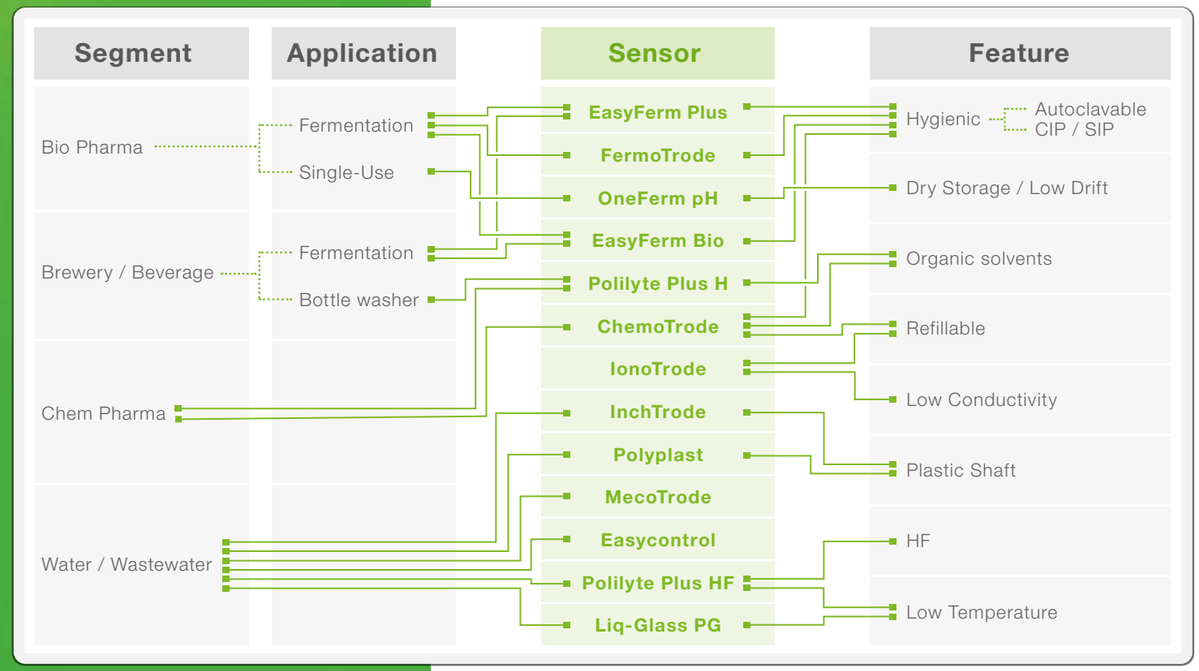
pH

pH measurements are important in many processes. There is almost no application 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.



Distribuito da: GEASS Srl
Via Ambrosini 8/2 - 10151 Torino
Tel: 0112291578 commerciale@geass.com

Polilyte Plus family

The outstanding success of the Polilyte Plus in chemical and wastewater applications gave the inspiration for transferring the good features to a whole family of sensors. The expanded portfolio widens the range of applications that can be covered.

All members have the same reference electrolyte Polisolve Plus, use the Single Pore technology but will have different pH glasses.

Benefits

- More applications with HB pH glass
- Better overview of the portfolio
- There's always at least one family member that suits the different applications
- Resistant against solvents, strong acids and bases

Typical applications

- Sugar industry
- Microelectronics
- Industrial wastewater
- Downstream processes
- Fermentation

How to choose the sensor	New sensor	pH glass	Electrolyte	Predecessor
HF in the media, low temperature	**Polilyte Plus HF**	HF	Polisolve Plus	ClaryTrode
Low conductivity	**Polilyte Plus H**	H	Polisolve Plus	Polilyte HT
CIP, SIP, autoclavations, chemical robustness	**Polilyte Plus PHI**	PHI	Polisolve Plus	Polyclave
CIP, SIP, autoclavations, fast response time	**Polilyte Plus HB**	HB	Polisolve Plus	
High pressure	**Polilyte Plus XP**	H	Polisolve Plus	Polilyte Plus XP

Specifications

Measuring range	0 to 14 pH
Process temperature	See table on page 160/161
Pressure range (relative to ambient)	See table on page 160/161
Hygienic aspects	Autoclavable: H, HB, PHI CIP: HB, PHI SIP: H, HB, PHI
pH glass	See table on page 18
Electrolyte	Polisolve Plus
Reference system	Everef-L
Diaphragm	Single Pore
O-ring	EPDM: HB, PHI FKM: H, HF

For more specifications see www.hamiltoncompany.com

Ordering Information

Polilyte Plus Family Structure

242428 **Basic number = Polilyte Plus VP 120 (old Ref)**

Code	pH glass
1	H
2	HB (not for MS)
3	HF
4	PHI

Code	Electrical Connector
1	VP
2	S8
3	Arc
4	Memosens

Code	a-length (mm)
1	120
2	225
3	325
4	360 (not for Arc, MS only with H glass)
5	425

Code	Temperature sensor
1	Pt100 (VP) (not applicable for Arc)
2	Pt1000 (VP) (not applicable for Arc)
3	none (S8) or given (Memosens, Arc)

242428 – ← **Order Code**

238811 **Polilyte Plus XP S8 120**

242415 **Polilyte Plus XP VP 120 Pt1000**

Accessories

pH buffers see page 100 **Cables** see page 108 **Housings** see page 126

EasyFerm Plus family

Specifications	
Measuring range	0 to 14 pH
Process temperature	0 to 140 °C (Arc: analog 0 to 110 °C, digital 0 to 140 °C)
Pressure range (relative to ambient)	0 to 6 bar
Hygienic aspects	Autoclavable, SIP, CIP
pH glass	HB, PHI
Electrolyte	Phermlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

The EasyFerm Plus family of pH sensors is designed to withstand demanding applications in the Pharmaceutical and Chemical industries. All family members have the same reference electrolyte Phermlyte, the same type of diaphragm HP Coatramic but different pH glasses. The standard EasyFerm Plus, with its PHI glass, is directed at the BioPharm and Pharmaceutical industries because the glass has an excellent chemical robustness and provides best results in applications where sterilization either in an autoclave or an SIP is performed frequently. The new versions with the HB glass show a very fast recovery after CIP and SIP cycles leading to a shortened set-up time.

The LEVP (LE = Liquid Earth) versions have a stabilized sensor signal and an extended sensor diagnosis.

“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

How to choose the sensor	New sensor	pH glass	Electrolyte	Predecessor
CIP, SIP, autoclavations, chemical robustness	**EasyFerm Plus PHI**	PHI	Phermlyte	EasyFerm Plus
CIP, SIP, autoclavations, fast response time	**EasyFerm Plus HB**	HB	Phermlyte	

Ordering Information

EasyFerm Plus Family Structure

238633

Code	pH glass
1	PHI (recommended pH glass type)
2	HB

Code	Electrical Connector
1	VP Ex
2	S8 Ex
3	Arc
4	Memosens Ex
5	K8 Ex
6	LEVP (only for 120 and 225 mm length) Ex

Code	a-length (mm)
1	120
2	160
3	200
4	225
5	325
6	360 (not for Arc and only PHI glass)
7	425
8	275

Code	Temperature sensor
1	Pt100 (VP, LEVP) (not applicable for Arc)
2	Pt1000 (VP, LEVP) (not applicable for Arc)
3	none (S8, K8) or given (Memosens, Arc)

238633 – ← Order Code

Accessories

pH buffers see page 100 **Cables** see page 108 **Housings** see page 126

EasyFerm Bio family

Specifications	
Measuring range	0 to 14 pH
Process temperature	0 to 140 °C (Arc: analog 0 to 110 °C, digital 0 to 140 °C)
Pressure range (relative to ambient)	0 to 6 bar
Hygienic aspects	Autoclavable, SIP, CIP
pH glass	HB, PHI
Electrolyte	Foodlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
O-ring	Silicone

For more specifications see www.hamiltoncompany.com

The EasyFerm Bio family of pH sensors is designed for applications in the Pharmaceutical, Biotechnology and Food & Beverage industries. All family members have the same reference electrolyte Foodlyte, with its certified bio-compatibility. The standard EasyFerm Bio, with its HB glass, is directed at the Food & Beverage industry where CIP and SIP cycles occur frequently because the glass shows a very fast recovery leading to a shortened set-up time. The new versions with the PHI glass show an excellent chemical robustness at high pH values.

The LEVP (LE = Liquid Earth) versions have a stabilized sensor signal and an extended sensor diagnosis.

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

Benefits

- Specifically designed for sterile applications in Pharma and Biotechnology (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
- Downstream processes
- Brewhouse
- Gelatine manufacturing

How to choose the sensor	New sensor	pH glass	Electrolyte	Predecessor
CIP, SIP, autoclavations, fast response time	**EasyFerm Bio HB**	HB	Foodlyte	EasyFerm Bio
CIP, SIP, autoclavations, chemical robustness	**EasyFerm Bio PHI**	PHI	Foodlyte	

Ordering Information

EasyFerm Bio Family Structure

243632

Code	pH glass
1	PHI
2	HB (recommended pH glass type)

Code	Electrical Connector
1	VP
2	S8
3	Arc
4	Memosens
5	K8
6	LEVP (only for 120 and 225 mm length)

Code	a-length (mm)
1	120
2	160
3	200
4	225
5	325
7	425

Code	Temperature sensor
1	Pt100 (VP, LEVP) (not applicable for Arc)
2	Pt1000 (VP, LEVP) (not applicable for Arc)
3	none (S8, K8) or given (Memosens, Arc)

243632 – ← **Order Code**

Accessories

pH buffers see page 100 **Cables** see page 108 **Housings** see page 126

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 25 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

Specifications

Measuring range	0 to 14 pH
Process temperature	0 to 130 °C
Pressure range (relative to ambient)	0 to 16 bar (25 °C) 0 to 6 bar (130 °C)
pH glass	MecoTrode: H MecoTrode HF: HF
Electrolyte	Viscous 3 M KCl-Pharma, blue
Reference system	Everef
Diaphragm	HP ceramic
Temperature sensor	Pt100 in VP version
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	S8	VP 6	MS	Arc
MecoTrode H	120	238801	238437	242837	10110152*
MecoTrode HF	120	–	–	242839	–
	225	–	–	242840	–

Not for explosive environments

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

OneFerm pH new

The OneFerm family of pH sensors is designed for applications in the single-use (SU) Pharmaceutical and Biotechnology Industries. Hamilton OneFerm sensors are the next step in the evolution of single-use measurement. Their design solves some of the issues that commonly occur with reusable pH sensors that are inserted into the bag.

Specifically, Hamilton's single-use sensors combine the reliability and measurement stability of our long-term proven conventional sensors with the ease of use as an integral part of the bioreactor. The sensors retain the high accuracy performance even after gamma irradiation and a sufficient shelf life making it the ideal single-use solution.

"Did you know… that with the reusable Arc Module SU pH a very stable digital signal can be achieved?"

Benefits

- Specially designed for sterile application in SU Pharma and Biotechnology
- Highly reliable measurements after gamma sterilization and dry storage even after short wet-in time (<30 min)
- Very low drift (<0.1 pH per week)
- Biocompatible materials (ISO 10993-5 and USP <87>)

Typical applications

- SU bioreactors (bag application)
- SU bioreactors (rigid containers)
- SU mixer
- SU downstream processes

Specifications	
Measuring range	3 to 10 pH
Process temperature	4 to 50 °C
Pressure range (relative to ambient)	0 to 1 bar
Hygienic aspects	Gamma irradiation up to 45 kGy (for the OneFerm sensors and the pH-port)
Diaphragm	HP Coatramic
O-ring	Silicone

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	VP 6 / Pt100	VP 6 / Pt1000	VP 6 / NTC22	K8
OneFerm pH*	70	243216	243266	243235	–
	120	243217	243267	243236	243271
	160	10064894	10108674	10065001	10106075
	225	243218	243268	243237	243272
	325	243219	243269	243238	243273
	425	10101065	10089592	243239	243274

*Only for OEM integration available

Arc Module SU pH
Ref 243233

pH Port
Ref 243462

Accessories

Cables see page 108

ChemoTrode / P
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 to 14 pH
Process temperature	0 to 130 °C
Pressure range (relative to ambient)	0 to 6 bar
Hygienic aspects	SIP, CIP
pH glass	PHI
Electrolyte	ChemoTrode: Viscous 3 M KCl-LR ChemoTrode Bridge: Skylyte ChemoTrode P: Protelyte
Reference system	ChemoTrode: Everef-F ChemoTrode Bridge: Everef-B ChemoTrode P: Everef-F
Diaphragm	ChemoTrode: HP ceramic ChemoTrode Bridge: Platinum ChemoTrode P: HP ceramic
Temperature sensor	Pt1000 in VP version

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	S7	VP 6 / Pt1000	VP 6 / Pt100
ChemoTrode	120	238760	242700	–
	150	238762	242701	–
	200	238764	–	–
	250	238766	242703	10069903
ChemoTrode P	120	238761	243252	–
	150	238763	243253	–
	250	238767	243254	–
ChemoTrode Bridge (Non Ex)	120	238770	–	–
	150	238772	–	–
	250	238776	–	–

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

FermoTrode

Specifications	
Measuring range	0 to 14 pH
Process temperature	0 to 130 °C
Pressure range (relative to ambient)	0 to 4 bar
Hygienic aspects	SIP
pH glass	PHI
Electrolyte	Skylyte
Reference system	Everef-F
Diaphragm	Coatramic

For more specifications see www.hamiltoncompany.com

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, and 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

Ordering Information

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

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

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 µS/cm?"

Benefits

- Offers highest accuracy over a long period of time
- Stable measurements in samples with low conductivity of at least 0.2 µS/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 to 14 pH
Process temperature	-10 to 40 °C
Pressure range (relative to ambient)	0 to 0.5 bar or higher if pressurization by side-arm
pH glass	F
Electrolyte	3 M KCl
Reference system	Everef
Diaphragm	Sleeve
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

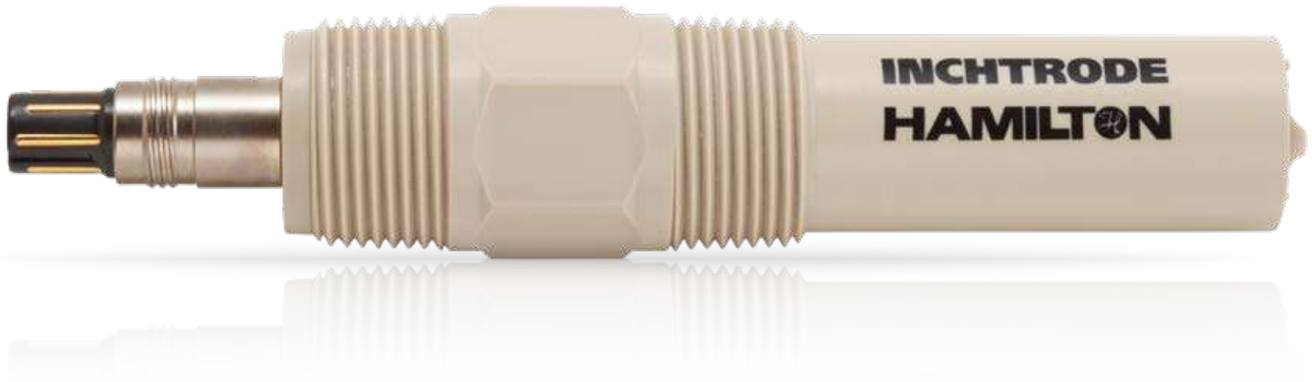
Ordering Information

	a-length	S7
IonoTrode	120	238525

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

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 the best and fast measuring results because of direct contact between the sample and the Polisolve 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 Polisolve 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 to 14 pH
Process temperature	-10 to 130 °C (flat membrane) 0 to 130 °C (cylindrical membrane)
Pressure range (relative to ambient)	0 to 10 bar (25 °C) 0 to 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

For more specifications see www.hamiltoncompany.com

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)	–

F = Flat membrane
P = Cylindrical membrane
C = Fix cable

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

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 Polisolve 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 Polisolve 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 to 14 pH
Process temperature	Polilyte Pro: -10 to 60 °C Polyplast Pro: -10 to 40 °C
Pressure range (relative to ambient)	0 to 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
O-ring	Polilyte Pro: EPDM Polyplast Pro: EPDM

For more specifications see www.hamiltoncompany.com

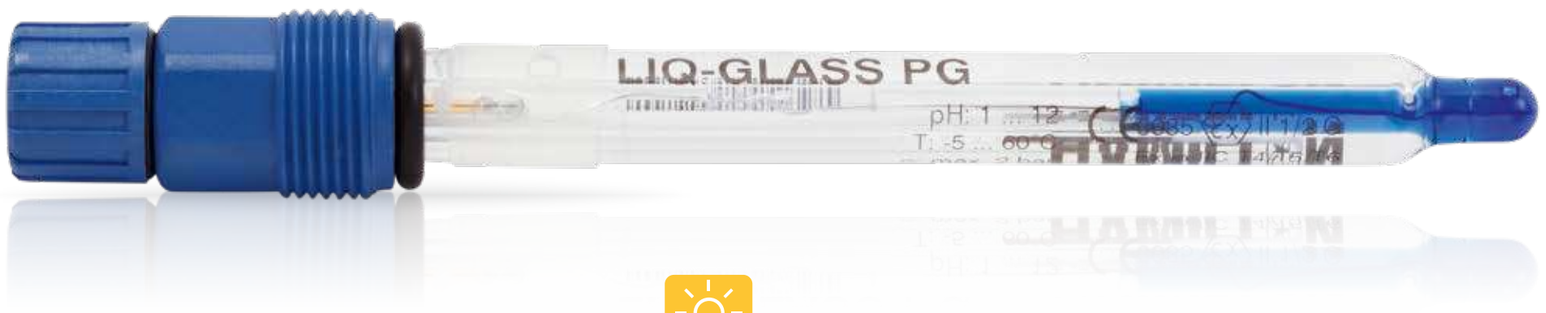
Ordering Information

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

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

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 behaviour in samples with low conductivity.

Specifications

Measuring range	Liq-Glass PG: 1 to 12 pH EasyControl: 0 to 14 pH
Process temperature	Liq-Glass PG: -5 to 60 °C EasyControl: 0 to 60 °C
Pressure range (relative to ambient)	0 to 2 bar
pH glass	Liq-Glass PG: F EasyControl: HF
Electrolyte	Liq-Glass PG: Viscous 3 M KCl-LR EasyControl: Gel electrolyte
Reference system	Liq-Glass PG: Everef EasyControl: Ag/AgCl
Diaphragm	Ceramic
O-ring	Liq-Glass: EPDM EasyControl: EPDM

For more specifications see www.hamiltoncompany.com

“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

Ordering Information

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

Accessories

pH buffers see page 100
Cables see page 108
Housings see page 126

ORP

ORP (Oxidation Reduction Potential) 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 frequently 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.

Pollilyte Plus ORP

The maintenance free Pollilyte Plus ORP sensors are designed to withstand demanding applications in chemical and petrochemical industries. Monitoring the ORP value is becoming increasingly important in many applications, especially harsh chemical environments or high alkaline wastewater. Because of its Single Pore diaphragms you will never have liquid junction problems and total breakdowns. The Pollilyte Plus ORP sensors demonstrate reliable reproducible measurement accuracy in highly alkaline solutions as well as in samples with low conductivity. Additionally, the Everef-L reference cartridge ensures a long lifetime.

Benefits

- 2 Single Pores prevent clogging and ensure reliable measurements
- Minimal diffusion potenital
- Highly reproducible measurements and 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	± 2000 mV (Arc: ± 1500 mV)
Process temperature	0 to 130 °C (Arc: analog 0 to 110 °C, digital 0 to 130 °C)
Pressure range (relative to ambient)	0 to 3 bar (140 °C) 0 to 10 bar (130 °C) 0 to 16 bar (100 °C)
Hygienic aspects	Autoclavable, CIP, SIP
ORP element	Pt wire
Electrolyte	Polisolve Plus
Reference system	Everef-L
Diaphragm	Single Pore
O-ring	FKM

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	S8	Arc	VP 6
Pollilyte Plus ORP	120	243185	243060	243648
	225	243186	243061	–
	325	10078139	243062	–
	425	10078140	243063	–

Accessories

ORP buffers see page 101
Cables see page 108
Arc Accessories see page 117
Housings see page 126

EasyFerm Plus ORP

Specifications	
Measuring range	± 2000 mV (Arc: ± 1500 mV)
Process temperature	0 to 140 °C (Arc: analog 0 to 110 °C, digital 0 to 140 °C)
Pressure range (relative to ambient)	0 to 6 bar
Hygienic aspects	Autoclavable, CIP, SIP
ORP element	Pt ring
Electrolyte	Phermlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

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.

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

Ordering Information

	a-length	S8	Arc
EasyFerm Plus ORP	120	243187	243050
	225	243188	243051
	325	–	243052
	425	–	243053

Accessories

ORP buffers see page 101
Cables see page 108
Arc Accessories see page 117
Housings see page 126

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 ORP 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.

Specifications

Measuring range	± 2000 mV
Process temperature	0 to 130 °C
Pressure range (relative to ambient)	0 to 6 bar
ORP element	Pt ring
Electrolyte	Viscous 3 M KCl-LR
Reference system	Everef-F
Diaphragm	HP Ceramic

For more specifications see www.hamiltoncompany.com

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

Ordering Information

	a-length	S7
ChemoTrode ORP	120	238740
	150	238742

Accessories

ORP buffers see page 101
Cables see page 108
Housings see page 126

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 potential in pipe mounting.

Specifications

Measuring range	± 2000 mV
Process temperature	0 to 130 °C
Pressure range (relative to ambient)	0 to 16 bar (25 °C) 0 to 6 bar (130 °C)
ORP element	Pt wire
Electrolyte	Viscous 3 M KCl-Pharma, blue
Reference system	Everef
Diaphragm	HP ceramic
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

“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

Ordering Information

	a-length	S8
OxyTrode	120	238810

Accessories

ORP buffers see page 101
Cables see page 108
Housings see page 126

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 Polisolve electrolyte – clogging is nearly impossible. The Polyplast Pro sensor comes with a robust plastic shaft and glass bulb protection, making it one of our most economical and longest lasting sensors.

Benefits

- Single Pore for direct sample contact with Polisolve 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
Process temperature	Polilyte Pro: -10 to 60 °C Polyplast Pro: -10 to 40 °C
Pressure range (relative to ambient)	0 to 6 bar
ORP element	Pt-wire
Electrolyte	Polisolve
Reference system	Polilyte Pro: Everef-B Polyplast Pro: Ag/AgCl
Diaphragm	Single Pore
O-ring	Polilyte RX: EPDM Polyplast Pro RX: EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

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

Accessories

ORP buffers see page 101
Cables see page 108
Housings see page 126

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, with respectively low conductivity.

Specifications

Measuring range	± 2000 mV
Process temperature	0 to 60 °C
Pressure range (relative to ambient)	0 to 2 bar
ORP element	Pt-wire
Electrolyte	Gel electrolyte
Reference system	Ag/AgCl
Diaphragm	Ceramic
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Benefits

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

Typical applications

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

Ordering Information

	a-length	S8
EasyControl ORP	120	238523

Accessories

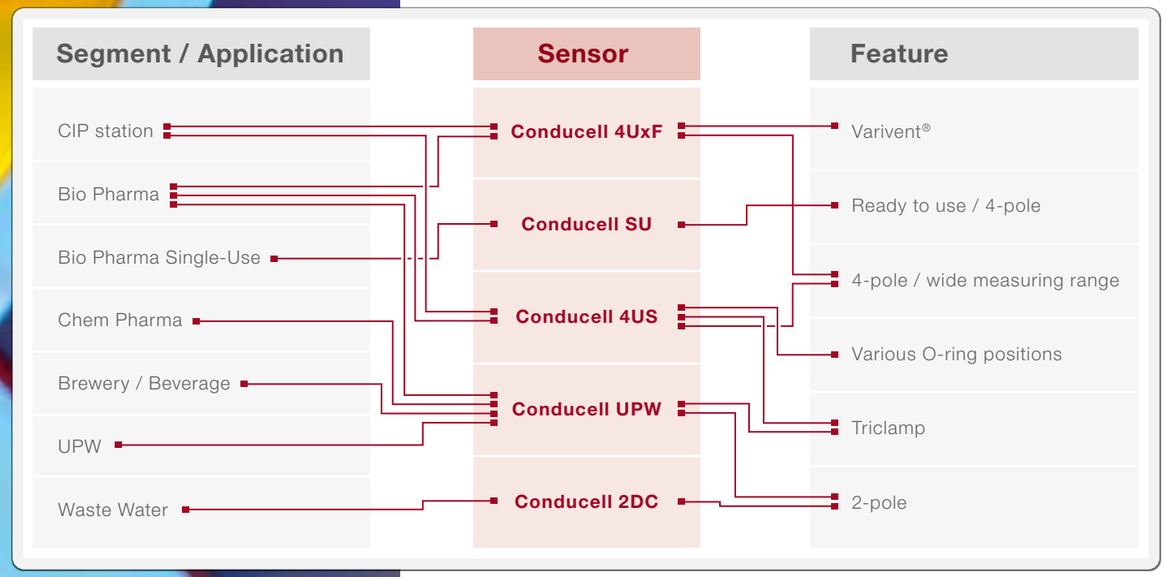
ORP buffers see page 101
Cables see page 108
Housings see page 126

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 µS/cm or mS/cm.



Conducell 4UxF family

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 Varivent®.

The Conducell 4USF with stainless steel electrodes is most common. This sensor is suitable for various applications in biopharma, water or food industry. The newly implemented lengths are perfectly designed for flow cells e.g. in downstream applications.

All plastic materials are compliant with the order EU 10/2011.

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

Typical applications

- CIP station
- Water preparation

Specifications

Measuring range	1 µS/cm to 300 mS/cm
Measurement Principle	4 pole contacting
Process temperature	-20 to 150 °C (Arc: analog 0 to 110 °C, digital 0 to 140 °C)
Pressure range (relative to ambient)	0 to 20 bar (135 °C) 0 to 10 bar (150 °C)
Hygienic aspects	Autoclavable, CIP, SIP
Cell constant	0.36/cm
Material of electrodes (x)	S = Stainless steel 1.4435 H = Hastelloy C 2.4602 T = Titanium Pt = Platinum
O-ring	EPDM (other versions available on request)

For more specifications see www.hamiltoncompany.com

Ordering Information

Conducell 4UxF Family Structure

243590

Code	Electrode Material
1	Stainless Steel 1.4435
2	Platinum (not for Triclamp)
3	Stainless Steel 2.4602
4	Titanium (not for Triclamp)

Code	Electrical Connector
1	Arc
2	VP

Code	a-length (mm)
1	120 (PG13,5)
2	225 (PG13,5)
3	325 (PG13,5)
4	425 (PG13,5)
5	30 (PG13,5)
6	60 (PG13,5)
7	21 – Triclamp 1.5"

Code	O-ring Material
1	EPDM

243590 – ← Order Code

	a-length	VP 6
Conducell 4USF-VV	3	237640 (non Ex)

Accessories

Conductivity Standards see page 102
Cables see page 108
Housings see page 126

Conducell SU new

Hamilton's single-use conductivity monitoring system is comprised of the reusable Arc Module Cond-P SU and a single-use sensor patch Conducell-P SU. The Conducell-P SU is integrated within the single-use container by the container manufacturer.

Unlike other single-use conductivity solutions, Hamilton's reusable Arc Module enables a compact and cost-effective measurement solution without sacrificing accuracy or precision. A standard measuring loop consists of a sensor element (Conducell-P SU), which is connected directly to the electronic (Arc Module Cond-P SU) to enable disturbance free measurement signals.

"Did you know… that with the reuseable Arc Module and the precalibrated sensor a ready to use system can be achieved?"

Benefits

- Specially designed for sterile application in SU Pharma and Biotechnology
- Highly reliable measurements after gamma sterilization and dry storage even after short wet-in time (<30 min)
- Biocompatible materials

Typical applications

- Mixing bags for buffer preparation, virus inactivation or intermediate storage

Specifications	
Measuring range	0.1 to 300 mS/cm
Measurement Principle	4 pole contacting
Process temperature	4 to 50 °C
Pressure range (relative to ambient)	0 to 1 bar
Hygienic aspects	Gamma irradiation up to 50 kGy (for the disposables)
Cell constant	1.31/cm
Material of electrodes	Pt = Platinum

For more specifications see www.hamiltoncompany.com

Ordering Information

Arc Module Cond-P SU	Conducell-P SU*
10071707	10076677

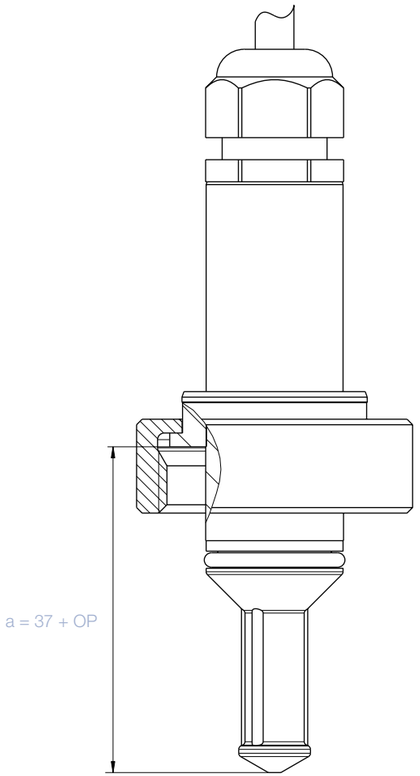
*Only for OEM integration available

Accessories

Conductivity Standards see page 102

Cables see page 108

Conducell 4US



Specifications	
Measuring range	0.1 µS/cm to 500 mS/cm
Measurement Principle	4 pole contacting
O-ring position	22 to 55 mm
Process temperature	-20 to 135 °C
Pressure range (relative to ambient)	0 to 6 bar
Hygienic aspects	CIP, SIP
Cell constant	0.147/cm
Material of electrodes	Stainless steel 1.4435
O-ring	EPDM (other versions available on request)

For more specifications see www.hamiltoncompany.com

The Conducell 4US 4-pole conductivity sensors are designed for different process connections such as Triclamp or G 1¼“ with various O-ring positions.

The sensors show a very good linearity over a broad range of conductivities.

The Conducell 4US 4-pole sensor can easily bei cleaned and is suitable for steam sterilization, autoclavation and CIP cleanings.

All plastic materials are compliant with the order EU 10/2011.

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

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"** Ref 237931
  This flow through cell made of FDA approved PEEK facilitates insertion of Conducell 4US-T150-50 in pipework.

Conductivity Standards see page 102
Safety Socket see page 152

Conducell UPW

Specifications	
Measuring range	0.01 to 1500 µS/cm
Measurement Principle	2 pole contacting
Process temperature	Arc: analog 0 to 110 °C, digital 0 to 130 °C
Pressure range (relative to ambient)	0 to 10 bar (130 °C)
Hygienic aspects	Autoclavable, CIP, SIP
Cell constant	< 0.1/cm
Material of electrodes	Stainless Steel DIN 1.4435
Surface quality	R_a < 0.4 µm (N5)
O-ring	EPDM (other versions available on request)

For more specifications see www.hamiltoncompany.com

The Conducell UPW 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 UPW sensors are available with different process connections such as TriClamp 1.5”, PG 13.5.

All plastic materials are compliant with the order EU 10/2011.

“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

Ordering Information

	a-length	VP6	Arc
Conducell UPW PG 13.5	120	243640	243579
Conducell UPW TC 1.5”	87	–	243578

UPW Simulator

Accessories

UPW Simulator Ref 243580

Traceable resistor to verify the Arc module acc. to USP <645>

Conductivity Standards see page 102
Cables see page 108
Arc Accessories see page 117
Housings see page 126

Conducell 2DC-PG

The Conducell 2DC sensor is constructed in a simple way and is best suited for measurements in clean 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 µS/cm to 20 mS/cm
Measurement Principle	2 pole contacting
Process temperature	-5 to 80 °C
Pressure range (relative to ambient)	0 to 6 bar
Cell constant	1/cm
Material of electrodes	Graphite
O-ring	EPDM (other versions available on request)

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	5 m fix cable
Conducell 2DC-PG 120	120	237610

Accessories

Conductivity Standards see page 102
Housings see page 126

CO_2

Dissolved carbon dioxide (DCO_2) is a critical process parameter (CPP) in biopharma production processes according to PAT guidelines. By influencing other parameters such as extracellular and intracellular pH, it has an effect on different metabolic pathways which are involved in cell growth or in product formation and quality.

In the past, continuous in-line monitoring of DCO_2 has only been possible through electrochemical sensors that are based on the Severinghaus principle and measure the DCO_2 concentration indirectly. The result is significant maintenance effort and multiple sources of drift that must be compensated by time-consuming product calibration.

Now, Hamilton has introduced a completely new way to measure DCO_2: The new in-line sensor CO_2NTROL is a maintenance free, solid-state sensor that directly measures DCO_2 resulting in better measurement accuracy and lower cost of ownership.

CO_2NTROL new

The Solid State Sensor directly measures DCO_2 and provides maintenance free, real-time, and in-line control of this new critical process parameter.

Unlike traditional sensors that are based on the electrochemical Severinghaus principle, CO_2NTROL is a pure direct measurement in a solid state design: CO_2 molecules diffuse into a gas permeable membrane where the sensor measures the absorption of CO_2-specific Mid-IR wavelengths. This absorption correlates to the partial pressure of CO_2 in the media.

CO_2NTROL's hygienic design makes it compliant with requirements of biopharma applications. The sensor is EHEDG approved (EL Class I, test executed with Hamilton hygienic socket REF 242545) and is ready for GMP compliance. Embedded electronics convert the MIR CO_2 measurement into standard digital and analog signals that are easily integrated into your control strategy.

Arc Wi 2G Adapter BT (REF 243470) is required to output an analog 4-20 mA signal from the digital Modbus communication.

"Did you know…
Hamilton is the first and only supplier to bring the maintenance-free optical IR technology into a SIP/CIP compliant 12mm CO_2 sensor"

Benefits

- Maintenance-free
- Simple calibration
- Hygienic design: SIP/CIP compatible, autoclavable
- Inverted installation possible
- Direct measurement of CO_2 – no ammonia interference

Typical applications

- Biopharma Cell Cultures and Fermentations

Specifications

Measurement Principle	Optical – CO_2 Absorption in Middle Infrared (MIR)
Measuring Range	5 to 1000 mbar or 0.5 to 100 %-Vol or 7.5 to 1500 mg/L (in liquid phase at 101.3 kPa and 25 °C)
Diameter	12 mm
Process Connection	PG 13.5
Wetted Parts	Stainless Steel 1.4435, EPDM (Ethylene propylene elastomer), FDA compliant silicone
Surface Quality	R_a < 0.4 µm (N5)
Steam Sterilizable	Yes
Autoclavable	Yes
CIP	Yes
Operating temperature range	-10 to 60 °C

Ordering Information

	a-length	Arc
CO_2NTROL RS485	120 mm	10087810-11
	160 mm	10087810-12
	225 mm*	10087810-13
	325 mm	10087810-14
	425 mm	10087810-15

*CO_2NTROL 225 have, in reality, a shaft length of 215 mm. This ensures optimal rinsing in replaceable armatures, such as Retractex.

Accessories

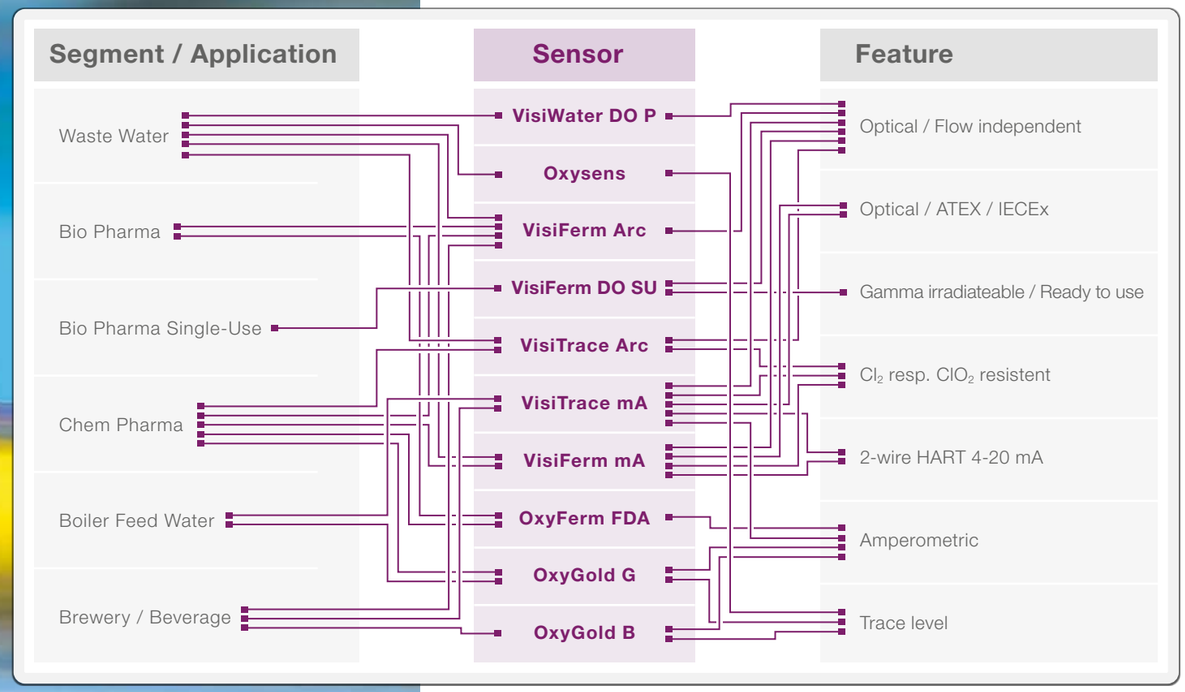
Calibration Station Ref 243575

Cables see page 108
Arc Accessories see page 117
Housings see page 126

DO

The partial pressure of dissolved oxygen (DO) plays an important role in many biological, chemical and physical processes. 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.



VisiFerm RS485 family new

The VisiFerm RS485 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.

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

Benefits

- Reliable and robust optical measurement
- 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
- Calibration, verification, and maintenance data accessible via ArcAir app

Typical applications

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

Specifications

Measuring range	4 ppb to 25 ppm (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 30 s at 25 °C, from air to nitrogen
Process temperature	-20 to 140 °C, the sensor provides no DO reading above 85 °C
Operating voltage	10 to 27 VDC max. 1.5W
Pressure range (relative to ambient)	-1 to 12 bar
Hygienic aspects	Autoclavable, CIP, SIP
Surface Quality	R_a < 0.4 µm (N5)
Material	Stainless steel 1.4435
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

VisiFerm RS 485 Family Structure

	Code	Interface
10118255		
	1	RS485-ECS
	Code	**a-length (mm)**
	1	120
	2	160
	3	225
	4	325
	5	425
	Code	**ODO Cap**
	1	H0
	2	H2
	3	H3
	4	H4
	Code	**Wetted Parts**
	1	EPDM
10118255 –		← Order Code

ODO Cap H0 + H3: For general application in biotechnology, water treatment and monitoring as well as in breweries, wineries and soft drink processing.

ODO Cap H2 + H4: Designed for fermentation processes where sterilization in place (SIP) is performed in media containing higher amounts of lipophilic compounds. It comes with a hygienic design.

Accessories

- **ODO Cap H0 Kit** Ref 243515
- **ODO Cap H2 Kit** Ref 243505
- **ODO Cap H3 Kit** Ref 10068400
- **ODO Cap H4 Kit** Ref 10078261

Cables see page 108
Arc Accessories see page 117
Housings see page 126

VisiFerm DO SU new

Hamilton's single-use dissolved oxygen monitoring system is comprised of the reusable VisiFerm DO SU and a single-use optical dissolved oxygen sensor cap. The cap is integrated with the single-use container by the container manufacturer.

Hamilton's reusable sensor element enables a compact and cost-effective measurement solution without sacrificing accuracy or precision. A standard measuring loop consists of a sensor element, which is connected to the VisiFerm DO SU.

"Did you know… that Hamilton invented the first optical DO sensor in 12 mm format?"

Benefits

- Specially designed for sterile application in SU Pharma and Biotechnology
- Highly reliable measurements after gamma sterilization and dry storage even after short wet-in time (<30 min)
- Very low drift
- Biocompatible material

Typical applications

- SU bioreactors (bag application)
- SU bioreactors (rigid containers)
- SU mixer (fill and finish application)

Specifications

Measuring range	4 ppb to 25 ppm (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 30 s at 25 °C, from air to nitrogen
Process temperature	4 to 50 °C
Operating voltage	7 to 30 VDC max. 1 W
Hygienic aspects	Gamma irradiation up to 50 kGy (for the disposables)
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	Arc	ECS	ODO Cap S0*	ODO Cap S2*	ODO Cap S3*
VisiFerm DO SU	120	10078255	10116427	243461	10077858	10113953
	225	10087920	10116428	–	–	–

*Only for OEM integration available

Accessories

Silicone Sleeve (for ODO Cap S3)
Ref 10114324

Cables see page 108
Arc Accessories see page 117

VisiFerm mA family

Specifications	
Measuring range	4 ppb to 25 ppm (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 30 s at 25 °C, from air to nitrogen
Process temperature	-20 to 140 °C, the sensor provides no DO reading above 85 °C
Operating voltage	18 to 30 VDC
Pressure range (relative to ambient)	-1 to 12 bar
Hygienic aspects	Autoclavable, CIP, SIP
Surface Quality	R_a < 0.4 µm (N5)
Material	Stainless steel 1.4435
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

The VisiFerm mA is the optical dissolved oxygen (DO) sensor for use in explosive environment. VisiFerm mA optical technology improves the measuring performance and simplifies maintenance. Improvements compared to conventional electrochemical (amperometric) sensors include flow independence, rapid startup with no polarization time, and simplified maintenance.

Designed especially for production environments, the VisiFerm mA is a 2-wire sensor with 4-20 mA standard or digital HART signal output, and ATEX & IECEx approval. The VisiFerm mA mitigates the negative effects of aging, temperature, and photobleaching in order to reduce the frequency of calibration and deviation reports.

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

Benefits

- Reliable and robust optical measurement in hazardous environments
- Longer cap and sensor life
- Less frequent calibrations
- Easy installation with 2-wire connection
- Direct analog 4-20 mA or digital HART communication
- Calibration, verification, and maintenance data accessible via ArcAir app

Typical applications

- Explosive atmospheres environment
- Fermentation
- Wort aeration in breweries

Ordering Information

VisiFerm mA Family Structure

	Code	Interface			
10070760					
	1	mA/HART			
		Code	a-length (mm)		
		1	120		
		2	160		
		3	225*		
		4	325		
		5	425		
			Code	ODO Cap	
			1	H3	
			2	H4	
				Code	Wetted Parts
				1	EPDM
10070760 –					← Order Code

*The VisiFerm mA 225 have, in reality, a shaft length of 215 mm. This ensures optimal rinsing in retractable armatures, such as Retractex.

ODO Cap H3: For general application in biotechnology, water treatment and monitoring as well as in breweries, wineries and soft drink processing.

ODO Cap H4: The ODO Cap H4 is designed for fermentation processes where sterilization in place (SIP) is performed in media containing higher amounts of lipophilic compounds. It comes with a hygienic design.

Accessories

- **ODO Cap H3 Kit** Ref 10068400
- **ODO Cap H4 Kit** Ref 10078261

Cables see page 108
Housings see page 126

VisiTrace RS485 family new

Specifications	
Measuring range	0 to 2000 ppb (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 20 s in gas; < 90 s in water
Process temperature	-20 to 140 °C, the sensor provides no DO reading above 85 °C
Operating voltage	10 to 27 VDC max. 1.5W
Pressure range (relative to ambient)	-1 to 12 bar
Hygienic aspects	Autoclavable, CIP, SIP
Surface Quality	R_a < 0.4 µm (N5)
Material	Stainless steel 1.4435
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

The VisiTrace RS485 is designed to measure dissolved oxygen in the low ppb ranges in brewing applications, notably during filtration, and filling. In addition, the special designed ODO Cap L1 for breweries is stabilized against standard disinfectant solution with active chlorine and chlorine dioxide. This is powerful during measurements in breweries, which may not allow for calibration after every CIP.

With the transmitter integrated, the intelligent VisiTrace RS485 sensor provides more reliable measurements.

“Did you know… that the VisiTrace RS485 is the only optical DO sensor that withstands chlorine and chlorine dioxide for a long time?”

Benefits

- For measurements from 0 to 2000 ppb
- Stable against chlorine and chlorine dioxide
- Rapid start-up with no polarization
- Flow and CO_2 independent readings
- Robust design for high flow rates

Typical applications

- Breweries
- Power Plants

Ordering Information

VisiTrace RS485 Family Structure

	Code	Interface	Code	a-length (mm)	Code	ODO Cap	Code	Wetted Parts	
10140043									
	1	RS485							
			1	120					
			2	160					
			3	225*					
			4	325					
			5	425					
					1	L1			
							1	EPDM	
10140043 –									← Order Code

**The VisiTrace RS485 225 have, in reality, a shaft length of 215 mm. This ensures optimal rinsing in retractable armatures, such as Retractex.*

ODO Cap L1: The L1 cap is designed for trace level measurements of dissolved oxygen in breweries, water de-aeration and power plants.

Accessories

- **ODO Cap L1 Kit** Ref 10107102
- **Calibration station** Ref 243575

Cables see page 108
Housings see page 126

VisiTrace mA family

Specifications	
Measuring range	0 to 2000 ppb (DO)
Measurement Principle	Oxygen dependent luminescence quenching
Response time $t_{98\%}$	< 20 s in gas; < 90 s in water
Process temperature	-20 to 140 °C, the sensor provides no DO reading above 85 °C
Operating voltage	18 to 30 VDC
Pressure range (relative to ambient)	-1 to 12 bar
Hygienic aspects	Autoclavable, CIP, SIP
Surface Quality	R_a < 0.4 µm (N5)
Material	Stainless steel 1.4435
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

The VisiTrace mA is designed to measure dissolved oxygen in the low ppb ranges in brewing applications, notably during filtration, and filling. In addition, the special designed ODO Cap L1 for breweries is stabilized against standard disinfectant solution with active chlorine and chlorine dioxide. This is powerful during measurements in breweries, which may not allow for calibration after every CIP.

With the transmitter integrated, the intelligent VisiTrace mA sensor provides more reliable measurements directly to your process control system via the 4-20 mA output. The also integrated Bluetooth 5 wireless interface may be used for monitoring, configuration and calibration, and saves time without compromising quality.

“Did you know… that the VisiTrace mA is the only optical DO sensor that withstands chlorine and chlorine dioxide for a long time?”

Benefits

- For measurements from 0 to 2000 ppb
- Stable against chlorine and chlorine dioxide
- Rapid start-up with no polarization
- Flow and CO_2 independent readings
- Robust design for high flow rates

Typical applications

- Breweries
- Power Plants

Ordering Information

VisiTrace mA Family Structure

	Code	Interface			
10068709	1	mA/HART			
		Code	**a-length (mm)**		
		1	120		
		2	225*		
		3	325		
		4	425		
			Code	**ODO Cap**	
			1	L1	
				Code	**Wetted Parts**
				1	EPDM
10068709 –					**← Order Code**

**The VisiTrace mA 225 have, in reality, a shaft length of 215 mm. This ensures optimal rinsing in retractable armatures, such as Retractex.*

ODO Cap L1: The L1 cap is designed for trace level measurements of dissolved oxygen in breweries, water de-aeration and power plants.

Accessories

- **ODO Cap L1 Kit** Ref 10107102
- **Calibration station** Ref 243575

Cables see page 108
Housings see page 126

VisiWater DO P

The VisiWater DO P is an optical dissolved oxygen sensor designed for applications in water, wastewater, fish farming, lakes, and rivers. Its robust plastic shaft is ideal for these applications. The optical measurement technology ensures fast response time and minimum maintenance without polarization time. Like for all optical DO sensors the only spare part is the cap, which is easy and quickly replaceable.

The output signals 4-20 mA or Modbus can easily be integrated into process control systems (PCS). Calibration and configuration can be done via the PCS or ArcAir Desktop version with the help of the USB RS485 Modbus Converter.

Benefits

- Simple and low maintenance
- Robust design
- Outdoor use incl. submersion

Typical applications

- Water and Wastewater
- Fish farming

Specifications

Measuring range	0 to 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Process temperature	0 to 60 °C
Pressure range	-1 to 12 bar
Material	Shaft: PVC-U Cap: PPA

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	10 m fix cable
VisiWater DO P Arc 120 FC10	150	10066566

Accessories

- **ODO Cap H20** Ref 243536
- **Junction Box** Ref 10076282

Cables see page 108

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.

The sensor is equipped with an FDA-approved membrane for use in hygienic processes. It withstands steam sterilization, autoclavation and CIP cleanings.

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

- Explosive atmospheres environment
- Fermentation

Specifications

Measuring range	10 ppb to 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Process temperature	0 to 130 °C (Arc: analog 0 to 110 °C, digital 0 to 130 °C)
Pressure range (relative to ambient)	0 to 4 bar
Hygienic aspects	Autoclavable, CIP, SIP
Electrolyte	Oxylyte
Surface Quality	R_a < 0.4 µm (N5)
Current in air at 25°C	40 to 80 nA
Material	Stainless steel 1.4435
Polarization voltage	-670 mV
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	T82	VP 6	Arc	MS
OxyFerm FDA	120	237450	237540	243100	237713
	160	237455	237541	243101	10069701
	225	237452	237542	243102	237715
	325	237453	237543	243103	10069700
	425	237454	237544	243104	–
OxyFerm XL	56	237175-OP	–	243140-OP	–
	125	237170	–	–	–
	262	237174	–	–	–
OxyFerm CIP	120	243289	–	–	–

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** Ref 237140
- **Membrane Kit CIP** Ref 237126
- **Membrane Kit** Ref 237123
- **Oxylyte 30 mL** Ref 237118
- **Replacement Cathode OxyFerm** Ref 237306
- **Autoclavation Cap Oxyferm** Ref 242000
- **Polarization Module G** Ref 237350
- **Polarization Module T** Ref 237370

Cables see page 108
Arc Accessories see page 117
Housings see page 126

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 not affected by acidic gases.

Apart from the production of sparkling beverages, the OxyGold B can be used in all production processes where CO_2 might be an issue for electrochemical sensors.

“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 CO_2
- Only very little flow required
- Pressure and CIP resistent
- Replacing the cathode is possible and very simple to perform.

Typical applications

- CO_2 recovery
- Water de-aeration

Specifications

Measuring range	8 ppb to 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Process temperature	0 to 100 °C
Pressure range (relative to ambient)	0 to 12 bar
Hygienic aspects	CIP
Electrolyte	Oxylyte B
Surface Quality	R_a < 0.4 µm (N5)
Current in air at 25°C	180 to 500 nA
Material	Stainless steel 1.4435
Polarization voltage	0 mV
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	VP 6	Arc
OxyGold B	120	237180	not available anymore*
	225	237185	

*See VisiTrace sensor, page 92

Accessories

- **OxyGold Membrane Kit** Ref 237135
- **Oxylyte B 30 mL** Ref 237138
- **Polarization Module B** Ref 237360
- **Replacement Cathode OxyGold B** Ref 237437

Cables see page 108
Housings see page 126

OxyGold G

Specifications	
Measuring range	1 ppb to 40 ppm (DO)
Response time $t_{98\%}$	< 60 s at 25 °C, from air to nitrogen
Process temperature	0 to 130 °C (Arc: analog 0 to 110 °C, digital 0 to 130 °C)
Pressure range (relative to ambient)	0 to 12 bar
Hygienic aspects	Autoclavable, CIP, SIP
Electrolyte	Oxylyte G
Surface Quality	R_a < 0.4 µm (N5)
Current in air at 25°C	180 to 500 nA
Material	Stainless steel 1.4435
Polarization voltage	-670 mV
O-ring	EPDM

For more specifications see www.hamiltoncompany.com

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.

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

Ordering Information

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

Accessories

- **OxyGold Membrane Kit** Ref 237135
- **Oxylyte G 30 mL** Ref 237139
- **Polarization Module G** Ref 237350
- **Replacement Cathode OxyGold G** Ref 237427

Cables see page 108
Arc Accessories see page 117
Housings see page 126

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

Specifications

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

For more specifications see www.hamiltoncompany.com

Ordering Information

	a-length	5 m fixed cable
Oxysens	120	237150

Accessories

- **Immersing Set** Ref 237158
  The Immersing Set sheaths and protects 120mm sensors such as Oxysens while immersed in streams or channels.

Housings see page 126