ZIROX® Miniature Probe SS27

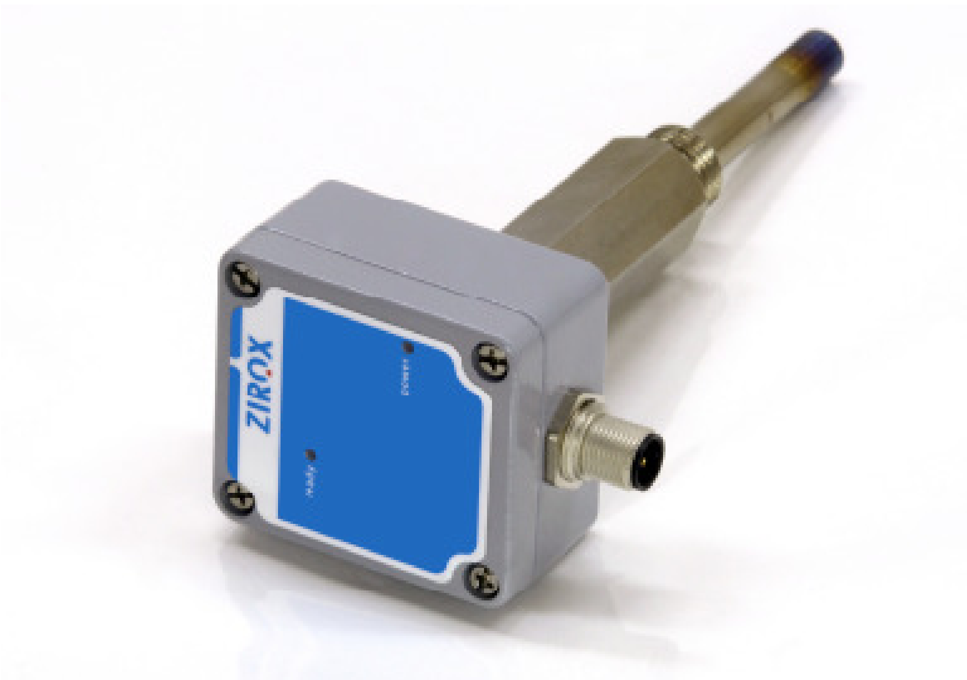
Properties

Potentiometric oxygen probes, which were developed for exhaust gas measurements in motor vehicles (λ-probes), are frequently used in industrial equipment. Due to their construction, the probes have some significant disadvantages: from the uncontrolled heating (steady working voltage) and ceramic coating of the electrodes, which stimulate the diffusion of special gas components, serious measuring errors can result.

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

Applications

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



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Technical Data

Length	50…300 mm
Diameter	10 mm
Weight	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 is calculated with the NERNST equation. For normal pressure applies:

$$\varphi(O_2) = 20.64 * e^{(-46.42\ U/T)}$$

$\varphi(O_2)$: 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 = 12.5 mV cell voltage
Voltage output 0-5 V:	1 V = 40 mV cell voltage
Voltage output 0-10 V:	1 V = 20 mV cell voltage

Example for 0...200 mV range: At a current of 5.5 mA ($(5.5\text{-}4)_{mA}$ x 12.5 mV = **18.75** mV) an oxygen concentration $\varphi(O_2)$ = 8.43 vol% results.