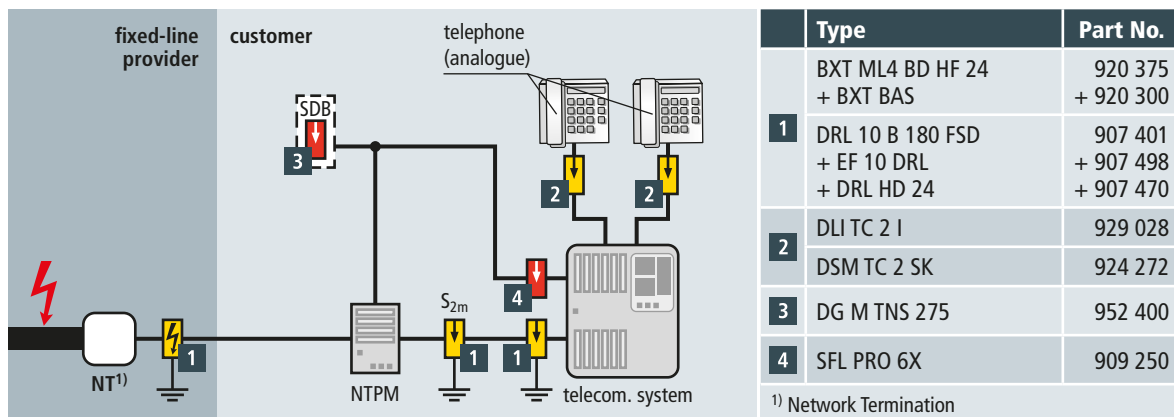
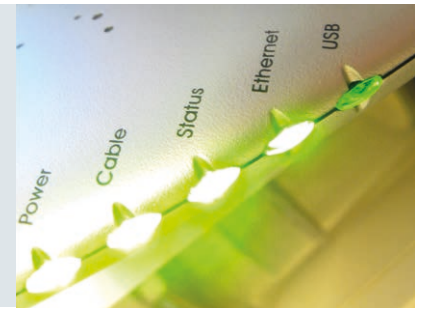


Figure 3 Surge protection for telecommunication systems with "ISDN primary multiplex connection"

Surge protection for the ADSL connection

In addition to a conventional telephone connection, an ADSL connection requires a network or ATM card in the PC (depending on the type of access), a special ADSL modem and a splitter to separate the telephone and data traffic. The telephone connection can be an analogue or ISDN connection.

The splitter divides the analogue voice signal or the digital ISDN signal from the ADSL data taking into account all important system parameters such as impedances, attenuation and level. It thus fulfils the function of a dividing network. The splitter is connected to the telephone socket on the input side. On the output side, it provides the high-frequency signals of the ADSL frequency band to the ADSL modem and controls communication with the NTBA or the analogue terminal device in the low frequency range.

The ADSL modem is connected to the PC via an Ethernet (10 MBit/s), ATM25 or USB interface and requires a 230 V a.c. supply voltage (Figures 1 and 2).

Surge protection for the ISDN connection

ISDN (Integrated Service Digital Network) offers different services in a common public network. Both voice and data can be transmitted via digital transmission. The transfer interface for the NTBA, which is also supplied with 230 V a.c. on the power supply side, is a network termination unit.

Figure 2 shows surge protective devices for an ISDN connection.

Surge protection for the primary multiplex connection

The primary multiplex connection (NTPM) features 30 B-channels with 64 kBit/s each, a D-channel and a synchronisation channel with 64 kBit/s and allows data transfer rates up to 2 MBit/s. The NTPM is supplied by the U_{2m} interface. The device interface is referred to as S_{2m} . Large-scale interphone systems or data connections with high data volumes are connected to this interface. Figure 3 shows surge protective devices for such a connection. The NTPM is also supplied with 230 V a.c. on the power supply side.

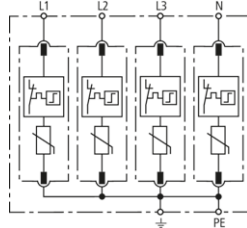
DEHNguard

DG M TNS 275 (952 400)

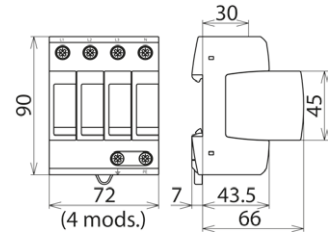
- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device



Figure without obligation



Basic circuit diagram DG M TNS 275



Dimension drawing DG M TNS 275

Modular surge arrester for use in TN-S systems.

Type	DG M TNS 275
Part No.	952 400
SPD according to EN 61643-11 / IEC 61643-11	type 2 / class II
Nominal a.c. voltage (U_N)	230 / 400 V (50 / 60 Hz)
Max. continuous operating a.c. voltage (U_C)	275 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
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	4 module(s), DIN 43880
Approvals	KEMA, VDE, UL, VdS
Weight	443 g
Customs tariff number	85363030
GTIN	4013364108455
PU	1 pc(s)

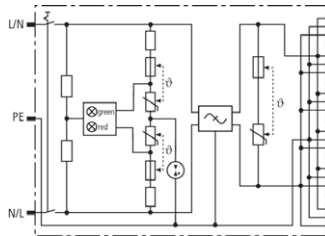
SFL Protector

SFL PRO 6X (909 250)

- Surge protection with monitoring device and disconnecter
- Interference suppressor filter
- Visual operating state (green) and fault indication (red)



Figure without obligation



Basic circuit diagram SFL PRO 6X



Dimension drawing SFL PRO 6X

Surge protective multiple socket outlet with mains filter

Type	SFL PRO 6X
Part No.	909 250
SPD according to EN 61643-11	Type 3
SPD according to 61643-1/-11	Class III
Nominal a.c. voltage (U_N)	230 V
Max. continuous operating a.c. voltage (U_C)	255 V
Nominal load current a.c. (I_L)	16 A
Nominal discharge current (8/20 μ s) (I_n)	3 kA
Total discharge current (8/20 μ s) [L+N-PE] (I_{total})	5 kA
Combined impulse (U_{OC})	6 kV
Combined impulse [L+N-PE] ($U_{OC total}$)	10 kV
Voltage protection level (U_P)	≤ 1.5 kV
Response time [L-N] (t_A)	≤ 25 ns
Response time [L/N-PE] (t_A)	≤ 100 ns
Max. mains-side overcurrent protection	16 A gL/gG or B 16 A
Short-circuit withstand capability for mains-side overcurrent protection with 16 A gL/gG	1.5 kA _{rms}
Temporary overvoltage (TOV) [L-N] (U_T)	335 V / 5 sec.
Temporary overvoltage (TOV) [L/N-PE] (U_T)	400 V / 5 sec.
Temporary overvoltage (TOV) [L+N-PE] (U_T)	1200 V + U_{CS} / 200 ms
TOV characteristic [L-N]	withstand
TOV characteristic [L/N-PE]	withstand
TOV characteristic [L+N-PE]	safe
Fault indication	red light
Operating state indication	green light
Number of ports	2
Operating temperature range (T_U)	-20°C...+40°C
Connecting cable	approx. 2000 mm
Number of socket outlets	6
For mounting on	plug-in systems with earth contact according to DIN 49440 / DIN 49441
Enclosure material	thermoplastic, black/silver, UL 94 V-1
Place of installation	indoor installation
Degree of protection	IP 20
Dimensions	571 x 72 x 43 mm
Mains filter	acc. to EN 60939-1
Attenuation for f = 1 MHz, balanced	≥ 32 dB
Attenuation for f = 1 MHz, unbalanced	≥ 30 dB
Weight	1,1 kg
Customs tariff number	85369010
GTIN	4013364132566
PU	1 pc(s)

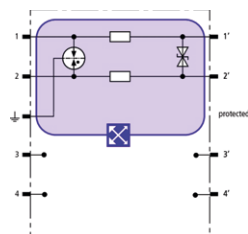
BLITZDUCTOR XT

BXT ML2 BD 180 (920 247)

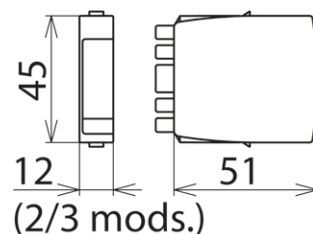
- LifeCheck SPD monitoring function
- Optimal protection of one pair
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A-2 and higher



Figure without obligation



Basic circuit diagram BXT ML2 BD 180



Dimension drawing BXT ML2 BD 180

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting one pair of unearthed balanced 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 ML2 BD 180 920 247
SPD monitoring system	LifeCheck
SPD class	TYPE 1P2
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 at 45 °C (I _N)	0.75 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)	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)	≤ 270 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)	≤ 250 V
Voltage protection level line-PG at 1 kV/µs C3 (U _p)	≤ 550 V
Series resistance per line	1.8 ohm(s)
Cut-off frequency line-line (f _G)	25.0 MHz
Capacitance line-line (C)	≤ 240 pF
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 / 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	43 g
Customs tariff number	85363010
GTIN	4013364116078
PU	1 pc(s)

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

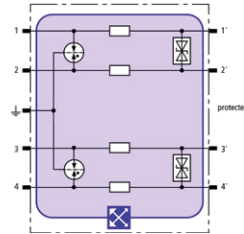
BLITZDUCTOR XT

BXT ML4 BD HF 24 (920 375)

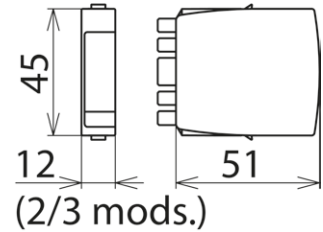
- LifeCheck SPD monitoring function
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A –2 and higher



Figure without obligation



Basic circuit diagram BXT ML4 BD HF 24



Dimension drawing BXT ML4 BD HF 24

Space-saving combined lightning current and surge arrester module with LifeCheck feature for protecting two pairs of high-frequency bus systems or video transmission systems. 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 ML4 BD HF 24
Part No.	920 375
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 _N)	1.0 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)	≤ 65 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)	≤ 47 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 _c)	100.0 MHz
Capacitance line-line (C)	≤ 25 pF
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 / 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	24 g
Customs tariff number	85363010
GTIN	4013364109100
PU	1 pc(s)

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

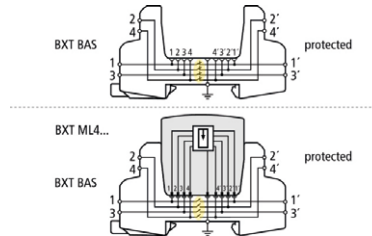
BLITZDUCTOR XT

BXT BAS (920 300)

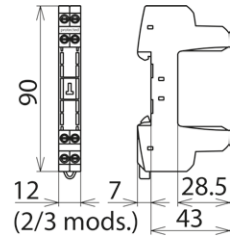
- Four-pole version for universal use with all types of BSP and BXT / BXTU protection modules
- No signal interruption if the protection module is removed
- Universal design without protection elements



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

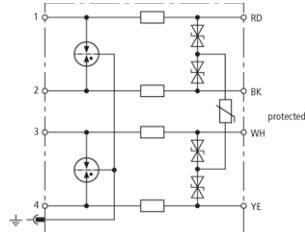
DSM

DSM ISDN SK (924 270)

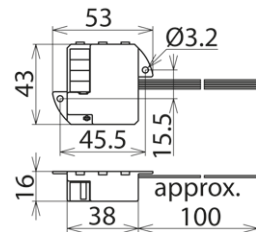
- Optional through-wiring of the ISDN bus via plug-in terminals
- Integrated protection for the supply voltage
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B -2$ and higher



Figure without obligation



Basic circuit diagram DSM ISDN SK



Dimension drawing DSM ISDN SK

Energy-coordinated two-stage arrester for ISDN S_0 buses that also protects the supply voltage. Four-pole terminal allows through-wiring of the ISDN bus.

Type	DSM ISDN SK
Part No.	924 270
SPD class	TYPE 2[P1]
Nominal voltage (U_N)	5 V
Nominal voltage pair-pair (U_N)	40 V
Max. continuous operating d.c. voltage (U_C)	7.5 V
Max. continuous operating d.c. voltage pair-pair (U_C)	45 V
Nominal current (I_N)	200 mA
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)	5 kA
Voltage protection level line-line for I_n C2 (U_P)	≤ 30 V
Voltage protection level line-PG for I_n C2 (U_P)	≤ 600 V
Voltage protection level pair-pair for I_n C2 (U_P)	≤ 180 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_P)	≤ 17 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_P)	≤ 600 V
Voltage protection level pair-pair at 1 kV/ μ s C3 (U_P)	≤ 100 V
Series resistance per line	4.7 ohms
Cut-off frequency (f_G)	4 MHz
Capacitance line-line (C)	≤ 1.5 nF
Capacitance line-PG (C)	≤ 15 pF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
Connection (input / output)	four-pole terminal / stranded conductor (0.25 mm ²)
Pinning	2 pairs
Connection diameter, solid	0.5-1.0 mm
Earthing via	flat connector (2.8 mm)
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST
Accessories	flat connector, 500 mm earthing conductor
Weight	45 g
Customs tariff number	85363010
GTIN	4013364082960
PU	1 pc(s)

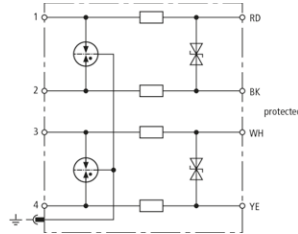
DSM

DSM TC 2 SK (924 272)

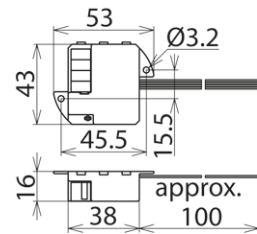
- Excellent transmission performance
- Also suitable for installation into distribution boards
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



Figure without obligation



Basic circuit diagram DSM TC 2 SK



Dimension drawing DSM TC 2 SK

Energy-coordinated two-stage surge arrester free of leakage currents to earth for (system) telephones, U_{k0} -ADSL, for two pairs.

Type Part No.	DSM TC 2 SK 924 272
SPD class	TYPE 2 P2
Nominal voltage (U_N)	130 V
Max. continuous operating d.c. voltage (U_C)	170 V
Nominal current (I_n)	200 mA
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)	5 kA
Voltage protection level line-line for I_n C2 (U_P)	≤ 275 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)	≤ 220 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_P)	≤ 600 V
Series resistance per line	4.7 ohms
Cut-off frequency (f_c)	17 MHz
Capacitance line-line (C)	≤ 300 pF
Capacitance line-PG (C)	≤ 10 pF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
Connection (input / output)	four-pole terminal / stranded conductors (0.25 mm ²)
Pinning	2 pairs
Connection diameter, solid	0.5-1.0 mm
Earthing via	flat connector (2.8 mm)
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST
Accessories	flat connector, 500 mm earthing conductor
Weight	45 g
Customs tariff number	85363010
GTIN	4013364082984
PU	1 pc(s)

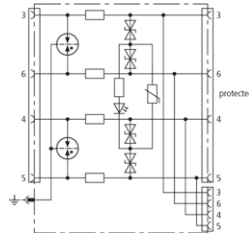
DEHNlink

DLI ISDN I (929 024)

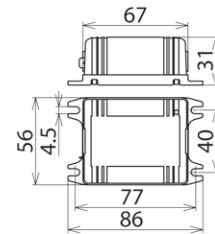
- Two protected outputs
- Surge protection and LED display for supply voltage included
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B -2$ and higher



Figure without obligation



Basic circuit diagram DLI ISDN I



Dimension drawing DLI ISDN I

Energy-coordinated surge arrester with two protected ISDN S_0 outputs and operating state indication (LED) of the phantom power supply. No indication during emergency operation (supply from telephone network only). Connecting cable and mounting material included.

Type Part No.	DLI ISDN I 929 024
SPD class	TYPE 2 [PI]
Nominal voltage (U_N)	5 V
Nominal voltage pair-pair (U_N)	40 V
Max. continuous operating d.c. voltage (U_c)	7.5 V
Max. continuous operating a.c. voltage (U_c)	5.2 V
Max. continuous d.c. voltage pair-pair (U_c)	45 V
Nominal current (I_l)	200 mA
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)	10 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	2.5 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 30 V
Voltage protection level line-PG for I_n C2 (U_p)	≤ 600 V
Voltage protection level pair-pair for I_n C2 (U_p)	≤ 180 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 17 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 600 V
Voltage protection level pair-pair at 1 kV/ μ s C3 (U_p)	≤ 100 V
Series resistance per line	1 ohm
Cut-off frequency line-line	2 MHz
Capacitance line-line (C)	≤ 3 nF
Capacitance line-PG (C)	≤ 15 pF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
Connection (input / output)	RJ45 / 2 x RJ45
Pinning	3/6, 4/5
Earthing via	flat connector (6.3 mm)
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST
Accessories	connecting cable, mounting material
Weight	113 g
Customs tariff number	85363010
GTIN	4013364093355
PU	1 pc(s)

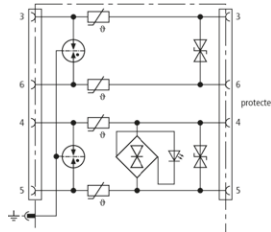
DEHNlink

DLI TC 2 I (929 028)

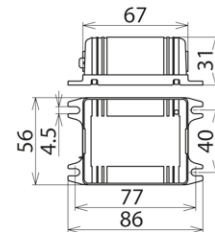
- LED display for supply voltage
- Integrated protection against power crossing
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_B –2 and higher



Figure without obligation



Basic circuit diagram DLI TC 2 I



Dimension drawing DLI TC 2 I

Two-stage surge arrester with overcurrent protection for analogue or system telephones with operating state indication (LED). Even protects from alternating current interference. Pins compatible with RJ11/12 plugs. Connecting cable and mounting material included.

Type Part No.	DLI TC 2 I 929 028
SPD class	TYPE 2 P2
Nominal voltage (U_N)	130 V
Max. continuous operating d.c. voltage (U_c)	170 V
Max. continuous operating a.c. voltage (U_c)	120 V
Nominal current (I_n)	150 mA
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)	10 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	2.5 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 250 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)	≤ 230 V
Voltage protection level line-PG at 1 kV/ μ s C3 (U_p)	≤ 600 V
Series resistance per line	10 ohms
Cut-off frequency line-line	10 MHz
Capacitance line-line (C)	≤ 0.3 nF
Capacitance line-PG (C)	≤ 15 pF
Operating temperature range (T_U)	-40 °C ... +80 °C
Degree of protection	IP 20
Connection (input / output)	RJ45 / RJ 45 (compatible with RJ12)
Pinning	3/6, 4/5 (3/4, 2/5 for RJ12)
Earthing via	flat connector (6.3 mm)
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST
Accessories	connecting cable, mounting material
Weight	101 g
Customs tariff number	85363010
GTIN	4013364093379
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

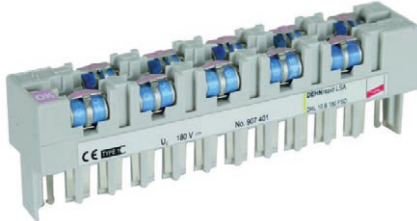
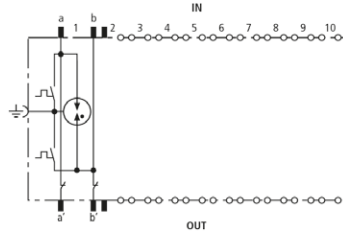
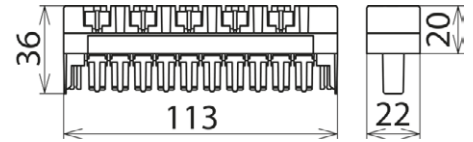


Figure without obligation



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	DRL 10 B 180 FSD
Part No.	907 401
SPD class	TYPE 1
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_N)	0.4 A
D1 Total lightning impulse current (10/350 μ s) (I_{imp})	5 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)	10 kA
C2 Nominal discharge current (8/20 μ s) 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/ μ s C3 (U_p)	≤ 500 V
Voltage protection level line-PG at 1 kV/ μ s 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)

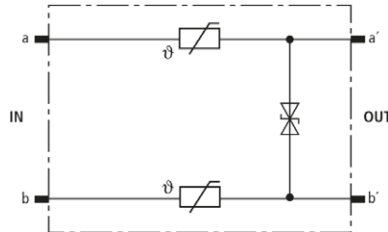
DEHNrapid LSA

DRL PD 180 (907 430)

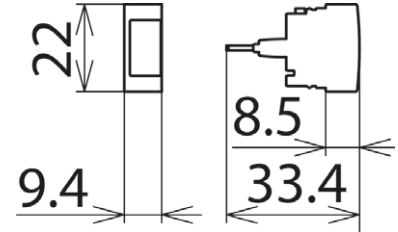
- For maximum transmission rates - combined with overcurrent protection
- Energy-coordinated with DRL plug-in SPD block
- For installation in conformity with the lightning protection zone concept at the boundaries from 1 – 2 and higher



Figure without obligation



Basic circuit diagram DRL PD 180



Dimension drawing DRL PD 180

Protective plug (one pair), energy-coordinated with DRL plug-in SPD block, for use as single-stage protective device for terminal equipment. Low voltage protection level line-line and integrated overcurrent protection for ADSL, ISDN U_{ko} or a/b lines. To be mounted into EF 10 DRL. Installation recommended only in combination with DRL plug-in SPD block.

Type Part No.	DRL PD 180 907 430
SPD class	TYPE 2
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)	0.1 A
D1 Total lightning impulse current (10/350 μ s) in combination with DRL 10 B... (I_{imp})	5 kA
D1 Lightning impulse current (10/350 μ s) per line in combination with DRL 10 B... (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 μ s) in combination with DRL 10 B... (I_n)	10 kA
C2 Nominal discharge current (8/20 μ s) per line in combination with DRL 10 B... (I_n)	5 kA
C1 Nominal discharge current (8/20 μ s) per line without DRL 10 B... (I_n)	0.25 kA
Voltage protection level line-PG for I_{imp} D1 in combination with DRL 10 B... (U_p)	≤ 500 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 270 V
Series resistance per line	10 ohms +/- 15%
Cut-off frequency line-line (f_c)	61 MHz
Capacitance line-line (C)	≤ 80 pF
Version	integrated overcurrent protection
Operating temperature range (T_U)	0 °C ... +70 °C
Degree of protection	IP 20 (when plugged in)
Plugs into	LSA disconnection block 2/10 or DRL 10 B... plug-in SPD block
Enclosure material	polyamide PA 6.6
Colour	yellow
Test standards	IEC 61643-21 / EN 61643-21
Approvals	GOST, VdS
Weight	4 g
Customs tariff number	85363010
GTIN	4013364107670
PU	10 pc(s)

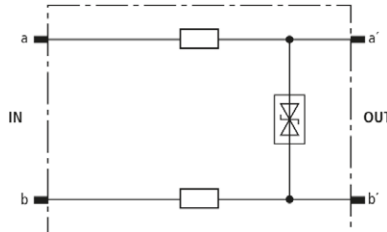
DEHNrapid LSA

DRL HD 24 (907 470)

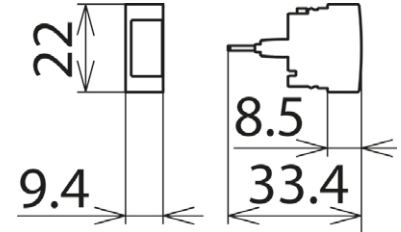
- For maximum transmission rates
- Energy-coordinated with DRL plug-in SPD block
- For installation in conformity with the lightning protection zone concept at the boundaries from 1 – 2 and higher



Figure without obligation



Basic circuit diagram DRL HD 24



Dimension drawing DRL HD 24

Protective plug (one pair), energy-coordinated with DRL plug-in SPD block, for use as single-stage protective device for terminal equipment for high-frequency transmissions such as G.703 or ISDN U_{2m} , S_{2m} and S_0 . To be mounted into EF 10 DRL. Installation recommended only in combination with DRL plug-in SPD block.

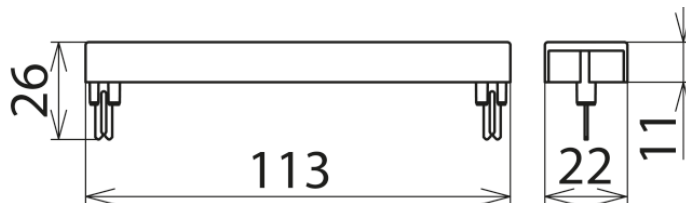
Type	DRL HD 24
Part No.	907 470
SPD class	TYPE 3 Pt
Nominal voltage (U_N)	24 V
Max. continuous operating d.c. voltage (U_C)	28 V
Max. continuous operating a.c. voltage (U_C)	19.5 V
Nominal current (I_L)	0.4 A
D1 Total lightning impulse current (10/350 μ s) in combination with DRL 10 B... (I_{imp})	5 kA
D1 Lightning impulse current (10/350 μ s) per line in combination with DRL 10 B... (I_{imp})	2.5 kA
C2 Total nominal discharge current (8/20 μ s) in combination with DRL 10 B... (I_n)	10 kA
C2 Nominal discharge current (8/20 μ s) per line in combination with DRL 10 B... (I_n)	5 kA
C1 Nominal discharge current (8/20 μ s) 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)	≤ 500 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 46 V
Series resistance per line	4.7 ohms
Cut-off frequency line-line (f_G)	94 MHz
Capacitance line-line (C)	≤ 22 pF
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
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	4013364107663
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	EF 10 DRL
Part No.	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)

DEHNprotector

DPRO 230 NT (909 310)

Figure without obligation



- Surge protective device for terminal equipment in telecommunications systems with a modern design
- Includes accessories for RJ 11/12 and TAE connections
- For installation in conformity with the lightning protection zone concept at the boundaries from 2 – 3 and higher

Combined surge protection for the power and data side of a digital network termination (NT). Also suited for telephones and fax machines. With visual operating state and fault indication and integrated child lock.

Protection of the data side

Type	DPRO 230 NT
Part No.	909 310
SPD class	TYPE 2 P1
Max. continuous operating d.c. voltage (U_c)	180 V
Lightning impulse current (10/350 μ s) per line D1 (I_{imp})	1 kA
C2 Nominal discharge current (8/20 μ s) per line (I_n)	2.5 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 300 V
Voltage protection level line-PE for I_n C2 (U_p)	≤ 500 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	≤ 300 V
Voltage protection level line-PE at 1 kV/ μ s C3 (U_p)	≤ 500 V
Cut-off frequency (f_c)	50 MHz
Operating temperature range (T_u)	-25 °C ... +40 °C
Degree of protection	IP 20
Connection (input / output)	RJ12 socket / RJ12 socket
Pinning	3/4
Earthing via	protective conductor connection
Enclosure material	thermoplastic, UL 94 V-2
Colour	pure white
Test standards	IEC 61643-21 / EN 61643-21

Protection of the power side

Type	DPRO 230 NT
Part No.	909 310
SPD according to EN 61643-11 / IEC 61643-11	type 3 / class III
Nominal a.c. voltage (U_N)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage (U_c)	255 V (50 / 60 Hz)
Nominal load current a.c. (I_L)	16 A
Nominal discharge current (8/20 μ s) (I_n)	3 kA
Total discharge current (8/20 μ s) [L+N-PE] (I_{total})	5 kA
Combination wave (U_{oc})	6 kV
Combination wave [L+N-PE] ($U_{oc total}$)	10 kV
Voltage protection level [L-N] (U_p)	≤ 1.25 kV
Voltage protection level [L/N-PE] (U_p)	≤ 1.5 kV
Response time [L-N] (t_A)	≤ 25 ns
Response time [L/N-PE] (t_A)	≤ 100 ns
Max. mains-side overcurrent protection	B 16 A
Short-circuit withstand capability for mains-side overcurrent protection (I_{SCCR})	1 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) [L/N-PE] (U_T) – Characteristic	335 V / 120 min. – withstand
Temporary overvoltage (TOV) [L/N-PE] (U_T) – Characteristic	440 V / 5 sec. – withstand
Temporary overvoltage (TOV) [L+N-PE] (U_T) – Characteristic	1200 V + U_{REF} / 200 ms – safe failure
Fault indication	red indicator light
Operating state indication	green indicator light
Number of ports	1
For mounting on	earthed socket outlets according to DIN 49440/DIN 49441
Test standards	EN 61643-11
Weight	212 g
Customs tariff number	85363010
GTIN	4013364117747
PU	1 pc(s)

DEHNprotector

DPRO 230 ISDN (909 320)

Figure without obligation



- Surge protective device for ISDN or Ethernet components (10 BASE-T) with a modern design
- Shielded patch cable (1.5 m) included
- For installation in conformity with the lightning protection zone concept at the boundaries from 2 – 3 and higher

Combined surge protection for the power and ISDN S₀ side of ISDN systems and devices. Shielded port allows to protect Ethernet 10 BT. With visual operating state and fault indication and integrated child lock.

Protection of the data side

Type Part No.	DPRO 230 ISDN 909 320
SPD class	TYPE 2 [P]
Max. continuous operating d.c. voltage (U _c)	48 V
Lightning impulse current (10/350 µs) per line D1 (I _{imp})	1 kA
C2 Nominal discharge current (8/20 µs) line-line (I _n)	120 A
C2 Nominal discharge current (8/20 µs) line-PE (I _n)	2.5 kA
C2 Total nominal discharge current (8/20 µs) (I _n)	10 kA
Voltage protection level line-line for I _n C2 (U _p)	≤ 100 V
Voltage protection level line-PE for I _n C2 (U _p)	≤ 500 V
Voltage protection level line-line at 1 kV/µs C3 (U _p)	≤ 80 V
Voltage protection level line-PE at 1 kV/µs C3 (U _p)	≤ 500 V
Cut-off frequency (f _c)	50 MHz
Operating temperature range (T _U)	-25 °C ... +40 °C
Degree of protection	IP 20
Connection (input / output)	shielded RJ45 socket / shielded RJ45 socket
Pinning	1(5)/2(4), 3/6
Earthing via	protective conductor connection
Enclosure material	thermoplastic, UL 94 V-2
Colour	pure white
Test standards	IEC 61643-21 / EN 61643-21

Protection of the power side

Type Part No.	DPRO 230 ISDN 909 320
SPD according to EN 61643-11 / IEC 61643-11	type 3 / class III
Nominal a.c. voltage (U _N)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage (U _c)	255 V (50 / 60 Hz)
Nominal load current a.c. (I _L)	16 A
Nominal discharge current (8/20 µs) (I _n)	3 kA
Total discharge current (8/20 µs) [L+N-PE] (I _{total})	5 kA
Combination wave (U _{oc})	6 kV
Combination wave [L+N-PE] (U _{oc total})	10 kV
Voltage protection level [L-N] (U _p)	≤ 1.25 kV
Voltage protection level [L/N-PE] (U _p)	≤ 1.5 kV
Response time [L-N] (t _A)	≤ 25 ns
Response time [L/N-PE] (t _A)	≤ 100 ns
Max. mains-side overcurrent protection	B 16 A
Short-circuit withstand capability for mains-side overcurrent protection (I _{SCCR})	1 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) [L/N-PE] (U _T) – Characteristic	335 V / 120 min. – withstand
Temporary overvoltage (TOV) [L/N-PE] (U _T) – Characteristic	440 V / 5 sec. – withstand
Temporary overvoltage (TOV) [L+N-PE] (U _T) – Characteristic	1200 V + U _{REF} / 200 ms – safe failure
Fault indication	red indicator light
Operating state indication	green indicator light
Number of ports	1
For mounting on	earthed socket outlets according to DIN 49440/DIN 49441
Test standards	EN 61643-11
Weight	215 g
Customs tariff number	85363010
GTIN	4013364136885
PU	1 pc(s)

DEHNprotector

DPRO 230 LAN100 (909 321)

Figure without obligation



- Surge protective device for Ethernet components (1000 BASE-T) with an elegant design
- Shielded Cat 5e patch cable (1.5 m) included
- For installation in conformity with the lightning protection zone concept at the boundaries from 2 – 3 and higher

Combined surge protection for the power side and data input for protecting LAN components. Protection of all pairs for Ethernet pin assignment. It meets the requirements for channel class D in accordance with EN 50173 and is thus suitable for 1000 Base-T (Gigabit Ethernet). With visual operating state and fault indication and integrated child lock.

Protection of the data side

Type Part No.	DPRO 230 LAN100 909 321
SPD class	TYPE 2 P1
Max. continuous operating d.c. voltage (U_c)	58 V
Lightning impulse current (10/350 μ s) per line D1 (I_{imp})	1 kA
C2 Nominal discharge current (8/20 μ s) line-line (I_n)	30 A
C2 Nominal discharge current (8/20 μ s) line-PE (I_n)	2.5 kA
C2 Total nominal discharge current (8/20 μ s) (I_n)	10 kA
Voltage protection level line-line for I_n C2 (U_p)	≤ 100 V
Voltage protection level line-PE for I_n C2 (U_p)	≤ 500 V
Voltage protection level line-line at 1 kV/ μ s C3 (U_p)	90 V
Voltage protection level line-PE at 1 kV/ μ s C3 (U_p)	≤ 500 V
Cut-off frequency (f_c)	120 MHz
Operating temperature range (T_o)	-25 °C ... +40 °C
Degree of protection	IP 20
Connection (input / output)	shielded RJ45 socket / shielded RJ45 socket
Pinning	1/2, 3/6, 4/5, 7/8
Earthing via	protective conductor connection
Enclosure material	thermoplastic, UL 94 V-2
Colour	pure white
Test standards	IEC 61643-21 / EN 61643-21

Protection of the power side

Type Part No.	DPRO 230 LAN100 909 321
SPD according to EN 61643-11 / IEC 61643-11	type 3 / class III
Nominal a.c. voltage (U_n)	230 V (50 / 60 Hz)
Max. continuous operating a.c. voltage (U_c)	255 V (50 / 60 Hz)
Nominal load current a.c. (I_L)	16 A
Nominal discharge current (8/20 μ s) (I_n)	3 kA
Total discharge current (8/20 μ s) [L+N-PE] (I_{total})	5 kA
Combination wave (U_{oc})	6 kV
Combination wave [L+N-PE] ($U_{oc total}$)	10 kV
Voltage protection level [L-N] (U_p)	≤ 1.25 kV
Voltage protection level [L/N-PE] (U_p)	≤ 1.5 kV
Response time [L-N] (t_A)	≤ 25 ns
Response time [L/N-PE] (t_A)	≤ 100 ns
Max. mains-side overcurrent protection	B 16 A
Short-circuit withstand capability for mains-side overcurrent protection (I_{SCCR})	1 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) [L/N-PE] (U_T) – Characteristic	335 V / 120 min. – withstand
Temporary overvoltage (TOV) [L/N-PE] (U_T) – Characteristic	440 V / 5 sec. – withstand
Temporary overvoltage (TOV) [L+N-PE] (U_T) – Characteristic	1200 V + U_{REF} / 200 ms – safe failure
Fault indication	red indicator light
Operating state indication	green indicator light
Number of ports	1
For mounting on	earthed socket outlets according to DIN 49440/DIN 49441
Test standards	EN 61643-11
Weight	222 g
Customs tariff number	85363010
GTIN	4013364126152
PU	1 pc(s)



**Surge Protection
Lightning Protection
Safety Equipment
DEHN protects.**

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GmbH + Co.KG.

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