

# TTC-6-2X1-M-24DC-UT-I - Surge protection device



2906716

<https://www.phoenixcontact.com/us/products/2906716>

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Surge protection with integrated status indicator and disconnect knife for two signal wires with common reference potential, e.g., Digital IN/OUT. Can be used in safety-related circuits up to SIL 3.

## Your advantages

- Space-saving and cost-saving with a narrow overall width of just 6 mm
- Continuous monitoring of protective devices, plus mechanical status indicator with optional remote signaling
- Finding the right product for all possible requirements in MCR applications is easy, thanks to the complete range of products with customized features
- Signal circuits easily interrupted for maintenance work, thanks to vertical knife disconnection

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2906716       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL23          |
| Product key                          | CL2261        |
| GTIN                                 | 4055626134499 |
| Weight per piece (including packing) | 42.4 g        |
| Weight per piece (excluding packing) | 42.3 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          | TERMITRAB complete                  |
| IEC test classification | C1                                  |
|                         | C2                                  |
|                         | C3                                  |
|                         | D1                                  |
| Type                    | DIN rail module, one-piece          |

### Insulation characteristics

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

### Electrical properties

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

### Connection data

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| Connection method                | Screw connection                            |
| Screw thread                     | M3                                          |
| Tightening torque                | 0.5 Nm ... 0.6 Nm                           |
| Conductor cross-section flexible | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Conductor cross-section rigid    | 0.2 mm <sup>2</sup> ... 4 mm <sup>2</sup>   |
| Conductor cross-section AWG      | 24 ... 12                                   |

### Dimensions

|                     |                                 |
|---------------------|---------------------------------|
| Dimensional drawing |                                 |
| Width               | 6.2 mm +0.1 mm                  |
| Height              | 105.8 mm                        |
| Depth               | 83.5 mm (incl. DIN rail 7.5 mm) |

### Material specifications

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

### Mechanical properties

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## Mechanical data

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

## Protective circuit

|                                                                   |                                                                                                                             |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Direction of action                                               | Line-Line & Line-Signal Ground/Shield & optional Signal Ground/Shield-Earth Ground                                          |
| Maximum continuous operating voltage $U_C$                        | 30 V DC<br>21 V AC                                                                                                          |
| Rated current                                                     | 600 mA (40 °C)                                                                                                              |
| Operating effective current $I_C$ at $U_C$                        | $\leq 5 \mu A$                                                                                                              |
| Protective conductor current $I_{PE}$                             | $\leq 10 \mu A$                                                                                                             |
| 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-earth)                       | $\leq 140 V$ (C1 - 1 kV / 500 A)<br>$\leq 130 V$ (C2 - 10 kV / 5 kA)<br>$\leq 45 V$ (C3 - 25 A)<br>$\leq 50 V$ (C3 - 100 A) |
| Voltage protection level $U_p$ static (line-earth)                | $\leq 55 V$ (C1 - 1 kV / 500 A)<br>$\leq 80 V$ (C2 - 10 kV / 5 kA)                                                          |
| Response time $t_A$ (line-earth)                                  | $\leq 1 ns$                                                                                                                 |
| Input attenuation aE, asym.                                       | typ. 0.3 dB ( $\leq 270 kHz/150 \Omega$ )                                                                                   |
| Cut-off frequency $f_g$ (3 dB), asym. (PE) in 150 $\Omega$ system | typ. 960 kHz                                                                                                                |
| Capacity (Core-Earth)                                             | typ. 2.2 nF                                                                                                                 |
| Resistance per path                                               | 1.65 $\Omega \pm 20 \%$                                                                                                     |
| Surge protection fault message                                    | optical                                                                                                                     |
| Max. required back-up fuse                                        | 630 mA (FF)                                                                                                                 |
| Impulse durability (line-earth)                                   | C1 - 1 kV / 500 A<br>C2 - 10 kV / 5 kA<br>C3 - 100 A<br>D1 - 500 A                                                          |
| Pulse reset time (line-earth)                                     | $\leq 300 ms$                                                                                                               |

## Additional technical data

|                                                             |            |
|-------------------------------------------------------------|------------|
| Max. total discharge current $I_{total max}$ (8/20) $\mu s$ | 20 kA (1x) |
|-------------------------------------------------------------|------------|

## Environmental and real-life conditions

### Ambient conditions

|                                         |                      |
|-----------------------------------------|----------------------|
| Degree of protection                    | IP20                 |
| Ambient temperature (operation)         | -40 °C ... 85 °C     |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C     |
| Altitude                                | $\leq 4000 m$ (amsl) |
| Permissible humidity (operation)        | 5 % ... 95 %         |

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## 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 |
|---------------|--------------------------|

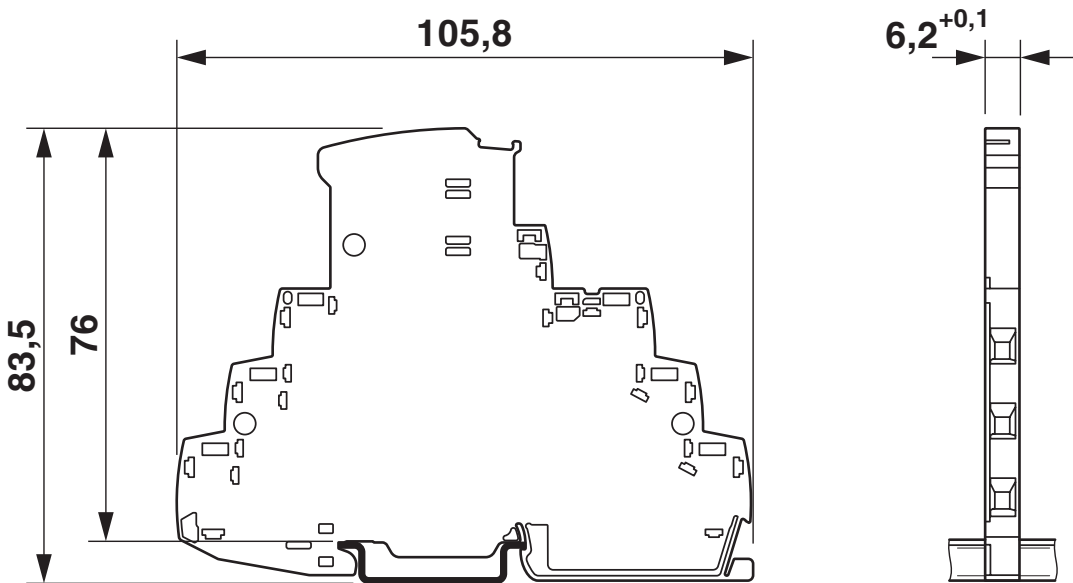
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Drawings

Dimensional drawing

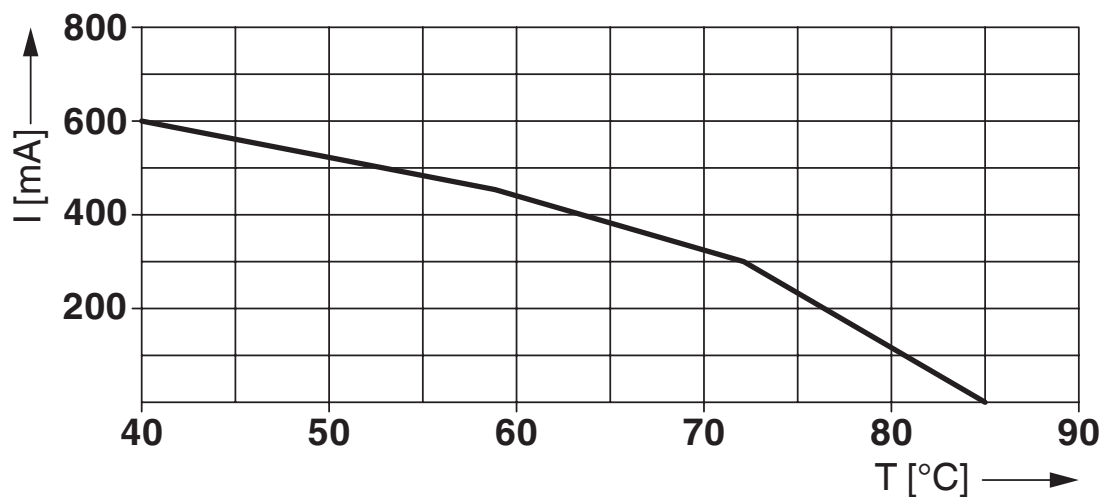


Schematic diagram

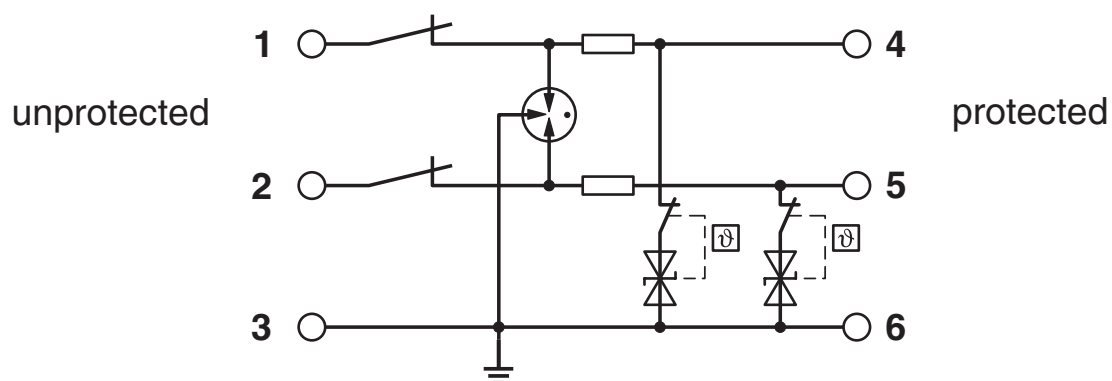
| TTC-6-2X1-...                                                                                                                                                                                                                                                                                                            |                                  |                                      |                          |       |                                  |                                       |      |                          |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|--------------------------|-------|----------------------------------|---------------------------------------|------|--------------------------|-------|
| 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   |
|                                                                                                                                                                                                                                                                                                                          |                                  |                                      |                          |       |                                  |                                       |      |                          |       |
|                                                                                                                                                                                                                                                                                                                          | 1.69 <sub>x10<sup>-5</sup></sub> | 3.00 <sub>x10<sup>-9</sup></sub> 1/h | 0.2 %                    | 0.3 % | 8.44 <sub>x10<sup>-7</sup></sub> | 1.50 <sub>x10<sup>-10</sup></sub> 1/h | 5 %  | 0.1 %                    | 0.2 % |
|                                                                                                                                                                                                                                                                                                                          |                                  |                                      |                          |       | 1.69 <sub>x10<sup>-6</sup></sub> | 3.00 <sub>x10<sup>-10</sup></sub> 1/h | 10 % | 0.2 %                    | 0.3 % |
| 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%<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.  
Table also applies to the TTC-6-2X1-M-...-I item group

Diagram



Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906716>



**CSA**

Approval ID: 70136717



**DNV GL**

Approval ID: TAE000027G



**UL Listed**

Approval ID: FILE E 138168



**CSAus**

Approval ID: 70136717

**UAE-RoHS**

Approval ID: 22-06-16191

**Functional Safety**

Approval ID: 16-06-072 R023 V3R1

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27171501 |
| ECLASS-15.0 | 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                                | f9686dc7-ac0e-4774-84dc-b22b6047e0ce |

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