

Test&Motion Plus

User Manual

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1 Introduction

Dear customer, thank you for choosing a product of **DOLI Elektronik GmbH**. This manual will help you to get familiar with your new testing software **Test&Motion Plus** fast. The manual shall answer questions and help you to solve problems, which might appear.

1.1 Symbols

The different symbols in this manual will allow you to find your way more easy.

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 Test&Motion Plus Software , the EDCs or the testing instrument.

1.2 Description

Test&Motion Plus is a state-of-the-art 32-bit application for the operating systems Microsoft Windows 7/8/10©.

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.



Test&Motion Plus 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 Test&Motion Plus Software:

- If you do not have any experience with Windows 7/8/10© yet, we recommend that you get yourself an overview of this operating system using the online-help or other literature before working with **Test&Motion Plus**.
- 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 **Test&Motion Plus** 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 CONFIG](#) 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, a lot of measured values will be recorded. They can be stored into a measurement value file (see chapter [Data Storage](#)).

These measurement values are the **standard values**

- | | |
|-----------------------------|----------|
| • Test time | T |
| • Crosshead position | S |
| • Load | F |
| • Elongation | L |
| • Strain (extension) | D |
| • Stress | R |
| • Cycles | C |

as well as up to **30 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 30 so-called **userdefined values**. You can define them in the [dialog USER1...USER30](#) ([menu Test](#) → [command USER1...USER30](#)). 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...USER30](#))
- 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. **Test&Motion Plus** 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 TRS

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“) or you can store them into a “Test specification database”. 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 you store the initial values to the database, you have to specify up to 4 selectors, to identify the dataset later. You save the initial data for example under “Article no.” and “Drawing no.”. With help of these selectors you can load the initial data from database.

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“). On top of that we can save them to a Series database (FireBird). 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 Test&Motion Plus will automatically save the measurement values under the defined path.

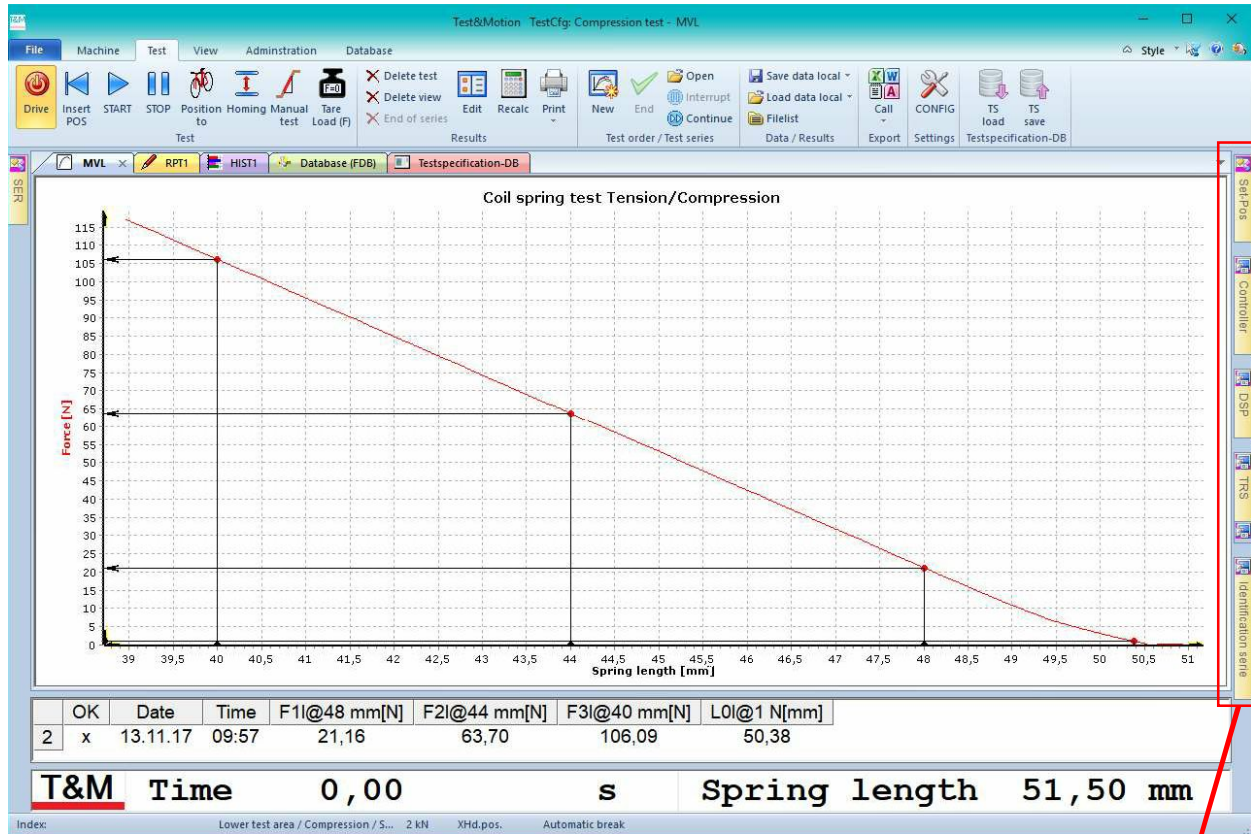
- The **test results** are stored as test result files (extension *.TRS = „Test results“). During a course of a test series, the results will be stored into the operating store of the PC and can be stored into a test result file if necessary. The initial values (meaning the values with which the test 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 **Test&Motion Plus** 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 **Test&Motion Plus**-Software consists of:

- Main frame with a variable number of registers (above) and dock windows (left and right) for additional data and informations.
- Presentation of the test results of a single test.
- Channel display horizontal
- The dock windows:

(They can be folded in when needed and pinned to the main frame)

- SER Directory tree for test series
- Controller Operating unit with various functions
- DSP Vertical channel display
- TRS Test result and statistics tables of a test series
- Identification series Header data of the test series in process (test order)





2.2 Opening and closing the docking window

Open a dock window

- Swipe with the mouse pointer: the window opens and closes again when the mouse leaves the window (mouse-over effect)
- Left mouse click on the element: The window opens and stops (in front of the main frame). By clicking on another screen area, the window closes again.

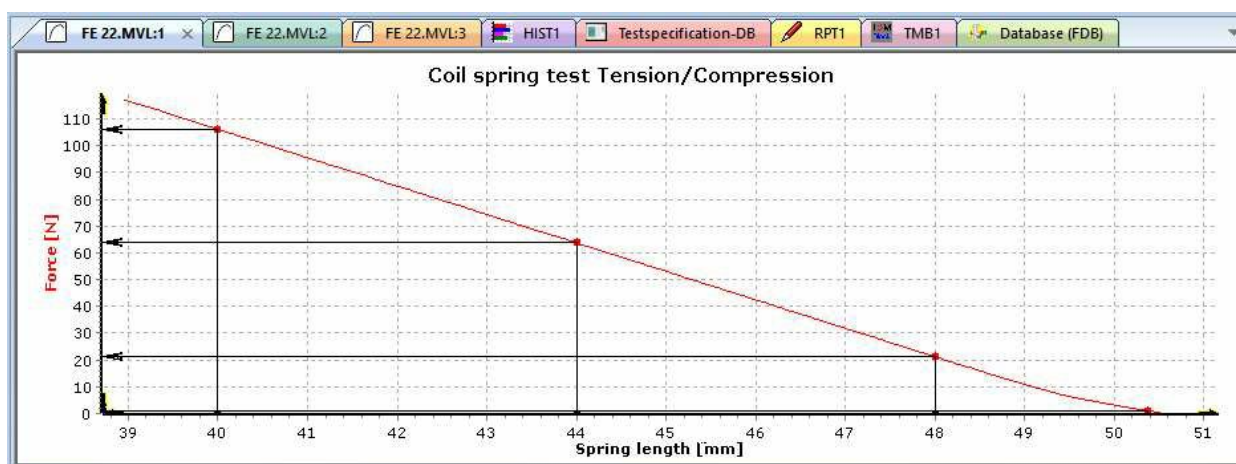
Fixation of docking windows:

- Click on the pin symbol on the upper right edge of the unfolded window fixes the window and attaches it to the main frame.

Closing the docking windows:

- By clicking on the pin icon again, the window will close again. This way, elements that are not always needed can be removed from the field of vision and reactivated quickly when needed.

2.3 Main frame with registers



Registers:

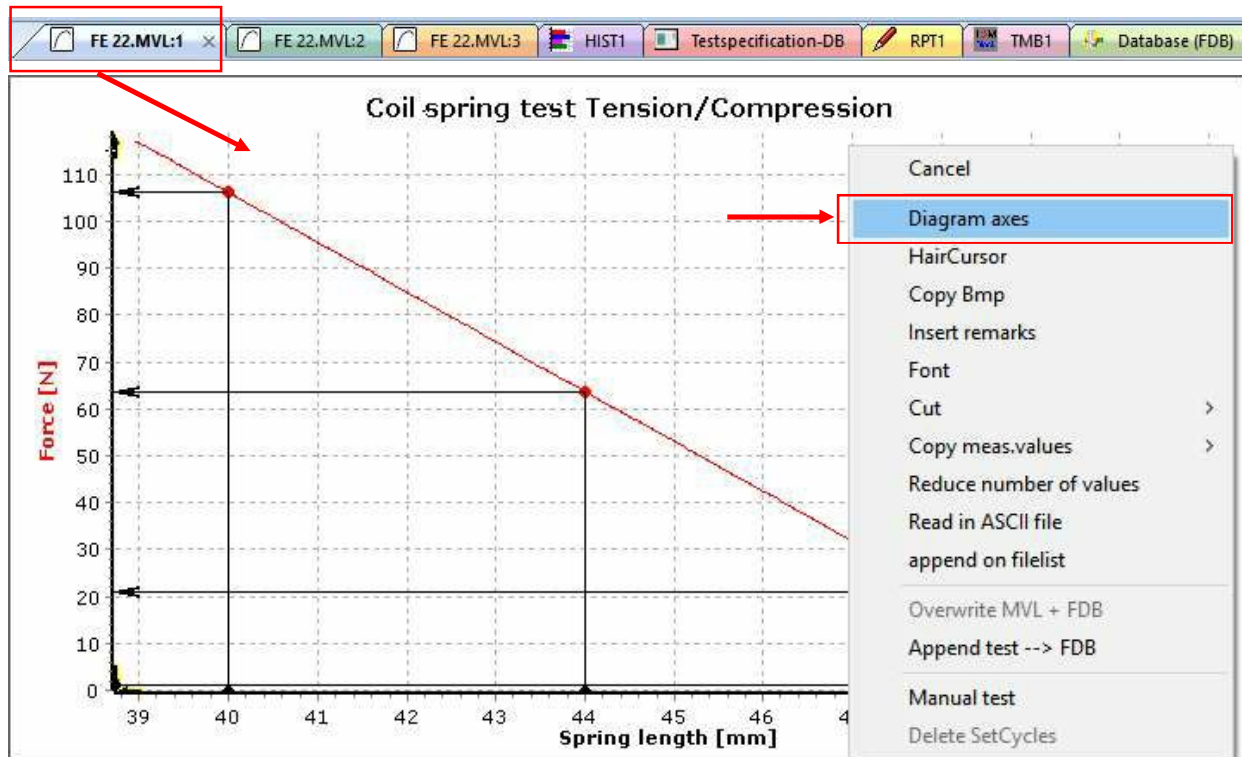
MVL 1	Characteristic graph	
MVL 2	Characteristic graph	can be faded in and out *)
MVL 3	Characteristic graph	can be faded in and out
HIST 1	Shows TRS data as histogram	can be faded in and out
Testspecification DB	Database view with test settings	can be faded in and out
RPT 1	Report window with Logbook function	can be faded in and out
TMB 1	Window with programming features	can be faded in and out
Database (FDB)	Database view (FireBird)	can be faded in and out

*) Fade in and out of tabs in menu „View“



2.3.1 Register MVL1 ... MVL3

With left mouse button we select an MVL register- 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.



Options:

- **Diagram axes**

This opens the dialog [Measured Value Diagram](#). Important input parameters are:

- **Headline:** the entered text appears at the top of the graphic as a title
- **Number of curves:** number of Y-axes. If you enter a value > 1, new registers appear. A maximum of 8 Y-axes can be displayed.

- **Hair Cursor:**

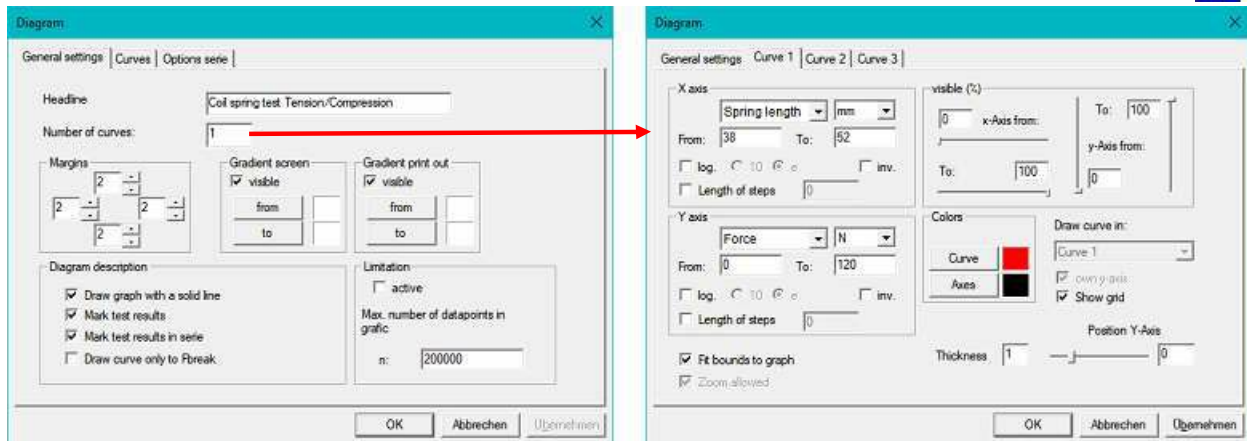
With the Hair Cursor, the values of the individual measuring points can be displayed from the characteristic curve: as with a pointer, you point to individual points of the graph with the Hair Cursor → the associated measured data points are displayed at the same time in the DISP window.

- **Insert comments:**

This opens the dialog Comment texts. In the upper left line, enter the desired comment text and click on Add. The comment is written in the list below. You can also change or delete the comments (with the respective function fields).

In the Measured values area, you can enter the corresponding results from the DSP window as comments for up to four measuring points.

You set the shape, color, transparency, shadow and font size of the comment at the bottom of the dialog.



- **Cut off:**
You can trim a curve in front or behind.
- **Copy readings:**
You can copy the measured values to different file types (Save As dialog box appears) or to the clipboard.
- **Import ASCII:**
You can read data from an ASCII file (the Open dialog for selecting the file appears) and display it in the MVL window.

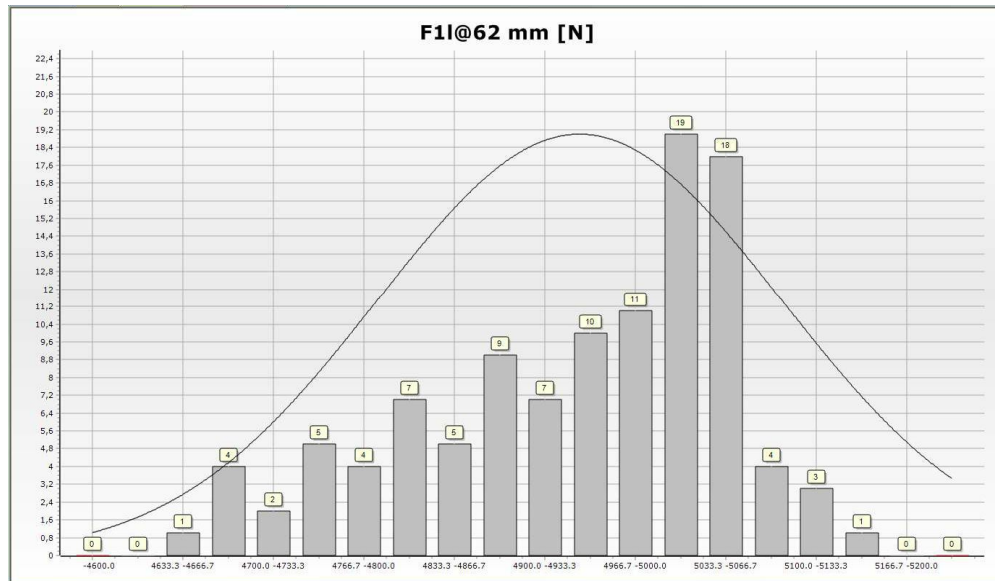
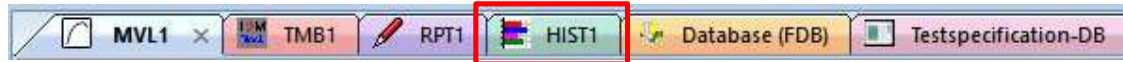
Further options in the MVL register:

- **Zoom:**
You can use the mouse zoom feature in the graph window (MVL) to zoom in on clippings. To do so, press the left mouse button at any position in the diagram window and drag the mouse from top left to bottom right and release the button → The selected section is enlarged. You can do this process several times in succession. Dragging the mouse from bottom right to top left while holding down the left mouse button restores the normal view.
- **Move**
Right-click in the diagram window (MVL), hold down the button and move the mouse → the diagram section shifts.



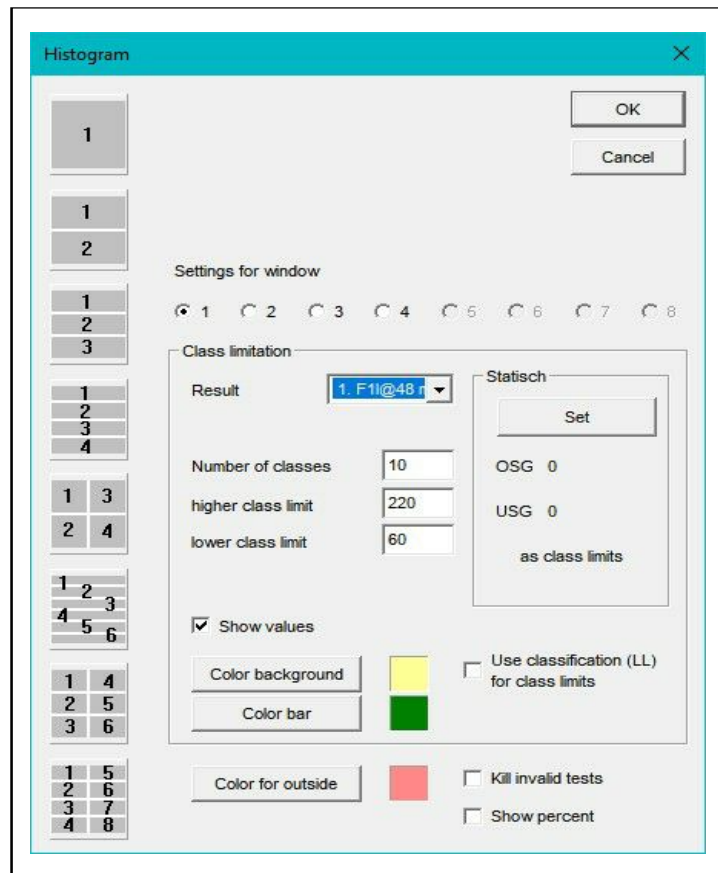
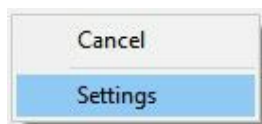
2.3.2 Register HIST1

Select the HIST1-register with left mouse button





One click with right mouse button in graphic opens the following context menu:



Menu items:

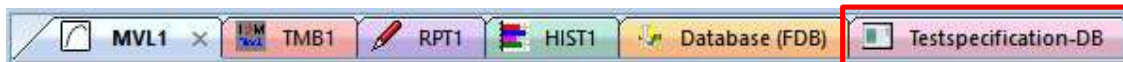
- Settings for window: Select the window (1..8)

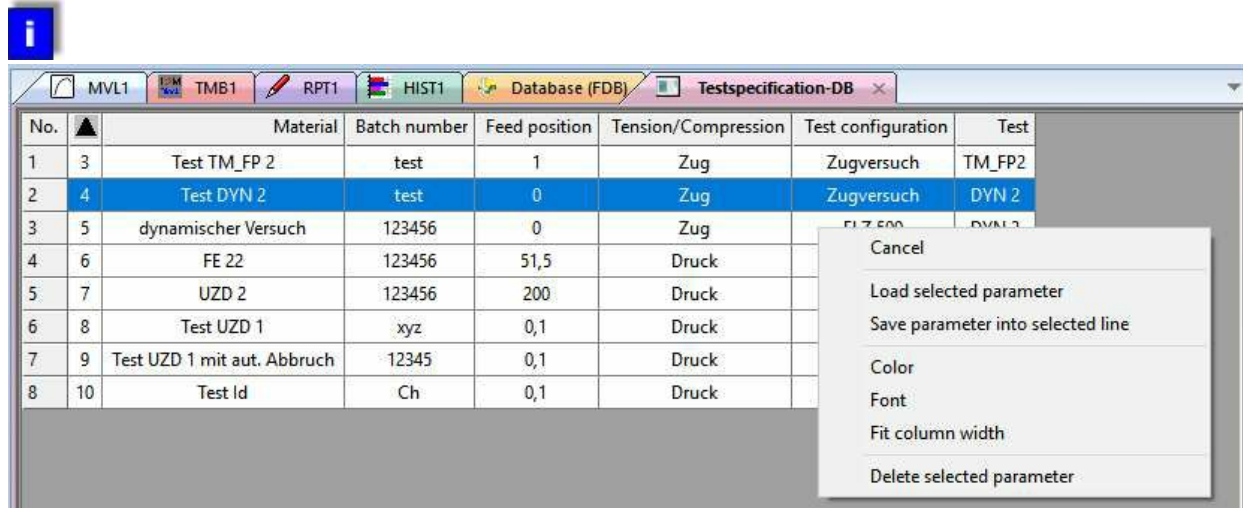
Classification:

- Result: Selection of the characteristic to be considered (characteristic value)
- Number of classes: Number of classes (bars)
- Higher class limit: Input field upper class limit
- Lower class limit: Input field lower class limit
- Show values: Numeric values are displayed above the individual bars
- Color background: Color picker for the chart background
- Color bar: Color selection for the bars
- Color outside: Color selection for tolerance infringers
- Kill invalid tests: Test results of invalid tests are not considered
- Show percent: Bar label as a percentage of total sample size

2.3.3 Register Testspecification DB

Select the Testspecification-DB-register with left mouse button. A list with already saved datasets is shown.





Editing individual test specifications:

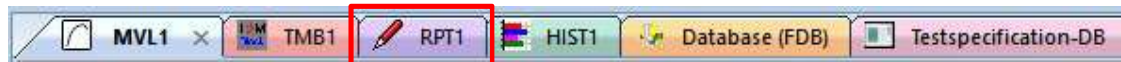
Select a line in the list by clicking on the "No." field with the left mouse button. A click with the right mouse button opens the context menu.

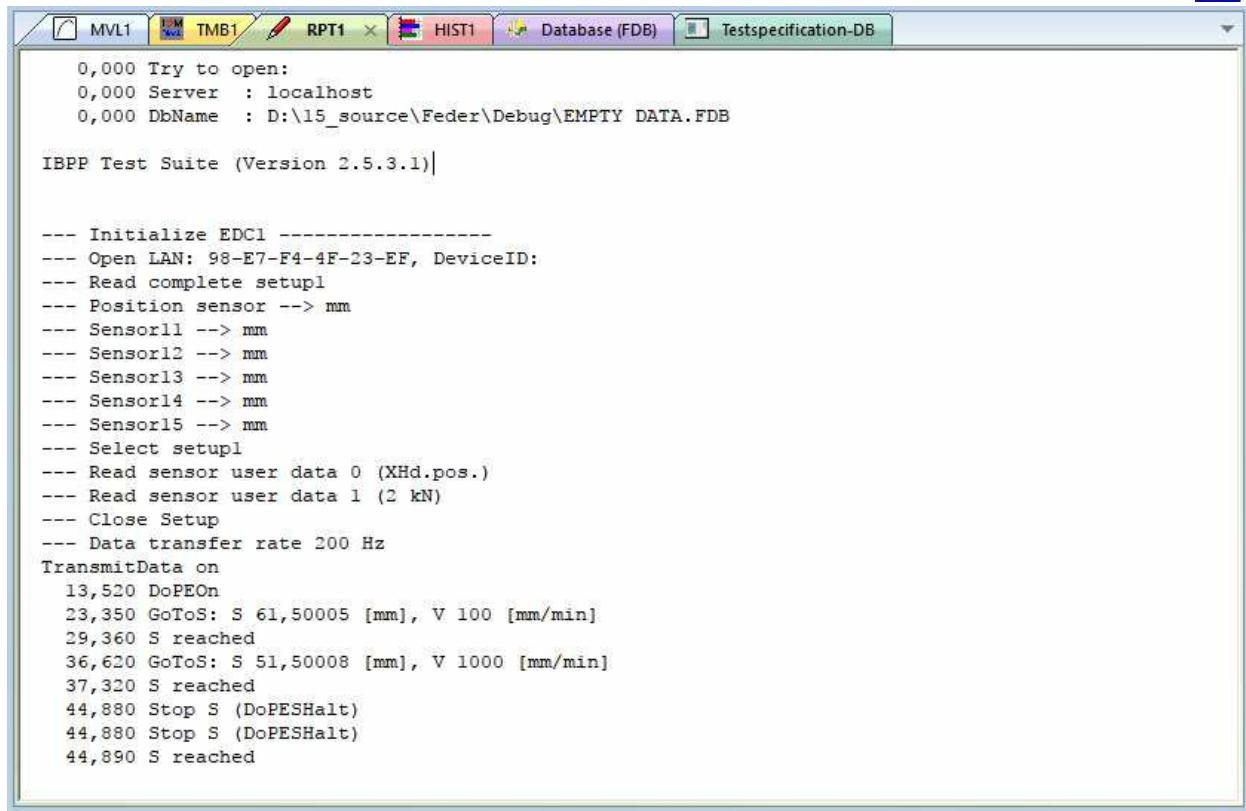
Choices:

- Cancel** The window disappears
- Color** The background color of the table can be changed
- Font** Font size, type and color can be defined
- Delete selected parameters** The selected data record is deleted
- Adjust column width** The width of the table columns is optimized
- Load selected parameters** The selected data set is loaded

2.3.4 Register RPT1

Select the RPT1-register with left mouse button





The screenshot shows a software window titled 'Testspecification-DB' with a toolbar containing icons for MVL1, TMB1, RPT1, HIST1, Database (FDB), and Testspecification-DB. The main text area displays the following log output:

```

0,000 Try to open:
0,000 Server   : localhost
0,000 DbName   : D:\15_source\Feder\Debug\EMPTY DATA.FDB

IBPP Test Suite (Version 2.5.3.1)

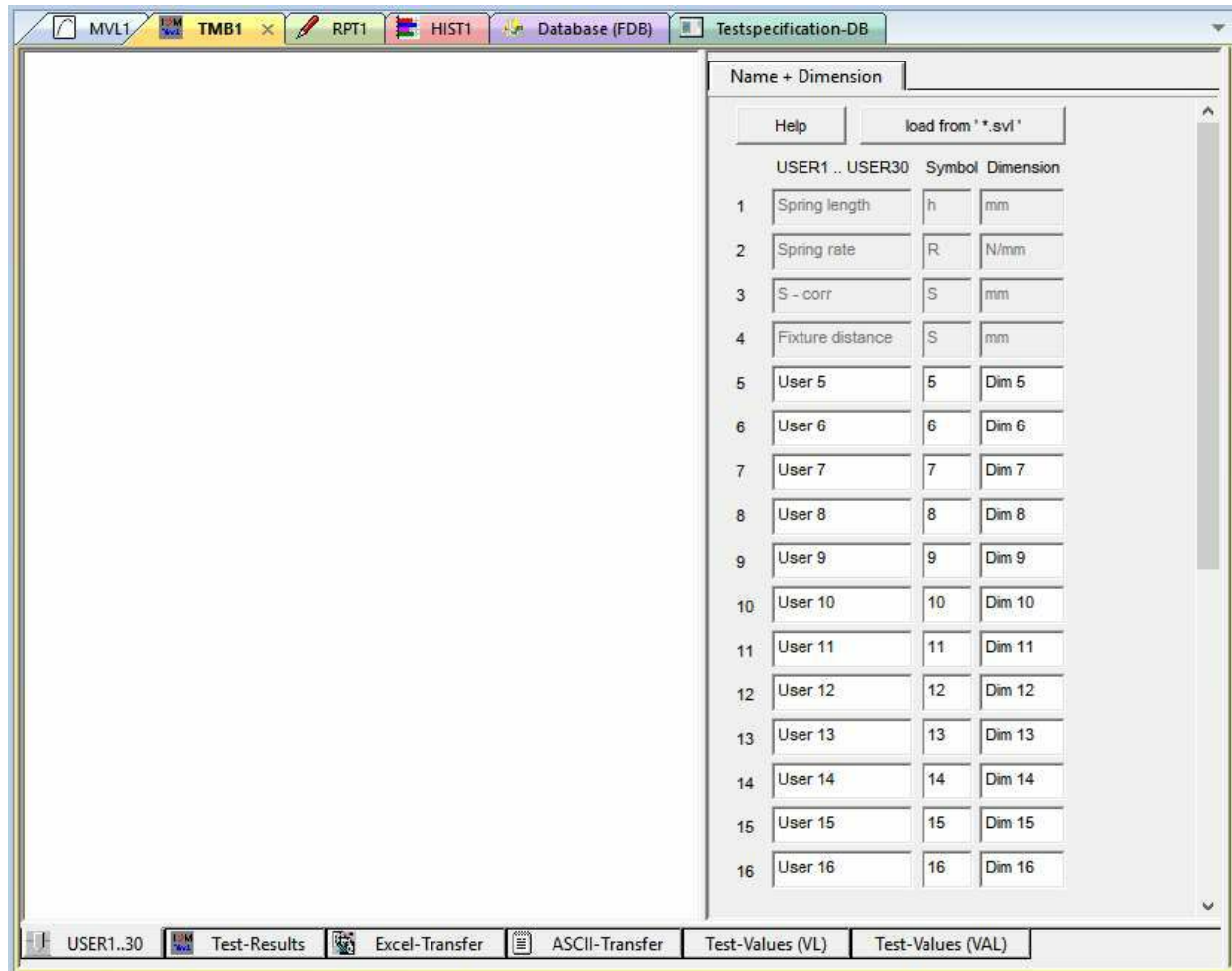
--- Initialize EDC1 -----
--- Open LAN: 98-E7-F4-4F-23-EF, DeviceID:
--- Read complete setup1
--- Position sensor --> mm
--- Sensor11 --> mm
--- Sensor12 --> mm
--- Sensor13 --> mm
--- Sensor14 --> mm
--- Sensor15 --> mm
--- Select setup1
--- Read sensor user data 0 (XHd.pos.)
--- Read sensor user data 1 (2 kN)
--- Close Setup
--- Data transfer rate 200 Hz
TransmitData on
13,520 DoPEOn
23,350 GoToS: S 61,50005 [mm], V 100 [mm/min]
29,360 S reached
36,620 GoToS: S 51,50008 [mm], V 1000 [mm/min]
37,320 S reached
44,880 Stop S (DoPEShalt)
44,880 Stop S (DoPEShalt)
44,890 S reached
    
```

This window is useful as a service tool to analyze possible malfunctions. This window automatically records all actions performed and communication between the electronics and Test&Motion Plus.



2.3.5 Register TMB1

Select the TMB 1-register with left mouse button.



It is a tool for specialists with the ability to program and to deeply intervene in the structure of **Test&Motion Plus**.



Attention: This requires special training and instruction.



2.4 Test result and statistics tables of a test series

The test result table TRS shows the characteristic values specified in the test specification.

Die Betätigung des Buttons **STAT** bewirkt die Umschaltung auf die Statistik-Anzeige.

The context menu belonging to the TRS window provides a variety of functions:

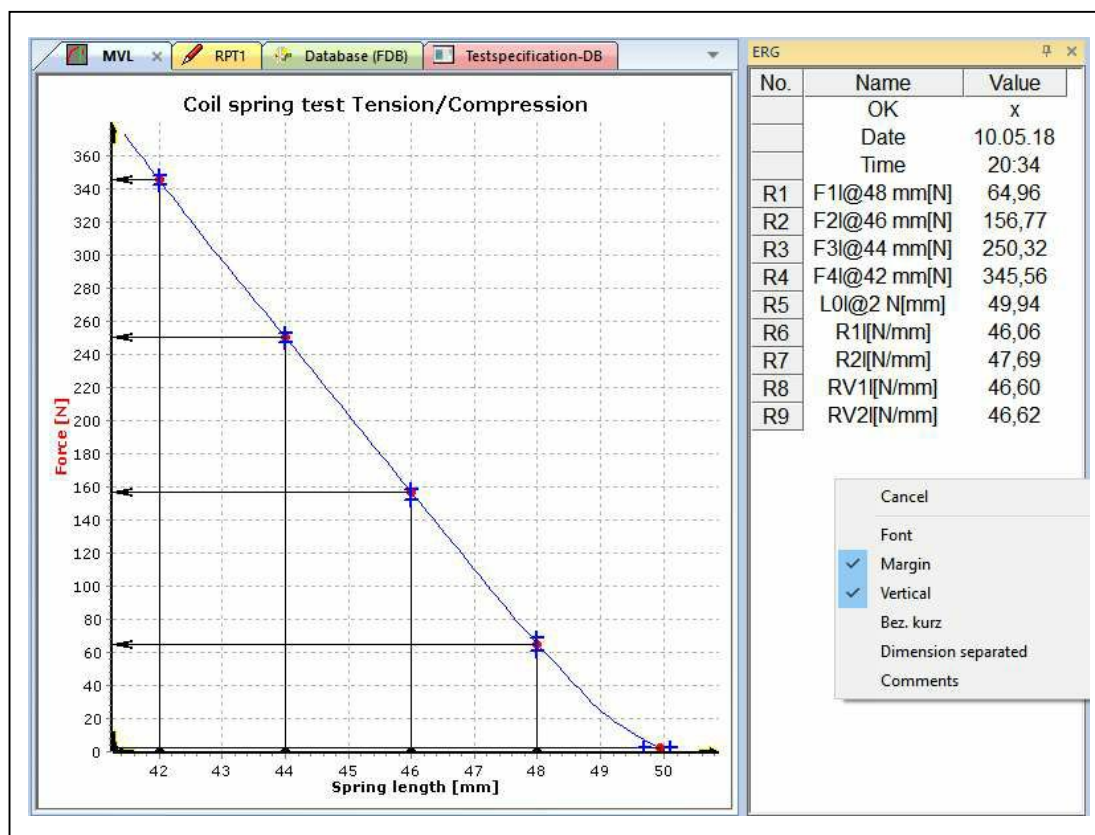
- Here you can set the background color for the result window and statistics window as well as their font. The TRS window can be saved as ASCII file or to the clipboard.
- Save "Rescue.TRS" creates a file after each test, which can be read if necessary.
- „Current test visible" scrolls down automatically if the test is saved at the end of the test and it would no longer be visible in the window.
- OT, UT, Xm are statistical values which are displayed above the TRS window and during printing.
- Separate Statistics", activated in the dialog "Test Settings | Statistics Parameters".
- a, b, h, m" the current sample dimensions can be read in at the end of the test. The results of the test and the entire statistics are then recalculated.



2.5 Presentation of the test results of a single test

This window shows the current test result of the last sample or of the selected sample in the directory tree. Optionally, only the results or comments are displayed. The individual results / comments are arranged horizontally or vertically, depending on the setting.

	OK	Date	Time	F1l@48 mm[N]	F2l@46 mm[N]	F3l@44 mm[N]	F4l@42 mm[N]	L0l@2 N[mm]	R1l[N/mm]	R2l[N/mm]	RV1l[N/mm]	RV2l[N/mm]
1	x	10.05.18	20:34	64,96	156,77	250,32	345,56	49,94	46,06	47,69	46,60	46,62



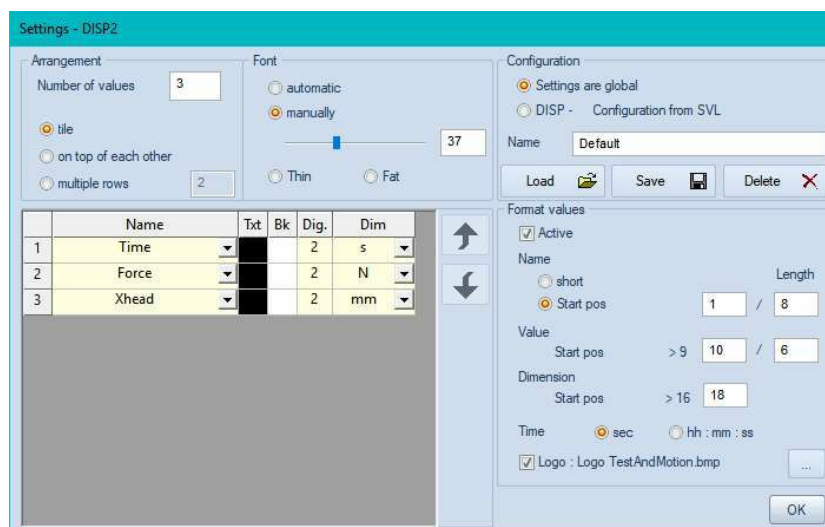
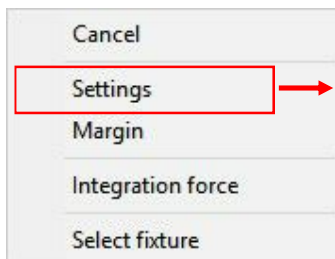
If setpoints are defined for the results, 'outliers' are highlighted here. The result window can be displayed with or without a frame. The frame is needed to position (pin) the window somewhere on the surface.



2.6 Channel display - DISP

Test&Motion	Time	0,00 s	Force	-0,00 N	* Xhead	55,00 mm
-------------	------	--------	-------	---------	---------	----------

A click with the right mouse button on the display opens a selection window.



You can display 1...32 values simultaneously in a DISP window; they are arranged next to each other, one above the other or on several lines. The input value 'Number of values' defines the number of grid rows displayed in the field below. In each line the value to be displayed, the text and background color, for output values the number of decimal places and their dimensions are defined.

Set a format for the output values to the right of the grid. The length of the name, the number format and the position of name, value and dimension can be set.

The size of the character set depends on the output window; in the case of manual font size, the user can adjust this to his requirements using the slider. The font can be bold or thin.

The settings of this dialog can apply globally, they are not changed by loading an initial value file (SVL). The configuration of the DISP channel display can be saved and reloaded under any name. This is done using the Load and Save buttons. If 'DISP settings of SVL' is activated, the desired configuration is set when the SVL is loaded. This allows a wide range of display options.

Time	0,00 s	Stress	-0 MPa	User 5	0,00 Dim 5
*Xhead	55,00 mm	Elongation	-55,00 mm	User 6	0,00 Dim 6
Force	-0,00 N	Spring length	55,0 mm/min	User 7	0,00 Dim 7
Extension	-550,0 %	SVL:		User 8	0,00 Dim 8

Time	0,00 s
*Xhead	55,00 mm
Force	-0,00 N
Extension	-550,0 %
Stress	-0 MPa
Elongation	-55,00 mm
Spring length	55,0 mm/min
SVL:	
User 5	0,00 Dim 5
User 6	0,00 Dim 6
User 7	0,00 Dim 7
User 8	0,00 Dim 8



2.7 Identification Serie

Display the header data of the test series in process (test order).

Identification serie	
SAP no.	12345678
Batch number	4711
Order number	2018-05
Department	research
Sample no.	x1

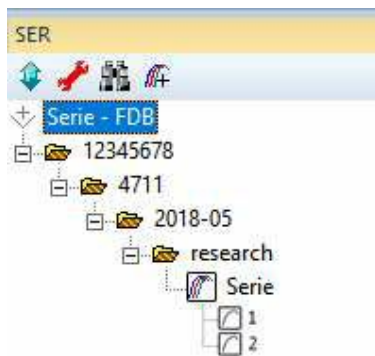


2.8 Directory tree for test series

The directory tree on the left side of the main frame shows the current test series.
The folder structure is freely definable.

Example.

- SAP No.: 2345678
- Batch number: 4711
- Order number: 2018-05-10
- Department: research



Double-click on "Serie" all samples are selected



Double-click on the sample number the sample is selected

Samples selected in the directory tree are shown in the diagram window, can be re-evaluated, even with modified characteristic value configuration

Click with right mouse button on icons:

Series and single samples can be deleted or renamed



2.9 The main frame window of the Test&Motion Plus testing machine software

consists of

- Title bar
- Toolbar - Toolbar
- Status bar

and forms the frame for the document windows in which the data of the individual documents is displayed.

- Document window for the measured value diagram MVL
- Document window for test results and statistics TRS
- Document window for SER series management
- Document window for TMB commands TMB (T&M block programming function, e.g. for user-defined identities)
- Document window for report data RPT

Right-clicking in the individual windows opens context menus that provide you with additional functions for these windows: Among other things, you can show and hide the windows, change their position and size, design their contents and appearance, configure the display of measured values, import, copy or export data or activate measured value monitoring.

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](#)).



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.

2.9.1 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.



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



2.9.2 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

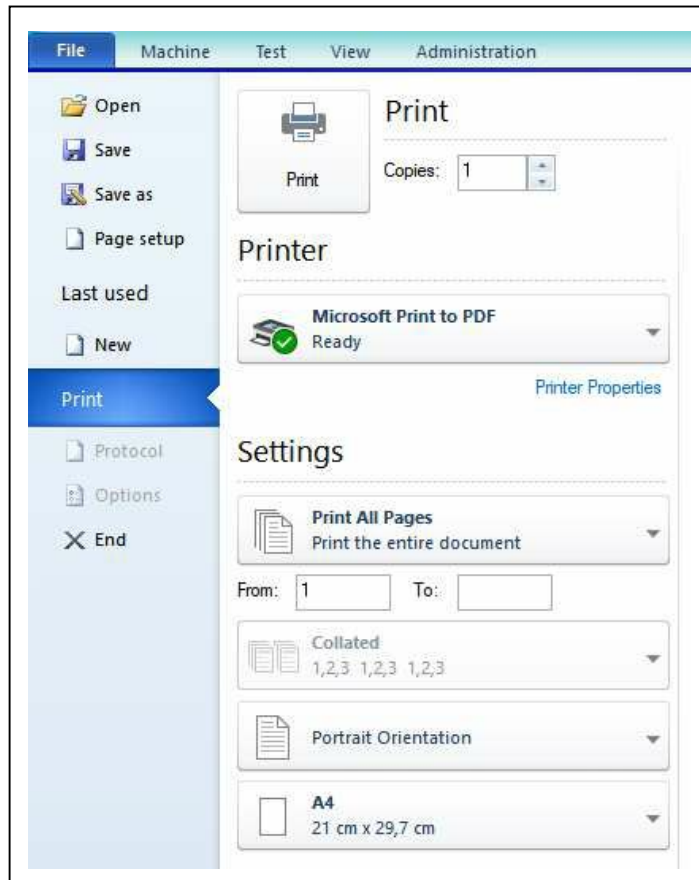
- the selected load transducer
- the selected strain transducer
- the reasons for the abort of the last test

2.9.3 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. We distinguish between the function groups File, Machine, Test, View and Administration.



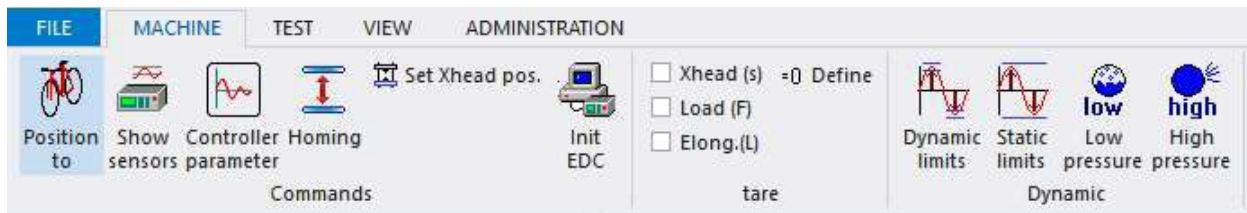
2.9.3.1 Toolbar File



Open	Opens an existing document.
Save	Saves an open document.
Page Setup	Configures the printout of the active document.
Print	Prints the active document.
End	Exits the Test&Motion Plus software.



2.9.3.2 Toolbar Machine



Opens the dialog 'Travel order' for placing motion tasks on the crosshead.



Opens the dialog 'Raw Measured Values' to display the unchanged data of the EDC.



Opens the online controller parameter dialog.



Opens the dialog 'Reference traverse' for setting the clamping length between the clamps or setting the plate spacing.



Opens a dialog for setting the crosshead position. This is transferred to the memory of the EDC.



Calls the initialization of the connected measurement technology.



Calls the dialog for defining the taring functions.



Opens the dialog 'Definition dynamic limits' to define the monitoring of peak values of certain measurement channels within a defined range



Opens the dialog 'Definition of static limits' to define the monitoring of the maximum values of certain measurement channels by the EDC



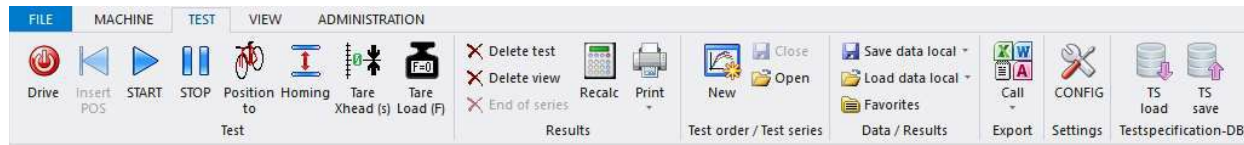
Switches the hydraulics of the testing machine to the low pressure range (e.g. necessary for setup operation; not possible on all machines)



Switches the hydraulics of the testing machine to the high pressure range (e.g. necessary for test operation)



2.9.3.3 Toolbar Test



Switches on the machine drive.



Moves the crosshead back to the starting position (Feed position) after a test.



Test is started.



Ends the current test



Opens the Motion Task dialog for defining and controlling the same.



Opens the dialog Reference traverse for setting the clamping length between the clamps or setting the plate spacing.



Tares the crosshead position.



Tares the force



Delete test (deletes the current test from the series).



Delete view (deletes all views MVL, TRS, SER).



End of series (Ends the currently open series).



Calls a recalculation of the test results with the current input data.



Prints the active document.



Start a new series, it will be stored in the FireBird database. The dialog box that appears loads the series settings from the test definition database after entering the series-specific data..



Ends the current series.



Opens an existing series to edit or continue.



Saves different document types under a file name to be entered.



Opens an existing document.



Opens the file list.



Opens a list of all previously defined export routines to Excel, Word, ASCII to start the export.



Opens the Test Settings dialog. Here you have the following options is ready to configure the test.



Loads test settings from the 'Test Specifications Database'.



Saves the current settings to the 'Test Specifications Database'.

2.9.3.4 Toolbar View



Shows you a full screen display of certain document types.



Opens / closes the measured value window (MVL1,..., MVL3).



Opens / closes the histogram window (HIST).



Opens / closes the Report window (RPT).



Opens / closes the Test&Motion Plus block window (TMB).



Opens / closes the SetPos window.



Opens / closes the 'Test specification' database.



Opens / closes the 'Results database'



Opens / closes the display window (DISP1..3)



Opens / closes the OSZI window (OSZI 1.. 3).



Opens / closes the VAL window (VAL 1.. 3).



Opens / closes the COV window (COV 1.. 2).



Opens / closes the DYN window.



Opens / closes the VL window (VL 1.. 3).



Shows dialog for saving the current window configuration.



Shows dialog for loading a window configuration.

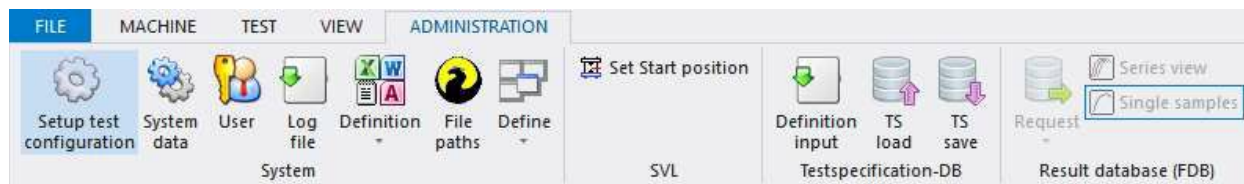


Window configurations xyz, can be activated via button.



Define opens dialog for defining buttons for window configurations.

2.9.3.5 Toolbar Administration



Opens dialog for creating and editing test configurations (machine configuration).



Opens dialog for editing system data (basic system setting).



Opens dialog for editing user rights.



Settings for a log file.



Writing export programs to Excel, Word, ASCII, and defining the export list. This list determines which export programs can be called under the Test toolbar.



Dialog defines file paths, to the result database (FDB), test specification database, user definition database,...



Dialog defines the window configuration list and the window configuration buttons.



Defines the start position of an SVL file in active 'Position mode'.



Opens a dialog which defines settings for data in 'Test Specifications database'.



Loads test settings from the 'Test Specifications database'.



Saves the current settings to the 'Test Specifications database'.



Opens dialogs for querying the result database (series database).



Activates the 'series view' of the Firebird database.



Activates the 'single curve view' of the Firebird database.



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 **Test&Motion Plus** software, if not already done.
3. Start Windows and afterwards the **Test&Motion Plus** 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 Settings Dynamic**
Here you configure the covering curve for dynamic tests.
18. **Dialog Definition cosinus cycles**
Here you configure the cosine cycle procedures for dynamic tests.
19. **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. The **window Dynamic drive commands (DYN)** shows the actual dynamic values, the **window Oscilloscope functions (OSZ)** shows the oscilloscope graph and the **window COV** shows the covering curve.

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. In the document **window Dynamic drive commands (DYN)** you can interrupt a running test with **function field Halt (palm symbol)**, restart it with the **function field Continue** or abort the test with **function field Stop (stop sign)**.

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 recalculation 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 Test&Motion Plus-Software

Before you can install and work with the **Test&Motion Plus**-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 Test&Motion Plus-Software



1. Place the **Test&Motion Plus** 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 **Test&Motion Plus**-Software.
3. Close the dialog and remove the CD from the drive.
4. Start the **Test&Motion Plus** Software (double click on the program button on your desktop or via [menu Start → Programs → Test&Motion Plus](#)).



5 Test preparation

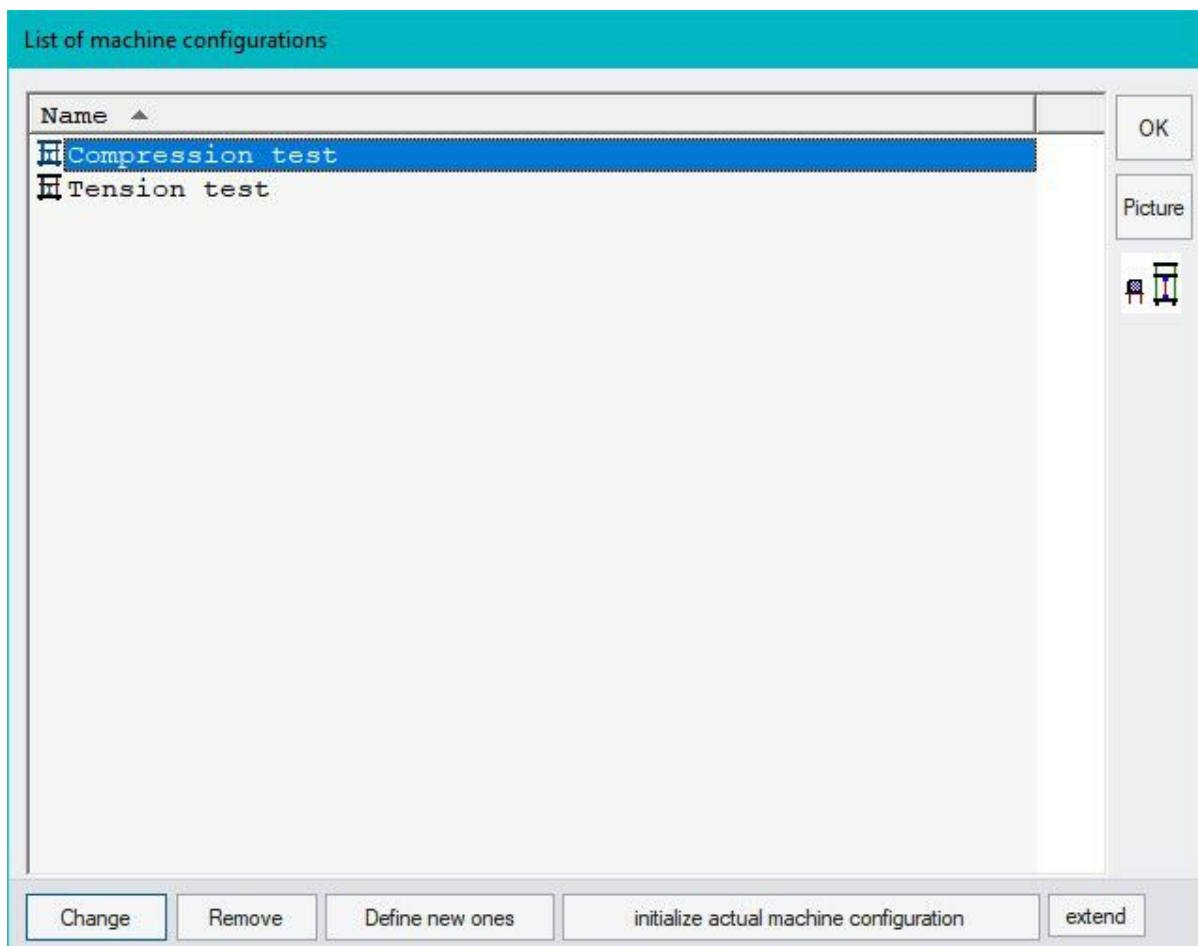
5.1 Machine setup

5.1.1 Define test configurations

The **Test&Motion Plus**-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. [Toolbar Administration](#) → [command Setup test configurations](#) → [Password request](#), Password: „DOLI“ or „doli“ → [dialog List of machine 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).

Machine configuration 'Compression test'

Measuring equipment

Machine name: Compression

Measuring equipment: EDC580 ☒ active

Communication port:

- ☐ COM: COM1
- ☐ USB
- ☒ LAN: 98-E7-F4-4F-23-EF: Realtek PCIe

Function - ID: 1

Baud rate: []

Setup EDC: Setup 1

Data transfer rate: 0.02 sec

Timer-Rate: 20 msec

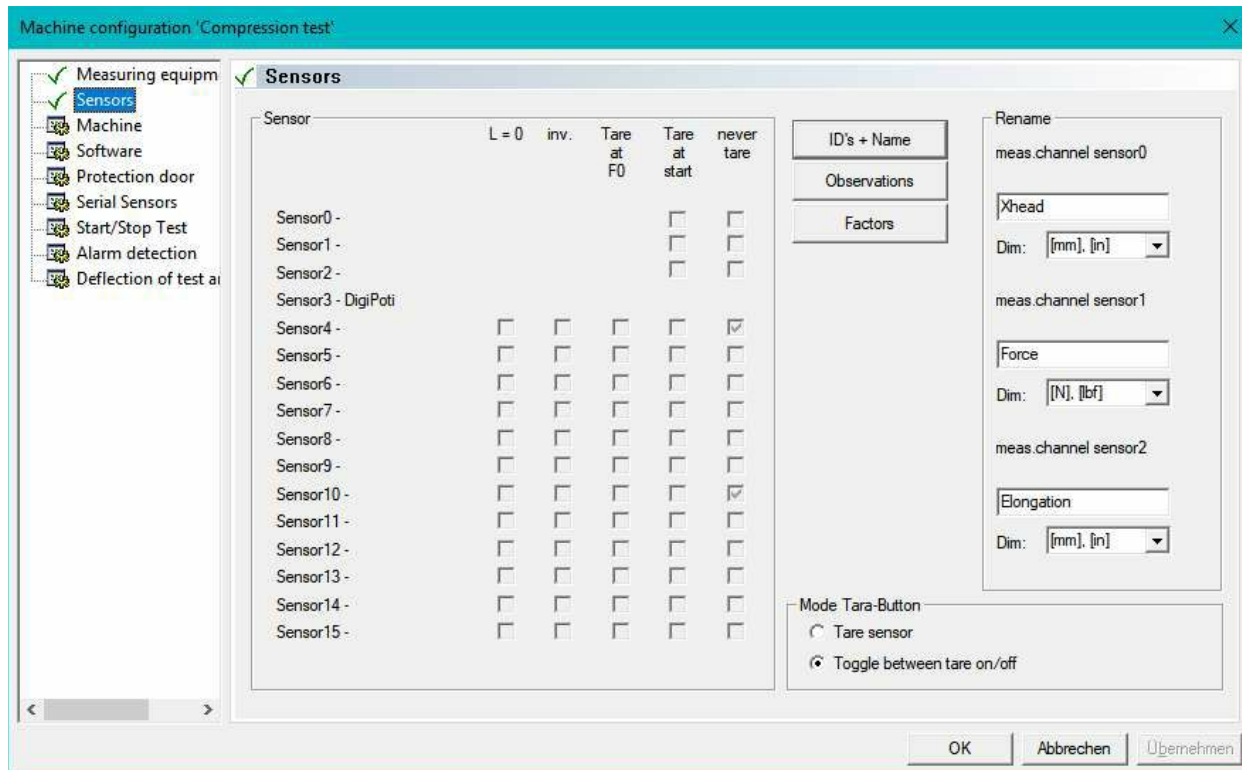
OK Abbrechen Übernehmen

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:

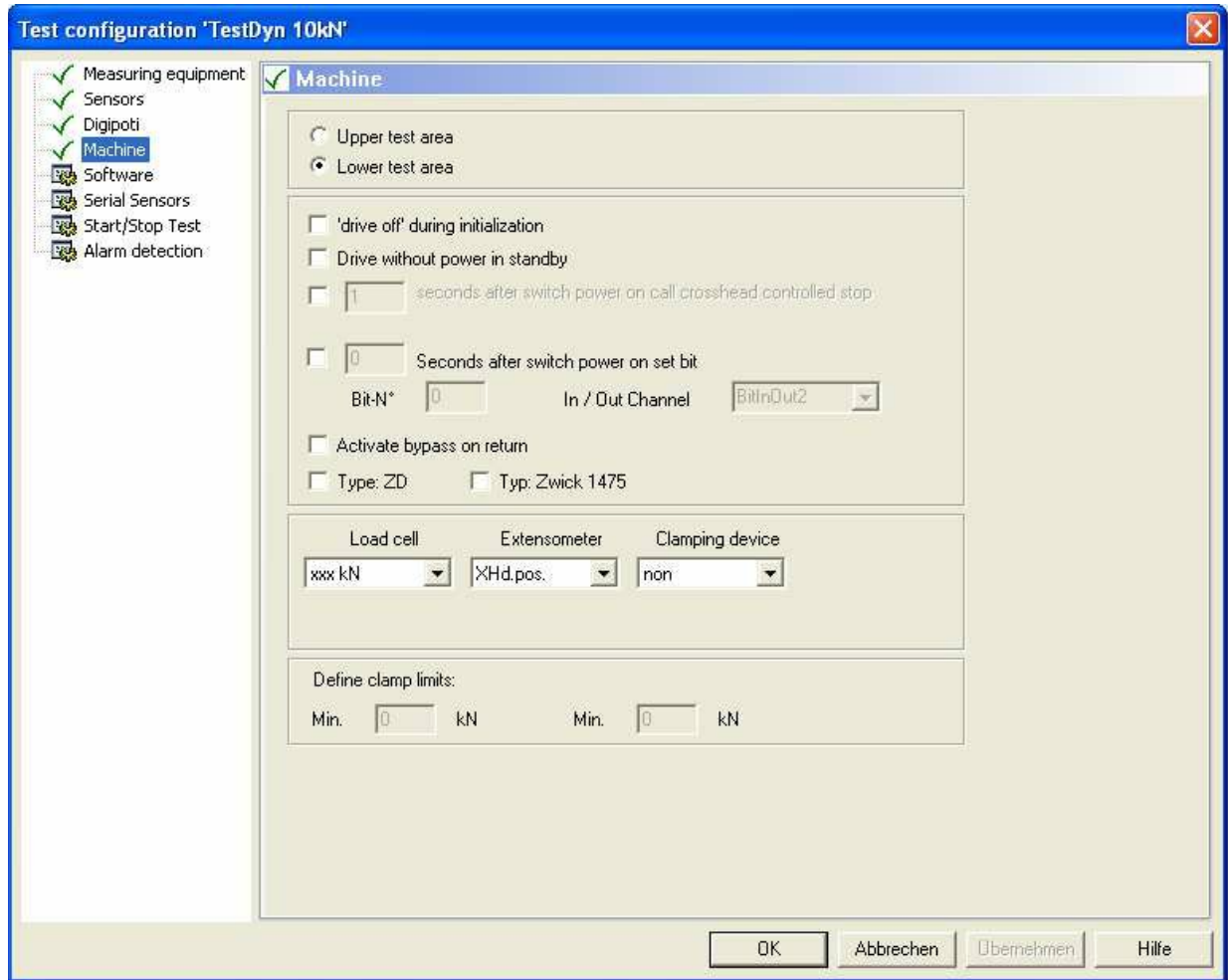
You can have - one or two measuring channels – kept monitored for exceeding limits. If the limits are exceeded, the **Test&Motion Plus** Software will stop the crosshead and show a problem report on the display. If you want to use this function, perform the following steps:



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 - 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:



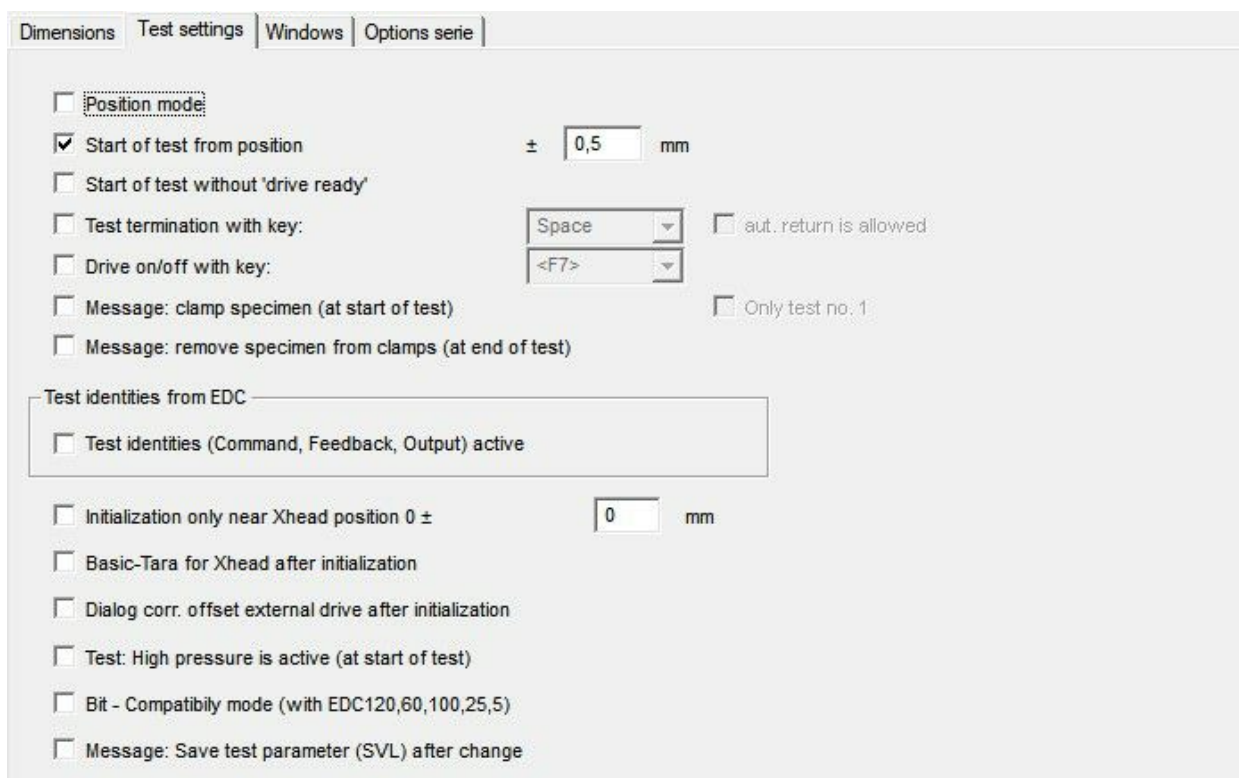
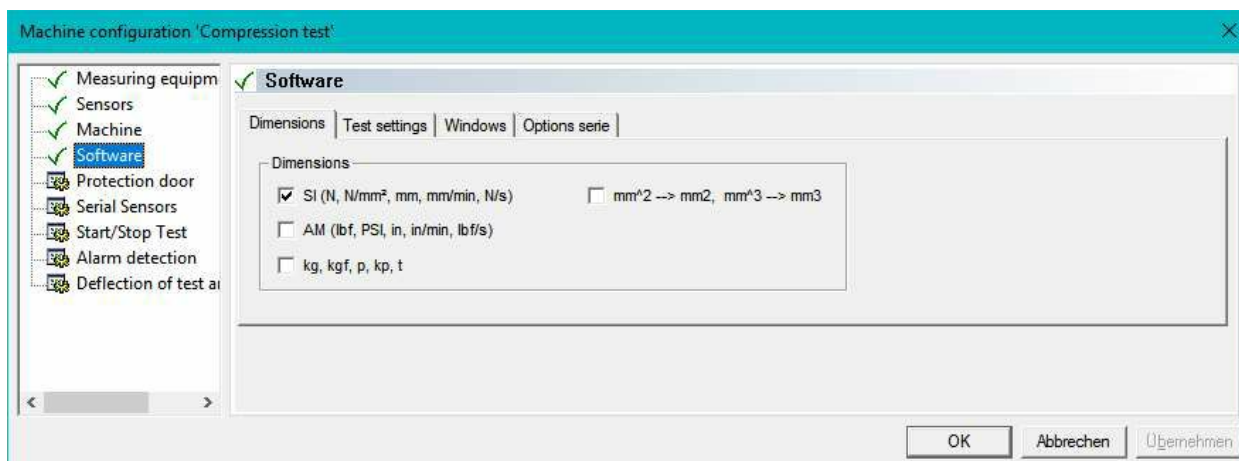
1. Define the test area, if your instrument has several available.
2. For hydraulic instruments it may be necessary, that you define the reactions of the instrument under the indicated conditions.
3. Select the active load cell, the extensometer and the clamping device.
4. Define the clamp limits:



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.

5.1.1.4 Test configuration - Software

By means of different settings, you can adapt the display features of the **Test&Motion Plus** 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 | Test settings | Windows | Options serie

Windows	Dynamic	USER9 .. USER30	Devices	Program list
☐ MVL2 ☐ DSP1 ☐ DISP1 ☐ RPT2 ☐ FDB ☐ CIRC1 ☐ MVL3 ☐ DSP2 ☒ DISP2 ☐ RPT3 ☐ FDB-TO ☐ CIRC2 ☐ MVL4 ☐ DSP3 ☒ DISP3 ☐ ODBC-Outp. ☐ MVL5 ☐ REMOTE ☐ QUALI ☐ ODBC-Inp. ☐ MVL6 ☐ SPL ☐ RMC ☐ DKD ☐ ResultBar ☐ Histogram	☐ OSZ1 ☐ VAL1 ☐ VL1 ☐ OSZ2 ☐ VAL2 ☐ VL2 ☐ OSZ3 ☐ VAL3 ☐ VL3 ☐ COV1 ☐ DYN ☐ CYC ☐ COV2 ☐ DYN3 ☐ LCF	☒ USER9 .. USER16 ☒ USER17 .. USER24 ☐ USER25 .. USER30	☐ SP8 (Spider8) ☐ Eurotherm ☐ MGC + ☐ DK38, DMP40, AED ☐ MERCURY, RTSS ☐ ME46 (VideoExt.) ☐ QuantumX ☐ HRX (Hardness) ☐ PSD (Pendel) ☐ SAMPLE1	☒ Userdefined results ☒ Excel export ☒ WORD export

Dimensions | Test settings | Windows | Options serie

Max. number of curves in serie

100

☐ first 100
 ☒ last 100

☐ Show whole serie after test

Input values for series

☐ Input values of serie active
☒ Input values of single curve active

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 ± 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.

5.1.1.5 Protection door

Machine configuration 'Compression test'

Protection door

☐ active

STMin: -200 N

STMax: 200 N

vMax: 9.64287e-39 mm/min

Hardware settings

BitInChannel 0..9: 0 0000000000000000

Bit-No. 0..5(7): 1 0000000000000010

Door close (0/1): 1 close

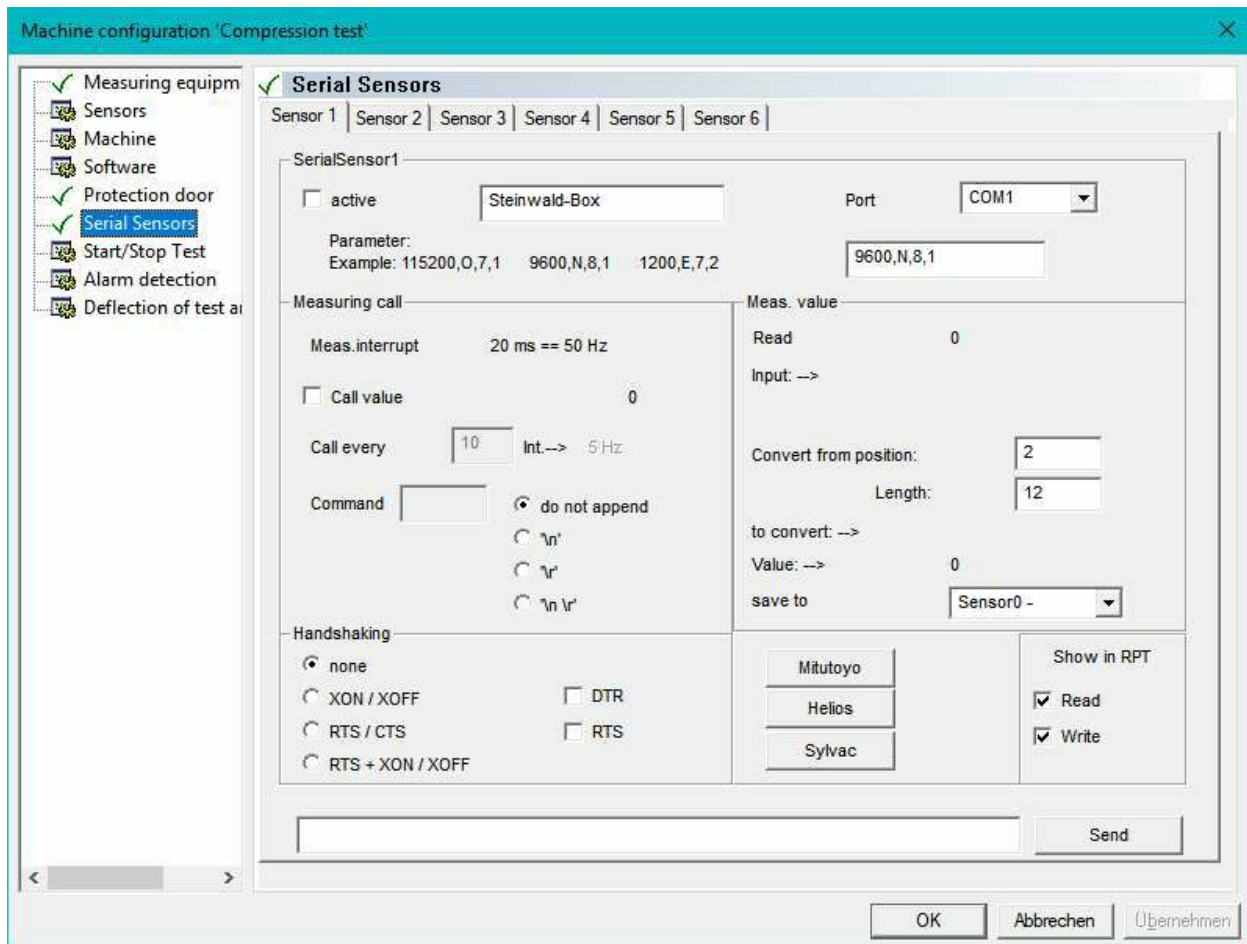
☒ Test start with open safety door and 'vMax open' possible

vMax open: 20 mm/min

OK Abbrechen Übernehmen

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 digipoti, 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.

Machine configuration 'Compression test'

Alarm detection

	BitIn-Channel(0..9)	InBit (0..15)	Level	Test
☒ Alarm 1	BitIn0	4	☐ Low -> High ☒ High -> Low	☐ at start of test ☐ during test ☒ always
Oil temperature too high!!				
☐ Alarm 2	BitIn0	0	☐ Low -> High ☒ High -> Low	☐ start of test ☐ during test ☐ always
☐ Alarm 3	BitIn0	0	☐ Low -> High ☒ High -> Low	☐ start of test ☐ during test ☐ always
☐ Alarm 4	BitIn0	0	☐ Low -> High ☒ High -> Low	☐ start of test ☐ during test ☐ always

OK Abbrechen Übernehmen

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**.

5.1.1.9 Test configuration - Deformation of the test arrangement

Under a load of the machine up to nominal load, considerable deformations of the load frame and the load cell may occur. These deformations do not play a role as long as strain transducers are used to determine the deformation and the modulus of elasticity.

However, if compression tests are performed in which strain gauges cannot be used because the specimen is too small, the traverse travel must be used to determine the deformation. However, this is distorted by the machine's own deformation, which is often greater than the deformation of the specimen.

If you now determine the deformation of the machine, you can have this calculated during the current test. The deformation can be defined as a factor or as a deformation curve.

If necessary, select a correction factor or a correction curve when correcting the deformation of the test arrangement (import the correction file via function field).



Note: In most cases it is not necessary to make settings here. In addition, incorrect settings can falsify the check result more than is possible if no correction is made.

Machine configuration 'Compression test'

Deflection of test arrangement

Correction of deflection of test arrangement

☐ no correction

☐ with factor mm/kN

☒ with curve

correction file: ...

Force /

☐ Send deformation curve to EDC

Correction of deflection

☐ active Faktor mm/kN

☐ active Faktor mm/kN

☐ Show negative elongation

☐ Show correction curve

☐ Fit correction curve

Order

DiagX: ID_S, ID_L, ID_L_Org

DiagY: ID_F, ID_R

Sensor spring height

OK Abbrechen Übernehmen

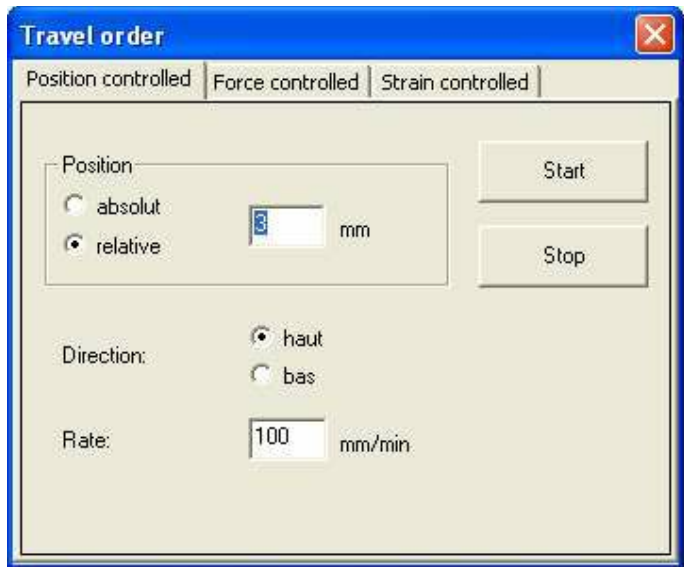


Note: You have now finished defining the test configuration. Close the dialog with OK.

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 helpfull 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](#)

Raw measured values

Time15,985

Sensor0 - Trav.weg55

Sensor1 - 2 kN-0,128

Sensor20

Sensor3 - DigiPoti0

Sensor4 - (S1+S1)/2-0,044

Sensor5 - MFA 2-10,0032

Sensor60

Sensor70

Sensor80

Sensor90

Sensor100

Sensor11 - 0,01 mm-0,00011

Sensor12 - 0,01 mm-0,00041

Sensor13 - 0,01 mm-0,00024

Sensor14 - 0,01 mm-0,00051

Sensor15 - Stiff.corr238,477

Cycles0

Close

Help

Input7 .. Input0

00000000

InChannel0

00000000

InChannel1

Output7 .. Output0

00000000

OutChannel0

Bit 7Bit 6Bit 5Bit 4Bit 3Bit 2Bit 1Bit 0

00000000

OutChannel1

Bit 7Bit 6Bit 5Bit 4Bit 3Bit 2Bit 1Bit 0

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.

Here it is possible to display digital InBits and to set OutBits. This should facilitate the integration of external bit-controlled clamping devices or automatic extensometers.

5.1.4 Controller parameter online



can reach the [dialog Controller parameter online](#) via toolbar [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.

Thus, you can directly observe as well as adjust the x-head reactions to the changed parameter settings by looking at the oscilloscope curve.

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:

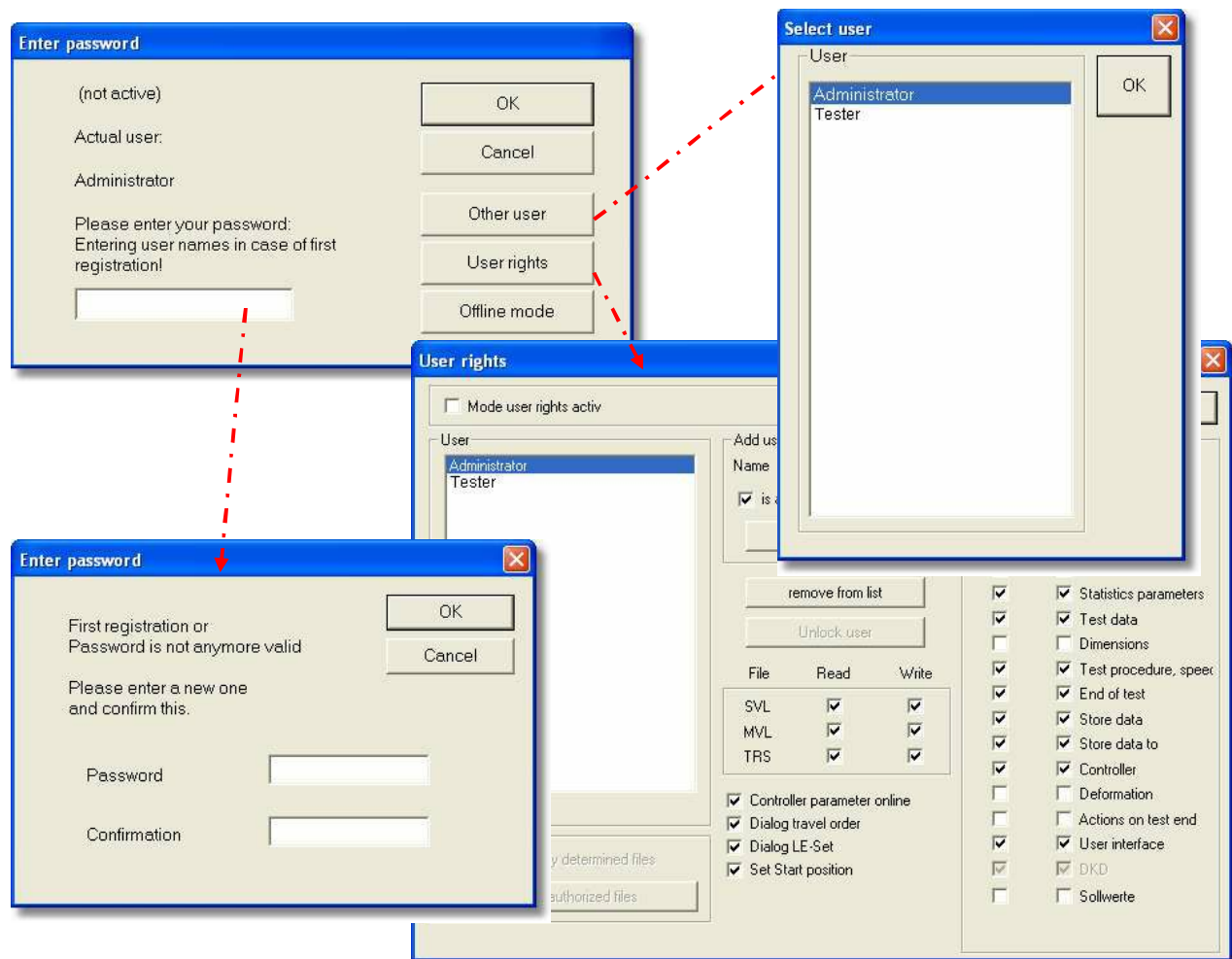
- False insertions due to unknowing adjustments can be avoided.
- False settings can block the system.
- Securing of tests according to the standards: False test parameters can lead to tests, which do not apply to the standards any longer.
- Efficient Test Run: If you offer the possibility to set a lot,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

Therefore, the **Test&Motion Plus** 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.





Note: For the 'first-time' use of this mode you should find the administrator as the activated user here. If this is not so, you can change the user via the function field **Other user – dialog Select user**.



2. Enter the password. At the 'first-time' use the password corresponds to the user name (here "administrator").
3. Click the function field **User rights**.



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 **Test&Motion Plus** Software.

5.1.6 General Settings



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

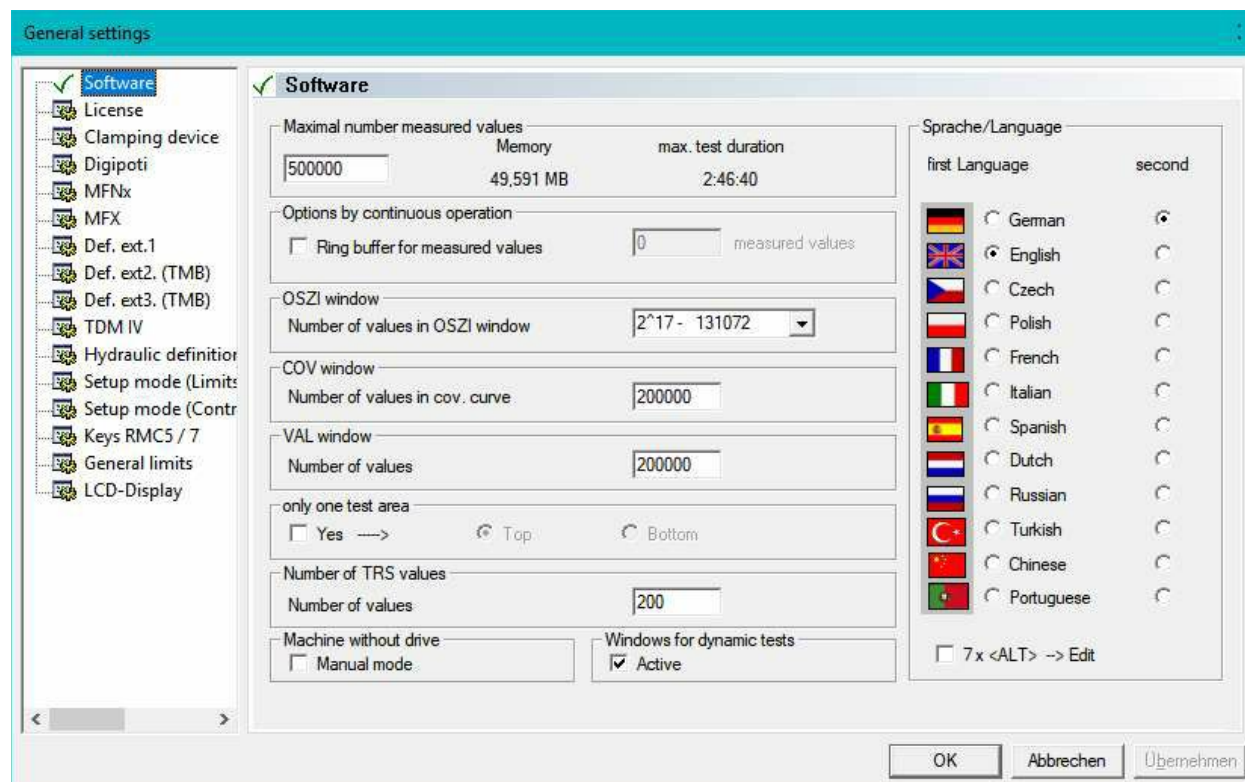
The dialog **General settings** is used for basic definitions of the mode of operation of the test program. Click on the respective items in the left list, in order to call up the dialogs. Now, you can perform the corresponding settings.



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 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



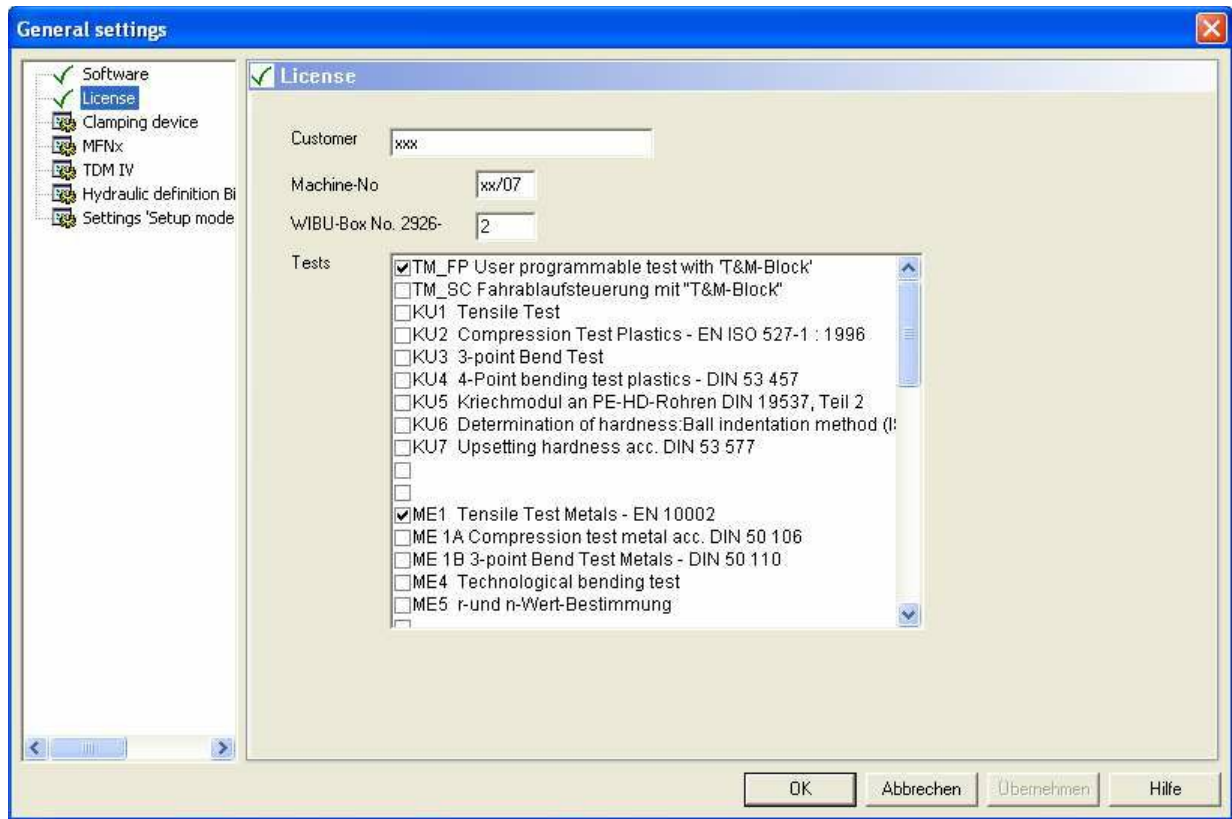
5. Set a checkmark, if your testing instrument has only one test area and mark its position. Now, no queries for the test area will be activated.

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.



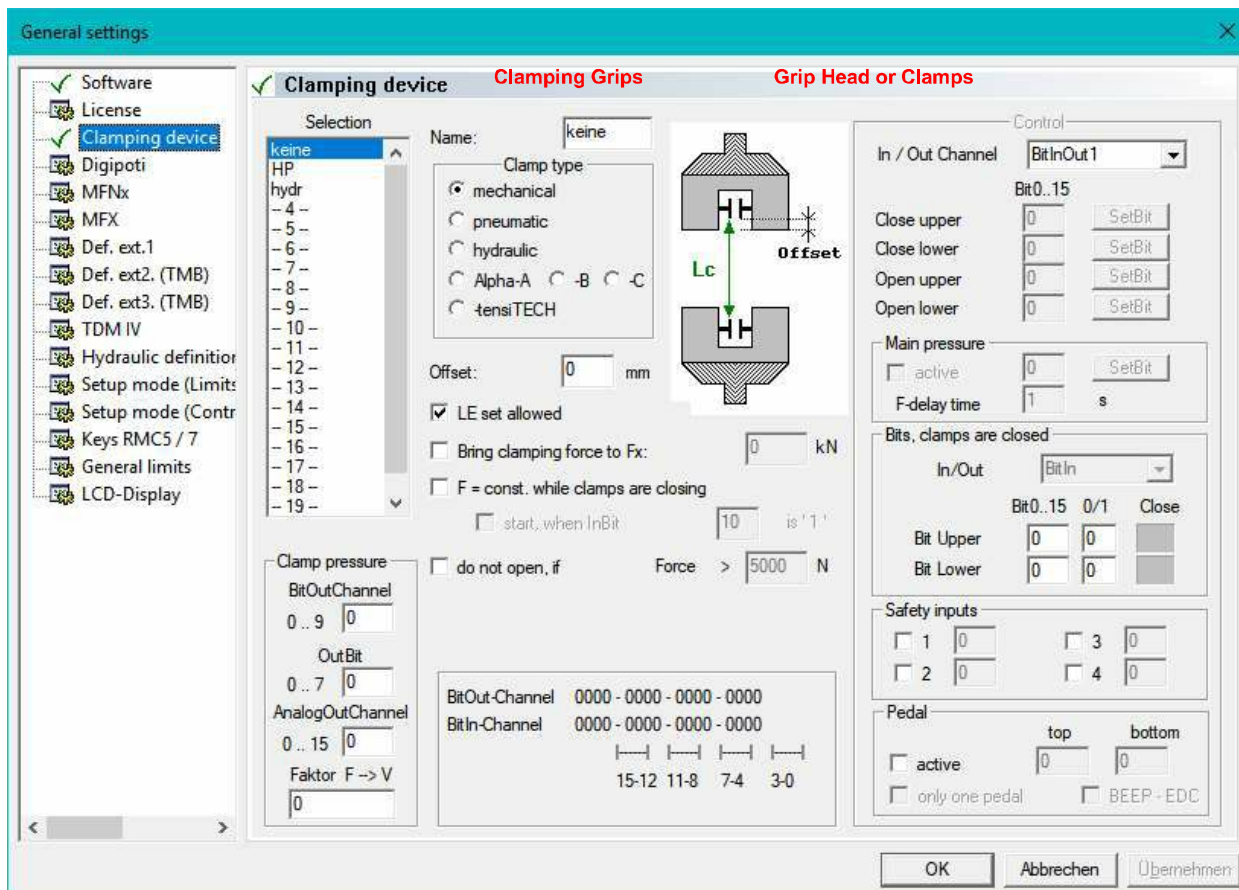
1. Enter the Code contained in the Dongle here, in case it is not already entered.

Tests:

Furthermore, the **Test&Motion Plus** 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!

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!

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

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](#)).

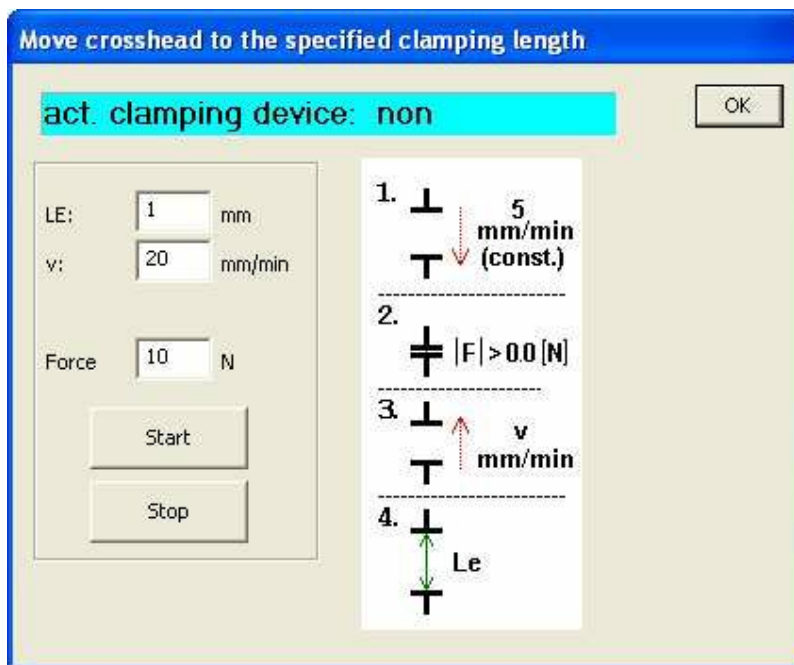
To set a specific clamping length, do as follows:



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.



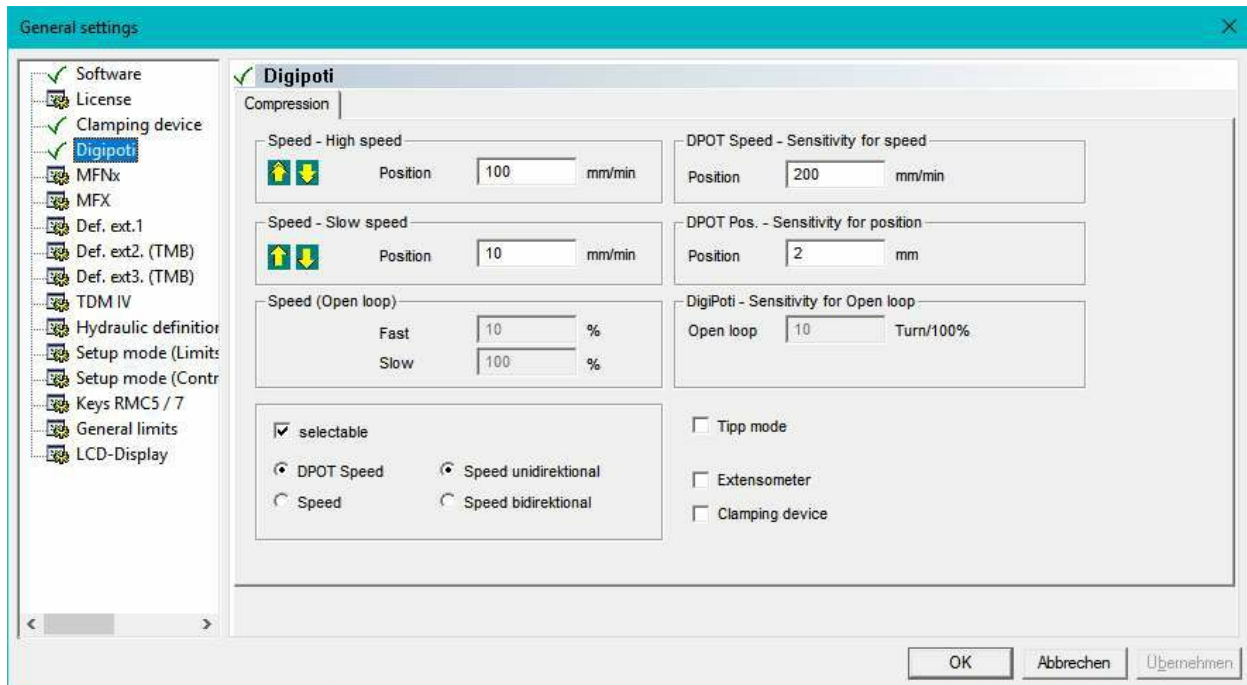
Note: The load complies with the load area of the testing instrument and should be set in a manner that the instrument will recognize the contact of the clamps.



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.

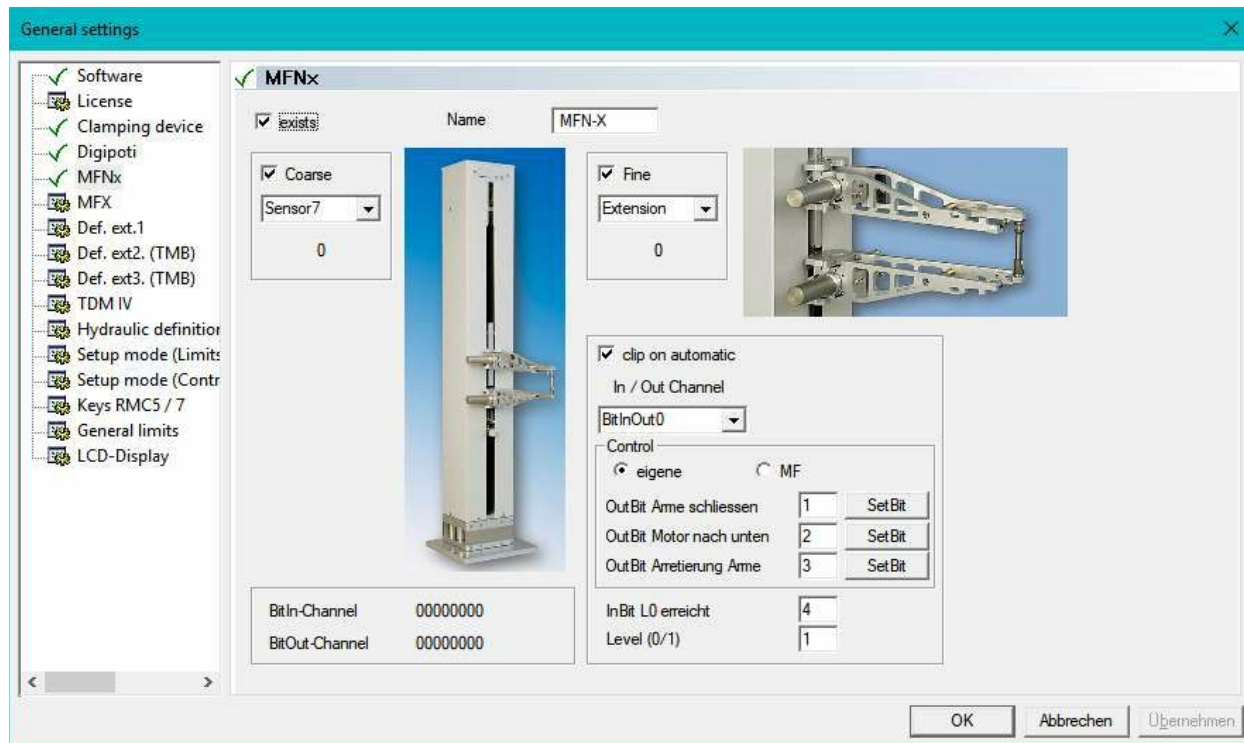
5. Click [Start](#) to start the approach → the testing instrument should approach the clamps in the way described under the steps 1 to 4. With [Stop](#) you can end the approach, if this becomes necessary.
6. Close the dialog with [OK](#).
7. Return with [menu Machine](#) → [command General settings](#)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

5.1.6.4 General Settings – DigiPoti



5.1.6.5 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.

5.1.6.6 General settings – MFX

General settings

✓ MFX

☒ active

Sensor: Extension 0

Highest position: 200 mm

Factor position: 1,23

Factor Le: 1

Time after OK: 2 sec

Aktuelle ESV: keine

ESV-No.	Position [mm]	Corr.Offset
2543	12	0,2
	0	0
	0	0
	0	0

Test MFX - GoTo Lower position + Le

Le: 30

Lower position: 40

Ext. ansetzen

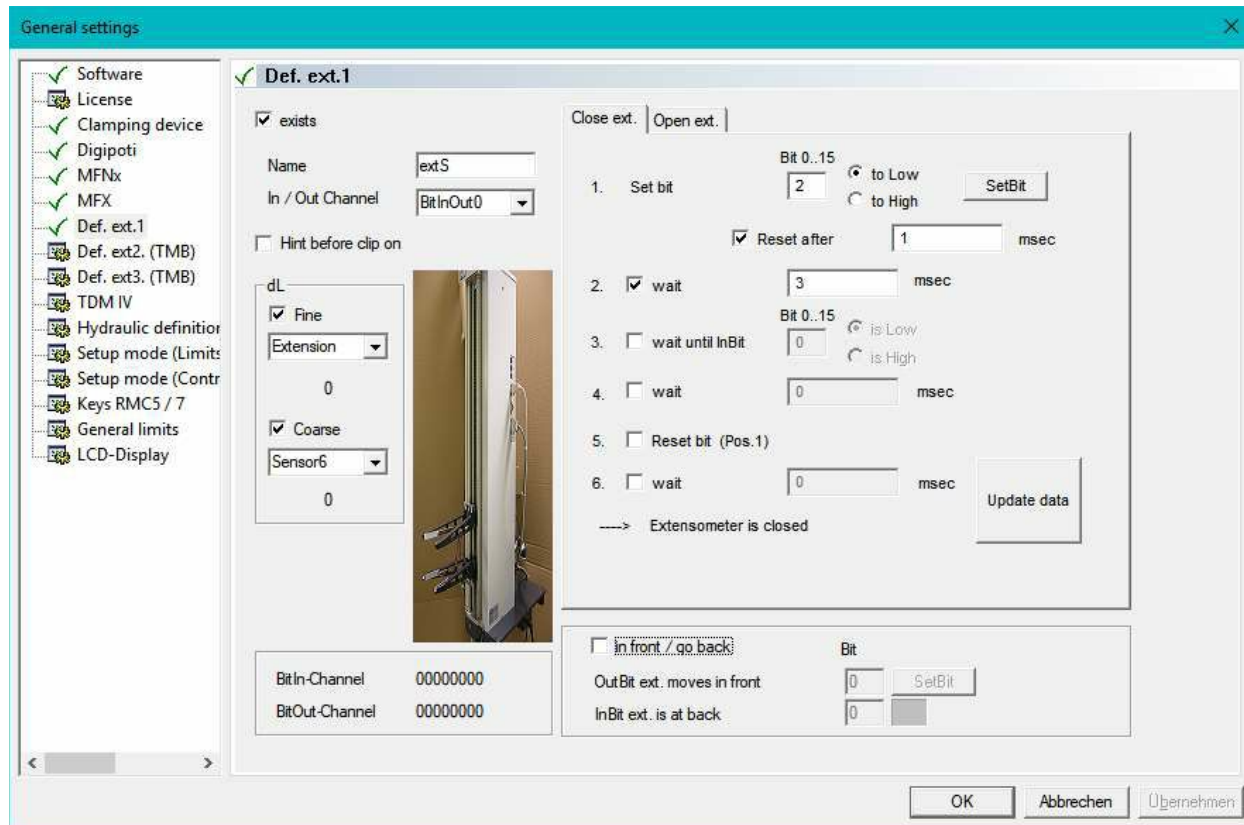
Ext. absetzen

In / Out Channel: BitInOut0

OutBit close arms	1	SetBit	BitIn-Channel	00000000
OutBit open arms	2	SetBit	BitOut-Channel	00000000
OutBit goto pos+Le	3	SetBit		
InBit closed	1			

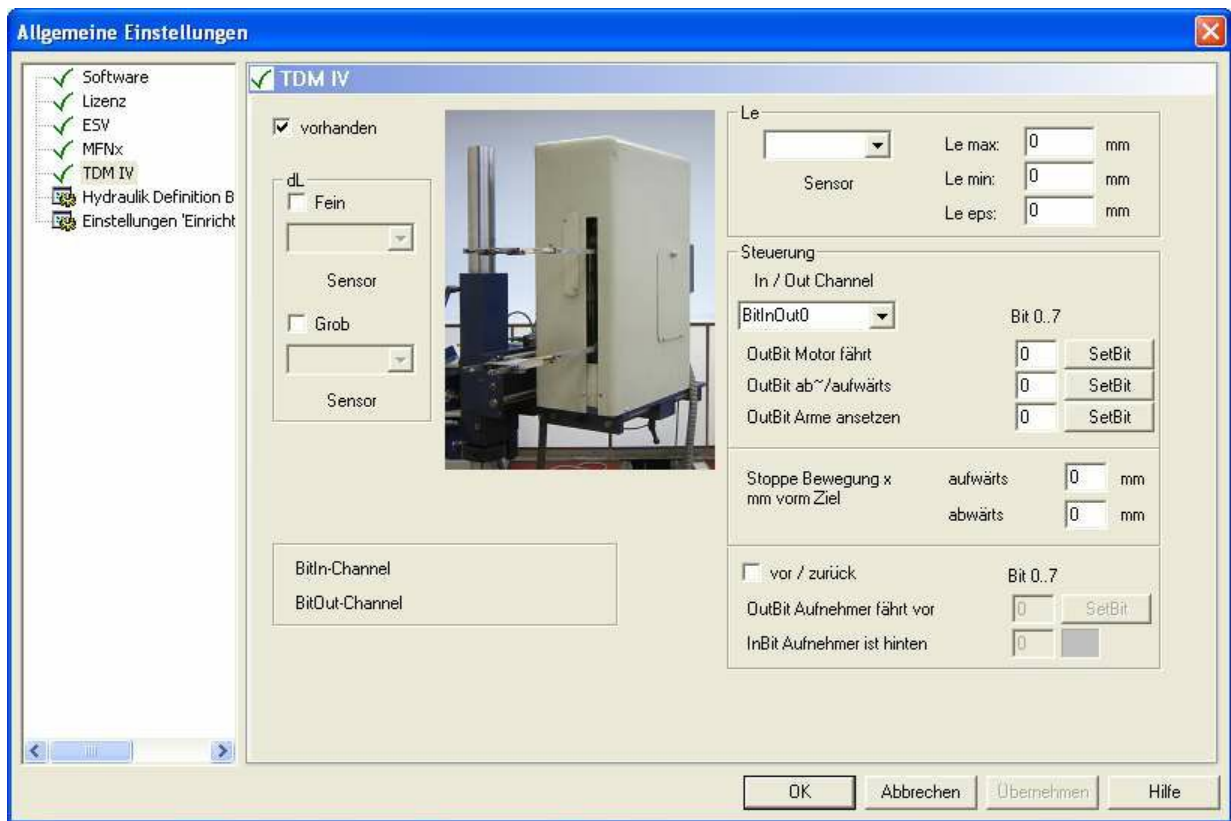
OK Abbrechen Übernehmen

5.1.6.7 General settings – Def ext 1



5.1.6.8 General settings – TDM

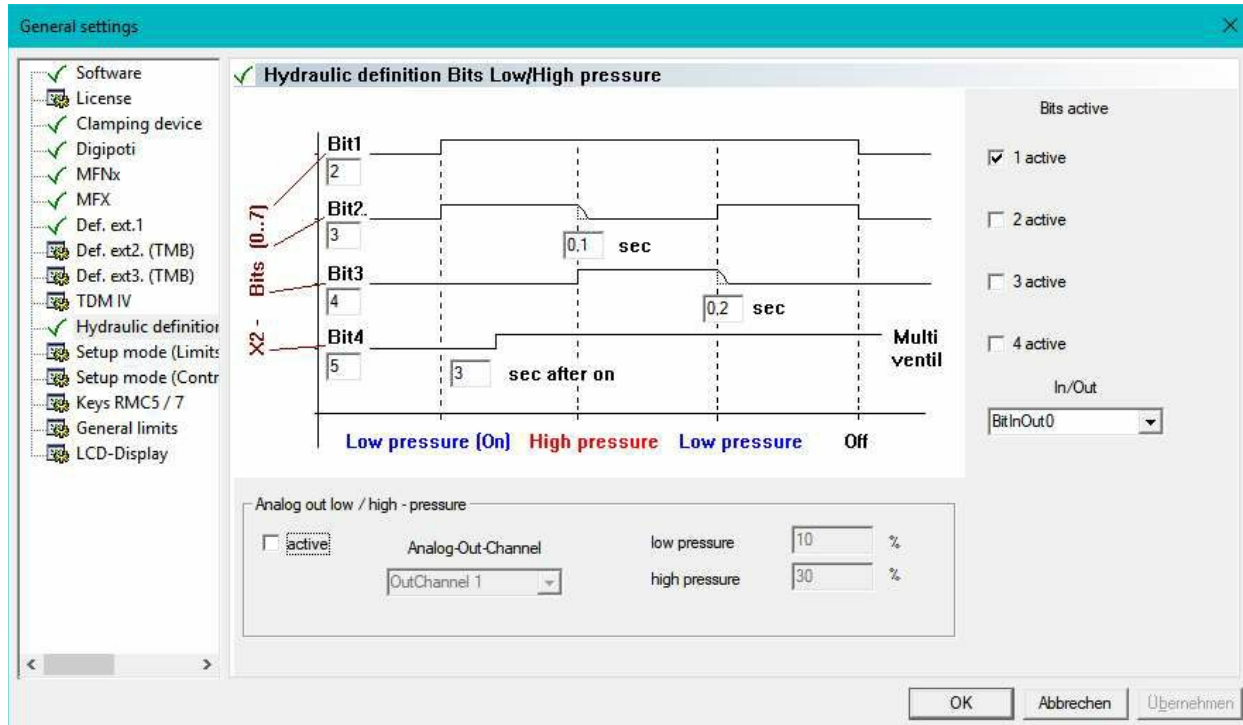
You will need this dialog only, if you are using a TDM-Strain transducer by „Roell und Korthaus“ with your testing instrument.



1. Define the necessary bits to control the extensometer.

5.1.6.9 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.

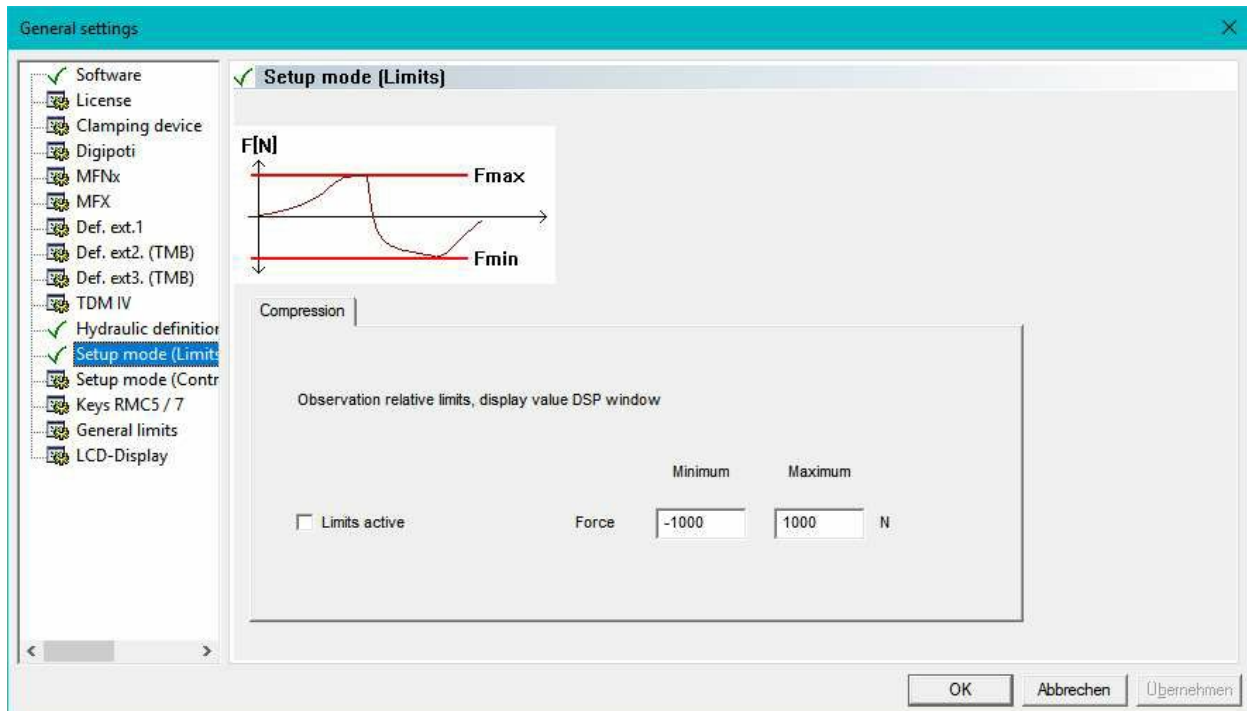


1. Define when and under which conditions the testing instrument is supposed to switch between the pressure ranges.

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.

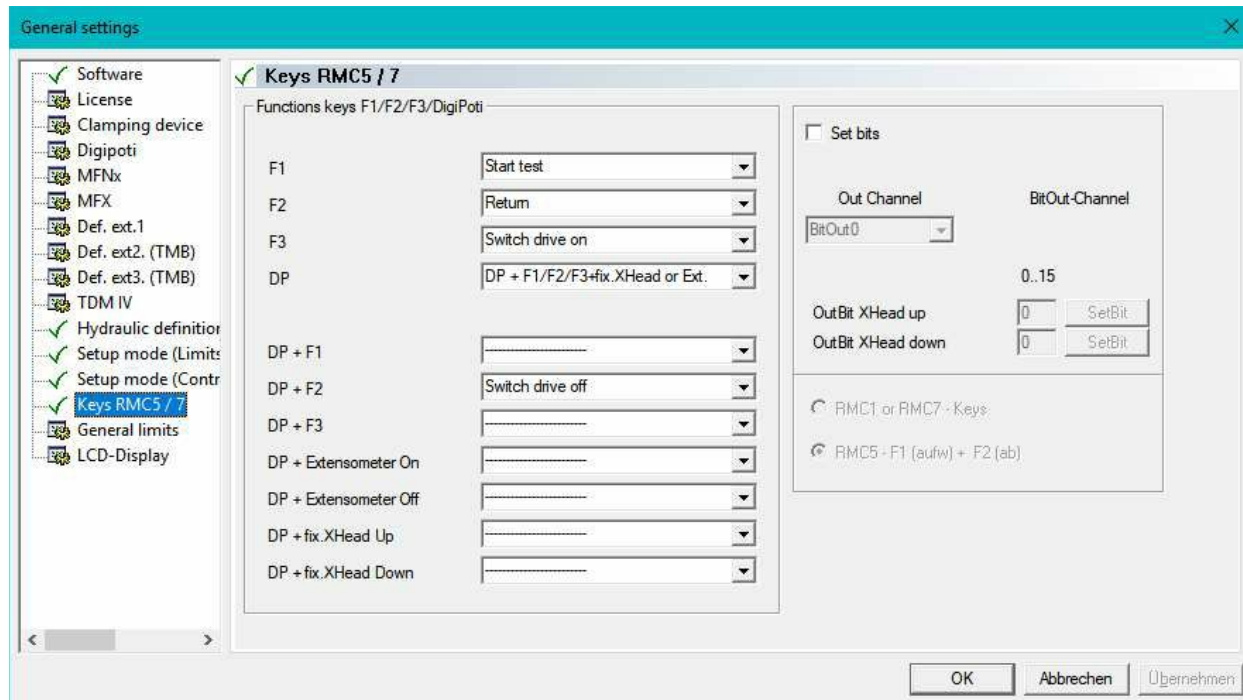
5.1.6.10 General Settings – Settings 'Low pressure range

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.

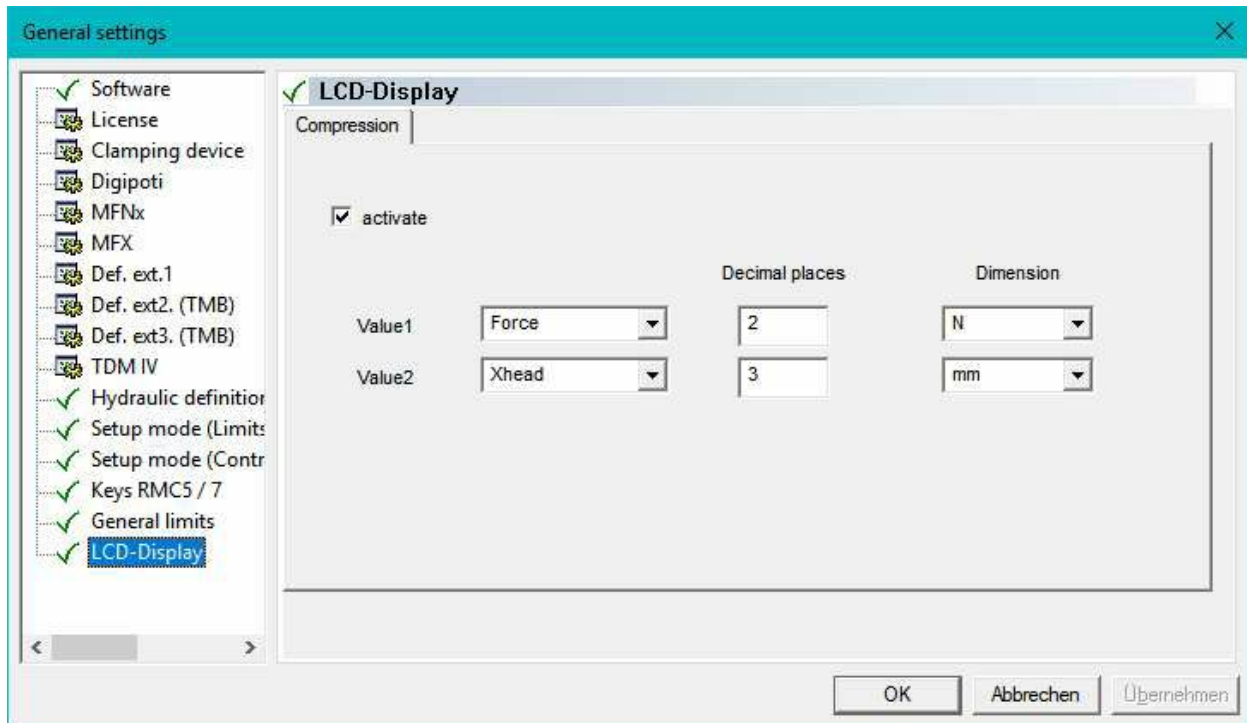


1. Define the force limits for the low pressure range.

5.1.6.11 General Settings – Keys RMC5 / 7



5.1.6.12 General Settings –LCD Display



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.



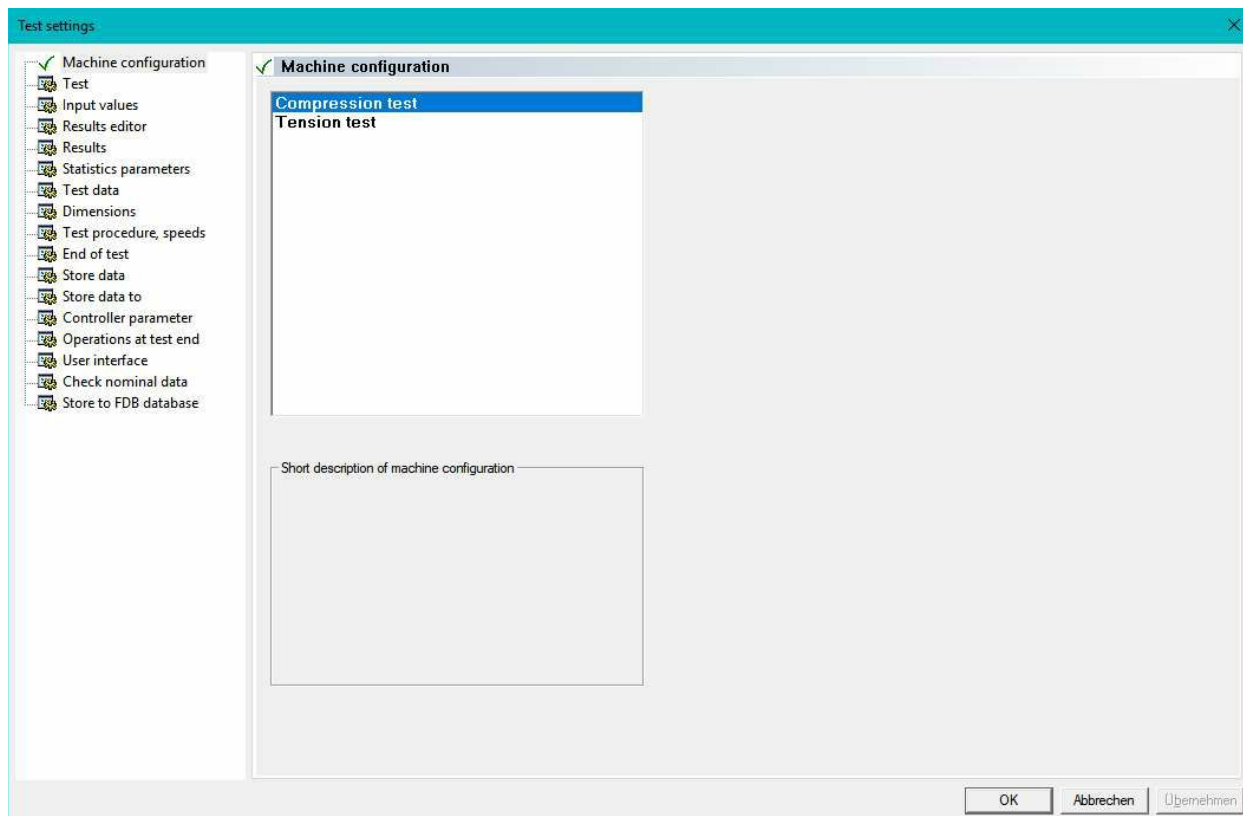
The settings in this dialog define the execution of the tests. Here, all completed sub-dialogs are marked by a checkmark (left side).



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

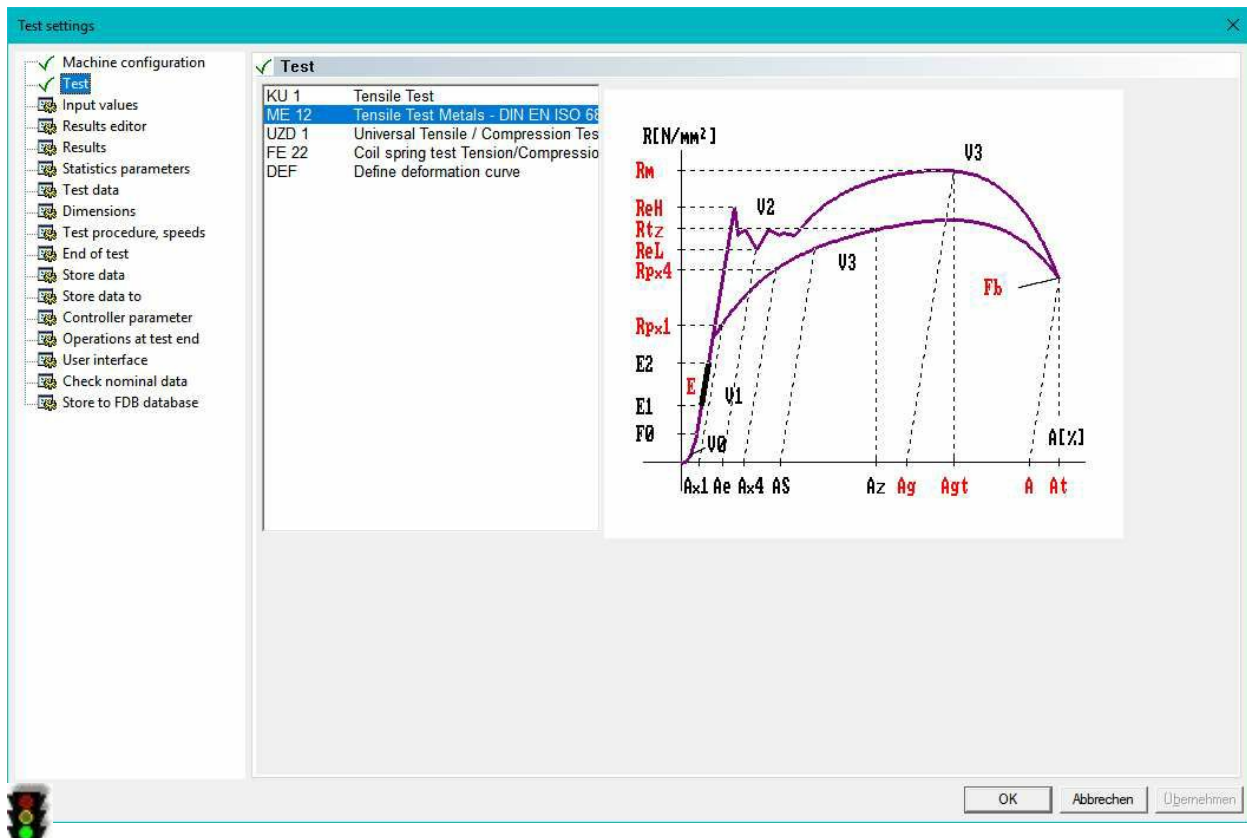
This dialog shows all the testing instrument configurations, which you have defined in the **dialog Test configuration list** (see chapter [Machine setup – Define test configuration](#)).



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

5.2.2 Test settings – Test

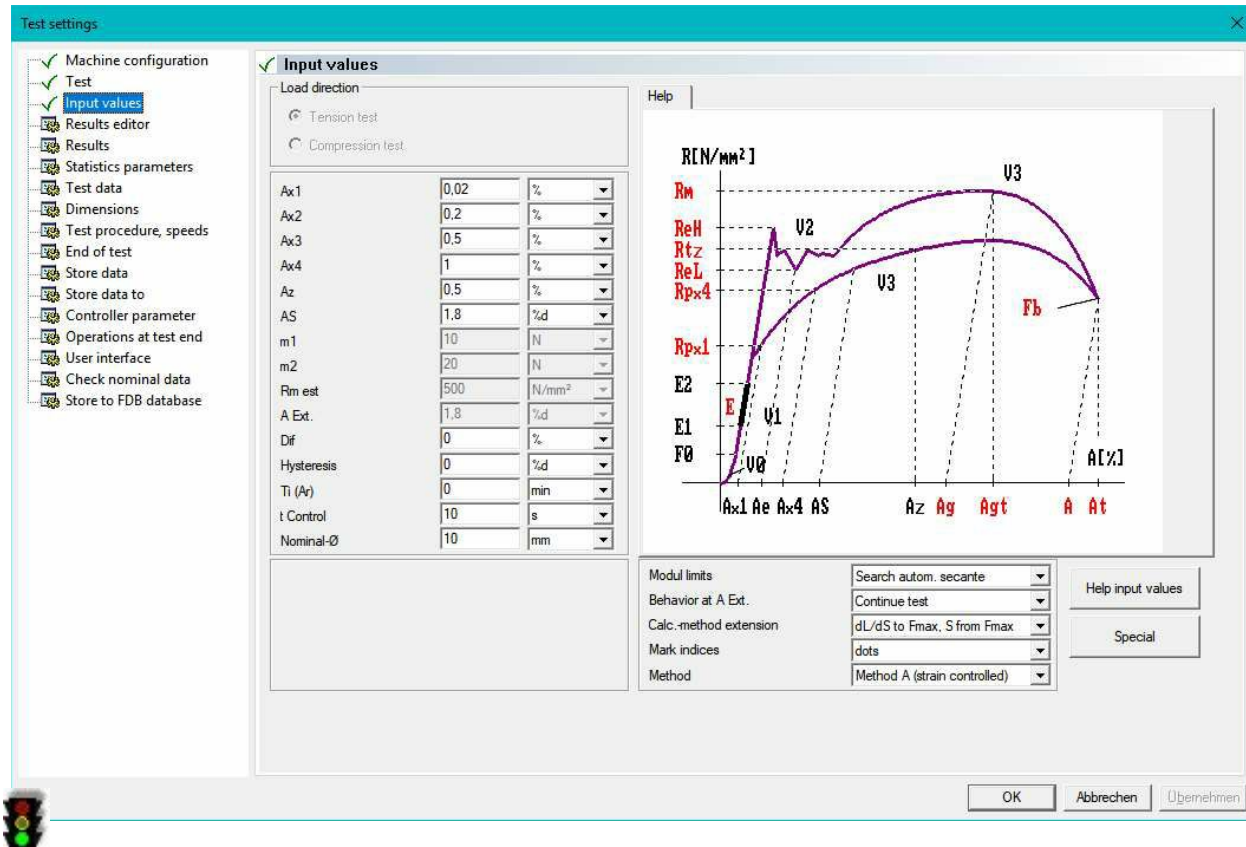
The dialog shows a list of all installed test regulations as well as the associated example graphic.



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.

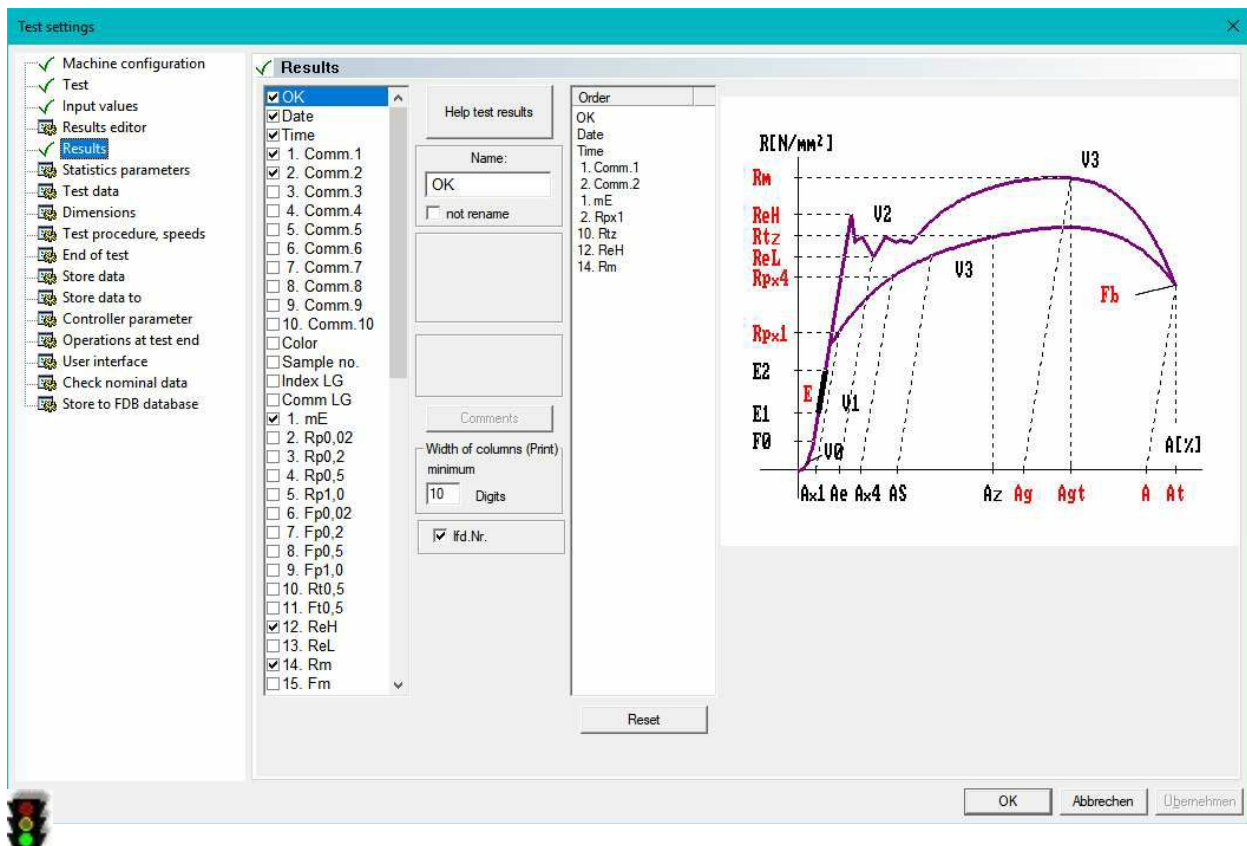


1. Depending on your needs set the load direction and the demanded nominal values.



Note: For dynamic tests an entry is not necessary.

5.2.4 Test settings – Results

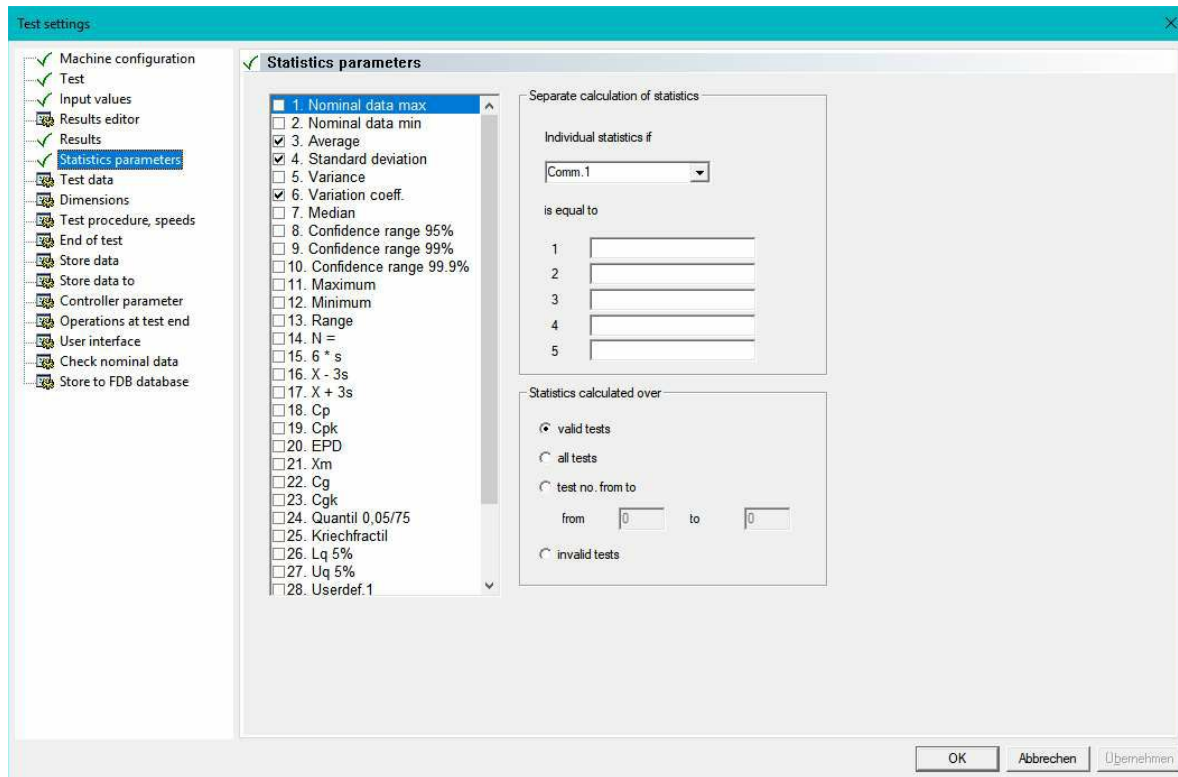


2. Set a checkmark at the results, which you want to have determined.
→ After the test, these results are then shown in the **MVL-window** (measurement diagram) and in the **TRS-window** (Result and Statistics).
3. If needed, rename the results, (field **Name**), define the units (field **Unit**), define 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 Test&Motion Plus-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 **Test&Motion Plus-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

Test settings

- Machine configuration
- Test
- Input values
- Results editor
- Results
- Statistics parameters
- Test data
- Dimensions
- Test procedure, speeds
- End of test
- Store data
- Store data to
- Controller parameter
- Operations at test end
- User interface
- Check nominal data
- Store to FDB database

Test data

☐ Read test data before 1. test
☒ Read test data before each test

☐ Operator = DB - User Windows - User

☐ Force input load from *.svl

		deactiv. input	Delete	Force input
Material	Rubber	☐	☐	☐
Batch number	4711	☐	☐	☐
Order number	0745	☐	☐	☐
Customer number	SGH	☐	☐	☐
Operator	VEII	☐	☐	☐
Department		☐	☐	☐
TestData 7		☐	☐	☐
TestData 8		☐	☐	☐
TestData 9		☐	☐	☐
TestData 10		☐	☐	☐
TestData 11		☐	☐	☐
TestData 12		☐	☐	☐
TestData 13		☐	☐	☐
TestData 14		☐	☐	☐
TestData 15		☐	☐	☐
TestData 16		☐	☐	☐
TestData 17		☐	☐	☐
TestData 18		☐	☐	☐
TestData 19		☐	☐	☐
TestData 20		☐	☐	☐

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.



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.

Test settings

Test procedure, speeds

Test rates		Rate switch points	
V0	2.5 mm/min	☒ F0	10 MPa
V1	0.0007 1/s dL	☐ V1→V2	2000 N
V2	0.0067 1/s S	☐ V2→V3	2000 N
V3	20 mm/min		2000 N
V4	10 mm/min		2000 N
V5	10 mm/min		2000 N
VR	50 mm/min		

☐ Automatic crosshead return after the end of test ☒ to position 0 mm
☐ to start position

☐ Perform force regulated stop at F0

☐ Clip on extensometer at F0

☐ wait F-controlled until >= 0 min

☐ Test force < Preload F0 before start of test

☐ Move Xhead before test ☒ Distance_ 0 mm
☐ to absolute position
Speed 0 mm/min

☐ Goto force Fx Xhead controlled, Fx: 0 N 0 mm/min

☐ If Time >= 0 Set Bit 0 OutChannel BitOut0
Reset after 0 sec

OK Abbrechen Übernehmen

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.



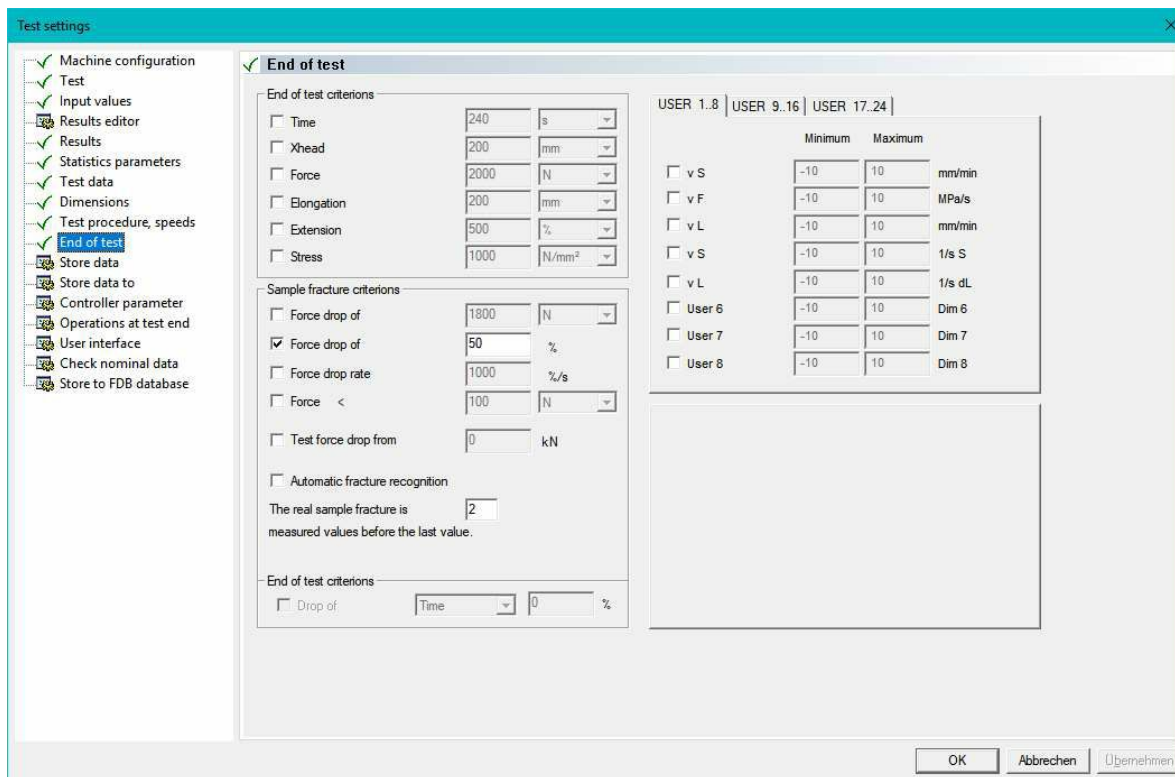
Note: You have set the load Fx in the **dialog General settings – ESV** (see homonymous chapter) while setting the free clamping device. The load Fx is used to eliminate loads, which can arise from the flowout of the sample out of the grips.

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.

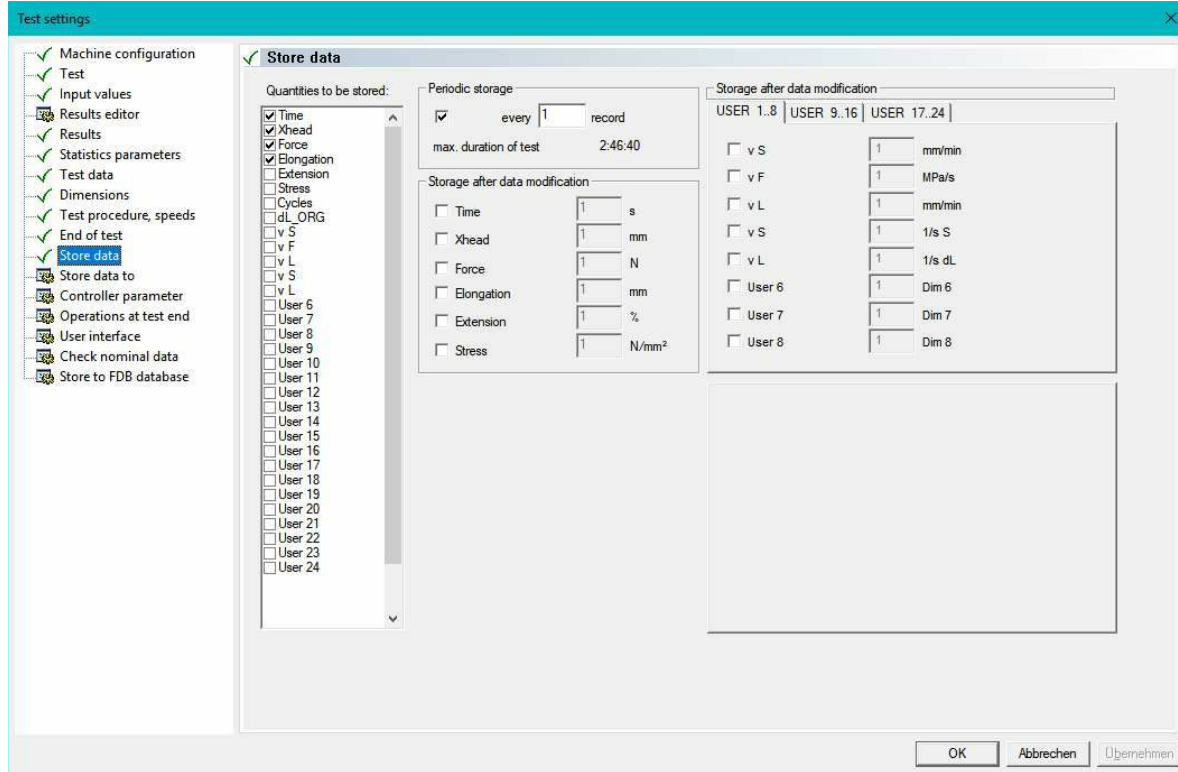
It is possible that several test end criteria are active at the same time (disjunction). The first criterion that applies, will end the test. You can see the reason for the test end in the status bar (lower right side).



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



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 **Test&Motion Plus 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.



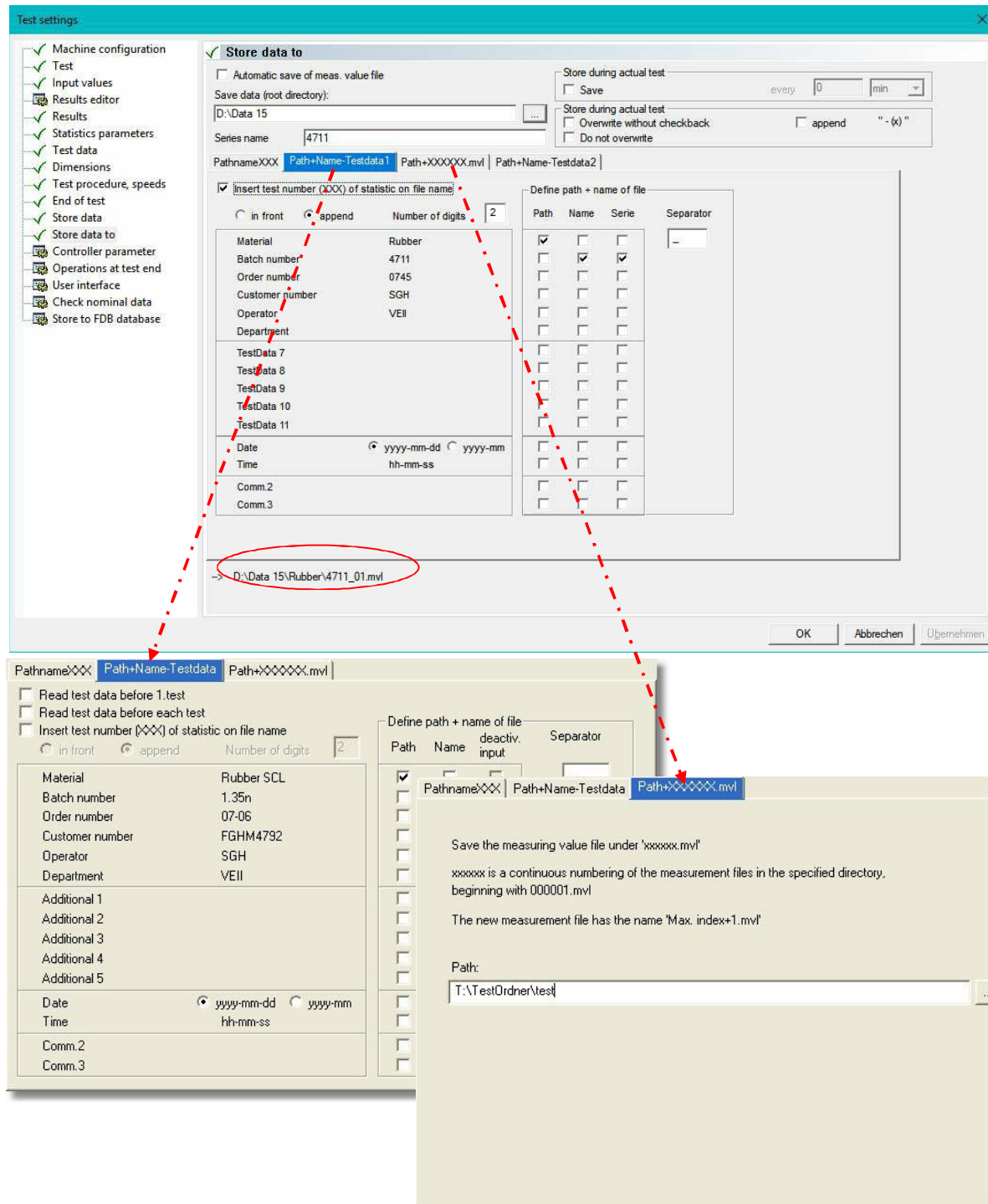
Note: Certain tests (e.g. cycle tests) stop the recording of the measuring values self-dependently; they affect the recording irrespective to these settings.

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 **Test&Motion Plus**-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 actual 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.

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 **Test&Motion Plus**-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 – Operations at test end

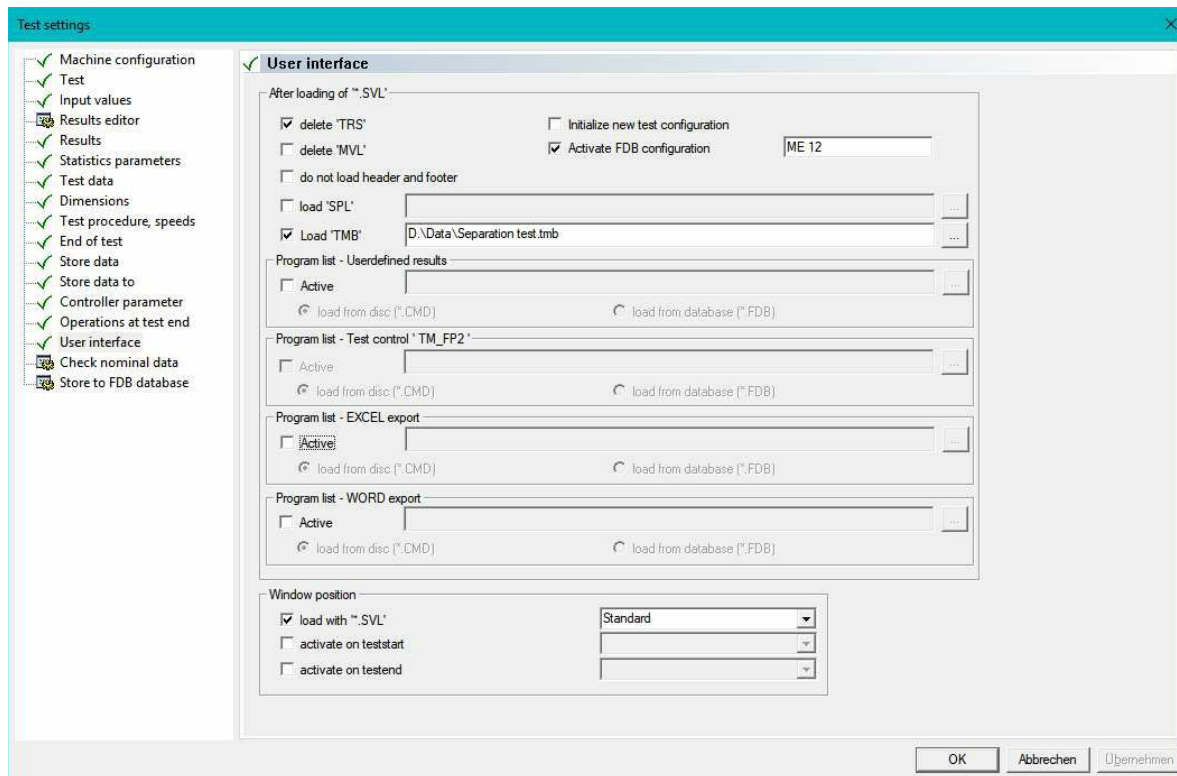
Occasionally, a test cannot be observed by the assayer (e.g. long term tests). In this case, it makes sense to point out to the assayer, that the test has been ended. This can be done by an audible signal. This and further settings can be defined here.



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).

5.2.14 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 **Test&Motion Plus**-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.

5.2.15 Test settings – Check nominal data



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.

	aktiv	mE[kN/mm ²]	Rp0,02[N/mm ²]	Rt0,5[N/mm ²]	ReH[N/mm ²]	Rm[N/mm ²]
Maximum	☒	0,000	780	0	0	0
Minimum	☒	0,000	720	0	0	0
Xm + abs.	☐	0,000	0	0	0	0
Xm + rel. (%)	☐	0,000	0	0	0	0
Nominal data X...	☐	0,000	0	0	0	0
Xm - rel. (%)	☐	0,000	0	0	0	0
Xm - abs.	☐	0,000	0	0	0	0



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

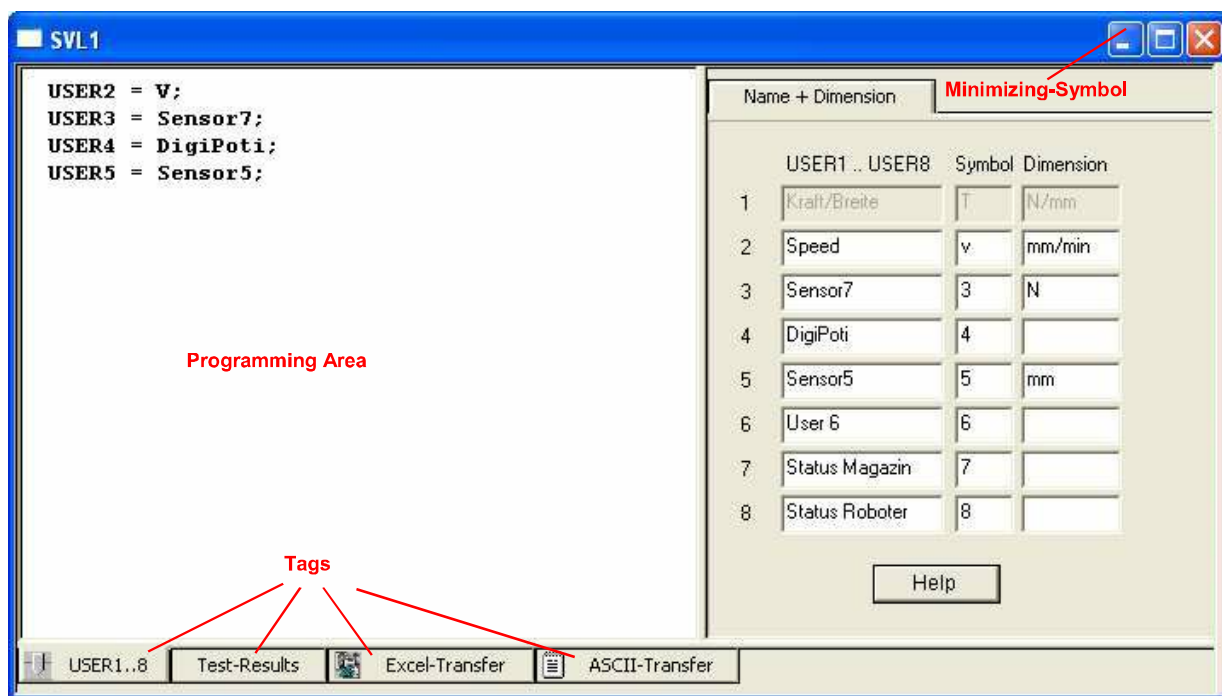
The **Test&Motion Plus**-Software offers the possibility to define up to eight measured values and their related calculation regulations in addition to the standardized results. This is done in a simple scripting language in the [document window for TMB commands](#), which forms the basis of the **T&M-Blockprogramming-function**. 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...USER30**.



As you can see, the dialog includes four windows (USER1..30, 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..30](#).

Dialog USER1..30

In [dialog USER1..30](#) 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.

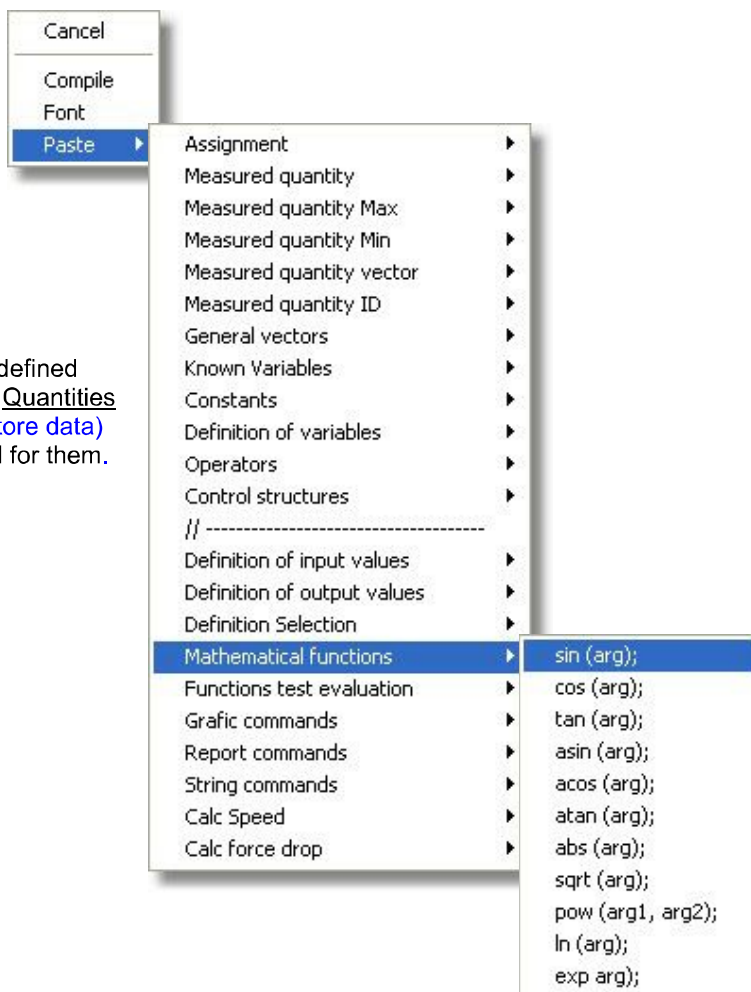
Dialog Excel-Transfer and ASCII-Transfer

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**.

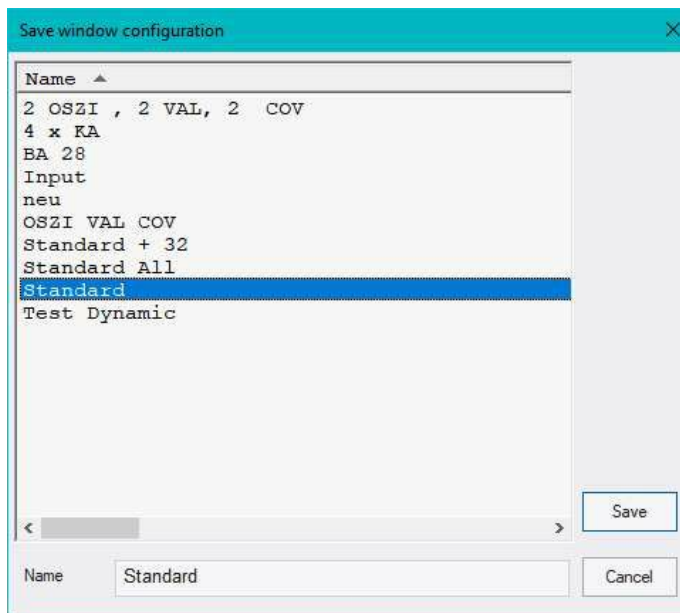
5.4.1 Save several window positions

As already mentioned (see chapter [Test settings – User interface](#)), using the **Test&Motion Plus**-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.

Create Window configuration



1. In the toolbar **View**, open the windows that are belong to the window configuration.
2. Slide the document windows to the intended position on the screen and adjust the size to your requirements.
3. Save the window configuration. To do this, call 'Save' in the **View** toolbar.
4. Enter the name of the new Window configuration and press button **Save**



Each saved window configuration creates an XML file in the subfolder 'WindowConfig*' whose names are listed here. By simply copying this XML file you can export the window configuration to another computer.

Call Window configuration



You can activate a window configuration in various ways

1. Call via button **Open** in the **View** toolbar. The following dialog shows a list of the available window configurations.
2. Define a button in the **View** toolbar that can be used to load a specified window configuration. The definition dialog is accessed via **Define** in the **Administration** toolbar.

Up to 8 buttons can be defined. The labeling of the button and the window configuration called up can be set here.

Under 'Default configuration' the window configuration to be activated at program start is selected.

The checkbox 'Show' activates/deactivates the buttons 'Load/Save window configuration' in the View toolbar.

The result of these settings is the following appearance in the **View** toolbar.



3. Automatically activate a window configuration after loading a previously created test specification. To do this, activate the checkbox '**Load with SVL**' in the dialog '**Test – Settings**' - Interface in the section Window position and select the desired configuration.

Now this window configuration is activated after each loading of the SVL file from the hard disc or the test configuration from the test specification database.

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 main software window with a graph titled "Coil spring test Tension/Compression". The y-axis is labeled "Force [N]" and ranges from 100 to 360. The x-axis is labeled "Spring length" and ranges from 39 to 51. A red line represents the test data, with three blue asterisks marking specific points. A context menu is open over the graph, listing various options including "Diagram axes", "HairCursor", "Copy Bmp", "Insert remarks", "Font", "Cut", "Copy meas.values", "Reduce number of values", "Read in ASCII file", "append on filelist", "Overwrite MVL + FDB", "Append test --> FDB", "Manual test", and "Delete SetCycles".

Two dialog boxes are also shown. The "Diagram" dialog box (top) has tabs for "General settings", "Curves", and "Options serie". The "General settings" tab is active, showing fields for "Headline" (Coil spring test Tension/Compression), "Number of curves" (1), "Margins" (2, 2, 2, 2), "Gradient screen" (visible), "Gradient print" (visible), "Diagram description" (Draw graph with a solid line, Mark test results, Mark test results in serie, Draw curve only to Fbreak), "Limitation" (active), "Max. number graphic" (n: 2), and "OK".

The "Diagram" dialog box (bottom) has tabs for "General settings", "Curves", and "Options serie". The "General settings" tab is active, showing fields for "X axis" (Spring length, mm), "From" (39), "To" (51), "log" (10), "e", "inv.", "Length of steps" (0), "Y axis" (Force, N), "From" (0), "To" (500), "log", "10", "e", "inv.", "Length of steps" (0), "Fit bounds to graph" (checked), "Zoom allowed" (checked), "visible (%)" (0 to 100), "Colors" (Curve: red, Axes: black), "Draw curve in:" (Curve 1), "own y-axis" (checked), "Show grid" (checked), "Position Y-Axis" (0), "Thickness" (1), and buttons for "OK", "Abbrechen", and "Übernehmen".

General Settings



2. Here you can define the general appearance of the diagrams: Headline (name of the test regulation predefined), margins, colour design and the number of the curves to be shown. If you change the settings 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 Results and Statistics TRS

Click with right mouse button on grid for [context menu](#) → several commands will appear.

The screenshot shows the TRS window with a table of test results. The table has columns for OK, Date, Time, F1l@48 mm [N], F2l@46 mm [N], F3l@44 mm [N], and L0l@2 N [mm]. The table contains 19 rows of data. A context menu is open over the table, showing various options such as Cancel, Color results, Color statistic, Font, Copy '*.txt', Copy to clip board, Actual test visible, Fit column width (checked), Save 'Rescue.TRS', OT, UT, Xm, Separate statistics, a read in, b read in, h read in, and m read in.

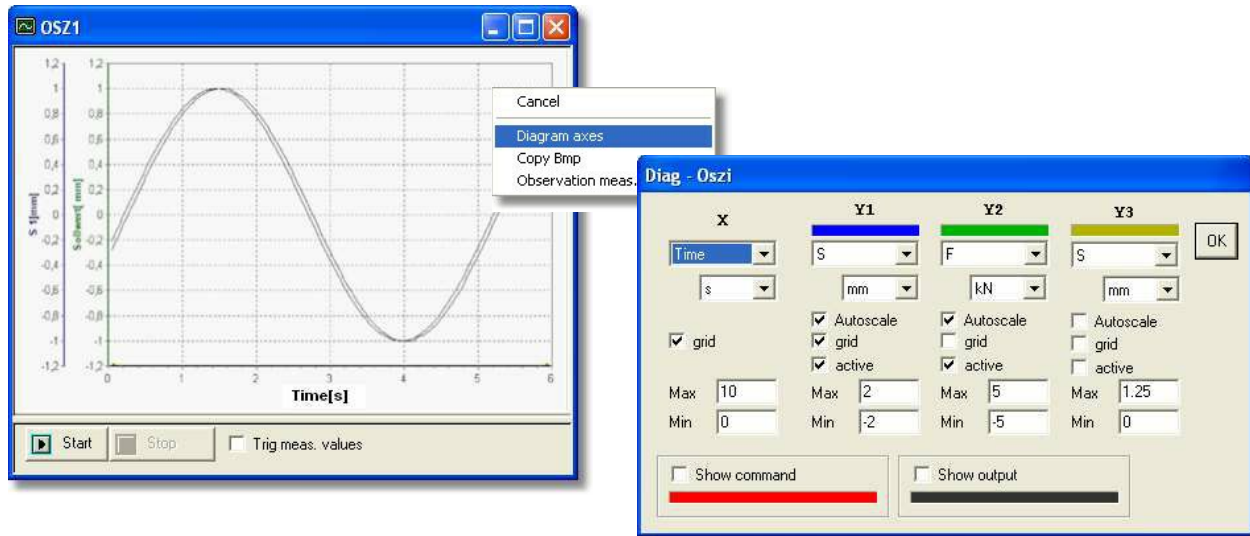
	OK	Date	Time	F1l@48 mm [N]	F2l@46 mm [N]	F3l@44 mm [N]	L0l@2 N [mm]
1	☐	13.05.18	11:11	63,63	156,18	249,18	49,91
2	☒	13.05.18	11:21	63,84	156,60	249,90	49,91
3	☐	13.05.18	11:21	63,78	156,57	249,91	49,90
4	☒	13.05.18	11:21	63,96	156,86	250,29	49,90
5	☒	13.05.18	11:21	63,98	157,04	250,73	49,90
6	☒	13.05.18	11:21	64,65	157,35	251,06	49,91
7	☒	13.05.18	11:21	64,76	157,39	251,40	49,90
8	☒	13.05.18	11:22	64,77	157,56	251,86	49,90
9	☐	13.05.18	11:22	64,80	157,70	252,06	49,90
10	☐	13.05.18	11:22	64,71	158,03	252,29	49,90
11	☐						
12	☐						
13	☐						
14	☐						
15	☐						
16	☐						
17	☐						
18	☐						
19	☐						

You can:

1. Define the background colors of the areas for results and statistics
2. Set the font and font size
3. Save the current table as a text file
4. Copy the data to the clipboard
5. 'Actual test visible' moves the last test into the visible area of the TRS window
6. Automatically adjust the column width to the content
7. Save 'Rescue.TRS', if enabled, the contents of the TRS window is automatically saved to disk as 'Rescue.TRS' file after each test.
8. Display the set limits OT and UT as well as the mean value Xm.
9. Re-read the dimensions a, b, h, m

5.4.4 Oscilloscope functions OSZ

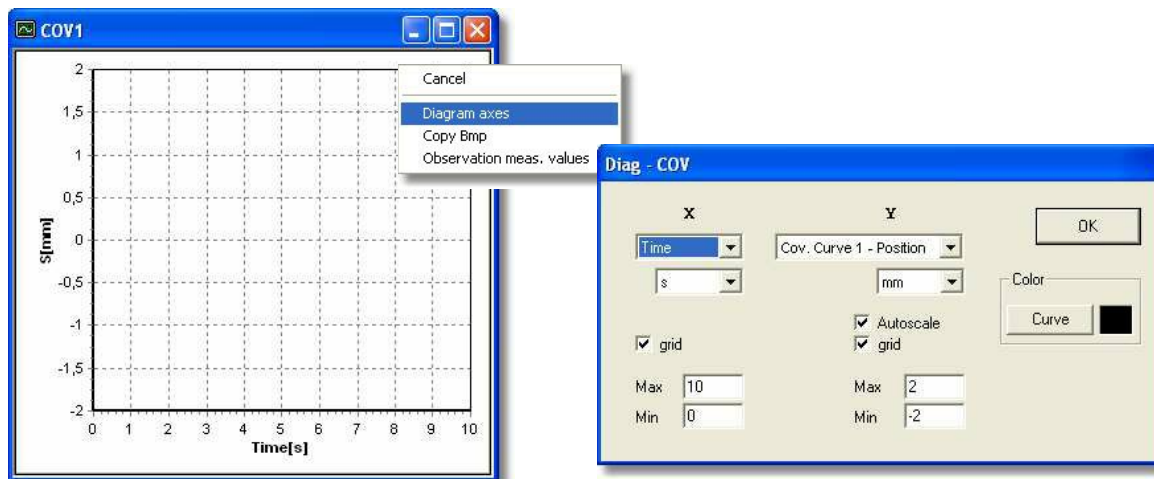
Click [context menu](#) → [command Diagram axes](#) → the dialog [Diag-Oszi](#) will open.



Here you define the layout of the [OSZ-window](#). You can set: diagram axes, their colours, their dimensions, their units, and their scaling. You can blend in: the grids, set values and command outputs or you can activate the auto scale (during the test, curves are then continuously scaled in a way, that they are always completely visible in the window).

5.4.5 Covering curve COV

Click [context menu](#) → [command Diagram axes](#) → the dialog [Diag-COV](#) will open.



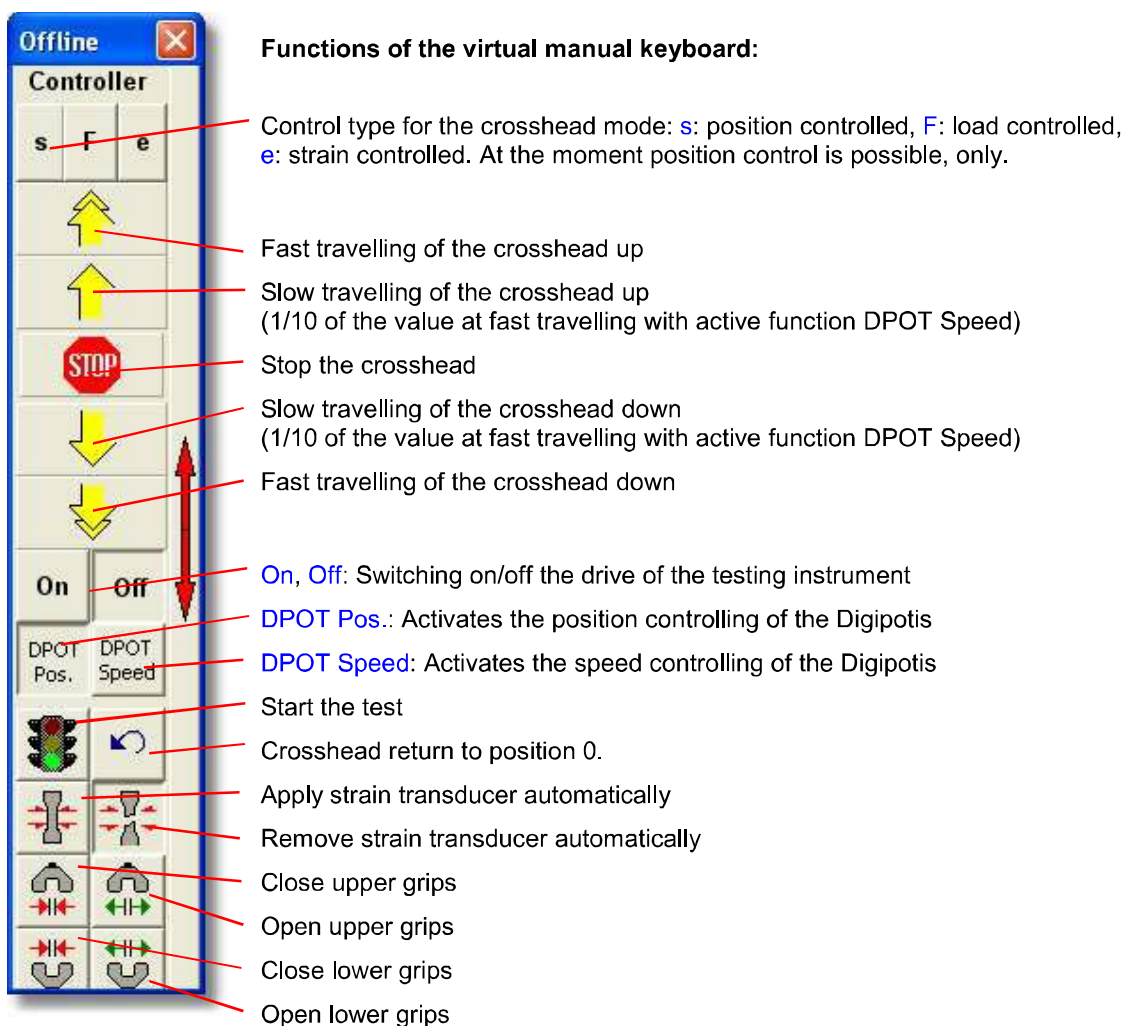
Here, you define the design of the [COV-window](#). You can set: the dimensions, the units and the scale setting for the diagram axes. You can blend in the grids or activate the auto scaling (during the test, curves are then continuously scaled in a way, that always keeps them completely visible in the window).

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.



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:

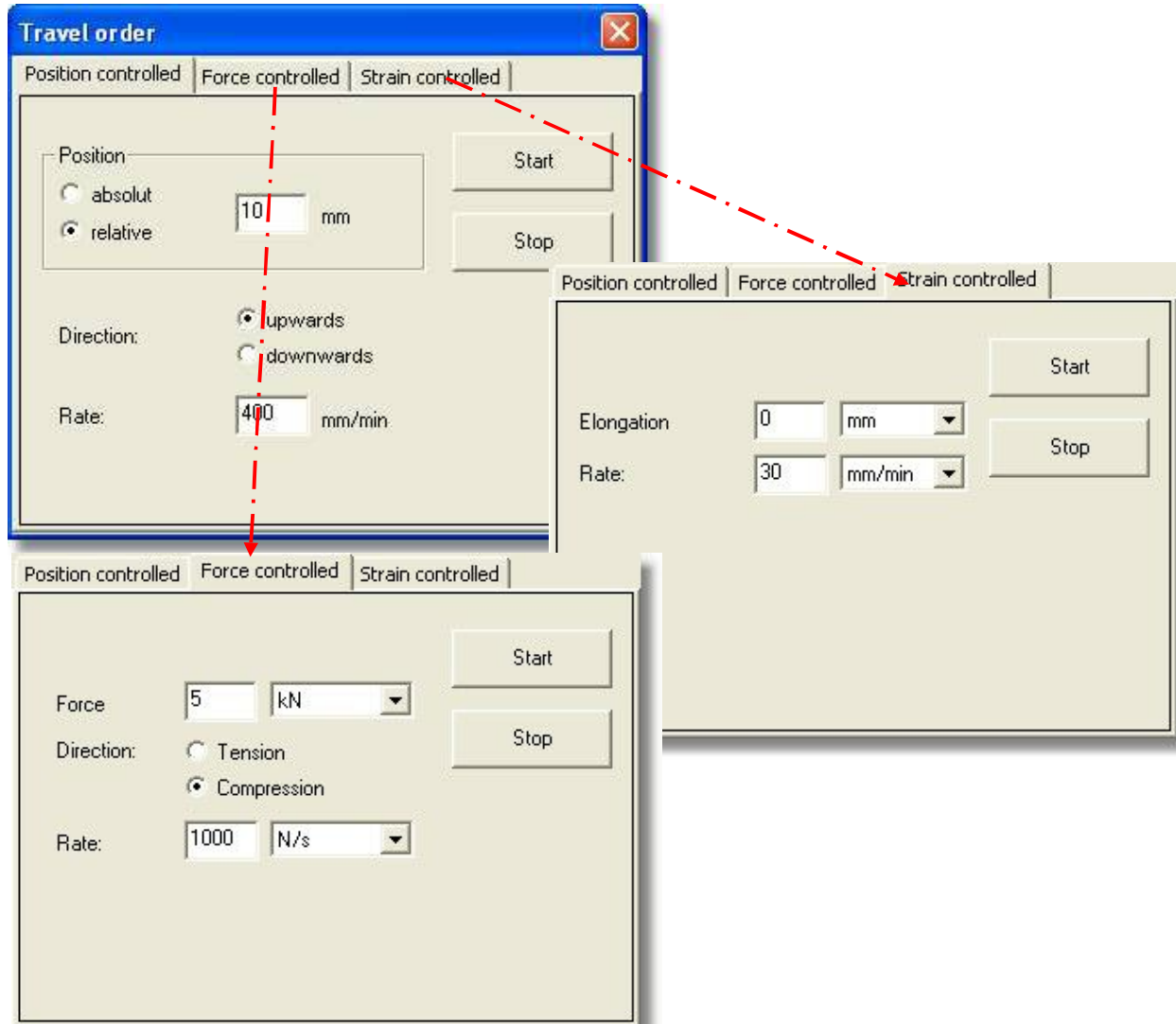
If you click the [function field Speed](#), the crosshead moves - by means of the double arrows – with the defined speed of 100mm/min; with the single arrow 1mm/min.

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](#).



2. Select the control type for the movement:

Position controlled: Enter the position, the direction and the speed for the crosshead movement.

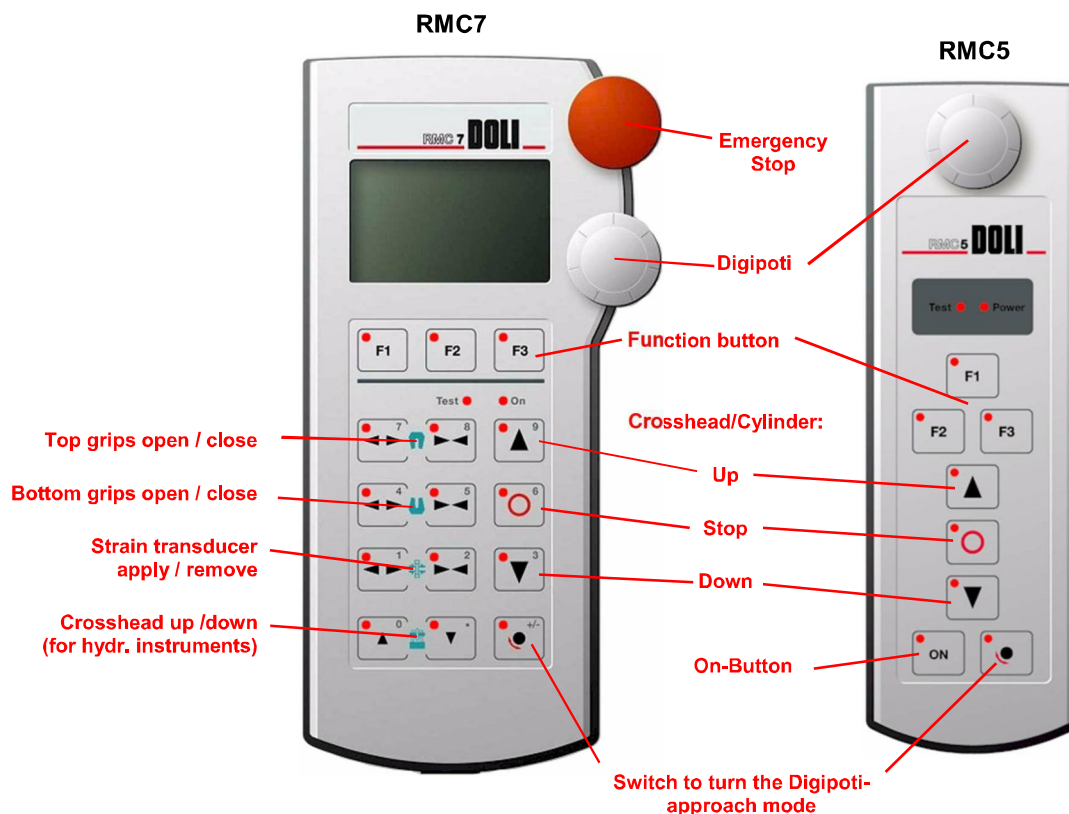
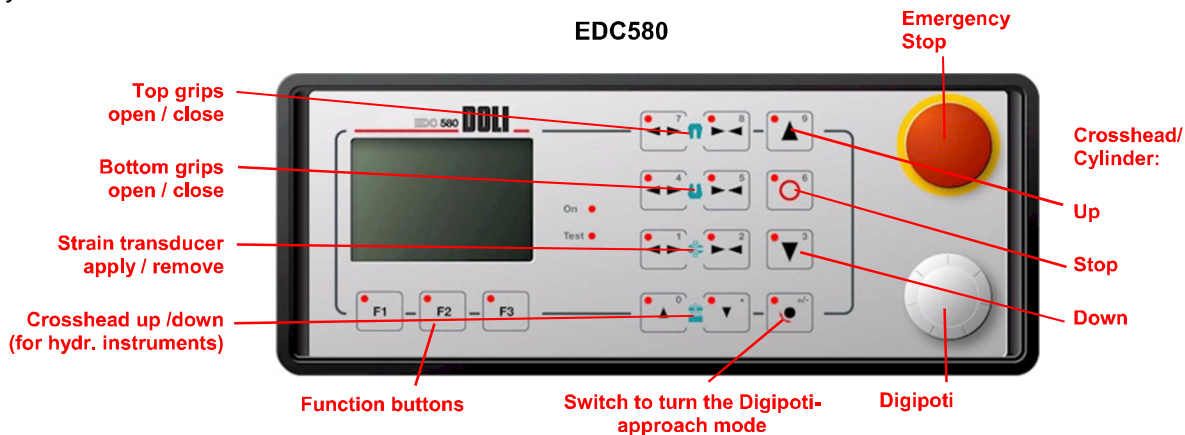
Load (force) controlled: Enter the load, the direction (tension/compression) and the speed for the crosshead movement.

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

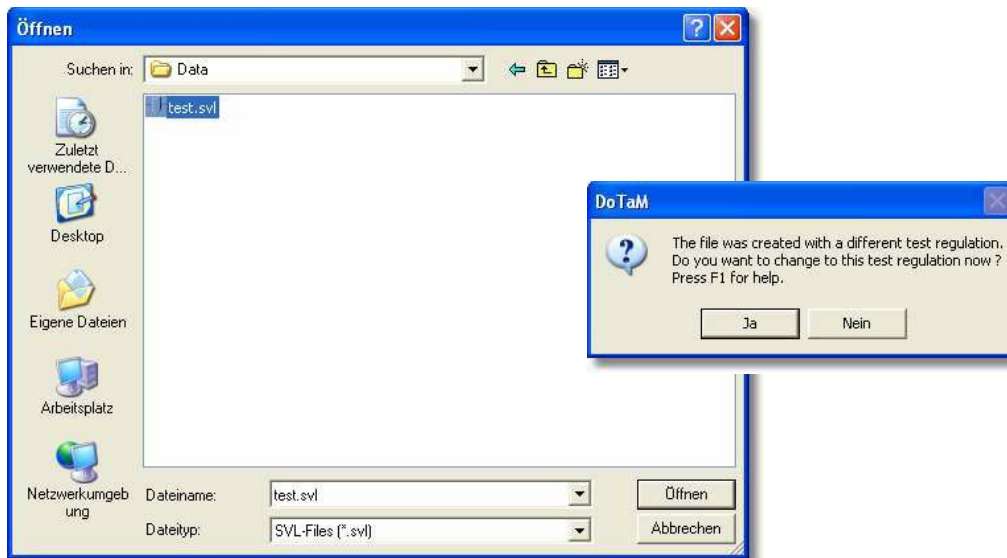
Here the general approach for a test performance is outlined.

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](#).

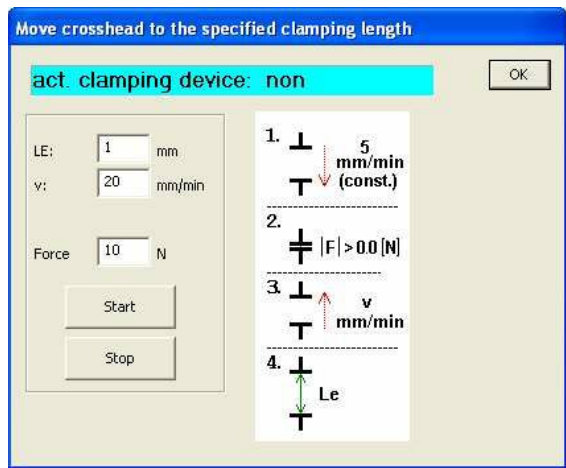
Clamp a sample



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

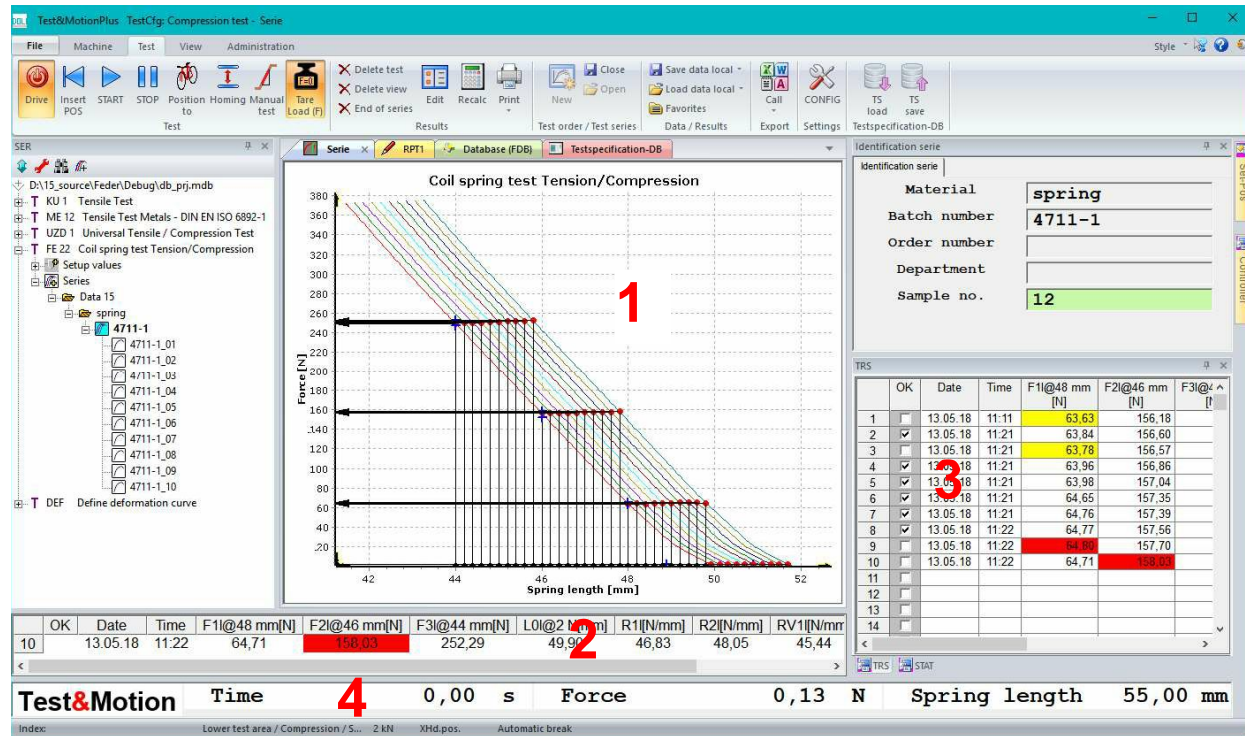
Crosshead return



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 \(MVL\)](#) (1). 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 result line (2).
3. The test results are added to the result list (3), 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 actual measured values (4).

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 all graph windows ([MVL](#), [COV](#), [OSZ](#)). 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 one of the graph windows ([MVL](#), [COV](#), [OSZ](#)), 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

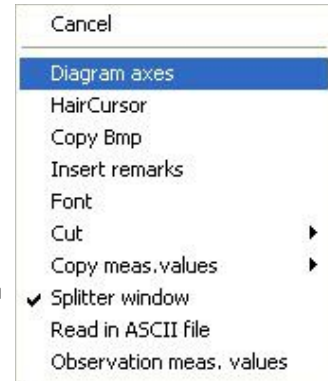
You can export data via the clip board in order to work with them further on in other programs ([symbol Export data](#) → the [dialog Export](#) will open, see chapter [Export data](#)).

7.3 Edit measurement diagram

The **Test&Motion Plus**-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 your comment and click the [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

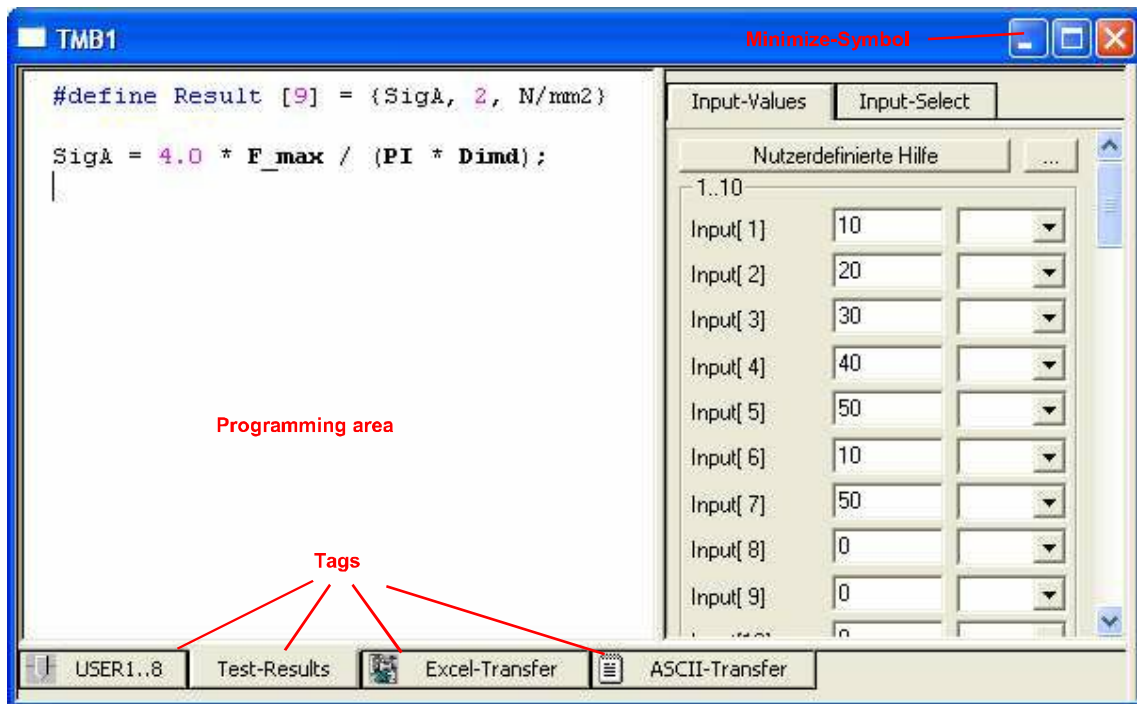
In addition to the results calculated by the **T&M-Dynpack**-Software, you can define further output values and set their calculation regulations. This is done in the [document window TMB commands \(TMB\)](#) under [dialog Test-Results](#).



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.

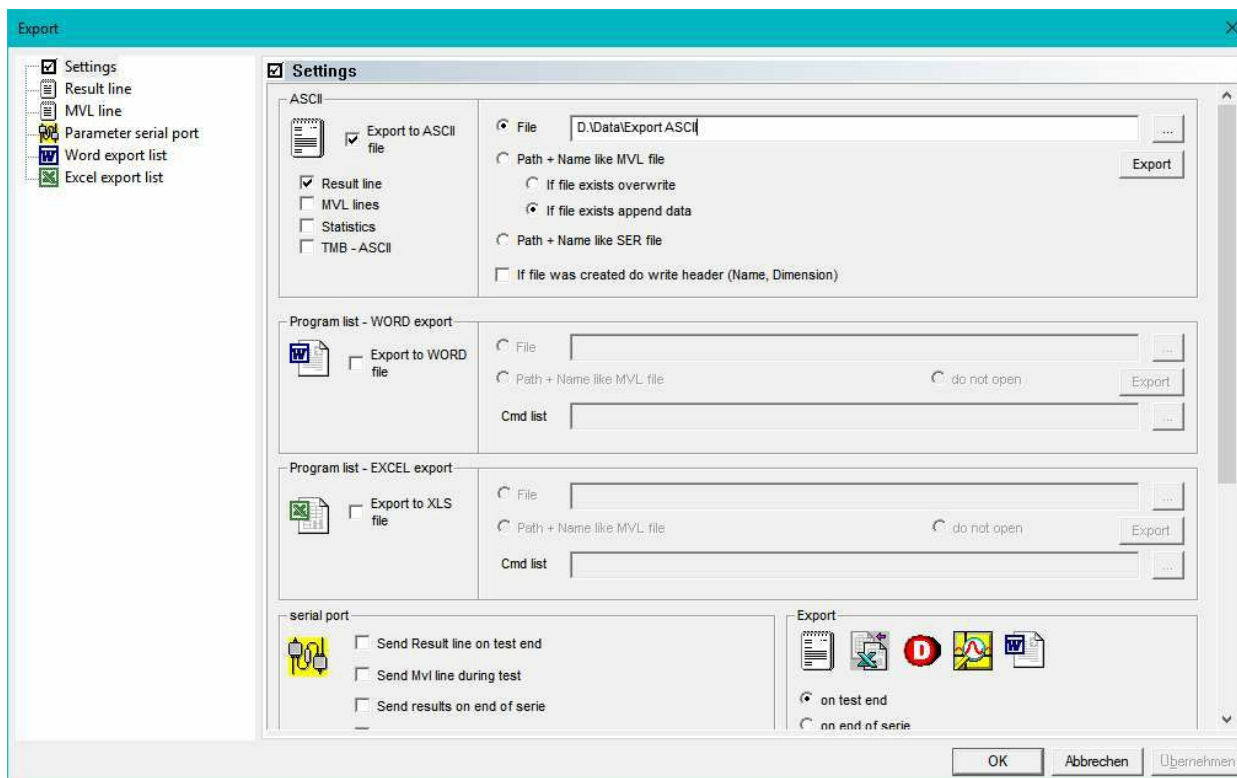
7. **Check in the [MVL-window](#)**

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

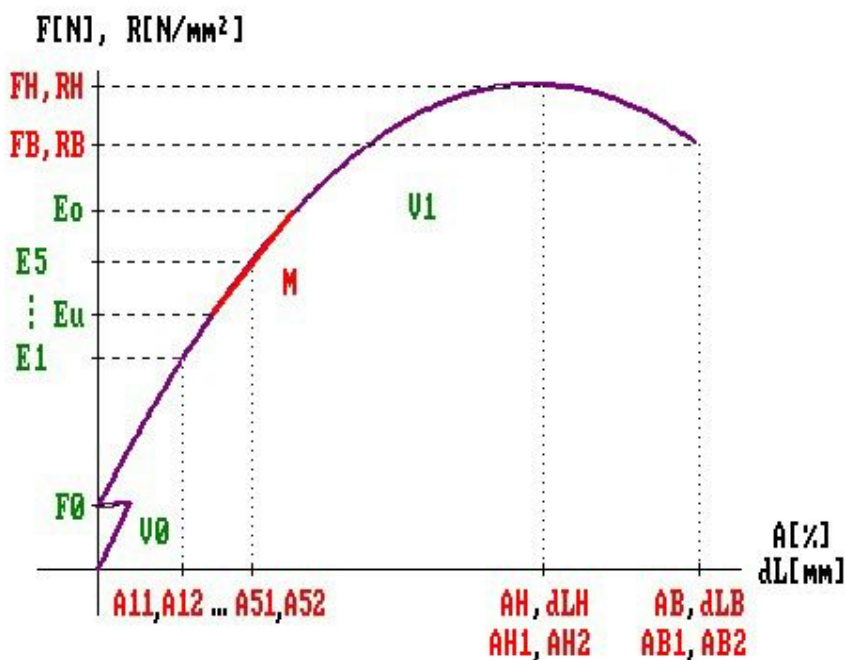
8.1 Universal-Tension-/Compression test ZD1 (included in the base module)

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/mm²], [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 3
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).

8.2 Dynamic control single axis test

8.2.1 Range of application

Dynamic charge of components and assemblies.

8.2.2 Input values DYN 2

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
 - Settings dynamic
 - Definition Cosinus cycles
 - Check nominal data

Definition Cosinus cycles

	Offset:	Hz	Amplitude:	Control type:	Number of cycles	Save each nth cycle	Ctrl.Param. P	I	Temp. stop	Peak.Ctrl. On	not off	values	n:
01:	0	5	100	F [N]	100	100	0	0		☒		10	4
02:	20	5	100	F [N]	100	100	0	0		☒		15	
03:	0	5	100	F [N]	100	100	0	0		☒		10	
04:	20	5	100	F [N]	100	100	0	0			☒	15	
05:	0	5	100	F [N]	100	100	0	0				1	
06:	0	5	100	F [N]	100	100	0	0				1	
07:	0	5	100	F [N]	100	100	0	0				1	
08:	0	5	100	F [N]	100	100	0	0				1	
09:	0	5	100	F [N]	100	100	0	0				1	
10:	0	5	100	F [N]	100	100	0	0				1	
11:	0	5	100	F [N]	100	100	0	0				1	
12:	0	5	100	F [N]	100	100	0	0				1	
13:	0	5	100	F [N]	100	100	0	0				1	
14:	0	5	100	F [N]	100	100	0	0				1	
15:	0	5	100	F [N]	100	100	0	0				1	
16:	0	5	100	F [N]	100	100	0	0				1	
17:	0	5	100	F [N]	100	100	0	0				1	
18:	0	5	100	F [N]	100	100	0	0				1	
19:	0	5	100	F [N]	100	100	0	0				1	
20:	0	5	100	F [N]	100	100	0	0				1	

☐ Send contr.param.

OK Abbrechen Übernehmen Hilfe

Meanings of the input values:

Column	Description	Unit
Offset	Mean value	[N, kN], [mm]
Hz	Frequency	Hertz
Amplitude	Amplitude	[N, kN], [mm]
Controller type	Controller type	F, S, E
Number of cycles	Number of alternations of the load	without
Store cycle x..	the cycle to be stored	without
CrtParam	Controller parameters P, I	without
PeahCrt	Activate the peak value control	
n	Number of blocks	

