

General Specifications

Model RAGK Laboratory Glass ROTAMETER

GS 01R01B07-00E-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.

FEATURES

- Large selection of measuring ranges
- 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



without valve



with valve



without valve



with valve

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STANDARD SPECIFICATIONS

RoHS Directive 2011/65/EU:

RoHS conform according to EN 50581

Measurable flow rates

- Water (20 °C) : 0.002 l/h – 630 l/h
- Air (20 °C; 1 bar abs.): 0.2 l/h – 6 300 l/h

Measuring range : 10:1 (20:1)

Metering tubes : M3; K6; M6; K7; R7; M7

Accuracy:

Glass metering tube	Length	Measuring accuracy acc. VDI/VDE 3513 sheet 2 ($q_0=50\%$)	Measuring accuracy acc. VDI/VDE 3513 sheet 2 ($q_0=100\%$)
K631 - K743	75 mm	4 % (for ball 6 %)	-----
R741 - R743	75 mm	6 % (only with ball)	-----
M613 - M622	150 mm	-----	4 %
M624 - M747	150 mm	2.5 %	-----
M352 - M357	150 mm	2.5 %	-----

Glass metering tube	Length	Flow accuracy full scale
K631 - K743	75 mm	$\pm 4\%$ ($\pm 6\%$)
R741 - R743	75 mm	$\pm 6\%$
M613 - M622	150 mm	$\pm 4\%$
M624 - M747	150 mm	$\pm 2.5\%$
M352 - M357	150 mm	$\pm 2.5\%$

Max. Temperature (see Figure 1)

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

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 : Polypropylen; 1.4571

Material of gaskets : Buna

- With option /MV : PTFE / Viton

Length approx. : 90 mm; 165 mm or 175 mm

Weight : 0.3 – 1.2 kg, depending on design (without stand and controller)

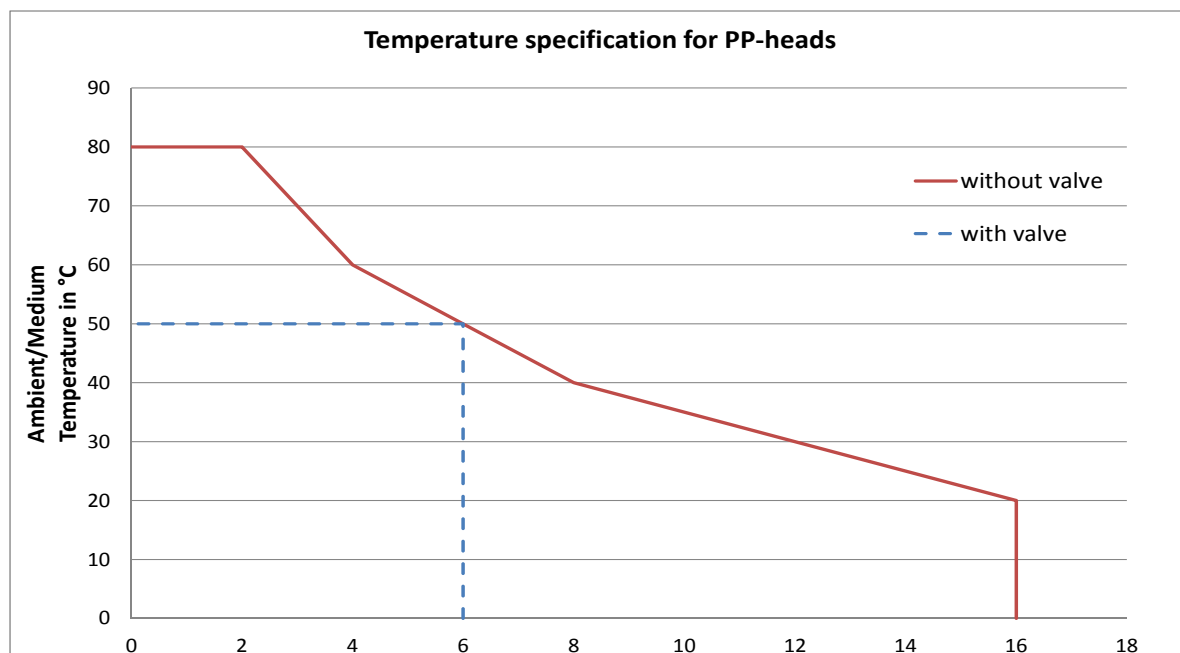
METROLOGICAL REGULATION IN CIS (GOST)

RAGK has "Pattern Approval Certificate of Measuring Instruments" and is registered as a measuring instrument in Russia.

For export to CIS countries please contact your Yokogawa representative.

Max. Pressure (see Figure 1): 16 bar

Figure 1:



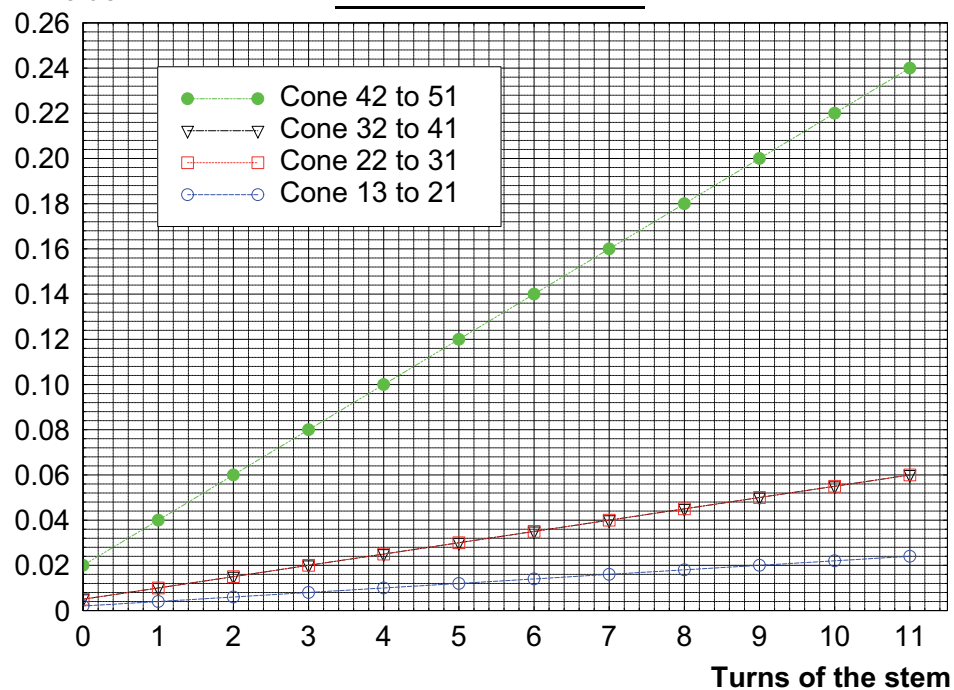
Design (valve): With or without built-in valve

KV-value of valves (see Figure 2):

Figure 2:

KV- value

KV-values of the valves



OPTIONS SPECIFICATIONS

LIMIT SWITCH (OPTION /GR1 – /GR8)

(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 – 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 – +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 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.

Explosion proof (option /KS1, /ES1, /NS1):

Temperature range	: -25 °C – +60 °C
Type	: RI20-10K/G or RI20-17K/G
Certificate No.	: PTB 03 ATEX 2111 (/KS1) IECEX PTB13.0023 (/ES1) NEPSI GYJ14.1356 (/NS1)
Protection	: Ex ia IIC T6 Gb
Safety relevant data	: $U_i = 12$ V, $I_i = 22$ mA, $P_i = 66$ mW, $L_i = 20$ mH, $C_i = 200$ nF

CE-marking:  0344  2 G

LIMIT SWITCH (OPTION /GM1 – /GM5)

(For metering tube M3 and floats with magnet only)

Type	: reed contact with bistable switching
Max. switching voltage	: 230 V
Max. switching current	: 0.6 A
Max. switching capacity	: 12 VA or 12 W
Temperature range	: -10 °C – +70 °C
Protection	: IP 65
Internal capacity	: 0 nF
Internal inductance	: 0 mH
Electrical connection	: LIYY 2 x 0.34 mm ² ; 1 m long
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:
 $U_i = 15$ V ; $I_i = 50$ mA ; $P_i = 187$ mW
 $L_i \approx 0$ mH ; $C_i \approx 0$ nF

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 [Ex ia] II C PTB 00 ATEX 2081 (/W2□) PTB 00 ATEX 2080 (/W4□) IECEX PTB11.0031 (/W1A, /W1B, /W2A, /W2B) IECEX PTB11.0034 (/W4A, /W4B)

CONTROLLER (OPTION /R1 AND /R3)

(not for tube M3)

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

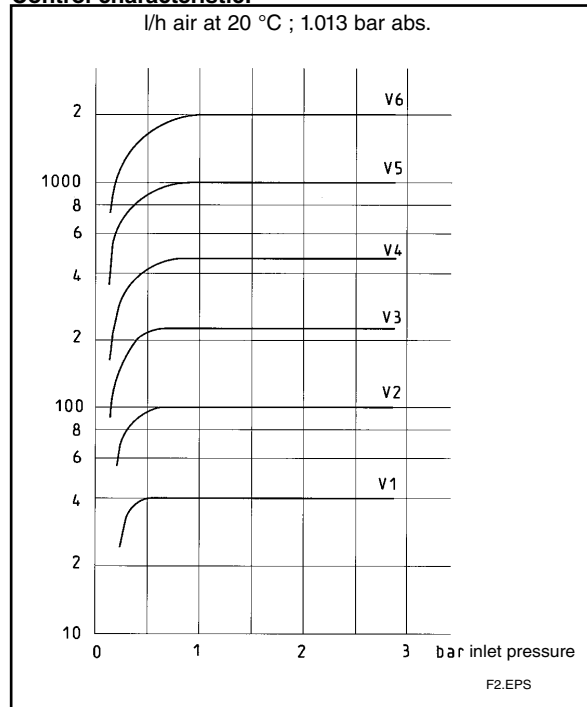
Max. temperature : 80 °C

Recommended differential pressure : > 400 mbar

Materials:

Housing, Tubes, Springs	Membrane
316L/316Ti (1.4404/1.4571)	PTFE

Control characteristic:

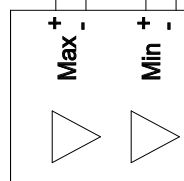


The curves V1 – V6 show how the flow depends on the inlet pressure for different valve settings. The back pressure at the outlet (ambient pressure) is 1bar.

Hazardous Area Ex- Bereich Zone Ex

Inductive ring sensor RI20
Induktiver Ringinitiator RI20
Bague inductive RI20

Rotameter RAGK option /GRx (x = 1 ... 8)



EN 60947-5-6 (Namur)

Maximum medium- and ambient temperature :
Maximale Mediums- und Umgebungstemperatur :
Temperature ambiante et temperature de fluide maximale :

Tamax = 60 °C

RI20-10, RI20-17
Ex ia IIC T6
U _i = 12 V
I _i = 22 mA
P _i = 66 mW
C _i = 200 nF
L _i = 20 mH

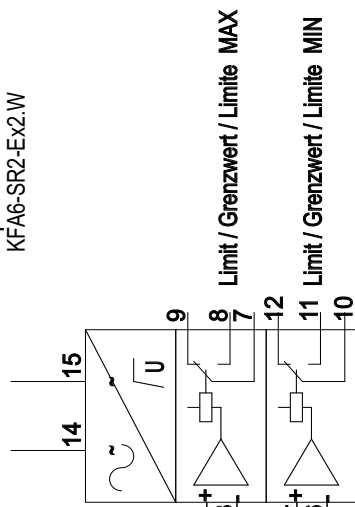
PTB 03 ATEX 2111X
IECEX PTB.13.0023X
NEPSI GYJ14.1356

Safe Area Sicherer Bereich Hors Zone

Option /W4B 24VDC
KFD2-SR2-Ex2.W

Mains / Netz / Tension

Option /W2B 230VAC
KFA6-SR2-Ex2.W



Transmitter Relay
Trennschaltverstärker
Amplificateur Separateur

One channel transmitter : ...-SR2-Ex1.W, connection like limit MAX
Einkanaliger Verstärker : ...-SR2-Ex1.W, Anschluss wie Grenzwert MAX
Un canal amplificateur : ...-SR2-Ex1.W, raccord comme limite MAX

KFD2-SR2-Ex2.W
EEEx ia / ib IIC
U ₀ = 10.5 V
I ₀ = 13 mA
P ₀ = 34 mW
C ₀ = 2410 nF
L ₀ = 210 mH

PTB 00ATEX 2080
IECEX PTB.11.0034
NEPSI GYJ12.1081

KFA6-SR2-Ex2.W
EEEx ia / ib IIC
U ₀ = 10.6 V
I ₀ = 19,1 mA
P ₀ = 51 mW
C ₀ = 2320 nF
L ₀ = 97 mH

PTB 00ATEX 2081
IECEX PTB.11.0031
NEPSI GYJ12.1079

F2.EPS

MODEL SPECIFICATIONS

Process connection diameter	Model	Process connection				Material Process connection	Material Holder	Design (valve)	Metering tube length / diameter		
		Inner- thread	Cutting- ring	Nozzle	Swageloc						
	Code	Code	Code	Code	Code	Code	Code	Code	Code		
¼ inch	RAGK41	T0	-	-	-	PP	PP	NNN; SAE; SBE; SAA; SBA	K6; K7; R7; M6; M7		
6 mm	RAGK53	-	C0	-	-	SS;ST	PP				
	RAGK53	-	-	P0	-	SS	PP				
	RAGK53	-	-	-	W0	SS	PP				
8 mm	RAGK54	-	C0	P0	-	SS;ST	PP				
	RAGK54	-	-	-	W0	SS	PP				
10 mm	RAGK55	-	C0	-	-	SS;ST	PP				
	RAGK55	-	-	-	W0	SS	PP				
12 mm	RAGK56	-	C0	-	-	SS;ST	PP				
¼ inch	RAGK41	T0	-	-	-	SS	SS				
	RAGK41	R0	-	-	-	SS	SS				
6 mm	RAGK53	-	C0	P0	W0	SS	SS				
8 mm	RAGK54	-	C0	P0	W0	SS	SS				
10 mm	RAGK55	-	C0	-	W0	SS	SS				
12 mm	RAGK56	-	C0	-	W0	SS	SS				
3/8 inch	RAGK42	T0	-	-	-	PP	PP				
	RAGK42	R0	-	-	-	PP	PP				
	RAGK42	-	-	P0	-	ST	PP				
	RAGK42	T0	-	-	-	SS	SS				
	RAGK42	R0	-	-	-	SS	SS				
10 mm	RAGK55	-	C0	-	-	SS	SS				
	RAGK55	-	C0	-	-	SS;ST	PP				
12 mm	RAGK56	-	C0	-	-	SS	SS				
	RAGK56	-	C0	-	-	SS;ST	PP				
Process connection	Inner thread NPT.....	-T0	-C0	-P0	-W0	PP SS ST	-PP -SS	NNN SAE SBE SAA SBA GDE GEE GDA GEA	M3		
	Inner thread RP.....	-R0									
Cutting ring.....											
Nozzle.....											
Swageloc-connection.....											
Material of process connection		Polypropylene.....				PP SS ST					
		1.4571.....									
		Steel.....									
Material of Holder		Polypropylene.....				-PP -SS					
		1.4571.....									
Design		Without valve						NNN			
For tubes K6; K7; M6; M7 with	Valve	Gasket	Valve seat							SAE SBE SAA SBA	
	input	Buna	Silver								
	input	Viton	Silver								
	output	Buna	Silver								
	output	Viton	Silver								
	output	Viton	Silver								
For tubes M3 with	Valve	Gasket	Valve seat							GDE GEE GDA GEA	
	input	Buna	PTFE								
	input	Viton	PTFE								
	output	Buna	PTFE								
	output	Viton	PTFE								
	output	Viton	PTFE								
The suffix code of the metering tube-float-combination can be read from the flow table.....									xxxxx- xxxxx		
Options (see separate table).....									/xx		

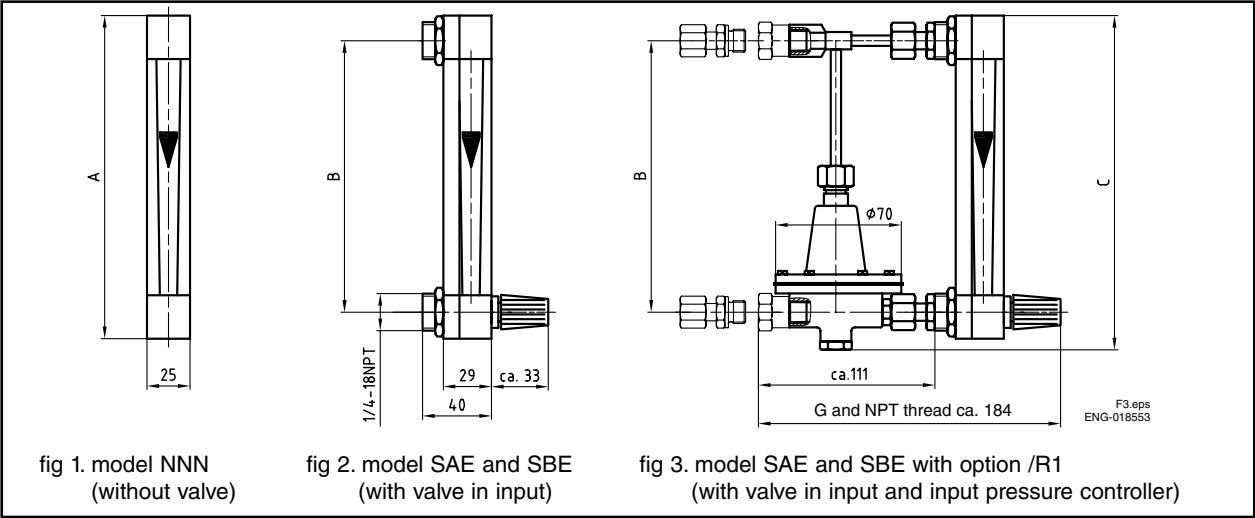
FLOW TABLES WITH METERING TUBE- FLOAT COMBINATION FOR WATER / LIQUIDS

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 D	row 1 SS;MU ¹⁾	B	L	N						
2.5	3	-	-	K	6	33											
4	4	-	-	K	6	34											
6	8	-	-	K	6	37			C								
10	4	-	-	K	7	41											
15	5	-	-	K	7	42											
26	6	-	-	K	7	43			D								
40	5	-	-	K	7	44											
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			D								
40	5	-	-	R	7	44											
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⁾									
1	2	2	3	M	6	31		B									
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		C									
4	2	6.3	4	M	7	34											
6.3	3	10	5	M	7	37											
10	3	16	5	M	7	41		row 2 SS;MU ¹⁾	D								
16	4	27	6	M	7	42											
25	5	44	6	M	7	43											
40	5	66	8	M	7	44											
63	10	100	10	M	7	47											
63	3	-	-	M	3	52		PP;PF	3	1	N						
160	10	100	5	M	3	52		row 1 SS		row 1 3	N;M ²⁾						
250	13	160	7	M	3	53				row 2 2							
400	15	250	10	M	3	54		row 2 PP;PF									
630	18	400	12	M	3	57											
Tube length (type)		75 mm.....		K	X												
		75 mm.....		R													
		150 mm.....		M													
Tube diameter		10 mm; 17 mm; 28 mm.....				X											
Tube cone		See flow table.....															
Tube medium scale		Scale on tube (recommended)..... Connection scale ⁴⁾ Metering tube with mm-division only..... Dual scale, scale on tube and connection scale ^{4) 5)}															
Float material		1.4571..... Titanium..... Mumetal (for limit switch /GR1-/GR2 and /GR4..... PVDF (for limit switch /GR2 – /GR4)..... Corundum..... CrNi-ball..... Polypropylene..... PTFE.....						SS TT MU PD KR SR PP PF		X							
Float diameter		1.6 mm – 15.7 mm.....															
Flow mark		Liquid..... Factor 0.4 (Water)..... Factor 0.63 (Water)..... Factor 1 (Water).....										L 1 2 3					
Float insertion		Without magnet..... With magnet.....															
¹⁾ For option limit switch /GR1 – /GR8																	
²⁾ For option limit switch /GM1 – /GM5																	
³⁾ Max. viscosity is 2 mPas*s																	
⁴⁾ Not with option limit switch /GR1 – /GR8																	
⁵⁾ With option /PT mm- scale on tube and product scale connected																	
*) 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 Yokogawa Flow Configurator																	

OPTIONS

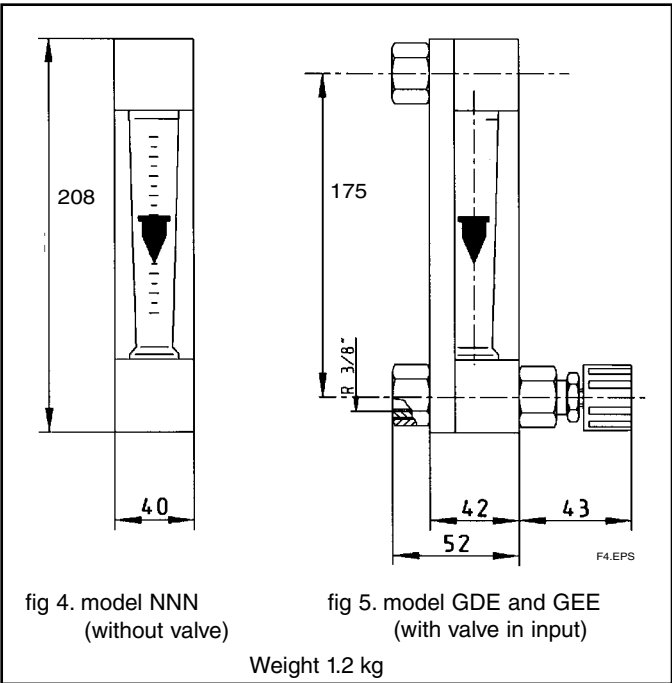
Options	Option code	Description	Restrictions
Marking	/B1 /B4 /BG	Tag plate (SS) Neutral version Customer specific notes on scale	Plate 12 x 40 mm; max. 45 digits
Limit switches	/GM1 /GM2 /GM3 /GM4 /GM5 /GR1 /GR2 /GR3 /GR4 /GR5 /GR6 /GR7 /GR8	Magnetic MIN-contact Magnetic MAX-contact Magnetic MIN-MAX-contact Magnetic MIN-MIN-contact Magnetic MAX-MAX-contact Bistable inductive ring sensor Bistable inductive ring sensor Bistable inductive ring sensor 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 insertion code M3 (with magnet) Only for float insertion code M3 (with magnet) Only for float insertion code M3 (with magnet) Only for float insertion code M3 (with magnet) Only for float insertion code M3 (with magnet) 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 /ES1 /NS1	ATEX intrinsically safe „ia“ IECEx intrinsically safe „ia“ NEPSI intrinsically safe „ia“	Only for /GR1 – /GR8 Only for /GR1 – /GR8 Only for /GR1 – /GR8; only with /CN
Test and certificates	/H1 /P2 /P3 /PP /PT	Oil and fat free for wetted surface acc. to Yokogawa specification 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 Flow table for recalculation (with mm-scale for D scale)	Not with /R1, /R3 Only for N and D scale
Accessories metering tube	/MV	Viton PTFE-gasket and Viton O-ring	Not for valve type with Buna gasket.
Accessories float stops	/S1	Spring stops made of SS 1.4571	
Accessories	/QA /QB /QF	Frame for panel mounting With tapped holes in the connecting heads for mounting Foot stand	Not with /GR1 – /GR8 Only for SS holder material and PP holder material with M3 tube
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
Delivery to Korea	/KC	With KC-mark in Korea	
Delivery to China	/CN	For delivery to China	
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	
Special order	/Z	Special design, must be specified separately. If /Z is selected, several Suffix of Model-Suffix Code can be changed to Z.	

DIMENSIONS WITH METERING TUBES K6; R7; K7; M6 AND M7



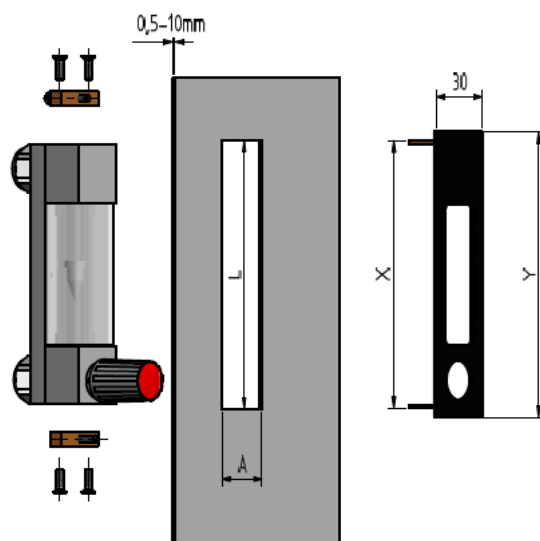
Metering tube	Dimensions in mm			Weight in kg	
	A	B	C	without controller	with controller
K6 ; K7	111	90	121	0.3	1.0
M6 ; M7	186	165	196	0.4	1.1

DIMENSIONS WITH METERING TUBE M3



Dimensions in mm

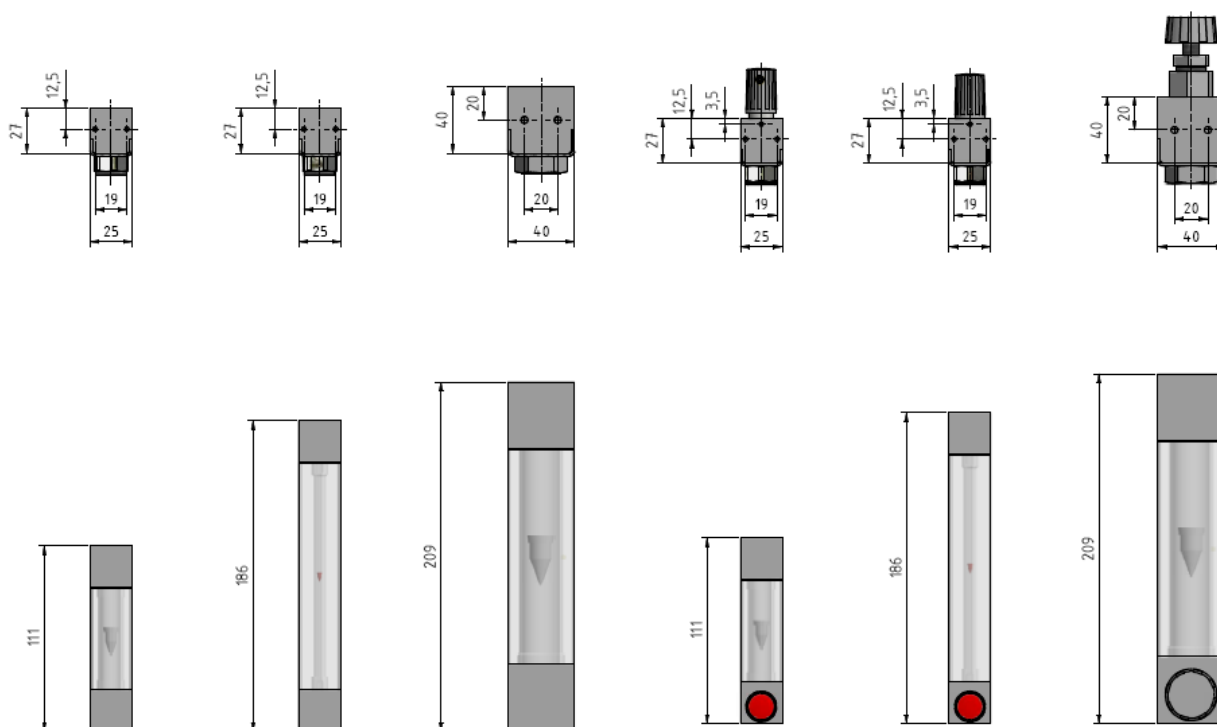
DIMENSIONS (OPTION /QA)



	A ± 0.5	L ± 0.5	X	Y
K- metering tube	26	115	114.3	122
M- metering tube	26	190	189.3	197

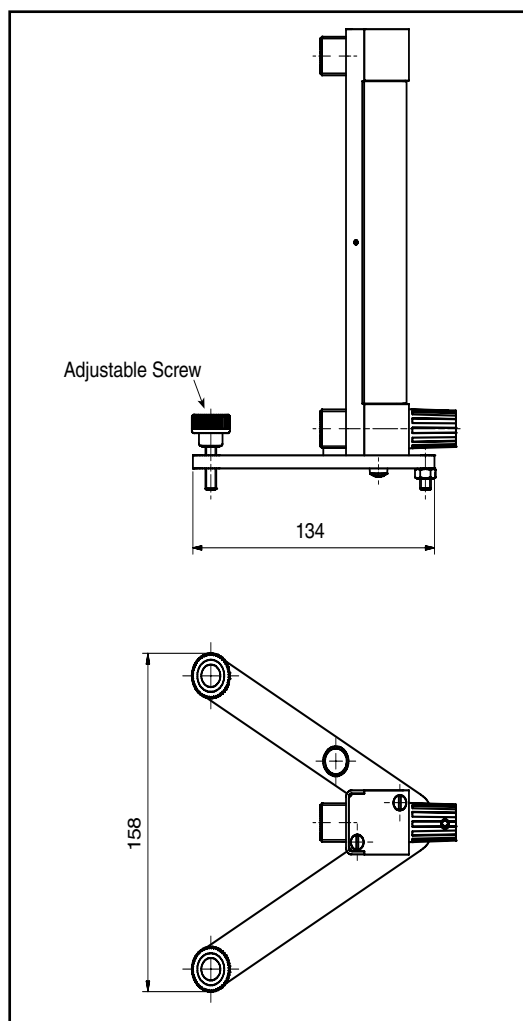
Dimensions in mm

DIMENSIONS WITH TAPPED HOLES IN THE CONNECTING HEADS FOR MOUNTING (OPTION /QB)



Dimensions in mm

DIMENSIONS FOOT STAND (OPTION /QF)



Dimensions in mm

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