IMA CIMUS

Meter GUIDE for

# NT x IM/ NTx2 IM

# Ion Meter

# Software User Guide

V9.1.2



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# 1 SPECIFICATIONS

## 1.1 TECHNICAL FEATURES

- Input/Measure channels: 7 Channels
- Measurement range from -2500 mV to 2500 mV.
- Input impedance of 1e12 Ohms.
- Resolution of 0.1 mV.
- Working temperature: from 0º C to 70º C.
- Temperature measure range: -10º C to 70º C
- Temperature resolution: 0.1 ºC
- Dimensions 155 x 90 x 35 mm.
- Weight 240 g.
- ABS enclosure

## 1.2 CONNECTION

The device has three connectors:

- Multiple connector of 8 pins (for Multi Ion probe input)
- BNC Connector (for Combination or Half-cell electrodes)
- Mini USB female connector type AB (for power supplying/communication to PC). (Provided)

## 1.3 POWER SUPPLY

The instrument is powered directly from the USB port connected to the PC, so it does not require any additional power supply.

## 1.4 SYSTEM REQUERIMENTS

Windows XP, Windows Vista o Windows 7.

Net Framework 4 o later (official link).

NTx Ion Meter Software (supplied).

Available USB port.

Mouse and keyboard are required.

## 1.5 COMPATIBLE ELECTRODES

NT Ion meters are compatible with the CNT_ISE from NT Sensors. Also other commercially available electrodes could be used with NT Ion meters. Ask for more info about compatibility of other types of electrodes.

# 2 SOFTWARE FOR WINDOWS

## 2.1 SOFTWARE DOWNLOAD AND SETUP

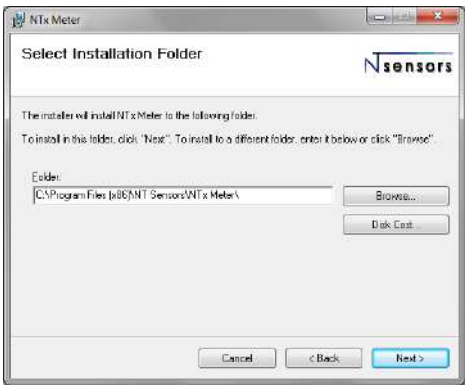
The software application for multiparameter meters is so-called IMACIMUS.

Download the Software for your meter at:

- http://software.imacimus.com
- Register previously with a valid e-mail.
- Open the installation wizard and follow the instructions
- Plug the meter to the computer
- Click "IMA CIMUS" icon from Desktop.

Once installation is executed, the Screenshot 1: Installation I will appear. Select the button "Next >", to continue the installation process.

Screenshot 1: Installation I

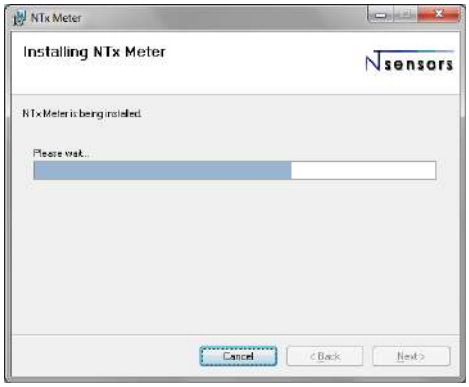



Screenshot 2: Installation II

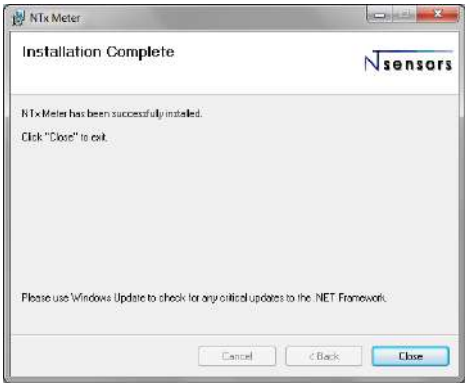
Choose the directory where the program should be installed. By defect, the setup will create a folder called "NT Sensors" in Program Files. To continue, click on the next button "Next >".

**RECOMMENDATION**

Do not modify the folder if you are not an advanced user.




Screenshot 3: Installation III




Screenshot 4: Installation IV

If the system requires additional licenses to install the software, allow to continue. Finally, the software program will be installed in the specific folder.

When installation is completed, the IMACIMUS icon will be created on your desktop. Double clicking on this will start the program.

## 2.2 SOFTWARE EXECUTION

Before starting, connect the NT Ion Meter to the PC through the USB cable supplied.

Plug through the specific connector the electrodes/sensors that are going to be used in the assay.

When NT Ion Meter is connected, run IMA CIMUS software from desktop shortcut icon.

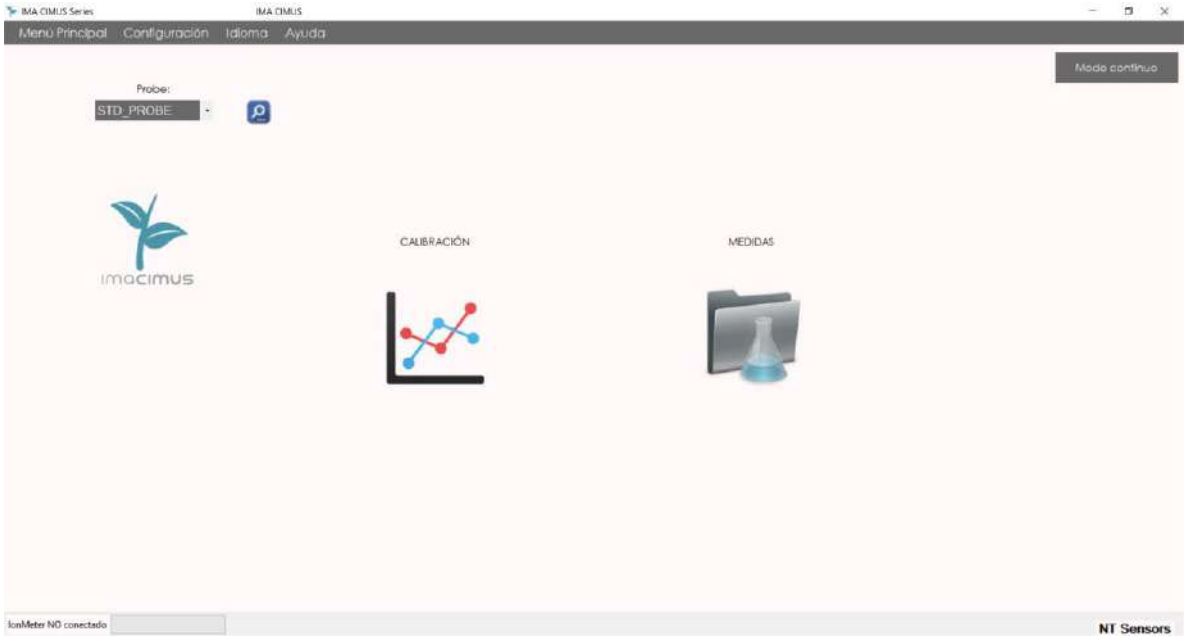
**IMPORTANT NOTE**

Do not leave the meter connected to the PC when not in use or when do not have to be used in a long period of time.

## 2.3 INITIAL CONFIGURATION

In the first attempt to use the software, you must plug the meter BEFORE running the Software. The Software will automatically detect what type of equipment you have acquired, in order to load standard configurations. If you miss this note, you can go to configuration restore, and 1) plug the meter and 2) run the software.

In the Main Menu you will setup Language, customize probe or electrodes and the calibration solutions.




Screenshot 5: Main Menu

### 2.3.1 NEW PROBE CONFIGURATION

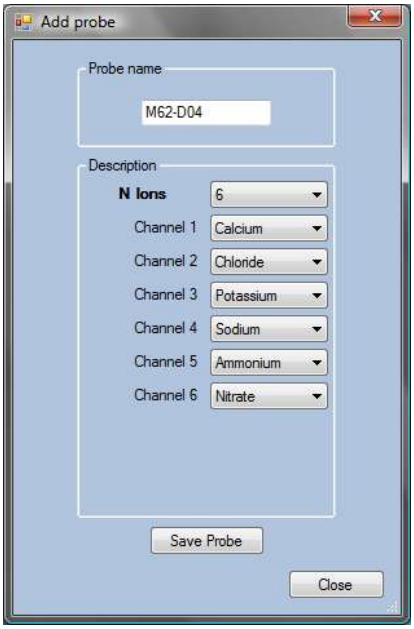
Clicking on the dropdown button displays “probe” the set of probes or sensors that the user has introduced. By selecting in a particular probe, the ions will be detailed.

*CREATE A PROBE*

When using the software for the first time or when you have to introduce a new probe, go to "Configuration" in the menu bar at the top of the screen.

Once there, choose "Add probe." A window appears where you must enter:

- The name of the probe.
- Total number of ions. ( or channels to be measured)
- Identify the ions according to their channel position. (
- Finally, click "save probe".




Screenshot 7: Create a probe

*DELETE PROBE*

To delete a probe, go to "Configuration" in the menu bar at the top. Click the drop-down button, select the probe you want to remove and click "Delete".

Screenshot 8: Delete probe

### 2.3.2 NEW CALIBRATION SOLUTION CONFIGURATION

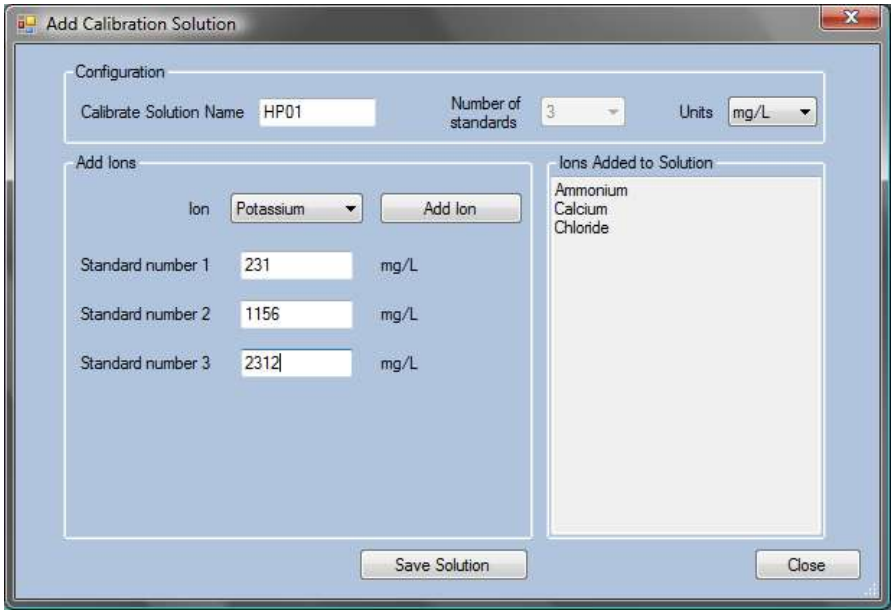
*CREATE A NEW CALIBRATION SOLUTION*

To create a set of calibration solutions, go to "configuration" on the top menu bar and choose "add calibration solution."

A window appears where you must enter the name of the calibration solution, select the number of calibration standards (from 2 to 5) and select the desired concentration units (those that appear in the supplied standards).

Then, you must enter the concentrations of each ion that is contained in the calibration standard. Once entered, click on the "add ion". The added ions appear in the information box on the right side of the screen.

Once you have added all ions, click on "save solution" to save the solution.




Screenshot 10: Create a Calibration Solution

*DELETE A CALIBRATION SOLUTION*

To delete a calibration solution, go to "Configuration" in the menu bar at the top. Click the drop-down button, select the probe you want to remove and click "Delete".

Screenshot 11: Delete a Calibration Solution

### 2.3.3 NOTE FOR NTX2-IM / IMACIMUS 2 /IMALAB 2 METERS:

- You could use (CALIBRATE AND MEASURE) up two probes simultaneously, one combination probe + half-cell electrode. Or pH electrode + half-cell electrode.
- The meter allows calibrating individual two different probes, and then using it all together to perform measures. Just only one reference electrode from a combination/pH could be used, and you may use both probes to calibrate the half-cell electrode.
- If you have any technical doubt, do not hesitate to contact our technical support: tech.support@ntsensors.com

### 2.3.4 OPERATION

When we have defined the probe and the calibration solution, the software allows three functions: Calibrate the probe / sensor, batch or continuous measures or record mV data if the sensor is not currently calibrated. They are listed in buttons as follows:

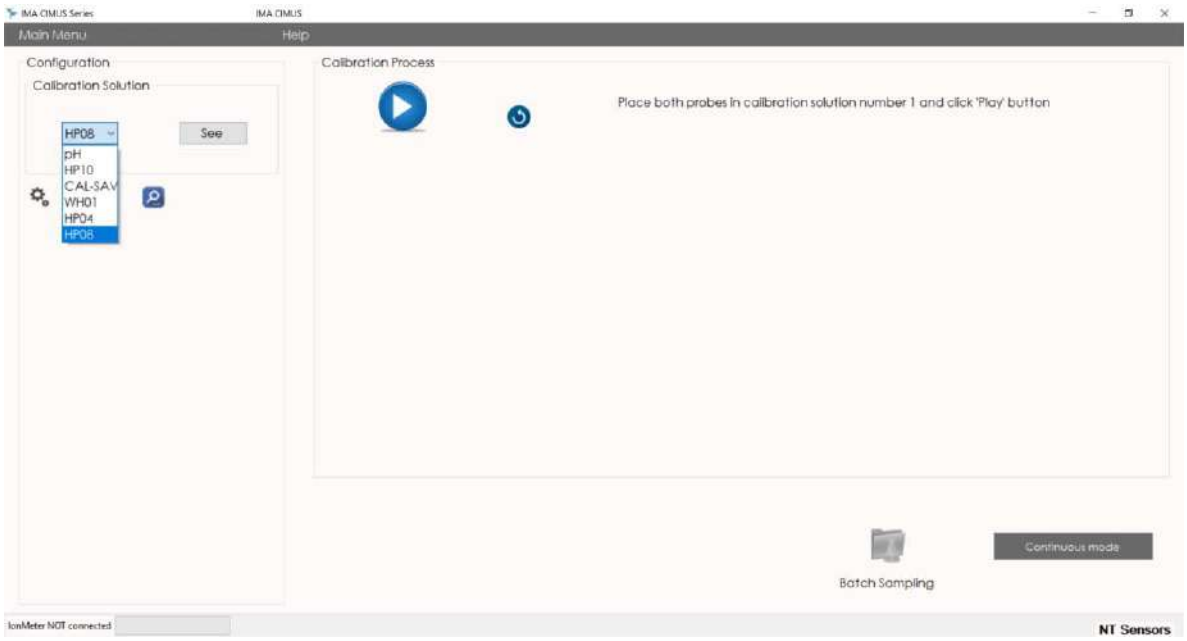
- Calibrate
- Measure (only available if the sensors have been previously calibrated, batch measures)
- mV: monitoring or continuous measurements in mV mode (or units of concentration if the probe has been previously calibrated)

## 2.4 CALIBRATION

To calibrate the probe, go to calibration in the main menu by clicking on the icon.

### 2.4.1 CALIBRATION SOLUTION SELECTION

Clicking on the dropdown button shows the calibration solutions that the user has registered. To check the solution concentration and parameters, press "see".

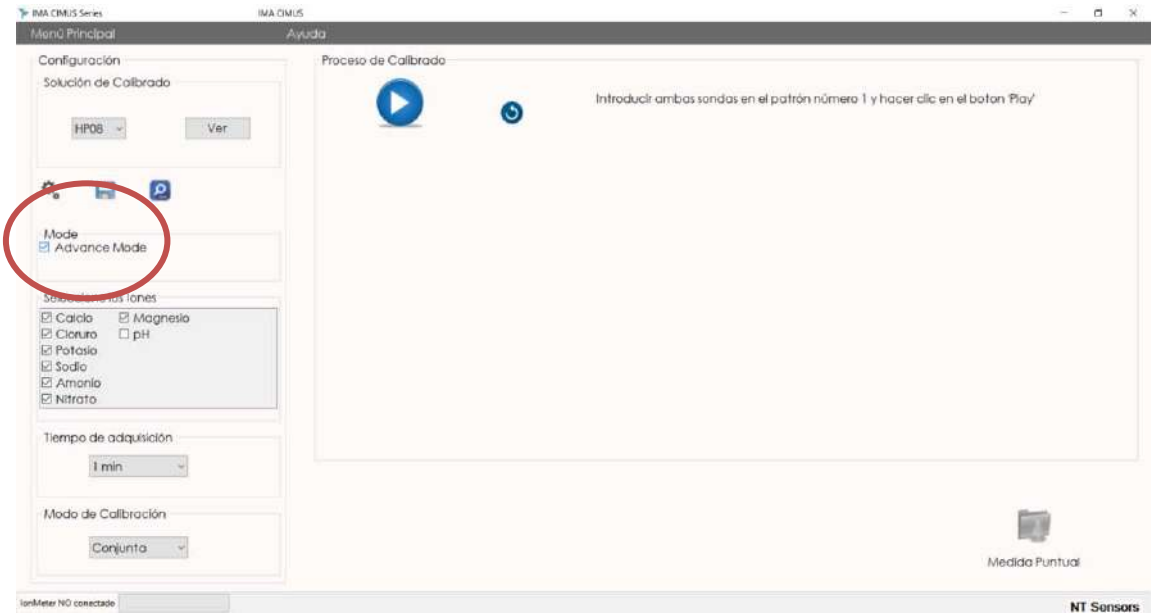



Screenshot 9: Calibration solution selection in the main menu

## 2.5 ADVANCED MODE CALIBRATION

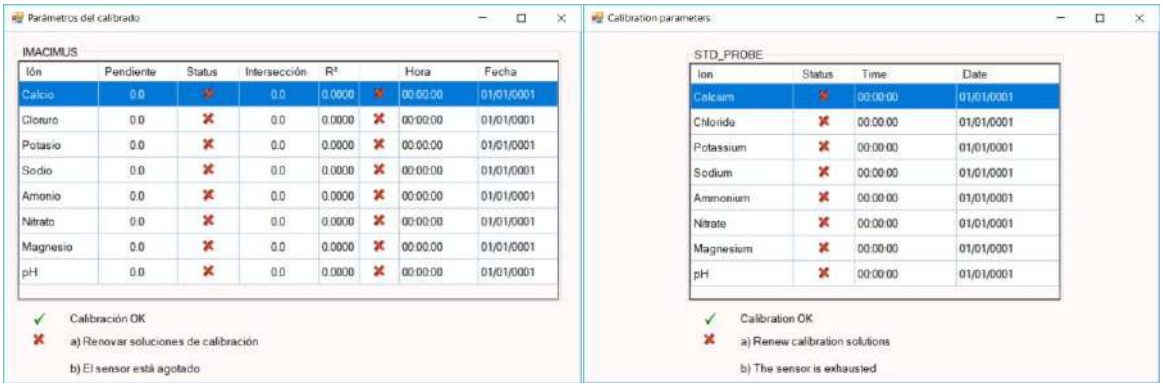
For advanced customization on the meter features, please press icon

ADVANCED-LAB VIEW




By selecting this check-box, the user can have detailed parameters after calibration, with detailed specifications of slope, intersection and correlation fit.

*Advanced-Lab* *Normal view*




This data is always stored on exported files, although it is shown in the pop-up screen after ending a calibration.

### 2.5.1 ACQUISITION TIME

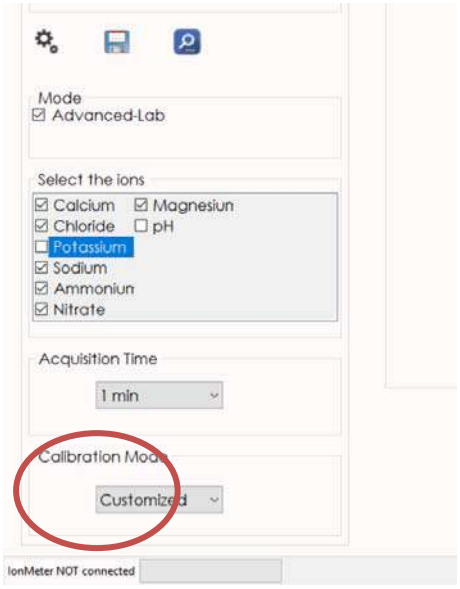
The selection of acquisition time of the analysis depends on the response time of the contained ions in a probe (indicated in the technical specifications).

When the probe is in the right standard, the user decides when to begin the measurement of each point. Depending on the selected acquisition time, the software will record the potential shown by the sensor after this time (1, 2 or 3 minutes).

NOTE: If you have sensors with different acquisition time, always select the larger response time.

### 2.5.2 CALIBRATION MODE

In this section the user chooses how to calibrate the probe or the measuring system: "Simultaneous" to calibrate simultaneously all ions or "Custom" to calibrate them separately or individually.




Screenshot 15: Customized Calibration

In the mode "Simultaneous", all the ions contained in the standard solution are going to be calibrated at the same time (middle box not active). The probe will be calibrated with all the selected ions simultaneously.

In the "Customized" mode, the user can select in the middle box the ions to be calibrated. Once finished the calibration, the user can select the remaining ions and calibrate them in a second calibration process.

Through the drop-down button "Calibration solution", the user can choose the solution to calibrate each set of ions. An information box list all the ions contained within the calibration solution.

### 2.5.3 CALIBRATION PROCESS

Once the calibration parameters have been setup, the user can proceed to calibrate the probe / sensors.

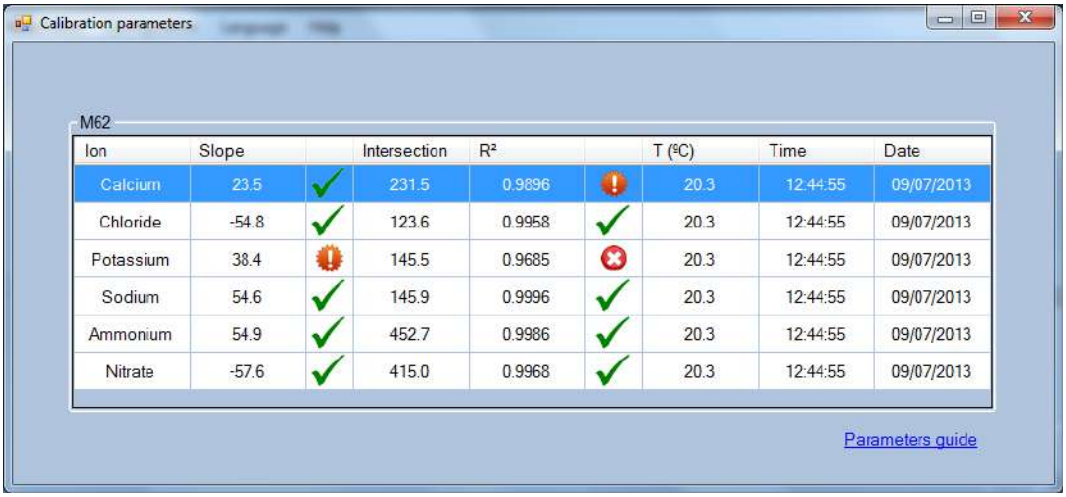
The calibration is carried out by recording data from of each calibration standard. The user must place the probe in the first standard and then click the "Start" button. A counter will appear with the remaining time for the calibration step.

A wizard will guide through the whole calibration process, showing messages for the steps to be carried out.

At the left bottom corner of the screen a bar indicator will report of the course of each reading.

After calibration, a screen pop up appears with the results of the calibration

The "Parameters" button provides information about the slope, intercept and correlation coefficient obtained, plus the date and time of calibration.




| Ion | Slope | | Intersection | R² | | T (ºC) | Time | Date |
|---|---|---|---|---|---|---|---|---|
| Calcium | 23.5 | ✓ | 231.5 | 0.9896 | ! | 20.3 | 12:44:55 | 09/07/2013 |
| Chloride | -54.8 | ✓ | 123.6 | 0.9958 | ✓ | 20.3 | 12:44:55 | 09/07/2013 |
| Potassium | 38.4 | ! | 145.5 | 0.9685 | ✗ | 20.3 | 12:44:55 | 09/07/2013 |
| Sodium | 54.6 | ✓ | 145.9 | 0.9996 | ✓ | 20.3 | 12:44:55 | 09/07/2013 |
| Ammonium | 54.9 | ✓ | 452.7 | 0.9986 | ✓ | 20.3 | 12:44:55 | 09/07/2013 |
| Nitrate | -57.6 | ✓ | 415.0 | 0.9968 | ✓ | 20.3 | 12:44:55 | 09/07/2013 |

Screenshot 18: Calibration parameters

Once evaluated the parameters related to the calibration process, if some error is detected by the user, the calibration can be repeated by clicking on the "Recalibrate" button. .

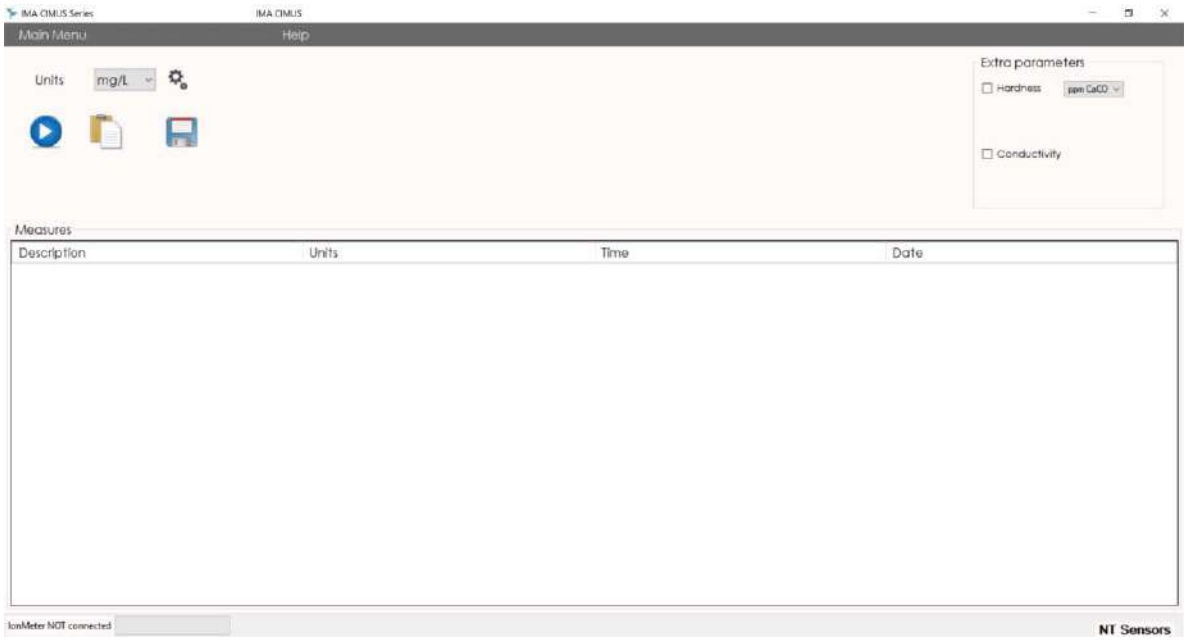
After calibration, you can choose among two different modes to record the concentrations of the sample:

- Mesurement menu / Batch sampling (recommended
- Continuous monitoring

## 2.6 BATCH MEASUREMENTS

To get to this section, the probe must have been calibrated before. In order to obtain correct measurements the calibration used must be recent (you can check this information through the button "Parameters")

The purpose of this mode is to obtain discrete measures. By default, the results are obtained in the same units as the calibration was performed, although you can select the units to display the result of each single measurement.




Screenshot 19: Batch measurements

Units: can be selected mg/L or mmol/L

export data of all the measurement and calibration ifno

Save measurements on clipboard

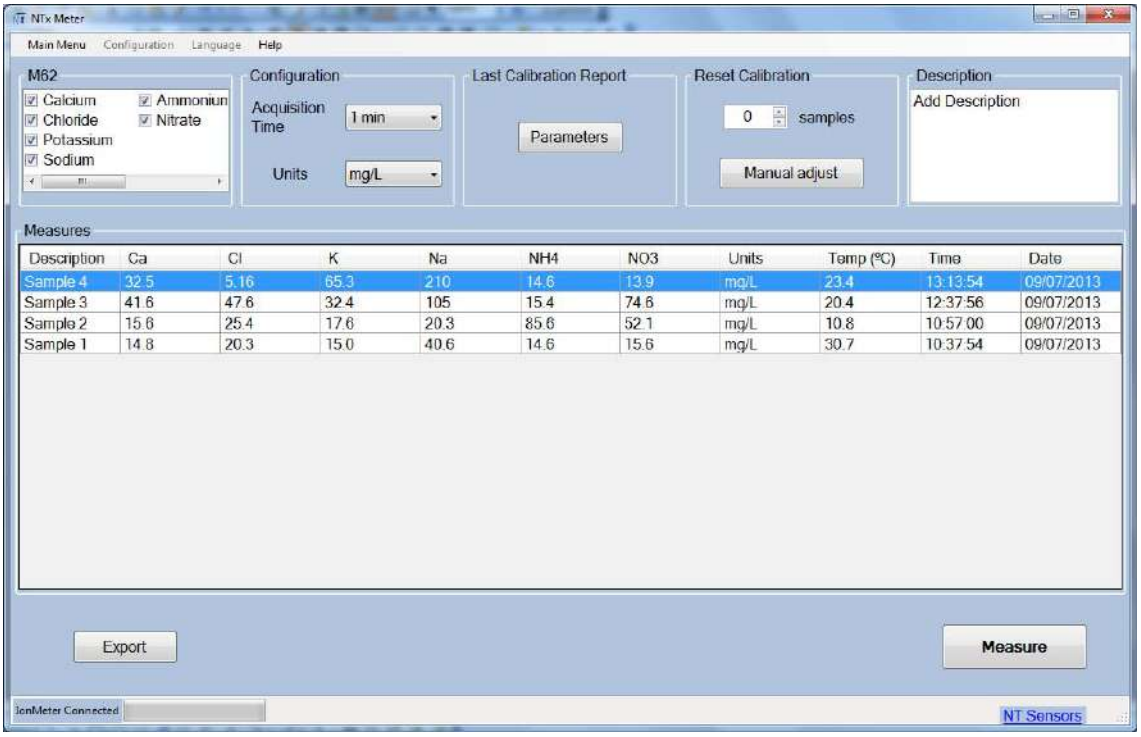
Start a new measurement

Advanced options. At the top left, the probe's ions information is shown. The calibrated ions are marked and displayed by default. If you do not want to display/measure all the ions, simply unmark them.

Acquisition time: this time is defined generally by the response time of each sensor, which appears in the technical specifications of each one.

| |
|---|
| It is strongly recommended to use the same acquisition time during the sampling and calibration tests. |

To take measurements, click on the "PLAY" button.




Screenshot 20: Measurement description

The user can edit the column "description" to enter some details or a description of the measured sample. This description is recorded when the test data is exported.

In order to save to a file the performed measurements, click on the button "Export".

### 2.6.1 READJUST CALIBRATION

The readjust calibration option is in order to maintain the highest accuracy across a large number of measures. In this process, the intermediate point of the calibration (solution nº2) is used to recalculate the calibration parameters in order to minimize the natural drift of the electrodes after a several nuber of samples.

This step can be selected to be done automatically by selecting a frecuency, then after the selected number of samples the system will ask to introduce the probe in the second standard solution. Also this adjustment can be performed manually by the user, by clicking the 'Manual Adjust' button.

To adjust de calibration parameters, introduce the probe into standard solution 2 and click 'Start' button. When it is done, the parameters window will appear and show the new values. Then, close the readjust calibration window and continue measuring.

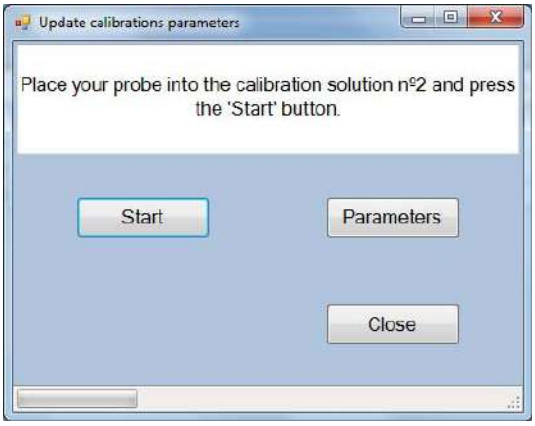
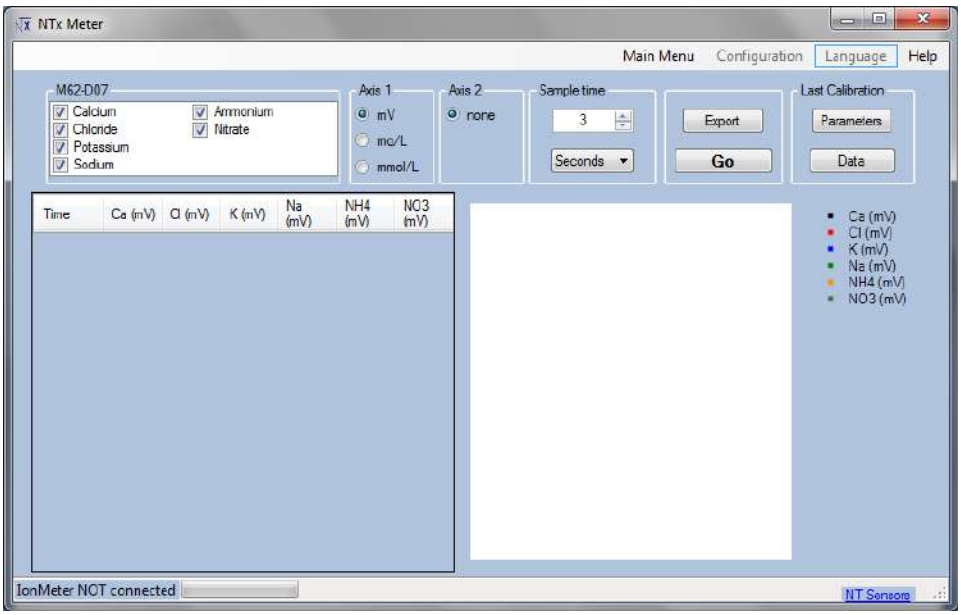



Imagen 21: Calibration adjust

## 2.7 MONITORING OR CONTINIOUS MEASUREMENT

For continuous-time measurement user should go to "Monitore" through the button that is located on the Main Menu.




Screenshot 22: Monitorization

### 2.7.1 IONS

At the top left, the probe's ions information is shown. The calibrated ions are marked and displayed by default. If you do not want to display all the ions, simply unmark them.

### 2.7.2 SAMPLING TIME

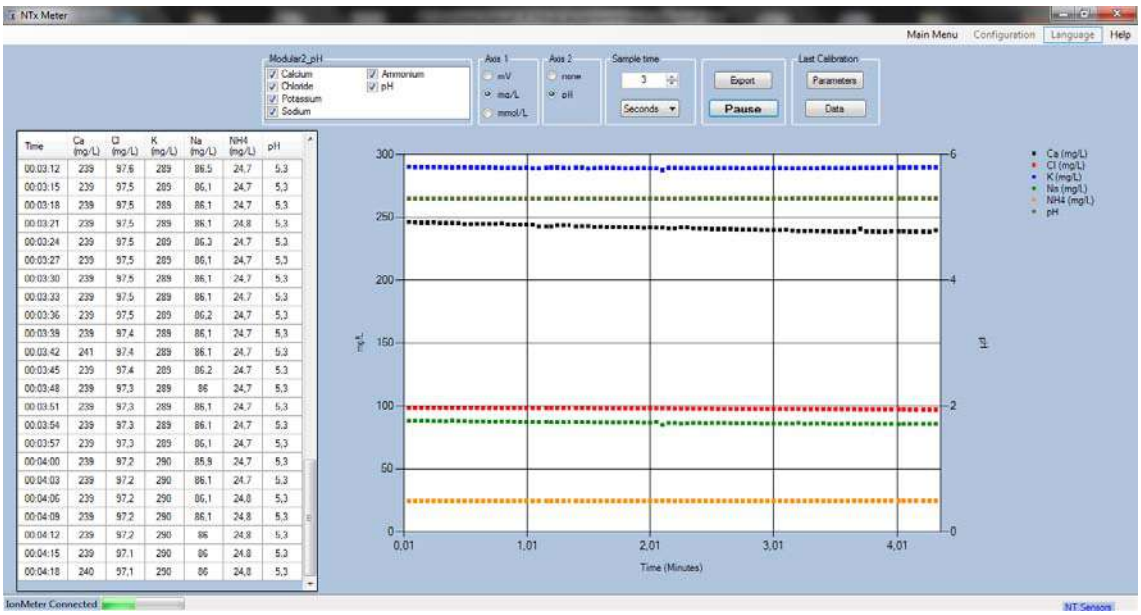
The user can change the sampling period by introducing a numerical digit and selecting the time unit (seconds, minutes or hours).

### 2.7.3 UNITS (AXIS)

While the measures are undertaken, you can choose the displayed units on the plot in the section "Axis 1". In order to display the mV data or the concentration or "mg / L" or "mmol / L" (if the probe is calibrated), simply mark the desired unit.

Checking the desired units will automatically change the output value that appears in both the table and in the plot.

"Axis 2" section allows monitoring  pH or Temperature in parallel to the measurement of ion concentration. By selecting "pH" or “Temp”, you enable a secondary axis. The pH option only appears if there is a pH sensor in the measurement system.




Screenshot 23: Secondary axis

## 2.7.4 ACTIONS – MONITORING & EXPORT FILES

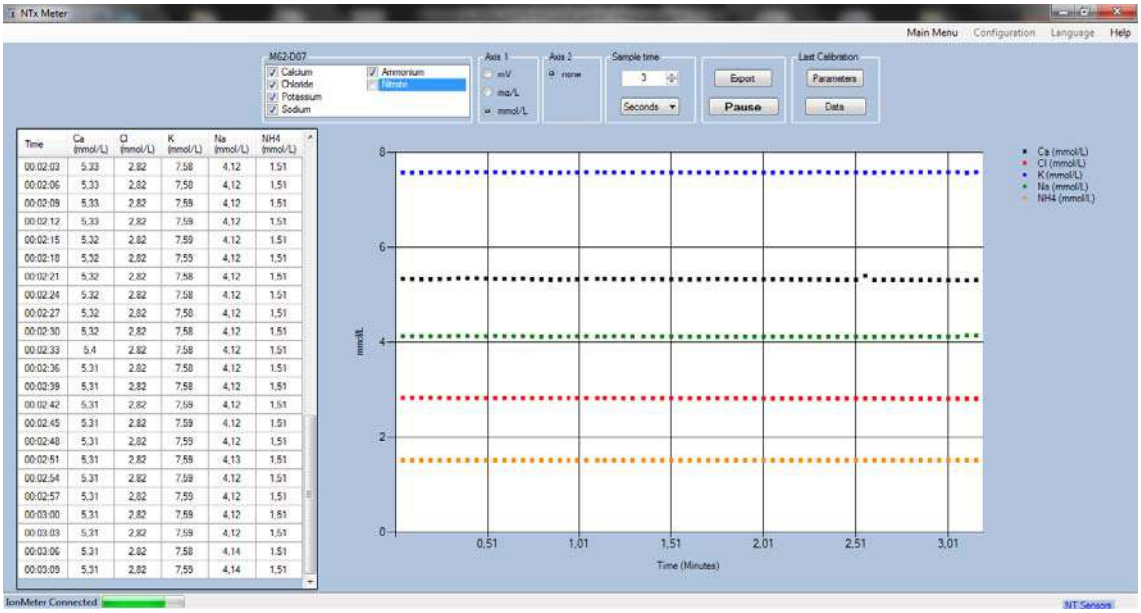
Once all the parameters are defined, the measurements will start by clicking on the button "Go". After the process is started, the states "Pause" and "Resume" will be alternated.

At any time during the monitoring the user can generate an exported file containing the measurements. The file created will contain information about the probe and the results of monitoring (mV). If the probe is already calibrated, the exported file will contain the calibration parameters.

The export button will export only data in the units that are currently selected. You can export in all the units that are listed in the section “Axis 1”. Just select the units in which format you want to export data and click “Export”. The data file will only contain the selected units. When you export, it creates a file with the data that appears in the screen, i.e.: "mV".

## 2.7.5 LAST CALIBRATION

In this section the user can review the parameters of the current calibration that is being used.

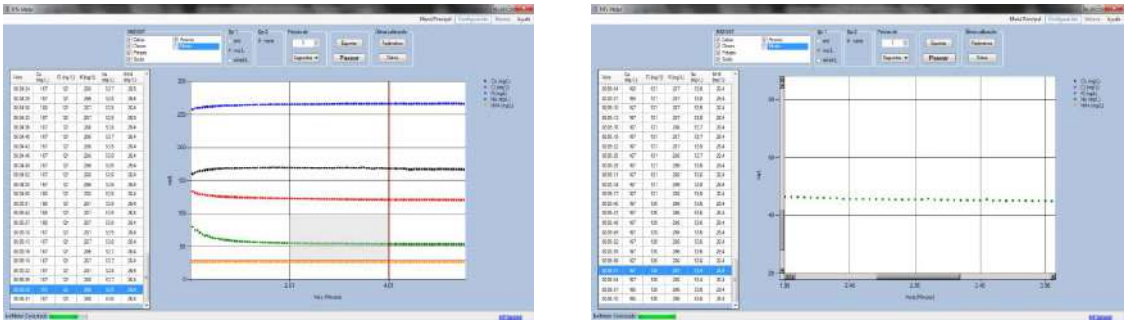



Screenshot 24: Monitoring

When the measures are finished, you can return to the main menu or close the application directly.

### 2.7.6 ZOOM USE

To make zoom in the plot, select the area with the left mouse button, then automatically the zoom will be applied. To restart to the initial view, make click on the right mouse button.



Screenshot 25: Plot zoom

## 2.8 BNC CONNECTOR

In addition to the Multipin connector of the Multi Ion probe, Ion Meter NTx has a standard BNC connector.

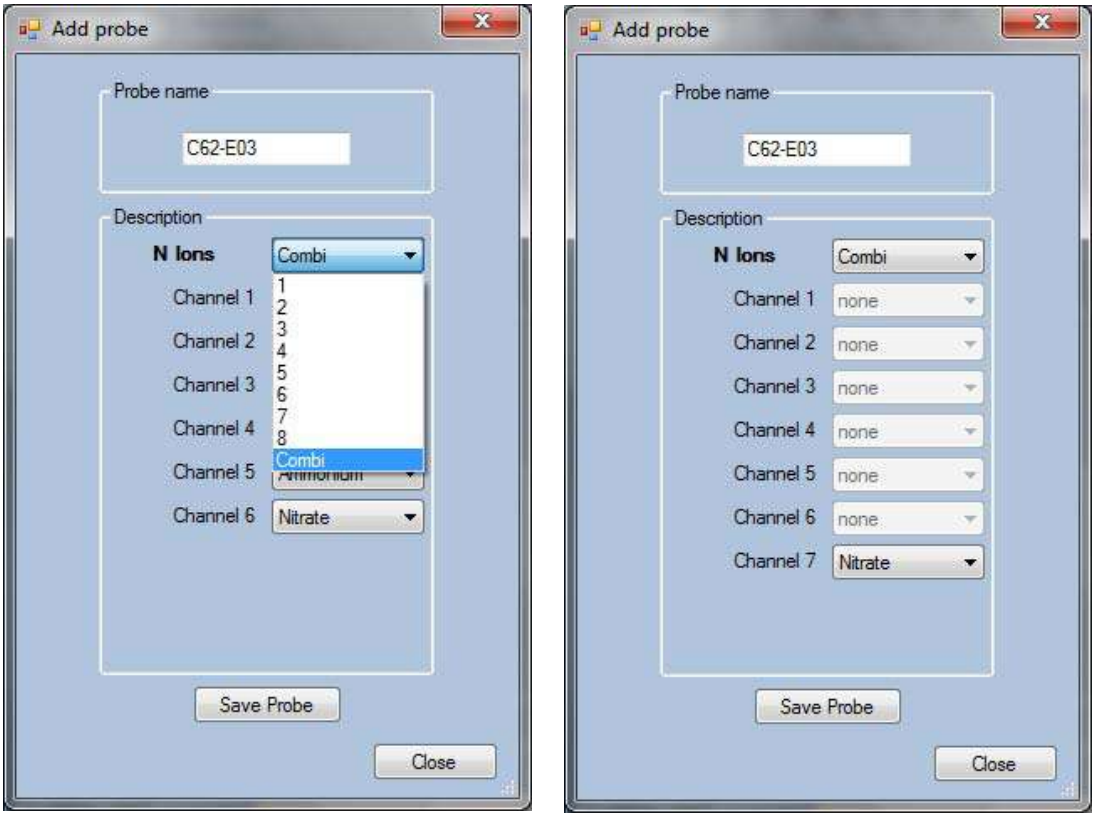
Due to the presence of the BNC connector the NTx Ion Meter could work with any standard combinated electrode, as a meter of one single channel. It also allows the incorporation of a half-cell electrode, which acts as the seventh sensor in measuring system, when a multiion probe is used.

### 2.8.1 COMBINATION ELECTRODE / HALF-CELL ELECTRODE ( IMACIMUS 4 – 5- 10)

The BNC connector allows the NTx Ion Meter to work with any combinated electrode (reference electrode + indicator electrode) (“Combi ION”) or pH sensor.

For the combined electrode configuration, go to "Configuration" menu in the menu bar at the top right of the initial screen.

As indicated in part 2.3.1, you must enter the name of the probe and then, in the number of ions selector, select the "Combi" option. Selecting this option will disable the first 6 ions showing "None" as an indicator that no sensors connected those channels. Then, select the specific ion in question on channel 7.




Screenshot 26: Combination electrode configuration

The steps of calibration, batch measurements and monitoring will be made through the normal process described above in parts 2.4, 2.5 and 2.6 respectively.

**ATTENTION**

The half-cell electrode can only work together with a Reference Electrode. The two probes must remain immersed in the same solution (sample).

## 2.9 TEMPERATURE

The NTx Ion Meter incorporates temperature measurement. Multi Ion Probe contains a temperature sensor that is connected to the meter through the multipin connector of the same probe.

The temperature recorded appears in the "Parameters" button, part 2.4.3, indicating the temperature at which the process was performed calibration.

In the "batch measures", section 2.5, the recorded temperature appears in each discrete readings, as a column next to other parameters (units, date, time ...).

The temperature is also displayed in the "monitoring" menu, Section 2.6, in the table on the left of the screen in data associated with each measurement. As we can see in section 2.6.3, the temperature can also be monitored through the second axis.

## 2.10 *.NTS FILES

The files created by the software are text files. It can be open in spreadsheet programs (Excel) or in notepad or similar.

If your computer do not recognize it automatically, press with the left button the file, and select the option "open with" and then select you desired program (e.g. Microsoft Excel) and save you preferences to open always with this program.

The exported files contain, firstly, a brief description of the experiment, which contains the probe used, and description edit by the user (if provided). Secondly, the calibration parameters and finally, the measurements performed.

## 2.11 COMMON ERRORS

### 2.11.1 FRAMEWORK 4 O LATER NOT INSTALLED

Download and install from the official Microsoft website .NET framework (link).

If the error persists, please contact with tech.support@ntsensors.com

### 2.11.2 CORRUPT INSTALLATION OF NT SENSORS SOFTWARE

When executing the program, this cannot be initialized, proceed to reinstall the program.

If the error persists, please contact with tech.support@ntsensors.com

### 2.11.3 E30: ION METER NOT CONNECTED

When using the program, if some of the following error messages appears in the screen, Error 12, 13 or 14, could be due to three different situations:

1. Ion meter not connected to the computer. Be sure of the connection or connect them.
2. The driver is not installed: if this happens in the first attempt to use / connect the ion meter to the computer, please wait until the drivers are being installed automatically.
3. If it is not any problem described above, please unplug the USB cable from the meter, and plug again after 10 seconds. If the problem persists, check that the USB port from the computer is working properly.
4. If the error persists, please contact with tech.support@ntsensors.com

### 2.11.4 COMUNICATION ERROR

If an error message - different from the Error40 - appears while performing measure, please unplug the USB cable from the meter, and plug again after 10 seconds. You must be able to continue with the measures.

If the error persists, please contact with tech.support@ntsensors.com

# 3 DOUBTS AND SUGGESTIONS

Any question or comments please feel free to contact with the NT Sensors team.

Thanks for using our products.

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