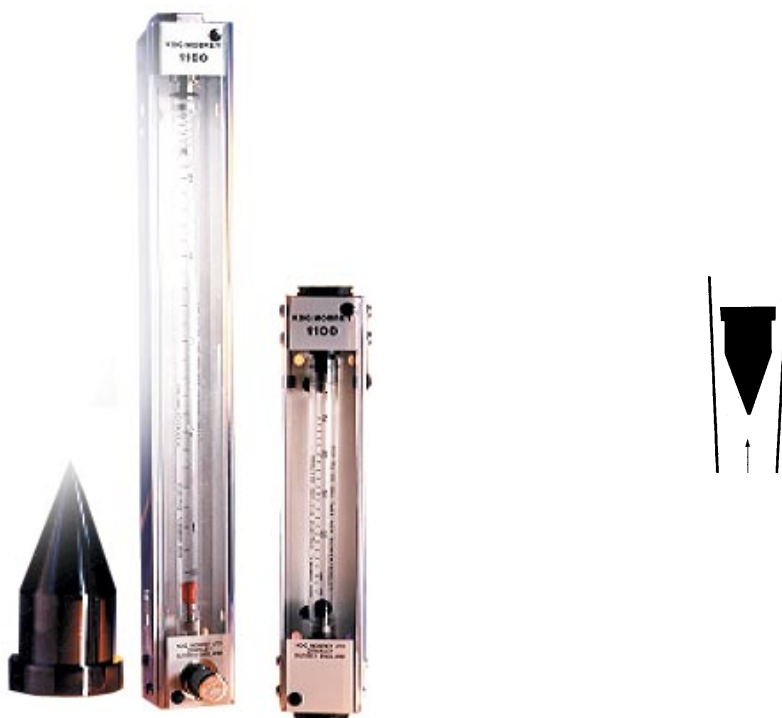


KDG

Rotameter Series 1100 Variable-area Flowmeters

Data sheet
1708



Description of operation

Glass tube V.A. (variable area) flowmeter tubes taper over the full length with the internal diameter increasing towards the top. The float settles at a position in the tube where its mass is just balanced by the upward forces due to the liquid flow through the annulus between float and tube. The greater the flow the higher the float must rise to create a larger annulus. The float position and flow rate are read off against a calibrated scale.

Construction

A steel channel carried at each end of the connection block containing the fittings which secure the tube. The block at the inlet end may also incorporate a needle valve. The front of the instrument is protected by a transparent plastic dust cover. Tube and float are easily removable while the meter remains in situ.

Contact materials

Metering tube: borosilicate glass.
Nylon connection blocks and tube fittings or stainless steel (316)

connection blocks and fittings.
Needle valve (when fitted) :
Stainless steel body and needle.
'O' rings and joint washers : Nitrile or 'Viton'
The plastic material - glass loaded nylon 12 - has a very low water absorption and a useful degree of chemical resistance. It is physiologically harmless and is acceptable in the food trades.

Connections

Internally screwed ¼ in. BSP parallel. Normal arrangement is rear-pointing, but straight-through connections are also available.

Metering tubes and floats

Calibrated tubes, 150mm long, with "plumb-bob" floats	Table A
Calibrated tubes, 300mm long, with "plumb-bob" floats	Table B
Predicted scale tubes with ball floats, 150mm long only	Table C

The tables referred to give the flow ranges for air and water. Tubes and floats for other fluids are supplied to order.

Working Pressure

Maximum (non-shock)-	
Gas service:	6 bar, (11.5 bar when fitted with operator-safety shield)
Liquid service:	11.5 bar
Maximum test pressure:	28 bar

Working Temperature

60°C max. - Nylon connections
100°C max. - Stainless steel connections.

Accessories

Bench stand. Connection nozzles for 3/8 in. rubber or plastic tube. Bezel for flush panel mounting. Photo-electric alarm (see back page). Polycarbonate operator-safety shield.

Gallons referred to in this bulletin are UK (imperial) gallons. 1 UK gal. = 1,20095 US gal.

WARNING: The needle valve fitted to this instrument is intended for flow control and will not give an absolute shut off. A separate shut off valve should be fitted if there is any risk of leakage creating a hazard.

Table A

Tubes 150 mm long with "plumb-bob" floats. Scale length 90 mm approx. Individually calibrated
Accuracy: Sizes 1.6, D and E to VDI/VDE 3513, class 2.5, i.e. \pm (3% measured value + 1% full scale value).
Sizes G, H and J to VDI/VDE 3513, class 2.5, i.e. \pm (1.875% measured value + 0.625% full scale value).

Float materials: Anodised light alloy (suffix A), 316 stainless steel (suffix S).

Tube	Float	ml/min	AIR, 15° C/1013 mbar abs			WATER, 20° C.			g/h	Frame Arrgt.
			1/min	1/h	ft ³ /h	ml/min	1/h			
1.6 - A - 150	1.6S	4-40		0.2-2.5	0.01-0.085					Fig. 1
1.6 - B - 150	"	5-60		0.4-3.6	0.01-0.13					"
D - A - 150	DS	10-100		0.5-6.0	0.02-0.2					"
D - B - 150	"	10-150		1-9	0.02-0.032					"
D - C - 150	"	20-250		1-15	0.05-0.5	0.5-5.5	0.02-0.32	0.005-0.07		"
D - D - 150	"	40-400		2-25	0.1-0.85	1-9	0.05-0.55	0.01-0.12		"
E - A - 150	ES	50 - 600		4-36	0.1-1.3	1-15	0.1-1.0	0.02-0.2		"
E - B - 150	"		0.1-1.0	5-60	0.2-2.0	2-28	0.1-1.5	0.02-0.34		"
E - C - 150	"		0.1-1.5	10-90	0.2-3.2	2-40	0.1-2.4	0.05-0.55		"
G - E - 150	GA		0.04-0.8	5-50	0.1-1.6					Fig. 2
G - F - 150	"		0.1-1.5	10-90	0.2-3					"
G - E - 150	GS					5-70	0.4-4.2	0.05-0.9		"
G - F - 150	"					10-120	0.5-7.5	0.1-1.6		"
H - A - 150	HA		0.2-2.5	10-150	0.5-5.0					Fig. 2
H - B - 150	"		0.4-4.0	20-250	1.0-8.5					"
H - C - 150	"		0.5-6.0	40-360	1-13					"
H - D - 150	"		1-10	50-600	2-20	L/min				"
H - E - 150	"		1-15	100-900	2-32			0.2-2.6		"
H - A - 150	HS					0.02-0.2	1-12	0.2-4.2		"
H - B - 150	"					0.02-0.32	1-20	0.5-6.5		"
H - C - 150	"					0.05-0.5	2-30	1-10		"
H - D - 150	"					0.1-0.8	5-50	1-18		"
H - E - 150	"					0.1-1.2	5-75			"
J - A - 150	JA		2-25	100-1500	5-50					Fig. 2
J - B - 150	"		4-40	200-2500	10-85			2-28		"
J - A - 150	JS					0.2-2.0	10-120	4-44		"
J - B - 150	"					0.2-3.4	15-200			"

Table B

Tubes 300mm long with "plumb-bob" floats. Scale length 240 mm approx. Individually calibrated.

Accuracy: Sizes 1.6, D and E to VDI/VDE 3513 class 2.5 i.e. $\pm (1.875\% \text{ measured value} + 0.625\% \text{ full-scale value})$.

Sizes G, H and J to VDI/VDE 3513 class 1.6, i.e. $\pm (1.2\% \text{ measured value} + 0.4\% \text{ full scale-value})$.

Float materials: Anodised light alloy (suffix A), 316 stainless steel (suffix S).

Tube	Float	AIR, 15° C/1013 mbar abs				WATER, 20° C			Frame Arrgt.	
		ml/min	l/min	l/h	ft³/h	ml/min	l/h	g/h		
1.6-300	1.6S	6-60		0.4-3.6	0.015-0.12	0.4-2.6	0.03-0.16	0.05-0.034	Fig.1	Inter-changeable
D1-300	DS	10-120		0.6-7.2	0.02-0.25	0.4-3.4	0.03-0.21	0.05-0.045	"	
D3-300	"	10-150		0.6-9.0	0.02-0.32	0.6-6.0	0.04-0.36	0.008-0.08	"	
D2-300	"	20-250		1-15	0.04-0.52	0.6-8.0	0.04-0.48	0.008-0.10	"	
D4-300	"	30-350		1.5-21	0.06-0.74	1-10	0.06-0.6	0.01-0.13	"	
E3-300	ES	50-500		3-30	0.1-1.0	1-16	0.1-1.0	0.01-0.21	"	
E2-300	"	80-800		5-48	0.5-1.7	3-36	0.2-2.2	0.04-0.48	"	Inter-changeable
E-300	"	100-1200		6-72	0.2-2.5				"	
G-G-300	GA		0.06-0.6	4-36	0.1-1.3				Fig.2	Inter-changeable
G-H-300	"		0.1-1.2	5-75	0.2-2.5	5-70	0.4-4.2	0.05-0.9	"	
G-G-300	GS					10-120	0.5-7.5	0.1-1.6	"	Inter-changeable
G-H-300	"								"	
H-F-300	HA		0.2-2.5	15-150	0.4-5.2				Fig.2	Inter-changeable
H-G-300	"		0.6-5.0	40-300	1.5-10	L/min			"	
H-H-300	"		1-10	60-600	2-21				"	Inter-changeable
H-J-300	"		1-15	100-900	2-32	0.02-0.20	1-13	0.2-2.9	"	
H-F-300	HS					0.05-0.4	3-24	0.6-5.4	"	Inter-changeable
H-G-300	"					0.14-0.86	8-52	2-12	"	
H-H-300	"					0.1-1.2	5-75	1-18	"	Inter-changeable
H-J-300	"								"	
J-C-300	JA		2-25	150-1500	4-50				Fig.2	Inter-changeable
J-D-300	"		4-40	250-2400	8-84	0.2-2.0	10-120	2.5-25	"	
J-C-300	JS					0.4-3.4	20-200	5-45	"	
J-D-300	"								"	

Table C

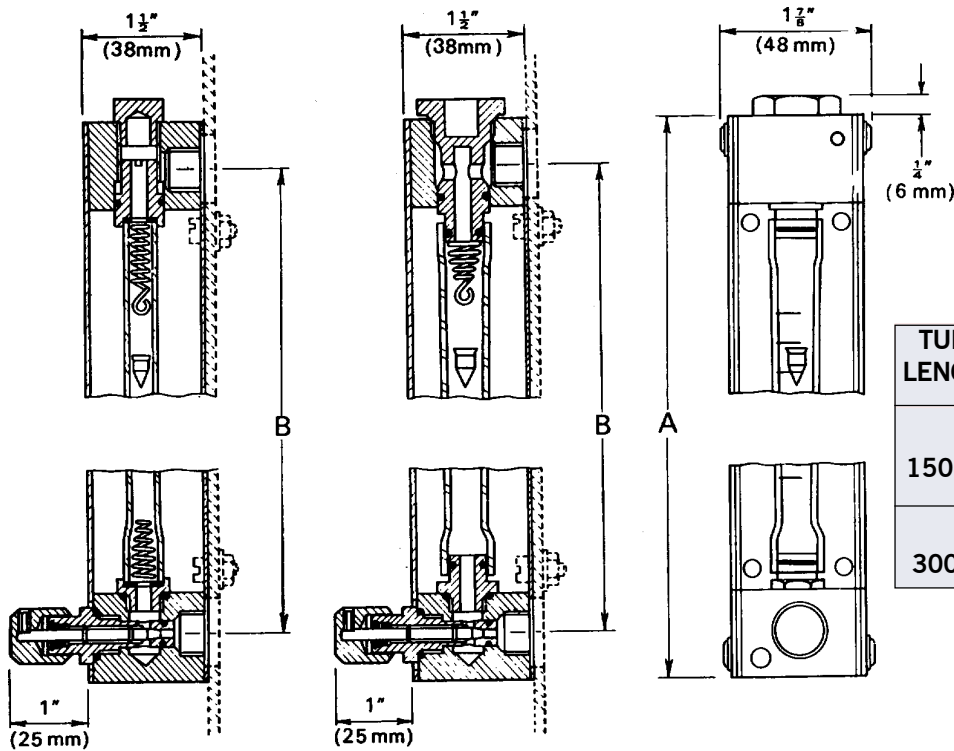
Tubes 150mm long with ball floats. Scale length 90mm approx.

Balls are of ruby glass, or stainless steel are guided by longitudinal ribs in the metering tube. Flow scales are produced mechanically - not by individual calibration (except 1-A-150 tubes which are all flow tested).

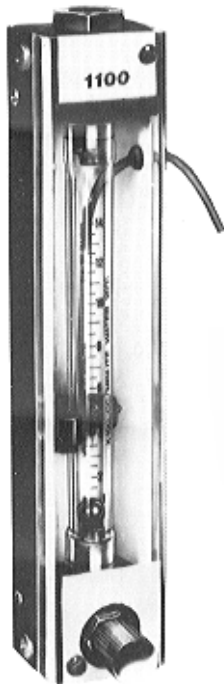
Accuracy: Grade P2 i.e. $\pm 5\%$ full scale value.

Tubes with ball floats do not require precise vertical installation and are therefore suitable for use on portable equipment.

Tube	Float	AIR, 15° C/1013 mbar abs				WATER, 20° C			Frame Arrgt.	
		ml/min	l/min	l/h	ft³/h	ml/min	l/h	g/h		
1-A-150	S.S	20-200		1-12	0.04-0.4				Fig.1	Inter-changeable
"	Ruby	40-300		2-18	0.05-0.6	0.5-7.5	0.02-0.46	0.005-0.1	"	
2-A-150	S.S	60-500		4-30	0.1-1.0	1-9.5	0.05-0.6	0.015-0.125	"	
"	Ruby	100-800		6-48	0.2-1.7	2-19	0.1-1.2	0.02-0.26	"	
2-B-150	S.S		0.1-1.0	5-60	0.2-2.0	2-26	0.1-1.5	0.02-0.34	"	
"	Ruby		0.2-1.6	10-95	0.4-3.4	2-42	0.1-2.5	0.05-0.55	"	
2-C-150	S.S		0.3-1.3	10-80	0.2-2.8	2-32	0.1-2.0	0.02-0.42	"	
"	Ruby		0.2-2.0	10-120	0.4-4.0	5-55	0.2-3.2	0.05-0.7	"	
2-D-150	S.S		0.4-3.0	20-180	1-6	5-75	0.4-4.4	0.05-1.0	"	
"	Glass		0.6-4.6	40-260	1-9.5	10-130	0.5-7.5	0.1-1.6	"	
4-A-150	S.S		0.5-5.0	40-300	1-10.5	10-120	0.5-7.0	0.1-1.6	Fig.2	
"	Glass		1-10	50-600	2-20	20-280	1-18	0.2-3.8	"	
6-A-150	S.S		3-25	200-1500	5-50	50-600	2-36	0.5-8.0	Fig.2	
"			6-50	400-3000	10-105	170-1500	10-90	2-20	"	



TUBE LENGTH	A	B
150mm	8 ³ / ₈ ins 213mm	7 ¹ / ₄ ins 184mm
300mm	14 ⁹ / ₃₂ ins 363mm	13 ⁵ / ₃₂ ins 334mm



Type 1100-V-A-S-P-150
with photo-electric alarm

Photo-Electric Alarm

The photo-electric alarm (illustrated left) is fully adjustable and will detect alarm conditions at very low flows, even if the float moves at a high speed. Supply voltage may be 110V or 240V a.c., or 24V d.c. the circuitry is transistorised and housed in a light alloy box. The single pole change-over alarm switch has contacts rated at 250V 5A, non-inductive, a.c. or d.c.

Frame Arrangement Code

When ordering, please use the following code:

(1)	(2)	(3)	(4)	(5)	(6)
1100	V	A or S	A or S	P	150 or 300
Type	Needle valve	Angle or Straight inlet	Angle or Straight outlet	Flush panel mounting	Tube length

Thus, 1100-V-A-S-P-150 denotes a meter of the 150 mm tube length, with needle valve, angle inlet, straight outlet, and bezel for flush panel mounting. If the valve and/or bezel were not required the code letters under (2) and/or (5) would be omitted.

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