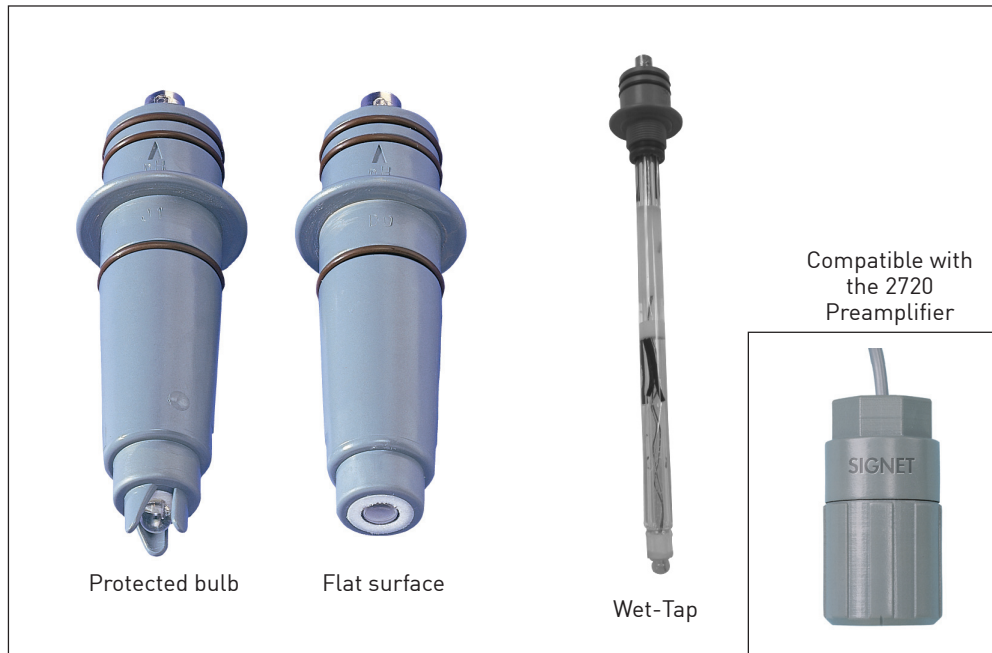


# Signet 2714-2717 Twist-Lock pH/ORP Electrodes



## Features

- Durable CPVC or glass body with Twist-Lock connector
- Flat or bulb surfaced electrodes available
- Large reference volume and solid polymer electrolyte
- Integrated temperature sensor (pH)
- Designed for maximum protection from process contamination
- DI option (pH) for pure water use (<100 µS)
- HF option (pH) for applications containing trace amounts of HF (<2%)

## Description

Feature-packed Signet 2714-2717 Twist-Lock pH & ORP Electrodes provide unsurpassed simplicity, reliability and accuracy for a wide variety of industrial applications. Rugged construction, large reference volume and intelligent positioning of internal elements combine to extend the service-life of these dependable and highly responsive electrodes. Flat versions allow sediment and particles to sweep past the measurement surface,

minimizing risks of abrasion, breakage and coating. The unique Twist-Lock design enables sensor connections to the Signet 2720 preamplifier in one easy motion. The integral temperature sensor built into the pH electrode or the I.D. resistor in the ORP electrodes is used for automatic sensor recognition by Signet pH/ORP instrumentation, adding convenience and versatility to our systems.

## Applications

- Water & Wastewater Treatment
- Neutralization Systems
- Effluent Monitoring
- Sanitization Systems
- Commercial Pools & Spas
- Aquatic Animal Life Support Systems
- Process Control
- Cooling Towers
- Boiler Protection

## System Overview

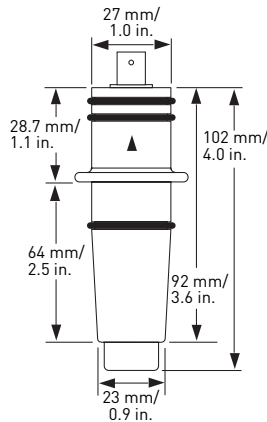
In-Line Installation		Submersible Installation	Wet-Tap Installation
<b>Panel Mount</b> Signet Instrument (sold separately)  5700    8750	<b>Pipe, Tank, Wall Mount</b> Signet pH/ORP Transmitter (sold separately)  Signet Universal Adapter Kit (3-8050) (sold separately) 	<b>Panel, Pipe, Tank, Wall Mount</b> Signet Instrument (sold separately)  5700    8750	<b>Panel, Pipe, Tank, Wall Mount</b> Signet Instrument (sold separately)  5700    8750
<b>Signet 2714-2717 pH/ORP Electrode with 2720 Preamplifier (each sold separately)</b> 	<b>Signet 2714-2717 pH/ORP Electrode with 2720 Preamplifier (each sold separately)</b> 	Pipe extension or conduit with 3/4 in. NPT or ISO 7/1-R 3/4 threads (customer supplied) 	<b>Signet 2716-WT 2717-WT and 2720 preamp. (sold separately)</b>  Signet 3719 WetTap Assembly (sold separately) 
Signet sensor cap (sold separately) 		<b>Signet 2714-2717 pH/ORP Electrode with Signet 2720 Preamplifier</b> 	
Signet Fittings* (sold separately) 			Signet Fittings* (sold separately)

\* See Fittings section for more information.

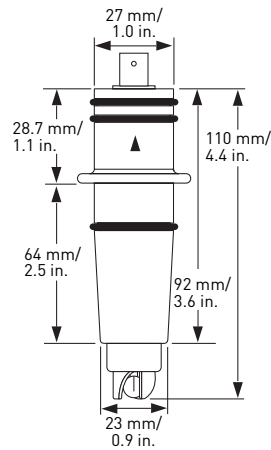


## Dimensions

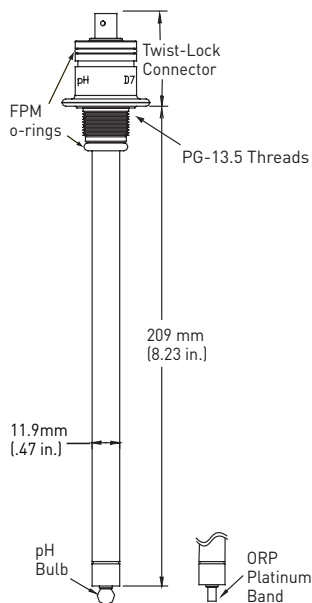
2714/2714-HF pH Electrode  
2715 Flat ORP Electrode



2716/2716-DI Bulb pH Electrode  
2717 Bulb ORP Electrode



2716-WT and 2717-WT  
Wet-Tap Electrode



## Specifications

2714 - 2717 pH/ORP Electrodes  
General

Operating Range:

- 2714, 2716, 2716-DI: 0 to 14 pH
- 2714-HF: 0 to 12 pH
- 2715, 2717:  $\pm 2,000$  mV

Pipe Size Range:

0.5 in. and up: use Signet installation fittings from 0.5 to 4.0 in. (use pipe adapter in pipes over 4 in.)

Mounting:

- In-line pipe mounting:  $\geq 50^\circ$  to the horizontal plane
- Submersion with 3-2720 preamplifier requires 3/4 in. NPT or ISO 7-1/R 3/4 in. Male threaded extension.

Efficiency:  $> 97\%$  @ 25°C (77°F)

pH Response Time:

$< 5$  secs. for 95% of signal change

ORP response time: application dependent

Reference:

Electrolyte: Solidified Acrylamide Gel

- 3.5M KCl
- 0.1 M KCl (2716-DI only)

Secondary junction: Nylon filament

Element: Ag/AgCl

Primary Functions:

- 2714/2715: Flat surface resists fouling
- 2716/2717: Bulb surface for general use
- 2714-HF: Extended use in applications with trace hydrofluoric acid ( $< 2\%$ )
- 2716-DI: Extended use in pure waters ( $< 100 \mu\text{S}$ )

Temperature Sensor:

3K Balco (3000  $\Omega$  @ 25°C)

Response Time,  $\tau$ :

- 2714: 140 secs.
- 2716: 196 secs.

Wetted Materials

- Body: CPVC
- O-rings: FPM
- O-ring junction: Porous UHMW Polyethylene
- Sensing Surface: glass membrane (pH), platinum (ORP)

Max. Temperature/Pressure Rating

Operating Temperature:

- 2716/2717: 0°C to 85°C (32°F to 185°F)
- 2714/2715: 10°C to 85°C (50°F to 185°F)
- 2714-HF: 0°C to 50°C (32°F to 122°F)

Storage Temp.: -10°C (15°F) to 30°C (86°F)

Temperature and Pressure Limit:

- 6.89 bar @ 0°C (100 psi @ 32°F to 149°F)
- 4.00 bar @ 85°C (58 psi @ 150°F to 185°F)

See Temperature and Pressure graphs for more information.

Shipping Weight: 0.2 kg (0.4 lbs.)

2716-WT and 2717-WT Wet-Tap  
pH/ORP Electrodes

General

Operating Range:

- pH: 0 to 14 pH
- ORP: -2000 to +2000 mV

Compatibility:

Signet 3719 Wet-Tap Connector (CPVC): Twist-Lock

Mounting:

Any angle is acceptable. Use with 3719 wet-tap assembly for mounting electrodes.

Efficiency:  $> 97\%$  @ 25°C (77°F)

Response Time:

- pH:  $< 5$  sec. for 95% of signal change
- ORP: Application dependent

Reference:

Junctions: Porous PTFE

Electrolyte: 3.5M KCl

Elements: Ag/AgCl

Temp. Sensor (pH):

- 3K Balco (3-2716-WT)
- Temp. Response Time ( $\tau$ ): 438s

Wetted Materials

- Body : Glass
- O-rings: FPM
- Junctions : Porous PTFE
- Sensing surface: glass Membrane (pH), platinum (ORP)

Max. Temperature/Pressure Rating

Operating Temperature:

0°C to 85°C (32°F to 185°F)

Storage Temperature:

0°C to 85°C (32°F to 185°F)

Temperature and Pressure Limit:

6.9 bar @ 65°C (100 psi @ 149°F)

See Temperature and Pressure graphs for more information.

Shipping Weight: 0.22 kg (0.5 lb.)

Standards/Approvals

- CE
- Manufactured under ISO 9001:2000 for Quality and ISO 14001: 2004 for Environmental Management

pH/ORP

**Specifications (continued)**

**2720 pH/ORP Pre-amplifier**

**General**

Input Range: ±2,500 mV  
 Power Requirements: ±4.5 to ±8 VDC, dual supply (provided by all Signet pH/ORP instruments)  
 Maximum Current: < 1 mA, dual supply  
 Temp. Contact Resistivity: < 0.1Ω  
 Input Impedance: >10<sup>11</sup>Ω  
 Gain: Unity  
 End Connection: Twist-Lock mount to Signet 271X Electrodes  
 Cable Type: 6 conductor, foil shield, w/drain wire, 24AWG  
 Cable Length: 4.6 m (15 ft.) supplied; maximum extension to 120 m (400 ft.)

**Wetted Material:** CPVC

**Max. Temperature/Pressure Rating**

Operating Temperature:  
 • 7 bar (100 psi) max @ 65°C (149°F)  
 • 4 bar (58 psi) max @ 80°C (176°F)  
 Storage Temperature:  
 0°C to 80°C (32°F to 176°F)

See Temperature and Pressure graphs for more information.

**Shipping Weight:** 0.5 kg/1.2 lbs.

**Standards and Approvals**

- CE
- Manufactured under ISO 9001:2000 for Quality and ISO 14001:2004 for Environmental Management

**2721 Remote pH/ORP Pre-amplifier**

**General**

Input power: ±4.5 to ±8 VDC dual supply (provided by Signet pH/ ORP instruments)  
 Compatibility: pH sensors with cables and BNC connector (supplied by other manufacturers)  
 Input Impedance: >10<sup>11</sup>Ω  
 Gain: Unity  
 Current consumption: <1 mA, dual supply  
 Electronics assembly: Epoxy encapsulated

**Material:**

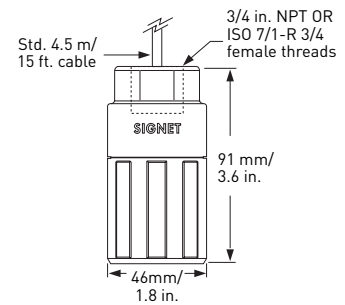
Housing: Low density polyethylene

**Max. Temperature/Pressure Rating**

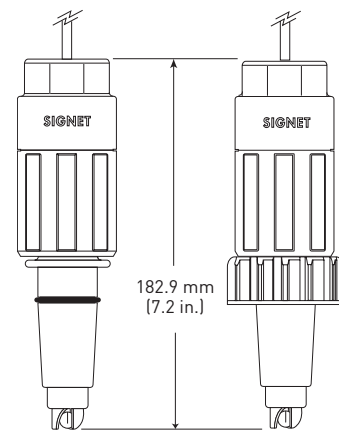
Operating temperature:  
 -15°C to 65°C (-5°F to 150°F)



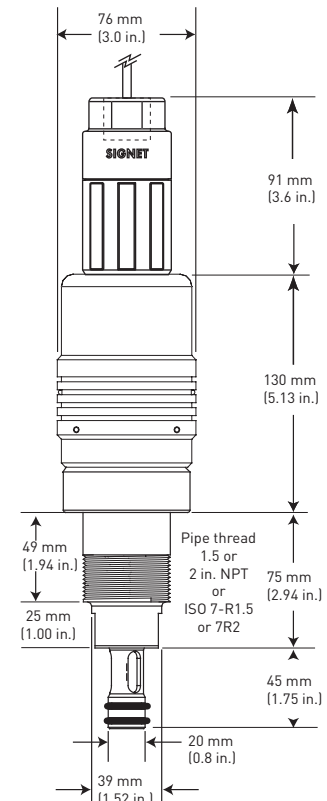
**2720 Pre-amplifier**



**2714-2717 w/2720 Preamp** and **2714-2717 w/2720 Preamp with sensor cap**

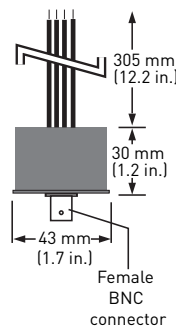


**2716/17-WT w/ 2720 pre-amplifier in 3719 WetTap assembly**



**2721 Remote Pre-amplifier**

The 2721 remote pre-amplifier should be used with special order sensors that are built with cables (Signet Models 277X-HT, 277X-1-HT, or other Signet sensors ordered with cables). It can also be used for applications where another manufacturer's sensor is used with a Signet 5700 or 8750 instrument.



## Ordering Information

### Model 2714-2717 and Model 2720 Ordering Notes:

- 1) Electrodes require purchase of preamplifier for full system installation.
- 2) To replace electrodes, simply untwist from pre-amplifier to replace with new electrode.
- 3) Always purchase a Signet cap and installation fitting for pipe applications.
- 4) Conduit and mounting brackets for submersible installation must always be used (customer supplied).
- 5) Use pipe adapters to install in pipes larger than DN100 (4 in.). Specify socket weld or NPT thread.
- 6) Use 3-2721 remote pre-amplifier when connecting other manufacturers' electrodes to Signet instruments.

Electrode Part Number- Choose either a pH or ORP Electrode	
pH Electrodes	
<b>3-2714</b>	Flat pH surface electrode
<b>3-2714-HF</b>	Flat pH surface electrode, for use in trace HF (hydrofluoric acid) in concentrations < 2%
<b>3-2716</b>	Bulb pH electrode with bulb protection (on plastic body electrodes only)
<b>3-2716-DI</b>	Bulb pH electrode with bulb protection, for process liquids <100 µS/cm conductivity
ORP Electrodes	
<b>3-2715</b>	Flat ORP surface electrode
<b>3-2717</b>	Bulb ORP electrode with bulb protection (on plastic body electrodes only)
Options	
-	For electrodes used in in-line mounting with Signet fittings, use red or blue electrode cap (see sensor caps for in-line mounting)
-WT	Glass electrode with Twist-Lock connector; for use with the 3719 Wet-Tap Assembly Only. Available for Part Numbers 3-2716 and 3-2717 only
<b>3-2714</b>	<b>Example Part Number</b>
<b>3-2716</b>	<b>Example Part Number</b>

pH/ORP

Sensor Caps for In-Line Mounting - Choose one (required for initial installation of any pH or ORP electrode)	
<b>P31542</b>	Red Sensor Cap (commonly used for distinguishing pH from ORP sensors)
<b>P31542-3</b>	Blue Sensor Cap (commonly used for distinguishing ORP from pH sensors)
<b>P31542</b>	<b>Example Part Numbers</b>

Preamplifiers - Choose one (required for initial installation of any pH or ORP electrode)	
<b>3-2720</b>	3/4 inch FNPT submersion threads; 4.6m (15 ft.) cable
<b>3-2720-2</b>	ISO 7/1-R3/4 inch FNPT submersion threads; 4.6m (15 ft.) cable
<b>3-2714 and 3-2720</b>	<b>Example Part Numbers</b>

#### Application Notes:

- Use the flat glass electrodes when a self-cleaning feature is desired; especially useful in applications with abrasive particles.
- Use bulb protected electrodes for general purpose applications
- ORP electrodes are generally used for chemical reaction monitoring, not process control.
- Ensure that sensor materials are chemically compatible with the process liquid.
- Cleaning and calibration of electrodes is application dependent.

**Please refer to Installation, Accessories and Fittings sections for more information.**

Mfr. Part No.	Code	Mfr. Part No.	Code
3-2714	<b>198 844 300</b>	3-2717-WT	<b>159 000 811</b>
3-2714-HF	<b>198 844 305</b>	3-2720	<b>198 864 602</b>
3-2715	<b>198 844 301</b>	3-2720-2	<b>198 864 603</b>
3-2716	<b>198 844 302</b>	3-2721	<b>198 864 610</b>
3-2716-DI	<b>198 844 306</b>	P31542	<b>198 801 630</b>
3-2716-WT	<b>159 000 809</b>	P31542-3	<b>159 000 464</b>
3-2717	<b>198 844 303</b>		

## Accessories and Replacement Parts

Mfr. Part No.	Code	Description
<b>Calibration Accessories</b>		
3-2759	<b>159 000 762</b>	pH/ORP System Tester (includes bypass adapter)
3-0700.390	<b>198 864 403</b>	pH Buffer Kit
<b>Mounting</b>		
P31515-0P200	<b>159 000 630</b>	PVC Pipe Adapter, 1.25 in. O.D.
P31515-0C200	<b>159 000 631</b>	CPVC Pipe Adapter, 1.25 in. O.D.
P31515-0V200	<b>159 000 459</b>	PVDF Pipe Adapter, 1.25 in. O.D.
<b>Other</b>		
1220-0021	<b>198 801 186</b>	Replacement O-ring, FPM (for electrodes)
1224-0021	<b>198 820 006</b>	Replacement O-ring, EPDM (for electrodes)
1228-0021	<b>198 820 007</b>	Replacement O-ring, Kalrez® (for electrodes)
5523-0624	<b>159 000 636</b>	Cable, 24 AWG, 6-conductor (specify length)
3-2721	<b>198 864 610</b>	Remote pH/ORP preamplifier
3-2759.393	<b>159 000 765</b>	Adapter cable for use with 2720
P31542	<b>198 801 630</b>	Sensor cap, red
P31542-3	<b>159 000 464</b>	Sensor cap, blue