

GEN'AIR

Oxygen pump-gauge



The GEN'AIR allows generating and measuring several different oxygen atmospheres. Its technology is based on the zirconia ionic conduction principle.

The GEN'AIR is made of two parts:

- **The pump:** it raises or decreases the oxygen concentration in the gas that passes inside its zirconia tube. It requires only a low gas flow: between 1 and 12l/h. It involves mixtures such as inert gas/oxygen or buffered mixtures/oxygen as CO/CO₂/O₂ or H₂/H₂O/O₂.
- **The gauge:** it measures the partial pressure generated by the pump. Thanks to the MicroPoas¹ its response time is very fast and it gives extremely accurate measurements.

- **Generation and analysis of atmospheres at controlled oxygen rates.**
- **Use of only small quantity of carrier gas.**
- **Limited costs owing to the use of a single gas.**
- **Large dynamic scale.**
- **Compact and secured system.**
- **Almost maintenance-free and low servicing requirements.**
- **Extremely high measurement stability.**

¹ Patented design (University of Grenoble – France)

Operation principle

The pump:

A selector and a potentiometer are on the front panel to adjust the voltage applied to the pump, between 0 and around +/-1250mV. This generates an oxygen flow through the zirconia tube. The flow follows the Faraday's law:

$$X=X_0\pm 0,209*I/D$$

Where X_0 is the mole fraction of oxygen before the pump
X is the mole fraction of oxygen after the pump
I is the current intensity in amperes
D is the flow of the carrier gas in l/h

The gauge:

Placed after the pump, it enables to validate the partial pressure generated by the pump. The MicroPoas - zirconia sensor with built-in metal reference – carries out the measurement. The MicroPoas is based on the Nernst's law, like all other zirconia sensors:

$$E=(RT/4F)\ln(P_{mes}/P_{ref})$$

As for the MicroPoas, the reference partial pressure is set by an equilibrium between a metal and its oxide.

Example of performances

At 1.6 l/h and 800 °C for a gas containing oxygen 5% in nitrogen:

Voltage applied to the pump (mV)	Oxygen partial pressure (atm)
200	3.70E-02
400	2.30E-02
625	5.40E-03
900	1.10E-08
-1265	1.40E-01

Technical Specification

Measurement range	10 ⁻³⁵ to 0,25 atm*
Useful flow	1 to 12 l/h**
Output signals	0-20 mA or 4-20 mA, linear, with galvanic insulation RS232 port
Dimensions and weight	430x170x430 mm (wxhxd) - 15 kg
Power supply	115 or 230 Vac – 50/60 Hz
Power	550 VA

* Measurement of trace oxygen with a zirconia sensor remains delicate insofar as the presence of trace of combustible component impurities may create instability. More specifically inside the 10⁻⁹ to 10⁻¹² atm O2 interval. The use of buffered mixtures enables generating reducing atmospheres under control.

** The flow is controlled by an external system. We advise the use of a mass flow controller (please contact us).

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