

Oxygen Deficiency Monitor

- No maintenance Zirconium cell
- No calibration required
- No drift due to environmental or temperature changes
- Operates at -40C in freezers
- 10 + years sensor life
- Local display, 4-20mA output
- Joystick adjustable dual alarm relays
- Integral computer controlled electronics



Presentation Overview

- Features & Advantages of PureAire oxygen monitor with zirconium oxide sensor cell.
- Comparison of oxygen monitors with disposable sensor cell technology.
- Typical Oxygen monitoring applications.
- PureAire O₂ monitor operation
- Why to use a PureAire O₂ monitoring

PureAire's Zirconium Oxide Sensor

PureAire Current Limiting

Zirconium Oxide O₂ cell

Non-depleting sensor cell

Cell Life is 10 + years

Maintenance Free

No cell replacement required

No Calibration

Non-depleting and does not rely on partial pressure. The earth is a wonderful source of calibrated oxygen.

Operates at high and low temperatures, not effected by humidity

Can operate down to -40 C & 100 % RH condensing

No reference gas required

Can operate in a 100% N₂ Environment

Test #		Initial setup	TEST #1	TEST #2	TEST #3	TEST #4
Date		1/23/2008	2/6/2008	2/20/2008	3/5/2008	3/19/2008
Time		11:45	14:50	13:30	11:50	11:30
Amount	Total	Initial	Exposed	First Detailed	2nd Detailed	3rd Detailed
of Room	Air	Set-up	sensor	Test	Test	Test
Air Added	Added	Basically	to room air			
СС	СС	a N ₂ purge				
0	0	0	0	0	0	0
10	10	-	-	0.4	0.2	0.2
10	20	-	-	0.7	0.6	0.5
10	30	-	-	1.1	1	1
10	40	-	-	1.4	1.2	1.3
10	50	-	-	1.8	1.5	1.6
50	100	-	-	3.2	3.1	3.1
50	150	-	-	4.5	4.5	4.4
50	200	-	-	5.8	5.6	5.6
50	250	-	-	6.6	6.5	6.6
50	300	-	-	7.7	7.7	7.7
50	350	-	-	8.5	8.6	8.5
50	400	-	-	9.5	9.5	9.4
50	450	-	-	10.1	10.3	10.1
765	765	21.3	21.2	-	-	-

Disposable Oxygen Sensor Cell

Partial Pressure Electrochemical Disposable Cell Sensor

Continuously Depleting sensor

Lead anode is used up in detecting O_2 . Ambient Oxygen depletes the sensor cell, hence more O_2 the sensor is exposed to, the faster the anode depletes

Drifts to changes in barometric pressure

Operates on partial pressure of O_2 to drive molecules through the barrier into the sensor. O_2 reading drops to lower pressure

One to two year cell life

Life expectancy is dependant on the concentration of gas the sensor cell is exposed to along with environmental conditions such as humidity, temperature, and pressure.

Requires frequent dynamic calibration

The lead anode is continuously being used when exposed to 20.9%. As is depletes it drifts below 20.9%, which can cause a false alarm.

Cannot operate at low temperatures

Cell electrolyte freezes and output drops to zero (Cannot operate in a freezer)





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Explosion Proof Monitor With Sample Pump



- Suitable for Class 1 Div 1 Group B
- No maintenance Zirconium cell
- No calibration required
- No drift to environmental or temperature changes
- 10 + years Sensor life
- Local display, 4-20 mA analog output, and User selectable Dual alarm relays
- Built-in sample pump with flow control

Air Check O₂ Sample Draw

- For remote sampling 100 feet
- No maintenance Zirconium cell
- No calibration required
- No drift to environmental or temperature changes
- 10 + year Sensor life
- Local display
- 4-20 mA analog output
- Built-in flow sample pump
- Built-in adjustable alarm relays



Only Company To Operate In A Vacuum Environment





- Monitors in vacuum 10⁻³ torr
- No maintenance Zirconium cell calibration required
- No drift to environmental or temperature changes
- ✓ 10 + year Sensor life
- Local digital display, 4-20mA output
- Joystick adjustable dual alarm relays
- Integral computer controlled electronics

Air Check Oxygen monitor with remote Horn & Strobe



O2 monitors connected to Multi channel controller

Remote Horn/Strobe







	Pow C MA	er Analog ou Common sigr 4-20mA sign (connects to 24VDC Powe	al ground (al output (P PLC or Rer r (Pin 1)	inal Block (Pin 3) mA output Pin 2) note display)
	Remote	Fault Relay	Alarm 1	Alarm 2
	Reset	C NC NO	C NC NO	C NC NO
A three-wire shielded cable, 3- conductor, 18 AWG stranded. General Cable E2203S.30.860, or equivalent is recommended for the connection.				

Front View Exterior with Relay Option



- **1. Digital Display** —3-digit backlit LCD digital display for showing the oxygen levels in percent.
- 2. Joystick Used for selecting and adjusting the built-in menus.
- **3. Cable Port** —4-20 mA output and 24 VDC power cable.
- 4/5. Sensor Protector—The O2 sensor is heated and the sensor protector shields
- 4/5. Oxygen Sensor A zirconium oxide sensor,

Joystick Functions



- Minus



Menu Functions & Settings

Menu Function	Factory Default	Menu Defined	
Alarm Thresholds	Alarm 1 = 19.5% Alarm 2 = 18% Audio = 19.5% *	At what level do you want to alarm?	
Set Alarm Threshold Polarity	Alarm 1 = Inverted Alarm 2 = Inverted Audio = Inverted *	Do you want to alarm at a level higher, (normal) or lower, (inverted) than the alarm threshold?	
Alarm Delay	Alarm $= 5$ seconds	How long do you want to wait until the alarms activate?	
Set Alarm Hysterisis	Alarm 1 = 0.0 % Alarm 2 = 0.0 % Audio = 0.0 %	For use when using the O ₂ monitor for control. See Section 5.4.8	
Relay Latching	Alarm 1 = Non-latching Alarm 2 = Non- latching Audio = Non-latching	Do you want the alarm to automatically reset? (non-latching) or do you want to manually reset the alarm? (latching)	
Format Relay - LED State **	Alarm 1 = Normal Alarm 2 = Normal Fault = Normal	Do you want the relays to energize, (normal) or de-energize, (fail safe) when the alarm activates?	

Summary of PureAire Monitor

- No need to replace sensor cells, can save up to \$300 annually, per monitor
- Non depleting sensor, no replacement
- No calibration
- No drifting to environmental conditions, or rapidly changing barometric pressure
- No false alarms
- Suitable for many different monitoring applications

Comparison of annual maintenance for a 1-point O₂ monitoring system

PureAire's O₂ Zirconium sensor does not require have consumables

Disposable O₂ cells (Annual replacement recommended)

- No calibration required
- Average Life is 10 + year

Quarterly calibration

Replacement cells @ average \$300 per cell*

Total\$ 0.00 per yearTotal\$ 300 per yrFive year cost\$0.00Six year cost\$1,800

* Replacement O₂ cells range from \$200 to \$495 per cell

PureAire Monitoring Systems, Inc. Oxygen Monitor Users List

Tufts University Boston, MA

NASA Moffitt Field, California

Cornell Medical College New York, NY

Rolls Royce North Canton, OH

Grainger Oak Lawn, IL

University of Notre Dame Notre Dame, IN

Abbott Phamaceuticals Barceloneta, PR Harvard University Cambridge, MA

Lockheed Martin Littleton, CO

UCSB Santa Barbara, CA

Jayhawk Fine Chemicals Galena, KS

Stanford University Stanford, CA

ASM America Phoenix, AZ

Aviza Technology, Inc. Scotts Valley, California New York Presbyterian Hospital New York, NY

Tev Tech, LLC Wilmington, MA

University at Buffalo Buffalo, NY

Washington State University Pullman, WA

Goodyear Gadsen, AL

US FDA Winchester, MA