



METER

SO-411 OXYGEN SENSOR



Measure gaseous oxygen in the lab or field

The Apogee SO-411 Oxygen Sensor provides reliable, affordable measurement of gaseous oxygen in the laboratory, soil, and porous media. It's used in compost piles and mine tailings, for monitoring redox potential in soils, for determination of respiration rates through measurement of O₂ consumption in sealed chambers, and for measurement of O₂ gradients in soil or porous media.

Plug and play technology-remote data access

Incredibly simple to set up, you just plug the oxygen sensor into the ZL6 data logger which self-identifies each sensor and automatically records important metadata such as GPS location. Get instant remote data access from the cloud wherever you are on your computer, tablet or smartphone.

Ruggedized and robust

SO-411 is housed in a tough polypropylene body, ideal for long-term deployment in porous media, including acidic environments (mine tailings). It also includes a diffusion head that creates a small air pocket for measurement in porous media.

Simply smarter

Designed with an internal thermistor, the oxygen sensor allows for temperature monitoring and correction of signal for temperature effects. Plus it comes with a resistive heater to raise the temperature of the membrane approximately two degrees above ambient temperature. This keeps condensation from occurring on the Teflon membrane and blocking the diffusion path of the sensor.*

Calibration made easy

In order to accurately output oxygen concentration in units of % oxygen, all oxygen sensors must be calibrated under ambient conditions at the elevation of the location where they will be installed. SO-411 combined with ZENTRA loggers and software make this calibration as easy as the press of a button. The ZENTRA loggers and software also make an optional zero offset with N₂ gas simple and foolproof (recommended for measurements below 10% O₂).

* **NOTE:** To operate the heating element, a user-supplied 12 V source must be attached to the two heater leads. For most installations a 12 V battery is the power supply of choice with either mains power charging, solar charging at remote locations, or periodic battery replacement if no battery charging is available.



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Specifications

Measurement range	0 to 100% O ₂
Measurement repeatability	Less than 0.1% of mV output at 20.95% O ₂
Non-linearity	Less than 1%
Long-term drift (non-stability)	1 mV per year
Oxygen consumption rate	0.1 μ mol O ₂ per day at 20.95% O ₂ and 23°C (galvanic cell sensors consume O ₂ in a chemical reaction with the electrolyte, which produces an electrical current)
Response time	60 s
Operating environment	-20 to 60°C; 0 to 100% relative humidity (non-condensing); 60 to 114 kPa Note: Electrolyte will freeze at temperatures lower than -20°C. This will not damage the sensor, but the sensor must be at a temperature of -20°C or greater in order to make measurements.
Heater voltage requirement	12 VDC continuous
Heater current draw	6.2 mA (74 mW power requirement when powered with 12 VDC source)
Dimensions	32 mm diameter, 68 mm length
Directional (Cosine) response	\pm 2% at 45° zenith angle, \pm 5% at 75° zenith angle
Cable	5 m or 10 m sensor cable splitting into 2 m stereo cable for ZENTRA logger and 2 m cable with pigtail termination for 12V heater power supply.
Mass	175 g (with 5 m of lead wire)
Data logger compatibility	METER EM60 series, ZL6 series, ZSC, ProCheck