



## Flow Meters and Switches for very Low Flows

KDF for liquids · KDG for gases



measuring  
•  
monitoring  
•  
analysing

### KDF/KDG



- Flow rates:  
water 0.25 - 2.5 ... 16 - 160 l/h  
air 0,5 - 5 ... 500 - 5000 NI/h
- Accuracy:  $\pm 2.5\%$   $q_G = 50\%$
- $p_{max}$ : PN 16;  $t_{max}$ : 100 °C
- Connection: 1/4" NPT female or G 1/4 female, hose nozzle 8 mm
- Material: stainless steel

15



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### Method of Operation

The flow meters and switches for very low flows model KDF and KDG for liquids and air operate on the suspended float principle: that is, the installation position is vertical and the direction of flow is from bottom to top.

The instruments have been designed as simple and thus economical measuring systems. The float is a ball, whereby the indication point is the upper edge of the ball. A needle valve is fitted as standard.

### Areas of Application

#### KDF- and KDG-versions

KDF... for liquids

KDG... for gases

### Technical Details

Installation position:	vertical, flow from bottom
Accuracy:	<ul style="list-style-type: none"><li>• <math>\pm 2.5\%</math> <math>q_G</math> 50 acc. VDE/VDI 3513 page 2</li><li>• <math>\pm 3\%</math> of full scale (upstream pressure controller) <math>\pm 5\%</math> of full scale (downstream pressure controller) (within 10-100% of measuring range)</li></ul>
Max. pressure:	PN16
Process temperature:	-20 °C ... +100 °C -20 °C ... +70 °C with contact
Ambient temperature:	-20 °C ... +100 °C -20 °C ... +70 °C with contact
Protection type:	IP 65 (EN60529)
Repeatability:	$\pm 1,0\%$ FS
(Differential pressure regulator):	$\pm 1,5\%$ / $2,5\%$ FS
Connection:	1/4" NPT; G 1/4 (female backward)
Option:	hose nozzle for 8 mm hose
Weight:	approx. 0.45 kg approx. 0.8 kg with controller

### Materials (in contact with the media)

Fitting:	stainless steel 1.4401
Measuring tube:	borosilicate glass
Float stop:	PTFE
Float:	stainless steel 1.4404
Gasket:	FPM, option FFKM
Valve stem:	stainless steel 1.4404
Valve seat:	PTFE 25% C (carbon fibre)
Hose nozzle:	polyamide

### ATEX approval

(on request from our sister company Heinrichs, Model: K12)

Explosion protection:  II 2GD IIC TX (for mech. instrument)

Contacts ignition category: PTB 00 ATEX 2128 X  
II 2G Ex ia IIC T6-T4 (c/w limit switches)

### Limit switches (Option)

The flow meters can be fitted with limit switches as an option. These limit switches are ring-type proximity switches. The electrical connection is via a 2 m cable or junction box.

The electrical characteristic values for all types are according to DIN 19234 (NAMUR).

Isolation switching amplifiers are necessary to operate these ring-type proximity switches (see Accessories brochure).

The following types are available:

#### Monostable

Are used preferably as Min. or Max. contact.

#### Bistable

As limit contact used at any position of the measuring tube.

**Important!** *The contact cannot be switched at the relative upper range value from product size KDF-2239 and KDG-2257 upward.*

#### Differential pressure controllers (Option)

Differential pressure controllers are suitable for maintaining a constant flow rate of liquid and gaseous products in pipelines. The differential pressure controller consists of stainless steel with an integrated membrane made of FPM or PTFE and a counterbalance valve of stainless steel.

The membrane of the controller is in balanced condition when the pressure conditions on both sides are equal. The pressure on the incoming side is determined by the medium pressure. The pressure on the output side is determined by the pressure loss of the adjustment valve at the flow meter.

During a one-sided pressure change on the incoming or output side, a pressure compensation takes place across the integrated diaphragm valve which holds the set flow rate constant.

The version to use for gases for constant upstream pressure is "valve up" and for constant downstream pressure "valve down".

For liquids the valve position is without effect on the function of measuring device.

**Important!** *The controller can only regulate the pressure fluctuations of inlet or outlet.*

The pressure condition of the other side has to be stable. Min.- pressure difference between inlet and outlet side: 350 mbar.

Max.- load of membrane at one-side load: 7 bar

Two types are available:

#### Upstream pressure controller (KDF-/KDG- ...E, F)

Upstream pressure controllers hold the flow for gases and liquids constant with variable upstream pressure and constant downstream pressure.

#### Downstream pressure controller (KDF-/KDG-...A, B)

Downstream pressure controllers hold the flow of gaseous media and liquids constant with variable downstream pressure and constant upstream pressure. Preferably, these should be used for liquids.



Standard with needle valve



Panel mount



with differential pressure controller



**Liquids Order Details** (Example: KDF-2217 N V 0 M1 0)

Measuring range water [l/h]	Valve seat [mm]	Pressure Drop [mbar]	Order no. stainless steel	Connection	Gasket option	Panel installation kit	Contact option	Miscellaneous options
0.25 - 2.5	1.2	10	KDF-2217...	N = ¼" NPT R <sup>3)</sup> = G ¼ W = hose connector angular, 90°, for 8 mm hose S = hose connector straight, for 8 mm hose Y = special	V = FPM T = FFKM	0 = without S <sup>5)6)</sup> = with	00 = without contact	0 = without E = differential pres. contr. with constant outlet pressure, valve at input ¼" NPT, FPM A = differential pres. contr. with constant inlet pressure, valve at output ¼" NPT, FPM F = as 'E' however with FFKM instead of FPM B = as 'A' however with FFKM instead of FPM Y = e. g. without valve. Please specify in writing
0.5 - 5	1.2	20	KDF-2220...				upto model KDF-2220 with 2 m cable	
1.2 - 12	2.8	10	KDF-2225...				M1 = 1 monostable contact M2 = 2 monostab. contacts N1 = 1 bistable contact N2 = 2 bistable contacts	
2.5 - 25	2.8	20	KDF-2228...				with junction box <sup>4)</sup>	
4 - 40	2.8	30	KDF-2230...				A1 = 1 monostable contact A2 = 2 monostab. contacts B1 = 1 bistable contact B2 = 2 bistable contacts	
6 - 60	2.8	80	KDF-2235...				from model KDF-2225 with 2 m cable	
10 - 100 (10 - 50 <sup>2)</sup> )	2.8	125	KDF-2239... <sup>1)</sup>				M3 = 1 monostable contact M4 = 2 monostab. contacts N3 = 1 bistable contact N4 = 2 bistable contacts	
12 - 120 (12 - 50 <sup>2)</sup> )	3.4	200	KDF-2240... <sup>1)</sup>				with junction box <sup>4)</sup>	
16 - 160 (16 - 50 <sup>2)</sup> )	3.4	200	KDF-2241... <sup>1)</sup>				A3 = 1 monostable contact A4 = 2 monostab. contacts B3 = 1 bistable contact B4 = 2 bistable contacts	
other liquids	on request	on request	KDF-22YY...					

**Gases Order Details** (Example: KDG-2207 N V 0 M1 0)

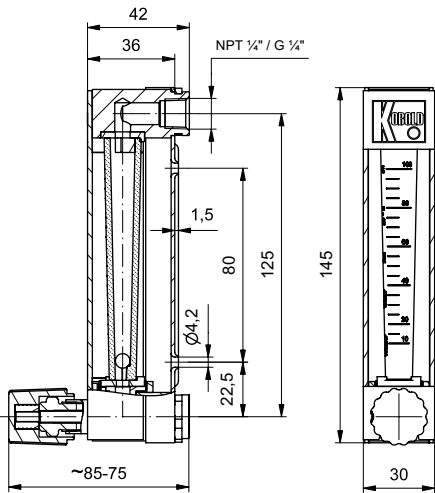
Measuring range air <sup>3)</sup> [Nl/h]	Valve seat [mm]	Pressure Drop [mbar]	Order no. stainless steel	Connection	Gasket option	Panel installation kit	Contact option	Miscellaneous options
0.5 - 5	1,2	15	KDG-2207...	N = ¼ NPT R <sup>3)</sup> = G ¼ W = hose connector angular, 90°, for 8 mm hose S = hose connector straight, for 8 mm hose Y = special	V = FPM T = FFKM	0 = without S <sup>5)6)</sup> = with	00 = without contact	0 = without E = differential pres. contr. with constant outlet pressure, valve at input ¼" NPT, FPM A = differential pres. contr. with constant inlet pressure, valve at output ¼" NPT, FPM F = as 'E' however with FFKM instead of FPM B = as 'A' however with FFKM instead of FPM Y = e. g. without valve. Please specify in writing
0.8 - 8	1,2	15	KDG-2209...				upto model KDG-2224 with 2 m cable	
1.6 - 16	1,2	15	KDG-2213...				M1 = 1 monostable contact M2 = 2 monostab. contacts N1 = 1 bistable contact N2 = 2 bistable contacts	
4 - 40	1,2	20	KDG-2221...				with junction box <sup>4)</sup>	
6 - 60	1,2	25	KDG-2224...				A1 = 1 monostable contact A2 = 2 monostab. contacts B1 = 1 bistable contact B2 = 2 bistable contacts	
10 - 100	2,8	15	KDG-2229...				from model KDG-2229 with 2 m cable	
25 - 250	2,8	15	KDG-2232...				M3 = 1 monostable contact M4 = 2 monostab. contacts N3 = 1 bistable contact N4 = 2 bistable contacts	
50 - 500	2,8	15	KDG-2237...				with junction box <sup>4)</sup>	
80 - 800	2,8	20	KDG-2242...				A3 = 1 monostable contact A4 = 2 monostab. contacts B3 = 1 bistable contact B4 = 2 bistable contacts	
100 - 1000	2,8	25	KDG-2246...					
180 - 1800	2,8	80	KDG-2251...					
240 - 2400	2,8	125	KDG-2257...					
300 - 3000 (300 - 2000 <sup>2)</sup> )	2,8	150	KDG-2261... <sup>1)</sup>					
400 - 4000 (400 - 1600 <sup>2)</sup> )	3,4	200	KDG-2264... <sup>1)</sup>					
500 - 5000 (500 - 1800 <sup>2)</sup> )	3,4	200	KDG-2268... <sup>1)</sup>					
other gases	on request	on request	KDG-22YY...					

<sup>1)</sup> The limit switch is only available as a min. contact.  
<sup>2)</sup> limited switching range  
<sup>3)</sup> At 1.2 bar absolute and 20 °C  
<sup>4)</sup> Not with panel installation kit  
<sup>5)</sup> Not with differential pressure controller  
<sup>6)</sup> Not with junction box

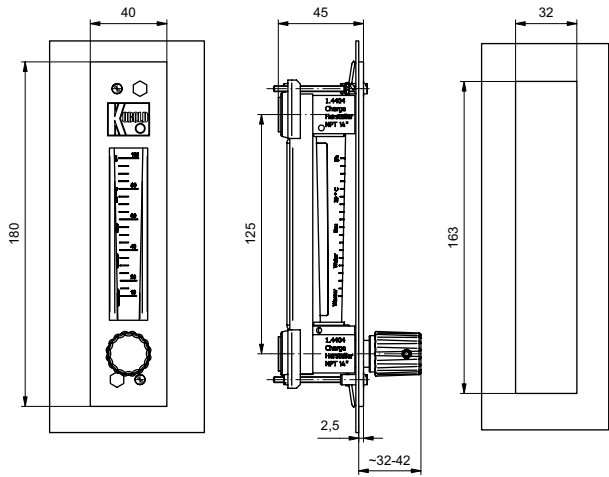


**Dimensions [mm]**

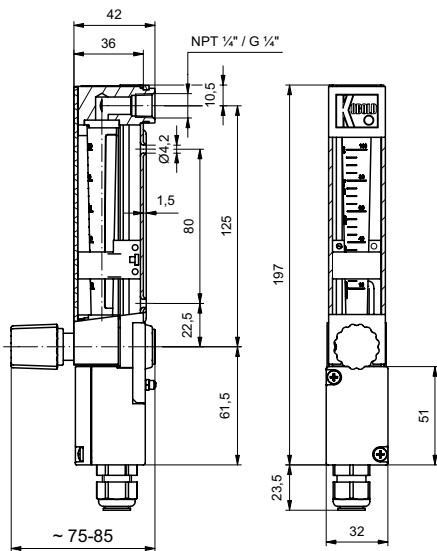
Standard with needle valve



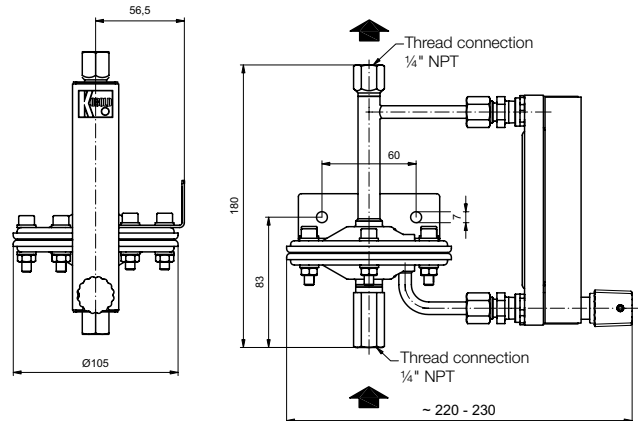
with panel installation kit



with contacts and junction box



with differential pressure controller with constant outlet pressure



with differential pressure controller with constant inlet pressure

