Cambridge Sensotec Ltd

Rapidox 3100A Dual Gas O_2 / CO_2 Analyser

Description

The Rapidox 3100A dual gas O_2 / CO_2 analyser allows fast and accurate oxygen analysis over the full oxygen range ($10e^{-20}$ppm to 100% O_2) and a range of CO_2 concentrations up to 100%. The Rapidox 3100A analyser provides continuous on-line analysis, with a typical response time less than 5 seconds for a 90% response to a step change oxygen gas compositions and 30 seconds for a 90% change in CO_2 concentration.

At the heart of the Rapidox 3100A is a top-of-the-range linear-piston vacuum pump manufactured by Nitto; a world leader in pump technology. The pumps are exceptionally quiet (40 dB/m or less). The flow of gas can be adjusted using the flow gauge / needle valve on the front panel of the analyser. Typical flow rate is 1 litre per minute

The oxygen sensor head is located inside the analyser and comprises a zirconia ceramic tube that needs to be heated to 650°C before it will conduct oxygen ions. An internal pressure sensor compensates for small changes in gas pressure to keep the readings stable. The CO_2 sensor is based on infra-red NDIR silicon based chip technology with unique internal referencing. The module is exceptionally stable and requires no maintenance or calibration.

The analyser is packed with features including fully programmable alarm circuits, programmable analogue outputs, easy calibration (user selectable gases), RS232 / RS485 communications, independent type K thermocouple and a full set of communications / data-logging software. Full data logging of O_2 & CO_2 together with temperature and pressure is possible using the MS-Excel compatible logging software

Features

- Continuous dual-gas sampling via powerful internally located linear piston pump
- Flow rate controlled by needle valve / flow gauge on front panel
- Very fast O_2 measurement response (around 5 seconds for a 90% response).
- Full O_2 measurement range available ($10e^{-20}$ ppm to 100% oxygen).
- User-specified CO_2 ranges available from 0-5% to 0-100%
- Independent type K thermocouple fitted as standard. Range 0-1250°C.
- Easy to calibrate by the user using ANY TWO gases.
- RS232 / RS485, 0-5V and 4-20mA current loop outputs (both user programmable).
- Windows data logging software with MS-Excel compatible graphing.
- Programmable alarms (low and high condition) with outputs and visual warning.
- Internal pressure sensor fitted for automatic pressure correction

Applications

- Laboratory scale furnace experiments where the control and monitoring of residual oxygen and carbon dioxide is critical.
- Sampling oxygen levels in rooms where asphyxiation may be a hazard. E.g. in rooms containing liquid nitrogen dewars
- Monitoring vehicle emissions and pollution control
- Industrial processes using low oxygen environments. E.g. wave soldering under nitrogen, vacuum welding, testing nitrogen generators
- Monitoring of the combustion process in lean-burn applications
- Control of critical oxygen atmospheres where high partial pressures are required.
- Food production
- Testing the purity of inert gases such as argon and nitrogen

Technical Data: Analyser

Voltage	110 / 220V ac 50/60 Hz
Analyser dimension	360mm X 410mm X 150mm
Weight	5 kg
Display	16 X 2 character (9mm) back lit
Warm up time	3-4 minutes at 20°C
Sample pump	Mains powered linear piston pump
Normal operating temperature	5-35°C
Outputs	0-5V logarithmic (user programmable) 4-20mA logarithmic (user programmable) RS232: data streamed every 0.1 second
Calibration (oxygen sensor only)	Requires 2 user-selectable gas compositions (air is default plus another)
Thermocouple	Type K fitted to standard compensated plug Range 0-1250°C accuracy ± 1%

Technical Data: Sensors & Pump

Maximum free air displacement	7 litres per minute (0.28 cfm)
Noise level	40dB (max) at 1 meter
Maximum inlet temperature	55°C
O_2 sensor life expectancy	> 35000 hours
O_2 range of measurement	$10e^{-20}$ ppm to 100% O_2
Response time (gas flow rate 1ltr.min^{-1})	approximately 5 secs for a 90% step
Accuracy	± 1% of the actual oxygen concentration
CO_2 sensor range of measurement	0-5%, 0-10%, 0-20% OR 0-100%
CO_2 sensor accuracy	± 1.5% of Full Scale +3%
Response time (gas flow rate 1ltr.min^{-1})	Approximately 30 secs for a 90% step
CO_2 sensor life expectancy	> 10 years

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