General Specifications

ROTA***METER*** RAGN
Glass Variable Area Flowmeter

GS 01R01B10-00E-E

The Rotameter RAGN is designed for continuous flow measurement of liquids and gases.
The fluid passes through the metering tube from bottom to top and consequently needs to be installed vertically with flow direction upwards. The conical glass metering tube includes a free rotating float which provides self stabilization. The actual flow is indicated by the top of the float and can be directly read from the scale on the metering tube.





Features:
- All stainless steel design
- Turnable splinter shield
- Designed for aggressive applications
- Easy to install and maintain
- Wide measuring range selection for gases and liquids
- Low pressure loss
- Easy to read scale
- Optional limit switches with connection box
- FMEDA report available for SIL applications

Applications:
- Visual fluid monitoring
- Industrial gas measurement
- Controlling of water circuits

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

GS 01R01B10-00E-E
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6th edition, July 2024(RYG)

STANDARD SPECIFICATIONS

RoHS Directive 2011/65/EU, 2015/863/EU:
RoHS conform according to EN IEC 63000

WEEE
Rota Yokogawa GmbH & Co. KG is registered at „Stiftung EAR“ as manufacturer of electronic devices.
WEEE-Reg.Nr. DE 93847364.

Intended use (for UAE):
Rotameter RAGN flow meter is specifically designed to both be installed and function within:
- large scale fixed installations
- means of transport for persons or goods, excluding electric two-wheel vehicles which are not type approved.

Fluids to be measured : Liquids and gas

Measurable flow rates :
- Water (20 °C) : 0.002 l/h to 10 m3/h
- Air (20 °C; 1 bar abs.) : 0.1 l/h to 160 m3/h

The measureable flow rates are depending from density and viscosity of the fluid. To find the fluid specific measuring range please use the Yokogawa FlowConfigurator: www.FlowConfigurator.com.

Turndown:
- P metering tube : ≈ 10:1
- L metering tube : ≈ 20:1

Metering tubes : L6; L7; P0; P1; P2; P4 (length 300 mm)

Ambient temperature : -25 °C to 100 °C

Process temperature : -25 °C to 100 °C

Process pressure:

Metering tube	L6;L7	P0;P1	P2	P4
Pmax (bar)	16	10	8	6

Installation length:

Process connection	Thread	Clamp	Flange
Length [mm]	375	375	425

Weight : Depending on design (see page 8)

Accuracy:

Tube	Measuring accuracy acc. Directive VDI/VDE 3513 sheet 2 (q_G = 50 %)
L613 - L623	2.5 %
L624 - L747	1.6 %
P051 - P471	1.6 %

Materials:
Threads G, NPT : 1.4404/316L
Flange EN / ASME : 1.4404/316L
Clamp ISO 2852 : 1.4404/316L
Housing : 1.4401/304
Nut : 1.4401/304 (or galvanized steel)
Stoppers (L6, L7 tube): PFA
Stoppers (P0 - P4 tube) : PVDF
Measuring cone : Borosilicate glass
Float (L6, L7 tube) : Titanium, PVDF
Float (P0 - P4 tube) : PTFE, PVDF (FDA conform), 1.4571/316Ti
Gaskets : NBR, FKM,EPDM (FDA conform)

Pressure Equipment Directive (PED) Directive 2014/68/EU:
Models : RAGN04, RAGN05, RAGN06
Tubes:
- Modul : A
- Fluid Group : 1 (liquid, gases)
- Produced acc. to category : I

Please note that the device is not intended to measure unstable gases.

FDA-Conformity:
RAGN with P- tube, PVDF- or SS- float and EPDM- gaskets (option /ME).
Stoppers and floats made of PVDF: 21 CFR § 177 1520(a)
O-rings made of EPDM: 21 CFR § 177 2600
Float (PTFE): 21 CFR § 177 1550

Following IEC 61508:
RAGN with Read-switch (/GM1 to /GM5)
Suitable for application in safety functions up to and including SIL1.
RAGN with Ring sensor (/GR2 to /GR5)
Suitable for application in safety functions up to and including SIL1.
Details see FMEDA report.

Following ISO 13849-1:
Safety Metrics available for:
RAGN with Read-switch (/GM1 to /GM5)
RAGN with Ring sensor (/GR2 to /GR5)
Details see FMEDA report.

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OPTION SPECIFICATIONS

Limit switch (option /GM1 to **/GM5)**
(for P- tubes with PVDF- or SS- float with magnet only)
Type : reed contact with bistable switching
Max. switching voltage : 230 V
Max. switching current : 2 A
Max. switching capacity: 40 W/VA
Temperature range : -10 °C to +70 °C
Protection : IP65
Internal capacity : 0 nF
Internal inductivity : 0 mH
Electrical connection: LIYY 2 x 0.34 mm²; length 1 m
Housing : Polystyrene
Weight : 35 g
Equipment safety acc. EN 61010-1, EN 60010-2-030**:**
• Over voltage category: II (acc. to EN 60664-1)
• Pollution degree : I
• Safety class : I
Explosion proof :
Intrinsic safe acc. EN 60079-11 chapter 5.7,
IEC 60079-11 chapter 5.7 and ANSI/ISA 60079-11 chapter 5.7 as "Simple Apparatus".
Group : IIC
Category : 2G
Temperature class: T6
Entity parameter : Ui = 15 V ; Ii = 50 mA ; Pi = 187 mW
Li ≈ 0 mH ; Ci ≈ 0 nF

Limit switch (option /GR2 to **/GR8**
(for L- tubes with PVDF float only)
Type : Bistable inductive ring sensor
Power supply : 4.5 V to 15 V DC
Consumption : acc. DIN EN 60947-5-6 (NAMUR)
Float below ring sensor: < 1 mA
Float above ring sensor: > 2.2 mA
Temperature range: -25 °C to +65 °C non-Ex- type
Protection : IP 67
Electrical connection: 1 x 0.14 mm², with shield 0.4 mm², length 2 m

EMC Compliance:
• EMC compliance according EN 60947-5-2 table 8 (for use in industrial locations). Based on EMC compliance the limit switch is marked with CE, EAC and RCM. 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.
• Approval for Morocco:
Limit switch complies with the provisions of the Moroccan Regulations: EN 61326-1

Explosion proof type (option /KS1, /ES1):
Temperature range : -25 °C to +60 °C
Type : RI20-10K/G or RI20-17K/G
Year of production: : in serial number
Protection : Ex ia IIC T6 Gb
Certificate No. : PTB 03ATEX 2111 (/KS1)
IECEx PTB13.0023 (/ES1)
ECAS 24-05-111620/E24-05-115195/NB0010 (/ES1)

Taiwan Safety label : Registration Document:
ML0412007043A3
Option /ES1 must be selected.
For export to Taiwan please contact your Yokogawa representative regarding Taiwan Safety Label

Safety relevant data (see also certificate for data):
Ui = 12 V, Ii = 22 mA , Pi = 66 mW,
Li = 20 mH, Ci = 200 nF

CE-marking: CE 0344 Ex II 2 G

Option /KS1 includes non-electrical Ex h, data see /KC1.

ATEX registrated mechanical RAGN (option /KC1)
Deposition No. : IBExU 096/24

Explosion proof:
• II2G Ex h IIC T6...T5 Gb
• II2D Ex h IIIC T100°C Db

Ambient- / process- temperature:
-25 °C to +100 °C (-4 °F to 212 °F)

Power supply for limit switch (option /W□□)

Type:
Acc. to EN 60947-5-6
Standard:
• KFA5-SR2-Ex*.W (115 V AC); * = 1 or 2
• KFA6-SR2-Ex*.W (230 V AC); * = 1 or 2
• KFD2-SR2-Ex*.W (24 V DC); * = 1 or 2
alternative for AC types:
• KFU8-SR-Ex*.W (90 to 253 V AC); * = 1 or 2

Power supply:
• 250 V AC ± 10 %, 45 to 65 Hz
• 115 V AC ± 10 %, 45 to 65 Hz
• 24 V DC ± 25 %
alternative for AC types:
• 90 to 253 V AC 50 to 60 Hz

Relay output:
• 1 or 2 potential-free change over contact(s)
• Switching capacity: Max. 250 V AC, max. 2 A

Approvals:
• KFA5-SR2-Ex*.W:
ATEX: PTB 00 ATEX 2081
IECEx: IECEx PTB11.0031
• KFA6-SR2-Ex*.W:
ATEX: PTB 00 ATEX 2081
IECEx: IECEx PTB11.0031
• KFU8-SR-Ex*.W:
ATEX: FIDI 22 ATEX 0029X
IECEx: IECEx FIDI 22.0003X
• KFD2-SR2-Ex*.W:
ATEX: PTB 00 ATEX 2080
IECEx: IECEx PTB11.0034

Entity parameters and marking:
See certificates

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MODEL SPECIFICATIONS

Model	Suffix code	Description	Restrictions
RAGN01 RAGN23 RAGN02 RAGN04 RAGN05 RAGN06		Size DN 15 (½ inch) Size ¾ inch Size DN 25 (1 inch) Size DN 40 (1½ inch) Size DN 50 (2 inch) Size 2½ inch	for D4, A1, G0, T0, S4 with L6, L7, P0, P1 for G0, T0 with L6, L7, P0, P1 for D4, A1, G0, T0, S4 with L6, L7, P0, P1, P2 for D4, A1, G0, T0 with P2, P4 for D4, A1, with P2, P4; for G0, T0 with P4 for G0, T0 with P4
Process connection	-D4 -A1 -G0 -T0 -S4	EN flange PN 40, process connection dimension + facing acc. EN 1092-2 Form B1 ASME flange class 150, process connection dimension + facing acc. ASME B 16.5 Inner thread G Inner thread NPT Clamp ISO 2852	
Material of process connections	SS	Stainless steel	
Metering tube [1]	-L -P	L-tube (300 mm) P-tube (300 mm)	
Diameter of metering tube [1]	6 7 0 1 2 4	10 mm 17 mm 20 mm 34 mm 48 mm 81 mm	
Cone [1]	13 14 17 21 22 23 24 27 31 32 33 34 37 41 42 43 44 47 51 52 53 54 57 61 62 63 64 67 71		
Float material [1]	-SS -PF -PD -TT	1.4571/316 Ti PTFE PVDF Titanium	
Diameter of float [1]	A B C D 0 1 2 4	1.59 mm 3.18 mm 6.35 mm 9.53 mm 12.2 (P0-float) mm 21.6 (P1-float) mm 31.2 (P2-float) mm 54.1 (P4-float) mm	
Medium / Float factor [1]	L G 2 3 6 7	For liquid For gas For water (factor 0.63) For water (factor 1) For air (factor 16) For air (factor 22 to 24)	
Float insertion [1]	N M	Without magnet With magnet	

[1] The measureable flow rates are depending from density and viscosity of the fluid. To find the fluid specific measuring range please use the Yokogawa FlowConfigurator: www.FlowConfigurator.com.

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OPTIONS

Options	Code	Description	Restriction
Marking	/B1	Tag plate (SS)	Plate 12 x 40 mm; max. 45 digits
	/B4	Neutral version	Not with /KS1
	/BG	Customer specific notes on name plate	Max. 30 digits
	/B10	Percentage scale	
	/B11	Measuring tube without yellow background	
	/BD	Dual scale	Only for tube P
Limit switches	/GM1	Magnetic MIN-contact	Only for tube P0 to P4 and float insertion code M (with magnet)
	/GM2	Magnetic MAX-contact	Only for tube P0 to P4 and float insertion code M (with magnet)
	/GM3	Magnetic MIN-MAX-contact	Only for tube P0 to P4 and float insertion code M (with magnet)
	/GM4	Magnetic MIN-MIN-contact	Only for tube P0 to P4 and float insertion code M (with magnet)
	/GM5	Magnetic MAX-MAX-contact	Only for tube P0 to P4 and float insertion code M (with magnet)
	/GR2	Bistable inductive ring sensor	Only for tube L6 with float code PDB
	/GR3	Bistable inductive ring sensor	Only for tube L7 with float code PDC
	/GR4	Bistable inductive ring sensor	Only for tube L7 with float code PDD
	/GR6	2 bistable inductive ring sensors	Only for tube L6 with float code PDB
	/GR7	2 bistable inductive ring sensors	Only for tube L7 with float code PDC
	/GR8	2 bistable inductive ring sensors	Only for tube L7 with float code PDD
Connection box	/GD1	Connection box for 1 limit switch	Only with /GM1 to 2, /GR2 to 4
	/GD2	Connection box for 2 limit switches	Only with /GM3 to 5, /GR6 to 8
Ex-proof type	/KS1	ATEX intrinsically safe „ia“	Only for /GR2 to /GR8
	/KC1	ATEX non-electrical Ex h	Not with /GM□or /GR□
	/ES1	IECEx intrinsically safe „ia“	Only for /GR2 to /GR8
Scale	/IB	Scale imprinted on the tube and burned in	Must with /KC1
Installation lengths	/L12	Installation length 500 mm	Only for D4, A1
(s. also table on page 6)	/L13	Installation length 356 mm	Only for size 01 and G0, T0
	/L14	Installation length 368 mm	Only for size 01, 23, 02 and G0, T0
	/L15	Installation length 386 mm	Only for size 02, 04 and G0, T0
	/L16	Installation length 394 mm	Only for size 05, 06 and G0, T0
Valves	/V1	Valve made of 1.4571 G ½” (parts attached)	Only for G0 and tube L6, L7, P0
(inner thread,	/V2	Valve made of 1.4571 G 1”(parts attached)	Only for G0 and tube P1
double fitting is attached,	/V3	Valve made of 1.4571 G 1½” (parts attached)	Only for G0 and tube P2
not for FDA)	/V4	Valve made of brass G ½” (parts attached)	Only for G0 and tube L6, L7, P0
	/V5	Valve made of brass G 1” (parts attached)	Only for G0 and tube P1
	/V6	Valve made of brass G 1½” (parts attached)	Only for G0 and tube P2
Test and certificates	/H1	Oil + fat free for wetted surfaces acc. Yokogawa specification	Not with /V1 to /V6
	/P2	Certificate of Compliance with the order acc. EN 10204: 2004- 2.1	
	/P3	As /P2 +Test report acc. to EN 10204: 2004- 2.2	
	/P6	Material certificate for Insertion parts or flange connections acc. EN 10204: 2004- 3.1	Only for insertion and flange connections
	/PP	Pressure test report for metering system	Not with /V1 to /V6
	/PT	With flow table for recalculation + mm- scale	
	/PM2	PMI test (2 test points)	Only for connections G0, T0, S4 except RAGN04-G0SS-P2 and RAGN04-T0SS-P2
	/PM4	PMI test (4 test points)	Only for connections A1, D4 and RAGN04-G0SS-P2 and RAGN04-T0SS-P2
Country-specific delivery	/KC	With KC-mark in Korea	
	/CN	For delivery to China	
Accessories for metering tube	/MV	Gasket FKM (Viton)	
	/ME	Gasket EPDM (conform to FDA, -30 °C – +100 °C)	
	/MN	Nut galvanized steel	not for S4 and RAGN04 with P2
Power supply for limit switches	/W1A	115 V AC, 1 channel	Only with GR1 to GR4 or GM1 to GM2
(transmitter relay)	/W1B	115 V AC, 2 channel	Only with GR5 to GR8 or GM3 to GM5
	/W2A	230 V AC, 1 channel	Only with GR1 to GR4 or GM1 to GM2
	/W2B	230 V AC, 2 channel	Only with GR5 to GR8 or GM3 to GM5
	/W4A	24 V DC, 1 channel	Only with GR1 to GR4 or GM1 to GM2
	/W4B	24 V DC, 2 channel	Only with GR5 to GR8 or GM3 to GM5
Instruction manuals	/IEn	Quantity of instruction manuals in English	n = 1 to 9 selectable *)
	/IDn	Quantity of instruction manuals in German	n = 1 to 9 selectable *)
Special order	/Z	Special design, must be specified separately. If /Z is selected, several Suffix of Model-Suffix Code can be changed to Z.	

*) If no instruction manual is selected, only a Short IM and in case of limit switches a DVD with instruction manuals is shipped with the flowmeter.

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PROCEDURE TO SELECT THE MODEL CODE

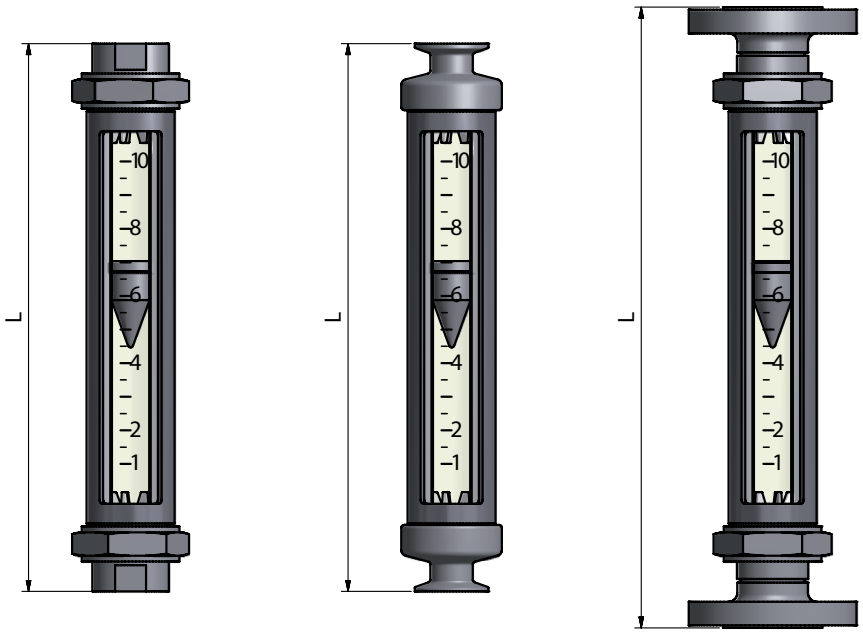
Please specify in the following order

- Measuring range for water/liquid or air/gas
- With or without optional limit switch

First select the required measuring range from the flow table (last column) and specify the float insertion for the optional limit switch. Then the suffix code for the combination metering tube - float can be fixed.
For your special application please use the Yokogawa Sizing Software www.FlowConfigurator.com.

DIMENSIONS

METERING TUBE



Inner thread type (T0; G0) Clamp type (S4) Flange type (D4; A1)

Installation lengths and weights:

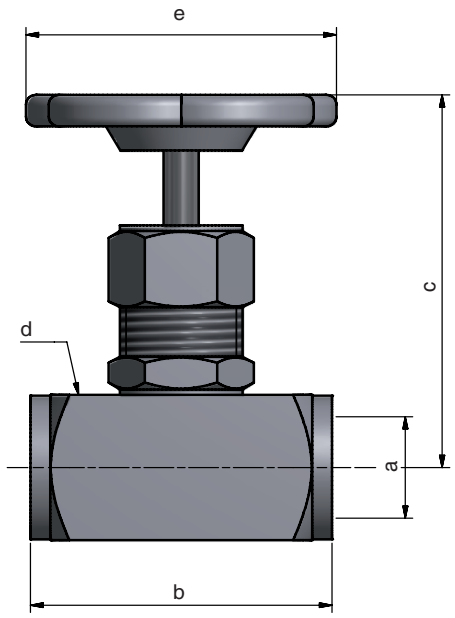
Model	Process connection	Tube	Length L in mm	Weight in kg
RAGN01	Inner thread	L6; L7; P0; P1	375	1.7
	Clamp		375	1.9
	Flange		425	2.5
RAGN23	Inner thread		375	1.7
RAGN02	Inner thread	L6; L7; P0; P1	375	1.7
		P2		2.6
	Clamp	L6; L7; P0; P1		2.0
		P2		2.8
	Flange	L6; L7; P0; P1	425	3.3
		P2		3.9
RAGN04	Inner thread	P2	375	2.6
		P4		7.1
	Flange	P2	425	5.2
		P4		8.7
RAGN05	Inner thread	P4	375	7.1
	Flange	P2	425	6.6
		P4		11.1
RAGN06	Inner thread	P4	375	7.1

Compatibility with former Rotameter RAGG / RAGH:

Former model	Tube	Installation length in mm	Model RAGN
RAGH01	L6;L7;G0	356	RAGN01..../L13
RAGH02	G1	368	RAGN02..../L14
RAGH04	G2	386	RAGN04..../L15
RAGH06	G4	394	RAGN06..../L16
RAGH23	G1	368	RAGN23..../L14
RAGH05	G4	394	RAGN05..../L16
RAGG01	G0;G1	500	RAGN01..../L12
RAGG02	G2	500	RAGN02..../L12
RAGG04	G4	500	RAGN04..../L12

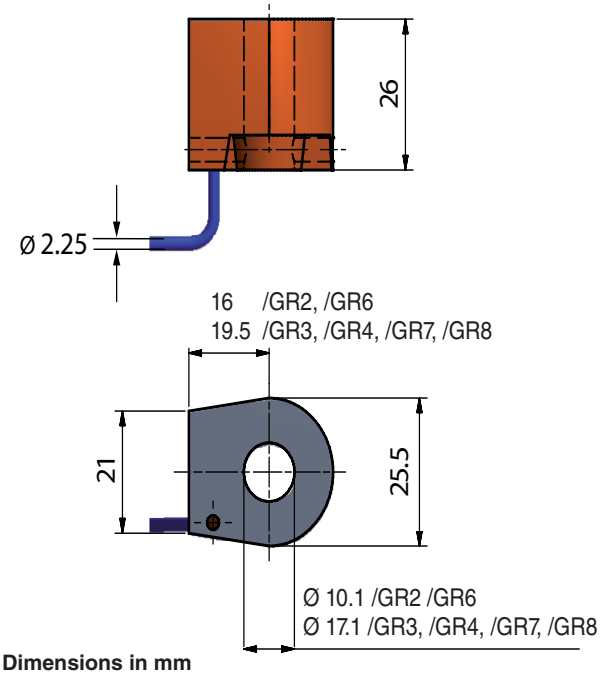
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VALVE /Vx



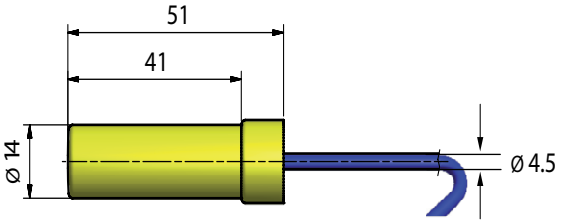
Option	a	b	c	d	e	KV value
	Thread	mm	mm	mm	mm	m³/h
/V1	G ½"	60	88	SW 30	63	0.66
/V2	G 1"	100	110	SW 45	90	2.2
/V3	G 1½"	130	145	SW 70	100	17
/V4	G ½"	55	78	SW 25	63	0.66
/V5	G 1"	75	93	SW 41	63	2.2
/V6	G 1½"	110	118	SW 60	90	17

LIMIT SWITCH /GRx



Dimensions in mm

LIMIT SWITCH /GMx



Dimensions in mm

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Identification:
The product has a QR Code pasted for efficient plant maintenance work and as-set information management. It enables confirming the specifications of purchased products and user's manuals. For more details, please refer to the following URL.
(https://www.yokogawa.com/qr-code)

Manufacturer:

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

For the actual manufacturing location of your device refer to the model code and/or serial number.

QUALITY SYSTEM CERTIFICATION
DNV
ISO 14001
ISO 45001
ISO 9001
ISO/IEC 27001

GS 01R01B10-00E-E 6th edition, July 01 2024-00

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