



SW-02

Miniature Variable Area Flowswitch

Features

- / Small dimensions for assembly
- / Brass and stainless steel versions
- / Scales for water and air
- / Mounting in any position
- / Highly accurate switching
- / Very low switching hysteresis

Description:

The SW-02 series of flowswitches operates according to a modified variable area principle. Using a spring, the float is introduced into a cylindrical hole. The flowing medium moves the float in the direction of flow and the upper edge of the float corresponds to the scale mounted on the body of the SW-02. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move (maximum up to the stopper that prevents overriding of the operating range). This ensures a bistable switching action at any time.

Application:

The SW-02 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors, high-pressure cleaners and so on. In actual application, a switching hysteresis of only 0.5 .. 1.5 mm float stroke has been achieved by careful selection of the reed contacts being used.



Ordering Codes:

Order number SW-02. 1. 1. 1. 06. 1. 1. 1. 0

SW-02 Miniature Variable Area Flowswitch

Process connection /

- 1 = female thread G 1/4"
- 2 = female thread G 1/2"
- 3 = female thread G 3/4"
- 4 = female thread G 1"

Material /

- 1 = brass, spring stainless steel 1.4571
- 2 = fully stainless steel 1.4571

Scale /

- 1 = for water (20°C)
- 2 = for air (at 1.013 bar absolute, 20°C)

Operating ranges / deactuation flow rates

SW-02.1 only:	Water	Air
01 =	5...60 ml/min	0.6...2.2 NI/min
02 =	40...130 ml/min	
03 =	0.1...0.6 l/min	1.7...6 NI/min
04 =	0.2...1.2 l/min	2.5...8 NI/min
05 =	0.4...2.0 l/min	3...12 NI/min
06 =	0.5...3.0 l/min	3...22 NI/min
07 =	1.0...5.0 l/min	7...24 NI/min
08 =		12...34 NI/min
09 =		16...56 NI/min
10 =		20...80 NI/min
SW-02.2 only:		
11 =	0.02...0.2 l/min	2.5...10 NI/min
12 =	0.2...0.6 l/min	5.5...20 NI/min
13 =	0.4...1.8 l/min	8...30 NI/min
14 =	0.8...3.2 l/min	10...35 NI/min
14b =		45...90 NI/min
15 =	2...7 l/min	55...220 NI/min
16 =	3...13 l/min	65...240 NI/min
17 =	4...20 l/min	80...300 NI/min
18 =	8...30 l/min	140...525 NI/min
SW-02.3 or SW-02.4:		
18a =	10...30 l/min	
19 =	15...45 l/min	60...180 NI/min
19a =	20...60 l/min	
20 =	30...90 l/min	100...300 NI/min
21* =	60...150 l/min	200...650 NI/min

Number of contacts /

- 1 = 1 contact
- 2 = 2 contacts

Contact function /

- 1 = NO-contact
- 2 = change-over contact
- 3 = Ex m-change-over contact, SW-02.2, SW-02.3 a. SW-02.4 only (always with 2m infused cable)
- 4 = Ex m-NO-contact, SW-02.2, SW-02.3 and SW-02.4 only (always with 2m infused cable)
- 5 = change-over contact for PLC (not SW-02.1)
- 6 = Ex ib-NO-contact, SW-02.1 and SW-02.2 only
- 7 = Ex ib-change-over-contact, SW-02.1 and SW-02.2 only

Electrical connection /

- 1 = plug DIN43650, counter plug incl.
- 2 = plug M12x1, counter plug incl. (-20...+85°C)
- 3 = 1 m infused cable (2 m for Ex), (not for Ex ib-change-over-contact)

Special issues /

- 0 = none

* operating range 21 for water only as SW-02.4 with G1"-female threads

Technical Specifications:

Operating ranges /

- H₂O: 5...60 ml/min to 60...150 l/min
- Air: 0,6...2,2 NI/min to 200...650 NI/min (reference to 1,013 bar abs., 20°C)

Materials /

brass and st. steel versions

Protection class /

IP65 with plug DIN43650, IP67 with cable connection or plug M12 x 1, (ranges 18a-21, else IP65)

max. Pressure /

brass: 1/4" and 1/2" 300 bar, 3/4" and 1" 250 bar; st. steel: 1/4" and 1/2" 350 bar, 3/4" and 1" 300 bar

Pressure drop /

SW-02.1: 0.02...0.2 bar
SW-02.2: 0.02...0.3 bar
SW-02.3: 0.02...0.4 bar
SW-02.4: 0.02...0.4 bar

max. Temp. /

water 100°C (optional 160°C)
air 120°C (optional 160°C)

El. connection /

plug as per DIN 43650

Accuracy /

± 10% of full scale value

Setpoint adjustment /

The contact opens respectively changes, when the upco- ming flow falls below the adjusted setpoint.



Wetted Parts:

Element	brass version	st. steel version
Spring	st. steel 1.4571	st. steel 1.4571
Seals ⁽¹⁾	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Magnet	hard ferrite	hard ferrite
Other parts	brass nickel-plated	st. steel 1.4571

⁽¹⁾ connection reductions only (SW-02.3)

Contacts (max. V):

Element	SW-02.1	SW-02.2	SW-02.3 / SW-02.4
NO-contact	200V, 1A, 20VA	230V, 3A, 60VA	250V, 3A, 100VA
Change-over	150V, 1A, 20VA ⁽³⁾	250V, 1.5A, 50VA ^{(2),(3)}	250V, 1.5A, 50VA ⁽²⁾
Ex m-NO ⁽¹⁾		250V, 2A, 60VA	250V, 2A, 60VA
Ex m-CO ⁽¹⁾		250V, 1A, 30VA	250V, 1A, 30VA ⁽²⁾
Change-over SPS		250V, 1A, 60VA ⁽³⁾	250V, 1A, 60VA
NO M12x1	125 V, 1A, 20VA	125 V, 3 A, 60VA	250V, 3A, 100VA
Change-over M12x1	125 V, 1A, 20VA	125 V, 1.5 A, 50VA ⁽²⁾	250V, 1.5A, 50VA ⁽²⁾
Ex ib-NO	see Table		
Ex ib-CO	see Table		

⁽¹⁾ ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db - (max. Amb.temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db - (max. Amb.temp. 90°C)

⁽²⁾ Minimum load 3VA

⁽³⁾ Only with plug connection

EX ib NO and Change-over

Gas			Dust		
Ui	Ii	Pi	Ui	Ii	Pi
< 12.1 V	1.0 A	3.0 W	< 12.1 V	0.25 A	0.75 W
< 20 V	0.309 A	1.55 W	< 20 V	0.25 A	0.75 W
< 25 V	0.158 A	0.99 W	< 25 V	0.25 A	0.75 W
< 30 V	0.101 A	0.76 W	< 30 V	0.25 A	0.75 W

The switching units have to be connected only to intrinsically safe circuits.

Li = 0; Ci = 0

protection class with plug DIN 43650 C or plug M12: IP65

protection class with 1 m infused cable: IP67

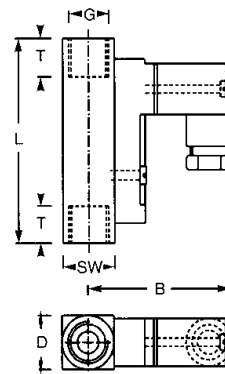
marking: II 2G Ex ib IIC and II 2D Ex ib IIIC

operating temperature -5°C < T_{Service} < +45°C

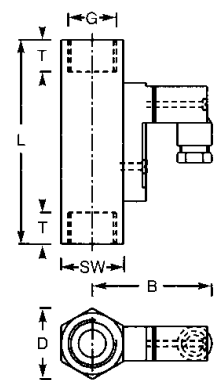
Dimensions in mm:

Type	SW	D	B	G	T	L	Weight
SW-02.1	18	18	48	1/4"	10	70	140 g
SW-02.2	27	31	52	1/2"	14	90	350 g
SW-02.3.1	34	47	79	3/4"	15	152	1240 g
SW-02.3.2	34	40	78	3/4"	15	152	1320 g
SW-02.4.1	41	47	79	1"	17	130	1030 g
SW-02.4.2	41	40	78	1"	17	130	1130 g

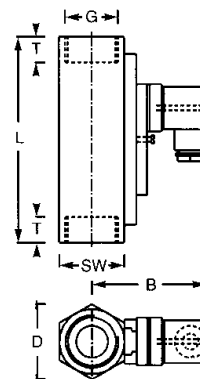
SW-02.1



SW-02.2



SW-02.3 / SW-02.4



Electrical connection

