

# Signet 2850 Conductivity/Resistivity Sensor Electronics and Integral Systems



Universal Mount  
Junction Box



NPT Mount  
Junction Box



2850 Integral Conductivity System  
for in-line installations

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 any standard Signet sensors for submersible 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, 10.0 or 20.0  $\text{cm}^{-1}$  cell constants. The 2850 is ideal for applications with a conductivity range of 0.055 to 400,000  $\mu\text{S}/\text{cm}$  or a resistivity range of 18.2  $\text{M}\Omega\cdot\text{cm}$  to 10  $\text{k}\Omega$ .

All 2850 units are available with a digital ( $\text{S}^3\text{L}$ ) output, or a single 4 to 20 mA. The digital ( $\text{S}^3\text{L}$ ) output version can be paired with the 9900 or 9950 transmitter to extend the distance between the measuring points to 120 m (400 ft).

The 8900 Multi-Parameter Controller allows for up to six 2850 ( $\text{S}^3\text{L}$ ) output conductivity sensors to be used with the Signet 8900 Multi-Parameter Controller. All 2850 units are built with NEMA 4X/IP65 enclosures which allow output wiring connections with long cable runs of up to 305 m (1,000 ft).

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 is field selectable.

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.

## Features

- Test certificate supplied with all sensors
- Custom cell constant programmed into the electronics
- Integral mount systems for quick and easy installation
- Compact design for maximum installation flexibility
- Extends the distance between the measuring point and the 9900/9950 Transmitter to 120 m (400 ft)
- Digital ( $\text{S}^3\text{L}$ ) interface or two-wire 4 to 20 mA output
- EasyCal with automatic test solution recognition
- For use with ALL Signet conductivity electrodes



## Applications

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

# Specifications

## General

Compatible Electrodes All Signet Sensors

## Materials

NPT Mount Junction Box for Integral Mount PBT

Universal/Remote Mount PBT, CPVC

EasyCal - Automatic Recognition of the Following Conductivity Values

146.93, 1408.8, 12,856  $\mu\text{S}/\text{cm}$  (@25 °C) (Test solutions Per ASTM D1125-95)  
 10, 100, 200, 500, 1000, 5000, 10,000, 50,000, 100,000  $\mu\text{S}/\text{cm}$   
 (@ 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, 9900, 9950, 0486),  
 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	< 0.2 °C

Resolution	Conductivity	0.1% of reading
	Temperature	< 0.2 °C

Update Rate	Conductivity and Temperature	< 600 ms
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Available Data via Digital (S<sup>3</sup>L) Output

Raw conductivity
Calibrated conductivity
Compensated conductivity at temperature
Temperature

## Max. Temperature/Pressure Rating

Operating Temperature	-10 °C to 85 °C	14 °F to 185 °F
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Storage Temperature	-20 °C to 85 °C	-4 °F to 185 °F
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Relative Humidity 0 to 95%, non-condensing

Enclosure NEMA 4X/IP65

Current Output

Field-selectable Ranges

Factory Set Span (Integral mount only)	0.01 cell (2839**)	4 to 20 mA = 0 to 100 $\mu\text{S}/\text{cm}$
	0.10 cell (2840**)	4 to 20 mA = 0 to 1000 $\mu\text{S}/\text{cm}$
	1.0 cell (2841**)	4 to 20 mA = 0 to 10,000 $\mu\text{S}/\text{cm}$
	10.0 cell (2842**)	4 to 20 mA = 0 to 200,000 $\mu\text{S}/\text{cm}$
	20.0 cell (2823)*	4 to 20 mA = 0 to 400,000 $\mu\text{S}/\text{cm}$

\*Special Order

\*\*Test certificate supplied with all sensors. Custom cell constant programmed into the electronics.

Max. Loop Resistance	50 $\Omega$ @ 12 VDC
	325 $\Omega$ @ 18 VDC
	600 $\Omega$ @ 24 VDC

Accuracy	$\pm 2\%$ of output span
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Resolution	7 $\mu\text{A}$
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Update Rate	< 600 ms
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Error Indication	22 mA
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Pure Water Compensation	When using 0.01 $\text{cm}^{-1}$ cell and raw conductivity value < 0.5 $\mu\text{S}/\text{cm}$ , the 2850 auto-switches to compensate for non-linear temperature effects found in this low conductivity (high resistivity) range.
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## Shipping Weight

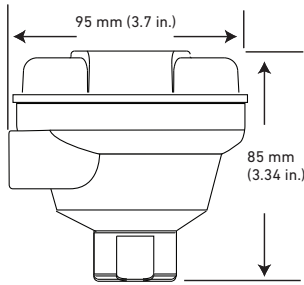
NPT Mount Junction Box	0.75 kg	1.75 lb
Universal Mount	0.75 kg	1.75 lb

## Standards and Approvals

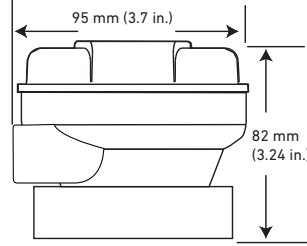
CE, FCC
RoHS compliant, China RoHS
Manufactured under ISO 9001, ISO 14001 and ISO 45001

# Dimensions

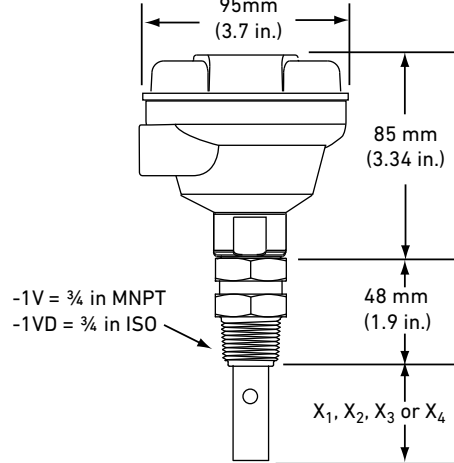
## 2850-5X NPT Mount Junction Box Systems



## 2850-6X Universal Mount Systems





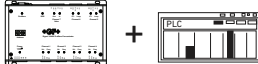
## 2850-5X-XX-1V(D) Field (Integral) Mount Systems



Sensor	Insertion Depth
X1 (3-2839-1V(D))	73 mm (2.88 in.)
X2 (3-2840-1V(D))	35 mm (1.38 in.)
X3 (3-2841-1V(D))	41.3 mm (1.63 in.)
X4 (3-2842-1V(D))	41.3 mm (1.63 in.)

# System Overview

## In-Line Installation

Panel, Wall Mount	4 to 20 mA Output	Automation System
Signet Instruments - 8900 - 9900* - 9950 	- Customer Supplied Programmable Logic Controller or - Programmable Automation Controller 	- 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or - Programmable Automation Controller 



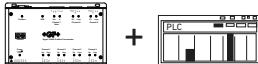
**Signet 2850 Conductivity Integral System or 2850 Universal Mount**  
with any Signet conductivity probe



Fittings - Customer Supplied 3/4 in. NPT or ISO threads

All sold separately

## Submersible Installation

Panel, Wall Mount	4 to 20 mA Output	Automation System
Signet Instruments - 8900 - 9900* - 9950 	- Customer Supplied Programmable Logic Controller or - Programmable Automation Controller 	- 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or - Programmable Automation Controller 

**Signet 2850 Universal Mount or NPT Mount Junction Box**  
with any Signet conductivity probe

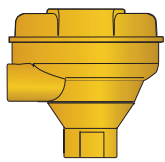


Fittings - Customer Supplied 3/4 in. NPT or ISO threads

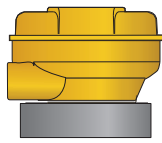
All sold separately

\* If the 2850 is used with the 9900, it is not necessary to use the 9900 conductivity module.

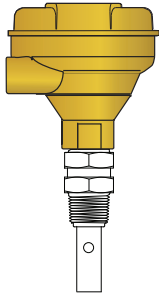
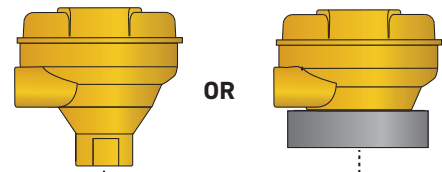
Note:  
The 9900 (with Direct Conductivity/Resistivity module) can run all conductivity sensors with 30 m (100 ft) of cable.  
The 2850 (S<sup>2</sup>L) signal can be used for distances over 30 m (100 ft). The 2850 has a limited sensor cable input length of 4.6 m (15 ft).



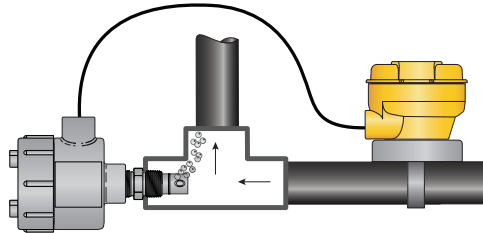
-5X NPT Mount  
Junction Box



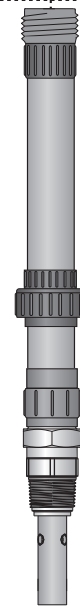
-6X Universal Mount  
Junction Box



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



Universal J-box assembly allows sensors without the 3/4 " rear thread to be used.



Submersible application options - Please see Signet Submersion Kit brochure, 3-0000.707, for more information.

## Field Selectable Ranges for 4 to 20 mA Operation

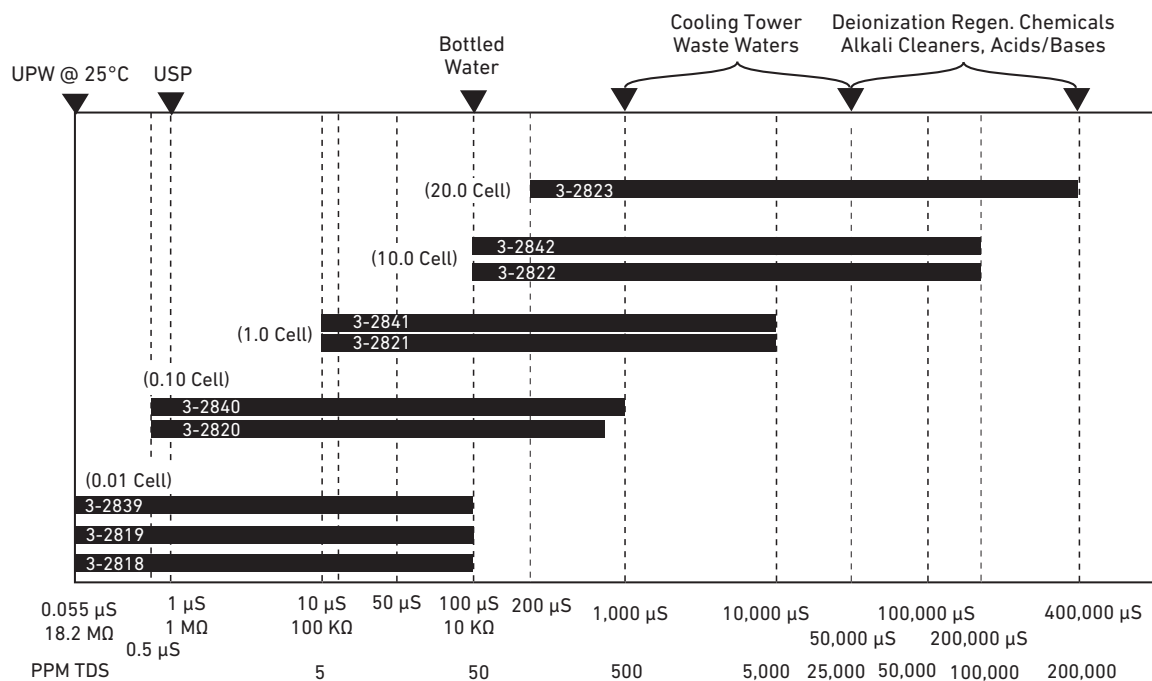
The chart below indicates the field selectable ranges in which the 2850 sensor electronics can be set via internal switches. All ranges can be inverted if required. Signet models listed below are compatible Conductivity/Resistivity electrodes.

0.01 Cell	0.10 Cell	1.0 cell	10.0 Cell	20.0 Cell
Signet Model 2839	Signet Model 2840	Signet Model 2841	Signet Model 2842	Signet Model 2823 (Special Order)
<b>10 to 20 MΩ</b>	0 to 2 μS	0 to 20 μS	0 to 200 μS	0 to 400 μS
<b>2 to 10 MΩ</b>	0 to 5 μS	0 to 50 μS	0 to 500 μS	0 to 1,000 μS
<b>0 to 2 MΩ</b>	0 to 10 μS	0 to 100 μS	0 to 1,000 μS	0 to 2,000 μS
<b>0 to 1 MΩ</b>	0 to 50 μS	0 to 500 μS	0 to 5,000 μS	0 to 10,000 μS
<b>0 to 5 MΩ</b>	0 to 100 μS	0 to 1000 μS	0 to 10,000 μS	0 to 20,000 μS
<b>0 to 10 MΩ</b>	0 to 200 μS	0 to 2000 μS	0 to 50,000 μS	0 to 100,000 μS
N/A	0 to 500 μS	0 to 5,000 μS	0 to 100,000 μS	0 to 200,000 μS
N/A	0 to 1,000 μS	0 to 10,000 μS	0 to 200,000 μS	0 to 400,000 μS

The 4 to 20 mA output ranges shown in this chart can be inverted using the internal switch Resistivity. Ranges are in BOLD  
 Note: The 2819-2823 series Integral Systems must be ordered through special order products.

## 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.



### Ordering Notes

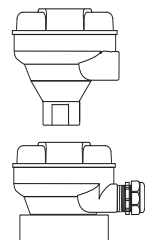
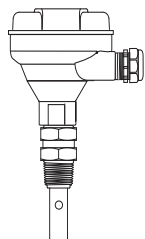
- 1) All 2850 units can be used with any Signet Conductivity/Resistivity electrode
- 2) Integral systems are only offered with Signet models 2839-2842 electrodes. 2818-2823 require a special order sensor.
- 3) Dual channel units are only available in the universal mount junction box/remote mount configuration and with digital (S<sup>3</sup>L) output for use with the Multi-Parameter instruments.

### Application Tips

- Maximum distance between sensor and 2850 electronics is 4.6 m (15 ft).

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

## Ordering Information



Mfr. Part No.	Code	Sensor	Process Threaded Connection
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2850 Integral Mount Systems, (includes Sensor Electronics and 316 SS Electrode with PVDF process connection) with EasyCal

Digital (S<sup>3</sup>L) output

3-2850-51-39V	<b>159 001 818</b>	2839 Electrode, 0.01 cell	NPT threads
3-2850-51-40V	<b>159 001 819</b>	2840 Electrode, 0.1 cell	NPT threads
3-2850-51-41V	<b>159 001 820</b>	2841 Electrode, 1.0 cell	NPT threads
3-2850-51-42V	<b>159 001 821</b>	2842 Electrode, 10.0 cell	NPT threads
3-2850-51-39VD	<b>159 001 822</b>	2839 Electrode, 0.01 cell	ISO threads
3-2850-51-40VD	<b>159 001 823</b>	2840 Electrode, 0.1 cell	ISO threads
3-2850-51-41VD	<b>159 001 824</b>	2841 Electrode, 1.0 cell	ISO threads
3-2850-51-42VD	<b>159 001 825</b>	2842 Electrode, 10.0 cell	ISO threads

4 to 20 mA output

3-2850-52-39V	<b>159 001 826</b>	2839 Electrode, 0.01 cell	NPT threads
3-2850-52-40V	<b>159 001 827</b>	2840 Electrode, 0.1 cell	NPT threads
3-2850-52-41V	<b>159 001 828</b>	2841 Electrode, 1.0 cell	NPT threads
3-2850-52-42V	<b>159 001 829</b>	2842 Electrode, 10.0 cell	NPT threads
3-2850-52-39VD	<b>159 001 830</b>	2839 Electrode, 0.01 cell	ISO threads
3-2850-52-40VD	<b>159 001 831</b>	2840 Electrode, 0.1 cell	ISO threads
3-2850-52-41VD	<b>159 001 832</b>	2841 Electrode, 1.0 cell	ISO threads
3-2850-52-42VD	<b>159 001 833</b>	2842 Electrode, 10.0 cell	ISO threads

\* Integral systems are shipped with a sensor and 2850 combined. Other 2850 systems are available with Signet 2818 to 2823 electrodes upon request. See individual electrode product pages for more information.

Mfr. Part No.	Code	Output
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2850 Sensor Electronics\*\* with EasyCal

NPT mount junction box (¾ inch threaded) for standpipe or integral mounting, single input only

3-2850-51	<b>159 001 398</b>	One input/one digital (S <sup>3</sup> L) output for use with 8900 , 9900 or 9950
3-2850-52	<b>159 001 399</b>	One input/one 4 to 20 mA output

Universal mount junction box for remote mount, single or dual input

3-2850-61	<b>159 001 400</b>	One input/one digital (S <sup>3</sup> L) output for use with 8900 , 9900 or 9950
3-2850-62	<b>159 001 401</b>	One input/one 4 to 20 mA output

\*\*For use when remote sensor mounting is desired. Compatible with ALL Signet conductivity electrodes. See individual electrode product pages for more information.

## 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
3-2839-1V	<b>159 001 810</b>	Electrode SS/PVDF- 0.01 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2839-1VD	<b>159 001 811</b>	Electrode SS/PVDF- 0.01 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2840-1V	<b>159 001 812</b>	Electrode SS/PVDF- 0.1 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2840-1VD	<b>159 001 813</b>	Electrode SS/PVDF- 0.1 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2841-1V	<b>159 001 814</b>	Electrode SS/PVDF- 1.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2841-1VD	<b>159 001 815</b>	Electrode SS/PVDF- 1.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2842-1V	<b>159 001 816</b>	Electrode SS/PVDF- 10.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2842-1VD	<b>159 001 817</b>	Electrode SS/PVDF- 10.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
5523-0322	<b>159 001 807</b>	Sensor Cable (per ft), 3 cond. plus shield, 22 AWG

Note: Although a customer can extend the cable of a conductivity sensor, GF Signet does not recommend this, and offers extended cable lengths from the factory.

3-2850\_PVDF.099 Rev D (09/20)

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