Signet 2850 Conductivity/Resistivity Sensor Electronics and Integral Systems with PVDF Sensor

Universal Mount Junction Box

NPT Mount Junction Box

2850 Integral Conductivity System for in-line installations, PVDF

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, 10.0 or 20.0 cm^{-1} 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 digital (S^3L) output, or a single 4 to 20 mA. The digital (S^3L) 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 (S^3L) 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 Transmitter to 120 m (400 ft)**
- **Digital (S^3L) 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**

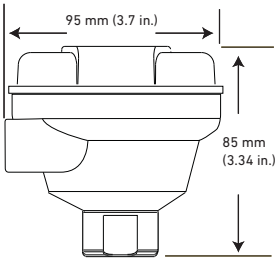
U.S. Patent No.: 7,550,979 B2

Specifications

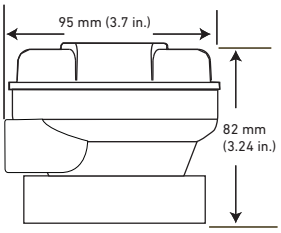
General			
Compatible Electrodes		All Signet Sensors	
Materials			
NPT Mount Junction Box for Integral Mount		PBT	
Universal/Remote Mount		PBT, CPVC	
EasyCal - Automatic Recognition of the Following Conductivity Values			
	146.93 µS, 1408.8 µS, 12856 µS (@25 °C) (Test solutions Per ASTM D1125-95)		
	10 µS, 100 µS, 200 µS, 500 µS, 1000 µS, 5000 µS, 10,000 µS, 50,000 µS, 100,000 µS (@ 25 °C) (Standard test solutions)		
Electrical			
Power	12 to 24 VDC ±10%, regulated for 4 to 20 mA output (typically called "Loop Powered")		
	5 to 6.5 VDC ±5% regulated recommended (provided by the Signet 8900, 9900, 0486), 3.0 mA max for Digital (S^3L) output (Reverse polarity and short circuit protected)		
Digital (S^3L) Output: Serial ASCII, TTL level 9600 bps			
Accuracy	Conductivity	± 2% of reading	
	Temperature	< 0.2 °C	
Resolution	Conductivity	0.1% of reading	
	Temperature	< 0.2 °C	
Update Rate	Conductivity and Temperature	< 600 ms	
Available Data via Digital (S^3L) Output			
	Raw conductivity		
	Calibrated conductivity		
	Calibrated temperature-compensated conductivity		
	Temperature		
Max. Temperature/Pressure Rating			
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 (Integral mount only)	0.01 cell (2839**)	4 to 20 mA = 0 to 100 µS	
	0.10 cell (2840**)	4 to 20 mA = 0 to 1000 µS	
	1.0 cell (2841**)	4 to 20 mA = 0 to 10,000 µS	
	10.0 cell (2842**)	4 to 20 mA = 0 to 200,000 µS	
	20.0 cell (2823)*	4 to 20 mA = 0 to 400,000 µS	
*Special Order			
**Test certificate supplied with all sensors. Custom cell constant programmed into the electronics.			
Max. Loop Resistance	50 Ω @ 12 VDC		
	325 Ω @ 18 VDC		
	600 Ω @ 24 VDC		
Accuracy	± 2% of output span		
Resolution	7 µA		
Update Rate	< 600 ms		
Error Indication	22 mA		
Pure Water Compensation	When using 0.01-cm cell and raw conductivity value < 0.5 µS, the 2850 auto-switches to compensate for non-linear temperature effects found in this low conductivity (high resistivity) range.		
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 for Quality and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety		

Dimensions

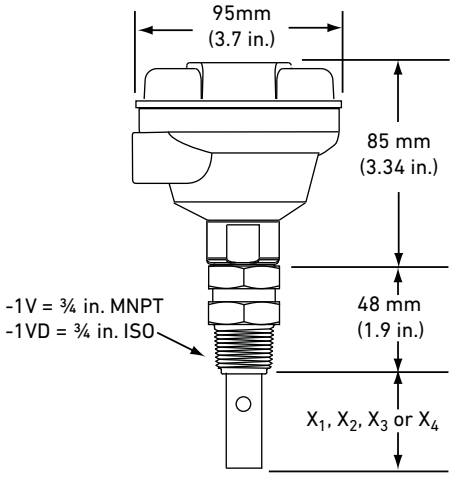
2850-5X NPT Mount Junction Box Systems



2850-6X Universal Mount Systems



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

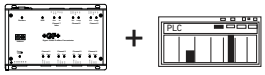


Sensor	Insertion Depth
X1 (3-2839-1V(D))	73 mm (2.88 in.)
X2 (3-2840-1V(D))	35 mm (1.38 in.)
X3 (3-2841-1V(D))	41.3 mm (1.63 in.)
X4 (3-2842-1V(D))	41.3 mm (1.63 in.)

System Overview

In-Line Installation

Panel 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



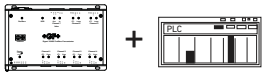
Signet 2850 Conductivity System or 2850 Universal Mount

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

All sold separately

Submersible Installation

Panel 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



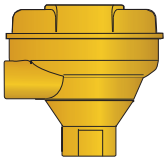
Signet 2850 Universal Mount or NPT Mount Junction Box

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

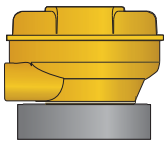
All sold separately

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

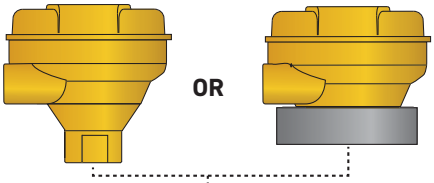
Note:
The 9900 (with Direct Conductivity/Resistivity module) can run all conductivity sensors with 30 m (100 ft) of cable.
The 2850 (S^3L) signal can be used for distances over 30 m (100 ft). The 2850 has a limited sensor cable input length of 4.6 m (15 ft).

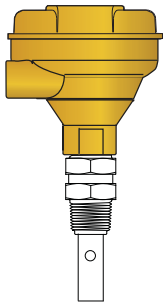


-5X NPT Mount
Junction Box

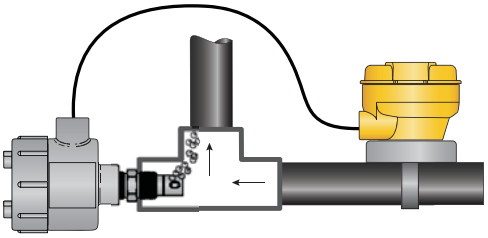


-6X Universal Mount
Junction Box

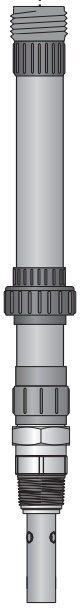




Integral System includes the 2850 sensor electronics and a choice of Conductivity/Resistivity electrode.



Universal j-box assembly allows sensors without the 3/4 in. 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

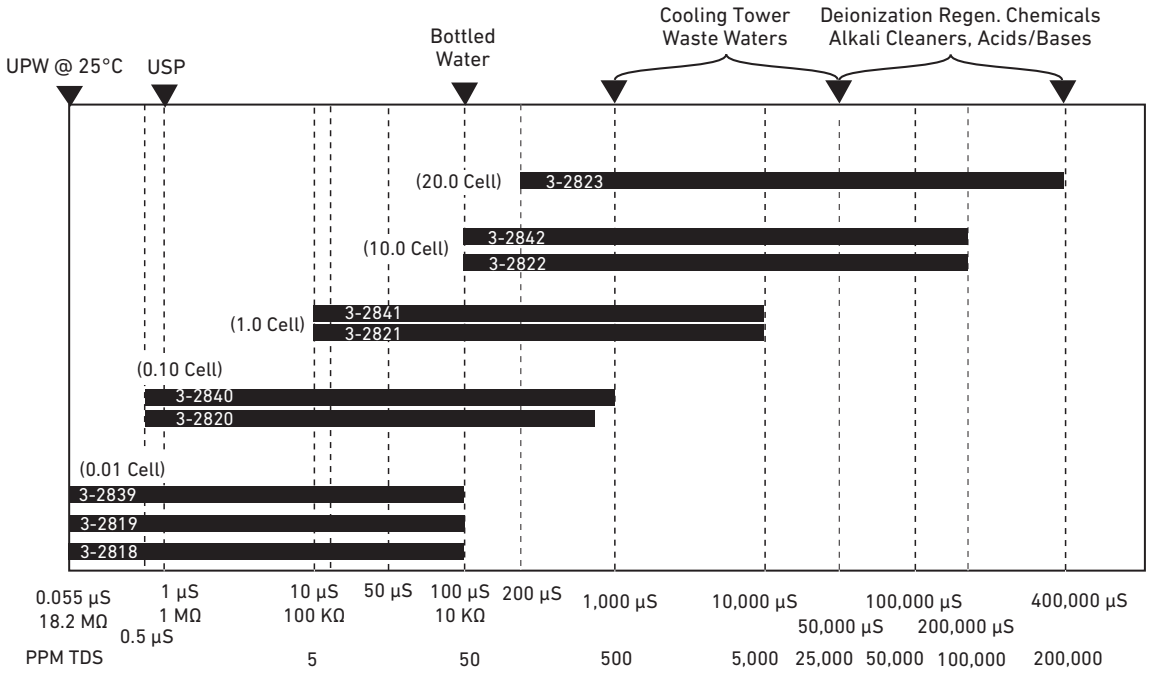
The chart below indicates the field selectable ranges in which the 2850 sensor electronics can be set via internal switches. All ranges can be inverted if required. Signet Models listed below are compatible Conductivity/Resistivity electrodes.

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)
10 to 20 MΩ	0 to 2 µS	0 to 20 µS	0 to 200 µS	0 to 400 µS
2 to 10 MΩ	0 to 5 µS	0 to 50 µS	0 to 500 µS	0 to 1,000 µS
0 to 2 MΩ	0 to 10 µS	0 to 100 µS	0 to 1,000 µS	0 to 2,000 µS
0 to 1 MΩ	0 to 50 µS	0 to 500 µS	0 to 5,000 µS	0 to 10,000 µS
0 to 5 MΩ	0 to 100 µS	0 to 1000 µS	0 to 10,000 µS	0 to 20,000 µS
0 to 10 MΩ	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.

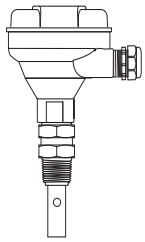


Ordering Notes

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^3L) output for use with the Multi-Parameter instruments.

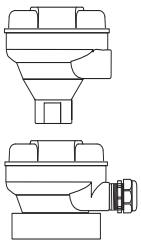
Please refer to Wiring, Installation, and Accessories sections for more information.

Ordering Information



Mfr. Part No.	Code	Sensor	Process Threaded Connection
2850 Integral Mount Systems, PVDF* (includes Sensor Electronics and PVDF Electrodes) with EasyCal			
		Digital (S^3L) output	
3-2850-51-39V	**159 001 818**	2839 Electrode, 0.01 cell	NPT threads
3-2850-51-40V	**159 001 819**	2840 Electrode, 0.1 cell	NPT threads
3-2850-51-41V	**159 001 820**	2841 Electrode, 1.0 cell	NPT threads
3-2850-51-42V	**159 001 821**	2842 Electrode, 10.0 cell	NPT threads
3-2850-51-39VD	**159 001 822**	2839 Electrode, 0.01 cell	ISO threads
3-2850-51-40VD	**159 001 823**	2840 Electrode, 0.1 cell	ISO threads
3-2850-51-41VD	**159 001 824**	2841 Electrode, 1.0 cell	ISO threads
3-2850-51-42VD	**159 001 825**	2842 Electrode, 10.0 cell	ISO threads
		4 to 20 mA output	
3-2850-52-39V	**159 001 826**	2839 Electrode, 0.01 cell	NPT threads
3-2850-52-40V	**159 001 827**	2840 Electrode, 0.1 cell	NPT threads
3-2850-52-41V	**159 001 828**	2841 Electrode, 1.0 cell	NPT threads
3-2850-52-42V	**159 001 829**	2842 Electrode, 10.0 cell	NPT threads
3-2850-52-39VD	**159 001 830**	2839 Electrode, 0.01 cell	ISO threads
3-2850-52-40VD	**159 001 831**	2840 Electrode, 0.1 cell	ISO threads
3-2850-52-41VD	**159 001 832**	2841 Electrode, 1.0 cell	ISO threads
3-2850-52-42VD	**159 001 833**	2842 Electrode, 10.0 cell	ISO threads

*For use 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 2818 to 2823 electrodes upon request. See individual electrode product pages for more information.



Mfr. Part No.	Code	Output
2850 Sensor Electronics** with EasyCal		
		NPT mount junction box (¾ inch threaded) for standpipe or integral mounting, single input only
3-2850-51	**159 001 398**	One input/one digital (S^3L) output for use with 8900 or 9900
3-2850-52	**159 001 399**	One input/one 4 to 20 mA output
		Universal mount junction box for remote mount, single or dual input
3-2850-61	**159 001 400**	One input/one digital (S^3L) output for use with 8900 or 9900
3-2850-62	**159 001 401**	One input/one 4 to 20 mA output
3-2850-63	**159 001 402**	Dual input, dual (S^3L) output for use with 8900 only

**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	**159 001 392**	Plug-in NIST traceable recertification tool, 1.0 µS simulated
3-2850.101-2	**159 001 393**	Plug-in NIST traceable recertification tool, 2.5 µS simulated
3-2850.101-3	**159 001 394**	Plug-in NIST traceable recertification tool, 10.0 µS simulated
3-2850.101-4	**159 001 395**	Plug-in NIST traceable recertification tool, 18.2 MΩ simulated
3-2850.101-5	**159 001 396**	Plug-in NIST traceable recertification tool, 10.0 MΩ simulated
3-2839-1V	**159 001 810**	Electrode PVDF/SS- 0.01 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2839-1VD	**159 001 811**	Electrode PVDF/SS- 0.01 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2840-1V	**159 001 812**	Electrode PVDF/SS- 0.1 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2840-1VD	**159 001 813**	Electrode PVDF/SS- 0.1 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2841-1V	**159 001 814**	Electrode PVDF/SS- 1.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2841-1VD	**159 001 815**	Electrode PVDF/SS- 1.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2842-1V	**159 001 816**	Electrode PVDF/SS- 10.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2842-1VD	**159 001 817**	Electrode PVDF/SS- 10.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
5523-0322	**159 001 807**	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.