2850 DryLoc™ Conductivity/Resistivity Sensor

3-2850.099 (A - 2 /03)

2850-1
2850-2

2850-3
2850-4

Features

- **S³L™ Digital Interface**
- **Two-wire 4 to 20mA output with many range settings**
- **In-line integral mount and submersible installation versions**
- **Automatic electrode cell constant recognition (0.01, 0.10, 1.0, 10.0)**
- **Automatic temperature compensation**
- **DryLoc™ electrode connector**
- **Optional EasyCal with automatic standard test solution recognition**
- **Junction boxes for convenient wiring**

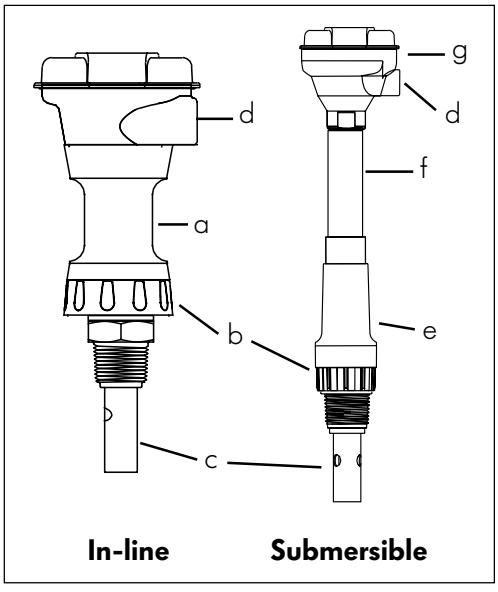
Description

The 2850 Conductivity/Resistivity Sensors provide two-wire 4 to 20mA output without the expense of local display and other luxuries available in full-featured transmitters. Eight 4 to 20mA output ranges for each electrode cell constant, plus the ability to invert each range, are selectable by the user in the field. These sophisticated sensors also provide S³L™ (Signet Sensor Serial Link) digital interface, another example of leading-edge technology from +GF+ SIGNET.

The DryLoc™ electrode connector quickly forms a robust assembly for submersible and in-line installations. NEMA 4X Junction Boxes are integral parts of the in-line version and are available as accessories for the submersible version. With the optional EasyCal feature, the devices automatically recognize standard conductivity test solution values for simple field calibration.

System Features

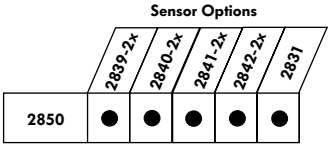
a) 2850-1, -2 Sensor Electronics
b) DryLoc™ electrode connector
c) 2839-2842 DryLoc™ Conductivity/ Resistivity Electrodes (sold separately)
d) S³L™ or 4 to 20mA Output (field selectable)
e) 2850-3, -4 Sensor Electronics
f) Extension pipe (customer supplied)
g) 8052-1CR, -2CR Junction Box (sold separately)



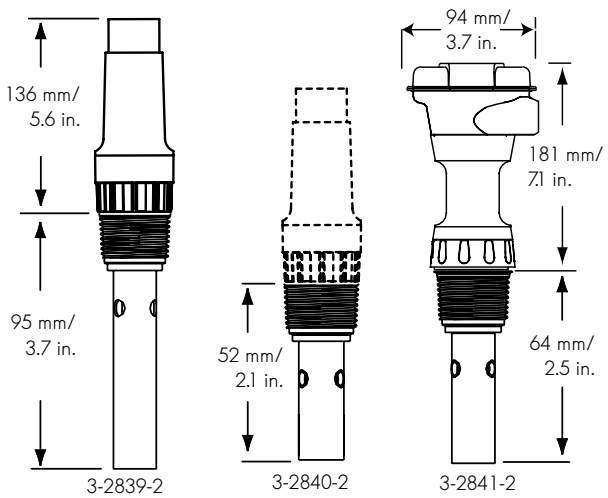
Applications

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

Options



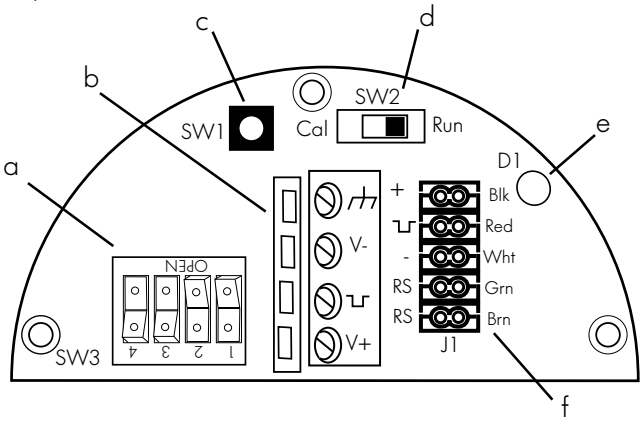
Dimensions



Shown with 2850-3, -4 (available with either 3/4 in. NPT or ISO 7-1/R 3/4 male threads)

Wiring

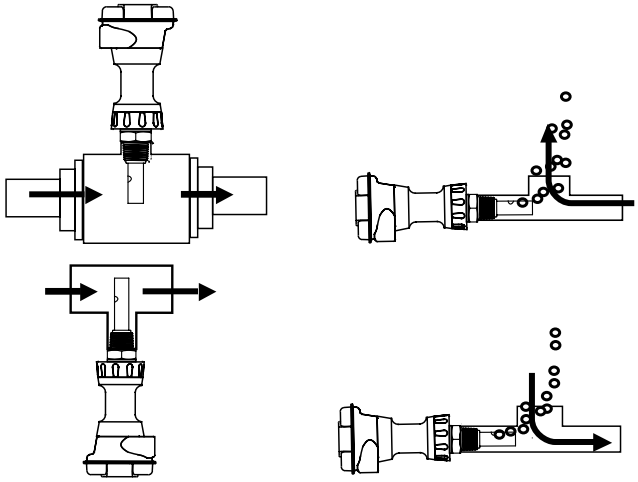
EasyCal Board shown here.



a) 4 to 20mA output range selection switches
b) Power and 4 to 20mA or S^{3}L™ output terminal block
c) Push-button calibration (EasyCal option)
d) S^{3}L™ output interrupt (EasyCal option)
e) LED indicator (EasyCal option)
f) I/O terminal block to sensor electronics

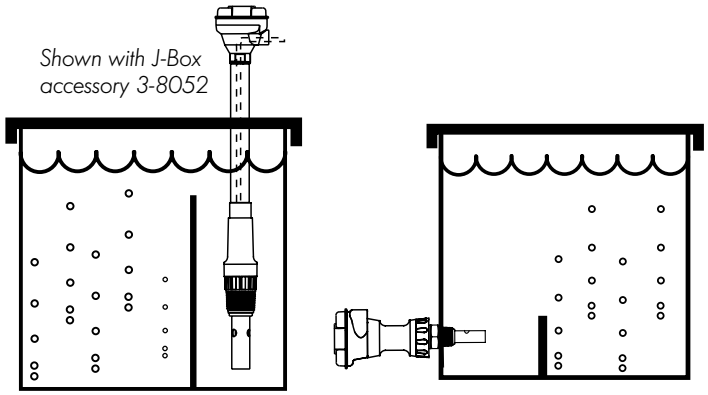
Note: Maximum wire length between 2850-X and 805X-XCR junction boxes is 4.5m (15 ft.)

Installation



In-line Installation

- Position the electrode to avoid entrapment of air bubbles.
- The preferred installation for in-line applications directs flow straight into the electrode.
- If the electrode is mounted vertically in a tee, do not recess the orifices inside the tee. Mounting upside down may help prevent air entrapment.
- An oversized tee or flow cell may be helpful for inline installations.



Submersible/Tank Installation

- If installed in an aerated vessel, ensure that the electrode is in a stillwell to avoid entrapment of air bubbles.
- Select a location that will remain free of sediment.
- To prevent moisture accumulation at the cable-end of the electrode, fill the lower 3 to 4 in. of conduit or extension pipe with a flexible sealant, such as silicone.

Specifications

General

Compatible Electrodes: +GF+ SIGNET 2839-2842 DryLoc™ CR Electrodes

Operational Range:

0.01 cell (2839-2X):	0.010 to 100µS
0.10 cell (2840-2X):	1 to 1,000µS
1.0 cell (2841-2X):	10 to 10,000µS
10.0 cell (2842-2X):	100 to 200,000µS
Temperature:	-10° to 85°C (14° to 185°F)

Materials/Shipping Weight:

2850-1, -2 (in-line):	PBT = 0.75kg (1 .75 lbs.)
2850-3, -4 (submersible):	CPVC = 0.64kg (1 .4 lbs.)

Temperature Compensation: Automatic

Cable: 4.5m/15ft., 5-conductor shielded 22AWG (2850-3, -4)

Optional EasyCal

Automatic recognition using the following cond. values:

1µS*	200µS	10,000µS
2.5µS*	500µS	12,856µS**
10µS	1,000µS	50,000µS
100µS	1,408.8µS**	100,000µS
146.93µS**	5,000µS	

* = simulated value via 3-2831 Conductivity Recertification Tool (for system verification per USP requirements)
** = per ASTM D1125-95
All other values are standard test solutions available from VWR Scientific.

Electrical

Power: 12 to 24VDC for 4 to 20mA output
5VDC ±5% regulated, 2mA max., for S³L™ output
Reverse polarity and short circuit protected

Note: applied power determines output mode (S³L™ or 4 to 20mA)

Current Output

- 2850-1, -2 (in-line): Field-selectable ranges
- 2850-3, -4 (submersible): Full-scale fixed 4 to 20mA dependent upon cell constant of electrode as follows:
  0.01 cell (2839-2X): 4 to 20mA = 0 to 100µS
  0.10 cell (2840-2X): 4 to 20mA = 0 to 1,000µS
  1.0 cell (2841-2X): 4 to 20mA = 0 to 10,000µS
  10.0 cell (2842-2X): 4 to 20mA = 0 to 200,000µS
  Use 8050-XCR and 8052-XCR accessory J-Boxes for field-selectable ranges.

Field Selectable Ranges for 4 to20mA Operation

SW3 Switch Setting				0.01 Cell	0.10 Cell	1.0 Cell	10.0 Cell
#4	#3	#2	#1	Resistivity Ranges in **BOLD**			
O	C	C	C	**10 to 20 MΩ**	0 to 2µS	0 to 20µS	0 to 200µS
C	C	C	C	**20 to 10 MΩ**	2 to 0µS	20 to 0µS	200 to 0µS
O	C	C	O	**2 to 10MΩ**	0 to 5µS	0 to 50µS	0 to 500µS
C	C	C	O	**10 to 2 MΩ**	5 to 0µS	50 to 0µS	500 to 0µS
O	C	O	C	**0 to 2 MΩ**	0 to 10µS	0 to 100µS	0 to 1,000µS
C	C	O	C	**2 to 0 MΩ**	10 to 0µS	100 to 0µS	1,000 to 0µS
O	C	O	O	0 to 1µS	0 to 50µS	0 to 500µS	0 to 5,000µS
C	C	O	O	1 to 0µS	50 to 0µS	500 to 0µS	5,000 to 0µS
O	O	C	C	0 to 5µS	0 to 100µS	0 to 1,000µS	0 to 10,000µS
C	O	C	C	5 to 0µS	100 to 0µS	1,000 to 0µS	10,000 to 0µS
O	O	C	O	0 to 10µS	0 to 200µS	0 to 2,000µS	0 to 50,000µS
C	O	C	O	10 to 0µS	200 to 0µS	2,000 to 0µS	50,000 to 0µS
O	O	O	C	0 to 50µS	0 to 500µS	0 to 5,000µS	0 to 100,000µS
C	O	O	C	50 to 0µS	500 to 0µS	5,000 to 0µS	100,000 to 0µS
O	O	O	O	0 to 100µS	0 to 1,000µS	0 to 10,000µS	0 to 200,000µS
C	O	O	O	100 to 0µS	1,000 to 0µS	10,000 to 0µS	200,000 to 0µS
C = closed O = open				Switch #4 inverts the output: OPEN = 4 to 20mA, CLOSED = 20 to 4mA			

Current Output (continued)

Max Loop Resistance: 50Ω @ 12VDC
325Ω @ 18VDC
600Ω @ 24VDC

Accuracy: ± 2% of full scale

Resolution: ± 7µA

Update rate: < 600µS

Error indication: 22mA

S³L™ Output

Serial ASCII, TTL level 9600 bps

Accuracy: (Conductivity) 2% of reading
(Temperature) ±0.5°C

Resolution: (Conductivity) <0.1% of reading
(Temperature) <0.07°C

Update Rate: < 600µS

Available Data:
- Raw conductivity
- Calibrated conductivity
- Calibrated temperature compensated conductivity
- Temperature

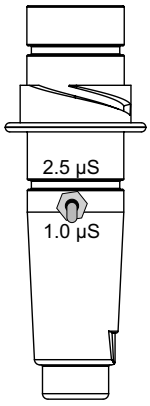
Error Indication: Open input and out of range diagnostics for conductivity and temperature

Environmental

- Storage Temp: -20° to 85°C (-4° to 185°F)
- Operating Temp: -10° to 85°C (14° to 185°F)
- Relative Humidity: 0 to 95%, non-condensing (without electrode connected)
- Enclosure Rating:
  2850-1, -2 (in-line): NEMA 4X/IP65 with electrode connected
  2850-3, -4 (submersible): NEMA 6P/IP68 with electrode and watertight conduit and/or extension pipe connected

Standards & Approvals

- CE
- Immunity: EN61326-1
- Emissions: EN55011 Class A
- Manufactured under ISO 9001 and ISO 14001



Pictured on the left is the 2831 Conductivity Recertification Tool and below is a sample copy of the new label installed on each unit.

+GF+ SIGNET 2831 Conductivity Certification Tool

0.01 Cell Constant Simulates 1.0µS and 2.5µS, ± 0.1µS

For use with +GF+ SIGNET 3-2850 Cond. / Res. Sensor Electronics.

Ordering Information

Mfr. Part No.	Code	Description
3-2850-1	159 000 783	In-line Sensor Electronics
3-2850-2	159 000 784	In-line Sensor Electronics w/EasyCal
3-2850-3	159 000 785	Submersible Sensor Electronics, 3/4 in. NPT male threads
3-2850-4	159 000 857	Submersible Sensor Electronics, ISO 7-1/R 3/4 male threads

Accessories

Mfr. Part No.	Code	Description
3-2831	159 000 888	Conductivity Recertification Tool (for system verification per USP requirements)
3-2839-2	159 000 922	Cell 0.01, DryLoc™, 3/4 in. NPT
3-2839-2D	159 000 924	Cell 0.01, DryLoc™, ISO 7/1-R 3/4
3-2840-2	159 000 787	Cell 0.1, DryLoc™, 3/4 in. NPT
3-2840-2D	159 000 789	Cell 0.1, DryLoc™, ISO 7/1-R 3/4
3-2841-2	159 000 791	Cell 1.0, DryLoc™, 3/4 in. NPT
3-2841-2D	159 000 793	Cell 1.0, DryLoc™, ISO 7/1-R 3/4
3-2842-2	159 000 795	Cell 10.0, DryLoc™, 3/4 in. NPT
3-2842-2D	159 000 797	Cell 10.0, DryLoc™, ISO 7/1-R 3/4
3-2842.390	159 000 925	2842 Replacement Insulator w/FPM O-ring
3-8050-1	159 000 753	Universal Mount Junction Box
3-8050-1CR	159 000 889	Universal Mount J-Box w/CR Cell Ranges
3-8050-2CR	159 000 802	Universal Mount J-Box w/CR EasyCal
3-8052	159 000 188	3/4 in. Integral Mounting Kit
3-8052-1	159 000 755	3/4 in. NPT Mount Junction Box
3-8052-1CR	159 000 890	3/4 in. NPT Mount Junction Box w/CR Cell Ranges
3-8052-2CR	159 00 803	3/4 in. NPT Mount Junction Box w/CR EasyCal
3-9000.392-1	159 000 839	Liquid-tight Connector Kit, 1 set, 1/2 in. NPT
3-9000.392-2	159 000 841	Liquid-tight Connector Kit, 1 set, PG 13.5

Engineering Specifications

- The sensor shall provide 4 to 20mA or S^{3}L™ (Signet Sensor Serial Link) outputs, and be available with ISO and NPT threads for the submersible model and include a junction box with/without EasyCal for the in-line version.
- The sensor shall be compatible with the 2839-2842 DryLoc™ Conductivity/Resistivity Electrodes and will recognize cell constant inputs of 0.01, 0.10, 1.0 and 10.0.
- The sensor shall have an operating temperature of -10° to 85°C (14° to 185°F) and an accuracy of ±2% of reading at 25°C.
- The sensor shall have power requirements of 5VDC ±5% regulated for S^{3}L™, and 12 to 24VDC for 4 to 20mA current output, and shall meet CE requirements and be manufactured under ISO 9001 and ISO 14001.
- The sensor shall be +GF+ SIGNET Model 3-2850.

For more information on these products, please contact your local sales company:

A Georg Fischer Rohrleitungssysteme GmbH, Sandgasse 16, A-3130 Herzogenburg, Tel. 02782/56 43-0, Fax 02782/51 56
AUS George Fischer IPS Pty Ltd., 186-190 Kingsgrove Road, Kingsgrove, NSW 2208, Tel. 02 9554 3977, Fax 02 9502 2561
B/L Georg Fischer N.V./S.A., Digue du Canal 109-111 – Vaartdijk 109-111, B-1070 Bruxelles/Brussel, Tél. 02/556 40 20, Fax 02/524 34 26
BAR George Fischer Ltda Av. dos Nações Unidas, 21689 CEP 04795-100 - S.Paulo - SP Tel.: 155111 247 1311 Fax: 155111 247 6009
CH Georg Fischer Rohrleitungssysteme (Schweiz) AG, Amsler-Laffon-Strasse 1, Postfach, CH-8201 Schaffhausen, Tel. 052/631 30 26, Fax 052/631 28 97
D Georg Fischer GmbH, Daimlerstraße 6, Postfach 1154, D-73093 Albershausen, Tel. 07161/302-0, Telex 727867, Fax 07161/302259
DK Georg Fischer A/S, Klintehøj Vænge 17, DK-3460 Birkerød, Tel. 42/81 1975, Fax 42/81 1622
E Georg Fischer S.A., Sistemas de tuber´ıas para la industria, Calle Isla de la Palma, 32 – Nave 1, E-28700 San Sebastián de los Reyes (Madrid), Tel. 91/663 80 00, Fax 91/663 81 76
F George Fischer S.A., 105–113, rue Charles Michels, B.P.174, F-93208 Saint-Denis Cedex 1, Tél. 1/49 22 13 41, Fax 1/49 22 13 00
GB George Fischer Sales Limited, Paradise Way, Coventry, CV2 2ST, Tel. 01203/53 55 35, Telex 330032, Fax 01203/53 04 50-51
I Giorgio Fischer S.p.A., Via Sondrio 1, I-20063 Cernusco S/N (MI), Agente generale di vendita Tufira S.r.l., Tel. 02/92 18 61, Fax 02/92 14 07 85
J Georg Fischer Ltd., 2-47, Shikitsuhigashi, 1-chome, Naniwa-ku, Osaka 556, Tel. 6/6482838, Telex 5267785, Fax 6/6482565
N Georg Fischer A.S, Bygdøy Allé 23, Postboks 3223 Elisenberg, N-0208 Oslo 2, Tel. 22/44 41 10, Fax 22/43 40 19
PRC Georg Fischer Piping Systems, Ltd., No. 218 Kang Qiao Dong Road, Pudong Shanghai 201319 Tel. 86 21 58 13 33 33, Fax 86 21 58 13 33 66
RA George Fischer Inc., Lavalle 2614, 1640 Martinez Buenos Aires, Tel. 01/798 74 01, Fax 01/798 40 74
NL Georg Fischer N.V., Lange Veenteweg 19, Postbus 35, NL-8160 AA Epe, Tel. 0578678222, Fax 0578621768
S/SF Georg Fischer AB, Box 113, S-12523 Älvsjö-Stockholm, Tel. 08/7274700, Fax 08/7492370
SGP George Fischer Pte. Ltd., 15 Kaki Bukit Road 2, KB Warehouse Complex, SGP-417 845 Singapore/Singapore, Tel. 747 06 11, Fax 747 05 77
USA* George Fischer Inc., 2882 Dow Ave., Tustin, CA 92780-7285, Tel. 714/731-8800, Toll Free 800/854-4090, Fax 714/731-4688,
e-mail: info@us.piping.georgefischer.com, Internet: http://www.us.piping.georgefischer.com
*Serving North, Central, and South America

+GF+ SIGNET

Signet Scientific Company, 3401 Aerojet Avenue, El Monte, CA 91731-2882 U.S.A. • Tel. (626) 571-2770 • Fax (626) 573-2057
For Worldwide Sales and Service, visit our website: gfsignet.com • e-mail: info@gfsignet.com

3-2850.099 (A-2/03)

printed in U.S.A.