Move the mouse cursor to a corner of the section of the diagram you want to magnify. Press the left mouse button and keep it depressed. Move the mouse until the movable frame encloses the diagram section of interest. Release the mouse button.
After pressing the **right mouse button** the full diagram is displayed again.

	Expansion by factor 2	Contraction by factor 2
horizontally	**Ctrl** + →	**Ctrl** + ←
vertically	**Ctrl** + ↑	**Ctrl** + ↓

D 5.3   Scrolling

From the scroll bars on the right and at the bottom of the window you can see which segment of the diagram is displayed. Shifting of the visible segment is always possible regardless of which option button is active.
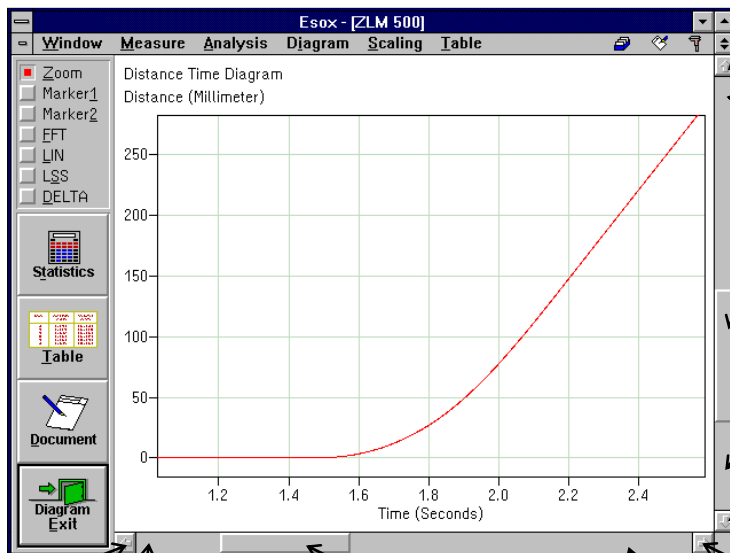
To scroll **up by 10%**.

To scroll **up by one windowful**.

To scroll **to any desired position vertically:**
Click and hold the left mouse button. Drag the mouse until the square is in the wanted position.

To scroll **down by one windowful.**

To scroll **down by 10%.**

To scroll **to the left by 10%**.

To scroll **to the left by one windowful.**

To scroll **to any desired position horizontally:**
Click and hold the left mouse button. Drag the mouse until the square is in the wanted position.

To scroll **to the right by one windowful.**

To scroll **to the right by 10%**.

Scrolling	to the right	to the left	up	down
by 10%	⇧ + →	⇧ + ←	⇧ + ↑	⇧ + ↓
by one windowful	**Ctrl** + **PgUp**	**Ctrl** + **PgDn**	**PgUp**	**PgDn**

D 5.4   Marker cross-hairs

On activating the "**Marker 1**" option button or "**Diagram - Mode Marker1**" menu option a marker cross-hair appears in the diagram.

In this field the measured value will be numerically displayed.

By clicking the [**Off**] button the marker cross-hair can be removed from the screen.
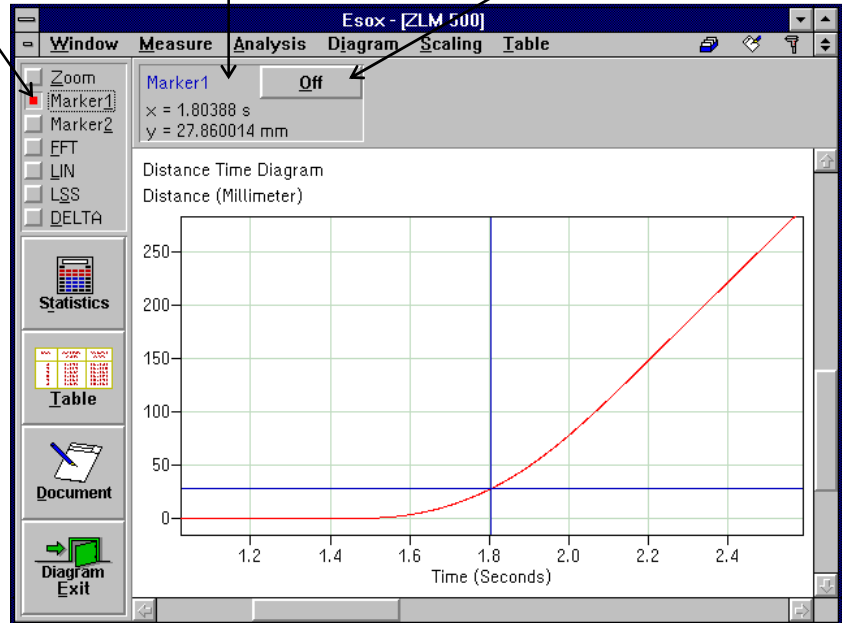

With a mouse click on a point in the diagram, the vertical line of the cross-hair is moved to this point. The horizontal line of the cross-hair is positioned according to the value measured at this position. That value appears in the numerical display field.

You can move the marker cross-hair with the [→] and [←] keys.

The option button "**Marker2**" or the menu option "**Mode Marker2**" permits a second marker cross-hair to be displayed. It is handled in the same way as the first marker cross-hair.

When both marker cross-hairs are active, the difference between the measured values marked by the cross-hairs is displayed.
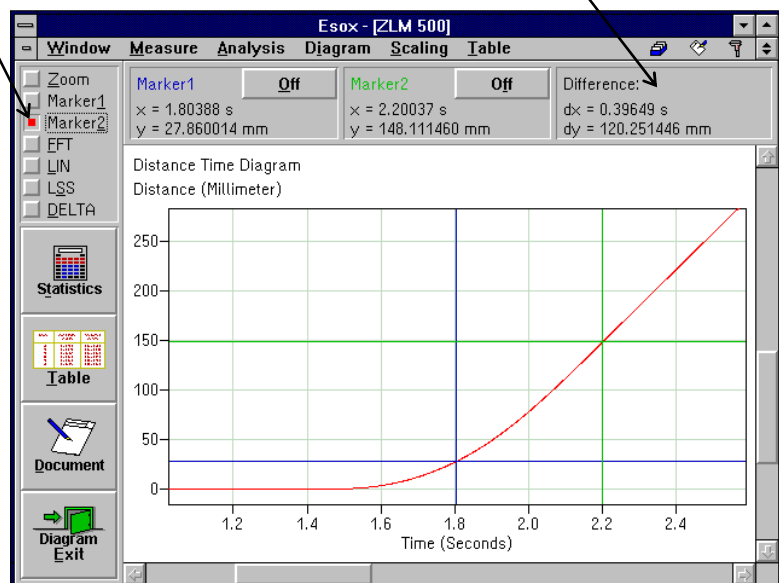
D 5.5   Statistics

Activation of the "**Statistics**" button or the "**Statistics**" option of the "**Diagram**" menu displays
- the number of readings
- the minimum reading
- the mean value
- the maximum reading
- the standard deviation
- and the maximum-to-minimum variation.
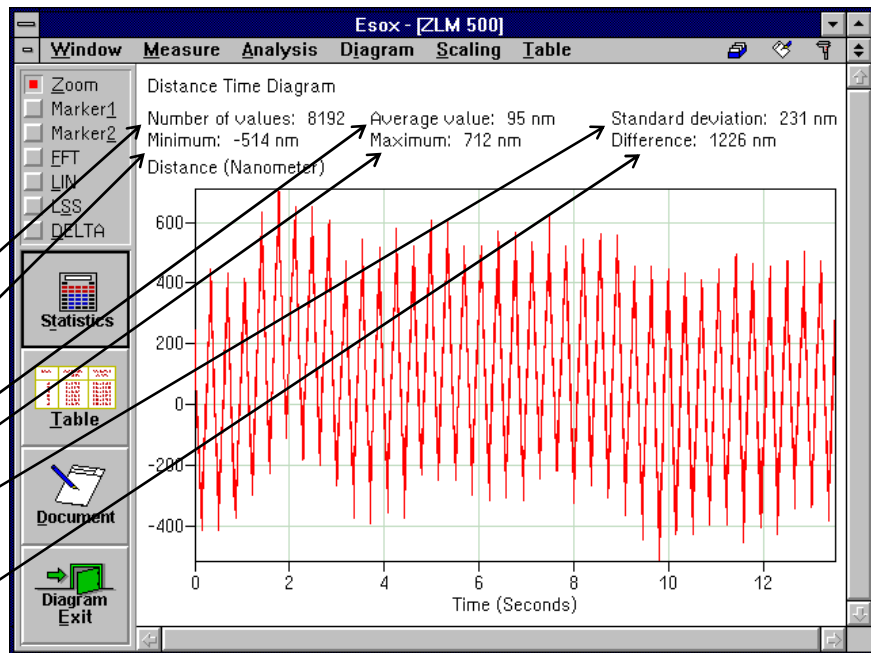
All these data is calculated from the currently visible diagram segment. When you move the diagram, the data are recalculated for the new diagram segment and displayed accordingly. The clicked button will lock. Click it again to remove the display of mean value and standard deviation.

D 5.6   Tables

By clicking the "**Table**" button while a diagram is displayed, a table with the measured data can be displayed in addition. The clicked button will lock. Click it again to remove the table.
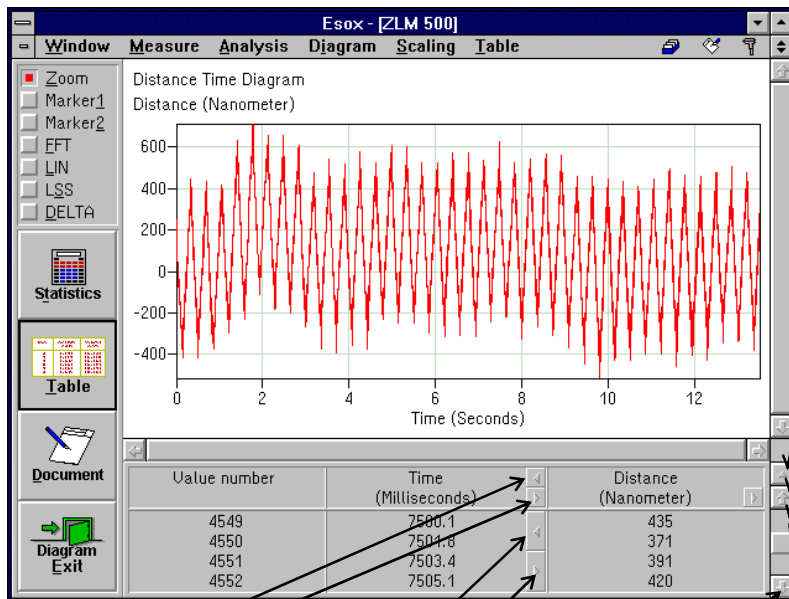
Button for **maximizing** the table

To scroll **up by one line.**

To scroll **up by one windowful**.

To scroll **to any desired position vertically:**
Click and hold the left mouse button. Drag the mouse until the box is in the wanted position.

Switch buttons for unit to be displayed.
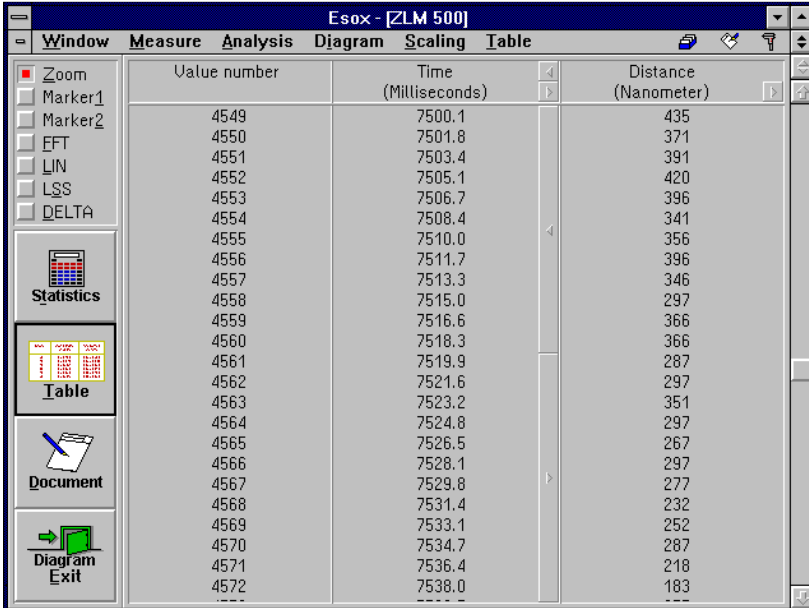
Switch button for number of decimal places.

To scroll **down by one line.**

To scroll **down by one windowful**.

The table may occupy either the bottom right section or almost all of the program window. In the second case, the diagram is hidden behind the table. For switching between normal-size and full-window presentation of the table, click the button at the top right table margin.

The functions described above are accessible with the keyboard as well, if you select, in the **"Table"** menu, the options
"No table",
"Small table" or
"Big table"

Value number	Time (Milliseconds)	Distance (Nanometer)
4549	7500.1	435
4550	7501.8	371
4551	7503.4	391
4552	7505.1	420
4553	7506.7	396
4554	7508.4	341
4555	7510.0	356
4556	7511.7	396
4557	7513.3	346
4558	7515.0	297
4559	7516.6	366
4560	7518.3	366
4561	7519.9	287
4562	7521.6	297
4563	7523.2	351
4564	7524.8	297
4565	7526.5	267
4566	7528.1	297
4567	7529.8	277
4568	7531.4	232
4569	7533.1	252
4570	7534.7	287
4571	7536.4	218
4572	7538.0	183

(Window menu options: Zoom, Marker1, Marker2, FFT, LIN, LSS, DELTA; buttons: Statistics, Table, Document, Diagram Exit)

Button for switching back to normal-size presentation of the table

The visible segment of the table can be shifted by means of the vertical scroll bar at the right margin of the table.

↑   shifts the visible table segment up by one line.

↓   shifts the visible table segment down by one line.

Home   shifts the visible table segment so that the first line is displayed.

End   shifts the visible table segment so that the last line is displayed.

PgUp   shifts a full-screen table segment up by so many lines as there are lines visible.

PgDn   shifts a full-screen table segment down by so many lines as there are lines visible.

D 5.7   Compiling a record (document)

The "Document" part of the program serves for printing the record and for compiling the record contents. It is there that the arranging of the record contents and the printing of the record are carried out, rather than in the measuring program. Diagrams, tables and statistical data can be transferred from the measuring program to the "Document" program module. For further information on the "Document" program module, see section "L - Program module "Document""

Click the [Document button] button or call the **"Prepare document"** option of the **"Diagram"** menu to display

the "Prepare document" dialogue box.

If the "**Diagram**" switch is activated ([X]), the diagram displayed on the screen immediately before the "Prepare document" dialogue box was called is transferred to the "Document" program module.
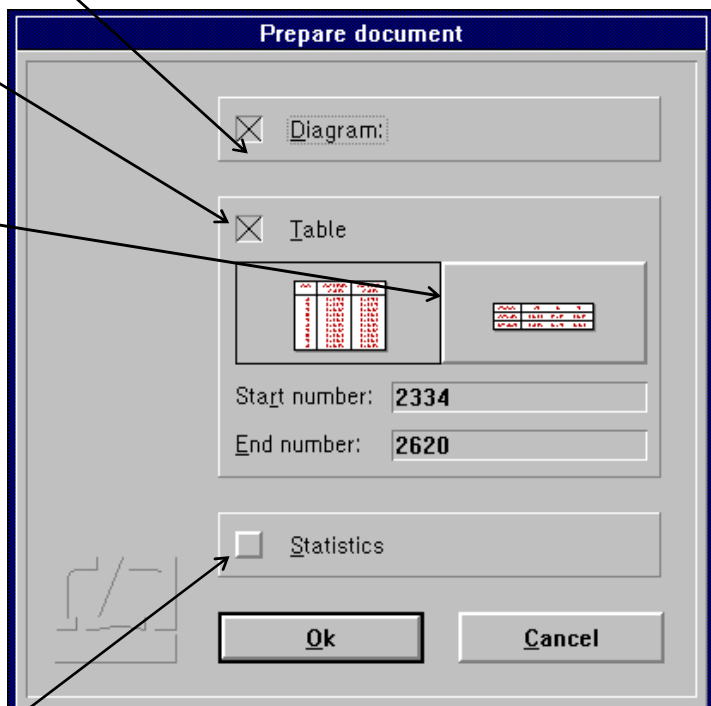
If the "Table" switch is activated, the buttons

[horizontal button] and [vertical button]

can be clicked to select between horizontal and vertical arrangement of measured data in the table.

In case of horizontal arrangement, the table is split up and transferred to the "Document" program module in the form of several tables if all the measured data do not fit into one line. When recording a table, please mind that a printed text page has about 60 lines. If a great number of readings have been taken, you should select which of them to be transferred into a table. For this you can use the "Start number" and "End number" input boxes.

If the number of measured data between the first and last readings entered exceeds 1000, the program will restrict the table to 1000 readings.

Prepare document

- [X] Diagram:
- [X] Table

Start number: 2334
End number: 2620

- [ ] Statistics

[Ok]   [Cancel]

Click the "Statistics" switch to transfer to the "Document" program module the number of readings, the mean value, the standard deviation, the maximum reading, the minimum reading and the maximum-to-minimum variation of the readings that were visible in the diagram immediately before the "Prepare document" dialogue box was called.

D 5.8 Fourier analysis, least squares line, and deviation from nominal positions

With some diagrams, further analyses are possible for part of the measured data, i.e. a segment of the diagram. These functions are also accessible via option buttons.

Selection of the diagram section is only possible with the mouse.
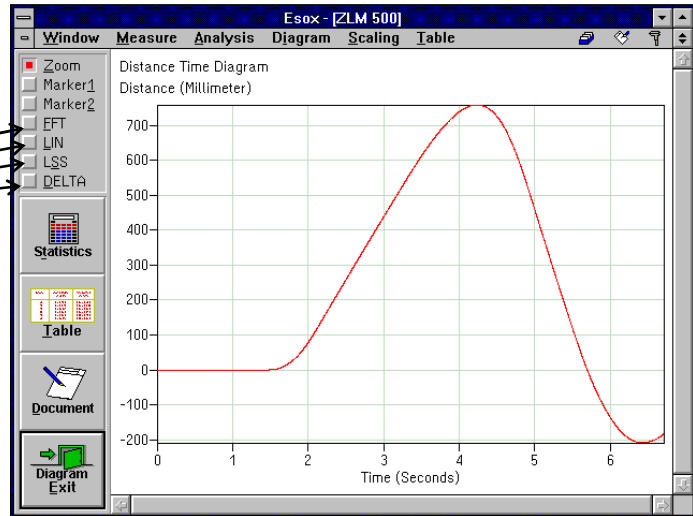
Move the mouse cursor to a corner of the diagram segment to be further analysed. Click and hold the left mouse button. Then drag the mouse until the movable frame encloses the diagram segment of interest. Release the left mouse button.

The functions released by the option buttons after selection of the diagram segment are explained in the sections below.

D 5.8.1 Fourier analysis

With an active **"FFT"** option button or **"Fourier analysis mode"** option of the **"Diagram"** menu, a Fourier analysis is carried out for the diagram segment selected.
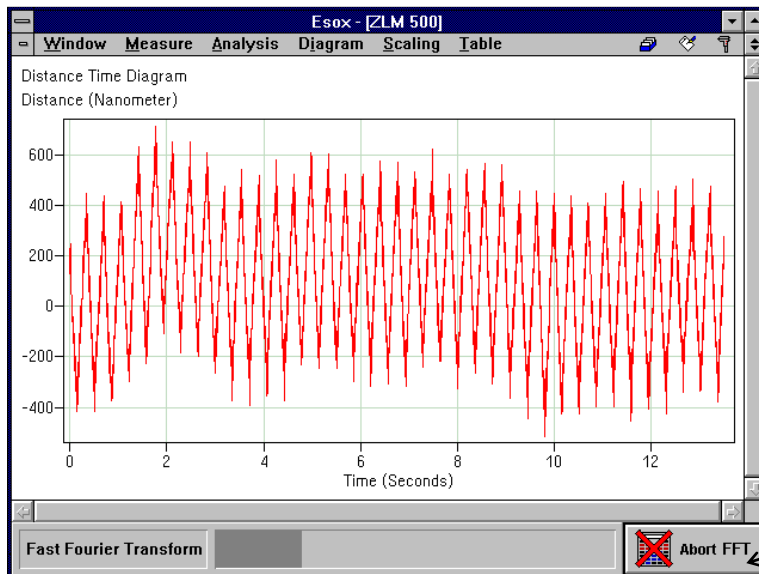
Since Fourier analysis takes a longer time with a greater number of measured data, a status bar with an abort button is displayed at the bottom of the window.

While the fast Fourier transformation is running, you can switch to another program module or another Windows program.

D 5.8.2   Linear deviation

With an active **"LIN"** option button or **"Linear deviation mode"** option of the **"Diagram"** menu, a diagram is generated showing the distance deviation from a straight line with preselected ascent (gradient).

Enter the ascent into the dialogue box.

Use the **"Centre diagram"** button to define whether

☐ the amount of the first reading is to be maintained or

☒ the absolute term of the straight line is to be determined by the program so that the maximum and the minimum of the calculated deviation have the same amount but different signs

Deviation from linear ascent

Ascent: `100.000000000000`   nm/s

☐ Centre diagram

◉ Distance deviation time diagram
☐ Distance deviation expectation diagram
☐ Distance deviation measured diagram

Ok   **Cancel**

Use these radio buttons for selecting the kind of diagram required, i.e. distance deviation-vs.-time, distance deviation-vs.-expected distance, or distance deviation-vs.-measured distance.

D 5.8.3   Deviation from least squares line

With an active **"LSS"** option button or **" Least square straight mode "** option of the **"Diagram"** menu a diagram is generated with a distance deviation from a straight line with preselected ascent.

D 5.8.4   Deviation from nominal positions ("expected values")

With an active **"DELTA"** option button or **" Expect. value deviation mode "** option of the **"Diagram"** menu it is possible to generate diagrams showing the deviation from nominal positions. These need not be equidistant from each other. But if they are, the "Deviation from linear ascent" mode (see D 5.8.2 Linear deviation) will produce the same effect faster.

Use the mouse to select the data to be processed. The screen will then display the "Deviation from expected values" dialog box.

Key in the nominal positions in the **"Expected distance"** column. Use the ↓ and ↑ keys to move from one nominal input field to that for the next or previous measurement reading.

The last column of the table indicates the result of the nominal-actual comparison.

If you have selected more than ten readings, use the vertical scroll bar to the right of the table to scroll the visible table segment.

Deviation from expected values

Value number	Time (Seconds)	Expected distance (Nanometer)	Measured distance (Nanometer)	Distance deviation (Nanometer)
2375	3.91496	0	297	297
2376	3.91661	0	391	391
2377	3.91826	0	415	415
2378	3.91991	0	316	316
2379	3.92156	0	336	336
2380	3.92321	0	371	371
2381	3.92486	0	326	326
2382	3.92651	0	307	307
2383	3.92816	0	331	331
2384	3.92981	0	321	321

■ Distance deviation time diagram
☐ Distance deviation expectation diagram
☐ Distance deviation measured diagram

[**Ok**]   [**Automatic**]   [**Const. Dev.**]   [**Cancel**]

Use the radio buttons to select the kind of diagram required.

In special cases the expected (i.e. nominal or desired) positions can be calculated by the computer after activating the **"Automatic"** button.

Click the **"Const.Dist."** button to easily generate equidistant nominal positions.

Use the **"Const.Dist."** button to generate equidistant nominal positions for selected successive readings. In the dialog box you can specify "Start value", "Distance", "First value number" and "Last value number".

Equidistant expected values

Start value: 0   nm

Distance: 0   nm

First value number: 2375

Last value number: 2509

[**Ok**]   [**Cancel**]

By clicking the **Automatic** button you can effect calculation of the nominal positions from the measured data by rounding off to a preset number of decimal places. Clicking the button will call the "Automatic" dialog box.

After you press the **Ok** button in this dialog box, the program will identify the reading that has the greatest absolute amount. The reading will be rounded to as many decimal places as you have preset in this dialog box. All other measured data will be rounded to the same number of places.
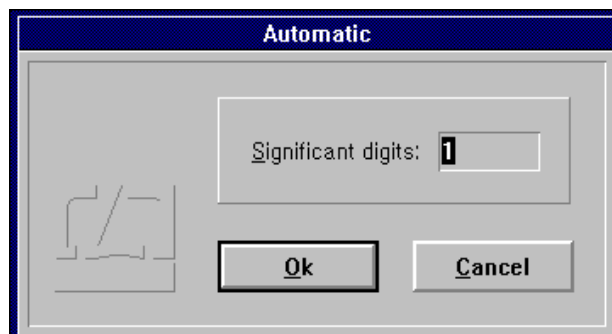
Example: The following readings have been taken:

Number of reading	Distance (millimetres)
1	0.0000
2	100.0082
3	250.0125
4	800.0853
5	1200.1734

If you preset "Significant digits: 2", rounding is effected to 100 mm (the reading having the greatest absolute amount is 1200.1734 mm), and you obtain the following nominal positions:

Number of reading	Nominal position (mm)	Deviation (mm)
1	0	0.0000
2	100	0.0082
3	300	-49.9875
4	800	0.0853
5	1200	0.1734

The desired result is only obtained if you preset "Significant digits: 3" or "Significant digits: 4":

Number of reading	Nominal position (mm)	Deviation (mm)
1	0	0.0000
2	100	0.0082
3	250	0.0125
4	800	0.0853
5	1200	0.1734

D 5.9   Evaluation of previous measurements

After the measurement a file card is created containing the measurement results. These cards are managed by the program module "Cardfile". In this program module you can load the card of an earlier measurement as current card. The measurement program is informed about this and will load the measured values assigned to this card automatically. Now you can start evaluating the measured values of this previous measurement. The program module "Cardfile" is described in detail in Section „J Program module „Cardfile"" .

D 5.10   Changing the scaling of diagram axes

The program has an automatic algorithm for the automatic scaling of diagram presentations. If you want to change the unit of measurement or the coordinate scales to be applied to the display before you transfer a diagram to the "Document" program module for documentation (see sect. D 5.7 "Compiling a document "), use the menu options "Diagram - Abscissa scaling" or "Diagram - Ordinate scaling". Such a change will only remain valid until the visible diagram segment is changed by zooming or scrolling.

Upon the calling of the menu option "Scaling - Abscissa scaling" or " Scaling - Ordinate scaling", the "Scaling x-axis" or " Scaling y-axis " dialog box will appear on the screen.

The list box "Unit" can be opened to change the unit.

In the four input boxes below this you can specify the required scaling.
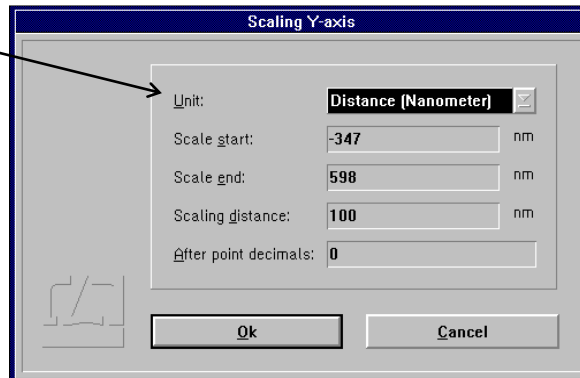
D 5.11   Exiting the diagram presentation

To exit the diagram presentation and return to the display of the current distance or velocity value, activate

the button or choose

the **"End diagram"** option of the **"Diagram"** menu.