English

Signet 2610 Process Optical Dissolved Oxygen Sensor

3-2610.090 Rev. C 08/13

Operator's Manual

Introduction

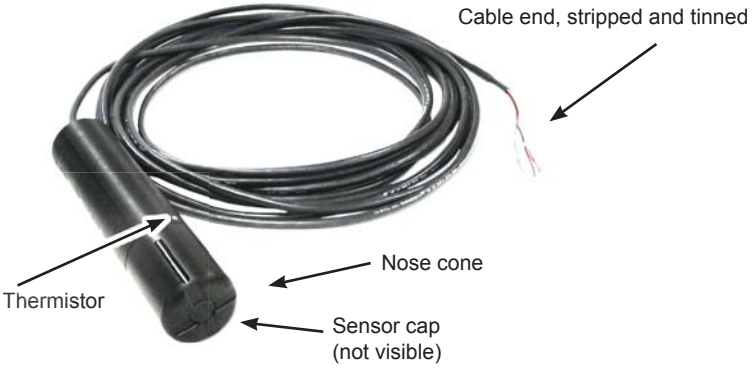
System Description

Your new RDO® Pro is a rugged, reliable sensor designed to deliver accurate dissolved oxygen (DO) data across a wide measuring range while reducing maintenance costs. It features the latest optical technology for DO measurement.

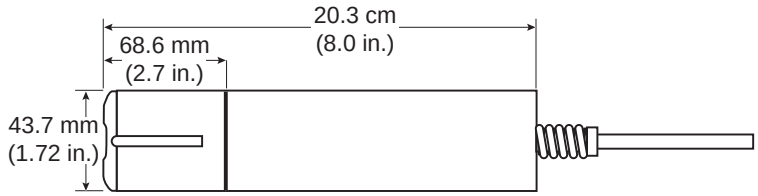
The RDO Pro system is available in two versions. The 3-2610-31 has 4 to 20mA current loop output, Modbus RS485, and SDI-12 connectivity. The 3-2610-41 includes S^{3}L communications to support both the 8900 and 9900 Signet products in place of the SDI-12 output.

The RDO Pro system consists of the following:

- 10 m (32.8 ft.) cable with stripped and tinned ends
- Black sensor body with removable nose cone
- Optical DO sensing cap
- Titanium thermistor



Dimensions



Serial Numbers

The instrument part number, code number and serial number is engraved on the side of the unit.

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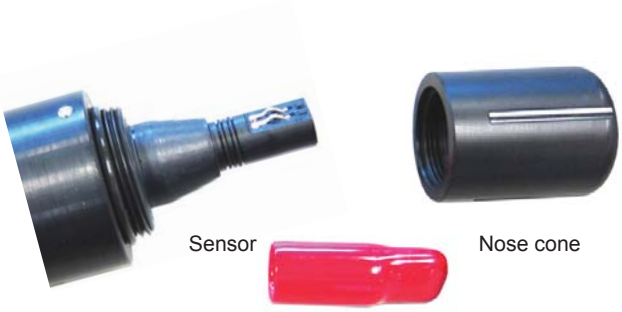


Shipping/Storage sleeve

Unpacking the Sensor

1. Remove the RDO® sensor from the box and other packaging materials.
2. Unscrew the nose cone from the sensor and remove the red protective dust cap from the sensor. Save the dust cap for later use.
3. Remove the sensor cap from its shipping/storage sleeve.
4. Align the two lines on the cap with the flat part of the sensor and firmly **press (DO NOT TWIST)** the cap onto the sensor until it seals over the probe body.

   - **CAUTION:** Twisting the sensor cap can permanently damage both the cap and the sensor.
   - Avoid allowing moisture, including atmospheric humidity, inside the cap. Keep the cap in its sealed packaging until you are ready to install it. Install promptly. Make sure that O-ring grooves are dry and the O-ring is not rolled or pinched inside the cap.
   - The cap's lifetime is 1 year after the first reading has been taken. Install by the date printed on the packaging.

5. Reattach the nose cone

Calibration

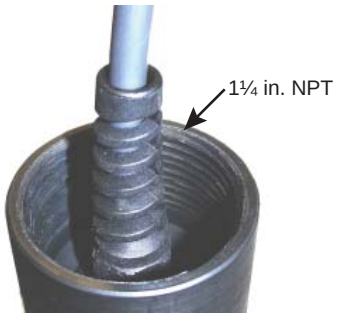
Calibration is not required. The unit, as shipped from the factory, will measure within 2% of reading for the life of the sensor cap.

Replacing the sensor cap will keep the reading within 2% accuracy.

Sensor Deployment

The cable end of the RDO® Pro is internally threaded (1¼ - 11½ NPT) and can be attached to a externally threaded pipe.

When deployed, make sure that the nose cone and thermistor are completely submerged.



with 10 m cable

Care and Maintenance

Cleaning the Sensor Cap

1. Leave the cap and nose cone on the sensor!
2. Rinse the sensor with clean water from a squirt bottle or spray bottle.
3. Gently wipe with a soft-bristled brush or soft cloth if biofouling is present. Use Alconox® to remove grease.
4. If extensive fouling or mineral build-up is present, soak the cap end in vinegar for 15 min., then soak in deionized water for 15 min.

Do not use organic solvents - they will damage the foil.
Do not remove the cap from the sensor prior to brushing.

Cleaning the Optical Window

Perform only when changing the cap. See full instructions in the sensor replacement cap kit.

Do not wet the lens area with water or any solution.

Remove the cap and gently wipe the window with the supplied lens wipe. Use only the supplied lens wipe for cleaning. Do not use any other wipe or material.

Cleaning the Sensor Body

With the sensor cap installed on sensor, gently scrub sensor body with a soft-bristled brush or nylon dish scrubber. Use Alconox to remove grease or other matter. Soak in vinegar and deionized (DI) water to remove mineral deposits or extensive fouling as in step 4, above.

Cap Storage

- Prior to installation: Store in factory supplied container.
- Installed: Keep or store in the calibration chamber with the storage cap attached and a few drops of clean water.

Sensor Cap Replacement Kit Contents:
- Sensor cap
- O-rings (2)
- O-ring lubricant
- Lens wipe
- Instruction sheet

Sensor Cap Replacement

Replace the Sensor Cap

The sensor cap has a 1-year life after the instrument takes its first reading. Install the cap by the date printed on the package. Replacement caps are available from Georg Fischer, part number 3-2610.392 (159 310 122).

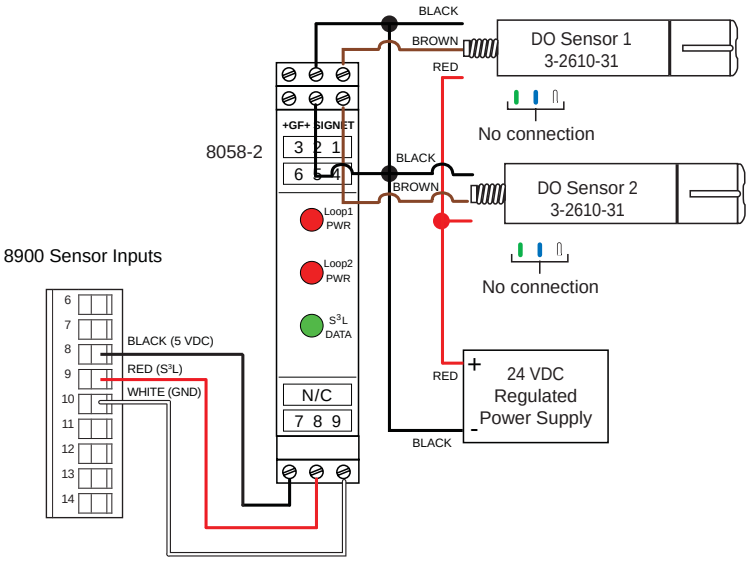
Avoid allowing moisture, including atmospheric humidity, inside the cap. Keep the cap in its sealed package until you are ready to install it. Install promptly. Make sure that O-ring grooves are dry and that the O-rings are not rolled or pinched inside the cap.

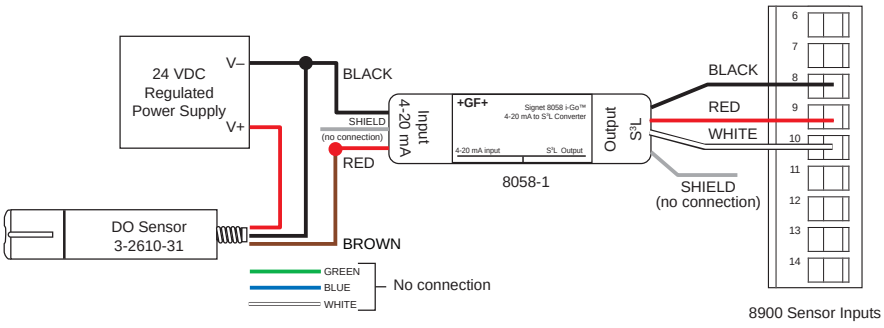
1. Pull the used sensor cap off of the sensor. **DO NOT TWIST!**
2. Remove the existing O-rings from the sensor.
3. Use a lint-free cloth to remove any moisture from the sensor body. **NOTE:** Make sure that the O-ring grooves are dry. Avoid touching or cleaning the lens with anything other than the supplied lens wipe.
4. Use your finger to apply a thin layer of lubricant around the O-ring grooves. Place the O-rings on the sensor. **NOTE:** Do not transfer lubricant to the lens or sensor pins.
5. Clean the lens on the sensor with the wipe provided in the kit and allow to dry thoroughly. Inspect for scratches or dirt.
6. Remove the new cap from its sealed package.
7. Align the arrow on the cap with the index mark on the sensor and press it firmly until it seals over the probe body. **DO NOT TWIST.** Make sure that the O-rings are not pinched or rolled between the cap and sensor.
8. Replace the nose cone on the sensor.

Wiring and Set Up

3-2610-31 to 8900 Set Up

1. Connect the 8058, 2610-31, and 8900 as shown in the diagram.
2. Press and hold ENTER key for 5 seconds.
3. The display should flash “System Setup”.
4. Press ENTER key.
5. Scroll to the desired channel for Dissolved Oxygen.
6. Press the ► key.
7. Enter the password.
8. Repeatedly press the ▼ key until the lower line of the display reads “Other (4-20)”.
9. Press ENTER key.
10. The 8900 will warn that “Channel Data will be Reset. Are you sure?” Press the ▼ key so that “Yes” is flashing and press ENTER key.
11. Simultaneously press the▲ and ▼ keys to return to the Menu Directory.
12. Press the ▼ key to select the “Channel Settings” menu and press ENTER key to select.
13. Use the ▼ key to select the channel used in step 5.
14. Press the ► key to change the label and press ENTER when done.
15. Press the ▼ key to select the abbreviation.
16. Press the ► key to change the label and press ENTER when done. Press the ▼ key to select the Units.
17. Press the ► key to change the Units. The 2610 shipped with default units of mg/L or ppm, either can be used. Press ENTER when completed.
18. Press the ▼ key to select the 4 mA Set Point.
19. Press the ► key to change the set point. By default the 4 mA set point for the 2610 is 0.0. Press the ENTER key when complete.
20. Press the ▼ key to select the 20 mA Set Point.
21. Press the ► key to change the set point. By default the 20 mA set point for the 2610 is 20.0. Press the ENTER key when complete.
22. Press the ▼ key to select the Decimal location.
23. Press the ► key and change the decimal position if desired. Press ENTER when complete.
24. Simultaneously press the ▲ and ▼ keys to exit out of the channel menu.
25. Continue programming other options in the 8900 or simultaneously press the ▲ and ▼ keys to return to the View Mode.

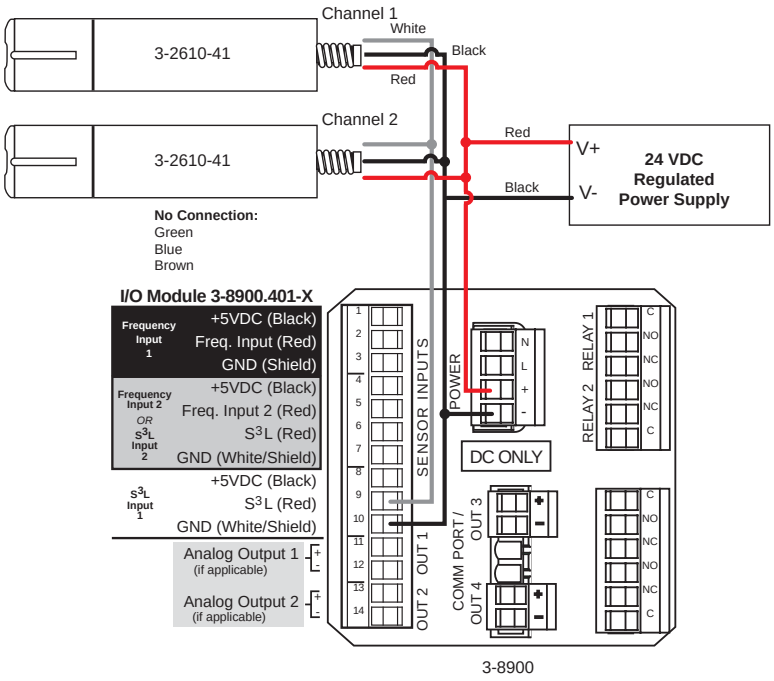




3-2610-41 to 8900 Set Up

The 3-2610-41 Optical Dissolved Oxygen Sensor with S^{3}L was designed to emulate a 4 to 20 mA current input device, e.g., Signet 3-8058, on the 8900 controller. This allows the 3-2610-41 to be backward compatible with all existing 8900 controllers.

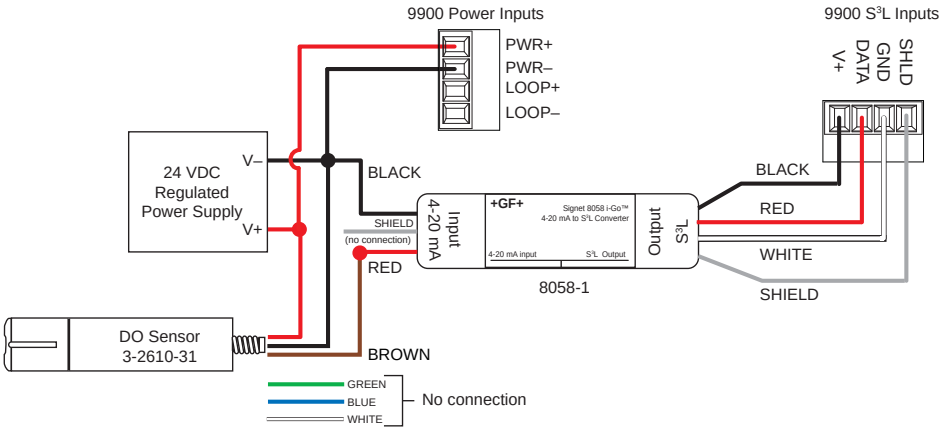
1. Connect the 3-2610-41, and 8900 as shown in the diagram
   NOTE: The wiring of the 3-2610-41 is non-standard:
   - Red wire is connected to 12 to 24 VDC
   - White wire is connected to S^{3}L Data
   - Black wire is connected to VDC Ground
   - A jumper wire must be connected between the VDC Ground and S^{3}L Gnd.
2. Press and hold Enter key for 5 seconds. The display will read “System Setup”.
3. Press Enter key.
4. Scroll to the channel that will be dissolved oxygen.
5. Press the ► key.
6. Enter the password.
7. Repeatedly press the ▼ key until the lower line of the display reads “Other (4-20)”.
8. Press Enter key.
9. The 8900 will warn that “Channel Data will be Reset. Are you sure?” press the ▼ key so that “Yes” is flashing and press Enter key.
10. Simultaneously press the ▲ and ▼ keys to return to the Menu Directory.
11. Press the ▼ key to select the menu “Channel Settings” and press Enter key to select.
12. Use the ▼ key to select the channel used in step 4.
13. Press the ► key to change the label and press Enter when done.
14. Press the ▼ key to select the abbreviation.
15. Press the ► key to change the label and press Enter when done.
16. Press the ▼ key to select the Units.
17. Press the ► key to change the Units. The 2610 shipped with default units of mg/L, or ppm, either can be used. Press Enter when completed.

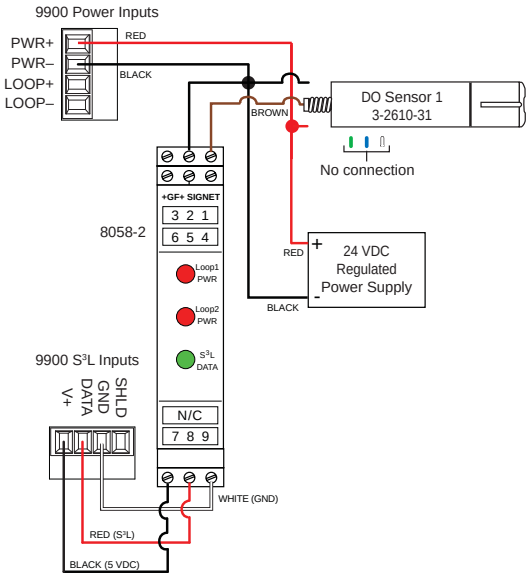


18. Press the ▼ key to select the 4mA Set Point.
19. Press the ► key to change the set point. By default the 4mA set point for the 2610 is 0.0. Press the Enter key when complete.
20. Press the ▼ key to select the 20mA Set Point.
21. Press the ► key to change the set point. By default the 20 mA set point for the 2610 is 20.0. Press the Enter key when complete.
22. Press the ▼ key to select the Decimal location..
23. Press the ► key and change the decimal position if desired. Press Enter when complete.
24. Simultaneously press the ▲ and ▼ keys to exit out of the channel menu.
25. Continue programming other options in the 8900 or simultaneously press the ▲ and ▼ keys to return to View Mode.

3-2610-31 to 9900 Set Up

1. Wire the 9900, 2610-31, and 8058 as shown in the diagrams.
2. On the 9900 press and hold the ENTER key for 2 seconds.
3. Press the ▼ key to select the INPUT menu item.
4. Press the ENTER key to access the INPUT menus.
5. Press the▲ key to select the TYPE menu item.
6. Press the ► key to change the TYPE selection.
7. Enter the password code.
8. Repeatedly press the ▼ key until the “4-20 mA INPUT” menu item is flashing and then press the ENTER key.
9. The 9900 will prompt “All settings will be reset”, press the ▲ key to select “Yes” and then press the ENTER key.
10. The 9900 will return to the View Mode display.
11. Press and hold the ENTER key for 2 seconds.
12. Press the ▼ key to select the INPUT menu item.
13. In the NAME menu item, press the ► key to change the displayed name from “4-20 mA INPUT” to a more descriptive name (e.g., "DISSOLVED O2") and press ENTER when done.
14. Press the ▼ key to select SENSOR UNIT menu item.
15. Press the ► to change the label from UNIT to MG/L or PPM and press ENTER.
16. Press the ▼ key and ensure the 4 mA VALUE is set to 0.0000.
17. Press the ▼ key and change the 20 mA VALUE from 5.0000 to 20.000 and press ENTER.
18. Press both the▲ and ▼ keys simultaneously to return to the Menu.
19. Press the ▼ to select the LOOP menu and press ENTER.
20. Set the 4 MA SET POINT to your desired value. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
21. Press the ▼ key to select the 20 MA SET POINT and set to your desired value. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
22. Press both the ▲ and ▼ keys simultaneously to return to the Menu.
23. Press the ▼ key twice to select the OPTION menu and press ENTER.
24. Press the ▼ key twice to select the SET BAR MIN option. Change this option if desired. The 2610 is factory set for a 0 to 20 mg/L output. Press the ENTER key when done.
25. Press the ▼ key to select the SET BAR MAX option. Change this option if desired. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
26. Press both the▲ and ▼ keys simultaneously to return to the Menu.
27. ENTER the other menus and set the unit as desired for your application.
28. Press both the▲ and ▼ keys simultaneously to return to the View Menu.



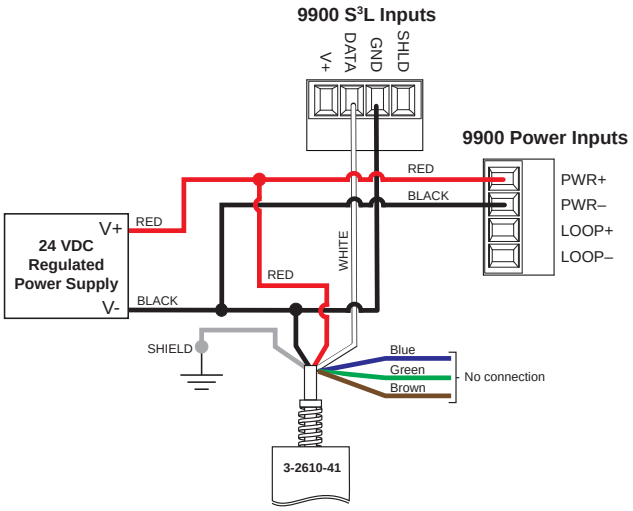


Technical Notes:

- The cable length from the 8058 to the 9900 must not exceed 60 m (200 ft).
- When using the 8058-2 with the 9900, connect the loop source to 8058-2 Channel 1 input ONLY as shown in the figure.
- See the 8058 manual for more information.

3-2610-41 to 9900 Set Up

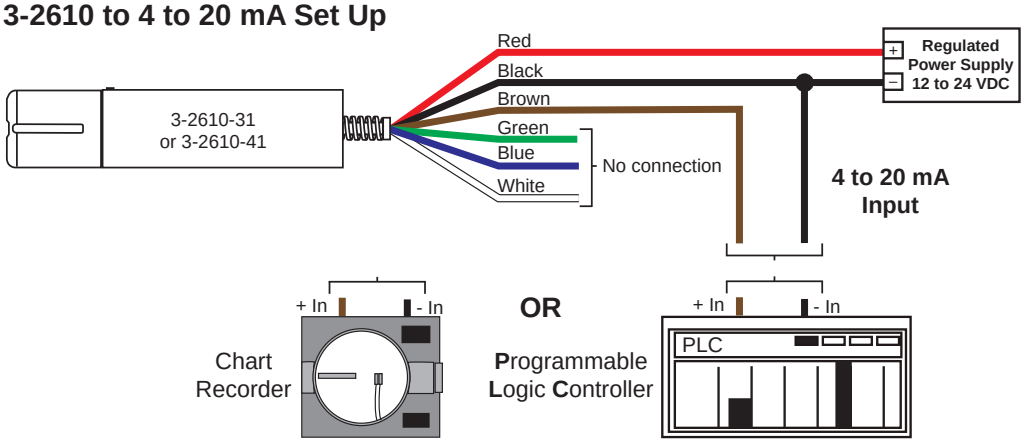
The 3-2610-41 Optical Dissolved Oxygen Sensor with S³L was designed to emulate a 4 to 20 mA current input device, 8058, on the 9900 controller. This allows the 3-2610-41 to be backward compatible with all existing 9900 controllers.



1. Wire the 9900 and 3-2610-41 as shown in the diagram.
   NOTE: The wiring of the 3-2610-41 is nonstandard:
   - 3-2610-41 Red wire is connected to 12 to 24 VDC
   - 3-2610-41 White wire is connected to S³L Data
   - 3-2610-41 Black wire is connected to VDC Ground
   - A jumper wire must be connected between the VDC Ground and S³L Gnd.
2. On the 9900 press and hold the ENTER key for 2 seconds.
3. Press the ▼ key to select the INPUT menu item.
4. Press the Enter key to access the INPUT menus.
5. Press the ▲ key to select the TYPE menu item.
6. Press the ► key to change the TYPE selection.
7. Enter the code.
8. Repeatedly press the ▼ key until the “4-20 mA INPUT” menu item is flashing and then press ENTER.
9. The 9900 will prompt “All settings will be reset”. Press the ▲ key to select “Yes” and then press ENTER.
10. The 9900 will return to the View Mode display.
11. Press and hold the ENTER key for 2 seconds.
12. Press the ▼ key to select the INPUT menu item.
13. In the NAME menu item, press the ► key to change the displayed name from “4-20 mA INPUT” to a more descriptive name (e.g., "DISSOLVED O2") and press ENTER when done.
14. Press the ▼ key to select SENSOR UNIT menu item.
15. Press the ► to change the label from UNIT to MG/L or PPM and press ENTER.
16. Press the ▼ key and ensure the 4 mA VALUE is set to 0.0000.
17. Press the ▼ key and change the 20 mA VALUE from 5.0000 to 20.000 and press ENTER.
18. Press both the ▲ and ▼ keys simultaneously to return to the Menu.
19. Press the ▼ to select the LOOP menu and press ENTER.
20. Set the 4 MA SET POINT to your desired value. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
21. Press the ▼ key to select the 20 MA SET POINT and set to your desired value. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
22. Press both the ▲ and ▼ keys simultaneously to return to the Menu.
23. Press the ▼ key twice to select the OPTION menu and press ENTER.
24. Press the ▼ key twice to select the SET BAR MIN option. Change this option if desired. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
25. Press the ▼ key to select the SET BAR MAX option. Change this option if desired. The 2610 is factory set for a 0 to 20 mg/L output. Press ENTER when done.
26. Press both the ▲ and ▼ keys simultaneously to return to the Menu.
27. Enter the other menus and set up the unit as desired for your application.
28. Press both the ▲ and ▼ keys simultaneously to return to the View Menu.

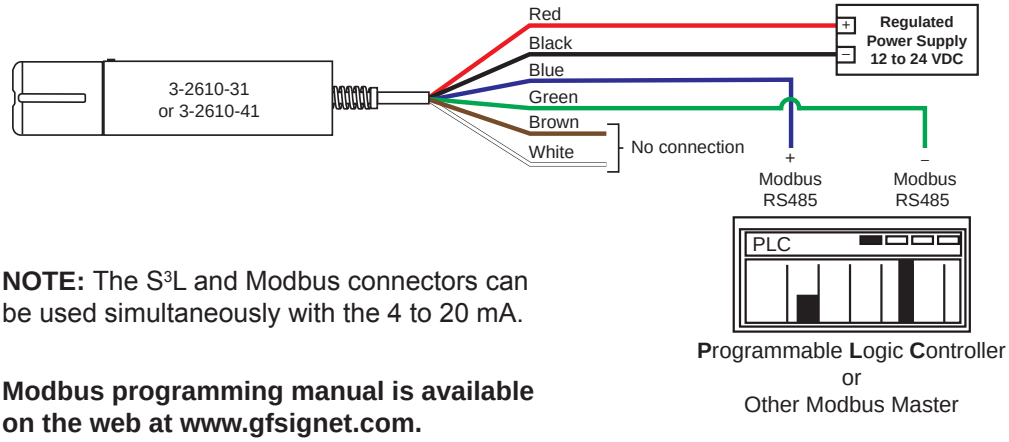
9900 Generation III supports 3-2610-41 direct connection.
Please refer to the 9900 product manual for setup instructions.

3-2610 to 4 to 20 mA Set Up



NOTE: The S³L and Modbus connectors can be used simultaneously with the 4 to 20 mA.

3-2610 to Modbus Set Up



NOTE: The S³L and Modbus connectors can be used simultaneously with the 4 to 20 mA.

Modbus programming manual is available on the web at www.gfsignet.com.

Specifications

General

Sensor type:	Luminescent dissolved oxygen sensor
Transmitter/local display:	Optional, not required
Communications options:	Modbus (RS-485), 4 to 20 mA, Digital S^{3}L
Maximum cable length:	Up to 4000 ft (Modbus and 4 to 20 mA) Up to 100 ft (S^{3}L)
Internal mounting thread:	1¼ NPT

Performance

Salinity range:	0 to 42 PSU, fixed or real-time capable
pH range:	2 to 10 pH
Barometric range:	507 to 1115 mbar, fixed or real-time capable
Idle current:	160 µA typical at 24 VDC
Maximum pressure:	300 psi
Range:	0 to 20 mg/L concentration, 0 to 200% saturation
Accuracy (DO):	±0.1 mg/L, 0 to 8 mg/L, ±0.2 mg/L, 8 to 20 mg/L
Response time:	Cap T90: 30 sec Cap T95: 37 sec @ 25 °C
Resolution:	0.01 mg/L
Measure current:	6 mA typical at 24 VDC

Environmental

Wetted Materials:	ABS, Titanium, FPM
Usage life of cap:	1 year from the first instrument reading
Shelf life of cap:	24 months from date of manufacture (install w/in 12 mo. of manufacture)
Operating temperature:	0 °C to 50 °C (32 °F to 122 °F)
IP rating:	IP-67 with cap off, IP-68 with cap installed
Storage conditions, cap:	1 °C to 60 °C (33 °F to 140 °F), in factory container
Storage conditions, sensor:	-5 °C to 60 °C (23 °F to 140 °F)

Warranty

Sensor:	3 years from date of manufacture
Cap:	2 years from date of manufacture or one year from first reading whichever comes first

Standards and Approvals

CE

RoHS Compliant

China RoHS (Go to www.gfsignet.com for details)

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and, (2) This device must accept any interference received, including interference that may cause undesired operation.

Ordering Information

2610 Optical DO Sensor

Mfr. Part No	Code	Description
3-2610-31	159 001 753	Optical DO Sensor (0-20 ppm) with Modbus, SDI, and 4 to 20 mA output
3-2610-41	159 001 754	Optical DO Sensor (0-20 ppm) with S^3L, Modbus, and 4 to 20 mA output

Accessories and Replacement Parts

Mfr. Part No	Code	Description
3-2610.392	159 310 122	Replacement Optical Dissolved Oxygen Sensor Cap (0 to 20 ppm)
3-2610.501	159 500 413	DO Threaded Pipe Adapter, 2 in. Male NPT
861-170	—	1¼ in. Close Nipple
—	721 914 211	63 mm Cement Socket to 2 in. NPT Female Adapter Fitting

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