

pH or ORP Transmitter



Type 8202 can be combined with...



Type 6642
Solenoid valve



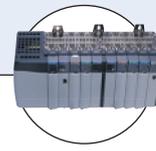
Type 8620
Cooling Tower or boiler
chemistry controller



Type 2030
On/Off Diaphragm
valve



Type 8644
Valve islands



PLC

- Programmable outputs: two transistor and single or dual analog 4-20 mA (Process + Temp)
- Removable backlighted display
- Universal process connection
- Compatible with 120 mm pH/ ORP probes
- Diagnostic function

The Bürkert 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 probe 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 and a removable display. Thus the Bürkert Transmitter facilitates short installation and maintenance effort.

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 ORP sensor type, measuring range, engineering units, calibration...) 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 physical 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	DN25 to DN125 (DN<25 with reduction)
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)
ORP measurement	
Measuring range	-2000 ...+2000 mV
Resolution	1 mV
Accuracy	± 3 mV
Minimal ORP scale	50 mV (i.e 1550 to 1600 mV corresponding to 4-20 mA)
Temperature measurement	
Measuring range	-40 to +130°C (-40 to 266°F)
Resolution	0.1°C (0.18°F)
Accuracy	± 1°C (1.8°F)
Temperature compensation	automatic (integrated Pt1000) - reference temperature 25°C (77°F)
Minimal temperature scale	10 °C (18°F) (i.e 10 to 20 °C (50 to 68°F) corresponding to 4-20 mA)
Medium temperature*	
With PVC nut connection	0 up to 50°C (32 to 122°F) restricted by the used probe
With PVDF nut connection	-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)

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

Environment

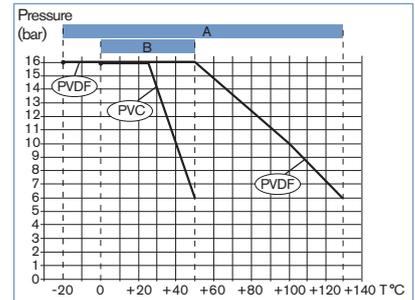
Ambient temperature	-10 to +60°C (14 to 140°F) (operating and storage without probe)
Relative humidity	≤ 85%, without condensation

8202 ELEMENT

bürkert

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	3 outputs transmitter (2-wire) ≤ 1 A (with transistor loads) 4 outputs transmitter (3-wire) ≤ 25 mA (at 14 VDC without transistor loads, with current loop) ≤ 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	3 outputs transmitter (2-wire) 4-20 mA programmable as sourcing or sinking, 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 which are fitted out with Bürkert adaptor S022 (see separate data sheet)
Materials	See exploded view, opposite Housing / cover / seals 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 Probe 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 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 Bürkert ORP probe
Temperature sensor	Pt1000 integrated within the holder
Display (accessories)	Grey dot matrix 128x64 with backlighting
Electrical connections	3 outputs transmitter (2-wire) 1x 5-pin M12 male fixed connector, 4 outputs transmitter (3-wire) 1x 5-pin M12 male and 1x 5-pin M12 female fixed connectors
Connection cable	Shielded cable
Standards, directives and approvals	
Protection class	IP65 and IP67 with M12 cable plug mounted and tight-ened 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
* 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



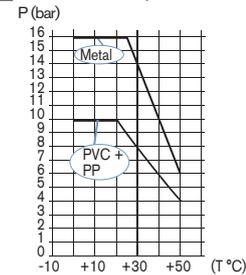
Application range of a B202:

- A**: with PVDF nut
- B**: with PVC nut

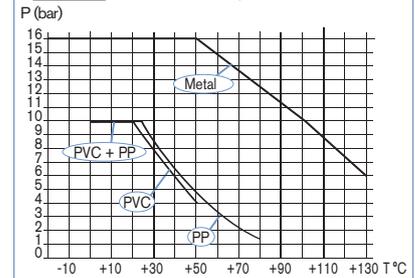
The measures have been made at an ambient temperature of 60°C, without probe.

Application range of a B202 (without probe)

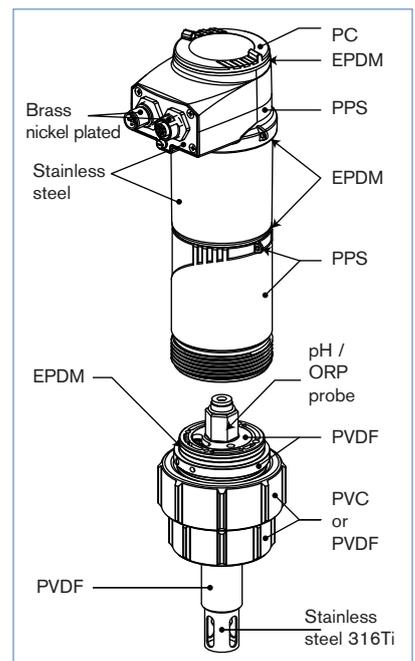
- with PVC nut with S022 adaptor



- 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	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)
Storage	4 to +30°C (39.2 to 86°F)	4 to +30°C (39.2 to 86°F)	4 to +30°C (39.2 to 86°F)	4 to +30°C (39.2 to 86°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	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)	0 to +60°C (32 to 140°F)
Storage	4 to +30°C (39.2 to 86°F)	4 to +30°C (39.2 to 86°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

Principle of operation

The 8202 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).

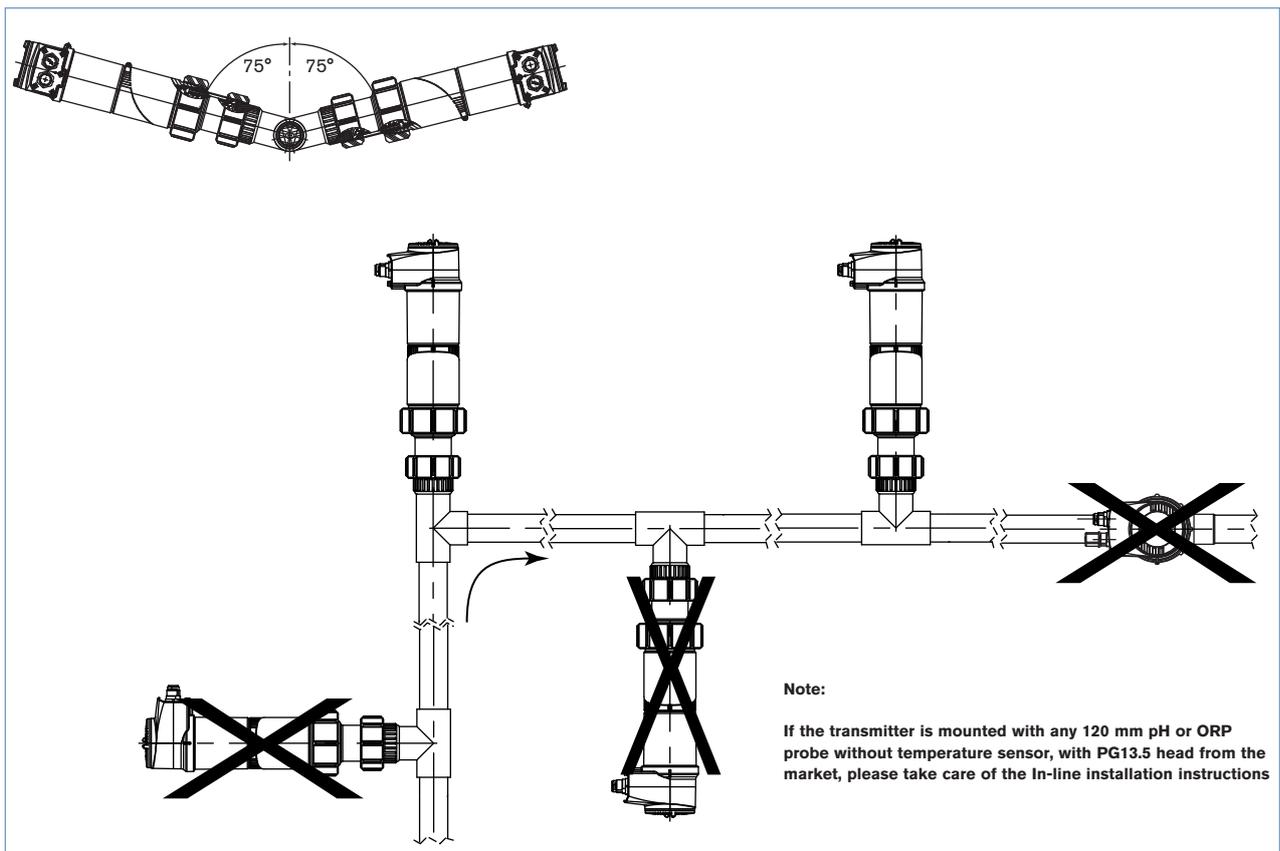
The transmitter is a two wire device (3 outputs transmitter) or a three wire device (4 outputs transmitter) which requires a power supply of 14 V DC (3 outputs transmitter) or 12 V DC (4 outputs transmitter) up to 36 V DC and delivers a 4... 20 mA standard signal proportional to the pH or to the redox potential as output signal.

Installation

The 8202 pH/ORP transmitter can be installed into any adaptor with G1 1/2" 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 with an angle of $\pm 75^\circ$ max. against the vertical onto an horizontal pipe. For mounting on a tank or direct mounting on a pipe (DN100 and DN110), an adaptor with a G1 1/2" external threaded sensor connection must be used.

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 avoided.

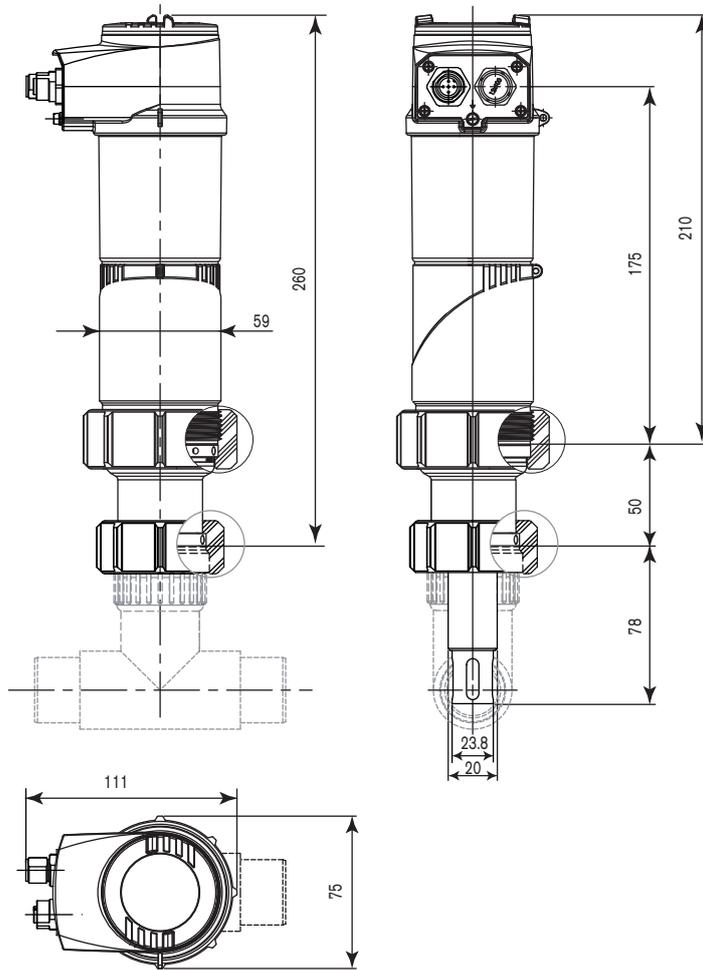
Please ensure that the mounting location provides a continuous and complete immersion of the probe in the flow stream.



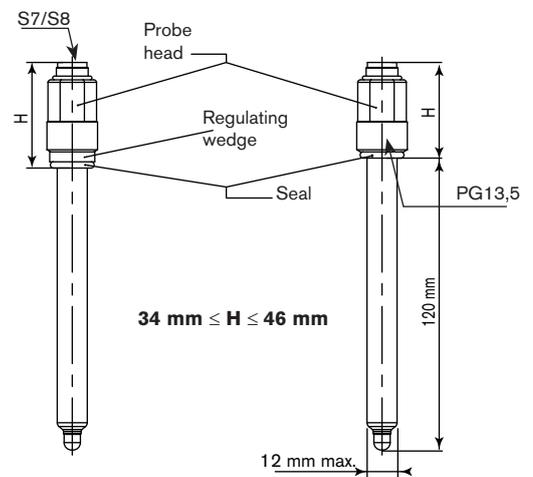
The probe must continuously be immersed into the measuring fluid in order to protect it from drying out.

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

Dimensions [mm] of transmitter Type 8202



Probe



Ordering information for compact transmitter Type 8202

A complete compact pH/ORP ELEMENT transmitter Type 8202 consists of a compact pH/ORP ELEMENT transmitter Type 8202, a pH/ORP probe, a removable display/programmer 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/ORP ELEMENT transmitter **Type 8202** (see ordering chart on p. 7)
- **Item no.** of the selected pH/ORP probe (see accessories ordering chart on p.7)
- **Item no.** of the a removable display/programmer (see accessories ordering chart on p7)
- **Item no.** of the selected INSERTION adaptor **Type S022 with G1½" external threaded sensor connection** (see separate data sheet)



You have to order three or four components.

Attention!

When you order devices without display, please take care that you also order at least one display module for the operation.
Order no. of the removable display / programming module (see ordering chart on p.7)

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
without display**

Removable display/programmer



pH or ORP probes



INSERTION adaptor Type S022



More info.

**Complete ELEMENT transmitter for pH
or ORP measurement Type 8202**



Fitting (example only)

Ordering chart for compact transmitter Type 8202

pH/ORP transmitter Type 8202

Specifications	Voltage supply	Output	Sensor version	Nut material	Electrical connection	UL Approvals	Item no.
Compact transmitter: probe holder with integrated Pt1000 + electronic module with cover, without display	14-36 V DC	2 x transistors + 1x 4-20 mA	None	PVC	5-pin M12 male fixed connector	Nein	559 630
						 UL-Recognized	559 634
				PVDF	5-pin M12 male fixed connector	Nein	559 632
						 UL-Recognized	559 636
	12-36 V DC	2 x transistors + 2x 4-20 mA	None	PVC	5-pin M12 male and 5-pin M12 female fixed connectors	Nein	559 631
						 UL-Recognized	559 635
				PVDF	5-pin M12 male and 5-pin M12 female fixed connectors	Nein	559 633
						 UL-Recognized	559 637

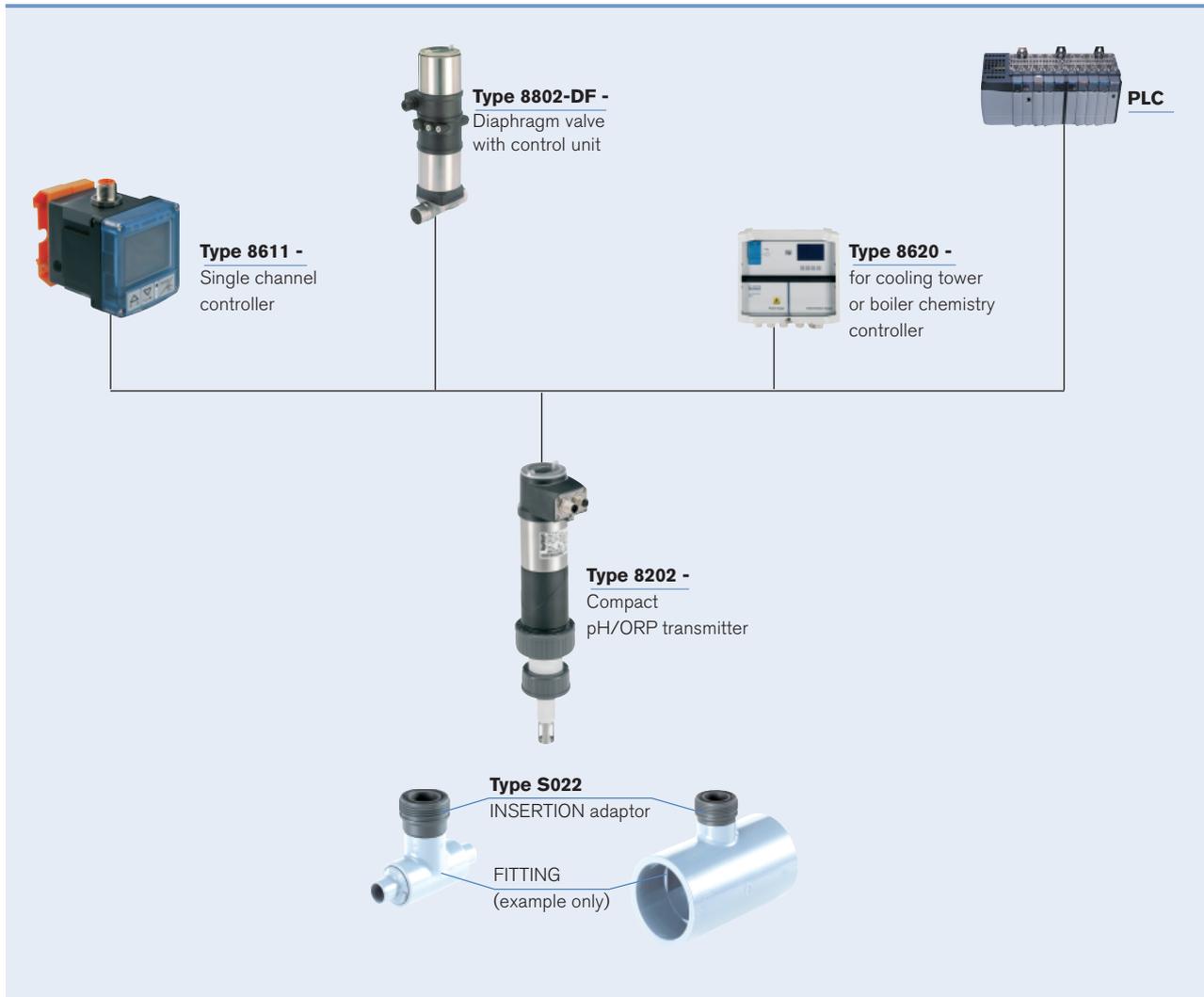
Note: Order separately (see accessories)

- pH or ORP probe
- 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 EPDM seal	560 948
Transparent cover with EPDM seal	561 843
One ø 46x2 mm EPDM seal for 120 mm probe holder (with instruction sheet)	559 169
Probe holder with PVC nut	560 947
Probe holder with PVDF nut	561 476
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 male straight cable plug with plastic threaded locking ring, to be wired	560 946
 5 pin M12 female straight cable plug moulded on cable (2 m, shielded)	438 680
 5 pin M12 male straight cable plug moulded on cable (2 m, shielded)	559 177

Interconnection possibilities with other Bürkert devices



DTS 1000114206 EN Version: E Status: RL (released | freigegeben | validé) printed: 26.10.2010

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please consult for advice.

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