Oxygen Measurement and Analysis

Solutions to protect processes, reduce costs and maintain quality

MICHELL Instruments

Oxygen Measurement and Analysis

A comprehensive range of oxygen analyzers and transmitters from experts in control instrumentation

Precise measurement of oxygen is critical for processes in many industries, ranging from the purity of industrial gases and protecting against leaks in glove boxes to monitoring flue gas for optimum combustion efficiency. Because the requirements of the various applications are very different, Michell offers ranges of analyzers to ensure that you can always select the best technology for your application.

Why choose Michell?

With an oxygen analyzer from Michell Instruments you get:

- Control over your process for safety, quality and to meet legislation.
- Low cost of ownership – the analyzers are designed for minimum maintenance.
- Support from a world-wide network of engineers.
- Confidence in a company that has been providing solutions in process control and measurement for over 30 years.
- The right measurement technology for your application.

Typical Applications

- Inerting reactors or vessels
- Argon or Nitrogen purity
- Combustion control on boilers and incinerators
- Cylinder filling and bottling plants
- Marine inert gas generation
- Carbon-dioxide purity in breweries
- Annealing furnaces

Customers

Michell's customer base for oxygen analyzers includes leading companies in industries ranging from Industrial Gas, Chemical, Power, Compressed Air, Petrochemical and Marine.

We also work with many smaller enterprises that rely on our market expertise. Due to the high degree of customization available we are able to meet their specific needs in many applications.

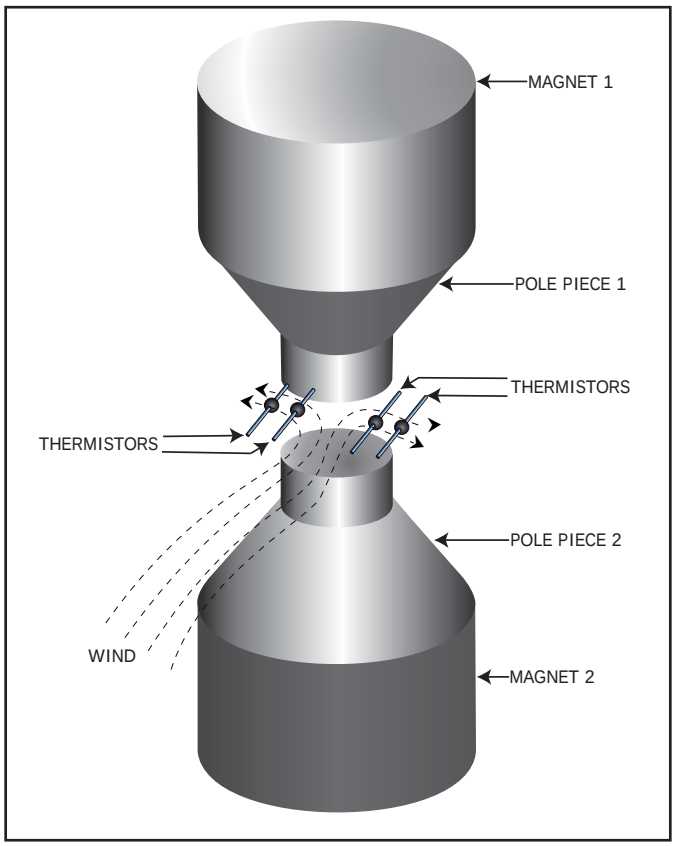
Customer reference list available.

Sensor Technologies

Thermo-Paramagnetic

Michell's Thermo-Paramagnetic sensor uses a combination of paramagnetic and thermal conductivity techniques to accurately measure the oxygen content within a process gas.

Oxygen is a paramagnetic gas, which means that it is attracted to a magnetic field. It is this property that can be exploited to help determine the level of oxygen in many background gases. The magnetic susceptibility of oxygen decreases inversely with its temperature, so Michell's thermo-paramagnetic analyzer uses a temperature-controlled measuring chamber to create a flow of the process gas (known as a 'magnetic wind') between a pair of thermistors. This 'magnetic wind' alters the equilibrium temperature between the thermistors and the resulting change in the electrical resistance produces a signal that is proportional to the oxygen concentration in the sample gas.



Thermo-paramagnetic cell showing magnetic wind

Advantages:

- The thermo-paramagnetic sensor has no moving parts and its operation is not affected by shocks or vibrations.
- Resistant to corrosive sample gases.
- Highly stable measurements
- Excellent balance of price and performance
- Compact design (especially for Hazardous Areas)

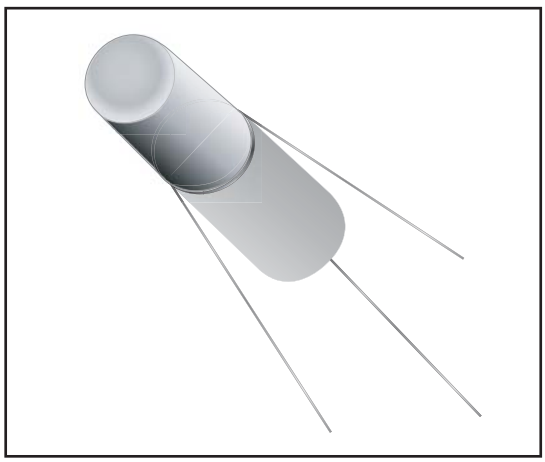
Instruments: XTP600GP, XTP600EX

Sensor Technologies

Metallic Sealed Reference Sensor (MSRS) (Zirconium-oxide)

Zirconium oxide sensors are based on the principle of a solid-state electrochemical cell. A yttria-stabilized zirconium oxide layer is heated to around 600°C. This allows oxygen ions to pass through the disc (similar to osmosis) from a high concentration to a lower concentration. The movement of ions produces an electro-motive force which is used to determine the oxygen concentration.

Michell's zirconium oxide sensor contains a metallic sealed reference which eliminates the need for a reference gas. The sensor technology was developed to measure oxygen levels in gas from volcanoes so is robust enough to withstand extreme heat and highly corrosive gases. These properties make it very effective for high-temperature applications (up to 1300°C) such as flue-gas analysis, which saves on fuel and reduces emissions.



Metallic sealed reference sensor

Advantages of MSRS:

- Operates effectively in high temperatures and harsh environments.
- Long sensor lifetime compared to electro-chemical cells and other zirconia sensors.
- Fast response due to its miniature size – within seconds for 90% of a step-change.
- Resistant to pollution and very low drift.
- Single calibration gas requirement.

Instruments: XZR400WM, XZR400RM and XZR500

Product Guide

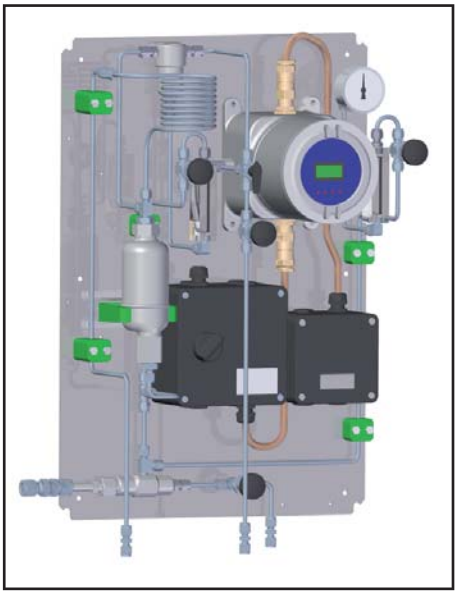
Process Oxygen Analysis

XTP600

The XTP600 process oxygen analyzer can help to increase safety and enhance product quality. Based on the Thermo paramagnetic principle, it is rugged and reliable and gives precise measurements of oxygen in process gases. Typical applications include oil tanker or reactor blanketing, process control, natural gas monitoring, oxygen generator quality.

- Excellent stability
- Cost effective solution
- No consumable sample cells
- Compact design and very easy to install.
- Hazardous area version available.
- Sample handling system available (OS600).

XTP600 Thermo-paramagnetic analyzer



XTP600 with OS600 sample system for misty gases

OS600

The OS600 is a configurable and modular approach to sample handling which is designed to condition the gas before it reaches the XTP600 – this is essential to ensure that the analyzer is not damaged. Building on extensive experience producing moisture and hydrocarbon dew point sampling systems for the Condumax, Promet and Liquidew ranges, Michell's systems engineering department is uniquely qualified to create oxygen sampling systems that take into account both the application and site-specific conditions for each customer.

- Customized design for your site
- Modular design for shorter lead times
- Hazardous Area version available
- FAT and commissioning service available

XTP600 with basic system

Product Guide

Combustion Control

XZR500 sensor head with probe and control unit

XZR500

The XZR500 oxygen analyzer is designed to determine the amount of excess of air required for optimum combustion control. It also uses the MSRS technology to measure levels of oxygen in harsh conditions such as boilers, incinerators and furnaces.

- MSRS technology
- Reliable and repeatable measurements
- Simple to maintain, easy to calibrate
- Robust design
- Quick and easy to install
- Simple to use
- Multiple probe material options for different applications.
- No Aspirator or Reference air required for operation.

Trace Oxygen Analysis for Industrial Gases

Two models are available – a wall mounted analyzer and a 19" rack-mount version.

XZR400

The XZR400 oxygen analyzer detects trace oxygen in background gases. It is designed for applications in industrial gas production – such as Nitrogen, Argon, Helium and Carbon Dioxide. Based on the MSRS Zirconia sensor, its fast response time enables users to respond quickly to leaks and prevent contamination.

- MSRS technology
- Super-fast response time
- Simple and easy operation
- Low maintenance and cost of ownership
- No need for instrument air
- High accuracy with built-in pressure compensation
- Highly stable sensor

Michell Instruments operates in the following markets:

- Compressed Air Dryers
- Pharmaceutical
- Standards Laboratories and Metrology
- Semiconductors
- Natural Gas and Petrochemicals
- Industrial and Pure Gas Production
- Power Generation

Other Product Ranges

Dew-Point Transmitters
Michell offers the widest range of dew-point sensors and transmitters on the market. From the industry standard Easidew 2-wire transmitter to the new, rugged Easidew PRO IS for hazardous areas, all are supplied with sensors traceable to national standards.

Portable Instruments
Michell's range of easy-to-operate portable instruments provides fast, accurate and stable measurement of dew point, relative humidity and moisture concentration. They are designed to satisfy the most demanding industrial conditions, and are unique in the market for giving repeatedly fast response to low dew points.

Chilled Mirror Instruments
Chilled Mirror is a fundamental measuring technology offering the user exceptionally accurate, reliable and repeatable measurements from trace moisture to high humidity. Michell offers a range of instruments based on a rugged sensor design that is equally suitable for installation in demanding process environments or for use as an accurate reference instrument in a National Standards Laboratory.

Process Analyzers
Michell's range of analyzers is specifically designed to provide reliable online measurement in process applications such as dedicated water and hydrocarbon dew-point determination in natural gas. Three sensing technologies are used: the Ceramic Impedance sensor for measurements in gas and liquid phase; Quartz Crystal Microbalance for trace moisture in process gases and the Dark Spot Chilled Mirror for hydrocarbon dew point.

Calibration Instruments
Michell has a wide offering of calibration equipment for the verification of trace moisture, dew point and relative humidity sensors. A modular concept means that Michell's engineers can build a customised calibration solution that meets your exact needs. Components may include air compressor and dryer; low range or high range humidity generator; simple sensor housing or environmentally controlled test chamber and finally, verification using a traceable Michell Chilled Mirror Hygrometer.

Relative Humidity Instruments
Michell's own RH sensing technology provides excellent resolution, long-term stability and speed of response. We offer a wide range of humidity and temperature measuring sensors and instruments, including relative humidity transmitters, humidity and temperature transmitters as well as handheld indicators. The humidity generator range includes the most stable humidity generator on the market.

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Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
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