

## Type 8020

Flowmeter with paddle wheel



Operating Instructions

Bedienungsanleitung  
Manuel d'utilisation

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Technische Änderungen vorbehalten.  
Sous réserve de modifications techniques.

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1. ABOUT THIS MANUAL.....	3
2. INTENDED USE.....	5
3. BASIC SAFETY INFORMATION .....	6
4. GENERAL INFORMATION .....	9
5. DESCRIPTION.....	10
6. TECHNICAL DATA .....	13
7. INSTALLATION AND COMMISSIONING.....	19
8. MAINTENANCE.....	32
9. ACCESSORIES.....	35
10. PACKAGING, TRANSPORT .....	36
11. STORAGE .....	36
12. DISPOSAL OF THE PRODUCT .....	37

## 1. ABOUT THIS MANUAL

This manual describes the entire life cycle of the device. Please keep this manual in a safe place, accessible to all users and any new owners.

### This manual contains important safety information.

Failure to comply with these instructions can lead to hazardous situations.

- ▶ This manual must be read and understood.

## Symbols used



### DANGER

Warns against an imminent danger.

- ▶ Failure to observe this warning can result in death or in serious injury.



### WARNING

Warns against a potentially dangerous situation.

- ▶ Failure to observe this warning can result in serious injury or even death.

**CAUTION****Warns against a possible risk.**

- ▶ Failure to observe this warning can result in substantial or minor injuries.

**NOTE****Warns against material damage.**

- ▶ Failure to observe this warning may result in damage to the device or system.



Indicates additional information, advice or important recommendations.



refers to information contained in this manual or in other documents.

- ▶ Indicates an instruction to be carried out to avoid a danger, a warning or a possible risk.

→ Indicates a procedure to be carried out.

**Definition of the word "device"**

The word "device" used within this manual always refers to the flowmeter type 8020.

4

English

**2. INTENDED USE****Use of the device that does not comply with the instructions could present risks to people, nearby installations and the environment.**

The flowmeter type 8020 is exclusively intended to measure the flow rate of neutral or slightly aggressive liquids free of solid particles.

- ▶ This device must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- ▶ This device must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the user manual.
- ▶ Requirements for the safe and proper operation of the device are proper transport, storage and installation, as well as careful operation and maintenance.
- ▶ Only use the device as intended.

**3. BASIC SAFETY INFORMATION**

This safety information does not take into account:

- any contingencies or occurrences that may arise during installation, use and maintenance of the devices.
- the local safety regulations for which the operating company is responsible including the staff in charge of installation and maintenance.

**Danger due to high pressure in the installation.****Danger due to electrical voltage.****Danger due to high temperatures of the fluid.****Danger due to the nature of the fluid.****Various dangerous situations**

- ▶ Prevent any unintentional power supply switch-on.
- ▶ Ensure that installation and maintenance work are carried out by qualified, authorised personnel in possession of the appropriate tools.

6

English

**Various dangerous situations**

- ▶ Guarantee a set or controlled restarting of the process, after a power supply interruption.
- ▶ Use the device only if in perfect working order and in compliance with the instructions provided in the operating instructions.
- ▶ Observe the general technical rules when installing and using the device.
- ▶ Do not use this device in explosive atmospheres.
- ▶ Do not use fluid that is incompatible with the materials the device is made of.
- ▶ Do not use this device in an environment incompatible with the materials it is made of.
- ▶ Do not subject the device to mechanical loads.
- ▶ Do not make any modifications to the device.

English

7

**NOTE**

**The device may be damaged by the fluid in contact with.**

- ▶ Systematically check the chemical compatibility of the component materials of the device and the fluids likely to come into contact with it (for example: alcohols, strong or concentrated acids, aldehydes, alkaline compounds, esters, aliphatic compounds, ketones, halogenated aromatics or hydrocarbons, oxidants and chlorinated agents).

**NOTE**

**Elements / Components sensitive to electrostatic discharges**

- ▶ This device contains electronic components sensitive to electrostatic discharges. They may be damaged if they are touched by an electrostatically charged person or object. In the worst case scenario, these components are instantly destroyed or go out of order as soon as they are activated.
- ▶ To minimise or even avoid all damage due to an electrostatic discharge, take all the precautions described in the EN 61340-5-1 norm.
- ▶ Do not touch any of the live electrical components.

**5. DESCRIPTION**

**Construction**

The device is made up of an electronic module and of a flow sensor. The device can be installed in any pipe from DN20 (except for DN20 specified in [Table 2, page 23](#)) to DN400.

The device has, depending on the version, 1 NPN transistor output, 2 transistor outputs, NPN and PNP, or 1 sinus output (coil output).

Electrical connection is made via a male fixed connector.

**Measuring principle**

The circulation of fluid within the pipe causes the paddle wheel of the sensor to rotate. The flowmeter detects the rotation of the paddle-wheel and generates a signal which frequency *f* is proportional to the flow rate *Q*, using the formula  $f = K \times Q$ .

$f$  = frequency in Hertz (Hz)

$K$  = K factor of the S020 fitting used, in pulse/litre

$Q$  = flow rate in litre/second

**4. GENERAL INFORMATION**

To contact the manufacturer of the device, use following address:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

The addresses of our international sales offices are available on the internet at: [www.burkert.com](http://www.burkert.com)

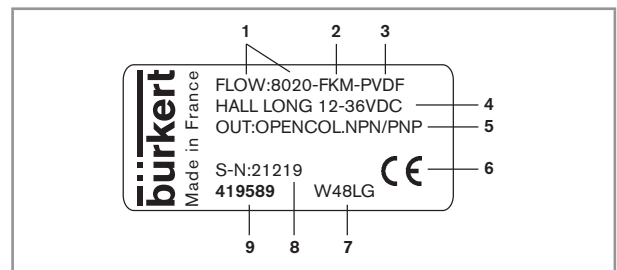
**Warranty conditions**

The condition governing the legal warranty is the conforming use of the device in observance of the operating conditions specified in this manual.

**Information on the Internet**

You can find the user manuals and technical data sheets regarding the type 8020 at: [www.burkert.com](http://www.burkert.com)

**Description of the name plate**



1. Quantity measured and type of the device
2. Material of the seal
3. Material of the flow sensor frame
4. Version of the flow sensor and, when required, power supply
5. Output data
6. Conformity logo
7. Manufacturing code
8. Serial number
9. Order code

## Available versions of the electronic module

The electrical connection of all the devices is made through a male fixed connector.

Supply voltage	Output	Flow sensor	Order code
12-36 V DC filtered and regulated	2 transistors, NPN and PNP	Hall, short	419 587
		Hall, long	419 589
energized via the Bürkert transmitter the flow sensor is connected to	1 NPN transistor	Hall Low Power, short	419 591
		Hall Low Power, long	419 593
without	1 sinus output	Coil, short	419 583
		Coil, long	419 585

## 6. TECHNICAL DATA

### Operating conditions

Ambient temperature	-15 °C...+60 °C
Air humidity	< 80%, non condensated
Protection rating acc. to EN 60529	IP65, female connector wired, plugged and tightened

### Conformity to standards and 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).

- Article 4§1 of the Pressure Equipment Directive 2014/68/EU

The device can only be used in the following cases (depending on the maximum pressure, the DN of the pipe and the fluid):

Type of fluid	Conditions
Fluid group 1, art. 4 §1.c.i	DN ≤ 25
Fluid group 2, art. 4 §1.c.i	DN ≤ 32 or PNxDN ≤ 1000

Type of fluid	Conditions
Fluid group 1, art. 4 §1.c.ii	DN ≤ 25 or PNxDN ≤ 2000
Fluid group 2, art. 4 §1.c.ii	DN ≤ 200 or PN ≤ 10 or PNxDN ≤ 5000

### Mechanical data

Part	Material
Housing	PE
Nut	PC
Female connector type 2508 / screw / seal	PA / Stainless steel / NBR
Frame of the flow sensor and paddle wheel	PVDF
Axis and bearings	Ceramic
Gasket	FKM (EPDM optional)

### Dimensions of device

→ please refer to the technical data sheets regarding the type 8020 available at: [www.burkert.com](http://www.burkert.com)

### Fluid data

<b>Fluid temperature</b>	The fluid temperature may be restricted by the fluid pressure: Refer to the fluid temperature-pressure dependency curves for the device. See <a href="#">Table 1</a>
▪ with fitting S020 in metal or PVDF	▪ -15...+80 °C
▪ with fitting S020 in PP	▪ 0...+80 °C
▪ with fitting S020 in PVC	▪ 0...+50 °C
<b>Flow rate measuring range</b>	
▪ Hall and Hall Low Power versions	▪ 0,3...10 m/s
▪ Sinus version	▪ 0,5...10 m/s
<b>Measurement deviation</b>	
▪ with standard K-factor	▪ ±2,5% of the measured value*
▪ with Teach-In	▪ +1% of the measured value*

<b>Linearity</b>	±0,5 % of the full scale (10 m/s)
<b>Repeatability</b>	±0,4 % of the measured value*

\* Determined under following reference conditions:  
 medium = water, water and ambient temperatures 20 °C, min.  
 upstream and downstream distances respected, appropriate pipe  
 dimensions

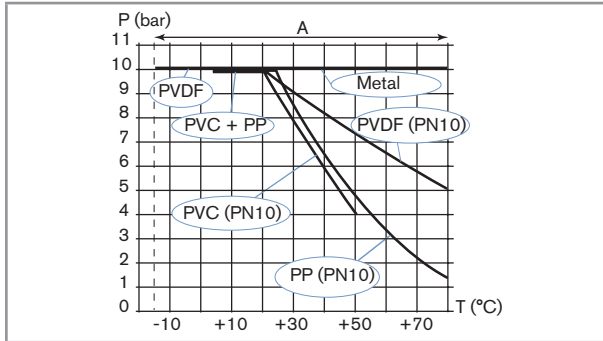


Table 1: Fluid temperature-pressure dependency curves

## Electrical data

Supply voltage	
▪ Hall version	▪ 12-36 V DC, filtered and regulated
▪ Hall Low Power version	▪ 12-36 V DC, via transmitter the device is connected to
Current consumption	
▪ Hall version	▪ 50 mA max.
▪ Hall Low Power version	▪ 0,8 mA max.
<b>Protection against polarity reversal</b>	yes
<b>Protection against spike voltages</b>	yes
<b>Protection against short circuits</b>	yes
<b>Transistor output (Hall version)</b>	pulse output, NPN and PNP, open collector, max. 100 mA, frequency up to 300 Hz, duty cycle 1/2 ±10% NPN output: 0,2-36 V DC PNP output: supply voltage

<b>Transistor output (Hall Low Power version)</b>	pulse output, NPN, open collector, max. 10 mA, frequency up to 300 Hz, duty cycle 1/2 ±10%
<b>Coil output</b>	sine-wave signal, frequency up to 300 Hz, about 2.8 mV peak-to-peak/Hz under a 50 kΩ load

## Electrical connection

Type of connector	Cable type
2508 female connector (supplied), with order code 438811	For the Hall and Hall Low Power versions: <ul style="list-style-type: none"> <li>▪ shielded, max. 50 m</li> <li>▪ 5...8 mm in diameter</li> <li>▪ wires, 0,25...1,5 mm<sup>2</sup> in cross section</li> </ul>
	For the sinus version: <ul style="list-style-type: none"> <li>▪ shielded, max. 10 m</li> <li>▪ 5...8 mm in diameter</li> <li>▪ wires, 0,25...1,5 mm<sup>2</sup> in cross section</li> </ul>

## 7. INSTALLATION AND COMMISSIONING

### Safety instructions



#### DANGER

#### Risk of injury due to high pressure in the installation.

- ▶ Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

#### Risk of injury due to high fluid temperatures.

- ▶ Use safety gloves to handle the device.
- ▶ Stop the circulation of fluid, and drain the pipe before loosening the process connections.

#### Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of hazardous products.

**! DANGER**

**Risk of injury due to electrical voltage.**

- ▶ Shut down and isolate the electrical power source before carrying out work on the system.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

**! WARNING**

**Risk of injury due to non-conforming installation.**

- ▶ The electrical and fluid installation can only be carried out by qualified and skilled staff with the appropriate tools.
- ▶ Observe mounting instructions of the fitting.
- ▶ Risk of injury due to an uncontrolled restart.
- ▶ Ensure that the restart of the installation is controlled after any interventions on it.

**! WARNING**

**Risk of injury if the fluid pressure/ temperature dependency is not respected.**

- ▶ Take account of fluid temperature-pressure dependency according to the nature of the materials the fitting is made of (see [Table 1](#)).
- ▶ Comply with the pressure equipment directive 2014/68/EU.

**! WARNING**

**Risk of injury due to non-conforming commissioning.**

Non-conforming commissioning may lead to injuries and damage the device and its surroundings.

- ▶ Before commissioning, make sure that the staff in charge have read and fully understood the contents of the manual.
- ▶ In particular, observe the safety recommendations and intended use.
- ▶ The device / the installation must only be commissioned by suitably trained staff.

**NOTE**

**Risk of damage to the device due to the environment**

- ▶ Protect this device against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of the climatic conditions.



To make sure the device operates correctly, plug in and tighten the connector.

**Installation of the fitting onto the pipe**

- Choose a fitting appropriate to the velocity and the flow rate of the fluid inside the pipe, refer to the graphs at right (see [Table 2](#)). The graph is used to determine the DN of the pipe and the fitting appropriate to the application, according to the fluid velocity and the flow rate.
- Install the fitting on the pipe as described in the operating instructions of the fitting used.

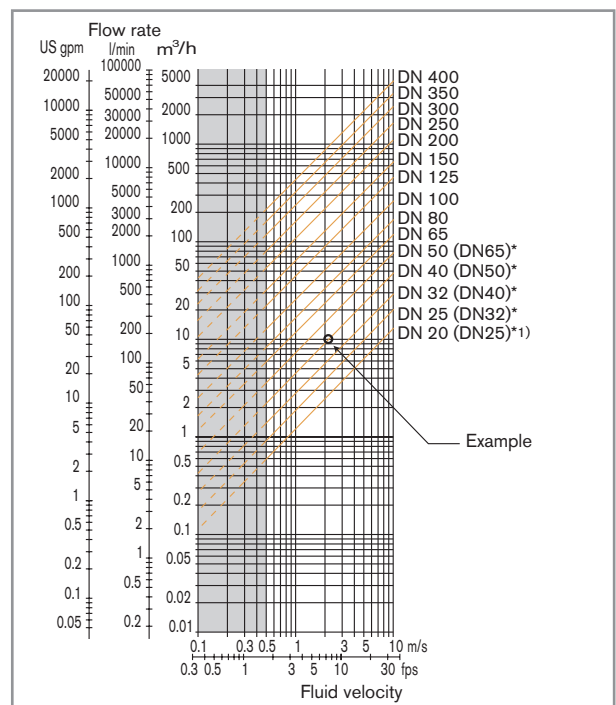


Table 2: Diagram flow rate / fluid velocity / DN of the fittings type S020

(\*) For the fittings:

- with external thread connections acc. to SMS 1145,
- with welding end connections acc. to SMS 3008  
DIN 11866 series C / BS 4825-1 / ASME BPE,  
DIN 11850 series 2 / DIN 11866 series A /  
EN 10357 series A,
- with clamp connections acc. to SMS 3017,  
BS 4825-3 / ASME BPE,  
DIN 32676 series A

<sup>1)</sup>The device cannot be installed on the DN20 fittings listed above.

**Example:**

- Specification:
  - nominal flow: 10 m<sup>3</sup>/h,
  - optimal flow velocity: 2...3 m/s
- Solution: intersection between flow rate and flow velocity in the graph gives the appropriate pipe diameter, DN40 (or DN50 for the asterisked fittings).

**Installation of the 8020 on the S020 fitting**

→ Insert nut 3 on fitting 5.

→ Insert snap ring 2 into groove 4.

→ Check that seal 6 is correctly inserted on the flow sensor.

→ Slowly insert device 1 into the fitting.

If the mounting is correctly done the device cannot be turned around anymore.

→ Hand lock the assembly with nut 3.

Fig. 1: Installation of the flowmeter on the S020 fitting

**Wiring**

**⚠ DANGER**

**Risk of injury due to electrical discharge**

- ▶ Shut down and isolate the electrical power source before carrying out work on the system.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

**⚠ Protect the power supply**

Protect the power supply with a correctly rated fuse if it is not protected by default.

- Use a shielded cable with an operating temperature limit higher than +80 °C.
- Use a high quality electrical power supply (filtered and regulated).
- Do not install the cable near high voltage or high frequency cables.
- If a closed installation cannot be avoided, maintain a minimum distance of 30 cm.

**Assembling the female connector**

→ Unscrew nut [1] of the cable gland.

→ Remove terminal block [3] from housing [2].

→ Insert the cable into nut [1], through seal [4], and into the cable gland and finally through housing [2].

→ Connect the wires on terminal block [3].

→ Position terminal block [3] in steps of 90° then put it back into housing [2], pulling gently on the cable so that the wires do not clutter the housing.

→ Tighten nut [1] of the cable gland.

→ Place seal [5] between the connector and the fixed connector on the device and then plug the 2508 connector into the fixed connector.

→ Insert and then tighten screw [6] to ensure tightness and correct electrical contact.

Fig. 2: Assembling the female connector type 2508 (supplied)

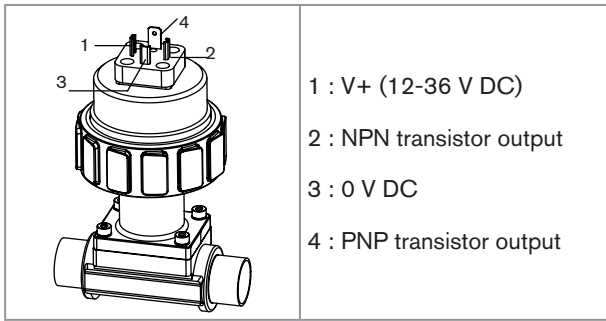


Fig. 3: Pin assignment of the fixed connector, Hall version

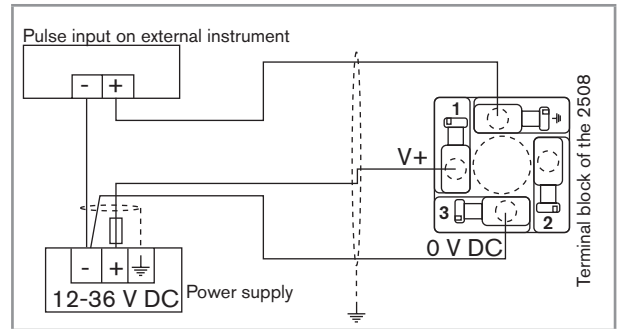


Fig. 5: PNP wiring of the Hall version

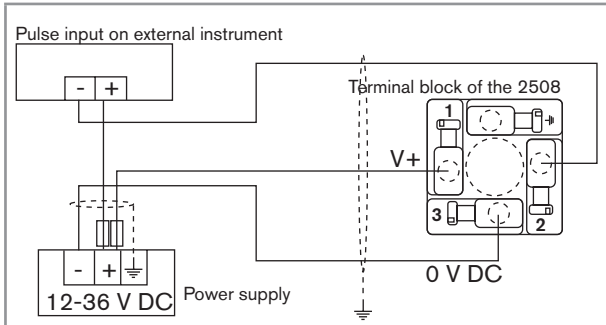


Fig. 4: NPN wiring of the Hall version

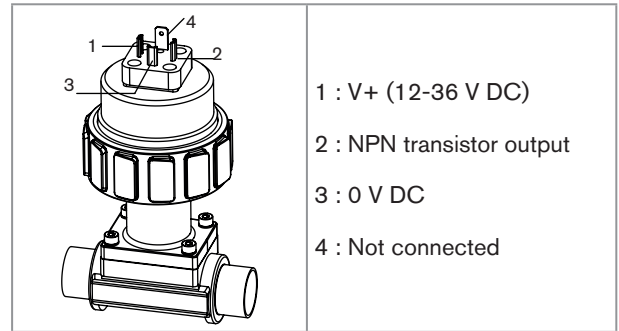


Fig. 6: Pin assignment of the fixed connector, Hall Low Power version

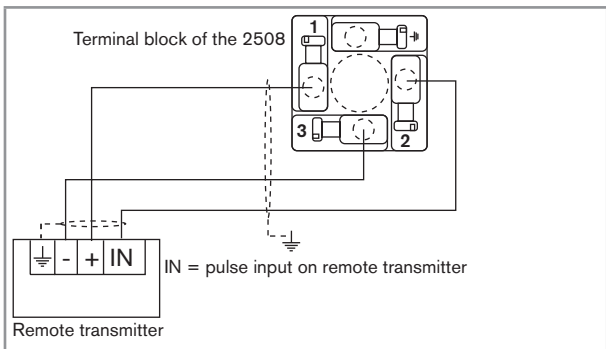


Fig. 7: NPN wiring of the Hall Low Power version

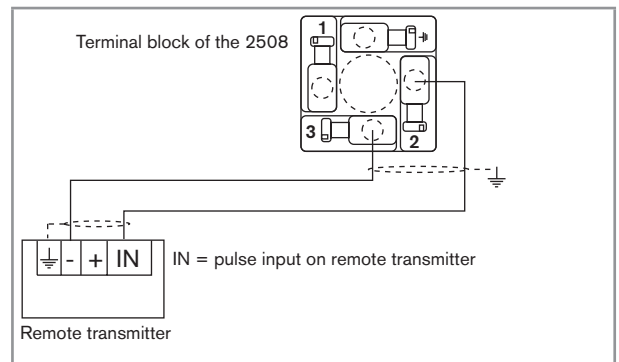


Fig. 9: Wiring of the sinus output of a sinus version

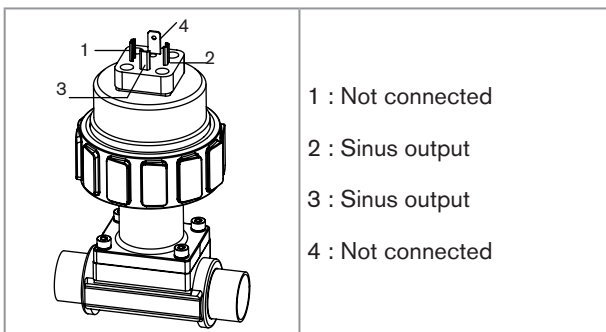


Fig. 8: Pin assignment of the fixed connector, sinus version



## 8. MAINTENANCE

### Safety instructions

#### DANGER

##### Risk of injury due to electrical voltage.

- ▶ Shut down and isolate the electrical power source before carrying out work on the system.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

##### Risk of injury due to high pressure in the installation.

- ▶ Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

##### Risk of injury due to high fluid temperatures.

- ▶ Use safety gloves to handle the device.
- ▶ Stop the circulation of fluid, and drain the pipe before loosening the process connections.
- ▶ Keep all easily flammable material and fluid away from the device.

#### DANGER

##### Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of aggressive fluids.

#### WARNING

##### Risk of injury due to non-conforming maintenance.

- ▶ Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.
- ▶ Ensure that the restart of the installation is controlled after any interventions.

### Cleaning

#### NOTE

##### The device may be damaged by the cleaning liquid.

- ▶ Clean the device with a cloth slightly dampened with water or a cleaning liquid compatible with the materials the device is made of.

### Cleaning the flow sensor

#### NOTE

##### The flow sensor may be damaged by the cleaning liquid.

- ▶ Use a cleaning product that is compatible with the materials the flow sensor is made of.
- ▶ Do not use any abrasive acting materials.

#### NOTE

After cleaning the flow sensor:

- ▶ Rinse the flow sensor.
- ▶ Check the seal and replace it if necessary.

## 9. ACCESSORIES

#### CAUTION

##### Risk of injury and/or damage caused by the use of unsuitable parts.

Incorrect accessories and unsuitable spare parts may cause injuries and damage the device and the surrounding area.

- ▶ Use only original accessories and original spare parts from Bürkert.

Accessories	Order code
Female connector with cable gland (type 2508)	438 811
Female connector (type 2509) with NPT 1/2" reduction, without cable gland	162 673
Set with seals (1 FKM + 1 EPDM)	552 111

## 10. PACKAGING, TRANSPORT

### NOTE

#### Damage due to transport

- Transport may damage an insufficiently protected device.
- ▶ Transport the device in shock-resistant packaging and away from humidity and dirt.
  - ▶ Do not expose the device to temperatures that may exceed the admissible storage temperature range.
  - ▶ Protect the electrical interfaces using protective plugs.

## 11. STORAGE

### NOTE

#### Poor storage can damage the device.

- ▶ Store the device in a dry place away from dust.
- ▶ Storage temperature: -15...+60°C.

## 12. DISPOSAL OF THE PRODUCT

→ Dispose of the device and its packaging in an environmentally-friendly way.

### NOTE

#### Damage to the environment caused by parts contaminated by the fluid.

- ▶ Comply with the national and/or local regulations which concern the area of waste disposal.