

# REMOTE OXYGEN SENSOR MODULE

TECHNICAL BULLETIN 037

Sensor module and sampling system  
For ppm to percent range O<sub>2</sub> measurement

## Introduction

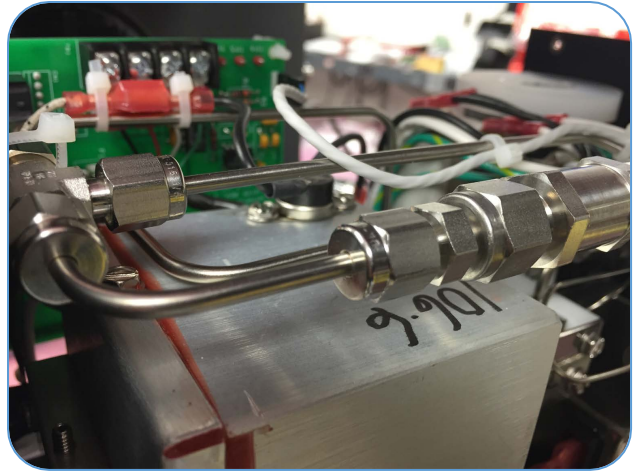
The Neutronics Remote Sensor Module (RSM) is designed to direct the sample gas in a continuous flow through the sample inlet port and the sampling system to the oxygen sensor. Available in two configurations, the RSM contains the oxygen sensor, sensor heater, heater control components, and delivery system for the process gas. The sensor determines the oxygen concentration of the gas and reports the measurements to the oxygen analyzer in real-time.

The RSM features the Neutronics rapid-response zirconium oxide (ZrO<sub>2</sub>) sensor, designed for ppm to percent range oxygen measurement. It is a ceramic, solid-state device that features an extremely fast response to oxygen, a wide measurement range, and a robust design. The ZrO<sub>2</sub> sensor is responsive to changes in the partial pressure of oxygen in the sampled gas ranging from ppm concentrations to 100% oxygen.

Critical to reliable performance and rapid response, the 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.

## Description

The RSM is designed for easy integration into a variety of platforms, single machines, or combined systems. With a small footprint and standard surface mount configuration, it can be installed close to the sampling point to ensure optimal response time and performance for process control applications.



## Features

- Rapid response time – reads ppm oxygen from air in < 10 seconds
- Not position or motion sensitive
- Not affected by oxygen shock – can be exposed to air and measure ppm oxygen in seconds
- Small compact packaging
- Top or bottom mounting
- 316 stainless steel wetted parts
- Inline 40 micron sintered stainless steel filter

## Applications

Air separation

Blanketing gas analysis

Contact lens manufacturing

Cryogenic gas generation

Food and beverage packaging

Glass and fiber optics manufacturing

Glove box systems

Inert gas purity/nitrogen purity systems

Process ovens

Dryers

Semiconductor manufacturing

Welding

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For systems operating close to atmospheric pressure, the pump-driven RSM (Figure 1) utilizes a high purity sample pump to extract the sample gas from the process. After the sample is drawn through the pump, the gas stream is separated into two parallel streams, the sensor stream and the bypass stream. The two-stream configuration is designed to ensure a higher total gas flow for faster pneumatic response and to provide the oxygen sensor with a stable flow for accurate measurement.

For process operating pressures of 5 psig and above, the positive pressure-driven RSM (figure 2) uses flow and pressure reduction to control and stabilize the process gas flow. Due to the positive pressure conditions, a sample pump is not required. From a single inlet source, the sample stream is separated into two parallel streams, the sensor stream and the bypass stream. To maintain a stable sample flow to the sensor and protect it against overpressure, the bypass stream includes a check valve designed to open at 5 psig.

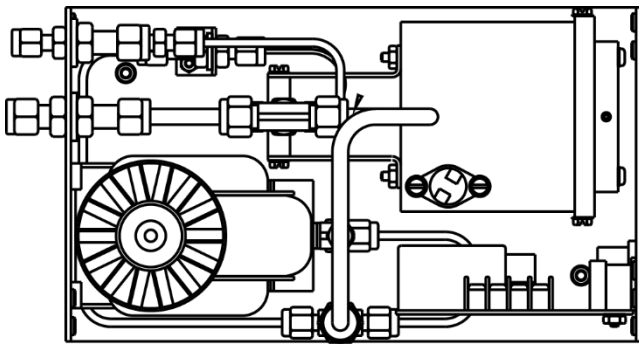


Fig.1, pump-driven RSM, Model 3-SPM-N1-SS (top view)

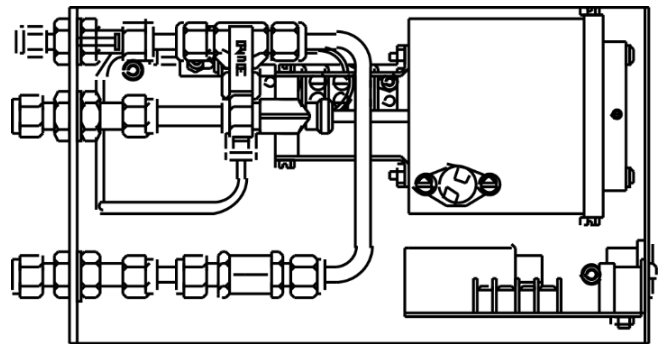


Fig.2, positive pressure-driven RSM, Model 3-LP-N1-SS (top view)

## Technical specifications

Remote sensor module	<b>3-SPM-N1-SS</b>	<b>3-LP-N1-SS</b>
Configuration	Pump-driven sampler (RSM)	Positive pressure-driven sampler (RSM)
Sensor	Zirconium oxide	Zirconium oxide
Measurement range	0.1 ppm to 100%	0.1 ppm to 100%
Accuracy	± 2.0% of range@ STP	± 2.0% of range @ STP
Response time	T <sub>90</sub> < 5 seconds	T <sub>90</sub> < 5 seconds
Warm up time	20 to 30 minutes	20 to 30 minutes
Operating temperature	32°F to 104°F (0°C to 40° C)	32°F to 122°F (0°C to 50° C)
Sample pressure	12inHg vacuum to 7 psig	6 to 60 psig
Sample flow	3 slm @ atmospheric pressure	1 slm @ 6 psig
Power	90 to 264 VAC, 47 to 63 Hz, 250W	90 to 264 VAC, 47 to 63 Hz, 250W
Dimensions	9.22" x 5.40" x 6.12" (234 x 137 x 155mm)	9.22" x 5.40" x 6.12" (234 x 137 x 155mm)
Weight	8.5 lbs. (3.8kg)	3.0 (1.36kg)



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