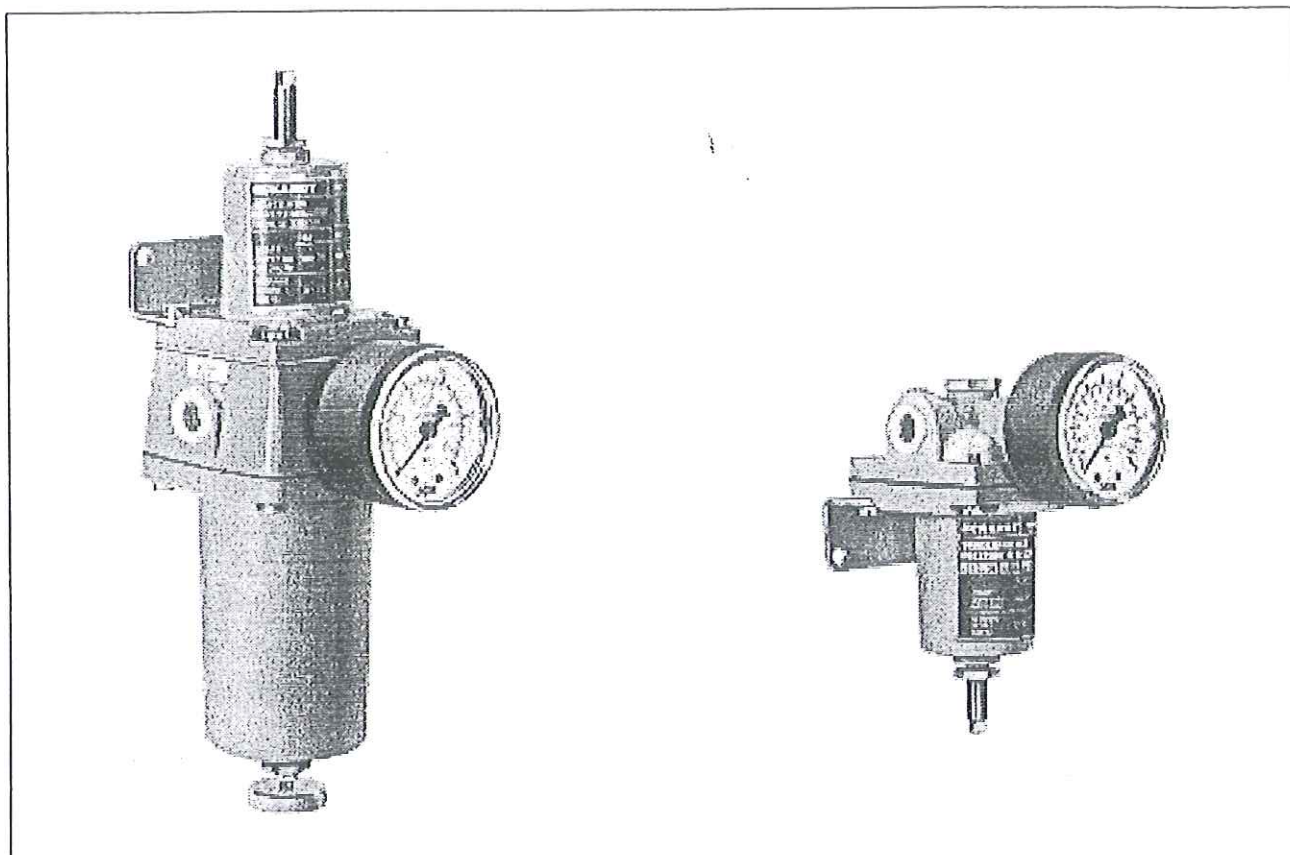


FRS923 Filter regulator



Control of instrument supply air pressure, and removal by filtration of dust particles and water content.

FEATURES

Pressure reducer and supply air station:

- Minimal effect of upstream pressure fluctuation.
- Low inherent air consumption.
- With or without filter

TECHNICAL DATA

Filter regulator

Pressure reducer, including mounting bracket and filter bowl

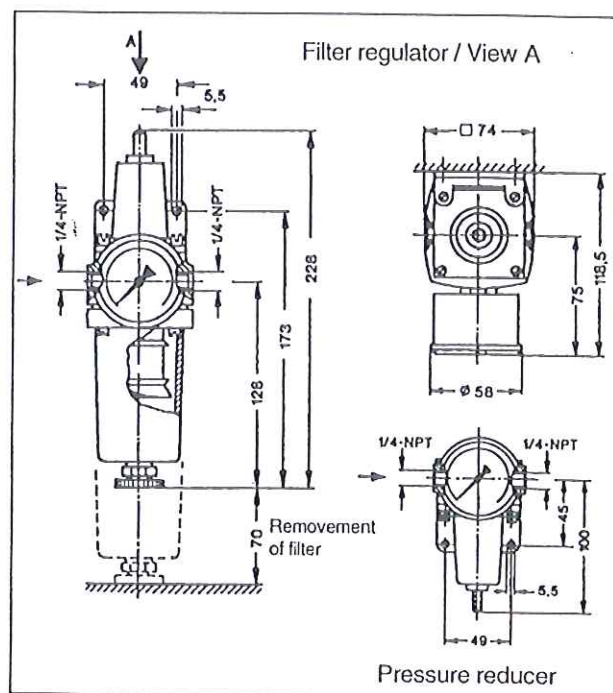
Input	max. 15 bar/1.5 MPa 15 kg/cm ² /220 psi
Control range	0 to 2.5 bar/0 to 35 psi (Code -1) 0 to 6 bar/0 to 90 psi (Code -2)
Indicating range	0 to 2.5 bar/0 to 35 psi (Code -1) 0 to 10 bar/0 to 145 psi (Code -2)
Error limit	Class 2.5
Air throughput Q _n	max. 24 m ³ /h*
Upstream press. dependency	≤ 1 mbar/0.1 bar
Max.inherent air consumption	≤ 0.001 m ³ /h*
Location class	IP 54 acc. to IEC 529
Area classification	D ₂ acc. to IEC 654/1
Ambient temperature range	-40 to +80 °C**
Mounting	Wall mounting/Pipe mounting
Nominal position	NL 90
Pneum. connections	internal thread 1/4 – 18 NPT

Materials:

- Filter: Sintered bronze, diffusion tinned, filter grade 30 µm
- Filter bowl: Diecast aluminium
- Gauge: housing, plastic; measuring system, brass
vers. without nonferrous metal, Mat. No. 1.4571

Weight approx. 1 kg

DIMENSIONS



- * Measured at 7 bar upstream pressure and 1.4 bar output pressure, based on standard reference conditions.
- ** The supply air must be dry for operation at temperatures below 0 °C (observe dew point)

MODEL CODES

Filter regulator	FRS923
Control range	
0 - 2,5 bar / 0 - 35 PSI	-1
0 - 6 bar / 0 - 90 PSI	-2
Version	
Standard	S
free of nonferrous metals	B
Gauges	
without (a)	W
gauge with plastic housing (b)	K
gauge with housing in 1.4571 (c)	V
Options	
Indication range in kg/cm ²	-A
Indication range in kPa	-B
Tag.No. Labeling	
Stamped with weather resistant color	-G
Stainless steel label fixed with wire	-L
Example:	FRS923 -1 S K -G
Footnotes	(c) not available with Optional features -A
(a) not available with Optional features -A,-B, ECEPEP0121	
(b) not available with Version B	Fittings see EOO9001

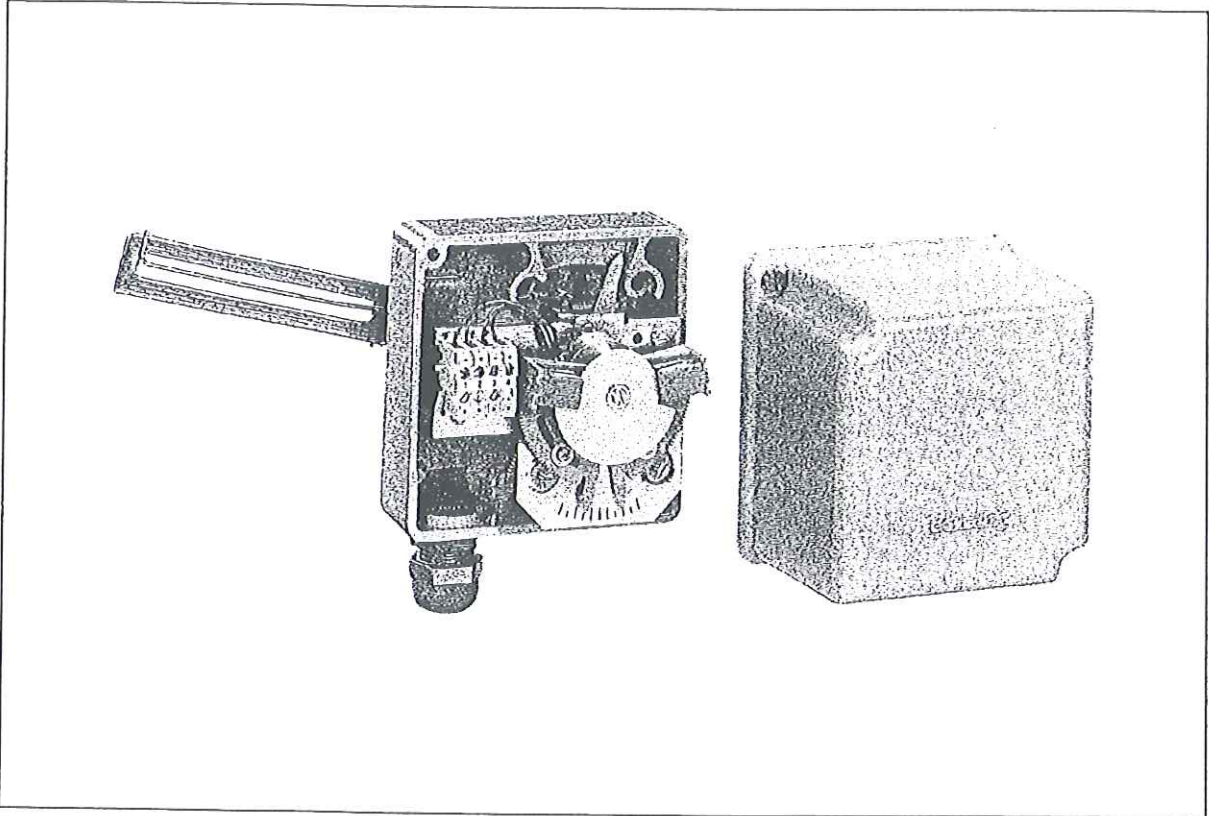
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DOKT 535 786 024



SGE985 Limit switch



Limit switch SGE985 serves as end position signaling of actuators and can be mounted to stroke actuators as well as to rotary actuators. It is constructed with inductive sensors or micro switches and signalizes exceeding or declining of two adjustable positions.

FEATURES

- Inductive limit switch according to DIN 19 234 resp. NAMUR or three wire system
- Variable switching functions
- Precise switching points through adjustable transmission
- Robust design; low vibration effect in all directions
- Mounting according to DIN IEC 534 part 6 (NAMUR)
- Rotation adapter for angles up to 120 °
- Explosion protection: EEx ia IIC T6 according to CENELEC
- EMC in accordance with international standards and laws (CE)

TECHNICAL DATA

Input

Stroke up to 100 mm with attachment kit for diaphragm actuators
 Rotary angle up to 120 ° with attachment kit for rotary actuators

Output Inductive Limit Switch, two-wire system Code S, T

Output 2 inductive proximity sensors acc. to DIN 19 234 resp. NAMUR for connection to a switching amplifier with an intrinsically safe control circuit ^{1) 2) 3)}

Current consumption

Vane clear ≥ 3 mA

Vane interposed ≤ 1 mA

for control circuit with the following electrical values

Supply voltage DC 8 V, R_i approx. 1 k Ω

Residual ripple ≤ 5 %

Internal inductance 160 μ H

Internal capacitance 20 nF

Perm. line resistance ≤ 100 Ω

Switching differential ⁶⁾ ≤ 1 %

Explosion protection⁷⁾ see page 3

Output Inductive limit switch, three-wire system Code U

Output 2 inductive proximity sensors, three-wire system, contact, pnp ^{2) 4)}, LED indication,

Supply voltage U_S DC 10 ... 30 V

Residual ripple ± 10 %, $U_S = 30$ V

Switching frequency 2 kHz

Constant current 100 mA

Switching differential ≤ 1 %

Output Limit switch assy. with micro switches Code V

Output 2 micro switches ^{2) 5)}

Connected load, alternating current

Switching capacity max. 250 VA

Switching voltage max. 50 V

Switching current with

ohmic resistance max. 5 A

inductive resistance max. 2 A

Bulb, metal filament max. 0.5 A

Connected load, direct current

Switching voltage, max. V	Ohmic load A	Inductive load A
30	5	3
50	1	1

Switching differential ≤ 2.5 %

Response characteristic ⁶⁾

Gain continuously adjustable from 1:1 to approx. 7:1

Switching point repeatability ≤ 0.2 %

Ambient conditions ⁷⁾

Ambient temperature $-25 \dots 85$ °C / $-13 \dots 185$ °F

Relative humidity ≤ 100 %

Transport and

storage temperature $-40 \dots 85$ °C / $-40 \dots 185$ °F

Protection class IP 65

The device can be operated at a class D1 location according to DIN IEC 654, part 1 ⁷⁾.

Mounting

For attaching to diaphragm actuators acc. to DIN IEC 534-6 (NAMUR) and to rotary actuators acc. to VDI/VDE 3845

Mounting orientation any

Electric connection

Line entry 1 or 2 cable glands M20x1.5 (others with Adapter AD-...)

Cable diameter 6 to 12 mm (0.24 to 0.47 in)

Screw terminals Screw terminals for wires up to 2.5 mm² (AWG 14)

Materials

Housing and cover Aluminum (Alloy No. 230) finished with DD varnish

Control vanes Aluminum

Setting mechanism Fibre glass reinforced polyamid

Transmission shaft 1.4571

Mounting bracket 1.4301

Weight

SGE985 approx. 0.6 kg (1.3 lbs)

1) For the standard version Code S one switching amplifier is required, For the security version Code T a fail-safe amplifier for each inductive proximity sensor is required.

2) Operating mode min. (=low) / max. (=high) selectable by adjustment of switch vanes.

3) Operating mode normally closed circuit / normally open circuit selectable at switch amplifier output.

4) Contact closed within the positive range.

5) Contact open within the positive range.

6) For feedback lever effective length 117.5 mm (4.63 in), stroke 30 mm (1.28 in) and maximum gain.

7) For security version: lower temperature limit -40° , and operating location at a class D2 location. For this version a fail-safe amplifier for each inductive proximity sensor is required, eg Pepperl & Fuchs WE 77/Ex-SH-03

SAFETY REGULATIONS

Explosion protection

inductive proximity sensor . . . Type SJ 3,5-N resp.

Type SJ 3,5-SN

(security version)

Type of protection EEx ia IIC T1 to T6

Certificate of conformity PTB Nr. Ex-83/2022 X

For operation in certified intrinsically safe circuits with the following maximum values:

U_{max} 15,5 V

I_{max} 52 mA

P_{max} 169 mW

Internal inductance 160 μ H

Internal capacitance 40 nF

Permissible ambient temperature depending on temperature class.

T 6	T 5	T 1 to T 4
-20 ... 45 °C	-20 ... 60 °C	-20 ... 80 °C

The certificate of conformity refers to the inductive sensor installed. Mounting conforms to the stipulations of the certificate and the mounting conditions.

CE marking

Electromagnetic compatibility 89/336/EWG

Low-voltage regulation 73/23/EWG not applicable

Electromagnetic compatibility EMC

Operating conditions industrial environment

Immunity according to

- EN 60 947 -5 -2 fulfilled

Emission according to

- EN 55 011

Group 1, Class A fulfilled

- EN 50 081-2 fulfilled

Safety requirements

According to EN 61 010-1

(resp. IEC 1 010-1). Safety class III,
overvoltage category 1

Internal fuses none

External fuses limitation of power supplies
for fire protection have to be
observed due to EN 61
010-1,
Appendix F (resp. IEC 1 010-1)

SWITCHING FUNCTIONS

The switching functions may be freely selected and set. The control vanes may be adjusted as desired in order to reach the wanted switching behavior. The illustration here shows the four basic settings and adjacent the respective switch behavior (gray=immersed vane).

The examples are based on the following setting:

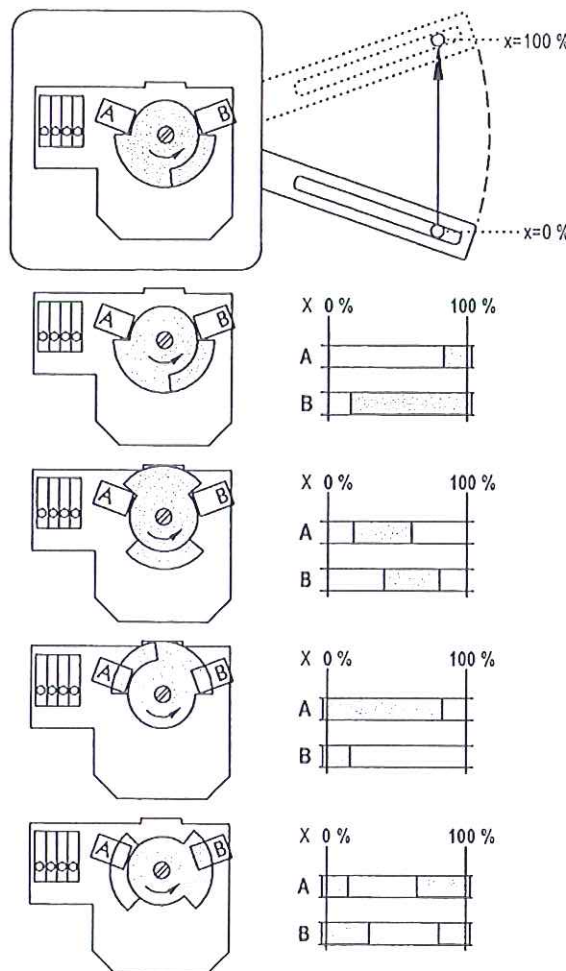
Mounting left=feedback level right; transmission is selected so that at stroke x from 0 to 100 % the guidance shaft travels through a rotary angle of 180°.

Illustrated in resting position $x = 0\%$.

2-wire technique: if control vane is immersed the initiator power circuit becomes high-ohmic.

3-wire technique: if control vane is immersed the contact is closed against plus.

Micro switch: Contact opens during passing of the control vanes.



MODEL CODES SGE985

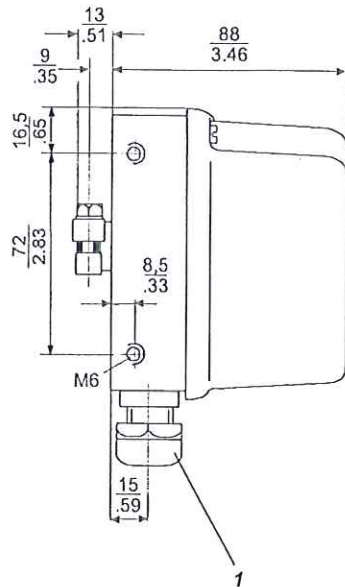
Limit switch	SGE985
Version	
inductiv switches, standard (a)	-S
inductiv switches, security (a)	-T
inductiv switches, three-wire technique (b)	-U
two microswitches (b)	-V
Cable Entry	
M20x1.5 with plastic cable gland	7
Electrical certification	
EEx ia IIC T6	EAA
EEx ib IIC T6	EBB
without	ZZZ
Attachment kit	
order as auxiliary	N
Options	
Tag.No. Labeling	
Stamped with weather resistant color	-G
Stainless steel label fixed with wire	-L
Example:	SGE985 -S 7 ZZZ N -G
Footnotes	
(a) Only available with EAA or EBB	Auxiliary see EVE9902
(b) Only available with ZZZ	Tube fittings see EOO9001

MODEL CODES ACCESSORIES

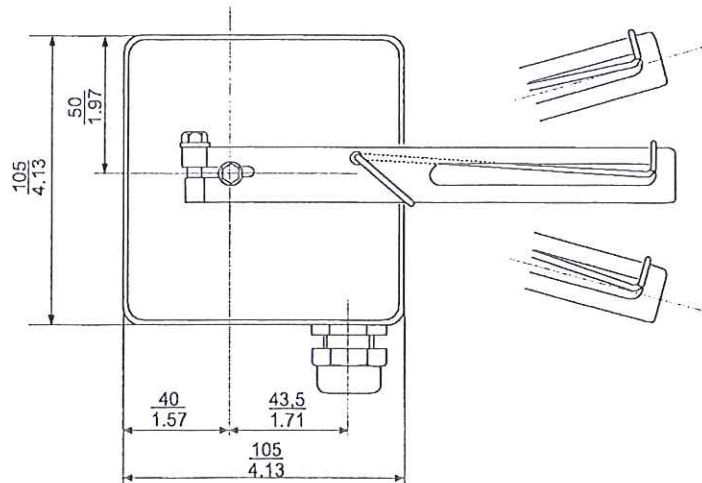
Attachment kit	EBZG
for diaphragm actuators with casting yoke acc. to NAMUR (incl. standard Couple lever)	-GN
(for SRP981, SRI983, SMP981, SMI983, SGE985)	
for diaphragm actuators with casting yoke acc. to NAMUR (incl. standard Couple lever) (for SRI986)	-HN
for diaphragm actuators with pillar yoke acc. to NAMUR (incl. standard Couple lever)	-FN
(for SRP981, SRI983, SMP981, SMI983, SGE985)	
for diaphragm actuators with pillar yoke acc. to NAMUR (incl. standard Couple lever) (for SRI986)	-KN
for rotary actuators, without flange, 3 drill holes 6.5 mm (for SRP981, SRI983, SRI986, SMP981, SMI983, SGE985)	-PN
for rotary actuators, without flange, 4 threads M6 (for SRP981, SRI983, SRI986, SMP981, SMI983, SGE985)	-NN
for rotary actuators, with flange (for SRP981, SRI983, SRI986, SMP981, SMI983, SGE985)	-JN
for rotary actuators, with shaft (for SRP981, SRI983, SRI986, SMP981, SMI983, SGE985)	-ZN
for Masoneilan type Camflex II (for SRP981, SRI983, SRI986, SMP981, SMI983, SGE985)	-RN
for Masoneilan type Sigma F (for SRP981, SRI983)	-SN
for Masoneilan type 37(38, Fisher Elliott type 656, 667 (for SRP981, SRI983)	-TN
for Gulde type P (for SRP981, SRI983)	-UN
Couple lever / cam	
standard (a = 72 mm)	-AN
extended (a = 91 mm)	-BN
inverse equal percentage cam for rotary actuators	-CN
Adapter (Material SS)	AD
Adapter PG 13.5 to 1/2" - 14 NPT (internal thread)	-A1
Adapter PG 13.5 to M20 x 1,5 (internal thread)	-A2
Adapter 1/2" NPT to 3/4" NPT	-A3
Adapter PG 13.5 to G 1/2" (internal thread)	-A4
Adapter (stainless steel) M20x1.5 to 1/2"-14NPT (internal thread)	-A6
Adapter (stainless steel) M20x1.5 to PG 13.5 (internal thread)	-A7
Adapter (stainless steel) M20x1.5 to G 1/2" (internal thread)	-A8
Adapter (plastic) M20x1.5 to PG 13.5 (internal thread)	-A9

DIMENSIONS

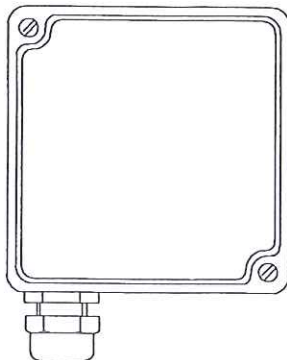
Limit switch



mm
in

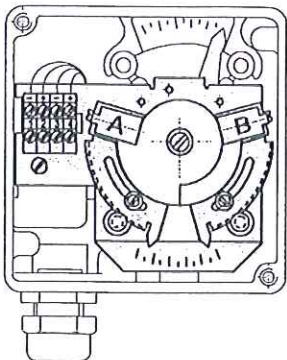


Limit switch, front view



1 Line entry via screwed gland

Limit switch, front view, cover removed



Connecting block

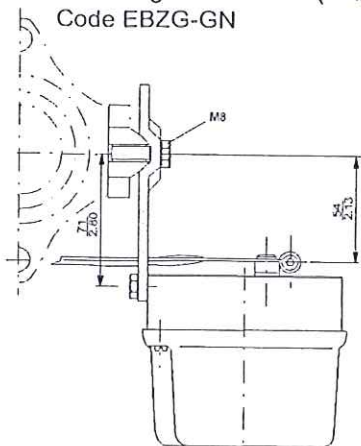
2 wire technique 3 wire technique micro switch



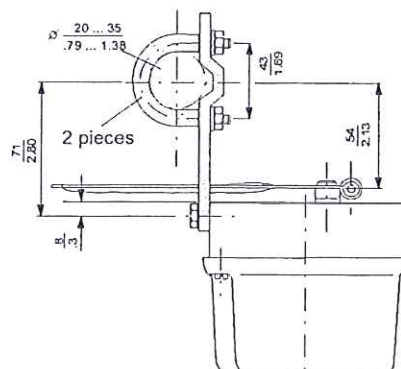
Probe A: 1 - / 2 +
 Probe B: 3 - / 4 +

ATTACHMENT KIT FOR DIAPHRAGM ACTUATORS

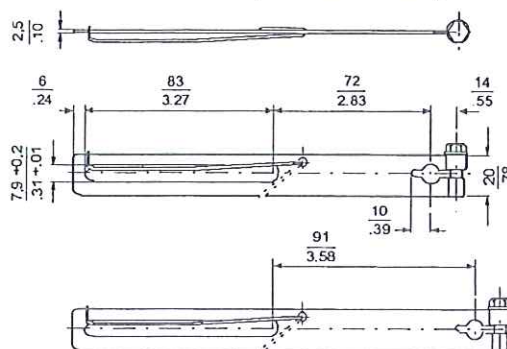
Attachment to casting yoke
according to IEC 534-6 (NAMUR)
Code EBZG-GN



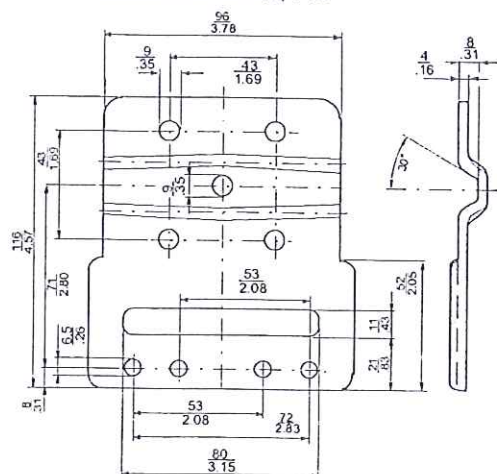
Attachment to pillar yoke
according to IEC 534-6 (NAMUR)
Code EBZG-FN



Feedback lever
Code EBZG-AN, -FN, -GN
Code EBZG-BN (extended version)

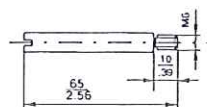


Mounting bracket
according to IEC 534-6 (NAMUR)
for Code EBZG-GN, FN



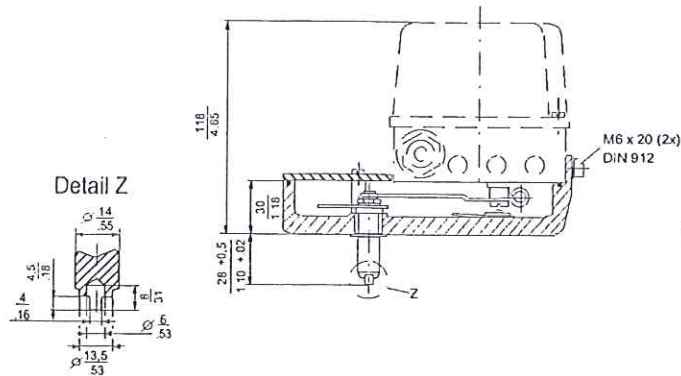
mm
in

Carrier bolt
for attachment to valve stem

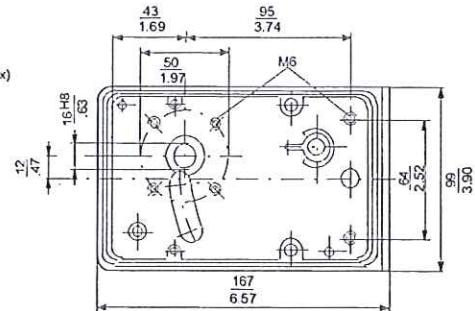


ATTACHMENT KIT FOR ROTARY ACTUATORS

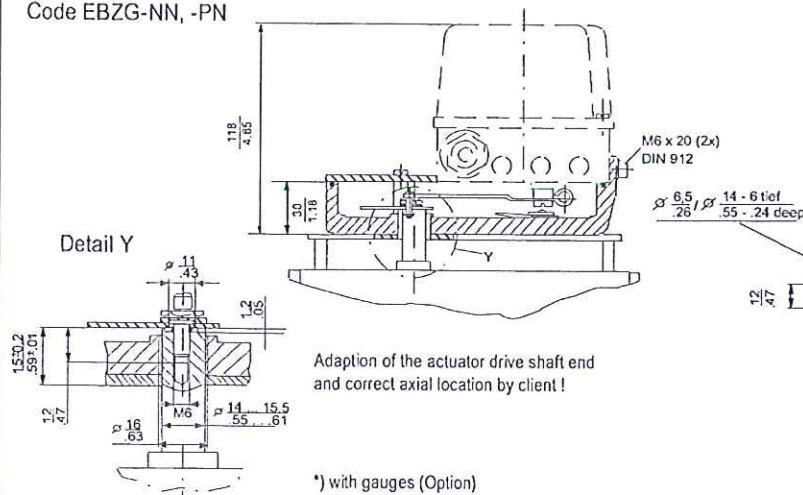
With shaft
(according to VDI/VDE 3845)
Code EBZG-ZN



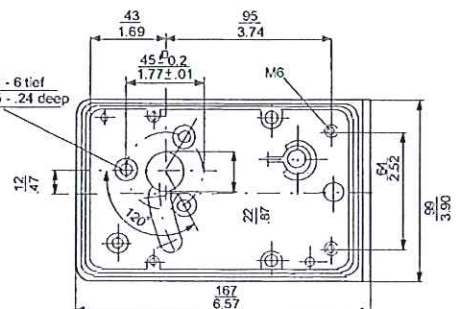
Housing dimensions
Attachment kit with shaft
resp. without flange
Code EBZG-NN



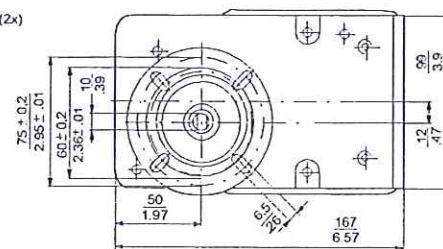
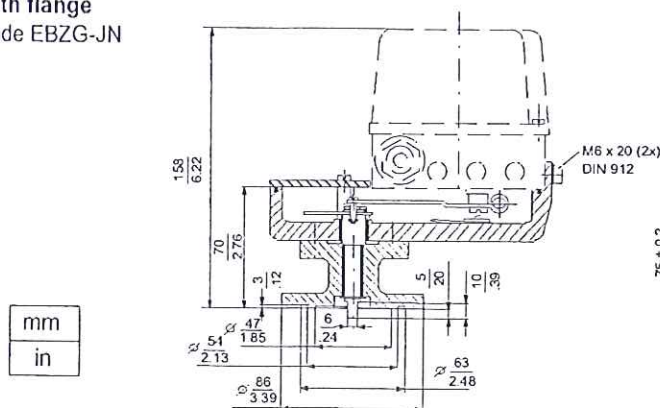
Without flange
Code EBZG-NN, -PN



Housing dimensions
Attachment kit without flange
Code EBZG-PN



With flange
Code EBZG-JN



Rotation angle max 120°; torque requirement 14 Nm

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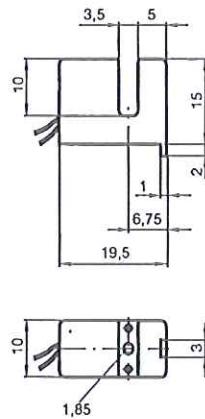
DOKT 535 792 026



Inductive proximity switches

SJ3,5-N

Comfort series
3.5 mm slot width

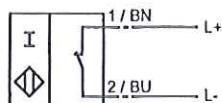


CE 0102

Switching element function	NAMUR NC
Slot width	3,5 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Installation	
Nominal voltage U_0	8 V
Operating voltage U_B	5 ... 25 V
Switching frequency f	0 ... 3000 Hz
Hysteresis H	0,41 ... 0,6 mm
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
EMC in accordance with	EN 60947-5-2
Standards	DIN EN 60947-5-6 (NAMUR)
Ambient temperature	-25 ... 100 °C (248 ... 373 K)
Connection type	0.5 m, flexible lead LIY
Core cross-section	0.14 mm ²
Housing material	PBT/PPS
Protection degree	IP67
Use in the hazardous area	see instruction manuals
Category	2G

Connection_type:

N / NO



105910_ENG.xml

2003-03-03

Instruction

Manual electrical apparatus for hazardous areas

Device category 2G

Directive conformity

Standard conformity

for use in hazardous areas with gas, vapour and mist

94/9/EG

EN 50014:1997, EN 50020:1994

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

CE 0102

CE symbol

Ex-identification

II 2G EEx ia IIC T6

EC-Type Examination Certificate

Assigned type

Effective internal capacitance Ci

Effective internal inductance Li

General

PTB 99 ATEX 2219 X

SJ3,5-...-N...

≤ 50 nF A cable length of 10 m is considered.

≤ 250 μH A cable length of 10 m is considered.

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The EU prototype test certificate must be observed. The special conditions must be adhered to!

The temperature ranges, according to temperature class, are given in the EU prototype test certificate.

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.

Highest permissible ambient temperature

Installation, Commissioning

Maintenance

No changes can be made to apparatus, which are operated in hazardous areas.
Repairs to these apparatus are not possible.

Special conditions

Protection from mechanical danger

The sensor must not be mechanically damaged.



(1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 99 ATEX 2219 X



(4) Equipment: Slot-type initiators types SJ... and SC...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 99-29175.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 50014:1997 **EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

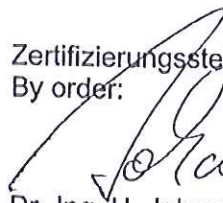
(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

 **II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, December 22, 1999


Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



sheet 1/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(15) Description of equipment

The slot-type initiators of types SJ... and SC... are used to convert displacements into electrical signals.

The slot-type initiators may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the intrinsically safe slot-type initiators depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and
supply circuit.....

type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$	$U_i = 16 \text{ V}$
$I_i = 25 \text{ mA}$	$I_i = 25 \text{ mA}$	$I_i = 52 \text{ mA}$	$I_i = 76 \text{ mA}$
$P_i = 34 \text{ mW}$	$P_i = 64 \text{ mW}$	$P_i = 169 \text{ mW}$	$P_i = 242 \text{ mW}$

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators are shown in the table:

types	C _i [nF]	L _i [μH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
SC2-N0...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5-N0-Y...	150	150	72	87	100	65	80	100	40	55	75	23	38	54
SC3,5...-N0...	150	150	73	88	100	66	81	100	45	60	89	30	45	74
SJ1,8-N-Y...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2,2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57
SJ3,5...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ3,5-H...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74
SJ5-K...	50	550	72	87	100	66	81	100	42	57	82	26	41	63
SJ10-N...	50	1000	72	87	100	66	81	100	42	57	82	26	41	63
SJ15-N...	150	1200	72	87	100	66	81	100	42	57	82	26	41	63
SJ30-N...	150	1250	72	87	100	66	81	100	42	57	82	26	41	63

(16) Test report PTB Ex 99-29175

(17) Special conditions for safe use

1. For the application within a temperature range of -60°C to -20 °C the slot-type initiators of types SJ... and SC... must be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the slot-type initiators of types SJ... and SC... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
3. The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators is shown in the table given under item (15) of this EC-type-examination certificate..
4. Inadmissible electrostatic charge of the plastic housing of the slot-type initiators of type SJ30-N..., has to be avoided (warning label on the device).

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, August 10, 1999

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EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.