


DS02

Miniature Variable Area Flowmeter and Switch- All Metal Version

- for low viscosity liquids and gases
- small mounting dimensions
- brass or stainless steel version
- robust design without a measuring glass tube
- universal installation position
- high switching accuracy
-  optional Ex- version acc. to ATEX
- analogue transmitter 4...20 mA optional
- P_{\max} : 350 bar, T_{\max} : 160 °C



Description:

The flow switch model DS02 works according to a modified variable area principle. The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction.

A Reed contact is mounted outside the meter in a sealed housing. This reed contact is encapsulated in a continuously adjustable housing and thus protected from external influences.

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. An external pointing instrument is magnetically coupled to the float and indicates the flow rate.

Typical application:

The variable area flowmeters and monitors DS02 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: 0,6...2,2 NI/min – 200...650 NI/min
(referenced to 1 bar abs, 20°C)

Materials: Brass or stainless steel versions

Technical Data:

Max. Pressure:

	DS02.1	DS02.2	DS02.3/4
Liquids:	200 bar (MS) 300 bar (VA)	300 bar (MS) 350 bar (VA)	300 bar (MS) 350 bar (VA)
Gases:	300 bar (MS) 350 bar (VA)	300 bar (MS) 350 bar (VA)	250 bar (MS) 300 bar (VA)

Pressure loss: DS02.1: 0,02–0,2 bar
DS02.2: 0,02–0,3 bar
DS02.4: 0,02–0,4 bar

Max. media-temperature: 100 °C (optional 160 °C) for liquids
120 °C (optional 160 °C) for gases
Ex-devices acc. to ATEX-marking

Operating temp.: 70 °C with analogue transmitter AZ06

Electr. Connection: DS02.1 and DS02.2:
angle plug acc. to EN 175301-803,
form C (DIN 43650)
DS02.3 and DS02.4
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 % of full scale
(for vertical installation)

Materials:

Brass version:

Wetted parts:
Meas. tube: brass (outside nickel plated)
Spring: st. steel 1.4571
Gaskets*: NBR, optional: EPDM, FKM
Magnet: ferrite

all other wetted parts: brass

Stainless steel version 1.4571:

Wetted parts:
Gaskets*: FKM, optional EPDM, NBR
Magnet: ferrite

all other wetted parts: stainless steel 1.4571

*only for reduced connection

Order Code:

Order Number: DS02. 1. 1. 1. W13. 1. 1. 0.

**Miniature variable area flowmeter-
and switch**

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*
) reduced

Material:

1 = brass
2 = stainless steel 1.4571

Scale:

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

Measuring ranges:

Water

only DS02.1:

W101 = 5–60 ml/min
W102A = 40–130 ml/min
W106 = 0,1–0,6 l/min
W11 = 0,2–1,2 l/min
W12 = 0,4–2 l/min
W13 = 0,5–3 l/min
W15 = 1,0–5 l/min

Air:

L1002 = 0,6–2,2 NI/min
L1006 = 1,7–6,0 NI/min
L1008 = 2,5–8,0 NI/min
L1012 = 3–12 NI/min
L1022 = 3–22 NI/min
L1024 = 7–24 NI/min
L1034 = 12–34 NI/min
L1056 = 16–56 NI/min
L1080 = 20–80 NI/min

only DS02.2:

W202 = 0,02–0,2 l/min
W206 = 0,2–0,6 l/min
W21 = 0,4–1,8 l/min
W23 = 0,8–3,2 l/min
W27 = 2–7 l/min
W213 = 3–13 l/min
W220 = 4–20 l/min
W230 = 8–30 l/min

L2010 = 2,5–10 NI/min
L2020 = 5,5–20 NI/min
L2030 = 8–30 NI/min
L2035 = 10–35 NI/min
L2090 = 45–90 NI/min
L2220 = 55–220 NI/min
L2240 = 65–240 NI/min
L2300 = 80–300 NI/min
L2525 = 140–525 NI/min

DS02.3 or DS02.4

W3030 = 10–30 l/min
W3045 = 15–45 l/min
W3060 = 20–60 l/min
W3090 = 30–90 l/min

L30180 = 60–180 NI/min
L30300 = 100–300 NI/min
L30650 = 200–650 NI/min

only DS02.4

W4150 = 60–150 l/min

Addition S...= special scale

Number of contacts:

0 = without contact (only for devices with indication and/or AZ06)
1 = 1 contact
2 = 2 contacts

Contact function / Analogue output:

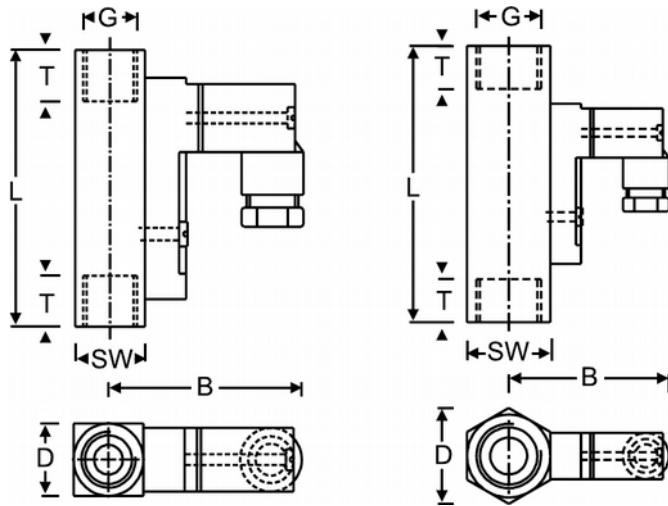
(contact or analogue transmitter available)

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, not for DS02.1
3ST6 = Ex-N/O, T6 (80 °C), with 2 m cable, not for DS02.1
3UT5 = Ex-SPDT, T5 (100 °C), with 2 m cable, not for DS02.1
3UT6 = Ex-SPDT, T6 (80 °C), with 2 m cable, not for DS02.1
3SM = Ex-N/O, only DS02.1 and DS02.2
3UM = Ex-SPDT, only DS02.1 and DS02.2
SU20 = analogue transmitter 4...20 mA and 0...10 V

Options:

0 = without
1 = please specify in plain text
AZ = with pointer indication (not for DS02.1)
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:



DS02.1

DS02.2 – DS02.4

Dimensions:

Type	Dimensions [mm]						Weight [g]
	SW	D	B	G	T	L	
DS02.1	17	17	47	G 1/4	10	65	140
DS02.2	27	31	52	G 1/2	14	90	350
DS02.3	41	47	76	G 3/4	21	152	1200
DS02.4	41	47	76	G 1	17	130	1050

Note: DS02.2...AZ and DS02.3(4)...AZ: square housing

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
DS02.1	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*			-/-
DS02.2	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*			-/-
		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)
DS02.3 DS02.4	3/4" 1"	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 DS02.1 and DS02.2: IP65

ATEX-designations:

Contacts 3SM and 3UM for DS02.1/2.:

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 DS02.2/3/4.:

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.

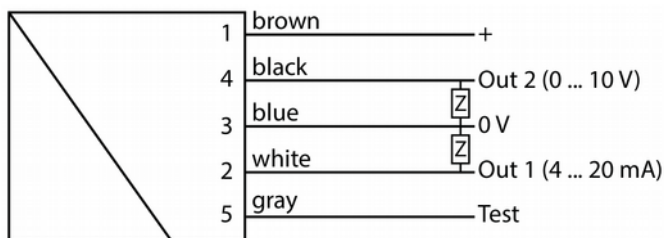
Electrical Data:

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:

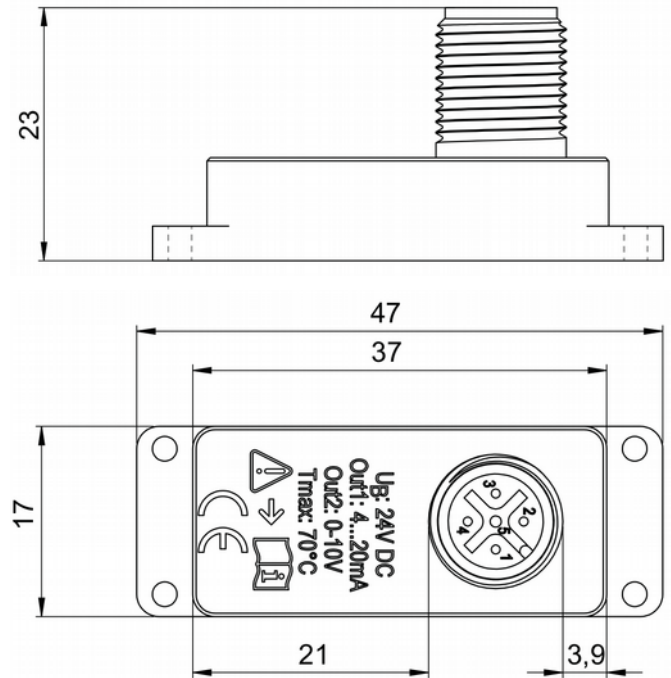
Flowmeter and analogue transmitter SU20 have been optimally adjusted to each other and may not be exchanged.

Electrical Connection:



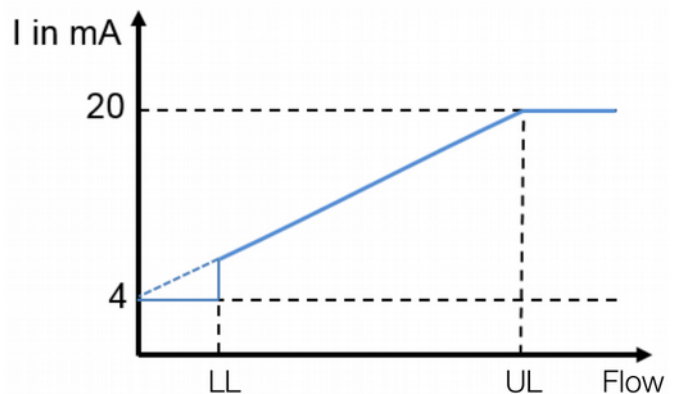
Attention: Pin 5 must not be electrically connected! We strongly recommend use of a four core cable.

Dimensions:

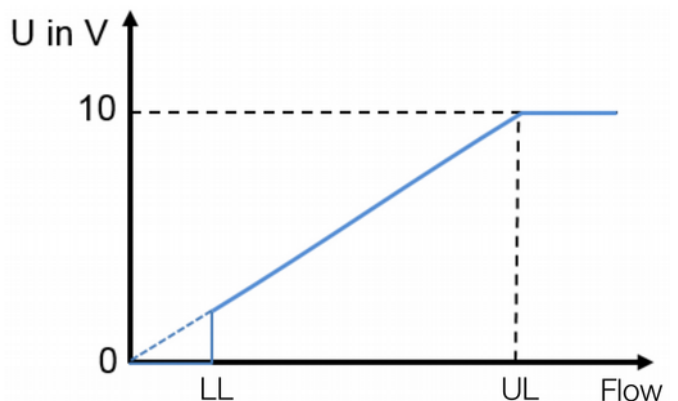


Characteristics:

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!