Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

Flap Flow Meter

for Liquids

measuring • monitoring • analysing

- Range:
  0.5 - 3.5 ... 200 - 1500 m³/h
- Accuracy: ± 2.0 of reading
- p_{max}: PN40, t_{max}: -40 ... +300 °C
- Connection: wafer flange
  DN 25 ... 500
- Material: stainless steel,
  Hastelloy C, PP, PTFE
- Option: limit contacts,
  analogue output with HART® or
  PROFIBUS-PA®, Counter

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Model:
TSK

Description

The Kobold flap flowmeter type TSK is suitable for flow measurement of liquid products in pipes. The special advantage is that it can be used for all directions of flow. It shows the current flow rate in volume or mass per unit in time. The meter's design makes it ideal for processes under difficult and adverse operating conditions. The devices are available with additional electrical equipment for process monitoring and control.

Function

If a medium flows with sufficient velocity through the horizontally or vertically mounted TSK fitting, the paddle will swivel around the axle until the force of the medium and the opposing force of the paddle surface plus the spring tension establish equilibrium. The angular position or the position of equilibrium of the paddle in the measuring compartment is the measure for the flow. The encapsulated ring-type permanent magnet at the end of the paddle axis transmits this position to the scale and the optional electronic evaluators through the magnet tracking indicator system. This happens safely and without packing glands.

The flow rates shown on the scale only apply to the calibrated medium or to a medium with the same physical characteristics.

Additional advantages

- A large spectrum of wetted materials and linings
- Magneto-resistive signal transmission
- Special design for high temperature applications

Applications

- Control of cooling- and flushing processes
- Chemical industry
- Water- and waste-water technology
- Power-plants
- Maschinery-building

Technical details

Sensor

Materials:	1.4404 (316 L) / 1.4571 (316 Ti) (TSK-S) Steel / Stainless steel (TSK-C from DN80) Hastelloy C-22 (TSK-H) Polypropylene / Stainless steel (TSK-H) Polypropylene / Hastelloy C-22 (TSK-J) PTFE / Hastelloy C-22 (TSK-P) other materials on request
Process connection:	Sandwich acc. EN 1092, ASME B16.5, DIN2512, special connections on request
Nominal pressure:	PN 40, ASME Cl150 / 300 (standard) (TSK-S/C/H) PN 16, ASME Cl150 (standard) (TSK-K/J/P) higher pressure rates optional
Process temperature:	-40 °C up to +300 °C (TSK-S/C/H) 0 °C up to +80 °C (TSK-K/J) -20 °C up to +125 °C (TSK-P)
Ambient temperature:	-40 °C up to +80 °C
Ingress protection:	IP 65 (EN60529)
Accuracy:	Liquid: ± 2 % of reading ± 1% of upper range value ± 0.2 % with transmitter (ES)

Certification

Explosion protection:	BVS 03 ATEX H/B 112
CE-Marking:	Pressure Equipment Directive 97/23/EC

Display

Materials:	Aluminium (stove-enameled) Stainless steel (as option)
Outputs:	inductive switch inductive switch in safety design microswitch others on request
Ambient temperature:	-40 °C up to +80 °C (without switch) -40 °C up to +65 °C (with switch)

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Technical details

Transmitter:

- ES with HART®-protocol
- ES with HART®-protocol and 2 NAMUR-switches
- ES with HART®-protocol and 1 NAMUR-switch / 1 pulse output
- ES with PROFIBUS-PA®
- ES with HART®-protocol and counter module

Power supply:	14 - 30 V_{DC}
Output:	passive, galvanically isolated
Currency:	4-20 mA
Binary 1 and 2:	U_i=30 V, I_i=20mA, P_i=100 mW
Input Binary:	Counter reset (only for ES with counter module)
Ambient temperature:	-40 °C up to +70 °C
Ingress protection:	IP 20 (EN60529)

Certification

Explosion protection:	DMT 00 ATEX E 075
Type of protection:	II 2G EEx ia IIC T6
CE-Marking:	Explosion Protection Directive 94/9/EC

Order Details (Example: TSK-S 109C A1 U 6 V 00 S 1 0 0)

Model	Process connection 1… = flange Form C DIN 2501 2… = flange RF ASME B16.5-2003	Range m³/h water	Flow direction	Temperature class	Seal
TSK-S = Armatur stainless steel, built-in parts stainless steel **TSK-H** = Armatur and built-in parts Hastelloy C-22 **TSK-K**[2] = Armatur PP, built-in parts stainless steel **TSK-J**[2] = Armatur PP, built-in parts Hastelloy C-22 **TSK-P**[3] = Armatur PTFE, built-in parts Hastelloy C-22 **TSK-C**[1] = Armatur steel, built-in parts stainless steel	**109C** = DN25 PN40	**A1** = 0.5 - 3.5	**U** = from the bottom to the top **O** = from the top to the bottom **L** = from the left to the right **R** = from the right to the left	**6**[2] = max. 80 °C, Magnet encapsulation PVDF **5** = max. 100 °C, Magnet encapsulation PVDF **4** = max. 135 °C, Magnet encapsulation PVDF, forward advanced display **3** = max. 200 °C, Magnet encapsulation Stainless steel, forward advanced display **2** = max. 300 °C, Magnet encapsulation Stainless steel, forward advanced display	**V** = FPM (max. 150 °C) **F** = FEP (max. 200 °C) **S** = Stainless steel (max. 300 °C)
	203R = 1" Class 150	
	223R = 1" Class 300	
	117C = DN40 PN40	**B1** = 1.5 - 6
	205R = 1 1/2" Class 150	**B2** = 1.5 - 10
	225R = 1 1/2" Class 300	**B3** = 3 - 15
	121C = DN50 PN40	**C1** = 1.5 - 10 **C2** = 3 - 30
	206R = 2" Class 150	
	226R = 2" Class 300	
	126C = DN65 PN40	**D1** = 1.5 - 14
	207R = 2 1/2" Class 150	**D2** = 4 - 30
	227R = 2 1/2" Class 300	**D3** = 6 - 50
	131C = DN80 PN40	**E1** = 4 - 24 **E2** = 10 - 60
	208R = 3" Class 150	
	228R = 3" Class 300	
	135C = DN100 PN16	**F1** = 6 - 40 **F2** = 8 - 80
	210R = 4" Class 150	
	230R = 4" Class 300	
	140C = DN125 PN16	**G1** = 10 - 60 **G2** = 20 - 120
	211R = 5" Class 150	
	231R = 5" Class 300	
	145C = DN150 PN16	**H1** = 15 - 100 **H2** = 30 - 200
	212R = 6" Class 150	
	232R = 6" Class 300	
	150C = DN200 PN16	**J1** = 25 - 160
	213R = 8" Class 150	**J2** = 50 - 275 **J3** = 60 - 400
	155C = DN250 PN10	**K1** = 50 - 200
	214R = 10" Class 150	**K2** = 75 - 400 **K3** = 80 - 500
	162C = DN300 PN10	**L1** = 80 - 400
	215R = 12" Class 150	**L2** = 100 - 600
	169C = DN350 PN10	**M1** = 120 - 700
	216R = 14" Class 150	**M2** = 150 - 1000
	175C = DN400 PN10	**N1** = 150 - 800
	217R = 16" Class 150	**N2** = 200 - 1300
	180C = DN500 PN10	**P1** = 200 - 1300
	219R = 20" Class 150	**P2** = 200 - 1500

1) only available for Nominal diameter DN80 / 3"

2) Model TSK-K and TSK-J (Armatur PP) only max. 80 °C possible!

3) TSK-P max. 125 °C

Special seal	Certificate	Display	Scale	Electr. outputs	Accessories
0 = without **1** = with (FPM, max. 150 °C) Protection of incoming solids (f. ex. metal chippings) in the transmission chamber	**0** = without **1** = Certificate of compliance with the order 2.1 **2** = Test report 2.2 **B** = Inspection certificate 3.1 **C** = Inspection certificate 3.2	**S** = Standard (Aluminium) **E** = Stainless steel display IP 66 **T** = Standard (Aluminium) with pressure compensation	**1** = %-Scale (Water) **2** = Range-scale (Water) **4** = %-Scale (Media) **5** = Range-scale (Media)	**0** = without **1** = 1x inductive limit contact **2** = 2x inductive limit contacts **6** = electr. transmitter ES, HART® Protocol, 4-20 mA, EEx ia **7** = electr. transmitter ES, HART® Protocol, 4-20 mA, EEx ia, 2x Namur contacts **9** = electr. transmitter ES, PROFIBUS-PA® , EEx ia **I** = 4-20 mA with HART® and counter module	**0** = without **X** = with (see separate specifications)

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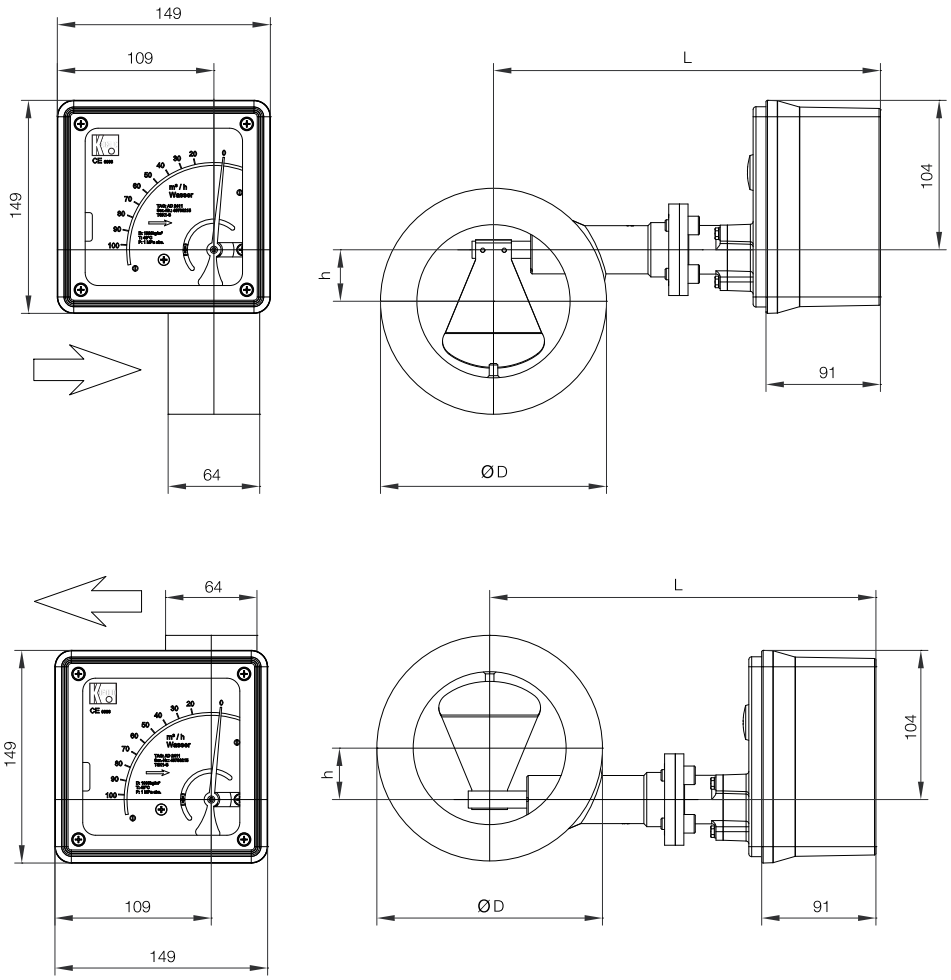
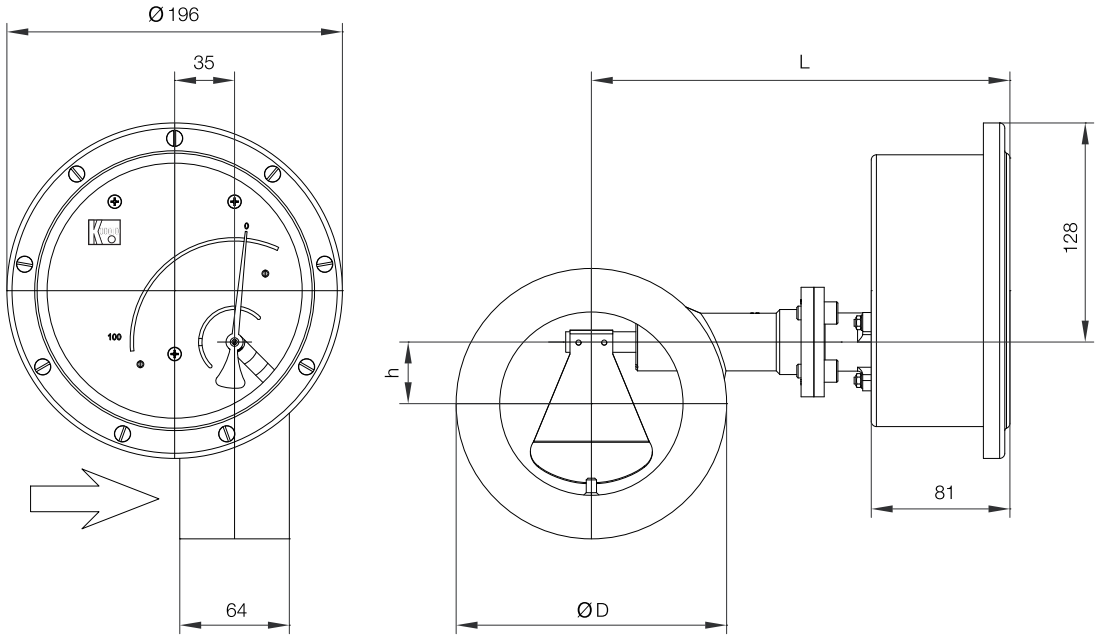
Dimensions

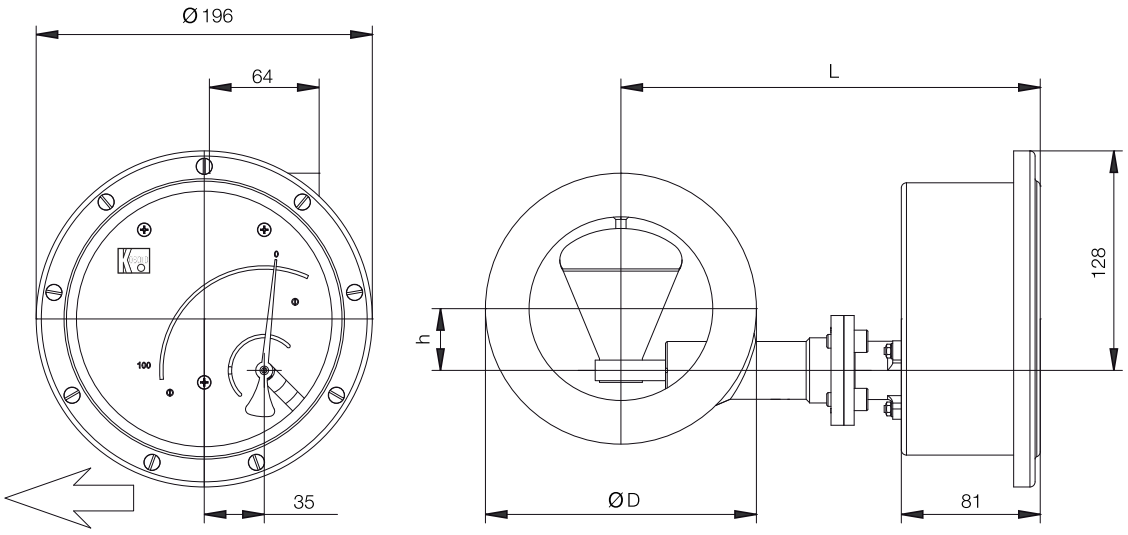
Size		Nominal pressure (standard)		L [mm]		D [mm]		
DIN/EN	ASME	PN	class	Display aluminium	Display stainless steel	DIN-/EN-flange	ASME-flange	h [mm]
50	2"	40	300	272	261	102	92,1	17
65	2 1/2"	40	300	272	261	122	102	21 (ASME = 17)
80	3"	40	300	272	261	138	127	31
100	4"	16	150	272	261	158	158	36
125	5"	16	150	352	341	186	186	45
150	6"	16	150	352	341	212	212	53
200	8"	16	150	352	341	268	268	80
250	10"	16	150	352	341	320	320	90
300	12"	10	150	372	361	370	381	100
350	14"	10	150	442	431	430	413	100
400	16"	10	150	452	441	482	470	130
500	20"	10	150	492	481	585	585	130

Design with standard display for horizontal flow



Design with stainless steel display for horizontal flow





Design for vertical flow