Gear Type
Flow Meter

VC PULSE
Gear Type Flow Meter VC PULSE

Description

The measuring unit is driven by the flow of fluid based on the principle of a gear motor. The gears run contactless in the measuring chamber. The low-friction plain bearings or ball bearings act as the bearing elements. The gear movement is sampled contactless through the sensor installed in the cover. Between the sensor cavity and the measuring chamber there is a pressure-resistant amagnetic divider. A high-efficiency magnetic coupling transfers the rotation free from slip to a sensor assembly that is applied to the exterior of the unit. The signal is output as a square wave. The two-channel scanning facilitates a higher measuring resolution and detection of the direction of the flow rate.

Product Characteristics

- Selectable high measurement value resolution
- Viscosity-independent measurements made in the frame of the stated ranges
- Low pressure drop
- Highly-dynamic measurements
- High compression strength
- Low noise emission
- Highly-accurate measurements with outstanding reproducibility
- Temperature-independent pulses in a large temperature range
- Great accuracy even at low flow rates in the lower measurement range
- Electronics has low susceptibility to disturbance
- Easy to install electronics connection
- Sensor system in EMC-compatible version

Typical Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Medium</th>
<th>Version</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate measurement</td>
<td>oil, brake fluid, skydrol, diesel lubricating low viscosity</td>
<td>Spheroidal cast iron ball bearings minimal clearances</td>
<td>1</td>
</tr>
<tr>
<td>Ratio control</td>
<td>Polyols + Isocyanate, glue, resin, silicon poor lubricating medium viscosity</td>
<td>Spheroidal cast iron tungsten carbide plain bearings enhanced play</td>
<td>4</td>
</tr>
</tbody>
</table>
Accuracy Characteristics

- The accuracy values stated by KRACHT refer to the pulse volumes [cm³/Imp], i.e., the percentage deviation applies to each current measurement value.
- Repeat accuracy is +/- 0.05% under constant conditions
- The accuracy check is a component of every pre-delivery inspection.
- On request, we will calibrate in the factory and its result will be documented in the form of an accuracy characteristic curve.
- Such an accuracy characteristic curve is shown below for a VC 1 Series 1 as an example.
- The accuracy values stated by Kracht shall be confirmed by the DKD (Deutscher Kalibrierdienst).
### Gear Type Flow Meter VC PULSE

#### Characteristics

<table>
<thead>
<tr>
<th>Mounting position</th>
<th>optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow direction</td>
<td>optional</td>
</tr>
<tr>
<td>Connection type</td>
<td>Plate mounting / pipe thread</td>
</tr>
<tr>
<td>max. operating pressure $p_{\text{max}}$</td>
<td>400 bar</td>
</tr>
<tr>
<td>Pressure peak $\bar{p}$</td>
<td>480 bar</td>
</tr>
<tr>
<td>Max. pressure drop $\Delta p_{\text{max}}$</td>
<td>Series 1 16 bar, Series 4 16/40 bar (according to version)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>1…2,500,000 mm²/s (according to series)</td>
</tr>
<tr>
<td>Accuracy (of measurement value)</td>
<td>Series 1 +/- 0.3 % at ≥ 20 mm²/s, Series 4 +/- 0.5 % at ≥ 100 mm²/s</td>
</tr>
</tbody>
</table>

#### Permitted Temperature Ranges

<table>
<thead>
<tr>
<th>Sealing material</th>
<th>FKM</th>
<th>EPDM</th>
<th>FEP</th>
<th>FFKM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>$-15^\circ C ... 80^\circ C$</td>
<td>$-30^\circ C ... 80^\circ C$</td>
<td>$-30^\circ C ... 80^\circ C$</td>
<td>$-15^\circ C ... 80^\circ C$</td>
</tr>
<tr>
<td>Media temperature</td>
<td>$-15^\circ C ... 80^\circ C$</td>
<td>$-30^\circ C ... 80^\circ C$</td>
<td>$-30^\circ C ... 80^\circ C$</td>
<td>$-15^\circ C ... 80^\circ C$</td>
</tr>
</tbody>
</table>

#### Series Selection

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Series</th>
<th>Starting point (l/min)</th>
<th>Measuring range (l/min)</th>
<th>Material housing</th>
<th>Material gears</th>
<th>Bearing</th>
<th>Type of connection</th>
<th>Perm. foreign body size in the medium (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.04</td>
<td>1</td>
<td>0.004</td>
<td>0.02-4</td>
<td>Spheroidal cast iron</td>
<td>Steel</td>
<td>Ball bearing</td>
<td>Plate mounting</td>
<td>20</td>
</tr>
<tr>
<td>0.2</td>
<td>1</td>
<td>0.01</td>
<td>0.16-16</td>
<td>Spheroidal cast iron</td>
<td>Steel</td>
<td>Ball bearing</td>
<td>Plate mounting</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0.02</td>
<td>0.4-80</td>
<td>Spheroidal cast iron</td>
<td>Steel</td>
<td>Ball bearing</td>
<td>Plate mounting</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td>0.3-60</td>
<td>Spheroidal cast iron</td>
<td>Steel</td>
<td>Low-friction plain bearing</td>
<td>Pipe connection</td>
<td>30</td>
</tr>
</tbody>
</table>

#### Working Characteristics

<table>
<thead>
<tr>
<th>VC</th>
<th>Selectable sensor resolution [pulse/rev.]</th>
<th>Pulse volume [cm³/pulse]</th>
<th>Resolution [pulse/l]</th>
<th>Resolution (4-fold evaluation) [pulse/l]</th>
<th>Pulse frequency at $Q_{\text{nom}}$ [Hz]</th>
<th>Multiplication factor to standard VC [-]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC 0.04</td>
<td>512</td>
<td>0.001484</td>
<td>673 684</td>
<td>2 694 737</td>
<td>44 912</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>2 500</td>
<td>0.000304</td>
<td>3 289 474</td>
<td>13 157 896</td>
<td>219 298</td>
<td>132</td>
</tr>
<tr>
<td>VC 0.2</td>
<td>512</td>
<td>0.006699</td>
<td>149 271</td>
<td>597 084</td>
<td>39 806</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>2 500</td>
<td>0.001372</td>
<td>728 863</td>
<td>2 915 452</td>
<td>194 363</td>
<td>179</td>
</tr>
<tr>
<td>VC 1</td>
<td>512</td>
<td>0.028328</td>
<td>35 301</td>
<td>141 204</td>
<td>47 067</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>2 500</td>
<td>0.005802</td>
<td>172 366</td>
<td>689 464</td>
<td>229 822</td>
<td>179</td>
</tr>
</tbody>
</table>

Sensor resolutions 360 up to 2500 pulses/rev. available upon request.
### Signal Characteristics

**Channel I**
- A rising flank
- B one pulse
- C falling flank
- D ON phase
- E OFF phase
- F Pulse duty factor 1:1 ± 15%

**Channel II**
- G Channel offset

### Electrical Characteristics

- **Number of measuring channels**: 2
- **Supply voltage**: $U_B = 11 \ldots 30$ V DC
- **Pulse amplitude**: $U_A \geq 0.8 U_B$
- **Pulse form at symmetr. Output signal**: square wave, pulse duty factor/ channel 1:1 ± 15 %
- **Signal output**: Push-Pull
- **Pulse offset between both channels**: 90° ± 30°
- **Maximum load**: ± 30 mA
- **Current consumption**: Standard 45 mA
- **Maximum 150 mA
- **Frequency**: max. 200 kHz
- **Degree of protection**: IP 65 DIN EN 60529

### Electrical Connection

- 1 $V_{cc}$ 11 ... 30 V DC
- 2 Channel 1
- 3 GND
- 4 Channel 2
Pressure Drop Parameter: Viscosity (mm²/s)

Series 1

VC 0.04

Pressure drop $\Delta p$ [bar]

Flow rate $Q$ [l/min]

VC 0.04

Flow rate $Q$ [l/min]

Pressure drop $\Delta p$ [bar]
**Pressure Drop**  Parameter: Viscosity (mm²/s)

**Series 1**

**VC 0.2**

![Graph showing pressure drop vs flow rate for VC 0.2 with viscosity parameter.]

**VC 0.2**

![Graph showing pressure drop vs flow rate for VC 0.2 with viscosity parameter. Extract see below.]
Gear Type Flow Meter VC PULSE

Pressure Drop  Parameter: Viscosity (mm²/s)

Series 1

VC 1

Pressure Drop

Extract see below

Flow rate Q [l/min]

Pressure drop Δp [bar]

Flow rate Q [l/min]

VC 1 (extract)
Pressure Drop Parameter: Viscosity (mm²/s)

Series 4

VC 1

Pressure drop $\Delta p$ [bar]

Flow rate $Q$ [l/min]

Extract see below

Pressure drop $\Delta p$ [bar]

Flow rate $Q$ [l/min]
Product Portfolio

Gear Pumps
Gear pumps for lubricating oil supply equipment, low pressure filling and feed systems, dosing and mixing systems.

Hydraulics
Single and multistage high pressure gear pumps and hydraulic motors for construction machinery, vehicle-mounted machines.

Flow Measurement
Gear, turbine and screw type flow meters and electronics for volume and flow metering technology in hydraulics, processing and laquering technology.

Valves
Cetop directional control and proportional valves, pressure, quantity and stop valves for pipe and slab construction.

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