



*PKP Process Instruments Inc.*

*10 Brent Drive*

*Hudson, MA 01749*

*Tel: +1-978-212-0006*

*Fax: +1-978-568-0060*

*PKP Prozessmesstechnik GmbH*

*Borsigstrasse 24*

*D-65205 Wiesbaden-Nordenstadt*

*Tel: 06122 / 7055 - 0*

*Fax: 06122 / 7055 - 50*

## **Operating Instructions**

### **DS01**

*Miniature Variable Area Flowmeter  
And Switch*

## ***General***

---

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

## ***Installation***

---

A spring, integrated in the measuring tube, makes the flowmeter widely independent of the mounting position. The medium flow is always from the lowest to the highest scale value.

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 fittings have to be countered by means of a suitable wrench. If this is not done the fitting may rotate within its aluminium housing which in turn may cause the flowmeter to leak or may damage the measuring glass.

While connecting flowmeters with 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***

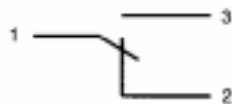
---

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

N/O contact



SPDT contact



## ***Adjustment of switch point***

---

The contact is open in the no-flow position. With flow, the contact will close

1. Loosen the tightening screws of the switch housing and move the housing all the way down.
2. Increase the flow until the upper edge of the float shows the desired min. flow rate (contact is now closed)
3. Move the switch housing upwards until the contact opens. Increase the flow the the normal flow rate (the contact is now closed).

## ***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 wether they may affect the materials of the flowmeter.

# DS01

## Miniature Variable Area Flowmeter And Switch

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- universal mounting position
- high switching accuracy
- very small switch hysteresis



### Description:

The flowmeter and switch model DS01 works according to a modified variable area principle.

The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via a burnt-in scale on the measuring glass. 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 switching range of the meter.

### Application:

The variable area flowmeter and switch model DS01 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.

### Switching hysteresis:

By careful selection of the Reed contacts the switching hysteresis could be reduced to only 0.02" - 0.06" / 0.5 - 1.5 mm float movement.

## Measuring Ranges:

Water: 0.08 - 0.95 GPH ... 16 - 40 GPM  
5 - 60 ml/min ... 60-150 l/min  
Air: 0.4 - 2.75 SCFH ... 7.0 - 22.0 SCFM  
0.2 - 1.3 NI/min ... 200 - 625 NI/min  
(at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

## Materials:

brass or stainless steel

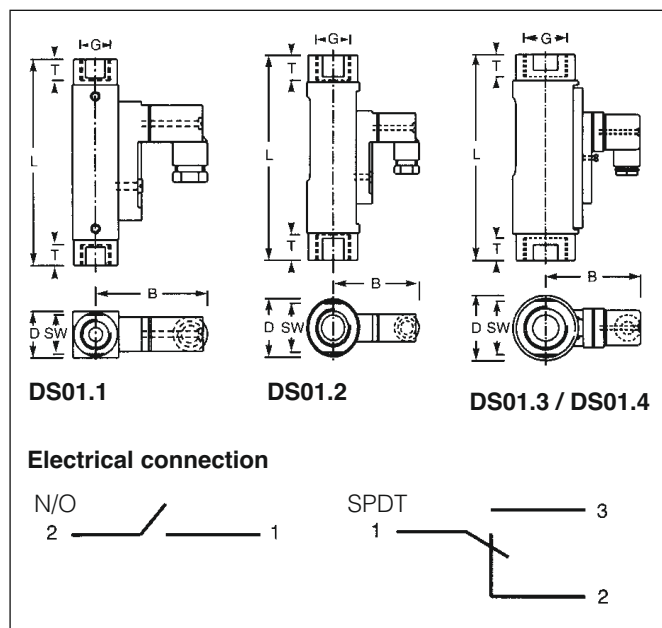
## Contacts:

Contact function	DS01.1	DS01.2	DS01.3 / DS01.4 DS01.5
N/O	200V, 1A, 20VA	230 V, 3A, 60 VA	250 V, 3A, 100 VA
SPDT	200 V, 1A, 20VA	250 V, 1.5A, 50 VA	250 V, 1.5A, 50 VA
N/O*			250 V, 2A, 60VA
SPDT*			250 V, 1A, 30VA

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

## Dimensions:

Model	Mounting dimensions in inch / mm						Weight (lbs / g)
	SW	D	B	NPT / G	T	L	
DS01.1	0.67 / 17	0.79 / 20	1.93 / 49	1/4	0.39 / 10	3.54 / 90	0.31 / 140
DS01.2	1.06 / 27	1.26 / 32	2.09 / 53	1/2	0.55 / 14	4.89 / 114	0.66 / 300
DS01.3	1.61 / 41	1.97 / 50	3.03 / 77	3/4	0.67 / 17	5.47 / 139	1.98 / 900
DS01.4	1.61 / 41	1.97 / 50	3.03 / 77	1	0.67 / 17	6.22 / 158	1.98 / 900
DS01.5	1.61 / 41	1.97 / 50	3.03 / 77	1 1/4	0.67 / 17	6.54 / 166	2.03 / 920



## Technical Specifications:

**max. pressure:** DS01.1: 230 psi / 16 bar  
DS01.2 / DS01.3 / DS01.4: 145 psi / 10 bar

**pressure drop:** DS01.1: 0.29-2.9 psi / 0.02-0.2 bar  
DS01.2: 0.29-4.35 psi / 0.02-0.3 bar  
DS01.3 / DS01.4: 0.29-5.8 psi / 0.02-0.4 bar

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

**materials:** measuring glass: Duran 50  
housing: anodized alumin

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

**electr. connection:** plug acc. to DIN 43650 (optionally: 1 m cable connection for DS01.1, N/O only)

**accuracy:** ± 10% f.s.

**analogue output:** see model DSxx-A in section "accessory"

## Ordering Code:

Order number: **DS01. 1. 1. 1. W13. 1. 1. 0**

## Miniature variable area flowmeter and switch

### Connection:

1N = 1/4" NPTF	1 = G 1/4 female
2N = 1/2" NPTF	2 = G 1/2 female
3N = 3/4" NPTF	3 = G 3/4 female
4N = 1" NPTF	4 = G 1 female
5N = 1 1/4" NPTF	5 = G 1 1/4 female

### Material:

1 = brass, spring of st. steel 304 / 1.4310  
2 = all stainless steel 316 TI / 1.4571

### Scale:

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

### Measuring ranges:

#### DS01.1 only:

<b>Water:</b> WU101 = 0.08-0.95 GPH	W101 = 5-60 ml/min
WU102 = 0.4-2.0 GPH	W102 = 20-140 ml/min
WU106 = 1.6-9.5 GPH	W106 = 0.1-0.6 l/min
WU11 = 3-19 GPH	W11 = 0.2-1.2 l/min
WU12 = 0.1-0.5 GPM	W12 = 0.4-2 l/min
WU13 = 0.13-0.8 GPM	W13 = 0.5-3 l/min
WU15 = 0.25-1.3 GPM	W15 = 1.0-5 l/min
<b>Air:</b> LU1001 = 0.4-2.75 SCFH	L1001 = 0.2 -1.3 NI/min
LU1002 = 1.05-4.25 SCFH	L1002 = 0.5-2.0 NI/min
LU1003 = 1.7-6.4 SCFH	L1003 = 0.8-3 NI/min
LU1005 = 3.5-10.5 SCFH	L1005 = 1.5-5.0 NI/min
LU1008 = 4.5-17.0 SCFH	L1008 = 2-8 NI/min
LU1012 = 6.5-25.0 SCFH	L1012 = 3-12 NI/min
LU1014 = 7.5-29.5 SCFH	L1014 = 3.5-14 NI/min
LU1020 = 12-42 SCFH	L1020 = 5.5-20 NI/min
LU1024 = 15-50 SCFH	L1024 = 7-24 NI/min
LU1035 = 21-74 SCFH	L1035 = 10-35 NI/min
LU1042 = 21-89 SCFH	L1042 = 10-42 NI/min

#### DS01.2 only:

<b>Water:</b> WU205 = 1.6-8 GPH	W205 = 0.1-0.5 l/min
WU21 = 3.2-16 GPH	W21 = 0.2-1 l/min
WU22 = 0.1-0.4 GPM	W22 = 0.4-1.6 l/min
WU24 = 0.25-1.0 GPM	W24 = 1-4 l/min
WU28 = 0.55-2.0 GPM	W28 = 2-8 l/min
WU215 = 1.1-4.0 GPM	W215 = 4-15 l/min
WU220 = 1.5-5.5 GPM	W220 = 5-22 l/min
WU228 = 1.5-7.5 GPM	W228 = 6-28 l/min
<b>Air:</b> LU2012 = 6.5-25.0 SCFH	L2012 = 3-12 NI/min
LU2030 = 15-64 SCFH	L2030 = 7-30 NI/min
LU2040 = 25-85 SCFH	L2040 = 12-40 NI/min
LU2125 = 1.0-4.4 SCFM	L2125 = 28-125 NI/min
LU2200 = 1.8-7.0 SCFM	L2200 = 50-200 NI/min
LU2420 = 3.5-14.8 SCFM	L2420 = 100-420 NI/min
LU2480 = 4.2-17 SCFM	L2480 = 120-480 NI/min

#### DS01.3, DS01.4 and DS01.5:

<b>Water:</b> WU3030 = 2.1-8.0 GPM	W3030 = 8 - 30 l/min
WU3045 = 4.0-12.0 GPM	W3045 = 15-45 l/min
WU3090 = 8.0-24.0 GPM	W3090 = 30-90 l/min
<b>Air:</b> LU30080 = 48-170 SCFH	L30080 = 22.5-80 NI/min
LU30130 = 105-275 SCFH	L30130 = 50-130 NI/min
LU30420 = 4.6-14.8 SCFM	L30420 = 130-420 NI/min
LU30625 = 7.0-22.0 SCFM	L30625 = 200-625 NI/min

#### DS01.4 or DS01.5:

<b>Water:</b> WU3150 = 16-40 GPM	W3150 = 60-150 l/min
----------------------------------	----------------------

### No. of contacts:

1 = 1 contact  
2 = 2 contacts

### Contact function:

1 = N/O  
2 = SPDT  
3S = Ex-N/O (EEx m II T6), DS01.3, DS01.4, DS01.5 only  
3U = Ex-SPDT (EEx m II T6), DS01.3, DS01.4, DS01.5 only

### Options:

0 = without  
1 = please indicate

PKP Prozessmesstechnik GmbH

Borsigstraße 24 · D-65205 Wiesbaden  
+49 (0) 6122-7055-0 · +49 (0) 6122-7055-50  
Email: info@pkp.de · Internet: www.pkp.de

PKP Process Instruments Inc.

10 Brent Drive · Hudson, MA 01749  
+1-978-212-0006 · +1-978-568-0060  
Email: info@pkp.eu · Internet: www.pkp.eu

