



## Design and applications

Measuring units RA 65 and FA 65 are based on the variable area float principle.

In pipelines the RA 65 is installed by means of pipe unions and the FA 65 is mounted between flanges. The borosilicate glass measuring cone is located inside a protection steel tube with an inspection window.

VA flow meters RA 65 and FA 65 are most suitable for the flow measurement of transparent liquids and gases. Each unit is customized with a scale specific for the medium to be measured. RA 65 and FA 65 are used e.g. in plant and process engineering.

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

By installing a linear displacement sensor an output signal can be generated which is proportional to the height setting of the flow meter.

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

RA 65 / FA 65



- **calibrated borosilicate measuring cone**
- **armature with protective steel tube**
- **perspex half-shell as shatter protection**
- **reliable due to simple mode of operation**
- **scales specific for the media to be measured**
- **optionally**
  - **limit value switches**
  - **analogue output 4 ... 20 mA**
  - **explosion-proof design**
  - **PVC lining for flow measurement of aggressive fluids**





# RA 65 / FA 65

## Variable area flow meters

### Type series

RA 65	with threaded connection
FA 65	with flange connection
RA / FA 65-MSK1	with switching switch (normally open)
RA / FA 65-MSK12	with switching switch (normally closed)
RA / FA 65-MSKW	with switching switch (change over)
RA / FA 65-EM	with analogue output 4 ... 20 mA
RA / FA 65... Ex	explosion-proof design

### Technical data

Nominal pressure	FA 65: PN 10 at 20 °C RA 65: PN 10 at 20 °C
Max. operating pressure	see table measuring ranges on page 3
Thermal endurance	80 °C, optionally 100 °C
Ambient temperature	max. 90 °C
Turn-down ratio	1:10
Accuracy class	VDE/VDI 3513 page 2 (08/2008)
Error limit (G)	1,6 %
Linear limit (qG)	50 %
Connection RA 65	two-part pipe fitting: insert with cylindrical internal thread acc. to DIN EN 10226-1 (ISO 7-1)
Connection FA 65	flange PN 10 acc. to DIN EN 1092-1, other connections on request
Corrosion protection	epoxy paint, kiln-dried, traffic blue (RAL 5017), satin finished
Corrosion class	C2

### Materials

Protective sleeve	precision steel tube made of P235
Heads RA 65	S355, optionally: PVC <sup>2)</sup>
Threaded joint	malleable cast iron, zinc plated, optionally: PVC <sup>2)</sup>
Flanges FA 65	S355 (size 19), EN-GJL-200 (size 30 - 43) optionally: with PVC inlay <sup>2)</sup>
Measuring glass	borosilicate glass
Splinter shield	perspex
Gaskets	standard NBR optionally FKM, EPDM, silicone
Floats for liquids <sup>1)</sup>	standard: 1.4571 optionally: PVC, PP, PVDF or PTFE with lead core
Floats for gases <sup>1)</sup>	aluminium anodized optionally: PVC, PP, PTFE, PVDF or 1.4571
With limit value switches <sup>1)</sup>	1.4571 with magnetic core (liquids) PVC with magnetic core (gases)
Special design <sup>2)</sup>	protection of all parts in contact with media

other materials on request

<sup>1)</sup> Floats of small sizes are nonguided. Size 30 and larger: Partly with guided float. Optionally sizes 9,5 (without limits switches only) and 19 are deliverable. A detailed table is available on request.

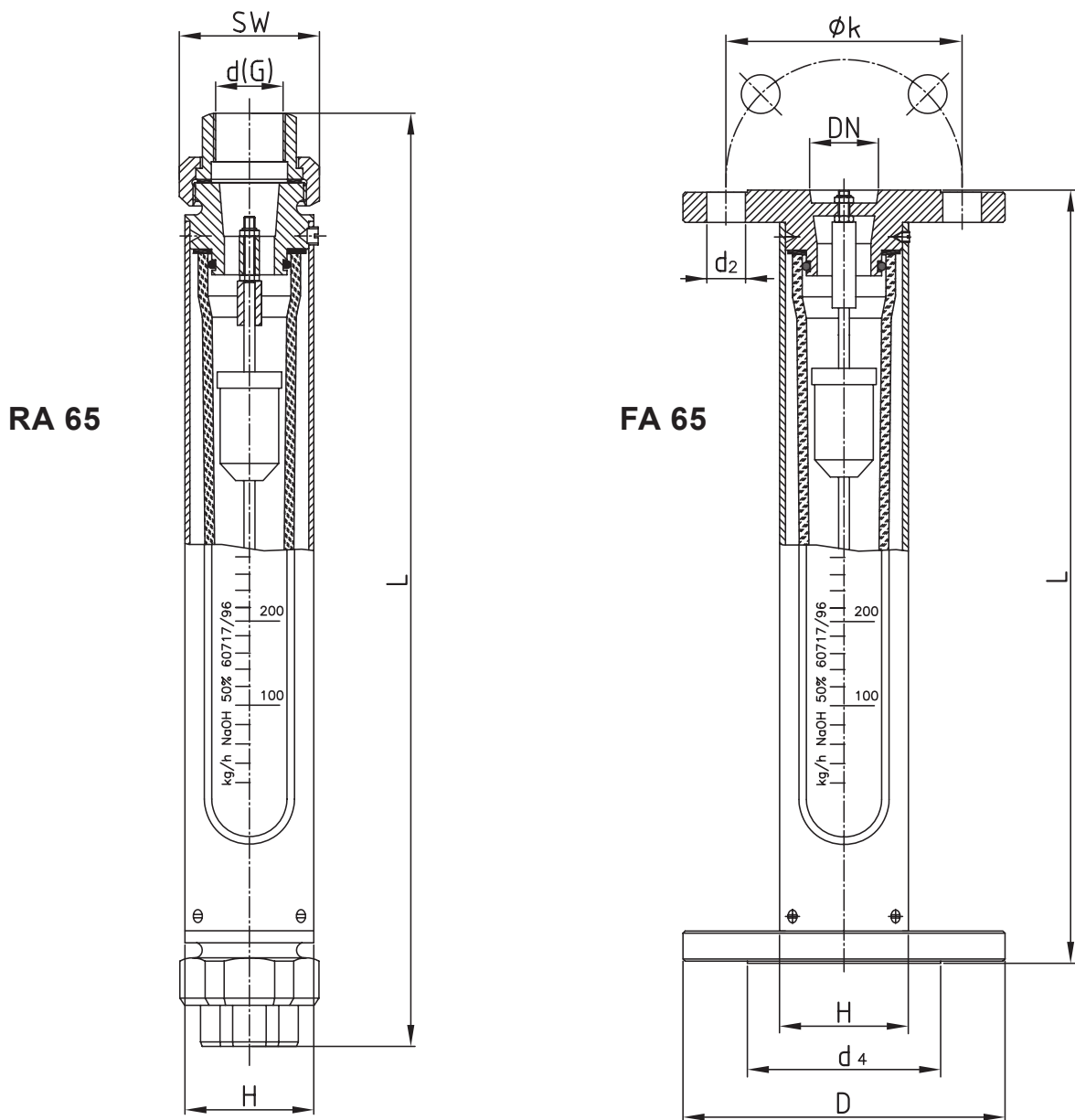
<sup>2)</sup> PVC lining: All wetted parts, except the measuring glass, are made from PVC.

### Dimensions

RA 65					
Size	Pipe fitting	SW	d <sup>1)</sup>	L	H
9,5	Rp ¼	28	12	308	25
	Rp ⅜	32	16	310	
	Rp ½	39	20	312	
19	Rp ½	39	20	413	45
	Rp ¾	48	25	420	
	Rp 1	55	32	424	
30	Rp 1	55	32	424	60
	Rp 1 ¼	67	40	428	
	Rp 1 ½	74	50	430	
36	Rp 1 ¼	67	40	428	70
	Rp 1 ½	74	50	430	
	Rp 2	90	63	445	
43	Rp 1 ½	74	50	430	90
	Rp 2	90	63	445	
	Rp 2 ½	111	75	446	
	Rp 3	131	90	450	

<sup>1)</sup> d for gluing and welding sleeves

FA 65									
Size	DN	L	H	D	d <sub>4</sub>	k	Screws		d <sub>2</sub>
							Qty	Thread	
9,5	10	260	25	90	40	60	4	M12	14
	15			95	45	65	4	M12	14
19	10	360	45	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	20	360	60	105	58	75	4	M12	M12
	25			115	68	85	4	M12	14
	40			150	88	110	4	M16	18
36	25	360	70	115	68	85	4	M12	M12
	40			150	88	110	4	M16	18
	50			165	102	125	4	M16	18
43	50	360	90	165	102	125	4	M16	18
	65			185	122	145	4	M16	18



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

Size	measuring range m³/h H₂O		measuring range m³/h air at STP <sup>1)</sup>		RA 65 Threaded connection	FA 65 Flange connection DN	max. operating pressure bar at 20 °C		
9,5	0,5	– 5	l/h	8	– 80	l/h	Rp ¼ Rp ¼ Rp ½	10 15	10
19	12	– 120	l/h	0,15	– 1,5	m³/h	Rp ½ Rp ¾ Rp 1	10 15 20 25	10
30	0,1	– 1	m³/h	1,3	– 13	m³/h	Rp 1 Rp 1 ¼ Rp 1 ½	25 40	10
36	0,4	– 4	m³/h	4	– 40	m³/h	Rp 1 ¼ Rp 1 ½ Rp 2	40 50	8
43	0,9	– 9	m³/h	5	– 50	m³/h	Rp 1 ½ Rp 2 Rp 2 ½ Rp 3	50 65	8

measuring ranges for other substances and operating conditions on request

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



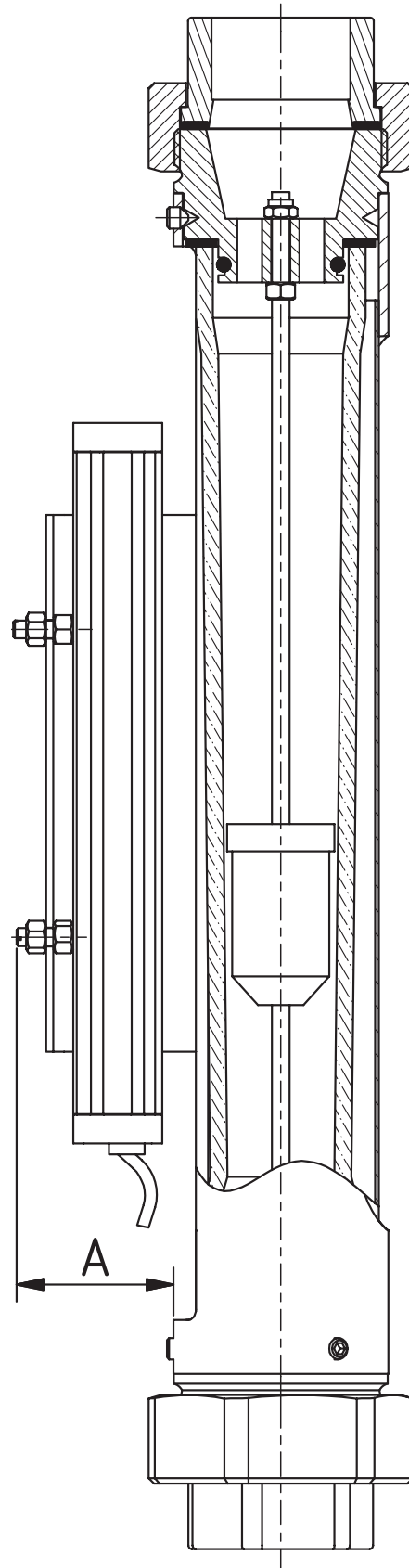
# RA 65 / FA 65

Variable area flow meters

## RA / FA 65-EM

Size *)	A
19	37
30	45
36	46
43	47

\*) Linear displacement sensor not available for Size 9,5



## Limit value switches MSK1/MSK12/MSKW

In order to realise 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 <sup>1)</sup>	-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 <sup>1)</sup>	-20 ... +90 °C	
Switching function	change over	
Connection		

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

## Linear displacement sensor EM

The linear displacement sensor based on the Hall principle delivers an output signal proportional to the height setting of the flow meter. This signal can be displayed in 4 ... 20 mA or 0 ... 10 V to realise a remote indication. The sensor is connected via the enclosed M12 x 1 plug.

- Compact Design
- High level of reproducibility
- Measuring range indication via LED
- Most helpful for SPS integration
- Realise remote indication

Please notice that the sensor has a blind zone in the range of 3.7 mA to around 4 mA and only performs stable operation from approx. 4 mA.

### Technical Data

Measurement range [A...B]	160mm
Repeatability	≤ 0,1 % from measurement range ≤ dependent upon position sensor
Linearity deviation	≤ 1 % v.E.
Temperature drift	≤ ± 0,006 %/K
Ambient temperature	-25 ... +70 °C
Operating voltage	15 ... 30 V DC
Idle current	≤ 15 mA
Output function	Four-wire, analogue output
Voltage output → Load resistor	0 ... 10 V ≥ 4,7 kΩ
Current output → Load resistor	4 ... 20 mA ≤ 0,4 kΩ
Sampling rate	200 Hz
Connection	Connector, M12 x 1
Protection class	IP67
Operating voltage display	LED, green
Measurement range display	LED, yellow, position sensor in detection range
Connection diagram	

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







## RA 65 / FA 65

Variable area flow meters

### 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 as regards 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](http://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.