

# TTC-6P-1X2-F-M-24DC-UT-I - Surge protection device



2906781

<https://www.phoenixcontact.com/us/products/2906781>

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Surge protection, consisting of protective plug and base element, with integrated status indicator and disconnect knife for a 2-wire floating signal circuit, e.g., 0(4) mA ... 20 mA current loop. Indirect grounding via gas discharge tube, HART-compatible. 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
- Easy testing and documentation with CHECKMASTER 2 with pluggable protective modules
- The signal is not influenced during maintenance work, thanks to the impedance-neutral insertion and removal of protective plugs

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2906781       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL23          |
| Product key                          | CL2161        |
| GTIN                                 | 4055626135380 |
| Weight per piece (including packing) | 47.2 g        |
| Weight per piece (excluding packing) | 47.1 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, two-section, divisible |
| Wire pairs per module   | 1                                       |

### Insulation characteristics

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

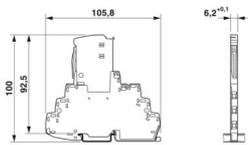
### Electrical properties

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

### Connection data

|                                  |   |
|----------------------------------|---|
| Connection method                | 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               | 100 mm (incl. DIN rail 7.5 mm)   |

### Material specifications

|  |                       |
|--|-----------------------|
| Color (Base element)                   | gray (RAL 7042)       |
| Color (Male connector)                 | light gray (RAL 7035) |
| Flammability rating according to UL 94 | V-0                   |
| Insulating material                    | PBT                   |
| Housing material                       | PBT                   |

## Mechanical properties

### 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  |
|   | 21 V AC  |
| Rated current   | 600 mA (56 °C)   |
| Operating effective current $I_C$ at $U_C$                            | $\leq 5 \mu\text{A}$   |
| Protective conductor current $I_{PE}$                                 | $\leq 1 \mu\text{A}$   |
| Nominal discharge current $I_n$ (8/20) $\mu\text{s}$ (line-line)      | 5 kA   |
| Nominal discharge current $I_n$ (8/20) $\mu\text{s}$ (line-ground)    | 5 kA   |
| Pulse discharge current $I_{imp}$ (10/350) $\mu\text{s}$ (line-line)  | 0.5 kA   |
| Pulse discharge current $I_{imp}$ (10/350) $\mu\text{s}$ (line-earth) | 0.5 kA   |
| Total discharge current $I_{Total}$ (8/20) $\mu\text{s}$              | 10 kA  |
| Voltage protection level $U_p$ (line-line)                            | $\leq 200 \text{ V}$ (C1 - 1 kV / 500 A)   |
|   | $\leq 320 \text{ V}$ (C2 - 10 kV / 5 kA)   |
|   | $\leq 50 \text{ V}$ (C3 - 25 A)  |
|   | $\leq 55 \text{ V}$ (C3 - 100 A)   |
| Voltage protection level $U_p$ (line-earth)                           | $\leq 900 \text{ V}$ (C1 - 1 kV / 500 A)   |
|   | $\leq 1.05 \text{ kV}$ (C2 - 10 kV / 5 kA)   |
|   | $\leq 1.3 \text{ kV}$ (C3 - 25 A)  |
|   | $\leq 1.4 \text{ kV}$ (C3 - 100 A)   |
| Voltage protection level $U_p$ static (line-line)                     | $\leq 50 \text{ V}$ (C1 - 1 kV / 500 A)  |
|   | $\leq 120 \text{ V}$ (C2 - 10 kV / 5 kA)   |
| Voltage protection level $U_p$ static (line-earth)                    | $\leq 900 \text{ V}$ (C1 - 1 kV / 500 A)   |
|   | $\leq 1.05 \text{ kV}$ (C2 - 10 kV / 5 kA)   |
| Response time $t_A$ (line-line)                                       | $\leq 1 \text{ ns}$  |
| Response time $t_A$ (line-earth)                                      | $\leq 100 \text{ ns}$  |
| Input attenuation aE, sym.  | typ. 0.3 dB ( $\leq 250 \text{ kHz}$ / 150 $\Omega$ )                              |
| Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system           | typ. 940 kHz   |
| Capacity (Core-Core)  | 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-line)  | C1 - 1 kV / 500 A  |
|   | C2 - 10 kV / 5 kA  |
|   | C3 - 100 A   |
| Impulse durability (line-earth)                                       | C1 - 1 kV / 500 A  |
|   | C2 - 10 kV / 5 kA  |
|   | C3 - 100 A   |

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|                               |            |
|-------------------------------|------------|
|                               | D1 - 500 A |
| Pulse reset time (line-line)  | ≤ 700 ms   |
| Pulse reset time (line-earth) | ≤ 30 ms    |

## Additional technical data

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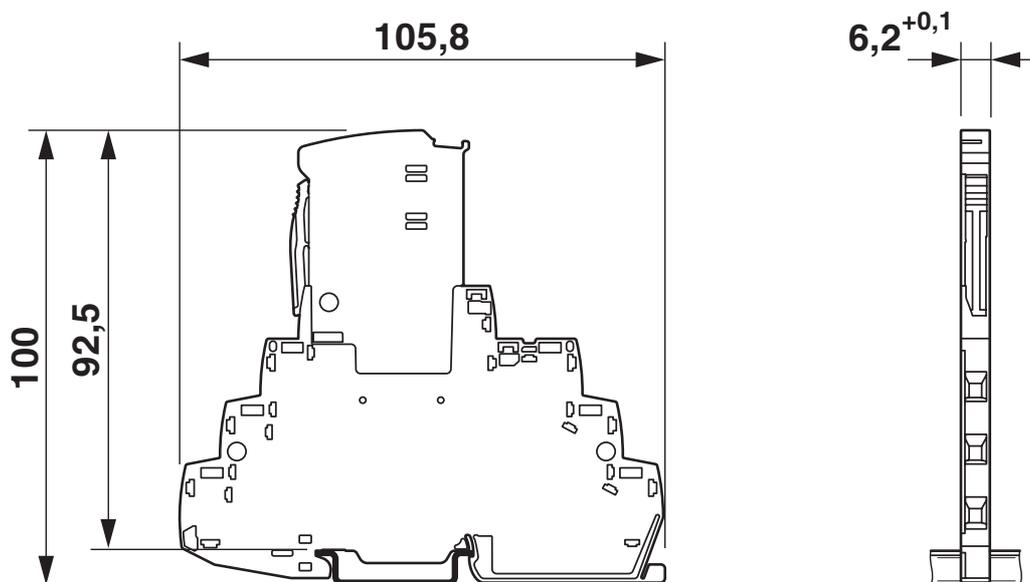


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## Drawings

Dimensional drawing



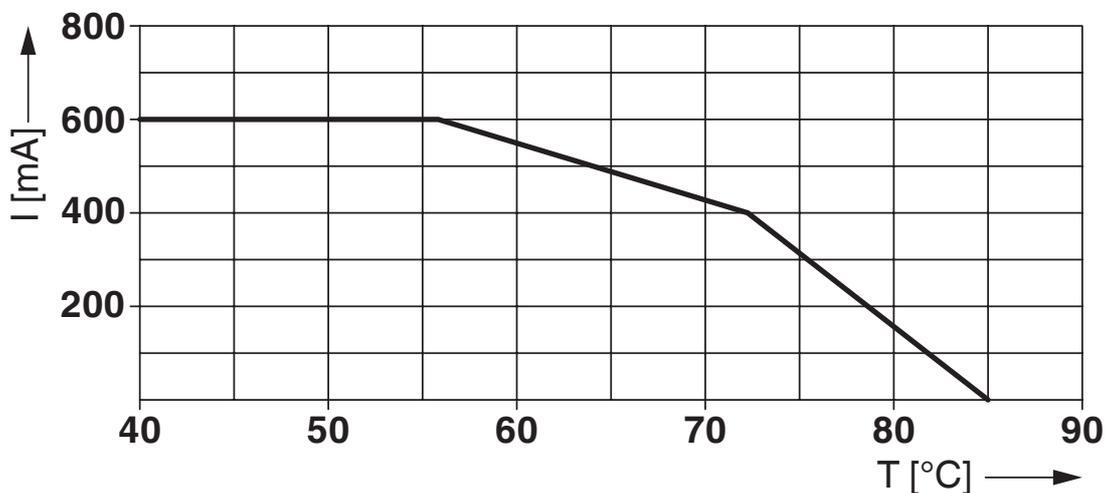
Schematic diagram

| TTC-6P-1x2-F-M-...-I |                          |                             |                          |       |                          |                            |      |                          |       |
|----------------------|--------------------------|-----------------------------|--------------------------|-------|--------------------------|----------------------------|------|--------------------------|-------|
| 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   |
|                      | 2.70x10 <sup>-5</sup>    | 4.80x10 <sup>-9</sup> [1/h] | 0.3 %                    | 0.5 % | 1.35x10 <sup>-6</sup>    | 2.40x10 <sup>-10</sup> 1/h | 5 %  | 0.1 %                    | 0.2 % |
|                      |                          |                             |                          |       | 2.70x10 <sup>-6</sup>    | 4.80x10 <sup>-10</sup> 1/h | 10 % | 0.3 %                    | 0.5 % |

Calculation based on exida report, Phoenix Contact 16/06-072 R022 V4R2  
 exida Profile 1, FMEDA Analysis 2, T<sub>proof</sub>: 1 year, MT: 10 years, MTTR: 24 hours, PTC: 99%  
 Used standards  
 IEC/EN 61508, edition 2010 (device specific)  
 IEC/EN 61511, edition 2016 + COR1:2016 + A1:2017 (system specific)

## Functional safety scenarios

Diagram



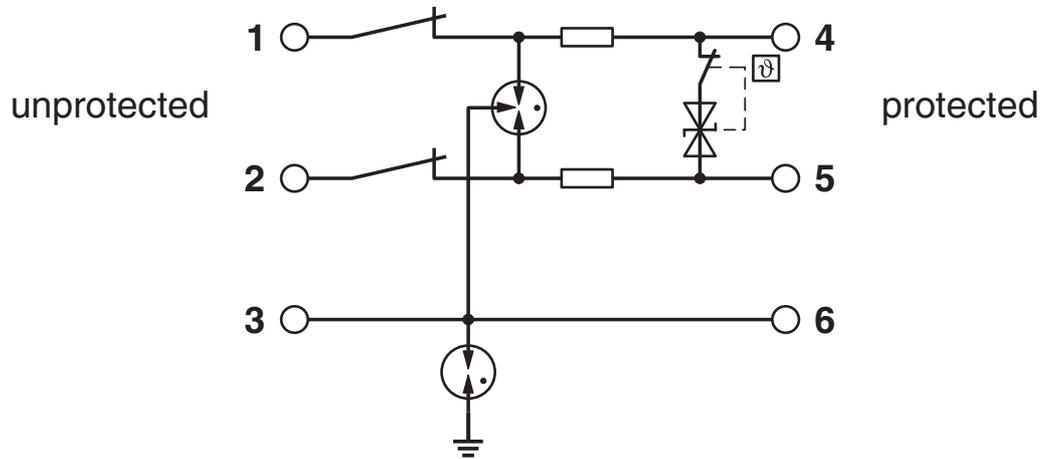
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Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906781>



**CSA**

Approval ID: 70136717



**DNV GL**

Approval ID: TAE000027G



**UL Listed**

Approval ID: FILE E 138168



**CSAus**

Approval ID: 70136717

**UAE-RoHS**

Approval ID: 22-06-16781

**Functional Safety**

Approval ID: 16-06-072 R022 V4R3

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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                                | b738c4d4-4b6f-4310-9c32-e2c967002fbf |

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