

# GE Industrial Sensing

## Applications

The OxyTrak 390 flue gas analyzer measures unburned oxygen levels in dirty, aggressive combustion applications including:

- Boilers—all fuels and all types, including marine, recovery and utility
- Furnaces—all fuels and all types, including heat treating, glass and process
- Rotary kilns—ore reduction, cement, alumina processing and others
- Incinerators—industrial, municipal and hazardous waste

## Features

- Ex situ diffusion/convection loop design with zirconium oxide oxygen sensor for measurement accuracy and durability
- Sensor housing maintains steady temperature for greater accuracy and longer sensor life
- Automatic calibration and verification
- Optional sensor to measure CO, H<sub>2</sub> and other combustibles
- Corrosion-resistant design with plug-resistant sample path
- Easy installation and sensor replacement
- Suitable for temperatures up to 3452°F (1900°C)

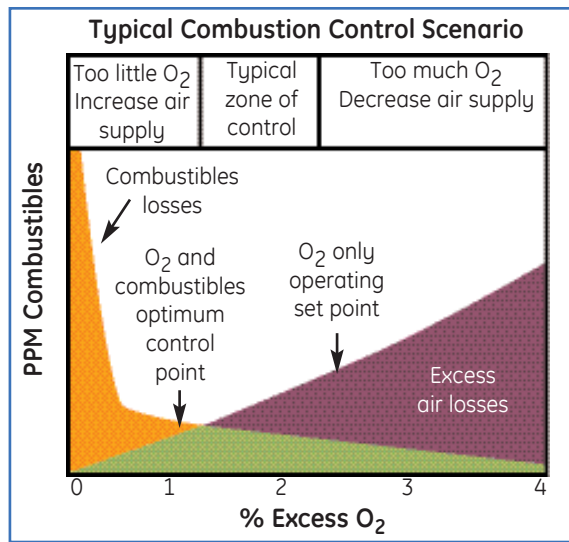
# OxyTrak™ 390 Panametrics Flue Gas Oxygen Analyzer

OxyTrak 390 is a GE Panametrics product. GE Panametrics has joined other GE high-technology sensing businesses under a new name—GE Industrial Sensing.



## Why Monitor Flue Gas?

In an ideal combustion process, fuel and air burn stoichiometrically to yield only heat, water vapor and carbon dioxide. In reality, burners age, mixing is imperfect, caloric value of fuel varies and firing rates change. These factors change the amount of air required for safe and efficient combustion of fuel. Accurate flue gas analysis minimizes fuel costs and reduces pollution in all combustion processes.



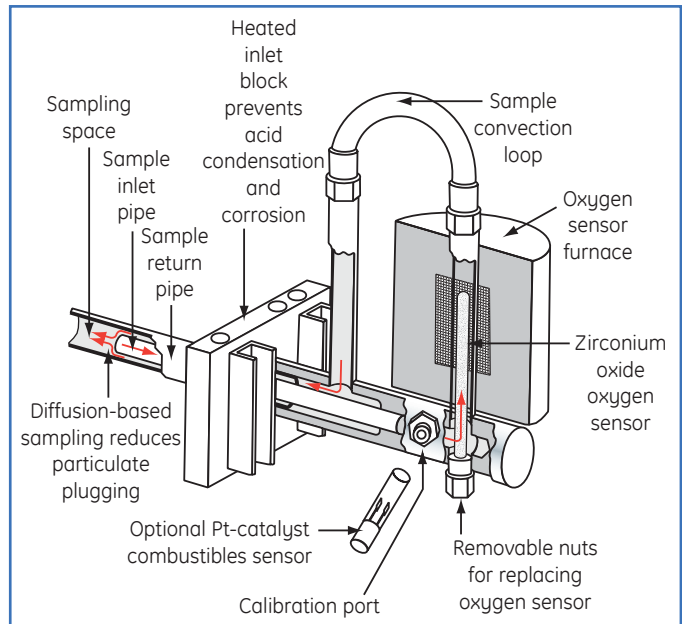
Combustibles applications typically trim burner air supply to run excess oxygen at an optimal level to ensure complete combustion.

## OxyTrak 390 Series—A Step Ahead of Traditional Flue Gas Analyzers

The OxyTrak 390 combines state-of-the-art measurement technology with a unique sampling design. The result is an accurate, low-cost analyzer that stays on the job for extended periods with minimal maintenance. It responds in seconds to changes in flue gas concentrations of oxygen and/or combustibles, constantly providing the information you need to keep your boiler or furnace operating at maximum efficiency. OxyTrak 390 special design features include:

### Stable, Accurate, Wide-Range Oxygen Sensor

The zirconium oxide oxygen sensor, is housed in a furnace that maintains the O<sub>2</sub> sensor at a steady 1292°F (700°C). The temperature stability improves accuracy and extends the sensor's life.



Unique OxyTrak 390 ex situ diffusion convection loop design is better than traditional flue gas analyzers because it provides a clean gas to the sensor.

### Corrosion-Resistant Design

The manifold heater block located at the sample inlet prevents manifold corrosion due to flue gas acid condensation and corrosion is prevented, ensuring maximum analyzer life with minimum maintenance.

### Optional Platinum-Catalyst Combustibles Sensor

A unique platinum-catalyst sensor is available to measure levels of combustibles (CO plus H<sub>2</sub>). This is useful for detecting incomplete combustion or defective burner equipment.

### Simple Installation

The OxyTrak 390 can be installed on a flue or furnace on an existing flange mount. Because it utilizes the ex situ convection loop design, reference air is not needed.

### Fast, Easy Routine Maintenance

Calibration is easily achieved by introducing a calibrated gas through the convenient calibration port and making an automatic adjustment via the display controller. For sensor replacement, there is no need to remove the entire analyzer from the flue. Since the sensor is ex situ, it can be quickly removed with basic tools.

### Plug-Resistant Sample Path

A diffusion-based sampling technique greatly reduces the entry of particulates into the analyzer. If necessary, quick and easy cleaning is possible without disassembling the unit.

# OxyTrak 390 Specifications

## Performance

### Accuracy

- Oxygen:  $\pm 0.1\% \text{ O}_2$  (0 to 10%  $\text{O}_2$ ) and  $\pm 0.2\% \text{ O}_2$  (10 to 25%  $\text{O}_2$ )
- Combustibles:  $\pm 20$  ppm or  $\pm 5\%$  of reading, whichever is greater (Optional)

### Repeatability

- Oxygen:  $\pm 0.05\% \text{ O}_2$  (0 to 10%  $\text{O}_2$ ) and  $\pm 0.1\% \text{ O}_2$  (10 to 25%  $\text{O}_2$ )
- Combustibles:  $\pm 10$  ppm or  $\pm 2\%$  of reading, whichever is greater (Optional)

### Output Resolution

- Oxygen:  $\pm 0.01\% \text{ O}_2$
- Combustibles:  $\pm 1\%$  of full scale (FS) (Optional)

### Stability

- Oxygen:  $> 0.01\% \text{ O}_2$  per month
- Combustibles:  $> 5$  ppm per month (Optional)

### Measurement Range

- Oxygen: 0 to 1% to 0 to 100%  $\text{O}_2$ , user-selectable
- Combustibles: 0 to 500/1000/2000/5000/10,000 ppm; 0 to 2% (Optional)

### Process Pressure Effect

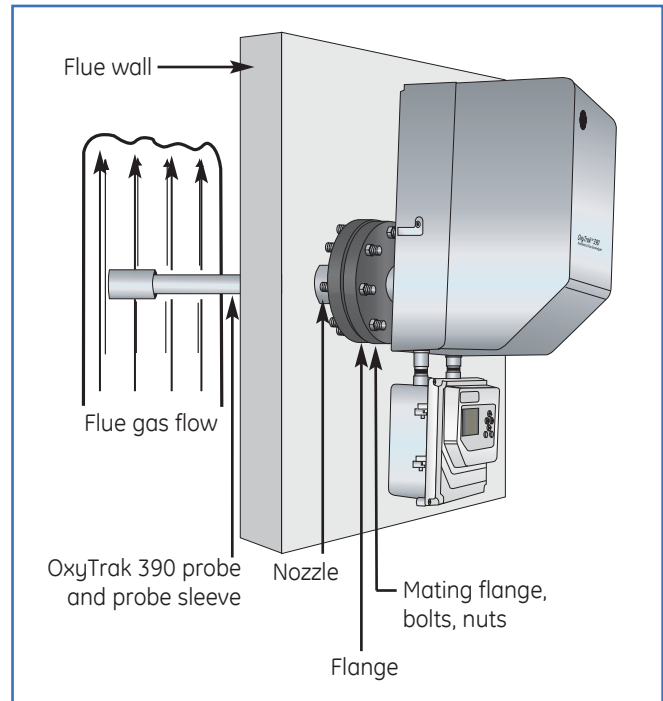
$> \pm 0.05\% \text{ O}_2$  per psi (bar) pressure compensation

### Supply Voltage Effect

$> \pm 0.05\% \text{ O}_2$

### Response Time

- Oxygen: 90% step change within 20 s
- Combustibles: 90% step change within 20 s (Optional)



*Typical horizontal flue gas analyzer installation*

## Functional

### Display

Intuitive, state-of-the-art microprocessor-based controller displays readings for up to three user-specified process conditions (%  $\text{O}_2$ , ppm combustible, furnace temperature, heater block temperature)

### Output

- Analog: three linearized, isolated, 4 to 20 mA outputs, user selectable, field programmable for  $\text{O}_2$  or combustibles over any range
- Alarm: eight configurable relays:
  - Oxygen; high and low
  - Combustibles; high and low
  - Autocalibration or autoverification, two relays for  $\text{O}_2$  and/or two relays for combustibles
  - System fault
  - Blowback feature
- Digital
  - Standard: PanaView™ via RS485 or RS232, user selectable

# OxyTrak 390 Specifications

## Ambient Temperature Range

- Analyzer: -22°F to 158°F (-30°C to 70°C)
- Analyzer, optional: High dew point version available
- Display/controller: -4°F to 140°F (-20°C to 60°C)

## Sensor Temperature

- Standard: 1292°F (700°C)
- Optional: 1418°F (770°C)
- Optional: 1493°F (812°C) for high sulfur applications

## Flue Gas Temperature Range/Probe Material

- Up to 1200°F (650°C)/316 stainless steel
- 1200°F to 1750°F (650°C to 950°C)/MA253 stainless steel
- 1750°F to 2900°F (950°C to 1600°C)/Mullite
- 2900°F to 3450°F (1600°C to 1900°C)/Alumina

## Warm-Up Time

50 minutes

## Calibration Verification

3 modes: Manual, AutoCal and AutoVerify  
Calibration gas flow rate: 240 ±10 cc/min

## Physical

### Sensor Type

- Oxygen: Stabilized zirconium oxide
- Combustibles: Catalytic-combustion, platinum RTD (Optional)

### Wetted Materials

316 stainless steel

### Probe Lengths

- Standard: 24 in (0.6 m), 39 in (1 m) or 55 in (1.4 m)
- Other lengths available upon request

### Overall Dimensions (h x w x d)

22 in x 17 in x 12 in (559 mm x 431 mm x 305 mm), not including mounting flange or probe and probe sleeve)

### Total Weight (19 in (483 mm) probe)

25 lb (11.4 kg)

### Mounting

- Standard: 1 1/2 in MNPT
- Optional: DN80 PN16, 3 in and 4 in CS flanges

### Housing

- Analyzer: Type 2; IP52

## Display/Controller

### Enclosure and User Interface

- External 6-button keypad for field programming
- Large, 128 x 64 pixel LCD graphic display
- User-configurable display
- Local or remote installation of controller display (25, 50 and 100 ft standard cable lengths)
- Proprietary Proportional Integral Derivative (PID) control circuit (patent pending) provides the highest level of O<sub>2</sub> measurement accuracy via exceptional sensor furnace temperature control
- Weatherproof Type 4X, IP67 enclosure
- Size (h x w x d): 8.8 x 8.2 x 3.6 in (220 x 210 x 90 mm)

### Output Load

600 Ω

### Power

- Supply: 115, 230 or 240 VAC; ±10%
- Consumption: 350W

### European Compliance

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



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920-091A

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

Today's Date:		<b>GE Sensing Oxytrak 390/411, FGA311/300 Analyzer Application Data Sheet</b>						
<b>Contact Information</b>								
Name:						Phone:		
Company:						Fax:		
Address:						E-mail:		
Installation Address:						Delivery Want		
Measurement Points								
Account Manager/Sales rep (if known)								
<b>Process Data</b>								
Please supply the following data for each sample point								
Process Type (boiler, furnace, incinerator, etc)								
Fuel:				Diameter of flue at installation site:				
Existing flange size (if any):				Existing opening (diameter):			in./mm	
Pressure:	Units		Minimum		Maximum		Nominal	
Temperature:	Units		Minimum		Maximum		Nominal	
Possible acid contaminants & percentage (HCL, H2S etc.)								
If sample will be returned to process, pressure at sample return point:								
SO2 Concentration: %								
Dust/soot-laden flue gas: <input type="checkbox"/> No <input type="checkbox"/> Yes (specify amount of particulate)								
Oxidizing/reducing atmosphere: <input type="checkbox"/> No <input type="checkbox"/> Yes								
Remarks:								
<b>Analyzer Measurement Parameters</b>								
Applicable parameters (specify any that are relevant):								
Air factor:	<input type="checkbox"/>	0.8 to 1.2%	<input type="checkbox"/>	0.8 to 2.0%				
Excess fuel:	<input type="checkbox"/>	0 to 5%	<input type="checkbox"/>	0 to 10%	<input type="checkbox"/>	0 to 20%	<input type="checkbox"/>	0 to 25%
Equivalent combustibles:	<input type="checkbox"/>	0 to 5%	<input type="checkbox"/>	0 to 10%	<input type="checkbox"/>	0 to 20%	<input type="checkbox"/>	0 to 25%
Linear oxygen meter:	<input type="checkbox"/>	0 to 5%	<input type="checkbox"/>	0 to 10%	<input type="checkbox"/>	0 to 20%	<input type="checkbox"/>	0 to 25%
Logarithmic oxygen meter 0 to 1000 mV output (equivalent to 0 to 21% oxygen): <input type="checkbox"/> Yes <input type="checkbox"/> No								
Combustibles measurement (CO & H2):	<input type="checkbox"/>	Not required		<input type="checkbox"/>	Required (oxidizing atmospheres only)			
Combustibles range:	<input type="checkbox"/>	0 to 2000 ppm v		<input type="checkbox"/>	0 to 5000 ppm v			
Area classification:	<input type="checkbox"/>	Hazardous		<input type="checkbox"/>	No hazardous			
If hazardous:	Class		Division		Group			
Ambient air temperature:	Units		Minimum		Maximum		Nominal	
(At installation area)								
<b>Electronics/Display Package</b>								
Location:	<input type="checkbox"/>	Local			<input type="checkbox"/>	Remote		
Display type:	<input type="checkbox"/>	Rack		<input type="checkbox"/>	Bench		<input type="checkbox"/>	Panel <input type="checkbox"/> Wall mount/weatherproof
Output units:	<input type="checkbox"/>	0 to 20 mA		<input type="checkbox"/>	4 to 20 mA		<input type="checkbox"/>	0 to 10 VDC
Other (specify)								
Alarms (choose one)	<input type="checkbox"/>	Oxygen & combustibles			<input type="checkbox"/>	Dual oxygen		<input type="checkbox"/> al combustibles
Power available:	<input type="checkbox"/>	VAC		<input type="checkbox"/>	Hz		<input type="checkbox"/> Other	
Dry Air:	<input type="checkbox"/>	Not available		<input type="checkbox"/>	Available (specify)		psig	
Area classification:	<input type="checkbox"/>	Hazardous		<input type="checkbox"/>	No hazardous			
If hazardous:	Class		Division		Group			
If remote, cable distance from analyzer/probe to remote electronics: ft/m Choose one								
Please supply a brief description and sketch of the process. Be sure to indicate installation point.								
(Attach a separate sheet if necessary)								