

# TTC-6P-1X2-F-M-24DC-UT-I - Surge protection device



2906781

<https://www.phoenixcontact.com/us/products/2906781>

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Surge protection, consisting of protective plug and base element, with integrated status indicator and disconnect knife for a 2-wire floating signal circuit, e.g., 0(4) mA ... 20 mA current loop. Indirect grounding via gas discharge tube, 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
- 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	2906781
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	CL23
Product key	CL2161
GTIN	4055626135380
Weight per piece (including packing)	47.1 g
Weight per piece (excluding packing)	47.1 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, two-section, divisible
Wire pairs per module	1

### Insulation characteristics

Overvoltage category	III
Pollution degree	2

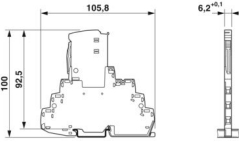
### Electrical properties

Nominal voltage $U_N$	24 V DC
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### 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

### Dimensions

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

### 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
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### 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 (56 °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)	$\leq 200 \text{ V}$ (C1 - 1 kV / 500 A) $\leq 320 \text{ V}$ (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)	$\leq 900 \text{ V}$ (C1 - 1 kV / 500 A) $\leq 1.05 \text{ kV}$ (C2 - 10 kV / 5 kA) $\leq 1.3 \text{ kV}$ (C3 - 25 A) $\leq 1.4 \text{ kV}$ (C3 - 100 A)
Voltage protection level $U_p$ static (line-line)	$\leq 50 \text{ V}$ (C1 - 1 kV / 500 A) $\leq 120 \text{ V}$ (C2 - 10 kV / 5 kA)
Voltage protection level $U_p$ static (line-earth)	$\leq 900 \text{ V}$ (C1 - 1 kV / 500 A) $\leq 1.05 \text{ kV}$ (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)
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

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	C3 - 100 A
	D1 - 500 A
Pulse reset time (line-line)	≤ 700 ms
Pulse reset time (line-earth)	≤ 30 ms

## Additional technical data

Max. total discharge current $I_{\text{total max}} (8/20) \mu\text{s}$	20 kA (1x)
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## 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 %

## 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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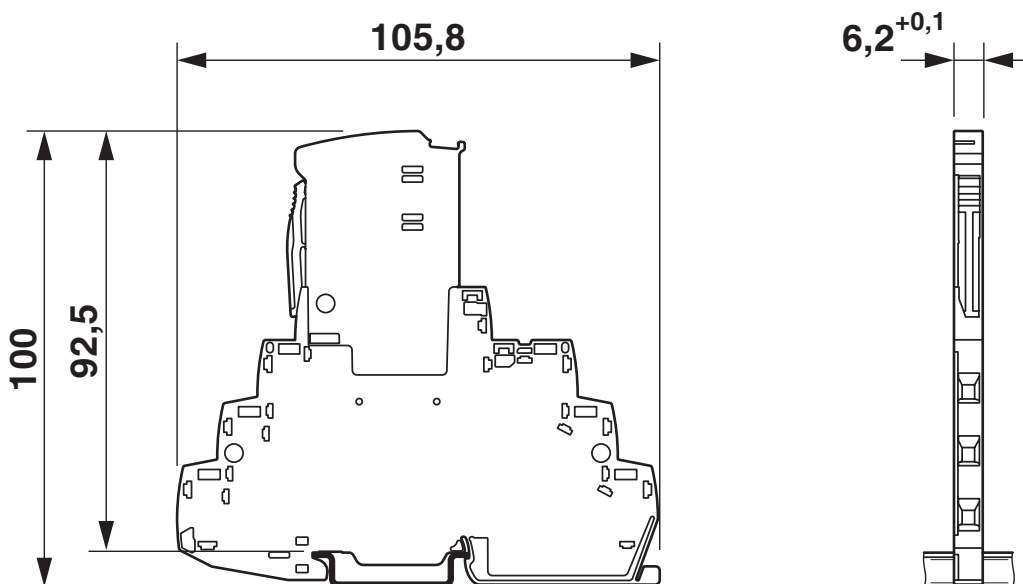


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## Drawings

Dimensional drawing



Schematic diagram

TTC-6P-1x2-F-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
	2.70x10 <sup>-5</sup>	4.80x10 <sup>-9</sup> [1/h]	0.3 %	0.5 %	1.35x10 <sup>-6</sup>	2.40x10 <sup>-10</sup> 1/h	5 %	0.1 %	0.2 %
					2.70x10 <sup>-6</sup>	4.80x10 <sup>-10</sup> 1/h	10 %	0.3 %	0.5 %

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



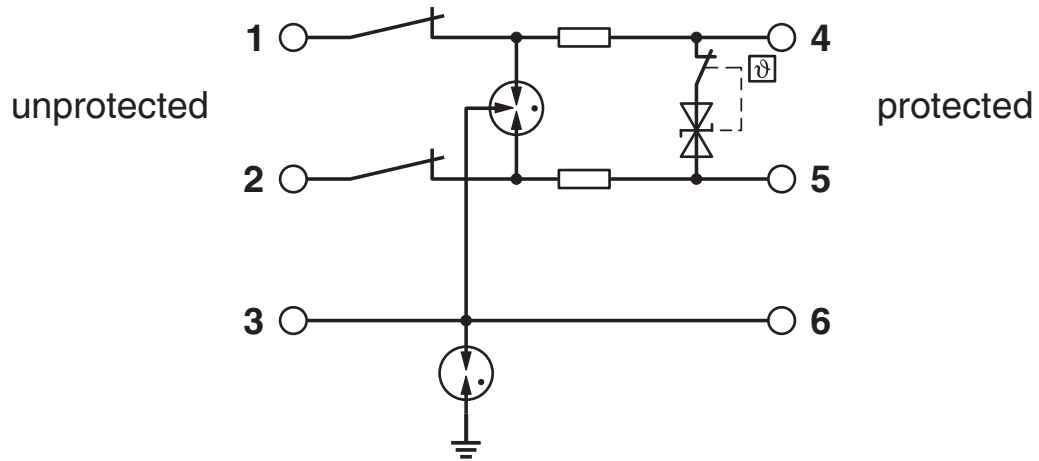
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Circuit diagram





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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: 22-06-16781

**Functional Safety**  
Approval ID: 16-06-072 R022 V4R3

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## Classifications

### ECLASS

ECLASS-13.0	27171501
ECLASS-15.0	27171501

### ETIM

ETIM 10.0	EC001466
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### 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	b738c4d4-4b6f-4310-9c32-e2c967002fbf

### EF3.1 Climate Change

CO2e kg	1.48 kg CO2e
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