

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



2906713

<https://www.phoenixcontact.com/us/products/2906713>

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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	2906713
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	CL23
Product key	CL2261
GTIN	4055626134376
Weight per piece (including packing)	52.4 g
Weight per piece (excluding packing)	41.7 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
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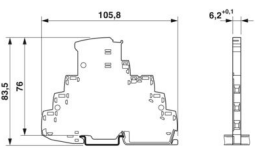
### Connection data

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

### 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

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Depth	83.5 mm (incl. DIN rail 7.5 mm)
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## Material specifications

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
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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 (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)	$\leq 55 V$ (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 ( $\leq 250 kHz / 150 \Omega$ )
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 $\Omega \pm 20 \%$

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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
	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)
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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 %

## Approvals

### Conformity/Approvals

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

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Mounting type

DIN rail: TH 35 - 7.5 mm

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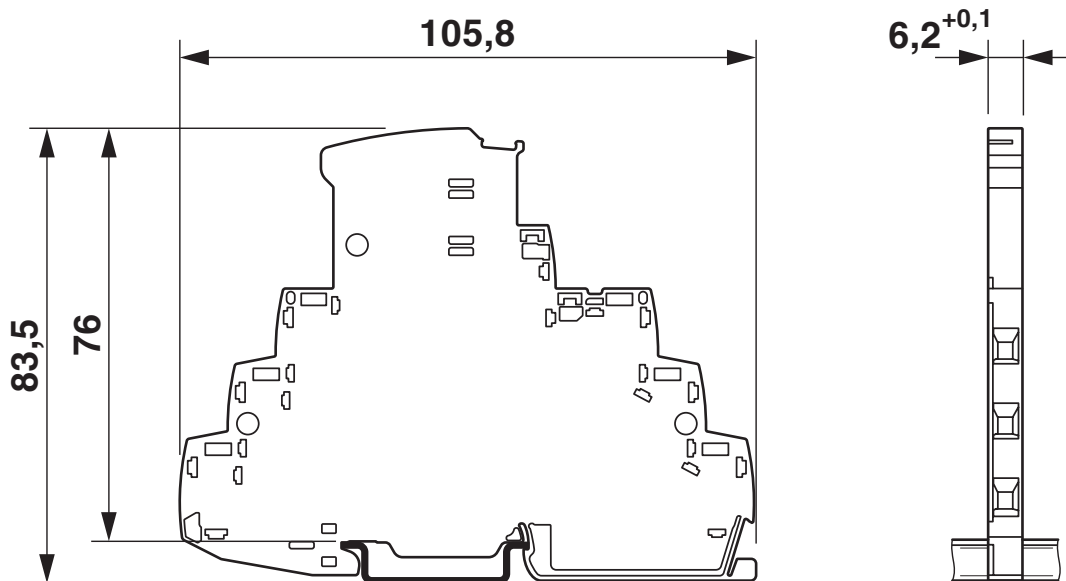


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## Drawings

Dimensional drawing

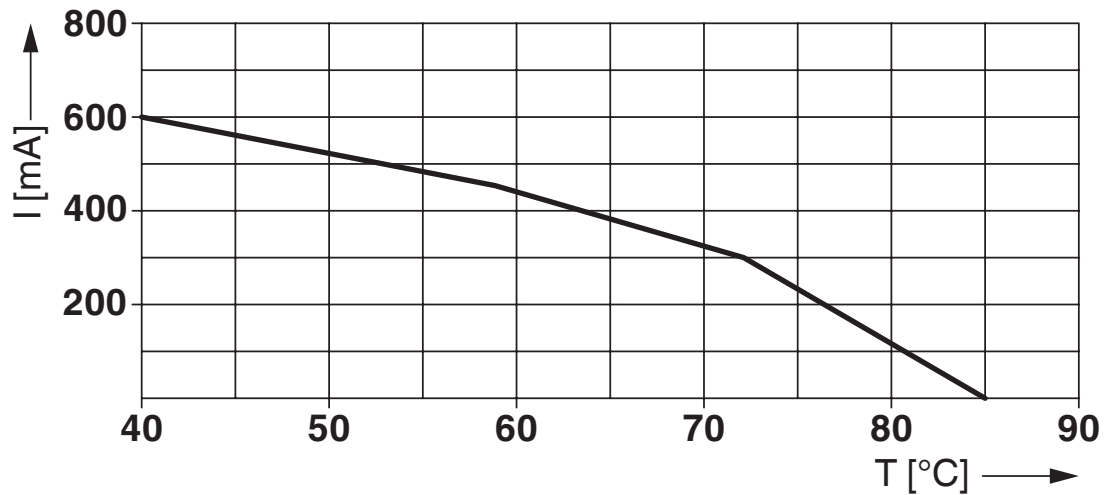


Schematic diagram

TTC-6-1X2-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 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

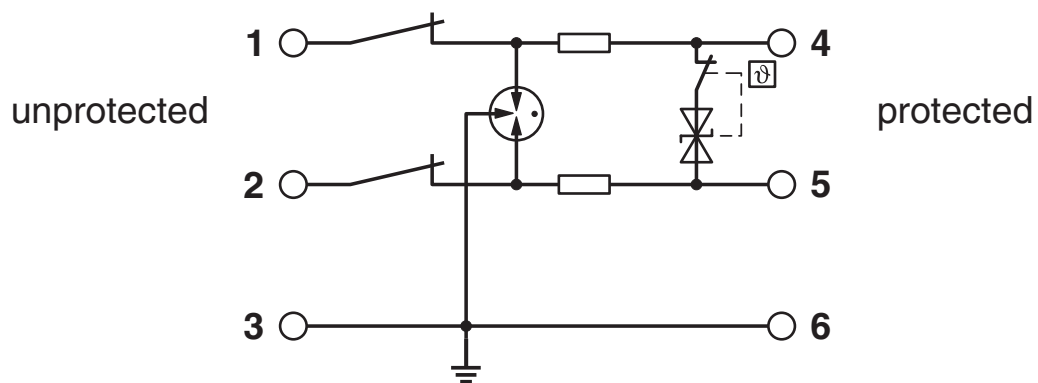


Diagram

**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/2906713>



**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



**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
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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	c018cccd-0dbf-42f3-92c6-c46f4692ff1c

### EF3.1 Climate Change

CO2e kg	1.09 kg CO2e
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