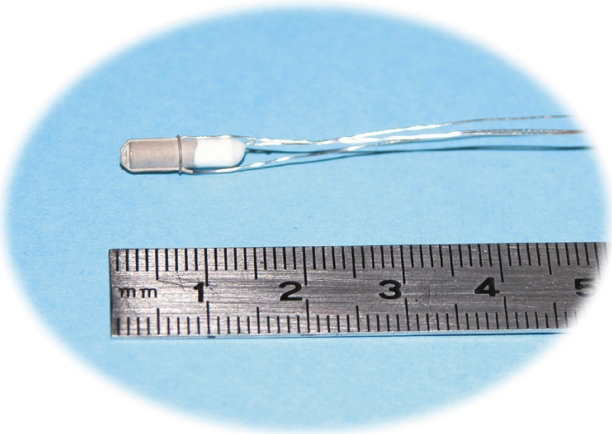
MicroPoas

The smallest zirconia sensor



- *No reference gas.*
- *Response time<< 1s.*
- *Life time >> 1 year on clean gases.*
- *Measured oxygen partial pressure: 10^{-30} to 10 atm.*
- *Recommended working temperature: 500 to 800°C (greater for optional models)*
- *Resistance to total pressure: > 400 atm.*
- *Resistance to thermal shocks: > 100 cycles between 20 and 700°C in 10 seconds.*

Unlike conventional zirconia sensors, known as "air reference" sensors, MicroPoas[1] obtains its own reference, from a metal and its oxyde both placed and sealed inside a zirconia sheath.

Therefore this **built-in metallic reference** sensor doesn't need a reference gas.

The MicroPoas is very small: 2 or 3mm diameter and only 10mm long. It is attached to a K or S-type thermocouple which provides accurate temperature measurements.

This design leads to high precision, very good resistance to thermal shocks and accordingly increases the lifetime of the sensor.

[1] Patented design (University of Grenoble – France)

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MEASUREMENT PRINCIPLE

At high temperature, zirconia allows migration of oxygen ions. An electrochemical voltage appears between the two platinium plated faces of the zirconia when they are in contact with two gaseous atmospheres which are at different partial pressures, according to the Nernst equation:

$$E = \frac{RT}{4F} \ln \frac{P1(O2)}{P2(O2)}$$

Where: E = voltage (in V)

T = temperature (in K)

P1(O2) and P2(O2) = partial pressures (reference and required)

R et F are constants

By fixing one of the oxygen partial pressures, called reference pressure, and measuring the voltage E and the temperature T, one can calculate the other oxygen partial pressure.

The MicroPoas can be used:

- Directly in a high temperature process
- Mounted inside a thermostatic controlled enclosure maintaining it at a convenient temperature

Voltage at the MicroPoas terminals should be measured using a very high impedance voltmeter (> 1000 MΩ) to avoid fast damage to the sensor. Our control units are able to process O2 signal from our sensors (doc. Ref. S301GB)

APPLICATIONS:

- Control of combustion
- Fundamental research
- Measurement of oxygen traces in pure gases
- Control of atmospheres (thermal treatment, food preservation, medical gases, detection of leakage …)

Specifications are subject to change – for improvement purposes – without notice.

SETNAG - 31, bd de Magallon - 13015 MARSEILLE - FRANCE
Tel: +33.4.91.95.65.12 - Fax: +33.4.91.64.22.27
E-mail: export@setnag.com - Web: www.setnag.com