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Operating Instructions

DS04

*Variable Area Flowmeter and Switch
High Pressure Version*

General

1. Before installation, make sure that the materials of the flowmeter are suitable for the medium to be measured.

Installation

The flowmeter and switch model DS04 works according to the variable area principle. The meter must be mounted vertically. Flow is always from bottom to top.

The medium must be free of particles (especially ferrous particles which may cause a clogging of the measuring tube. If this is not the case we recommend the use of filters, in case of ferrous particles with a magnetic insert with a max. mesh size of 0,02" / 0.6 mm. All applications which deviate from the standard conditions (monitoring of continuous flow) should be discussed first with our technical personnel.

Flow switches with Reed contact may not be used within an inductive or strong magnetic field.

All standard threads are made according to DIN 2999 Part 1. Please make sure that only appropriate counter threads and sealing material is used for installation, in order to ensure proper function and tightness.

To avoid measurement errors, straight pipe runs of 10 x D upstream and 5 x D downstream of the meter should be installed.

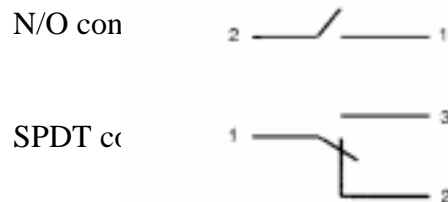
While mounting the flowmeter the max. thread length has to be observed. Using too long a thread may cause the flow switch to leak or even to be damaged.

While connecting the Reed contact make sure that the max. contact ratings on the unit are not exceeded (not even for short times), as Reed contact are very sensitive to overloads. This especially applies when inductive loads are connected. When switching inductive loads current surges of up to 10 times the rated value of the coil may occur. In such cases we recommend the use of a contact protection relay.

The Reed contacts are coated with tungsten, gold or rhodium and may therefore be connected directly to a PLC without any problems.

Electrical connection

The drawing shows the Reed contacts in the no-flow position.



Adjustment of switch point

The switching point is adjusted by means of the scale on the flow switch housing. The markings on the scale always define the N/O position. This means that with falling flow the Reed contact will open at the respective flow rate; it is closed while the flow is above the set flow rate.

Maintenance

The flowmeter and switch has only very few moving parts. Therefore maintenance is limited to occasional cleaning and a function check of the unit. With corrosion inhibitors or additives in the medium please check whether they may affect the materials of the flowmeter.

DS04

Variable Area Flowmeter And Switch For High Pressure Applications

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- high switching accuracy
- very small switch hysteresis
- robust design without glass measuring tube
- suitable for pressures up to 4350 psi / 300 bar



Description:

The flowmeter and switch model DS04 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a slotted nozzle. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale. A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The Reed contact is adjustable over the full measuring and switching range of the meter.

Application:

The variable area flowmeter and switch model DS04 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling circuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Versions:

- flow switch only with Reed contact
- optionally as flow meter and switch with external pointer indicator and contact

Measuring Ranges:

Water: 1.5-23.8 GPH ... 65-790 GPH
 Air: 2-59 SCFH ... 7-51 SCFM
 (at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Materials: brass or stainless steel

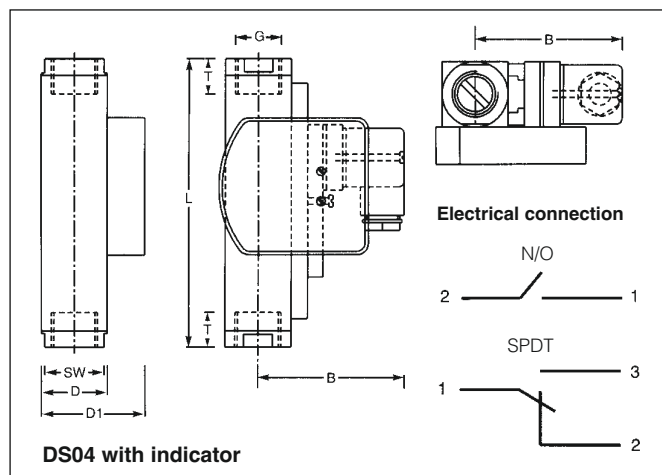
Contacts:

N/O: 250 V, 3 A, 100 VA
 SPDT: 250 V, 1.5 A, 30 VA
 Ex- N/O*: 250 V, 2 A, 60 VA
 Ex-SPDT*: 250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm							Weight (lbs / g)	
	SW	D	D1	B	NPT / G	T	L	without	with indication
DS04.1.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/4"	0.55 / 14	5.12 / 130	1.76 / 800	1.87 / 850
DS04.2.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/2"	0.59 / 15	5.12 / 130	1.76 / 800	1.87 / 850
DS04.2.x.x.05	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/2"	0.59 / 15	5.83 / 148	1.87 / 850	1.98 / 900
DS04.3.x.x.x	1.34 / 34	1.57 / 40	2.24 / 57	2.80 / 71	3/4"	0.71 / 18	5.98 / 152	2.97 / 1350	3.08 / 1400
DS04.4.x.x.06/07	1.42 / 36	1.42 / 36	2.09 / 53	2.99 / 76	1"	0.75 / 19	6.14 / 156	2.31 / 1050	2.42 / 1100
DS04.4.x.x.08	1.97 / 50	1.97 / 50	2.64 / 67	2.99 / 76	1"	0.79 / 20	7.87 / 200	6.06 / 2750	6.17 / 2800



Technical Specifications:

max. pressure: brass version: 2900 psi / 200 bar
 st. steel version: 4350 psi / 300 bar

pressure drop: 0.29-5.8 psi / 0.02-0.4 bar

max. temperature: 212 °F / 100 °C (320 °F / 160 °C on request) for liquids, 194 °F / 90 °C for gases

materials:
 wetted parts:
 brass version: nickel plated brass
 st. steel version: st. steel 316 Ti / 1.4571

O-rings: Buna (optionally: Viton, EPDM)

electrical connection: plug acc. to DIN 43650 (optionally: 1m cable connection)

accuracy: ± 5% f. s. for water, ± 10% f. s. for air

analog output: see model DSxx-A in section "accessories"

Ordering Code:

Order number: DS04. 4. 1. 1. WA06. 1. 1. 1. 0

Variable area flowmeter and switch

Connection:

1N = 1/4" NPT female 1 = G 1/4 female
 2N = 1/2" NPT female 2 = G 1/2 female
 3N = 3/4" NPT female 3 = G 3/4 female
 4N = 1" NPT female 4 = G 1 female

Material:

1 = brass
 2 = all st. steel AISI 316 Ti / 1.4571

Scale:

1 = for water
 2 = for air (at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Measuring ranges:

DS04.1 and DS04.2:

Water WU01 = 1.5 – 23.8 GPH WA01 = 0.1 - 1.5 l/min
 WU02 = 3.0 – 47.5 GPH WA02 = 0.2 - 3 l/min
 WU03 = 1.0 – 127 GPH WA03 = 0.3 - 8 l/min
 WU04 = 16 – 190 GPH WA04 = 1 - 12 l/min

Air LU01 = 2 – 59 SCFH LA01 = 1 - 28 NI/min
 LU02 = 8 – 127 SCFH LA02 = 4 - 60 NI/min
 LU03 = 15 – 340 SCFH LA03 = 6 - 160 NI/min
 LU04 = 40 – 510 SCFH LA04 = 20 - 240 NI/min

DS04.2 and DS04.3:

Water WU05 = 32 – 285 GPH WA05 = 2 - 18 l/min
Air LU05 = 80 – 760 SCFH LA05 = 40 - 360 NI/min

DS04.3 and DS04.4:

Water WU06 = 50 – 555 GPH WA06 = 3 - 35 l/min
 WU07 = 65 – 790 GPH WA07 = 4 - 50 l/min

Air LU06 = 60 – 700 SCFH LA06 = 60 - 700 NI/min
 LU07 = 2 – 24.5 SCFH LA07 = 80 - 1000 NI/min

DS04.4 only:

Air LU08 = 7 – 51 SCFH LA08 = 200 - 1400 NI/min

Version:

0 = switch only, without flow rate indication
 1 = flow meter and switch, with side indicator

No. of contacts:

0 = without contact
 1 = 1 contact
 2 = 2 contacts

Contact function:

0 = without contact
 1 = N/O
 2 = SPDT
 3S = Ex-N/O (EEx m II T6)
 3U = Ex-SPDT (EEx m II T6)

Options:

0 = without
 1 = please indicate