

General Specifications

Model RAGL Rotameter

GS 01R01B08-00E-E

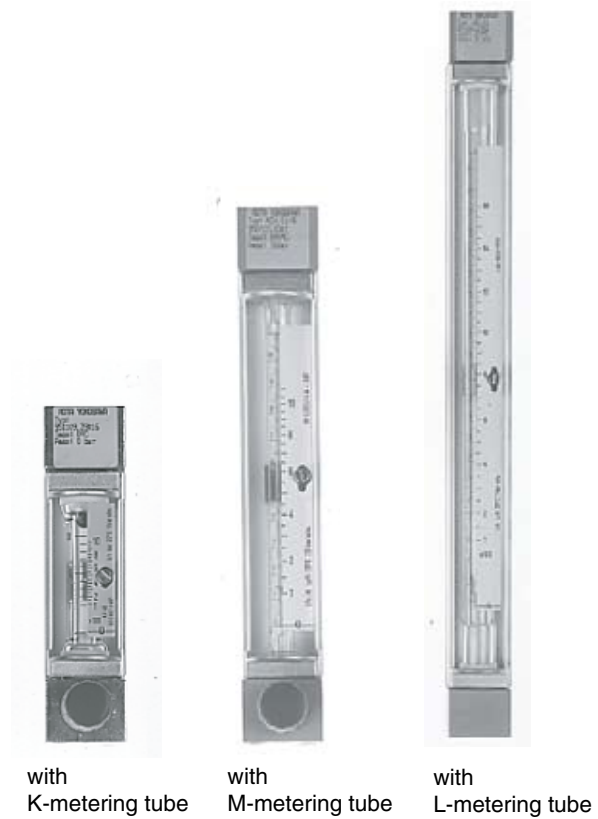
This type of Rotameter is designed for measurement of liquids and gases.

The conical glass metering tube has a free rotating float. This float 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.

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 ₀ =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% better on request 2.5% better on request	± 4% ± 2.5%
M613 - L623 L624 - L747	300 mm 300 mm	2.5% better on request 1.6% better on request	± 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)

TECHNICAL DATA OF OPTIONS

LIMIT SWITCH (OPTION /GI1 to /GI4)

(For floats of Mumetal or PVDF with Fe-core only and $Q_{min} > 0.004$ 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	: < 1 mA
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 mm ² , with shield 0.4 mm ² , 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	: $U_i = 12$ V, $I_i = 22$ mA, $P_i = 66$ mW, $L_i = 20$ mH, $C_i = 200$ nF or see certificate for data

CE-marking :   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.

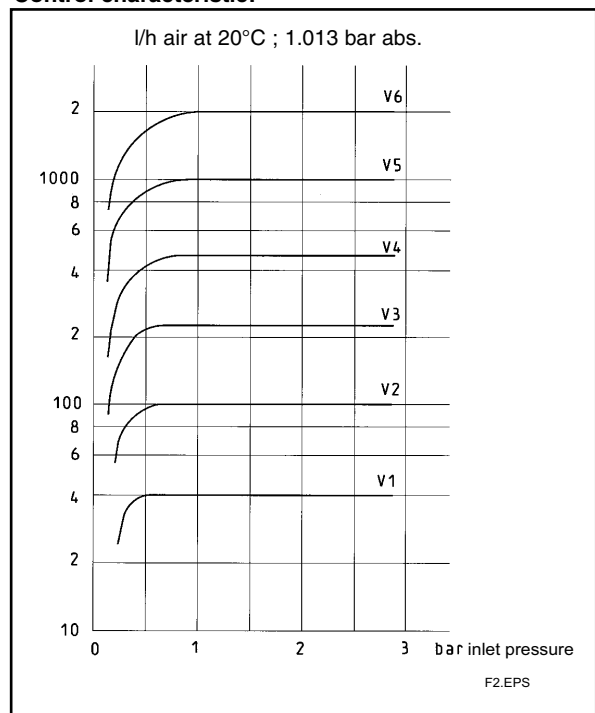
Max. liquid flow	: 100 l/h
Max. gas flow	: 3000 l/h
Max. temperature	: 80°C

Recommended differential pressure : > 400 mbar

Materials:

Housing	Membrane	Springs
CrNi-steel	PTFE	CrNi-steel

Control characteristic:

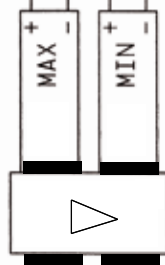


The curves V1 to V6 show how the flow depends on the inlet pressure for different valve settings. The back pressure at the outlet (ambient pressure) is 1 bar.

Ex - BEREICH
HAZARDOUS AREA
ZONE EX

INDUKTIVER RINGINITIATOR RI20
INDUCTIVE RINGINITIATOR RI20
BAGUE INDUCTIVE RI20

ROTAMETER RAGK, RAGL OPTION: /GIn



EN 60947-5-6 (NAMUR)

MAXIMALE MEDIUM UND UMGEBUNGSTEMPERATUR
MAXIMUM MEDIUM AND AMBIENT TEMPERATURE
TEMPERATURE AMBIANTE ET TEMPERATURE DE FLUIDE MAXIMALE

$T_{\text{amax}} = 60\text{ }^{\circ}\text{C}$

RI20-10, RI20-17
EEx ia IIC T6
$U_{\text{max}} = 12\text{V}$
$I_{\text{max}} = 22\text{mA}$
$P_{\text{max}} = 66\text{mW}$
$C_i = 200\text{nF}$
$L_i = 20\text{mH}$
$T_{\text{amax}} = 60\text{ }^{\circ}\text{C}$

PTB 03 ATEX 2111

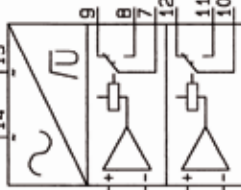
SICHERER BEREICH
SAFE AREA
HORS ZONE

NETZ/MAINS/TENSION

OPTION: /W4B 24VDC
KFD2-SR2-Ex2.W

OPTION: /W2B 230VAC
KFA6-SR2-Ex2.W

(L+) (L-)



GRENZWERT/LIMIT/LIMITE
MAX

GRENZWERT/LIMIT/LIMITE
MIN

TRENSCHALTVESTAERKER
TRANSMITTEER RELAY
AMPLIFICATEUR SEPARATEUR

KFD2-SR2-Ex2.W
[EEx ib] IIC
$U_0 = 10.5\text{V}$
$I_0 = 13\text{mA}$
$P_0 = 34\text{mW}$
$C_0 = 2410\text{nF}$
$L_0 = 210\text{mH}$
$T_{\text{amax}} = 60\text{ }^{\circ}\text{C}$

PTB 00 ATEX 2080

EINKANALIGE VERSTAERKERSR2-Ex1.W ANSCHLUSS WIE GRENZWERT "MAX"
ONE CHANNEL TRANSMITTERSR2-Ex1.W CONNECTIOIN LIKE LIMIT "MAX"
UN CANAL AMPLIFICATEURSR2-Ex1.W RACCORD COMME LIMITE "MAX"

KFA6-SR2-Ex2.W
[EEx ib] IIC
$U_0 = 10.6\text{V}$
$I_0 = 19.1\text{mA}$
$P_0 = 51\text{mW}$
$C_0 = 2320\text{nF}$
$L_0 = 97\text{mH}$
$T_{\text{amax}} = 60\text{ }^{\circ}\text{C}$

PTB 00 ATEX 2081

ACHTUNG! ATTENTION! ATTENTION!

DIESE KONFIGURATION IST NUR IN ZONE 1 UND 2 EINSETZBAR
THIS CONFIGURATION IS ONLY FOR ZONE 1 AND 2
CETTE CONFIGURATION EST SEULEMENT POUR ZONE 1 ET 2

1

MODEL SPECIFICATIONS

Process connection	Model	Code process connection				Material Process - connection	Material holder	Design (valve)	Metering tube length / diameter
		Inner - thread	Cutting - ring	Nozzle	Swage-loc				
	Code	Code	Code	Code	Code	Code	Code	Code	
¼ inch	RAGL41	T0	–	–	–	PP	PP	NNN; SAE; SBE; SAA; SBA	K6; K7; R7 M6; M7; L6; L7
	RAGL41	R0	–	–	–	PP	PP		
6 mm	RAGL53	–	C0	–	–	SS; ST	PP		
	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							NNN SAE SBE SAA SBA	
Process connection 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 SAE SBE SAA SBA	
	With valve		Gasket	Valve seat					
	input		Buna	Silver				
	input		Viton	Silver				
	output		Buna	Silver				
output		Viton	Silver					
The suffix code of the metering tube-float-combination can be read from the flow table.									xxxxx- xxxxx
Options (see separate table).....									/xx

T2.EPS

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

Flow table Air 20°C, 1 bar abs. / Gas				Suffix code metering tube-float-combination							
Recommended comb. Row 1		Alternative comb. Row 2		Metering tube			Float				
Max. Flow [l/h]	Pressure-loss *) [mbar]	Max. Flow [l/h]	Pressure-loss *) [mbar]	- X	X	XX	X	- XX	X	X	X
Code	Code	Code	Code	Length Code	Diameter Code	Tube Cone Code	Scale Code	Material Code	Diameter Code	Flow mark Code	Insertion Code
16	1	25	2	K	6	31					
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					
250	2	360	3	K	7	42					
400	2	600	4	K	7	43					
630	3	1 000	4	K	7	44					
1 000	4	1 600	5	K	7	47					
1 600	7	2 500	9	K	7	51					
3 500	10	-	-	K	7	51					
1.9	1	3	2	M	6	13					
4.4	2	8	3	M	6	17					
10	3	17	4	M	6	22					
23	2	36	3	M	6	24					
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					
250	3	340	5	M	7	37					
400	3	550	5	M	7	41					
630	4	900	6	M	7	42					
1 000	5	1 400	6	M	7	43					
1 600	5	2 200	8	M	7	44					
2 400	10	3 300	10	M	7	47					
1.9	1	3	2	L	6	13					
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					
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					
250	3	360	5	L	7	37					
400	3	600	5	L	7	41					
630	4	950	6	L	7	42					
1 000	5	1 500	6	L	7	43					
1 600	5	2 200	8	L	7	44					
2 400	10	3 500	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.....					X					
Tube medium scale	Scale on tube and mm-division. 2).....										
	Connection scale and mm- division (recommended)...										
	Metering tube with mm- division only.....										
Float material	1.4571.....							SS			
	Titanium.....							TT			
	Mumetal (for limit switch /GI1; /GI2 to /GI4).....							MU			
	PVDF (for limit switch /GI2 to GI4).....							PD			
	Corundum.....							KR			
	Glas 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 /GI1 bis /GI4
 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.

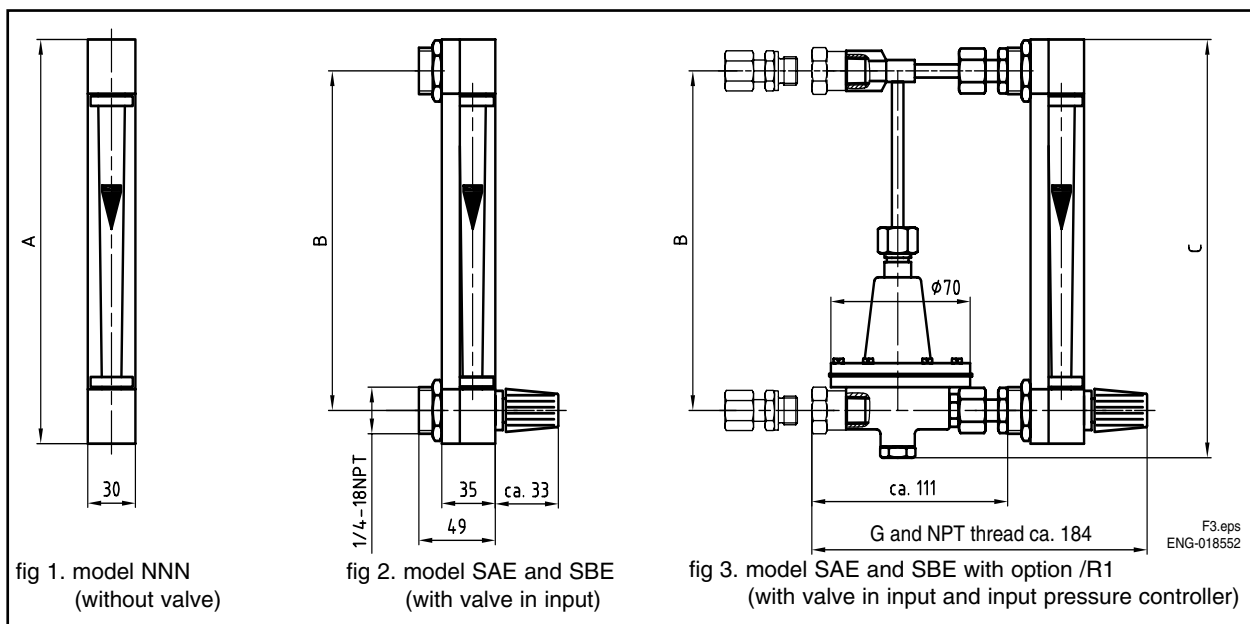
OPTIONS

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	/GI1 /GI2 /GI3 /GI4	Bistable inductive ring sensor ¹⁾ Bistable inductive ring sensor ¹⁾ Bistable inductive ring sensor ¹⁾ Bistable inductive ring sensor ¹⁾	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 /GI1 to /GI4
Test and certificates	/H1 /P2 /P3 /PP /PT	Certificate of degrease 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	
Accessoires metering tube	/MM /MV	No unit scale (1-10 or mm- division) (without calculation table) Viton PTFE- gasket and Viton O-ring	For high temperatures (100°C to 130°C) Only with SS holder material
Accessoires float stops	/S1	Spring stops made of SS 1.4571	
Accessoires	/QA /QB /QF	For mounting With tapped holes in the connection heads for mounting Stand	Not with /GI1 to /GI4 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-Ex2.W / 230 V AC, 2 channels KFD2-SR2-Ex1.W / 24 V DC, 1 channel KFD2-SR2-Ex2.W / 24 V DC, 2 channels	

1) Not delivered with plastic cover

T5.EPS

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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