

Oxygen sensor Data sheet

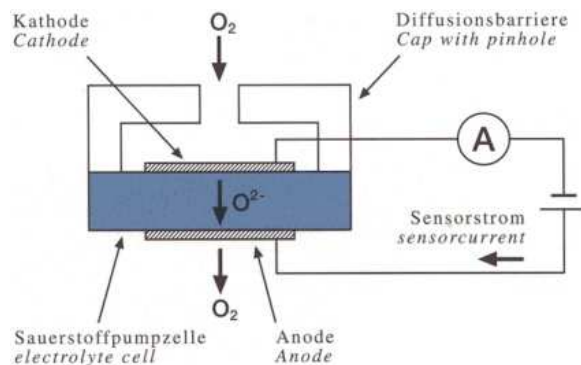
Principle of Operation:

When voltage is applied to a zirconia electrolyte cell, oxygen is pumped through the zirconia disc from the cathode side to the anode side because the carriers of the current flowing through the zirconia electrolyte are oxygen ions. By attaching a cap with a pinhole on the cathode side of the cell and by increasing the voltage over the cell the current shows saturation due to the rate limiting step in the transfer of oxygen to the cathode. This saturation current is called limiting current and is nearly proportional to the ambient oxygen concentration. Below the advantages of the oxygen sensor:

- measuring range 10 ppm to 96% oxygen
- High accuracy
- For many types a more or less linear characteristic
- Small temperature dependence of the sensor signal
- Low interference with other gases
- Long service life
- "Single point calibration" only necessary once

Application:

- Combustion control, control of gas or oil burners by measuring the oxygen concentration in exhaust gases
- Measuring equipment
- Exhaust gas measuring, gas analysis
- Medical treatment, oxygen enricher, incubators, respiration control and equipment
- Biochemistry, fermentation equipment, incubator
- Food packaging, measuring of residual oxygen
- Safety controls in shafts, green houses, food storage
- Climate control, air quality monitoring, oxygen monitoring
- Chemical industry
- Industrial driers equipment
- Diving sport



Schematic drawing of a sensor element, several housing types

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Characteristic Data:

measuring parameter: oxygen concentration
measuring medium: gaseous atmosphere
measuring principle: limiting current type sensor
measuring ranges: Type SO-XX-001 10 to 1000 ppm O₂
 Type SO-XX-010 0.01 to 1.0% O₂
 Type SO-XX-020 0.01 to 2.0% O₂
 Type SO-XX-050 0.05 to 5.0% O₂
 Type SO-XX-250 0.1 to 25.0% O₂
 Type SO-XX-960 1.0 to 96.0% O₂

output-characteristic:
$$I_s(O_2) = -k * \ln\left(1 - \frac{[O_2]}{100}\right)$$

$I_s(O_2)$.. sensor current in μA
 $[O_2]$.. oxygen concentration in %
 k .. specific constant of sensor

output-signal: 0 - 412 μA
 (depends on sensor type and oxygen concentration)

accuracy: 1% of measuring range
 (Type SO-XX-001: 2% of measuring range)

response time (t₉₀): 2 to 10 sec. (depends on sensor type)

sensor voltage: 0,7 to 1,6 Volt

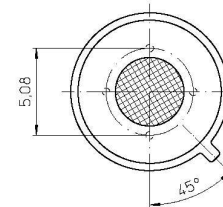
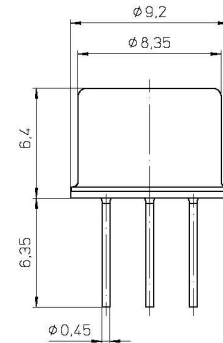
heating voltage: 3.6 – 4.4 Volts (1.3 to 1.8 Watts, depends on application and packaging)

warm up time: approx. 2 min.

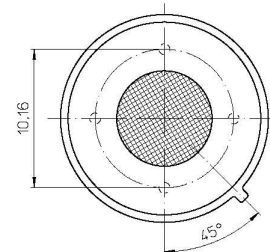
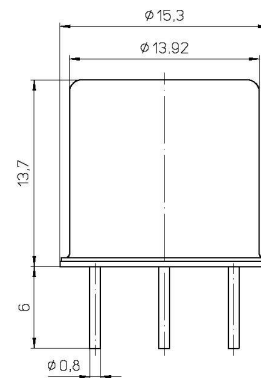
max. packaging-temperature: approx. 250 °C (measured by room temperature)

max. ambient temperature: 350 °C

Packaging: SO-A0-XXX TO 39 9.2 \varnothing * 6.4 mm
 SO-B0-XXX TO 8 15.3 \varnothing * 13.7 mm
 SO-B1-XXX TO8 with mounting flange
 SO-D0-XXX Screw mounted housing
 SO-D1-XXX Screw mounted housing
 customized housings available



**Package TO 39
(SO-A0-XXX)**



**Package TO 8
(SO-B0-XXX)**