

# Oxygen Sensors

SO-100 Series, SO-200 Series



[www.apogeeinstruments.com](http://www.apogeeinstruments.com)

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Measure oxygen levels



- Designed to measure 0 – 100% Oxygen in soil, growth media, air, or in-line tubing (flow-through applications)
- Includes temperature sensor to compensate for temperature changes
- Integrated heater prevents condensation for use in conditions where relative humidity can reach 100%
- Performance proven in the field
- Four year warranty

Apogee Instruments Oxygen Sensors are designed to measure 0 – 100% Oxygen\*. This wide measurement range allows them to be used for applications either in the soil or in the lab. An integrated temperature sensor makes compensating for temperature changes straightforward. An integrated heater keeps moisture from condensing on the sensor allowing for use in conditions where relative humidity can reach 100%. The sensor is calibrated to ambient air making it very easy to calibrate. An aluminum housing that is filled with epoxy allows the sensors to withstand harsh conditions.

In applications with high humidity, condensation can occur on the Teflon membrane, blocking the diffusion path of the sensor. To prevent this, a resistive heater is included to raise the temperature of the membrane approximately two degrees above ambient temperature.

\*Measurement of oxygen below 1% requires special calibration. Contact Technical Support for more details.



AO-002 Flow through Head



AO-001 Diffusion Head

# SPECIFICATIONS

**Measurement Range:** 0 to 100 % O<sub>2</sub>

**Sensitivity:**

SO-110, 120 – 2.6 mV per % O<sub>2</sub> (approximation)

SO-210, 220 – 0.6 mV per % O<sub>2</sub> (approximation)

**Output at 0 % O<sub>2</sub>:**

SO-110, 120 – 6 % of output at 20.95 % O<sub>2</sub>

SO-210, 220 – 3 % of output at 20.95 % O<sub>2</sub>

**Measurement Repeatability:** < 0.1 % of mV output at 20.95 % O<sub>2</sub>

**Non-linearity:** < 1 %

**Non-stability (Signal Decrease):**

SO-110, 120 – 1 mV per year

SO-210, 220 – 0.8 mV per year

**Oxygen Consumption Rate:** 2.2 μmol O<sub>2</sub> per day at 20.95 % O<sub>2</sub> and 23 C (galvanic cell sensors consume O<sub>2</sub> in a chemical reaction with the electrolyte, which produces an electrical current)

**Response Time:**

SO-110, 120 – 60 s (time required to read 90 % of saturated response)

SO-210, 220 – 14 s (time required to read 90 % of saturated response)

**Operating Environment:** -20 to 60 C

0 to 100 % relative humidity (non-condensing)

60 to 140 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.

**Input Voltage Requirement:** 12 V DC continuous (for heater); 2.5 V DC excitation (for thermistor, SO-110, 210)

**Heater Current Drain:** 6.2 mA

**Thermistor Current Drain:** 0.1 mA DC at 70 C (maximum, assuming input excitation of 2.5 V DC)

**Dimensions:** 3.2 cm diameter, 6.8 cm length

**Diffusion Head (Accessory):** 3.5 cm diameter, 3.5 cm length, 125 mesh screen

**Flow Through Head (Accessory):** 3.2 cm diameter, 9.1 cm length, ¼ inch barbed nylon connectors

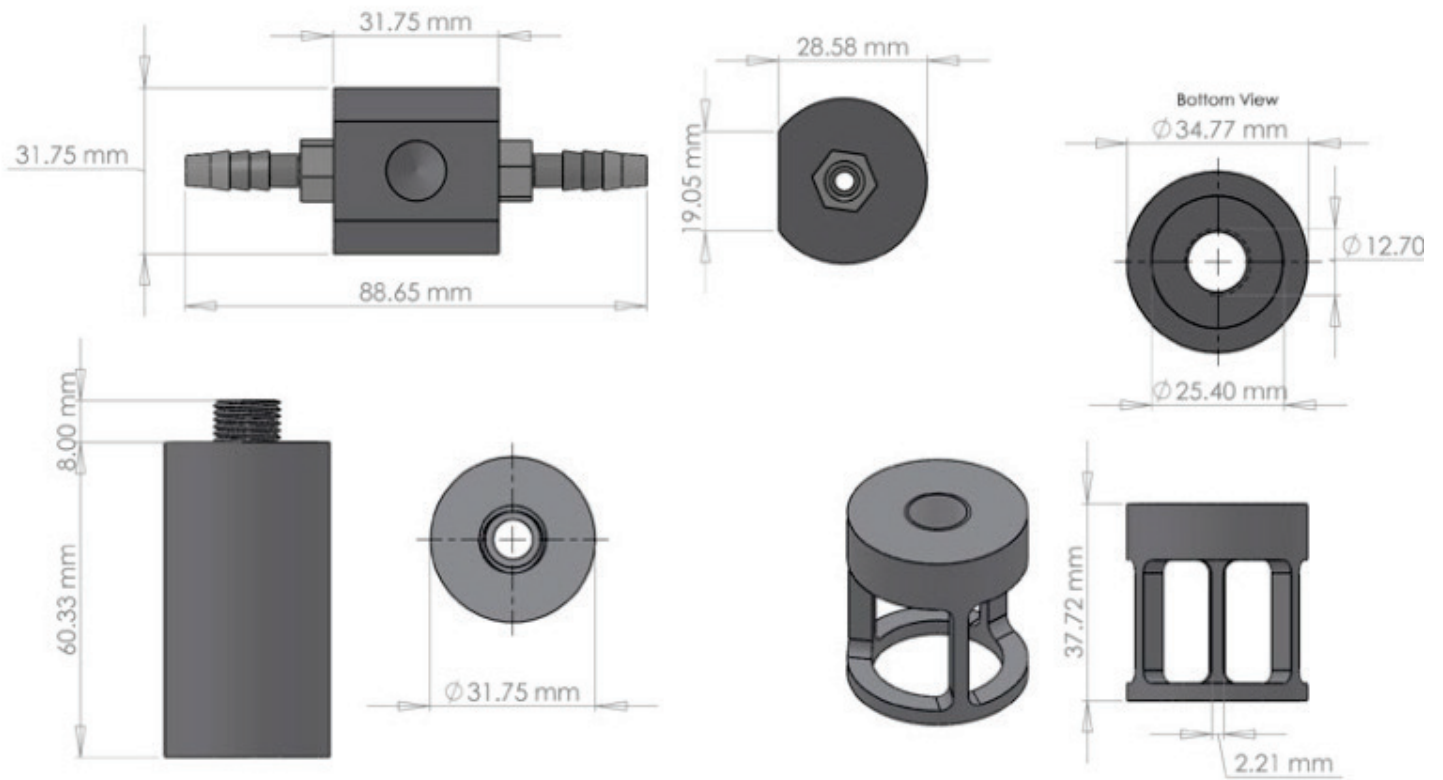
**Mass:** 175 g (with 5 m of lead wire)

**Cable:** 5 m of six conductor, shielded, twisted-pair wire, pigtail lead wires

Santoprene rubber jacket (high water resistance, high UV stability, flexibility in cold conditions)

Additional cable available in multiples of 5 m

**Influence from Various Gases:** Sensors are unaffected by CO, CO<sub>2</sub>, NO, NO<sub>2</sub>, H<sub>2</sub>S, H<sub>2</sub>, and CH<sub>4</sub>. There is a small effect (approximately 1 %) from NH<sub>3</sub>, HCl, and C<sub>6</sub>H<sub>6</sub> (benzene). Sensors are sensitive to SO<sub>2</sub> (signal responds to SO<sub>2</sub> in a similar fashion to O<sub>2</sub>). Sensors can be damaged by O<sub>3</sub>.



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