

TYPE 134

Glass tube variable area flowmeter



A range of quality glass tube V.A. flowmeters for general purpose & industrial applications:

- Robust construction
- Cost effective design
- Flanged or threaded connection
- Customised scales
- Alarm outputs
- Interchangeable tube or float without re-calibration
- Glass tube for long life
- Accurate
- Lightweight design for pipework support
- Choice of wetted materials

Philosophy

The Rotameter series 134 is a new addition to the VA meter range from Mobrey Measurement. Comprising medium to large glass tubes, it is suitable for monitoring both liquid (0.008 to 335 l/min) and gas flows (0.2 to 4200 l/min). The borosilicate glass tube coupled with the choice of other wetted parts, ensures that the 134 is compatible with most fluids. The 134's rugged chassis offers excellent protection of the tube and the availability of both flanged and threaded connections gives ease of mounting. The lightweight construction enables simple in-line pipework mounting, without the need for additional wall or bracket support, allowing use in both light and heavy industrial areas.

Principle of operation

Rotameters are utilised for the flowrate measurement of most liquids and gases with direct readout of flowrate.

A special "float" is fitted within a tapered glass tube. With the flow vertically upward through the meter, the float settles at a position where its mass is balanced by the upward forces of the flow through the annulus between the tube and float. The greater the flow the higher the float rises to increase the annulus and balance. The top edge of the float is read against the scale, giving an instantaneous reading of the flow rate.

Various methods of alarm output are available for signalling low or high flow conditions.

Flow measurement

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Specification

Accuracy:	+/- 2.0 % of full scale reading	Construction:-	
scale length:	300 mm nominal	Tube:	borosilicate glass
Scale units:	customer specified	Chassis:	polyester painted aluminium, optional epoxy paint
Temp. max:	90°C -nitrile seals	Float:	stainless steel 316L - code I or IA aluminium - code D or DA PVC - code P or PA
	150°C -Fluorocarbon (FPM/FKM) seals	Seals:	Nitrile (90°C) standard
	60°C -PVC seals		Fluorocarbon (FPM/FKM) (150°C) & PVC (60°C)
	200°C on request	Float stop:	Stainless steel 316L, optional PVC
Pressure max.:	see table below		

Maximum pressure and viscosity ceiling

Tube size (see table below for flowranges)	5	7	10	14	18	24	35	47	65
Max. operating pressure (Bar)									
liquid	16	16	16	16	14	10	8	7	6
gas	4	4	4	4	3	3	3	2	1.5
gas with polycarbonate screens <i>Option Z7 required</i>	8	8	8	8	7	5	4	3.5	3
Viscosity max (centipoise)	4.5	5.5	7	9	11	14	19.5	25.5	34.5

Float material

Floats are available in three different materials as shown above, float codes with a suffix A have an encapsulated magnet within

the float, to operate an optional reed switch alarm. This option is available on tube sizes 10 to 65

Flow Ranges, Sizing and Pressure Drop

The table below shows the nominal flow ranges available for each tube and float combination. The flow range details shown are water at 20°C for liquids and Air at 15°C and 1013 mBar.abs

(1 atm) for gases. Customised scales are available in any flow units, for most liquids or gases. For sizing assistance please consult the sales office.



According PED 2014/68/EU on under pressure equipments, glass tube flowmeters are furnished only in 4.3. Art. Tubes ≥ 24X are not compatible with group 1 gas.

Flow Range and Pressure Drop											
Tube size	Liquids					Gases					
	Flow rate code	St Stl float type I or IA	Pressure drop mBar	PVC float type P or PA	Pressure drop mBar	Flow rate code	Duralium float type D	Pressure drop mBar	St Stl float type I or IA	Duralium float, type DA	Pressure drop mBar
5,1	M1	0.5-5 l/h	1			MG1			20-200 l/h		2
5,1	M2	1-10	4	0.6-6 l/h	2	MG2	12-120	1	30-300		5.5
5,2	M3	1.7-17	5	1-10	2	MG3	20-200	1	50-500		5.5
5,3	M4	3-30	6	2-20	2	MG4	35-350	1	0.1-1 m³/h		6.5
7 x	M5	5-50	7	2.5-25	2	MG5	50-500	1	0.15-1.5		8.5
7	M6	6-60	8	3.5-35	3	MG6	60-600	1	0.2-2		9
10 x	M7	10-100	9	5-50	4	MG7	0.1-1 m³/h	1.5	0.3-3		12
10	M8	15-150	11	8-80	4	MG8	0.15-1.5	1.5	0.5-5		14
14 x	M9	20-200	11	10-100	4	MG9	0.2-2	2	0.6-6		15
14	M10	30-300	13	18-180	4.5	MG10	0.3-3	2	1-10		17
18 x	M11	50-500	16	40-400	10	MG11	0.5-5	3	1.6-16		22
18	M12	70-700	18	50-500	10	MG12	0.8-8	3.5	2-20		25
24 x	M13	0.1-1 m³/h	20	70-700	11	MG13	1-10	4	3-30		30
24	M14	0.15-1.5	24	0.1-1 m³/h	12	MG14	1.5-15	4	4.5-45		32
35 x	M15	0.2-2	35	0.15-1.5	20	MG15	3-30	9		4-40 m³/h	18
35	M16	0.3-3.3	40	0.25-2.5	22	MG16	5-50	10		6-60	18
47 x	M17	0.6-6	50	0.45-4.5	40	MG17	6-60	8		8-80	18
47	M18	0.8-8	55	0.6-6	40	MG18	8-80	8		10-100	18
47 a	M19	1-10	60	0.8-8	45	MG19	10-100	8		15-150	20
65 x	M20	1.5-15	75	2-12	50	MG20	15-150	9		20-200	20
65	M21	4-20	75	2-15	50	MG21	20-200	11		25-250	22
65	M22			3.5-18	55	MG22	25-250	22			

For higher or lower flow ranges consult the sales office.

Float types I, IA, D, DA, are guided when used in tube sizes 47 & 65.

The flow range of each tube/float combination given above is the nominal range available. Please check with the sales office for the maximum and minimum scale values for your application.

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Flow measurement

Alarm options

A range of flowrate alarms are available for use with the 134, most are latching ie. the relay status indicates whether the flow is above or below the switch point. Meters can be supplied with 1, 2 or more sensors for high, low and intermediate switching.

Sensor types S2 & S3 can be used with a power supply/ amplifying relay (S4 & S5), whereas the S1 reed switch is an integral sensor and switch.

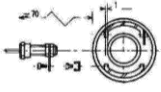
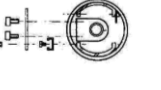
Type	S1 reed switch	S2 photoelectric sensor	S3 inductive sensor	S4 power supply relay for S2	S5 amplifying relay for S3
Output	SPDT latching (Bi-stable)	V or I pulse or via S4	current switching <3 or >5 mA or via S5 latching all	SPDT	SPDT latching (Bi-stable)
Fluid types	all	all translucent	all	all translucent	all
Float types	IA, DA, PA with magnet	all	St Steel or PVC	all	as S3
Tube sizes	10 to 65	all	5 & 7	all	as S3
Hazardous area use	Yes - with barrier*	No	with S5	No	[EEx ia/ib] IIB/IIIC
Temp -fluid	-15 to +120°C	-25 to +55°C	-25 to +70°C	n/a	n/a
-ambient	-15 to +120°C	-25 to +55°C	-25 to +70°C	-10 to +55°C	-25 to +60°C
Protection	IP65	IP65	IP67		IP30
Switch rating					35mm rail mount
Max voltage	250VAC/250VDC	24VDC**	n/a	250VAC	250VAC
Max current	1A*	80 mA**	n/a	3A	4A
Max power	60VA / 30W resistive		n/a		500VA
Power supply	not required	12 to 24VDC +10% (via S4)	5 to 25VDC max ripple 5%	110/220V+/-10% 50/60Hz (via S5)	220V -10% +15% 45-65Hz (110VAC or 24VDC optional)
Power consumption	n/a	0.96W max	0.125W nominal	8VA max	3.5 VA nominal
Max. no. of sensors per tube	6	3	6	n/a	n/a
Min. distance between sensors	40mm	80mm	40mm	n/a	n/a
Specification sheet	1040	1033	1067	1028	1068

Refer to specification sheets for further information.

* Simple apparatus, maximum current 0.1A for hazardous area use.

** S2 can be used without S4, for current or voltage logic output.

Sensor Mounting

	S1
Reed switch	Code
	S2
Photoelectric sensor	Code
	S3
Inductive sensor	Code

Dimensions, Connections & Weight

Tube size	Connection Type	Dimensions (mm)											Weight
		L	H	Ø	P1	B	J	P	N	T	E	kg	
5 to 14	½" BSP,P C1,C2 & C4	454	430	58	26							1.5	
	PVC ISO 727 Ø20mm, C5	450	430	58								1.5	
	DN15 NP16 st st C6	540	430	58		95	47	65	4	14	14	2.3	
	½" ANSI 150 st st C7	540	430	58		89	35	60.3	4	16	16	2.3	
	PVC NP10 DN15 C8	540	430	58		95	34	65	4	14	11	2	
18 & 24	1" BSP,P C1,C2 & C4	462	432	78	38							2.8	
	PVC ISO 727 Ø32mm, C5	462	432	78								2.8	
	DN25 NP16 st st C6	540	432	78		115	58	85	4	14	14	4	
	1" ANSI 150 st st C7	540	432	78		108	50.8	79.4	4	16	17	4	
	PVC NP10 DN25 C8	540	432	78	54	115	50	85	4	14	14	3.5	
35	1½" BSP,P C1,C2 & C4	476	434	93								5	
	PVC ISO 727 Ø50mm, C5	480	434	93								5	
	DN40 NP16 st st C6	540	434	93		150	88	110	4	18	16	7.5	
	1½" ANSI 150 st st C7	540	434	93		127	73	98.4	4	16	22	7.5	
	PVC NP10 DN40 C8	540	434	93		150	73	110	4	18	16	6.5	
47 & 65	2" BSP,P C1,C2 & C4	494	450	133	66							10	
	PVC ISO 727 Ø63mm, C5	506	450	133								10	
	DN50 NP16 st st C6	560	450	133		165	102	125	4	18	16	13	
	2" ANSI 150 st st C7	560	450	133		152	92.1	120.6	4	19	25	13	
	PVC NP10 DN50 C8	560	450	133		165	90	124	4	18	16	12	

Installation and maintenance

For satisfactory operation the following points should be considered :
Install the flowmeter vertically with the flow upward, keep it clean and avoid water-hammer.

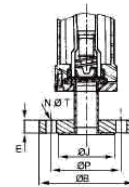
Spare parts

The following spares are available, please quote the serial number in all cases:

- Glass tube
- Float stops
- Float
- Scale plate
- Seal kit

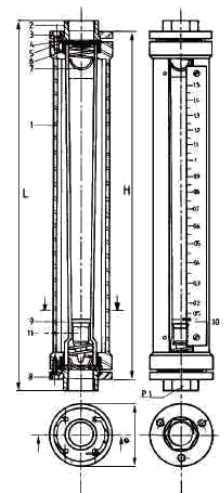
Parts

1. Painted aluminium chassis.
2. Connection - depending on model.
3. Painted aluminium end plate.
4. Flat seal (nitrile, FPM/FKM or PVC).
5. Stainless steel disc.
6. Tube seal (nitrile, FPM/FKM or PVC).
7. Float stop (stainless steel or PVC).
8. Stainless steel retaining screw.
9. Borosilicate glass measuring tube.
10. Painted aluminium graduated scale.
11. Float (stainless steel, aluminium or PVC).



Flanged connection

Dimensional drawings



Screwed connection

Flow measurement

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Ordering information

134	Series 134 Rotameter			
Code		End connections - state size e.g. 1 1/2" C1		
__ C1		BSP.P cast iron		
__ C2		BSP.P stainless steel. 316L		
__ C4		BSP.P PVC		
__ C5		PVC glued connection (to PVC pipe - ISO 727)		
__ C6		NP16 NFE29203 316L stainless steel collar and loose epoxy painted carbon steel flange		
__ C7		ANSI 150 316L stainless steel collar and loose epoxy painted carbon steel flange		
__ C8		ISO 2084 PN10 PVC flange		
__ CX		Special construction		
Code		Flow range and float type (see flowrate chart)		
M1-I	to M21-I	Liquid	stainless steel float	
M7-IA	to M21-IA	Liquid	stainless steel float + magnet	(for alarm S1)
M2-P	to M22-P	Liquid	PVC float	
M7-PA	to M22-PA	Liquid	PVC float + magnet	(for alarm S1)
MG2-D	to MG22-D	Gas	aluminium float	
MG15-DA	to MG21DA	Gas	aluminium float plus magnet	(for alarm S1)
MG1-I	to MG21-I	Gas	stainless steel float	
MG7-IA	to MG14-IA	Gas	stainless steel float + magnet	(for alarm S1)
M.. -x	to MG.. -x	For special flow rates consult sales		
Code		Flow alarms		
S0		Not required		
S1		Reed switch alarm (with float type IA,DA or PA)		
S2		Photoelectric alarm (without relay)		
S3		Inductive alarm, stainless steel and PVC floats M1 to M6		
S4		Power supply relay for S2		
S5		Amplifying relay for S3		
Sx		Special contact		
Code		Options		
Z0		None		
Z1		Fluorocarbon (FPM/FKM) seals	(Nitrile as standard)	
Z3		PVC seals	(Nitrile as standard)	
Z5		PVC float stops	(316L st st as standard)	
Z6		1 polycarbonate screen	(Front only)	
Z7		2 polycarbonate screens	(if no alarms fitted)	
Z8		2nd scale plate, for different fluid/conditions		
Z9		Epoxy paint	(Polyester as standard)	
Z10		Degreasing	(for oxygen service)	
Z11		Customised scale	(not as table opposite)	
134	1/2" C1	MG10 - IA	S1	Z1 1 to 10m³/h - air 20°C 1013 mBar abs
Example ordering code				

Please specify: Flow range, fluid details, density of fluid, viscosity, working temperature, working pressure.

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