

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



2800035

<https://www.phoenixcontact.com/us/products/2800035>

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Surge protection for a floating signal circuit in the screw-on module with IP67 degree of protection for sensor heads, connection: 1/2-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, HART-compatible. 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                          | 2800035             |
| Packing unit                         | 1 pc                |
| Minimum order quantity               | 1 pc                |
| Sales key                            | CL02                |
| Product key                          | CL2232              |
| Catalog page                         | Page 154 (C-4-2019) |
| GTIN                                 | 4046356411011       |
| Weight per piece (including packing) | 232.714 g           |
| Weight per piece (excluding packing) | 198.43 g            |
| Customs tariff number                | 85363010            |
| Country of origin                    | DE                  |

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## 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     | 2                                   |
| Wire pairs per module   | 1                                   |

### 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 $\mu$ H                                          |
| Max. input current $I_i$        | 500 mA (T4 / $\leq 75^\circ\text{C}$ )             |
|                                 | 500 mA (T5 / $\leq 75^\circ\text{C}$ )             |
|                                 | 500 mA (T6 / $\leq 60^\circ\text{C}$ )             |
| 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 $^\circ\text{C}$ ... 75 $^\circ\text{C}$ (T4)  |
|                                 | -40 $^\circ\text{C}$ ... 75 $^\circ\text{C}$ (T5)  |
|                                 | -40 $^\circ\text{C}$ ... 60 $^\circ\text{C}$ (T6)  |
| Operating temperature range     | -40 $^\circ\text{C}$ ... 100 $^\circ\text{C}$ (T4) |
|                                 | -40 $^\circ\text{C}$ ... 75 $^\circ\text{C}$ (T5)  |
|                                 | -40 $^\circ\text{C}$ ... 60 $^\circ\text{C}$ (T6)  |
| Max. surface temperature        | 135 $^\circ\text{C}$ (T4)                          |
|                                 | 100 $^\circ\text{C}$ (T5)                          |
|                                 | 85 $^\circ\text{C}$ (T6)                           |

### Dimensions

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

## Material specifications

|                  |                         |
|------------------|-------------------------|
| Color            | Steel / stainless steel |
| 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       |
| Maximum continuous voltage $U_C$                                     | 36 V DC                             |
|                                                                      | 25 V AC                             |
| Operating effective current $I_C$ at $U_C$                           | $\leq 5 \mu A$                      |
| Residual current $I_{PE}$                                            | $\leq 2 \mu A$                      |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-line)           | 260 A                               |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-ground)         | 10 kA                               |
| Pulse discharge current $I_{imp}$ (10/350) $\mu s$                   | 1 kA                                |
| Total discharge current $I_{total}$ (8/20) $\mu s$                   | 20 kA                               |
| Total discharge current $I_{total}$ (10/350) $\mu s$                 | 2 kA                                |
| Max. discharge current $I_{max}$ (8/20) $\mu s$ maximum (line-line)  | 260 A                               |
| Max. discharge current $I_{max}$ (8/20) $\mu s$ maximum (line-earth) | 20 kA                               |
| Nominal pulse current $I_{an}$ (10/1000) $\mu s$ (line-line)         | 50 A                                |
| Output voltage limitation at 1 kV/ $\mu s$ (line-line) spike         | $\leq 130 V$                        |
| Output voltage limitation at 1 kV/ $\mu s$ (line-earth) spike        | $\leq 1.1 kV$                       |
| Output voltage limitation at 1 kV/ $\mu s$ (line-line) static        | $\leq 60 V$                         |
| Voltage protection level $U_p$ (line-line)                           | $\leq 65 V$ (C3 - 10 A)             |
| Voltage protection level $U_p$ (line-earth)                          | $\leq 1.1 kV$ (C3 - 100 A)          |
|                                                                      | $\leq 1.1 kV$ (C1 - 1 kV / 500 A)   |
|                                                                      | $\leq 1.2 kV$ (C2 - 10 kV / 5 kA)   |
| Response time $t_A$ (line-line)                                      | $\leq 1 ns$                         |
| Response time $t_A$ (line-earth)                                     | $\leq 100 ns$                       |
| Input attenuation aE, sym.                                           | typ. 0.1 dB (30 MHz / 50 $\Omega$ ) |
|                                                                      | typ. 0.1 dB (6 MHz / 150 $\Omega$ ) |
| Cut-off frequency $f_g$ (3 dB), sym. in 50 $\Omega$ system           | typ. 70 MHz                         |

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|                                                             |                   |
|-------------------------------------------------------------|-------------------|
| Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system | typ. 70 MHz       |
| Capacity (Core-Core)                                        | typ. 20 pF        |
| 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  | II 1 G Ex ia IIC T4...T6              |
|       | II 2 G Ex d IIC T4...T6               |
|       | II 1 D Ex iaD 20 IP6x T85 °C...135 °C |
|       | 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

|                          |             |
|--------------------------|-------------|
| 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        |

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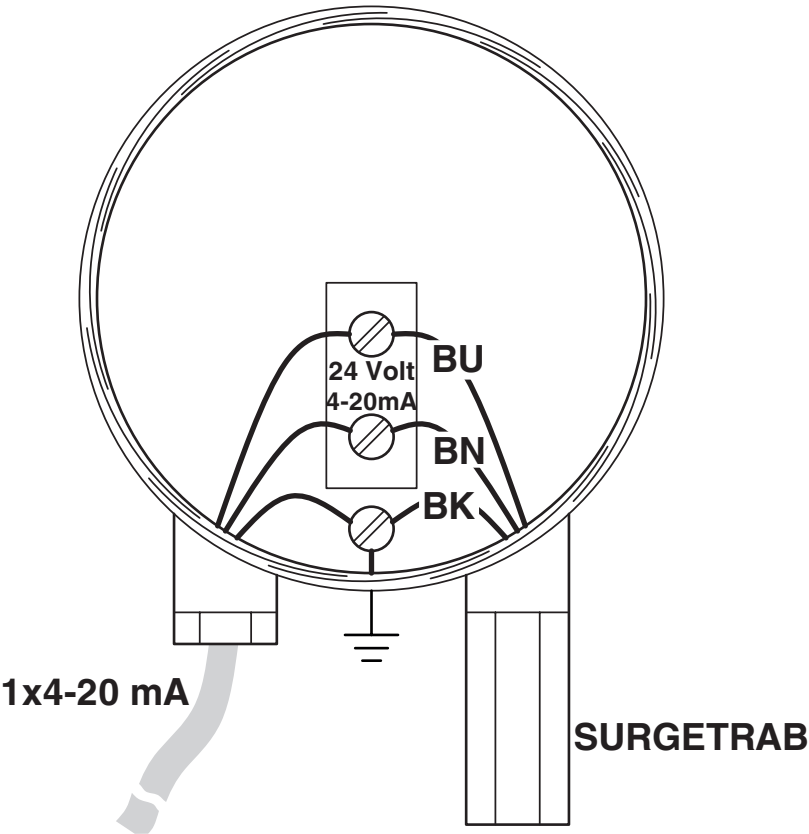
|                          |              |
|--------------------------|--------------|
| Standards/specifications | IEC 60079-11 |
| Note                     | 2011         |
| Standards/specifications | IEC 60079-31 |
| Note                     | 2008         |

## Mounting

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

Drawings

Application drawing



Schematic diagram

| S-PT-EX-...DC*                                                                                                                                                                                                                                                                                                          |                          |                           |                          |       |                          |                            |      |                          |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|--------------------------|-------|--------------------------|----------------------------|------|--------------------------|-------|
| Category                                                                                                                                                                                                                                                                                                                | 1oo1 architecture, HFT=0 |                           |                          |       | 1oo2 architecture, HFT=1 |                            |      |                          |       |
|                                                                                                                                                                                                                                                                                                                         | PFD <sub>AVG</sub>       | PFH                       | Used budget of SIL 2 SIF |       | PFD <sub>AVG</sub>       | PFH                        | CCF  | Used budget of SIL 3 SIF |       |
|                                                                                                                                                                                                                                                                                                                         |                          |                           | PFD <sub>AVG</sub>       | PFH   |                          |                            |      | PFD <sub>AVG</sub>       | PFH   |
|                                                                                                                                                                                                                                                                                                                         |                          |                           |                          |       |                          |                            |      |                          |       |
|                                                                                                                                                                                                                                                                                                                         | 8.43x10 <sup>-5</sup>    | 1.50x10 <sup>-9</sup> 1/h | 0.1 %                    | 0.2 % | 4.22x10 <sup>-7</sup>    | 7.50x10 <sup>-11</sup> 1/h | 5 %  | 0.0 %                    | 0.1 % |
|                                                                                                                                                                                                                                                                                                                         |                          |                           |                          |       | 8.43x10 <sup>-7</sup>    | 1.50x10 <sup>-10</sup> 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 <sub>proof</sub> : 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

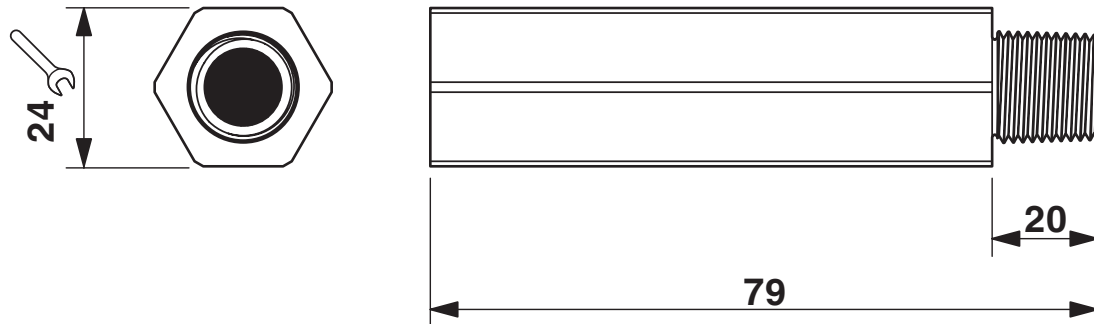
# S-PT-EX-24DC-1/2" - Surge protection device



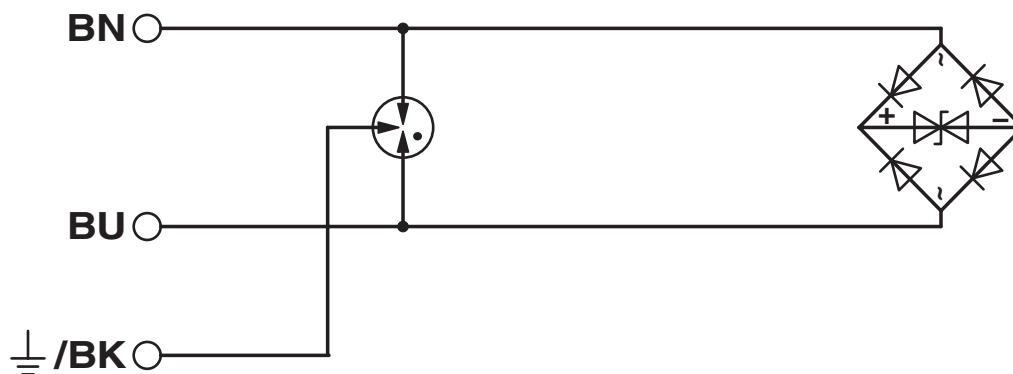
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Dimensional drawing



Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2800035>



**EAC**

Approval ID: RU C-DE.\*09.B.00169

### Functional Safety

Approval ID: 09-08-42 R011 V4R1



**ATEX**

Approval ID: KEMA 09ATEX0028 X



**EAC Ex**

Approval ID: RU C-DE.\*\*87.B.00420



**IECEx**

Approval ID: IECEx KEM 09.0014X



**CCC**

Approval ID: 2020322316000794



**CCC**

Approval ID: 2020322316000794



**NEPSI-EX**

Approval ID: GYJ20.1159X



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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-11.0 | 27130807 |
| ECLASS-13.0 | 27171502 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC000943 |
|----------|----------|

### UNSPSC

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

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## 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                                    | 241af969-b7f6-4595-b083-ff67e4c238e9                                                                                                                                                                                              |

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