

## Dissolved Oxygen Measurement Systems High Reliability and Wide Application Coverage

**Real-time, continuous measurement of dissolved oxygen (DO) is central to the efficiency of many industrial processes. METTLER TOLEDO offers a range of robust DO sensors that utilize a well-established electrochemical measuring principle, plus sensors with the latest optical technology for applications where simplicity of operation is particularly important.**

### Measurement of dissolved oxygen

Proper oxygen levels are important in many processes in biotechnology, pharmaceutical development, food and beverage, chemical manufacturing, and in water and primary waste treatment. Control of dissolved oxygen helps ensure product quality, reduce costs, and provide maximum product yield.

### Optical measurement solutions from METTLER TOLEDO

The heart of the optical sensor is an oxygen-sensitive layer containing immobilized marker molecules. They absorb light from a light emitting diode and are able to release this energy as light at a different wavelength (fluorescence).

The fluorescence depends on the amount of oxygen that is present in the environment of the marker molecules. This effect allows determination of the oxygen concentration in the sample media.

### Advantages of optical oxygen technology

The optical oxygen sensors offer a highly accurate oxygen measurement with enhanced signal stability and fast response time. The sensors are fully steam sterilizable, autoclavable and fulfill all industrial requirements for hygienic design and traceability. Since no electrolyte exchange or sensor polarization is needed, sensor main-

tenance is easy and less error-prone. This sensor type takes advantage of ISM technology.

### Electrochemical oxygen sensors

The large portfolio of Ingold amperometric sensors fulfill the highest industrial requirements in performance and design to accommodate virtually any application. They are equipped with the unique ISM technology.

ISM®



InPro 6860 i



InPro 6960 i  
InPro 6970 i



InPro 6900 i  
InPro 6950 i



InPro 6800  
12 mm and 25 mm

## Application guide for dissolved oxygen sensors

	Amperometric hygienic sensors		Optical hygienic sensors				Non hygienic sensors	
	InPro 6800	InPro 6850i	InPro 6900/InPro 6900i	InPro 6860i nA/InPro 6860i mA HART (MODBUS)	InPro 6960i	InPro 6970i	InPro 6050	Optical InTap
<b>Industrial processes</b>								
<b>Pharmaceutical Industry</b>								
Biotechnological applications	•	•	•					
<b>Chemical Industry</b>	•	•						
<b>Beverage Industry</b>	•	•	•		•	•		•
<b>Wastewater applications</b>							•	

### Transmitter selection

Several Ingold transmitters are available to work in conjunction with our amperometric and optical sensors including the multi-parameter transmitter lines M100, M200, M300, M400, M700 and M800.

### Housings and socket selection

The widest selection of stationary, retractable and submersion housings is provided to match virtually any

process connection. Vessel ports or sockets are used as entry points for the oxygen sensor. METTLER TOLEDO provides a host of ports including the original Ingold 25 mm port which is recognized as a standard in the biotech and pharmaceutical industries.

### Professional service and validation

Sensor service includes rebuilding, cleaning, testing, and recertification of your Ingold sensor, done quickly and

efficiently to minimize downtime.

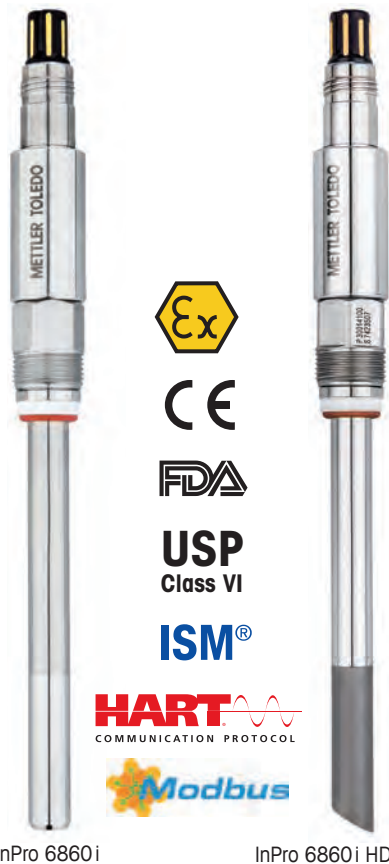
Validation and testing of oxygen equipment is done with equipment traceable to NIST.

### Integration flexibility

Optical sensors can be integrated directly using their analog (mA-HART) or digital (MODBUS) interface.

## InPro 6860 i Optical Oxygen Sensor

### Easy Handling, Exceptional Performance



InPro 6860 i

InPro 6860 i HD

#### Features Overview

- Plug and Measure
- Outstandingly fast service
- Immediate availability without need of polarization
- No electrolyte handling
- Low detection limit
- Highest signal stability
- Fast response time
- All wetted parts in accordance to FDA and USP Class VI-standards
- Sterilizable and autoclavable
- Hygienically polished surface
- Digital ISM technology

Combining innovative ISM technology with high-end optical measurement, METTLER TOLEDO offers optical oxygen sensors fully suitable for biopharma applications. The InPro 6860 i offers highly accurate oxygen measurement with enhanced stability, and easy handling without electrolyte change or time-consuming polarization procedures. The sensor is equipped with a digital interface (digital ISM and Modbus RTU) plus analog output signal for direct integration into existing biocontrollers, analog transmitters and into process environments including HART communication protocol.

#### Integrates ISM technology

With ISM, the installation, maintenance, and safety of the system is drastically improved. All sensor relevant data are stored in the sensor. Pre-calibrated systems transfer the data automatically to the transmitter and are therefore ready for measuring within seconds. Changes in the measuring system are monitored via the Dynamic Lifetime Indicator. With these features, error-free and safe operation of the sensor and the transmitter is assured. For more information see ISM introduction pages 10–11.

#### Specifications

##### Performance

Operating range	0 ppb to saturation
Accuracy	$\leq \pm [1\% + 8 \text{ ppb}]$
Response time at 25 °C (77 °F) (Air → N <sub>2</sub> )	98% of final value in <90s

##### Construction

Measuring principle	Fluorescence quenching
Cable connection	VP8
Connector design	Straight
Process connection	Pg 13.5
Sensor body	316 L stainless steel
OptoCap membrane material	PTFE
Surface roughness of wetted parts	N5 / R <sub>a</sub> 16 (R <sub>a</sub> =0.4 μm / 16 μin)
O-ring material	EPDM (FDA positive listed)
Sensor diameter	12 mm

##### Working Conditions

Temperature compensation	Automatic
Measuring temperature range	5 to 60 °C (41 to 140 °F)
Environmental temperature range	InPro 6860 i: –20 to 140 °C (–4 to 284 °F) (sterilizable, autoclavable)

Operating pressure	0.2 to 6 bar (2.9 to 87 psi absolute)
Design pressure	Maximum 6 bar (87 psi absolute)

##### Certificates and Approvals

METTLER TOLEDO Quality Certificate  
 FDA/USP Class VI, 3.1, N5/R<sub>a</sub>16  
 ATEX

## Ordering Information

Sensor	Length	nA	mA; HART	Modbus	OptoCap BT02T	OptoCap BT02THD	Order Number
InPro 6860 i nA	120 mm	•		•	•		30 014 100
InPro 6860 i nA	220 mm	•		•	•		30 014 101
InPro 6860 i nA	320 mm	•		•	•		30 014 102
InPro 6860 i nA	420 mm	•		•	•		30 014 103
InPro 6860 i nA HD	120 mm	•		•		•	30 449 703
InPro 6860 i nA HD	220 mm	•		•		•	30 449 704
InPro 6860 i nA HD	320 mm	•		•		•	30 526 901
InPro 6860 i nA HD	420 mm	•		•		•	30 526 902
InPro 6860 i nA HD	590 mm	•		•		•	30 526 903
InPro 6860 i mA	120 mm		•	•	•		30 129 734
InPro 6860 i mA	220 mm		•	•	•		30 129 735
InPro 6860 i mA	320 mm		•	•	•		30 129 736
InPro 6860 i mA	420 mm		•	•	•		30 129 737
InPro 6860 i mA HD	120 mm		•	•		•	30 449 705
InPro 6860 i mA HD	220 mm		•	•		•	30 449 706
InPro 6860 i mA HD	320 mm		•	•		•	30 526 900
InPro 6860 i mA HD	420 mm		•	•		•	30 532 157

## Transmitter

	Order Number
M400 Type 2	30 374 112
M400 Type 3	30 374 113
M400/2H	30 025 514
M400/2(X)H	30 025 515
M400 FF	30 026 616
M400 FF 4-wire	30 374 121
M400 PA	30 026 617
M800 Process, 1-channel	30 026 633
M800 Process, 2-channel	52 121 813
M800 Process, 4-channel	52 121 853
M800 Process, 1-channel SST	30 246 551
M800 Process, 2-channel SST	30 246 552
M800 Process, 4-channel SST	30 246 553

## InPro 6860 i Consumables

	Order Number
OptoCap BT02T (InPro 6860 i)	30 018 857
OptoCap BT02THD	30 302 172

## Accessories

	Order Number
iLink Multi (incl. automated humidity and pressure compensation)	30 130 631
iLink Multi Cable/Set oDO (Cable set for all oDO sensors)	30 355 582
Housing Retrofit kit	52 403 811
Power supply in case of need for analog installation of InPro 6860 i	30 014 119

## OptoCap replacement



OptoCap – BT02T electropolished, delivers a hygienically polished surface.

OptoCap – BT02THD stabilizes the measurement signal by its hydrophilic surface by avoiding air bubble interference.



## Did You Know

The optical oxygen sensors can be used in conjunction with all M400 and M800 transmitters as well as with existing analog and digital MODBUS installations.



## Did You Know

Oxygen bubble interference can be a common issue when optical oxygen sensors are installed vertically. The new OptoCap™ (BT02THD) with its proprietary design has a surface treatment that efficiently reduces these interferences. This allows greater production control leading to consistent yield, batch to batch.

## Suitable Housings

	p.
InFit 761 e.....	110
InTrac 777 e.....	119
InTrac 797 e.....	120
InTrac 781 .....	121
InTrac 785 e.....	122

## Powering Accessories for InPro 6860 i Digital Sensor Integration

Combined oDO & pH Junction Box with Bluetooth connectivity



InPro 6860 i  
Adapter T82



InPro 6860 i  
Adapter VP6

### Features Overview

- Uses existing cables to biocontrollers
- Simplified installation
- Flexible powering options

The J-Box BTLE simplifies biocontroller upgrades to advanced InPro 6860 i optical oxygen and digital ISM pH sensors without complicated wiring or grounding requirements. Using a shared power supply, the J-Box BTLE connects both oxygen and pH sensors to biocontrollers using existing and standard T-82 (for oxygen) and AK9 (for pH) cables. Measurement signals are sent from the J-Box as nA for oxygen and mV for pH providing universal connectivity to biocontrollers. Standard 1 or 3 meter cables are available for connection from the J-Box BTLE to the oxygen and pH sensors.

The J-Box BTLE is equipped with a Bluetooth interface. It connects to iSense and iSense Mobile for calibration, maintenance and diagnostic purposes.

The InPro 6860 i Adapter provides functionality with a direct connection to InPro 6860 i optical oxygen sensors. 24 V DC is provided through a standard 2.1 mm × 5.5 mm female barrel connection with existing T-82 cables connected to the adapter's outlet.

### Flexible installation choices

The J-Box BTLE is ideal for installing ISM optical oxygen and pH sensors onto the head plate of a reactor when space is limited.

The InPro 6860 i Powered Adapter is ideal for installations with sufficient space on the head plate of a reactor and where only optical oxygen is required.

### Specifications

#### Performance

Minimum input power requirement	24 V DC (min. 800 mW, 0.03 A)
Power connection	2.5 mm × 5.5 mm male barrel mating to a 2.1 mm × 5.5 mm female barrel connection

#### Combined J-Box Sensor Connections

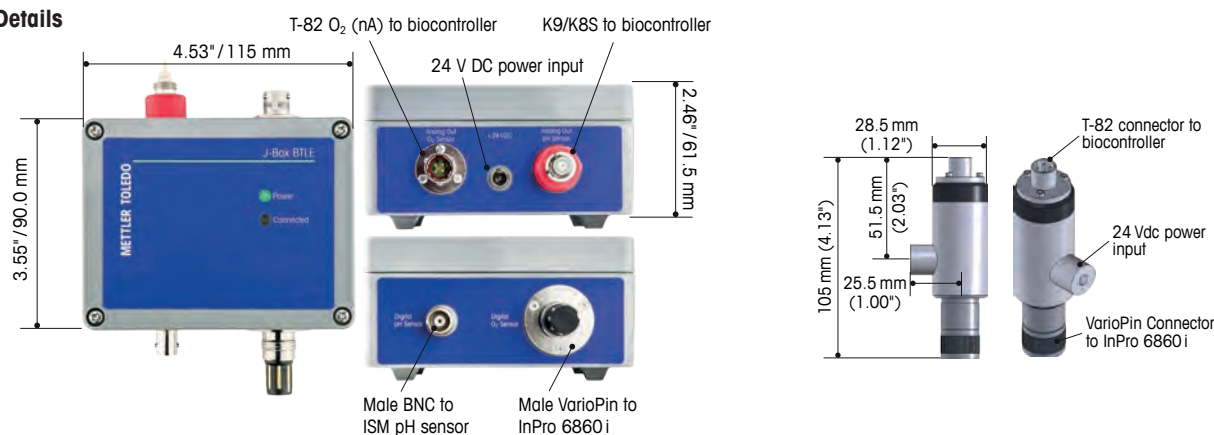
To InPro 6860 i sensor	Male VarioPin
To ISM pH sensor	Male BNC
Simulated O <sub>2</sub> (nA) to biocontroller	Male T-82 connector* wired for temperature
Simulated pH (mV) to biocontroller	Male K9/K8S

#### InPro 6860 i Adapter Connections

To InPro 6860 i sensor	Female VarioPin
To biocontroller	Male T-82 connector wired for temperature

\* The T-82 Adapter is also available with a VP6 connector.

## Details



## Ordering Information

Product Description	Order Number
J-Box BTLE	30 365 368
InPro 6860i T-82 Adapter for Biocontroller Retrofit	30 083 984
InPro 6860i VP6 Adapter for Biocontroller Retrofit	30 083 985
Power supply 24 V 0.75 A angled plug	30 323 961

### O<sub>2</sub> Accessory Cables (for J-Box BTLE to InPro 6860i sensor)

Product Description	Order Number
Cable, VP-8, 1 m, Female VP	30 094 370
Cable, VP-8, 3 m, Female VP	30 094 371

### ISM pH Accessory Cables (for J-Box BTLE to ISM pH sensor)

Product Description	Order Number
Cable, AK9, 1 m, Female BNC	59 902 168
Cable, AK9, 3 m, Female BNC	59 902 194

### Biocontroller Retrofit Cables for InPro 6860 i

VP6 (analog)	Order Number	VP8 (digital)	Order Number
All standard VP6 (analog)	see table, pp. 132/133	VP8-ST, 1 m (3.3 ft)	52 300 353
VP6 Connector BNC, 1 m (3.3 ft)	30 032 730	VP8-ST, 3 m (9.9 ft)	52 300 354
VP6 Connector BNC, 3 m (9.9 ft)	30 032 731	VP8-ST, 5 m (16.4 ft)	52 300 355
VP6 Connector LEMO, 1 m (3.3 ft)	30 032 732	VP8-ST, 10 m (32.8 ft)	52 300 356
VP6 Connector LEMO, 3 m (9.9 ft)	30 032 733	VP8-ST, 15 m (49.2 ft)	52 300 357
VP6 Connector Lumberg, 1 m (3.3 ft)	30 032 734	VP8-ST, 20 m (65.6 ft)	52 300 358
VP6 Connector Lumberg, 3 m (9.9 ft)	30 032 735	VP8-ST, 35 m (114.8 ft)	52 300 359



### Did You Know

The J-Box BTLE is an ideal solution to retrofit biocontrollers with InPro 6860i and ISM pH sensors. The integral 2.5 mm × 5.5 mm barrel connector enables simplified power connection. METTLER TOLEDO recommends using a three-pronged grounded 24 V DC power supply for best performance.



### Additional Cable Options

METTLER TOLEDO offers a wide variety of oxygen and pH cables for connecting the J-Box BTLE or InPro 6860i Adapter to your biocontrollers. Please contact your local representative to learn more about our available options.

## InPro 6960 i/InPro 6970 i Optical Oxygen Sensor

### Reliable and Intelligent



#### Features Overview

- Plug and Measure
- Fast maintenance in less than 1 minute
- Immediate availability, no need for polarization
- No electrolyte handling
- Low detection limit
- Highest signal stability
- Fast response time
- All wetted parts in accordance to FDA and USP Class VI-standards
- Fully CIP and SIP resistant
- Hygienically polished surface finish of N5/R<sub>a</sub>16 (R<sub>a</sub>=0.4 μm/16 μin)
- Digital ISM technology

Optical technology in 12 mm design is available for challenging brewery applications such as filler line measurement. These optical sensors offer high performance together with reduced and easier maintenance. The outstanding measurement performance with low detection limit, minimum drift and short response time improves oxygen monitoring and helps to reduce out of spec production. The easy maintenance without liquid handling and polarization increases the availability of the measuring system.

#### ISM

ISM technology helps to make optical oxygen measurement simple and more reliable. Thanks to the Dynamic Lifetime Indicator (DLI) and Adaptive Calibration Timer (ACT), maintenance planning becomes easy and the risk of sensor failures during production time is significantly reduced. For more information see ISM introduction pages 10–11.

#### Specifications

##### Performance

Operating range	InPro 6960 i: 0 ppb to 25 ppm InPro 6970 i: 0 ppb to 2000 ppb
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Accuracy	InPro 6960 i: $\leq \pm [1 \% + 8 \text{ ppb}]$ InPro 6970 i: $\leq \pm [1 \% + 2 \text{ ppb}]$
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Response time at 25 °C (77 °F) (Air → N <sub>2</sub> )	98 % of final value in <20 s
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Residual signal in oxygen-free medium	<0.025 % of the signal in ambient air
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##### Construction

Measuring principle	Fluorescence quenching
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Cable connection	5-Pin
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Connector design	Straight
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Process connection	Pg 13.5
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Sensor body	316L stainless steel
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Membrane material	Silicone
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Surface roughness of wetted parts	N5/R <sub>a</sub> 16 (R <sub>a</sub> =0.4 μm/16 μin)
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O-ring material	EPDM (FDA positive listed)
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Sensor diameter	12 mm
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##### Working Conditions

Temperature compensation	Automatic
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Measuring temperature range	–5 to 40 °C (23 to 104 °F)
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Environmental temperature range	0 to 121 °C (32 to 250 °F) (sterilizable)
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Operating pressure	0.2 to 12 bar (2.9 to 174 psi absolute)
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Design pressure	Maximum 12 bar (174 psi absolute)
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##### Certificates and Approvals

METTLER TOLEDO Quality Certificate,  
FDA/USP Class VI, 3.1, N5/R<sub>a</sub>16

► [www.mt.com/InPro6960i](http://www.mt.com/InPro6960i)

► [www.mt.com/InPro6970i](http://www.mt.com/InPro6970i)

**Ordering Information****12 mm InPro 6960 i/6970 i**

Sensor	Length	Order Number
InPro 6960 i	120 mm	52 206 500
InPro 6960 i	220 mm	52 206 501
InPro 6960 i	320 mm	52 206 502
InPro 6970 i	120 mm	52 206 393
InPro 6970 i	220 mm	52 206 394
InPro 6970 i	320 mm	52 206 395

**Transmitter**

M400 Type 3	30 374 113
M400/2H	30 025 514
M400/2(X)H	30 025 515
M400 FF	30 026 616
M400 PA	30 026 617
M800 SST, 1-channel	30 246 551
M800 SST, 2-channel	30 246 552
M800 Process, 1-channel	30 026 633
M800 Process, 2-channel	52 121 813
M800 Process, 4-channel	52 121 853

**InPro 6960 i/6970 i Consumables**

OptoCap BW01 for 6960 i	52 206 509
OptoCap BR01 for 6970 i	52 206 403
O-ring set	52 206 252

**Sensor Cables**

2 m (6.6 ft)	52 300 379
5 m (16.4 ft)	52 300 380
10 m (32.8 ft)	52 300 381
15 m (49.2 ft)	52 206 422

**Accessories**

iLink-RS485 Sensor Cable for iSense	52 300 399
iLink Multi	30 130 631
iLink Multi cable set oDO	30 355 582
Housing retrofit kit	52 403 811
Maintenance cap	52 206 251

**Did You Know**

In conjunction with the M400, the **InPro 6960 i** offers an easy-to-use solution for high ppm measurements as found in wort aeration monitoring.

**Other Highlights**

- No electrolyte necessary
- No polarization required
- Easy maintenance

**Did You Know**

In conjunction with the M400, the **InPro 6970 i** offers an easy-to-use solution for low ppb measurements throughout brewing and filler lines.

**OptoCap replacement**

One piece O-ring-free OptoCap

**Suitable Housings**

InFit 761 e.....	110
InTrac 777 e.....	119
InTrac 797 e.....	120



## InPro 6800/InPro 6850 i (12 & 25 mm) For Accurate Oxygen Measurement



InPro 6850 i    InPro 6800

### Features Overview

- Revolutionary “Quick Disconnect” system allows for service in seconds
- Defection limit down to 6 ppb
- Accurate measurement and quick response
- Long lasting and easy to maintain membranes
- FDA positive listed materials of construction
- Hygienically polished surface finish of N5/R<sub>a</sub>16 (R<sub>a</sub>=0.4 μm/16 μin)
- EHEDG certified for cleanability and 3A compliant
- Wetted O-rings comply with FDA and USP Class VI standards
- Autoclavable and steam sterilizable

The InPro 6800 dissolved oxygen sensor with 12 or 25 mm diameter body provides maximum accuracy and ultimate cleanability for vessels with limited space or in containers with smaller volumes. The sensor is available with the state-of-the-art VP connector or T-82 connector in straight or angled versions. A durable 316L stainless steel construction allows for CIP, steam sterilization or autoclaving in place, and the high sensor finish virtually eliminates contamination of the process. Ingold’s PTFE/silicone membranes have been designed with an internal steel mesh that makes the membrane more rugged and dramatically increases membrane life.

### Specifications

#### Performance

Operating range	6 ppb to saturation
Accuracy	≤ ± [1 % +6 ppb]
Response time at 25 °C (77 °F)	98 % of final value in < 90 s
Sensor signal in air at 25 °C (77 °F)	50 to 110 nA
Residual signal in oxygen-free medium	< 0.1 % of the signal in ambient air

#### Construction

Measuring principle	Amperometric Clark electrode
Cable connection	Analog VarioPin (IP 68), Digital K8S (IP 68)
Connector design	Straight or angled
Process connection	Pg 13.5 (12 mm); Ingold (25 mm)
Sensor body	316L stainless steel
Membrane material	PTFE/Silicone/PTFE (reinforced with steel mesh)
Surface roughness of wetted parts	N5/R <sub>a</sub> 16 (R <sub>a</sub> =0.4 μm/16 μin)
O-ring material	Silicone (FDA and USP Class VI positive listed)
Sensor diameter	12 mm/25 mm

#### Working Conditions

Temperature compensation	Automatic
Measuring temperature range	0 to 80 °C (32 to 176 °F)
Environmental temperature range	–5 to 140 °C (23 to 284 °F) (steriliz., autocl.)
Operating pressure	0.2 to 6 bar (2.9 to 87 psi absolute)
Design pressure	Maximum 12 bar (174 psi absolute)

#### Certificates and Approvals

METTLER TOLEDO Quality Certificate, EHEDG, FDA/USP Class VI, 3.1, N5/R <sub>a</sub> 16,
ATEX: Ex ia IIC T6/T5/T4/T3 Ga/Gb,
Ex ia IIIC T69 °C/T81 °C/T109 °C/T161 °C Da/Db
FM: IS Cl. I, II, III, Div 1, GR ABCDEFG/T6

#### Intelligent Sensor Management (ISM)

InPro 6850i sensors with integrated ISM functionality allow Plug and Measure and advanced diagnostics. ISM simplifies the installation, handling and maintenance of measurement equipment. For more information see ISM introduction pages 10–11.

#### Other Highlights

- Small 12 or 25 mm diameter saves valuable space
- Pg 13.5 threads for interface into housings
- Comes with either watertight VP connector (IP 68) or T-82 connector
- Ingold 25 mm sensor design recognized as a standard in the industry
- Cap nut allows for easy interface to Ingold ports

► [www.mt.com/InPro6800](http://www.mt.com/InPro6800)

## Ordering Information

### 12 mm InPro 6800/6850 i DO Sensor Series

Sensor	Length	Connector	VP Number	ISM Number
InPro 6800/6850 i	70 mm	Straight	52 200 964	52 206 118
InPro 6800/6850 i	120 mm	Straight	52 200 965	52 206 119
InPro 6800/6850 i	220 mm	Straight	52 200 966	52 206 120
InPro 6800/6850 i	320 mm	Straight	52 200 967	52 206 121
InPro 6800/6850 i	420 mm	Straight	52 200 968	52 206 122
InPro 6810	70 mm	Angled	52 200 969	
InPro 6810	120 mm	Angled	52 200 970	
InPro 6810	220 mm	Angled	52 200 971	
InPro 6810	420 mm	Angled	52 200 973	

### 12 mm InPro 6800 DO Sensor Series (T-82 Connector)

Sensor	Length	Connector	Order Number
InPro 6820	120 mm	Straight T-82	52 201 012
InPro 6820	220 mm	Straight T-82	52 201 013
InPro 6820	320 mm	Straight T-82	52 201 014
InPro 6820	420 mm	Straight T-82	52 201 015
InPro 6830	120 mm	Angled T-82	52 201 016
InPro 6830	220 mm	Angled T-82	52 201 017
InPro 6830	320 mm	Angled T-82	52 201 018
InPro 6830	420 mm	Angled T-82	52 201 019

### 25 mm InPro 6800/6850 i DO Sensor Series

Sensor	Length	Connector	VP Number	ISM Number
InPro 6800/6850 i	80 mm	Straight	52 200 974	52 206 123
InPro 6800/6850 i	160 mm	Straight	52 200 975	52 206 124
InPro 6800/6850 i	260 mm	Straight	52 200 976	52 206 125
InPro 6800/6850 i	360 mm	Straight	52 200 977	52 206 126
InPro 6810	80 mm	Angled	52 200 978	
InPro 6810	100 mm	Angled	52 200 982	
for B. Braun ports	EPDM O-rings			
InPro 6810	160 mm	Angled	52 200 979	
InPro 6810	260 mm	Angled	52 200 980	
InPro 6810	360 mm	Angled	52 200 981	

For available sensors for B. Braun ports please ask your local sales organization.

### 25 mm InPro 6800 DO Sensor Series (T-82 Connector)

Sensor	Length	Connector	Order Number
InPro 6820	80 mm	Straight T-82	52 201 020
InPro 6820	160 mm	Straight T-82	52 201 021
InPro 6820	260 mm	Straight T-82	52 201 022
InPro 6830	80 mm	Angled T-82	52 201 023
InPro 6830	160 mm	Angled T-82	52 201 024
InPro 6830	260 mm	Angled T-82	52 201 025

### InPro 6800/6850 i Consumables

	Order Number
Membrane body, single T-96	52 200 071
Membrane kit T-96 (4 membranes, 1 O-ring set silicone, 25 ml of electrolyte, wetted parts SS 316L)	52 200 024
Membrane bodies (16 pieces), T-96	52 206 114
O <sub>2</sub> electrolyte pack (3 × 25 mL)	30 298 424
InPro 6800 replacement anode/cathode assembly	52 200 899
InPro 6850i replacement anode/cathode assembly	52 206 347

For accessories, cables and cable lengths refer to page 132 – 135.

InPro 6800 sensor master with sensor

Angled version of InPro 6800



Replaceable anode/cathode assembly



### Did You Know

The dissolved oxygen membrane used on these sensors is more durable and less prone to fouling than competitive products due to its advanced membrane design. This makes these sensors an excellent choice for dirty DO applications.

### Suitable Housings for 12 mm p.

InFit 761 e.....	110
InFit 762 e/763 e.....	112
InFlow .....	114
InDip .....	113
InTrac 777 e.....	119
InTrac 797 e.....	120
InTrac 781 .....	121
InTrac 785/787 .....	122

## InPro 6900 (i)/InPro 6950 i Accurate Trace Oxygen Measurement



Angled version also available

**USP**  
Class VI



**ISM**<sup>®</sup>

InPro 6950 i    InPro 6900

### Features Overview

- Revolutionary “Quick Disconnect” system allows for service in seconds
- Accurate measurement at very low levels of oxygen
- Long lasting and easy to maintain membranes
- FDA positive listed materials of construction
- Hygienically polished surface finish of N5/R<sub>a</sub>16 (R<sub>a</sub>=0.4 μm / 16 μin)
- EHEDG certified for cleanability and 3-A compliant
- Wetted O-rings comply with FDA and USP Class VI standards
- Steam sterilizable

► [www.mt.com/InPro6950](http://www.mt.com/InPro6950)

► [www.mt.com/InPro6900](http://www.mt.com/InPro6900)

The InPro 6900 and the InPro 6950 dissolved oxygen sensors with 12 mm diameter body offer the same advanced features as the InPro 6800, with the additional benefit of being able to measure trace oxygen concentrations. In particular, the InPro 6950 i sensor offers excellent accuracy at the lowest oxygen levels due to the built-in 4-electrode measurement system. Ingold’s unique cathode design, membrane and specially formulated electrolyte generate stable and accurate results at extremely low levels of oxygen.

### Specifications

#### Performance

Operating range	<b>InPro 6900 (i):</b> 1 ppb to saturation in aqueous solutions 3 ppb to saturation in CO <sub>2</sub> containing solutions
	<b>InPro 6950 i:</b> 0.1 ppb to saturation in aqueous solutions 0.25 ppb to saturation in CO <sub>2</sub> containing solutions

Accuracy	<b>InPro 6900 (i):</b> ≤ ± [1 % + 1 ppb] / ≤ ± [1 % + 3 ppb]
	<b>InPro 6950 i:</b> ≤ ± [1 % + 0.1 ppb] / ≤ ± [1 % + 0.25 ppb]

Response time at 25 °C (77 °F)	<b>InPro 6900 (i):</b> 98 % of final value in <90 s
	<b>InPro 6950 i:</b> 90 % of final value in <90 s

Sensor signal in air at 25 °C (77 °F)	<b>InPro 6900 (i):</b> 250 to 500 nA
	<b>InPro 6950 i:</b> 2500 to 6000 nA

Residual signal in oxygen-free medium	<b>InPro 6900 (i):</b> <0.03 % of the signal in ambient air
	<b>InPro 6950 i:</b> <0.025 % of the signal in ambient air

#### Construction

Measuring principle	Amperometric Clark electrode
Sensor design	12 mm sensor with VP design
Connector design	Straight or angled
Process connection	Pg 13.5
Sensor body	316L stainless steel
Membrane material	PTFE/Silicone (reinforced)
Surface roughness of wetted parts	N5/R <sub>a</sub> 16 (R <sub>a</sub> =0.4 μm / 16 μin)
O-ring material	Silicone (FDA and USP Class VI positive listed)

#### Working Conditions

Temperature compensation	Automatic
Measuring temperature range	0 to 80 °C (32 to 176 °F)
Environmental temperature range	<b>InPro 6900 (i):</b> –5 to 140 °C (23 to 284 °F) (sterilizable and autoclavable)
	<b>InPro 6950 i:</b> –5 to 121 °C (23 to 250 °F) (sterilizable)

Operating pressure	<b>InPro 6900 (i):</b> 0.2 to 6 bar (2.9 to 87 psi absolute) 0.2 to 9 bar (2.9 to 130 psi absolute) with T-6900 R
	<b>InPro 6950 i:</b> 0.2 to 9 bar (2.9 to 130 psi absolute)

Design pressure	Maximum 12 bar (174 psi absolute)
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#### Certificates and Approvals

METTLER TOLEDO Quality Certificate, EHEDG, FDA/USP Class VI, 3.1, N5/Ra16, ATEX: Ex ia IIC T6/T5/T4/T3 Ga/Gb, Ex ia IIIC T69 °C/T81 °C/T109 °C/T161 °C Da/Db FM: IS Cl. I, II, III, Div 1, GR ABCDEFG/T6
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#### Intelligent Sensor Management (ISM)

Intelligent Sensor Management (ISM) InPro 6900 i and 6950 i sensors with integrated ISM functionality allow Plug and Measure and advanced diagnostics. ISM simplifies the installation, handling and maintenance of measurement equipment. For more information see ISM introduction pages 10–11.



## Ordering Information

### 12 mm InPro 6900 (i) DO Sensor Series

Sensor	Length	Connector Style	VP Order Number	ISM Order Number
InPro 6900 (i)	70 mm	Straight	52 200 944	52 206 316
InPro 6900 (i)	120 mm	Straight	52 200 945	52 206 317
InPro 6900 (i)	220 mm	Straight	52 200 946	52 206 318

### 12 mm InPro 6950 i DO Sensors

Sensor	Length	Connector Style	ISM Order Number
InPro 6950 i	70 mm	Straight	52 206 127
InPro 6950 i	120 mm	Straight	52 206 128
InPro 6950 i	220 mm	Straight	52 206 129
InPro 6950 i	320 mm	Straight	52 206 130

### InPro 6900 (i) Consumables

	Order Number
Membrane body, single InPro 6900 (i)	52 201 049
Membrane kit InPro 6900 (i) (4 membranes, 1 O-ring set silicone, 10 ml of electrolyte, wetted parts SS 316L)	52 201 003
Reinforced membrane body, single InPro 6900 (i) (T-6900 R)	52 201 108
Reinforced membrane kit InPro 6900 (i) (T-6900 R) (4 membranes, 1 O-ring set silicone, 10 ml of electrolyte, wetted parts SS 316L)	52 201 109
InPro 6900 electrolyte pack (3 × 5 mL)	30 298 425
InPro 6900 (i) replacement anode/cathode assembly	52 200 943

### InPro 6950 (i) Consumables

	Order Number
Membrane kit InPro 6950 i (4 membranes, 1 O-ring set silicone, 10 ml of electrolyte, wetted parts SS 316L)	52 206 106
InPro 6950 electrolyte pack (3 × 5 mL)	30 298 426
InPro 6950 i replacement anode/cathode assembly	52 206 112

For accessories and spare parts refer to p. 53.

Replaceable anode/cathode assembly for InPro 6950



Reinforced membrane body InPro 6900

## Other Highlights

- Small 12 mm diameter saves valuable space
- Watertight VP connector (IP68)
- Variety of sensor lengths available
- Withstands CIP

## InPro 6900 (i)/InPro 6950 i Transmitter Compatibility

Sensor	M400 Type 3	M700 (x) Modules		M800 2/4-ch	M800 1-ch
		4700 i	4700 i x trace		
InPro 6900	•	•	•	–	•
InPro 6900 i	•	•	•	•	•
InPro 6950	–	•	•	–	•
InPro 6950 i	•	•	•	•	•

## Suitable Housings

	p.
InFit 761 e.....	110
InFit 762 e/763 e.....	112
InFlow .....	114
InDip .....	113
InTrac 777 e.....	119
InTrac 797 e.....	120
InTrac 781 .....	121
InTrac 787 .....	122

## InTap: Portable Optical Dissolved Oxygen Analyzer Maximum Control of Beverage Quality



Dissolved oxygen level is an important quality factor in the food and beverage industry. Maintaining low oxygen levels in food and beverage production ensures flavor stability as well as long shelf life. The InTap, with an internal optical DO sensor, allows users to measure dissolved oxygen values wherever and whenever required for optimum control of production processes and product quality.

The InTap is used for the measurement of beverage DO, and at-line measurement of beer during or after filtration and prior to filling. Further, the InTap is the perfect reference measurement instrument for calibrating installed in-line oDO sensors that measure at the lowest oxygen ranges.

The InTap is equipped with a Bluetooth interface and can connect to sensors equipped with the T100 Bluetooth tool.

Reference calibration is done with a few clicks and can be transmitted wirelessly to the sensor. All data is stored in the InTap's USB-connected storage and a database of measurement points is easily built up.

### Specifications

Measurement parameters	DO saturation e.g. concentration and temperature
Operating range*	0 ppb to 2000 ppb
Accuracy*	$\leq \pm [1\% + 2 \text{ ppb}]$
Response time at 25°C (air to N <sub>2</sub> ); † 98%	< 20s
Temperature measuring range	-5 to 60 °C (23 to 140 °F)
Operating pressure range	0 to 6 bar
Design pressure	12 bar
Protection rating	IP 67
Weight	3.5 kg
Battery	24 to 48 h
Data storage	1 GB

\*Sensor specifications

### Features Overview

- 4.0" touchscreen
- Fast response time
- Lowest calibration requirement
- Highest accuracy down to 2 ppb
- IP 67 enclosure resists harsh environments

### Other Highlights

- Full user management
- Wireless in-line sensor calibration
- Data logging up to 24 h
- Measurement point data management
- Calibration report management
- ISM predictive maintenance tools

## Ordering Information

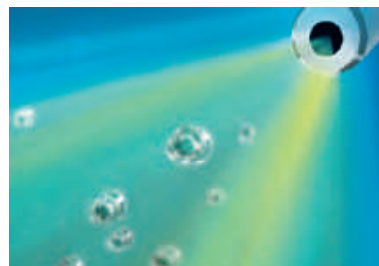
<b>Analyzer</b>		<b>Order Number</b>
InTap portable oDO analyzer		30 425 550
InTap portable oDO analyzer imp. inch/US		30 457 912
<b>Accessories</b>		<b>Order Number</b>
T100 M12 Bluetooth Interface for in-line sensor		30 432 819
<b>Replacement Parts</b>		<b>Order Number</b>
InTap 12V Power Supply Set		30 383 009
OptoCap for InTap (OptoCap BR01)		52 206 403
O <sub>2</sub> sensor InTap		30 422 571
Polyamide hose Ø 6×4 mm		30 422 575
Polyamide hose Ø ¼" (2m)		30 461 774



T100: Bluetooth interface for oDO sensors.



Touchscreen interface with convenient data management



Stable and accurate results with minimized calibrator demands.

Beyond optical technology METTLER TOLEDO has implemented Automatic Stability Control (ASC) to ensure stable and reliable results, also minimizing calibration demands.



With the InTap you can store the calibration data of installed sensors and build up an electronic database for sensor management. Data is stored on a USB stick and can be transferred conveniently to a PC.



**Did You Know**  
Installed oDO sensors can be upgraded with the T100 Bluetooth tool, allowing calibration data to be sent wirelessly to the InTap.

## InPro 6050 Continuous Control of Your Wastewater Application



The InPro 6050 dissolved oxygen sensor provides reliable continuous measurement of dissolved oxygen in water applications including biological treatment in wastewater. The InPro 6050 offers proven Ingold sensor technology with an integrated thermistor in a rugged plastic sensor body providing optimum measurement accuracy at an affordable price. The PTFE/silicone membrane is reinforced by an integral stainless steel mesh, which provides durability and mechanical stability to ensure reliable, continuous on-line measurement.

### Specifications

#### Performance

Operating range	30 ppb to saturation
Accuracy	± [1 % + 30 ppb]
Response time at 25 °C (77 °F)	98 % of final value in < 90 s
Sensor signal in air at 25 °C (77 °F)	40 to 110 nA
Residual signal in oxygen-free medium	< 0.3 % of the signal in ambient air

#### Construction

Measuring principle	Amperometric Clark electrode
Cable connection	VP
Connector design	Straight
Process connection	Pg 13.5
Sensor body	PPS
Membrane material	PTFE/Silicone/PTFE (reinforced w/steel mesh)
O-ring material	Viton®, Silicone
Sensor diameter	12 mm
Shaft length	120 mm

#### Working Conditions

Temperature compensation	Automatic
Measuring temperature range	0 to 60 °C (32 to 140 °F)
Design pressure	Maximum 2 bar (29 psi absolute)

#### Certificates and Approvals

METTLER TOLEDO Quality Certificate

### Features Overview

- Rugged sensor designed for the wastewater industry
- Low maintenance
- Accurate measurement and quick response
- Long lasting and easy to maintain membranes
- Watertight VP connector (IP 68)
- PTFE coated membrane protects the membrane against particle adhesion and chemical interference

### Ordering Information

Sensor	Length	Connector Style	Order Number
InPro 6050	120 mm	Straight VP	52 200 851

### InPro 6050 Consumables

#### Order Number

Membrane body, single T-96	52 200 071
Membrane kit T-96 (4 membranes, 1 O-ring set, 25 ml of electrolyte)	52 200 024
O <sub>2</sub> electrolyte pack (3 × 25 ml)	30 298 424

For accessories and spare parts refer to p. 53

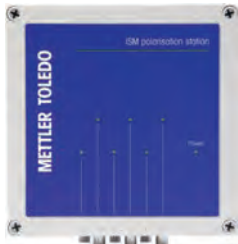
► [www.mt.com/InPro6050](http://www.mt.com/InPro6050)

# Oxygen Accessories and Spare Parts

## For Efficient Operation



Membrane kit with 4 membranes and electrolyte



6-port ISM polarization station for digital oxygen sensors



ISM O<sub>2</sub> Verification Kit. See page 104 for details.



ISM Optical O<sub>2</sub> Verification Kit. See page 105 for details.

An oxygen measuring system is made up of several important components and because the measurement is so critical to the process, all of them need to operate efficiently. This section outlines the accessories and maintenance items that can be used to optimize and maintain the quality of measurement.

### Membrane maintenance

Perhaps the most common problem seen over time with electrochemical oxygen sensors is membrane integrity. During the course of a membrane's life it may encounter difficult situations such as harsh samples, multiple sterilization cycles, or impact, all of which cause normal wear and tear on the membrane. Ingold pioneered the design of the PTFE and silicone membrane with a built-in steel mesh that greatly increases membrane durability, extends membrane life and can be easily and quickly replaced as required. We offer multiple membrane styles according to your application including those that have FDA positive listed components for wetted parts.

### Spare Parts – Ordering Information

InPro 6800 and InPro 6000 Series Sensor Membranes	Order Number
Membrane kit, S-96 (silicone)	52 200 025
Membrane kit, T-96 (PTFE)	52 200 024
Membrane body, single, S-96	52 200 072
Membrane body, single, T-96	52 200 071
O <sub>2</sub> electrolyte pack (3 × 25 ml)	30 298 424
Cap sleeve N (no protective cage)	52 200 037
Cap sleeve P (protective cage)	52 200 038
Cap sleeve N, HA-C22	52 200 642

### Accessories – Ordering Information

Product Description	Order Number
Digital ISM sensor master	52 206 329
Digital ISM sensor 6-port polarization station	52 206 480
ISM simulator O <sub>2</sub> Kit for InPro 6850i/6850iG	52 300 416
ISM simulator O <sub>2</sub> ppb Kit for InPro 6900i/6900iG	52 300 422
ISM simulator O <sub>2</sub> Trace Kit for InPro 6950i/6950iG	52 300 428
InPro 6800 sensor master polarization unit	52 200 892
InPro 6900 sensor master polarization unit	52 200 893
InPro 6950 sensor master polarization unit	52 206 113
DO sensor simulator for T-82 cabled transmitters	59 906 816
DO sensor simulator for VP cabled transmitters	52 200 891
Oxygen zeroing gel (3 × 25 mL)	30 300 435
Adapter T-82 cable to VP electrode connector	52 200 939
Adapter VP cable to T-82 electrode connector	52 200 940
Cap sleeve without protective cage N-type (SS 316L)	52 200 037
Cap sleeve with protective cage P-type (SS 316L)	52 200 038
Cap sleeve without protective cage N-type (C22)	52 200 642
Cap sleeve without protective cage N-type (Ti)	52 200 268
Optical O <sub>2</sub> Simulator	30 404 694