

Product manual

PSE EX Switch

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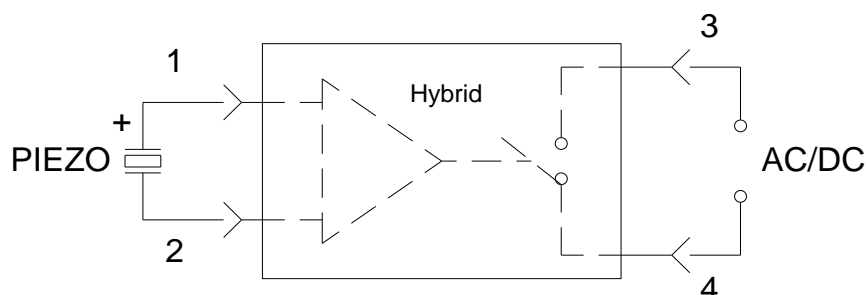
1 PRODUCT DESCRIPTION

1.1 Functional Description: NO Switch

The piezo switch is based on the functional principle of the piezoelectric crystal. The action of force on the piezo disk causes a voltage to be induced due to a charge transfer. The voltage generated is converted by the electronic connection into a polarity-neutral, electronic switch contact.

During the voltage drop, the electronic switch contact is closed for the specified pulse duration. After this, the electronic switch contact opens again, even if the force is still present. The period that the electronic switch contact remains closed depends on the actuating speed and force as well as on the duration of actuation.

Diagram of an NO switch:



The piezo disk is connected to the terminals 1 and 2. The electric circuit to be switched is connected at the terminals 3 and 4. This can be either direct voltage (DC) or alternating voltage (AC). If a pulse is applied to the piezo disk, terminal 1 becomes positive in relation to terminal 2 due to the voltage generated. The integrated switching element controls the electric circuit to be switched.

In the neutral position of the piezo switching element, the terminals 3 and 4 are non-conductive, and initial contact resistance is greater than 10 MOhm. When the piezo disk is actuated, the initial contact resistance is reduced to less than 20 Ohm.

When actuating the piezo disk, the resistance between terminals 3 and 4 is therefore changed from high resistance → low resistance → high resistance.

This corresponds in principle to the function of a conventional NO pushbutton switch.

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1.2 Annotation to the Protection type

The explosion protected Piezoswitchelement (further on PSE EX) has the function of a contacts (normally open / NO).

For the electrical characteristics please refer to the label under point 2 “Technical data”.

The permissible voltage and current of explosion protected PSE are limited, so that the PSE EX is according with EN60079-11 and has an intrinsic safety.

The explosion protected PSE EX is according to EN 60079-0 in the device group II in category 2.

The PSE EX is only allowed in areas where the creation of explosive mixture atmospheres by gases, vapours, mists or dust with air is caused occasionally not permanent (Cat. II).

Attention:

- **The maximum operating temperature is -20°C to +60°C.**
- **The approval will cease when the type label is removed**
- **The switch had to be installed and used according to IEC/EN 60079-14 and IEC/EN 60079-25**

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2 TECHNICAL DATA AND DIMENSIONAL DRAWINGS

2.1 Technical Data

<u>Electrical Data</u>			
Switching Voltage max.	U_I	(VAC/DC)	24/24
Switching Current max.	I_I	(mA)	40
Rated Breaking Capacity	P_I	(W)	0.96
Lifetime (at Rated Breaking Capacity)		(Mio.)	20
Insulation Resistance (OFF=not actuated)		(M Ω)	>10
Initial Contact Resistance (ON=actuated)		(Ω)	<20
Capacity	C_I	(nF)	5
Inductivity	L_I (non-applicable)	(H)	-
NO Pulse Time (depending on the actuating force, time and speed)		(ms)	20-1000
Contact Configuration			polarity-free
Switch Function			NO switch

<u>Mechanical Data</u>		
Actuating Force (at ambient temperature)	(N)	$\leq 3^1$
Actuating Travel	(mm)	0.002
Torque	(Nm)	2.5
IK Protection Class	(IK)	02

<u>Climatic Data</u>		
Operating Temperature	($^{\circ}$ C)	-20 to +60
Storage Temperature	($^{\circ}$ C)	-20 to +60
IP Degree of Protection Front Side submerged	(IP)	67
IP Degree of Protection Front Side hose water		69K

¹⁾ At temperatures lower than -10 $^{\circ}$ C, the actuating force increases 2- to 4-fold.

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<u>Material Individual Parts</u>	<u>Material</u>
Housing (depending on type)	Stainless Steel ²⁾
	Anodized aluminum
	Polyamide
	Messing chrome-plated

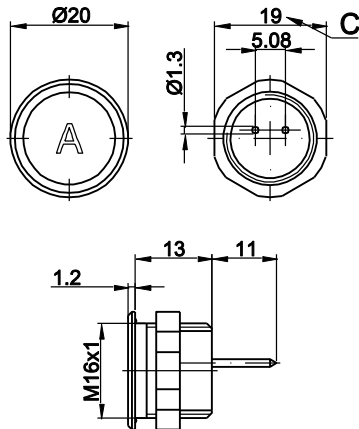
²⁾ *When using the switch in a saline or chloric environment, special materials must be used. Items available upon request.*

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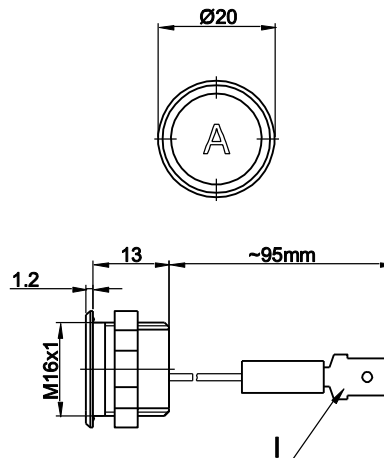
2.2 Component dimensions

2.2.1 M16 Series with Finger Guidance

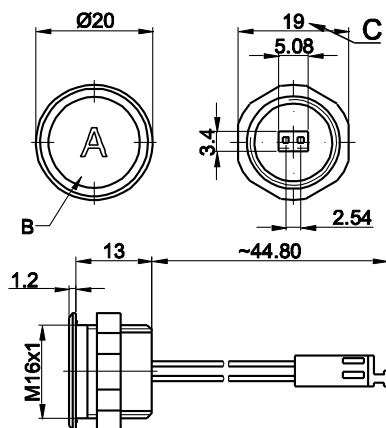
with Pins



with Quick Connect Terminal



with AMP ¹⁾



Legend:

- B = Actuating Area
- C = Width Across Flats
- I = Crimp terminal male 6.3x0.8

Lettering:

- either with/without lettering (see Chapter 3.2)
- position of the connections with respect to the position of the lettering is not defined

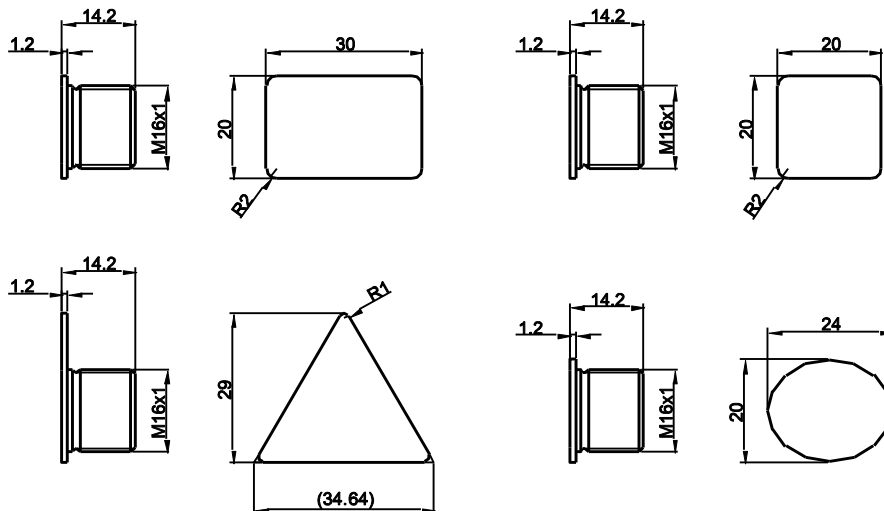
¹⁾ Version available on request

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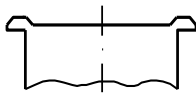
2.3 Possible Designs

2.3.1 Possible Housing Geometry: M16 (on request)

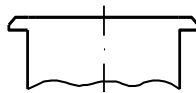


2.3.2 Actuation Area

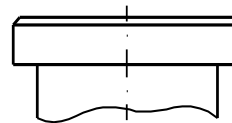
**with finger guidance
(standard)**



**without finger guidance
(on request)**



**elevated front design:
(standard, others on request)**



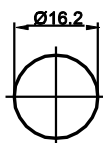
2.3.3 Connection variants

- Wire (Standard: 0,14mm² / 200mm wire-length)
- Pins (with Connection Terminal 0098.9207)
- Quick Connect Terminal 6,3mmx0,8mm

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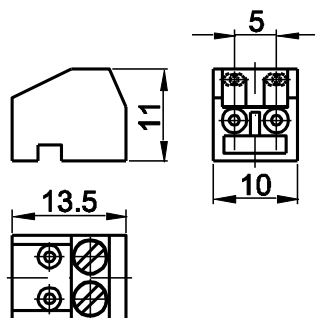
2.4 Hole Dimensions M16



2.5 Component Parts

Connection Terminal for Pinsolution

Ordernummer: 0098.9207 (order quantity 10 pieces)



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3 ORDERNUMBERS



3.1 M16 Series

<u>Item Number</u>	<u>Function</u>	<u>Connection</u>	<u>Housing Material</u>	<u>Housing Color</u>
1241.2415.1.XXX	EX - NO	Pins	Aluminium	gold
1241.2415.3.XXX	EX - NO	Pins	Aluminium	rot
1241.2415.4.XXX	EX - NO	Pins	Aluminium	blau
1241.2415.5.XXX	EX - NO	Pins	Aluminium	grün
1241.2415.7.XXX	EX - NO	Pins	Aluminium	schwarz
1241.2415.8.XXX	EX - NO	Pins	Aluminium	Alu natur
1241.2435.8.XXX	EX - NO	Quick Connect Terminal	Aluminium	Alu natur
1241.2485.8.XXX	EX - NO	AMP-Connector	Aluminium	Alu natur
1241.2515.XXX	EX - NO	Pins	Messing chromed	
1241.2615.XXX	EX - NO	Pins	Stainless Steel	

*The listed item numbers represent a selection from the range of piezo switches.
Other mounting diameters, materials, colors and connections are available upon request.*

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Order Indices for Lettering

001= A	016= P	031= 4	046= 	061= EIN
002= B	017= Q	032= 5	047= \rightarrow	062= AUS
003= C	018= R	033= 6	048= \leftarrow	063= AUF
004= D	019= S	034= 7	049= \downarrow	064= AB
005= E	020= T	035= 8	050= \uparrow	065= ON
006= F	021= U	036= 9	051= %	066= OFF
007= G	022= V	037= +	052= \surd	067= UP
008= H	023= W	038= -	053= CTRL	068= DOWN
009= I	024= X	039= .	054= RETURN	069= HIGH
010= J	025= Y	040= x	055= SHIFT	070= LOW
011= K	026= Z	041= ÷	056= LOCK	071= ON/OFF
012= L	027= 0	042= *	057= STOP	072= START
013= M	028= 1	043= =	058= ENTER	073= RESET
014= N	029= 2	044= #	059= BACK	074= 
015= O	030= 3	045= \leftrightarrow	060= LINE	

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3.2.1 Fontsize

PSE M16

Individual characters:	Height: 5 mm; font: Helvetica normal DIN1451-1E
Lettering, max. 3 characters:	Height: 3 mm; font: Helvetica normal DIN1451-1E
Symbols (Indices 037-052):	Height of capital letters: 5 mm; font: True Type, Symbol

3.2.2 Standard Colors for Lettering

Stainless Steel:	Black	Filled letters
Aluminum natural:	Gray	Filled letters (only after customer approval)
Anodized Aluminum:	White	Filled letters

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4 PACKAGING

PSE Switches

M16	air cushion bags 1 Piece	10 pieces per carton
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Piece separately in ESD-Bag packed with Operationmanual



Nuts with sealing rings (10 Pieces) are packaged separately and are enclosed in the carton.



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5 QUALIFICATION TESTS

5.1 IP Protection Class

IP Protection Class IEC/DIN/EN/60529	Front Side	IP 67
IP Protection Class DIN 40050-9:1993 (High-pressure steam-cleaning test)	Front Side	IP 69K

5.2 IK Protection Class

Tested centrally

IK Protection Class DIN EN 50102	IK 02
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5.3 Salt-Spray Test

Salt-spray test according to DIN 50021- SS

24h, 48h and 96h test duration

After 8h, the start of corrosion may be discerned; after 96h, this corrosion has spread across large areas of the switch.

This surface corrosion may be removed under running water.

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6 APPROVALS

<u>Description</u>	<u>Standard</u>
Thermal Shock	MIL-STD 202F Method 107G
High Temperature	MIL-STD 810E Method 501.3
Low Temperature	MIL-STD 810E Method 502.3
Humidity	MIL-STD 810E Method 507.3
Vibration	MIL-STD 202F Method 204D
Mechanical Shock	MIL-STD 202F Method 213B
RFI	MIL-STD 416D Method RS103
ESD	EN 61000-4-2
Burst	EN 61000-4-4

7 ATEX APPROVAL

<u>Description</u>	<u>Denotation</u>
Model test report	TÜV 08 ATEX 554671X
Marking	II 2 G Ex ib IIB T4

8 ROHS COMPLIANCE

All items listed are RoHS-compliant.



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