

# Oxygen Sensors | SO-100, SO-200, and SO-400 Series

Measure gaseous O<sub>2</sub> in the laboratory and porous media



AO-001

AO-002

## Heated Detector

The protective membrane in front of the oxygen sensor can be heated to prevent water from condensing on the membrane and blocking the diffusion path. The heater is typically used when sensors are deployed in soil or compost where relative humidity is close to 100 %.

## Rugged Housing

Housed in a polypropylene body and electronics are fully potted, ideal for long-term deployment in porous media, including acidic environments (mine tailings). Two head options are available: a diffusion head that creates a small air pocket for measurement in porous media and a flow-through head with two adapters for tubing that allows measurement of gas flowing in lines.

## Internal Temperature Sensor

All oxygen sensors have an internal thermistor (type-K thermocouple is available upon request) that allows for temperature monitoring and correction of signal for temperature effects.

## Simple Calibration

Voltage output is linearly proportional to absolute amount of oxygen. Calibration is accomplished by measuring the voltage under ambient conditions (atmosphere is 20.95 % O<sub>2</sub>) and deriving a linear calibration factor (slope). A zero offset can be measured with N<sub>2</sub> gas (recommended for measurements below 10 % O<sub>2</sub>).

## Output Options

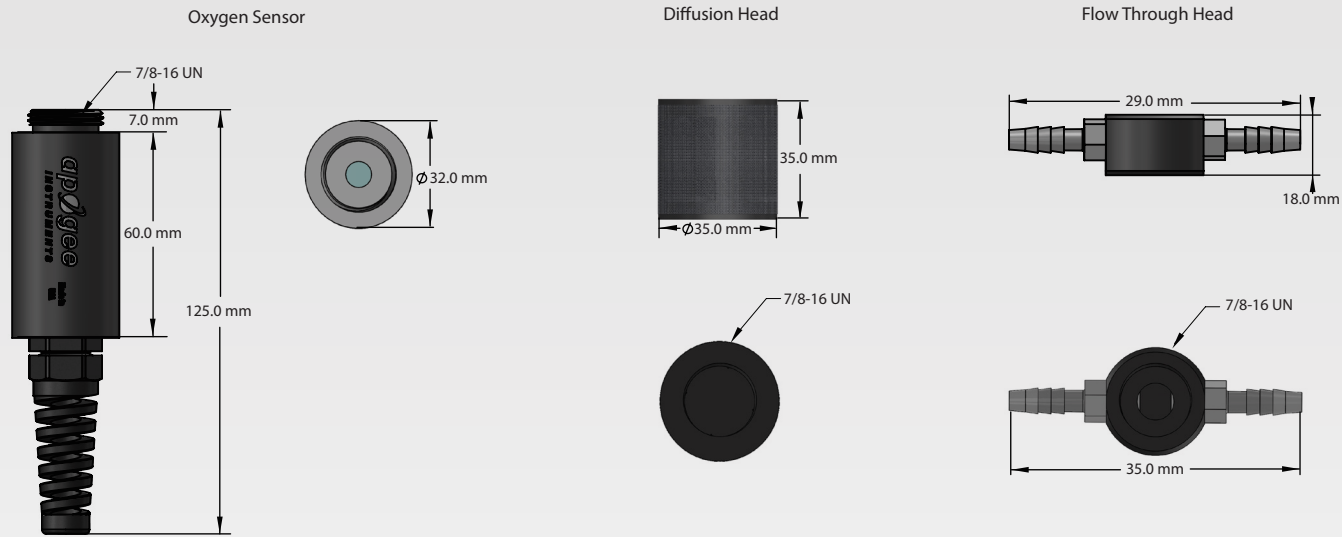
Analog and digital output options are available. Analog version is an un-amplified voltage output. Digital version is SDI-12 communication protocol. Sensor is available attached to a hand-held meter.

## Typical Applications

Applications include: measurement of O<sub>2</sub> in laboratory experiments, monitoring gaseous O<sub>2</sub> in indoor environments for climate control, monitoring of O<sub>2</sub> levels in compost piles and mine tailings, monitoring redox potential in soils, and determination of respiration rates through measurement of O<sub>2</sub> consumption in sealed chambers or measurement of O<sub>2</sub> gradients in soil/porous media.



## Dimensions



**S0-110**  
Slower Response  
Higher Output

**S0-120**  
Slower Response  
Higher Output

**S0-210**  
Faster Response  
Lower Output

**S0-220**  
Faster Response  
Lower Output

**S0-411**

**S0-421**

Input Voltage Requirement	—				4.5 to 24 V DC	
Current Drain	—				0.6 mA (quiescent); 1.3 mA (active)	
Reference Temperature Sensor	Thermistor	Type-K Thermocouple	Thermistor	Type-K Thermocouple	Thermistor	Thermistor
Measurement Range	0 to 100 % O <sub>2</sub>					
Sensitivity (at sea level, 101.3 kPa)	52-58 mV in 21 % O <sub>2</sub> ; 2.6 mV per % O <sub>2</sub> ; 26 µV per 0.01 % O <sub>2</sub>		12-13 mV in 21 % O <sub>2</sub> ; 0.6 mV per % O <sub>2</sub> ; 6 µV per 0.01 % O <sub>2</sub>		—	
Response Time (time required to read 90 % of saturated response)	60 s		14 s		60 s	14 s
Output at 0 % O <sub>2</sub>	5 % of output at 20.95 % O <sub>2</sub> or 2.5 ± 1 mV		2 % of output at 20.95 % O <sub>2</sub> or 0.2 ± 0.1 mV		—	
Measurement Repeatability	Less than 0.1 % of mV output at 20.95 % O <sub>2</sub>					
Non-linearity	Less than 1 %					
Signal Decrease per Year	1.8 % per year (1 mV per year)		6.3 % per year (0.8 mV per year)		1.0 mV per year	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)					
Operating Environment	-20 to 60 C; 0 to 100 % relative humidity (non-condensing); 60 to 140 kPa					
Input Voltage Requirement	12 V DC continuous (for heater); 2.5 V DC excitation (for thermistor)					
Heater Current Drain	6.2 mA (74 mW power requirement when powered with 12 V DC source)					
Thermistor Current Drain	0.1 mA DC at 70 C (maximum, assuming input excitation of 2.5 V DC)					
Dimensions	32 mm diameter, 68 mm length					
Diffusion Head (Accessory)	35 mm diameter, 35 mm length, 125 mesh screen					
Flow Through Head (Accessory)	32 mm diameter, 91 mm length, 0.25 in barbed nylon connectors					
Mass	175 g (with 5 m of lead wire)					
Cable	5 m of six conductor, shielded, twisted-pair wire					
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> .					
Warranty	4 years against defects in materials and workmanship					

