

# Variable Area Flowmeters RA 60 / FA 60



- Direct reading on calibrated tube
- Range: From 0.1 l/h up to 1,500 m<sup>3</sup>/h
- Accuracy  $\pm 2\%$
- For liquid or for gas
- Materials: Glass, Steel or Stainless Steel
- Adjustable contacts
- Analogue output 4-20 mA or 0-10 Volt
- ATEX version

## APPLICATIONS

Direct reading of flow-rate on gases or on liquids:

- Water treatment, Industrial process (paper mill, textiles etc.), Chemical and pharmaceutical industries, Heating and cooling plants

## 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 is inside a steel case with a transparent reading window.

Versions:

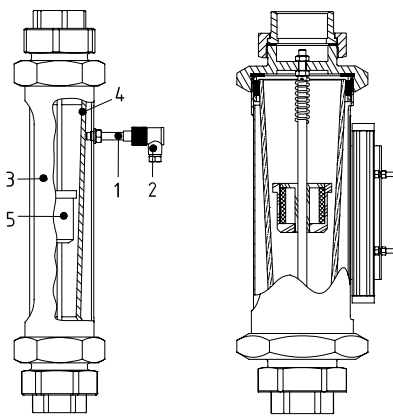
RA 60	Fittings: Unions BSP-F: 1/4" to G 3"
FA 60	Fittings: Flange ND 10 to ND 200
RA/ FA 60-MSK1	With N.C. bistable contact
RA/ FA 60-MSK2	With N.O. bistable contact
RA / FA 60-MSKW	With bistable changeover contact
RA / FA 60-EM *	With analogue output 4-20 mA or 0-10 Volt (Only on model sizes 100 and 110)
RA / FA 60... Ex	ATEX, explosion-proof version

### Contacts:

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

### Output 4-20 mA or 0-10 Volt:

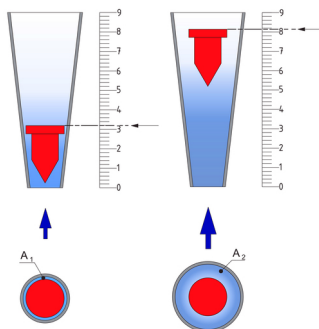
The transmitter is connected to a Hall effect, linear signal ruler. The analogue signal is the image of the float position. The transmitter is connected via an M12 connector. This output is useful for applications using a PLC. The device is compact with a high level of repeatability.



Contact output

- 1) : Reed contact
- 2) : Connector, elbow shape
- 3) : Flowmeter
- 4) : Measuring tube
- 5) : Magnetic float

4-20 mA output (Hall effect sensor)



Operating principle

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## Variable Area Flowmeters RA 60 / FA 60

07-12-2020

D-727.01-EN-AC

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727-01 /1

## TECHNICAL FEATURES

Nominal pressure	PN 10 at 20 °C
Pressure limits	See the table "Measuring ranges"
Operating temperature	Max. 80 °C depending of the 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 60	Union, 2 pieces Inner cylindrical insert, thread according to DIN EN 10226-1 (ISO 7-1)
Raccords / FA 60	Flange PN 10 according to DIN EN 1092-1, Other fittings on request
Corrosion protection	Epoxy coating, glossy blue (RAL 5017)
Corrosion class	C3

### Materials

Steel case	Steel Pipe, P235
Ends / RA 60	S355 (size 19), EN-GJL-200 (size 30 - 36), Cast aluminum from size 43 and larger
Threaded seal	Malleable cast iron, zinc plated
Flanges / FA 60	S355
Measuring tube	Borosilicate glass
Protective screen	Perspex
Seals	NBR (Options: FPM, EPDM, FFKM)
Floats for liquids <sup>1)</sup>	AISI 316 Ti (Options: PVC, PP, PVDF or PTFE with weighted core)
Floats for Gas <sup>1)</sup>	Anodized aluminum (Option: PVC, PP, PTFE, PVDF or AISI 316 Ti)
Floats for versions with contacts <sup>1)</sup>	For liquids: AISI 316 Ti with magnetic core For gas: PVC with magnetic core Other materials on request <sup>1)</sup> Small floats are not guided. With guide rod from size 30 and greater (Detailed description on request)

### Potential free contacts, features

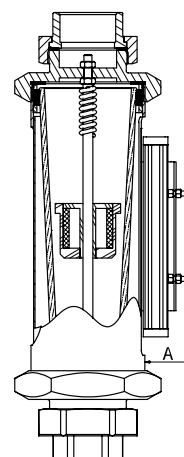
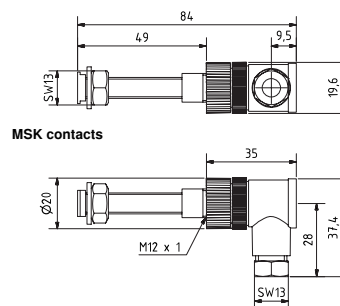
	MSK1	MSK2	MSKW
Operation	Bistable N.C.	Bistable N.O.	Bistable, changeover
Max. voltage	50 V AC / 75 V DC	50 V AC / 75 V DC	50 V AC/75 V DC
Max. current	0.5 A	0.5 A	0.5 A
Switching power	10 W/VA	10 W/VA	5 W/VA
Range T ° <sup>1)</sup>	-20...+90 °C	-20...+90 °C	-20...+90 °C

<sup>1)</sup> : Consider as well the the temperature limit of the flowmeter

### Features of transmitters 4-20 mA -- EM <sup>1)</sup>

Measuring scale [A...B]	160 mm
Repeatability	≤ 0.1% of measuring range ≤ depending on sensor position
Ambient temperature	-25...+70 °C
Output signal	4-20 mA or 0-10 Volt; 3-wire
Power supply	15...30 V DC
Electrical connection	M12 connector / elbow shape
Protection	IP 67
LEDs indication	Green: Power ON Yellow: Float position

<sup>1)</sup> 4-20 mA or 0-10 Volt outputs: Available only for size 100 and 110 models.



4-20 mA output  
Size 100: A = 47 mm  
Size 110: A = 47 mm

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## MEASURING RANGES

Size	Scale: Water at 20 °C	Scale: Air <sup>1)</sup>	RA 60 - Union Fittings	FA 60 - Flanges ND..	Max. P. at 20 °C [bar]
10	0.1 – 1 l/h 15 – 150 l/h	0.3 – 3 l/h 0.25 – 2.5 m <sup>3</sup> /h	Rp ¼"	10	10
			Rp ⅜"	15	
			Rp ½"	20	
				25	
19	12 – 120 l/h 0.12 – 1.2 m <sup>3</sup> /h	0.15 – 1.5 m <sup>3</sup> /h 1.6 – 16 m <sup>3</sup> /h	Rp ½"	10	10
			Rp ¾"	15	
			R 1"	20	
				25	
30	0.1 – 1 m <sup>3</sup> /h 0.3 – 3 m <sup>3</sup> /h	1.3 – 13 m <sup>3</sup> /h 3.6 – 36 m <sup>3</sup> /h	Rp 1"	25	10
			Rp 1 ¼"	32	
			Rp 1 ½"	40	
36	0.4 – 4 m <sup>3</sup> /h	4 – 40 m <sup>3</sup> /h	Rp 1 ¼"	32	8
			Rp 1 ½"	40	
			R 2"	50	
43	0.9 – 9 m <sup>3</sup> /h 1.6 – 16 m <sup>3</sup> /h	5 – 50 m <sup>3</sup> /h 16 – 160 m <sup>3</sup> /h	Rp 1 ½"	40	8
			Rp 2"	50	
			Rp 2 ½"	65	
100	1.6 – 16 m <sup>3</sup> /h 2 – 20 m <sup>3</sup> /h	12 – 120 m <sup>3</sup> /h 28 – 280 m <sup>3</sup> /h	Rp 2"	65	6
			Rp 2 ½"	80	
			R 3"	100	
110	2.5 – 25 m <sup>3</sup> /h 3 – 30 m <sup>3</sup> /h	14 – 140 m <sup>3</sup> /h 44 – 440 m <sup>3</sup> /h	Rp 2 ½"	65	5
			Rp 3"	80	
				100	
150	—	30 – 300 m <sup>3</sup> /h 100 – 1000 m <sup>3</sup> /h	—	80	4
				100	
				125	
				150	
180	—	30 – 300 m <sup>3</sup> /h 150 – 1500 m <sup>3</sup> /h	—	150	3
				200	

<sup>1)</sup> At Standard Temperature and Pressure: 0 °C at 1013 mbar Abs  
On request: Measuring ranges for other fluids and operating conditions

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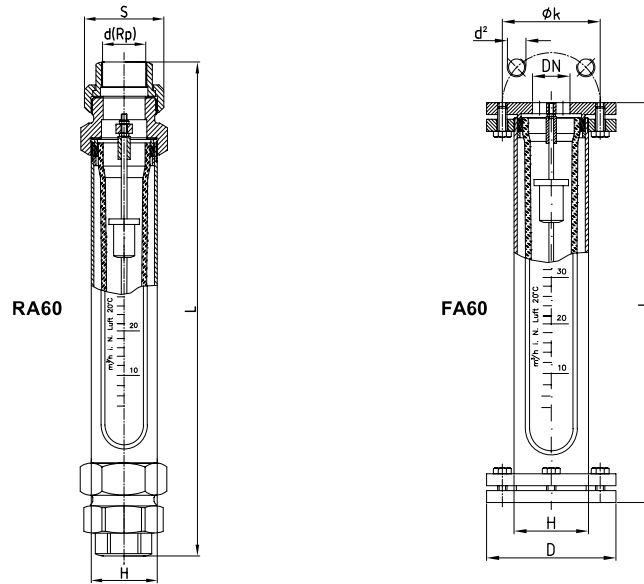
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## DIMENSIONS



RA 60						FA 60										
Size	Union	S [mm]	d' [mm]	L [mm]	H [mm]	Size	DN	L [mm]	H [mm]	D [mm]	k [mm]	x Vis	d²			
10	Rp 1/4"	28	12	388	28	10	10	340	28	90	60	4	M12			
	Rp 3/8"	32	16	390			15			65	4	M12				
	Rp 1/2"	39	20	393			20			75	4	M12				
19	Rp 1/2"	39	20	405	45	19	25	340	45	90	60	4	M12			
	Rp 3/4"	48	25	407			15			65	4	M12				
	Rp 1"	55	32	415			20			75	4	M12				
30	Rp 1"	55	32	415	60	30	25	340	60	115	85	4	M12			
	Rp 1 1/4"	67	40	430			15			65	4	M12				
	Rp 1 1/2"	74	50	436			20			75	4	M12				
36	Rp 1 1/4"	67	40	430	75	36	40	340	75	140	100	4	M16			
	Rp 1 1/2"	74	50	436			25			85	4	M12				
	Rp 2"	90	63	446			32			110	4	M16				
43	Rp 1 1/2"	74	50	440	95	43	40	340	95	150	110	4	M16			
	Rp 2"	90	63	446			50			125	4	M16				
	Rp 2 1/2"	111	75	460			40			110	4	M16				
	Rp 3"	131	90	470			50			125	4	M16				
100	Rp 2"	90	63	446	115	100	65	340	115	185	145	4	M16			
	Rp 2 1/2"	111	75	458			80			160	8	M16				
	Rp 3"	131	90	470			100			180	8	M16				
110	Rp 2 1/2"	111	75	462	133	110	65	340	133	185	145	4	M16			
	Rp 3"	131	90	474			80			160	8	M16				
							100			180	8	M16				
d¹ : For welding or solvent welding						150	80 <sup>1)</sup>	640	178	220	160	8	M16			
							100			220	180	8	M16			
							125			250	210	8	M16			
							150			285	240	8	M20			
							180			150	640	219	285	240	8	M20
										200	340	295	8	M20		

<sup>1)</sup> : For installation, length: 655 mm

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