

# pH Sensors

In the biotech- and pharmaceutical industry it is vital to have precise information about the pH value of the bioprocess. The pH level directly affects viability, productivity, stability of the cells and it influences analysis of active ingredients.

The AppliSens pH<sup>+</sup> sensor is specifically designed for long-term, stable and accurate measurements in bioprocesses. The pH<sup>+</sup> sensor has a fixed sleeve diaphragm that reduces the influence of the culture medium on the pH measurement.

Compared to classic diaphragm types, the sleeve diaphragm increases measuring accuracy and increases the lifetime of the sensor which is vital for long lasting biotech cultivation processes.

## Features

- Robust design by using tempered glass shaft
- Sensor head uses minimal space on bioreactor topplate
- Accurate measurement
- Low sensitivity to fouling due to sleeve diaphragm
- Stable signal over longer time
- FDA approved materials
- Withstands repeated SIP and CIP cycles
- Standardized PG 13.5 connection guarantees interchangeability with other bioreactor brands

## Applications

- Microbial cultures
- Cell cultures
- Batch
- Fed Batch
- Continuous cultures
- Perfusion cultures



# DO<sub>2</sub> Sensors

Measurements of dissolved oxygen (DO<sub>2</sub>) in biotechnological processes is a basis for process optimization and allows to maximize the product yield. A microorganism or cell responds to the oxygen concentration in regulating its overall metabolism. Therefore the knowledge of the DO<sub>2</sub> concentration and the proper control during the process are of great importance. The AppliSens Low Drift DO<sub>2</sub>-sensor is specifically designed for long-term, stable and accurate measurements in bioprocesses. The DO<sub>2</sub>-sensor has a titanium membrane module to minimize the measurement drift. The autoclavable polarization module allows polarizing of your DO<sub>2</sub>-sensor while autoclaving your bioreactor system, resulting in reduced start-up time for your culture.



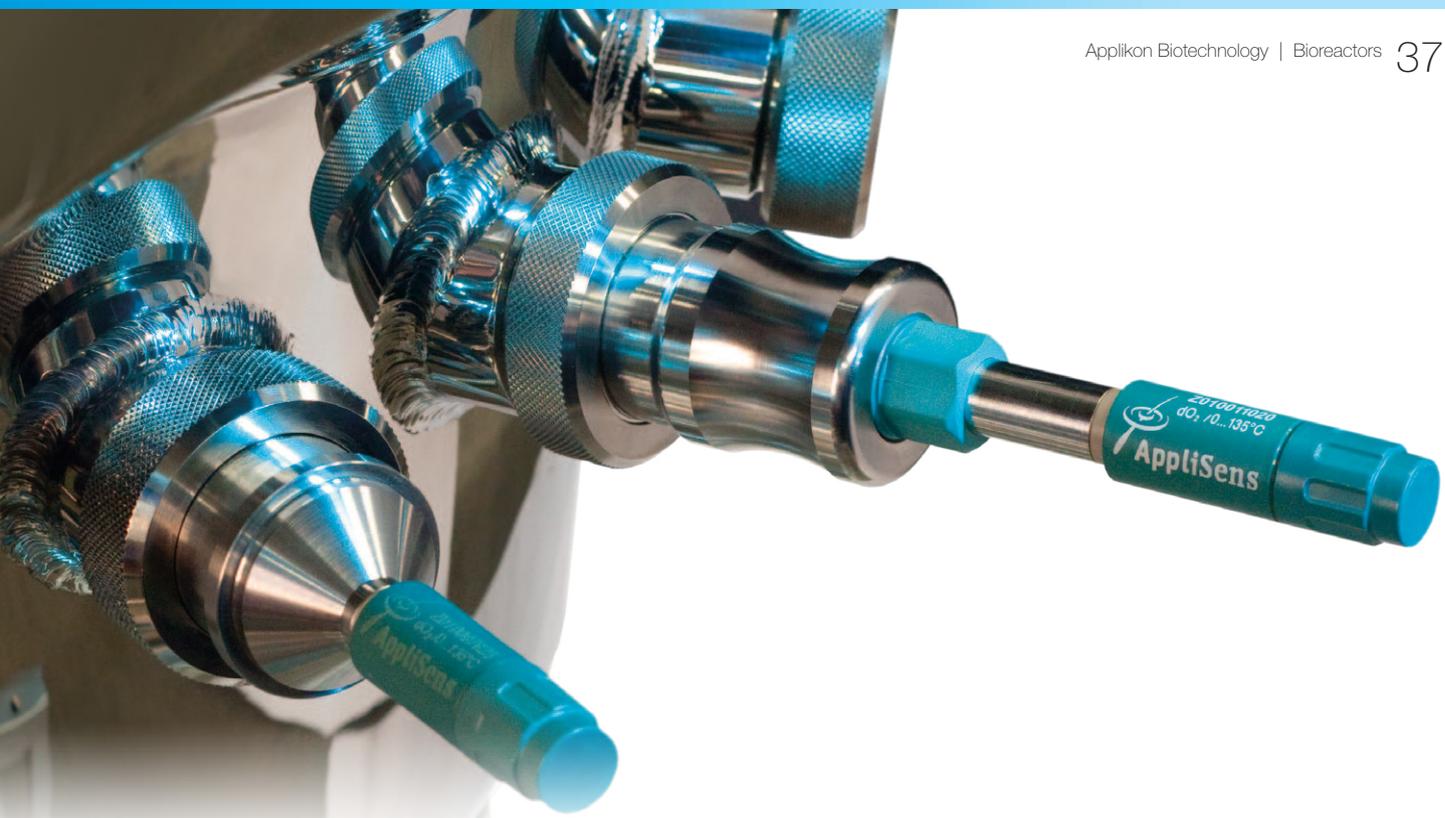
## Features

- Titanium and PEEK materials guarantees low drift
- cGMP compatible by using FDA approved materials
- Electropolished surface roughness finish of 0.4 µm eases cleaning
- Short response time
- Withstands repeated SIP and CIP cycles
- Standardized PG 13.5 connection guarantees interchangeability with other bioreactor brands

## Applications

- Microbial cultures
- Cell cultures
- Batch
- Fed Batch
- Continuous cultures
- Perfusion cultures





## Specifications

<b>Optimum polarization potential</b>	- 800 mV @ 40°C	
<b>Polarization potential amplifier</b>	- 675 mV	
<b>max. Pressure where linearity is guaranteed</b>	4 bar	
<b>max. Sterilization temperature</b>	135°C	
<b>minimum polarization time</b>	30 minutes	
<b>minimum polarization time after autoclaving</b>	4h	
<b>optimum polarization time after autoclaving</b>	Overnight	
<b>Polarization current</b>	Air / 25°C / 1.013 bar / 100 % RH	(33 - 66) nA
<b>Polarization current</b>	Air / 40°C / 1.013 bar / 100 % RH	(65 - 98) nA
<b>Polarization current</b>	O <sub>2</sub> / 40°C / 1.013 bar / 0% RH	(300 - 350) nA
<b>Response time gas phase 20°C</b>	t (90%)	(20 - 30) s
<b>Response time gas phase 40°C</b>	t (90%)	(10 - 20) s
<b>Response time gas phase 60°C</b>	t (90%)	(5 - 10) s
<b>Drift between 15h - 5 days</b>	< 0.2 % / day	
<b>Drift between 5 days and 7 days</b>	< 0.1 % / day	
<b>Drift between 7 days and 30 days</b>	< 0.05 % / day	

### Insertion Length

Z010011025	insertion length 110 mm, 215 mm total length (used with Tracfix sensor holder)
Z010015420	insertion length 154 mm, 259 mm total length
Z010023525	insertion length 235 mm, 340 mm total length (Bioreactor 1-5 Ltr.)
Z010032525	insertion length 325 mm, 430 mm total length (Bioreactor 7 Ltr.)
Z010042525	insertion length 425 mm, 530 mm total length (Bioreactor 15 Ltr.)
Z010059025	insertion length 590 mm, 695 mm total length (Bioreactor 20 Ltr.)



## Specifications

Parameter	As Delivered
pH range	0 - 12 pH
Temperature range	0 - 135°C
Electrode zero point (E7)	+/-15 mV
Electrode slope (S4/7)	> 98%
Isothermal Intersection- pH (Eiso)	6.5 - 8
PH Range	4 - 9
Membrane resistance @ 25°C (MΩ)	<1200
Membrane resistance @ 37°C (MΩ)	<500
Calibration drift in Buffer 9 (mV / Min)	< 2
Stirring Error (Buffer 9 @ 25°C - pH)	< 0.05
Drift 72 hours after Autoclaving pH	< 0.13
Zero-point drift per week in PBS (pH)	< 0.05
Response Time (pH 9 to 4 @ 25°C in Seconds)	< 90
Response Time 90% (pH 9 to 4 @ 25°C in Seconds)	< 45
Response Time (pH 9 to 4 @ 37°C in Seconds)	< 45
Response Time 90% (pH 9 to 4 @ 37°C in Seconds)	< 45
Sensor diameter	12 mm
Sensor length, insertion length/total length	
Article nr:	
Z001012051	120 / 170 mm
Z001023551	235 / 185 mm
Z001032551	325 / 375 mm
Z001042551	425 / 475 mm
Z001059051	590 / 640 mm
Sensor electrical connection	K9

