

# Dissolved Oxygen Sensor Care and Use Instructions

## Product Instructions

### Introduction

Your Dissolved Oxygen (DO) sensor is a galvanic electrochemical device; i.e. it does not require power from your meter or controller to generate its signal. The DO sensor will provide a millivolt signal proportional to the concentration of oxygen in the water (model DO7400, DO7400TC) or 4-20mA current output (models DO7441 and DO7442). The signal output is proportional to ppm of oxygen for probes with millivolt signal output or changes linearly with ppm of oxygen sensors with 4-20mA output. The partial pressure of oxygen, which is directly proportional to the percent saturation of oxygen in a specified sample, can be calculated based upon the oxygen solubility which is a function of temperature, salinity, total atmospheric pressure, etc.

Your Dissolved Oxygen sensor consists of an cathode, anode and an electrolyte separated from your process fluid by an oxygen permeable membrane. The oxygen passing through the membrane reacts at the cathode, giving up electrons, which produces an electrical current.

### Electrical Connections

#### DO7400 and DO7400TC models:

Red wire of Sensor to DO input + (cathode)  
 Black wire of Sensor to DO input - (anode)  
 White and Green wires of Sensor to Temperature input (10k NTC)  
 (See wiring FIG 2)

#### DO7441 and DO7442 models:

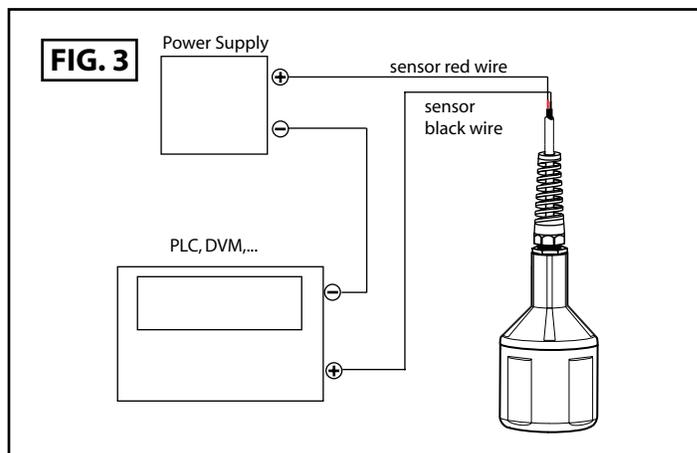
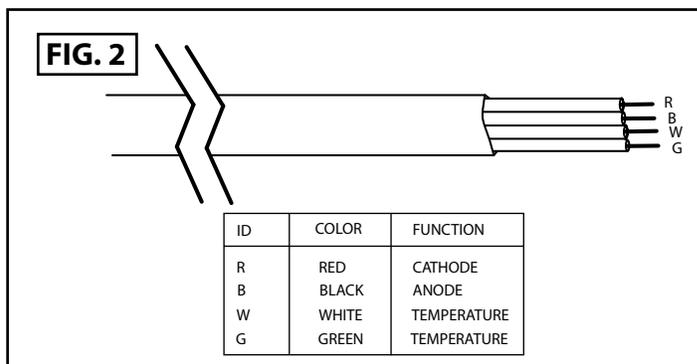
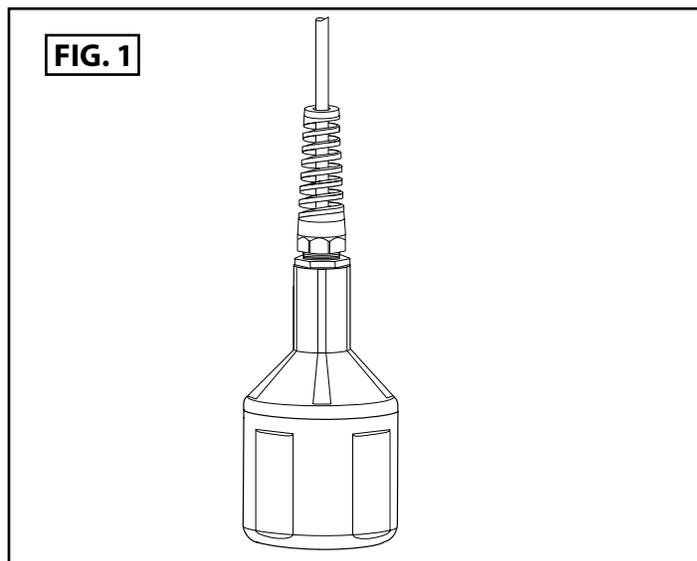
Red wire of Sensor to DO input + (cathode)  
 Black wire of Sensor to DO input - (anode)  
 (See wiring FIG 3)

### Getting Your DO Sensor Ready to Use

Your DO sensor is shipped to you dry and is not ready for use. See steps 1, 7, 8, 9 and 10 of the "Sensor Reconditioning" section of this sheet for instructions on sensor preparation. The installed membrane shipped with the probe is usable if it passes the leak test in step 8. Maintenance items included with your sensor include: one each membrane lock tool, two each Teflon or HDPE membranes, two each membrane o-rings and 250mL of electrolyte.

### Calibration

The simplest method to calibrate your DO sensor is to hold it in air. You may also bubble air past the sensor in water. The sensor is pre-calibrated at the factory (see Specifications Section for calibration range). If you want a two-point calibration, a saturated solution of sodium sulfite ( $\text{Na}_2\text{SO}_3$ ) is suggested. 17g Sodium sulfite in 125mL DI water is more than enough. Sodium sulfite will not reach a true zero output but it should reach less than 1 mV or less than 4.5mA in five minutes or less (See Specifications section for range).



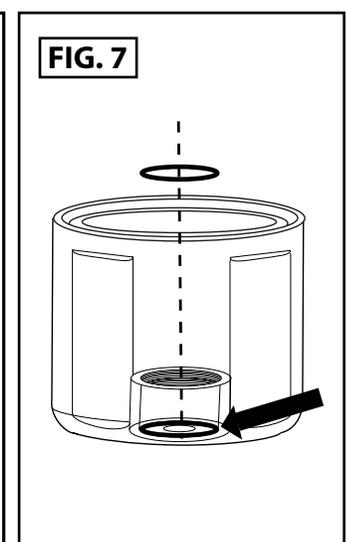
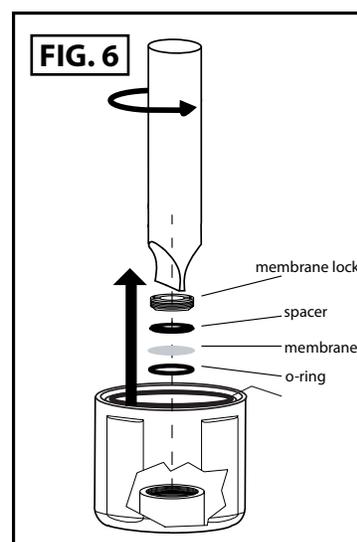
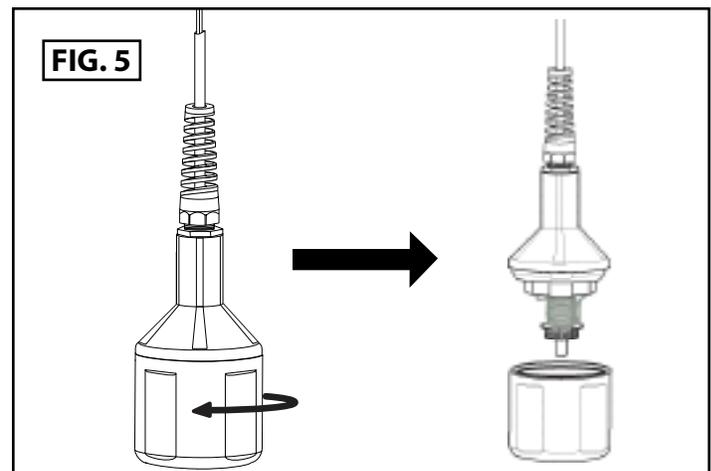
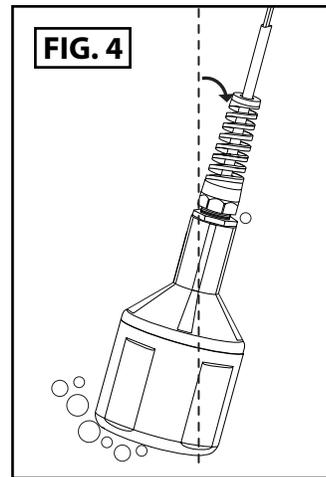
Parts covered by this product data sheet include:  
 DO7400, DO7400TC, DO7441, DO7442

## Mounting Your DO Sensor

Submersion mounting of the sensor is recommended. To prevent air bubbles from becoming trapped on the membrane and producing falsely high DO readings, it is recommended that the sensor be mounted at a slight angle (SEE FIG 4).

## Sensor Re-Conditioning

1. Unscrew the lower body from the upper body (FIG 5).
2. Safely dispose of the electrolyte that is a special molarity, reagent grade Sodium Chloride solution (salt water). Make sure o-ring does not fall out of cap.
3. Using the Membrane Tool, unscrew the Membrane Lock in the lower body as shown in FIG 6.
4. Remove and dispose of the membrane and its o-ring as shown in FIG 6.
5. To clean, take the top part of the sensor and immerse in vinegar (distilled white vinegar) for about 30 minutes. If you don't have vinegar, you can use a *soft* toothbrush, dish washing powder, and clean water, clean the cathode, anode, and plastic between them. Rinse all components thoroughly with clean water after cleaning (SEE FIG 8).
6. First, install a new o-ring into the lower body membrane cavity (the o-ring must go all the way to the bottom as shown in FIG 7), then a new membrane (*remove paper backing from membrane before installing*), then the spacer. Using the Membrane tool, install the Membrane Lock on top of the spacer as shown in FIG 9. Make sure cap is upright (not sideways) when screwing in lock.
7. Inspect the membrane for wrinkles—replace if it is wrinkled.
8. Pour some water into the lower body and look for leakage around the membrane (SEE FIG. 10)—replace it if there is leakage. If there is no leakage, dispose of the water.
9. Fill the bottom cap to the top with fresh electrolyte.
10. Keep the sensor upright so that the cable is pointed upwards (not sideways). Screw the bottom cap onto the upper body until hand tight. Excess electrolyte will leak out at the joint between the sensor's cap and upper body.



### Sensor Repair

Do not attempt to repair any part of the sensor. If the sensor's cable is damaged, consult the factory for details.

### Sensor Storage

If long-term storage of probes is required, empty electrolyte out of probe, rinse with clean water and remove the membrane. *Store dry and empty.*

### SPECIFICATIONS

**Sensor Materials**

<b>Top and Bottom Cap:</b>	Noryl <sup>®</sup>
<b>Sensor Body:</b>	Delrin <sup>®</sup>
<b>Anode:</b>	Lead (Pb) Wire
<b>Cathode:</b>	Silver

**Output at 100% Saturation (mV models)**

<b>PTFE Membrane:</b>	31+/-5 mV
<b>HDPE Membrane:</b>	48+/-8 mV

**Output at 100% Saturation (mA models)**

<b>D06441:</b>	18-22mA
<b>D06442:</b>	11-13mA

**Output at 0% Saturation (mV models)**

<b>PTFE &amp; HDPE Membrane:</b>	<1mV
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**Output at 0% Saturation (mA models)** <4.5mA

**Temperature Range**

<b>Max:</b>	50 deg C
<b>Min:</b>	0 deg C

**Response Time**

<b>PTFE Membrane:</b>	5 minutes from 100% to 0% Oxygen (<1mV or 4.5mA)
<b>Water Flow Rate:</b>	Min 2 inch/second across membrane.

**Wetted Materials**

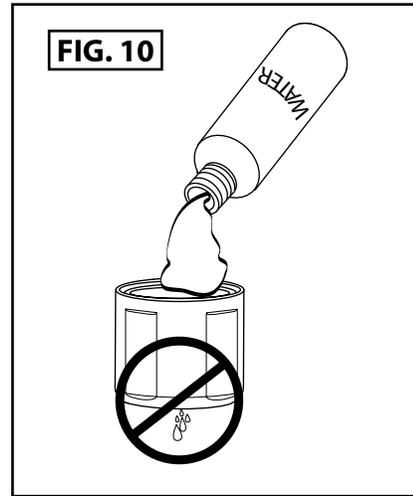
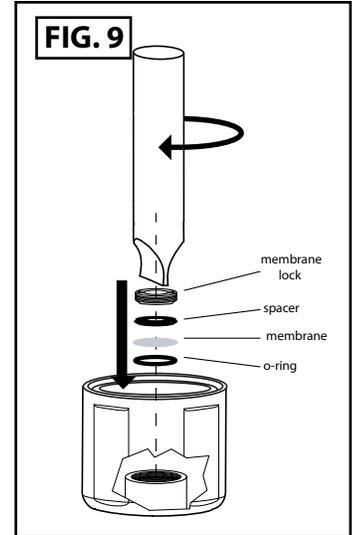
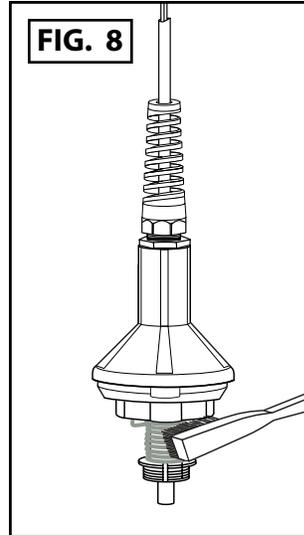
<b>Body:</b>	Noryl <sup>®</sup>
<b>Membrane:</b>	Teflon <sup>®</sup> or HDPE
<b>Cable:</b>	4-conductor, 24AWG, Copper/PVC, polyurethane outer jacket.

**Wiring**

<b>D07400, D07441*, D07442*</b>	Red = +, Black = -
<b>D07400/TC</b>	Red = +, Black = - White = Temp, Green = Temp

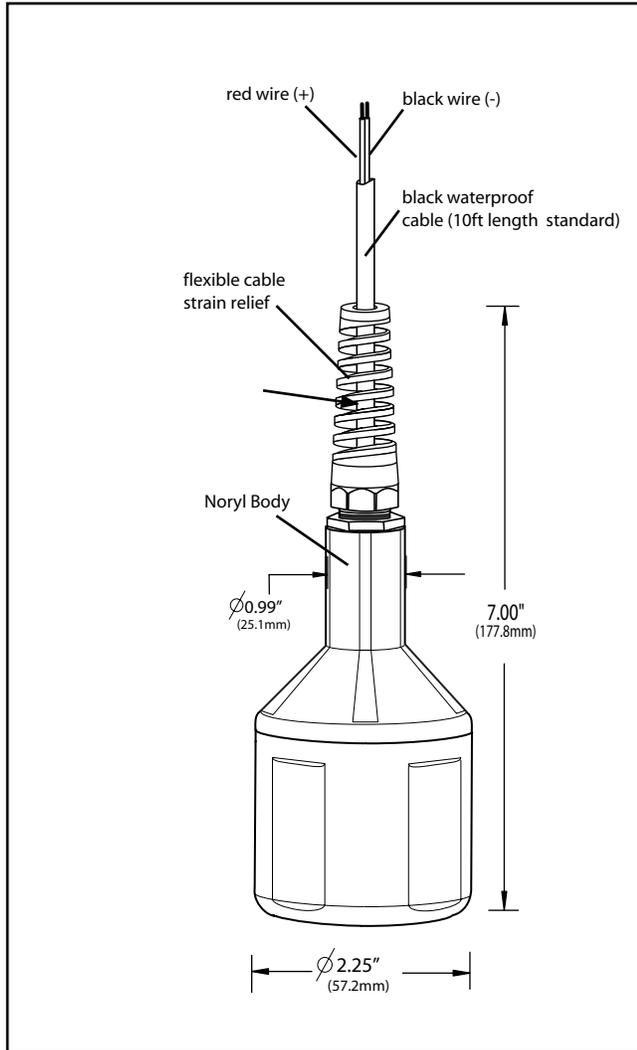
Note: \* 4-20mA output versions  
Teflon is a registered trademark of E.I. DuPont de Nemours Co.  
Delrin is a registered trademark of E.I. DuPont de Nemours Co.

Noryl is a registered trademark of General Electric Company

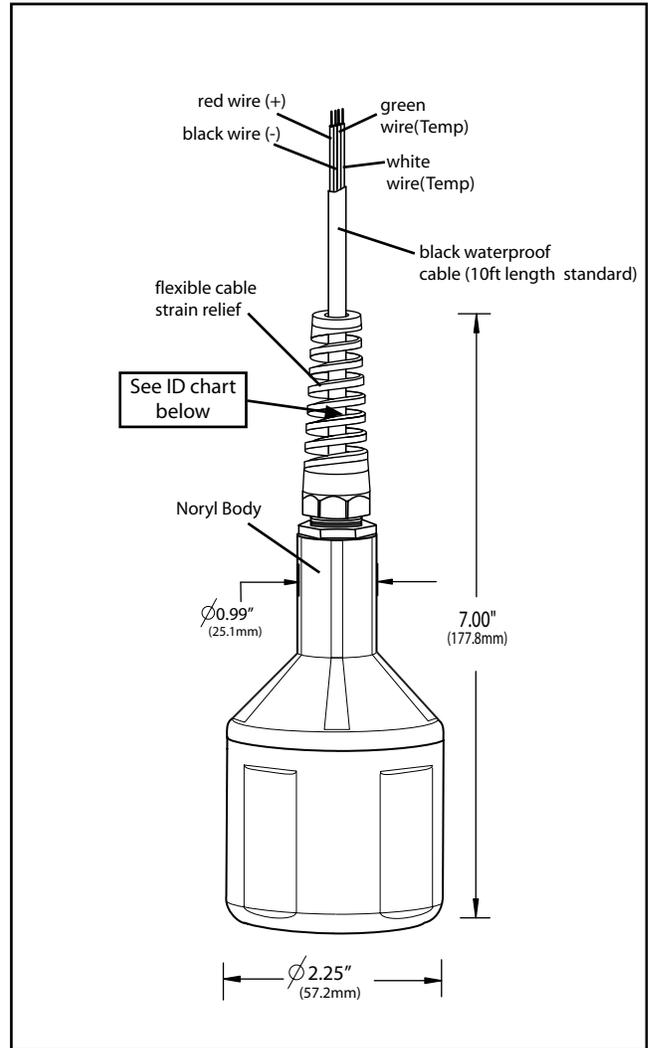


## Outline and Dimensions

### DO7400 and DO7441, 7442



### DO7400TC



### Sensor ID Chart

Model#	Shrink Color
DO7400/T &/H	White under strain relief
DO7441/T&/H	White under strain relief + yellow
DO7442/T&/H	White under strain relief + yellow + green