General Specifications
Model FU20-FTS and FU20-MTS
Differential pH/ORP-sensor

Overview
The FU20-FTS and FU20-MTS is a successful development in pH sensor technology, available from Yokogawa. This sensor has the measuring technology from differential sensor and the ruggedness of the appreciated wide body FU20 design in one product.

Most pH sensors are using silver/silver chloride reference cells with an open junction to the process. With the differential technology, the junction is not in direct contact with the process. This is for many applications beneficial because you will not poison silver/silver chloride reference. In a wide range of applications this solution has proven very effective and remains a cost effective solution.

Lifetime of the conventional sensors 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 measurement 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
• NEW FU20-MTS release with FFKM
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
- Sealing: Viton-FTS FFKM, EPDM-FTS
- 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
- Asymmetry potential: > 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 °C (14 to 221 °F)
- Pressure: p(bar)

**Conductivity**
- > 10 µS/cm 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**
  - Certificate no.: DEKRA 11ATEX0014
  - Special conditions (X): T3 for Tamb. -40 °C to +40 °C
  - T4 and T5 for Tamb. -30 °C to +105 °C

- **ROHS II**
  - Applying article: 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.

- **IECEx**
  - Applying standards: IEC 60079-0: 2012
  - IEC 60079-11: 2012
  - Certificate no.: IECEx DEK 11.0064X Ex ia IIC T3... T6 Ga
### MODEL CODES

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### Dimensional drawing
Dimensions in mm (inches)

**Fig 1. Dimensional drawing FU20-FTS**

**Connection scheme for variopin options**

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**Fig 2. Pin assignment scheme VP6 and VP8**

**Fig 3. Connections FU20-FTS/MTS**
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/MTS adapter Stainless Steel & Titanium and FU20-FTS/MTS adapter for FF40, FS40 and FD40 fittings

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

Fig 8. Installation example FU20-FTS/MTS in FF20-flow fitting SS
Fig 9. Installation examples for the FU20 in FD40

Fig 10. Installation examples for the FF40

GS 12B06J 03-05E-E
Fig 11. Installation in PR10 retractable fitting

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