



Flow Meters and Switches for very Low Flows

KDF for Liquids · KDG for Gases



measuring
•
monitoring
•
analysing



- Flow rates: Water 0.002-0.02 to 16-160 L/h
Air 0.03-0.3 to 430-4300 L_N/h
- Accuracy: category 2.5
- p_{max} 10 bar, t_{max} 100 °C
- Connection ¼ NPT female
- Material: stainless steel, brass, PVDF



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Model:
KDF
KDG



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: category 2.5 (VDI/VDE 3513, sheet 2)
- Max. pressure: 10 bar (brass or stainless steel fitting) 4 bar (with PVDF fitting)
- Special all types: at temperatures > 20 °C the maximum pressure decreases by 1 %/K.
- Max. temperature: 100 °C 80 °C with contact
- Connection: 1/4 NPT female at the back: G 1/4 female for PVDF version
- Weight: approx. 0.4 kg

Materials (in contact with the media)

- Fitting: brass or stainless steel 1.4581 or PVDF
- Measuring tube: borosilicate glass
- Float stop: PTFE
- Float: stainless steel 1.4401 (for the standard scales below)
- Gasket: FPM, option FFKM
- Valve stem: stainless steel 1.4571

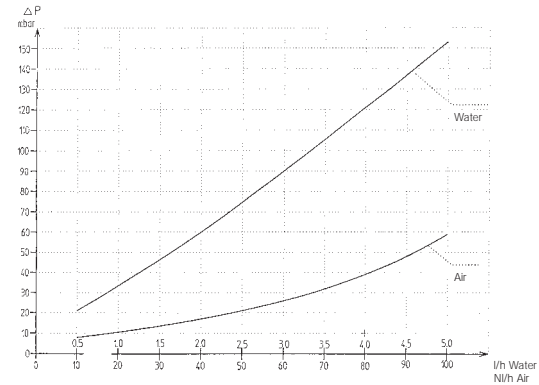
Pressure losses

Most of the pressure loss is across the valve.

Up to measuring range code KDG-...28/KDF-...20

Pressure loss measurement

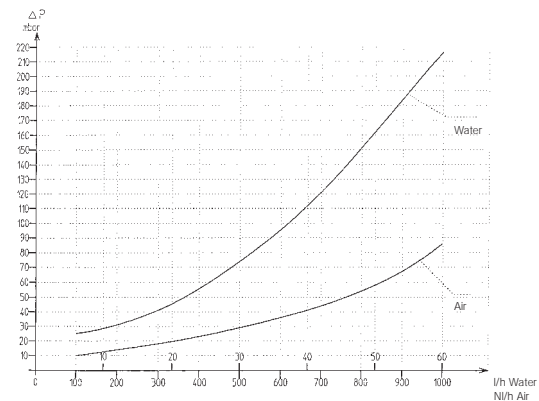
Needle valve: 1 mm
Float: ball/stainless steel



**Measuring range code KDG-...32 to KDG-...46
KDF-...25 to KDF-...30**

Pressure loss measurement

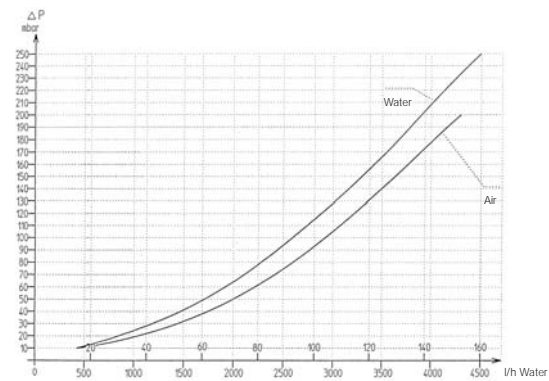
Needle valve: 2.5 mm
Float: ball/stainless steel



Measuring range code from KDG-...51/KDF-...35

Pressure loss measurement

Needle valve: 4.5 mm
Float: ball/stainless steel





Options

1. Limit switch

The flow meters, equipped with a stainless steel ball, can be fitted with limit switches as an option. These limit switches are ring-type proximity switches.

Four types are available:

Monostable

- TG-10-1 (up to measuring range KDG-...24, KDF-...17)
- TG-15-1 (from measuring range KDG-...28, KDF-...20)

Both these types are available **with and without** junction box.

Bistable

- TG-10-1/bi (up to measuring range KDG-...24, KDF-...17)
- TG-15-1/bi (from measuring range KDG-...28, KDF-...20)

These types are **only available with** junction box and without the option "panel mounting".

Important: The contacts can only be used as minimum contacts up to approximately 40% of the measured value from measuring range code KDG-...62/KDF-...40.

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

Isolation and switch units are required to operate these ring-type proximity switches. We recommend our types REL-6000 (230 V_{AC}) and REL-6005 (24 V_{DC}) (see Accessories brochure).

2. Differential pressure controllers

Two types of differential pressure controllers are available: Please note that these controllers are not pressure-reducing valves.

● **Upstream pressure controllers**

Types RE and NRE hold the flow for gases and liquids constant with variable upstream pressure and constant downstream pressure.

● **Downstream pressure controllers**

Controller types RA, NRA hold the flow of gaseous media constant with variable downstream pressure and constant upstream pressure.

The downstream pressure controllers require a minimum pressure difference between upstream pressure and downstream pressure.

The upstream pressure p_1 must always be greater than the downstream pressure p_2 .

The instruments with downstream pressure controllers are delivered without a non-return ball in the device head.

The following technical details must be observed so as to operate these controllers.

Type	Designation	Material	Max. flow rate		Min. necessary upstream pressure p_1
			Water**	Air**	
Upstream pressure controller			L/h	L/h	p_1 in bar
RE-1000-R RE-1000-N	RE 10 RE 10	CrNi-steel brass	40 40	1000 1000	0.5 0.5
RE-4000-R RE-4000-N	RE 40 RE 40	CrNi-steel brass	160 160	4000 4000	1 1
NRE-100-R NRE-100-N	NRE 1 NRE 1	CrNi-steel brass		100 100	0.06 0.06
NRE-800-R NRE-800-N	NRE 8 NRE 8	CrNi-steel brass		800 800	0.2 0.2
Downstream pressure controller					Min. differential pressure* Δp in bar
RA-1000-R RA-1000-N	RA 10 RA 10	CrNi-steel brass		1000 1000	0.4 0.4
RA-2500-R RA-2500-N	RA 25 RA 25	CrNi-steel brass		2500 2500	0.8 0.8
NRA-800-R NRA-800-N	NRA 8 NRA 8	CrNi-steel brass		800 800	0.15 0.15

* Pressure difference between upstream and downstream pressure

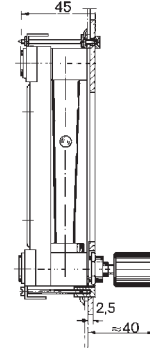
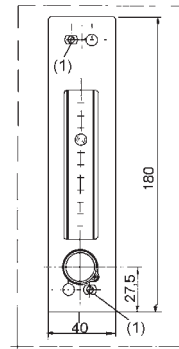
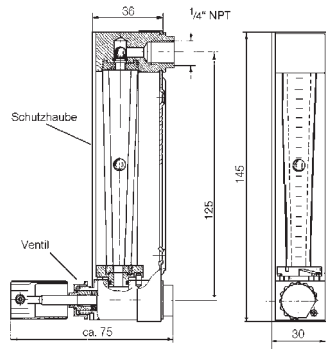
** Reference conditions: 20 °C, 1.013 bar absolute



Dimensions

Panel mounting

Panel cut-out



Liquids: Order Details (Example: KDF-1117 NV 0 M10)

Measuring range water L/h	Order no. brass	Order no. stainless steel	Order no. PVDF***	Connection***	Gasket option	Panel installation kit	Contact option	Miscellaneous options
0.25 - 2.5	KDF-1117...	KDF-1217...	KDF-1317...	N = 1/4 NPT R = G 1/4 W = hose connector angular, 90° S = hose connector straight Y = Special	V = FPM T = FFKM	0 = without S = with	00 = without contact	0 = without Y = E. g. with Controller, without valve. Please specify in writing
0.5 - 5	KDF-1120...	KDF-1220...	KDF-1320...				only model KDF-xx17 without junction box	
1.2 - 12	KDF-1125...	KDF-1225...	KDF-1325...				M1 = 1 monostable contact M2 = 2 monostab. contacts	
2.5 - 25	KDF-1128...	KDF-1228...	KDF-1328...				with junction box	
4 - 40	KDF-1130...	KDF-1230...	KDF-1330...				A1 = 1 monostable contact A2 = 2 monostab. contacts B1 = 1 bistable contact B2 = 2 bistable contacts	
6 - 60	KDF-1135...	KDF-1235...	KDF-1335...				from model KDF-xx20 without junction box	
10 - 100	KDF-1139...*	KDF-1239...*	KDF-1339...*				M3 = 1 monostable contact M4 = 2 monostab. contacts	
12 - 120	KDF-1140...*	KDF-1240...*	KDF-1340...*				with junction box	
16 - 160	KDF-1141...*	KDF-1241...*	KDF-1341...*				A3 = 1 monostable contact A4 = 2 monostab. contacts B3 = 1 bistable contact B4 = 2 bistable contacts	
other liquids	KDF-11YY...	KDF-12YY...	KDF-13YY...					

Gases: Order Details (Example: KDG-1107 NV 0 M10)

Measuring range air** L _N /h	Order no. brass	Order no. stainless steel	Order no. PVDF***	Connection***	Gasket option	Panel installation kit	Contact option	Miscellaneous options
0.5 - 5	KDG-1107...	KDG-1207...	KDG-1307...	N = 1/4 NPT R = G 1/4 W = hose connector angular, 90° S = hose connector straight Y = Special	V = FPM T = FFKM	0 = without S = with	00 = without contact	0 = without Y = E. g. with Controller, without valve. Please specify in writing
0.8 - 8	KDG-1109...	KDG-1209...	KDG-1309...				up to model KDG-xx24 without junction box	
1.6 - 16	KDG-1113...	KDG-1213...	KDG-1313...				M1 = 1 monostable contact M2 = 2 monostab. contacts	
4 - 40	KDG-1120...	KDG-1220...	KDG-1320...				with junction box	
6 - 60	KDG-1124...	KDG-1224...	KDG-1324...				A1 = 1 monostable contact A2 = 2 monostab. contacts B1 = 1 bistable contact B2 = 2 bistable contacts	
10 - 100	KDG-1128...	KDG-1228...	KDG-1328...				from model KDG-xx28 without junction box	
25 - 250	KDG-1132...	KDG-1232...	KDG-1332...				M3 = 1 monostable contact M4 = 2 monostab. contacts	
50 - 500	KDG-1137...	KDG-1237...	KDG-1337...				with junction box	
80 - 800	KDG-1142...	KDG-1242...	KDG-1342...				A3 = 1 monostable contact A4 = 2 monostab. contacts B3 = 1 bistable contact B4 = 2 bistable contacts	
100 - 1000	KDG-1146...	KDG-1246...	KDG-1346...					
180 - 1800	KDG-1151...*	KDG-1251...*	KDG-1351...*					
240 - 2400	KDG-1157...*	KDG-1257...*	KDG-1357...*					
300 - 3000	KDG-1161...*	KDG-1261...*	KDG-1361...*					
400 - 4000	KDG-1164...*	KDG-1264...*	KDG-1364...*					
500 - 5000	KDG-1168...*	KDG-1268...*	KDG-1368...*					
other gases	KDG-11YY...	KDG-12YY...	KDG-13YY...					

*For all instruments which are marked with * the limit switch is only available as a min. contact.
 ** at 1.2 bar absolute and 20°C
 ***PVDF-version only with G 1/4 available