

IN SITU ZIRCONIUM O₂/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/CO_e 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 O₂ excess concentration as well as the amount of Combustible Gas in the flue gas to optimize combustion.

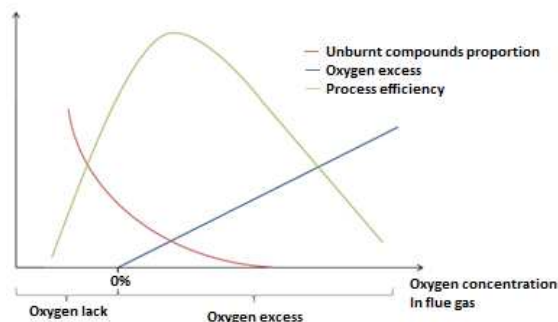


Figure 1 : Process Efficiency Graph

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:

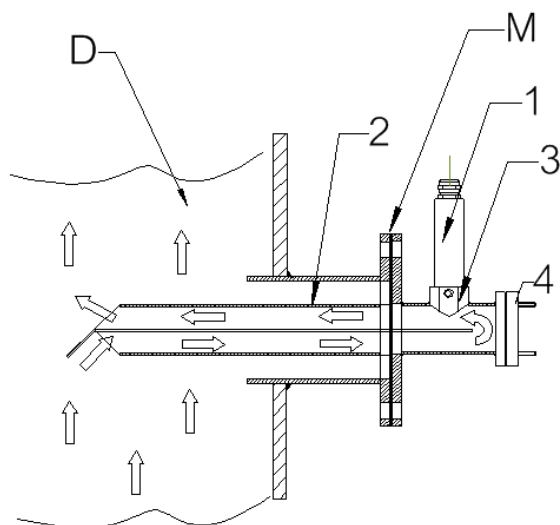
- > Power plant: biomass/gas/oil/coal
- > Boiler room
- > Incinerator
- > Metalworking industry
- > Paper factory

The in situ O₂/CO_e Analyzer includes the following parts (*see typical assembly p.3*):

- > 1 O₂/CO_e Probe
- > 1 Remote O₂/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.

SAMPLING TUBE



- 1 O₂/CO Probe – including 2m cable
- 2 Deflecting Sampling Tube
- 3 Probe fixing
- 4 Removable flange for cleaning
- M Mating flange and flange gasket
- D Furnace Duct

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/CO_e 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 CO_e (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.

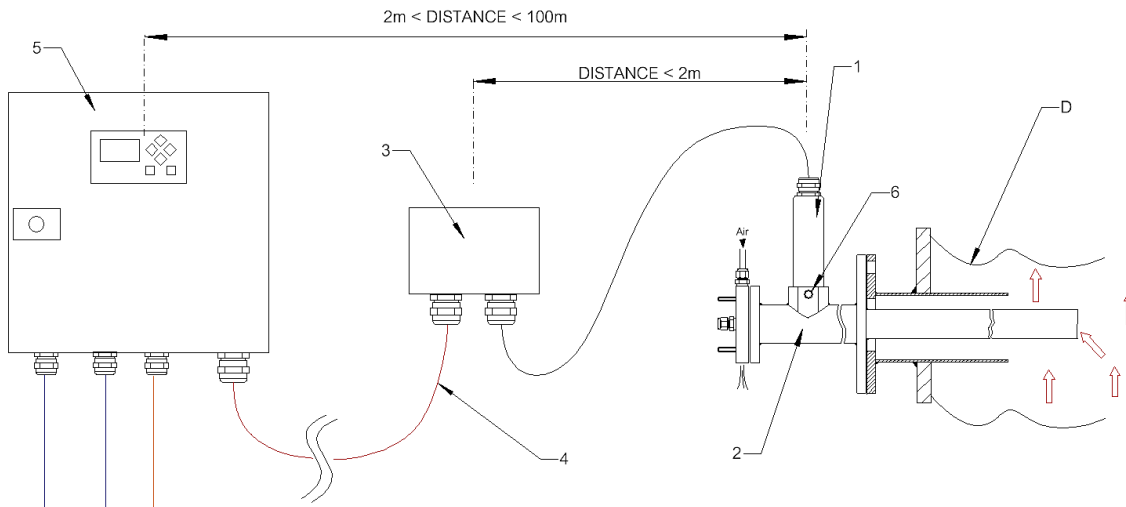
Gas are sent to the probe from a remote calibration system. Other calibration gazes can be used as well.

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.

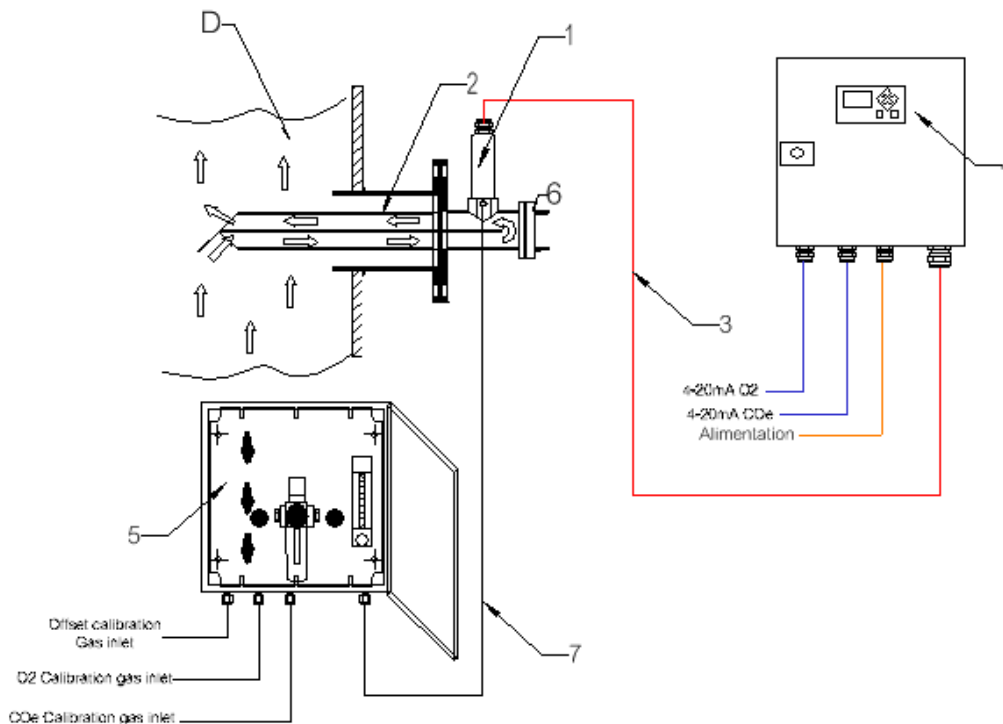
O2/COe ANALYZER TYPICAL ASSEMBLY



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|---|------------------------------------|
| 1 O2/CO Probe – including 2m cable | 4 Interconnection Cable |
| 2 Sampling Tube | 5 Remote Converter (distance<120m) |
| 3 Intermediary Junction Box - <i>To be used if probe-converter distance > 2m</i> | 6 Calibration Line |

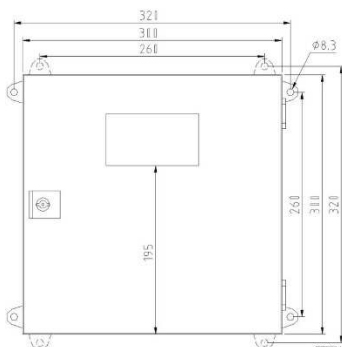
Accessories and consumables

- > Accessories for installation and calibration



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

TRANSMITTER DIMENSIONS



ANALYZER GENERAL SPECIFICATIONS

MEASUREMENT PRINCIPLE	Zirconium oxide dual probe signal (mV) conversion into O ₂ (%vol.) and CO _e (ppm) concentration	APPLICATION	IN SITU O ₂ % measurement and unburnt compounds (Coe, ppm) detection in Combustion Flue Gas for process control
PROBE CERTIFICATION	Not to be used in hazardous areas	CONVERTER CERTIFICATION	Not to be used in hazardous areas Protection IP54 – ambient t° -20- +60°C
ASSEMBLY	Probe on flue gas duct Remote transmitter up to 100m from probe	IN SITU SAMPLING SYSTEM	Made to order Sampling Tube inserted into the flue gas duct.
MEASURING RANGE	O ₂ : 0 – 18% vol. O ₂ CO _e : 0 - 10.000 ppm CO _e settable from 0- 1 000 ppm to 0 – 10 000ppm	OUTPUT SIGNAL	Analog 0..1VDC (Voltage), Analog 4-20mA (Current), HART (option)
RESPONSE TIME	O ₂ :<10s for 60% of final value CO _e :<2s for 60% of final value (from calibration gas inlet)	ACCURACY	O ₂ : +/-2% of full scale CO _e : +/-2% of full scale (0-10000ppm) In the range 0..100ppm < 10ppm
MEASURED GAS T°	120 to +1500°C	MEASURED GAS PRESSURE	-3 to +3kPa (-306 to +306mmH ₂ O)
POWER SUPPLY	120VAC/-30% to 230VAC/+10%, 50/60Hz	POWER CONSUMPTION	Typical 28W, 52VA Heating Power : 18 to 25 Watt
REPETABILITY O₂	+/-1% of full scale	LINEARITY O₂	+/-2% of full scale
RECOMMENDED CALIBRATION GAS	SPAN : 20,9%vol.O ₂ in N ₂ balance (Instr. Air) ZERO : 1%vol. O ₂ in N ₂ balance CO _e : 2%vol.O ₂ +100ppmCO+100ppmH ₂	CALIBRATION GAS CONSUMPTION	Average 5L of each calib. gas per calibration cycle at recommended 30-40NL/h flowrate.
CROSS SENSITIVITY	In view of SO ₂ , NH ₃ , NO, propane, aromatic hydrocarbons	PERMISSIBLE FUELS	Non-interacting gaseous hydrocarbons Natural Gas, Fuel Gas Coal, Wood
ACCESSORIES	Mounting panel or self-standing rack Calibration kit. Sampling tube accessories	STORAGE CONDITIONS	Sensing element: -20 to +70°C Flow Guide Tube: -10 to +100°C

ORDERING INFORMATION

Please refer to RB-Technologies team for ordering this product

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