DS04

Variable Area Flowmeter and Switch for High Pressure Applications

- applicable for low viscosity liquids and gases
- small mounting dimensions
- brass (nickel plated) or stainless steel version
- high switching accuracy
- robust design without a measuring glass tube
- for process pressure up to 300 bar
- optional Ex- version acc. to ATEX
- analogue transmitter 4...20 mA optional
- P_{max}: 300 bar, T_{max}: 160 °C

Description:

The flowmeter and switch model DS04 works according to a modified variable area principle.
The float is guided in an upward tapered measuring tube. 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.

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

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Models:

Measuring ranges:

water:	0,1–1,5 l/min ... 4–50 l/min
air:	1–28 Nl/min ... 200–1450 Nl/min (referenced to 1 bar abs, 20°C)

Materials: brass (nickel plated) or stainless steel versions

Technical Data:

Max. pressure: brass version: 200 bar
stainless steel version: 300 bar

Pressure loss: 0,02–0,2 bar (for liquids)
0,02 – 0,4 bar (for gases)

Max. media-temperature: 100 °C for liquids (optional 160 °C)
80 °C for gases,
Ex-devices acc. to. ATEX-marking

Operating temp.: 70 °C with analogue transmitter AZ06

Electr. Con.: angle plug acc. to EN 155301-803, Form A (DIN 43650),
Ex-contact with 2 m cable,
optional: cable connection
round plug M12 x 1 acc. to EN 50044
angle plug with LED or glow lamp

Accuracy: ± 5 % of full scale for liquids
± 10 % of full scale for air

Mounting position: vertical

Materials:

Brass version (nickel plated):

Wetted parts:

float:	brass nickel plated (for liquids) POM (for gases)
threaded rings:	brass
gaskets:	NBR (optional FKM, EPDM)

all other wetted parts: brass nickel plated

Stainless steel version 1.4571:

Wetted parts:

float:	stainless steel 1.4571 (for liquids) POM (for gases)
gaskets:	FKM (optional NBR, EPDM)

all other wetted parts: stainless steel 1.4571

Order Code:

Order Number: DS04. 3. 1. 1. WA06. 1. 1. 1. 0

variable area flow meter- and switch

Connection female thread:

1 = G 1/4	1N = 1/4“ NPT
1A = G 3/8	1AN = 3/8“ NPT
2 = G 1/2	2N = 1/2“ NPT
3 = G 3/4	3N = 3/4“ NPT
4 = G 1	4N = 1“ NPT

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	Air
DS04.1, DS04.1A and DS04.2:	
WA01 = 0,1–1,5 l/min	LA01 = 1–28 Nl/min
WA02 = 0,2 –3 l/min	LA02 = 4–60 Nl/min
WA03 = 0,3–8 l/min	LA03 = 6–160 Nl/min
WA04 = 1–12 l/min	LA04 = 20 –240 Nl/min
DS04.2 and DS04.3:	
WA05 = 2 –18 l/min	LA05 = 40 –360 Nl/min
DS04.3 or DS04.4:	
WA06 = 3–35 l/min	
WA07 = 4–50 l/min	LA07 = 60–700 Nl/min
only DS04.4:	
	LA08 = 200 –1450 Nl/min

Addition S...= special scale

Flow indicator:
0 = switch only, without flow indicator
1 = flow meter and -switch, with flow indicator

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
3ST5 = Ex-N/O, T5 (100 °C), with 2 m cable
3ST6 = Ex-N/O, T6 (80 °C), with 2 m cable
3UT5 = Ex-SPDT, T5 (100 °C), with 2 m cable
3UT6 = Ex-SPDT, T6 (80 °C), with 2 m cable
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 (for liquids only)
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

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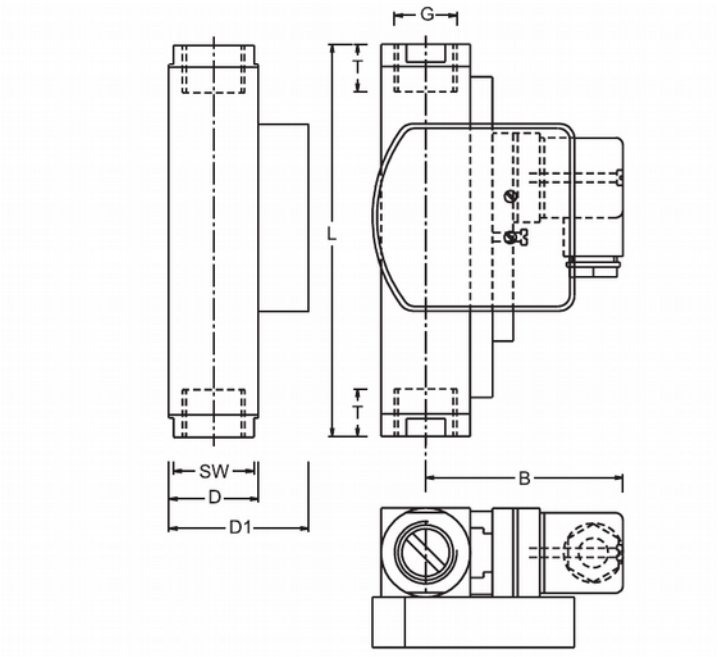
Dimensions:



DS04 with flow indicator

Dimensions:

Type	Dimensions [mm]							Weight appr. [g]
	SW	D	D1	B.	G	T	L	
01 - 04	27	30	47	71	1/4 3/8 1/2	14 19 19	131	800/900
05	27	30	47	71	1/2	19	146	800/850
	32	35	47	71	3/4	17	174	960/1010
06	34	40	57	76	3/4	18	152	1350/1400
07	40	40	57	76	1	19	156	1050/1100
08	50	40	67	81	1	20	200	2750/2800

Contacts:

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

			Switching capacity		
Type	**Size**	**Contact function**	**Angle plug IP65**	**M12x1 plug IP67**	**cable connection (1 m) IP67**
DS04.1 DS04.1A DS04.2 DS04.3 DS04.4	1/4“ 3/8“ 1/2“ 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

ATEX-designations:

Contacts 3ST5, 3ST6, 3UT5, 3UT6:

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)

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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.

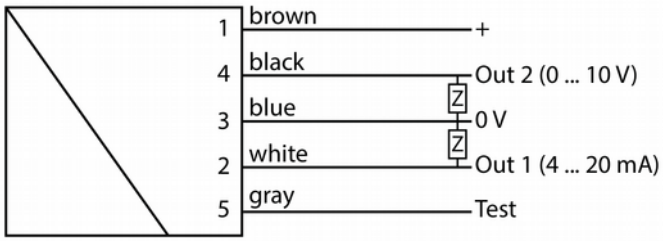
Electrical Data:

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:

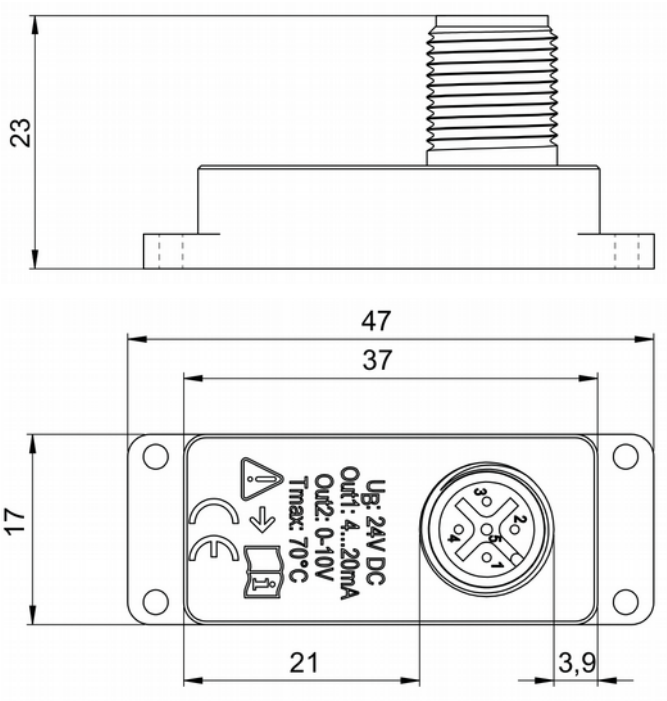
Flowmeter and analogue transmitter SU20 have been optimally adjusted to each other and may not be exchanged.

Electrical Connection:



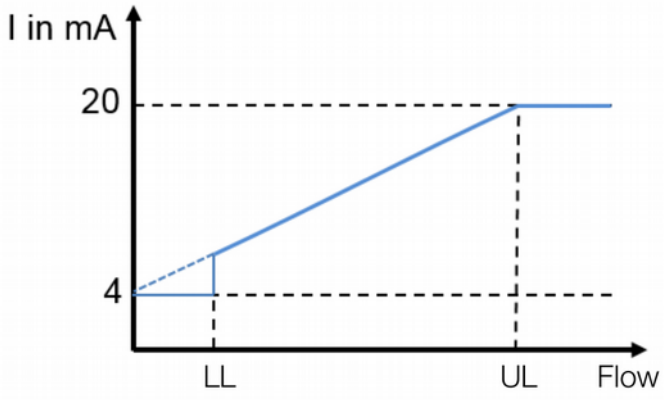
Attention: Pin 5 must not be electrically connected! We strongly recommend use of a four core cable.

Dimensions:

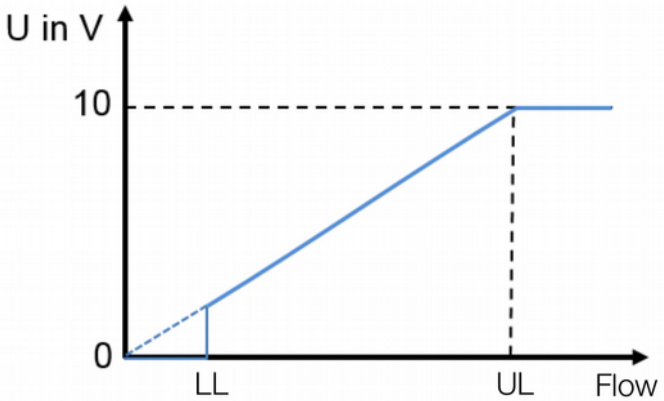


Characteristics:

Current-Flow characteristic:



Voltage-Flow characteristic:



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

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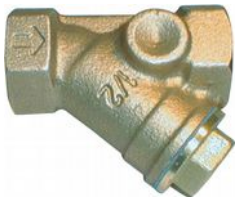
Accessories (see separate data sheets):

- **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!

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