

Rosemount™ 5081FG

High Temperature Oxygen Analyzer



- Intrinsically safe.
- Operates at high temperatures: 1022 to 2550 °F (550 to 1400 °C).
- Assists in low nitrous oxide operation.
- Calibration check ability.
- Fast response - no flame arrestors.
- HART®/Asset Management Solutions (AMS) communications.
- Accuracy: $\pm 1.5\%$ of reading.

Features and benefits

Features	Benefits
Both the analyzer's in situ probe and 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-proof conduit is not required for cabling.
Operates in process gases ranging from 1022 to 2550 °F (550 to 1400 °C).	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.
HART®/Asset Management Solutions (AMS) 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 you reduce energy costs; improves process throughput.

Measures closer to the flame while maintaining intrinsic safety

Traditional in situ oxygen flue gas analyzers use 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 operators of combustion processes have applications that involve hazardous gases in the process itself or in the ambient gases in the area where the analyzer's electronics are installed. These 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 of these concerns, these operators must purchase oxygen analyzers with costly protection features.

In addition, traditional in situ oxygen analyzers use metallic alloys that are also limited to temperatures below 1300 °F (701 °C). 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 oxygen measurement. Improved analyzer accuracy often results in significant fuel savings or improved processes throughout.

The Rosemount 5081FG High Temperature Oxygen Analyzer uses a zirconium oxide sensor to measure excess oxygen in combustion processes. The cost-effective design enables it to accurately measure excess oxygen in process temperatures ranging from 1022 to 2550 °F (550 to 1400 °C). In addition, the analyzer is designed so that both its 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 high process temperatures.

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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.

The analyzer's electronics are intrinsically safe, powered by the 4-20 mA signal wires. In addition, the electronics permit configuration, operation, and diagnostics with an easy-to-use hand-held infrared remote control (IRC). Only one IRC is required to communicate with any number of analyzers at your location. To communicate with any specific analyzer, aim the IRC beam directly at the electronics and enter its factory or user ID number at the prompt. This instrument can also communicate over the 4-20 mA signal wires with a HART® communicator or Emerson Asset Management Solutions (AMS) software.

Operator interface

The Rosemount 5081FG is also an Emerson SMART instrument.

Operators can communicate with the analyzer using any host that supports HART® communication protocol, such as Emerson's Asset Management Solutions (AMS) system. Using AMS, operators may diagnose and communicate with the analyzer from a centrally located personal computer (PC), which may also be communicating with all HART-compatible instruments within the operator's plant.

Calibration check capability

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

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

Ordering information

Model

Code	Description
5081FG	High Temperature Oxygen Analyzer: High temperature (1022 to 2912 °F [550 to 1600 °C]), HART® smart

Sensing probe type

Code	Description
1	20-in. (508 mm) probe, ¼-in. (6.4 mm) tube fittings
2	26-in. (660 mm) probe, ¼-in. (6.4 mm) tube fittings
3	38-in. (965 mm) probe, ¼-in. (6.4 mm) tube fittings

Probe outer tube material - maximum operating temperature

Code	Description
1	Alumina - 2912 °F (1600 °C) maximum - 1¼ NPT mounting
2	Inconel alloy - 1832 °F (1000 °C) maximum - 1¼ NPT mounting

Mounting adapter (stack side)

Code	Description
0	No adapter plate required; uses 1¼ NPT
1	New flanged installation - square weld plate with studs
2	Westinghouse model 450 mounting
3	Competitor's mount

Mounting adapter (probe side)

Code	Description
0	No adapter plate
1	ANSI 2-in. (50.8 mm) flange to 1¼ NPT adapter
2	DIN to 1¼ NPT adapter
3	JIS to 1¼ NPT adapter
4	Model 450 to 1¼ NPT adapter
5	Competitor's mounting flange

Electronics and housing - Type 4X (IP65)

Code	Description
1	5081-G-HT-73 - ATEX
2	5081-G-HT-69 - CSA
3	5081-G-HT-67 - FM

Housing mounting

Code	Description
00	Surface or wall mounting
01	½ to 2-in. pipe mounting

Communications (HART® standard)

Code	Description
0	No remote control
1	Infrared remote control (LCD display through cover)

Calibration accessories

Code	Description
0	No hardware
1	Calibration/reference flow meters and reference pressure regulator

Special armored length

Code	Description
00	No cable
11	20 ft. (6 m)
12	40 ft. (12 m)
13	60 ft. (18 m)
14	80 ft. (24 m)
15	100 ft. (30 m)
16	150 ft. (45 m)
17	200 ft. (61 m)
18	300 ft. (91 m)
19	400 ft. (122 m)
20	500 ft. (152 m)

Specifications

General specifications

Net O₂ range	0-25 percent
System accuracy	±1.5 percent of reading or 0.05 percent O ₂ , whichever is greater

System speed response in flue gas	Initial response: less than 3 seconds T ₉₀ response: less than 10 seconds
Shipping weight	10 lb. (4.5 kg)

Probe specifications

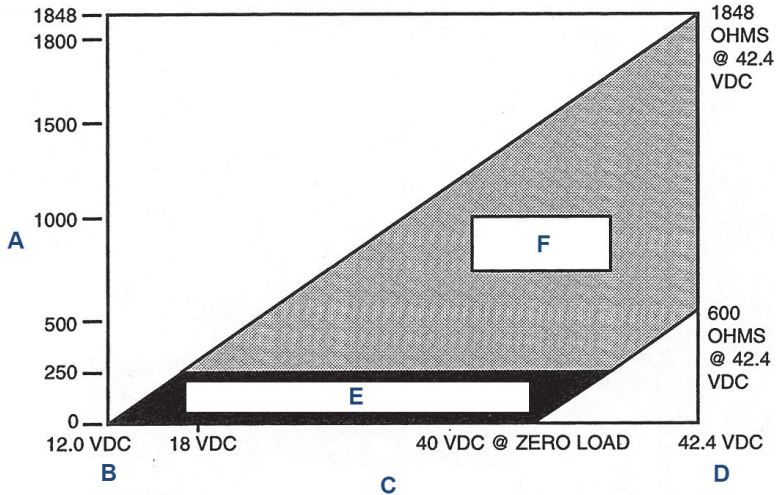
Lengths	20 in. (508 mm) 26 in. (660 mm) 38 in. (965 mm)								
Process temperature limits	1022 to 2550 °F (550 to 1400 °C) Operation to 2912 °F (1600 °C) with reduced cell life								
Ambient temperature limits	-40 to 300 °F (-40 to 149 °C)								
Mounting and mounting position	Vertical or horizontal								
Materials of construction	<table> <tr> <td>Process wetted parts</td> <td>Zirconia</td> </tr> <tr> <td>Inner probe</td> <td>Alumina (2912 °F [1600 °C] limit)</td> </tr> <tr> <td>Outer protection tube</td> <td>Inconel 600 (1832 °F [1000 °C] limit)</td> </tr> <tr> <td>Probe junction box</td> <td>Cast aluminum</td> </tr> </table>	Process wetted parts	Zirconia	Inner probe	Alumina (2912 °F [1600 °C] limit)	Outer protection tube	Inconel 600 (1832 °F [1000 °C] limit)	Probe junction box	Cast aluminum
Process wetted parts	Zirconia								
Inner probe	Alumina (2912 °F [1600 °C] limit)								
Outer protection tube	Inconel 600 (1832 °F [1000 °C] limit)								
Probe junction box	Cast aluminum								
Speed of installation/ withdrawal	1 in. (25.4 mm) per minute								
Hazardous area certification	See the Rosemount 5081FG Manual for product certifications.								
Reference air requirement	100 ml per minute (2.119 scfh) of clean, dry instrument air; ¼-in. (6.4 mm) tube fittings								
Calibration check gas fittings	¼-in. (6.4 mm) tube fittings								
Cabling	Two twisted pairs, shielded								

Electronics specifications

Enclosure	Type 4X (IP65) weatherproof and corrosion-resistant
Materials of construction	Low copper aluminum
Ambient temperature limits	-4 to 149 °F (-20 to 65 °C)
Relative humidity	95 percent with covers sealed

Power supply and load requirements See [Figure 1](#).

Figure 1: Load/power supply requirements



- A. Load (ohms)
- B. Lift off
- C. Power supply voltage
- D. Maximum
- E. Without Field Communicator
- F. Operating region

Inputs (from O₂ probe) Two wires: O₂ signal
Two wires: type B thermocouple

Output One 4-20 mA signal with superimposed digital HART® signal

Power transient protection IEC 801-4

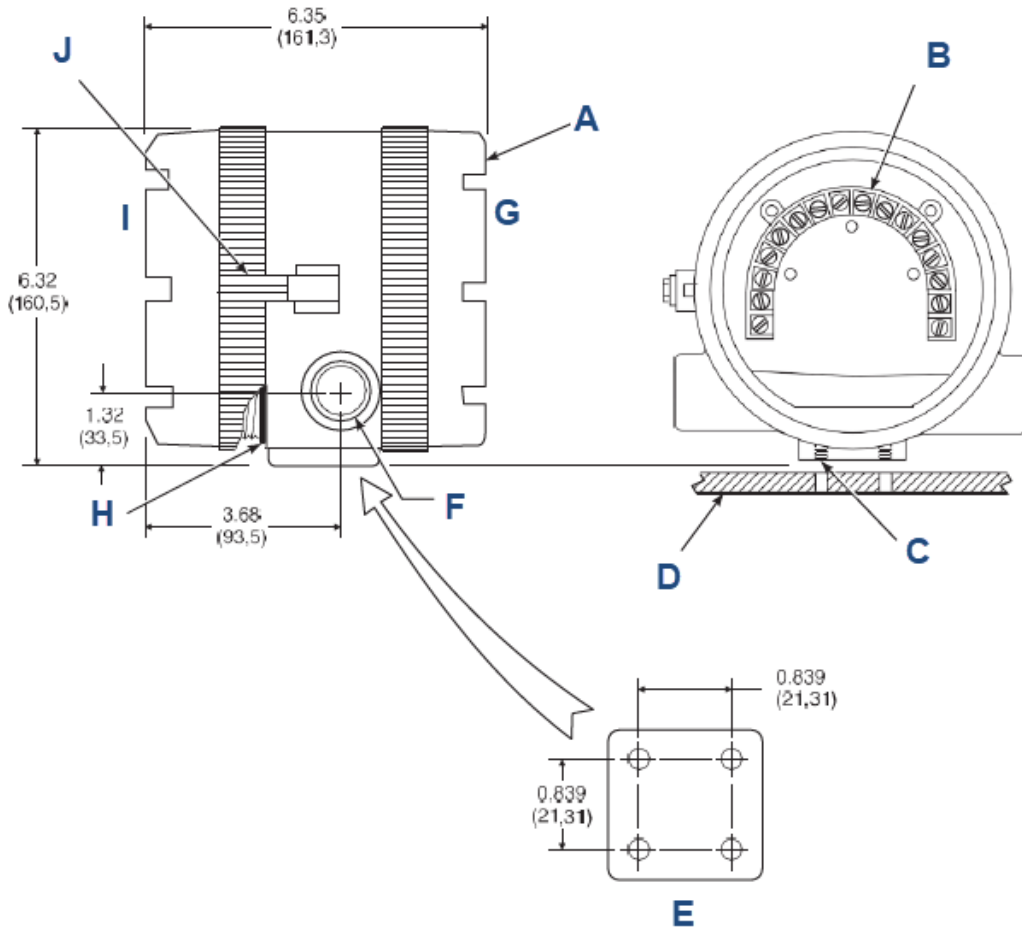
Infrared remote control (IRC) specifications

Power requirements Three AAA batteries

Hazardous area certification Intrinsically safe

Dimensional drawings

Figure 2: Flat surface mounting dimensions

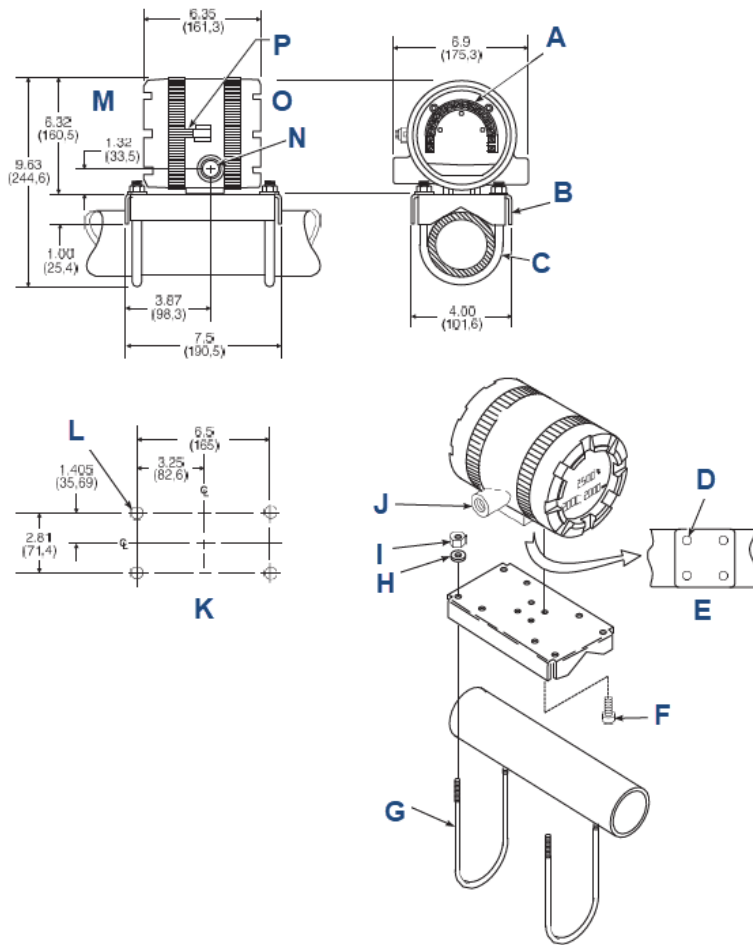


- A. Threaded cap (two places).
- B. Terminal block (TB). Terminal end cap omitted for clarity (this view).
- C. $\frac{1}{4}$ -20 threads (four places).
- D. Surface by others.
- E. Flat surface mounting pad hole pattern.
- F. $\frac{3}{4}$ -14 NPT (two places).
- G. Terminal end.
- H. O-ring (two places).
- I. Circuit end.
- J. Cover lock.

Note

Dimensions are in inches with millimeters in parentheses.

Figure 3: Rosemount 5081FG electronics mounting dimensions



- A. Terminal block (TB). Terminal end cap omitted for clarity in this view.
- B. 2-in. pipe/wall mounting bracket (option).
- C. U-bolt (two places).
- D. 3/4-20 threads.
- E. Bottom view.
- F. 1/4-20 screw. Screws furnished with mounting kit only. Not furnished with analyzer.
- G. U-bolt.
- H. 5/16 washer
- I. 5/16-18 nut.
- J. 3/4-14 FNPT (two places).
- K. Bracket hole pattern for wall mounting.
- L. 0.375 (9.53) diameter (four mounting holes).
- M. Circuit end.
- N. 3/4-14 NPT two places.
- O. Terminal end.
- P. Cover lock.

Note

Dimensions are in inches with millimeters in parentheses..

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