General Specifications

Model RAKD
Small Metal ROTAMETER

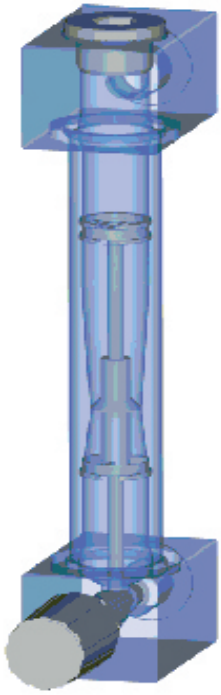
GS 01R01B30-00E-E

The short-tube Rotameter is used for measurement of low flow rates of liquids and gases. Its special application is in turbulent, opaque or aggressive mediums and under high pressure.
The instrument is mounted in a vertical pipeline with flow direction upwards.
A float is guided concentrically in a conic metal tube.
The position of this float is magnetically transmitted to the indicator.
When the process conditions change the scale needs to be replaced by a new one of which the values should be calculated.

Indicator RAKD with tube without valve

FEATURES

- Different process connections like internal threads and flanges
- Available with control valve (horizontal connection) or without valve (vertical connection)
- All wetted parts of stainless steel AISI 316Ti (1.4571)
- Measuring accuracy acc. to standard VDI/VDE 3513 sheet 2 (q_G = 50 %) at calibration conditions
- Round industrial standardized stainless steel housing with degree of protection IP 66/67
- Light, guided floats resulting in low pressure loss and stable float movement
- Max. flow range water: 1 to 250 l/h water resp.
- Max. flow range air: 40 to 8000 l/h (+20 °C, 1.013 bar abs)
- Turndown ratio: 10:1
- Pressure controller for a maximum flow of 100 l/h water resp. 3.250 l/h air
- Electronic µP-controlled transmitter with linearized output
- Electrical connection by fast connection technique (Quickon)
- Limit switches, also available as “fail-safe” version
- Connection of common transformer isolated barriers and transmitter power supplies possible
- Intrinsically safe version (Ex i): ATEX, IECEx, FM, NEPSI, PESO, EAC, INMETRO, KOSHA
- Non-electrical hazardous area approval: ATEX and EAC
- FMEDA report available for SIL application



Tube RAKD with valve

Contents	
Features	page 1
Standard Specifications	page 2
Hazardous Area Specifications	page 5
Temperature Specification	page 8
Installation and Planning Hints	page 9
Model and Option Specifications	page 9
Options	page 14
Dimensions	page 15
Types of Process Connections	page 18
Installation Lengths depending on Process Connection Type and Size	page 18
Weights	page 18

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Germany

GS 01R01B30-00E-E

14th edition, March 2019 (RYG)

STANDARD SPECIFICATIONS

RoHS Directive 2011/65/EU:
RoHS conform acc. to EN 50581

MEASURING TUBE

Materials of wetted parts1:
- Stainless steel AISI 316Ti (1.4571)
- Other materials on request

Fluids to be measured:
Liquid or gas

Measuring range:
See pages 9 to 13

Measuring turndown ratio:
10:1

Process connections:
- Inner thread: G ¼"; NPT ¼"; G ⅜"; NPT ⅜"
- Cutting ring: 6 mm; 8 mm; 10 mm; 12 mm
- Cutting ring (Swagelok): 6 mm; 8 mm; 10 mm; 12 mm
- Nozzle: 6 mm; 8 mm
- Flange (screwed in):
  - Acc. to EN 1092-1: DN15 and DN25 PN40;
  - Acc. to ASME B 16.5: ½" and 1" Class 150, Class 300
- Stainless steel AISI 316Ti
  Gasket PTFE

Process pressure:
Depends on process connection; see model code

Viscosity limit:
6 mPas

Process temperature:
- Without valve: -25 °C to +250 °C
- With valve -25 °C to +150 °C

See also fig. 2.
Lower temperatures on request.

Measurement accuracy:
Acc. to standard VDI/VDE 3513 sheet 2 (q_G = 50 %) 4 %

Installation:
- Installation position: vertical
- Flow direction: upwards
- Face to face length: 125 mm, with flange 250 mm

Weight:
See table 9

MECHANICAL INDICATOR, type -T

Measuring principle
The indication is made by magnetic coupling of a magnet enclosed in the float and a magnet in the indication unit, which follows the movements of the float.

Scale:
Standard: removable aluminium plate with printed scale (double scale as option)

Indicator housing:
- Material: Stainless steel AISI304 (1.4301)
- Degree of Protection: IP66/67

Process and ambient temperature:
The dependency of the process temperature from the ambient temperature is shown in fig. 2.

Transportation and storage condition:
-40 °C to +110 °C

ELECTRONIC TRANSMITTER, type -E

Temperature range:
-25 °C to +65 °C

Transportation and storage condition:
-40 °C to +70 °C

Process and ambient temperature:
The dependency of the process temperature from the ambient temperature is shown in fig. 2.

Power supply:
14 to 30 V DC

Load resistance:
(U – 14 V) / 20 mA, max. 500 Ω

Analog output:
4 to 20 mA

Linearity:
± 0.25 % of 20 mA

Hysteresis:
± 0.15 % of 20 mA

Repeatability:
± 0.16 % of 20 mA

Influence of power supply:
± 0.1 % of 20 mA

Temp. coefficient of analog output:
± 0.5 % / 10 °C of 20 mA

AC-part of analog output:
± 0.15 % of 20 mA

Long time stability:
± 0.2 % / year

Maximum output current:
21.5 mA

Output current in case of failure:
≤ 3.6 mA (NAMUR NE 43)

Response time (99 %):
Approx. 1 s

Quickon connector:
- Cable diameter: 4 to 6 mm
- Cable cross-section: 0.34 to 0.75 mm^2

Pulse output, option /CP:
Electronic switch with galvanic isolation, acc. to EN 60947-5-6 (NAMUR)
- Pulse length: 200 ms
- Max. frequency: 4 Hz

Electromagnetic compatibility (EMC)
- EN 61326-1: Class A, see Table 2
- EN 61326-2-3

POWER SUPPLY FOR ELECTRONIC TRANSMITTER, option /UT

Type:
Power supply with galvanically separated input and output RN221N-B1, HART®-compatible

Supply voltage:
20 to 250 V DC / AC 50/60 Hz

Maximum load:
700 Ω

Output signal:
4 to 20 mA

ELECTRICAL CONNECTION, indicator type -E

Type:
- Quickon
- M12, option /A29, /A30

Cable diameter:
4 to 6 mm

Maximum cross section of core:
Ø 0.34 to 0.75 mm²

LIMIT SWITCHES IN STANDARD VERSION, option /K1 to /K3

Type:
Inductive proximity switch SC2-N0 acc. to EN 60947-5-6

Nominal voltage:
8 V DC

Output signal:
≤ 1 mA or ≥ 3 mA

Hysteresis:
< 0.5 mm

LIMIT SWITCHES IN FAIL-SAFE VERSION, option /K6 to /K8

Type:
Inductive proximity switch SJ2-SN acc. EN 60947-5-6

Nominal voltage:
8 V DC

Output signal:
≤ 1 mA or ≥ 3 mA

Hysteresis:
< 0.5 mm

ELECTRICAL CONNECTION, option /K1 to /K8

Type:
- Quickon
- M12 (option /A29, /A30)

Cable diameter:
4 to 6 mm

Maximum cross section of core:
Ø 0.34 to 0.75 mm²

HYSTERESIS OF LIMIT SWITCHES

Min-contact and Max-contact:
- Pointer movement: ≈ 0.8 mm
- Float movement: ≈ 0.8 mm

Minimum distance between 2 limit switches:
≈ 8 mm

POWER SUPPLY FOR LIMIT SWITCHES, option /W□□

Type:
Acc. to EN 60947-5-6
- 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

Fail-safe
- KHA6-SH-Ex1 (115/230 V AC), 1 channel
- KFD2-SH-Ex1 (24 V DC), 1 channel

Power supply:
- 230 V AC ± 10 %, 45 to 65 Hz
- 115 V AC ± 10 %, 45 to 65 Hz
- 24 V DC ± 25 %

Relay output:
1 or 2 potential-free change over contact(s)

Switching capacity:
Max. 250 V AC, max. 2 A

Note:
If fail-safe limit switch option /K6 or /K7 is ordered, for power supply option /W2E or /W4E must be selected.
If fail-safe limit switch option /K8 is ordered, for power supply option /W2F or /W4F must be selected.

SWITCHING LEVELS FOR LIMIT SWITCHES

Table 1 Min, Max, Min-Max, Min-Min and Max-Max-contact as standard version

		Option /K1	Option /K2	Option /K3
Function	Pointer	Signal	Signal	Signal
		SC2-N0	SC2-N0	SC2-N0
MAX	above LV	----	1 mA	1 mA
	below LV	----	3 mA	3 mA
Function	Pointer	Signal	Signal	Signal
		SC2-N0	SC2-N0	SC2-N0
MIN	above LV	3 mA	----	3 mA
	below LV	1 mA	----	1 mA
Note: LV = Limit Value				

Table 2 Min, Max and Min-Max-contact as fail-safe version

		Option /K6	Option /K7	Option /K8
Function	Pointer	Signal	Signal	Signal
		SJ2-SN	SJ2-SN	SJ2-SN
MAX	above LV	----	1 mA	1 mA
	below LV	----	3 mA	3 mA
	fail-safe	----	1 mA	1 mA
Function	Pointer	Signal	Signal	Signal
		SJ2-SN	SJ2-SN	SJ2-SN
MIN	above LV	3 mA	----	3 mA
	below LV	1 mA	----	1 mA
	fail-safe	1 mA	----	1 mA
Note: LV = Limit Value				

FLOW CONTROLLER, option /R1 and /R3

Flow controller for constant flow in case of variations in process pressure.
These are no valves to reduce the pressure.

- **Controller /R1** for liquids with variable inlet or outlet pressure and for gases with variable inlet pressure and constant back pressure.
- **Controller /R3** for gases with fluctuations of the back pressure.

- Max. liquid flow: 100 l/h
- Max. gas flow: 3250 l/h
- Max. pressure: 25 bar
- Recommended differential pressure: >400 mbar
- Temperature range: -25 °C to +80 °C

Table 3 Materials:

	Housing	Diaphragm	Springs
/R1 or /R3	CrNi-Steel	PTFE	CrNi-Steel

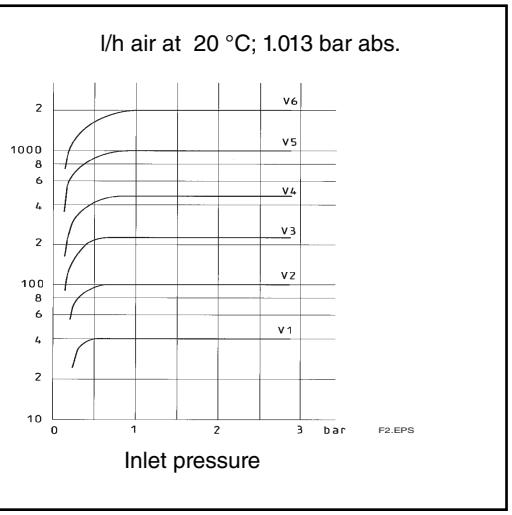


Fig. 1 Diagram controller characteristic

FOLLOWING IEC 61508

RAKD with local indicator and standard or fail-safe limit switches

(RAKD□□-□□SS-□□□□□-T□□NNN/K1 to K8):
Suitable for application in safety functions up to and including SIL1.

RAKD with valve and controller with local indicator and standard or fail-safe limit switches

(RAKD□□-□□SS-□□V□□-T□□NNN/R□/K1 to K8):
Suitable for application in safety functions up to and including SIL1.

Details see FMEDA report.

FOLLOWING ISO 13849-1

Safety Metrics available for:

RAKD with local indicator and standard or fail-safe limit switches

(RAKD□□-□□SS-□□□□□-T□□NNN/K1 to K8)

RAKD with valve and controller with local indicator and standard or fail-safe limit switches

(RAKD□□-□□SS-□□V□□-T□□NNN/R□/K1 to K8)

Details see FMEDA report.

APPROVALS IN EAEU AND CIS COUNTRIES

Eurasian Conformity (EAC)

RAKD complies to applicable Technical Regulations valid in EAEU countries Russia, Belarus, Kazakhstan, Armenia and Kyrgyzstan (option /VE).

- TR CU 004
- TR CU 020
- TR CU 012 can be added for hazardous area applications (options /GS1, /GC1)

Pattern Approval certificate of Measuring Instruments

RAKD has Pattern Approval certificates and is registered as a measuring instrument in Kazakhstan, Uzbekistan and Russia.

- Option /QR2 for Kazakhstan
- Option /QR3 for Uzbekistan
- Option /VR for Russia

An additional Primary verification certificate is available for Russia with option /QR, only in combination with option /VR.

HAZARDOUS AREA SPECIFICATIONS

HAZARDOUS AREA APPROVALS FOR INTRINSICALLY SAFE RAKD

Intrinsically safe with ATEX-approval, option /KS1

Certificate:
KEMA 00ATEX 1037X

Explosion proof:
Ex ia IIC T6...T4 Gb

Entity parameter:

Table 4

IS parameter	Analog output	Pulse output	Limit switch			
			Type 2 /K1 to /K3	Type 3 /K1 to /K3	Type 2 /K6 to /K8	Type 3 /K6 to /K8
Ui in V	30	16	16	16	16	16
Ii in mA	100	20	25	52	25	52
Pi in mW	750	64	64	169	64	169
Li in mH	0.73	0	0.15	0.15	0.1	0.1
Ci in nF	2.4	0	150	150	30	30

Temperature specification:

Table 5

Configuration	Max. ambient temperature	Max. process temperature	Temperature class
Transmitter 4 to 20 mA / Pulse	65 °C	65 °C	T6
	50 °C	80 °C	
	45 °C	100 °C	T5
	38 °C	135 °C	T4
Limit switches type 2	65 °C	65 °C	T6
	80 °C	80 °C	T5
	59 °C	100 °C	
	100 °C	100 °C	T4
	73 °C	135 °C	
Limit switches type 3	23 °C	65 °C	T6
	37 °C	80 °C	T5
	34 °C	100 °C	
	57 °C	80 °C	T4
	54 °C	100 °C	
	48 °C	135 °C	

For the configurations where a transmitter is combined with limit switches, the temperature class is determined by the most restrictive combinations of maximum ambient temperature and maximum process temperature.
Description of limit switch type 2 and 3 see ATEX certificates from Pepperl & Fuchs:

- PTB 99 ATEX 2219X (SC2-NO) for /K1, /K3
- PTB 00 ATEX 2049X (SJ2-SN) for /K6 to /K8

Intrinsically safe RAKD with ATEX-approval for use in zone 2, option /KS3

Explosion proof:
Ex ic IIC T6...T4 Gc

Entity parameter:
See table 4

Temperature specification:
See table 5

Intrinsically safe RAKD with IECEx-approval, option /ES1

Certificate:
IECEx DEK 12.0003X

Explosion proof:
Ex ia IIC T6...T4 Gb

Entity parameter:
See table 4

Temperature specification:
See table 5

For the configurations where a transmitter is combined with limit switches, the temperature class is determined by the most restrictive combinations of maximum ambient temperature and maximum process temperature. Description of limit switch type 2 and 3 see IECEx certificates from Pepperl & Fuchs:

- IECEx PTB 11.0091X (SC2-NO) for /K1 to /K3
- IECEx PTB 11.0092X (SJ2-SN) for /K6 to /K8

Intrinsically safe RAKD with NEPSI-approval (China), option /NS1

Certificate:
GYJ15.1065

Explosion proof:
Ex ia IIC T4~T6 Gb

Max. Tamb.:
+65 °C

Limit switches:
Option /K1 to /K8

Entity parameter:
See table 4

Temperature specification:
See table 5

Intrinsically safe RAKD with PESO-approval (India), option /Q11 with /KS1

Same data as ATEX-certified type, option /KS1.

Certificate:
PESO Ref. No.: P420770/1

Explosion proof:
Ex ia IIC T6...T4 Gb

Temperature specification:
See table 5

Intrinsically safe RAKD with KOSHA-approval (Korea), Option /ES1 with /KC

Same data as for IECEx certification, option /ES1..

Certificate:
12-AV4BO-0522X

Explosion proof:
Ex ia IIC T6...T4

Temperature specification:
See table 5

Intrinsically safe RAKD with EAC-approval (Russia, Belarus, Kazakhstan, Armenia and Kyrgyzstan), option /GS1
For indicator type -E and limit switches
Certificate:
RU C-DE.ГБО8.В.01183
Explosion proof:
0ExiaIICT6 X
Entity parameter:
See table 4
Temperature specification:
See table 5

Intrinsically safe with INMETRO-approval (Brasil), option /US1
Certificate:
DEKRA 15.0005X
Explosion proof:
Ex ia IIC T6...T4 Gb
Entity parameter:
See table 4
Temperature specification:
See table 5

Intrinsically safe with Taiwan Safety Mark
Registration Document:
ML041200703XN3
Option /ES1 must be selected.
Same data as IECEx-certifiied type (/ES1).
For export to Taiwan please contact your Yokogawa representative in Taiwan to receive the Taiwan Safety Mark.

HAZARDOUS AREA APPROVALS FOR INTRINSICALLY SAFE LIMIT SWITCHES

Intrinsically safe and dust proof limit switches with ATEX-approval for indicator type -T, option /K1 to /K8 with /KS2
Certificate:
- PTB 99 ATEX 2219X (SC2-N0)
- PTB 00 ATEX 2049X (SJ 2-S.N)

Explosion proof:
- Ex ia IIC T6...T1 Gb, II 2G
- Ex ia IIIC T135 °C Da, II 1D
- Ex ib IIIC T135 °C Db, II 2D

Entity parameter:
See certificate

Intrinsically safe or nonincendive limit switches with FM-approval for indicator type -T, option /K1 to /K8 with /FS1
Explosion proof:
- IS: Cl. I, II, III, Div. 1, Gp. ABCDEFG, T6, Ta = +60 °C,
- NI: Cl. I, Div. 2, Gp. ABCD, T5, Ta = +50 °C
  Cl. II, Div. 1, Gp. EFG
  Cl. III, Div. 1

Entity parameter:
- See FM-control drawing 116-0165 for IS
- See FM-control drawing 116-0155 for NI

POWER SUPPLIES FOR INTRINSICALLY SAFE COMPONENTS

Power Supply for the intrinsically safe electronic transmitter, option /UT

Type:
Power supply with galvanically separated input and output RN221N-B1, HART®-compatible

Certificate:
- ATEX: PTB00ATEX 2018
- Other certificates available on request.

Supply voltage:
20 to 250 V DC/AC 50/60 Hz

Maximum load impedance:
700 Ω

Output signal:
4 to 20 mA

Control circuit:
Intrinsically safe [Ex ia] IIC; group II; category (1)GD

Entity parameters:
See certificate

Power supply for intrinsically safe limit switches, option W□□

Type:
Acc. to EN 60947-5-6
- 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

Fail-safe
- KHA6-SH-Ex1 (115/230 V AC), 1 channel
- KFD2-SH-Ex1 (24 V DC), 1 channel

Approvals:

• KFA5-SR2-Ex*-W:	ATEX:	PTB 00 ATEX 2081
	FM:	ID 3011578
	IECEx:	PTB11.0031
	EAC:	RU C-П.ГБ05.В.00718
	NEPSI:	GYJ17.1283
• KFA6-SR2-Ex*-W:	ATEX:	PTB 00 ATEX 2081
	FM:	ID 3011578
	IECEx:	PTB11.0031
	EAC:	RU C-П.ГБ05.В.00718
	NEPSI:	GYJ17.1283
• KHA6-SH-Ex1:	ATEX:	PTB 00 ATEX 2043
	EAC:	RU C-П.ГБ05.В.00718
• KFD2-SR2-Ex*-W:	ATEX:	PTB 00 ATEX 2080
	FM:	ID 3011578
	IECEx:	PTB11.0034
	EAC:	RU C-П.ГБ05.В.00718
	NEPSI:	GYJ17.1283
• KFD2-SH-Ex1:	ATEX:	PTB 00 ATEX 2042
	EAC:	RU C-П.ГБ05.В.00718

Control circuit (ATEX):
[Ex ia] IIC; group II; category (1)GD

Entity parameter:
See certificate

HAZARDOUS AREA APPROVALS FOR COMPLETE MECHANICAL RAKD

ATEX registrated RAKD, option /KC1

Archive No.:
IBExU 137/15

Explosion proof:
II 2GD IIC TX

Max. surface temperature:
TX: corresponding process temperature

Ambient temperature:
-25 °C to +80 °C

Max. process temperature
- Without valve: +250 °C
- With valve: +150 °C

RAKD with EAC-approval, option /GC1

Approval:
RU C-DE.ГБО8.В.01183

Explosion proof:
- II Gb IIC T* X
- III Db IIIC T* °C X

Max. surface temperature:
TX: corresponding process temperature

Ambient temperature:
-25 °C to +80 °C

Max. process temperature:
- Without valve: +250 °C
- With valve: +150 °C

TEMPERATURE SPECIFICATION

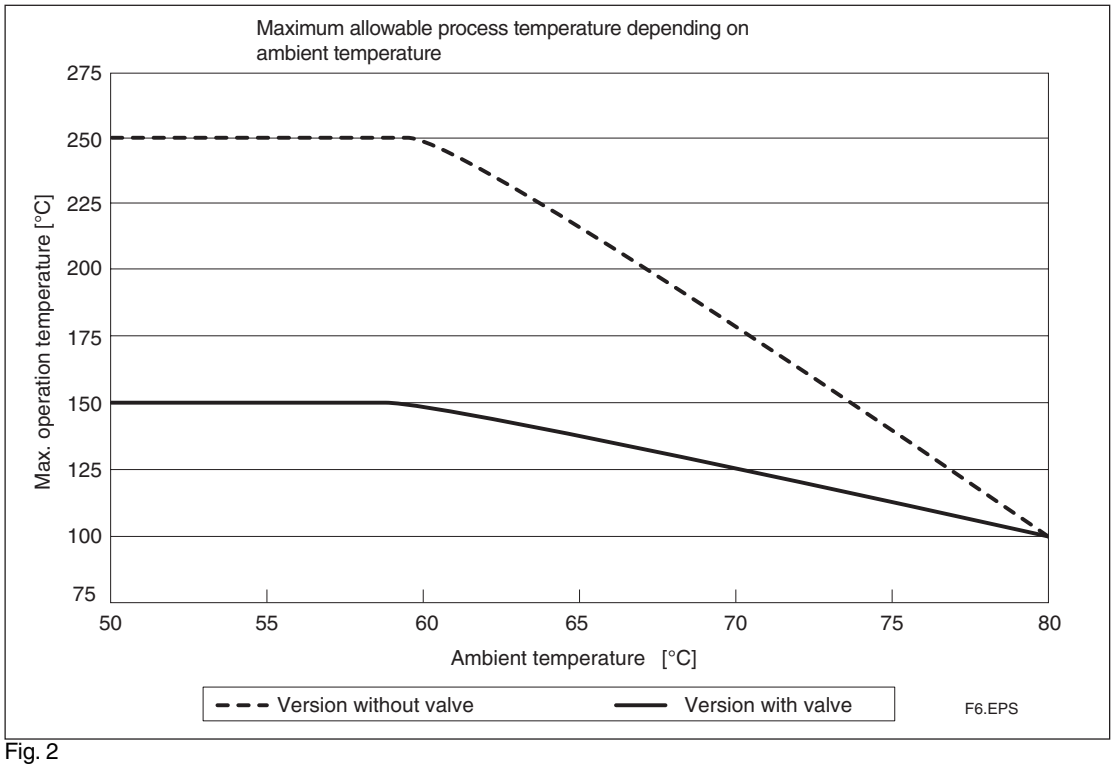


Fig. 2

For units with explosion proof certification the temperature limits according the certificate of conformity must be regarded (see also table 5).

The minimum ambient temperature is -25 °C. Lower temperatures on request.

PLANNING AND INSTALLATION HINTS

- The user is responsible for the use of the flowmeters regarding suitability and use as designed.
- The actual operation pressure must be lower as the specified pressure limits of the Rotameter.
- Make sure that the wetted parts are resistant against the process fluid.
- Ambient- and process temperature must be lower than the specified maximum values.
- If dirt accumulation is to be expected, we recommend installing a bypass pipe.
- To avoid float bouncing in case of gas application notice the recommendations of VDI/VDE 3513 Sheet 3.
- Avoid static magnetic fields next to the Rotameter.

Ordering instructions:
Standard:
- Model, suffix and option code
- Flow conditions
- Temperature
- Pressure
- Viscosity (see viscosity limit)
- Density

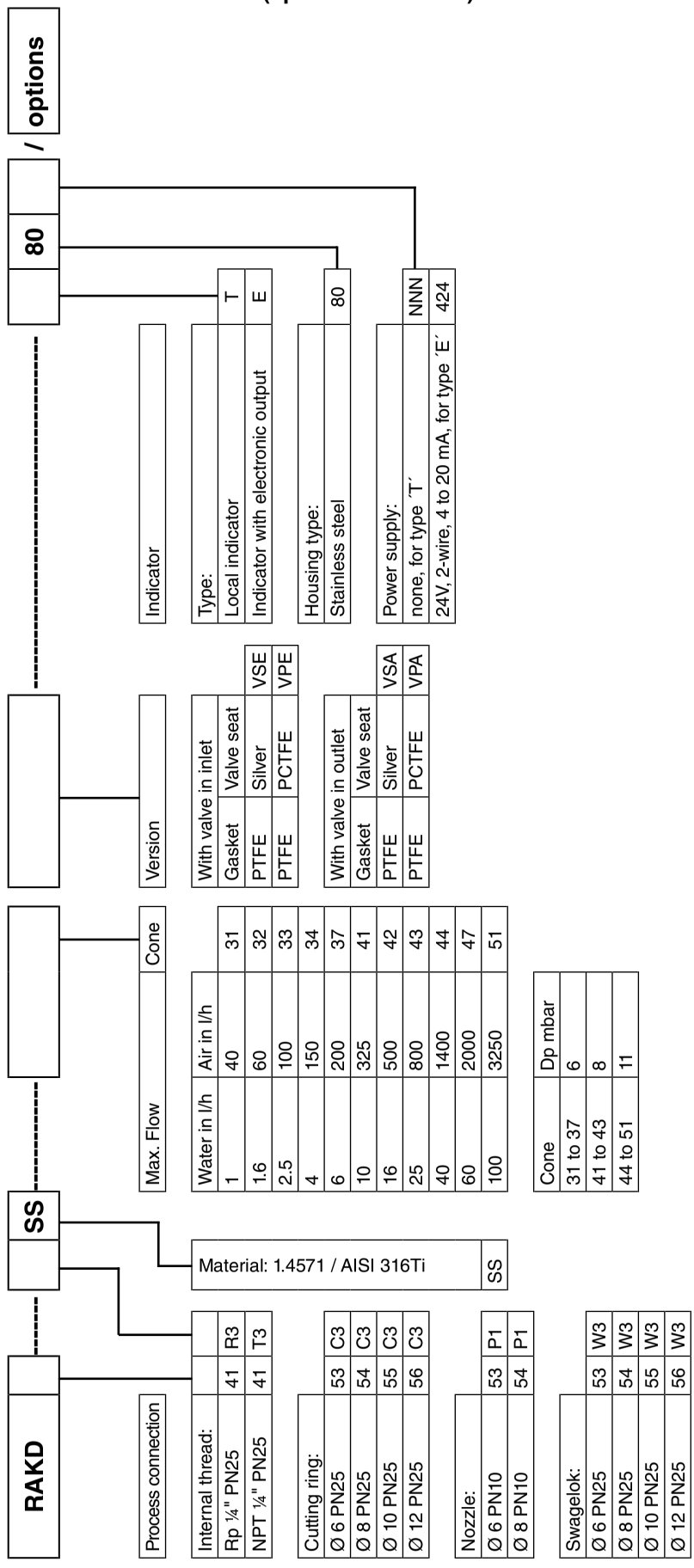
For gases:
- Cross reference of the scale
- Option /B□: customer specification notes

For your special application please use the Yokogawa Sizing Software “FlowConfigurator”.

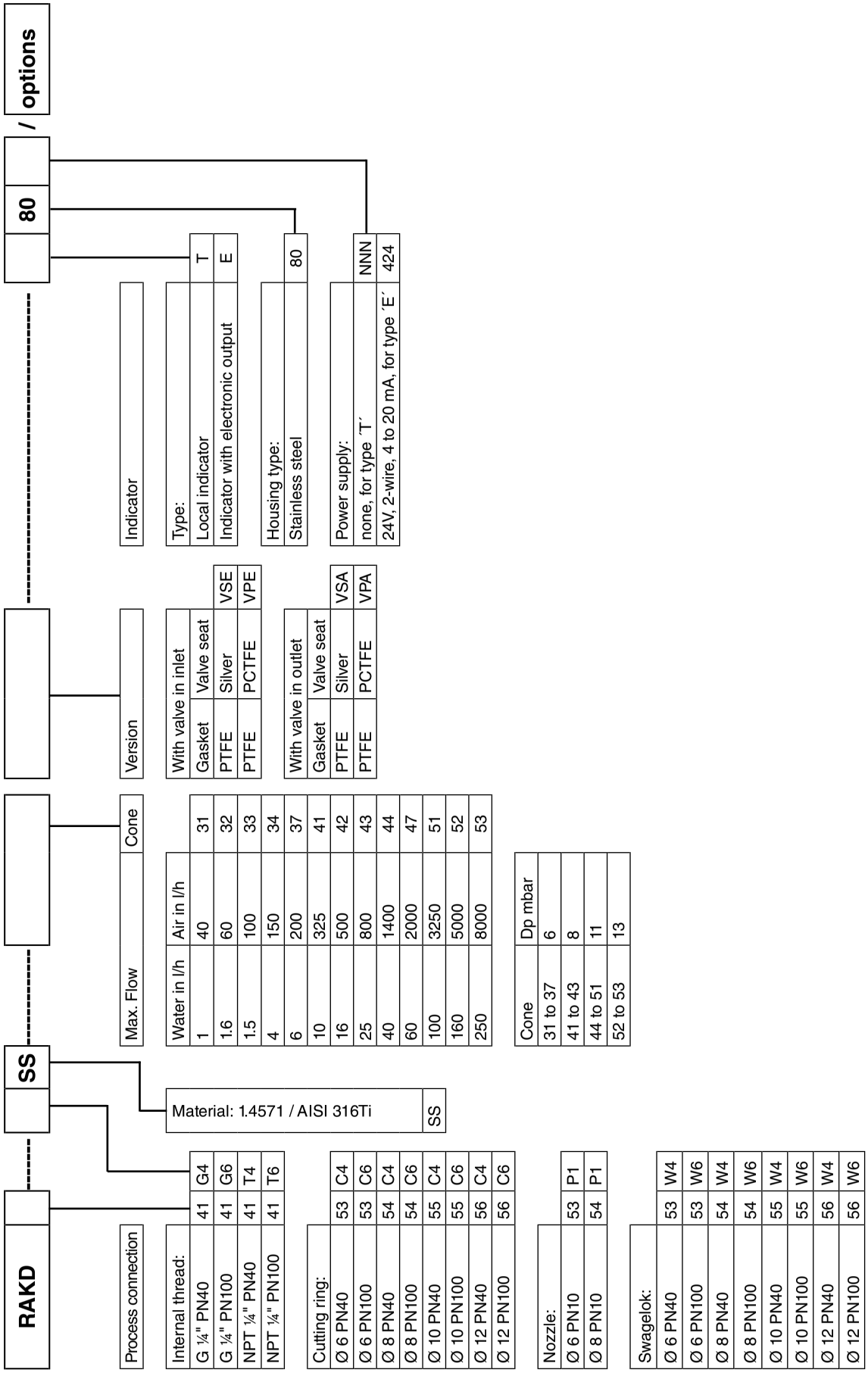
MODEL AND OPTION SPECIFICATIONS

Please make your decision in this order:					
1. Option controller		**with controller**	**without controller**		
	2. Version	**with valve**		**without valve**	
	3. Max. Flow **Cone**	1.0 to 100 l/h water 40 to 3250 l/h air 31 to 51	1.0 to 250 l/h water 40 to 8000 l/h air 31 to 53	1.0 to 100 l/h water 40 to 3250 l/h air 31 to 51	160 to 250 l/h water 5000 to 8000 l/h air 52 to 53
	4. Process connection	Inner thread Cutting ring Cutting ring (Swagelok) Nozzle		Inner thread Cutting ring Cutting ring (Swagelok) Nozzle Flange	Inner thread Cutting ring Cutting ring (Swagelok) Flange
Specify the model code according the mentioned page.		Page 10	Page 11	Page 12	Page 13

RAKD with valve and controller (option /R1 and /R3) 1.0 to 100 l/h water / 40 to 3250 l/h air



RAKD with valve 1.0 to 250 l/h water / 40 to 8000 l/h air



RAKD without valve 1.0 to 100 l/h water / 40 to 3250 l/h air

RAKD		-------		SS	----------		NNN	----------		80		/ options

Process connection		
Flange: *)		
DN 15 PN40	01	D4
DN 25 PN40	02	D4
ANSI ½" 150 lbs	01	A1
ANSI 1" 150 lbs	02	A1
ANSI ½" 300 lbs	01	A2
ANSI 1" 300 lbs	02	A2
Internal thread:		
G ¼" PN100	41	G6
G ¼" PN160	41	G7
NPT ¼" PN100	41	T6
NPT ¼" PN160	41	T7
Cutting ring:		
Ø 6 PN100	53	C6
Ø 6 PN160	53	C7
Ø 8 PN100	54	C6
Ø 8 PN160	54	C7
Ø 10 PN100	55	C6
Ø 10 PN160	55	C7
Ø 12 PN100	56	C6
Ø 12 PN160	56	C7
Nozzle:		
Ø 6 PN10	53	P1
Ø 8 PN10	54	P1
Swagelok:		
Ø 6 PN100	53	W6
Ø 6 PN160	53	W7
Ø 8 PN100	54	W6
Ø 8 PN160	54	W7
Ø 10 PN100	55	W6
Ø 10 PN160	55	W7
Ø 12 PN100	56	W6
Ø 12 PN160	56	W7

*) Gasket PTFE

Material: 1.4571 / AISI 316Ti
SS

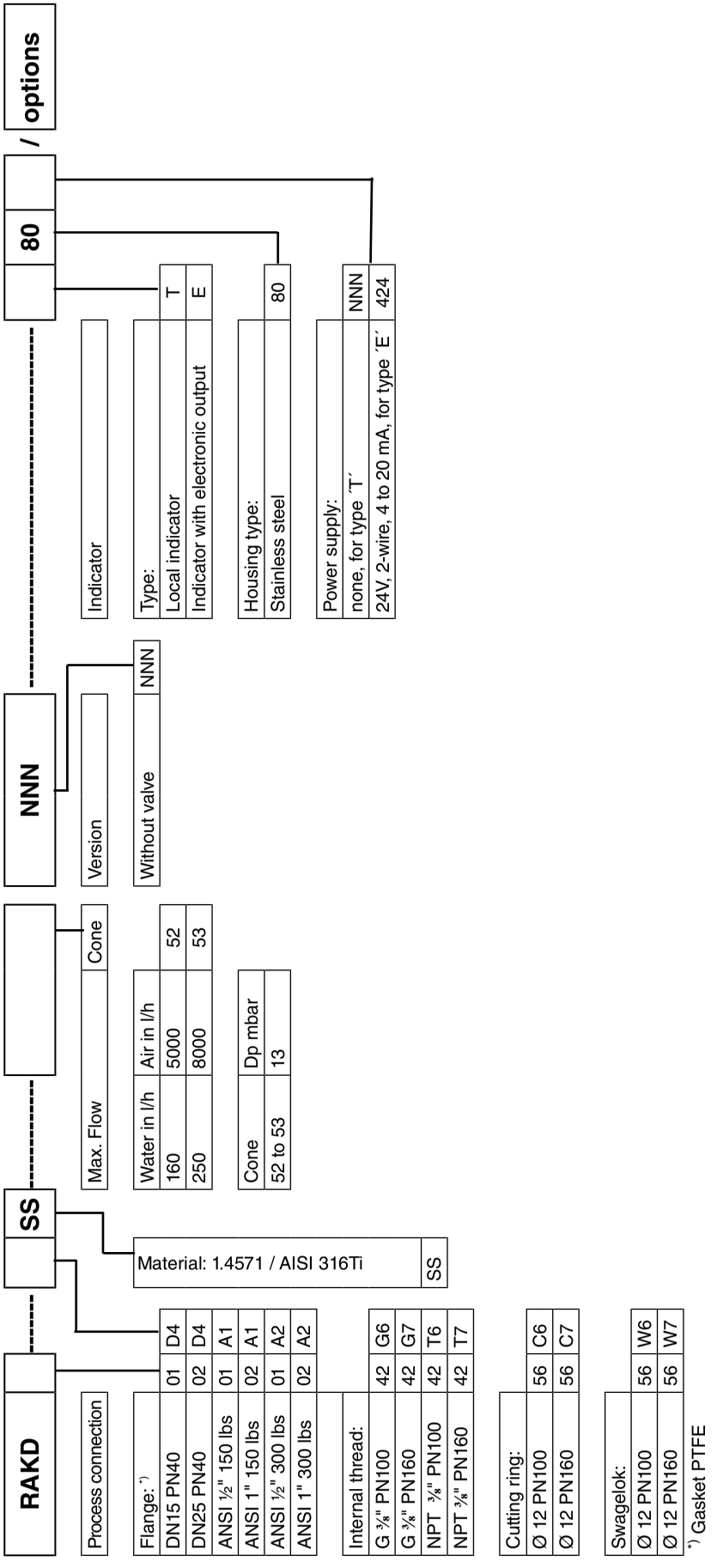
Max. Flow		Cone
Water in l/h	Air in l/h	
1	40	31
1.6	60	32
1.5	100	33
4	150	34
6	200	37
10	325	41
16	500	42
25	800	43
40	1400	44
60	2000	47
100	3250	51

Cone	Dp mbar
31 to 37	6
41 to 43	8
44 to 51	11

Version	
Without valve	NNN

Indicator	
Type:	
Local indicator	T
Indicator with electronic output	E
Housing type:	
Stainless steel	80
Power supply:	
none, for type ´T´	NNN
24V, 2-wire, 4 to 20 mA, for type ´E´	424

RAKD without valve 160 to 250 l/h water / 5000 to 8000 l/h air



OPTIONS

Options	Option code	Description	Restriction
Indicator	/A12	US-engineering units	Only for indicator type E
	/A29	M12-connector acc. to IEC 61076-2-101	Only for indicator type E or T with limit switches
	/A30	M12-connector with plug connector acc. IEC 61076-2-101	Only for indicator type E or T with limit switches
Marking	/B1	Tag plate (SS) fixed by wire and customer specified tag number on scale	Plate 12x40 mm; max. 45 digits
	/B4	Neutral version	
	/B8	Customer provided marking on label	Not with Ex-proof type
	/B10	Percent scale	
	/BG	With customer specified tag number on scale	Max. 45 digits
	/BD	Dual Scale	Adjustment only possible for 1 fluid
Limit switches	/K1	MIN-contact	
	/K2	MAX-contact	
	/K3	MIN-MAX-contact, MIN-MIN-contact, MAX-MAX-contact	Only for indicator type T
	/K6	MIN-contact “fail-safe” version	
	/K7	MAX-contact “fail-safe” version	
	/K8	MIN-MAX-contact “fail-safe” version	Only for indicator type T
Pulse output	/CP	Pulse output, acc. EN 60947-5-6 (NAMUR)	Only for indicator type E; not with limit switches
Hazardous area approvals	/KS1	ATEX intrinsically safe „ia”	Not for indicator type T without limit switches
	/KS2	ATEX gas and dust proof limit switches, category 2G 1D	Only for indicator type T with limit switches
	/KS3	ATEX intrinsically safe „ic”	Not for indicator type T without limit switches
	/ES1	IECEx intrinsically safe „ia”	Not for indicator type T without limit switches
	/ES3	IECEx intrinsically safe „ic”	
	/FS1	FM intrinsically safe / non incendive limit switches (USA)	For indicator type T only with limit switches
	/NS1	NEPSI approval (China)	Not for indicator type T without limit switches;
	/GS1	EAC intrinsically safe „ia”	only with /CN
			Not for indicator type T without limit switches;
	/US1	INMETRO intrinsically safe „ia”	only with /VE or /VR
	/KC1	ATEX non-electrical type	Not for indicator type T without limit switches
	/GC1	EAC non-electrical type	Only for indicator type T withouit limit switches
			Only for indicator type T withouit limit switches;
			only with /VE or /VR
	/Q11	PESO intrinsically safe „ia”	Only with option /KS1
Country-specific delivery	/VE	EAC-mark for EAEU countries	Not with /Q11
	/VR	EAC-mark and Pattern Approval marking for Russia	Not with /Q11
	/KC	KC-mark for Korea	Not with /Q11; for explosion proof see /ES1
	/CN	China RoHS mark	Not with /Q11
Country-specific application	/QR	Primary verification certificate valid in Russia	Only with /VR
	/QR2	Primary verification certificate and Pattern Approval valid in Kazakhstan	See page 5, only with /VE or /VR
	/QR3	Primary verification certificate and Pattern Approval valid in Uzbekistan	
Test and certificates	/H1	Oil + fat free for wetted surfaces	Not for /R1 and /R3
	/PP	Pressure test report measuring system	
	/P2	Certificate of Compliance with the order acc. to EN 10204: 2004-2.1	
	/P3	As /P2 +Test report acc. to EN 10204: 2004-2.2	
	/P6	Material certificate acc. to EN 10204: 2004-3.1	Only for tube, connection heads, screw sealing plug
	/PM1	PAMI test (1 test point: metering tube)	Only for models without valve
	/PM4	PAMI test (4 test points: metering tube, connection heads, sealing plug)	Only for models with valve
	/PM5	PAMI test (5 test points: metering tube, connection pieces, slip on flanges)	Only for models with process connection D4, A1, A2
Controller	/R1	Pre pressure controller 1.4571 (only with valve in inlet; for gas with variable pre pressure and liquids with variable pre and back pressure)	Only for process connection R3, T3, C3, W3, P1; only with valve
	/R3	Back pressure controller 1.4571 (only with valve in outlet; for gas with variable back pressure)	Only for process connection R3, T3, C3, W3, P1; only with valve
Power supply for electronic transmitter	/UT	RN221N-B1, 20 to 250V DC/AC, Ex i	Only for indicator type E in standard and ATEX
Power supply for limit switches (transmitter relay)	/W1A	KFA5-SR2-Ex1.W / 115 V AC, 1 channel	Only for limit switches /K1, /K2, /K3 or /CP
	/W1B	KFA5-SR2-Ex2.W / 115 V AC, 2 channel	Only for limit switches /K1, /K2, /K3
	/W2A	KFA6-SR2-Ex1.W / 230 V AC, 1 channel	Only for limit switches /K1, /K2, /K3 or /CP
	/W2B	KFA6-SR2-Ex2.W / 230 V AC, 2 channel	Only for limit switches /K1, /K2, /K3
	/W2E	KHA6-SH-Ex1 / 115/230 V AC, 1 channel, fail-safe	Only for limit switches /K6, /K7
	/W2F	2x KHA6-SH-Ex1 / 115/230 V AC, 1 channel, fail-safe	Only for limit switches /K8
	/W4A	KFD2-SR2-Ex1.W / 24 V DC, 1 channel	Only for limit switches /K1, /K2, /K3 or /CP
	/W4B	KFD2-SR2-Ex2.W / 24 V DC, 2 channel	Only for limit switches /K1, /K2, /K3
	/W4E	KFD2-SH-Ex1 / 24 V DC, 1 channel, fail-safe	Only for limit switches /K6, /K7
	/W4F	2x KFD2-SH-Ex1 / 24 V DC, 1 channel, fail-safe	Only for limit switches /K8
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 DVD with instruction manuals is shipped with the flowmeter

DIMENSIONS

Note: The dimensions a; b; c; L1; L2; L3 are listed in table and 8.

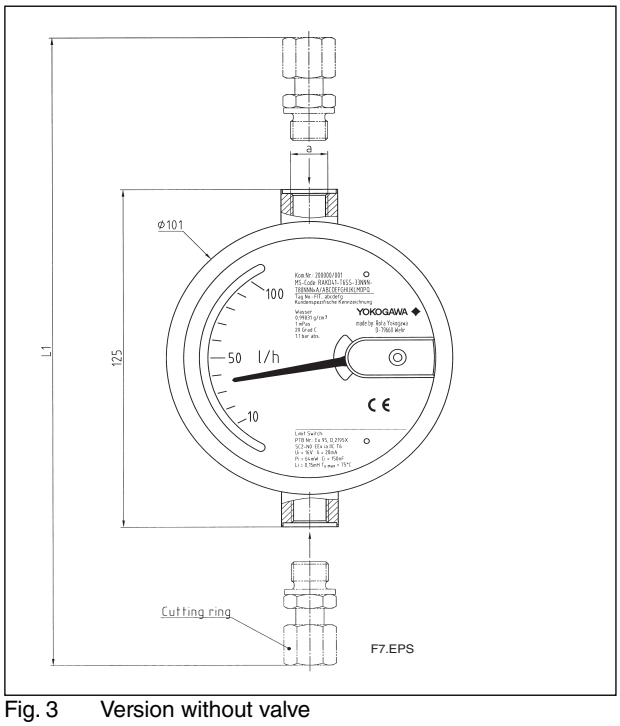


Fig. 3 Version without valve

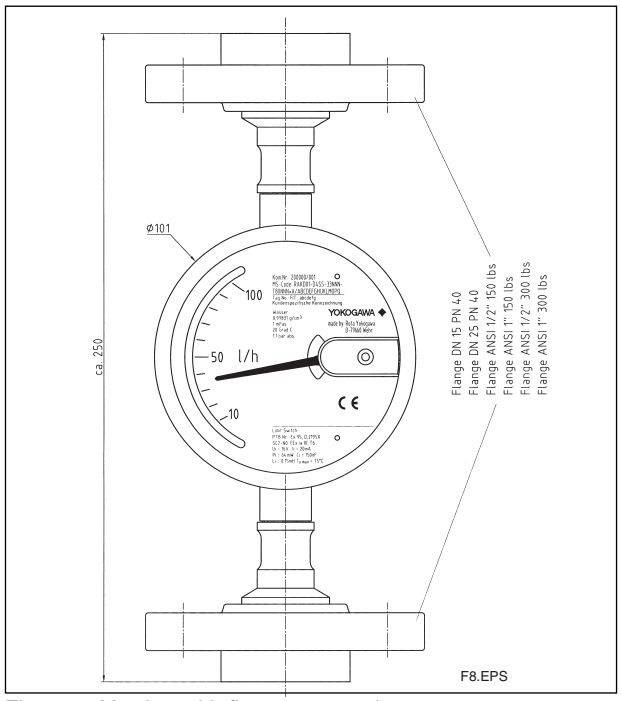


Fig. 4 Version with flange connection

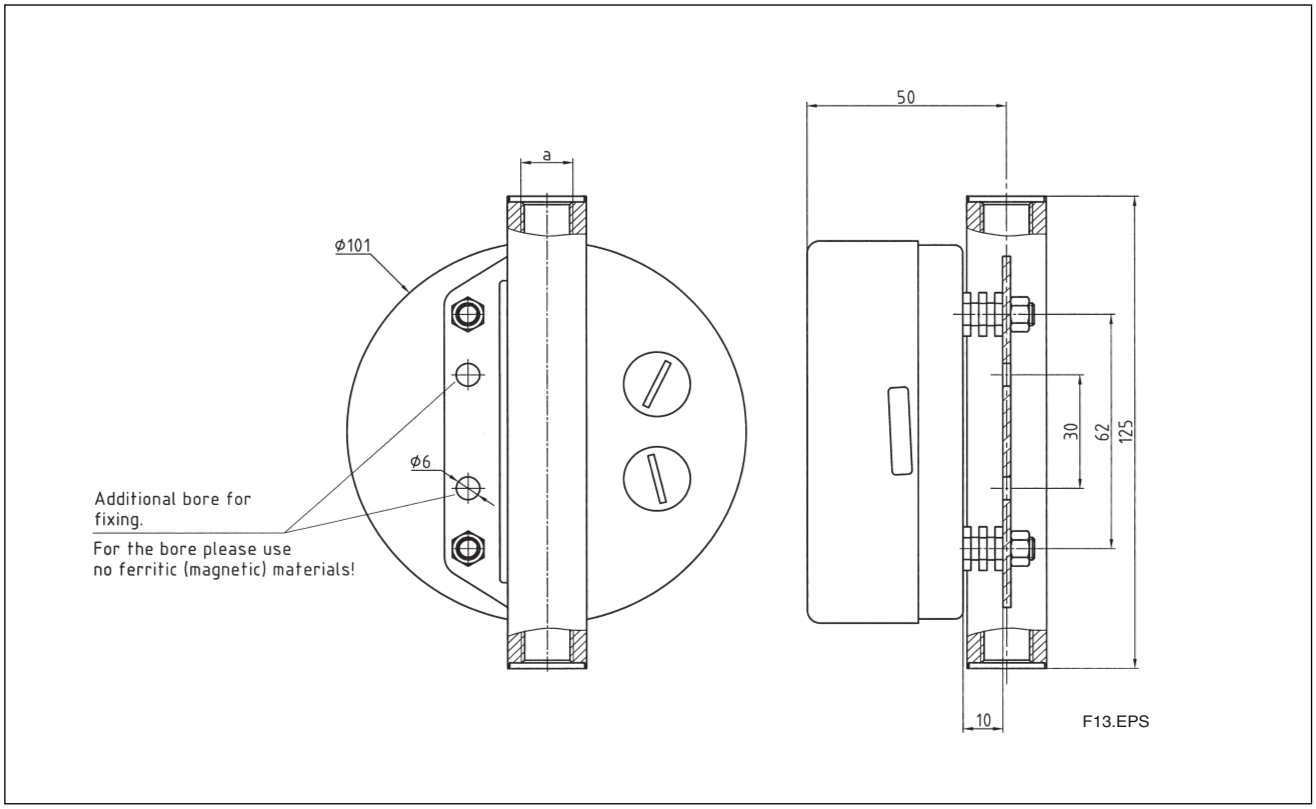


Fig. 5 Back view with mounting

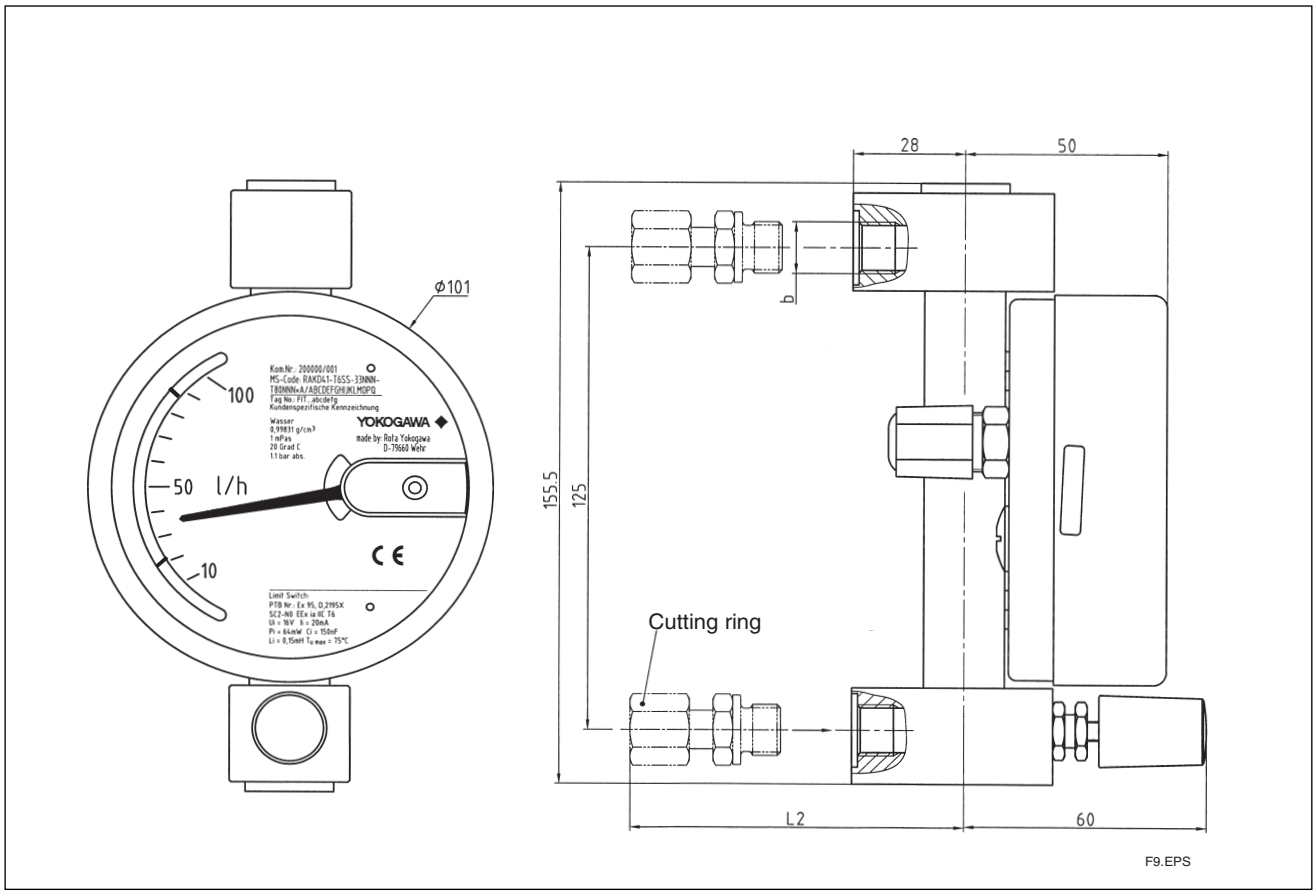


Fig. 6 Version with inlet valve

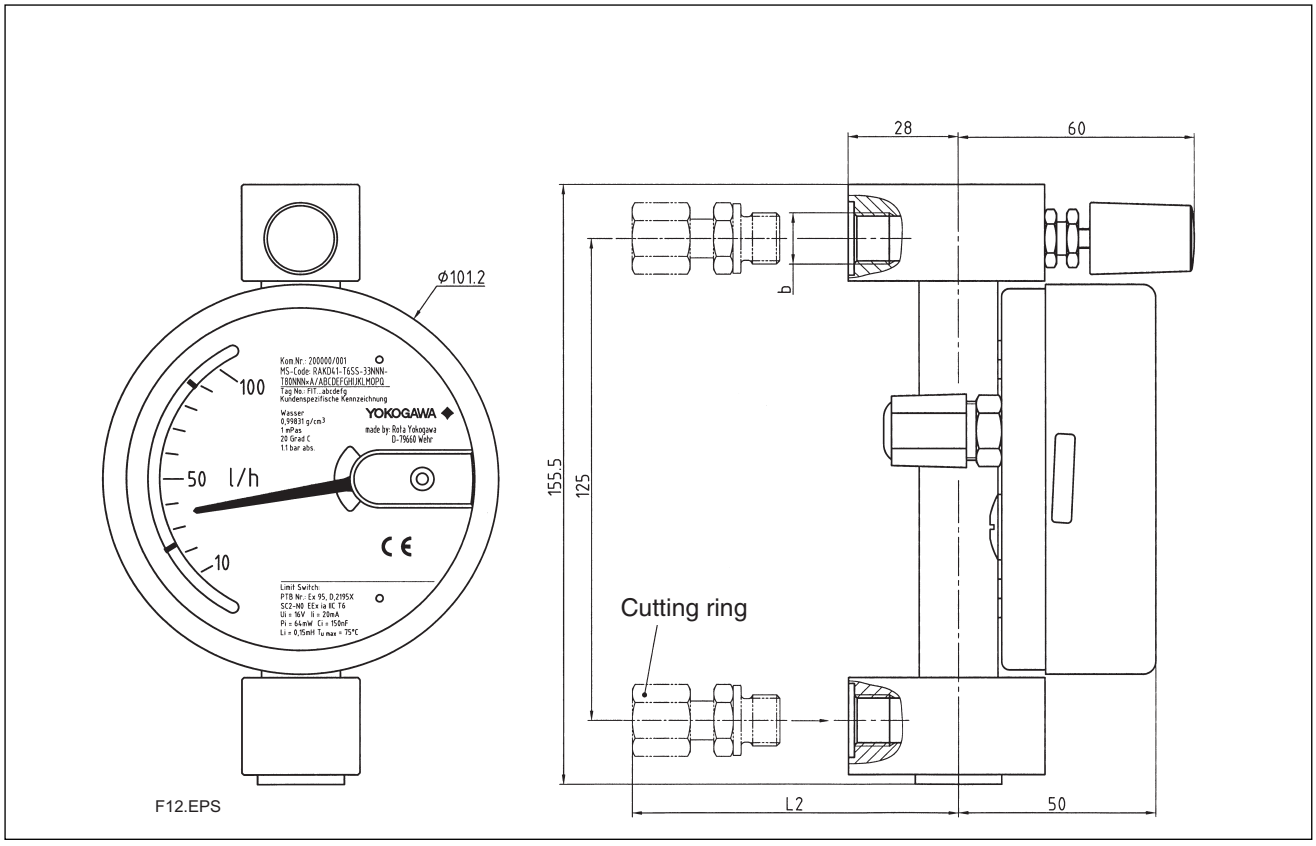


Fig. 7 Version with outlet valve

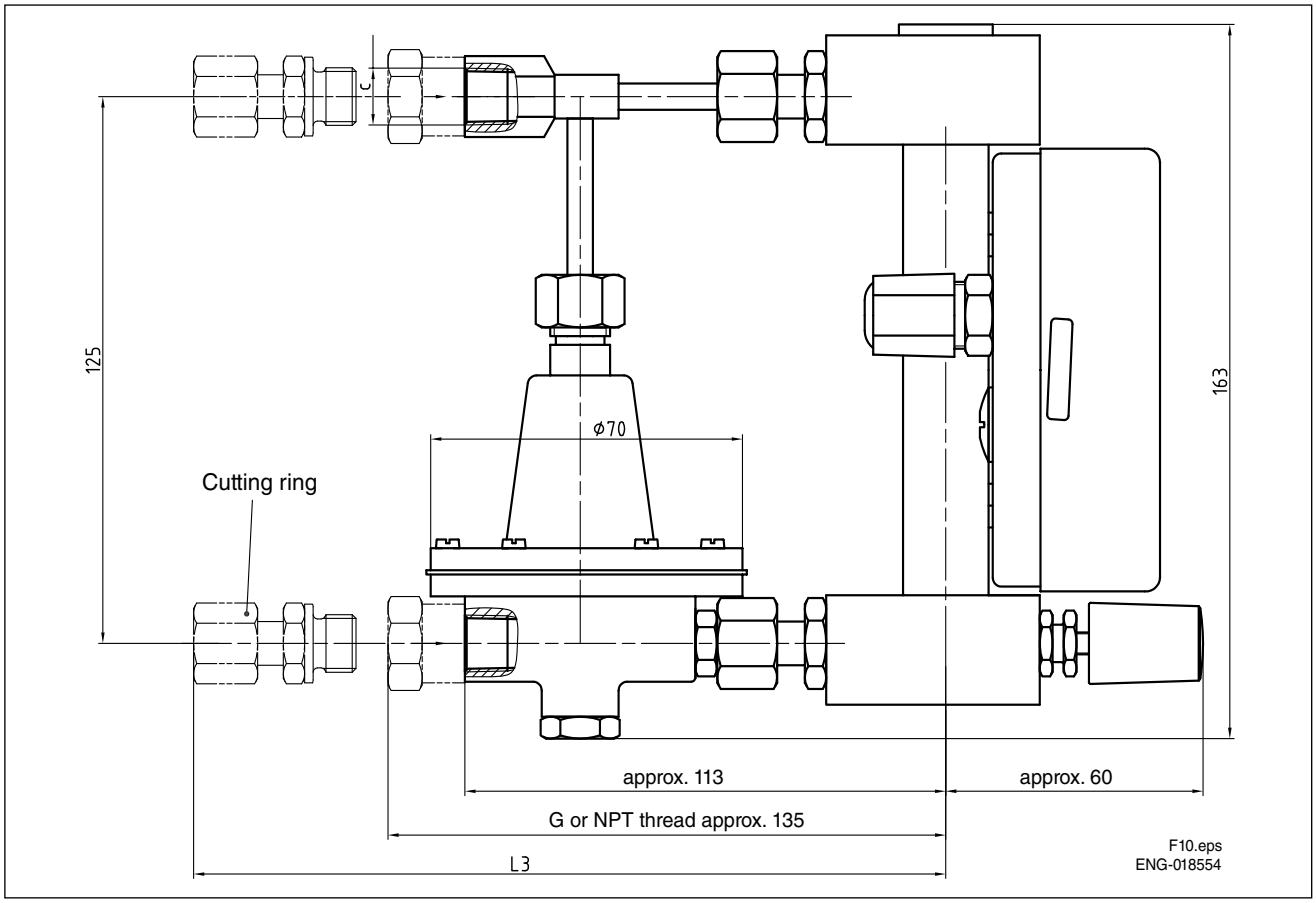


Fig. 8 Version with inlet valve and inlet controller

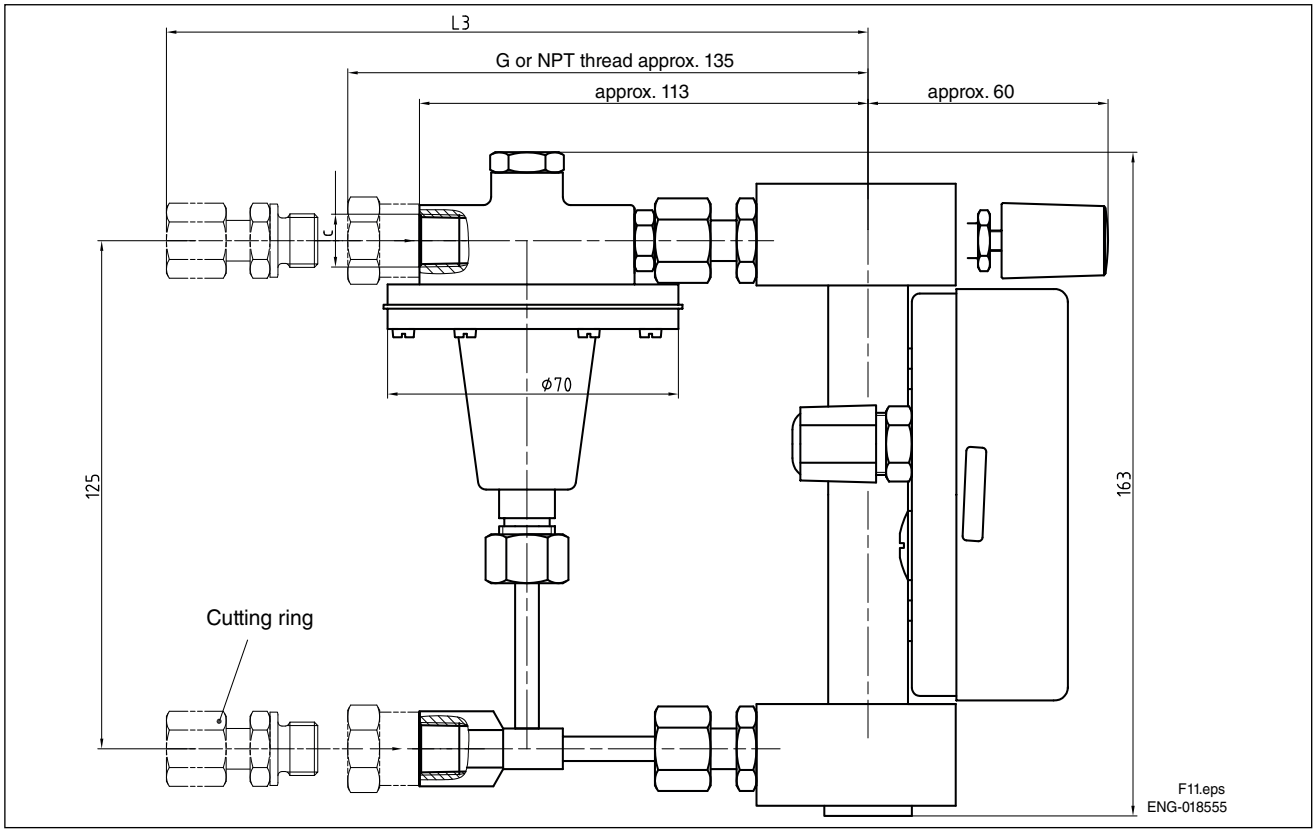


Fig. 9 Version with outlet valve and back pressure controller

TYPES OF PROCESS CONNECTIONS

Table 6

Size	a		b	c
Cone	31 to 51	52 to 53	31 to 53	31 to 51
Thread	G ¼"	G ⅜"	G ¼"	G ¼"
	NPT ¼"	NPT ⅜"	NPT ¼"	NPT ¼"

INSTALLATION LENGTHS DEPENDING ON PROCESS CONNECTION TYPE AND SIZE

Table 8

		L1		L2	L3
Process connection	**Size**	Cone 31 to 51	Cone 52 to 53	Cone 31 bis 53	Cone 31 to 51
Cutting ring	6 mm	178 mm	------	54.5 mm	164 mm
	8 mm	172 mm	------	51.5 mm	161 mm
	10 mm	174 mm	------	52.5 mm	162 mm
	12 mm		177 mm		
Nozzle	6 mm	182 mm	------	56.5 mm	166 mm
	8 mm				

WEIGHTS

Table 9

	Without valve	With valve	With controller
Weight	approx. 600 g	approx. 1000 g	approx. 1800 g

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