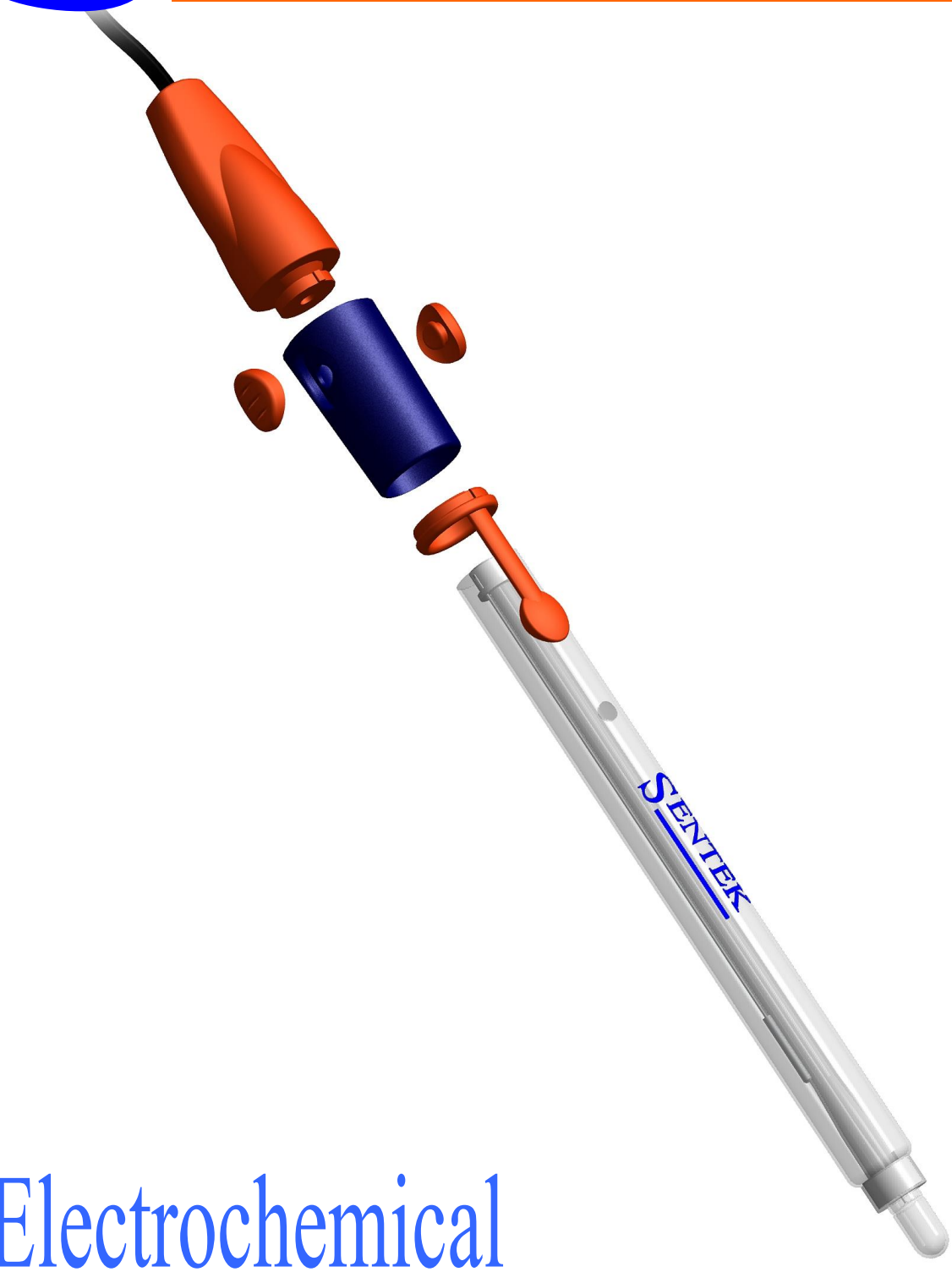
SENTEK



Electrochemical Sensors

Electrode Selection Chart

(Laboratory Products)

Sample Type	PI10/LAB	P11	P11HA	P12	P13	P14	P15	P16	P17	P18	P19	P20
Agar	X	X	X	X	X	X	X	X	✓	X	X	X
Alkalines (high)	✓	X	✓	X	X	X	X	X	X	X	X	X
Beer	✓	✓	X	✓	✓	✓	X	X	✓	X	X	✓
Blood Products	✓	✓	X	✓	✓	*	X	*	✓	X	X	*
Bread, Dough	✓	X	X	X	X	X	X	X	*	✓	✓	X
Cement	✓	✓	✓	*	*	*	X	X	*	*	*	*
Cosmetics	✓	✓	X	✓	✓	✓	*	X	✓	*	*	*
Dairy Products	*	✓	X	✓	✓	*	*	X	✓	*	✓	X
Education	✓	✓	*	*	*	✓	*	*	✓	*	*	✓
Fats/Cream	✓	*	X	*	X	X	X	X	*	*	✓	X
Field Use	*	*	X	X	X	✓	✓	X	✓	✓	*	✓
Fish Products	✓	*	X	*	*	*	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	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	X
Photographic	✓	X	✓	X	X	X	X	X	X	X	X	X
Soil	X	*	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
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.
Biological
Chemistry

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 - 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

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 Cermic		
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 – 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		

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		

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		

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		

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:	AgCl		
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:	AgCl		
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

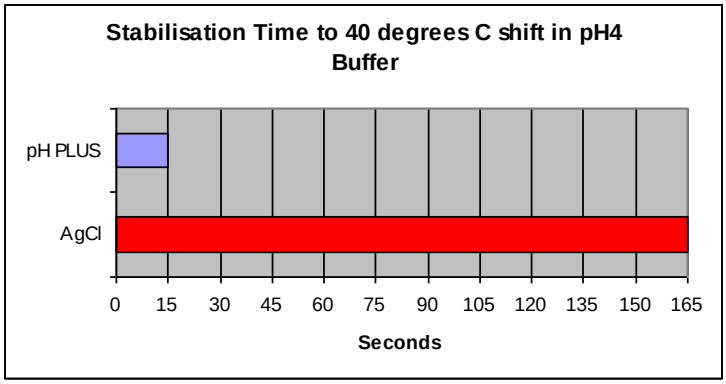
PR1 – Use with P10 and ISE's

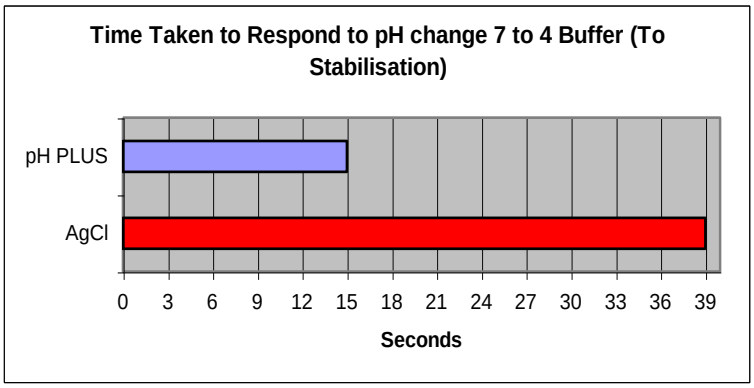
Technical Specification	
Temp Range:	0-100°C
Junction Type:	Annular Ceramic
Stem Diameter:	120x12mm
Body Type:	Glass

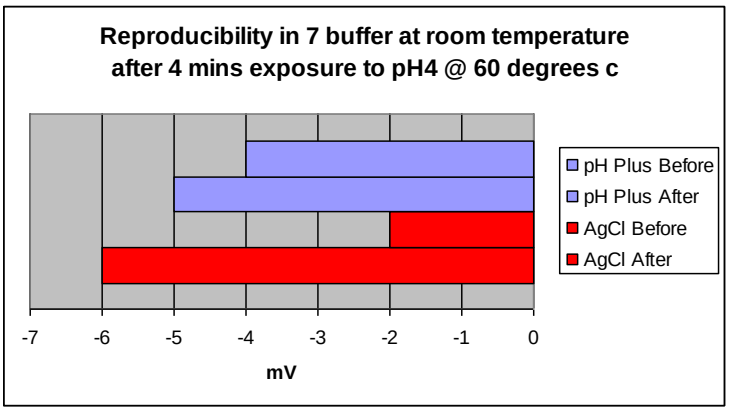
Advantages of using pH PLUS

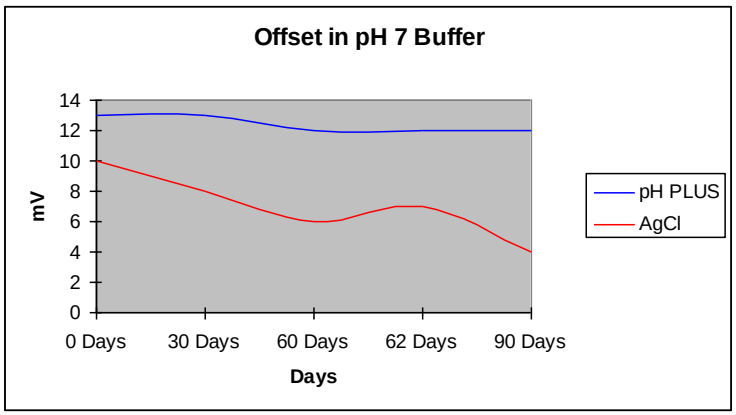
* Quick Calibrations. Response time in pH Buffers is remarkable. (see fig. 2).

Faster measurements. pH PLUS electrodes reach equilibrium in samples significantly faster than conventional electrodes, especially when there is temperature variation.
(see Fig. 1)









- 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 hysterisis (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.

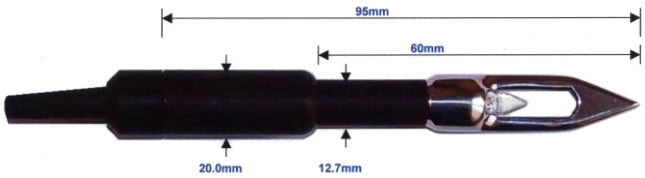
Stainless Steel Tip protects pH electrode inserted in frozen meat

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



P29 – Micro Food Penetration Probe
Application – Cheese, Meat, Fish and Fruit

Technical Specification	
pH Range:	0-14
Temp Range:	0-50°C
Ref. Type:	Double Junction
Junction:	Open
Body Material:	PVC

SENTEK

Solid Gel Electrodes & Educational Electrode

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 duo 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 filing.

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 Titrator 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
Tamp 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^{0} – 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 $(NH_4)_2SO_4$
367-75	Perchlorate (ClO_4^-)	1 – 2 x 10^{-6}	99,500 – 0.2	0 – 50	I^-, SCN^-, NO_3^-	0 – 11	CH_3COONa
366-75	Potassium (K^+)	1 – 10^{-6}	39,000 – 0.04	0 – 50	Cs^+, NH_4^+	1 – 9	TEAC
371-75	Silver (Ag^+)	10^{0} – 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^{-5}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_2PO_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/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

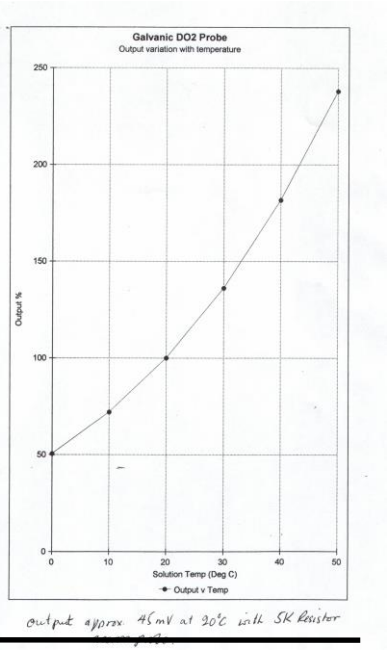
Technical Specification	
Range:	0.055µS-200µS
Temp Range:	0-50°C
Body Type:	PVC
Plate Material:	316 Stainless Steel
Diameter:	12.7mm
Cell Constant:	K=0.08

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.



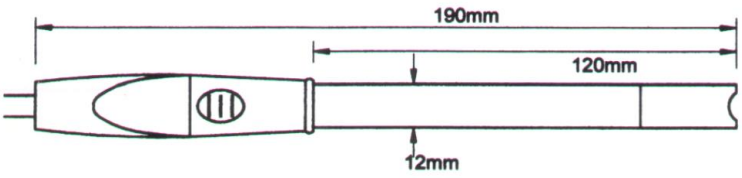
Technical Specification	
Measuring Range:	0-200%
Temp Range:	0-40°C
Max Operating Pressure:	1 BAR
Linearity:	This is a straight line
Output:	Zero mV in sodium sulphate zero solution, 35-55mV in air
Dimensions:	120x12mm
ATC:	Can be fitted on receipt of required value
Lifetime:	2 Years under normal usage

Polargraphic Dissolved Oxygen Electrode

SENTEK manufacturers 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

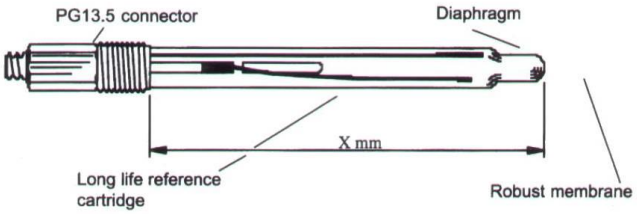
Example: 601/2m/Th10K/5Pin Din – which would be 601 with 2m cable, 10K Thermistor ATC and 5 Pin Din Connector.

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

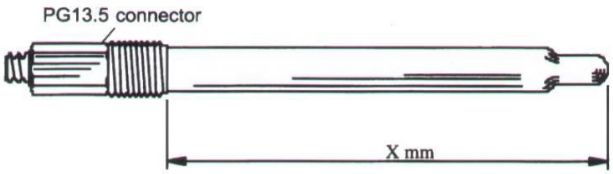
The Ster-Probe has been developed for use in food, beverage and pharmaceutical related applications. The combination of a special reference design and new pH glass formulation makes it the ultimate pH probe for your bio-reactor and ensures minimum drift, fast response and accurate pH readings. The Ster-Probe 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

K21/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

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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SENTEK

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BS EN ISO 9001:2008
Certificate No. FM 36099

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

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