Measure,
what is measurable,
and make measurable
that which is not.

Galileo Galilei (1564-1642)

Anton Paar

Instruction Manual

Rheoplus Software

Volume 2 - Reference

Software Version: 2.6x

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Contents

1 Introduction

This manual describes the menus and commands of the Rheoplus software. As it follows the structure of the software, it should be easy to find the topic you are looking for in this reference manual.

Should you require further information, you are welcome to contact our local distributor or Anton Paar Germany directly.

June 2005

Anton Paar Germany GmbH

2 Safety Instructions

Make sure you read and understand all the safety instructions given in this section and throughout the manuals before installing and operating the equipment. Follow the instructions in this manual at all times.

The manual contains important advice and warnings. Read them carefully and follow all instructions to avoid danger to yourself and others and / or damage to the equipment.

General Information

- The Rheoplus software by Anton Paar Germany GmbH has been developed for controlling Anton Paar and Physica rheometers and viscometers. It is used for the recording, evaluation and presentation of measurement data.

- All measurement data obtained with this equipment should be checked for plausibility before consequential actions are taken based on this data.

- Before using the software read all safety instructions and information regarding the use of the equipment. Follow the instructions at all times.

- Anton Paar Germany GmbH and its suppliers shall not be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising from the use or inability to use this product, even if Anton Paar Germany GmbH has been advised of the possibility of such damages. In any case, Anton Paar Germany GmbH's liability shall be limited to the amount actually paid by you for this product. This limitation does not apply to damages which were caused by Anton Paar Germany GmbH with intent or due to gross negligence. Likewise, claims which are based on mandatory legal rules regarding product liability remain unaffected.

3 Symbols

The following symbols will be used in this manual:

Warning:
A section marked with this sign contains important information. Read the section carefully and follow all instructions. Disregarding the information may lead to injuries and / or damage to the equipment.

Important:
A section marked with this symbol contains important information on how to handle the equipment and ensure the reliability of the measurement results. Disregarding this information may cause damage to the equipment.

Hint:
A section marked with this symbol contains additional information.

4 Overview Workbook

The figure below shows the main elements of the workbook window. The terms given here will be used throughout the manual. The diagram, table, analysis, measurement and application (not in the example) windows are sub-windows of the workbook; they are stored in the workbook.
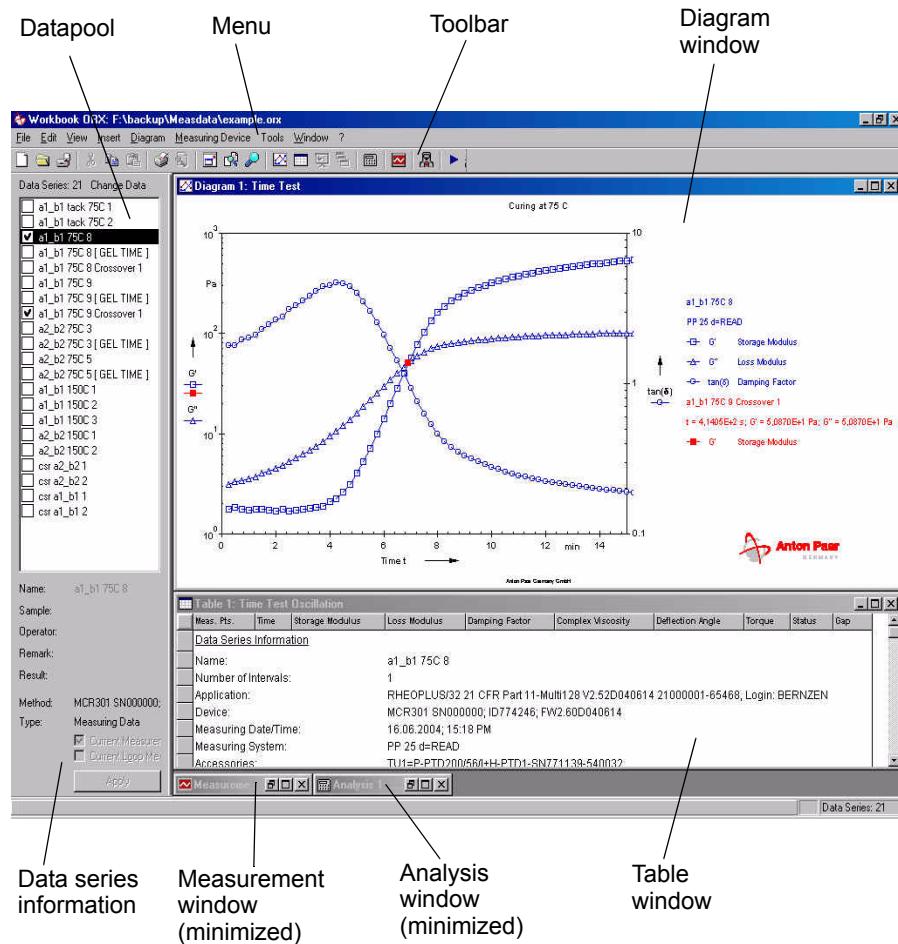
Fig. 4 - 1   Overview workbook window

The workbook can contain several diagram, table, application and analysis windows, but only one measurement window. The different window types are described in detail later in this manual.

The datapool contains the list of data series which are the results of the measurement and analysis. The data series information, e.g. 'Name' or 'Sample', can be edited after the measurement. The datapool is part of the workbook, but can be saved in a separate file.

5 The Toolbar

Starts the RheoManager where you can select a template for the creation of a new workbook or select another file type, e. g. Joblist.

Displays the 'Open workbook' dialog. Use this dialog to open previously stored files.

Saves the current file. If the file has not been saved before, the 'Save as' dialog box will be shown.

Not available.

Copies the selected data to the clipboard.

Not available.

Prints the current window to the printer selected for that window type.

Shows a print preview for the current window (diagram window only).

Shows/hides the datapool in the workbook.

Opens a dialog box for the selection of data that are to be displayed in the current presentation window.

Switches to the data selection mode which allows selecting input data points for an analysis with the cursor in the diagram

Switches to the zoom mode (only available for diagram windows).

Switches between the diagram windows in a workbook. This button is only available if the workbook contains a diagram window.

Switches between the table windows in a workbook. This button is only available if the workbook contains a table window.

Switches between the application windows in the workbook. This button is only available if the workbook contains an application window.

Arranges all windows to the default settings (diagrams and tables are visible, all other windows are minimized)

Switches between the analysis windows in a workbook. This button is only available if the workbook contains an analysis window.

Switches to the measurement window. This button is only available if the workbook contains a measurement window.

Opens the device driver dialog box.

Starts a measurement. This button is shown in stand-by mode only.

Stops a currently running measurement. This button is only shown during a measurement.

6   The 'File' Menu

6.1   'File I New'

This command opens the RheoManager where you can select a workbook template for the creation of a new workbook. Select the tab with the required measurement type or application, highlight the required method (workbook template) and click 'OK'.

Select the tab with the required test type or application

Select the work-book template

Gives access to e.g. user-defined templates
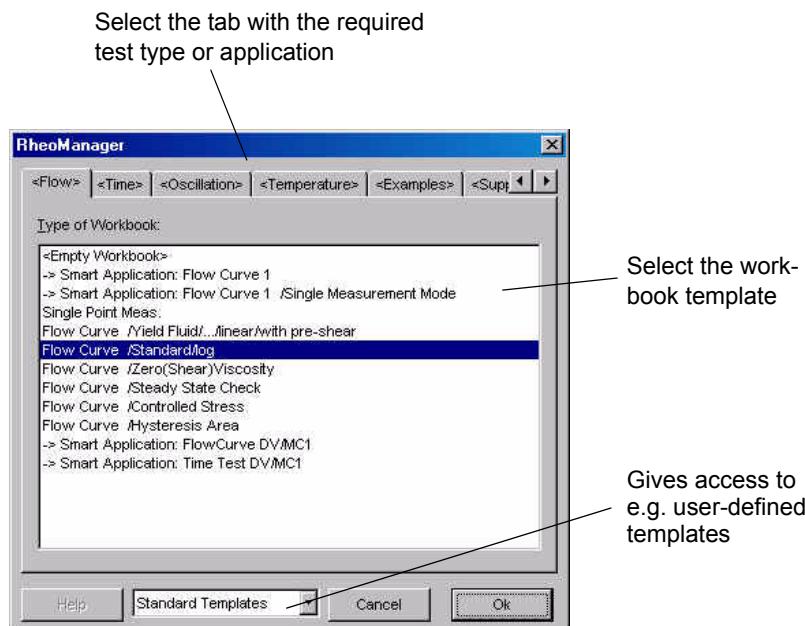
Fig. 6 - 1   RheoManager - Example

The list box at the bottom of the dialog box gives access to user-defined templates (if these have been created), to the 'Joblist' and to 'Direct Control' (see 'Direct Control' manual).

6.2   'File I Open'

This command displays the standard Windows dialog box for opening files. Select the path and file name of a previously stored file and click 'Open'.

The default file type setting for the 'Open' dialog box is the workbook (file extension *.orx). To open a different file type, change the selection in the list box 'File type' in the 'Open' dialog box. Other available file types are *.ctx (workbook without datapool), *.ort (workbook template), *.aux (joblist) and *.dcx (direct control).

6.3   'File I Save'

The command stores the workbook with the current name. If used for an unsaved file, the 'Save as' dialog box will be opened.

6.4   'File I Save as'

This command displays the 'Save as' dialog box in which you can select the drive and directory for saving the current file. The dialog will by default display the path that has been defined as 'Default Path' ('Tools I Options I Default Paths').

Enter a name for your file and click 'OK' to save it. You do not need to specify the extension, this will be set by the software automatically. For better identification of your data you can enter a remark in the field below the file name. Once a workbook has been saved, both name and path will be shown in the title bar.

Please note: This dialog is also used for exporting (saving) the settings of the different window types.

6.5   'File I Save as Template'

This command allows you to store a workbook as a template which may contain example data besides the required settings for instrument and windows. The file extension for templates is *.ort.

Select the drive and directory in which you wish to save the template. By default, this dialog box shows the directory stored as the default path ('Tools I Options I Default Paths') for templates.

Enter a file name and description (optional) and click 'Save'. You do not need to specify the file extension as this will be added by the software.

If an entry is made for 'Filemakro', this entry is used to generate a name for the workbook when the template is used. You can enter a fixed name, select a makro or several makros or use a combination of both.

Note: Templates can be selected with 'File I New' in the RheoManager. Select 'User Templates' in the list box in the RheoManager to access your templates. When a template is selected, a workbook (combination file *.orx) is created which contains all settings that have been stored with the template.

6.6 File I Save with Agreement / Save and Release as Template

These commands are available only if the option 'CFR 21 Part 11' has been installed. They are described in the CFR 21 Part 11 manual.

6.7 'File I Properties'

The file properties dialog shows the properties of the current workbook: remark, datapool with path (if applicable) and all open windows with their name and type are listed. The remark can be edited.

6.8 'File I Order / Result'

This command is only available when the workbook contains a result file from the LIM/SAP mode. The dialog box displays the contents of the order/result file. The same dialog box is used when a LIM/SAP workbook is started or finished. Information on the LIM/SAP option can be found in the relevant software manual.

6.9 'File I Import I Replace Datapool'

This command closes the current datapool and opens another. When using this command you will be prompted to store the datapool as a separate file (*.mph). Select the path and file name for the datapool and click 'Save'. If you do not save the datapool, all data will be lost.

After the current datapool has been saved, the 'Open' dialog box is shown. Select the path and datapool and click 'Open'. When the workbook is next saved, the new datapool will be associated with it.

6.10 'File I Import I Append Datapool'

This command adds an existing datapool to the current datapool in the workbook. In the 'Open' dialog box, select the path and file name and click 'OK'. The 'new' data series will be added at the end of the datapool.

6.11 'File I Import I Data'

The dialog box opened by this command allows you to import data from a variety of sources, e.g. text files (ASCII format), Physica or Anton Paar software and third-party software or the clipboard, into the datapool. The imported data are added at the end of the datapool as data series.

Select the data type ⎯⎯

Select whether to import
from a file, port or clipboard ⎯⎯

Select Windows Text Format
or DOS Text Format ⎯⎯
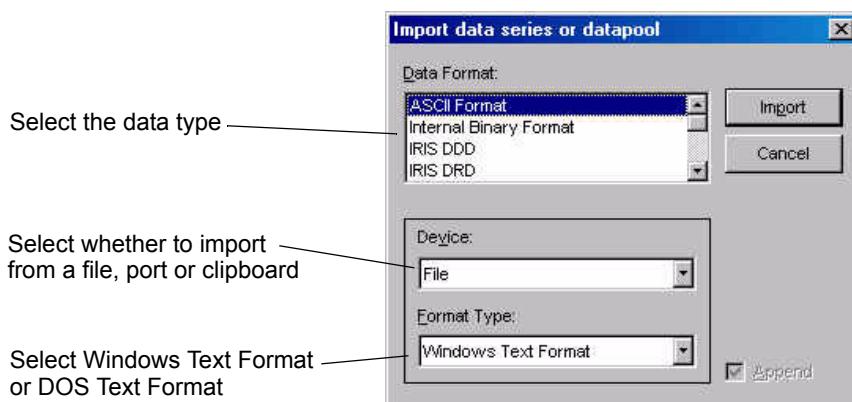
Fig. 6 - 2   Importing data

To import data from a text file or e.g. Excel tables, choose the data format 'ASCII Format' and the device. The ASCII data can be read if the variables and units use a format that is recognized by the software. If you are not sure what format to use, you can export the first two lines of a Rheoplus table, where the variables and units are shown, and copy them to another program. The variable names have to be identical to those in the Rheoplus software, the units have to be set in angle brackets. Units that are available in the software, have to be used. For example:

T	eta
[°C]	[Pa·s]
10	5.1
20	4.3
30	2.7

The available variables and their units can be found under 'Tools I Options I Default Units'. Data series that are imported as ASCII data will be shown as 'Untitled' in the datapool.

6.12 'File I Import I Settings for ASCII Import'

The dialog box opened by this command allows you to select the options according to the settings in your ASCII file.

- *Sign for Remarks*
  Enter the delimiter that separates the data you would like to import from any comments. It is not possible to use a comma (,) as a delimiter.

- *Number of Headlines*
  Enter the number of lines at the beginning of the ASCII files that do not need to be imported.

- *Dashline between Head and Data Lines*
  Check this option if your data are separated from other information by a line of at least 40 hyphens.

- *Variable in Column Head*
  This option needs to be checked.

- *Unit in Column Head*
  Check if the units of your data are available in a second heading line. These units can be converted by the Rheoplus into default units (usually SI units). The unit has to be written with angle brackets. If the unit is not available in the imported data the software will assume that SI units have been used.

- *Column Separation Character*
  <Tab>, <Space> and semicolon (;) are recognized as separators, as is the sign that has been specified as column separator in the Control Panel. If the ASCII file contains a different separator you can enter it here. It is not possible to use a comma as the column separator. The buttons 'Excel compatible' and 'Standard ASCII' automatically set suitable settings for these two types of import data.

6.13 'File I Import I Replace Active Window by Template'

The settings of all sub-windows of a workbook (diagram, table, measurement, analysis and application) can be saved as a file and imported to any other window of the same type, independent of the workbook. In the dialog box opened by this command, select the path and file name for the previously stored file and click 'Open'. The settings of the currently highlighted window will be replaced by those stored in the file. The file type is selected by the software automatically.

6.14 'File I Export I Workbook / Datapool / Empty Template'

The 'Export' command allows you to store the current workbook as a different file format. The following formats are available:

• Workbook CTX: Workbook type of the US 200 software version 2.xx, similar to the Rheoplus workbook, but without the datapool

• Workbook ORX: Workbook for US 200 and Rheoplus

• Datapool MPH: Stores the datapool as a separate file

• Empty Template: Stores the current workbook as a template without any device settings. If this template is used, the user is prompted to select a configuration file.

6.15 'File I Export I Content of Active Window'

This command has the same function as 'Copy' and 'Print'. A dialog box is opened in which you can select the output device. Make your selection and click 'Export'. If 'Printer' has been selected as the device, you will be prompted to select a printer. Select the required printer, make all settings and click 'OK' to print the window content.

6.16 'File I Export I Active Window as Template'

This command allows you to store the settings of a sub-window (diagram, table, measurement, analysis and application) as a separate file. This file can then be imported to apply the settings to a window of the same type in any workbook. In the dialog box opened by this command, select the path and file name, then click 'Save'. The software automatically chooses the file extension for the active window type.

6.17 'File I Export I Settings'

In this dialog box you specify the separator sign and path for tables that are stored automatically during an automation procedure. The data are stored as *.csv files.

6.18 'File I Print'

This command prints the currently highlighted window to the printer selected for that window type. If no printer has been selected for that window type, the dialog box for printer selection is opened.

6.19 'File I Print Preview'

This command is only available for diagram windows. It shows the active window as it would be printed.

6.20 'File I Printer Setup'

The Rheoplus software allows you to configure a separate printer for each type of presentation window or type of output. To select the printer for the table output go to 'File I Printer setup I Text', for diagrams '... I Graphics' and for applications '... I Application'.

6.21 'File I Stop Rheoplus'

This command closes the Rheoplus software or the current workbook. Depending on the saving options you will be prompted to store the changes.

7 The 'Edit' Menu

The commands available in the edit menu change dependent on which window is currently displayed on top.

- 'Cut'
  The cut command is only available for the measurement window. It removes the selected interval, row or field and places the contents in the clipboard.

- 'Copy'
  The copy command is available for all window types and copies the window content (for diagram and application) or the selected field, rows or columns (for measurement window, table and analysis) to the clipboard.

- 'Paste'
  The paste command is only available for the measurement window. It inserts the clipboard content into the selected field, row or column.

- 'Select all'
  The select all command is available for the measurement and analysis window and for tables. It selects the entire content (all columns) of the respective window.

- 'Edit Data Series'
  This command opens a dialog box where you can edit the name of the data series and all other settings from the start dialog box such as remark, operator and sample. The same dialog box can be opened by double-clicking the data serie name in the datapool.

8 The 'View' Menu

- Toolbar
  The toolbar is shown in the Rheoplus window if this option is checked.

- Show Datapool
  Shows the datapool in the workbook, if checked.

- Maximize Window
  If enabled, the Rheoplus window is maximized at the start.

- Presentation Mode
  If enabled, the flags <Current Measurement> and <Current Analysis> are not used for the presentation windows.

9   The 'Insert' Menu

With the commands of the 'Insert' menu, you can create new windows, i.e. diagrams, tables and so on, in the current workbook. Select the command for the window type that you want to create. In the dialog box, select the group and the template that you want to use, then click 'Finish' to create the window.

10 The 'Measuring Device' Menu

In this menu, you can select the measuring device, make all settings such as selecting the measuring system and cell and interact directly with the device.

10.1 'Measuring Device I Control Panel'

This command opens the control panel for the selected measuring device. In the control panel, you can select the measuring system and measuring cell, send a temperature or other values and make general settings for the measuring device. The available functions and the layout of the dialog box depend on the selected device. The control panel is described in the respective device driver manual.

10.2 'Measuring Device I Configuration'

10.2.1 'Measuring Device I ... I Edit Configuration'

Depending on the selected measuring device, this command opens the device driver (control panel) or a setup dialog box for the selection of measuring system and measuring cell and the general settings for the measuring device. Selections made here, are used in the control panel as well. Make all required settings and close the dialog box with 'OK'. The setup can be saved as a file for e.g. backup or use in other workbooks (see also 10.2.3).

10.2.2 'Measuring Device I ... I Load Configuration'

The command opens a dialog box for loading (opening) configuration files. Select the path and file name for the required setup and click 'Open'. All current settings in the control panel will be replaced by those stored in the configuration file.

10.2.3 'Measuring Device I ... I Save Configuration'

This command saves the settings of the control panel in a file. Select the path, enter a file name and click 'Save' to store the configuration. To retrieve the stored settings, use 'Measuring Device I Load Setup'.

10.2.4 'Measuring Device I ... I Select Default Configuration'

This command opens a dialog box with a list of all available configuration files. The path can be selected, if necessary. The content of each file is shortly described. Select the required file in the list and click 'Open' to use it as the default configuration. The default configuration will be used for all new workbooks. Previously stored workbooks are not affected by this change.

10.2.5 'Measuring Device I ... I Use Default Configuration for Empty Workbooks'

If this option is enabled, the previously selected default configuration is applied not only to new workbooks but also when a workbook is opened that has been stored without a device (i. e. no instrument has been selected in the workbook).

10.3 'Measuring Device I Start With Dialog'

This command shows the start dialog box in which you can enter e.g. a name for the measurement and make settings for thermal equilibrium and the automatic naming of data series. To start the measurement, click 'Start the Test Now' after you have made all settings.

- 'Information Texts and Start'
  The 'Name' is the name that will be displayed in the datapool for the result of this measurement. The 'Information Texts for Measurement' can be used for additional information about the sample, the operator or other data that are needed to identify the data series.

- 'Temperature Settings'
  If the option 'Set Temperature before Starting Test' is checked, a new temperature value will be send to the controller when the measurement is started.
  It is recommended to use the option 'Wait for Temperature before Starting Test'. You need to enter the check time, i.e. the time for which the temperature should be within the defined limit. The measurement starts after the thermal equilibrium has been reached. If no equilibrium is reached during the interval defined in 'Timeout' the measurement will be aborted. If the automation loop is enabled, you can choose whether to ignore the temperature setting from the loop by checking that option. Further, you have direct access to the loop data dialog box.

- 'Waiting before Starting Test'
  The option 'With Waiting Time' can be used to delay the start for a defined time span. If the option 'With Test Preparation' is selected, the measurement parameters will be send to the instrument when the 'Prepare the Test' button is clicked. This allows to prepare the sample, e.g. load a curing sample, and then start the measurement immediately without any loss of time.

- 'Data Settings'
  For the naming of the data series you can choose between automatic numbering of data series or overwriting data series that use the same name. The third option is automatic numbering for data series that have the same name as an existing one.

Automatic naming of the result workbook is also possible. These settings are made in the workbook template when saving the file. Please see 6.5 for more information.

10.4 'Measuring Device I Start Immediately'

If 'Start Immediately' is selected, the start dialog box is not shown and the measurement will start directly.

10.5 'Measuring Device I Stop Measurement'

This command is available while a measurement is running and ends the measurement.

10.6 'Measuring Device I Start Diagnosis'

This command checks the communication to the measuring device. If you encounter any problems in the communication to the device, use this command and make a note of the messages that are reported. They may help our support team to identify the problem.

10.7 'Measuring Device I Temperature Calibration'

A temperature calibration of the measuring cell or temperature controller can be started with this command. The calibration itself and the calculation of the correction is carried out by the software automatically. The procedure is described in Appendix A:

10.8 'Measuring Device I Temperature Calibration Management'

All temperature calibrations that have been carried out with on installation of the software can be retrieved and, if required, re-calculated using this dialog box. The stored calibrations are listed in the upper box.

List of existing calibrations

Starts an analysis of the selected calibration

Prints, shows or exports the selected calibration or analysis

List of analyses for the selected calibration

Applies the selected analysis to the accessory
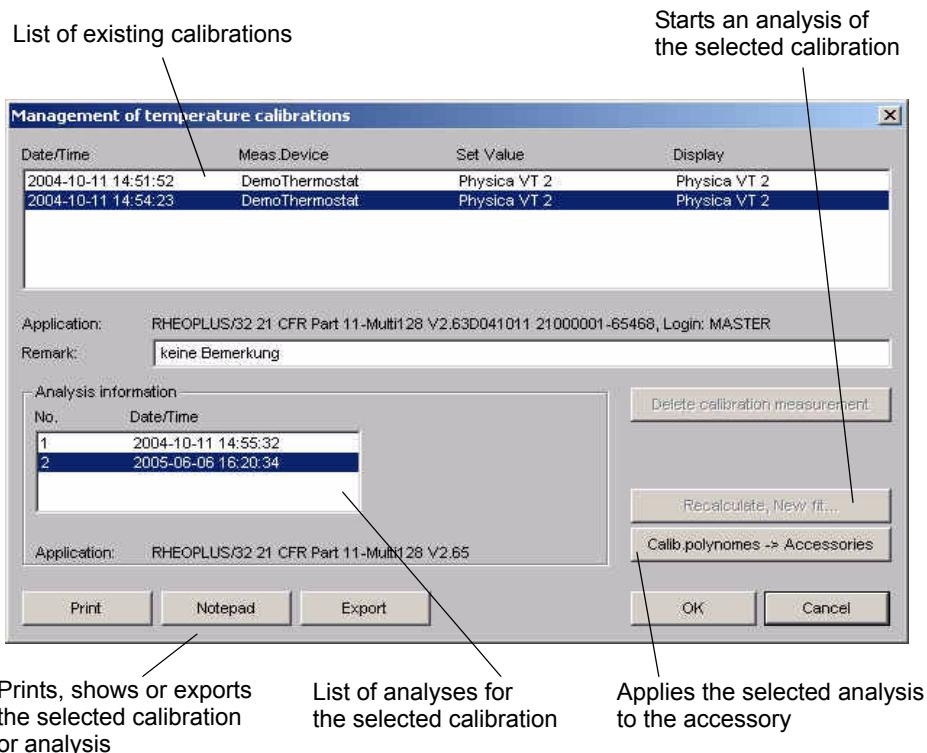
Fig. 10 - 3   Temperature calibration management

To re-calculate an existing calibration, highlight it in the list and click 'Recalculate, New Fit'. The new fit will be added to the list of analyses in the lower left corner. By clicking 'Calib. polynomes -> Accessories' you can apply the highlighted analysis to the currently selected accessory.

To view the calibration you can click either 'Print' or 'Notepad'. To store it as a file click 'Export', select a file name and click 'OK'.

10.9 'Measuring Device I Import Offline Measurement' (RheolabQC only)

Measurements that have been carried out with the RheolabQC in manual operation can be imported to the Rheoplus software using this command. The data can then be analysed or presented in diagrams or tables.

To read out measuring data highlight the required measurement(s) in the dialog box and click 'Import'. The measurements will be added to the datapool of the current workbook. To delete measurements in the instrument, open the dialog box from the RheolabQC device driver ('Service' tab).

10.10 'Measuring Device I Export / Import Measuring Profile' (RheolabQC only)

The export/import function allows to apply measuring profiles stored on the RheolabQC to the measurement window of the current workbook. Further, the settings in the measuring window can be exported to the RheolabQC and then used in manual operation.

To readout a profile from the instrument, highlight it in the list in the dialog box and click 'Import'. Then confirm replacing the current profile in the measuring window.

To export the current profile from the measuring window enter a name, the sample name, if required, and select the required options for the measuring system recognition, the use of global settings and for the printout / storing of measuring data on the instrument. The measurements carried out with this program will contain the measuring profile when re-imported into the software, if the option 'Save measuring template' is activated. Click 'Export' after you have made all settings. The measuring profile can now be selected as a program in manual operation of the RheolabQC.

Please refer to the instruction manual of the RheolabQC for information on the Toolmaster™ (measuring system recognition), the global settings and the printing and storing of measuring data.

Profiles can be deleted from the instrument, if this dialog box is opened from the device driver ('Service' tab) of the RheolabQC.

10.11 'Measuring Device I Select Device'

If several measuring devices are installed in the Rheoplus software, use this command to select the device for the current workbook. Highlight the device in the list and click 'OK'. If no port has been selected for the device yet, either click 'Connect' (if available) or go to 'Tools I Setup I Device and Accessories' (see also 11.3). The 'Free' button disengages the serial port in case of a software crash.

The installation of more than one device to the Rheoplus software is only possible if you have installed a 'multi version'. For information on the multi version please contact our local distributor or Anton Paar Germany directly.

11 The 'Tools' Menu

In the 'Tools' menu, you find general settings for the software and the installation functions for devices, measuring systems, accessories and software modules.

11.1 'Tools I Automation'

11.1.1 Automation

With this function you can select a number of operations to be carried out automatically after or during a measurement. For example, it is possible to print out or analyse data automatically after the measurement or change the temperature settings in a number of loops.

Check to enable automation

Check to enable automation loop

Click to access loop settings

Settings for automatic analysis

Settings for automatic printing

Select for automatic storing as a file (for table only)

Settings for chaining workbooks
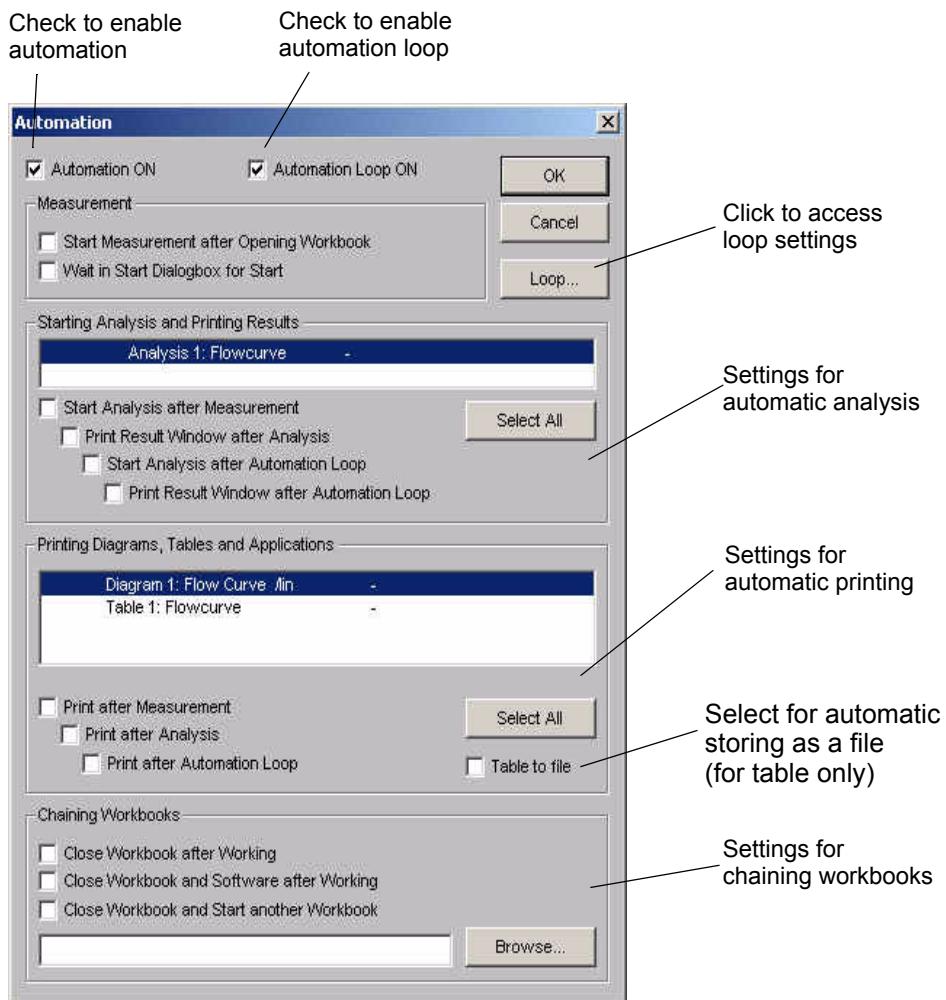
Fig. 11 - 1   Automation dialog box

To enable the automation function go to 'Tools I Automation' and check the option 'Automation'. Then check the functions that you want to be carried out automatically. The list below describes the options of the four function groups in the dialog box.

- Measurement
  To start a workbook automatically after it is opened, check the option 'Start Measurement...'. The start dialog box is not displayed at the start unless the option 'Wait in Start Dialogbox for Start' has been checked.

- Starting Analysis and Printing Results
  Highlight the analysis window in the list and check the required options. The selections made for an analysis window are shown in the list with an 'x'.

- Printing Diagrams, Tables and Applications.
  Highlight the window in the list and check the required options. The selections made for a window are shown in the list with an 'x'. To store the data automatically in a file, check the option 'Table to File'. The table data are then stored as files with the extension *.csv which can be read by e. g. Excel™. The column delimiter can be defined under 'File I Export I Settings' where you can also set the default path for the csv-files.

- Chaining Workbooks
  Once the automation is finished, the software can close the workbook or close the workbook and quit the software altogether. If you select the option 'Close Workbook and Start another Workbook' you need to specify the new workbook. Enter the file name with the correct path or click 'Browse' to select the new workbook file. In that workbook, you should enable the option 'Start Measurement after Opening Workbook' under 'Automation'.

Besides the automation functions for the workbook itself, there are some functions concerning the operation of the instrument. It is, for example, possible to switch off the temperature control after the measurement (depending on the controller or measuring cell type that is used) or to lower and raise the measuring head automatically (for instruments with automatic gapsetting). These settings are found in the device driver of the instrument. Please refer to the relevant device driver manual for detailed information on where to make these settings.

11.1.2 Loop

- **Loop control**
  For the setup of the automation loop you have the following options to define after how many times or under what conditions the loop should be stopped.

  - Exactly x Loops
    The loop is stopped after the workbook has been carried out x times. Enter the value for x in the text box.

  - Loop until Result of Last Analysis Step is PASSED or FAILED or Step Changes
    The loop is stopped if the analysis result is 'PASSED' or 'FAILED' or if the result changes from passed to failed or vice versa. For these options only the analysis method 'Quality control' can be used. It returns the result of either passed or failed depending on the check conditions set by the user. The option requires that the analysis is carried out automatically after the measurement.

  - Loop until List of Values is Done or End Value is Reached
    The loop is stopped depending on the settings in the 'Modification Type'. Currently, only the temperature can be used as a check variable. To use this option check 'Modify Value of Setting while Running Loop' and select one of the modification types.

  - Endless Loop Until Manual Break
    The loop will continue until stopped by the user.

- **Loop by Loop Modified Settings**
  These settings are only available if 'Modify Value of Setting while Running Loop' has been selected.

  - Use Start Value, End Value and Increment
    The temperature is changed from the start to the end value using the defined steps.

  - Use Start Value, Increment and Direction
    The temperature is increased or decreased from the start value in defined steps. The direction (up/down) depends on whether the analysis returns the result 'passed' or 'failed'.

  - Use List of Values
    The temperature values from the list are used. To add a value to the list enter it in the 'Value' field and click 'Add'. Continue until you have entered all desired values. Make sure to check 'Loop until List of Values is Done or End Value is Reached' in the automation loop dialog box.

- Use Increment
  The temperature is changed using the defined steps.

- Use Increment and Direction
  The temperature is increased or decreased using the defined increment. The direction (up/down) depends on whether the analysis returns the result 'passed' or 'failed'.

To run a measurement at several constant temperatures activate 'Automation' and 'Automation Loop' and select the option 'Loop until List of Values is Done or End Value is Reached'. Then highlight the temperature and check 'Modify Value...'. If you want to run the measurement at fixed values select the option 'Use List of Values' and enter the required temperature values. To run a measurement from x ºC to y ºC every 10 degrees, select the option 'Use Start Value, End Value and Increment', enter the start and end temperature and the step width, e.g. 10 degrees.

In the measurement profile do not define a temperature, as this will override the automation settings. To ensure that all measurements are made at a constant and stable temperature, define the 'Temperature Settings' in the start dialog box. Enable 'Set Temperature before Starting the Test' and 'Waiting for Temperature before Starting the Test' and enter the appropriate time and temperature values. The set temperature in the start dialog box will not be used, the settings from the loop dialog box are valid unless you enable the option 'Ignore Temperature Settings in Automation Loop'.

11.2 'Tools I Single Measurement Mode'

If this option has been enabled, only one measurement can be carried out with the workbook. A second start will lead to an error message. Analysis methods can still be carried out.

11.3 'Tools I Setup I Device and Accessories'

The dialog box opened by this command is called the configuration dialog or configuration box. It allows you to install devices to the software and to install or edit accessories and measuring systems.

11.3.1 Installing / Connecting / Deleting a Measuring Device

The first tab lists the installed measuring device(s) and gives access to the installation of a new device and to the device driver.

1. To install a device, click 'Install'. In the dialog box ('Install, connect and delete measuring devices') that is opened, the installable devices are shown on the left hand side, the installed devices are shown on the right. To be able to install more than one device, you need to have a 'multi version' (see below) of the software.

2. Highlight the device in the list on the left hand side and click 'Add'.

3. Enter the installation code (extended serial number) when prompted and click 'OK'.

4. Select the port when prompted and click 'OK'.

5. Click 'Quit' and 'OK' to close the dialog boxes.

The install dialog box can also be used to connect a previously installed device to a port or to change the port. To do this, click 'Install', highlight the device in the list on the right hand side and click 'Connect'. Make the required changes and confirm with 'OK'. Close the dialog boxes as described above.

To delete a device, click 'Install', highlight the device in the list on the right hand side and click 'Delete'. Confirm the deletion with 'OK' and close the dialog boxes as described above.

A default installation of the Rheoplus allows you to install one measuring device at a time. To be able to install more than one device, a Multi version is required. Multi versions allow you to install three, six... up to 128 devices. Please contact our local distributor or Anton Paar Germany directly for information on upgrading to a Multi version.

11.3.2   Accessories and Measuring Systems

The tabs for accessories and for measuring systems are similar, the buttons are identical. For the accessories, you may have several groups arranged as tabs from which you have to select first. The number and type of groups depend on the selected measuring device.

For information on **editing and creating an accessory or measuring system** please see chapter 11.3.3 or 11.3.4 respectively.
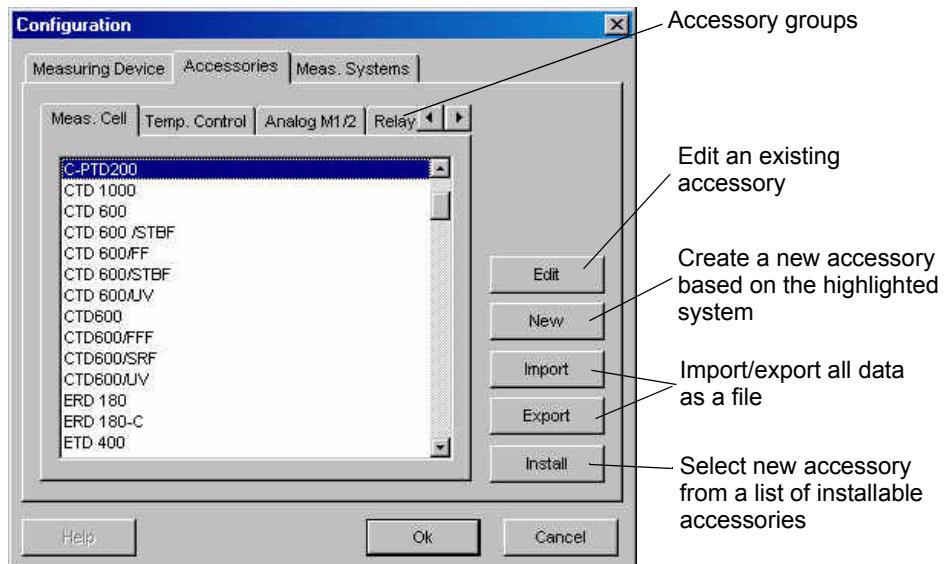
Fig. 11 - 2   Configuration dialog box - Tab 'Accessories'

To **install an accessory or a measuring system** select the appropriate tab and click 'Install'. In the dialog box 'Insert and delete...' select the group for your measuring device and highlight the new item(s) in the list of installable items on the left hand side of the dialog box. Click the arrow button to add it (them) to the list of installed items and close the dialog box with 'OK'. Then click 'OK' to close the configuration dialog box.

The **'Import'** button opens a dialog similar to the 'Open file' dialog in which you can select another accessory/measuring system file to be imported to the current file. This is useful e.g. if you have installed a new version of the software in a separate directory and would like to import all measuring system settings from the previous installation. To import a file, go to the appropriate drive and directory and select the accessory or measuring system file. The accessory files have the extension *.pzg, the measuring system files have the extension *.pms.

The list of accessories/measuring systems can be **exported** as a pzg-file/pms-file or as a text file. The use of the pzg-file/pms-file is recommended if the export function is used for a backup of the settings and for direct import to another installation of the Rheoplus software. The data can be sent to a printer or to a clipboard as well.

11.3.3 Editing or Creating an Accessory

> **Warning:**
> Some of the accessory data are essential for the correct functioning of the accessory, the gap setting and the reliability of the measurement results. Always make sure you enter correct data when editing or creating an accessory. Incorrect data may result in incorrect measurement results or damage to the equipment.

To create an accessory, go to 'Tools I Setup I Device and Accessories' and select the tab 'Accessories'. If a similar accessory is available, highlight it in the list, then click 'Create'. To edit an accessory, select it in the list and click 'Edit'. Both commands open a dialog box like the one or similar to the one shown below. For a new accessory the 'Name', 'SN' and 'Type' entries can be modified.
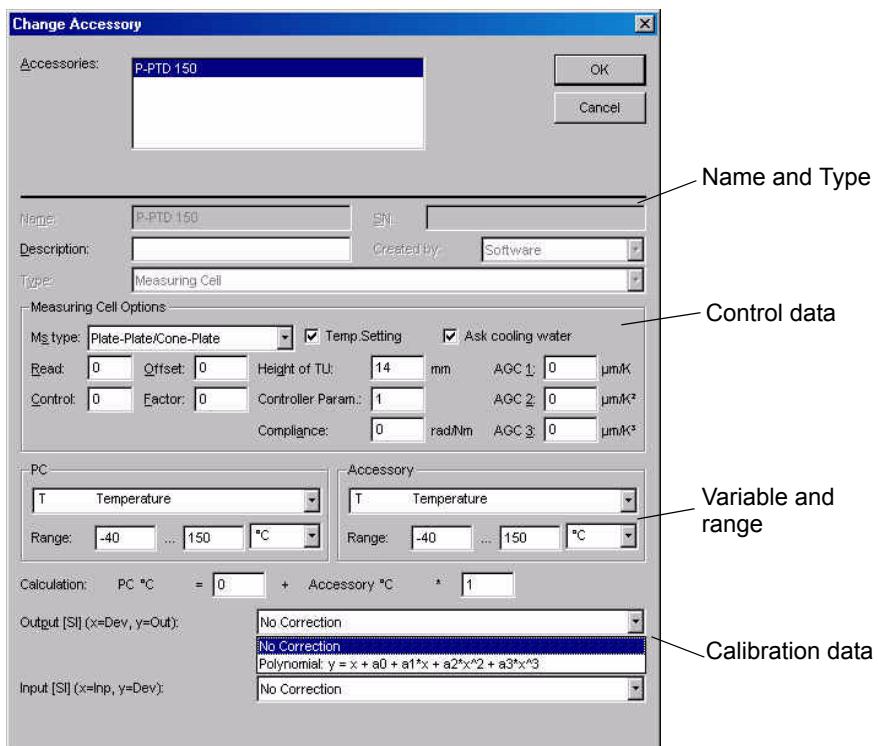
Fig. 11 - 3   'Change Accessory' dialog box

Enter the name and all other data as given on the data sheet delivered with a new accessory, then click 'OK'. The name of an existing accessory cannot be changed. If you want to customize the names of your accessories, you need to create a new accessory based on the existing one and change the name. The control data should not be changed.

The calculation gives the conversion between accessory variable and the variable set in the software, e.g. if the accessory requires an input voltage but the set variable, that is visible for the user, is a temperature. 'Output' and 'Input' are used for a calibration as described in Appendix A:.

11.3.4 Editing or Creating a Measuring System

Warning:

Some of the measuring system data are essential for the correct functioning of the instrument, the gap setting and the reliability of the measurement results. Always make sure you enter correct data when editing or creating a measuring system. Incorrect data may cause incorrect measurement results or damage to the equipment.

To create a measuring system, go to 'Tools I Setup I Device and Accessories' and select the tab 'Meas. Systems'. If a similar measuring system is available, highlight it in the list, then click 'New'. To edit a measuring system, select it in the list and click 'Edit'. Both commands open a dialog box as shown below. For a new measuring system the 'Name' and 'SN' entries can be modified.

Measuring system type, necessary for correct calculation of CSS and CSR factor

Click to calculate CSS and CSR factor

Physical measuring system properties

Geometry-specific values
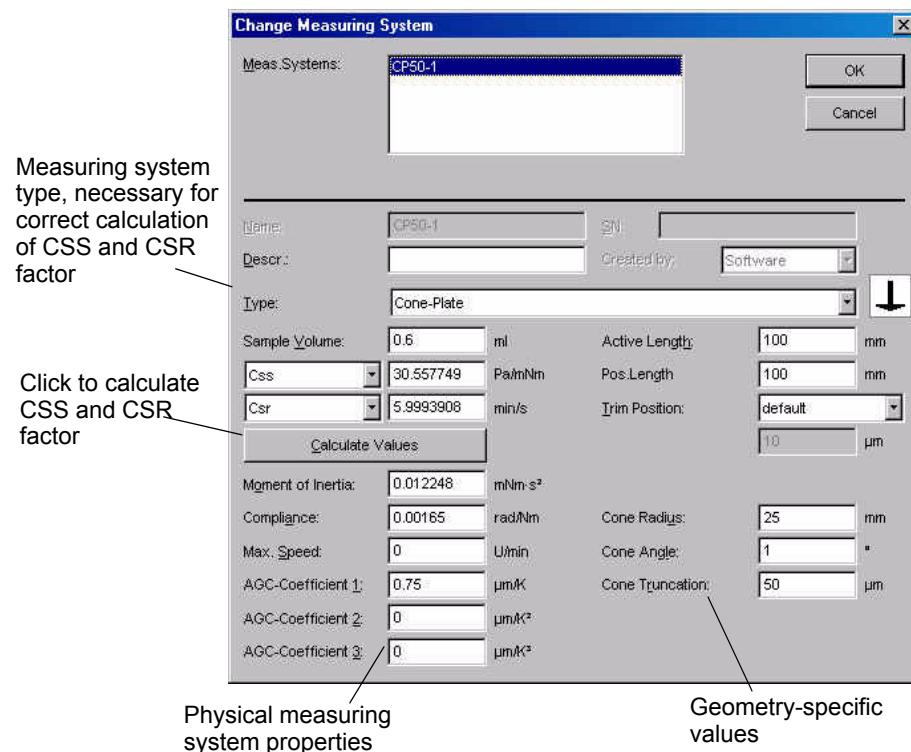
Fig. 11 - 4   'Change Measuring System' dialog box

To create a new measuring system, enter the name and all other data as given on the data sheet, then click 'OK'. The name of an existing measuring system cannot be changed. If you want to customize the names of your measuring systems, you need to create a new measuring system based on the existing one and change the name.

The CSS and CSR factors are the basis for all measurement results. They are calculated from the geometry values which are measured for each system before delivery. The type and number of geometry-specific values depends on the selected measuring system type.

Below you will find an explanation of some of the values in the dialog box.

Css factor

The stress factor Css is used to calculate the shear stress from the instrument's torque: shear stress = torque x stress factor. The factor can be given as Pa/Nm or Pa/mNm or as a relative stress factor. Please make sure that you have selected the correct option as given on the measuring system's data sheet if you need to compare values.

Csr factor

The shear rate factor Csr is used to calculate the shear rate from the instrument's rotational speed: shear rate = rotational speed x Csr factor. The shear rate factor can be given in min/s or s/s. Please make sure that you have selected the correct option as given on the measuring system's data sheet if you need to compare values.

Moment of Inertia

The moment of inertia needs to be determined before you can use the measuring system (see the device driver manual for your instrument). The correct determination of the moment of inertia is important for correct results in oscillatory measurements and it is also needed for the speed control.

Compliance

The compliance is a measure of the 'stiffness' of the measuring system. It is needed to eliminate errors in the calculation of oscillatory measurements.

AGC coefficients 1-3

The AGC coefficient gives the thermal expansion of the measuring system. It is used to compensate for the change in the measuring system's length during temperature changes. It is especially important to enter the coefficient if you are measuring with temperature gradients or several temperatures in one measurement. The Rheoplus software includes a predefined workbook for the determination of the AGC coefficient.

Active Length / Position Length

The active length value is the length of the measuring system from the lower end of the measuring system to the end of the shaft (lower end of the coupling). The position length is only used for cylinder systems to make sure they are positioned correctly in the outer cylinder.

Trim Position

If the trim position is enabled (default setting for cones and plates) the gap motor stops at a defined distance from the measuring position to allow the user to remove excess sample. The default value for this distance is shown beneath the selection. If 'User defined' is selected, the value can be changed; if 'None' is selected, the trim position is not used (not recommended). If the value is not shown, the measuring system does not use the trim position, e.g. concentric cylinders.

11.4 'Tools I Setup I Install Language Libraries'

By default, the Rheoplus software is delivered with two languages, English and German. Additional languages can be installed, if available, using the dialog box opened with this command.

To install a new language, open the dialog and highlight the required language(s) in the list of installable languages and click 'Add'. If the language libraries are stored in a location different from the default, click 'Path' to select the appropriate file location. To delete an installed language highlight it in the list to the right ('Installed') and click 'Delete'.

To change the default font click on the respective button and select font, size, style and so on. The variable font is e.g. used for dialog boxes, diagrams and tables. For languages that do not use Latin letters the appropriate font has to be selected here to make sure that the dialog boxes contain the correct font.

For the 'Font in Dialogs' the user selected font is the default setting. If 'System font' is selected, the settings from the operating system are used; if 'Dialog resource' is selected the programmed font will be used.

11.5 'Tools I Setup I Install Analysis Modules'

The 'Install and delete analysis modules' dialog lists the available methods to the left and those that are installed to the right.

To add a new method select it from the list, click 'Add' and enter the serial number. To delete a method select it from the right hand list and click 'Delete'. The 'Path' button allows you to change the location of the setup file (oemsetup.inf).

11.6 'Tools I Options I Replace Printer Configuration'

These settings decide which output device (for text, graphics or applications) to use in case the one defined in the workbook is not available.

Choose one of the following options:

• Unchanged
The settings in the workbook will be used; make sure that the printers and instrument selected in the workbook are available.

- Replace only when not defined
  The settings from the workbook will only be used if the selected printers/ instrument are available, otherwise the setting from the main window will be used.

- Change
  The settings from the main window will be used, the settings in the workbook will be disregarded.

11.7 'Tools I Options I Settings for Saving'

The options under 'Closing Window' determine the behavior of the software when it is closed. You can set up the software to display or not to display a warning if files (workbooks, job lists or datapools) are closed. There are three settings available:

- Ask if file has been changed
  A dialog is displayed that asks the user whether to save a file that has been changed since the last saving. This is the default setting.

- Save (Replace)
  All changes in a previously stored file are saved automatically when the file is closed. This setting will automatically overwrite files with the same name without any further warning or notification.

- Do Not Save
  Changes are not saved even if the file has been changed, there is no further warning or notification. This option is only recommended if you would like to avoid unintentional changes on complete workbooks, e.g. those that are used for tests with standard settings.

Check the option 'Save Data Automatically after Measurement / Analysis' to automatically store the data after each measurement or analysis. The data can also be saved periodically, e.g. during a measurement. Please enter the time interval in the text box. This setting is only active in a workbook.

Check the option 'Save Settings on Exit' if you would like all changes to be saved when you quit the program. If this option is not checked the software will keep the last saved settings and they cannot be changed unintentionally.

11.8 'Tools I Options I Default Paths'

Opens the dialog box 'Setup default paths' in which you specify the default directories for saving and opening Rheoplus files such as workbooks, job lists and datapools. The default paths are user-dependent if the login function is used.

11.9 'Tools I Options I User Defined Variables'

In the dialog opened by this command you can define any variable for the presentation in diagrams or tables; you can use both rheological and non-rheological quantities.

User-defined variables are recognized only by their position in the list of variables, not by their name. Therefore, it is recommended only to add or remove variables at the end of the list. Also, you need to make sure that different installations of the Rheoplus software have identical lists of user-defined variables if you want to compare data with other users. User-defined variables cannot be used for calculations as the default variables.

To define a new variable proceed as follows:

• Go to 'Tools I Options I User-defined Variables'.

• Enter the formula symbol in normal and in symbol font (see below for information on using Greek characters).

• Enter the name (the name is used for column headings or axis descriptions).

• Select the unit, if applicable, and click 'Add'.

• When finished, click 'OK' to close the dialog box.

To use the Greek character for your variable you can enter the corresponding Latin character in 'Formula Symbol Symbol Font'. The table below shows which Latin character corresponds to which Greek character.

A	B	C	D	E	F	G	H	I	J	K	L	M
A	B	X	Δ	E	Φ	Γ	H	I	ϑ	K	Λ	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
N	O	Π	Θ	P	Σ	T	Y	ς	Ω	Ξ	Ψ	Z
a	b	c	d	e	f	g	h	i	j	k	l	m
α	β	χ	δ	ε	φ	γ	η	ι	φ	κ	λ	μ
n	o	p	q	r	s	t	u	v	w	x	y	z
ν	o	π	θ	ρ	σ	τ	υ	ϖ	ω	ξ	ψ	ζ

In case you need to use a combination of Greek and Latin characters, e.g. DT, you enter D&NT into the field. The 'D' is presented as D and the combination '&N' switches from the Greek to Latin character set so the letter 'T' is shown as a normal Latin character. The combination &S switches to symbol font.

11.10 'Tools I Options I Default Units'

The dialog opened by this command displays all available variables with a short name and the current default unit. The short name is used to recognize the unit when data are imported (ASCII import).

The default unit of a variable is used in tables and diagrams for the presentation of data. The unit can be changed there but if you prefer to have another default setting for a certain variable, highlight that variable in the list and change the unit. Then click 'OK' to close the dialog box.

To export the list of variables click the 'Export' button. In the export dialog you need to select a column separator from the list, the output device (available are file, printer, editor (notepad), clipboard and port) and the format type (available are 'Windows Text Format' and 'MS-DOS Text Format').

11.11 'Tools I Options I Setup Colors'

You can adjust the color settings for all window types, dialog boxes and messages separately. Select the object for which you would like to change the color.

In the 'Color Settings' dialog you can choose between selecting predefined colors and creating your own color using the RGB sliders. Select or create a color then click the item you would like to use the color for.

- Background   changes the background color

- Edit Controls   changes the color of edit boxes and lists

- Text   changes the text color

11.12 'Tools I Login I Change Password…'

Use this command to change the password of the user that is currently logged in. Enter the current password in the dialog box that is shown upon this command and click 'OK'. Enter the new password twice ('New password' and 'Repeat password'). Then click 'OK'.

11.13 'Tools I Login I Setup'

The user administration under 'Setup I Login I Setup' is only available to an administrator. The password is required to access this function.

11.13.1 Creating and editing users

To **create a new user**, enter the user name, the password (in 'Password' and 'Repeat') and select an access level from the 'Group' list. It is recommended to enable the option 'User has to change password at next login'. Further, select the default paths unless the user should work with the standard settings. The default paths can be selected individually for each user. Then click 'Insert'.
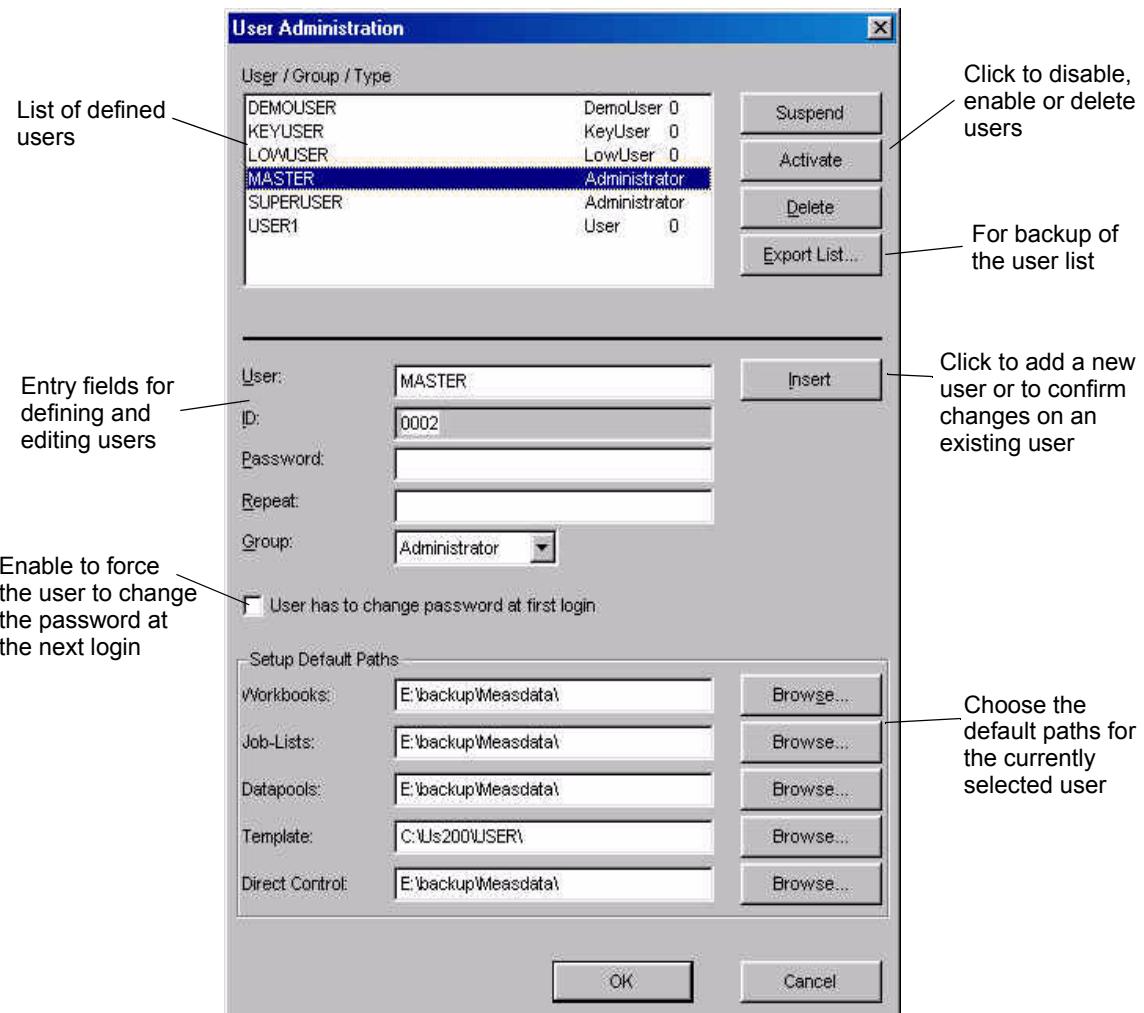

Fig. 11 - 5   Dialog box for user administration

To **edit an existing user**, select the name in the list, apply the changes and click 'Insert'.

The 'Suspend' button de-activates an existing user, a login is no longer possible. To permanently remove a user, click 'Delete'. The 'Activate' button is used to enable a suspended or locked out user. A lockout is applied by the Rheoplus after three failed login attempts.

The following access levels are currently available:

- Administrator
  The Administrator has access to all functions of the Rheoplus software including the setup of the login function. The Administrator can control the measuring systems, accessories and instrument setup.

- SuperUser
  The SuperUser has access to all functions of the Rheoplus software except the setup of the login function. The SuperUser can control the measuring systems, accessories and instrument setup.

- KeyUser
  A KeyUser can create and change workbooks but does not have access to the setup of measuring systems or accessory. This setting is often used for laboratory managers who create and set up workbook templates.

- User
  A User has the same rights as the LowUser, but can delete data series from a datapool.

- LowUser
  A LowUser can only open files and carry out measurements. He does not have the right to change the measurement profile or any other settings. This setting is often used in quality control to protect routine measurements.

12 The 'Window' Menu

12.1 'Window I Delete'

This command deletes the currently highlighted window from the workbook. To irretrievably delete the window click 'Delete' in the message box, ; to keep the window click 'Cancel'.

12.2 'Window I Rename'

This command opens a dialog in which you can change the name of the current window. Enter the new name and click 'OK'. The name is always displayed in the window's title bar. Using your own names may make it easier to recognize a window, especially if you are working with many windows.

12.3 'Window I Duplicate'

This command creates an exact copy of the current window with all the settings. Please note that the data series presented in the window are not included in the settings.

Hint:
To transfer the selected data from the original window to the duplicate, you need to go to the original window, right-click and select 'Copy Viewing data'. Then select the duplicate window in the list and click 'Copy'.

12.4 'Window I Default Arrangement'

This command arranges all windows in the workbook to the predefined default. All diagram and table windows are placed next to each other; analysis, application and measurement window(s) are minimized.

12.5 'Window I Cascade / Tile / Arrange Icons'

The command 'Cascade' arranges all open windows overlapping each other, the title bar of each window is shown. 'Tile Vertical' or 'Tile Horizontal' arranges all windows next to each other with reduced size either vertically or horizontally. 'Arrange Icons' places all minimized windows at the lower end of the workbook window.

12.6 'Window I Window To Top'

The settings in this menu apply to the currently highlighted window. You can select whether to show this window during measurement, during an automation or after an automation has been stopped.

13 The '?' Menu

13.1 '? I Rheoplus Help'

This command opens the help file.

13.2 '? I System Report'

This command opens a dialog where you can generate a report about your system (computer and instrument). This report can e.g. be used to trace errors.

Use 'Software Report' to show information about the Rheoplus installation or 'Software and System Report' to show Rheoplus and operating system information. With 'Software Update' you can generate an order form for a new software version.

Select an output device for the report, e.g. printer or editor, and click 'Export'. The default format for the export is the windows text format, if you are exporting to a DOS application you should change this setting accordingly.

13.3 '? I Error Manual'

The error manual contains a listing of all error messages you may encounter in your work with the software. The file is in the Windows help format and you can search for errors by their number. In case you need more help with an error message you are welcome to contact our local distributor or Anton Paar Germany directly. It is of great help if you make a note of the description and number of the error.

13.4 '? I Software Order Form'

This command generates an order form for a new software version.

13.5 '? I Info about Rheoplus'

The info dialog shows the version number, date and serial number of the software. Further, you will find the address of Anton Paar Germany and an e-mail address for support.

14 The 'Measurement' Menu

The menu 'Measurement' is shown if the measurement window is the active window in a workbook. To move the measurement window to active, click the measurement window button in the toolbar or go to the 'Window' menu and select the measurement window from the list. If the workbook does not contain a measurement window, go to 'Insert I Measurement Window' and select a suitable template from the list to create one.

In the measurement window, you set all parameters for a measurement, including rheological parameters, time settings and other control settings. On the left hand side, the window shows the selected measuring device and accessory or accessories.

The 'Start' button opens a start dialog box in which you enter sample information and a name for the measurement. The feasibility of the selected measurement parameters can be tested with 'Check Profile'.

The column next to the device shows the variables that can be used as measurement parameters. The type and number of available variables, or test types, depends on the selected device and accessories.

Shows selected device and accessories; opens the control panel on double-click

Measurement intervals (red cross = no data recording)

Starts the measurement

Set variables (test types)

Parameter cells with measuring parameters (double-click to edit)

Time settings (double-click to edit)
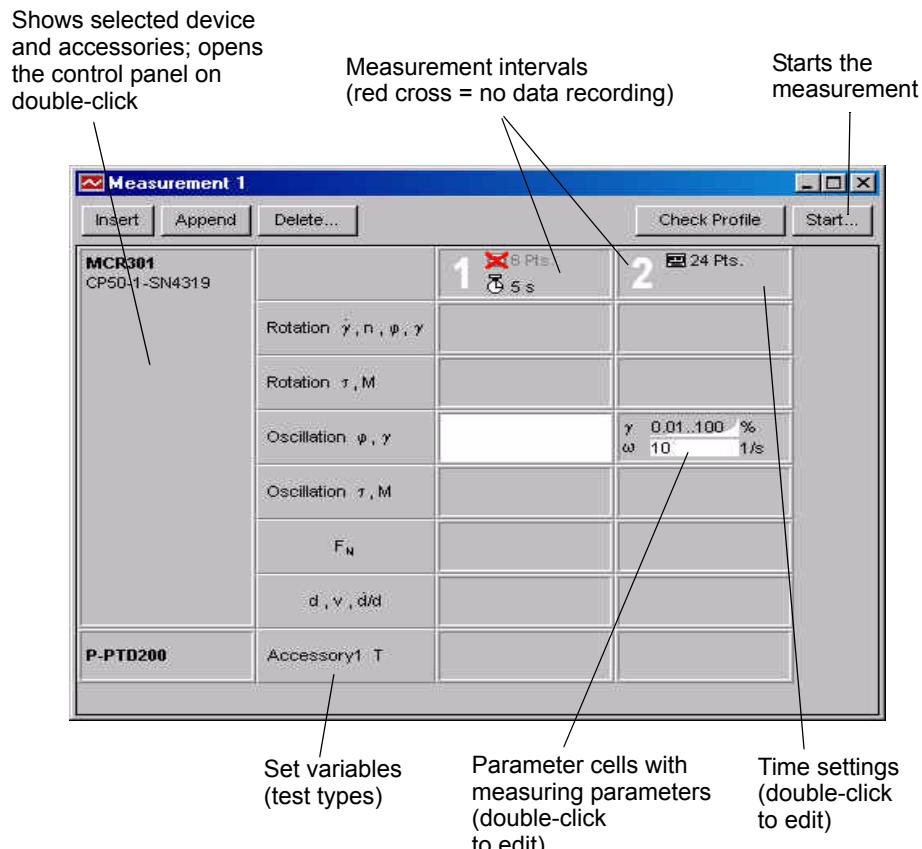
Fig. 14 - 1   Overview measurement window

If you are using one of the default workbooks, the measurement window already contains settings that are generally suitable for the selected test. You can adapt the time settings and you may have to change the temperature and rheological parameters to suit your sample.

All parameters can be edited by double-clicking on the respective cell in the measurement window. A short description of the various parameters can be found in chapter 14.3.

14.1 'Measurement I Interval'

The commands in this menu have the same functions as the corresponding buttons in the measurement window.

• Insert
   The command adds a new interval before the currently selected interval.

• Append
   The command adds a new interval at the end of the measuring profile.

• Delete
   The command deletes the currently selected interval(s).

14.2 'Measurement I Measuring Profile'

• Working with External Measuring Profile / Load External Measuring Profile
   If this option is activated, the software does not use the measurement parameters of the measurement window but the profile described in a separate file. Once the option has been selected, the menu and window 'Measurement' will change. To load the parameters from the external file, go to 'Measuring profile' and select 'Load External Measuring Profile'; , then select and open the file.

• Automatic Adaptation
   When a device is selected, the software will check whether the current measuring profile can be used. If a parameter defined in the profile is not available for the instrument or exceeds the instrument range, a warning will be displayed; the measuring profile cannot be used. If 'Automatic Adaptation' is activated, you are prompted to either set up the device properly, if possible, or to reject the current incompatible settings. The parameters cannot be used until they have been adjusted to the instrument capabilities.

- Edit Measuring Profile
This command displays the edit dialog for the currently selected interval or setting. The editing of the measurement parameters is described in chapter 14.3.

- Check
The check command starts a control procedure for the parameters in the measurement window. The instrument needs to be connected and switched on for this check. Once the check is finished, a message window with a list of possible warnings or errors will be displayed. The measuring profile is also checked, when an instrument is changed or if the device setup dialog has been opened.

- Extended Check
This command starts a more detailed control procedure (for service only).

14.3 Editing the Measuring Profile

The dialog box shown below is opened when you double-click any of the parameter cells or the time setting in the measuring window. In this window, you can select and edit the output variables.
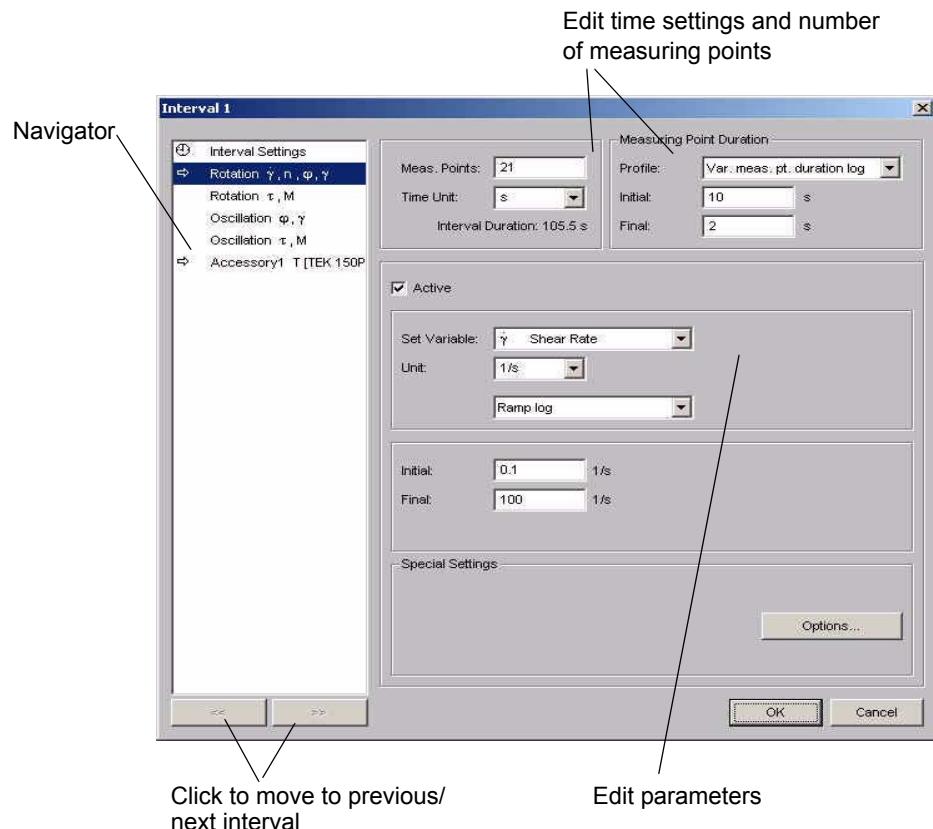
Fig. 14 - 2   Editing the measuring profile - Example

The navigator displays the available set variables as shown in the measurement window. The cell that has been double-clicked is highlighted, all active output variables are marked with an arrow in the navigator and with a check mark next to 'Active'. An output variable that is set to active will be used in the measurement. It is possible, depending on the variable type, to activate several variables, e.g. Rotation and Temperature or Oscillation, Temperature and Normal force.

The example shows a logarithmic shear rate ramp from 0.1 to 100 1/s, there are no further output variables selected.

14.3.1   Interval Setting

In the interval settings panel of the measurement window you select the number of data points for the current interval and the duration for each point. These settings are visible and can be edited in the other panels as well.

For intervals that are only necessary for e.g. thermal equilibrium or as rest intervals for the sample you can turn off the data recording by selecting the option 'Data Recording OFF' for that interval. No measuring points will be stored.

For the time settings select the number of measuring points for that interval, the time unit and the profile. The profile options are described below. Depending on the selected option, you can enter the duration for the first and for the last measuring point, or the duration for all measuring points. If a variable measuring point duration has been selected, the software will calculate the values in between the start and final value.

From the drop-down list 'Profile' you can select from the following options:

- No time setting
  The measuring point duration is not set by the software. This option should be selected for all oscillatory measurements because the duration of one measuring point is dependent on the frequency in this type of test. The exception are time or temperature-dependent tests where measuring points at constant intervals are required.
  With this option there are no additional settings for the measuring point duration.

- Fixed measuring point duration
  All measuring points have the same duration. This is the preferable setting for temperature or time-dependent tests, independent of the test method. If this setting is used for oscillatory measurements care should be taken that the measuring point duration is longer than the period time of the selected frequency.
  Further, if manual settings for 'Data Generation' are used, make sure that the sum of the adjusting time and the time for mean value does not exceed the total time per measuring point.
  If fixed measuring point duration is selected you need to enter the duration for the measuring points or the interval duration. The corresponding value is calculated by the software.

- Variable measuring point duration lin / Variable measuring point duration log
  The measuring point duration varies from the initial value, which is used for the first data point, to the final value, which is used for the last data point. Logarithmic distribution is the preferable setting. The total length of the interval is calculated and displayed next to the final value.
  As with the fixed measuring point duration setting, make sure that the sum of the adjusting time and the time for mean value does not exceed the measuring point duration.

Besides the measuring point duration, time settings can be chosen for the data generation i.e. for adjusting time and averaging.

The maximum adjusting time is the time the instrument can take to reach the target value, e.g. strain or shear rate. You can use the automatic setting or set a value. The instrument will stop the adjustment and continue with the averaging as soon as the target value is reached, hence maximum adjusting time. If the target value is not reached in the available time, a note will be made in the status column of the result table.

The number of mean values determines how many raw values are used by the software to calculate the presented data point. The instrument is capable of generating 500 points per second internally (2 ms per point). The mean value time is usually longer than the adjusting time and should be increased if the results show a lot of noise. The more raw data points for the calculation, the better the presented data. Also, make sure that the number of raw values is selected so that always the last part of the measurement point duration is used; this stops transient effects at the start-up of the measurement influencing the results.

Please note that for oscillatory measurements one raw value corresponds to one period and the time interval has to be calculated by the frequency. The automatic setting usually gives good results and should always be used for oscillatory measurements.

With 'Event control' you can define events and reactions that allow you to control the measurement depending on the measured value of a measuring variable or the availability of a measurement result. The event defines the condition that is being checked each time a measuring point has been generated. As soon as the measuring variable fulfills the condition, the 'Reaction' will be carried out. For example, the stress is checked against a limit value; when this value is reached during the measurement, the current interval will end and the measurement continues with another interval from the measuring profile or is stopped.

14.3.2   Rotation

There are two types of rotational measurements available: stress controlled and shear rate controlled. The edit dialog for both types is identical, except the 'Set Variable' changes. For stress controlled measurements you can select the shear stress (Pa or equivalent) or the torque (mNm or equivalent); for shear rate controlled measurements you can select shear rate (1/s), rotational speed, displacement or strain. With these settings all types of rotational measurements can be set up: flow curve, single stress or shear rate, creep recovery, stress relaxation, etc.

If you would like to measure a flow curve, you need to select a ramp in the 'Profile' setting; logarithmic for more points at the start of the range, linear for an even distribution of points. Recommended are the logarithmic setting and shear rate control.

For a creep curve you select a constant (low) stress in the first interval and a stress of zero in the second. For a relaxation measurement you set a constant deformation.

14.3.3   Oscillation

For oscillatory measurements both types, stress controlled and strain controlled, are available. The edit dialog allows you to set up e.g. amplitude sweeps, stress sweeps, frequency sweeps, constant frequency and stress or strain over time and so on. This can be controlled by the two parameters frequency and stress or strain. For both parameters you can select a profile and range according to the type of measurement you would like to carry out.

For an *amplitude sweep* you select a range of deformation values (or stress values) and a constant frequency, usually ω = 10 1/s. The amplitude sweep is usually the first test carried out on an unknown sample to find the linear viscoelastic region. The deformation range should cover two or three decades, starting with a low value. Depending on the result, you may have to adapt the deformation range and repeat the measurement with a fresh sample. Though it is possible to run this test with stress or strain control, the latter option is usually preferred, as it is easier to set up and often easier to understand.

For frequency sweeps the deformation is usually kept constant while the frequency changes. Therefore, select a constant amplitude and a ramp for the frequency. The deformation has to be inside the linear viscoelastic range. A stress controlled frequency sweep is seldom used as it is more difficult to set up because the stress values need to be changed during the measurement to keep the deformation within the linear viscoelastic range.

For time or temperature sweeps both strain and frequency are kept constant. Again, the strain has to be inside the linear viscoelastic range.

The 'Multiwave' button gives access to the 'Multiwave' dialog. With multiwave, several superimposed frequencies are applied during the measurement. This can be used e.g. to generate frequency sweep data for several temperatures in a short time.

To use the multiwave option, you need to activate it in the dialog. The settings are based on one single selected frequency in the main edit dialog. The frequencies for the multiwave measurement are calculated using the frequency factor. The amplitude factor is applied to the amplitude value from the main edit dialog. The reduction is necessary because the sum of deformations needs to be below the critical deformation. The resulting amplitude is shown next to the 'Multiwave' button.

14.3.4 Normal Force

The Rheoplus software allows you to control the normal force on the sample during the measurement, if the instrument has this function. Please note that normal force control is only possible with plate-plate systems.

The normal force and gap control are not shown by default and not available for all instruments. For detailed information on activating normal force control please see the relevant device driver manual or instrument manual.

One frequent application of this setting is the normal force control for the measurement of samples that shrink or expand during measurement. A constant normal force ensures that the contact between sample and upper measuring system is maintained and that the sample is not squeezed out from under the measuring system. For practical purposes the normal force value is kept constant within a user-defined range; the range is defined as a hysteresis value in the control panel.

14.3.5 Gap and Gap Speed

The instruments of the Physica MCR and MCR xx1 series allow you to control the gap, the gap speed (velocity), gap change or gap during the measurement. Select the variable you wish to use, the profile type and enter the value(s). Please note that the required test type is an option for the device driver that is not available by default.

14.3.6 Temperature

If this setting is not activated the measurement will be carried out at the current temperature or the value that has last been sent to the instrument, either in stand-by or from the start dialog box. To control the temperature value, e.g. for a gradient, you need to activate the temperature control and enter a range of temperature values.

To define a gradient select 'Heating Rate', enter start and end temperature as well as the required heating rate. The number of measuring points is calculated accordingly by the software. To change the time unit, select it in the list below the number of measuring points.

15 The 'Analysis' Menu

In the analysis window, you select the methods for the evaluation of your measurement data. The data can be evaluated by several methods in a row, e.g. smoothing the data first, then evaluating them using a rheological model. The available methods of evaluation are described separately in Volume 3 of this manual. In this chapter you will find a description of how to set up the analysis window and choose data for evaluation.

Similar to the measurement window, the analysis window uses a table format in which the steps of the analysis are the rows and the different data settings and parameters are the columns. The cells can be edited by double-clicking or with the respective command on the analysis menu.

The analysis menu is available in the workbook when an analysis window is the active window. To move the analysis window to active, go to the 'Window' menu and select the analysis window from the list. If the workbook does not contain a analysis window, go to 'Insert I Analysis Window' and select a suitable template from the list to create one.

15.1 'Analysis I Analysis Step'

The 'Insert' command adds a new step before the currently selected step. This command has the same function as the 'Insert' button in the analysis window.

The 'Append' command adds a new step after the currently selected step. This command has the same function as the 'Append' button in the analysis window.

The 'Delete' command deletes the currently selected step. This command has the same function as the 'Delete' button in the analysis window.

15.2 'Analysis I Options'

The settings in the options dialog define how much data are shown in the result window and whether all defined steps are applied to the input data.

- Long Method Information
  This shows detailed information in the result window

- Show Method Name
  This shows the name of the selected method in the result window

- Show Data Information
  This displays the location and file name of the datapool as well as the names of the input and output data series in the result window

- Clear Result Window before Start Analysing / Clear Result Window before Start autom. measuring
  This erases the information from a previous analysis in the result window. It is recommended to use this option to avoid data overflow.

- Which Analysis Step Should Be Calculated
  Select whether to calculate all steps or to calculate just a range of steps in an analysis. If the second option is selected, enter the start and end step as well.

The 'Options' button in the analysis window opens the same dialog box.

15.3 'Analysis I Method'

This command displays a dialog in which you can select an analysis method from the list of available (installed) methods. Highlight the method you would like to use and click 'OK'. This dialog can also be opened by double-clicking on a cell in the 'Method' column.

If two or more methods are defined in the analysis window you will need to select the method you want to change in a dialog that is opened with this command.

15.4 'Analysis I Parameters'

In the parameter dialog, which can also be accessed by double-clicking on a cell in the 'Parameters' column, you choose the variables for the selected analysis method. The parameters and settings are specific for each method and are therefore described in Volume 3 of this manual.

15.5 'Analysis I Input Data'

In the input data dialog you select the data series or data series intervals to which you would like to apply the selected analysis method. To add a data series, highlight it in the list of 'Possible Data Series' and click the right arrow button.

If only parts of the data series are to be evaluated, enter the interval number (from the measuring profile or table) and the point number (see table). Then click 'Append' to add your selection to the list of defined regions.

To remove a selected data series you highlight it in the list of selected data series and click the left arrow button.

If two or more methods are defined, you will need to select the method you want to change in the dialog that is opened with this command.

15.6 'Analysis I Output Data'

The analysis result is usually added to the datapool as a new data series. In the output data dialog you can define a name for the data series or use macros to automatically create a name for the result data series. This is similar to the generation of data series names in a measurement.

To use a macro, select it from the list and click 'Insert'. It is possible to link a number of macros.

If you are using several steps in an analysis and are only interested in the final result of the last step it is recommended that you select 'Temporary Result' for all analysis steps but the last. For each step you can define the temporary data series <Tn> (where n is a number) of the previous step as the input data. This way the input data are current each time the analysis is carried out. If you also uncheck the option 'Data Series in Datapool' the temporary results will not be stored in the datapool.

If the option 'Write Results of Analysis to Analysis Window' is enabled, the calculated data are shown in the 'Results' field in the analysis window.

15.7 'Analysis I LIM'

The command 'LIM' is only available if the Rheoplus software runs in LIMS mode (see the LIM/SAP manual for more information on linking to LIM/SAP master systems). It opens a dialog in which you can select additional keys that pass analysis results to the master system. Select the required values from the list and enter the necessary settings.

The dialog can also be opened by double-clicking the 'LIM data' column in an analysis window (only in LIMS mode).

15.8 'Analysis I Start / Stop'

The start command starts the analysis; all selected steps will be carried out and the results will be presented in the result window during the calculation. Please observe that some methods may have long calculation times.

The stop command interrupts the analysis that is currently running, a result data series is not created. If the analysis contains several steps, the result data series from the steps before the stop are stored in the datapool. It has the same function as the stop button.

15.9 'Analysis I Clear Results'

The 'Clear Results' command erases the information currently displayed in the result window; it does not delete the data series. The 'Clear' button in the analysis window has the same function.

16 The 'Diagram' Menu

The 'Diagram' menu is available when a diagram window is the active window in the workbook. To move the diagram window to active, go to the 'Window' menu and select the diagram window from the list. If the workbook does not contain a diagram window, go to 'Insert I Diagram Window' and select a suitable template from the list to create one. The diagram window displays the measurement and analysis results as a graph. The variables that are shown and the diagram settings can be selected by the user.

The diagram window consists of five 'areas': diagram (including diagram area, diagram text, curves and axis), title, legend, logo and footer. For each area you can set up a color setting and frame. The edit dialog for each item in the diagram can be accessed by a double-click on the respective item or by the corresponding command in the right-click menu or in the diagram menu.

Diagrams can be duplicated (creating an identical copy) and copied to the clipboard. From the clipboard, they can be pasted into any windows application.
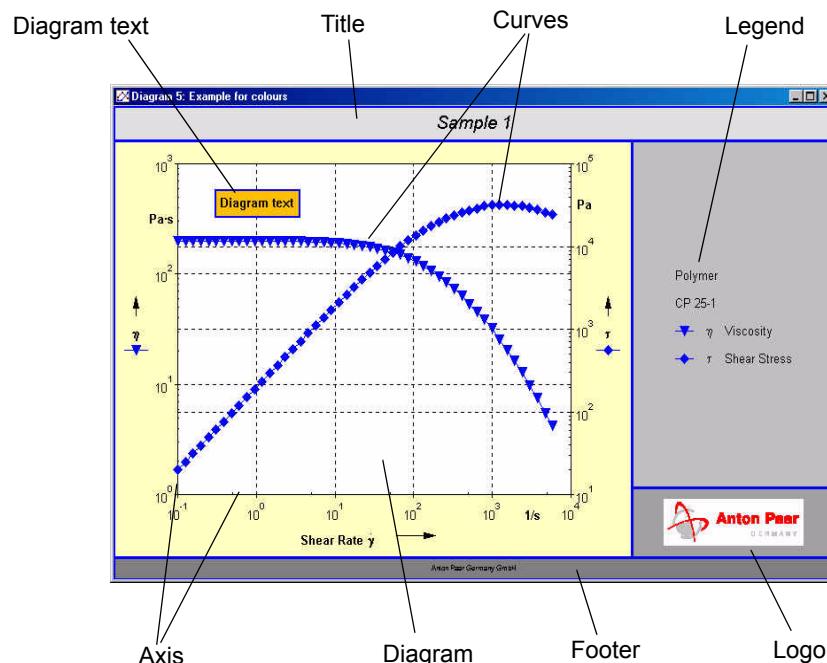

Fig. 16 - 1   Example diagram

16.1 'Diagram I Select Viewing Data'

To quickly select and deselect data series for the presentation in diagrams, you can use the check marks next to the data series in the datapool. The check marks work for all data series except the current analysis or current measurement. These cannot be deselected using the check marks.

To select specific intervals or ranges of a data series, go to 'Diagram I Select Viewing Data' or choose 'Select Viewing Data' from the right-click menu.

Enable to select a third dimension for the viewing data, e. g. upper waves from a multiwave measurement or waveform analysis .

Data series in the datapool

Select whether to display the entire data series or parts of it. To add the selected data, click 'Insert'.

Selected data

The software checks for the <Current> flag in the datapool and displays the data series if enabled.

Check to display new data automatically
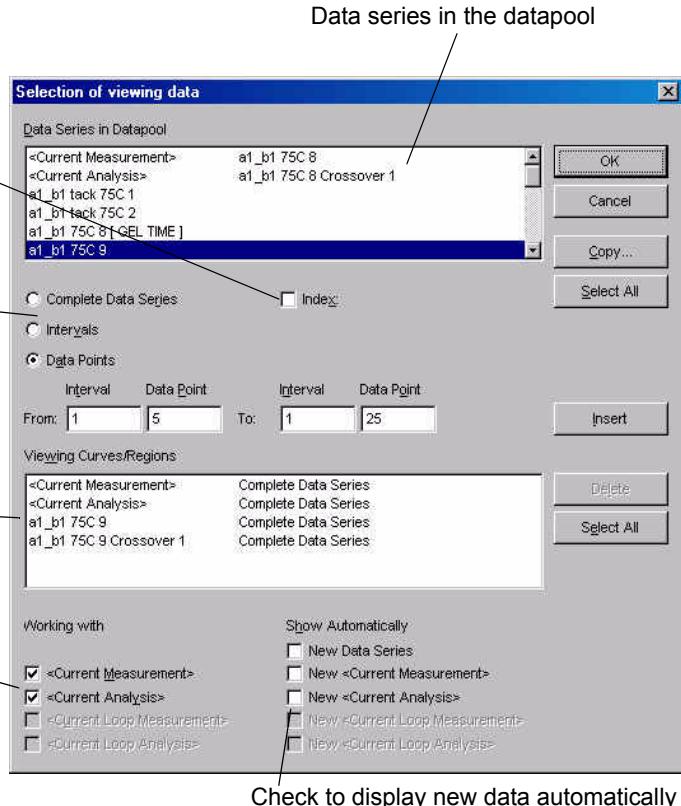
Fig. 16 - 2   Selection of data for display in a diagram

16.2 'Diagram I Copy Viewing Data'

Data that have been selected for one presentation window can be copied to any other open table or diagram. To copy data from the current window to another go to 'Copy Viewing data' in the diagram menu or the right-click menu and select the window(s) you want to insert the data in.

16.3 'Diagram I Reset Viewing Data'

This command removes all data series from the diagram except the <Current Measurement> and <Current Analysis>. The command on the right-click menu has the same function.

16.4 'Diagram I Working with <Current ...>

If these options are checked, the diagram window will check the properties of the data series in the datapool and those that have the <Current...> flag set will be displayed automatically.

16.5 'Diagram I Edit'

The edit menu gives access to the settings of all diagram window elements. The commands on this menu will be described in detail in chapter 16.11.

16.6 'Diagram I Arrangement'

The arrangement settings define if and where the legend, title, diagram text, logo and footer are displayed. To display an item in the diagram you need to check the 'Show' option.

For the legend and title you can select one of the predefined positions; the diagram text can be placed freely in the diagram area. Use the x,y sliders to place the diagram text. The 'Frame' button accesses the frame dialog for the entire window.

16.7 'Diagram I Move Diagram Text'

The text box in the diagram can be moved with the cursor when this option is activated. The option remains active until the text box is 'dropped' by clicking with the left mouse button. The diagram text is not shown by default but is enabled under 'Diagram I Arrangement'.

16.8 'Diagram I Select Data Points Graphically'

The selection mode can be enabled via the menu or by clicking the cursor button in the toolbar. It allows to highlight data points in the diagram; these data points are then used as input data for an analysis.

To use the graphic selection enable it and point to the first data point that you want to select as input data, then click the left mouse button. Keep the button pressed and drag it along the curve to the last required point, then release the mouse button.

To select the analysis method right-click on the diagram area and go to 'Analysis I With Template...' and select the required method from the list. Information about the analysis window can be found in chapter 15. The analysis methods are described in volume 3 of the software manual.

To de-select all data points right-click on the diagram area and go to 'Cancel Selection'. To change the selected range grab the first or last point of the selection and drag it to the required position.

To leave the selection mode, go to 'Diagram I Select Data Points Graphically' or click the cursor button in the toolbar.

16.9 'Diagram I Zoom with Cursor'

Activate this option or click the magnifying glass button in the toolbar to zoom in a diagram by dragging the cursor. The software then switches to the zoom mode. Point the mouse to one corner of the area that you want to zoom in, click and keep the mouse button pressed while dragging the pointer to the opposite corner of the zoom area. Then release the mouse button.

To keep this view click on the magnifying glass button again or right-click on the diagram area and select 'End' in the menu. To return to the normal view of the diagram enter the zoom mode again, if you have left it, right-click on the diagram area and select 'Total' in the menu. These zoom settings are valid until the workbook is closed.

16.10 'Diagram I Zoom'

Select any of the predefined zoom factors or 'User defined' to change the size of the diagram presentation. If you select 'User defined' you can enter your own zoom factor. The zoom factor only affects the presentation on screen.

16.11 Editing the Diagram

All elements of the diagram, e.g. marker symbols, marker and line colors, background color and pattern, arrangement of items such as legend or title, can be customized. The settings are stored with the workbook.

The main elements can be accessed by double-clicking on the relevant item. For example, a double-click on the axis opens the dialog box where axis type and variable can be selected, a double-click on a marker symbol opens the dialog box for selecting marker types and colors.

In this chapter, the commands are listed in the order they are shown in the menu 'Diagram I Edit'.

16.11.1 'Edit I Diagram'

The settings in this dialog box influence the general appearance of the diagram, e.g. two- or three-dimensional type and color settings for the diagram area.

- Dimension
  Choose '2D' (default setting) to present the data in a two-dimensional diagram or '3D' to present the data in a three-dimensional diagram.

- All Axis
  - Using Grid Colors for Inscription
    By default the axis inscription uses the color defined for text in the diagram window. If this setting is activated, the numbers on the axis are shown in the color selected for the major grid. The grid colors are set in the axis dialog (see 'Edit I Axis').

  - Show Points Outside of Diagram Plane
    If the selected range on the axis is smaller than the measured range of data the diagram will indicate this by drawing the curve across the boundary of the diagram plane.

  - Square Diagram
    Displays a diagram with equal side lengths.

  - Full variable name for Y-axis / Short variable name for X-axis
    By default the diagram displays the symbol for the y-axis variable(s) and the full name for the x-axis variable. These settings can be used to change the default.

- All Data Series
  - Show all invisible data points
    The 'Change settings of curve attributes' dialog (double-click on a curve) allows you to hide data points. These points are not shown in a diagram by default. You can use this setting to display all hidden points without re-activating them in the curve attributes.

  - Color / Marker
    Select one of the color and marker schemes from the list. The settings will be used for data series that are added to the diagram. The selection for color and marker is also available under 'Edit I Curves'.

The 'Frame' dialog is used to change the background color and pattern of the diagram and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness). This dialog is used for the color settings for all diagram areas.

The 'Font' button opens the common Windows font dialog in which you can select the font type, size, presentation and color.

The '3D View' button opens a dialog box in which you can enter the settings for the shape of a three-dimensional diagram. The settings are as follows:

Select angle:
y-axis: Y-Alpha
y-axis: X0-Phi
x-axis: X1-Beta

16.11.2 'Edit I Axis'

The 'Change settings of axis' dialog is used to edit the variables and settings of existing axes and to add new axes (y-axis for 2D diagrams, z-axis for 3D diagrams) or to delete an axis. It can also be opened by a double-click on any of the diagram axes.

A diagram needs at least the x-axis and one y-axis; 3D diagrams need the x-axis, y-axis and one z-axis. If a 2D diagram has more than two y-axes, additional axes will be displayed next to the first and second axis.
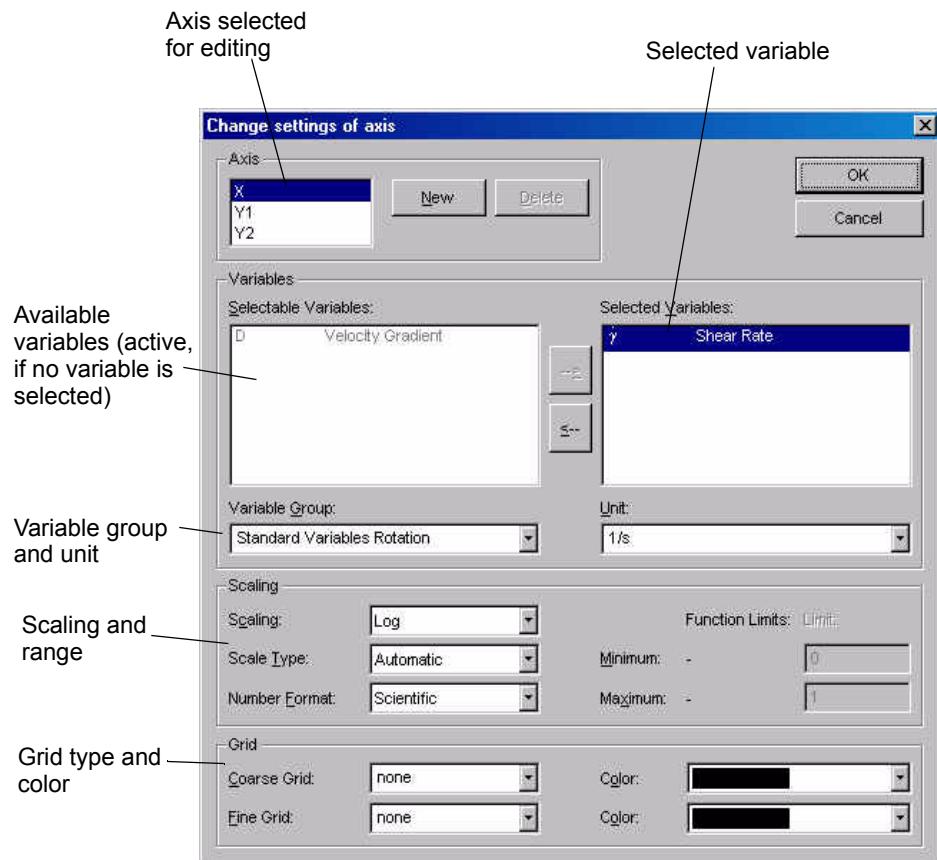
Fig. 16 - 3   Axis settings for the diagram

To edit an axis, highlight it in the axis list. The list on the right hand side will display the currently selected variable. If the variable is removed (with the arrow button or by double-clicking) all available variables are shown on the left hand side. The number of visible variables can be limited by selecting a variable group.

Select the scaling type and range -if you selected manual scaling- and the number format. The available number formats are described for the table.

To use the grid (major and minor grid) select a line type and color for each type.

16.11.3 'Edit I Legend'

The legend contains by default the data series name, the measuring system and the variables that are shown for this data series. In this dialog box you can customize the information that is shown and where it is shown in the legend. Each setting can be shown in the first or second line of the legend or next to the marker. The following information settings are available.

Data Series	displays the name of the data series
Device / Method	displays the instrument type or analysis method
Remarks, Operator, Sample	displays data series information
Date, Time	displays the date and time of the measurement
Meas. System	displays the measuring system
Test Type, Constants 1-4	only for imported data (RS 100 / 120 or OS 300)
Curve Data	displays selected interval and point numbers
Datapool	displays the name of the datapool
Analysis Result	displays the analysis result e.g. coefficients

The 'Font' button opens the common Windows font dialog in which you can select the font type, size, presentation and color. The 'Frame' dialog is used to change the background color and pattern of the diagram and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness).

If the option 'Using Function Color for Text in Legend' is checked, the legend will use the same color as the corresponding curve. If the option is not used, the legend text uses the default font color.

The marker list can contain the symbol for the variable, the full variable name or both. Select the required options.

16.11.4 'Edit I Title'

Enter the title text and select the alignment. The 'Font' button opens the common Windows font dialog in which you can select the font type, size, presentation and color. The 'Frame' dialog is used to change the background color and pattern of the diagram and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness).

16.11.5 'Edit I Footer'

The 'Footer' dialog is identical to the title dialog. Enter the footer text and select the alignment.

The 'Font' button opens the common Windows font dialog in which you can select the font type, size, presentation and color. The 'Frame' dialog is used to change the background color and pattern of the diagram and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness).

16.11.6 'Edit I Logo'

For the logo you can edit the background color, pattern and frame. The 'Frame' dialog is used to change the background color and pattern of the diagram and / and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness).

The logo itself can be replaced, e.g. by your company logo, by replacing the file logo.bmp in the sub-directory \data in the installation directory of the Rheoplus.

16.11.7 'Edit I Diagram Text'

The 'Diagram text' dialog is identical to the title dialog. Enter the diagram text and select the alignment. The 'Font' button opens the common Windows font dialog in which you can select the font type, size, presentation and color. The 'Frame' dialog is used to change the background color and pattern of the diagram and/or to add a frame to the diagram. Select the color and possible pattern you would like to use. For a frame you need to select the color, pattern and width (line thickness).

The diagram text can be placed freely on the diagram area with the x,y sliders in the 'Arrangement' dialog.

16.11.8 'Edit I Curves'

You can either edit the properties of a single curve or the settings for all curves in a diagram window. The settings remain valid even if all curves are removed from the diagram, the general settings can be made in advance.

16.11.8.1 Editing the General Settings

Go to 'Diagram I Edit I Curves' or right-click on the diagram area and select 'Edit I Curves' to open the dialog box shown below. To edit the settings for a curve, highlight the marker in the table. The table shows all variables that are used or have been used in the diagram as rows. Variables that are not used can be deleted using the 'Delete' button under 'Variable'. The columns correspond to the curves in the diagram: the settings from columns 1 are applied to curve 1, column 2 is applied to curve 2 and so on. The order of the curves in a diagram corresponds to their order in the datapool.
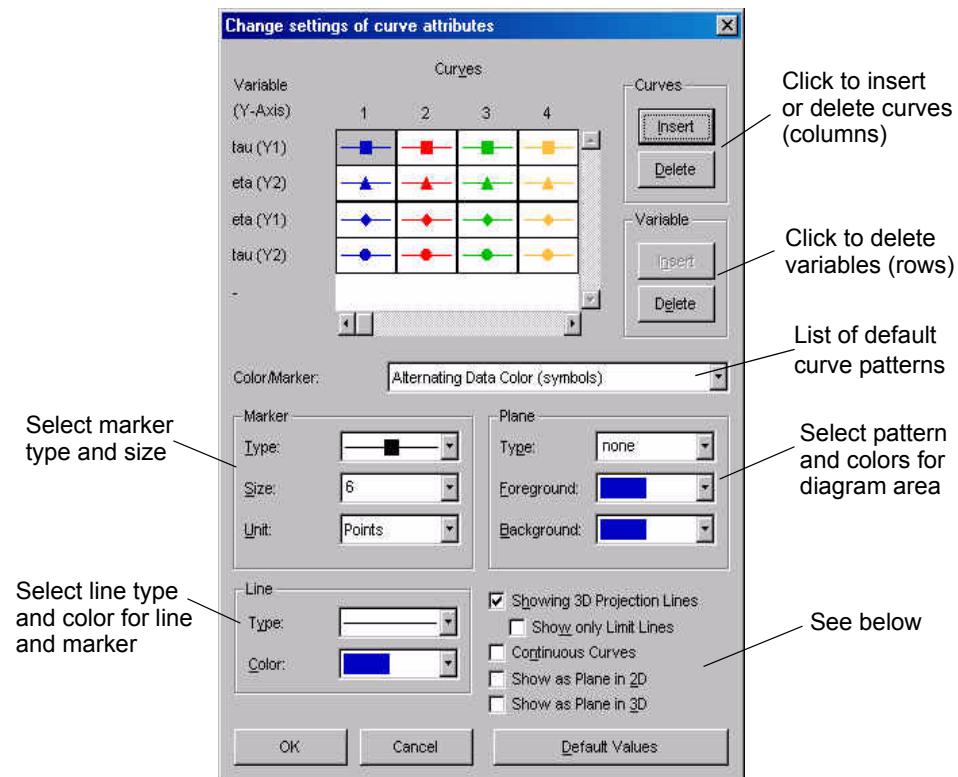
Fig. 16 - 4   Editing curve properties

The 'Continuous Curves' setting is recommended if you have removed points from the data series but want the curve to be shown as a continuous line. If you are displaying several intervals of one measurement it may be necessary to uncheck this option. The setting 'Showing 3D Projection Lines' displays lines from each data point to the x-y plane of a three-dimensional diagram. If 'Show only Limit Lines' is activated, the projection lines are shown for the outer data points only.
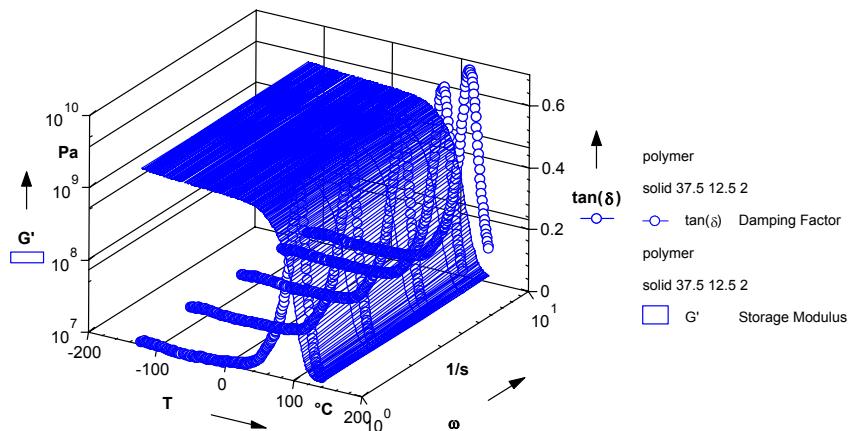
Fig. 16 - 5   3D diagram - Example

If the option 'Show as Plane…' is activated, the curve is displayed as shown in the example above; here, 'Show as Plane in 3D' has been activated for the storage modulus G'.

16.11.8.2 Editing a Single Curve

Double-click any marker on the curve you want to edit. A dialog box similar to the one described above is opened. The editing functions are identical in both dialog boxes, therefore please refer to the previous chapter for information on editing the curve properties. In this dialog box only one curve at a time can be edited.

You can hide data points by removing the check mark next to the data point in the list under 'Function values'. To go to another data point use the scroll bar. Hidden data points are not shown in a diagram, in a table they are marked with ***. Hidden data points are not used for analysis. It is not possible to actually delete points from a measurement.

17 The 'Table' Menu

The 'Table' menu is available if a table window is the active window in a workbook. To move the table window to active, go to the 'Window' menu and select the table window from the list. If the workbook does not contain a table window, go to 'Insert I Table Window' and select a suitable template.

The table window displays the measurement or analysis results and information about the datapool and data series. The variables and units can be selected by the user, as well as the format of the displayed values and the amount of information in the table header.

Table data can be copied to other Windows applications. To copy data select the columns you would like to transfer and select 'Copy' on the right-click menu or the copy button. To highlight the entire table, click the button in the upper left corner of the table or choose 'Select all' from the right-click menu.

17.1 'Table I Select Viewing Data'

To quickly select and deselect data series for a table, you can use the check marks next to the data series in the datapool. The check marks work for all data series except the current analysis or current measurement (unless you are in 'Presentation Mode').

To select specific intervals or ranges of a data series, go to 'Table I Select Viewing Data' or choose 'Select Viewing Data' from the right-click menu.

Enable to select a third dimension for the viewing data, e. g. upper waves from a multiwave measurement or waveform analysis .

Select whether to display the entire data series or parts of it. To add the selected data, click 'Insert'.

Data series in the datapool

Selected data

The software checks for the <Current> flag in the datapool and displays the data series if enabled.

Check to display new data automatically
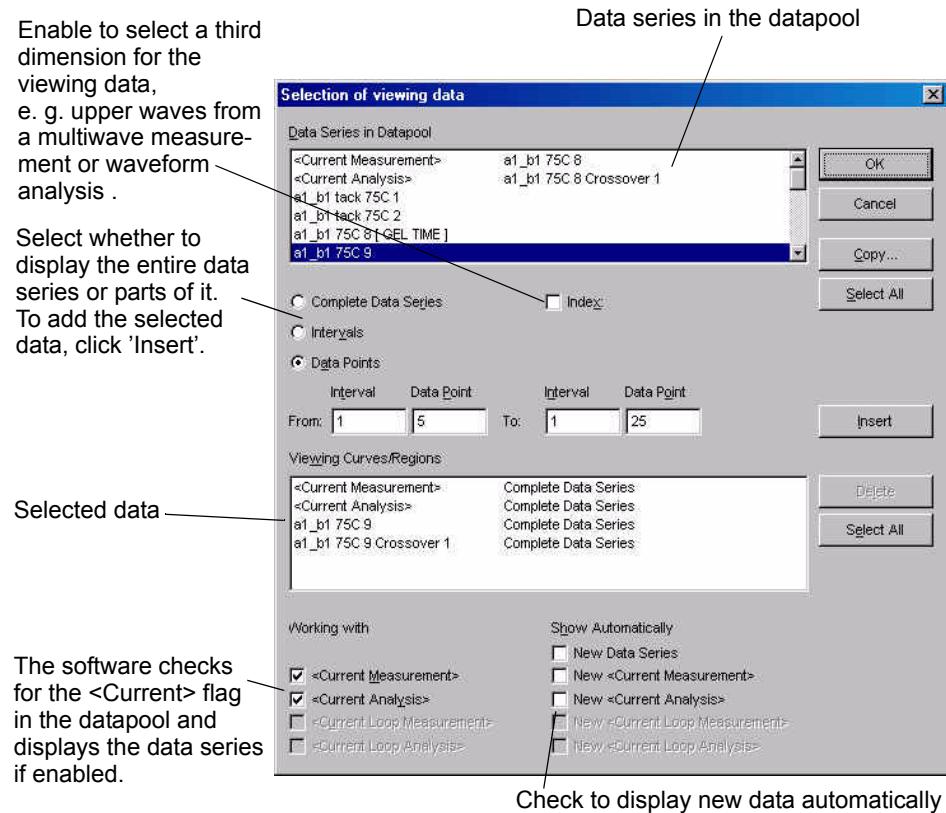
Fig. 17 - 6   Selection of data for display in a table

17.2 'Table I Copy Viewing Data'

Data that have been selected for one presentation window can be copied to any other open table or diagram. To copy data from the current window to another, go to 'Copy Viewing data' in the table menu or the right-click menu and select the window(s) you want to insert the current data into.

17.3 'Table I Reset Viewing'

This command removes all data series from the table except the <Current Measurement> and <Current Analysis>. The command on the right-click menu has the same function.

17.4 'Table I Working with <Current ...>'

If these options are checked, the table window will check the properties of the data series in the datapool and those that have the <Current...> flag set will be displayed automatically.

17.5 'Table I Edit'

In this dialog box you can select which variables are shown in the table and the information that is shown in the table heading. For the variables you can also select the number format and the number of digits.

- Datapool Information
  Displays the location and file name of the workbook.

- Data Series Information
  Displays the name of the data series. The number of intervals in this data series, the software and the instrument or analysis method that were used, are shown. For a measurement, the measuring system and accessory are shown; for an analysis, the result is shown as well. All these items belong to the 'Type information'. 'List of Variables' displays the settings, e.g. torque and deformation, that were available for the instrument. 'Constant List' displays the conversion factors of the measuring system that has been used for the measurement and some instrument parameters.

- Interval Information
  Displays the interval number and number of points for each interval. 'Test Data' displays a summary of the measurement parameters as defined in the measurement window. These data are not available for an analysis. 'Measurement Data' lists all variables that have been saved with the data series. Normally, all other results can be calculated from these values.

- Data Columns
  Displays the measurement data. If 'Units' is selected the column heading will consist of one row for the variable name and one row for the selected unit.

18 The 'Application' Menu

The application menu is available in the workbook if an application window is the active window. To move the application window to active, go to the 'Window' menu and select the application window from the list. If the workbook does not contain a application window, go to 'Insert I Application Window' and select a suitable template from the list to create one.

An application window contains table(s) and diagram(s) and can be used e.g. as a report sheet. There are several templates for application windows available, the most commonly used contains one table and one diagram. The settings of the application windows are fixed; if you require a specially designed application window, please contact our local distributor or Anton Paar Germany directly.

18.1 'Application I Zoom'

Select any of the predefined zoom factors or 'User defined' to change the size of the application window. If you select 'User defined' you can enter your own zoom factor.

19 The 'Monitor' Menu

The 'Monitor' menu is available if a table window is the active window in a workbook. To move the monitor window to active, go to the 'Window' menu and select the monitor window from the list. If the workbook does not contain a monitor window, go to 'Insert I Monitor Window' and select a suitable template from the list to create one.

The monitor window is used to display the raw data for torque and deflection angle during an oscillation measurement (without DSO). It displays these variables as a function of time or in a Lissajout plot where the angle is shown as a function of the torque.

19.1 'Monitor I Configure Window'

Select whether to show the variables as a function of time ('Function Diagram') or as a Lissajous plot. If the option 'Showing Status Information' is enabled, the current status of the instrument (standby or measurement) will be shown in the title of the monitor window.

19.2 'Monitor I Zoom'

Select any of the predefined zoom factors or 'User defined' to change the size of the application window. If you select 'User defined' you can enter your own zoom factor.

20 The Datapool

The datapool is the part of the workbook where all measurement and analysis results are listed. The name that is shown in the datapool is the information that has been entered as 'Name' in the start dialog box (for a measurement) or as 'Name of Data Series' in the output data dialog box (for an analysis).
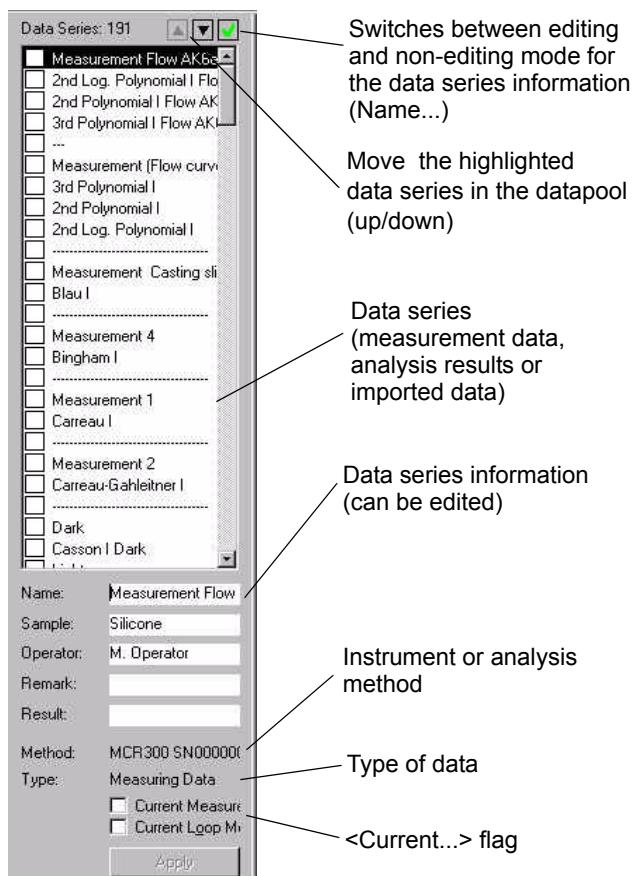
Fig. 20 - 1   The datapool

Any data series that is generated by a measurement or an analysis or is imported into the Rheoplus software is added to the datapool. The type of data is shown for each data series ('Measuring data', 'Analysis data' or 'ASCII Format'). Each new measurement or analysis is set automatically to be the <Current> and shown in the table and diagram window(s).

The flag, as well as all other data series information, can be edited. To switch between editing (✓) and non-editing (+) mode click the button. Working with the datapool is only possible while no measurement or analysis is running.

Through the right-click menu you can access some functions for handling data series in the datapool. The commands in the 'Edit' menu do not work with the datapool, only with the data series information and the windows.

- Cut
  Removes the selected data series.

- Copy
  Copies the selected data series to the clipboard. The data can be appended to any open datapool with the 'Append' command on the right-click menu.

- Append
  Pastes (=appends) the data series to the current datapool. This command only works if a data series is available in the clipboard.

- Select All
  Highlights all data series in a datapool

- Presentation Mode
  When the presentation mode is activated, the data series with a <Current..> flag are not shown automatically in the presentation windows (tables, diagrams...) although they can be selected.

21 The Joblist

The joblist is a sequence of indivually selectable workbooks/templates that are carried out one after the other. It is possible to either link a number of different workbooks or use one workbook for a number of steps. The sample information, file names and temperature settings can be set globally for all steps in the header or separately for each step.

Click to insert or append a new step or delete the highlighted step.

Header (contains global settings that are used for all steps)

Click to select settings such as automatic start or printout.

Click to define which settings are selected in the header and which are set for each step.

Steps (select the step and double-click to edit)
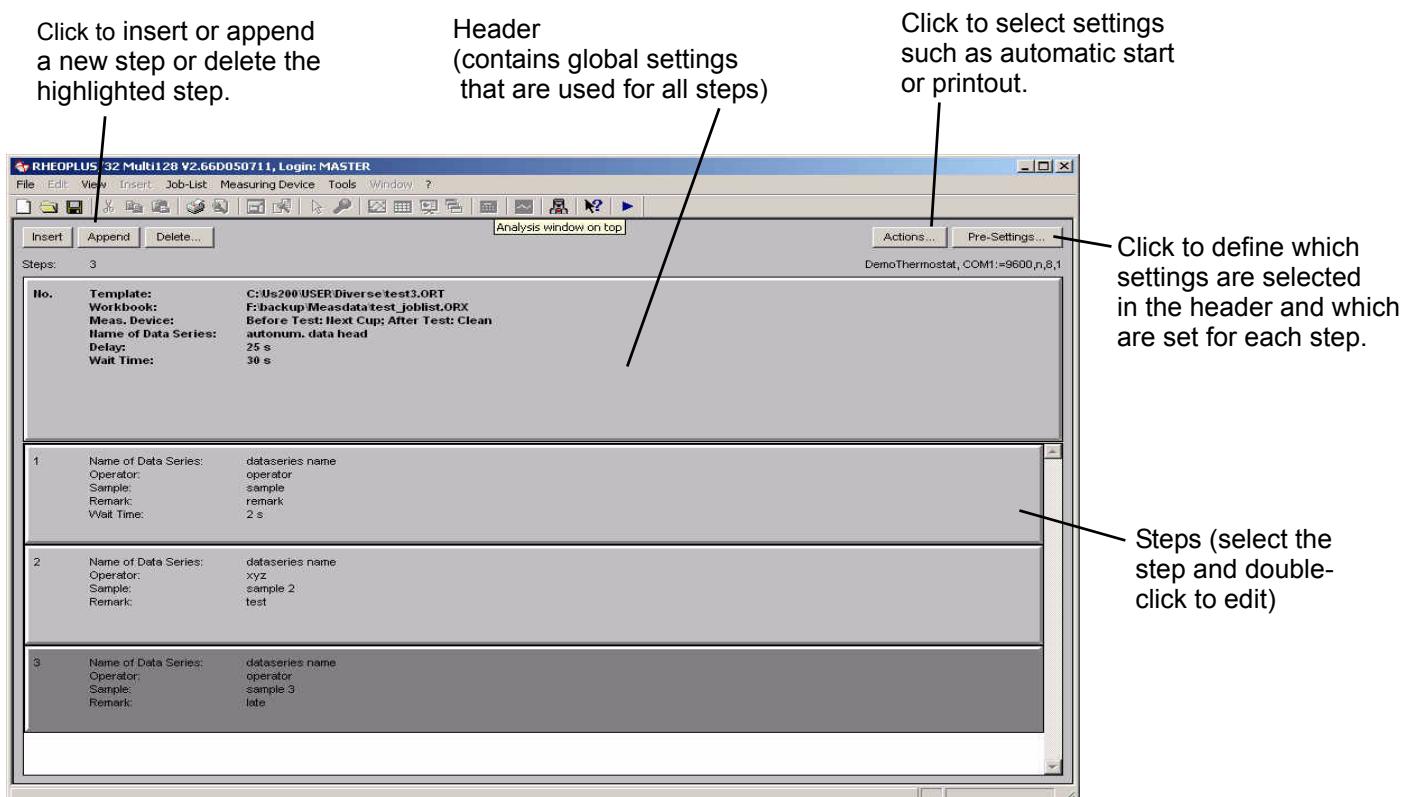
Fig. 21 - 1   The joblist window - Example

Below you find a short overview of the steps necessary to create a new joblist.

1. Set up and save the required workbook templates.

2. Go to 'File I New' and select 'Joblist' in the RheoManager. A new joblist window is created.

3. Select the measuring device ('Measuing Device I Select Device') and the printer(s) ('File I Printer Setup'). It is also possible to automatically use the devices selected in the workbook templates (see 'Actions).

4. Append as many steps as required by using the 'Append' button or the command in the joblist menu.

5. Go to 'Pre-Settings' and select which settings are identical for all steps and which should be set separately for each step. It is also possible to use the settings from the template that is used in the steps. For better control of the settings that actually will be used, it may be easier to define the settings in the joblist.

6. Double-click the header and make all required entries. Close the header dialogbox with 'OK' or click 'Settings for Step 1' to continue with editing the steps.

7. Double-click the first step unless you have continued with editing from the header. Make all required entries and proceed to the next step with '>>'.

8. Edit all steps and close the dialog box with 'OK' after the last step has been edited.

9. Click the 'Actions' button and check the options you want to use. Then close the dialog box with 'OK'.

21.1 The Joblist Toolbar

Starts the RheoManager where you can select a template for the creation of a new workbook or select another file type, e. g. Joblist.

Displays the 'Open workbook' dialog. Use this dialog to open previously stored files.

Saves the current file. If the file has not been saved before, the 'Save as' dialog box will be shown.

Prints the current window to the printer selected for that window type.

Opens the device driver dialog box.

Starts a measurement. This button is shown in stand-by mode only.

Stops a currently running measurement. This button is only shown during a measurement.

21.2 The 'File' Menu

See chapter 6, "The 'File' Menu"

21.3 The 'View' Menu

See chapter 8, "The 'View' Menu"

21.4 The 'Joblist' Menu

21.4.1 'Joblist I Automation Steps I Settings for Joblist / Settings for Step''

The number of settings available in the header of the joblist is dependend on the selections made in the 'Pre-settings' dialogbox (see 21.4.6). The figure below shows an example where all settings except the data series name and the sample description are set in the joblist header, the corresponding step dialog box is shown as well.
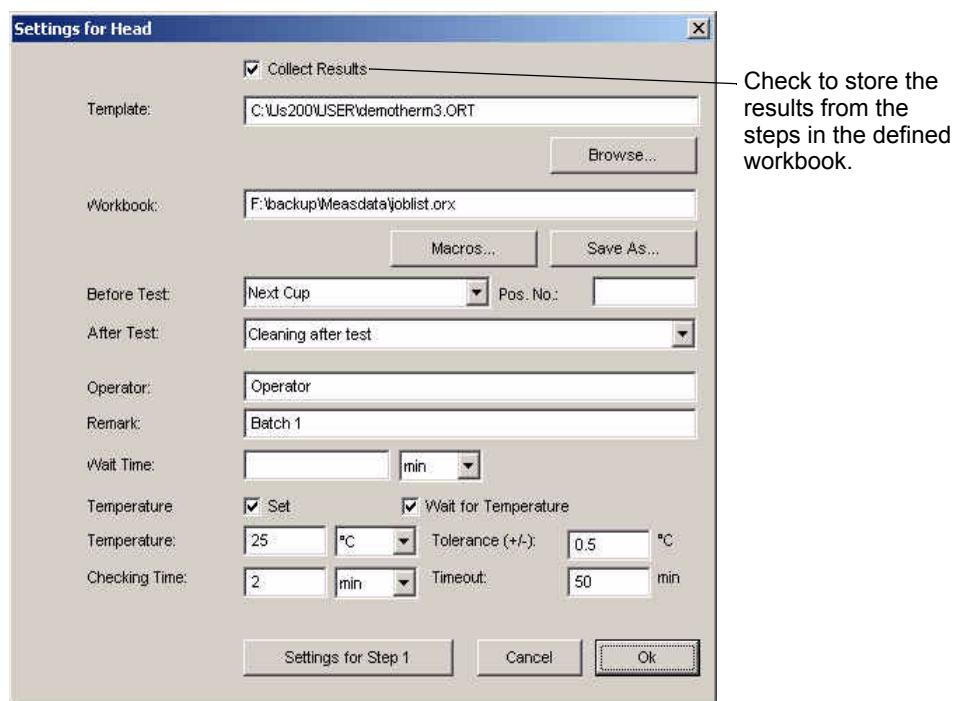
Fig. 21 - 2   Header settings - Example
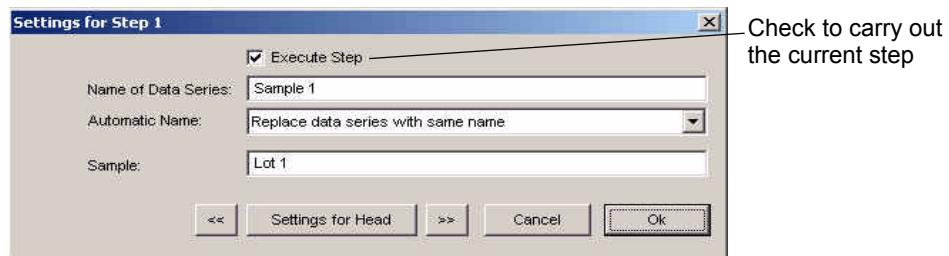
Fig. 21 - 3   Settings for joblist section - Example

The dialog boxes can be also opened from the right-click menu or by double-clicking the relevant part of the joblist. To switch between steps click the arrow buttons.

Select the template with the 'Browse' button and select the path for the workbook. The file name for the workbook is entered manually. The macros can be added to the file name e.g. for automatic numbering of the file, the file name can also consist of macros alone.

The delay is the time that the software will wait before carrying out the current step. It is independent of the wait time and can only be set in the joblist.

Under 'Measuring Device Data' you can enter the name of the cleaning program (ASC only) that should be used for the joblist or step. If no name is entered here, the cleaning program associated with the template will be used.

The pretest action will be carried out before the step, the posttest action after the workbook has been finished. The actions can e.g. be used to go to the measuring position or move the ASC magazine before the measurement and to go to the lift position or start the cleaning (ASC).

The remaining setting are identical to those in the start dialog box of a workbook. All settings that are entered here will override the settings made in the template.

21.4.2 'Joblist I Automations Step I Show Template / Show Workbook'

These commands open the template or workbook selected for the highlighted step or header. The commands are also available in the right-click menu.

21.4.3 'Joblist I Automations Step I Select all / Execute Steps / Don't Execute Steps'

It is possible to temporarily disable steps in the joblist by removing the checkmark for 'Execute Step' in the dialog box for editing the step settings. To disable several steps at once highlight them in the joblist by using <Shift> or <Ctrl> and the left mouse button and go to 'Don't Execute Steps'. To enable the steps highlight them again, or use 'Select all', and choose 'Execute Steps'. All commands are available in the right-click menu as well.

21.4.4 'Joblist I Automations Step I Insert / Append / Delete'

These commands (also available in the right-click menu) have the same functions as the buttons in the joblist window.

21.4.5 'Joblist I Setup I Actions'

The settings of the 'Actions' dialog determine the behaviour of the job list, e.g. endless working and prompts. The dialog can also be accessed with the 'Actions' button in the job list window. The available options are listed below.

- Starting Job List by opening Job List Book
  The job list will be carried out when the file is opened.

- Closing Job List by ending Job List
  The job list window is closed after all steps have been carried out.

- Closing Main Window by closing Job List
  The job list window and the software will be closed after all steps have been carried out.

- Print Data before starting Job List
  The measurement results are printed after the start command before the steps are carried out. If necessary further information such as file names created by macros will be added before the printout.

- Print Data after ending Job List
  The measurement results are printed after all steps are carried out.

- Call Head Data Dialogbox by Starting Job List
  The header dialog box is opened after the start command. You can enter global settings and information that is going to be used for all steps.

- Call Cell Data Dialogbox before Running Workbook
  The cell dialog box is opened after the start command before each step. You can then enter individual settings and information for each step.

- Delete Finished Parts
  Those steps that have been carried out are removed from the job list. It is recommended to use this settings for endless operations; otherwise the list of steps would become extremely long.

- Clear Working Step Flag after Finishing
  The steps that have been carried out are disabled and will be ignored.

- Endless Working
  The program adds new steps automatically. You will be prompted to enter the cell data for each new step. You may also add new steps while a previously defined one is running. This mode is suitable for an automatic sampler that is working as a buffer for several samples. It is recommended to use 'Clear Working Step after Finishing' for this mode.

- Disable inserting and deleting steps
  If this option is activated the user cannot add or remove steps from the job list.

- Call workbook as symbol
  With this option the workbook will not be shown in the normal window size but as a symbol.

- Using Measuring Device
  The instrument and instrument settings defined in the job list window will be used for all steps. The individual settings that have been saved with the workbooks will be ignored.

- Call Setup Box before Running Job List
  The device setup dialog is opened after the start command.

- Using Text Device
  The printer defined for text output in the job list window will be used for all steps. The individual settings that have been saved with the workbooks will be ignored.

- Using Graphic Device
  The printer defined for graphic output in the job list window will be used for all steps. The individual settings that have been saved with the workbooks will be ignored.

- Using Application Device
  The printer defined for application output in the job list window will be used for all steps. The individual settings that have been saved with the workbooks will be ignored.

21.4.6 'Joblist I Setup I Settings'

The template and the workbook can be selected in the header or in each step. Further, the sample information and some other data can be entered in the template, the header or in each step. The selections in the 'Pre-settings' dialogbox decide which option is used.
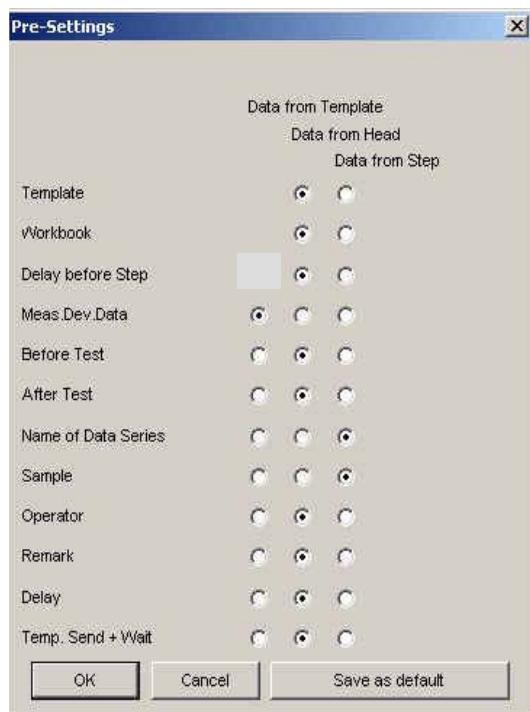
Fig. 21 - 4   Pre-Settings dialog box

The figure above shows an example for the pre-settings. With this setup, the same template and workbook are used for all steps ('Data from Head' enabled); the selection is made in the header of the joblist. The pre-test and post-test action and the time and temperature settings are set in the header as well. The data series and sample name can be entered for each step with this example ('Data from Step' enabled). The measuring device data e.g. cleaning program for the ASC are taken from the template ('Data from Template' enabled).

Choosing the pre-settings is the first step in setting up a joblist. First after these selections have been made, the header and the steps can be set up correctly.

21.4.7 'Joblist I Test'

The test command checks the parameters of all workbooks in a job list.

21.4.8 'Joblist I Start / Break'

These commands start a joblist respectively stop a running joblist. If a joblist is stopped while a copy of the workbook is open, you will have to close the window as well. You are prompted to confirm interrupting the measurement.

21.5 The 'Measuring Device' Menu

See chapter 10, "The 'Measuring Device' Menu"

21.6 The 'Tools' Menu

See chapter 11, "The 'Tools' Menu"

Appendix A: Temperature Calibration

Warning:
The temperature calibration needs to be carried out with a calibrated temperature sensor and with great care. Always wait for thermal equilibrium before taking a temperature reading. An incorrect temperature calibration will always result in incorrect measurement data.

For a temperature calibration, a number of temperatures is set and the temperature in the sample area is measured, either with an external temperature sensor or with the calibration substance sensor. The calibration substance sensor can only be used for instruments of the Physica MCR series and the Physica MCR xx1 series, and for measuring cells that do not need a Pt100 sensor. At least two calibration temperatures, one slightly above and one slightly below the measurement range, should be used. A single point calibration is only useful if all measurements are carried out at that temperature.

After all calibration points have been measured, a polynomial fit is applied to the data. These calibration data are stored with the measuring cell for those cells that are connected directly to the instrument. If the measuring cell is connected to an external controller, the calibration will be stored with the controller. It is therefore necessary to define a separate controller as an accessory if one controller is used for several measuring cells; an example would be a waterbath that is used for a plate measuring cell and for a cylinder measuring cell. Below, the calibration procedure is described step-by-step. The settings that vary for the different types of temperature control units will be pointed out where necessary.

1. Switch on the instrument and the temperature controller, if necessary, and start the software. Make sure the counter-cooling is working if you are using a Peltier system.

2. Initialize the instrument, if necessary, select the correct temperature cell and measuring system and set zero gap, if appropriate.

3. A. For a plate measuring cell, the temperature sensor should be placed between the upper and lower plate. Use a heat-conductive paste to ensure the contact between the plates and the temperature sensor. Move down the upper plate carefully, until the temperature sensor is placed securely between the plates.
   For instruments that allow normal force controlled sample loading, you can enter the approximate height of the temperature sensor as the gap value and move to the measuring position with a maximum normal force of 5 to 10 N. The instruments of the Physica MCR series and Physica MCR xx1 series also allow you to stop the movement automatically when a certain normal force is reached.

B. If you are using a cylinder system, fill the cylinder with a suitable fluid and place the temperature sensor in the fluid.

Warning:

Make sure that the fluid you are using is stable within the temperature range you intend to calibrate for. Do not use water if you are calibrating outside the temperature range of +5 ºC to +90 ºC. Make sure that the calibration temperatures are well below the flash point of the fluid.

4. Go to 'Measuring Device I Temperature Calibration' to open the calibration dialog box. The figure below shows the settings for an MCR xx1 equipped with a Peltier system.

Shows the current values during the calibration

Check that the settings are correct

Enter the calibration temperature(s) and confirm each line with <Enter>

Select the setting and reading temperature depending on the accessory type

Only available with the calibration sensor for Physica MCR and MCR xx1

Click to start the calibration procedure

Enter temperature from external sensor when prompted

Abb. A - 1   Temperature calibration dialog

5. Check under 'Meas. Device' that the selected accessory is shown.

6. Enter the temperatures at which you want to calibrate in the 'Output List'. Confirm each line with <Enter>.

7. Enter the values for 'Temp. Tolerance', 'Checking Time' and 'Mean Build. Time'. A recommended setting for the tolerance is 0.05 to 0.1 degrees. The checking time should be at least 10 min, the time for building the mean value can be set to one or two minutes.

The 'Check time' is the time interval during which the temperature needs to be stable inside the given tolerance. Every time the measured temperature is outside the tolerance, calculated from the previous value, the check time starts again. After the check time, the 'Mean Build. Time' starts. The temperature values measured during this time are recorded and the average is calculated.

8. The selection of the options 'Use Temperature Output' and 'Use Temperature Input' depends on the accessory you are calibrating.
A. For a measuring cell that is connected directly to the instrument, e.g. a Peltier on a Physica MCR, both setting and reading temperature are enabled. 'Temperature Input' and 'Temperature Output' are identical and show the measuring cell. The same cell is listed under 'Meas. Device'.
The calibration is stored with the measuring cell.

B. For a measuring cell with an external serial controller, where the controller temperature is used, both the setting and reading temperature have to be enabled. Temperature input and output show the controller, the measuring cell is listed under 'Meas. Device'. The calibration is stored with the controller.

C. For a measuring cell with an external controller but its own temperature sensor (controller temperature is not used) both the setting and reading temperature need to be enabled. The temperature output shows the controller, the temperature input shows the measuring cell which is also listed under 'Meas. Device'. The output calibration is stored with the controller, the input calibration is stored with the measuring cell.

D. For a measuring cell with a temperature sensor and an external controller that is operated manually enable the reading temperature only. The output list in the calibration dialog box cannot be used. The temperature input shows the measuring cell which is also listed under 'Meas. Device'. The input calibration is stored with the measuring cell.

E. For an analog controller enable the setting temperature only. With this configuration the settings for 'Temp. Tolerance', 'Checking time' and 'Mean Build. Time' are disabled. The calibration is stored with the controller.

9. The option 'Calibrating Temperature Output to Input' can only be enabled if you are sure that the temperature sensor that reads the input temperature is calibrated.

10. The option 'Use Calibration Substance Sensor' needs to be disabled unless you are using the calibration sensor from Anton Paar Germany GmbH.

11. Once you have made all the settings, click 'Start Calibration'. The first calibration temperature will be sent to the controller/measuring cell, if possible. For a manually operated controller, you need to start the temperature control yourself.

12. After the temperature has been stable for the checking time interval, the interval for building the mean value starts. When this is finished, you will be prompted to enter the temperature in the 'Subst. Temp.' box. If you are using the calibration substance sensor, no user intervention is necessary as the software will read and store the measured temperature automatically.

13. The calibration will proceed until all values entered in the 'Output List' have been measured. The calibration result is then calculated and stored automatically. To look at the calibration parameters, click 'Extended Analysis' or 'Show'. With the extended analysis it is possible to change the data fitting.

14. Click 'OK' to finish the calibration or 'Start Verification' to repeat the output list to check the calibration parameters.

15. The calibration parameters are stored, if applicable, with the controller or measuring cell and can be viewed in the edit dialog box for the accessory. Please note that the temperature shown on the instrument or controller display will be the temperature necessary to reach the required sample temperature. The 'real' temperature for the sample is shown in the software and the measurement results.

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