



## Nitrate (NO<sub>3</sub>) and Ammonium (NH<sub>4</sub>) Maintenance and Calibration Video Transcript

### Function

The ammonium and nitrate ion sensors use two electrodes to measure the electrical potential between a known ion concentration and the sample. The electrode inside the sensor tip is surrounded by a solution of a known concentration of the appropriate ion. The other electrode is the reference electrode used by the pH sensor. Between the sample water and the ion solution inside the sensor is a membrane that reacts selectively with the specified ion. Other ions in sufficient concentrations can interfere with the readings however, so these sensors should not be used in salt-water environments.

### Maintenance

The only maintenance required for the ion sensors is to keep them clean. Over time the reactive membrane will deplete itself, and must be replaced.

### Calibration

The ion activity in a solution is affected by the pH and conductivity of the solution. Prior to calibrating any of the ion sensors, the pH, ORP and conductivity must be calibrated. If installing a replacement tip, the specific ion tip should be hydrated for 24 hours prior to calibration.

Determine whether you will be performing a 2, 3, or 4 point calibration. A two-point calibration requires a high and low standard, both at room temperature. A three-point calibration requires an additional high standard at a temperature close to the expected sample temperature. A four-point calibration requires an additional high and low standard, close to the expected sample temperature, and within 0.5 C of each other.

Establish a connection to the sonde with Hydras 3LT. Click the button labeled '**Operate Sonde**'. When the sonde finishes its initialization, click the '**Parameter Setup**' tab then click the '**(Ion) [mg/l – N]**' tab. Type the number of calibration points you are using in the box and click 'Save Settings'. If you changed the number of calibration points, you will need to close the Hydras window and re-connect to the sonde for the change to appear on the calibration screen.

Click on the '**Calibration**' tab, then click the '**(Ion) [mg/l – N]**' tab. You will see a picture of the probes as well as the current value, the date and time, the current temperature and the voltage. Rinse and dry the sensors and attach the storage/calibration cup.

Fill the cup about 25% with the room temperature high standard and screw the storage cap on. Shake for six seconds. Remove the storage cap and pour the standard out. Fill the cup with room





temperature high standard again, this time covering the ion tip and the pH sensor. Wait five minutes for the readings to stabilize. When the readings are stable, type a value of 1 in the first box to designate the high standard. Type 46.2 into the second box and click '**Calibrate**'. A "Calibration Successful" message will appear. Record the temperature and the voltage reading.

\*\*\*Note: The value typed into the box is the ion activity, but the value appearing in the 'Current value' display will be the ion concentration.

Rinse the cup and sensors with de-ionized water and dry them. Fill the cup about 25% with the room temperature low standard and screw the storage cap on. Shake for six seconds. Remove the storage cap and pour the standard out. Fill the cup with room temperature low standard again, this time covering the ion tip and the pH sensor. Wait five minutes for the readings to stabilize. When the readings are stable, type a value of 2 in the first box to designate the low standard. Type 4.62 into the second box and click '**Calibrate**'. A "Calibration Successful" message will appear. Record the temperature and the voltage reading.

The two temperatures must be within 0.5 C of each other for a valid calibration. The low voltage and the high voltage will have a difference between 50 and 65 mV on a tip that is functioning properly. This gap will shrink as the sensor tip ages and becomes less sensitive. If it falls outside of the 50 – 65 mV range it is time to replace the tip.

If you are performing a three-point calibration, the third point (Hi-Lo) is with the high standard at a temperature close to the expected water temperature.

If you are performing a four-point calibration, the fourth point (Lo-Lo) is with the low standard at a temperature close to the expected water temperature.

The temperature readings for points three and four must also be within 0.5 C of each other, and the voltage readings should have a difference between 50 and 65 mV.

The Ion sensor is now calibrated.