

S-PT-EX(I)-24DC - Surge protection device



2880671

<https://www.phoenixcontact.com/us/products/2880671>

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Surge protection in the IP67 screw-on module for measuring sensors in intrinsically safe circuits, direct mounting with M20 x 1.5 external 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	2880671
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	CL02
Product key	CL2231
GTIN	4046356049016
Weight per piece (including packing)	409.1 g
Weight per piece (excluding packing)	402 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 ² ... 1.5 mm ²
Conductor cross-section rigid	0.14 mm ² ... 1.5 mm ²
Conductor cross-section AWG	26 ... 16

Ex data

Maximum inner capacitance C_i	2 nF
Max. internal inductance L_i	1 μ H
Max. input current I_i	350 mA (T4 / ≤ 50 °C)
	350 mA (T5 / ≤ 50 °C)
	350 mA (T6 / ≤ 50 °C)
Max. input voltage U_i	30 V
max. input power P_i	3.00 W
Insulation voltage to ground	500 V AC
Ambient temperature (operation)	-40 °C ... 50 °C
	135 °C (T4)

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Max. surface temperature	100 °C (T5)
	85 °C (T6)

Dimensions

Dimensional drawing	
Width	33.5 mm
Height	33.5 mm
Depth	137 mm

Material specifications

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

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	30 V DC
	21 V AC
Rated current	350 mA (50 °C)
Operating effective current I_C at U_C	$\leq 10 \mu A$
Protective conductor current I_{PE}	$\leq 2 \mu A$
Nominal discharge current I_n (8/20) μs (line-line)	10 kA
Nominal discharge current I_n (8/20) μs (line-ground)	10 kA (per path)
Nominal discharge current I_n (8/20) μs (shield-ground)	10 kA (optional)
Pulse discharge current I_{imp} (10/350) μs	1 kA
Max. discharge current I_{max} (8/20) μs maximum (line-line)	10 kA
Max. discharge current I_{max} (8/20) μs maximum (line-earth)	10 kA (per path)
Discharge surge current I_{max} (8/20) μs maximum (shield-ground)	10 kA
Nominal pulse current I_{an} (10/1000) μs (line-line)	30 A
Nominal pulse current I_{an} (10/1000) μs (line-earth)	100 A (per path)
Nominal pulse current I_{an} (10/1000) μs (shield-ground)	100 A
Output voltage limitation at 1 kV/ μs (line-line) spike	$\leq 50 V$
Output voltage limitation at 1 kV/ μs (line-earth) spike	$\leq 1.4 kV$ (Direct grounding)
Output voltage limitation at 1 kV/ μs (shield-ground) spike	$\leq 600 V$ (optional)
Output voltage limitation at 1 kV/ μs (line-line) static	$\leq 50 V$

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Output voltage limitation at 1 kV/ μ s (line-earth) static	≤ 1.4 kV (Direct grounding)
Residual voltage at I_n (conductor-conductor)	≤ 50 V
Residual voltage with I_{an} (10/1000) μ s (line-line)	≤ 50 V
Voltage protection level U_p (line-line)	≤ 50 V (C1 - 0.5 kV / 250 A)
	≤ 55 V (C1 - 1 kV / 500 A)
	≤ 55 V (C2 - 2 kV/1 kA)
	≤ 55 V (C2 - 10 kV / 5 kA)
	≤ 50 V (C3 - 10 A)
	≤ 50 V (C3 - 25 A)
	≤ 80 V (D1 - 1 kA)
Voltage protection level U_p (line-earth)	≤ 1.4 kV (C1 - 1 kV / 500 A)
	≤ 1.4 kV (C2 - 2 kV/1 kA)
	≤ 1.4 kV (C2 - 10 kV / 5 kA)
	≤ 1.4 kV (C3 - 25 A)
	≤ 1.4 kV (C3 - 100 A)
	≤ 1.4 kV (D1 - 1 kA)
Voltage protection level U_p (shield-ground)	≤ 600 V (C1 - 0.5 kV / 250 A)
	≤ 650 V (C1 - 1 kV / 500 A)
	≤ 650 V (C2 - 2 kV/1 kA)
	≤ 650 V (C2 - 10 kV / 5 kA)
	≤ 650 V (C3 - 10 A)
	≤ 750 V (C3 - 25 A)
	≤ 750 V (C3 - 100 A)
	≤ 650 V (D1 - 1 kA)
Response time t_A (line-line)	≤ 1 ns
Response time t_A (line-earth)	≤ 100 ns
Response time t_A (shield-ground)	≤ 100 ns
Input attenuation aE, sym.	typ. 0.5 dB (≤ 1 MHz / 50 Ω)
	typ. 0.2 dB (≤ 400 kHz / 150 Ω)
Cut-off frequency f_g (3 dB), sym. in 50 Ω system	typ. 6 MHz
Cut-off frequency f_g (3 dB), sym. in 150 Ω system	typ. 2.5 MHz
Resistance per path	2.2 $\Omega \pm 10$ %
Surge protection fault message	none
Impulse durability (line-line)	C1 - 1 kV / 500 A
	C2 - 10 kV / 5 kA
	C3 - 25 A
	D1 - 1 kA
Impulse durability (line-earth)	C1 - 1 kV / 500 A
	C2 - 10 kV / 5 kA
	C3 - 100 A
	D1 - 1 kA
Impulse durability (shield-ground)	C1 - 1 kV/500 A
	C2 - 10 kV/5 kA
	C3 - 100 A

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	D1 - 1 kA
Alternating current carrying capacity (line-earth)	10 A - 1 s
Alternating current carrying capacity (shield-ground)	10 A - 1 s

Environmental and real-life conditions

Ambient conditions

Degree of protection	IP67
Ambient temperature (operation)	-40 °C ... 50 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Altitude	≤ 2000 m (amsl)

Approvals

Conformity/Approvals

ATEX	Ⓢ II 1G Ex ia IIC T4...T6 Ga
IECEX	Ex ia IIC T4...T6 Ga

Standards and regulations

Air clearances and creepage distances

Standards/regulations	IEC 60664-1 / EN 60079-0 / EN 60079-11
Standards/specifications	EN 61643-21
Note	A2:2013
Standards/specifications	EN 60079-0
Note	2018
Standards/specifications	EN 60079-11
Note	2012
Standards/specifications	IEC 60079-0
Note	2017
Standards/specifications	IEC 60079-11
Note	2011
Standards/specifications	GB/T 3836.1
Note	2021
Standards/specifications	GB/T 3836.4
Note	2021

Mounting

Mounting type	direct screw connection
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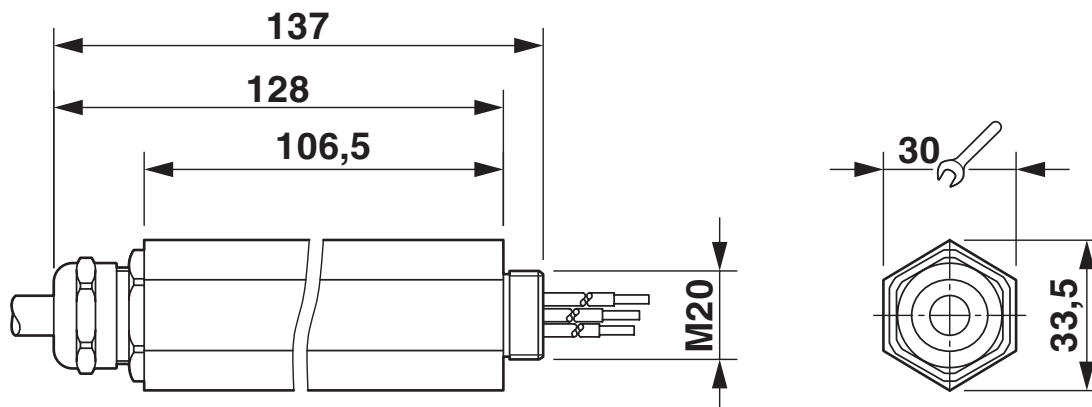


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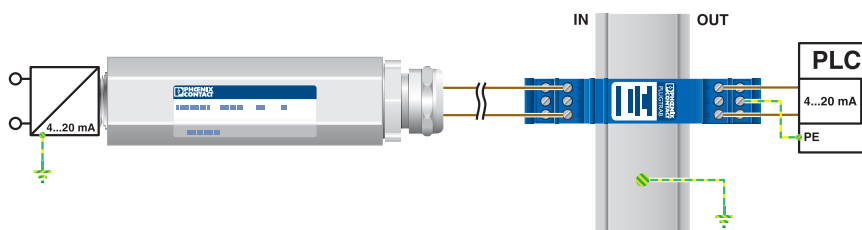
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Drawings

Dimensional drawing



Application drawing



Schematic diagram

S-PT-1X2-24DC*									
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
	4.50·10 ⁻⁶	8.00·10 ⁻¹⁰ 1/h	0.0 %	0.1 %	2.25·10 ⁻⁷	4.00·10 ⁻¹¹ 1/h	5 %	0.0 %	0.0 %
					4.50·10 ⁻⁷	8.00·10 ⁻¹¹ 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 _{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

Table also applies to the S-PT-EX(I)-24DC* item group

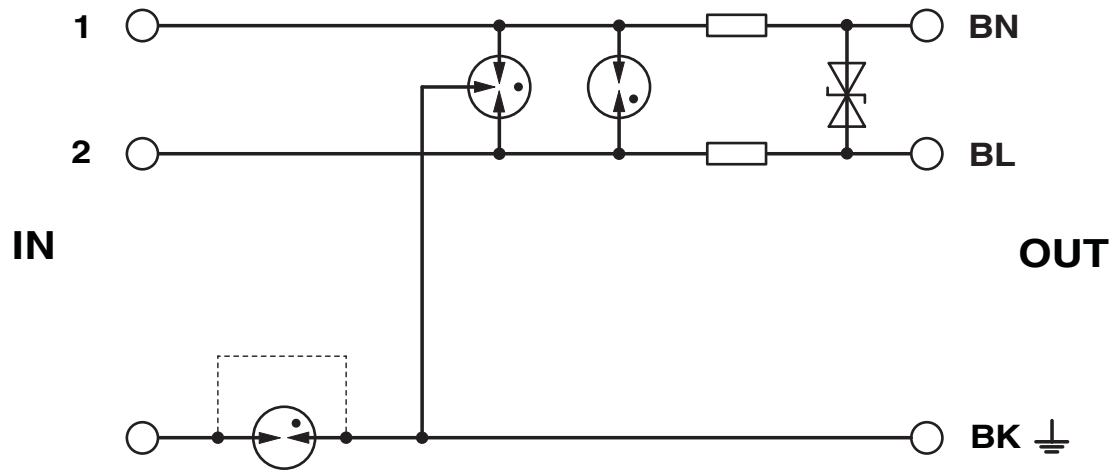
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Circuit diagram



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Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2880671>

Functional Safety

Approval ID: 23-05-128 R029 V1R0



ATEX

Approval ID: KEMA 06ATEX0002



IECEX

Approval ID: IECEX KEM 10.0064



CCC

Approval ID: 2020322316000817



NEPSI-EX

Approval ID: GYJ20.1178X



UKCA-EX

Approval ID: DEKRA 21UKEX0235

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Classifications

ECLASS

ECLASS-13.0	27171502
ECLASS-15.0	27171502

ETIM

ETIM 10.0	EC001466
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UNSPSC

UNSPSC 21.0	39121620
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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	6750a85f-5b0d-4af9-b451-f94ddcee6184

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