



Design and applications

Measuring units RA 77 and FA 77 are based on the variable area float principle. The flow meter consists of a PVC armature with a measuring cone made of borosilicate glass. With these design features the RA 77 / FA 77 devices combine the advantages of the classical VA flow meters with those of pure plastic measuring devices: Cost-effective, resistant against almost all aggressive media, as well as a high accuracy of the measuring glass, which can be calibrated to suit any requirement. Especially with water and aggressive media this design has proven itself. Therefore the RA 77 / FA 77 are frequently used in the chemical industry and in water treatment plants.

By installation of electrical limit value switches, which are adjustable throughout the entire measuring range, these devices can be used as detectors.

Our technical documents provide a detailed explanation of the function and measuring principle of VA flow meters.

RA 77 / FA 77



- **calibrated borosilicate measuring cone**
- **armature made of plastic**
- **perspex half-shell as shatter protection**
- **reliable due to simple mode of operation**
- **resistant against aggressive media**
- **cost-effective**
- **scales specific for the media to be measured**
- **optionally limit value switches**





RA 77 / FA 77

Variable area flow meters

Type series

RA 77	with thread connection / gluing sleeve
FA 77	with flange connection
RA / FA 77-MSK1	with switching switch (normally open)
RA / FA 77-MSK12	with switching switch (normally closed)
RA / FA 77-MSKW	with switching switch (change over)

Technical Data

Nominal pressure rating and temperature resistance of the armature	PN 10 at 0 to +20 °C PVC: max. 6 bar at 40 °C PP: max. 1,5 bar at 80 °C PVDF: max. 5,5 bar at 80 °C
Max. operating pressure	see table of measuring ranges on page 3
Measuring range	1:10
Accuracy class	VDE/VDI 3513 page 2 (08/2008)
Error limit (G)	1,6 %
Linear limit (qG)	50 %
Connection RA77	union nut and gluing sleeve acc. to DIN 8063, optionally thread acc. to DIN EN ISO 228 T1
Connection FA77	flange PN 10 acc. to DIN EN 1092-1, others on request

Materials

Protective tube	PVC-CAW-tube with insp. window, dark grey
Fittings and inserts RA 77	standard: PVC optionally: PP, PVDF
Flanges FA 77	standard: PVC optionally: PP, UP-GF
Measuring glass	borosilicate glass
Splinter shield	perspex
Gaskets	standard: EPDM optionally: FKM
Floats for liquids ¹⁾	standard: PVC red with lead core optionally: 1.4571, PP, PVDF
Floats for gases ¹⁾	standard: PVC red optionally: Aluminium anodized, PP, PVDF
With limit value switch	PVC red with magnetic core

other materials on request

¹⁾ Floats at small sizes unguided, from size 30 partly with guide rod.

We will send you a detailed table on request.

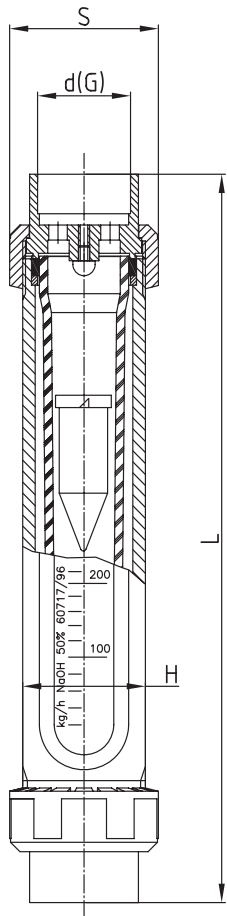
Dimensions

RA 77						
Size	Glued DN	d	G	H	S	L
9,5	10	16	¼	1	43	250
	15	20	¾			
10	10	16	¼	1	43	350
	15	20	¾			
19	15	20	¼	1 ½	60	350
	20	25	¾			
	25	32	½			
30	25	32	1	2 ¼	80	385
	32	40	1 ¼			
	40	50				
36	32	40	1 ¼	2 ¾	98	385
	40	50	1 ½			
	50	63				
43	40	50	1 ½	3 ½	120	385
	50	63	2			
	65	75				
100	50	63	2	4 ½	140 ¹⁾	385
	65	75	2 ½			
	80	90	3			

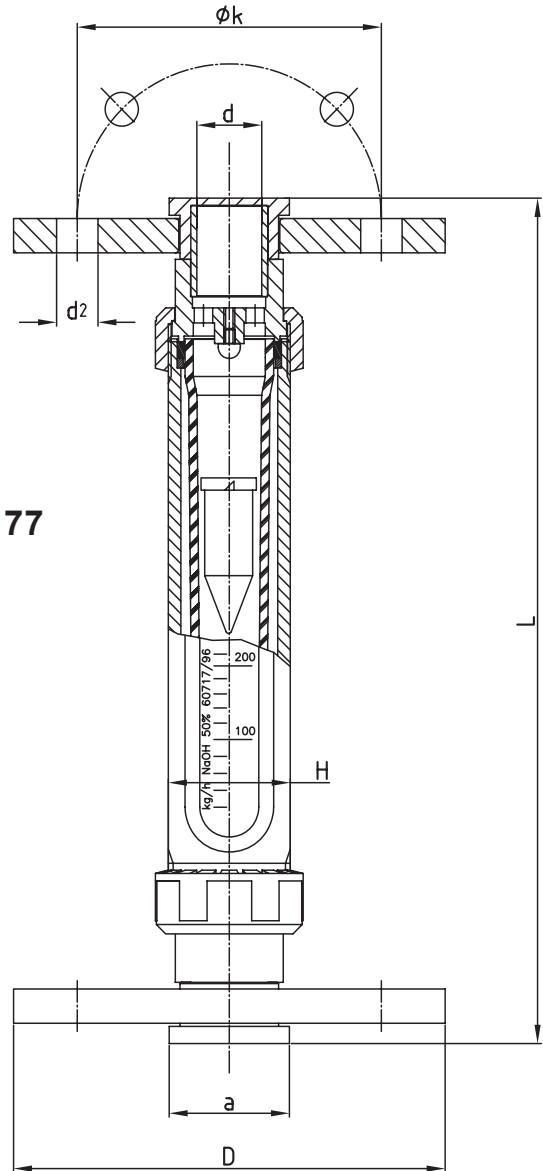
1) Union nut: Aluminium hexagon

FA 77										
Size	DN	d	d ₂	D	H	L	k	a	Screws	
									Qty	Thread
9,5	10	16	14	90	1	284	60	29	4	M 12
	15	20	14	95		288	65	34	4	M 12
10	10	16	14	90	1	384	60	29	4	M 12
	15	20	14	95		388	65	34	4	M 12
19	15	20	14	95	1 ½	388	65	34	4	M 12
	20	25	14	105		394	75	41	4	M 12
	25	32	14	115		400	85	50	4	M 12
30	25	32	14	115	2 ¼	435	85	50	4	M 12
	32	40	18	140		443	100	61	4	M 16
	40	50	18	150		453	110	73	4	M 16
36	32	40	18	140	2 ¾	443	100	61	4	M 16
	40	50	18	150		453	110	73	4	M 16
	50	63	18	165		467	125	90	4	M 16
43	40	50	18	150	3 ½	453	110	73	4	M 16
	50	63	18	165		467	125	90	4	M 16
	65	75	18	185		479	145	106	8	M 16
100	50	63	18	165	4 ½	467	125	90	4	M 16
	65	75	18	185		479	145	106	8	M 16
	80	90	18	200		497	160	125	8	M 16

RA 77



FA 77



Measuring range (min. and max. measuring range; all intermediate measuring ranges are possible)

Size	measuring range H ₂ O	measuring range HCL 30 %	measuring range NaOH 30 %	measuring range NaOH 50 %	measuring range Luft i.N. ¹⁾	max. operating pressure at 20 °C in bar
9,5	0,3 – 3 l/h 10 – 100 l/h	0,3 – 3 l/h 10 – 100 l/h	on request	on request	8 – 80 l/h 0,22 – 2,2 m ³ /h	10
10	0,1 – 1 l/h 15 – 150 l/h	1 – 10 l/h 10 – 100 l/h	on request	on request	0,3 – 3 l/h 0,25 – 2,5 m ³ /h	10
19	12 – 120 l/h 0,2 – 1,6 m ³ /h	10 – 100 l/h 0,11 – 1,1 m ³ /h	4 – 40 l/h 80 – 800 l/h	4 – 40 l/h 20 – 200 l/h	0,17 – 1,7 m ³ /h 1,5 – 15 m ³ /h	10
30	0,1 – 1 m ³ /h 0,3 – 3 m ³ /h	90 – 900 l/h 0,28 – 2,8 m ³ /h	0,1 – 1 m ³ /h 0,2 – 2 m ³ /h	38 – 380 l/h 0,1 – 1 m ³ /h	1 – 10 m ³ /h 3 – 30 m ³ /h	10
36	0,35 – 3,5 m ³ /h 0,6 – 6 m ³ /h	0,3 – 3 m ³ /h 0,55 – 5,5 m ³ /h	0,3 – 3 m ³ /h 0,5 – 5 m ³ /h	0,15 – 1,5 m ³ /h 0,35 – 3,5 m ³ /h	3,6 – 36 m ³ /h 7 – 70 m ³ /h	8
43	0,6 – 6 m ³ /h 3 – 16 m ³ /h	0,56 – 5,6 m ³ /h 0,95 – 9,5 m ³ /h	0,6 – 6 m ³ /h 1 – 10 m ³ /h	0,45 – 4,5 m ³ /h 0,8 – 8 m ³ /h	6 – 60 m ³ /h 12 – 120 m ³ /h	8
100	1,5 – 15 m ³ /h 2 – 20 m ³ /h				13 – 130 m ³ /h 20 – 200 m ³ /h	5

measuring ranges for other substances and operating conditions on request

¹⁾ at STP: at standard conditions (0 °C and 1013 mbar abs.)



RA 77 / FA 77

Variable area flow meters

Limit value switches MSK1/MSK12/MSKW

In order to realize a local display with a monitoring function the flowmeter can be equipped with limit value switches. The limit value switch consists of a connector housing and a bistable reed switch. A magnet integrated in the float switches this reed switch. The limit value switch is guided in a guide slot on the back of the protective tube and can be adjusted throughout the entire measuring range. In case of inductive or capacitive load applications, e.g. caused by contactors or solenoid valves, uncontrolled current and voltage peaks may occur. In dependence on their geometry such peaks also occur in lines if they exceed a certain length. It is therefore recommended to use an additionally available arc suppression relay "MSR". This increases the switching capacity and avoids the appearance of inductive and capacitive peaks. It thereby ensures a long lifetime of the contact.

Technical data of the limit value switches

Design	MSK1	MSK12
Switching voltage	50 V AC/75 V DC	50 V AC/75 V DC
Switching current	0,5 A	0,5 A
Switching capacity	10 W/VA	10 W/VA
Dielectric strength	230 V AC/400 V DC	230 V AC/400 V DC
Temperature range ¹⁾	-20 ... +90 °C	-20 ... +90 °C
Switching function	normally closed	normally open
Connection		

Design	MSKW	
Switching voltage	50 V AC/75 V DC	
Switching current	0,5 A	
Switching capacity	5 W/VA	
Dielectric strength	110 V AC/200 V DC	
Temperature range ¹⁾	-20 ... +90 °C	
Switching function	change over	
Connection		

¹⁾ The thermal endurance of the flow meter is crucial.

Low Voltage Directive

Above 50 V AC/75 V DC, electrical components are subjected to the EU Low Voltage Directive (LVD). The user is required to verify their use accordingly.

Proper use

The user is responsible for assessing the suitability of the flow meters for his case of application, for use as prescribed and for material compatibility regarding the fluid product used in his process.

The manufacturer shall not be liable for any damage arising from incorrect or improper use of the devices.

Pressure surges can cause glass breakage and should therefore generally be avoided. The limit values given in the data sheet should be observed.

In all other respects we advise following the installation recommendations specified in Code VDI/VDE 3513, Sheet 3.

The equipment from **Kirchner und Tochter** has been tested in compliance with applicable CE-regulations of the European Community. The respective declaration of conformity is available on request. Subject to change without notice. The current valid version of our documents can be found at www.kt-flow.de.

The **Kirchner und Tochter** QM-System is certified in accordance with DIN EN ISO 9001:2008. The quality is systematically adapted to the continuously increasing demands.