

Documentation

about
3D-stainless steel limit switch boxes
with
 i ... 8 V DC inductive sensors
for
pneumatic actuators



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1. Objectives and practical use

The positions of industrial valves represent an important piece of information for the course of action of a production. These valves are actuated with rotary actuators which the end position of the valve like "open" or "closed" is reported back to a control system. This is done via a mounted a limit switch box which is placed at the actuator, see images 1-3.



Image 1: stainless steel limit switch box, Aisi 304, with 3D-indicator, size.: 150x150x80mm, with stainless steel bracket, hole space 80x30mm for actuators acc. to VDI/VDE 3845 steam height 20mm

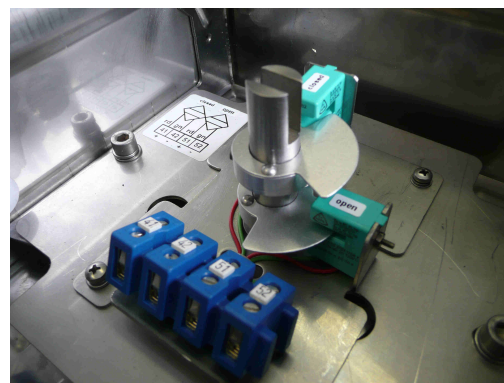
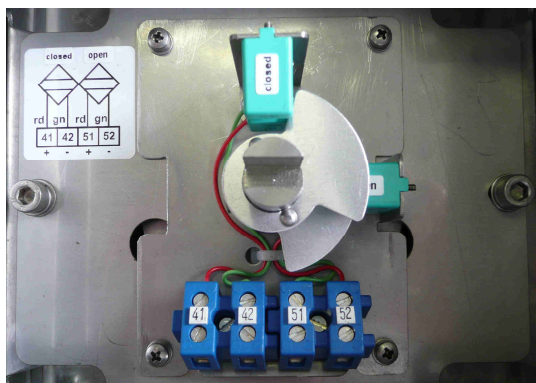


Image 2+3: 2x inductive Pepperl+Fuchs sensors SJ 3,5-S1N with adjustable switching cams, connecting at the 4-pole clamp

2. Technical specifications

- stainless steel housing, Aisi 304, option: Aisi 316Ti, size : 150x150x80mm, F05-slot, top with 3D-indicator (black/yellow) for OPEN/CLOSED
- 2x inductive Pepperl+Fuchs sensors SJ 3,5-N, SJ 3,5-SN or SJ 3,5-S1N, 8V DC, details see 5. Page 4
- 4-pole clamp blue and wiring diagram OPEN/CLOSED.
- 1x stainless steel cable gland, Aisi 304, M20x1,5mm, clamp range $\varnothing$ 13,0-9,0 mm
- 2x aluminium adjustable switching cams for position 0° up to 360°, fixed with hexagon socket screw M4 SW 2mm
- 2x stainless steel shaft, 2x stainless steel ground plates
- protection class: IP 65
- stainless steel bracket for actuators acc. to VDI/VDE 3845 with 20mm steam high and hole space 80x30mm
- temperature range: - 25°C up to + 70°C

3. Wiring diagrams sensors

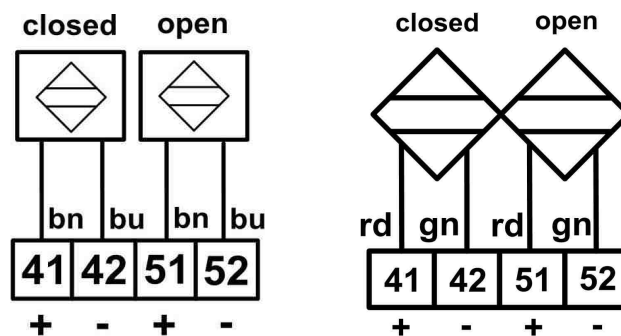


Image 4+5: wiring diagram 2x P+F sensors SJ 3,5-N, SJ 3,5-SN and SJ 3,5-S1N connecting at the 4-pole clamp

4. Mounting the top

Attention, mounted the 3D-shaft from the top rightness in the groove from the lower part housing housing shaft.

5. Data sheets sensors (only the first page): SJ 3,5-N, SJ 3,5-SN and SJ 3,5-S1N

Inductive slot sensor

SJ3,5-N



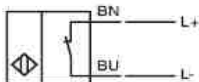
Model Number

SJ3,5-N

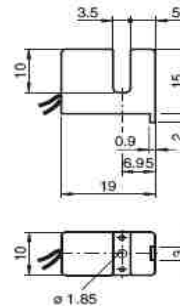
Features

- 3.5 mm slot width
- Usable up to SIL2 acc. to IEC 61508

Connection



Dimensions



Technical Data

General specifications

Switching element function	NAMUR, NC
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 mm ; typ. 6 mm
Installation	
Output polarity	NAMUR

Nominal ratings

Nominal voltage	U_0	8.2 V (R_i approx. 1 k Ω)
Operating voltage	U_B	5 ... 25 V
Switching frequency	f	0 ... 3000 Hz
Hysteresis	H	0.41 ... 0.6 mm
Suitable for 2:1 technology		yes, Reverse polarity protection diode not required
Current consumption		
Measuring plate not detected		≥ 3 mA
Measuring plate detected		≤ 1 mA

Functional safety related parameters

MTTF _d	8415 a
Mission Time (T_M)	20 a
Diagnostic Coverage (DC)	0 %

Ambient conditions

Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
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Mechanical specifications

Connection type	flexible leads LIY, 500 mm
Core cross-section	0.14 mm ²
Housing material	PBT/PPS
Protection degree	IP67

General information

Use in the hazardous area	see instruction manuals
Category	1G; 2G; 1D

Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

Approvals and certificates

FM approval	
Control drawing	116-0165F
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤ 36 V do not bear a CCC marking because they do not require approval.

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Subject to modifications without notice

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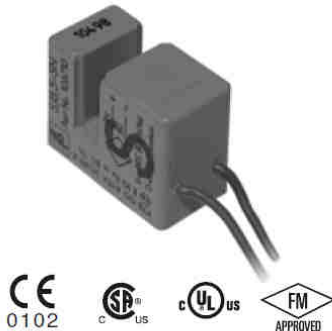
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PEPPERL+FUCHS
SENSING YOUR NEEDS

1

Inductive slot sensor

SJ3,5-SN



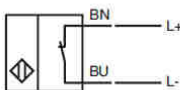
Model Number

SJ3,5-SN

Features

- 3.5 mm slot width
- Usable up to SIL 3 acc. to IEC 61508
- Extended temperature range

Connection



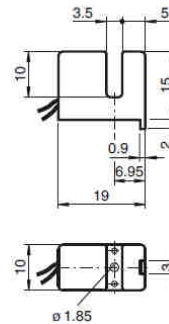
Application



Danger!

In safety-related applications the sensor must be operated with a qualified fail safe interface from Pepperl+Fuchs, such as KFD2-SH-EX1. Consider the "exida Functional Safety Assessment" document which is available on www.pepperl-fuchs.com as an integral part of this product's documentation.

Dimensions



Technical Data

General specifications

Switching element function	NAMUR, NC
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Installation	
Output polarity	Safety Function

Nominal ratings

Nominal voltage	U_0	8 V
Switching frequency	f_s	0 ... 3000 Hz
Hysteresis	H	with NAMUR switch amplifier: 0.045 mm (e. g. Pepperl+Fuchs KCD2-SR-Ex1.LB) with safety switch amplifier 0.025 mm (e. g. Pepperl+Fuchs KFD2-SH-Ex1)
Suitable for 2:1 technology		yes, with reverse polarity protection diode
Rate of current rise		-4.5 mA / mm

Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA

Functional safety related parameters

MTTF _d	7970 a
Mission Time (T_M)	20 a
Diagnostic Coverage (DC)	0 %

Ambient conditions

Ambient temperature	-50 ... 100 °C (-58 ... 212 °F)
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Mechanical specifications

Connection type	flexible leads LIY, 500 mm
Core cross-section	0.14 mm ²
Housing material	PBT
Protection degree	IP67
Note	adjustable stop Security relevant only up to -40°C

General information

Use in the hazardous area	see instruction manuals
Category	1G; 2G; 3G; 1D

Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

Approvals and certificates

FM approval	
Control drawing	116-0165F
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	CCC approval / marking not required for products rated ≤ 36 V

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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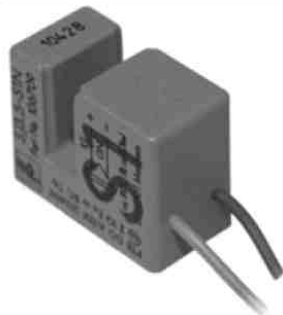
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PEPPERL+FUCHS 1
SENSING YOUR NEEDS

Inductive slot sensor

SJ3,5-S1N



Model Number

SJ3,5-S1N

Features

- 3.5 mm slot width
- Usable up to SIL 3 acc. to IEC 61508
- Nonferrous targets

Application



Danger!

In safety-related applications the sensor must be operated with a qualified fail safe interface from Pepperl+Fuchs, such as KFD2-SH-EX1. Consider the "exida Functional Safety Assessment" document which is available on www.pepperl-fuchs.com as an integral part of this product's documentation.

Technical Data

General specifications

Switching element function	NAMUR, NO
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Installation	
Output polarity	Safety Function

Nominal ratings

Nominal voltage	U_o	8 V
Switching frequency	f	0 ... 2500 Hz
Hysteresis	H	with NAMUR switch amplifier: 0.09 mm (e. g. Pepperl+Fuchs KCD2-SR-Ex1.LB) with safety switch amplifier 0.05 mm (e. g. Pepperl+Fuchs KFD2-SH-Ex1)
Suitable for 2:1 technology		yes, with reverse polarity protection diode
Rate of current rise		2.1 mA / mm

Measuring plate not detected	≤ 1 mA
Measuring plate detected	≥ 3 mA

Functional safety related parameters

MTTF _d	7974 a
Mission Time (T _M)	20 a
Diagnostic Coverage (DC)	0 %

Ambient conditions

Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
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Mechanical specifications

Connection type	flexible leads LIY, 500 mm
Core cross-section	0.14 mm ²
Housing material	PBT
Protection degree	IP67
Note	only for non-ferrous metal Adjustable stop

General information

Use in the hazardous area	see instruction manuals
Category	1G; 2G; 3G; 1D

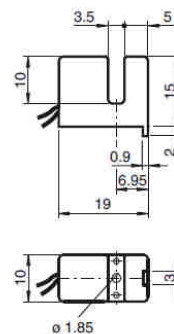
Compliance with standards and directives

Standard conformity	
Standards	EN 60947-5-2:2007 IEC 60947-5-2:2007

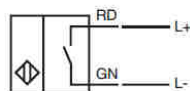
Approvals and certificates

FM approval	
Control drawing	116-0165F
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	CCC approval / marking not required for products rated ≤ 36 V

Dimensions



Electrical Connection



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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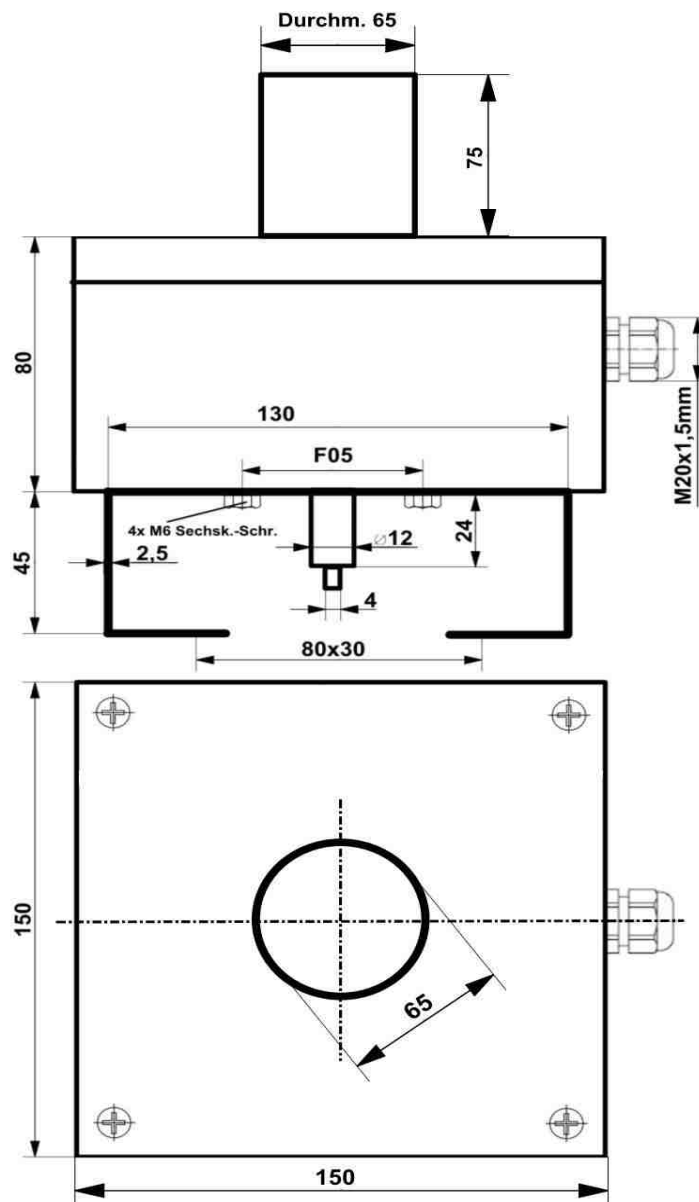
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PEPPERL+FUCHS

1

6. Drawing



7. Brackets

stainless steel brackets size 1 - 4 for sensor and limit switch boxes

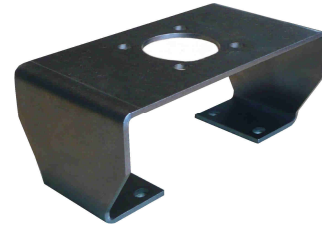
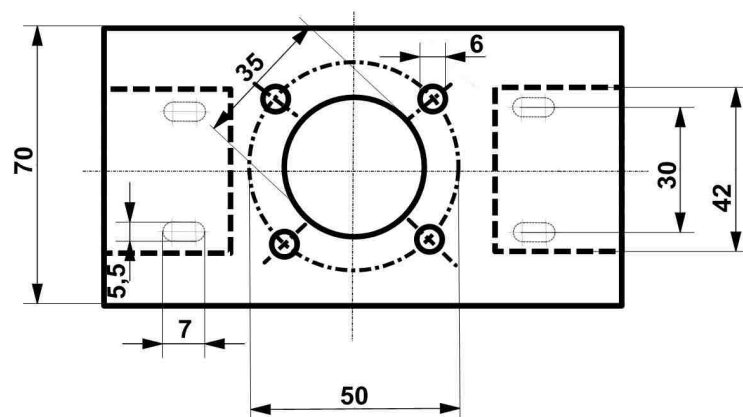
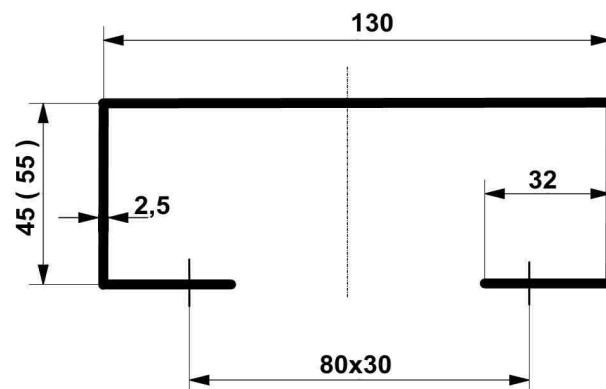


image.: brackets size 1 - 2 for actuators
acc. to VDI/VDE 3845, steam high 20mm
and 30mm, hole spacing 80x30mm

dimensions: without () = bracket size 1 () = bracket size 2

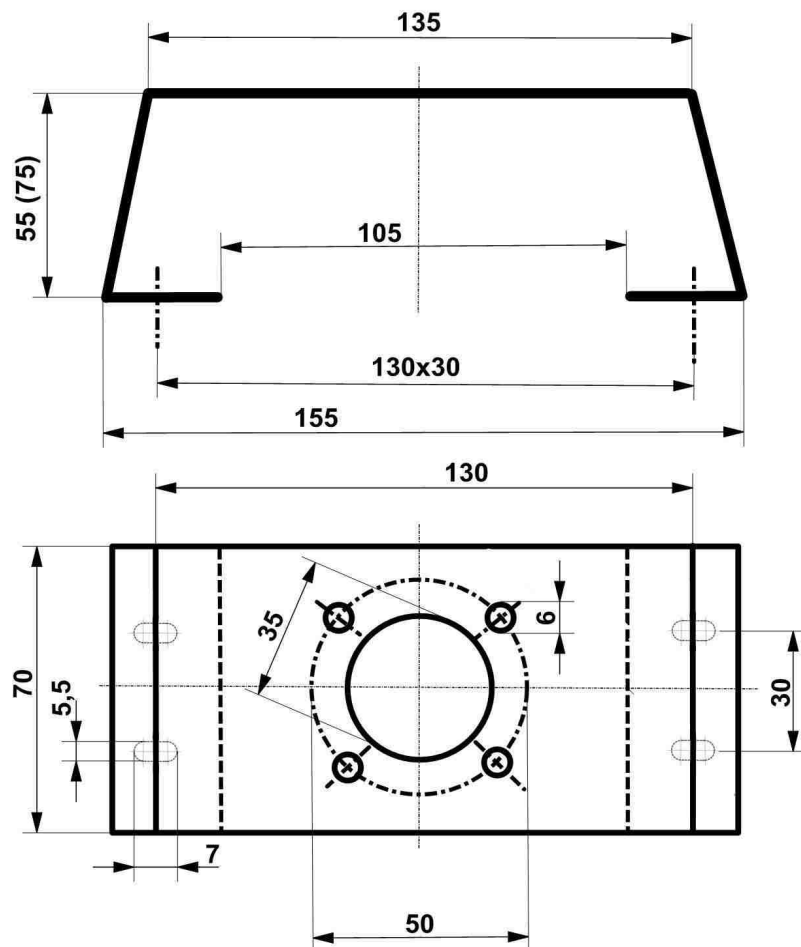


material = stainless steel A2



image.: brackets size 3 - 4 for actuators
acc. to VDI/VDE 3845, steam height 30mm
and 50mm, hole spacing 130x30mm

dimensions: without () = bracket size 3 () = bracket size 4



material = stainless steel A2