ZR800 Process Oxygen Analysers

ZR810
Bench/Panel Mount
190H x 237W x 410D (mm)
7.9 kg

ZR820
IP66/NEMA 4X
Wall Mount/Weatherproof
460H x 380W x 160D (mm)
15.5kg

ZR830
Rack Mount 4U - 19 inch
Houses 1 or 2 Analysers
178H x 484W x 410D (mm)
9.7kg (single unit)

Technical Specifications

Range	Autoranging from 0.1ppm to 100%
Accuracy (after calibration)	±2% of reading ±0.2ppm at constant temperature
Stability	Better than ±2% of reading per month
Repeatability	Better than ±2% of reading
Response Time	90% of step change within 5 seconds
Measuring Cell Type	Stabilised zirconia sensor

Operating Conditions

Sample Inlet Pressure	0.25 to 4 Barg
Sample Flow Rate	Approximately 150cc/min
Sample Temperature	-5 to 50°C
Ambient Temperature	-5 to 50°C
Sample Humidity	0-99% non-condensing
Sample Connections	1/8” OD compression fitting
Communications	USB/RS232/RS485
Unsuitable Gases	H_2S, Ammonia, Corrosive gases, Hydrocarbons, Combustibles, Hydrogen, Carbon Monoxide, NO_2, Halogens, Halogenated Hydrocarbons, Sulphur containing compounds, Lead containing compounds. **Note**: Optional version for use with gases containing low ppm levels of hydrocarbons, combustibles, hydrogen and carbon monoxide for high purity analysis.

Power Requirements

Power Supply	90-260 VAC, 50/60 Hz, 80 VA, 24 VDC version option.
Display Type	4 digit high visibility LED

Options

High/Low Alarms	2 Volt free changeover contacts. Rated 240VAC / 5A
Analogue Outputs	Scaleable 4-20mA, 0-20mA, 0-10V, 0-100mV, all isolated, optional for one channel or three
Autocalibrate	Provision for remote calibrate start and autocal in progress
Sample Stream Options	Bypass flowmeter, Sample pump, Flow alarm, Stainless steel sample system in place of brass/copper.
Nitrosave	O_2 measurement and control system ZR8500

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ZR800 Process Oxygen Analysers

The ZR800 Oxygen Analysers offer unsurpassed accuracy, reliability and flexibility under the most demanding on-line operating conditions.

Features & Benefits

- Non depleting, maintenance free, oxygen sensor
- Ambient air or traceable gas calibration
- Microprocessor controlled functions
- Extremely fast response
- Sturdy, reliable construction with three mounting options
- Large, autoranging LED display
- Unaffected by vibration or position
- Specific to oxygen
- New hydrocarbon tolerant version for ultra high purity analysis
- 24VDC version

Unmatched Speed in High Performance On-Line Oxygen Analysis

Applications

Electronics

Solder Powder Production

Semiconductor Furnaces

Gas Quality

Metals

Heat Treating / Annealing

Steel Production

Pure Metal Production

Pharmaceutical

Inert Packaging

Fermentation

Vessel Blanketing

Process

Ceramics

Contact Lens Manufacturing

Food Packaging

Glass/Fibre Optics

Inert Gas Welding

Lamp Manufacturing

Solar Cell Manufacturing

General

Gas Production

Controlled Environments

Glove Boxes

Oxygen Deficiency

Research & Development

Unmatched Performance

Fast. Accurate. Reliable. Flexible. These characteristics are found in Systech's process oxygen analysers. The ZR800 Series Oxygen Analysers are capable of measuring from 0.1ppm up to 100% oxygen in most industrial gas streams. With a response time and accuracy unparalleled in the industry, the ZR800 has found wide acceptance in the electronics, semiconductor, food processing, and gas manufacturing industries. These microprocessor controlled instruments have user-friendly menu driven software to customise the analyser to meet your requirements. The ZR800 series is specifically designed to provide ultra fast oxygen analysis and performance you can count on.

Cabinetry & Mounting

Three different configurations to match your needs.

- Panel or bench mount
- NEMA 4X / IP66 waterproof and weatherproof
- 19 in. rack mount

Operator Interface /Diagnostics

- User-friendly menu
- Read-only mode available
- Diagnostic capabilities
- Fault alarms

Sampling Systems

- Bypass flowmeter
- Pressure regulator
- Sample pump
- Flow alarm
- Auto Calibration
- Cartridge Filter Kit

Outputs & Alarm Options

For charting, process control, or remote monitoring.

- USB and RS485, standard
- Analogue outputs (one or three channels), optional
- High / low alarms, optional
- Fault alarm, standard

Precision Sensors

All ZR800 Oxygen Analysers utilise precision Zirconia Oxide sensors for accurate detection of oxygen.

ZR810

ZR820

ZR830

Basic Principle of Operation

The oxygen detection cell is a high purity, high density, stabilised zirconia ceramic. The sensor produces a voltage signal relative to the oxygen concentration of the sample gas stream. The cell's logarithmic output is converted and linearised by a high speed microprocessor to provide a direct digital readout on the instrument's LED display.

Zirconia Oxide Sensor Theory

The conventional zirconium oxide cell consists of a zirconium oxide ceramic tube plated with porous platinum electrodes on its inner and outer surfaces. As the sensor is heated above 600°C, it becomes permeable to oxygen ions (O_2^-) with vacancies in its crystal lattice structure permitting their mobility. Because of this, the sensor becomes an oxygen ion-conducting electrolyte.

The electrodes provide a catalytic surface for the change in oxygen molecules, O_2, to oxygen ions, and oxygen ions to oxygen molecules. Oxygen molecules on the high concentration reference gas side of the cell gain electrons to become ions which enter the electrolyte. Simultaneously, at the inner electrode, oxygen ions lose electrons and become released from the surface as oxygen molecules.

When the oxygen concentration differs on each side of the sensor, oxygen ions migrate from the high concentration side to the low concentration side. This ion flow creates an electronic imbalance resulting in a DC voltage across the electrodes. This voltage is a function of the sensor temperature and the ratio of oxygen partial pressures (concentrations) on each side of the sensor.

The relationship between the oxygen concentration of the unknown gas, the oxygen concentration of the reference gas (typically air which is 20.9% oxygen by volume), the temperature, the voltage output, and the cell constant is defined by the Nernst Equation which states:

$$E(mV) = \frac{RT}{4F} \log \frac{O_2 \text{ Ref. gas}}{O_2 \text{ Sample}}$$

Where: R = gas constant
F = Faraday's constant
O_2 Ref. gas = partial pressure of oxygen in air
O_2 Sample = partial pressure of oxygen in sample gas
T = absolute temperature of Zirconia sensor