bürkert
FLUID CONTROL SYSTEMS

pH or ORP Transmitter

- Analog 4-20 mA output
- Universal process connection
- Compatible with 120 mm pH/ ORP probes
- Temperature compensated pH measurement

Type 8202 neutrino can be combined with...

Type 8620
Cooling Tower or boiler chemistry controller

Type 8802-DF
Diaphragm valve with control unit

Type 0911
Process display

Type 8644
Valve islands

PLC

The Bürkert neutrino transmitter Type 8202 is a compact device designed for the measurement of:
- the pH in clean liquids or liquids containing solids, sulphides or proteins.
- or the oxidation-reduction potential in clean liquids or liquids containing solids, sulphides or proteins which may present low conductivity.

The transmitter consists of a replaceable standard 120 mm pH or ORP probe, screwed in a sensor holder with integrated Pt1000 temperature sensor. This ensemble is plugged-in and screwed with a nut to an enclosure with cover, containing the electronic module. Thus the Bürkert Transmitter facilitates short installation and maintenance effort.

The neutrino transmitter Type 8202 is a 2-wire device with a 4-20 mA current output.
The device Type 8202 converts the measured signal, computes the output signal, which is provided via a free positionable M12 fixed connector or on a terminal strip via a cable gland.

Technical data (Pipe + transmitter)	
Pipe diameter	DN25 to DN125 (DN<25 with reduction)
pH measurement Measuring range Accuracy	 0...14 pH ±0.05 pH
ORP measurement Measuring range Accuracy	 -2000 ...+2000 mV ± 3 mV
Temperature measurement Measuring range Accuracy	 -40 to +130°C *(-40 to 266°F)* ± 1°C *(1.8°F)*
Temperature compensation	automatic (integrated Pt1000) - reference temperature 25°C *(77°F)*
Medium temperature* With PVC nut connection With PVDF nut connection (on request)	 0 up to 50°C *(32 to 122°F)* restricted by the used probe -20 up to 130°C *(-4 to 266°F)* restricted by the used adaptor or probe restriction with adaptor S022 in: - PVC: 0 up to 50°C *(32 to 122°F)* - PP: 0 up to 80°C *(32 to 176°F)* - Metal: -20 up to 130°C *(-4 to 266°F)*
Fluid pressure max	PN16 *(232 PSI)* (see pressure / temperature chart - depends on selected probe)
4-20 mA output accuracy	±1%

* If the specific temperature limits for the probe used and the temperature limits given in the above technical data chart are different, please use the more restrictive range.

Environment	
Ambient temperature	-10 to +60°C *(14 to 140°F)* (operating and storage without probe)
Relative humidity	≤ 85%, without condensation

DTS 1000130455 EN Version: D validé) printed: 26.10.2010 Status: RL (released I freigegeben I

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Electrical data	
Power supply	12-36 V DC, filtered and regulated
Current consumption with sensor	≤ 25 mA
Reversed polarity of DC	Protected
Voltage peak	Protected
Output	
Current	4-20 mA max. loop impedance: 1100 Ω at 36 V DC; 610 Ω at 24 V DC; 100 Ω at 12 V DC;
Response time (10% - 90%)	5 s. (standard)

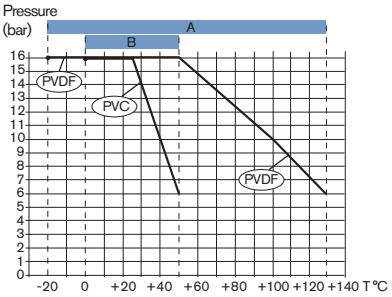
General data	
Compatibility	Any pipe from which are fitted out with Bürkert adaptor S022 (see separate data sheet)
Materials	See exploded view, opposite
Housing	Stainless steel 1.4561 (316L), PPS
Cover	PPS
Seals	EPDM
Fixed connector/cable gland	PA66
Nut	PVC (PVDF on request)
Wetted part materials	
Sensor holder	PVDF, Stainless steel 1.4571 (316Ti)
Probe	See probe specific technical data
Probe	
Bürkert pH probe	Type PLASTRODE pH 120 mm Type FLATRODE pH 120 mm Type LOGOTRODE pH 120 mm Type UNITRODE PLUS pH 120 mm Type CERATRODE pH 120 mm
Bürkert ORP probe	Type FLATRODE O.R.P 120 mm Type LOGOTRODE O.R.P 120 mm Type UNITRODE PLUS O.R.P 120 mm or any combined 120 mm pH or ORP probe, without temperature sensor, with PG13.5 head, S7/S8 connector
Temperature sensor	Pt1000 integrated within the holder
Electrical connections	1x 5-pin M12 male fixed connector, or Terminal strip via 1x cable gland M16x1.5
Recommended connection cable for terminal strip	Shielded cable (Measuring data acc. to CEI 664-1/VDE 0110 (4.97))
Solid H05(07) V-U	0.25 up to 1.5 mm²
Flexible H05(07) V-K	0.25 up to 1.5 mm²
With wire end ferrule	0.25 up to 1.5 mm²
With plastic collar ferrule	0.25 up to 0.75 mm²
Diameter	4 to 8 mm

Standards, directives and approvals	
Protection class	IP65, IP67, NEMA 4X and NEMA 6P, with M12 cable plug or cable gland tightened or obturated and cover properly mounted and secured
Standard and directives CE	
EMC	EN 61000-6-2, EN 61000-6-3
Pressure	Complying with article 3 of §3 from 97/23/CE directive.*
Vibration / Shock	EN 60068-2-6 / EN 60068-2-27

* For the 97/23/CE pressure directive, the device can only be used under following conditions (depend on max. pressure, pipe diameter, type of probe and fluid).

Type of fluid	Conditions
Fluid group 1, §1.3.a	Only DN25
Fluid group 2, §1.3.a	DN ≤ 32, or DN > 32 and PN*DN ≤ 1000
Fluid group 1, §1.3.b	DN ≤ 25, or DN > 25 and PN*DN ≤ 2000
Fluid group 2, §1.3.b	DN ≤ 125

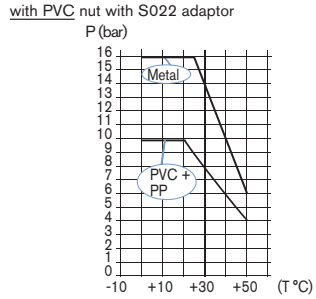
Pressure / temperature chart



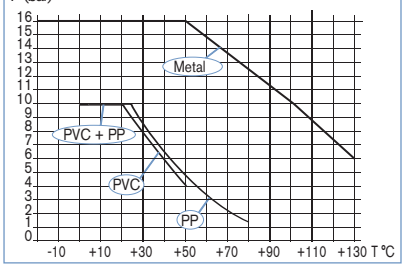
Application range of a 8202 ELEMENT neutrino transmitter:
A: with PVDF nut (on request)
B: with PVC nut
The measures have been made at an ambient temperature of 60°C, without probe.

Application range of a 8202 ELEMENT neutrino transmitter (without probe)

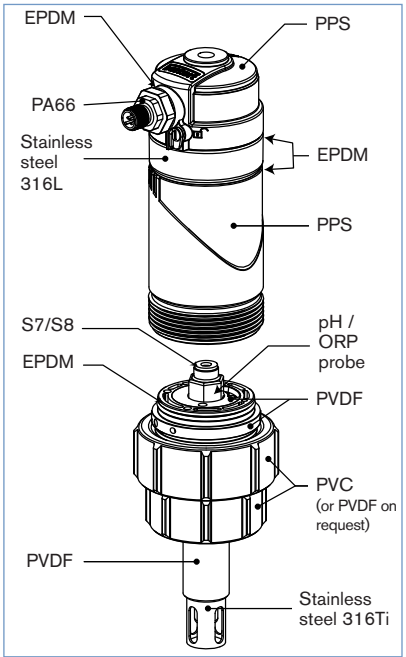
with PVC nut with S022 adaptor



with PVDF nut with S022 adaptor



Materials view



Specific technical data

Probe	PLASTRODE pH 120	FLATRODE pH 120	LOGOTRODE pH 120	UNITRODE PLUS pH 120	CERATRODE pH 120
Fluids	- cost effective probe for drinking water, aquarium, swimming-pool...	- Contaminated (viscous, suspended solids, small volumes, paints, cosmetics, foodstuffs)	- Clean (drinking water, cooling-water, aquarium, swimming-pool...)	- Contaminated (effluent rinse water, cooling water, electro-plating, paints, cosmetics...) - containing sulfides/ proteins (tannery, animal breeding, effluent, foodstuffs, cosmetics, biotechnology)	- High pressure, high flow rate applications
Measuring range	0 ... 14 pH	0 ... 14 pH (sodium ion error > 12.3 pH)	0 ... 14 pH	0 ... 14 pH	0 ... 14 pH
Fluid pressure	0 - 6 bar *(0 - 87 PSI)*	0 - 6 bar *(0 - 87 PSI)*	0 - 6 bar *(0 - 87 PSI)*	0 - 6 bar *(0 - 87 PSI)*	0 - 16 bar *(0 - 232 PSI)*
Fluid temperature	-10 to +40°C *(14 to 140°F)*	0 to +80°C *(32 to 176°F)*	-10 to +60°C *(14 to 140°F)*	0 to +130°C *(32 to 266°F)*	0 to +130°C *(32 to 266°F)*
Ambient temperature Operation Storage	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*
Minimal conductivity	50 µS/cm	50 µS/cm	2 µS/cm	2 µS/cm	50 µS/cm
Max. pressure at max. temperature	6 bar *(87 PSI)*	4 bar *(58 PSI)*	6 bar *(87 PSI)*	6 bar *(87 PSI)*	6 bar *(87 PSI)*
No. of diaphragms	1	1	1	2	3
Diaphragm	"single pore™"	Double Junction	"single pore™"	"single pore™"	HP ceramics
Reference electrolyte	polymer	Acrylamide gel KNO_3/3.5M KCl-AgCl	polymer	polymer	gel

Probe	FLATRODE ORP 120	LOGOTRODE ORP 120	UNITRODE PLUS ORP 120
Fluids	- Contaminated (viscous, suspended solids, small volumes, paints, cosmetics, foodstuffs)	- Clean (cooling-water, waste water or slightly contaminated) - with low conductivity (pure and rainwater...>2µS/cm)	- Clean (drinking water, aquarium, swimming-pool...) - Contaminated (effluent rinse water, cooling water, electro-plating, paints...) - with low conductivity (pure and rainwater...>2µS/cm) - containing sulfides/proteins (tannery, animal breeding, effluent, foodstuffs, cosmetics, biotechnology...)
Measuring range	-2000 ... +2000 mV	-2000 ... +2000 mV	-2000 ... +2000 mV
Fluid pressure	0 - 6 bar *(0 - 87 PSI)*	0 - 6 bar *(0 - 87 PSI)*	0 - 6 bar *(0 - 87 PSI)*
Fluid temperature	0 to +80°C *(32 to 176°F)*	-10 to +50°C *(14 to 122°F)*	0 to +130°C *(32 to 266°F)*
Ambient temperature Operation Storage	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*	 0 to +60°C *(32 to 140°F)* 4 to +30°C *(39.2 to 86°F)*
Minimal conductivity	50 µS/cm	2 µS/cm	2 µS/cm
Max. pressure at max. temperature	4 bar *(58 PSI)*	6 bar *(87 PSI)*	6 bar *(87 PSI)*
No. of diaphragms	1	1	2
Diaphragm	Double Junction	"single pore™"	"single pore™"
Reference electrolyte	Acrylamide gel KNO_3/3.5M KCl-AgCl	polymer	polymer

DTS 1000130455 EN Version: D validé) printed: 26.10.2010 Status: RL (released I freigegeben I

Principle of operation

The 8202 neutrino device can be used as a pH or a ORP transmitter according to the probe version mounted into the holder. The pH or redox probe is a glass membrane with variable selectivity according to the pH or the redox, which must be calibrated with buffer solution before the installation of the transmitter into the pipe.

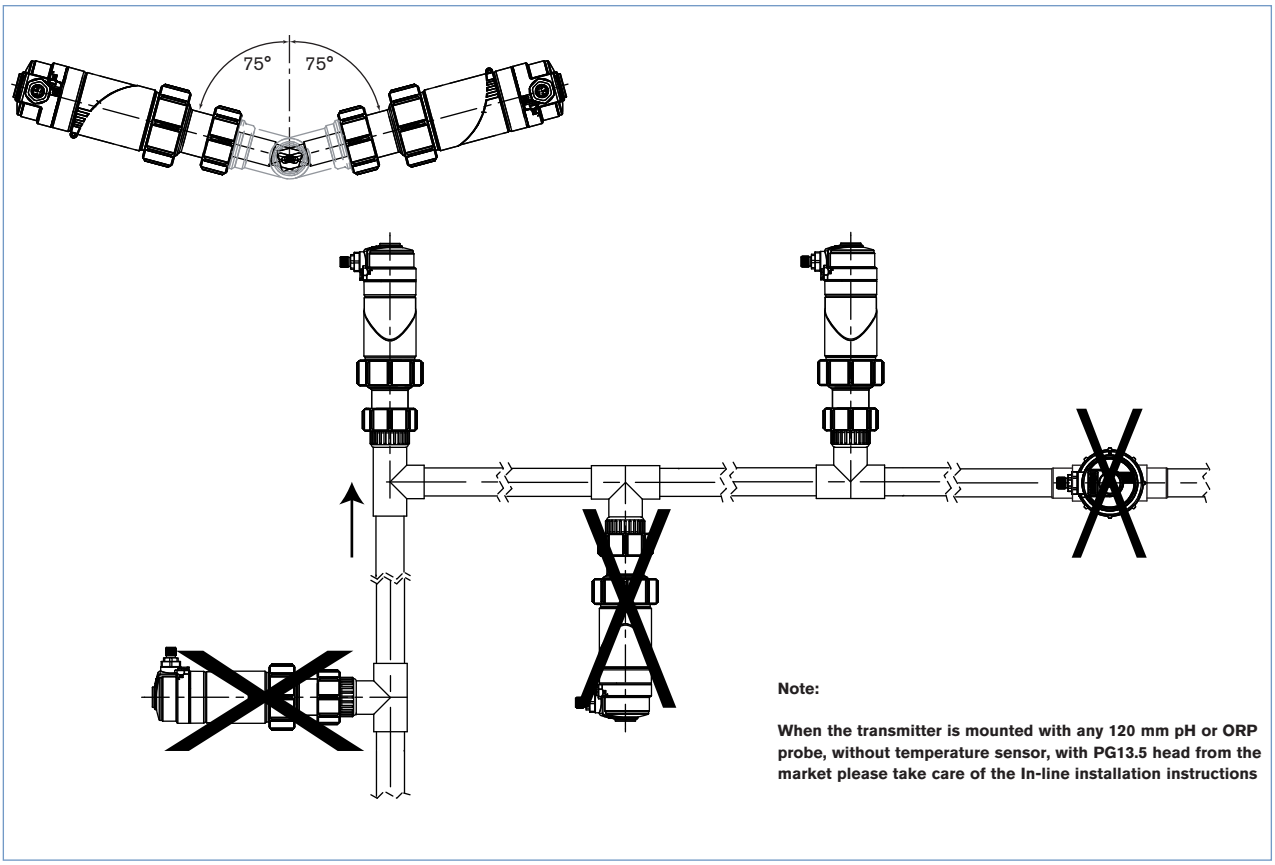
- When a pH probe is immersed into the solution a difference in potential is formed due to ions (H+) between the glass membrane and the solution. This difference in potential measured in relation to a reference electrode is directly proportional to the pH value (59.16 mV per pH unit at 25°C). The pH sensor can be calibrated in 1-point (Offset at pH 7) or in 2-points (Offset at pH 7 and Span at pH 4 or pH 10).

- When a redox probe is immersed into the solution an electron exchange occurs between the oxidised and the reduced state of an electrolyte. The generated cell voltage is the oxidation-reduction potential that is directly proportional to the redox value. The ORP sensor can only be calibrated in 1-point (Offset).

The transmitter is a two-wire device, which requires a power supply of 12 V DC up to 36 V DC and delivers a 4... 20 mA standard signal proportional to the pH or to the redox potential as output signal.

Installation

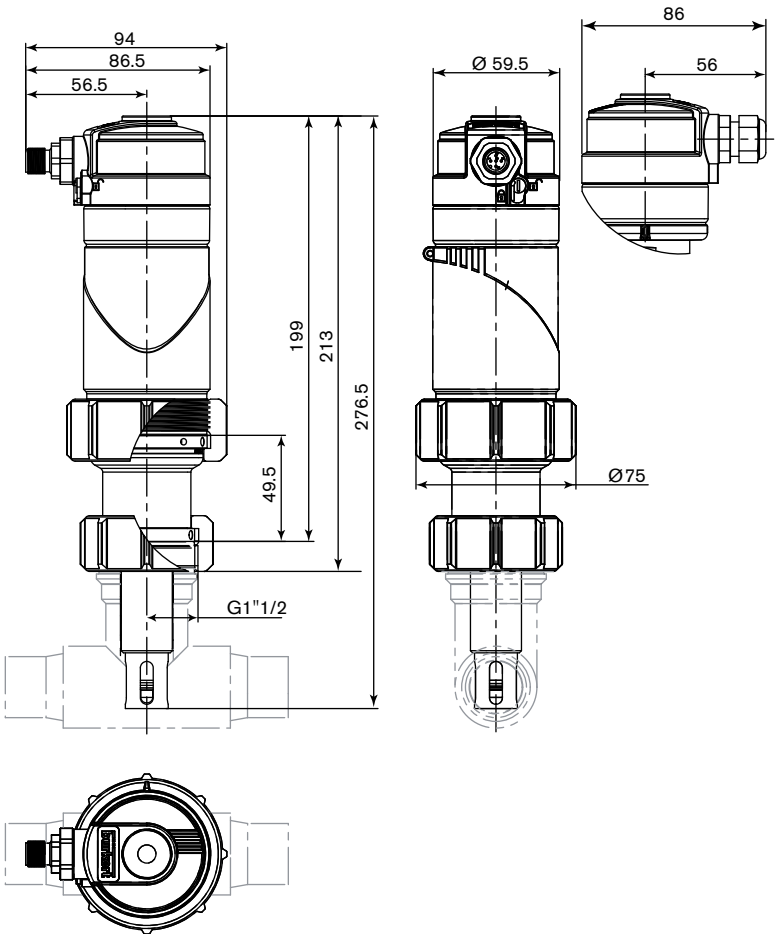
The 8202 pH/ORP ELEMENT neutrino transmitter can be installed into any adaptor with G1½" external threaded sensor connection by just fixing the main nut. Select the required adaptor according to specific requirements of the sensor and material (temperature and pressure), and install it in a vertical position or with an angle of ±75° max. against the vertical onto an horizontal pipe. For mounting on a tank or direct mounting on a pipe (DN100 or DN110), an adaptor with a G1½" external threaded sensor connection must be used.
After having connected the pH or redox sensor to the Type 8202 neutrino transmitter and having calibrated the unit, cautiously install the complete unit on the fitting. In order to get reliable measurement air bubbles must be avoided.
Please ensure that the mounting location provides a continuous and complete immersion of the probe in the flow stream.



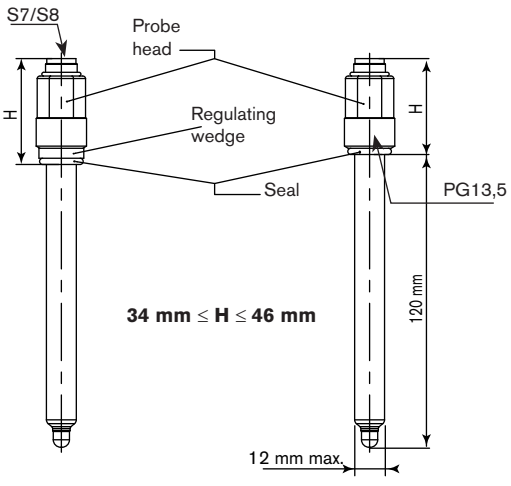
The probe must continuously be immersed into the measuring fluid in order to protect it from drying out.
The transmitter must be protected from constant heat radiation and other environmental influences, such as direct exposure to sunlight.

DTS 1000130455 EN Version: D validé) printed: 26.10.2010 Status: RL (released I freigegeben I

Dimensions [mm] of transmitter Type 8202



Probe



Ordering information for compact transmitter Type 8202

A complete pH or ORP ELEMENT neutrino transmitter Type 8202 consists of a compact pH or ORP ELEMENT neutrino transmitter Type 8202, a pH or ORP probe and a Bürkert INSERTION adaptor Type S022 **(with G 1" 1/2 external threaded sensor connection)**

The following information is necessary for the selection of a complete device:
- **Item no.** of the desired pH or ORP ELEMENT neutrino transmitter **Type 8202** (see Ordering chart, below)
- **Item no.** of the desired pH or ORP probe (see Ordering chart on p. 7)
- **Item no.** of the selected INSERTION adaptor **Type S022** **with G1½" external threaded sensor connection** (see separate data sheet)

You have to order three components.

When you click on the orange box "More info." below, you will come to our website for the resp. product where you can download the data sheet.

Example

Compact transmitter Type 8202

pH or ORP probes

INSERTION adaptor Type S022

Complete compact transmitter Type 8202

Fitting (example only)

Ordering chart for ELEMENT neutrino transmitter Type 8202

Specifications	Voltage supply	Output	Sensor version	Nut material	Electrical connection	Item no.
Compact transmitter: sensor holder with integrated Pt1000 + electronic module with cover	12-36 V DC	1x 4-20 mA	None	PVC	5-pin M12 male fixed connector	561 685
					Cable gland	561 686

Note: Order separately
- M12 female cable plug

Further versions on request

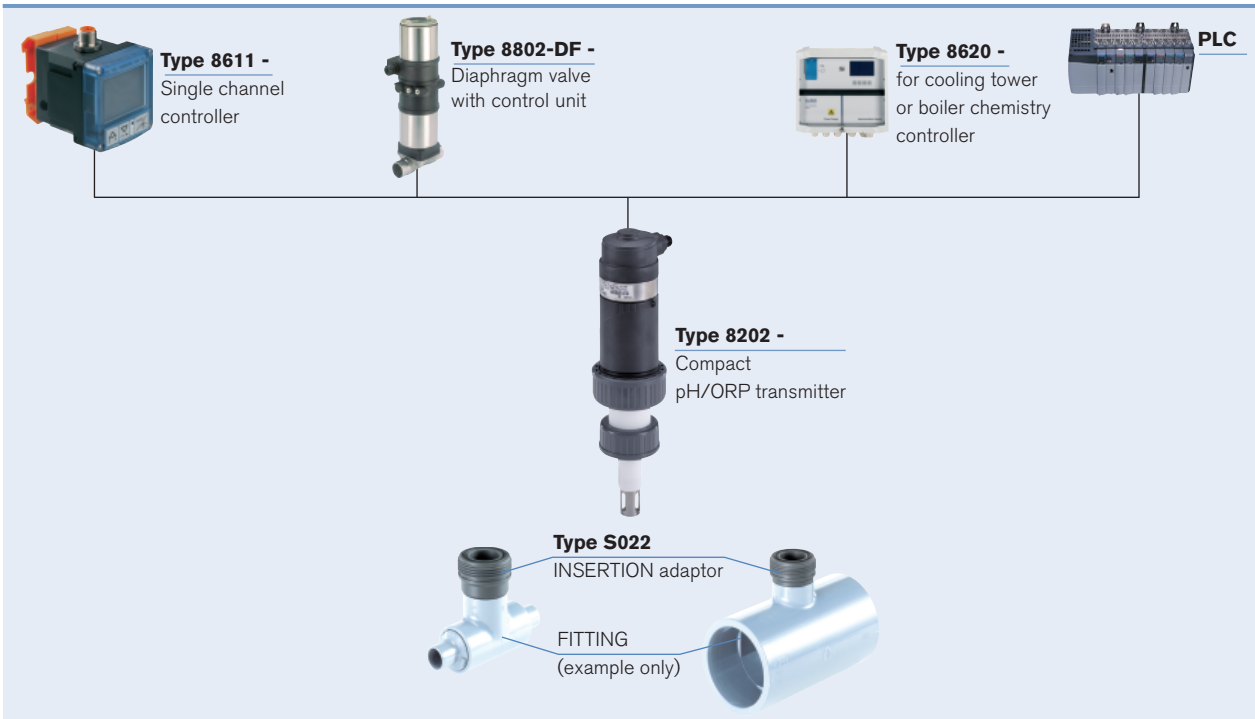
Materials
PVDF nuts

DTS 1000130455 EN Version: D validé) printed: 26.10.2010 Status: RL (released I freigegeben I

Ordering chart for accessories

	Description	Item no.
	One ø 46x2 mm EPDM seal for 120 mm probe holder (with instruction sheet)	559 169
	EPDM seal for cover/housing sealing	561 752
	Probe holder with PVC nut	560 947
	pH probe -10... 40°C, 0... 6 bar, pH 0... 14 - PLASTRODE pH 120 mm	560 377
	pH probe 0... 80°C, 0... 6 bar, pH 0... 14 - FLATRODE pH 120 mm	561 025
	pH probe -10... 60°C, 0... 6 bar, pH 2... 14 - LOGOTRODE pH 120 mm	427 114
	pH probe 0... 130°C, 0... 6 bar, pH 0... 14 - UNITRODE PLUS pH 120 mm	560 376
	pH probe 0... 130°C, 0... 16 bar, pH 0... 14 - CERATRODE pH 120 mm	418 319
	ORP probe 0... 80°C, 0... 6 bar, -2000 ... +2000 mV - FLATRODE ORP 120 mm	561 027
	ORP probe -10... 50°C, 0... 6 bar, -2000 ... +2000 mV - LOGOTRODE ORP 120 mm	560 379
	ORP probe 0... 130°C, 0... 6 bar, -2000 ... +2000 mV - UNITRODE PLUS ORP 120 mm	560 378
	Storage solution for probes (KCl 3M), 500 ml	418 557
	Cleaning solution set for probes, 3x 500 ml	560 949
	Buffer solution, 500 ml, pH = 4	418 540
	Buffer solution, 500 ml, pH = 7	418 541
	Buffer solution, 500 ml, pH = 10	418 543
	Buffer solution, 500 ml, ORP = 475 mV	418 555
	5 pin M12 female straight cable plug with plastic threaded locking ring, to be wired	917 116
	5 pin M12 female straight cable plug moulded on cable (2 m, shielded)	438 680

Interconnection possibilities with other Bürkert devices



To find your nearest Bürkert facility, click on the orange box → **www.burkert.com**

In case of special application conditions, please consult for advice.

Subject to alteration.
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