

# Variable area flowmeters RA 87 / FA 87



- Direct reading on a calibrated tube
- Water: Up to 16 m<sup>3</sup>/h ; Air: Up to 160 m<sup>3</sup>/h
- Body: Stainless steel
- Adjustable limit value switches
- Analogue output: 4-20 mA or 0-10 V
- ATEX version

## APPLICATIONS

Direct reading of flow rates of liquids and gases:

- Water treatment, Industrial process (paper mill, textiles etc.), chemical and pharmaceutical industries

## DESCRIPTION

The measuring principle is that of the variable area flowmeter, the float is moved by the fluid inside a calibrated conical glass tube. The borosilicate glass conical tube is inside a stainless steel protection case with a transparent reading window. These flowmeters can be calibrated for each fluid, depending on the operating conditions.

Standard versions:

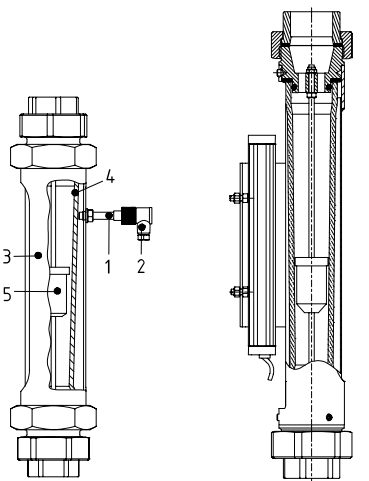
RA 87 G	Fittings: BSP-F 1/4" ... 2"
RA 87 Rp	Fittings: Unions
FA 87	Fittings: Flanges ND 10 ... 65
RA / FA 87-MSK1	With bistable contact N.C.
RA / FA 87-MSK2	With bistable contact N.O.
RA / FA 87-MSKW	With bistable changeover contact
RA / FA 87-EM	With analogue output 4-20 mA or 0-10 V
RA / FA 87... Ex	ATEX, explosion-proof version

### Limit value switches

These flowmeters can be equipped with a magnetic float and Reed contacts, triggerpoints adjustable over the entire measuring range.

### Analogue output 4-20 mA or 0-10 V

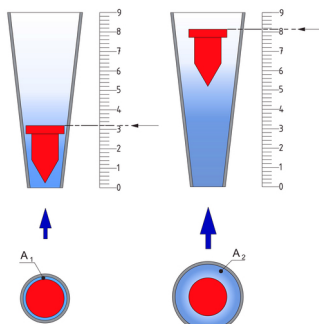
The transmitter is connected to a Hall effect linear signal ruler. The analogue signal (4-20 mA or 0-10 V) is the image of the float position; The transmitter is connected via a connecteur M12. This output is useful for applications using a PLC. The device is compact with a high level of repeatability.



Switch output

- 1): Reed contact
- 2): Right angle connector
- 3): Body
- 4): Measuring tube
- 5): Magnetic float

4-20 mA output  
(hall effect sensors)



Principle

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**RA 87 / FA 87**

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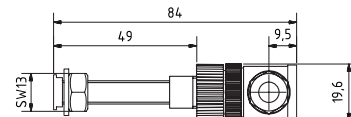
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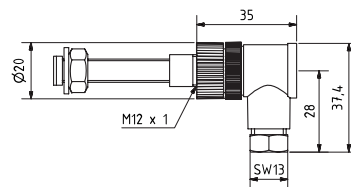
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## TECHNICAL FEATURES

Nominal pressure	PN 10 at 20 °C
Pressure limits	See the table of measuring ranges
Operating temperature	Max. 80 °C acc. version (Option : 100 °C)
Scale factor	1:10
Accuracy class	According to VDE/VDI 3513 page 2 (08/2008)
Error limit (G)	1.6 %
Linear limit (qG)	50 %
Fittings RA 87	G: BSP-F ISO 288 Rp: Unions, inner cylindrical insert, thread according to DIN EN 10226-1 (ISO 7-1)
Fittings FA 87	Flanges PN 10 according to DIN EN 1092-1, Others (ANSI, JIS, etc.) on request
<b>Materials</b>	
Protective sleeve	AISI 304 (1.4301)
RA 87	Threads: AISI 316 Ti (1.4571); Option: PVDF lining <sup>2)</sup> Unions: AISI 316 Ti (1.4571); Option: PVDF lining <sup>2)</sup>
FA 87	Flanges: AISI 316 Ti (1.4571); Option: PVDF lining <sup>2)</sup>
Reading tube	Borosilicate glass
Protective screen	Perspex
Gaskets	FPM
	Options : EPDM, FFKM, Silicone, Perlast®
Floats for liquids <sup>1)</sup>	AISI 316 Ti (1.4571); Option: Hastelloy C4
Floats for gases <sup>1)</sup>	PTFE; Options: PVC, PVDF, PP, anodized aluminum
Floats for use of limit value switches <sup>1)</sup>	On liquids: AISI 316 Ti with magnetic core On gases: PVC with magnetic core Options: PP, PVDF, PTFE (with magnetic core) <sup>1)</sup> Floats of small sizes are non-guided. As an option, sizes 9.5 and 19 (without switches) are available (detailed description on request) <sup>2)</sup> PVDF lining: All wet parts (excepted the glass tube) are of PVDF. With protective lining of wet parts
Special versions <sup>2)</sup>	

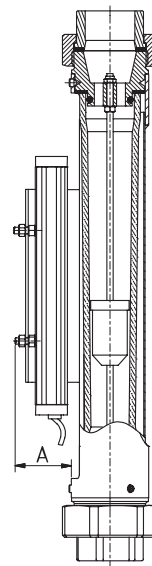


Limit value switches MSK..



Function	Switches features		
	MSK1	MSK2	MSKW
Function	Bistable N.C.	Bistable N.O.	Bist. Changeover
Max. voltage	50 V AC / 75 V DC	50 V AC / 75 V DC	50 V AC/75 V DC
Max. current	0,5 A	0,5 A	0,5 A
Switching capacity	10 W/VA	10 W/VA	5 W/VA
Temperature <sup>1)</sup>	-20...+90 °C	-20...+90 °C	-20...+90 °C

<sup>1)</sup> The thermal endurance of the flow meter is crucial.



Analogue output 4-20 mA

Size 9.55: A = 45 mm  
Size 19: A = 37 mm  
Size 30: A = 45 mm  
Size 36: A = 46 mm  
Size 43: A = 47 mm

Analogue output 4-20 mA -- EM; Features	
Scale height	160 mm, 125 mm
Repeatability	≤ 0,1% F.S.
Ambient temperature	-25 .... +70 °C
Output signal	4-20 mA; 4-wire
Supply voltage	15 ... 30 V DC
Connections	M12 x 1 connector, right angle
Protection	IP 67
Signaling LED	Green: Operating Yellow: Position sensor in detection

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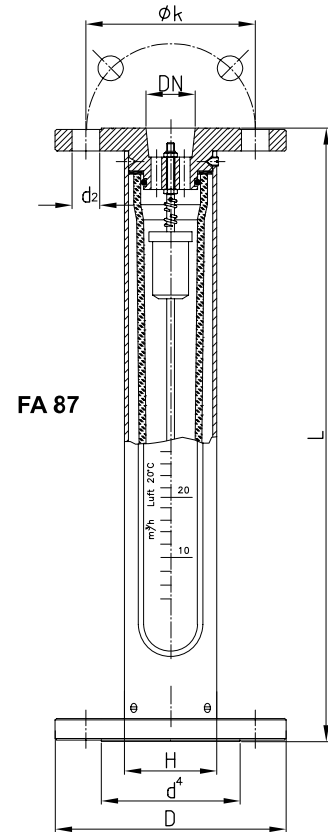
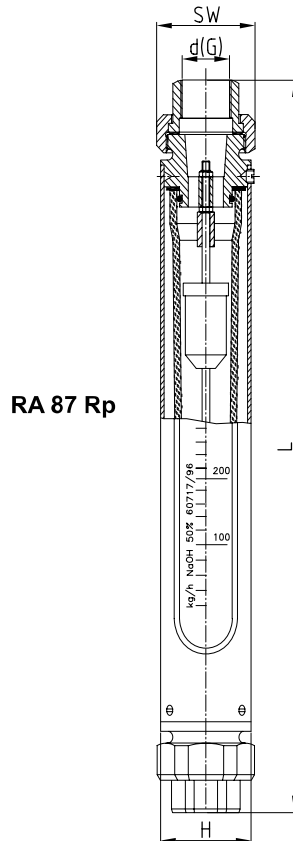
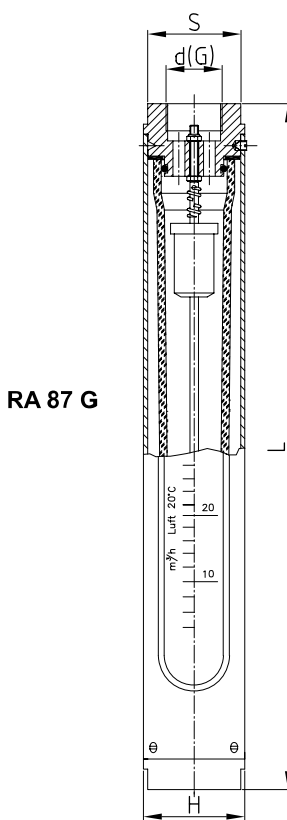
## MEASURING RANGES

Limits Min. & Max. for each standard ranges; Other on request.

Size	H <sub>2</sub> O Float Any material	Air (0 °C / 1013 mbar ABS)		Fittings		Pressure Max. at 20 °C [bar]
		PTFE, PVDF	PVC, PP	RA 87 BSP-F	FA 87 Flanges ND	
9.5	0.5 - 5 l/h	8 - 80 l/h	8 - 80 l/h	1/4"	10	10
	20 - 200 l/h	0.28 - 2.8 m <sup>3</sup> /h	0.2 - 2 m <sup>3</sup> /h	3/8"	15	
19	12 - 120 l/h	0.15 - 1.5 m <sup>3</sup> /h	0.14 - 1.4 m <sup>3</sup> /h	1/2"	15	10
	0.12 - 1.2 m <sup>3</sup> /h	1.6 - 16 m <sup>3</sup> /h	1.2 - 12 m <sup>3</sup> /h	3/4"	20 25	
30	0.1 - 1 m <sup>3</sup> /h	1.2 - 12 m <sup>3</sup> /h	0.85 - 8.5 m <sup>3</sup> /h	1"	25	10
	0.3 - 3 m <sup>3</sup> /h	3 - 30 m <sup>3</sup> /h	2 - 30 m <sup>3</sup> /h	1 1/4"	40	
36	0.4 - 4 m <sup>3</sup> /h	3.5 - 35 m <sup>3</sup> /h	2.5 - 25 m <sup>3</sup> /h	1 1/4"	40	8
	0.8 - 8 m <sup>3</sup> /h	8 - 80 m <sup>3</sup> /h	5 - 50 m <sup>3</sup> /h	1 1/2"	50	
43	0.9 - 9 m <sup>3</sup> /h	8 - 80 m <sup>3</sup> /h	6 - 60 m <sup>3</sup> /h	1 1/2"	50	8
	1.6 - 16 m <sup>3</sup> /h	16 - 160 m <sup>3</sup> /h	12 - 120 m <sup>3</sup> /h	2"	65	

Other measuring ranges according fluid and operating conditions: On request

## DIMENSIONS



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RA 87 G						
Size	G	DN	SW1 <sup>2)</sup>	d [mm] <sup>1)</sup>	L [mm]	H [mm]
9.5	1/4"	10	20	12	266	25
	3/8"	15		16		
19	1/2"	15	40	20	366	44.5
	3/4"	20		25		
	1"	25		30		
30	1"	25	55	32	366	60
	1 1/4"	32		40		
36	1 1/4"	32	65	40	366	70
	1 1/2"	40		50		
43	1 1/2"	40	82	50	366	89
	2"	50		63		

<sup>2)</sup> Only for Stainless steel versions AISI 316 Ti

<sup>1)</sup> Only for versions with couplings in PVC (solvent welding) and PP, PVDF (fusion welding)

RA 87 Rp								
Size	AISI 316 Ti version			Plastic versions				H
	Thread	L [mm]	SW2	DN	d <sup>1)</sup>	L [mm] PVC	L [mm] PP, PVDF	
9.5	Rp 1/4"	306	27	10	16	302	304	25
	Rp 3/8"	309	32	15	20	305	305	
	Rp 1/2"	314	41					
19	Rp 1/2"	414	41	15	20	405	405	44.5
	Rp 3/4"	416	50	20	25	411	409	
	Rp 1"	422	55	25	32	417	413	
30	Rp 1"	422	55	25	32	423	419	60
	Rp 1 1/4"	428	70	32	40	432	424	
	Rp 1 1/2"	429	75	40	50	442	430	
36	Rp 1 1/4"	428	70	32	40	432	424	70
	Rp 1 1/2"	429	75	40	50	442	430	
	Rp 2"	433	90	50	63	456	438	
43	Rp 1 1/2"	429	75	40	50	448	436	89
	Rp 2"	433	90	50	63	462	444	

<sup>1)</sup> Only for versions with couplings in PVC (solvent welding) and PP, PVDF (fusion welding)

FA 87									
Size	DN	L [mm]	H [mm]	D [mm]	d <sub>4</sub> [mm]	k [mm]	Screws	ISO thread	d <sub>2</sub>
9.5	10	260	25	90	40	60	4	M12	14
	15			95	45	65	4	M12	14
19	10	360	44.5	90	40	60	4	M12	M12
	15			95	45	65	4	M12	14
	20			105	58	75	4	M12	14
	25			115	68	85	4	M12	14
30	25	360	60	115	68	85	4	M12	14
	40			150	88	110	4	M16	18
36	40	360	70	150	88	110	4	M16	18
	50			165	102	125	4	M16	18
43	50	360	89	165	102	125	4	M16	18
	65			185	122	145	4	M16	18

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