ProTrode pH sensors
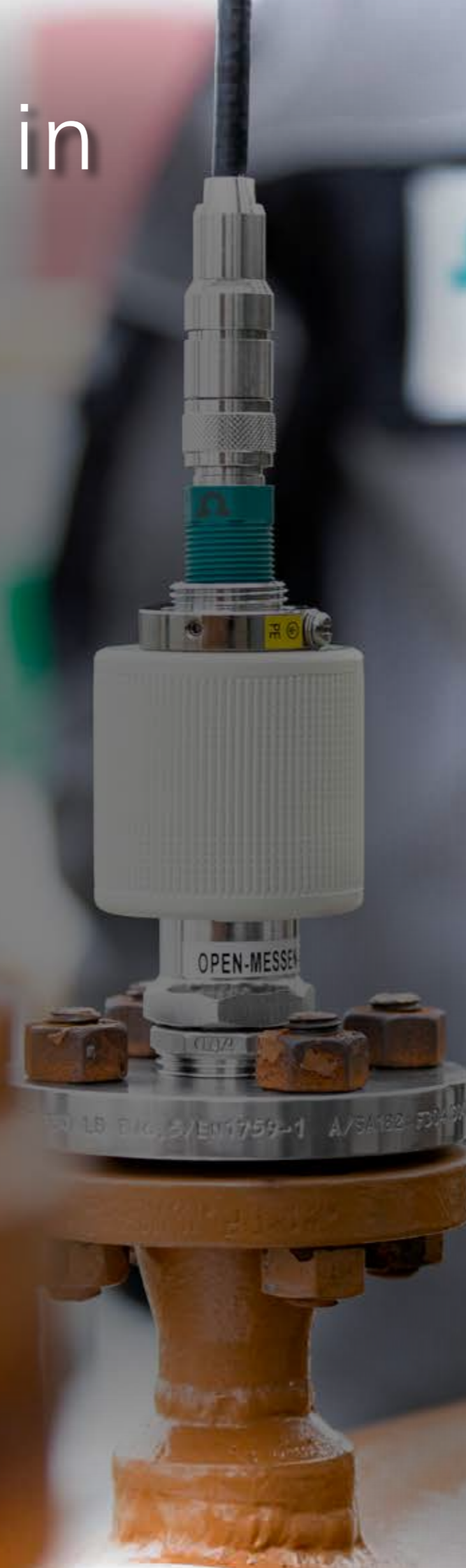
Enhance your process insights with inline pH measurements

**PUSHING
THE
LIMITS
TOGETHER**

Metrohm
Process Analytics

Innovators in process analytics

Smart and robust solutions for optimal inline pH measurements in your process

Metrohm Process Analytics is known as a pioneer in process analysis and is one of the global process industry's preferred solution providers for monitoring key parameters in large scale industrial manufacturing processes.

The first multipurpose process analyzer was developed by Metrohm in the 1970's. Since then, Metrohm Process Analytics has continued to push the limits together with our customers by providing the best customized online analytical solutions on the market.

Metrohm Process Analytics products are the most versatile products on the market. They enable 24/7 inline, online or atline monitoring of chemical industrial processes, water and wastewater and a multitude of different liquids and gases.

Metrohm is a pioneer when it comes to precise laboratory pH measurements. From the early design and development of the first pH meters to

a scaled up production of a broad range of pH sensors. Until now, Metrohm's pH sensor focus was mainly on laboratory offline and industrial online applications. Now, Metrohm Process Analytics have expanded their product portfolio to include an inline pH sensors to meet the requirements of the challenging and expanding sensor technology world.

By choosing an inline pH sensor from Metrohm Process Analytics, higher efficiency and optimization of your process control is guaranteed, as well as years of application knowledge and reliable expert support. «**ProTrode sensors**» are the next evolution of inline sensors in Metrohm Process Analytics.

ProTrode sensors

Decades of experience have given Metrohm Process Analytics unique application know-how, and pH knowledge is no exception. Four versions are available for the ProTrode sensor series, each of them highly accurate, effective, and robust – ideal for many industrial applications.

Metrohm Process Analytics ProTrode series enables fast and accurate inline pH measurements in various processes across many industries.

KEY BENEFITS
- Reliable: correct and trusted results over the entire lifetime of the sensor
- Flexible: adaptable for measurements in vessels, tanks, or pipes
- Robust: designed for a wide range of process environments
- Maintenance-free: the ProTrode sensors are always ready to use

Combined reference
Easy pH measurements using integrated reference

Temperature compensation
Avoid fluctuations in results thanks to temperature compensation using the integrated Pt1000 sensor

FOUR SENSORS FOR YOUR INLINE PH ANALYSIS

Guaranteed reproducibility
Sleeve diaphragms are ideal for application where the samples are stirred or with variable process flows. This type of diaphragm creates a very stable outflow of electrolyte around the sensor so that stable results are always obtained.

Do not worry about pressure
The ProTrode 250, 300 and 350 are pre-pressurized sensors and thus they can measure in process conditions of up to 4 bar, without any complications.

ProTrode 200 and 250

Avoid silver interference
Metrohm Process Analytics' ProTrode 200 and 300 sensors are equipped with a silver scavenger which avoids silver ions to enter the sample solutions.

Accurate measurements 24/7
The ProTrodes 250 and 350 are made with a high alkaline H glass, which makes them highly accurate in the high pH range. Thus, these sensors are suitable for a wide range of applications.

ProTrode 300 and 350

A new era of Metrohm pH sensors

Robust connection
Safe and rugged VarioPin sensor connection for IP68, protecting the VarioPin connection from damage

Fast and reliable Data transmission
The VarioPin sensor connector guarantees reliable signal transmission from the sensor to the 2060 Process Analyzer or transmitter

Length options
Broad range of sensors lengths [mm]: 120, 225, 325, 360, 425

Multiple installation options
Metrohm Process Analytics offers multiple solutions to integrate the ProTrode into the process. For example installation of the ProTrode in vessels, tanks, pipes or reactors

Integrated reference and temperature electrodes make the ProTrode sensors easy to use. Also, the ProTrode sensors can be integrated with any Metrohm Process Analyzer.

Optimize your plant performance

Process Analytical Technology's (PAT) framework is a valuable guidance for many organizations and operations with regard to optimizing process efficiency while ensuring adherence to environmental and safety standards, compliance requirements, and product quality. «Real-time» results from process analyzers and inline sensors as part of continuous process control can minimize product reject rates (material waste) by revealing process variation instantly. Gaining a clearer understanding of how a process is actually operating and where improvements are needed can lead to valuable savings.

Inline sensors can be mounted directly in the process and require no sample preparation or reagents. These non-invasive, direct measurements provide «real-time» results. Metrohm Process Analytics' ProTrode pH sensors can be installed to measure pH in a sample and provide instant sample data to the distributed control system (DCS) early in a process when results start to trend. Additionally, multiple ProTrode pH sensors can be installed in different parts of a process and be connected to a 2060 Process Analyzer for continuous, complete, and unattended monitoring.

Every process is different and has different necessities. Different ProTrode sensors connection systems are possible, which guarantee increased process efficiency, reveal occurrences of process variation, reduce waste, and minimize production delays by providing more continuous and comprehensive monitoring.
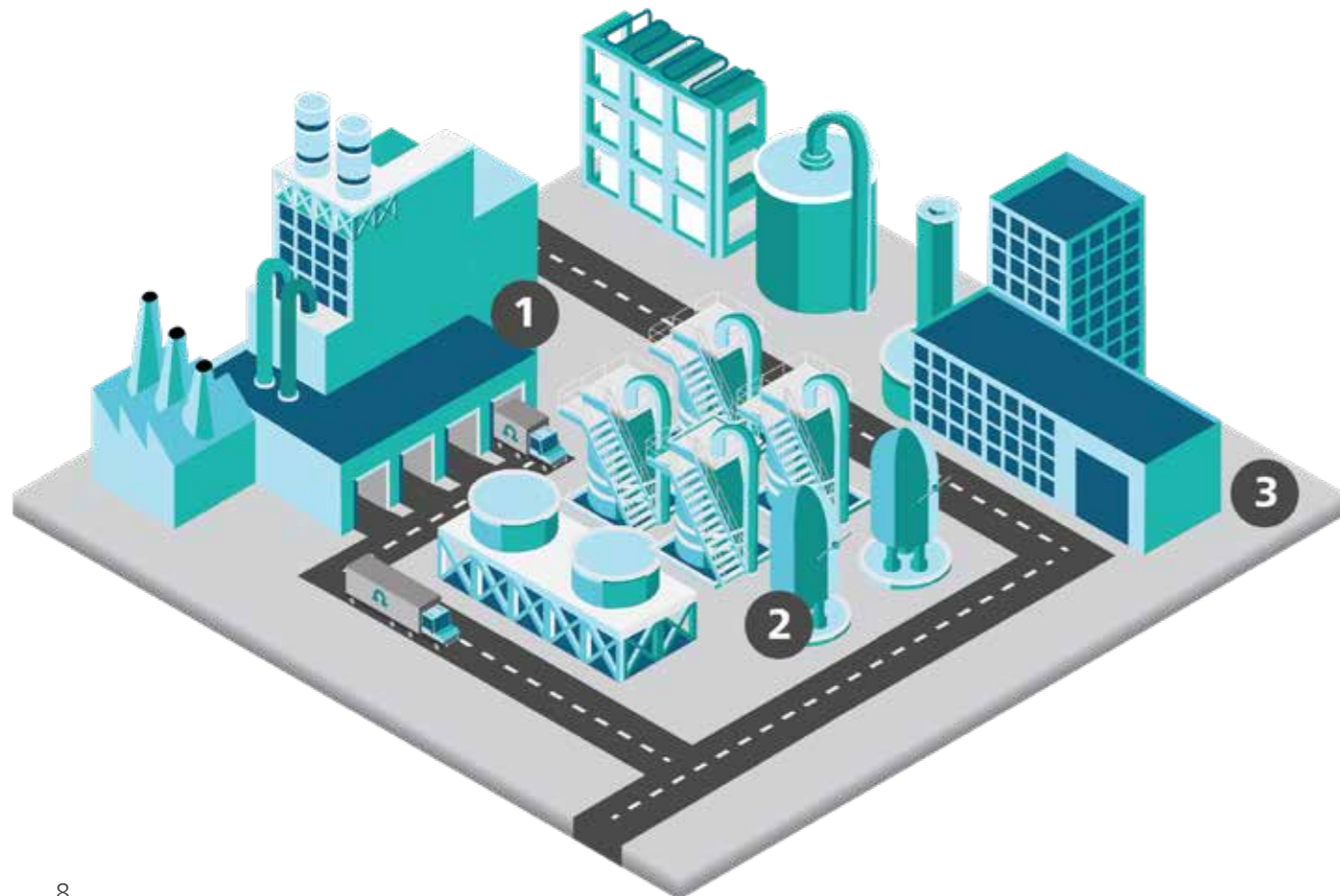
① Typical measurement setup

In a typical measurement setup, one or more inline pH sensors which are installed into the process are connected to a transmitter, which communicates to the DCS using analog and discrete signals. It does not matter, if you need to measure inside a reaction tank, pipeline or overflow vessel – with the ProTrode sensors, accurate, fast, and reliable results are always obtained.
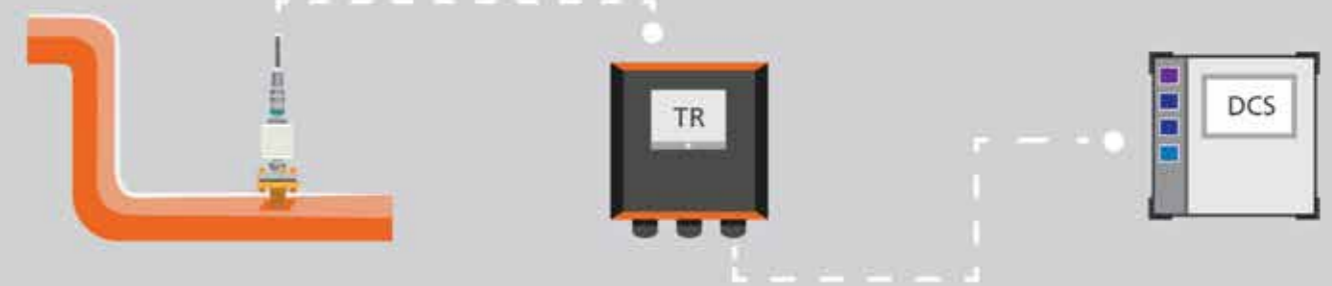
② Analyzer connection

Measuring pH only is not always enough. The ProTrode pH sensors from Metrohm Process Analytics can be connected to one or more transmitters, which can be connected to the 2060 Process Analyzer as part of a multi parameter system. The advantage of this setup is that the analyzer can read and interpret the pH data (and other parameters) and take correct actions if necessary. Additionally, the 2060 Process Analyzer has the feature to take over certain functionalities of the DCS, which reduces overall costs.

③ Smart Connection

Communication is always evolving, and Metrohm Process Analytics keeps up with the trends. With SmartConnectors on our ProTrode sensors, data can be easily transfered to the 2060 Process Analyzer using Analog output or Modbus protocols. The advantage of this setup is that an external transmitter is no longer required due to the direct connection to the ProTrode pH sensor itself. Besides this, calibration is a piece of cake. The Protrode sensors calibration can be performed with ease in a clean safe environment with the resulting calibration data stored securely in the «SmartConnector» and easily applied to new measurements.

Inline pH sensors for all industries

The ProTrode sensors from Metrohm Process Analytics are the perfect solution for a wide range of industrial applications. Our Swiss quality sensors offer type HT and H quality glass which enable stable readings and accurate measurements over a broad pH range.

Chemical

A wide range of processes with different process conditions are used in the chemical industry. The ProTrode 250 and 350 have been designed with glass type H to withstand the most challenging environments. Additionally, all the ProTrode sensors fulfill **EU ATEX directives**, thus they can be used in locations classified as hazardous areas.


Pharmaceutical & Biotechnology

It is important to monitor and verify the amount of reagents and other components in pharmaceutical and biotechnology manufacturing plants to ensure the correct concentration of chemicals are present as well as for compliance with official regulations. The ProTrode 200 and 300 have been designed with a silver scavenger to avoid silver ions contaminating the process sample thus interfering with the process.

Every minute counts

In laboratories, sample analyses are mostly carried out offline. However, this is not applicable in high throughput industrial processes, as offline analysis does not represent the most current process conditions due to the time delay between sampling and testing. Any beneficial process adjustments are delayed by hours or even days after an out-of-specification reading, causing losses of raw material, final product, and even company assets (e.g. corrosion due to ion exchanger breakthrough).

Inline analysis with industrial process analyzers and inline sensors saves time by automating measurements directly at the sample point. Reducing manual sampling **lowers costs, increases the safety** of plant operations, and much more:
- High analysis frequency leads to high quality products
- Protection of your company assets
- Increase your company profits
- Avoid incidents with process automation
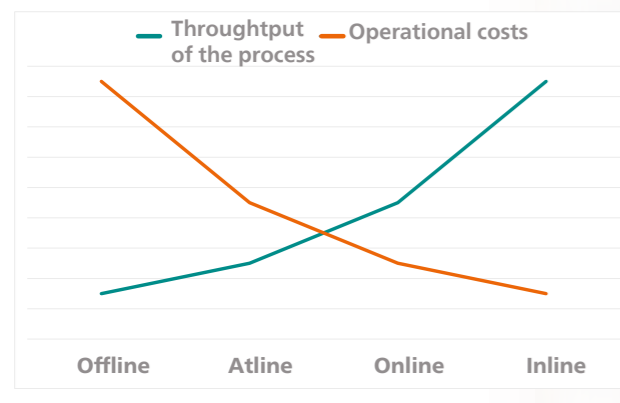
Product and process optimization differences between offline, atline, online, and inline analysis

We are here for you worldwide

Metrohm Process Analytics is present in more than 50 countries. Every subsidiary has its own service organization, spare parts warehouse, and trained service engineers. Distributors are either equipped with the same infrastructure or receive service and repair support from our Regional Support Centers (RSC), or directly from our headquarters in the Netherlands.

The high standards we maintain are also a promise to you. Regardless of when or where in the world you rely on our services, these services are performed to the same exacting standards.

Wherever you need us, we're there to help.

Local service and support – worldwide

- Subsidiaries
- Exclusive distributor

Metrohm
Repair Service

Technical specifications

Specifications	Protrode 200	Protrode 300	Protrode 250	Protrode 350
Industry	Biotech/Pharma	Biotech/Pharma	Chemistry	Chemistry
pH range	0 – 12	0 – 12	0 – 14	0 – 14
Membrane	HT glass	HT glass	H glass	H glass
Shaft material	Glass	Glass	Glass	Glass
Diaphragm	Sleeve	Ceramic pin	Sleeve	Ceramic pin
Temperature sensor	Pt1000	Pt1000	Pt1000	Pt1000
Electrolyte	Saturated KCl gel	Prepressurized Gelified 3M KCl	Prepressurized Gelified 3M KCl	Prepressurized Gelified 3M KCl
Reference system	Ag/AgCl reference with Ag-scavenger	Ag/AgCl reference with Ag-scavenger	Ag/AgCl reference	Ag/AgCl reference
Temperature range	0 – 80 °C	0 – 120 °C	0 – 120 °C	0 – 120 °C
High temperature	<20 min 135°C	<20 min 135°C	<20 min 135°C	<20 min 135°C
Pressure (bar)	1	4	4	4
Shaft diameter (mm)	12	12	12	12
Sensor connector	VarioPin, PG 13.5	VarioPin, PG 13.5	VarioPin, PG 13.5	VarioPin, PG 13.5
Output signal	Analog	Analog	Analog	Analog
Min. Immersion depth (mm)	25	25	25	25
Length (mm)	120, 225, 325, 360, 425	120, 225, 325, 360, 425	120, 225, 325, 360, 425	120, 225, 325, 360,425
ATEX	No	No	Yes	Yes

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