# TTC-6P-1X2-48DC-UT-I - Surge protection device

2908194

https://www.phoenixcontact.com/us/products/2908194

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Surge protection, consisting of protective plug and base element, with integrated status indicator for a 2-wire floating signal circuit. 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

ELEKTROGERÄTE RÜCKNAHME

## Commercial data

| | |
|---|---|
| Item number | 2908194 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | CL23 |
| Product key | CL2161 |

| | |
|---|---|
| GTIN | 4055626282695 |
| Weight per piece (including packing) | 45.5 g |
| Weight per piece (excluding packing) | 39.46 g |
| Customs tariff number | 85363010 |
| Country of origin | DE |

## 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 |

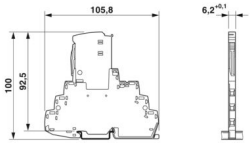
### Electrical properties

| | |
|---|---|
| Nominal voltage $U_N$ | 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 mm² ... 2.5 mm² |
| Conductor cross-section rigid | 0.2 mm² ... 4 mm² |
| 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 |
| Nominal voltage $U_N$ | 48 V DC |
| Maximum continuous operating voltage $U_C$ | 55.2 V DC |
| | 30 V AC |
| Rated current | 160 mA DC (75 °C) |
| | 600 mA AC (56 °C) |
| Operating effective current $I_C$ at $U_C$ | ≤ 5 µA |
| Protective conductor current $I_{PE}$ | ≤ 1 µA |
| Nominal discharge current $I_n$ (8/20) µs (line-line) | 5 kA |
| Nominal discharge current $I_n$ (8/20) µs (line-ground) | 5 kA |
| Pulse discharge current $I_{imp}$ (10/350) µs (line-line) | 0.5 kA |
| Pulse discharge current $I_{imp}$ (10/350) µs (line-earth) | 0.5 kA |
| Total discharge current $I_{Total}$ (8/20) µs | 10 kA |
| Voltage protection level $U_p$ (line-line) | ≤ 180 V (C1 - 1 kV / 500 A) |
| | ≤ 400 V (C2 - 10 kV / 5 kA) |
| | ≤ 85 V (C3 - 25 A) |
| | ≤ 90 V (C3 - 100 A) |
| Voltage protection level $U_p$ (line-earth) | ≤ 750 V (C1 - 1 kV / 500 A) |
| | ≤ 750 V (C2 - 10 kV / 5 kA) |
| | ≤ 700 V (C3 - 25 A) |
| | ≤ 750 V (C3 - 100 A) |
| Voltage protection level $U_p$ static (line-line) | ≤ 45 V (C1 - 1 kV / 500 A) |
| | ≤ 160 V (C2 - 10 kV / 5 kA) |
| Voltage protection level $U_p$ static (line-earth) | ≤ 750 V (C1 - 1 kV / 500 A) |
| | ≤ 750 V (C2 - 10 kV / 5 kA) |
| Response time $t_A$ (line-line) | ≤ 1 ns |
| Response time $t_A$ (line-earth) | ≤ 100 ns |
| Input attenuation aE, sym. | typ. 0.3 dB (≤ 470 kHz/150 Ω) |
| Cut-off frequency fg (3 dB), sym. in 150 Ω system | typ. 1.8 MHz |
| Capacity (Core-Core) | typ. 1.1 nF |
| Resistance per path | 1.65 Ω ±20 % |
| Surge protection fault message | optical |
| Max. required back-up fuse | 160 mA DC (FF) |
| | 630 mA AC (FF) |
| Impulse durability (line-line) | C1 - 1 kV / 500 A |
| | C2 - 10 kV / 5 kA |
| | C3 - 50 A |

| | |
|---|---|
| Impulse durability (line-earth) | C1 - 1 kV / 500 A |
| | C2 - 10 kV / 5 kA |
| | C3 - 100 A |
| | D1 - 500 A |
| Pulse reset time (line-line) | ≤ 700 ms |
| Pulse reset time (line-earth) | ≤ 1500 ms |

Additional technical data

| | |
|---|---|
| Max. total discharge current $I_{total\ max}$ (8/20) µs | 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

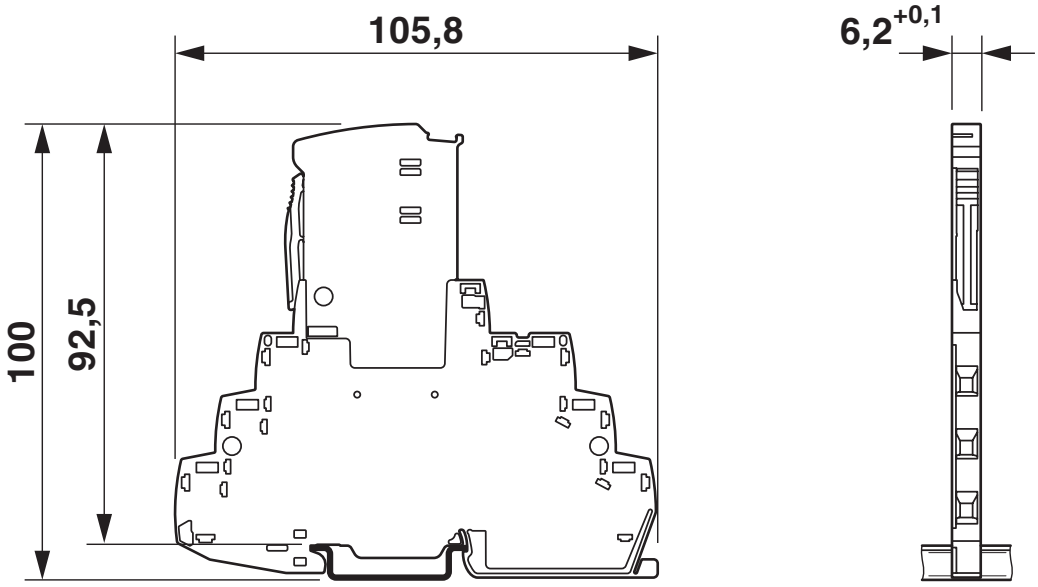
| | |
|---|---|
| Standards/specifications | EN 61643-21 |
| Note | 2001 + A1:2009 + A2:2013 |

## Mounting

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

## Drawings

Dimensional drawing

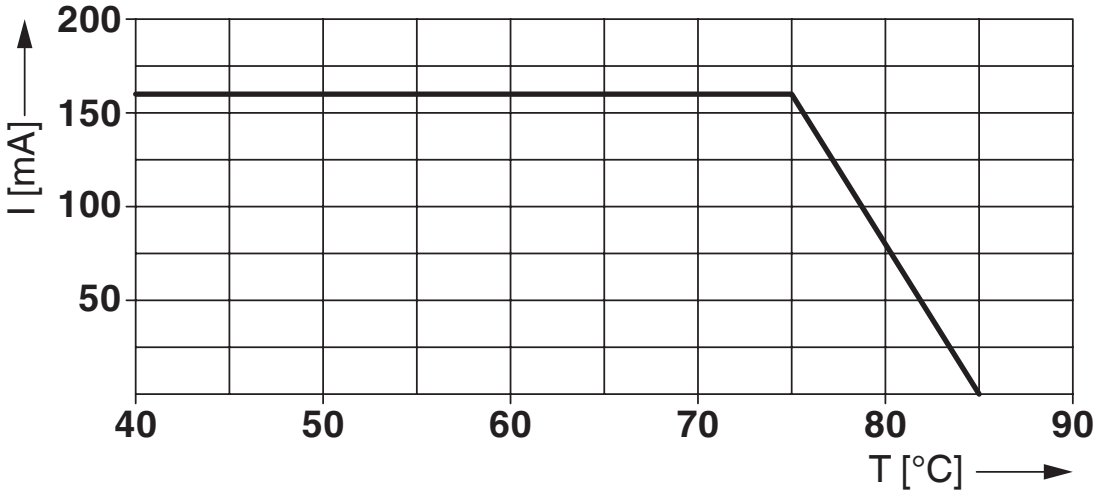



Schematic diagram

| TTC-6P-1x2-...-I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Category | 1oo1 architecture, HFT=0 | | | | 1oo2 architecture, HFT=1 | | | | |
| | $PFD_{AVG}$ | PFH | Used budget of SIL 2 SIF | | $PFD_{AVG}$ | PFH | CCF | Used budget of SIL 3 SIF | |
| | | | $PFD_{AVG}$ | PFH | | | | $PFD_{AVG}$ | PFH |
| | $3.88_{x10^{-5}}$ | $6.90_{x10^{-9}}$ 1/h | 0.4 % | 0.7 % | $1.94_{x10^{-6}}$ | $3.45_{x10^{-10}}$ 1/h | 5 % | 0.2 % | 0.3 % |
| | | | | | $3.88_{x10^{-6}}$ | $6.90_{x10^{-10}}$ 1/h | 10 % | 0.4 % | 0.7 % |
| | Calculation based on exida report, Phoenix Contact 16/06-072 R022 V4R2<br>exida Profile 1, FMEDA Analysis 2, $T_{proof}$: 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) | | | | | | | | |

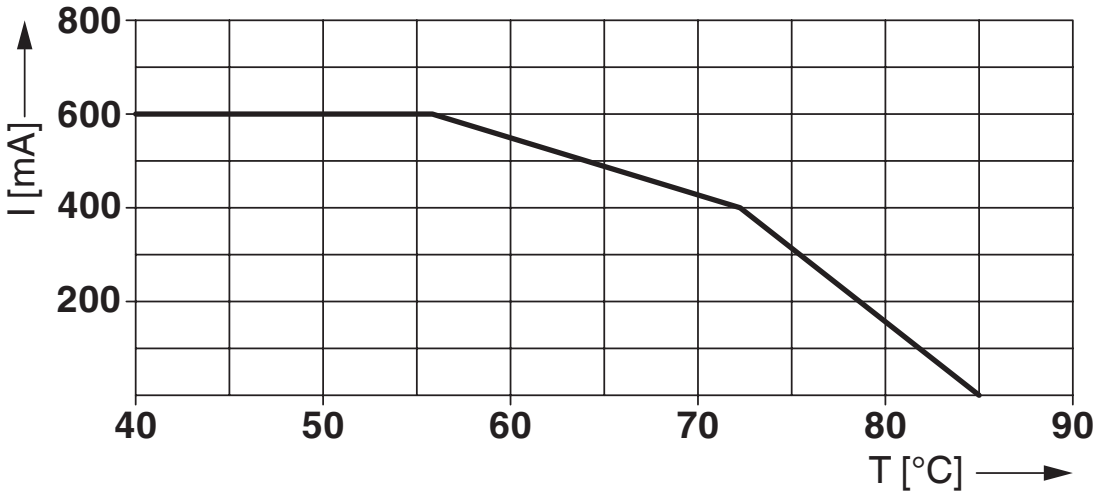
Functional safety scenarios

Diagram



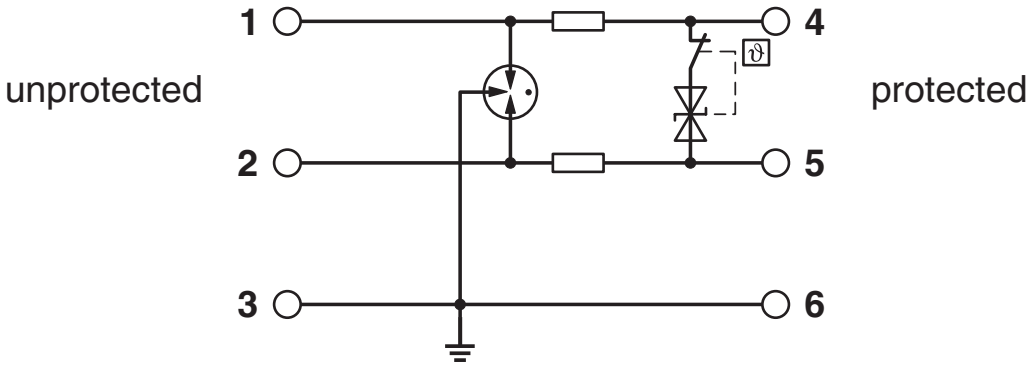

Derating curve at 55.2 V DC

Diagram




Derating curve at 30 V AC

Circuit diagram



## Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/2908194

**CSA**
Approval ID: 70136717

**DNV GL**
Approval ID: TAE000027G

**UL Listed**
Approval ID: FILE E 138168

**CSAus**
Approval ID: 70136717

**UAE-RoHS**
Approval ID: 22-06-16192

**Functional Safety**
Approval ID: 16-06-072 R022 V4R3

## Classifications

### ECLASS

| | |
|---|---|
| ECLASS-13.0 | 27171501 |
| ECLASS-15.0 | 27171501 |

### ETIM

| | |
|---|---|
| ETIM 10.0 | EC001466 |

### 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 | 27c12a36-9dc0-4984-a05b-84d90fdf2fc1 |

EF3.1 Climate Change

| | |
|---|---|
| CO2e kg | 1.161 kg CO2e |

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