

OXITEC® Oxygen Analyser Systems



Maximum Efficiency and Supreme Quality
for the World Market

ENOTEC

Theory = Practice

ENOTEC Goes for it with Nernst

Measuring oxygen using the zirconium oxide principle has been recognised a million times over as a simple and cost-efficient method.

ENOTEC has resolutely put the Nernst equation into practice for the users' benefit.

The Nernst equation and its "leak-tight fraction bar".

A process gas (A) with an unknown oxygen (O_2) concentration flows around a measuring probe which is sealed off, by means of a heated zirconium-oxide measuring cell (B), against the process gas.

A reference gas (C) with a known oxygen (O_2) concentration flows around the measuring cell from the inside.

At an optimum temperature a voltage (U) in mV is created between the two surfaces of the cell. At a constant temperature in the cell this voltage is dependent only on the ratio of the oxygen concentrations (partial pressures) in (A) and (C).

Using air (oxygen content at constant 20.95%) as a reference gas, the measurable voltage is a direct measure for the oxygen concentration in the process gas (A), provided that the insulation between the process gas and the reference gas is **absolutely gas-tight**, thus ruling out distortion of the measuring result.

Only probes manufactured by ENOTEC truly comply with the Nernst equation.

$$U = K \cdot T \cdot \log \frac{P_1}{P_2} + C \rightarrow \begin{array}{l} \text{Reference gas with partial pressure } P_1 \\ \text{Process gas with partial pressure } P_2 \end{array}$$

U = measurable voltage (mV)

K = natural constant

T = temperature (measuring cell)

P1 = O_2 - partial pressure in the reference gas

P2 = O_2 - partial pressure in the process gas

C = constant offset

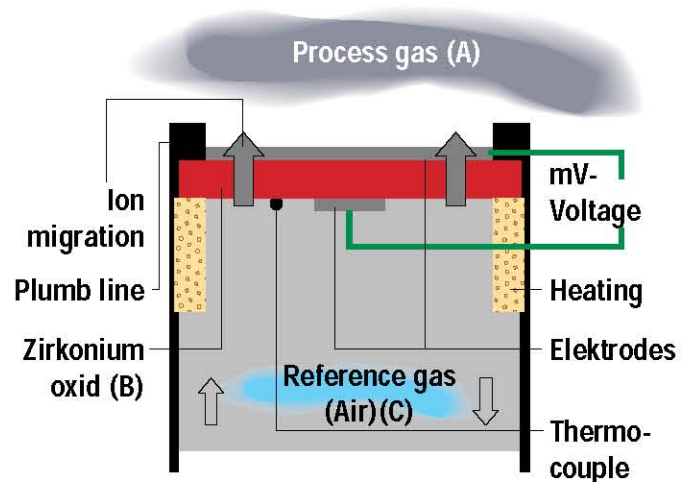
With a "leak-tight fraction bar" and air as the reference gas, all parameters – except for P2 – of the Nernst equation are constant. This means that the mV signal is dependent only on the O_2 partial pressure (P2) in the process gas.

The Nernst equation therefore does not require calibration

Thanks to the special soldering technique used for their manufacture, only OXITEC® probes guarantee the leak-tight fraction bar.

Configuration of the measuring cell

The technological and structural design of the OXITEC® zirconium oxide measuring cell guarantees permanent gas-tight separation of process gas and reference gas.



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All OXITEC® Oxygen Analyser Systems Have the Following Outstanding Qualities:

- Automatic start-up through intelligent electronics
- No calibration necessary
- Maximum precision of measurement
- Complete package including installation accessories and connection cables
- Integrated pneumatic unit
- Maximum protection for the measuring cell ensures reliable and long-lasting operation
- Maintenance-free technology and design
- Components can be replaced by the customer
- Gas-tight cell design using –ENOTEC soldering technique
- No need for gas sampling and processing
- Explosion-proof designs
- Probes are suitable for applications at up to 1400 °C
- Optimum positioning in the flue gas stream for representative O₂ values measured
- Individual manufacturing technology
- Comprehensive accessories

Competence for the Benefit of our Customers

Ideal for all Industrial Steam Generators



The Optimum Solution for all Utility Boilers



OXITEC® KES-132x

Flue gas temperature:	up to 600 °C up to 1400 °C (with KSR-tube)
Compatibility:	Westinghouse 132
Depth of immersion:	385 mm (KES-1321) 475 mm (KES-1322) 615 mm (KES-1323)

(KSR-tube is the gas cooling tube)

OXITEC® KES-200x & KIS-200x

Flue gas temperature:	up to 800 °C up to 1400 °C (with KSR-tube)
Compatibility:	Westinghouse 218, 225
Depth of immersion:	495 mm (KES-2001) 925 mm (KES-2002) 1835 mm (KES-2003) 2768 mm (KES-2004) 3682 mm (KES-2005) Other lengths on request

Technical Data for the KES-132x, KES-200x, KIS-200x, KES500x, KEX500x Probes

Measuring principle:	zirconium oxide	Probe material:	V4A (1.4571/316SS)**
Permissible operating data		Type of protection (terminal box):	IP 65
Flue gas temperature:	see type of probe	Detection limit:	less than 1 ppm O ₂
Flue gas pressure*:	-50 to +50 mbar	Voltage supply:	via electronics unit
Flow velocity*:	0 to 50 m/s	Dimensions:	see dimension drawing
Ambient temperature*:	-40°C to +80°C	Compatibility:	see types of probes
Response time (lag time):	0,5 s (flue gas flowing at > 10 m/second)	Service life:	up to 10 years, depending on the application
T90 time	5 s (flue gas flowing at > 10 m/second)	Depth of immersion:	see types of probes

* others on request

** Incoloy for KIS-probes

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Compatible for all World-Market Analysers

Simply the Best: EExd II C T3
Explosion-Proof Probe



NEW



NEW



OXITEC® KES500x

Flue gas temperature:	up to 760°C up to 1400°C (with KSR-tube)
Compatibility:	ABB Kent, Rosemount, Thermox, Yokogawa
Depth of immersion:	520 mm (KES5001) 950 mm (KES5002) 1865 mm (KES5003)

(KSR-tube is the gas cooling tube)

OXITEC® KEX500x

Flue gas temperature:	up to 500°C up to 1400°C (with KSR-tube)
CENELEC certificate:	EExd II C T3
Compatibility:	ABB Kent, Rosemount, Thermox, Yokogawa
Depth of immersion:	520 mm (KEX5001) 950 mm (KEX5002)

Competence and Experience in Many Areas
with 10,000 Installations World-wide

- Power generation
- Refuse incineration
- Iron and steel
- Inert processes
- Foodstuffs
- Chemicals industry
- Petrochemicals industry
- Cellulose
- Paper
- Cement
- Glass

Multi-Layer-Technology (MLT)

All OXITEC® oxygen analysis systems can optionally be delivered with the MLT cell technology developed by ENOTEC.

MLT guarantees maximum working life – even with the most problematic flue gases of any kind.

OXITEC® 5000

Metrology Intelligence



Design in sheet steel housing (IP 65)



Design in explosion-proof housing (IP 65/Exd II C T6)

Dimensions:	see dimension drawings
Mains voltage:	230V/50 up to 60Hz, tolerance $\pm 10\%$ 115V/50 up to 60Hz, tolerance $\pm 10\%$
Power consumption:	400 VA during heating-up 100 – 200 VA during operation
Series fuse recommended:	10A
Ambient temperature:	-20° to +55°C other temperatures on request
Immunity from disturbance:	according to EMVG and low-voltage directive 72/73 EEC EN 50081-2: July 1993 EN 50082-2: March 1995
Relay outputs: floating:	230 V – 5 A resistive load
Analogue input of the cell:	electrical resistance > 9 Meg Ohm electrical voltage -45 mV to +265 mV
Resolution of the A/D converter in the active measuring range:	14 bits + sign
Analogue input of the thermocouple:	electrical resistance: >900 k Ohm
Temperature compensation:	electronic
Signal output 0/4 to 20 mA	burden max. 500 ohm, potential-free
Response time of the mA output:	< 175 ms
Display:	LCD LED illuminates 240 x 64 points graphic display
Interfaces:	RS 232, RS 485, bus compatible
Accuracy of measurement:	deviation of $\pm 0.2\%$ from the measured value



Design in a 19" housing (IP 54)

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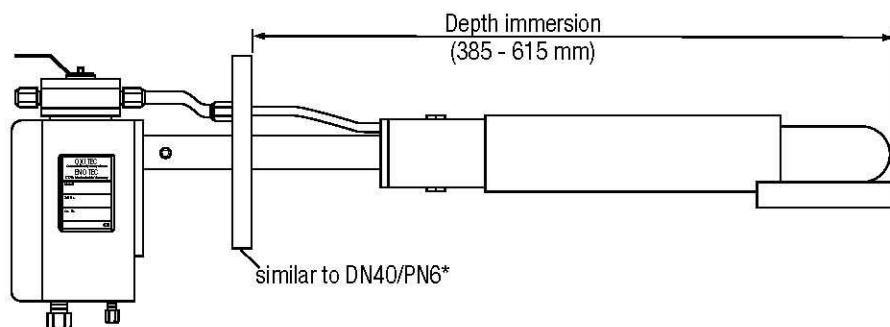
Innovative Electronic Analysis Technology designed for Maximum Accuracy of Measurement with Simple Operator Interface

Unrivalled Range of Functions

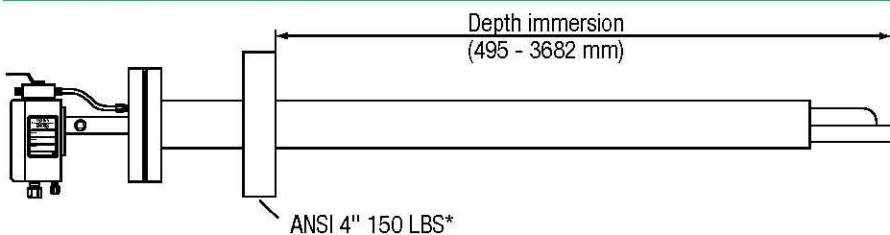
- Accuracy of measurement: deviation of only 0.2% from the measured value
- Fully automatic calibration
- Storage of measured values
- Freely adjustable output attenuation
- Electronically monitored pneumatic unit for reference air and calibration gas
- Two freely adjustable measuring ranges
- Double limit monitoring
- Self-regulating
- Intuitive operation via soft keys
- Status display with on-line help
- Display capable of graphics with
 - Digital display
 - Plain-text display
 - Bar-graph display

Dimensions of the probes

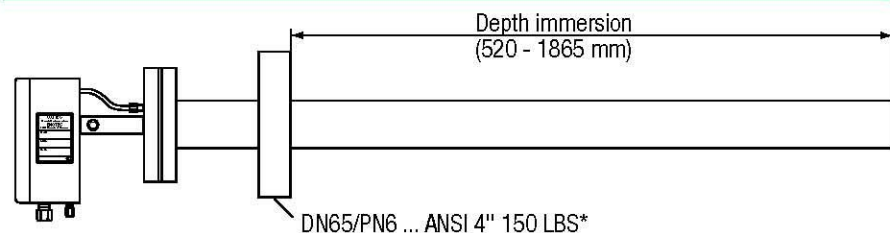
OXITEC® KES-132x



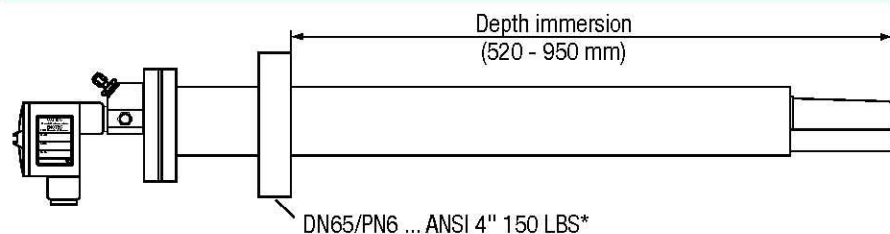
OXITEC® KES-200x & KIS-200x



OXITEC® KES500x



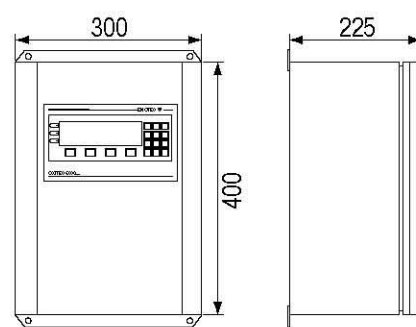
OXITEC® KEX500x



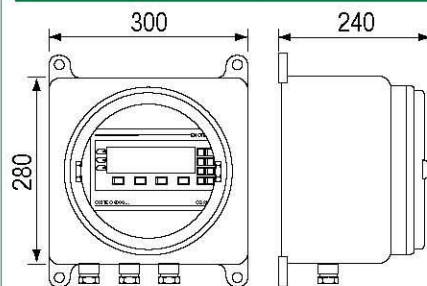
*Please see dimensional drawings for flange dimensions

Dimensions of the Electronic Equipment

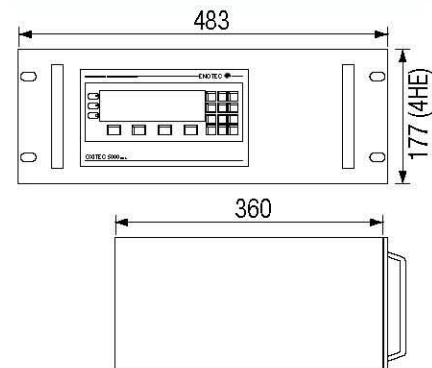
Sheet steel panel housing



Explosion proof housing EExd II C T6



19" slide in module



All dimensions in mm

WITHUS
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