


DS01

Miniature Variable Area Flowmeter and Switch -with Sight Glass-

- for low viscosity liquids and gases
- small mounting dimensions
- brass (nickel plated) or stainless steel version
- scales burned into the sight glass
- universal installation position
- high switching accuracy
-  optional Ex- version acc. to ATEX
- analogue transmitter 4...20 mA optional
- P_{max} : 16 bar, T_{max} : 160 °C



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.

Typical application:

The variable area flowmeters and monitors DS01 are used to measure and monitor continuous flow rates of low-viscosity liquids or gaseous media.

Areas of applications are:

- cooling systems
- engineering
- medical technology
- pharmaceutical and chemical industries
- research and development

Models:

Measuring ranges:

water: 5...60 ml/min – 60...150 l/min
air: 0,2...1,3 NI/min – 200...625 NI/min
(referenced to 1 bar abs, 20°C)

Materials: brass (nickel-plate) or stainless steel

Technical Data:

Max. pressure: DS01.1 / DS01.2: 16 bar
DS01.3 / DS01.4 / DS01.5: 10 bar

Pressure loss: DS01.1: 0,02–0,2 bar
DS01.2: 0,02–0,3 bar
DS01.3 / DS01.4 / DS01.5: 0,02–0,4 bar

Max. media-temperature: 100 °C (optional 160 °C)
Ex-devices acc. to ATEX-marking

Electr. Connection: DS01.1 and DS01.2:
angle plug acc. to EN 175301-803,
form C (DIN 43650)
DS01.3, DS01.4 und DS01.5:
angle plug nach EN 155301-803,
form A (DIN 43650),
Ex-contact 3S and 3U with 2 m cable
optional: cable connection
round plug M12 x 1 acc. to EN 50044,
angle plug with LED or glow lamp

Accuracy: ± 10 % FS
(for vertical installation)

Materials:

**Protective housing:
(non-wetted parts)** aluminium anodized

Brass version (nickel-plated):

Wetted parts:
Sight glass: borosilicate glass
Float: stainless steel
Gaskets: NBR, optional FKM, EPDM
Magnet: ferrite
Spring: stainless steel 1.4571

all other wetted parts: brass, nickel plated

Stainless steel version (1.4571):

Wetted parts:
Sight glass: borosilicate glass
Gaskets: FKM, optional NBR, EPDM
Magnet: ferrite

all other wetted parts: stainless steel 1.4571

Order Code:

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

**Miniature variable area flowmeter-
and switch – with sight glass -**

Connection female thread:

1 = G 1/4 1N = 1/4" NPT
2 = G 1/2 2N = 1/2" NPT
3 = G 3/4 3N = 3/4" NPT
4 = G 1 4N = 1" NPT
5 = G 1 1/4 5N = 1 1/4" NPT
(5, 5N for liquids only)

Material:

1 = brass nickel-plated
2 = stainless steel 1.4571

Scale:

1 = for water
2 = for air (at 1 bar abs., 20 °C)

Measuring ranges:

Water (DS01.1 only):	Air:
W101 = 5–60 ml/min	L1001 = 0,2 –1,3 NI/min
W102A = 25–130 ml/min	L1002 = 0,5–2,0 NI/min
W103 = 0,06–0,3 l/min	L1003 = 0,8–3 NI/min
W106 = 0,1–0,6 l/min	L1005 = 1,5–5,0 NI/min
W11 = 0,2–1,2 l/min	L1008 = 2–8 NI/min
W12 = 0,4–2 l/min	L1012 = 3–12 NI/min
W13 = 0,5–3 l/min	L1014 = 3,5–14 NI/min
W15 = 1,0–5 l/min	L1020 = 5,5–20 NI/min
	L1024 = 7–24 NI/min
	L1035 = 10–35 NI/min
	L1042 = 10–42 NI/min

DS01.2 only:

W205A = 0,2–0,5 l/min	L2012 = 3–12 NI/min
W21A = 0,3–1,0 l/min	L2030 = 7–30 NI/min
W22A = 0,7–2,0 l/min	L2040 = 12–40 NI/min
W24A = 1,6–4,0 l/min	L2080 = 20–80 NI/min
W28A = 3,0–8,0 l/min	L2125 = 28–125 NI/min
W212 = 4,5–12 l/min	L2200 = 50–200 NI/min
W215A = 6,0–15 l/min	L2420 = 100–420 NI/min
W220A = 8,0–20 l/min	L2500 = 200–500 NI/min
W224 = 9,5–24 l/min	
W228A = 12–28 l/min	

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

W3030 = 8–30 l/min	L30080* = 22,5–80 NI/min
W3045 = 15–45 l/min	L30130* = 50–130 NI/min
W3060 = 20–60 l/min	L30420* = 130–420 NI/min
W3090 = 30–90 l/min	L30625* = 200–625 NI/min

*not for 1 1/4"-version

DS01.4 and DS01.5 only:

W4120 = 40–120 l/min
W4150 = 60–150 l/min

Addition S... = special scale

Number of contacts:

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

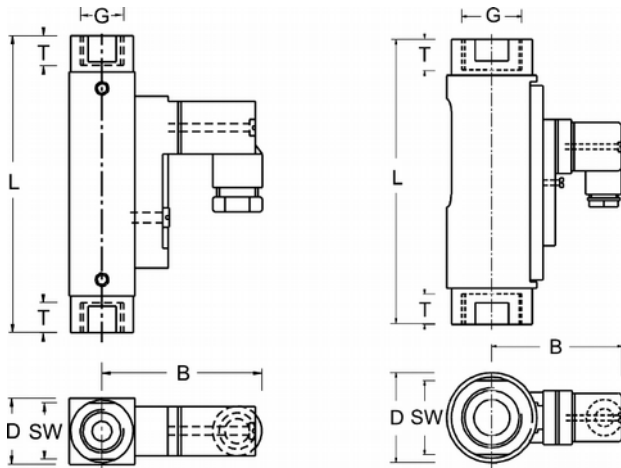
Contact function / analogue output:

0 = without
1 = N/O
2 = SPDT
2X = SPDT for SPS application (for devices from 1/2")
3ST5 = Ex-N/O, T5 (100 °C), with 2 m cable, only DS01.3/4/5
3ST6 = Ex-N/O, T6 (80 °C), with 2 m cable, only DS01.3/4/5
3UT5 = Ex-SPDT, T5 (100 °C), with 2 m cable, only DS01.3/4/5
3UT6 = Ex-SPDT, T6 (80 °C), with 2 m cable, only DS01.3/4/5
3SM = Ex-N/O, only DS01.1 and DS01.2
3UM = Ex-SPDT, only DS01.1 and DS01.2
SU20 = analogue transmitter 4...20 mA and 0...10 V

Options:

0 = without
1 = please specify in plain text
HT = high temperature version 160 °C
M12 = round plug M12 x 1 acc. to EN 50044 (Tmax. 85 °C)
Kx = cable version 1 m, 2 m, 5 m or 10 m

Dimensions:



DS01.1

DS01.2 – DS01.5

Dimensions:

Type	Dimensions [mm]						Weight [g]
	SW	D	B	G	T	L	
DS01.1	17	20	49	G 1/4	10	90	140
DS01.2	27	32	53	G 1/2	14	114	300
DS01.3	41	50	77	G 3/4	15	144.5	850
DS01.4	41	50	77	G 1	17	158	900
DS01.5	50	50*	77	G 1 1/4	17	166	920

*Screwing D = 55

Contacts:

The contact opens/changes, if the flow level has fallen under the adjusted value

Type	Size	Contact function	Switching capacity		
			Angle plug IP65	M12x1 plug IP67**	Cable connection (1 m) IP67
DS01.1	1/4"	1 = N/O	140 VAC / 0,7 A / 20 VA 200 VDC / 1 A / 20 VA	125 VAC / 0,7 A / 20 VA 125 VDC / 1 A / 20 VA	140 VAC / 0,7 A / 20 VA 200 VDC / 1 A / 20 VA
		2 = SPDT	150 VAC/DC / 1 A / 20 VA	125 VAC/DC / 1 A / 20 VA	-/-
		3SM = Ex-N/O*	gas: < 30 V / 0,101 A / 0,76 W dust: < 30 V / 0,25 A / 0,75 W		gas: < 30 V / 0,101 A / 0,76 W dust: < 30 V / 0,25 A / 0,75 W
		3UM = Ex-SPDT*			-/-
DS01.2	1/2"	1 = N/O	230 V / 3 A / 60 VA	125 V / 3 A / 60 VA	230 V / 3 A / 60 VA
		2 = SPDT	250 V / 1,5 A / 50 VA, min load: 3 VA	125 V / 1,5 A / 50 VA, min load: 3 VA	-/-
		2X = SPDT for SPS	250 V / 1 A / 60 VA	-/-	-/-
		3SM = Ex-N/O*	gas: < 30 V / 0,101 A / 0,76 W dust: < 30 V / 0,25 A / 0,75 W		gas: < 30 V / 0,101 A / 0,76 W dust: < 30 V / 0,25 A / 0,75 W
		3UM = Ex SPDT*			-/-
DS01.3 DS01.4 DS01.5	3/4" 1" 1 1/4"	1 = N/O	250 V / 3 A / 100 VA		
		2 = SPDT	250 V / 1,5 A / 50 VA, min load: 3 VA		
		2X = SPDT for SPS	250 V / 1 A / 60 VA	-/-	-/-
		3ST5 = Ex-N/O, T5* 3ST6 = Ex-N/O, T6*	-/-	-/-	250 V / 2 A / 60 VA (2 m cable)
		3UT5 = Ex-SPDT, T5* 3UT6 = Ex-SPDT, T6*	-/-	-/-	250 V / 1 A / 30 VA, min load: 3 VA (2 m cable)

* Exact max. switching capacity: see ATEX documents

** Protection class M12x1 plug for DS01.1 and DS01.2: IP65

ATEX-designations:

Contacts 3SM and 3UM for DS01.1/2.:

ATEX II 2 G Ex ib IIC and ATEX II 2 D Ex ib IIIC
for connection to a certified intrinsically safe circuit,
temperature range $-5\text{ °C} < T_{\text{Service}} < 45\text{ °C}$, $L_i=0$, $C_i=0$

Contacts 3ST5, 3ST6, 3UT5, 3UT6 for DS01.3/4/5.:

ATEX II 2 G Ex mb IIC T6 Gb, ATEX II 2 D Ex tb IIIC T80 °C Db
ATEX II 2 G Ex mb IIC T5 Gb, ATEX II 2 D Ex tb IIIC T100 °C Db
(with cable connection, Standard 2 m only)

Analogue Transmitter SU20:

The position of a magnetic float / piston is detected by means of Hall sensors and converted into an analogue signal. .

- analogue signal 4...20 mA and 0...10 V
- operating temperature: -20... +70 °C
- accuracy: +/- 10 % of full scale
- Aluminium housing, anodized



Technical Data:

Accuracy*:	+/- 1 % of full scale
Operating temperature:	-20...+70 °C
Storage temperature:	-20...+80 °C
Repeatability:	tbd.
Housing material:	Aluminium, blue anodized
Protection class:	IP67

* The actual accuracy depends on the flow sensor used. On request the accuracy of the flow sensor used can be significantly increased by a customized calibration.

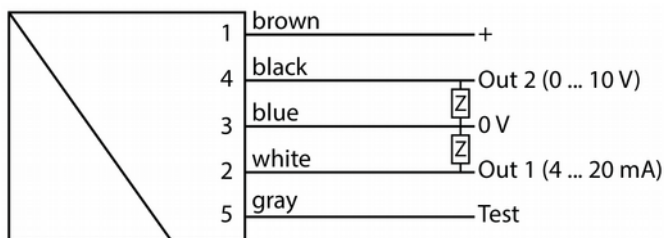
Electrical Data:

Analogue output:	4...20 mA and 0...10 V
Power supply:	24 V _{CD} (19...30 V _{DC})
Power consumption:	< 1 W
Current output:	max. load 600 Ohm
Voltage output	max. current 10 mA
Connection:	round plug M12x1, 5-pole

Notes:

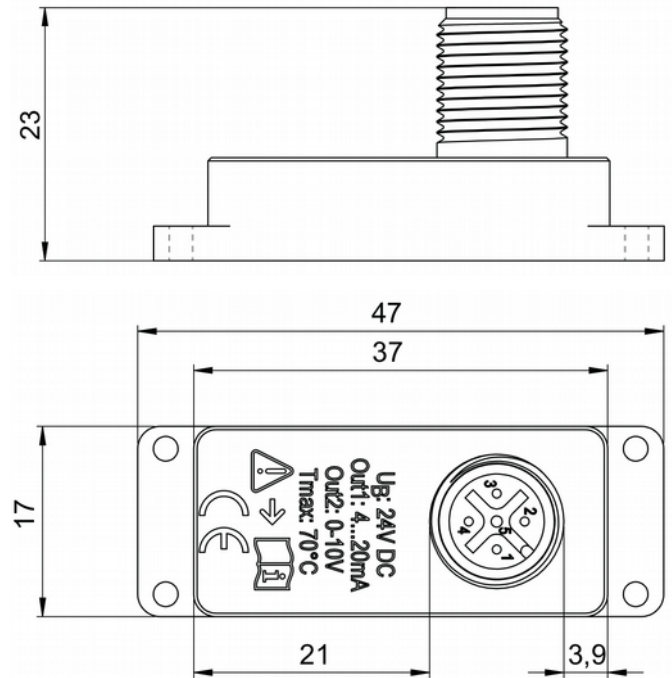
Flowmeter and analogue transmitter SU20 have been optimally adjusted to each other and may not be exchanged.

Electrical Connection:



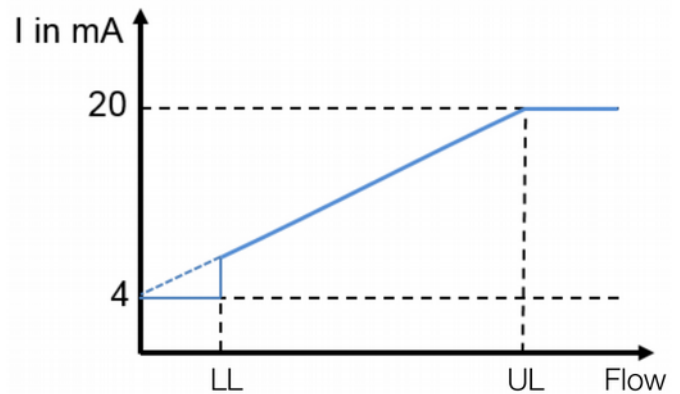
Attention: Pin 5 must not be electrically connected! We strongly recommend use of a four core cable.

Dimensions:

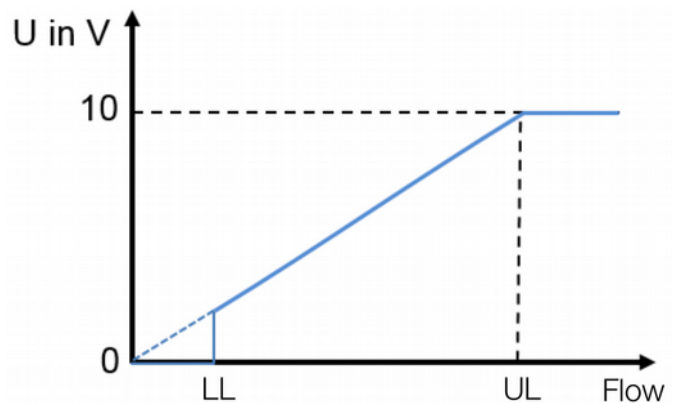


Characteristics:

Current-Flow characteristic:



Voltage-Flow characteristic:



LL: lower limit of measuring range
UL: upper limit of measuring range

Accessories (see separate data sheets):

- Needle valves SNV01, SNV02



- Ball valves SKG01, SKG02



- Dirt traps SF00, SF01



- Protection relay MSR01



- M12 Plug connector PVC-cable SM12



Notes:

The specified measuring/switching ranges apply when the instrument is installed vertically and the flow rate is from bottom to top.

Other installation positions or operating densities deviating from the specified specifications increase the specified measuring error.

Special scales for different media and operating conditions are available on request.

The specified switching points are shut-off points at falling flow rates. Please note that the switch-on points are higher due to the hysteresis.

For applications where pressure surges are to be expected, please contact PKP!