

## Reference Electrode Potentials @ 25°C

Reference Type	Electrolyte	Potential. mV vs. SHE
Hg/Hg <sub>2</sub> Cl <sub>2</sub>	Sat. KCl	244
Hg/Hg <sub>2</sub> Cl <sub>2</sub>	1M KCl	280
Ag/AgCl	Sat. KCl	199
Ag/AgCl	3.5M KCl	205
Ag/AgCl	1M KCl	236
Ag/AgCl seawater	Seawater	Approx 250
Hg/Hg <sub>2</sub> SO <sub>4</sub>	Sat. KCl	650
Cu/CuSO <sub>4</sub>	Sat. KCl	316

## Warranty

IJ electrodes have a pro-rata warranty of 12 months from date of purchase. Any electrode found to be faulty due to manufacture within this time will be replaced.

Ionode reserves the right to limit or modify product warranty if it is deemed that the electrode has been used in unsuitable applications.

IJ electrodes have an expected lifetime of 2-4 years in ideal samples at room temperature. This may be reduced in chemically aggressive or abrasive samples and at high temperatures.

Please visit [www.ionode.com](http://www.ionode.com) to register your purchase as soon as you receive your electrode.

## Intermediate Junction Series

# IJ14

Reference Electrode

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## Troubleshooting

Symptom	Possible cause	Remedy
Drift	Junction blocked	Remove sleeve. Clean glass stem and sleeve. Refill with electrolyte and replace sleeve.
	Air bubbles in sleeve electrolyte	Remove sleeve and replace electrolyte (see preparation)
Noisy/Off scale	Insufficient electrolyte	Refill electrolyte
	Poor connection	Check connection
	Junction not immersed fully	Lower electrode into solution below junction
	Insufficient electrolyte	Refill electrolyte

Parameter	Operating Range
Half-cell potential	-44mV ± 10mV with respect to SCE (saturated calomel electrode)
Reference type	Double Junction Ag/AgCl/sat KCl
Temperature range	0 – 60°C
Sleeve electrolyte	KCl gel electrolyte is supplied as standard. Other electrolytes such as sat KCl, KNO <sub>3</sub> and LiCl in ethanol can be used depending on the application
Body and sleeve	Polypropylene
Overall length	150mm
Barrel diameter	12mm
Cable length	1m standard, longer to order. Maximum 50m
Connector	4mm banana plug standard, others on request



## Introduction

The IJ14 is a double junction Ag/AgCl reference electrode suited for use with a wide variety of indicator electrodes such as pH, ISE and metal half-cells. The double junction design allows the user to select electrolytes suitable for use with the majority of ion selective electrode half-cells. Suitable electrolytes commonly used include KCl, KNO<sub>3</sub>, NH<sub>4</sub>NO<sub>3</sub>, and ethanolic LiCl. The IJ14 can also be used to monitor potentials of various processes such as corrosion.

This guide contains the basic information for correct use and maintenance of your new IJ14 reference electrode. A more comprehensive manual is available for download from [www.ionode.com.au](http://www.ionode.com.au)

## Preparation

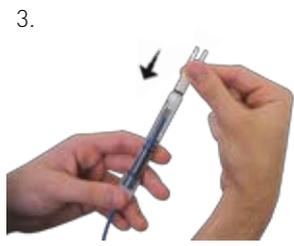
IJ14 series electrodes are shipped without sleeve electrolyte, and must be filled prior to use. To fill, hold the electrode by the sleeve and gently ease off the rubber wetting cap. Prepare as follows:



1. Invert the electrode. Hold the electrode just below the sleeve and with careful rotation and pulling along the axis of the electrode, remove the sleeve. DO NOT BEND.



2. Fill the annular space with gel or electrolyte to approximately half to three quarter full.



3. Slide the sleeve back onto the electrode ensuring the black O-ring is well seated within the electrode body. Do not exert side-ways force. Any excess electrolyte will be expelled from the end of the electrode through the ground junction. Ensure there are no air bubbles in the sleeve. Wash off any excess electrolyte and store in 2-3M KCl before use.

## Theory in brief

Electrochemical measurements are relative, which raises the question—what is the correct value?

The standard hydrogen electrode (SHE) has an arbitrarily assigned value of 0.000V. However, the SHE is impractical to use, and in most cases either calomel (Hg/Hg<sub>2</sub>Cl<sub>2</sub>/sat KCl) or Ag/AgCl/sat KCl electrodes are used.

The IJ14 will have a constant potential providing the electrolyte concentration is kept constant and the secondary sleeve junction is maintained in a good condition.

## Helpful Hints

- Select the correct sleeve electrolyte for the application.
- Keep all connections dry.
- Use a dedicated high impedance pH meter.
- Immerse the electrode so that the reference junction is below the liquid surface.
- Minimise contact with sulphide vapours and change the sleeve electrolyte frequently in these conditions.

## Maintenance

- When not in use (short term storage), keep the electrode immersed in 2-3M KCl solution to stabilise junction potentials.
- Replace sleeve electrolyte when necessary. The frequency of this is best determined by experience, however this should be done more often when measuring contaminated samples.
- For long term storage, remove and clean the sleeve. Replace the sleeve (without electrolyte) and attach the wetting cap.
- DO NOT store the electrode in deionized or distilled water.

## Cleaning

Cleanliness of the sensor and junction is critical for accurate measurement as drift is often due to an unclean sensor/junction. Clean the electrode periodically. Remove the sleeve and clean the membrane, ground glass stem and sleeve using one of the following methods. DO NOT use abrasive materials.

**Method One: Alkaline samples and scale:** Soak membrane in 1M HCl for an hour. Wash well with water and condition in 20% KCl before use.

**Method Two: Grease and oil:** Wipe the membrane and ground stem with cotton or tissue soaked in acetone followed by methylated spirits. Wash with distilled water before use.

**Method Three: Solids and organics:** Wipe the membrane and junction with cotton or tissue soaked in a mild non-alkaline detergent. Wash with distilled water and condition in 20% KCl before use.