

General Specifications

Compact pH Probes Model EXA Series

EXA

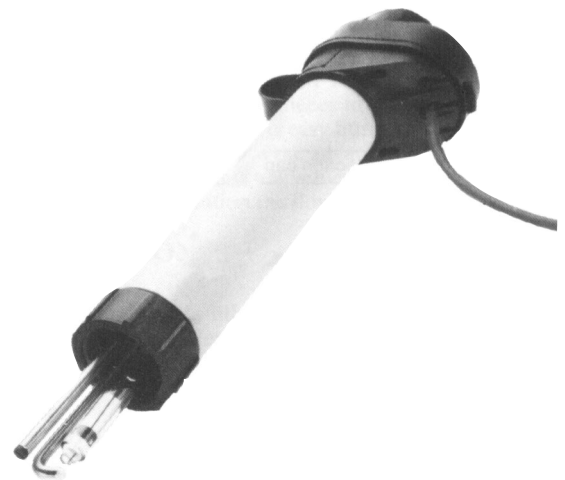
EXA Compact is a versatile series of probes suitable for pH measurements in all common applications in industrial processes and (waste) water treatment installations.

EXA Compact is available as a flow type, an insertion type and an immersion type of fitting. A wide choice of process connections is available to make installation in a tank, open basin or pipe/bypass very simple. The careful choice of chemically resistant materials makes it suitable for most processes.

The EXA Compact probe is flexible in use and its small size and light weight makes it easy to handle.

EXA Compact comes as a complete system including a basic holder with electrode, integrated liquid earth with temperature sensor, a spray unit for chemical cleaning (optional) and one combination cable.

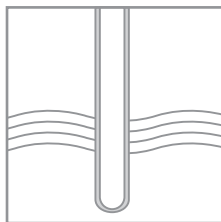
The EXA Compact system is perfectly suited for the advanced capabilities of the EXA PH analyzers, e.g.: sensor diagnostics and automatic chemical cleaning, resulting in a reliable pH-loop with outstanding performance.



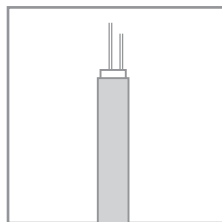
FEATURES:

- Available for flow-, insertion- and immersion mounting.
- Integrated liquid earth for sensor diagnostics with the EXA PH-series.
- Suitable for measurement with double sided high impedance input circuits.
- Integrated spray unit for chemical cleaning available as option.
- Integrated temperature sensor (Pt100 or Pt1000) supporting automatic temperature compensation.
- Electrode removal without twisting the cable.
- One combination cable incorporating all leads and shields.
- Easy installation by modular design and many process connections.
- Easy handling by small size, light weight and fast-fit parts.
- All-in-one system eases stock and order processing.
- Non-flow combination electrode with PTFE-diaphragm.
- Wetted parts from Ryton, PVC-C and stainless steel (or hastelloy) for excellent chemical resistance.
- Flow electrode for severe fouling and poisoning applications.

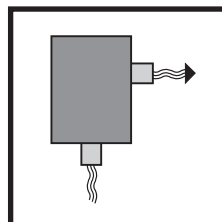
SYSTEM CONFIGURATION



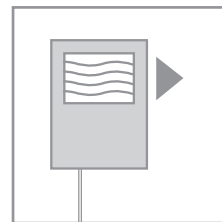
Sensors



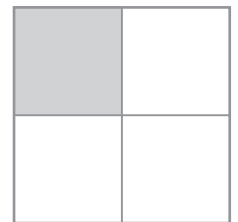
Cables



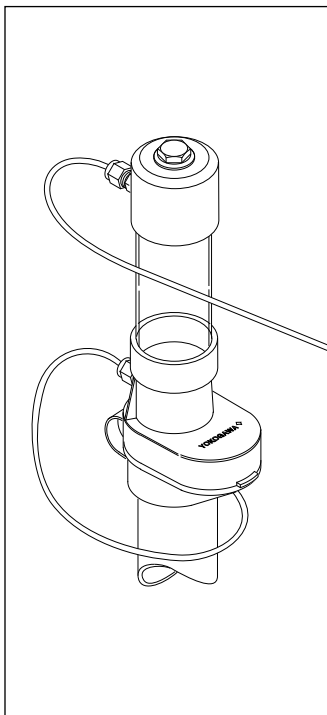
Fittings



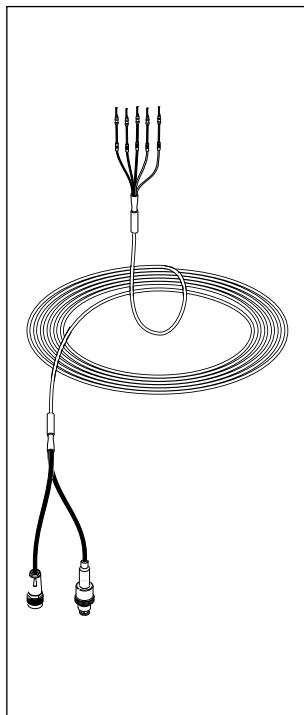
Transmitters



Accessories



Liquid reservoir with protection cap



Combination cable

THE EXA COMPACT PROBE SYSTEM

Reference liquid (KCl) reservoir (optional):

The reference liquid reservoir is used to supply electrolyte (KCl) to the flow electrode when used. This gives a constant out-flow of electrolyte into the process preventing penetration of process liquid into the electrode. This protects the reference electrode against risk of poisoning. For this purpose the reservoir can also be pressurized up to 5 bar.

The reservoir with electrolyte saves maintenance costs and, because of its transparency, the electrolyte level is shown all the time. Mounting and de-mounting on the protective cap is very simple so the standard system can retrospectively be upgraded to a flow version if necessary.

Protection hood with cap:

The protection hood with cap protects the electrode head and electrical connections of the basic holder against rain, dust and mechanical damage. It can be withdrawn easily from the basic holder to give fast access to the electrode and connections. The cap also retains the cable and tubes for electrolyte and chemical cleaning agent. Unlocking is easy by opening the cap.

Combination cable:

The combination cable is a factory finished multi-core coax cable with simple connectors for the electrode and liquid earth with integrated temperature sensor and a 5-lead connection to the converter. This allows a quick and simple installation on site.

Non-flow combination pH-electrode:

The non-flow combination electrode is suitable for a wide range of applications. It is filled with gelled electrolyte and so requires no filling. It has a large area PTFE diaphragm which is particularly resistant to fouling. The unique construction of the Pg13.5 electrode head allows the electrode to be installed and removed without twisting the cable.

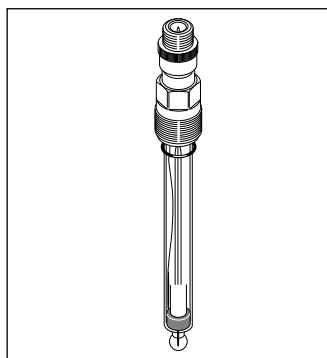
Flow combination electrode:

This electrode is connected to the reservoir which supplies a positive flow of electrolyte to prevent penetration of process liquid into the electrode. This provides additional protection of the measurement against risk of poisoning or fouling.

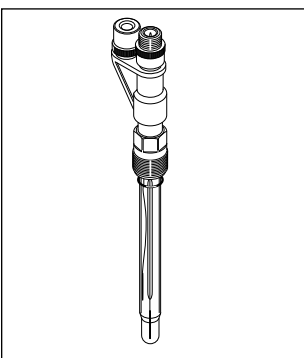
Basic holder:

This is the central unit of the system upon which the electrodes and all other parts are mounted. It includes the liquid earth pin which gives a stable measurement in combination with high impedance input circuits of the pH converter. In the case of the EXA pH converter it also supports the on line diagnostics of the sensor. The integral temperature sensor gives optimum accuracy over a wide range of process temperatures. With the optional spray unit a cleaning agent can be sprayed onto the pH electrode. In conjunction with EXA 4-wire instruments the dynamic response of the sensor is also checked.

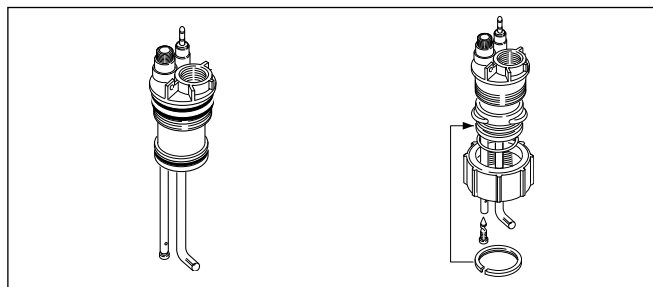
A unique twist-lock system ensures with easy handling a watertight connection



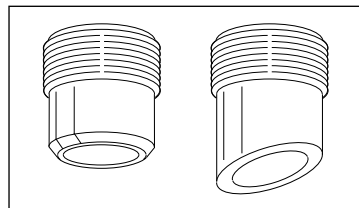
Electrode (non-flow)



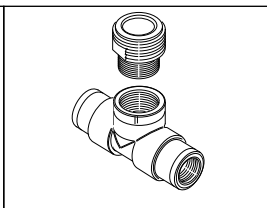
Electrode (flow)



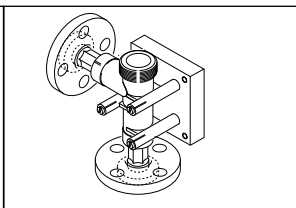
Basic holders



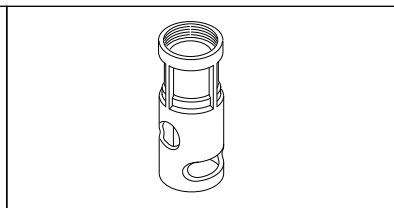
Welding sockets
The probe can be supplied with welding sockets for direct insertion into a pipe or tank.



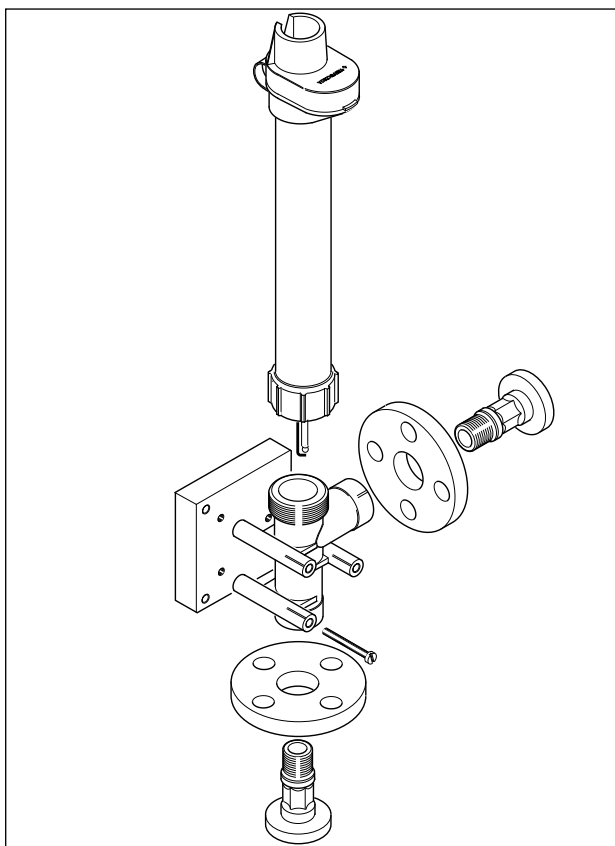
T-pieces
T-pieces are available for installation directly in line.



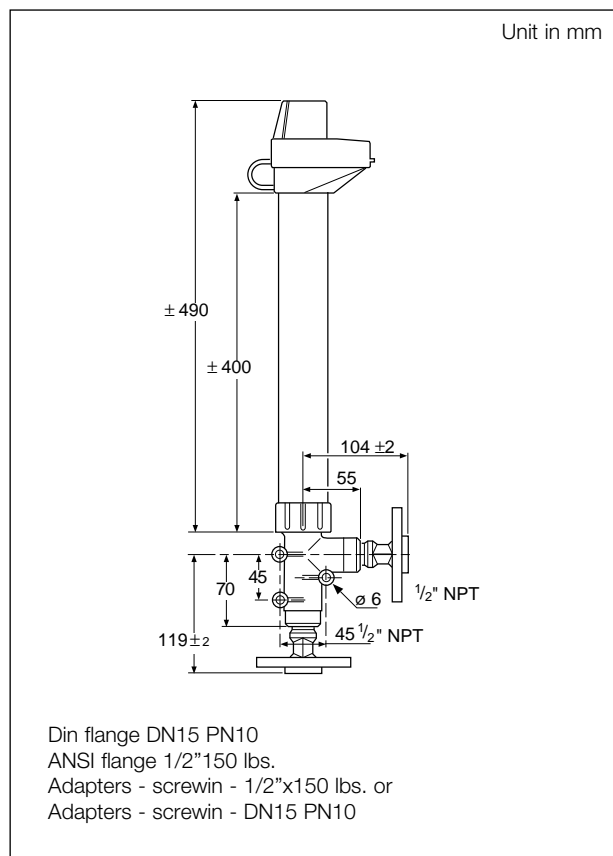
Flow vessel
The injection-moulded flow vessel is suitable for installation in a sample line. Flange connection for DIN or ANSI are available.



Protection cage
The immersion probe is suitable for installation in open or closed tanks using a gas-tight flange or clamps for wall mounting. The protection cage shield the electrodes from mechanical damage and allows fast removal of the sensor for calibration



Flow type



THE EXA COMPACT FLOW PROBE MODEL PF20

The EXA Compact flow system is ideal for installation in a by-pass circulation pipe line of a tank or fast sample loop from a large volume flow line. It has a very small dead volume giving immediate response to changes. By-pass measurement has the advantage of easy isolation from the main stream for maintenance.

The flow fitting can be located at a convenient place and level with small diameter pipe-line connecting to the vessel.

The basic holder with electrode can be quickly taken off for inspection or calibration with the large fixing nut without twisting the cable.

The flow vessel has 1/2" NPT female connections. In addition to that flange adapters are available for DN 15 DIN flanges or 1/2" ANSI flanges.

The inlet at the bottom gives an angled flow with the outlet on the horizontal level. When the outlet runs down the tip of the electrodes will stay wetted with the sample.

The flow vessel can be surface mounted by three long bolts (M5) or by an optional wall mounting plate.

SPECIFICATIONS:

Wetted parts

Holder	: Glas-fitted PPS (RYTON)
Earth pin	: Stainless steel 316L or Hastelloy 276C
O-ring	: Viton/NBR
Spray unit (optional)	: Stainless steel 316L or Hastelloy 276C

General

Cap	: EPDM rubber
Protection hood	: Polypropylene

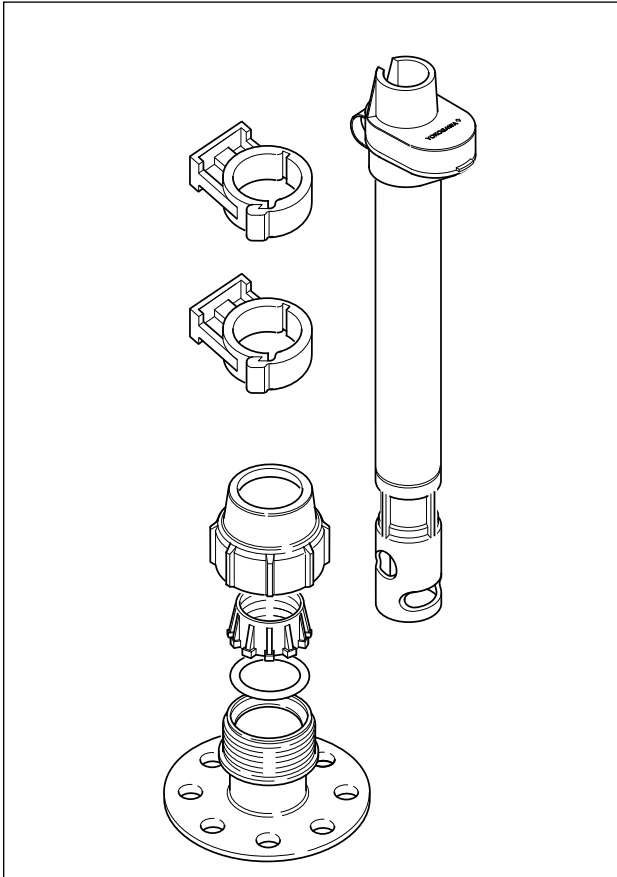
Process conditions

Temperature limits	: 0-70°C
Pressure limits	: 0-2 bar (0-200 kPa)
Flow rate max.	: 3 l/m

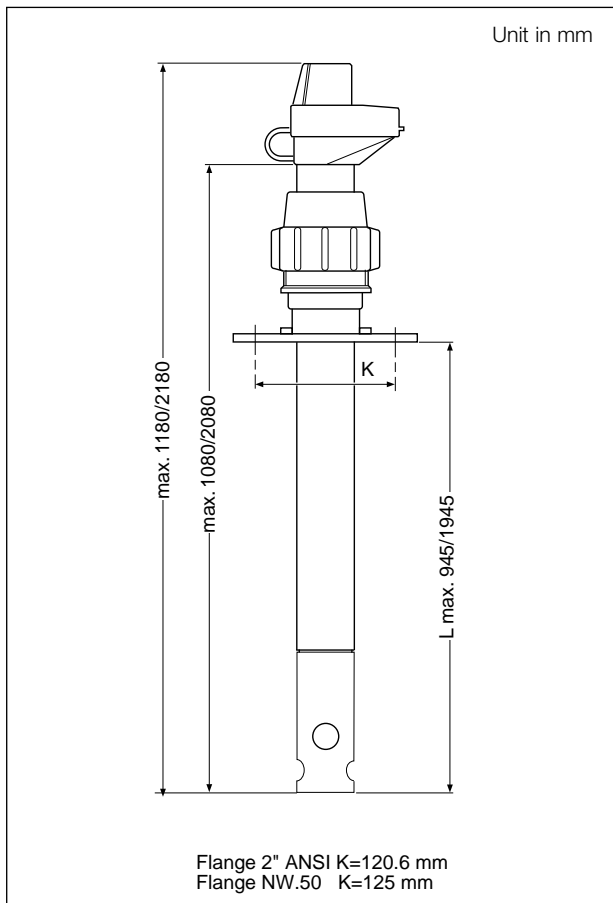
Electrode	: Non Flow	: Flow
Glass membrane	: universal pH-glass; bulb	: universal pH-glass; dome
Glass resistance	: 75...150 MΩ	: 120...200 MΩ
pH range	: 2...12	: 0...14
Temp. range	: 0...70°C	: 0...100°C
Pressure range	: max. 2 bar (200kPa)	: max. 5 bar (500kPa)
Reference liquid	: 1 M KCl, thickened	: 3.3 M KCl
Reference system	: Ag/AgCl (wire)	: Ag/AgCl (pin)
Diaphragm	: PTFE (ring shaped)	: ceramic

MODEL CODE

Model	Suffix code	Option code	Description
PF20	.....	.....	Flow pH probe with flow vessel and electrode holder in Ryton and 1/2" NPT female process connection
Liquid Earth	-RS .....	.....	Liquid earth in stainless steel 316L
	-RH .....	.....	Liquid earth in Hastelloy 276C (not in combination with-CS)
Chemical	-CS .....	.....	Chemical Cleaning with spray unit in cleaning stainless steel 316L
	-CH .....	.....	Chemical Cleaning with spray unit in Hastelloy 276C
Length of cable (and tube for cleaning)	-05 .....	.....	5m
	-10 .....	.....	10m
Temperature Compensation	-T1 .....	.....	Pt1000
	-T2 .....	.....	Pt100
Style code	.....	-A	Style A
Options (process connections) and electrode)	/WM ..	.....	Wall mounting plate (use recommended with options /FC and /FD)
	/FC ..	.....	2xDN15 PN10 Flanges in reinforced polyester
	/FD ..	.....	2x1/2" ANSI (Class 150) Flanges in reinforced polyester
	/EN ..	.....	Non-flow Combined Electrode with PTFE diaphragm
	/EF ..	.....	Flowing electrode
	/KR ..	.....	Flow reservoir
/M ..	.....	Material certificate 3.1b for wetted metal parts only	



Immersion type



THE EXA COMPACT IMMERSION PROBE MODEL PD20

The EXA Compact immersion system is ideal for installation in open or closed tanks or channels. The light weight and small diameter make it easy to handle. For maintenance the basic holder with electrode comes off without tools or turning, leaving the cable untwisted.

Standard lengths of 1 or 2 meter are available. When the rubber cap is removed from the top the pipe can be shortened if needed. Mounting with the optional gas-tight sliding flange is ideal for installation in a closed tank. The immersion depth can be varied by sliding the pipe through the flange.

The flange has both DIN DN50 and ANSI 2" fixing holes.

Mounting in open vessels or channels is easy with the optional clamps for wall mounting. The immersion depth into the process can be adjusted by sliding the tube through the clamps.

SPECIFICATIONS:

Wetted parts

- Holder : Glas-fitted PPS (RYTON R4XT)
- Earth pin : Stainless steel 316L or Hastelloy 276C
- O-ring : Viton
- Immersion tube : High temperature polyvinylchloride (PVC-C)
- Protection cage : Reinforced polypropylene
- Flange : Reinforced polypropylene

General

- Cap : EPDM rubber
- Protection hood : Polypropylene
- Wall mounting clamps : Polypropylene

Process

- Temperature limits : 0-70°C
- Pressure limits : 0-0.5 bar (50 kPa)
- Flow speed limits : 0.5 m/s

Electrode

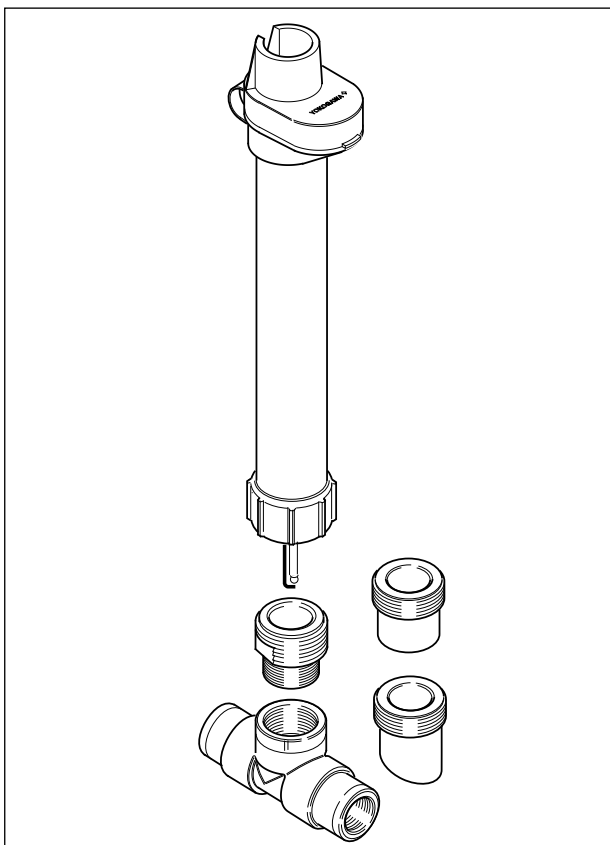
- Glass membrane : universal pH-glass; bulb
- Glass resistance : 75...150 MΩ
- pH range : 2...12
- Temp. range : 0...70°C
- Pressure range : max. 2 bar (200kPa)
- Reference liquid : 1 M KCl, thickened
- Reference system : Ag/AgCl (wire)
- Diaphragm : PTFE (ring shaped)

Flow

- : universal pH-glass; dome
- : 120...200 MΩ
- : 0...14
- : 0...100°C
- : max. 5 bar (500kPa)
- : 3.3 M KCl
- : Ag/AgCl (pin)
- : ceramic

MODEL CODE

Model	Suffix code	Option code	Description
PD20	.....	.....	Immersion pH probe with immersion tube in PVC-C and electrode holder in Ryton
Liquid Earth	-RS .....	.....	Liquid earth in stainless steel 316L
	-RH .....	.....	Liquid earth in Hastelloy 276C (not in combination with-CS)
Chemical	-CS.....	.....	Chemical Cleaning with spray unit in cleaning stainless steel 316L
	-CH.....	.....	Chemical Cleaning with spray unit in Hastelloy 276C
Length of cable (and tube for cleaning)	-05 .....	.....	5m
	-10 .....	.....	10m
Length Insertion tube	1 .....	.....	1m (adjustable on site)
	2 .....	.....	2m (adjustable on site)
Temperature Compensation	-T1 .....	.....	Pt1000
	-T2 .....	.....	Pt100
Style code		*A.....	Style A
Options (process connections and electrode)	/CW ..	.....	2 clamps (PP) for wall mounting
	/FA....	.....	Flange (PP), DN50 (holes acc.to PN10) or 2" holes acc. to ANSI
	/EN ..	.....	Non-flow Combined Electrode with PTFE diaphragm
	/EF ....	.....	Flowing electrode
	/KR ..	.....	Flow reservoir
	/M ....	.....	Material certificate 3.1b for wetted metal parts only



Insertion type

THE EXA COMPACT DIRECT INSERTION PROBE MODEL PS20

The EXA Compact direct insertion system is ideal for installation directly in a flow line or tank. With a choice of adapters the system can be used in a variety of applications.

The standard 1 1/4" BSP female connections can be mounted into the stainless steel weld-in sockets. These sockets are either welded from a vertical or angled position into the wall of the tank or into the pipe.

The minimal angle of mounting is 15° from the horizontal level. For mounting into a tapered stud we provide a polypropylene 1 1/4" BSPT male and stainless steel 1" NPT male adapter.

Further accessories include T-pieces in polypropylene (1" BSPP) and stainless steel (1" NPT) for easy fitting into a piping system. These wide bore systems have the advantage of keeping the electrode clean through the high flow velocity. The disadvantage is that for inspection or calibration the flow has to be stopped.

SPECIFICATIONS:

Wetted parts

- Holder : Glas-fitted PPS (RYTON)
- Earth pin : Stainless steel 316L or Hastelloy 276C
- O-ring : Viton
- Weld-in adapters : Stainless steel 316
- T-piece with adapter : Stainless steel 316 or Polypropylene

General

- Cap : EPDM rubber
- Protection hood : Polypropylene

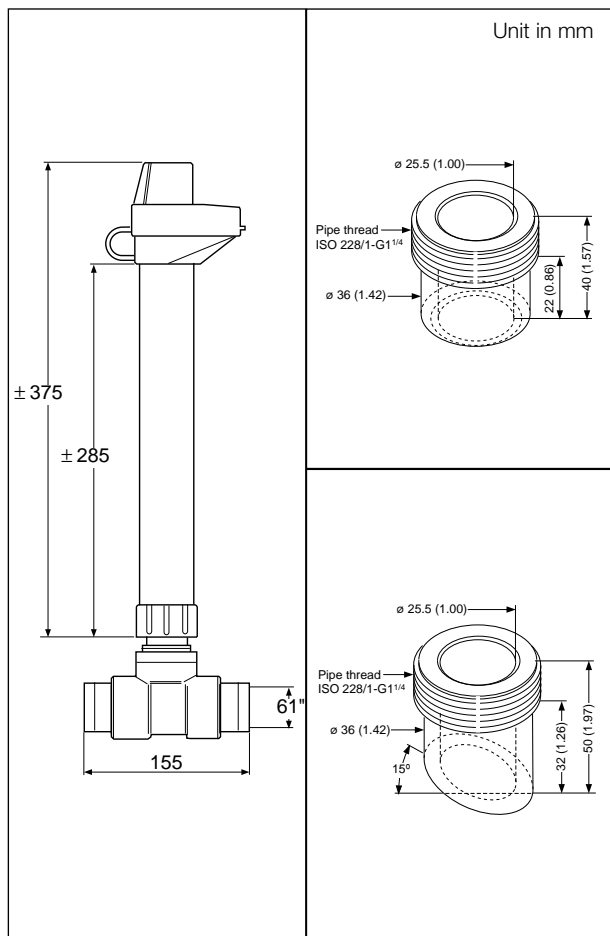
Process conditions

- Temperature limits : 0-70°C
- Pressure limits : 0-2 bar (0-200 kPa)
- Flow rate max : 20 l/m

- | | | |
|------------------|----------------------------|----------------------------|
| Electrode | : Non Flow | : Flow |
| Glass membrane | : universal pH-glass; bulb | : universal pH-glass; dome |
| Glass resistance | : 75...150 MΩ | : 120...200 MΩ |
| pH range | : 2...12 | : 0...14 |
| Temp. range | : 0...70°C | : 0...100°C |
| Pressure range | : max. 2 bar (200kPa) | : max. 5 bar (500kPa) |
| Reference liquid | : 1 M KCl, thickened | : 3.3 M KCl |
| Reference system | : Ag/AgCl (wire) | : Ag/AgCl (pin) |
| Diaphragme | : PTFE (ring shaped) | : ceramic |

MODEL CODE

Model	Suffix code	Option code	Description
PS20			Direct insertion pH probe with electrode holder in Rytan and 1 1/4" BSPP female process connection
Liquid Earth	-RS		Liquid earth in stainless steel 316L
	-RH		Liquid earth in Hastelloy 276C (not in combination with -CS)
Chemical	-CS		Chemical Cleaning with spray unit in cleaning stainless steel 316L
	-CH		Chemical Cleaning with spray unit in Hastelloy 276C
Length of cable (and tube for cleaning)	-050		5m
	-100		10m
Temperature Compensation	-T1		Pt1000
	-T2		Pt100
Style code		*A	Style A
Options (process connections and electrode)		/NP	1 1/4" BSPT (male) (PP)
		/NS	1" NPT male (SS 316)
		/WA	Angle welding (SS 316)
		/WS	Straight welding (SS 316)
		/TP	T-piece (PP); 2x1" BSPP female (incl. option /NP)
		/TS	T-piece (SS316); 2x1" NPT female (incl. option /NS)
		/EN	Non-flow Combined Electrode with PTFE diaphragm
		/EF	Flowing electrode
		/KR	Flow reservoir
		/M	Material certificate 3.1b for wetted metal parts only



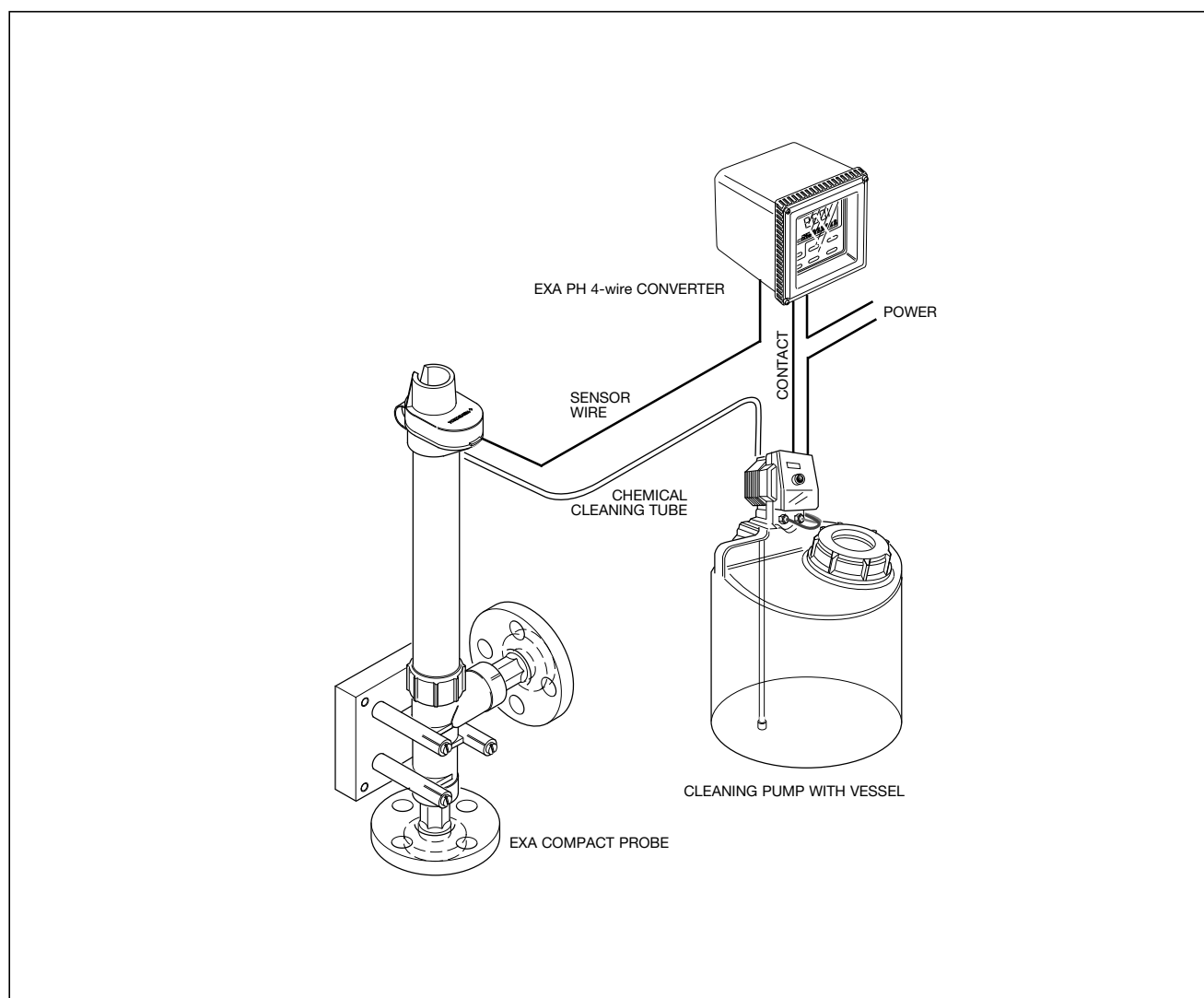
AUTOMATIC CLEANING

The EXA Compact pH probe can be easily upgraded with an integrated spray unit for a chemical cleaning of the electrode, where there is a risk of fouling. This reduces the maintenance costs.

As can be seen from the configuration chart, the EXA Compact pH probe should be connected to a pump (or solenoid valve), spraying the cleaning agent from a reservoir onto the electrode. A pump pressure from 3 to 10 bar is needed to achieve an effective cleaning. The EXA PH 4-wire converter with built-in washtimer is used for controlling the automatic chemical cleaning cycle.

Depending of the cleaning agent used and the process conditions, a choice can be made from a spray unit in stainless steel or Hastelloy (see model code). In a lot of processes (3-5% HCl or hot water only is sufficient to achieve a chemical cleaning effect. By using a pump pressure of (10 bar also a chemical cleaning effect will be achieved.

Please consult Yokogawa for more detailed information about the chemical cleaning of electrodes and delivery of the complete configuration.



Configuration with cleaning system

CONSUMABLES AND ACCESSORIES

EXA Compact pH electrode

Part No.	Description of electrode
SC21-AGP64	Non-flow Combined Electrode with PTFE diaphragm
SC21-AGC55	Flow Combined Electrode with ceramic diaphragm
K1520YA	Flow reservoir
K1520VA	Refill solutions for SC21-AGC55

Flow model PF20

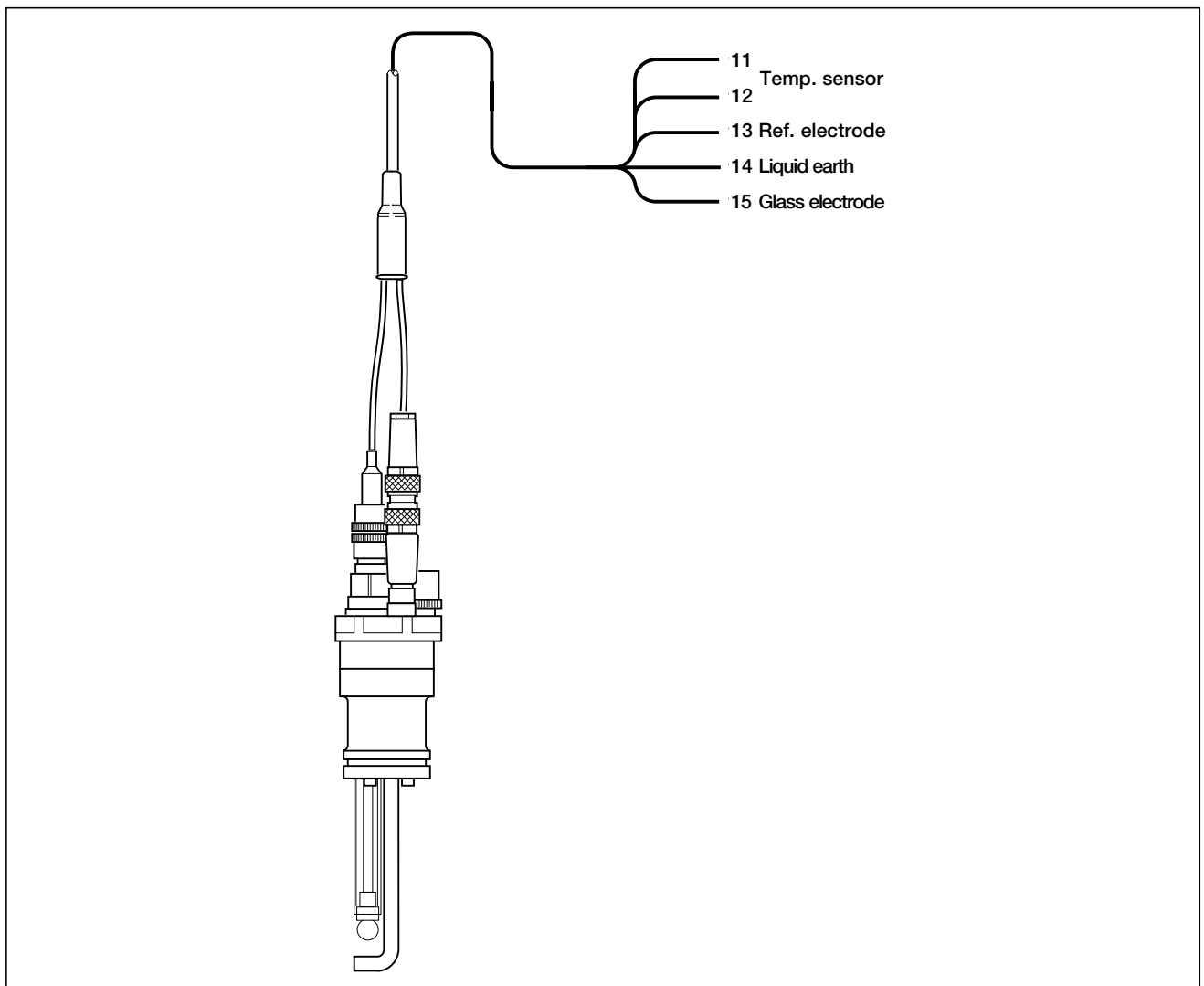
Part No.	Description of process connections
K1520GF	Wall mounting plate (use recommended with part no. K1500YC or K1500YD)
K1500YC	2xDN15 PN10 Flanges in reinforced polyester
K1500YD	2x1 1/2" ANSI (class 150) Flanges in reinforced polyester

Direct Insertion model PS20

Part No.	Description of process connections
K1520CZ	1 1/4" BSPT male (PP)
K1520DZ	1" NPT male (SS 316)
K1520EK	Angle welding (SS 316)
K1520EJ	Straight welding (SS 316)
K1520YE	T-piece (PP); 2x1" BSPP female (incl. part no. K1520CZ)
K1520YF	T-piece (SS 316); 2x1" NPT female (incl. part no. K1520DZ)

Immersion model PD20

Part No.	Description of process connections
K1500YA	2 clamps (PP) for wall mounting
K1520EV	Flange (PP), DN50 (holes acc. to PN10) or 2" (holes acc. to ANSI)



Wiring diagram

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ISO 9001



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