Oxygen Measurement Systems

In-line Oxygen Measurements
Leading in Performance and Reliability

InPro 6000 Sensor Series
– Improved product quality
– Enhanced process safety
– Ease of operation
– Full regulatory compliance
Reliable Oxygen Measurement for Liquid and Gas Phase Applications

Industrial oxygen measurement systems for process control and monitoring are critical for yield and safety. Mettler-Toledo Ingold offers a full line of amperometric and optical oxygen sensors to fulfill the toughest application requirements. The result: superior process performance combined with low maintenance costs.

Easy maintenance through ISM®
The Intelligent Sensor Management (ISM) technology simplifies all maintenance operations of the sensor. Process interruptions are shorter, leading to enhanced productivity.

Improved product quality
Highest measurement accuracy at all measurement ranges is guaranteed through tailored, application-specific sensor solutions. Lowest detection limit for trace oxygen measurement significantly improves product quality in the brewing and beverage industry.

Maximum process reliability
Reliable sensor operation, combined with the unique ISM technology improve batch-to-batch consistency and boost product quality. The sensors are compliant with the highest quality and safety standards, for instance in hazardous areas.

Attractive solution for gaseous oxygen applications
The robust gaseous oxygen sensors accurately operate in a wide range of applications without gas pre-conditioning. Fast and simple maintenance during operation minimizes cost of operation.

Improved process control in biotech applications
The unique optical oxygen measurement solution provides a significant improvement in accuracy and process control, resulting in optimum cell growth.

Chemical industry:
inertization control.

Pharmaceutical industry:
fermentation control.

Brewery: beer quality.

Wastewater process: biological water treatment.
Complete Portfolio for Demanding Measurement Tasks

Ingold’s high performance in-line oxygen sensors portfolio is the answer to the highest requirements for measuring dissolved or gaseous oxygen. Latest innovative measurement technology combined with Ingold’s established ISM concept result in measurement systems tailored to your application.

From traces to air saturation
Extensive range of dissolved and gaseous oxygen sensors available:
- Highest measurement consistency with optical oxygen technology
- Approved quality with certified traceability
- Fast response in determination of oxygen traces
- Enhanced process safety under harsh conditions in gas applications

Latest Optical Technology
The InPro 6880i sensors set a new standard in bioprocess control.
- Outstanding accuracy and high signal stability
- Extremely easy and fast maintenance
- Rugged, industrial design

ISM sensors for easy maintenance and less process downtimes
- Plug and measure: Fast and trouble-free sensor start-up
- ISM sensors carry their own history for easy documentation
- Sensor wear monitoring for predictive maintenance

Amperometric oxygen sensors
Low oxygen concentration
InPro 6950
High oxygen concentration
InPro 6800
InPro 6850i

Optical oxygen sensors
High oxygen concentration
InPro 6880i

Latest Optical Technology
The InPro 6880i sensors set a new standard in bioprocess control.
- Outstanding accuracy and high signal stability
- Extremely easy and fast maintenance
- Rugged, industrial design

Digital sensors for enhanced process control
The InPro 6850i and InPro 6950i sensors fully support the ISM technology for better maintenance:
- Signal conditioning directly in the connector for better signal transmission
- Separated anode and reference electrodes for enhanced signal stability
- Fully autoclavable and sterilizable to avoid cross contamination

The InPro 6000 series is completed with an extensive range of housings and transmitters, i.e. retractable housing InTrac 777, transmitter M 700.
InPro 6800 Series
the Benchmark in Quality and Versatility

The InPro 6800 and InPro 6850 i sensors are the answer for accurate and reliable measurement at higher oxygen concentration and are ideal for pharmaceutical and chemical processes. The modular design of the in-line dissolved oxygen sensors protects your investment and leads to low maintenance.

Amperometric sensors satisfy all requirements for reliable measurement under demanding process conditions. With its unique 3-electrode technology with dedicated anode and reference electrodes, combined with the ISM technology for better sensor management, the digital InPro 6850 i sensor sets a new milestone in performance and reliability.

The InPro 6800 and InPro 6850 i sensors are typically used in applications such as:
- Fermentation processes
- Cell growth monitoring
- Inertization and blanketing in gas phase

The sensors are available in 12 mm or 25 mm diameter to allow for fast and convenient installation.

Selected features of InPro 6800 Series sensors

<table>
<thead>
<tr>
<th>Feature</th>
<th>InPro 6850 i</th>
<th>InPro 6800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam-sterilizable</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Autoclavable</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Accuracy (in aqueous media)</td>
<td>± ± (1 % + 6 ppb)</td>
<td>± ± (1 % + 6 ppb)</td>
</tr>
<tr>
<td>Process temperature</td>
<td>0…80°C</td>
<td>0…80°C</td>
</tr>
<tr>
<td></td>
<td>32…176°F</td>
<td>32…176°F</td>
</tr>
<tr>
<td>Process pressure (absolute)</td>
<td>0.2…6 bar</td>
<td>0.2…6 bar</td>
</tr>
<tr>
<td></td>
<td>2.9…87 psi</td>
<td>2.9…87 psi</td>
</tr>
<tr>
<td>Connector</td>
<td>K8S</td>
<td>VP</td>
</tr>
<tr>
<td>MaxCert™</td>
<td>Quality certificate, EHEDG, material certificate 3.1, FDA + USP class VI, surface finish 2.1, ATEX/FM</td>
<td></td>
</tr>
</tbody>
</table>

Your benefits

**Proven performance**
InPro 6800 and 6850 i oxygen sensors stand for accurate oxygen control even under harshest conditions.

**Time-saving maintenance**
The modular sensor design enables fast and easy part exchange for maximum availability.

**Enhanced process compatibility with MaxCert™**
InPro 6800 and 6850 i sensors offer a certified, hygienic design and are fully sterilizable and autoclavable. Sensor materials are fully traceable and comply with international standards like FDA or USP.

Fast interior body exchange
Optical Technology for Top Measurement Performance

The InPro 6880i series sets a new standard for operational availability and measurement quality of your oxygen loop. The optical oxygen sensors are easy and fast to maintain, leading to enhanced process safety and low cost of ownership.

The InPro 6880i optical sensors for high-level oxygen control
Using state-of-the-art measurement technology, the InPro 6880i sensors with integrated electronics combine industrial design with regulatory compliance, making this sensor ideal for use in biopharmaceutical applications.

Your benefits

Better measurements
Reduced signal drift and faster response time compared to amperometric sensors guarantees maximum accuracy of the oxygen measurement. Digital communication ensures interference-free signal transmission.

Maintenance redefined with ISM
Simplified electrolyte-free sensor handling guarantees maximum availability of the sensor. The built-in ISM (Intelligent Sensor Management) provides the user important information about the sensor wear and enables predictive maintenance.

Easy operation
The InPro 6880i with its plug and measure functionality combined with fastest opto-cap replacement sets a new standard in ease of use. Requires no electrolyte and no polarization.

Selected features of optical oxygen measurement systems

<table>
<thead>
<tr>
<th>InPro 6880i</th>
<th>Steam-sterilizable</th>
<th>130°C/266 °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoclavable</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>± ± (1% + 8 ppb)</td>
<td></td>
</tr>
<tr>
<td>Process temperature</td>
<td>0...80°C (32...158°F)</td>
<td></td>
</tr>
<tr>
<td>Process pressure (absolute)</td>
<td>0.2...6 bar (2.9...87 psi)</td>
<td></td>
</tr>
<tr>
<td>MaxCert™</td>
<td>Quality certificate, material certificate 3.1, FDA + USP class VI, surface finish 2.1</td>
<td></td>
</tr>
</tbody>
</table>
Trace Oxygen Sensors
for Enhanced Product Quality

The innovative 4-electrode measurement technology ensures accurate trace oxygen determination with high signal stability and reduced maintenance efforts. This establishes InPro 6950 and InPro 6950i sensors as ideal measurement solutions in liquid and gas phase applications.

For detection of oxygen at the level of 0.1 ppb (parts per billion), there is no alternative to the revolutionary InPro 6950. Dedicated anode and reference electrodes and a guard ring around the cathode fully eliminate unwanted side effects and boost accuracy. Leading-edge membrane technology add up to the outstanding performance of the InPro 6950 and 6950i.

Typical applications in the liquid phase are:
- Filtration and filler lines in breweries
- CO₂ gas recovery in the beverage industry

InPro 6950/6950i
with gas option

<table>
<thead>
<tr>
<th></th>
<th>InPro 6950/6950i</th>
<th>InPro 6950/6950i with gas option</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIP resistant</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Hygienic design</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Detection limit</td>
<td>0.1 ppb</td>
<td>5 ppm (0.0005 Vol-%)</td>
</tr>
<tr>
<td>Process temperature (measurement)</td>
<td>0…80°C</td>
<td>0…70°C</td>
</tr>
<tr>
<td>Process pressure (absolute)</td>
<td>0.2…9 bar</td>
<td>0.2…9 bar</td>
</tr>
<tr>
<td>32…176°F</td>
<td>32…158°F</td>
<td></td>
</tr>
<tr>
<td>2.9…130.5 psi</td>
<td>2.9…130.5 psi</td>
<td></td>
</tr>
<tr>
<td>Response time (air → N₂) tₜₙₙₜₜ</td>
<td>&lt; 90s</td>
<td>&lt; 60s</td>
</tr>
</tbody>
</table>

Your benefits

Outstanding measurement performance
InPro 6950 sensors offer fast and accurate determination of oxygen traces down to 0.1 ppb.

Reduced maintenance
The innovative 4-electrode technology reduces maintenance effort by minimizing electrolyte replacement.

Highest process safety through ISM
The separation of anode and reference electrode guarantees maximum signal stability. The built-in ISM (Intelligent Sensor Management) enables sensor wear monitoring.

Selected features of the InPro 6950 sensor family

InPro 6950i digital sensor

Modular sensor design allows component replacement in minutes and ensures fail-safe handling.

4-electrode technology with additional guard and reference electrode.
The Portable Analyzer
for the Control of Your Process Quality

In the beverages industry, dissolved oxygen concentration is one of the most important process parameters influencing shelf-life and taste stability of the final products. The InTap 4000e/4004e allow users to perform quick spot measurements wherever and whenever required.

Time saving, easy handling and user-friendly
INGOLD InTap 4000e or InTap 4004e dissolved oxygen (DO) analyzers can easily be connected to your process. Both analyzers have an intuitive control menu, resulting in maximum convenience for users.

Cost-saving
InTap 4000e and InTap 4004e offer the best price/performance ratio yet available. The sensor maintenance cycle takes just two minutes, thereby maximizing availability. The analyzers are powered by three standard, user-replaceable, batteries.

Precise and fast measurements
The flow-optimized measuring chamber and advanced sensor design guarantee fast, stable and repeatable results, unaffected by flow rate and effective at very low DO concentrations.

The InTap 4000e can store up to 200 measurement values. The accompanying Paraly® software allows data transfer to a PC and further processing in spread sheet programs to visualize your process.

Wastewater and water applications with InPro 6050
In the field of biological wastewater treatment and for the monitoring of water generally, we recommend the use of our special robust and easy-to-use measuring system.

The durable oxygen sensor InPro 6050 is ideal for such demanding applications.

O₂ sensor
InPro 6050
Immersion housing
InDip 550
Transmitter M300
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