

# S-PT-1X2-24DC - Surge protection device



2880668

<https://www.phoenixcontact.com/us/products/2880668>

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Surge protection in the IP67 screw-on module for measuring sensors, direct mounting with M20 x 1.5 outer thread, cable gland for the signal line, two-stage protective circuit. HART-compatible. Can be used in safety-related circuits up to SIL 3.

## Your advantages

- Easiest field mounting with standardized thread
- Versatile in use with universal protective circuit
- Use under extreme ambient conditions with robust design

## Commercial data

Item number	2880668
Packing unit	1 pc
Minimum order quantity	1 pc
Note	Made to order (non-returnable)
Sales key	CL02
Product key	CL2231
GTIN	4046356049009
Weight per piece (including packing)	418.1 g
Weight per piece (excluding packing)	352.52 g
Customs tariff number	85363010
Country of origin	DE

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## Technical data

### Notes

Notes on operation	When the bridge is disconnected, the shield connection is indirectly connected to the housing or reference potential.
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### Product properties

Product type	Surge protection for MCR technology
Product family	SURGETRAB
IEC test classification	C1
	C2
	C3
	D1
Type	Screw-in module
Number of positions	3
Surge protection fault message	none
Wire pairs per module	1

### Insulation characteristics

Overvoltage category	III
Pollution degree	2

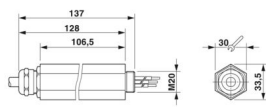
### Electrical properties

Nominal voltage $U_N$	24 V DC
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### Connection data

Connection method	Screw connection
Screw thread	M3
Tightening torque	0.6 Nm
Conductor cross-section flexible	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross-section rigid	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross-section AWG	26 ... 16

### Dimensions

Dimensional drawing	
Width	33.5 mm
Height	33.5 mm
Depth	137 mm

### Material specifications

Color	Steel/stainless steel color
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Housing material	Zinc die-cast, surface bronzed and nickel-plated
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## Mechanical properties

### Mechanical data

Open side panel	No
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## Protective circuit

Direction of action	Line-Line & Line-Earth Ground
Nominal voltage $U_N$	24 V DC
Maximum continuous operating voltage $U_C$	40 V DC
	28 V AC
Rated current	450 mA (55 °C)
Operating effective current $I_C$ at $U_C$	$\leq 10 \mu\text{A}$
Protective conductor current $I_{PE}$	$\leq 2 \mu\text{A}$
Nominal discharge current $I_n$ (8/20) $\mu\text{s}$ (line-line)	10 kA
Nominal discharge current $I_n$ (8/20) $\mu\text{s}$ (line-ground)	10 kA (per path)
Nominal discharge current $I_n$ (8/20) $\mu\text{s}$ (shield-ground)	10 kA (optional)
Pulse discharge current $I_{imp}$ (10/350) $\mu\text{s}$	1 kA
Total discharge current $I_{Total}$ (8/20) $\mu\text{s}$	20 kA
Total discharge current $I_{Total}$ (10/350) $\mu\text{s}$	2 kA
Max. discharge current $I_{max}$ (8/20) $\mu\text{s}$ maximum (line-line)	10 kA
Max. discharge current $I_{max}$ (8/20) $\mu\text{s}$ maximum (line-earth)	10 kA (per path)
Discharge surge current $I_{max}$ (8/20) $\mu\text{s}$ maximum (shield-ground)	10 kA
Nominal pulse current $I_{an}$ (10/1000) $\mu\text{s}$ (line-line)	23 A
Nominal pulse current $I_{an}$ (10/1000) $\mu\text{s}$ (line-earth)	100 A
Nominal pulse current $I_{an}$ (10/1000) $\mu\text{s}$ (shield-ground)	100 A
Output voltage limitation at 1 kV/ $\mu\text{s}$ (line-line) spike	$\leq 55 \text{ V}$
Output voltage limitation at 1 kV/ $\mu\text{s}$ (line-earth) spike	$\leq 450 \text{ V}$ (Direct grounding)
Output voltage limitation at 1 kV/ $\mu\text{s}$ (shield-ground) spike	$\leq 600 \text{ V}$ (optional)
Output voltage limitation at 1 kV/ $\mu\text{s}$ (line-line) static	$\leq 55 \text{ V}$
Output voltage limitation at 1 kV/ $\mu\text{s}$ (line-earth) static	$\leq 450 \text{ V}$ (Direct grounding)
Residual voltage at $I_n$ (conductor-conductor)	$\leq 55 \text{ V}$
Residual voltage with $I_{an}$ (10/1000) $\mu\text{s}$ (line-line)	$\leq 65 \text{ V}$
Voltage protection level $U_p$ (line-line)	$\leq 80 \text{ V}$ (C2 - 10 kV / 5 kA)
Voltage protection level $U_p$ (line-earth)	$\leq 450 \text{ V}$ (C2 - 10 kV / 5 kA)
Voltage protection level $U_p$ (shield-ground)	$\leq 600 \text{ V}$ (C2 - 10 kV / 5 kA)
Voltage protection level $U_p$ static (line-line)	$\leq 50 \text{ V}$ (C2 - 10 kV / 5 kA)
Response time $t_A$ (line-line)	$\leq 1 \text{ ns}$
Response time $t_A$ (line-earth)	$\leq 100 \text{ ns}$
Response time $t_A$ (shield-ground)	$\leq 100 \text{ ns}$
Input attenuation aE, sym.	typ. 0.5 dB ( $\leq 1.5 \text{ MHz} / 50 \Omega$ )
	typ. 0.2 dB ( $\leq 300 \text{ kHz} / 150 \Omega$ )
Cut-off frequency $f_g$ (3 dB), sym. in 50 $\Omega$ system	typ. 6 MHz
Cut-off frequency $f_g$ (3 dB), sym. in 150 $\Omega$ system	typ. 2 MHz

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Resistance per path	2.2 $\Omega$ $\pm$ 10 %
Surge protection fault message	none
Max. required back-up fuse	500 mA (T)
Impulse durability (line-line)	C2 - 10 kV / 5 kA
	D1 - 1 kA
Impulse durability (line-earth)	C2 - 10 kV / 5 kA
	D1 - 1 kA
Impulse durability (shield-ground)	C2 - 10 kV/5 kA
	D1 - 1 kA

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP67
Ambient temperature (operation)	-40 °C ... 85 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Altitude	$\leq$ 2000 m (amsl)

## Standards and regulations

### Air clearances and creepage distances

Standards/regulations	IEC 60664-1 / VDE 0110-1
Standards/specifications	IEC 61643-21
Note	2002

## Mounting

Mounting type	direct screw connection
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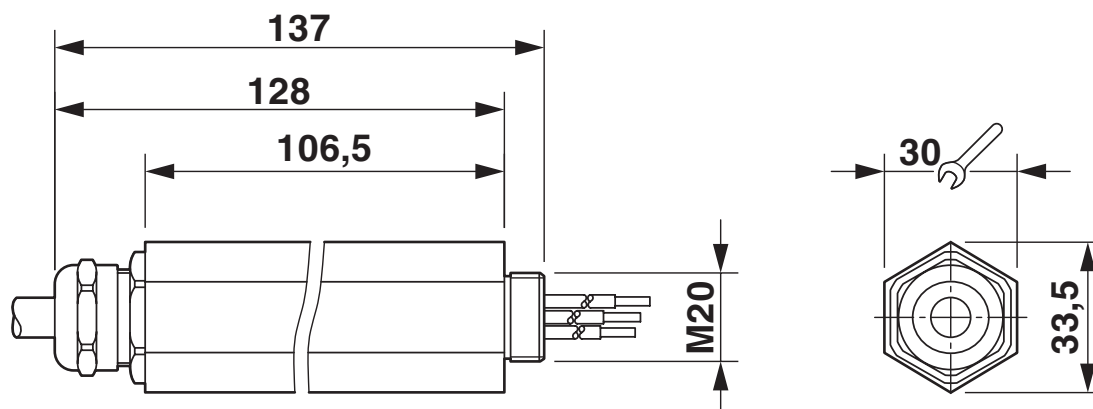


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## Drawings

Dimensional drawing

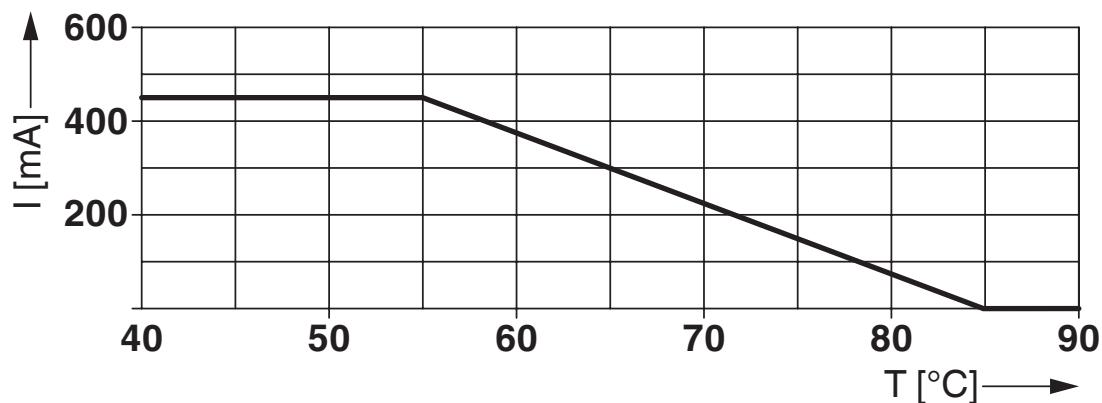


Schematic diagram

S-PT-1X2-24DC*									
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
	4.50·10 <sup>-6</sup>	8.00·10 <sup>-10</sup> 1/h	0.0 %	0.1 %	2.25·10 <sup>-7</sup>	4.00·10 <sup>-11</sup> 1/h	5 %	0.0 %	0.0 %
					4.50·10 <sup>-7</sup>	8.00·10 <sup>-11</sup> 1/h	10 %	0.0 %	0.1 %
Calculation based on exida report, Phoenix Contact 23/05-128 R029 V1R0 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



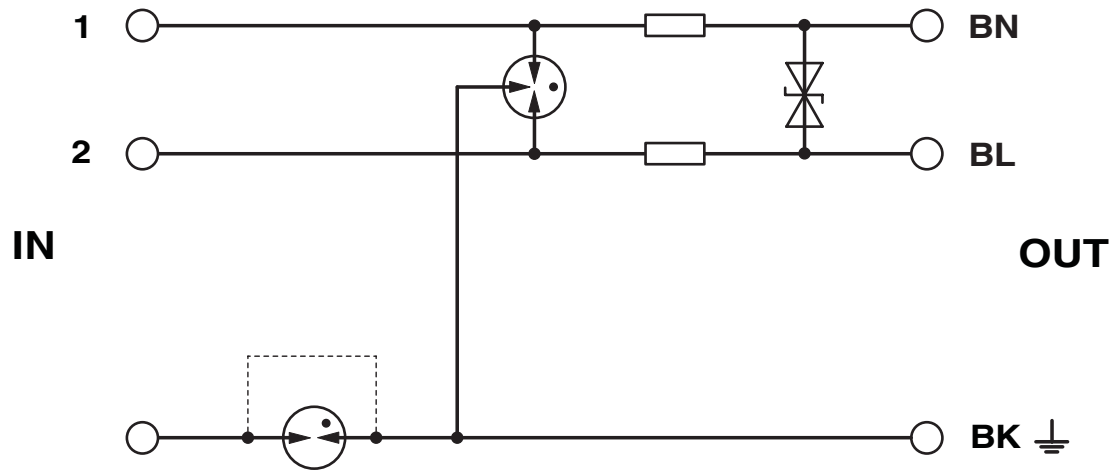
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Circuit diagram



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## Approvals

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### Functional Safety

Approval ID: 23-05-128 R029 V1R0

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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)

### 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	4d77b868-fb3a-4416-952c-40f64197bc26

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