

Flap spring-loaded type flow-meters KFS



KFS

- For gases and liquids
- DN 25 to DN 600
- Carbon steel, Stainless steel, PVC, PPH, PVDF
- Horizontal or vertical mounting
- Independent of viscosity
- Outputs: 4-20 mA, contacts, totalizer, ATEX version

APPLICATIONS

On-line visualization of the instantaneous flow rate in multiple fields: Water treatment, chemical industry, industrial processes, etc. The measurement is independent of viscosity and is suitable for indicating the flow of water, alkaline solutions and gases.

DESCRIPTION

The flow indicator KFS is used to evaluate flows in piping from DN25 up to DN600. Each flow indicator is calibrated according to customer requirements and equipped with a scale specific to the medium.

The measuring cell includes a flap spring-loaded moved by the medium. The angle of rotation of the flap changes according to the flow. A magnetic coupling transfers the movement to a pointer on a dial (Fig. A).

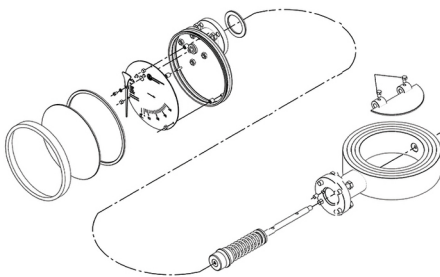
- The KFS series proposes two types of local indicators.
- KFS Standard: Stainless steel case with bayonet lock.
 - KFS-M40: M40 case with output: 4-20 mA and Totalizer

Options: Contact outputs

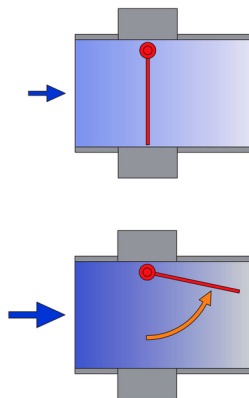
For process control purposes, the measuring device can be equipped with contacts, inductive or Reed type. Each contact (max. 2) is adjustable over the entire measurement range.

Option: Analogue output 4-20 mA

A transmitter is added: 4-20 mA; 2-wire; Signal is proportional to the flow-rate. It is factory calibrated; no calibration needed on site. The calibration values are stored in a memory chip. The transmitter is protected against reverse polarity.



Pic. A



Operating principle



KFS-M40

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THE DIFFERENT MODELS OF KFS Series

KFS Standard case, IP 66	Contact-s	4-20 mA	Totalizer	ATEX	Specificities	
KFS	---	--	---	---	Standard mechanical indicator	
KFS-IK1	Yes				+ 1 contact NAMUR, 2-wire; bistable, or N.O. or N.C.	
KFS-IK2	Yes				+ 2 contacts NAMUR, 2-wire; bistable, N.O. or N.C.	
KFS-IKS1	Yes				+ 1 inductive contact, 3-wire; bistable, or N.O. or N.C.	
KFS-IKS2	Yes				+ 2 inductive contacts, 3-wire; bistable, N.O. or N.C.	
KFS-RK1	Yes				+ 1 Reed contact, 2-wire; bistable, or N.O. or N.C.	
KFS-RK2	Yes				+ 2 Reed contacts, 2-wire; bistable, N.O. or N.C.	
KFS Ex	---				Yes	ATEX version, Standard mechanical indicator
KFS-IK1 Ex	Yes				Yes	+ 1 Inductive contact, ATEX version
KFS-IK2 Ex	Yes				Yes	+ 2 Inductive contacts, ATEX version

KFS-M40: Case M40, IP 68	Contact-s	4-20 mA	Totalizer	ATEX	Specificities		
KFS-M40	---	---	---	---	Mechanical indicator M40		
KFS-M40-EM	---	Yes			+ 4-20 mA output		
KFS-M40-EM-IK1	Yes	Yes			+ 4-20 mA output + 1 inductive contact		
KFS-M40-EM-IK2	Yes	Yes			+ 4-20 mA output + 2 inductive contacts		
KFS-M40-EMZ	---	Yes			Yes	+ Totalizer + LCD display	
KFS-M40-IK1	Yes	---			Indicator + 1 inductive contact		
KFS-M40-IK2	Yes				Indicator + 2 inductive contacts		
KFS-M40-Ex	---	Yes			---	Yes	Mechanical indicator M40, ATEX version
KFS-M40-EM Ex	---					Yes	+ 4-20 mA output, ATEX version
KFS-M40-EM-IK1 Ex	Yes					Yes	Yes
KFS-M40-EM-IK2 Ex	Yes		Yes	Yes		+ 4-20 mA output + 2 inductive contacts, ATEX version	
KFS-M40-EMZ Ex	---		Yes	Yes		Yes	Totalizer +LCD Display, Explosion proof version

MATERIALS

DN	Fluid temperature Max.	Pressure Max.	Measuring cell	Wet parts	Wet seal ²⁾
25 - 600	-70 ... +200 °C ⁴⁾	PN 6/10 ³⁾	S355	AISI 316 Ti (1.4571)	Sil 4400
25 - 600	-70 ... +200 °C ⁴⁾	PN 6/10 ³⁾	1.4571	AISI 316 Ti (1.4571)	Sil 8800
25 - 80	0... +20 °C	10 bar	PVC	AISI 316 Ti (1.4571) ¹⁾	EPDM
100 - 300	0... +20 °C	6 bar			
25 - 300	0... +40 °C	6 bar			
25 - 80	0... +20 °C	10 bar	PP	AISI 316 Ti (1.4571) ¹⁾	EPDM
100 - 300	0... +20 °C	6 bar			
25 - 300	0... +80 °C	1.5 bar			
25 - 80	-40 ... +20 °C	10 bar	PVDF	AISI 316 Ti (1.4571) ¹⁾	FPM
100 - 300	-40 ... +20 °C	6 bar			
25 - 300	-40 ... +140 °C	6 bar			

The liquid must not freeze.

¹⁾ : Hastelloy C4 as an option

²⁾ : Others on request

³⁾ : Option as PN 16/ 25/ 40

⁴⁾ : KFS Ex, KFS-IK1 Ex et KFS-IK2 Ex: possibility to have a thermic insulation pipeline and instrument.

Indicator	KFS	KFS-M40-EM
Case	AISI 304 (1.4301)	Painted aluminum
Pointer	Painted aluminum	Painted aluminum
Dial	Coated aluminum	Coated aluminum
Window	PC (Glass as an option)	Glass

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TECHNICAL FEATURES

Accuracy	5 % F.S.
Scale units:	l/h or m ³ /h or else on request
Scale factor	Minimum 1:10
Protection	Indicator: IP 66 (or IP 67 for KFS-EM)
Corrosion protection	Carbon steel version: Epoxy painted, kiln-dried, blue (RAL 5017), satin finish Corrosion class: C2
Wafer mounting	Standard body width: 50 mm 60 mm for PVC / PP / PVDF & DN 250-300
Fitting	Between flanges, type DIN EN 1092-1, PN 6/10/16/25/40 On request: ASME B16.5, JIS B 2220 (others on request)

• Reed contacts, RK1 and RK2:

RK1	1 Reed contact, bistable, or N.O. or N.C.
RK2	2 Reed contacts, bistable, N.O. or N.C.
Switching power	Max. 5 VA ; 0.25 A / 50 V AC Maxi 3 W ; 0.25 A / 75 V DC
Ambient temperature	-25...+105 °C

The switching point is adjustable over the full measuring range. The pointer of the indicator activates a built-in inductive switch by means of a metal paddle. The switching point is indicated by a pointer on the flow-meter scale.

• Inductive contacts, IK1 and IK2 (NAMUR, 2-wire):

The trigger points are adjustable over the entire measuring range. A maximum of two (2) contacts can be mounted.

IK1	1 Inductive contact, NAMUR, 2-wire, bistable, or N.O. or N.C.
IK2	2 Inductive contacts, NAMUR, 2-wire, bistable, N.O. or N.C.
Slot width	2.0 mm
Hysteresis	1.0 % v. E ... 10 % v. E
Accuracy	Repeatability: ≤ 2.0 %
Temperature drift	≤ ± 10 %
Ambient temperature	-25...+70 °C
Voltage	Nom. 8.2 V DC (via insulation switching amplifier KFA)
Switching frequency	≤ 2.5 kHz
Power consumption	Active area uncovered: ≥ 2.1 mA Active area covered: ≥ 2.1 mA
Protection	Against reverse polarity
Certification	KEMA 02 ATEX 1090 X
Inductance (Li)	266 µH
Capacitance (Ci)	* Values for pre-assembled cables up to 10 m
ATEX cert.	Ex II 1G Ex ia IIC T4...T6 Ga (Max. Ui = 20 V DC; li = 60 mA; Pi = 130 mW)
Option	Explosion proof version

• Inductive contacts, IKS1 and IKS2 (3-wire):

IKS1	1 Inductive contact, bistable, or N.O. or N.C.
IKS2	2 Inductive contacts, bistable, N.O. or N.C.
Power supply	24 V DC
Current switched I(A)	≤ 100 mA
Power consumption	Open circuit: ≤ 10 mA
Ambient temperature	-25...+70 °C
Voltage drop (at I max.)	≤ 1.2 V

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• Analogue output 4-20 mA (EM models):

Power supply	24 V DC
Output signal	4 ... 20 mA
	For flow-rate from 0 to 100 %
	> 20.8 mA for alarm status
Power supply influence	< 0.1 %
External resistance dependence	< 0.1 %
Temperature incidence	< 5 μ A/K
External resistance	
Ambient temperature	-25 ... +60 °C
Agreement	TÜV 15 ATEX 7805 X
Inductance (Li) / Capacitance (Ci)	~ 0 μ H / 10 nF
ATEX cert.	EX II 2G Ex ia IIC T6...T1 Gb (Max. Ui = 30 V; li = 130 mA; Pi = 1 W)

• Analogue output 4-20 mA + Totalizer (EMZ model)

The EMZ flow totalizer in 2-wire technology is used in combination with the electrical current output EM. An LCD display indicates the total flow value (cumulated) and may be commuted for instant flow-rate display as 0 ... 100 %.

The EMZ has two galvanically insulated binary outputs which can be configured as a contact output or pulse output. The pulse output supplies for each displayed counter increment a number of pulses, which number is adjustable. If the voltage drops, an automatic backup takes place. If an indicator with totalizing function is to be used in potentially explosive areas, it must be connected to an intrinsically safe circuit.

2 binary outputs	Galvanically insulated, passive
Connection types	NAMUR (EN 60947-5-6) 2 wire or Transistor output (passive, open collector) 3-wire

Open collector output:

Power	24 V DC; Max. 30 V DC
Load, RL	250 ... 1000 Ω
Current	Max. 100 mA
P max.	500 mW

NAMUR contact output:

Uo	8.2 V DC
Ri ¹⁾	1000 Ω
Signal current	> 3 mA: switching value reached < 1 mA: switching value not reached

1): Switching power amplifier with Uo = 8,2 V CC and Ri = 1000 Ω

Pulse output:

T on	setting from 50 to 500 ms
T off	Depending on flow-rate
f max.	10 Hz
Pulse value	Setting in flow units (e.g. 5 pulses per cubic meter)
Ambient temperature	-40...+70 °C

• ATEX version

Explosion protection according to Directive 2014/34/EU.

The following versions are also available in the type-tested explosion-proof variant for Zone 1 and 2 of device categories 2 and 3, atmosphere G, in compliance with Directive 2014/34/EU.

KFS Ex	Mechanical indicator
KFS-IK1 Ex	With one inductive limit value contact *
KFS-IK2 Ex	With two inductive limit value contacts *
KFS-M40-EM Ex	With 4-20 mA output *
KFS-M40-EMZ Ex	With totalizer *

(*): Connection to intrinsically safe circuits only

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MEASURING RANGES

Measuring ranges, scales for water at 20 °C

DN	Standard ranges in m ³ /h					
25	0.5 - 7	1 - 12				
32	0.5 - 8	1,8 - 18	3 - 30			
40	0.6 - 6	1 - 10	2 - 20	3 - 30	5 - 50	
50	0.8 - 8	2 - 20	3 - 35	5 - 50	7 - 70	
65	2 - 20	4 - 40	6 - 60	9 - 90	11 - 110	
80	2 - 20	4 - 40	6 - 60	10 - 100	12 - 120	20 - 200
100	4 - 40	8 - 80	12 - 120	16 - 160	20 - 200	25 - 250
125	5 - 55	8 - 80	12 - 120	14 - 140	20 - 200	35 - 350
150	6 - 60	10 - 100	14 - 140	18 - 180	22 - 220	35 - 350
200	5 - 50	9 - 90	12 - 120	15 - 150	20 - 200	25 - 250
250	18 - 180	25 - 250	30 - 300	40 - 400		
300	15 - 170	20 - 220	25 - 250	30 - 300	50 - 500	

DN	Specific ranges in [m ³ /h] of water at 20 °C					
200	40 - 400	60 - 600				
250	50 - 500	60 - 600				
300	60 - 650	90 - 900				
350	50 - 500	70 - 700	90 - 900	100 - 1000		
400	60 - 600	75 - 750	110 - 1100	400 - 1850		
500	70 - 700	100 - 1000	135 - 1350	200 -		
600	80 - 800	125 - 1250	165 - 1650			

Measuring ranges for Air at 0 °C and 1013 mbar abs (standard conditions)

ND	Range Nm ³ /h (standard conditions)	
25	15 - 150	30 - 300
32	15 - 150	30 - 300
40	15 - 150	40 - 400
50	18 - 180	75 - 750
65	18 - 180	80 - 800
80	20 - 200	100 - 1000
100	25 - 250	220 - 2200
125	25 - 250	260 - 2600
150	30 - 300	300 - 3000
200	40 - 400	300 - 3000
250	100 - 1000	400 - 4000
300	150 - 1500	500 - 5000

Intermediate measuring ranges possible

The measuring ranges for the series KFS-EM/EMZ differ slightly from the above values.

Measuring ranges for other fluids and operating conditions: On request.

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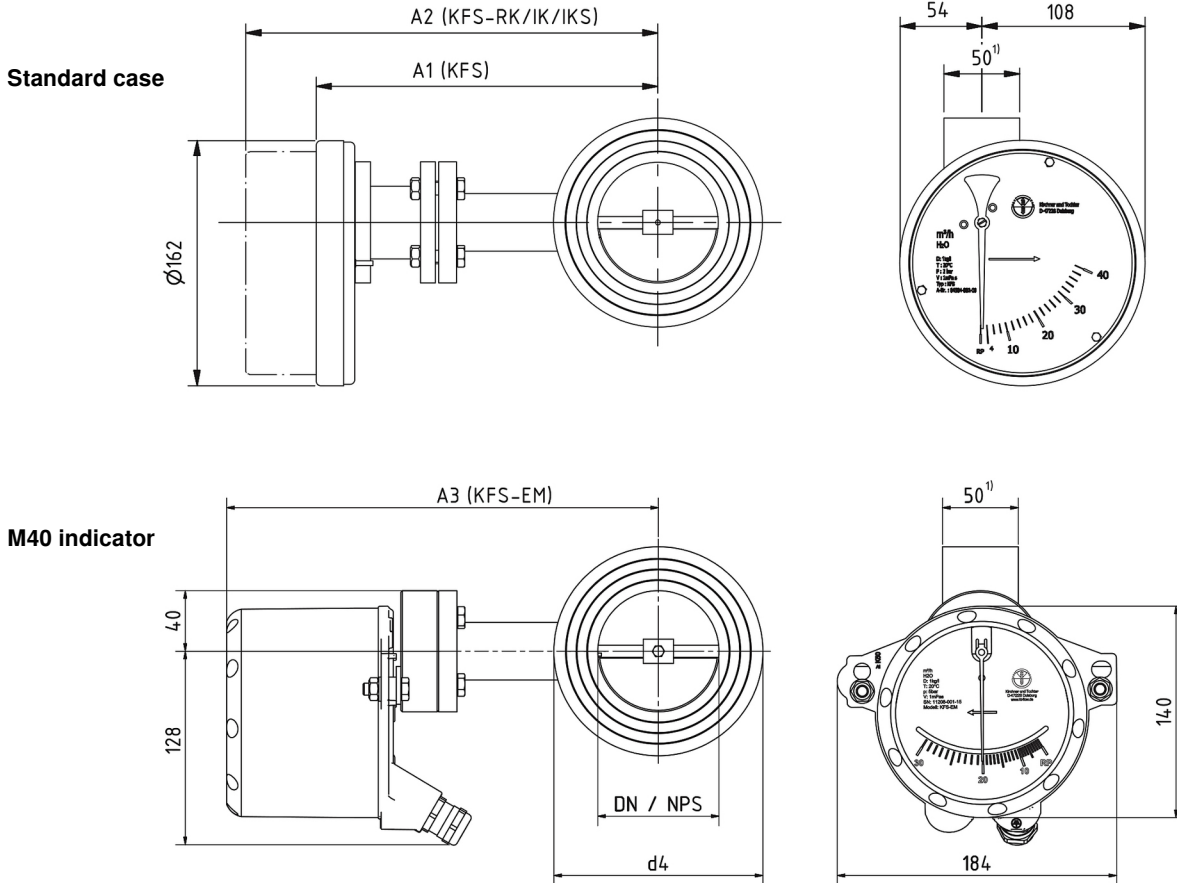
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DIMENSIONS



DN	d ₄	Masse [kg]		ASME flange		KFS		KFS-RK/IK/IKS		KFS-M40-EM/EMZ	
		Steel	PVC ¹⁾	NPS	d ₄	A1 ²⁾	A1 ²⁾ (ASME)	A2 ²⁾	A2 ²⁾ (ASME)	A3 ²⁾	A3 ²⁾ (ASME)
25	68	3.8	2.0	1"	51	202	199	249	246	242	242
32	78	3.8	2.0	1 1/4"	64	206	204	253	251	245	247
40	88	3.8	2.0	1 1/2"	73	206	206	253	253	251	249
50	102	3.9	2.1	2"	92	211	212	258	259	256	255
65	122	5.0	2.3	2 1/2"	105	219	217	266	264	262	260
80	138	5.6	2.5	3"	127	226	225	273	272	269	268
100	158	6.4	2.7	4"	157	236	237	283	284	279	280
125	188	8.0	2.8	5"	186	249	250	296	297	292	293
150	212	8.8	3.3	6"	216	261	263	308	310	304	306
200	268	11.4	3.7	8"	270	286	287	333	334	329	330
250	320	13.0	4.5	10"	324	311	313	358	360	354	356
300	370	22.0	4.9	12"	381	336	338	383	385	379	381
350	430	29.3	—	—	—	376	—	423	—	404	—
400	482	31.5	—	—	—	401	—	448	—	429	—
500	585	39.0	—	—	—	451	—	498	—	494	—
600	685	45.5	—	—	—	501	—	548	—	544	—

All dimensions are in mm ; Excepted for NPS inner diam. ASME flange fittings

¹⁾: Models in PVC, PP, PVDF with DN 250 and 300: Thickness is 60 mm.

²⁾: PVC, PP and PVDF versions differ minimally from the standard.

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