

Soil O₂ Sensor

Product Overview

The Soil O₂ Sensor is used for measuring the root respiration. It detects the density of oxygen in the soil by % order, Auger a hole in the soil and place this sensor into the hole. The usual usage of this sensor is to place the sensor vertically at intervals of 20 to 50 cm. The vertical profile of the O₂ in the soil can then be measured.

Features

- Can be used for long - term observation with easy set-up.
- Automatic temperature compensation as it has a built in thermo-couple compensation circuit.
- Not influenced by the rain or water. TEFLON water protection.
- Easy span calibration. Users can calibrate at the usual atmosphere (20.9 % Oxygen concentration).
- Zero calibration is not needed. 0 % Oxygen = 0 mV output



Specifications

Theory	Galvanic battery + porous membrane sheet
Shape	Diameter 35 mm, length 65mm (cable connector length 50mm)
Output	45~65 mV at 20.9 % O ₂ (users must check the output of the air before set-up)
Weight	220 grams (includes 3m cables)
Cable Length	3 m (+ white, - black, shield cable)
Temperature effect	At R.H. 100 % and O ₂ 20.9 %. Sensor output is 20.8 % at 5 C, 19.4 % at 40 C. At R.H. 0 % and O ₂ 20.9 %. Sensor output is not Influenced by temperature.
Temperature	0~40 C when in use



INTERNATIONAL

Solutions for soil, plant & meteorology

www.ictinternational.com.au

Ph: +61-2-6772 6770 sales@ictinternational.com.au

Soil O₂ Sensor – User Manual and Common Questions

Instructions

Place the O₂ Sensor into the atmosphere for 10-20 minutes, in the vertical direction so that the galvanic cell, white porous filter, faces downward and is protected. Check the mV output using a multimeter. Positive (+) is white and negative (-) is black. The mV reading will be between 40-60mV in ambient air at O₂ of 20.9%. When the O₂ Sensor is in 0% O₂ condition, the output is 0mV. Then measured O₂% can be calculated using the example:

$$O_2\% = \frac{20.9\%}{52.0\text{mV}} \times \text{mV (sensor output in soil)}$$

NB. 52.0mV at 20.9% O₂ was recorded.

Life Expectancy

The sensors will have a life expectancy of 5 plus years in soil and 10 plus years in storage.

Mine Site Applications

In mine site applications involving sulphidic – mine waste materials, would SO₂ type “intermediates” of sulphide – oxidation influence the performance of the sensor?

Effective gas	Range of Effective gas	Influence (Full Scale)
CO	0-100%	Less than 0.5%
CO ₂	0-100%	Less than 0.5%
NO	0-1%	Less than 0.5%
NO ₂	0-1%	Less than 0.5%
SO ₂	0-3%	3%
H ₂ S	0-3%	Less than 0.5%
NH ₃	0-3%	1%
H ₂	0-100%	Less than 0.5%
HCL	0-3%	1%
C ₆ H ₆	0-100ppm	1%
CH ₄	0-100%	Less than 0.5%
H ₂ O	0-100%	Less than 0.5%

When soils are saline or sodic, would there be a reduced accuracy?

Saline and sodic soils are no problem. Only the molecules that exist in the gas phase have the possibility to affect the O₂ Sensor. Note, care is necessary especially for toluene, benzene, xylene, acetone, methyl ethyl ketone, dichloromethane, kerosene, gasoline, naphtha and light oil. The concentration of these gases in the atmosphere that will affect the sensor will be at levels that will be uncomfortable for humans.

Biological Applications

Soil oxygen (O₂) in the soil is dependent on micro-organism activity and the permeability of the soil. It is recommended to measure the soil water content and soil temperature to assist with the interpretation of the O₂.



Solutions for soil, plant & meteorology

www.ictinternational.com.au

INTERNATIONAL

Ph: +61-2-6772 6770 sales@ictinternational.com.au