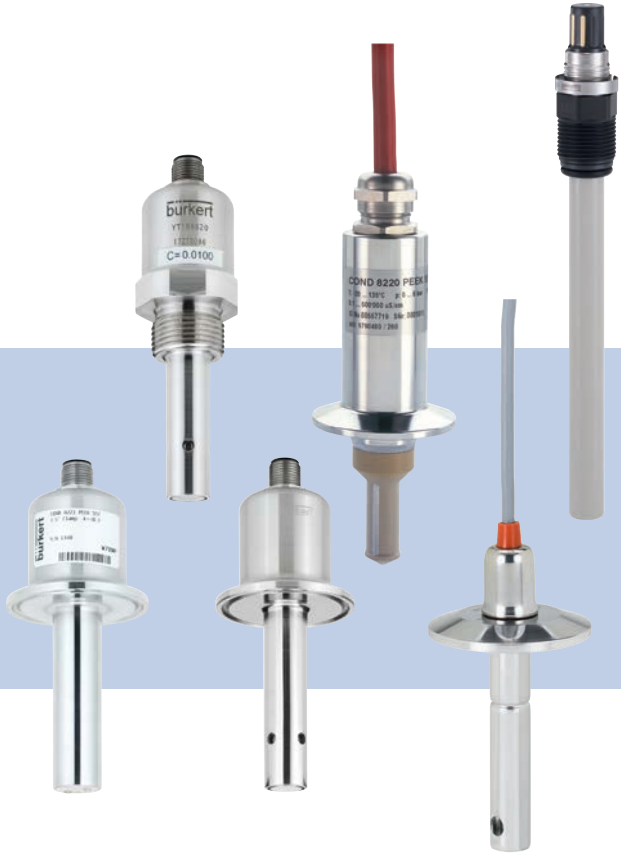
bürkert
FLUID CONTROL SYSTEMS

Type 8221

Conductivity sensor
Leitfähigkeitssensor
Sonde de conductivité



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

MAN 1000334507 EN Version: GStatus: RL (released | freigegeben) printed: 23.10.2024

Operating Instructions 2410/07_EU-ML_00565354_Original_FR REF 624533/04

MAN 1000334507 EN Version: GStatus: RL (released | freigegeben) printed: 23.10.2024

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 "3. Basic safety information" and "2. Intended use".

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

1.1. Symbols used

DANGER

Warns against an imminent danger.

- Failure to observe this warning results 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.

NOTICE

Warns against material damage.

Indicates additional information, advice or important recommendations.

Refers to information contained in these Operating Instructions 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. 3 chap. 6.4.

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 measured fluid.

- 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 these Operating Instructions.

They are also available on the internet at: country.burkert.com

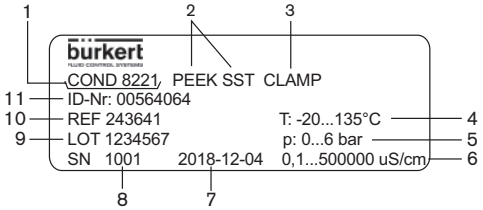
4.2. Warranty conditions

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

4.3. Information on the internet

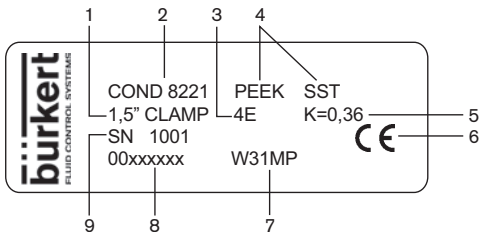
You can find the Operating Instructions and technical data sheets related to the Type 8221 at: country.burkert.com

5. TYPE LABEL



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 (µS.cm^{-1})
7. Manufacturing code
8. Serial number
9. Lot number
10. Internal code
11. Article number

Fig. 1: Type label of a product with 4 electrodes (example)



1. Type of connection
2. Measured quantity and type of the product
3. Number of electrodes
4. Materials
5. Nominal cell constant value
6. Conformity marking
7. Manufacturing code
8. Article number
9. Serial number

Fig. 2: Type label, lasered, of a product with 4 electrodes (example)

6. TECHNICAL DATA

The Type label of the product gives important technical data.

▸ Always respect the data given on the Type label.

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

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

- Product used on a pipe (PS = maximum admissible pressure in bar; DN = nominal dimension of the pipe, no unit)

Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.c.i	DN ≤ 25
Fluid group 2, Article 4, Paragraph 1.c.i	DN ≤ 32 or PSxDN ≤ 1000 bar
Fluid group 1, Article 4, Paragraph 1.c.ii	DN ≤ 25 or PSxDN ≤ 2000 bar
Fluid group 2, Article 4, Paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 bar or PSxDN ≤ 5000 bar

- Product used on a vessel (PS = maximum admissible pressure in bar, V = vessel volume in L)

Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.a.i	V >1 L and PSxV ≤ 25 bar.L or PS ≤ 200 bar
Fluid group 2, Article 4, Paragraph 1.a.i	V >1 L and PSxV ≤ 50 bar.L or PS ≤ 1000 bar
Fluid group 1, Article 4, Paragraph 1.a.ii	V >1 L and PSxV ≤ 200 bar.L or PS ≤ 500 bar
Fluid group 2, Article 4, Paragraph 1.a.ii	PS >10 bar and PSxV ≤ 10000 bar.L or PS ≤ 1000 bar

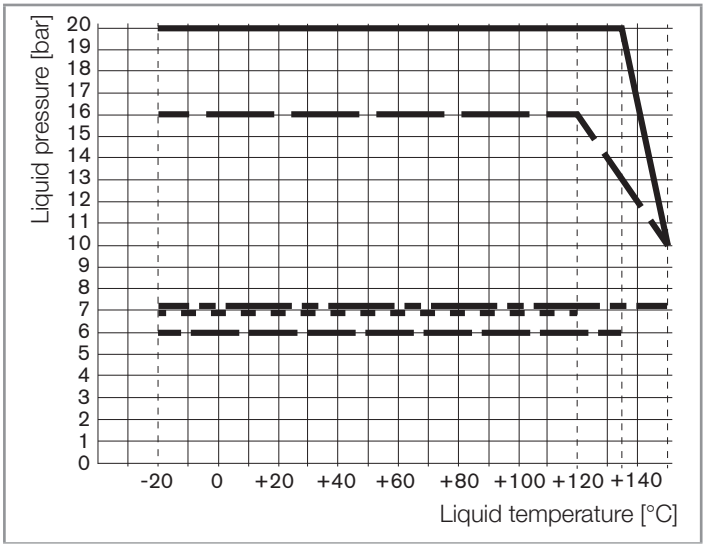
6.3. Materials

Process connection	Electrical connection	Number of electrodes	Materials			Surface finish of metallic wetted parts
			Electrodes	Frame	Seal	
1½'' clamp	5-pin M12 male connector	2	Stainless steel 316L	Stainless steel 316L PEEK (conform to FDA - 21CFR 177.2415)	EPDM (conform to FDA - 21CFR 177.2600)	Ra<0.4 µm, electro-polished
G1''						Ra<1.6 µm
G¾''						
NPT¾''						
1½'' clamp	Cable		Stainless steel	Stainless steel PTFE	EPDM	Ra<0.5 µm
1½'' clamp	8-pin M12 male connector	4	Stainless steel 316L	Stainless steel 316L PEEK (conform to FDA - 21CFR 177.2415)	EPDM (conform to FDA - 21CFR 177.2600)	Ra<0.4 µm, electro-polished
1½'' clamp, short and long	VarioPin male connector		Stainless steel 1.4435/316L	Stainless steel 1.4435/316L PEEK (conform to FDA - 21CFR 177.2415)	EPDM (conform to FDA - 21CFR 177.2600)	
1½'' clamp, short and long	Cable					
G1¼''						
2'' clamp	VarioPin male connector					
2'' (DN50/40) [1)]						
PG13.5				PEEK (conform to FDA - 21CFR 177.2415)		

1) *Adapted for GEA Tuchenhagen VARINLINE process connections*

6.4. General technical data

→ Obey the dependency between the liquid temperature and liquid pressure, given in Fig. 3.



Operating range for conductivity sensors with 4 electrodes and connection: 2'' clamp, 2'' (DN50/40) adapted for GEA Tuchenhagen VARINLINE process connections, PG13.5

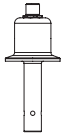
Operating range for conductivity sensors:
- with 2 electrodes, with 5-pin M12 male connector and process connection: 1½'' clamp, G1", G¾" and NPT¾"
- with 4 electrodes, with 8-pin M12 male connector and process connection: 1½" clamp

Operating range for conductivity sensors with 2 electrodes and connection 1½'' clamp with M12 connector

Operating range for conductivity sensors with 2 electrodes and connection 1½'' clamp with cable

Operating range for conductivity sensors with 4 electrodes and connection: G1¼'', 1½'' clamp (short and long insertion depth)

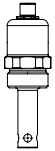
Fig. 3: Liquid temperature / liquid pressure dependency diagram

	• 2 electrodes • 1½'' clamp connection • 5-pin M12 male connector	
Article number	**568818**	**569643**
Measurement range	0.05...20 µS.cm^{-1}	1...200 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %	
Cell constant [2]	0.01 cm^{-1}	0.1 cm^{-1}
Fluid temperature	–20...+150 °C	
Fluid pressure	PN16 at –20...+120 °C PN10 at +120...+150 °C	
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a 5-pin M12 female cable plug	
Temperature sensor	Pt1000	
Electrical connection	5-pin M12 male connector	

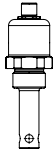
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product and is reported on the Type label of the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • 1½'' clamp connection • 8-pin M12 male connector
Article number	**571162**
Measurement range	1...20000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.33 cm^{-1}
Fluid temperature	–20...+150 °C
Fluid pressure	PN16 at –20...+120 °C PN10 at +120...+150 °C
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with an 8-pin M12 female cable plug
Temperature sensor	Pt1000
Electrical connection	8-pin M12 male connector

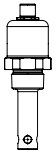
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product and is reported on the Type label of the product. The cell constant can be influenced by the assembly situation.*

	• 2 electrodes • G1'' connection • 5-pin M12 male connector	
Article number	**569644**	**569645**
Measurement range	0.05...20 µS.cm–1	1...200 µS.cm–1
Linearity [1] **(relative)**	±0.5...5 %	
Cell constant [2]	0.01 cm^{-1}	0.1 cm^{-1}
Fluid temperature	–20...+150 °C	
Fluid pressure	PN16 at –20...+120 °C PN10 at +120...+150 °C	
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a 5-pin M12 female cable plug	
Temperature sensor	Pt1000	
Electrical connection	5-pin M12 male connector	

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product and is reported on the Type label of the product. The cell constant can be influenced by the assembly situation.*

	• 2 electrodes • G ¾'' connection • 5-pin M12 male connector	
Article number	**570452**	**570453**
Measurement range	0.05...20 µS.cm^{-1}	1...200 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %	
Cell constant [2]	0.01 cm^{-1}	0.1 cm^{-1}
Fluid temperature	–20...+150 °C	
Fluid pressure	PN16 at –20...+120 °C PN10 at +120...+150 °C	
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a 5-pin M12 female cable plug	
Temperature sensor	Pt1000	
Electrical connection	5-pin M12 male connector	

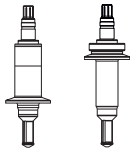
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product and is reported on the Type label of the product. The cell constant can be influenced by the assembly situation.*

	• 2 electrodes • NPT ¾'' connection • 5-pin M12 male connector	
Article number	**570454**	**570455**
Measurement range	0.05...20 µS.cm^{-1}	1...200 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %	
Cell constant [2]	0.01 cm^{-1}	0.1 cm^{-1}
Fluid temperature	–20...+150 °C	
Fluid pressure	PN16 at –20...+120 °C PN10 at +120...+150 °C	
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a 5-pin M12 female cable plug	
Temperature sensor	Pt1000	
Electrical connection	5-pin M12 male connector	

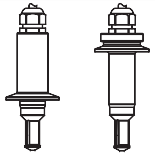
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product and is reported on the Type label of the product. The cell constant can be influenced by the assembly situation.*

	• 2 electrodes • 1½'' clamp connection • Cable		
Article number	**564898**	**562261**	**564899**
	Not available anymore		
Measurement range	0.05...20 µS.cm^{-1}	1...200 µS.cm^{-1}	5...5000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %		
Cell constant [2]	0.01 cm^{-1}	0.1 cm^{-1}	1 cm^{-1}
Fluid temperature	max. +120 °C		
Fluid pressure	max. 7 bar (100 psi)		
Protection class according to IEC/EN 60529	–		
Temperature sensor	Pt1000		
Electrical connection	Cable, length 3 m, instrument side with open wire.		

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • 1½'' clamp connection, short or long insertion depth • VarioPin male connector
Article number	**562420 (short), 564064 (long)**
Measurement range	0.1...500000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.147 cm^{-1}
Fluid temperature	–20...+135 °C
Fluid pressure	max. 6 bar (87 psi)
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a VarioPin female connector
Temperature sensor	Pt1000
Electrical connection	VarioPin (VP 6.0) male connector

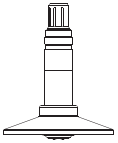
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • 1½'' clamp connection, short or long insertion depth • Cable
Article number	**557719 (short), 558884 (long)** **Not available anymore**
Measurement range	0.1...500000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.147 cm^{-1}
Fluid temperature	–20...+135 °C
Fluid pressure	max. 6 bar (87 psi)
Protection class according to IEC/ EN 60529	–
Temperature sensor	Pt1000
Electrical connection	High temperature cable, length 5 m, instrument side with open wire.

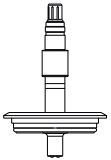
1) *Uncertainty of ±5 % arises when using only one single cell constant for the full range. ±0.5 % measurement deviation can be achieved when calibration is performed in a conductivity range close to that of the used solution.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • G1¼'' connection • Cable
Article number	**562240** **Not available anymore**
Measurement range	0.1...500000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.147 cm^{-1}
Fluid temperature	–20...+135 °C
Fluid pressure	max. 6 bar (87 psi)
Protection class according to IEC/ EN 60529	–
Temperature sensor	Pt1000
Electrical connection	High temperature cable, length 5 m, instrument side with open wire.

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • 2'' clamp connection • VarioPin male connector
Article number	**559120**
Measurement range	1...300000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.360 cm^{-1}
Fluid temperature	–20...+150 °C
Fluid pressure	max. 20 bar (290 psi) at –20...+135 °C max. 10 bar (145 psi) at +150 °C
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a VarioPin female connector
Temperature sensor	Pt1000
Electrical connection	VarioPin (VP 6.0) male connector

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • 2'' (DN50/40) connection, adapted for GEA Tuchenhagen VARINLINE process connections • VarioPin male connector
Article number	**563269**
Measurement range	1...300000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.360 cm^{-1}
Fluid temperature	–20...+150 °C
Fluid pressure	max. 20 bar (290 psi) at –20...+135 °C max. 10 bar (145 psi) at +150 °C
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a VarioPin female connector
Temperature sensor	Pt1000
Electrical connection	VarioPin (VP 6.0) male connector

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

	• 4 electrodes • PG13.5 connection • VarioPin male connector
Article number	**563186**
Measurement range	1...300000 µS.cm^{-1}
Linearity [1] **(relative)**	±0.5...5 %
Cell constant [2]	0.360 cm^{-1}
Fluid temperature	–20...+150 °C. max
Fluid pressure	max. 20 bar (290 psi) at –20...+135 °C max. 10 bar (145 psi) at +150 °C
Protection class according to IEC/ EN 60529	IP67, if the product is wired, inserted and screwed with a VarioPin female connector
Temperature sensor	Pt1000
Electrical connection	VarioPin (VP 6.0) male connector

1) *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.*
2) *Nominal cell constant. The cell constant of every product is measured according to a Bürkert standard procedure. The individual cell constant measured is reported in the calibration report, delivered with the product. The cell constant can be influenced by the assembly situation.*

6.5. Dimensions

→ Please refer to the technical data sheets related to the product at: country.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. 3 chap. 6.4.

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. Product with clamp connection, and M12 male connector or product with clamp connection, cable and 2 electrodes

The chapter describes the installation of the following products:

- products with a 1½" clamp connection, a cable and 2 electrodes. The article numbers are **564898, 564899** or **562261**;
- products with a 1½" clamp connection and a 5-pin M12 male connector. The article numbers are **568818** or **569643**;
- product with a 1½" clamp connection and a 8-pin M12 male connector. The article number is **571162**.

→ Install the product in the following ways: onto a pipe (chap. 7.2.1) or on a vessel (chap. 7.2.2).

7.2.1. Installation onto the pipe

→ 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.

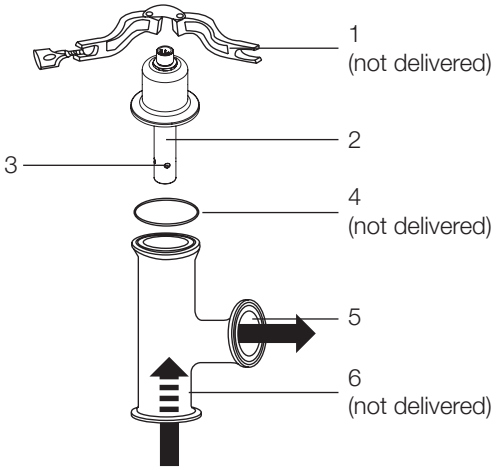
→ Choose an appropriate clamp collar.

→ For the article number **564898** carry out the mounting procedure on Fig. 4.

→ For the article number **564899** or **562261** carry out the mounting procedure on Fig. 5.

→ For the article number **568818** or **569643** carry out the mounting procedure on Fig. 4 or on Fig. 5.

→ For the article number **571162** carry out the mounting procedure on Fig. 4 or on Fig. 5.



➡ Flow direction (indicated by the arrows on the product)

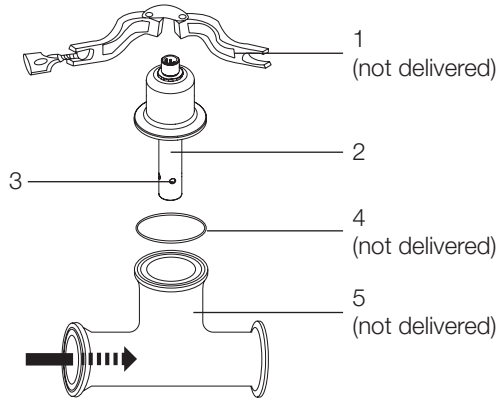
→ Put the seal 4 onto the hygienic tee-fitting 6.

→ 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. 4: Installation of a 8221 with article number 564898, 568818, 569643 or 571162 onto a pipe



➡ Flow direction (indicated by the arrows on the product)

→ 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. 5: Installation of a 8221 with article number 564899, 562261, 568818, 569643 or 571162 onto a pipe

7.2.2. Installation on a vessel

→ Choose an appropriate fitting for the installation of the product on the vessel.

→ Make sure the seals are in good condition.

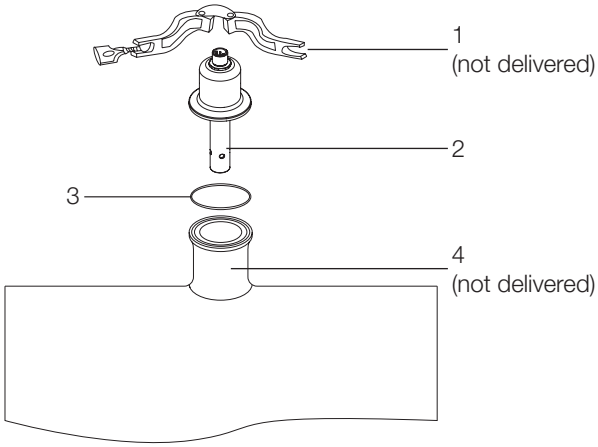
→ Place seals adapted to the process (temperature, fluid type) in the grooves of the clamp fitting.

→ Mount the fitting into the vessel. 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.



→ Put the seal 3 onto the fitting 4.
→ Put the product 2 onto the seal 3.
→ Fix the clamp of the product 2 and the clamp of the fitting 4 with the clamp collar 1.

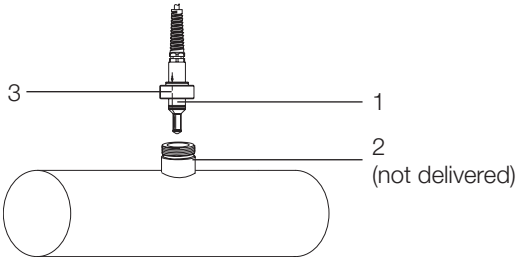
Fig. 6: Installation of a 8221 on a vessel

7.3. Product with G1¼'' connection

Install the product in the following ways: onto a pipe (chap. 7.3.1) or on a vessel (chap. 7.3.2).

7.3.1. Installation onto the pipe

→ Mount a 1¼'' weld-in socket, with article number **737241** on the pipe. Obey the instructions given with the weld-in socket.

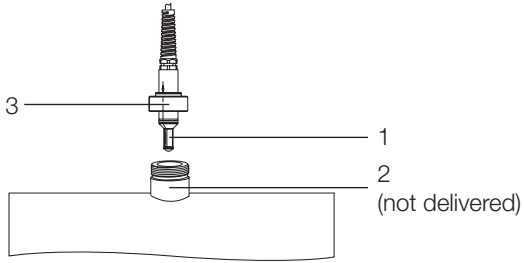


→ Insert the product 1 in the socket 2.
→ Screw the nut 3 on the socket 2.

Fig. 7: Installation of a 8221 with a G1¼'' connection onto a pipe

7.3.2. Installation on a vessel

→ Mount a 1¼'' weld-in socket, with article number **737241** on the vessel. Obey the instructions given with the weld-in socket.



→ Insert the product 1 in the socket 2.
→ Screw the nut 3 on the socket 2.

Fig. 8: Installation of a 8221 with a G1¼'' connection on a vessel

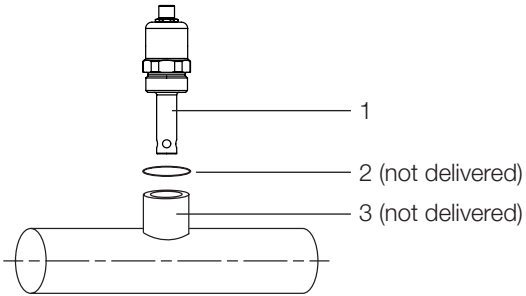
7.4. Product with G1'', G¾'' or NPT¾'' connection

Install the product in the following ways: onto a pipe (chap. 7.4.1) or on a vessel (chap. 7.4.2).

For compliance with the PN rating, make sure the complete length of the threaded part (16 mm) is contained in the corresponding weld-in socket, and make sure the seal is correctly compressed.

7.4.1. Installation onto the pipe

→ Mount a weld-in socket with an internal thread of G1", of G¾'' or of NPT¾'' on the pipe. Obey the instructions given with the weld-in socket.

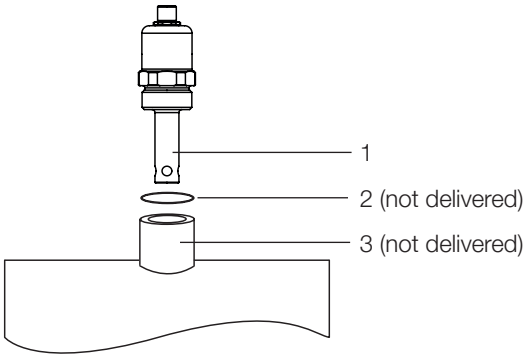


→ Put the seal 2 onto the product 1.
→ Insert the product 1 in the socket 3.
→ Screw the product 1 into the socket 3.

Fig. 9: Installation of a 8221 with a G1'', a G¾'' or a NPT¾'' connection onto a pipe

7.4.2. Installation on a vessel

→ Mount a weld-in socket with an internal thread of G1", of G¾'' or of NPT¾'' on the vessel. Obey the instructions given with the weld-in socket.



→ Put the seal 2 onto the product 1.
→ Insert the product 1 in the socket 3.
→ Screw the product 1 into the socket 3.

Fig. 10: Installation of a 8221 with a G1'', a G¾'' or a NPT¾'' connection on a vessel

7.5. Product with clamp connection and VarioPin male connector or product with clamp connection, cable and 4 electrodes

The chapter describes the installation of the following products:

- products with a 1½" or 2" clamp connection, a cable and a VarioPin male connector. The article numbers of the products are **562420, 564064** or **559120**;
- products with a 1½" clamp connection, a cable and 4 electrodes. The article numbers The article number of the products are **557719 or 558884**.

→ Install the product in the following ways: onto a pipe (chap. 7.5.1) or on a vessel (chap. 7.5.2).

7.5.1. Installation onto the pipe

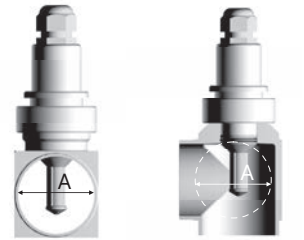
→ Make sure the process connection is clean. Clean it if necessary.
→ Obey the following recommendations when installing the product.

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.

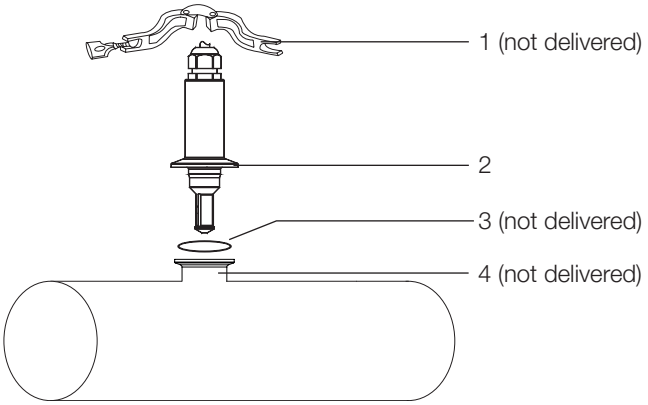
To achieve high precision the cell constant should be calibrated in the final setup:

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



A: ø 60 mm min

Fig. 11: Placing the product onto the pipe



→ Make sure the seal 3 is on the product 2.

→ Install product 2 with clamp connection onto the clamp 4 of the pipe and put them together.

→ Fix the clamps with the clamp collar 1.

Fig. 12: Installation of a 8221 with article number 562420, 564064, 559120, 557719 or 558884 onto a pipe

7.5.2. Installation on a vessel

→ Make sure the process connection is clean. Clean it if necessary.

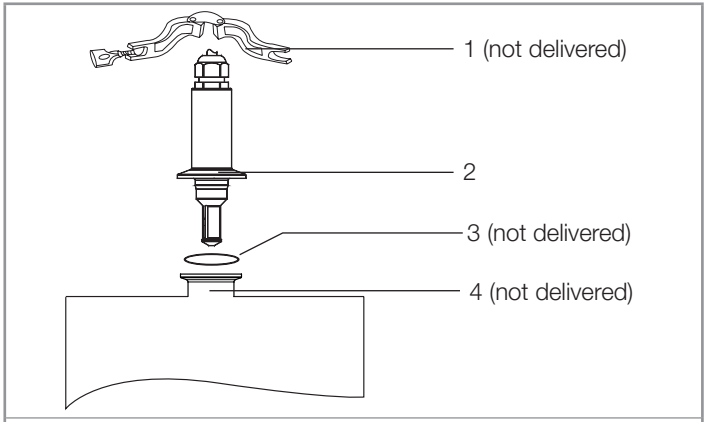
→ Obey the following recommendations when installing the product.

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.



→ Make sure the seal 3 is on the product 2.

→ Install product 2 with clamp connection onto the clamp 4 of the vessel and put them together.

→ Fix the clamps with the clamp collar 1.

Fig. 13: Installation of a 8221 with article number 562420, 564064, 559120, 557719 or 558884 on a vessel

7.6. Product with 2'' (DN50/40) connection

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

7.7. Product with PG13.5 connection

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

- 8200 direct welding holder (see chap. 7.7.1);
- 8200 hygienic holder with G1¼'' threaded connection (see chap. 7.7.2);
- 8200 hygienic holder with clamp connection (see chap. 7.7.3).

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.

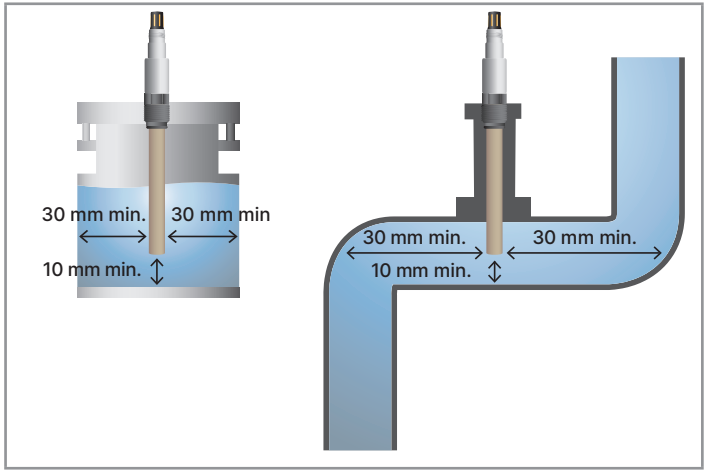
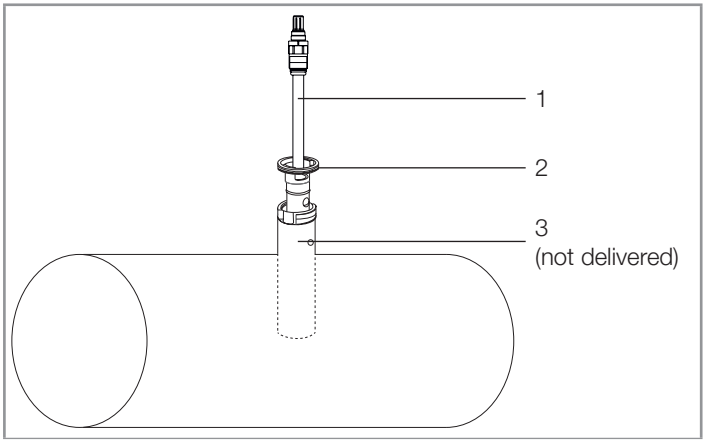


Fig. 14: Placing the product onto the pipe

7.7.1. Product with 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.

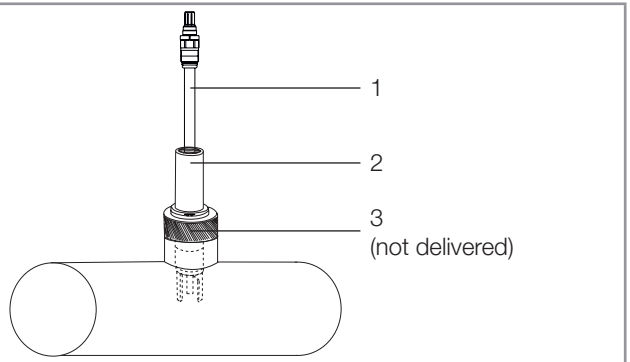


→ Make sure the direct welding holder is mounted onto the pipe or on the vessel.
→ Make sure the product and the holder are not damaged.
→ Make sure all O-rings are in place in their appropriate grooves, and are not damaged.
→ Insert the seal pusher 2 into the holder 3.
→ Screw the product 1 into the seal pusher 2 using a tightening torque of 2...3 N·m (1.48...2.21 lbf·ft).

Fig. 15: Installation of a 8221 with a PG13.5 connection onto a direct welding holder onto a pipe or on a vessel

7.7.2. Product with PG13.5 connection onto a G1¼'' threaded hygienic holder

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

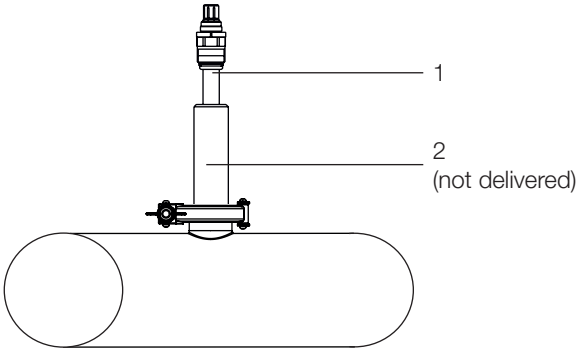


→ Make sure the product and the holder are not damaged.
→ Make sure all O-rings are in place in their appropriate grooves, and are not damaged.
→ Make sure the holder 2 is mounted onto an adaptor 3 welded onto the pipe or on the vessel.
→ Screw the product 1 in the holder 2.

Fig. 16: Installation of a 8221 with a PG13.5 connection onto a holder with G1¼'' connection onto a pipe or on a vessel

7.7.3. Product with PG13.5 connection onto a hygienic holder with clamp connection

- To avoid any mechanical damage to O-rings during assembly, lightly grease 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 or onto the clamp of the vessel.
→ Screw the product 1 in the holder 2.

Fig. 17: Installation of a 8221 with a PG13.5 connection onto a holder with clamp connection onto a pipe or on a vessel

8. WIRING

8.1. Product with 4 electrodes and cable, process connection 1½'' clamp or G1¼''

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	–
–		PLEASE NOTE: short 4 C– and 6 FE

8.2. Product with 4 electrodes and VarioPin connector, process connection 1½'' clamp, 2'' clamp or 2'' (DN50/40)

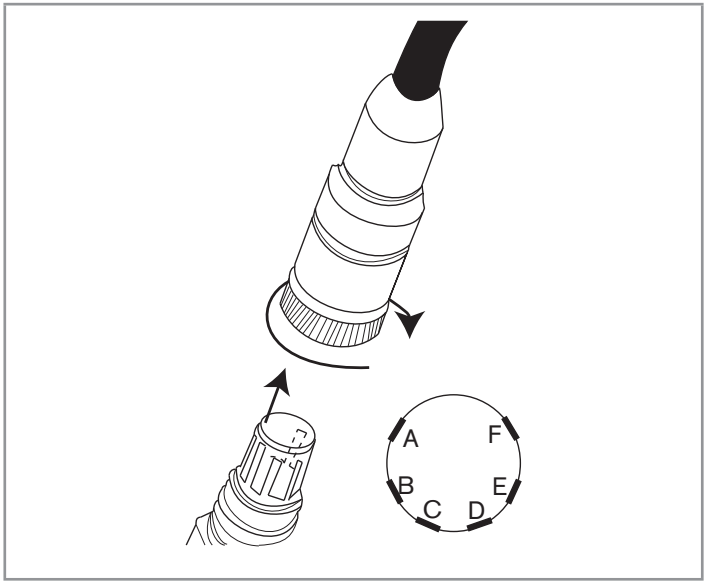


Fig. 18: Pins of the VarioPin connector

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 short 4 C– and 6 FE

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

8.3. Product with 4 electrodes and 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 short 4 C– and 6 FE

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

8.4. Product with 2 electrodes and 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+ and 1 C+ short 3 P– and 4 C– short 4 C– and 6 FE

8.5. Product with 2 electrodes and 5-pin M12 male connector

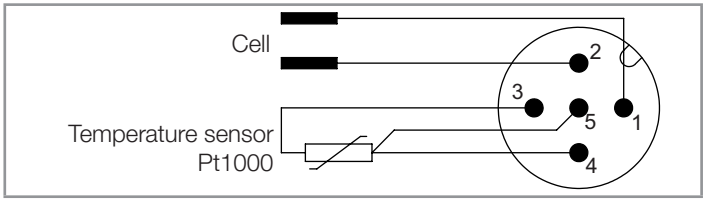


Fig. 19: 5-pin M12 male connector, pin assignment

→ To connect the product to a device Type 8619, obey the instructions given in the Operating Instructions Type 8619 and in Fig. 20.

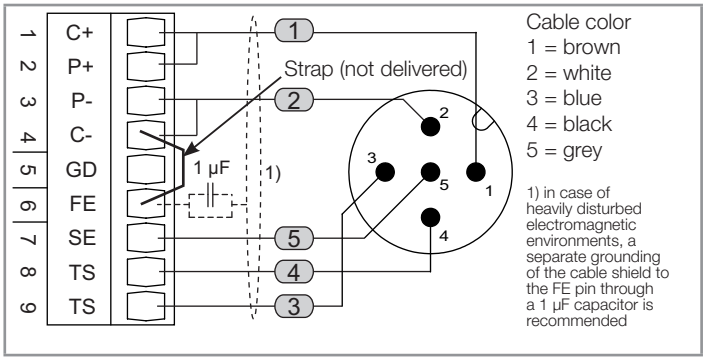


Fig. 20: Wiring the product with 2 electrodes and a 5-pin M12 male connector to the device Type 8619

8.6. Product with 4 electrodes and 8-pin M12 male connector

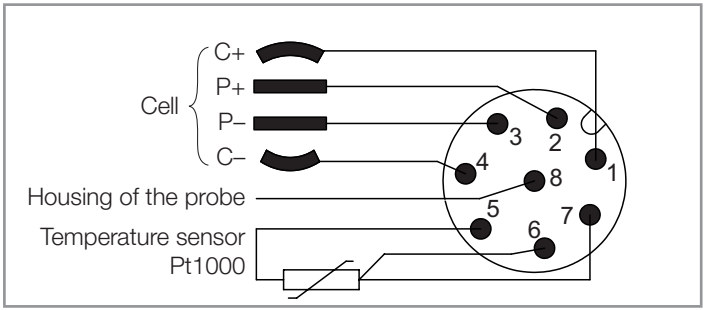


Fig. 21: 8-pin M12 male connector, pin assignment

→ To connect the product to a device Type 8619, obey the instructions given in the Operating Instructions Type 8619 and in Fig. 22.

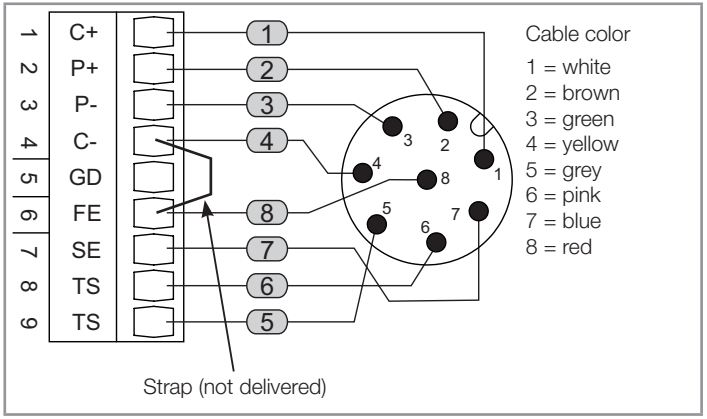


Fig. 22: Wiring the product with 4 electrodes and an 8-pin M12 male connector to the device Type 8619

9. CALIBRATION

There are 2 possible calibration procedures:

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

The installation conditions affects the conductivity measurement. Pipe dimensions, pipe diameter and sensor's distance to the tank wall affects the measured conductivity.

In case of metal installation, Bürkert recommands to perform the calibration in the process, as described in chapter 9.2, page 32.

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 (see chapter 11, page 34).

→ 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 completely immersed and free of gas and free of air bubbles. 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. 3 chap. 6.4.

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 product and the surrounding area.

- Use only original accessories and original replacement parts from Bürkert.

Accessories	Article number
Calibration solution, 5 µS.cm^{-1} conductivity standard, ±1 % accuracy, 300 ml	440015
Calibration solution, 15 µS.cm^{-1} conductivity standard, ±5 % accuracy, 300 ml	440016
Calibration solution, 100 µS.cm^{-1} conductivity standard, ±3 % accuracy, 300 ml	440017
Calibration solution, 706 µS.cm^{-1} conductivity standard, ±2 % accuracy, 300 ml	440018
Calibration solution, 1413 µS.cm^{-1} conductivity standard, ±1 % accuracy, 300 ml	440019
Calibration solution, 100 µS.cm^{-1} conductivity standard, ±1 % accuracy, 300 ml	440020
Connection cable VarioPin (VP 6.0), female connector, 3 meters	554855

Accessories	Article number
Connection cable VarioPin (VP 6.0), female connector, 5 meters	554856
Connection cable VarioPin (VP 6.0), female connector, 10 meters	554857
Straight 5-pin M12 female cable-plug with plastic threaded locking-ring, to be wired	917116
Straight 5-pin M12 female cable-plug moulded on cable (2 meters, shielded)	438680
Straight 5-pin M12 female cable-plug moulded on cable (5 meters, shielded)	560365
Straight 5-pin M12 female cable-plug moulded on cable (10 meters, shielded)	563108
Straight 8-pin M12 female cable-plug with plastic threaded locking-ring, to be wired	444799
Straight 8-pin M12 female cable-plug moulded on cable (2 meters, shielded)	444800
Straight 8-pin M12 female cable-plug moulded on cable (5 meters, shielded)	555675

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 product and its packaging in an environmentally-friendly way.

NOTICE

Damage to the environment caused by parts contaminated by fluids

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

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FLUID CONTROL SYSTEMS

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