

# AFiH: IN SITU ZIRCONIUM OXYGEN & REDUCTORS ANALYZER FOR HIGH TEMPERATURE COMBUSTION CONTROL



- > Analyzer for combustion control up to 1500°C and up to 50m distance
- > Key device to be integrated and added in every combustion regulation system
- > Revolutionizes the state-of-the-art in standard design for zirconia sensors used in O2 analysis
- > High throughput manufacturing
- > Streamlined integration:
  - FiNCORE sensor with built-in junction box.
  - Standard filter holder 60mm or 100mm flange made from SS316L.
  - FiNCORE controller transmitter board.
  - FiNCORE standard cabinet with OLED display + 5 buttons or small cabinet with 4-20mA displays
  - Standard 24V DC power connection
  - Modbus RTU RS-485 communication
  - 2x 4-20mA NAMUR analog outputs

## ZrO2 FiNCORE OVERVIEW

The oxygen measurement enables the control of burner fuel/air ratios to ensure combustion efficiency and process safety. FiNCORE in-situ Combustion Control Analyzers can be installed in hazardous areas and can withstand critical environments such as:

- > Refinery process heaters
- > Petrochemical reactor furnaces
- > Industrial large-scale boilers
- > Metal fusion/Treatment furnaces
- > Glass industry furnaces
- > Large scale dryers (Paper, Wood...)

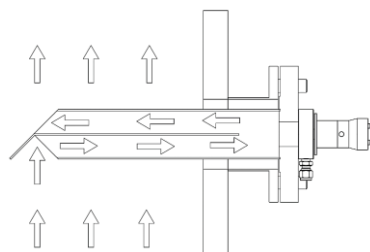
## New Generation Analyzer with highest standard of accuracy and reliability

- > Multiplex long life sensor
  - O2 with air/gas reference, acc. to Nernst law
  - pRed (Reducing potential), COe unburnt compounds production indicator
- > Sensibility down to 10ppm H2 or CO
- > Robust versatile electronic board
- > Low maintenance probe design
- > Low response time
- > Built-in heater & thermocouple
- > Low heating inertia and gradient
- > Consistent repeatability
- > Superior linearity
- > High reproducibility due to serial production

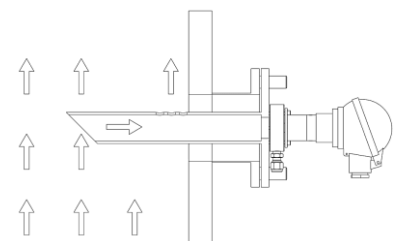
## Sampling principle

- > Passive flue gas deviation
- > Low-maintenance cost & robustness
- > Low sampling response Time
- > Range of design, custom made:
  - Flue Dimension: 200mm to 5m
  - Flue gas Temp.: up to 1500°C
  - Mating Flange dimension and type

**Bypass Tube**



**Direct Tube**



## Analysis capabilities and configuration:

- > O2 – 0.1% to 100% for combustion regulation
- > O2 + O2 – Redundancy with two probes or in one probe design
- > O2 + COe – For combustion efficiency assessment
- > O2 / O2 – Built-in redundancy for enhanced reliability and lower maintenance/calibration

**Zr | O2 FiNCORE AFiH CHARACTERISTICS:**

|                                   |  |                                  |   |
|-----------------------------------|--|----------------------------------|---|
| <b>APPLICATION</b>                | In situ O2%, COe/pRed, in Combustion Flue Gas for process control                    | <b>CALIBRATION GAS</b>           | Recommended concentrations:<br>Intercept gas: 20.9% O <sub>2</sub> (Instr. Air)<br>Slope gas: 1.0% O <sub>2</sub><br>COe: 2%vol.O <sub>2</sub> + 250ppmCO + 25ppmH <sub>2</sub> |
| <b>MEASUREMENT PRINCIPLE</b>      | Zirconium Oxide Sensor   | <b>IN SITU SAMPLING SYSTEM</b>   | Probe mounted on made to order sampling Tube inserted into the flue gas duct. See relevant data sheet   |
| <b>MEASUREMENT RANGE</b>          | O2: 0.1 - 100%<br>COe/pRed: 10 - 200 ppm H <sub>2</sub> , 5000ppm CO                 | <b>OUTPUT SIGNALS</b>            | 4-20mA – NAMUR – max 1000 Ω<br>RS485 RTU/MODBUS   |
| <b>MEASURED GAS TEMPERATURE</b>   | Up to 1500°C   | <b>WARM-UP TIME</b>              | < 10 min.   |
| <b>MEASURED GAS PRESSURE</b>      | -0.5 to +0.5 bar   | <b>SENSOR HEATING REGULATION</b> | S type thermocouple   |
| <b>RESPONSE TIME</b>              | At sampling port: T <sub>60</sub> < 15s<br>At calibration port: T <sub>60</sub> < 4s | <b>STORAGE</b>                   | Ambient temperature, <95%RH<br>> 1 year   |
| <b>REPETABILITY</b>               | +/- 0.5% of full scale   | <b>ACCESSORIES</b>               | Sampling tube: Direct, By-pass, Flow booster<br>Calibration set manual or automatic<br>115-230V AC Power supply<br>Small cabinet with 4-20mA displays                           |
| <b>LINEARITY</b>                  | +/- 2% of value, not lower than 0.1%   |                                  |   |
| <b>SENSOR TEMPERATURE</b>         | 600 to 800°C - regulated   |                                  |   |
| <b>POWER SUPPLY / CONSUMPTION</b> | 24V DC<br>Average 7W – Up to 9W  |                                  |   |

**ORDERING INFORMATION:**

**Analyzer type AFiH – process temperature up to 1500°C – remote transmitter**

| FiNCORE sensor (Process Temperature up to 1500°C – remote transmitter) |  |
|--|--|
| Product Number   | Product Description  |
| ZRPO2S-B   | FiNCORE sensor with build-in junction box + cable gland for O2 measurement       |
| ZRPC2S-B   | FiNCORE sensor with build-in junction box + cable gland for O2 + COe measurement |

| FILTER HOLDER WITH CALIBRATION PORT |  |
|-------------------------------------|--|
| Product Number                      | Product Description  |
| ZRF6-LO                             | Filter holder Ø 60 mm with SS316L filter and 6mm calibration port  |
| ZRF0-LO                             | Filter holder Ø 100 mm with SS316L filter and 6mm calibration port |

(\*¼" calibration port can be fitted upon request)

| FiNCORE TRANSMITTER |   |
|---------------------|---|
| Product Number      | Product Description   |
| ZRTOS3-OFM0         | FiNCORE O2 Transmitter 115/230V AC, OLED Display direct interface, 2x4-20mA, RS485, in SS304 IP Cabinet<br>3 settable dry contacts output, 2 settable dry contacts input                            |
| ZRTOS3-OFMA         | FiNCORE O2 Transmitter 115/230V AC, OLED Display direct interface, 2x4-20mA, RS485, in SS304 IP Cabinet<br>with automatic calibration, 1 settable dry contact output, 2 settable dry contacts input |
| ZRTCS3-OFM0         | FiNCORE O2 + COe Transmitter 115/230V AC, OLED Display direct interface, 2x4-20mA, RS485, in SS304 IP Cabinet<br>3 settable dry contacts output, 2 settable dry contacts input                      |
| ZRTCS3-OFMA         | FiNCORE O2 + COe Transmitter 115/230V AC, OLED Display direct interface, 2x4-20mA, RS485, in SS304 IP Cabinet<br>with automatic calibration, 2 settable dry contacts input                          |

| CABLE          |   |
|----------------|---|
| Product Number | Product Description   |
| ZRZB - 0       | Analyzer connection cable for junction box (cable length up to 10 meters) |
| ZRZB - 1       | Analyzer connection cable for junction box (cable length up to 50 meters) |

| SAMPLING TUBE  |   |
|----------------|---|
| Product Number | Product Description   |
| STBN***FDE     | By-pass sampling tube, SS310, 4"150 FF flange for probe mounting on straight extension            |
| STDH***FDA     | Direct sampling tube, KANTHAL 4"150 FF flange for probe mounting on removable cooling extension   |
| STBH***FDA     | By-pass sampling tube, KANTHAL, 4"150 FF flange for probe mounting on removable cooling extension |

(\*\*\*: tube length, flange type and dimensions can be adjusted upon request)

| OPTION: CALIBRATION SET   |  |
|---|--|
| Manual or automatic calibration set for O2 or O2+COe analyzer upon demand |  |