

General Specifications

Model RAGK 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 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
- 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 630 l/h
- Air (20 °C; 1 bar abs.): 0.2 l/h to 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. Directive VDI/VDE 3513 sheet 2 ($q_a=50\%$)	Standard flow accuracy full scale
K631 - K743 R741 - R743	75 mm 75 mm	4% (for ball 6%) 6% (only with ball)	$\pm 4\%$ ($\pm 6\%$) $\pm 6\%$
M613 - M622 M624 - M747 M352 - M357	150 mm 150 mm 150 mm	4% better on request 2.5% better on request 2.5% better on request	$\pm 4\%$ $\pm 2.5\%$ $\pm 2.5\%$

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 : Polypropylen; 1.4571

Material of gaskets : Buna

- With option /MV : PTFE / Viton



with
K-metering tube



with
M3-metering tube

Design (valve)

: With or without built-in valve

Length approx.

: 90 mm; 165 mm or 175 mm

Weight

: 0.3 to 1.2 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 : < 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 :
 $U_i = 12V$, $I_i = 22mA$, $P_i = 66mW$,
 $L_i = 20mH$, $C_i = 200nF$
 or see certificate for data

CE-marking : 

LIMIT SWITCH (OPTION /GM1 AND /GM2)

(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 to +70 °C
Protection : IP 65
Internal capacity : 0 nF
Internal inductance : 0 mH
Electrical connection : LIYY 2 x 0.34 mm²; 1 m long
Housing : Polystyrene
Weight : 35 g
Explosion proof :
 Intrinsic safe acc. EN 60079-11 chapter 5.7 "Simple electrical instruments".
Group : IIC
Category : 2
Expl. atmosphere : G
Temperature class : T6
Entity parameter : $U_i = 15V$; $I_i = 50mA$;
 $P_i = 187mW$
 $L_i \approx 0mH$; $C_i \approx 0nF$

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)

(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

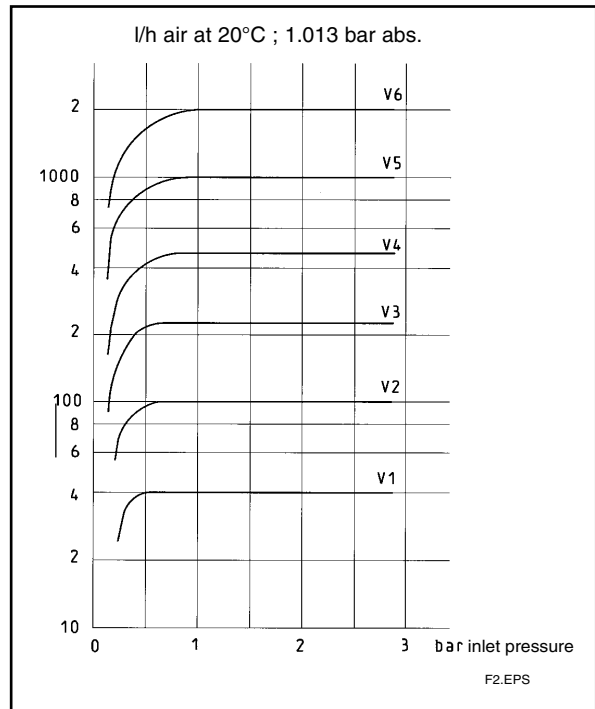
Max. gas flow : 3000 l/h

Max. temperature : 80°C

Recommended differential pressure : > 400 mbar

Materials:

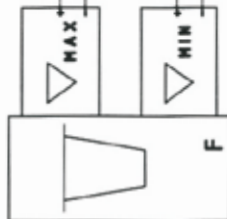
Housing	Membrane	Springs
CrNi-steel	PTFE	CrNi-steel

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 1bar.

EX-BEREICH
HAZARDOUS AREA
ZONE EX

GRENZWERTSCHALTER GI
LIMIT SWITCH GI
CONTACT LIMITE GI
ROTAMETER RAGK, RAGL/GI



EN 60947-5-6 (NAMUR)

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

T_{amax} = 60°C

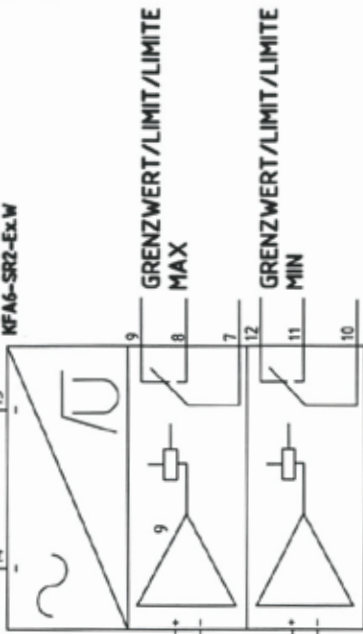
R120-10, R120-17	
Ex IIC T6	
U _{max}	=12V
I _{max}	=22mA
P _{max}	=66mW
C _i	=200nF
L _i	=20mH
T _{amax}	=60°C

SICHERER-BEREICH
SAFE AREA
HORS ZONE

NETZ/MAINS/TENSION

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

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



GRENZWERT/LIMIT/LIMITE
MAX

GRENZWERT/LIMIT/LIMITE
MIN

TRENSCHALTVERSTÄRKER
TRANSFORMER ISOLATED BARRIER
AMPLIFICATEUR SEPARATEUR

KFD2-SR2-Ex2.W	
(EEx ib) IIC	
U ₀	=10,5V
I ₀	=13mA
P ₀	=34mW
C ₀	=24,10nF
L ₀	=210mH
T _{amax}	=60°C

PTB 00 ATEX 2080

KFA6-SR2-Ex2.W	
(EEx ib) IIC	
U ₀	=10,6V
I ₀	=19,1mA
P ₀	=51mW
C ₀	=2320nF
L ₀	=97mH
T _{amax}	=60°C

PTB 00 ATEX 2081

ENKANALIGE VERSTÄRKERSR2-EX1W ANSCHLUSS WE GRENZWERT "MAX"
ONE CHANNEL TRANSMITTERSR2-EX1W CONNECTION LIKE LIMIT "MAX"
UN CANAL AMPLIFICATEURSR2-EX1W RACCORD COMME LIMITE "MAX"

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

MODEL SPECIFICATIONS

Process connection	Model	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	RAGK41	T0	-	-	-	PP	PP			
	RAGK41	R0	-	-	-	PP	PP			
6 mm	RAGK53	--	C0	--	--	SS; ST	PP	NNN; SAE; SBE; SAA; SBA K6; K7; R7 M6; M7; L6; L7		
	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	GDE; GEE; GDA; GEA; M3		
	RAGK42	R0	-	-	-	PP	PP			
	RAGK42	-	-	P0	-	ST	PP			
10 mm	RAGK55	-	C0	-	-	SS; ST	PP			
12 mm	RAGK56	T0	-	-	-	SS; ST	PP			
3/8 inch	RAGK42	T0	-	-	-	SS	SS			
	RAGK42	R0	-	-	-	SS	SS			
10 mm	RAGK55	-	C0	-	-	SS	SS			
12 mm	RAGK56	-	C0	-	-	SS	SS			
Process connection	Inner thread NPT.....	- T0							NNN SAE SBE SAA SBA GDE GEE GDA GEA	
	Inner thread RP	- R0								
	Cutting ring.....		- C0							
	Nozzle.....			- P0						
	Swagelok - 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 GDE GEE GDA GEA		
	For tubes K6; K7; M6; M7 with	Valve		Gasket	Valve seat					
		input		Buna	Silver					
		input		Viton	Silver					
		output		Buna	Silver					
	For tubes M3 with	output		Viton	Silver					
		Valve		Gasket	Valve seat					
		input		Buna	PTFE					
		input		Viton	PTFE					
	output		Buna	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	

T2.EP:

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					
15	5	-	-	K	7	42					
26	6	-	-	K	7	43					
40	5	-	-	K	7	44					
63	8	-	-	K	7	47					
110	10	-	-	K	7	51					
10	4	-	-	R	7	41					
16	4	-	-	R	7	42					
25	5	-	-	R	7	43					
40	5	-	-	R	7	44					
63	6	-	-	R	7	47					
100	6	-	-	R	7	51					
0.025	1	0.054	2	M	6	13					
0.063	2	0.15	3	M	6	17					
0.16	3	0.36	4	M	6	22					
0.4	1	0.8	2	M	6	24					
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					
6.3	3	10	5	M	7	37					
10	3	16	5	M	7	41					
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					
160	10	100	5	M	3	52					
250	13	160	7	M	3	53					
400	15	250	10	M	3	54					
630	18	400	12	M	3	57					
Tube length (type)	75 mm.....			K			G A N	SS TT MU PD KR SR PP PF	X	L	N M 2)
	150 mm.....			M							
Tube diameter	10 mm; 17 mm; 28mm.....				X						
Tube cone	see flow table.....					X					
Tube medium scale	Scale on tube and mm-division.3).....										
	Connection scale and mm- division (recommended).5).....										
	Metering tube with mm- division only.....										
Float material	1.4571.....										
	Titanium.....										
	Mumetal (for limit switch /GI1; /GI2 and /GI4).....										
	PVDF (for limit switch /GI2 to /GI4).....										
	Corundum.....										
	CrNi-ball.....										
	Polypropylene.....										
	PTFE.....										
Float diameter	1.6 mm to 15.7 mm.....										
Flow mark	Liquid										
	Factor 0.4 (Water).....										
	Factor 0.63 (Water).....										
	Factor 1 (Water).....										
Float insertion	Without magnet										
	With magnet.....										

1) For option limit switch /GI1 to /GI4

2) For option limit switch /GM1 and /GM2

3) Select option /MM if no mm-division is required

4) Max. viscosity is 2 mPas*s

5) Not with option limit switch /GI1 to /GI4

*) 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.

T3.EPS

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							
250	2	360	3	K	7	42							
400	2	600	4	K	7	43							
630	3	1000	4	K	7	44							
1000	4	1600	5	K	7	47							
1600	7	2500	9	K	7	51							
3500	10	-	-	K	7	51							
1,9	1	3	2	M	6	13							
4,4	2	7	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							
1000	5	1400	6	M	7	43							
1600	5	2200	8	M	7	44							
2400	10	3300	10	M	7	47							
1000	2	-	-	M	3	52							
1600	3	-	-	M	3	52							
2500	4	-	-	M	3	52							
4000	8	-	-	M	3	52							
6300	11	-	-	M	3	53							
Tube length (type)	75 mm K 150 mm M												
Tube diameter	10 mm 17 mm 28 mm				6 7 3								
Tube cone	see flow table					XX							
Tube medium scale	Scale on tube and mm-division ³⁾ Connection scale and mm-division (recommended) ⁴⁾ Metering tube with mm-division only						G A N						
Float material	1.4571 Titanium Mumetal (for limit switch /GI1; /GI2 and /GI4) PVDF (for limit switch /GI1 to /GI4) Corundum Polypropylen Glass ball							SS TT MU PD KR PP GL					
Float diameter	1.6 mm to 15.7 mm								X				
Flow mark	Gas Factor 6.3 (Air) Factor 10 (Air) Factor 16 (Air) Factor 25 (Air)									G 4 5 6 7			
Float insertion	Without magnet With magnet											N M ²⁾	

¹⁾ For option limit switch /GI1 to /GI4
²⁾ For option limit switch /GM1 and /GM2
³⁾ Select option /MM if no mm- division is required
⁴⁾ Not with option limit switch /GI1 to /GI4

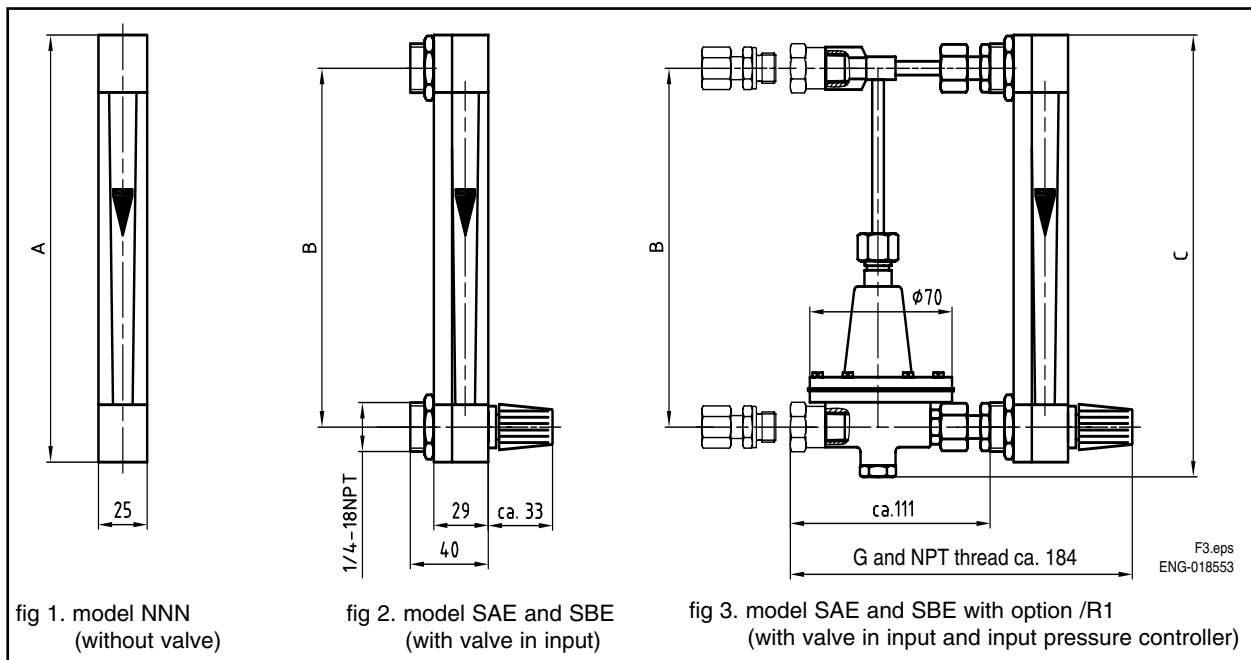
*) The indicated pressure loss is a pilot value and may deviate based on the type of Rotameter. Additional tube- float- combinations with different float materials and different measuring ranges are available on request. If the Rotameter should be used in other media- / process- conditions use the sizing 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 /GM1 /GM2	Bistabile inductive ring sensor Bistabile inductive ring sensor Bistabile inductive ring sensor Bistabile inductive ring sensor Magnetic contact Magnetic contact	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 with float with magnet, tube M3 Only with float with magnet, tube M3
Ex-proof type	/KS1	ATEX intrinsically safe "ia"	Only for /GI1 to /GI4
Test and certificates	/H1 /P2 /P3 /PP /PT	Certificate of degree 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	

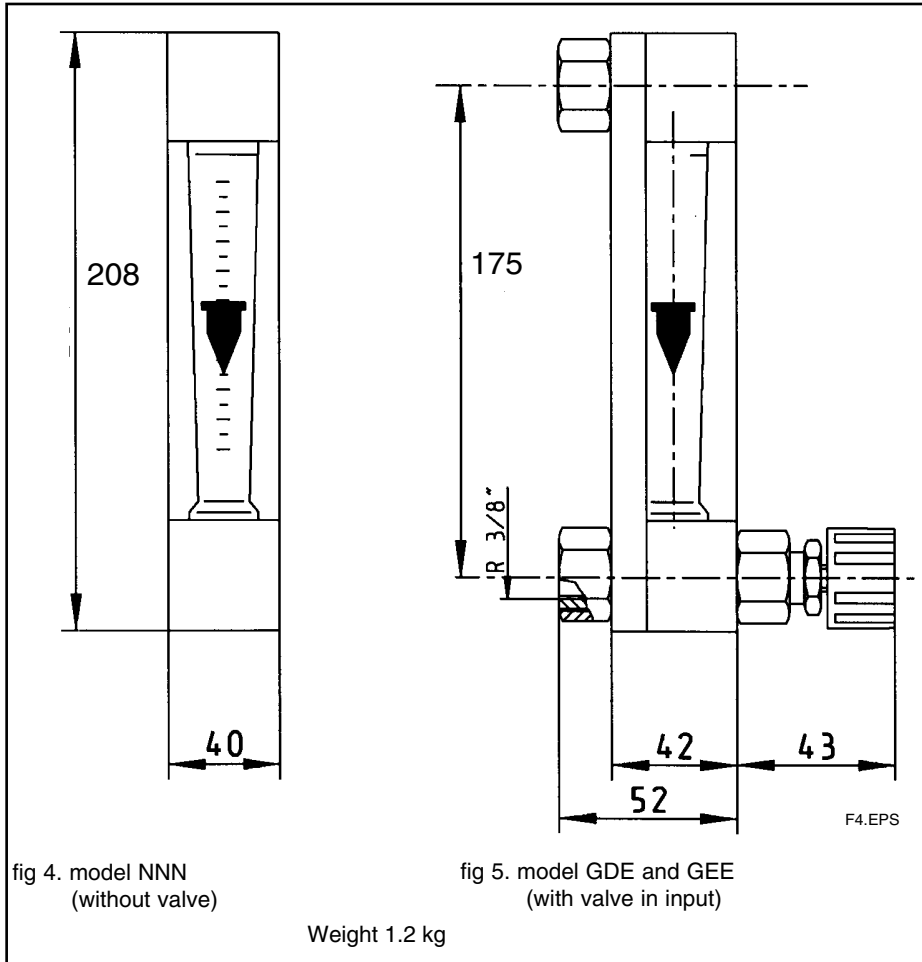
T5.EPS

DIMENSIONS WITH METERING TUBES K6; K7; M6 AND M7

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ENG-018553

Metering tube	Dimensions [mm]			Weight [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



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