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

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

Technical data

Notes

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

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

Connection data

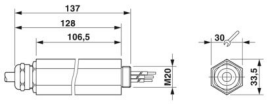
Connection method	Screw connection
Screw thread	M3
Tightening torque	0.6 Nm
Conductor cross-section flexible	0.14 mm² ... 1.5 mm²
Conductor cross-section rigid	0.14 mm² ... 1.5 mm²
Conductor cross-section AWG	26 ... 16

Ex data

Maximum inner capacitance C_i	2 nF
Max. internal inductance L_i	1 µH
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)

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

Protective circuit

Direction of action	Line-Line & Line-Earth Ground
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	≤ 10 µA
Protective conductor current I_{PE}	≤ 2 µA
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 Ian (10/1000) µs (line-line)	30 A
Nominal pulse current Ian (10/1000) µs (line-earth)	100 A (per path)
Nominal pulse current Ian (10/1000) µs (shield-ground)	100 A
Output voltage limitation at 1 kV/µs (line-line) spike	≤ 50 V
Output voltage limitation at 1 kV/µs (line-earth) spike	≤ 1.4 kV (Direct grounding)
Output voltage limitation at 1 kV/µs (shield-ground) spike	≤ 600 V (optional)
Output voltage limitation at 1 kV/µs (line-line) static	≤ 50 V
Output voltage limitation at 1 kV/µs (line-earth) static	≤ 1.4 kV (Direct grounding)

Residual voltage at I_n (conductor-conductor)	≤ 50 V
Residual voltage with Ian (10/1000) µs (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 tA (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 fg (3 dB), sym. in 50 Ω system	typ. 6 MHz
Cut-off frequency fg (3 dB), sym. in 150 Ω system	typ. 2.5 MHz
Resistance per path	2.2 Ω ±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
	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	Ⓔx II 1G Ex ia IIC T4...T6 Ga
IECEx	Ex ia IIC T4...T6 Ga

Standards and regulations

Air clearances and creepage distances

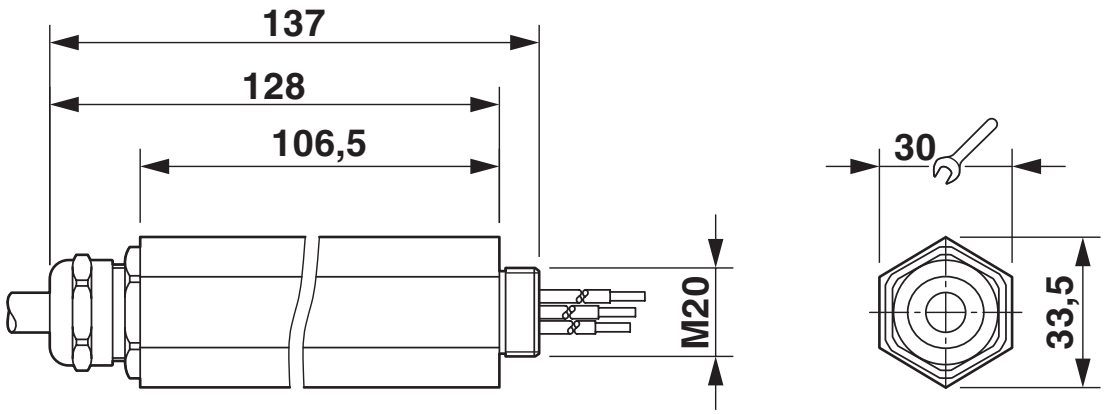
Standards/regulations	IEC 60664-1 / EN 60079-0 / EN 60079-11
Standards/specifications	EN 61643-21
Note	A2:2013
Standards/specifications	EN 60079-0
Note	2018
Standards/specifications	EN 60079-11
Note	2012
Standards/specifications	IEC 60079-0
Note	2017
Standards/specifications	IEC 60079-11
Note	2011
Standards/specifications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

Mounting

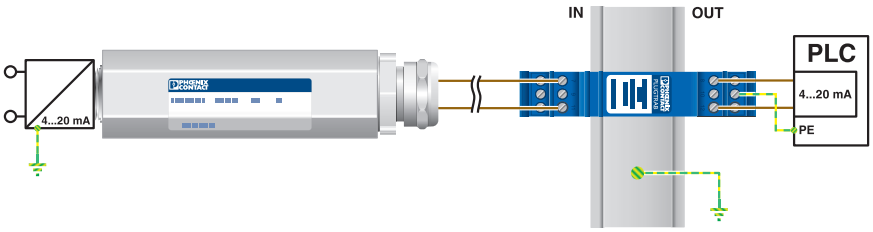
Mounting type	direct screw connection

Drawings

Dimensional drawing



Application drawing

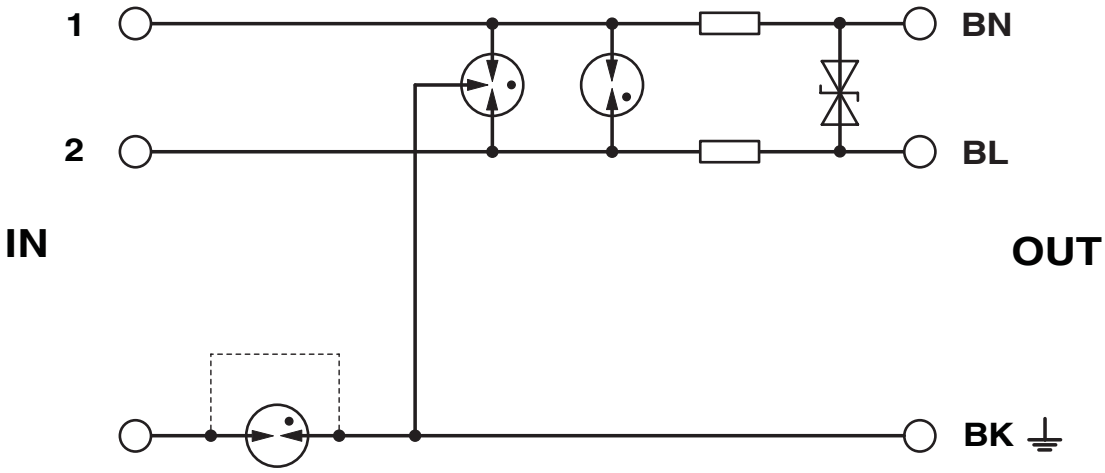


Schematic diagram

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
	$4.50_{x10^{-6}}$	$8.00_{x10^{-10}}$ 1/h	0.0 %	0.1 %	$2.25_{x10^{-7}}$	$4.00_{x10^{-11}}$ 1/h	5 %	0.0 %	0.0 %
					$4.50_{x10^{-7}}$	$8.00_{x10^{-11}}$ 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

Circuit diagram



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

Classifications

ECLASS

ECLASS-13.0	27171502
ECLASS-15.0	27171502

ETIM

ETIM 9.0	EC001625

UNSPSC

UNSPSC 21.0	39121620

Environmental product compliance

EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	6(c), 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: n/a)
SCIP	6750a85f-5b0d-4af9-b451-f94ddcee6184

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