pyroscience
sensor technology

# Specifications
## OPTICAL OXYGEN MINISENSORS

## 1 SENSOR SPECIFICATIONS

**Only valid in water/gas (typ. air components) for 2-point calibrated sensors at 20°C, 1013mbar absolute pressure, using default measuring parameters/modes!**

Specifications are valid for retractable needle-type minisensors (item no.: **OXR430**), fixed needle-type minisensors (item no.: **OXF1100**), fixed needle-type minisensors with protected tip (item no.: **OXF500PT**, **OXF900PT**), and bare fiber minisensors (item no.: **OXB430**), including the following options: optical isolation (-**OI**), high speed (-**HS**), ultra-high speed (-**UHS**).

### 1.1 Gas Phase: partial pressure $pO_2$ (hPa), volume percent pV (% $O_2$ gas)

For a calibrated sensor, the partial oxygen pressure $pO_2$ in units of hPa (equivalent to mbar) is the fundamental oxygen unit measured by the oxygen meter (in gas and water phase).

| **Specifications** | | |
|---|---|---|
| **Measuring Range**<br>Optimum<br>Maximum (not specified) | **% O2 gas**<br>0-50% O2<br>0-100% O2 | **hPa**<br>0-500 hPa<br>0-1000 hPa |
| **Accuracy ***<br>at 1% O2/10 hPa<br>at 20% O2/200 hPa | <br>±0.02% O2<br>±0.2% O2 | <br>±0.2 hPa<br>±2 hPa |
| **Resolution**<br>at 1% O2/10 hPa<br>at 20% O2/200 hPa | <br>0.01% O2<br>0.05% O2 | <br>0.1 hPa<br>0.5 hPa |
| **Detection Limit** | 0.02% O2 | 0.2 hPa |

* The absolute accuracy of full range sensors depends on the calibration mode. For 1-point calibrated sensors these values increase due to a decreasing accuracy. More details on request.

## 1.2 Dissolved Oxygen: % air saturation, µmol/L, mg/L = ppm, mL/L

Oxygen dissolved in water can be expressed in % air saturation and in concentration units like µmol/L, mg/L (ppm), and mL/L. For details on calculation of dissolved oxygen units from partial pressure readings (interpolation formula based on temperature, atmospheric pressure and salinity), please see the respective sensor/oxygen meter manuals.

| **Specifications** | | |
|---|---|---|
| **Measuring Range**<br>Optimum<br>Maximum (not specified) | **% air saturation (a.s.)**<br>0-250% a.s.<br>0-500% a.s. | **mg/L (ppm)**<br>0-22 mg/L<br>0-44 mg/L |
| **Accuracy ***<br>at 5% a.s./0.44 mg/L<br>at 95% a.s./8.8 mg/L | <br>±0.1% a.s.<br>±1% a.s. | <br>±0.01 mg/L<br>±0.1 mg/L |
| **Resolution**<br>at 5% a.s./0.44 mg/L<br>at 95% a.s./8.8 mg/L | <br>0.05% a.s.<br>0.25% a.s. | <br>0.005 mg/L<br>0.025 mg/L |
| **Detection Limit** | 0.1% a.s. | 0.01 mg/L |

* The absolute accuracy of the full range sensors depends on the calibration mode. For 1-point calibrated sensors these values increase due to a decreasing accuracy. More details on request.

## 1.3 General Characteristics

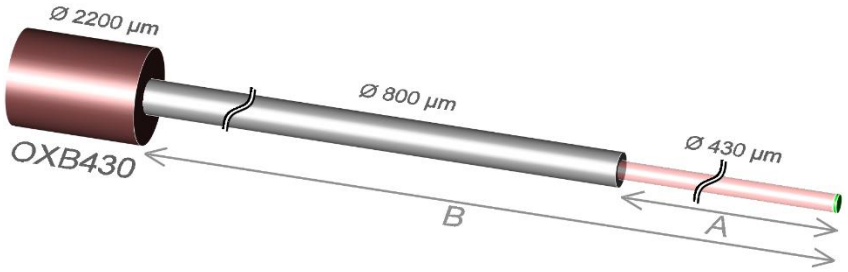
| | | |
|---|---|---|
| **Response Time (t90) ‡**<br>Gas (standard / with **-OI**)<br>Water (standard / with **-OI**)<br>High Speed (**-HS**)<br>Ultra-High Speed (**-UHS**) | **OXR430/OXB430/OXF1100**<br><3 sec / <6 sec<br><5 sec / <10 sec<br><0.8 sec<br><0.3 sec | **OXF500PT/OXF900PT**<br><2 sec / <4 sec |
| **Temperature Range** | specified: 0°C (32°F) to 50°C (122°F)<br>not specified: -20°C (-4°F) to 70°C (158°F) | |
| **Minimum Lifetime**<br>data points | standard / **-OI**<br>1,000,000 | **-HS**<br><1,000,000 **-UHS**<br><<1,000,000 |
| **Calibration Modes** | 1-point and 2-point calibration; obligatory to calibrate in gas (*water*) calibration standards for measurements in gas (*water*) samples | |

| | | | | |
|---|---|---|---|---|
| **Sensor Dimensions: OXR/OXF** | **OXR430** | **OXF1100** | **OXF500PT** | **OXF900PT** |
| Length without cable (ca.) | 230 mm | 190 mm | 190 mm | 190 mm |
| Shaft diameter (ca.) | 8 mm | 8 mm | 8 mm | 8 mm |
| **Needle Dimensions: OXR/OXF** | **OXR430** | **OXF1100** | **OXF500PT** | **OXF900PT** |
| Length | 40 mm | 40 mm | 40 mm | 40 mm |
| Diameter | 1.1 mm | 1.2 mm | 0.5 mm | 0.9 mm |
| **Fiber and Sensor Tip: OXR/OXF** | **OXR430** | **OXF1100** | **OXF500PT** | **OXF900PT** |
| Fiber & tip diameter | 430 µm | 430 µm | 230 µm | 230 µm |
| Sensor tip position (rel. to needle) | -6/0/+6/+12 mm | ca. 2-3 mm | 0 mm | 0 mm |
| **Sensor Dimensions: OXB430**<br>Fiber & tip diameter<br>Tip geometry<br>Stripping lengths | 430 µm<br>see image and text below<br>A = 20mm, B = 100mm (other stripping lengths optional on request) | | | |
| **Cable length** | ca. 2 m or ca. 4 m (custom versions up to ca. 20 m) | | | |
| **Application Areas** | Laboratory, industry, research.<br>**NOT** for medical or any safety-critical application.<br>**NOT** for application in humans.<br>**NOT** for application in food intended for human consumption. | | | |

‡ Typical response times for 90% signal change. For liquids: measured for the transition from air into a stirred solution of 1% $Na_2SO_3$

## Tip Geometry: OXB430

True to scale drawings with outer jacket (brown), plastic coating (grey), optical fiber (pink) and oxygen sensitive REDFLASH indicator (green).



# 2 APPLICABILITY AND CROSS-SENSITIVITY

| | Applicability | Cross-Sensitivity | NO Cross-Sensitivity |
|---|---|---|---|
| **Water/Aqueous solutions** | X | | |
| **Gas Phase (typ. air components)** | X | | |
| **Ethanol[1],[2]** | short-term only | | |
| **Methanol[1],[2]** | short-term only | | |
| **Isopropanol[1],[2]** | short-term only | | |
| **Other organic solvents[3]** | | X | |
| **Chlorine gas ($Cl_2$), $NO_2$ gas, bleach** | | X | |
| **pH 1-14** | | | X |
| **$CO_2$** | | | X |
| **$CH_4$** | | | X |
| **$H_2S$** | | | X |
| **Any ionic species** | | | X |

[1] Not applicable for sensors with optical isolation (**-OI**).
[2] Only diluted and after conditioning– contact info@pyroscience.com for more information.
[3] Includes liquid solvents and solvent vapors

# 3 CLEANING, STERILIZATION, STORAGE

| | |
|---|---|
| **Cleaning** | 3% $H_2O_2$, Soap solution, short-term Ethanol |
| **Sterilization** | short-term 70% Ethanol*, short-term 70% Isopropanol* |
| **Storage** | >3 years in darkness at room temperature |

* Not applicable for sensors with optical isolation (**-OI**).

## Contact

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