

Rhinomanometer NR6

User Software Guide
And Installation Notes
V9



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Software Installation

COMPUTERS SUPPORTED

NR6 will work on any PC which can run Windows 2000, XP or Vista and which has a free USB socket. NB units, which comply with EN60950, should be used.

PRINTERS SUPPORTED

As these instruments operate in a Windows environment, print capability depends on you having installed a printer under Windows. Virtually any printer, which works under the version of Windows you have, will be suitable.

INSTALLATION SEQUENCE

The software comes on 2 CD's and should be installed **before connecting the NR6 Rhinometer to your PC**. It is also advisable to close any other programs you may be running while performing the installation as you may need to close down the PC during this operation.

GMI SOFTWARE

Put the CD in your drive, navigate to it using My Computer/Windows Explorer, and double click on the file SETUP.EXE. Accept the defaults offered at each stage.

INTERFACE BOARD SOFTWARE (Measurement Computing)

Ensure the USB cable is not connected to the NR6 unit.

Put the CD in your drive. If your PC is set to autorun CD's then allow this to happen while accepting the defaults offered. The program Instacal and other driver software will be loaded to a folder called Measurement Computing.

If your PC does not automatically run the CD's installation program, click on My Computer, select and open your CD drive, and then double click on mccsetup.exe to install the programs and files.

The installation program will offer defaults all of which should be accepted.

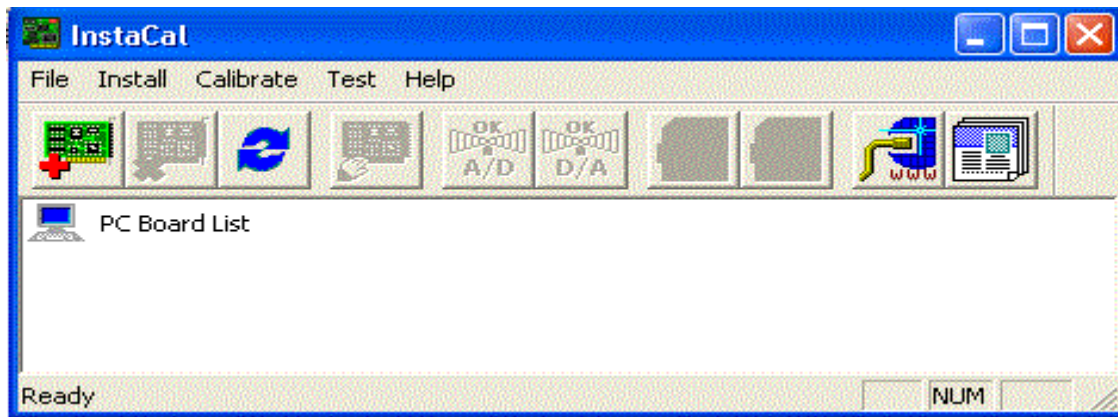
INTERFACE BOARD HARDWARE

The last installation operation is to have your PC identify the USB A/D convertor, which is built into the NR6 unit..

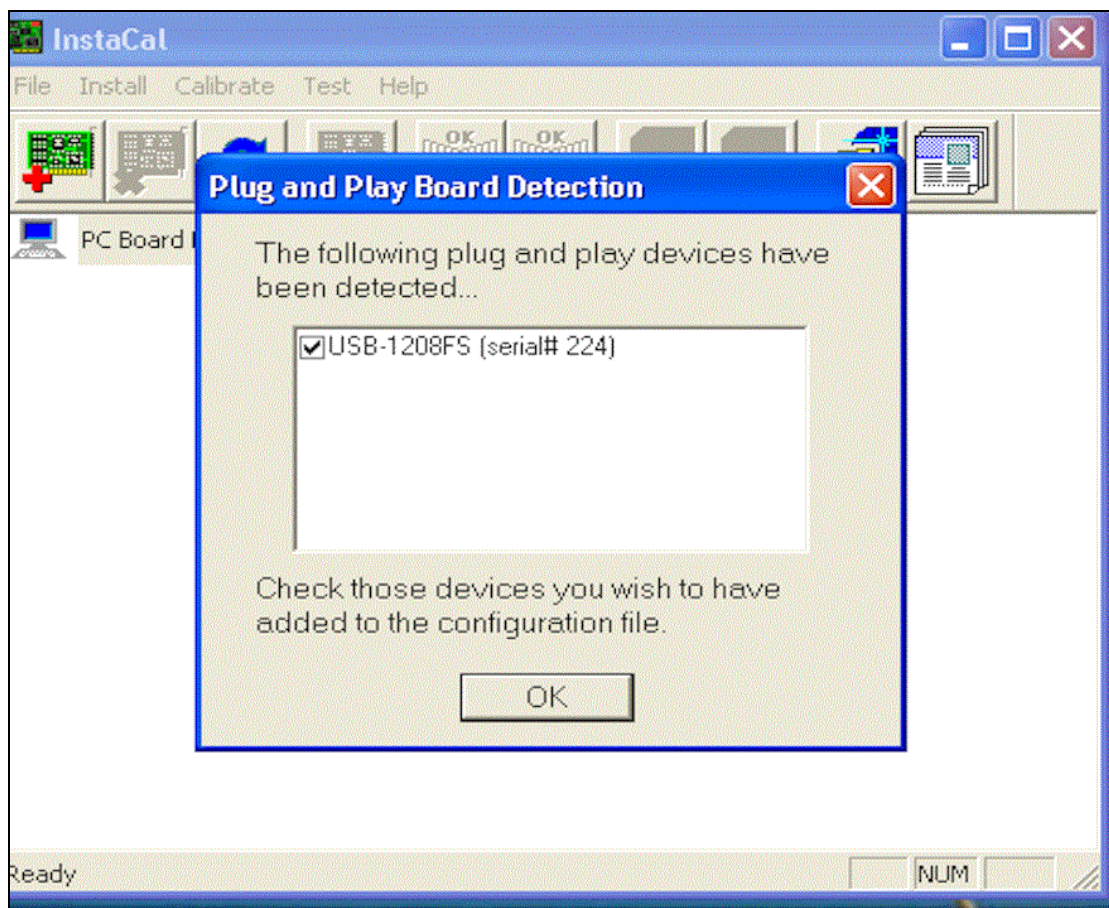
Click on

START/ALL PROGRAMS/MEASUREMENT COMPUTING/INSCAL32.exe

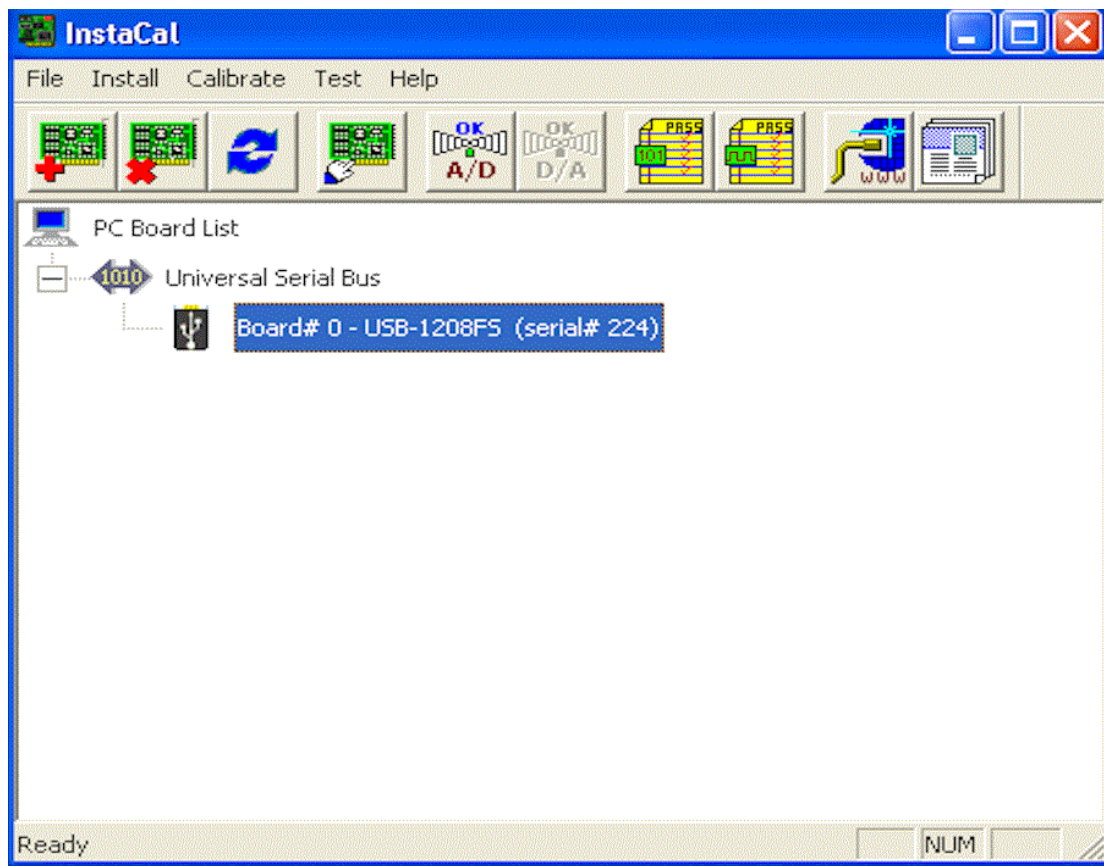
and Instacal will show no boards installed as shown overleaf.



Connect the USB cable between the NR6 and the PC. Wait for a few seconds as the USB interface is recognised and the drivers loaded. Once completed the Instacal screen will offer the opportunity to install your USB board.



Click on OK.



When the Instacal program shows the screen above, installation is complete and Instacal can be closed down.

The NR6 Rhinomanometer program can now be started by clicking on PROGRAMS/GMI NASAL MEASUREMENTS/NR6 Rhinomanometer

Hardware Installation

The NR6 hardware installation is concerned with the cable between the NR6 and the PC and the "plumbing" section which is concerned with the pressure and flow tubes and mask assembly.

There is a single cable which links the NR6 box to the PC through the interface card. It can only be connected one way, and should already be connected.

NR6 "plumbing"

- 1) The NR6 box has three nozzles on it, which are colour coded
Black is the pressure input. Red is the positive flow input.
Green is the negative flow input.
- 2) Connect the tube marked black onto the nozzle marked black. The tube marked red onto the nozzle marked red and the tube marked green onto the nozzle marked green.

At the free end connect the tube marked red onto the flowhead port marked red. The tube marked green onto the flowhead port marked green and the tube marked black onto the mask port marked black, for posterior tests or on to the anterior tube connector for anterior tests



NR6 front view flowhead and pressure connections

NR6 back panel view showing USB to PC socket and blanked link socket.

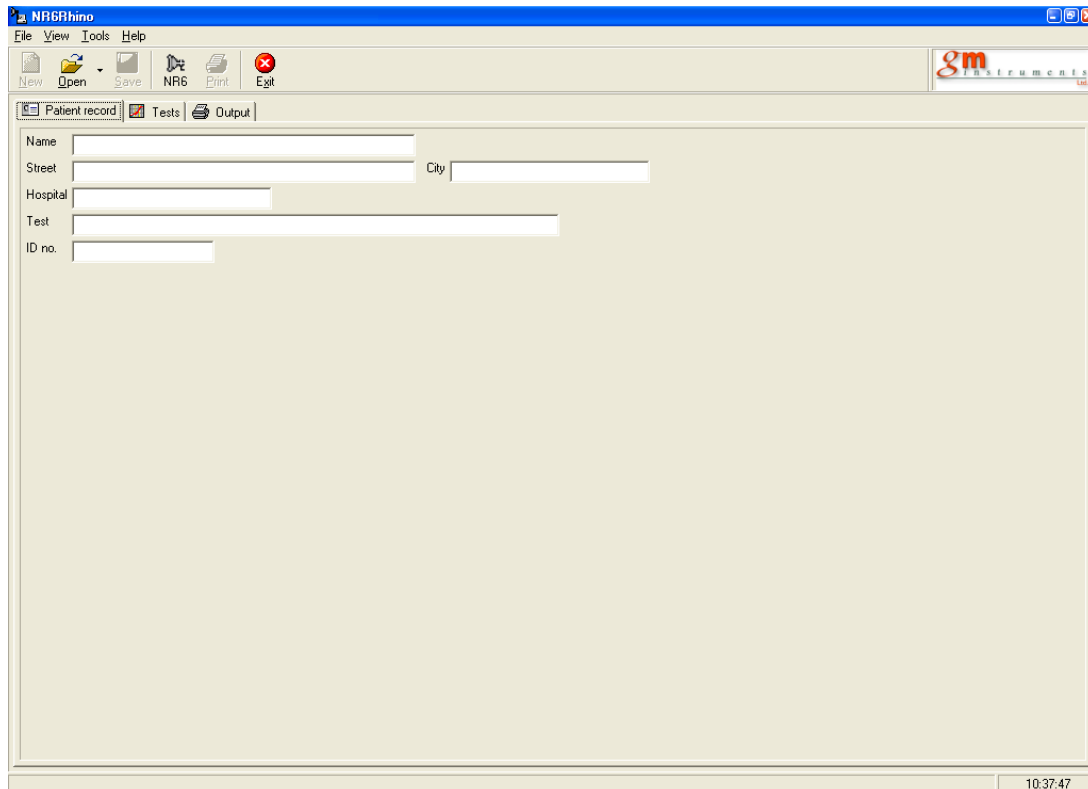


Opening the Software

Start the program by clicking on its desktop icon or by clicking on

START/PROGRAMS/GMI NASAL MEASUREMENTS/RHINOMANOMETER NR6

The opening window is as shown below.



A number of elements within the program can be configured to suit your application, and although you may wish to change them again later, it should be noted that fields within the Patient Information screen should not be changed after storing results for a particular subject, as the stored information may become inaccessible after that time.

Full information on the alterations possible, and how to make them, are shown on the following pages.

How To Configure the Software

All changes are made by clicking on TOOLS and OPTIONS. A new window named SETUP is then displayed which shows 4 tabs, each of which contain user configurable items. The four tabs are labelled:-

Formatting, in which you can change the colour of almost any element of the program on screen or printout.

Patient Record, in which you can alter the number of fields available for information input, their size, their names and the type of characters which are acceptable. You can also tell the system to use a particular field entry as the patient file name.

Rhinomanometry / Devices lets you tell the program what settings have been used for the interface card and what connections have been made to it. We do not recommend that any of the default settings are altered unless there is a good reason for doing so.

Rhinomanometry / Acquisition, is the tab screen to use when you want to preset the type of measurement you want to be offered by default when you start testing. You can alter a number of parameters which are discussed in detail below.

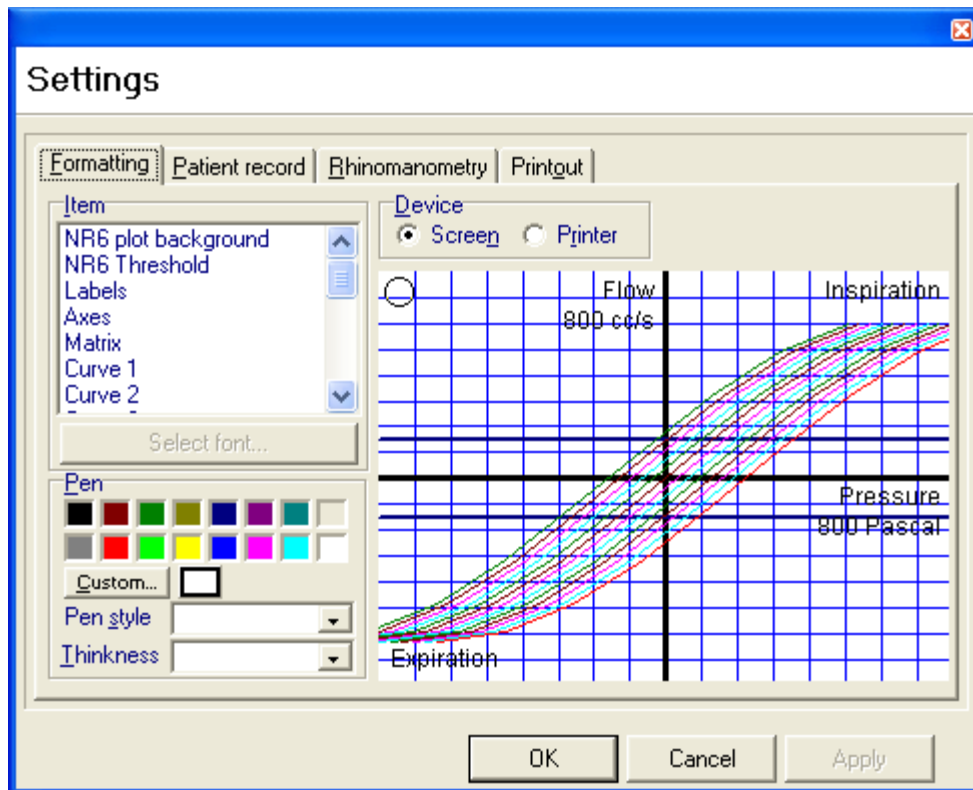
Rhinomanometry / Calculation, lets you add the display of Broms angles or Rohrer values when the boxes are ticked.

Rhinomanometry / Printout, allows you to select other parameters for printing.

Printout, The header text and margin details can be modified from here, along with additional outputs selected

A detailed description of each of these Tab screens along with a screen image follows below:

Formatting Tab



The formatting tab screen is made up of the following elements:-

Device “radio” button....from which you can select Screen or Printout for alteration.

Item scrolling window which contains a list of the screen or printout elements whose colour can be changed.

Pen colour palate, from which you choose the colour you want applied to any element selected in the item window.

Pen Style window which can be applied to any line drawing element selected from the item window.

Pen Thickness window which allows you to apply different line thickness' to any line drawing element selected from the item window.

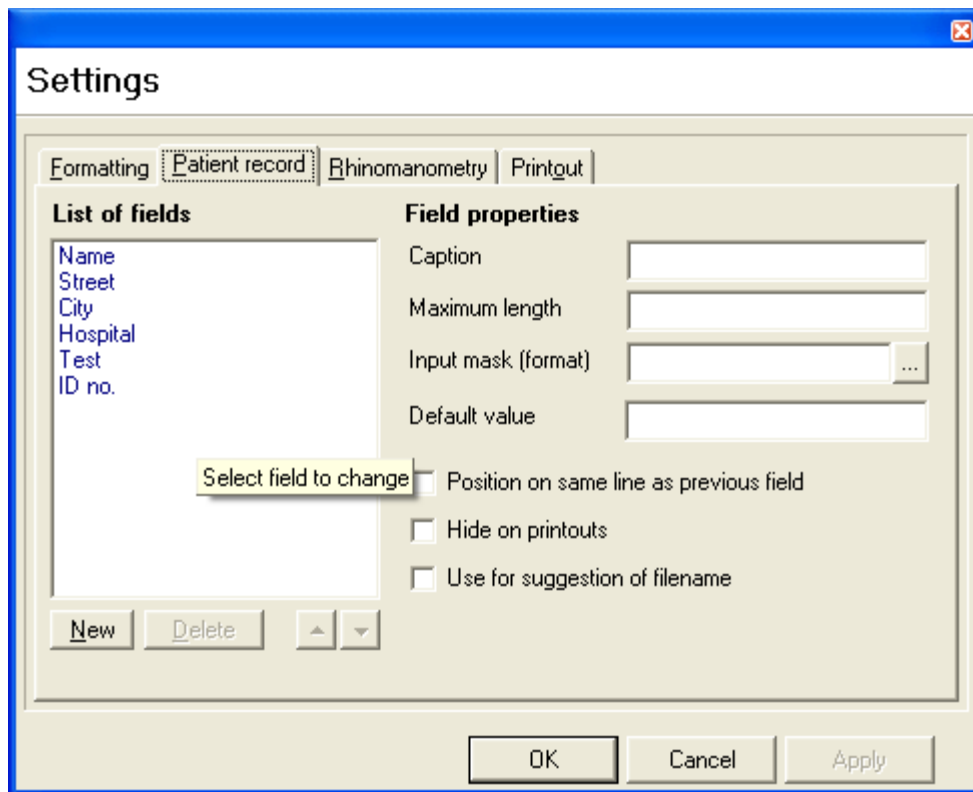
Preview window which lets you see the effect of a change.

To make a change to the default settings select **Screen** or **Printer**, select an **Item** from the list, select your chosen **Pen** colour and if appropriate **Pen Style** or **Thickness**. You will immediately see the effect of that change in the **Preview** window.

If you click on **Apply** the change will be recorded and you can move to another element.

If you click on **OK** instead of **Apply**, the change will be made, and recorded, but you will close the **Setup** window and return to the main screen.

Patient Record Tab



The **Patient Record** information window can contain many fields. You can however include as many or as few as you want, put them in any order, define what kind of data is acceptable for entry in any field and specify the size of field.

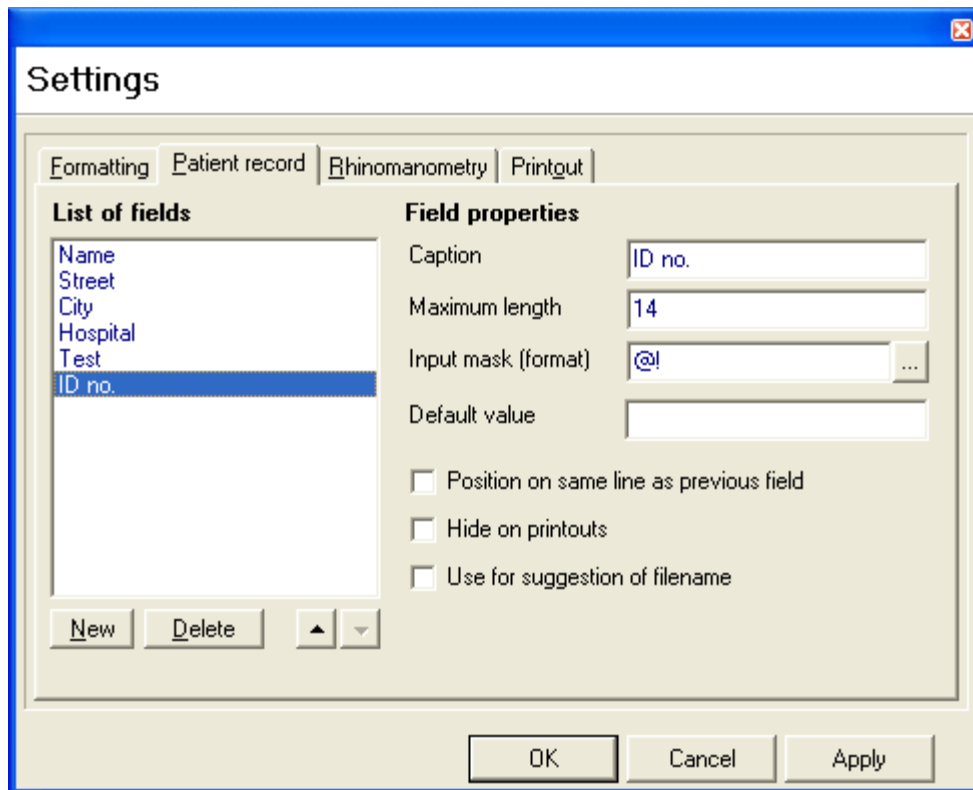
The Patient Record tab contains the following elements:-

List of Fields is a window which shows the current “labels” already selected for inclusion. If you click on one of these it can be edited or deleted or its position moved within the group. When highlighted the information relating to its structure is shown on the right hand side of the window under the headings of:-

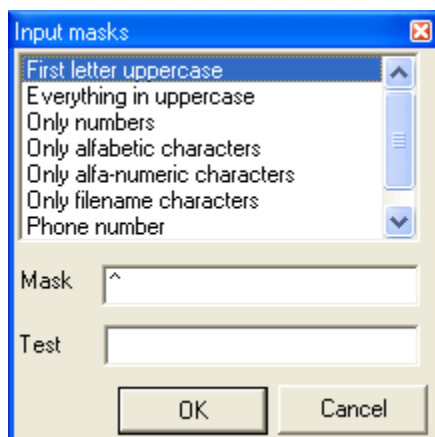
Caption the current label selected for editing.

Maximum Length the number of character spaces allocated in the **Patient Information** window against that name.

Input Mask (format) the conditions applied to character entry in the associated **Caption** field. An example is shown below:-



In the above example ID is highlighted in the **Lists of fields** window. The label ID No is shown in the **Caption** field and it can be seen that currently space is allowed for 14 characters. The mask applied was one, which only allowed numbers or letters for entry in that field but no spaces or other characters. **Masks** can be selected or changed by clicking on the button on the extreme right of the **Mask** field.



The **Input Mask** window allows selection of the conditions you want to apply and has space below for you to try out or **Test** the restrictions. If you wish to keep the currently selected field, click on **OK**, and then on **Apply**.

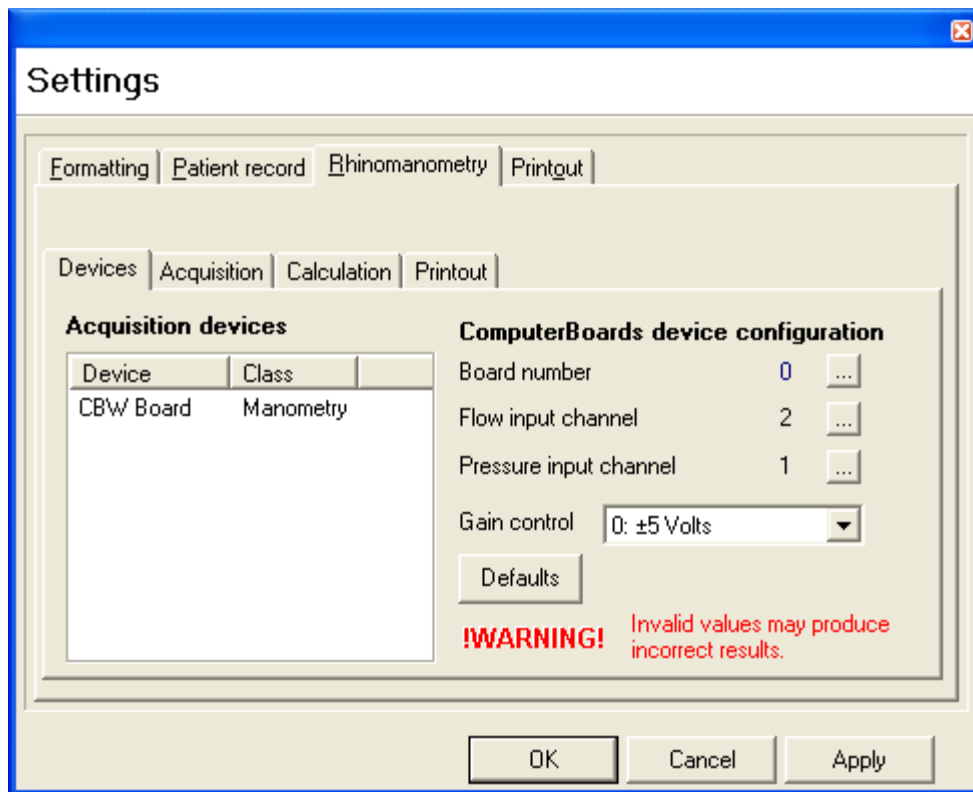
If you wish to discard any field click on **Delete**. If you want to add a new one click on **New**.

If you want to change the order in which they appear, highlight the one you want to move and then use the **UP** or **Down** arrow'd buttons to the right of the **Delete** button.

You can place more than one item on a line by placing it below the item you want it lined up with and clicking on **Position on same line as previous field**.

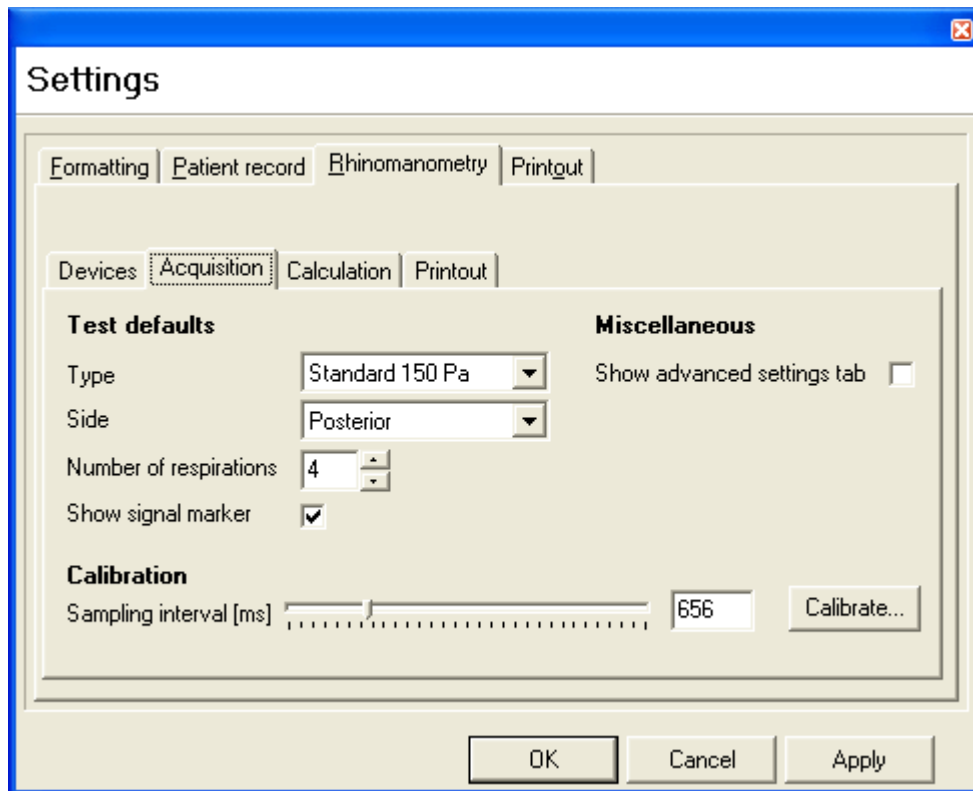
You can also "hide" a field from printout by highlighting it and clicking on the **Don't Show in Printouts**.

A field can be used for the test file name by highlighting it and then clicking on **Use for suggestion of filename**.

Rhinomanometry / Devices Tab

The **Rhinomanometry / Devices** screen shown above contains settings for **Board Number**, which depends on the number assigned by Instacal during the installation process, but this will normally be 0. The other parameters on this tab should not be altered.

Rhinomanometry / Acquisition Tab



The **Rhinomanometry / Acquisition** tab contains the settings for:

Type defines whether you will be offered a **Broms** or **Standard** fixed point resistance test. You can always change at the time of testing but this facility allows a standard protocol to be offered.

Side gives the option of Posterior or Anterior Right or Anterior Left testing as the default test starting point.

Number of Respirations lets you set the number of breathing cycles, or **Respiration's** required to complete a test. The default number is 4 cycles.

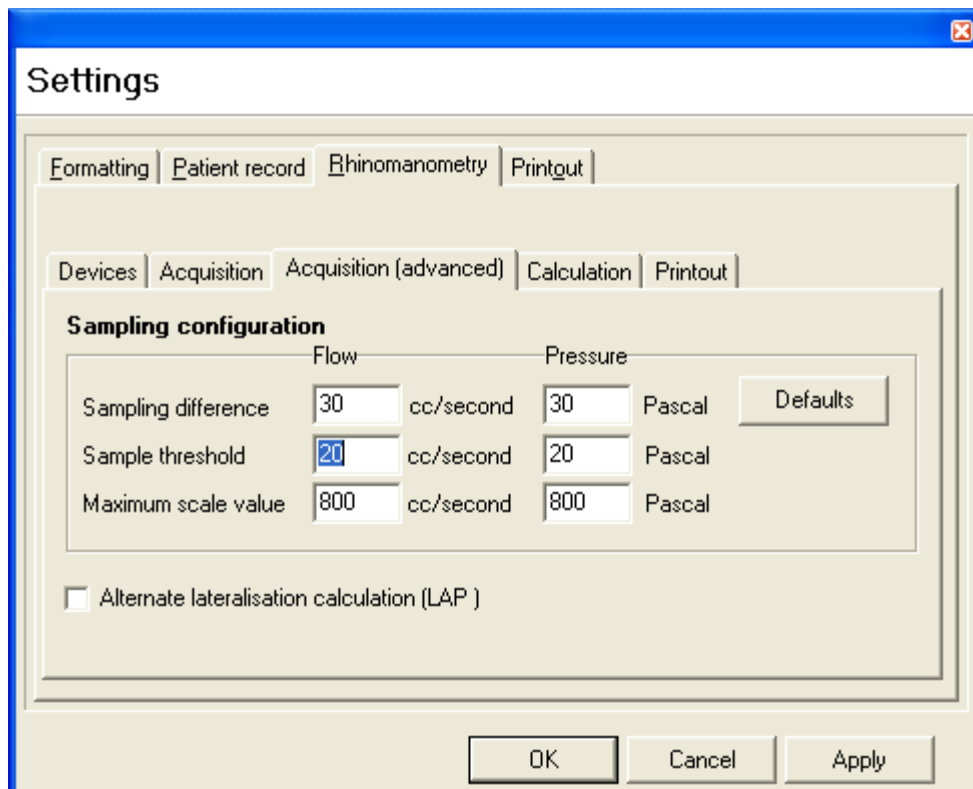
Show Signal Marker, lets you switch on or off the circle which surrounds the Acquisition Spot during an Acquisition.

Sampling Interval is a facility to slow down the rate at which the digital meter used during calibration changes is updated. The slide switch can be moved using the mouse, by placing the mouse cursor on the slider control and holding it down while moving the slider to the left or right.

Calibrate, this button is a link to the Calibration screen, which is described separately.

Show Advanced Settings allows some fundamental parameters to be altered. We strongly advise that these are not altered unless you have clearly

thought through and understand the consequences. Clicking on the button marked **Default** returns the settings to the original values.



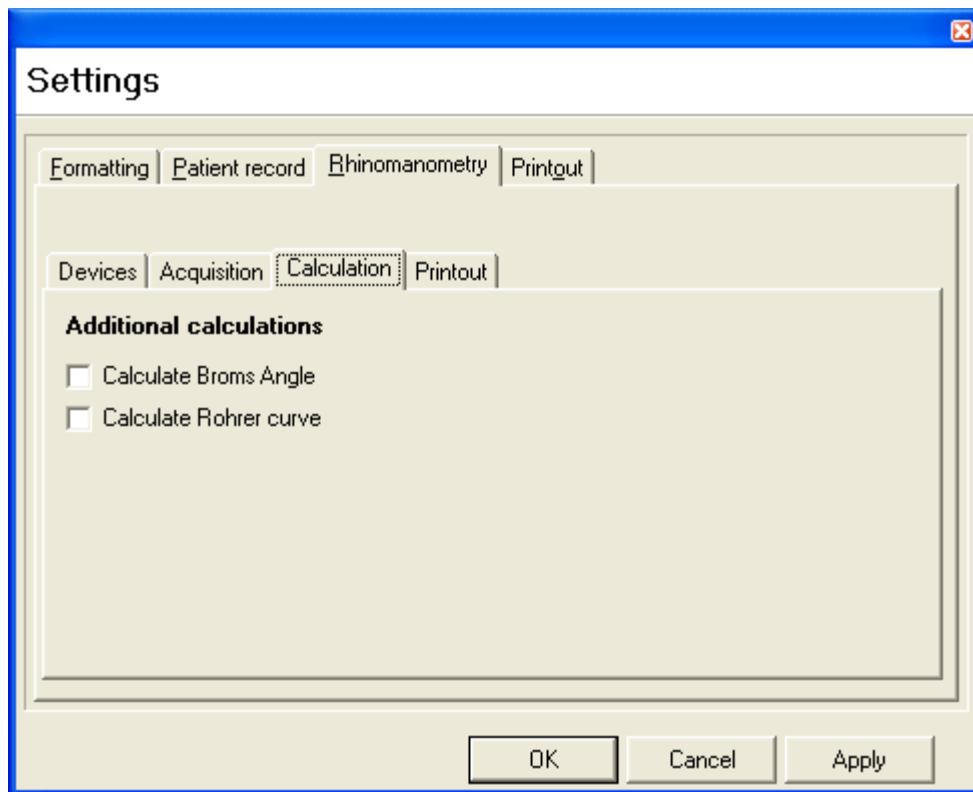
Under **Advanced Settings** the step size of flow or pressure change required to force the plotting of a new point is specified in **Sampling Difference**. The normal value is 30 units.

The change in flow or **Pressure Signal** required to start a measurement recording is set in **Sample Threshold**.

The **Maximum Scale Value** can be altered at will as it effectively increases the resolution of the displayed curve, but does not affect calibration. The normal value is 800 units.

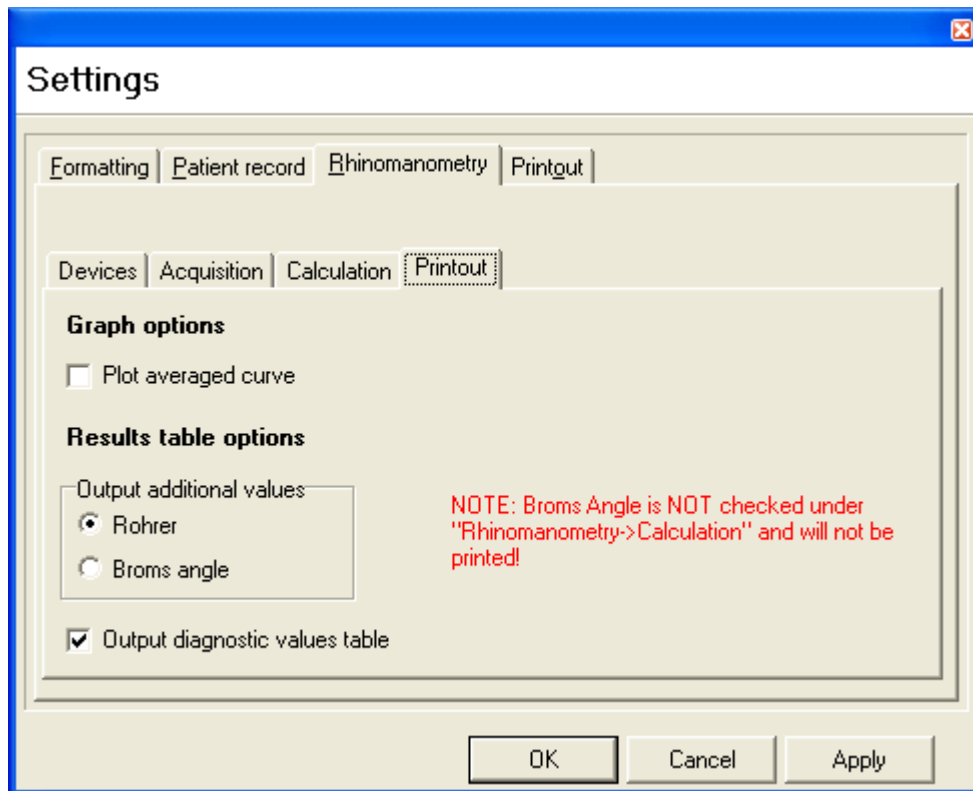
The **Lateralisation Calculation** can be switched on from here, for example to display *Left* greater than *Right* by 15% when Anterior test is performed.

Rhinomanometry / Calculation Tab



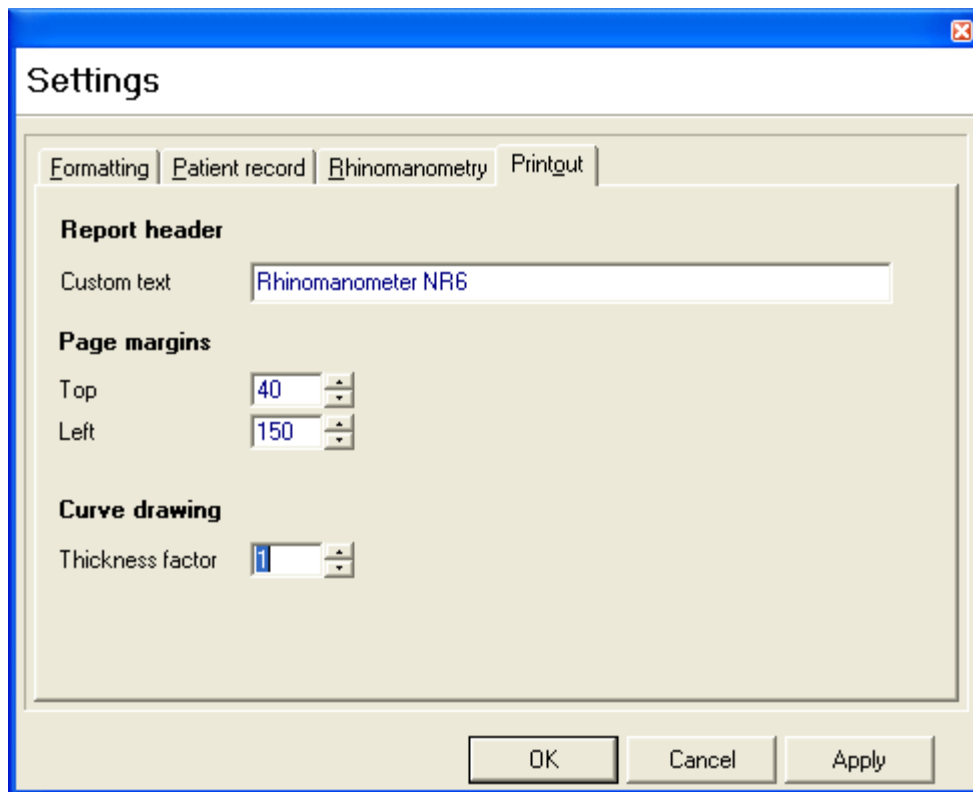
The **Rhinomanometry / Calculation** tab contains options about the **Broms Angle** and the **Rohrer curve** and enables you to switch them on and off according to your requirements.

Rhinomanometry / Printout Tab



In the **Rhinomanometry / Printout** tab you can arrange to **Plot Averaged Curve** for the Respiratory cycles selected for inclusion, or the Acquired Data as actually recorded, when you click on Print. You can also add the **Rohrer** or **Broms Angles** – instead of Resistance Values – provided you acquire data with **Broms** switched on & for Anterior measurements. It is also possible to select printing out of the **Diagnostic Values Table** at this stage.

Printout Tab

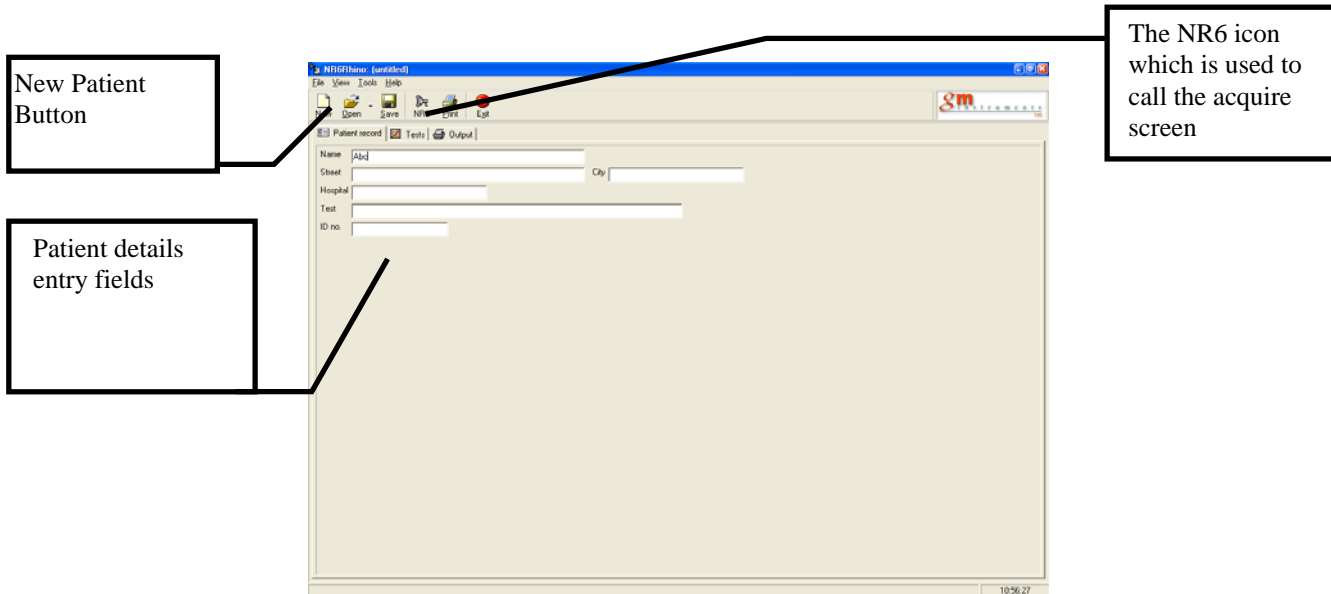


The **Printout Tab** allows the setting of a title which will appear on printouts and the alteration of margins. More detailed control of printer options is available in the normal Windows print driver.

Starting A Test

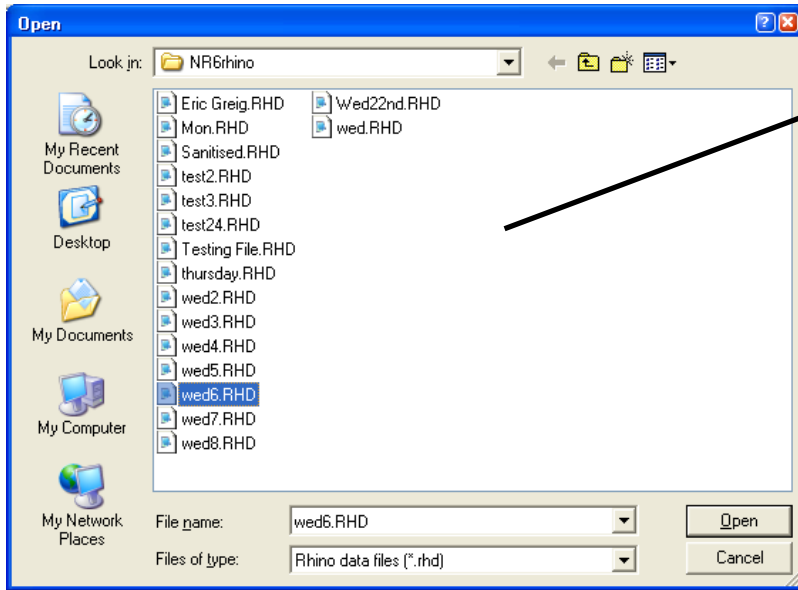
To prepare for measurements on a new subject

1. All current patient information and test results are cleared when the program is started or if having performed other measurements, you click on the NEW button.
2. In either event the cursor is set to the first field in the patient information window.
3. You can then enter all patient details. Pressing TAB after entering information in each field will take the cursor to the next one.
4. To start the Acquire procedure you click on the NR6 icon.



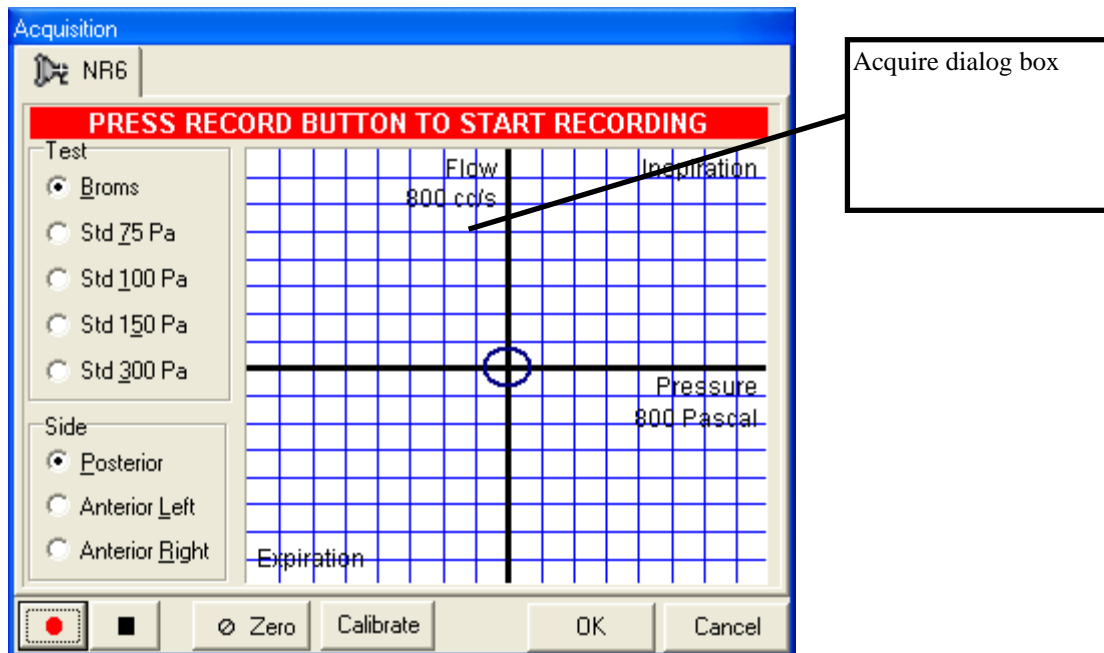
To prepare for measurements on a subject who has already been tested

- 1) Click on the button marked OPEN and then using the dialog box offered go to the folder you store your results in and click on the subject's file you want to open.
- 2) You will then be able to check that you have the correct subject by examining the patient details by clicking on the PATIENT INFORMATION tab. Clicking on the RESULTS tab will show you all previous test dates and results for that patient.



To Make A New Record

1) Click on NR6. The acquire dialog box will show



Acquire dialog box

2) Check that the spot is zeroed on the origin of the graph. If not click on ZERO. Connect the subject to the mask and mouth tube and ask them to breathe in a normal relaxed way. You should see the trace being described across the screen and once that shows in a consistent fashion, click on the red button to begin recording data (a USB footswitch is also available as an additional option or extra to begin the recording cycle).

3) Once 4 complete respiratory cycles have been taken in the system will stop taking in data, will show you the resultant curves, each of which is drawn in a different colour and will add the test to the test list for that subject.

4) If any curve is obviously bad it can be de-selected by clicking in the appropriate check box in the RESPIRATIONS section on the bottom right of the screen.

5) Comments can be added in the box found on the bottom of the screen.

6) If required additional testing can be done or the current test printed by clicking on PRINT, or saved by clicking on SAVE.

7) The OUTPUT tab can be used to create a printout consisting of a number of curves selected by clicking in the check box on the left of the test list.

To Compare Any Two Test Results

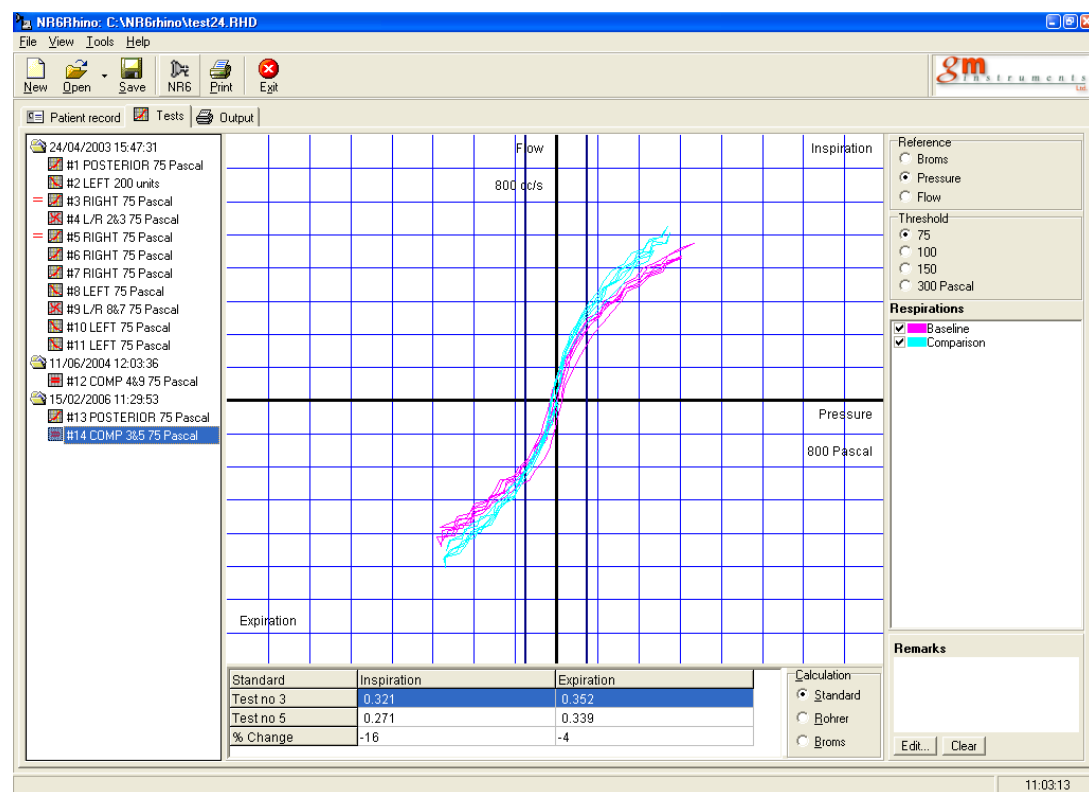
Any 2 (same type) test results can be compared by:-

- 1) Select the TESTS tab
- 2) Click on what is to be the baseline test, using the left mouse button.

Hold down the Ctrl key and click on the test you want to compare with the baseline test, using the left mouse button. You should now have 2 tests highlighted.

3) Click on one of the selected tests using the right mouse button, and from the drop down menu, click on compare.

4) A new test entry is created which is a comparison test between the two previously selected tests. If selected the baseline curve will be shown in one colour and the one compared against in another colour. The numerical information will show percentage change.



To Delete A Test Result

Select the test result to be deleted from the test list using the left mouse button, in order to confirm that you do want to delete it. Then click on the test result again this time using the right mouse button and from the menu which appears select delete.

Batch Test Facility (only on Executive versions)

Validation of test results is a facility which has proved to be invaluable in many situations. In rhinomanometry result variation is normally caused by distortion of the nose or leakage in the connections to it. The batch test facility has been incorporated into the Executive version of the program in order to allow users to check for these sources of result variation.

The program offers the possibility of switching on the “batch” process when you go in to the acquire screen, by clicking on the small check box on the top right hand side of the window. An additional section of window is then added to the acquire screen in which a number of pieces of information will be added as test results are taken in.

The screenshot shows the NR6 software interface with the following components:

- Batch selection “tic” box:** A small check box labeled “Batch mode” in the top right corner of the main window.
- Batch progress dialog box:** A dialog box titled “Acquisition” with a red banner that says “PRESS RECORD BUTTON TO START RECORDING”. It contains test parameters like “Test” (Broms, Std 75 Pa, Std 100 Pa, Std 150 Pa, Std 300 Pa), “Side” (Posterior, Anterior Left, Anterior Right), and “Zero”/“Calibrate” buttons.
- Batch results and print box:** A dialog box titled “Batch Results” showing calculated values: Mean (1), SD (1), and CV (1). It includes “Clear” and “Print” buttons.

At the bottom of the main window, there is a table with the following data:

Standard	Inspiration	Expiration
Testno 3	0.321	0.352
Testno 5	0.271	0.339
% Change	-16	-4

At the end of the first test the words “Start batch” will be shown in the progress dialog box. At this point the subject should be disconnected from the equipment, and then reconnected again. The test start red button should be clicked on again to start part two. Once completed a coefficient of variance percentage change figure will be shown in the progress box, while additional information such as the mean resistance, standard deviation between values and the CV% figure are shown in the results section. If the CV% figure is 10% or below then normally the tests will be considered to be close enough and indicate the strong likelihood of being accurate, as the chance of creating the same distortion or leakage twice in succession is remote. However additional tests can be added to the batch (with the subject disconnected between them each time) if you want further re assurance.

The batch values can be printed directly without any possibility of modifying the data by clicking on the batch print button and when you click on close, the batch tests are transferred to the normal test list for further examination and permanent storage.

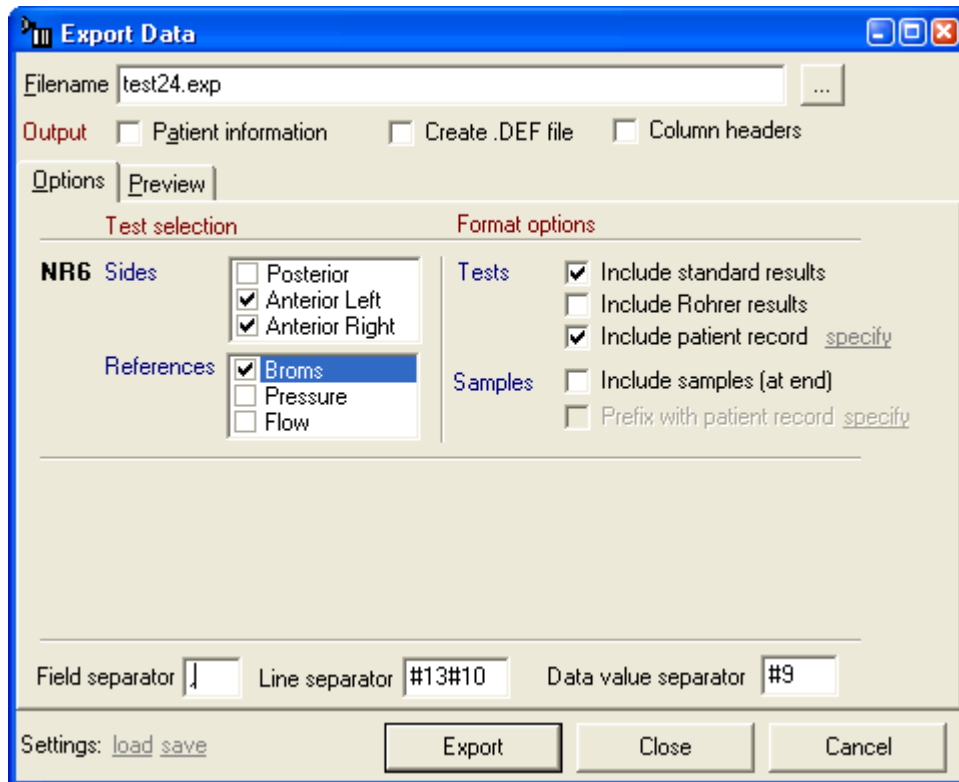
Data Export Facility (only on Executive versions)

The NR6 conversion facility has been designed to allow the extraction, display and manipulation of data contained within an NR6 XXX.RHD data file.

To extract a file

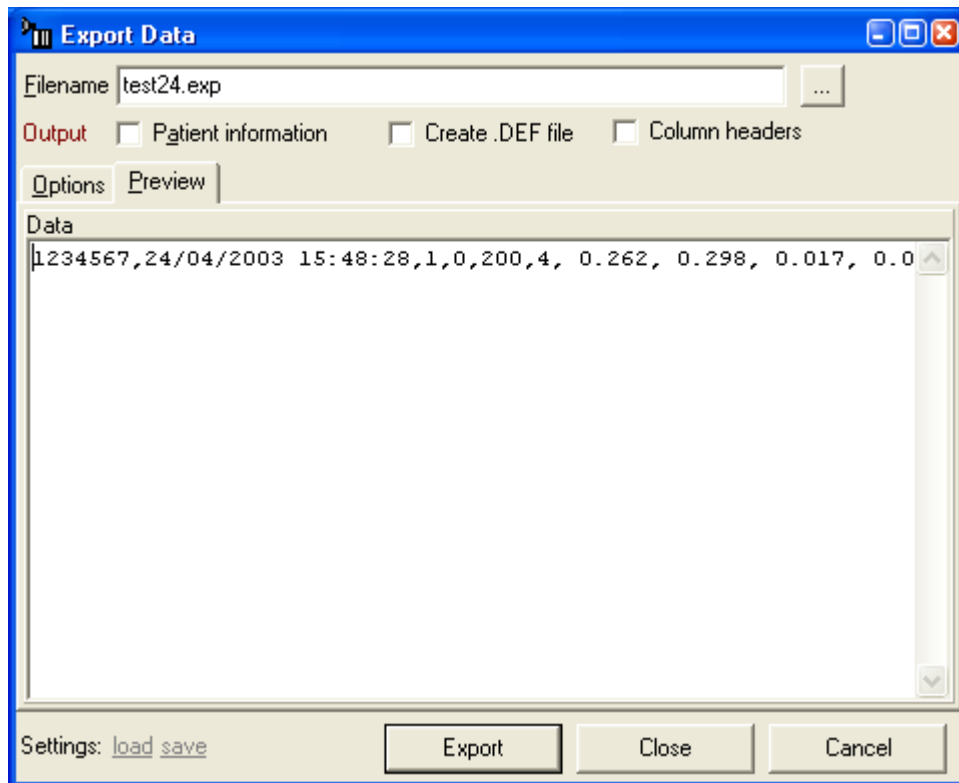
Extraction and conversion of a patients data requires that their file be currently active in the program.

- 1) Click on the icon to start the NR6 program.
- 2) Select the file to be converted by clicking on the open button and then clicking on the appropriate file. Confirm this is the file you want to extract by checking the patient details, then click on file and export.



- 3) The file name for the exported file will be offered by default.
- 4) If you want to have the patient details listed at the top of the exported file click on the tick box named Patient Information.
- 5) If you want to be able to view a list of field names, which correspond with the data you select for export, and print this as a separate file for reference, click on Create .Def file.
- 6) Next click on options **a to d** (listed below) and choose from the following to select which type or part of the file should be extracted. Having made a selection you can view both the data you will get in the

.exp file and the fields these values represent in the .def file, by clicking on the Preview tab.



- a) **(Sides)** posterior and / or anterior left and / or anterior right test results can be extracted, provided they are in the patients test list.
 - b) **(References)** select records created with Broms and / or pressure and / or flow reference settings.
 - c) **(Tests)** show standard and / or Rohrer calculated results for the sides selected above, and if ticked, repeats selected patient information at the beginning of each line.
 - d) **(Samples)** list the raw pressure and flow data values for the above records by clicking on Include Samples and put selected items of patient information at the beginning of each sample line by clicking on Prefix with patient record (you can define which fields you want present by clicking on define and selecting appropriate fields) If you select the samples option, two vertical columns are produced containing a list of pressure and corresponding flow values. If you further select and define prefix with patient record a third column is generated which shows the patient details selected. The number of full tests included is shown before the first column of values
- 4) Once the elements required for extraction have been selected click on OK.

5) A file name for the file which is soon to be created should already be present in the space in the top left hand side of the dialog box. This will have the suffix .EXP. Click on export to begin the conversion.

6) The .exp file (and if selected the .def) created will be saved to the folder C:/NR6RHINO unless you have altered the standard setup. The .def file will show the meaning of values shown in each position except for the following:-

Side 0 = posterior 1 = left 2 = right
Ref 0 = Broms 1 = pressure 2 = flow
CountInsp = The number of inspiratory curves used in the calculation of the mean values
CountExp = The number of expiratory curves used in the calculation of the mean values
DevInsp = Maximum deviation from the mean for any single inspiratory resistance value
DevExp = Maximum deviation from the mean for any single expiratory resistance value

The sample below shows corresponding .exp and .def files.

```
123,,,,,,,,,,,,,456
29/08/2001 14:42:29,0,1,75, 0.692, 0.806, 0.056, 0.050, 4.000, 4.000
29/08/2001 14:42:46,1,1,75, 0.769, 0.926, 0.081, 0.091, 4.000, 4.000
29/08/2001 14:42:55,2,1,75, 0.813, 0.977, 0.108, 0.032, 4.000, 4.000
```

Experiment no,Name,Street,Zip,City,State,Nationality,Hospital,Ward No,Lab No,Physician,Test,ID no.

Date

Time,Side,Ref,Threshold,MeanInsp,MeanExp,DevInsp,DevExp,CountInsp,CountExp

Date

Time,Side,Ref,Threshold,MeanInsp,MeanExp,DevInsp,DevExp,CountInsp,CountExp

Date

Time,Side,Ref,Threshold,MeanInsp,MeanExp,DevInsp,DevExp,CountInsp,CountExp

NB. All combined tests (i.e. left and right comparison tests) are not included in the output file. In the above example only the experiment No. and Test ID No. had values in them in the original patient information screen. All other fields were blank.

The example below shows corresponding .exp and .def files, with samples additionally selected.

```
123,,,,,,,,,,,,,456
```

29/08/2001 14:42:29,0,1,75, 0.692, 0.806, 0.056, 0.050, 4.000, 4.000

29/08/2001 14:42:46,1,1,75, 0.769, 0.926, 0.081, 0.091, 4.000, 4.000

29/08/2001 14:42:55,2,1,75, 0.813, 0.977, 0.108, 0.032, 4.000, 4.000

3

49 -66

66 -98

92 -130

123 -157

154 -180

185 -200

217 -216

248 -230

279 -249

310 -262

341 -269

309 -258

277 -243

246 -231

215 -212

184 -194

153 -178

122 -154

91 -129

58 -95

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