Product Data Sheet
PDS 71-403/rev.A
June 2005

ENDURANCE® Sanitary Flange Conductivity Sensors

- CONDUCTIVITY SENSOR DESIGNED TO MEET USP REQUIREMENTS in water for injection.
- INITIAL CALIBRATION NOT REQUIRED. Predetermined 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

Model 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

ENDURANCE Model 403 and 403VP sensors are contacting sensors. They are available in cell constants of 0.01, 0.1, 1.0, and 10/cm. The choice of cell constant depends on conductivity. High conductivity samples require larger cell constants.

Sensors with 0.01, 0.1, and 1.0/cm cell constants 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 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.

Sensors with a 10/cm cell constant have side-by-side graphite electrodes and an epoxy body. The RTD is enclosed in a titanium capsule protruding from the end of the sensor. Graphite electrode sensors are not compliant with 21CFR177, nor do they have a 16 microinch Ra surface finish.

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

Model 403VP has a Variopol 6.0 (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.

®Neoflon is a registered trademark of Daikin Industries.
®TriClover is a registered trademark of Jensen, Inc.

SPECIFICATIONS (options -11, -12, -13)

Cell constants: 0.01, 0.1 and 1.0/cm

Wetted materials:

Electrodes: titanium
Sanitary flange: 316 stainless steel
Insulator: PCTFE (Neoflon); compliant with 21CFR 177.1380
O-rings: 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 – 221ºF (0 – 105ºC). Sensors are steam-sterilizable to 275ºF (135ºC).

Pressure: 250 psig (1825 kPa abs) maximum

Cable length (Model 403 only): 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)

SPECIFICATIONS (options -14)

Cell constant: 10/cm

Wetted materials:

Electrodes: graphite
RTD capsule: titanium
Sanitary flange: 316 stainless steel
Insulator and body: epoxy
O-rings: EPDM

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

Temperature: 32 – 212ºF (0 – 100ºC).

Pressure: 250 psig (1825 kPa abs) maximum

Cable length (Model 403 only): 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)

SENSOR AND INSTRUMENT SELECTION GUIDE

Instrument	Recommended for range for cell constant (µS/cm)		
	0.01/cm	0.1/cm	1.0/cm
1055	0-50	0.1-2500	10-8000
54eC	0-50	0.1-2000	10-12,000
5081-C	0-50	0.1-500	10-20,000
Xmt-C	0-50	0.1-500	10-20,000

MODEL 403VP INSTALLATION DETAILS

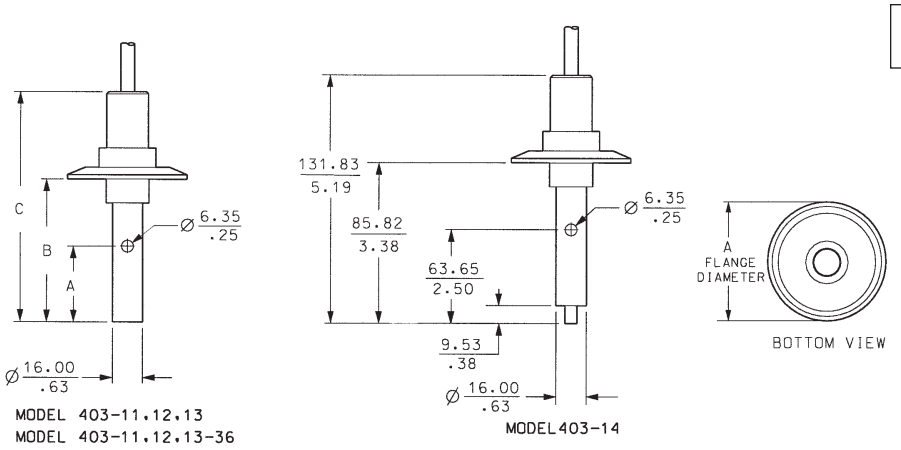


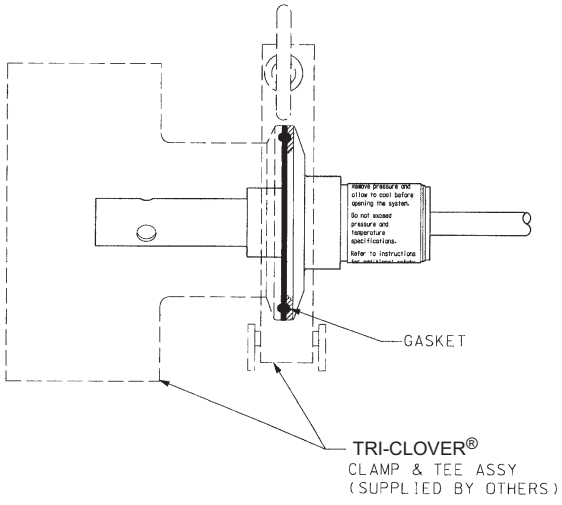
TABLE 1

MODEL NO	"A"		"B"		"C"	
	INCH	MM	INCH	MM	INCH	MM
403-11(-20/-21)(-50/-54)	1.59	40.39	3.00	76.20	4.88	123.95
403-12(-20/-21)(-50/-54)	.67	17.02	1.62	41.15	3.50	88.90
403-13(-20/-21)(-50/-54)	.68	17.27	2.13	54.10	4.01	101.85
403-11(-20/-21)(-50/-54)-36	1.59	40.39	6.00	152.40	7.88	200.15

TABLE 2

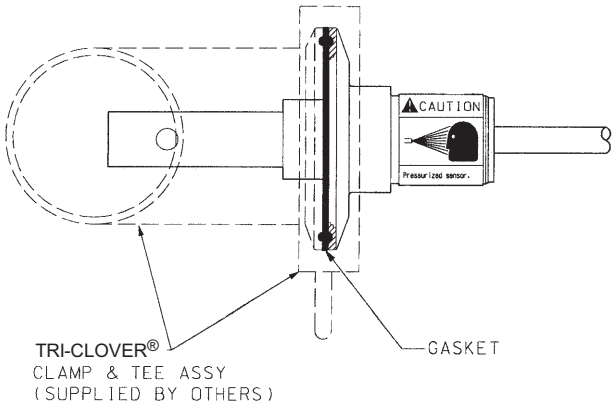
MODEL NO	FITTING SIZE (TUBE O.D.)	A FLANGE DIAMETER	
		INCHES	mm
403-( )-20	1 1/2 INCHES	1.98	50.39
403-( )-21	2 INCHES	2.50	63.50

Model 403 Dimensions



Model 403 Sanitary Sensor Installation - Side View

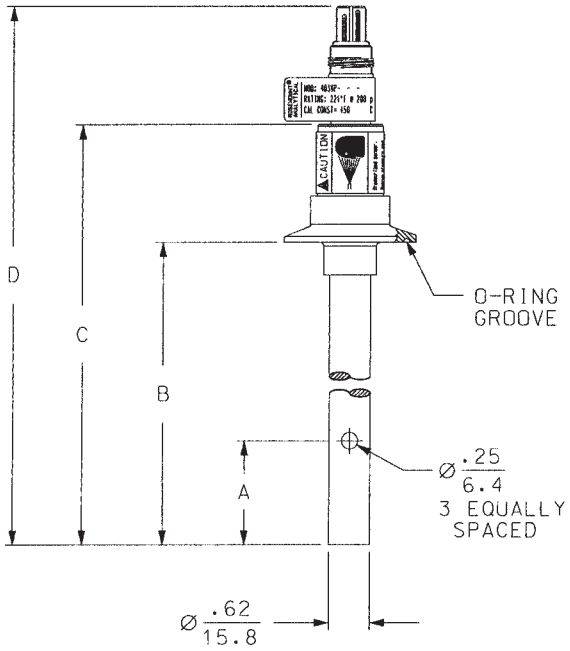
Secure the sanitary sensor with a Tri Clover clamp.

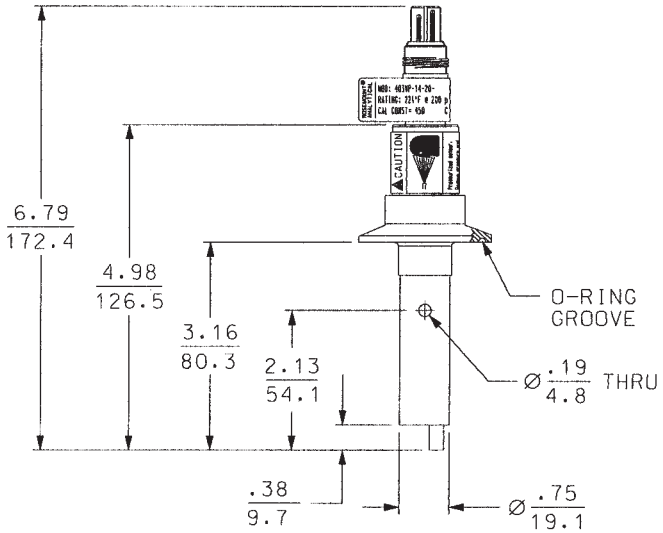


Model 403 Sanitary Sensor Installation - End View

The branch containing the sensor must be completely flooded with the liquid being measured.

MODEL 403VP INSTALLATION DETAILS

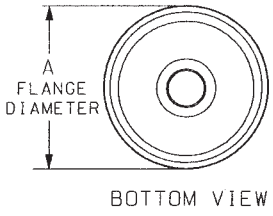




MODEL 403VP-14-20(-53/-54)

TABLE 1

MODEL NO	A		B		C		D	
	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
403VP-11 (-20/-21)(-53/-54)	1.59	40.4	2.98	75.7	4.80	121.9	6.60	167.6
403VP-12 (-20/-21)(-53/-54)	0.69	17.5	1.61	40.9	3.43	87.1	5.23	132.8
403VP-13 (-20/-21)(-53/-54)	0.68	17.3	2.15	54.6	3.97	100.8	5.77	146.6
403VP-11 (-20/-21)(-53/-54)-36	1.59	40.4	5.99	152.1	7.81	198.4	9.61	244.1
403VP-12 (-20/-21)(-53/-54)-36	0.69	17.5	6.00	152.4	7.82	198.6	9.62	244.3
403VP-13 (-20/-21)(-53/-54)-36	0.68	17.3	6.00	152.4	7.82	198.6	9.62	244.3



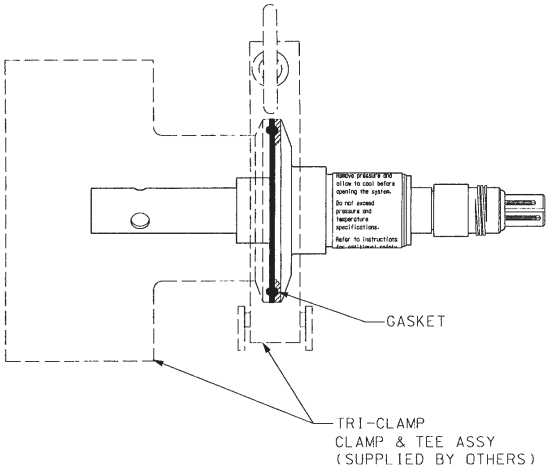
BOTTOM VIEW

TABLE 2

MODEL NO	FITTING SIZE (TUBE O.D.)	A FLANGE DIAMETER	
		INCHES	mm
403-( )-20	1 1/2 INCHES	1.98	50.4
403-( )-21	2 INCHES	2.50	63.5

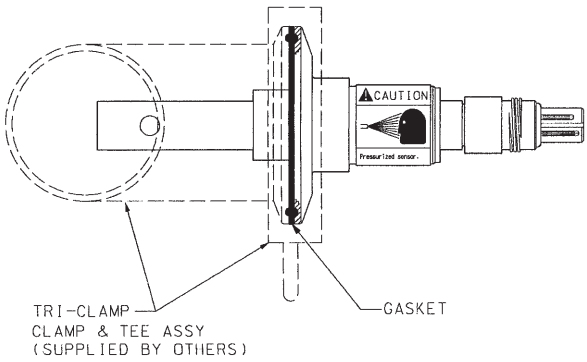
Model 403VP Dimensions

MODEL 403VP INSTALLATION DETAILS



Model 403VP Sanitary Sensor Installation - Side View

Secure the sanitary sensor with a Tri Clover® clamp.



Model 403VP Sanitary Sensor Installation - End View

The branch containing the sensor must be completely flooded with the liquid being measured.

Model 403VP

Model 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 materials in the -11, -12, and -13 options are 21CFR177 (FDA) compliant and 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.

MODEL 403	SANITARY FLANGE CONDUCTIVITY SENSOR
CODE	**Cell Constant (required selection)**
11	0.01/cm
12	0.1/cm
13	1.0/cm
14	10.0/cm

CODE	Diameter of Fitting (required selection)
20	1-1/2 inch
21	2 inch (available with options -11, -12, and -13 only)

CODE	Temperature Measurement
--	Pt 1000 for 1054BLC, 1054BR, 1054BDC, 1055, 54C, 54eC, 3081C, 4081C, 5081-C, and Xmt-C
54	Pt 100 for 1054C, 1054A C, 1054B C, 2081C, and 2054C

CODE	Additional Options (optional selection)
36	Extended insertion length (6 in. from inside face of flange to end of sensor, option -11 only)
50	Extended cable length, 50 ft (15.2 m)
99Q8	Supplier material traceability certificates (available with options -11, -12, and -13 only)

403	11	21	50	EXAMPLE

Model 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 materials in the -11, -12, and -13 options are 21CFR177 (FDA) compliant and 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.**

MODEL 403VP	SANITARY FLANGE CONDUCTIVITY SENSOR
CODE	**Cell Constant (required selection)**
11	0.01/cm
12	0.1/cm
13	1.0/cm
14	10.0/cm

CODE	Diameter of Fitting (required selection)
20	1-1/2 inch
21	2 inch (available with options -11, -12, and -13 only)

CODE	Temperature Measurement
	Pt 1000 for 1054BLC, 1054BR, 1054BDC, 1055, 54e C, 81C, 3081C, 4081C, 5081-C, and Xmt-C
54	Pt 100 for 1054C, 1054A C, 1054B C, 2081C, and 2054C

CODE	Additional Options (optional selection)
36	Extended insertion length (6 in. from inside face of flange to end of sensor, option -11 only)
99Q8	Supplier material traceability certificates (available with options -11, -12, and -13 only)
403VP	**11** **21** **EXAMPLE**

Interconnecting VP Cable

Part Number	Description	Weight	Shipping Weight
23747-02	Interconnecting cable 10 ft (3.0 m) with VP 6.0 receptacle	1 lb (0.5 kg)	Add 1 lb (0.5 kg)
23747-03	Interconnecting cable 50 ft (15.2 m) with VP 6.0 receptacle	3 lb (1.5 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 (1 kg/10 m)	Add 1 lb (0.5 kg)
23747-00	Connecting cable, terminated, specify length	0.6 lb/10ft (1 kg/10 m)	Add 1 lb (0.5 kg)
9210004	Conductivity standard, 2,000 uS/cm, 16 oz (0.47 L)	2 lb (1.0 kg)	3 lb (1.5 kg)
SS-6	Conductivity standard, 200 uS/cm, 32 oz (0.95 L)	3 lb (1.5 kg)	4 lb (2.0 kg)
SS-6A	Conductivity standard, 200 uS/cm, 1 gal (3.78 L)	9 lb (4.5 kg)	10 lb (4.5 kg)

ENGINEERING SPECIFICATION FOR 403 AND 403VP SENSOR
(Cell constants 0.01, 0.1, and 1.0/cm)

1. The sensor shall be suitable for the determination of electrolytic conductivity in water for injection and in any water purification installation where Tri Clover 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 Model 403 (integral cable) or 403VP (Variopol fitting) or approved equal.

Emerson Process Management

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

http://www.raihome.com