

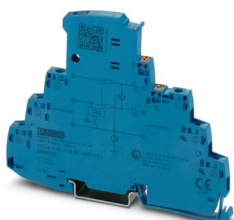
# TTC-6-3-HF-F-M-EX-24DC-UT-I - Surge protection device



2906823

<https://www.phoenixcontact.com/us/products/2906823>

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Surge protection with integrated status indicator and knife disconnection for a 3-wire Ex i signal circuit with common reference potential. For HF applications. Indirect grounding via gas discharge tube, HART-compatible. Suitable for use in the fieldbus system (e.g., PROFIBUS PA) in accordance with the FISCO concept. 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                          | 2906823       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL23          |
| Product key                          | CL2263        |
| GTIN                                 | 4055626135854 |
| Weight per piece (including packing) | 63.1 g        |
| Weight per piece (excluding packing) | 59.4 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, 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 mm² ... 2.5 mm² |
| Conductor cross-section rigid    | 0.2 mm² ... 4 mm²   |
| Conductor cross-section AWG      | 24 ... 12           |

Ex data

|                                          |                                          |
|------------------------------------------|------------------------------------------|
| Maximum inner capacitance C <sub>i</sub> | negligible                               |
| Max. internal inductance L <sub>i</sub>  | negligible                               |
| Max. input current I <sub>i</sub>        | 400 mA (T4 / -40 °C ... +50 °C)          |
|                                          | 250 mA (T4 / -40 °C ... +70 °C)          |
|                                          | 350 mA (T6 / -40 °C ... +35 °C)          |
|                                          | 100 mA (T6 / -40 °C ... +70 °C)          |
| Max. input voltage U <sub>i</sub>        | 30 V DC                                  |
| Insulation voltage to ground             | > 180 V DC                               |
| Ambient temperature (operation)          | -40 °C ... 70 °C (with current derating) |

## Dimensions

Dimensional drawing

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

## Material specifications

|                                        |                 |
|----------------------------------------|-----------------|
| Color                                  | blue (RAL 5015) |
| 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                                                                            |
| Rated current                                                   | 600 mA (40 °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-line)      | 5 kA                                                                               |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-ground)    | 5 kA                                                                               |
| Pulse discharge current $I_{imp}$ (10/350) $\mu s$ (line-line)  | 0.5 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-line)                      | $\leq 150 V$ (C1 - 1 kV / 500 A)                                                   |
|                                                                 | $\leq 275 V$ (C2 - 10 kV / 5 kA)                                                   |
|                                                                 | $\leq 55 V$ (C3 - 100 A)                                                           |
| Voltage protection level $U_p$ (line-earth)                     | $\leq 750 V$ (C1 - 1 kV / 500 A)                                                   |
|                                                                 | $\leq 750 V$ (C2 - 10 kV / 5 kA)                                                   |
|                                                                 | $\leq 1.2 kV$ (C3 - 100 A)                                                         |
| Voltage protection level $U_p$ static (line-line)               | $\leq 75 V$ (C1 - 1 kV / 500 A)                                                    |
|                                                                 | $\leq 120 V$ (C2 - 10 kV / 5 kA)                                                   |
| Voltage protection level $U_p$ static (line-earth)              | $\leq 750 V$ (C1 - 1 kV / 500 A)                                                   |
|                                                                 | $\leq 750 V$ (C2 - 10 kV / 5 kA)                                                   |
| Response time $t_A$ (line-line)                                 | $\leq 1 ns$                                                                        |
| Response time $t_A$ (line-earth)                                | $\leq 100 ns$                                                                      |
| Input attenuation aE, sym.                                      | typ. 0.3 dB ( $\leq 8.7 MHz/150 \Omega$ )                                          |
| Input attenuation aE, asym.                                     | typ. 0.3 dB ( $\leq 10.5 MHz/150 \Omega$ )                                         |
| Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system     | typ. 60 MHz                                                                        |
| Capacity (Core-Core)                                            | typ. 32 pF                                                                         |
| Resistance per path                                             | 1.65 $\Omega \pm 20 \%$                                                            |
| Surge protection fault message                                  | optical                                                                            |

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|                                 |                   |
|---------------------------------|-------------------|
| 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)    | ≤ 600 ms          |
| Pulse reset time (line-earth)   | ≤ 30 ms           |

## 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                                | ≤ 2000 m (amsl)  |
| Permissible humidity (operation)        | 5 % ... 95 %     |

## Approvals

### Conformity/Approvals

|                  |                                       |
|------------------|---------------------------------------|
| UL, USA / Canada | Class I, Div. 2, Groups A, B, C, D T4 |
|------------------|---------------------------------------|

## Standards and regulations

|                          |             |
|--------------------------|-------------|
| Standards/specifications | EN 60079-0  |
| Note                     | 2018        |
| Standards/specifications | EN 60079-11 |
| Note                     | 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 60079-11                                          |
| Note                     | 2008                                                  |
| Standards/specifications | IEC 61643-21                                          |
| Note                     | 2000 + corrigendum 2001 + A1:2008, modified + A2:2012 |

## Mounting

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

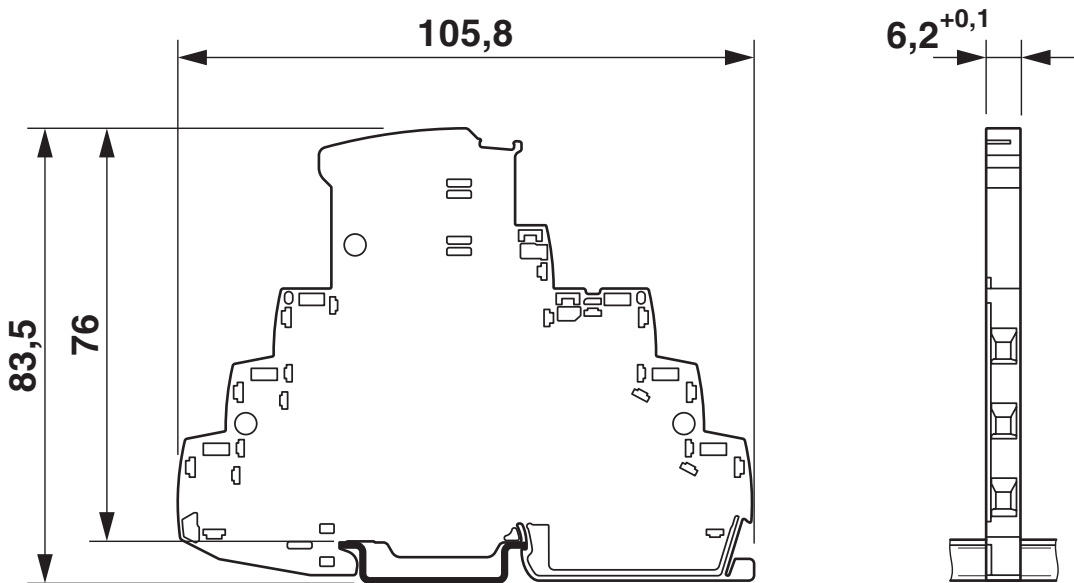
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Drawings

Dimensional drawing



Schematic diagram

| TTC-6-3-HF-F-M-EX-...-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   |
|                                                                                                                                                                                  |                          |                           |                          |       |                          |                            |      |                          |       |
|                                                                                                                                                                                  | 3.26x10 <sup>-5</sup>    | 5.80x10 <sup>-9</sup> 1/h | 0.3 %                    | 0.6 % | 1.63x10 <sup>-6</sup>    | 2.90x10 <sup>-10</sup> 1/h | 5 %  | 0.2 %                    | 0.3 % |
|                                                                                                                                                                                  |                          |                           |                          |       | 3.26x10 <sup>-6</sup>    | 5.80x10 <sup>-10</sup> 1/h | 10 % | 0.3 %                    | 0.6 % |
| 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% |                          |                           |                          |       |                          |                            |      |                          |       |
| 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

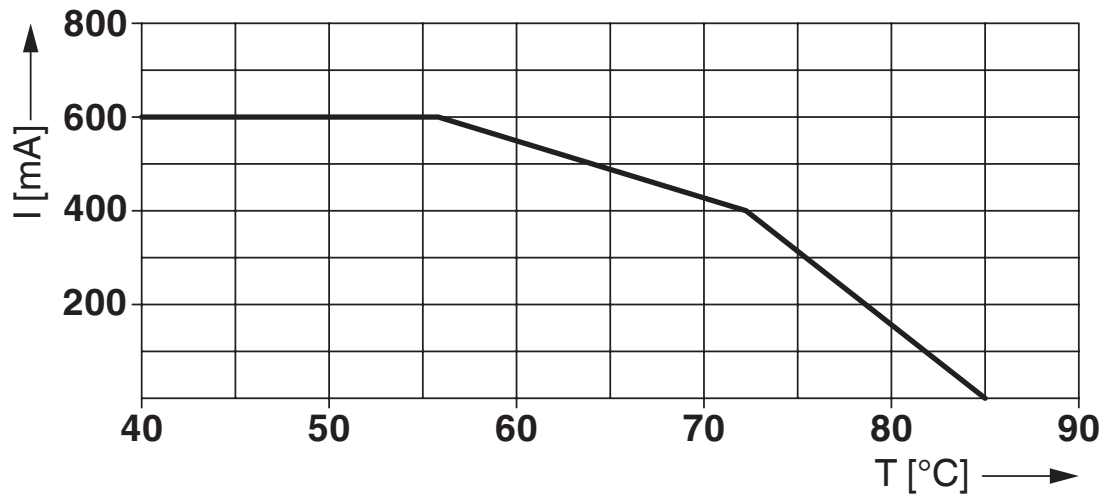
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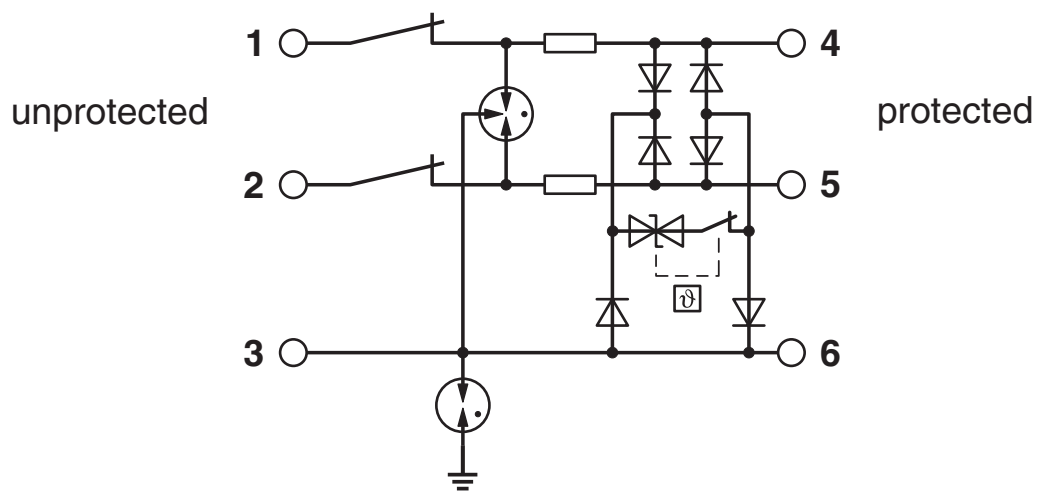
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Diagram



Derating for non-Ex applications

Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906823>



**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



**IECEx**

Approval ID: IECEx BVS 16.0090X



**cUL Listed**

Approval ID: FILE E 333250



**ATEX**

Approval ID: BVS 16 ATEX E 125 X

**INMETRO**

Approval ID: 19.0077 X



**NEPSI-EX**

Approval ID: GYJ20.1114X

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**CCC**

Approval ID: 2020322316000780



**UKCA-EX**

Approval ID: DEKRA 23UKEX0110X



**cULus Listed**

Approval ID: File E 333250



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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27171502 |
| ECLASS-15.0 | 27171502 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC001625 |
|----------|----------|

### 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                                | 60f316c9-166f-45cc-87a2-cf835c2028ef |

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