

## Type 8220

Leitfähigkeitssensor  
Conductivity sensor  
Capteur de conductivité



## Operating Instructions

Bedienungsanleitung

Manuel d'utilisation

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## 1 ABOUT THE OPERATING INSTRUCTIONS

The Operating Instructions describe the entire life cycle of the device. Please keep the Operating Instructions in a safe place, accessible to all users and any new owners.

**The Operating Instructions contain important safety information.**

Read the Operating Instructions from the beginning to the end. Observe in particular the chapters "[Basic safety information](#)" and "[Intended use](#)".

- ▶ The Operating Instructions must be read and understood.

### 1.1 Definition of the word "device"

The word "device" used in the Operating Instructions always refers to the conductivity sensor type 8220.

### 1.2 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.**



Advice or important recommendations.



refers to information contained in the Operating Instructions or in other documents.

→ Indicates a procedure to be carried out.

## 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 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.

## 3 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.

## 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 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.

## 4 GENERAL INFORMATION

### 4.1 Manufacturer's address and international contacts

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

Bürkert SAS  
Rue du Giessen  
BP 21  
F-67220 TRIEMBACH-AU-VAL

You may also contact your local Burkert sales office.

The addresses of our international sales offices are available on the internet

### 4.2 Warranty conditions

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

### 4.3 Information on the Internet

You can find the Operating Instructions and technical data sheets related to the type 8220

## 5 DESCRIPTION

### 5.1 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).

### 5.2 Construction

The device is made up of:

- 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.
- a 4-pin male fixed connector;
- 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.

### 5.3 Description of the name plate

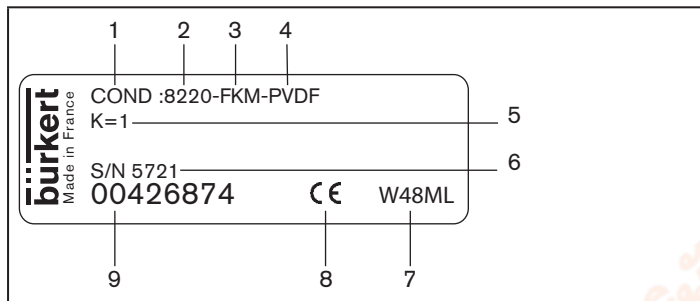


Fig. 1: Name plate of the device (example)

1. Measured quantity
2. Type of the device
3. Seal material in contact with the fluid
4. Material of the holder for the measuring sensor
5. Cell constant
6. Serial number
7. Manufacturing code
8. Conformity marking
9. Article number

## 6 TECHNICAL DATA

### 6.1 Conditions of use

Ambient temperature	0 to +60°C
Air humidity	≤ 80 %, non-condensing

### 6.2 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).

### 6.3 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 bar
Fluid group 2, Article 4, Paragraph 1.a.i	PS ≤ 1000 bar
Fluid group 1, Article 4, Paragraph 1.a.ii	PS ≤ 500 bar
Fluid group 2, Article 4, Paragraph 1.a.ii	PS ≤ 1000 bar

## 6.4 Materials

Element	Material
Housing	PC
Screw of the connector type 2508	stainless steel
Connector type 2508	PA
Measuring sensor holder	PVDF
Pt 1000	stainless steel 1.4571 (316 Ti)
Electrodes	<ul style="list-style-type: none"> <li>▪ sensor K=1 or K=10</li> <li>▪ sensor K=0,1 or K=0,01</li> </ul>
	<ul style="list-style-type: none"> <li>▪ graphite</li> <li>▪ stainless steel 1.4571 (316 Ti)</li> </ul>

## 6.5 Dimensions of the device

→ Refer to the technical data sheet related to the device available



## 6.6 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 (see Fig. 2)
Fluid temperature	Fluid pressure and material of the fitting S020 used, can limit the max. admissible temperature of the fluid (see Fig. 2)
Conductivity measurement	
▪ Measurement range	▪ 0,05 $\mu$ S/cm to 200 mS/cm
▪ Measurement deviation	▪ typical: $\pm 3\%$ of the MV.* max.: $\pm 5\%$ of the MV.*
Temperature probe	Pt 1000 integrated in the measuring sensor
Temperature measurement	
▪ Measurement range	▪ -50 to +150°C
▪ Measurement deviation	▪ $\pm 1^\circ$ C

\* of the MV. = of the measured value

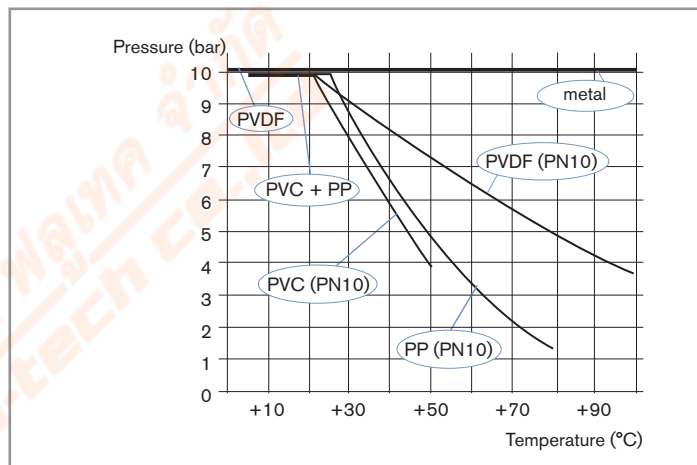


Fig. 2: Dependency between fluid pressure and fluid temperature, for the 8220 inserted in a S020 fitting, depending on the material of the S020 fitting

## 6.7 Sensor data

Sensor K=0,01	
▪ Measurement range	▪ 0,05 to 20 $\mu\text{S}/\text{cm}$
▪ Type of fluid	▪ ultra pure water, pure water
Sensor K=0,1	
▪ Measurement range	▪ 0,5 to 200 $\mu\text{S}/\text{cm}$
▪ Type of fluid	▪ pure water, industrial water
Sensor K=1	
▪ Measurement range	▪ 0,005 to 10 $\text{mS}/\text{cm}$
▪ Type of fluid	▪ industrial water, waste water
Sensor K=10	
▪ Measurement range	▪ 0,5 to 200 $\text{mS}/\text{cm}$
▪ Type of fluid	▪ waste water, concentrated solution

## 7 INSTALLATION AND WIRING

### 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.

##### **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.

**! 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**

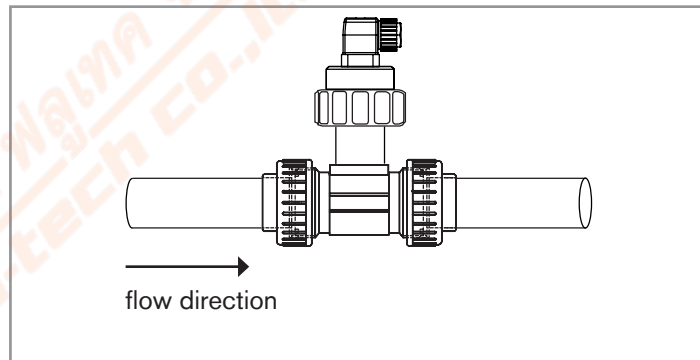
**Risk of injury if the dependency between the fluid pressure and the fluid temperature is not respected.**

- ▶ Take account of the dependency between the fluid pressure and the fluid temperature, according to the materials the fitting is made of (see Fig. 2, page 10).
- ▶ 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.

## 7.2 Installation on the pipe

The device can be installed on a pipe using a fitting type S020 (see Fig. 3 et Fig. 4).



*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.

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### Installation and wiring

- Install the fitting (mark 5) on the pipe acc. to the Operating Instructions of the fitting used and acc. to the [Fig. 3](#).
- Check that the seal (mark 6) is on the conductivity sensor.
- Insert the nut (mark 3) on the fitting.
- Insert the snap ring (mark 2) in the groove (mark 4).
- 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.

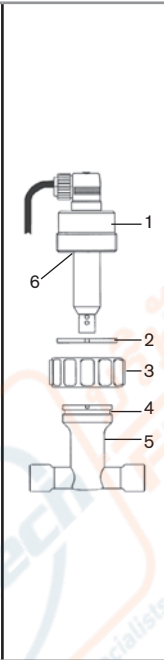


Fig. 4: Installation of the 8220 on the S020 fitting

## 7.3 Electrical wiring

### 7.3.1 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.

### 7.3.2 Technical data of the cables for the female connectors, type 2508 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 to 1,5 mm <sup>2</sup>

### 7.3.3 Assembling the female connector

→ Loosen the nut [1] of the cable gland.

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

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

→ Connect the 4 conductors to the terminal block [3].

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

→ Tighten the nut [1] of the cable gland.

→ Put the 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 the screw [6] to ensure tightness and correct electrical contact.

Fig. 5: Assembling the female connector type 2508 (supplied)

### 7.3.4 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.

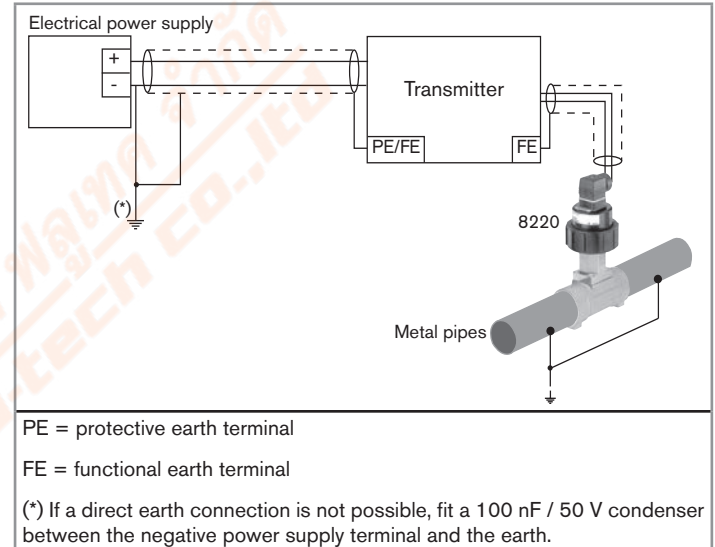


Fig. 6: Equipotentiality of the installation with metal pipes

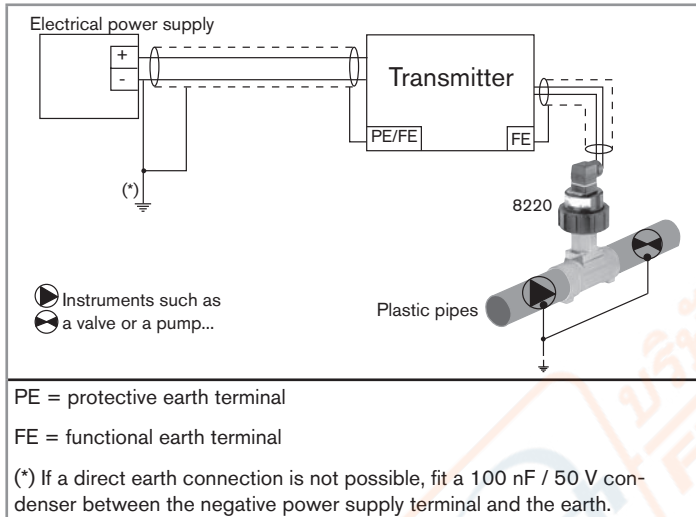


Fig. 7: Equipotentiality of the installation with plastic pipes

### 7.3.5 Connect the device to the transmitter

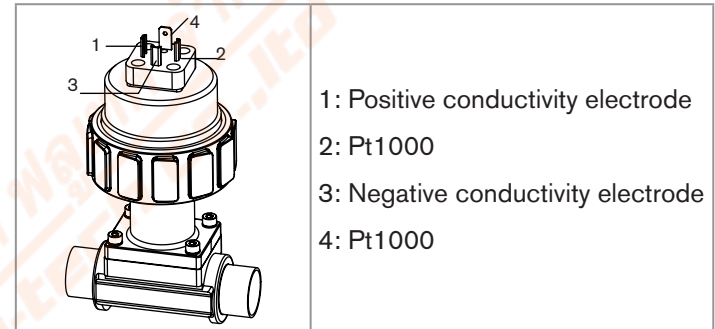


Fig. 8: Pin assignment of the fixed connector

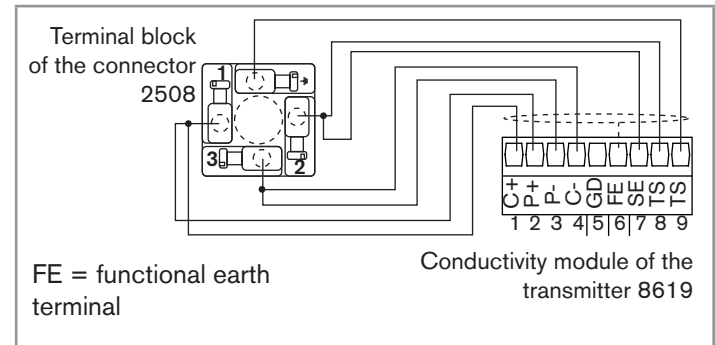


Fig. 9: Connection example of the 8220 to the transmitter 8619

## 8 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.

## 9 MAINTENANCE AND TROUBLESHOOTING

### 9.1 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.

#### 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.




 **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.

## 9.2 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.

Please feel free to contact your Bürkert supplier for any additional information.

## 10 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 (Fig. 10)	Article number
Set with 1 FKM green seal (mark 5) + 1 EPDM black seal (mark 5)	552111
Snap ring (mark 3)	619205
Nut (mark 4)	619204

Accessories (Fig. 10)	Article number
4-pin female connector, with cable gland (type 2508) (mark 1)	438811
4-pin female connector, with reduction NPT 1/2" (type 2509) (mark 2)	162673

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Transport, storage, disposal

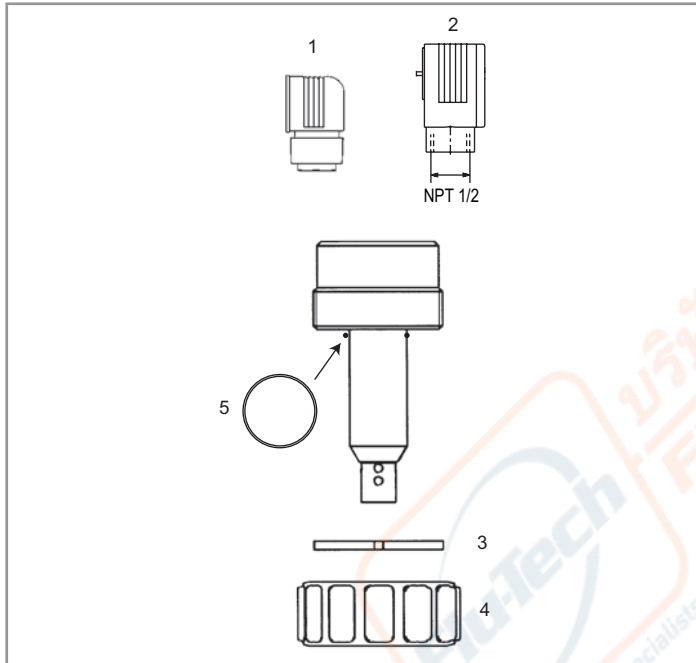


Fig. 10: Exploded view of the conductivity sensor type 8220

## 11 TRANSPORT, STORAGE, DISPOSAL

### 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.

#### Poor storage can damage the device.

- Store the device in a dry place away from dust.
- Device storage temperature: 0...+60 °C.

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

- Dispose of the device and its packaging in an environmentally-friendly way.
- Comply with the national and/or local regulations which concern the area of waste disposal.