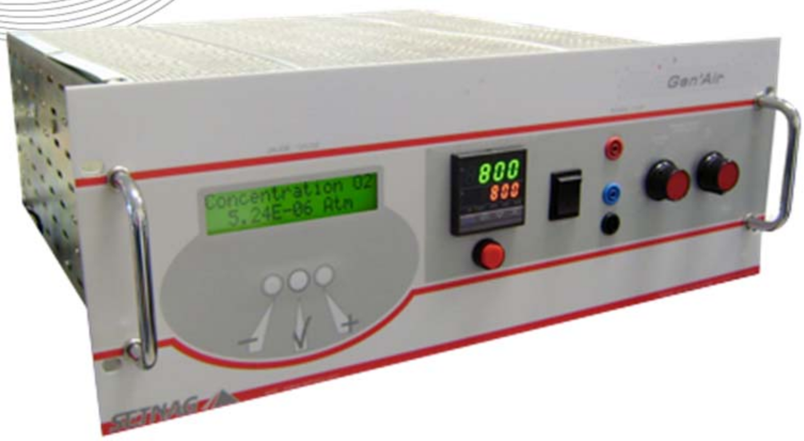
GEN'AIR

Oxygen pump-gauge



The GEN'AIR allows generating and measuring several different oxygen atmospheres. It's 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 partial pressure 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 $CO/CO_2/O_2$ or $H_2/H_2O/O_2$.

The gauge: it measures the partial pressure generated by the pump.
Thanks to the MicroPoas[1] its response time is very fast and it gives extremely accurate measurements.

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

- ***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***

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:

The gauge is placed after the pump; it enables validating 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:

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

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

Example of performances

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

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

Technical features

Measurement range	10^{-35} to 0.25atm*
Necessary flow	1 to 12 l/h**
Output signals	0-20mA or 4-20mA, linear, with galvanic insulation RS232 port
Dimensions	430x170x430 mm (wxhxd)
Weight	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^{-8} 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.

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