

# General Specifications

## Model RAGN Glass Rotameter

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 and flow direction is 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
- Suitable for applications according to IEC 61508: 2010 and ISO 13849 - in preparation

### Applications:

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



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## STANDARD SPECIFICATIONS

**Fluids to be measured** : Liquids and gas

**Measurable flow rates** :  
 - Water (20 °C) : 0.002 l/h to 10 m<sup>3</sup>/h  
 - Air (20 °C; 1 bar abs.) : 0.1 l/h to 160 m<sup>3</sup>/h

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

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

**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 7)

**Accuracy** :

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

**Materials** :

Threads G, NPT : AISI 316L (1.4404)  
 Flange EN / ASME : AISI 316L (1.4404)  
 Clamp ISO 2852 : AISI 316L (1.4404)  
 Housing : AISI 304 (1.4301)  
 Nut : AISI 316 (1.4401)  
 (or galvanized steel)  
 Stoppers (L6, L7 tube) : PFA  
 Stoppers (P0 - P4 tube) : PVDF, AISI 316L (1.4404)  
 Measuring cone : Borosilicate glass  
 Float (L6, L7 tube) : Titanium, PVDF  
 Float (P0 - P4 tube) : PTFE, PVDF (FDA conform),  
 AISI 316Ti (1.4571)  
 Gaskets : NBR, FKM, EPDM (FDA conform)

**Pressure Equipment Directive (PED) Directive 97/23/EG:**

Models : RAGN04, RAGN05, RAGN06  
 Tubes :  
 - Modul : A  
 - Fluid Group : 1 (liquid, gases)  
 - Produced acc. to category : I

**FDA-Conformity:**

RAGN with P- tube, PVDF- or SS- float and EPDM- gaskets (option /ME).  
 Stoppers and floats made of PVDF:  
 21 CFR § 177 2510(a)  
 O-rings made of EPDM:  
 21 CFR § 177 2600-21

## OPTION SPECIFICATIONS

**Limit switch (option /GM1 to /GM5):**

(for P- tubes with PVDF- or SS- float with magnet only)

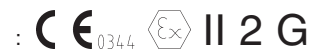
Type : reed contact with bistable switching  
 Max. switching voltage : 230 V  
 Max. switching current : 2 A  
 Max. switching capacity: 40 W/VA  
 Temperature range : -10°C to +70°C  
 Protection : IP65  
 Internal capacity : 0 nF  
 Internal inductivity : 0 mH  
 Electrical connection : LIYY 2 x 0.34 mm<sup>2</sup>; length 1 m  
 Housing : Polystyrene  
 Weight : 35 g  
 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 : U<sub>i</sub> = 15 V ; I<sub>i</sub> = 50 mA ; P<sub>i</sub> = 187 mW  
 L<sub>i</sub> ≈ 0 mH ; C<sub>i</sub> ≈ 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 : 2 x 0.14 mm<sup>2</sup> , with shield 0.4 mm<sup>2</sup>,  
 2 m long  
 Explosion proof type (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 : 2G  
 Temperature class : T6  
 Certificate No. : PTB 03ATEX 2111  
 Safety relevant data (see also certificate for data):  
 U<sub>i</sub> = 12 V, I<sub>i</sub> = 22 mA, P<sub>i</sub> = 66 mW,  
 L<sub>i</sub> = 20 mH, C<sub>i</sub> = 200 nF

CE-marking

: 

**Power supply for limit switch (option /W\_):**

Type : Transmitter relay acc.  
 DIN EN 60947-5-6 (NAMUR)  
 Power supply :  
 230 V AC +10% / -15%, 50/60 Hz (/W2A, /W2B)  
 115 V AC +10% / -15%, 50/60 Hz (/W1A, /W1B)  
 24 V DC ± 20 (/W4A, /W4B)  
 Switching capacity: max. 250 V AC; max. 4 A or  
 max. 500 VA  
 Relay output :  
 1 potential free changeover contact (/W\_A)  
 2 potential free changeover contacts (/W\_B)  
 Explosion proof : Intrinsic safe [Ex ia] II C  
 PTB 00 ATEX 2081 (/W1\_, /W2\_)  
 PTB 00 ATEX 2080 (/W4\_)

## MODEL SPECIFICATIONS

Model	Suffix code	Description	Restrictions
RAGN01 RAGN23 RAGN02 RAGN04 RAGN05 RAGN06		Size DN 15 (½ inch) Size DN 20 (¾ inch) Size DN 25 (1 inch) Size DN 40 (1½ inch) Size DN 50 (2 inch) Size DN 65 (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 <sup>1)</sup>	-L -P	L-tube (300 mm) P-tube (300 mm)	
Diameter of metering tube <sup>1)</sup>	6 7 0 1 2 4	10 mm 17 mm 20 mm 34 mm 48 mm 81 mm	
Cone <sup>1)</sup>	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 <sup>1)</sup>	-SS -PF -PD -TT	1.4571 / AISI 316 Ti PTFE PVDF Titanium	
Diameter of float <sup>1)</sup>	A B C D 0 1 2 4	1.59 3.18 6.35 9.53 12.2 (P0-float) 21.6 (P1-float) 31.2 (P2-float) 54.1 (P4-float)	
Medium / Float factor <sup>1)</sup>	L G 2 3 6 7	For liquid For gas For water For water For air For air	
Float insertion <sup>1)</sup>	N M	Without magnet With magnet	

<sup>1)</sup> Combinations see tables on page 4 and 5

## FLOW TABLE WITH METERING TUBE-FLOAT-COMBINATION FOR WATER / LIQUIDS

Flow table		Suffix code metering tube - float- combination								
Water / liquids 20°C		Metering tube			Float					
Max. Flow [l/h]	Pressure loss [mbar]	-x	x	xx	-xx	x	x	x		
		Length	Diameter	Cone	Material	Diameter	Flow mark	Insertion		
		Code	Code	Code	Code	Code	Code	Code		
0.025	1	L	6	13	TT	A <sup>1)</sup>	L	N		
0.04	1	L	6	14						
0.063	2	L	6	17						
0.1	2	L	6	21						
0.16	3	L	6	22						
0.25	4	L	6	23						
0.4	1	L	6	24	TT;PD	B	L			
0.63	1	L	6	27						
1	2	L	6	31						
1.6	3	L	6	32						
2.5	4	L	6	33						
4	2	L	7	34		C	L			
6.3	2	L	7	37						
10	3	L	7	41						
16	4	L	7	42						
25	5	L	7	43						
40	5	L	7	44	D	L				
63	10	L	7	47						
63	10	P	0	51	PD	0	2		M	
100	16	P	0	52						
100	16	P	0	51	SS		1		3	M <sup>2)</sup> ; N
160	24	P	0	52						
160	15	P	1	53	PD	2			2	M
250	16	P	1	54						
400	18	P	1	57						
630	26	P	1	61						
250	15	P	1	53	SS		3	3	M <sup>2)</sup> ; N	
400	16	P	1	54						
630	18	P	1	57						
1000	26	P	1	61	PD			4	2	M
1000	11	P	2	62						
1600	13	P	2	63						
1600	26	P	2	62	SS	4			3	M <sup>2)</sup> ; N
2500	30	P	2	63						
2500	16	P	4	64	PD		4		2	M
4000	18	P	4	67						
6300	21	P	4	71						
4000	40	P	4	64	SS			4	3	M <sup>2)</sup> ; N
6300	44	P	4	67						
10000	53	P	4	71						
	<b>Description</b>									
Length metering tube	300 mm .....	P								
	300 mm .....		L							
Diam. metering tube	10 mm to 81 mm .....		x							
Cone metering tube	See flow table .....			xx						
Float material	1.4571 .....				SS TT PF PD					
	Titanium .....									
	PTFE .....									
	PVDF .....									
Float diameter	1.6 mm to 54 mm .....					x				
Flow mark	For liquid .....						L			
	For water .....						2			
	For water .....						3			
Float insertion	Without magnet .....							N		
	With magnet .....							M <sup>2)</sup>		

<sup>1)</sup> Max. viscosity 2 mPas\*s

<sup>2)</sup> For option limit switch /GM1 to /GM5

## FLOW TABLE WITH METERING TUBE-FLOAT-COMBINATION FOR AIR / GASES

Flow table		Suffix code metering tube - float- combination							
Air/Gases 20°C, 1 bar abs		Metering tube			Float				
Max. Flow [l/h]	Pressure loss [mbar]	-x	x	xx	-xx	x	x	x	
		Length Code	Diameter Code	Cone Code	Material Code	Diameter Code	Flow mark Code	Insertion Code	
1.9	1	L	6	13	TT	A	G	N	
3	1	L	6	14					
4.4	2	L	6	17					
6.5	2	L	6	21					
10	3	L	6	22					
14	4	L	6	23					
23	2	L	6	24	PD;TT	B	G		
33	2	L	6	27					
50	2	L	6	31					
70	3	L	6	32					
100	4	L	6	33					
180	3	L	7	34		C	G		
250	3	L	7	37					
400	3	L	7	41					
630	4	L	7	42					
1000	5	L	7	43					
1600	5	L	7	44	D	G			
2400	10	L	7	47					
1600	4	P	0	51			PF		0
2500	6	P	0	52					
2400	8	P	0	51	PD	0	7		M <sup>1)</sup>
3800	11	P	0	52					
6000	6	P	1	53	PD	1	7		M <sup>1)</sup>
9300	7	P	1	54					
14500	8	P	1	57					
23000	10	P	1	61					
400	5	P	1	53	PF	1	6	N	
6300	5	P	1	54					
10000	6	P	1	57					
16000	8	P	1	61					
35000	11	P	2	62	PD	2	7	M <sup>1)</sup>	
55000	13	P	2	63					
25000	8	P	2	62	PF	2	6	N	
40000	10	P	2	63					
88000	29	P	4	64	PD	4	7	M <sup>1)</sup>	
140000	32	P	4	67					
220000	34	P	4	71					
63000	13	P	4	64	PF	4	6	N	
100000	14	P	4	67					
160000	17	P	4	71					
	<b>Description</b>								
Length metering tube	300 mm .....	P							
	300 mm .....	L							
Diam. metering tube	10 mm to 81 mm .....		x						
Cone metering tube	See flow table .....			xx					
Float material	Titanium .....				TT				
	PTFE .....				PF				
	PVDF .....				PD				
Float diameter	1.6 mm to 54 mm .....					x			
Flow mark	For gas .....						G		
	For air .....						6		
	For air .....						7		
Float insertion	Without magnet .....							N	
	With magnet .....							M <sup>1)</sup>	

<sup>1)</sup> For option limit switch /GM1 to /GM5

## OPTIONS

Options	Code	Description	Restriction
Marking	/B1 /B4 /BG /B10 /BD	Tag plate (SS) Neutral version Customer specific notes on name plate Percentage scale Dual scale	Plate 12 x 40 mm; max. 45 digits Not with /KS1 Max. 45 digits  Only for tube P
Limit switches	/GM1 /GM2 /GM3 /GM4 /GM5 /GR2 /GR3 /GR4 /GR6 /GR7 /GR8 /GD1 /GD2	Magnetic MIN-contact Magnetic MAX-contact Magnetic MIN-MAX-contact Magnetic MIN-MIN-contact Magnetic MAX-MAX-contact Bistable inductive ring sensor Bistable inductive ring sensor Bistable inductive ring sensor 2 bistable inductive ring sensors 2 bistable inductive ring sensors 2 bistable inductive ring sensors Connection box for 1 limit switch Connection box for 2 limit switches	Only for tube P0 to P4 and float insertion code M (with magnet) Only for tube P0 to P4 and float insertion code M (with magnet) Only for tube P0 to P4 and float insertion code M (with magnet) Only for tube P0 to P4 and float insertion code M (with magnet) Only for tube P0 to P4 and float insertion code M (with magnet) Only for tube L6 with float code PDB Only for tube L7 with float code PDC Only for tube L7 with float code PDD Only for tube L6 with float code PDB Only for tube L7 with float code PDC Only for tube L7 with float code PDD Only with /GM1 to 2, /GR2 to 4 Only with /GM3 to 5, /GR6 to 8
Ex-proof type	/KS1	ATEX intrinsically safe „ia“	Only for /GR2 to /GR8
Installation lengths (s. also table on page 7)	/L12 /L13 /L14 /L15 /L16	Installation length 500 mm Installation length 356 mm Installation length 368 mm Installation length 386 mm Installation length 394 mm	Only for D4, A1 Only for size 01 and G0, T0 Only for size 01, 23, 02 and G0, T0 Only for size 02, 04 and G0, T0 Only for size 05, 06 and G0, T0
Valves (inner thread, double fitting is attached, not for FDA)	/V1 /V2 /V3 /V4 /V5 /V6	Valve made of 1.4571 G ½'' (parts attached) Valve made of 1.4571 G 1'' (parts attached) Valve made of 1.4571 G 1½'' (parts attached) Valve made of brass G ½'' (parts attached) Valve made of brass G 1'' (parts attached) Valve made of brass G 1½'' (parts attached)	Only for G0 and tube L6, L7, P0 Only for G0 and tube P1 Only for G0 and tube P2 Only for G0 and tube L6, L7, P0 Only for G0 and tube P1
Test and certificates	/H1 /P2 /P3 /P6 /PP /PT /PM2  /PM4	Oil + fat free for wetted surfaces acc. Yokogawa specification Certificate of Compliance with the order acc. EN 10204: 2004- 2.1 As /P2 +Test report acc. to EN 10204: 2004- 2.2 Material certificate for Insertion parts or flange connections acc. EN 10204: 2004- 3.1 Pressure test report for metering system With flow table for recalculation + mm- scale PAMI test (2 test points)  PAMI test (4 test points)	Only for insertion and flange connections Not with /V1 to /V6  Only for connections G0, T0, S4 except RAGN04-G0SS-P2 and RAGN04-T0SS-P2 Only for connections A1, D4 and RAGN04-G0SS-P2 and RAGN04-T0SS-P2
Delivery to Korea	/KC	With KC-mark in Korea	
Accessories for metering tube	/MV /ME /MN	Gasket FKM (Viton) Gasket EPDM (conform to FDA, -30°C to +100°C) Nut galvanized steel	conform with FDA -30°C to +100°C not for S4 and RAGN04 with P2
Power supply for limit switches (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 channel KFA6-SR2-Ex1.W / 230 V AC, 1 channel KFA6-SR2-Ex2.W / 230 V AC, 2 channel KFD2-SR2-Ex1.W / 24 V DC, 1 channel KFD2-SR2-Ex2.W / 24 V DC, 2 channel	
Instruction manuals	/IEn /IDn	Quantity of instruction manuals in English Quantity of instruction manuals in German	n = 1 to 9 selectable *) n = 1 to 9 selectable *)
Special order	/Z	Special design must be specified in an extra text.	

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

## PROCEDURE TO SELECT THE MODEL CODE

Please specify in the following order

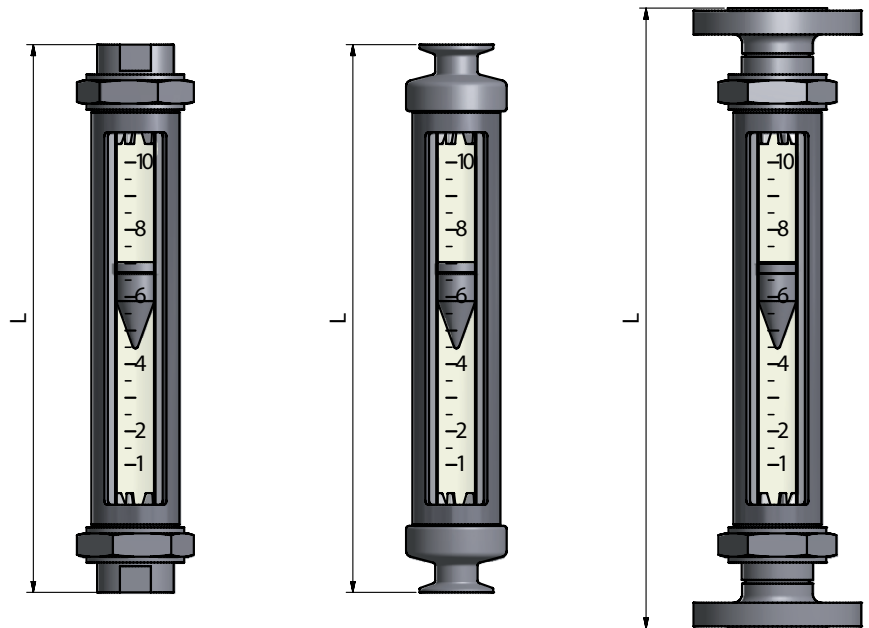
- Measuring range for water/liquid or air/gas
- With or without optional limit switch

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.

To size the Rotameter for other medium - process- conditions use sizing program Durep V.

## DIMENSIONS

### METERING TUBE



Inner thread type (T0; G0)

Clamp type (S4)

Flange type (D4; A1)

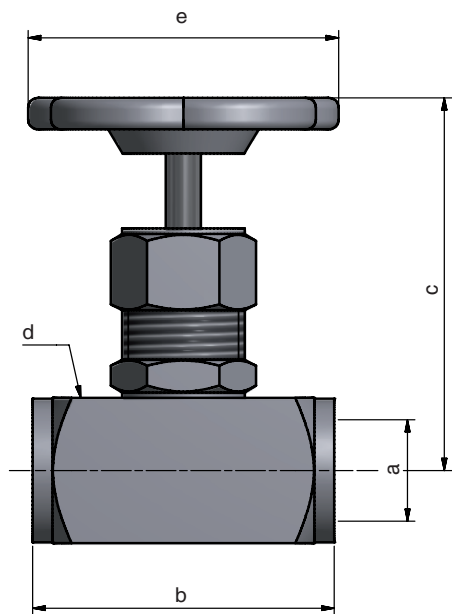
#### Installation lengths and weights:

Model	Process connection	Tube	Length L mm	Weight 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:

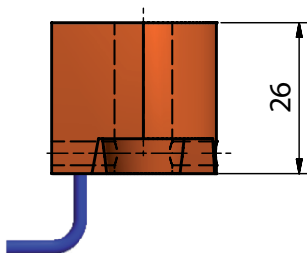
Former model	Tube	Installation length mm	Model RAGN
RAGH01	L6;L7;G0	356	RAGN01..../L13
RAGH02	G1	368	RAGN02..../L14
RAGH04	G2	386	RAGN04..../L15
RAGH06	G4	394	RAGN06..../L16
RAGH23	G1	368	RAGN23..../L14
RAGH05	G4	394	RAGN23..../L16
RAGG01	G0;G1	500	RAGN01..../L12
RAGG02	G2	500	RAGN02..../L12
RAGG04	G4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

VALVE /Vx

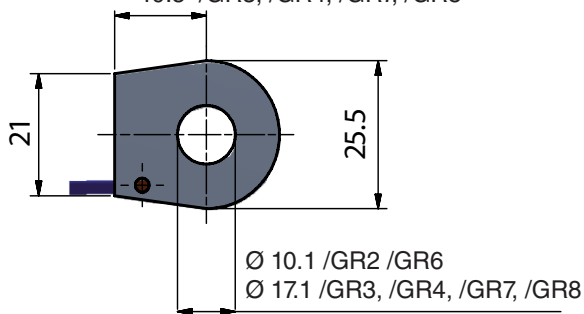


Option	a	b	c	d	e
	Thread	mm	mm	mm	mm
/V1	G 1/2"	60	88	SW 30	63
/V2	G 1"	100	110	SW 45	90
/V3	G 1 1/2"	130	145	SW 70	100
/V4	G 1/2"	55	78	SW 25	63
/V5	G 1"	75	93	SW 41	63
/V6	G 1 1/2"	110	118	SW 60	90

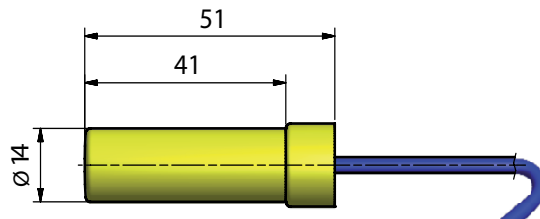
LIMIT SWITCH /GRx



16 /GR2, /GR6  
19.5 /GR3, /GR4, /GR7, /GR8



LIMIT SWITCH /GMx



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