# S-PT-2XEX-24DC-1/2" - Surge protection device

2800041

https://www.phoenixcontact.com/us/products/2800041

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24 V

IEC



Surge protection for two floating signal circuits in the screw-on module with IP67 degree of protection for sensor heads, connection: ½ inch 14 NPT. Tested in accordance with the following types of protection in Ex areas: Ex d/Ex tD/Ex ia IIC/Ex iaD. Suitable for use in the fieldbus system in accordance with the FISCO concept. Can be used in safety-related circuits up to SIL 3.

## Your advantages

- Easiest field mounting with standardized thread
- Versatile in use with universal protective circuit
- Use under extreme ambient conditions with robust design

## Commercial data

| | |
|---|---|
| Item number | 2800041 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | CL02 |
| Product key | CL2232 |
| GTIN | 4046356411035 |
| Weight per piece (including packing) | 242.3 g |
| Weight per piece (excluding packing) | 209.06 g |
| Customs tariff number | 85363010 |
| Country of origin | DE |

## Technical data

### Product properties

| | |
|---|---|
| Product type | Surge protection for MCR technology |
| Product family | SURGETRAB |
| IEC test classification | C1 |
| | C2 |
| | C3 |
| | D1 |
| Type | Screw-in module |
| Number of positions | 4 |
| Wire pairs per module | 2 |

Insulation characteristics

| | |
|---|---|
| Overvoltage category | III |
| Pollution degree | 2 |

### Electrical properties

| | |
|---|---|
| Nominal voltage $U_N$ | 24 V DC |

### Connection data

| | |
|---|---|
| Connection method | Individual wires |

### Ex data

| | |
|---|---|
| Maximum inner capacitance $C_i$ | 1.65 nF |
| Max. internal inductance $L_i$ | 1 µH |
| Max. input current $I_i$ | 500 mA (T4 / ≤ 75 °C) |
| | 500 mA (T5 / ≤ 75 °C) |
| | 500 mA (T6 / ≤ 60 °C) |
| Max. input voltage $U_i$ | 36 V DC |
| max. input power $P_i$ | 3.00 W |
| Insulation voltage to ground | 500 V AC |
| Ambient temperature (operation) | -40 °C ... 75 °C (T4) |
| | -40 °C ... 75 °C (T5) |
| | -40 °C ... 60 °C (T6) |
| Operating temperature range | -40 °C ... 100 °C (T4) |
| | -40 °C ... 75 °C (T5) |
| | -40 °C ... 60 °C (T6) |
| Max. surface temperature | 135 °C (T4) |
| | 100 °C (T5) |
| | 85 °C (T6) |

### Dimensions

| | |
|---|---|
| Dimensional drawing |   |
| Width | 28 mm |
| Height | 28 mm |
| Depth | 79 mm |

## Material specifications

| | |
|---|---|
| Color | Steel/stainless steel color |
| Housing material | Stainless steel 1.4404 |
| | ASTM 316L |

## Mechanical properties

Mechanical data

| | |
|---|---|
| Open side panel | No |

## Protective circuit

| | |
|---|---|
| Direction of action | Line-Line & Line-Earth Ground |
| Nominal voltage $U_N$ | 24 V DC |
| Maximum continuous operating voltage $U_C$ | 36 V DC |
| | 25 V AC |
| Operating effective current $I_C$ at $U_C$ | ≤ 5 µA |
| Protective conductor current $I_{PE}$ | ≤ 2 µA |
| Nominal discharge current $I_n$ (8/20) µs (line-line) | 260 A |
| Nominal discharge current $I_n$ (8/20) µs (line-ground) | 10 kA |
| Pulse discharge current $I_{imp}$ (10/350) µs | 1 kA |
| Total discharge current $I_{Total}$ (8/20) µs | 20 kA |
| Total discharge current $I_{Total}$ (10/350) µs | 2 kA |
| Nominal pulse current Ian (10/1000) µs (line-line) | 50 A |
| Output voltage limitation at 1 kV/µs (line-line) spike | ≤ 65 V |
| Output voltage limitation at 1 kV/µs (line-earth) spike | ≤ 1.1 kV |
| Output voltage limitation at 1 kV/µs (line-line) static | ≤ 50 V |
| Voltage protection level $U_p$ (line-line) | ≤ 50 V (C3 - 10 A) |
| Voltage protection level $U_p$ (line-earth) | ≤ 1.1 kV (C3 - 100 A) |
| | ≤ 1.1 kV (C1 - 1 kV / 500 A) |
| | ≤ 1.2 kV (C2 - 10 kV / 5 kA) |
| Response time $t_A$ (line-line) | ≤ 1 ns |
| Response time $t_A$ (line-earth) | ≤ 100 ns |
| Input attenuation aE, sym. | typ. 0.1 dB (1 MHz/50 Ω) |
| | typ. 0.1 dB (400 kHz / 150 Ω) |
| Cut-off frequency fg (3 dB), sym. in 50 Ω system | typ. 5 MHz |
| Cut-off frequency fg (3 dB), sym. in 150 Ω system | typ. 2 MHz |

| | |
|---|---|
| Capacity (Core-Core) | typ. 1.5 nF |
| Capacity (Core-Earth) | typ. 5 pF |
| Surge protection fault message | none |
| Impulse durability (line-line) | C3 - 25 A |
| Impulse durability (line-earth) | C1 - 1 kV / 500 A |
| | C2 - 10 kV / 5 kA |
| | C3 - 100 A |
| | D1 - 1 kA |
| Alternating current carrying capacity (line-earth) | 10 A - 1 s |

## Environmental and real-life conditions

Ambient conditions

| | |
|---|---|
| Degree of protection | IP67 |
| Ambient temperature (operation) | -40 °C ... 80 °C (non-Ex) |
| Altitude | ≤ 2000 m (amsl) |

## Approvals

Conformity/Approvals

| | |
|---|---|
| ATEX | Ⓔx II 1 G Ex ia IIC T4...T6 |
| | Ⓔx II 2 G Ex d IIC T4...T6 |
| | Ⓔx II 1 D Ex iaD 20 IP6x T85 °C...135 °C |
| | Ⓔx II 2 D Ex tD A21 IP6x T85 °C...135 °C |
| IECEx | Ga Ex ia IIC T4...T6 |
| | Ex d IIC T4...T6 |
| | Ex iaD IP6x T85 °C...135 °C |
| | Ex tD A21 IP6x T85 °C...135 °C |

## Standards and regulations

Air clearances and creepage distances

| | |
|---|---|
| Standards/regulations | IEC 60664-1 / IEC 60079-11 |
| Standards/specifications | EN 61643-21 |
| Note | A2:2013 |
| Standards/specifications | EN 60079-0 |
| Note | 2018 |
| Standards/specifications | EN 60079-1 |
| Note | 2007 |
| Standards/specifications | EN 60079-11 |
| Note | 2012 |
| Standards/specifications | EN 60079-31 |
| Note | 2009 |
| Standards/specifications | IEC 60079-0 |
| Note | 2017 |
| Standards/specifications | IEC 60079-1 |

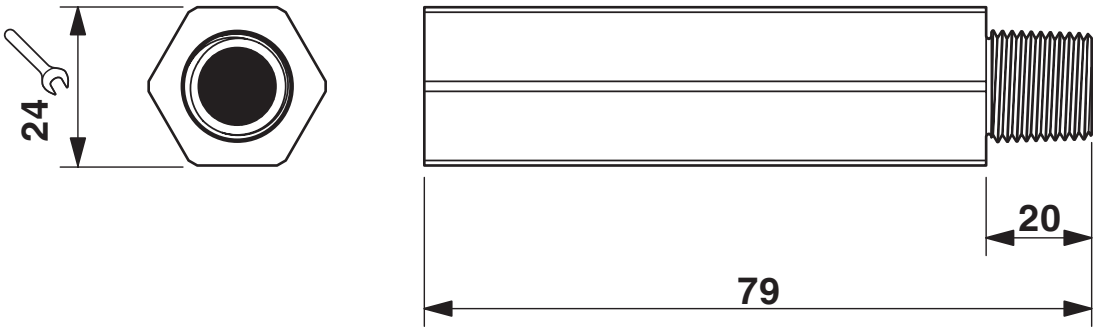
| | |
|---|---|
| Note | 2007 |
| Standards/specifications | IEC 60079-11 |
| Note | 2011 |
| Standards/specifications | IEC 60079-31 |
| Note | 2008 |
| Standards/specifications | GB/T 3836.1 |
| Note | 2021 |
| Standards/specifications | GB/T 3836.2 |
| Note | 2021 |
| Standards/specifications | GB/T 3836.4 |
| Note | 2021 |
| Standards/specifications | GB/T 3836.31 |
| Note | 2021 |

## Mounting

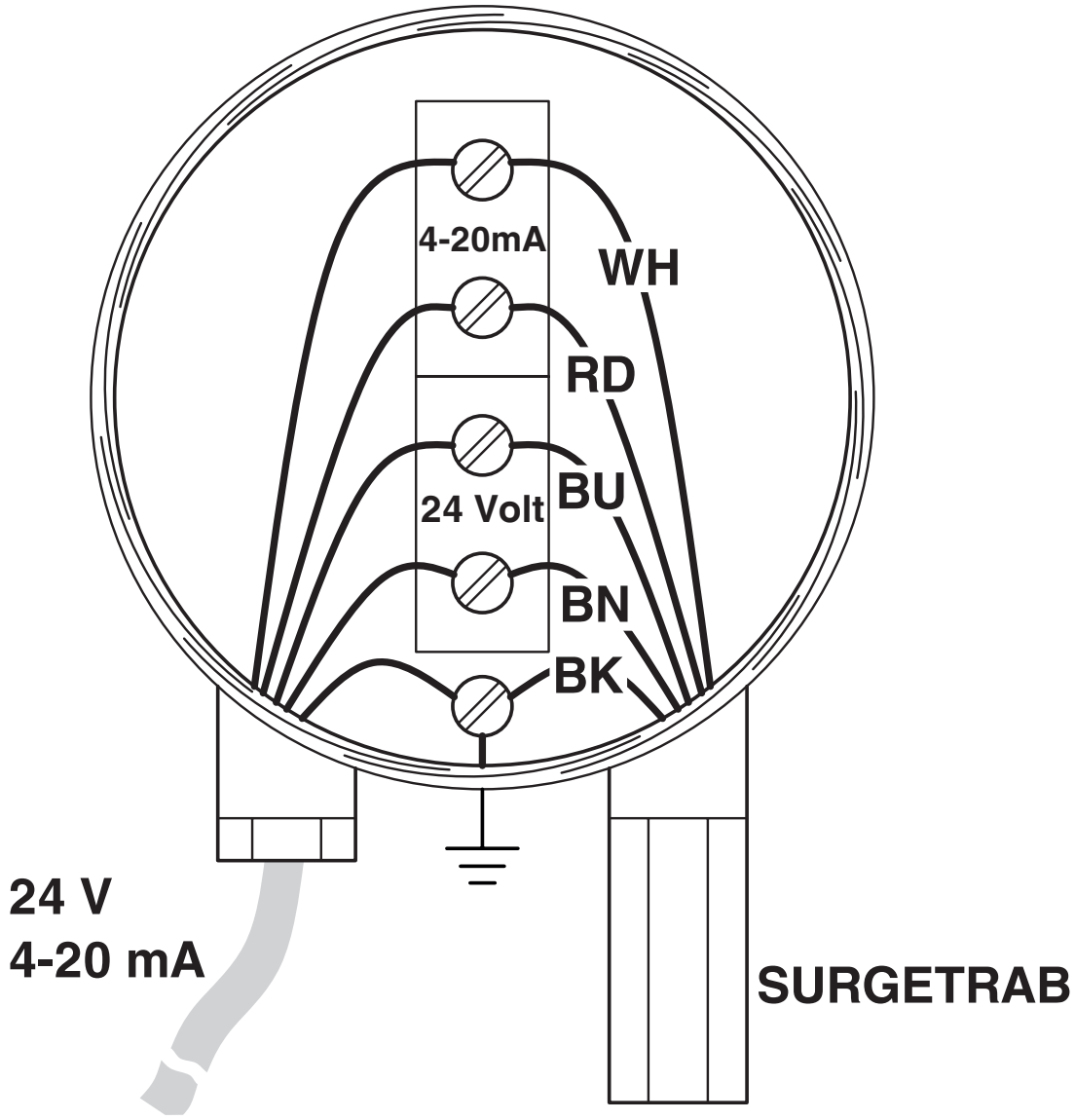
| | |
|---|---|
| Mounting type | 1/2" NPT |

## Drawings

Dimensional drawing



Application drawing

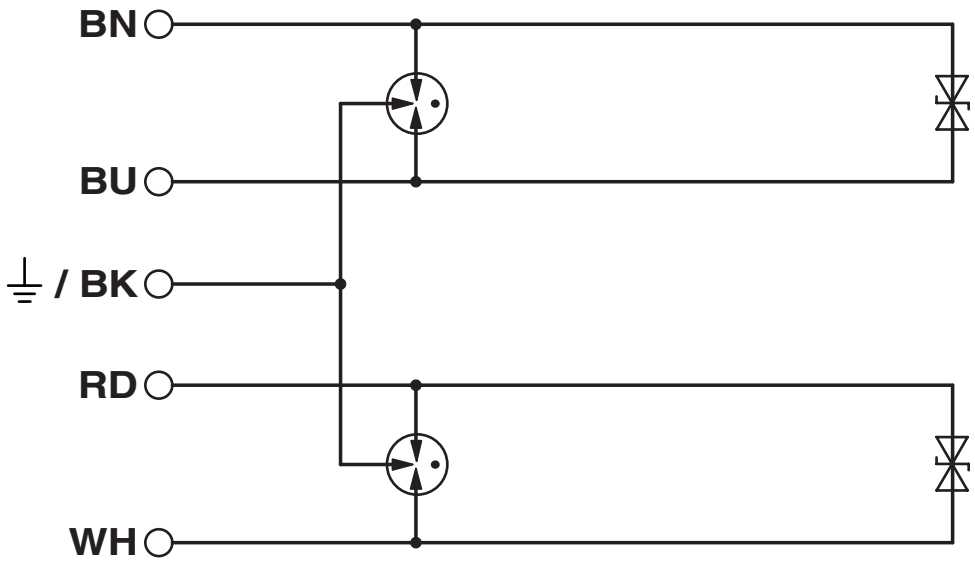



Schematic diagram

| S-PT-2XEX-...DC-* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Category | 1oo1 architecture, HFT=0 | | | | 1oo2 architecture, HFT=1 | | | | |
| | $PFD_{AVG}$ | PFH | Used budget of SIL 2 SIF | | $PFD_{AVG}$ | PFH | CCF | Used budget of SIL 3 SIF | |
| | | | $PFD_{AVG}$ | PFH | | | | $PFD_{AVG}$ | PFH |
| | $8.43_{x10^{-5}}$ | $1.50_{x10^{-9}}$ 1/h | 0.1 % | 0.2 % | $4.22_{x10^{-7}}$ | $7.50_{x10^{-11}}$ 1/h | 5 % | 0.0 % | 0.1 % |
| | | | | | $8.43_{x10^{-7}}$ | $1.50_{x10^{-10}}$ 1/h | 10 % | 0.1 % | 0.2 % |
| Calculation based on exida report, Phoenix Contact 09/08-42 R011 V4R1<br>exida Profile 1, FMEDA Analysis 2, $T_{proof}$: 1 year, MT: 10 years, MTTR: 24 hours, PTC: 99%<br>Used standards<br>IEC/EN 61508, edition 2010 (device specific)<br>IEC/EN 61511, edition 2016 + COR1:2016 + A1:2017 (system specific) | | | | | | | | | |

Functional safety scenarios

Circuit diagram



## Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/2800041

**Functional Safety**
Approval ID: 09-08-42 R011 V4R1

**ATEX**
Approval ID: KEMA 09ATEX0028 X

**IECEx**
Approval ID: IECEx KEM 09.0014X

**CCC**
Approval ID: 2020322316000794

**CCC**
Approval ID: 2025322304006705

**KC-s**
Approval ID: 26-KA4BO-0005X

**KC-s**
Approval ID: 26-KA4BO-0006X

## Classifications

### ECLASS

| | |
|---|---|
| ECLASS-13.0 | 27171502 |
| ECLASS-15.0 | 27171502 |

### ETIM

| | |
|---|---|
| ETIM 10.0 | EC001466 |

### UNSPSC

| | |
|---|---|
| UNSPSC 21.0 | 39121600 |

## Environmental product compliance

EU RoHS

| | |
|---|---|
| Fulfills EU RoHS substance requirements | Yes |
| Exemption | 7(a), 7(c)-I |

China RoHS

| | |
|---|---|
| Environment friendly use period (EFUP) | EFUP-50 |
| | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |

EU REACH SVHC

| | |
|---|---|
| REACH candidate substance (CAS No.) | Lead(CAS: 7439-92-1) |
| SCIP | bfb34622-f030-4f7a-bf39-09d5727c158e |


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