

# MODEL 4100



**Neutronics**  
Gas Analysis Solutions

## Trace Oxygen Analyzer Compact Series/High Purity



### Wide Ranging. Accurate. Robust.

- 50 ppb to 100% oxygen measurement range
- rapid-response zirconia oxide sensor
- 5 year sensor life
- $T_{90} < 5$  seconds
- not position or motion sensitive

#### Description

The Neutronics Model 4100 is a compact analyzer for trace oxygen gas measurement and process control applications. With a measurement range of ppb to 100% oxygen, this analyzer features a remote sensor module with the Neutronics rapid response zirconia oxide sensor. With extremely high accuracy, rapid response, and a long expected service life, this analyzer is a low-maintenance solution that delivers reliable performance for critical applications that require oxygen contaminant monitoring in the ppb range.

#### Rapid Response Zirconia Oxide Sensor

The robust design of the Neutronics zirconia oxide sensor gives this analyzer the ability to rapidly measure oxygen through large step changes in concentration and the ability to accurately measure ppm concentrations of oxygen within seconds after exposure to air. When heated to an elevated temperature, the rapid-response zirconia oxide sensor produces a predictable electrical output in response to changes in the partial pressure of oxygen. The sensor is a solid-state device that utilizes yttria-stabilized zirconia (YSZ), a zirconium-oxide based ceramic in which the crystal structure of the zirconium oxide is made stable at room temperature by the addition of yttrium oxide.

#### Precise Sensor Temperature Control

Critical to reliable performance and rapid response, the remote sensor module (RSM) includes a precision controlled sensor heater assembly designed to maintain the temperature of the sensor at 650° C by continuously modulating the VAC electrical power input. To meet strict heat loss requirements, the sensor heater housing utilizes high temperature microporous insulation, a low density material with an extremely low thermal conductivity.

#### Long Sensor Life

The expected service life for the Neutronics zirconia oxide sensor is greater than 5 years. The sensor has an unlimited shelf life when stored within the recommended temperature range, and it will not dry out or freeze.

#### Wide Measurement Range – PPB To 100%

The Model 4100 provides a simple solution for a wide range of applications with fast and reliable measurement of oxygen concentrations from ppb to 100%. Precision welded sample tubing and components ensure the leak tightness required for ppb measurement.

#### Compact Modular Design

Along with the analyzer module, the Model 4100 includes a remote sensing module (RSM) to house the sensor, heater assembly, and the delivery system for the gas sample. The pump driven unit utilizes a diaphragm pump to extract the process gas from a non-pressurized source. The positive pressure driven unit is designed for system operating pressures above 25 psig.

#### Low Maintenance

The Model 4100 does not require any major periodic servicing. Calibration of the sensor should be performed only as needed. Validation of the display to a known gas source should be performed on a regular basis.

#### Simple to Install

The analyzer is not position or motion sensitive. For the pump driven RSM, an orifice plate is included to maintain a reduced constant flow of sample gas from the measured process to the sensor. A check valve, set to open at 5 psig, is included to protect the unit from overpressure. For the positive pressure driven RSM, the sample gas input range is 25 to 60 psig.

#### Easy to Operate

The Model 4100 is shipped ready to install and operate. Each unit is configured and tested prior to shipment. Configuration parameters may be changed by the user through the setup menu on the keypad or by using the RS-232 service port interface.

#### Communication Options

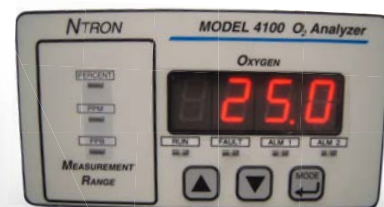
The user has a choice of options for communicating between the Model 4100 analyzer and the operating system controller. Two analog outputs are available: 4-20 mA and 0-1, 0-5, or 0-10 VDC. The RS-232 digital interface gives the user access to all settings including the option to restore the analyzer to its factory delivered settings.

#### Two Adjustable Alarms

Alarms with configurable relay outputs initiate active modes and light indicator LEDs based on user defined settings. The alarm status clears automatically when the measured oxygen concentration is within the set threshold value.

#### Auto Or Fixed Range Measurement

The Model 4100 can be configured to automatically change the measurement range based on the concentration of oxygen in the process. When auto-ranging is used, the 0-10 VDC Auto-range Identification output provides an indication of the selected full-scale of the analog output.



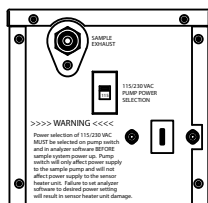
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## Trace Oxygen Analyzer

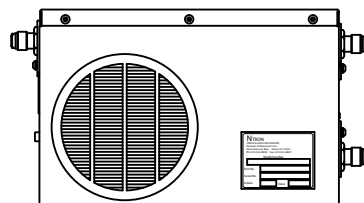
### Specifications

Type	Trace oxygen analyzer
Operating range	50-100 ppb, 50-1,000 ppb, 0-10 ppm, 0-100 ppm, 0-1,000 ppm, 0-10,000 ppm, 0-10%, 50 ppb to 100% oxygen, auto
Sensor	Zirconium oxide, Neutronics
Accuracy (pump driven)	± 2.0% of range @ calibrated temperature and pressure
Accuracy (positive pressure)	50- 1000 ppb range, ±10 ppb or ±5% of reading 1- 1000 ppm range, ±5 ppm or ±5% of reading 0.1- 100% ppb range, ± 0.2% or ±2% of reading
Response time (pump driven)	T <sub>90</sub> < 5 seconds
Response time (positive pressure)	T <sub>90</sub> < 15 seconds for order of magnitude change
Warm up time (pump driven)	20-30 minutes
Warm up time (positive pressure)	15 minutes to operating temperature
Sensor expected service life	>5 years
Relative humidity (analyzer)	0 - 95% non-condensing
Operating temperature	0 - 40° C (32 - 104° F)
Sample pressure	12 inHg vacuum to 7 psig (pump driven); 25 to 60 psig (positive pressure)
Display	7-segment, 0.75" alphanumeric LED, 4 characters 3 range LEDs to indicate ppb, ppm, or percent LEDs for system status: run, fault, alarm-1, alarm-2
Power supply	115/230 VAC, 50/60 Hz, single phase
Analog current output	4 - 20 mA, 12 VDC, powered by the analyzer
Analog voltage output	0-1, 0-5, 0-10 VDC
Relay outputs	two alarm relays, field adjustable Form C (SPDT) one system fault relay, non-adjustable Form B (SPST) one heater OK relay, non-adjustable Form B (SPST)
Serial service port	RS-232
Control panel rating	weatherproof NEMA 4, IP66
Rear electronics chassis rating	NEMA 1, IP20
Warranty	12 months
Analyzer dimensions (LxWxH)	7.00" (117.80mm) x 4.125" (104.78mm) x 3.75" (95.25mm)
RSM dimensions (LxWxH)	9.22" (234mm) x 5.40" (137mm) x 6.12" (155.4mm)
Weight	2 lbs. (.9 kg) (analyzer); 8.5 lbs. (3.9 kg) (RSM)

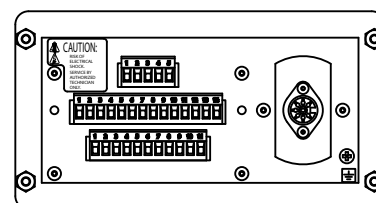
Specifications are subject to change without notice.



RSM End View



RSM Side View



Oxygen Analyzer

### Order Information

#### Part

4-LP-N1-SS, RSM (positive pressure drive)  
4-SPM-N1-SS RSM (pump drive)  
4100-N1 Analyzer  
interface cable, 2m  
40 micron in-line sample filter  
power cord

#### Part Number

C7-01-1000-54-0  
C7-01-1000-81-0  
C7-01-4100-00-1  
C6-01-1000-73-0  
C4-05-1300-01-0  
1-10-0000-01-0



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