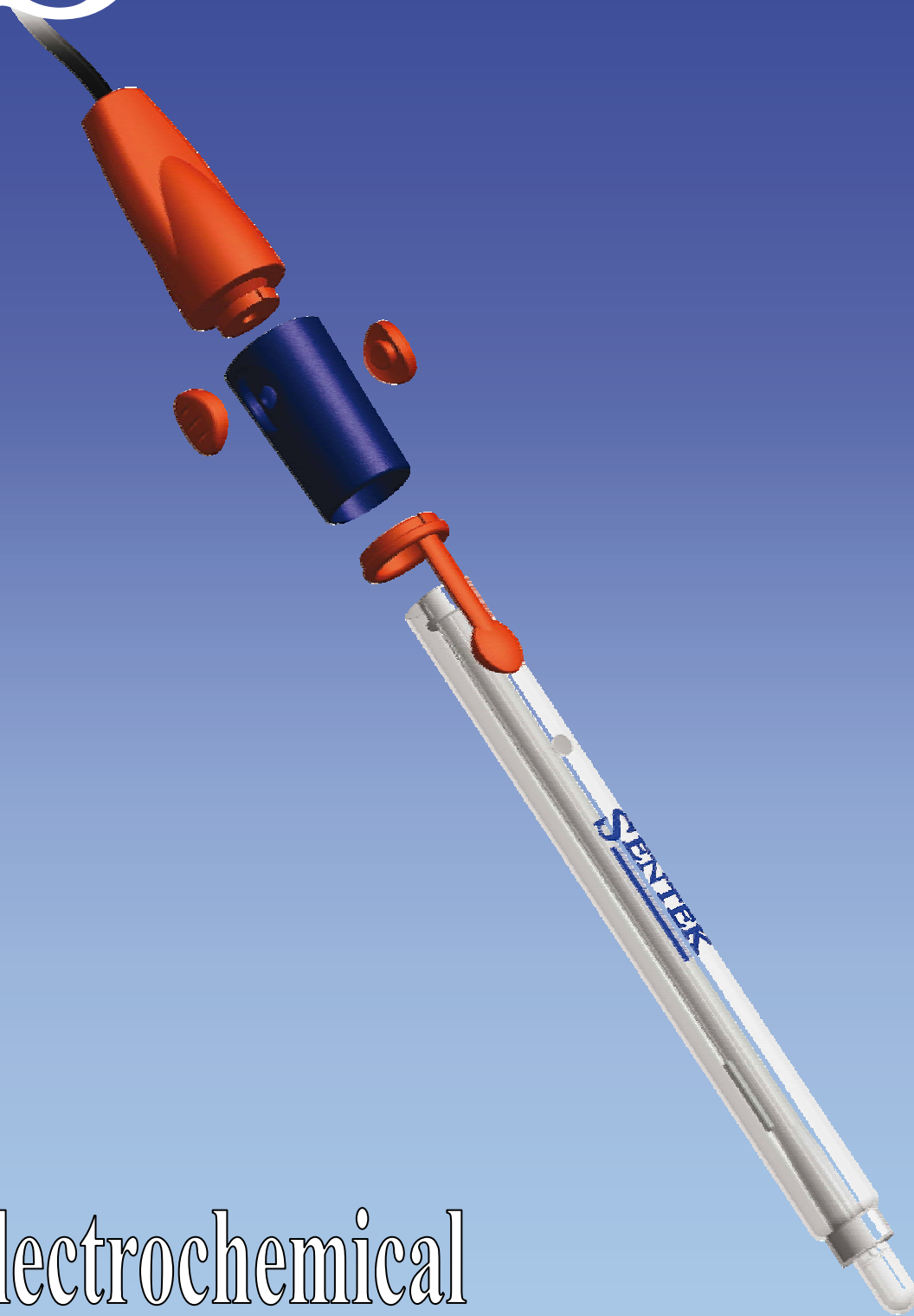


SENTEK



Electrochemical
Sensors

Electrode Selection Chart

(Laboratory Products)

Sample Type	P10†	P11	P11HA	P12	P13	P14	P16	P17	P18	P19	P20	P21
Agar	X	X	X	X	X	X	X	✓	X	X	X	X
Alkalines (high)	X	X	✓	X	X	X	X	X	X	X	X	X
Beer	✓	✓	X	✓	✓	✓	X	✓	X	X	✓	✓
Blood Products	✓	✓	X	✓	✓	*	*	✓	X	X	*	✓
Bread, Dough	X	X	X	X	X	X	X	*	✓	✓	X	X
Cement	*	✓	✓	*	*	*	X	*	*	*	*	*
Cosmetics	*	✓	X	✓	✓	✓	X	✓	*	*	*	✓
Dairy Products	*	✓	X	✓	✓	*	X	✓	*	✓	X	X
Education	✓	✓	*	*	*	✓	*	✓	*	*	✓	*
Fats/Cream	*	*	X	*	X	X	X	*	*	✓	X	X
Field Use	X	*	X	X	X	✓	X	✓	✓	*	✓	X
Fish Products	*	*	X	*	*	*	X	✓	*	✓	X	*
Lab Flasks	X	X	X	✓	X	X	X	X	X	X	X	X
Low Ionic	*	✓	X	*	X	X	X	X	X	X	X	✓
Meat, Cheese	X	X	X	X	X	X	X	✓	*	✓	X	X
Micro Samples	X	X	X	*	✓	X	*	*	X	*	X	X
Paint	✓	X	X	✓	✓	X	X	✓	X	X	X	X
Photographic	X	X	✓	X	X	X	X	X	X	X	X	X
Soil	*	*	X	*	*	*	X	X	✓	✓	X	X
Surface	X	X	X	X	X	X	X	✓	X	X	X	X
Test Tubes	X	X	X	✓	*	X	✓	X	X	X	X	X
Tris Buffer	X	X	X	X	X	X	✓	X	X	X	X	X
Viscose Samples	X	X	X	X	X	X	X	✓	*	*	X	X

✓ **Recommended**

* **Satisfactory**

X **Not Suitable**

NOTE: For Emulsions, Liquors, Non-Aqueous samples and Oils use type P11/DJ/LiCl

For Hydrofluoric Acid samples use type P14/HF

† Requires separate reference electrode type R1 or R2 consult your dealer

Samples of varying temperature refer to pH PLUS range.

For Jam Measurements use type P14/RJ/LF

For Measurements in Swimming Pools use type: pH – P14/NS/SR/CAP/S8 or P14/NS/SR/CAP/1M/BNC

Redox – O14/NS/SR/CAP/S8 or O14/NS/SR/CAP/1M/BNC

P11/DJ – For difficult samples. i.e. solutions, sulphide.

All electrodes (except P10) are combination type with integral reference. Each electrode is supplied with 1 metre of cable and a BNC plug as standard. If an additional cable length or alternative plug is required, please specify when ordering.

P10 – General Purpose (Requires separate reference electrode)



Technical Specification

pH Range:	0-14
Temp Range:	0-80°C
Diameter:	120x12mm
Combination:	No
Body Type:	Glass

P11-DJ



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Annular Ceramic		
Diameter:	120x12mm		

P11HA – PHOTOGRAPHIC PROBE

Application – Photographic solutions and solutions of very high pH



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	Ag/AgCl		
Wet Materials:	Glass, Ceramic		
Dimensions:	120x12mm		

P11- PROTECTED BULB PROBE

Application – General pH of application where rugged electrode is required but epoxy is unacceptable.



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	Ag/AgCl		
Wet Materials:	Glass, Teflon		
Dimensions:	120x12mm		

P13 – Liquids

P13/4/180/NMR Long Reach available



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Frit Ceramic		
Stem:	90x4.5mm		

P11 - Liquids

P11/ROD also available



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Annular Ceramic		
Diameter:	120x12mm		

P11/DJ/LiCl



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Annular Ceramic		
Diameter:	120x12mm		

P11 – NON AQUEOUS PROBE

Application – pH non aqueous titrations, biofuels



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Wet Materials:	Ceramic		
Dimensions:	120x12mm		

P12 - Liquids



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Frit Ceramic		
Stem:	150x6mm		

P14 - General



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Epoxy
Ref. Type:	AgCl		
Junction Type:	Porous Teflon		
Dimensions:	120x12mm		

P15 – Low Conductivity Water



Technical Specification

pH Range:	0-11	Combination:	Yes
Temp Range:	0-50°C	Body Type:	Glass
Ref. Type:	HgCl		
Junction Type:	Annular Ceramic		
Dimensions:	120x12mm		

P16 - Tris



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-50°C	Body Type:	Glass
Ref. Type:	HgCl		
Junction Type:	Frit Ceramic		
Stem:	90x6mm		

P17 - Surface



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-60°C	Body Type:	Epoxy
Ref. Type:	AgCl		
Junction Type:	Porous Teflon		
Dimensions:	120x12mm		

P18 – Slurries



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Annular Ceramic		
Dimensions:	120x12mm		

P19 – Semi-solids



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Frit Ceramic		
Dimensions:	40x6mm		

P20 – General. Has integral temperature compensation



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Epoxy
Ref. Type:	AgCl		
Junction Type:	Ceramic		
Dimensions:	120x12mm		

P21 – Colloids/Low Conductivity



Technical Specification

pH Range:	0-14	Combination:	Yes
Temp Range:	0-80°C	Body Type:	Glass
Ref. Type:	AgCl		
Junction Type:	Sleeve		
Dimensions:	120x12mm		

PI10Lab – High Temperature Probe

Application – For high temperature measurements



Technical Specification

pH Range:	0-14
Temp Range:	0-130°C
Ref. Type:	AgCl
Wet Materials:	Teflon
Diameter:	120x12mm
1 metre cable & BNC plug	

S7 Range

The S7 Range incorporates all the proven technical specifications of the standard Sentek range, but with the convenience to the customer of the detachable cable.



P10 P11/Rod P12 P13 P14 P15 P17 P19 P21 R1 O1

Features: Greater accuracy, very fast response, and greater stability.
Non Silver Reference System = Better performance on samples prone to contamination from Silver Reference Systems.

PP10 – General Purpose



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Stem Diameter:	120x12mm
Body Type:	Glass

PP11 – General Purpose



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

PP11 ROD – General Purpose



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

PP12 – Measurements in Flasks



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Frit Ceramic
Stem Diameter:	150x6mm
Body Type:	Glass

PP13 – Small Volumes



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Frit Ceramic
Stem Diameter:	90x4.5mm
Body Type:	Glass

PP15 – Low Conductivity Water



Technical Specification

pH Range:	0-10
Temp Range:	0-50°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

PP16 – Semi Micro



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Frit Ceramic
Stem Diameter:	90x6mm
Body Type:	Glass

PP17 – Measurements of Flat Surfaces



Technical Specification

pH Range:	0-14
Temp Range:	0-90°C
Junction Type:	Porous Teflon
Stem Diameter:	120x12mm
Body Type:	Epoxy

PP18 – Soils and Slurries



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

PP19 – Meat and Cheeses



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Frit Ceramic
Stem Diameter:	40x6mm
Body Type:	Glass

PP21 – Colloids and Slurries



Technical Specification

pH Range:	0-14
Temp Range:	0-100°C
Junction Type:	Glass Sleeve
Stem Diameter:	120x12mm
Body Type:	Glass

PR1 – Use with P10 and ISE's



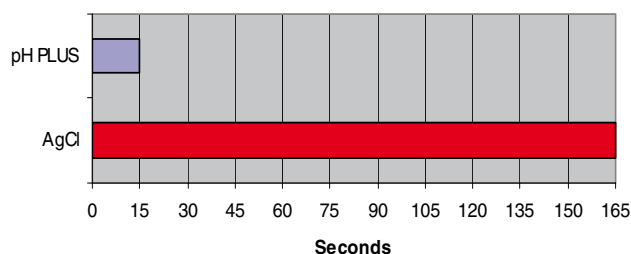
Technical Specification

Temp Range:	0-100°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

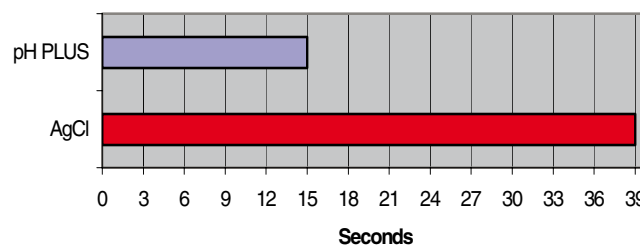
Advantages of using pH PLUS

* Quick Calibrations. Response time in pH Buffers is remarkable. (see fig. 2).
Faster measurements. pH PLUS electrodes reach equilibrium in samples significantly faster than conventional electrodes, especially when there is temperature variation.
(see Fig. 1)

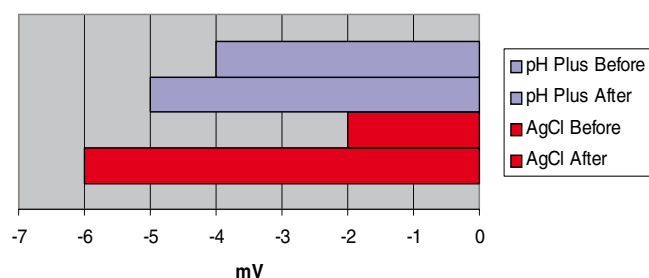
Stabilisation Time to 40 degrees C shift in pH4 Buffer



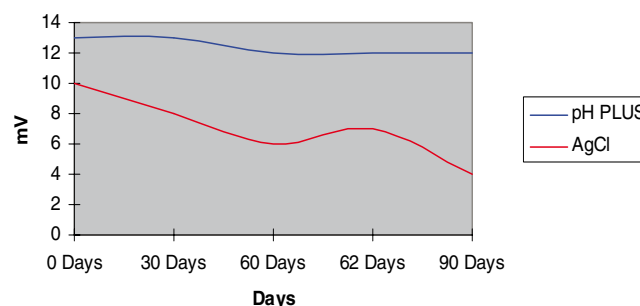
Time Taken to Respond to pH change 7 to 4 Buffer (To Stabilisation)



Reproducibility in 7 buffer at room temperature after 4 mins exposure to pH4 @ 60 degrees c



Offset in pH 7 Buffer



- Drift: Long term drift on pH PLUS is shown in Fig. 4. This means that calibration procedures are required less frequently, saving time.
- Reproducibility: The pH PLUS electrode displays unsurpassed reproducibility when returned to original samples, after being exposed to extreme conditions of pH and temperature. (see Fig. 3)
- Linearity: pH Electrodes of all types show good linearity over the pH range 2-12. pH PLUS assists the user to make reliable measurements as there is no temperature hysteresis (of memory) effect caused by variations in temperature. So results are achieved in seconds rather than minutes.

Not only is time saved by rapid equilibration but accuracy and confidence in the result allows use of pH PLUS probes in a wide variety of samples without recalibration.
Fast response and excellent reproducibility will also facilitate accurate results from unskilled operators, once drift and uncertainty of response have been eliminated.

Ordering Information

For different connector types, just add the type of connector onto the description of the probe, for example:

PP11/1m/BNC, PP11/1m/DIN, PP11/1m/COAX, PP11/S7

Please specify cable length when ordering

P11/DW – Drinking Water Probe

Application – pH of water particularly cold low conductivity waters for low ionic strength



Technical Specification

pH Range:	0-11
Temp Range:	0-50°C
Ref. Type:	Double Junction Ag/AgCl
Wet Materials:	Glass, Polymer
Dimensions:	120x12mm

P14/RJ/LF – Jam Probe

Application – pH measurement in jam & fruit preserves
Replacement Junctions available – ask for details.



Technical Specification

pH Range:	0-13
Temp Range:	0-80°C
Ref. Type:	Single Junction Ag/AgCl
Wet Material:	Glass, Ceramic
Dimensions:	120x12mm

P17 – Dairy Products Probe

Application – pH of milk, sauces, mayonnaise



Technical Specification

pH Range:	0-14
Temp Range:	0-80°C
Ref. Type:	Single Junction Ag/AgCl
Wet Material:	Glass, Epoxy, Teflon
Dimensions:	120x12mm

P19 – Penetration Food Probe

Application – pH of meat, cheese and semi solids



Technical Specification

pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	Single Junction Ag/AgCl
Wet Material:	Glass, Teflon, PVC
Dimensions:	8mm diameter spear point

pH Knife Probe

Application – For direct measurement to frozen and defrosted meat products.

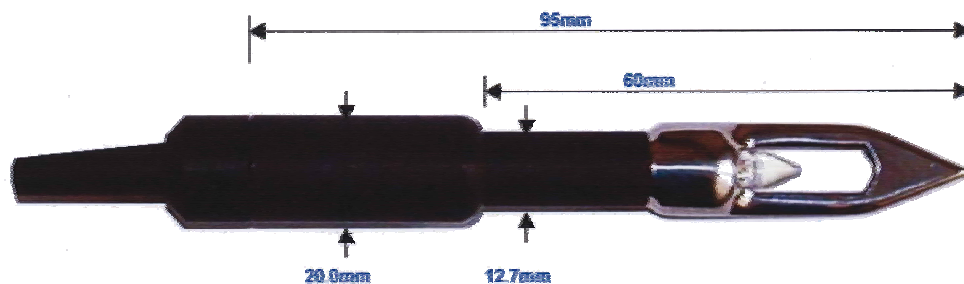
Stainless Steel Tip protects pH electrode inserted in frozen meat

Temperature Range 0 – 80°C

pH Range 0 – 14pH

The KNIFE PROBE has been developed for use in the food industry where it is required to insert the electrode into frozen or semi-frozen foodstuffs.

The stainless steel KNIFE protects the pH electrode from damage, but does not in anyway prevent the glass sensor from effectively measuring the pH value of the sample. The KNIFE PROBE can be used with any pH meter on the market.



ORDERING INFORMATION

130-77	Knife Kit with probe (please specify meter for which this is to be used)
130-79	Replacement probe for Knife Kit



These combination electrodes, employing the use of solid gel, were designed with the water industry very much in mind. Capable of being used with portable instruments, and on-line, they will give optimum performance in cold water. The gel retains salt, and maintains zero potential for a much longer period of time. The mechanical strength of the gel allows the use of a junction with a much higher porosity than previous designs. This benefits the user in the following ways:

1. The response time to equilibrium is improved, especially at low temperatures. (high porosity = low temperature)
2. Accuracy is improved due to liquid junction potentials, or "errors" in samples of different ionic strength being minimised

Therefore we have:

Fast response to equilibrium, Less frequent calibrations, Improved accuracy, Greater stability, Longer electrode life, and Optimum performance in cold water.

P14/SG/BNC (114-707)



Technical Specification	
pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	AgCl
Junction Type:	Porous Teflon
Dimensions:	120x12mm
Body Type:	Epoxy
Pressure:	5 BAR
Termination:	BNC Plug*

P14/SG/S8 (114-712)



Technical Specification	
pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	AgCl
Junction Type:	Porous Teflon
Dimensions:	120x12mm
Body Type:	Epoxy
Pressure:	5 BAR
Termination:	S8 Cap

P14/SG/½" BSP/Fixed Cable



Technical Specification	
pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	AgCl
Junction Type:	Porous Teflon
Dimensions:	120x12mm
Body Type:	Epoxy
Pressure:	5 BAR
Termination:	½" BSP Fixed Cable

* If alternative plug required, please specify.

NOTE: Any of the Sentek range of combination electrodes can be supplied with a solid gel filling.

EP14 – Educational Electrode

The Sentek EP14 offers an effective electrode for the Educational market, combining quality at an affordable price. This is an ideal introductory product to the world of pH.



Technical Specification	
pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	AgCl
Junction Type:	Fibre
Dimensions:	120x12mm
Combination:	Yes
Body Type:	Epoxy

P14/RF/Kit

Also available for the Education market is the P14/RF/KIT, complete with 30ml Partial Gel, Syringe, 30ml Cleaning Solutions and 30ml Storage Solution.



Technical Specification	
pH Range:	0-14
Temp Range:	0-70°C
Ref. Type:	AgCl
Junction Type:	Porous Teflon
Dimensions:	120x12mm
Combination:	Yes
Body Type:	Epoxy

At SENTEK, we identified the need for reasonably prices, high quality pH and Redox electrodes for the Swimming Pool market.

These new electrodes require infrequent calibrations, typically once per month in their first year of use. This is made possible by incorporating a strong salt, stable, low flow reference system.

An additional benefit of this reference system, is that the electrode can tolerate a great deal of abuse, and it can be stored dry for a period of up to one year, with very little reduction in its performance – simply connect, and rely on it.

P14/NS/SR/CAP/1M/BNC



Technical Specification

Reference:	AgCl
Junction:	Ceramic
Electrolyte:	Viscous Saturated DryTech Gel
Max Pressure:	8 BAR
Range:	pH2-pH13
Tip Shape:	Bulb
Body Material:	Epoxy
Cap:	Fixed Cable & BNC Connector
Ordering Code:	114-922

P14/NS/SR/CAP/S8



Technical Specification

Reference:	AgCl
Junction:	Ceramic
Electrolyte:	Viscous Saturated DryTech Gel
Max Pressure:	8 BAR
Range:	pH2-pH13
Tip Shape:	Bulb
Body Material:	Epoxy
Cap:	S8 PG13.5
Ordering Code:	114-921

O14/NS/SR/CAP/1M/BNC



Technical Specification

Reference:	AgCl
Junction:	Ceramic
Electrolyte:	Viscous Saturated DryTech Gel
Max Pressure:	8 BAR
Range:	0-1200mV
Tip Shape:	Platinum
Body Material:	Epoxy
Cap:	Fixed Cable & BNC Connector
Ordering Code:	451-922

O14/NS/SR/CAP/S8



Technical Specification

Reference:	AgCl
Junction:	Ceramic
Electrolyte:	Viscous Saturated DryTech Gel
Max Pressure:	8 BAR
Range:	pH2-pH13
Tip Shape:	Bulb
Body Material:	Epoxy
Cap:	S8 PG13.5
Ordering Code:	451-921

For optimum results use SENTEK cleaning (791-15) & storage (791-65) solutions with your pH Electrodes

Sentek Titration Electrodes can be configured to fit into any titration vessel.

Supplied with NS14/15 cones, as standard, and refillable glass bodies which can be configured to any titration sample.

Available with a detachable or fixed cable, with cones of varying sizes (please specify) or without cones.

Simply advise your requirements.

O1-NS14/15-L – Redox Titration



Technical Specification

Range:	0-1000mV
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Ceramic
Body Type:	Glass

P11-NS14/15/L – pH Titration



Technical Specification

Range:	0-14pH
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Ceramic
Body Type:	Glass

P11-NS14/15-LiCl-L – Non Aqueous pH Titration



Technical Specification

Range:	0-14pH
Temp Range:	0-50°C
Ref. Type:	AgCl, Double Junction
Junction Type:	Ceramic
Body Type:	Glass

P21-NS14/15-L – pH Titration Difficult Samples



Technical Specification

Range:	0-14pH
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Glass Sleeve
Body Type:	Glass

O2-NS14/15-L – Karl Fisher Titration



Technical Specification

Range:	N/A
Temp Range:	0-80°C
Ref. Type:	N/A
Junction Type:	N/A
Body Type:	Glass

SENTEK Offer a vast range of non standard sensors for special applications or OEM requirements. Contact sentekuk@btconnect.com for further information.

Types O1 and O3 are supplied with 1 metre of cable and a BNC plug as standard. Type O2 is supplied with 1 metre of cable and 2x4mm plugs as standard.

NOTE: Types O1 and O3 are also available in Silver and Gold – add suffix S or G when ordering.

O1 – General



Technical Specification	
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Annular Ceramic
Diameter:	120x12mm
Combination:	Yes
Body Type:	Glass

O2 – Karl Fischer



Technical Specification	
Temp Range:	0-80°C
Diameter:	120x12mm
Combination:	Yes
Body Type:	Glass

O3 - General



Technical Specification	
Temp Range:	0-80°C
Diameter:	120x12mm
Combination:	No
Body Type:	Glass

O1-NS14/15-L – Redox Titration



Technical Specification	
Range:	0-1000mV
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Ceramic
Body Type:	Glass

O2-NS14/15-L – Karl Fisher Titration



Technical Specification	
Temp Range:	0-80°C
Body Type:	Glass

O3/5mmPt.Discx8mm/4mm



Technical Specification	
Range:	0-2000mV
Temp Range:	0-100°C
Diameter:	8mm
Body Type:	Glass
Plate Material:	99.99% Pure Platinum Disc

Combination Ion Selective Electrodes

These electrodes can be used with any conventional laboratory or hand held pH meter with a millivolt mode.

Cable length can be specified at the time of ordering. Maximum length is 10 metres. Standard products are fitted with 1 metre of cable terminated with a BNC connector.

Dimensions are: 120x12mm.

Main features and benefits include:

- No Reference electrode needed
- Available in fully submersible and water proof format
- Solid state sensors
- Ideal for unskilled operatives
- No filling solution required
- Virtually unbreakable
- Can be left dry for long periods
- Long lifetime



Order No.	Description	Concentration	Limits (ppm)	Temp Range °C	Main Interference's	pH Range	ISAB
362-75	Ammonium (NH ₄ ⁺)	0.5 – 5 x 10 ⁻⁵	9,000 – 0.9	0 – 50	K ⁺ , Na ⁺	0 – 8.5	CH ₃ COOH
368-75	Barium (Ba ²⁺)	10 ⁻¹ – 10 ⁻⁵	13,000 – 1.4	0 – 50	Sr ⁺⁺ , K ⁺ , Na ⁺	3 – 10	LiAc
375-75	Bromide (Br)	1 – 5 x 10 ⁻⁶	81,000 – 0.4	5 – 50	I ⁻ , CN ⁻ , S ⁻	1 – 12	5M KNO ₃
373-75	Cadmium (Cd ²⁺)	10 ⁻¹ – 1 x 10 ⁻⁶	11,200 – 0.1	5 – 50	Hg ⁺⁺ , Ag ⁺ , Cu ⁺⁺	3 – 7	5M KNO ₃
361-75	Calcium (Ca ²⁺)	10 ⁻¹ – 5 x 10 ⁻⁷	4,010 – 0.02	0 – 50	Ba ⁺⁺ , Al ⁺⁺⁺ , Sr ⁺⁺	3.5 – 11	KCl
364-75	Chloride (Cl)	1 – 3 x 10 ⁻⁶	35,000 – 1	5 – 50	I ⁻ , Br, CN ⁻ , S ⁻	1 – 12	5M KNO ₃
379-75	Cupric (Cu ²⁺)	10 ⁻² – 1 x 10 ⁻⁷	64,000 – 0.006	5 – 50	Hg ⁺⁺ , Ag ⁺ , S ⁻	2 – 7	5M KNO ₃
377-75	Cyanide (CN)	10 ⁻² – 1 x 10 ⁻⁶	260 – 0.03	5 – 50	I ⁻ , S ⁻ , Br ⁺	11 – 13	10M NaOH
365-75	Fluoride (F)	10 ⁻¹ – 1 x 10 ⁻⁶	1,900 – 0.02	5 – 50	CH ⁻	4 – 8	TISAB
376-75	Iodide (I)	1 – 5 x 10 ⁻⁷	127,000 – 0.06	5 – 50	CN ⁻ , S ⁻	2 – 12	5M KNO ₃
372-75	Lead (Pb ²⁺)	10 ⁻¹ – 1 x 10 ⁻⁶	20,800 – 0.02	5 – 50	Hg ⁺⁺ , Ag ⁺ , Cu ⁺⁺	3 – 7	LiAc
360-75	Nitrate (NO ₃)	1 – 7 x 10 ⁻⁶	62,000 – 0.4	0 – 50	Cl ⁻ , NO ⁻	2 – 11	4M (NH ₄) ₂ SO ₄
367-75	Perchlorate (ClO ₄)	1 – 2 x 10 ⁻⁶	99,500 – 0.2	0 – 50	I ⁻ , SCN ⁻ , NO ₃ ⁻	0 – 11	CH ₃ COONa
366-75	Potassium (K ⁺)	1 – 10 ⁻⁶	39,000 – 0.04	0 – 50	Cs ⁺ , NH ₄ ⁺	1 – 9	TEAC
371-75	Silver (Ag ⁺)	10 ⁻² – 1 x 10 ⁻⁷	107,900 – 0.01	5 – 50	S ⁻ , Hg ⁺⁺	1 – 9	5M KNO ₃
315-77	Sodium (Na ⁺)	3 – 10 ⁻⁷	69,000 – 0.002	0 – 50	Ba ⁺⁺ , Li ⁺ , K ⁺	1 – 9	SISAB
378-75	Sulphide (S ²⁻)	1 – 1 x 10 ⁻⁷	32,00 – 0.003	5 – 50	Ag ⁺ , Hg ⁺⁺	13 – 14	10MNaOH
380-75	Thiocyanate (SCN)	10 ⁻¹ – 2 x 10 ⁻⁶	5,800 – 1	5 – 50	I ⁻ , Cl ⁻ , S ⁻ , Br ⁻	2 – 12	5M KNO ₃
370-75	Water Hardness	2 x 10 ⁻¹ – 5 x 10 ⁻⁵	-	0 – 50	Ba ⁺⁺ , Cd ⁺⁺ , Cu ⁺⁺	4.5 – 10	LiAc
321-75	Ammonia (NH ₃)	1M – 10 ⁻⁶ M	0.02	0 – 50	Hydrazine & Aliphatic Amines	11 – 13	1M NaOH

MONO Ion Selective Electrodes - Require a Separate Reference Electrode – (see chart)

The SENTEK range of standard mono ion selective electrodes are ideal for applications where high accuracy is required, particularly where ion levels are low (<1ppm)

Order No.	Description	Concentration Range (Mol/L)	Lower Limits (ppm)	Temp Range °C	Ref. Elec.	Main Interference's	pH Range	ISAB
334-75	Ammonium (NH ₄ ⁺)	10 ⁻¹ – 10 ⁻⁶ M	0.02	0 – 50	R2	K ⁺ =1.2x10 ⁻¹ , Na ⁺ 2.0x10 ⁻³ , Mg ²⁺ =2.0x10 ⁻⁴	5 – 8	4M LiAc
312-75	Barium (Ba ²⁺)	1M-5 x 10 ⁻⁶ M	10	0 – 50	R2	Na ⁺ =4x10 ⁻⁴ , K ⁺ =9x10 ⁻³ , Ca ²⁺ = 2.5x10 ⁻²	5 – 9	4M LiAc
302-75	Bromide (Br)	1M-5 x 10 ⁻⁶ M	0.4	0 – 80	R2	I ⁻ , S ²⁻ , CN ⁻ must be absent, OH ⁻ =3 x 10 ⁻⁵ , Cl ⁻ =2.4x10 ⁻²	2 – 12	5M NaNO ₃
309-75	Cadmium (Cd ²⁺)	10 ⁻¹ – 10 ⁻⁶ M	0.2	0 – 80	R1	Ag ⁺ , Hg ²⁺ , Cu ²⁺ <10 ⁻⁷ M	3 – 7	5M NaNO ₃
310-75	Calcium (Ca ²⁺)	1M-5 x 10 ⁻⁷ M	0.02	0 – 50	R2	Mg ²⁺ , Ba ²⁺ , Pb ²⁺ , Zn ²⁺ , Na ⁺	4 – 9	4M KCl
301-75	Chloride (Cl)	1M-5 x 10 ⁻⁶ M	1.8	0 – 80	R2	Br, I ⁻ , CN ⁻ must be absent, S ²⁻ must be less than 10 ⁻⁷ M	2 – 11	5M NaNO ₃
306-75	Copper (Cu ²⁺)	1M-5 x 10 ⁻⁶ M	0.3	0 – 80	R2	S ²⁻ , Ag ⁺ , Hg ²⁺ should be absent, Cl ⁻ , Br ⁻ interfere	0 – 7	5M NaNO ₃
304-75	Cyanide (CN)	10 ⁻² – 10 ⁻⁶ M	0.03	0 – 80	R2	S ²⁻ , must be, <10 ⁻⁷ M, =1.0	10 – 14	5M NaOH
333-75	Fluoride (F)	1M-5 x 10 ⁻⁷ M	0.01	0 – 80	R1	OH ⁻ = 10 ⁻¹	4 – 8	TISAB
303-75	Iodide (I)	1M – 10 ⁻⁷ M	0.02	0 – 80	R2	S ²⁻ =10 ⁻¹ must be <10 ⁻⁷ M/CN=1.0	3 – 12	5M NaNO ₃
307-75	Lead (Pb ²⁺)	10 ⁻¹ -5 x 10 ⁻⁶ M	1.0	0 – 80	R2	S ²⁻ , Ag ⁺ , Hg ²⁺ should be absent, Cd ²⁺ , Cu ²⁺ , Fe ³⁺ , interfere	0 – 9	5M KNO ₃
311-75	Nitrate (NO ₃)	1M-5 x 10 ⁻⁶ M	0.08	0 – 50	R2	Cl ⁻ , NO ₂ ⁻ , Br ⁻ , SO ₄ ²⁻ , F ⁻ , ClO ₃ ⁻ , ClO ₄ ⁻	3 – 10	1M KH ₂ PO ₄
314-75	Potassium (K ⁺)	1M-10 ⁻⁶ M	0.04	0 – 50	R2	Na ⁺ , Ca ²⁺ , Rb ⁺ , Mg ²⁺ , Cs ⁺ , NH ₄ ⁺	4 – 9	TEAC
308-75	Silver (Ag ⁺)	1M-10 ⁻⁷ M	0.01	0 – 80	R2	S ²⁻ , Hg ²⁺ , must be absent	2 – 9	5M NaNO ₃
315-75	Sodium (Na ⁺)	Sat. -10 ⁻⁶ M	1ppb	-5 – +70	R2	Li ⁺ , K ⁺ , NH ₄ ⁺ /Ag should be absent	2 – 12	SISAB
305-75	Sulphide (S ²⁻)	1M-10 ⁻⁷ M	0.003	0 – 80	R1	Hg ²⁺ , Ag ⁺ must be absent	12 – 14	SAOB

Supplied with 1 metre of cable and a 2mm plug, as standard. (R1, R2, and R4)

R1 – Calomel (HgCl)



Technical Specification	
Temp Range:	0-50°C
Ref. Type:	HgCl
Junction Type:	Frit Ceramic
Body Type:	Glass
Dimensions:	120x12mm

R1/Ag



Technical Specification	
Temp Range:	0-50°C
Ref. Type:	AgCl
Junction Type:	Frit Ceramic
Body Type:	Glass
Dimensions:	120x12mm

R2 – (AgCl) Double Junction



Technical Specification	
Temp Range:	0-80°C
Ref. Type:	AgCl
Junction Type:	Frit Ceramic
Body Type:	Glass

R4-Ag/Cl



Technical Specification	
Temp Range:	0-100°C
Ref. Type:	AgCl
Junction Type:	Teflon
Body Type:	Epoxy

SENTEK can offer Electrodes to suit most Instruments on the market and offer a comprehensive design service for special electrode requirements.

Consult us for advice on applications.



Supplied with 1 metre of cable. ATC optional, please specify when ordering. Types K20, K21, K22 and K25 are glass free. Type K25 is a 4 ring cell.

SENTEK manufacture electrodes for many major OEM customer and welcome enquiries for custom built OEM products.

NOTE: When ordering conductivity cells please specify make and model of conductivity meter. For the K25, particular interest to instrument manufacturers.

K10 - General



Technical Specification

Range:	0-150mS
Temp Range:	0-50°C
Body Type:	Glass
Plate Material:	Platinum
Diameter:	120x12mm
Cell Constant:	K=1

K10-6mm – Test Tube and small volume measurements



Technical Specification

Range:	0-50mS
Temp Range:	0-80°C
Body Type:	Glass
Plate Material:	Platinum
Diameter:	6mm
Cell Constant:	K=1

K20 – Paints, Inks, Dyes, Foodstuffs



Technical Specification

Range:	0-10mS
Temp Range:	0-50°C
Body Type:	Epoxy
Plate Material:	Carbon
Diameter:	120x12mm
Cell Constant:	K=1

K21 – Pure Water



Technical Specification

Range:	0-500µS
Temp Range:	0-50°C
Body Type:	Epoxy
Plate Material:	Carbon
Diameter:	120x12mm
Cell Constant:	K=0.1

K22 – Solutions with High Conductivity



Technical Specification

Range:	0-0.5S
Temp Range:	0-50°C
Body Type:	Epoxy
Plate Material:	Carbon
Diameter:	120x12mm
Cell Constant:	K=10

K25 – General Purpose



Technical Specification

Range:	0-1S
Temp Range:	0-50°C
Body Type:	Epoxy
Plate Material:	Carbon
Diameter:	120x12mm
Cell Constant:	K=0.55

K30 – Flow Through



Technical Specification

Range:	0-150mS
Temp Range:	0-50°C
Body Type:	Glass
Plate Material:	Pt
Diameter:	120x12mm
Cell Constant:	K=1

K40 – Pure Water



Technical Specification

Range:	0-500µS
Temp Range:	0-50°C
Body Type:	Glass
Plate Material:	Pt
Diameter:	120x12mm
Cell Constant:	K=0.1

18MPRB-USP Measurement of DI Water



Technical Specification

Range:	0.055µS-200µS
Temp Range:	0-50°C
Body Type:	PVC
Plate Material:	316 Stainless Steel
Diameter:	12.7mm
Cell Constant:	K=0.08

K10-5mm



Technical Specification

Range:	0-50mS
Temp Range:	0-80°C
Body Type:	Glass
Plate Material:	Pt
Diameter:	5mm
Cell Constant:	K=1

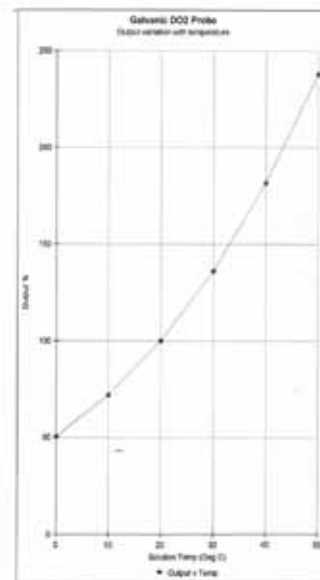
Galvanic – Maintenance Free DO2 Electrode

The unique sealed membrane allows ease of use of the DO2 sensor without the need for spare membranes and refilling solutions whilst still guaranteeing accurate results and long life.



Technical Specification

Measuring Range:	0-200%
Temp Range:	0-40°C
Max Operating Pressure:	1 BAR
Linearity:	This is a straight line
Output:	Zero mV in sodium sulphate zero solution, 35-55mV in air
Dimensions:	120x12mm
ATC:	Can be fitted on receipt of required value
Lifetime:	2 Years under normal usage



output approx 45mV at 35°C with 50% humidity

Polargraphic Dissolved Oxygen Electrode

SENTEK manufactures a polargraphic dissolved oxygen electrode, designed for laboratory measurements and has a standard 12mm body diameter.

In air-saturated water (20.9% Oxygen), the probe has an output of 600nA.

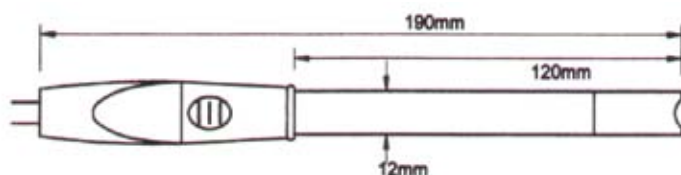
The residual output in zero oxygen solution is less than 1% of the output in saturated water.

One or two ATC sensors (Thermistor or PT100/1000) may be fitted to customers specific requirements. Replacing the Teflon membrane is quick and easy. Simply unscrew the old assembly, load the new one with fill solution and screw on to the electrode.

The electrode is supplied complete with 2 membrane assemblies and a 50ml bottle of filling solution.

A 50ml bottle of Zero Oxygen solution is available for calibration purposes.

When ordering replacement electrodes, please specify make and type of instrument for which the electrode is required.



Technical Specification

Description:	601/ABCD Polargraphic
Output at Saturation:	600nA ± 25%
Output at Zero Oxygen:	<1% saturation
Polarisation Voltage:	800mV
Membrane:	Teflon

When ordering please specify the following:

- A** = Length of cable required in metres
- B** = ATC element (Th=Thermistor or Pt=Platinum Resistance Element)
- C** = Resistance value of ATC
- D** = Connector Type

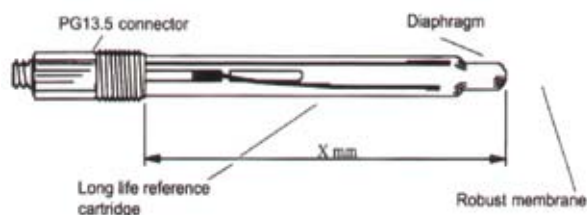
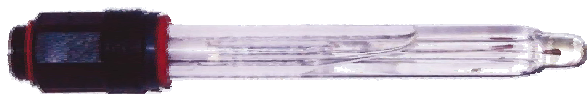
Example: 601/2m/Th10K/5Pin Din – which would be 601 with 2m cable, 10K Thermistor ATC and 5 Pin Din Connector.

pH Electrodes for all Steam Sterilisable and autoclavable applications.

- For all sterile biotech applications
- Almost zero maintenance
- PG13.5 compatibility
- Pressure resistant up to 10 BARS
- Minimum drift due to special reference-pH glass design

The Ster-Probe has been developed for use in food, beverage and pharmaceutical related applications. The combination of a special reference design and new pH glass formulation makes it the ultimate pH probe for your bio-reactor and ensures minimum drift, fast response and accurate pH readings. The Ster-Probe has a spherical shaped pH bulb, making breakage virtually impossible. The Ster-Probe can be used equally well in small bio-reactors and in large scale fermentation processes.

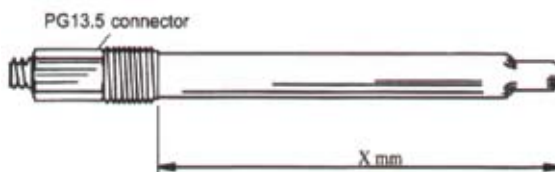
Cables, housings and accessories are also available. Please consult your dealer for additional information. Alternative lengths are available, details on request.



Technical Specification

pH Range:	0-14
Pressure Range:	Max. 10 BARS
Temp. Range:	0-135°C
Compatibility:	With all pH transmitters
Connector:	Euro-standard with PG13.5

Part No.	Type No.	Immersion Depth
135-75	GT135-B120-S8	120mm
135-76	GT135-B130-S8	130mm
135-77	GT135-B150-S8	150mm
135-78	GT135-B210-S8	210mm
135-79	GT135-B225-S8	225mm
135-80	GT135-B260-S8	260mm
135-81	GT135-B325-S8	325mm
135-82	GT135-B425-S8	425mm
135-83	GT135-B480-S8	480mm



Part No. Pt100	Part No. PT1000	Type No.	Immersion Depth
135-05	135-14	TP135-B120-S8	120mm
135-06	135-15	TP135-B130-S8	130mm
135-07	135-16	TP135-B150-S8	150mm
135-08	135-17	TP135-B210-S8	210mm
135-09	135-18	TP135-B225-S8	225mm
135-10	135-19	TP135-B260-S8	260mm
135-11	135-20	TP135-B325-S8	325mm
135-12	135-21	TP135-B425-S8	425mm
135-13	135-22	TP135-B480-S8	480mm

PI10 and KI10 are detachable lead electrodes. PI11 and KI11 are supplied with 5 metres of cables as standard. If additional length is required please specify when ordering. ATC can be built in, please specify when order.
PI10/KI10 = PG13.5 thread. PI11/KI11 = ¾ NPT.

PI10 – Industrial Pipeline



Technical Specification

pH Range:	0-14	Pressure: 10 BAR
Temp Range:	0-130°C	
Ref. Type:	AgCl	
Junction Type:	Porous Teflon	
Diameter:	120x12mm	
Combination:	Yes	
Body Type:	Glass	

PI11 – Industrial Dip



Technical Specification

pH Range:	0-14	Pressure: 100 PSI
Temp Range:	0-100°C	
Ref. Type:	AgCl	
Junction Type:	Porous Teflon	
Diameter:	150x25.9mm	
Combination:	Yes	
Body Type:	Ryton	

KI10 – Industrial Pipeline



Technical Specification

Range:	0-200mS	Pressure: 3 BAR
Temp Range:	0-70°C	
Body Type:	Glass	
Plate Material:	Pt	
Diameter:	120x12mm	
Pressure (psi):	100	
Cell Constant:	K=1	

KI11 – Industrial Dip



Technical Specification

Range:	0-10mS	Pressure: 5 BAR
Temp Range:	0-50°C	
Body Type:	Ryton	
Plate Material:	Carbon	
Diameter:	150x25.4mm	
Pressure (psi):	100	
Cell Constant:	K=1	

OI10 – Rough applications with high/low pH levels, viscous, solutions, gelatins



Technical Specification

Range:	0-1000mV	Pressure: 10 BAR
Temp Range:	0-130°C	
Ref. Type:	AgCl	
Junction Type:	Porous Teflon	
Diameter:	12mm	
Combination:	Yes, Double Junction	
Body Type:	Glass	

OI11 – General Industrial Use, Dip applications



Technical Specification

Range:	0-1000mV	Pressure: 100 PSI
Temp Range:	0-80°C	
Ref. Type:	AgCl	
Junction Type:	Porous Teflon	
Diameter:	25mm	
Combination:	Yes, Double Junction	
Body Type:	Glass Filled PPS	

P14/DJ/S8



Technical Specification

pH Range:	0-14
Temp Range:	0-80°C
Ref. Type:	Double Junction AgCl
Junction Type:	Teflon
Diameter:	12mm
Combination:	Yes
Body Type:	Epoxy
Pressure:	5 BAR

O14/DJ/S8



Technical Specification

Range:	0-2000mV
Temp Range:	0-80°C
Ref. Type:	Double Junction AgCl
Junction Type:	Teflon
Diameter:	12mm
Combination:	Yes
Body Type:	Epoxy
Pressure:	5 BAR

K20/S8



Technical Specification

Range:	0-10mS
Temp Range:	0-80°C
Diameter:	12mm
Body Type:	Epoxy
Pressure:	10 BAR
Plate Material:	Graphite
Cell Constant:	K=1

O14/DJ/S8



Technical Specification

Range:	0-500μS
Temp Range:	0-80°C
Diameter:	12mm
Body Type:	Epoxy
Pressure:	10 BAR
Plate Material:	Graphite
Cell Constant:	K=0.1

K22/S8



Technical Specification

Range:	0-500mS
Temp Range:	0-80°C
Diameter:	12mm
Body Type:	Epoxy
Pressure:	10 BAR
Plate Material:	Graphite
Cell Contacts:	K=10

K20 Low Cost Conductivity



Technical Specification

Range:	0-2mS
Temp Range:	0-45°C
Body Type:	PVC
Pressure:	10 BAR
Plate Material:	Graphite
Cell Contact:	K=1

K40 Low Cost Conductivity



Technical Specification

Range:	0-500μS
Temp Range:	0-45°C
Body Type:	PVC
Pressure:	10 BAR
Plate Material:	Graphite
Cell Constant:	K=0.1

K=0.01 Stainless Steel Low Cost Conductivity



Technical Specification

Range:	0-100μS
Temp Range:	0-45°C
Body Type:	PVC
Pressure:	10 BAR
Plate Material:	Stainless Steel
Cell Constant:	K=0.01

Features and Procedures

The EconoRUSH™ Sensor Holder is designed to allow replacement of 12mm diameter x 120mm long electrodes without interrupting the process flow.

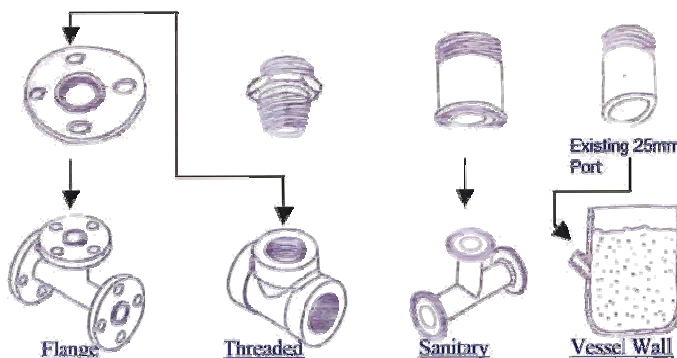
It utilises the 25mm port system, a unique gimbal mounting, o-rings with low compression set, and the majority of parts are constructed of stainless steel (316L).



Installation and Use

Mounting: The EconoRUSH™ Sensor Holder was designed to be used with the 25mm (44mm long) port system that is used throughout the Bio Pharmaceutical Industry. For other industries there are a series of adapters.

One adapts the 25mm port to 1 ¼" NPT. Other sizes can be 1", 1 ½", and 2" NPT or additional process type threads. Another adapter is for interfacing to a 1 ½" Sanitary Flange. Other sizes available are 2" and 2 ½". Other adapters can be realised as needed with some limits on size.



Mounting the Electrode

To mount the Electrode into the holder, the existing O-ring and washer need to be removed from the electrode.

The Gimbal is then screwed onto the electrode and then fitted into the holder.

The Gimbal Nut is then screwed on top to hold the electrode in place.



Orientation: There are two orientations as aspects to be considered when installing the holder onto the process fitting. The first is to decide the orientation of the Actuating Handle. It should be orientated such that it can be easily operated and will not interfere with, or be interfered by, other elements in the processing surroundings.

This orientation can be done simply by directing the Handle in the desired position and tightening the Port Nut.

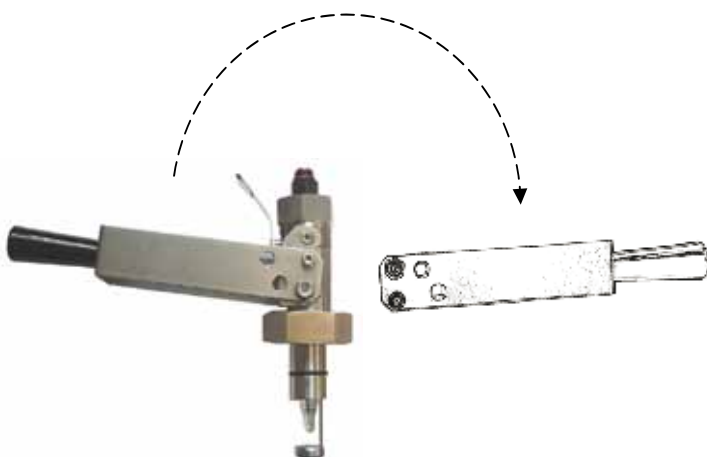
The other aspect to be considered is the orientation of the "finger" where the sensor extends into the process. Depending on the process, this finger may need to be situated between the flow and the sensor where it provides a great deal of protection.



Other situations may dictate that the finger not hinder any of the flow and be situated at 90 degrees. In any case, this is accomplished by removing the two attachment bolts, the Latching post, and the Solution Ground Post at the top of the Sensor Body, rotating the Sensor Body in 90 degree increments relative to the Main Body and attached the bolts and posts.

!!Caution!! This procedure should not be done when the EconoRUSH™ is installed in an active process situation. The attachment bolts removed are holding the Sensor Body in place and the full force of the process will be active.

Actuation: Actuation of the EconoRUSH™ Sensor Holder is an easy one stroke movement. Grasp Actuating Handle with one hand. With the other hand, pull the Latching Band away from the Latching Post, freeing the actuating mechanism. Smoothly manipulate the Actuating Handle and secure the latch once in position. The latching system provides a two-action procedure to avoid inappropriate operation.



* Security Lock Fitted

Installation & Use Continued

Sensor Replacement: With the EconoRUSH™ Sensor Holder installed, the sensor can be easily replaced without shutting down the process. Manipulate the Actuating Handle to the retracted mode. Remove the Gimbal Nut. Carefully twist out the sensor/Gimbal assembly from the o-ring seals.

!!Caution!! A small portion of the process fluid, at the process pressure, was entrapped and may spew forth.

Remove the Gimbal from the old sensor. Mount the new sensor (see above) and manipulate the Actuator Handle into the measuring mode.

SECURITY: By fitting the extended padlock, the system can be locked in its restricted or inserted mode to prevent unauthorised tampering.

Accessories

Available for the EconoRUSH™ Holder:



Sanitary



Security Lock



Threaded

PG13.5 Electrodes

P14/SG/S8



O14/DJ/S8



Technical Specification	
pH Range:	0-14
Temp Range:	0-60°C
Ref. Type:	AgCl
Junction Type:	Porous Teflon
Dimension:	120x12mm
Combination:	Yes
Body Type:	Epoxy
Pressure:	5 BAR
Termination:	S8 Cap

Technical Specification	
Range:	0-2000mV
Temp Range:	0-80°C
Ref. Type:	Double Junction AgCl
Junction Type:	Teflon
Dimensions:	120x12mm
Combination:	Yes
Body Type:	Epoxy
Pressure:	5 BAR
Termination:	S8 Cap



255-75 - Flow Through Cell



775-70 – Electrode
Storage Bottle
791-97 – pack of 3



750-39 – NS14-15
Adaptor



743-01 – Bulb
Protector



521-13 – Swing Arm
Electrode Holder

pH Buffer Capsules – supplied per box of 50 (100mls per capsules)



790-13 – pH4



790-17 – pH7



790-20 – pH9



790-21 – pH10



791-15 – Cleaning
Solution 150ml
791-65 – Storage
Solution 150ml

Reference Filling Solutions – 150ml

551-53 – LiAc

551-54 – TEAC.

551-55 – LiCl

551-56 – NH₄ Cl

551-64 – KCl

551-65 – KNO₃

551-66 – NaNO₃

551-68 – 3M KCl/AgCl

551-69 – (NH₄)₂SO₄

Other Solutions

551-63 – 3.5M KCL/AgCl Partial Gel (for P17 & P21 Electrodes)

551-71 – Fill Solution for Polarographic DO₂ Electrode (30ml)

551-72 – Fill Solution for Galvanic DO₂ Electrode (30ml)

551-73 – Zero Solution for Dissolved Oxygen Electrode (500ml)



BNC



DIN



CLSCH S7/S8



2mm Pin



No.7



Jack



Banana



BNC Socket



8 Pin Din



US Standard



Lemo

530-14 US Std Socket/BNC
530-20 BNC Socket/DIN 19262
530-21 BNC Socket/US Std Plug
530-22 S7/S8 to BNC with 1 Metre Cable
530-34 BNC Socket/US Std Plug & Reference Pin

530-35 BNC Socket/3.5mm/2mm
530-36 BNC Socket/No.7
530-37 4mm Socket/2mm
530-38 2mm Socket/3mm
530-40 BNC Socket/Coax

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N.B.: All specifications are subject to change without prior notice.

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