

**Servo Hydraulic
Universal test Machines
TS150,TS200 , TS230**

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User Guide
User Guide
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1 Introduction

This manual will help you to get familiar with your new testing software quickly. The manual answers questions and help you to solve problems that may appear.

1.1 Symbols

Different symbols used in this manual will allow you to find your way more easily.

Symbol	Meaning
	Safety Instructions: In order to avoid interruptions in the work flow as well as damages to man and machine, follow the safety instructions at all cost.
	Job/work instructions: Instructive part of the document with precise work instructions. Here you are asked to do something.
	Information: General information and descriptions of working procedures, etc.
	Note: Important note for the operation, the function or for the working procedures.
	Tip: Gives tips for easy handling of the The software Software, the EDCs or the testing instrument

1.2 Description

The Software is a state-of-the-art 32-bit application for the operating systems Microsoft Windows 95/98/NT/2000/XP®.

The software has been developed for computer controlled:

- data logging and control of material testing instruments,
- material tests following common standards (DIN, EN, ...),
- evaluation of the tests carried out.

The software has been developed for testing instruments, which can be controlled by the measurement electronics of **DOLI Elektronik GmbH** – the External Digital Controller **EDC**. This 'intelligent' electronics has its own processor with a separate program, which is able to exchange data with the PC software. This way, it is possible to detect data from the tester, process them in real-time and send commands from the PC to the tester.

It is possible that, besides the EDC, further measuring cards or measuring instruments are served by the software. These cards and instruments have to be defined with different test configurations before the start of the test. Since the handling of different machines having different test configurations differs in some points, the most important differentiating factors are named at the corresponding place. The relevant places of the help system refer to the different measuring technology systems.

The EDC (External Digital Controller) is located either in a separate housing beside or as a build-in unit inside the testing instrument. EDC and PC do communicate via a serial cable. For simple test tasks, the EDC is even able to control the instrument without a PC; this is called "stand alone" mode.

Please pay attention implicitly to the notes and instructions of the EDC-User-Manual, also.



We recommend the following order to become acquainted with the Software:

If you do not have any experience with Windows 95/98/NT/2000/XP® yet, we recommend that you get yourself an overview of this operating system using the online-help or other literature before working with **The software**.

- In case you have not already read the EDC-User-Manual, read it now. Make yourself familiar with the handling of the EDCs and the most important instructions. It is very important, that you follow the safety instructions at all cost, in order to avoid handling errors and as an outcome of these dangers for man or machine.
- Then get yourself familiar with the concepts of the software, in order to understand its functional principle (see chapter [Introduction](#)) and structure (see chapter [User Interface](#)).
- Carry out simple tests following the description in chapter [Test Performance](#).
- For any help concerning the user surface (e.g. the meaning of the single menu commands or of the function fields in the toolbar), please use the [context help](#). Further on, there is the [online-help](#) ([function field help](#) in the dialogs or the symbol bar) and the remarks via key [F1](#).

1.3 Test Regulations

Your material tests do follow specific standards, which must have been chosen in advance (see [menu Test → command Settings → dialog Test settings](#) opens → [dialog Test](#)).

When choosing the test regulation, you determine:

- the standard the test will follow
(This way, in many cases, the type of material to be tested will be determined by the standard, too.)
- the algorithm to be used to control the instrument during the test
- the test results to be determined during the test.

After having chosen the test regulation, choose test parameters in order to configure the test according to your needs (same dialog).

With program start, the test regulation used the last time will be chosen automatically.

1.4 Measurement Quantities

During the test course, up to 14 measured values will be recorded. They can be stored into a measurement value file (see chapter [Data Storage](#)).

These 14 measurement values are the **6 standard values**

- **test time** **T**
- **crosshead position** **S**
- **load** **F**
- **elongation** **L**
- **strain (extension)** **D**
- **stress** **R**

as well as up to **8 userdefined values**.

In some cases, several **standard quantities** can be deactivated, if they are not necessary for the chosen test regulation. Then, you will not be able to use these quantities.

With some test regulations, standard quantities may have another meaning as normally used. In bending tests, for example, “elongation” will turn into “deflexion”, the “extension” will become “edge fibre extension” and “stress” will be “bending stress”.

In addition to the standard values there are 8 so-called **userdefined values**. You can define them in the [dialog USER1...USER8](#) ([menu Test → command USER1...USER8](#)). One example for a userdefined value is the quantity “load related to width”, which is used in several test regulations.

Userdefined values are divided into two types:

- Fixed programmed values: The manufacturer has configured the software in such a way, that the calculation regulation for a value is fixed and cannot be changed by the user while the program is running.
- Freely definable values: The user can define the quantity during the program running time.

In both cases, programming of almost all kinds of interdependencies is possible.

It is possible to display the progress of the measured values in the measurement diagram on the screen. Use [menu Diagram → command Axes](#) to determine, which values you want to be displayed.

Further on, you can determine test end criteria for all values (see [menu Test → Settings → dialog End of test](#)).

1.5 Physical Units

A physical unit is allocated to all measured values, results and to many of the input parameters, also. For values used more often, the program offers the possibility to choose between several units.

The following units are possible for the standard quantities:

Value	Standard units	Further Units
Time	[s]	[min], [h]
Position	[mm]	
Load	[N]	[mN], [cN], [kN]
Elongation	[mm]	
Strain	[%]	
Stress	[N/mm ²]	[kN/mm ²], [N/cm ²], [MPa], [kPa]

The units of the test results can be specified using the [menu Test → command Settings → Results](#).

1.6 Initial Values

All kinds of test settings are summarised as “initial values”. Here they are:

- the test regulation (see [menu Test → command Settings](#))
- the test data (see [menu Test → command Settings](#))
- the shape and dimensions of the samples (see [menu Test → command Settings](#))
- the test rates and rate switch points
(see [menu Test → command Settings → dialog Test procedure, speeds](#))
- the options before test start (see [menu Test → command Settings → dialog Test procedure, speeds](#))
- the test end criteria (see [menu Test → command Settings → dialog End of Test](#))
- the storage options (see [menu Test → command Settings](#))
- the controller parameters
(see [menu Machine → command Controller parameters](#) or [menu Test → command Settings](#))
- the test specific input values (see [menu Test → command Settings](#))
- the configuration of the results (see [menu Test → command Settings](#))
- the configuration of the statistic parameters (see [menu Test → command Parameters](#))
- the configuration of the user-defined quantities (see [menu Test → command USER1...USER8](#))
- the configuration of the measurement diagram
(see [menu Diagram → command Axes](#) or [context menu → Diagram axes](#))
- the configuration of the measured value display
([menu View → command Measured value display](#) or [context menu → Measured value display](#))
- the configuration of the test protocols (see [menu File → command Page Setup](#))

You have the possibility to store a set of initial values into a setup value file (extension *.svl) and recall it later. Once you have adapted a set of parameters to your test requests, you can re-use them as often as you want. The actual initial values are shown in the [document window Initial values \(SVL\)](#) (see chapter [Documents and Document Windows](#)) and can be printed, also. The initial values will be stored in measurement value files (extension *.mvl) and result files (extension *.trs), in order to be able to reconstruct these test conditions later on.

1.7 Documents and Document Windows

A document in general is a summary of all data of the same type. **The software** works with 3 different document types: Initial values, measured values and test results.

The data of a document can be stored into a file and can be recalled later on (see chapter [Data Storage](#)).

On the screen, the data of a document will be shown in the associated document window.

Document Window Initial Values **SVL**

The initial values combine all kinds of settings needed to define your test (test course as well as calculation of the results) (see chapter [Initial values](#)).

Document Window Measurement Diagram **MVL**

Document Window Measured Value Display **DSP**

The measured values do contain the initial values and the progress of the measured values recorded during the test. The progresses are shown in the [document windows Measurement Diagram](#) and [Measured Value Display](#).

Document Window Test Results and Statistics **TSR**

The test results do contain the initial values and the test results of a test series (but not the test courses). A statistics for these results will be calculated. The results and the statistics are shown in the [document window Test Results and Statistics](#).

(For more document windows, see chapter [Main Frame Window](#)).

The commands of the menus in the menu row always do relate to the active document window. So, before opening a menu and initiating a command, you must activate the correct window by clicking on it.

Example: If you want to print the measurement diagram, you will have to click on the [document window Measurement Diagram](#) and then open the [menu file](#) and click [command Print](#).

As mentioned earlier, the commands do relate to the document windows. As a result, some of the menu commands will not be available (written in grey) for some of the document windows. You can see in the menus which commands will be available.

1.8 Data Storage

The data of a document can be stored in a file (either on the hard disk or on an external disk) and recalled later on.

- The **initial values** are stored as initial values files (extension *.svl = „setup values“). After you pre-defined the test settings according to your needs, you can store them into an initial value file. This way, you have the possibility to recall them for later tests and do not have to re-enter them every time. For more information, which settings do belong to the initial values, see chapter [Initial Values](#).

If a test has already been carried out or a measurement value file has been loaded before an initial value file, the test results will be recalculated using the initial values and the actual data will be shown on the screen.

- The **measurement values** are stored as measurement value files (extension *.mvl = „measured values“). During a test course, the recorded results will be stored into the working memory (RAM) of the PC. After test end, it is possible to store them into a measurement value file. The initial values (meaning the values with which the test was run) will be stored into this measurement value file, also, in order to reconstruct the test conditions later on. Choose the quantities you want to be stored ([menu Test → command Settings → dialog Store data](#)) either before or after the test. After the test is finished, store the measurement value ([symbol Save](#) or [menu File → command Save – Measurement values](#)) into a measurement value file.



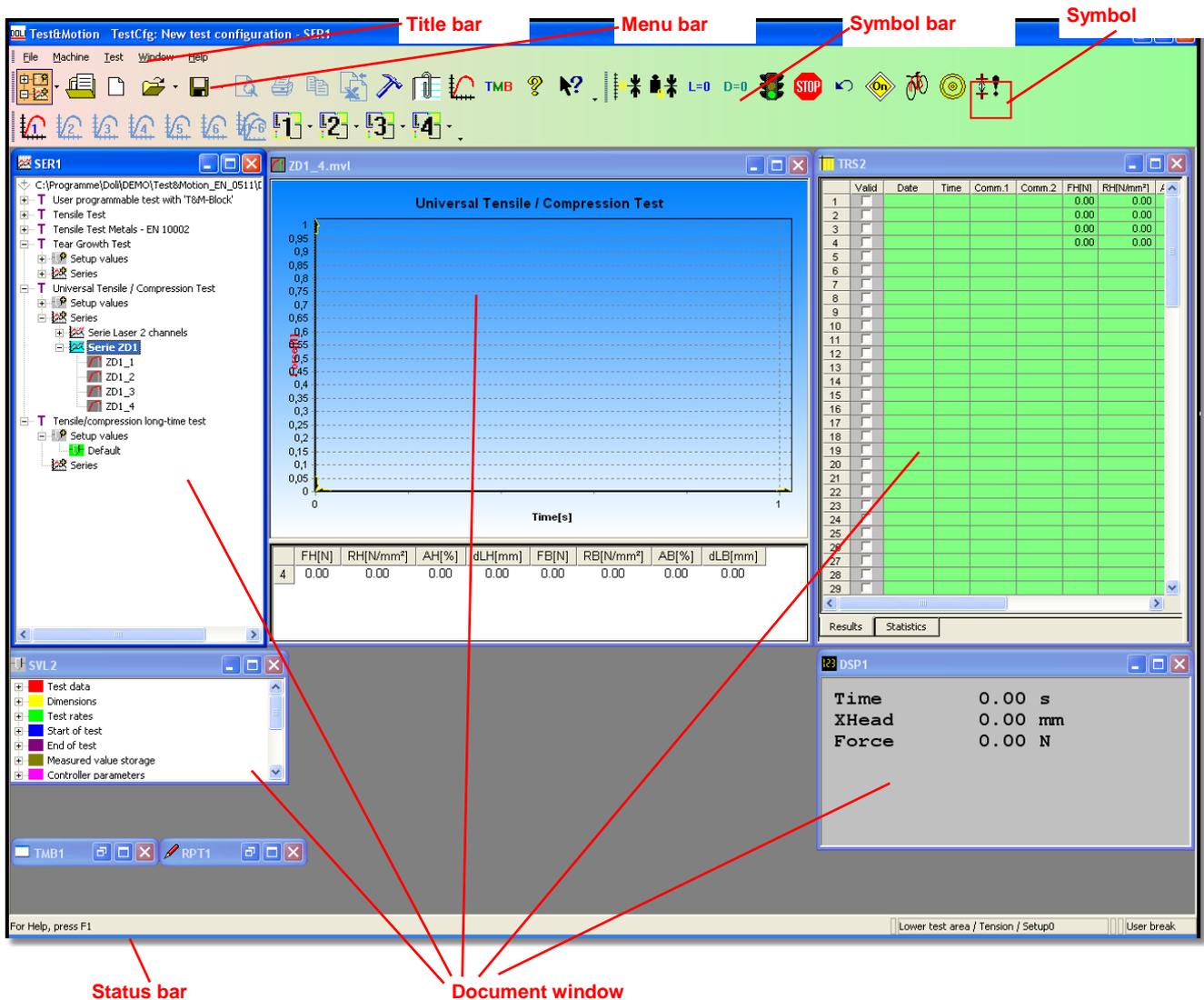
Note: If you have activated the automatic saving for measurement value files ([menu Test → command Settings – dialog store data to](#)), the measurement value file will be automatically stored into the path and under the name defined in this dialog. In addition to this, the series mode is activated, viz. you can test an entire series with the defined test conditions and The software will automatically save the measurement values under the defined path.

- The **test results** are stored as test result files (extension *.trs = „test results“). During a course of a test series, the results will be stored into the operating store of the PC and can be stored into a test result file if necessary. The initial values (meaning the values with which the test has been run) will be stored into this measurement value file, also, in order to reconstruct the test conditions later on. Store the results using [symbol Save](#) or [menu File → command Save – Statistics](#) into a result file.

All files generated with **The software** will get a remark containing the test regulation the tests have been conducted with. If you try to load a file with a different regulation than the current one, the software will ask you, whether you want to switch to the needed test regulation (“Yes”: change will happen, “No”: no change, file will not be loaded).

2 User Interface

2.1 Main frame window



The main frame window of the Software consists of:

- Title bar
- Menu bar
- Symbol bar
- Status bar

The main frame window provides the framework for the document windows, in which the data of the specific documents are displayed.

- Document window Measurement Diagram MVL
- Document window Measured Value Display DSP
- Document window Test Results and Statistics TRS
- Document window Initial Values SVL
- Document window Administration of Series SER

- Document window TMB Commands TMB (T&M_Blockprogramming-Funktion, e.g. for user defined dimensions)
- Document window Report Data RPT

By the means of a right mouse click in the specific window, a context menu will open. Here you will find further functions for this window: you can – amongst others – design the windows, configure the display of the measurement value, import, copy or export data, or activate the measurement value monitoring system. Further on, it is possible to store several window positions in order to permanently save the sizes and positions of the single windows (see chapter [Configure Document Windows](#)).

TIPP Tip: By clicking in the document windows you can activate them. The frame and the title bar of an activated window have a darker colour.

2.1.1 Title bar of the main frame window

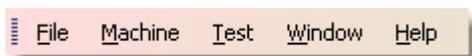
The title bar stretches across the upper border of a window. The main frame windows as well as the document windows have a title bar. In the title bar of the main frame window the names for the application and the active document will show up. In the title bar of the document window the name of the associate document appears. In order to move the window the title bar can be drawn.

TIPP Tip: Dialog fields may be moved by drawing the title bar, also.

A title bar can include the following elements:

- Systems menu field for the application (main frame menu)
- Systems menu field of the document window
- Symbol for maximise
- Symbol for minimise
- Symbol for recover
- Symbol for close
- Application name
- Document name

2.1.2 Menu bar of the main frame window



With a mouse click on one of the entries, you get information about the commands of the respective menu.

2.1.3 Status bar



The status bar stretches across the lower border of the main frame window. With [menu Window](#) → [command Status bar](#) you can show or remove the status bar.

While you are moving through the menus with the UP/DOWN keys or the mouse, the left part of the status bar will describe the functions of the menu entries in short. This applies when you are moving the mouse pointer over a symbol of the symbols bar, also.

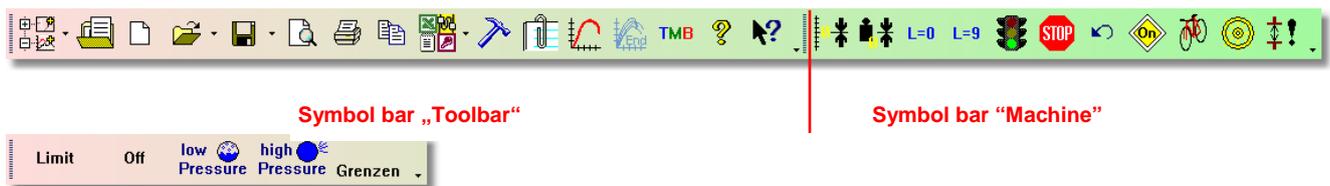
In the right part you will find the notifications for

- the selected load transducer
- the selected strain transducer
- the reasons for the abort of the last test

2.1.4 Symbol bars of the main frame menu

The symbol bar is shown horizontally beneath the menu bar. Via mouse clicks it provides a fast access for often used commands. The standard symbol bar can be supplemented by several further symbol bars, which combine certain functions, as shown below e.g. the symbol bar machine.

With a right mouse click and the [command Customize](#) you can add or delete symbols to the bars. In order to fade in or fade out the symbol bars, you can activate the [command symbol bar](#) (here: tool bar) in the [menu Window](#).

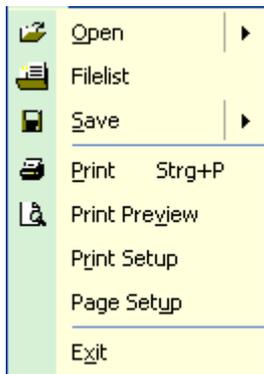


Symbol bar “Hydraulic”

- Opens the [document window administration of series \(SER\)](#)
- Opens the file list (see [menu File → command file list](#)).
- Deletes the active document and re-sets it to the standard values.
- Opens an existing document (see [menu File → command Open](#)).
- Saves the active document under its current file name (see [menu File → command Save](#)).
- Shows the active document on the monitor, as it is going to look like, when it is printed (see [menu File → command Print Preview](#)).
- Prints the active document (see [menu File → command Print](#)).
- Copies data of the active document into the clip board.
- Opens the [dialog Export](#). Here the data for exporting can be defined.
- Opens the [dialog Test settings](#). Here you can find the selection possibilities for the configuration of the tests (see [menu Test → command Settings](#)).
- Opens the [dialog Enter comments](#)
- Opens the [dialog Diagram](#) for configuration of the diagram axes (see [menu Test → command Axes](#)).
- Ends a test series.
- Opens the [document window TMB commands \(TMB\)](#) - **T&M**-Blockprogramming-Function to define userdefined dimensions
- Shows the index of the help topics (see [menu Help → command Help Topics](#)).

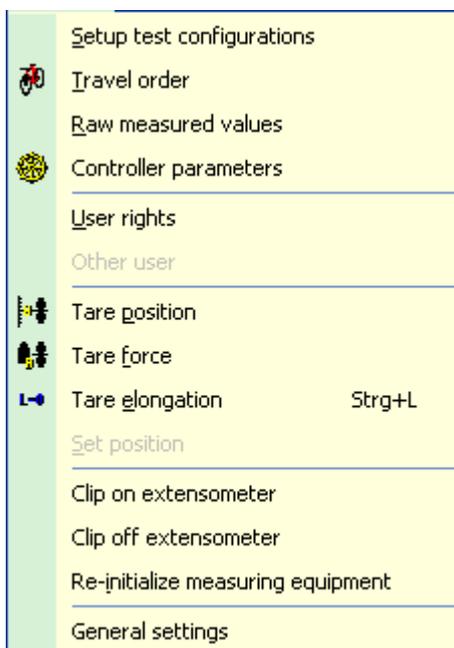
-  Activates the Context Help Function (see [menu Help → command Context help](#)).
-  Tares the Crosshead position (see [menu Machine → command Tare path](#)).
-  Tares the load (see [menu Machine → command Tare load](#)).
-  Tares the elongation (see [menu Machine → command Tare elongation](#)).
-  Tares the thickness sensor.
-  Starts a test (see [menu Test → command Start](#)).
-  Ends the running test (see [menu Test → command Stop](#)).
-  Moves the Crosshead, after a test, back to the starting position (see [menu Test → command Crosshead return](#)).
-  The Drive of the machine is switched on.
-  Opens the [dialog Travel order](#) for defining and controlling.
-  Opens the [dialog Controller parameter online](#) (see [menu Machine → command Controller parameters](#)).
-  Opens the [dialog Move crosshead to the specific clamping length](#) to set the free clamping length.
-  Opens the [dialog Observation meas. channel](#) for definition and observation of the limits for several measuring channels via the EDC.
-  Ends the observation of the measuring channels.
-  Switches the hydraulics of the instrument into the low-pressure-mode (e.g. for the setup mode, not possible with all instruments)
-  Switches the hydraulics of the instrument into the high-pressure-mode (e.g. necessary for the test mode)
-  Opens the [dialog Start observation meas. Val.](#) For the observation of the limits (having been defined via [symbol Limit](#)).

2.2 Explanation for the menus of the main frame window



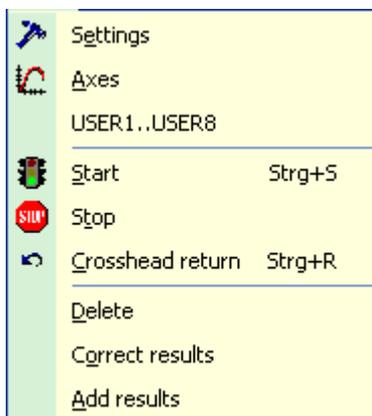
Commands of the menu **File**

Open	Opens an existing document.
File list	Shows the dialog file list , for selection of existing files.
Save	Saves an open document.
Print	Prints the active document.
Print preview	Shows the active document on the display, as it will look when it is printed.
Print Setup	Chooses a printer and a printer interface.
Page Setup	Configures the output for the active document.
Exit	Ends the Software.



Commands of the menu **Machine**

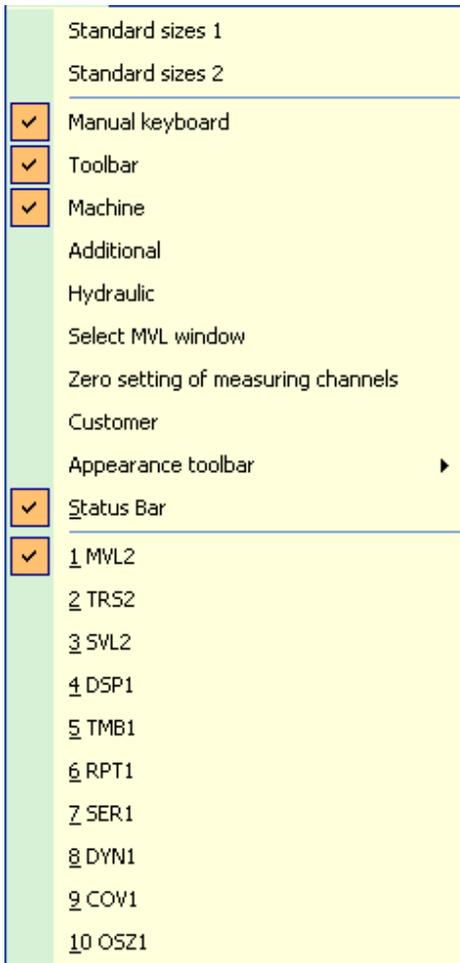
Setup test configurations	Provides the selection possibilities for the machine setting or a test configuration.
Travel order	For manual movement of the x-head to defined positions.
Raw measured values	Indicates the raw measured values, as they are supplied by the sub-system.
Controller parameters	Allows the definition of the parameters for the specific controllers.
User rights	Here different user rights can be assigned.
Other user	Selection of another user with different rights.
Tare path	Tare the crosshead position.
Tare Load	Tare the load.
Tare elongation	Tares the elongation.
Set position	
Clip on Extensometer	Grabs the strain transducer (only for automatic strain transducers).
Clip off Extensometer	Releases the strain transducer (only for automatic strain transducers).
Re-initialize measuring equipment	The measuring equipment is re-initialised.
General settings	Provides selections for general settings, such as input of licenses, etc.



Commands of the menu **Test**

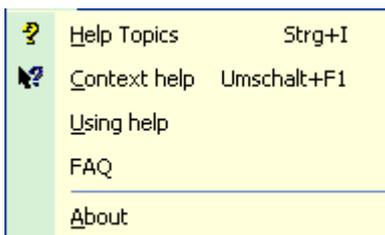
Settings	Provides selection possibilities to configure the test.
Axes	Dialog for setting the graph, specifying the axes and the dimensions to be presented.
USER1...USER8	Provides the selection possibilities to configure the user-defined dimensions.
Start	Starts a test.
Stop	Ends a running test.
Crosshead return	Move the crosshead back to the start position after the test.
Delete	Deletes the last test from the results table.
Correct results	Overwrites the results of the last test in the result table with the currently calculated test results.
Add results	Adds the current test results as a new test to the

results table.



Commands of the menu **Windows**

Standard sizes 1	The display of the document window changes according to the definition.
Standard sizes 2	The display of the document window changes according to the definition.
Manual keyboard	Manual keyboard is faded in or out.
Toolbar	The symbol bar is faded in or out.
Machine	The symbol bar 'Machine' is faded in or out.
Additional	The symbol bar 'Additional' is faded in or out.
Hydraulic	The symbol bar 'Hydraulic' is faded in or out.
Select MVL window	The symbol bar 'MVL-Window' is faded in or out.
Zero setting of measuring channels	The toolbar 'Zero setting of measuring channels' is faded in or out.
Customer	The toolbar 'customer' is faded in or out.
Appearance toolbar	Changes the appearance of the symbols bar as well as the dialogs and document windows.
Status bar	The status bar is faded in or out.
MVL1...	Shows a list of the open document windows.



Commands of the menu **Help**

Help topics	Shows the index of the help topics.
Context help	Activates the context help function.
Using help	Provides a general introduction of how to use the Windows-Help-System.
FAQ	A list of often asked questions.
About	Shows the Version- and Copyright-Reference of this application.

3 Test Performance – Short Overview

The short overview ought to give you a fast review of the test performances. You will find more specifics for each setting and command in chapter [Test preparations](#) and the following chapters.

3.1 Short overview: Test preparations

Perform the following steps for test preparations:



1. Switch on your testing instrument and the Control-PC.
2. Install the WIBU-KEY (Dongle) and the software, if not already done.
3. Start Windows and afterwards the software.

3.1.1 Short overview: Set-up the instrument

Normally, you carry out these steps only once. They will have to be repeated only, if the configuration of the instrument is changed or if you want to use several different test configurations.



1. Open [Menu Machine](#) → [command Setup test configurations](#) → [password request](#) (enter DOLI or doli) → [dialog List of test configurations](#).
2. Create a new test configuration:
Click the [function field Define new ones](#) → a new test configuration is displayed.
Choose with a mouse click and afterwards click the [function field Change](#) → the [dialog Test configuration 'New test configuration'](#) is displayed.
By clicking on the respective items in the list shown on the left you can call up dialog windows, in order to perform the corresponding settings.
3. [Dialog Measuring equipment](#)
Here you choose the EDC, with which your testing instrument is equipped, and all associated settings.
4. [Dialog Sensors](#)
Here you define the sensors, which you use on the testing instrument.
5. [Dialog Digipoti](#)
Here you define effects, which using a Digipoti (EDC/RMC) will have on the testing instrument.
6. [Dialog Machine](#)
Here you define the properties of the testing instrument, which you want to use, such as e.g. test area, load cell, extensometer, clamping device, etc.
7. [Dialog Software](#)
Here you define the dimensions, position mode and miscellaneous display options.
8. [Dialog Serial Sensors](#)
Here you enter the parameters of the serial sensors, which you want to use with the testing instrument.
9. [Dialog Start/Stop Test](#)
Here you define, how Start and Stop of the test take place.
10. [Dialog Alarm detection](#)
Here you assign at which parameter an alarm shall be carried out.
11. Switch on the drive of the testing instrument: [F3-Key](#) at the EDC (EDC60/120 and EDC220/222/580) or [ON-Key](#) on the EDC (EDC100) (see EDC-User-Manual) or [Symbol Drive on](#) in the symbol bar.

3.1.2 Short overview: Clamping the sample



1. Define the clamping length for the clamping device ([symbol Gauge length/Set distance between plates](#) → [Dialog Move crosshead to specific clamping length](#) opens. When the clamping length is reached, this corresponds to position 0. Normally, you will have to carry out this setting only once. However, in case of a change of the clamping length occurs from one test to the other (e.g. different sample length) or using another clamping device, you will have to carry out this setting again.
2. Move the crosshead to the required clamping length. If this did not happen with point 1 already, you can use one of the following commands to do that:
Manual travel order (Up/Down-keys and Digipoti at the EDC)

Via the virtual manual keyboard

Travel order (menu [Machine](#) → [Dialog Travel order](#)).

[Command Tare path](#) (menu [Machine](#)) or [symbol Crosshead position = 0](#) (symbol bar).

[Command Crosshead return](#) (menu [Test](#)) or [symbol Crosshead return](#) (symbol bar).

3. Clamp the sample into the clamping device of the instrument.
If the clamping device has automatic clamps, you can open and close them either using the manual keyboard or via the related keys at the RMCs or the EDC.

3.1.3 Short overview: Configuring the test

After the start of the software or after selecting a test regulation the following settings already have meaningful standard values. Therefore, you only have to enter such values being special for your kind of test. It is possible to reload the following settings from an initial value file, a measurement value file or a test result file, too.

-  1. [Menu Test](#) → [command Settings](#) → [dialog Test settings](#).
By clicking on the respective items in the list shown on the left, you can call up dialog windows in order to perform the corresponding settings.
2. [Dialog Test configuration](#)
Here you select the desired test configurations.
3. [Dialog Test](#)
Here you select the desired test regulation.
4. [Dialog Input values](#)
Here you enter test specific parameters such as, e.g. certain reference values, etc.
5. [Dialog Test results](#)
Here you select the results, which ought to be calculated.
6. [Dialog Statistic parameter](#)
Here you select the statistic values, which shall be calculated.
7. [Dialog Test data](#)
Here you enter general data for test identification, such as e.g. material data, batch number, tester, etc.
8. [Dialog Dimensions](#)
Here you define the form and the dimensions of the sample.
9. [Dialog Test procedure, speeds](#)
Here you enter the test speed, switch points and further values, which define the work flow.
10. [Dialog End of test](#)
Here you define the end- or break criteria, which will end the test.
11. [Dialog Store data](#)
Here you define which quantities ought to be saved.
12. [Dialog Store data to](#)
Here you define, where and under what name the data is supposed to be saved.
13. [Dialog Controller](#)
Here you define the values for position-, load- and strain control.
14. [Dialog Deflection of test arrangements](#)
Here you have several possibilities to compensate the deflection of the instrument (relevant for testing very hard samples with high loads such as concrete, only).
15. [Dialog Operations at test end](#)
Here you assign what is supposed to happen at the end of the test, e.g. acoustic indication, intermediate storage of the results, sample measurement, etc.
16. [Dialog User interface](#)
Here you can set, how the user interface is supposed to change after the [document window Initial values \(SVL\)](#) was loaded.
17. [Dialog Check nominal data](#)
Here you define the control and evaluation of the nominal values.

3.2 Short overview: Test performance



1. Start a test via [menu Test → command Start](#) or with the [symbol Start](#) (traffic lights) in the symbol bar. As an alternative, you can use the [function field Start](#) in the [window Dynamic drive commands \(DYN\)](#).

Now, the system will perform the test run as defined by the test regulations and user entries. At the same time the measured dimensions are shown in the [window Measured value display \(DSP\)](#) as numerical value and in the [window Measurement diagram \(MVL\)](#) graphically.

Normally, the test is ended, when one of the defined end- or break criteria has been achieved.

You are able to cut short a running test at anytime with [menu Test → command Stop](#) or with the [symbol Stop](#) in the symbol bar.

3.3 Short overview: Test evaluations

After the end of the test, you will have the following possibilities for evaluation:



1. At the end of the test, the results will be calculated and displayed in the lower section of the [document window Measurement diagram \(MVL\)](#).
2. Depending on the test regulation, several results in the [MVL-window](#) will be indicated in colour.
3. The results will be inserted into the results list and the statistics will be calculated.
4. If you do not want to keep the data of the last test, then you can delete it with the following commands: [menu Test → command Delete](#) or [document window Test results and statistics \(TRS\) → context menu \(right mouse key\) → command Cancel](#)).
5. You can choose the dimensions which are supposed to be presented in the measurement value graph with [menu Test → command Axes](#). Use the Zoom-function to enlarge sections of the diagram. Therefore, push down the left mouse button anywhere in the graph, and pull the mouse from the upper left to the lower right (mouse button stays pushed) in the diagram, and then release the mouse button → the selected section is displayed aggrandised. This procedure can be applied to several times in a row. To go back to normal display, pull the mouse (left mouse button pushed) from the lower right to the upper left.
6. You can adjust the graphic section (place the mouse cursor in the graphic click the right mouse button, keep it pushed and pull the mouse).
7. You have the possibility to change several test settings even after the test. This will cause a re-calculation of the results with the new settings ([menu Test → command Settings](#)).
8. You can store the data for reloading them later on (see [menu File → command Save](#)).
9. You can print a testing log for the last test or for the running test series ([menu File → commands Page Setup](#) and [Print Setup](#)).

4 Installation of the WIBU-KEYs (Dongle) and the Software

Before you can install and work with the Software you have to install the provided Dongle (WIBU-KEY).

4.1 WIBU-KEY



1. Plug in the WIBU-KEY to the parallel or the USB-Interface of your computer.
2. Turn on your computer and start WINDOWS.
3. This is how you install the WIBU-KEY Software:
Place the provided CD into the drive and activate the file WkRt-Int.exe in the path WIBU 4.x → a dialog will open, which will lead you through the installation.
4. Follow the instructions, until the dialog announces the successful installation of the WIBU-KEY.
5. Close the dialog and remove the CD from the drive.

4.2 Software



1. Place the **Software** CD in the drive of your computer and start the file SETUP.EXE (Path of your drive) → A dialog will open, which will lead you through the installation.
2. Follow the instructions, until the dialog announces the successful installation of the Software.
3. Close the dialog and remove the CD from the drive.
4. Start the Software (double click on the program button on your desktop or via [menu Start → Programs → Test&Motion](#)).

5 Test preparation

5.1 Machine setup

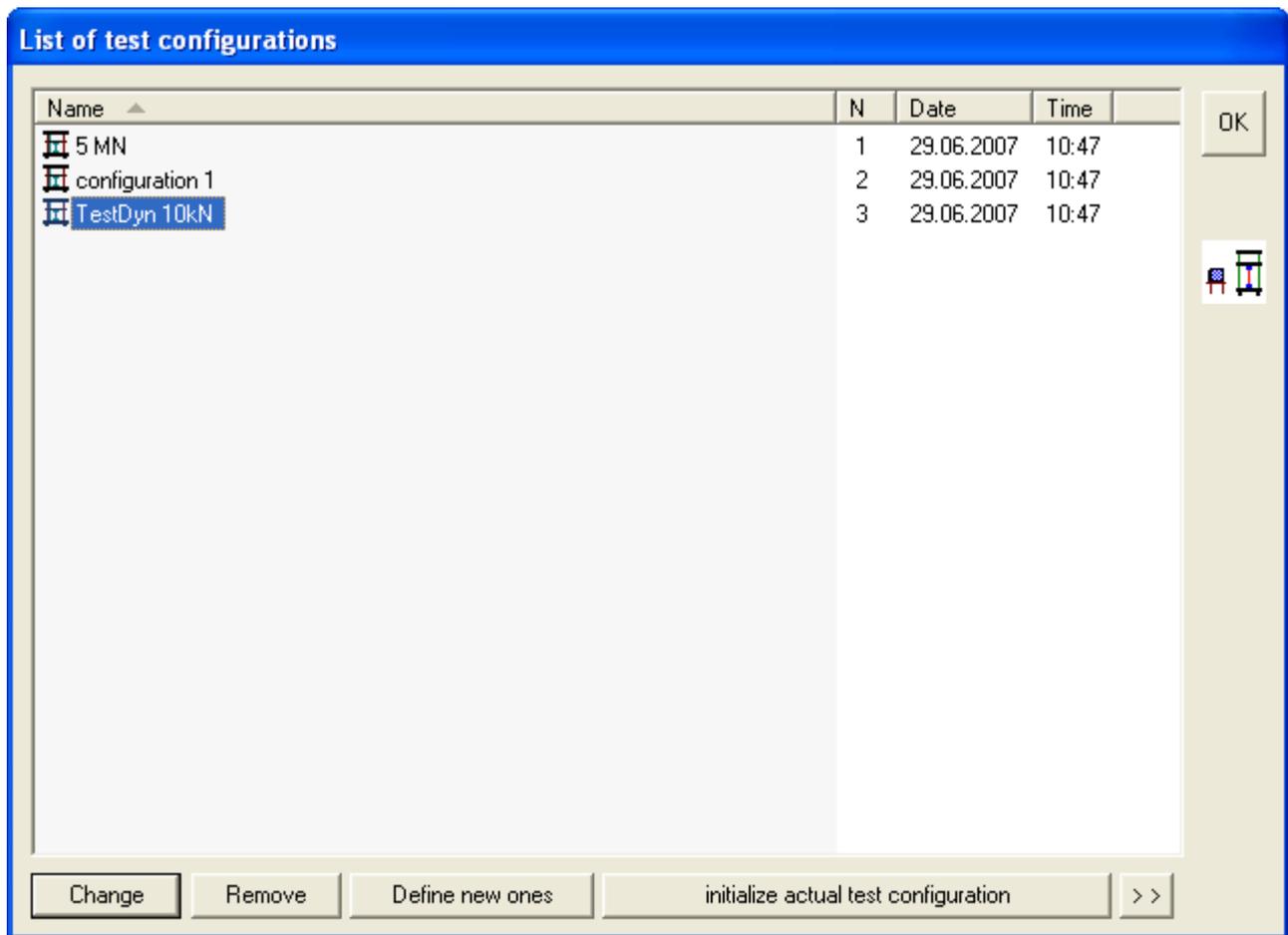
5.1.1 Define test configurations

The Software was developed to control material testing instruments. It supports several measuring equipments and if selected is able to work with several of them simultaneously.

Therefore, you have to define a separate test configuration for each machine to be controlled:



1. **Menu Machine** → **command Setup test configurations** → **Password request**, Password: „DOLI“ or „doli“ → **dialog List of test configurations**.



This dialog shows all test configurations. It shows the already existing ones as well as the ones you will be creating. To change a name, slowly click on it twice. If you click at a name once, you can highlight the configuration. Each action, activated via the function fields, is applied to the highlighted configuration.

You can: change (double click or **function field Change**), delete (**function field Remove**), define new (**function field Define new ones**) or install (**function field initialize current test configuration**) a test configuration.

The following chapters will show you, which settings you can conduct for the test configurations, e.g. you can determine with which measuring equipment the testing will be done (several equipments are possible), via which PC-Interface and with which parameters communication to the measuring equipment will be done, which sensors (serial ones, too) are connected, which test area is active. Additionally, you can deposit a picture of the test setup as well as a short description of the test run or a comment concerning the test.

All these inputs are stored under a name as configuration, which is loaded with a test parameter file (*.svl) later on.

Directly before the test is started, the software checks, if the selected test configuration is available, viz. are all necessary measurement channels and sensors available.

2. Click the **function field Change** → dialog **Test configuration** “New test configuration” appears.
3. By clicking on the respective items in the list shown on the left, you can call up dialog windows, in order to perform the corresponding set ups.



Tip: If you call up a dialog, its symbol will change in the list. This way you can catch by a glimpse, which data you already have configured.

5.1.1.1 Test configuration – Measuring Equipment

Here you can define the connected measuring equipment; it is possible that several different types of EDCs are active (see mark at the field active).

The screenshot shows the 'Test configuration 'TestDyn 10kN'' dialog box. On the left is a tree view with 'Measuring equipment' selected. The main panel is titled 'Measuring equipment' and contains the following fields:

- Measuring equipment:** A dropdown menu showing 'EDC120' and a checked 'active' checkbox.
- Machine name:** A text input field containing '5 MN'.
- Communication port:** Three radio buttons labeled 'COM', 'USB', and 'LAN'. The 'COM' radio is selected. To the right are three dropdown menus: 'COM2', 'Device - ID', and '00-02-3F-D4-05-56: Realtek RTL8139/810'.
- Baud rate:** A dropdown menu showing '115200'.
- Setup EDC:** A dropdown menu showing 'Setup 1'.
- Data transfer rate:** A text input field with '0' and a 'sec' label.
- Timer-Rate:** A text input field with '100' and a 'msec' label.

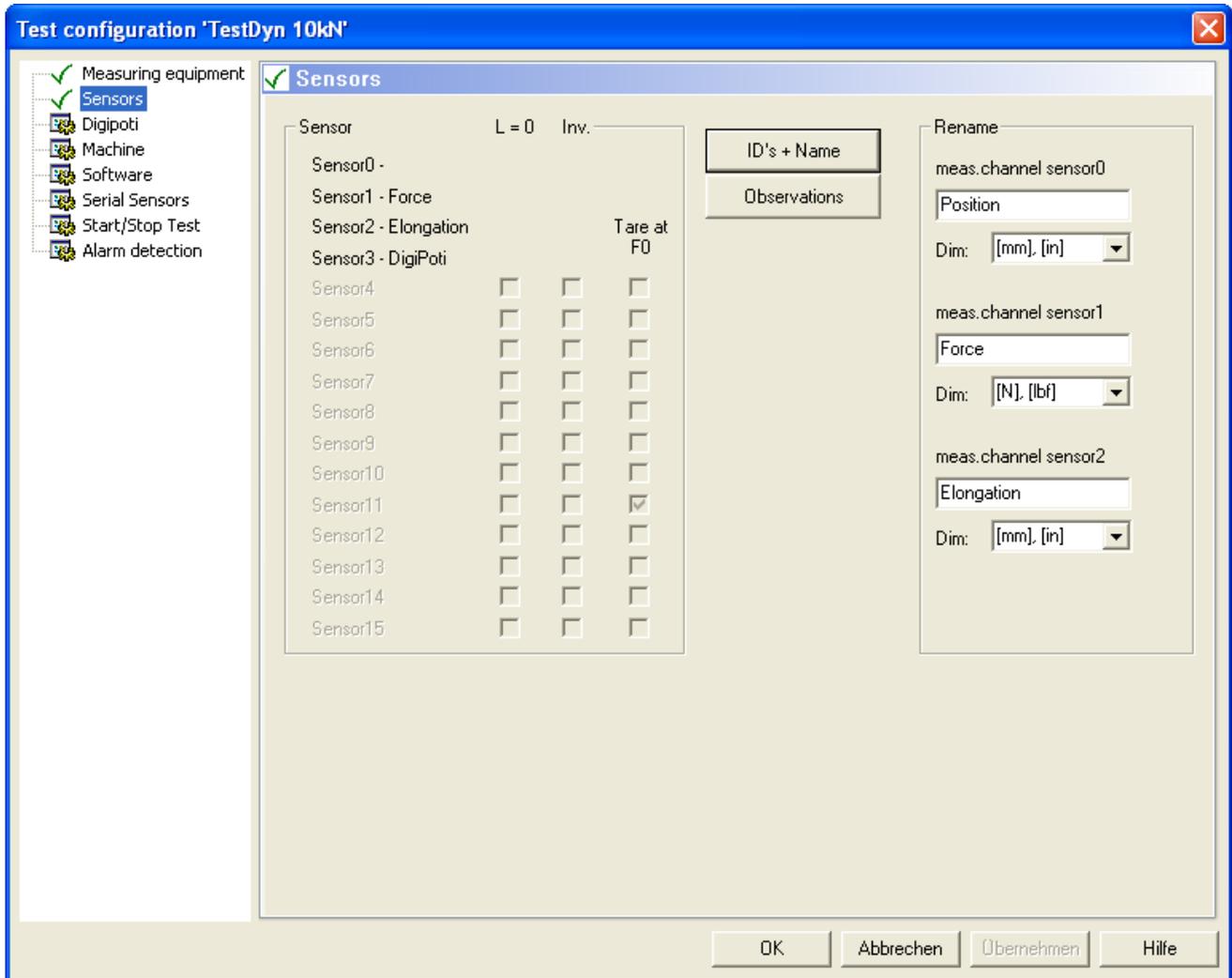
At the bottom of the dialog are four buttons: 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe'.



1. Choose the desired measuring equipment from the list; if necessary enter a machine name, choose the port with which the EDC will communicate and enter the baud rate, the number for the EDC-Setup (1 pre-defined) and the data transfer rate.

5.1.1.2 Test configuration - Sensors

Each sensor recognised by the measuring equipment, will be displayed here. Here you can: setup measuring channels for the sensors, assign dimensions and units, carry out additional settings or have up to two sensors kept monitored for limits.



IDs + Name:

1. Click the [function field IDs + Name](#) → the [dialog Sensors ID + Name](#) will open. Here you define the terms of the individual sensors, particularly, the standard measuring channels for position, load and (if available) strain (elongation).
2. The sensor 0 must always be the position sensor. Choose ID_S from the selection list and enter "XHd.Pos" as Name.
3. Normally, the load sensor is Sensor 1. Choose ID_F_STD from the selection list and enter any name, e.g. the nominal load of the load cell.
4. In case a strain sensor is available, define it as sensor 3.
5. If necessary, setup all possibly available sensors in the same manner.
6. If you have defined all sensors, click the [function field Write](#) in order to write the data of the sensors into the EEPROMs of the sensor plug.
7. Click the [function field Read](#), in order to check, if your data was written into the EEPROMs correctly.
8. Click [OK](#), in order to close the dialog.

You are back in the [dialog Sensors](#) again.

Columns L=0, Inv., Tare at F0:



9. Set a checkmark in the column L=0, if you want the [symbol elongation=0](#) (L=0) in the symbol bar to be active, i.e. then you will be able to tare a sensor using this symbol.
10. Set a checkmark in the column Inv., if you want the algebraic signs (in the [window Measured value display DSP](#)) for a sensor twisted/inverted.
11. Set a checkmark in the column Tare at F0, if you want to tare a sensor at F=0.

Function field Observation:

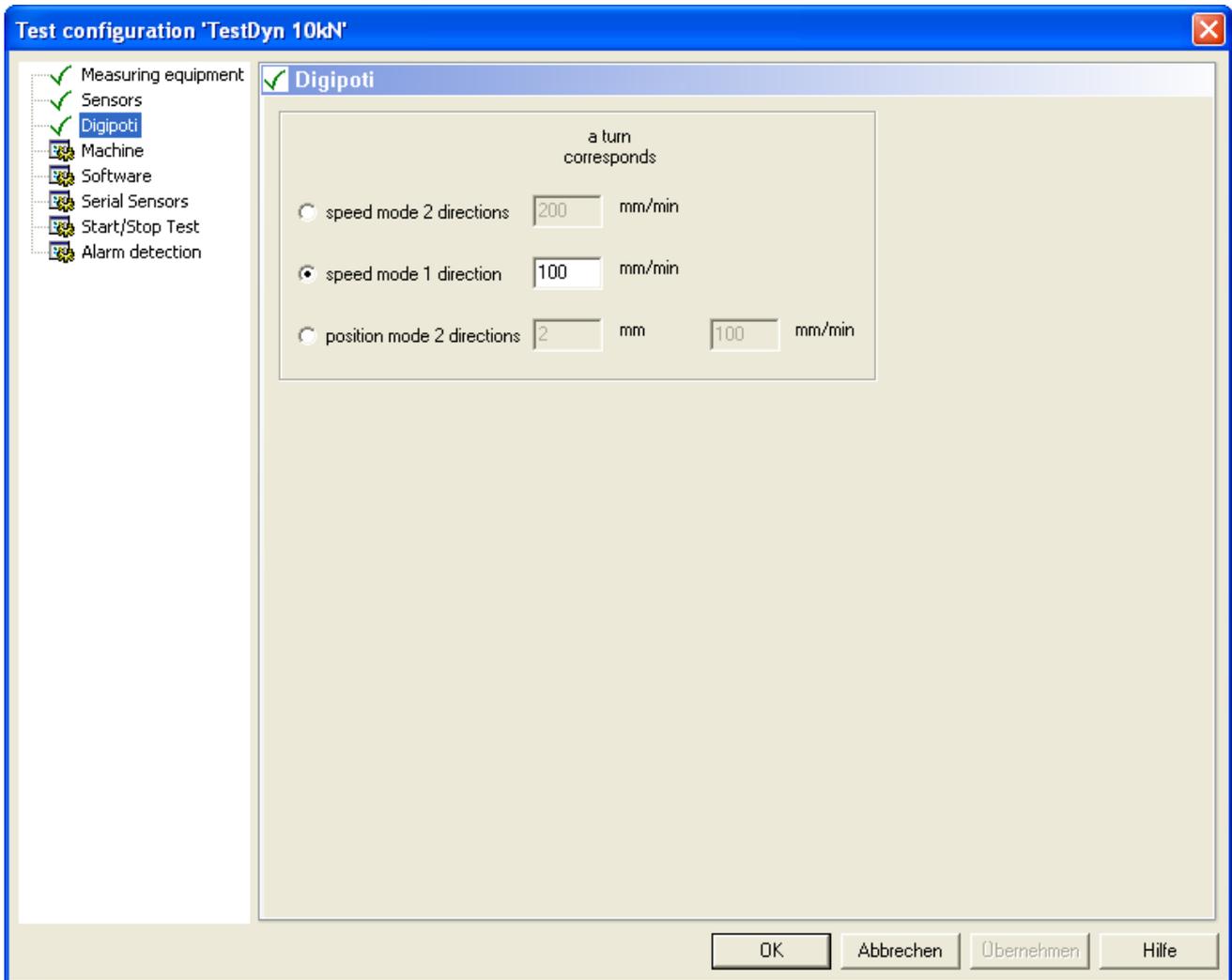
You can have - one or two measuring channels – kept monitored for exceeding limits. If the limits are exceeded, the Software will stop the crosshead and show a problem report on the display. If you want to use this function, perform the following steps:



12. Click the [function field observation](#) → the [dialog Observation meas. channel](#) will open.
13. Set a checkmark in the field Observation 1, find the corresponding sensor in the selection list and enter the limits.
14. If a second measuring channel is to be observed, proceed with Observation 2 as you did under the section Observation 1.
15. Click [OK](#) in order to close the dialog.

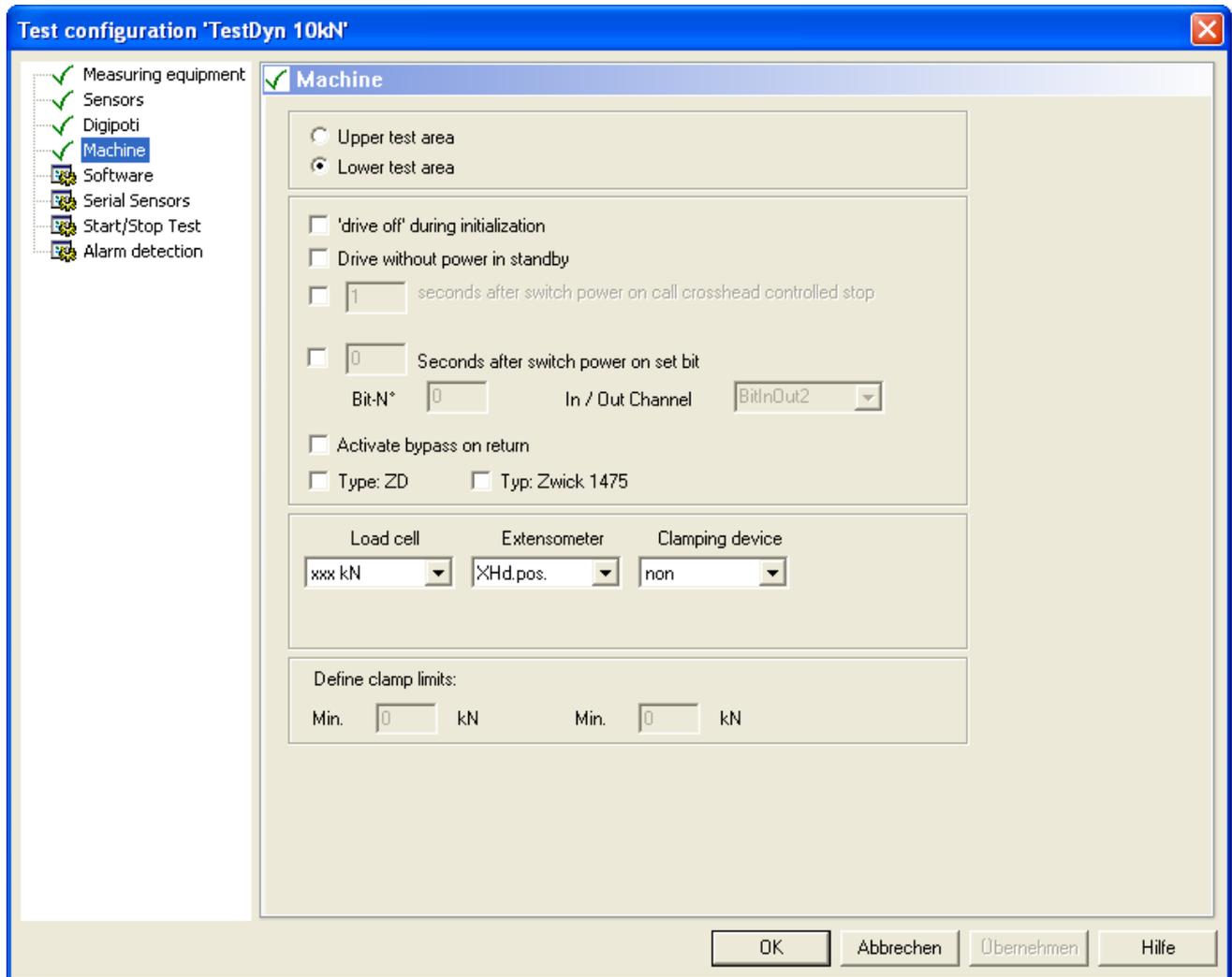
5.1.1.3 Test configuration - Digipoti

In the dialog **Digipoti**, values for the digipoti, which are available either at the EDC or at the RMC, are defined. Use the pre-defined values.



5.1.1.4 Test configuration - Machine

In the dialog [Machine](#) you can: define the test area, several machine reactions, choose sensors and clamping device and define clamp limits. Use the pre-defined values, if available in this dialog.



For setup of a new machine configuration do as described in the following points:



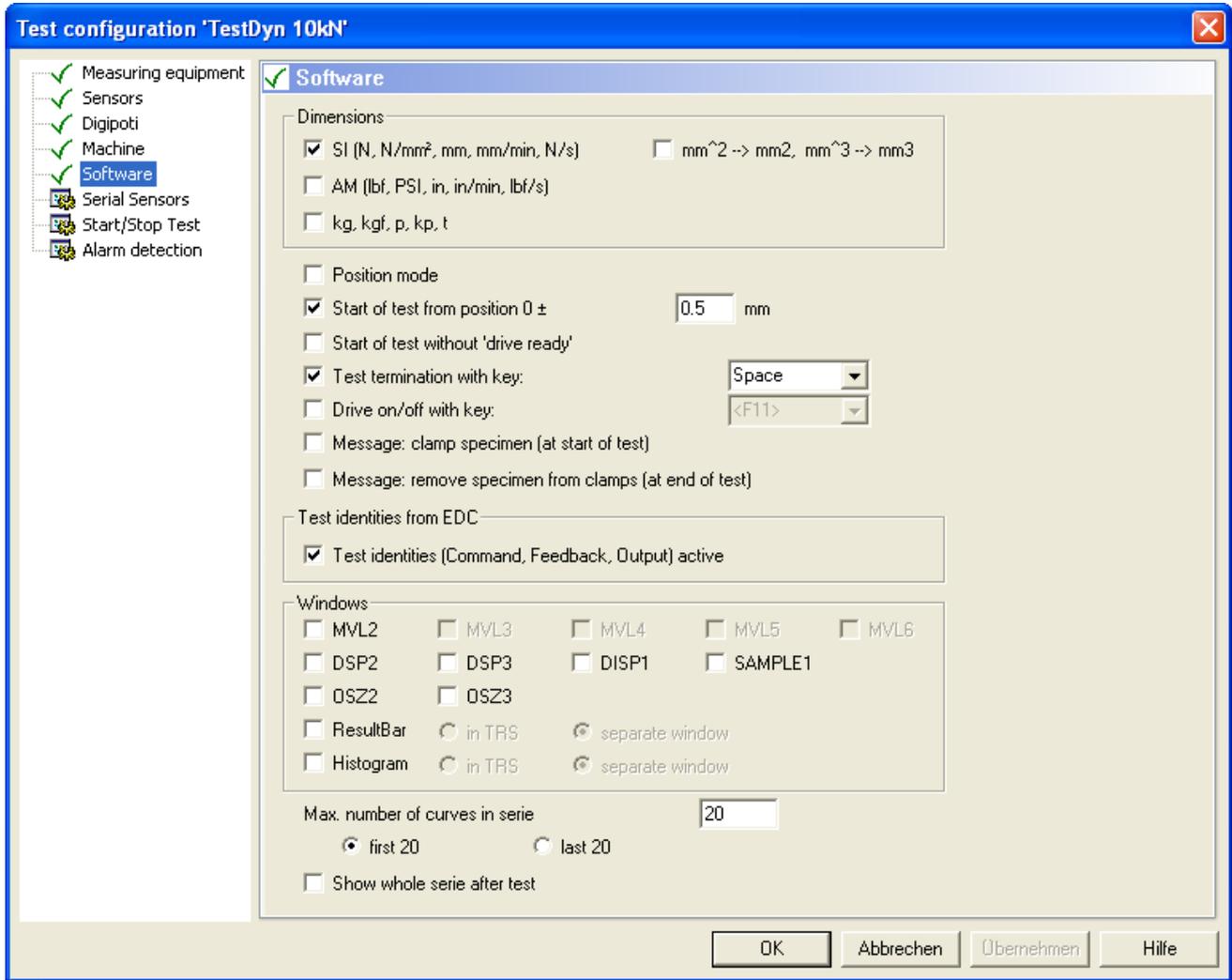
1. Define the test area, if your instrument has several available.
2. For hydraulic instruments it may be necessary, that you define the reactions of the instrument under the indicated conditions.
3. Select the active load cell, the extensometer and the clamping device.
4. Define the clamp limits:



Attention: A clamping device must not be opened, as long as a high load rests against it! Therefore, you can define a load range around the zero point, which allows a riskless opening of the clamping device.

5.1.1.5 Test configuration - Software

By means of different settings, you can adapt the display features of the Software according to your own wishes. However, we recommend, that for a start you will change the pre-defined values as little as possible.



Dimensions:

By default the display of the measuring values is shown in SI-Units, sometimes American units or [kg] or [kp] are needed, also.



1. If necessary, set different dimensions/units for the measuring values.

Position-Mode and following:



2. Define the crosshead position, from which the test is supposed to be started (as well as further Start- and termination modalities, if necessary):

Position-Mode: If you activate the position mode, the current crosshead position will be stored additionally as starting position of this test, when saving in an initial value file (*.svl). By loading the initial value file, the crosshead will be driven to the stored position, and therefore the same starting position is implemented. Before driving to the start position a dialog appears, in which you have to confirm the movement to starting position.

Start the test at Pos 0 ±: Usually, you return to the initial position of a test, after the test has been completed. This happens at test end or on command ([symbol Crosshead return](#) in the symbol bar or [menu](#)

Test → command [Crosshead return](#)) automatically. At the start of the following test the program will check, if the crosshead is close to the zero point (Crosshead position = 0). "Close to" means the crosshead position is $0 \pm$ inserted value.



Note: If you select this value to be very high, you practically can start off at any point. But than you are not reminded to drive back to the starting position, if this is not done automatically.

Test identities from the EDC:

With dynamic applications it is customary to display the actual- and the set dimension of the load or the position simultaneously. By means of this, the control parameters can be optimally set during the test via the [dialog Controller parameters](#) (menu [Machine](#), command [Controller parameters](#)). Therefore, the values "Command", "Feedback" and "Output" have to be send from the EDC to the PC.



3. Set a checkmark here, if you want to activate the function described above.



Note: If you do not need these dimensions, this feature ought to be deactivated in order to avoid unnecessary data flow in the interface. This will prevent that the data rate is affected in a negative way at a large amount of measuring channels.

Windows:



4. Set checkmarks at the windows to be displayed.

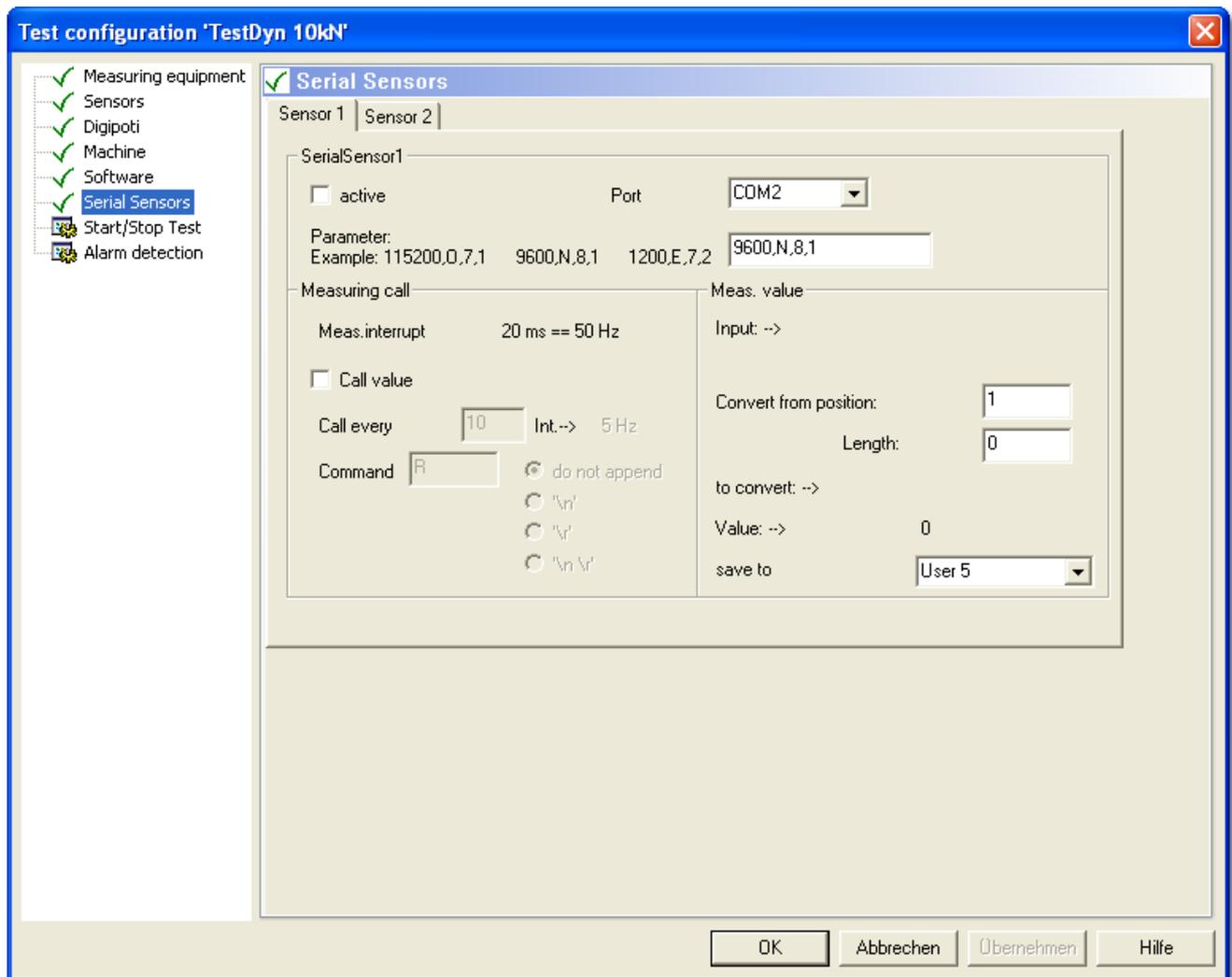
Max. number of curves and following:



5. Define how many curves and which curves should be displayed in the [MVL-window](#) for a serial test. Define whether the series should be displayed only after the end of the test.

5.1.1.6 Test configuration – Serial Sensors

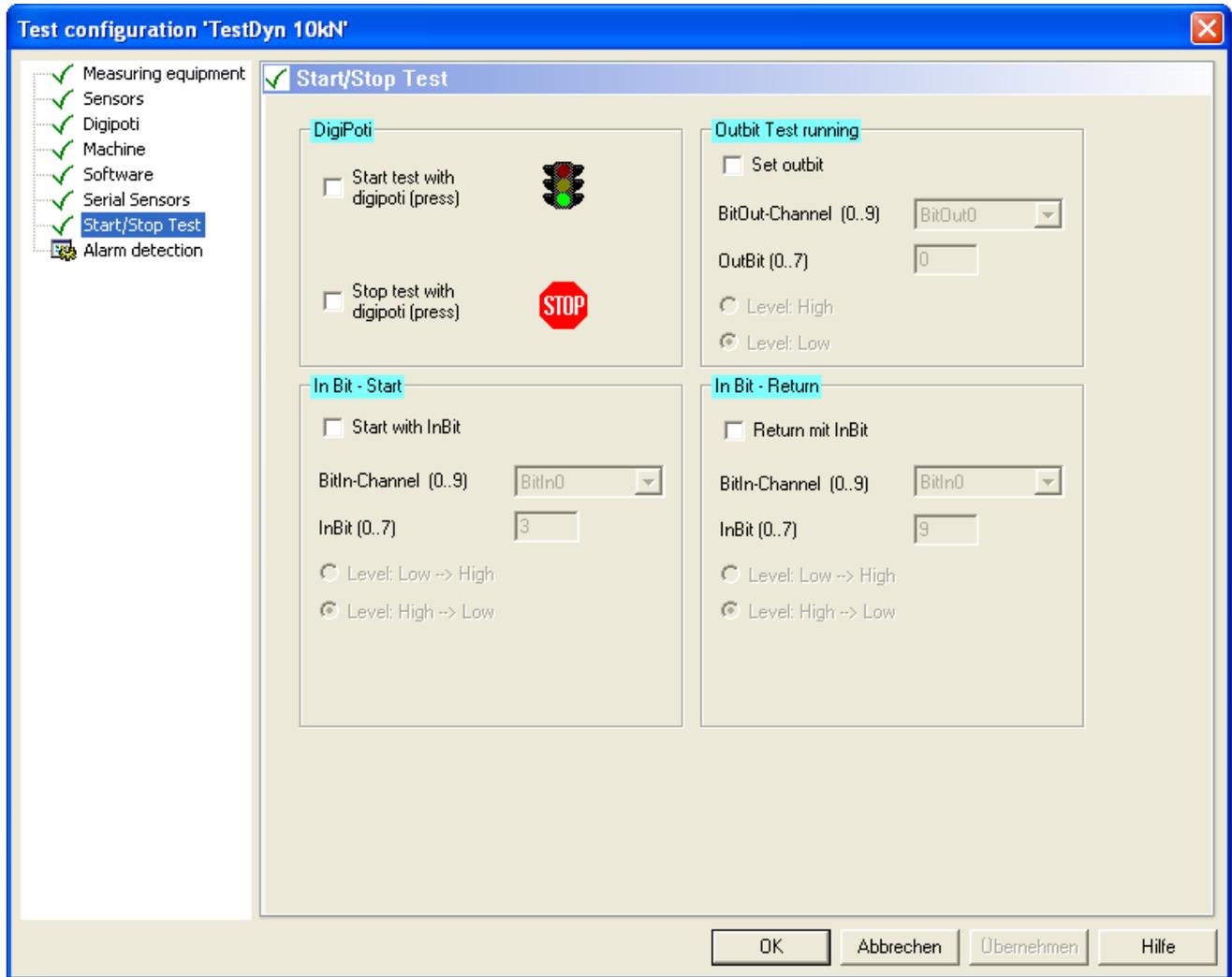
Normally, it is not necessary to use serial sensors.



1. In case you are using serial sensors, you can set the parameters for them here.

5.1.1.7 Test configuration – Start/Stop Test

Here you can define how a test is supposed to be started and stopped. Additionally, it is possible to define if at a certain event Hardware bits are supposed to be set or if Hardware bits are supposed to start a certain event.



With the **symbol Start (traffic light)** a test is started, with the **symbol Stop (Stop sign)** (tool bar) a test is stopped.



1. Set a checkmark in the corresponding field, if you want to define this option for the digipot, also.
2. Set a checkmark in the corresponding field, if you want to set bits for the individual operations and define the channels and levels for these bits.



Note: With these Hardware bits you can control external instruments or send signals to an external Software (e.g. at the start operation a green control lamp is activated via an output bit). Or you can control certain operations of the test via input bits (e.g. you can start the test via a connected switch key, which sets an input bit).

5.1.1.8 Test configuration – Alarm detection

Here you can set bits as alarm bits for errors or certain events. Normally this is not necessary.

Test configuration 'TestDyn 10kN'

Measuring equipment
Sensors
Digipoti
Machine
Software
Serial Sensors
Start/Stop Test
Alarm detection

Alarm detection

	BitIn-Channel(0..9)	InBit (0..7)	Level	Test
<input type="checkbox"/> Alarm1	BitIn0	4	<input type="radio"/> Low -> High <input checked="" type="radio"/> High -> Low	<input type="checkbox"/> at start of test <input type="checkbox"/> during test <input type="checkbox"/> always
Error Engine is burning				
<input type="checkbox"/> Alarm2	BitIn0	5	<input type="radio"/> Low -> High <input checked="" type="radio"/> High -> Low	<input type="checkbox"/> start of test <input type="checkbox"/> during test <input type="checkbox"/> always
Bit4				
<input type="checkbox"/> Alarm3	BitIn0	6	<input type="radio"/> Low -> High <input checked="" type="radio"/> High -> Low	<input type="checkbox"/> start of test <input type="checkbox"/> during test <input type="checkbox"/> always
Bit5				
<input type="checkbox"/> Alarm4	BitIn0	7	<input type="radio"/> Low -> High <input checked="" type="radio"/> High -> Low	<input type="checkbox"/> start of test <input type="checkbox"/> during test <input type="checkbox"/> always
Bit6				

OK Abbrechen Übernehmen Hilfe

Now, you have finished the definition of the new test configuration and all that is left for you to do is to initialize it:

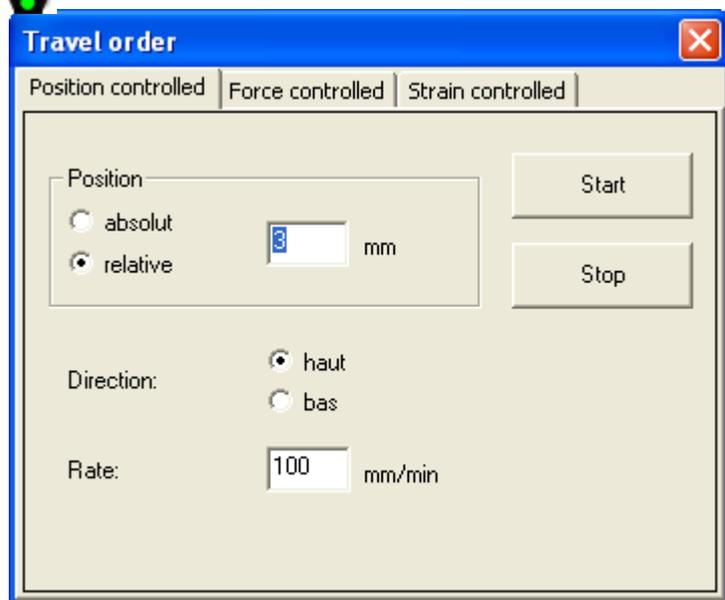
1. Click **OK**, to go back to the [dialog List of Test configuration](#) and click the [function field initialize actual](#) (meant is active) [test configuration](#).



Note: You have finished the definition of the test configurations now. Close the dialog with **OK**.

5.1.2 Travel order

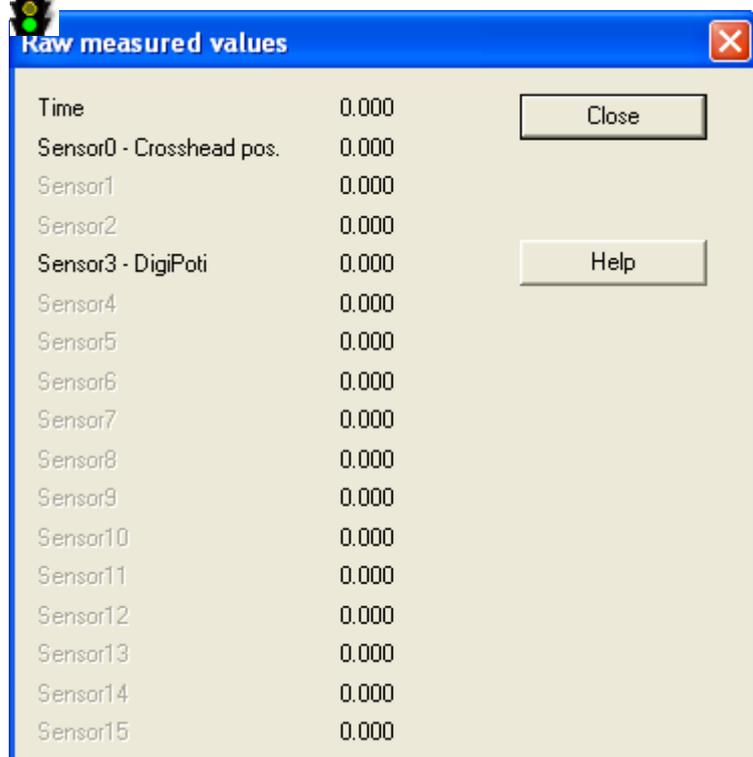
You can reach the dialog **Travel order** via menu **Machine** → command **Travel order** or Symbol 



The **command Travel Order** enables a manual drive of the instrument, according to the defined parameters. This for example is helpful for the set up of the instrument or while moving the grips to the free clamping length.

5.1.3 Raw measured values

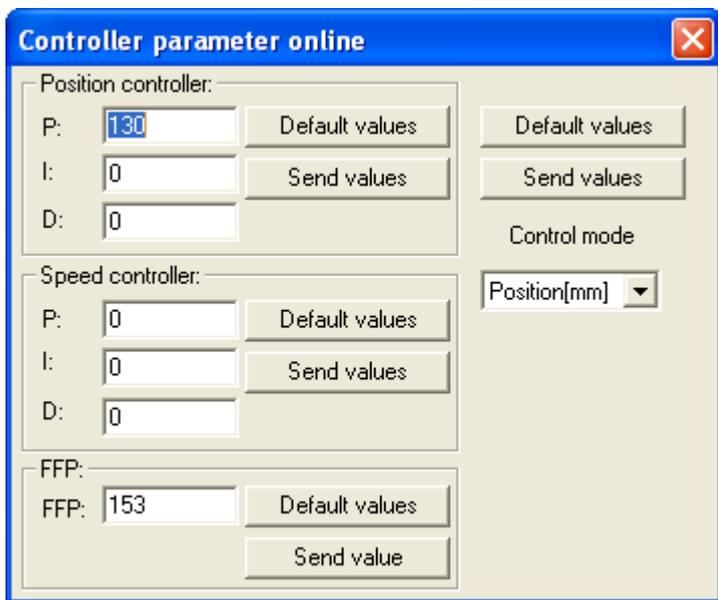
You can reach the dialog **Raw measured values** via **Menu Machine** → command **Raw measured values**



This dialog is used to assure that the EDC receives the signals of connected sensors. The received signals are displayed here. The measured values are not tared. They are shown just as they are detected by the EDC.

5.1.4 Controller parameter online

 can reach the dialog [Controller parameter online](#) via menu [Machine](#) → command [Controller parameter online](#) or symbol [Controller parameter](#) 



You use this dialog to optimise the control parameters. You can collect the parameters during the running test via the [function field Default values](#), change them here and send them back to the controller via the [function field Send values](#). This can be done individually with the left function fields or for all of them with the right field.

For each position-, load- and elongation controller, there is a set of parameters available and if possible for several machines (Controller axes, EDCs).

 **Note:** The values for the position controller depend on the testing instrument. After the instrument has been set up, a modification should not become necessary. The values for the load and strain controller, however, depend on the materials to be tested. Here, it can be necessary to modify the controller parameters for each new material. Normally, this is done during the test preparations.

You will find more information about the settings of the controller parameters in chapter [Test Settings – Controller](#).

(P = Proportional controller part, I = Integral controller part, D = Differential controller part of a PID-Controller)

5.1.5 User rights

In many cases it is requested that the settings- and selection possibilities in the software can be delimited for certain user groups. This makes sure, that initial value files can only be written by the administrator. End user can only load these files.

The following reasons militate in favour for the limitation of user rights:

- False insertions due to unknowing adjustments can be avoided.
- False settings can block the system.
- Securing of tests according to the standards: False test parameters can lead to tests, which do not apply to the standards any longer.
- Efficient Test Run: If you offer the possibility to set a lot, there most likely will be a lot of trying.

Therefore, the Software offers the **user rights mode**. If this mode is activated, each defined user has to login with his/her password and can only use the features which the administrator has defined for him/her. This applies to, e.g. read/write access for certain files; the right to look at or change different input values in the [dialog Test settings](#) or the use of the [dialogs Travel order](#) and [Controller parameters online](#).

You (administrator) can set up this mode as follows:



1. Click [menu Machine](#) → [command User rights](#) → [dialog Enter password](#) will open. It shows which mode is active and which user is selected.

The screenshot shows three overlapping dialog boxes. The top-left dialog is titled 'Enter password' and contains a text area for a password and buttons for 'OK', 'Cancel', 'Other user', 'User rights', and 'Offline mode'. The top-right dialog is titled 'Select user' and shows a list with 'Administrator' and 'Tester', with 'Administrator' selected. The bottom dialog is titled 'User rights' and contains a checkbox for 'Mode user rights activ', a list of users, and a table of permissions for 'Administrator'.

File	Read	Write
SVL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MVL	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TRS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The 'User rights' dialog also includes a 'Test settings' section with a list of checkboxes for various test parameters, such as 'Test configuration', 'Test', 'Input values', 'Results', 'Statistics parameters', 'Test data', 'Dimensions', 'Test procedure, speed', 'End of test', 'Store data', 'Store data to', 'Controller', 'Deformation', 'Actions on test end', 'User interface', 'DKD', and 'Sollwerte'.



“administrator”).

3. Click the [function blue User r](#)



Note: For the 'first-time' use the dialog **Enter password** appears. You are requested to define a new password. Do this and close the dialog with **OK**.

4. The dialog **User rights** will open.
You can activate or deactivate the user rights mode in the field Mode user rights active.
In the left display field (User) you can see the defined users.
You can add new users in the field Name in the centre (Add user). Define which user will have administrator rights and click **Add**.
You can delete individual user by clicking the function field **Remove from list**.
In the area File / Read / Write you define if the user is allowed to read, create or change the files SVL (Initial Values), MVL (Measured Values) or TRS (Test results and statistics).
In the area underneath you define the access for the listed dialogs and functions.
In the area (right) Test settings, you choose which settings the user may read and/or change.
5. Close the dialog with **OK**.

Login for the user:

6. Click **Menu Machine** → command **User rights** → dialog **Enter password** will open.
7. If the dialog does not show your user name, click the function field **Other user**. → The dialog **Select user** will open. Select your user name and close the dialog with **OK**. → This brings you back to the dialog **Password input**.
8. Enter your password and acknowledge with **OK**. At the 'first-time' use the password corresponds to the user name (here "tester"). In this case, the dialog **Enter password** will open. Enter a new password and acknowledge with **OK**.

Now you are logged in and can work within the limits of your rights with the Software.

5.1.6 General Settings



1. Click menu **Machine** → command **General settings** → the dialog **General settings** will open.

The dialog **General settings** is used for basic definitions of the mode of operation of the test program. Click on the respective items in the left list, in order to call up the dialogs. Now, you can perform the corresponding settings.



Tip: If you call up a dialog, its symbol will change to a checkmark in the list. This way you can catch by a glimpse, which data you have already configured.

5.1.6.1 General settings - Software

Normally, the pre-definitions in this dialog do not have to be changed. However, if changes are necessary, follow the instructions to come.

Maximal number measured values	Memory	max. test duration
200000	19.836 MB	1:06:40

Maximal number of measured values:

The measuring values are sent from the EDC to the PC with 50Hz (Standard setting). There, the values are stored one after the other in the memory. Depending on the saving methods (save all or save after measuring value change) the memory is filled differently fast. For the saving, you have to appoint a maximum size for the measuring value buffer. Depending on the measuring equipment and the measuring rate, you will get a maximum test duration, which is displayed.



1. Define the number of measured values, that the measuring value buffer is supposed to record. The associated memory requirements and the maximum test time will be displayed directly after the input.

Settings for fatigue test:

The measuring value storage can be turned off and turned on again, depending on the tests. Thus, with dynamic tests, e.g. only every 1000th cycle is stored. If there is a sample break within the time that is not stored, we do not have a record of this incident.

A remedy for this is found in a so called ring buffer, which always stores the last measuring values. If a sample breaks, the test and thereby the measuring value recording for the ring buffer is stopped. Now, it is possible to load the ring buffer and – depending on the size of the buffer – the last seconds before the break are available as a curve.

-  2. If needed, set a checkmark to activate the ring buffer and define the number of the measuring value pairs to be stored.

OSZI Window

-  3. If needed, define a value for the number of the values to be shown in the [Oscilloscope window \(OSZ\)](#).

COV Window

-  4. If needed, define a value for the number of the values to be shown in the generating [Covering curve window. \(COV\)](#).

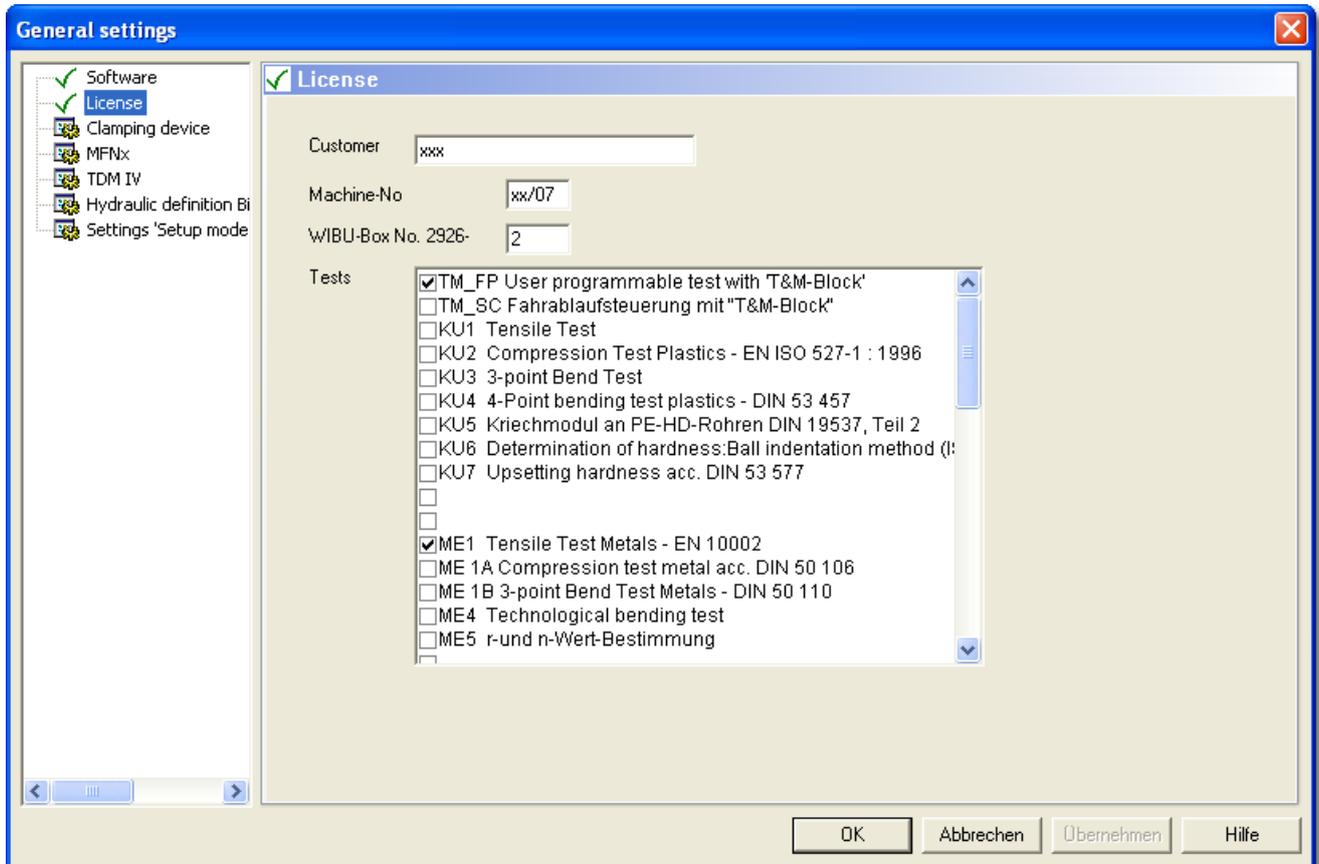
Only one test area

-  5. Set a checkmark, if your testing instrument has only one test area and mark its position. Now, no queries for the test area will be activated.

Number TRS-Values

-  6. Define how many results data records are to be shown in the [TRS-window](#). If, for example, you enter 50, 50 data records will be created in the [TRS-window](#). However, if during the test a higher amount of data records arise, for e.g. 51, the amount of the shown data records is increased by the defined amount, viz. 100 data records will be shown for the described example.

5.1.6.2 General settings – License



WIBU-Box No. 2926-:

The Dongle (WIBU-Key) is the copy protection of the Software. Without a connected Dongle it is not possible to start a test, but all other functions are available. Thus, you can copy the Software as often as you like in order to load, print or export the recorded measuring curves in your office.



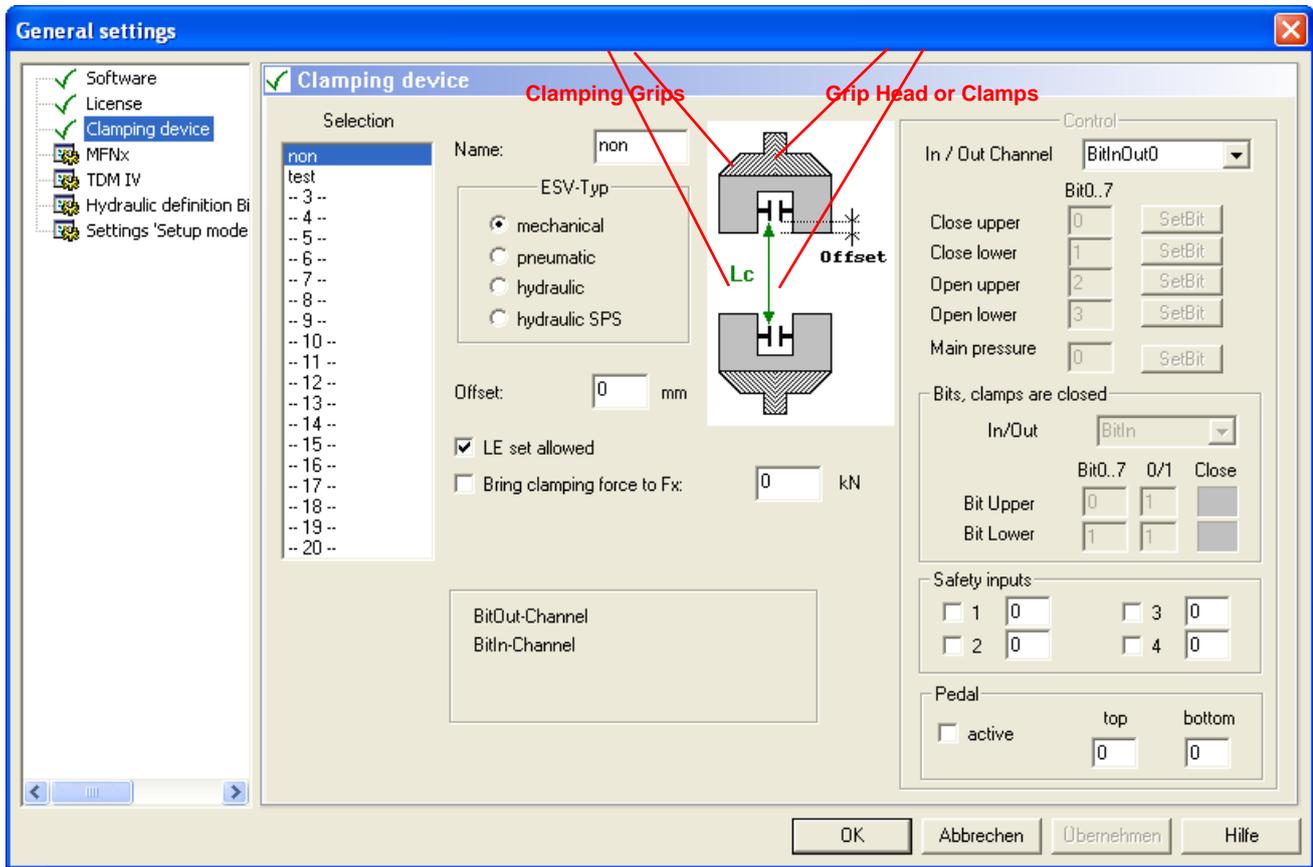
1. Enter the Code contained in the Dongle here, in case it is not already entered.

TIPS:

Furthermore, the software application modules, that you have purchased, are recorded in the Dongle. But irrespectively you can activate further application modules, in order to load measuring value curves, which have been recorded by another testing instrument. The program start of not purchased application modules is interrupted by a license indication.

5.1.6.3 General settings - ESV

In this dialog you can define several clamping devices for your testing instrument. Possible are: manually closed clamps as well as pneumatically or hydraulically controlled clamps, which can be closed via the EDC.



Selection and Name

The area Selection contains a list of all defined clamping devices. Up to 20 entries are possible. If there are not any clamping devices defined, yet, the window shows the numbers 1 to 20. You can enter or change the respective number in the field Name.

1. Click a free number or an already defined clamping device in the list → it will appear in the field Name.
2. Now, you can rename an already defined tool or give a name to a new tool.

ESV-Type

3. Now you choose the type of your clamping device:
 - Mechanical:
clamps, that are closed manually or pneumatically/hydraulically clamps, which are not connected to the EDC.
 - Pneumatic, Hydraulic, Hydraulic SPS:
pneumatic/hydraulic clamps, which are connected to the EDC and triggered by EDC-Signals. Enables you to check the opening status of the clamps before the test start. Depending on the kind of clamping devices chosen, further fields will become active/inactive, with which you can define the control of the clamping devices.
4. If needed, set a checkmark in the field LE set allowed. LE stands for the free clamping length between the clamping grips (see chapter [Setting the free clamping length](#)).
5. Field Correction Offset:
You will need this field if the free clamping device is constructed in a way, that the grips are mounted countersunk within the grip head, viz. when driving together vertically, only the edges of the grip head

touch and not the edges of the grips (just as shown in the drawing in [dialog General settings - ESV](#)). The difference between the outer edges of the grips and the grip head is called Offset. When vertically driving together the upper and lower grips, which becomes necessary for e.g. while setting the free clamping length LE (see chapter [Setting the free clamping length](#)), the Offset has to be considered. Therefore determine the Offset of your free clamping device and enter the simple value here.



Attention: If the Offset is not set or it is set to low, driving the grip heads can lead to damages on the instrument!

6. Field LE set allowed:

If you remove the checkmark in this field, it is no longer possible to drive up to the free clamping length LE. → The [symbol Gauge length/set distance between plates](#) (symbol bar Machine) will turn grey. Use this option in case parts - for e.g. the grip head - prevent the vertical driving together of the grips and an adjustment via an Offset, as described in point 5 („Field Correction Offset”), is not possible.



Attention: An incorrect setting can lead to damages on the machine!

7. Field Bring clamping load to Fx:

If a sample is clamped at the top and at the bottom between two grips each, a flow of the sample material may occur – depending on the clamping load and the material. This can lead to falsified test results, due to the forces which are applied to the sample. By entering an adequate value for Fx, these forces will be compensated and the sample will be tightened load controlled up to Fx. Fx can be F=0 or another smaller load value.



Note: In order to guarantee the comparability of the measurement values, the value for Fx should be maintained.

Control

8. By setting bits for the single functions, you can control the clamps via the software or external hardware as well as monitor the individual conditions.

5.1.6.3.1 Setting the free clamping length

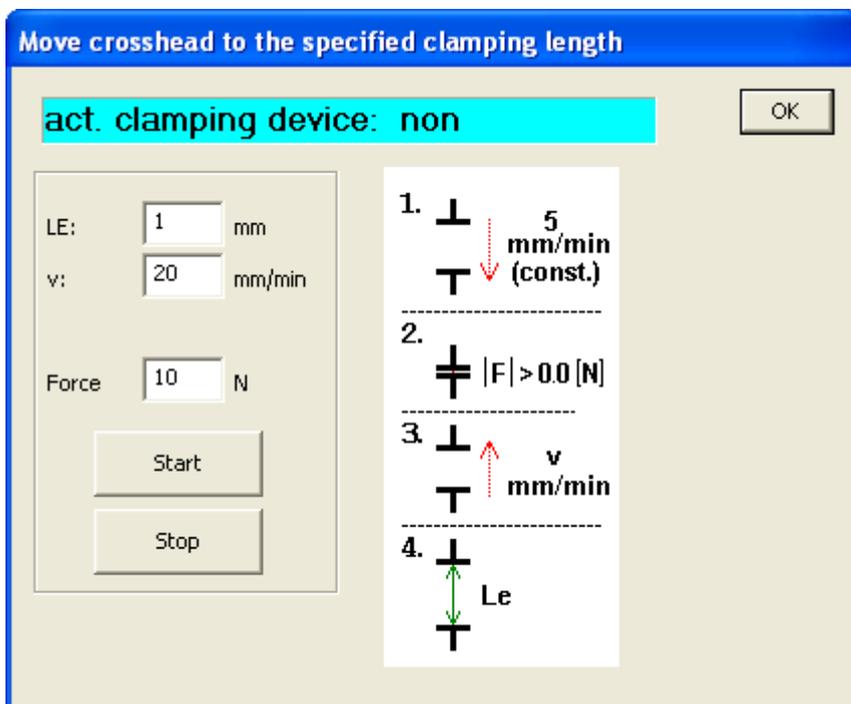
Here, you should set the free clamping length (space between the clamp top and bottom) for the clamp device and check if the testing instrument drives up to the free clamping length using the set values. Therefore, you need the [dialog Move crosshead to the specific clamping length](#), which can be activated in the symbol bar.

 **Note:** With this dialog you can drive up to the free clamping length exactly. This may be necessary for the clamping of the sample prior to the test run (see chapter [Performing a test](#)).

To set a specific clamping length, do as follows:

1. Close the [dialog General Settings](#) with **OK**.
 2. In the tool bar click the [Symbol Gauge length/set distance between plates](#). 
- The [dialog Move crosshead to the specified clamping length](#) will open.

 **Note:** If the symbol is inactive (grey), the function [LE set allowed](#) is deactivated in the [dialog General Settings – ESV](#). Activate the function by setting a checkmark.



In the upper row you see the name of the clamping device, for which the following settings are conducted (see chapter [General Settings – ESV](#)). In the left area you have fields for setting the essential values. The drawing on the right illustrates the individual steps, with which the specified clamping length can be approached.

- Step 1** Vertically approach the clamps with a constant speed of 5mm/min, until in →
- Step 2** the pre-load F is reached (field [Load N](#)).
- Step 3** Now, the clamps move - with the speed v (to be defined in field [v mm/min](#)) – apart from one another, until in →
- Step 4** the specific clamping length LE (field [LE mm](#)) is reached.

-  3. Set the value for the specific clamping length in field [LE mm](#) and the speed in field [v mm/min](#), with which the clamping length will be approached in step 3.



Tip: The speed for the approach should not be too small, otherwise the approach of the clamping length may take very long.

4. Enter the preload to be approached (as described in Step 2) in field Load N.



Note: The load complies with the load area of the testing instrument and should be set in a manner that the instrument will recognize the contact of the clamps.

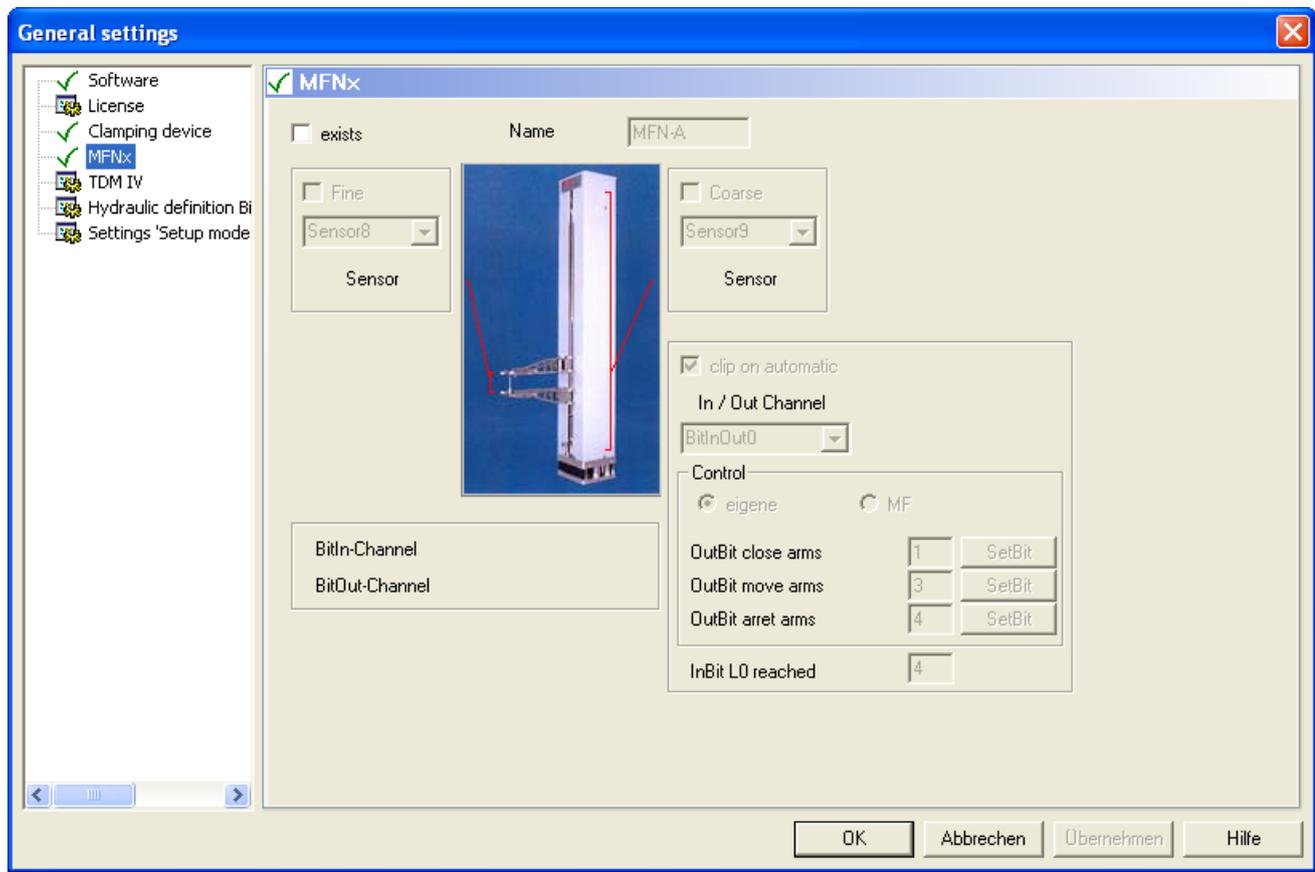


Tip: Depending on the gap between the grips the vertical approach with a speed of 5mm/min (Step 1) may take very long. Therefore it is advisable, to approach the grips, for e.g. with a digipoti, to a point where the gap between them is not very big.

5. Click **Start** to start the approach → the testing instrument should approach the clamps in the way described under the steps 1 to 4. With **Stop** you can end the approach, if this becomes necessary.
6. Close the dialog with **OK**.
7. Return with **menu Machine** → **command General settings** → to **dialog General settings**.

5.1.6.4 General Settings – MFNx

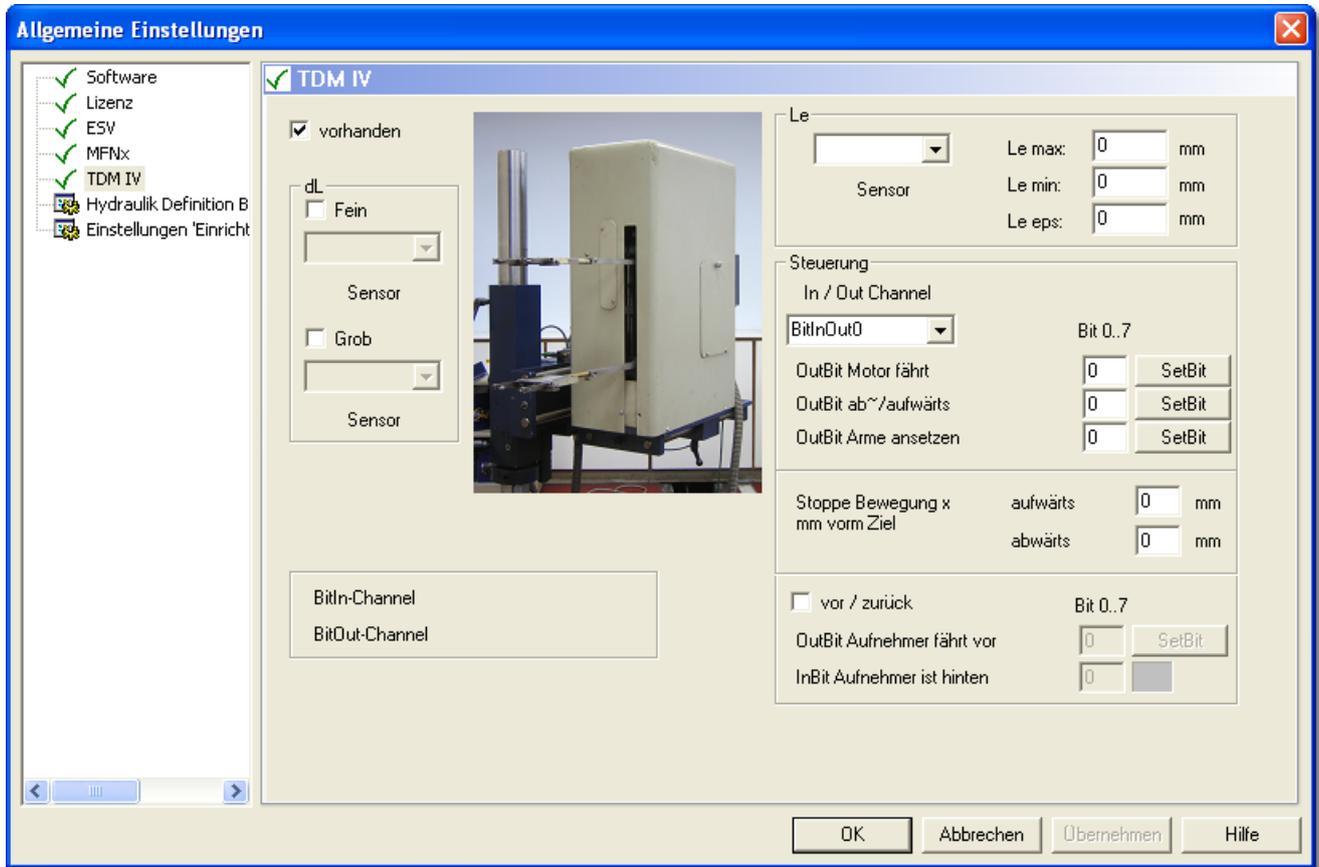
You will need this dialog, only, if you are using a MFN-Extensometer with your testing instrument.



1. Define the necessary bits for the control of the Extensometers.

5.1.6.5 General settings – TDM

You will need this dialog only, if you are using a TDM-Strain transducer by „Roell und Korthaus“ with your testing instrument.



1. Define the necessary bits to control the extensometer.

5.1.6.6 General Settings – Hydraulic definition - Bits Low pressure/High pressure

This dialog is for testing instruments which can be driven with two different pressure ranges. In this case, use the “low pressure range” e.g. for the rigging and the “high pressure range” for the actual test.

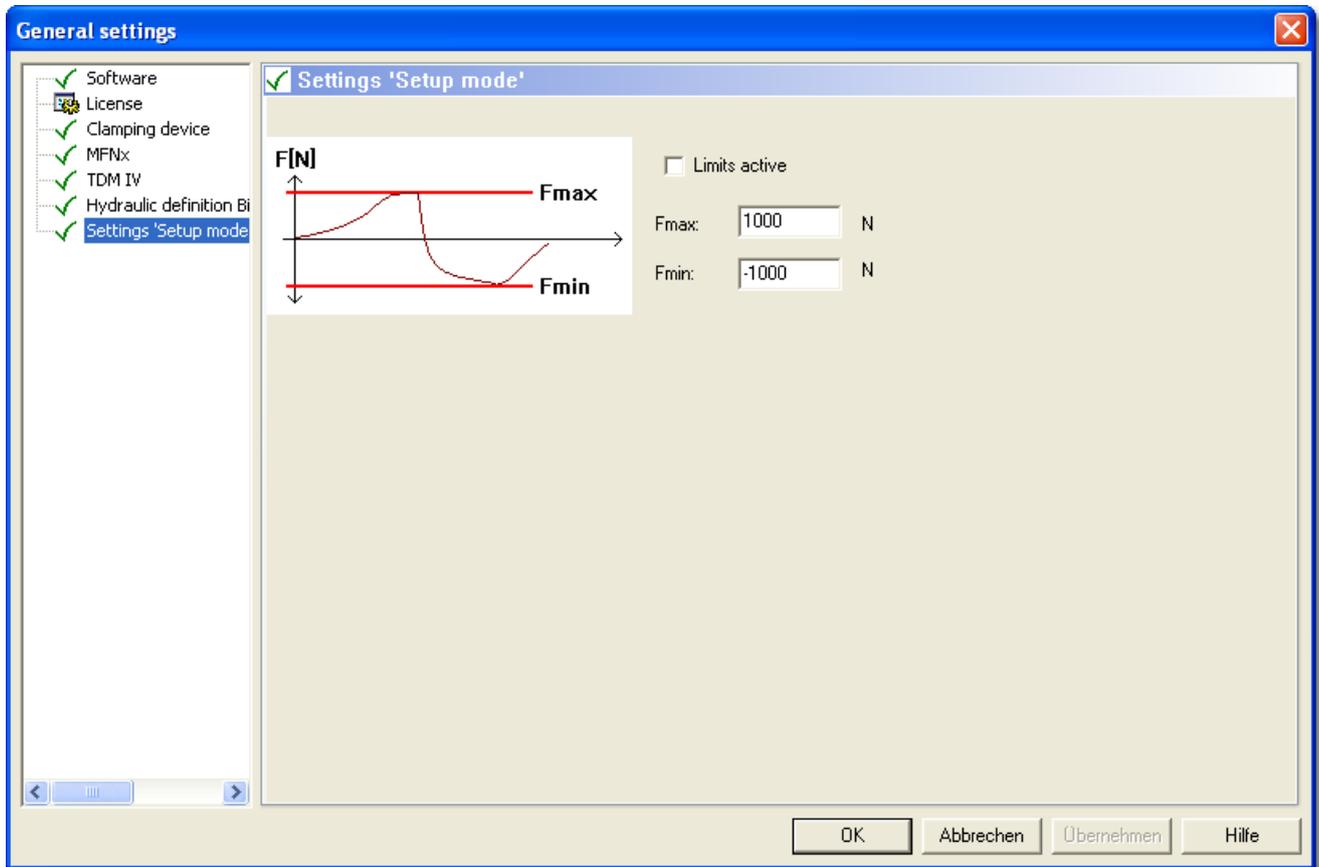
The screenshot shows the 'General settings' dialog box with the 'Hydraulic definition Bits Low pressure/High pressure' section selected. The dialog contains a sequence of four bits (Bit1 to Bit4) and a 'Multi ventil' signal. Bit1 is active (0), Bit2 is active (1), Bit3 is active (2), and Bit4 is active (3). The pressure range starts at 'Low pressure (On)', switches to 'High pressure' after 0.1 seconds, and returns to 'Low pressure' after 0.4 seconds. The 'Multi ventil' signal is active for 0.3 seconds. The 'OutPort' is set to 'BitInOut0'. The 'Bits' section on the right shows 'A active' checked, 'B active', 'C active', and 'D active' unchecked.

1. Define when and under which conditions the testing instrument is supposed to switch between the pressure ranges.

Example: In above picture Bit A is active. Viz., the testing instrument will start with the low pressure range, change to the high pressure range after 0.1 seconds and stay there until the testing instrument is turned off.

5.1.6.7 General Settings – Settings ‘Low pressure range’

This dialog is for testing instruments which can be driven with two different pressure ranges. In this case, use the “low pressure range” for e.g. for the rigging and the “high pressure range” for the actual test.



1. Define the limit pressures for the low pressure range.



Note: You have finished the General settings now. Close the dialog with **OK**.

5.2 Test settings



1. Click menu [Test](#) → command [Settings](#)
Optionally: Click the symbol [Test settings](#) 
→ the dialog [Test settings](#) will open.

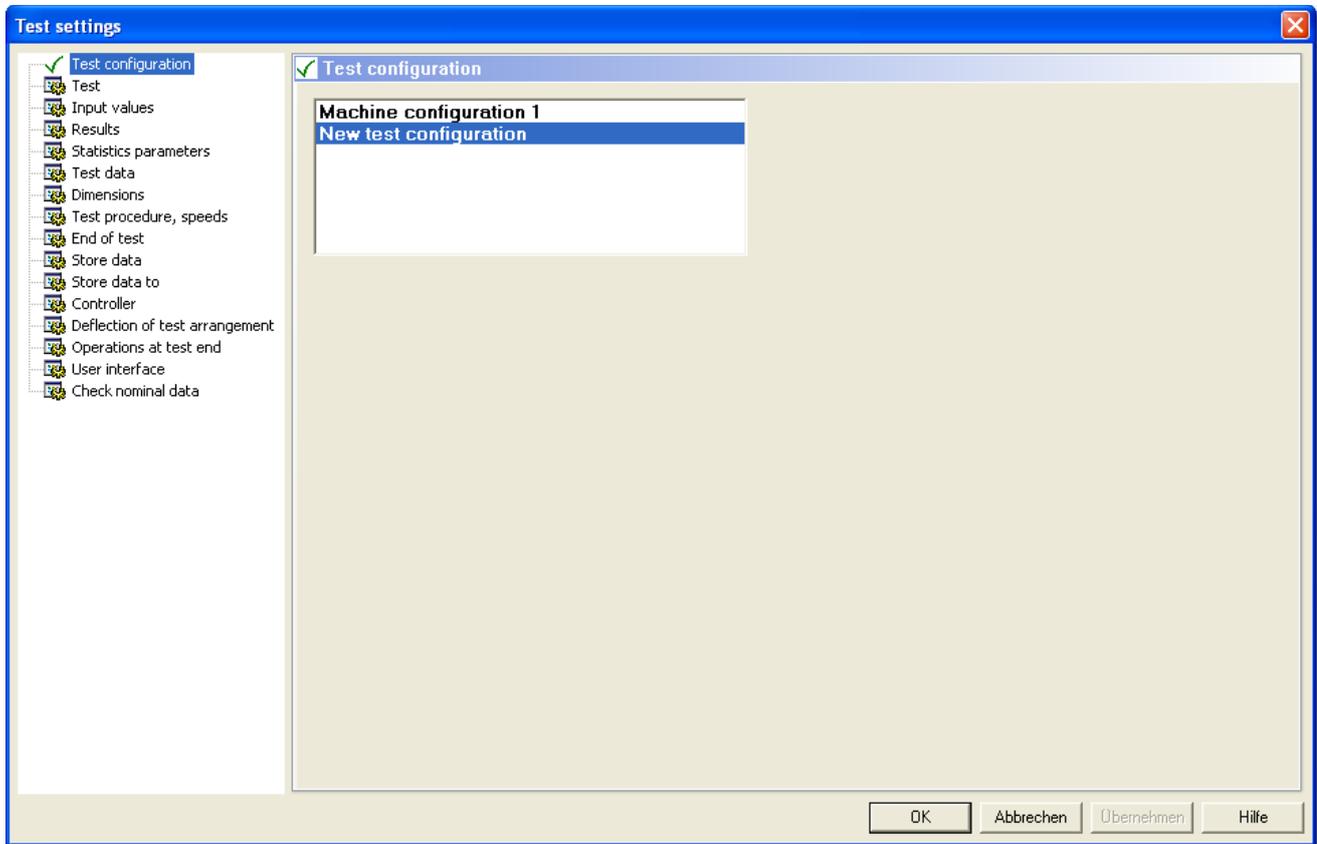
The settings in this dialog define the execution of the tests. Here, all completed sub-dialogs are marked by a checkmark (left side).



Tip: Save the test settings in an initial value file (SVL). If you want to perform this or a similar test again, you can re-load the data and do not have to re-enter it.

5.2.1 Test settings – Test configuration

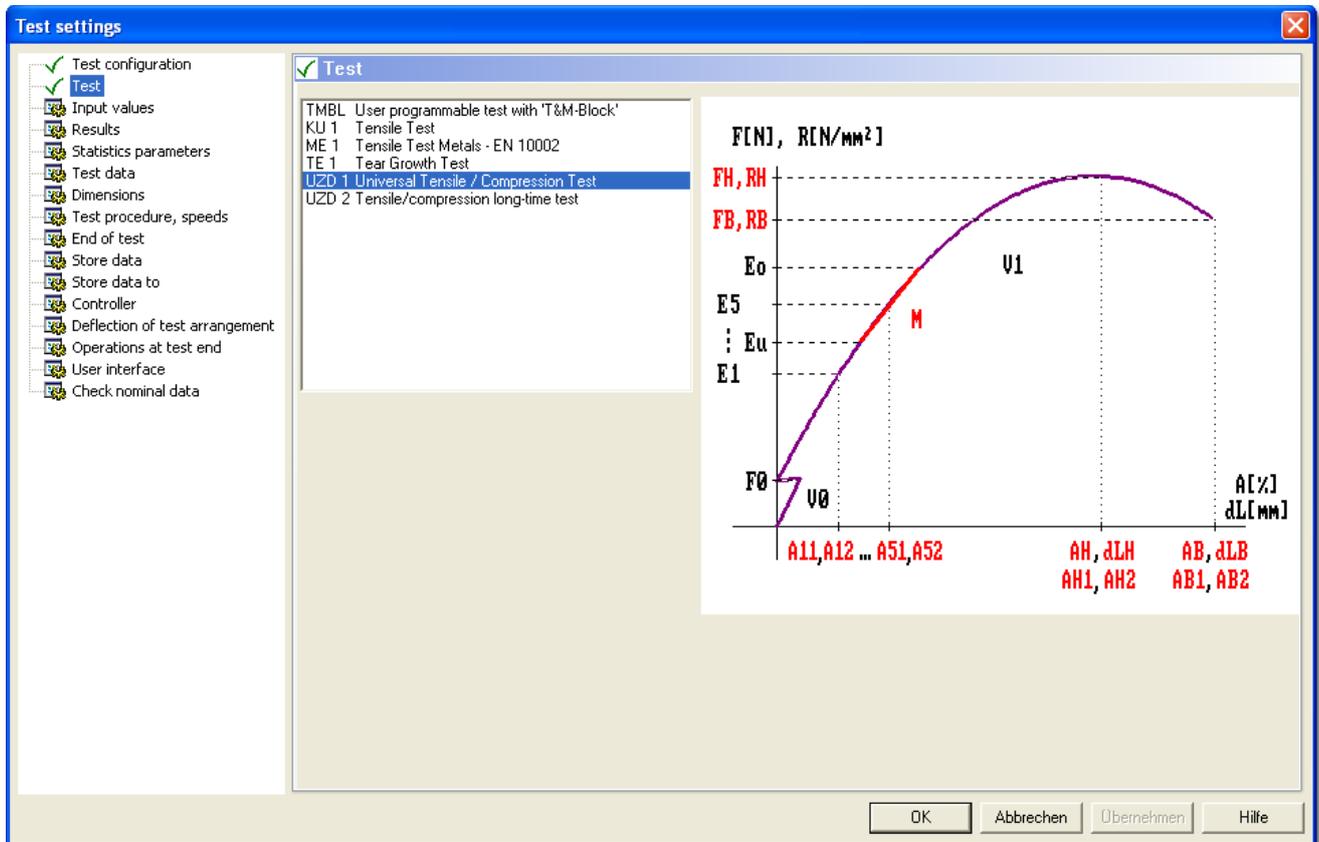
This dialog shows all the testing instrument configurations, which you have defined in the [dialog Test configuration list](#) (see chapter [Machine setup – Define test configuration](#)).



1. Choose the test configuration you want to work with.

5.2.2 Test settings – Test

The dialog shows a list of all installed test regulations as well as the associated example graphic.



1. Choose the test regulation you want to work with.

5.2.3 Test settings – Input values

Depending on the selected test regulation different input masks will appear.

The screenshot shows the 'Test settings' dialog box with the 'Input values' tab selected. The left sidebar contains a tree view with the following items: Test configuration, Test, Input values (selected), Results, Statistics parameters, Test data, Dimensions, Test procedure, speeds, End of test, Store data, Store data to, Controller, Deflection of test arrangement, Operations at test end, User interface, and Check nominal data.

The 'Input values' tab contains a 'Load direction' section with two radio buttons: 'Tension test' (selected) and 'Compression test'. Below this is a table with the following data:

Parameter	Value	Unit
E1	0.1	N
E2	0.2	N
E3	0.3	N
E4	0.4	N
E5	0.5	N
Eu	0.1	N
Eo	0.5	N

To the right of the table is a graph showing a force-displacement curve. The y-axis is labeled 'F[N], R[N/mm²]' and the x-axis is labeled 'dL[mm]'. The curve starts at the origin, rises to a peak, and then falls. Key points on the curve are labeled: F0, V0, E1, E5, Eu, Eo, V1, M, FH, RH, FB, RB, AH, dLH, AB, dLB, and A[%]. A 'Help input values' button is located below the graph.

At the bottom of the dialog box are four buttons: 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe'.



1. Depending on your needs set the load direction and the demanded nominal values.

5.2.4 Test settings – Results

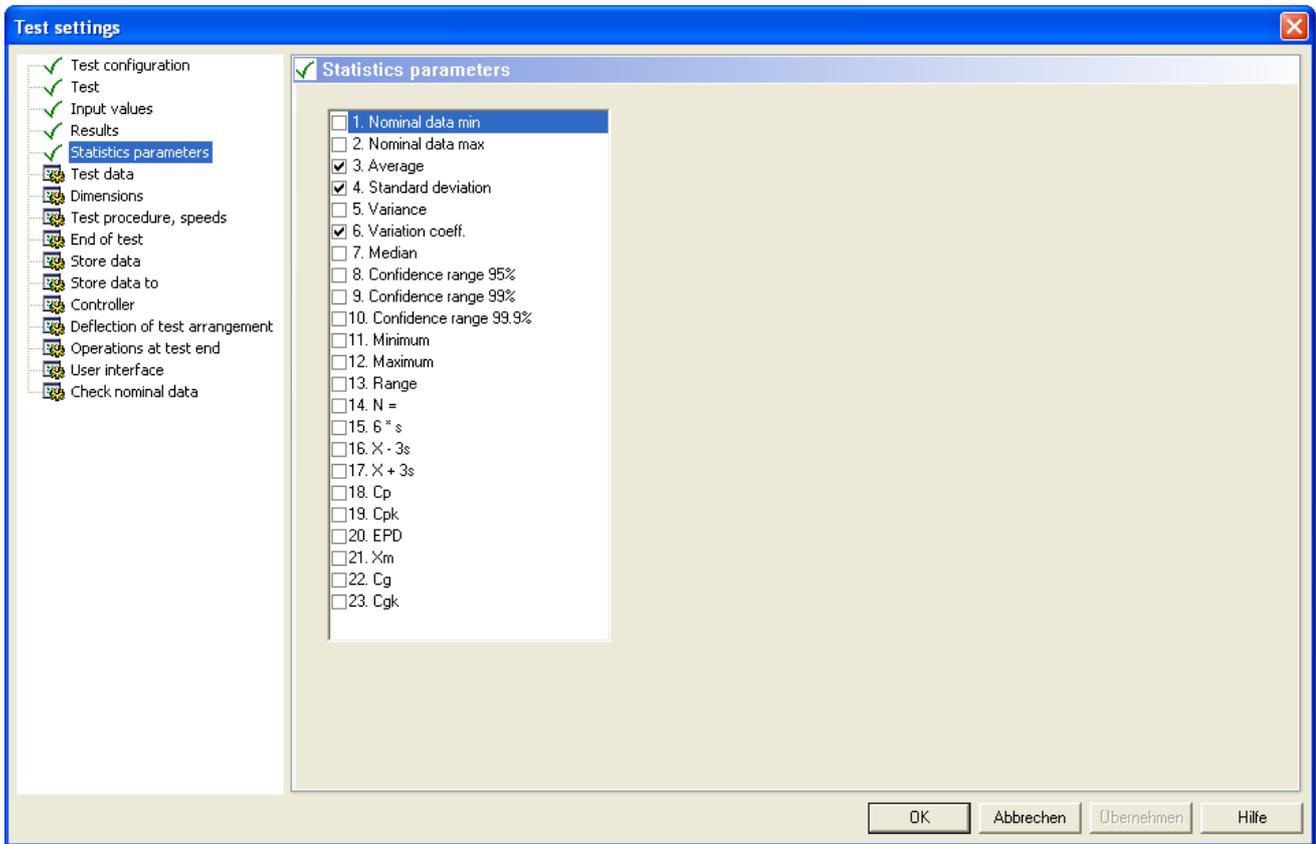
The screenshot shows the 'Test settings' window with the 'Results' tab selected. The left sidebar contains a tree view of settings categories. The 'Results' section is expanded, showing a list of 22 items (1. FH to 22. AB2) with checkboxes. The 'Name' field contains 'FH', 'Unit' is 'N', and 'Decimal places' is '2'. To the right is a graph titled 'F[N], R[N/mm²]' showing a curve with various points labeled (F0, V0, E1, E5, E0, M, V1, A1, A2, AB, dLB) and their corresponding values on the axes. The graph also shows 'A[%]' and 'dL[mm]' on the x-axis.

1. Set a checkmark at the results, which you want to have determined.
→ After the test, these results are then shown in the **MVL-window** (measurement diagram) and in the **TRS-window** (Result and Statistics).
2. If needed, rename the results, (field Name), define the units (field Unit), define the position after the decimal point (field Decimal places) or define the width of column for these results (field width of columns) for a printing.



Note: Even after the test it is possible to select certain results. As long as the Software has obtained the necessary data for the determination, it will calculate the results and display them in the **windows MVL and TRS**.

5.2.5 Test settings – Statistics parameters



-  1. Choose the statistic parameters, which you need for your evaluation, from the pre-defined list.
→ These parameters are displayed in the [window Results and Statistics TRS](#), also.



Note: Even after the test it is possible to select certain statistic parameters. As long as the Software has obtained the necessary data for the determination, it will calculate the statistic parameters and display them in the [TRS-Window](#).

5.2.6 Test settings – Test data

The screenshot shows the 'Test settings' dialog box with the 'Test data' tab selected. The left sidebar contains a tree view with the following items: Test configuration, Test, Input values, Results, Statistics parameters, Test data (selected), Dimensions, Test procedure, speeds, End of test, Store data, Store data to, Controller, Deflection of test arrangement, Operations at test end, User interface, and Check nominal data. The main area of the dialog contains the following fields:

Material	Metall XP1
Batch number	3.46
Order number	FGH492
Customer number	CUST3456
Operator	SEB
Department	VEB1
Additional 1	
Additional 2	
Additional 3	
Additional 4	
Additional 5	

At the bottom of the dialog are four buttons: OK, Abbrechen, Übernehmen, and Hilfe.

1. Here you enter data that will allow an allocation to the sample.
2. If needed, you can change the names in the list (right mouse click in the grey part of the dialog, then choose [command Redefine Names](#). → The [dialog Redefine name of input data](#) will appear. Here you can enter a new name.



Note: You can choose whichever test data you would like to have printed in your test report (menu [File](#) → [command Page setup](#) → [Test parameters](#), see chapter [General Evaluation](#)).



Note: You can even use this test data to store your measurement value files (MVL), see chapter [Test settings – Store data to](#)).

5.2.7 Test settings – Dimensions

Depending on the test regulations, you can enter data and dimensions concerning the sample.

The screenshot shows the 'Test settings' dialog box with the 'Dimensions' tab active. The left sidebar lists various test settings, with 'Dimensions' highlighted. The main panel is divided into several sections:

- Sample shape:** Radio buttons for Flat (selected), Cylindrical, Pipe, Cross section, Linear density, Irregular, Special, Pipes, and Springs.
- Dimensions:** Four columns for defining dimensions 'a' and 'b'. Each column has a value field (e.g., '1 mm'), radio buttons for 'Constant', 'Varying', and 'Port', a 'Readings' field, and checkboxes for 'automatic read in' and 'Confirm with OK'.
- Clamping length, Gauge length:** A 'LO' field set to '50 mm' and a checkbox for 'if variable, read in before start of test'.

Buttons at the bottom include 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe'.

1. Here you define the form, the length, the width, the height and the weight of your samples.
2. Define here also, whether you always will be using the same samples (constant) or different samples (varying) in this test series and if the data is supposed to be read via an interface (Port).
→ Depending on your selection, further fields will open, which will allow definitions such as: how many measurements are supposed to be performed with the available test data (field Measuring), or via which sensor and to which interface the data will come in and if they will be read automatically or if the user has to confirm the data import.

5.2.8 Test settings – Test procedure, speeds

Here you define the test procedure.

The screenshot shows the 'Test settings' dialog box with the 'Test procedure, speeds' tab selected. The left sidebar lists various test settings, with 'Test procedure, speeds' highlighted. The main area is divided into two sections: 'Test rates' and 'Rate switch points'. Under 'Test rates', there are input fields for V0 (5 mm/min), V1 (10 mm/min), V2 (10 mm/min), V3 (10 mm/min), V4 (10 mm/min), V5 (10 mm/min), and VR (50 mm/min). Under 'Rate switch points', there is a checked checkbox for 'F0' with a value of 0.01 and a unit of 'N'. Below this are five unchecked checkboxes for transitions: V1->V2, V2->V3, V3->V4, and V4->V5, each with a value of 1 and a unit of 'N'. At the bottom of the dialog, there are three unchecked checkboxes: 'Automatic crosshead return after the end of test', 'Perform force regulated stop at F0', and 'Clip on extensometer at F0'. Below these is a section for 'Move Xhead before test' with two input fields, both set to 0, and units of 'mm' and 'mm/min' respectively. At the bottom right, there are buttons for 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe'.

Test rate and Rate switch points

Depending on the chosen test regulation, a different number of test speeds are needed. Thereby the switch points between the speeds are either defined constantly (e.g. metal test EN 10002) or they can be set by the user in this dialog. (V1 → V2, V2 → V3, ...).

1. If needed, enter the desired test speeds and switch points. VR stands for the speed of the crosshead return.

Automatic crosshead return... and following

2. Set a checkmark in the field Automatic crosshead return after the end of test, if you want the crosshead to be driven back to the starting position after the test end automatically.
→ If this field has a checkmark, you must drive back the crosshead after the end of the test with the [Symbol Crosshead return](#) (toolbar).
3. Set a checkmark in the field Perform load regulated stop at F0 if, before the start of the test, the instrument is to be maintained load controlled (e.g. at pre-heat tension tests with tube furnaces, the sample will be pre-heated).
4. Set a checkmark in the field Clip on extensometer at F0, when an extensometer is supposed to be applied.
You have two options, when using an extensometer: Option 1: the strain transducer is applied before the test start (no checkmark). Option 2: the strain transducer is applied after the pre-load F0 has been reached (checkmark set).
5. If you set a checkmark in the field Test Load < Pre-load F0 before start of test, the software will check in the rigging, if the adjoining load is smaller than the pre-load F0. That, for e.g. is necessary, so that the sample will not be elongated during the clamping.

6. In the field Move Crosshead before test you can define, if the crosshead is supposed to be driven automatically to a certain starting position.
7. In the field Go to load Fx Crosshead controlled, Fx you define, if and with which speed the crosshead is supposed to approach the load Fx position controlled.



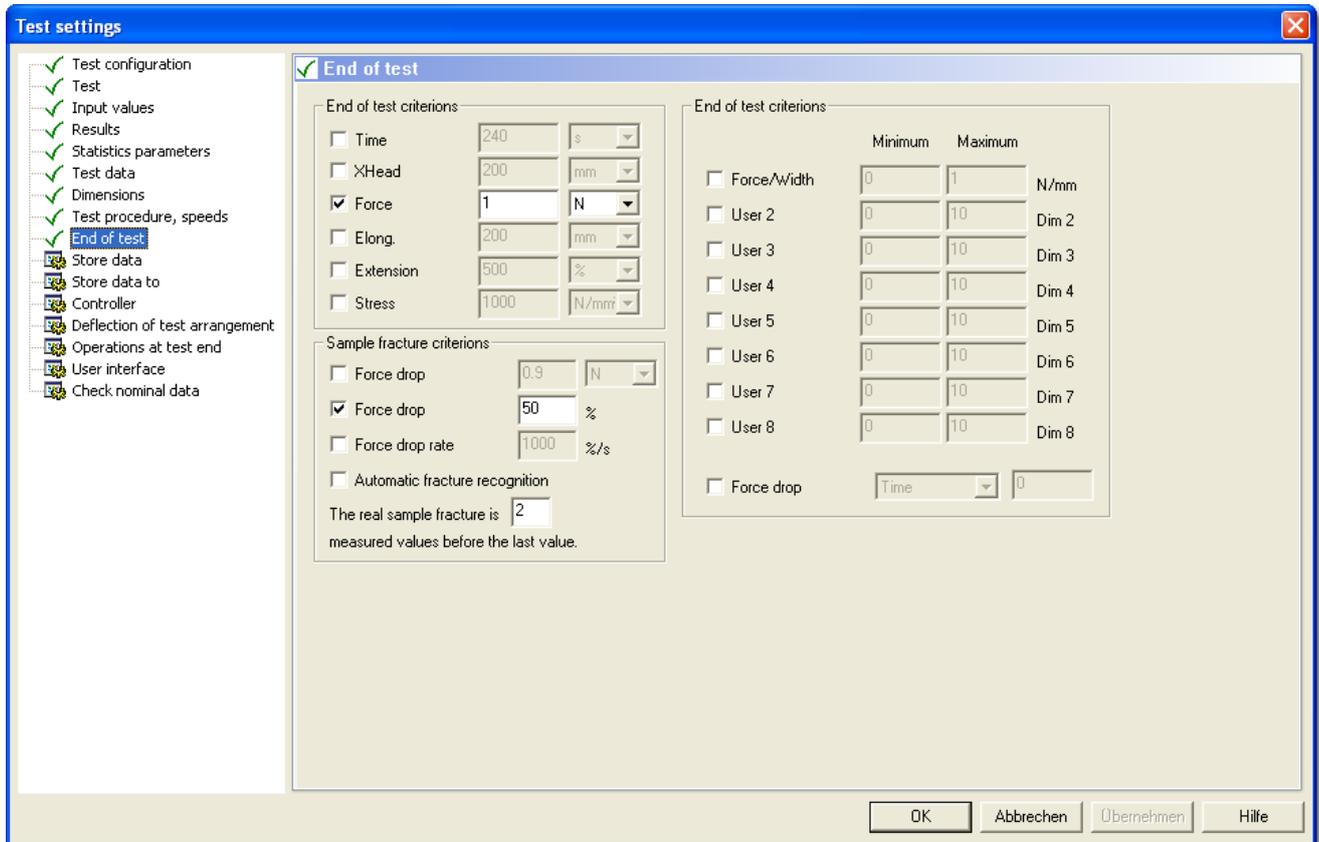
Note: You have set the load Fx in the **dialog General settings – ESV** (see homonymous chapter) while setting the free clamping device. The load Fx is used to eliminate loads, which can arise from the flowout of the sample out of the grips.

Here, you can enter a value for Fx which differs from the pre-set value.



Tip: It is not advisable to change this value for each test run, because the results of these tests then no longer will be comparable due to different initial values.

5.2.9 Test settings – End of test



Depending on the selected test regulations there are different test end criteria.

Sample fracture criteria

A tearing test for example is ended regularly, after a defined tearing position was reached. Normal tension tests are ended, after a load loss has occurred, which complies with a sample break. This loss of load, can be defined: absolute [N], relative in [%] or as load decrease rate.



1. Define the break criterion.

End of test criteria

Time, crosshead position, load, elongation, cycle no. and stress can be monitored for reaching a certain value. Thus, a test can be abandoned after a defined time or a clamping device is protected against an overcharged load.

With the user-defined dimensions (List User 1 ... 8), see chapter [User defined names and dimensions](#), you can define test end criteria, also.

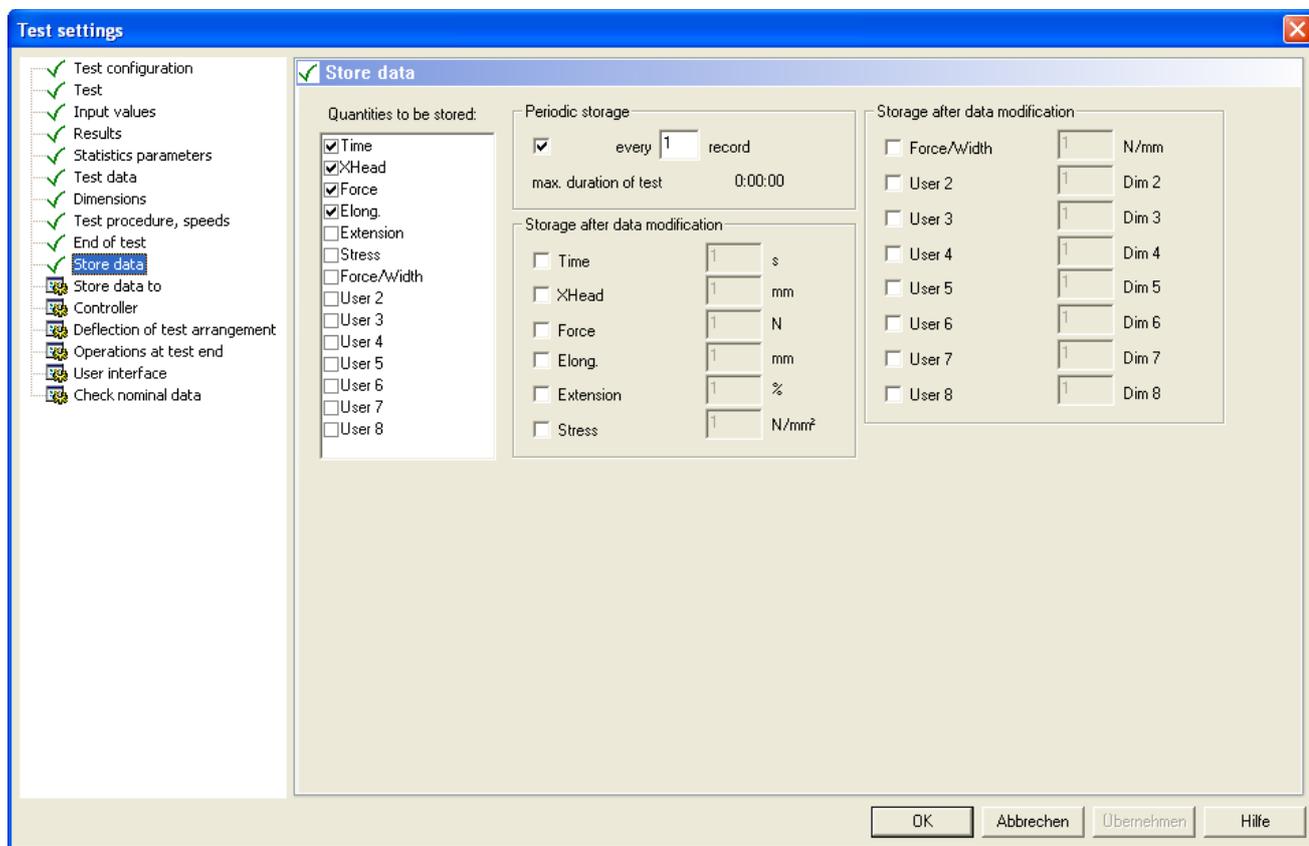
It is possible that several test end criteria are active at the same time (disjunction). The first criterion that applies, will end the test. You can see the reason for the test end in the status bar (lower right side).



2. Define the test end criteria.

5.2.10 Test settings – Store data

In this dialog you can set which dimensions are to be stored under which conditions.



Quantities to be stored

 1. Choose from the list, which quantities are supposed to be stored during the test progress. These quantities are displayed in the Graphic ([MVL-window](#)) and can be written into a measurement value file (.mvl).

Periodic storage and following

During the running test, the measured values are saved in the PC working memory (RAM). Therefore, the length of a buffer was defined ([menu Machine](#) → [command General Settings](#) → [Software](#), see chapter [General Settings – Software](#)). The length of the buffer determines the maximum test period (shown here).

The following possibilities to vary the saving rate are possible:

- Store every X-th record
- Store only when the measuring value is changed.
- A combination of both

TIPP **Tip:** For simple tension tests, on the one hand, the buffer length is sufficient. For long term tests on the other hand, it is not recommended to save every measuring value delivered by the measuring devices. Firstly, a non manageable amount of data would be generated, which would slow down the computer and secondly, most measuring values for long term tests do not differ significantly from one another or are not of any interest. Because of this, the Software offers the possibility to vary the saving rate. Thus, less measuring values are written into the buffer, assuring that its capacity is reached later. Therefore, the test can run longer.



2. If needed, set a checkmark at Periodic storage and enter a value, which determines which X-th data record is to be stored. The displayed test time will change accordingly.
3. If needed, set a checkmark at Storage after data modification for the value whose changes are supposed to trigger off the storage. You have to define the dimensions for the necessary changes, also. This works for standard- and userdefined dimensions.



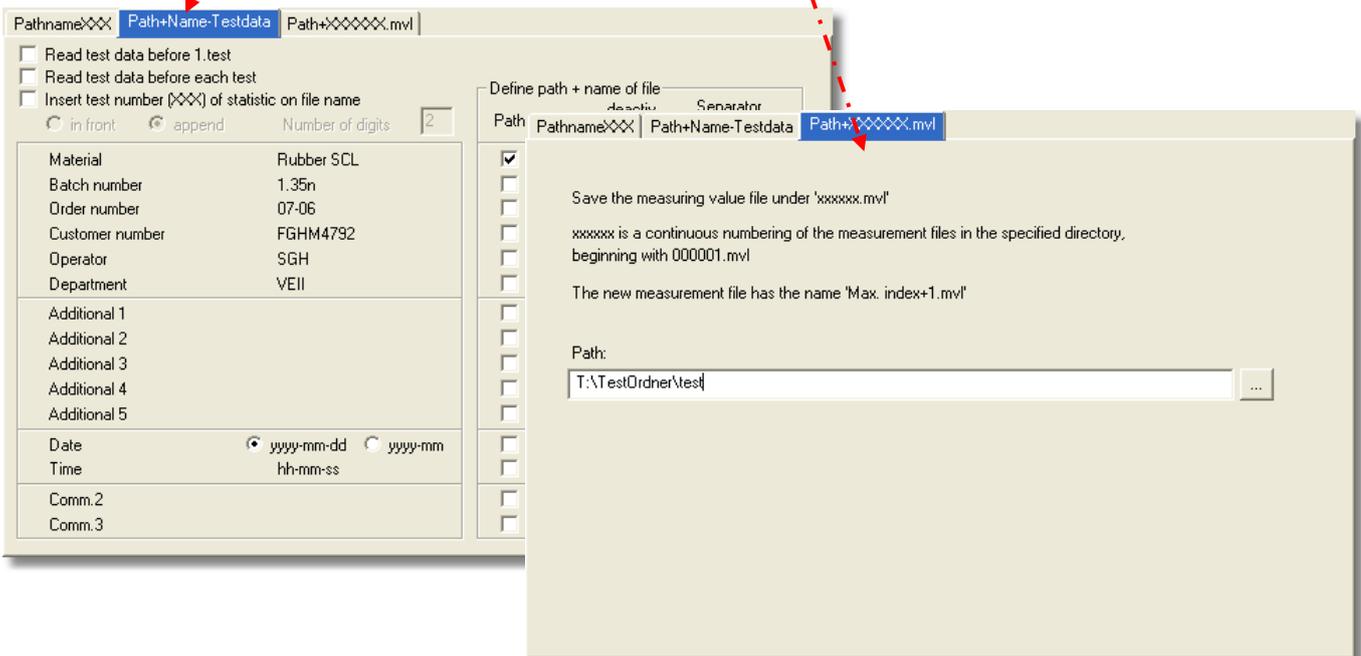
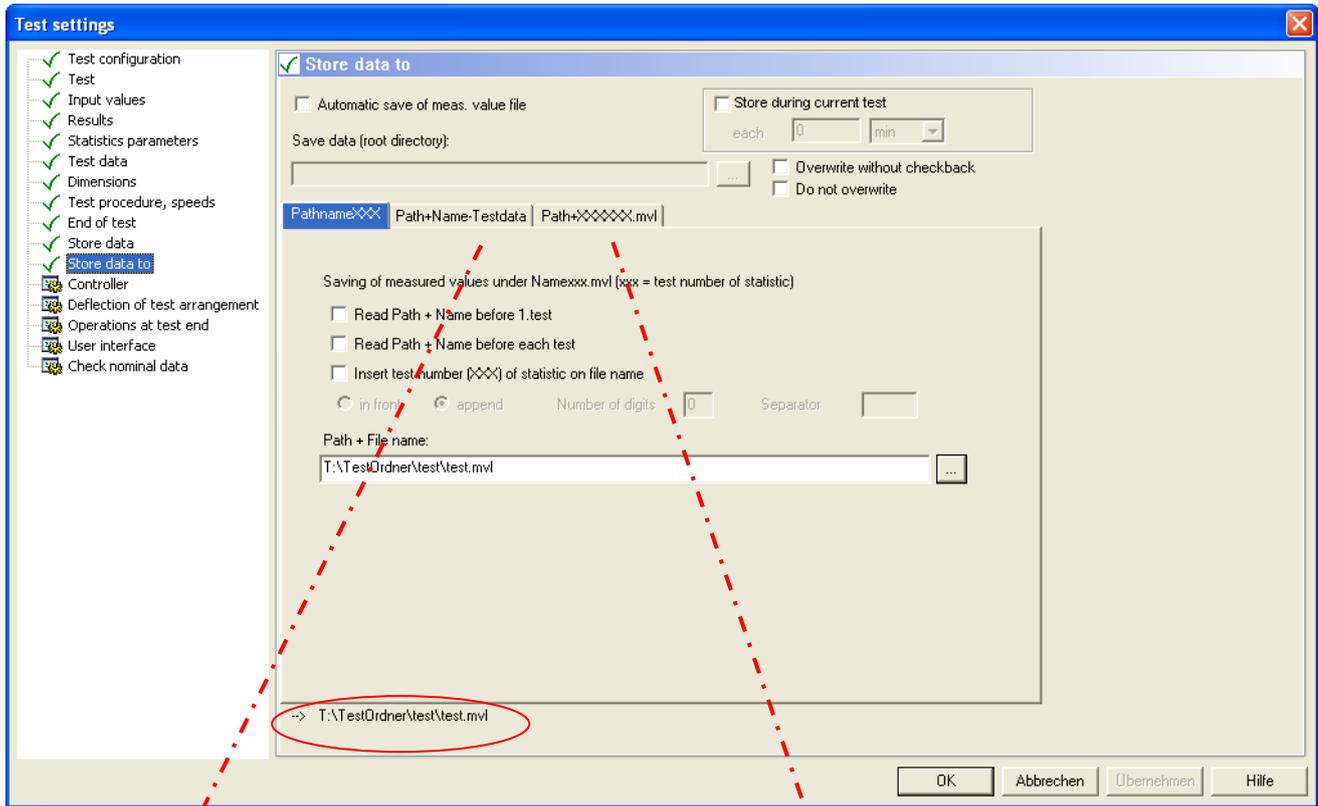
Note: Certain tests (e.g. cycle tests) stop the recording of the measuring values self-dependently; they affect the recording irrespective to these settings.

5.2.11 Test settings – Store data to

All data, that is collected or calculated during a test, is stored in the working memory (RAM) of the PC. For the evaluation to be done later on, it is necessary to store them on the hard disk. This is possible manually (see the note at the end of this chapter) as well as automatically.



Tip: For the performance of several tests the automatic method is recommended.





1. If needed, set a checkmark at field Automatic save of meas. value file. By doing this you activate the quseries mode. The Software stores the single tests of a series test automatically with ongoing numbers under the name and path, which you have defined.
2. Set a checkmark at Store during current test and define a store interval that is not to large. Thus, you can avoid a complete loss of data during a power failure or at a system crash.
3. Define, if the computer is allowed to overwrite already available data and if he is to send a warning when doing so.

Definition of store path and file name:

There are three different dialogs for the definition of the saving path and file name. You can open these dialogs by clicking on the flags. The blue flag always shows the active dialog. The settings made immediately result in a changed path display under the dialogs (see red marking in the picture).

Select the method that suits your intentions.

Dialog Pathname XXX

Here, the file will be saved under the selected path and under the entered file name, the ongoing number from the statistic file (.trs) may be added, also.



4. Define, if the data, which define the path and the name, are to be read before the first test, only or before each test (fields Read Path + Name before 1. test and Read Path + Name before each test).
5. Set a checkmark in order to add an ongoing number to the file name and then, define the position and the looks (field Insert test number (XXX) of statistic on file name).



Tip: Activate this function at any case. Thus, each file name is different and cannot be overwritten by mistake. Additionally, the ongoing number reflects the test sequence.

6. Click the right function field → the dialog **Open** will appear. Choose the desired path and enter a file name. Click **Open** → the dialog is closed and the path will be visible and the field path +file name.

Dialog Path+Name-Testdata

Here the file name and the path are composed out of the test data, which have been entered under the dialog with the same name (see chapter [Test settings – Test data](#)). Here you can add an ongoing number from the statistics file (.trs), also.



4. Define if the data, which define the path and the name, are to be read before the first test, only, or before each test (fields Read test data before 1. test and Read test data before each test).
5. Set a checkmark in order to add an ongoing number to the file name and then define the position and the looks (field Insert test number (XXX) of statistic on file name).



Tip: Activate this function at any case. Thus, each file name is different and cannot be overwritten by mistake. Additionally, the ongoing number reflects the test sequence.

6. Set checkmarks at the items, which you want to be applied for the name and the path and define the wanted delimiters between the terms.

Dialog Path+XXXXXX.mvl

Here, the measuring value file is stored under the path you have chosen and with ongoing numbers as file name.



4. Click the right function field → the dialog **Choose a directory** appears. Choose the desired path or enter a new one. Click **OK** → the dialog is closed and the path will be visible in the field path.



Note: This is the way to store measuring values manually: Activate the MVL-window (measuring diagram) and now click the symbol Save (symbols bar)

→ the dialog **Save as** will open. Choose the desired path and enter a name for the file. Click **Save**. → the dialog will close and the data is stored accordingly.

5.2.12 Test settings – Controller

The EDC has a set of standardised controller parameters available, with which the controllers are initialised, automatically. This set can be used for most testing systems and for samples, also.



Attention: The controller parameter must only be changed by trained users and then only, if the character of the sample or the test device make this necessary.

The screenshot shows the 'Test settings' dialog box with the 'Controller' tab selected. The left sidebar lists various settings categories, with 'Controller' highlighted. The main area is divided into three columns: Path, Force, and Elongation. Each column contains a 'Path controller' section with P, I, and D input fields, a 'Speed controller' section with P, I, and D input fields, and an 'FFP' section with an FFP input field. Below these are checkboxes for 'send before test' and 'Def. values from' (with a printer icon), and 'Values from dialog' (with a gear icon). At the bottom are buttons for 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe'.

Position:

The position controller is independent of the sample. Therefore, the values **should not be changed**. Merely the different impact frequencies at dynamic testing instruments necessitate a change of position parameters.

Load (Force):

The settings for the load controllers depend on the **stiffness of the sample**. The standard values are valid for very stiff samples. That way, the measurement office, for example, can run up simple forces without changing the load controllers.

Strain (Elongation):

The settings for the strain controllers depend on the **Stiffness of the sample**. The standard values are valid for very stiff samples.



1. If changes are necessary, click in the corresponding fields and enter the values.
2. Set a checkmark in the field send before test, if you want to update the controller parameters before the test is started. The Update applies to this single test, only. After this test has been ended, the Software will re-set the controller parameters automatically.

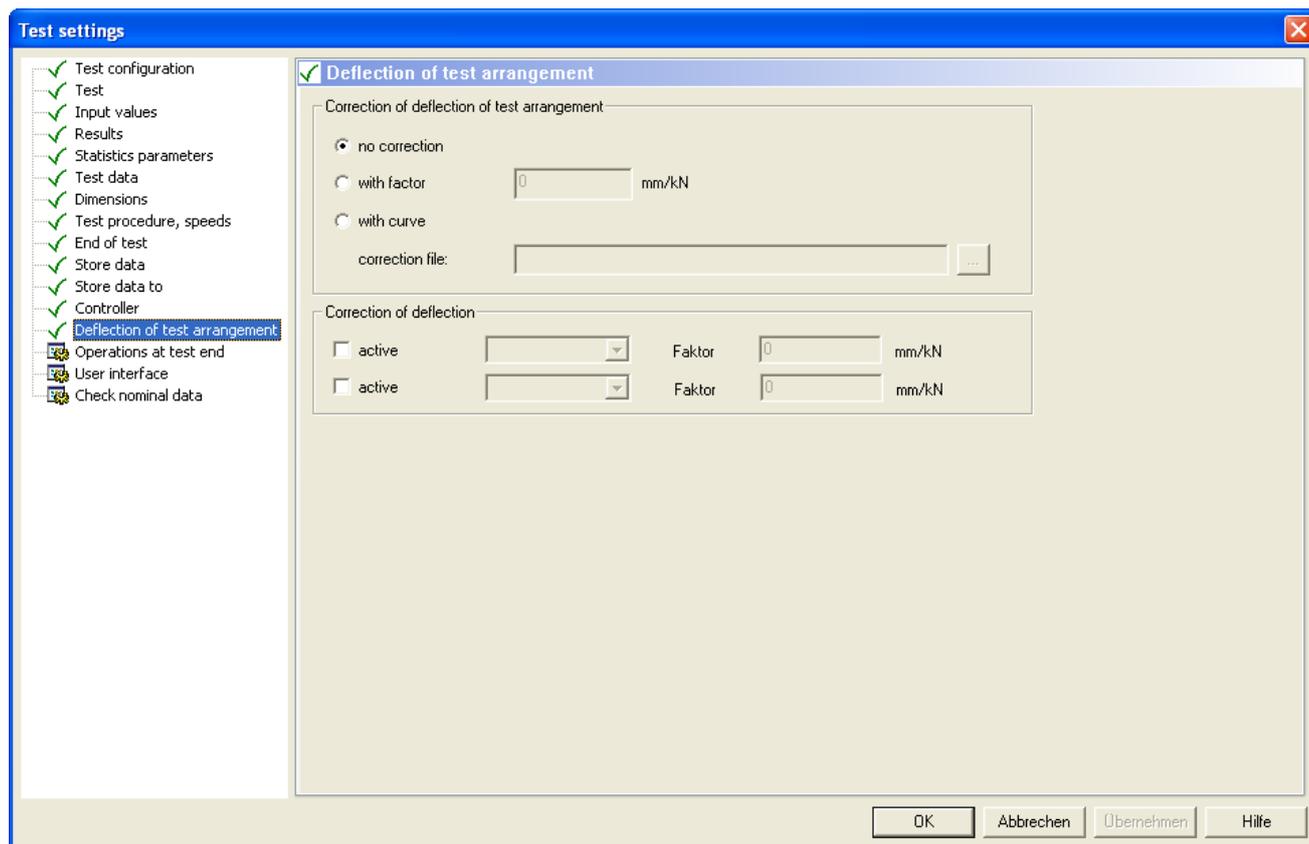
3. With the function field  you can enter the standardised controller parameters of the EDC, with the function field  you can enter values from the [dialog Controller parameters online](#) (menu [Machine](#) → command [Controller parameters](#), see chapter [Controller parameters](#)).

5.2.13 Test settings – Deflection of test arrangements

If the testing instrument is charged up to nominal load, you sometimes may have significant deflections of the load frame. These deflections are irrelevant, as long as you have appointed strain transducers to determine the deflection and the Young's modulus.

If however you are performing pressure tests, for which a strain transducer cannot be appointed, because the sample is too small, you must use the crosshead position to determine the deflection. Due to the deflection of the tester, which often is bigger than the deflection of the sample, the crosshead position is falsified.

If you determine the deflection of the testing instrument now, you can have it calculated during the running test. In doing so, the deflection can be defined as factor or as deflection curve.



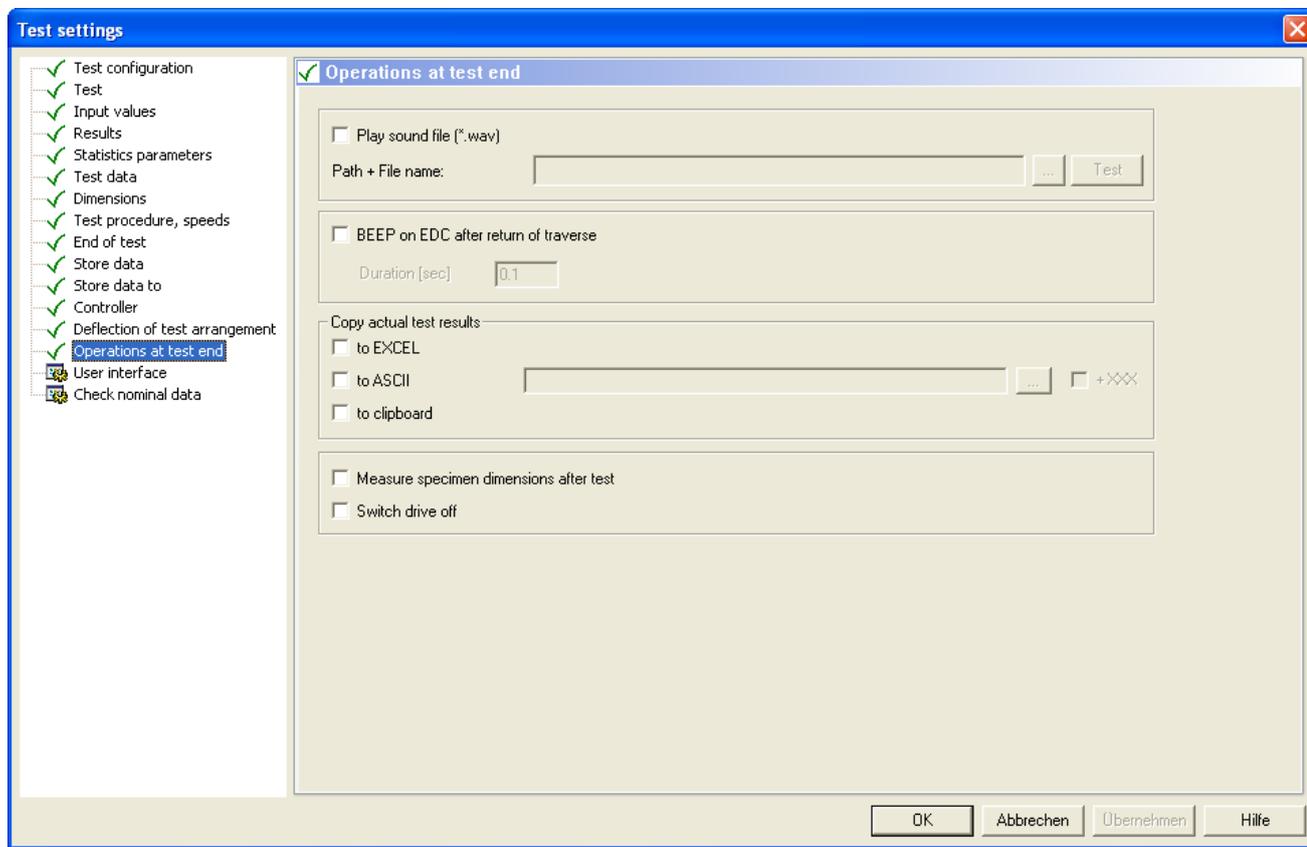
1. If needed, choose Correction of deflection of the test arrangement with factor or with curve (the correction file can be imported via the [function field](#)).



Note: In most cases, it is not necessary to make settings here. Above all, incorrect settings can falsify the result of the test more than this is possible due to a non-performed correction.

5.2.14 Test settings – Operations at test end

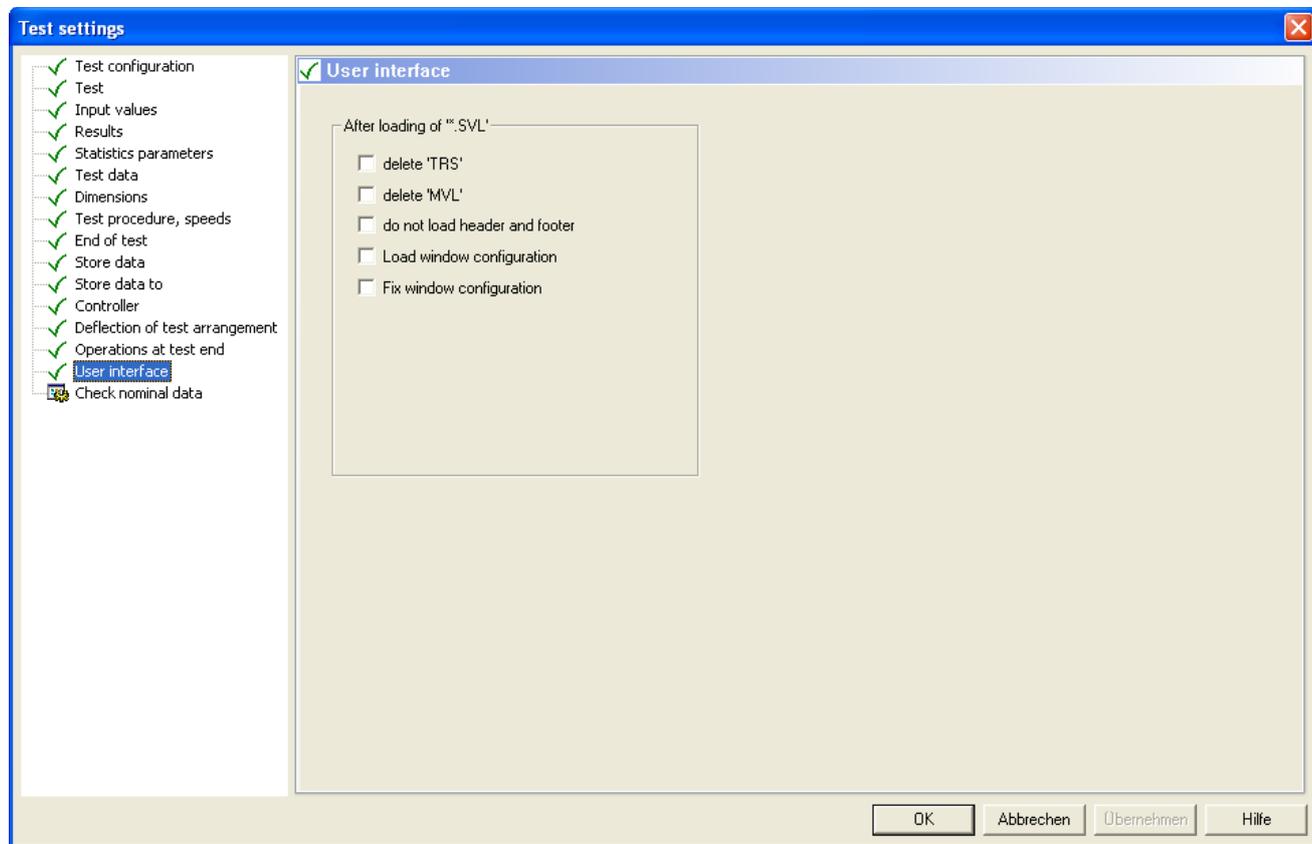
Occasionally, a test cannot be observed by the assayer (e.g. long term tests). In this case, it makes sense to point out to the assayer, that the test has been ended. This can be done by an audible signal. This and further settings can be defined here.



1. If needed, set an audible signal for the end of the test.
2. Define, if the current test results are supposed to be copied into the clip board (recommended).
3. Determine, if the sample dimensions are supposed to be imported after the end of the test and if the drive is supposed to be switched off.
4. Define, what the software is supposed to do with the results of an invalid test.
5. Define, if and when the next test is supposed to start automatically.
6. Choose the control mode, in which the machine is supposed to stop (e.g. position controlled).

5.2.15 Test settings – User interface

Here you can set, what the user interface is supposed to look like after the initial value file (.svl) has been opened.



1. With a checkmark set in the corresponding field you determine if the statistics (**TRS**) are to be deleted after loading, if the measuring diagram (**MVL**) is to be removed and if the header and footer or the window configuration is to be loaded.

Window position:

With the Software it is generally possible to blend in or blend out the individual document windows as well as to change their position and size in any order. This way, you can optimize your monitor to any processing step (e.g. a bigger **MVL-Window** during the test run, a large **TRS-Window** at the test end or a large **OSZ-Window** while rigging to optimize the controller parameters a.s.o.). You can store these settings as so called window positions. How this is done, is described in chapter [Set document windows](#).



2. With a checkmark in the corresponding fields in the area Window position, you can determine that the associated windows cannot be moved.

5.2.16 Test settings – Check nominal data

TIPP Tip: The settings in this dialog do not have to be made, especially with dynamic tests, but in some cases they may increase the overview of the results.

In this dialog, you can define the reactions of the software to the results, which lie outside the limits. The appearance of these results in the TRS- and MVL-windows may be changed and bits may be set, which are supposed to generate a hardware reaction (e.g. red light, dialling tone) to invalid measurement values.

Test settings

- Test configuration
- Test
- Input values
- Results
- Statistics parameters
- Test data
- Dimensions
- Test procedure, speeds
- End of test
- Store data
- Store data to
- Controller
- Deflection of test arrangement
- Operations at test end
- User interface
- Check nominal data**

Check nominal data

By means of CheckBox 'active' can you activate/deactivate the check for the complete line.
There are only checked these results, where the boundary values are not equal to zero.
If the value 0 is entered for minimum or maximum, the corresponding boundary is not checked.

	aktiv	FH[N]	RH[N/mm ²]	AH[%]	dLH[mm]	FB[N]	RB[N/mm ²]	AE[%]	dLB[mm]
Maximum	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minimum	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xm + abs.	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xm + rel. (%)	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nominal data Xm	<input type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xm - rel. (%)	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Xm - abs.	<input checked="" type="checkbox"/>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

if outside **color TRS cell** **set Comm1..10**

Maximum	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	
Minimum	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	
Xm + abs.	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	
Xm + rel. (%)	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	
Xm - rel. (%)	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	
Xm - abs.	<input type="checkbox"/>	...	<input type="checkbox"/>	Comm.1	

Limit line active Mark
 Show in diagram Thickness: 0
Y: Time Color:
X: Time Point:
 Square

	1	2	3	4	5	6	7	8	9
Y above	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
X	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Y below	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

OK Abbrechen Übernehmen Hilfe

1. In the column **if outside** you can define, which results should be marked.
2. In the column **color TRS cell** you can define, if the corresponding result is supposed to be marked in colour. Therefore, click the **function field** and choose a colour in the appearing dialog.
3. In the column **Comm1...10 ...** you can define up to 10 comments for the result by choosing a number (Comm.1, Comm.2 a.s.o.) in the selection field and by entering a comment in the field next to it.
4. In the area **Set outfit** you can set a bit for a hardware reaction.
5. In the area beneath, you can define the display and the evaluation of characteristic curves, as well as if an evaluation is supposed to occur in certain points, only.

! Note: You have finished the definition of the Test settings now. Close the dialog with **OK**.

5.3 User-defined names and dimensions

The Software offers the possibility to define up to eight measured values and their related calculation regulations in addition to the standardized results. This is done in a simple scripting language in the [document window for TMB commands](#), which forms the basis of the T&M-Blockprogramming-function. This function is already included in every Base or Dynpack module.

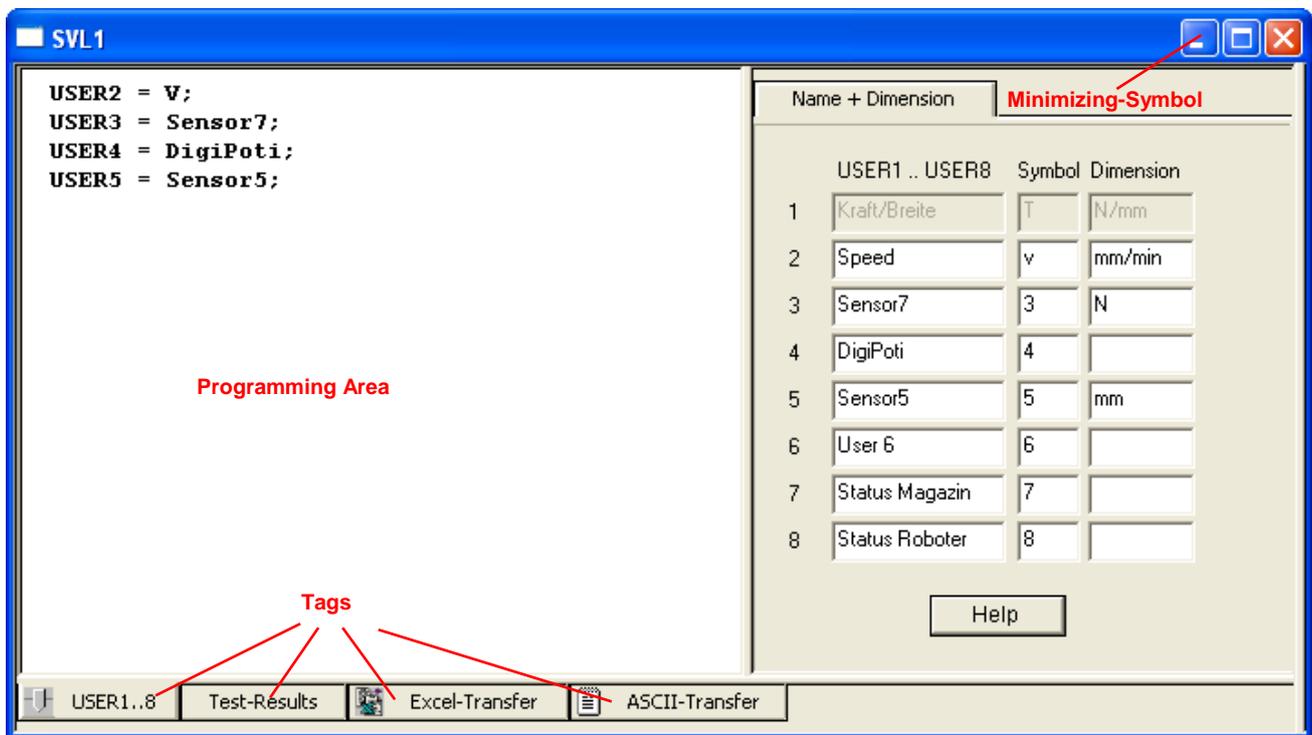


Tip: The T&M-Blockprogramming-function offers (context menu) every necessary function command for an immediate entry, thus eliminating malfunctions due to typing or syntax errors. So, you do not have to type the commands by hand.



1. Open the [document window for TMB commands](#) either via [symbol TMB commands](#) (symbol bar) or via [Menu Test](#) → [command USER1...USER8](#).

TMB



As you can see, the dialog includes four windows (USER1..8, Test-Results, Excel-Transfer, ASCII-Transfer). You can alternate between them by clicking the corresponding tag. Following this, you will find a short explanation for all four of them, even so for the moment, you only need [dialog USER1..8](#).

Dialog USER1..8

In [dialog USER1..8](#) you may set the so called „User defined dimensions“. The title bar shows SVL1, meaning that the data entered here will be stored in a .svl-file.

Dialog Test-Results

In [dialog Test-Results](#) you may define further test results as well as enter their calculation regulations after the test was ended (see chapter [Definition of additional results](#)). These values are then stored as .tmb-file (the title bar now shows TMB).

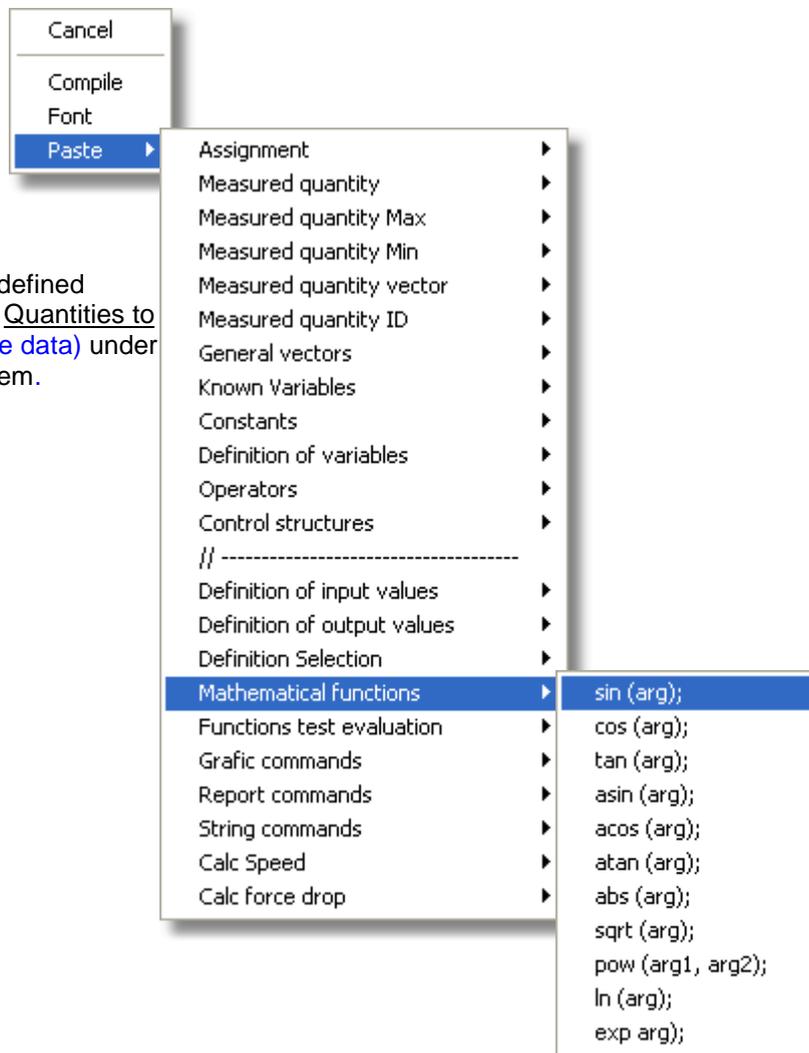
You do not need this function for normal situations, because the standard results normally are sufficient.

Dialog Excel-Transfer and ASCII-Transfer

After the test was ended, you may define, if and in which matter your test results are supposed to be exported in an Excel-chart or as an ASCII-file (see chapter [General evaluation](#)). These settings will be stored as .tmb-files.

Setting the user defined dimensions:

-  2. If necessary, you may rename the user defined names, as well as assign symbols and dimensions for them (right part of the dialog).
3. Do a right mouse click in the programming area → a context menu will open via which the individual function commands can be selected (see picture).
4. That way you may program a calculation regulation for the desired dimensions.
5. Afterwards click (context menu) **command Translate**. → The **T&M-Blockprogramming-function** now checks, if the entered regulation is correct. It will show possibly made entry mistakes which you can correct now.
6. If you have finished your definition, you can minimize the **window Initial values** by clicking the minimizing-symbol (top right).



As a result to these settings the user defined dimensions will now appear in the list Quantities to be stored ([Dialog Test settings – Store data](#)) under the terms you have just defined for them.

5.4 Set up the document windows



Note: You do not necessarily have to carry out the settings described in this chapter. Then, the software will work with the predefined settings.

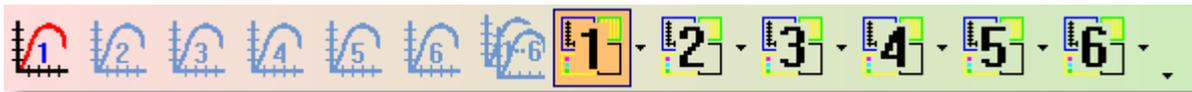
You can design the individual windows according to your wishes and thus determine which values are displayed and observed during the test and in which manner.



1. Do a right mouse click in the respective window → the associated context menu will open. Here you will find miscellaneous commands for designing the window and for the management of the data.
2. Make your settings and end them, where applicable, with **OK**.

5.4.1 Save several window positions

As already mentioned (see chapter [Test settings – User interface](#)), using the Software it is generally possible to blend-in or blend-out the individual document windows as well as to change their positions and sizes. This way you can adjust your monitor in an optimal manner according to each processing step (e.g. large [MVL-window](#) during the test run, large [TRS-window](#) at test end or large [OSZ-window](#) while rigging to optimize the controller parameters etc.). You can save these settings as so called window positions and define in [dialog Test setting – User interface](#) (menu [Test](#) → [command Settings – User interface](#)) which window is supposed to be loaded at which test step.



Symbols for the display of the MVL-window
Set window position 1:

Symbols for the window positions



1. First you have to activate the symbol bar [Select MVL-window](#) (if not already active). Therefore, click [menu Window](#) → [Command Select MVL-window](#) → the symbol bar [Select MVL-window](#) appears.
2. Click the [symbol Call window position 1](#). → Depending on the prior made definitions, the windows possibly rearrange themselves now.
3. Move the required document windows to the wanted positions on your monitor and readjust their sizes according to your wishes. → The window position 1 is now well-defined. If you change between the individual symbols now (window position 1 to 6), window 1 will always reappear at this position when clicking [symbol Call window position 1](#).
4. You may freeze this position in order to avoid a dislocation by mistake. Therefore, click the selection mark on the right side of the [symbol Call window position 1](#) → the [command Fix window position 1](#) appears. Activate it by clicking on it (a checkmark will appear in front of the command). → Now, the window position is fixed and you will not be able to move the window or change its size.
5. In case you want to cancel the fixation of the window, re-click the command to deactivate it (no checkmark in front of the command). Now, you are able to move the windows again.

Set window position 2 ... 6:

6. In order to set further window positions, repeat the steps 1 to 3 (respectively up to 5), by clicking the window symbol you want to set.

5.4.2 Measurement diagram MVL



1. Click **Context menu** → command **Diagram axes** or menu **Test** → command **axes** → the dialog **Diagram** will open.

The screenshot displays the MVL2 software interface. At the top, a window titled 'MVL2' contains a graph titled 'Dynamical test one axis'. The graph shows a square wave signal on a grid. The y-axis is labeled 'S (mm)' and ranges from -1 to 1.4. A context menu is open over the graph, listing options such as 'Diagram axes', 'HairCursor', 'Copy Bmp', 'Insert remarks', 'Font', 'Cut', 'Copy meas. values', 'Splitter window', 'Read in ASCII file', and 'Observation meas. values'. Below the graph, two 'Diagram' dialog boxes are shown. The top dialog is for 'Curve 1' and shows 'General settings' with fields for 'Headline' (Dynamical test one axis), 'Number of curves' (1), 'Margins' (2), and 'Diagram description' (checked options: Draw graph with a solid line, Mark test results, Mark test results in serie). The bottom dialog is also for 'Curve 1' and shows 'General settings' with 'X axis' (Time, s) and 'Y axis' (Force, N). It includes 'visible (%)' settings, 'Colors' (Curve: red, Axes: black), 'Draw curve in:' (Curve 1), and 'Thickness' (1). Buttons for 'OK', 'Abbrechen', 'Übernehmen', and 'Hilfe' are visible at the bottom of the dialog.



2. Here you can define the general appearance (predefined), margins, colour design and in the field **Number of curves**, the software will immediately adjust the existing amount of record cards. Now you will see a new card with the name 'Curve X'.
3. In the area **Diagram description** you define, if you want the measuring values interlinked (curve) or if and how the test results are supposed to be indicated.

Curve 1 (and following, depending on the number of curves).

4. Define the dimensions, units and arrangements of the diagram axes (area **X axis**, **Y axis**) and set a checkmark, if their scaling (**fit bounds to graph**) is supposed to be adjusted to the curve. The latter makes sure that the curves do not run out of the display during a longer test, but can always be seen.
5. You can change the visibility of the individual axes (area **visible (%)**). That way for example, it is possible to show several curves shifted against each other.
6. Set the colour of the curves and axes (area **colors**) or fade in the grid. With the field **Thickness** you determine the intensity of the curve. With the **scroll bar** next to it, you can move the Y-axis in order to be able to determine the values from certain curve points a lot easier.

5.4.3 Measured value display DSP



1. Click **Context menu** → **Command Measured value display** → the dialog **Measured value display** will open.

The image shows two overlapping windows. On the left is the 'DSP1' window, which displays a list of measured values in a black background with yellow text:

Time	0.00	s
Position	0.00	mm
Force	0.00	N
Elongation	0.00	mm
Cycle no.	0.00	
Stress	0.00	N/mm ²
Time		

A context menu is open over the DSP window, with 'Measured value display' selected. On the right is the 'Measured value display' dialog box. It features a list of checkboxes for 'Time', 'Position', 'Force', 'Elongation', 'Cycle no.', 'Stress', and 'User 1' through 'User 8'. The 'Time' checkbox is checked. To the right of the list are settings for 'Decimal places' (set to 2) and 'Unit' (set to 's'). There are also checkboxes for 'hh : mm : ss', 'Short names', and 'Show position' (checked). At the bottom of the dialog are buttons for 'Font', 'Background color', 'OK', 'Cancel', and 'Help'.



2. Here you determine which measuring values (including user values) should be displayed. Available are standard- as well as user values. The unit is set to seconds, as proposed to
3. Furthermore, you can set the **Fonts** and the **Background colour** for the **DSP-window**.

5.4.4 Results and Statistics TRS



1. Click **context menu** → several commands will appear.

The screenshot shows the TRS1 application window. The window title is 'TRS1'. It contains a table with the following columns: Valid, Date, Time, Comm.1, Comm.2, and FH [N]. The table has 11 rows, numbered 1 to 11. The 'Valid' column contains checkboxes, all of which are unchecked. The 'Date', 'Time', 'Comm.1', and 'Comm.2' columns are empty. The 'FH [N]' column contains the numbers 1 through 11. A context menu is open over the table, listing the following options: Cancel, Color results, Color statistic, Font, Copy '*.txt', Splitter window, Actual test visible (checked), a read in, b read in, h read in, and m read in. The 'Actual test visible' option is checked. The 'a read in', 'b read in', 'h read in', and 'm read in' options are listed below a horizontal line. At the bottom of the window, there are two tabs: 'Results' and 'Statistics'.



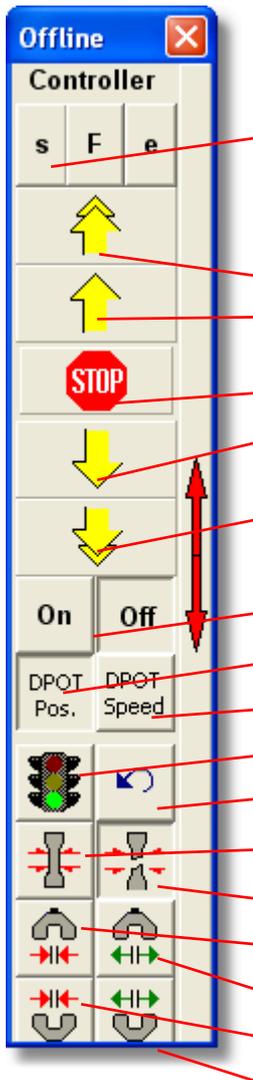
2. You can set the colour for results and statistics, change the fonts, blend in/out current tests and import individual sample data.

5.5 Manual Control of the Instrument

There are several possibilities to control the instrument manually – either for setting or during the test.

5.5.1 Virtual manual keyboard

The virtual manual keyboard, which becomes visible via [menu window](#) → [Command Manual Keyboard](#), offers the possibility, comparable to the RMCs or the EDC keyboard, to move the crosshead manually. Via the context dialog [Manual keyboard](#) you can define the individual fields.



Offline [Close]

Controller

s F e

Fast travelling of the crosshead up

Slow travelling of the crosshead up
(1/10 of the value at fast travelling with active function DPOT Speed)

Stop the crosshead

Slow travelling of the crosshead down
(1/10 of the value at fast travelling with active function DPOT Speed)

Fast travelling of the crosshead down

On Off

DPOT Pos. DPOT Speed

Apply strain transducer automatically

Remove strain transducer automatically

Close upper grips

Open upper grips

Close lower grips

Open lower grips

Functions of the virtual manual keyboard:

Control type for the crosshead mode: **s**: position controlled, **F**: load controlled, **e**: strain controlled. At the moment position control is possible, only.

On, Off: Switching on/off the drive of the testing instrument

DPOT Pos.: Activates the position controlling of the Digipotis

DPOT Speed: Activates the speed controlling of the Digipotis

Start the test

Crosshead return to position 0.

Apply strain transducer automatically

Remove strain transducer automatically

Close upper grips

Open upper grips

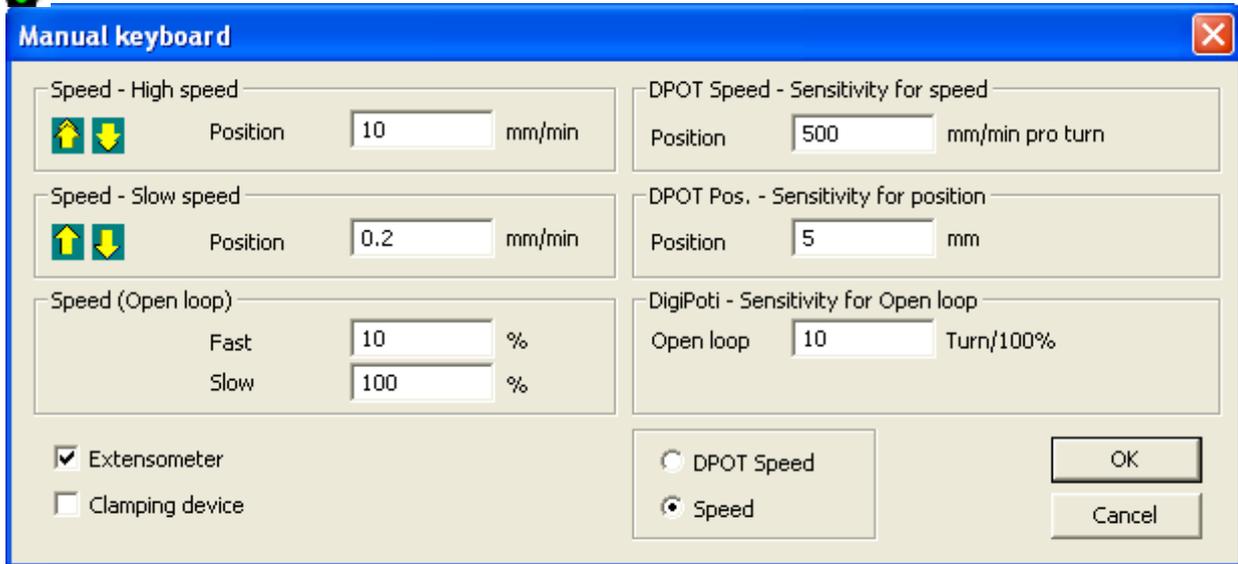
Close lower grips

Open lower grips

You can change the settings for the virtual keyboard as follows:



1. Do a right mouse click on the manual keyboard → the dialog **Manual keyboard** will open.



Speed – High speed / Slow Speed

2. Here you can define the values for the fast and slow travelling of the crosshead for the up and down direction → by using the [single-](#) or [double arrows](#) on the virtual keyboard.

Speed (Open Loop)

3. Here you can define the crosshead path in case there is no position controller connected to the testing instrument. The crosshead will be driven uncontrolled then.

DPOT Speed – Sensitivity for the speed

4. Define the speed for driving the crosshead via the DigiPoti in speed control ([function field DPOT Speed](#) on the virtual keyboard).

DPOT Pos – Sensitivity for Position

5. Define the position for driving the crosshead with the DigiPoti in position control ([function field DPOT Pos.](#) on the virtual keyboard).

DigiPoti – Sensitivity for Open Loop

6. Here you can define the crosshead path in case there is no position controller connected to the testing instrument. The crosshead will be driven uncontrolled then.

Selection fields for the extensometer and clamping device:

7. Via a checkmark you can define, if the function fields for applying a strain transducer respectively for the opening and closing of the grips are to be activated. → This way they will appear or disappear from the virtual keyboard.

Selection field for DPOT Speed and Speed:

8. Here you define which of the defined values are to be active for the controlling.

Function DPOT Speed:

activates the values entered under DPOT Speed and DPOT Pos.. The arrows react with the values set for the DigiPoti.



Note: This setting is helpful if you have got a Digipoti to drive the crosshead, e.g. at the EDC or with a RMC.

Example 1:

If you activate the speed control ([function field DPOT Speed](#)), turning the digipoti results in a movement of the crosshead with a speed of 500mm/min per revolution. By clicking the yellow double arrow on the virtual keyboard, the crosshead moves with the set speed (500mm/min), whereas the speed for the single arrow is 1/10th of this speed (here 50mm/min).

Example 2:

If you activate the position control ([function field DPOT Pos.](#)), turning the digipoti results in a movement of the crosshead with a speed of 5mm. By clicking the yellow double arrow on the virtual keyboard, the crosshead moves with a speed of 5mm, also, whereas using the single arrow the movement will only be 1/10th of the way (here 0,5mm).

Function Speed

activates the set values in the areas Speed... → on the manual keyboard the [function field DPOT Speed](#) is replaced by [Speed](#).

Example 3:

If you click the [function field Speed](#), the crosshead moves - by means of the double arrows – with the defined speed of 100mm/min; with the single arrow 1mm/min.

5.5.2 Travel order

With the [dialog Travel order](#) you can move the crosshead manually, e.g. while rigging, to approach position 0 or for clamping the sample. Travelling is possible in position-, load- and strain control.



1. Open [dialog Travel order](#) via the [symbol Travel order](#) or via [menu Machine](#) → [command Travel order](#).



The screenshot displays the 'Travel order' dialog box with three tabs: 'Position controlled', 'Force controlled', and 'Strain controlled'. The 'Position controlled' tab is active, showing fields for Position (10 mm), Direction (upwards), and Rate (400 mm/min). The 'Force controlled' tab shows Force (5 kN), Direction (Compression), and Rate (1000 N/s). The 'Strain controlled' tab shows Elongation (0 mm) and Rate (30 mm/min). Red dashed arrows point from the 'Start' button in the Position controlled tab to the 'Start' button in the Strain controlled tab, and from the 'Rate' field in the Position controlled tab to the 'Rate' field in the Strain controlled tab.

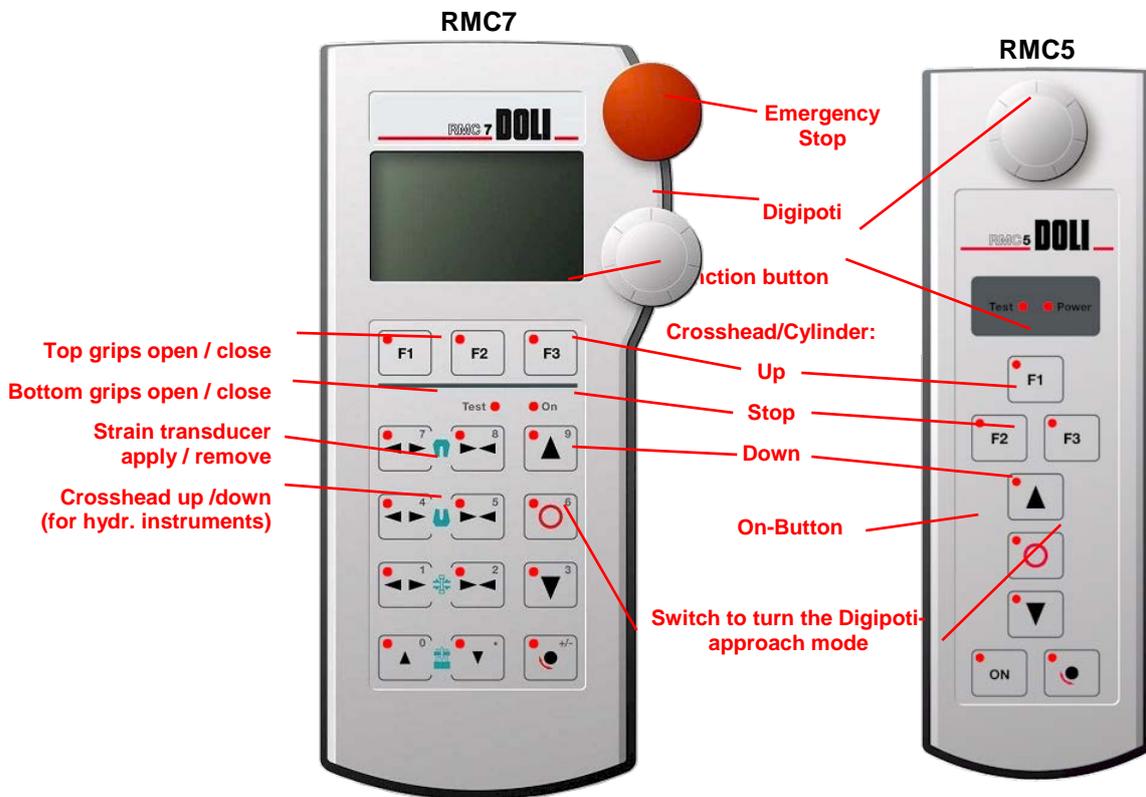
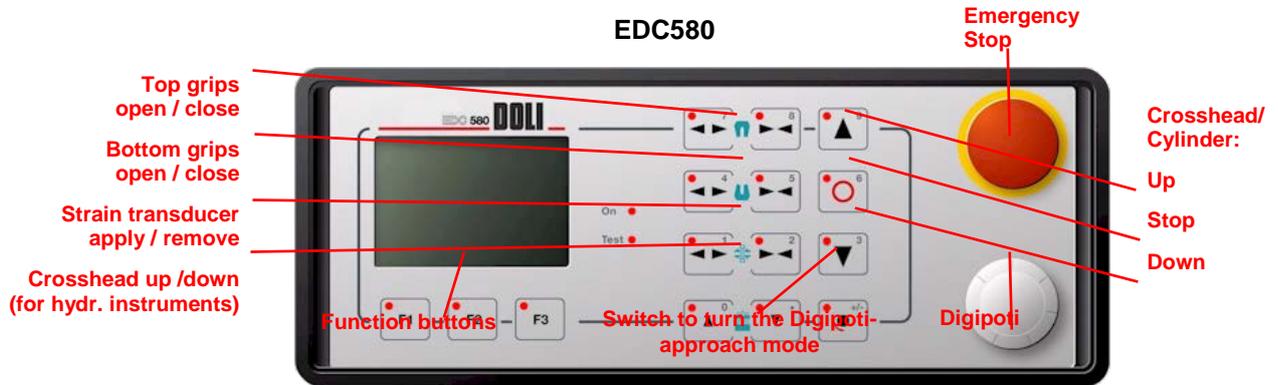
and the speed for the crosshead movement. (Tension/compression) and the speed for the

Strain controlled: Enter the desired elongation of the sample and the speed.

3. With [Start](#) you start the Travel order; with [Stop](#) you can stop it.

5.5.3 RMC Remote Control and EDC-Display

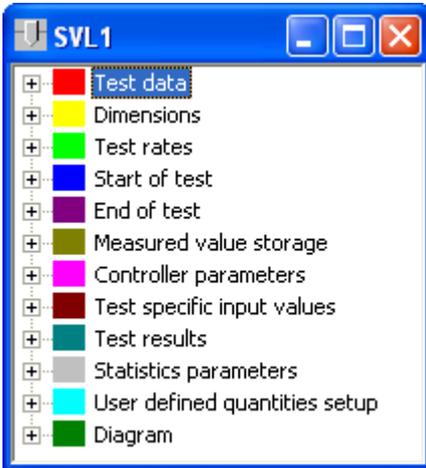
If you have an EDC with display or a RMC (remote control), you may control several functions by using the keyboards of these devices.



5.6 Test settings store



Note: The document window **Initial values (SVL)** gives you an overview of all set pre-definitions. It shows which .svl-file is active at the moment. Just click the cross in front of the respective item and the associated data will be shown.



1. In order to save the test settings activate the **SVL-window** (click in the window). Click **symbol Save**  or use **menu File → Save** → the **dialog Save as** will open. The field **File name** shows “SVL”, the field **File type** shows “SVL-Files”.
2. Choose the desired path and save the initial values under the desired name.

5.6.1 Save data under the dialog Filelist



1. Via **menu File → command Filelist** or via **symbol Filelist** you can open the **dialog Filelist**. You can copy test files into this list by using the **function field insert in list**.



Tip: In case you are working with few different test files only, you should store them in the filelist. This will give you a fast access to the files.

6 Performing a test

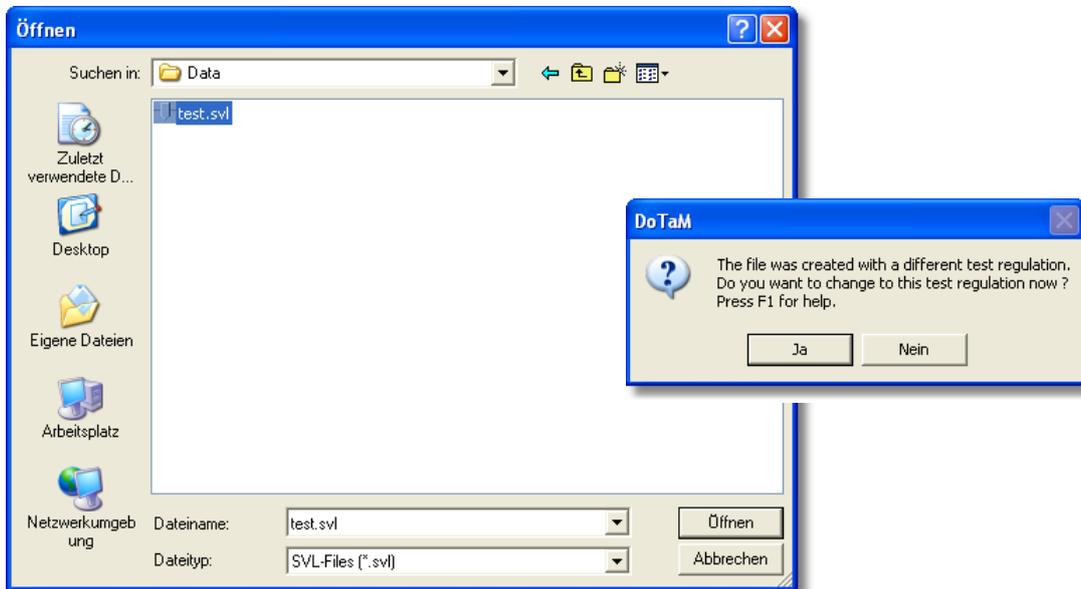
Here the general approach for a test performance is outlined.

Load initial values

In chapter [Preparation of a test](#), you have defined test settings and you have stored them in an initial value file. You have to load these data now:



1. Click [menu File](#) → [command Open](#) → [Method SVL](#)
or activate the [SVL-window](#) and click [symbol Open](#)
→ the [dialog Open](#) will appear.
Optionally click [symbol File list](#) → the [dialog File list](#) will appear
2. Choose the desired file and open it.
3. Where necessary the program will ask, if you want to change the test regulations.
Confirm with [Yes](#).



4. If necessary, you can check the loaded values via the [SVL-window](#).

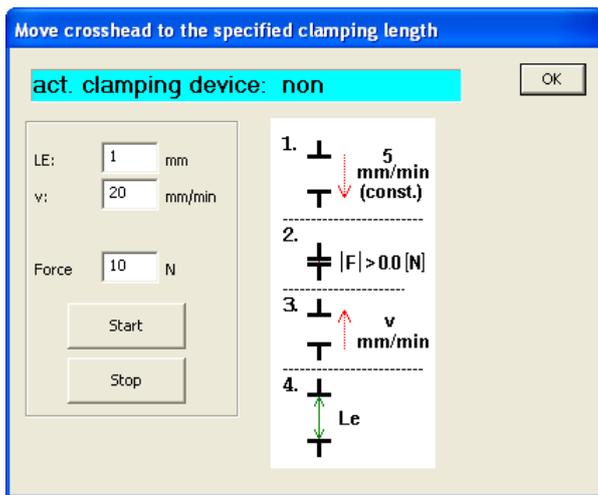
Clamp a sample



Note: In case you already have set /defined the clamping length (see chapter [Setting the clamping length](#)), continue with point 7.



5. Click [symbol clamping length/Set distance between plates](#)  if you want to approach the clamping length exactly or if you still need to define the clamping length. → The [dialog Move crosshead to the specified clamping length](#) appears. You have defined the values for LE (clamping length), v (speed for the approach) and load (pre-load) in the test preparations already (see chapter [Setting the free clamping length](#)).



6. Click the [function field Start](#). Now, the testing instrument will approach the clamping length:
Step 1: With constant speed of 5mm/min the clamps are driven together, until in →
Step 2 the pre-load F is reached (field [load N](#)).
Step 3 Now, the clamps move apart from one another with the speed v (field [V mm/min](#)), until in →
Step 4 the free clamping length LE (field [LE mm](#)) is reached.
(See chapter [Setting the free clamping length](#)).
Now, continue with step 8.
7. Use one of the following possibilities to clamp the sample on to the clamping device of the testing instrument:
Remote controlled Travel order (with direction arrows and digipoti on the EDC)
Via the virtual manual keyboard
Travel order in the [dialog Travel order](#) (menu Machine → [command Travel order](#))
[Command Tare position](#) (menu Machine) or [symbol Tare position](#) (symbol bar)
[Command Crosshead return](#) (menu Test) or [symbol Crosshead return](#) (symbol bar)
8. Clamp the sample to the grips of the testing instrument.
In case the clamping device has automatic grips you can open and close them via the manual keyboard control or via the respective buttons on the RMCs or the EDCs.



Note: Preferably, the sample has to be clamped free of transverse load.

Start a test



Attention: Before you start a test, the crosshead must be at position 0, otherwise there may be damages to the testing instrument as a result of this.



Note: Via menu **Test** → command **Settings** → dialog **Test settings – Test procedures**, field Automatic crosshead return after end of the test you may define, if the crosshead is supposed to return to position 0 automatically.



9. Move the crosshead to position 0 (in case it is not already there). You may use one of the following commands to do so:

Remote controlled Travel order (with direction arrows and digipoti on the EDC, on the RMCs or on the virtual manual keyboard)

Travel order in the dialog **Travel order** (menu **Machine** → command **Travel order**)

Command **Tare position** (menu **Machine**) or symbol **Tare position** (symbol bar)

Command **Crosshead return** (menu **Test**) or symbol **Crosshead return** (symbol bar)

10. Start the test with symbol **Start** (traffic light)



Abandon Test

You can end the running test at any time with symbol **Stop**



Crosshead return after test end

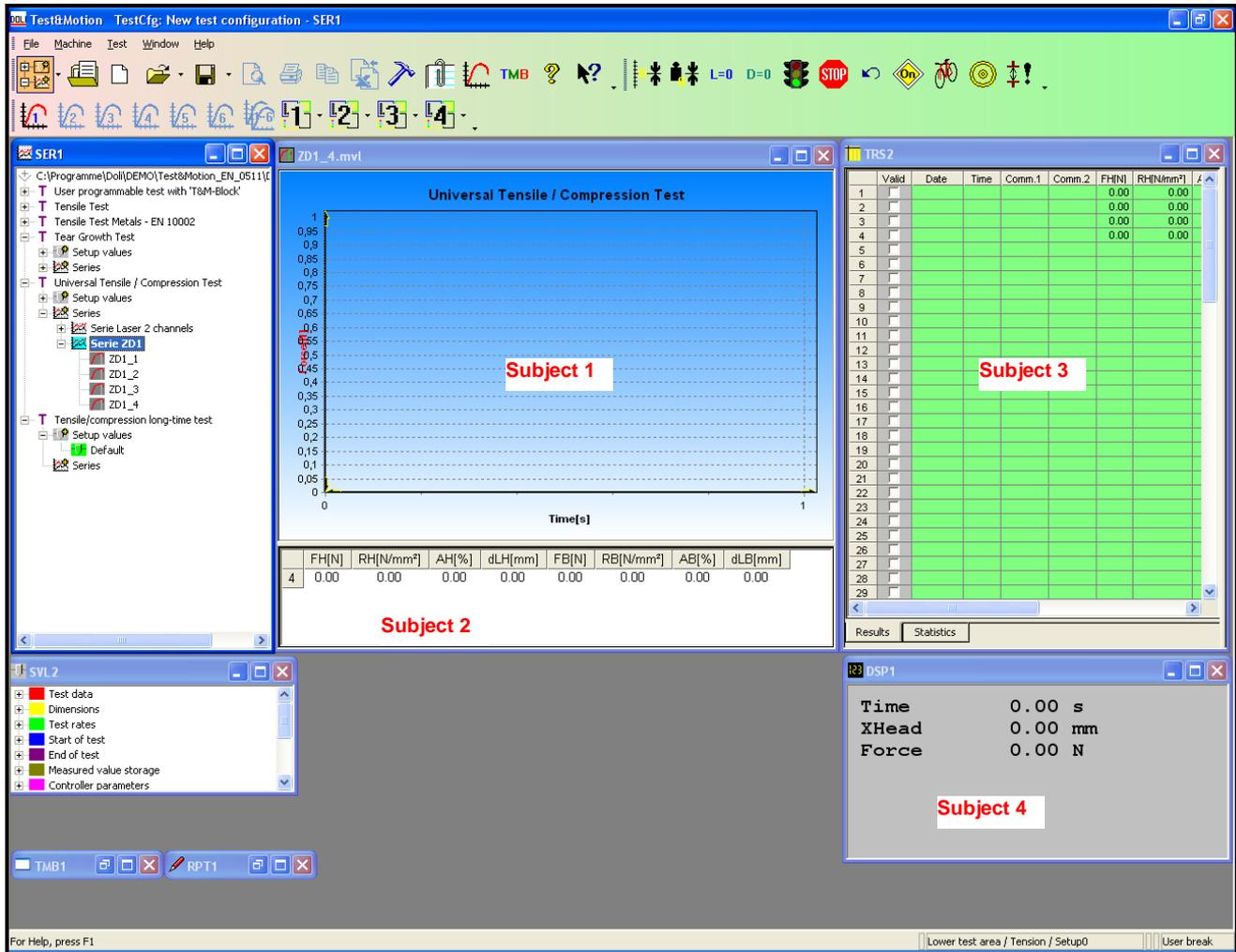


11. In case this is not done automatically, you can move back the crosshead to position 0 with symbol

Crosshead return  after the end of the test.

7 Evaluation of a test

At the end of a test or a test series the results are shown in different ways and you have several possibilities to work with the test results.



7.1 Results Display

This is what you see:

1. The curve is shown in the [document window Measurement diagram \(MVL\)](#). Depending on the test regulations some of the results are displayed in colour.
2. After the end of the test, the test results are calculated and displayed in the lower part of the [document window Measurement diagram \(MVL\)](#) (with setting "Splitter-Window", [Context menu](#) → [command Splitter-Window](#)).
3. The test results are entered into the result chart, and the statistic will be re-calculated ([document window Test results and statistic \(TRS\)](#)).
4. In the [document window Measured value display \(DSP\)](#), you will find the last measured values of the test.

7.2 General Evaluation

This is what you can do to edit the test and the results:



1. **Delete data**
if you do not want to keep the data of the last test, click at them in the [TRS-window](#) and delete them from the result chart with [Menu Test → command Delete](#).
2. **Edit the measurement diagram**
You can edit the [document window Measurement diagram \(MVL\)](#) in different ways (see chapter [Edit measurement diagram](#)).
3. **Zooming**
With the mouse-zoom-function you can enlarge sections in the graph window ([MVL](#)). Therefore, push down the left mouse button anywhere in the graph, and pull the mouse from the upper left to the lower right (mouse button stays pushed) in the diagram, and then release the mouse button → the selected section is displayed aggrandised. This procedure can be applied to several times in a row. To go back to normal display, pull the mouse (left mouse button pushed) from the lower right to the upper left.
4. **Moving**
Do a right mouse click in the graph window ([MVL](#)), keep the mouse button pushed and move the mouse → the graph section will move.
5. **Change Test settings**
Even after a test you may change many test settings or define, which dimensions are to be issued or printed ([menu Test → command Settings → Results](#)). Thereupon the test results are re-calculated with the changed input values or the chosen results are displayed.



Note: This, however, may not be helpful for dynamic tests.

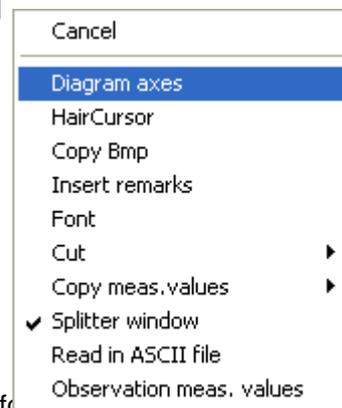
6. **Save data**
You can save your data in order to reload it later on if needed ([menu File → command save](#), see chapter [Store data](#)).
7. **Print test report**
You can have a test report printed for the last test respectively for the running test series ([menu File → commands Page Preview and Print](#)). The [command Page Setup](#) enables you to design the printouts according to you wishes (set margins and paginations, adjust header and footer, add company logos, add or delete measured values).
8. **Export data**
You can export data via the clip board in order to work with them further on in other programs ([symbol Export data](#) → the [dialog Export](#) will open, see chapter [Export data](#)).

7.3 Edit measurement diagram

The Software offers different possibilities, to edit the measurement diagram. In addition to the functions **Zoom** and **Moving**, which have already been described in chapter [General evaluation](#), you have further possibilities via a context menu. Below find explanations for the most important ones.



1. Do a right mouse click in the graph in order to open the context menu and then click the respective command.
2. **Command Diagram axes**
→ The **dialog Diagram** will open. Here you can define the appearance of the diagram and the display of the results, as described in chapter [Measurement diagram MVL](#).
3. **Command Hair Cursor**
With the Hair Cursor you have the possibility to show the results for each single point on the graph: use the Hair Cursor to point to certain points on the graph → the corresponding measured values will be shown in the **DSP-window** at the same time.
4. **Command Insert remarks**
The **dialog Remarks** will open. In the upper left row enter the desired text for **function field Add**. The comment is written into the list beneath. You can change or delete the comments, also (use the respective function field).
Form, colour, transparency, shadows and font sizes for the comment can be set in the lower part of the dialog.
5. **Command Cut**
You may cut the graph in the front or in the back.
6. **Command Copy measuring values**
You may copy the measuring values as different file types (**dialog Save as** will open) or to the clipboard.
7. **Command Splitter window**
Here you can define if the **MVL-window** is displayed as a mere graph window or as a twice-shared window with the measuring values under the graph.
8. **Command Read in ASCII file**
You may read in data from an ASCII-File (the **dialog Open** for the selection of the file will open) and display them in the **MVL-window**.



7.4 Definition of additional results

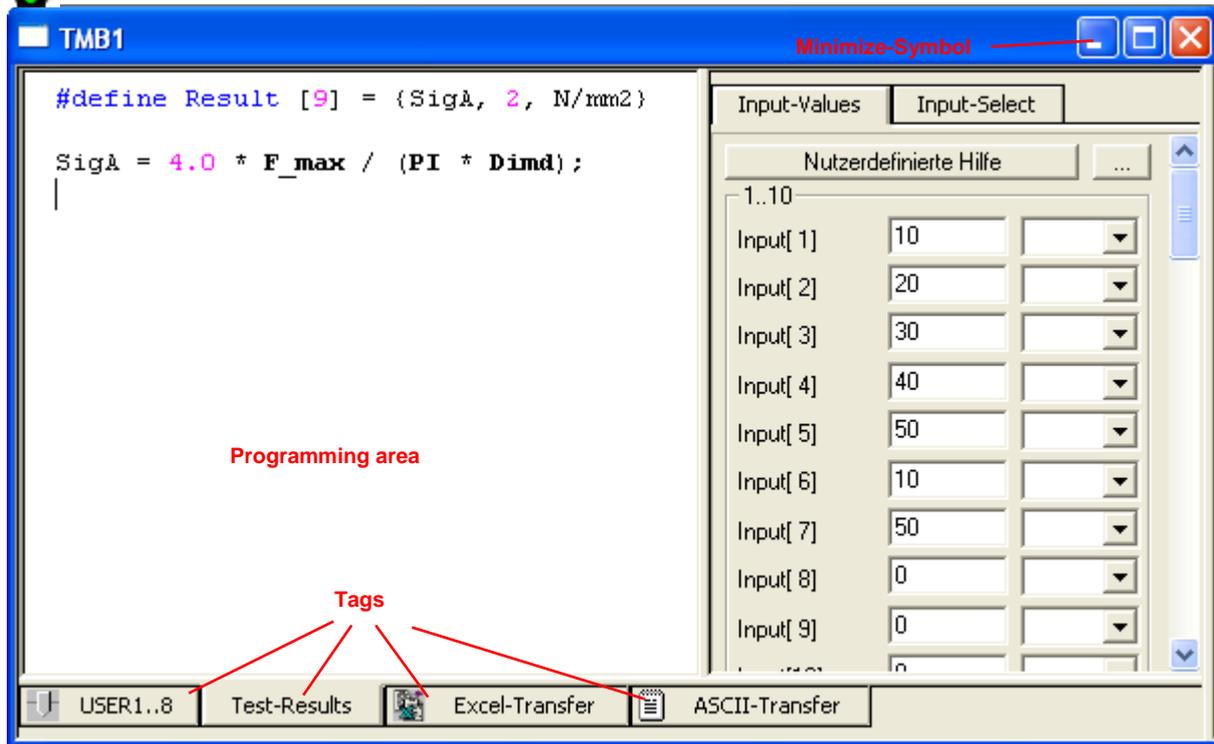
In addition to the results calculated by the **T&M-Dynpack**-Software, you can define further output values and set their calculation regulations. This is done in the [document window TMB commands \(TMB\)](#) under [dialog Test-Results](#).



Note: Normally, you do not need this function, because generally the standard results are sufficient.



1. Click the [symbol TMB Commands](#)  → the window will open. Click the tag [Test-Results](#).



The programming area and the right area are independently. The additional results are generated in the programming area via the context menu, either by re-entry or by changing the already existing calculation regulation. This data is then stored as a .tmb-file and appears in the list for the selectable results in [dialog Test settings – Results](#). In case you select them here, they will appear in the [MVL-window](#) under the graph (see [Splitter-Window-Settings](#)). For the other dialogs in the [TMB-window](#) see the chapters [Set User defined dimensions](#) and [Data Export](#)).

Example:

An additional output value is defined now in the „Universal Tension- / Compression test“ (Short: „UZD 1“), which is part of the **T&M-Dynpack**-Software. Therefore, the existing result 9 (once A11, see [dialog Test settings - Results](#)) will be changed:

The definition of the calculation regulations for the output value is done in simple script language.



2. Switch to the test regulation „ Universal Tension- / Compression test“ UZD 1 ([Symbol Test settings](#) → [Test configuration](#)) and confirm with **OK** (if needed twice). → The [dialog Test settings](#) will close again and you will be back in the [TMB-window](#).



3. **Formula entry**

In the programming area enter the following formula:

```
#define Result[9] = {SigA, 2, N/mm2}
```

You have two possibilities to do this:

Simply enter the formula → during the entry the program will automatically change the colour of the characters according to their function in the formula.

Or you use the entry help of the context menu. → Therefore, do a right mouse click in the programming area → the context menu will open. Select the [command Insert](#) → [Definition of output values](#) → [Command #define Result \[1\] = {Name, digits, dimension}](#). → This entry will appear in the programming area and you will only have to adjust it.

This entry means: Result 9 will be defined = its term will be SigA, it will be shown with two internal decimal places and has the unit N/mm2.

4. **Compilation**

Do a right mouse click in the programming area again → the context menu will open. Here click the [command Compile](#). → Now, the **T&M**-Blockprogramming-function checks if the entered formula is correct. In case of a mistake you will see an error message, which will help you with the correction.

5. Click the minimizing symbol of the [TMB-window](#) → and the window will minimize to the lower part of the monitor.

6. **Check in the [dialog Test settings – Results](#)**

Click the [symbol Test settings](#) → (the dialog with the same name will open) and then [Results](#). → The result “SigA” can be found in row nine of the list. If you click at it, you will see the name, the unit and the two internal decimal places, which you have programmed.

7. **Check in the [MVL-window](#)**

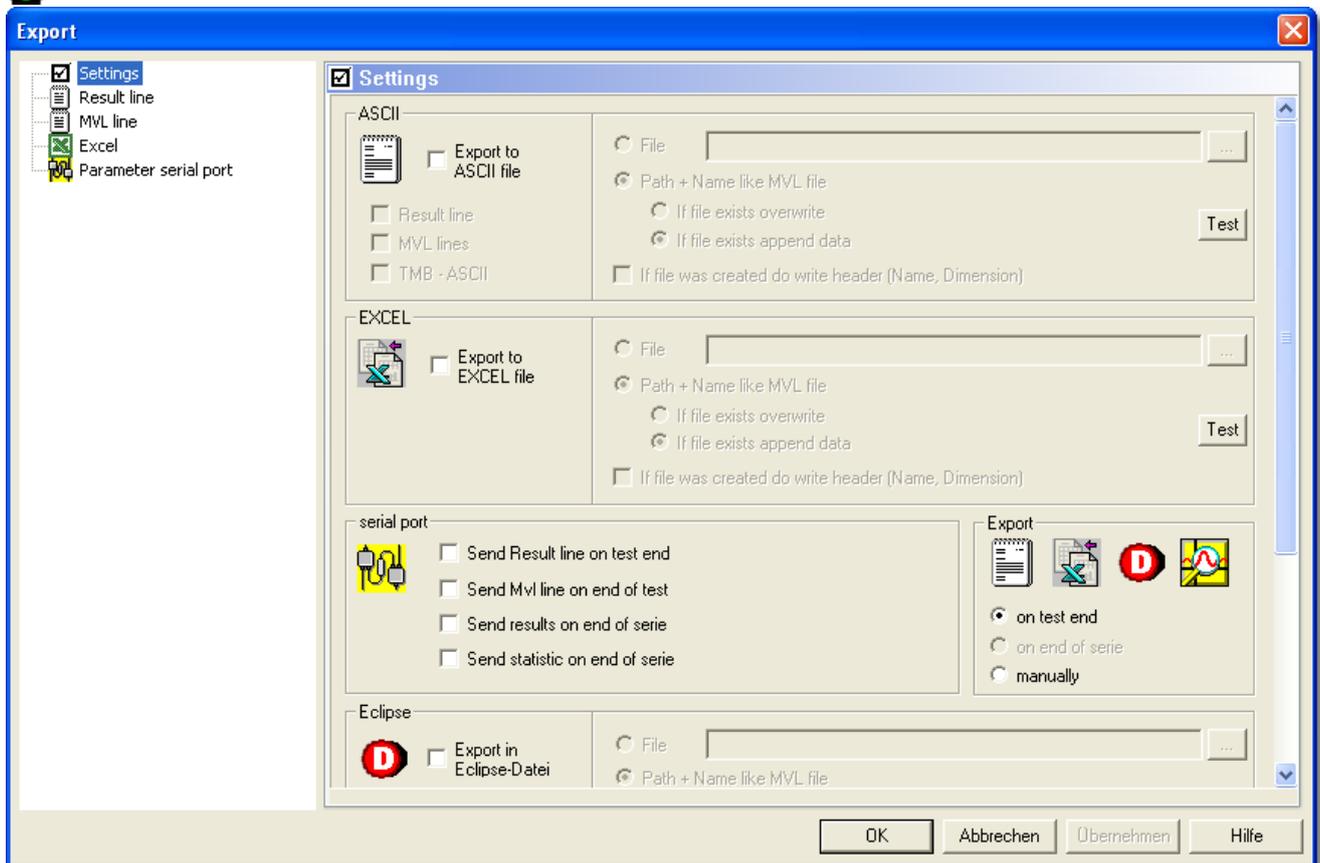
Set a checkmark at the “result 9” and close the dialog with **OK**. → In the [MVL-window](#) the column [SigA\[N/mm2\]](#) will appear in the result row.

7.5 Data Export

You have several possibilities to export data. For example you may export: in an ASCII-File, in an EXCEL-file, via a serial interface or in an ECLIPSE-file. In case you want to export your data please do as follows.



1. Click **Symbol Export data** . → The dialog **Export** will open.



The dialog **Export** offers further sub-dialogs which can be opened by clicking the associated title in the left list.

Dialog Settings:



2. Here you define the export possibilities: areas ASCII, EXCEL, serial port or Eclipse. Several definitions are possible, too. Partly, you can set via checkmarks which data is to be exported at what point of time (e.g. field Send result line on test end in the area serial port) and if this is to be done automatically or manually (fields on test end or manually in the area Export). In the right part of the respective area you can define, how the data is supposed to be saved, e.g. in a selected file (field File) or in the same path as the .mvl-file. You determine if existing files are to be overwritten (fields if file exists....) and you may test the defined settings directly (function field Test).

Dialog Result line

-  3. From the list available parameters you can copy individual parameters via the function fields **>**, **Reset** and **<** into the list selected parameters. In the areas Results and Separator you can define the parameters more precisely (with/without name, dimension, decimal indicator as point or comma a.s.o.). In the area Begin of line and End of line you define how a line is supposed to begin or end, so that the Target-Software can process and part the data correctly. → In the display area underneath it, you can directly see how the result line will change according to the settings you have made.

Dialog MVL line

-  4. It is possible for the MVL-line, also, to select, which parameters (via a click in the selection list) and via which way (fields decimal places, Unit, Value with) are to be displayed and how the line is supposed to be formatted (area Format of a line). → In the display area underneath it, you can directly see how the result line will change according to the settings you have made.

Dialog Excel

-  5. If you wish a data export into an Excel-File, define here, how the chart is supposed to look and which values it should contain.

Dialog Parameter serial port

-  6. Here you define the serial port for the transmission as well as further parameters. With the function fields **Send result line now** and **Send current curve now** you activate the data transfer.

7. Close the dialog with **OK**, if you have defined all the necessary settings.

8 Description of the tests

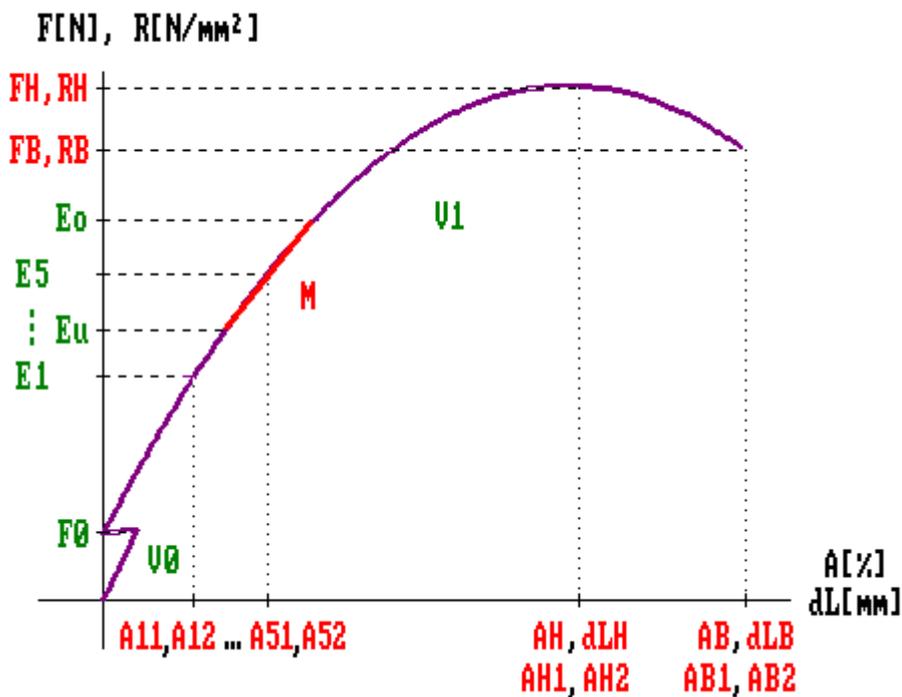
8.1 Universal-Tension-/Compression test ZD1 (included in the base module)

8.1.1 Range of application

Define the maximum load for the test, break load, strength as well as its strain and up to 5 reference values in the Tension- respectively Compression test. Definition of the deflection at constant load.

8.1.2 Test Graphics ZD1

Do a mouse-click on the in-/output values, for which you want help.



8.1.3 Input values ZD1



1. Click [menu Test](#) → [command Settings – Input values](#). Here you will already find helpful input values for the test procedure. If necessary, adjust the entries according to your needs.

Parameter	Meaning	Dimension
E1	Reference value 1	[N, kN], [N/mm ²], [mm_S], [mm_dL], [%], [s, min, h] [Dim User1], .. , [Dim User8]
E2	Reference value 2	Dimensions analogue E1
E3	Reference value 3	...
E4	Reference value 4	...
E5	Reference value 5	Dimensions analogue E1
Eu	Lower limit module	Dimensions analogue E1
Eo	Upper limit module	...

8.1.4 Output values ZD1



1. Click [menu Test](#) → [command Settings – Results](#). Here you will already find helpful input values for the test procedure. If necessary, adjust the entries according to your needs.

Parameter	Meaning	Remark
FH	Maximum load (Tension/compression)	Calculation during the test
RH	Tension/compression strength	Calculation during the test
AH	Total elongation at max. load	Calculation during the test
dLH	Elongation at max. load	Calculation during the test
FB	Load at break	Calculation during the test
RB	Stress at break	Calculation during the test
AB	Total elongation at sample break	Calculation during the test
dLB	Elongation at sample break	Calculation during the test
A11, A12	Measuring values at input value E1	
A21, A22	Measuring values at input value E2	
A31, A32	Measuring values at input value E3	
A41, A42	Measuring values at input value E4	
A51, A52	Measuring values at input value E5	
AH1, AH2	Measuring values at max. load	The meaning of the output values is defined by the selected units (analogue to the output values A11, A12, ... A51, A52). Calculation during the tests.
AB1, AB2	Measuring values at break load	
M	Module between input values Eu and Eo	Calculation during the test. The module limits are defined by the input values Eu and Eo.
t	Load duration (time from reaching F0 until the end of the test.)	
S0	Cross-sectional area of the sample	
PA1	Sample dimensions 1 (not for all sample forms)	
PA2	Sample dimensions 2 (not for all sample forms)	

8.1.5 Notes for the test ZD1

8.1.5.1 Notes to Pre- load F0

- Elongation and strain are set to zero.
- Switch point for testing speed V0 to V1
- The measuring length will be adjusted to $L0' = L0 + dL(F0)$

$L0'$ *adjusted measuring length*

$L0$ *measuring length*

$dL(F0)$ *Sample deflection at F0*

8.1.5.2 Notes to input values E1...E5

At the 5 points E1, ... , E5 (entry under "Test → Settings → Input Values"), 2 output values (A11, A12, .. , A51, A52) can be determined for each point. The meaning of the in- and output values is determined by the selected dimensions. Depending on the selected dimensions different test results are determined.

Units for the input- and output values	Meaning
N, kN	Load
N/mm ²	Stress
%	Strain
mm_dL	Elongation
mm_S	Crosshead position
s, min, h	Duration
Dim User1	User-defined meaning 1
Dim User2	User-defined meaning 2
Dim User3	User-defined meaning 32
Dim User4	User-defined meaning 4
Dim User5	User-defined meaning 5
Dim User6	User-defined meaning 6
Dim User7	User-defined meaning 7
Dim User8	User-defined meaning 8

8.1.5.3 Notes to results ZD1

When reaching the maximum load and at the moment of break, it is possible to define two additional output values in amendment to load (FH, FB), stress (RH, RB), elongation (dLH, dLB) and strain (AH, AB). This way, it is imaginable to define the values of User-defined dimensions as output values. This simply is done via the unit selection of the output values AH1, AH2, AB1 or AB2.

8.1.5.4 Notes to module

Between the input values Eu and Eo a tangent module is determined.

8.1.5.5 Notes to End of test



Note: With compression tests you always should activate "Smax" as test end criterion (Safety criterion). In doing so, Smax is to be selected smaller than the pressure plate distance at test start.

Smax < LE at test start

8.1.5.6 Notes to keep loads and deflections at a constant level

 **Note:** By entering the speed "0" it is possible to hold stresses as well as deflections constant. In doing so, it will be helpful when approaching a load - which is supposed to be kept constant – that this is done in a load controlled manner; analogue at deflections.

The load respectively the deflection supposed to be kept constant will be selected as switch point and is to be entered accordingly.

Tests with constant loads are to be ended after a certain time respectively position (deflection); Tests with constant deflections are to be ended after a certain time respectively loss of load (df) (Test end criteria).

Example:

V0 = 2mm/min
V1 = 100 N/s V1/V2 = 5000N
V2 = 0 N/s
Test end: Crosshead position: 4mm
Test time: 200s

 **Note:** If the sample must not be overloaded, we recommend, that you test with an additional speed.

Example:

V0 = 2 mm/min
V1 = 100 N/s V1/V2 = 4800N
V2 = 20 N/s V2/V3 = 5000N
V3 = 0 N/s

 **Attention:** It is absolutely necessary to adjust the parameters for the load controller to the stiffness of the test materials, when charging respectively holding in load control (see Help Controller parameters).

