

Type 8071

Oval gear volume flow sensor for low volume flow rates



Operating Instructions

We reserve the right to make technical changes without notice.

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Inhaltsverzeichnis

1	About this document	4
1.1	Symbols	4
1.2	Terms and abbreviations	5
1.3	Manufacturer	5
2	Safety	6
2.1	Intended Use	6
2.2	Basic Safety Information	6
3	Description	8
3.1	Area of application	8
3.2	General description	8
3.2.1	Construction	8
3.2.2	Measuring principle	8
3.3	Description of the type label	9
3.4	Available versions	9
4	Technical Data	11
4.1	Standards and directives	11
4.2	Conditions of use	11
4.3	Conformity to the Pressure Equipment Directive	11
4.4	Mechanical data	12
4.5	Fluid data	12
4.6	Electrical data	13
4.7	Dimensions	13
4.8	K factors (in pulse/l)	13
5	Installation and Wiring	14
5.1	Safety instructions	14
5.2	Installation instructions	15
5.3	Wiring	15
5.3.1	Wiring the NPN transistor output and the Reed switch output	16
6	Commisioning	17
7	Maintenance and Troubleshooting	18
7.1	Safety instructions	18
7.2	Maintenance of the strainer	18
7.3	Maintenance of the device	18
7.4	Dismantle the device	19
7.5	Assemble the device	19
7.6	If a problem occurs	21
8	Spare parts and Accessories	23
9	Logistics	24
9.1	Transport and storage	24
9.2	Return	24
9.3	Disposal	24

1 About this document

The document is an important part of the product and guides the user to safe installation and operation. The information and instructions in this document are binding for the use of the product.

- ▶ Before using the product for the first time, read and observe the whole safety chapter.
- ▶ Before starting any work on the product, read and observe the respective sections of the document.
- ▶ Keep the document available for reference and give it to the next user.
- ▶ Contact the Bürkert sales office for any questions.



Further information concerning the product at [Products](#).

- ▶ Enter the article number from the type label in the search bar.

The illustrations in these instructions may vary depending on the product variant.

1.1 Symbols



DANGER!

Warns of a danger that leads to death or serious injuries.



WARNING!

Warns of a danger that can lead to death or serious injuries.



CAUTION!

Warns of a danger that can lead to minor injuries.

NOTICE!

Warns of property damage on the product or the installation.



Indicates important additional information, tips and recommendations.



Refers to information in this document or in other documents.

- ▶ Indicates a step to be carried out.

✓ Indicates a result.

Menu Indicates a software user-interface text.

1.2 Terms and abbreviations

The terms and abbreviations are used in this document to refer to following definitions.

Product	Flowmeter with oval rotors Type 8071
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1.3 Manufacturer

Bürkert Fluid Control Systems

Christian-Bürkert-Str. 13–17

74653 Ingelfingen

GERMANY

The contact addresses are available at [Contact](#).



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2 Safety

2.1 Intended Use

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

- ▶ The device is intended to measure the flow rate of fluids, especially of viscous fluids.
 - ▶ 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.
- ✓ Observe any existing restraints when the device is exported.

2.2 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 that the operator must ensure the staff in charge of installation and maintenance observe.

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

To avoid injury take care to:

- ▶ 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.
- ▶ to guarantee a set or controlled restarting of the process, after a power supply interruption.
- ▶ to use the device only if in perfect working order and in compliance with the instructions provided in the instruction manual.
- ▶ to observe the general technical rules when installing and using the device.
- ▶ not to use the device in an explosive atmosphere.
- ▶ not to use this device in an environment incompatible with the materials it is made of.
- ▶ not to use fluid that is incompatible with the materials the device is made of.

- ▶ not to use the device for the measurement of gas flow rates.
- ▶ not to subject the device to mechanical loads (e.g. by placing objects on top of it or by using it as a step).
- ▶ not to make any external modifications to the device. not to paint or varnish any part of the device.

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).

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 and 5-2 norms.
- ▶ Also ensure that you do not touch any of the live electrical components.

3 Description

3.1 Area of application

The device is intended to measure, thanks to its oval rotors, the flow rate of viscous fluids. It must be combined with a remote instrument (such as transmitter type 8025 Universal or batch controller type 8025 Batch) which converts the pulse frequency due to oval rotors rotation.

3.2 General description

3.2.1 Construction

The device is built of a fitting which includes oval rotors and of a cover including the electronic module with Hall effect sensor and Reed switch.

The oval rotors of the fitting contain magnets.

All the device versions provide an NPN transistor output and a Reed switch output.

The electrical connection is made by a 1 meter 5-wire cable.

3.2.2 Measuring principle

When the fluid flows through the pipe, the oval rotors which contain magnets turn. The displacement of magnets lead to a variation of magnetic field. The sensor measures the variation of the magnetic field and converts the signal into a frequency. The frequency is available at both the NPN transistor and Reed switch outputs.

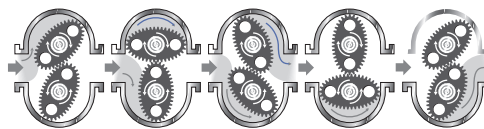


Fig. 1: Running/displacement of oval rotors

The remote instrument converts the frequency into a flow rate by using the correct K factor.

3.3 Description of the type label

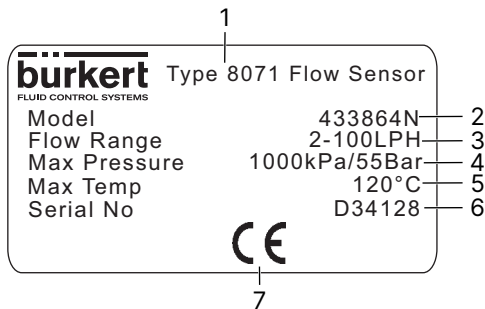


Fig. 2: Type label of the device

1 Type	2 Article number
3 Flow rate measuring range	4 Maximum operating pressure
5 Maximum temperature	6 Serial number
7 CE marking	

3.4 Available versions

Process connection	Flow rate range		Materials			Max. pressure ¹⁾	Order code ²⁾
	Viscosity > 5 mPa.s and < 1000 mPa.s	Viscosity < 5 mPa.s	Housing	Rotors / axis	Seal		
G 1/8"	0.5 ... 100 l/h	2 ... 100 l/h	Aluminium	Stainless steel	FKM	5 bar	565117
			Stainless steel	Stainless steel	FFKM	55 bar	565118
NPT 1/8"	0.5 ... 100 l/h	2 ... 100 l/h	Aluminium	Stainless steel	FKM	5 bar	565119
			Stainless steel	Stainless steel	FFKM	55 bar	565120

1) High pressure versions available on request

2) Other high viscosity versions available on request

Process connection	Flow rate range		Materials			Max. pressure ¹⁾	Order code ²⁾
	Viscosity > 5 mPa.s and < 1000 mPa.s	Viscosity < 5 mPa.s	Housing	Rotors / axis	Seal		
G 1/4"	0.5 ... 100 l/h	2 ... 100 l/h	PPS	PPS / Hastalloy C	FFKM	5 bar	432288
			Stainless steel	Stainless steel	FFKM	55 bar	433864
	15 ... 500 l/h	40 ... 500 l/h	PPS	PPS / Hastalloy C	FFKM	5 bar	430856
			Stainless steel	Stainless steel	FFKM	55 bar	437518
NPT 1/4"	0.5 ... 100 l/h	2 ... 100 l/h	PPS	PPS / Hastalloy C	FFKM	5 bar	448654
			Stainless steel	Stainless steel	FFKM	55 bar	448656
	15 ... 500 l/h	40 ... 500 l/h	PPS	PPS / Hastalloy C	FFKM	5 bar	448655
			Stainless steel	Stainless steel	FFKM	55 bar	448657
Process connection	Flow rate range	Materials			Max. pressure ¹⁾	Order code ²⁾	
	Viscosity > 1000 mPa.s	Housing	Rotors / axis	Seal			
G 1/4"	15 ... 500 l/h	Stainless steel	Stainless steel	FFKM	55 bar	552426	
NPT 1/4"	15 ... 500 l/h	Stainless steel	Stainless steel	FFKM	55 bar	553652	

4 Technical Data

4.1 Standards and directives

This product complies with the legal requirements applicable at the time of placing on the market and has been developed and tested in accordance with the relevant European directives/regulations and harmonized standards. The conformity is documented and, if necessary, supported by evidence. The EU Declaration of Conformity can be found behind the respective type on the home page

country.burkert.com

4.2 Conditions of use

Ambient temperature	
• Aluminium or PPS housing	• max. 80 °C
• Stainless steel housing	• max. 120 °C
Air humidity	< 85%, non condensated
Protection rating	IP54 (NEMA 13)
Storage temperature	-10...+60 °C

4.3 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.

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, in mm)

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

4.4 Mechanical data

Part	Material
Housing	- Aluminium - PPS - Stainless steel 316F (1.4401)
Rotors	- PPS - Stainless steel 316F (1.4401)
Axis	- Hastalloy C - Stainless steel 316F (1.4401)
Seal	FKM or FFKM

4.5 Fluid data

Process connection	Internal thread G 1/8", G 1/4", NPT 1/8" or NPT 1/4"
Max. fluid pressure	- PPS or aluminium housing - Stainless steel housing
Viscosity	Depends on the version (see Available versions ▶ 9])
Flow rate measuring range	Depends on the version (see Available versions ▶ 9])
Accuracy	≤ ±1% of the measured value
Repeatability	≤ ±0,03% of the measured value
Max. size of particles	75 µm

4.6 Electrical data

Supply voltage	4,5 ... 24 V DC
Tansistor output	
• Type of output	• Frequency on open collector, NPN, max. 25 mA, 4,5 to 24 V DC
• Hall sensor max. intensity	• 25 mA
• Recommended load	• 1,8 KΩ Pull up at 24 V DC
Reed switch output	
• Type	• Frequency
• Max. switching voltage	• 30 V DC
• Max. switching current	• 0,5 A
• Max. operating current	• 0,5 A
• Number of cycles (typical)	• 500 x 10 ⁶ cycles (at 10 V DC and 10 mA)
Electrical connection	5-wire cable, 1 m long

4.7 Dimensions

Refer to the related datasheet at [Type 8071](#)

4.8 K factors (in pulse/l)

Flow rate range	K factor (in pulse/l)
0.5 ... 100 l/h	1000
15 ... 500 l/h	400



If the device is combined with an instrument which does not automatically convert the K factors, make the conversion using one of the following formulae:

K factor in pulse/gallon US = K factor in pulse/l x 3,785 to obtain flow rate in gallon US / time unit

K factor in pulse/gallon UK = K factor in pulse/l x 4,546 to obtain flow rate in gallon UK / time unit.

5 Installation and Wiring

5.1 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.



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.



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.



DANGER!

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.



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.
- ▶ Install the appropriate security devices (correctly dimensioned fuse and/or circuit breaker)



WARNING!

Risk of injury due to unintentional switch on of power supply or uncontrolled restarting of the installation

- ▶ Take appropriate measures to avoid unintentional activation of the installation.
- ▶ Guarantee a set or controlled restarting of the process subsequent to the installation of the device.

5.2 Installation instructions

NOTICE!

Risk of damaging the device if it is subjected to mechanical stress

- ▶ Use flexible hoses.

NOTICE!

The oval rotors may be damaged if particles with diameter $> 75 \mu\text{m}$ go into the fitting

- ▶ Install a strainer of $75 \mu\text{m}$ upstream and as close as possible to the device.
- ▶ Install a by-pass line on your installation to service the device and the strainer without stopping the process (see the following Figure).

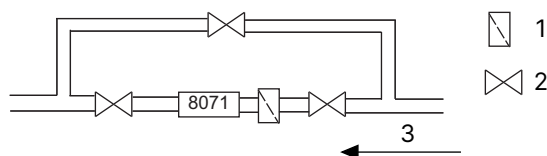


Fig. 3: Installation of a by-pass line

1 Filter

2 Valve

3 Direction of flow

- ▶ Install the device onto the pipe so that the shafts of the rotors are in a horizontal plane.



Seal the external threads of the fitting with a product compatible with the materials from which the device housing and the pipe are made.

- ▶ Screw the device onto the pipe.

5.3 Wiring



WARNING!

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.



- ▶ Use a high quality electrical power supply (filtered and regulated).
- ▶ Make sure the installation is equipotential.

Red wire	Power supply (+)
Black wire	Power supply (-)
White wire	NPN transistor output
Yellow wire	Reed switch
Green wire	Reed switch

Tab. 1: Connection wire assignment

5.3.1 Wiring the NPN transistor output and the Reed switch output

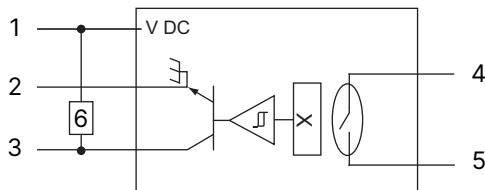


Fig. 4: Wiring of NPN transistor output and the Reed switch output

1 L+ (4,5...24 V DC) (red wire)	2 L- (black wire)
3 NPN transistor output (white wire)	4 yellow wire
5 green wire	6 R = 1,8kOhm pull-up at 24 V DC

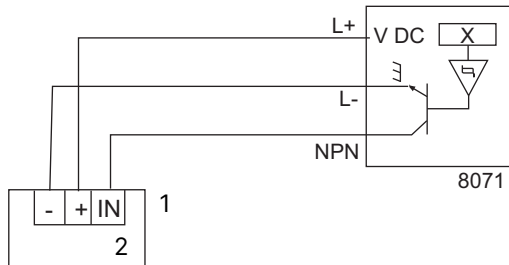


Fig. 5: Example for the connection of the NPN transistor output to a

1 IN = pulse input on remote transmitter	2 Remote transmitter
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6 Commissioning



WARNING!

Risk of injury due to nonconforming 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.



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



The pipe must be full of liquid without air bubbles.

- ▶ Drain air from the pipe by gradually filling the pipe with fluid.
- ▶ Make sure the installation is tight.

7 Maintenance and Troubleshooting

7.1 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.



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.



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.



DANGER!

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.



WARNING!

Risk of injury due to non-conforming maintenance

- ▶ Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.
- ▶ Guarantee a set or controlled restarting of the process, after a power supply interruption.

7.2 Maintenance of the strainer

- ▶ After the circulation of 200 liters of fluid, examine the strainer for particles. If necessary clean the strainer with a product compatible with the materials from which it is made.
- ▶ Regularly examine the strainer for good condition, in particular when the flow rate decreases. If necessary clean the strainer with a product compatible with the materials from which it is made.

7.3 Maintenance of the device

- ▶ Regularly examine the seal and the oval rotors for good condition. Follow the instructions on [Dismantle the device \[► 19\]](#) and [Assemble the device \[► 19\]](#).

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

Your Bürkert supplier is at your disposal for any further information.

7.4 Dismantle the device

- ▶ Unscrew the screws and remove the cover including the electronic module.
- ▶ Remove the seal.
- ▶ Examine the seal for good condition. If not, replace it by a new one (see [Spare parts and Accessories](#) [▶ 23]).
- ▶ Remove the rotors.
- ▶ Examine the rotors for good condition. If necessary, clean or replace them (see [Spare parts and Accessories](#) [▶ 23]).

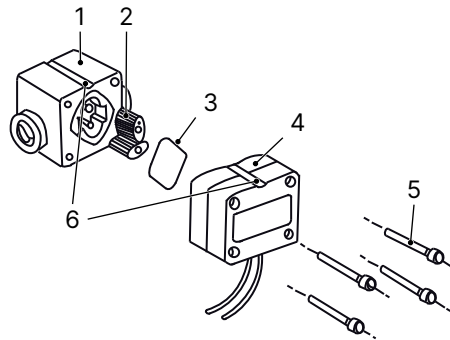


Fig. 6: Exploded view of the device

1 Fitting	2 Rotors (2x)
3 Seal	4 Electronic module
5 Screws (4x)	6 Grooves (2x)

7.5 Assemble the device



Put the magnetized rotor on the same side as the groove.

- ▶ Put the rotors inside the housing, at 90°.

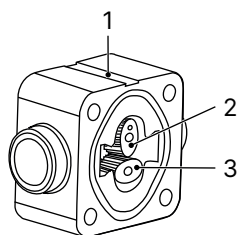


Fig. 7: Position of the oval rotors

1 Groove	2 Magnetized oval rotor
3 Neutral oval rotor (without magnet)	

Flow rate range	Magnetized oval rotor
0.5 ... 50 l/h	hole of the magnet seat is visible (set towards the cover)
0.5 ... 50 l/h 2 ... 100 l/h 15 ... 500 l/h	hole of the magnet seat is not visible (set towards the bottom of the housing)

- Set the radius of curvature present on the periphery of the oval rotors towards the bottom of the rotor housing.

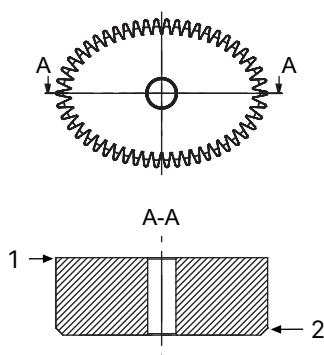


Fig. 8: Cross-section of an oval rotor

1 Right angle	2 Round-off
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- Make sure that the magnet is in place by using a detector.
- Make sure that the rotors freely turn by turning them slowly with the finger.
- Put the seal (see [Dismantle the device \[► 19\]](#)) in its groove.
- Put the cover (see [Dismantle the device \[► 19\]](#)) on the housing, aligning the groove on the cover with the one of the housing.

- ▶ Tighten the 4 screws (see [Dismantle the device \[▶ 19\]](#)), carefully to avoid damages to the housing, and in an alternating pattern at the following torque:
 - 1 Nm for a PPS housing
 - 2 Nm for an aluminium housing
 - 9 Nm for a stainless steel housing

7.6 If a problem occurs

Fluid does not flow through the device any more

Cause	Solution
Obtured device	▶ Remove and clean the oval rotors (see Dismantle the device [▶ 19] and Assemble the device [▶ 19]) ▶ Add a strainer of 75 µm upstream of the device.
Obtured strainer (if present)	▶ Clean the strainer.
Rotors damaged	▶ Replace the rotors (see Spare parts and Accessories [▶ 23], Dismantle the device [▶ 19] and Assemble the device [▶ 19])

Reduced flow rate through the device

Cause	Solution
Strainer (if present) partially obtured	▶ Clean the strainer.
Fluid too viscous	▶ Use rotors for fluids with a viscosity > 1000 mPa.s.

Incoherent measurement

Cause	Solution
Flow rate range not adapted	▶ Verify specifications, adjust the device or the flow rate (see Fluid data [▶ 12])
Air within the pipe	▶ Slowly drain air from the pipe.
Friction due to an incorrect assembly of the device	▶ Verify the assembly of the rotors in the fitting (see Spare parts and Accessories [▶ 23], Dismantle the device [▶ 19] and Assemble the device [▶ 19]).

No frequency output

Cause	Solution
Incorrect wiring of the outputs	▶ Make sure that the device has been wired correctly (see Wiring [► 15])
Rotors incorrectly mounted	▶ Dismantle the device and modify the position of the rotors (see Dismantle the device [► 19] and Assemble the device [► 19])
Magnet damaged	▶ Replace the rotors (see Spare parts and Accessories [► 23], Dismantle the device [► 19] and Assemble the device [► 19])
Hall sensor or Reed switch defective	▶ Replace the cover with electronic module (see Spare parts and Accessories [► 23], Dismantle the device [► 19] and Assemble the device [► 19])

8 Spare parts and Accessories



CAUTION!

Risk of injury and 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.

Spare part	Order code
Set of 2 oval rotors in stainless steel, flow rate range of 0.5 ... 100 l/h	550919
Set of 2 oval rotors in stainless steel, flow rate range of 15 ... 500 l/h	550920
Set of 2 oval rotors in PPS, flow rate range of 0.5 ... 100 l/h	550921
Set of 2 oval rotors in PPS, flow rate range of 15 ... 500 l/h	550922
FKM seal	550923
FFKM seal	550959
Cover in stainless steel with electronic module including Hall effect sensor and Reed switch	553653
Cover in PPS with electronic module including Hall effect sensor and Reed switch	553654
Cover in aluminium with electronic module including Hall effect sensor and Reed switch	on request

9 Logistics

9.1 Transport and storage

- ▶ Protect the device against moisture and dirt in the original packaging during transportation and storage.
- ▶ Avoid UV radiation and direct sunlight.
- ▶ Protect connections, if present, from damage with protective caps.
- ▶ Observe the permitted storage temperature.

9.2 Return



No work or tests will be carried out on the device until a valid Contamination Declaration has been received.

- ▶ To return a used device to Bürkert, contact the Bürkert sales office. A return number is required.

9.3 Disposal

Environmentally friendly disposal



- ▶ Follow national regulations regarding disposal and the environment.
- ▶ Collect electrical and electronic devices separately and dispose of them as special waste.

Further information at country.burkert.com