

CO₂ Measuring System

INGOLD

Leading Process Analytics

**InPro 5000 CO₂ sensor /
CO₂ 5100 e transmitter**

- High process reliability
- Real-time response
- Cost saving: modular design and higher yield



In-situ CO₂ measurement for in-line fermentation control – with optimal growth and higher yields!

METTLER TOLEDO

Continuous monitoring of dissolved CO₂...

Why should you measure CO₂ in your process? The oxidation of carbohydrates to CO₂ and water results from aerobic respiration. Beside pH and dissolved oxygen measurements, reliable monitoring and control of the CO₂ partial pressure is important for successful fermentation.



Biotechnology:
In-line fermentation control.

High process reliability

No risk of contamination, durable materials, and a robust design are typical INGOLD system benefits. The sensor is fully sterilizable either in-situ or in an autoclave. Even the interior body and inner electrolyte maintain sterile conditions during process calibration.

Optimize product yield and growth conditions

The yield in bacteria fermentation is strongly influenced by the control of CO₂ partial pressure. A high partial pressure of CO₂ can inhibit further growth of sensitive mammalian cell culture applications. The InPro 5000 sensor measures in-situ and therefore «registrates» exactly the same partial pressure as the cell.



Mammalian cell.

Save time with easy handling and maintenance

The CO₂ measuring system can be installed in nearly all types of bioreactors: Top entry installations in small bench top type reactors or side-entry installations with sterilizable and retractable housings in production reactors. The 5100 e CO₂ transmitter allows a straight-forward calibration and measurement with enhanced diagnostic features.

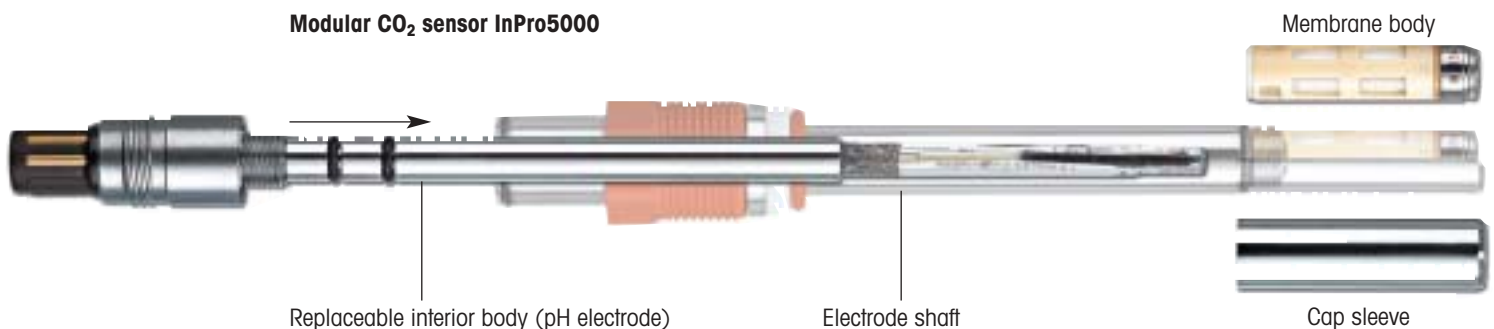
On-site service with modular sensor design

The unique membrane module dramatically reduces full service time to just minutes. The interior body, a high performance pH electrode, can easily be replaced at the customer site. No need to send the sensor to a METTLER TOLEDO facility for service.

Measuring principle

CO₂ diffuses through the membrane into the inner electrolyte where it equilibrates with bicarbonate ions, altering the pH value (Severinghaus principle). The respective change in pH values is sensed with an easy replaceable pH electrode.

Modular CO₂ sensor InPro5000



Replaceable interior body (pH electrode)

Electrode shaft

Membrane body

Cap sleeve

...to increase fermentation yield.

A successful implementation of a CO₂ control strategy in cell cultivation processes is guaranteed with the InPro 5000 sensor in combination with the transmitter CO₂ 5100 e and a suitable stationary or retractable housing of METTLER TOLEDO.

MaxCert™ includes:

- 3.1B
- EHEDG
- End control certificates

MaxCert™, a practical validation standard

METTLER TOLEDO provides 3.1 B, EHEDG and the production end control certificate free of charge in one bundle to satisfy safety, hygienic requirements and to guarantee traceability. The InPro 5000 is manufactured in accordance with the most precise surface treatment standards to comply with EHEDG and FDA flat surface recommendations for high level hygienic applications.

Reliability and operational safety

The operational safety of the «Advanced Line» CO₂ 5100 e transmitter is provided through continuous sensor diagnostics. Straight-forward calibration procedures are self-explanatory through pictographic user interface and Sensoface®.

High selectivity for CO₂

No cross interference of volatile organic acids (VOA) which are always produced simultaneously by the cells during fermentation. A new sophisticated membrane allows only CO₂ to pass through which guarantees accurate results.



CO₂ selective membrane, against volatile organic acids (VOA).

Distinctive features of suggested products for use in CO₂ measuring systems:

	Easy to use	Process calibration	Process safety (no contamination)	Easy to maintain
CO₂ sensor InPro 5000	modular design	improved accuracy	hygienic design MaxCert™	replaceable interior body
Transmitter CO₂ 5100 e	self-explanatory operation	straight-forward procedure	sensor diagnostics	performance check with pH simulator
Stationary housing InFit 761	for top or side entry installation	for small bioreactors	autoclavable	nearly maintenance free
Retractable housing InTrac 797	for medium to large bioreactors	for medium to small bioreactors	double lock chamber for sterile operation	replaceable O-rings



Housing:
InTrac 797



CO₂ sensor:
InPro 5000



Transmitter:
CO₂ 5100 e



The competence makes the difference...

METTLER TOLEDO offers a wide scope of technological measurement solutions for the field of industrial Process Analytics:

- a complete range of electrodes/sensors for the measurement of pH/ORP, O₂, conductivity, and turbidity values.
- a wide variety of static and retractable housings, cables and dedicated accessories as well as auxiliary systems such as automatic sensor cleaning and calibration devices.
- a comprehensive selection of transmitters to meet the most demanding application requirements, including compatibility with sophisticated, modern communication and automation systems.

SERVICE XXL

Our professional worldwide distribution and service network is at your disposal to provide you with the best possible technical and application support, from presales consulting through to on-site, operational trouble-shooting.

Ordering information for CO₂ systems:

Technical data sheet
with detailed product information and order numbers

Order no.
52 002 457

For further documentation on our products, please refer to your METTLER TOLEDO sales representative.

Documentation material for products and systems (available in English, German and French):



Transmitters

- «Value Line»
- «Advanced Line»
- «Premium Line»



pH / ORP

- Gel / polymer electrodes
- Liquid electrodes
- Non-glass electrodes
- Polymer body electrodes



O₂ / DO

- Value sensors
- Advanced sensors
- Premium sensors
- Portable instruments



Conductivity

- Value sensors
- 2/4-electrode sensors
- Inductive sensors



Turbidity

- Low to medium turbidity
- Medium to high turbidity



Housings

- For gel and polymer electrodes
- For liquid electrolyte electrodes



Cleaning & calibration systems

- EasyClean family



Management System
certified according to
ISO 9001 / ISO 14001

Sales and service: