

# XZR400 Series

## Oxygen Analyzers

A range of trace oxygen analyzers utilizing Michell's Metallic Sealed Reference Sensor (MSRS) technology. Designed to measure O<sub>2</sub> as an impurity in pure inert gases such as N<sub>2</sub>, CO<sub>2</sub>, He, Ar and Kr. The XZR400 can also be used for cylinder filling and other applications where a precise measurement of oxygen is required. There are 4 different chassis to choose from and various internal options including pumps, flow alarms and digital communications to match customer needs.



### Highlights

- Fast response time
- Simple and easy operation
- Low maintenance and cost of ownership
- No need for reference air
- Barometric pressure compensation
- Multiple Outputs available from 4-20 mA, RS485 Modbus RTU and RS232
- Rack, wall-mount, bench-mount, and transportable versions available
- Optional built-in Easidew Transmitter with rack-mount version

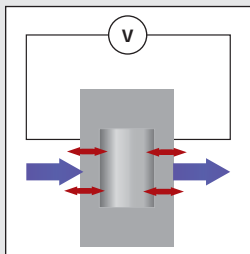
### Applications

- Gas quality measurements
- Environmental control applications
- Control of pure gas for semiconductor and nuclear industries
- Control of gas purity for industrial gas manufacturers
- Tracing leaks in glove boxes
- Measuring oxygen traces in Carbon Dioxide for breweries
- Heat-treating applications such as galvanizing furnaces
- Simulation in laboratories

# Michell XZR400 Series Trace Oxygen Analyzers

## MSRS Technology

The MSRS (Metallic Sealed Reference Sensor) technology was developed from a sensor originally designed for ultra harsh applications in volcanoes. The innovative design with the fast speed of response and long life-time makes it the technology of choice for oxygen measurement in a range of applications such as industrial gas purity.



The MSRS responds quickly to oxygen and has a T90 of under 11 seconds. Another benefit of having a sealed reference is that measurements can be made without a reference gas and independent of the quality of the surrounding air. The analyzer is virtually drift-free, extending calibration interval time.

In field tests, the drift of MSRS was found to be less than 140 ppb in one month for concentrations of oxygen at 1 ppm. Compared to other sensors which required weekly calibration, MSRS technology proved superior.

The XZR400 Series from Michell Instruments is designed to detect trace oxygen in clean gases, such as nitrogen, argon, helium, and carbon dioxide, to monitor purity both in production and when used in processes.

The XZR400 series rapidly detects trace amounts of oxygen. It is an ideal instrument for detecting leaks and reacts quickly to avoid costly contamination of the pure product.



## Highlights and Benefits

### Fast response time

Due to its miniature size and unique design, the MSRS Technology sensor of the XZR400 Series responds to input changes in less than 11 seconds.



### Simple and easy operation

The intuitive touch screen offers two operation levels with a basic mode for daily work and an expert mode that can only be used by authorized personnel with an access code - preventing accidental or unauthorized operation. The operation follows the NAMUR recommendation.

### Low maintenance and cost of ownership

MSRS technology-based sensors have an extremely long life expectation and are very easy to calibrate using dry air. For simplicity, Michell offers an optional Auto Calibration facility in addition to a choice of calibration kits.

Due to the highly stable nature of the sensor, calibration is only required once or twice a year allowing for significant cost savings.

### No need for instrument air

MSRS Technology based sensors do not require reference air to be connected to the reference side of the sensor. The analyzer can be calibrated using just a single reference gas.

### High accuracy with built-in pressure compensation

Pressure has a significant influence on oxygen measurements. The XZR400 maintains high accuracy of less than 2% of reading across the full range due to the built-in atmospheric pressure compensation (system pressure influence can be compensated via the external pressure sensor input).

### Minimal sample requirements

Due to the size and construction of the cell, only 2 l/hr sample is required – as opposed to other units requiring up to 1 l/min.

### Highly stable and drift free

All MSRS technology-based sensors are resistant to pollution and operate virtually drift free. This positively impacts on both the maintenance and calibration costs.

## XZR400 Range

The 4 chassis types available offer maximum flexibility and ease of use in many different applications.

### XZR400-RM

XZR400 rack mount comes in a 3U high, 19" rack mount chassis and is supplied with 2 off 4-20 mA outputs and ModBus RS485 as standard.



### XZR400-WM

XZR400 wall mount is primarily designed for cylinder filling or applications where the analyzer needs to be mounted as close to the process as possible.



### XZR400-BM

Transportable version with a carry handle and rubber feet for use in laboratories or processes where multiple sample points are required.



### XZR400-PT

Essentially this is an XZR400 wall mount in an aluminium flight case designed to be protected in transport when moving between sites.



## Available Options for the Range

Each unit comes with a variety of standard and optional features, the table below gives a quick reference:

Feature	XZR400-RM	XZR400-WM	XZR400-BM	XZR400-PT
1st 4-20 mA analog output	✓	✓	Option	✓
2nd 4-20 mA analog output	✓	Option	Option	Option
2 threshold alarms and 1 general fault alarm	✓	✓	Option	✓
RS485 digital output	✓	Option	Option	Option
RS232 digital output (instead of RS485)	Option	Option	Option	Option
Integrated pump	Option	×	×	Option
Pump in a separate housing	×	Option	×	×
Auto adjustment	Option	Option	×	×
Total pressure correction	Option	Option	Option	Option
Wider range beyond 25%	Option	Option	Option	Option
Automatic commutation of the scale	Option	Option	Option	Option
Contact for abnormal flow	Option	Option	Option	Option

✓ = Standard  
 × = Unavailable

## Appendix A Technical Specifications

Sensor Type				
Measurement Principle	Zirconium Oxide Sensor with Metallic Sealed Reference and S Type thermocoupe			
Performance				
Gas	Clean, dry, oil free with particles less than 3 µm			
Measurement Range	0.1 ppm up to 25% O <sub>2</sub> Extended ranges available up to 0 to 100% O <sub>2</sub>			
Lowest detectable limit (LDL)	0.1ppm(v) O <sub>2</sub>			
Accuracy (Intrinsic Error)	Less than 2% of reading			
Response Time	< 11 seconds			
Repeatability	±0.1% of reading			
Stability	1% per month			
Linearity	Better than ±1%			
Drift	<1% of reading per week			
Sample Flow Rate	1 to 3 NI/h with built-in fast loop			
Maximum Sample Pressure	2 barg (29 psig)			
Maximum Sample Temperature	+100°C (+212°F)			
Atmospheric Pressure Compensation	Built-in as standard			
Optional sensor				
Moisture sensor	Easidew sensor can be fitted as an option. Please, see a separate datasheet for full specifications.			
Measurement range	-100 °C to + 20 °C			
Sample Flow rate	60 to 300 NI/hour			
Outputs				
Analog Output	0, 1 or 2 off 0/4-20 mA Linear with Galvanic Isolation output			
Digital Communications Output	Modbus RTU over RS485 protocol (Standard on XZR400A1) RS232 output (optional)			
Output Load	Over 1,000 Ω			
Self-Diagnostics	Via HMI			
Output Ranges	0.0 ppm to 1ppm up to 0 to 25% O <sub>2</sub> Extended ranges available up to 0 to 100% O <sub>2</sub>			
Alarms	2 threshold alarms, freely configurable 1 general fault alarm including flow alarm 1 flow alarm (optional)			
Display Resolution	0.01 ppm between 0.1 ppm and 10 ppm 0.1 ppm between 10 ppm and 10,000 ppm 0.01% between 1 to 10% 0.1% between 10 to 25%			
Power Supply	90 to 264 V AC, 47/63 Hz			
Power Consumption	50 VA			
Operating Conditions				
Ambient Temperature Range	0 to +55°C (+32 to +131°F)			
Sensor Temperature	Optimized at 634°C			
Operating Humidity	5 to 90% RH without condensation			
Mechanical Specification				
Model	Dimensions	Weight	Gas Connectors	Ingress Protection
Rack mount:	19", 3U, 482.5 x 133 x 371.5mm	10kg	1/8"	IP20
Wall mount:	200 x 220 x 290mm	5kg	6 mm	IP40
Bench mount:	290 x 260 x 236mm	5.2kg	6 mm	IP20
Transportable:	450 x 300 x 330mm	13.5kg	6 mm	IP40
Sample Gas Connections	All gas connections are Swagelok (MALE) Fittings (316 SS)			

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