

# TTC-6P-2X1-F-48DC-UT-I - Surge protection device



2908208

<https://www.phoenixcontact.com/nl/products/2908208>

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Surge protection, consisting of protective plug and base element, with integrated status indicator for two signal wires with common reference potential, e.g., Digital IN/OUT. Indirect grounding via gas discharge tube. 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                          | 2908208       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL2161        |
| Product key                          | CL2161        |
| GTIN                                 | 4055626282916 |
| Weight per piece (including packing) | 46,7 g        |
| Weight per piece (excluding packing) | 42,27 g       |
| Customs tariff number                | 85363010      |
| Country of origin                    | DE            |

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## Technical data

### Product properties

|                         |                                         |
|-------------------------|-----------------------------------------|
| Product family          | TERMITRAB complete                      |
| IEC test classification | C1                                      |
|                         | C2                                      |
|                         | C3                                      |
|                         | D1                                      |
| Type                    | DIN rail module, two-section, divisible |

### Insulation characteristics

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

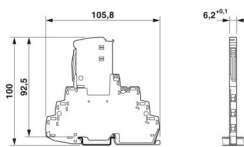
### Electrical properties

|                       |         |
|-----------------------|---------|
| Nominal voltage $U_N$ | 48 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

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

## Protective circuit

|                                                                 |                                                                                                                               |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Direction of action                                             | Line-Line & Line-Signal Ground/Shield & optional Signal Ground/Shield-Earth Ground                                            |
| Nominal voltage $U_N$                                           | 48 V DC                                                                                                                       |
| Maximum continuous operating voltage $U_C$                      | 53 V DC<br>30 V AC                                                                                                            |
| Rated current                                                   | 220 mA DC (75 °C)<br>600 mA AC (56 °C)                                                                                        |
| Operating effective current $I_C$ at $U_C$                      | $\leq 5 \mu A$                                                                                                                |
| Protective conductor current $I_{PE}$                           | $\leq 1 \mu A$                                                                                                                |
| 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)                     | $\leq 750$ V (C1 - 1 kV / 500 A)<br>$\leq 750$ V (C2 - 10 kV / 5 kA)<br>$\leq 800$ V (C3 - 25 A)<br>$\leq 1.1$ kV (C3 - 50 A) |
| Voltage protection level $U_p$ static (line-earth)              | $\leq 750$ V (C1 - 1 kV / 500 A)<br>$\leq 750$ V (C2 - 10 kV / 5 kA)                                                          |
| Response time $t_A$ (line-earth)                                | $\leq 100$ ns                                                                                                                 |
| Input attenuation aE, asym.                                     | typ. 0.3 dB ( $\leq 480$ kHz / 150 $\Omega$ )                                                                                 |
| Capacity (Core-Earth)                                           | typ. 1.2 nF                                                                                                                   |
| Resistance per path                                             | 1.65 $\Omega \pm 20$ %                                                                                                        |
| Surge protection fault message                                  | optical                                                                                                                       |
| Max. required back-up fuse                                      | 160 mA DC (FF)<br>630 mA AC (FF)                                                                                              |
| Impulse durability (line-earth)                                 | C1 - 1 kV / 500 A<br>C2 - 10 kV / 5 kA<br>C3 - 57 A<br>D1 - 500 A                                                             |
| Pulse reset time (line-earth)                                   | $\leq 30$ 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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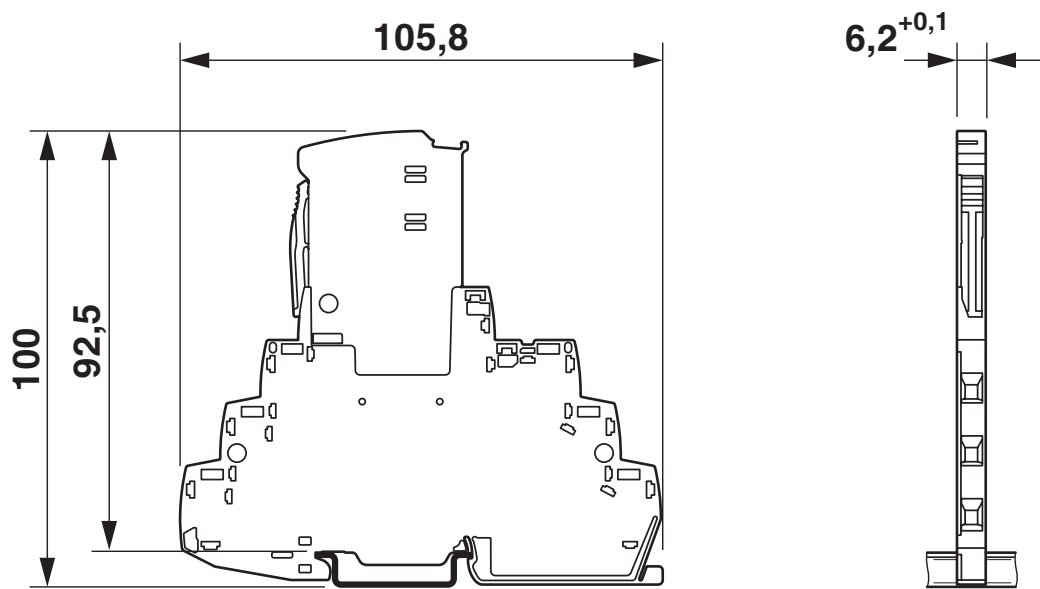


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Drawings

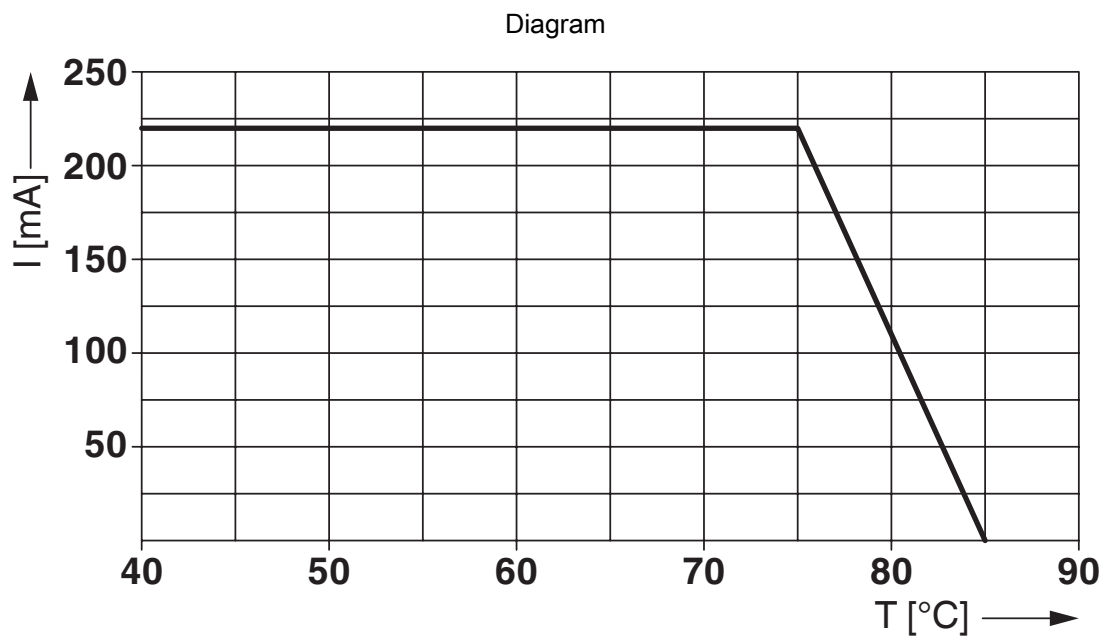
Dimensional drawing



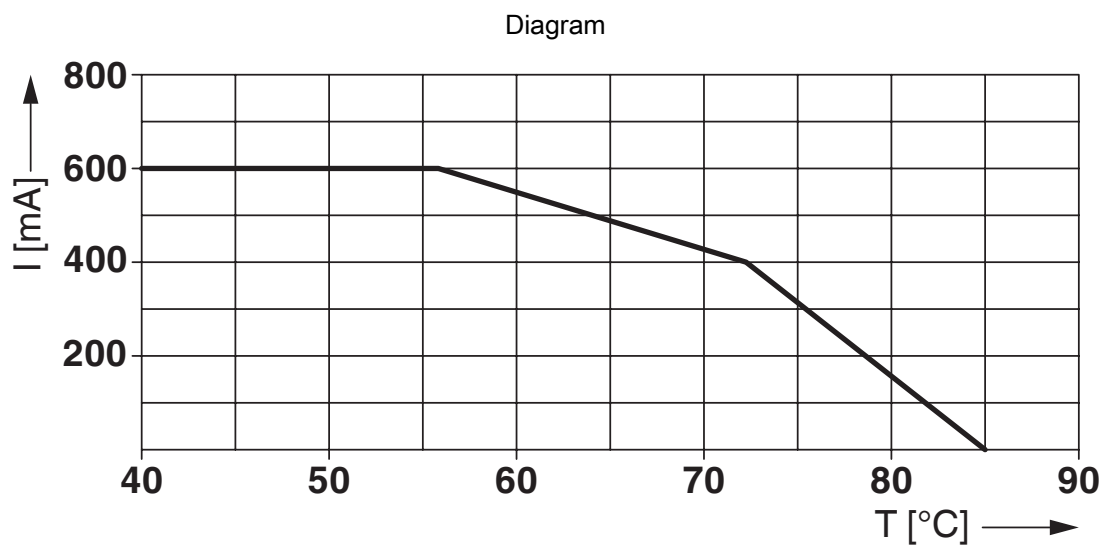
Schematic diagram

| TTC-6P-2X1-F-...-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   |
|                                                                                                                                                                                                                                                                                                                          | 2.25x10 <sup>-5</sup>    | 4.00x10 <sup>-9</sup> 1/h | 0.2 %                    | 0.4 % | 1.13x10 <sup>-6</sup>    | 2.00x10 <sup>-10</sup> 1/h | 5 %  | 0.1 % 0.2 %              |
|                                                                                                                                                                                                                                                                                                                          |                          |                           |                          |       | 2.25x10 <sup>-6</sup>    | 4.00x10 <sup>-10</sup> 1/h | 10 % | 0.2 % 0.4 %              |
| Calculation based on exida report, Phoenix Contact 16/06-072 R022 V4R2<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



Derating curve at 55.2 V DC



Derating curve at 30 V AC

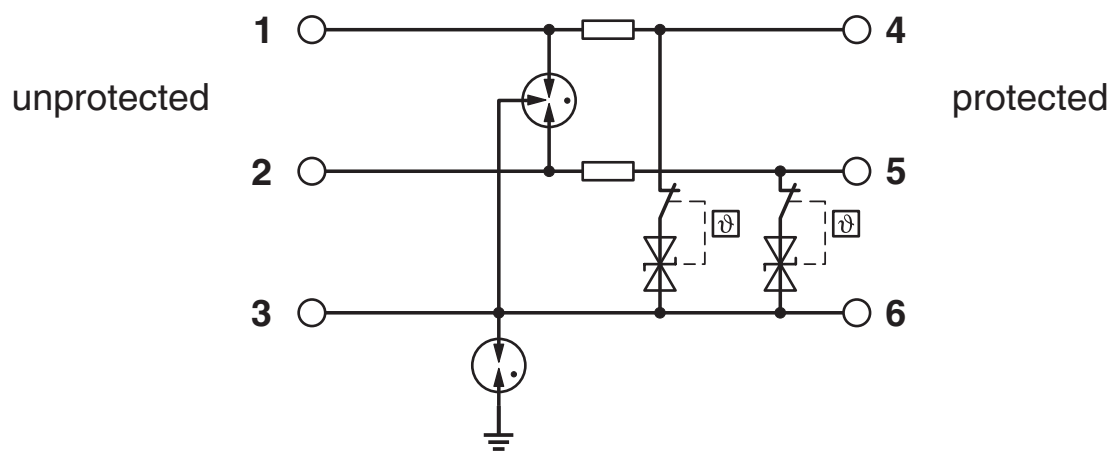
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Circuit diagram



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## Approvals

🔗 To download certificates, visit the product detail page: <https://www.phoenixcontact.com/nl/products/2908208>



**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 10.0 | EC000943 |
|-----------|----------|

### 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                                | e8faf47a-2204-4af5-9834-dd985c3ed6a6 |