

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

YOKOGAWA

FU20-05-T1-NPT

WIDE BODY PH ORP SENSOR

Used with the applicable FU20 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: FU20 manufacturer technical reference

■ 1. General Specification FU20

1.1 Measuring elements

Sensor type	: pH glass electrode
Reference system	: Silver/Silver Chloride (Ag/AgCl) reference
Reference liquid	: FDA approved KCl
Electrode type	: Solid Platinum electrode
Temperature sensor	: Pt1000 temperature sensor (IEC 751)

1.2 Wetted parts

Wetted parts	
Sensor body	: PPS GF40 for type NPT, FSM, RCD, RCF : PVDF GF20+TZ4 for type FTD, MTD
Earthing/ORP pin	: Solid Platinum
Glass Membrane	: G-glass
Glass tube	: Lead-free glass
O-ring	: FKM, FFKM (model dependent)
Reference junction	: Porous PTFE

1.3 Functional specifications (at 25°C)

Isothermal point	: pH 7 / 3.3m KCl
Glass impedance range	
- Dome shape	: 100-300 MΩ
- Flat Surface	: 500-1000 MΩ
Junction resistance	: < 10 kΩ
Liquid outlet	: non-flow double junction
Asymmetry potential	: 8 ± 15 mV
Linearity pH (Slope)	: > 96 % (of theoretical value)

Note: The temperature sensor included in the FU20 is designed for process compensation and for indication. It is NOT designed for process temperature control.

1.4 Dynamic specifications (at 25°C)

Response time pH step (7 to 4)	: < 15 sec for 90%
Response time temp step (10°C)	
- Dome shape	: < 1 min for 90%
- Flat Surface	: < 4 min for 90%
Stabilization time (0.02 pH unit/10 s)	: < 2 minutes

1.5 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 (see Figures 1a and 1b)	
- For NPT, RCD	: 1.5 kPa - 1000 kPa (at 25°C to 105°C)
- For FSM, RCF	: 1.5 kPa - 500 kPa (at 25°C to 105°C)
- For FTD, MTD	: 1.5 kPa - 1000 kPa (at 25°C) 1.5kPa - 500 kPa (at 105°C)
Conductivity	: > 50 μS/cm

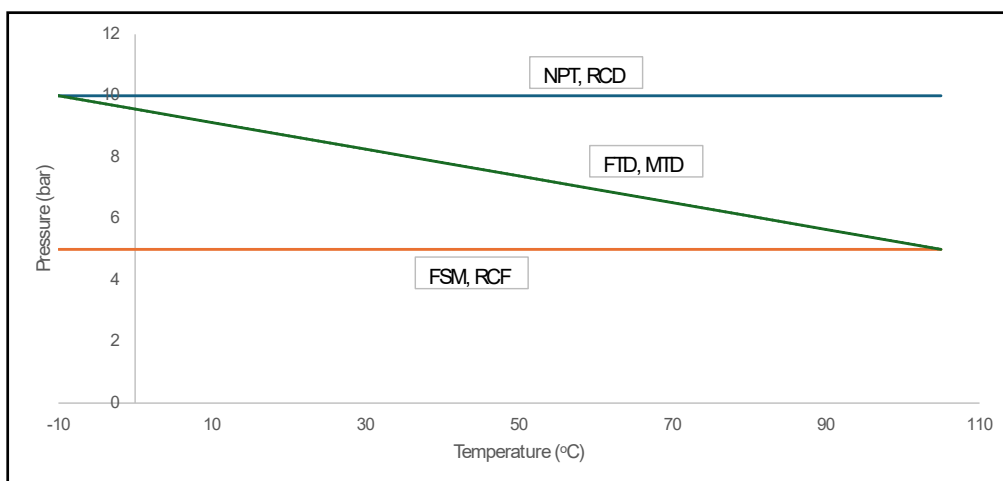


Figure 1a: Pressure (bar) & Temperature (°C) range FU20

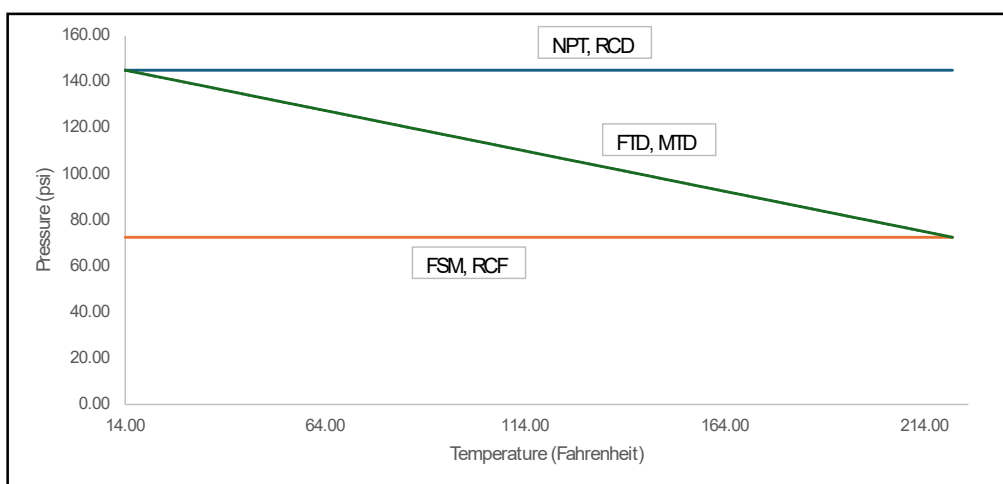


Figure 1b: Pressure (psi) & Temperature (°F) range FU20

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.

Note: The upper process temperature for the intrinsically safe version is limited by the ambient temperature (Tamb.) defined for each temperature class (T3, T4, T5 and T6)

1.6 Enviromental conditions

Storage temp. : -15 to 50 °C (5 to 122 °F)

Ingress Protection : IP67

1.7 Mechanical specifications

Max. torque on sensor body : -NPT, FSM, RCD, RCF 12 Nm
-FTD, MTD 8Nm

■ 2. Dimensions

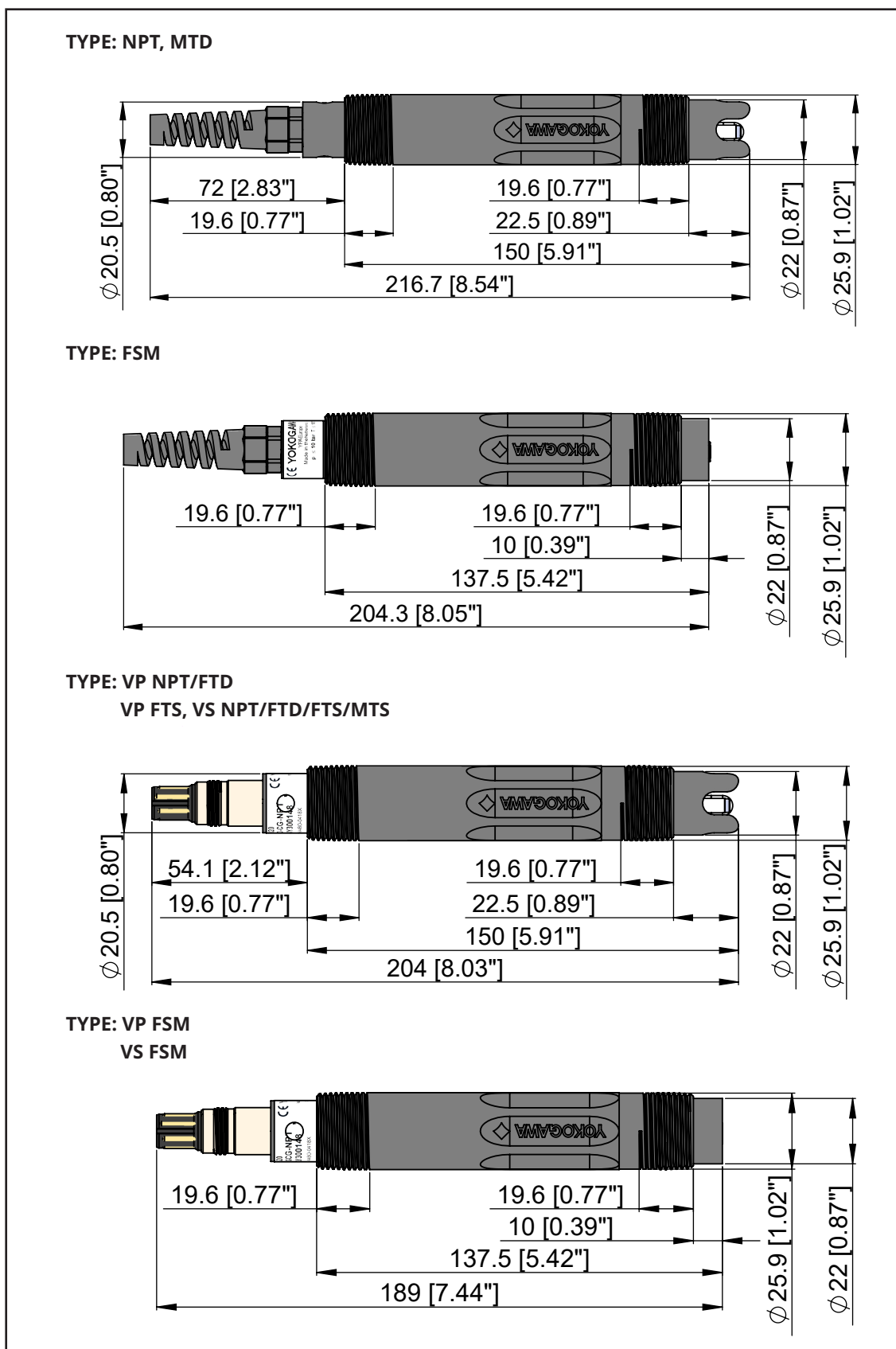


Figure 2: Dimensions FU20 non-collar body

■ 3. Model Codes & Parts

Table 2: Model & Suffix codes FU20

Model	Suffix Code	Option code	Description	
FU20			Wide Body sensor	
Cable length	-03		3 m cable	available for -NPT, FSM, FTD, MTD (MTD only in 5 m)
	-05		5 m cable	
	-10		10 m cable	
	-20		20 m cable	
	-VP		No Cable; VarioPin connector; available for -NPT, FTD, FSM	
	-VS		No Cable; VarioPin connector with ID-chip available for -NPT, FTD, RCD, FSM, RCF	
Temperature Sensor	-CG		Pt1000, IS for KCs	
	-T1		Pt1000, IS for ATEX/IECEX/FM-US/FM-CAN/NEPSI/PESO/TS/EACEx	
Model	-NPT		PPS body / Tapered Thread / Dome shaped	
	-RCD		PPS Collar body / Tapered Thread / Dome shaped (for use with FF40 fittings without the need for the K1523DD adapter)	
	-FSM		PPS body / Tapered Thread / Flat Surface	
	-RCF		PPS Collar body / Tapered Thread / Flat Surface (for use with FF40 fittings without the need for the K1523DD adapter)	
	-FTD		PVDF body / Tapered Thread / Dome shaped	
	-MTD		PVDF body / Tapered Thread / Dome shaped / FFKM O-ring in diaphragm	

Note: Suffix -FTS -MTS are not included in this manual. For specifications of these models check GS12B06J03-05EN-P and IM12B06J03-05EN-P.

Note: For model codes -RCD, - RCF and - MTD ATEX and FM approval is requested and approval is pending (expected completion in the coming months).

■ Addendum 1: Typical Installations

Mounting the FU20 in PR10 retractable

1. Take the sensor out of the box and apply Teflon tape to the appropriate threaded end.
2. Bind the separate wires of the cable together with a piece of tape.
3. Take the fitting out of the box and remove the option(s), if necessary.
4. Release the pigtail (cable gland) completely. Do not undo the part in the metal tube!
5. Lead the sensor cable through the tube of the fitting, from the side where the knurled knob has been removed. Attach the sensor and cable as usual.
6. Hold the sensor still and turn the metal tube onto the sensor. Don't rotate the cell, but rotate the tube of the fitting, because the cable can be disconnected from the cell, when rotating it.
7. Lead the loose part of the pigtail onto the cable and screw it onto the fixed part.
8. Remove the tape.

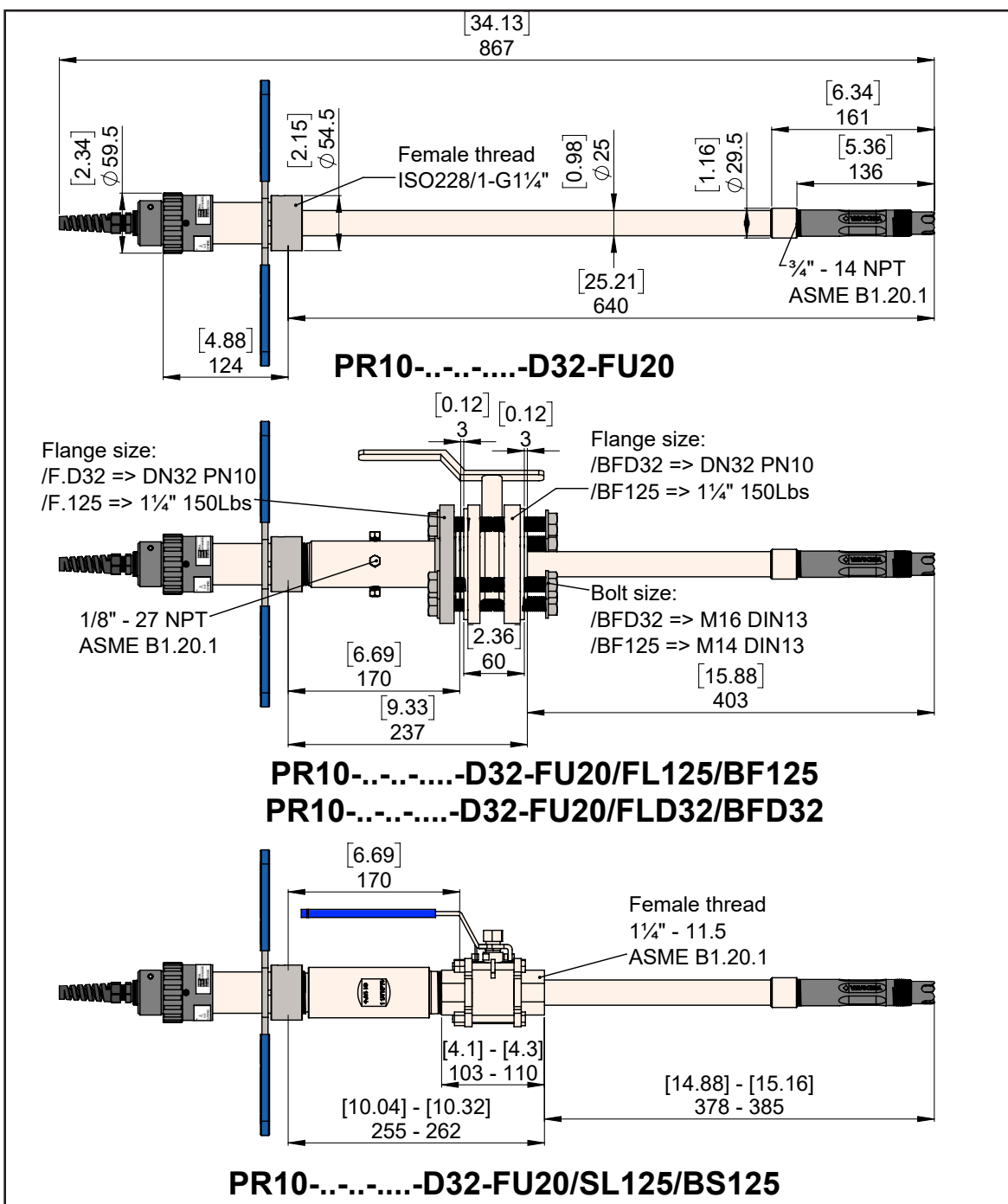


Figure 6: Dimensional drawing PR10...-D32 with mounted FU20 sensor units mm (inches)

Installation examples of FU20 with F*40 fittings

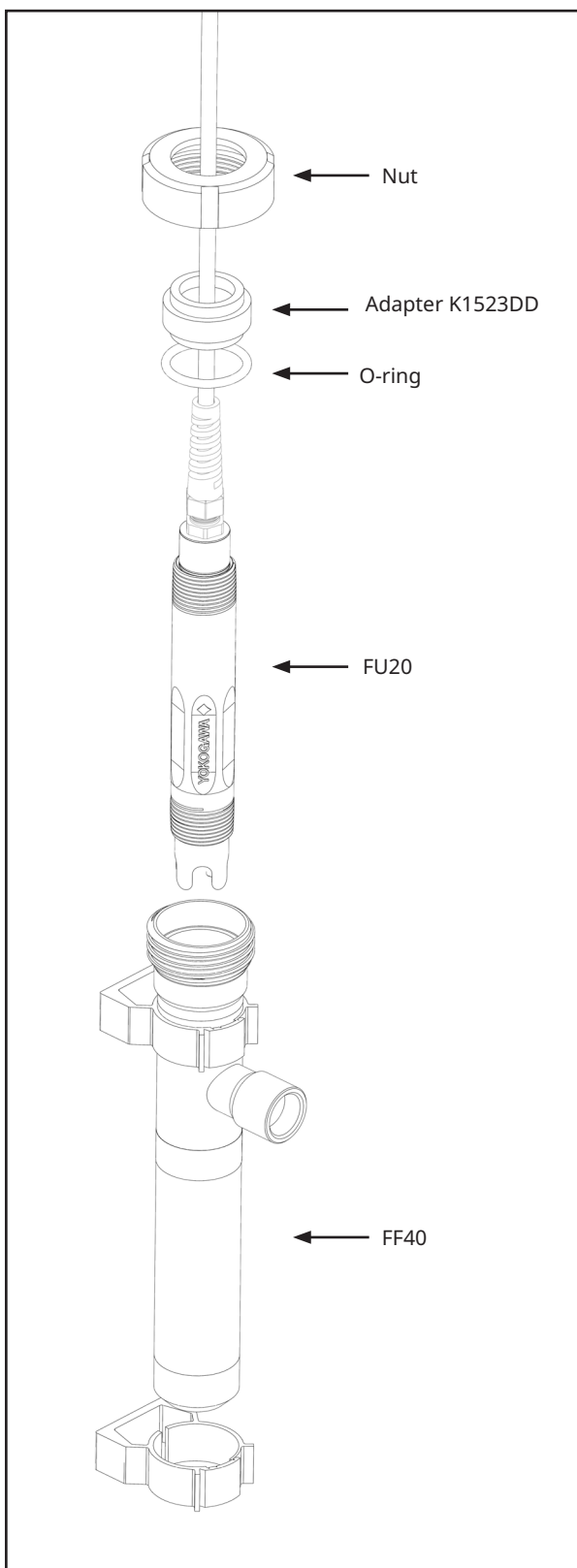


Figure 7: FF40 in combination with FU20 (non-collar body) using spare part number K1523DD adapter.

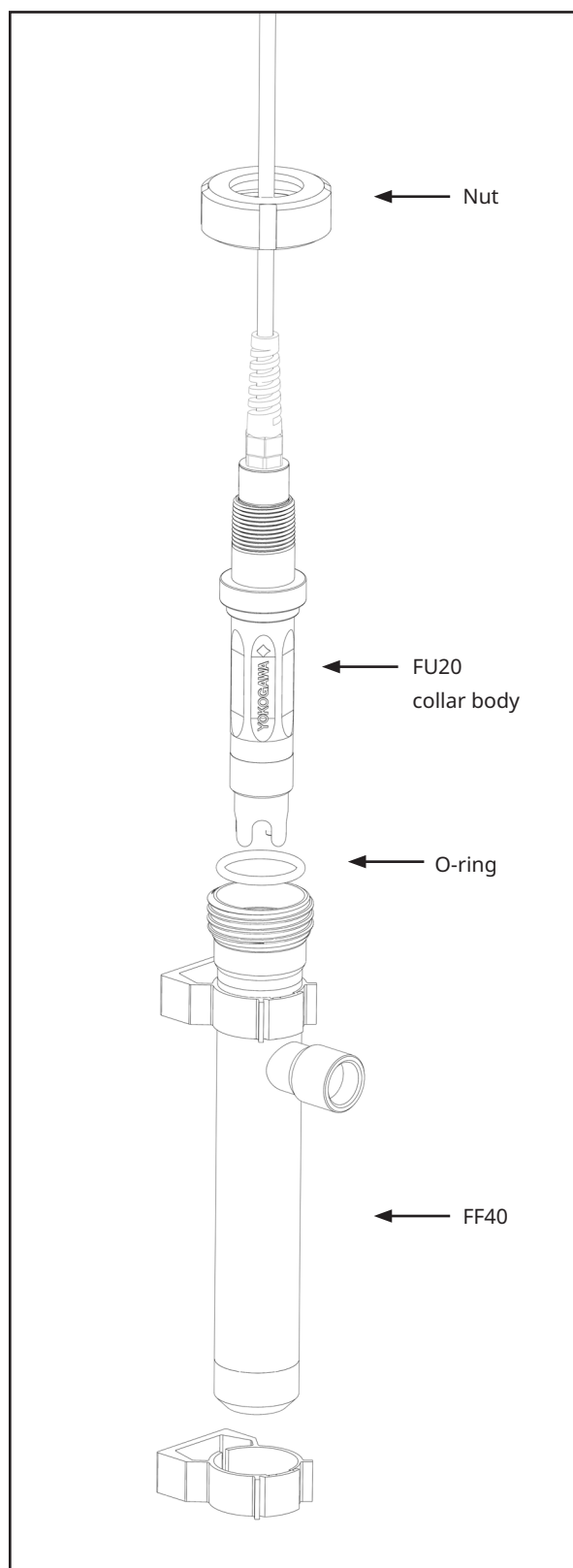


Figure 8: FF40 in combination with FU20 collar body (no adapter needed)