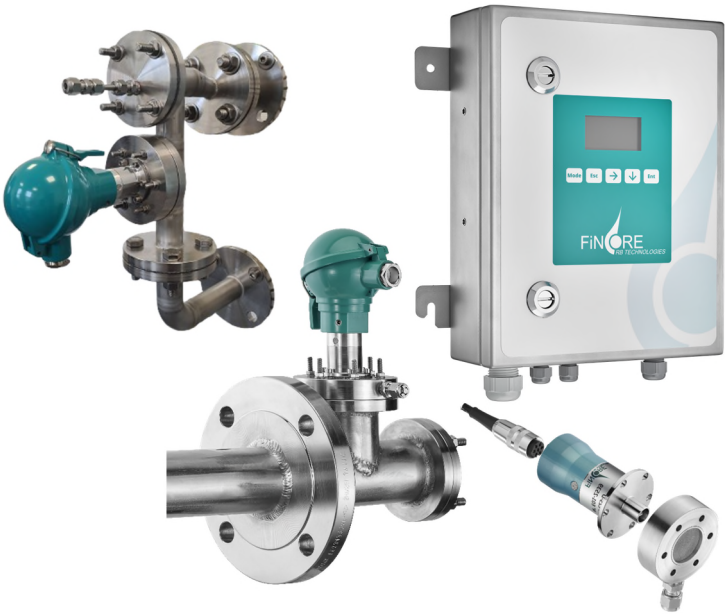
# IN SITU ZIRCONIUM OXYGEN & REDUCTORS ANALYZER COMPATIBLE WITH HIGH TEMPERATURE APPLICATIONS



- Analyzer for Oxygen and unburnt compound measurement in various applications up to 1500°C and up to 50m distance
- Key device to be integrated and added in every combustion regulation system, inerting or metal treatment process
- 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

## FiNCORE OVERVIEW

The oxygen measurement enables the control of burner fuel/air ratios to ensure combustion efficiency and process safety. It also enables precise Oxygen measurement in all inerting and metal treatment applications. FiNCORE in-situ 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**

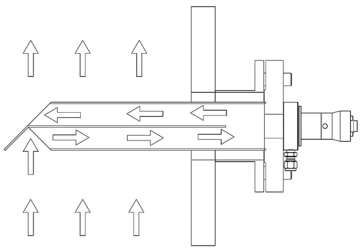
- Multiplex long life Zirconia sensor
  - O2 with air/gas reference, acc. to Nernst law
  - pRed (Reducing potential), COe unburnt compounds production indicator
- Sensibility down to 10ppm H2 or CO
- Robust versatile electronic board
- Low maintenance probe design
- Low response time
- Built-in heater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

**Sampling principle**

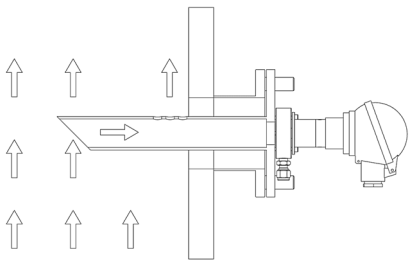
- Passive flue gas deviation or semi-extractive sampling tube
- Low-maintenance cost & robustness
- Low sampling response Time

- Range of design, custom made sampling tube:
  - Flue Dimension: 200mm to 5m
  - Flue gas Temp. material selection: up to 1500°C
  - Mating Flange dimensions from 2”300 to 6”150

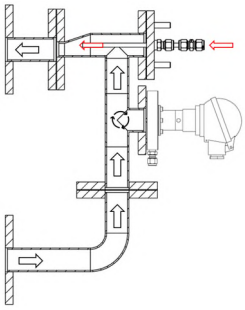
**Bypass Tube**



**Direct Tube**



**Semi-extractive Tube**



**Analysis capabilities and configuration:**

- O2 – 0% to 100% for combustion regulation and inerting process
- 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

## FiNCORE ANALYZER CHARACTERISTICS:

| | |
|---|---|
| APPLICATION | In situ O2%, COe/pRed, in Combustion Flue Gas for process control or in inerting process |
| MEASUREMENT PRINCIPLE | Zirconium Oxide Sensor for O2% and for COe ppm |
| O2 MEASUREMENT RANGE | Adjustable from 0 to 1% up to 50% in 1% increments.<br>Minimum Detectable Quantity: 0.01% $O_2$<br>or<br>Adjustable from 0 to 1,000 up to 9,999 ppm in 1 ppm increments<br>Minimum Detectable Quantity: 10 ppm $O_2$ |
| COe MEASUREMENT RANGE | Adjustable from 0 to 1,000 ppm up to 9,999 ppm in 1 ppm increments.<br>Minimum Detectable Quantity: 10 ppm COe |
| MEASURED GAS PRESSURE | -0.5 to +0.5 bar |
| SENSOR TEMPERATURE | Settable 600 to 800°C – regulated by thermocouple |
| SENSOR HEATING REGULATION | S type thermocouple |
| MEASURED GAS TEMPERATURE | Up to 1500 °C<br>performance unaffected by process temperature; the sensor is temperature-regulated and fully compensated. |
| MEASUREMENT ACCURACY | See detailed paragraph below |

| | |
|---|---|
| RESPONSE TIME | At sampling port: $T_{60}$ < 15s<br>At calibration port: $T_{60}$ < 4s |
| POWER SUPPLY / CONSUMPTION | 24V DC<br>Average 7W – Up to 9W |
| WARM-UP TIME | < 10 min. |
| INPUT/OUTPUT SIGNALS | Analog 4-20mA – NAMUR – max 1000 Ω<br>Digital RS485 RTU/MODBUS<br>Galvanically isolated<br>2x settable galvanically isolated 24V DC dry contact inputs<br>3x settable 230V AC relay contact outputs |
| CALIBRATION GAS | Recommended concentrations:<br>Intercept gas: 20.9% $O_2$ (Instr. Air)<br>Slope gas: 1.0% $O_2$<br>COe: 2%vol.O2 + 250ppmCO + 25ppmH2 |
| IN SITU SAMPLING SYSTEM | Probe mounted on made to order Passive Sampling Tube inserted into the flue gas duct.<br>Material selection depending on process temperature<br>See relevant data sheet |
| STORAGE | Ambient temperature, <95%RH<br>> 1 year |
| ACCESSORIES | Sampling tube: Direct, By-pass, Semi-extractive<br>Calibration set manual or automatic<br>115-230V AC Power supply<br>Small cabinet with 4-20mA displays |

### FiNCORE ANALYZER MEASUREMENT ACCURACY

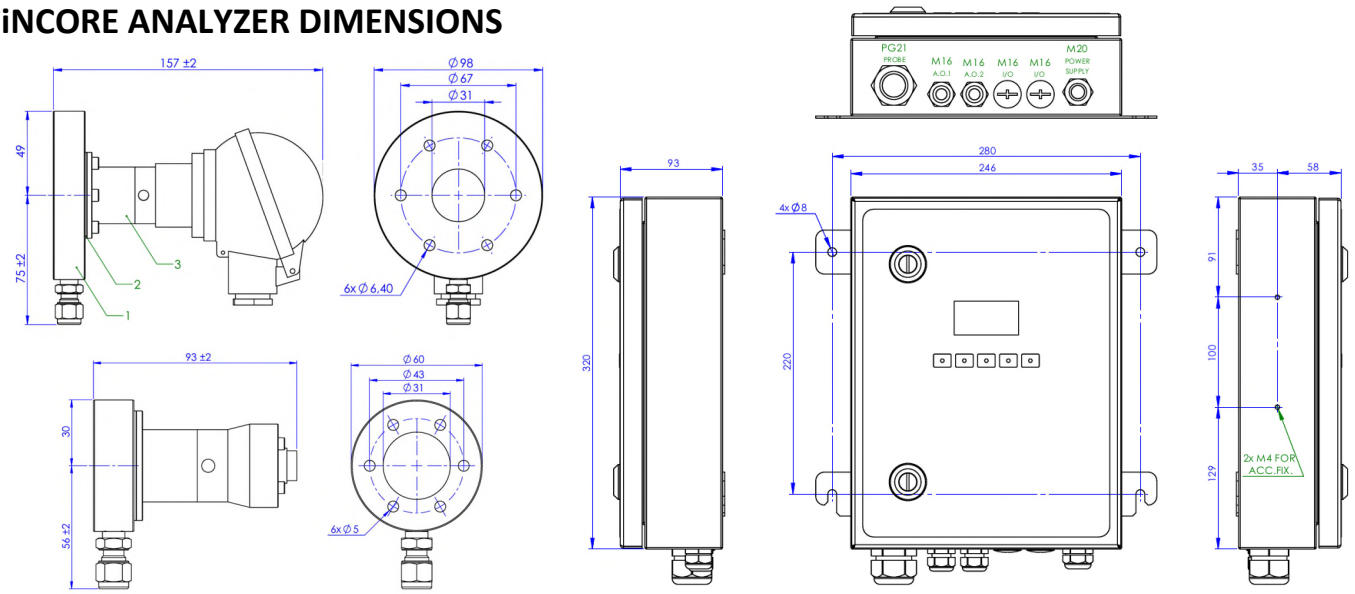
Measurement accuracy is calculated within calibration ranges equivalent to the measurement ranges (e.g., for a 0–10% range, calibration must be performed using gases at 1% and 10%).

- Measurement Accuracy in the Absence of Reducing Gas (less than 10 ppm COe)
  ±0.5% of the measurement or 50 ppm $O_2$, whichever is greater.

- Measurement Accuracy in Oxidizing Combustion Flue Gas Conditions (less than 500 ppm COe and more than 0.5% $O_2$)
  ±0.75% of the measurement or 0.05% $O_2$, whichever is greater.

- Measurement Accuracy in Reducing Combustion Flue Gas Conditions (more than 500 ppm COe and less than 0.5% $O_2$) is degraded.

## FiNCORE ANALYZER DIMENSIONS




## ORDERING INFORMATION:

| FiNCORE SENSOR HOLDER (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 |
| ZRPO2S-D | FiNCORE sensor with build-in DIN connector for O2 measurement |
| ZRPC2S-D | FiNCORE sensor with build-in DIN connector for O2 + COe measurement |

| FILTER HOLDER WITH CALIBRATION PORT | |
|---|---|
| **Product Number** | **Product Description** |
| ZRF6-L0 | Filter holder Ø 60 mm with SS316L filter and 6mm calibration port |
| ZRF0-L0 | 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** |
| ZRTOS3-0FM0 | 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 |
| ZRTOS3-0FMA | 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 |
| ZRTCS3-0FM0 | 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 |
| ZRTCS3-0FMA | 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** |
| ZRZD - 0 | Analyzer connection cable for DIN (cable length up to 10 meters) |
| 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** |
| STDL***FAE | Direct sampling tube, SS316L, 2''300 FF flange for probe mounting on straight extension |
| ZTBL***FDE | By-pass sampling tube, SS316L, 4''150 FF flange for probe mounting on straight extension |
| ZTBN***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 |
| ZTBH***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 |