

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 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 $\text{M}\Omega$ to 10 $\text{k}\Omega$.

All 2850 units are available with a choice of a single or dual digital (S^3L) outputs, or a single 4 to 20 mA. The single digital (S^3L) output version can be paired with the 9900 Transmitter to extend the distance between the measuring points to 120 m (400 ft).

The 8900 Multi-Parameter Controller allows for up to six sensor inputs directly into 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 feet).

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

- Certificate of calibration 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
- Dual channel unit available for low cost installation with Signet 8900 Multi-Parameter Controller
- 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
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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), 3.0 mA max for Digital (S ³ L) output (Reverse polarity and short circuit protected)
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Digital (S³L) 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	Single channel models	< 600 ms
	Dual channel models	< 1200 ms

Available Data via Digital (S³L) 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) *Special Order	0.01 cell (2818*, 2819*, 2839**)	4 to 20 mA = 0 to 100 µS
	0.10 cell (2820*, 2840**)	4 to 20 mA = 0 to 1000 µS
	1.0 cell (2821*, 2841**)	4 to 20 mA = 0 to 10,000 µS
	10.0 cell (2822*, 2842**)	4 to 20 mA = 0 to 200,000 µS
	20.0 cell (2823)*	4 to 20 mA = 0 to 400,000 µS

Certificate of calibration 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

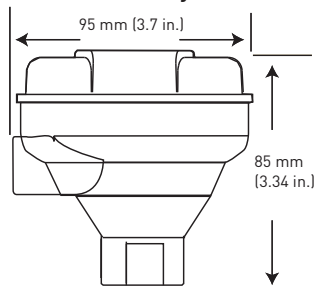
NPT Mount Junction Box	1.75 lb	0.75 kg
Universal Mount	1.75 lb	0.75 kg

Standards and Approvals

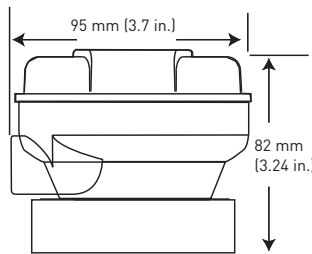
CE, FCC
RoHS compliant, China RoHS
Manufactured under ISO 9001 for Quality and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety

Dimensions

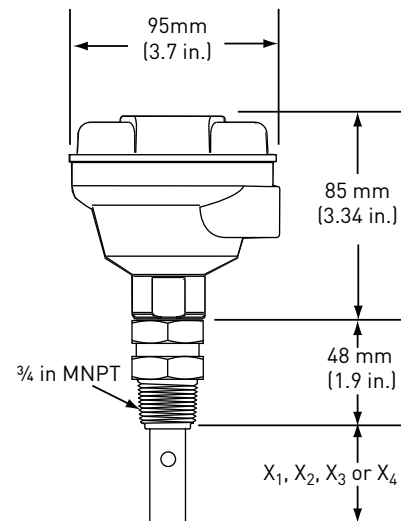
2850-5X NPT Mount Junction Box Systems



2850-6X Universal Mount Systems

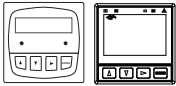
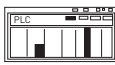
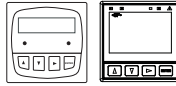
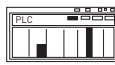


2850-5X-XX Integral Mount Systems



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

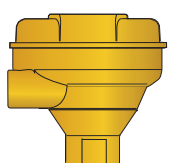
In-Line Installation

Panel Mount	4 to 20 mA input	Panel Mount	4 to 20 mA input
Signet Instruments 8900 9900 	Customer Supplied Programmable Logic Controller 	Signet Instruments 8900 9900 	Customer Supplied Programmable Logic Controller 
Signet 2850 Conductivity System 		Signet 2850 Universal Mount 	
Fittings - Customer Supplied 3/4 in. NPT or ISO threads			All sold separately

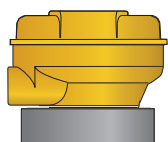
Submersible Installation

Panel Mount	Panel Mount	4 to 20 mA input
Signet Instruments 8900 9900 	Signet Instruments 8900 9900 	Customer Supplied Programmable Logic Controller 
Signet 2850 Universal Mount or NPT Mount Junction Box 		
Fittings - Customer Supplied 3/4 in. NPT or ISO threads		All sold separately

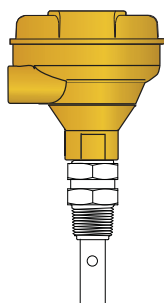
Note: The 9900 (with Direct Conductivity/Resistivity module) can run all conductivity sensors with 100 feet of cable.
The 2850 (S³L) signal can be used for distances over 100 feet. The 2850 has a limited sensor cable input length of 15 feet



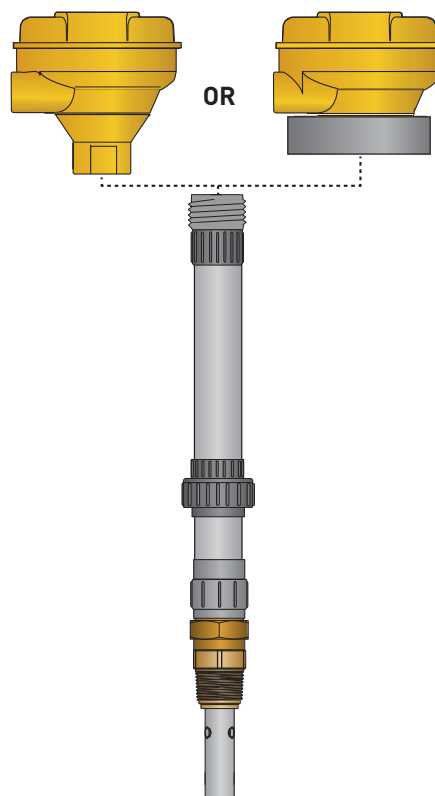
-5X NPT Mount
Junction Box



-6X Universal Mount
Junction Box



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



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

Field Selectable Ranges for 4 to 20 mA Operation

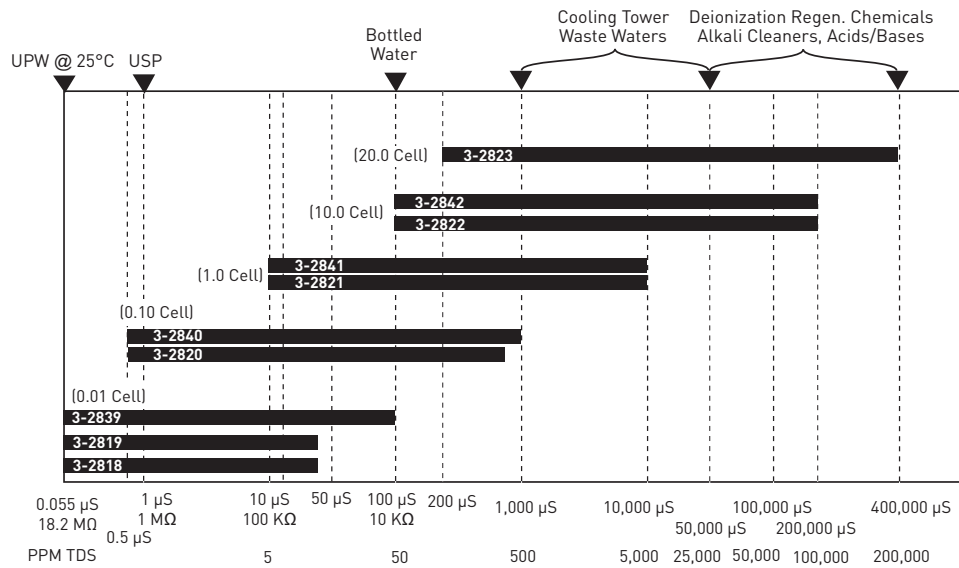
The chart below indicates the field selectable ranges in which the 2850 sensor electronics can be set via internal switches. All ranges can be inverted if required. Signet Models listed below are compatible Conductivity/Resistivity electrodes.

0.01 Cell	0.10 Cell	1.0 cell	10.0 Cell	20.0 Cell
Signet Model 2819 or 2839	Signet Model 2820 or 2840	Signet Model 2821 or 2841	Signet Model 2822 or 2842	Signet Model 2823
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 output ranges shown in this chart can be inverted using the internal switch **Resistivity Ranges are in BOLD**

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

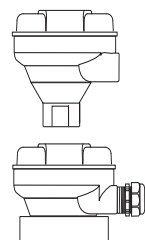
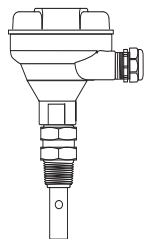
- 1) All 2850 units can be used with any Signet Conductivity/Resistivity electrode
- 2) Integral systems are only offered with Signet models 2839-2842 electrodes. 2818-2823 require a special order sensor.
- 3) Dual channel units are only available in the universal mount junction box/remote mount configuration and with digital (S³L) output for use with the Multi-Parameter instruments.

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 or 9900. (Not available for 4 to 20 mA versions).

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* (includes Sensor Electronics and Electrodes) with EasyCal			

Digital (S³L) output

3-2850-51-39	159 001 339	2839 Electrode, 0.01 cell	NPT threads
3-2850-51-40	159 001 340	2840 Electrode, 0.1 cell	NPT threads
3-2850-51-41	159 001 341	2841 Electrode, 1.0 cell	NPT threads
3-2850-51-42	159 001 342	2842 Electrode, 10.0 cell	NPT threads
3-2850-51-39D	159 001 343	2839 Electrode, 0.01 cell	ISO threads
3-2850-51-40D	159 001 344	2840 Electrode, 0.1 cell	ISO threads
3-2850-51-41D	159 001 345	2841 Electrode, 1.0 cell	ISO threads
3-2850-51-42D	159 001 346	2842 Electrode, 10.0 cell	ISO threads

4 to 20 mA output

3-2850-52-39	159 001 347	2839 Electrode, 0.01 cell	NPT threads
3-2850-52-40	159 001 348	2840 Electrode, 0.1 cell	NPT threads
3-2850-52-41	159 001 349	2841 Electrode, 1.0 cell	NPT threads
3-2850-52-42	159 001 350	2842 Electrode, 10.0 cell	NPT threads
3-2850-52-39D	159 001 351	2839 Electrode, 0.01 cell	ISO threads
3-2850-52-40D	159 001 352	2840 Electrode, 0.1 cell	ISO threads
3-2850-52-41D	159 001 353	2841 Electrode, 1.0 cell	ISO threads
3-2850-52-42D	159 001 354	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 ³ L) output
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 ³ L) 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 ³ L) 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
3-2839-1	159 000 921	Electrode - 0.01 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2839-1D	159 000 923	Electrode - 0.01 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2840-1	159 000 786	Electrode - 0.1 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2840-1D	159 000 788	Electrode - 0.1 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2841-1	159 000 790	Electrode - 1.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2841-1D	159 000 792	Electrode - 1.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
3-2842-1	159 000 794	Electrode - 10.0 µS/cm, ¾ inch NPT, 4.6 m (15 ft) cable
3-2842-1D	159 000 796	Electrode - 10.0 µS/cm, ISO 7/1-R 3/4, 4.6 m (15 ft) cable
5523-0322	159 000 761	Sensor cable (per ft), 3 cond. plus shield, 22 AWG

3-2850.099 Rev E (5/13)

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