

# Rapidox 2100 OEM-SIL2

**The Rapidox 2100 OEM-SIL2 is a high-performance zirconia oxygen (O<sub>2</sub>) analyser that is designed to meet the SIL2 requirements of IEC 61508/61511 under high demand use for safety integrity as part of a Safety Instrumented System (SIS). The analyser design uses two microprocessors that continuously monitor the state of operation, quality of readings and the integrity of the digital & analogue outputs and the alarm relays. The likelihood of a fault being undetected is reduced by several orders of magnitude compared with a non-SIL2 equivalent product.**

The compact design (4.5" x 3.0") allows integration into the tightest of spaces yet comes with the same performance specs and features of our existing analyser range. The analyser comes with a robust cabled zirconia sensor, which is ideal for providing fast and accurate remote in-situ gas analysis over the full oxygen range 10-20ppm to 30% O<sub>2</sub>.

Zirconia oxygen sensors are extremely rugged and particularly suitable for monitoring inert atmospheres and aggressive industrial applications directly within manufacturing processes such as additive manufacturing (3D printers), soldering ovens and furnaces. High temperature (650°C) and vacuum applications are particularly suited to this model. The SIL2 version is particularly suited to applications where there is an additional risk of human suffocation, and the sensor needs to be relied upon to warn correctly of the presence of a suffocating atmosphere. The SIL2 design shrinks the failure window where a dormant fault condition could exist from days or weeks to just a few minutes.



The Rapidox 2100 OEM-SIL2 analyser is supplied in a custom DIN rail enclosure with or without local display and keypad (these are for programming and not in the scope of SIL2). The sensor cable can be made to any length up to 25m and there are a choice of sensor mounting options including aluminium and stainless manifolds as well as vacuum fittings (ISO-KF and CF). It has fully programmable analogue (voltage and current) outputs and alarm relays as well as RS232 / RS485 digital signalling as standard. In addition to the standard Rapidox digital communications protocol and software, Modbus-RTU is included as standard. The analyser is designed specifically for seamless integration to PLC systems.

## SIL2 Features for this model include:

- A watchdog microprocessor (PIC) to monitor the operational health of the main program PIC
- Zirconia oxygen sensor signal sensor output and heater circuit are monitored for reliability
- Auto-test function set every ten (10) minutes to test alarm relay operation by injecting a false sensor signal without disruption to the attached equipment
- Multiple high-spec electrical alarm relays with built in redundancy
- Digital outputs tested for the flow of data without interruption
- Voltage (0-5V) and current (4-20mA) outputs checked for integrity
- Alarm indications such as sounder are continuously monitored for integrity
- Master alarm and Master relay added
- Set of LED status indicators (continuously integrity tested)
- Designed to meet the requirements of IEC 61508/61511 under high demand use

Though highly configurable to suit individual customer requirements, the Rapidox 2100 OEM-SIL2 product possesses a number of standard features to enhance functionality.

- SIL2 dual microprocessor design to meet the requirements of IEC 61508/61511
- Zirconia sensor supplied with bespoke cable
- Miniature 4.5" x 3" circuit board with DIN rail mount enclosure options
- Fast and accurate measurement of oxygen
- Pre-calibrated sensors for uninterrupted service
- Fully programmable analogue outputs
- Data logging software
- Two programmable alarm relays
- Type K thermocouple option (out of the scope of SIL2)
- 24Vdc 20W power
- Password protected menu system

## Applications



Additive Manufacturing



Metal Powder Processing



Solder Reflow Oven



Combustion



Glove Boxes



Metal Heat Treatment



Manufacturing



Inert Gas Blanketing



Forming Gas



Research & Development

## Accessories



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- 1 Calibration Kit
- 2 Multiplex Sampling System
- 3 Gas Recovery Bag
- 4 Thermal Printer
- 5 Calibration Service Gas
- 6 Filters

## SIL2 Specification - Meeting the requirements of IEC 61508/1511

<b>O<sub>2</sub> Sensor Range</b>	10 <sup>-20</sup> ppm to 30% Zirconia version. 10 <sup>-26</sup> ppm extended range available on request
<b>O<sub>2</sub> Sensor Accuracy</b>	±1% of the actual measured oxygen content OR 0.5ppm (whichever is the greater)
<b>Ambient Operating Temperature</b>	5-35°C 0-95% RH non condensing
<b>Ambient Operating Pressure</b>	800 to 1200mbar absolute
<b>Max Sample Gas Pressure</b>	Up to 10 bar gauge (200bar burst pressure)
<b>Temperature</b>	650°C
<b>O<sub>2</sub> Sensor Response</b>	4 seconds for a T90 step change @1L per min flow
<b>Life Expectancy</b>	>17,000 hours
<b>Sensor Cable</b>	2m high temp as standard. Any length up to 25m available on request
<b>Voltage</b>	24V VDC +/-10%
<b>Voltage Outputs</b>	0-5V (0-10V on request) - continuously self-tested under SIL2
<b>Current Outputs</b>	4-20mA - continuously self-tested under SIL2
<b>Digital Outputs</b>	RS232 / RS485 & Modbus RTU - continuously self-tested under SIL2
<b>Sample Connections</b>	Nipple or Swagelok
<b>Display</b>	OLED display & keypad on enclosure version (not in the scope of SIL2)
<b>Circuit Board Dimensions</b>	4.5" x 3" (114mm x 76mm)
<b>Weight</b>	<0.5kg in enclosure, OEM board 120g
<b>Power / Warm-up Time</b>	20W / 1-2 minutes at 20°C
<b>Alarms</b>	2 alarm relay circuits, fully user-configurable - self-tested every 10 minutes under SIL2
<b>Calibration</b>	Any 2 or 3 gases - Pre-calibrated Sensors available
<b>UL Compliance</b>	All paints, cables, wires, plastic materials etc are UL certified and marked
<b>Enclosure Materials</b>	painted aluminium
<b>Din Rail Option</b>	DIN Rail Mountable enclosure
<b>Functional Safety</b>	Meets the requirements of SIL2 under IEC 61508/61511