IN SITU ZIRCONIUM $O_2/CO_e$ DUAL ANALYZER FOR COMBUSTION CONTROL

- Oxygen analyzer and Combustible Gas detector
- Reliable/Long Lasting System
- Accurate and Representative Measurements
- Regulated Sensor Temperature
- Easy to Integrate, Install, and Maintain

ANALYZER OVERVIEW

RB-Technologies O2/COe Analyzer is the ideal equipment for fine tuning air/combustible proportions in a way to improve process efficiency without compromising safety.

Combustion efficiency is determined by low-level oxygen excess in the flue gas and is limited by the production of hazardous Combustible Gas (mainly composed of H2 and CO) at low oxygen concentrations. It is thus crucial to control the $O_2$ excess concentration as well as the amount of Combustible Gas in the flue gas to optimize combustion.

Figure 1: Process Efficiency Graph

Thanks to a dual zirconia technology, the analyzer provides both oxygen concentration and an accurate estimation of the amount of CO in the flue gas. The experimental CO equivalent ($CO_e$) correlation data is representative of the amount of Combustible Gas in the flue gas.

The analyzer is designed for flue gas temperature up to 1300°C and applications such as:
- Power plant: biomass/gas/oil/coal
- Boiler room
- Incinerator
- Metalworking industry
- Paper factory

The in situ $O_2/CO_e$ Analyzer includes the following parts (see typical assembly p.3):
- 1 $O_2/CO_e$ Probe
- 1 Remote $O_2/CO_e$ Transmitter
- 1 Sampling Tube: extraction or deviation
- 1 Junction box and connection cable if Probe-Transmitter distance >5m
- 1 calibration case

In situ sampling is done thanks to a deflecting tube mounted on the flue gas duct mating flange. The tube spontaneously deflects some of the process flue gas from its main stream and drives it to the probe. This assembly provides fast, highly accurate and reliable measurement while keeping the probe away from the aggressive furnace core. When extractive sampling system is required, it can be done with a Venturi Extraction System. Also the probe remains easily accessible for maintenance operations. The sensor is mounted perpendicularly to the stream of flue gas, reducing the risk of clogging or damage to the probe.
The sampling tube is ended by a flange. If clogging does occur it can be cleaned. Automatic Blowing system can be installed for cloggy flue gas application.

The tube length must be adapted to reach the center of stack where data measurements are most reliable and representative of process characteristics. This long-lasting assembly provides fast and highly accurate measurements.

Each sampling tube is designed and made-to-order in order to fit the unit’s specifications (see corresponding data sheet).

O2/COe Transmitter is to be installed remotely from the probe, either on self-standing racks at ground level or on wall-mounted panels on platform. This device supplies the power for heating probes to their operation temperature. It turns the sensor’s signal (mV) into O₂ (%vol.) and COe (ppm) concentration. The measured values are displayed on the transmitter’s screen and can be sent to control rooms with 4-20mA lines. The electronic converter can feature HART communication on demand.

Maintenance operations such as calibration and analyzer settings are performed directly on the transmitter display board.

Gas are sent to the probe from a remote calibration system. Other calibration gases can be used as well.

Recommended calibration gases are:

- 100 ppmH₂ + 100 ppm CO + 2%vol. O₂ in N₂ balances – 300 ppm calibration
- 1.0% O₂ in N₂ balance - SPAN calibration
- 20.9% O₂ in N₂ balance - SPAN calibration

No instrument air is required for reference.
O2/COe ANALYZER TYPICAL ASSEMBLY

Accessories and consumables

- Accessories for installation and calibration

1. O2/CO Probe – including 2m cable
2. Deflecting Sampling Tube
3. Interconnection Cable
4. Remote Converter LT3
5. O2Coe Calibration Case
6. Removable flange for cleaning
7. Calibration Line
**TRANSMITTER DIMENSIONS**

**ANALYZER GENERAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th><strong>MEASUREMENT PRINCIPLE</strong></th>
<th>Zirconium oxide dual probe signal (mV) conversion into O2 (%vol.) and Coe (ppm) concentration</th>
<th><strong>APPLICATION</strong></th>
<th>IN SITU O2 % measurement and unburnt compounds (Coe, ppm) detection in Combustion Flue Gas for process control</th>
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<tr>
<td><strong>PROBE CERTIFICATION</strong></td>
<td>Not to be used in hazardous areas</td>
<td><strong>CONVERTER CERTIFICATION</strong></td>
<td>Not to be used in hazardous areas</td>
</tr>
<tr>
<td><strong>ASSEMBLY</strong></td>
<td>Probe on flue gas duct Remote transmitter up to 100m from probe</td>
<td><strong>IN SITU SAMPLING SYSTEM</strong></td>
<td>Made to order Sampling Tube inserted into the flue gas duct.</td>
</tr>
<tr>
<td><strong>MEASURING RANGE</strong></td>
<td>O2: 0 – 18% vol. O2 Coe: 0 - 10.000 ppm Coe settable from 0-1 000 ppm to 0 – 10 000ppm</td>
<td><strong>OUTPUT SIGNAL</strong></td>
<td>Analog 0..1VDC (Voltage), Analog 4-20mA (Current), HART (option)</td>
</tr>
<tr>
<td><strong>RESPONSE TIME</strong></td>
<td>O2: &lt;10s for 60% of final value Coe: &lt;2s for 60% of final value (from calibration gas inlet)</td>
<td><strong>ACCURACY</strong></td>
<td>O2: +/-2% of full scale Coe: +/-2% of full scale (0-10000ppm) In the range 0..100ppm &lt; 10ppm</td>
</tr>
<tr>
<td><strong>MEASURED GAS T°</strong></td>
<td>120 to +1500°C</td>
<td><strong>MEASURED GAS PRESSURE</strong></td>
<td>~3 to +3kPa (~306 to +306mmH2O)</td>
</tr>
<tr>
<td><strong>POWER SUPPLY</strong></td>
<td>120VAC/-30% to 230VAC/+10%, 50/60Hz</td>
<td><strong>POWER CONSUMPTION</strong></td>
<td>Typical 28W, 52VA Heating Power : 18 to 25 Watt</td>
</tr>
<tr>
<td><strong>REPEATABILITY O2</strong></td>
<td>+/-1% of full scale</td>
<td><strong>LINEARITY O2</strong></td>
<td>+/-2% of full scale</td>
</tr>
<tr>
<td><strong>RECOMMENDED CALIBRATION GAS</strong></td>
<td>SPAN : 20,9%vol.O2 in N2 balance (Instr. Air) ZER0 : 1%vol. O2 in N2 balance Coe : 2%vol.O2+100ppmCO+100ppmH2</td>
<td><strong>CALIBRATION GAS CONSUMPTION</strong></td>
<td>Average 5L of each calib. gas per calibration cycle at recommended 30-40NL/h flowrate.</td>
</tr>
<tr>
<td><strong>CROSS SENSITIVITY</strong></td>
<td>In view of SO2, NH3, NO, propane, aromatic hydrocarbons</td>
<td><strong>PERMISSIBLE FUELS</strong></td>
<td>Non-interacting gaseous hydrocarbons Natural Gas, Fuel Gas Coal, Wood</td>
</tr>
<tr>
<td><strong>ACCESSORIES</strong></td>
<td>Mounting panel or self-standing rack Calibration kit. Sampling tube accessories</td>
<td><strong>STORAGE CONDITIONS</strong></td>
<td>Sensing element: –20 to +70°C Flow Guide Tube: –10 to +100°C</td>
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</tbody>
</table>

**ORDERING INFORMATION**

Please refer to RB-Technologies team for ordering this product

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