J & S Instruments, Inc.

3071 S. Limestone St.
Springfield, Ohio 45505-5023
Phone: (937) 325-7499
Fax: (937) 323-9588
Home Page: www.jsinstruments.com

Subsurface Oxygen Sensor Specifications

Part #:	JS-XT253-XX, (were XX = length in feet)
Sensor Type:	Electrochemical cell
Sensor Life:	≈ 7 years
Temperature Compensation:	Internal Thermistor
Pressure Compensation:	None (see pressure compensation notes)
Accuracy (full scale):	≈ 1% for oxygen depleting (calibration at 20.9%)
Storage Temperature:	0 - 70^{o} C
Storage and Operating Orientation:	Vertical
Operating Temperature:	0 - 70^{o} C
Output Signal:	mV or 4-20mA
Maintenance Required:	None
Calibration Requirements:	Calibrate in air before installation (see long term stability fig. 1)
Installation Methods:	2" or larger monitoring well or directly buried in soil
Response Time:	12 Sec. (5 min. for temperature compensation)

Influence of Various Gases

Influence Level	Gas Type
Unaffected	CO_2, CO, H_2S, SO_2, H_2, CL_2, CFC's, CH_4, N_2, etc...
Affected	Nh_3 (ammonia), Ozone

Pressure Influence

The oxygen sensor is responsive to partial pressure of oxygen molecules which enter the sensor through a Teflon membrane. The effects from a change (from calibration point) in atmospheric pressure can be corrected by recalibration of sensor. It is recommended to calibrate the sensor on site to compensate for pressure-altitude equivalents (e.g. -531 ft. = 1033mB, sea level = 1013mB, 5974 ft. = 813mB). The following equation represents the effect of pressure influence on the sensor.

$Vo = Vos \times (P/1013)$ were... P = pressure (mB)
Vos = voltage at 1013 mB
Vo = voltage output (mV)

Vos = 44.3mv @ 1013 = 20.9% O_2, Cf = .5, ≈ %O_2 = Cf X (Vo - 2.5)

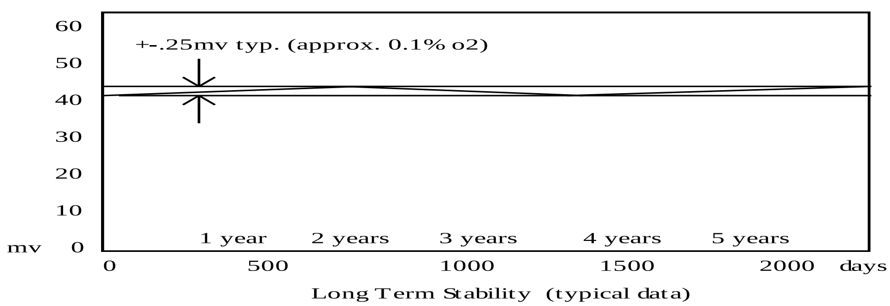
29.3 in. Hg. (sea level - storm conditions)	20.5% O_2 = .5 x ((44.3 x $^{992}/_{1013}$) - Ov)
29.9 in. Hg. (sea level - calm conditions)	20.9% O_2 = .5 x ((44.3 x $^{1013}/_{1013}$) - Ov)
30.5 in. Hg. (sea level - storm conditions)	21.3% O_2 = .5 x ((44.3 x $^{1033}/_{1013}$) - Ov)

were... **Ov = offset voltage @ 0% O_2 = ≈ 2.5mV**
Cf = calibration factor = 20.9/(Vo @ 20.9 O_2 % - Ov)

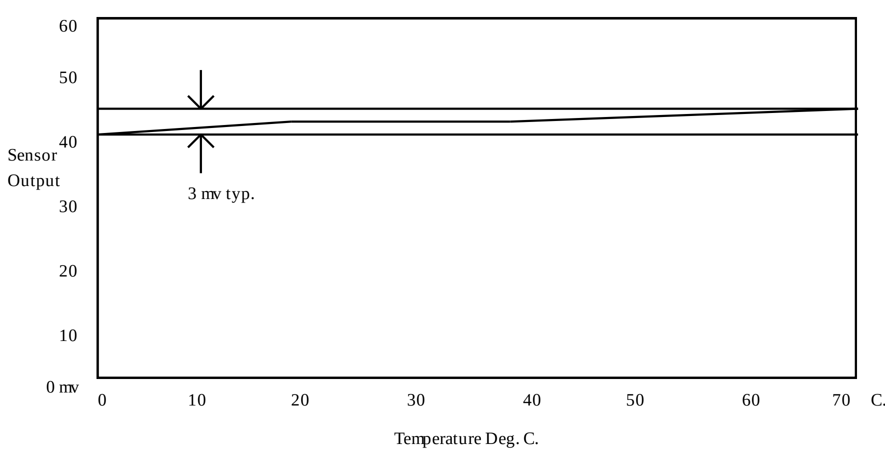
As shown above, considerable changes in barometric pressure is not great enough to produce serious degradation in sensor performance for long term remediation monitoring applications. Studies indicate that for in-situ O_2 monitoring possible diurnal change caused by various impending factors affect subsurface O_2 concentration levels (see oxygen sensor applications literature).

Subsurface Oxygen Sensor Specifications Cont.

Long Term Stability (fig. 1)



Temperature Compensation (fig. 2)



Sensitivity Characteristics (fig. 3)