



pH measuring system for hygienic applications

- Special glass-free probe for measuring pH to be connected to Type 8619 multiCELL
- Sterile design, CIP-compatible, in-line sterilizable
- Robust and unbreakable construction
- Long service life, long calibration intervals
- Especially suitable when preparing foods and drinks

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with



Type 8619 ▶
multiCELL - Multi-channel and multi-function transmitter/controller



Type 8200 ▶
Armatures for analytical sensors

Type description

The type 8201 pH measuring system is suitable for measuring absolute pH values in liquids between pH 0 and pH 12 at medium temperatures of up to 140°C and process pressures of max. 6 bar.

Due to its hygienic design and the robust glass-free construction, this model is particularly suitable for use in hygienic processes. An example would be the production of foods and active ingredients, during which the pH value of liquid mediums - including those which are viscous or contain solids - is measured.

The pH electrode's extremely smooth enamel surface prevents the medium from sticking and is very easy to clean in line. Due to its robust design and high temperature and chemical tolerance, the electrode stays in the process even during a CIP purification. This means that expensive retractable fittings can be dispensed with.

1. General Technical Data

The complete measuring system consists of the pH probe, an adaptation set, a fitting, the reservoir with hose for the electrolyte solution, the electrolyte solution and the electric cable for connecting to a suitable transmitter.

The pH probe Type 8201 is supplied without adaptation. According to the chosen fitting/armature the appropriate adaptation set has to be selected. Different hygienic fittings (Type 8201) or for general purpose applications pH armatures of Type 8200 can be selected.

See **data sheet Type 8200** ▶ for more information.

Product properties

Material

Please make sure the device materials are compatible with the fluid you are using.

Detailed information can be found in chapter **"3.1. Chemical Resistance Chart – Bürkert resistApp"** on page 5.

Wetted parts

Sensor tube	Enamelled steel tube
Diaphragm	Ceramic
Process connection	Stainless steel 1.4404
Electrode head	PVDF
Seal	EPDM
Electrolyte vessel	Stainless steel (1.4301)
Dimensions	Detailed information can be found in chapter "4. Dimensions" on page 6.
Compatibility	Any tanks or process pipelines which are fitted with <ul style="list-style-type: none"> • pH armature Type 8200 or • Fitting Type 8201 or • Flange connection adapted for GEA Tuchenhausen VARINLINE process connection (DN 50...DN 125) or • Clamp 2" See data sheet Type 8200 ▶ or chapter "4.2. Fittings Type 8201" on page 9 or chapter "9.4. Ordering chart" on page 14 for more information.

Temperature sensor	Pt1000 integrated within the holder
Measuring variable	Absolute pH value
Reference system	<ul style="list-style-type: none"> • Aseptic ground (ceramic) diaphragm • Reference electrode Ag/AgCl • KCl electrolyte 3-molar sterile (conform to FDA)
Measuring range	0...10 pH (for up to 12 pH, see chapter "5.2. pH/temperature diagram" on page 11)
Measuring chain zero point	$8.65 \pm 1 \text{ pH}^{(1)}$
Measuring chain isotherm point pH_0	$1.0 \pm 1 \text{ pH}$; $U_{is} = 440 \text{ mV}^{(1)}$

Product accessories

Suitable transmitter	<ul style="list-style-type: none"> • Multi channel and multi function multiCELL transmitter/controller Type 8619 See data sheet Type 8619 multiCELL ▶ for more information. • Devices with isotherm option
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Performance data

Measuring deviation	Max. $\pm 0.05 \text{ pH}$, depending on calibration
Repeatability	0.05 pH
Slope of measuring chain	56...59 mV/pH ⁽¹⁾ at 25 °C (77 °F)
Measurement chain potential	+600...-400 mV
Inner resistance of measuring chain	$10^9 \dots 10^{10} \Omega$ at +25 °C (77 °F)
Diaphragm resistance	Approx. 20...200 k Ω
Insulation resistance	$\geq 10^{12} \Omega$
Inner capacity (with connection cable)	$\leq 5 \text{ nF}$
Inner inductivity (with connection cable)	Negligibly low
Thermal shock resistance	$\Delta T = 120 \text{ °C}$ (248 °F)
Corrosion resistance	See chapter "5.1. Sensor corrosion resistance diagram" on page 10.

Electrical data


Output signal	<ul style="list-style-type: none"> • pH value: analog signal, to be connected to multiCELL transmitter/controller Type 8619. See data sheet Type 8619 multiCELL ▶ for more information. • Pt1000: 2-wire
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Medium data	
Fluid temperature	0...+140 °C (+32...+284 °F), see chapter "5.2. pH/temperature diagram" on page 11.
Fluid pressure	-1...+6 bar rel. (-14...+87 PSI)
Fluid conductivity	Min. 1 µS/cm
Process/Port connection & communication	
Process connection	Through adaptation sets for <ul style="list-style-type: none"> • pH armature Type 8200 in stainless steel or • Hygienic fittings Type 8201 <ul style="list-style-type: none"> – Weld connection DN 25 (Ingold welding nozzle) – Weld connection DN 30, other on request – Stainless steel connecting pieces 1.4404 or • Flange connection adapted for GEA Tuchenhagen VARINLINE process connection (DN 50...DN 125) or • Clamp 2" <p>See data sheet Type 8200 ▶ or chapter "4.1. pH probe enamel" on page 6 or chapter "9.4. Ordering chart" on page 14 for more information.</p>
Electrical connection	6 pin gold-plated Variopin connector
Approvals and certificates	
Standards	
Degree of protection according to IEC/ EN 60529	IP68
Directives	
CE 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)
Pressure equipment directives	Complying with Article 4, Paragraph 1 of 2014/68/EU directive Detailed information on the pressure equipment directive can be found in chapter "2.3. Pressure Equipment Directive" on page 5.
Certificates	ECR1935/2004 declaration
Environment and installation	
Ambient temperature	Operation and storage: 0...+50 °C (+32...+122 °F)
Relative air humidity	≤85 %, without condensation
Height above sea level	Max. 2000 m
Operating condition	Continuous
Equipment mobility	Fixed
Application range	Indoor and outdoor (protect the device against electromagnetic interference, ultraviolet rays and against the effects of climatic conditions)
Installation category	Category I according to UL/EN 61010-1
Pollution degree	Degree 2 according to UL/EN 61010-1

1.) For exact values see probe test report.

2. Approvals

2.1. Certificates

Certificates	Description
FDA	FDA The KCI electrolyte complies in its composition with the Code of Federal Regulations published by the FDA (Food and Drug Administration, USA).
	EC-Regulation 1935/2004/EC The device is suitable in its composition for use with foodstuffs and beverages (according to EC Regulation 1935/2004/EC).

2.2. Pressure Equipment Directive

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

Device used on a pipe

Note:

- The data in the table is independent of the chemical compatibility of the material and the fluid.
- PS = maximum admissible pressure, DN = nominal diameter of the pipe

Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.c.i	$DN \leq 25$
Fluid group 2, Article 4, Paragraph 1.c.i	$DN \leq 32$ or $PS \cdot DN \leq 1000$
Fluid group 1, Article 4, Paragraph 1.c.ii	$DN \leq 25$ or $PS \cdot DN \leq 2000$
Fluid group 2, Article 4, Paragraph 1.c.ii	$DN \leq 200$ or $PS \leq 10$ or $PS \cdot DN \leq 5000$

Device used on a vessel

Note:

- The data in the table is independent of the chemical compatibility of the material and the fluid.
- PS = maximum admissible pressure, V = vessel volume

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

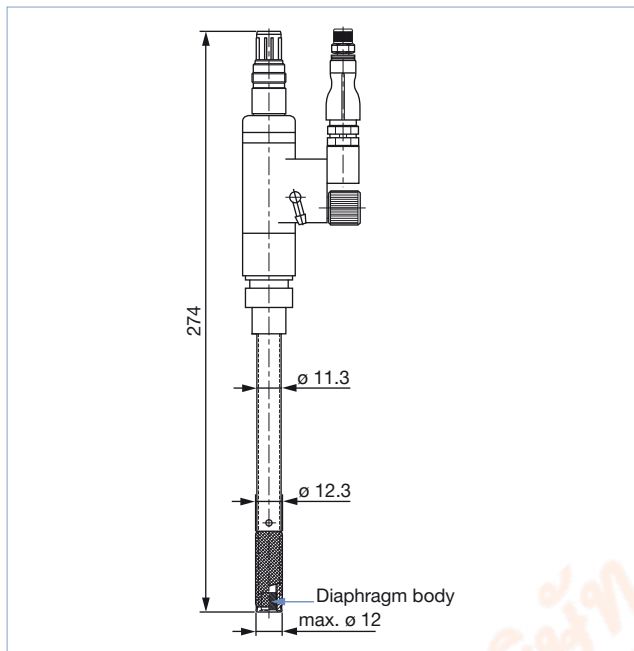
4. Dimensions

4.1. pH probe enamel

Probe without adaptation

Note:

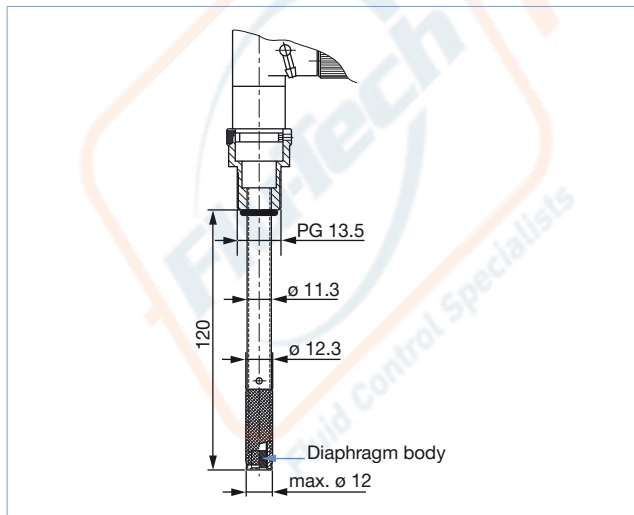
Dimensions in mm



Probe with adaptation set PG 13.5 for pH armature Type 8200

Note:

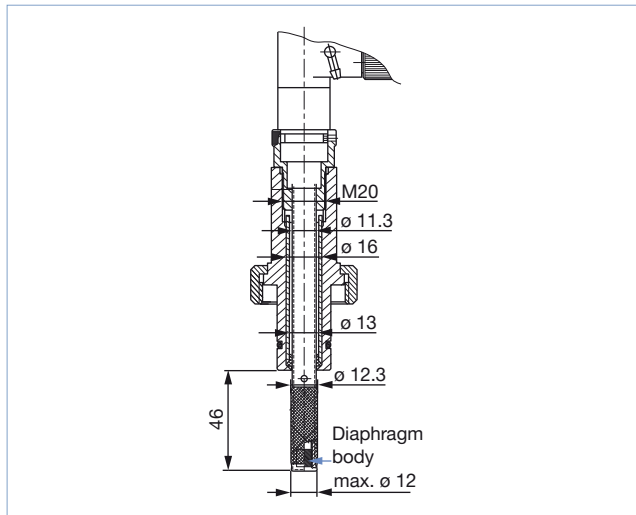
Dimensions in mm



Probe with adaptation set for fitting Type 8201, welding tab DN 25 version

Note:

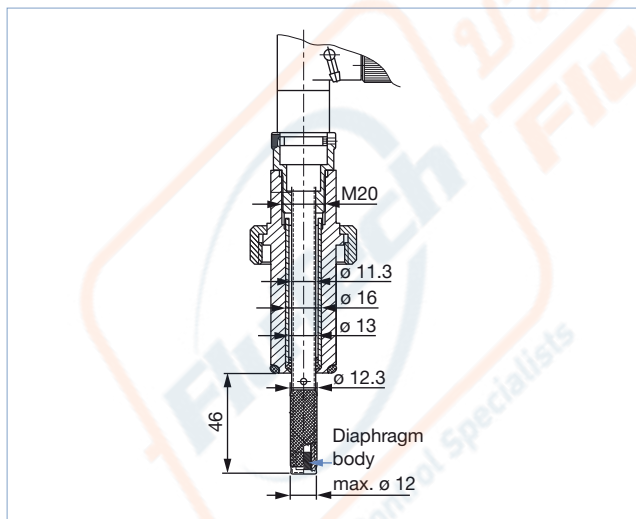
- Dimensions in mm
- Fitting Type 8201, see chapter "9.4. Ordering chart" on page 14.



Probe with adaptation set for fitting Type 8201, welding tab DN 30 version

Note:

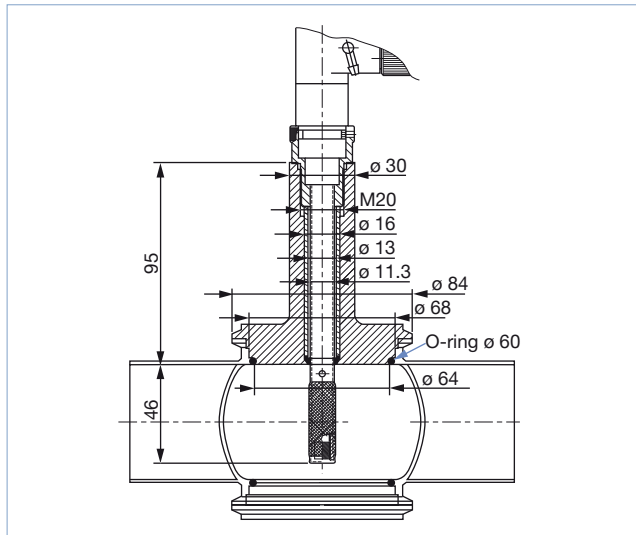
- Dimensions in mm
- Fitting Type 8201, see chapter "9.4. Ordering chart" on page 14.



Probe with adaptation set for flange connection adapted for GEA Tuchenhausen VARINLINE process connection

Note:

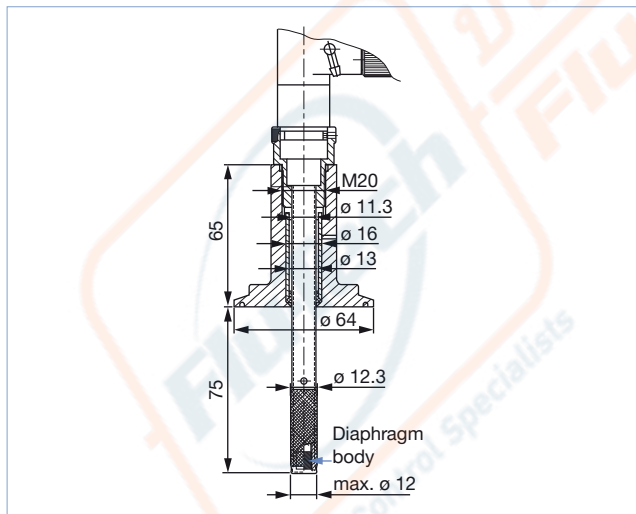
- Dimensions in mm
- Process connection DN 50...DN 125
- Housing and O-ring $\varnothing 60$ not included in delivery



Probe with adaptation set for clamp 2" external $\varnothing 64$ mm

Note:

Dimensions in mm

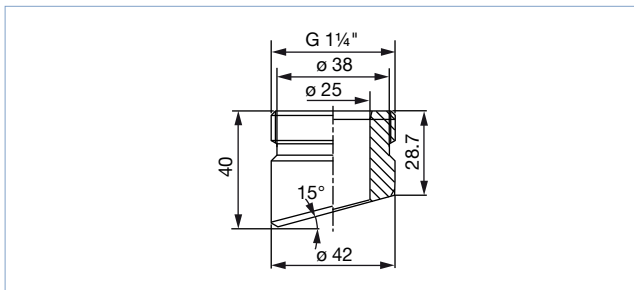


4.2. Fittings Type 8201

Welding tab DN 25, sloped

Note:

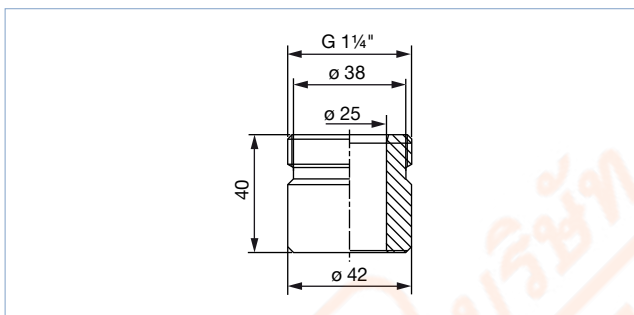
Dimensions in mm



Welding tab DN 25, straight

Note:

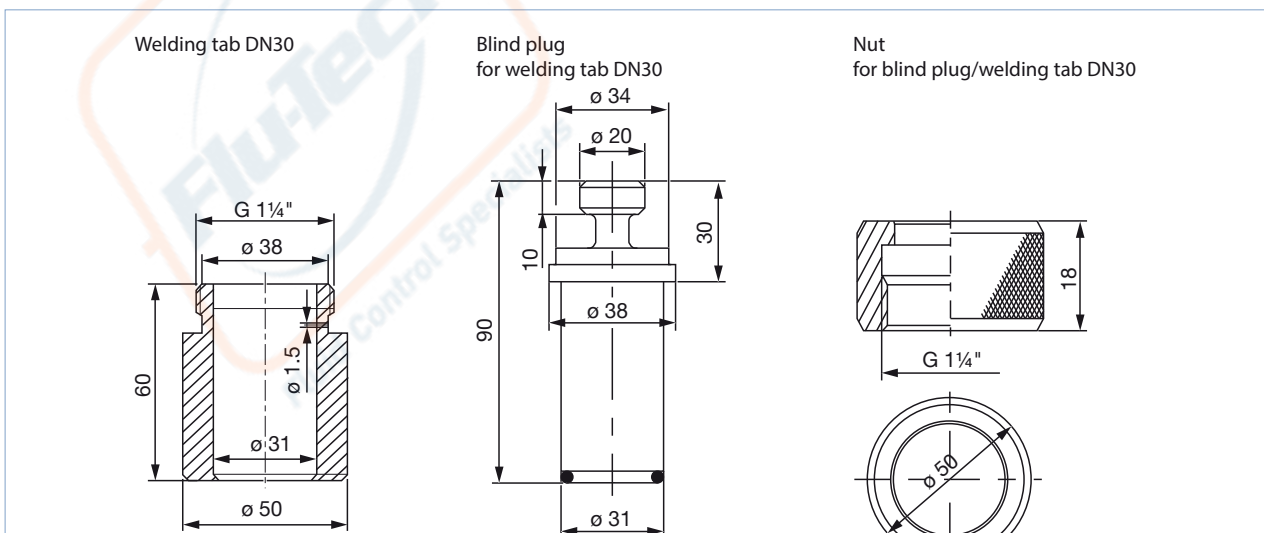
Dimensions in mm



Welding tab DN 30

Note:

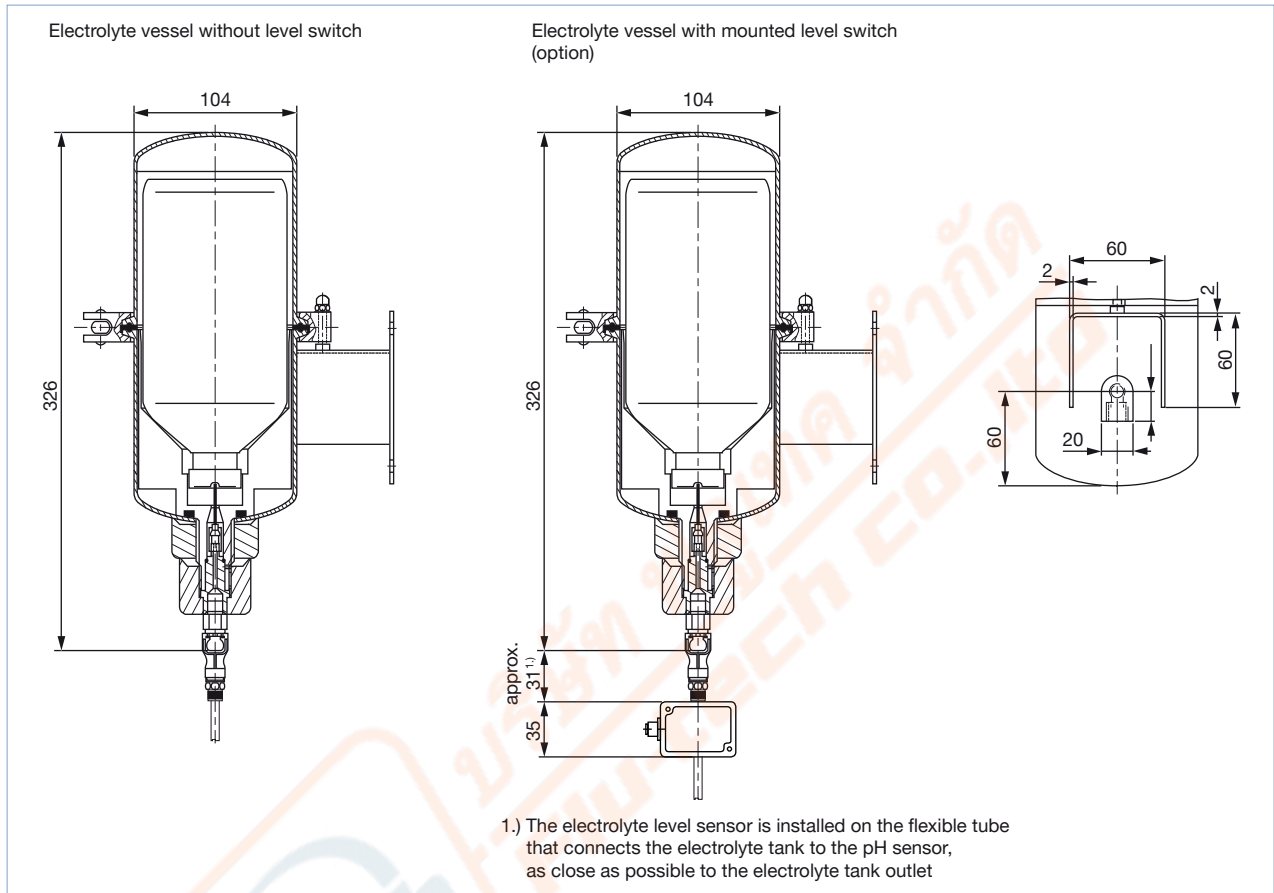
Dimensions in mm



4.3. Electrolyte vessel

Note:

- Dimensions in mm
- With built-in electrolyte supply bottle

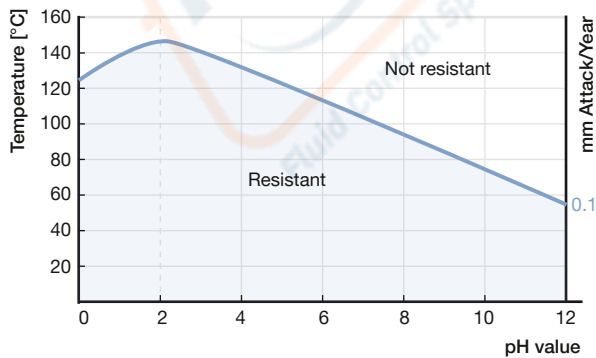


5. Performance specifications

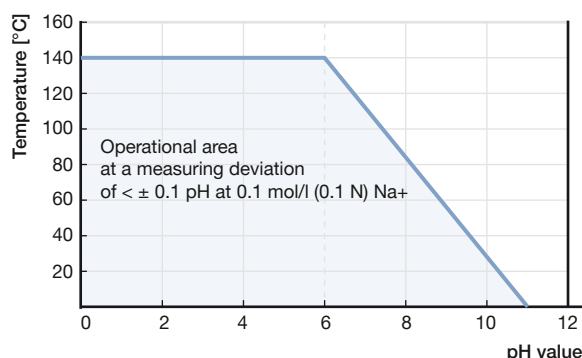
5.1. Sensor corrosion resistance diagram

Note:

A corrosive attack of under 0.1 mm/year is deemed resistant.



5.2. pH/temperature diagram



6. Product installation

6.1. Installation notes

Intended performance is limited to proper installation of the fitting (by weld), integrating the probe into the process using the appropriate adaptation kit, proper mounting of the electrolyte vessel (electrolyte attachment perpendicularly downwards) close to the measuring point and connecting the pH sensor and electrolyte vessel using the hose connection supplied. The electrolyte supply bottle is inserted into the electrolyte vessel and the pH sensor filled with electrolyte by opening the ventilation screw.

The assembly position of the pH sensor can be chosen freely. During operation care must be taken that the active surface (length approx. 45 mm from probes lower edge) is completely surrounded by medium. The flow velocity should not exceed 3...4 m/s. Dry-storage of the pH sensor is unrestricted.

The probe is connected to the transmitter by means of the attachment cable. Inductive level switch is attached to a suitable analysing device.

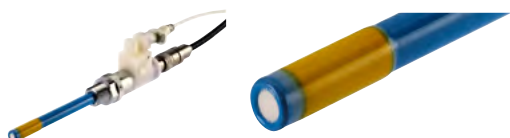
7. Product operation

7.1. Measuring principle

The pH sensor works as a single-rod measuring cell. The measuring electrode and reference electrode are combined in one element. An enamelled steel pipe is used as the basic carrier. The measuring electrode is created by additionally attaching an ion-sensitive enamel layer (yellow) with metallic voltage conductor (positioned in the non-conductive blue enamel carrier layer). An ion exchange of H^+ ions and alkali ions takes place on the surface (gel layer) of this enamel layer. The Ag/AgCl reference electrode is located in the interior of the enamel pipe filled with electrolyte. A ceramic machined diaphragm is pressed into the lower end of the pipe. Electrolytic conduction takes place through the contact of the electrolyte via the annular gap of the diaphragm to the measuring solution. A Pt1000 for temperature compensation is also integrated in the sensor. The electrolyte (conform to FDA) used is 3-molar KCl, stored in a separate electrolyte vessel and permanently connected to the probe via a hose.

The pressure of the electrolyte vessel must be maintained above the process pressure by means of a Bürkert Type TPM001 pressure controller (not supplied, see **data sheet Type TPM001** ▶ for more information) or another one available on the market. We recommend a pressure difference of at least 0.5 bar. Under these conditions, the electrolyte flow rate is about 0.01 ml/h (actual flow rate specified in the test report delivered with the device). For non-pressurised processes the static overpressure of the pressure vessel mounted approx. 0.5 m above the probe is generally sufficient (50 mbar). Due to the extremely low permanent electrolyte flow through the very small annular gap, contamination of the reference electrode is practically excluded. Accidental operation without electrolyte is prevented by optional inductive level monitoring of the pressure container. When a minimum level has been reached, the electrolyte supply bottle in the pressure container is simply changed.


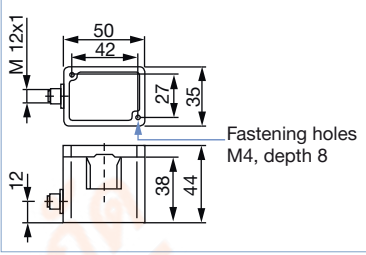
Bürkert Transmitter/Controller Type 8619 provides the analysis of the measured value. The maximum length of cable (5 m) between probe and converter (transmitter) has to be respected. pH probe Type 8201 is supplied without adaptation. The appropriate set is selected according to the fitting/armature chosen. Different hygienic variations of Type 8201 are available. Various standard armatures Type 8200 can be used as well.



8. Product accessories

8.1. Ultrasonic detection electrolyte level switch

The use of a level switch allows the monitoring of the filling level of the pressure vessel.

Accessory	Description	Dimensions
	<p>Ultrasonic level switch</p> <ul style="list-style-type: none"> Body and cover in POM, ultrasonic cell in PPMA, seal in FKM, plug housing in PUR M12x1 connector 10...35 V DC, PNP open collector <p>Detailed information can be found in the instruction manual of the electrolyte monitoring, see user manual Type 8201 ▶ and for ordering information, see chapter "9.5. Ordering chart accessories" on page 14.</p>	

8.2. Maintenance sets

Since the enamelled pH sensor does not deteriorate and is largely insensitive to dirt, the maintenance and cleaning of the sensor system is minimal.

- Maintenance sets for the pH sensor and for the electrolyte vessel are available. They contain small parts such as O-rings, seals, stainless steel cannula, flexible tubing, couplings etc.
- You may need to disinfect and rinse the measuring system. For this you will require demineralised water and a plastic bottle with septum for alcohol filling.

See chapter **"9.5. Ordering chart accessories"** on page 14 for more information.