

# 650

## SERIES

# NOxygen



**Chemiluminescent NO/NO<sub>x</sub> & Paramagnetic Oxygen Analyzer**

### APPLICATIONS

- Stack Gases (CEM)
- Scrubber Efficiency
- Combustion Efficiency
- Turbine/Generator Feedback Control
- Process Chemical Gas Analysis
- Personnel Safety
- Power Plant De-Nitrification
- Fuel Cell Analysis
- Vehicle Emissions

### OPTIONS

- Internal Zero/Span/Sample Valves
- Internal Sample Pump
- Internal Ozone Pump
- High Output Ozone Lamp
- 19 Inch Rack Mount Slides

### FEATURES

- Measures From 0-3 to 0-3,000 ppm Full Scale (NO/NO<sub>x</sub>)
- Four User Definable Ranges
- Oxygen Range: 0-25%
- Fast Response Time
- Auto Ranging
- Auto Calibration
- Output Options: Analog (User Scalable), (RS232) using AK Protocol & TCP/IP
- Data Archiving
- Remote Monitoring and Control
- Electronic Proportional Pressure Control for Sample & Ozone Flow



# 650 SERIES CLD/Paramagnetic Analyzer

# NOxygen

## DESCRIPTION

The California Analytical Model 650 NOxygen NO/NO<sub>x</sub>/NO<sub>2</sub>/O<sub>2</sub> digital analyzer is designed around a state-of-the-art 16 bit microprocessor, with 16 digital inputs, 16 digital outputs, 16 analog inputs and 4 analog outputs. The analyzer can be manually operated from the keypad or remotely via TCP/IP, RS-232C communications and discrete inputs. The analyzer display includes screen presentation of all analyzer alarms. Four levels of password protection are provided. For precision measurements, the analyzer's accuracy is increased by entering calibration curve fit polynomials. Automatic calibrations may be activated locally or remotely or at preset times. The analyzer may also display NO, NO<sub>x</sub>, NO<sub>2</sub>, and O<sub>2</sub> via selectable time and hold commands.

## METHOD OF OPERATION

### Chemiluminescent

The California Analytical Model 650 NOxygen Analyzer utilizes the principle of chemiluminescence for analyzing the NO or NO<sub>x</sub> concentration within a gaseous sample. In the NO mode, the chemiluminescent reaction occurs between ozone and nitric oxide (NO) yielding nitrogen dioxide (NO<sub>2</sub>\*) and oxygen. This reaction produces light. The intensity of this light is linearly proportional to the mass flow rate of NO into the reaction chamber. The light is measured with a photodiode and associated amplification electronics. The photodiode is thermoelectrically cooled and temperature regulated. In the NO<sub>x</sub> mode, NO plus NO<sub>2</sub> is determined as above, however, the sample is first routed through the internal NO<sub>2</sub> to NO converter which converts the NO<sub>2</sub> in the sample to NO. The resultant chemiluminescent NO-O<sub>3</sub> reaction is then directly proportional to the total NO<sub>x</sub> concentration. Local operation is simplified using the 20 button alphanumeric keypad with data presented on a back lit LCD display. All local operations may be performed remote via RS 232 and/or TCP/IP.

## METHOD OF OPERATION—O<sub>2</sub>

The California Analytical oxygen analyzer section utilizes the paramagnetic method to determine the percent level of oxygen contained in the sample gas. The oxygen level is displayed on the LCD panel in Engineering units.

## SPECIFICATIONS

**DETECTORS:** Chemiluminescence (CLD) Photodiode / Paramagnetic (O<sub>2</sub>)  
**NO/NO<sub>x</sub> RANGES:** 0-3 to 0-3,000 ppm NO/NO<sub>x</sub> (Other Ranges Available)  
(Four user programmable ranges) (Higher Ranges Available upon Request)  
**OXYGEN RANGE:** 0-25%  
**RESPONSE TIME:** Typically < 2 Seconds to 90% Full Scale  
**REPEATABILITY:** Better than 0.5% of Full Scale  
**LINEARITY:** Better than 1% of Full Scale  
**NOISE:** Less than 0.5% of Full Scale  
**ZERO & SPAN DRIFT:** Less than 1% of Full Scale per 24 Hours  
**ZERO & SPAN ADJUSTMENT:** Via front panel, TCP/IP or RS-232  
**CO<sub>2</sub> EFFECT:** Less than 2% with 10% CO<sub>2</sub>  
**ADDITIONAL INTERFERENCE DATA:** CO 1000 ppm – N/A  
HCN 28 ppm – N/A, SO<sub>2</sub> 500 ppm – N/A  
**NH<sub>3</sub>:** 10 ppm – N/A, N<sub>2</sub>O 201 ppm – N/A  
**FLOW CONTROL:** Electronic Proportional Pressure Controller  
**SAMPLE FLOW RATE :** Typically 2.0 LPM (0.6 LPM with Low Flow Option)  
**NO<sub>2</sub> CONVERTER:** Carbon Material @ 205°C > 95% Efficiency  
**OZONATOR:** Ultraviolet Lamp  
**AIR OR O<sub>2</sub> REQUIREMENTS:** Dry Air less than 0.01 ppm NO<sub>x</sub> at 240 cc/Min. @ 25 psig (Dew Point < -10°C)  
**NO/NO<sub>x</sub> Control:** Manual/Remote/Auto Cycle  
**OUTPUTS AVAILABLE:** TCP/IP, RS232, 0-1, 0-5, 0-10 VDC, 4-20mA (selectable)  
**DISCRETE ALARMS/CONTROL:** 15 definable, optically isolated solid state relays (60 VDC max @ 600 mA max)  
**DIGITAL DIAGNOSTICS:** Converter Temperature, Cell Temperature Photodiode Temperature, Air Pressure, Flow Rate & EPC Control Voltage Sample Pressure  
**KEYPAD DISPLAYS:** Factory Settings, TCP/IP address, Passwords (4) Scalable Analog Output Voltages, Full Scale Range Select, Auto Cal Times  
**SPECIAL FEATURES:** Calculated NO<sub>2</sub>, Auto Ranging, Auto Calibration (adjustable through internal clock), Data Archiving  
**DISPLAY:** 3" x 5" Back Lit LCD  
**SAMPLE TEMPERATURE:** Up to 50°C Non-condensing  
**AMBIENT TEMPERATURE:** 5 to 40°C  
**AMBIENT HUMIDITY:** Less than 90% RH (Non-condensing)  
**WARM-UP TIME:** 1 Hour  
**FITTINGS:** 1/4 Inch Tube  
**POWER REQUIREMENTS:** 115 VAC/60 Hz or 230 VAC/50 Hz  
**DIMENSIONS:** 5¼ H x 19 W x 23 D (Inches)  
**WEIGHT:** 55 Pounds

Specifications subject to change without notice.

