Flow Rates:
- Water: 0.25 - 2.5...16 - 160 l/h
- Air: 0.5 - 5...500 - 5000 NI/h

Accuracy: ±2.5 % \( q_{\text{G}} \) = 50 %

\( p_{\text{max}} \): PN 16; \( t_{\text{max}} \): 100 °C

Connection: ¼" NPT female or G ¼ female

Material: stainless steel
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 Data

Installation position: vertical, flow from bottom
Accuracy: ±2.5% q0 50
±3% of full scale (upstream pressure controller)
±5% of full scale (downstream pressure controller)
(within 10-100% of measuring range) acc. VDE/VDI 3515 page 2
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: IP65 (EN60529)
Repeatability: ±1,0% FS
(Differential pressure regulator): ±1,5% / 2,5% FS
Connection: ¼" NPT; G ¼ (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: Hostaflon ET
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: Ex 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)

Flow Meters and Switches for very Low Flows Model KDF/KDG

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 Z2).
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 setted 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.
### Liquids Order Details (Example: KDF-2217 NV 0 M10)

<table>
<thead>
<tr>
<th>Measuring range water [l/h]</th>
<th>Valve seat [mm]</th>
<th>Pressure Drop [mbar]</th>
<th>Order no.</th>
<th>Connection</th>
<th>Gasket option</th>
<th>Panel installation kit</th>
<th>Contact option</th>
<th>Miscellaneous options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25 - 2.5</td>
<td>1.2</td>
<td>10</td>
<td>KDF-2217...</td>
<td>N = ¼&quot; NPT, Rₜ = G ¼, W = hose connector angular, 90°, for 8 mm hose</td>
<td>0 = without Sₜₜₜ = with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 - 5</td>
<td>1.2</td>
<td>20</td>
<td>KDF-2220...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 - 12</td>
<td>2.8</td>
<td>10</td>
<td>KDF-2225...</td>
<td>V = FPM, T = FFKM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 - 25</td>
<td>2.8</td>
<td>20</td>
<td>KDF-2228...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - 40</td>
<td>2.8</td>
<td>30</td>
<td>KDF-2230...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - 60</td>
<td>2.8</td>
<td>80</td>
<td>KDF-2235...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 100</td>
<td>2.8</td>
<td>125</td>
<td>KDF-2239...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 - 120</td>
<td>3.4</td>
<td>200</td>
<td>KDF-2240...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 - 160</td>
<td>3.4</td>
<td>200</td>
<td>KDF-2241...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other liquids</td>
<td>on request</td>
<td>on request</td>
<td>KDF-22YY...</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Gas Ordering Details (Example: KDG-2207 NV 0 M10)

<table>
<thead>
<tr>
<th>Measuring range air [Nm³/h]</th>
<th>Valve seat [mm]</th>
<th>Pressure Drop [mbar]</th>
<th>Order no.</th>
<th>Connection</th>
<th>Gasket option</th>
<th>Panel installation kit</th>
<th>Contact option</th>
<th>Miscellaneous options</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 - 5</td>
<td>1.2</td>
<td>15</td>
<td>KDG-2207...</td>
<td>N = ½&quot; NPT, Rₜ = G ¼, W = hose connector angular, 90°, for 8 mm hose</td>
<td>0 = without Sₜₜₜ = with</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0.8 - 8</td>
<td>1.2</td>
<td>15</td>
<td>KDG-2209...</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1.6 - 16</td>
<td>1.2</td>
<td>20</td>
<td>KDG-2213...</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>4 - 40</td>
<td>1.2</td>
<td>20</td>
<td>KDG-2221...</td>
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<tr>
<td>6 - 60</td>
<td>1.2</td>
<td>25</td>
<td>KDG-2224...</td>
<td></td>
<td></td>
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<tr>
<td>10 - 100</td>
<td>2.8</td>
<td>15</td>
<td>KDG-2229...</td>
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<tr>
<td>25 - 250</td>
<td>2.8</td>
<td>15</td>
<td>KDG-2232...</td>
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<tr>
<td>50 - 500</td>
<td>2.8</td>
<td>15</td>
<td>KDG-2237...</td>
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<tr>
<td>80 - 800</td>
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<td>20</td>
<td>KDG-2242...</td>
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<tr>
<td>100 - 1000</td>
<td>2.8</td>
<td>25</td>
<td>KDG-2246...</td>
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<tr>
<td>180 - 1800</td>
<td>2.8</td>
<td>80</td>
<td>KDG-2251...</td>
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<tr>
<td>240 - 2400</td>
<td>2.8</td>
<td>125</td>
<td>KDG-2257...</td>
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<tr>
<td>300 - 3000</td>
<td>2.8</td>
<td>150</td>
<td>KDG-2261...</td>
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<tr>
<td>400 - 4000</td>
<td>3.4</td>
<td>200</td>
<td>KDG-2264...</td>
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<tr>
<td>500 - 5000</td>
<td>3.4</td>
<td>200</td>
<td>KDG-2268...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other liquids</td>
<td>on request</td>
<td>on request</td>
<td>KDG-22YY...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. the limit switch is only available as a min. contact.
2. at 1.2 bar absolute and 20°C
3. not with panel installation kit
4. not with differential pressure controller
5. not with junction box

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Flow Meters and Switches for very Low Flows Model KDF/KDG

**Dimensions [mm]**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Standard with needle valve</th>
<th>with Panel installation kit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>with contacts and junction box</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with differential pressure controller with constant inlet pressure</td>
</tr>
</tbody>
</table>

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