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

Flap Flowmeter

for liquids

KOBOLD

measuring
•
monitoring
•
analysing

TSK

- Range: 0.5 - 3.5 … 200 - 1500 m³/h
- Accuracy: ±2.5 of full scale
- p_{max}: PN 40, t_{max}: -40 … +300 °C
- Connection: wafer flange DN 25 … 500
- Material: stainless steel, Hastelloy® C, PTFE
- Option: limit contacts, analogue output with HART® or Profibus-PA®, counter

S3

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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
- Machinery-building

Technical Details

Sensor

Materials:	1.4404 (316 L) / 1.4571 (316 Ti) (TSK-S) steel / stainless steel (TSK-C from DN125) Hastelloy® C-22 (TSK-H) PTFE / Hastelloy® C-22 (TSK-P) other materials on request
Process connection:	sandwich acc. EN 1092, ASME B16.5, DIN 2512, special connections on request
Nominal pressure:	PN 40, ASME Cl150 / 300 (standard) (TSK-S/C/H) PN 16, ASME Cl150 (standard) (TSK-P) higher pressure rates optional
Process temperature:	-40 °C ... +300 °C (TSK-S/C/H) -20 °C ... +125 °C (TSK-P)
Ambient temperature:	-40 °C ... +80 °C
Accuracy:	liquid/gas: ± 2.5% of full scale ± 0.2% with transmitter (ES)
Repeatability:	± 0.5%
Protection:	IP 65 (EN 60529)

Certification

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

Display

Materials:	aluminum (stove-enameled) stainless steel (as option)
Electrical outputs:	inductive switch microswitch others on request
Ambient temperature:	-40 °C ... +80 °C (without switch) -40 °C ... +65 °C (with switch)

Transmitter

- ES with HART®-protocol
- ES with HART®-protocol and 2 NAMUR-switches
- ES with Profibus-PA®
- ES with HART®-protocol and counter module

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

Certification

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

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Order Details (Example: **TSK-S 309B A1 U 6 V 00 S 1 0 0**)

Model	Process connection 3… = flange form B1 DIN EN 1092-1 2… = flange RF ASME B16.5-2003	Range m³/h water	Flow direction	Temperature class	Seal
TSK-S = armature stainless steel, built-in parts stainless steel **TSK-H** = armature and built-in parts Hastelloy® C-22 **TSK-P**[3] = armature PTFE, built-in parts Hastelloy® C-22 **TSK-C**[1] = armature steel, built-in parts stainless steel	**309B** = 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	**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)
	309D = DN25 PN40 form D				
	317B = DN40 PN40	**B1** = 1,5 - 6 **B2** = 1,5 - 10 **B3** = 3 - 15			
	205R = 1 ½" Class 150				
	225R = 1 ½" Class 300				
	321B = DN50 PN40	**C1** = 1,5 - 10 **C2** = 3 - 30			
	206R = 2" Class 150				
	226R = 2" Class 300				
	326B = DN65 PN40	**D1** = 1,5 - 14 **D2** = 4 - 30 **D3** = 6 - 50			
	207R = 2 ½" Class 150				
	227R = 2 ½" Class 300				
	331B = DN80 PN40	**E1** = 4 - 24 **E2** = 10 - 60			
	208R = 3" Class 150				
	228R = 3" Class 300				
	335B = DN100 PN16	**F1** = 6 - 40 **F2** = 8 - 80			
	210R = 4" Class 150				
	230R = 4" Class 300				
	340B = DN125 PN16	**G1** = 10 - 60 **G2** = 20 - 120			
	211R = 5" Class 150				
	231R = 5" Class 300				
	345B = DN150 PN16	**H1** = 15 - 100 **H2** = 30 - 200			
	212R = 6" Class 150				
	232R = 6" Class 300				
	350B = DN200 PN16	**J1** = 25 - 160 **J2** = 50 - 275 **J3** = 60 - 400			
	213R = 8" Class 150				
	355B = DN250 PN10	**K1** = 50 - 200 **K2** = 75 - 400 **K3** = 80 - 500			
	214R = 10" Class 150				
	362B = DN300 PN10	**L1** = 80 - 400 **L2** = 100 - 600			
	215R = 12" Class 150				
	369B = DN350 PN10	**M1** = 120 - 700 **M2** = 150 - 1000			
	216R = 14" Class 150				
	375B = DN400 PN10	**N1** = 150 - 800 **N2** = 200 - 1300			
	217R = 16" Class 150				
	380B = DN500 PN10	**P1** = 200 - 1300 **P2** = 200 - 1500			
	219R = 20" Class 150				

[1] Only available for nominal diameter ≥ DN 125 / 5" [3] TSK-P t_{max} 125 °C

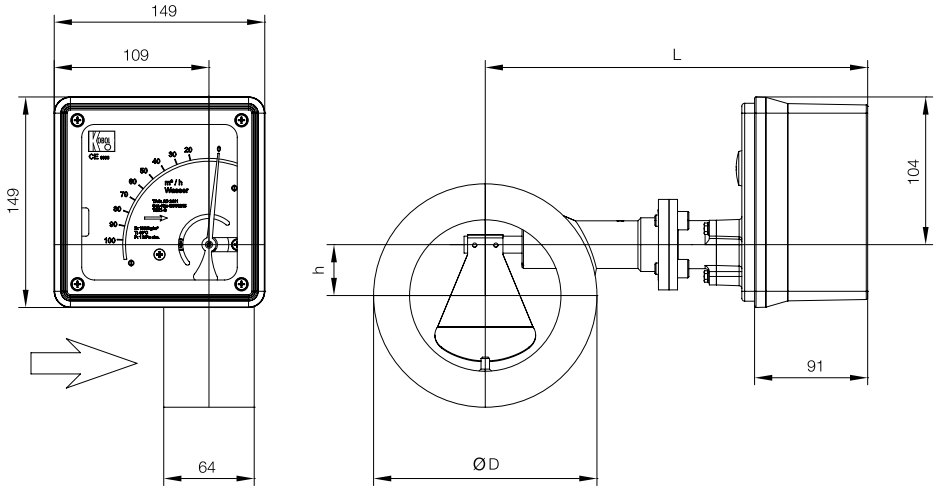
Special seal	Certificate	Display	Scale	Electrical outputs	Accessories
0 = without **1**[4] = FPM, (max. +150 °C) **2**[4] = FEP, (max. +200 °C)	**0** = without **1** = certificate of compliance with the order 2.1 **2** = test report 2.2 **B** = inspection certificate 3.1 **C** = inspection certificate 3.2	**S** = standard (aluminum) **E** = stainless steel display IP 67 **T** = standard (aluminum) with pressure compensation	**1** = % scale (water) **2** = range scale (water) **4** = % scale (media) **5** = range scale (Media)	**0** = without **1** = 1x inductive limit contact, SIL-1[5] **2** = 2x inductive limit contacts, SIL-1[5] **C** = 1 micro switch **D** = 2 micro switches **6** = electr. transmitter ES, HART®, 4-20 mA, EEx ia **7** = electr. transmitter ES, HART®, 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 **K** = electr. transmitter ES, Fieldbus Foundation®	**0** = without **X** = with (see separate specifications)

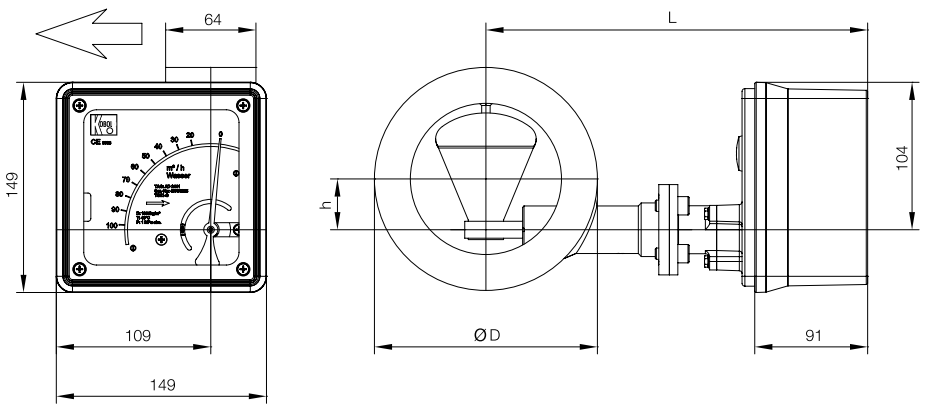
[4] Protection of incoming solids (f. ex. metal chippings) in the transmission chamber
[5] IEC 61508-2:2010 Conformity confirmed by EXIDA

Dimensions

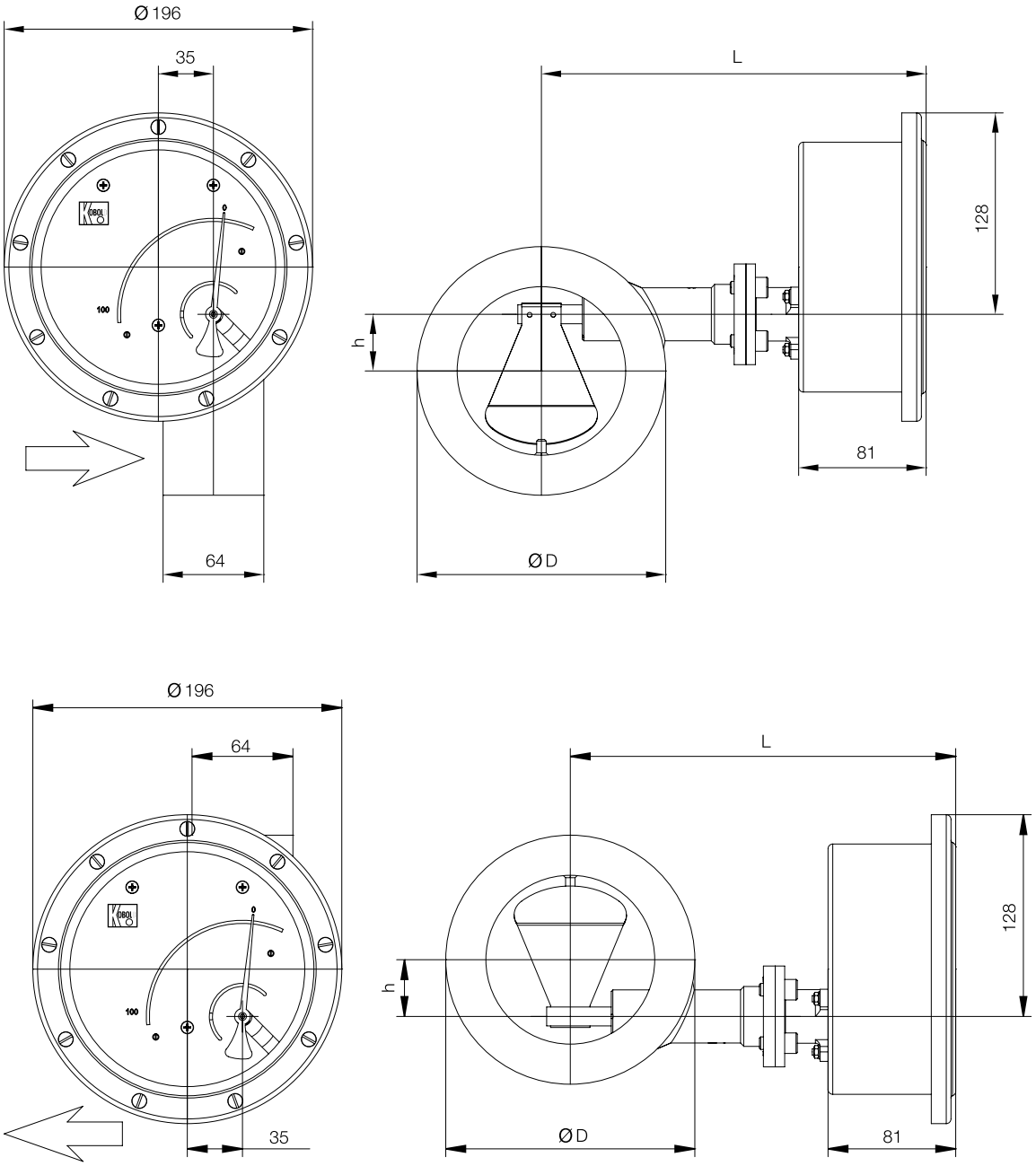
Size		Nominal pressure (standard)		L [mm]		D [mm]		
DIN/EN	ASME	PN	class	Display aluminium	Display stainless steel	DIN-/EN-flange	ASME-flange	h [mm]
50	2"	40	300	272	261	102	92,1	17
65	2 ½"	40	300	272	261	122	102	21 (ASME = 17)
80	3"	40	300	272	261	138	127	31
100	4"	16	150	272	261	158	158	36
125	5"	16	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