



## pH and ORP Electrodes-Selection Guide

As part of our product range, Rotek now supply 100% Australian designed and manufactured pH, ORP/Redox and Ion Selective sensors to suit most laboratory and industrial applications. This guide provides an overview of the standard product range, recommendations for use and applications as well as pH sensor bulb specialised glass choices, sensor bulb types, body construction and junction types. A choice of shielded cable lengths and terminations (including BNC and separate pin). Custom manufacturing is also available should you have a specialised requirement not covered in the standard range.

### ELECTRODES & SENSORS

**SELECTION GUIDE** ↘

**APPLICATION GUIDE** ↘

**TECHNICAL DATA** ↘

**SPECIFICATIONS** ↘

**OEM CORE COMPETENCIES** ↘



**UNEQUALLED SINCE 1972**



*Pure Water. Simple Solutions*



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# SELECTION GUIDE

## Electrodes and sensors



tech  
SUPPORT  
1972



All-purpose sensors with super long life, heavy duty performance, renewable junction and simple cleaning. Recommended for virtually any application.

### IJ Intermediate Junction DEFEATS CONTAMINATION:

- Removable sleeve gives easy access for routine cleaning and renewal of junction
- Secondary junction is isolated from direct contact with the sample.
- Unequalled in food, wine and dairy, contaminated waste samples, industrial and mining applications, petro-chemical, plating and countless others.

### IDEAL FOR DIRECT PENETRATION:

- Toughened membrane and time proven glass formula with a strong polymer or kynar body.
- Chosen by Meat & Livestock Association of Australia.
- Chosen by leading winemakers for over 20 years.
- Preferred for difficult samples by leading laboratories
- Time-proven toughness for the factory floor, field applications and demanding laboratory environments.

### SELECTABLE ELECTROLYTE:

- Users can optimize the electrolyte to suit the sample.
- Ideal for non-aqueous measurements and titrations, ion selective measurements and chloride/salt titrations.
- Appropriate in pharmaceutical, oil analysis, food & dairy.

### A SAFER & MORE SIMPLE CHOICE TO REPLACE CALOMEL SENSORS:

- No exposure to hazardous Mercury
- No need for special disposal procedures.
- Fits directly into an Eppendorf style tube and requires only 0.25ml sample.
- Superior in life science and bio-medical application.

### pH INTERMEDIATE JUNCTION



**IJ-40**  
BULLET  
**IJ-44**  
SPEAR  
**IJ-46**  
FLAT FLOW

### ORP/METAL INTERMEDIATE JUNCTION



**IJ-64**  
Pt ORP  
**IJ-Ag**  
Silver Billet  
**IJ-Au**  
Gold ORP

### ION SELECTIVE INTERMEDIATE JUNCTION



Fluoride  
Cyanide  
Bromide  
Iodide  
Chloride  
Sulphide  
Ammonia

**IH** Economical, robust and recommended for use in many diverse applications including aquaculture, hydroponics, swimming pools, water treatment, environmental, corrosion and teaching. The Ionode Ag/AgCl double junction pedigree gives fast, accurate results with super-long life and is the right choice for routine use in reasonably clean samples through to more challenging applications. Easy clean bullet membrane, water-proof to 30ft/10m and available with automatic temperature compensation.

### DOUBLE JUNCTION SEALED GEL



**IH-10**  
Reference  
**IH-30**  
ORP  
**IH-40**  
Sealed Gel  
pH 0-12

**P** SERIES represents exceptional value for money and is a low maintenance traditional refillable single junction Ag/AgCl reference. Ideal for teaching labs, education and routine laboratory applications. The PBFA with 3 porous frits is particularly suited to measurements in poorly buffered water samples.

### P SERIES SINGLE JUNCTION REFILLABLE



**PBFA pH**  
pH 0-12  
**PBFC pH**  
pH 0-14  
**PRFO**  
ORP  
**PJFO**  
Reference Electrode

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# pH APPLICATION GUIDE

✓ Recommended Probe

✓ Suitable Probe

	IH40A	IH40C	IH46	IJ44A	IJ44C	IJ40A	IJ40C	IJ44C-HT	IJ40C-HT	PBFA	PBFB	PBFC
Acid / Base Titrations			✓		✓				✓			
Alkaline solutions		✓		✓		✓				✓		
Biodiesel			✓		✓							
Contaminated Solutions				✓		✓						
Chemical industries	✓			✓		✓	✓	✓				
Dairy Products			✓	✓								
Emulsions & Creams			✓		✓							
Environmental	✓				✓							
Education/Teaching	✓				✓						✓	
Field Use	✓				✓							
Flat Surfaces			✓									
Food			✓	✓			✓					
Hydroponics	✓				✓							
High temperature >60°C							✓	✓				
Life Sciences / Tris			✓		✓							
Low temperature <10°C	✓											
Meats & cheese (penetration)			✓	✓			✓					
Minerals & Minerals Processing				✓		✓	✓	✓				
Plating baths				✓		✓		✓				
Poorly Buffered Solutions					✓				✓			
Sewage / Waste Water			✓	✓	✓							
Small Sample Volumes		✓	✓									
Soil Suspensions				✓	✓							
Wine, Juice & Beverages				✓	✓							
Water treatment & recycling	✓				✓							

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# TECHNICAL DATA

## Electrodes & Sensors



### Typical applications include:

- Direct connection to laboratory instrumentation
- Portable pH, ORP and ISE instruments
- Direct connection for chemical dosing pumps where inputs for pH and/or ORP sensors are available
- pH and ORP controllers

## pH BULB TYPE



### Spear (Eg IJ44A)

- For direct penetration (eg Meat & Cheese)
- Ideal for food
- Small samples (Approx. 400µL in microtubes)
- Tough membrane



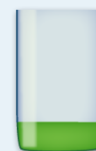
### Bullet (Eg IJ40A)

- General purpose
- Easy to clean
- Fast response



### Bulb (Eg PBFA)

- General purpose
- Lab use
- Fastest response
- Suitable for poorly buffered samples



### Flat (Eg IH46)

- Flat samples
- (eg Paper & Plastic)
- Small sample volumes

## BODY TYPE

Ionode pioneered the process of injection moulding polypropylene for electrode bodies. Unlike other polymers such as epoxy, injection moulded polypropylene has the advantage of being able to be moulded to specific and complex shapes allowing designs like the IH & IJ series to be robust, waterproof and submersible. Polypropylene is also chemically resistant to attack by various acids and bases and many organic solvents. Kynar probes made from PVDF offer enhanced temperature and chemical resistance properties and approach those of glass but with far more strength and durability.

From laboratory to the factory floor – Ionode probes offer benefits of chemical and mechanical resistance, making them highly suitable for all types of measurements either in the field, laboratory or in challenging industrial environments.

	Chemical Resistance	Max Temp.	Waterproof	Durable	Field Use	Lab Use
Kynar (PVDF)	Excellent	100°C	✓	✓	✓	✓
Polypropylene	Good	60°C	✓	✓	✓	✓
Glass	Excellent	100°C	✗	✗	✗	✓



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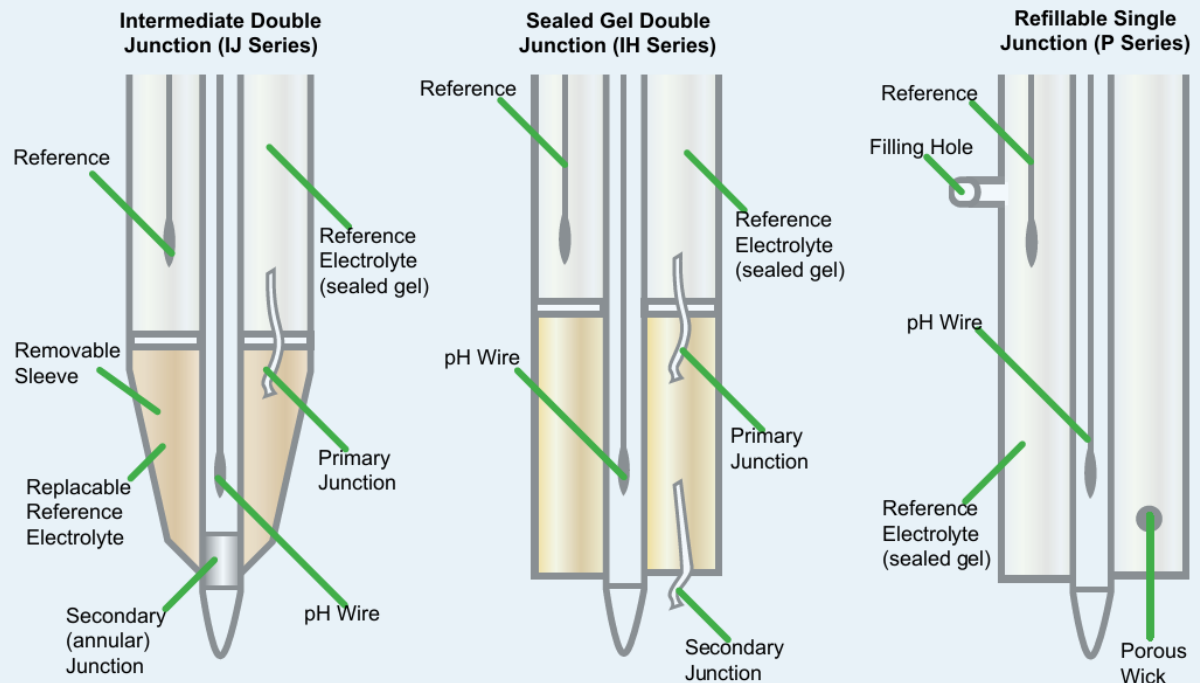
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## JUNCTION TYPE

All electrodes are only as good as their reference junction and over many years of diverse applications, the unique **IJ Reference** (*Intermediate Junction*) has faithfully provided reliable and accurate measurements in just about any sample type. Whether used in demanding applications such as food processing, dairy, industrial waste, or minerals processing, Ionode's Intermediate Junction is the ideal choice as the sample does not come into direct contact with the reference and thus extends electrode life considerably. Additionally, the annular ring junction (polymer on ground joint) assures free-flow under of all conditions, including those with high contaminant loads and even those of poor buffering capacity. To further ensure optimal performance and long life, users can easily remove the sleeve junction for simple cleaning and electrolyte replacement. Users can even use different sleeve electrolytes such as potassium nitrate or lithium acetate for special applications to ensure maximum versatility. For routine and/or economy measurements, Ionode manufacturer double junction sealed-gel types and single junction refillable types for maximum performance to price ratio.



## SPECIALISED GLASS FORMULATIONS

Ionode has many years experience in the development and manufacture of proprietary pH glass manufacture and continuing research allows for optimum formulations which assure the best compromise between chemical resistance and performance. An automated propriety glass bulb manufacturing process ensures absolutely consistency in bulb manufacture for maximum uniformity and reliability.

Ionode pH bulbs offer high chemical resistance and performance along with time-proven resistance to breakage and are commonly used for direct insertion into cheese and meat carcasses by high volume process environments.

Ionode "A" glass formulations are designed for general use at pH ranges from 0-12 and offer low electrical resistance especially if used in the bullet/dome membrane shape. 'A' glass is suited to temperatures from 60°C down to just a few degrees.

The "C" glass formulations are designed for measurements over the pH range of 0-14 and can be used for more harsh conditions and at higher temperatures (up to 100°C).

Standard membrane shapes are bullet/dome for general use, spear tip for food/penetration measurements and a flat membrane for measurements on paper/fabrics etc.



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# SPECIFICATIONS

## pH INTERMEDIATE JUNCTION



**IJ-40**  
BULLET  
**IJ-44**  
SPEAR  
**IJ-46**  
FLAT FLOW

## ORP/METAL INTERMEDIATE JUNCTION



**IJ-64**  
Pt ORP  
**IJ-Ag**  
Silver Billet  
**IJ-Au**  
Gold ORP

IJ SERIES					
Model	Parameter	Range	Sensor	ATC	High Temp
IJ-40A	pH	pH 0-12	A glass Bullet	Optional	Optional
IJ-40C	ph	pH 0-14	C glass Bullet	Optional	Optional
IJ-44A	pH	pH 0-12	A glass spear	Optional	Optional
IJ-44C	pH 0-100°C	pH 0-14	C glass spear	Optional	Optional
IJ-46	pH	pH 0-12	Flat	Optional	Optional
IJ-64	ORP	±2000mV	Platinum	NA	Optional
IJ-Ag	Ag, Cl by titration	±2000mV	Silver billet	NA	NA
IJ-Au	ORP	±2000mV	Gold wire	NA	Optional
IJ-14	Ref		Ref	NA	Optional

Standard temperature range 0-60°C, HT range 0-100°C  
High Temp. sensors are of Kynar construction for higher resistance to solvents, higher operating temperatures and increased strength and rigidity.

## ION SELECTIVE INTERMEDIATE JUNCTION



Fluoride  
Cyanide  
Bromide  
Iodide  
Chloride  
Sulphide  
Ammonia\*

IJ SERIES - ION SELECTIVE (*Gas sensing)				
Model	Ion(s)	Range ppm	pH range	Interferences
IJ-F	Fluoride F <sup>-</sup>	0.02-19,000	5-7	OH <sup>-</sup>
IJ-Cl	Chloride Cl <sup>-</sup>	1.8-35,500	2-12	S <sup>2-</sup> , Br <sup>-</sup> , I <sup>-</sup> , CN <sup>-</sup>
IJ-Br	Bromide Br <sup>-</sup>	0.79-79,900	2-12	I <sup>-</sup> , S <sup>2-</sup> , CN <sup>-</sup>
IJ-I	Iodide I <sup>-</sup>	0.013-130,000	2-12	Br <sup>-</sup> , CN <sup>-</sup> , S <sup>2-</sup>
IJ-CN	Cyanide CN <sup>-</sup>	0.05-25	9-14	S <sup>2-</sup> , I <sup>-</sup> , Br <sup>-</sup>
IJ-Ag <sub>2</sub> S	Sulphide Ag <sup>+</sup> /S <sup>2-</sup>	0.01-107,900 Ag <sup>+</sup>	2-8	Hg <sup>+</sup> , Hg <sup>2+</sup>
		0.03-32,100 S <sup>2-</sup>	>11	
ISE-NH <sub>3</sub>	Ammonia NH <sub>3</sub>	0.01 - 17,000	>11	Volatile amines

## DOUBLE JUNCTION SEALED GEL



**IH-10**  
Reference  
**IH-30**  
ORP  
**IH-40**  
Sealed Gel  
pH 0-12

IH SERIES				
Model	Parameter	Range	Sensor	Temperature Comp.
IH40A	pH	pH 0-12	A glass bullet	Optional
IH40C	pH	pH 0-14	C glass Bullet	Optional
IH30	ORP	±2000mV	Platinum	NA
IH10	Ref		Ref	NA

## SINGLE JUNCTION SEALED GEL



**ECO pH**  
BULB pH 0-12  
**ECO ORP**  
PLATINUM

ECO SERIES				
Model	Parameter	Range	Sensor	Temperature Comp.
EcopH	pH	pH 0-12	A glass bulb	Optional
EcoORP	ORP	±2000mV	Platinum	NA

## P SERIES SINGLE JUNCTION REFILLABLE



**PBFA pH**  
pH 0-12  
**PBFC pH**  
pH 0-14  
**PRFO**  
ORP  
**PJFO**  
Reference Electrode

P SERIES			
Model	Parameter	Range	Sensor
PBFA	pH	pH 0-12	A glass bulb / 3 frits (LIS)
PBFC	pH	pH 0-14	C glass bulb
PJFO	Ref	-	Reference
PRFO	ORP	±2000mV	Platinum wire

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## OEM CORE COMPETENCIES

- Manufacture of pH & ORP sensors
- Manufacture of pool sensor components
- Value-added products and services
- Fixed Pricing
- Competitive advantages
- Dynamic consulting systems

### You're in good hands ...

In 1972 Ionode created a benchmark in the development and manufacture of electro-chemical sensors and today preserve an outstanding global reputation for delivering the things that really count. Reliability, performance and a real readiness to contribute to the growth of clients requiring products and services from within the Ionode portfolio.

#### Ionode clients receive:

- Time proven practices & product designs
- Benchmark reliability & performance
- Dynamic consulting & information services to call on
- Outstanding customer service principles
- Benefits of an ever-widening focus on research & development, allowing you to concentrate directly on your own core values and expertise.

#### Ionode R & D can:

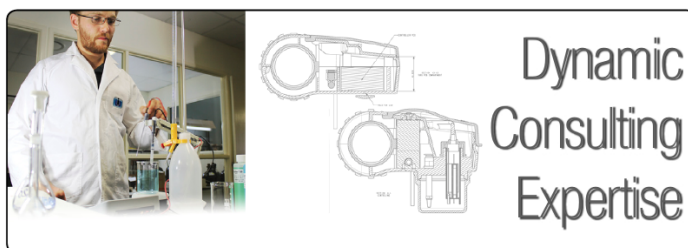
- Develop & prototype pool probes to your needs
- Develop custom sensor solutions to your needs
- Consult directly with stakeholders on complex issues

#### Ionode Production can:

- Produce in high or low volumes at high speed
- Produce for direct replacement of existing sensors
- Private label & contract manufacturing
- Produce stems & components to order

#### Ionode Consulting can:

- Provide expert advice on matters of electro-chemistry
- Provide expert qualified advice on matters of electronics - including design & implementation
- Consult on software & firmware design & development
- Advise on marketing, promotion & commercial opportunities
- Provide troubleshooting solutions & project assistance



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