

Stoichiometric Air/Fuel Ratio Analyzer (S A/F IQ)

Reliable off-gas and waste-gas analysis for accurate air-to-fuel ratio control of burners using variable composition fuel gas

With the trend toward greater use of fuel gases with highly variable calorific value, there has been an increased need to properly control the burners using such gases. The traditional method uses a gas chromatograph or calorimeter to determine the BTU value of a fuel that is blended with waste gas to maintain a constant calorific value. While a GC/BTU measurement is appropriate for custody transfer applications, it is too indirect for actual combustion control of highly variable fuel gases.

The ThermoX S A/F IQ Analyzer from AMETEK Process Instruments directly measures the flow of air needed to burn a constant flow of a variable composition fuel gas. This information is used to compensate for non-uniformity in gas supplies and aid the efficient utilization of byproduct and waste gas streams as fuel. Applications include waste-gas and off-gas, fired heaters, boilers, and reheat furnaces.

The analyzer delivers a very fast responding signal enabling the combustion control system to react quickly to the variability of the combustion fuel and provide the right amount of excess air. It operates by burning a continuous sample of the fuel gas stream and available combustion air, duplicating the combustion process.

The S A/F IQ analyzer continuously measures excess oxygen in the products produced by the combustion process. That oxygen measurement can then be used to calculate the Wobbe Index or Stoichiometric Air-to-Fuel (S A/F) ratio as a function of the fuel sample's specific gravity.

BENEFITS

- ▶ Tighter process control through reduced signal lag – S A/F IQ analyzer instantly tracks changes in the fuel gas stream or ambient combustion air.
- ▶ Few maintenance needs – calibration check once per month only
- ▶ Maximum up-time – no consumables to replace means more reliable operation
- ▶ Minimal training needed – simple to use and easy to maintain
- ▶ Better process control from a direct measurement based upon a duplication of the combustion process
- ▶ Compensates for variable amounts of oxygen in the fuel



PRINCIPLE OF OPERATION

Air and fuel enter the sensor from the respective inlets and go through two-stage pressure regulation. The air and fuel flows are metered by sharp-edged orifices and then mixed. Most of this mixture is discarded through a bypass exhaust, but approximately 1.2 cfm flows to a burner which burns the mixture to completion. The products of this combustion then reach the oxygen cell where the oxygen remaining after complete combustion is measured. This measurement correlates to the S A/F and Wobbe Index numbers and inherently corrects for any oxygen in the fuel gas.

OPTIONAL

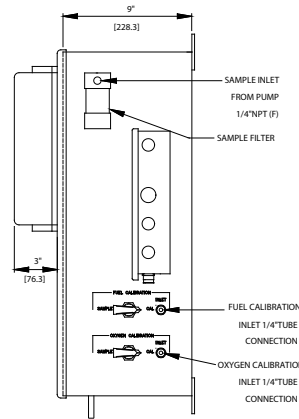
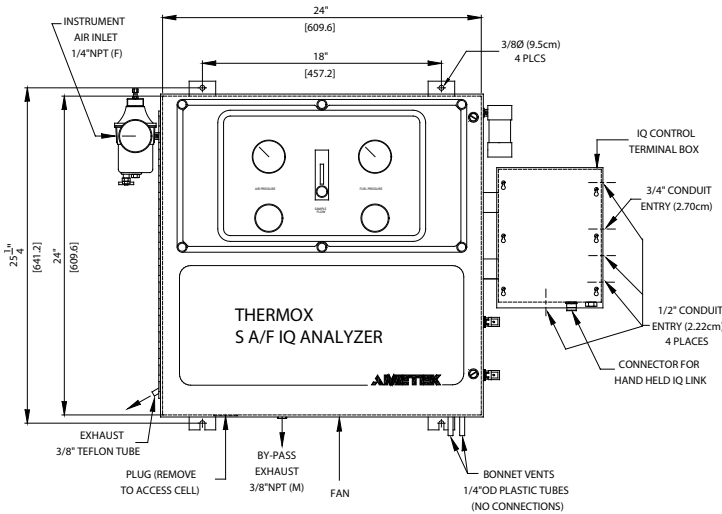
IQ Link provides a local interface to set up and display system parameters, initiate calibrations, initiate system tests, and troubleshooting. Handheld or dedicated wall mount versions available.

S A/F IQ ANALYZER

SENSOR

APPROX. WEIGHT: 95 LB (43 KG)

INCHES
CM



WALL MOUNT IQ LINK - OPTIONAL

APPROX. WEIGHT: 10 LB (4.5 KG)

SPECIFICATIONS

Sensor Enclosure: General Purpose

Pressure Requirements:

Sample Inlet: 5 psi minimum; 100 psi maximum* @ 1 scfm max. (*Optional Sample Pump available)

Air Inlet: 10 psi minimum; 100 psi maximum @ 1 scfm max.

Analog Output: Three selectable current outputs: oxygen, Wobbe Index or Air/Fuel Ratio. The output can be 4-20 mA, 0-20 mA, 20-4 mA or 20-0 mA.

Response Time with a 10:1 By-pass Flow: 5-7 seconds to start; 25-35 seconds to 90%.

Zero/Span Drift: Less than 2% in 7 days

Calibration Gas Requirements: 2 cfh @ 5 psi

Alarms: Three oxygen alarms, high or low selectable and energize or deenergize on alarm. Assign alarm as O₂, calibrate or verify.

Contact Rating: 1A, 30V max., non-inductive load, AC or DC.

Diagnostics: Watchdog timer and service alarm

Environment:

Ambient Temperature: -20°C to +40°C

Sample Temperature: -20°C to +40°C

Power Requirements: 115 VAC or 230 VAC, ±10% 47-63 Hz

Communications: RS-485, RS-232 (IQ Links), HART® Option available

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One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
Specifications subject to change without notice.

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