

Rotameter [®]

Series 134 metal tube variable area flowmeter

Data sheet
1702

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 The Solartron Mobrey Group.

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.



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 150°C -viton seals 60°C -PVC seals 200°C on request	Float:	stainless steel 316L - code I or IA aluminium - code D or DA PVC - code P or PA
Pressure max.:	see table below	Seals:	Nitrile (90°C) standard Viton (150°C) & PVC (60°C)
		Float stop:	Stainless steel 316L, optional PVC

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.

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 m ³ /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 m ³ /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 m ³ /h	20	70-700	11	MG13	1-10	4	3-30		30
24	M14	0.15-1.5	24	0.1-1 m ³ /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 m ³ /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.

Application

The Series 134 is a general purpose unit for most industrial and laboratory type applications. It is ideally suited for medium to low pressure gas or liquid flows where clear, accurate flowrate indication is required with or without flowrate alarms. The 134 is classified as simple apparatus* therefore can be used in hazardous and non-hazardous areas. With the chemically inert borosilicate glass tube and choice of other wetted materials, the 134 can be used on air or water in addition to a wide range of chemical flows.

The Series 134 is part of a large range of Rotameters available

* When used with or without alarm type S1.

from the Solartron Mobrey Group, including :- metal tube meters for high pressures or electrical output of flowrate (4 to 20 mA) and other glass tube meters for applications such as :- very low flows, high accuracy test rig use, low cost purge meters, quick release tubes and units designed for behind panel mounting. For details of the complete range of Rotameters (Variable Area flowmeters) available from the Solartron Mobrey Group ask for sales brochure no. IP330.

134 Features

Lowest cost installation.

Unique PVC connection **glues directly on to PVC pipework** saving installation time and the cost of additional fittings.

Quality borosilicate glass tube

- the inherent inert nature of glass eliminates the problems associated with plastic tubes, giving a long trouble free life.

60 Years of experience -

proven design - **for reliability.**

The Solartron Mobrey Group has been designing and manufacturing Rotameters for over 60 years and the simplicity of the principle speaks for itself.

Flowrate Alarms are available for signalling both high and low flows and can be used in safe as well as hazardous areas, providing a very reliable and visual flowrate measurement and alarm.

Rugged and yet lightweight design. Eliminates strain on the tube and provides excellent protection, while being light enough to be supported merely by the pipework. **Avoiding the extra cost** of wall or bracket fixings. For behind panel (bezel) or wall mounting ask about our Series 2000.

Choice of connections, screwed or flanged, in a wide choice of materials to ensure site compatibility.

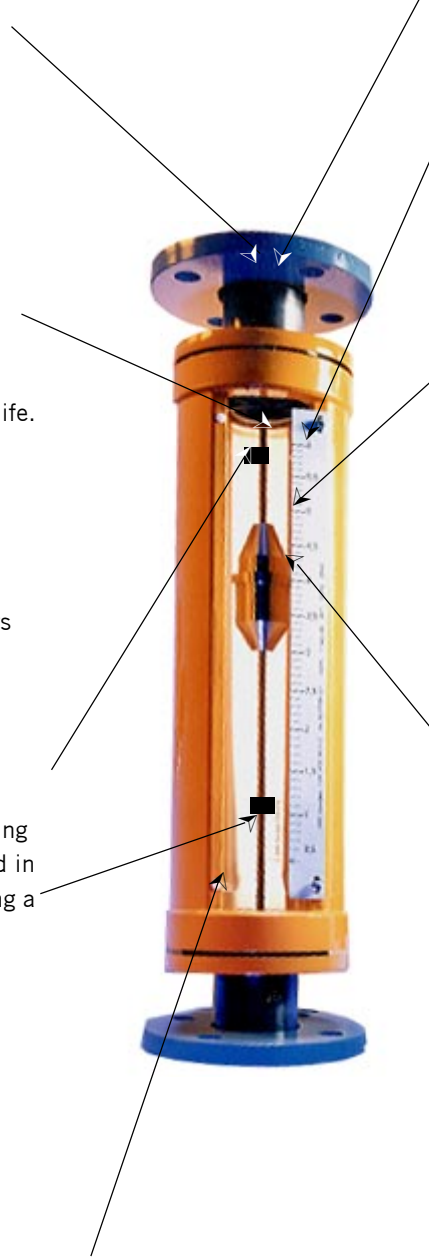
Customised flow scales

Scale plates are customised to suit specific site requirements for fluid type, reference temperature and pressure and flowrate units.

The 134 has **Removable scales** - allowing different scales to be used for **changes of fluid**, up to 4 scales can be affixed to a single unit to measure various fluids at different conditions. Should the fluid change at a later date, The Solartron Mobrey Group can produce new scales on production of the meter's serial number.

With a 300mm scale length the 134 is **easy to read**. Carefully designed taper rates maximise float stability, ensuring that the reading **resolution is optimised**.

Most series 134 scales are produced using empirical data; this combined with the high tolerances used in manufacture allows tubes, floats or scales to be replaced in the field with no loss of accuracy and without replacement of all three parts as a matched set.



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.

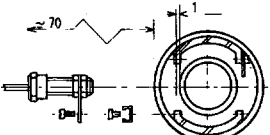
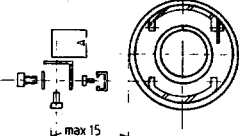
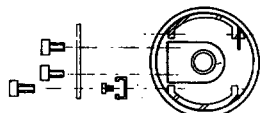
Type	S1 reed switch	S2 photoelectric sensor	S3 inductive sensor	S4 power supply relay for S2	S5 amplifying relay for S3
Output	SPDT latching (Bi-stable)	V or I pulse or via S4	current switching <3 or >5 mA or via S5 latching	SPDT	SPDT latching (Bi-stable)
Fluid types	all	all translucent	all	all translucent	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/IIC
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 35mm rail mount
Switch rating					
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		

Ordering information

134	Series 134 Rotameter		
	Code	End connections - state size e.g. 1 ½" 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	Viton 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	½"	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.

Dimensions, Connections & Weight

Tube size	Connection Type	Dimensions (mm)										Weight kg
		L	H	Ø	P1	B	J	P	N	T	E	
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

Parts

1. Painted aluminium chassis.
2. Connection - depending on model.
3. Painted aluminium end plate.
4. Flat seal (nitrile, viton or PVC).
5. Stainless steel disc.
6. Tube seal (nitrile, viton 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).

Installation and maintenance

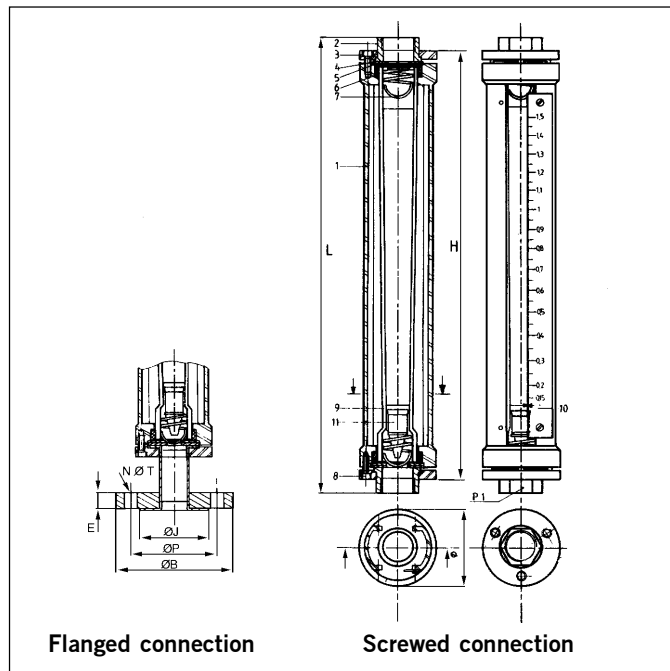
For satisfactory operation the following points should be considered :
Install the flowmeter vertically with the flow upward, keep it clean and avoid water-hammer.

Spare parts

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

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

Dimensional drawings



KDG Instruments

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