

User maintenance and troubleshooting

| Symptom | Possible cause | Remedy |
|--|---|---|
| Drift | Junction blocked | Remove sleeve. Clean junction or ground glass stem |
| | Sensor tip not clean | Remove sleeve Clean sensor tip |
| | Reading stable in standards, but not in samples | See ORP theory in comprehensive manual available on-line |
| | Electrode polarised | Replace electrode |
| Noisy | Poor connection to meter | Check connection |
| | Junction not immersed fully | Lower electrode into solution below junction |
| | Insufficient electrolyte | Refill electrolyte |
| Not within tolerance ($\pm 20\text{mV}$) | Contaminated standard | Replace standard |
| | Correlation to wrong reference electrode | Calculate what standard would read if using a saturated KCl reference |
| | Sensor not clean | Remove sleeve. Clean sensor wire |
| | Electrode polarised | Isolate electrode |
| Displays 0mV for all solutions | Electrical short | Check connector |
| | Internal short | Replace electrode |
| Reading out of range | Noise | Refer above |
| Unreliable titration results with IJAg | pH too high | Acidify with nitric acid to approx pH2-3 |
| | Contamination from electrolyte | Use 1M potassium nitrate in sleeve |
| Slow ORP response | Non reversible ORP reaction | Stir sample |

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.au to register your purchase as soon as you receive your electrode.

All specifications and values are subject to change without notice. © 2009

| Parameter | Operating Range |
|-------------------|--|
| mV range | -2000 to +2000 mV |
| Accuracy | $\pm 10\text{mV}$ |
| Temperature range | 0 - 60°C |
| Reference type | Double Junction Ag/AgCl/sat KCl |
| Sensor materials | Platinum wire (IJ64) Silver billet (IJAg) Gold wire (IJAu) |
| Body and sleeve | Polypropylene |
| Overall length | 150mm |
| Barrel diameter | 12mm |
| Cable length | 1m standard, longer to order. Maximum 20m |
| Connector | BNC standard, others on request |

Intermediate Junction Series

Short-Form Operators Manual

Download a detailed manual at
www.ionode.com.au

IJ64
ORP Electrode (Pt tip)

IJAu
ORP Electrode (gold tip)

IJAg
Silver Billet Electrode



ionode

Good Chemistry

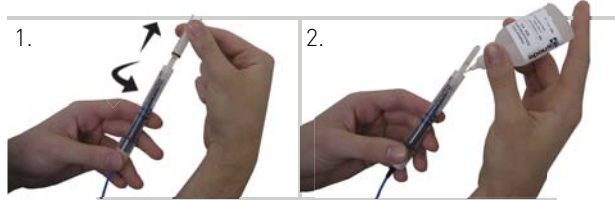


Introduction

This guide contains the basic information for correct use and maintenance of your new ORP/Metal electrode. A more comprehensive manual is available for download from www.ionode.com.au

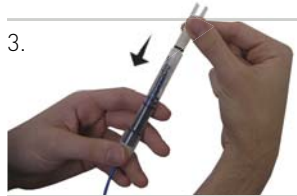
Preparation

IJ 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. (use potassium nitrate in IJAg).



3. Slide the sleeve back onto the electrode ensuring the black O-ring is well seated within the electrode body. Do not exert sideways 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.

Calibration

Unlike pH electrodes, ORP electrodes do not require asymmetry potential and slope correction. However, an offset can develop if the sensor tip or the reference junction becomes contaminated. To assure correct operation, check ORP electrodes with an ORP standard as detailed below.

Checking ORP Electrodes IJ64/IJAu

- Set pH/mV meter to mV and connect electrode.
- Place the electrode in a stirred ORP standard, allow time to stabilise, and observe the reading.
- Note mV reading and compare to the correct value.
- If reading is not within $\pm 20\text{mV}$ of the correct value, clean the electrode, replenish the electrolyte and repeat the procedure.
- Rinse the electrode in distilled water before use.

ORP Standards

We recommend the use of either Light's [476mV @25°C] or Zobell's [229mV @25°C] solution for checking ORP electrodes.

Checking Silver Electrode

- A simple procedure for checking the silver electrode is to check the mV potentials in two (2) chloride standards a decade apart in concentration.
- The more dilute solution should read higher (more +ve mV) than the more concentrated one.
- Rinse in distilled water before use.

Helpful Hints

- ORP standards are generally unstable—measure samples on site whenever possible.
- Most ORP reactions are not reversible—solutions should be stirred for best results.
- Clean the sensing tip regularly.
- Allow adequate time for stabilisation.
- Always use fresh standards.
- DO NOT leave IJAg in the titrated solution after silver nitrate (argentimetric) titrations.
- Acidify samples with dilute nitric acid before argentimetric titrations (pH should be around 2-3).
- Expected endpoint for argentimetric chloride titration is approximately 280mV.

Maintenance

- When not in use (short term), store the electrode in 2-3M KCl.
- 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.
- From time to time, excess AgCl deposits should be removed from the silver rod (IJAg) by wiping with a tissue. The rod can be cleaned with 0.1M nitric acid or dilute ammonia.

Cleaning

Cleanliness of the sensor and junction is critical for accurate measurement. Drift and long response times are often due to an unclean sensor/junction. Remove the sleeve, clean the sensor wire, ground glass stem and sleeve periodically by 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: Plated metals: Metals such as copper and zinc can plate onto the Pt or Au tip. These can be removed by soaking in dilute (approx 0.1M) nitric acid for 15-20 minutes, followed by soaking in 2-3M KCl before use.