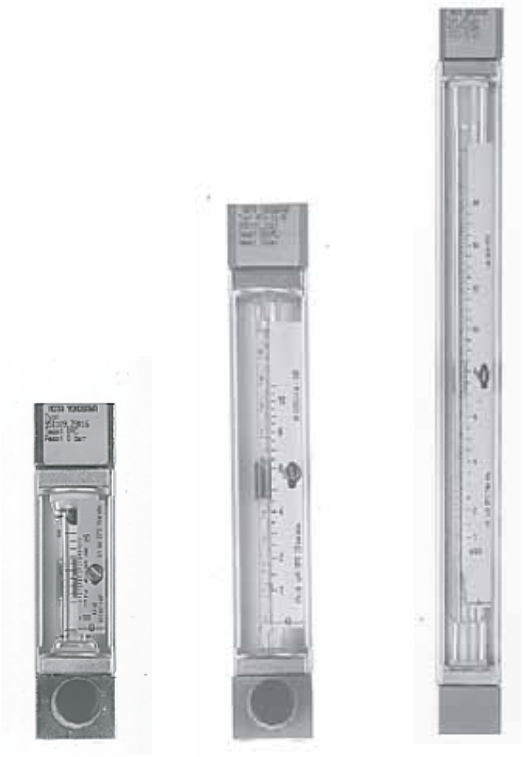
General Specifications

Model RAGL
Rotameter

GS 01R01B08-00E-E

This type of Rotameter is designed for measurement of liquids and gases.
The conical glass metering tube has a free rotating float. This metering tube is mounted in a vertical pipeline with flow direction upwards. The flow is indicated by the top of the float and can be read from the standard scale on the metering tube or from a connected scale.

When the process conditions are changed the scale needs to be replaced by a new one of which the values should be calculated.



with K-metering tube | with M-metering tube | with L-metering tube

FEATURES

- Large selection of measuring ranges
- Anti-static metering tubes for measurement of small quantities of gas
- High accuracy of free rotating float even at low flow rates
- Low pressure loss
- Visual check of the medium
- Non-powered local indication
- Large selection of scales
- Optional built-in valve
- Exact scale calculation at changed process conditions according to VDE/VDI guidelines 3513 with the use of the flow table (option /PT).

STANDARD SPECIFICATIONS

Measurable flow rates
- Water (20 °C) : 0.002 l/h to 110 l/h
- Air (20 °C; 1 bar abs.): 0.1 l/h to 3500 l/h

Measuring range :
- -K metering tube : 10:1
- -M metering tube : 20:1 (10:1)
- -L metering tube : 20:1

Metering tubes : K6; M6; L6; K7; R7; M7; L7

Accuracy:

Glass metering tube	Length	Measuring accuracy acc. Directive VDI/VDE 3513 sheet 2 (q_G=50%)	Standard flow accuracy full scale
R741 - R743 K631 - K743	75 mm 75 mm	6% (only with ball) 4% (for ball 6%)	± 6% ± 4% (± 6%)
M613 - M622 M624 - M747	150 mm 150 mm	4% 2.5%	± 4% ± 2.5%
M613 - L623 L624 - L747	300 mm 300 mm	2.5% 1.6%	± 2.5% ± 1.6%

Max. Temperature
- Fitting material SS : 100°C
- With option /MV : 130°C (not for PP-Rotameter)
- Fitting material PP : 80°C

Max. Pressure : 16 bar

Material process connection
- Inner thread : PP or 1.4571 (for option controller 1.4571)
- Cutting ring : 1.4571 or steel
- Nozzle : 1.4571 or steel
- Swagelok connection : 1.4571

Material of fitting : Polypropylene; 1.4571

Material of gaskets : PE / Buna (for M-, K-, R- tube)
PTFE / Buna (for L-tube)
- With option /MV : PTFE / Viton

Design (valve) : With or without built-in valve

Length approx. : 100 mm; 175 mm or 325 mm

Weight : 0.3 to 1.3 kg, depending on design (without stand and controller)

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Rota Yokogawa GmbH & Co. KG
Rheinstr. 8
D-79664 Wehr
Germany

GS 01R01B08-00E-E

8th edition, July 2012 (Rü)

TECHNICAL DATA OF OPTIONS

LIMIT SWITCH (OPTION /GR1 to /GR8)

(For floats of Mumetal or PVDF with Fe-core only and Qmin > 0.004 l/h water or 0.3 l/h air)

Type : Bistable inductive ring sensor
Power supply : 4.5 V to 15 V DC
Consumption : acc. DIN EN 60947-5-6 (NAMUR)
For float below ring sensor : < 1mA
above ring sensor : > 2.2 mA
Temperature range : -25°C to +65°C not Ex-type
Protection : IP 67
Electrical connection : 2 x 0.14 mm² , with shield 0.4 mm², 2 m long

EMC :
DIN EN 61000-4-2 : level 3
DIN EN 61000-4-3 : level 2
DIN EN 61000-4-4 : level 3
DIN EN 61000-4-6 : level 2
DIN EN 55011 : group 1 / class A

In general the RI20 complies with the above given criteria. However, in certain situations the switch may react from "off" to "on". In such cases the customer has to assure by himself that this does not happen. Normally the behavior can be improved by more distance to the EMC-source or by using a different cable position.

Explosion proof (OPTION /KS1):
Temperature range :-25°C to +60°C
Marking acc. guideline 94/9/EG :
Manufacturer : Rota Yokogawa, Rheinstr.8, D-79664 Wehr
Type : RI20-10K/G or RI20-17K/G
Year of production : in serial number
Protection : Ex ia
Group : IIC
Category : 2
Explosive atmosphere : G
Temperature class : T6
Certificate No. : PTB 03 ATEX 2111
Safety relevant data :
Ui = 12 V, Ii = 22 mA , Pi = 66 mW,
Li = 20 mH, Ci = 200 nF
or see certificate for data

CE-marking : CE 0344 Ex II 2 G

POWER SUPPLY FOR LIMIT SWITCH (OPTION /W__)

Type : Transmitter relay acc. DIN EN 60947-5-6 (NAMUR)
Power supply : 230V AC (/W2_)
115V AC (/W1_)
24V DC (/W4_)
Switching capacity : max. 250 V AC; max. 4A or max. 500 VA
Relay output : 1 or 2 potential free changeover contacts
Explosion proof : Intrinsic safe [EEx ia] II C
acc. PTB 00 ATEX 2081 (/W2_)
acc. PTB 00 ATEX 2080 (/W4_)

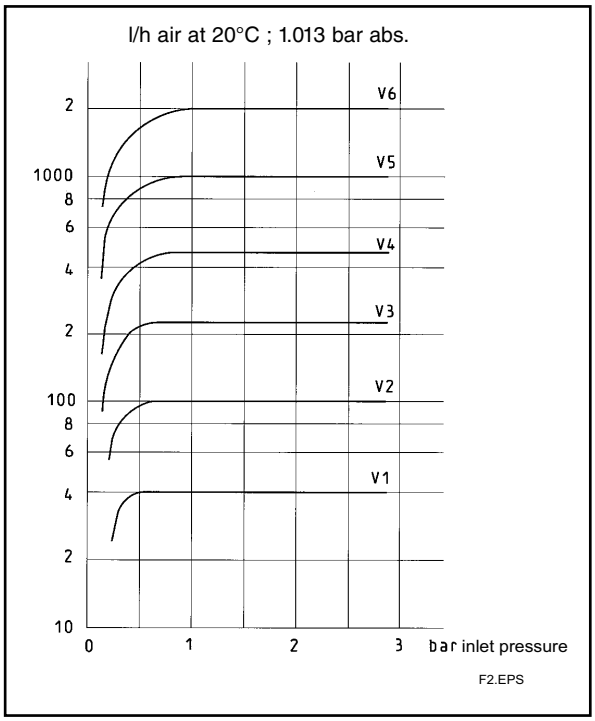
CONTROLLER (OPTION /R1 AND /R3)

Differential pressure controller for a constant flow at fluctuations of the pressure.
These are no pressure limiting valves.
- The controller /R1 is for liquids with variable inlet or outlet pressure and for gases with variable inlet pressure and constant back pressure.
- The controller /R3 is for gases with fluctuations of the back pressure.

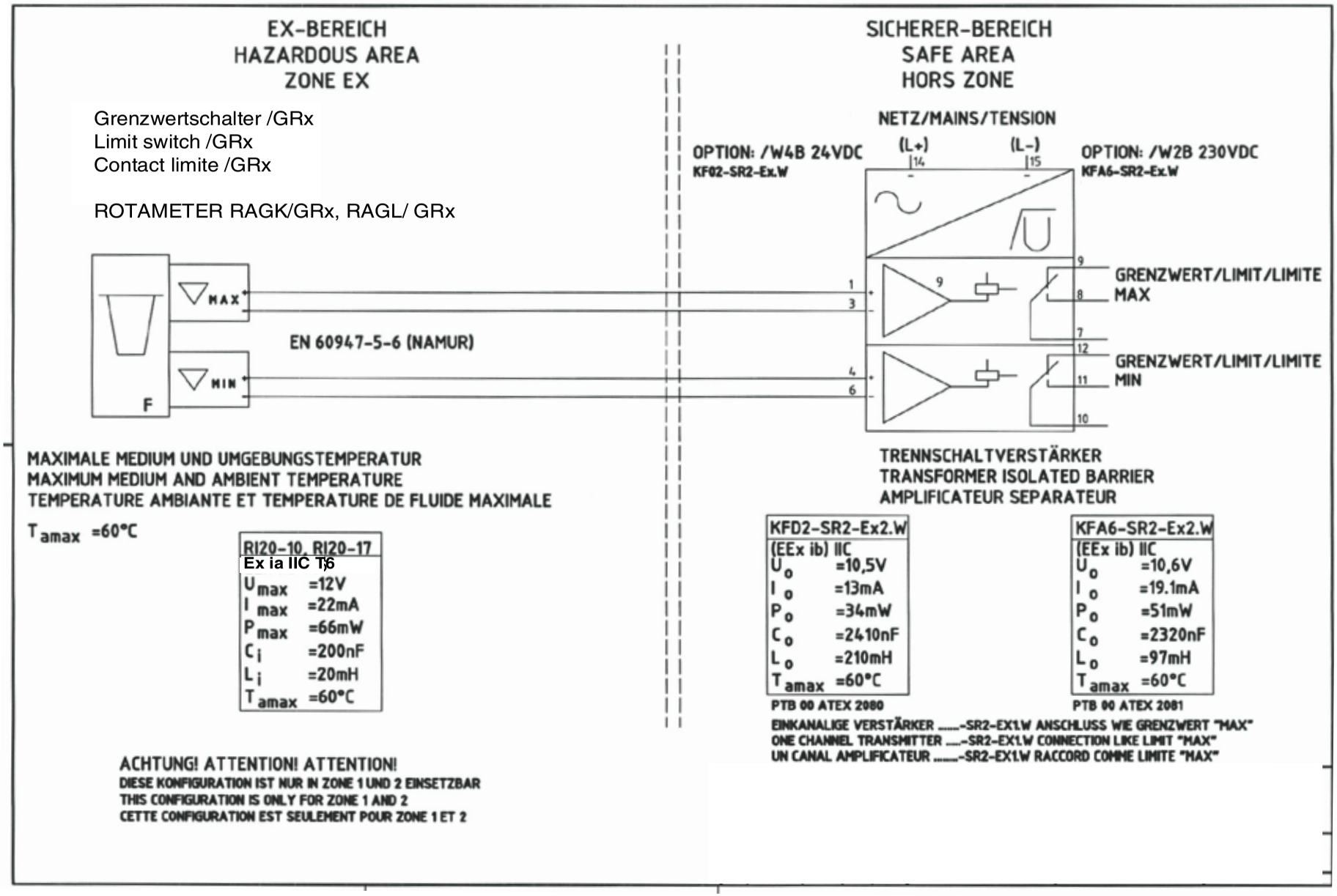
Max. liquid flow : 100 l/h
Max. gas flow : 3000 l/h
Max. temperature : 80°C
Recommended differential pressure : > 400 mbar
Materials:

Housing	Membrane	Springs
CrNi-steel	PTFE	CrNi-steel

Control characteristic:



The curves V1 to V6 show how the flow depends on the inlet pressure for different valve settings. The back pressure at the outlet (ambient pressure) is 1 bar.



MODEL SPECIFICATIONS

Process connection diameter	Model	Process connection: Inner-thread	Process connection: Cutting-ring	Process connection: Nozzle	Process connection: Swageloc	Material Process connection	Material Holder	Design (valve)	Metering tube length / diameter	
	Code	Code	Code	Code	Code	Code	Code	Code	Code	
¼ inch	RAGL41	T0	-	-	-	PP	PP			
	RAGL41	R0	-	-	-	PP	PP			
6 mm	RAGL53	-	C0	-	-	SS;ST	PP	NNN; SAE; SBE; SAA; SBA	K6; K7; R7; M6; M7;L6;L7	
	RAGL53	-	-	P0	-	SS	PP			
	RAGL53	-	-	-	W0	SS	PP			
8 mm	RAGL54	-	C0	P0	-	SS;ST	PP			
	RAGL54	-	-	P0	-	-	-			
	RAGL54	-	-	-	W0	SS	PP			
10 mm	RAGL55	-	C0	-	-	SS;ST	PP			
	RAGL55	-	-	-	W0	SS	PP			
12 mm	RAGL56	-	C0	-	-	SS;ST	PP			
¼ inch	RAGL41	T0	-	-	-	SS	SS			
	RAGL41	R0	-	-	-	SS	SS			
6 mm	RAGL53	-	C0	P0	W0	SS	SS			
8 mm	RAGL54	-	C0	P0	W0	SS	SS			
10 mm	RAGL55	-	C0	-	W0	SS	SS			
12 mm	RAGL56	-	C0	-	W0	SS	SS			

Process connection	Inner thread NPT…...	-T0								
	Inner thread RP….....	-R0								
	Cutting ring……………….........		-C0							
	Nozzle……………………........................			-P0						
	Swageloc-connection………......……………………				-W0					
Material of process connection	Polypropylene………..............................					PP				
	1.4571…………………...........................					SS				
	Steel…………………………….....…….....					ST				
Material of Holder	Polypropylene…………………….............................…						-PP			
	1.4571……………………………………………………..						-SS			
Design	Without valve							NNN		
		Valve	Gasket	Valve seat						
		input	Buna	Silver		……………………......		SAE		
		input	Viton	Silver		……………………......		SBE		
		output	Buna	Silver		……………………......		SAA		
		output	Viton	Silver		……………................		SBA		
The suffix code of the metering tube-float-combination can be read from the flow table……………………………......									xxxxx-xxxxx	
Options (see separate table)…………………………………………………………………………………………......................										/xx

FLOW TABLES WITH METERING TUBE- FLOAT COMBINATION FOR WATER / LIQUIDS

Flow table				Suffix code metering tube-float-combination							
Water 20°C / Liquid				Metering tube				Float			
Recommended comb. row 1		Alternative comb. row 2		-X	X	XX	X	-XX	X	X	X
Max. Flow [l/h]	Pressure-loss [mbar]	Max. Flow [l/h]	Pressure-loss*) [mbar]	Length Code	Diameter Code	Tube Cone Code	Scale Code	Material Code	Diameter Code	Flow mark Code	Insertion Code
1	2	-	-	K	6	31	G;A;N	row 1 SS;MU [1]	B	L	N
2.5	3	-	-	K	6	33					
4	4	-	-	K	6	34					
6	8	-	-	K	6	37					
10	4	-	-	K	7	41			C		
15	5	-	-	K	7	42					
26	6	-	-	K	7	43					
40	5	-	-	K	7	44			D		
63	8	-	-	K	7	47					
110	10	-	-	K	7	51					
10	4	-	-	R	7	41		SR	C		
16	4	-	-	R	7	42					
25	5	-	-	R	7	43					
40	5	-	-	R	7	44			D		
63	6	-	-	R	7	47					
100	6	-	-	R	7	51					
0.025	1	0.054	2	M	6	13		row 1 TT;KR	A [3]		
0.063	2	0.15	3	M	6	17					
0.16	3	0.36	4	M	6	22		row 2 SS;MU [1]			
0.4	1	0.8	2	M	6	24		row 1 TT;KR; PD [1]	B		
1	2	2	3	M	6	31					
1.6	3	2.8	3	M	6	32					
2.5	4	4	4	M	6	33					
3.5	5	6	8	M	6	35					
4	2	6.3	4	M	7	34			C		
6.3	3	10	5	M	7	37		row 2 SS;MU [1]			
10	3	16	5	M	7	41					
16	4	27	6	M	7	42					
25	5	44	6	M	7	43			D		
40	5	66	8	M	7	44					
63	10	100	10	M	7	47					
0.025	1	0.054	2	L	6	13		row 1 TT;KR	A [3]		
0.04	1	0.074	2	L	6	14					
0.063	2	0.15	3	L	6	17					
0.1	2	0.23	3	L	6	21					
0.16	3	0.36	4	L	6	22		row 2 SS;MU [1]			
0.25	4	0.54	5	L	6	23					
0.40	1	0.8	2	L	6	24		row 1 TT;KR; PD [1]	B		
0.63	1	1.2	2	L	6	27					
1	2	2	3	L	6	31					
1.6	3	2.8	3	L	6	32					
2.5	4	4	4	L	6	33					
4	2	6.3	4	L	7	34			C		
6.3	2	10	4	L	7	37		row 2 SS;MU [1]			
10	3	16	5	L	7	41					
16	4	27	6	L	7	42					
25	5	44	6	L	7	43					
40	5	66	8	L	7	44			D		
63	10	110	10	L	7	47					
Tube length (type)		75 mm.....		K							
		150 mm.....		M							
		300 mm.....		L							
Tube diameter		10 mm; 17 mm.....			X	X					
Tube cone		See flow table.....									
Tube medium scale		Scale on tube and mm-division [2].....					G				
		Connection scale and mm-division (recommended).....					A				
		Metering tube with mm-division only.....					N				
Float material		1.4571.....						SS			
		Titanium.....						TT			
		Mumetal (for limit switch /GI1,/GI2 and /GI4.....						MU			
		PVDF (for limit switch /GI2 to /GI4).....						PD			
		Corundum.....						KR			
		CrNi-ball.....						SR			
Float diameter		1.6 mm to 9 mm.....							X		
Flow mark		Liquid.....								L	
Float insertion		Without magnet.....									N

[1] For option limit switch /GR1 to /GR8 [2] Select option /MM if no mm-division is required. [3] Max. viscosity is 2 mPas*s

*) The indicated flow drop is a pilot value and may deviate based on the type of Rotameter.

Additional tube-float-combinations with different float materials and different measuring ranges are available on request.

If the Rotameter should be used in other media- / process- conditions use the sizing software DUREP-v.

FLOW TABLES WITH METERING TUBE- FLOAT COMBINATION FOR AIR / GAS

Flow table				Suffix code metering tube-float-combination								
Air 20°C, 1 bar abs./Gas				Metering tube				Float				
Recommended comb. row 1		Recommended comb. row 2		-X	X	XX	X	-XX		X	X	X
Max. Flow [l/h]	Pressure-loss *) [mbar]	Max. Flow [l/h]	Pressure-loss *) [mbar]	Length Code	Diameter Code	Tube cone Code	Scale Code	Material Code row 1	Material Code row 2	Diameter Code	Flow mark Code	Insertion Code
16	1	25	2	K	6	31	G;A;N	GL	TT; KR; PD 1)	B	G	N
40	1	55	2	K	6	33						
63	2	85	3	K	6	34						
100	3	140	5	K	6	37						
160	2	240	3	K	7	41				C		
250	2	360	3	K	7	42						
400	2	600	4	K	7	43						
630	3	1000	4	K	7	44				D		
1000	4	1600	5	K	7	47						
1600	7	2500	9	K	7	51						
3500	10	-	-	K	7	51		SS; MU 1)	-			
1.9	1	3	2	M	6	13		TT; KR	SS; MU 1)	A		
4.4	2	7	3	M	6	17						
10	3	17	4	M	6	22						
23	2	36	3	M	6	24		TT; KR; PD 1)		B		
50	2	80	3	M	6	31						
70	3	110	4	M	6	32						
100	4	160	4	M	6	33						
140	5	220	8	M	6	35						
180	3	260	5	M	7	34				C		
250	3	34	5	M	7	37						
400	3	550	5	M	7	41						
630	4	900	6	M	7	42						
1000	5	1400	6	M	7	43						
1600	5	2200	8	M	7	44				D		
2400	10	3300	10	M	7	47						
1.9	1	3	2	L	6	13		TT; KR		A		
3	1	4.5	2	L	6	14						
4.4	2	8	3	L	6	17						
6.5	2	11	3	L	6	21						
10	3	16	4	L	6	22						
14	4	23	5	L	6	23						
23	2	40	3	L	6	24		TT; KR; PD 1)		B		
33	2	55	3	L	6	27						
50	2	80	3	L	6	31						
70	3	110	4	L	6	32						
100	4	160	4	L	6	33						
180	3	260	5	L	7	34				C		
250	3	360	5	L	7	37						
400	3	600	5	L	7	41						
630	4	950	6	L	7	42						
1000	5	1500	6	L	7	43						
1600	5	2200	8	L	7	44				D		
2400	10	3500	10	L	7	47						
Tube length (type)		75 mm.....		K								
		150 mm.....		M								
		300 mm.....		L								
Tube diameter		10 mm; 17 mm.....			X							
Tube cone		See flow table.....				XX						
Tube medium scale		Scale on tube and mm-division 2).....					G					
		Connection scale and mm-division (recom.)					A					
		Metering tube with mm-division only.....					N					
Float material		1.4571.....						SS				
		Titanium.....						TT				
		Mumetal (for limit switch /GI1, /GI2 and /GI4).....						MU				
		PVDF (for limit switch /GI1 to /GI4).....						PD				
		Corundum.....						KR				
		Glass ball.....						GL				
Float diameter		1.6 mm to 9 mm.....								X		
Flow mark		Gas.....									G	
Float insertion		Without magnet.....										N

1) For option limit switch /GR1 to /GR8 2) Select option /MM if no mm-division is required.

*) The indicated flow drop is a pilot value and may deviate based on the type of Rotameter.

Additional tube-float-combinations with different float materials and different measuring ranges are available on request.

If the Rotameter should be used in other media- / process- conditions use the sizing software DUREP-v.

OPTIONS

Options	Option code	Description	Restrictions
Marking	/B1 /B4 /B8 /BG	Tag plate (SS) Neutral version Customer provided marking on label Customer specific notes on scale	Plate 12 x 40 mm; max. 45 digits
Limit switches	/GR1 /GR2 /GR3 /GR4 /GR5 /GR6 /GR7 /GR8	Bistable inductive ring sensor Bistable inductive ring sensor Bistable inductive ring sensor Bistable inductive ring sensor 2 bistable inductive ring sensors (2 x /GR1) 2 bistable inductive ring sensors (2 x /GR2) 2 bistable inductive ring sensors (2 x /GR3) 2 bistable inductive ring sensors (2 x /GR4)	Only for float MU A_N Only for float PD B_N or MU B_N Only for float PD C_N Only for float MU C_N, MU D_N; PD D_N Only for float MU A_N Only for float PD B_N or MU B_N Only for float PD C_N Only for float MU C_N, MU D_N; PD D_N
Ex-proof type	/KS1	ATEX intrinsically safe „ia“	Only for /GR1 to /GR8
Test and certificates	/H1 /P2 /P3 /PP /PT	Oil and fat free for wetted surface acc. to ASTM G93-03 level C Certificate of Compliance with the order acc. to EN 10204: 2004-2.1 As /P2 + Test report acc. to EN 10204: 2004-2.2 Pressure test report for measuring system With flow table for recalculation	
Accessories metering tube	/MM /MV	No unit scale (0-10 or mm-division) (without calculation table) Viton PTFE-gasket ad Viton O-ring	 For high temperatures (100°C to 130°C) Only with SS holder material. Not for valve with Buna gasket.
Accessories float stops	/S1	Spring stops made of SS 1.4571	
Accessories	/QA /QB /QF	For mounting With tapped holes in the connecting heads for mounting Stand	Not with /GR1 to /GR8 Not with metering tube M3
Controller	/R1 /R3	Pre- pressure controller 1.4571 (only with valve in inlet: for gas with variable pre- pressure and liquids with variable pre- and back- pressure) Back- pressure controller 1.4571 (only with valve in outlet; for gas with variable back-pressure)	Not with metering tube M3 Not with metering tube M3
Power supply for limit switch (es) (transmitter relay)	/W1A /W1B /W2A /W2B /W4A /W4B	KFA5-SR2-Ex1.W /115 V AC, 1 channel KFA5-SR2-Ex2.W /115 V AC, 2 channels KFA6-SR2-Ex1.W /230 V AC, 1 channel KFA6-SR2-Ex1.W /230 V AC, 2 channels KFD2-SR2-Ex1.W /24 V DC, 1 channel KFD2-SR2-Ex2.W /24 V AC, 2 channels	

DIMENSIONS

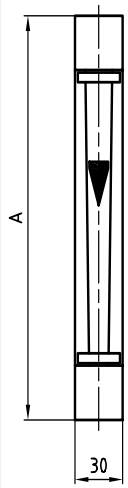


fig 1. model NNN
(without valve)

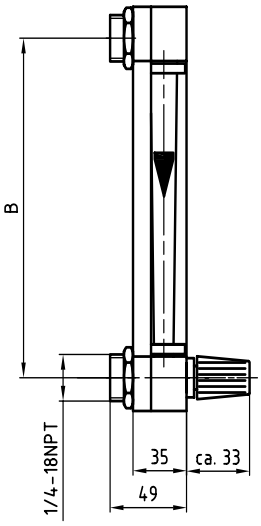


fig 2. model SAE and SBE
(with valve in input)

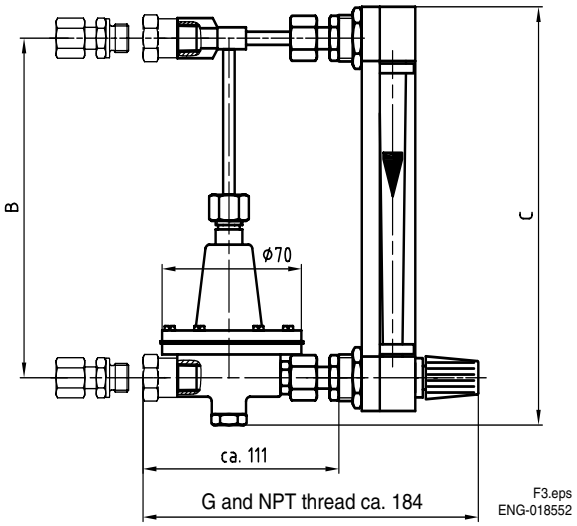


fig 3. model SAE and SBE with option /R1
(with valve in input and input pressure controller)

Metering tube	Dimensions [mm]			Weight [kg]		
	A	B	C	without controller	with controller	Laboratory Rotameter-Set with case, stand and metering tube
K6 ; K7	125	100	135	0.3	1.0	----
M6 ; M7	200	175	210	0.4	1.1	---
L6 ; L7	350	325	360	0.6	1.3	about 3.5

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