

# TTC-6P-3-HF-M-12DC-UT-I - Surge protection device



2906744

<https://www.phoenixcontact.com/us/products/2906744>

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Surge protection, consisting of protective plug and base element, with integrated status indicator and knife disconnection for three signal wires with common reference potential. For HF applications and telecommunications interfaces without supply voltage, EX e approval for zone 2. 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                          | 2906744       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL23          |
| Product key                          | CL2161        |
| GTIN                                 | 4055626134765 |
| Weight per piece (including packing) | 57 g          |
| Weight per piece (excluding packing) | 46.5 g        |
| Customs tariff number                | 85363010      |
| Country of origin                    | DE            |

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## Technical data

### Product properties

|                         |   |
|-------------------------|---|
| Product type            | Surge protection for information technology |
| 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 $U_N$ | 12 V DC |
|-----------------------|---------|

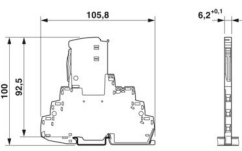
### Connection data

|                                  |   |
|----------------------------------|---|
| 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                                   |

### Ex data

|                                 |  |
|---------------------------------|--|
| Maximum input current           | 600 mA (T4 / $\leq 30$ °C)               |
|                                 | 500 mA (T4 / $> 30$ °C ... $\leq 50$ °C) |
|                                 | 400 mA (T4 / $> 50$ °C ... $\leq 70$ °C) |
| Maximum input voltage           | 15 V DC                                  |
| Altitude                        | $\leq 2000$ m (amsl)                     |
| Ambient temperature (operation) | -40 °C ... 70 °C (T4)                    |

### Dimensions

|                     |  |
|---------------------|--|
| Dimensional drawing |  |
| Width               | 6.2 mm +0.1 mm   |
| Height              | 105.8 mm   |
| Depth               | 100 mm (incl. DIN rail 7.5 mm)   |

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## 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 $U_N$   | 12 V DC  |
| Maximum continuous operating voltage $U_C$                            | 15 V DC  |
|   | 10 V AC  |
| Rated current   | 600 mA (56 °C)   |
| Operating effective current $I_C$ at $U_C$                            | $\leq 100 \mu\text{A}$   |
| Protective conductor current $I_{PE}$                                 | $\leq 200 \mu\text{A}$   |
| 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 $I_{Ttotal}$ (8/20) $\mu\text{s}$             | 10 kA  |
| Voltage protection level $U_p$ (line-line)                            | $\leq 145 \text{ V}$ (C1 - 1 kV / 500 A)   |
|   | $\leq 260 \text{ V}$ (C2 - 10 kV / 5 kA)   |
|   | $\leq 25 \text{ V}$ (C3 - 25 A)  |
|   | $\leq 30 \text{ V}$ (C3 - 100 A)   |
| Voltage protection level $U_p$ (line-earth)                           | $\leq 80 \text{ V}$ (C1 - 1 kV / 500 A)  |
|   | $\leq 95 \text{ V}$ (C2 - 10 kV / 5 kA)  |
|   | $\leq 25 \text{ V}$ (C3 - 25 A)  |
|   | $\leq 30 \text{ V}$ (C3 - 100 A)   |
| Voltage protection level $U_p$ static (line-line)                     | $\leq 40 \text{ V}$ (C1 - 1 kV / 500 A)  |
|   | $\leq 95 \text{ V}$ (C2 - 10 kV / 5 kA)  |
| Voltage protection level $U_p$ static (line-earth)                    | $\leq 40 \text{ V}$ (C1 - 1 kV / 500 A)  |
|   | $\leq 95 \text{ V}$ (C2 - 10 kV / 5 kA)  |
| Response time $t_A$ (line-line)                                       | $\leq 1 \text{ ns}$  |
| Response time $t_A$ (line-earth)                                      | $\leq 1 \text{ ns}$  |
| Input attenuation aE, sym.  | typ. 0.3 dB ( $\leq 8.7 \text{ MHz}/150 \Omega$ )                                  |
| Input attenuation aE, asym.   | typ. 0.3 dB ( $\leq 10.5 \text{ MHz}/150 \Omega$ )                                 |
| Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system           | typ. 60 MHz  |
| Cut-off frequency $f_g$ (3 dB), asym. (PE) in 150 $\Omega$ system     | typ. 60 MHz  |

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|                                 |                   |
|---------------------------------|-------------------|
| Capacity (Core-Core)            | typ. 32 pF        |
| Capacity (Core-Earth)           | typ. 32 pF        |
| Resistance per path             | 1.65 Ω ±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        |
|                                 | D1 - 500 A        |
| Pulse reset time (line-line)    | ≤ 30 ms           |
| Pulse reset time (line-earth)   | ≤ 30 ms           |

## Additional technical data

|   |                     |
|---|---------------------|
| Max. total discharge current I <sub>total max</sub> (8/20) μs | 20 kA (1x - non Ex) |
|---|---------------------|

## 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 %     |

## Approvals

### Conformity/Approvals

|                  |  |
|------------------|--|
| UL, USA / Canada | Class I, Div. 2, Groups A, B, C, D T4A |
|------------------|--|

## 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 |
| Standards/specifications | IEC 60079-0              |
| Note                     | 2017                     |
| Standards/specifications | IEC 60079-7              |
| Note                     | 2017                     |
| Standards/specifications | EN IEC 60079-0           |
| Note                     | 2018                     |
| Standards/specifications | EN IEC 60079-7           |

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|      |                |
|------|----------------|
| Note | 2015 + A1:2018 |
|------|----------------|

## Mounting

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

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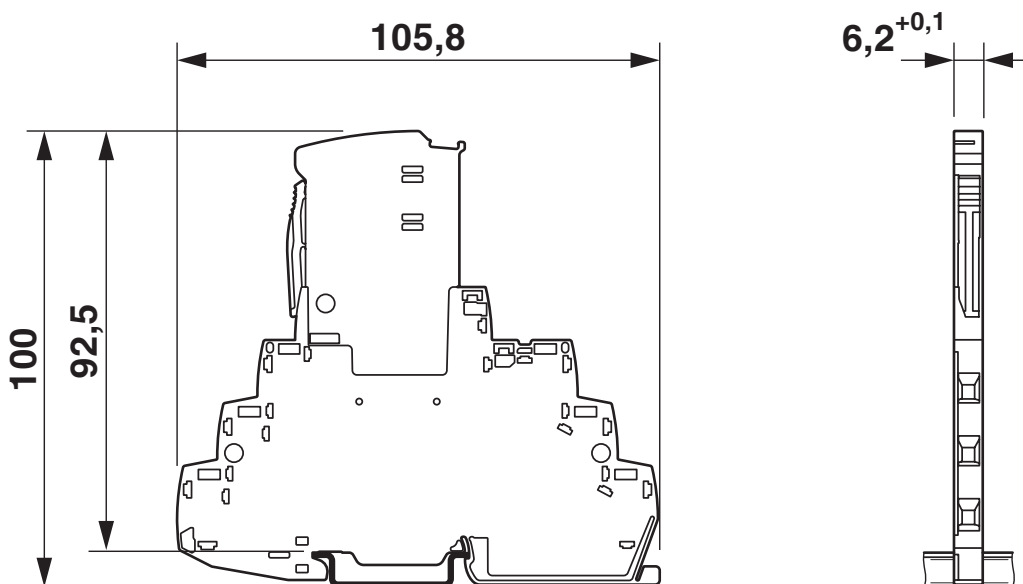


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## Drawings

Dimensional drawing



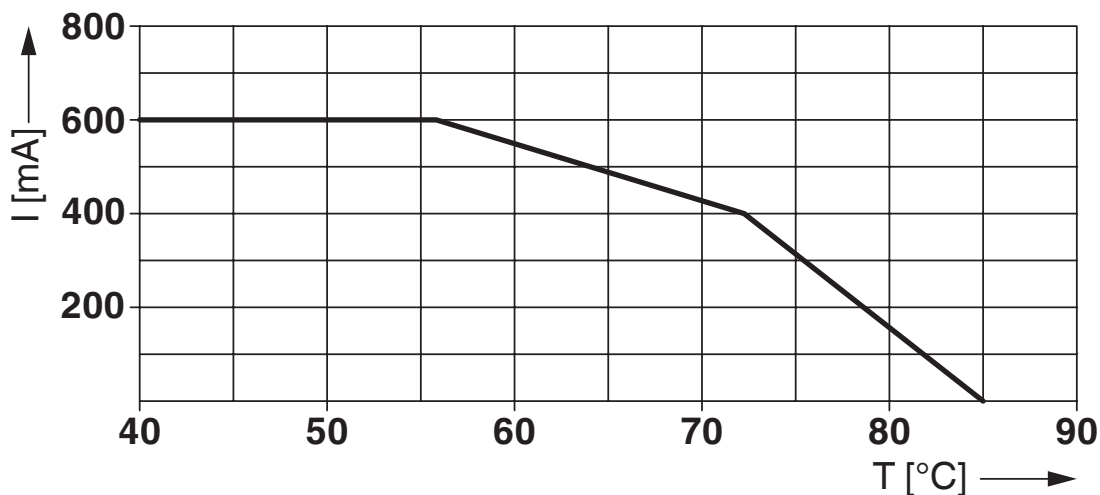
Schematic diagram

| TTC-6P-3-HF-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   |
|                     | 1.30x10 <sup>-4</sup>    | 2.31x10 <sup>-8</sup> 1/h | 1.3 %                    | 2.3 % | 6.52x10 <sup>-6</sup>    | 1.16x10 <sup>-9</sup> 1/h | 5 %  | 1.3 %                    | 2.3 % |
|                     |                          |                           |                          |       | 1.30x10 <sup>-5</sup>    | 2.31x10 <sup>-9</sup> 1/h | 10 % | 1.3 %                    | 2.3 % |

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

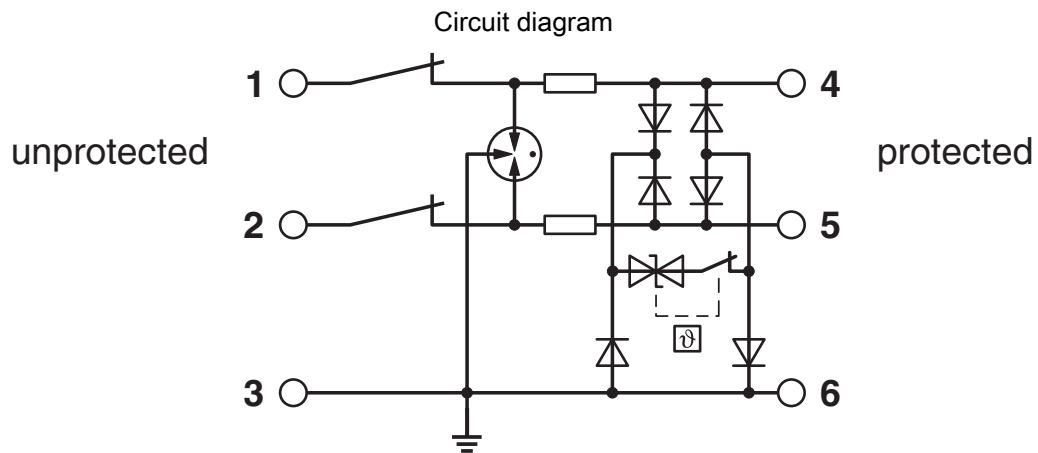
Diagram



## Diagram

### Derating for Ex-areas (Zone 2, EX ec)

| $\vartheta$ [°C]                                     | I [mA] |
|--|--------|
| $\leq 30^{\circ}\text{C}$                            | 600 mA |
| $> 30^{\circ}\text{C} \dots \leq 50^{\circ}\text{C}$ | 500 mA |
| $> 50^{\circ}\text{C} \dots \leq 70^{\circ}\text{C}$ | 400 mA |



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906744>



**CSA**

Approval ID: 70136717



**DNV GL**

Approval ID: TAE000027G



**UL Listed**

Approval ID: FILE E 138168



**CSAus**

Approval ID: 70136717

**UAE-RoHS**

Approval ID: 22-06-16783

**Functional Safety**

Approval ID: 16-06-072 R022 V4R3



**IECEX**

Approval ID: IECEX BVS 21.0057X



**ATEX**

Approval ID: BVS 21 ATEX E 052 X



**UKCA-EX**

Approval ID: DEKRA 23UKEX7003X



**cULus Listed**

Approval ID: File E 333250



**CCC**

Approval ID: 2022122304116080

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**NEPSI-EX**

Approval ID: HT25-037

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27171503 |
| ECLASS-15.0 | 27171503 |

### ETIM

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

### 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                                | 9796e9a6-ca5f-453e-b032-110b81bc09cd |

### EF3.1 Climate Change

|         |               |
|---------|---------------|
| CO2e kg | 1.362 kg CO2e |
|---------|---------------|

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