

ZIROX® Miniature Probe SS27

Properties

Potentiometric oxygen probes, which have been developed for the exhaust gas measurements in motor vehicles (λ -probes), will be frequently used in industrial equipments. According to the construction these probes have any disadvantages: because of the uncontrolled heating (steady working voltage) and ceramic cover films of the electrodes (which promote the diffusion of special gas components) important measuring errors can result.

The SS27 with controlled heating and integrated primarily electronic has a great accuracy at comparatively lower costs. The main part is the approved ZIROX potentiometric zirconia based solid electrolyte cell (drift-, calibration- and maintenance-free). The using of high quality components and materials guarantees high long term stability.

Applications

The ZIROX® Miniature Probe SS27 serves for the exhaust gas measurements in large-scale engines, for process control and combustion optimisation in small-scale firing equipments and for furnace gas measurements in heat treatment equipments. Further application areas are the optimisation of incineration plants and monitoring of industrial processes under protective or inert gas atmospheres.



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Sensoren und Elektronik GmbH



Technical Data

Length.....	50...300 mm
Diameter	10 mm
Mass	0.5 kg
Dimension clamp head.....	64 x 58 x 36 mm
Protection degree	IP42, others on request
Mounting variants	KF25, KF40, screw thread M18 x 1.5
Power supply	24 V DC
Power consumption	17 W
Warm up	approx. 5 min
Sensor voltage (raw signal).....	0...200 mV (0...300 mV on request)
Range	15 ppm...20.6 Vol.-% O ₂ (0...200 mV) 0.13ppm...20.6 Vol.-% (0...300 mV)
Accuracy	< 5 % rel. error
Measuring gas temperature	max. 300 °C
Probe working temperature	700 °C
Surrounding conditions probe head	max. 50 °C, rel. Humidity < 80 %
Offset	approx. -2...-8 mV (compensable)
Output signal	4-20 mA (0-5 V, 0-10 V on request)

Plug assignment:

1	Analog output	+ I _A
2	Analog output	GND I _A
3	power supply	GND V _B
4	power supply	+ 24 V V _B
5	Relay	RDY

Calculation of oxygen concentration

The oxygen partial pressure will be calculated by NERNST equation. For normal pressure applies:

$$\varphi(\text{O}_2) = 20.64 * e^{(-46.42 U/T)}$$

$\varphi(\text{O}_2)$:	oxygen concentration in Vol.-%
U:	cell voltage in mV
T:	cell temperature in K (700 °C = 973.15 K)
20.64:	oxygen concentration in surrounding air at 50 % rel. humidity

Translation of the output signal (range 0...200mV):

Current output 4-20 mA:	1 mA \equiv 12.5 mV cell voltage
Voltage output 0-5 V:	1 V \equiv 40 mV cell voltage
Voltage output 0-10 V:	1 V \equiv 20 mV cell voltage

Example for 0...200 mV range: At a current of 5.5 mA $((5.5-4)_{\text{mA}} \times 12.5 \text{ mV} = 18.75 \text{ mV})$ an oxygen concentration $\varphi(\text{O}_2) = 8.43 \text{ Vol.-%}$ results.

