The paddle wheel flowmeter for continuous flow measurement is especially designed for use in neutral, slightly aggressive, solid free liquids.

The Bürkert designed fitting system ensures simple installation of the devices into all pipes from DN20 to DN400. The flowmeter produces a frequency pulse signal, proportional to the flow rate, which can easily be transmitted and processed by a Bürkert transmitter/controller.

**General data**

**Compatibility**

With fittings S020 (see corresponding data sheet)

**Materials**

- Housing / Union nut: PE / PC
- Cable plug: PA
- Wetted parts materials: Brass, stainless steel 1.4404/316L, PVC, PP, PVDF
- Sensor armature, paddle wheel: PVDF
- Axis, bearing / Seal: Ceramics / FKM (EPDM option)

**Electrical connection**

- Cable plug EN 175301-803

**Complete device data (fitting + electronic module)**

- Pipe diameter: DN20 to DN400
- Measuring range: 0.3 to 10 m/s
- Medium temperature:
  - with fitting in PVC / PP: 0 to 50°C (32 to 122°F) / 0 to 80°C (32 to 176°F)
  - Stainless steel, brass, PVDF: -15 to 80°C (5 to 212°F)
- Medium pressure max.: PN10 (145.1 PSI)
- Viscosity / Pollution: 300 cSt, max. / max. 1% (Size of particles 0.5 mm max.)
- Accuracy:
  - Teach-In: ±0.5% of F.S.* (at 10 m/s)\(^1\)
  - Standard K-factor: ±(0.5% of F.S. + 2.5% of Reading)\(^1\)
- Linearity: ±0.5% of F.S.* (at 10 m/s)\(^1\)
- Repeatability: ≤ 0.4% of Reading\(^1\)

**Environment**

- Ambient temperature: -15 to 60°C (5 to 140°F) (operating and storage)
- Relative humidity: ≤ 80%, without condensation

\(^1\) Under reference conditions i.e. measuring fluid = water, ambient and water temperature = 20°C (68°F), applying the minimum inlet and outlet pipe straights, matched inside pipe dimensions.
Electrical data

Operating voltage
- 12 - 36 V DC (via Bürkert transmitter for “Low Power” version)

Current consumption
- Pulse version ≤ 50 mA
- Pulse “Low power” version ≤ 0.8 mA

Output: Frequency
- Pulse version
  - Transistor NPN/PNP, open collector, max. 100 mA, frequency: 0...300 Hz; duty cycle 1/2
- Pulse “Low Power” version
  - Transistor NPN, open collector, max. 10 mA, frequency: 0...300 Hz; duty cycle 1/2

Reversed polarity of DC
- Protected

Standards and approvals

Protection class
- IP65 with connector plugged-in and tightened

Standard and directives
- EMC
  - EN 61000-6-2, 61000-6-3
- Pressure
  - Complying with article 3 of §3 from 97/23/CE directive.*
- Vibration
  - EN 60068-2-6
- Shock
  - EN 60068-2-27

Accuracy diagram

Pressure / temperature chart

* For the 97/23/CE pressure directive, the device can only be used under following conditions (depend on max. pressure, pipe diameter and fluid).

<table>
<thead>
<tr>
<th>Type of fluid</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid group 1, §1.3.a</td>
<td>DN 25 only</td>
</tr>
<tr>
<td>Fluid group 2, §1.3.a</td>
<td>DN ≤ 32 or DN &gt; 32 and PN*DN ≤ 1000</td>
</tr>
<tr>
<td>Fluid group 1, §1.3.b</td>
<td>DN ≤ 25 or DN &gt; 25 and PN*DN ≤ 2000</td>
</tr>
<tr>
<td>Fluid group 2, §1.3.b</td>
<td>DN ≤ 400</td>
</tr>
</tbody>
</table>

A: Application range for complete device (fitting + flowmeter)
Design and principle of operation

The flowmeter 8020 consists of a transducer and a paddle-wheel with ceramic bearings. The ceramic rotating axis is set on the end of a PVDF INSERTION sensor armature. The transducer is mounted inside the armature. In a 3-wire system, the signal can be displayed or processed directly. The output signal is provided via cable plug according to EN 175301-803.

When liquid flows through the pipe, the paddle-wheel is set in rotation. The non-wetted permanent magnets inserted in the paddle wheel generate a measuring signal which frequency is proportional to the flow velocity. A conversion coefficient (K-factor, available in the instruction manual of the fitting), specific to each pipe (size and material) enables the conversion of this frequency into flow rate.

Installation

The 8020 flowmeter can easily be installed into any Bürkert INSERTION fitting system Type S020, by just fixing the main nut. Minimum straight upstream and downstream distances must be observed. According to the pipe’s design, necessary distances can be bigger or use a flow conditioner to obtain the best accuracy. For more information, please refer to EN ISO 5167-1.

EN ISO 5167-1 prescribes the straight inlet and outlet distances that must be complied with when installing fittings in pipe lines in order to achieve calm flow conditions. The most important layouts that could lead to turbulence in the flow are shown below, together with the associated prescribed minimum inlet and outlet distances. These ensure calm, problem-free measurement conditions at the measurement point.

Two electronic module versions with frequency output are available:

- with one pulse output (either NPN or PNP transistor output depending on wiring).
  An external power supply of 12 - 36 V DC is required. It is designed for connection to any system with open collector NPN or PNP frequency input.

- with one pulse “Low Power” output (NPN transistor output).
  An external power supply of 12 - 36 V DC is required. Can only be connected to separate versions of flow transmitters Type 8025/8032.

Pressure and temperature ratings must be respected according to the selected fitting material. The suitable pipe size is selected using the diagram Flow/Velocity/DN. The measuring device is not designed for gas flow measurement.
Example:
- Flow: 10 m³/h
- Ideal flow velocity: 2...3 m/s

For these specifications, the diagram indicates a pipe size of DN40 [or DN50 for (*) mentioned fittings]

Note:
The length of the sensor armature depends on the fitting used. See data sheet Type S020.

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>T-Fitting H [mm]</th>
<th>Plastic Spigot</th>
<th>St. St. Spigot</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>153.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>153.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>157.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>161.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>167.0 191.5</td>
<td>162.5</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>167.0 190.5 172.5</td>
<td>167.0</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>194.5 177.5</td>
<td>173.0</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>199.5 184.0 183.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>195.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>202.5</td>
<td>194.5</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>212.5 230.0</td>
<td>206.5</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>236.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>248.5 251.0</td>
<td>226.0</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>269.0</td>
<td>286.0</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>280.5</td>
<td>305.5</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>294.0</td>
<td>317.5</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>308.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* for following fittings with:
- external threads acc. to SMS 1145
- weld ends acc. to SMS 3008, BS 4825/ASME BPE or DIN 11850 Series 2
- Clamp acc. to SMS 3017/ISO 2852, BS 4825/ASME BPE or DIN 32676
Ordering chart for flowmeter Type 8020

A flowmeter Type 8020 consists of:
- a flowmeter Type 8020
- an INSERTION fitting Type S020 (DN20 to DN400 - Refer to corresponding data sheet - has to be ordered separately)

<table>
<thead>
<tr>
<th>Description</th>
<th>Operating voltage</th>
<th>Output</th>
<th>Sensor version</th>
<th>Electrical connection</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse version flowmeter (pluggable to Types 8025 Universal transmitter, batch controller or konti-Dos, 8032, PLC)</td>
<td>12 - 36 V DC</td>
<td>Frequency with pulse, PNP or NPN</td>
<td>short</td>
<td>Cable plug EN 175301-803</td>
<td>419 587</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>long</td>
<td>Cable plug EN 175301-803</td>
<td>419 589</td>
</tr>
<tr>
<td>Pulse &quot;Low Power&quot; version flowmeter (pluggable to Types 8025, 8032 transmitter)</td>
<td>from associated transmitter</td>
<td>Frequency with pulse, NPN</td>
<td>short</td>
<td>Cable plug EN 175301-803</td>
<td>419 591</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>long</td>
<td>Cable plug EN 175301-803</td>
<td>419 593</td>
</tr>
</tbody>
</table>

Ordering chart for accessories (has to be ordered separately)

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set with 1 green FKM and 1 black EPDM gasket</td>
<td>552 111</td>
</tr>
<tr>
<td>Ring</td>
<td>619 205</td>
</tr>
<tr>
<td>Union nut</td>
<td>619 204</td>
</tr>
<tr>
<td>Cable plug EN 175301-803 with cable gland (Type 2508)</td>
<td>438 811</td>
</tr>
<tr>
<td>Cable plug EN 175301-803 with NPT1/2 &quot; reduction without cable gland (Type 2509)</td>
<td>162 673</td>
</tr>
</tbody>
</table>

Interconnection possibilities with other Bürkert products

- Type 8025 - Universal, konti-Dos flow transmitter/batch controller
- Type 8032 - Flow switch/transmitter
- Type 8020 - Flowmeter with Hall transducer (pulse signal)
- Type 8030 - Flowmeter with Hall "Low Power" transducer (pulse signal)