

Process Analytics

Measuring Solutions



HAMILTON®

Global Presence

Hamilton has sales representatives in many countries. There is always a competent representative or partner in the neighborhood of our customers. The map below shows the Hamilton offices.



Sensor manufacturing in Bonaduz, CH



Headquarter in Reno, USA



Want to get in touch with Hamilton? We are just one click away:

www.hamiltoncompany.com

Process Analytics

Measuring Solutions



Arc – Wisdom from Within

See more on page 8



Beverly – Born with a purpose

See more on page 78



Housings

See more on page 98



Table of Contents

Innovations	4
Arc Family	8
System Installations	10
Sensors	12
pH	12
ORP	42
Cond	56
DO	66
Beverly	78
DuraCal pH Buffers	80
Conductivity Standards	82
Connecting Cables for Sensors	84
Oxygen Accessories	86
Electrolytes and Solutions	87
Arc Accessories	88
Hamilton Customized Products	91
Transmitter	92
H100	92
H200	96
Housings	98
Alphabetical Index	130

Beyond Process Analytics

Hamilton's electrochemical and optical sensors are the solution for process analytical measurement systems, characterized by proven quality and outstanding performance. Offering measurement parameter solutions in pH, ORP, dissolved oxygen and conductivity, our sensors and accessories are backed by over 50 years of engineering and manufacturing expertise in innovative design.



pH Glasses

Measurement Accuracy in Various Applications

Measurement stability and sensor lifetime in various environments requires different pH glasses.

Our high performance glasses, the PHI and the HB glass, were developed to withstand frequent steam sterilization, autoclavation and CIP cleaning using hot caustics. PHI and HB glass provide the lowest drift and show almost no shift after sterilization and cleaning procedures.

The H glass has excellent aging characteristics and offers stable readings even in samples with low water content such as anhydrous or only partially aqueous solutions. The low alkali error of H glass means accurate measurements even at high pH or high operating temperatures. HF glass ensures the longest possible lifetime in low temperature processes and processes containing hydrofluoric acid.



Foodlyte

Biocompatible Reference Electrolyte

The Foodlyte electrolyte was specifically developed for the needs of the biotechnology, pharmaceutical and food industries. It's based on food ingredients and the perfect electrolyte for applications where non-toxicity is mandatory. Foodlyte is taste-, odor- and harmless for microorganisms.

The biocompatibility is approved by MDT¹ according to EN ISO 10993-5² and USP 31, 2008 Chapter 87³ and according to international GLP⁴ guidelines.



¹ Medical Device Testing GmbH Ochsenhausen

² Biological evaluation of medical devices -- Part 5: Tests for in vitro cytotoxicity

³ Biological Activity Tests, In Vitro

⁴ Good Laboratory Practice



Single Pore Concept

The never-clog Liquid Junction

A Single Pore is an open liquid junction and an alternative to diaphragms. Instead of many tiny pores in a ceramic diaphragm, a single pore, about 2000 times larger in diameter, is used. This concept provides a direct contact between reference electrode and sample. In combination with the bigger diameter this liquid junction can hardly be clogged. The Single Pore results in a faster response time, more accurate readings and prevents reference poisoning.

NOTE: The PTB (Physikalisch-Technische Bundesanstalt = Physical Technical Federal Institute) in Braunschweig, Germany, determined the Single Pore pH electrode to be the most accurate laboratory electrode. Further information can be found in "Traceability of pH measurement" by Petra Spitzer; ISBN 3-89429-877-4 or ISSN 0947-7063

Polisolve Plus

Most innovative Polymer Reference Electrolyte

Hamilton has designed innovative Polisolve Plus polymer electrolyte sensors that cover the full pH range, a wide temperature range and withstand reference poisoning for an extended lifetime. It's also stable against most organic solvents and free of toxic acrylamide.

When Polisolve Plus and Single Pore concepts are combined the result is a Polilyte Plus sensor for a wide range of applications as well as a problem solver for difficult applications.

- ▶ Industrial waste water
- ▶ Hot sugar juice
- ▶ Samples containing color pigments
- ▶ Oily samples

The combination leads to more stable reference signals and minimized diffusion potentials. Polisolve Plus represents a significant contribution to long lasting pH sensors.



Conductivity Standards

Certified and Traceable

Hamilton is the first seller worldwide of conductivity standards at 1.3 and 5 $\mu\text{S}/\text{cm}$ with a certified accuracy of $\pm 1\%$ and a durability of 1.5 or 3 years. All conductivity standards exhibit a previously unknown level of stability which has been confirmed by measurements done by the PTB. Governmental metrological institutes that deal with measurement of electrolytic conductivity have become aware of these standards. The composition of these standards is patented. The measurement procedure for determining conductivity has been developed in collaboration with the DFM¹. Each batch is certified by the DFM. In an inter-laboratory test among prestigious European metrological institutes (PTB, DFM, DAkkS²), Hamilton standards were used as a measurement solution.



¹ DFM: Danish Institute of Fundamental Metrology, Lyngby, Denmark
² DAkkS: Deutsche Akkreditierungsstelle, Wolfen, Germany



DuraCal pH Buffers

Easy calibration with 5-year shelf life

DuraCal pH buffers consist of a complete range of patented stable pH buffer solutions from pH 1.09 to pH 12.00. Hamilton guarantees that they last for five years from the date of manufacture. The pH 9.21 and pH 10.01 buffers are even stable in air. High buffer capacities enable quick and stable calibrations.

Closed-loop traceability: In contrast with other manufacturers Hamilton has developed a “closed-loop” traceability. For users of DuraCal pH buffer solutions this means a unique level of reliability.

Top-down traceability: With Hamilton the pH value of the DuraCal buffer is determined by a comparison with two secondary reference solutions.

Bottom-up traceability: From each lot manufactured, a representative quantity is measured at DAkkS (Deutsche Akkreditierungsstelle, Wolfen, Germany). This ensures an external independent verification by an accredited institute. The DAkkS issues an official calibration certificate for every DuraCal batch manufactured.



VisiFerm DO

The most reliable optical dissolved oxygen probe in the industry

The VisiFerm DO is the first optical dissolved oxygen (DO) process sensor for demanding applications in the pharmaceutical, biotechnology and beverage industries. The measuring principle is based on oxygen dependent quenching of the emitting light of a luminophore. Easy and fast to maintain, the multiple time-constraints caused by the use of electrochemical type DO sensors is eliminated. Decreased cost of ownership is further improved with an integrated sensor lifetime check that indicates when the sensor is in need of maintenance. A simple, replaceable cap rebuilds the sensor in seconds.

The optical measurement is independent from the flow and insensitive to CO₂. A special window behind the luminophore enables the sensor to withstand pressure hammers and spikes. Due to this design, the VisiFerm DO is suitable for inline measurement of dissolved oxygen in various processes.



Beverly

Portable Dissolved Oxygen Measurement

Beverly is designed for at-line and laboratory use in small and midsize breweries as well as in the beverage industry to provide excellent reliability in a rugged design, and purpose built to handle the environmental extremes encountered in everyday brewing operations. Superior performance at an affordable price is achieved using Hamilton's best in class optical sensor VisiFerm DO B with built-in intelligence, making Beverly the brewer's best friend.

The True Power

No external Transmitter

Hamilton Arc revolutionizes the integration of sensors by rethinking communication between sensors, end users and process control systems (PCS). The functionality of a traditional transmitter has been replaced by a microprocessor within the sensors head. Arc sensors communicate directly with the PCS through 4-20mA standard and digital signals.

With the micro-transmitter integrated, Arc sensors offer a fully compensated, converted digital and 4-20mA signal directly to the process control system.

Fully compensated signal

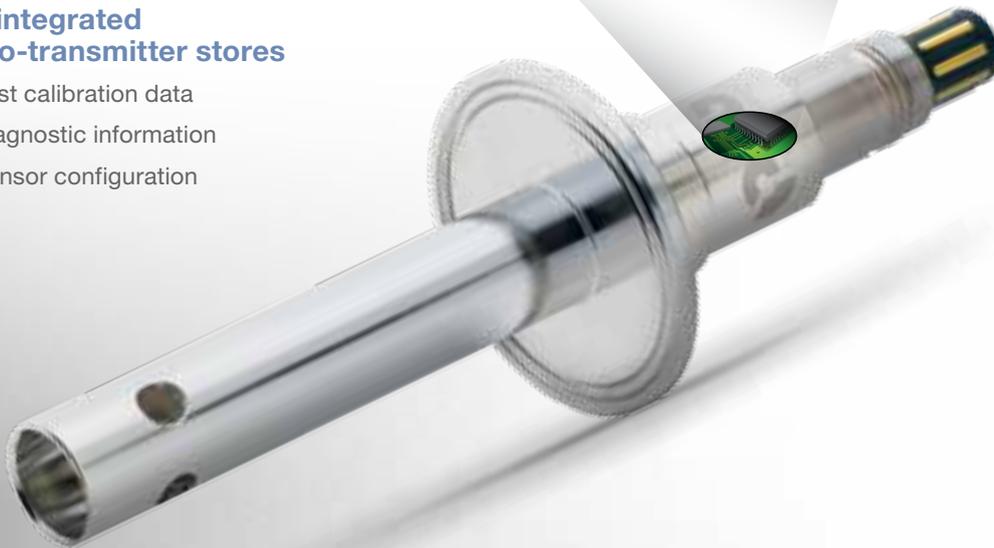
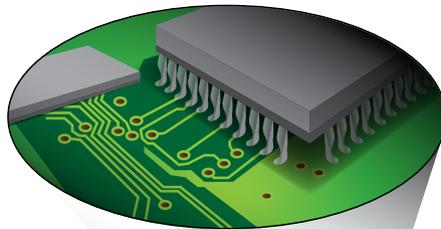
- ▶ Temperature compensated
- ▶ E.g. Pressure, Salinity

Conversion to

- ▶ Digital Modbus
- ▶ 4-20mA analog
- ▶ Different parameter units (e.g. mV, ppb, %sat....)

The integrated micro-transmitter stores

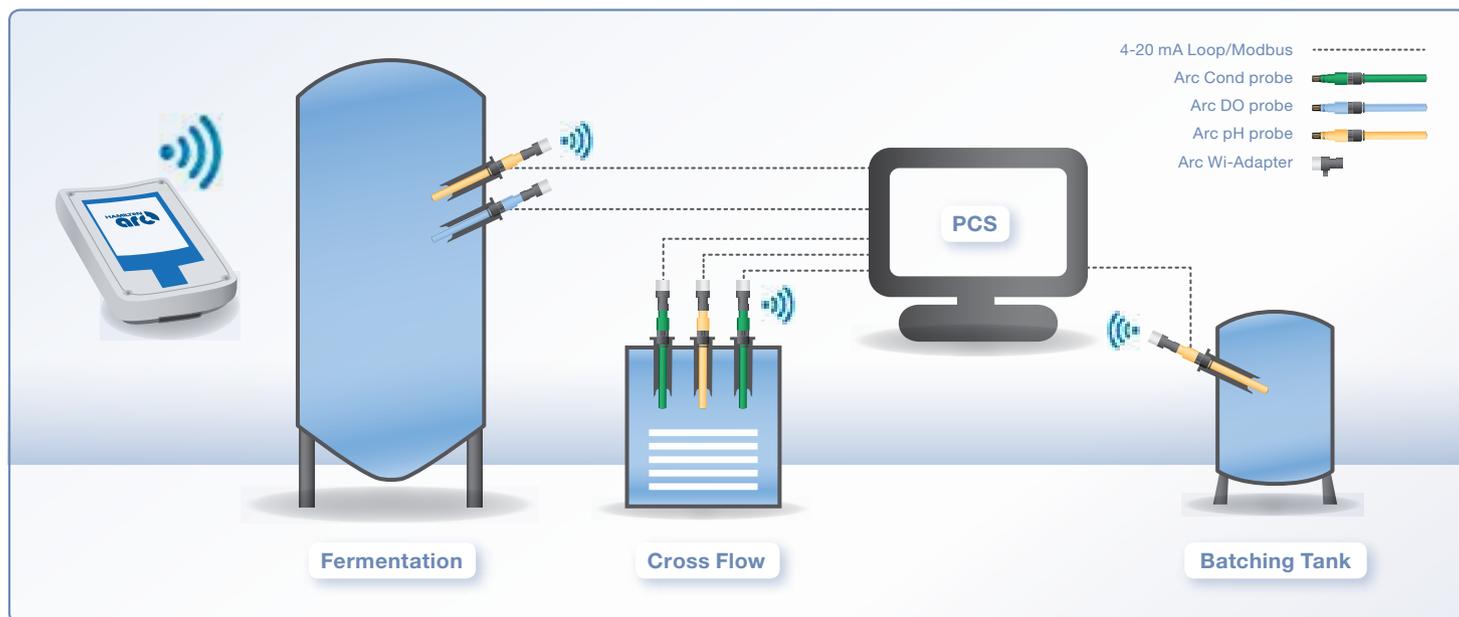
- ▶ Last calibration data
- ▶ Diagnostic information
- ▶ Sensor configuration



Arc Intelligence

Wireless Communication and Calibration

Arc sensors provide full online wireless option for monitoring, configuration and calibration.



Laboratory Calibration



Complete Arc Sensor Portfolio

pH Arc



DO Arc



ORP Arc

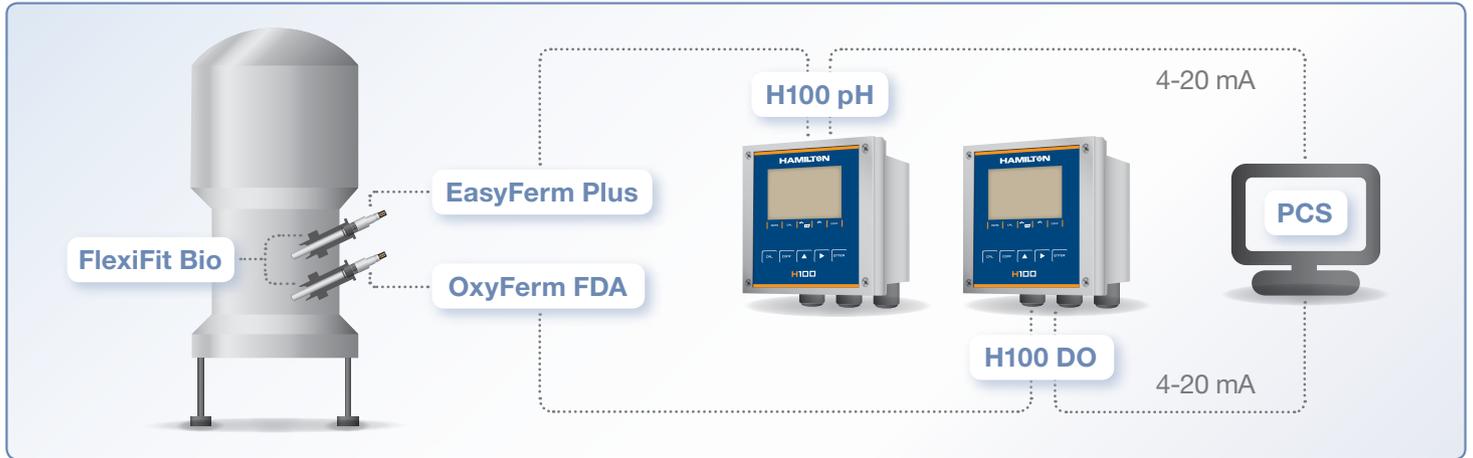


COND Arc

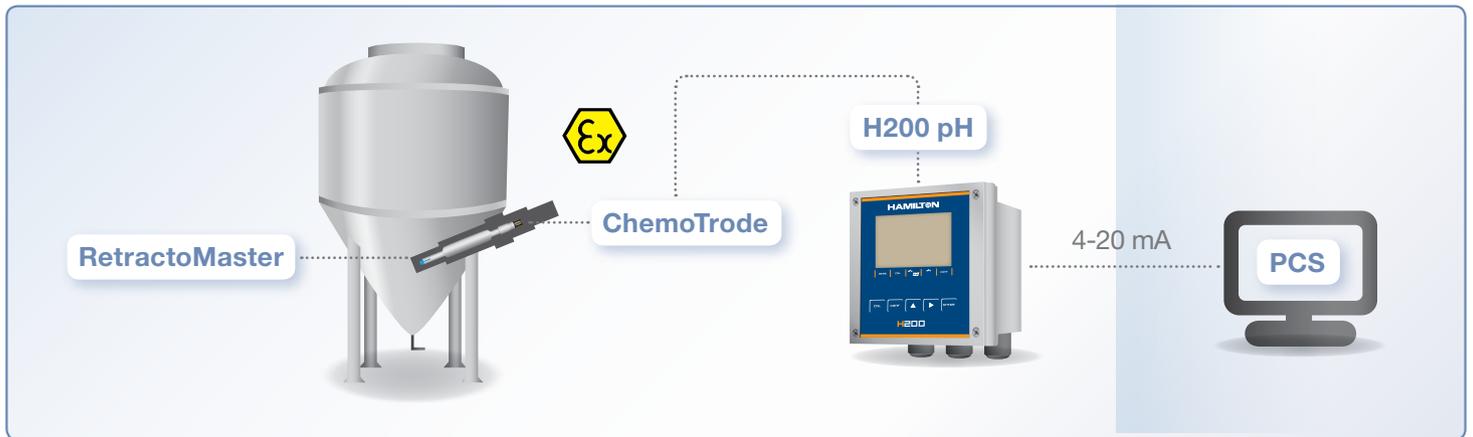


Analog Systems

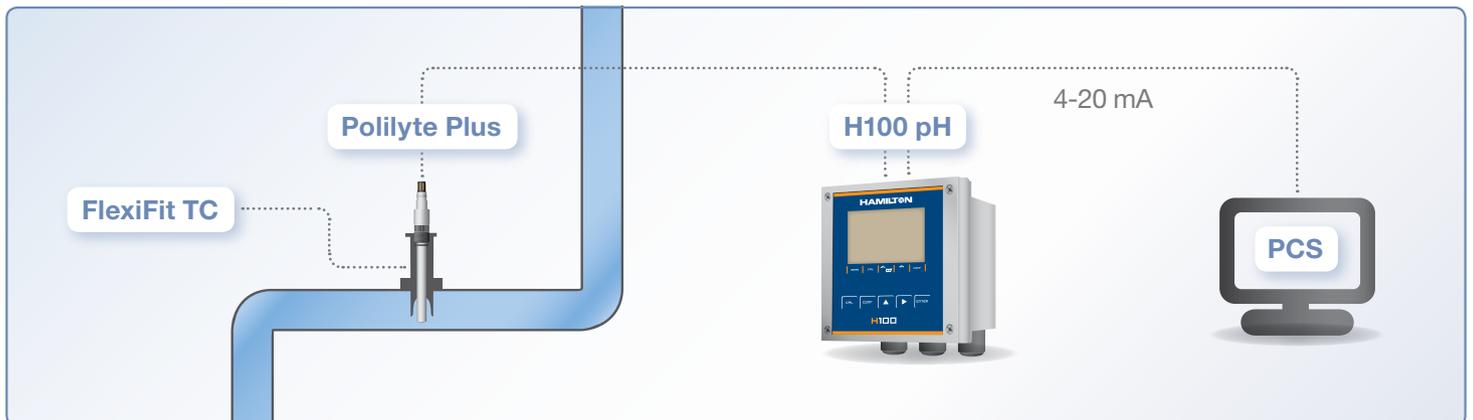
Standard Measuring Loop



Measuring Loop in Hazardous Area

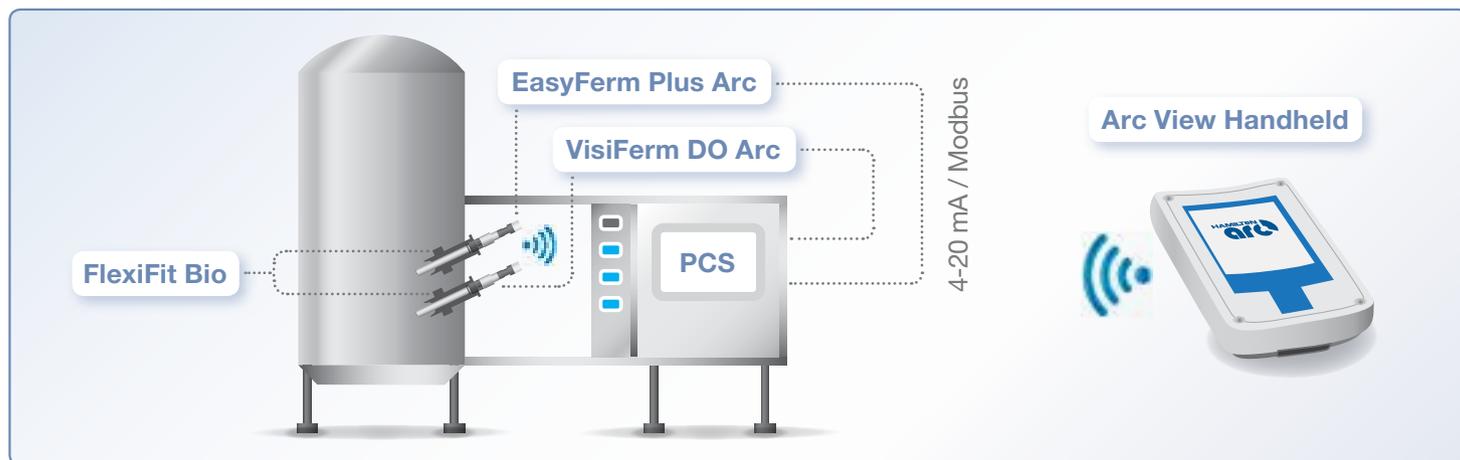


Measuring Loop in Pipe

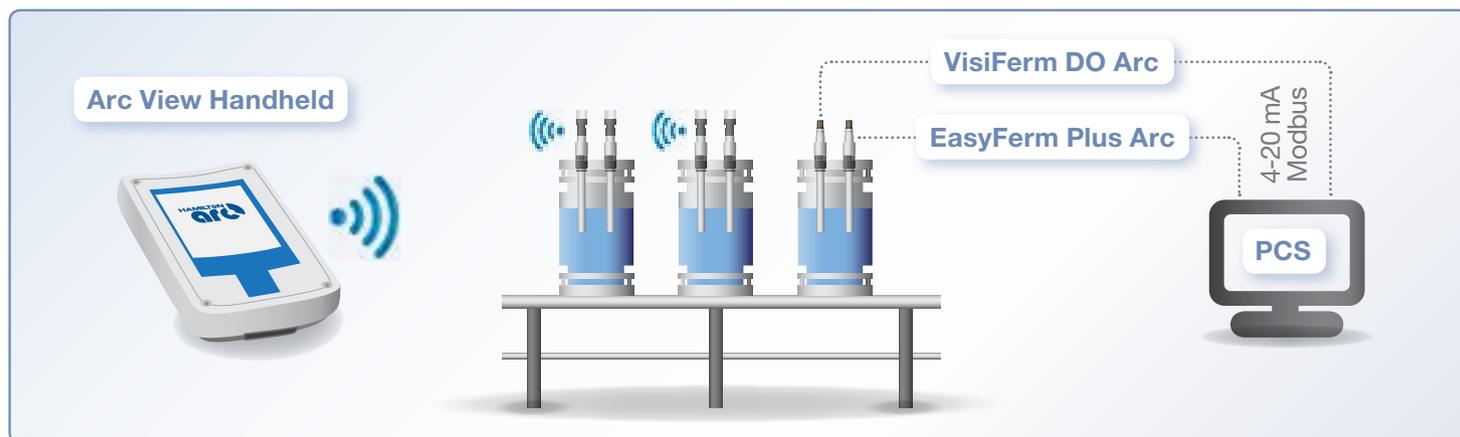


Arc Systems

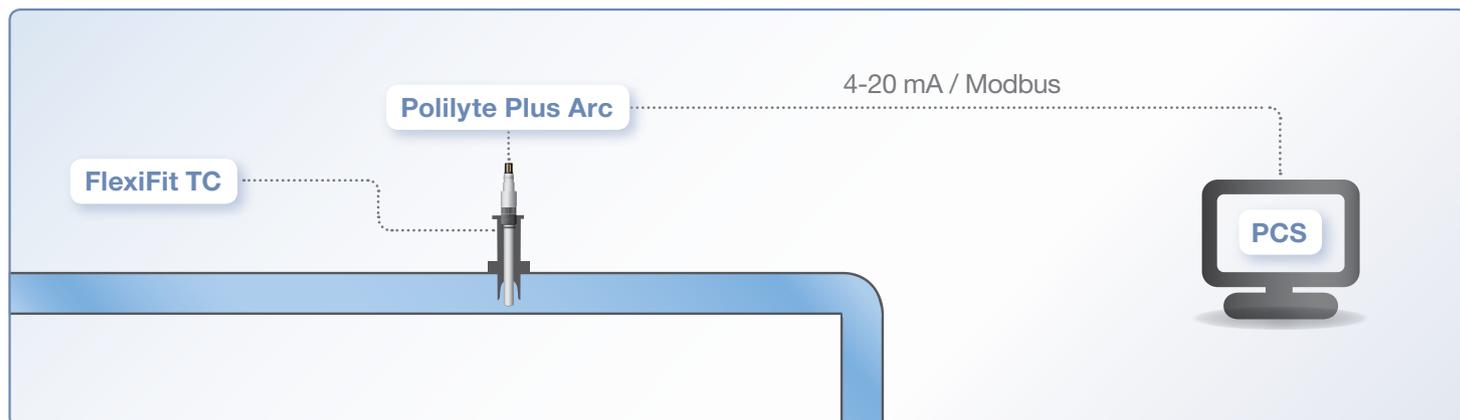
Skid System

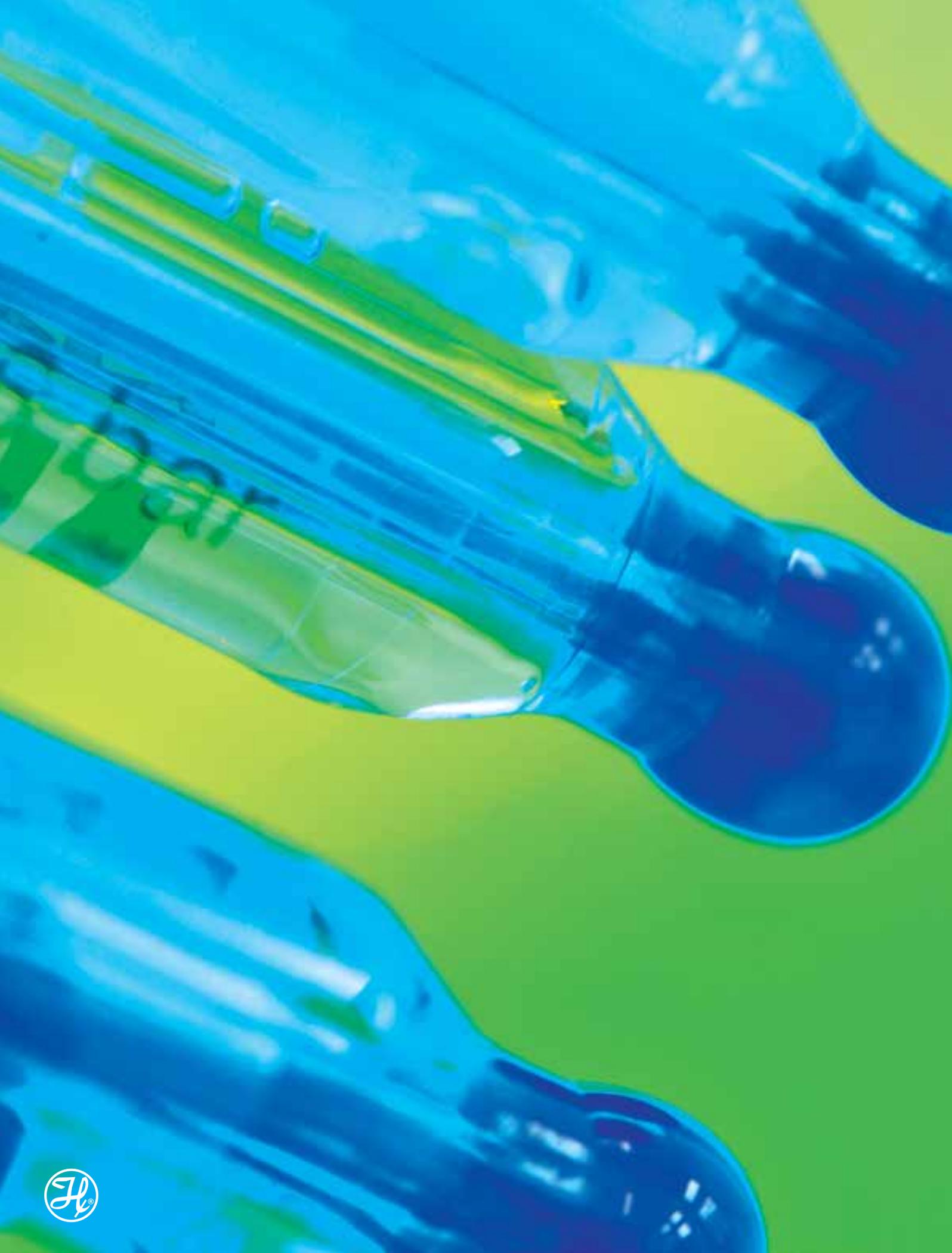


Benchtop Fermenter Queue



Measuring Loop in Pipe





pH

pH measurements are important in many processes. There is almost none where the pH value does not play a dominant role. All biological processes depend on the activity of enzymes because they show a pH optimum and lose their functionality if the pH is too low or too high.

The pH value is measured in most processes using a glass electrode. This pH glass forms a thin gel layer in aqueous solutions that is highly selective to H⁺ ions. The pH dependent potential of the gel layer is measured against a built-in reference electrode with a constant potential. This reference electrode may be a silver wire in contact with solid silver chloride or a calomel electrode.

In general, the pH value is a measure of the acidity or the basicity of an aqueous solution. In technical terms, pH is the negative logarithm of the activity of the solvated protons H⁺. It's mostly explained as the measure of the proton concentration which is correct for dilute aqueous solutions.

Segment	Application	Sensor	Feature
Bio Pharma	Fermentation	EasyFerm Plus	Hygienic, Autoclavable CIP / SIP
		FermoTrobe	
		EasyFerm Bio	Organic solvents
Breweries/Beverages	Fermentation	Polilyte Plus	
	Bottle washer	ChemoTrobe	Refillable
		IonoTrobe	Low Conductivity
		InchTrobe	
Chem Pharma		Polilyte HT*	
		Polyplast	Plastic Shaft
		MecoTrobe	
Water/Wastewater		Easycontrol	HF
		ClaryTrobe	
		Liq-Glass PG	Low Temperature

*Note: No specific link = general use

Polilyte Plus



The maintenance free Polilyte Plus sensors are designed to withstand demanding applications in chemical and petrochemical industries. It's also suitable for process water, wastewater treatment and many applications more. Because of its two Single Pores liquid junction problems and total break downs are eliminated. The Polilyte Plus sensors show good measurement accuracy in highly alkaline solutions as well as in samples with low conductivity. Additionally, the Everef-L reference cartridge ensures a long lifetime.

A stabilized sensor signal and an extended sensor diagnosis thanks to the integrated Liquid Earth in the VP are further features of the Polilyte Plus. The Polilyte Plus XP is suited for very high pressures up to 50 bar with the same advantages like Polilyte Plus.

Arc System

The Polilyte Plus is also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



“Did you know... that the Single Pore is an open junction between the measuring solution and the electrolyte?”

Benefits

- ▶ 2 Single Pores prevent clogging and ensure reliable measurements
- ▶ Upside-down mounting possible
- ▶ Highly reproducible measurements thanks to Polysolve Plus reference, very stable over a long period of time
- ▶ Resistant against solvents, strong acids and basis

Typical applications

- ▶ Sugar industry
- ▶ Dye industry
- ▶ Industrial Waste water
- ▶ Paper industry





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	Polilyte Plus: 0 – 10 bar (130 °C), 0 – 16 bar (100 °C) Polilyte Plus XP: 0 – 50 bar (60 °C), 0 – 20 bar (100 °C), 0 – 16 bar (130 °C)
Hygienic aspects	autoclavable, SIP
pH glass	H
Electrolyte	Polisolve Plus
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	Pt1000 in VP version

Ordering Information

					
	a-length	S8	VP 6	Arc	MS
Polilyte Plus	120	242431	242428	242111	242660
	120 (Pt100)	–	243019	–	–
	225	242432	242429	242112	242661
	325	242433	242439	242113	242662
	360	242434	242442	–	242663
	425	242435	242449	242114	242664
Polilyte Plus XP	120	238811	242415	–	–

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

EasyFerm Plus



The EasyFerm Plus sensors are designed to withstand demanding applications in pharmaceutical and chemical industries. It is supplied with a pre-pressurized electrolyte which prevents the diffusion of sample into the sensor. The Everef-F reference cartridge ensures that the Phermlyte reference electrolyte remains free of silver and precipitation. It withstands steam sterilization, autoclavation and CIP cleanings.

The EasyFerm Plus LEVP (LE = Liquid Earth) has a stabilized sensor signal and an extended sensor diagnosis thanks to the integrated Liquid Earth.

Arc System

The EasyFerm Plus is also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



“Did you know... that with a pre-pressurized reference system the life time of a sensor is extended?”

Benefits

- ▶ Pre-pressurized reference electrolyte ensures a clog-free diaphragm
- ▶ Almost drift-free measurement
- ▶ Stable measurement signals after steam sterilization, autoclavation and CIP cleanings

Typical applications

- ▶ Bioreactors
- ▶ Industrial processes
- ▶ Downstream processes





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 135 °C
Pressure range	0 – 6 bar (pressurized)
Hygienic aspects	autoclavable, SIP, CIP
pH glass	PHI
Electrolyte	Phermlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
Temperature sensor	Pt100 in VP version

Ordering Information



a-length

	S8	K8	VP 6	Arc	MS
120	238643	238625	238633	242091	242650
120 (LE Pt100)	–	–	243646	–	–
160	238679	238630	–	–	–
200	–	238627	–	–	–
225	238644	238626	238634	242092	242651
225 (LE Pt100)	–	–	243647	–	–
325	238645	238628	238635	242093	242652
360	238642	–	238632	–	242653
425	238674	238629	238636	242094	–

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

EasyFerm Bio



EasyFerm Bio sensors are designed for applications in pharmaceutical, biotechnology and food & beverages industries. It is certified to EHEDG criteria. The Foodlyte electrolyte has a certificate for its Bio-compatibility. It does not harm microorganisms in fermenters. The electrolyte is pre-pressurized to prevent the diffusion of sample into the sensor. The Everef-F reference cartridge ensures that the Foodlyte reference electrolyte remains free of silver and precipitation of proteins. EasyFerm Bio sensors withstand steam sterilization, autoclavation and cleaning in place.

Arc System

The EasyFerm Bio is also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



“ Did you know...
that you may even
eat the Foodlyte? ”

Benefits

- ▶ Specifically designed for sterile applications in Pharma and Biotechnology (EHEDG, Biocompatibility)
- ▶ Highly reliable measurements after steam sterilization, autoclavation and CIP cleanings
- ▶ Drift free measurements
- ▶ Ceramic diaphragm is an improved barrier of the electrode

Typical applications

- ▶ Bioreactors
- ▶ Brewhouse
- ▶ Downstream processes
- ▶ Gelatine manufacturing





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 135 °C
Pressure range	0 – 6 bar (pressurized)
Hygienic aspects	autoclavable, SIP, CIP
pH glass	HB
Electrolyte	Foodlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
Temperature sensor	Pt100 in VP version

Ordering Information

	a-length	S8	K8	VP 6	Arc
EasyFerm Bio	120	243642	243625	243632	242120
	160	–	243626	–	–
	200	–	243627	–	–
	225	243643	243628	243633	242121
	325	243644	243629	243634	242122
	425	243645	243630	243635	242123

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

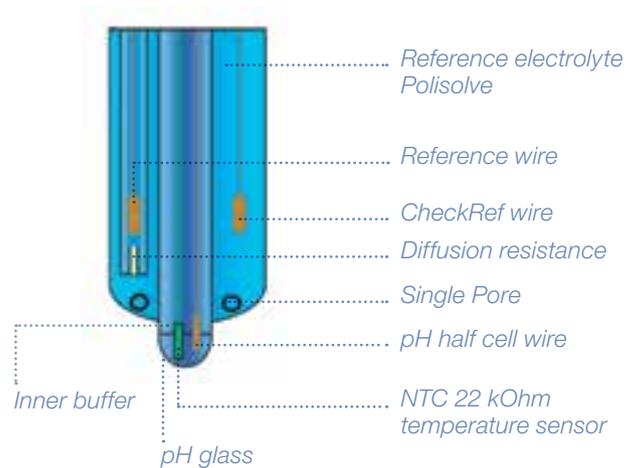
pHeasy



The pHeasy is one of the first pH sensors with a built-in lifetime monitoring without calibration. The second reference electrode helps to detect reference problems and indicates when the sensor has to be changed. It is designed for various applications where monitoring the long-term stability is appreciated like in the chemical industry or in wastewater treatment.

Arc System

The pHeasy is only available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



Benefits

- ▶ 2 Single Pores for clog-free contact between measurement medium and Polisolve electrolyte
- ▶ Extends service intervals and increases reliability of pH measurement
- ▶ Built-in accuracy monitoring

Typical applications

- ▶ Wastewater



Specifications

Measuring range	0 – 14 pH
Operating temperature	Analog interface: 0 – 110 °C Digital interface: 0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	autoclavable, CIP, SIP
pH glass	PHI
Electrolyte	Polisolve
Reference system	Everef-L
Temperature sensor	NTC 22 kOhm

Ordering Information



	a-length	Arc
pHeasy	120	242154
	225	242155

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

Polilyte HT



The maintenance free Polilyte HT sensors are designed to withstand demanding applications in chemical and petrochemical industries. The Polilyte HT is the predecessor of the Polilyte Plus.

The Everef-L reference cartridge ensures a long lifetime. Because of its two Single Pores liquid junction problems and total break downs are eliminated.

The Polilyte HT sensors show good measurement accuracy in highly alkaline solutions as well as in samples with low conductivity.



“*Did you know... that the blue reference electrolyte is unique for Hamilton?*”

Benefits

- ▶ 2 Single Pore's prevent clogging and ensure reliable measurements
- ▶ Minimal diffusion potential
- ▶ Upside-down mounting possible
- ▶ Best measurement accuracy both in high-alkali processes and in samples with very low conductivity.

Typical applications

- ▶ Sugar industry
- ▶ Industrial Processes
- ▶ Industrial Wastewater



USP
Class VI





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	autoclavable, SIP
pH glass	H
Electrolyte	Polisolve
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	Pt100 in VP version

Ordering Information



	a-length	S8	VP 6
Polilyte HT	120	238431	238428
	225	238432	238429
	425	238467	238449

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

Polyclave



The maintenance free Polyclave sensor is designed for applications in pharmaceutical, biotechnical and chemical processes.

The Everef-L reference cartridge ensures a long lifetime. Because of its two Single Pores liquid junction problems and total break downs are eliminated. The Polyclave can be mounted upside down at the bottom of a tank.

Benefits

- ▶ 2 Single Pore's prevent clogging and ensure reliable measurements
- ▶ Minimal diffusion potential
- ▶ Upside-down mounting possible
- ▶ CIP, SIP and autoclavable
- ▶ Most reproducible measurements even in hot caustic due to proprietary pH glass / low drift

Typical applications

- ▶ Fermentation processes
- ▶ Downstream processes



USP
Class VI





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	autoclavable, SIP, CIP
pH glass	PHI
Electrolyte	Polisolve
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	Pt100 in VP version

Ordering Information



	a-length	S8	VP 6
Polyclave	120	238450	238455
	225	238451	238456

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

ClaryTrode



The ClaryTrode sensor is designed for measuring pH in applications containing hydrofluoric acid (HF). HF for example is formed as a by-product of the production of phosphoric acid, which is derived from the mineral apatite. The Everef-L reference cartridge ensures a long lifetime. Because of its two Single Pores liquid junction problems and total break downs are eliminated. The ClaryTrode can be mounted upside down at the bottom of a tank.

Benefits

- ▶ HF pH glass withstands HF better than other pH glasses
- ▶ Significantly extended sensor life
- ▶ Single Pore for direct sample contact with Polysolve electrolyte – No clogging
- ▶ Very long-lasting reference system
- ▶ Stable measurement values under tough conditions

Typical applications

- ▶ Gas washer
- ▶ Water and Wastewater
- ▶ Microelectronics





Specifications

Measuring range	0 – 14 pH
Operating temperature	-5 – 100 °C
Pressure range	0 – 6 bar
pH glass	HF
Electrolyte	Polisolve
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	Pt100 in VP version
HF concentrations	< 0.01M / 200 mg/l HF at 20 °C or 0.05M / 1000 mg/l HF at 50 °C

Ordering Information



	a-length	S8	VP 6
ClaryTrode	120	238821	238831

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

ChemoTrode

ChemoTrode Bridge



The ChemoTrode is the most robust sensor to measure pH in demanding applications in pharmaceutical and chemical industries.

The ChemoTrode has a refill hole which allows refilling of the electrolyte and pressurization of the reference system. Its Everef-F reference cartridge ensures that the reference electrolyte remains free of silver and precipitation of proteins.



“ Did you know... that the ChemoTrode Bridge has an extended life time due to its special reference system? ”

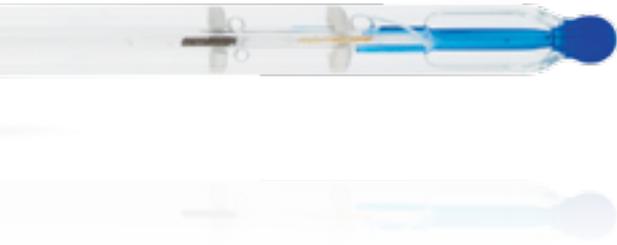
Benefits

- ▶ Liquid electrolyte ensures fast response time and high precision
- ▶ Longer lifetime thanks to refillable electrolyte
- ▶ Everef-F reference cartridge extends electrode life in aggressive media

Typical applications

- ▶ Industrial processes
- ▶ Mining Industry
- ▶ Pulp and Paper industry
- ▶ Fermentations





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	SIP, CIP
pH glass	PHI
Electrolyte	ChemoTrode: Viscous 3 M KCl-LR ChemoTrode Bridge: Skylyte
Reference system	ChemoTrode: Everef-F ChemoTrode Bridge: Everef-B
Diaphragm	ChemoTrode: HP ceramic ChemoTrode Bridge: Platinum
Temperature sensor	Pt1000 in VP version

Ordering Information



	a-length	S7	VP 6
ChemoTrode	120	238760	242700
	150	238762	242701
	200	238764	-
	250	238766	242703
ChemoTrode Bridge	120	238770	-
	150	238772	-
	250	238776	-

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

FermoTrode



The maintenance free FermoTrode sensors are designed for measuring pH in pharmaceutical and biotechnological industries and fit in the MasterFit and RetractoMaster housings. The Everef-F reference cartridge ensures that the reference electrolyte Skylyte remains free of silver and precipitation. It withstands steam sterilization.

It is not suited for contact with caustic soda like in CIP-cleanings or for use in media containing citric acid.

Benefits

- ▶ No air pressure required, no risk of empty reference electrolyte compartment
- ▶ 3 Coatramic diaphragms prevent clogging due to proteins
- ▶ Very long lifetime, stable calibration after sterilization and practically drift-free signals

Typical applications

- ▶ Biotechnology
- ▶ Pharmaceutical Industry





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	0 – 4 bar
Hygienic aspects	SIP
pH glass	PHI
Electrolyte	Skylyte
Reference system	Everef-F
Diaphragm	Coatramic

Ordering Information



	a-length	S7
FermoTrode	120	238480
	150	238482
	200	238484
	250	238486

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

IonoTrode



The IonoTrode sensor is designed for applications in ion weak media. The F glass membrane has a very low resistance, therefore the sensor can be used in samples with low conductivity, where it offers highest accuracy over a long period of time.

If there is a storage container with 3 M KCl attached via a tube to the side-arm of the IonoTrode, the flow-out of the electrolyte can be controlled with the sleeve diaphragm.



“

Did you know...

that the IonoTrode is designed for ion weak media with a low conductivity of only 0.2 μ S/cm? ”

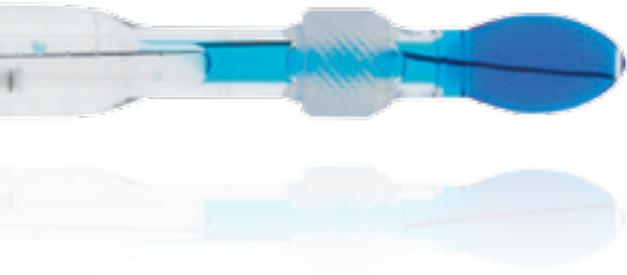
Benefits

- ▶ Offers highest accuracy over a long period of time
- ▶ Stable measurements in samples with low conductivity of at least 0.2 μ S/cm
- ▶ Removable PTFE sleeve diaphragm to check electrolyte outflow
- ▶ Side-arm attachment via tube to storage vessel containing 3 M KCl, and control of electrolyte flow with PTFE diaphragm ring

Typical applications

- ▶ Drinking Water Plants
- ▶ Boiler Feed Water

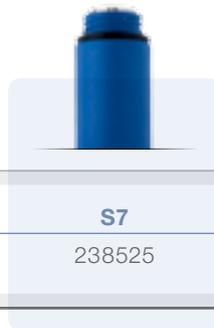




Specifications

Measuring range	0 – 14 pH
Operating temperature	-10 – 40 °C
Pressure range	0 – 0.5 bar or higher if pressurization by side-arm
pH glass	F
Electrolyte	3 M KCl
Reference system	Everef
Diaphragm	Sleeve

Ordering Information



	a-length	S7
IonoTrode	120	238525

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

InchTrode



The InchTrode sensors are designed to measure pH in demanding applications in the paper making as well as in the chemical industries. The Single Pore liquid junction guarantees best and fast measuring results because of direct contact between the sample and the Polysolve electrolyte.

The InchTrode sensors are easy to install without additional housing and have a robust PEEK shaft.



“
Did you know... that
the InchTrode is available
in two different sizes and with
different membrane shapes?”

Benefits

- ▶ Single Pore for direct sample contact with Polysolve electrolyte – no clogging
- ▶ Very long-lasting reference system
- ▶ Robust PEEK shaft
- ▶ Simple installation without additional housing

Typical applications

- ▶ Pulp and Paper industry
- ▶ Water and Wastewater





Specifications

Measuring range	0 – 14 pH
Operating temperature	-10 – 130 °C (flat membrane) 0 – 130 °C (cylindrical membrane)
Pressure range	0 – 10 bar (25 °C) 0 – 6 bar (130 °C)
pH glass	HF (flat membrane) PHI (cylindrical membrane)
Electrolyte	Polisolve
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	Pt1000 in VP version Pt100 in fix cable version

Ordering Information



	Type	a-length	VP 6	Fix Cable
InchTrode	N75F	143	238346	–
	N75P	150	238342	–
	N75FC10	143	–	238364
	N75PC10	150	–	238359
	N100F	140	238352 (non Ex)	–

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

MecoTrode



The maintenance free MecoTrode sensor is designed for processes in the chemical industry with extreme pH values. The H glass type membrane glass provides a low alkaline error and stable measurement even at high temperatures.

Three high-performance ceramic diaphragms reduce the effect of flow potential in pipe mounting.



“

Did you know...

*that the MecoTrode is already
20 years in the market?*”

Benefits

- ▶ 3 high performance ceramic diaphragms for reduced flow potentials when mounted in pipes
- ▶ «H» glass for most accurate readings at high pH values or high temperatures
- ▶ Very good precision at low pH values (pH < 2)

Typical applications

- ▶ Water and Wastewater
- ▶ Industrial processes



USP
Class VI





Specifications

Measuring range	0 – 14 pH
Operating temperature	0 – 130 °C
Pressure range	0 – 16 bar (25 °C) 0 – 6 bar (130 °C)
pH glass	H
Electrolyte	Viscous 3 M KCl-Pharma, blue
Reference system	Everef
Diaphragm	HP ceramic
Temperature sensor	Pt100 in VP version

Ordering Information



	a-length	S8	VP 6
MecoTrode	120	238801	238437

Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

Polilyte Pro Polyplast Pro



The maintenance free Polilyte Pro and Polyplast Pro sensors are designed for pH measurement in water applications, especially in low conductivity samples, e.g. wastewater, fish farming, ground water, etc.

The Single Pore liquid junction guarantees best measurement results because of direct contact between the sample and the Polysolve electrolyte – clogging is nearly impossible. The Polyplast Pro sensor comes with a robust plastic shaft and glass bulb protection.



“
Did you know...
that the Polilyte Pro has the
HF resistant pH glass? ”

Benefits

- ▶ Single Pore for direct sample contact with Polysolve electrolyte
- ▶ No clogging
- ▶ Fast response even in low conductivity media
- ▶ Easy maintenance due to non-refillable electrolyte

Typical applications

- ▶ Wastewater applications
- ▶ Fish farming
- ▶ Ground water



Specifications

Measuring range	0 – 14 pH
Operating temperature	Polilyte Pro: -10 – 60 °C Polyplast Pro: -10 – 40 °C
Pressure range	0 – 6 bar
pH glass	Polilyte Pro: HF Polyplast Pro: V
Electrolyte	Polisolve
Reference system	Polilyte Pro: Everef-B Polyplast Pro: Ag/AgCl
Diaphragm	Single Pore
Temperature sensor	Pt1000 in VP version

Ordering Information



	a-length	S8	VP 6
Polilyte Pro	120	238411	238417
Polyplast Pro	120	238408	–

Accessories



pH buffers see page 80

Cables see page 84

Housings see page 98

Liq-Glass PG EasyControl



The maintenance free Liq-Glass PG and the EasyControl sensors are entry level sensors for chemical or waste water applications and low process temperatures. They show good behavior in samples containing few ions, respectively low conductivity.



“
Did you know...
that the EasyControl is also
available as ORP sensor?”

Benefits

- ▶ Suitable for low conductivity media
- ▶ Easy maintenance due to non-refillable electrolyte
- ▶ Liq-Glass PG has 3 ceramic diaphragms for reduced flow potentials

Typical applications

- ▶ Wastewater applications
- ▶ Fish farming
- ▶ Ground water
- ▶ Swimming Pools





Specifications

Measuring range	Liq-Glass PG: 1 – 12 pH EasyControl: 0 – 14 pH
Operating temperature	Liq-Glass PG: -5 – 60 °C EasyControl: 0 – 60 °C
Pressure range	0 – 2 bar
pH glass	Liq-Glass PG: F EasyControl: HF
Electrolyte	Liq-Glass PG: Viscous 3 M KCl-LR EasyControl: Viscous 3 M KCl-Pharma
Reference system	Liq-Glass PG: Everef EasyControl: Ag/AgCl
Diaphragm	Ceramic

Ordering Information



	a-length	S8
Liq-Glass PG	120	238515
EasyControl	120	238522 (non Ex)

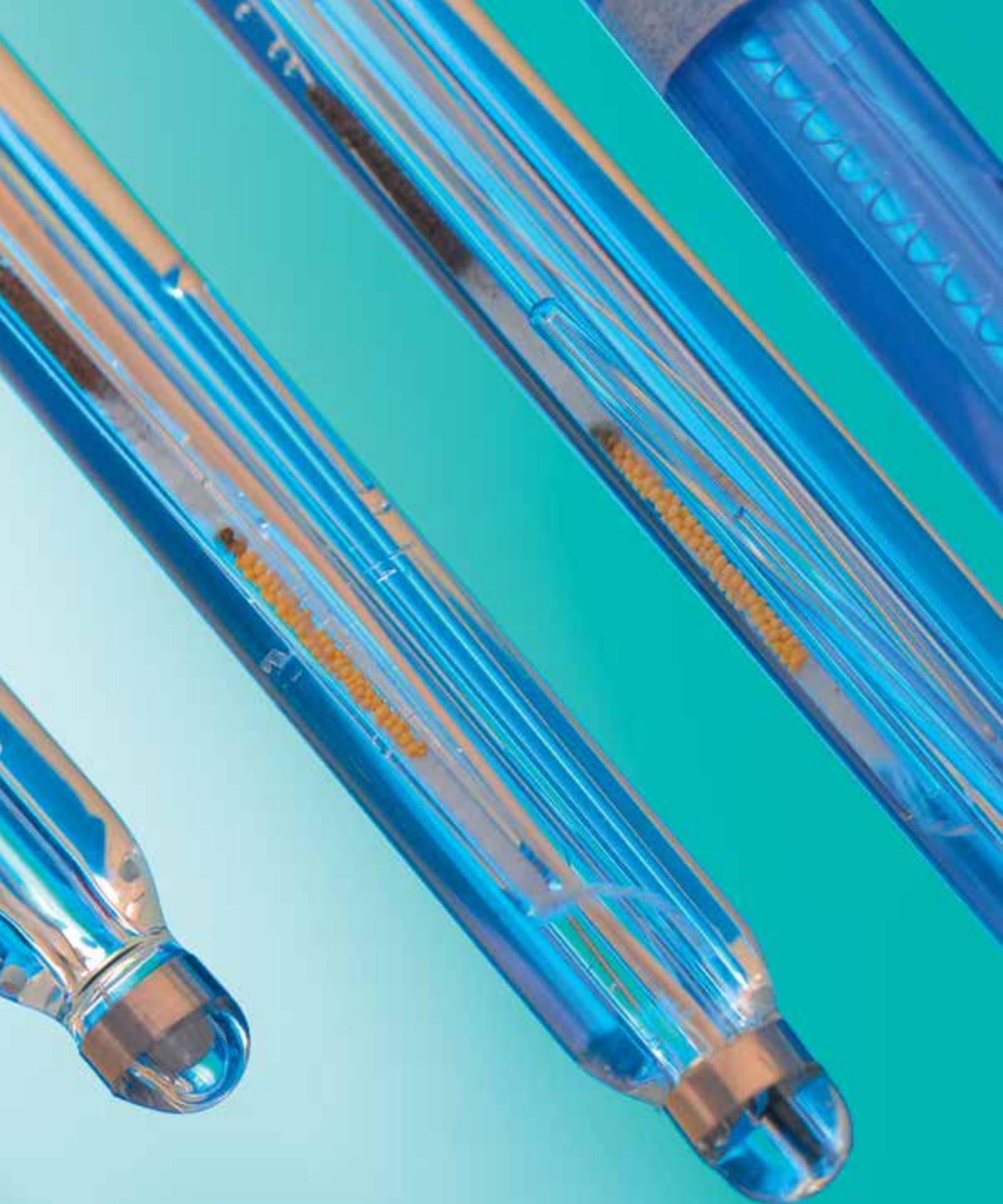
Accessories



pH buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)





ORP

ORP is a common measurement in biochemistry, environmental chemistry and water quality. In the biochemical perspective, an oxidizing chemical pulls electrons away from the cell membrane which means it can be destabilized and leaky. The rapid death of a cell is the consequence of a destroyed membrane. The ORPs of natural systems like aerated surface water, rivers, lakes, rainwater and acid mine water usually have oxidizing conditions leading to positive potentials. Submerged soils, swamps and marine sediments, where air supply has its limitations, reducing conditions are the norm leading to negative potentials. For water system monitoring, the ORP value provides the operator with a rapid and single-value assessment of the disinfection potential of water in the postharvest system. This enables the operator to assess the activity of the applied disinfectant rather than the applied dose.

ORPs in aqueous solutions are determined by measuring the potential difference between an inert sensing electrode in contact with the solution and a stable reference electrode. The reference electrode is connected to the solution by a salt bridge. It has a known potential and is made of silver chloride or saturate calomel. Platinum is mostly used for the sensing electrode.

The Oxygen-Reduction Potential, also known as Redox Potential describes the tendency of a chemical species or a solution to acquire electrons and therefore to be reduced. Each species has its own reduction potential. It is measured in Volts (V) or mV.

Polilyte Plus ORP



The maintenance free Polilyte Plus ORP sensors are designed to withstand demanding applications in chemical and petrochemical industries. It's also suitable for process water, wastewater treatment and many applications more. Because of its two Single Pores liquid junction problems and total break downs are eliminated. The Polilyte Plus ORP sensors show good measurement accuracy in highly alkaline solutions as well as in samples with low conductivity. Additionally, the Everef-L reference cartridge ensures a long lifetime.

Measuring the ORP value is getting more and more important in the branches mentioned above.

Arc System

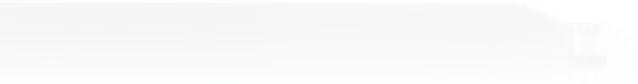
The Polilyte Plus ORP is only available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page 8

Benefits

- ▶ 2 Single Pores prevent clogging and ensure reliable measurements
- ▶ Minimal diffusion potential
- ▶ Highly reproducible measurements due to Polysolve Plus reference, very stable over a long period of time
- ▶ Resistant against solvents, strong acids and bases

Typical applications

- ▶ Sugar industry
- ▶ Dye industry
- ▶ Industrial wastewater
- ▶ Paper industry



Specifications

Measuring range	+/- 1500 mV
Operating temperature	Analog interface: 0 – 110 °C Digital interface: 0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	Autoclavable, SIP
ORP element	Pt wire
Electrolyte	Polisolve Plus
Reference system	Everef-L
Diaphragm	Single Pore
Temperature sensor	NTC 22 kOhm



Ordering Information

	a-length	Arc
Polilyte Plus ORP	120	243060
	225	243061
	325	243062
	425	243063

Accessories



ORP buffers see page 80

Cables see page 84

Arc Accessories see page 88

Housings see page 98

EasyFerm Plus ORP



The EasyFerm Plus ORP sensors are designed to withstand demanding applications in pharmaceutical and chemical industries. It is supplied with a pre-pressurized electrolyte which prevents the diffusion of sample into the sensors. The Everef-F reference cartridge ensures that the Phermlyte reference electrolyte remains free of silver and precipitation.

Measuring the ORP value is getting more and more important in the branches mentioned above.

Arc System

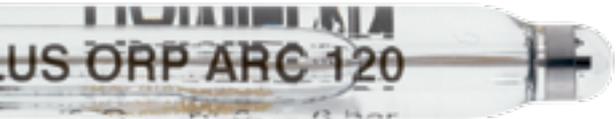
The EasyFerm Plus ORP is only available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)

Benefits

- ▶ Pre-pressurized reference electrolyte ensures a clog-free diaphragm
- ▶ Almost drift-free measurement
- ▶ Stable measurement signals after steam sterilization, autoclavation and CIP cleanings
- ▶ Large platinum ring

Typical applications

- ▶ Bioreactors
- ▶ Industrial processes
- ▶ Downstream processes



Specifications

Measuring range	+/- 1500 mV
Operating temperature	Analog interface: 0 – 110 °C Digital interface: 0 – 130 °C
Pressure range	0 – 6 bar
Hygienic aspects	Autoclavable, CIP, SIP
ORP element	Pt ring
Electrolyte	Phermlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
Temperature sensor	NTC 22 kOhm



Ordering Information

	a-length	Arc
EasyFerm Plus ORP	120	243050
	225	243051
	325	243052
	425	243053

Accessories



ORP buffers see page 80

Cables see page 84

Arc Accessories see page 88

Housings see page 98

ChemoTrode ORP



The ChemoTrode ORP is the most robust sensor to measure the oxidation-reduction potential in demanding applications in pharmaceutical and chemical industries. The ChemoTrode has a refill hole which allows refilling the electrolyte and pressurization of the reference electrolyte. Its Everef-F reference cartridge ensures that the reference electrolyte remains free of silver and precipitation of proteins.

Benefits

- ▶ Liquid electrolyte ensures fast response time and high precision
- ▶ Longer lifetime thanks to refillable electrolyte
- ▶ Everef-F reference cartridge extends electrode life in aggressive media

Typical applications

- ▶ Industrial processes
- ▶ Mining Industry
- ▶ Pulp and Paper industry
- ▶ Fermentations





Specifications

Measuring range	+/- 2000 mV
Operating temperature	0 – 130 °C
Pressure range	0 – 6 bar
ORP element	Pt ring
Electrolyte	Viscous 3 M KCl-LR
Reference system	Everef-F
Diaphragm	HP Ceramic

Ordering Information



	a-length	S7
ChemoTrode ORP	120	238740
	150	238742

Accessories



ORP buffers see page 80

Cables see page 84

Housings see page 98

OxyTrode Pt



The maintenance free OxyTrode Pt is an ORP sensor designed for processes in the chemical industry and for applications in wastewater treatment. Three high-performance ceramic diaphragms reduce the effect of flow potentials in pipe mounting.



“
Did you know... that the
OxyTrode Pt is the ORP
version of the MecoTrode? ”

Benefits

- ▶ 3 high performance ceramic diaphragms for reduced flow potentials when mounted in pipes
- ▶ Platinum wire coil welded onto the glass

Typical applications

- ▶ Water and Wastewater
- ▶ Industrial processes



USP
Class VI





Specifications

Measuring range	+/- 2000 mV
Operating temperature	0 – 130 °C
Pressure range	0 – 16 bar (25 °C) 0 – 6 bar (130 °C)
ORP element	Pt wire
Electrolyte	Viscous 3 M KCl-Pharma, blue
Reference system	Everef
Diaphragm	HP ceramic

Ordering Information



	a-length	S8
OxyTrode	120	238810

Accessories



ORP buffers see page [80](#)

Cables see page [84](#)

Housings see page [98](#)

Polilyte RX

Polyplast Pro RX



The maintenance free Polilyte RX and Polyplast Pro RX sensors are designed for ORP measurement in water applications and low conductivity samples, e.g. wastewater, fish farming, ground water, etc.

The Single Pore liquid junction guarantees best measurement results because of direct contact between the sample and the Polysolve electrolyte – clogging is nearly impossible. The Polyplast Pro sensor comes with a robust plastic shaft and glass bulb protection.

Benefits

- ▶ Single Pore for direct sample contact with Polysolve electrolyte
- ▶ No clogging
- ▶ Fast response even in low conductivity media
- ▶ Easy maintenance due to non refillable electrolyte

Typical applications

- ▶ Wastewater applications
- ▶ Fish farming
- ▶ Ground water





Specifications

Measuring range	+/- 2000 mV
Operating temperature	Polylyte Pro: -10 – 60 °C Polyplast Pro: -10 – 40 °C
Pressure range	0 – 6 bar
ORP element	Pt-wire
Electrolyte	Polisolve
Reference system	Polylyte Pro: Everef-B Polyplast Pro: Ag/AgCl
Diaphragm	Single Pore

Ordering Information



	a-length	S8
Polylyte RX	120	238433
Polyplast Pro RX	120	238409

Accessories



ORP buffers see page 80

Cables see page 84

Housings see page 98

EasyControl ORP



The maintenance free EasyControl ORP is an entry level ORP sensor for chemical or wastewater applications and low process temperatures.

It is also often used in swimming pools to control the disinfection with chlorine. They show also good behavior in samples containing few ions, respectively low conductivity.

Benefits

- ▶ Suitable for low conductivity media
- ▶ Easy maintenance due to non refillable electrolyte

Typical applications

- ▶ Wastewater applications
- ▶ Fish farming
- ▶ Ground water
- ▶ Swimming Pools





Specifications

Measuring range	+/- 2000 mV
Operating temperature	0 – 60 °C
Pressure range	0 – 2 bar
ORP element	Pt-wire
Electrolyte	Viscous 3 M KCl-Pharma
Reference system	Ag/AgCl
Diaphragm	Ceramic

Ordering Information



	a-length	S8
EasyControl ORP	120	238523

Accessories



ORP buffers see page 80

Cables see page 84

Housings see page 98



Cond

The electrical conductivity is important for the characterization of liquids in different kinds of processes. In aqueous solutions the conductivity is caused by the decomposition of dissolved acids, bases or salts into positive cations and negative anions. In ultra-pure water, where no ions, except very few H_3O^+ and OH^- , are present, the conductivity is extremely low. This intrinsic conductivity of water represents the lower border of the conductivity scale.

The electrical conductivity is determined by a resistivity measurement when an alternating voltage is applied to a measurement cell that consists of two or four electrodes. To compensate for the geometry of the conductivity cell a cell constant is used. This constant is either known or determined by means of conductivity standards.

Electrical conductivity is the reciprocal of electrical resistivity, and measures a material's ability to conduct an electric current. Its SI unit is Siemens per meter (S/m). For the measurement of the conductivity of a solution it's common to use $\mu S/cm$ or mS/cm .

Segment / Application	Sensor	Feature
CIP station	Conducell 4UxF	Varivent®
Bio Pharma	Conducell 4US	4 pole / wide measuring range
Chem Pharma	Conducell PWSE	Various O-ring positions
Brewery / Beverage	Conducell PWSE	Triclamp
UPW	Conducell PWSE	Triclamp
Waste Water	Conducell 2DC	2 pole

Conducell 4UxF



The Conducell 4UxF sensors are suited for measurements in hygienic applications. All wetted parts are FDA approved, can be cleaned easily and withstand CIP cleanings and autoclavations. The sensors show a very good linearity over a broad measuring range.

They are available with different process connections such as BioConnect® (BC) or Varivent®.

The Conducell 4USF with stainless steel electrodes is most common and suitable for many applications.

Arc System

The Conducell 4UxF is available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)

Benefits

- ▶ Very good linearity, especially for applications with sharp variations in conductivity
- ▶ All wetted parts are FDA-compliant
- ▶ Sensor is very easy to clean due to the forward facing, flush arrangement of electrodes
- ▶ Specifically designed for sterile applications in Pharma and Biotechnology (EHEDG)

Typical applications

- ▶ CIP station
- ▶ Water preparation



Specifications

Measuring range	1 μ S/cm – 500 mS/cm
Measurement Principle	4 pole contacting
Operating temperature	-20 – 150 °C
Pressure range	0 – 20 bar (135 °C) 0 – 10 bar (150 °C)
Cell constant	0.36/cm
Material of electrodes (x)	S = Stainless steel 1.4435 H = Hastelloy C 2.4602 T = Titanium

Ordering Information



	a-length	VP 6	Arc
Conducell 4USF-PG	120	237620	242159
	225	–	242160
	325	–	242161
	425	–	242162
Conducell 4UHF-PG	120	237627	–
Conducell 4UTF-PG	120	237630	–
Conducell 4USF-VV	3	237640	–
Conducell 4USF-BC	21	237650	–

Accessories



Conductivity Standards see page [82](#)

Cables see page [84](#)

Housings see page [98](#)

Conducell 4US



The Conducell 4US 4-pole sensor can easily be cleaned and withstands CIP cleanings and autoclavations. The sensor shows a very good linearity over a broad measuring range.

Available with different process connections like Triclamp or G 1¼“.

Benefits

- ▶ Very good linearity, especially for applications with wide variations in conductivity
- ▶ All wetted parts are FDA-compliant
- ▶ Sanitary: Sensor is easy to clean
- ▶ O-ring position can be chosen individually

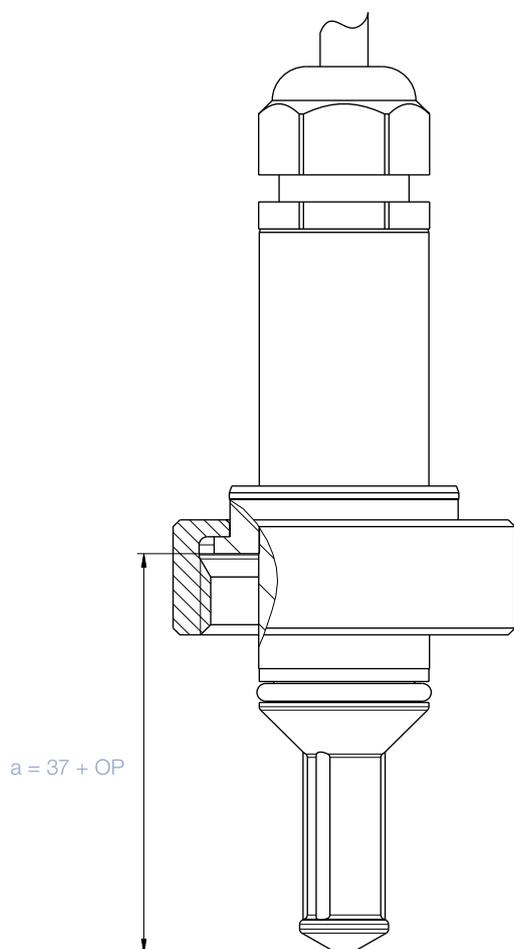
Typical applications

- ▶ Fermentation
- ▶ Chemical industry



USP
Class VI





Specifications

Measuring range	0.1 μ S/cm – 500 mS/cm
Measurement Principle	4 pole contacting
O-ring position	22 mm – 55 mm
Operating temperature	-20 – 135 °C
Pressure range	0 – 6 bar
Cell constant	0.147/cm
Material of electrodes	Stainless steel 1.4435

Ordering Information



	a-length	5 m Fix cable
Conducell 4US-G125	variable	237700-OP
Conducell 4US-T150-50	50	237750
Conducell 4US-T150-100	100	237760

Accessories



- **Flow-through cell PEEK TC 1.5"** P/N 237931
This flow through cell made of FDA approved PEEK facilitates insertion of Conducell 4US-T150-50 in pipework.

Conductivity Standards see page [82](#)

Safety Socket see page [122](#)

Conducell PWSE



The Conducell PWSE 2-pole conductivity sensors are designed for the use in liquids with very low conductivity, i.e. Ultra Pure Water, Pure Water and Water for Injection, particularly in the pharmaceutical and chemical industry.

Conducell PWSE sensors are available with different process connections such as TriClamp 1.5", PG 13.5, G 1 1/4", NPT 3/4".

Arc System

The Conducell PWSE is only available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



“*Did you know... that with Arc all the important information is stored in the sensor head?*”

Benefits

- ▶ Sanitary design: all wetted parts are FDA approved
- ▶ Easy cleanable
- ▶ Intelligence in the sensor: fully compensated measurement signals
- ▶ Easy handling due to user-friendly interface

Typical applications

- ▶ Ultra Pure Water
- ▶ Pure Water
- ▶ Water for Injection





Specifications

Measuring range	0.01 – 2000 $\mu\text{S}/\text{cm}$
Measurement Principle	2 pole contacting
Operating temperature	Analog interface: 0 – 110 °C Digital interface: 0 – 130 °C
Pressure range	0 – 10 bar (130 °C)
Cell constant	< 0.1/cm
Material of electrodes	Stainless Steel DIN 1.4435
Surface quality	$R_a < 0.4 \mu\text{m}$ (N5)

Ordering Information



	a-length	Arc	Arc
Conducell PWSE Arc PG 13.5	120	242730	–
Conducell PWSE Arc TC 1.5"	87	–	242720

Accessories



Conductivity Standards see page [82](#)

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

Conducell 2DC-PG



The Conducell 2DC sensor is constructed in a simple way and is best suited for measurements in clear solutions and non-critical applications. Contaminants, such as lime, will affect the measurement.

Benefits

- ▶ 2 large graphite electrodes for stable measurements
- ▶ Mechanically-stable plastic shaft
- ▶ Easily cleanable

Typical applications

- ▶ Water and Wastewater



Specifications

Measuring range	10 μ S/cm – 20 mS/cm
Measurement Principle	2 pole contacting
Operating temperature	-5 – 80°C
Pressure range	0 – 6 bar
Cell constant	1/cm
Material of electrodes	Graphite

Ordering Information**Conducell 2DC-PG 120****a-length**

120

5 m Fix cable

237610

Accessories

**Conductivity Standards** see page [82](#)**Housings** see page [98](#)



DO

The partial pressure of dissolved oxygen (DO) plays an important role in many biological, chemical and physical processes. Respiration in a lung or a leaf depends on the differences of the partial pressure as well as fermentation of substrates by yeast or bacteria. The amount of dissolved oxygen is also important for the safety and the quality of many other industrial processes.

The most common technologies to measure DO are the classical amperometric and the modern optical method. Classical amperometric Clark cells, where cathode and anode are separated from the sample by a gas permeable membrane, generate an electrical current proportional to the oxygen partial pressure of dissolved oxygen. The oxygen is reduced in the sensor, catalyzed by an electrolyte at a platinum cathode. At the anode silver is oxidized. In contrast to the Clark cells the optical measurement is based on the luminescence of a luminophore that absorbs photons and releases a part of the absorbed energy by emission of photons with a higher wavelength. Oxygen quenches this process by transferring the energy partially by collision. The more oxygen present the more quenching is observed. Hamilton measures the phase shift between excitation and emission across a population of light pulses in order to achieve the highest accuracy and widest operating range. The difference in the intensity of both waves is used for online sensor diagnostics.

Segment / Application	Sensor	Feature
Waste Water	Oxysens	Amperometric
Bio Pharma	VisiFerm DO	Optical / Flow independent
Chem Pharma	OxyFerm	Trace level
Boiler Feed Water	OxyGold G	Trace level
	OxyGold B	Trace level
Brewery / Beverage	VisiFerm DO B	CIP / Brewery mode

VisiFerm DO / B



The VisiFerm DO is the first optical oxygen sensor with integrated opto-electronics, having the full functionality of a measuring device with self-diagnostics. It is steam sterilizable, autoclavable and CIP compatible. The VisiFerm requires less maintenance than a classical oxygen sensor as it does not have a mechanically sensitive membrane or a corrosive electrolyte.

The VisiFerm DO B is designed to measure DO in brewing applications, notably during fermentation, filtration and filling. An integrated CIP and brewery mode enable reliable measurements in environments which may not allow calibration after CIP.

Arc System

The VisiFerm DO and the VisiFerm DO B are also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page 8



“Did you know... that Hamilton invented the first optical DO sensor in 12 mm format?”

Benefits

- ▶ No fragile membrane – with a solid sensor cap
- ▶ No polarization time required
- ▶ Instantly stable values, low drift, quick response
- ▶ Electrolyte-free, so no leakage
- ▶ Convenient precalibration in the laboratory, because data is stored in the sensor head

Typical applications

- ▶ Ethanologenic fermentation
- ▶ Biotechnical fermentation
- ▶ Brewery fermentation, filtration, filling
- ▶ Proactive corrosion control in HVAC systems





Specifications

Measuring range	4 ppb – 25 ppm (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 30 s at 25 °C, from air to nitrogen
Operating temperature	-10 – 140 °C, the sensor provides no DO reading above 85 °C
Operating voltage	7 – 30 VDC max. 1 W
Pressure range	0 – 12 bar
Surface Quality	$R_a < 0.4 \mu\text{m}$ (N5)
Material	Stainless steel 1.4435

Ordering Information

	a-length	VP 8	Arc	VP 8	Arc
VisiFerm DO	120	242450-02	242163	–	–
	160	242451-02	–	–	–
	225	242452-02	242164	–	–
	325	242453-02	242165	–	–
	425	242454-02	242166	–	–
VisiFerm DO B	120	–	–	243090	243094
	225	–	–	243091	243095
	325	–	–	243092	243096
	425	–	–	243093	243097

Accessories



- **ODO Cap P0** P/N 242427
- **ODO Cap P1** P/N 243510

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

OxyFerm FDA



The OxyFerm FDA is an electrochemical oxygen sensor suited for applications with high demands for hygiene, e.g. in pharmaceutical industry, in biotechnology and in food & beverage production. It is available with 12 mm or 25 mm (XL) shaft diameter.

When using Oxylyte USD (UpSide Down) electrolyte, even upside-down insertion is possible. The sensor is equipped with a FDA approved membrane for usage in hygienic processes. It withstands steam sterilization, autoclavation and CIP cleanings.

Arc System

The OxyFerm FDA is also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)

Benefits

- ▶ Sanitary Feature: The silicone membrane seals without a gap to steel membrane body (no additional o-ring)
- ▶ Little drift, fast response, short polarization time
- ▶ Replacing the cathode is possible and very simple to perform.

Typical applications

- ▶ ATEX environment
- ▶ Fermentation



Specifications

Measuring range	10 ppb – 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Operating temperature	0 – 130 °C
Pressure range	0 – 4 bar
Electrolyte	Oxylyte
Surface Quality	$R_a < 0.4 \mu\text{m}$ (N5)
Current in air at 25°C	40 – 80 nA
Material	Stainless steel 1.4435
Polarization voltage	-670 mV

Ordering Information



	a-length	T82	VP 6	Arc
OxyFerm FDA	120	237450	237540	243100
	160	237455	237541	243101
	225	237452	237542	243102
	325	237453	237543	243103
	425	237454	237544	243104
	XL-version	56	237175-OP	–
150		237170	–	–
300		237174	–	–

With the XL option, the o-ring position can be optimally matched to the weld-in socket from 22 to 55mm. Please state the OP you need when ordering.

Accessories



- **Membrane Kit FDA** P/N 237140
- **Membrane Kit CIP** P/N 237126
- **Membrane Kit** P/N 237123
- **Oxylyte 50 mL** P/N 237118
- **Oxylyte USD 50 mL** P/N 237136

- **Replacement Cathode OxyFerm** P/N 237306
- **Autoclavation Cap Oxyferm** P/N 242000
- **Polarization Module G** P/N 237350
- **Polarization Module T** P/N 237370

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

OxyGold B



The OxyGold B is an electrochemical oxygen sensor especially designed for applications which contain carbon dioxide like the production of beer, sparkling wine or soft drinks. The sensor is insensitive to acidic gases.

Apart from the production of sparkling beverages, the OxyGold B can be used in all production processes where CO₂ might be an issue for electrochemical sensors.

Arc System

The OxyGold B is also available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)



“

Did you know...

that the OxyGold B is the only sensor in the market with a polarization voltage of 0 mV?,”

Benefits

- ▶ No cross-sensitivity with CO₂
- ▶ Only very little flow required
- ▶ Pressure and CIP resistant
- ▶ Replacing the cathode is possible and very simple to perform.

Typical applications

- ▶ CO₂ recovery
- ▶ Water de-aeration



Specifications

Measuring range	8 ppb – 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Operating temperature	0 – 100 °C
Pressure range	0 – 12 bar
Electrolyte	Oxylyte B
Surface Quality	$R_a < 0.4 \mu\text{m}$ (N5)
Current in air at 25°C	180 – 500 nA
Material	Stainless steel 1.4435
Polarization voltage	0 mV

Ordering Information



	a-length	VP 6	Arc
OxyGold B	120	237180	243115
	225	237185	243116

Accessories



- **Oxygold Membrane Kit** P/N 237135
- **Oxylyte B 50 mL** P/N 237138
- **Polarization Module B** P/N 237360
- **Replacement Cathode OxyGold B** P/N 237306

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

OxyGold G



The OxyGold G is an electrochemical oxygen sensor designed for processes in which very small amounts of oxygen have to be traced, like in the pharmaceutical or microelectronics industry. It is also suitable for processes where high pressures are applied.

Arc System

The OxyGold G is available with our innovative Arc system. The Arc system eliminates the transmitter and communicates directly with your Process Control System. More information can be found on page [8](#)

Benefits

- ▶ Trace level measurement
- ▶ Suitable for use at high temperatures and high pressures during sterilization and CIP
- ▶ Little flow sensitivity
- ▶ Replacing the cathode is possible and very simple to perform.

Typical applications

- ▶ Boiler Feed Water
- ▶ Microelectronics



Specifications

Measuring range	1 ppb – 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Operating temperature	0 – 130 °C
Pressure range	0 – 12 bar
Electrolyte	Oxylyte G
Surface Quality	$R_a < 0.4 \mu\text{m}$ (N5)
Current in air at 25°C	180 – 500 nA
Material	Stainless steel 1.4435
Polarization voltage	-670 mV

Ordering Information

	a-length	VP 6	Arc
OxyGold G	120	237395	243110
	225	237396	243111

Accessories



- **Oxygold Membrane Kit** P/N 237135
- **Oxylyte G 50 mL** P/N 237139
- **Polarization Module G** P/N 237350
- **Replacement Cathode OxyGold B** P/N 237427

Cables see page [84](#)

Arc Accessories see page [88](#)

Housings see page [98](#)

Oxysens



The Oxysens is an electrochemical oxygen sensor designed for applications in water, e.g. wastewater treatment, swimming pools or fish farms. It is easy to maintain, because the membrane and the electrolyte do not need to be replaced.

The response time of the Oxysens is fast, it is almost independent to flow and insensitive to soiling.

Benefits

- ▶ Maintenance-free DO sensor, no change of membrane or electrolyte
- ▶ Robust design
- ▶ Insensitive to soiling
- ▶ Short polarization and response times

Typical applications

- ▶ Water and Wastewater
- ▶ Fish farming



USP
Class VI





Specifications

Measuring range	40 ppb – 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Operating temperature	0 – 60 °C
Pressure range	0 – 4 bar
Electrolyte	Oxylyte
Surface Quality	$R_a < 0.8 \mu\text{m}$ (N6)
Current in air at 25°C	40 – 80 nA
Material	Stainless steel 1.4435
Polarization voltage	-670 mV

Ordering Information



	a-length	5 m fix cable
Oxysens	120	237150

Accessories



- **Immersing Set** P/N 237158

The Immersing Set sheaths and protects 120mm sensors such as Oxysens while immersed in streams or channels.

Housings see page [98](#)

Born with a Purpose

Powered
by VisiFerm
DO B

Beverly is designed for at-line and laboratory use in small and midsize breweries as well as in the beverage industry to provide excellent reliability in a rugged design, and purpose built to handle the environmental extremes encountered in everyday brewing operations.

Superior performance at an affordable price is achieved using Hamilton's best in class optical sensor VisiFerm DO B with built-in intelligence, making Beverly the brewer's best friend.



Ordering Information

Type	P/N
Beverly	817100

Benefits

- ▶ Efficiency and serviceability bred from VisiFerm DO B optical sensors
- ▶ Built to endure IP 67 watertight standards
- ▶ Stamina for 50 hours of continuous operation
- ▶ Fast response time down to ppb level
- ▶ Calibration without removing the sensor



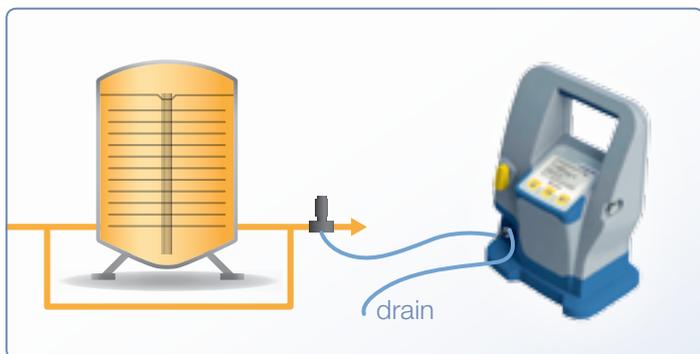
Portable DO Measurement

Measure DO in the bottle or can

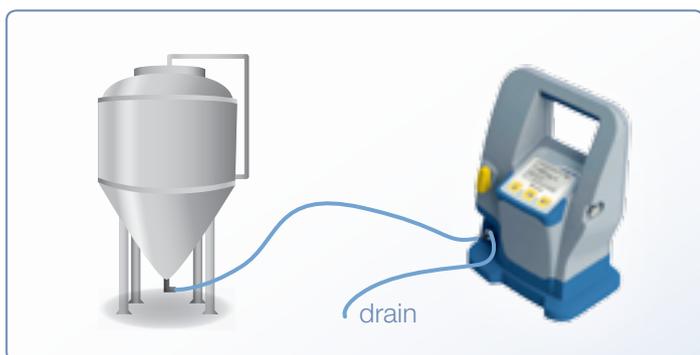


Beverly can be used as shown in the pictures and even beyond. A further application is to check the oxygen content of the exhaust gas of vessels while flushing with CO₂ after cleaning and prior to filling. Measuring the oxygen at this point can help to save time and CO₂. Even if Beverly stays connected to a pipe or a vessel while CIP is running it's robust stainless steel flow cell prevents damage.

Measure DO during or after filtration



Check DO of bright beer tank prior to bottling



Specifications

Measuring range	4 ppb – 25 ppm (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Protection Classification	IP 67
Operating temperature	-10 – 140 °C, no DO reading above 85 °C
Pressure range	0 – 10 bar

Accessories



- **VisiFerm DO B** P/N 243090
- **ODO Cap P0** P/N 242427
- **Hoses** P/N 817134
- **Power supply** P/N 817804

Buffer Solutions you can Trust

All calibration procedures assume that the labeled values of the calibration buffers are correct. But buffer values can change over time and so can your results. A complete range of patented buffer solutions provides pH stability up to 5 years, something never achieved before. The pH buffers 9.21 and 10.01 are even stable in air. High buffering capacity provides rapid, stable calibration. The growth of fungus and micro-organisms is prevented.



Traceability

An important issue for the production of Certified Reference Materials is to ensure traceability through an unbroken chain of comparisons to reference material of the highest metrological quality (Primary Reference Material) from NIST¹ and PTB². Unlike other manufacturers, where only top-down traceability is applied, Hamilton works with circular or closed-loop traceability, providing unique reliability of Hamilton DuraCal buffers.

Top-down traceability: At Hamilton, the pH value of DuraCal buffers is determined by comparison against two secondary reference buffer solutions from accredited suppliers of secondary reference materials. The solutions themselves are compared against primary reference solutions from PTB or NIST. The measurement uncertainties of every measurement comparison are known and documented.

Bottom-up traceability: To ensure the highest possible accuracy and full reliability of the pH value, a representative number of samples from every single production lot is verified by an external, independent and impartial DAkkS³ laboratory. The DuraCal samples are compared against secondary reference solutions from DAkkS and these are referenced themselves to primary reference solutions from PTB or NIST. At this stage, the traceability loop is closed. DAkkS provides Hamilton with a calibration certificate for every DuraCal production batch.

Certified reference material: Due to the complete traceability of the measurement procedure and the assignment of uncertainties to the particular testing steps, the buffers pH 4.01, 7.00, 9.21 and 10.01 are classified as “Certified Reference Material” (CRM).

Features

- ▶ Convenient 250 mL or 500 mL bottle with built-in calibration compartment
- ▶ Economical, only about 15 mL of buffer is used per calibration
- ▶ Certified pH value from a DAkkS laboratory accredited for pH measurement
- ▶ First class certificate with traceability to international standards
- ▶ Certificates available at www.hamiltoncompany.com
- ▶ Expiration date on the bottle
- ▶ Immune to microbial growth

1) NIST: National Institute of Standards and Technology, Gaithersburg, MD, USA

2) PTB: Physikalisch Technische Bundesanstalt, Braunschweig, Germany

3) DAkkS: Deutsche Akkreditierungsstelle GmbH (D-K-15186-01-00), Zentrum for Messen und Kalibrieren GmbH, Wolfen, Germany



pH Buffers

Simple handling for professional results

pH Value	Accuracy	Stability*	Certified By	Packaging Unit	PN
1.09	±0.02	60	Hamilton	500 mL	238271
1.68	±0.02	60	Hamilton	500 mL	238272
2.00	±0.02	60	Hamilton	500 mL	238273
3.06	±0.02	60	Hamilton	500 mL	238274
4.01	±0.01/±0.02	24/60	DAkKS	250 mL	238317
4.01	±0.01/±0.02	24/60	DAkKS	500 mL	238217
4.01	±0.01/±0.02	24/60	DAkKS	3 x 500 mL	238917
4.01	±0.01/±0.02	24/60	DAkKS	5 L	238332
4.01	±0.01/±0.02	24/60	DAkKS	10 L	238194
4.01	±0.01/±0.02	24/60	DAkKS	1000 L	238895
5.00	±0.02	60	Hamilton	500 mL	238275
6.00	±0.02	60	Hamilton	500 mL	238276
7.00	±0.01/±0.02	24 / 60	DAkKS	250 mL	238318
7.00	±0.01/±0.02	24 / 60	DAkKS	500 mL	238218
7.00	±0.01/±0.02	24 / 60	DAkKS	3 x 500 mL	238918
7.00	±0.01/±0.02	24 / 60	DAkKS	5 L	238333
7.00	±0.01/±0.02	24 / 60	DAkKS	10 L	238188
7.00	±0.01/±0.02	24 / 60	DAkKS	1000 L	238896
8.00	±0.02	60	Hamilton	500 mL	238277
9.21	±0.02	60	DAkKS	250 mL	238319
9.21	±0.02	60	DAkKS	500 mL	238219
9.21	±0.02	60	DAkKS	3 x 500 mL	238919
9.21	±0.02	60	DAkKS	10 L	238216
9.21	±0.02	60	DAkKS	1000 L	238897
10.01	±0.02	60	DAkKS	250 mL	238321
10.01	±0.02	60	DAkKS	500 mL	238223
10.01	±0.02	60	DAkKS	3 x 500 mL	238923
10.01	±0.02	60	DAkKS	10 L	238187
10.01	±0.02	60	DAkKS	1000 L	238898
11.00	±0.02	24	Hamilton	500 mL	238278
12.00	±0.02	24	Hamilton	500 mL	238279
4.01/7.00/9.21	±0.01/±0.02	24/60	DAkKS	500 mL, mixed	238922
4.01/7.00/10.01	±0.01/±0.02	24/60	DAkKS	500 mL, mixed	238924

Step 1 Open bottle



Step 2 Fill calibration compartment



Step 3 Calibrate electrode



Step 4 Empty calibration compartment



ORP Buffers

pH Value	Accuracy	Stability*	Certified By	Packaging Unit	PN
271 mV	±5 mV	24	None	500 mL	238228
475 mV	±5 mV	24	None	250 mL	238322
475 mV	±5 mV	24	None	500 mL	238227

* In months

Hamilton Conductivity Standards

Long-term stability and accuracy

For measurements in the low conductivity range stable and reliable calibration standards have been completely lacking up to now. Since a conductivity standard is not a buffer solution, the lower the value of the conductivity standard, the greater the effect of entry of CO₂ or contamination. Hamilton is the first manufacturer to offer patented conductivity standards of 1.3 and 5 µS/cm with a certified accuracy of ±1% and a lifetime of 1 and 3 years, respectively. The procedure for determining conductivity was developed in collaboration with DFM¹. Many metrological institutes choose Hamilton standards because of their unprecedented stability and independent verification by PTB. During an interlaboratory test among prestigious European metrological institutes (PTB, DFM, DAkkS³) Hamilton standards were used as measurement solutions.



Hamilton is Different

Hamilton offers conductivity standards whose stability of ±1% is guaranteed over a lifetime of up to 3 years. They can be used repeatedly under the condition that the bottle is not left open for more than 1 hour in total.

A representative number of bottles from every batch are measured by DFM. Their value is recorded on the calibration certificate and on every bottle. DFM enjoys the highest prestige in Europe in the area of electrolytic conductivity and is equipped with an absolute measurement cell that was developed in collaboration with NIST, and is accredited by the Danish accreditation agency DANAK to a conductivity of 0.9 µS/cm. DFM and NIST⁴ have made comparisons of their measurement uncertainty and have confirmed in a series of scientific publications that the measurement accuracy is in each case the

same. Because no primary standards exist in the low conductivity range, measurements depend on absolute measurement cells which trace electrical conductivity back to the SI units: meter and volt. Testing of Hamilton standards is thus carried out on the most precise measurement apparatus in the world, and certified accordingly.



- 1) DFM: Danish Institute of Fundamental Metrology, Dänemark
- 2) PTB: Physikalisch-Technische Bundesanstalt, Braunschweig
- 3) DAkkS: Deutsche Akkreditierungsstelle
- 4) NIST: National Institute of Standards and Technology, Gaithersburg MD, USA



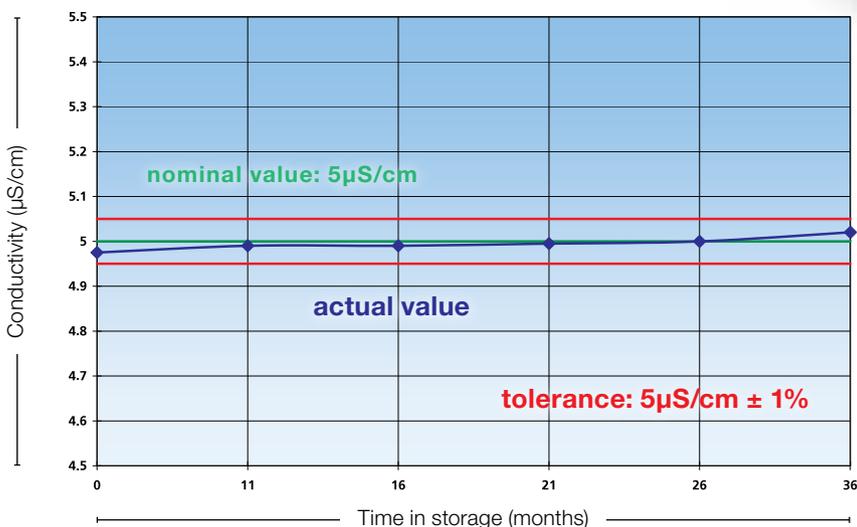
Unique advantages:

- ▶ Remains stable for a minimum of 1 year for 1.3 µS/cm, and up to 3 years for all other values
- ▶ Certificate with calibration document from DFM (available at www.hamiltoncompany.com)
- ▶ Expiration date shown on every bottle
- ▶ Bottles are permitted to stay open for a total of 60 minutes



Stability of the Hamilton 5µS/cm Conductivity Standard over 36 months

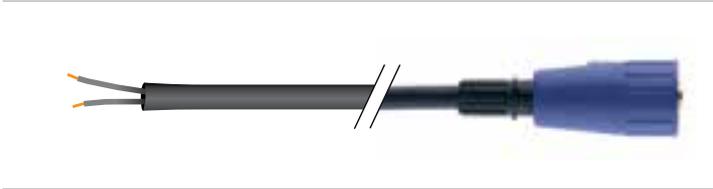
Check measurement by PTB²



Value at 25°C	Accuracy	Stability (in months)	Certificate From	Packaging Unit	Volume	PN
1.3 µS/cm	±1%	12	DFM	Glass bottle	300 mL	238973
5 µS/cm	±1%	36	DFM	Glass bottle	300 mL	238926
15 µS/cm	±1%	36	DFM	Glass bottle	300 mL	238927
84 µS/cm	±1%	18	DFM	Calpack bottle	500 mL	238984
100 µS/cm	±1%	36	DFM	Glass bottle	300 mL	238934
147 µS/cm	±1%	18	DFM	Calpack bottle	500 mL	238985
706 µS/cm	±2%	36	Hamilton	Glass bottle	300 mL	238929
1413 µS/cm	±1%	36	DFM	Glass bottle	300 mL	238928
1413 µS/cm	±1%	18	DFM	Calpack bottle	500 mL	238986
12880 µS/cm	±1%	18	DFM	Calpack bottle	500 mL	238988
100 mS/cm	±1%	36	Hamilton	Glass bottle	300 mL	238935

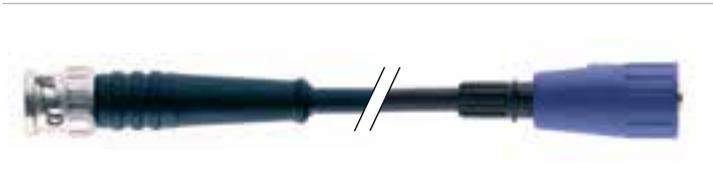
Cables

For sensors with standard (S7) connector. Device side no connector (open end).



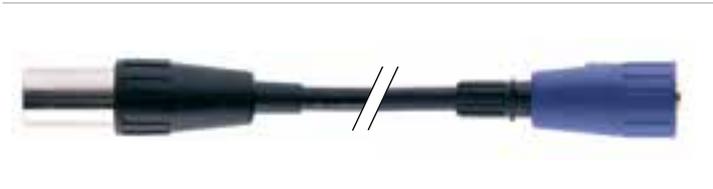
Length	Diameter	Order No.
1 m	5 mm	355 072
5 m	5 mm	355 066
10 m	5 mm	355 080

For sensors with standard (S7) connector. Device side BNC connector.



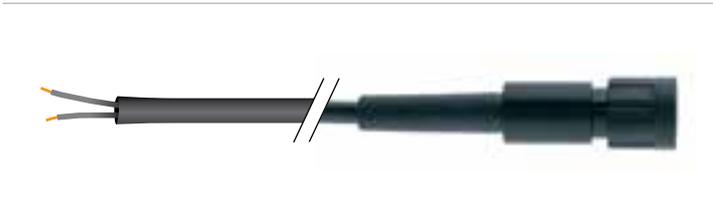
Length	Diameter	Order No.
1 m	3 mm	355 043
3 m	3 mm	355 057
5 m	3 mm	355 056

For sensors with standard (S7) connector. Device side DIN connector.



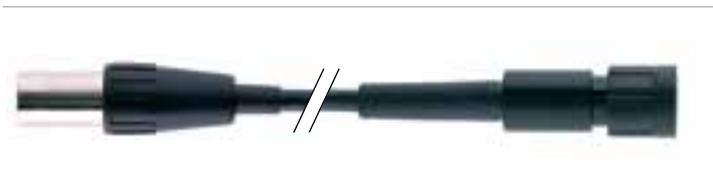
Length	Diameter	Order No.
1 m	3 mm	355 045
3 m	3 mm	355 059
5 m	3 mm	355 058

For sensors with K8 connector. Device side no connector (free end).



Length	Diameter	Order No.
1 m	5 mm	355 153
3 m	5 mm	355 154
5 m	5 mm	355 155
10 m	5 mm	355 156

For sensors with K8 connector. Device side DIN connector.



Length	Diameter	Order No.
1 m	5 mm	355 157
2 m	5 mm	355 158
3 m	5 mm	355 159

For sensors with VP 6 connector. VP 6 single coaxial cable. Device side no connector (open end).



Length	Diameter	Order No.
1 m	7,5 mm	355 108
3 m	7,5 mm	355 109
5 m	7,5 mm	355 110
10 m	7,5 mm	355 111
20 m	7,5 mm	355 112

For sensors with VP 8 connector, e.g. VisiFerm DO, Arc Sensors. VP 8 double coaxial cable. Device side no connector (open end).



Length	Diameter	Order No.
1 m	7,5 mm	355 217
3 m	7,5 mm	355 218
5 m	7,5 mm	355 219
10 m	7,5 mm	355 220
15 m	7,5 mm	355 221
20 m	7,5 mm	355 222

For sensors with T82/D4 connector, e.g. OxyFerm. Device side no connector (open end).



Length	Diameter	Order No.
1 m	5 mm	355 087
3 m	5 mm	355 088
5 m	5 mm	355 089

For sensors with T82/D4 connector, e.g. OxyFerm. Device side Lemo connector.



Length	Diameter	Order No.
1 m	5 mm	355 160
2 m	5 mm	355 161
3 m	5 mm	355 162
5 m	5 mm	355 163

Oxygen Accessories



OxyFerm Membrane Kit

The OxyFerm Membrane Kit contains 3 membrane bodies, Oxylyte electrolyte, pipette, spare o-ring and a polishing strip.

P/N 237123

Membrane Kit FDA

The Membrane Kit FDA ist the kit for the OxyFerm FDA sensors and contains 3 FDA membrane bodies, Oxylyte electrolyte, pipette, spare o-ring and a polishing strip. The mambrane body of the FDA membrane has a special rounded design to prevent accumulation of gas bubbles.

P/N 237140

Membrane Kit CIP

The Membrane Kit CIP contains 3 membrane bodies that are especially designed to withstand CIP cleanings. Oxylyte electrolyte, pipette, spare o-ring and a polishing strip.

P/N 237126

OxyGold Membrane Kit

The OxyGold Membrane Kit contains 3 membrane bodies with the rounded design, pipette and a spare o-ring. Electrolyte must be ordered separately to match the sensor (see page 87).

P/N 237135

Polarization Module

The Polarization Module is to prepare replacement sensors so that they can be used immediately for measurements without connection to a transmitter. It polarizes the oxygen sensors and safes the polarization time at the transmitter.

Polarization Module T OxyFerm / OxyFerm FDA / OxyFerm XL	P/N 237370
Polarization Module G OxyFerm VP / OxyGold G	P/N 237350
Polarization Module B OxyGold B	P/N 237360

Replacement Cathode OxyFerm	P/N 237306
Replacement Cathode OxyGold G	P/N 237427
Replacement Cathode OxyGold B	P/N 237437

Autoclavation Cap

The Autoclavation Cap is used to protect the OxyFerm T82 connector from moisture during autoclavation. It is important to keep connections dry and clean to ensure reliable measurements.

Autoclavation Cap OxyFerm P/N 242000



Electrolytes and Solutions



Electrolyte

Electrolytes for pH Sensors

		P/N
3 M KCl	100 mL	238036
3 M KCl	500 mL	238936
Skylyte-CL	100 mL	242080
Protelyte	100 mL	238038

Electrolytes for Oxygen Sensors

		P/N
OxyGold Oxylyte G	50 mL	237139
OxyGold Oxylyte B	50 mL	237138
OxyFerm Oxylyte	50 mL	237118
Oxylyte USD (Up-Side Down)	50 mL	237136

Storage Solution

In order to achieve long sensor life and faster electrode response times, it is recommended to store electrodes in our storage solution. It is an acid-buffered solution that ensures the regeneration of the electrode in addition to provide an optimized storage.

Storage Solution

500 mL P/N 238931



Cleaning Solution Set

Depending on the type of application the pH glass or diaphragm can get contaminated through various ingredients of the measuring solution. This is indicated by a slow response of the electrode, or even incorrect readings. To overcome these problems, Hamilton has developed a cleaning solution set. The intention is to have an overall cleaning of the pH glass as well as the diaphragm. The set comprises Cleaning Solution A, Cleaning solution B and a storage solution. To clean the electrode put it for 15 – 30 minutes into each solution, and your electrode will be ready for new measurements again.

Cleaning Solution Set

P/N 238290

Arc Accessories

Sensor Cable M12 for sensors with standard M12 connector. Device side open end.



Length	P/N
3 m	355 283
5 m	355 284
10 m	355 285

Sensor Power Cable for control systems or transmitters with Lemo connector.



The code XX in the product number defines the type of electrical power connector:

Length	P/N
2,5 m	355245-xx

- 01 – Power cord EU
- 02 – Power cord CH
- 03 – Power cord US
- 04 – Power cord UK
- 05 – Power cord AU/NZ

Sensor Power Cable for control systems or transmitters with BINDER connector.



The code XX in the product number defines the type of electrical power connector:

Length	P/N
4 m	355258-xx

- 01 – Power cord EU
- 02 – Power cord CH
- 03 – Power cord US
- 04 – Power cord UK
- 05 – Power cord AU/NZ

Sensor Power Cable for control systems or transmitters with BNC connector.



The code XX in the product number defines the type of electrical power connector:

Length	P/N
1 m	355297-xx
3 m	355296-xx

- 01 – Power cord EU
- 02 – Power cord CH
- 03 – Power cord US
- 04 – Power cord UK
- 05 – Power cord AU/NZ

Sensor Power Cable for control systems or transmitters with AMP connector.



The code XX in the product number defines the type of electrical power connector:

Length	P/N
2,5 m	355298-xx

- 01 – Power cord EU
- 02 – Power cord CH
- 03 – Power cord US
- 04 – Power cord UK
- 05 – Power cord AU/NZ



Demo Cable VP 8 for demonstration of Arc sensors. With power supply. Device side open end.



The code XX in the product number defines the type of electrical power connector:

01 – Power cord EU
02 – Power cord CH
03 – Power cord US
04 – Power cord UK
05 – Power cord AU/NZ

Length	P/N
1 m	355194-xx

Arc Wireless Converter Modbus



Designed for wireless communication between HDM (Hamilton Device Manager) and Arc Sensors.

P/N	243498
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Arc Wi Sensor Adapter



The Arc Wi sensor adapter is expanding the functionality of Arc sensors by providing wireless communication for local monitoring all analog and digital signals are bypassed through the Arc Wi Sensor Adapter.

P/N	242170
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Arc Wi 2G Adapter



The Arc Wi 2G adapter is expanding the functionality of Arc sensors by providing wireless communication for local monitoring in parallel to robust 4-20 mA signal, and simple sensor connection to the PCS with additional internal

galvanic isolator for an enhanced signal quality.

P/N	243030
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VisiFerm D4-Power Adapter



The code XX in the product number defines the type of electrical power connector:

01 – Power cord EU
02 – Power cord CH
03 – Power cord US
04 – Power cord UK
05 – Power cord AU/NZ

P/N	242413-XX
-----	-----------

Arc View Handheld

This device empowers the operator to monitor measurement values, calibrate Arc sensors and configure various parameters using a unified user interface for pH, DO, Conductivity and ORP. The Arc View Handheld can communicate with up to 30 Arc sensors at a time over wireless channels parallel to the process control system's main interface.



Features & Benefits

- ▶ On-line wireless sensor monitoring (up to 30 Arc sensors)
- ▶ Display & manage sensor data
- ▶ Sensor calibration & configuration
- ▶ Visualization of the sensor
- ▶ Status and diagnostic data

Arc View H-Package

The H-Package consists of an Arc View Handheld, the docking station, a power supply and a sensor cable.



Type	P/N
Arc View Handheld	242167
Arc View Handheld Dock	242168
Arc View H-Package	242180
Power Supply	242007
Memory Stick	396230
Accu Pack Arc View	242057

Arc Sensor Cable with M8 4-pole socket. For sensor connection to Arc View Handheld Dock.



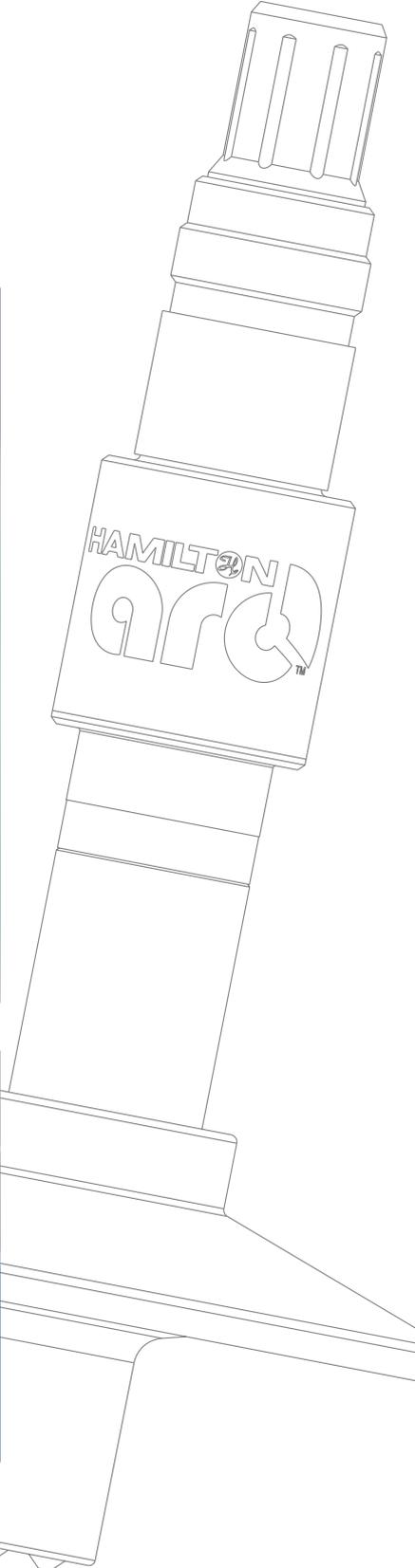
Length	P/N
1 m	242176



Hamilton Customized Products

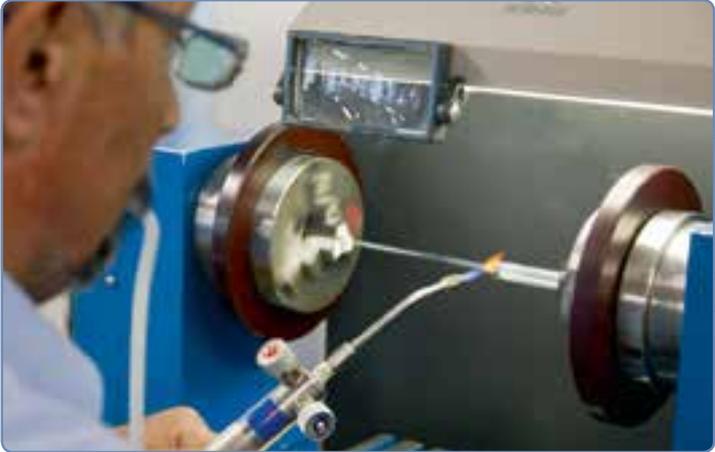
Customized products for our customers' special needs

The adaptation of standard products to customer's special needs is the main focus of our application engineering team. Customizing can include changes to length, insertion depth, process adaptation of sensor or housing switching to a different material and many more.



HAMILTON
CUSTOMIZED
PRODUCT

Need a custom housing or sensor? The Hamilton Customized Product team is happy to help design products for your specific application. Give us a call to learn more.



Transmitter H100

The H100 is a transmitter for universal use in the chemical industry, power stations, biotechnology, food processing and pharmaceutical industries as well as in water/wastewater treatment. Icons guide the operator and show the sensor status.

Sensor failures are detected, shown on the display and an alarm is set. Calibration can be done manually or by selecting standard calibration media. After each calibration the sensor data will be shown and evaluated. The H100 is easy to handle and can be mounted on the wall as well as on a panel.



User friendly, robust and reliable



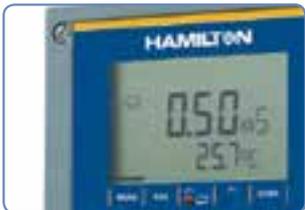
Easy to install, operate and calibrate

- ▶ Large terminal compartment and pre-assembled rear unit for easy installation.
- ▶ The large display and intuitive menu structure ensure straightforward navigation.
- ▶ Icons supply operating messages and signal unusual states.
- ▶ Simple calibration with automatic buffer recognition.



Robust design

- ▶ Optional protective hood for additional protection against weather exposure and mechanical damage.
- ▶ Wall, post/pipe, or panel mounting possible with optional panel- or pipe-mount kit.



Reliable instrument for process applications

- ▶ The sensor status and potential defects are continuously monitored for real time display of error or alarm.
- ▶ Asymmetry potential, slope and response time are evaluated during calibration through the sensor lifetime for preventive maintenance indication.
- ▶ The integrated calibration timer automatically indicates when calibration is required.





Transmitter H100 pH

Specifications

Measured variable	pH, mV and temperature
Measuring range (pH / OPR)	-1500 – +1500 mV
Display range pH	-2.00 – 16.00
Measuring error	<0.02 pH, <1 mV
Temperature input	Pt 100, Pt 1000, NTC 30 kOhm
Temperature measuring range	-20.0 – +150 °C
Temperature resolution	0.1 °C
Calibration	1 point, 2 point and product calibration
Power Supply	24 – 230 V AC/DC
Display	LC display, 7-segment with icons
Ambient temperature	-20 – 55 °C
Relative humidity	80 % at temperatures up to 55 °C
Ingress protection	IP 65, NEMA 4X
Alarm contact	Yes
Hold Mode	Yes

Ordering Information

Type	P/N
H100 pH	243080-01

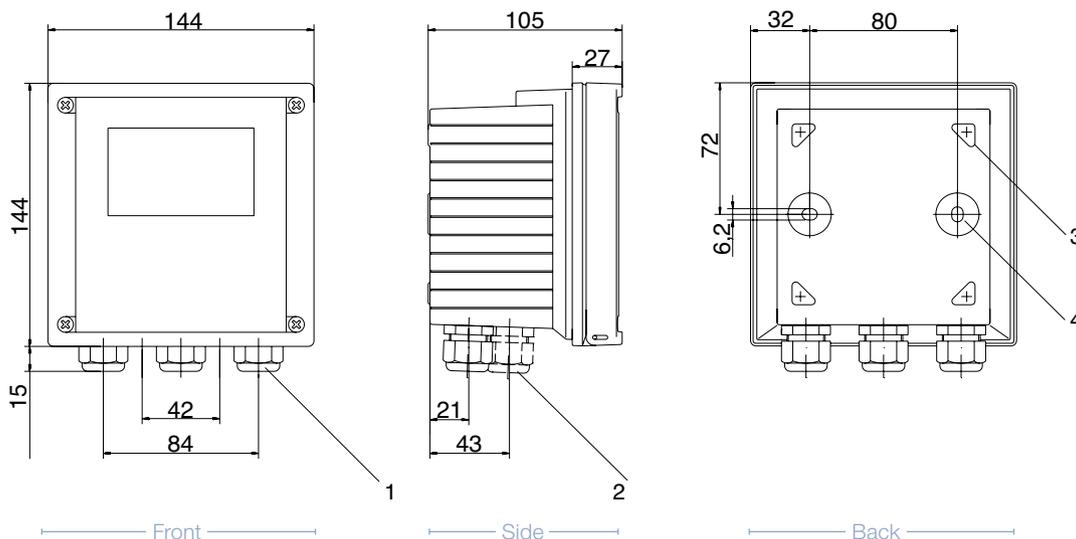


Accessories

- **Pipe-mount kit** P/N 243082
- **Panel-mount kit** P/N 243083
- **Protective hood** P/N 243084

Mounting plan

all dimensions in mm



- 1 Cable gland (3x)
- 2 Knockouts for cable glands or 1/2" conduit (conduits not incl.)
- 3 Knockout for pipe mounting (4x)
- 4 Knockout for wall mounting (2x)

Transmitter H100 Cond

Specifications

Measured variable	Conductivity, resistivity, concentration, salinity, temperature
Measuring range conductivity	0 – 999.9 mS/cm
Effective range conductivity	0.2 μ S x c – 1000 mS x c
Measuring range resistivity	0.00 – 99.99 M Ω x cm
Measuring range concentration	0.00 – 9.99 % by wt
Measuring range salinity	0.0 – 45 ‰ (0 – 35 °C)
Measuring error	< 1 % meas. val. + 0.4 μ S x c
Temperature input	Pt 100, Pt 1000, NTC 30 kOhm
Temperature measuring range	Pt 100/Pt 1000: -20.0 – +200 °C NTC 30 kOhm: -20.0 – +150 °C
Temperature resolution	0.1 °C
Power Supply	24 – 230 V AC/DC
Display	LC display, 7-segment with icons
Ambient temperature	-20 – 55 °C
Relative humidity	80 % at temperatures up to 55 °C
Ingress protection	IP 65, NEMA 4X
Alarm contact	Yes
Hold Mode	Yes

Ordering Information

Type	P/N
H100 Cond	243080-02

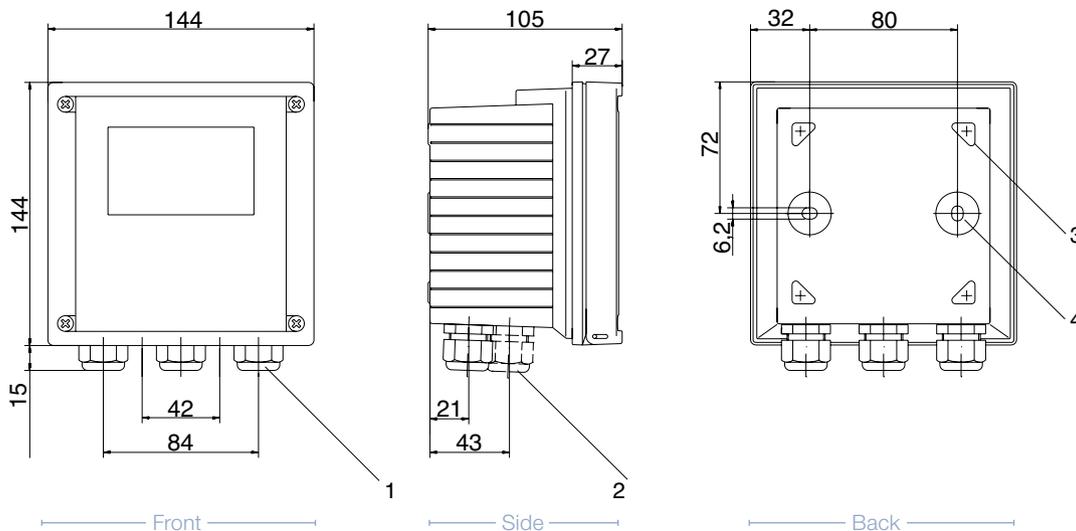


Accessories

- **Pipe-mount kit** P/N 243082
- **Panel-mount kit** P/N 243083
- **Protective hood** P/N 243084

Mounting plan

all dimensions in mm



Transmitter H100 DO

Specifications

Measured variable	DO saturation, DO concentration
Measuring current	-2 – 1800 nA
O ₂ resolution	0.05 nA
O ₂ saturation	0 – 200 %
O ₂ concentration	0.00 – 20.00 mg/l / 0.00 – 20.00 ppm
Polarization voltage	0 – 1000 mV (User-defined)
Salinity correction	00.00 – 45.00 g/kg (User-defined)
Measuring error	< 0.5 % meas. val. + 0.5 %
Temperature input	NTC 20 kOhm, NTC 30 kOhm
Temperature measuring range	-20,0 – +150 °C
Temperature resolution	0.1 °C
Power Supply	24 – 230 V AC/DC
Display	LC display, 7-segment with icons
Ambient temperature	-20 – 55 °C
Relative humidity	80 % at temperatures up to 55 °C
Ingress protection	IP 65, NEMA 4X
Alarm contact	Yes
Hold Mode	Yes

Ordering Information

Type	P/N
H100 DO	243080-03

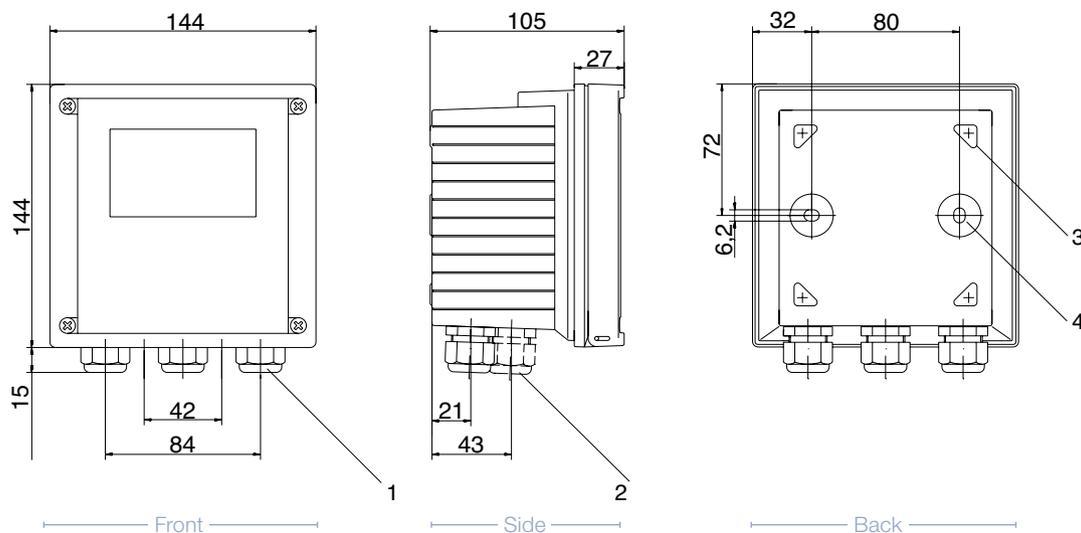


Accessories

- **Pipe-mount kit** P/N 243082
- **Panel-mount kit** P/N 243083
- **Protective hood** P/N 243084

Mounting plan

all dimensions in mm



Transmitter H200X pH

Hamilton's H200X Transmitter for pH measurement combines ease of use and reliability in hazardous areas. It has been designed for universal process applications including use in pharmaceutical, chemical and food & beverage industries as well as water/wastewater treatment.

The self-explaining user interface ensures comfortable and intuitive handling. Hamilton's H200X pH transmitter provides continuous sensor monitoring and preventive maintenance indication for maximum reliability.



Perfectly designed for hazardous areas



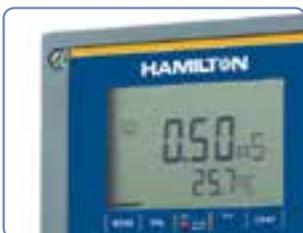
Easy to install, operate and calibrate

- ▶ Large terminal compartment and pre-assembled rear unit for easy installation.
- ▶ The large display and intuitive menu structure ensure straightforward navigation.
- ▶ Icons supply operating messages and signal unusual states.
- ▶ Simple calibration with automatic buffer recognition.



Robust design

- ▶ Wall, post/pipe, or panel mounting possible with optional panel or pipe mount kit.
- ▶ Application in hazardous locations (FM, CSA Class I Div. 2 / Zone 2)
- ▶ H200X pH may be installed in the following locations:
ATEX, Zone 1 with measurement in Zone 0
- ▶ Explosion protection



Reliable instrument for process applications

- ▶ Sensor status and potential defects are continuously monitored ; errors and alarms are displayed in real time
- ▶ Asymmetry potential, slope and response time are evaluated during calibration through the sensor lifetime for preventive maintenance indication.
- ▶ The integrated calibration timer automatically indicates when calibration is required.
- ▶ Remote-controlled via HART communication





Transmitter H200X pH

Specifications

Measured variable	pH, mV and temperature
Measuring range (pH / OPR)	-1500 to +1500 mV
Display range pH	-2.00 – 16.00 pH, -1999 – +1999 mV (ORP)
Measuring error	<0.02 pH, <1 mV
Temperature input	Pt 100, Pt 1000, NTC 30 kOhm
Temperature measuring range	Pt 100, Pt1000: -20.0 – +200 °C NTC 30 kOhm: -20.0 – +150 °C
Temperature resolution	0.1 °C
Calibration	1 point, 2 point and product calibration
Power Supply	12 – 30 V
Display	LC display, 7-segment with icons
Ambient temperature	-20 – 55 °C
Relative humidity	10 – 80% not condensing
Ingress protection	IP 65, NEMA 4X
Hold Mode	Yes
Explosion protection	II 2(1)G Ex ib [ja Ga] IIC T6 Gb
HART communication	Digital communication by FSK (Frequency Shift Keying) modulation of loop current, reading of device identification, measured values, status, and messages, reading and writing of parameters, start of product calibration, signaling of configuration changes according to FDA 21 CFR Part 11

Ordering Information

Type	P/N
H200X pH	243085-01

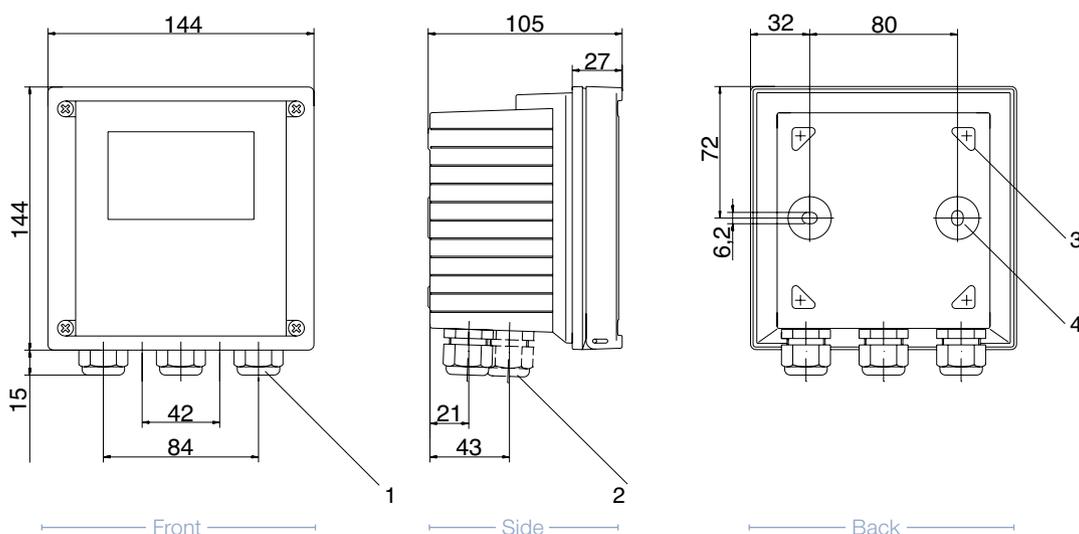


Accessories

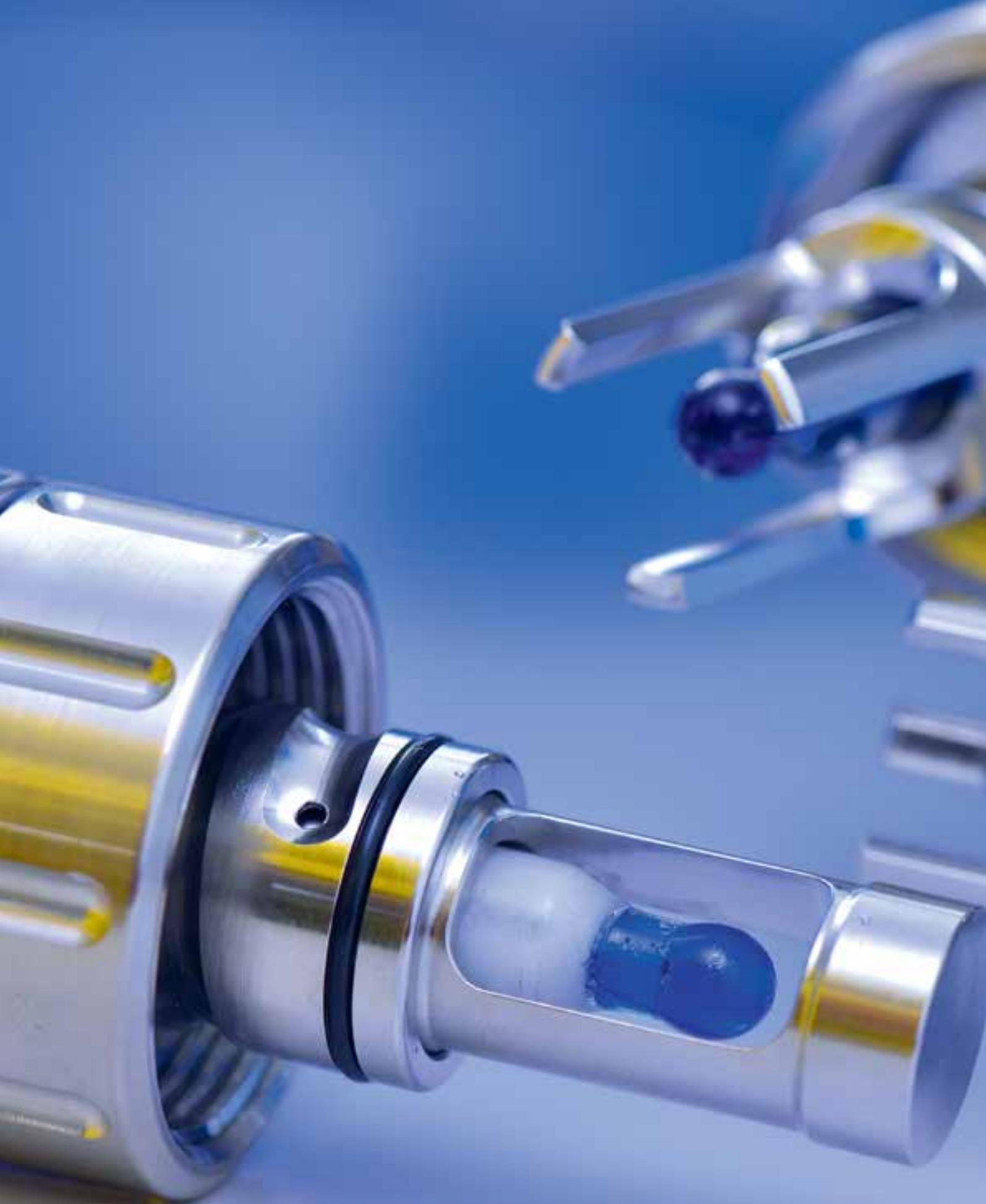
- **Pipe-mount kit** P/N 243082
- **Panel-mount kit** P/N 243083
- **Protective hood** P/N 243084

Mounting plan

all dimensions in mm



- 1 Cable gland (3x)
- 2 Knockouts for cable glands or 1/2" conduit (conduits not incl.)
- 3 Knockout for pipe mounting (4x)
- 4 Knockout for wall mounting (2x)





Housings

Different processes have different requirements for sensors for an accurate and reliable measurement. Being in contact with the media is the most important one. In order to meet the different requirements, Hamilton has developed various kinds of housings and armatures: static, retractable, pressurizable, pneumatic, manual, weld-in and hygienic sockets.

No matter if housing is needed for a pipe or a vessel, on the following pages the right one for each application can be found.

FlexiFit



The FlexiFit housings are designed for 120 mm sensors in different kinds of industries. A variety of process connections ensure the usability in the chemical industry as well as in hygienic processes. All FlexiFit have EPDM o-rings and the electropolished surface quality ($R_a < 0.4 \mu\text{m}$) quality is shown on a certificate. They are suitable for autoclavation, CIP and SIP procedures.

Benefits

- ▶ Easy installation and handling
- ▶ Various o-ring positions available
- ▶ ATEX approved
- ▶ Hygienic design

Ordering Information

Type	Process Connection	P/N
FlexiFit Bio	G 1/4	237331-OP
FlexiFit U Bio	G 1/4	237380-OP
FlexiFit TC 150-33	TC 1.5"	237341
FlexiFit VV-0	Varivent®	237344
FlexiFit VV-15	Varivent®	237345



USP
Class VI

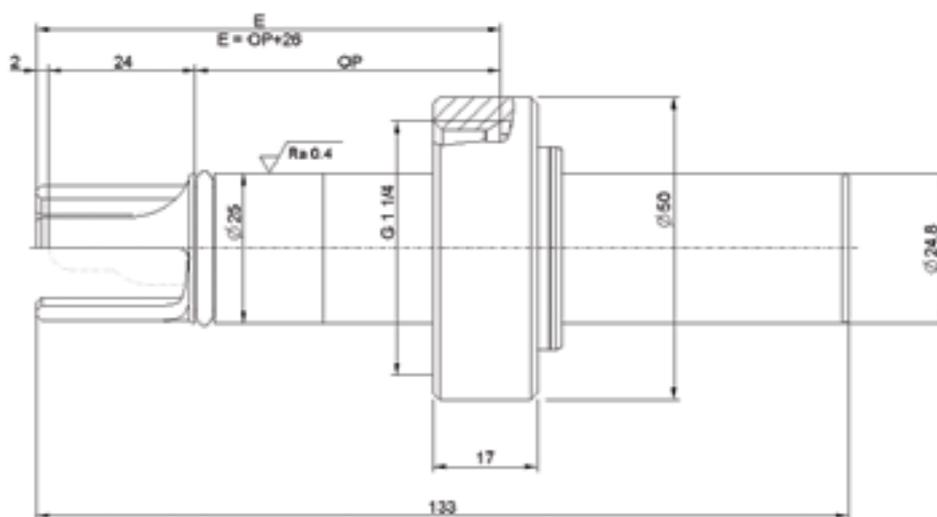


Specifications

Wetted Parts	Stainless Steel 1.4435
O-ring Material	EPDM (FDA approved)
O-ring position	22 mm – 55 mm (G 1¼)
Pressure range	0 – 6 bar
Temperature range	-10 – 140 °C
Sensor thread	PG 13,5
Sensor a-length	120 mm
Surface finish	$R_a < 0.4 \mu\text{m}$ (N5 electropolished)
ATEX approval	CE 0035 II 1/2 G Ex ia IIC T4/T5/T6

Dimensional drawing / FlexFit Bio

all dimensions in mm



Accessories



- **Service Kit Flexifit Bio** P/N 237366
- **Service Kit FFPM** P/N 237319

Safety Socket see page 122

RetractoFit



The RetractoFit is a retractable armature designed for 225 mm sensors in industrial applications. It allows to mount and dismount sensors while the process is running. Safe sensor handling during process is guaranteed because insertion without sensor is impossible so is removal in measuring position. It is easy to use and maintain: only one press on the red button is needed to move the sensor into or out of the process. All o-rings can easily be replaced by the operator without special tools. The RetractoFit is available in different versions.

Benefits

- ▶ Integral safety mechanism
- ▶ Sensor can be withdrawn from the process for cleaning, calibration or replacement
- ▶ Easy maintenance
- ▶ 3.1 material certificate included

Ordering Information

Type	Process Connection	P/N
RetractoFit	G 1¼	237240
RetractoFit PEEK 25	G 1¼	237490
RetractoFit PEEK 38.5	G 1¼	237460



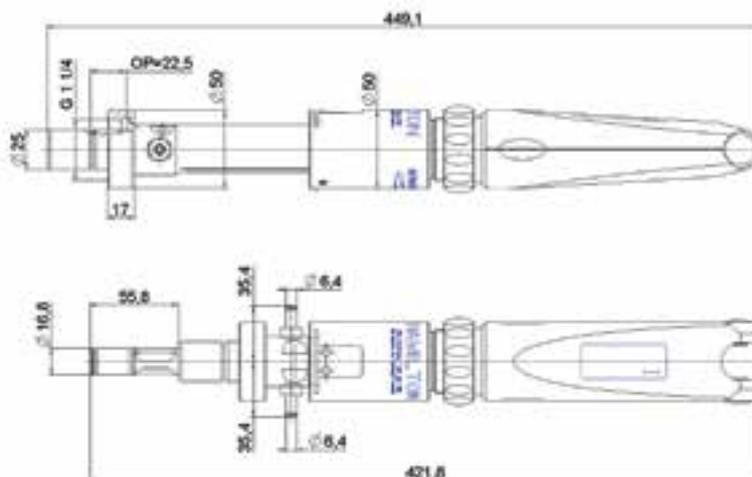


Specifications

Wetted Parts	RetractoFit: Stainless Steel 1.4571 RetractoFit PEEK: PEEK (FDA approved)
O-ring Material	FPM
O-ring position	RetractoFit: 22.5 mm RetractoFit PEEK: 25 mm and 38.5 mm
Pressure range	0 – 6 bar
Temperature range	-10 – 130 °C
Sensor thread	PG 13.5
Sensor a-length	225 mm
Surface finish	RetractoFit: $R_a < 0.4 \mu\text{m}$ (N5 electropolished)
ATEX approval	RetractoFit: CE 0035 II 1/2 G Ex ia IIC T4/T5/T6 RetractoFit PEEK: CE 0035 II 1/2 G Ex ia IIB T4/T5/T6

Dimensional drawings / RetractoFit

all dimensions in mm



Maintenance position

Measuring position

Accessories



- **Service Kit RetractoFit** P/N 237239
- **FFPM Kit RetractoFit** P/N 237339
- **Insertion tube short** P/N 237255

Safety Socket see page 122

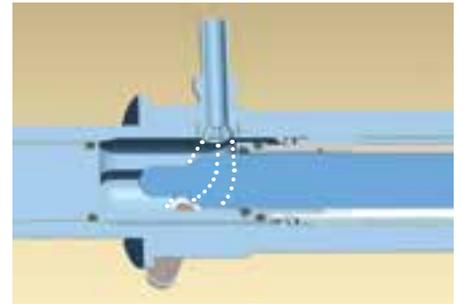
RetractoFit Bio



The RetractoFit Bio is a retractable housing designed for 225 mm sensors in hygienic applications in the biotechnology, food & beverage and the pharmaceutical industry. It allows to mount and dismount sensors while the process is running. Safe sensor handling during process is guaranteed because insertion without sensor is impossible so is removal in measuring position. It is easy to use and maintain: only one press on the red button is needed to move the sensor into or out of the process. All o-rings can be easily be replaced by the operator without special tools.



“Did you know... that the RetractoFit Bio has a special rinsing chamber with angled connections for cleaning solutions and special inlet construction guarantees an entire cleaning of the chamber through a swirl effect.”



Benefits

- ▶ Integral safety mechanism
- ▶ Sensor can be withdrawn from the process for cleaning, calibration or replacement
- ▶ Special hygienic design of cleaning chamber
- ▶ Easy maintenance



USP
Class VI





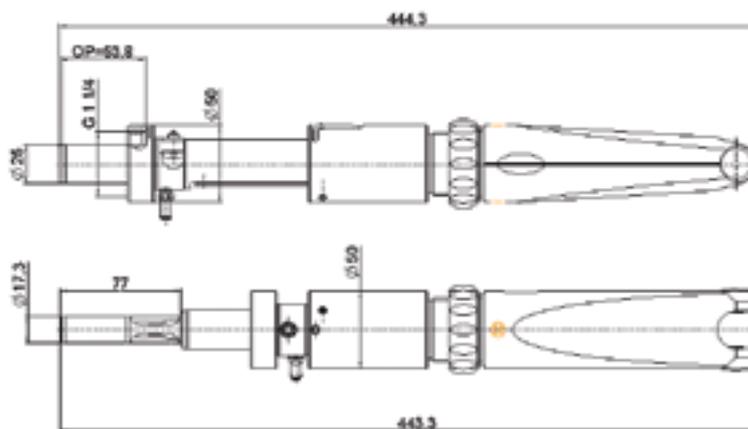
Specifications

Wetted Parts	Stainless Steel 1.4435
O-ring Material	EPDM (FDA approved)
O-ring position	22 mm and 55 mm
Pressure range	0 – 6 bar
Temperature range	-10 – 140 °C
Sensor thread	PG 13.5
Sensor a-length	225 mm
Surface finish	$R_a < 0.4 \mu\text{m}$ (N5 electropolished)
ATEX approval	CE 0035 II 1/2 G Ex ia IIC T4/T5/T6

Dimensional drawings / RetractoFit Bio 55

all dimensions in mm

Maintenance position



Measuring position

Ordering Information

Type	Process Connection	P/N
RetractoFit Bio 25	G 1/4	237480
RetractoFit Bio 55	G 1/4	237440

Accessories



• **FDA Service Kit** P/N 237338

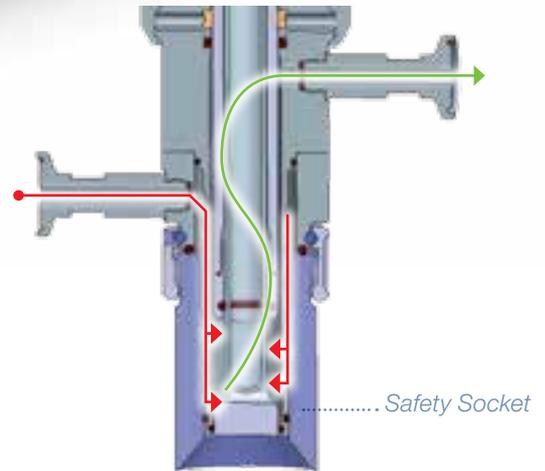
Safety Socket see page 122

Retractex B



The retractable pneumatic or manual housing Retractex B was designed for sanitary applications in biotechnology, food & beverage and pharmaceutical industry. The compact design with a stroke of only 36 mm keeps wear on seals to a minimum and leads to excellent reliability – day and night, all year long. It can be cleaned easily and thoroughly in place, including the space between socket and rinsing chamber. The Retractex B with its patented HyCIP cleaning principle offers the best available cleaning efficiency for Ingold sockets (G 1¼”).

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.) for best human safety. It is available with various process connections that can be used with all vessels used in these branches.



How does the HyCIP process connection work?

In cleaning position, the sensor can be cleaned and sterilized together with all wetted seals. In the HyCIP connection the cleaning solution is directed between armature and socket up to the process seal so the most remote parts of the chamber are rinsed. Thus HyCIP housings are unmatched for their cleaning performance of the sensor and of all relevant seals.

Benefits

- ▶ Extremely compact design
- ▶ Integrated safety concept- no sensor – no insertion
- ▶ Very low maintenance
- ▶ Sterile safety and unique cleaning efficiency with HyCIP



Specifications

Wetted Parts	Stainless Steel 1.4404
O-ring Material	EPDM (FDA approved) or FPM
O-ring position	25 mm, 50 mm and 55 mm
Pressure range	0 – 16 bar (120 °C), 10 bar (140 °C)
Temperature range	0 – 140 °C
Sensor a-length	225 mm
Surface finish	R _a < 0.8 µm (N6)
ATEX approval	Conform to DIN EN 13463-1

Ordering Information**Retractable Housing: Retractex B (hygienic)****243240 Retractex B (pneumatic)****243275 Retractex B M (manual)**

Code	Material (wetted parts)
1	Stainless Steel 1.4404 (material certificate included)
0	special
Code	Sealing Material (wetted sealings)
1	EPDM/FDA USP class VI (elastomer certificate included)
2	FPM
0	special
Code	Sensor
1	225 mm PG 13.5 Gel-filled
0	special
Code	Process Connection
1	Ingold (G 1¼") o-Ring Position 28 mm
2	Varivent N DN 40-125
3	TriClamp 1,5" (OD Ø 50,5 mm)
4	TriClamp 2" (OD Ø 64 mm)
5	NEUMO BioControl 50
6	DIN 11851 DN50
7	HyCIP for Ingold (G 1¼") o-Ring Position 25 mm
8	HyCIP for Ingold (G 1¼") o-Ring Position 50 mm
9	HyCIP for Ingold (G 1¼") o-Ring Position 55 mm
0	special
Code	Cleaning Connection
1	G 1/8" thread female
2	G 1/4" thread female
3	1/4" NPT female
4	TriClamp 3/4"
9	TriClamp 3/4" Ø10.3 Sartorius
0	special
Code	Position switch
1	pneumatic / without for manual
0	special
P/N	← Ordercode

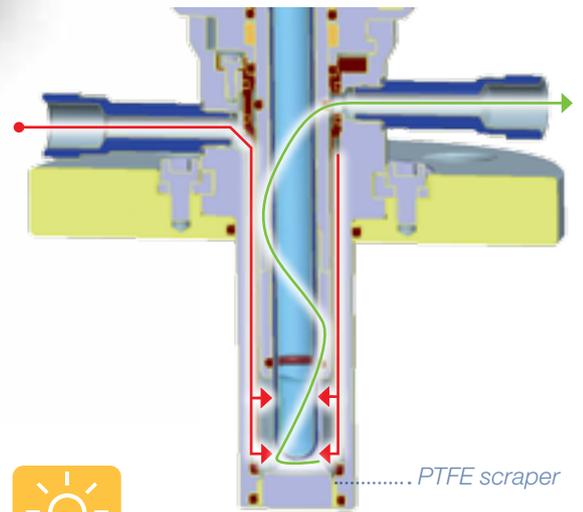
Retractable C Steel



The retractable pneumatic or manual housing Retractable C was 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 leads to excellent reliability – day and night, all year long. 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.) for best human safety. It is available with various process connections that can be used with all vessels used in this branch.

Cleaning of the Retractable C?

In cleaning position, the sensor can be cleaned while the process is running. The advantage of the insertion tube is the short way for insertion. A PTFE scraper with o-ring guarantees that dirt stays outside of the armature and does not harm the o-ring.



“ Did you know... that the pneumatic Retractable can be connected to the RetractoControl for even more comfortable handling? ”

Benefits

- ▶ Extremely compact design
- ▶ Integrated safety concept- no sensor – no insertion
- ▶ Very low maintenance
- ▶ Easy installation of the pneumatic armature with color coded connectors



Specifications

Wetted Parts	Stainless Steel 1.4404 or 2.4602
O-ring Material	EPDM (FDA approved) or FPM or FFPM
Pressure range	0 – 16 bar (120 °C), 10 bar (140 °C)
Temperature range	0 – 140 °C
Sensor a-length	225 mm
Surface finish	R _a < 0.8 μm (N6)
ATEX approval	Conform to DIN EN 13463-1

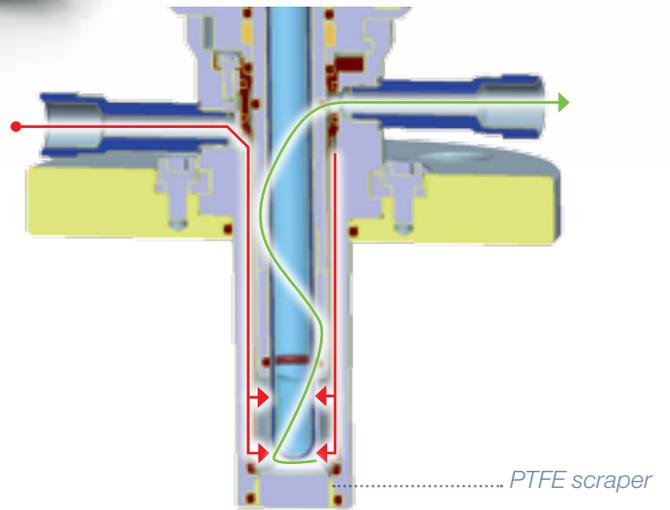
Ordering Information**Retractex C Steel**

243200	Retractex C Steel (pneumatic)				
243255	Retractex C Steel M (manual)				
	Code	Material (wetted parts)			
	1	Stainless Steel 1.4404 (material certificate included)			
	2	Stainless Steel 2.4602 (material certificate included)			
	0	special			
		Code	Sealing Material (wetted sealings)		
		1	EPDM / USP class VI (elastomer certificate included)		
		2	FPM		
		3	FFPM		
		0	special		
		Code	Sensor		
		1	225 mm PG 13.5 Gel-filled		
		0	special		
		Code	Process Connection		
		1	Flange DN32 PN16		
		2	Flange DN40 PN16		
		3	Flange DN50 PN16		
		4	Flange ANSI 1¼" 150lbs		
		5	Flange ANSI 1½" 150lbs		
		6	Flange ANSI 2" 150lbs		
		7	NPT M 1¼"		
		8	Tri Clamp 2"		
		0	special		
		Code	Cleaning Connection		
		1	G 1/8" thread female		
		2	G 1/4" thread female		
		3	1/4" NPT female		
		0	special		
		Code	Position switch		
		1	pneumatic / without for manual		
		0	special		
P/N					← Ordercode

Retractable C Plastic



The retractable pneumatic or manual housing Retractable C was 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 leads to excellent reliability – day and night, all year long. 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.) for best human safety. It is available with various process connections that can be used with all vessels used in this branch.



Cleaning of the Retractable C?

In cleaning position, the sensor can be cleaned while the process is running. The advantage of the insertion tube is the short way for insertion. A PTFE scraper with o-ring guarantees that dirt stays outside of the armature and does not harm the o-ring.

Benefits

- ▶ Extremely compact design
- ▶ Integrated safety concept- no sensor – no insertion
- ▶ Very low maintenance
- ▶ Easy installation of the pneumatic armature with color coded connectors
- ▶ Choice of 3 different plastics



Specifications

Wetted Parts	PVDF or PEEK or PP
O-ring Material	EPDM (FDA approved), FPM or FFPM
Pressure range	0 – 16 bar (120 °C), 10 bar (140 °C)
Temperature range	0 – 140 °C
Sensor a-length	225 mm
Surface finish	$R_a < 0.8 \mu\text{m}$ (N6)
ATEX approval	Conform to DIN EN 13463-1

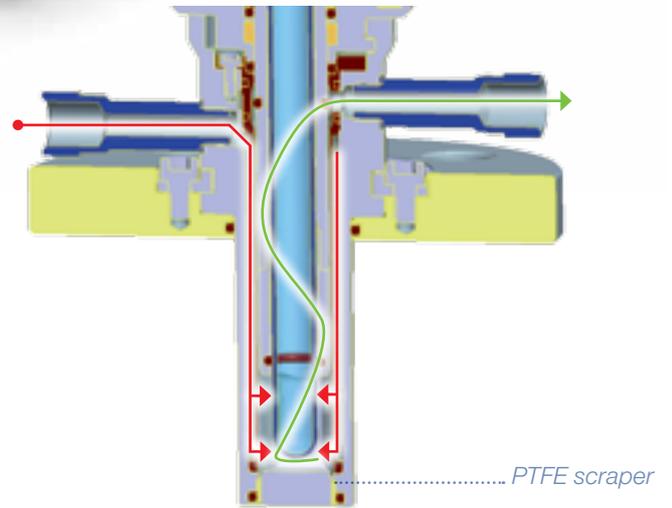
Ordering Information**Retractable Housing: Retractex C Plastic**

243220	Retractex C Plastic (pneumatic)					
243265	Retractex C Plastic M (manual)					
	Code	Material (wetted parts)				
	1	PP				
	2	PVDF / Stainless Steel 2.4602				
	3	PEEK (FDA approval certificate included)				
	0	special				
	Code	Sealing Material (wetted sealings)				
	1	EPDM / FDA USP class VI (elastomer certificate included)				
	2	FPM				
	3	FFPM				
	0	special				
	Code	Sensor				
	1	225 mm PG 13.5 Gel-filled				
	0	special				
	Code	Process Connection				
	1	Flange DN50				
	2	Flange ANSI 2"				
	3	NPT M 1/4"				
	0	special				
	Code	Cleaning Connection				
	1	G 1/8" thread female				
	2	G 1/4" thread female				
	3	1/4" NPT female				
	0	special				
	Code	Position switch				
	1	pneumatic / without for manual				
	0	special				
P/N						← Ordercode

Retractable C Steel LT



The retractable pneumatic or manual housing Retractable C was designed for applications in the chemical industry. The compact design with a stroke of only 36 mm with an insertion depth up to 207 mm keeps wear on seals to a minimum and leads to excellent reliability – day and night, all year long. 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.) for best human safety. It is available with various process connections that can be used with all vessels used in this branch.



Cleaning of the Retractable C?

In cleaning position, the sensor can be cleaned while the process is running. The advantage of the insertion tube is the short way for insertion. A PTFE scraper with o-ring guarantees that dirt stays outside of the armature and does not harm the o-ring.

Benefits

- ▶ Extremely compact design (only 36 mm travel of insertion tube with an insertion depth of 207 mm)
- ▶ Integrated safety concept- no sensor – no insertion
- ▶ Very low maintenance
- ▶ Easy installation of the pneumatic armature with color coded connectors

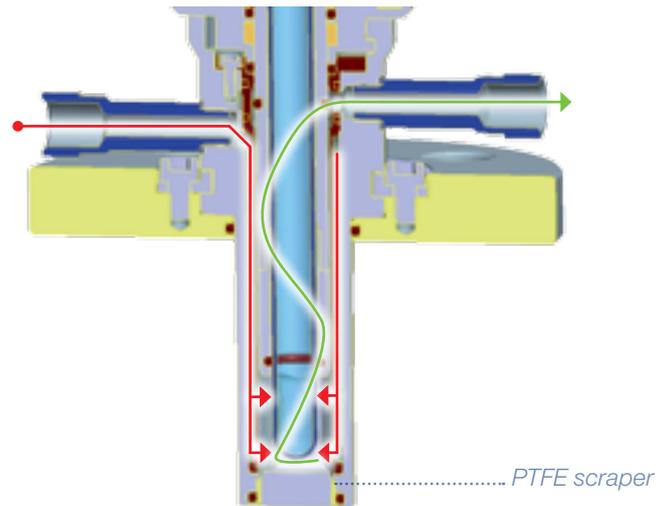


Retractable C

Plastic LT



The retractable pneumatic or manual housing Retractable C was designed for applications in the chemical industry. The compact design with a stroke of only 36 mm with an insertion depth up to 207 mm keeps wear on seals to a minimum and leads to excellent reliability - day and night, all year long. 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.) for best human safety. It is available with various process connections that can be used with all vessels used in this branch.



Cleaning of the Retractable C?

In cleaning position, the sensor can be cleaned while the process is running. The advantage of the insertion tube is the short way for insertion. A PTFE scraper with o-ring guarantees that dirt stays outside of the armature and does not harm the o-ring.

Benefits

- ▶ Extremely compact design (only 36 mm travel of insertion tube with an insertion depth of 207 mm)
- ▶ Integrated safety concept- no sensor – no insertion
- ▶ Very low maintenance
- ▶ Easy installation of the pneumatic armature with color coded connectors



Specifications

Wetted Parts	PVDF or PEEK
O-ring Material	EPDM (FDA approved) or FPM or FFPM
Pressure range	0 – 16 bar (120 °C), 10 bar (140 °C)
Temperature range	0 – 140 °C
Sensor a-length	325 mm
Surface finish	$R_a < 0.8 \mu\text{m}$ (N6)
ATEX approval	Conform to DIN EN 13463-1

Ordering Information**Retractable Housing: Retractex C Plastic LT****243230 Retractex C Plastic LT (pneumatic)****243270 Retractex C Plastic LT M (manual)**

Code	Material (wetted parts)
1	PVDF / Stainless Steel 2.4602
2	PEEK (FDA approval certificate included)
0	special
Code	Sealing Material (wetted sealings)
1	EPDM / FDA USP class VI (elastomer certificate included)
2	FPM
3	FFPM
0	special
Code	Sensor
1	325mm PG 13.5 Gel-filled
0	special
Code	Process Connection
1	Flange DN50
2	Flange ANSI 2"
0	special
Code	Cleaning Connection
1	G 1/8" thread female
2	G 1/4" thread female
0	special
Code	Position switch
1	pneumatic / without for manual
0	special
P/N	← Ordercode

MasterFit



The MasterFit is a housing for pressurizable pH sensors like the ChemoTrode types. The pressurization ensures a constant outflow of electrolyte. This helps to prevent clogging of the diaphragm and poisoning of the electrolyte. The MasterFit can be used in a huge variety of applications mainly in the chemical industry.

The pressure inside the MasterFit can be controlled via a built-in manometer. Furthermore the liquid level of the electrode can be controlled through the coated glass body of the armature at any time.

Benefits

- ▶ Sealing feature prevents loss of pressure caused by soiling
- ▶ Pressure reduction on disassembly
- ▶ Various o-ring positions available
- ▶ Easy maintenance

Ordering Information

Type	Process Connection	P/N
MasterFit 120	G 1/4	237200-OP
MasterFit 150	G 1/4	237225-OP
MasterFit 200	G 1/4	237235-OP



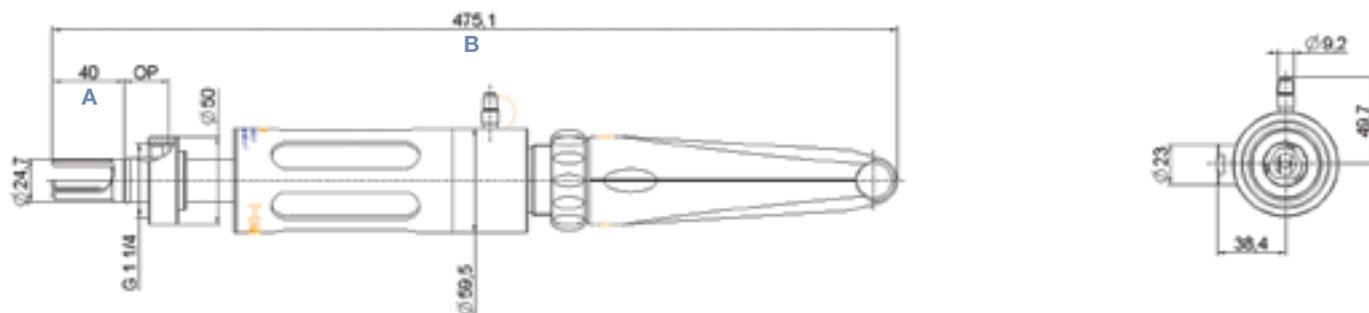


Specifications

Wetted Parts	Stainless Steel 1.4435
O-ring Material	EPDM (FDA approved)
O-ring position	22 mm – 55 mm
Pressure range	0 – 6 bar
Temperature range	-10 – 130 °C
Sensor a-length	120, 150, 200 mm
Surface finish	$R_a < 0.8 \mu\text{m}$ (N6)
ATEX approval	CE 0035 II 1/2 G Ex ia IIC T4/T5/T6

Dimensional drawings / MasterFit 120

all dimensions in mm



Type	A (armature insertion depth)	B (total length)
MasterFit 120	40 mm	475 mm
MasterFit 150	70 mm	505 mm
MasterFit 200	120 mm	555 mm

Accessories



- **Pressure Adapter** P/N 237252
- **Service Kit for MasterFit** P/N 237229
- **FFPM Kit for MasterFit** P/N 237319

- **Flange Adapter for MasterFit*** P/N 237810

Safety Socket see page [122](#)

* The Flange Adapter is used with a MasterFit 120 and a sensor with a shaft length of 150 mm

RetractoMaster



The RetractoMaster is a retractable housing for pressurizable sensors like the ChemoTrode. The pressurization ensures a constant outflow of electrolyte. This helps to prevent clogging of the diaphragm and poisoning of the electrolyte. It allows to mount and dismount the sensors while the process is running. The pressure inside the RetrctoMaster can be controlled via a built-in manometer. Only one press on the red button is needed to move the sensor into or out of the process. Safe sensor handling during process is guaranteed because insertion without sensor is impossible so is removal in measuring position. O-rings can easily be replaced without special tools. Furthermore the liquid level of the electrode can be controlled through the coated glass body of the armature at any time. The RetractoMaster can be used in a huge variety of applications mainly in the chemical industry.

Benefits

- ▶ Sensor can be withdrawn from the process for cleaning, calibration or replacement
- ▶ Easy maintenance
- ▶ Long life time of the sensor due to pressurization of the sensor and the possibility to remove it while the process is running.
- ▶ 3.1 certificate included

Ordering Information

Type	Process Connection	P/N
RetractoMaster	G 1/4	237250



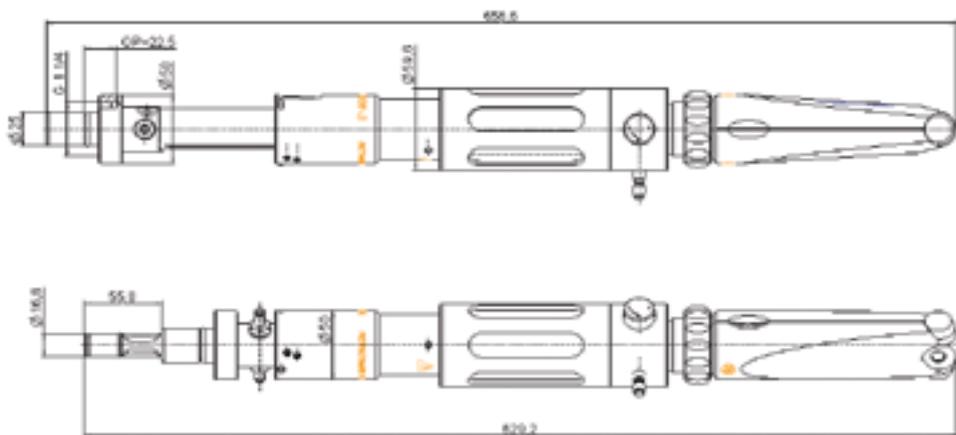
Specifications

Wetted Parts	Stainless Steel 1.4571
O-ring Material	FPM
O-ring position	22.5 mm
Pressure range	0 – 6 bar
Temperature range	-10 – 130 °C
Sensor a-length	250 mm
Surface finish	$R_a < 0.4 \mu\text{m}$ (N5)
ATEX approval	Conform to DIN EN 13463-1

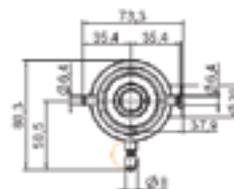
Dimensional drawings

all dimensions in mm

Maintenance position



Measuring position



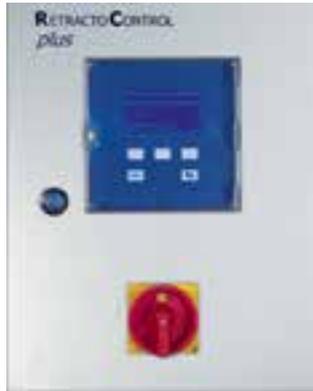
Accessories



• **Pressure Adapter** P/N 237252

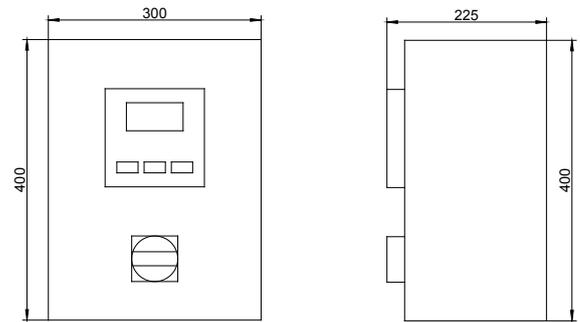
Safety Socket see page 122

RetractoControl Plus



Dimensional drawings

all dimensions in mm

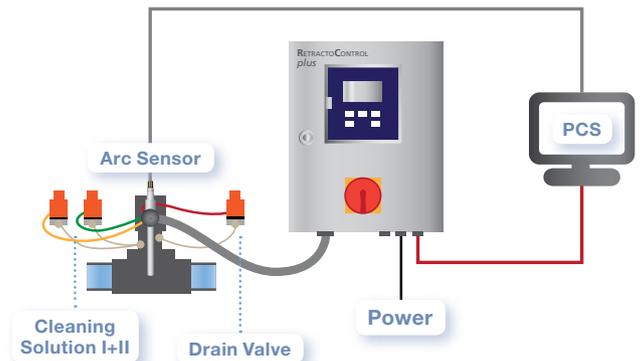


The RetractoControl is a control unit for a pneumatical Retractex in order to clean a sensor automatically. The full power of the automatic cleaning system can be achieved with an Arc sensor because it can be built-in pre-calibrated. Analog sensors in combination with a transmitter can be used as well. The measurement and cleaning cycles can be programmed very easily according to the needs of the process. Thanks to automatically controlled cleanings the life time of the sensor can be extended and manpower can be saved.

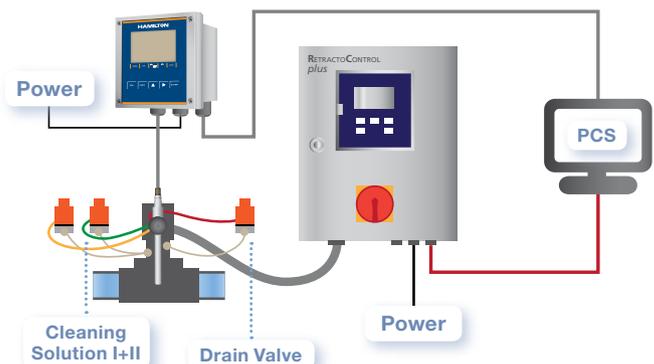
Benefits

- ▶ Scheduled and unattended maintenance
- ▶ Easy interaction with process control system
- ▶ Menu based user interaction
- ▶ Manpower can be saved

Connection Plan with Arc Sensor



Connection Plan with Analog Sensor



Specifications

Ingress Protection Rating	IP 54
Power	24V DC 30 VA
Air Pressure	4 – 6 bar

Ordering Information**Automatic Control Unit for Retractable**

242216	RetractoControl Plus			
	Code	Housing		
	1	Plastic housing		
	2	Stainless Steel housing		
	3	special		
		Code	Cleaning	
		1	for one cleaning solution with drain port	
		2	for two cleaning solutions with drain port	
		3	special	
		Code	Connecting hose	
		1	without	
		2	3 m length	
		3	5 m length	
		4	10 m length	
		5	special	
			Code	Fastener
			1	without
		2	Fastening angle Retractex	
		3	special	
242216			← Ordercode	

Accessories



- **Wall Mounting Set (for plastic housing)** P/N 242214
- **Wall Mounting Set (for stainless steel housing)** P/N 242212
- **Post Mounting Set (for plastic and stainless steel housing)** P/N 242213
- **Cleaning valve set PVDF/FPM with 2 membrane-valves for one cleaning solution and one drain; connectors, PTFE-tubing and mounting brackets included** P/N 242210
- **Cleaning valve set PVDF/FPM with 3 membrane-valves for two cleaning solution and one drain; connectors, PTFE-tubing and mounting brackets included** P/N 242211

Safety Socket



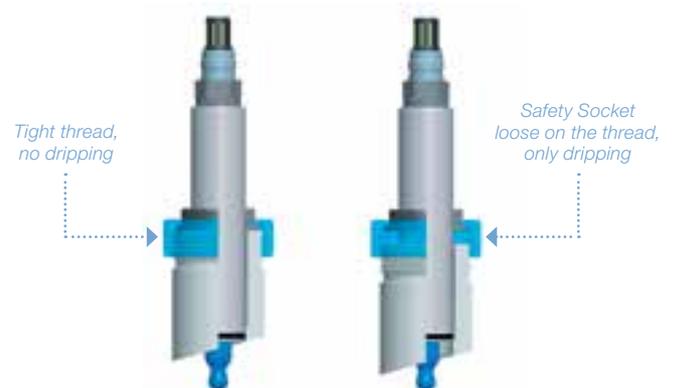
The Safety Sockets are hygienic weld-in sockets adequate for hygienic armatures like the FlexiFit Bio. They are available for 3 different o-ring positions to cover different standards. Furthermore you can choose between two kinds of stainless steels and two different angles.

The Safety Socket narrows at the o-ring positions and it seals only if the o-ring of the armature is exactly at the right place. If the process is under pressure, dripping process medium can be a strong hint that the armature should not be loosened entirely. Therefore the Safety Socket is suited for a wide variety of applications and installations.

Benefits

- ▶ Safety design, leakage before total release of the armature
- ▶ Hygienic surface finish
- ▶ 3 different o-ring positions and two different stainless steels available

O-ring sealing position



USP
Class VI

FDA

CE



Specifications

Wetted Parts	Stainless Steel 1.4435, 1.4404 or 1.4571
O-ring material for Blind Plug	EPDM (FDA approved)
Pressure range	0 – 50 bar
Temperature range	-30 – 160 °C
Process connection	G 1¼
Surface finish	R _a < 0.4 µm (N5 electropolished)
ATEX approval	Conform to DIN EN 13463-1

Ordering Information

Type	Steel	Angle	OP	P/N
Safety Socket	1.4404	15	25	242570
Safety Socket	1.4404	15	50	242571
Safety Socket	1.4404	15	55	242572
Safety Socket	1.4404	0	25	242573
Safety Socket	1.4404	0	50	242574
Safety Socket	1.4404	0	55	242575
Safety Socket	1.4435	15	25	242576
Safety Socket	1.4435	15	50	242577
Safety Socket	1.4435	15	55	242578
Safety Socket	1.4435	0	25	242579
Safety Socket	1.4435	0	50	242580
Safety Socket	1.4435	0	55	242581
Weld in socket without safety feature	1.4571	15	25	237202

Dimensional drawings

all dimensions in mm



Accessories



- **Blind plug 1.4404-25** P/N 242560
- **Blind plug 1.4404-50** P/N 242562
- **Blind plug 1.4404-55** P/N 242564
- **Blind plug 1.4435-25** P/N 242565
- **Blind plug 1.4435-50** P/N 242567
- **Blind plug 1.4435-55** P/N 242569
- **Blind Plug 1.4571-25** P/N 237230

Hygienic Socket



The Hygienic Socket with its space saving design and simple sterilization is ideal for weld-in to fermenters or small pipes. The advantages are also numerous for many other applications in tanks or pipes for water treatment and in the pharmaceutical and chemical industries.

It is designed for 120 mm sensors and developed to ease installation and maintenance, improve cleanability and increase human safety. Two “Live Guard” openings provide indication of sealing failures. The sensor insertion depth can be varied for DO sensors by using the Hamilton DO Adapter.

Benefits

- ▶ Hygienic design because complete sensor installation with only one wetted o-ring
- ▶ Space saving
- ▶ Cost saving: Socket and Housing all in one
- ▶ Low maintenance and easy replacement of o-ring

Example for Installation



USP
Class VI

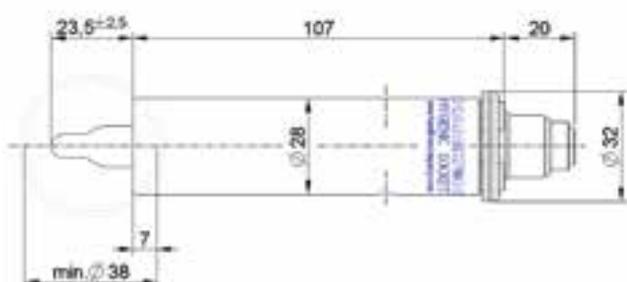


Specifications

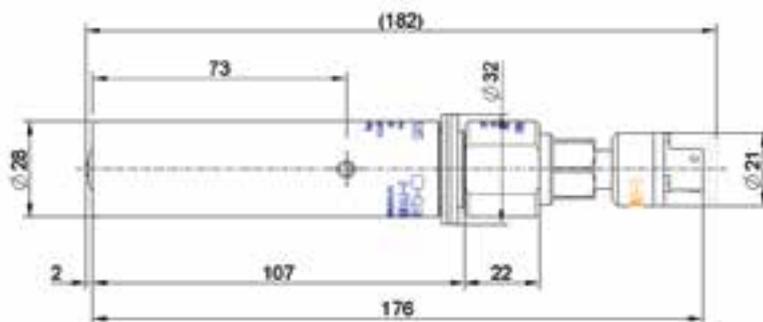
Wetted Parts	Stainless Steel 1.4435 or 1.4404 or 1.4571 or 2.4602
O-ring Material	EPDM (FDA approved)
Pressure range	0 – 16 bar
Temperature range	-10 – 140 °C
Sensor thread	PG 13.5
Sensor a-length	120 mm
Surface finish	$R_a < 0.4 \mu\text{m}$ (N5 electropolished)
ATEX approval	Conform to DIN EN 13463-1

Dimensional drawings

all dimensions in mm



Hygienic socket with
a pH sensor



Hygienic socket with DO adapter
and oxygen sensor

Ordering Information

Type	P/N
Hygienic Socket 1.4404	242535
Hygienic Socket 1.4435	242545
Hygienic Socket 1.4571	242548
Hygienic Socket 2.4602	242550

Accessories



- **Hygienic Socket DO Adapter** P/N 242538
- **Replacment Kit Seal Pusher** P/N 242532
- **O-ring set EPDM** P/N 242595

- **O-ring set FPM** P/N 242596
- **O-ring set Silicone** P/N 242597
- **O-ring set FFPM** P/N 242598

Ordering Information

Flow Cell				
242585	Code Measuring position			
	1	only pH		
	2	only Conductivity or Oxygen		
	3	pH and Conductivity or Oxygen		
	4	Conductivity and Oxygen		
	0	special		
	↓	Code Pipe Connection		
		1	¼" TC25	
		2	⅜" TC25	
		3	½" TC25	
		4	Swagelok 6 mm	
		5	Swagelok 10 mm *)	
		6	Swagelok ¼"	
		7	Swagelok ⅜" *)	
↓	Code o-ring material			
	1	EPDM		
	2	FFPM (two measuring positions)		
	3	FFPM (one measuring position)		
0	special			
242585 -			← Ordercode	

Flow Cell				
242590	Code Measuring position			
	1	only pH		
	2	only Conductivity or Oxygen		
	3	pH and Conductivity or Oxygen		
	4	Conductivity and Oxygen		
	0	special		
	↓	Code Pipe Connection		
		1	¾" TC50	
		2	1" TC50	
		3	1.5" TC50 *)	
	0	special		
	↓	Code o-ring material		
		1	EPDM	
		2	FFPM (two measuring positions)	
3		FFPM (one measuring position)		
0	special			
242590 -			← Ordercode	

*) not self draining

Accessories



- O-ring kit Flow Cell T25 P/N 237387
- O-ring kit Flow Cell T50 P/N 237390

FlexiFlow SL 10



The FlexiFlow is a flow-through cell. It can be used in all cases where pH or oxygen must be reliably measured in ion-weak media including coolant piping in power generating stations.

The sample is fed into the cell from the bottom at a low flow speed, and out of the cell again at the side. A groove cut into the FlexiFlow allows to be attached anywhere with commercially available screws, for example to a plate.

Benefits

- ▶ Compact design
- ▶ Easy to attach to a plate
- ▶ For use in small pipes where sensors cannot be inserted directly
- ▶ Self draining

USP
Class VI

FDA

CE

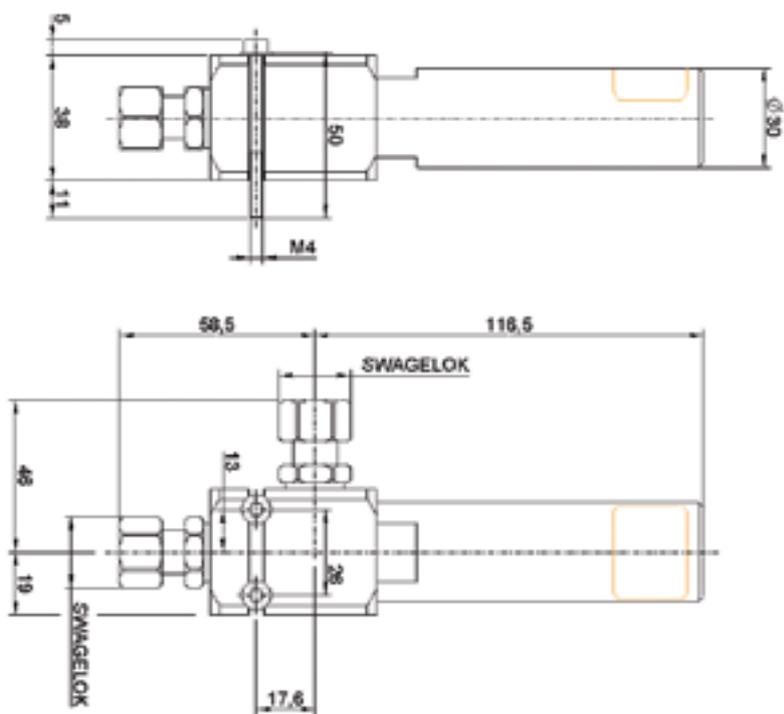


Specifications

Wetted Parts	Stainless Steel 1.4435
O-ring material	EPDM (FDA approved)
Pressure range	0 – 16 bar
Temperature range	-10 – 130 °C
Sensor thread	PG 13.5
Sensor a-length	120 mm
Process connection	Swagelok 10 mm
ATEX approval	Conform to DIN EN 13463-1

Dimensional drawings

all dimensions in mm



Ordering Information

Type	P/N
FlexiFlow SL 10	237340

Alphabetical Index

2-pole conductivity sensor	63, 65	EasyFerm Plus ORP	46
3 M KCl	87	Electrochemical oxygen sensor	70, 72, 74, 76
4-pole conductivity sensor	59, 61	Electrolyte	87
<hr/>			
A	AMP plug	88	F
	Arc	8, 9, 11, 15, 17, 19, 21, 45, 47, 59, 63, 69, 71, 73, 75	FDA Service Kit
	Arc Accessories	88	FermoTrode
	Arc Sensor Cable M8	90	FFPM Kit MasterFit
	Arc View Dock	90	FFPM Kit RetractoFit
	Arc View Handheld	90	Fix Cable
	Arc View H-Package	90	35, 61, 65, 77
	Arc Wi 2G Adapter	89	Flange Adapter MasterFit
	Arc Wi Sensor Adapter	89	117
	Arc Wireless Converter Modbus	89	FlexiFit
	Autoclavation Cap OxyFerm	86	100
			FlexiFit Bio
			100, 101
			FlexiFit T G 150-33
			100
			FlexiFit U Bio
			100
			FlexiFit VV-0
			100
			FlexiFit VV-15
			100
			FlexiFlow SL 10
			128, 129
			Flow Cell
			126, 127
			Foodlyte
			4, 18
<hr/>			
B	Beverly	2, 7, 78	H
	BINDER plug	88	H100 Cond
	BioConnect (BC)	58	94
	BioControl	107	H100 DO
	Blind plug	123	95
	BNC plug	84, 88	H100 pH
			93
			H200X pH
			96, 97
			Hamilton Customized Products
			91
			Housings
			99
			HyCIP
			106, 107
			Hygienic Socket
			124, 125
<hr/>			
C	Cables	84	I
	ChemoTrode	28, 116, 118	InchTrode
	ChemoTrode Bridge	28	34
	ChemoTrode ORP	48	Insertion tube short
	Clark cell	67	103
	ClaryTrode	26	IonoTrode
	Cleaning solution set	87	32
	Cleaning valve set PVDF/FPM 2 valve	121	
	Cleaning valve set PVDF/FPM 3 valve	121	
	Conducell 2DC-PG	64	
	Conducell 4US	60	
	Conducell 4USF	58	
	Conducell 4UxF	58	
	Conducell PWSE	62	
	Conductivity	57	
	Conductivity pathfinder	57	
	Conductivity Standards	6, 82, 83	
	Customized Products	91	
<hr/>			
D	DIN plug	84	K
	DO	67	K8
	DO Adapter	124, 125	17, 19, 84
	DO pathfinder	67	
	DuraCal pH buffers	6, 80, 81	
<hr/>			
E	EasyControl	40	L
	EasyControl ORP	54	Lemo plug
	EasyFerm Bio	18	85, 88
	EasyFerm Plus	16	Liq-Glass PG
			40
			Liquid Earth
			16
<hr/>			
			M
			MasterFit
			116, 117
			MasterFit 120
			116, 117
			MasterFit 150
			116, 117
			MasterFit 200
			116, 117
			MecoTrode
			36
			Membrane Kit CIP
			86
			Membrane Kit FDA
			86
			Memosens (MS)
			15, 17
<hr/>			
			O
			Optical oxygen sensor
			68
			O-ring Kit Flow Cell T25
			127
			O-ring Kit Flow Cell T50
			127
			O-ring set EPDM
			125



O-ring set FFPM	125		
O-ring set FPM	125		
O-ring set Silicone	125		
ORP	43		
ORP buffers	81		
OxyFerm	70, 85, 86		
OxyFerm FDA	70, 86		
OxyFerm Membrane Kit	86		
Oxygen Accessories	86		
OxyGold B	72, 86, 87		
OxyGold G	72, 86, 87		
OxyGold Membrane Kit	86		
Oxylyte	87		
Oxylyte B	87		
Oxylyte G	87		
Oxysens	76		
OxyTrode Pt	50		
<hr/>			
P Panel-mount Kit	93, 94, 95, 97		
pH buffers	81		
pH glasses	4		
pH pathfinder	13		
pHeasy	20		
Phermlyte	17, 47		
Pipe-mount Kit	93, 94, 95, 97		
Polarization Module	86		
Polarization Module B	86		
Polarization Module G	86		
Polarization Module T	86		
Policlave	24		
Polilyte HT	22		
Polilyte Plus	5, 14		
Polilyte Plus ORP	44		
Polilyte Plus XP	14		
Polilyte Pro	38		
Polilyte RX	52		
Polisolve	21, 23, 25, 27, 35, 39, 53		
Polisolve Plus	5, 14, 45		
Polyplast Pro	38		
Polyplast Pro RX	52		
Post Mounting Set	121		
Pressure Adapter	117, 119		
Protective Hood	93, 94, 95, 97		
Protelyte	87		
PTFE scraper	108, 110, 112, 114		
<hr/>			
R Replacement Cathode OxyFerm	86		
Replacement Cathode OxyGold B	86		
Replacement Cathode OxyGold G	86		
Replacement Kit Seal Pusher	125		
Retractex	106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 120		
Retractex B	106, 107		
Retractex B (pneumatic)	107		
Retractex B M (manual)	107		
Retractex C	108, 109, 110, 111, 112, 113, 114, 115		
Retractex C Plastic	110, 111, 114, 115		
Retractex C Plastic (pneumatic)	111		
Retractex C Plastic LT (pneumatic)	115		
Retractex C Plastic LT M (manual)	115		
Retractex C Plastic M (manual)	111		
Retractex C Steel	108, 109, 112, 113		
Retractex C Steel (pneumatic)	109		
Retractex C Steel LT	112, 113		
Retractex C Steel LT (pneumatic)	113		
Retractex C Steel LT M (manual)	113		
Retractex C Steel M (manual)	109		
RetractoControl Plus	120, 121		
RetractoFit	102, 103		
RetractoFit Bio	104, 105		
RetractoFit Bio 25	104		
RetractoFit Bio 55	104		
RetractoFit PEEK 25	102		
RetractoFit PEEK 38.5	102		
RetractoMaster	106		
<hr/>			
S S7	29, 31, 33, 49, 84		
S8	15, 17, 19, 23, 25, 27, 37, 39, 41, 51, 53, 55		
Safety Socket	122, 123		
Sensor Cable M12	88		
Sensor power cable	88		
Service Kit FFPM	101		
Service Kit FlexiFit Bio	101		
Service Kit MasterFit	117		
Service Kit RetractoFit	103		
Single Pore	5, 14, 20, 22, 24, 26, 34, 38, 44, 54		
Skylyte	29, 31, 87		
Storage solution	87		
System Installations	10, 11		
<hr/>			
T T82/D4	71, 85		
Transmitter	92, 93, 94, 95, 96, 97		
Triclamp (TC)	60, 62, 100, 107, 126, 127		
<hr/>			
V Varivent (VV)	58, 100, 107		
VisiFerm DO	7, 68, 85		
VisiFerm DO B	68, 78		
VP 6	15, 17, 19, 23, 25, 27, 29, 25, 37, 39, 59, 71, 73, 75, 85		
VP 8	69, 85, 89		
<hr/>			
W Wall Mounting Set (plastic housing)	121		
Wall Mounting Set (stainless steel housing)	121		
Weld-in socket	122		

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