

# TTC-6-1X2-M-24DC-PT-I - Surge protection device



2906726

<https://www.phoenixcontact.com/us/products/2906726>

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Surge protection with integrated status indicator and knife disconnection for a 2-wire floating signal circuit, e.g., 0(4) ... 20 mA current loop, Ex e approval for zone 2, 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
- Signal circuits easily interrupted for maintenance work, thanks to vertical knife disconnection

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2906726       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | CL23          |
| Product key                          | CL2262        |
| GTIN                                 | 4055626134581 |
| Weight per piece (including packing) | 47.2 g        |
| Weight per piece (excluding packing) | 47.2 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, one-piece          |
| Wire pairs per module   | 1                                   |

### Insulation characteristics

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

### Electrical properties

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

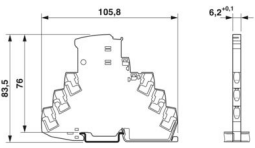
### Connection data

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| Connection method                | Push-in connection                          |
| 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) |
|                                 | 300 mA (T4 / $> 50$ °C ... $\leq 70$ °C) |
| Maximum input voltage           | 30 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               | 83.5 mm (incl. DIN rail 7.5 mm)                                                      |

### Material specifications

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|                                        |                 |
|----------------------------------------|-----------------|
| Color                                  | gray (RAL 7042) |
| 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 $U_N$                                                 | 24 V DC                                                                            |
| Maximum continuous operating voltage $U_C$                            | 30 V DC                                                                            |
|                                                                       | 21 V AC                                                                            |
| Rated current                                                         | 600 mA (40 °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)                            | $\leq 55 \text{ V}$ (C1 - 1 kV / 500 A)                                            |
|                                                                       | $\leq 65 \text{ V}$ (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)                           | $\leq 750 \text{ V}$ (C1 - 1 kV / 500 A)                                           |
|                                                                       | $\leq 750 \text{ V}$ (C2 - 10 kV / 5 kA)                                           |
|                                                                       | $\leq 700 \text{ V}$ (C3 - 25 A)                                                   |
|                                                                       | $\leq 750 \text{ V}$ (C3 - 100 A)                                                  |
| Voltage protection level $U_p$ static (line-line)                     | $\leq 50 \text{ V}$ (C1 - 1 kV / 500 A)                                            |
|                                                                       | $\leq 65 \text{ V}$ (C2 - 10 kV / 5 kA)                                            |
| Voltage protection level $U_p$ static (line-earth)                    | $\leq 750 \text{ V}$ (C1 - 1 kV / 500 A)                                           |
|                                                                       | $\leq 750 \text{ V}$ (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)                                                                        |
|                                                                       | C1 - 1 kV / 500 A                                                                  |

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|                                 |                   |
|---------------------------------|-------------------|
| Impulse durability (line-line)  | 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)    | ≤ 700 ms          |
| Pulse reset time (line-earth)   | ≤ 1500 ms         |

## Additional technical data

|                                                            |                     |
|------------------------------------------------------------|---------------------|
| Max. total discharge current $I_{total\ max} (8/20) \mu s$ | 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 T4 |
|------------------|---------------------------------------|

## 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           |
| Note                     | 2015 + A1:2018           |

## Mounting

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

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## Drawings

Dimensional drawing

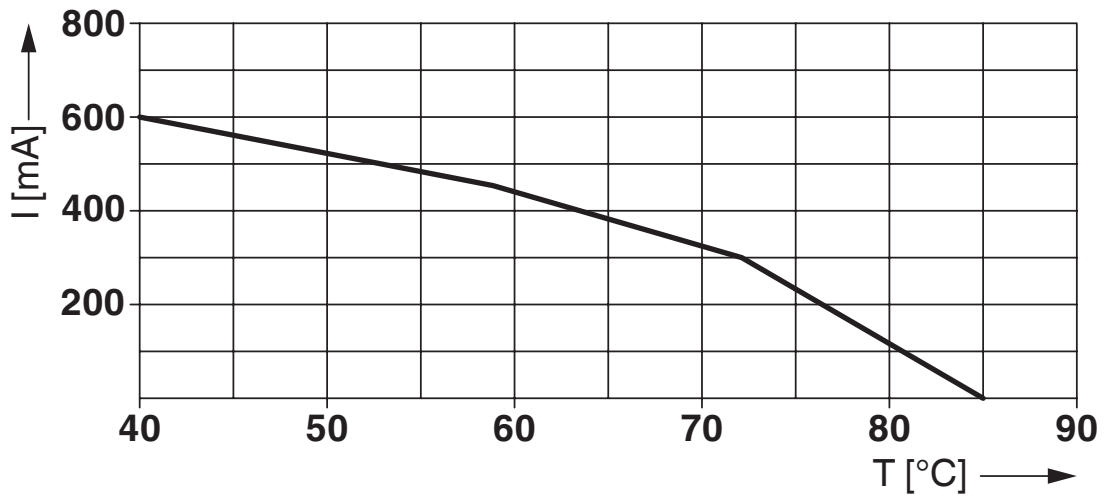


Schematic diagram

| TTC-6-1X2-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   |
|                                                                                                                                                                                                                                                                                                                          | 3.04·10 <sup>-5</sup>    | 5.40·10 <sup>-9</sup> 1/h | 0.3 %                    | 0.5 % | 1.52·10 <sup>-6</sup>    | 2.70·10 <sup>-10</sup> 1/h | 5 %  | 0.2 %                    | 0.3 % |
|                                                                                                                                                                                                                                                                                                                          |                          |                           |                          |       | 3.04·10 <sup>-6</sup>    | 5.40·10 <sup>-10</sup> 1/h | 10 % | 0.3 %                    | 0.5 % |
| 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%<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

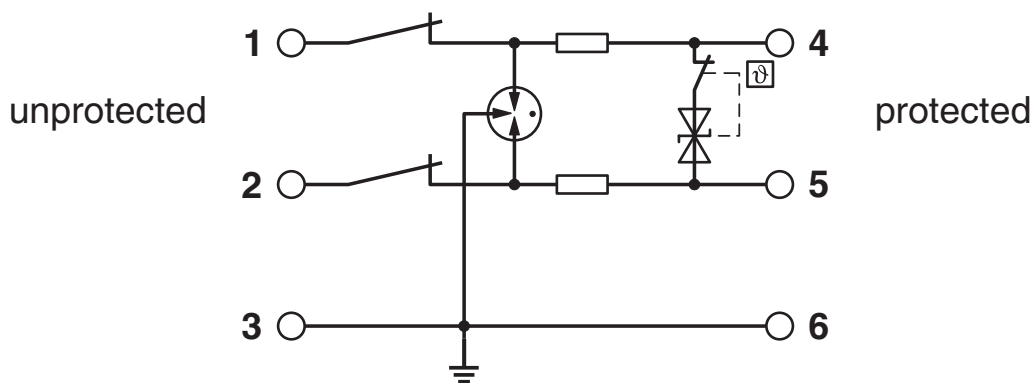


Diagram

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 |
| $> 50^{\circ}\text{C} \dots \leq 70^{\circ}\text{C}$ | 300 mA |

Circuit diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906726>



**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 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 | 27171501 |
| ECLASS-15.0 | 27171501 |

### 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)                 |
|                                     | Lead(CAS: 7439-92-1)                 |
| SCIP                                | 61e1084f-6320-4b83-8303-2702f38d9dbf |

### EF3.1 Climate Change

|         |               |
|---------|---------------|
| CO2e kg | 1.102 kg CO2e |
|---------|---------------|

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