

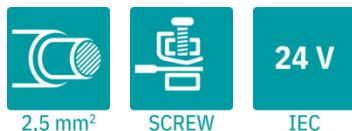
# TTC-6P-3-APL-EX-24DC-UT-I - Surge protection device



1635587

<https://www.phoenixcontact.com/us/products/1635587>

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Surge protection, consisting of protective plug and base element, with integrated status indicator for a 3-wire Ex i signal circuit. For HF applications. Protective circuit exclusively with gas discharge tubes. For use in two-wire Ethernet systems with cable shielding (APL, 2-WISE) and 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
- Fulfillment of the APL application specification thanks to the optimized protective circuit
- Easy integration of shielding thanks to a third terminal block level on the product
- Continuous monitoring of protective devices, plus mechanical status indicator with optional remote signaling
- The signal is not influenced during maintenance work, thanks to the impedance-neutral insertion and removal of protective plugs

## Commercial data

|                                      |                                |
|--------------------------------------|--------------------------------|
| Item number                          | 1635587                        |
| Packing unit                         | 1 pc                           |
| Minimum order quantity               | 1 pc                           |
| Note                                 | Made to order (non-returnable) |
| Sales key                            | CL23                           |
| Product key                          | CL2162                         |
| GTIN                                 | 4067923157163                  |
| Weight per piece (including packing) | 64.5 g                         |
| Weight per piece (excluding packing) | 44.2 g                         |
| Customs tariff number                | 85363030                       |
| 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, two-section, divisible |

### 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 <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

|                                 |                              |
|---------------------------------|------------------------------|
| Identification                  | 2 WISE auxiliary device      |
| Maximum inner capacitance $C_i$ | negligible                   |
| Max. internal inductance $L_i$  | negligible                   |
| Max. input current $I_i$        | 1 A (T4 / -40 °C ... +85 °C) |
|                                 | 1 A (T6 / -40 °C ... +70 °C) |
| Max. input voltage $U_i$        | 30 V DC                      |
| Ambient temperature (operation) | -40 °C ... 85 °C (T4)        |
|                                 | -40 °C ... 70 °C (T6)        |

### Dimensions

|                     |                |
|---------------------|----------------|
| Dimensional drawing |                |
| Width               | 6.2 mm +0.1 mm |
| Height              | 105.8 mm       |

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|       |                                |
|-------|--------------------------------|
| Depth | 100 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 & Signal Ground/Shield-Earth Ground |
| Nominal voltage $U_N$                                           | 24 V DC                                                                   |
| Maximum continuous operating voltage $U_C$                      | 30 V DC                                                                   |
| Operating effective current $I_C$ at $U_C$                      | $\leq 1 \mu A$                                                            |
| Protective conductor current $I_{PE}$                           | $\leq 1 \mu A$                                                            |
| Nominal discharge current $I_n$ (8/20) $\mu s$ (line-ground)    | 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-earth)                     | < 1000 V (C1 - 1 kV / 500 A)                                              |
|                                                                 | < 1300 V (C2 - 10 kV / 5 kA)                                              |
|                                                                 | < 1300 V (C3 - 100 A)                                                     |
| Response time $t_A$ (line-earth)                                | $\leq 100$ ns                                                             |
| Input attenuation aE, sym.                                      | < 0.1 dB ( $\leq 20$ MHz / 100 $\Omega$ )                                 |
|                                                                 | < 1 dB ( $\leq 220$ MHz / 100 $\Omega$ )                                  |
| Cut-off frequency $f_g$ (3 dB), sym. in 100 $\Omega$ system     | > 250 MHz                                                                 |
| Capacity (Core-Earth)                                           | < 13 pF                                                                   |
| Resistance per path                                             | < 0.1 $\Omega \pm 20$ %                                                   |
| Surge protection fault message                                  | optical                                                                   |
| Max. required back-up fuse                                      | 3.15 A (FF)                                                               |
| Impulse durability (line-earth)                                 | C1 - 1 kV / 500 A                                                         |
|                                                                 | C2 - 10 kV / 5 kA                                                         |
|                                                                 | C3 - 100 A                                                                |
|                                                                 | D1 - 500 A                                                                |
| Pulse reset time (line-earth)                                   | $\leq 500$ 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 |

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

## Approvals

### Conformity/Approvals

|                  |                 |
|------------------|-----------------|
| UL, USA / Canada | Class I, Div. 2 |
|------------------|-----------------|

## Standards and regulations

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
| Standards/specifications | EN/IEC 60079-0                                        |
| Note                     | 2018                                                  |
| Standards/specifications | EN 60079-11                                           |
| Note                     | 2012                                                  |
| Standards/specifications | CLC TS 60079-47                                       |
| Note                     | 2021                                                  |
| Standards/specifications | EN 61643-21                                           |
| Note                     | 2001 + A1:2009 + A2:2013                              |
| Standards/specifications | IEC 60079-0                                           |
| Note                     | 2017                                                  |
| Standards/specifications | IEC 60079-11                                          |
| Note                     | 2011                                                  |
| Standards/specifications | IEC/TS 60079-47                                       |
| Note                     | 2021                                                  |
| Standards/specifications | IEC 61643-21                                          |
| Note                     | 2000 + corrigendum 2001 + A1:2008, modified + A2:2012 |

## Mounting

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

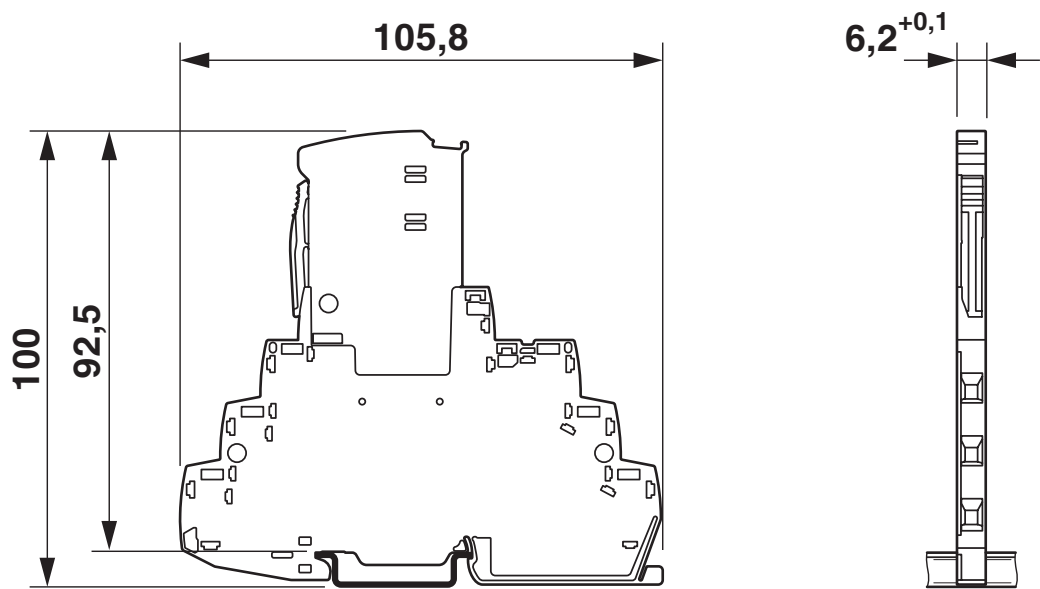
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Drawings

Dimensional drawing



Schematic diagram

| TTC-6P-3-APL-(EX-)24DC-UT-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   |
|                                                                                                                                                                                                                                                                                                                          | 1,49x10 <sup>-7</sup>    | 1,80x10 <sup>-11</sup> | 0,0 %                    | 0,0 % | 7,47x10 <sup>-9</sup>    | 1,13x10 <sup>-12</sup> 1/h | 5 %  | 0,0 % 0,0 %              |
|                                                                                                                                                                                                                                                                                                                          |                          |                        |                          |       | 1,49x10 <sup>-8</sup>    | 2,25x10 <sup>-12</sup> 1/h | 10 % | 0,0 % 0,0 %              |
| Calculation based on exida report, Phoenix Contact 16/06-072 R022 V4R2<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) |                          |                        |                          |       |                          |                            |      |                          |

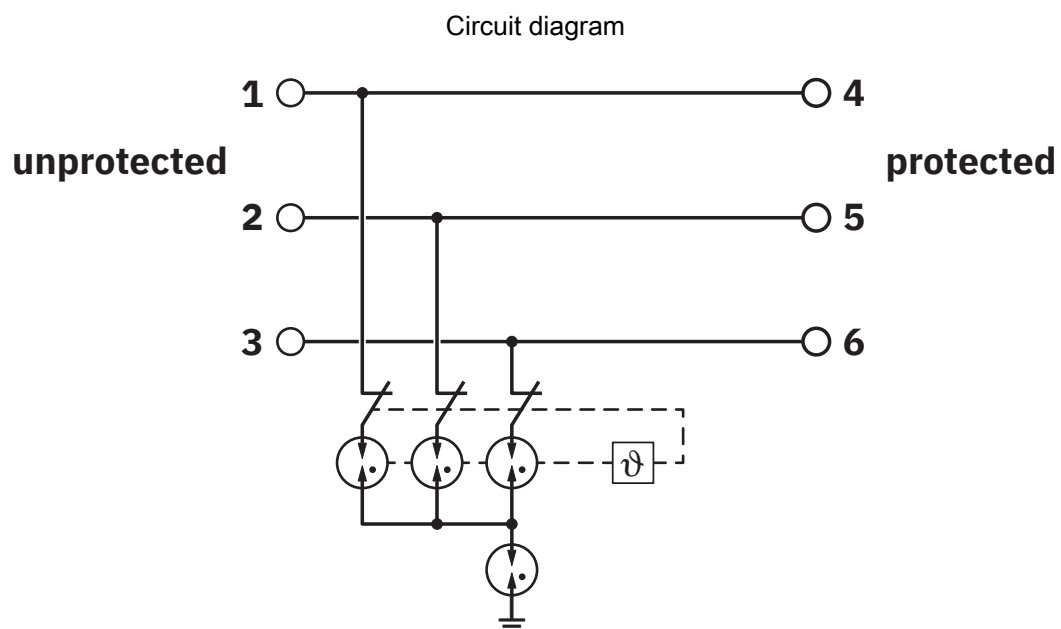
Functional safety scenarios

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/1635587>

### Functional Safety

Approval ID: 16-06-072 R022 V4R3



### UL Listed

Approval ID: FILE E 138168



### CCC

Approval ID: 2020322316000780



### cULus Listed

Approval ID: File E 333250



### IECEx

Approval ID: IECEx BVS 16.0090X



### ATEX

Approval ID: BVS 16 ATEX E 125 X

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## Classifications

### ECLASS

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

### ETIM

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

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## Environmental product compliance

### EU RoHS

|                                         |                    |
|-----------------------------------------|--------------------|
| Fulfills EU RoHS substance requirements | Yes, No exemptions |
|-----------------------------------------|--------------------|

### China RoHS

|                                        |                                          |
|----------------------------------------|------------------------------------------|
| Environment friendly use period (EFUP) | EFUP-E                                   |
|                                        | No hazardous substances above the limits |

### EU REACH SVHC

|                                     |                            |
|-------------------------------------|----------------------------|
| REACH candidate substance (CAS No.) | No substance above 0.1 wt% |
|-------------------------------------|----------------------------|

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