TELEDYNE
ANALYTICAL INSTRUMENTS

SERIES 9060

Two controllers to choose from

9060L

9060

Zirconium Oxide
Flue Gas
Oxygen Analyzers

Series 9060: Zirconium Oxide Flue Gas Oxygen Analyzers

Model 9060

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 Series 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.

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.

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 standard (9060 only). 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.

The low cost 9060L offers field-configurable ranges between 1% and 25% oxygen and has AutoRanging capability and 0-25% oxygen calibration. An optional full scale range is available up to 100%.

Two programmable failsafe concentration alarms (one high and one low setpoint) provide the versatility to satisfy nearly any requirement.

Model 9060L

Membrane command switches and a large, 4-digit LED display make setup and operation clear and quick.

- Low cost
- Designed for inside installation (but can be modified for outdoor installation)
- 4-20 mADC output
- Alarm relays
- Explosion proof configuration available

- 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 temp
- Display choices:
  O2 deficiency Probe EMF Combustibles
  Carbon dioxide* Efficiency* Stack temp
  Probe temperature Sensor impedance Ambient temperature
  Run hours since last service *Calculated values
- 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
- RS-485 MODBUS
- Optional dual ZrO2 probes provide a better profile of the O2 content in the stack
- Built-in self calibration
- Built-in automatic reference pump

PROBE SELECTION

PROBE CONFIGURATIONS	
9060H	Heated probe design for typical stack gas applications up to 1652°F or 900°C
9060UL	Unheated sensor probe, 253MA sheath for applications up to 1290-2100°F (700-1150°C) with thermocouple (Type R).
9060UH-LT	Unheated probe design (with 253MA sheath) from 1292 - 2102°F or 700 - 1150°C
9060UH-HT	Unheated probe design (with alumina ceramic sheath); suited for high temp applications from 1292 - 2552°F or 700 - 1400°C
9060UH-C	Unheated probe design (with proprietary sheath for corrosion resistance); suited for corrosive / acid gas content applications from 1292 - 2192°F or 700 - 1200°C
9060HEX	Heated probe design for extractive applications up to 1652°F or 900°C (non-insitu type)
9060HUOP	In-situ, heated extractive type O2 probe with exproof probe head for CCR applications rated at sample pressure of 35 psig

Connection cable between probe and controller:

Heated probes - 6 wire cable required

Unheated probes - 4 wire cable required

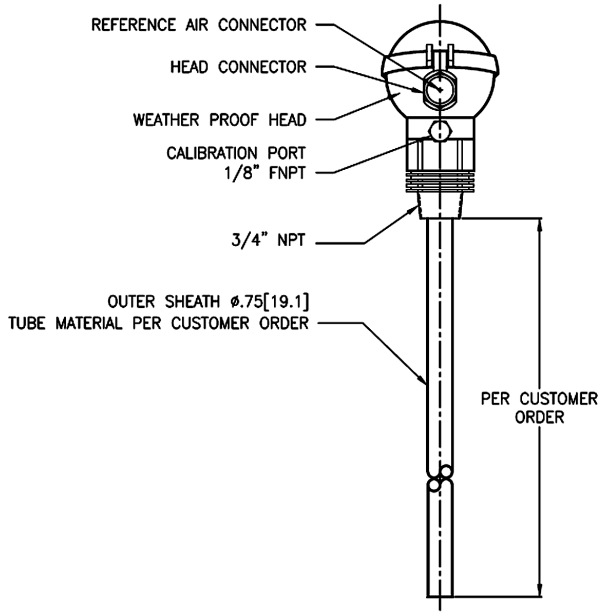
TAI can provide interconnection cables if requested.

Applications

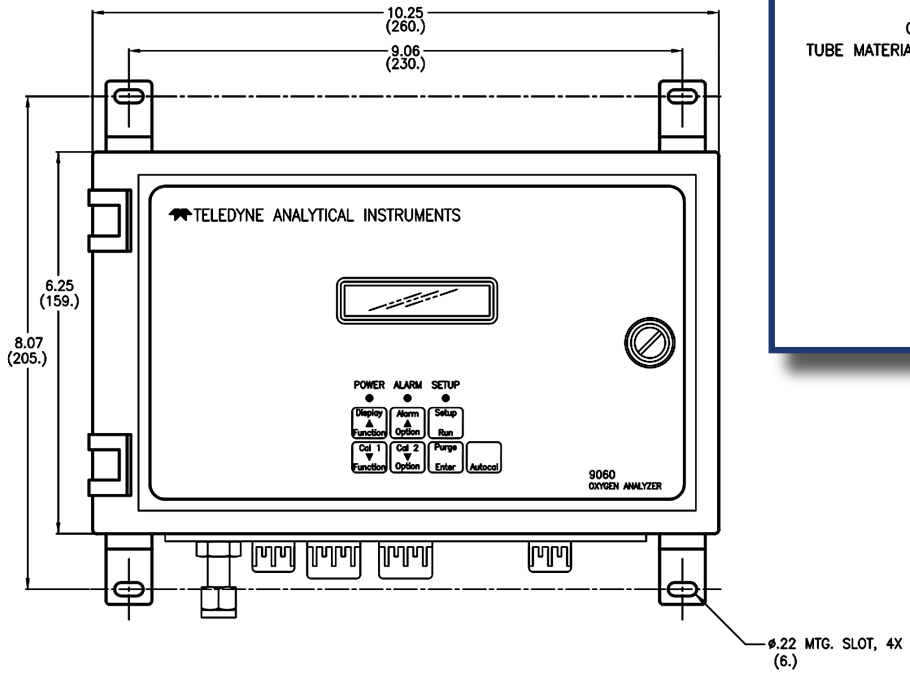
- Gas, oil, pulverized coal and black liquor boilers
- Cement, lime and ceramic kilns
- Refinery process heaters and furnaces
- Blast furnace ovens
- Soaking pit and heat treating furnaces
- Thermal cracking furnaces
- Catalyst regeneration
- Asphalt processes
- Utility boilers
- UOP Process

Probe Lengths

Probes can be purchased in varying lengths and explosion proof types are available. Contact Teledyne with your application needs.



9060 Probe



9060 Controller

9060 Series

9060 SPECIFICATIONS

Range of Output 1:	Field selectable linear from 0-1% to 0-100% O2
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
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 (50cc/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)
Power requirements:	120 or 240 VAC, 50/60 Hz, 125 VA (heated probe or sensor), 5 VA (unheated probe)
Weight:	5.5 lbs

9060L SPECIFICATIONS

Ranges:	Two user-selectable ranges between 0-1 and 0-100%
Display:	LED
Accuracy:	±2% of full scale at constant temperature; ±5% of full scale over operating temperature (once temperature equilibrium is reached; at 3% and higher user-defined ranges)
Response time:	90% in less than 20 seconds at 25°C
System operating temp:	0-50°C
Signal output:	4-20 mA and 0-10 VDC negative ground, non-isolated
Range identification:	0-10 VDC
Alarm output:	One high alarm relay, adjustable; One low alarm relay adjustable; One sensor calibration fail relay (all alarms are failsafe)

System power requirements: 110 or 220

9060 with the Z-Purge option

TELEDYNE ANALYTICAL INSTRUMENTS

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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.

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