

User maintenance and troubleshooting

Symptom	Possible cause	Remedy
Drift	Junction blocked	Remove sleeve. Clean junction or ground glass stem.
	Sensor tip dirty	Remove sleeve. Clean sensor tip.
	Reading stable in standards, but not in samples	See ORP theory in comprehensive manual - available online.
	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 (+/- 20mV)	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	pH too high	Acidify with nitric acid to approx pH2-3.
	Contamination from electrolyte	Replace electrode.
Slow ORP response	Non reversible ORP reaction	Stir sample.

Warranty

Any electrode found to be faulty due to manufacture will be replaced. IJ electrodes have a warranty of six months from date of purchase, however we reserve the right to void warranty if the electrode has been used in an unsuitable application. IJ electrodes will have an expected lifetime of two to four years in ideal samples at room temperature. This will be reduced in chemically aggressive or abrasive samples, and at high temperatures.

Parameter	Operating Range
mV range	-2000 to +2000 mV
Accuracy	+/- 10mV
Temperature range	0-100°C
Reference type	Double junction Ag/AgCl/sat KCl
Sensor Materials	Platinum wire
Body and sleeve	PVDF Kynar
Overall length	150mm
Barrel diameter	12mm
Cable length	1m standard, longer to order. Maximum 20m.
Connector	BNC standard, others on request

All specifications and values are subject to change without notice.

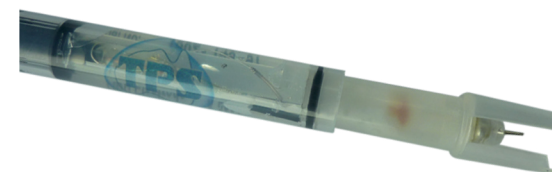
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Intermediate Junction Series Operator's Manual

High Temperature IJ-ORP (Redox) Electrode



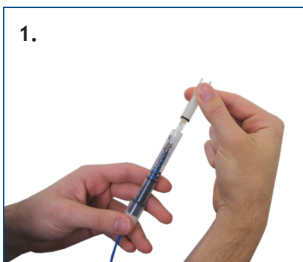
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Introduction

This guide contains the basic information for proper use of your new IJ pH electrode. A more comprehensive manual is available for download from our website: www.tps.com.au.

Preparation

IJ 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:



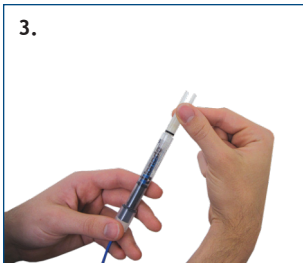
1.

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.



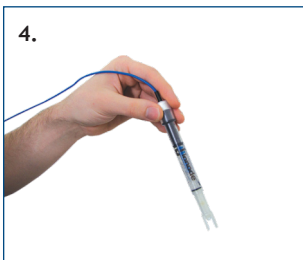
2.

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



3.

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.



4.

4. With the tip facing downwards, gently flick the electrode to remove any bubbles from within the membrane. Wash off any excess electrolyte and store in 2-3M KCl before use.

Calibration

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

Checking ORP Electrodes

- 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 +/- 20mV 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 (231mV@25°C) solution for checking ORP electrodes.

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 the electrode 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 (IJA_g) 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 Platinum 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.