

Four-electrode Conductivity Sensor

- FOUR ELECTRODE DESIGN provides exceptional linearity between 1 uS/cm and 1400 mS/cm.
- INITIAL CALIBRATION NOT REQUIRED Factory determined cell constant ensures maximum accuracy.
- AVAILABLE IN TRI-CLAMP¹, VARIVENT N², AND G-1¼ fittings.
- WETTED SURFACES (except electrodes) have a 16 micro-inch (0.4 micrometer) Ra finish.
- SENSOR BODY AND ELASTOMERS are compliant with 21CFR177.
- CERTIFICATE OF CONFORMANCE supplied with each sensor.



MODEL 410VP

APPLICATIONS

The Model 410VP four-electrode conductivity sensor is intended primarily for the determination of electrolytic conductivity in the pharmaceutical and food and beverage industries. Typical applications include monitoring the concentration of CIP solutions and rinses, monitoring eluents in chromatographic separations, and detecting liquid interfaces.

FEATURES

The Model 410VP sensor has a flat sensing face consisting of four circular electrodes arranged in a row. The analyzer injects an alternating current through the outer electrodes and measures the voltage across the inner electrodes. The conductance of the electrolyte solution between the voltage electrodes is readily calculated from the measured current and voltage. Because the voltage measuring circuit draws almost no current, errors caused by series capacitance and cable resistance, which are significant in two-electrode measurements at high conductivity, are greatly reduced. The Model 410VP sensor covers the range 1 uS/cm to 1400 mS/cm.

¹Tri-Clamp is a registered trademark of Alfa Laval, Inc.

²Varivent is a registered trademark of Tuchenhausen, GmbH.

Electrolytic conductivity is a strong function of temperature, and conductivity readings are typically corrected to a reference temperature. The Model 410VP senses temperature using a Pt1000 RTD. The RTD contacts the process liquid through a stainless steel face, so response to temperature changes is rapid.

The Model 410VP sensor is available in four sanitary connections: 1½-inch and 2-inch Tri-Clamp, Varivent N, and G 1¼. All wetted plastics and elastomers (elastomers are present in the G 1¼ version only) are compliant with 21CFR177, and all wetted surfaces except the electrodes have a 16 micro-inch (0.4 micrometer) Ra finish. The sensor is also available in a version (option -40) that is free of animal-derived ingredients.

The sensor is shipped with a certificate of conformance for materials and surface finish. A supplier material traceability certificate is also available as an option.

SPECIFICATIONS (Model 410VP)

Wetted materials:

- Electrodes: 316L stainless steel
- Sensor body: unfilled PEEK¹; compliant with 21CFR177.2415
- O-ring (option -22 only): EP; compliant with 21CFR177.2600

Surface finish: All wetted surfaces except electrodes have 16 micro inch (0.4 micrometer) Ra surface finish.

Process connections:

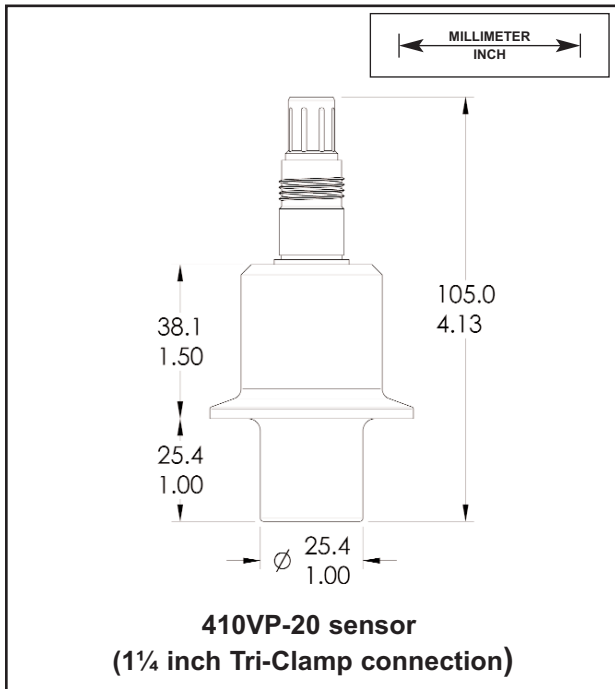
Option	Connection
20	1-1/2-inch Tri-Clamp
21	2-inch Tri-Clamp
22	G 1 1/4
23	Varivent N

- Compatible analyzer:** Model 1056 only
- Maximum cable length:** 100 ft (30.5 m)
- Range:** 1 uS/cm to 1400 mS/cm
- Accuracy:** within ±4% of the expected conductivity

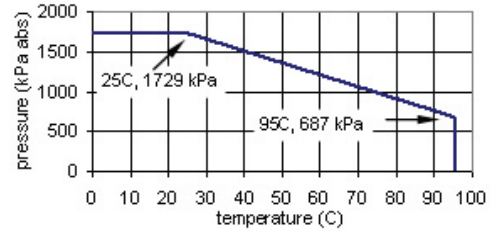
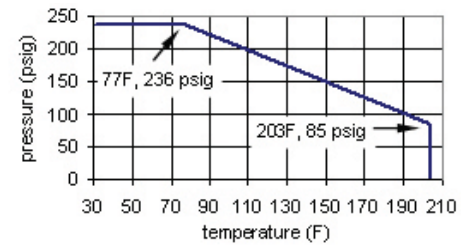
INSTALLATION

Install the sensor in the process piping so that the electrodes are completely immersed in the liquid. Generally, mounting the sensor in a vertical pipe is best. If the sensor must be installed in a horizontal pipe, place the sensor in the three o'clock position. Keep at least 0.25 inch (6 mm) clearance between the end of the sensor and the opposite pipe wall. Clamps and gaskets (if necessary) must be supplied by the user.

DIMENSIONS

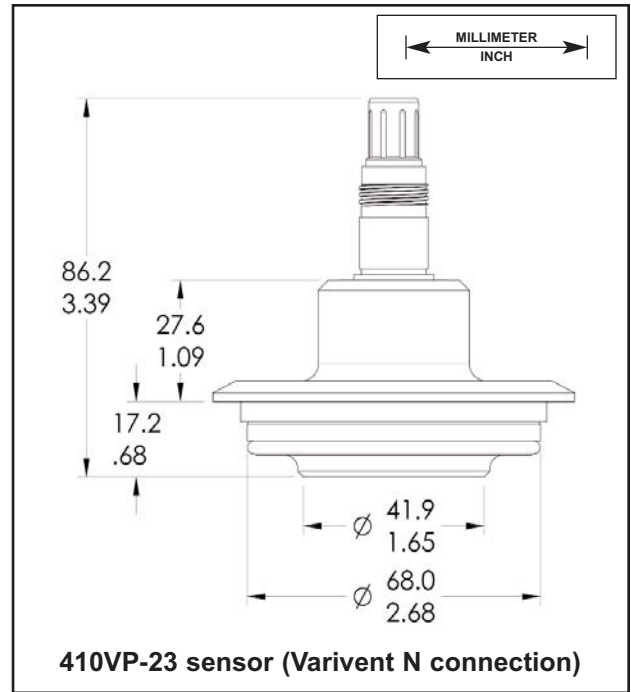
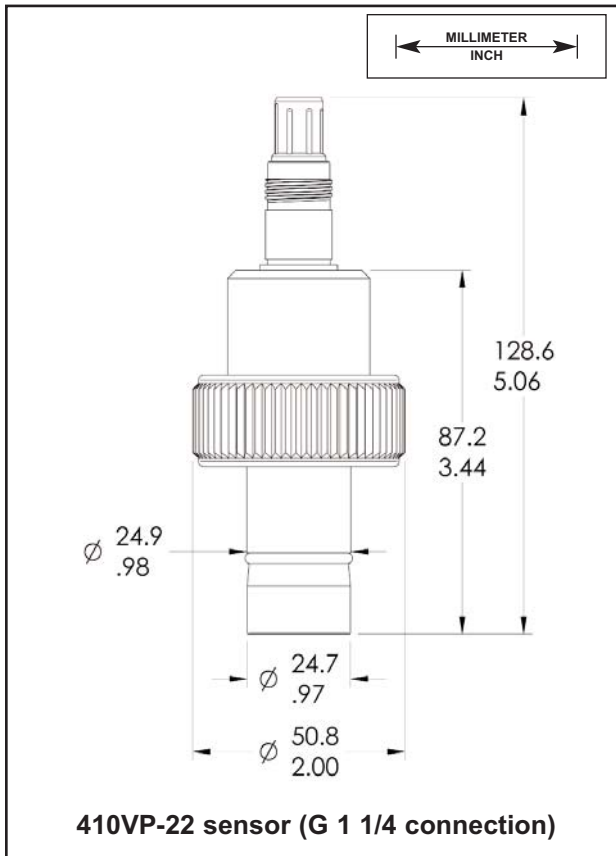


Temperature and Pressure:



- Steam sterilization:** tolerates SIP to 284°F (140°C)
 - Weight/shipping weight:** 1lb (0.5kg) / 1lb (0.5kg)
- Weight and shipping weight are rounded up to the nearest 1lb or 0.5kg.

¹PEEK is a registered trademark of Victrex plc.



ORDERING INFORMATION

Model 410VP four-electrode conductivity sensor is intended for the determination of conductivity in a variety of pharmaceutical and food and beverage applications. All wetted plastics and elastomers are compliant with 21CFR177, and all wetted surfaces except the electrodes have a 16 micro-inch (0.4 micrometer) Ra surface finish. A certificate of conformance is provided with each sensor. **Interconnecting VP cable must be ordered separately and is required for all first time installations. The sensor is compatible with the Model 1056 analyzer only.**

MODEL 410VP FOUR-ELECTRODE CONDUCTIVITY SENSOR	
CODE	Fitting type (required selection)
20	1½-inch Tri-Clamp
21	2-inch Tri-Clamp
22	G 1¼
23	Varivent N
CODE	Additional options (optional)
40	Sensor free of animal-derived ingredients
99Q8	Supplier material traceability certificates
410VP	20 EXAMPLE

INTERCONNECTING VP CABLE (required for first time installations)

Part number	Description	Weight *	Shipping Weight *
24287-00	Interconnecting cable for 410VP sensor with VP8.0 receptacle, 10ft (3.0m)	1lb (0.5kg)	2lb (1.0kg)
24287-01	Same as above except 50ft. (15.2m)	4lb (2.0kg)	3lb (2.5kg)

*Weights and shipping weights are rounded to the nearest 1 lb (0.5 kg).

ACCESSORIES

Part number	Description	Weight *	Shipping Weight *
23550-00	Junction box for remote cable connection	1lb (0.5kg)	2lb (1.0kg)
9200334	Extension cable from junction box to analyzer for 410VP sensor, unterminated, specify length	1lb/12ft 1.5 kg/10m	add 1lb (0.5kg)
24289-00	Extension cable from junction box to analyzer for 410VP sensor, terminated, specify length	1lb/12ft 1.5 kg/10m	add 1lb (0.5kg)

* Weights and shipping weights are rounded up to nearest 1lb (0.5kg)

ENGINEERING SPECIFICATIONS

1. The sensor shall be suitable for the determination of electrolytic conductivity between 1 uS/cm and 1400 mS/cm.
2. Measurement accuracy shall be $\pm 4\%$ of reading.
3. The sensor shall be available in 1½-inch and 2-inch Tri-Clamp, Varivent N, and G 1¼ process connections.
4. Electrodes shall be 316L stainless steel and the sensor body shall be unfilled PEEK. O-rings, if used, shall be EP. All plastics and elastomers shall be compatible with 21CFR177.
5. All wetted surfaces shall except electrodes have a 16 micro-inch (0.4 micrometer) Ra finish.
6. The sensor shall tolerate steam sterilization up to 284°F (140°C).
7. The sensor shall be available with a Variopol VP8.0 quick-disconnect fitting.
8. The sensor shall have an integral Pt 1000 RTD for temperature measurement.
9. The sensor shall be Rosemount Analytical Model 410VP or equivalent.



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