

F 5 Measurement

The settings to be made per channel in case of making measurements with permanent data saving are identical to the channel settings to be made for mere data display. With a channel switched "Off", no data will be recorded for that channel.

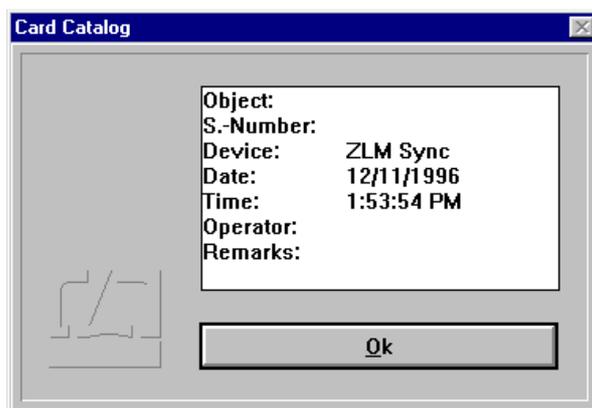
Before starting you need to set the reference value for each channel. You can do this either simultaneously for all channels with the  button in the large numerical display field, or individually per channel with the  button in the display and setting fields for the channels.

F 5.1 Starting the measurement

You can start a measurement by opening the "Measure" menu and choosing the "Start measure" option or by clicking the  button. While the measurement is running, the status bar indicates the number of readings currently taken. The display of laser stability at the right end of the status bar is replaced by the  button. This button is active, as indicated by its black frame, so that the measurement can be stopped immediately by clicking this button with the mouse, or by pressing the  key.

In the case of measurements over longer periods, you can switch to other program modules or run other MS-Windows programs.

After a successful measurement, the measured values are saved on a card of the card file. For this purpose, a dialog box "Card Catalog" is displayed, containing already entries for the measuring instrument used and the date and time of the start of the measurement. You can type in the remaining items via the keyboard.



Annex II contains the list of special function keys and key combinations for typing in text boxes.

Additionally, the following keys can be used:



- moves the text cursor to the next entry of the file card in the same line.



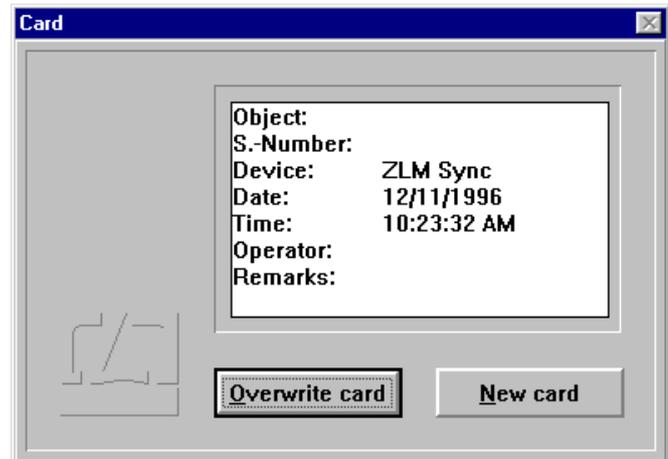
- moves the text cursor down to the next entry of the file card.



- moves the text cursor up to the previous entry of the file card.

On clicking the  button, the file card is created. Filing of file cards is handled by the "Cardfile" program module (see Section K).

If a card already exists in the main memory, the program provides the possibility to overwrite this card with new measured values.



F 5.2 Cancelling a measurement

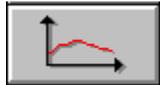
In the following cases the program cancels the measurement before all readings have been taken:

- The laser is unstable or becomes unstable while the measurement is running.
- The light power at the receiver is too low or becomes too low while the measurement is running.

- You have cancelled the measurement by clicking the  button.

You have the option of saving the readings taken until the moment of cancelling the measurement.

F 6 Analysis of a measurement

The measurement is analysed in the form of diagrams. A click on the  button or selection of the "Diagram" item in the "Measure" menu opens the diagram window.

F 6.1 Controls for diagram handling

If measurement data have been acquired in more than one channel, the diagram will have one ordinate axis for each channel. The colour of an ordinate axis is the same as that of the respective graph showing the series of data measured.

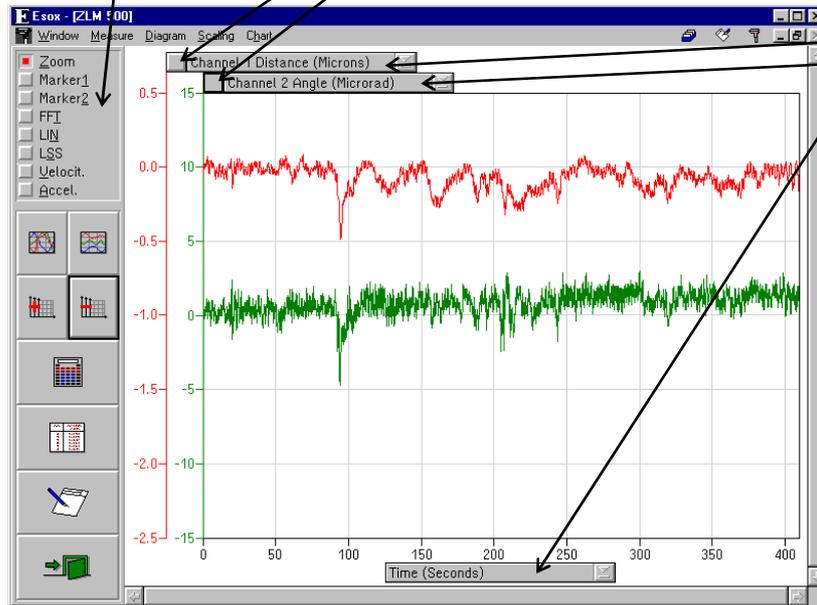
In case of measurements triggered by the timer, the abscissa axis represents time. In measurements triggered by external read-in signals or by pressing the **Space bar**, the program cannot assign any time to the individual readings. In the respective diagrams, the abscissa is divided by point numbers instead.

Abscissa and ordinate are scaled automatically by the program.

The options include zooming of defined sections of the diagram, cross-marking of points on the diagram to display the individual measured values numerically, and plotting of new diagrams from sections of the "mother" diagram.

With the option buttons at the top left you can choose the action to be taken next

Several operations cannot be performed simultaneously on more than one series of measurements. Therefore each ordinate has a button at its upper end with which the "active" ordinate can be selected.



In the drop-down list boxes you can select which series of measurements or which quantity is to be shown.

Use the scroll bars to shift the visible diagram segment. Vertical scrolling is limited to the graph with the currently active ordinate.

The buttons allow automatic scaling,

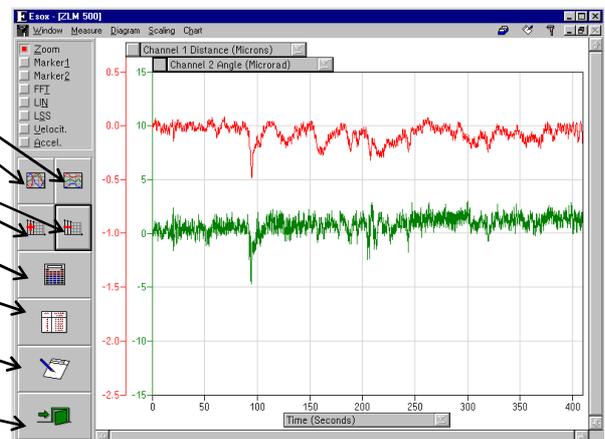
adding and removal of ordinate axes,

the display of statistical data,

the opening of a table of measured data,

transfer of the diagram and the tabular data into a record (document), and

exiting the diagram presentation.



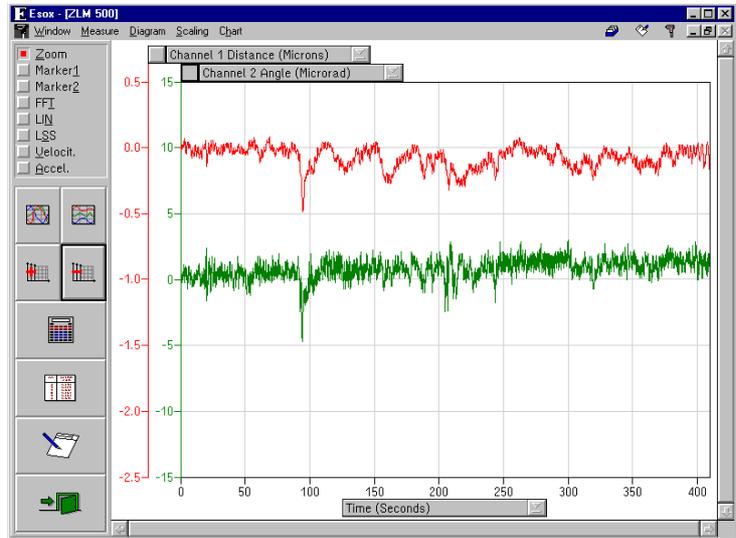
Use the  key to change from one button to the next.

In addition to these buttons you can also use some submenu items of the "Diagram", "Table" and "Scaling" menus.

F 6.2 Zooming of diagram segments

Any zooming action will only act on the series of data belonging to the currently active ordinate. Therefore, first select the data series to be zoomed, by clicking the button of the respective ordinate.

Then click the "Zoom" option button or the "Zoom mode" option of the "Diagram" menu.



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 + ↓ |

F 6.3 Scrolling a diagram

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 |

Vertical scrolling acts only on the series of measurement data belonging to the currently active ordinate.

F 6.4 Autoscaling

After a diagram has been zoomed and/or scrolled, press button  or  to revisualize all measured data.

 or the "**Autoscaling overlapping**" option of the "**Scaling**" menu: The graphs of the data series may overlap.

 or the "**Autoscaling non-overlapped**" option of the "**Scaling**" menu: The graphs of the data series are arranged one below the other.

F 6.5 Adding and deleting of ordinates

Before you can delete an ordinate you need to tell the program which ordinate to delete, by clicking the  button at the top end of the respective ordinate.

Then either click on this button  or select the **"Delete ordinate"** option of the **"Diagram"** menu. This will cause deletion of both the ordinate and the graph of the data series belonging to it.

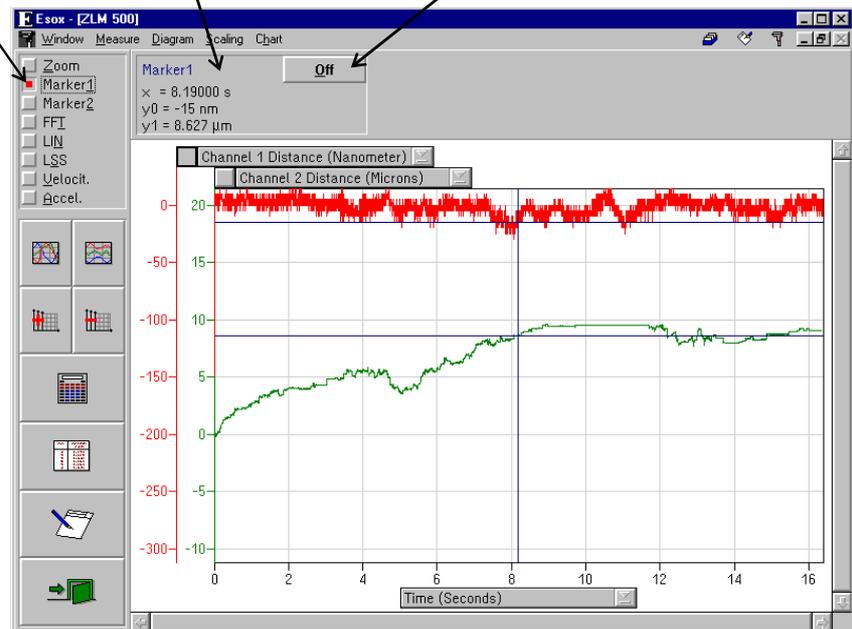
Click on button  or select the **"New ordinate"** option of the **"Diagram"** menu to add another ordinate. The new graph appearing with it represents the measured data of the first of the series of measurements that were not visible before.

F 6.6 Marker cross-hairs

On activating the **"Marker 1"** option button or **"Diagram - Mode Marker1"** menu option the diagram shows a marker cross-hair for each data series shown.

In this field the measured data will be numerically displayed.

By clicking the  button, marker cross-hairs can be removed from the screen.



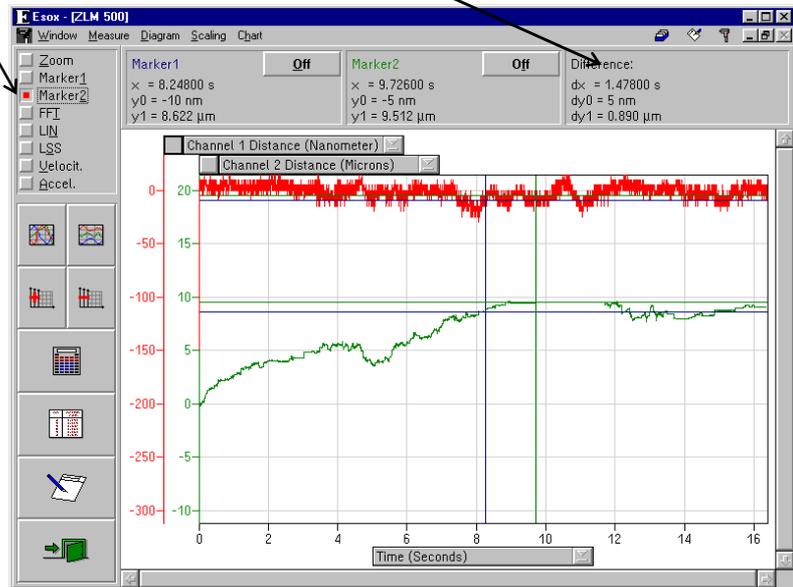
With a mouse click on a point in the diagram, the vertical line of a cross-hair is moved to this point. The horizontal line is positioned according to the value measured at this position. That value appears in the numerical display field.



You can move a 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 for each series of measurements. It is handled in the same way as the first marker cross-hair.

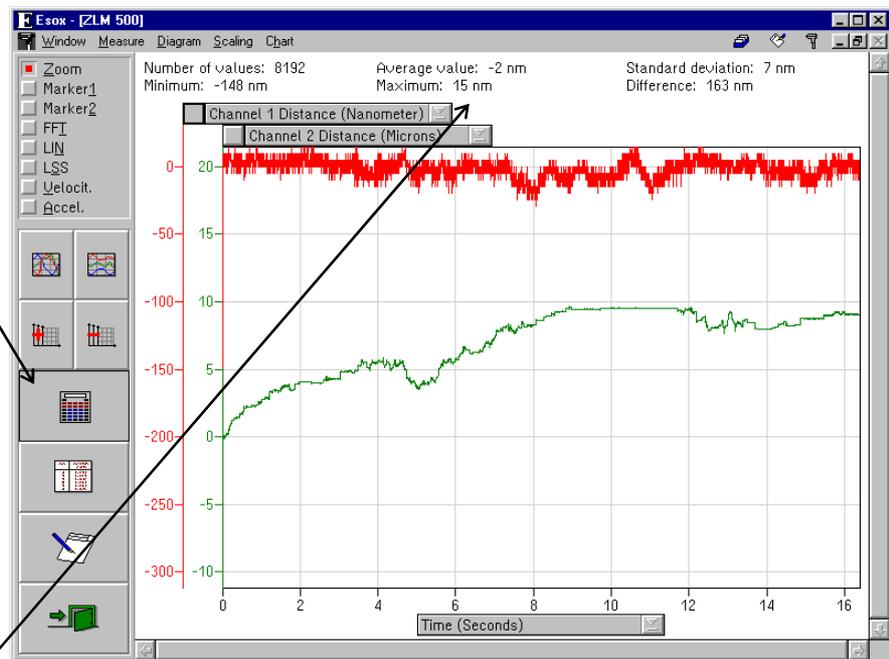
When both marker cross-hairs are active, the difference between the measured values marked by the cross-hairs is displayed.



F 6.7 Statistics

Activation of the  button or the "**Statistics**" option of the "**Diagram**" menu displays

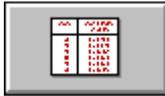
- the number of readings
- the maximum reading
- the mean value
- the minimum reading
- the standard deviation
- and the maximum-to-minimum variation.

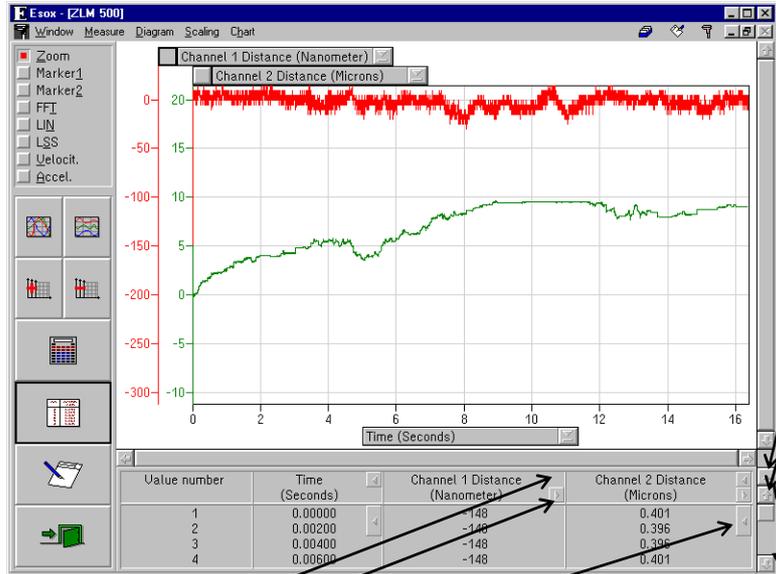


All these data is calculated from the data series belonging to the currently active ordinate and the currently visible diagram segment.

If you activate another ordinate or when you scroll or zoom the diagram, the data are recalculated and displayed accordingly. The clicked button will lock. Click it again to remove the display of mean value and standard deviation.

F 6.8 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**.

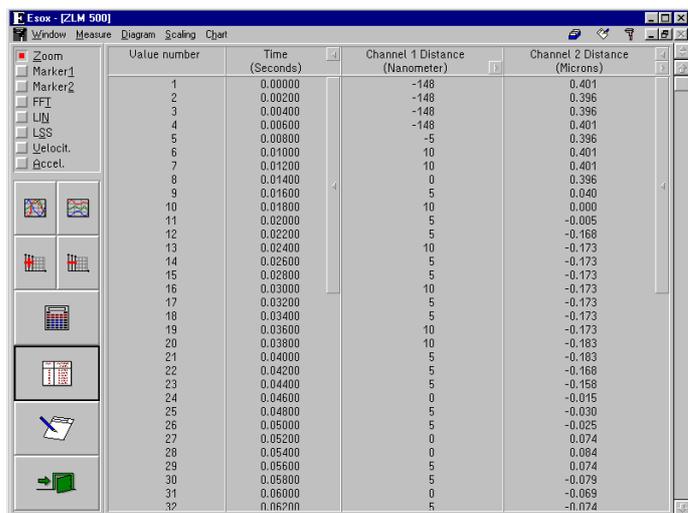
To scroll **down by one windowful**.

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.

By means of the menu items

- ### "Table - no table",
- ### "Table - small table" and
- ### "Table - big table"

the functions described above are accessible with the keyboard as well.



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.



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



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



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



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

F 6.9 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: The "Document" Program Module.

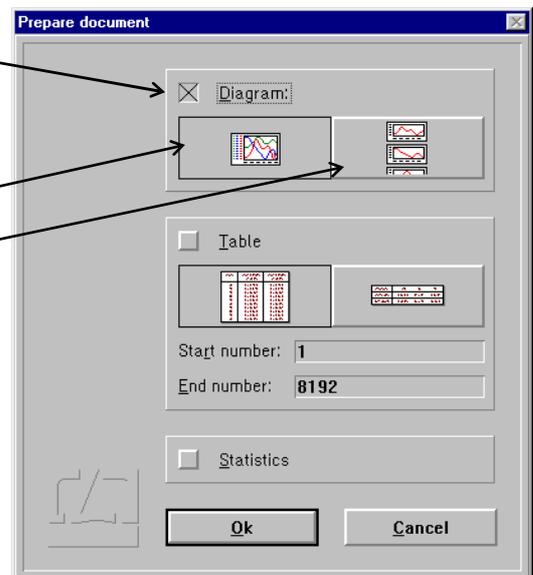


Click the button or call the **"Prepare document"** option of the **"Diagram"** menu to display the "Prepare document" dialog box.

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

With the buttons  and  you can select whether all series

of measurements are to be presented in one diagram or whether you want to have each series of measurements to be represented by an extra diagram and transferred to the "Document" program module. The latter option is recommended if you use a black-and-white printer, since the great number of measured data does not allow the printing of dashed lines.



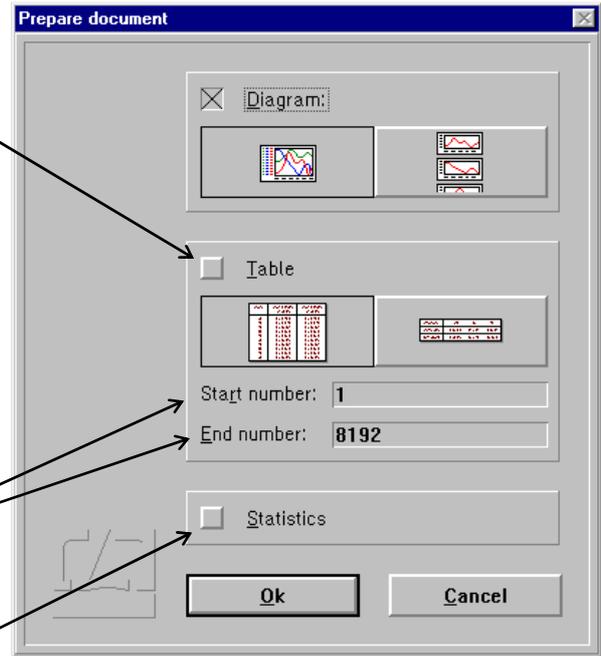
If the "Table" switch is activated, the buttons



and

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.



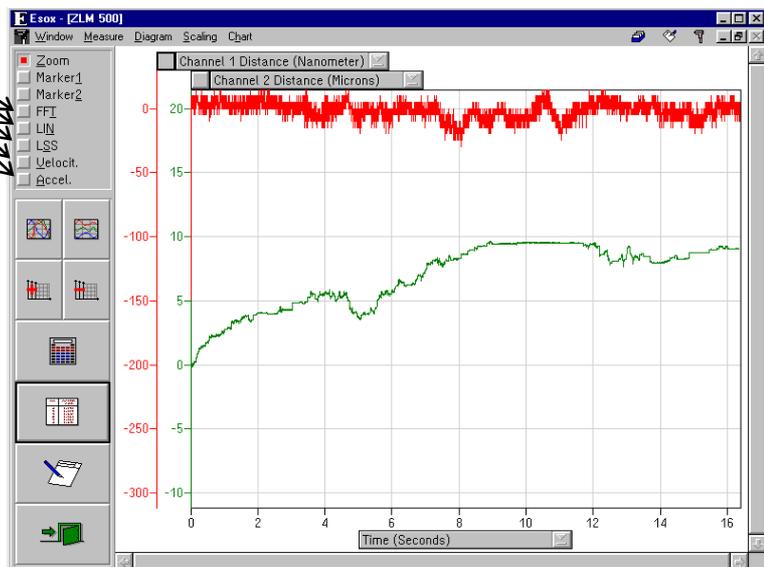
Click the "Statistics" switch to transfer to the "Document" program module the number of readings, the mean value, the standard deviation, the maximum reading, the minimum reading and the maximum-to-minimum variation of the readings that were visible in the diagram immediately before the "Prepare document"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

F 6.10 Velocity, acceleration, Fourier analysis, least-squares line and deviation from expected (nominal) positions

A section of the graph of a measurement series can be selected and subjected to a variety of operations to obtain further data. Before you can select such an operation you need to tell the program which series of measurement you want to operate on. Do this by clicking the button  at the top end of the respective ordinate.

Next, select the kind of operation by clicking the respective option button.

Now select the desired section of the data series. This is only possible with the mouse.





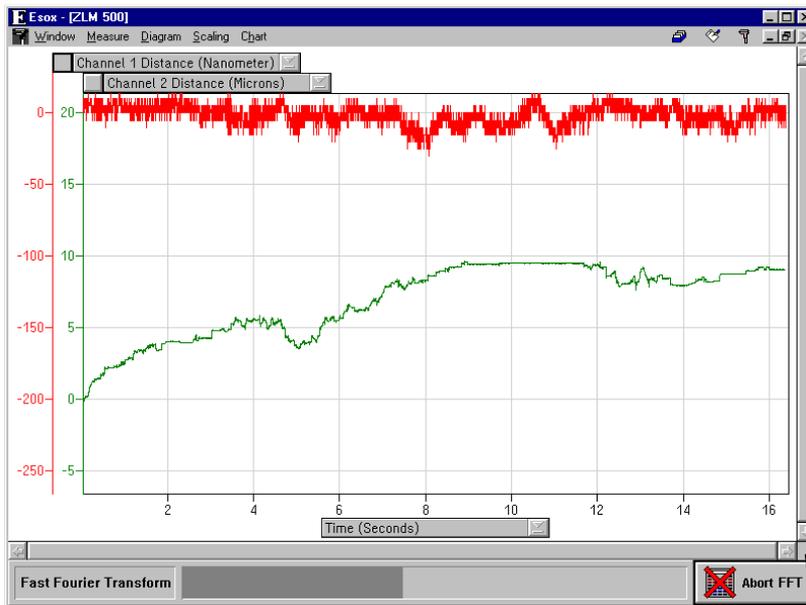
Move the mouse cursor to a corner of the diagram section to be further analysed. Click and hold the left mouse button. Then drag the mouse until the movable frame encloses the diagram section of interest. Release the left mouse button.

Except for the Fourier analysis, the data series newly computed is shown in the diagram with a new ordinate.

The functions released by the option buttons after selection of the diagram section are explained below.

F 6.10.1 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.

F 6.10.2 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 "Deviation from linear ascent" dialog box.

