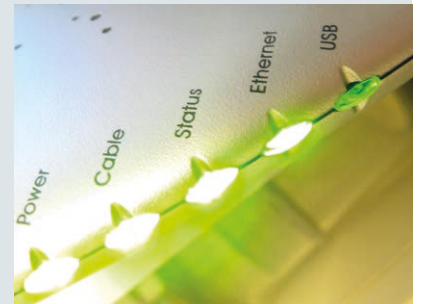




Surge protection for telecommunication connections

White Paper



Contents

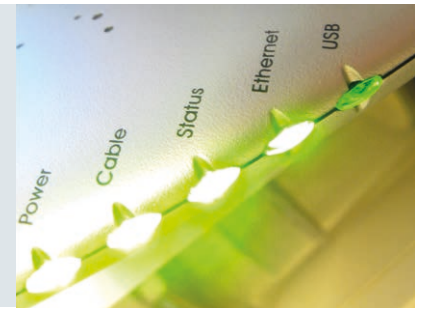
Lightning and surge protection for an analogue connection with ADSL

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, offices and residential buildings. 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.

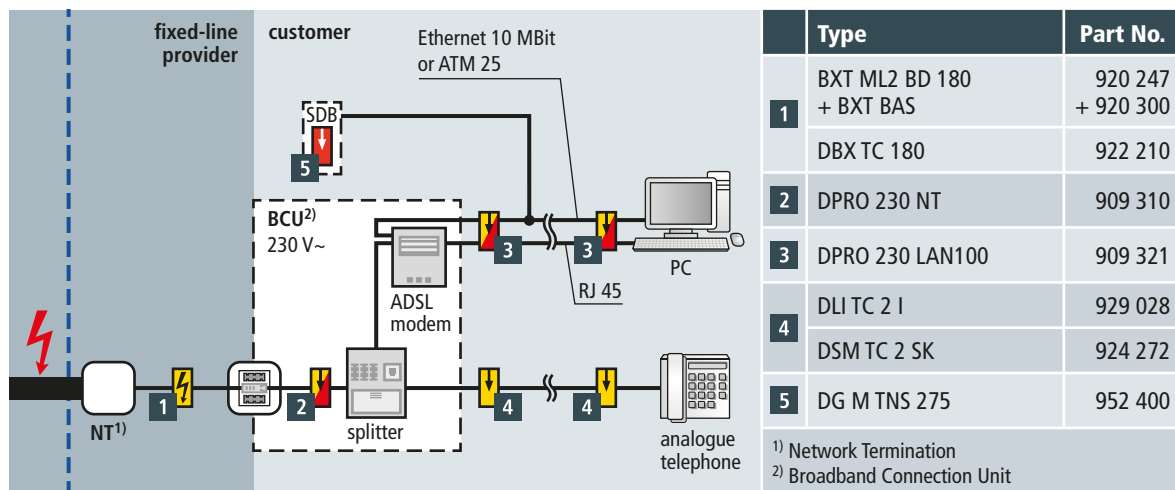


Figure 1 Lightning and surge protection for an analogue connection with ADSL

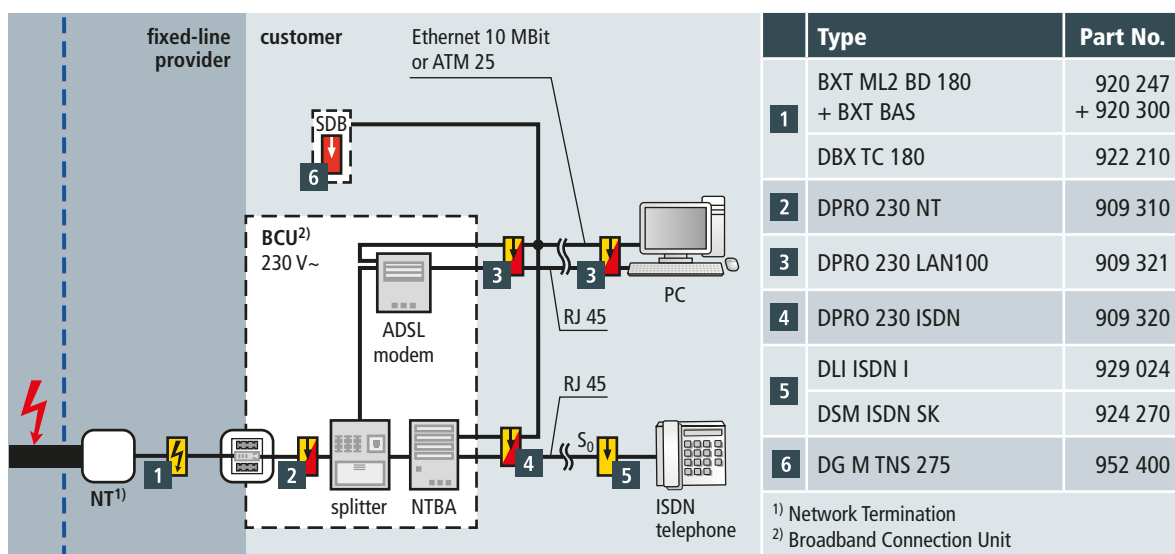


Figure 2 Lightning and surge protection for an ISDN connection with ADSL

Surge protection for telecommunication connections

White Paper

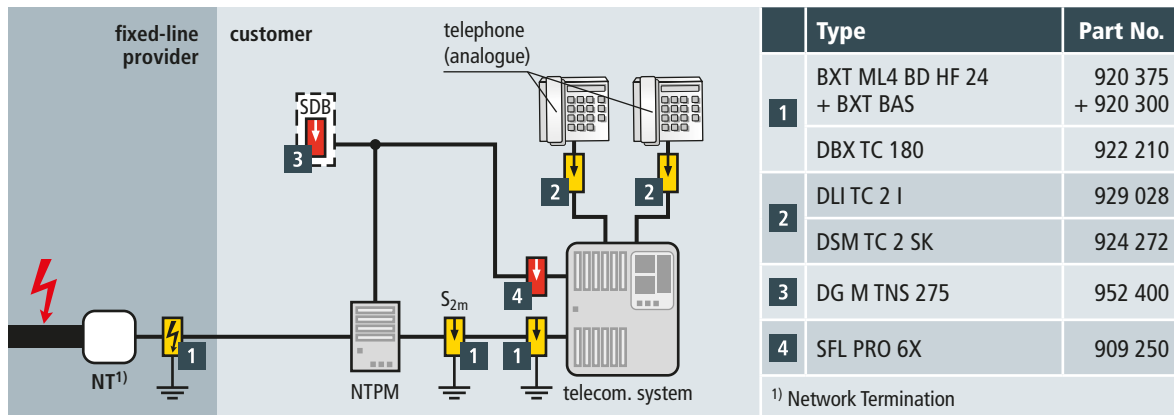
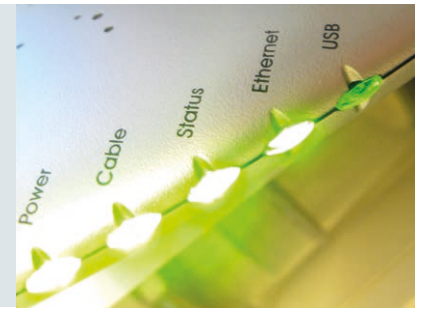


Figure 3 Surge protection for telecommunication systems with "ISDN primary multiplex connection"

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.

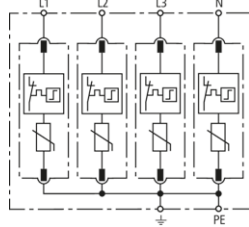
DEHNguard

DG M TNS 275 (952 400)

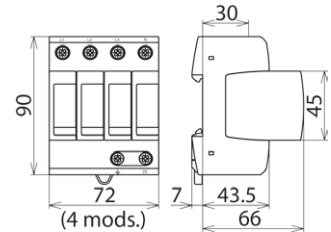
- Prewired complete unit consisting of a base part and plug-in protection modules
- High discharge capacity due to heavy-duty zinc oxide varistors / spark gaps
- High reliability due to "Thermo Dynamic Control" SPD monitoring device



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) |

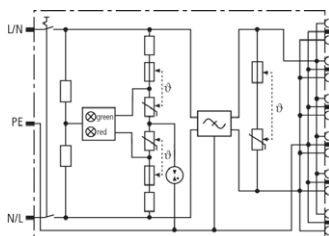
SFL Protector

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) |

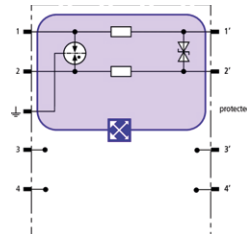
BLITZDUCTOR XT

BXT ML2 BD 180 (920 247)

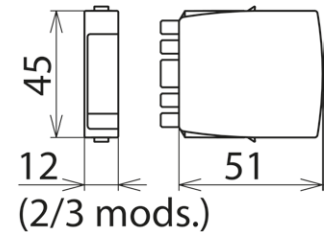
- LifeCheck SPD monitoring function
- Optimal protection of one pair
- For installation in conformity with the lightning protection zone concept at the boundaries from 0_A-2 and higher



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 | BXT ML2 BD 180 |
|--|--|
| Part No. | 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_L) | 0.75 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) | 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) | ≤ 270 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) | ≤ 250 V |
| Voltage protection level line-PG at 1 kV/ μ s C3 (U_p) | ≤ 550 V |
| Series resistance per line | 1.8 ohm(s) |
| Cut-off frequency line-line (f_c) | 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.

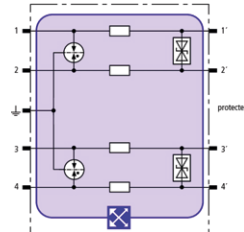
BLITZDUCTOR XT

BXT ML4 BD HF 24 (920 375)

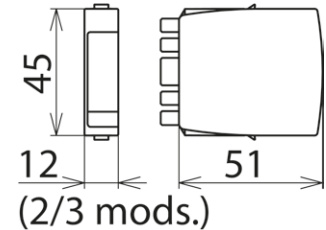
- LifeCheck SPD monitoring function
- Minimal signal interference
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_A -2$ and higher



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 1 PE |
| 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) | 1.0 A |
| D1 Total lightning impulse current (10/350 μ s) (I_{imp}) | 10 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) | ≤ 65 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) | ≤ 47 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) | ≤ 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.

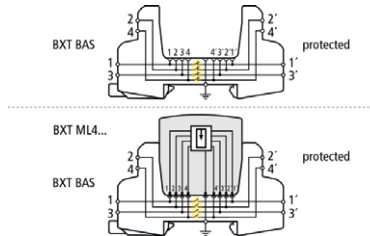
BLITZDUCTOR XT

BXT BAS (920 300)

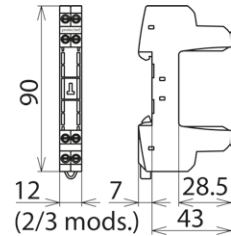
- Four-pole version for universal use with all types of BSP and BXT / BXTU protection modules
- No signal interruption if the protection module is removed
- Universal design without protection elements



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

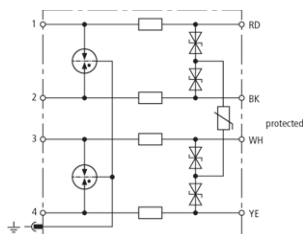
DSM

DSM ISDN SK (924 270)

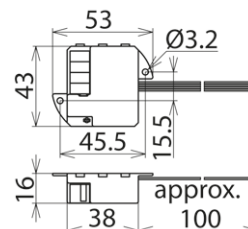
- Optional through-wiring of the ISDN bus via plug-in terminals
- Integrated protection for the supply voltage
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B -2$ and higher



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 2P1 |
| 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_C) | 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) |

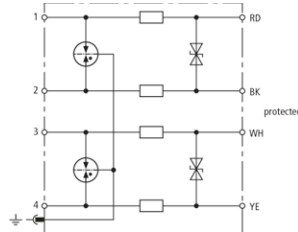
DSM

DSM TC 2 SK (924 272)

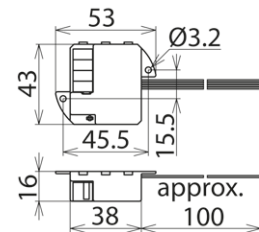
- Excellent transmission performance
- Also suitable for installation into distribution boards
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B - 2$ and higher



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.

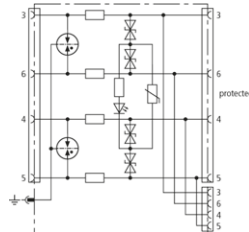
| Type | DSM TC 2 SK |
|--|--|
| Part No. | 924 272 |
| SPD class | TYPE 2/P2 |
| Nominal voltage (U_N) | 130 V |
| Max. continuous operating d.c. voltage (U_c) | 170 V |
| Nominal current (I_n) | 200 mA |
| D1 Lightning impulse current (10/350 μ s) per line (I_{imp}) | 1 kA |
| C2 Total nominal discharge 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) |

DLI ISDN I (929 024)

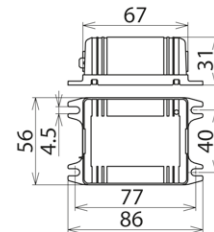
- Two protected outputs
- Surge protection and LED display for supply voltage included
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B -2$ and higher



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[P] |
| 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) |

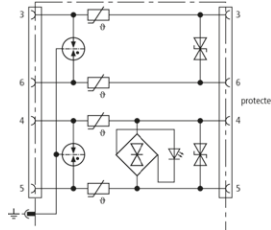
DEHNlink

DLI TC 2 I (929 028)

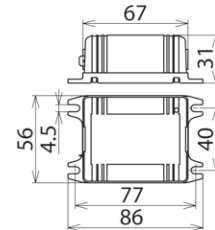
- LED display for supply voltage
- Integrated protection against power crossing
- For installation in conformity with the lightning protection zone concept at the boundaries from $0_B -2$ and higher



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 2P2 |
| 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) |

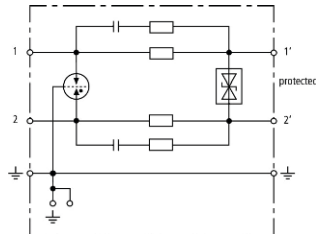
DEHNbox

DBX TC 180 (922 210)

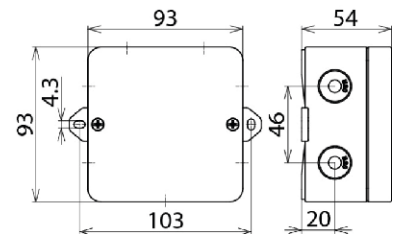
- Powerful protection for telecommunication interfaces
- Suitable for wall mounting, IP 65
- Installation in conformity with the lightning protection zone concept at the boundaries from $0_A - 2$ and higher



Figure without obligation



Basic circuit diagram DBX TC 180



Dimension drawing DBX TC 180

Compact combined arrester in a surface-mounted plastic enclosure for protecting information technology interfaces, particularly telecommunication connections and devices such as analogue telephones, ISDN and xDSL (VDSL2-tested). Fast connection of one pair without tools and integrated strain relief for the connecting cable. Cut-off frequency up to 250 MHz ensures maximum transmission performance in case of high-frequency signal parts.

| Type | DBX TC 180 |
|--|----------------------------|
| Part No. | 922 210 |
| SPD class | TYPE 1P2 |
| Nominal voltage (U_N) | 180 V |
| Max. continuous operating voltage (d.c.) (U_C) | 180 V |
| Max. continuous operating voltage (a.c.) (U_C) | 127 V |
| Nominal current at 45°C (I_L) | 0.75 A |
| D1 Total lightning impulse current (10/350 μ s) (I_{imp}) | 7.5 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) | 15 kA |
| C2 Nominal discharge current (8/20 μ s) per line (I_n) | 7.5 kA |
| Voltage protection level line-line at 1 kV/ μ s C3 (U_p) | ≤ 250 V |
| Voltage protection level line-PG at 1 kV/ μ s C3 (U_p) | ≤ 550 V |
| Voltage protection level line-line for I_{imp} D1 (U_p) | ≤ 300 V |
| Voltage protection level line-PG for I_{imp} D1 (U_p) | ≤ 550 V |
| Series resistance per line | 1.8 ohms |
| Bandwidth line-line (100 ohms) (f_c) | 250 MHz |
| Capacitance line-line (C) | ≤ 20 pF |
| Capacitance line-PG (C) | ≤ 10 pF |
| Operating temperature range (T_U) | -25 °C ... +40 °C |
| Degree of protection | IP 65 |
| Cross-sectional area of the signal lines, solid | 0.2-1.5 mm ² |
| Cross-sectional area of the signal lines, flexible | 0.25-1.5 mm ² |
| Cross-sectional area of the earth terminal | 0.25-2.5 mm ² |
| Dimensions (L x W x H) | 93 x 93 x 55 mm |
| Enclosure material | polycarbonate |
| Colour | grey |
| Test standards | IEC 61643-21 / EN 61643-21 |
| Weight | 138 g |
| Customs tariff number | 85363010 |
| GTIN | 4013364158214 |
| 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 Part No. | DPRO 230 NT 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 Part No. | DPRO 230 NT 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+1 |
| 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_U) | -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) |

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

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



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