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JS-XT253-SP Oxygen Sensor w/ Sideport

This product is the same as the JS-XT253 with a sideport installed into the probe body to permit for the unit to be calibrated with ambient air without requiring the removal of the probe from the soil. Ambient air is pumped down a vinyl tube to sensor chamber and the sensor's output is used to establish a new calibration value.

Subsurface Oxygen Sensor Specifications

Part #:	JS-XT253-SP-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° C
Storage and Operating Orientation:	Vertical
Operating Temperature:	0 - 70° 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, $\approx$ %O_2 = Cf X (Vo - 2.5)

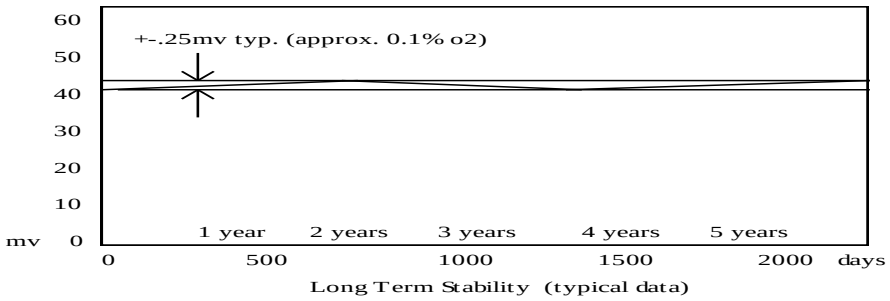
29.3 in. Hg. (sea level - storm conditions)	20.5% O_2 = .5 x ((44.3 x $^{992}/_{1013}$) - Ov)
29.9 in. Hg. (sea level - calm conditions)	20.9% O_2 = .5 x ((44.3 x $^{1013}/_{1013}$) - Ov)
30.5 in. Hg. (sea level - storm conditions)	21.3% O_2 = .5 x ((44.3 x $^{1033}/_{1013}$) - Ov)

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).

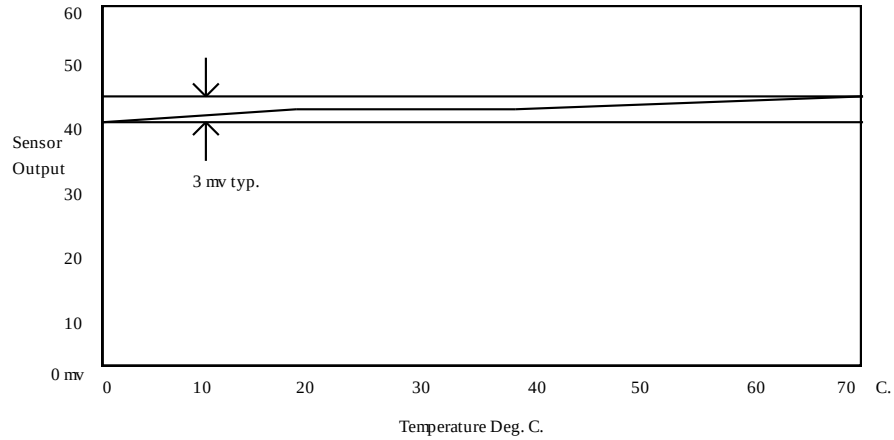
Subsurface Oxygen Sensor Specifications Cont.

Long Term Stability (fig. 1)



Long Term Stability (typical data)

Temperature Compensation (fig. 2)



Sensitivity Characteristics (fig. 3)