

**HAMILTON**  **N**

# Process Analytical Technology Sensors

Solutions For The Chemical Industry



# “Innovation For A Better World”



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# Partnering: Hamilton & The Chemical Industry

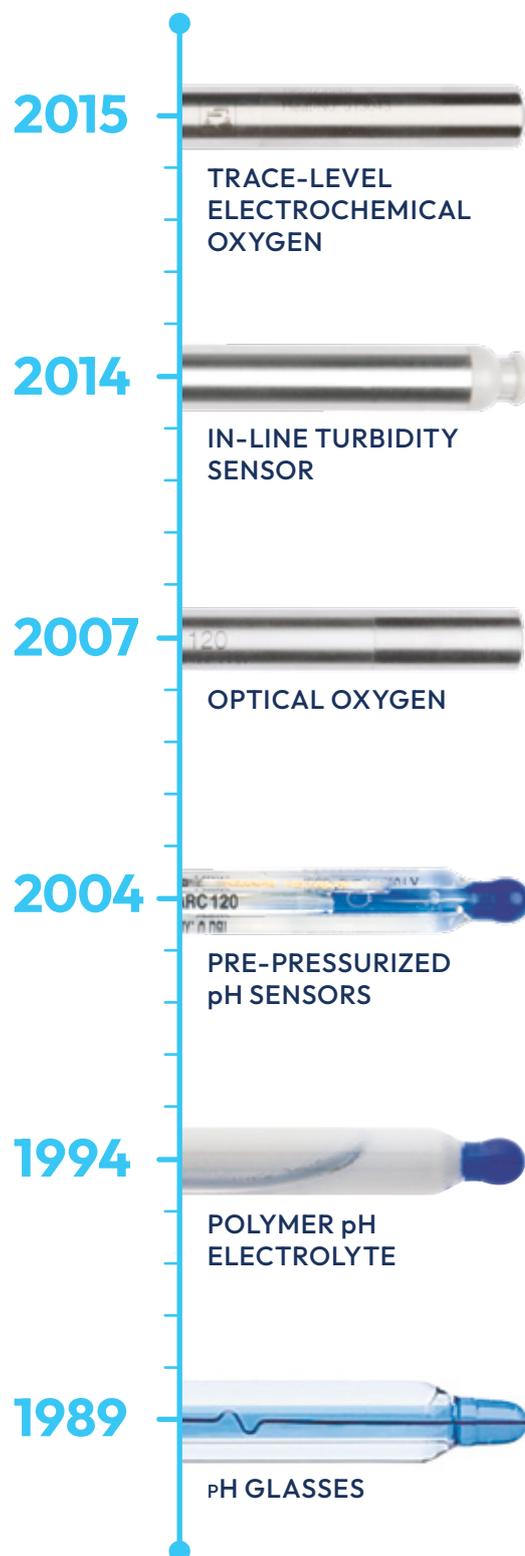
## Process Analytical Solutions for Chemical Applications

At Hamilton Process Analytics, we specialize in the development and production of innovative sensor technologies to monitor your process.

Our revolutionary pH Glass formulation in 1989 improved the stability of pH sensors at high temperatures. Since then, we have continued to innovate in the technologies we offer to the market, including the development of the Single Pore concept, EVEREF reference systems and introduction of pre-pressurized pH sensors.

In 2007, Hamilton made a pioneering advancement in dissolved oxygen (DO) measurement technology when we released our Optical DO sensors. Optical DO sensors are incredibly robust and require less maintenance than polarographic sensors. Our Visi Family of optical DO sensors are available in a variety of configurations and ATEX approved to meet your challenging applications.

Hamilton understands that a single connectivity type does not fit every system, therefore we offer 4-20 mA, PROFIBUS DP, PROFINET, MODBUS, HART connectivity across our sensor portfolio.



# Testimonial

**“Hamilton sensors and retractable fittings are not only essential for monitoring and controlling our chemical processes, but also make preventive maintenance and fault diagnosis much easier.**

**The robustness and durability of the products mean fewer emergency call-outs and greater overall plant effectiveness.**

**Overall, the sensors make a significant contribution to the safety, efficiency and reliability of our operating processes and help us to meet and exceed our high standards.**

**If you have any questions or individual concerns, our technical contacts are always on hand to advise you.”**

**-Dimitri Brumm | EMR Operating Engineer**

**-Cassella Chemiepark | GmbH**

# Reliable Measurement For The Chemical Industry

Monitor important parameters during your processes.



## BASIC CHEMICALS

The Building Blocks of Basic Chemical Production

The broad range of substances classified as basic chemicals (including acids, bases, solvents, and polymers) emphasizes the need for control measures during production. Some examples include:

- **Acid-Base Reactions:** sensors for precise control of neutralization reactions and product quality
- **Oxidation-Reduction Reactions:** ORP (Oxidation Reduction Potential) and DO (Dissolved Oxygen) sensors for monitoring and optimizing redox reactions
- **Electrolysis:** pH and conductivity sensors can be used to monitor electrolyte concentration



## FINE CHEMICALS

Ensuring Precision in Fine Chemical Production

Multi-step, batch production of pure, complex chemicals requires the up-most precision to ensure products meet product quality and specifications. Some examples include:

- **Reaction Monitoring:** pH, conductivity, DO
- **Crystallization Control:** conductivity, ORP, turbidity
- **Distillation Control:** temperature, pressure, pH, conductivity
- **Alkylation:** pH, conductivity, turbidity

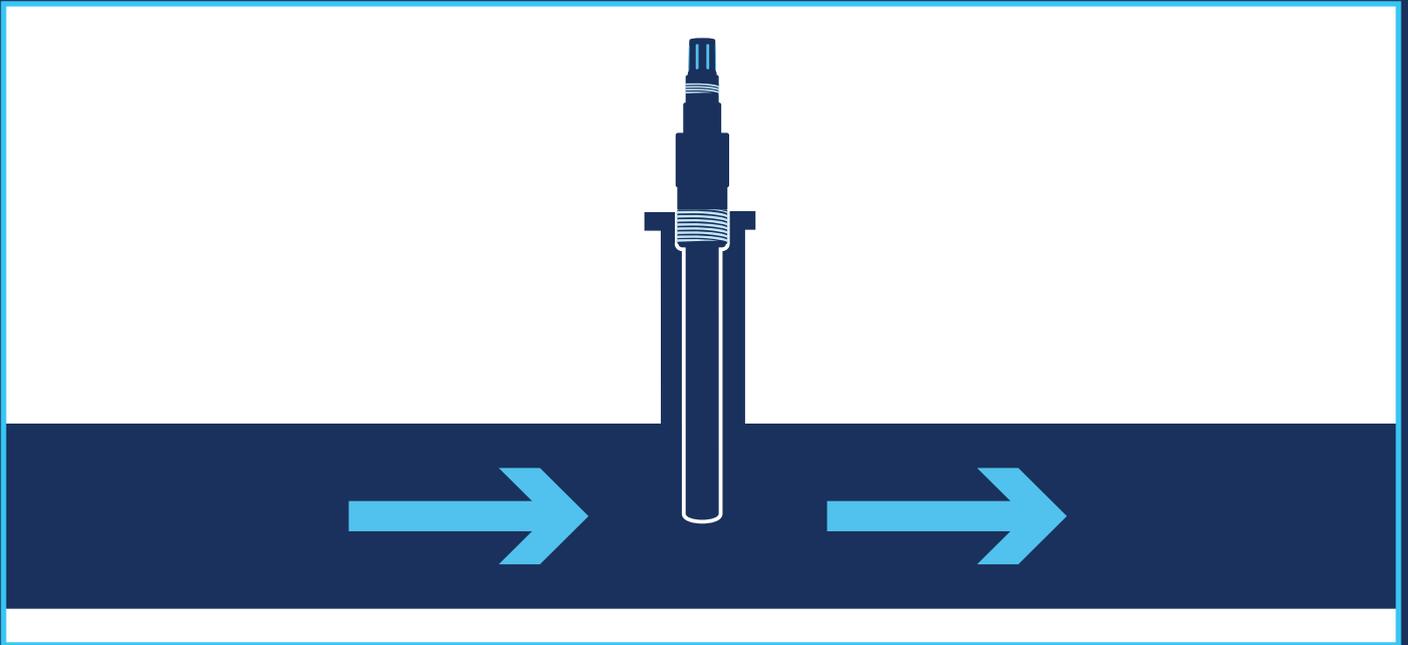


App Note:  
Flavor & Fragrance Industry



App Note:  
pH in Biocide Formulation





## PHARMACEUTICALS

Enhancing Quality & Efficiency  
in Pharmaceutical Manufacturing

The pharmaceutical industry produces medications under strict protocols to deliver products according to GMP requirements. PAT sensors can help to optimize conditions for improved efficiency, including:

- **Chemical Reactions:** pH, DO, conductivity, ORP
- **Separation Processes (Distillation, Liquid/Liquid Extraction, Filtration):** pH, conductivity, turbidity
- **Crystallization:** conductivity, pH, turbidity
- **Chromatography:** pH, conductivity



App Note:  
[Process Fermentation Plant](#)



## PETROCHEMICALS & OIL / GAS PROCESSING

Optimizing Petrochemical and Oil & Gas Operations

Refining petroleum and gas are multi-step processes that must each be monitored to maximize efficiency and reduce costs. Some examples include:

- **Cracking:** temperature, pressure, pH, DO, conductivity
- **Polymerization:** conductivity, temperature, turbidity
- **Distillation:** temperature, pressure, pH, conductivity, turbidity
- **Desalting:** pH, conductivity
- **Corrosion Monitoring:** pH, conductivity, ORP, DO
- **Emulsion Separation:** pH, conductivity



App Note:  
[Biofuel Production](#)

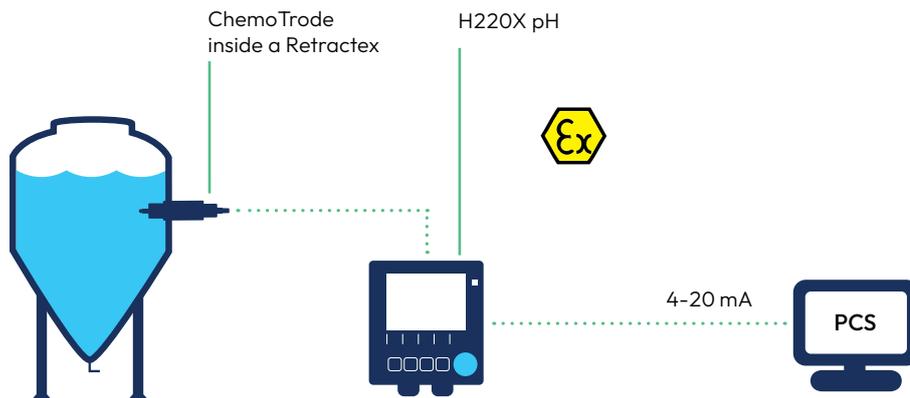


# Non-Segment Specific Applications

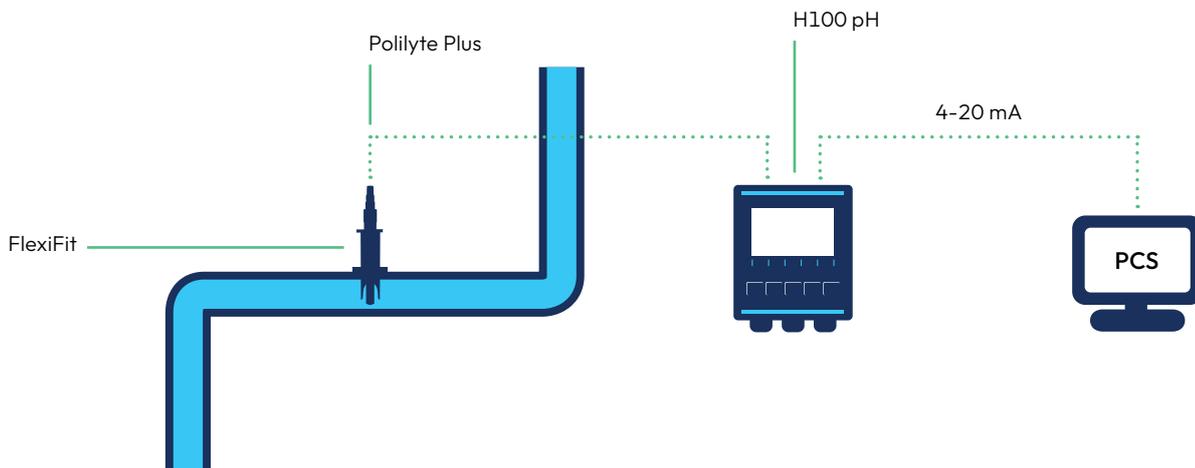
## Sensor Technologies in the Chemical Industry

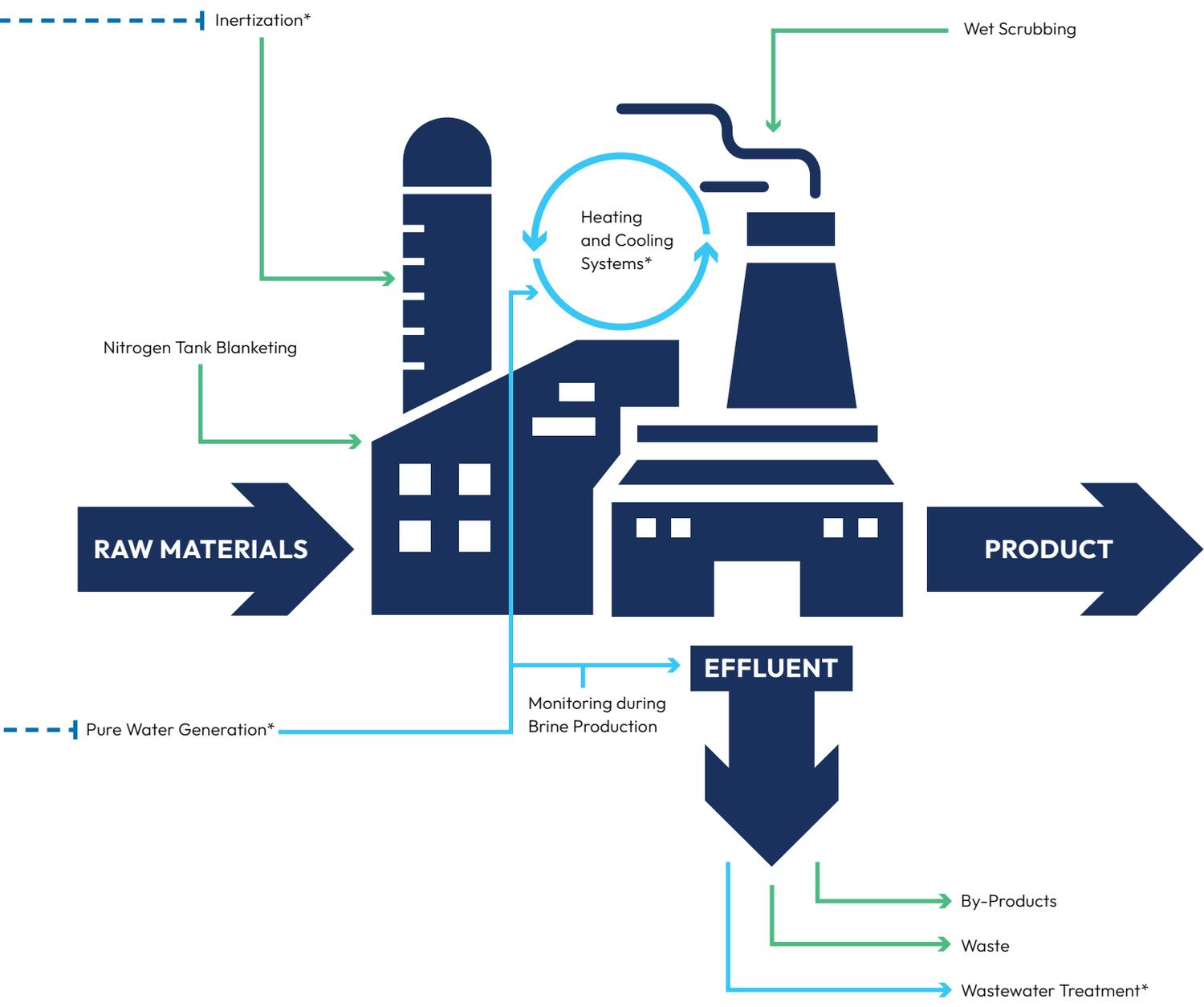
The chemical industry thrives on efficient and safe operations. Our advanced process sensors provide real-time data on crucial parameters across your entire process, from utilities to production and in non-hazardous and hazardous environments.

### Measuring Loop in Hazardous Area



### Measuring Loop in Non-Ex Zone





Pure Water Generation	Heating & Cooling	Inertization	Wastewater Treatment
			

\*Learn more about each process with the App Notes Above.

# Hamilton's Chemical Industry Portfolio

## pH

Polilyte Plus  
MecoTrode  
ChemoTrode  
DuraCal pH Buffer Solutions  
pH & ORP Storage Solution  
pH & ORP Cleaning Solution Set

## ORP

Polilyte Plus ORP  
DuraCal ORP Buffer Solutions  
pH & ORP Storage Solution  
pH & ORP Cleaning Solution Set

## Dissolved Oxygen: Optical

VisiTrace RS485  
VisiTrace mA  
VisiFerm RS485-ECS  
VisiFerm mA  
VisiWater DO P

## Dissolved Oxygen: Electrochemical

OxyFerm  
OxyGold G

## Turbidity

Dencytee

## Conductivity

Conducell 4UxF  
Conducell 4US  
Conducell 2DC-PG  
Conducell UPW  
Conductivity Standards

## Housings

FlowCell  
FlexiFlow  
FlexiFit  
Hygienic Socket  
Retractex BC & C  
RetractoFit  
RetractoFit Easy

## Housing Accessories

Sensors Dummy  
Immersion Set

pH

## Polilyte Plus

The Polilyte Plus sensor is designed for harsh industrial conditions, ensuring maintenance-free operation with anti-clog junctions and reliable accuracy in various solutions. It features an Everef-L reference cartridge for an extended lifespan and resistance against sulfide degradation of the electrolyte, and integrates Liquid Earth in the VP version for stable signals and enhanced diagnostics.



**Application:** chloro alkali, battery production, gas scrubber, mining applications, organic synthesis.

Specifications	
Measuring range	0 to 14 pH
Process temperature	0-130°C (H), -10-100°C (HF)
Pressure range (relative to ambient)	max 10 bar (H) max 16 bar (HF)
pH glass (recommended)	H, HF

### Benefits

- Maintenance free design: elimination of clogging with two single pore junctions.
- Good performance in highly alkaline solutions and in samples with low conductivity.
- Suitable for upside-down installation.



pH

## MecoTrode

The MecoTrode pH sensors are designed for processes in the chemical industry with extreme pH values. They are constructed from a H-glass type membrane which provides a low alkaline error and stable measurement even at high temperatures. Three high-performance ceramic diaphragms reduce the effect of flow potential in viscous liquids.



**Application:** chloro alkali, pH in silicate manufacture, battery production, gas scrubber, mining applications, organic synthesis.

Specifications	
Measuring range	0 to 14 pH
Process temperature	0 to 130°C
Pressure range (relative to ambient)	0 to 16 bar g (25°C), 0 to 6 bar g (130°C)
pH glass (recommended)	H, HF

### Benefits

- Capable of measuring a broad range of pH (including extreme pH values).
- Stable and accurate pH readings, even at high temperatures.
- Low maintenance.



## ChemoTrode

This is our most robust sensor, designed for measuring pH in demanding applications in pharmaceutical and chemical industries. The Everef-F reference cartridge ensures that the reference electrolyte remains free of silver and precipitation, while the liquid electrolyte can be easily refilled and pressurized up to 6 bar through a port in the sensor for easy maintenance. Refillable liquid electrolyte ensures fast response times and high precision during measurements.



**Application:** pH in silicate manufacture, organic synthesis.

### Specifications

Measuring range	0 to 14 pH
Process temperature	0 to 130°C
Pressure range (relative to ambient)	0 to 6 bar g
Sterilization method	SIP, CIP
pH glass	PHI

### Benefits

- Robust sensor suitable for applications in pharmaceutical and chemical industries.
- Liquid electrolyte ensures fast response time and high precision.
- Everef-F reference cartridge extends electrode lifetime by preventing diaphragm clogging.



S7  
\*ChemoTrode  
\*ChemoTrode P



VP6 / Pt1000  
\*ChemoTrode  
\*ChemoTrode P



VP6 / Pt100  
\*ChemoTrode



### Solutions:

- Protelyte
- Electrolyte 3 M KCl



## DuraCal pH Buffer Solutions

DuraCal Buffer pH are patented pH calibration solutions available in a wide range of independently verified pH values (pH 1.68 - pH 12). Their high buffering capacity accurately provides rapid and stable calibration ( $\pm 0.01$  pH) Hamilton's pH calibration solutions are stable for up to 5 years and their unique bottle design ensure convenient calibration with minimal waste (15 mL per calibration) and contamination.

### Benefits

- Convenient: bottle has a built-in calibration compartment.
- Economical: only 15 mL used per calibration.
- Certified and traceable pH value from an accredited DakS laboratory.



## Polilyte Plus ORP

A maintenance free sensor designed for applications in low conductivity samples. The Single Pore liquid junction guarantees best measurement results because of direct contact between the sample and the Polysolve electrolyte, clogging is nearly impossible.



**Application:** process water, pulp and paper, wastewater treatment.

### Specifications

Measuring range	± 2000 mV (Arc: ± 1500 mV)
Process temperature	0 to 130°C (Arc: analog 0 to 110°C, digital 0 to 140°C)
Pressure range (relative to ambient)	0 to 3 bar g (140°C) 0 to 10 bar g (130°C) 0 to 16 bar g (100°C)



**Buffer Solutions:**  
DuraCal ORP Standard  
Buffer Solutions



## DuraCal ORP Buffer Solutions

Hamilton ORP buffers provide accuracy of ±5 mV with stability up to 2 years after date of manufacture. The 500 ml bottle design uses Hamilton's unique calibration compartment which helps avoid cross contamination and only uses approximately 15 ml of solution.

### Benefits

- Convenient: bottle has a built-in calibration compartment.
- Economical: only 15 mL used per calibration.



pH

ORP



## pH & ORP

### Storage Solution

Hamilton storage solution is recommended to increase sensor longevity when not in use. The liquid solution is acid buffered to help with sensor response time after storage as well as prevent any biological growth.



pH

ORP



## pH & ORP

### Cleaning Solution Set

Complete solutions package: Simple two-solution cleaning kit with storage solution included. Compatible with all glass membrane pH sensors. Our two-solution cleaning simplifies cleaning of glass membrane pH sensors, and also includes storage solution for comprehensive sensor maintenance.



## VisiTrace Family

The VisiTrace offers all the advantages of Hamilton's optical dissolved oxygen sensors (fast response time and low maintenance) with the additional advantage of being specifically designed to measure ppb levels of dissolved oxygen.

**Application:** inertization, blanketing, water applications, leakage detection.

### Benefits

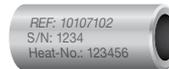
- Optical Dissolved Oxygen sensor: Fast response time and low maintenance.
- Designed to measure trace (ppb) levels of oxygen.
- VisiTrace mA is ATEX and IECEx approved.

### VisiTrace RS485



#### Specifications

Measuring range	0 to 2000 ppb (DO) or 0 to 50 mbar (pO <sub>2</sub> )
Process temperature	-20 to 140°C The sensor provides no DO reading above 85°C
Pressure range (relative to ambient)	-1 to 12 bar g



L1 Cap

### VisiTrace mA



#### Specifications

Measuring range	0 to 2000 ppb (DO) or 0 to 50 mbar (pO <sub>2</sub> )
Process temperature	-20 to 140°C The sensor provides no DO reading above 85°C
Pressure range (relative to ambient)	-1 to 12 bar g



L1 Cap



## VisiFerm Family

The VisiFerm is delivered ready-to-use without polarization and low maintenance. It has improved measurement performance and no CO<sub>2</sub> fouling issues, delivering the lowest drift of available Hamilton DO sensors and requires 80% less calibration. The VisiFerm performs real-time self-diagnostics on sensor and cap health to further ensure optimum performance and reduce process downtime or batch losses. The new generation of VisiFerm also has a 50% longer lifetime compared to the older generation of VisiFerm sensors.

**Application:** inertization, blanketing, water applications, leakage detection.

### Benefits

- Ready-to-use.
- Real-time self-diagnostic capabilities.
- Most stable and robust DO sensor.

### VisiFerm RS485-ECS



#### Specifications

Measuring range (in gas phase)	4 ppb to 25 ppm (DO) 0 to 62.85 %-vol or 0 to 300 %-sat
Process temperature	-20 to 140°C The sensor provides no DO reading above 85°C
Pressure range (relative to ambient)	-1 to 12 bar g



H3 Cap



H4 Cap

### VisiFerm mA



**2-Wire:** HART + ATEX

#### Specifications

Measuring range	4 ppb to 25 ppm (DO) 0 to 62.85 %-vol or 0 to 300 %-sat
Process temperature	-20 to 140°C The sensor provides no DO reading above 85°C
Pressure range (relative to ambient)	-1 to 12 bar g



H3 Cap



H4 Cap



DO

## VisiWater DO P

VisiWater sensors are optical technology sensors intended for the measurement of dissolved oxygen submersible applications in the environmental water industry due to the long fixed cable (10m) and IP68 rating. The VisiWater requires less maintenance due to its integrated self-diagnostic opto-electronics, and absence of a mechanically sensitive membrane or corrosive electrolyte. Optical DO technology ensures no CO<sub>2</sub> fouling, fast response time and stable measurement.



**Application:** water applications, fertilizer, nutrients, pesticide.

### Specifications

Measuring range	4 ppb to 40 ppm (DO)
Process temperature	0 to 60°C
Pressure range (relative to ambient)	-1 to 12 bar g



10 m Fix Cable



H2O Cap

### Benefits

- Intended for water applications.
- Self diagnostic capabilities.
- Less maintenance: mechanically sensitive membrane or corrosive electrolyte.
- Optical dissolved oxygen sensor: Fast response time and low maintenance.

DO

## OxyFerm

The OxyFerm sensor is a polarographic DO sensor, offering a broad detection range, durability against rigorous sterilization, and versatile connectivity options.



**Application:** battery production, fertilizer, nutrients, pesticide, organic synthesis.

### Specifications

Measuring range	10 ppb to 40 ppm (DO) or 0.2 to 1000 mbar (pO <sub>2</sub> )
Process temperature	0 to 130°C (Arc: analog 0 to 110°C, digital 0 to 130°C)
Pressure range (relative to ambient)	0 to 4 bar g

### Benefits

- Wide measuring range.
- Robust construction.
- Increased versatility through optional accessories.



### Accessories:

- OxyFerm Membrane Kit CIP
- Oxylyte 30 mL
- OxyFerm Replacement Cathode
- Polarization Module G / D4

DO

## OxyGold G

Designed for general use in applications in processes in which very small amounts of oxygen have to be traced.

### Benefits

- Designed for processes monitoring trace amounts of oxygen.
- Suitable for high-pressure processes.



**Application:** power plant, chemical, pharmaceutical, semiconductor, industrial gas production.

### Specifications

Measuring range	1 ppb to 40 ppm (DO) or 0.02 to 1000 mbar (pO <sub>2</sub> )
Process temperature	0 to 130°C (Arc: analog 0 to 110°C, digital 0 to 130°C)
Pressure range (relative to ambient)	0 to 12 bar g



### Accessories:

- Oxygold Membrane Kit
- Oxylyte G 30 mL
- Oxygold G Replacement Cathode
- Polarization Module G

Turb

## Dencytee

Hamilton's Dencytee Arc sensor is an on-line optical Transmittance and Reflectance sensor. Non ATEX.

### Benefits

- Robust design adapts to changes in ambient light and temperature.
- Easy air verification with our Maintenance Tool Kit.



**Application:** crystallization monitoring, dissolving process monitoring, filtration monitoring.

### Specifications

Wavelength	860 nm
Temperature	<80°C



### Accessories:

Dencytee Maintenance Tool Kit

## Conducell 4UxF

The Conducell 4UxF sensor measures a wide conductivity range, features FDA-compliant wetted parts compatible with CIP, SIP, and autoclaving, and is available in Traditional or Arc models with different materials suitable for diverse applications.



**Application:** processes in basic chemical production, fine chemical production, oil and gas and pharmaceutical.

### Specifications

Measuring range	Arc: 1 $\mu$ S/cm to 300 mS/cm Analog: 1 $\mu$ S/cm to 500 mS/cm
Process temperature	-20 to 150°C (Arc: analog 0 to 110°C, digital 0 to 140°C)
Pressure range (relative to ambient)	0 to 20 bar g (135°C) 0 to 10 bar g (150°C)



**Solutions:**  
Hamilton Conductivity  
Standard Solutions

### Benefits

- Can measure a broad range of conductivity (trace to very high).
- Real-time self-diagnostic capabilities.
- FDA compliant and suitable for CIP, SIP and autoclaving.
- Compatible with wired or wireless transmission.
- Customizable to your application.

## Conducell 4US

The Conducell 4US is ideal for measuring a broad range of conductivity (from 0.1 to 500'000  $\mu$ S/cm) with superior accuracy, resolution, and temperature compensation. wetted parts are FDA compliant. The Conducell 4US data works with a Traditional output.



**Application:** processes in basic chemical production, fine chemical production, oil and gas and pharmaceutical.

### Specifications

Measuring range	0.1 $\mu$ S/cm to 500 mS/cm
Process temperature	-20 to 135°C
Pressure range (relative to ambient)	0 to 6 bar g



**Solutions:**  
Hamilton Conductivity  
Standard Solutions

### Benefits

- All of your conductivity needs in one sensor: capable of measuring a broad range of conductivity.
- All wetted parts are FDA compliant.
- No need for separate housing, already integrated.

## Conducell 2DC-PG

The Conducell 2DC-PG 2-Pole sensor is a low-cost solution for contamination-free processing in the wastewater industry. Its stable 1.0 cell constant enables measurements from 0 to 20 mS/cm, while its 2-electrode design makes it a cost-effective solution. The 5 M fixed cable ensures the sensor remains below the liquid surface during operation, while the plastic shaft and graphite electrode are easy to clean.



**Application:** water treatment.

### Specifications

Measuring range	10 $\mu$ S/cm to 20 mS/cm
Process temperature	-5 to 80°C
Pressure range (relative to ambient)	0 to 6 bar g

### Benefits

- Suitable for wastewater industry applications and is implemented with a PG-35 process connection.
- High accuracy and cost effective.
- Capable for operating in a wide range of temperature (-5 to 80 °C) and pressure (0 – 6 bar) conditions.



**Solutions:**  
Hamilton Conductivity  
Standard Solutions

## Conducell UPW

The Conducell UPW sensor provides industry-leading, accuracy and sensitivity for producing pure and ultra-pure water in the pharmaceutical industry. Sensor is USP 645, EP, JP and FDA compliant, therefore appropriate for Pharmaceutical and pure water treatment applications. Arc model can be directly integrated into standard control systems, eliminating the need for a transmitter. Technology allows calibrations, predictive diagnostics, automated documentation, as well as user and process assignment to be stored in the sensor. The Traditional model is suitable for use in hazardous areas and is ATEX and IECEx approved.



**Application:** pure water, power, steam generators.

### Specifications

Measuring range	Arc: 0.01 to 1500 $\mu$ S/cm Analog: 0.02 to 2000 $\mu$ S/cm
Process temperature	Arc: analog interface 0 to 110°C, digital interface 0 to 130°C
Pressure range (relative to ambient)	0 to 10 bar g (130°C)

### Benefits

- Industry leading accuracy and precision: exceptional temperature compensation.
- Seamless integration.
- Easy cleaning.
- USP 645, EP and JP compliant.
- All wetted parts are FDA compliant.



**Solutions:**  
Hamilton Conductivity  
Standard Solutions



## Hamilton Conductivity Standards

Hamilton's conductivity standards are high-quality, high-purity calibration solutions designed for accurate and consistent verification of (all) conductivity meters and electrodes. They are available in a range of values and are suitable for various applications in pharmaceutical, chemical, and environmental monitoring industries. These standards are NIST traceable and are stable for 12-36 months.

### Benefits

- Unique certified conductivity standards of 1.3 and 5  $\mu\text{S}/\text{cm}$  at an accuracy of  $\pm 1\%$ .
- NIST traceable and fulfills all requirements of United States Pharmacopeia USP Chapter 625.



## Sensor Dummy

The sensor dummy is the ideal tool both for testing and training purposes and is the easiest way to replace a sensor during calibration, cleaning or replacement. This is because the dummy has the same specifications as a real sensor, therefore can be used to simulate the sealing properties in Housings.



## Immersion Set

The steel housing with hygienic surface and 3.1 material certificate serves as a weight to hang sensors freely suspended in the liquid to be measured. A simple and reliable installation of a sensor and at the same time extremely suitable for spot measurements.

Suitable for use with the Conducell 2DC-PG and VisiWater DO P.





## FlowCell

The flexible and space saving design of the FlowCell permits the simultaneous measurement of one or two parameters, even in systems with small pipe dimensions or when in-line measurement is not possible or desired, as samples are bypassed into the FlowCell for measurement. Two sizes of FlowCells are available, each configurable with various pipe connections.



### Specifications

Pressure range (relative to ambient)	0 to 16 bar g
Temperature range	-10 to 140°C

### Benefits

- Flexible design: measure one or two parameters simultaneously.
- PEEK lining delivers high chemical resistance.
- Low dead volume and self draining.



FlowCell



FlowCell XL

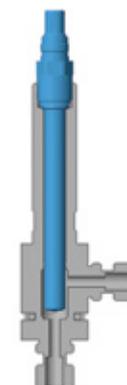
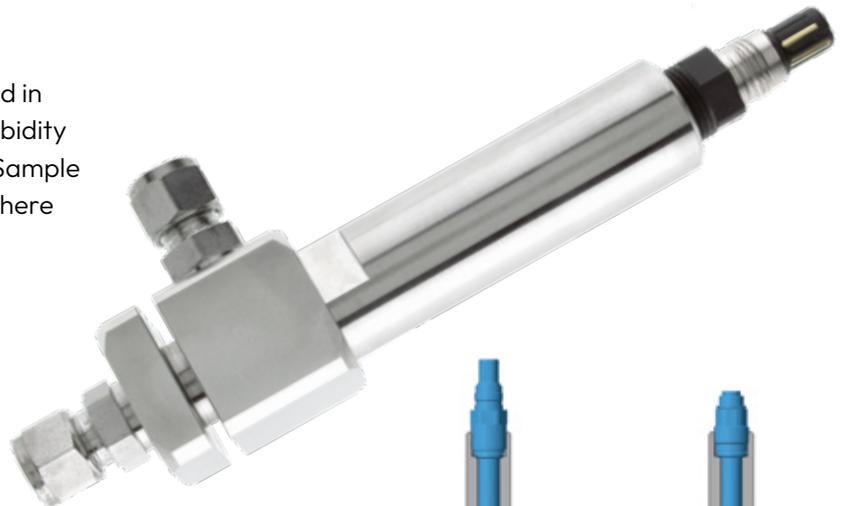


## FlexiFlow

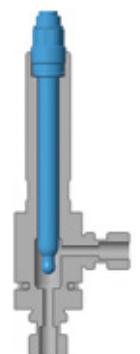
The FlexiFlow is a flow-through cell. It can be used in all cases where parameters as pH, oxygen or turbidity must be reliably measured in the flow of a pipe. Sample is bypassed into the flow cell for measurement where in-line measurement is not possible or desired.

### Benefits

- Enable measurement of pH, oxygen or turbidity in pipes.
- Self draining and easy to attach.



DO/CO<sub>2</sub>



pH

### Specifications

Pressure range (relative to ambient)	0 to 16 bar g
Temperature range	-10 to 130°C



## Hygienic Socket

The Hygienic Socket is designed for 120 mm sensors and ideal to weld into small pipes. Two “Live Guard” openings provide an indication of sealing failures. The sensor insertion depth can be varied for DO or Conductivity sensors by using the Hygienic Socket DO Adapter.

### Specifications

Pressure range (relative to ambient)	0 to 16 bar g
Temperature range	-10 to 140°C



DO Adapter

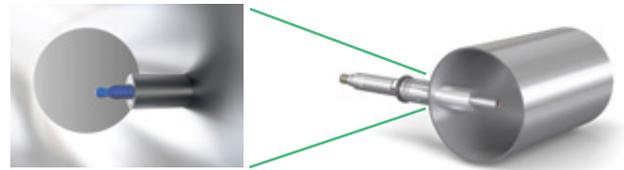


#### Accessories:

- Replacement Kit Seal Pusher
- Hygienic Socket O-Ring Replacement Set

### Benefits

- Space saving.
- Cost saving: Socket and Housing all in one.
- Low maintenance and easy replacement of o-ring.



## FlexiFit

FlexiFit static sensor housings are perfect for batch applications where the sensor is installed at the beginning of the process and does not need to be removed until the process has completed.

### Specifications

Pressure range (relative to ambient)	0 to 6 bar g
Temperature range	-10 to 140°C



#### Accessories:

- Service Kit FlexiFit

### Benefits

- Easy installation and handling.
- Various o-ring positions available.





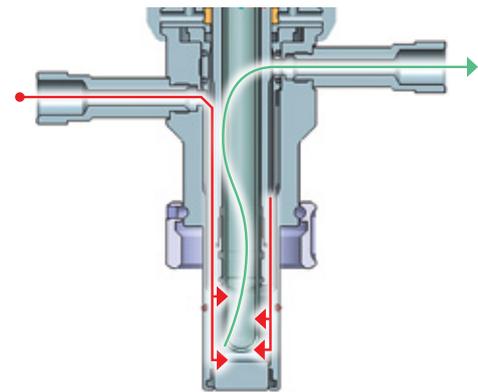
## Retractex

The retractable pneumatic or manual housing Retractex BC and Retractex C is designed for applications in the chemical industry. The compact design with a stroke of only 36 mm keeps wear on seals to a minimum and creates to excellent reliability. It can be cleaned easily and thoroughly in place. It is designed for 12 mm sensors and is equipped with several safety features (e.g. no sensor – no insertion, window to check seals for leakage etc.) to provide operator safety.

### Benefits

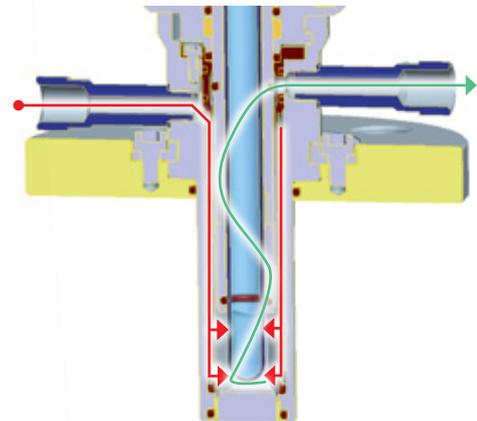
- The Retractex BC comes with a G 1¼" process connection and is available with two different o-ring positions.
- The Retractex C is available with various process connections that can be used with all vessels used in this branch.

### Retractex BC Steel



PTFE Scraper

### Retractex C Steel



PTFE Scraper

### Specifications

Pressure range (relative to ambient)	0 to 16 bar g (120°C), 10 bar g (140°C)
Temperature range	-10 to 140°C



Accessories:  
Service Kit Retractex



## RetractoFit

Safe sensor extraction during a running process. Easy, cost-effective manual retractable measuring point. With the RetractoFit, extraction of a sensor is possible during a running process under the highest safety standards, opening up new possibilities in terms of sensor calibration, cleaning and protection. Designed for use with 225 mm sensors.

### Benefits

- Safe sensor extraction during a running process.
- Easy, cost-effective manual retractable measuring point.

### Specifications

Pressure range (relative to ambient)	0 to 6 bar g
Temperature range	-10 to 130°C



## RetractoFit Easy

The RetractoFit Easy is a straightforward retractable probe housing crafted from stainless steel or plastic. It's designed to accommodate Ø12-120mm sensors on tanks and pipes. With an integrated locking mechanism, it securely holds the sensor in place while enabling effortless alignment of the protective cage. This ensures the inserted sensor is shielded from mechanical impacts and can nevertheless be aligned for the best possible measurement results.

### Benefits

- Compact design.
- Manually retractable.
- Suitable for processes up to 6 bar.

### Specifications

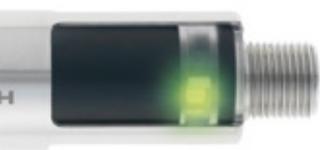
Pressure range (relative to ambient)	0 to 6 bar g
Temperature range	10 to 80°C



# Cables

A high quality measurement requires a high quality connection to the transmitter. Hamilton cables ensure the best possible connection between your sensor and your process control system.

## Sensor Connection



## Sensor connector and relevant cables

So what connector does my sensor have and what cable do I use? Below are a list of connectors available with Hamilton sensors.

### VP

The VP (VarioPin) is a common connector used throughout the Hamilton sensor product line. VP is abbreviation for “VarioPin”. The VP designation often includes a number referring to the number of exposed.

### K8

K8 connectors are typically used on traditional pH / ORP sensors which lack temperature compensation. These connectors have a two pole design comprised of the center core and outer metallic threaded connection.

### S7/S8

S7 and S8 connectors are typically found on traditional pH sensors with no temperature compensation. They are the same basic design however S8 connectors have PG13.5 mounting threads, while S7 connectors do not. These connectors are recessed thus care must be taken to avoid moisture getting trapped which could lead to a short circuit.

### T82

The T82 connector is sometimes known as a D4 connector. It uses a twist lock design to secure the cable to the sensor. These connectors are less common and only found on the Hamilton OxyFerm FDA Dissolved Oxygen Sensors.

### M12

The M12 connector is a common industrial connector found on our Visiferm mA and Visitrace mA sensors as well as various accessories. Be careful with cable selection as there can be many different variations of this connector in both number of pins and connection type.

### Memosens

Memosens® signals are digitalized and transferred inductively via a non-contact connection. Memosens features complete galvanic isolation and is fully waterproof and resistant to environmental influences.

## Cable Connection



Improved  
Electrical  
Properties

Robust  
Design

Hamilton  
Logo

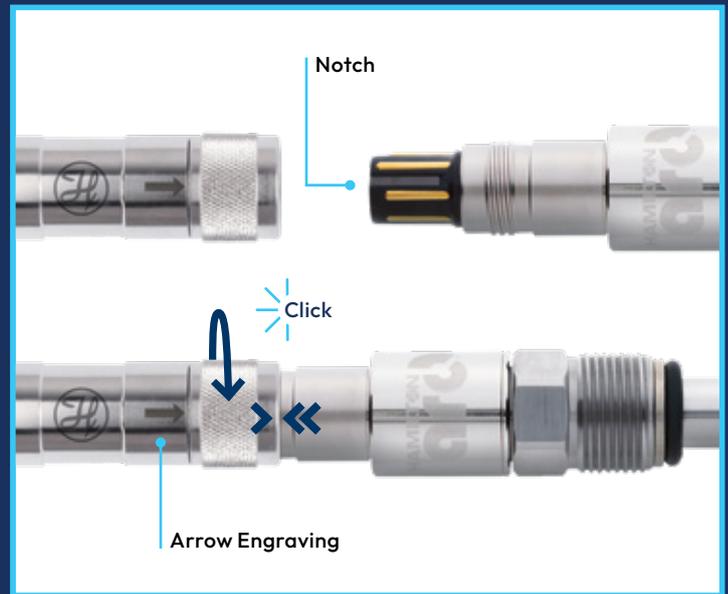
Indicator  
Arrows

Easier  
Connection

# Introducing the Hamilton Made VP Connector

## Now on all of our VP cables

Traditionally, VP connectors were every difficult to connect and disconnect. Our new connector was developed with special focus on the ease of connection.



## Closing

- Easy self alignment
- Closed position feedback

## Opening

- Tool less
- Low force

# Transmitter H220X



The Hamilton H220X transmitters are user-friendly devices designed for precision in measuring liquid properties with traditional pH, Dissolved Oxygen and Conductivity sensors.

They are suitable for a variety of applications, including pharmaceuticals and wastewater treatment. These transmitters offer an easy-to-navigate interface, continuous sensor monitoring, and visual fault identification, all backed by a power supply adaptable to AC or DC sources.

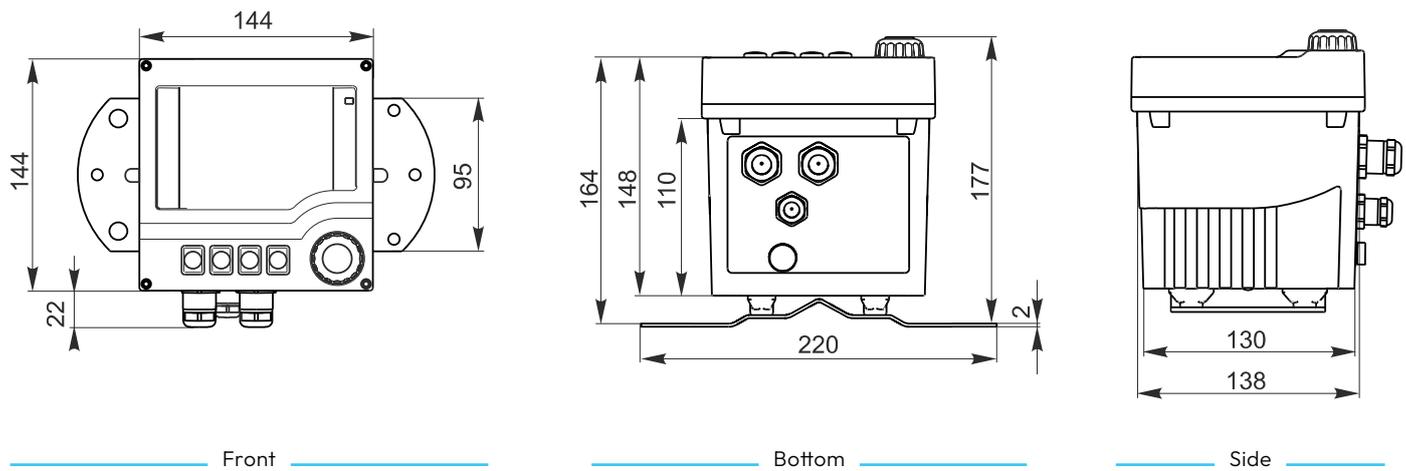
The Hamilton H220X Transmitter is built for safe use in explosive areas, meeting ATEX safety standards. It's simple to connect with systems using a standard 4-20 mA signal and includes Memosens technology for a secure, digital connection, ensuring reliable performance in tough conditions.



## Benefits:

- Modular design compatible with a range of sensor types, including pH, ORP, and conductivity.
- H220X is suitable for use in hazardous areas (ATEX)
- Offers software packages with advanced diagnostic and calibration features for more demanding applications.

**Mounting plan** (all dimensions in mm)



**The Transmitter H220X is available for the following parameters:**

- pH / ORP analog
- pH / ORP Memosens
- Conductive Conductivity analog
- Inductive Conductivity analog
- eDO Memosens

More info about measuring ranges, temperature ranges, input and output signals can be found on the Hamilton website.

# Explore Hamilton's Field Services

We offer various Hamilton field service options to fit your facility's needs. Our Field Service Team is factory trained and ready to help you at any stage, from installation to long-running maintenance. See which Hamilton field service fits your needs.



## INSTALLATION SUPPORT

Installation, set-up, and calibration support directly on-site. Our field service team ensures your sensors and cables are installed and functioning correctly.



## MAINTENANCE & CALIBRATION

Preventative maintenance and regular service contracts. Schedule on-site service dates to ensure your sensors are properly maintained and your process is optimized.



## ON-SITE TRAINING

User trainings and on-site trainings for technicians. Tailored training ranging from basic operation to advanced calibration and maintenance.

Learn More: [www.hamiltoncompany.com/field-services](http://www.hamiltoncompany.com/field-services)

**Note:** Our sensors are made to last. To increase sensor lifetime and avoid down-times, Hamilton suggests maintaining their sensors at least once a year by a Hamilton factory trained technician.

# Additional Hamilton Resources

Download And Find Out More



**Overview:**  
Sensors for the  
Chemical Industry



**Brochure:**  
Liquid Solutions  
for Calibration



**Catalog:**  
Process Analytics  
Catalog



We invite you to join us in our commitment to environmental responsibility by embracing digital documentation.

At Hamilton Company, we value sustainability and strive to minimize our impact on the environment by reducing paper waste, conserving natural resources, and minimizing our collective carbon footprint.



● Headquarters / Manufacturing



Years of Experience  
**75+**



Locations Worldwide  
**22+**



Employees Internationally  
**3,000+**

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