

# TTC-3-1X2-24DC-PT - Surge protection device



2907325

<https://www.phoenixcontact.com/us/products/2907325>

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Surge protection for a 2-wire floating signal circuit, e.g., 0(4) mA ... 20 mA current loop, HART-compatible. Can be used in safety-related circuits up to SIL 3.

## Your advantages

- Extremely space-saving installation with the narrowest overall width of just 3.5 mm
- Cost-optimized with tailored product features
- Finding the right product for all possible requirements in MCR applications is easy, thanks to the complete range of products with customized features

## Commercial data

|                                      |                     |
|--------------------------------------|---------------------|
| Item number                          | 2907325             |
| Packing unit                         | 1 pc                |
| Minimum order quantity               | 1 pc                |
| Sales key                            | CL23                |
| Product key                          | CL2266              |
| Catalog page                         | Page 119 (C-4-2019) |
| GTIN                                 | 4055626199917       |
| Weight per piece (including packing) | 24.5 g              |
| Weight per piece (excluding packing) | 19.5 g              |
| Customs tariff number                | 85363030            |
| Country of origin                    | DE                  |

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## Technical data

### Product properties

|                         |                                     |
|-------------------------|-------------------------------------|
| Product type            | Surge protection for MCR technology |
| Product family          | TERMITRAB complete                  |
| IEC test classification | C1                                  |
|                         | C2                                  |
|                         | C3                                  |
|                         | D1                                  |
| Type                    | DIN rail module, one-piece          |
| Wire pairs per module   | 1                                   |

### Data management status

|                  |    |
|------------------|----|
| Article revision | 06 |
|------------------|----|

### Insulation characteristics

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

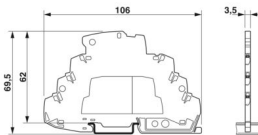
### Electrical properties

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

### Connection data

|                                                                       |                                             |
|-----------------------------------------------------------------------|---------------------------------------------|
| Connection method                                                     | Push-in connection                          |
| Conductor cross section, flexible, with ferrule, with plastic sleeve  | 0.2 mm <sup>2</sup> ... 1 mm <sup>2</sup>   |
| Conductor cross section flexible, with ferrule without plastic sleeve | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section flexible                                      | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section rigid                                         | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section AWG                                           | 24 ... 16                                   |

### Dimensions

|                     |                                                                                      |
|---------------------|--------------------------------------------------------------------------------------|
| Dimensional drawing |  |
| Width               | 3.5 mm                                                                               |
| Height              | 106 mm                                                                               |
| Depth               | 69.5 mm (incl. DIN rail 7.5 mm)                                                      |

### Material specifications

|                                        |                 |
|----------------------------------------|-----------------|
| Color                                  | gray (RAL 7042) |
|                                        | gray (RAL 7042) |
| Flammability rating according to UL 94 | V-0             |

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|                     |     |
|---------------------|-----|
| Insulating material | PBT |
| Housing material    | PBT |

## Mechanical properties

### Mechanical data

|                 |     |
|-----------------|-----|
| Open side panel | Yes |
|-----------------|-----|

## Protective circuit

|                                                                 |                                                                                    |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------|
| Direction of action                                             | Line-Line & Line-Signal Ground/Shield & optional Signal Ground/Shield-Earth Ground |
| Maximum continuous voltage $U_C$                                | 30 V DC                                                                            |
|                                                                 | 21 V AC                                                                            |
| Rated current                                                   | 250 mA (70 °C)                                                                     |
| Operating effective current $I_C$ at $U_C$                      | $\leq 1 \mu A$                                                                     |
| Residual current $I_{PE}$                                       | $\leq 1 \mu A$                                                                     |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-line)      | 5 kA                                                                               |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-ground)    | 5 kA                                                                               |
| Pulse discharge current $I_{imp}$ (10/350) $\mu s$ (line-earth) | 0.5 kA                                                                             |
| Total discharge current $I_{total}$ (8/20) $\mu s$              | 10 kA                                                                              |
| Voltage protection level $U_p$ (line-line)                      | $\leq 50 V$ (C1 - 500 V / 250 A)                                                   |
|                                                                 | $\leq 70 V$ (C2 - 10 kV / 5 kA)                                                    |
|                                                                 | $\leq 45 V$ (C3 - 30 A)                                                            |
| Voltage protection level $U_p$ (line-earth)                     | $\leq 1000 V$ (C2 - 10 kV / 5 kA)                                                  |
|                                                                 | $\leq 1000 V$ (C3 - 100 A)                                                         |
| Voltage protection level $U_p$ static (line-line)               | $\leq 50 V$ (C1 - 1 kV / 500 A)                                                    |
| Response time $t_A$ (line-line)                                 | $\leq 1 ns$                                                                        |
| Input attenuation aE, sym.                                      | typ. 0.3 dB ( $\leq 600 kHz$ / 150 $\Omega$ )                                      |
| Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system     | typ. 2.4 MHz                                                                       |
| Capacity (Core-Core)                                            | typ. 1 nF                                                                          |
| Resistance per path                                             | 2.2 $\Omega \pm 10 \%$                                                             |
| Surge protection fault message                                  | none                                                                               |
| Max. required back-up fuse                                      | 250 mA (FF)                                                                        |
| Impulse durability (line-line)                                  | C1 - 500 V / 250 A                                                                 |
|                                                                 | C2 - 10 kV / 5 kA                                                                  |
|                                                                 | C3 - 30 A                                                                          |
| Impulse durability (line-earth)                                 | C2 - 10 kV / 5 kA                                                                  |
|                                                                 | C3 - 100 A                                                                         |
|                                                                 | D1 - 500 A                                                                         |
| Pulse reset time (line-line)                                    | $\leq 30 ms$                                                                       |

## Environmental and real-life conditions

### Ambient conditions

|                                 |                       |
|---------------------------------|-----------------------|
| Degree of protection            | IP20 (with end cover) |
| Ambient temperature (operation) | -40 °C ... 85 °C      |

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|                                         |                  |
|-----------------------------------------|------------------|
| Ambient temperature (storage/transport) | -40 °C ... 85 °C |
| Altitude                                | ≤ 4000 m (amsl)  |
| Permissible humidity (operation)        | 5 % ... 95 %     |

## Standards and regulations

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
| Standards/specifications | IEC 61643-21                                          |
| Note                     | 2000 + corrigendum 2001 + A1:2008, modified + A2:2012 |

### EN 61643-21

|                          |                          |
|--------------------------|--------------------------|
| Standards/specifications | EN 61643-21              |
| Note                     | 2001 + A1:2009 + A2:2013 |

## Mounting

|               |                          |
|---------------|--------------------------|
| Mounting type | DIN rail: TH 35 - 7.5 mm |
|---------------|--------------------------|

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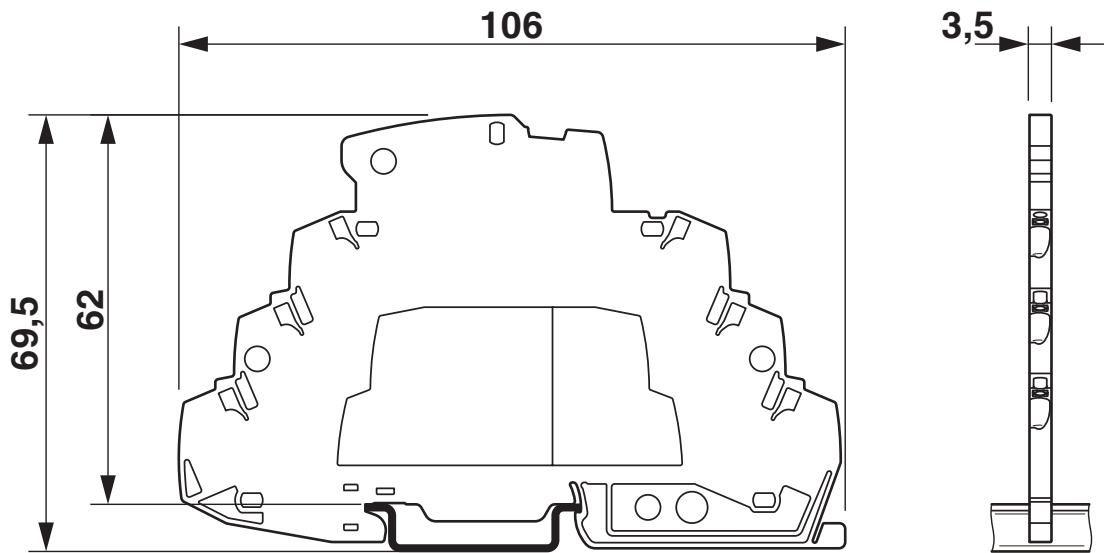
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Drawings

Dimensional drawing

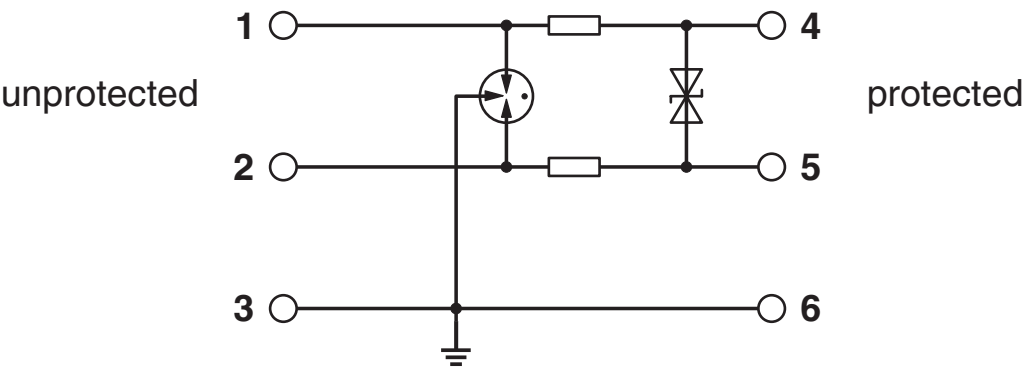


Schematic diagram

| TTC-3-1X2-...                                                                                                                                                                    |                          |                           |                          |                       |                           |                            |       |                          |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|--------------------------|-----------------------|---------------------------|----------------------------|-------|--------------------------|------|
| 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  |
|                                                                                                                                                                                  | 9.44x10 <sup>-5</sup>    | 1.68x10 <sup>-8</sup> 1/h | 0.9%                     | 1.7 %                 | 4.73x10 <sup>-6</sup>     | 8.43x10 <sup>-10</sup> 1/h | 5 %   | 0.5 %                    | 0.8% |
|                                                                                                                                                                                  |                          |                           |                          | 9.46x10 <sup>-6</sup> | 1.68x10 <sup>-9</sup> 1/h | 10 %                       | 0.9 % | 1.7 %                    |      |
| Calculation based on exida report, Phoenix Contact 16/06-072 R023 V3R1<br>exida Profile 1, FMEDA Analysis 2, T <sub>proof</sub> : 1 year, MT: 10 years, MTTR: 24 hours, PTC: 99% |                          |                           |                          |                       |                           |                            |       |                          |      |
| 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

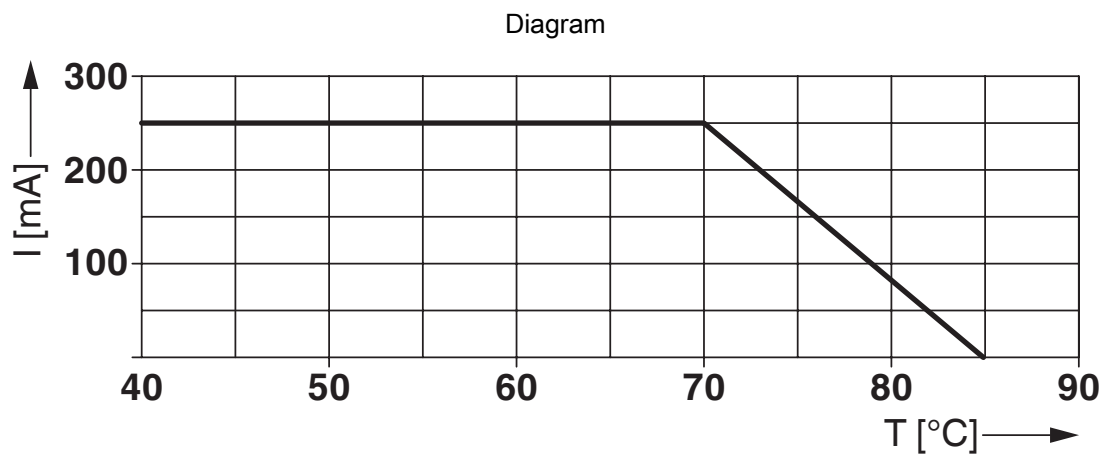


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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2907325>



**CSA**

Approval ID: 70136717



**DNV GL**

Approval ID: TAE000027G



**UL Listed**

Approval ID: FILE E 138168



**CSAus**

Approval ID: 70136717

**Functional Safety**

Approval ID: 16-06-072 R023 V3R1

**cCSAus**

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-11.0 | 27130807 |
| ECLASS-13.0 | 27171501 |

### 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                                | d160e4e4-3b4f-4507-8019-35e3364d8151 |

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