GE
Sensing

Applications

A complete oxygen analyzer typically used in applications such as:

- Vapor recovery
- Barge loading
- Flare gas
- Refinery gas
- Olefins such as ethylene and propylene
- Pure hydrocarbons

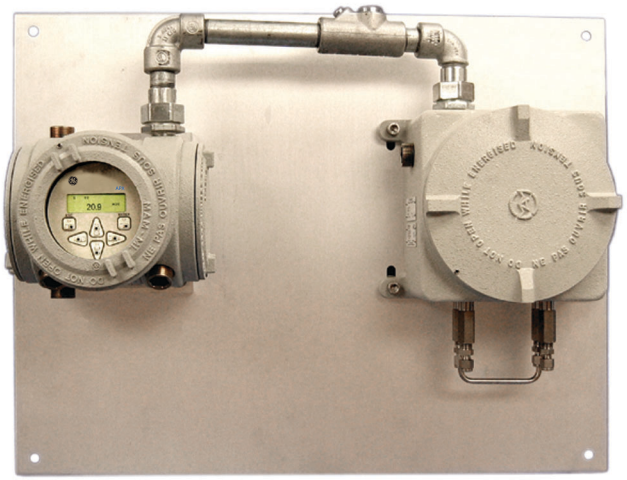
Features

- Advanced background gas compensation for varying gas mixtures
- Infrared (IR) through-glass keypad for easy programming in hazardous areas
- Certified for use in hazardous areas
- Resistant to liquid upsets
- No moving parts
- Universal AC input
- Long term calibration stability
- Calibrate in N_2 only, but use in any background gas

APX

Panametrics Advanced Paramagnetic Oxygen Analyzer

APX is a Panametrics product. Panametrics has joined other GE high-technology sensing businesses under a new name– GE Industrial, Sensing.



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Panametrics Advanced Paramagnetic Oxygen Analyzer

The APX advanced paramagnetic oxygen analyzer is the newest addition to the Panametrics line of thermoparamagnetic oxygen transmitters and analyzers. The APX is specially designed with advanced background gas compensation that makes it ideal for applications with defined or undefined hydrocarbon gases, including vapor recovery, flare gas and refinery gas.

Advanced Background Compensation

The APX's advanced background gas compensation not only measures the thermal conductivity of a gas, but the heat capacity and viscosity as well. By measuring these additional physical properties, the APX is better equipped to differentiate background gases that have significantly different or varying diamagnetic effects. This gives the APX an advantage over other, traditional dumbbell paramagnetic oxygen analyzers, which do not automatically compensate for the inherent diamagnetic effects of changing background gases. The result is that the APX reliably measures oxygen more accurately in a broader range of applications with either known or unknown background gases.

Top Performance and Ease of Use

An onboard microprocessor gives the APX the computing power to provide automatic oxygen signal compensation and integrated signal-processing algorithms. This enhances linearity and improves accuracy for reliable, long-term measurement.

The APX also has sophisticated error-checking software with user-programmable defaults and error limits to detect abnormal measurement conditions, including a loss of flow to the analyzer or a pressure spike.
The APX is easily programmed through the multilevel, menu-driven interface, which provides convenient access for changing defaults, analog output scaling and calibration.

Rugged Design and Low Maintenance

Sensor and electronic components are housed in a flameproof and explosion-proof enclosure with weatherproof protection, allowing installation right at the measurement point to simplify wiring and provide trouble-free operation. The unique dual-chamber, temperature-controlled, oxygen-sensor design provides resistance to contamination, while minimizing temperature and flow sensitivity.

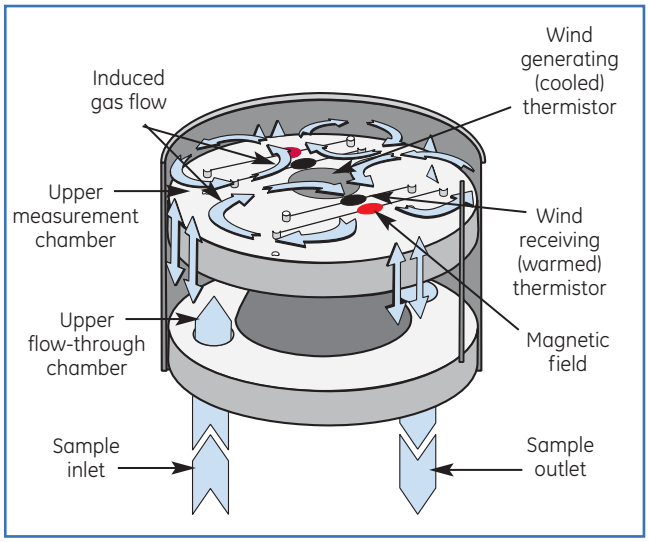
How It Works

Oxygen's paramagnetic property causes a gas sample containing oxygen to move within a magnetic field. Thermistor pairs, which are part of a wheatstone bridge circuit, sense the "magnetic wind" created by the gas movement. The resulting signal, along with heat capacity and viscosity measurements, is used by the microprocessor to calculate the oxygen percentage accurately.

Choice of Ranges

The APX provides a 4 to 20 mA output signal that is fully programmable for zero and span. The output is proportional to oxygen concentration and is internally compensated for background gas and pressure variations. The APX is available in a wide variety of measurement ranges.

Dual-Chamber Design



Flow schematic of the APX thermoparamagnetic oxygen measuring cell. Oxygen's paramagnetic property causes an oxygen-containing gas sample to move within the magnetic field. The gas movement creates a "magnetic wind" that is sensed by the thermistor pairs. Additional sensor elements are used to measure gas heat and viscosity. Oxygen concentration and background gas compensation are determined by the transmitter's microprocessor.

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APX Specifications

Performance

(Specifications for defined background gas variations)

Accuracy
- ±0.15% O_2 if calibrated in the critical gas
- ±0.25% O_2 in any gas mixture

Repeatability
±0.1% O_2

Measurement Resolution
0.01 mA/0.1% O_2

Stability
±0.05% O_2 per month

Measurement Ranges (Typical)
- 0% to 2%
- 0% to 5%
- 0% to 10%
- 0% to 21%
- 0% to 25%

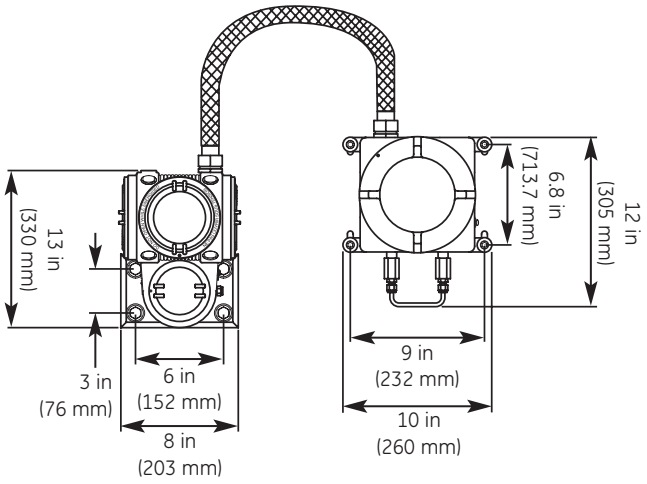
Analyzer Temperature
- Standard: Controlled to 113°F (45°C)
- Optional: Controlled to 140°F (60°C)

Required Sample Pressure
Regulate inlet pressure to 5 psig (0.3 bar)

Functional

Analog Output
4 to 20 mA, isolated, 800 Ω maximum, field programmable

Alarms
- Four SPDT rated to 2 A at 28 VDC
- One dedicated fault alarm rated to 2 A at 28 VDC



Depth required = 10 in (260 mm) minimum

Schematic of flameproof APX. Sensor housing and controller close coupled via certified flexible conduit. Maximum separation = 32 in (812.8 mm). Approved for II 2 GD EEx d T6, IP66.

Power
85 to 264 VAC, 47 to 63 Hz

Operating Temperature
Standard: 113°F (45°C)

Ambient Temperature Range
–4°F to 95°F (–20° to 35°C), standard cell operating temperature of 113°F (45°C)

Pressure Range
–5 psig to 5 psig (-0.3 bar to 0.3 bar)

Physical

Wetted Sensor Materials
Standard: Stainless steel, glass and Viton® O-rings

Environmental
- Explosion-proof design:
  CSA C US Class I, Division 1, Group B,C&D,
  Type 4X (approval pending)
- Flameproof design:
  Ex II 2 GD EEx d IIC T6, IP66
  ISSeP03ATEX096

European Compliance
Complies with EMC Directive 89/336/EEC, 73/23/EEC LVD (Installation Category II, Pollution Degree 2)

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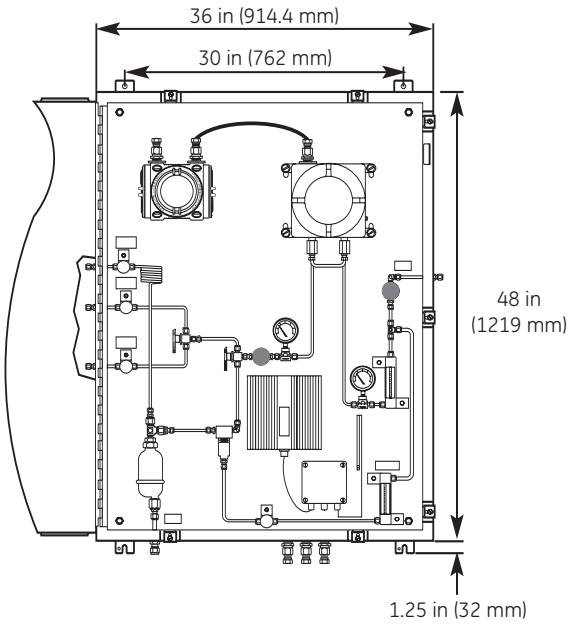
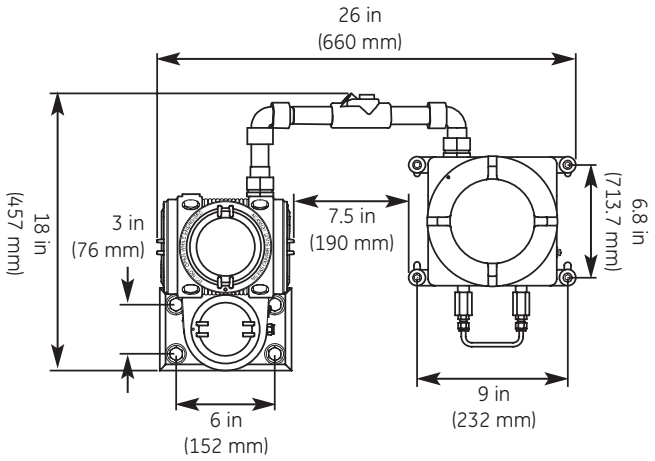
APX Specifications



Schematic of typical flameproof APX sample system



Depth required = 10 in (260 mm) minimum

Schematic of explosion-proof APX. Sensor housing and controller close coupled via rigid metal conduit. Class I, Division 1, Groups A,B,C&D.

Order Information

Record selected option in blank indicated at bottom of form.

APX Advanced Paramagnetic Oxygen Analyzer

Package
2 Explosion-proof/weatherproof enclosure

Power
1 100 VAC
2 115 VAC
3 230 VAC
4 240 VAC

Keypad
1 IR keypad

Configuration
1 Close coupled, explosion-proof design, Class I, Division 1
2 Close coupled, flameproof design, EEx d T6

APX – __ __ __ __ Use this number to order product

N4271 CE

920-008C

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Billerica, MA 01821
U.S.A.
T 800-833-9438
F 502-479-6722

Instructions: Please fill out the fields in color. Any field with a block is a required field.

Today's Date:

GE Sensing TMO2/XMO2/APX Analyzer Application Data Sheet

Contact Information

Name:		Phone:	
Company:		Fax:	
Address:		E-mail:	
Installation Address:		Delivery Want	
Measurement Points			
Account Manager/Sales rep (if known)			

Process Data

Process/Application:										
Physical State of material:	☐	Gas	☐	Liquid						
Complete Chemical Composition:	Component Name		Chemical Formula		Volume Percent					
Gas A	Oxygen		O2		Nominal:	%	+/-		%	
Gas B					Nominal:	%	+/-		%	
Gas C					Nominal:	%	+/-		%	
Gas D					Nominal:	%	+/-		%	
Gas E					Nominal:	%	+/-		%	
Gas F					Nominal:	%	+/-		%	
Other*					Nominal:	%	+/-		%	
					Total**	100%				
*Attach additional pages if more space is needed					**Gas composition must total 100%					
Pressure at sample points:	Units		Minimum		Maximum		Nominal			
Temperature at sample points:	Units		Minimum		Maximum		Nominal			
Sample Outlet:	☐	Vent to atmosphere	☐	Return to process						
If sample will be returned to process, pressure at sample return point:										
	Units		Minimum		Maximum		Nominal			
Temperature at sample return point:										
	Units		Minimum		Maximum		Nominal			

Measurement Parameters

Analyzer range (e.g. 0-25%)			% O2							
Utilities available at transmitter:	☐	Air, pressure		psig	☐	N2, pressure		psig		
	☐	Water, pressure		psig	☐	Temperature		☐ Deg F	☐ Deg C	
	1.2-A, 24-VDC power	☐	Available	☐	Not available					
4 to 20 mA output isolation:	☐	Not required	☐	Required						
RS232 port (XMO2):	☐	Not required	☐	Required						
Area classification:	☐	Nonhazardous	☐	Hazardous						
If hazardous:	Class			Division		Groups				
Ambient pressure:	Units		Minimum		Maximum		Nominal			
Ambient temperature:	Units		Minimum		Maximum		Nominal			

Electronics/Display Package

Digital display:	☐	Local	☐	Remote	☐	Not required				
Type:	☐	Weatherproof	☐	Explosionproof	☐	Rack	☐	Bench	☐	Panel
Automatic calibration:	☐	Not required	☐	Required						
RS232 port (TMO2D)	☐	Not required	☐	Required						
Alarm relays:	☐	Not required	☐	Required						
Output units:	☐	Single 4 to 20 mA (isolated)			☐	Dual 4 to 20 mA (isolated)				
Power available:	☐		VAC	☐		HZ	☐	Other		
Area classification:	☐	Nonhazardous	☐	Hazardous						
If hazardous:	Class			Division		Groups				
Distance between display(s) & transmitter(	☐	ft	☐	m	Choose one					
Tagging:	☐	Not required	☐	Required						
Drawings:	☐	Not required	☐	Required						
sample system fitting Requirements:	Parker / Swagelok / Other									

Additional Measurements

Moisture:	☐	Not required	☐	Required	
Flow:	☐	Not required	☐	Required	
Energy flow rate:	☐	Not required	☐	Required	

Hydrogen concentration:		☐	**Not required**	☐	**Required**	
Thermal conductivity:		☐	**Not required**	☐	**Required**	
Flue gas analysis:		☐	**Not required**	☐	**Required**	
Combustible gas:		☐	**Not required**	☐	**Required**	
Wobbe index:		☐	**Not required**	☐	**Required**	
CARI:		☐	**Not required**	☐	**Required**	
Calorific value:		☐	**Not required**	☐	**Required**	
Carbon potential:		☐	**Not required**	☐	**Required**	
Special Requirements:						
Please attach a brief description or sketch of the process						