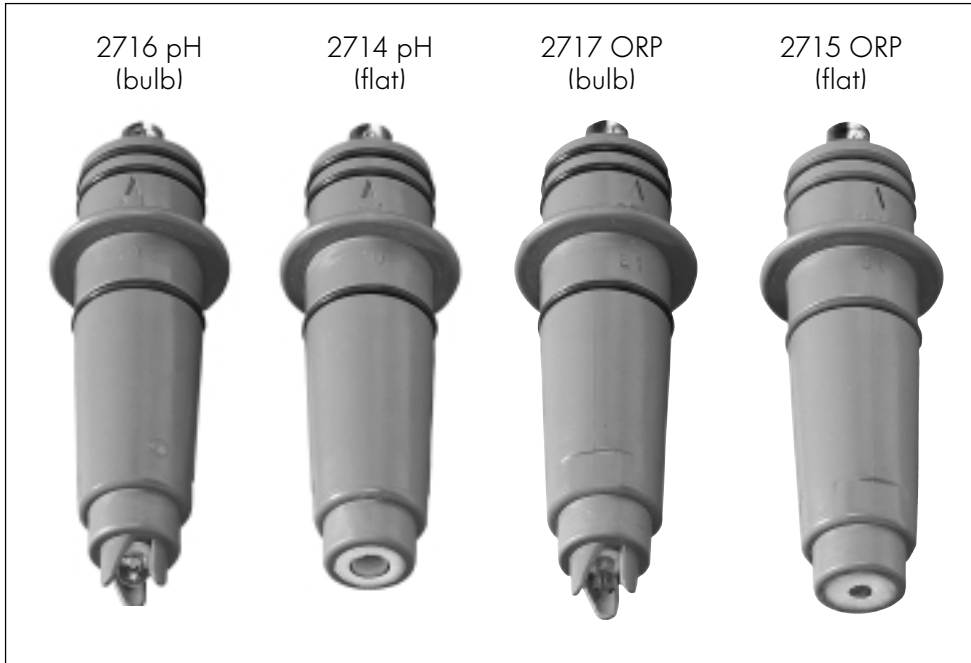


# +GF+ SIGNET 2714-2717 Twist-Lock pH and ORP Electrodes



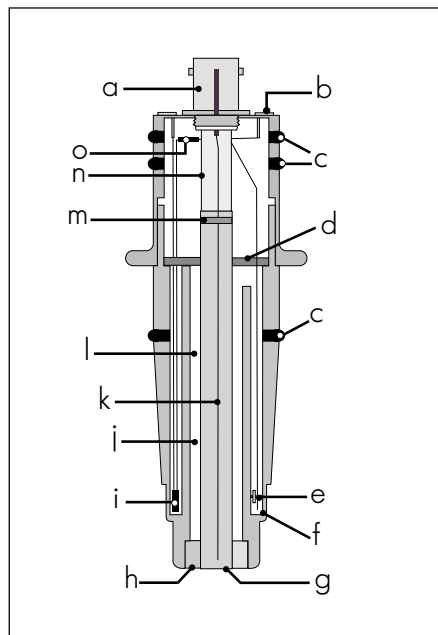
## Description

Feature-packed +GF+ SIGNET 2714-2717 Twist-Lock pH & ORP Electrodes provide unsurpassed simplicity, reliability and accuracy for a wide variety of industrial applications. Rugged CPVC construction, large reference volume and intelligent positioning of internal elements combine to extend the service-life of these dependable and highly responsive sensors. 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 in one easy motion. This includes the integral temperature sensor in pH electrodes, and the I.D. circuit in ORP electrodes. These contacts are used for automatic sensor recognition by +GF+ SIGNET pH/ORP Instrumentation, adding convenience and versatility to our systems.

## Technical Features

- a) Male BNC Connector
- b) I.D. Resistor (ORP sensor) or Thermistor contacts (pH sensor)
- c) Viton® O-rings (standard)
- d) Silicone-bushing seal (entire volume above seal potted with epoxy)
- e) Secondary junction: Nylon filament
- f) Ag/AgCl Reference element
- g) Platinum sensing surface (ORP sensor) or pH glass
- h) Primary junction: Porous UHMW polyethylene
- i) 3K Balco Thermistor (pH sensor)
- j) Solidified acrylamide reference electrolyte
- k) Ag/AgCl Measuring element
- l) Large reference volume
- m) Epoxy seal
- n) Shielding
- o) 10 K $\Omega$  I.D. resistor (ORP sensor)



## Features

- Designed for use with +GF+ SIGNET 2720 Pre-amplifier
- Durable CPVC Body
- Twist-lock design for easy installation and maintenance
- Flat versions resist fouling and reduce risks of breakage
- Large reference volume and solid polymer electrolyte for long service life
- pH electrodes include an integrated temperature sensor
- Reference element positioned for maximum protection from process contamination
- Symmetric arrangement of thermistor and reference elements optimizes temperature compensation in pH measurements
- Double O-ring seal protects the electrical interconnection between electrode and pre-amplifier
- DI option (pH) for pure water use (<100  $\mu$ S)
- HF option (pH) extends electrode life in applications containing trace amounts of HF (<2%)

## Applications

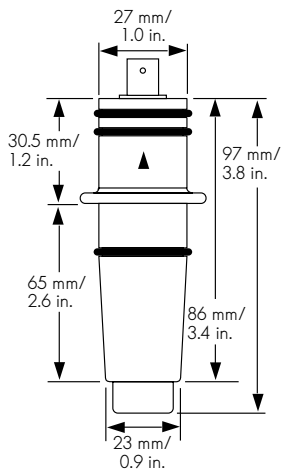
- Water & Wastewater Treatment
- Neutralization Systems
- Scrubber Control
- Effluent Monitoring
- Surface Finishing
- Heavy Metal Removal and Recovery
- Toxics Destruction
- Sanitization Systems
- Commercial Pools & Spas
- Aquatic Animal Life Support Systems
- Process Control

## Options

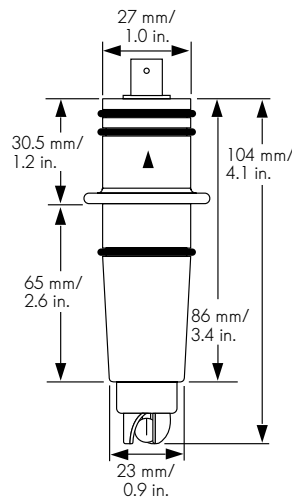
		Instrument Options/*Pre-amplifier				
Electrodes		2720	8150	5700	9030	9040
pH	2714	●	●	●	●	●
	2716	●	●	●	●	●
ORP	2715	●	●	●	●	●
	2717	●	●	●	●	●

## Dimensions

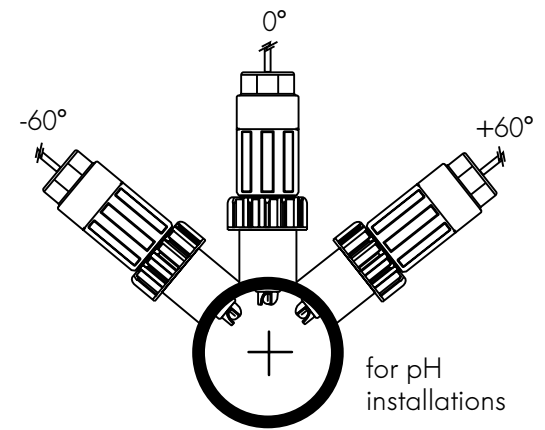
**2714/2714-HF pH Electrode**  
**2715 Flat ORP Electrode**



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



## Sensor Mounting

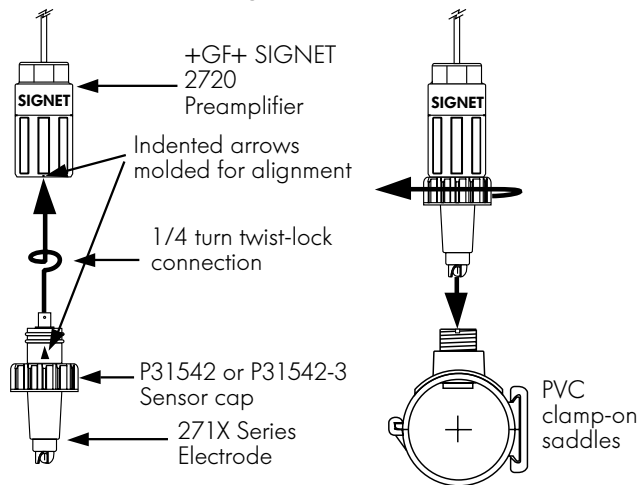


- It is recommended that you do not install standard electrodes within 30° of horizontal.
- Special electrodes for horizontal or inverted installation are available - contact factory.

## Installation

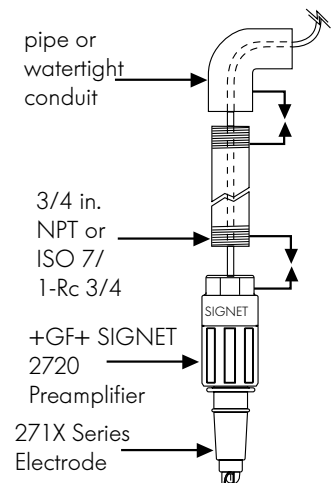
### In-Line:

For in-line installation, combine a 2720 Preamplifier with a sensor cap, 271X series electrode, and any +GF+ SIGNET fitting from 0.5 to 4 in.





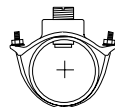
### Submersible:



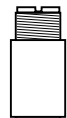
For submersible installation, combine a 2720 Preamplifier, a 271X series electrode, and a (user-supplied) pipe or watertight conduit. To prevent moisture accumulation at the cable-end of the pre amplifier, fill the lower 3 to 4 in. of conduit or extension pipe with a flexible sealant, such as silicone.



## Fitting Types for In-Line Installations

Refer to Fittings section of +GF+ SIGNET catalog for a complete listing of part numbers.

Type	Description
 Plastic tees	<ul style="list-style-type: none"> <li>• Available in 1/2 in. to 4 in. sizes</li> <li>• PVC, CPVC w/solvent cement socket</li> <li>• PVDF and PP w/union end fittings</li> </ul>
 PVC saddles	<ul style="list-style-type: none"> <li>• Available in 2 in. to 4 in. sizes</li> <li>• Requires 1-7/16 in. hole in pipe</li> </ul>
 Iron strap-on saddles	<ul style="list-style-type: none"> <li>• Available in 2 in. to 4 in. sizes</li> <li>• Requires 1-7/16 in. hole in pipe</li> </ul>

Type	Description
 Carbon steel weldolets	<ul style="list-style-type: none"> <li>• Available in 2 in. to 4 in. sizes</li> <li>• Requires 1-7/16 in. hole in pipe</li> <li>• Install by certified welder only</li> </ul>
 Carbon steel threaded tees	<ul style="list-style-type: none"> <li>• Available in 1/2 in. to 2 in. sizes</li> <li>• Female NPT ends</li> </ul>
 Universal pipe adapters	<ul style="list-style-type: none"> <li>• Use for installation in pipes &gt; 4 in. (1-1/4 in. NPT)</li> <li>• PVC, CPVC, or PVDF versions</li> <li>• Specify socket or 1-1/4 inch NPT male threads</li> </ul>

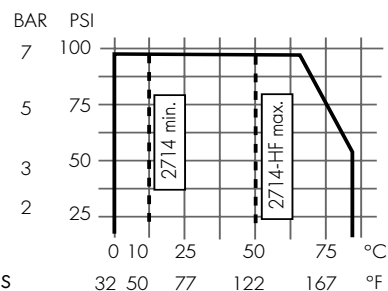
## Technical Data

### 2714 and 2716 pH Electrodes

Operating Range 2714, 2716:	0 to 14 pH
Operating Range 2714-HF:	0 to 12 pH
Operating Temperature:	
2716:	0°C to 85°C (32° to 185°F)
2714:	10° to 85°C (50° to 185°F)
2714-HF:	0° to 50°C (32° to 122°F)
Storage Temperature:	> -12° C (11° F)
Pressure:	6.89 bar @ 0°C (100 psi @ 32° to 149°F) 4.00 bar @ 85°C (58 psi @ 150° to 185°F)
Pipe Size Range:	1/2 in. and up. Use +GF+SIGNET installation fittings from 0.5 to 4.0 in. (use pipe adapter in pipes over 4 in.) Vertical mounting ±60° required. Submersion with 3-2720 pre-amplifier requires 3/4 in. NPT or ISO 7-1/3/4 in. Male threaded extension.
Efficiency:	>97% @ 25°C (77° F)
pH Response Time:	< 5 secs. for 95% of signal change
Wetted Materials:	CPVC Body Glass FPM - Viton® O-rings Porous UHMW Polyethylene (primary reference junction) Electrolyte: Solidified Acrylamide Gel 3.5M KCl (2714, 2714-HF, 2716) 0.1 M KCl (2716-DI) Secondary junction: Nylon filament Element: Ag/AgCl
Reference:	
Primary Functions:	2714: Flat surface resists fouling 2716: Bulb surface for general use 2714-HF: Extended use in applications with trace hydrofluoric acid (<2%) 2716-DI: Extended use in pure waters(< 100 µS)
Temperature Sensor:	3K Balco (3000Ω = 25° C)
Response Time, τ:	140 secs. (2714), 196 secs. (2716)
Shipping Weight:	0.2 kg (0.4 lbs.)

### 2715/2717 ORP Electrodes

Operating Range:	ORP: -2,000 to +2,000 mV
Operating Temperature/Pressure:	6.89 bar @ 0°C (100 psi @ 32° to 149° F) 4.00 bar @ 85°C (58 psi @ 150° to 185°F)
Storage Temperature:	> -12° C (11° F)
Pipe Size Range:	1/2" and up. Use +GF+ SIGNET installation fittings from 1/2 to 4 in. (use pipe adapters in pipes over 4 in.) Submersion with 3-2720 pre-amplifier requires 3/4 in. NPT or ISO 7-1 /R 3/4 in. male threaded extensions
Efficiency:	> 97% @ 25°C (77° F)
ORP Response Time:	Application dependent
Materials:	CPVC Body Glass FPM-Viton® O-rings Porous UHMW Polyethylene (primary reference junction) Platinum sensing surface
Reference:	Electrolyte: Solidified Acrylamide Gel = 3.5M KCl Secondary junction: Nylon filament Element: Ag/AgCl
Primary Functions:	2715: Flat surface resists fouling 2717: Bulb surface for general use
Shipping Weight:	0.2 kg (0.4 lbs.)



Graph applies to both pH and ORP electrodes

## Ordering Information

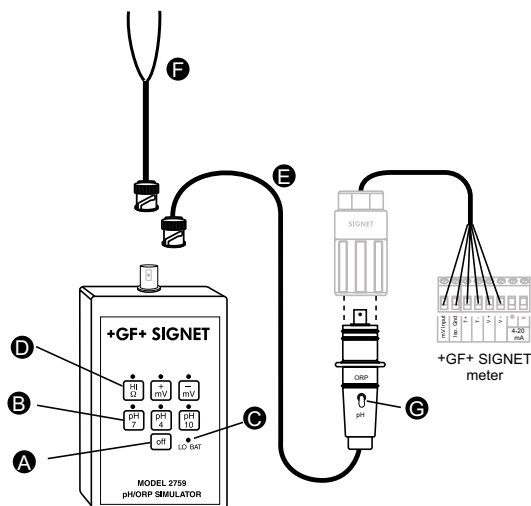
Mfr. Part No.	Code	Description
3-2714	198 844 300	Flat pH electrode
3-2714-HF	198 844 305	Flat pH hydrofluoric acid resistant electrode (<2%)
3-2716	198 844 302	Bulb pH electrode
3-2716-DI	198 844 306	Bulb pH electrode for process liquids (< 100 μs)
3-2715	198 844 301	Flat ORP Electrode
3-2717	198 844 303	Bulb ORP Electrode
3-2720	198 864 602	Preamplifier, 3/4" NPT (required to complete the system)
3-2720-2	198 864 603	Preamplifier, ISO 7-1/R 3/4 in. (required to complete the system)

## Accessories

Mfr. Part No.	Code	Description
P31542	198 801 630	Red sensor cap for in-line installations
P31542-3	159 000 464	Blue sensor cap for in-line installations
3-2759	159 000 762	pH/ORP system tester (includes bypass adapter)
3-0700.390	198 864 403	pH Buffer Kit
P31515-OP200	159 000 630	PVC Pipe Adapter
P31515-OC200	159 000 631	CPVC Pipe Adapter
P31515-OV200	159 000 459	PVDF Pipe Adapter
1220-0021	198 801 186	O-ring, FPM
1224-0021	198 820 006	O-ring, EPR
1228-0021	198 820 007	O-ring, Kalrez®

### 2759 pH/ORP System Tester Specifications

- A) Power OFF Button
- B) Output simulation buttons and indicators. Simulate pH and ORP output at five fixed values: pH 4, pH 7, pH 10, -700 mV and +700 mV. Pressing one of these buttons turns the 2759 on.
- C) Low battery indicator
- D) High Ω switch: Adds 1000 MΩ resistance in series with output. Simulates high impedance of pH electrodes. Used to verify proper preamplifier operation.
- E) 3-2759.393: Adapter cable for use with 2720
- F) 3-2759.390: Bypass adapter cable (included with 2759)
- G) Mode selector switch: Trigger automatic sensor recognition software in +GF+ SIGNET pH/ORP instrumentation.



## Engineering Specifications

- The electrode shall meet CE standards
- The electrode body shall be constructed of CPVC.
- The electrode shall have flat measuring glass or include guard
- The electrode shall have solidified acrylamide, solid polymer reference electrolyte.
- The electrode shall have a double UHMW reference junction.
- The pH electrode reference element shall be placed opposite the TC element for accurate temperature compensation.
- The electrode shall be constructed in order to allow for direct connection to preamplification without the need of coaxial cables and shall allow quick, simple electrical connection of mV and temperature signals utilizing a "twist-lock" connection.
- The electrode shall use a double O-ring seal to protect the electrical interconnection to the preamplifier.
- The electrode shall be equipped for either in-line or submersible installation using manufacturer supplied hardware.
- Optional: 3-2714-HF The electrode shall be supplied with a measuring glass construction, resistant to chemical attack from hydrofluoric acid/fluoride ions.
- The electrode shall indicate month and year of manufacture.

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