



Nitrate Logger Sensor Guide NUL-241



Nitrate logger sensor NUL-241

The nitrate ion sensor can be used for any science experiment which utilizes nitrate concentration readings such as in the fields of Environmental Science, Ecology, Chemistry, Biology, etc.

Among hundreds of possible experimental subjects, those that can be studied with the NUL-241 sensor are: chemical reactions, environmental health, small animal behavior, ecological studies, and many more.

The nitrate sensor's measurement units are:

- Milligrams per liter (mg/L): SI measurement unit for density of a solid dissolved in a liquid.
- Parts per million (ppm): The total amount of a specific molecule (nitrate for example) per million molecules in a sample.

Nitrate sensor usage

The nitrate sensor uses a ion-selective electrode, it must be used in conjunction with the pH sensor, which serves as the reference electrode.

Concentration range	0.1 ~ 14000 ppm
pH range	2.5 ~ 11 pH
Temperature range	0 ~ 50°C

Minimum sample size	3mL in a 50 mL beaker
Reproducibility	±4%
Electrode resistance	1 ~ 4 MΩ

Equipment required:

- Wash bottle with deionized or distilled water.
- Nitrate electrode 1000 ppm standard solution
- Nitrate electrode ISA bottle
- Several clean beakers.
- 1 mL, 10 mL and 50 mL pipettes (a 50 ml graduated cylinder can also be used).

Technical notes:

- All standard solutions should be prepared fresh.
- The standard solutions should be at the same temperature as the sample.

Electrode preparation

1. Remove the protective cap encasing the nitrate probe's electrode.



CAUTION: Do not touch the PVC membrane at the end of the probe with your fingers.

2. Do not connect the sensor to the USB module.

3. Rinse the electrode with deionized or distilled water and blot dry. Be sure not to rub as this will harm the sensor.



4. Dip the electrode in the 1000 ppm solution without voltage connection for two hours, if it has not been used during the last week; or for 15 minutes, if it has been used during the last week.



Offsetting the sensor

1. Run the "Ion_HC_sensor_offset.exe" file (inside the folder) and follow the instructions.

Ion HC sensor offset Ver:1.4

Ion-HC Selective sensor offset setting instructions

Select the connected sensor in the field on the right
Dip the electrode in the 1000 ppm solution
When reading is stable,
Press the "Start Offset" button below

Select a sensor type:

0000

Electrode preparation:

1. Remove the protective cap encasing the nitrate probe's electrode.
Caution: Do not touch the PVC membrane at the end of the probe with your fingers.
2. Do not connect the sensor to the USB module.
3. Rinse the electrode with deionized water and dry it. Be sure not to rub as this will harm the sensor.
4. Prepare 1000 ppm solution.
5. Stir the solution to be a uniform.
6. Dip the electrode in the 1000 ppm solution without voltage connection for two hours, if it has not been used during the last week or for 15 minutes, if it has been used during the last week.

Offsetting the sensor:

1. Prepare the probe as described in the "Electrode preparation" guide above.
2. Remove the protective cap of the pH probe.
3. Connect the pH sensor to the Ion selective HC sensor.
4. Connect the USB module the two plugged together sensors.
5. Connect the USB module to the computer.
6. Select the connected Ion selective sensor in the sensor field on the right.
7. Check that the [Start offset] button appears above
8. Stir the 1000 ppm solution.
9. Dip both electrodes (Ion selective probe and pH probe) together in same solution for 15 minutes more with a voltage connection.

Comm=OK 3 SV: 0.0

2.Prepare the electrode as described in the "Electrode preparation" guide above.

3.Remove the pH probe's protective cap.



4.Connect the pH sensor to the Ion selective HC sensor.

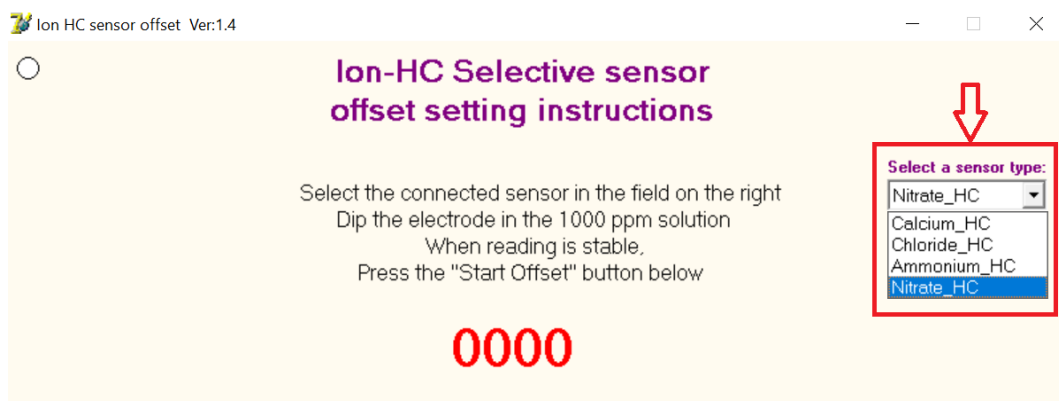


5. Connect the USB module to the two plugged together sensors.

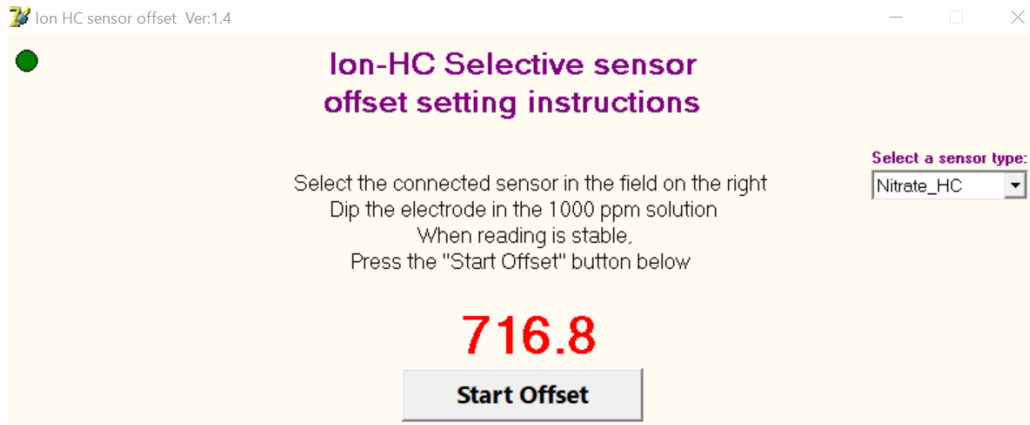


6. Connect the USB module to the computer.

7. Select the connected Ion selective sensor in the sensor field on the right.



8. The upper screen will be changed to the following one:



9. Check that the "Start offset" button appears above.

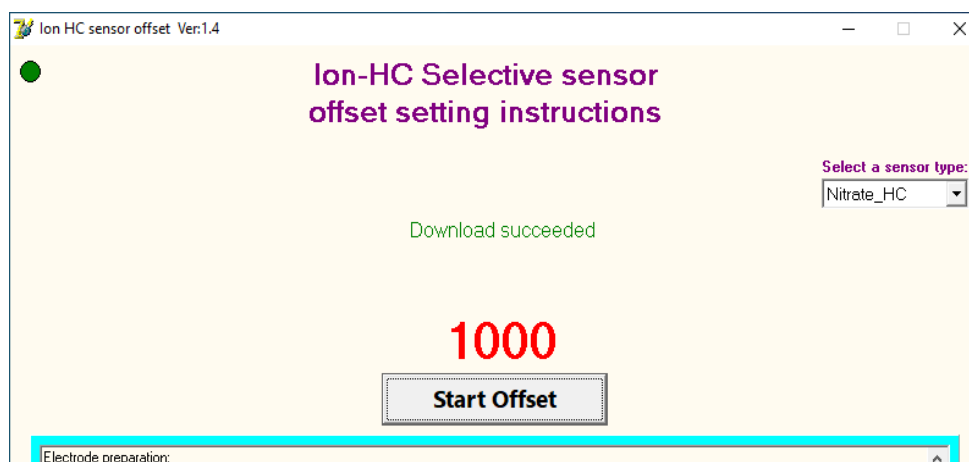
10. Dip the 1000 ppm solution.

11. Dip both electrodes (Ion selective probe and pH probe), with a voltage connection, in the same solution for another 15 minutes.



12. The current reading of the sensor will appear on the screen.

13. After a stable reading has been reached, press the "Start Offset" button and wait for the process to complete.



14. Rinse the electrode once more with deionized water or distilled water and blot dry.

15. The ammonium sensor is now ready for use.

Electrode storage

Short term (overnight or weekend):

Rinse the electrode thoroughly with deionized water or distilled water and place the tip in a standard solution (around 1000 ppm) between measurements.

Long term:

Rinse the electrode thoroughly with deionized water or distilled water and blot dry. Attach the hard plastic protective electrode cap again to protect the sensing element. Follow procedures in the "Electrode preparation" section when using the electrode again.

Sensor specifications		
	mg/L	ppm
Range and operation modes	0.1 ~ 14000	0.1 ~ 14000
ADC resolution	15 bit	
Resolution	0.4 at 0.1 to 1,000 mg/L 40 at 1,000 to	0.4 at 0.1 to 1,000 ppm 40 at 1,000 to

	14,000 mg/L	14,000 ppm
Max sample rate (S/sec)	100	

Experiment Duration: 1 second to 31 days.

Sensor's features

- Fully digital data.
- Rugged plastic ergonomic case.
- Ion selective electrode.
- Nitrate probe connected to the sensor's body by a flexible rubber-coated wire.
- Protective hard-plastic storage cap.
- Push-button switch for Start/Stop experiments in off-line mode.
- LED indicator of experiment status (blinks while collecting data).

Note: Products are intended for educational use.

Technical background

The philosophy behind plug and play technology is based on each sensor's ability to store its own data due to an internal flash memory chip and micro-controller in each plastic body. This technology allows the sensor to collect

and then store the digital data in the correct scientific units (for example: °C, °F, Lux, %, ppm).

The nitrate sensor uses a ion selective electrode to measure the amount of nitrate ion in a solution.

The Ionic Strength Adjustor (ISA) is used to standardize the strength of the ions in various solutions to give the most accurate readings.

Maintenance and storage

- Never submerge the plastic body in any liquid.
- Do not allow liquid into the nitrate sensor's body.
- After use, gently wipe away any foreign material from the nitrate sensor.
- Store in a box at room temperature out of direct sunlight.