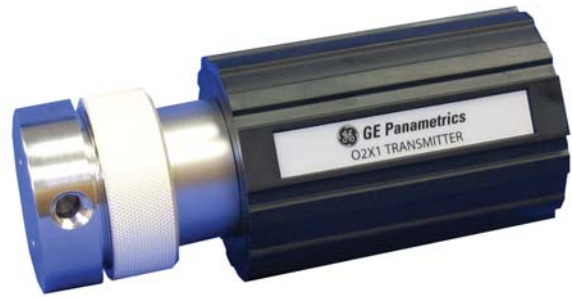


O2X1

Panometrics Oxygen Transmitter



Applications

An oxygen transmitter for use in:

- Heat treating and bright annealing
- Process monitoring of gaseous monomers
- Pure gaseous hydrocarbon streams
- Inert welding gases
- Glove box leak detection
- Ambient air monitor

Features

- Intrinsically safe
- Two-wire, loop-powered 4 to 20 mA transmitter
- Proven galvanic fuel cell O₂ sensor technology
- Programmable ranges for ppm and percent oxygen
- Microprocessor-based, all-digital technology for reliable operation
- Continuous monitoring
- Low maintenance
- Economical and compact



Panometrics Oxygen Transmitter

The O2X1 is a highly reliable and cost-effective two-wire, loop-powered transmitter with a linearized 4 to 20 mA output. It measures oxygen in four ppm ranges (10; 100; 1,000 and 10,000 ppm) and three percentage ranges (1, 10, and 25%). All ranges are user-programmable. This compact transmitter uses proven sensor technology to accurately measure O₂ in a variety of gases, even in hazardous environments.

Proven Sensor Technology

The O2X1's oxygen sensor is an advanced galvanic fuel cell that provides superior performance, accuracy, stability and long life. The cell's innovative design eliminates the potential for negative signal output, reduces sources of contamination and eliminates electrolyte leakage.

The cell is unaffected by other background gases or hydrocarbons and is compatible with acid gases (OX-2 and OX-4 cells). Recovery from air at low ppm levels takes just a few minutes. Because the cell is self-contained, little maintenance is required. There is no electrolyte to change or electrodes to clean.

Intrinsically Safe

When equipped with the optional MTL706 barriers, the O2X1 can be mounted in a hazardous (classified) location as defined by the National Electrical Code (NEC). The O2X1 316 stainless steel package is FM approved as intrinsically safe for use in Class I, II, III; Division 1; Groups A,B,C,D,E, F&G hazardous (indoor/outdoor) Type 4X locations, and is certified by BASEEFA II 1 G EEx ia IIC T4 (Tamb = -20°C to +60°C)

Control at the Tip of a Finger

The rugged O2X1 is controlled by a microprocessor that enables the user to select the range, trim outputs and perform calibration. Programming is easily done using the three-button keypad and the three light-emitting diodes (LEDs). These switches allow complete functionality in hazardous areas when equipped with an MTL706 barrier.

Installation Flexibility

The compact O2X1, with its built-in microprocessor, is designed to fit easily into any installation site. The O2X1 can be installed right at the sampling point, whereas other transmitters must be rack or panel mounted.

Sample Systems

In addition to standard features and options, GE offers a full line of sample handling systems for a variety of applications. If needed, GE can design and build a sample conditioning system to meet unique application requirements. Please contact GE for details.

Oxygen Sensor Interference Gases

Gas	OX-1 and OX-5, ppm Cont.	OX-2, ppm Cont.	OX-3, %		OX-4%	
			Cont.	Int. (1)	Cont.	Int.
H ₂ S	<5 ppm	<10 ppm	0.0005%	0.01%	0.001%	0.1%
SO ₃	<10 ppm	<10 ppm	0.01%	0.1%	0.01%	0.1%
SO ₂	<10 ppm	(3)	0.01%	0.1%	(3)	(3)
HCl	<1000 ppm	(3)	0.1%	1.0%	(3)	(3)
HCN	<1000 ppm	(3)	0.1%	1.0%	(3)	(3)
CO ₂	<1000 ppm	(3)	0.1%	20%	(3)	(3)
NO ₂	(2)	(2)	(2)	(2)	(2)	(2)
CL ₂	(2)	(2)	(2)	(2)	(2)	(2)

Cont. = Continuous, Int. = Intermittent

(1) Recommended maximum exposure 30 minutes followed by flushing with ambient air for equal period

(2) Minimal effect on sensor performance, but produces signal interference of 1:2 ratio

(3) Minimal effect on sensor performance

O2X1

Specifications

Intrinsically Safe (IS) Installation

Intrinsically safe installations require an MTL706 zener barrier, one IS cable and one non-IS cable.

Power Requirements

24 to 28 VDC at 50 mA

Cable

- OCI-*F-T5 in hazardous area: Two-conductor, twisted pair with connector; 22 AWG; 1100 ft (335 m) maximum cable length
- OCG-*F-0 in non-hazardous (safe) area: Three-conductor; 22 AWG; 4000 ft (1219 m) maximum cable length

Output

Total load must equal $250 \Omega \pm 5\%$

Non-Hazardous (Safe) Installation

No zener barrier is used.

Process Wetted Materials

- SS process unit: 316 stainless steel, Viton® O-ring and polytetrafluoroethylene
- Delrin® process unit: Delrin, Viton O-ring and polytetrafluoroethylene
- Ambient air monitoring unit: Delrin, Viton O-ring and polytetrafluoroethylene

Power Requirements

9 to 28 VDC loop powered, 0.6 W max

Cable

OCG-*F-T5: 2 conductor, twisted pair with connector; 22 AWG; 0.04 Ω /ft; 4000 ft (1219 m) maximum cable length

Output

Max. load (Ω) = $[40 \Omega \times (\text{PSV} - 8)] - \text{RC}$ where:
PSV = power supply voltage in VDC, and
RC = cable resistance (22 AWG cable has 0.04 Ω /ft)

Example:

Given a 24 VDC power supply and a 1000 ft (305 m) cable (22 AWG, 0.04 Ω /ft),

$\text{RC} = 1000 \text{ ft} \times 0.04 \Omega/\text{ft} = 40 \Omega$

Max. load = $[40 \times (24 - 8)] - 40$
= $[40 \times 16] - 40$
= 600Ω

Field Programmable

Measurement Ranges

- Ppm sensors:
 - 0 to 10 ppmv O₂ (OX-1 or OX-2 in 316 stainless steel package only)
 - 0 to 100 ppmv O₂
 - 0 to 1000 ppmv O₂
 - 0 to 10,000 ppmv O₂
- Percent sensors:
 - 0% to 1% O₂
 - 0% to 10% O₂
 - 0% to 25% O₂

Accuracy

- $\pm 1\%$ of span at calibration point
- $\pm 2\%$ of span at the calibration point for the 0 to 10 ppmv range (OX-1 or OX-2 in 316 stainless steel package only)

Repeatability

- $\pm 1\%$ of span
- $\pm 2\%$ of span for the 0 to 10 ppmv range (OX-1 or OX-2 in 316 stainless steel package only)

Resolution

$\pm 0.1\%$ of span

Linearity

$\pm 2\%$ of span

Operating Temperature

32°F to 113°F (0°C to 45°C)

Ambient Temperature Effect

$\pm 3\%$ of reading over operating temperature range

Sample Pressure

Vented to atmosphere during operation and calibration

Atmospheric Pressure Effect

$\pm 0.13\%$ of reading per mmHg (directly proportional to absolute pressure). During calibration, pressure and flow must be kept constant.

Process Connection

- 316 stainless steel and Delrin process units: 1/8 in NPT inlet and outlet
- Ambient air monitoring unit: None

Sample Flow Rate

1.0 SCFH (500 cc/min) recommended for process units

Electrical Classification/Certification

- Weatherproof, 316 stainless steel and Delrin process packages only: Type 4X/IP66
- Intrinsically safe, 316 stainless steel package only: Class I, II, III; Division 1; Group A,B,C,D,E,F&G; FM/CSA
 ⓈII 1 G EEx ia IIC T4
 (Tamb = -20°C to +60°C);
 BAS01ATEX1094X
 316 stainless steel ATEX compliance with EN50104 from 32°F to 104°F (0°C to 40°C)

European Compliance

Complies with EMC Directive 89/336/EEC

Order and Calibration Information

Record selected option in blank indicated at bottom of form.

O2X1 Oxygen Transmitter

Sensor

- 0 None
- 1 Standard ppm, 0 to 10 ppm
- 2 Acid ppm, 0 to 10, 100 and 1000 ppm
- 3 Standard %
- 4 Acid %
- 5 Standard ppm, 0 to 100 and 1000 ppm

Package

- 0 316 stainless steel process FM/CSA
- 1 Delrin process
- 2 Delrin ambient air monitoring
- 3 316 stainless steel process ATEX
- 9 316 stainless steel general purpose

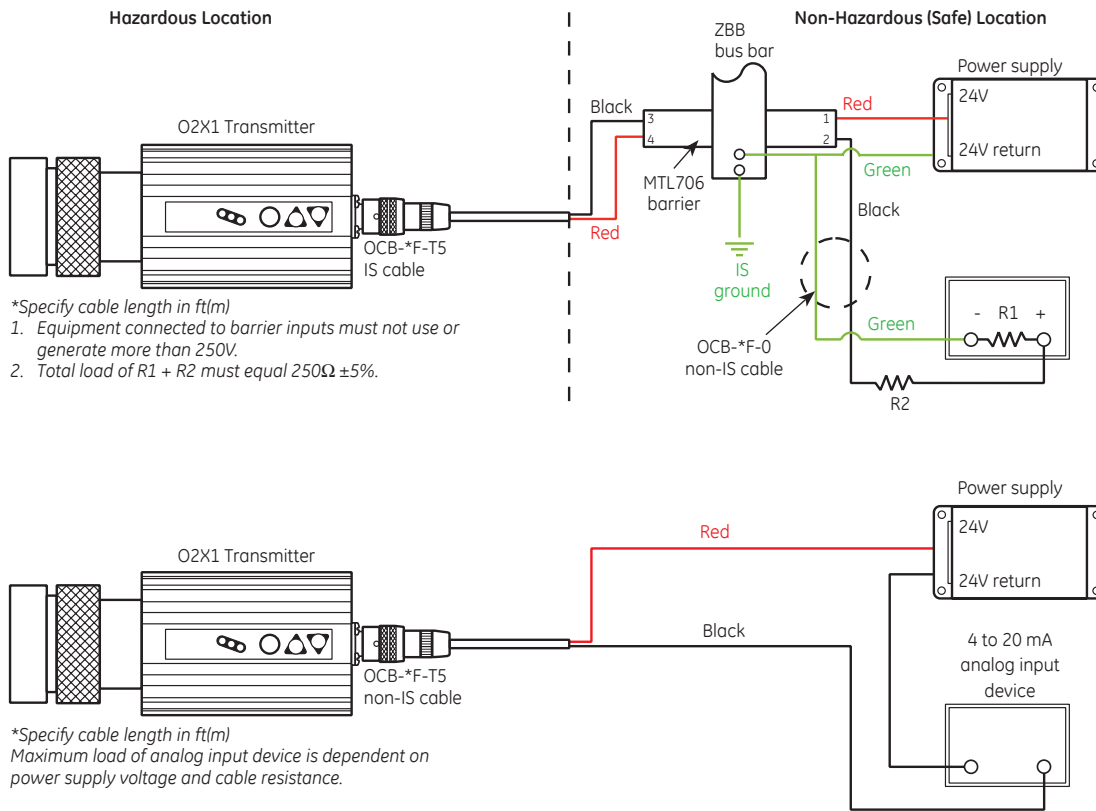
O2X1 - Use this number to order product

OX Spare Oxygen Sensor

Sensor

- 1 Standard ppm, 0 to 10 ppm
- 2 Acid ppm, 0 to 10, 100 and 1000 ppm
- 3 Standard %
- 4 Acid %
- 5 Standard ppm, 0 to 100 and 1000 ppm

OX - Use this number to order product



O2X1 intrinsically safe installation (top) and non-hazardous (safe) installation (bottom).



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Instructions: Please fill out the fields in color. Any field with a block is a required field.									
Today's Date: 		GE Sensing O2X1 Transmitter Application Data Sheet							
Contact Information									
Name: 		 				Phone: 		 	
Company: 		 				Fax: 		 	
Address: 		 				E-mail: 		 	
Installation Address: 		 				Delivery 		 	
Measurement Points: 		 				Want 		 	
Account Manager/Sales rep (if known): 		 							
Process Data									
Process/Application: 		 							
Physical State of material: 		<input type="checkbox"/> Gas		<input type="checkbox"/> Confirm gas phase		 			
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: 		<input type="checkbox"/> Vent to atmosphere		<input type="checkbox"/> 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: 		<input type="checkbox"/> 0 to 100 ppm		<input type="checkbox"/> 0 to 1000 ppm		<input type="checkbox"/> 0 to 10,000 ppm		 	
		<input type="checkbox"/> 0 to 10%		<input type="checkbox"/> 0 to 25 %		<input type="checkbox"/> Other, please specify		 	
Utilities available at transmitter: 		<input type="checkbox"/> Air, pressure		 psig		<input type="checkbox"/> N2, pressure		 psig	
		<input type="checkbox"/> Water, pressure		 psig		<input type="checkbox"/> Temperature		<input type="checkbox"/> Deg F <input type="checkbox"/> Deg C	
		24 VDC power		<input type="checkbox"/> Available <input type="checkbox"/> Not available		 			
Area classification: 		<input type="checkbox"/> Nonhazardous		<input type="checkbox"/> Hazardous		 			
Ambient pressure: 		Units: 		Minimum: 		Maximum: 		Nominal: 	
Ambient temperature: 		Units: 		Minimum: 		Maximum: 		Nominal: 	
Electronics/Display Package									
Digital display: 		<input type="checkbox"/> Local		<input type="checkbox"/> Remote		<input type="checkbox"/> Not required		 	
Type: 		<input type="checkbox"/> Weatherproof		<input type="checkbox"/> Explosionproof		<input type="checkbox"/> Rack		<input type="checkbox"/> Bench <input type="checkbox"/> Panel	
Automatic calibration: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Alarm relays: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Output units: 		<input type="checkbox"/> Single 4 to 20 mA (isolated)		<input type="checkbox"/> Dual 4 to 20 mA (isolated)		 			
If display is remote please fill in below: 		 							
Power available: 		<input type="checkbox"/> VAC		<input type="checkbox"/> HZ		<input type="checkbox"/> Other		 	
Area classification: 		<input type="checkbox"/> Nonhazardous		<input type="checkbox"/> Hazardous		 			
If hazardous: 		Class: 		Division: 		Groups: 		 	
Distance between display(s) & transmitter(s) if remote: 		<input type="checkbox"/> ft		<input type="checkbox"/> m		Choose one		 	
Tagging: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Drawings: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Other Requirements: 		 							
Additional Measurements									
Moisture: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Flow: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Energy flow rate: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			
Hydrogen concentration: 		<input type="checkbox"/> Not required		<input type="checkbox"/> Required		 			

Thermal conductivity:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Flue gas analysis:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Combustible gas:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Wobbe index:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
CARI:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Calorific value:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Carbon potential:	<input type="checkbox"/>	Not required	<input type="checkbox"/>	Required	
Special Requirements:					
Please attach a brief description or sketch of the process					