

Type 8020

Flowmeter with paddle wheel



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

We reserve the right to make technical changes without notice.

Technische Änderungen vorbehalten.

Sous réserve de modifications techniques.

www.burkert.com

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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.

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.



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.

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.

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English

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 [Tab. 1, page 24](#)) 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

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English

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: country.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.

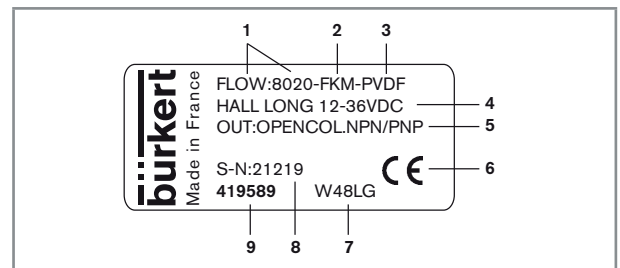
Information on the Internet

You can find the user manuals and technical data sheets regarding the type 8020 at: country.burkert.com

English

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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

English

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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

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English

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).

Conformity to the Pressure Equipment Directive

- Make sure that the device materials are compatible with the fluid.
- Make sure that the pipe DN is adapted for the device.
- Observe the fluid nominal pressure (PN) for the device. The nominal pressure (PN) is given by the device manufacturer.

English

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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 (PS = maximum admissible pressure, in bar; DN = nominal dimension of the pipe, no unit)

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 PSxDN ≤ 1000 bar
Fluid group 1, Article 4, Paragraph 1.c.ii	DN ≤ 25 or PSxDN ≤ 2000 bar
Fluid group 2, Article 4, Paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 bar or PSxDN ≤ 5000 bar

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English

Mechanical data

Part	Material
Housing	PE
Nut	PC
Female connector type 2518 / screw / seal	PA / Stainless steel / NBR
Frame of the flow sensor and paddle wheel	PVDF
Axis and bearings	Ceramic
Gasket	FKM (EPDM optional)

English

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Dimensions of device

→ please refer to the technical data sheets regarding the type 8020 available at: country.burkert.com

Fluid data

Fluid temperature	The fluid temperature may be restricted by the fluid pressure: Refer to the fluid temperature-pressure dependency curves for the device. See Fig. 1.
• with fitting S020 in metal or PVDF	• -15 °C...+80 °C
• with fitting S020 in PP	• 0 °C...+80 °C
• with fitting S020 in PVC	• 0 °C...+50 °C
Flow rate measuring range	
• Hall and Hall Low Power versions	• 0.3...10 m/s
• Sinus version	• 0.5...10 m/s

Measurement deviation	
• with standard K-factor	• ± 2.5 % of the measured value*
• with Teach-In	• +1 % of the measured value*
Linearity	± 0.5 % of the full scale (10 m/s)
Repeatability	± 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

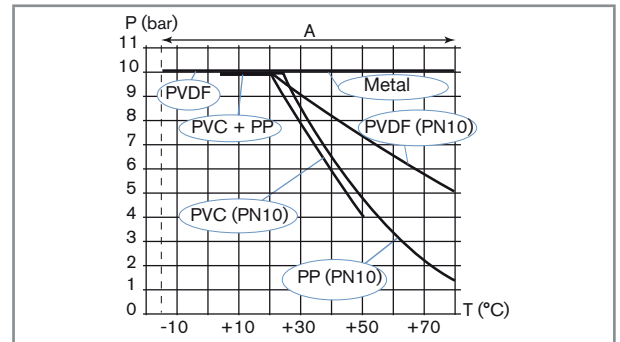


Fig. 1: Fluid temperature-pressure dependency curves

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.
Protection against polarity reversal	yes
Protection against spike voltages	yes
Protection against short circuits	yes
Transistor output (Hall version)	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

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

Electrical connection

Type of connector	Cable type
2518 female connector (supplied), with order code 572264	For the Hall and Hall Low Power versions: <ul style="list-style-type: none"> • shielded, max. 50 m • 5...8 mm in diameter • wires, 0.25...1.5 mm² in cross section For the sinus version: <ul style="list-style-type: none"> • shielded, max. 10 m • 5...8 mm in diameter • wires, 0.25...1.5 mm² in cross section

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 [Fig. 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.

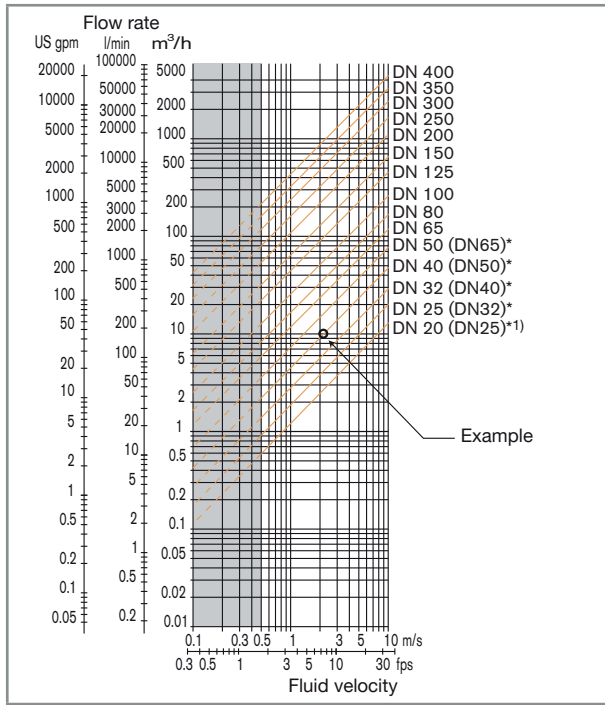


To make sure the device operates correctly, plug in and tighten the connector.

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 [Tab. 1](#)). 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.



Tab. 1: Diagram flow rate / fluid velocity / DN of the fittings type S020

Installation of the 8020 on the S020 fitting

- Insert nut 3 on fitting 5.
 - Insert snap ring 2 into groove 4.
 - Check that there is a seal 6 on the device 1 and that it is not damaged. Replace the seal if necessary.
 - 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.

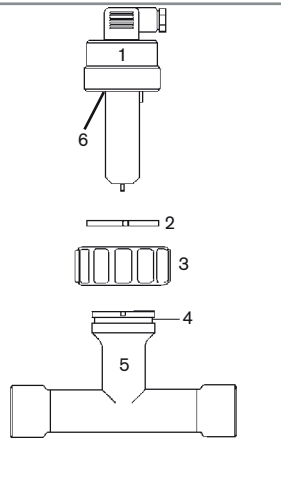


Fig. 2: Installation of the flowmeter on the S020 fitting

(*) 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

¹⁾The device cannot be installed on the DN20 fittings listed above.

Example:

- Specification:
 - nominal flow: 10 m³/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).

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

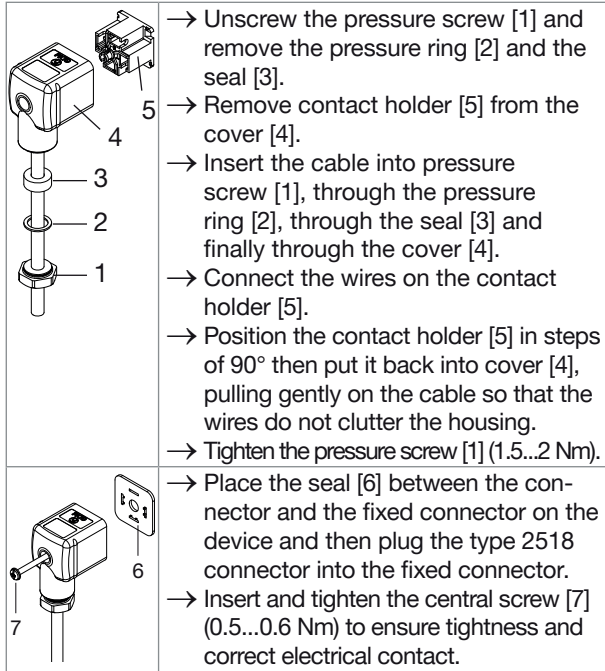


Fig. 3: Assembling the female connector type 2518 (supplied)

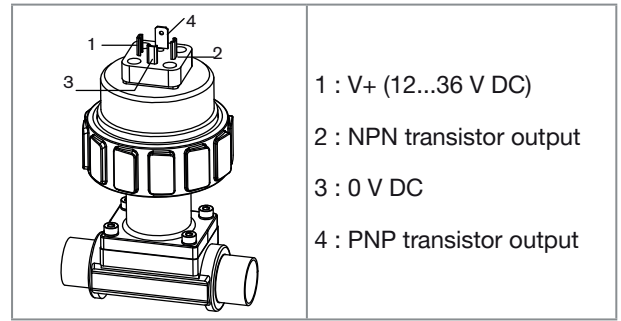


Fig. 4: Pin assignment of the fixed connector, Hall version

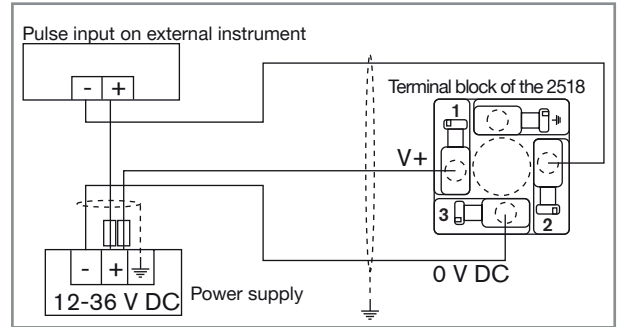


Fig. 5: NPN wiring of the Hall version

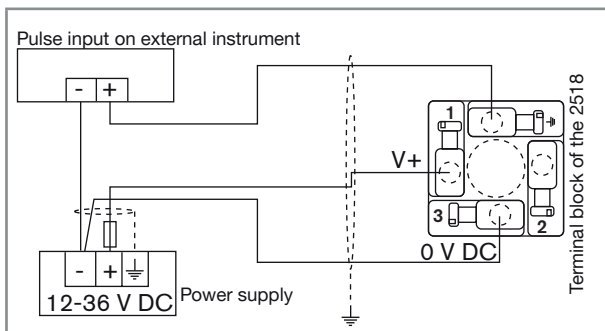


Fig. 6: PNP wiring of the Hall version

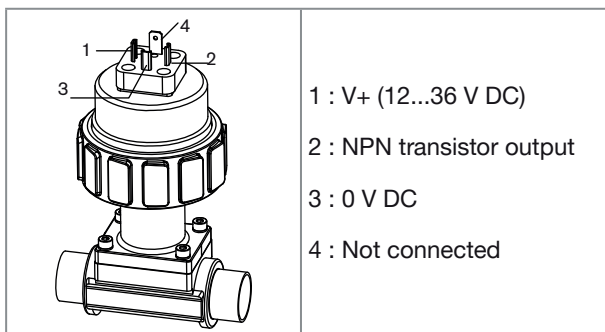


Fig. 7: Pin assignment of the fixed connector, Hall Low Power version

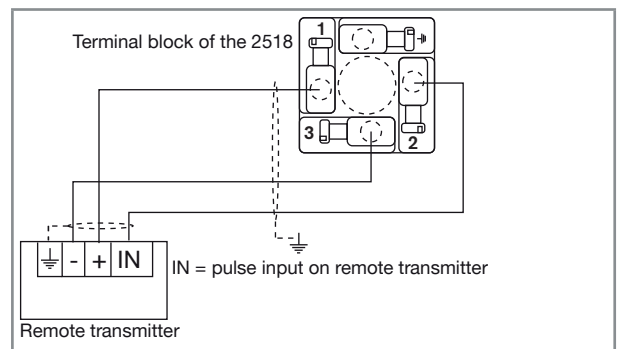


Fig. 8: NPN wiring of the Hall Low Power version

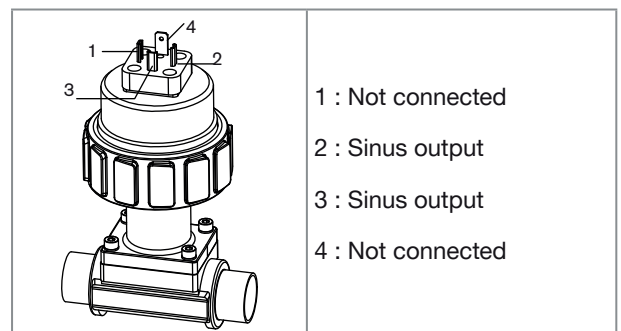


Fig. 9: Pin assignment of the fixed connector, sinus version

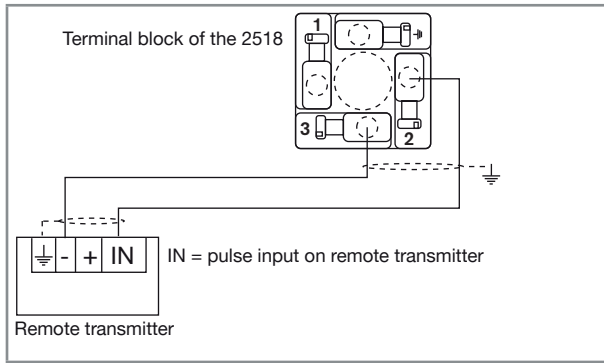


Fig. 10: Wiring of the sinus output of a sinus version

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 2518)	572 264
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 °C...+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.