

TTC-6-1X2-24DC-UT - Surge protection device



2906798

<https://www.phoenixcontact.com/us/products/2906798>

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Surge protection for a 2-wire floating signal circuit, e.g., 0(4) mA ... 20 mA current loop, HART-compatible. Can be used in safety-related circuits up to SIL 3.



Your advantages

- Space saving with a narrow overall width of just 6 mm
- Cost-optimized with tailored product features
- Easy selection for all possible demands in MCR applications with a complete product portfolio

Commercial data

| | |
|--------------------------------------|---------------|
| Item number | 2906798 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | CL23 |
| Product key | CL2261 |
| GTIN | 4055626135533 |
| Weight per piece (including packing) | 38.6 g |
| Weight per piece (excluding packing) | 38.6 g |
| Customs tariff number | 85363010 |
| Country of origin | US |

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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 | Screw connection |
| Screw thread | M3 |
| Tightening torque | 0.5 Nm ... 0.6 Nm |
| Conductor cross-section flexible | 0.2 mm ² ... 2.5 mm ² |
| Conductor cross-section rigid | 0.2 mm ² ... 4 mm ² |
| Conductor cross-section AWG | 24 ... 12 |

Dimensions

| | |
|---------------------|---------------------------------|
| Dimensional drawing | |
| Width | 6.2 mm +0.1 mm |
| Height | 105.8 mm |
| Depth | 69.5 mm (incl. DIN rail 7.5 mm) |

Material specifications

| | |
|--|-----------------------|
| Color | gray (RAL 7042) |
| | light gray (RAL 7035) |
| Flammability rating according to UL 94 | V-0 |
| Insulating material | PBT |
| Housing material | PBT |

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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 | $\leq 5 \mu A$ |
| Protective conductor current I_{PE} | $\leq 1 \mu A$ |
| 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 |
| Output voltage limitation at 1 kV/ μs (wire-wire) | $\leq 45 V$ |
| Voltage protection level U_p (line-line) | $\leq 55 V$ (C1 - 1 kV / 500 A) |
| | $\leq 65 V$ (C2 - 10 kV / 5 kA) |
| | $\leq 50 V$ (C3 - 25 A) |
| | $\leq 55 V$ (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) |
| | $\leq 700 V$ (C3 - 25 A) |
| | $\leq 750 V$ (C3 - 100 A) |
| Voltage protection level U_p static (line-line) | $\leq 50 V$ (C1 - 1 kV / 500 A) |
| | $\leq 65 V$ (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 ($\leq 250 kHz / 150 \Omega$) |
| | typ. 0.3 dB ($\leq 370 kHz / 100 \Omega$) |
| Cut-off frequency f_g (3 dB), sym. in 100 Ω system | typ. 1310 kHz |
| Cut-off frequency f_g (3 dB), sym. in 150 Ω system | typ. 940 kHz |
| Capacity (Core-Core) | typ. 2.2 nF |
| Resistance per path | 1.65 $\Omega \pm 20 \%$ |
| Surge protection fault message | none |
| Max. required back-up fuse | 630 mA (FF) |
| Impulse durability (line-line) | C1 - 1 kV / 500 A |
| | C2 - 10 kV / 5 kA |

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| | |
|---------------------------------|-------------------|
| | 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 $I_{\text{total max}} (8/20) \mu\text{s}$ | 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 | ≤ 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 |

Mounting

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

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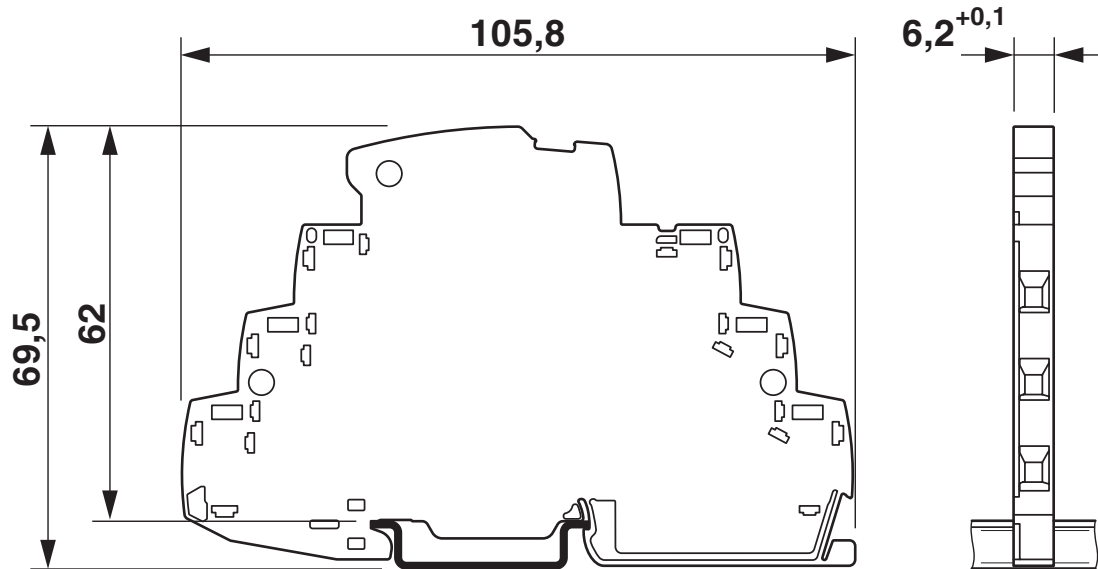


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Drawings

Dimensional drawing



Schematic diagram

| TTC-6-1X2-... | | | | | | | | | |
|--|--------------------------|---------------------------|--------------------------|-------|--------------------------|----------------------------|------|--------------------------|-------|
| 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 |
| | 3.04x10 ⁻⁵ | 5.40x10 ⁻⁹ 1/h | 0.3 % | 0.5 % | 1.52x10 ⁻⁶ | 2.70x10 ⁻¹⁰ 1/h | 5 % | 0.2 % | 0.3 % |
| | | | | | 3.04x10 ⁻⁶ | 5.40x10 ⁻¹⁰ 1/h | 10 % | 0.3 % | 0.5 % |
| Calculation based on exida report, Phoenix Contact 16/06-072 R023 V3R1 exida Profile 1, FMEDA Analysis 2, T _{proof} : 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

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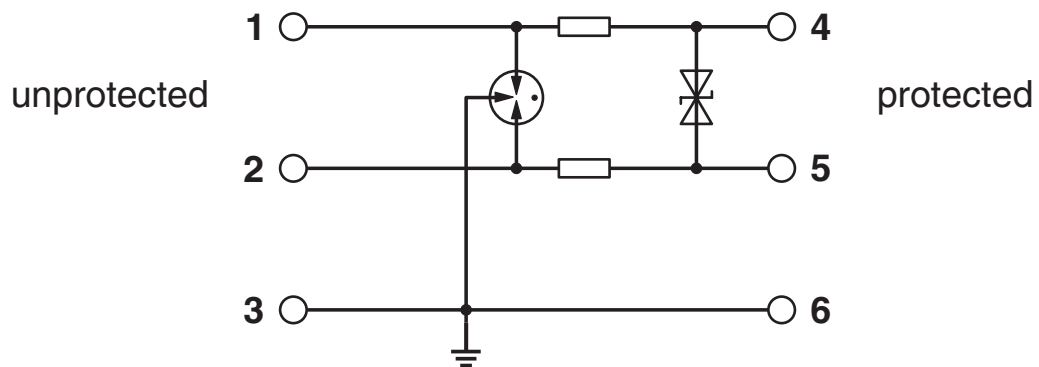
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Diagram



Circuit diagram



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Approvals

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 **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

 **cUL Listed**
Approval ID: FILE E 333250

 **cULus Listed**
Approval ID: File E 333250

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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) |
| SCIP | 25528658-df5e-4a25-9a74-28d661729cee |

EF3.1 Climate Change

| | |
|---------|---------------|
| CO2e kg | 1.025 kg CO2e |
|---------|---------------|

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