



### Design and applications

The VA flow meter RA/FA 77 consists of a PVC armature with a measuring cone made of borosilicate glass. With these design features the RA/FA 77 combines the advantages of the classical VA flow meter with those of purely synthetic measuring units:

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 proved worthwhile. Therefore the RA/FA 77 is frequently used in the chemical industry and in water treatment plants.

By installation of up to 3 electrical limit switches (min/max), which are adjustable throughout the entire measuring range, the unit can be employed as a detector too.

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



- calibrated borosilicate measuring glass
- armature made of PVC/PP
- reliable due to simple mode of operation
- resistant against aggressive media
- cost-effective
- with limit switches usable as detectors
- scales specific for the media to be measured
- ☹ 0085BN0045



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## RA 77/FA 77

### Technical data

Nominal pressure rating and temperature resistance of the armature	PVC: PN 10 at 0 to +20 °C/max 6 bar at 40 °C PP: PN 10 at 0 to +20 °C/max 1.5 bar at 80 °C PVDF: PN 10 at 0 to +20 °C/max 5.5 bar at 80 °C
max. operating pressure	see table of measur. ranges on page 3
Measuring range	1:10
Accuracy class	1.6 acc. to VDE/VDI 3513
Connection RA 77	Spigot nut and gluing sleeve acc. to DIN 8063, optionally thread acc. to DIN ISO 228 T1
Connection FA 77	Flange PN 10 acc. to DIN 2501, other connections (ANSI, JIS, ...) on request

### Materials

Protective tube	PVC-tube with insp.window, quality PVC-CAW dark grey
Fittings and inserts RA 77	PVC, optionally PP, PVDF
Flanges FA 77	PVC, optionally PP, UPGF
Measuring cone	Borosilicate glass
Seals	EPDM, optionally Viton
Floater for fluids	PVC red (lead weighted), optionally 1.4301, 1.4571, PP, PVDF
Floater for gases	PVC red, optionally aluminium anodized, PP, PVDF
with limit switches	PVC with magnetic core

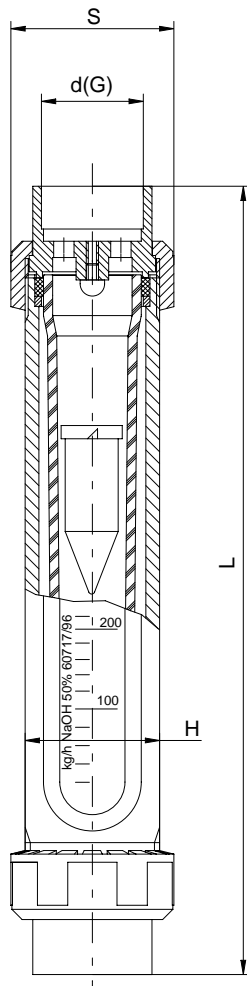
### Dimensions

RA 77						
Size	Glued DN	d	G	H	S	L
9.5	10	16	1/4	1	43	250
	15	20	3/8			
10	10	16	1/4	1	43	350
	15	20	3/8			
19	15	20	1/4	1 1/2	60	350
	20	25	3/8			
	25	32	1/2			
30	25	32	1	2 1/4	80	385
	32	40	1 1/4			
	40	50				
36	32	40	1 1/4	2 3/4	98	385
	40	50	1 1/2			
	50	63				
43	40	50	1 1/2	3 1/2	120	385
	50	63	2			
	65	75				
100	50	63	2	4 1/2	140 <sup>1)</sup>	385
	65	75	2 1/2			
	80	90	3			

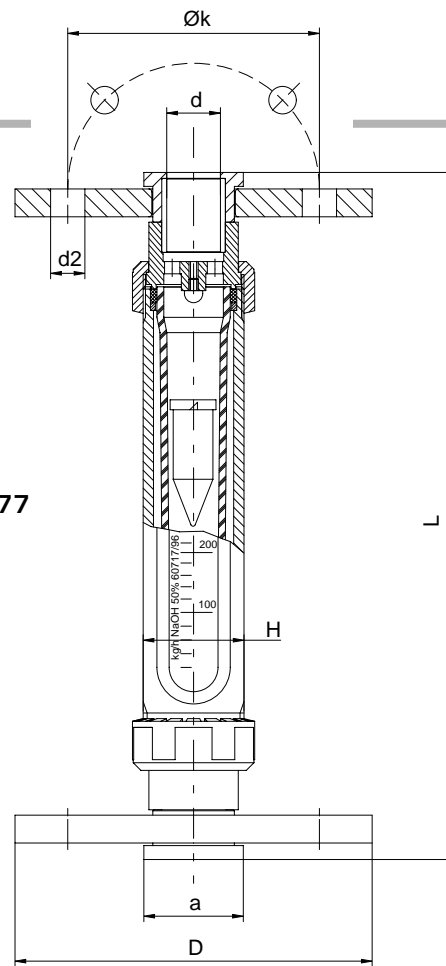
<sup>1)</sup> Spigot nut: Aluminium hexagon

FA 77										
Size	DN	d	d <sub>2</sub>	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 1/2	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 1/4	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 3/4	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 1/2	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 1/2	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 ranges** (min. and max. measuring range; all intermediate measuring ranges are possible)

Size	Measuring range m <sup>3</sup> /h H <sub>2</sub> O	Measuring range m <sup>3</sup> /h HCL 30%	Measuring range m <sup>3</sup> /h NaOH 30%	Measuring range m <sup>3</sup> /h NaOH 50%	Measuring range m <sup>3</sup> /h at s.c. air <sup>1)</sup>	max. operat. press. in bar at 20 °C
9.5	0,3 – 3 <sup>2)</sup> 10 – 100 <sup>2)</sup>	0,3 – 3 <sup>2)</sup> 10 – 100 <sup>2)</sup>	on request	on request	0,002 – 0,02 0,22 – 2,2	10
10	0,01 – 1 <sup>2)</sup> 15 – 150 <sup>2)</sup>	1 – 10 <sup>2)</sup> 10 – 100 <sup>2)</sup>	on request	on request	0,004 – 0,04 to 2,2	10
19	0,012 – 0,12 0,2 – 1,6	0,01 – 0,1 0,11 – 1,1	0,004 – 0,04 0,08 – 0,8	0,004 – 0,04 0,02 – 0,2	0,17 – 1,7 1,5 – 15	10
30	0,1 – 1 0,3 – 3	0,09 – 0,9 0,28 – 2,8	0,1 – 1 0,2 – 2	0,038 – 0,38 0,1 – 1	1 – 10 3 – 30	10
36	0,35 – 3,5 0,6 – 6	0,3 – 3 0,55 – 5,5	0,3 – 3 0,5 – 5	0,15 – 1,5 0,35 – 3,5	3,6 – 36 7 – 70	8
43	0,6 – 6 3 – 16	0,56 – 5,6 0,95 – 9,5	0,6 – 6 1 – 10	0,45 – 4,5 0,8 – 8	6 – 60 12 – 120	8
100	1,5 – 15 2 – 20	–	–	–	13 – 130 20 – 200	5

Measuring ranges for other measuring substances and operating conditions on request.

<sup>1)</sup> at s.c.: at standard conditions (0 °C and 1,013 bar abs.) <sup>2)</sup> in U/h

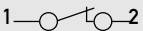
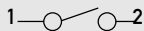


## RA 77/FA 77

### Limit switches MSK 1/MSK 12

In order to realize a local display with a monitoring function the flowmeter can be equipped with limit switches. The limit switch consists of a bistable reed contact switched by the magnet integrated in the float. The 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 switches

Design	MSK 1	MSK 12
Switching voltage	230 V AC/DC	230 V AC/DC
Switched current	0.5 A	0.5 A
Switching capacity	10 W/VA	10 W/VA
Dielectric strength	400 V	400 V
Temperature range	-40 to +50 °C	-40 to +50 °C
	the temperature resistance of the flow meter is decisive	
Switching function	Normally closed contact 	Normally open contact 

### Notes on safety

For safety reasons we recommend to use the VA flow meters with glass measuring tubes only in combination with a protective shield in front of the measuring tube.

Avoid extreme pressure shocks.

The equipment from KIRCHNER has been tested in compliance with applicable CE-regulations of the European Community.

The respective declaration of conformity is available on request.

The KIRCHNER QM-System is certified in accordance with DIN-EN-ISO 9001:2000. The quality is systematically adapted to the continuously increasing demands.



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