TELEDYNE ANALYTICAL INSTRUMENTS

MODEL 9060

Zirconium Oxide Flue Gas Oxygen Analyzer

Optimizing combustion efficiency and minimizing exhaust emissions are important for proper operation of nearly every industrial process that burns fuel. From clean burning natural gas to dirty coal fired kilns, Teledyne's Model 9060 provides reliable and efficient O2 monitoring capabilities by combining field proven zirconium oxide sensor technology with a powerful and versatile microprocessor based controller.

Model 9060 Control Unit

The 9060 O2 analyzer / transmitter provides in-situ analysis capability which can accept signals from up to two zirconia probes for averaging or backup purposes in furnaces, kilns, and boilers with sample temperatures ranging from ambient up to 1400° C. This unit is provided within a compact, steel, NEMA-4, easily installed, gasketed enclosure suitable for wall mounting. Purged or explosion proof design enclosures rated for hazardous areas can also be supplied.

Easy Set Up

Analyzer functions and adjustments are easily accessed via a 7 key membrane keyboard. By using the prompting keys and following the display codes from the 2 line alphanumeric LCD screen, the user can easily interface with and set up the 9060 for field operation.

Easy Calibration / Self Diagnostic Features

The 9060 provides standard programmable automatic calibration and auto-purge outputs. The user can program the cal/purge sequence to an alarm relay for external indication. The 9060 has also been designed with a probe diagnostic loop to continuously monitor for probe impedance to ensure the sensor is functioning properly. The electronics self-calibrates all inputs every minute.

Easy Interface

The 9060 provides two isolated 4-20mADC linearized control signal outputs. One is dedicated to the O2 signal and the other is user selectable from thirteen other variables. In addition, an RS-232 / RS-485 printer / computer interface capability is provided. One general diagnostic alarm and three field selectable alarms with switching are provided standard.

Additional Features

An integral automatic reference pump is provided as standard. This pump draws atmospheric air and delivers it to the zirconium sensor as reference air in lieu of customer supplied instrument air. If the operator desires, the pump can be bypassed and instrument air, at a flow of 50 cc/min, can be delivered to the sensor as required.

Applications

- Gas, oil, pulverized coal and black liquor boilers
- Cement, lime and ceramic kilns
- Refinery process heaters and furnaces
- Blast furnace ovens
- Soaking pit and heat treating furnaces
- Thermal cracking furnaces
- Catalyst regeneration
- Asphalt processes
- Utility boilers

Built for Reliability and Performance

Model 9060 Specifications

Range of Output 1: Field selectable linear from 0-1% to 0-100% O2

Output 2: Can be applied to the optional second sensor input or to one of the following selectable variables:

Combustibles	O2 deficiency	Probe EMF
Carbon dioxide	Efficiency	Stack temperature

Display Choice:

O2 deficiency	Probe EMF	Combustibles
Carbon dioxide*	Efficiency*	Stack temperature
Probe temperature	Sensor impedance	
Ambient temperature	Run hours and date since last service	

*Calculated values

Accuracy and Repeatability: ±1% of actual measured oxygen value with a repeatability of ±0.5% of measured value

Response time: 90% in less than 4 seconds - typical

Inputs:
- One or two zirconia oxygen probes or sensors
- Stack or spare thermocouple, type T, J, K, R, S, or N
- Main flame safety interlock (for heated probes only)
- Purge pressure switch
- Dual fuel selector
- Remote alarm acknowledge

Outputs: Two linearized isolated 4-20mADC signals

Max. load impedance: 4-20 mA isolated output 600 ohms

Alarms: Common alarm relay with 20 alarm functions and three programmable alarm relays for low, very low and high O2, probe temp. low, calibration error, pump failure and horn

Computer / Printer communications: RS-232 or RS-485 for connection of a computer terminal or printer for diagnostics of the analyzer, probe, sensor or combustion appliance

Purge and Calibration check: One purge and two calibration check output relays to operate, solenoid valves

Reference gas pump: Integral diaphragm pump delivers atmospheric air to the ZrO2 sensor, or customer can supply their own instrument air (50 cc/min) for reference purposes

Relay contacts: 0.5A-24 VAC, 1A-30 VDC, 50 VAC, or 30 VDC max

Ambient temperature: 32-122°F (0-50°C)

Connection cable: Special cable containing shield, thermocouple compensating lead, sensor conductors and heater conductors where a heated probe or sensor is used (optional)

Power requirements: 120 or 240 VAC, 50/60 Hz, 125 VA (heated probe or sensor), 5 VA (unheated probe)

Max. power consumption: Unheated probe at 110 VAC, 70mA; Heated probe at 110 VAC, 1.0 mA; Unheated probe at 240 VAC, 40mA; Heated probe at 240 VAC, 2.0 mA

Weight: 5.5 lbs

Enclosure: NEMA-4, suitable for outdoors, wall or surface mounting

Dimensions: 10.2" W x 5.1" H x 3.7" D

Accessories: In-situ probes and sampling sensors Class I, Div 1, Group B, C, D enclosures for hazardous areas
Probe and sensor cables
Sample aspirator (for extractive probe)
Purge and calibration check gas solenoid valves
Calibration check flowmeters

Series 9060 Zirconium Oxide Sensors / Probes

9060H	Heated probe design for typical stack gas applications
9060UH-LT	Unheated probe design (with 253MA sheath)
9060UH-HT	Unheated probe design (with alumina ceramic sheath) -- suited for high temp applications
9060UH-C	Unheated probe design (with proprietary sheath for corrosion resistance) -- suited for corrosive / acid gas content applications.
9060H-EX	Heated probe design for extractive applications

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Warranty

Instrument is warranted for 1 year against defects in material or workmanship

NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.