Insertion flowmeter with paddle wheel for continuous flow measurement

- Cost-effective integration in pipe systems without any additional pipelines
- 3-wire frequency-pulse variant for direct connection to a PLC (PNP and NPN)
- Simple connection to Bürkert evaluation devices in a remote variant

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

Can be combined with

Type 8611
eCONTROL – Universal controller

Type 8025
Insertion flowmeter or batch controller with paddle wheel and flow transmitter or remote batch controller

Type 8619
multiCELL – multi-channel/ multi-function transmitter/ controller

Type description

The flowmeter with paddle wheel is particularly suited to use with neutral or mildly aggressive, particle-free liquids.

Bürkert's proprietary fitting system permits simple installation of the devices into pipelines from DN 20 to DN 400. The flowmeter generates a pulse frequency signal proportional to the flow velocity. The signal can be processed by a Bürkert Transmitter/Controller.

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Visit product website

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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	
Make sure the device materials are compatible with the fluid you are using. Further information can be found in chapter "4.1. Bürkert resistApp" on page 6.	
Further information on the materials can be found in chapter "4.2. Material specifications" on page 6.	
Non-wetted parts	
Housing	PE
Screw	Stainless steel
Union nut	PC
Female cable plug/male fixed plug	• Body, contact holder and cable gland in PA • Cable gland seal and flat seal in NBR
Wetted parts	
Sensor armature	PVDF
Axis and bearing	Ceramics (Al_2O_3)
Paddle wheel	PVDF
Seal	FKM (EPDM as option)
Compatibility	Any pipe from DN 20...DN 400 which is fitted with Bürkert Insertion fitting Type S020. For the selection of the nominal diameter of the fittings, see **data sheet Type S020** ▶.
Pipe diameter	DN 20 [1.)]...DN 400
Dimensions	Further information can be found in chapter "5. Dimensions" on page 6.
Measuring principle	Paddle wheel
Measuring range	• Flow rate: 0.5...75000 l/min (0.13...19813 gpm) • Flow velocity: 0.3...10 m/s
Performance data	
Measurement deviation	• Teach-in: ± 1 % of the measured value [2.)] at teach-in flow rate value • Standard K factor: ± 2.5 % of the measured value [2.)]
Linearity	± 0.5 % of full scale [2.)]
Repeatability	± 0.4 % of the measured value [2.)]
Electrical data	
Operating voltage	• Hall variant: 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 • Hall "Low Power" variant: via the connected Bürkert transmitter
Power source (not supplied)	Limited power source according to UL/EN 62368-1 standards or limited energy circuit according to UL/EN 61010-1 paragraph 9.4
DC reverse polarity protection	Yes
Overvoltage protection	Yes
Current consumption	• Hall variant: ≤ 50 mA • Hall "Low Power" variant: ≤ 0.8 mA
Output	• Hall variant: – 2 transistors, pulse output, NPN and PNP, open collector – max. 100 mA – frequency: 0...300 Hz – NPN output: 0.2...36 V DC – PNP output: supply voltage – duty cycle (pulse duration/period): ½ ± 10 % • Hall "Low Power" variant: – 1 transistor, pulse output, NPN, open collector – max. 10 mA – frequency: 0...300 Hz – duty cycle (pulse duration/period): ½ ± 10 %

Voltage supply cable	• Max. 50 m length, shielded • Cross section of wires: 0.25...1.5 mm²
Medium data	
Fluid temperature	With Insertion fitting Type S020 in: • PVC: 0...+ 50 °C (+ 32...+ 122 °F) • PP: 0...+ 80 °C (+ 32...+ 176 °F) • PVDF, stainless steel or brass: - 15...+ 80 °C (+ 5...+ 176 °F) See **data sheet Type S020** ▶ for more information.
Fluid pressure	Max. PN 10 Further information can be found in chapter "6.1. Pressure temperature diagram" on page 7 or in the **data sheet Type S020** ▶.
Viscosity	Max. 300 cSt
Rate of solid particles	Max. 1 %
Maximum particle size	0.5 mm
Product connections	
Process connection	G 2" for use with Insertion fitting Type S020 See **data sheet Type S020** ▶ for more information.
Electrical connection	Female cable plug according to DIN EN 175301-803
Approvals and conformities	
Directives	
CE directive	Further information on the CE directive can be found in chapter "3.2. Standards" on page 5.
Pressure equipment directive	Complying with article 4, paragraph 1 of 2014/68/EU directive Further information on the pressure equipment directive can be found in chapter "3.3. Pressure Equipment Directive (PED)" on page 5.
Environment and installation	
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.
Degree of protection according to IEC/EN 60529	IP65 under the following simultaneous conditions: • device wired • cable plug mounted and tightened
Installation category	Category I according to UL/EN 61010-1
Pollution degree	Degree 2 according to UL/EN 61010-1

1.) Restricted to some Insertion fitting process connections

2.) Under reference conditions i.e. measuring medium = water, ambient and water temperature = + 20 °C (+ 68 °F), observing the minimum the minimum inlet and outlet sections and the appropriate inner diameter of the pipe.

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2. Product variants

The flowmeter is available with frequency output in two variants:

- **Hall variant** with two transistor outputs NPN and PNP.
  The flowmeter requires an external power supply of 12...36 V DC. The output signal is designed for connection to any system with open collector NPN or PNP frequency input. This variant is intended, for example, for connection to Universal flow transmitters or batch controller Type 8025, to pulse divider Type 8022, to eCONTROL universal controller Type 8611 or to multiCELL transmitter/controller Type 8619.
  See **data sheet Type 8025** ▶, **data sheet Type 8022** ▶, **data sheet Type 8611** ▶, **data sheet Type 8619** ▶ for more information.
- **Hall "Low Power" variant** with one NPN transistor "Low Power" output. The flowmeter requires an external power supply of 12...36 V DC, provided by the connected Bürkert transmitter. This variant is **only** intended for connection to the Bürkert device Type 8025 in its flow transmitter for "Low Power" flowmeters Type 8025 or to 4...20 mA flow transmitter Type 8022.
  See **data sheet Type 8025** ▶, **data sheet Type 8022** ▶ for more information.

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

3. Approvals and conformities

3.1. Conformity

In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

3.2. Standards

The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

3.3. Pressure Equipment Directive (PED)

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

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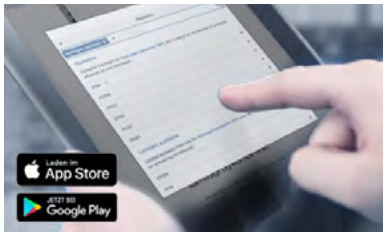
4. Materials

4.1. Bürkert resistApp

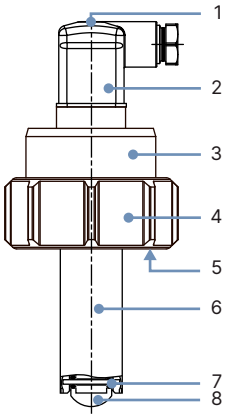


Bürkert resistApp – Chemical resistance chart

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

4.2. Material specifications



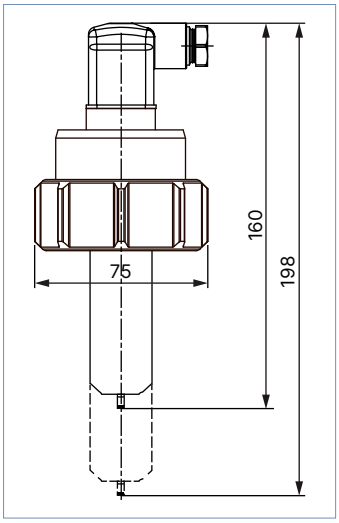
No.	Element	Material
1	Screw	Stainless steel
2	Female cable plug/male fixed plug	• Body, contact holder and cable gland in PA • Cable gland seal and flat seal in NBR
3	Housing	PE
4	Union nut	PC
5	Seal	FKM (EPDM as option)
6	Sensor armature	PVDF
7	Axis and bearing	Ceramics (Al_2O_3)
8	Paddle wheel	PVDF

5. Dimensions

5.1. Flowmeter

Note:

- Dimensions in mm, unless otherwise stated
- The length of the flow probe depends on the used Insertion fitting Type S020 and its nominal diameter. See **data sheet Type S020** ▶ for more information.



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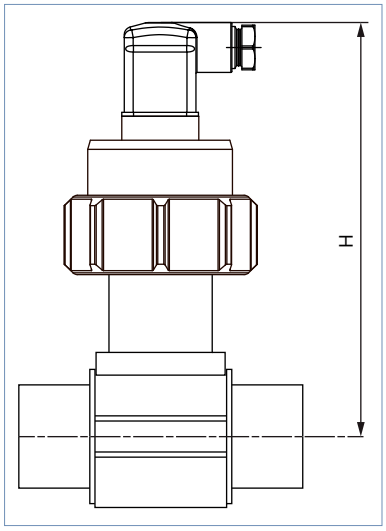
5.2. Flowmeter installed in an Insertion fitting Type S020

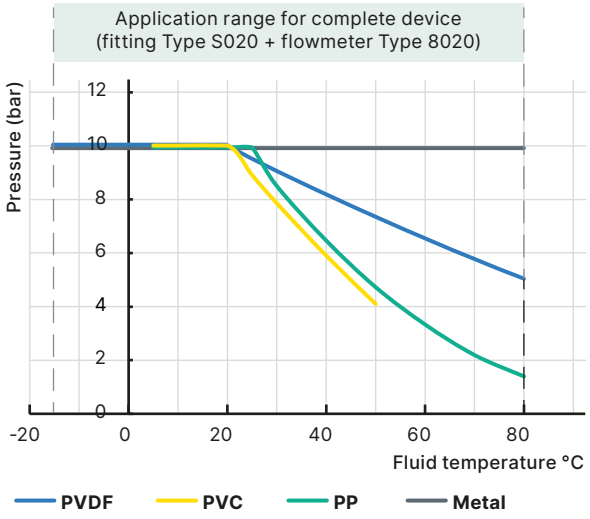
Note:
Dimensions in mm, unless otherwise stated



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	–

6. Performance specifications

6.1. Pressure temperature diagram



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7. Product installation

7.1. Installation notes

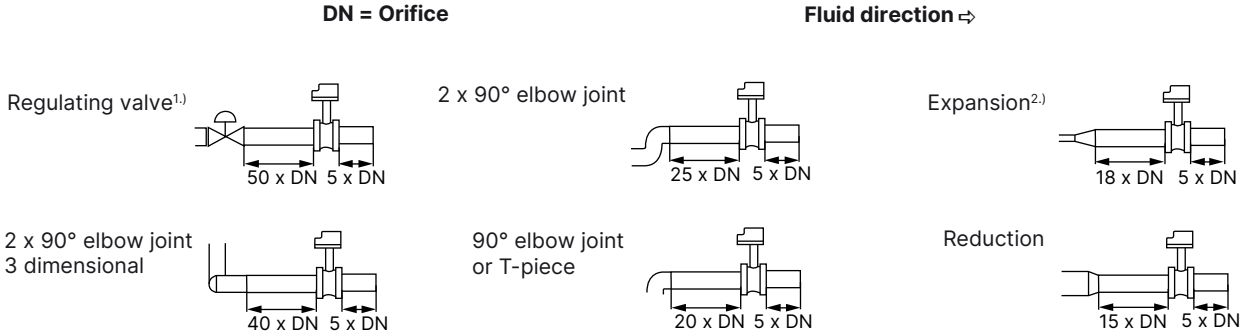
Flow measurement

Note:
The device is not suitable for use in gaseous media and steam.

Minimum straight distances upstream and downstream of the sensor must be observed. These stabilizing distances depend on the pipe's design. Increasing these distances or installing a flow conditioner may be necessary to obtain the best accuracy. For more information, 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 commonly used elements that could lead to turbulence in the flow are shown below. The related minimum inlet and outlet distances that ensure a calm flow are also specified.

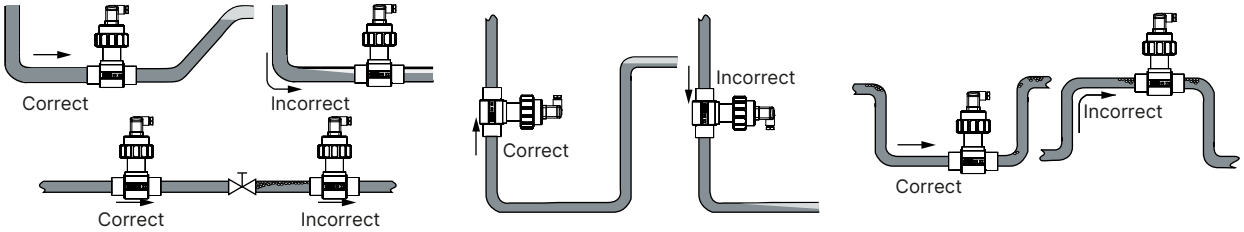
Make sure that the measuring conditions at the point of measurement are calm and problem-free.



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 device can be installed in either horizontal or vertical pipes, but following additional conditions should be respected:

- The pipe always has to be filled with fluid at all times near the device.
- The pipe design must be such that no air bubbles or cavitation can form within the medium near the device at any time.



Pressure and temperature ratings must be respected according to the selected fitting material. The suitable pipe size is selected using the diagram in the chapter "Nominal size selection" of the **data sheet Type S020 ▶**.

8. Product operation

8.1. 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, specific to each pipe, enables the conversion of this frequency into a flow rate.
This K factor is available in the Insertion fittings' instruction manual, see **Type S020 ▶**.

9. Product design and assembly

9.1. Product assembly

Note:

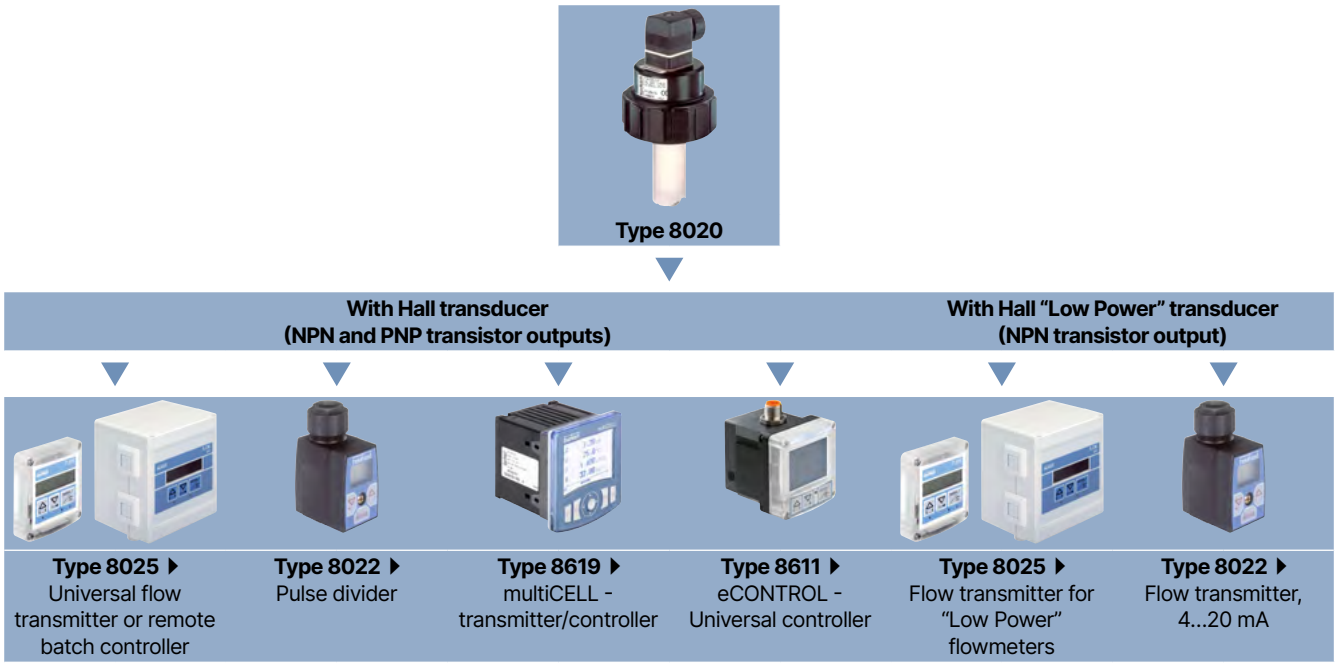
- The device Type 8020 is installed into a Bürkert Insertion fitting Type S020 and fastened with a union nut.
- The Insertion fitting Type S020 ensures simple installation into pipes from DN 20...DN 400, see **data sheet Type S020** ▸ for more information.

The flowmeter Type 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.

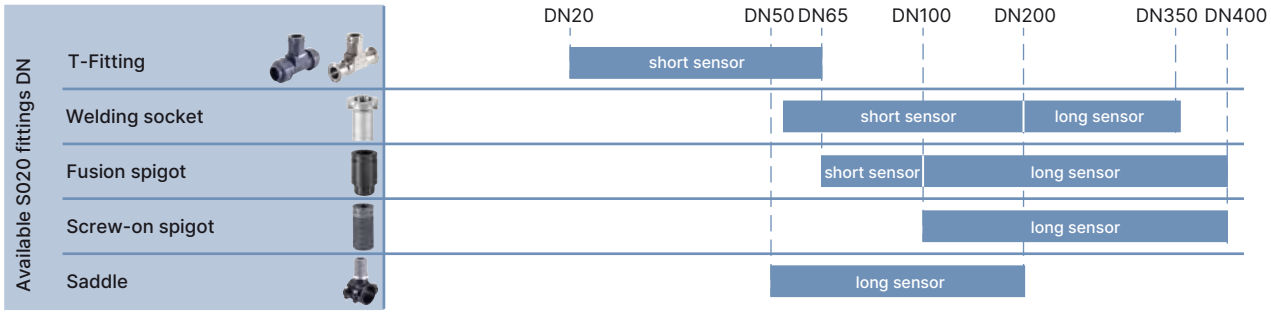
10. Networking and combination with other Bürkert products

10.1. Networking and combination of the device

Example:



10.2. Combination of the device with available Type S020 Insertion fittings DN



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11. Ordering information

11.1. Bürkert eShop

Bürkert eShop – Easy ordering and quick delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

11.2. Recommendation regarding product selection

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 to obtain a complete device. The following information is required:

- **Article no.** of the desired flowmeter Type 8020 (see chapter "11.4. Ordering chart" on page 10)
- **Article no.** of the selected Insertion fitting Type S020 (see **data sheet Type S020** ▶)

11.3. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements?
Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

11.4. Ordering chart

Description	Operating voltage	Sensor variant	Output	Electrical connection	Article no.
Hall variant (connectable to Type 8025 universal transmitter, or batch controller, Type 8619, Type 8611, Type 8022 pulse divider or to a PLC)	12...36 V DC	Short	Frequency with pulse, transistors PNP and NPN, open collector	Female cable plug DIN EN 175301-803	419587
		Long			419589
Hall "Low Power" variant (only connectable to the flow transmitter for "Low Power" flowmeters Type 8025 or to the flow transmitter Typ 8022)	From associated transmitter	Short	Frequency with pulse, transistor NPN, open collector		419591
		Long			419593

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11.5. Ordering chart accessories

Description	Article no.
Mounting accessory	
Set with a green FKM seal and a black EPDM seal	552111
Fastening ring (open) for Insertion fitting Type S020	619205
PC union nut for Insertion fitting Type S020	619204
Electrical connection	
Female cable plug, 4-pin (3 conductors + protective conductor), form A according to DIN EN 175301-803, with cable gland (**Type 2518** ▶)	572264
Female cable plug 32 mm, 4-pin (3 conductors + protective conductor), form A according to DIN EN 175301-803, with NPT ½" reduction without cable gland (**Type 2509** ▶)	162673

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