

# General Specifications

SENCOM<sup>®</sup> FU20F / FU24F / SC25F  
Digital pH/ORP-sensor



In today's market analytical measurements are moving from classical analogue measurement towards the use of digital smart measuring solutions. This tendency is initiated by evolving demand for solutions supporting increased diagnostics. Among these analytical measurements also the measurement of pH, an important control parameter in a variety of application is, following the trend resulting in the development of intelligent smart pH sensors at Yokogawa. The smart sensors developed in Yokogawa Process Analysers are the heart of the complete SENCOM<sup>®</sup>-platform.

The SENCOM<sup>®</sup> platform is build up around Yokogawa's FLEXA21 transmitter. By insertion of the so called SENCOM<sup>®</sup> module, the SPS24 software package and suitable SENCOM<sup>®</sup> sensors the digital features become available for customers' convenience. Yokogawa's SENCOM<sup>®</sup> technology allows sensors to transmit and receive data when connected to Yokogawa's FLEXA21 transmitter or to any PC with the SPS24 software installed. Sensor specific characteristics such as calibration data and other parameters are stored directly in the sensor, making configuration and setup simple and straightforward.

## SENCOM<sup>®</sup> features and benefits:

- Reduced maintenance time
- Off-line calibration minimizing process impact
- Easier asset management
- Improved statistical process control
- Monitoring extreme usage conditions
- Increased data transfer distance (upto 60 mtr.)

In this specification document we will only focus on the available sensors, **FU20F, FU24F, SC25F**, which are part of a complete measuring loop. For the specifications of the **SENCOM<sup>®</sup> module** and the SPS24 software supporting the platform, refer to the applicable GS sheet available through our internet page.

<http://www.yokogawa.com/us/products/analytical-products/ph-orp/sencom-digital-sensor-communication.htm>

SENCOM<sup>®</sup> sensors maintain specific measurement and calibration data on an integrated chip along that is an integral part of the sensor. This data can be exchanged between the sensor and either a process transmitter (FLEXA), or a laboratory PC using the SENCOM<sup>®</sup> SPS24 data management software. Using historical measurement, calibration and diagnostic data from the sensor, the SPS24 data management system provides technicians with the tools to predict maintenance and calibration frequency, estimate sensor life and project life expectancy. Calibration data can be downloaded or uploaded to and from the SENCOM<sup>®</sup> Sensor to the FLEXA analyzer allowing for true plug and play field installation.

## Data stored in the sensor includes:

- Calibration Values (Asymmetry, Slope, Temperature Offset)
- Sensor Status Signals (e.g. Glass Impedance Detection)
- Reference Junction Resistance
- Sensor details (Model, Serial Number, and Production Manufacturing Date)



SENCOM<sup>®</sup> sensors can be calibrated in the laboratory, or at the process site using the analyzer buffer calibration function instead of stored data from the sensor. When the sensor is connected to the data management software the calibration is downloaded into the history file. The available calibration methods using SMART Sensors and FLEXA analyzer are:

- pH: Manual/Automatic: Zero/Slope, Zero/Slope/ITP (3 point), Zero/Slope 1,2 (3 point)
- ORP: Manual 1, 2 (point)
- Temperature



## FU20F

The new Yokogawa FU20F smart pH/ORP sensor is the first in the company's SENCOM® family combining Yokogawa's proven pH sensor expertise with built-in intelligence and direct digital communication.

FU20F pH/ORP sensor, is called "SENCOM®" because of the digital communication possibility with this sensor. It shows how Yokogawa applies the motto "Simply the Best" to sensor technology.

The wide body sensor (26 mm diameter) holds four separate measuring elements in one unbreakable and chemical resistant PPS 40GF (Ryton™) body.

The long life and anti-fouling reference system diaphragm prolongs the life time of the sensor. This makes the sensor an excellent choice in general chemical environments.

The sensor communicates through bi-directional digital communication (RS 485) with limited MODBUS support to a Flexa transmitter. This feature makes the sensor true plug and play, decreasing the process impact due to maintenance.

For mounting, the sensor is equipped with a ¾" NPT thread. Optional quick removal adapters that allow the user to easily remove and install sensors are available. For detailed description of the possibilities please refer to the instruction manual of the FU20F.

### Features

- Solid Platinum ORP/LE electrode for accurate simultaneous pH and ORP measurements.
- Integral Pt1000 element for enhanced pH accuracy.
- Extended life time by saturated Ag/AgCl reference system with double junction combined with ion-trap, and porous PTFE reference diaphragm.
- Easy setup by sensor specific characteristics stored in the sensor itself.
- Simple maintenance by comprehensive design.
- Available in two versions, a robust dome shape model for applications with a limited amount of solids, and a flat surface model for slurry applications.
- ATEX, CSA and FM.

## MODEL AND SUFFIX CODES

Model	Suffix Code	Option code	Description
FU20F			SENCOM® pH Wide Body sensor
Model	-NPT -FSM		Dome Shape Model Flat Surface Model
Options		/HCNF /FPS /NSS /NTI /BSS /BTI	Complete Hastelloy cleaning system Adapter F*40 from Noryl 1" NPT, SS316 1" NPT, Titanium 1" BSP, SS316 1" BSP, Titanium

## GENERAL SPECIFICATIONS FU20F

**Measuring elements** : pH glass electrode  
Silver Chloride reference  
Solid Platinum electrode  
Pt1000 temperature sensor

### Wetted parts

Sensor body : PPS 40GF (Ryton™ with glass filing)  
Measuring sensor : G-glass  
Reference junction : Porous PTFE  
Earth pin : Solid Platinum  
O-ring : Viton

### Functional specifications (at 25°C)

#### Measuring system

Isothermal point : pH 7  
Reference system : Ag/AgCl with saturated KCl  
Glass impedance  
- Dome shape : 200 MΩ nominal  
- Flat surface : 700 MΩ nominal  
Liquid contact : Non-flow double junction  
Junction resistance : 1 to 15 kΩ  
Temperature element : Pt1000 to IEC 751  
Asymmetry potential (zero) :  $8 \pm 15$  mV  
Slope :  $> 96$  % (of theoretical value)

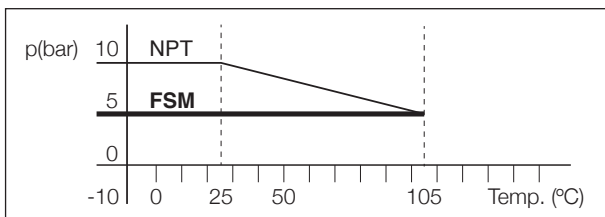
**Note:** The FU20F temperature sensor is designed for cell compensation and for indication.  
It is **NOT** designed for process temperature control.

### Dynamic specifications

Response time pH :  $t_{90} < 15$  sec. (for 7 to 4 pH step)  
Response time temperature  
- Dome shape :  $t_{90} < 1$  min. (for 10°C step)  
- Flat surface :  $t_{90} < 4$  min. (for 10°C step)  
- Stabilization time pH :  $< 2$  min (0.02 pH/10 sec.)

### Operating range

pH : 0 to 14  
ORP : -1500 to 1500 mV  
rH : 0 to 100  
Temperature  
- Dome shape : -10°C to 105°C (14°F to 221°F)  
- Flat surface : 15°C to 105°C (59°F to 221°F)  
Pressure : 0 to 10 bar (0 to 142 PSIG)



Conductivity :  $> 50$   $\mu$ S/cm

**Note:** The pH operating range at room temperature is 0-14pH, but at high temperatures the lifetime will be seriously shortened outside 2-12 pH range.

### Transmission signal (Data + and Data -)

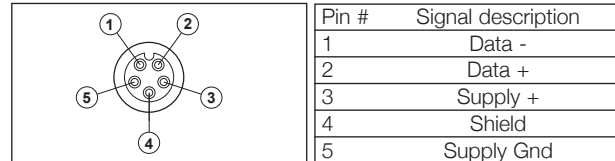
General : Bi-directional digital communication (RS 485) with limited MODBUS support  
Data rate : 9600 b/s (8,E,1)  
Output function : -pH and temperature compensated pH  
-ORP, pH compensated ORP, rH  
-Temperature  
-Junction resistance value

-Sensor details (Model, Serial Number, production date)  
-Sensor calibration data (zero, slope, temperature offset)  
-Sensor status signals (e.g. Glass impedance detection)

**Note:** The output functions and settings of the sensor are accessible using a dedicated device such as the Yokogawa FLXA analyzer.

### Power supply (Supply+ versus Supply Gnd)

Operating range : +2.7 to +3.6 VDC  
Power consumption :  $\leq 20$  mW



**Figure 1: Sensor connector (front view) with gold plated pins**

### Regulatory standards

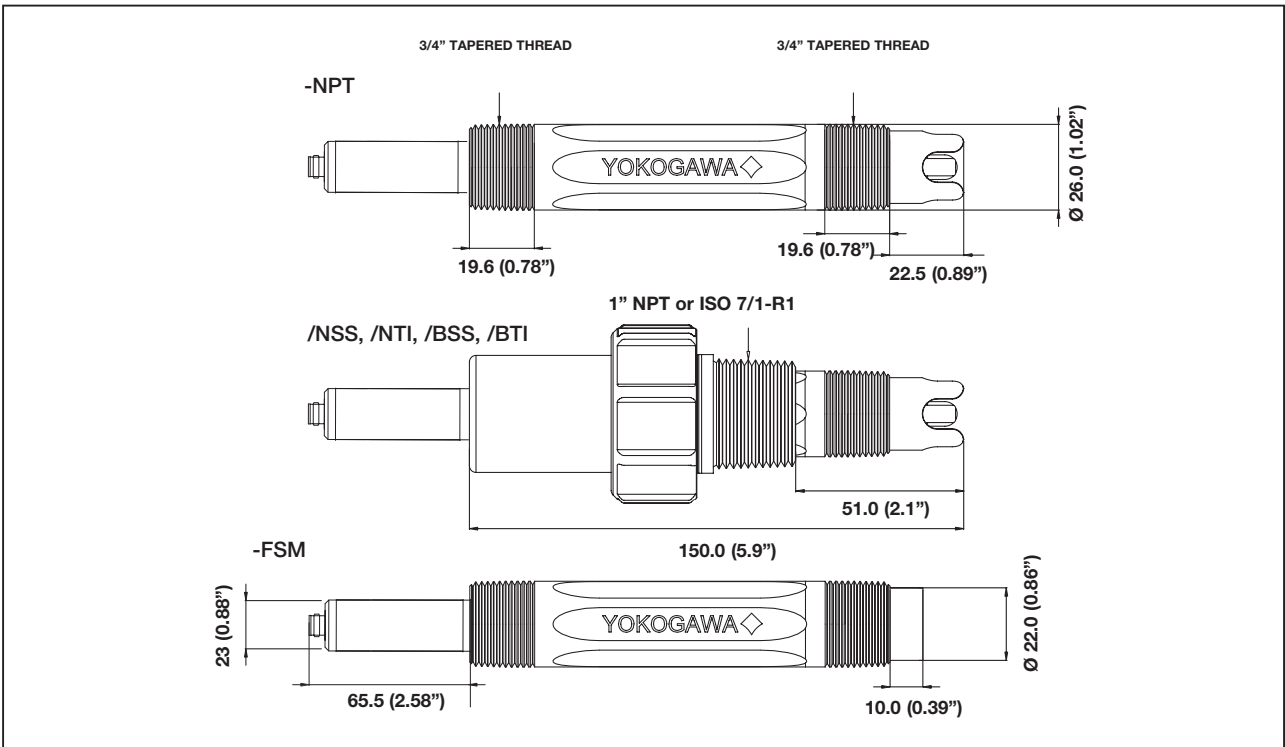
**CE** : Decision 768/2008/EC   
- ATEX : Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003  
Certificate no. : DEKRA 11ATEX0064 X  
 II 1 G Ex ia IIC T3...T6 Ga  
Electrical data : For sensor input circuits (by connector) connected to a certified intrinsically safe circuit with the following maximum values  
 $U_i = 6.1$  V;  $I_i = 230$  mA;  $P_i = 1.2$  W;  $L_i = 4$   $\mu$ H;  $C_i = 30$   $\mu$ F  
or  
Certified intrinsically safe Yokogawa transmitter Model FLXA21 series  
**CSA**  
Certificate no. : 2516979  
Master contract no. : 182892  
Electrical data : For sensor input circuits (by connector), connected to a certified intrinsically safe circuit, with the following maximum values  
 $U_i = 6.1$  V;  $I_i = 230$  mA;  $P_i = 1.2$  W;  $L_i = 4$   $\mu$ H;  $C_i = 30$   $\mu$ F  
or  
Certified intrinsically safe Yokogawa transmitter Model FLXA21 series.  
Ambient temperature : T6 for Tamb. -40 °C to +60 °C  
T5 for Tamb. -40 °C to +75 °C  
T4 for Tamb. -40 °C to +110 °C  
T3 for Tamb. -40 °C to +125 °C

### FM

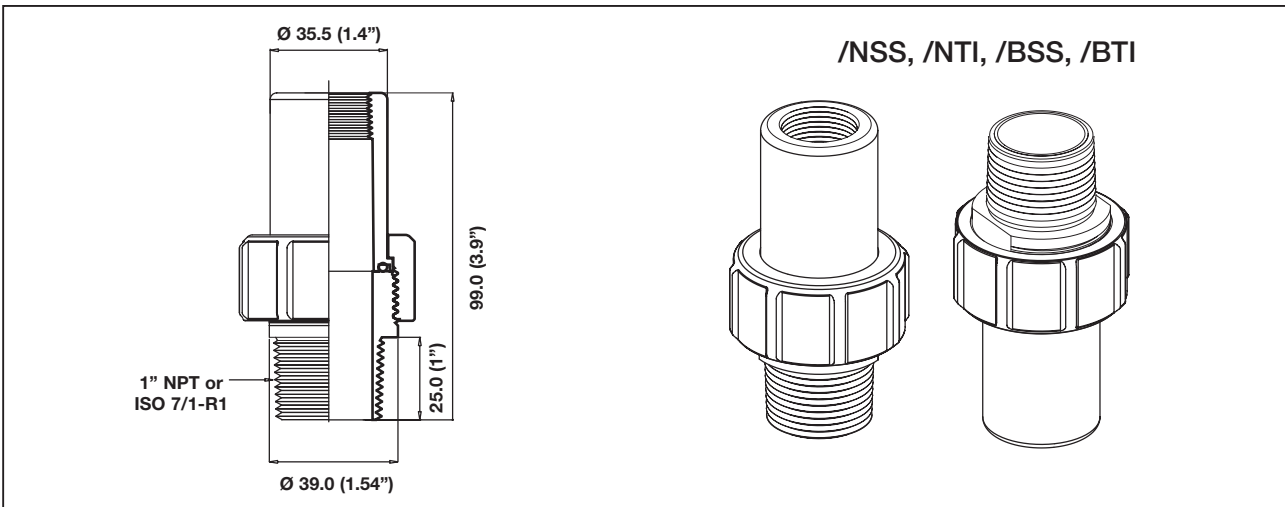
Certificate no. : 3046277  
IS, Class I Div. 1, GP A, B, C, D T3...T6  
Electrical data : For sensor input circuits (by connector), connected to a FM approved intrinsically safe apparatus meeting the entity parameters of the SENCOM® sensor:  
 $U_i = 6.1$  V;  $I_i = 230$  mA;  $P_i = 1.2$  W;  $L_i = 4$   $\mu$ H;  $C_i = 30$   $\mu$ F  
or  
FM approved intrinsically safe Yokogawa transmitter Model FLXA21 series.  
Ambient temperature: : T6 for Tamb. -40 °C to +60 °C  
T5 for Tamb. -40 °C to +75 °C  
T4 for Tamb. -40 °C to +85 °C  
T3 for Tamb. -40 °C to +85 °C

**DIMENSIONS**

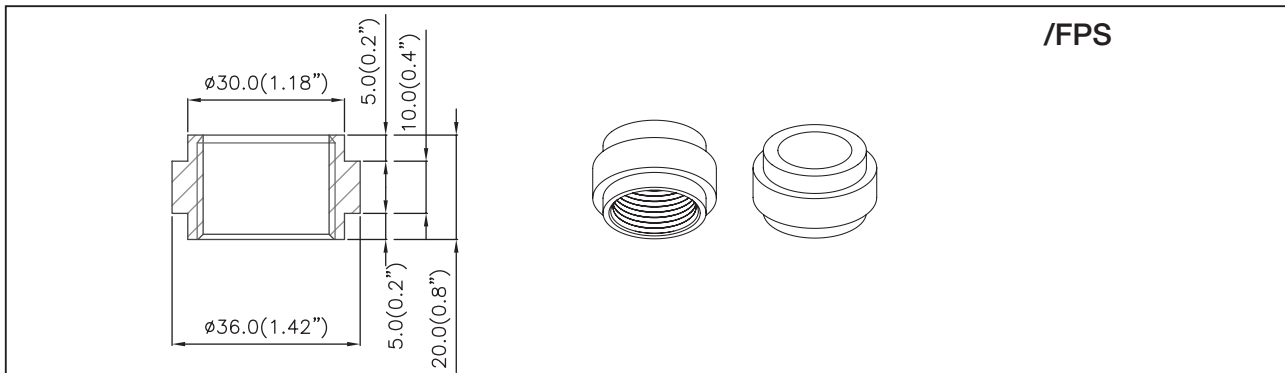
Dimensions in mm (inches)



**Figure 2: Dimensions of FU20F Sensor**



**Figure 3: Dimensions of quick-removal adapters /NSS, /NTI, /BSS, /BTI**



**Figure 4: Dimensions of F\*40 adapter /FPS**

### INSTALLATION OF FU20F

For optimum measurement results, the FU20F should be installed in a location that offers an acceptable representation of the process composition and **DOES NOT** exceed the specifications of the sensor. The FU20F is designed with 3/4" NPT threaded connections on both ends of the sensor to allow installation in a wide variety of applications.

#### Typical installation

The FU20F sensor is designed for versatile in-line, immersion or off-line installation. For best results the FU20F should be mounted with the process flow towards the sensor, and positioned at least 15° above the horizontal plane to eliminate air bubbles in the pH glass bulb (see Figure 5).

#### Mounting the sensor

The simplest mounting is to use one of the 3/4" NPT threaded connections (see Figure 6). The FU20F can also be mounted using one of the optional quick-removal adapters /NSS, /NTI, /BSP or /BTI (see Figure 7).

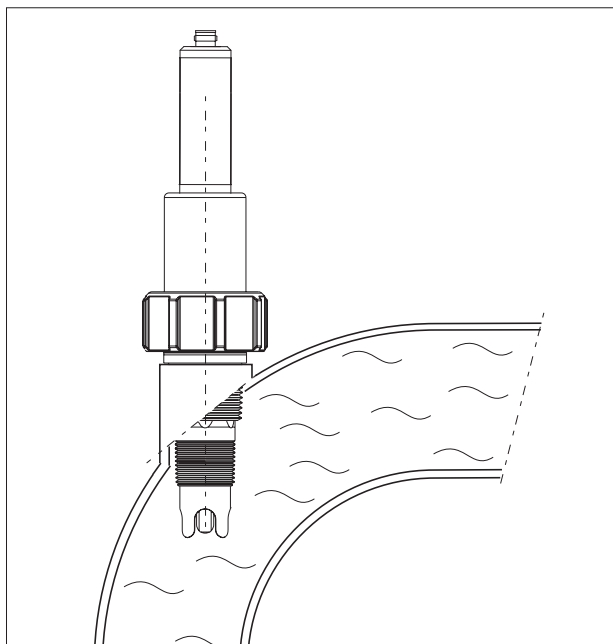
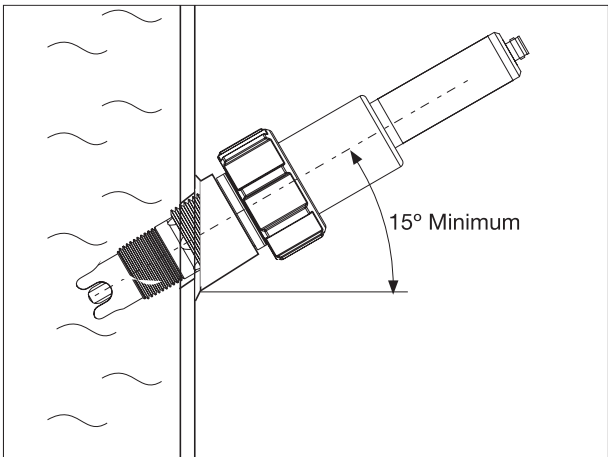


Figure 5: Sensor installation

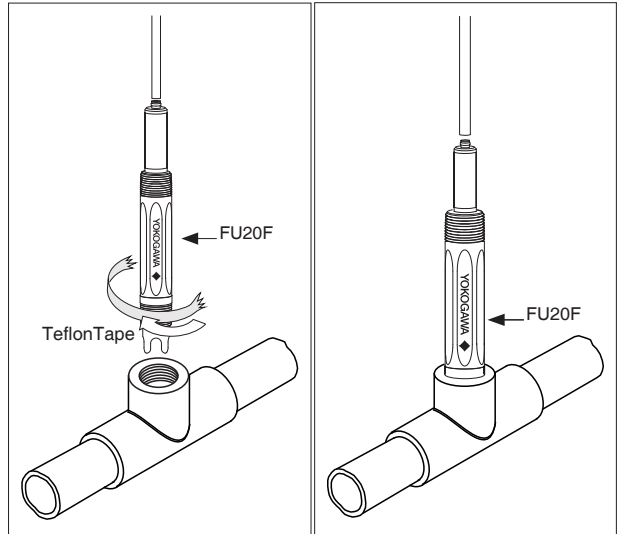


Figure 6: Simple mounting of sensor

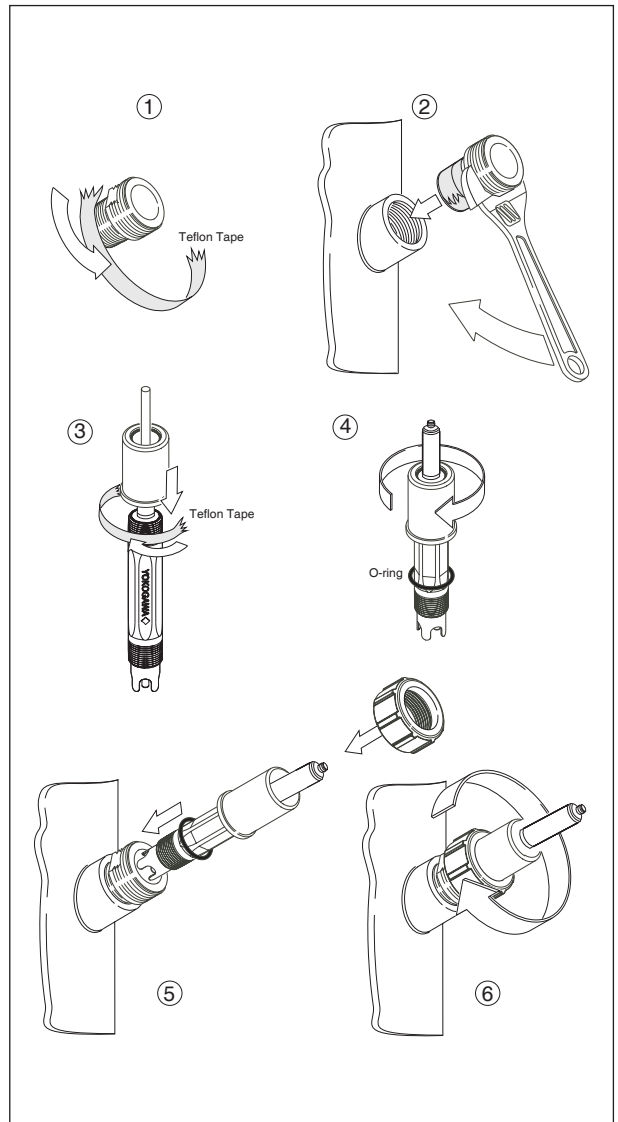
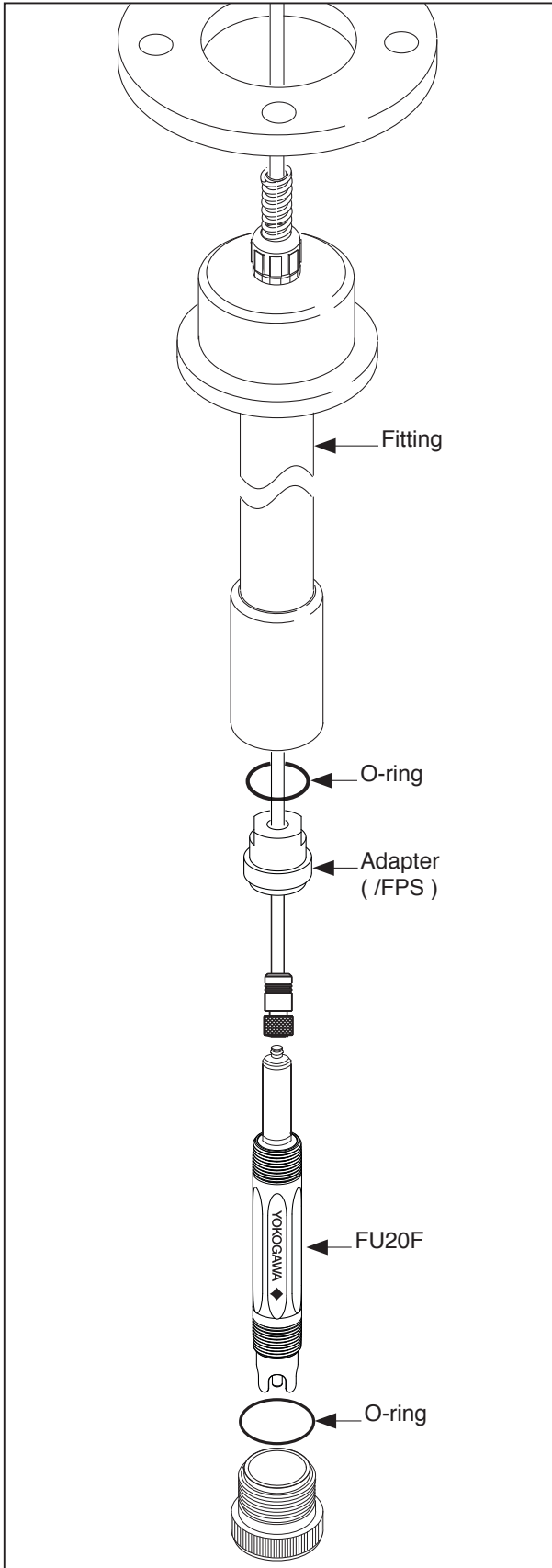
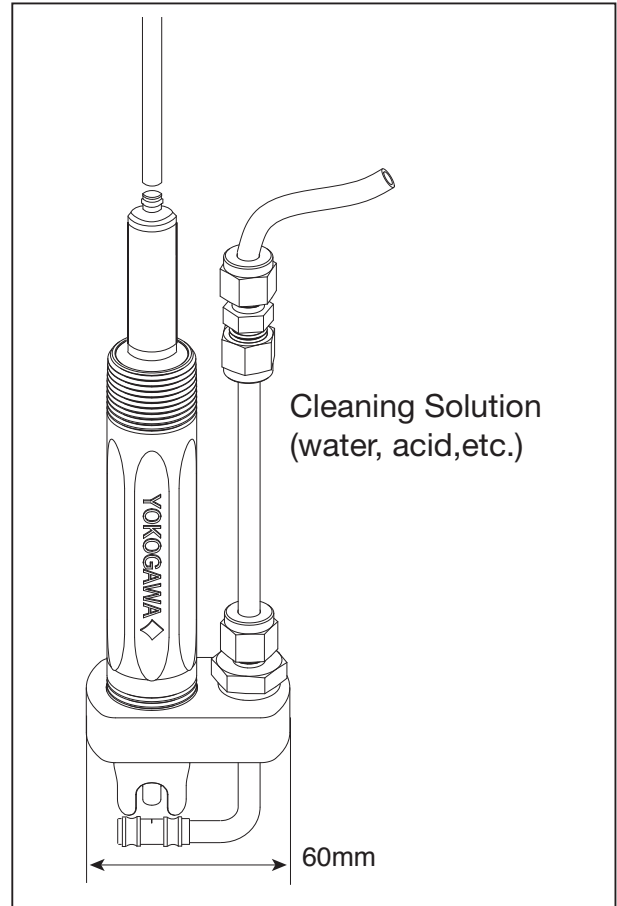


Figure 7: Mounting of sensor with /NSS, /NTI, /BSS or /BTI

Other mounting examples of the FU20F are given in Figure 8 and Figure 9.



**Figure 8: Mounting of sensor with /FPS**  
GS 12B06J03-04E-E



**Figure 9: Mounting of sensor with /HCNF**

## FU24F



Processes in which sensors are subjected to pressure changes normally decrease the useful life time. The internal pressure compensation feature of the analogue is made available for customers using digital sensors in the FU24F sensor.

The pressure changes of the process may cause fast desalting and dilution of the reference electrolyte. This on its turn will change the reference voltage being reason for drifting pH-measurement.

By using the successful Yokogawa patented Bellow system integrated in the FU24F electrode, a strong pressure compensation mechanism is created. The build-in bellow ensures immediate interior pressure equalization to the outside pressure, making the sensor virtually insensitive to external pressure variations. A slight overpressure caused by the bellow tension, prevents fluid ingress and maintains a positive ion flow out of the sensor. This feature is of particular interest in pure water applications.

For applicability in chemically harsh applications chemical resistant PPS 40GF has been selected for manufacturing the sensor body.

### Features

#### FU24F

- Simple installation due to two sided threaded body.
- Direct easy installation in-line.
- Installation in by-pass loop or immersion assembly.
- Flow fitting installation in FF20 using adapter K1521JA or K1521JB
- Optimal sensor for fluctuating pressure application due to patented bellow technique

### Model and suffix codes

Model code	Suffix code	Option code	Description
FU24F			SENCOM® pH Wide Body Sensor
Sensor tip	-FSM		Flat Surface Model
	-NPT		Dome Shaped Model

## GENERAL SPECIFICATIONS FU24F

### Measuring elements

pH glass electrode  
Silver / Silver Chloride reference  
Solid Platinum electrode Pt1000 temperature sensor

### Wetted parts

Sensor body : PPS 40GF (Ryton™ with glass filling)  
Measuring sensor : G-glass  
LE glass tube : AR-glass  
Reference junction : Porous PTFE  
Earth pin : Solid Platinum  
O-ring : Viton  
Bellow system : Viton

### Functional specifications (at 25°C)

Measuring system  
Isothermal point : pH 7  
Reference system : Ag/AgCl with saturated KCl  
Glass impedance  
- Dome shape : 200 MΩ nominal  
- Flat surface : 700 MΩ nominal  
Liquid junction : Non-flow double junction  
Junction resistance : 1 to 15 kΩ

Temperature element : Pt1000 to IEC 751  
Asymmetry potential(Zero) :  $8 \pm 15$  mV  
Slope :  $> 96$  % (of theoretical value)

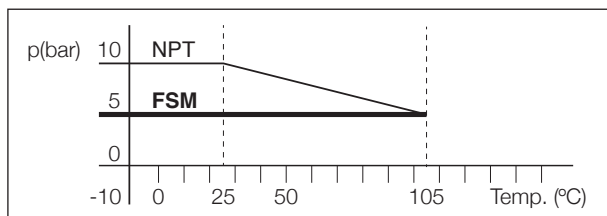
**Note:** The FU24F temperature sensor is designed for cell compensation and for indication. It is NOT designed for process temperature control.

### Dynamic specifications

Startup time sensor :  $< 60$  sec.  
Response time pH :  $t_{90} < 15$  sec. (for 7 to 4 pH step at 25 °C)  
Response time temperature  
- Dome shape :  $t_{90} < 1$  min. (for 10 °C step)  
- Flat surface :  $t_{90} < 4$  min. (for 10 °C step)  
Stabilization time pH :  $< 2$  min. (for 0.02 pH unit during 10 sec.)

### Operating range

pH : 0 to 14  
ORP : -1500 to 1500 mV  
rH : 0 to 100  
Temperature  
- Dome shape : -10 °C to 105 °C (14 °F to 221 °F)  
- Flat surface : +15 °C to 105 °C (59 °F to 221 °F)



Conductivity :  $> 10$  μS/cm

**Note:** The pH operating range is 0-14 pH, but using the sensor at temperature- and / or pH-extremes will seriously shorten the lifetime.

**Note:** Sensor is suitable for pure water applications.

GS 12B06J03-04E-E

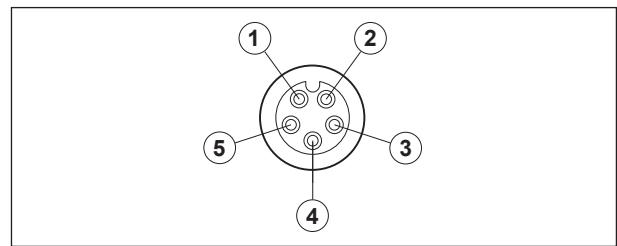
### Transmission signal (Data + and Data -)

General : Bi-directional digital communication (RS 485) with limited MODBUS support  
Data rate : 9600 b/s (8,E,1)  
Output function : pH or temperature compensated pH  
: ORP, pH compensated ORP, rH  
: Temperature  
: Junction resistance  
: Sensor details (Model, Serial Number, production date)  
: Sensor calibration data (zero, slope, temperature offset)  
: Sensor status signals (e.g. Glass impedance detection)

**Note:** The output functions and settings of the sensor are accessible using a dedicated device such as the Yokogawa FLXA analyzer.

### Power supply (Supply+ versus Supply Gnd)

Operating range : +2.7 to +3.6 VDC  
Power consumption :  $\leq 20$  Mw




**Figure 1: Sensor connector (front view) with gold plated contacts.**

Pin #	Signal description
1	Data -
2	Data +
3	Supply +
4	Shield
5	Supply Gnd

## REGULATORY STANDARDS

**CE** : Decision 768/2008/EC **CE N200**  
- ATEX : Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003  
Certificate no. : DEKRA 11ATEX0064 X  
 II 1 G Ex ia IIC T3...T6 Ga  
Electrical data : For sensor input circuits (by connector) connected to a certified intrinsically safe circuit with the following maximum values  
Ui = 6.1 V; Ii = 230 mA; Pi = 1.2 W;  
Li = 4 μH; Ci = 30 μF  
or  
Certified intrinsically safe Yokogawa transmitter Model FLXA21 series.  
Special conditions (X) : T6 for Tamb. -40 °C to +60 °C  
T5 for Tamb. -40 °C to +75 °C  
T4 for Tamb. -40 °C to +110 °C  
T3 for Tamb. -40 °C to +125 °C  
: Electrostatic charges on the sensor enclosure shall be avoided.



- 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.
- EMC	: Directive 2004/108/EC IEC 61326-1: 2006 Class A (control and laboratory use) IEC 61326-2-3: 2006 (use in industrial locations)
- Low Voltage	: Directive 2006/95/EC Sensor contains glass parts which if broken can cause cutting injuries.
- WEEE	: Directive 2012/19/EU 
- RoHS	: Directive 2011/65/EU

**IECEX**

Applying standards	: IEC 60079-0: 2007 IEC 60079-11: 2006 IEC 60079-26: 2006
Certificate no.	: IECEx DEK 11.0065X Ex ia IIC T3...T6 Ga

**CSA**

Certificate no.	: 2516979
Master contract no.	: 182892 IS, Class I Div. 1, GP A, B, C, D T3...T6
Electrical data	: For sensor input circuits (by connector), connected to a certified intrinsically safe circuit, with the following maximum values : $U_i = 6.1 \text{ V}$ ; $I_i = 230 \text{ mA}$ ; $P_i = 1.2 \text{ W}$ ; $L_i = 4 \text{ } \mu\text{H}$ ; $C_i = 30 \text{ } \mu\text{F}$ or Certified intrinsically safe Yokogawa transmitter Model FLXA21 series.
Ambient temperature	: T6 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+60 \text{ }^\circ\text{C}$ T5 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+75 \text{ }^\circ\text{C}$ T4 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+110 \text{ }^\circ\text{C}$ T3 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+125 \text{ }^\circ\text{C}$

**Note:** Intrinsically safe when connected as per Control Drawing FF1-K1226QV

**FM**

Certificate no.	: 3046277 IS, Class I Div. 1, GP A, B, C, D T3...T6
Electrical data	: For sensor input circuits (by connector), connected to a FM approved intrinsically safe apparatus meeting the entity parameters of the SENCOR <sup>®</sup> sensor: $U_i = 6.1 \text{ V}$ ; $I_i = 230 \text{ mA}$ ; $P_i = 1.2 \text{ W}$ ; $L_i = 4 \text{ } \mu\text{H}$ ; $C_i = 30 \text{ } \mu\text{F}$ or FM approved intrinsically safe Yokogawa transmitter Model FLXA21 series.
Ambient temperature	: T6 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+60 \text{ }^\circ\text{C}$ T5 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+75 \text{ }^\circ\text{C}$ T4 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+85 \text{ }^\circ\text{C}$ T3 for Tamb. $-40 \text{ }^\circ\text{C}$ to $+85 \text{ }^\circ\text{C}$

**Note:** Intrinsically safe when connected as per Control Drawing FF1-K1226QT (see

**INSTALLATION**

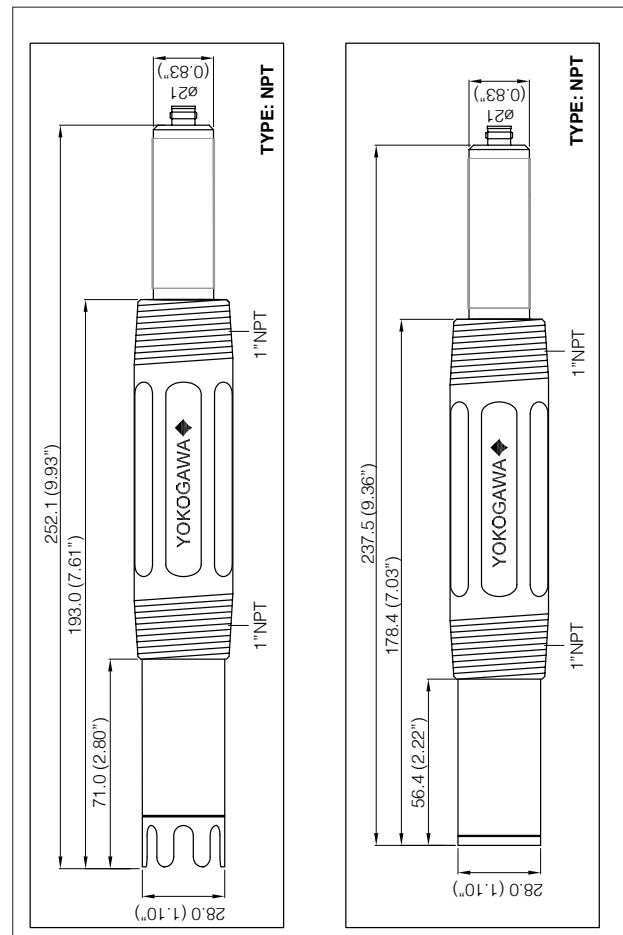
For optimum measurement results, the FU24F should be installed in a location that offers an acceptable representation of the process fluid composition and does not exceed the specifications of the sensor. The FU24F is designed with 1" NPT threads on either end of the body to allow installation in a wide variety of applications.

**Typical installation**

The FU24F sensor can be installed in-line, in a bypass loop or in an immersion assembly. For best results the FU24F should be mounted with the process fluid flowing towards the sensor. The sensor can also be mounted horizontally or any other angle.

**Mounting the sensor**

The FU24F can be mounted using the threads on the body of the sensor. For mounting the sensor in a FF20 flow fitting, use sparepart K1521JA or K1521JB.

**Dimensional Drawings**

## SC25F



The SC25F pH sensor, is the first 12 mm combined sensor released under the “SENCOM®” label. Under the SENCOM® product line digital communication functionality is added to sensors applied in process analysis. This digital communication and storage capability in the sensor opens additional advantages to our customers.

The basic features of the SC25F are similar to the analog SC25V sensor.

### Features

- 12mm PG13.5 pH electrode with Titanium LE element.
- Versatile in-line, immersion or off-line installation.
- Extended life time by saturated Ag/AgCl reference system with double junction combined with ion-trap, and porous PTFE reference diaphragm.
- Easy setup by sensor specific characteristics stored in the sensor itself.
- Integrated Pt1000 element for enhanced pH accuracy.
- Quality Inspection Certificate delivered with each sensor.

The SC25F SENCOM® sensors are equipped with PG13.5 connector and can be installed in the process by using:

- Retractable fitting PR10.
- Flow fitting FF20.
- Subassembly FS20.
- Immersion fitting FD20.
- Yokogawa’s Exacompact series PD20, PF20, PS20.

Using adapter K1523AJ it is also possible to install the sensor in the FF40 fitting supplied by Yokogawa. The last installation option in the small flow fitting K1598 requires the use of PG13,5 adapter K1523JB. For detailed information refer to the instruction manual for the SC25V

### Specifications

Type	Membrane	Resistance MΩ/ 25°C	pH- range	Temp. range (°C)	Pressure range (kPa)	Reference liquid	Diaphragm system	Reference	Atex	SENCOM
SC25F- AGP25	Universal pH glass bulb	175-275	0-14	-10-80	0-1000	Saturated KCl	Ag/AgCl wire	PTFE	Yes	Yes
SC25F- ALP25	High T chem.res.	500-700	0-14	15-130	0-1000	Saturated KCl	Ag/AgCl wire	PTFE	Yes	Yes

### Modelcode

Model	Suffix Code	Option code	Description
SC25F			12mm SENCOM® pH sensor: pH, Ref, LE, Temp.
Sensor type	-AGP25 -ALP25		General purpose High temperature chemical resistant.
Sensor length	-120 -225		120 mm 225 mm

**GENERAL SPECIFICATIONS SC25F**

**Measuring elements**  
 pH glass electrode  
 Silver Chloride reference  
 Solid Titanium electrode  
 Pt1000 temperature sensor

**Wetted parts**  
 Sensor body : Glass, PPS  
 Measuring sensor : G-glass or L-glass  
 Reference junction : Porous PTFE  
 Earth pin : Solid Titanium  
 O-ring : Viton

**Functional specifications (at 25°C)**

**Measuring system**  
 Isothermal point : pH 7  
 Reference system : Ag/AgCl with saturated KCl  
 Glass impedance : -G-glass 400 MΩ nominal  
 : -L-glass 775 MΩ nominal  
 Liquid outlet : Non-flow junction  
 Junction resistance : 0.2 to 5 kΩ  
 Temperature element : Pt1000 to IEC 751  
 Asymmetry potential(Zero) : 8 ± 15 mV  
 Slope : > 96 % (of theoretical value)

**Note:** The SC25F temperature sensor is designed for cell compensation and for indication. It is **NOT** designed for process temperature control.

**Dynamic specifications**

Response time pH : t90 < 15 sec. (for 7 to 4 pH step)  
 Response time temp. : t90 < 1.5 min. (for 10 °C step)  
 Stabilization time pH : < 2 min.  
 (for 0.02 pH / 10 sec.)

**Operating range**

pH : 0 to 14  
 Temperature G-glass : -10 °C to 80 °C (14 °F to 176 °F)  
 L-glass : +15°C to 130°C (59 °F to 266 °F)  
 Pressure : 0 to 10 bar (0 to 145 PSIG)  
 Conductivity : > 10 μS/cm

**Note:** The pH operating range at room temperature is 0-14 pH, but at high temperatures or range outside 2-12 pH the lifetime will be seriously shortened.

**Transmission signal (Data + and Data -)**

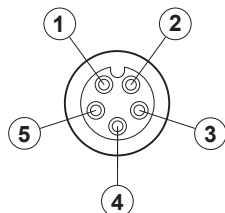
General : Bi-directional digital communication (RS 485) with limited MODBUS support  
 Data rate : 9600 b/s (8,E,1)  
 Output function : -pH or temperature compensated pH  
 -Temperature  
 -Junction resistance value  
 -Sensor details (Model, Serial Number, production date)  
 -Sensor calibration data (zero, slope, temperature offset)  
 -Sensor status signals (e.g. Glass impedance detection)

**Note:** The output functions and settings of the sensor are accessible using a dedicated device such as the Yokogawa FLXA analyzer





**Power supply (Supply+ versus Supply Gnd)**

Operating range : +2.7 to +3.6 VDC  
 Power consumption : ≤ 20 mW

Pin #	Signal description
1	Data -
2	Data +
3	Supply +
4	Shield
5	Supply Gnd



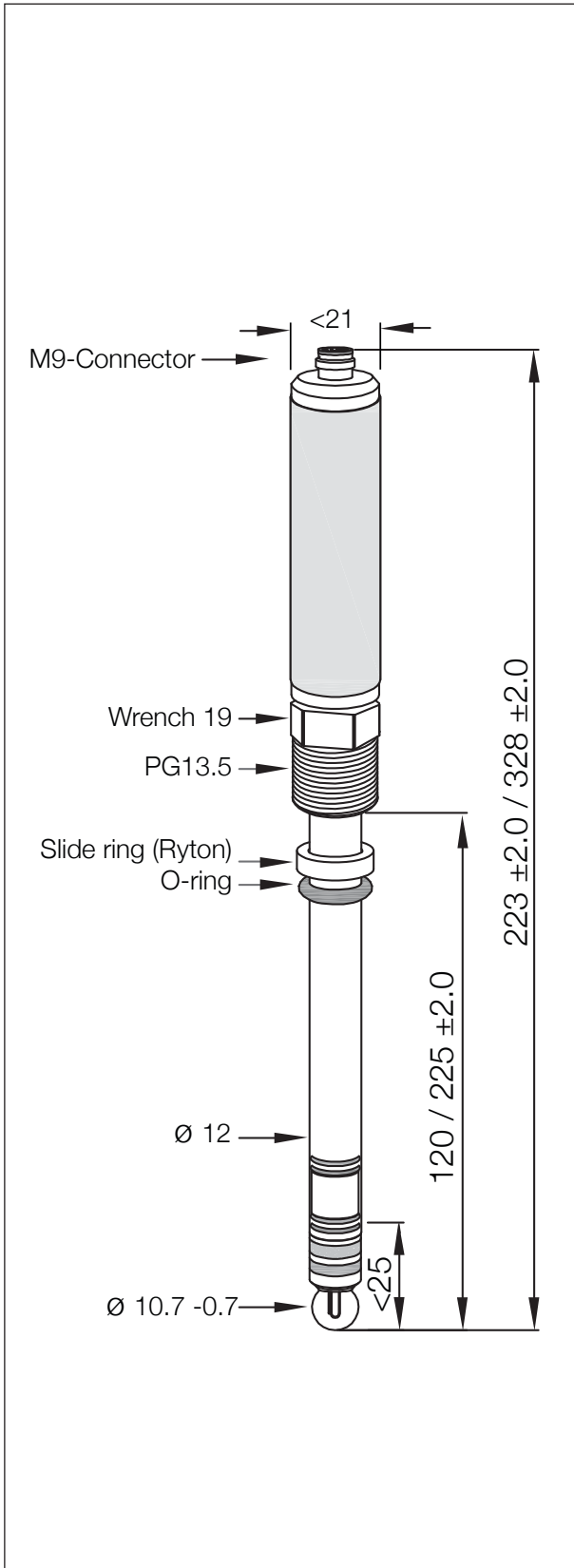
**Regulatory standards**

**CE** : Decision 768/2008/EC **CE N200**  
 - ATEX : Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003  
 Certificate no. : DEKRA 11ATEX0064 X for **Ex** II 1 G Ex ia IIC T3...T6 Ga  
 Electrical data : For sensor input circuits (by connector) connected to a certified intrinsically safe circuit with the following maximum values  
 Ui = 6.1 V; li = 230 mA; Pi = 1.2 W; Li = 4 μH; Ci = 30 μF  
 or Certified intrinsically safe Yokogawa transmitter Model FLXA21.  
 Special conditions (X) : T6 for Tamb. -40 °C to +60 °C  
 T5 for Tamb. -40 °C to +75 °C  
 T4 for Tamb. -40 °C to +110 °C  
 T3 for Tamb. -40 °C to +125 °C  
 Electrostatic charges on the sensor enclosure shall be avoided.  
 - 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.  
 - EMC : Directive 2004/108/EC  
 IEC 61326-1: 2005 Class A (control and laboratory use)  
 IEC 61326-1: 2005 (use in industrial locations)  
 - Low Voltage : Directive 2006/95/EC  
 Sensor contains glass parts which if broken can cause cutting injuries.  
 - WEEE : Directive 2012/19/EU   
 - RoHS : Directive 2011/65/EU   
**IECEx**  
 Applying standards : IEC 60079-0: 2007; IEC 60079-11: 2006; IEC 60079-26: 2006  
 Certificate no. : IECEx DEK 11.0065X for Ex ia IIC T3...T6 Ga  
**FM**  
 Certificate no. : 3046277  
 IS, CL I Div. 1, GP A, B, C, D T3...T6  
 Electrical data : For sensor input circuits (by connector), connected to a FM approved intrinsically safe apparatus meeting the entity parameters of the SENCOM® sensor:  
 Ui = 6.1 V; li = 230 mA; Pi = 1.2 W; Li = 4 μH; Ci = 30 μF  
 or FM approved intrinsically safe Yokogawa transmitter Model FLXA21 series.  
 Ambient temperature : T6 for Tamb. -40 °C to +60 °C  
 T5 for Tamb. -40 °C to +75 °C  
 T4 for Tamb. -40 °C to +85 °C  
 T3 for Tamb. -40 °C to +85 °C

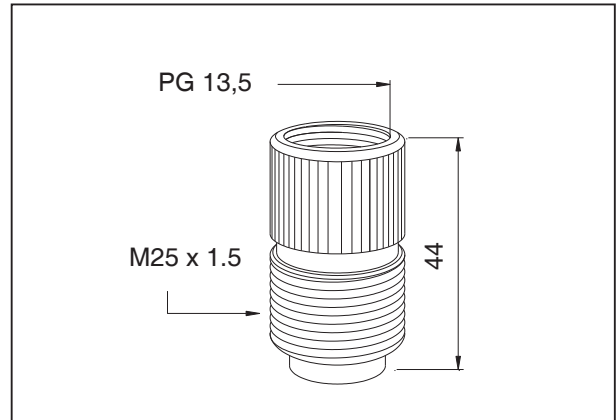
**Note:** Intrinsically safe when connected as per Control Drawing FF1-K1224QT

**DIMENSIONS**

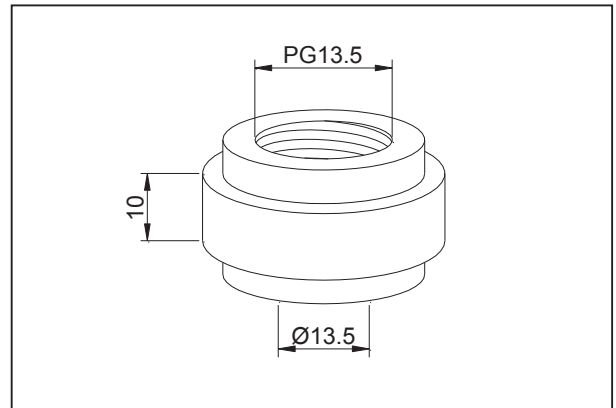
Dimensions in mm



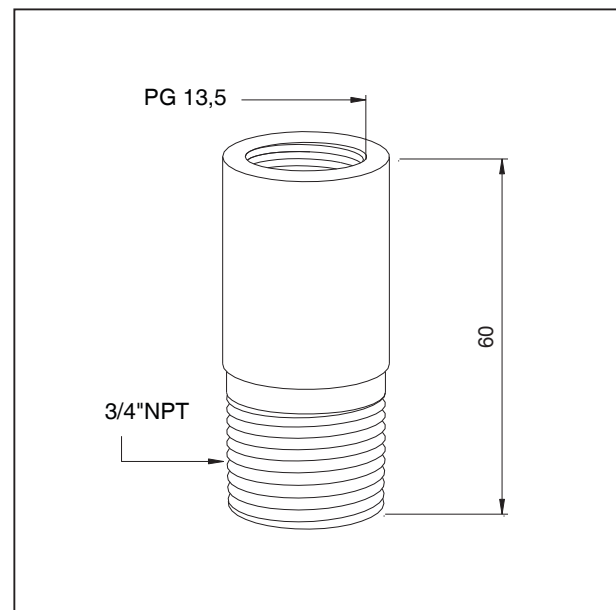
**Fig 10: Dimensions SC25F Sensor**



**Fig 11: Dimensions adapters  
K1500DV, K1520JN, K1520JP**



**Fig 12: Dimensions adapters  
K1523JA, K1523JC**



**Fig 13: Dimensions adapters  
K1523JB, K1523JD**

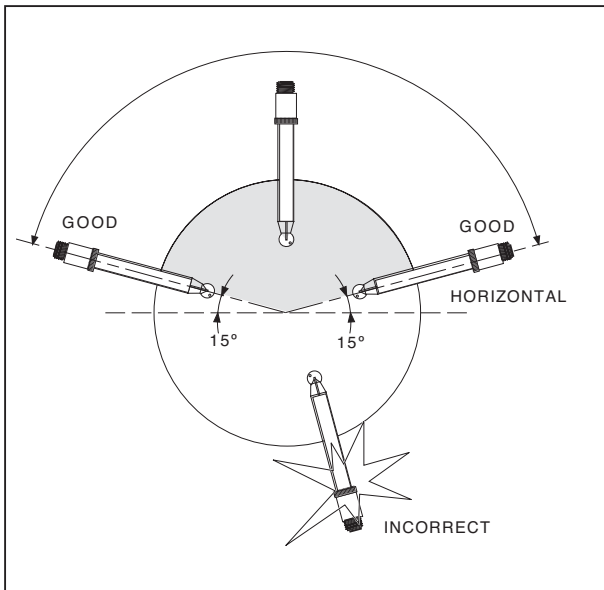
## INSTALLATION OF SC25F

For optimum measurement results, the SC25F should be installed in a location that offers an acceptable representation of the process composition and **DOES NOT** exceed the specifications of the sensor.

The SC25F is designed with PG13.5 threaded connection to allow installation in a wide variety of applications.

### Typical installation

The SC25F sensor is designed for versatile in-line, immersion or off-line installation. For best results the SC25F should be mounted with the process flow towards the sensor, and positioned at least 15° above the horizontal plane to eliminate air bubbles in the pH glass bulb (see Figure 14).



**Fig 14: Mounting positions of sensor**

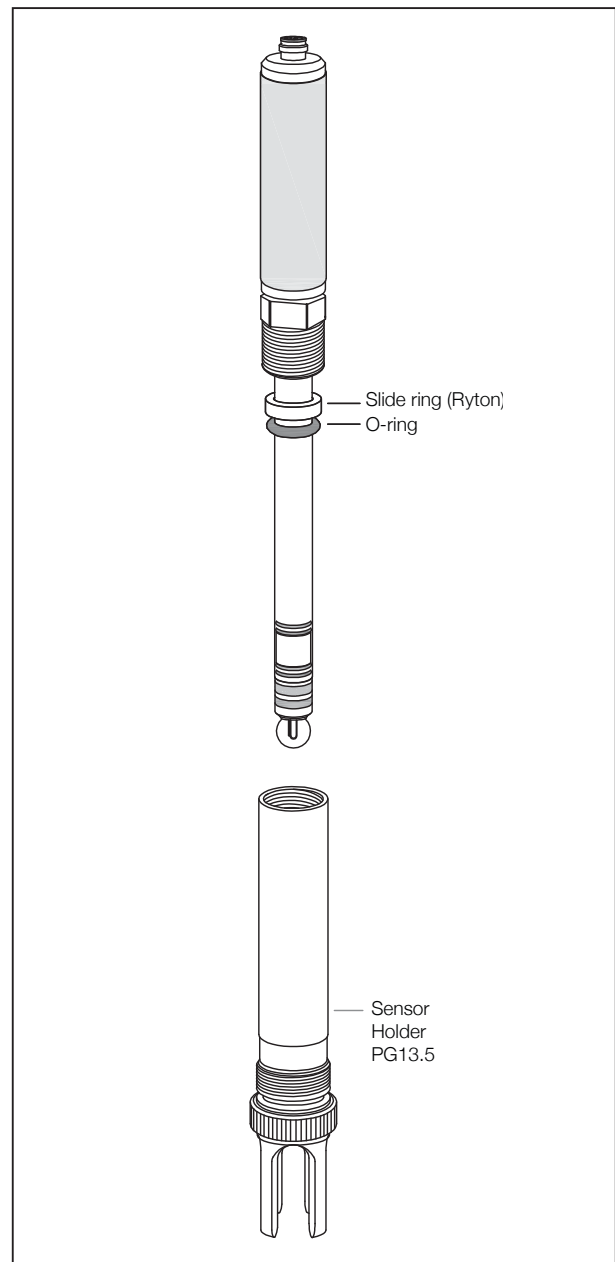
### Preparing the sensor for use

Remove the sensor from its shipping box and slide off the so-called 'wet pocket', the tube filled with solution to prevent drying out of the measuring elements during shipment or storage. During shipment, electrolyte in the sensor could be dislocated. To correct this, place the sensor upright for 24 hours. Before installing the sensor in the process it should be calibrated.

### Mounting the sensor

The simplest way is to use the PG13.5 threaded connection of the sensor. The sensor is standard with a slide ring (Ryton) and an O-ring (Silicon) for direct mounting in a fitting provided with PG13.5 thread (see Figure 15). Other O-ring materials are available as a spare part.

**Note:** When sensor is to be installed in a fitting which is already provided with a spacer for the sensor, remove the pre-installed slide ring and O-ring and follow the installation instructions of the fitting.



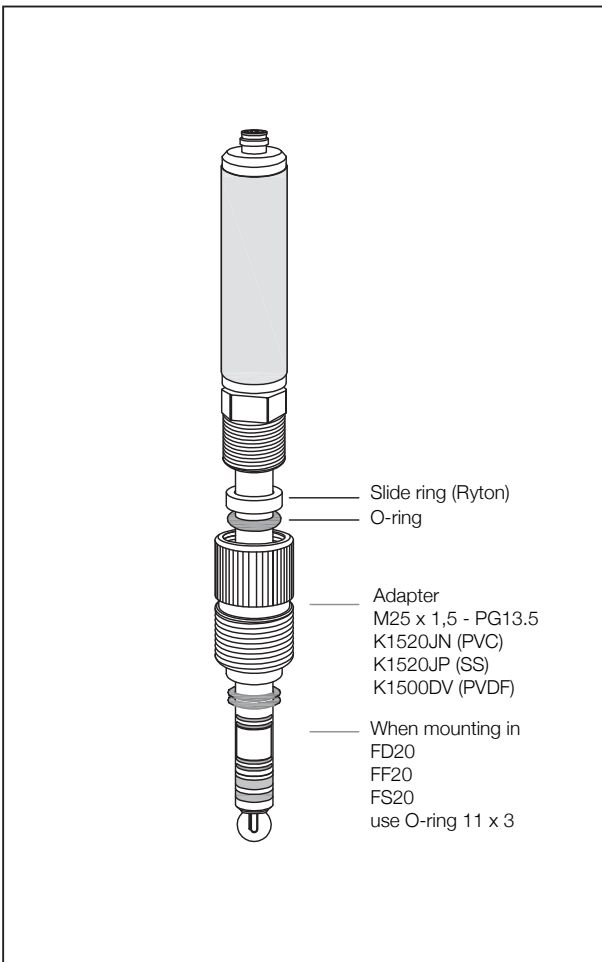
**Fig 15: Simple mounting of sensor in PR10 retractable fitting**

**Note:** Mounting the sensor in fittings where the sealing is situated nearby the sensortip, incorrect placement of the sensor will damage the measuring glass elements. Please handle with care.

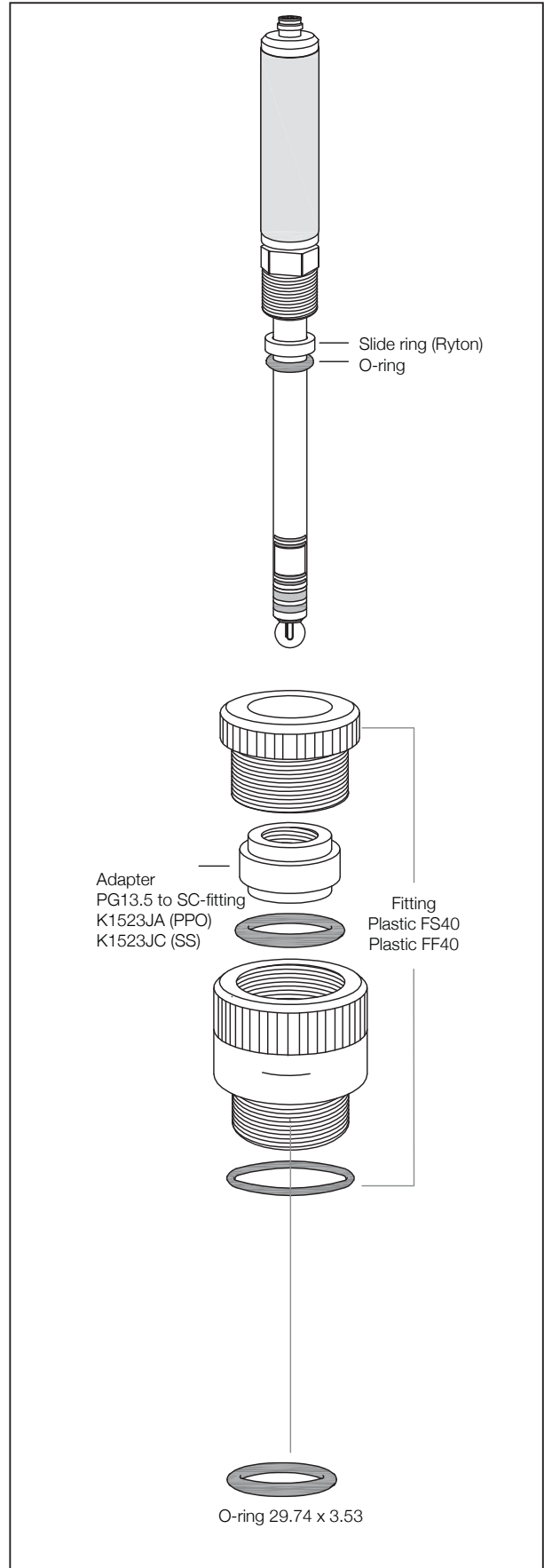
**Note:** First install the sensor in the adapter before mounting in the fitting.

The SC25F sensor can also be mounted in other fittings using a quick-removal adapter.

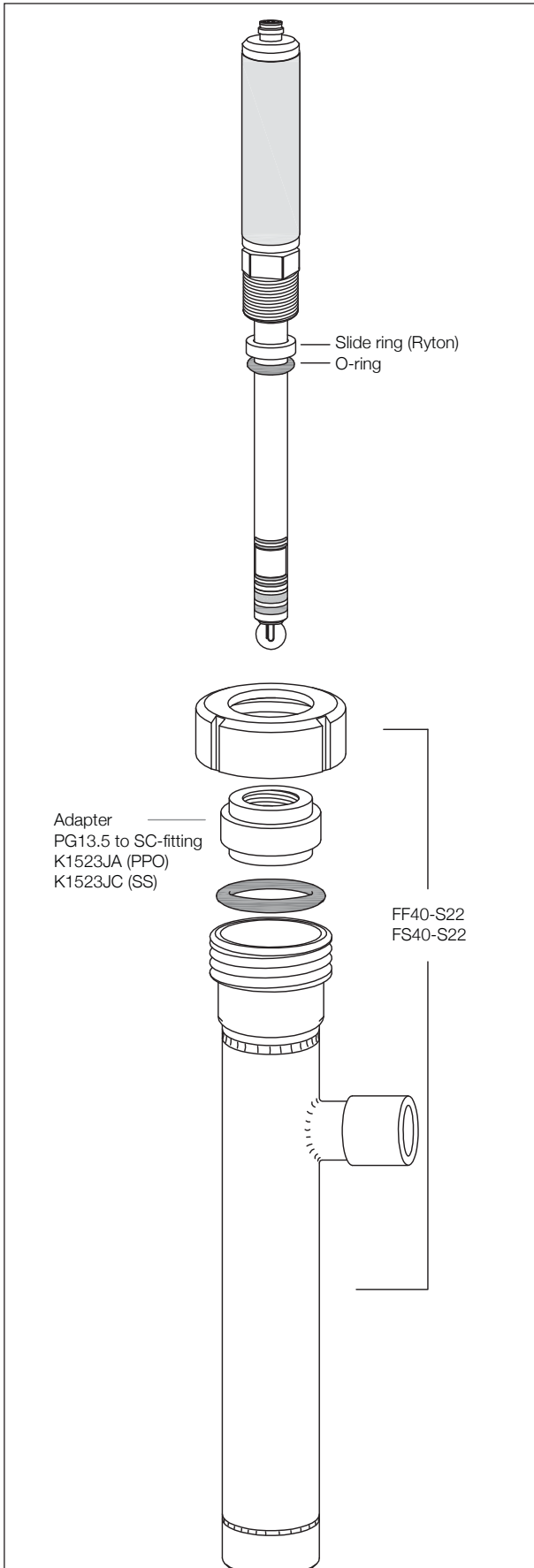
Examples of mounting the SC25F sensor using an adapter are given in Figures 16, 17, 18 and 19.



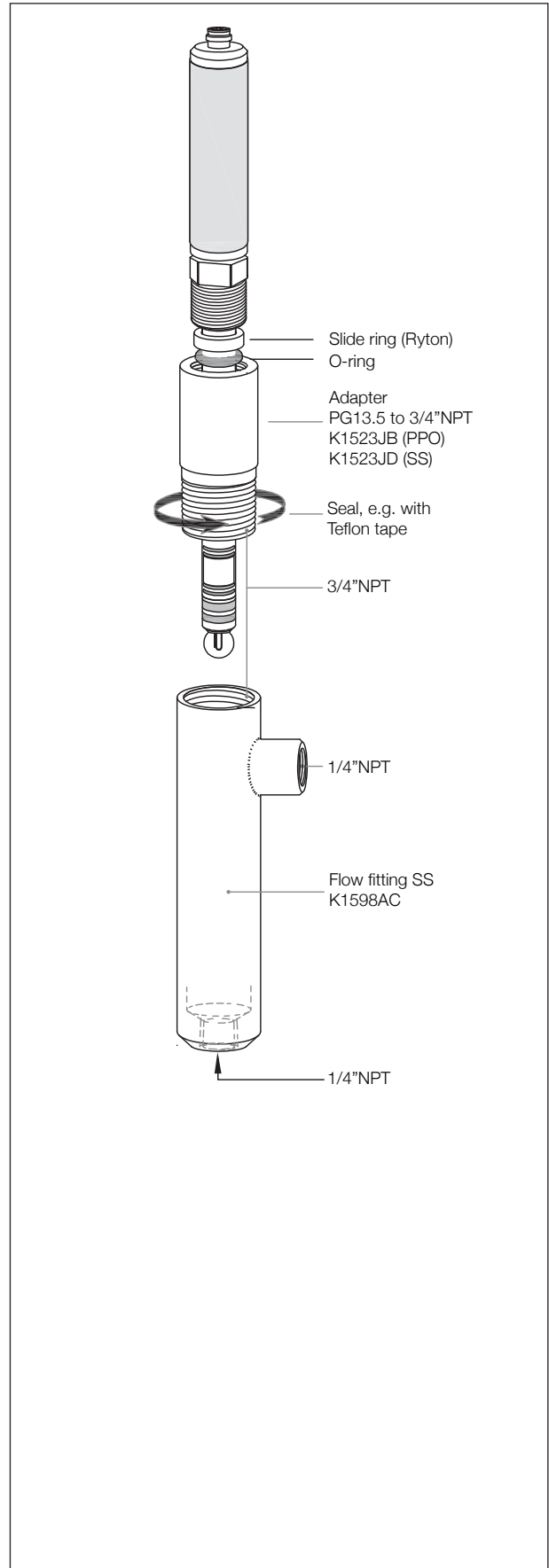
**Fig 16: Mounting of sensor in FD20/FF20/FS20 fitting using M25x1.5 adapter K1500DV/ K1520JN / K1520JP**



**Fig 17: Mounting of sensor in plastic FS40 / FF40 fitting, using adapter K1523JA / K1523JC**



**Fig 18: Mounting of sensor in metal FF40 fitting, using adapter K1523JA / K1523JC**



**Fig 19: Mounting of sensor in fitting K1598AC, using adapter K1523JB / K1523JD**

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