SM-10

Variable Area Flowmeter with Sight Glass for Small Flow Volumes

Features

/ Indication without power supply

/ For fluids and gases

/ Brass or stainless steel

/ With built-in needle valve

/ Alarm output on request

/ Accuracy class 1.0, 2.5 or 4.0

Description:

The SM-10 series of flowmeters operates according to the proven variable area principle. The flowing medium moves the float in a conical measuring tube in the opposite direction of gravitational force. The height of the float is a measure for the flow and it can be read from a non-abrasive and burnt-in scale. Optionally, inductive contacts fixed on the sight glass can be used for obtaining limit values. As a standard, all devices are equipped with a needle valve for precise regulation of flow.

Application:

The SM-10 series of variable area flowmeters is primarily intended for controlling and monitoring low-viscosity fluid or gaseous media. For standard conditions, scales for water or air are predefined and enable a quick and simple dimensioning of the devices. For other media or different process conditions specially customized scales are available.

Versions:

SM-10 Variable area Flowmeter with sight glas

SM-10.1: Design size 1, height: 111 mm, accuracy class 4.0

SM-10.2: Design size 2, height: 146 mm, accuracy class 2.5

SM-10.3: Design size 3, height: 196 mm, accuracy class 2.5

SM-10.4: Design size 4, height: 346 mm, accuracy class 1.0

Ordering Codes:

Order-no.	SM-10.	2.	1.	1.	1.	L01.	1.	1.	0

SM-10 Variable area Flow-meter with sight glass

Version /
1 = design size 1, accuracy class 4.0
2 = design size 2, accuracy class 2.5
3 = design size 3, accuracy class 2.5
4 = design size 4, accuracy class 1.0

Process connection /
1 = G 1/4"-female rear side
2 = NPT 1/4" rear side

Material /
1 = brass
2 = stainless steel

Gasket material /
1 = PTFE / FPM (standard)
2 = PTFE / FFKM

Operating range /
L01 - L22 = as per table „Operating ranges air"
W01 - W18 = as per table „Operating ranges water"
99 = special operating range

Valve /
0 = none
1 = valve at the inlet (standard)
2 = valve at the outlet (no backstroke ball)

Limit contacts /
0 = none
1 = 1 contact - Type A
2 = 2 contacts - Type A
3 = 1 contact - Type B
4 = 2 contacts - Type B

Options (multiple specs possible) /
0 = none
1 = switching panel assembly

/ Special type connections like hose spouts, SWAGELOK, ERMETO or others on request. For operating the limit contacts isolating circuit amplifiers KFA to SR2-Ex1.W for 1 contact or KFA to SR2-Ex2.W for 2 contacts are required. Technical specifications and prices on request.

Electrical Specifications:

Terminal connection /	connection box M16 x 1,5
Clamping range /	3 to 7 mm
Contact version /	2-wire
contact type A:	for ring diameter 10 mm
contact type B:	for ring diameter 15 mm
Contact function /	bistable
NAMUR /	yes
Nominal voltage U_0 /	8 VDC
Current consumption /	1 mA passage ↓ (1)
Current consumption /	3 mA passage ↑ (1)

(1) For devices with the valve at the top (at the outlet), the function is inverted!

Technical Specifications:

Measuring principle /	variable area measuring principle
Measurement /	
primary:	float position
secondary:	operating and standard volumetric flow
Inflow, outflow lines /	none
max. Pressure /	10 bar
max. Media temperature /	
without contact:	-5. . .+100°C
with contact:	-5. . .+65°C
max. Ambient temp. /	
without contact:	-20. . .+100°C
with contact:	-20. . .+65°C
Accuracy /	SM-10.1: Class 4.0 SM-10.2: Class 2.5 SM-10.3: Class 2.5 SM-10.4: Class 1.0
Materials /	
Top/bottom fitting:	CrNi steel 1.4404 / 316 L or brass nickel-plated (Hastelloy ® optional)
Measuring tube:	borosilicate glass
Float (ball shape):	CrNi steel 1.4404 / 316 L (glass, POM, titanium, Hastelloy® C4 optional)
Float (cone shape):	CrNi steel 1.4404 / 316 L, alu, (PP)
Valve:	CrNi steel 1.4571 / 316 Ti
Valve spindle:	CrNi steel 1.4404 / 316 L
Gaskets:	PTFE / FPM (PTFE / FFKM optional)
Protective cover:	polycarbonate

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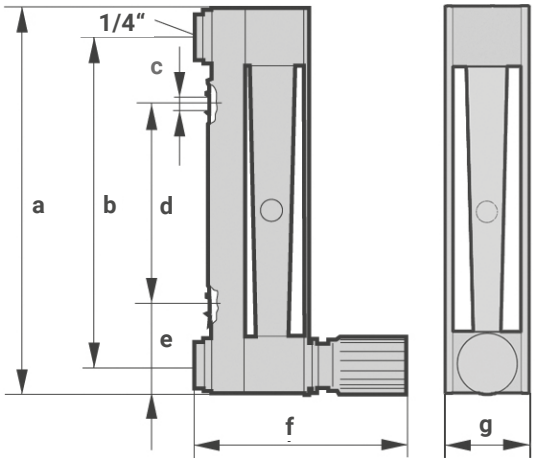
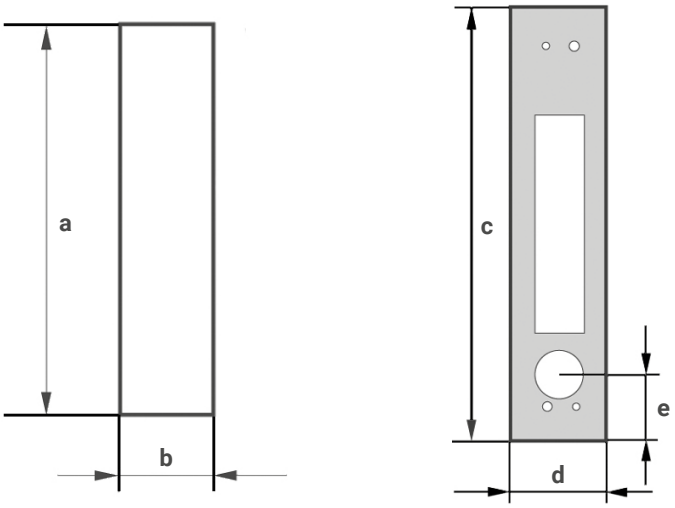
Dimensions in mm:



Version	a	b ± 0,25	c	d	e	f ca.	g	weight (kg)
SM-10.1	111	90	4.3	45	33	82	28	0.4
SM-10.2	146	125	4.3	80	33	82	28	0.5
SM-10.3	196	175	4.3	130	33	82	28	0.6
SM-10.4	346	325	4.3	280	33	82	28	0.7

Dimensions of control-panel cutout and faceplate:



Version	a	b	c	d	e
SM-10.1	128	32	145	40	27.5
SM-10.2	163	32	180	40	27.5
SM-10.3	213	32	230	40	27.5
SM-10.4	363	32	380	40	27.5

Operating ranges Water and Contact option:

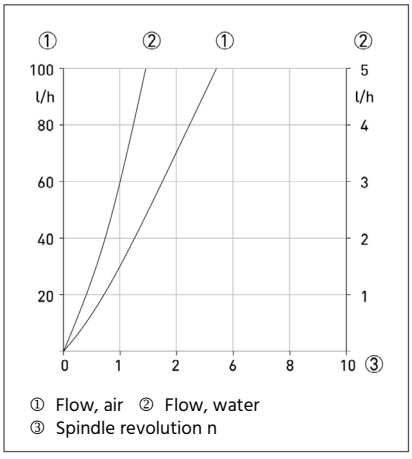
Operating range no.	Operating range l/h water	SM-10.1	Contact option	SM-10.2	Contact option	SM-10.3	Contact option	SM-10.4	Contact option
W01	0,04. . .0,4	-	-	-	-	-	-	$x^{2\,(1)}$	-
W02	0,063. . .0,63	-	-	-	-	-	-	x^2	-
W03	0,1. . .1	-	-	-	-	-	-	x^2	-
W04	0,16. . .1,6	-	-	-	-	-	-	x^2	A
W05	0,25. . .2,5	x	A	x	A	-	-	x^2	A
W06	0,4. . .4	-	-	-	-	-	-	x^2	A
W07	0,5. . .5	x	B	x	B	x	B	-	-
W08	0,63. . .6,3	-	-	-	-	-	-	x^2	A
W09	1. . .10	-	-	-	-	-	-	x^2	A
W10	1,2. . .12	x	B	x	B	x	B	-	-
W11	1,6. . .16	-	-	-	-	-	-	x^2	B
W12	2,5. . .25	x	B	x	B	x	B	x^2	B
W13	4. . .40	x	B	x	B	x	B	x^2	-
W14	6. . .60	x	B	x	B	x	B	-	-
W15	6,3. . .63	-	-	-	-	-	-	x^2	-
W16	10. . .100	x	B (min.)	x	B (min.)	x	B (min.)	x^2	-
W17	12. . .120	x	-	x	B (min.)	-	-	-	-
W18	16. . .160	x	-	x	B (min.)	-	-	-	-

x = available – = not available (1) = reduced accuray: 2.5 %
Contacts: The contact version is determined by the operating range.
(min.) = contact can be used as Min.-Contact only.

Float form: X =  X^1 =  X^2 = 

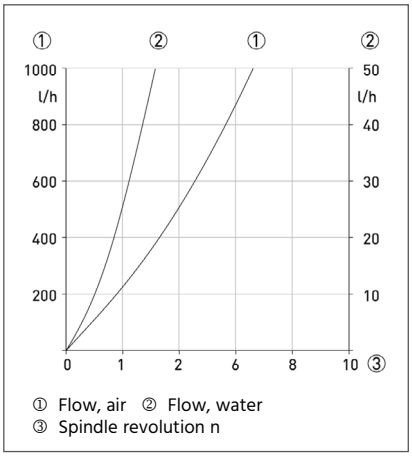
Valve characteristics:

Spindle Ø 1.0 mm



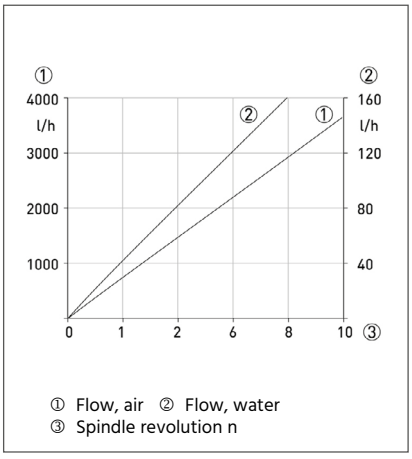
① Flow, air ② Flow, water
③ Spindle revolution n

Spindle Ø 2.5 mm



① Flow, air ② Flow, water
③ Spindle revolution n

Spindle Ø 4.5 mm



① Flow, air ② Flow, water
③ Spindle revolution n

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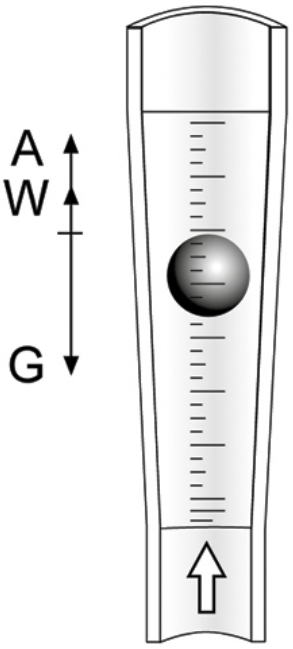
Operating ranges Air and Contact option:

Operating range no.	Operating range Nl/h air, 20°C, 1,2 bar abs.	SM-10.1	Contact option	SM-10.2	Contact option	SM-10.3	Contact option	SM-10.4	Contact option
L01	0,5. . .5	x[1]	A	x[1]	A	-	-	-	-
L02	0,8. . .8	x[1]	A	x[1]	A	-	-	-	-
L03	1,6. . .16	x	A	x	A	x[1]	A	x[2]	-
L04	2,5. . .25	-	-	-	-	-	-	x[2]	-
L05	4. . .40	x	A	x	A	x	A	x[2]	-
L06	6. . .60	x	A	x	A	x	B	x[2]	A
L07	9. . .90	-	-	-	-	-	-	x[2]	A
L08	10. . .100	x	B	x	B	x	B	-	-
L09	14. . .140	-	-	-	-	-	-	x[2]	A
L10	20. . .200	-	-	-	-	-	-	x[2]	A
L11	25. . .250	x	B	x	B	x	B	-	-
L12	30. . .300	-	-	-	-	-	-	x[2]	A
L13	50. . .500	x	B	x	B	x	B	x[2]	B
L14	80. . .800	x	B	x	B	x	B	x[2]	B
L15	100. . .1000	-	-	x	B	-	-	-	-
L16	120. . .1200	x	B (min.)	-	-	-	-	x[2]	-
L17	180. . .1800	-	-	x	B	-	-	-	-
L18	200. . .2000	-	-	-	-	-	-	x[2]	-
L19	240. . .2400	-	-	x	B	-	-	-	-
L20	300. . .3000	-	-	x	B (min.)	-	-	x[2]	-
L21	400. . .4000	-	-	x	B (min.)	-	-	-	-
L22	500. . .5000	-	-	x	B (min.)	-	-	-	-



Operating principle:

The flowmeter operates on the float measuring principle. The float adjusts itself so that the buoyancy force A, acting on it, the form drag W and its weight G are in balance:

G = A + W.

The height of the float is read on the scale of the measuring glass and indicates the flow rate. The top edge of the float marks the reading line for flow values.

Valve spindle	max. Flowrate		Valve characteristic value
	Water (20°C)	Air (20°C, 1.013 bar)	Cv
Ø [mm]	**[l/h]**	**[Nl/h]**	**[m³/h]**
1.0	5	100	0.018
2.5	50	1000	0.150
4.5	160	4300	0.480

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