

pH or O.R.P. Transmitter



- Programmable outputs: two transistor and single or dual analog 4-20 mA (Process + Temp)
- Removable backlit display
- Universal fluidic process connection
- Compatible with a 120 mm pH/ O.R.P. probe
- Diagnostic function

Type 8202 can be combined with...



Type 6642
Solenoid valve



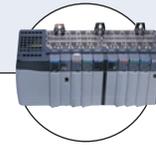
Type 8620
Cooling Tower or boiler chemistry controller



Type 2030
On/Off Diaphragm valve



Type 8644
Valve islands



PLC

The Bürkert transmitter Type 8202 is a compact, but modular device, specially designed for measuring the pH or O.R.P. value of fluids.

Our transmitter consists of a replaceable standard 120 mm pH or O.R.P. probe, screwed in a sensor holder with integrated Pt1000 temperature sensor. This ensemble is plugged-in and screwed with a nut to an IP67 enclosure containing the electronic module with cover and a removable display. Bürkert expedites thus maintenance work.

The pH/ORP transmitter can operate independent of the display, but it will be required for programming the transmitter (i.e. selection of pH or O.R.P. sensor type, measuring range, engineering units...) and also for visualizing continuously the measured and processed data.

The device Type 8202 is available :

- with three fully programmable outputs : two transistor and one 2-wire 4-20 mA current outputs
- with four fully programmable outputs: two transistor and two 3-wire 4-20 mA current outputs

The device Type 8202 converts the measured signal, displays different values in different units (if display mounted) and computes the output signals, which are provided via one or two M12 fixed connectors.

Technical data (Pipe + transmitter)

Pipe diameter	1/2" to 4" (DN 15 to 100)
pH measurement	
Measuring range	-2...16 pH or -580... +580 mV
Resolution	0.01 pH or 0.1 mV
Accuracy	±0.02 pH or 0.5 mV
Minimal pH scale	0.5 pH or 30 mV (i.e 6.7 to 7.2 pH or -20 to +10 mV corresponding to 4-20 mA)
O.R.P. measurement	
Measuring range	-2000 ...+2000 mV
Resolution	1 mV
Accuracy	±3 mV
Minimal O.R.P. scale	50 mV (i.e 1550 to 1600 mV corresponding to 4-20 mA)
Temperature measurement	
Measuring range	-40°F to 266°F (-40°C to +130°C)
Resolution	0.18°F (0.1°C)
Accuracy	± 1.8°F (1°C)
Temperature compensation	automatic (integrated Pt1000) - reference temperature 77°F (25°C)
Minimal temperature scale	18°F (10°C) (i.e 50°F to 68°F (10°C to 20°C) corresponding to 4-20 mA)
Medium temperature max. *	Fitting or nut in PVC: 122°F (50°C), - PP: 176°F (80°C) - PVDF: 212°F (100°C)
Fluid pressure max	232.16 PSI (PN16) (see pressure / temperature chart - depends on selected probe)

* If the specific max. medium temperature for the used probe is lower than the max. temperature given in the above technical data chart, please take the lowest temperature as max.

Environment

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

8202 ELEMENT Transmitter

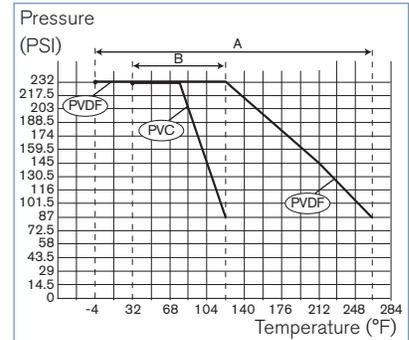


Electrical data	
Power supply	
3 outputs transmitter (2-wire)	14-36 V DC, filtered and regulated
4 outputs transmitter (3-wire)	12-36 V DC, filtered and regulated
Current consumption with sensor	≤ 1 A (with transistor loads)
3 outputs transmitter (2-wire)	≤ 25 mA (at 14 V DC without transistor loads, with current loop)
4 outputs transmitter (3-wire)	≤ 5 mA (at 12 V DC without transistor loads, without current loop)
Reversed polarity of DC	Protected
Voltage peak	Protected
Short circuit	Protected for transistor outputs
Output	
Transistor	configurable as sourcing or sinking (respectively both as PNP or NPN), open collector max. 700 mA, 0.5 A max. per transistor if the 2 transistor outputs are wired output NPN: 0.2 - 36 VDC output PNP: V+ power supply
Current	4-20 mA programmable as sourcing or sinking,
3 outputs transmitter (2-wire)	max. loop impedance: 1100 Ω at 36 V DC; 610 Ω at 24 V DC; 180 Ω at 14 V DC
4 outputs transmitter (3-wire)	configurable in the same mode as transistor: sourcing or sinking, 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%)	150 ms (standard)

General data	
Compatibility	Any pipe from DN 10 to 110 in PVC or PVDF which are fitted out with Bürkert Fitting S022 (see corresponding data sheet)
Materials	See exploded view, opposite
Housing / cover / gaskets	Stainless steel 1.4561, PPS / PC / EPDM
Screws / Display / navigation key	Stainless steel / PC / PBT
Fixed connector mounting plate	Stainless steel 1.4404 (316L)
Fixed connector / Nut	Brass nickel plated / PVC or PVDF
Wetted part materials	
Sensor holder	PVDF, Stainless steel 1.4571 (316Ti)
Electrode	See Electrode specific technical data
Probe	
Bürkert pH probe	Type UNITRODE PLUS pH 120 mm Type LOGOTRODE pH 120 mm Type CERATRODE pH 120 mm Type PLASTRODE pH 120 mm Type FLATRODE pH 120 mm
Bürkert O.R.P. probe	Type UNITRODE PLUS O.R.P 120 mm Type LOGOTRODE O.R.P 120 mm Type FLATRODE O.R.P 120 mm or any 120 mm pH or O.R.P. probe, without temperature sensor, with PG13.5 head
Temperature sensor	Pt1000 integrated within the holder
Display (accessories)	Grey dot matrix 128 x 64 with backlighting
Electrical connections	
3 outputs transmitter (2-wire)	1 x 5-pin M12 male fixed connector,
4 outputs transmitter (3-wire)	1 x 5-pin M12 male and 1 x 5-pin M12 female fixed connectors
Connection cable	Shielded cable

Standards, directives and approvals	
Protection class	IP67 with M12 cable plug mounted and tightened and cover fully screwed down
Standard and directives	
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
Approvals	
UL recognized for US and Canada	61010-1 + CAN/CSA-C22 No.61010-1

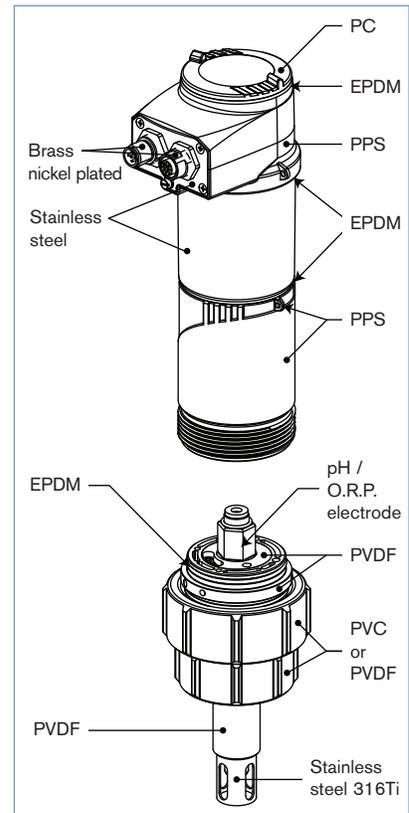
Pressure / temperature chart



A: application range of a 8202 with a PVDF nut
B: application range of a 8202 with a PVC nut

The measures have been made at an ambient temperature of 140°F (60°C), without probe.

Exploded view



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

Type of fluid	Conditions
Fluid group 1, §1.3.a	DN ≤ 25 only
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

Specific technical data

Electrode	LOGOTRODE pH 120	UNITRODE PLUS pH 120	CERATRODE pH 120	PLASTRODE pH 120	FLATRODE pH 120
Fluids	- 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	- Economical probe for drinking water, aquarium, swimming-pool...	- Contaminated (viscous, suspended solids, small volumes, paints, cosmetics, foodstuffs)
Measuring range	0 ... 14 pH	0 ... 14 pH	0 ... 14 pH	0 ... 14 pH	0 ... 14 pH (sodium ion error > 12.3 pH)
Fluid pressure	0 - 87.06 PSI (0 - 6 bar)	0 - 87.06 PSI (0 - 6 bar)	0 - 232.16 PSI (0 - 16 bar)	0 - 87.06 PSI (0 - 6 bar)	0 - 87.06 PSI (0 - 6 bar)
Fluid temperature	14°F to 140°F (-10°C to +60°C)	32°F to 266°F (0°C to +130°C)	32°F to 266°F (0°C to +130°C)	14°F to 140°F (-10°C to +60°C)	32°F to 176°F (0°C to +80°C)
Ambient temperature					
Operation	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)
Storage	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)
Minimal conductivity	2 µS/cm	2 µS/cm	50 µS/cm	50 µS/cm	50 µS/cm
Max. pressure at max. temperature	87.06 PSI (6 bar)	87.06 PSI (6 bar)	87.06 PSI (6 bar)	87.06 PSI (6 bar)	58.04 PSI (4 bar)
No. of diaphragms	1	2	3	1	1
Diaphragm	"single pore™"	"single pore™"	HP ceramics	"single pore™"	Double Junction
Reference electrolyte	polymer	polymer	gel	polymer	Acrylamide gel KNO ₃ /3.5M KCL-AgCl

Electrode	LOGOTRODE O.R.P. 120	UNITRODE PLUS O.R.P. 120	FLATRODE O.R.P. 120
Fluids	- Clean (cooling-water, waste water or slightly contaminated)	- 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...)	- Contaminated (viscous, suspended solids, small volumes, paints, cosmetics, foodstuffs)
Measuring range	-2000 ... +2000 mV	-2000 ... +2000 mV	-2000 ... +2000 mV
Fluid pressure	0 - 87.06 PSI (0 - 6 bar)	0 - 87.06 PSI (0 - 6 bar)	0 - 87.06 PSI (0 - 6 bar)
Fluid temperature	14°F to 122°F (-10°C to +50°C)	32°F to 266°F (0°C to +130°C)	32°F to 176°F (0°C to +80°C)
Ambient temperature			
Operation	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)	32°F to 140°F (0°C to +60°C)
Storage	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)	39.2°F to 86°F (4°C to +30°C)
Minimal conductivity	2 µS/cm	2 µS/cm	50 µS/cm
Max. pressure at max. temperature	87.06 PSI (6 bar)	87.06 PSI (6 bar)	58.04 PSI (4 bar)
No. of diaphragms	1	2	1
Diaphragm	"single pore™"	"single pore™"	Double Junction
Reference electrolyte	polymer	polymer	Acrylamide gel KNO ₃ /3.5M KCL-AgCl

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Principle of operation

The most important part of the transmitter is the pH/O.R.P. electrode with its pH/redox potential selective glass membrane.

When the pH electrode is immersed into the solution an electrical charge caused by ions (H⁺) generates a cell voltage between the glass membrane and the solution. This electrical voltage is measured with reference to a touchstone electrode, located around the pH glass electrode. The generated cell voltage of the combination electrode is directly proportional to the pH value.

When the redox electrode is immersed into the solution, an electron exchange occurs between the oxidized and the reduced state of electrolyte. The generated cell voltage is the redox potential, that is directly proportional to the redox value.

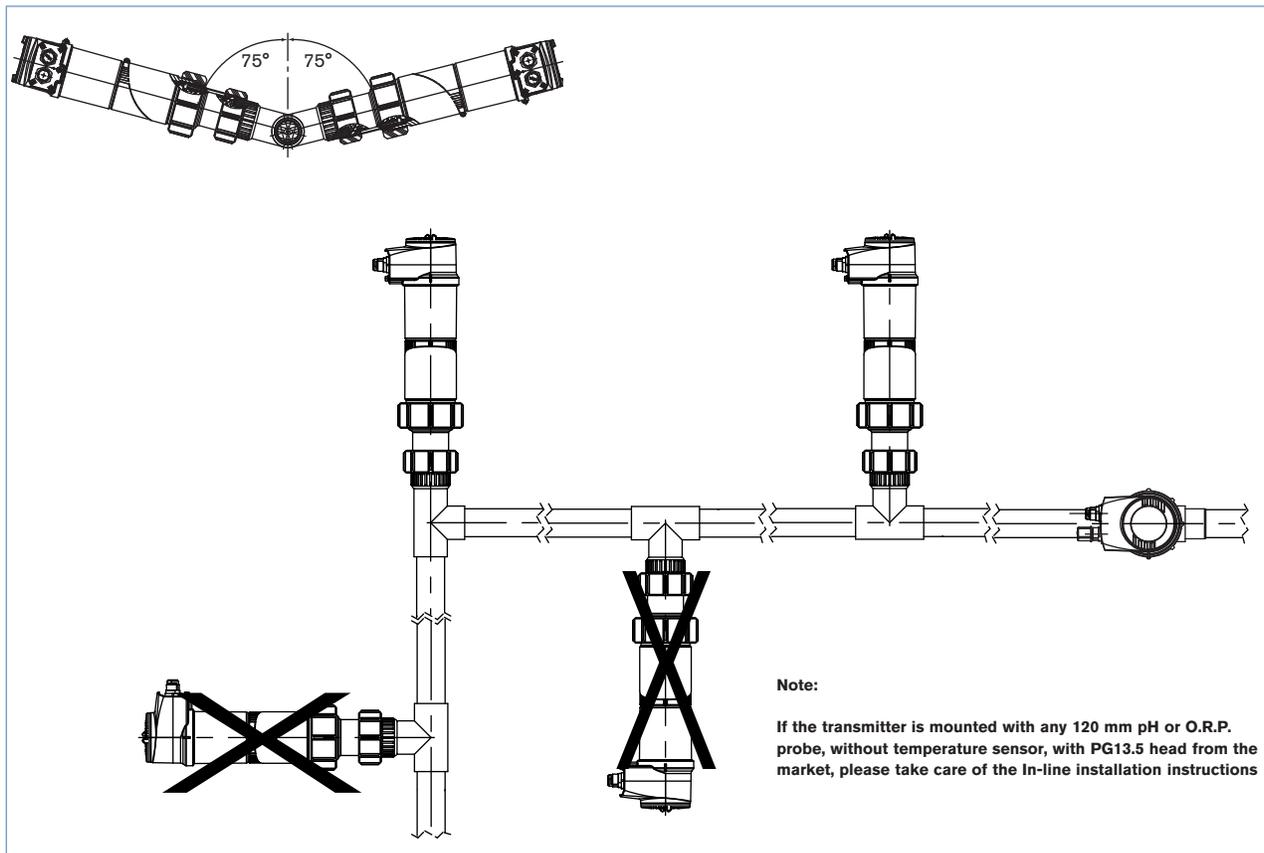
The transmitter functions in a two wire circuit (single transmitter version) or three wire circuit (dual transmitter version) and requires a power supply of 14 V DC (single transmitter version) or 12 V DC (dual transmitter version) up to 36 V DC.

A 4... 20 mA standard signal proportional to the pH, the redox potential or to the temperature (°C) is available as output signal.

In-line installation

The 8202 pH/O.R.P. transmitter can be installed into any fitting system with G 1" 1/2 external threaded sensor connection by just fixing the main nut. Select the required fitting, according to specific requirements of the sensor and fitting material (temperature and pressure), and install it in a vertical position with an angle of $\pm 75^\circ$ max. against the vertical onto an horizontal pipe. For a mounting on a tank or a direct mounting on a pipe (DN100 and 110), an adaptor with a G 1" 1/2 external threaded sensor connection must be used through the tank or pipe wall.

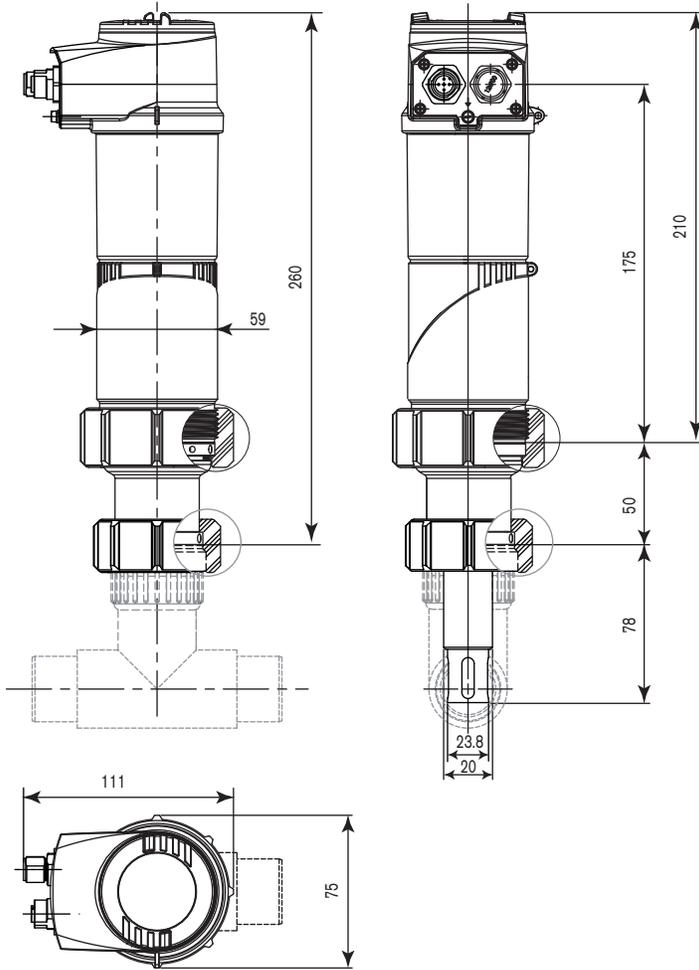
After having connected the pH or redox sensor to the Type 8202 transmitter and having calibrated the unit, cautiously install the complete unit on the fitting. In order to get reliable measurement, air bubbles must be avoid and the mounting location must ensure that the electrode is continuously and completely immersed in the flow stream.



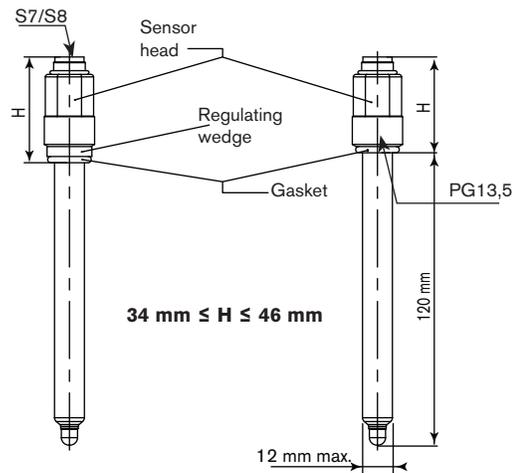
The electrode must continuously be immersed into the measuring fluid in order to protect it from drying out.

The transmitter must be protected from constant heat radiation and other environmental influences, such as direct exposure to sunlight.

Dimensions [mm] of transmitter Type 8202



Sensor probe



Ordering chart for compact transmitter Type 8202

A complete compact pH/O.R.P. transmitter Type 8202 consists of

- a compact pH/O.R.P. transmitter Type 8202
- a pH/O.R.P. electrode (see accessories)
- a removable display/programmer (see accessories)
- a fitting with G 1" 1/2 external threaded sensor connection (see data sheet Type S022)

pH/O.R.P. 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, without display	14-36 V DC	2 x transistors + 1 x 4-20 mA	None	PVC	5-pin M12 male fixed connector	559 630
				PVDF	5-pin M12 male fixed connector	559 632
	12-36 V DC	2 x transistors + 2 x 4-20 mA	None	PVC	5-pin M12 male and 5-pin M12 female fixed connectors	559 631
				PVDF	5-pin M12 male and 5-pin M12 female fixed connectors	559 633

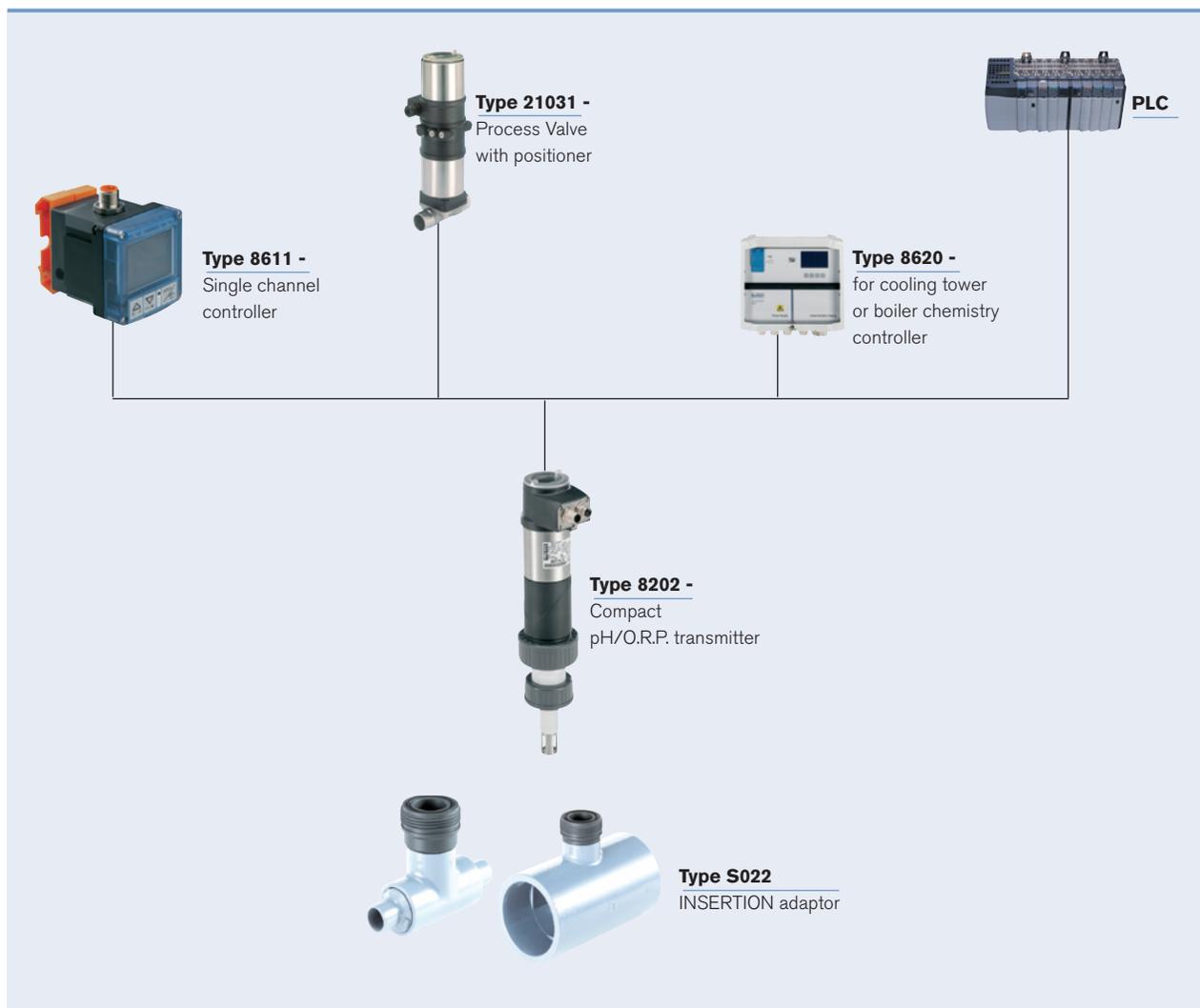
Note: Order separately (see accessories)

- pH or O.R.P. electrode
- display/programmer module
- M12 cable plugs (only female for single 4-20 mA, 1 male + 1 female for dual 4-20 mA transmitter)

Ordering chart for accessories

Description	Item no.
Removable display/programmer module (with instruction sheet)	559 168
Black blank cover with seal	560 948
One ø 46 x 2 mm EPDM gasket for 120 mm electrode holder (with instruction sheet)	559 169
Electrode holder with PVC nut	560 947
Electrode holder with PVDF nut	561 476
pH electrode -10... 60°C, 0... 6 bar, pH 2... 14 - LOGOTRODE pH 120 mm	427 114
pH electrode 0... 130°C, 0... 16 bar, pH 0... 14 - CERATRODE pH 120 mm	418 319
pH electrode 0... 130°C, 0... 6 bar, pH 0... 14 - UNITRODE PLUS pH 120 mm	560 376
pH electrode -10... 40°C, 0... 6 bar, pH 0... 14 - PLASTRODE pH 120 mm	560 377
pH electrode 0... 80°C, 0... 6 bar, pH 0... 14 - FLATRODE pH 120 mm	561 025
O.R.P. electrode 0... 130°C, 0... 6 bar, -2000 ... +2000 mV - UNITRODE PLUS O.R.P. 120 mm	560 378
O.R.P. electrode -10... 50°C, 0... 6 bar, -2000 ... +2000 mV - LOGOTRODE O.R.P. 120 mm	560 379
O.R.P. electrode 0... 80°C, 0... 6 bar, -2000 ... +2000 mV - FLATRODE O.R.P. 120 mm	561 027
Storage solution for electrodes (KCl 3M), 500 ml	418 557
Cleaning solution set for electrodes, 3 x 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, O.R.P. = 475 mV	418 555
 5 pin M12 female straight cable plug with plastic threaded locking ring, to be wired	98123241
 5 pin M12 male straight cable plug with plastic threaded locking ring, to be wired	98123242
 5 pin M12 female straight cable plug moulded on cable (2 m, shielded)	98123596
 5 pin M12 male straight cable plug moulded on cable (2 m, shielded)	98123931

Interconnection possibilities with other Bürkert devices



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