

pH/ORP Sensors



- **NEW QUICK CABLE-TO-SENSOR RELEASE**, provided by the watertight VP multiple-pin connector, eliminates cable twisting.
- **LONGER SENSOR LIFE** provided by triple junction reference cell in process solutions containing poisoning ions.
- **OPTIMUM VERSITILITY FOR VARIOUS MOUNTING OPTIONS** provided by one-piece construction with process threads in two places.
- **MAXIMUM CHEMICAL RESISTANCE** provided by rugged tefzel¹ body, completely sealed to eliminate sensor leakage.
- **NOISE FREE**, long distance transmission of the high impedance pH signal provided by integral preamplifier.
- **ENHANCED PERFORMANCE AND INCREASED LIFE** with minimized glass cracking provided by field-proven AccuGLASSTM² pH glass formulations.

FEATURES:

Wetted Materials: Tefzel, Viton¹, glass, ceramic

pH Glass Types: Hemi bulb and High pH glass

Insertion Depth: 2.8 in. to 5.5 in. (6.1 cm to 14 cm)

Sensor Design: Threaded connection for in-line or submersion mounting

Electrical Connection: Integral cable or VP connector

Temperature Compensation: 3K or Pt 100

Process Connection: 1 inch MNPT threads in two places



MODEL 389

Insertion/Submersion
Sensor with integral cable



MODEL 389VP

Insertion/Submersion Sensor
with new VP connector (uses mating VP cable)

FEATURES AND APPLICATIONS

The reference junction aids in the sensor's resistance to poisoning ions and helps prolong sensor life. Models 389 and 389VP are provided with a triple junction reference, which protects the reference element from poisoning ions — such as ammonia, chlorine, cyanides, and sulfides — in the process. Both models are made with an outer ceramic junction constructed in an annular design around the pH/ORP-sensitive membrane.

The AccuGLASS pH glass formulations exceed industry standards. The AccuGLASS pH glass is a result of many years of glass research resulting in a formulation which has been found to increase the life of the sensor. Unlike other pH glasses presently on the market, this glass resists cracking especially at higher temperatures and reduces sodium ion error commonly found in high pH applications. Overall, the AccuGLASS formulation enhances the sensor performance to measure pH more accurately and have a longer sensor life than ever before.

A choice of pH glass electrodes is available to best meet various application needs. Two types are available: hemi bulb and high pH glass. The AccuGLASS hemi bulb is the standard glass offered on both models and can be used for most applications. The hemi bulb is also found on the high pH glass option.

NEW - Model 389VP is offered with a watertight sensor-to-cable connector which eliminates rewiring and cable twisting when replacing sensors. The Variopol VP multiple pin connector is an integral part of each sensor model and uses a mating VP cable. Once the cable is installed and wired to the analyzer, sensors are easily replaced without replacing the cable and without rewiring the analyzer. Also the cable can be disconnected from the sensor before removal from the process which eliminates cable twisting.



Models 389 and 389VP are housed in a molded Tefzel body with Viton o-rings, making each sensor virtually indestructible and chemically resistant. Complete encapsulation eliminates leakage or high humidity problems traditionally found in other pH/ORP designs. The simplified construction, designed with user convenience in mind does not require electrolyte (KCl) replenishment or any high maintenance troubleshooting procedures.

A preamplifier converts the high impedance pH signal into a stable, noise-free signal and must be used with all pH sensors. The Model 389 offers the choice of an integral sensor preamplifier. Both Models can use a remote preamplifier, integral to the analyzer/transmitter or in a remote junction box. All preamplifiers have a transmission capability of up to three miles. The Rosemount Analytical preamplifier method has become the industry standard for pH/ORP measurement reliability.

Installation is easily achieved through the wide variety of mounting configurations. Both Models feature 1 inch (MNPT) front and rear facing connections for insertion, submersion, or flow-through pH and ORP applications.

Both models are combination sensors (pH, reference, and temperature within sensor body) and measure pH or ORP (Oxidation/Reduction Potential) of aqueous solutions in pipelines, open tanks, or ponds. Models 389 and 389VP are suitable for virtually all applications and are compatible with Rosemount Analytical and other manufacturers' instruments.

PHYSICAL SPECIFICATIONS

Materials of Construction: Tefzel, glass, ceramic and Viton

Process Connections: 1 in. MNPT, 2 places

Integral Cable:

Model 389: 15 ft or 25 ft (with integral sensor preamplifier only)

Model 389VP: None; must use mating VP cable

Measured Range: pH: AccuGLASS 0-14*
ORP: -1500 to +1500 mV

Maximum Pressure:

790 kPa [abs] (100 psig) at 65°C (150°F) - see Graph A

Weight/Shipping Weight: 0.45 kg/0.9 kg (1 lb/2 lb)

Temperature Compensation: Automatic 0° to 85°C (32° to 185°F), Temperature compensation is not required for 389 ORP or 389VP ORP when used with Models 1060, 1023 or 1181 ORP

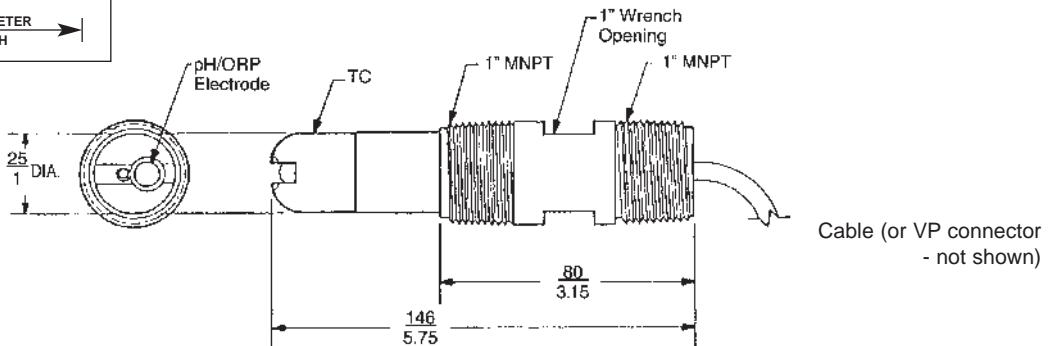
***Percent Linearity Over pH Range:**

Percent Linearity Over pH Range		
	Option 10	Option 11
0-2 pH	94%	94%
2-12 pH	99%	97%
12-13 pH	97%	98%
13-14 pH	92%	98%

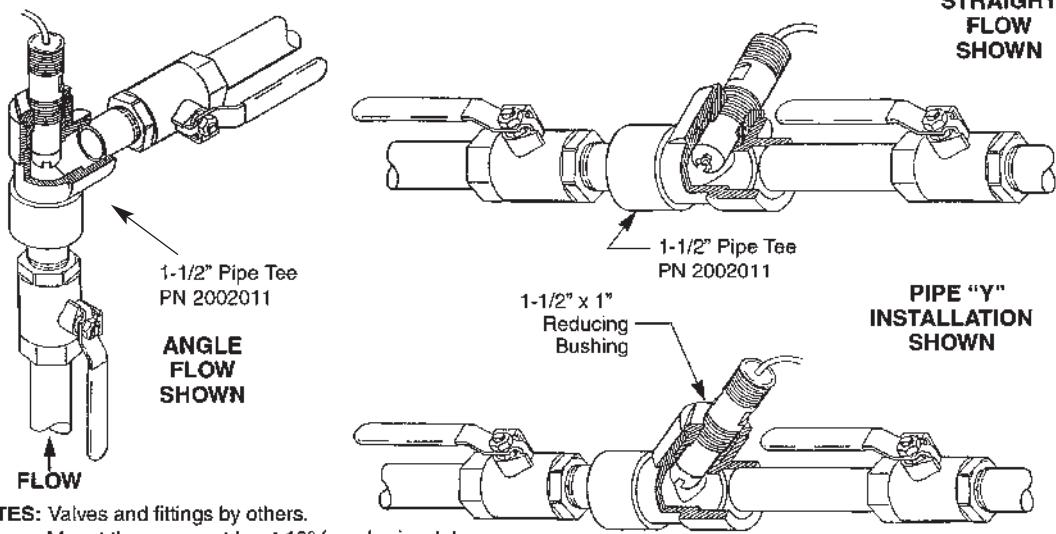
WHEN INCH AND METRIC DIMS
ARE GIVEN

MILLIMETER
INCH

DIMENSIONAL DRAWING



FLOW THROUGH/INSERTION INSTALLATION

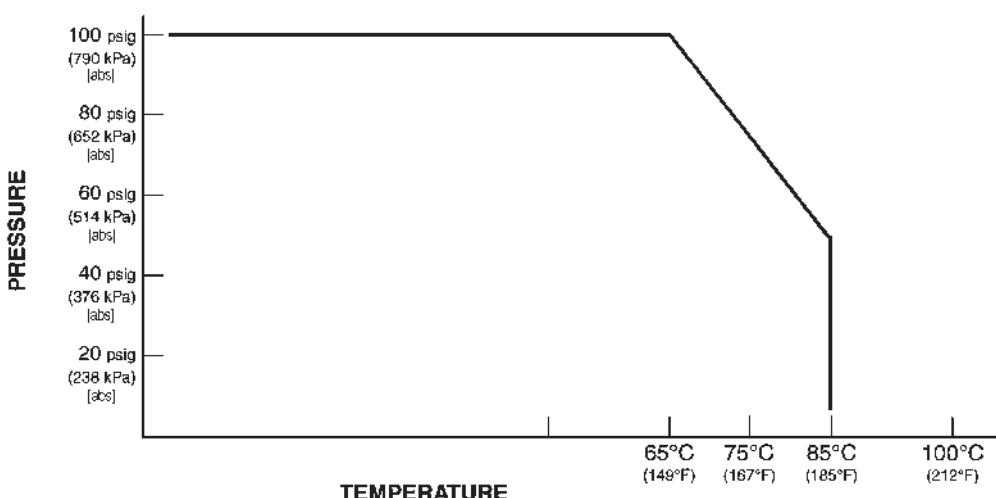


NOTES: Valves and fittings by others.

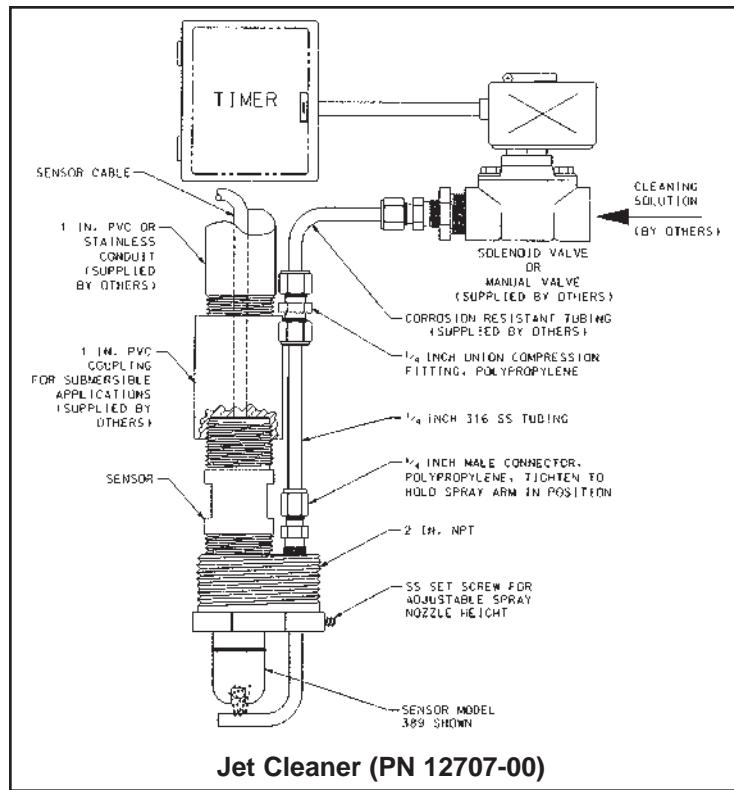
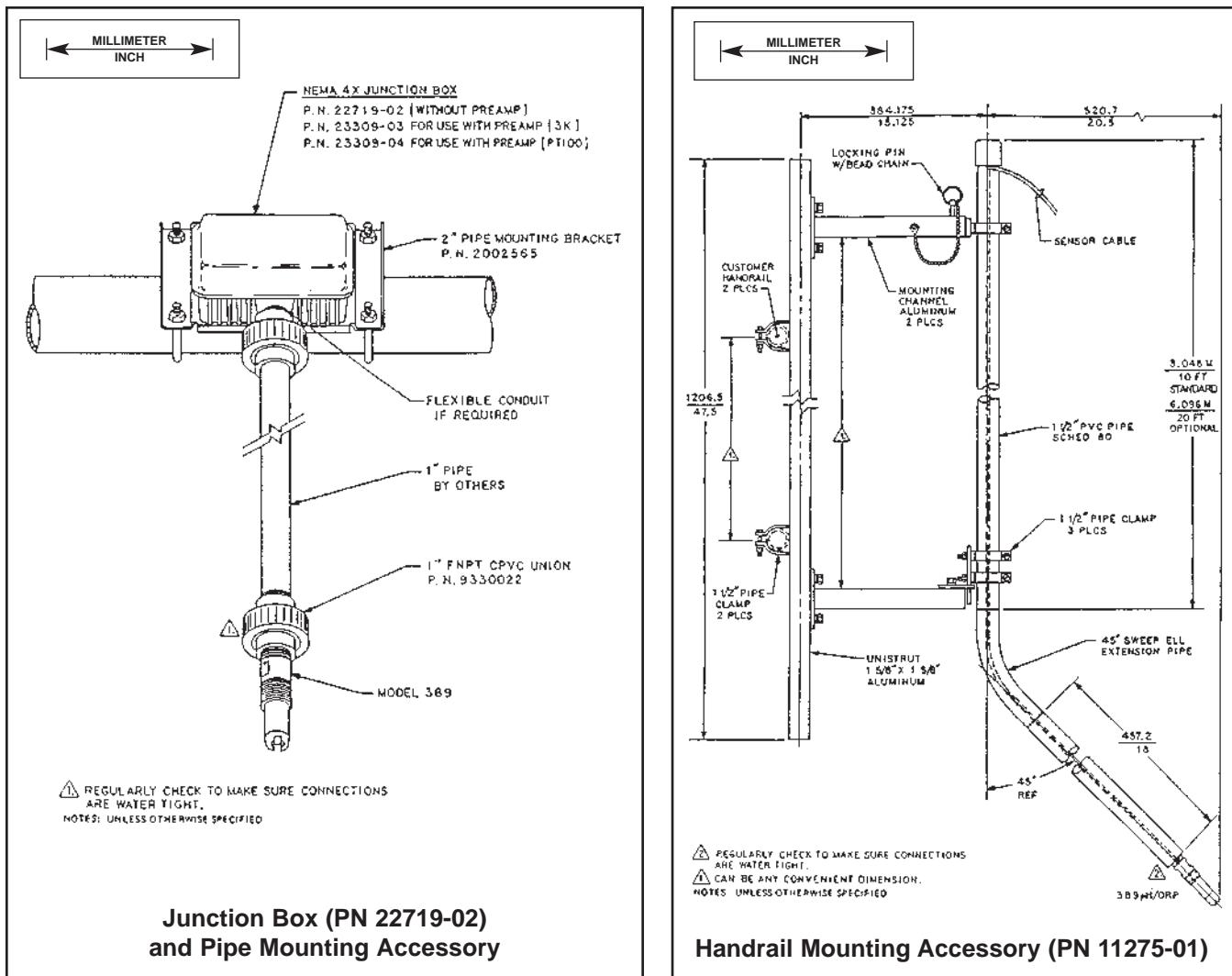
Mount the sensor at least 10° from horizontal.

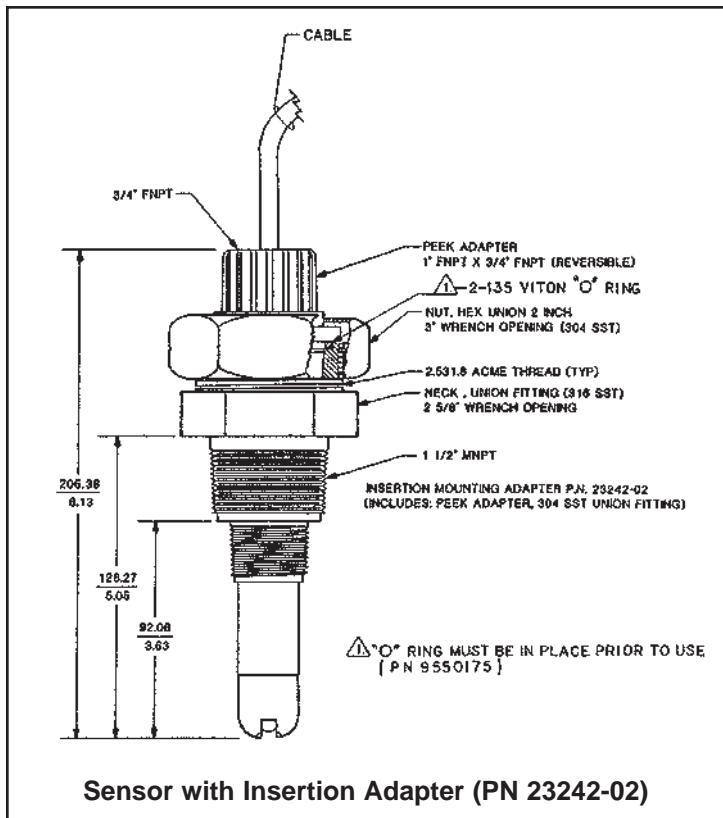
GRAPH A

PRESSURE/TEMPERATURE LIMITATIONS FOR MODELS 389 AND 389VP



SUBMERSION INSTALLATIONS





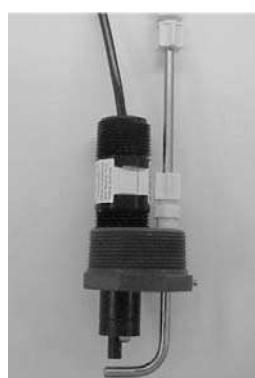
Sensor with Insertion Adapter (PN 23242-02)



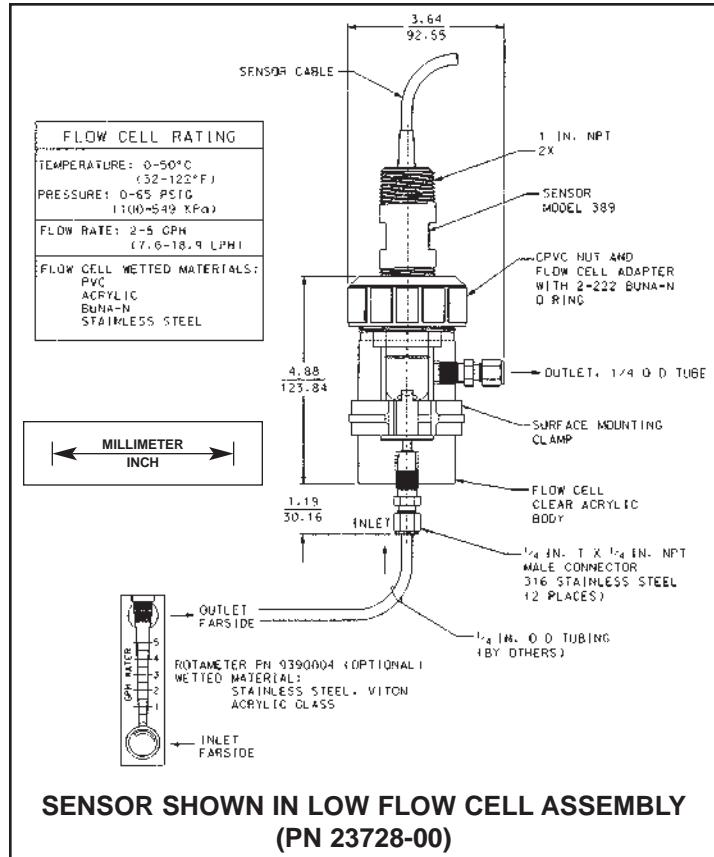
The Insertion Adapter (see drawing at left) mounts the Model 389 into a 1-1/2 inch NPT process pipe. Unscrewing the hex nut allows easy sensor removal without twisting the sensor cable.



The see-through flow cell (see drawing at left) is perfect for processes where flow regulation is desired. Tubing (1/4 inch) is all that is needed for connection to the process or sample stream.



The Jet Spray Cleaner (see drawing at right) eliminates routine, manual sensor maintenance by cleaning Model 389 or 389VP with water or compressed air. Flow through the cleaner can be controlled by a solenoid valve. (Model 399 pH sensor is shown in photo).



SENSOR SHOWN IN LOW FLOW CELL ASSEMBLY (PN 23728-00)

ORDERING INFORMATION

The Model 389 pH/ORP Sensor is housed in a molded Tefzel body with 1 in. MNPT threads suitable for insertion, submersion or flow through installation. The sensor includes a general purpose pH or high pH electrode or a platinum ORP electrode with a triple junction gel filled reference cell. The Model 389 pH is available with or without an integral preamplifier. The Model 389 ORP is available only with an integral preamplifier. Automatic temperature compensation is standard with the Model 389 pH. Temperature measurement is provided with the Model 389 ORP (when used with the Models 1054/1054A/1054B, 1055, 54, 3081, 4081, 2700 ORP Analyzers).



The Model 389 insertion/submersion sensor with integral cable is offered with or without a built-in preamplifier

MODEL 389 pH/ORP SENSOR

CODE	PREAMPLIFIER/CABLE (Required Selection)
01	With Integral preamplifier, 25 ft cable (not for use with the Model 54, 81, 2700, 4081, 1055, and 3081 Analyzers)
02	For use with remote preamplifier, 15 ft cable
CODE	COMBINATION ELECTRODE (Required Selection)
10	General Purpose Low Resistivity, GPLR
11	High pH
12	ORP
CODE	ANALYZER/TC COMPATIBILITY (Required Selection)
50	For Models 1181, 1050, 1060 (3K TC)
51	For Models 1003, 1023 (3K TC)
54	For Models 1054, 1054A/B, 2054, 2081; 2700, 54, 54e, 81, 1055, 3081, and 4081 Code 02 only (Pt 100 TC)
CODE	OPTIONS
40	Stainless steel tag (specify marking)
16	1-1/2 in. CPVC tee with 1 in. FNPT connections
62	Cable prepped w/o BNC for wiring to Models 54, 81, 1055, 2081, 3081, 4081 (only available w/combination of -02 & -54 options)
389	01 10 54 40
	EXAMPLE

ORDERING INFORMATION

The Model 389VP pH/ORP Sensor has similar features to the Model 389. However, the Model 389VP is offered with the new Variopol (VP) connector and uses a mating VP cable (purchased separately). A remote preamplifier must be used with this sensor.

A Variopol cable is required for all new installations. See below for cable selection.



The Model 389VP insertion/ submersion sensor with the VP (Variopol) connector

MODEL389VP pH/ORP SENSOR

CODE	COMBINATION ELECTRODE (Required Selection)
10	General Purpose Low Resistivity, GPLR
11	High pH
12	ORP
CODE	ANALYZER/TC COMPATIBILITY (Required Selection)
50	For Models 1181, 1050, 1060 (3K TC)
54	For Models 1054, 1054A/B, 2054, 2081; 2700, 54, 54e, 81, 1055, 3081, and 4081 Code 02 only (Pt 100 TC)
PN	MATING VP CONNECTOR CABLE (Required for all new installations)
23645-06	15 ft. cable with mating VP connector, prepped with BNC on analyzer end
23645-07	15 ft. cable with mating VP connector, prepped without BNC on analyzer end*
389VP	10 54
	EXAMPLE

* For use with connections to Models 54, 81, 1181, 1054, 2081, 3081, 4081, and Remote Junction Box PN 23555-00.

FOR FIRST TIME 389 OR 389VP* INSTALLATIONS, WE RECOMMEND USING THE FOLLOWING GUIDE:

1. Mounting Accessories (optional)

Choose one: PN 23242-02, Mounting adapter kit, 1/2 in. MNPT process connection, 1 in. x 3/4 in. sensor adapter
PN 915240-03, PVC flow through tee, 3/4 in. NPT process connection
PN 915240-04, PVC flow through tee, 1 in. NPT process connection
PN 915240-05, PVC flow through tee, 1-1/2 in. NPT process connection
PN 23728-00, Acrylic low flow cell
PN 2002011, 1-1/2 in. CPVC tee with 1-in. FNPT connection
PN 9322014, Pipe mount union, 1 in. x 1 in. Kynar (for sensor to analyzer distance extension)
PN 9330022, Pipe mount union, 1 in. x 1 in. CPVC (for sensor to analyzer distance extension)
PN 11275-01, Sensor handrail assembly
PN 1000857, Handrail mounting kit (pipe and sensor coupling supplied by others)

2. Junction Boxes (optional)

Remote Junction Boxes (to extend sensor to analyzer distances)

Choose one: PN 23555-00, includes preamplifier for Models 54, 1055, 81, 3081, 4081; NEMA 4X
PN 22719-02, Weatherproof junction box for cable extension
PN 23309-03, use with 1181 and 1050 compatible preamplifier
PN 23309-04, use with 1054/A/B, 2054, 2081 compatible preamplifier

3. Preamplifiers (used to amplify signal when mounting sensor further than 15 ft from the analyzer)

Choose one: PN 22698-02, Plug in preamplifier, 1181/1050 compatible (use with junction box PN 23309-03)
PN 22698-03, Plug in preamplifier, 1054/1054A/1054B/2054/ 2081 compatible (use with junction box PN 23309-04)

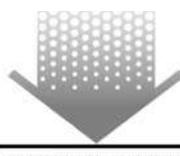
4. Extension cables (used with remote junction boxes)

Choose one: PN 23646-01, 11 conductor cable, shielded, prepped
PN 9200000, 4 conductor cable, shielded, unprepped
PN 9200273, 11 conductor cable, shielded, unprepped

5. Other optional accessories

Choose one: PN 12707-00, Jet spray cleaner
PN 2001492, Stainless steel tag, specify marking (formerly Code -11)
PN 9210012, Buffer solution, 16 oz, 4.01 pH
PN 9210013, Buffer solution, 16 oz, 6.86 pH
PN 9210014, Buffer solution, 16 oz, 9.18 pH
PN 22698-00, Plug-in preamplifier, 1003 compatible
PN 7901631, PVC Shroud
PN R508-16OZ, Standard, 474 mV, 16 oz

* Also requires mating VP cable — see 389VP Ordering Information.



*The right people,
the right answers,
right now.*

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