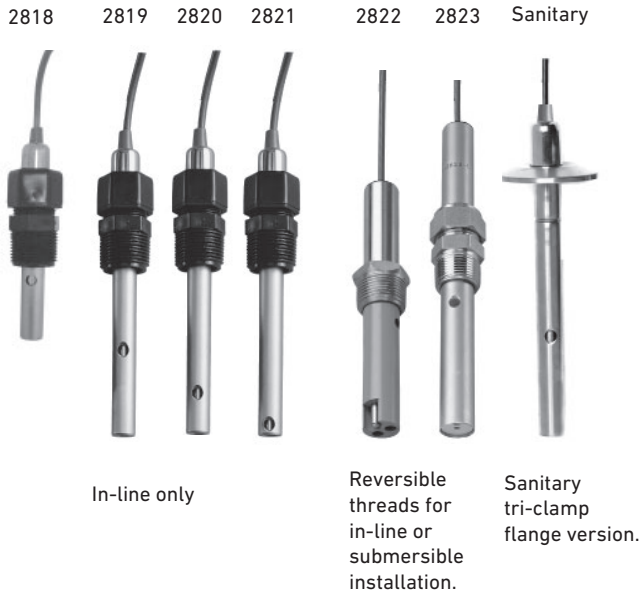


# Signet 2818-2823 Conductivity/Resistivity Electrodes **+GF+**



Signet 2818-2823 Conductivity/Resistivity Electrodes are designed to provide versatile installation and accurate sensing across a very broad dynamic range. These electrodes are built with a controlled surface finish to ensure accuracy and repeatability. The standard electrode material is 316 stainless steel, but there are other materials available for maximum chemical compatibility.

Reversible threads or sanitary flanges allow for maximum installation versatility.

Sanitary flange versions are available in stainless steel and titanium with surface quality finish of less than Ra 25  $\mu$ m and with an optional NIST Traceability Certificate to meet USP requirements.

Coupled with Signet patented measuring circuitry, a three decade measurement range is achieved without the need for troublesome electrode platinization. A platinum RTD (Pt1000) located within the electrode allows optimal temperature sensing.

## Features

- **Standard process connections**
  - 3/4 in. NPT Polypro
  - 3/4 in. NPT SS on 10 and 20 cell
  - Tri-clamp 1 -1 1/2 in., 2 in.
  - Opt. 1/2 in. NPT 316 SS
- **316 SS or Titanium (indicated tri-clamp only) standard electrode**
- **Alternative electrode materials available**
  - Hastelloy-C
  - Monel
  - Titanium
- **In-line or submersible mounting**
- **NIST traceable certified cells  $\pm 1\%$**
- **Meet USP requirements**



## Applications

- **Pure Water Treatment**
  - Reverse Osmosis
  - Deionization
  - Distillation
- **Boiler Condensate**
- **Semiconductor Water Production**
- **Rinse Water Monitoring and Control**
- **TDS (Total Dissolved Solids)**
- **Salinity**
- **USP Purified Water**
- **WFI Water Production**
- **Ultra Pure Water**

## Specifications

**Models 3-2818-1 (0.01 cm<sup>-1</sup> Cell), 3-2819-1\* (0.01 cm<sup>-1</sup> Cell), 3-2820-1\* (0.1 cm<sup>-1</sup> Cell), 3-2821-1\* (1.0 cm<sup>-1</sup> Cell)**

\* Certified versions available (add "C" suffix to part no.)

### General

Operating Range	3-2818, 3-2819	0.055 to 100 µS	18.2 MΩ to 10 KΩ	0.02 to 50 ppm
	3-2820	1 to 1000 µS	1 MΩ to 1 KΩ	0.5 to 500 ppm
	3-2821	10 to 10,000 µS	5 to 5,000 ppm	
Cell Constant Accuracy		±2% of reading (certified cells ±1%)		
Temperature Compensation Device		Pt1000		
Cable Length (use for the 2818, 19, 20, 21, 22 and 23)	Standard	4.6 m (15 ft)		
	Maximum	30 m (100 ft) all sensors when used with 9900 or 9950 and Direct Conductivity/ Resistivity Module. 2818, 2819 maximum 4.6 m (15 ft) when used with 2850		

### Wetted Materials

O-rings	EPR (EPDM)
Insulator Material	Carbon fiber reinforced PTFE
Electrodes	316L stainless steel (1.4408, DIN 17440) or Titanium

### Maximum Temperature/Pressure Rating

Standard Polypro Fitting	6.9 bar @ 100 °C	100 psi @ 212 °F
Optional 1/2: NPT 316 SS fitting (3-2820.392)	13.8 bar @ 120 °C	200 psi @ 248 °F
Sanitary Connection	6.9 bar @ 120 °C	100 psi @ 248 °F

### Temperature Response, τ

0.01 cell	7 sec.
0.1 cell	53 sec.
1.0 cell	21 sec.

Temperature Accuracy 0.3 °C

### Shipping Weight

0.4 kg	0.8 lb
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### Standards and Approvals

RoHS compliant, China RoHS
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### Model 3-2822-1 (10.0 cm<sup>-1</sup> Cell)

#### General

Operating Range	100 to 200,000 µS	50 to 100,000 ppm
Cell Constant Accuracy	±2% of reading (certified cells ±1%)	
Temperature Compensation Device	Pt1000	
Cable Length	Standard	4.6 m 15 ft
	Maximum	30 m 100 ft

#### Wetted Materials

O-rings	EPR (EPDM)	
Body	CPVC	
Electrodes	316 stainless steel (1.4408, DIN 17440)	
Process Connection	Standard 316 SS fitting	¾ in. NPT threads
	Optional 316 SS submersion adapter fitting (3-2820.390)	¾ in. NPT threads

#### Maximum Temperature/Pressure Rating

6.9 bar @ 95 °C	100 psi @ 203 °F
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Temperature Response, τ 5 seconds

Temperature Accuracy 0.3 °C

#### Shipping Weight

0.4 kg	0.8 lb
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#### Standards and Approvals

RoHS compliant, China RoHS
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## Model 3-2823-1 (20.0 cm<sup>-1</sup> Cell)

### General

Operating Range	200 to 400,000 μS	100 to 200,000 ppm
Cell Constant Accuracy	±2% of reading	
Temperature Compensation Device	Pt1000	
Cable Length	Standard	4.6 m (15 ft)
	Maximum	30 m (100 ft)

### Wetted Materials

O-rings	EPR (EPDM)	
Insulator Material	PEEK®	
Process Connection	Electrodes	316 stainless steel (1.4408, DIN 17440)
	Standard 316 SS fitting	¾ in. NPT thread

### Maximum Temperature/Pressure Rating

	6.9 bar @ 150 °C	100 psi @ 302 °F
Temperature Response, τ	120 seconds	
Temperature Accuracy	±0.3 °C	

### Shipping Weight

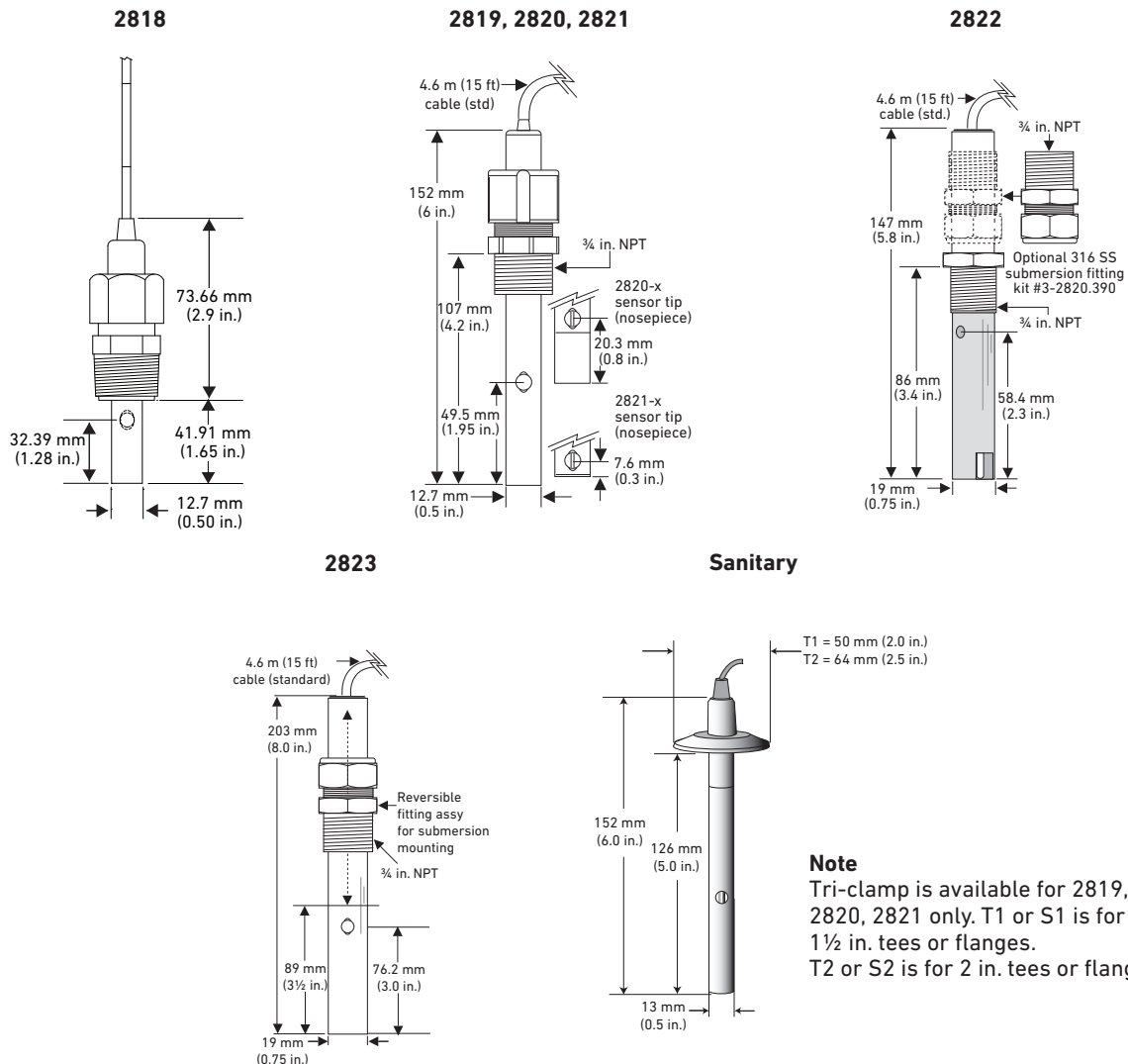
0.3 kg	0.6 lb
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### Standards and Approvals

RoHS compliant, China RoHS

See Temperature and Pressure graphs for more information.

## Dimensions

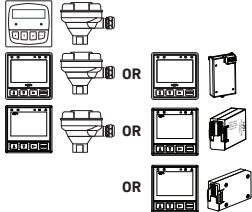
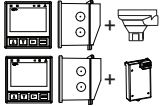
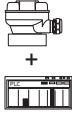
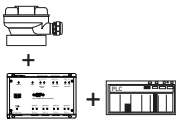
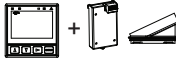




### Note

Tri-clamp is available for 2819, 2820, 2821 only. T1 or S1 is for 1 to 1½ in. tees or flanges. T2 or S2 is for 2 in. tees or flanges.

# System Overview

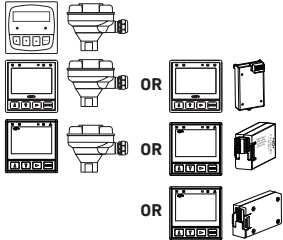
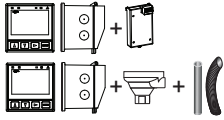
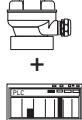
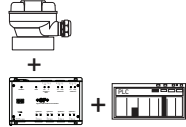
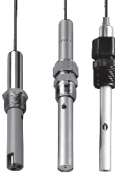
## In-Line Installation

Panel Mount	Pipe, Tank, Wall Mount	4 to 20 mA Output*	Automation System	Field (Integral) Mount*
<p>Signet Instruments with 2850 Sensor Electronics</p> <ul style="list-style-type: none"> <li>- 8900</li> <li>- 9900 or with 3-9900.394 Direct Conductivity/Resistivity Module</li> <li>- 9950 or with 9950.394 Direct Conductivity/Resistivity Module or with 3-9950.394-2 Dual Channel Conductivity Module</li> </ul> 	<p>Signet Instruments with 2850 Sensor Electronics</p> <ul style="list-style-type: none"> <li>- 9900 and Rear Enclosure or with 3-9900.394 Direct Conductivity/Resistivity Module and Rear Enclosure</li> </ul> 	<p>Signet 2850 Sensor Electronics with</p> <ul style="list-style-type: none"> <li>- Customer Supplied Programmable Logic Controller or</li> <li>- Programmable Automation Controller</li> </ul> 	<p>Signet 2850 Sensor Electronics with</p> <ul style="list-style-type: none"> <li>- 0486 Profibus Concentrator and</li> <li>- Customer Supplied Programmable Logic Controller or</li> <li>- Programmable Automation Controller</li> </ul> 	<p>Signet Instrument</p> <ul style="list-style-type: none"> <li>- 9900 with 3-9900.394 Direct Conductivity/Resistivity Module and Angle Adapter</li> </ul> 
<p><b>Signet 2818-2823 Conductivity Electrodes</b></p> 				<p><b>Signet 2819-2823 Conductivity Electrodes</b></p>  <p>Special order for 0.01, 0.1 and 1.0 cells**</p>

Fittings- Customer Supplied

All Sold Separately

## Submersible Installation

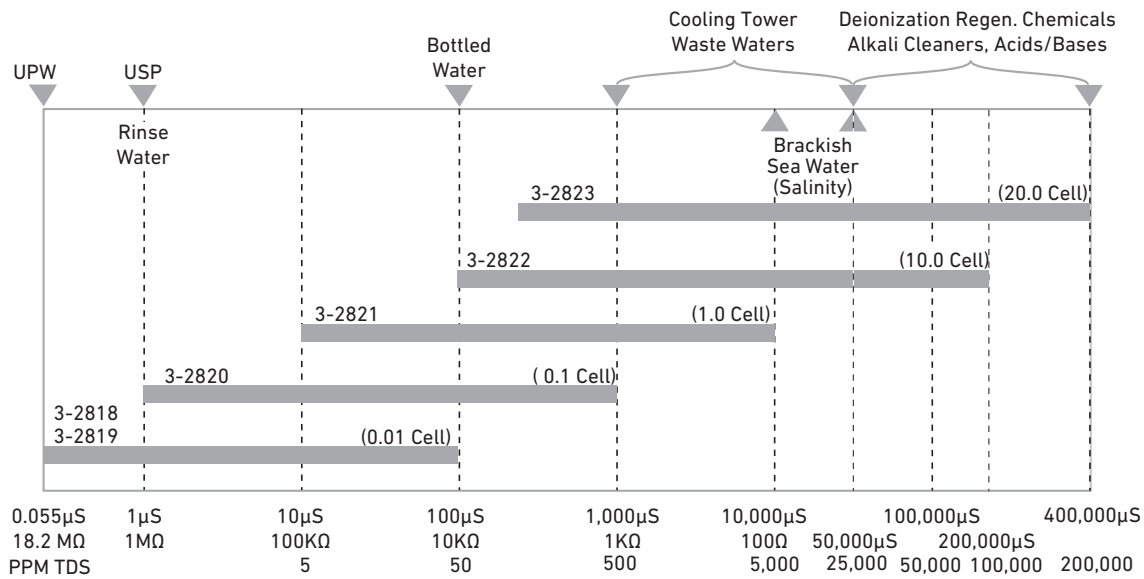
Panel Mount	Pipe, Tank, Wall Mount	4 to 20 mA Output*	Automation System
<p>Signet Instruments with 2850 Sensor Electronics</p> <ul style="list-style-type: none"> <li>- 8900</li> <li>- 9900 or with 3-9900.394 Direct Conductivity/Resistivity Module</li> <li>- 9950 with 9950.394 Direct Conductivity/Resistivity Module or with 3-9950.394-2 Dual Channel Conductivity Module</li> </ul> 	<p>Signet Instruments with 2850 Sensor Electronics</p> <ul style="list-style-type: none"> <li>- 9900 and Rear Enclosure or with 3-9900.394 Direct Conductivity/Resistivity Module, Rear Enclosure and customer supplied pipe extension or conduit with 3/4 in. FNPT threads***</li> </ul> 	<p>Signet 2850 Sensor Electronics with</p> <ul style="list-style-type: none"> <li>- Customer Supplied Programmable Logic Controller or</li> <li>- Programmable Automation Controller</li> </ul> 	<p>Signet 2850 Sensor Electronics with</p> <ul style="list-style-type: none"> <li>- 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or</li> <li>- Programmable Automation Controller</li> </ul> 
<p><b>Signet 2818-2823 Conductivity Electrodes</b></p>  <p>Special order for 0.01, 0.1 and 1.0 cells**</p>			<p>All Sold Separately</p>

\*If required distance between the measurement point and the display is greater than 100 ft, use 3-2850-51 (S<sup>3</sup>L) or 3-2850-52 4 to 20 mA sensor electronics.

\*\* Special Order submersible installation not applicable for Sanitary Conductivity Electrode.

\*\*\*Refer to the Signet Submersion Kit brochure (3-0000-707) located on our website for installation suggestions and options.

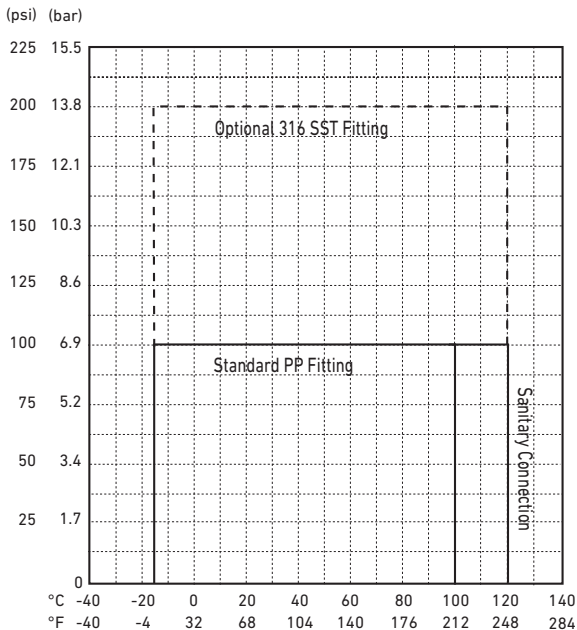
## Operating Range Chart



## Temperature/Pressure Graphs

### Note:

The pressure/temperature graphs are specifically for the Signet sensor. During system design the specifications of all components must be considered. In the case of a metal piping system, a plastic sensor will reduce the system specification.



### Example of NIST Traceability Certificate

CERTIFICATE	
Date:	November 10, 2017
Sensor Part Number:	3-2819-T1C
Sensor Serial Number:	980159-04
Sensor Cell Constant:	0.0102
Temp. Element Offset:	0.1 °C
Measured at:	24.8 °C
NIST Certified	

### Application Tips

- GF Signet advises all conductivity sensors be installed in a piping system in a mounting position as shown in Fig 1.
- When used in a tank application the liquid levels must be high enough to cover vent hole on sensor body.
- Threads on models 2823 can be reversed in the field.
- Install sensors in an area that will remain free of air bubbles and sediment build-up.
- Conductivity measurement is affected if the metal electrodes become coated by the process media.
- Use 2819 series electrodes with the 3-2850-63 electronics and 8900 for applications requiring multiple measuring points.

### Ordering Notes

- 1) Additional wetted materials and sensor lengths are available through special order.
- 2) The 2818 and 2819 maximum cable length is 4.6M (15 ft) when used with a 2850 Universal J-box.
- 3) When used with the 9900 and 9950 conductivity module, sensors are limited to 30 m (100 ft) maximum .
- 4) Sensors with cable lengths of up to 30 m (100 ft) are available - consult factory.
- 5) Use PN 3-2820.390 or 3-2820.391 for a submersible threaded connection.

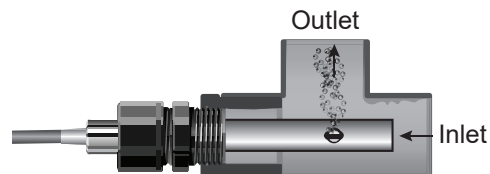
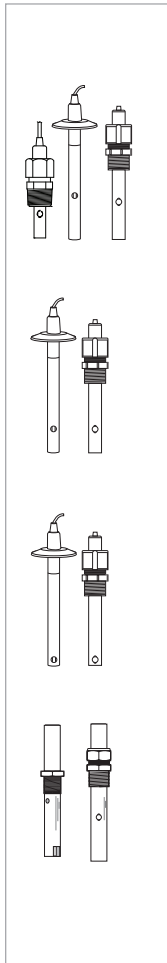


Fig. 1

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

## Ordering Information



Mfr. Part No.	Code	Cell Constant	Sensor Material and Mounting	Insertion into Tee Size
3-2818-1**	<b>159 001 718</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Threads	in-line only
3-2819-1	<b>198 844 010</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Threads	in-line only
3-2819-1C	<b>159 000 651</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Threads (certified)	in-line only
3-2819-S1	<b>159 000 085</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2819-S1C*	<b>159 000 087</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2819-S2†	<b>159 000 086</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	2 in.
3-2819-S2C*	<b>159 000 088</b>	0.01 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	2 in.
3-2819-T1†	<b>159 000 081</b>	0.01 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2819-T1C*	<b>159 000 083</b>	0.01 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2819-T2†	<b>159 000 082</b>	0.01 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	2 in.
3-2819-T2C*	<b>159 000 084</b>	0.01 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	2 in.
3-2820-1	<b>198 844 000</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, ¾ in. threads	in-line only
3-2820-1C	<b>159 000 654</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, ¾ in. threads (certified)	in-line only
3-2820-S1	<b>159 000 089</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp flange	1 to 1½ in.
3-2820-S1C*	<b>159 000 091</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp flange	1 to 1½ in.
3-2820-S2†	<b>159 000 090</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp flange	2 in.
3-2820-S2C*	<b>159 000 092</b>	0.1 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp flange	2 in.
3-2820-T1†	<b>159 000 624</b>	0.1 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp flange	1 to 1½ in.
3-2820-T2†	<b>159 000 625</b>	0.1 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp flange	2 in.
3-2821-1	<b>198 844 001</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Threads	in-line only
3-2821-1C	<b>159 000 650</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Threads (certified)	in-line only
3-2821-S1†	<b>159 000 093</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2821-S1C*	<b>159 000 095</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2821-S2†	<b>159 000 094</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	2 in.
3-2821-S2C*	<b>159 000 096</b>	1.0 cm <sup>-1</sup>	316 SS Electrode, Sanitary Tri-clamp Flange	2 in.
3-2821-T1†	<b>159 000 626</b>	1.0 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	1 to 1½ in.
3-2821-T2†	<b>159 000 627</b>	1.0 cm <sup>-1</sup>	Titanium Electrode, Sanitary Tri-clamp Flange	2 in.
3-2822-1	<b>198 844 002</b>	10 cm <sup>-1</sup>	316 SS Electrode with fixed ¾ in. Threads	in-line or submersible mounting only
3-2823-1	<b>198 844 003</b>	20 cm <sup>-1</sup>	316 SS Electrode, ¾ in. Reversible Threads	in-line or submersible mounting only

†Available for 0.01 cm<sup>-1</sup>, 0.1 cm<sup>-1</sup>, and 1.0 cm<sup>-1</sup> cells only

\*NIST Certified

\*\*NIST certificate available. Contact the factory.

### Special Order Options - Please consult the factory

High Temperature and Pressure options.

Wetted materials (Hastelloy-C, Monel and Titanium) and sensor lengths.

Wet-Tap, ball valve retractable sensor for long insertion length available as a special order.

## Accessories and Replacement Parts

Mfr. Part No.	Code	Description
3-2850.101-1	<b>159 001 392</b>	Plug-in NIST Traceable Recertification Tool, 1.0 µS Simulated, for use with 8900, 9900, 9950, 2850 and the 2850 4-20 mA output
3-2850.101-2	<b>159 001 393</b>	Plug-in NIST Traceable Recertification Tool, 2.5 µS Simulated, for use with 8900, 9900, 9950, 2850 and the 2850 4-20 mA output
3-2850.101-3	<b>159 001 394</b>	Plug-in NIST Traceable Recertification Tool, 10.0 µS Simulated, for use with 8900, 9900, 9950, 2850 and the 2850 4-20 mA output
3-2850.101-4	<b>159 001 395</b>	Plug-in NIST Traceable Recertification Tool, 18.2 MΩ Simulated, for use with 8900, 9900, 9950, 2850 and the 2850 4-20 mA output
3-2850.101-5	<b>159 001 396</b>	Plug-in NIST Traceable Recertification Tool, 10.0 MΩ Simulated, for use with 8900, 9900, 9950, 2850 and the 2850 4-20 mA output
3-2820.390	<b>198 840 223</b>	¾ in. NPT Fitting, 316 SS for use with 2822-1 and 2823-1 for submersible mounting
3-2820.391	<b>198 840 221</b>	¾ in. NPT Fitting, Polypro replacement for 2819-1, 2820-1 or 2821-1
3-2820.392	<b>198 840 222</b>	½ in. NPT Fitting, 316 SS for use with 2819-1, 2820-1 or 2821
3-2850-61	<b>159 001 400</b>	Universal Junction Box, Conductivity Electronics, digital (S <sup>3</sup> L) output
3-2850-62	<b>159 001 401</b>	Universal Junction Box, Conductivity Electronics, 4 to 20 output
5523-0322	<b>159 000 761</b>	Sensor Cable (per ft), 3 cond. plus shield, 22 AWG (for cable extension through a junction box for the following sensors: 3-2820, 3-2821, 3-2822, 3-2823)
3-8050-1	<b>159 000 753</b>	Universal Mount Junction Box

Note: GF Signet recommended sensors that require extended cable lengths be ordered from the factory.

### 3-2819.099 Rev P (09/20)

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