






## Insertion flowmeter with paddle wheel for continuous flow measurement

- Economic integration in pipe systems without any additional piping
- 3-wire frequency pulse version to directly interface with PLC's (both PNP and NPN)
- Connection to Bürkert devices in remote versions

Product variants described in the data sheet may differ from the product presentation and description.

### Can be combined with

	<b>Type 8611</b> eCONTROL - Universal controller	▶
	<b>Type 8025</b> Insertion flowmeter or batch controller with paddle wheel and flow transmitter or remote batch controller	▶
	<b>Type 8619</b> multiCELL - Multi-channel and multi-function transmitter/controller	▶

### Type description

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 DN 20...DN 400. The flowmeter produces a frequency pulse signal, proportional to the flow rate, which can easily be transmitted and processed by a Bürkert transmitter/controller.

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## 1. General technical data

### Note:

If the device is mounted in a humid environment or outside, then the maximum voltage allowed is **35 V DC** instead of 36 V DC.

### Product properties

#### Material

Please make sure the device materials are compatible with the fluid you are using.

Detailed information can be found in chapter **"3.1. Chemical Resistance Chart – Bürkert resistApp"** on page 5.

#### Non wetted parts

Housing	PE
Union nut	PC
Screws	Stainless steel
Female cable plug/male fixed plug	<ul style="list-style-type: none"> <li>• Body, contact holder and cable gland in PA</li> <li>• Cable gland seal and flat seal in NBR</li> </ul>

#### Wetted parts

Seal	FKM (EPDM option)
Axis and bearings	Ceramics (Al <sub>2</sub> O <sub>3</sub> )
Sensor armature, paddle wheel	PVDF
Dimensions	Detailed information can be found in chapter <b>"4. Dimensions"</b> on page 6.
Measuring principle	Paddle wheel
Compatibility	Any pipe from DN 20...DN 400 which is fitted with Bürkert S020 Insertion fitting. For the selection of the nominal diameter of the Insertion fittings, see <b>data sheet Type S020</b> ▶.
Pipe diameter	DN 20...DN 400
Measuring range	<ul style="list-style-type: none"> <li>• Flow rate: 0.5...75000 l/min (0.13...19813 gpm)</li> <li>• Flow velocity: 0.3...10 m/s</li> </ul>

### Performance data

Measurement deviation	<ul style="list-style-type: none"> <li>• Teach-In: ± 1 % of the measured value<sup>1)</sup> at Teach-In flow rate value</li> <li>• Standard K-factor: ± 2.5 % of the measured value<sup>1)</sup></li> </ul>
Linearity	± 0.5 % of full scale <sup>1)</sup>
Repeatability	± 0.4 % of the measured value <sup>1)</sup>

### Electrical data

Operating voltage	<ul style="list-style-type: none"> <li>• Pulse version: 12...36 V DC, filtered and regulated Connection to main supply: permanent (through external SELV (Safety Extra Low Voltage) and LPS (Limited Power Source) power supply</li> <li>• Pulse "Low Power" version: via Bürkert transmitter</li> </ul>
Power source (not supplied)	Limited power source according to UL/EN 60950-1 standards or limited energy circuit according to UL/EN 61010-1 §9.4
DC reverse polarity protection	Yes
Overvoltage protection	Yes
Current consumption	With sensor <ul style="list-style-type: none"> <li>• Pulse version: ≤ 50 mA</li> <li>• Pulse "Low Power" version: ≤ 0.8 mA</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>• Pulse version: <ul style="list-style-type: none"> <li>– Transistor NPN/PNP, open collector</li> <li>– max. 100 mA</li> <li>– 0...300 Hz</li> <li>– duty cycle (pulse duration/period): ½</li> </ul> </li> <li>• Pulse "Low Power" version: <ul style="list-style-type: none"> <li>– Transistor NPN, open collector</li> <li>– max. 10 mA</li> <li>– 0...300 Hz</li> <li>– duty cycle (pulse duration/period): ½</li> </ul> </li> </ul>

Voltage supply cable	<ul style="list-style-type: none"> <li>• Max. 50 m length, shielded</li> <li>• Cross section of wires: 0.25...1.5 mm<sup>2</sup></li> </ul>
<b>Medium data</b>	
Fluid temperature	With fitting Type S020 in: <ul style="list-style-type: none"> <li>• PVC: 0...+50 °C (+32...+122 °F)</li> <li>• PP: 0...+80 °C (+32...+176 °F)</li> <li>• PVDF, stainless steel or brass: -15...+80 °C (+5...+176 °F)</li> </ul> See <b>data sheet Type S020</b> ▶ for more information.
Fluid pressure	Max. PN 10 Detailed information can be found in chapter <b>“5.1. Pressure temperature diagram”</b> on page 7 or see <b>data sheet Type S020</b> ▶ for more information.
Viscosity	Max. 300 cSt
Rate of solid particles	Max. 1 %
Maximum particle size	0.5 mm
<b>Process/Port connection &amp; communication</b>	
Process connection	G 2" for use with Type S020 Insertion fitting See <b>data sheet Type S020</b> ▶ for more information.
Electrical connection	Female cable plug according to EN 175301-803
<b>Approvals and Certificates</b>	
<b>Standards</b>	
Degree of protection according to IEC/EN 60529	IP65 with cable plug mounted and tightened
<b>Directives</b>	
CE directives	The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of conformity (if applicable)
Pressure equipment directives	Complying with Article 4, Paragraph 1 of 2014/68/EU directive Detailed information on the pressure equipment directive can be found in chapter <b>“2.1. Pressure Equipment Directive”</b> on page 5.
<b>Environment and installation</b>	
Ambient temperature	Operation and storage: -15...+60 °C (+5...+140 °F)
Relative air humidity	≤80 %, without condensation
Height above sea level	Max. 2000 m
Operating condition	Continuous
Equipment mobility	Fixed
Application range	Indoor and outdoor (protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions)
Installation category	Category I according to UL/EN 61010-1
Pollution degree	Degree 2 according to UL/EN 61010-1

1.) Under reference conditions i.e. measuring fluid = water, ambient and water temperature = 20 °C (68 °F), while maintaining the minimum inlet and outlet distances and the appropriate internal diameters of the pipes.

## 2. Approvals

### 2.1. Pressure Equipment Directive

The device conforms to Article 4, Paragraph 1 of the Pressure Equipment Directive 2014/68/EU under the following conditions:

#### Device used on a pipe

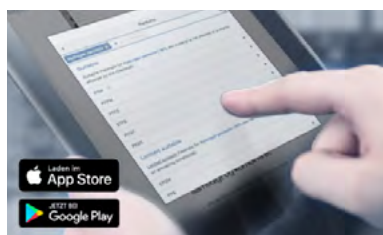
##### Note:

- The data in the table is independent of the chemical compatibility of the material and the fluid.
- PS = maximum admissible pressure, DN = nominal diameter of the pipe

Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.c.i	DN ≤ 25
Fluid group 2, Article 4, Paragraph 1.c.i	DN ≤ 32 or PS*DN ≤ 1000
Fluid group 1, Article 4, Paragraph 1.c.ii	DN ≤ 25 or PS*DN ≤ 2000
Fluid group 2, Article 4, Paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 or PS*DN ≤ 5000

## 3. Materials

### 3.1. Chemical Resistance Chart – Bürkert resistApp

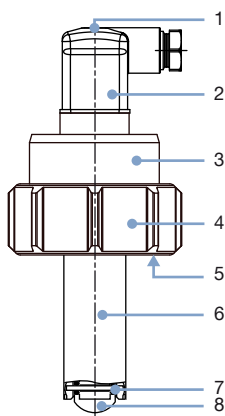


#### Bürkert resistApp – Chemical Resistance Chart

You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

[Start Chemical Resistance Check](#)

### 3.2. Material specifications



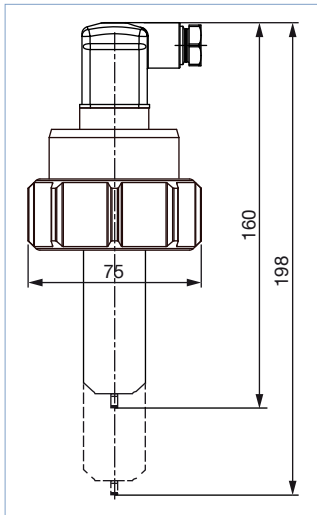
No.	Element	Material
1	Screw	Stainless steel
2	Female cable plug/male fixed plug	<ul style="list-style-type: none"> <li>• Body, contact holder and cable gland in PA</li> <li>• Cable gland seal and flat seal in NBR</li> </ul>
3	Housing	PE
4	Union nut	PC
5	Seal	FKM (EPDM option)
6	Sensor armature	PVDF
7	Axis and bearings	Ceramics (Al <sub>2</sub> O <sub>3</sub> )
8	Paddle wheel	PVDF

## 4. Dimensions

### 4.1. Flowmeter

**Note:**

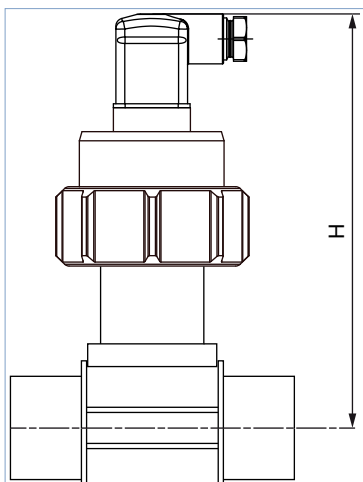
Specifications in mm



### 4.2. Flowmeter installed in a S020 fitting

**Note:**

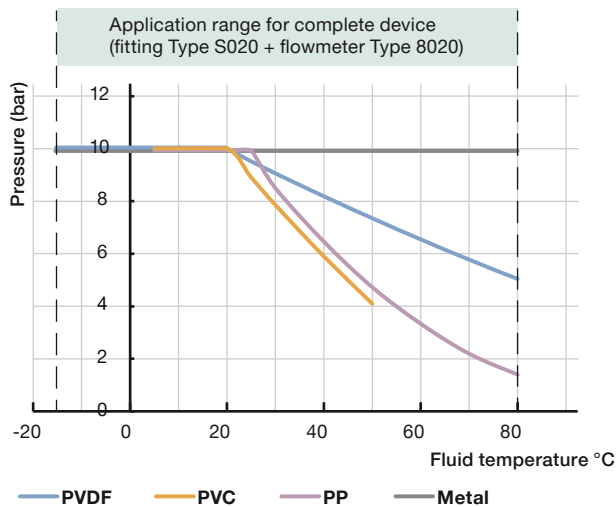
Specifications in mm



DN	H			
	T-Fitting	Saddle	Plastic spigot	Metal spigot
20	160.5	-	-	-
25	160.5	-	-	-
32	164.0	-	-	-
40	168.0	-	-	-
50	174.0	198.5	-	169.5
65	174.0	197.5	179.5	174.0
80	-	201.5	184.5	180.0
100	-	206.5	191.0	190.5
110	-	202.5	-	-
125	-	209.5	-	201.5
150	-	219.5	237.0	212.5
180	-	243.5	-	-
200	-	255.5	258.0	233.0
250	-	-	276.0	293.0
300	-	-	287.5	312.5
350	-	-	301.0	324.5
400	-	-	315.5	-

### 5. Performance specifications

#### 5.1. Pressure temperature diagram



### 6. Product installation

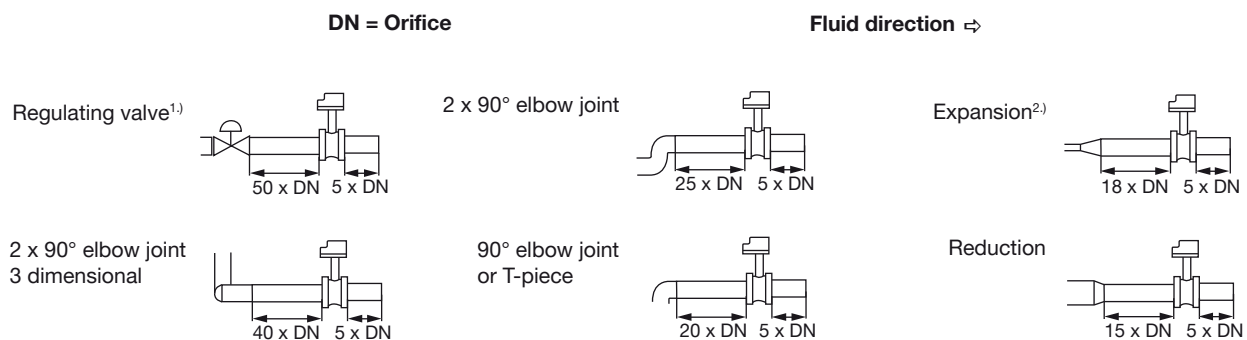
#### 6.1. Installation notes

**Note:**  
The flowmeter is not designed for gas and steam flow measurement.

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 specifies 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 specified minimum inlet and outlet distances.

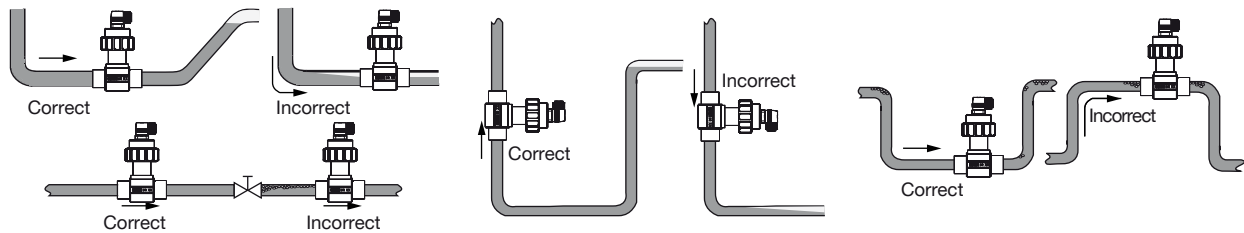
Make sure that the measuring conditions at the point of measurement are calm and problem-free.



1.) If the valve cannot be mounted after the measuring device, the minimal distances have to be respected.  
 2.) If an expansion cannot be avoided, the minimal distances have to be respected.  
 Please note minimum flow velocity

The flowmeter can be installed into either horizontal or vertical pipes. Important criteria for this are; ensure that the measurement pipe is fully filled and that the measurement pipe is free of bubbles.

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Pressure and temperature ratings must be respected according to the selected fitting material. The suitable pipe size is selected using the diagram for selecting the nominal diameter of the fitting, see **data sheet Type S020** ▶ for more information.

## 7. Product operation

### 7.1. Measuring principle

When liquid flows through the pipe, the paddle wheel with 4 inserted magnets is set in rotation, producing a measuring signal in the sensor (Hall sensor). The frequency modulated induced voltage is proportional to the flow velocity of the fluid.

A K-factor (available in the instruction manual of the S020 fitting), specific to each pipe (size and material) enables the conversion of this frequency into a flow rate.

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.

In a 3-wire system, the signal can be displayed or processed directly. The electrical connection is provided via a cable plug according to EN 175301-803.

## 8. Product design and assembly

### 8.1. Product assembly

**Note:**

- The 8020 flowmeter can easily be installed into any Bürkert Insertion fitting system (S020) by just fixing the main nut.
- The S020 Insertion fitting ensures simple installation into pipes from DN 20...DN 400.

See **data sheet Type S020** ▶ for more information.

The flowmeter 8020 consists of a transducer and a paddle-wheel with ceramic bearings. The ceramic rotating axis is set on the end of an insertion sensor armature. The transducer is mounted inside the armature.



## 9. Networking and combination with other Bürkert products

Example:



## 10. Ordering information

### 10.1. Bürkert eShop – Easy ordering and quick delivery



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### 10.2. Recommendation regarding product selection

**Note:**

A complete flow measurement equipment consists of a flowmeter Type 8020 and a Bürkert Insertion fitting Type S020.

See [data sheet Type S020 ▶](#) for more information.

Two different components must be ordered in order to select a complete device. The following information is required:

- **Article no.** of the desired flowmeter **Type 8020** (see chapter [“10.4. Ordering chart” on page 10](#))
- **Article no.** of the selected S020 Insertion fitting (See [data sheet Type S020 ▶](#))

### 10.3. Bürkert product filter







#### Bürkert product filter – Get quickly to the right product






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### 10.4. Ordering chart

Description	Operating voltage	Output	Sensor version	Electrical connection	Article no.
Pulse version flowmeter (pluggable to Types 8025 Universal transmitter, batch controller; 8619; PLC)	12...36 V DC	Frequency with pulse, PNP or NPN	Short	Female cable plug EN 175301-803	419587 
			Long		419589 
Pulse "Low Power" version flowmeter (pluggable to Type 8025 transmitter)	From associated transmitter	Frequency with pulse, NPN	Short		419591 
			Long		419593 

### 10.5. Ordering chart accessories

Description	Article no.
Set with 1 green FKM and 1 black EPDM gasket	552111 
Ring	619205 
Union nut	619204 
Female cable plug EN 175301-803 with cable gland - see <b>Type 2518</b> ▶	572264 
Cable plug EN 175301-803 with NPT ½" reduction without cable gland - see <b>Type 2509</b> ▶	162673 

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