

Model 4081FG

FOUNDATION™ Fieldbus In Situ Oxygen Analyzer (550° to 1600°C)

- Intrinsically safe:
 - Cenelec EEx ia IIC
 - Class I Div. I Gr. B,C,D (pending)
- Operates at high temperatures 550° to 1600°C (1022° to 2912°F)
- Assists in low NO_x operation
- Calibration check ability
- Fast response — no flame arrestors
- Digital Fieldbus communications
 - PlantWeb™ compatible
 - AMS
- Accuracy ±1.5% of reading

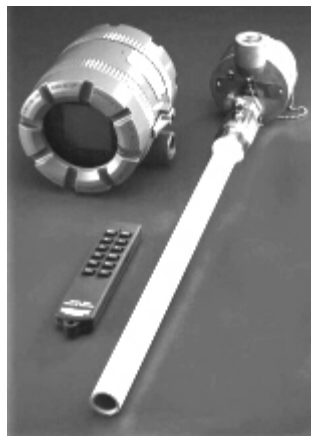
MEASURES CLOSER TO THE FLAME WHILE MAINTAINING INTRINSIC SAFETY

Traditional in situ oxygen flue gas analyzers utilize zirconium oxide sensors to measure excess oxygen in process flue gas. These zirconium oxide sensors use a principle of operation based on the Nernst equation. This principle requires that the sensor cell be maintained at a high operating temperature using a heater that is powered via the analyzer's electronics.

Many applications involve hazardous gases in the process itself or in the ambient gases in the area where the analyzer's electronics are installed. Operators are often concerned that the cell heater can serve as an ignition source to these hazardous gases inside the process or that the electronics can provide ignition to hazardous process or ambient gases that may be present. As a result, these users must purchase oxygen analyzers with costly protection features.

In addition, traditional in situ oxygen analyzers use metallic alloys that are also limited to temperatures in the range of 701°C (1300°F). This process temperature limitation prohibits the analyzer from being inserted close to the actual combustion process. Many operators prefer to measure flue gas oxygen close to the furnace or radiant section for a more representative O₂ measurement. Improved analyzer accuracy can often result in significant fuel savings or improved process throughput.

The Model 4081FG Flue Gas Analyzer utilizes a zirconium oxide sensor to measure excess oxygen in combustion processes. Its cost-effective design enables it to accurately measure excess oxygen in process temperatures ranging from 550° to 1600°C (1022° to 2912°F). The



Model 4081FG's oxygen probe and electronics ARE INTRINSICALLY SAFE without requiring costly design modifications such as flame arrestors. The oxygen probe is constructed of ceramic materials capable of withstanding the higher process temperatures. Also, the analyzer eliminates the use of the cell heater, using the higher process temperatures to heat the zirconium oxide sensor cell to the temperature required by the

Nernst equation principle of operation.

In addition, the electronics permit configuration, operation, and diagnostics with an easy-to-use handheld Infrared Remote Control (IRC). Only one IRC is required to communicate with any number of Model 4081FG Oxygen Flue Gas Analyzers at the user's location. Communication with any specific Model 4081FG Analyzer is accomplished by aiming the IRC beam directly at the electronics and entering its factory or user ID number at the prompt. The Fieldbus protocol provides a link into Fisher-Rosemount's PlantWeb field-based architecture. Instrument technicians can interface with the 4081FG from the operator console in the control room. Service diagnostics and calibrations can be performed remotely.



Applications

- Process heaters - hazardous areas
- Reactor furnaces - hazardous areas
- Boiler radiant zones
 - Measures before air leaks
 - Tuning individual burners
 - NO_x reduction
- Sulfur recovery furnaces
- Hazardous waste incinerators
- Steel reheat furnaces
- Glass furnaces
- Carburizing furnaces

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MODEL 4081FG TWO-WIRE HIGH TEMPERATURE OXYGEN ANALYZER FEATURES AND BENEFITS

FEATURES	BENEFITS
Both the analyzer s in situ probe and the electronics are intrinsically safe.	Provides protection from hazardous process or ambient gases, preventing explosions without requiring field-mounted electrical barriers, flame arrestors, or special enclosures. Explosion-pro of conduit is not required for cabling.
Operates in process gases ranging from 550° to 1600°C (1022° to 2912°F).	Provides accurate oxygen flue gas analysis closer to the flame in boiler applications; enables accurate flue gas analysis in high temperature process heater or furnace applications.
Provides FOUNDATION Fieldbus communications.	Provides convenient and cost-effective operator access to key analyzer parameters; provides analyzer diagnostic capabilities from the terminations room, instrument maintenance shop, or control room.
Provides accuracy of –1.5% of reading.	Best accuracy specification for analyzer of its type in the industry; enables tighter energy control in process which helps user reduce energy costs; improve process throughput.

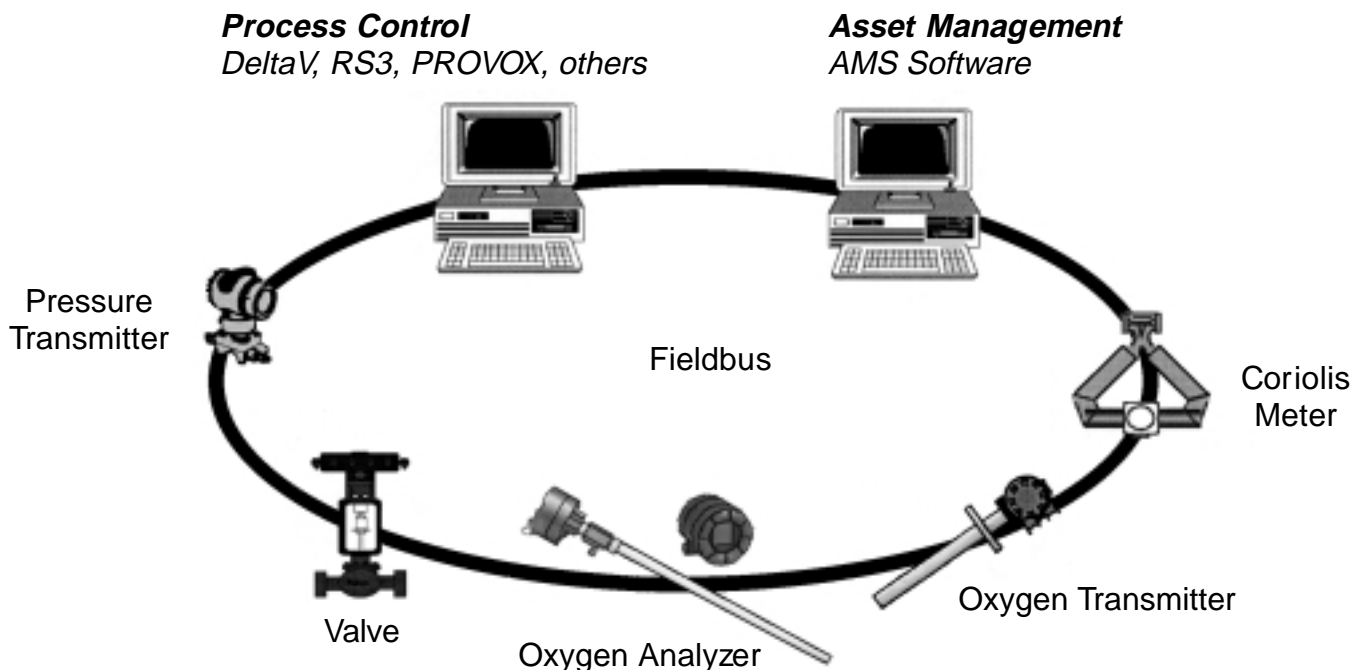
MODEL 4081FG OPERATOR INTERFACE

The Fieldbus protocol provides a link into Fisher-Rosemount's PlantWeb Field-Based Architecture. Instrument technicians can interface with the Oxymitter from the operator console in the control room. Service diagnostics and calibrations can be performed remotely.

Calibration Check Capability

The Model 4081FG offers the ability to flow calibration gases to the probe for calibration check. This feature helps ensure that your Model 4081FG Analyzer is performing within calibration and its specifications, providing accurate oxygen flue gas measurements to help you save fuel or improve process throughput.

Fieldbus Communications provides digital communications from field device to field device over a single pair of wires.



SPECIFICATIONS

GENERAL

Net O₂ range:	0-25%
System accuracy:	±1.5% of reading or 0.05% O ₂ , whichever is greater
System speed response in flue gas:	
	Initial response - less than 3 seconds
	T90 response - less than 10 seconds

PROBE

Lengths:	457 mm (18 in.) 610 mm (24 in.) 914 mm (36 in.) 1219 mm (48 in.)
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Process temperature limits:	550° to 1600°C (1022° to 2912°F)
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Ambient temperature limits:	-40° to 149°C (-40° to 300°F)
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Materials of construction:

Process wetted parts:

Inner probe: Zirconia

Outer protection tube: Alumina [1600°C (2912°F) limit]
Alloy [900°C (1652°F) limit]

Probe junction box: Cast aluminum

Speed of installation/withdrawal:	25.4 mm (1 in.) per minute
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Hazardous area certification:	Intrinsically safe per EN50 014 (1977), clause 1.3 ⁽¹⁾
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Reference air requirement:	100 ml per minute (2.119 scfh) of clean, dry instrument air; 1/4 in. tube fittings
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Calibration check gas fittings:	1/4 in. tube fittings
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Cabling:	Two twisted pairs, shielded
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ELECTRONICS

Enclosure:	IP65 (NEMA 4X), weatherproof, and corrosion-resistant
Materials of construction:	Low copper aluminum
Ambient temperature limits:	-20° to 65°C (-4° to 149°F)
Relative humidity:	95% with covers sealed
Inputs (from O₂ probe):	Two wires - O ₂ signal Two wires - type B thermocouple
Isolated Output:	Digital Fieldbus
Hazardous area certification:	Cenelec EEx ia IIC T4 or T5 ⁽²⁾ (pending) NEC Class I Div. I Group B,C,D (pending)
Power transient protection:	IEC 801-4
Shipping weight:	4.5 kg (10 lbs)

INFRARED REMOTE CONTROL

Power requirements: Three AAA batteries

Hazardous area certification:
Cenelec EEx ia IIC
Class I Div. I Group A,B,C,D

Fieldbus Logic Function Blocks:
AI - execution time:
75ms O₂

Power Consumption Limits:

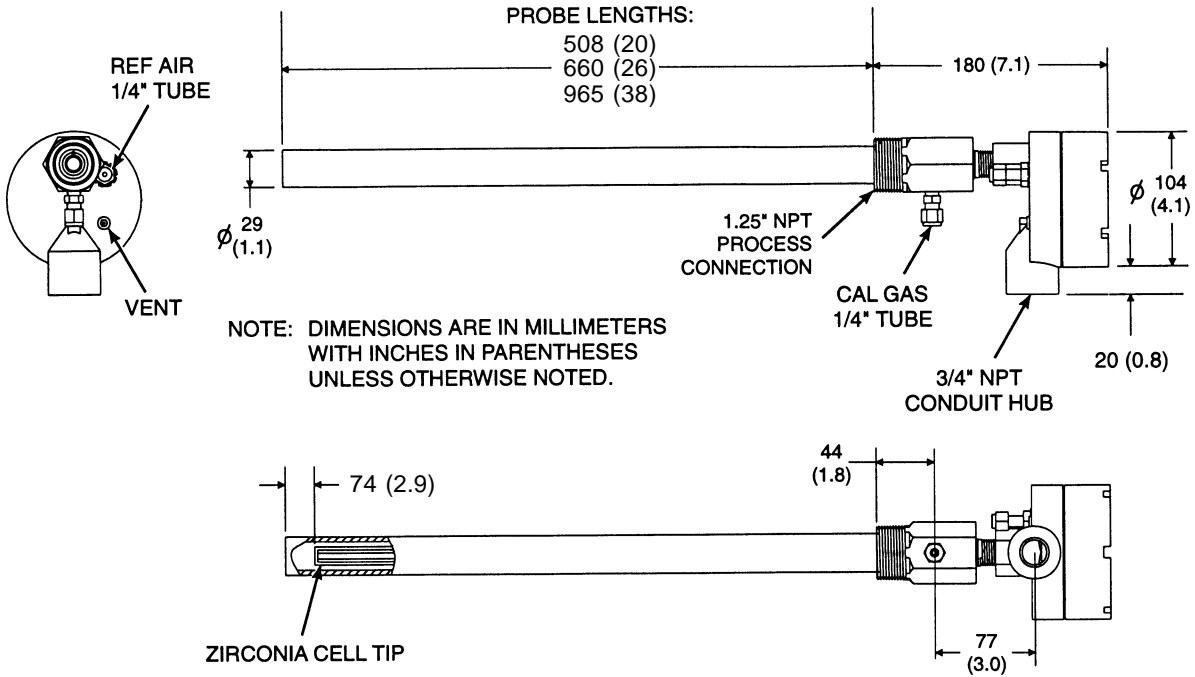
Power Consumption of Electronics: 10 W nominal max.

Fieldbus Segment Power Consumption: 17.5 mA

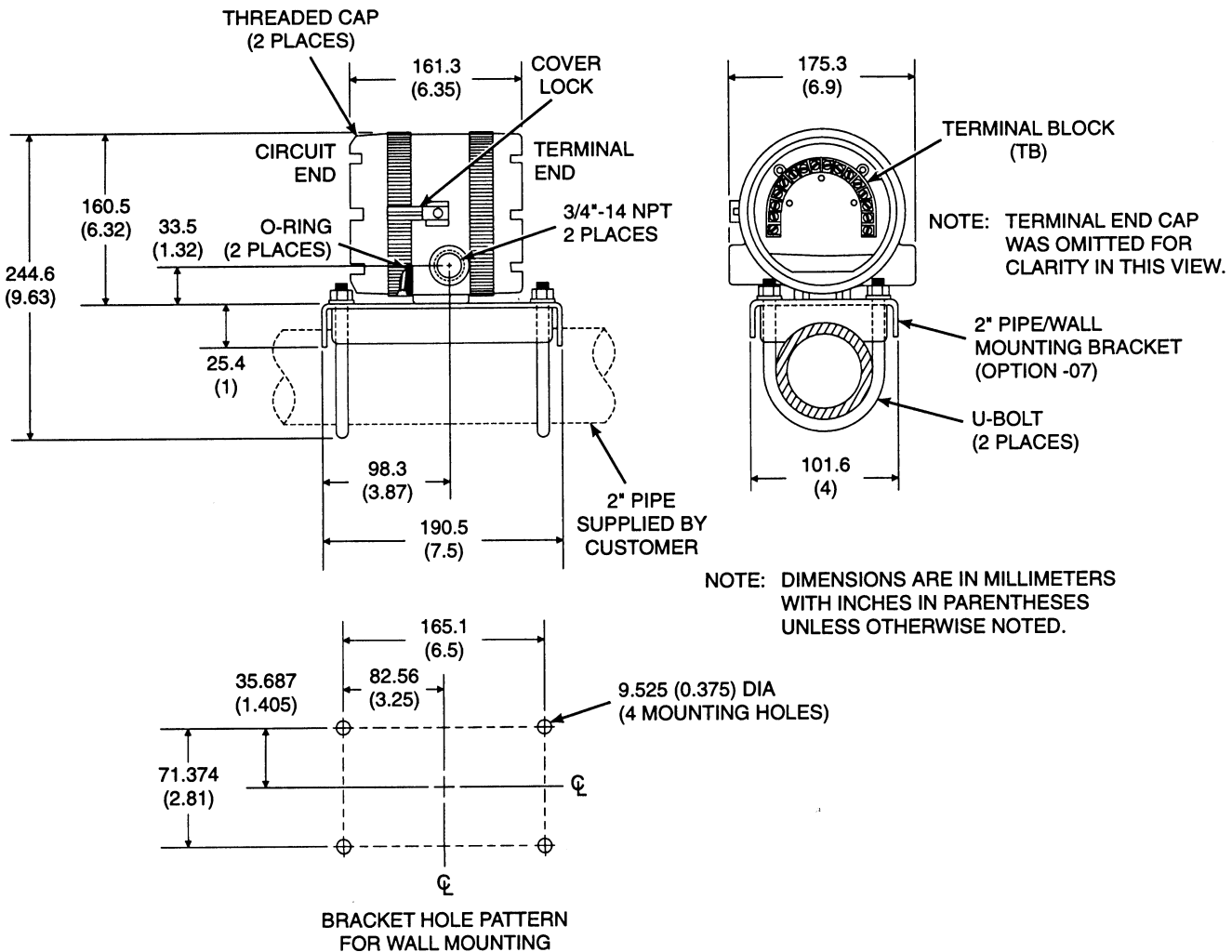
⁽¹⁾ Thermocouple and O₂ probe cell are both unpowered, developing a millivolt emf, and are considered a "simple apparatus" by certifying agencies.

⁽²⁾ Dependent on ambient temperature limits.

MODEL 4081FG PROBE MOUNTING DIMENSIONS



MODEL 4081FG ELECTRONICS MOUNTING DIMENSIONS



MODEL 4081FG ORDERING INFORMATION

4081FG	High Temperature Oxygen Flue Gas Analyzer									
High Temperature Analyzer - Instruction Book										
Code	Sensing Probe Length									
1	508 mm (20 in.) probe, 1/4 in. tube fittings									
2	660 mm (26 in.) probe, 1/4 in. tube fittings									
3	965 mm (38 in.) probe, 1/4 in. tube fittings									
Code	Probe Outer Tube Material - Maximum Operating Temperature									
1	Alumina - 1600°C (2912°F) maximum - 1.25 NPT mounting									
2	Inconel Alloy - 900°C (1652°F) maximum - 1.25 NPT mounting									
Code	Mounting Adapter - Stack Side									
0	No adapter plate required uses 1.25 NPT									
1	New flanged installation - Square weld plate with studs (matches "Mounting Adapter" below)									
2	Model 450 mounting ("4" must also be chosen under "Mounting Adapter" below)									
3	Competitor's Mount ("5" must also be chosen under "Mounting Adapter" below)									
Code	Mounting Adapter - Probe Side									
0	No adapter plate									
1	ANSI 2 in. 150 lb flange to 1.25 NPT adapter									
2	DIN to 1.25 NPT adapter (184 mm flange, 145 mm BC with 4 x 18 mm dia. holes)									
3	JIS to 1.25 NPT adapter (155 mm flange, 130 mm BC with 4 x 13 mm dia. holes)									
4	Model 450 to 1.25 NPT adapter									
5	Competitor's mounting flange									
Code	Electronics & Housing - Intrinsically Safe, NEMA 4X, IP66									
1	4081 Electronics (Fieldbus-compatible) - CENELEC Ex ia IIC T5									
2	4081 Electronics (Fieldbus-compatible) - CSA pending									
3	4081 Electronics (Fieldbus-compatible) - FM Class I, Div. I, Groups B,C,D									
Code	Housing Mounting									
0	Surface or wall mounting									
1	1/2 to 2 in. pipe mounting									
Code	Communications									
0	No remote control									
1	Infrared Remote Control (IRC)									
Code	Calibration Accessories									
0	No hardware									
1	Calibration and reference gas flowmeters and reference air pressure regulator									
Code	Armored Cable Length									
00	No cable									
11	6 m (20 ft)									
12	12 m (40 ft)									
13	18 m (60 ft)									
14	24 m (80 ft)									
15	30 m (100 ft)									
16	45 m (150 ft)									
17	61 m (200 ft)									
18	91 m (300 ft)									
19	122 m (400 ft)									
20	152 m (500 ft)									
4081FG	2	1	0	0	1	1	1	2	11	Example

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