

PureAir monitoring systems, inc.

Oxygen Deficiency Monitor and Oxygen Analyzers



Oxygen Sensors for 0-25% and 0-1000ppm



ABOUT PUREAIRE MONITORING SYSTEMS

- **PureAire** is an experienced safety gas detection manufacturer providing long lasting reliable products . We are capable of handling any size project including proving custom projects for OEM's.
- **PureAire's** most popular product, an Oxygen Deficiency Monitor, is paired with advanced electronics and software alerting employees of unsafe environments in seconds.
- Beginning in 1996, our growth has been a result of our commitment to supporting our customers. Our goal is to provide the best service and support in the industry. Available 24 hours a day, 7 days a week, **PureAire** takes the extra step to ensure your complete satisfaction.



O₂ DEFICIENCY MONITOR



- PureAire O₂ Monitoring System and typical installations
- Installed in any confined space where cryogenic gases (nitrogen, argon, helium, and CO₂) are located.
 - Cryogenic gas storage areas
 - Nitrogen freezers
 - Confined spaces
 - Nitrogen generators
 - Air separation plants
 - Cleanrooms, semiconductor
 - Laboratories, hospitals, and universities
 - 3D printers
 - MRI, NMR
 - Any other locations where low oxygen levels may pose an asphyxiation hazard



O₂ DEFICIENCY MONITOR



Benefits and Features

- 10+ year sensor life
- Zero maintenance
- No calibration required
- Unaffected by environmental temperature, humidity and barometric variations
- Operates at -40°F (-40°C) in freezers
- Local display, 4-20mA output
- 2 adjustable or configurable relays
- Computer controlled electronics
- UL / CUL listed and Ce approved
- Furnished with UL-listed 110 VAC/24 VDC regulated power adapter



O₂ DEFICIENCY MONITOR



Specifications

- **Sampling Method and Range:** Diffusion, 0 – 25% O₂
- **Accuracy:** ±0.5% of full scale
- **Operating Temperature:** -40°F to 131°F (-40°C to 55°C)
- **Humidity:** 0 – 95%
- **Display:** 3/4" backlit LCD digital
- **Audible Alarm (Sound Output):** 90 db
- **Response Time:** Within 1 second of any change in O₂
- **Repeatability:** ±1%
- **Required Calibration:** None (no zero or span pots supplied)
- **Minimum Detection:** 1000 ppm or .1% (other ranges available)
- **Signal Outputs:** DC 4-20mA analog output; dual-level user-selectable alarm relays and one fault relay
(2 amps @ 30 VDC/240 VAC)



O₂ DEFICIENCY MONITOR



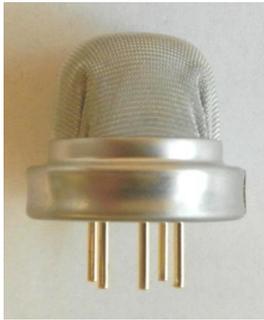
Specifications continued

- **Power Requirements:**
24 VDC 100mA without relays
500 mA with relays
(unit supplied with 110 VAC power adapter with 6 ft. power cord)
- **Dimensions:**
5.5" (W) x 3.5" (H) x 3.25" (D)
(140 mm x 89 mm x 83 mm)
- **Enclosure:** ABS plastic, NEMA 4X rated general purpose
(optional EX available for hazardous areas)
- **Weight:** 1.6 lbs. (0.8 kg)



O₂ DEFICIENCY MONITOR

Air✓O₂™



PureAire Current Limiting Zirconium Oxide O₂ cell

Does not require a reference gas.
Operates in 100% N₂ environments

Non-consuming sensor cell
Cell Life is 10 + years

Maintenance Free
No cell replacement required

No Calibration
Non depleting and does not rely on partial pressure

Operates at high and low temperatures
Can operate down to -40C



Partial Pressure Electrochemical Disposable Lead based sensor cell

Continuously Consuming sensor
Lead anode is used up in detecting O₂

Drifts to changes in barometric pressure
Operates on partial pressure of O₂ to drive molecules through the barrier into the sensor

One to Two year cell life
Warmer temperatures consumes the anode faster

Requires frequent dynamic calibration
Continuous exposure to ambient O₂ depletes the lead anode

Cannot operate at low temperatures
Cell electrolyte freezes and output drops to zero

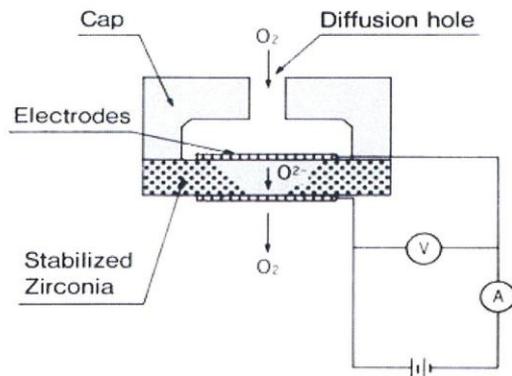
Lead contents presents disposal hazard



O₂ DEFICIENCY MONITOR



Principle of PureAire Oxygen Sensor



Schematic diagram of the sensor is shown in Fig. 1.

Zirconia electrolyte disc having electrodes on both sides has the ability to pass oxygen ions at high temperature. By attaching a cap with an aperture on one side (cathode) of the disc, the gas diffusion is limited and the saturated current is observed (fig. 2).

It is termed "limiting current". The limiting current is proportional to the ambient oxygen concentration as shown in Fig. 3.

Fig. 1 Schematic diagram of the sensor Fig. 4 shows the structure of the sensor.

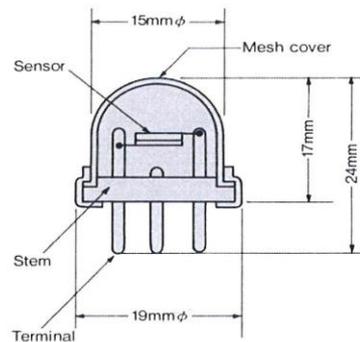


Fig. 4 Structure of the sensor



O₂ DEFICIENCY MONITOR



Comparison of annual maintenance for a 50-point O₂ system

PureAire's O₂ Zirconium

Oxide sensor does not
have consumables.

No calibration required

Average Life is 10 + years

Total \$ 0.00 per year

Five year cost \$0.00

Disposable O₂ cells
(Replaced once per year)
(Quarterly calibration required)

Replacement cell cost
**@ average \$360 /year per
O₂ monitor**

Total \$ 18,000 per yr

Five year cost \$90,000



O₂ DEFICIENCY MONITOR

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Why use?

O₂ monitors are used to protect people in the workplace.

Under normal conditions, we breathe 20.9% oxygen. OSHA states “Anything below 19.5% is deemed hazardous to our health.”

PureAire’s O₂ deficiency monitor is a stand-alone monitor with built-in audible alarm and alarm relay to alert employees when ambient oxygen levels go below 19.5%.



O₂ DEFICIENCY MONITOR

Air✓O₂TM

Why use? continued

O₂ monitors are used to protect people in the workplace.

An oxygen monitor is a safety device used in cryogenic areas to alert if there is a low level of oxygen in a room that may be caused by a nitrogen, helium or argon spill.



O₂ DEFICIENCY MONITOR



Why use? continued

Competitive O₂ monitors use a 6 to 18 month disposable electro-chemical sensor which requires frequent maintenance and calibration.



PureAire's O₂ monitor uses a 10+ year zirconium oxide (ZrO₂) non depleting sensor that does not require calibration or replacement.

PureAire is replacing many non performing competitive disposable electrochemical oxygen monitors

O₂ DEFICIENCY MONITOR

Air✓O₂™

- Standard O₂ monitor with audible alarm:
- **Optional Configurations:**
- Sample draw O₂ monitor (built-in pump for remote sampling up to 100 ft.)
- Explosion-proof O₂ monitor (explosion proof housing suitable for Class 1, Div.1, Group B, C, D locations)
- Glove box and vacuum O₂ (monitor where low or no oxygen levels need to be measured and controlled)



Comparison of Annual Maintenance

1-Point O₂ Monitoring System

	PureAire's O ₂ Zirconium Oxide	Disposable O ₂ Cells
	No replacement sensors	Replacement sensor recommended once per year
	No calibration required	Quarterly calibration required
	Average life 10+ years	Replacement cells: average \$300/year per O ₂ sensor cell
Total (annual):	\$0.00	\$360
Total (five years):	\$0.00	\$1,800



Most Common Complaints for Oxygen Monitors with Disposable Sensors

- Monitors require new sensors every 6 to 18 months. Sensors are costly, averaging \$200 – 400 per sensor.
- Sensors must be calibrated quarterly with a calibration gas, an additional cost to client.
- Sensors drift and false alarm due to infrequent calibration. The biggest customer complaints are customers simply don't have time to babysit their oxygen monitor.
- Sensors false alarm due to thunderstorms, changes in temperature, and changes in barometric pressure.
- Additional technicians are needed to maintain and calibrate sensors. Time is money.

“PureAire Monitoring Systems, LLC has sold over 10,000 monitors to broad range of industries worldwide. Our website lists a few customer [testimonials](#) along with reviews on [google](#).”



O₂ MONITOR – WHO NEEDS IT

Industry	Risk Site
Government/ Education	Labs (LN ₂ – Equipment Cooling)
Healthcare	MRI Rooms (He – Magnet Cooling)
Additive Manufacturing	3D printing chamber
Semiconductor	N ₂ and Cryogenics for wafer manufacturing
Pharmaceutical	Cryogenic Freezers
Misc.	Dewars (N ₂ , Ar, He) Confined Spaces



O₂ DEFICIENCY MONITOR



Where Are Oxygen Monitors Installed?



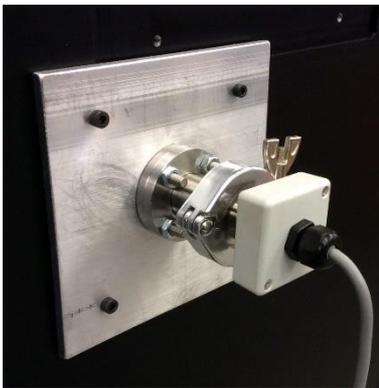
Nitrogen tanks



MRI Rooms



Semiconductor



Additive Manufacturing
3D Chamber



Nitrogen Freezers



Cryotherapy

O₂ DEFICIENCY MONITOR



Where Are the Monitors Installed? continued



**Near N₂, He and
Ar Cylinders**



**Altitude Training
with Prince Harry**



PureAire Model TX-1100DRA



Federal Signal Horn & Strobe



**Regulated Power supply 24VDC
Operates at 110/220VAC**



**Remote LED Display
and Horn**



O₂ DEFICIENCY MONITOR



Overview and Bottom Line

- 10+ year zirconium oxide sensor
- Best performing Oxygen monitor on the market
- No maintenance and no calibration required
- No costly replacement sensors
- No false alarms or drifting due to environmental changes
- The only O₂ monitor that operates in -40°C
- Operates in Freezers, confined spaces and gas storage areas
- Reliable and completely linear, full scale 0 – 25% O₂



END OF PRESENTATION

Thank you for your attention



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