

## Type 8221

Conductivity sensor  
Leitfähigkeitssensor  
Sonde de conductivité



## Operating Instructions

Bedienungsanleitung  
Manuel d'utilisation

We reserve the right to make technical changes without notice.  
Technische Änderungen vorbehalten.  
Sous réserve de modifications techniques.

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Operating Instructions 1707/01\_EU-ML\_00565354\_Original\_FR

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## 1. ABOUT THE OPERATING INSTRUCTIONS

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

### The Operating Instructions contain important safety information.

Failure to comply with these instructions can lead to hazardous situations. Pay attention in particular to the chapters [Basic safety information](#) and [Intended use](#).

- ▶ Whatever the version of the product, the Operating Instructions must be read and understood.

### 1.1. Symbols used



#### Warns against an imminent danger.

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



#### 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.

### NOTICE

#### Warns against material damage.

- ▶ Failure to observe this warning may result in damage to the product 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.

### 1.2. Definition of the word product

The word "product" used in these Operating Instructions always refers to the conductivity sensor type 8221.

## 2. INTENDED USE

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

The product is intended to measure the electrolytic conductivity of a solution.

- ▶ Use the product only in combination with foreign devices or foreign components recommended or approved by Bürkert.
- ▶ Use the product in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the Operating Instructions.
- ▶ Never use the product for security applications.
- ▶ Store, transport, install and operate the product properly.
- ▶ Only operate a product in perfect working order.
- ▶ Only use the product 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 product.

The operating company is responsible for the respect of the local safety regulations including for the staff safety.



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

- ▶ Before any intervention on the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure. See [Fig. 2](#) chap. 6.5.

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

- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

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

- ▶ Do not touch with bare hands the parts of the product that are in contact with the fluid.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.

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

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



#### **Various dangerous situations.**

To avoid injury:

- ▶ Do not use the product in explosive atmospheres.
- ▶ Do not use the product in an environment incompatible with the materials it is made of.
- ▶ Do not use fluid that is incompatible with the materials the product is made of.
- ▶ Do not subject the product to mechanical stress.
- ▶ Do not make any modifications to the product.
- ▶ Prevent any unintentional power supply switch-on.
- ▶ Only qualified and skilled staff can carry out the installation and maintenance work.
- ▶ Guarantee a defined or controlled restarting of the process, after a power supply interruption.
- ▶ Observe the general technical rules.

#### **NOTICE**

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

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

## **4. GENERAL INFORMATION**

### **4.1. International contacts**

The addresses of our international sales offices are available on the last page of this manual.

They are also available on the internet at: [www.burkert.com](http://www.burkert.com)

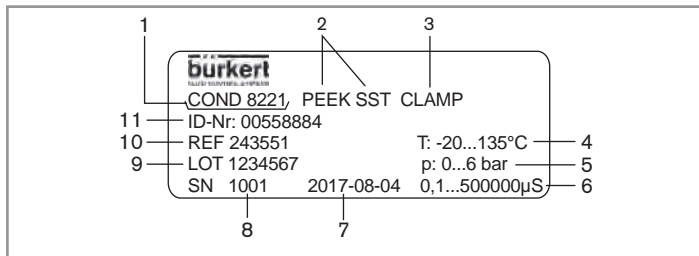
### **4.2. Warranty conditions**

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

### **4.3. Information on the internet**

You can find the operating instructions and technical data sheets related to the type 8221 at: [www.burkert.com](http://www.burkert.com)

## 5. RATING PLATE



1. Measured quantity and type of the product
2. Materials
3. Type of connection
4. Fluid temperature range
5. Fluid pressure range
6. Fluid conductivity measurement range
7. Manufacturing code
8. Serial number
9. Lot number
10. Internal code
11. Order code

Fig. 1: Rating plate of a product with 4 electrodes (example)

## 6. TECHNICAL DATA



The rating plate of the product gives important technical data.

► Always respect the data given on the rating plate.

### 6.1. 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).

### 6.2. Conformity to the pressure equipment directive

The product conforms to article 4§1 of the Pressure Equipment Directive 2014/68/EU under following conditions.

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

Type of fluid	Conditions
Fluid group 1, art. 4 §1.c.i	DN ≤ 25
Fluid group 2, art. 4 §1.c.i	DN ≤ 32 or PN×DN ≤ 1000
Fluid group 1, art. 4 §1.c.ii	DN ≤ 25 or PN×DN ≤ 2000
Fluid group 2, art. 4 §1.c.ii	DN ≤ 200 or PN ≤ 10 or PN×DN ≤ 5000

### 6.3. Materials

Process connection	Electrical connection	Number of electrodes	Materials			Surface finish
			Electrodes	Frame	Seal	
1 1/2" clamp	M12 male connector	2	Stainless steel 316L	Stainless steel 316L	PEEK, EPDM with FDA approval	0.4 µm, electro-polished
1 1/2" clamp	Cable	2	Stainless steel	Stainless steel PTFE	EPDM	
1 1/2" clamp, short and long	VarioPin male connector	4	Stainless steel 1.4435/316L	Stainless steel 1.4435/316L PEEK with FDA approval	EPDM with FDA approval	
1 1/2" clamp, short and long	Cable	4		Stainless steel 1.4435/316L		
G1 1/4"		4		PEEK with FDA approval (CFR 177.2415)		
2" clamp	VarioPin male connector	4		PEEK with FDA approval (CFR 177.2415)		
2" (DN50/40)*		4		PEEK with FDA approval (CFR 177.2415)		
PG13.5		4		PEEK with FDA approval (CFR 177.2415)		

\* Adapted for GEA Tuchenhagen VARINLINE process connections



## 6.4. Certifications

The design of the following versions is certified by EHEDG:

- product with a 2" (DN50/40) process connection, adapted for GEA Tuchenhagen VARINLINE process connections;
- product with a PG13.5 process connection

## 6.5. General technical data

→ Obey the dependency between the liquid temperature and liquid pressure, given in [Fig. 2](#).

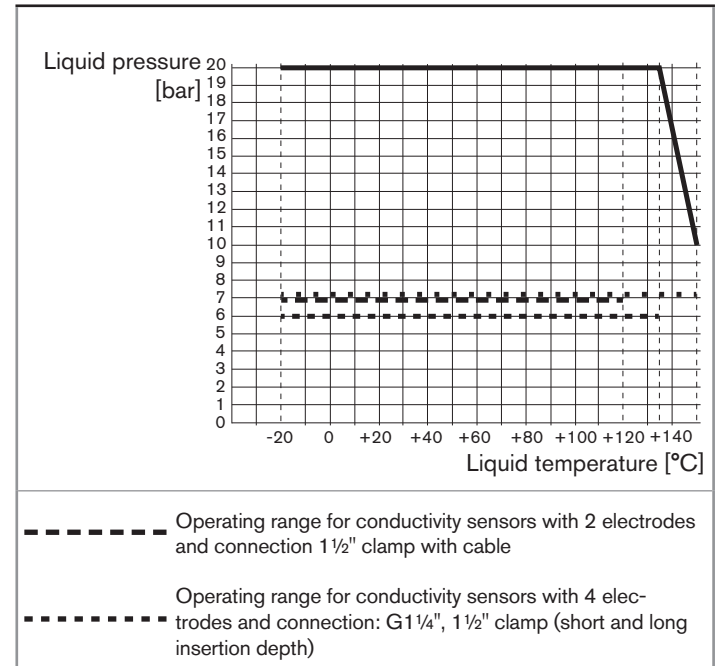
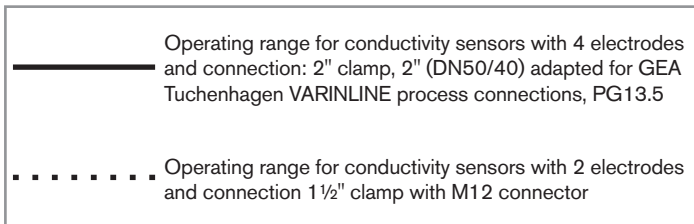




Fig. 2: Liquid temperature / liquid pressure dependency diagram

	<ul style="list-style-type: none"> <li>▪ 2 electrodes</li> <li>▪ 1 1/2" clamp connection</li> <li>▪ M12 male connector</li> </ul>
<b>Order code</b>	<b>568818</b>
<b>Measurement range</b>	0.05...20 $\mu\text{S}/\text{cm}^{-1}$
<b>Linearity<sup>1)</sup> (relative)</b>	$\pm 0.5 \dots 5\%$
<b>Cell constant<sup>2)</sup></b>	0.01 $\text{cm}^{-1}$
<b>Fluid temperature</b>	-20...+150 °C
<b>Fluid pressure</b>	max. 7 bar (100 psi)
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	5-pin M12 connector

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.


	<ul style="list-style-type: none"> <li>▪ 2 electrodes</li> <li>▪ 1 1/2" clamp connection</li> <li>▪ Cable</li> </ul>		
<b>Order code</b>	<b>564898</b>	<b>562261</b>	<b>564899</b>
<b>Measurement range</b>	0.05...20 $\mu\text{S}/\text{cm}^{-1}$	1...200 $\mu\text{S}/\text{cm}^{-1}$	5...5000 $\mu\text{S}/\text{cm}^{-1}$
<b>Linearity<sup>1)</sup> (relative)</b>	$\pm 0.5 \dots 5\%$		
<b>Cell constant<sup>2)</sup></b>	0.01 $\text{cm}^{-1}$	0.1 $\text{cm}^{-1}$	1 $\text{cm}^{-1}$
<b>Fluid temperature</b>	max. +120 °C		
<b>Fluid pressure</b>	max. 7 bar (100 psi)		
<b>Temperature sensor</b>	Pt1000		
<b>Electrical connection</b>	Cable, length 3 m, instrument side with open wire.		

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.


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Technical data

	<ul style="list-style-type: none"> <li>▪ 4 electrodes</li> <li>▪ G1 ¼" connection</li> <li>▪ Cable</li> </ul>
<b>Order code</b>	<b>562240</b>
<b>Measurement range</b>	0.1...500000 µS.cm <sup>-1</sup>
<b>Linearity <sup>1)</sup> (relative)</b>	±0.5... 5%
<b>Cell constant <sup>2)</sup></b>	0.147 cm <sup>-1</sup>
<b>Fluid temperature</b>	-20...+135 °C
<b>Fluid pressure</b>	max. 6 bar (87 psi)
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	High temperature cable, length 5 m, instrument side with open wire.

<sup>1)</sup> Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.

	<ul style="list-style-type: none"> <li>▪ 4 electrodes</li> <li>▪ 1 ½" clamp connection, short insertion depth</li> <li>▪ Cable</li> </ul>
<b>Order code</b>	<b>557719</b>
<b>Measurement range</b>	0.1...500000 µS.cm <sup>-1</sup>
<b>Linearity <sup>1)</sup> (relative)</b>	±0.5... 5%
<b>Cell constant <sup>2)</sup></b>	0.147 cm <sup>-1</sup>
<b>Fluid temperature</b>	-20...+135 °C
<b>Fluid pressure</b>	max. 6 bar (87 psi)
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	High temperature cable, length 5 m, instrument side with open wire.

<sup>1)</sup> Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.

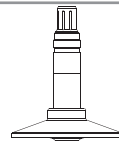


- 4 electrodes
- 1 1/2" clamp connection, long insertion depth
- Cable

<b>Order code</b>	<b>558884</b>
<b>Measurement range</b>	0.1...500000 $\mu\text{S}\cdot\text{cm}^{-1}$
<b>Linearity <sup>1)</sup> (relative)</b>	$\pm 0.5\text{...} 5\%$
<b>Cell constant <sup>2)</sup></b>	0.147 $\text{cm}^{-1}$
<b>Fluid temperature</b>	$-20\text{...}+135\text{ }^\circ\text{C}$
<b>Fluid pressure</b>	max. 6 bar (87 psi)
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	High temperature cable, length 5 m, instrument side with open wire.

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.



- 4 electrodes
- 2" clamp connection
- VarioPin male connector

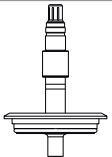
<b>Order code</b>	<b>559120</b>
<b>Measurement range</b>	0.1...500000 $\mu\text{S}\cdot\text{cm}^{-1}$
<b>Linearity <sup>1)</sup> (relative)</b>	$\pm 0.5\text{...} 5\%$
<b>Cell constant <sup>2)</sup></b>	0.360 $\text{cm}^{-1}$
<b>Fluid temperature</b>	$-20\text{...}+150\text{ }^\circ\text{C}$
<b>Fluid pressure</b>	max. 20 bar (290 psi) at $-20\text{...}+135\text{ }^\circ\text{C}$ max. 10 bar (145 psi) at $+150\text{ }^\circ\text{C}$
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	VarioPin (VP 6.0) male connector

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.


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Technical data

	<ul style="list-style-type: none"> <li>▪ 4 electrodes</li> <li>▪ 2" (DN50/40) connection, adapted for GEA Tuchenhagen VARINLINE process connections</li> <li>▪ VarioPin male connector</li> </ul>
<b>Order code</b>	<b>563269</b>
<b>Measurement range</b>	0.1...500000 $\mu\text{S}\cdot\text{cm}^{-1}$
<b>Linearity <sup>1)</sup> (relative)</b>	$\pm 0.5\%$ ... 5%
<b>Cell constant <sup>2)</sup></b>	0.360 $\text{cm}^{-1}$
<b>Fluid temperature</b>	-20...+150 °C
<b>Fluid pressure</b>	max. 20 bar (290 psi) at -20...+135 °C max. 10 bar (145 psi) at +150 °C
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	VarioPin (VP 6.0) male connector

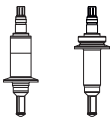
<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.

	<ul style="list-style-type: none"> <li>▪ 4 electrodes</li> <li>▪ PG13.5 connection</li> <li>▪ VarioPin male connector</li> </ul>
<b>Order code</b>	<b>563186</b>
<b>Measurement range</b>	0.1...500000 $\mu\text{S}\cdot\text{cm}^{-1}$
<b>Linearity <sup>1)</sup> (relative)</b>	$\pm 0.5\%$ ... 5%
<b>Cell constant <sup>2)</sup></b>	0.360 $\text{cm}^{-1}$
<b>Fluid temperature</b>	-20...+150 °C. max
<b>Fluid pressure</b>	max. 20 bar (290 psi) at -20...+135 °C max. 10 bar (145 psi) at +150 °C
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	VarioPin (VP 6.0) male connector

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.

	<ul style="list-style-type: none"> <li>▪ 4 electrodes</li> <li>▪ 1 1/2" clamp connection, short or long insertion depth</li> <li>▪ VarioPin male connector</li> </ul>
<b>Order code</b>	<b>562420, 564064</b>
<b>Measurement range</b>	0.1...500000 $\mu\text{S}\cdot\text{cm}^{-1}$
<b>Linearity <sup>1)</sup> (relative)</b>	$\pm 0.5\%$ ... 5%
<b>Cell constant <sup>2)</sup></b>	0.147 $\text{cm}^{-1}$
<b>Fluid temperature</b>	-20...+135 °C
<b>Fluid pressure</b>	max. 6 bar (87 psi)
<b>Temperature sensor</b>	Pt1000
<b>Electrical connection</b>	VarioPin (VP 6.0) male connector

<sup>1)</sup> Uncertainty of  $\pm 5\%$  arises when using only one single cell constant for the full range.  $\pm 0.5\%$  measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.

<sup>2)</sup> Individual cell constant measured with the Bürkert standard procedure. The cell constant can be influenced by the assembly situation.

## 6.6. Dimensions

→ Please refer to the technical data sheets related to the product at: [www.burkert.com](http://www.burkert.com)

## 7. INSTALLATION

### 7.1. Safety instructions



#### DANGER

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

- ▶ Before any intervention on the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure. See [Fig. 2](#) chap. [6.5](#).

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

- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

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

- ▶ Do not touch with bare hands the parts of the product that are in contact with the fluid.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.

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

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



## WARNING

### Risk of injury due to nonconforming installation.

- ▶ The electrical and fluid installation can only be carried out by qualified and skilled staff with the appropriate tools.
- ▶ Respect the assembly instructions for the fitting and/or the holder used.

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

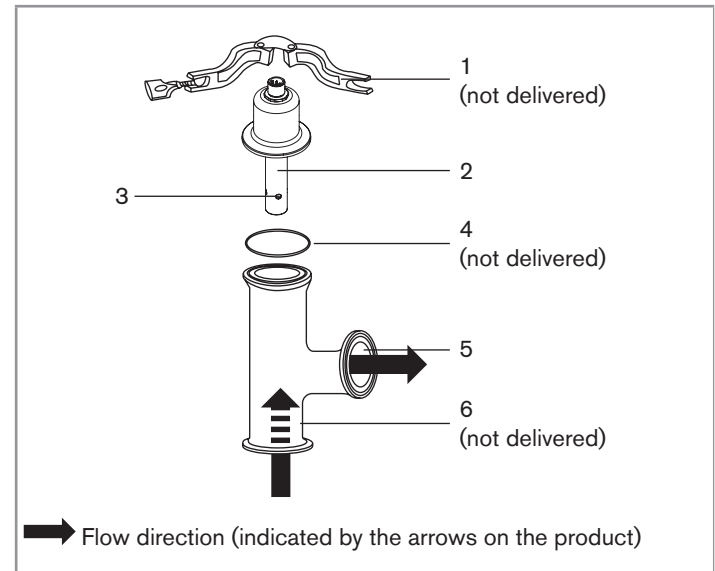
- ▶ Avoid unintentional activation of the installation.
- ▶ Guarantee a set or controlled restarting of the process subsequent to any intervention.

## 7.2. Installation onto the pipe

### 7.2.1. Product with 2 electrodes and a clamp connection

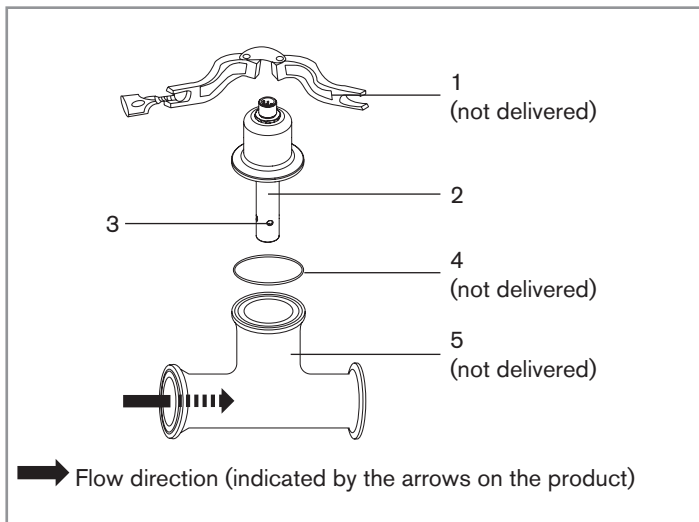
- Choose an appropriate tee-fitting for the installation of the product.
- Make sure the seals are in good condition.
- Place seals adapted to the process (temperature, fluid type) in the grooves of the Clamp fitting.
- Mount the tee-fitting in the pipe. Obey the mounting instructions given with the fitting.
- Make sure the electrodes will always be completely immersed in the liquid.

- Make sure no air bubbles will disturb the measurements.
- Choose an appropriate clamp collar.
- For the order code **564898** carry out the mounting procedure on [Fig. 3](#).
- For the order code **564899** or **562261** carry out the mounting procedure on [Fig. 4](#).
- For the order code **568818** carry out the mounting procedure on [Fig. 3](#) or on [Fig. 4](#).



- Put the seal 4 onto the hygienic tee-fitting 6.
- Put the product 2 onto the seal 4.
- Align the hole 3 of the product with the outlet 5 of the tee-fitting. The arrows on the product indicate how to place the product.
- Fix the clamp of the product 2 and the clamp of the tee-fitting with the clamp collar 1.

Fig. 3: Installation of a 8221 with 2 electrodes and with order code 564898 or 568818



- Put the seal 4 onto the hygienic tee-fitting 5.
- Put the product 2 onto the seal 4.
- Align the hole 3 of the product with the flow direction. The arrows on the product indicate how to place the product.
- Fix the clamp of the product 2 and the clamp of the tee-fitting with the clamp collar 1.

Fig. 4: Installation of a 8221 with 2 electrodes and with order code 564899 or 562261 or 568818

### 7.2.2. Product with a G1 1/4" connection

- Mount a 1 1/4" weld-in socket, with order code **737241** on the pipe. Obey the instructions given with the weld-in socket.

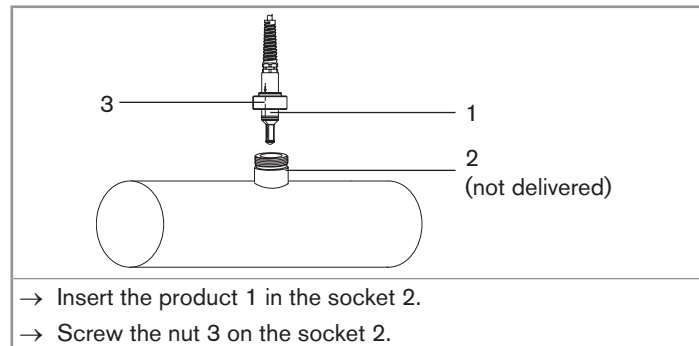


Fig. 5: Installation of a 8221 with a G1 1/4" connection



### 7.2.3. Product with 4 electrodes and a clamp connection

- Make sure the process connection is clean. Clean it if necessary.
- Obey the following recommendations when installing the product.

The cell constant and the linearity of the product may vary depending on the mounting position. A symmetrical setup is recommended:

- ▶ Leave a minimum clearance of 60 mm around the product.
- ▶ Use connection pieces made of non-conductive materials.

To achieve high precision the cell constant should be calibrated in the final setup:

- ▶ Make sure all 4 electrodes are completely and continuously immersed in the measuring sample.

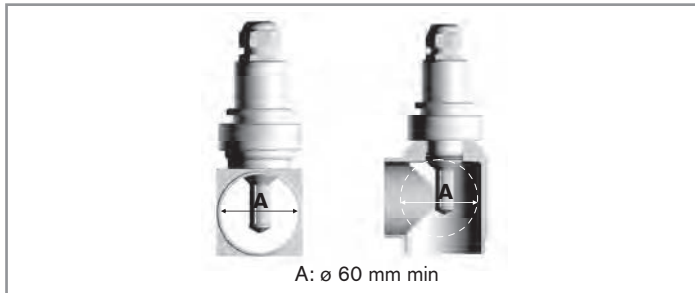


Fig. 6: Placing the product onto the pipe

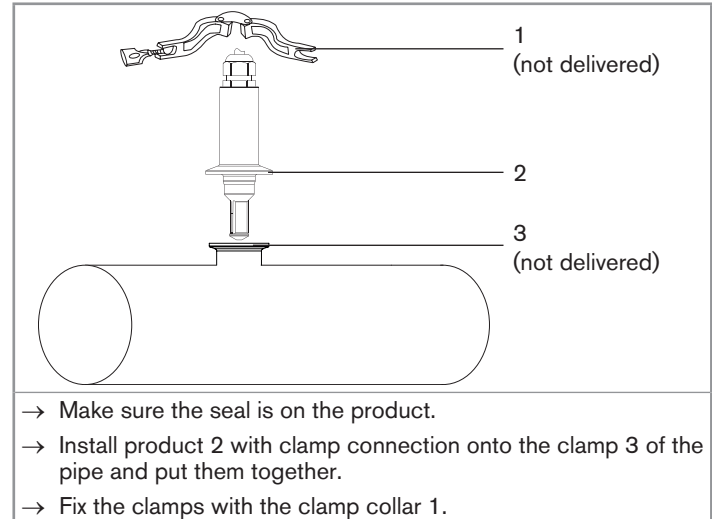


Fig. 7: Installation of a 8221 with 4 electrodes and a clamp connection

### 7.2.4. Product with a 2" (DN50/40) connection

The product with a 2" (DN50/40) connection is mounted onto the GEA Tuchenhausen VARINLINE process connections to the appropriate dimensions.

### 7.2.5. Product with a PG13.5 connection

The product with a PG13.5 connection is mounted onto a holder of the following types:

- 8200 direct welding holder (see [7.2.6](#));
- 8200 hygienic holder with G1 ¼" threaded connection (see [7.2.7](#));
- 8200 hygienic holder with clamp connection (see [7.2.8](#)).



To install the holder, refer to the Operating Instructions of the direct welding holder type 8200 or to the Operating Instructions of the hygienic holder type 8200.

### 7.2.6. Product with a PG13.5 connection onto a direct welding holder



The holder is only intended for the mounting of products with a length of 120 mm.



Make sure the welded area has cooled down before inserting the product.

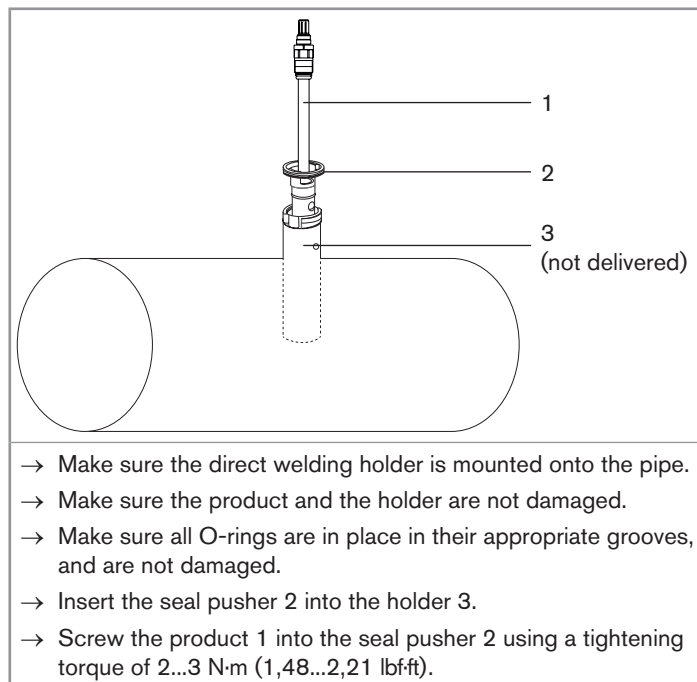
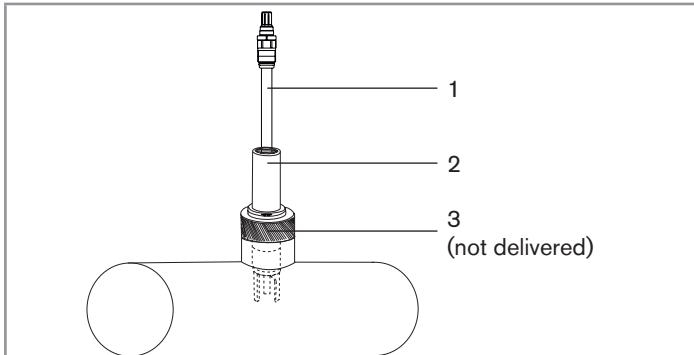


Fig. 8: Installation of a 8221 with a PG13.5 connection onto a direct welding holder

### 7.2.7. Product with a PG13.5 connection onto a G1 1/4" threaded hygienic holder



- To avoid any mechanical damage to O-rings during assembly, lightly greased them.
- After assembly, clean the product of any remaining drops of grease.



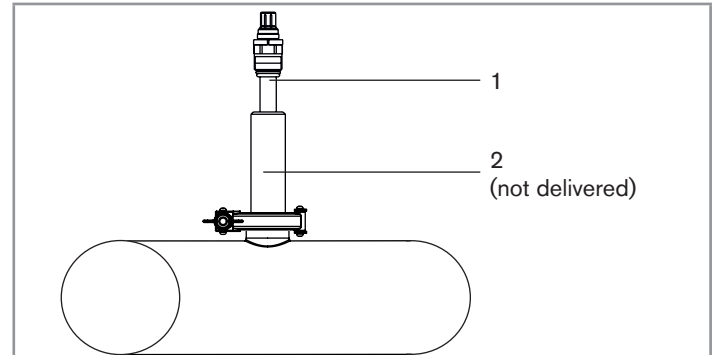
- Make sure the product and the holder are not damaged.
- Make sure all O-rings are in place in their appropriate grooves, and are not damaged.
- Make sure the holder 2 is mounted onto an adaptor 3 welded onto the pipe.
- Screw the product 1 in the holder 2.

Fig. 9: Installation of a 8221 with a PG13.5 connection onto a holder with G1 1/4" connection

### 7.2.8. Product with a PG13.5 connection onto a hygienic holder with clamp connection



- To avoid any mechanical damage to O-rings during assembly, lightly greased them.
- After assembly, clean the product of any remaining drops of grease.



- Make sure the product and the holder are not damaged.
- Make sure all O-rings are in place in their appropriate grooves, and are not damaged.
- Make sure the holder 2 is fixed onto the clamp of the pipe.
- Screw the product 1 in the holder 2

Fig. 10: Installation of a 8221 with a PG13.5 connection onto a holder with clamp connection

## 8. WIRING

### 8.1. Product with 4 electrodes and a cable, process connection 1 1/2" clamp or G1 1/4"

Signal description	Cable colour	Bürkert controller type 8619
Pt1000 (low end)	grey	7 SE
Pt1000	white	8 TS
Pt1000	blue	9 TS
Current electrode (high end)	pink	1 C+
Potential electrode (high end)	green	2 P+
Potential electrode (low end)	brown	3 P-
Current electrode (low end)	yellow	4 C-
Not connected on product	shield	6 FE
Not connected	red	-

### 8.2. Product with 4 electrodes and a VarioPin connector, process connection 1 1/2" clamp, 2" clamp or 2" (DN50/40)

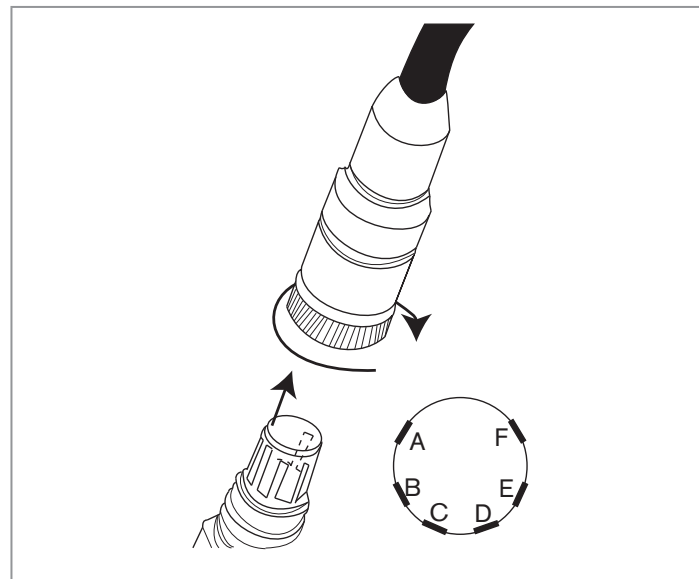


Fig. 11: Pins of the VarioPin connector

## Type 8221

### Wiring

Signal description	VarioPin *		Bürkert controller type 8619
	Pin	Cable colour	
Pt1000	E	white	9 TS
Pt1000	F	green	7 SE
Current electrode (high end)	B	red	1 C+
Potential electrode (high end)	A	transparent	2 P+
Potential electrode (low end)	C	grey	3 P-
Current electrode (low end)	D	blue	4 C-
Not connected on product	shield	green/yellow	6 FE
-			PLEASE NOTE: → short 7 SE and 8 TS

\* The cable colours are only valid for the Bürkert VarioPin connection cables with order code: **554855, 554856, 554857**.

### 8.3. Product with 4 electrodes, with PG13.5 connection

Signal description	VarioPin *		Bürkert controller type 8619
	Pin	Cable colour	
Pt1000	E	white	9 TS
Pt1000	F	green	7 SE
Current electrode (high end)	B	red	1 C+
Potential electrode (high end)	A	transparent	2 P+
Potential electrode (low end)	C	grey	3 P-
Current electrode (low end)	D	blue	4 C-
Not connected on product	shield	green/yellow	6 FE
-			PLEASE NOTE: → short 7 SE and 8 TS

\* The cable colours are only valid for the Bürkert VarioPin connection cables with order code: **554855, 554856, 554857**.

### 8.4. Product with 2 electrodes and a cable

Signal description	Cable colour	Bürkert controller type 8619
Pt1000	red	9 TS
Pt1000	green	7 SE
Potential electrode (low end)	white	3 P-
Potential electrode (high end)	black	2 P+
Shield	transparent	6 FE
		PLEASE NOTE: → short 7 SE and 8 TS → short 2 P+ et 1 C+ → short 3 P- and 4 C-

### 8.5. Product with 2 electrodes and an M12 connector

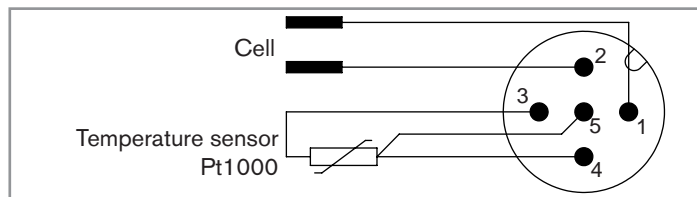


Fig. 12: M12 connector, pin assignment

→ To connect the product to a device type 8619, obey the instructions given in the Operating Instructions type 8619 and in [Fig. 13](#).

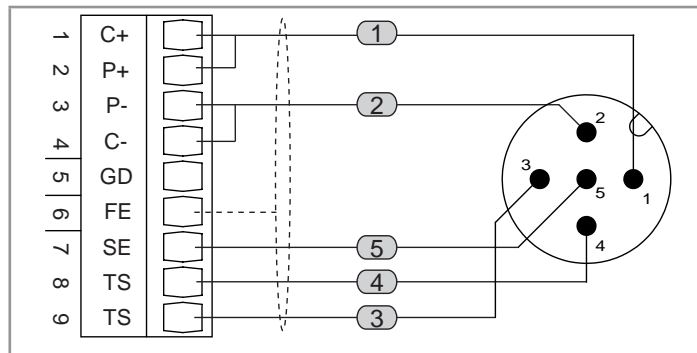


Fig. 13: Wiring the product with 2 electrodes and an M12 connector to the device type 8619

## 9. CALIBRATION

There are 2 possible calibration procedures:

- calibration while the product is disassembled from process;
- calibration in the process.

### 9.1. Calibration while the product is disassembled from process

For precise determination of the cell constant, it is recommended that you do the calibration procedure in the conditions that are similar to the process conditions. The cell constant may vary according to the final mounting position in the process.

- Rinse the product thoroughly with deionized water.
- Use a beaker with an internal diameter of at least 60 mm. (The product can be directly immersed into the Bürkert conductivity standard calibration solutions).
- Use a solution of known conductivity.
- Make sure the temperature of the solution is measured and stable.
- Immerse the product in the calibration solution. Make sure the surfaces of all electrodes (2 or 4, depending on the version) are immersed. The product should be placed in the center of the beaker.
- Leave the product in the solution for at least 5 minutes for equilibration, before initiating the calibration on the instrument.

### 9.2. Calibration in the process

- Insert the product in the process.
- Leave conductivity and temperature at least 15 minutes for equilibration.
- Take a process sample and do a measurement with a reference conductivity meter. Do the measurement at a temperature equal to that of the process. If that is not possible, you need to know the temperature compensation coefficient of your sample.
- Manually adjust the cell constant to read the same conductivity value on the process instrument.



You may switch off the temperature compensation of the process to prevent any errors. Refer to the Operating Instructions of the device connected to the product.

## 10. MAINTENANCE AND TROUBLESHOOTING

### 10.1. Safety instructions



#### **DANGER**

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

- ▶ Before any intervention on the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure. See [Fig. 2](#) chap. 6.5.

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

- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

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

- ▶ Do not touch with bare hands the parts of the product that are in contact with the fluid.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.

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

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

### 10.2. Maintenance of the product

The product can be cleaned with a cloth dampened with water or a detergent compatible with the materials the product is made of.

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



Check the O-rings at regular intervals.

- Replace the O-rings if their condition is not satisfactory.



## 11. SPARE PARTS AND ACCESSORIES



### CAUTION

**Risk of injury and/or 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 replacement parts from Bürkert.

Accessories	Order code
Calibration solution, 5 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 1\%$ accuracy, 300 ml	440015
Calibration solution, 15 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 5\%$ accuracy, 300 ml	440016
Calibration solution, 100 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 3\%$ accuracy, 300 ml	440017
Calibration solution, 706 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 2\%$ accuracy, 300 ml	440018
Calibration solution, 1413 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 1\%$ accuracy, 300 ml	440019
Calibration solution, 100 $\mu\text{S}/\text{cm}$ conductivity standard, $\pm 1\%$ accuracy, 300 ml	440020
Connection cable VarioPin (VP 6.0), female connector, 3 meters	554855

Accessories	Order code
Connection cable VarioPin (VP 6.0), female connector, 5 meters	554856
Connection cable VarioPin (VP 6.0), female connector, 10 meters	554857
5 pin M12 female straight cable plug with plastic threaded locking ring, to be wired	917116
5 pin M12 female straight cable plug moulded on cable (2 meters, shielded)	438680
5 pin M12 female straight cable plug moulded on cable (5 meters, shielded)	560365
5 pin M12 female straight cable plug moulded on cable (10 meters, shielded)	563108

## 12. PACKAGING, TRANSPORT

### NOTICE

#### Damage due to transport

Transport may damage an insufficiently protected part.

- ▶ Transport the product in shock-resistant packaging and away from humidity and dirt.
- ▶ Do not expose the product to temperatures that may exceed the admissible storage temperature range.

## 13. STORAGE

### NOTICE

**Poor storage can damage the product.**

- ▶ Store the product in a dry place away from dust.

## 14. DISPOSAL OF THE PRODUCT

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

### NOTICE

**Damage to the environment caused by products contaminated by fluids.**

- ▶ Keep to the existing provisions on the subject of waste disposal and environmental protection.



### NOTICE:

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



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