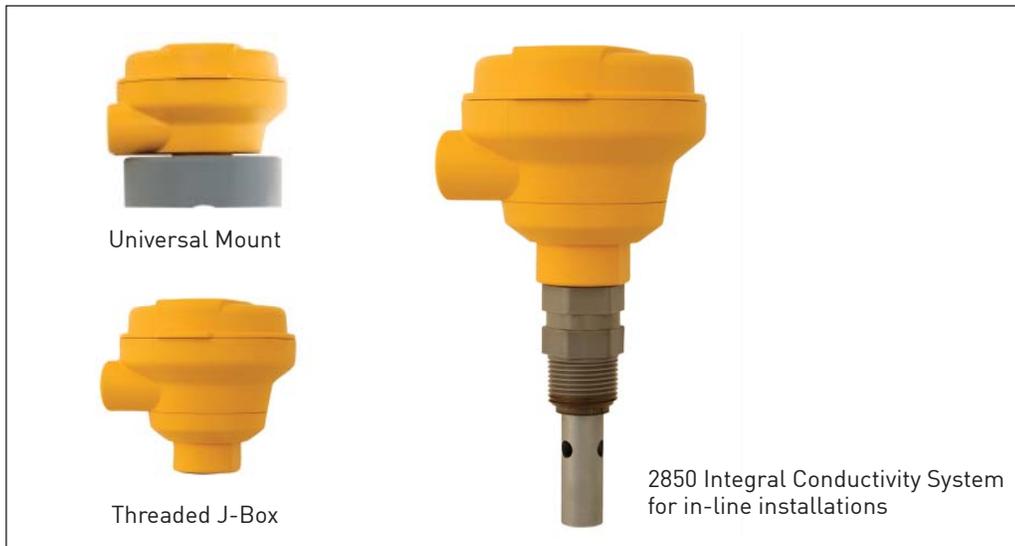


# Signet 2850 Conductivity/Resistivity Sensor Electronics and Integral Systems

## Features

- Integral mount systems for quick and easy installation
- Compact design for maximum installation flexibility
- Digital (S<sup>3</sup>L) interface or two-wire 4 to 20 mA output
- EasyCal with automatic test solution recognition
- Dual channel unit available for low cost installation with Signet 8900 Multi-Parameter Controller
- For use with ALL Signet conductivity electrodes



## Description

The Signet 2850 Conductivity/Resistivity Sensor Electronics are available in various configurations for maximum installation flexibility. The universal mount version is for pipe, wall, or tank mounting and enables single or dual (digital versions only) inputs using any standard Signet conductivity / resistivity sensor. The threaded j-box version can be used with these same Signet sensors for submersible sensor mounting. It is also available as a combined integral system configuration for in-line mounting and includes a conductivity electrode in a choice of 0.01, 0.1, 1.0, or 10.0 cm<sup>-1</sup> cell constants. The 2850 is ideal for applications with a conductivity range of 0.055 to 400,000 μS or a resistivity range of 18.2 MΩ to 10 kΩ.

All 2850 units are available with a choice of two outputs, digital (S<sup>3</sup>L) or 4 to 20 mA.

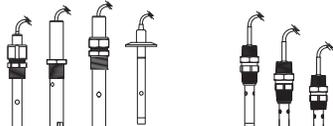
The digital (S<sup>3</sup>L) output version allows for up to six sensor inputs directly into the Signet 8900 Multi-Parameter Controller. The two-wire 4 to 20 mA output version is available with eight 4 to 20 mA output ranges for each electrode cell constant. Each range can be inverted and are field selectable.

All 2850 units are built with NEMA 4X/ IP 65 enclosures which allow output wiring connections with long cable runs of up to 1,000 feet (305 m). EasyCal is a standard feature that automatically recognizes conductivity test solution values for simple field calibration. A certification tool is available for validation of the sensor electronics according to USP requirements.

## Applications

- Water Treatment & Water Quality Monitoring
- Reverse Osmosis
- Deionization
- Demineralizer, Regeneration & Rinse
- Scrubber, Cooling tower and Boiler Protection
- Aquatic Animal Life Support Systems

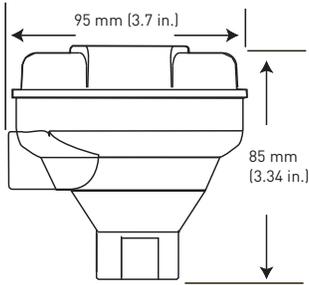
## System Overview

In-Line Sensor Installation				Submersible Installation	
<b>Panel Mount</b> Signet 8900 Instrument (sold separately) 	<b>4 to 20 mA Input</b> Programmable Logic Controller 	<b>Panel Mount</b> Signet 8900 Instrument (sold separately) 	<b>4 to 20 mA Input</b> Programmable Logic Controller 	<b>Panel Mount</b> Signet 8900 Instrument (sold separately) 	<b>4 to 20 mA Input</b> Programmable Logic Controller 
<b>Signet 2850 Conductivity System</b> 		<b>Signet 2850 Universal Mount</b> 		<b>Signet 2850 Universal Mount or Threaded J-Box</b> 	
		Signet 2819-2823 or 2839-2842 Conductivity Electrode (sold separately) 			
Fittings (3/4 in. NPT or ISO) - Customer supplied					

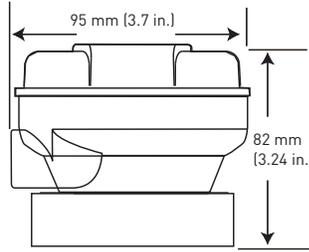


# Dimensions

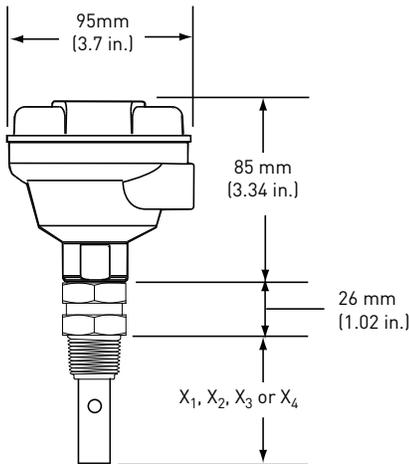
## 2850-5X Threaded J-Box



## 2850-6X Universal Mount Systems



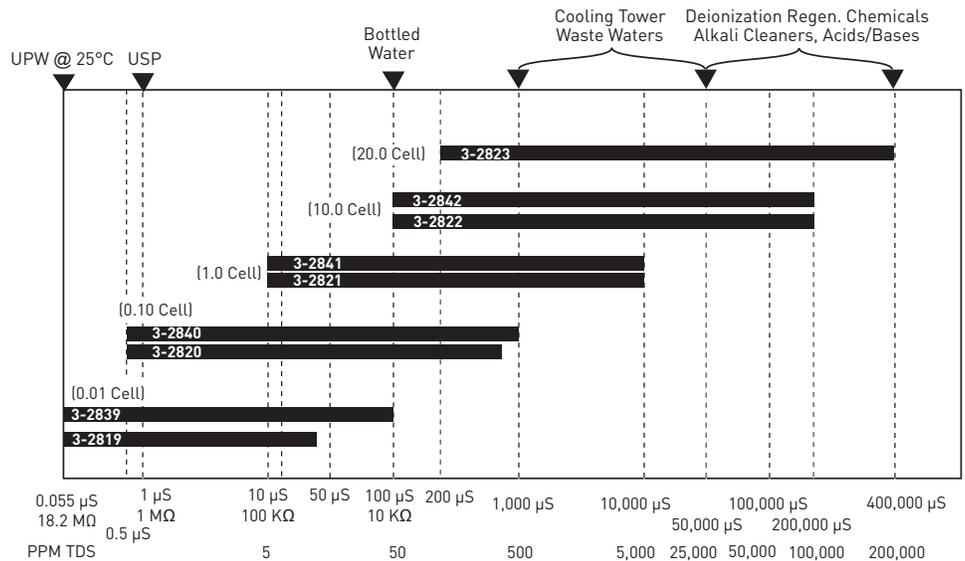
## 2850-5X-XX Integral Mount Systems



- X<sub>1</sub> [3-2839] = 73mm [2.88 in.]
- X<sub>2</sub> [3-2840] = 35mm [1.38 in.]
- X<sub>3</sub> [3-2841] = 41.3mm [1.63 in.]
- X<sub>4</sub> [3-2842] = 41.3mm [1.63 in.]

## Operating Range Chart

The 2850 is capable of measuring conductivity and resistivity values over a wide range. Below is a chart of Signet Conductivity/Resistivity electrodes (listed in each range box) that is recommended for the specified measurement range.



## Specifications:

### General

Compatible Electrodes: All Signet models with PT1000 RTD

### Materials

- Threaded j-box for Integral mount: PBT
  - Universal/Remote mount: PBT, CPVC
- Temperature Compensation: PT1000 RTD

EasyCal: Automatic recognition of the following conductivity values:

- 146.93  $\mu\text{S}$ , 1408.8  $\mu\text{S}$ , 12856  $\mu\text{S}$  (@ 25 °C) [Test solutions Per ASTM D1125-95]
- 10  $\mu\text{S}$ , 100  $\mu\text{S}$ , 200  $\mu\text{S}$ , 500  $\mu\text{S}$ , 1000  $\mu\text{S}$ , 5000  $\mu\text{S}$ , 10,000  $\mu\text{S}$ , 50,000  $\mu\text{S}$ , 100,000  $\mu\text{S}$  (@ 25 °C) [Standard test solutions]

### Electrical

Power:

- 12 to 24 VDC  $\pm 10\%$ , regulated for 4 to 20 mA output (typically called "Loop Powered")
- 5 to 6.5 VDC  $\pm 5\%$  regulated recommended (provided by the Signet 8900), 3.0 mA max for Digital (S<sup>3</sup>L) output (Reverse polarity and short circuit protected)

Digital (S<sup>3</sup>L) Output: Serial ASCII, TTL level 9600 bps

- Accuracy:
  - Conductivity:  $\pm 2\%$  of reading
  - Temperature:  $\pm 0.5$  °C
- Resolution:
  - Conductivity: 0.1% of reading
  - Temperature: < 0.2 °C
- Update Rate:
  - Single channel models: < 600 ms
  - Dual channel models: < 1200 ms

### Electrical (continued)

Available data via Digital (S<sup>3</sup>L) Output:

- Raw conductivity
- Calibrated conductivity
- Calibrated temperature-compensated conductivity
- Temperature

### Max. Pressure/Temperature Ratings

Operating Temperature:

-10 °C to 85 °C (14 °F to 185 °F)

Storage Temperature:

-20 °C to 85 °C (-4 °F to 185 °F)

Relative Humidity:

0 to 95%, non-condensing

Enclosure: NEMA 4X/IP65

Current Output:

- Field-selectable ranges
- Factory set Span:
  - 0.01 cell (2819, 2839): 4 to 20 mA = 0 to 100  $\mu\text{S}$
  - 0.10 cell (2820, 2840): 4 to 20 mA = 0 to 1000  $\mu\text{S}$
  - 1.0 cell (2821, 2841): 4 to 20 mA = 0 to 10,000  $\mu\text{S}$
  - 10.0 cell (2822, 2842): 4 to 20 mA = 0 to 200,000  $\mu\text{S}$
  - 20.0 cell (2823): 4 to 20 mA = 0 to 400,000  $\mu\text{S}$
- Max. Loop Resistance:
  - 50  $\Omega$  @ 12 VDC
  - 325  $\Omega$  @ 18 VDC
  - 600  $\Omega$  @ 24 VDC
- Accuracy:  $\pm 2\%$  of output span
- Resolution: 7  $\mu\text{A}$
- Update Rate: < 600 ms
- Error Indication: 22 mA

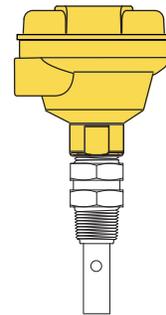
- Pure Water Compensation: When using 0.01-cm cell and raw conductivity value < 0.5  $\mu\text{S}$ , the 2850 auto-switches to compensate for non-linear temperature effects found in this low conductivity (high resistivity) range

### Shipping Weight

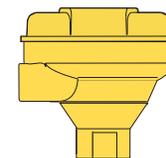
- Threaded J-Box: 0.75 kg 1.75 lb
- Universal mount: 0.75 kg 1.75 lb

### Standards and Approvals

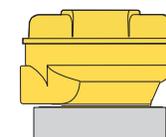
- CE
- Manufactured under ISO 9001 for Quality and ISO 14001 for Environmental Management



Integral System includes the 2850 sensor electronics and a choice of Conductivity/Resistivity electrode.



-5X Threaded J-Box



-6X Universal/Remote Mount

## Field Selectable Ranges for 4 to 20 mA Operation

The chart below indicates the field selectable ranges in which the 2850 sensor electronics can be set via internal switches. All ranges can be inverted if required. Signet Models listed below are compatible Conductivity/Resistivity electrodes.

0.01 Cell	0.10 Cell	1.0 cell	10.0 Cell	20.0 Cell
Signet Model 2819 or 2839	Signet Model 2820 or 2840	Signet Model 2821 or 2841	Signet Model 2822 or 2842	Signet Model 2823
<b>10 to 20 M<math>\Omega</math></b>	0 to 2 $\mu\text{S}$	0 to 20 $\mu\text{S}$	0 to 200 $\mu\text{S}$	0 to 400 $\mu\text{S}$
<b>2 to 10 M<math>\Omega</math></b>	0 to 5 $\mu\text{S}$	0 to 50 $\mu\text{S}$	0 to 500 $\mu\text{S}$	0 to 1,000 $\mu\text{S}$
<b>0 to 2 M<math>\Omega</math></b>	0 to 10 $\mu\text{S}$	0 to 100 $\mu\text{S}$	0 to 1,000 $\mu\text{S}$	0 to 2,000 $\mu\text{S}$
<b>0 to 1 M<math>\Omega</math></b>	0 to 50 $\mu\text{S}$	0 to 500 $\mu\text{S}$	0 to 5,000 $\mu\text{S}$	0 to 10,000 $\mu\text{S}$
<b>0 to 5 M<math>\Omega</math></b>	0 to 100 $\mu\text{S}$	0 to 1000 $\mu\text{S}$	0 to 10,000 $\mu\text{S}$	0 to 20,000 $\mu\text{S}$
<b>0 to 10 M<math>\Omega</math></b>	0 to 200 $\mu\text{S}$	0 to 2000 $\mu\text{S}$	0 to 50,000 $\mu\text{S}$	0 to 100,000 $\mu\text{S}$
N/A	0 to 500 $\mu\text{S}$	0 to 5,000 $\mu\text{S}$	0 to 100,000 $\mu\text{S}$	0 to 200,000 $\mu\text{S}$
N/A	0 to 1,000 $\mu\text{S}$	0 to 10,000 $\mu\text{S}$	0 to 200,000 $\mu\text{S}$	0 to 400,000 $\mu\text{S}$
The 4 to 20 output ranges shown in this chart can be inverted using the internal switch <b>Resistivity Ranges are in BOLD</b>				

## Model 2850

### Ordering Notes

- 1) All 2850 units can be used with any Signet Conductivity/Resistivity electrode
- 2) Integral systems are only offered with Signet models 2839-2842 electrodes.
- 3) Dual channel units are only available in the universal/remote mount configuration and with digital (S<sup>3</sup>L) output for use with the 8900 instrument.

### Application Tips

- Maximum distance between sensor and 2850 electronics is 4.6 m (15 ft).
- Longer cable runs may result in small temperature compensation offsets, but can be adjusted through calibration in the 8900. (Not available for 4 to 20 mA versions)

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

## Ordering Information

### 2850 Integral Systems

Use this ordering matrix when an integral 2850 system is desired (uses 2839-2842 series electrodes). Integral systems are shipped with a sensor and 2850 combined. Other 2850 systems are available with Signet 2819 to 2823 electrodes upon request. See individual electrode product pages for more information.

Integral Mount System (includes Sensor Electronics and electrodes)				
<b>3-2850</b>	Conductivity and Resistivity Sensor Electronics			
↓	Output Type			
	<b>-51</b>	Digital (S <sup>3</sup> L) output with EasyCal		
	<b>-52</b>	4 to 20 mA output with EasyCal		
	↓	Sensor Option		
		<b>-39</b>	2839 Electrode, 0.01 cell	
		<b>-40</b>	2840 Electrode, 0.1 cell	
		<b>-41</b>	2841 Electrode, 1.0 cell	
	<b>-42</b>	2842 Electrode, 10.0 cell		
	↓	Process Threaded Connection Types		
		<b>D</b>	ISO threads	
<b>-</b>		NPT threads		
<b>3-2850</b>	<b>-52</b>	<b>-39</b>	<b>Example Part Number</b>	

### 2850 Sensor Electronics

Use this ordering matrix when remote sensor mounting is desired. The 2850-5X and 2850-6X are compatible with ALL Signet conductivity electrodes. See individual electrode product pages for more information.

Sensor Part Number				
<b>3-2850</b>	Conductivity Sensor Electronics with 4 to 20 mA or digital output			
↓	Mounting Configurations			
	<b>-5</b>	¾ inch threaded j-box for standpipe mounting, single input only		
	<b>-6</b>	Universal mount Junction Box for remote mount, single or dual input		
	↓	Output Choices		
		<b>1</b>	One input/one Digital (S <sup>3</sup> L) output	
		<b>2</b>	One input/one 4 to 20 mA output	
		<b>3</b>	Two inputs/two Digital (S <sup>3</sup> L) outputs (available for -6X versions only)	
	<b>3-2850</b>	<b>-5</b>	<b>2</b>	<b>Example Part Number</b>

Mfr. Part No.	Code	Mfr. Part No.	Code	Mfr. Part No.	Code
3-2850-51	<b>159 001 398</b>	3-2850-51-41D	<b>159 001 345</b>	3-2850-52-39D	<b>159 001 351</b>
3-2850-51-39	<b>159 001 339</b>	3-2850-51-42D	<b>159 001 346</b>	3-2850-52-40D	<b>159 001 352</b>
3-2850-51-40	<b>159 001 340</b>	3-2850-52	<b>159 001 399</b>	3-2850-52-41D	<b>159 001 353</b>
3-2850-51-41	<b>159 001 341</b>	3-2850-52-39	<b>159 001 347</b>	3-2850-52-42D	<b>159 001 354</b>
3-2850-51-42	<b>159 001 342</b>	3-2850-52-40	<b>159 001 348</b>	3-2850-61	<b>159 001 400</b>
3-2850-51-39D	<b>159 001 343</b>	3-2850-52-41	<b>159 001 349</b>	3-2850-62	<b>159 001 401</b>
3-2850-51-40D	<b>159 001 344</b>	3-2850-52-42	<b>159 001 350</b>	3-2850-63	<b>159 001 402</b>

## 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
3-2850.101-2	<b>159 001 393</b>	Plug-in NIST traceable recertification tool, 2.5 µS simulated
3-2850.101-3	<b>159 001 394</b>	Plug-in NIST traceable recertification tool, 10.0 µS simulated
3-2850.101-4	<b>159 001 395</b>	Plug-in NIST traceable recertification tool, 18.2 MΩ simulated
3-2850.101-5	<b>159 001 396</b>	Plug-in NIST traceable recertification tool, 10.0 MΩ simulated
3-2839-3	<b>159 001 355</b>	Electrode - 0.01 µS/cm, 6 in. cable, NPT
3-2839-3D	<b>159 001 359</b>	Electrode - 0.01 µS/cm, 6 in. cable, ISO
3-2840-3	<b>159 001 356</b>	Electrode - 0.1 µS/cm, 6 in. cable, NPT
3-2840-3D	<b>159 001 360</b>	Electrode - 0.1 µS/cm, 6 in. cable, ISO
3-2841-3	<b>159 001 357</b>	Electrode - 1.0 µS/cm, 6 in. cable, NPT
3-2841-3D	<b>159 001 361</b>	Electrode - 1.0 µS/cm, 6 in. cable, ISO
3-2842-3	<b>159 001 358</b>	Electrode - 10.0 µS/cm, 6 in. cable, NPT
3-2842-3D	<b>159 001 362</b>	Electrode - 10.0 µS/cm, 6 in. cable, ISO
5523-0322	<b>159 000 761</b>	Sensor cable (per ft), 3 cond. plus shield, 22 AWG

### Rev A [3/09]

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