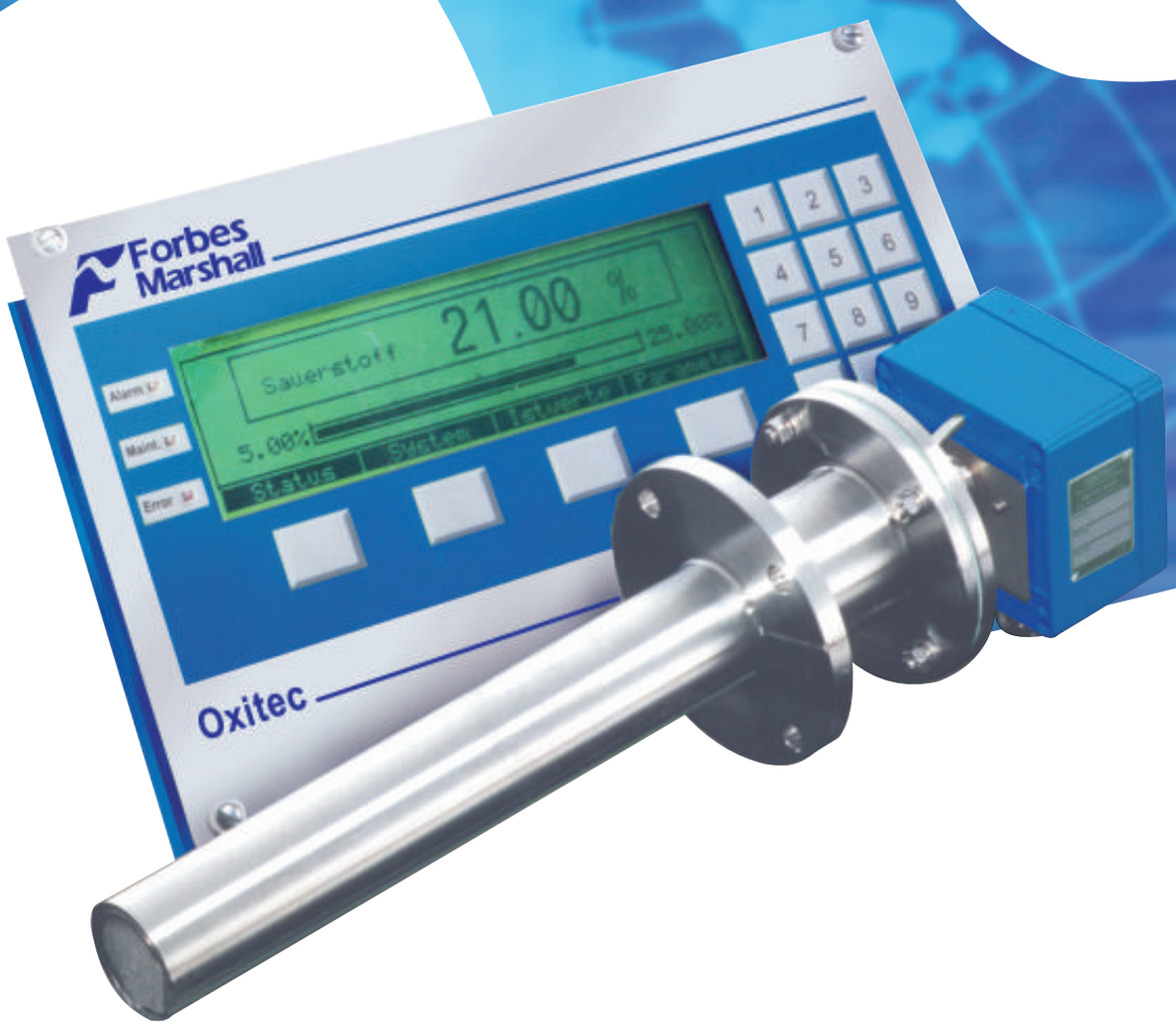
TÜV CERT
EN ISO 9001
Certificate: 041004422
RWTÜV

Forbes Marshall

Oxitec

Oxygen Analyser Systems

Maximum Efficiency and Supreme Quality for the World Market



Theory = Practice

FORBES MARSHALL Goes for it with Nernst

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

FORBES MARSHALL 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 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 offered by FORBES MARSHALL truly comply with the Nernst equation.

$$U = K \cdot T \cdot \log \frac{P1}{P2} + C$$

Reference gas with partial pressure P1
Process gas with partial pressure P2

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

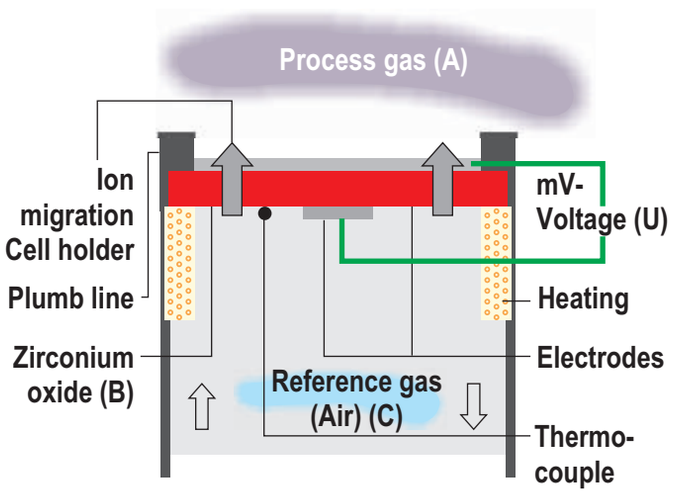
with a **"leak-tight fraction bar"** and air as the reference gas, all parameters-except for P2-of the Nernst equation are constant
This means that the mV signal is dependent only on the O_2 partial pressure (P2) in the process gas.

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.



BS DIN EN ISO 9001
Certificate: FM 522447
TÜV
CENELEC /DMT

Technical Competence for the Benefit of our Customer

Oxitec KES-200x & KIS-200x

Flue gas temperature:	up to 800 °C up to 1600 °C (with KSR - tube)
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

(KSR-tube is the gas cooling tube)
All Oxitec probes are compatible to Westinghouse.

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

Measuring principle:	zirconium oxide
Permissible operating data	
Flue gas temperature:	see type of probe
Flue gas pressure*:	+/-50 to mbar
Flow velocity*:	0 to 50 m/s
Ambient temperature*:	-40 °C to +80 °C
Response time (lag time): at>10m/second)	0.5 s(flue gas flowing
T90 time	5 s (flue gas flowing at> 10m/seond)
Probe material:	V4A (1.4571/316SS)**
Type of protection (terminal box):	IP 65
Detection limit:	less than 1 ppm O_2
Voltage supply:	via electronic unit
Dimension:	see dimension drawing
Compatibility:	see types of probes
Service life:	up to 10 years, depending on the application
Depth of immersion:	see types of probes
Filter:	As per application, sintered metal ceramic, basalt - flame arrestor (optional) - V dust shield optional
Linearity:	+/- 0.1%
Repeatability:	+/- 0.1%
Drift:	less than 1% per month

* others on request ** incoloy for KIS-probes

Oxitec KES500x

Flue gas temperature:	up to 760 °C up to 1600 °C (with KSR-tube)
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:	ATEX 112G E Exd 11T3
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
- Cellulose
- Paper
- Cement
- Glass

Multi-Layer-Technology (MLT)

MLT guarantees maximum working life -even with flue gas comprising of high sulphur content or also when the plant is running under reducing atmosphere.

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Oxitec
Metrology Intelligence

SME - 5

SME - 5EX

Design in sheet housing (IP 65)

Design in explosion-proof housing (IP 65/ATEX 112G E Exd 11CT6)

Dimension:	see dimension drawings
mains voltage:	230V/50 up to 60Hz, tolerance 10% 115V/50 up to 60 Hz, tolerance 10 %
Power consumption:	400 VA during heating-up 100 - 200 VA during operation
Series fuse recommended:	10A
Ambient temperature:	-20^{0} to $+55\ ^{0}C$ other temperature 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:	230V - 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 convertor 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 240x64 points graphic display
Interfaces:	RS 232, RS 485, bus compatible
Accuracy of measurement:	deviation of 0.2% from the measured valve
Pneumatic:	with pumps or for instrument air supply on request

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

Unrivaled 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
- Maintenance free design

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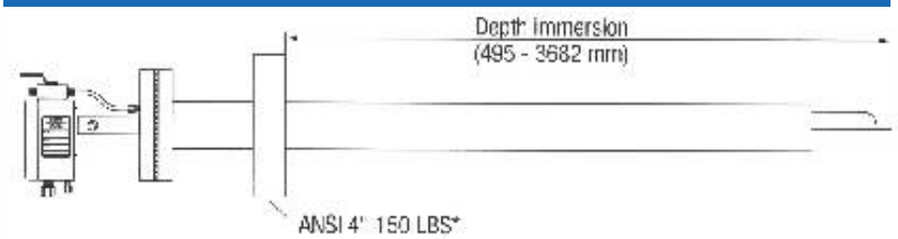
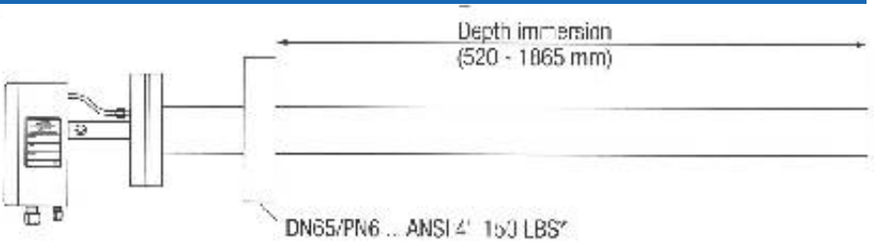
Dimensions of the probes

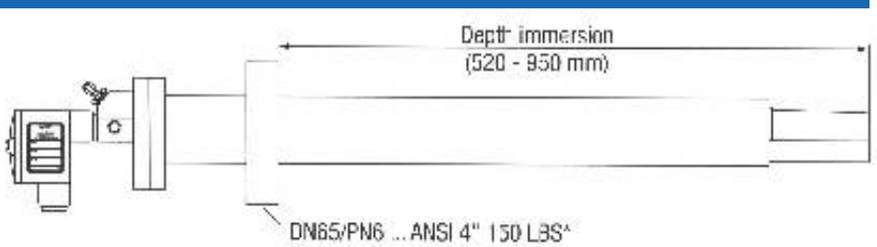
Oxitec KES-200x & KIS-200X



Oxitec KES500x



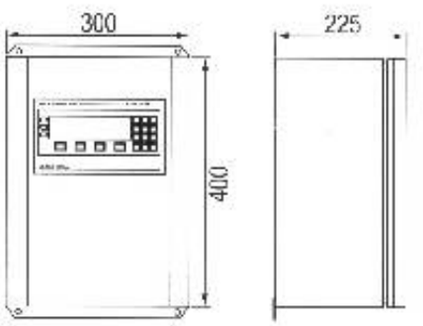
Oxitec KEX500x



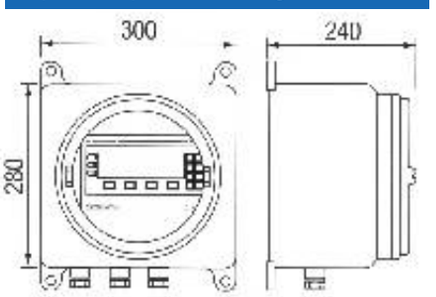
*Please see dimensional drawings for flange dimensions

Dimensions of the Electronic Equipment

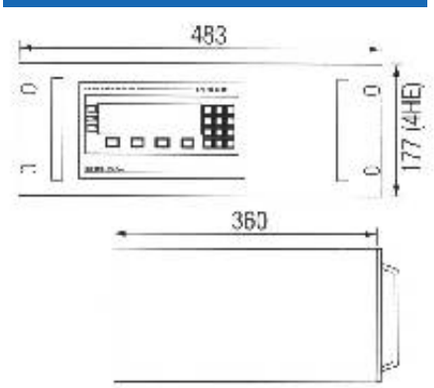
Sheet steel panel housing



Explosion proof housing EExd II T6



19" slide in module



All dimensions in mm

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