

Trace O₂ Applications

This full-featured oxygen analyzer is typically used in applications such as:

- Air separation plants
- Glove boxes
- Semiconductor manufacturing processes
- Heat treat and metallurgical processes
- Glass and ceramic research
- Inert gas purity
- Blanket gas monitoring
- Medical research
- Gas blending

Special Applications

- Welding atmospheres
- Gas generators
- Air/fuel mixtures

Features

- Fast, easy one-point calibration
- Low maintenance
- Measures oxygen from 0.1 ppm to 100 percent; can measure oxygen in reducing gases
- Fast response (90 percent of step change in less than 2 seconds)
- Extremely stable sensor operation
- Months of trouble-free service; calibration checks or adjustments seldom required; one-point calibration is sufficient for entire range from ppm to percent oxygen
- Accuracy increases at low oxygen concentrations

CGA 351

Panametrics Zirconium Oxide Oxygen Analyzer

CGA 351 is a Panametrics product. Panametrics has joined other GE high-technology sensing businesses under a new name—GE Industrial, Sensing.





Standard version of CGA 351

Panametrics Zirconium Oxide Oxygen Analyzer

The CGA 351 zirconium oxide oxygen analyzer uses an advanced zirconia sensor to accurately determine oxygen content in process gases. Microprocessor-based electronics allow measurements from ppm levels to 100 percent oxygen.

Applications and Uses

The CGA 351 zirconium oxide oxygen analyzer is suitable for monitoring and/or controlling high purity gas streams or atmospheres such as in air separation, heat treating, ceramic manufacturing and other processes. For dirty or wet gas applications, a suitable sampling system may be required.

How It Works

Sample gas enters the inlet port through a needle valve and flows into a ceramic inlet tube. It then flows through the annular space between the inlet tube and the inside of the zirconium oxide oxygen sensor, then out through the outlet port and a flowmeter. When there are no combustibles present in the sample gas, the analyzer measures total oxygen. When combustibles are present, a platinum-based catalyst at the end of the ceramic tube ensures that the sample reaches equilibrium before contacting the inner electrode. It is therefore possible to measure either oxygen excess or deficiency in air/fuel mixtures.

The zirconium oxide sensor is heated and closely controlled at 1292°F (700°C). As the sample contacts the inner electrode of the heated sensor, an electrical signal is generated. The signal is proportional to the logarithm of the ratio of the oxygen concentration in the sample gas to the oxygen concentration in a reference gas contacting the outer electrode. The electronics displays O₂ in ppm or percent. It also displays other parameters including O₂ sensor millivolts and sensor temperature in °F or °C. Ambient air is used as the reference gas on the outside of the electrochemical cell.

CGA 351 Specifications

Performance

Accuracy

0.2 ppm from 0 to 10 ppm or $\pm 2\%$ of reading

Repeatability

$\pm 1\%$ of reading

Response Time

Less than 2 seconds for 90% step change

Stability

Less than 3% of reading per year

Pressure Effect

Less than 0.2% of reading per mm Hg

Sample Flow Rate Influence

Per 40 cc/min flow change at 400 cc/min

0.2 ppm from 0 to 10 ppm or

2% of reading

Background Gas Variation Effect

Sample gas must be clean, dry and free of combustibles. For best results used same background gas for calibration. Standard factory calibration is 5 ppm O₂ in N₂.

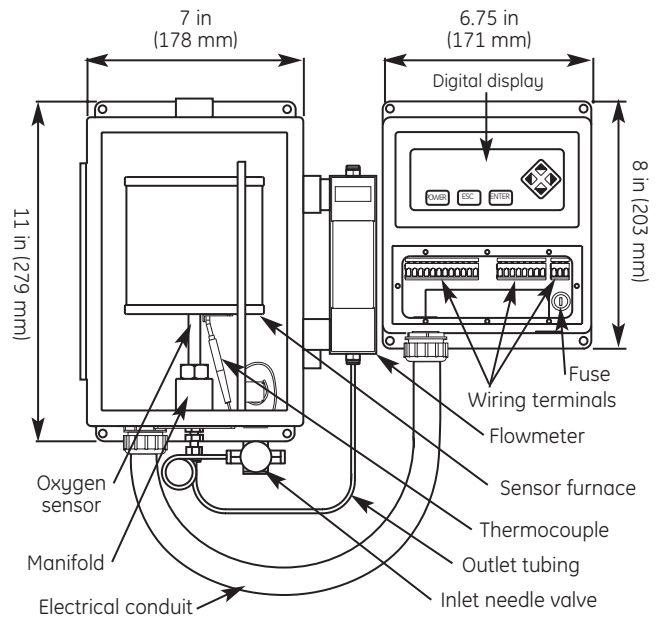
Operating

Measurement Range

- Standard factory setup is 0 to 10 ppm for 4 to 20 mA output. Field selectable for any portion of the range from 0.1 to 10 ppm O₂
- 0.1 ppm to 100% O₂
- The digital panel meter is software-configurable to display the following parameters:
 - Oxygen (ppm or %)
 - Temperature (°F or °C)
 - Sensor (mV)
 - CJC temperature (°F or °C)
- Field selection of autorange

Output Ranges

0/4 to 20 mA, 0 to 2 V



Standard version of CGA 351. Dimensions in inches (mm).

Alarm Circuits

- Dual alarm contacts
- Contact rating 2 A, 28 VDC, SPDT, fail-safe

Communications

Standard RS232 serial port, PanaView™ read only

Sample Requirements

- Sample flow: 400 cc/min (± 40 cc/min recommended)
- Sample inlet pressure: 1 to 10 psig
- Sample outlet (vent) pressure: 1 atmosphere

Ambient Requirements

- Relative humidity: 90% maximum
- Temperature range: -13°F to 122°F (-25°C to 50°C)

Power

100/115/220/240 VAC, 50 to 60 Hz, 250 W maximum

Line-Voltage Influence

$\pm 10\%$ nominal line voltage

Fuse

3 A, 250 V, antisurge, 5 x 20 mm

Materials Contacting Sample Gas

316 stainless steel, ceramic and platinum

Connections

- Sample inlet and outlet: 6 mm compression or ¼ in compression tube fitting
- Electrical analyzer and D/O unit: 1/2 inch conduit

CGA 351 Specifications

Dimensions

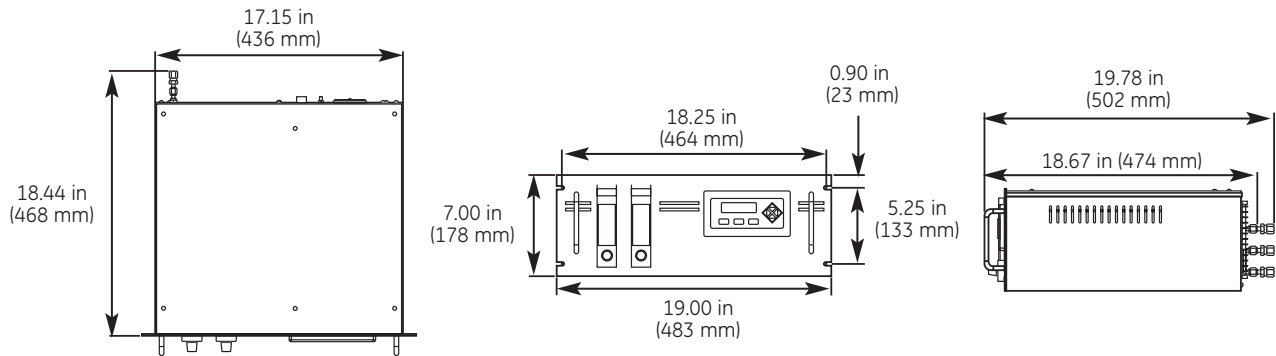
- Sensor enclosure: 7.0 in x 11.0 in (178 mm x 279 mm)
- Electronics enclosure: 6.75 in x 8.0 in (171 mm x 203 mm)

Warm-Up Time

- 45 minutes nominal
- Calibration at alarm or control level with certified mixtures of O₂ in N₂

European Compliance

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



Rack mount version of CGA 351

Order Information

Record selected option in blank indicated at bottom of form.

CGA 351 Zirconium Oxide Oxygen Analyzer

Power

- 1 100 VAC, 50 to 60 Hz
- 2 115 VAC, 50 to 60 Hz
- 3 230 VAC, 50 to 60 Hz
- 4 240 VAC, 50 to 60 Hz

Package

- 1 Wall mount
- 2 Rack mount (220 and 240 VAC only)

Connections

- 1 1/4 in tube fitting
- 2 6 mm tube fitting

CGA 351 - _ _ _ Use this number to order product



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Sensing

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

Today's Date:

GE Sensing CGA351 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 (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:	%	+/- %
Other*			Nominal:	%	+/- %
			Total**	100%	

*Attach additional pages if more space is needed **Gas composition must total 100% (+/- 1%)

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
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Ambient temperature:

Units	Minimum	Maximum	Nominal
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Sample dew point: deg F / deg C (circle one)

Measurement Parameters

Analyzer output range (e.g. 0-25%): % ppm

Area classification: Nonhazardous only

Electronics/Display Package

Output units: 4 to 20 mA (std) Other (specify)

Alarm relays: Not required Required

Power available: VAC HZ Other

Tagging: Not required Required

Drawings: Not required Required

SS compression fitting : Parker / Swagelok / Other :

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
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