

# Synthetic VA Flowmeters

## KM 16, KM 17 KM 18, KM 20

### Operation

The flowmeters type KM 16 to KM 20 operate with the float measuring principle

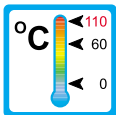


### Application

The flowmeters type KM 16 to KM 20 are used for measuring volumeflow of liquid and gaseous media.



Areas of application:



– Coolingsystems and cooling-circuits



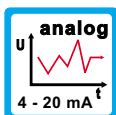
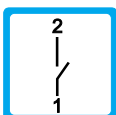
– Mechanical Engineering  
e.g. Weldingmachinery,  
Laserplants



– Medicine technology

– Pharmaceutical industry

– Research and development



### Features

The model proves itself through reliable function and easy handling:

- high accuracy  
(Accuracy class 4)
- easy to read
- Good suitability for special media by choice between 4 different materials
- Scales can be exchanged subsequently,  
Special scales on request
- Glue connections or threaded connections

### Installation hints

The instrument must be installed vertically in the flow circuit. The flowdirection is from bottom to top.

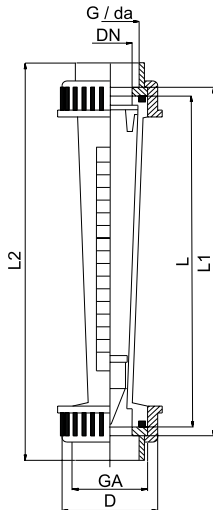
The flowmeter must not be used as a supporting part in a pipeconstruction!

The medium must not contain any solid particles!

KM16 1 0002 07-04 E M



# Technical Data



Material				
	Version PVC-U	Version PA	Version PSU	Version PVDF
Measuring tube	PVC-U	PA	PSU	PVDF
Float	PVDF*	PVDF*	PVDF*	PVDF*
Connection				
Glue connection	PVC			
Treaded connection				
standard:	PVC			
optional:	GTW, Brass, Stainless steel (1.4571)			

Standard exworks are glue connections.

\*optional liquidtight encapsulated magnets (Recording of measurement)

Other versions on request!

Type	Measuring range H <sub>2</sub> O [l/h]	Overall dimensions mm							Option G	Weight [g]
		da	DN	L	L1	L2	D	GA		
KM 16-02	3 - 24	16	10	165	171	199	35	3/4"	3/8"	78
KM 16-06	5 - 60	16	10	165	171	199	35	3/4"	3/8"	78
KM 16-1	10 - 100	16	10	165	171	199	35	3/4"	3/8"	78
KM 16 -2.5	25 - 250	16	10	165	171	199	35	3/4"	3/8"	78
KM 17-05	5 - 50	20	15	170	176	208	43	1"	1/2"	96
KM 17-1.5	15 - 150	20	15	170	176	208	43	1"	1/2"	96
KM 17-2.5	25 - 250	20	15	170	176	208	43	1"	1/2"	96
KM 17-4	40 - 400	20	15	170	176	208	43	1"	1/2"	96
KM 18-1.5	15 - 150	25	20	185	191	229	53	1 1/4"	3/4"	125
KM 18-4	40 - 400	25	20	185	191	229	53	1 1/4"	3/4"	125
KM 18-6	60 - 600	25	20	185	191	229	53	1 1/4"	3/4"	125
KM 18-10	100 - 1000	25	20	185	191	229	53	1 1/4"	3/4"	125
KM 20-2.5	25 - 250	32	25	200	206	250	60	1 1/2"	1"	250
KM 20-4	40 - 400	32	25	200	206	250	60	1 1/2"	1"	250
KM 20-10	100 - 1000	32	25	200	206	250	60	1 1/2"	1"	250
KM 20-15	150 - 1500	32	25	200	206	250	60	1 1/2"	1"	250

Technical data	KM-16	KM-17	KM-18	KM-20
Operating pressure max.:	see Pressure - Temperature - Diagram			
Pressure drop:	see table on page 3			
Temperature range:				
PVC-U	-10 bis +60 °C			
PA	+5 bis +75 °C			
PSU	+5 bis +100 °C			
PVDF	0 bis +110 °C			
Accuracy:	Accuracy class 4 according to VDE / VDI 3513 page 2			

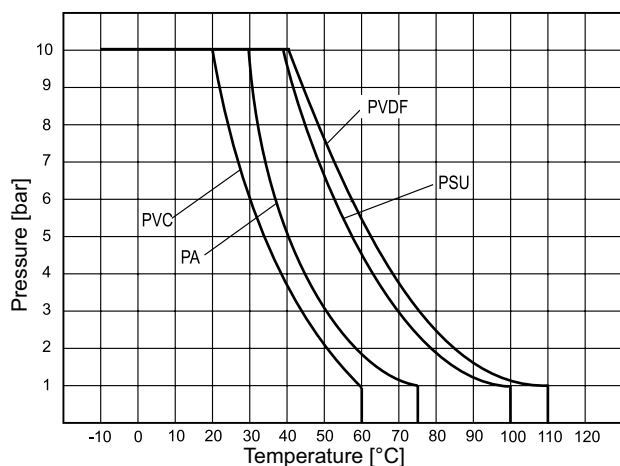
## Pressure - Temperature - Diagram

The curves of the diagram present approximate values of the resistance of four different materials in relation to the operating temperature.

Pressure - temperature curves are valid for a calculated life - time of 20 years.

Among other factors the creep strength of the different materials must be considered when determining the permissible operating pressure.

As far as these details or operating temperatures under 0 °C are concerned, we ask you to inform us about the exact operating conditions.



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## Measuring ranges for water and air

Type	Range	Pressure drop	Range	Pressure drop
	H <sub>2</sub> O [l/h]	H <sub>2</sub> O at 20 °C [mbar]	Air, 20 °C, 0 - 0,2 bar rel. [Nm <sup>3</sup> /h]	Air at 20 °C [mbar]
KM 16-02	3 - 24	3,3	0,2 - 1,0	4,8
KM 16-06	5 - 60	3,3	0,2 - 3,2	4,8
KM 16-1	10 - 100	3,3	0,5 - 3,6	4,8
KM 16 -2.5	25 - 250	3,3	0,5 - 9,0	4,8
KM 17-05	5 - 50	2,5	0,4 - 2,8	4,3
KM 17-1.5	15 - 150	2,5	0,8 - 6,25	4,3
KM 17-2.5	25 - 250	2,5	0,9 - 9,5	4,3
KM 17-4	40 - 400	2,5	2,0 - 15,0	4,3
KM 18-1.5	15 - 150	6,1	0,5 - 5,5	8,3
KM 18-4	40 - 400	6,1	2,0 - 14,0	8,3
KM 18-6	60 - 600	6,1	2,5 - 22,0	8,3
KM 18-10	100 - 1000	6,1	4,0 - 34,0	8,3
KM 20-2.5	25 - 250	6,1	1,0 - 8,0	8,3
KM 20-4	40 - 400	6,1	2,0 - 14,0	8,3
KM 20-10	100 - 1000	6,1	4,0 - 34,0	8,3
KM 20-15	150 - 1500	6,1	5,0 - 50,0	8,3

Type	Range	Range	Range	Range	Range	Range	Range	Range
	Air 1 bar [Nm <sup>3</sup> /h]	Air 2 bar [Nm <sup>3</sup> /h]	Air 3 bar [Nm <sup>3</sup> /h]	Air 4 bar [Nm <sup>3</sup> /h]	Air 5 bar [Nm <sup>3</sup> /h]	Air 6 bar [Nm <sup>3</sup> /h]	Air 7 bar [Nm <sup>3</sup> /h]	Air 8 bar [Nm <sup>3</sup> /h]
KM 16-02	0,2 - 1,3	0,25 - 1,6	0,3 - 1,75	0,3 - 1,9	0,3 - 2,1	0,3 - 2,2		0,3 - 2,3
KM 16-06	0,4 - 3,2	0,2 - 3,8	0,3 - 4,4	0,3 - 4,8	0,3 - 5,1	0,25 - 5,25	0,4 - 5,8	0,3 - 6,0
KM 16-1	0,6 - 5,0	0,8 - 6,0	0,8 - 7,0	0,8 - 7,8	0,8 - 8,0	1,0 - 8,7		1,0 - 9,0
KM 16 -2.5	1,0 - 13,0	1,0 - 16,0	1,5 - 18,0	1,5 - 20,0	2,0 - 23,5	2,0 - 26,0		
KM 17-05	0,2 - 3,2	0,5 - 4,0	0,5 - 4,5	0,3 - 4,6	0,5 - 5,5	0,5 - 5,5		0,5 - 6,5
KM 17-1.5	1,0 - 9,0	1,0 - 11,0	1,5 - 12,0	1,0 - 13,0	1,5 - 15,0	1,5 - 16,0	2,0 - 17,0	2,0 - 18,0
KM 17-2.5	1,5 - 13,0	1,5 - 17,0	2,0 - 20,0	1,5 - 22,0	2,0 - 23,5	4,0 - 26,0	2,0 - 28,0	
KM 17-4	2,0 - 21,0	3,0 - 26,0	3,0 - 30,0	3,0 - 33,0	3,0 - 36,0	4,0 - 40,0		
KM 18-1.5	1,0 - 8,5	1,0 - 11,0	1,0 - 10,5	1,5 - 13,5	1,5 - 15,0	1,0 - 12,0		
KM 18-4	2,0 - 20,0	3,0 - 26,0	4,0 - 30,0	3,0 - 33,0	4,0 - 36,0	4,0 - 38,5		4,0 - 40,0
KM 18-6	4,0 - 31,0	4,0 - 38,0	5,0 - 45,0	5,0 - 48,0	6,0 - 54,0	5,0 - 57,5		6,0 - 66,0
KM 18-10	5,0 - 45,0	6,0 - 58,0	7,5 - 67,5	7,5 - 72,5	8,0 - 80,0	10,0 - 90,0	10,0 - 100	
KM 20-2.5	1,5 - 13,0	1,5 - 16,0	1,5 - 17,0	2,0 - 18,0	2,0 - 19,0	2,0 - 20,0		
KM 20-4	2,0 - 20,0	3,0 - 26,0	3,0 - 30,0	3,0 - 33,0	4,0 - 34,0	4,0 - 38,5		
KM 20-10	4,0 - 46,0	5,0 - 55,0	6,0 - 66,0	7,5 - 72,5	8,0 - 80,0	8,0 - 90,0	7 - 95	
KM 20-15	6,0 - 70,0	7,5 - 90,0	7,5 - 100	10,0 - 120	10,0 - 130	10,0 - 140	10 - 150	

The measuring ranges indicated in the table are approximate values at 20 °C.  
Other measuring ranges and gases on request!

**Caution: Do not use PVC - measuring tubes with Air / Gas - Application !**



# Limitswitch, Measuring Sensor

## Limitswitch SG-KM

The limitswitches SG-KM serve as event marker for min., max. or any inbetween value of the flow. They are fitted on the dove-tail of the measuring tube and trigger a signal when the float reaches or passes the switch. As soon as this happens the reed contact opens or closes. For this function the float must contain magnets.



SG-KM

### Type SG-KM-MO-S monostable (normally open)

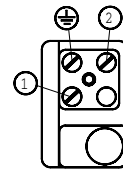
The contact is closed, when the float is in line with the limitswitch. It opens (event) as soon as the float moves up or down away from the switch, which means increasing or decreasing flow.

### Type SG-KM-BI-S/Ö bistable (normally open or normally closed)

The normally open contact closes as soon as the magnetfloat approaches (coming from the bottom) the limitswitch or is in line with the same. When overriding the limitswitch, the switchcondition remains. Only when overriding the limitswitch, the switchcondition will be cancelled.

The normally closed contact is closed under noflow condition and open under flow condition.

Remark: Before the first start up, the float has to pass the limitswitch at least 3 times in order to cancel the monostable behaviour!



### Connection allocation

The polarity of the connectors does not influence the function

Technical Data			
<b>Operating voltage:</b>	max. 470 V AC	<b>Operating temperature:</b>	0 °C bis +55 °C
<b>Switch current:</b>	max. 0,5 A	<b>Ingress protection:</b>	IP 65 (DIN 40050)
<b>Switch power:</b>	max. 10 W / 10VA	<b>Hysteresis:</b>	3 mm
<b>Switch resistance:</b>	< 150 mΩ	<b>Dimensions:</b>	34 x 17 x 41 mm
<b>Insulating resistance:</b>	> 10 <sup>11</sup> Ω	<b>Weight (incl. plug):</b>	40 g

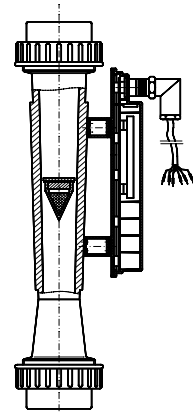
The electrical max. values must not be exceeded!

## Measuring Sensor KME-16/35

The measuring sensor KME-16/35 detects, by means of magnetic sensors, the actual position of the magnetic float in the measuring tube of the flowmeters.

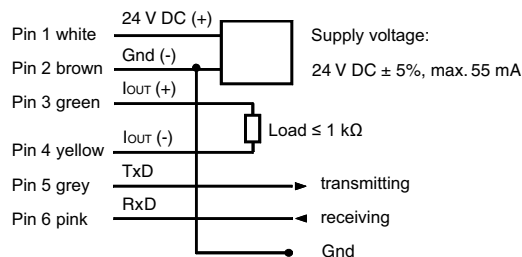
The position of the float is touchless detected within the flowrange from 10 to 100 % with a resolution of 0,1% and transmitted as analog signal of 4 - 20 mA and/or digital signal via RS 232 - interface.

The new sensor technique can be programmed for different media and operating conditions.



KME-16/35

Allocation and connecting diagram	
Pin 1 = 24 V DC (+)	
Pin 2 = Gnd (-)	
Pin 3 = I <sub>OUT</sub> (+) Analog output 4...20 mA, load ≤ 1 kΩ	
Pin 4 = I <sub>OUT</sub> (-) Analog output 4...20 mA	
Pin 5 = TxD (transmitting) Digital output	
Pin 6 = RxD (receiving) Digital output	
Pin 5 and Pin 6: RS 232 - Interface with TTL-level Data format : 9600 Baud, 8 Databits, 1 Stopbit, No Parity	



Technical Data			
<b>Supply voltage:</b>	24 V DC	<b>Operating temperature:</b>	0 °C bis +55 °C
<b>Input current:</b>	max. 55 mA	<b>Ingress protection:</b>	IP 65 (DIN 40050)
<b>direct Analog output:</b>	4... 20 mA	<b>Accuracy:</b>	± 1 % of actual value
<b>direct Digital output:</b>	RS 232	<b>Repeatability:</b>	0,2 % (over entire Range)
<b>Connection:</b>	6-pin plug	<b>Material:</b>	Thermoplastics

The analog inputs of instruments, which are connected to the analog output of the KME-16/35, must not be on operating voltage potential. Only instruments with galvanic isolated inputs must be used.

The max. cable length (w/o amplifier) is 2 m when using the RS 232 - interface and 20 m with the analog output.

An EPROM, inside the KME-16/35, is burnt for each individual application, therefore all medium specific data, which are necessary for special scaling, must be supplied with the order (concentration, viscosity, density).

