



Technical Specifications *

Accuracy:	< 2% of FS range under constant conditions, e.g. constant temperature, flow rate and ambient pressure: $\pm 5\%$ with temperature fluctuation of $\pm 10^\circ\text{F}$
Analysis:	Suppressed ranges: 90-100%, 80-100%, 50-100% and 0-100% FS range; Auto-ranging or fixed single range
Application:	Continuous analysis of high purity oxygen concentrations up to 100% oxygen in inert, He, H2 and mixed gases
Approvals:	CE
Area Classification:	General purpose
Alarms:	Two adjustable form C relay contacts non-latching; "weak sensor" indicator; power failure; system failure
Calibration:	3 month interval using certified span gas of 95-100% O2 balance N2 for high purity analysis; otherwise use O2 content approximately 80% of full scale range
Compensation:	Barometric pressure and temperature; temperature controlled sample system and sensor for stability
Connections:	Compression tube fittings 1/8" inlet, 1/4" vent
Controls:	Water resistant keypad; menu driven range selection, calibration, alarm and system functions
Data Acquisition:	Selectable data point intervals
Display:	Graphical LCD 5" x 2.75"; resolution .01%; displays real time ambient temperature and pressure
Enclosure:	Painted aluminum 7.5" x 10.8" x 12.25" panel mount
Flow:	Not flow sensitive; recommended flow rate 2 SCFH
Linearity:	> .995 over all ranges
Pressure:	Inlet - regulate to 5-30 psig to deliver 2 SCFH flow; vent - atmospheric
Power:	Universal; specify 100 or 200 VAC for heater system
Range ID:	Voltage, 4-20 mA or relay contacts
Response Time:	90% of final FS reading < 10 seconds
Sample System:	Stainless steel wetted parts, flow control, flow indicator, special integral sample
Sensitivity:	< 0.1% oxygen
Sensor Model:	GPR-11-120-OP
Sensor Life:	24 months in 100% oxygen at 25°C and 1 atm
Signal Output:	4-20mA isolated or 0-1V
Temp. Range:	5°C to 45°C
Warranty:	12 months analyzer; 12 months sensor



**GPR-3100
Oxygen Purity Analyzer**

Innovative Sensor & Analyzer (see back page)

Advanced Sensor Technology

- **Unmatched ROI and Performance in O2 Analysis**
- **24 Month Life Continuous Exposure @ 100% O2**
- **Sensitivity < 0.1% Oxygen**

Temperature Control Sample System

3 Suppressed Ranges, 0-100% FS Range

4 1/2 Digit Display with 0.01% Resolution

Insensitive to Vibration and Moisture

2 Field Selectable Alarm Setpoints

Auto Ranging or Single Fixed

Options: Auto-Zero and Auto-Cal

Remote Communication

Optional Equipment

19" rack, wall mounting, auto zero/cal, remote communication-contact factory

* Specification subject to change without notice.

**ISO 9001:2008 Certified
INTERTEK Certificate No. 485**





Background Oxygen Purity Analyzers

Historically, the production of pure oxygen has been confined to medical grade oxygen (99.0%). However, the demand for oxygen is expanding rapidly due to developments in chemical processes requiring elevated levels of oxygen (85-95%) that boost yields and reduce emissions without significant cost increases. Analyzers based on paramagnetic sensors have been the primary method of measuring oxygen purity. Accuracy at the suppressed range of 98-100% oxygen is their strength. However, compensating for their weaknesses is very expensive as they are sensitive to changes in the flow rate of the sample gas, the presence of minute particulates and moisture, temperature variations and vibration and require frequent calibration.

Analyzers based on galvanic oxygen sensors have always generated interest for oxygen purity measurements because they are specific to oxygen, versatile, low maintenance and less expensive. However, short sensor life and drift in the sensor's signal output with time have precluded their use.

Major Advancement in Galvanic Sensor Technology

An new galvanic sensor has been developed that is capable of precisely analyzing 100% oxygen concentrations continuously over a two (2) year period.

This proprietary design addresses the challenges of: 1) providing a sufficient amount of anode material to support the reduction of oxygen over several years, 2) maintaining at all times a sufficient concentration of hydroxyl ions to support the reduction of oxygen at and near the sensing electrode, and, 3) preventing the build-up of PbO at and near the sensing electrode that can cause the signal output of the sensor to drop or drift with time.

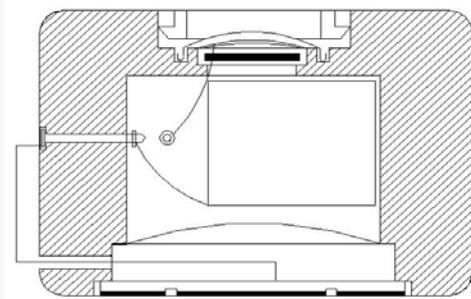
Through proprietary means the production rate of the reaction product is controlled without sacrificing either the fast response time (less than 13 seconds) or any of the features (described above) of analyzers based on galvanic sensors. The performance of this proprietary sensor was confirmed over 14 months of testing and exhibited excellent stability in 100% oxygen.

Test Results

With the sensor and sample gas lines temperature controlled and the signal output of the sensor compensated for ambient pressure variations, it was possible to measure oxygen in the suppressed range of 90-100% with less than $\pm 1\%$ of full scale ($\pm 0.1\%$ oxygen) accuracy. The calibration was checked periodically and found to be within $+1\%$ of full scale over the 14 month test period suggesting the interval between calibrations could be extended to several months.

Conclusion

The GPR-3100 galvanic sensor based Oxygen Purity Analyzer offers a very viable and cost effective solution for measuring elevated oxygen levels up to and above 99.5% in a maximum suppressed range of 90-100% with excellent accuracy and stability, a significant reduction in calibration requirements, unaffected by vibration and minor amounts of particulates and moisture.



Galvanic Oxygen Purity Sensor

Advancements:

- Innovative design, materials
- Extend life in continuous use @ 100% O₂
- Control reaction rate @ 100% O₂
- Suppressed range capability
- Insensitive to vibration
- Compact inexpensive design

Performance:

- 24 month life @ 100% O₂
- Accuracy $< \pm 1\%$ FS
- Sensitivity 0.1% oxygen
- Capable of analysis $> 99.50\%$
- Fast 13 response time
- Extended calibration period