

# PURSense™ Sanitary Flange Conductivity Sensors

- Conductivity sensor designed to meet USP requirements in water for injection.
- Initial calibration not required. Factory-measured cell constant ensures out-of-the-box accuracy.
- All wetted surfaces have 16 micro-inch (0.4 micrometer) Ra finish.
- All wetted plastics and elastomers are compliant with 21CFR177.
- Certificate of conformance supplied with each sensor.
- Available with Variopol (VP) quick disconnect fitting.



## Applications

Rosemount Analytical 403 and 403VP sensors are intended primarily for the determination of electrolytic conductivity in water-for-injection (WFI). The sensors are also used in water purification systems in the food and beverage industry.

## Features

PURSense 403 and 403VP sensors are metal electrode contacting sensors. They are available in cell constants of 0.01, 0.1, and 1.0/cm. The choice of cell constant depends on conductivity. High conductivity samples require larger cell constants.

Sensors have concentric titanium electrodes separated by a PCTFE (Neoflon®) insulator. Ethylene propylene O-rings seal the internal parts of the sensor from the process liquid. The sanitary flange is 316 stainless steel. All wetted plastics and elastomers are compliant with 21CFR177, and all wetted surfaces have a

16 microinch (0.4 micrometer) Ra finish. The O-rings also meet the requirements of USP Class VI. The sensor is shipped with a certificate of conformance for materials and surface finish.

Electrolytic conductivity is a strong function of temperature, and conductivity readings are typically converted to the value at a reference temperature. A platinum RTD in the inner electrode measures the temperature.

PURSense 403 and 403 VP sensors are available with either a 1-1/2 inch or 2-inch TriClamp® sanitary process connection.

The 403VP has a Variopol 6 (VP) quick disconnect watertight connector. Wire the interconnecting cable to the analyzer and run the cable to the sensor. The sensor plugs into the cable receptacle. To replace the sensor, simply disconnect the Variopol fitting and plug in a new sensor. There is no need to rewire or rerun cable.

## Specifications

**Cell constants:** 0.01, 0.1 and 1.0/cm

**Wetted materials:** titanium; 316L stainless steel (contains < 5% delta ferrite); PCTFE (Neoflon), compliant with 21CFR 177.1380; EP, compliant with 21CFR177.2600 and USP Class VI

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

**Process connection:** 1-1/2 inch or 2-inch sanitary flange

**Temperature:** 32 – 221°F (0 – 105°C). Sensors are steam-sterilizable to 275°F (135°C)

**Pressure:** 250 psig (1825 kPa abs) maximum

**Cable length:** 10 ft (3.1 m) standard; 50 ft (15.2 m) optional

### Weight/shipping weight:

403 sensor with 10 ft (3.1 m) cable: 2 lb (1.0 kg)/3 lb (1.5 kg)

403 sensor with 50 ft (15.2 m) cable: 4 lb (2.0 kg)/5 lb (2.5 kg)

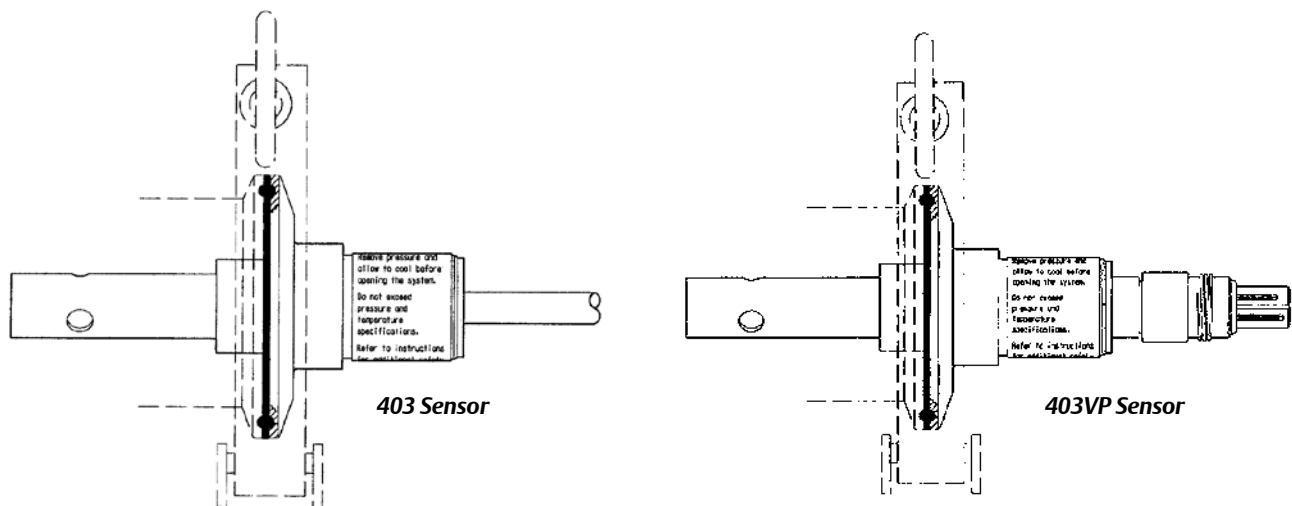
403VP sensor: 1 lb (0.5 kg)/2 lb (1.0 kg)

(rounded up to nearest 1 lb or 0.5 kg)

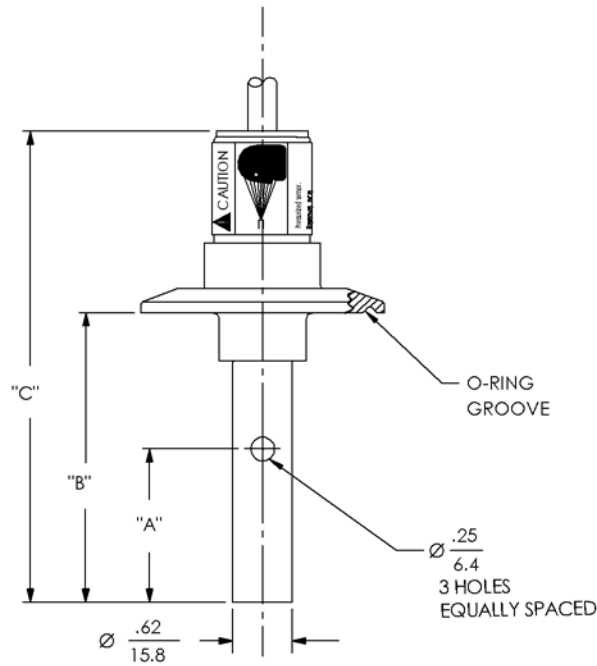
## Instrument Compatibility

The 403 sensor is compatible with the 1056, 56, 5081-C, and 1066-C instruments. Consult the analyzer data sheet for the recommended conductivity range for each cell constant and the expected linearity over the range. For compatibility with older instruments, call the factory.

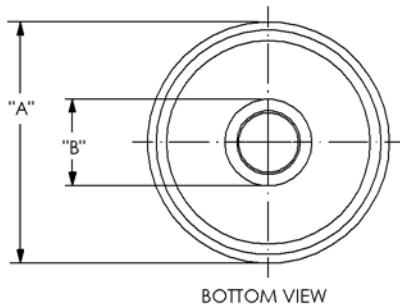
## Installation



**403 and 403VP Sensor Installation.** The tee, clamp, and gasket are supplied by the user. Install the sensor so that it is completely submerged in the process liquid. Installation in a vertical pipe run is best. If the sensor must be installed in a horizontal pipe run, place the sensor in the 3 o'clock position.



403-11, 12, 13

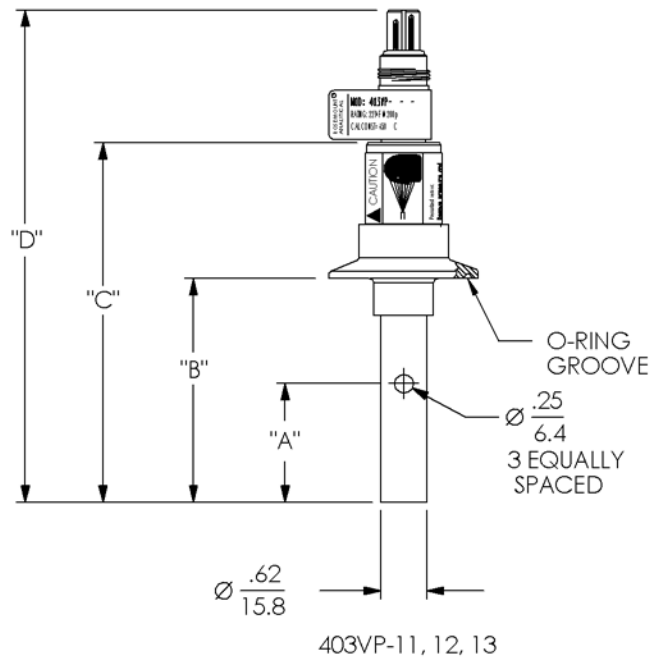


BOTTOM VIEW

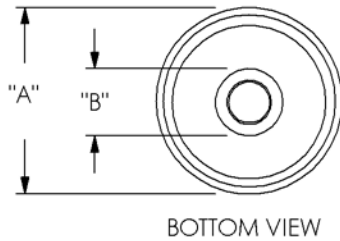
| MODEL NO                     | "A"  |      | "B"  |       | "C"  |       |
|------------------------------|------|------|------|-------|------|-------|
|                              | INCH | MM   | INCH | MM    | INCH | MM    |
| 403-11 standard length       | 1.59 | 40.4 | 3.00 | 76.2  | 4.88 | 124.0 |
| 403-12 standard length       | 0.67 | 17.0 | 1.62 | 41.1  | 3.50 | 88.9  |
| 403-13 standard length       | 0.67 | 17.0 | 2.13 | 54.1  | 4.01 | 101.9 |
| 403-11 extended length (-36) | 1.59 | 40.4 | 6.00 | 152.4 | 7.88 | 200.2 |
| 403-12 extended length (-36) | 0.67 | 17.0 | 6.00 | 152.4 | 7.88 | 200.2 |
| 403-13 extended length (-36) | 0.67 | 17.0 | 6.00 | 152.4 | 7.88 | 200.2 |

| MODEL NO.  | FITTING SIZE | "A" FLANGE "B" |      |          |      |
|------------|--------------|----------------|------|----------|------|
|            |              | DIAMETER       |      | DIAMETER |      |
|            |              | INCH           | mm   | INCH     | mm   |
| 403-( )-20 | 1 1/2 INCH   | 1.98           | 50.3 | .80      | 20.3 |
| 403-( )-21 | 2 INCH       | 2.50           | 63.5 | .90      | 22.9 |

**403 Sensor Dimensions**



| MODEL NO                       | "A"  |      | "B"  |       | "C"  |       | "D"  |       |
|--------------------------------|------|------|------|-------|------|-------|------|-------|
|                                | INCH | MM   | INCH | MM    | INCH | MM    | INCH | MM    |
| 403VP-11 standard length       | 1.59 | 40.4 | 3.00 | 76.2  | 4.80 | 121.9 | 6.60 | 167.6 |
| 403VP-12 standard length       | 0.67 | 17.0 | 1.62 | 41.1  | 3.44 | 87.4  | 5.24 | 133.1 |
| 403VP-13 standard length       | 0.67 | 17.0 | 2.13 | 54.1  | 3.95 | 100.3 | 5.75 | 146.1 |
| 403VP-11 extended length (-36) | 1.59 | 40.4 | 6.00 | 152.4 | 7.80 | 198.1 | 9.60 | 243.8 |
| 403VP-12 extended length (-36) | 0.67 | 17.0 | 6.00 | 152.4 | 7.80 | 198.1 | 9.60 | 243.8 |
| 403VP-13 extended length (-36) | 0.67 | 17.0 | 6.00 | 152.4 | 7.80 | 198.1 | 9.60 | 243.8 |



| MODEL NO     | FITTING SIZE | "A" FLANGE DIAMETER |      | "B" FLANGE DIAMETER |      |
|--------------|--------------|---------------------|------|---------------------|------|
|              |              | INCHES              | mm   | INCHES              | mm   |
| 403VP-( )-20 | 1 1/2 INCHES | 1.98                | 50.3 | .80                 | 20.3 |
| 403VP-( )-21 | 2 INCHES     | 2.50                | 63.5 | .90                 | 22.9 |

**403VP Sensor Dimensions**

The **403 Sanitary Flange Sensor** with integral cable is intended for the determination of electrolytic conductivity in clean water applications in the pharmaceutical and food and beverage industries. All wetted polymers are 21CFR177 (FDA) compliant, and the O-rings also meet USP Class VI requirements. All wetted surfaces have a 16 micro inch (0.4 micrometer) Ra finish. A certificate of conformance is provided with each sensor. For a copy of supplier material traceability certificates, order option 99Q8.

| 403 TRI-CLOVER flange Conductivity Sensor |   |
|---|---|
| CODE                                      | Cell Constant (required selection)  |
| 11  | 0.01/cm   |
| 12  | 0.1/cm  |
| 13  | 1.0/cm  |
|   |   |
| CODE                                      | Cell Constant (required selection)  |
| 20  | 1-1/2 inch  |
| 21  | 2 inch  |
|   |   |
| CODE                                      | Temperature Measurement   |
| -   | Pt 1000 for 1056, 56, 5081-C, 6081C, and 1066-C                               |
|   |   |
| CODE                                      | Additional Options (optional selection)                                       |
| 36  | Extended insertion length (6 in. from inside face of flange to end of sensor) |
| 50  | Extended cable length, 50 ft (15.2 m)   |
| 99Q8                                      | Supplier material traceability certificates                                   |
| <b>403</b>                                | <b>11      21      50      EXAMPLE</b>  |

The **403VP Sanitary Flange Sensor** with Variopol connector is intended for the determination of electrolytic conductivity in clean water applications in the pharmaceutical and food and beverage industries. All wetted polymers are 21CFR177 (FDA) compliant, and the O-rings also meet USP Class VI requirements. All wetted surfaces have a 16 micro inch (0.4 micrometer) Ra finish. A certificate of conformance is provided with each sensor. For a copy of supplier material traceability certificates, order option 99Q8. **Interconnecting cable must be ordered separately. See page 6.**

| 403VP Sanitary flange Conductivity Sensor |   |
|---|---|
| CODE                                      | Cell Constant (required selection)  |
| 11  | 0.01/cm   |
| 12  | 0.1/cm  |
| 13  | 1.0/cm  |
|   |   |
| CODE                                      | Diameter of Fitting (required selection)                                      |
| 20  | 1-1/2 inch  |
| 21  | 2 inch  |
|   |   |
| CODE                                      | Temperature Measurement   |
| -   | Pt 1000 for 1056, 56, 5081-C, 6081C, and 1066-C                               |
|   |   |
| CODE                                      | Additional Options (optional selection)                                       |
| 36  | Extended insertion length (6 in. from inside face of flange to end of sensor) |
| 99Q8                                      | Supplier material traceability certificates                                   |
| <b>403VP</b>                              | <b>11      21      EXAMPLE</b>  |

## CONNECTING VP CABLE FOR 403VP

| Part Number | Description                                  | Weight        | Shipping Weight   |
|-------------|--|---------------|-------------------|
| 23747-06    | Interconnecting cable, VP 6, 2.5 ft (0.8 m)  | 1 lb (0.5 kg) | Add 1 lb (0.5 kg) |
| 23747-04    | Interconnecting cable, VP 6, 4 ft (1.2m)     | 1 lb (0.5 kg) | Add 1 lb (0.5 kg) |
| 23747-02    | Interconnecting cable, VP 6, 10 ft (3.0 m)   | 1 lb (0.5 kg) | Add 1 lb (0.5 kg) |
| 23747-07    | Interconnecting cable, VP 6, 15 ft (4.6 m)   | 2 lb (1.0 kg) | Add 1 lb (0.5 kg) |
| 23747-08    | Interconnecting cable, VP 6, 20 ft (6.1 m)   | 2 lb (1.0 kg) | Add 1 lb (0.5 kg) |
| 23747-09    | Interconnecting cable, VP 6, 25 ft (7.6 m)   | 2 lb (1.0 kg) | Add 1 lb (0.5 kg) |
| 23747-10    | Interconnecting cable, VP 6, 30 ft (9.1 m)   | 2 lb (1.0 kg) | Add 1 lb (0.5 kg) |
| 23747-03    | Interconnecting cable, VP 6, 50 ft (15.2 m)  | 4 lb (2.0 kg) | Add 1 lb (0.5 kg) |
| 23747-11    | Interconnecting cable, VP 6, 100 ft (30.5 m) | 8 lb (4.0 kg) | Add 1 lb (0.5 kg) |

## ACCESSORIES

| Part Number | Description   | Weight                     | Shipping Weight      |
|-------------|---|----------------------------|----------------------|
| 23550-00    | Junction box for remote cable connection                | 8 lb (4.0 kg)              | 9 lb (4.5 kg)        |
| 9200275     | Connecting cable, unterminated, specify length          | 0.6 lb/10ft<br>(1 kg/10 m) | Add 1 lb<br>(0.5 kg) |
| 23747-00    | Connecting cable, terminated, specify length            | 0.6 lb/10ft<br>(1 kg/10 m) | Add 1 lb<br>(0.5 kg) |
| 05010781899 | Conductivity standard SS-6, 200 uS/cm, 32 oz (0.95 L)   | 3 lb (1.5 kg)              | 4 lb (2.0 kg)        |
| 05010797875 | Conductivity standard SS-6A, 200 uS/cm, 1 gal (3.78 L)  | 9 lb (4.5 kg)              | 10 lb (4.5 kg)       |
| 05010782468 | Conductivity standard SS-5, 1000 uS/cm, 32 oz (0.95 L)  | 3 lb (1.5 kg)              | 4 lb (2.0 kg)        |
| 05010783002 | Conductivity standard SS-5A, 1000 uS/cm, 1 gal (3.78 L) | 9 lb (4.5 kg)              | 10 lb (4.5 kg)       |
| 05000705464 | Conductivity standard SS-1, 1409 uS/cm, 32 oz (0.95 L)  | 3 lb (1.5 kg)              | 4 lb (2.0 kg)        |
| 05000709672 | Conductivity standard SS-1A, 1409 uS/cm, 1 gal (3.78 L) | 9 lb (4.5 kg)              | 10 lb (4.5 kg)       |
| 05010782147 | Conductivity standard SS-7, 5000 uS/cm, 32 oz (0.95 L)  | 3 lb (1.5 kg)              | 4 lb (2.0 kg)        |
| 05010782026 | Conductivity standard SS-7A, 5000 uS/cm, 1 gal (3.78 L) | 9 lb (4.5 kg)              | 10 lb (4.5 kg)       |

### Engineering Specification for 403 and 403VP sensor

1. The sensor shall be suitable for the determination of electrolytic conductivity in water for injection and in any water purification installation where Tri Clamp fittings are used.
2. The sensor shall be available with either 1-1/2 inch or 2-inch 316 stainless steel sanitary flanges.
3. Electrodes shall be titanium.
4. The insulator shall be PCTFE and shall be compliant with 21CFR177.1380.
5. The O-rings shall be EP and shall be compliant with 21CFR177.2600 and USP Class VI.
6. All wetted surfaces shall have a 16 micro inch (0.4 micrometer) Ra finish.
7. The sensor shall be available with either an integral cable or a Variopol quick disconnect fitting.
8. The sensor shall have an integral platinum RTD for temperature measurement.
9. The sensor shall be Rosemount Analytical 403 (integral cable) or 403VP (Variopol fitting) or approved equal.

## Compatible Analyzers and Transmitters

**The 1056 Dual Input Analyzer** can be used with any PURSense family conductivity sensor to measure electrolytic conductivity in a variety of applications. The 1056 can be set up as either a dual input conductivity analyzer, or the second input can be



connected to a pH, ORP, chlorine, oxygen, ozone, or turbidity sensor. The analyzer has two fully programmable analog outputs. Four fully programmable alarm relays are available as an option. The high contrast display shows measurement results in large, easy-to-read digits. Menu screens for programming are simple and intuitive. Plain language prompts (in seven languages) guide the user. The analyzer continuously monitors itself and the sensor for faults and alerts the user when it detects a problem. HART and Profibus digital communications are optional. HART allows the user to communicate with the analyzer through AMS (Asset Management Solutions) from a host anywhere in the plant.

**The 5081-C Transmitter** can be used with any PURSense family conductivity sensor to measure electrolytic conductivity in a variety of applications, particularly where a robust, explosion-proof instrument enclosure and loop power are needed. The conductivity reading is shown in large numerals in the top line of a two-line, seven-segment display. Local communication with the 5081-C is through a handheld infrared remote controller. Two digital communication protocols are available: HART and Foundation Fieldbus. Digital communications allow the user to communicate with the transmitter through AMS (Asset Management Solutions) from a host anywhere in the plant.



**The 56 Analyzer** can be used with any PURSense family conductivity sensor to measure electrolytic conductivity in a variety of applications. The 56 can be set up as either a dual input conductivity analyzer, or the second input can be







connected to a pH, ORP, chlorine, oxygen, ozone, or turbidity sensor. The analyzer has four fully programmable analog outputs and four fully programmable alarm relays, including PID and TPC control. The high contrast, full color display shows measurement results in large, easy-to-read digits. Menu screens for programming and calibration are simple and intuitive. Information screens, offering detailed explanation of programming features and calibration methods as well as troubleshooting assistance, are available at the touch of a button. An event and data logger and a dual graphical display are also standard. HART and Profibus DP digital communication are optional.

**The 1066-C Transmitter** can be used with any PURSense family conductivity sensor to measure electrolytic conductivity in a variety of applications, particularly where loop power is needed. The 1066-C has a large easy-to-read display that can be configured to meet user requirements. Menu screens (in eight languages) for configuring and calibrating are simple and intuitive. Two digital communication protocols, HART and FOUNDATION fieldbus, are available. Digital communications allows the user to communicate with the transmitter through AMS (Asset Management Solutions) from a host anywhere in the plant.



**All Rosemount Analytical Conductivity Instruments** feature automatic temperature corrections for high purity water and cation conductivity. Programmable percent change per °C temperature correction is also available.

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#### Emerson Process Management

2400 Barranca Parkway  
Irvine, CA 92606 USA  
Tel: (949) 757-8500  
Fax: (949) 474-7250

[RosemountAnalytical.com](https://RosemountAnalytical.com)

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