General Specifications

Model FU20-FTS
Differential pH/ORP-sensor

Overview

The FU20-FTS is the newest development in pH sensor technology available from Yokogawa. This sensor combines the measuring technology of our 12 mm differential sensor and the ruggedness of the appreciated wide body FU20 design in one product.

Like our competitors Yokogawa has used silver/silverchloride reference cells in its products. In a wide range of applications this solution has proven very effective and remains a cost effective solution.

Lifetime of the conventional sensors is highly dependent of regular maintenance of the pH probes. Regular cleaning is required to eliminate reference poisoning. 70-80% of industrial users will fully benefit from using differential sensor technology in their high temperature and pressure applications.

Example applications:

- pH monitoring in brine solutions applied in chemical industry
- The bleaching process in pulp and paper
- SO2 scrubber applications
- Tail gas, Quench Tower with sulfides

Features

In differential pH measurment solution provided by Yokogawa below features deliver benefits in customers application:

- No junction
- No open connection form the process to the inside of sensor
- No possibility of poisoning reference element
- No use of diaphragm hence no issues of plugging or coating of junction diaphragm
- No outflow of electrolyte so no depletion issues

Cation Reference Differential pH/ORP Electrode, FU20-FTS

This version encompasses the benefits of the cation reference into a PVDF rugged body with a ¾" NPT. The wide body sensor (26mm diameter) holds four separate measuring elements in one unbreakable and chemical resistant PVDF body. The FU20-FTS is targeted for those applications where the cation differential reference is the best solution, but need a more durable body then a 12mm glass.

Specification

Measuring elements

: Na-glass electrode
: pH-glass electrode
: Silver chloride reference
: Solid platinum electrode
: Pt1000 temperature sensor.

Wetted parts

Sensor body	: PVDF-(GF25+TZ4)
Earthing pin	: Solid Platinum
Measuring Sensor	: L-glass, pNa-glass
LE glass tube	: AR-glass
O-ring	: Viton
Body insert	: PVDF

Functional specifications (at 25°C)

Isothermal point	: pH7, pNa 0
Reference system	: Salt sensitive, Ag/AgCl in 1M KCl
Glass impedances	: Nominal: 750 MΩ
Liquid outlet	: Non-flow no junction
Temperature element	: Pt1000 to IEC 751
Asymmetry potential	: 0 ± 15 mV
Slope	: > 90% in pH 2-12 with pH = pNa+2

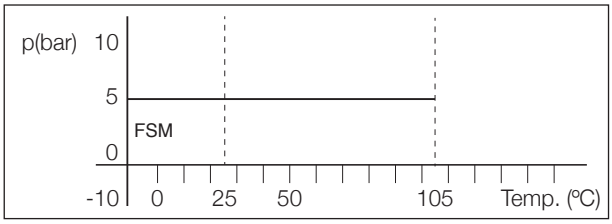
Dynamic specifications

Response time pH	: t90 < 15 sec. (for 7 to 4 pH step)
Response time temp.	: t90 < 120 sec. (for 10 °C step)
Stabilization time pH	: < 2 min. (for 0.02 pH unit during 10 sec.)

Operating range

pH : 2 to 14

ORP	: -1500 to 1500 mV
Temperature	: 0 to 105 ºC (14 to 221 ºF)
Pressure	: p(bar)



Conductivity : > 10 µS/cm ting range

Note: The pH operating range at room temperature is 2-14 pH, but at high temperatures or range outside 2-12 pH the lifetime will be seriously shortened.

Regulatory standards

CE : Decision 768/2008/EC CE

- ATEX : Directive 94/9/EC,as amended by Regulation (EC) no. 1882/2003

Certificate no. : DEKRA 11ATEX0014
Ex II 1 G Ex ia IC T3...T6 Ga

Electrical data : For sensor input circuit connected to a certified intrinsically safe circuit with the following maximum values: Ui = 18 V; Ii = 170 mA; Pi = 0.4 W; Li = 0 mH; Ci = 0 nF (VP type) or Certified intrinsically safe Yokogawa pH/ORP transmitter Model FLXA21 series or Model FLXA202 series.

Special conditions (X) : T6 for Tamb. -40 °C to +40 °C
T4 and T5 for Tamb. -40 °C to +55 °C T3 for Tam. -40 °C to +105 °C

WARNING : Electrostatic charges on the sensor enclosure shall be avoided.

-ROHS II : Directive 2011/65/EU
Applying article category 9; Industrial monitoring and control instruments; ion selective electrodes

- Pressure : Directive 97/23/EC,as amended by Regulation (EC) no. 1882/2003

Applying article : 3.3 (Sound Engineering Practice)
: Damaging the screw thread of the sensor might influence the maximum process pressure.
: Sensor contains glass parts which if broken can cause cutting injuries.

WEEE : Directive 2002/96/EC

IECEx

Applying standards : IEC 60079-0: 2007
IEC 60079-11: 2006
IEC 60079-26: 2006

Certificate no. : IECEx DEK 11.0064X Ex ia IIC T3... T6 Ga

Note: When the sensor has been connected to none intrinsically safe equipment which exceeds the restrictions regarding the sensor input circuit (see electrical data), the restrictions regarding the sensor input (see electrical data) the sensor is not suitable anymore for intrinsically safe use.

Model and suffix code

Model	Suffix Code	Option code	Description
FU20			Wide Body sensor
Cable length	-03		3 m cable
	-05		5 m cable
	-10		10 m cable
	-20		20 m cable
	-VP		No Cable; Vario Pin connector
Temperature Sensor	-T1		Pt1000
	-T2*		Pt100 (not available for FTS)
Model	-NPT		Ryton, Tapered thread, Dome Shaped
	-FSM		Ryton, Tapered thread, Flat Surface
	-FTD		PVDF, Tapered thread, Dome Shaped
	-FTS		PVDF, Tapered thread, Salt sensitive membrane
Options		/HCNF	Complete Hastelloy cleaning system
		/FPS	Adapter F*40 from PPO
		/NSS	1" NPT, SS316
		/NTI	1" NPT, Titanium
		/BSS	1" BSP, SS316
		/BTI	1" BSP, Titanium

Not available for model FTS

Model for these products refer to GS12B06J03-02E-E

* Only internal in Model Code

Dimensional drawing

Dimensions in mm (inches)

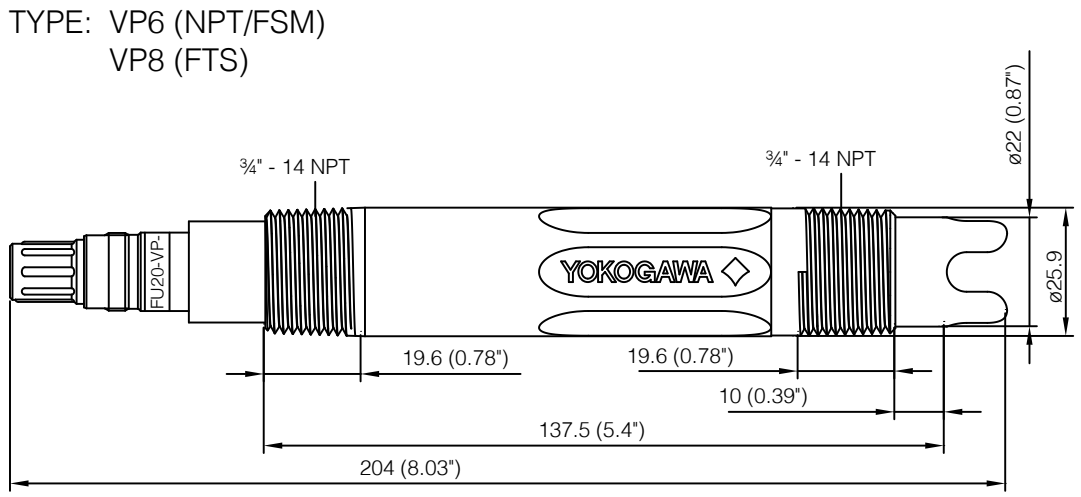


Fig 1. Dimensional drawing FU20-FTS

Connection scheme for variopin options

pin	VP6	VP8
A	pH	pH
B	Ref	pH guard
C	pH Guard	Ref
D	LE/ORP	Ref Guard
E	Temp	Temp
F	Temp	Temp
G	-	LE/ORP
H	-	-

Fig 2. Pin assignment scheme VP6 and VP8 compassion

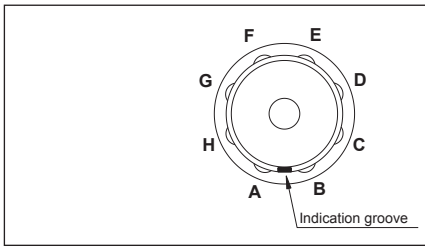


Fig 3. Connections FU20-FTS

Installation options

The differential FU20 sensor can be implemented in process applications using either :

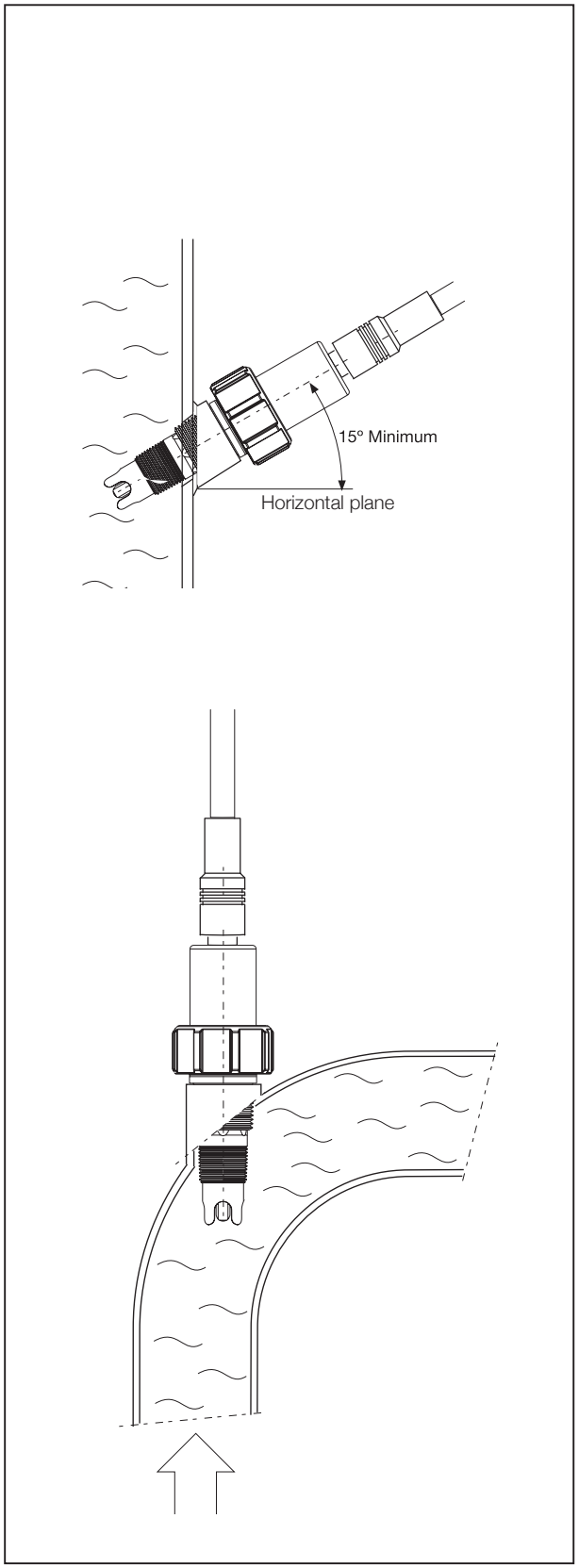


Fig 4. Direct process connection using the ¾" NPT thread using available adapters.

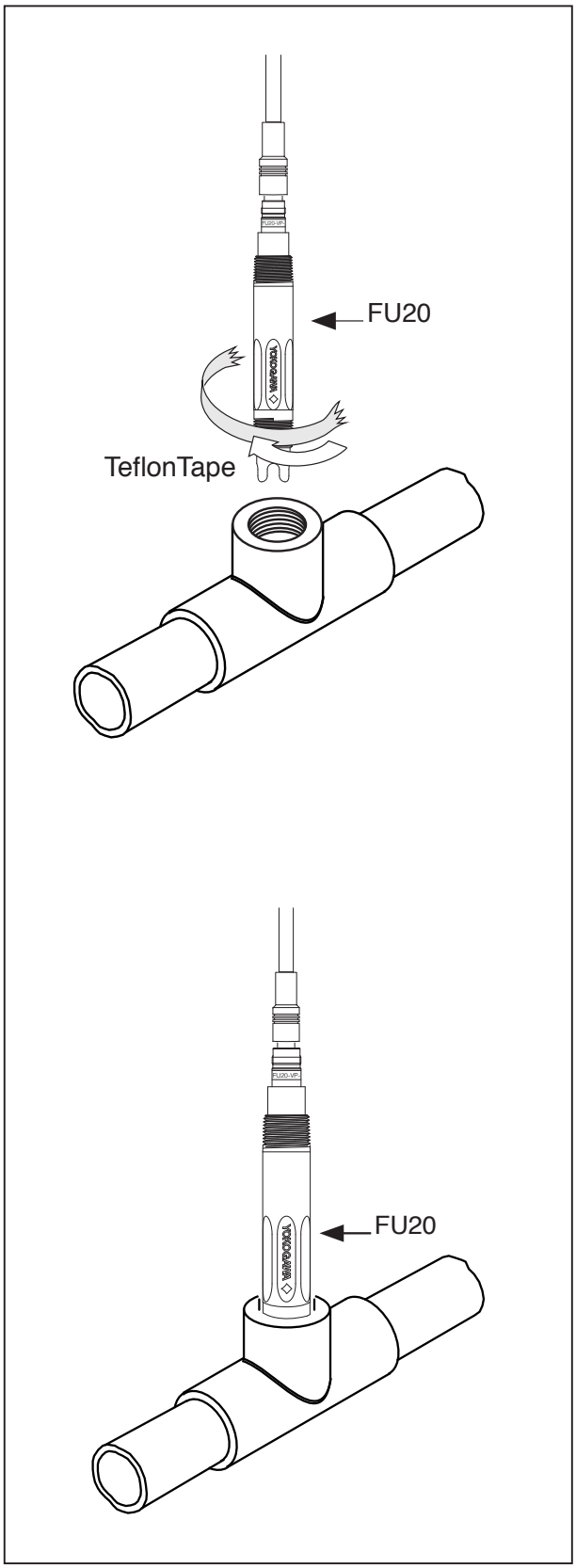


Fig 5. T-piece installation using 3/4" NPT Thread

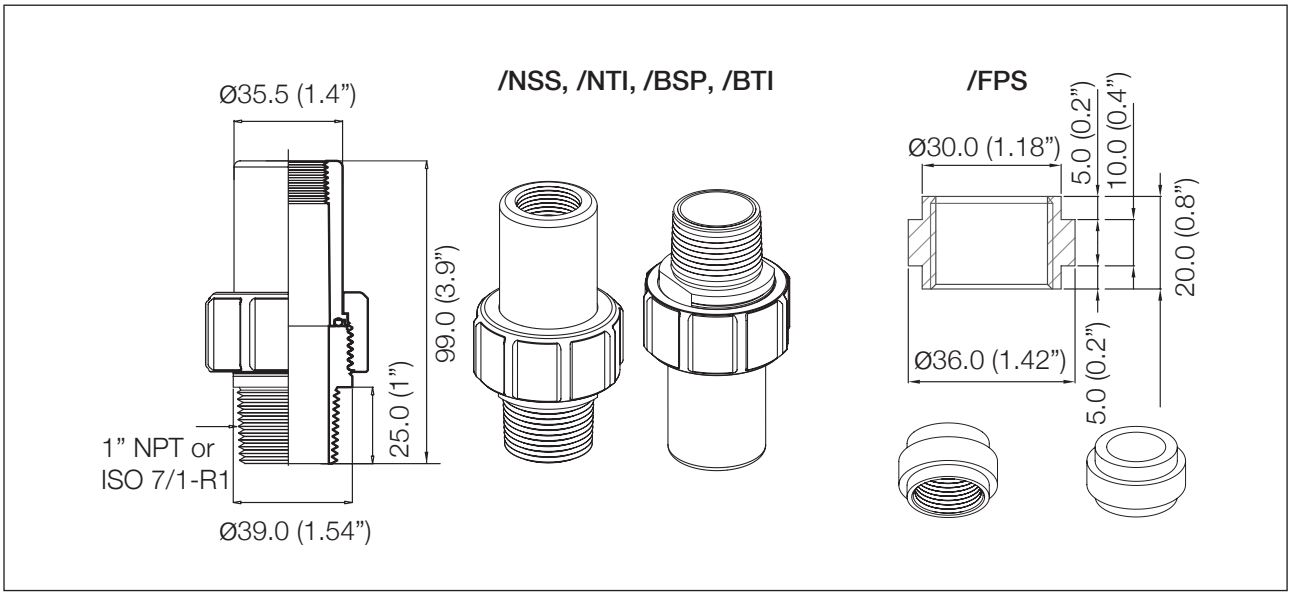


Figure 6. Dimensions 1" FU20-FTS adapter Stainless Steel & Titanium and FU20-FTS adapter for FF40, FS40 and FD40 fittings

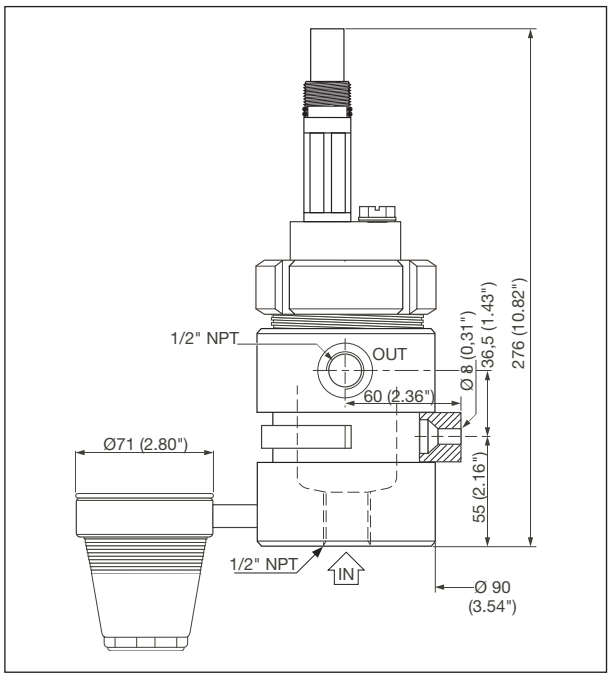


Fig 7. Installation example FU20-FTS in FF20 flow fitting PP/PVDF

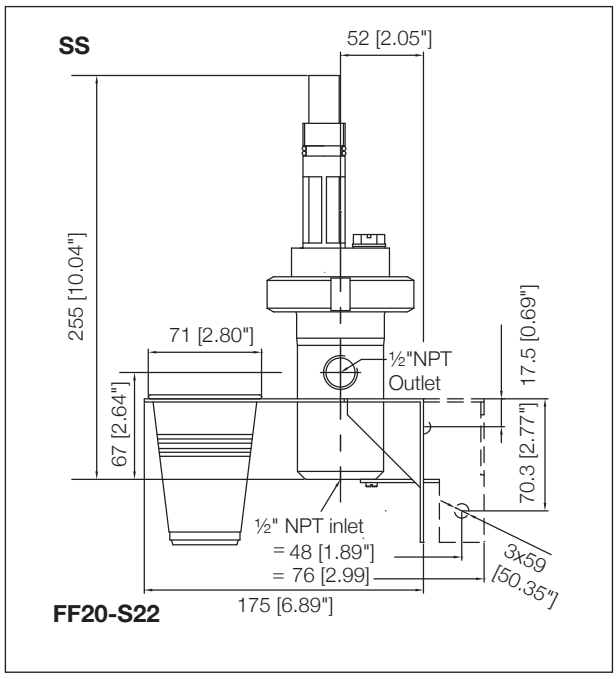


Fig 8. Installation example FU20-FTS in FF20- flow fitting SS

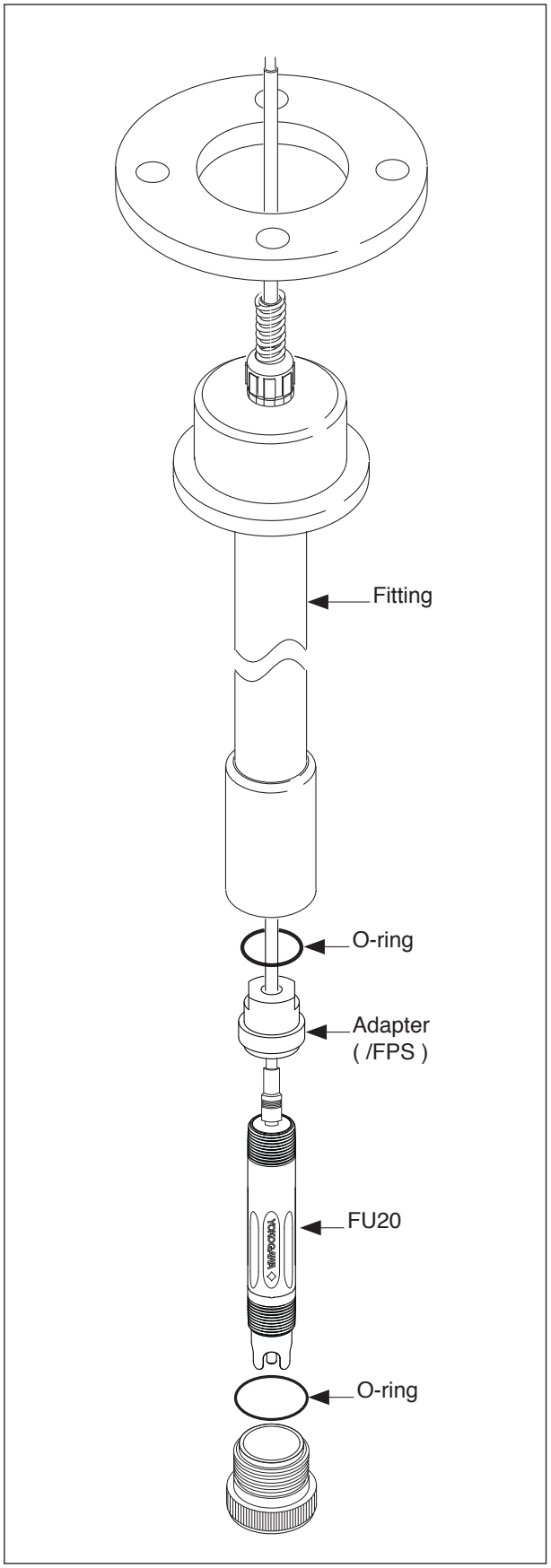


Fig 9. Installation examples for the FU20 in FD40

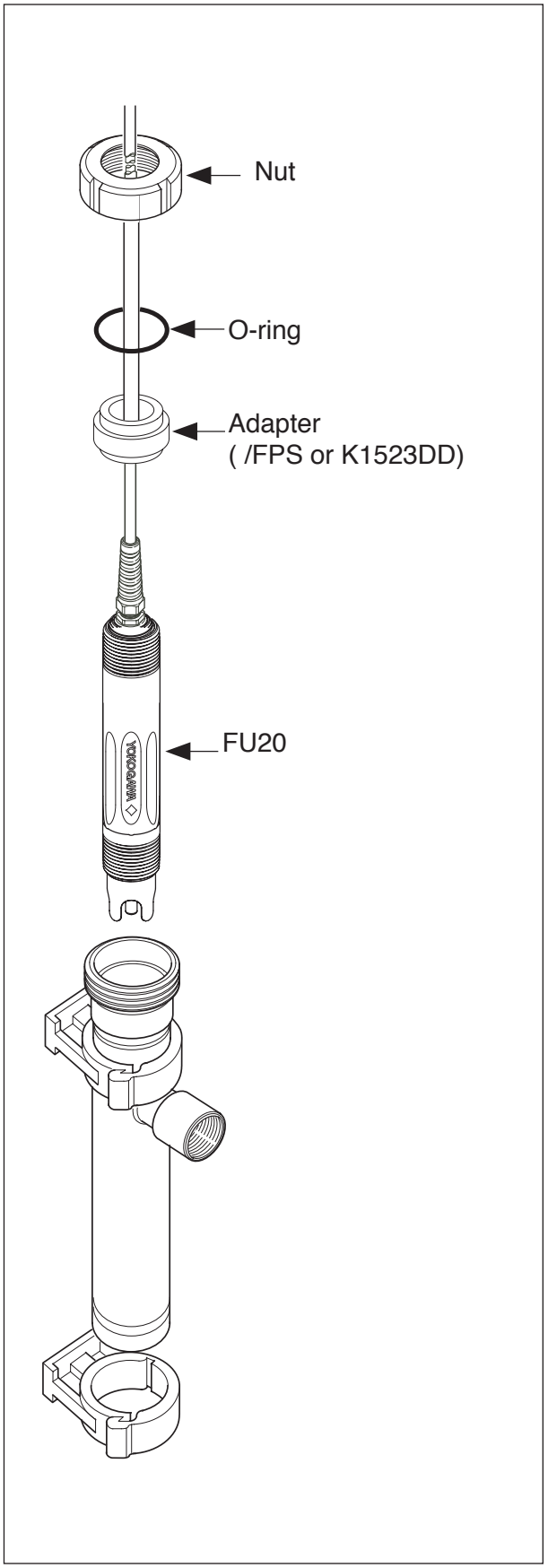


Fig 10. Installation examples for the FF40

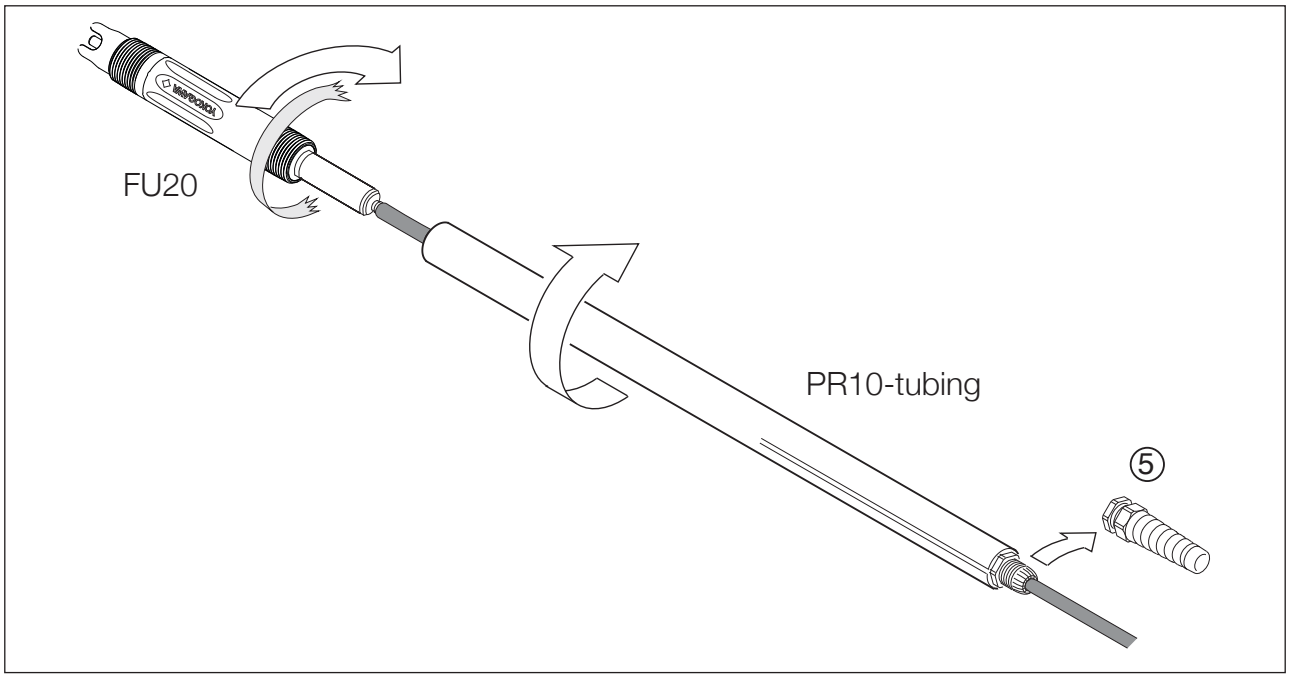


Fig 11. Installation in PR10 retractable fitting

For detailed information refer to the instruction manual coming with the retractable fitting.

YOKOGAWA HEADQUARTERS
9-32, Nakacho 2-chome, Musashinoshi
Tokyo 180
Japan
Tel. (81)-422-52-5535
Fax (81)-422-55-1202
www.yokogawa.com

YOKOGAWA EUROPE B.V.
Euroweg 2
3825 HD Amersfoort
The Netherlands
Tel. +31-88-4641 000
Fax +31-88-4641 111
www.yokogawa.com/eu

YOKOGAWA CORPORATION OF AMERICA
2 Dart Road
Newnan GA 30265
United States
Tel. (1)-770-253-7000
Fax (1)-770-251-2088
www.yokogawa.com/us

YOKOGAWA ELECTRIC ASIA Pte. Ltd.
5 Bedok South Road
Singapore 469270
Singapore
Tel. (65)-241-9933
Fax (65)-241-2606
www.yokogawa.com/sg

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