

# XTP600 Series

## Oxygen Analyzer for Safe or Hazardous Areas

A robust, linear and stable oxygen analyzer for measurements in gases such as hydrogen, nitrogen or air. The sensor is housed in an explosion-proof casing, making it suitable for a wide range of applications in hazardous areas.



### Highlights

- Compact and rugged design
- Best-in-class accuracy of better than 1% FS allows re-ranging with no need for re-calibration
- Best-in-class zero or span stability: better than 0.25% of span per month
- Increased protection against contamination
- A local display in an EExd enclosure with an isolated output allows flexible installation options.
- Lowest cost of ownership due to minimal maintenance
- Ranges available: 0-1% up to 0-25% & 90-100%

### Applications

- Oxygen measurement at inlet of compressors in steel or gas industries to monitor safety
- Biogas, waste, landfill and digester plants
- Inert gas for pharmaceutical industry
- Monitoring inert blanketing gases in oil tankers
- Furnace gas control in steel industry
- Hydrogen coolant in electricity turbines
- Catalyst regeneration
- And many more...

## Michell XTP600 Oxygen Analyzer for Safe or Hazardous Areas

When a process oxygen application demands high accuracy and stability, along with lowest maintenance cost, paramagnetic oxygen technology is usually preferred. If, in addition, the application calls for a rugged and reliable, corrosion resistant analyzer, the thermo-paramagnetic principle of Michell's new XTP600 series makes it the instrument of choice.

The XTP600 series oxygen analyzers from Michell Instruments are designed to measure the percentage of oxygen in process gases. Using thermo-paramagnetic technology, the sensor is reliable and highly stable. The XTP600 is housed in an explosion-proof case and is rated ATEX Zone 1 for use in hazardous areas. For installation in non-hazardous areas a general purpose version is available.



### Features

#### Excellent accuracy

The analyzer is ranged specifically to customers' needs so as to offer the best accuracy where it matters. For instance, in a 0-1% range the XTP600 is accurate to  $\pm 0.02\% \text{ O}_2$ .

#### Higher sensor stability reduces calibration costs

Thermistors that operate at elevated temperatures, such as in measurement circuits of traditional thermo-paramagnetic sensors, tend to drift, thus degrading the sensor stability. The innovative sensor of Michell's XTP600 analyzer largely eliminates thermistor drift, dramatically improving the stability of the measurement to values that are up to four times better than comparable sensor cells.

#### Reliable long-term performance

Unlike magneto-dynamic oxygen sensors the thermo-paramagnetic sensor has no moving parts, making it insensitive to vibration and movement and highly resistant to drift. It is ideal for installation in areas where vibration could affect the moving parts of other kinds of sensor, making it suitable for on-board installation on oil tankers, or in close proximity to compressors and turbines.

#### Non-depleting technology

The sensor does not require routine replacement and is not poisoned like electro-chemical cells. The cell performance is consistent and does not drift as it is not consumed by the process.

#### Easy installation with local display for use in hazardous areas

The XTP600 series provides an isolated 4-20mA output and is housed in a robust and weather-proof casing, allowing the analyzer to be placed at the point of measurement. Local display is standard without any extra cost.

The XTP600 series is ATEX certified to area classification EEX d IIC T4.

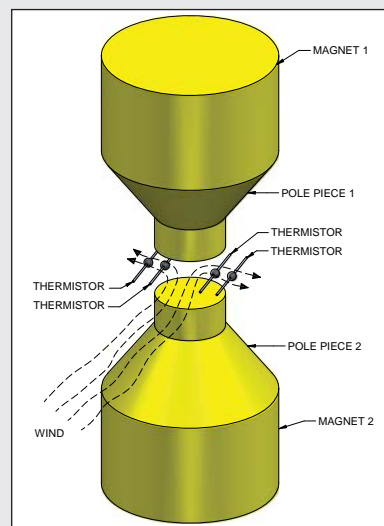
#### Easy to maintain – lowest cost of ownership

The casing unscrews to allow for easy access to the sensor, enabling maintenance of the modular components to be carried out quickly and efficiently.

### Technology Thermo-Paramagnetic Sensor

Oxygen is a paramagnetic gas, which means that it is attracted by a magnetic field. This magnetic susceptibility is much greater than that of most other gas molecules and therefore this physical property is ideal for the determination of the level of oxygen in a wide range of background gases.

The XTP600 series is a thermo-paramagnetic oxygen analyzer where the combination of paramagnetic and thermal conductivity technology is exploited to accurately measure oxygen. The magnetic susceptibility of oxygen decreases inversely with its temperature. This effect causes a flow of gas containing oxygen inside the temperature-controlled measuring chamber of the analyzer. The flow or "magnetic wind" alters the equilibrium temperature between thermistor pairs resulting in a change of the electrical resistance of the sensors and a signal that is proportional to the oxygen concentration in the measured gas.



Assembly, showing the flow of magnetic winds

In addition to the stability of the Michell XTP600 sensor, the insensitivity to mechanical shock is another advantage of the thermo-paramagnetic technology. As it relies solely upon fluctuations in magnetic fields and not internal moving parts, the sensor will operate efficiently under a wide range of environmental conditions. It is suitable for installation where vibration or movement could pose a problem for other sensor types.

## OS600 Premium Sample Handling System for the XTP600

Oxygen analyzers invariably require a clean, dry gas that is free from particulate and at a certain temperature and pressure. In the real world, the process gas to be measured almost never fulfils these requirements.

Michell Instruments offer a complete solution for this problem: The XTP600 and OS600 Sample Handling System.

This modular system is constructed in consultation with customers to ensure the best possible solution for each individual application.

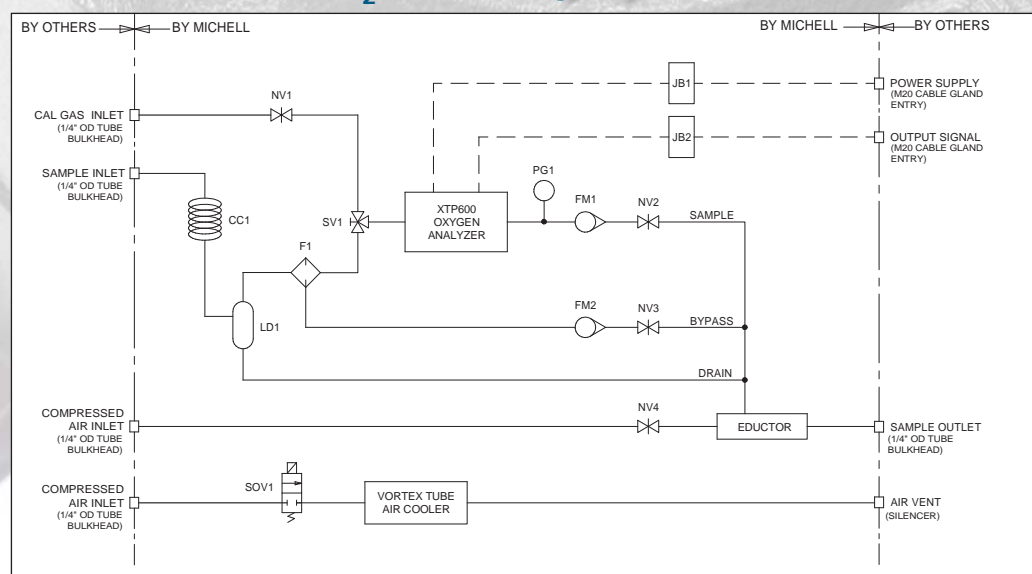


OS600 sampling system

### Sampling system features:

- Customized design to meet clients' actual needs
- Safe and hazardous area systems available
- Complete solution for easy integration
- Varying mounting options from open panel to stainless steel enclosures
- Quality components and materials from well known suppliers
- FAT & commissioning service available
- Full documentation and drawings supplied

### Flow Schematic for O<sub>2</sub> in natural gas



The sampling system shown is for use with 'misty' gases sampled in a hazardous area. It is one of the more complex sampling systems available.

The use of an eductor negates the issues of using a pump with hydrocarbons and reduces cost. There is also a vortex cooler to keep the system cabinet cool.



## Technical Specifications

Performance	
<b>Measurement Technology</b>	Thermo-paramagnetic oxygen sensor
<b>Gas</b>	Process and non-condensing sample
<b>Measurement Range</b>	Selectable from 0-1% to 0-25% oxygen and 90-100% (other ranges available on request)
<b>Accuracy</b>	< ±1% of span for all ranges except ±2% for 0-1% and 0.2% O <sub>2</sub> for 90-100%
<b>Response Time (T90)</b>	Standard response: 70 seconds, EN 50104: 45 seconds.
<b>Repeatability</b>	±0.2% of span
<b>Linearity</b>	±0.5% of span for ranges greater than 0-5% < ±1% of span for ranges less or equal to 0-5%
<b>Zero Stability</b>	±0.25% of span per month
<b>Span Stability</b>	±0.25% of span per month
<b>Sample Flow Rate</b>	0.3 l/min for the sensor cell
<b>Maximum Sample Pressure</b>	Atmospheric to maximum of 3 barg (43 psig)
<b>Maximum Sample Temperature</b>	55°C max (45°C for standard cell)
Electrical input/output	
<b>Output Signal</b>	One isolated (galvanic) 4–20 mA output (for O <sub>2</sub> concentration)
<b>Output Ranges</b>	0-1%; 2%; 5%; 10%; 25%; 90-100%
<b>Alarms</b>	Two concentration alarms (open collector)
<b>Display Resolution</b>	0.01%
<b>Power Supply</b>	24 V DC; 1.5 A max

### Operating conditions



**Ambient Temperature Range** 0°C to +55°C. (45°C for standard cell)

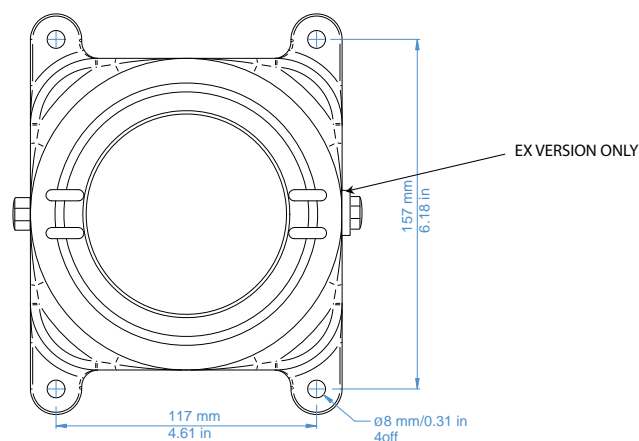
### Mechanical specification

<b>Warm-up time</b>	1 hour
<b>Dimensions</b>	180 x 140 x 213mm (8.4 x 5.6 x 7.1 in) (h x w x d) Allow 100mm on all sides for gas connections and cable entries.
<b>Weight</b>	6.3kg (13.9 lbs)
<b>Wetted Material</b>	AISI 316 and Viton®
<b>Gas connection</b>	1/4"NPT female
<b>Enclosure ingress protection</b>	IP66. Flame arrestors are supplied for hazardous area applications.

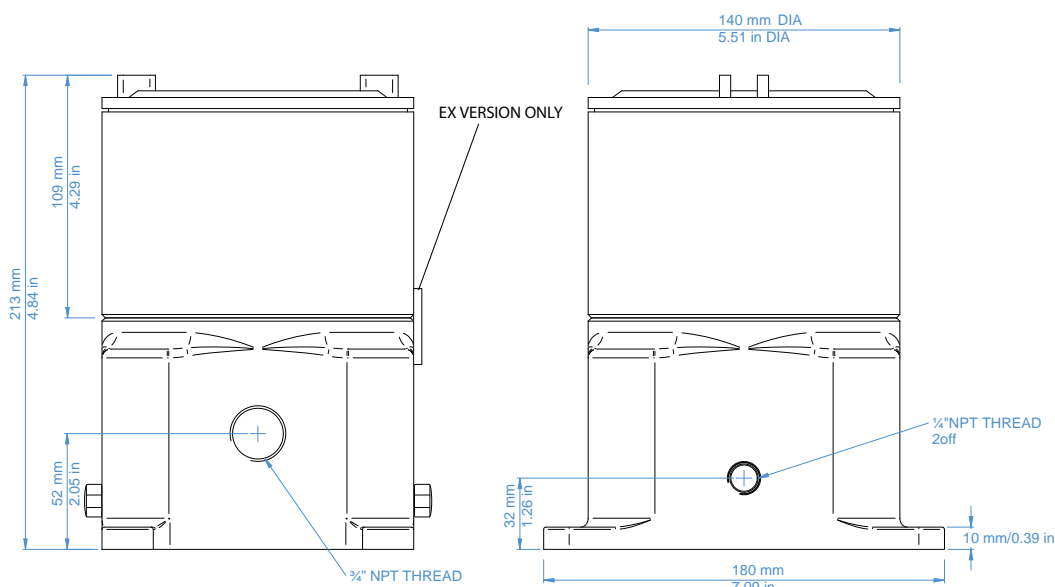
### General

**Hazardous area certifications**

 II 2 G Exd IIC T4 Gb  
 II 2 D Extb IIIC T135°C Db IP66  
 T Amb -50°C/+60°C



## Dimensions



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

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