

Type 8220

Conductivity sensor



Operating Instructions

We reserve the right to make technical changes without notice.

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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.

| | |
|--------|--------------------------------|
| Device | Conductivity sensor Type 8220. |
|--------|--------------------------------|

1.3 Manufacturer

Bürkert Fluid Control Systems

Christian-Bürkert-Str. 13-17

74653 Ingelfingen

GERMANY

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



Need more information or additional products?

- ▶ Explore the full range of products on our [eShop](#).

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 8220 conductivity sensor is intended solely for the measurement of the conductivity of liquids.

- ▶ This device must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the Operating Instructions.
- ▶ This device must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- ▶ Only use a device which is in correct operating condition.
- ▶ Store, transport, install and use the device properly.
- ▶ Only use the device as intended.

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.
- ▶ the local safety regulations for which the operating company is responsible including the staff in charge of installation.

Danger due to electrical voltage

- ▶ Shut down the electrical power source of all the conductors and isolate it 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.

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.
- ▶ Do not use this device in an explosive atmosphere.
- ▶ Do not use this device in an environment incompatible with the materials it is made of.
- ▶ Do not subject the device to mechanical loads (e.g. by placing objects on top of it or by using it as a step).
- ▶ Do not make any internal or external modifications to the device.

- ▶ Prevent any unintentional power supply switch-on.
- ▶ Guarantee a defined or controlled restarting of the process, after a power supply interruption.
- ▶ Observe the general technical rules.

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 any damage due to an electrostatic discharge, take all the precautions described in the EN 61340-5-1 norm.
- ▶ 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 the conductivity of liquids.

The device must be connected to a transmitter (Type 8619 for example).

3.2 Construction

The device is made up of:

1. a measuring sensor of physical quantities, made up of:
 - 2 electrodes which measure an impedance in Ohm;
 - a conductivity sensor which integrates a Pt1000 temperature probe.
2. a 4-pin male fixed connector;
3. a nut to fix the device to the S020 fitting.

The device does not need a separate power supply. It is energized via the remote transmitter to which it is connected.

3.3 Description of the type label

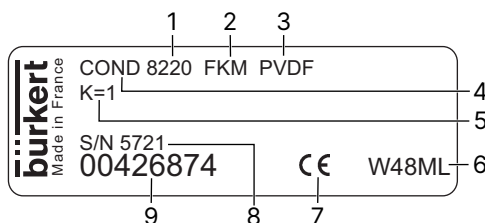


Fig. 1: Type label of the device (example)

| | |
|---|---|
| 1 Type | 2 Seal material in contact with the fluid |
| 3 Material of the holder for the measuring sensor | 4 Measured quantity |
| 5 Measuring cell constants | 6 Manufacture code |
| 7 CE marking | 8 Serial number |
| 9 Article number | |

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 | 0...+60 °C |
| Air humidity | ≤ 80 %, non-condensing |
| Storage temperature | 0...+60 °C |

4.3 Conformity to the pressure equipment directive

- ▶ Make sure the device materials are compatible with the fluid.
- ▶ Make sure the pipe DN and the nominal pressure PN are adapted for the device.

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

Device used on a piping (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 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 |

Device used on a vessel (PS = maximum admissible pressure)

| Type of fluid | Conditions |
|--|------------|
| Fluid group 1, Article 4, Paragraph 1.a.i | PS ≤ 200 |
| Fluid group 2, Article 4, Paragraph 1.a.i | PS ≤ 100 |
| Fluid group 1, Article 4, Paragraph 1.a.ii | PS ≤ 500 |
| Fluid group 2, Article 4, Paragraph 1.a.ii | PS ≤ 1000 |

4.4 Materials

| Element | Material |
|--|---|
| Housing | PC |
| Screw of the connector type 2518 | Stainless steel |
| Connector type 2518 | PA |
| Measuring sensor holder | PVDF |
| Pt 1000 | Stainless steel 1.4571 (316 Ti) |
| Electrodes | |
| <ul style="list-style-type: none"> Sensor K=1 or K=10 Sensor K=0.1 or K=0.01 | <ul style="list-style-type: none"> Graphite Stainless steel 1.4571 (316 Ti) |

4.5 Dimensions

Refer to the related datasheet at [Type 8220](#)

4.6 Fluid data, measurement data

| | |
|--------------------------|---|
| Pipe diameter | DN15 to DN200 |
| Process connection | S020 fitting for analysis purposes |
| Fluid pressure | PN 10 Fluid temperature and material of the fitting S020 used, can limit the max. admissible pressure of the fluid (refer to the following figure) |
| Fluid temperature | Fluid pressure and material of the fitting S020 used, can limit the max. admissible temperature of the fluid (refer to the following figure) |
| Conductivity measurement | <ul style="list-style-type: none"> • Measurement range • Measurement deviation |
| | <ul style="list-style-type: none"> • 0.05 $\mu\text{S/cm}$...200 mS/cm • typical: $\pm 3\%$ of the measured value • max.: $\pm 5\%$ of the measured value |
| Temperature probe | Pt 1000 integrated in the measuring sensor |
| Temperature measurement | <ul style="list-style-type: none"> • Measurement range • Measurement deviation |
| | <ul style="list-style-type: none"> • $-50\text{ }^\circ\text{C}$...$+150\text{ }^\circ\text{C}$ • $\pm 1\text{ }^\circ\text{C}$ |

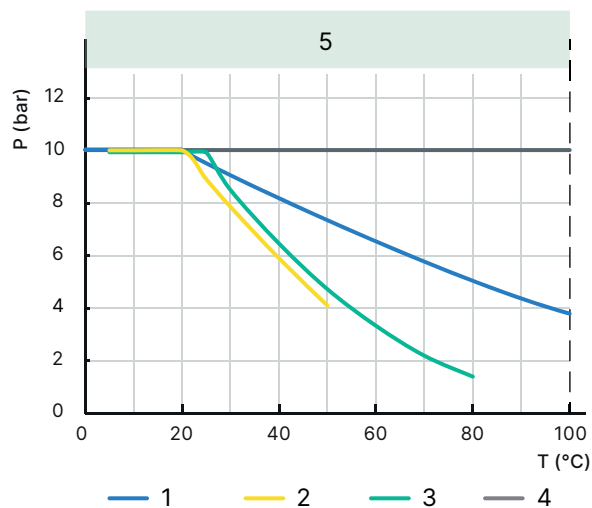


Fig. 2: Dependency between fluid pressure and fluid temperature,

| | |
|--|---------|
| 1 PVDF | 2 PVC |
| 3 PP | 4 Metal |
| 5 Application range for complete device (fitting + sensor) | |

4.7 Sensor data

Sensor K=0.01

- MeasureType of fluidment range • 0.05...20 $\mu\text{S}/\text{cm}$
 - Type of fluid • Ultra pure water, pure water
-

Sensor K=0.1

- MeasureType of fluidment range • 0.5...200 $\mu\text{S}/\text{cm}$
 - Type of fluid • Pure water, industrial water
-

Sensor K=1

- MeasureType of fluidment range • 0.005...10 mS/cm
 - Type of fluid • Industrial water, waste water
-

Sensor K=10

- MeasureType of fluidment range • 0.5...200 mS/cm
 - Type of fluid • Waste water, concentrated solution
-

5 Installation and Wiring

5.1 Safety instructions



DANGER!

Danger due to electrical voltage

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



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 high fluid temperatures

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



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 hazardous products.



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 the NF C 15-100 / IEC 60364 norm.
- ▶ Observe mounting instructions of the fitting.
- ▶ Protect the installation against unintentional power supply switch-on.
- ▶ Guarantee a set or controlled restarting of the process subsequent to any intervention on the device.



WARNING!

Risk of injury if the dependency between the fluid pressure and the fluid temperature is not respected

- ▶ Take account of the dependency between the fluid pressure and the fluid temperature, according to the materials the fitting is made of (see figure in [Fluid data, measurement data \[▶ 11\]](#)).
- ▶ Observe the Pressure Equipment Directive 2014/68/ EU.



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

5.2 Installation on the pipe

The device can be installed on a pipe using a fitting type S020 (refer to the following figures)

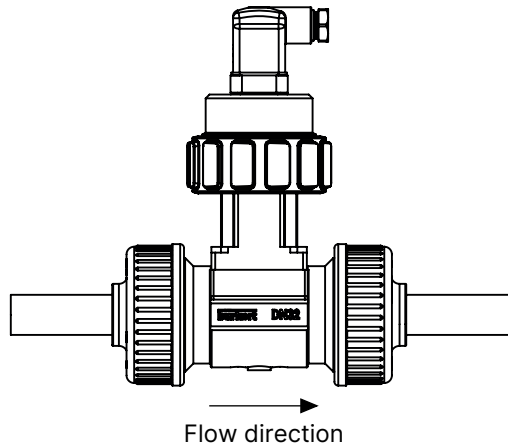


Fig. 3: Mounting position of the fitting-device system in the pipe

- ▶ Install the conductivity sensor on a horizontal pipe and position the connector upwards.
- ▶ Install preferably the device upstream an instrument generating turbulences such as a valve.

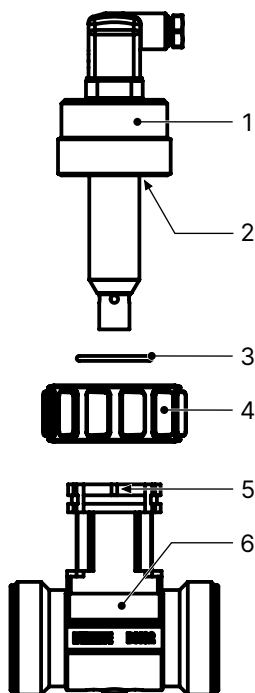


Fig. 4: Installation of the 8220 on the S020 fitting

| | |
|-------------|-----------|
| 1 Device | 2 Seal |
| 3 Snap ring | 4 Nut |
| 5 Groove | 6 Fitting |

- ▶ Install the fitting on the pipe according to the Operating Instructions of the fitting used and according to previous figures.
- ▶ Check that there is a seal on the device and that it is not damaged. Replace the seal if necessary.
- ▶ Insert the nut on the fitting.
- ▶ Insert the snap ring in the groove.
- ▶ With a cell constant $K=10$, point the opening of the channel in the direction of the fluid.
- ▶ Slowly push the device in the fitting. If the mounting is correctly done the device cannot be turned around anymore.
- ▶ Hand tighten the nut to lock the assembly.

5.3 Electrical wiring

5.3.1 Safety instructions



DANGER!

Risk of injury due to electrical discharge

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



Use a filtered and stable power supply.

Do not install the cable near high voltage or high frequency cables. If this cannot be avoided, observe a min. distance of 30 cm.

5.3.2 Technical data of the cables for the female connectors, Type 2518 or Type 2509

| Cable technical data | Recommended |
|----------------------------------|----------------------------|
| Electromagnetic protection (EMC) | Shielded |
| Maximal length | 10 m |
| Diameter | 5...8 mm |
| Operating temperature | Minimum 80 °C |
| Number of wires | 4 |
| Cross section of the wires | 0.25...1.5 mm ² |

5.3.3 Assembling the female connector

- ▶ Unscrew the pressure screw and remove the pressure ring and the seal.
- ▶ Remove the contact holder from the cover.
- ▶ Insert the cable into pressure screw, through the pressure ring, through the seal and finally through the cover.
- ▶ Connect the wires on the contact holder.
- ▶ Position the contact holder in steps of 90° then put it back into cover, pulling gently on the cable so that the wires do not clutter the housing.
- ▶ Tighten the pressure screw (1.5...2 Nm).
- ▶ Place the seal between the connector and the fixed connector on the device and then plug the Type 2518 connector into the fixed connector.
- ▶ Insert and tighten the central screw (0.5...0.6 Nm) to ensure tightness and correct electrical contact.

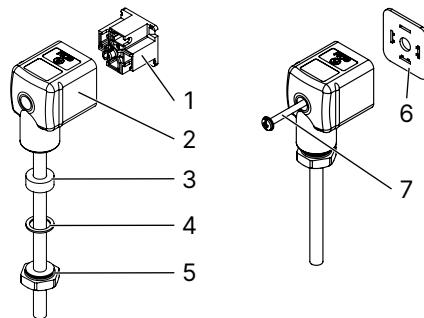


Fig. 5: Assembling the female connector type 2518 (supplied)

| | |
|------------------|-----------------|
| 1 Contact holder | 2 Cover |
| 3 Seal | 4 Pressure ring |
| 5 Pressure screw | 6 Seal |
| 7 Central screw | |

5.3.4 Ensuring the equipotentiality of the installation

To ensure the equipotentiality of the installation (power supply – device – fluid):

- ▶ Connect the different earth points to one another of the installation to eliminate the potential differences that may occur between themselves.
- ▶ Connect the negative terminal of the power supply to the earth to eliminate the common mode currents. If direct earthing is not possible insert a 100 nF / 50 V-capacitor between the negative terminal and the earth.
- ▶ When the device is installed on plastic pipes, connect to the same earth the different metal instruments such as a valve or a pump that are the closest possible to the device.
- ▶ If no such instrument is near the device, insert metal earthing rings inside the plastic pipes upstream and downstream the device and connect them to the same earth.
- ▶ Put the earthing rings in contact with the fluid.

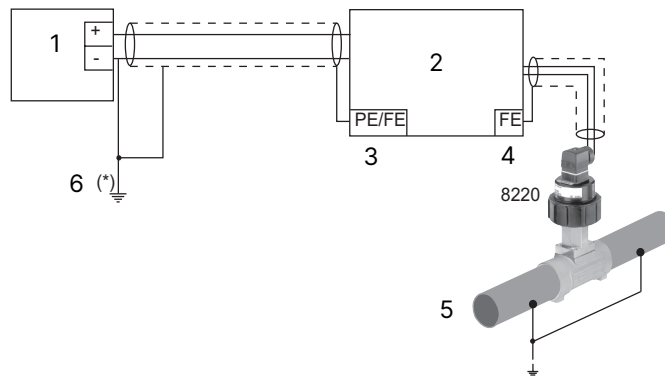


Fig. 6: Equipotentiality of the installation with metal pipes

| | |
|----------------------------------|---|
| 1 Electrical power supply | 2 Transmitter |
| 3 PE = Protective earth terminal | 4 FE = Functional earth terminal |
| 5 Metal pipe | 6 If a direct earth connection is not possible, fit a 100 nF / 50 V condenser between the negative power supply terminal and the earth. |

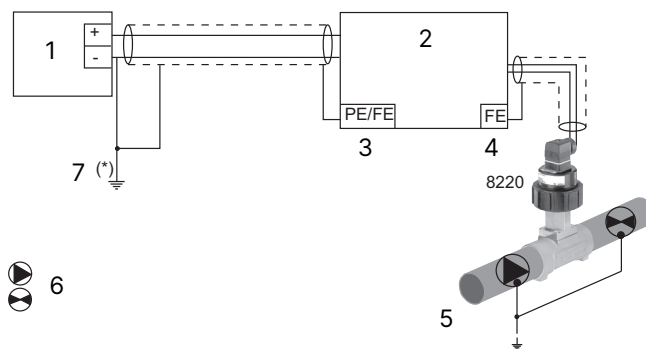


Fig. 7: Equipotentiality of the installation with plastic pipes

| | |
|--|--|
| 1 Electrical power supply | 2 Transmitter |
| 3 PE = Protective earth terminal | 4 FE = Functional earth terminal |
| 5 Plastic pipes | 6 Instruments such as a valve or a pump... |
| 7 If a direct earth connection is not possible, fit a 100 nF / 50 V condenser between the negative power supply terminal and the earth | |

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5.3.5 Connect the device to the transmitter

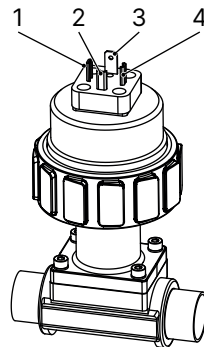


Fig. 8: Pin assignment of the fixed connector

| | |
|-----------------------------------|-----------------------------------|
| 1 Positive conductivity electrode | 2 Negative conductivity electrode |
| 3 Pt1000 | 4 Pt1000 |

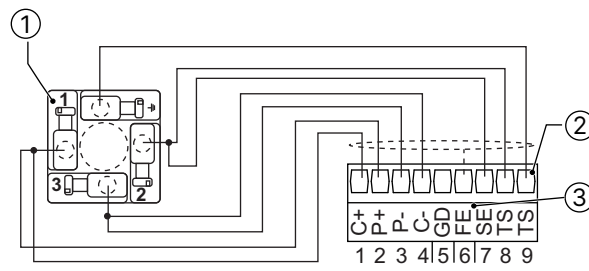


Fig. 9: Connection example of the 8220 to the transmitter 8619

| | |
|---|--|
| 1 Terminal block of the connector Type 2518 | 2 Conductivity module of the transmitter Type 8619 |
| 3 FE = Functional earth terminal | |

6 Commissioning



WARNING!

Risk of injury due to non-conforming commissioning

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

- ▶ The staff in charge of commissioning must have read and understood the contents of the Operating Instructions.
 - ▶ In particular, observe the safety recommendations and intended use.
 - ▶ The device / the installation must only be commissioned by suitably trained staff.
- ▶ Before commissioning, set the cell constant in the appropriate parameter menu of the remote transmitter. Refer to the Operating Instructions of the transmitter used.

7 Maintenance and Troubleshooting

7.1 Safety instructions



DANGER!

Danger due to electrical voltage

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



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 high fluid temperatures

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



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 hazardous products.



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.

7.2 Maintenance of the device and the conductivity sensor



Do not scratch the sensor surface while cleaning it.

Store the sensor in a dry place.

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

- ▶ Check regularly that the conductivity sensor is clean and clean it with water if necessary.

Contact the Bürkert supplier for any additional information.

8 Spare parts and accessories



CAUTION!

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

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

► Use only original accessories and original spare parts from Bürkert.

| Spare parts | Article number |
|---|----------------|
| Set with 1 FKM green seal + 1 EPDM black seal | 552111 |
| Snap ring | 619205 |
| Nut | 619204 |

| Accessories | Article number |
|---|----------------|
| 4-pin female connector, with cable gland (Type 2518) | 572264 |
| 4-pin female connector, with reduction NPT 1/2" (Type 2509) | 162673 |

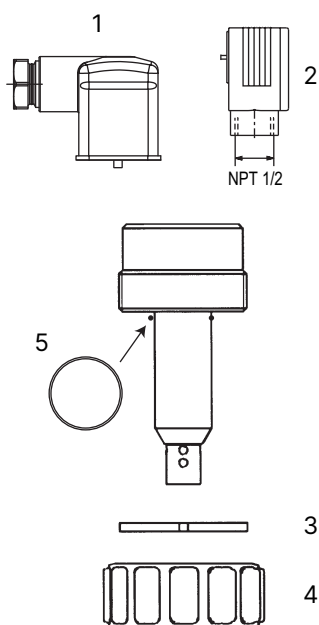


Fig. 10: Exploded view of the conductivity sensor Type 8220

| | |
|--|---|
| 1 4-pin female connector, with cable gland (Type 2518) | 2 4-pin female connector, with reduction NPT 1/2" (Type 2509) |
| 3 Snap ring | 4 Nut |
| 5 Set with 1 FKM green seal + 1 EPDM black seal | |

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