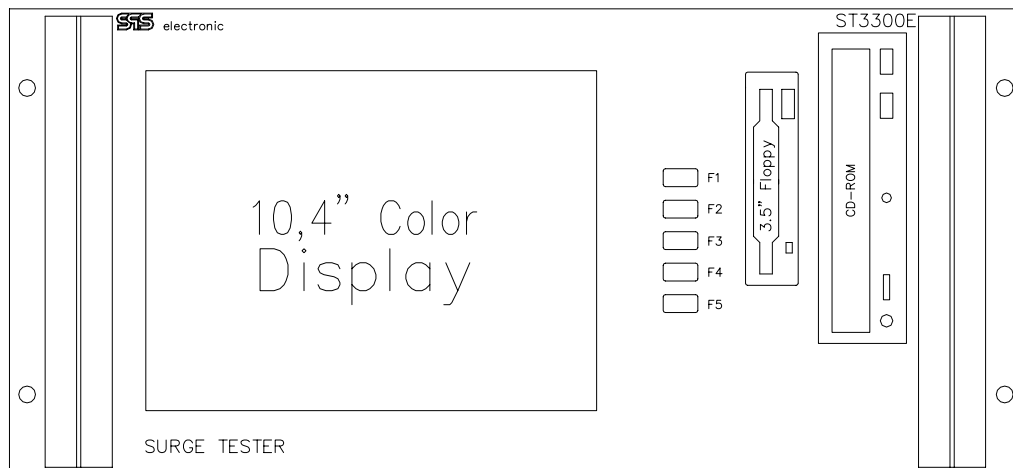


Operating Manual

Surge Tester ST 3300

Last update: 25.11.2003



Series:	ST 3300
Serial number:	
Constructed in:	

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1 Hardware Description

1.1 Range of delivery

While unpacking the device, make sure that the following parts are complete:

Number	Description
1	Test device ST 3300 in housing
1	Power cable
2 resp. 4	test connection cable, red, with terminals
1	PC keyboard, with adapter
1	PC mouse
1	Software license : WINDOWS 2000
1	3,5" floppy disk with application software ST 3300
1	Operating manual

1.2 Device functions

With the Surge Tester ST 3300 winding goods like stators, rotors, transformers etc. can be tested for insulation damages and predamages.

Not only already existing interturn short-circuits are being detected, but also the test procedure detects predamages, not yet recognized as electric interturn short-circuit.

Highlights:

- test voltage 500 VDC – 6000 VDC
- surge capacity 47 nF
- integrated PC for control, evaluation and storage
- WINDOWS surface for user-oriented operation
- Switching matrix for 3-phase DUTs (ST 3300D and ST 3300E only)
- integrated LC color display (ST 3300B and ST 3300E only)

1.3 Design and functions

1.3.1 Front panel

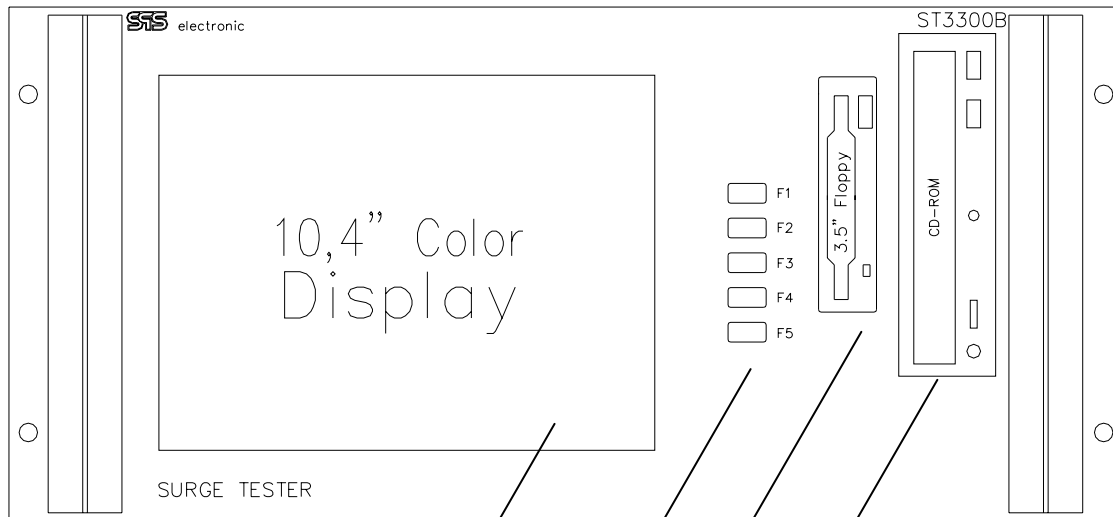


Bild 1: Front view of ST 3300B

- 1 VGA color display
- 2 Function keys F1 – F5
- 3 3,5“ floppy drive
- 4 CD-ROM drive

The color display is only built in the devices ST 3300B and ST 3300E.

The devices ST 3300A and ST 3300D have no display.

All devices offer the possibility to connect an external PC monitor by the VGA socket on the device's rear panel.

1.3.2 Rear panel

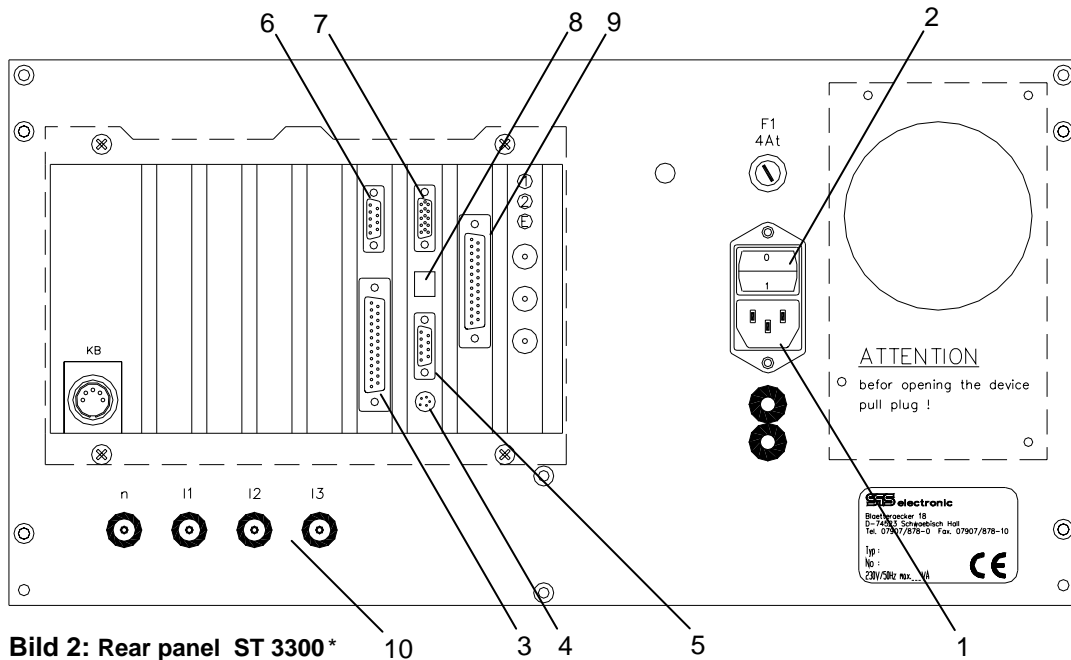


Bild 2: Rear panel ST 3300*

- 1 cold appliance socket for power cable
- 2 power switch
- 3 parallel interface LPT1
- 4 connector for keyboard and mouse
- 5 serial interface COM1
- 6 serial interface COM2
- 7 VGA connector for external monitor
- 8 network interface
- 9 I/O-interface X1
- 10 connectors for test connection cables

* The layout of the connectors in the slots may vary. On the rear panel, there is a sticker showing the actual configuration.

1.4 Switching the device on

Prior to switching the device on, it must have reached room temperature.

Before switching on, all necessary connections have to be made:

- connect power cable
- connect keyboard to rear panel (KB/mouse-socket, by Y-adapter)
- connect mouse to rear panel (KB/mouse-socket, by Y-adapter)
- connect 2 resp. 4 test cables to the appropriate connectors on the rear panel
- if needed, connect printer to the parallel interface on the rear panel

Now switch on the power switch on the rear panel.

The built-in monitor displays the initializing process as follows:

- loading of BIOS
- loading of MS-WINDOWS
- loading of ST3300 application

During this booting process, no keys should be pressed.

When the boot-up sequence has finished, the system software ST3300 starts up with the module that was active at last.

1.5 Switching the device off

In order to switch off the device, the application ST3300 has to be closed beforehand.

This can be done by either clicking on the button „Close program“ in the lower left, or the button in the upper right, or by pressing the keys „ALT“ and „X“ together. After this, Windows must be shut down by means of the START MENU.

2 Overview

2.1 About the system software

This system software ST3300 runs under the operating system WINDOWS and therefore offers optimal user friendliness. With just one click of your mouse the program will execute the respective command. All the functions which WINDOWS offers as a standard, are also included in the ST3300 software.

The software can be operated by keyboard, mouse, or by the F-keys on the device's front panel.

The usage of the mouse is preferable if one wants to edit test programs. For normal test operation, it is sufficient to use the keyboard only, or even to only use the F-keys.

The compilation of a test run is really quite easy: the individual tests can be »clicked together« via mouse in any number and order and can be deleted in the same way. Even later relocations in the test run are easily possible.

The test programs can be created on any IBM-compatible PC under Windows and can be transmitted via diskette/floppy disk or network to the control PC (PC connected to tester).

Each program manages a statistics on the tests executed which can flow into/influence quality assurance.

All the measuring results are stored in a type related file or a file of the day and can be printed at will via the standard printer interface. At the same time a printout of the current measuring data can be had after each test. An unmistakable assignment between DUT and measuring protocol is, even for years, easily possible.

For explanations and information pertaining to the graphic operating system WINDOWS, please see your Microsoft® manuals!



2.2 Surge Test and Master Curves

The most significant difference between the surge test and all other EST tests (high voltage tests, insulation tests, etc.) is that there are no fixed thresholds to judge the test results as GOOD or FAIL. Instead, an electric oscillation gets excited within the DUT by a line surge. Then, the task is to judge the *characteristics* of the resulting oscillation.

Therefore, prior to performing any real testing, it must be evaluated how the oscillation of the DUT should look at all. For that purpose, several test runs with DUTs confirmed to be error free are performed. By averaging their oscillation curves, the so-called **master curve** is obtained. Later, when doing real world test runs, the measurement of the DUTs is compared to that master curve to decide if the result is GOOD or FAIL.

Working with master curves

The application stores master curves as *.MCU files. Within a MCU file, several different master curves can be stored, or only a single one.

If a test program opened in the editor is saved, the actual chosen MCU file and active master curve gets linked to the program. The next time that program is opened - be it within the editor or during testing - that particular master curve of the linked MCU file is used again.

This behaviour enables different strategies to work with master curves:

- When working with only a small amount of different DUT types, it might be easier to have one MCU file for every kind of DUT, where every MCU file is named according to the DUT type, and holds only one master curve.
- When working with a big range of products, where perhaps certain series of DUT are splitted into several sub-types, one will probably prefer to have an MCU file for every series, and to hold different master curves in them, one for every DUT variant of a given series.

2.3 Mastercurve Editor

The configuration of the surge test is arranged in several levels of dialog windows. When the test step »Surge Test« is chosen, the main configuration window appears. Here the test parameters can be configured. The shown parameters are in respect to the actual master curve, which is shown in the according field.

To choose another master curve, or to edit an existing curve, the master curve editor is chosen by the button „Master Curve Editor“. See next page.

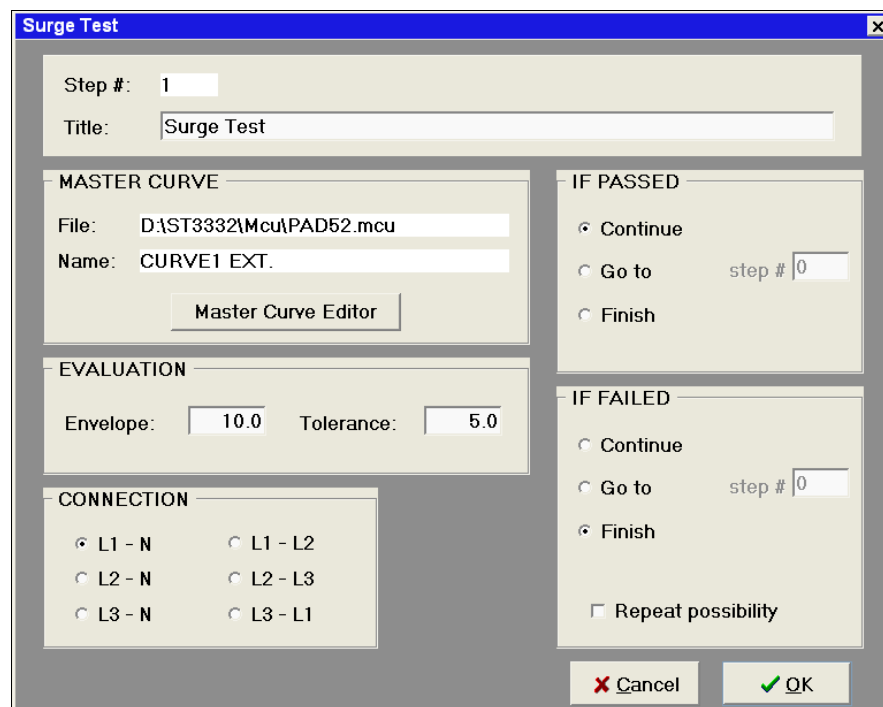


Bild 3: Test parameters surge test

Every master curve shown in the editor (see Bild 4 next page) can be edited by either double-clicking onto its name, or selecting it and then clicking »edit«.

To create a new master curve, the following parameters must be specified:

- the *name* of the master curve
- the *voltage* value for the line surge (e.g. 3000 volt)
- the *number of impulses*: this specifies the number of preceding impulses to perform, before the recording actually starts
- the *evaluation time* must be figured by try-and-error, to get an optimal curve display on the screen
- with *evaluation start & -end* the time period that is used for evaluation can be restricted.

On the next pages, all steps required to record or to edit a master curve are shown.

2.3.1 Master Curve Editor - Main Window

The Button „Master Curves Editor“ opens the following window:

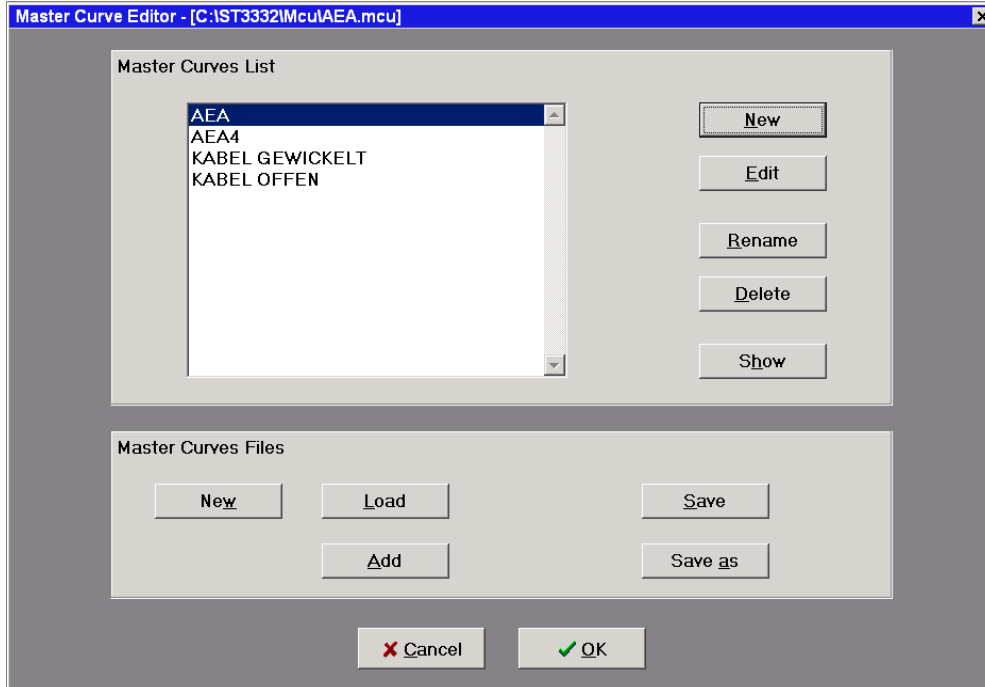


Bild 4: List of master curves

<i>Dialog element</i>	<i>Function</i>
<u>Master Curves List</u>	Shows the list of already existing master curves.
<i>New</i>	To create a new master curve within the marked file
<i>Edit</i>	To change the parameters of an existing master curve
<i>Rename</i>	Gives an existing master curve a new name
<i>Delete</i>	Deletes an existing master curve
<i>Show</i>	Draws the graph of an existing master curve
<u>Master Curves Files</u>	
<i>New</i>	Creates a new file, in which new master curves can be stored
<i>Load</i>	Opens a file with master curves
<i>Save</i>	Saves the master curves using the actual file name
<i>Save as</i>	Saves the master curves, using a new file name

2.3.1.1 New Master Curve

The button „New“ within the window „Master Curve Editor“ brings up the following dialog:

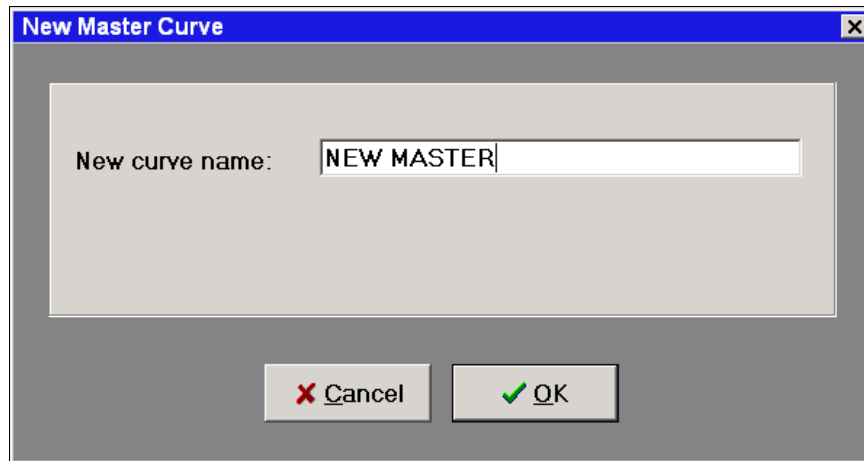


Bild 5: Dialog »New master curve«

<i>Dialog element</i>	<i>Function</i>
<i>New curve name</i>	Here one defines the name that will be used to save the new master curve. For the ease of use, it is advisable to choose a »speaking« name.
<i>OK</i>	Saves changes and quits this menu.
<i>Cancel</i>	Discards changes and quits this menu.

2.3.2 Recording a new master curve

Once a new curve name is defined and confirmed with »OK«, the recording of a new master curve may begin.

The window shown below appears also when the button »edit« within the window *Master Curve Editor* is pressed.

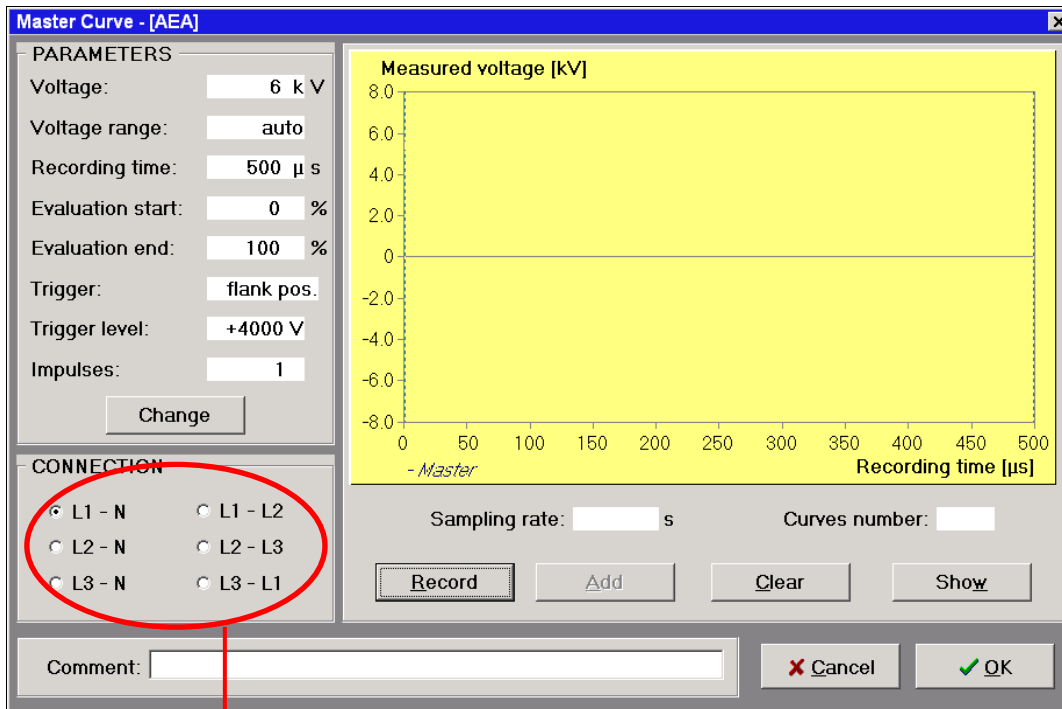


Bild 6: Window »Record Master Curve«

only ST3300D and ST3300E

<i>Dialog element</i>	<i>Function</i>
Change	To change the parameters that are important for the recording of the curve. See next page.
Connection (only ST3300D and ST3300E)	Defines the connection points between which the measurement will be done.
Comment	Any describing text can be entered here.
Record	Starts the recording of a new curve with the shown parameters. Attention: High voltage is applied to the DUT ! The recorded curve will be displayed in <u>red</u> .
Add	This adds the actually recorded curve (red) to the storage. By doing so, the curve's color will change to <u>blue</u> . By subsequently recording and adding curves of different DUTs, a decisive master curve will be built by averaging the recordings together. The number of curves that have been used to build the actual blue curve is shown in the field »Curves number«.
Clear	Clears curve memory for further recordings
Show	Draws the curve out of the curve memory full-screen.

2.3.3 Editor – Change master curve parameters

Choosing »Change« in the previous window brings up the dialog *Master Curve Parameters*. Here one can change the necessary parameters for the recording of the master curve, and adapt them to the DUT’s peculiarities.

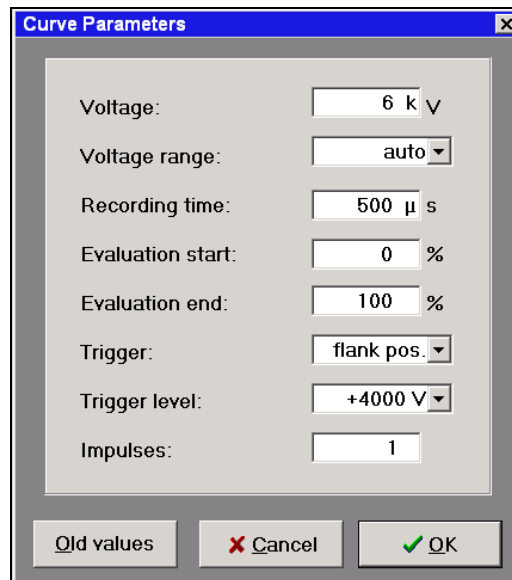


Bild 7: Parameter Master Curve

<i>Dialog element</i>	<i>Function</i>
<i>Voltage</i>	Defines the test voltage for the surge test. Possible values are 500 V up to 6000 V.
<i>Voltage range</i>	Defines the voltage range (y axis). This can be either done <i>automatic</i> (acc. to the test voltage) or manual. For certain DUTs it might be necessary to set it manually in order to get the curve displayed optimally.
<i>Recording time</i>	Defines the range for the x axis.
<i>Start of evaluation</i>	In case that the evaluation range should not cover the entire recording time, it can be restricted. The start of evaluation can be entered in %, and is shown in the diagram by a broken line.
<i>End of evaluation</i>	In accordance to the previous field, the end of evaluation can be defined (in %). This is also shown in the diagram by a broken line.
<i>Trigger</i>	Here one can define when the recording of the curve begins: c) 1 st flank: The 1. (positive) crossover will trigger b) 2 nd flank: The 2 nd (negative) crossover will trigger c) external: the surge signal will trigger regardless of the input signals
<i>Trigger level</i>	The voltage threshold for trigger catching in
<i>Number of impulses</i>	This defines the number of surge impulses. Only the last impulse will force a visible recording. For certain DUTs it is advantageous to perform several impulses prior to the recording, in order to get more stable results.
<i>Old values</i>	Discards all changes and switches back to the original values.
<i>OK</i>	Save changes and close dialog
<i>Cancel</i>	Close dialog without saving any changes made

When a recording is done, it will look similar to this:

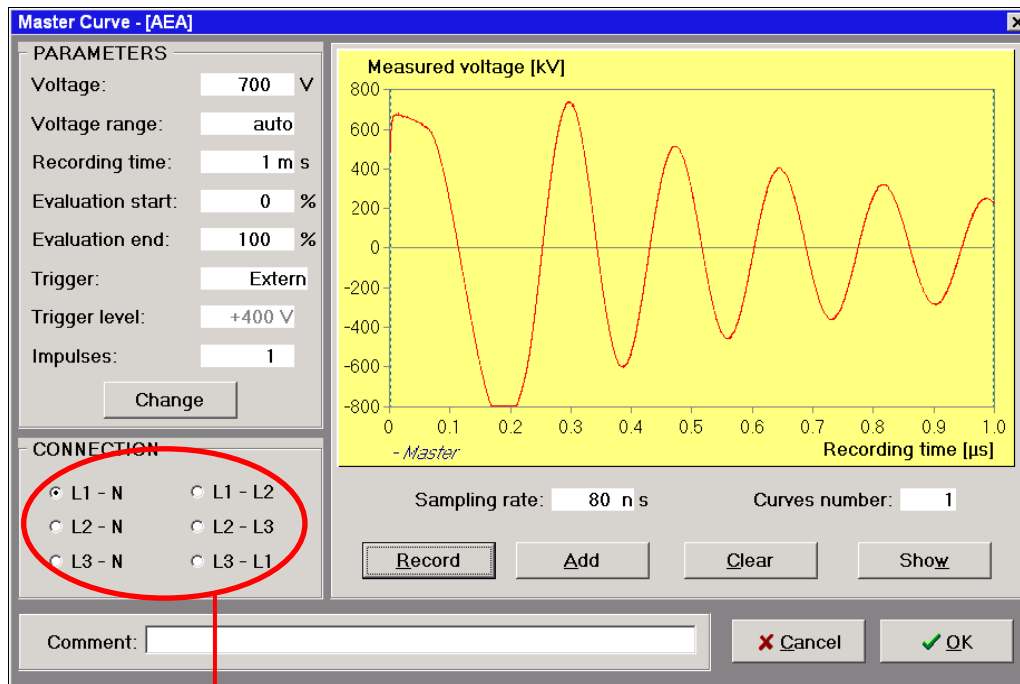


Bild 8: Recorded Curve

only ST 3300D and ST 3300E

The freshly recorded curve is shown in red. Clicking on the button »Add« will add the curve to the curve memory. It then will be displayed in blue, and the number of curves will be increased by 1.

When confirming by the button »OK«, the application asks for a filename to store the curve to the hard disk.

The default file extension is *.mcu, which is derived from **master curve**.

3 Software description

3.1 Main menu

<i>Menu</i>	<i>Menu item</i>	<i>Function</i>
<i>Program</i>	<i>New</i>	Create new test program with file name NONAME.PRG. However this new test program cannot be stored under the name NONAME.PRG, but needs another name.
	<i>Load</i>	Load an existing test program
	<i>Save</i>	Store current test program
	<i>Save as</i>	Store current test program under a new name
	<i>Print</i>	Print current test program with all the parameters
<i>Options</i>	<i>General</i>	To adjust the handling of DUT's serial numbers.
	<i>Environment</i>	Settings of program environment. See paragraph XXX
	<i>HW settings</i>	To adjust the hardware settings of the software acc. to your testing system. See paragraph XXX
	<i>Printer setup</i>	Call WINDOWS function »Printer installation«and configurate the installed printer or select another printer.
	<i>Users & rights</i>	To establish or to delete program users, edit their rights to use the software. See paragraph XXX
	<i>Password</i>	Edit the password of the current user
<i>Language</i>	<i>[Windows default]</i>	The Software adapts to WINDOW's default language
	<i>Deutsch (Germany)</i>	Sets the Software to appear in German lanuage
	<i>English</i>	Sets the Software to appear in English lanuage
<i>Info</i>	—	Information about the remote software
<i>Module</i>	<i>Editor</i>	Starts the module »Editor«
	<i>Testing</i>	Starts the module »testing«
	<i>Results</i>	Starts the module »results«
<i>End</i>	<i>Log out</i>	to change the current user
	<i>Exit</i>	Ends the software ST3332

3.1.1 Menu »Program«

All the file functions like e.g. loading or storing of test programs are realized via the WINDOWS typical file dialogs. The user can choose the directory or the file via three list windows. Fig. 9 shows the dialog for loading or opening test programs.

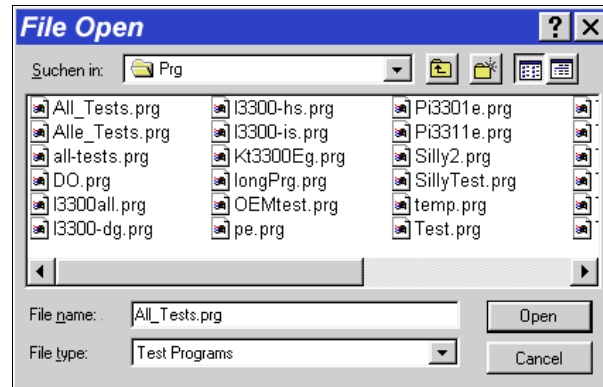


Fig. 9: Dialog window »open program«

Here in the center list window you can see all the test programs available in the chosen directory. The required directory is chosen via the list window on the top.

3.1.2 General settings

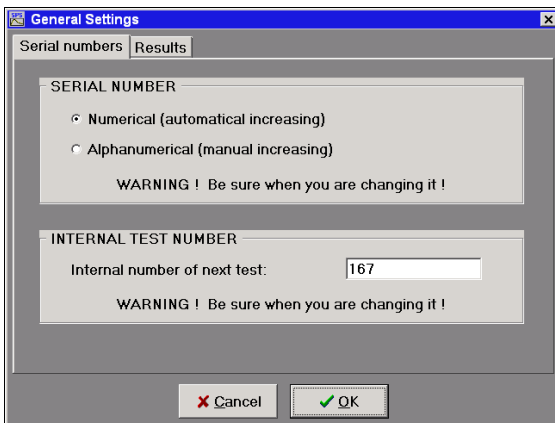


fig. 10: Register »Serial numbers«

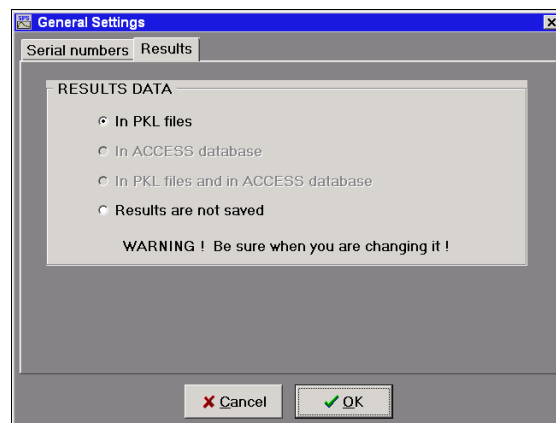


Bild 11: Register »Results«

On the register *Serial numbers*, one can choose whether to use numeric or alpha-numeric serial numbers.

- Numeric serial numbers are automatically incremented after each test.
- If you choose alpha-numeric serial numbers, it is possible to give an individual serial number to each DUT.

On the register *Results*, one can choose if the test results will be saved to PKL-files, or if the results will not be saved at all. (The latter is useful for setting up new test series, etc.)

3.1.3 Environment settings

Choosing *Options* → *Environment*, the following registers appear:

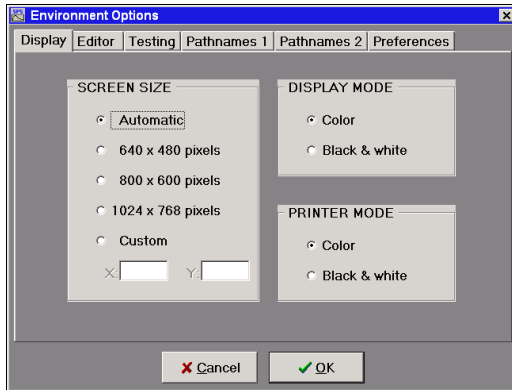


Fig. 12: Register »Display«

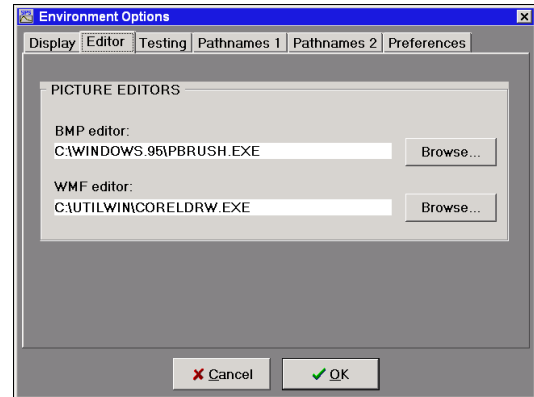


Fig. 13: Register »Editor«

- On the register *Display* you can adjust the size of the program window and the kind of screen mode. (See Fig. 12)
- On the register *Editor* you can specify the path of the graphic-editor to design the bitmaps for the test program with. (See Fig. 13)

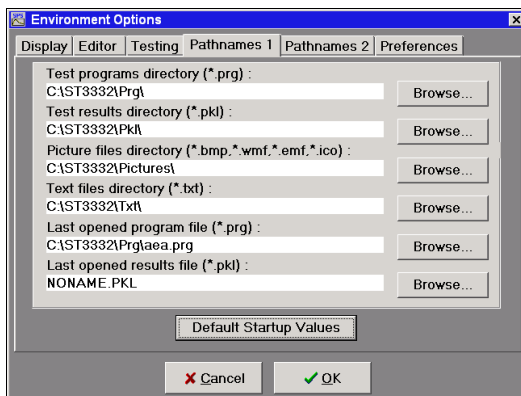


Fig. 14: Register »Pathnames 1«

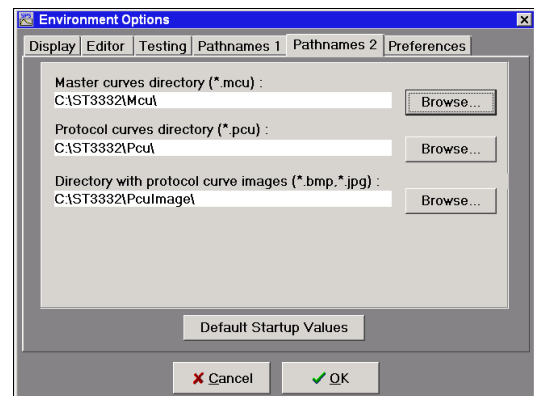


Fig. 15: Register »Pathnames 2«

- The register *Pathnames 1* shows the directories where the
 - testing programs (*.prg),
 - test results (*.pkl),
 - picture files (*.bmp, *.wmf, *.emf, *.ico)
 - text files (*.txt)
 - last opened program file (*.prg)
 - last opened result file (*.pkl)
 are to find.
- The register *Pathnames 2* shows the directories where the
 - master curves (*.mcl),
 - protocol curves (*.pcu),
 - curve images (*.bmp, *.jpg)
 are to find.

On both registers, you can specify individual directories via the buttons *Browse*. (See Fig. 15)

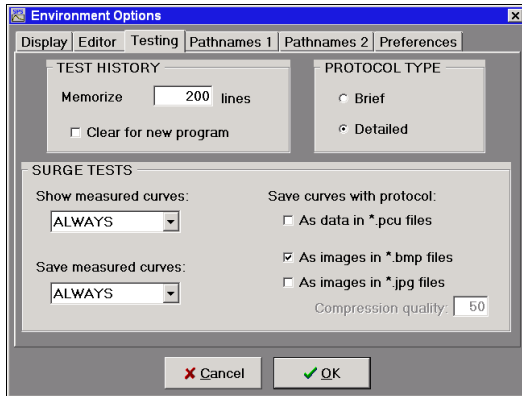


Fig. 16: Register »Testing«

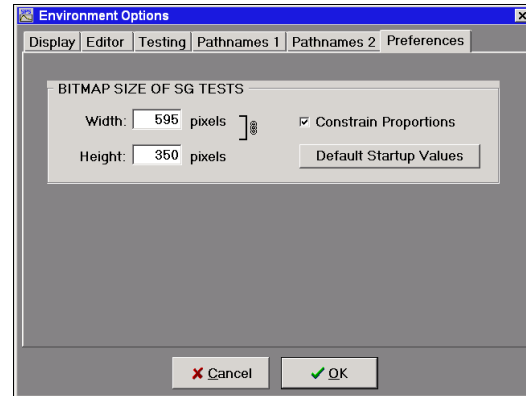


Fig. 17: Register »Preferences«

- On the register *Testing* you can choose by *test history*, how many lines the »testing past« shall display (how many old results are displayed in the lower part of the testing window). *Protocol Type* switches between brief (only test step's result appears in the protocol) and detailed (the result is put out along with the test values).

Within the field *Surge Test* the following settings can be made:

- Under »Show measured curves« one can choose under which conditions the curves measured during a surge test actually shall be displayed. Possible settings are *ALWAYS*, *IF GOOD*, *IF FAIL*, and *NEVER*.
- Under »save measured curves« one can choose under which conditions the measured curves will be saved. The possible settings are also *ALWAYS*, *IF GOOD*, *IF FAIL*, and *NEVER*.

Additionally, it can be specified in which format the curves will be saved. Available are the plain data format *.pcu, and the picture formats *.bmp and *.jpg.

The picture formats BMP and JPG come handy especially in the case that the evaluated curves shall be given to third parties, because these formats can be displayed on all WINDOWS-, Linux- and Macintosh-systems. However, these picture formats are memory intensive, and are therefore not well suited for everyday's testing operation. In particular, the BMP format delivers big files, since this format doesn't use any data compression. In contrary, the JPG format uses data compression, which yields to files that are 5% to 95% smaller than BMP files, depending on the compression factor that is entered in the field *Compression quality*. But keep in mind that the picture quality decreases along with increasing compression – one has to try out which compromise between file size and picture quality fits the needs.

For normal operation, it is advisable to use the internal data format PCU, since this format uses the least storage space. However, these files cannot be graphically displayed without the software ST3332 – but they can be loaded into the software's editor and be saved as BMP or JPG again at any time.

- On the register *preferences* the standard resolution (in pixels) for the curve images can be set. If the checkbox *Constrain Properties* is checked, the software will calculate the remaining value for width or height automatically as a new value is entered.

3.1.4 Hardware settings

Register Test system:

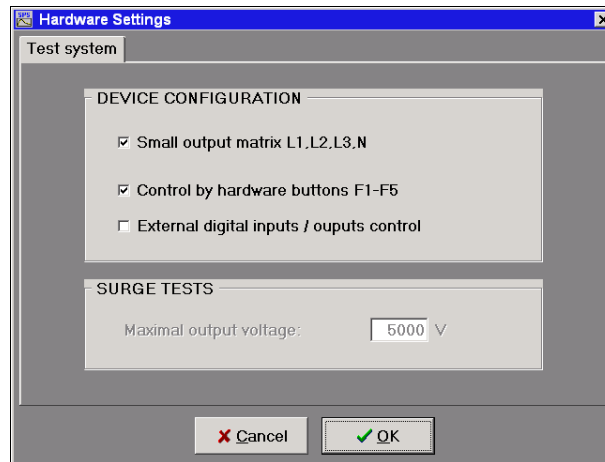


Fig. 18: Dialog window »Test system«

- Device configuration
 - *Small output matrix L1, L2, L3, N*
This must be enabled for devices dealing with 3-phase DUTs.
(Devices for 1-phase DUTs do not have the sockets L2/L3 on the rear panel)
 - *Control by hardware buttons F1-F5*
This option enables operation of the device by the funktion keys on the front panel.
 - *External digital inputs/outputs control*
This enables remote controlling the ST3300 by an external device through the I/O-interface on the rear panel. See also Appendix XXX.
(Devices for 1-phase DUTs do not have the sockets L2/L3 on the rear panel)

- Surge tests
 - *Maximal output voltage*
Here the maximal possible output voltage is displayed.
This value cannot be changed.

3.1.5 User administration

The software has a built-in *User administration*. Here all users of the software must be registered. To get into the program for the first time, you have to enter »SPS« as user and password both. After this, you can enter new users with their depending passwords and rights (see Fig. 19).



After having given the users and rights confirming your needs, we recommend to delete the user »SPS« in order to avoid abuse of the software.

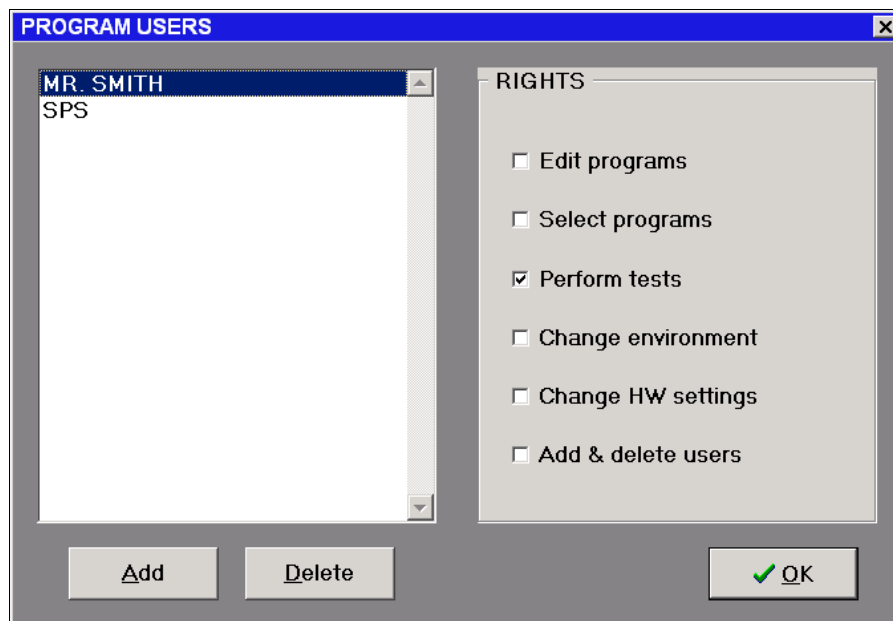


Fig. 19: User administration

Explanation of the rights:

<i>Edit programs</i>	enables editing of test programs
<i>Select programs</i>	enables loading of test programs (actual running test program is ended)
<i>Perform tests</i>	enables to switch to the module »testing«
<i>Change environment</i>	enables changes of program environment
<i>Change HW settings</i>	enables changes of Hardware settings
<i>Add & delete users</i>	enables to add new or to delete odd users and to change their rights

3.2 Program Module »Editor«

3.2.1 Overview

With the editor module you arrange the test, parametrize the single test steps and archive the test programs.

All test programs created with the editor are stored in the built-in hard disk and are available for later testing. Each test program has a definite name (plus extension *.prg). The name should be product-related for programs to be easy to identify.

Each test program has the following structure:

- general information: name of DUT, author, etc.
- protocol information: Shall a protocol be created, and how should it look like.
- sequence of test run
- a statistic module carried with (numeric).

The sequence of the test run is displayed in the middle of the window and can be changed with the editor's tools.

The single test steps can be:

- ... inserted (by double-clicking their name in the list of available test steps)
- ... deleted (with the button »cut«)
- ... changed (button »change« or double-clicking the step in the test run list)
- ... moved. This is done by means of Window's clipboard. The test step to be moved must be »cut«ted first and may be »insert«ed on a new position afterwards.
- ... copied. The procedure is like moving, but instead of »cut« use »copy«.

By means of the button »Print« the actual program inclusive all test parameters will be printed to a connected printer.

Each test step can be changed by either marking it and then clicking on »change«, or by simply double-clicking it.

By doing so, a new window will open in which all parameters of the test step can be adjusted. (See XXX through XXX)

Each test step by default receives a name characterizing the test step. In the parameter window this name can be edited to confirm with the DUT the program is written for (i.e. Surge Test L2–N).

3.2.2 Editor: Testinfo

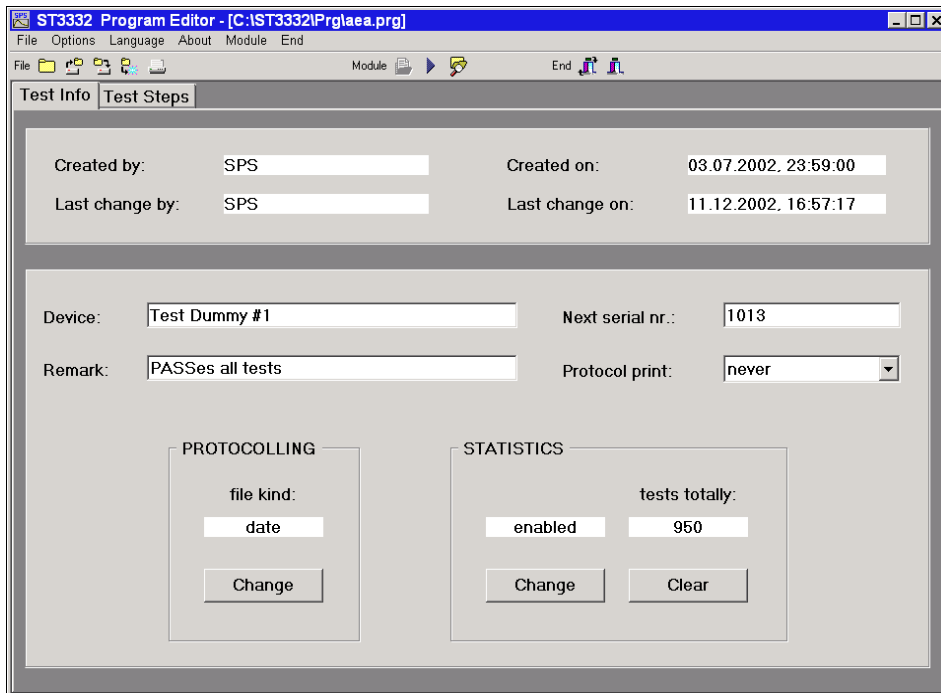


Bild 20: Program editor

- In the title bar you see the path and name of the actual test program.
- Below there is the menu bar (see paragraph 3.1, p.17).
- The register »*Testinfo*« shows general information on the actual testing program. You can also change the protocol settings on this card.
- The register »*Test steps*« shows the actual testing program in detail. Here you can edit existing testing programs and create new ones.

The register »*Test info*« shows the date of creation and date of last change. This information is directly produced by the software and cannot be changed by the user.

Below that there are the input fields for the general data on the DUT. You can enter here the person who is doing the testing, description of device, comments and serial number. This information does not effect the test run will, however, be shown for information in different windows and written out in the documentation.

3.2.2.1 Protocolling to a printer

The program allows the output of the test results on the printer. Same happens after each test run. Via the pre-selection list PRINT this procedure can be controlled.

Below print possibilities are available to the user:

<i>Element of list</i>	<i>Function</i>
NEVER	do not print protocol
ALWAYS	print protocol after each test
IF FAILED	print protocol only if there is an error
IF PASSED	print protocol only in case of end-result PASS

The chosen settings are specific to the loaded test program only, and are saved with it.

Below the general data the fields for pre-setting of the protocol file, statistics and password are arranged. Here current information is displayed and the respective pre-settings can be changed via the assigned buttons.

3.2.2.2 Clear statistic

In this test program there is a tabular statistics for each program. The passed, failed and invalid tests are counted and the results of each single test step are recorded. The info window shows the number of all the tests.

The tabular statistics can be deleted via the button CLEAR. Deletion of the statistics has to be acknowledged via a safety inquiry/query.

With the button CHANGE you can enable or disable the statistic analyse of the test program.

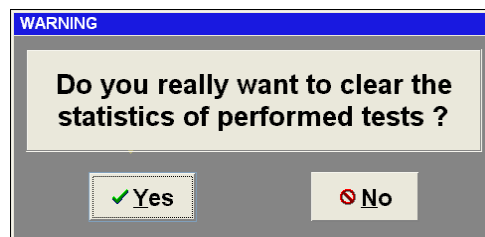


Bild 21: Safety inquiry

3.2.2.3 Protocol settings

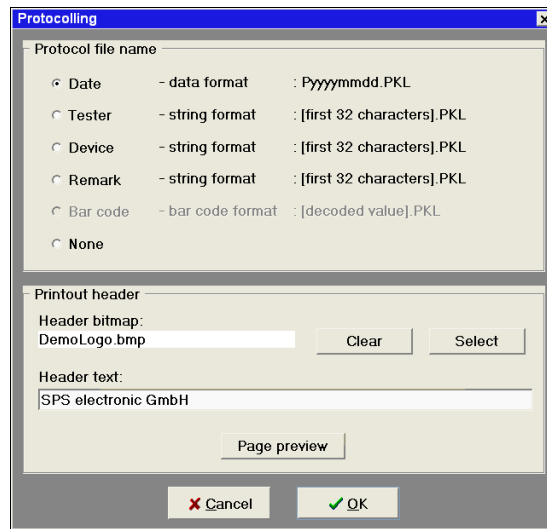


Bild 22: Dialog window »Protocolling«

After each test the test and measuring results are stored in a protocol file. By pressing button CHANGE in the PROTOCOLLING panel the user can determine the name of the protocol. Bild 22 shows the dialog window for defining the name.

<i>Selection panel</i>	<i>Function</i>
------------------------	-----------------

<i>Date</i>	File name is made up from date of day. The date format is Pyyymmdd. E.g. a protocol file created on May 07, 1998 would be filed under P980507.PKL. This pre-setting will be advantageous in as much as a new file is created every day.
<i>Operator</i>	File name is created from the first 32 letters of the operator name
<i>Device</i>	File name is created from the first eight letters of the name of the device.
<i>Remark</i>	File name is created from the first eight letters of the remark.

With the input line PRINTOUT HEADER you can enter any text which will be stored in the protocol file before each new test.

With the dialog **Header-Bitmap** you can use a previously created bitmap as protocol header. To prevent your bitmap of quality loss through scaling, the image should be 500 pixels wide, or an integer multiple of that.

3.2.3 Editor: Test steps

The organisation of the test steps and the definition of the test run is managed on the register *Test steps*:

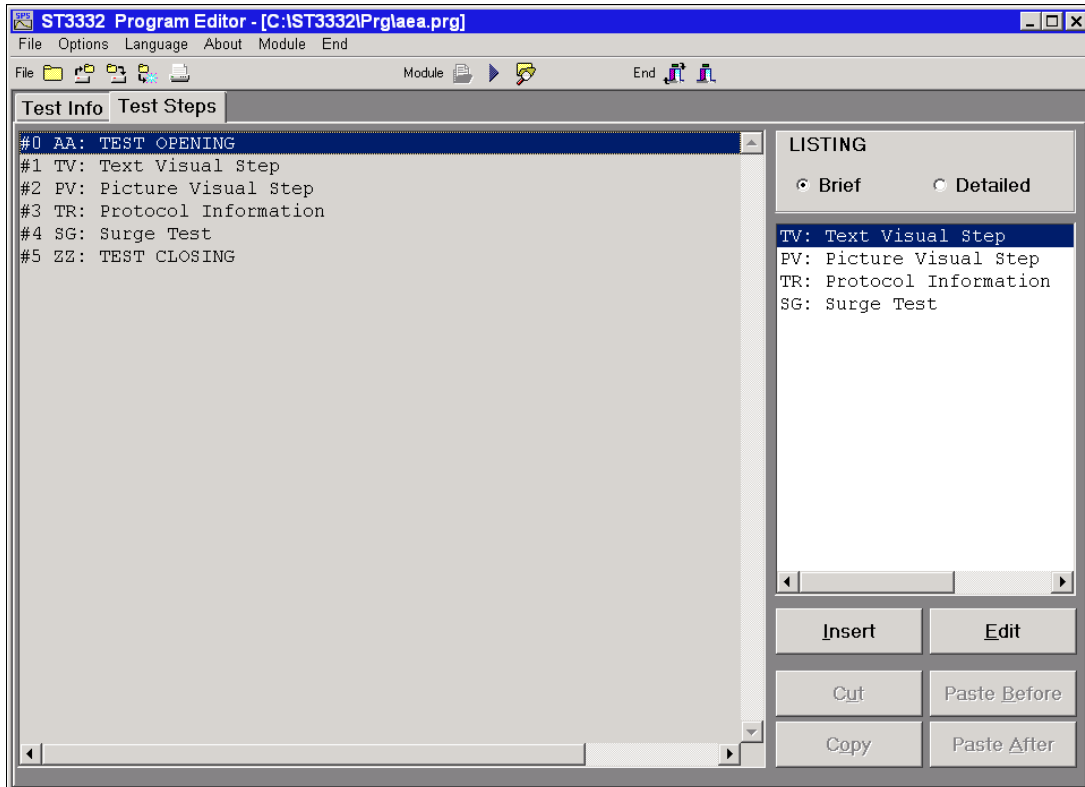


Bild 23: Editor - Test steps

Here a list with all the test steps in their chronological order is shown.

In the large dialog window you will find the test run list window showing the current test run step by step. This list window shows the test steps one by one with step number, grammalogue and definition of each step

Before and after each test run the test steps »TEST OPENING« and »TEST CLOSING« are arranged automatically. This way certain operations can be defined at the beginning and at the end of a test run.

The small list window on the right shows all the test steps available in the program. By a double click onto one of these test steps same is included in the test run list. Before inserting a new test step the step after which this new step is to be inserted should be marked in the test run list. With this double click the respective parameter window of the new test step opens automatically, and after editing the parameter and closing the parameter window the new test step will appear at the desired position in the test run list.



The representation of the test steps in the test run list can be switched over via key LISTING. With the display BRIEF only step number, step identification and step designation is displayed. The display DETAILED in addition displays the respective test parameters of the test steps:

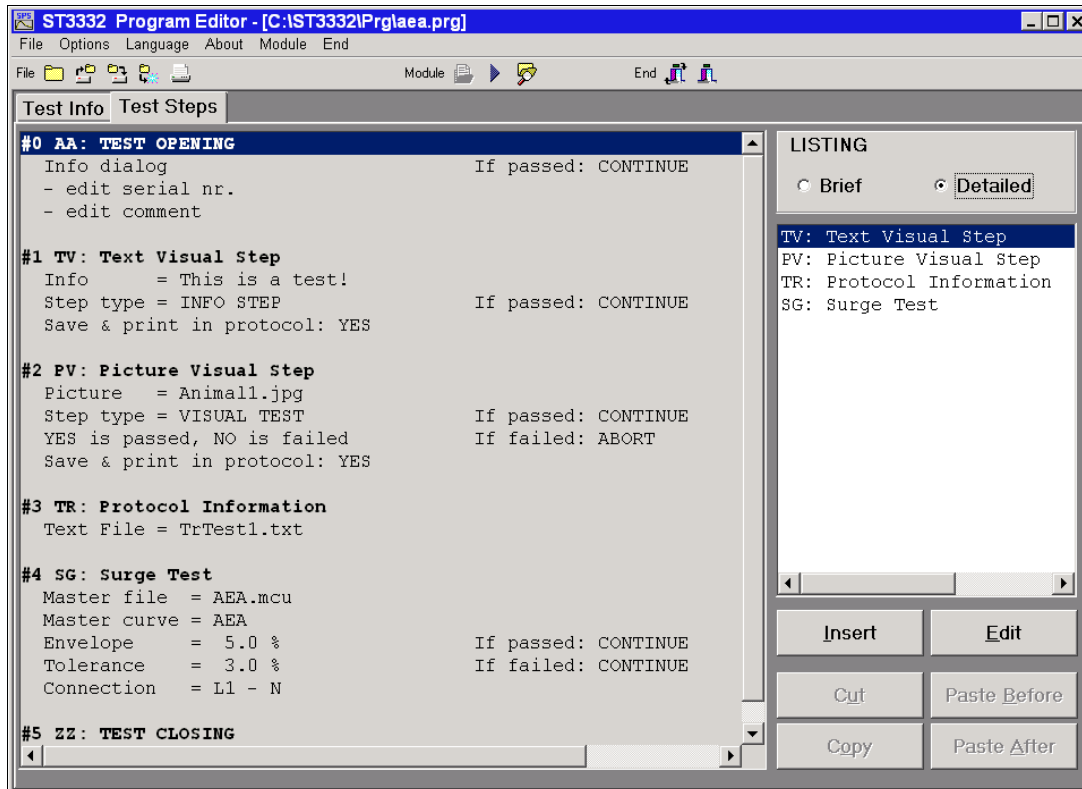


Bild 24: Test steps, format »detailed«

By means of the buttons in the lower right part of the dialog window you can manage the test steps in the test run list:

Button	Function
Insert	A new test step is inserted into the list (<i>after</i> the marked line/test step). The kind of test step can be chosen in the list on the right showing all possible test steps.
Edit	Brings up the parameter window of the chosen test step.
Cut	The marked test step will be removed to the clipboard.
Copy	The marked test step will be copied to the clipboard.
Paste Before	Pastes the test step stored in the clipboard before the marked test step.
Paste After	Pastes the test step stored in the clipboard after the marked test step.

3.3 Description of test parameters

3.3.1 General Information

The test steps have all common dialog elements or test parameters. With the »Picture Visual Step« as an example the make up of the dialog windows for the common test parameters is explained:



Bild 25: Dialog window with test parameters

Common parameters:

<i>Dialog element</i>	<i>Function</i>
<i>Step</i>	Display of test number in current test run.
<i>Title</i>	Labelling of test step. Display on test run window and during test run. You can also give instructions in the title for the testing person, e.g. »protective wire test at fan/ventilated motor«
<i>Test time</i>	Duration of test step.
<i>IF PASSED</i>	Decision panel in case of an error-free test result. The user is able to influence the test run as to the test result of the test step. The test run can be continued with the next test step by means of the selection possibility CONTINUE. With the selection possibility GO TO a jump is made to a certain test step and with the selection possibility FINISH a jump is made to the end of the test chain.
<i>IF FAILED</i>	Decision panel in case of a faulty test result. The functions of the selection possibilities CONTINUE and GO TO are the same as mentioned above. With the selection possibility ABORT the test run is interrupted in case of a faulty test step. Via the selection possibility REPEAT POSSIBILITY a faulty test step can be repeated. The person testing will then after an error be asked if he wants to repeat the test step.
<i>OK</i>	The dialog window is closed and the changed parameters are accepted.
<i>Cancel</i>	The dialog window is closed and changed parameters are rejected.

3.3.2 Text visual step

Choosing the test step »Text Visual Step« invokes the following dialog:

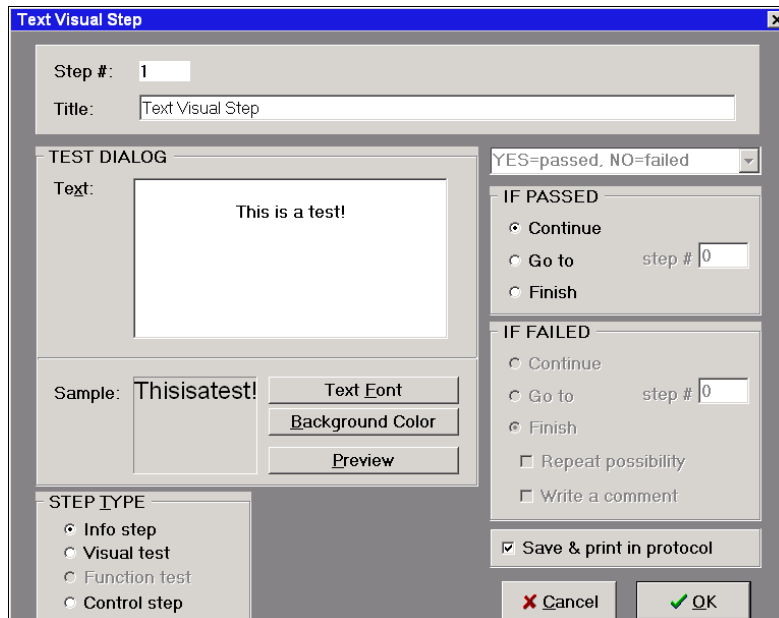


Bild 26: Test parameters »Text visual step«

In the test step *Text visual test* the dialog elements have below functions:

<i>Dialogelement</i>	<i>Funktion</i>
<i>Text</i>	Contents of this field is displayed when step is executed. The message has to consist of a minimum of five characters.
<i>Text font</i>	Choose the desired font for the message text
<i>Background color</i>	Choose the color of background on which the message will be displayed
<i>Preview</i>	Have a look on how your message will appear
<i>Write a comment</i>	If the test is confirmed with NO, one can enter a comment to the test
<i>Save&orint in protocol</i>	If not checked, the test will neither appear in the PKL nor will it be printed
<i>YES=passed, NO=failed</i>	By switching this parameter, it is possible to revert answer logic for certain questions (»Is there smoke coming out of the DUT?« → »NO« → result PASS)
<u>Step type</u>	
<i>Info step</i>	Choose this to give any information to the tester. There will only be an OK button to acknowledge the message.
<i>Visual test</i>	Choosing this option forces a dialog to appear which can be quitted with YES or NO. In case of NO, DUT has failed the test
<i>Function test</i>	When performing a visual test, DUT is set under operating voltage to give more possibilities to query for
<i>U nom</i>	The voltage for the function test (can only be changed with external source)
<i>Control step</i>	This test type is for information only. No test result PASSED or FAILED.

3.3.3 Picture visual step

With the image visual test the file name of an image file has to be specified. The software supports the image format BMP as well as WMF. Image files with both formats can e.g. be created with the »Paintbrush« software. The chosen image file is displayed within the dialog window.

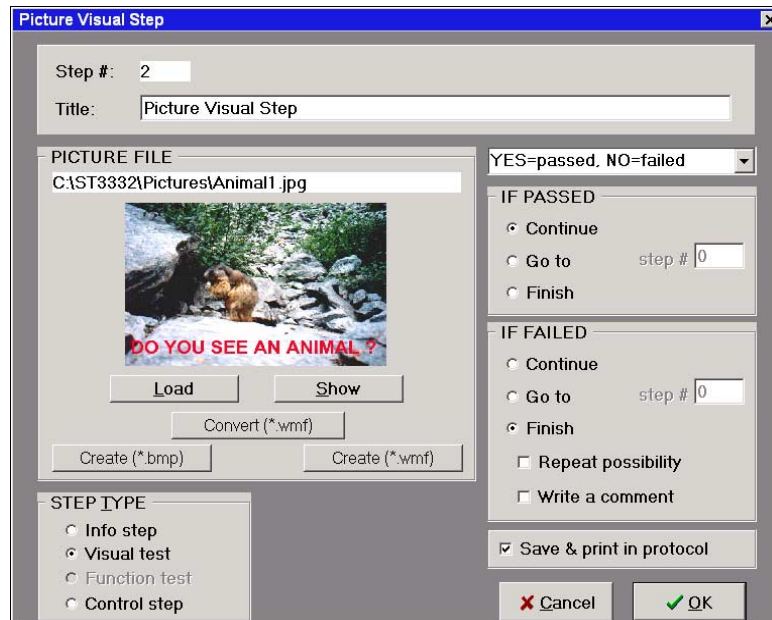


Bild 27: Test parameters »Picture visual step«

In test step *image visual step* the dialog elements have below functions:

<i>Dialog element</i>	<i>Function</i>
<i>Load</i>	Opens standard »open file« dialogue to choose an image
<i>Preview</i>	Have a look on how things will look on paper
<i>Create</i>	If you want to create a new image, you can start the image editor with this button. You can set the path to your preferred image editor in the menu options/environments/editor. The default setting points to MS Painbrusht
<i>Write a comment</i>	If the test is confirmed with NO, one can enter a comment to the test.
<i>Save&orint in protocol</i>	If not checked, the test will neither appear in the PKL nor will it be printed
<i>YES=passed, NO=failed</i>	reverts answer logic (see <i>Text visual step</i>)
<u>Step type</u>	
<i>Info step</i>	Choose this to give any information to the tester. There will only be an OK button to acknowledge the message.
<i>Visual test</i>	Choosing this option forces a dialog to appear which can be quitted with YES or NO. In case of NO, DUT has failed the test
<i>Function test</i>	When performing a visual test, DUT is set under operating voltage to give more possibilities to query for
<i>U nom</i>	The voltage for the function test (can only be changed with external source)
<i>Control step</i>	This test type is for information only. No test result PASSED or FAILED.

3.3.4 Surge Test

Choosing the test step »Surge Test«, the following window appears:

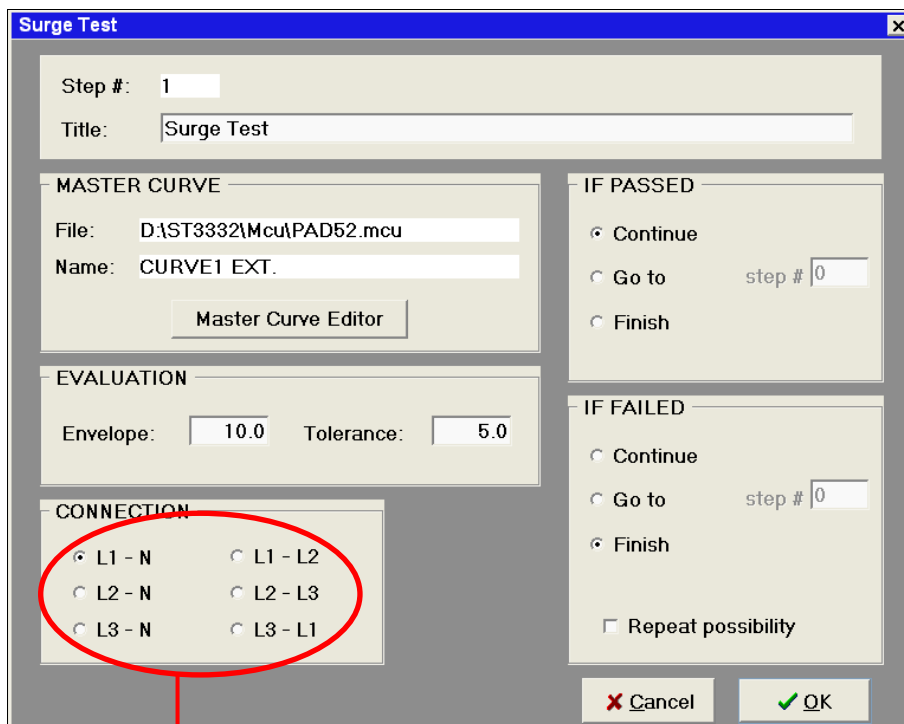


Bild 28: Test Parameters »Surge test«

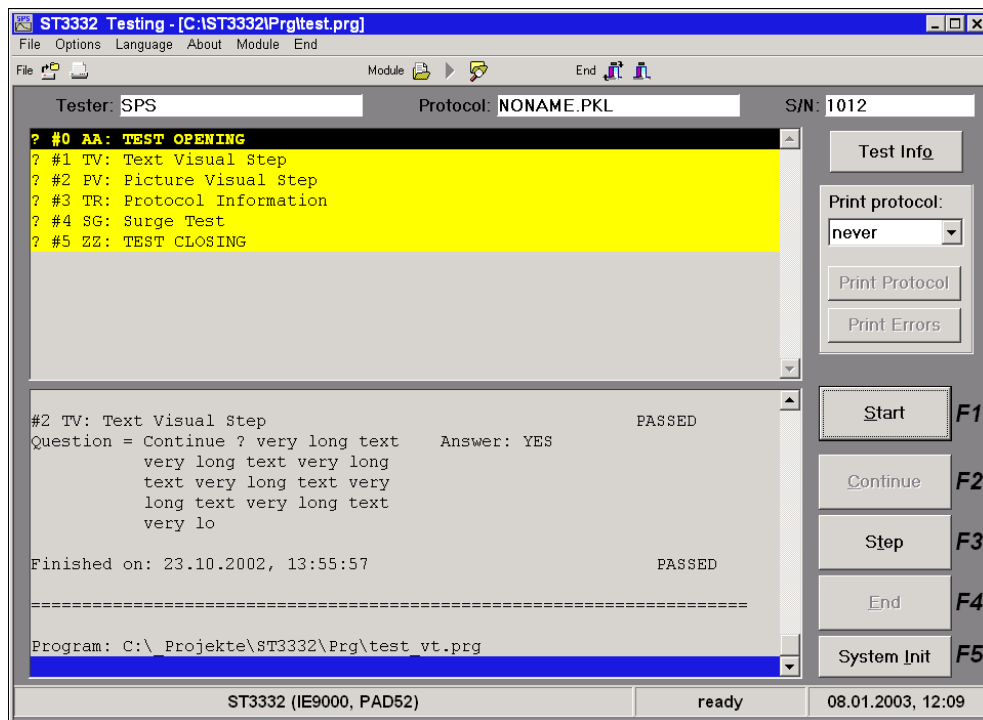
Only ST 3300D and ST 3300E

<i>Dialog element</i>	<i>Function</i>
MASTER CURVE	Shows the name and file name of the actual master curve.
- <i>Master Curve Editor</i>	Here one can edit existing master curves or record new ones. This opens the next menu, see next page.
EVALUATION	Shows the evaluation parameters:
- <i>Envelope</i>	This defines the allowed deviation of the envelope curve from the master curve (in %).
- <i>Tolerance</i>	This defines the number of measured samples that are allowed to fall out of the envelope (in %)
CONNECTION <i>(only ST 3300D and ST 3300E)</i>	Defines the connection points between which the measurement will be done (Also for sample !)

3.4 Program Module »Testing«

When programming of the test programs has been done, testing can begin. With the button »Test« or with the key »F1« one gets to the menu *Test*. Now it is possible to work with either the actual program (as shown in the window's title bar), or to load a different program by means of the button »Load«.

The operator has the possibility to enter his name as well as a comment in the appropriate fields, which will appear in the protocol print-out.



In the field to the upper left, all test steps that are used within the actual program are displayed.

When clicking the button »Start« (or pressing F1), the automatic test run is performed. After a test step has finished, its result is displayed in front of the test step's name.

In case an error occurs, it depends on the formerly programmed test parameters whether the test run is continued or aborted.

Single step operation (i.e. after each single test step acknowledgement by pressing a key) is possible if pressing key »F3« or the button »Step«.

A running test can be aborted by the key »F4« or the button »End«.

By means of the button »Exit« or key »F5«, one can leave the window *Test* and get back to the main menu.

In the field in the middle, the actual measured values of the test running are displayed.

3.5 Program Module »Statistics«

Pressing the button »Statistics« within the editor module opens the following window. Shown are the contents of the respective *.pkl or *.prg file.

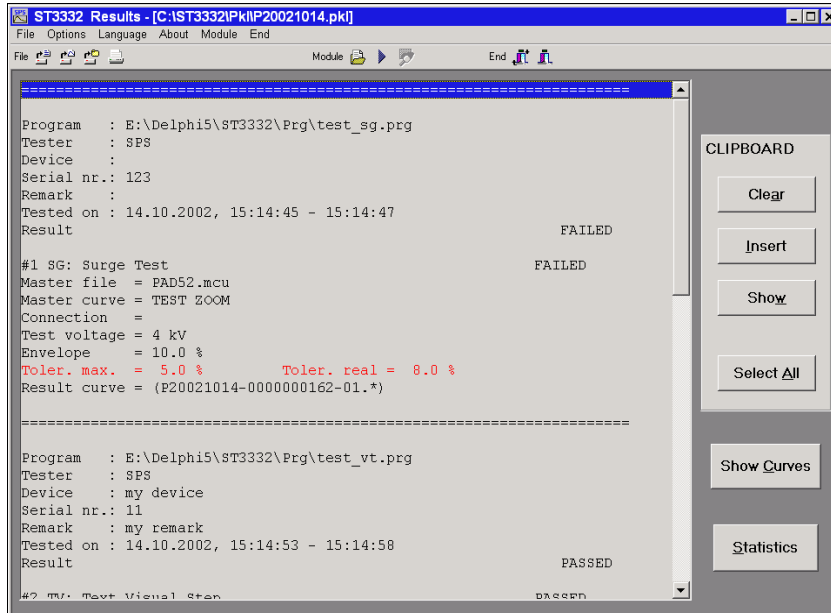


Bild 29: Main window of module »Results«

- Via the menu *Data / Load results* you can load saved protocol files. With *Data / Load program* you can load saved program files.
- To print the protocol, choose *Data / Print*
- The button »statistics« shows the statistics for the respective current test program. or for the current protocol file:

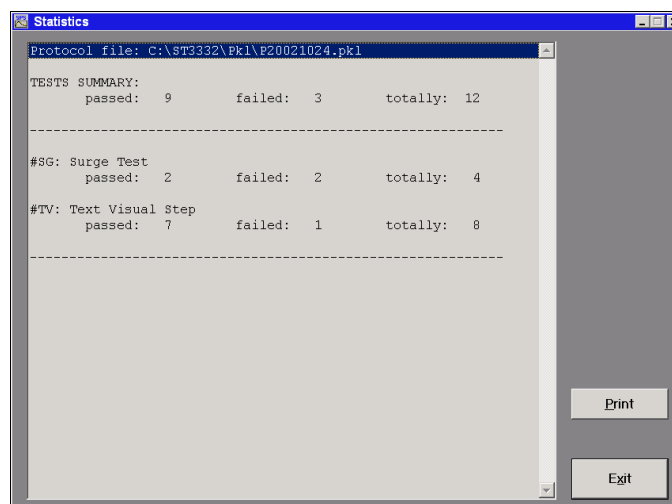


Bild 30: Dialog window »Statistics«

By means of the »Windows Clipboard« marked parts of the display window can be transferred to another Windows application - e.g. Microsoft Word®. By doing so, you can record the protocols in a documentation.

Appendix

A Protocol Files

Each executed test is stored in a protocol file. The structure of file name is build as follows:

```

P931025.PKL :  P    =  test
                93    =  year
                10    =  month
                25    =  day
                .PKL  =  protocol file
  
```

For each new test program called, this file records all necessary comments and nominal values just as if they were printed.

For each single test the number of test step, name of test step, the nominal values and the results are being stored.

With this file structure the data can be read into a database (e. g. Excel):

1. column : name of test step
2. column : nominal values
3. column : actual value + result

These files can be copied periodically on disks. In order to increase the capacity on the hard disk, it may become necessary to delete files on hard disk.

B Saving of data – data protection

As valid for all EDP systems, the stored data has to be saved periodically. This is especially important if the volume of files has reached a point where reinputting of data in case of data loss has become impossible.

C Test Cage HB 6010 (optional)

If needed, a test cage (series HB 6010) can be connected. It is equipped with connection wires to the device ST3300 as well as the necessary power supply. The connectors inside the test cage are designed as lab sockets, for universal connection possibilities.

For operation of the device, it is required to close the test cage. Only then the connection between the device and the DUT is established. This is also valid for the device's self-test function.

To start a test, the keys at the front panel have to be used.

Inside the cage, there are 2×5 connection sockets (4 mm). For each connection, one *source* and one *sense* connector is available. Both must be connected to the DUT.

D Initializing file „ST3300.INI“

The file ST3300.INI is the main initialization file for the application. It contains important system parameters.

Explanation of the entries:

[DIRECTORIES]	
LastPrgFile	Name and path of the last used test program
LastPklFile	Name and path of the last used protocol file
LastMcuFile	Name and path of the last used master curve file
PrgDirectory	Global path for loading and saving test programs
PklDirectory	Global path for loading and saving protocol files
McuDirectory	Global path for loading and saving master curve files
PcuDirectory	Global path to the *.PCU files
BmpDirectory	The bitmap graphic files are saved here
WmfDirectory	The metafile graphic files are saved here
TextDir	Path to the folder with *.txt files
ODBC	Name and alias of the active data base
[DISPLAY]	
WinSizeAuto	0 = the values ScreenSizeX/Y are used 1 = automatically adapt window size to screen size
ScreenSizeX	width of program window in direction x (in pixel)
ScreenSizeY	width of program window in direction y (in pixel)
BasicWinPosX	x coordinate of program window at program launch
BasicWinPosY	y coordinate of program window at program launch
WinMaximized	0 = windowed mode ; 1 = fullscreen mode
ColorDisplay=	0 : monochrome display ; 1 : color display
ColorPrinter=	0 : b/w printer is used ; 1 : color printer is used
[EDITOR]	
BmpCreateCmd=	Command line to PaintBrush
WmfCreateCmd=	Command line to a WMF editor (not included)
ListType=	How the list of test steps is displayed (0=short, 1=long)
[TESTING]	
HistoryMax=	How many recent tests shall be maintained (counted in lines)
ClearHistory=	If set to 1, the test history is deleted when the program is started
ShowSGcurves=	1 = show measured curves after surge test ; 0 = don't show
SaveSGcurves=	1 = save measured curves after surge test ; 0 = don't save
SavePCUfiles=	1 = save measured curves as *.pcu ; 0 = don't save as *.pcu
SaveSGimages=	1 = save measured curves as graphics ; 0 = don't save as graphics
ComprQuality=	Compression factor to use for JPG images
LastTestPrg=	Name and path of the last used test program
ProtocolType=	Kind of protocol to use (brief/detailed)

[PREFERENCES]	
HeaderBitmap	Name + Path of the graphic file to us for the protocol's header
HeaderText	Text that will appear in the headline of the printer protocol
PrgStatistic	0 = disabled ; 1 = enabled
SizeSGbitmapX	Size of surge curve's graphic in direction x
SizeSGbitmapY	Size of surge curve's graphic in direction y
SerialNrType	0 = alphanumeric ; 1 = numeric
TotalTestSN	Overall number of tests performed since last counter reset
ResultsMode	Type of protocolling
StartSegment	The program module to be loaded when launching the application
[TESTSYSTEM]	
OutputMatrix	1 = device has output matrix ; 0 = no matrix present
HwButtonsFN	1 = function keys are activated ; 0 = f-keys are deactivated
ExtIOControl	
MaxSGvoltage	

E Technical Data

Dimensions:	H*W*D : 5 HE(222mm) * 19" * 440 mm
Power supply:	230 VAC +/- 10 % / 50 Hz
Power fuse:	6,3 At (slow)
Power consumption:	max. 380 VA
Fan :	built-in (blowing out through rear panel)
Environmental conditions:	temperature: +15 °C – +40 °C humidity: max. 70% (not condensating) storage temp.: +5 °C – 50 °C
PC:	IBM™ compatible PC CPU: Intel Pentium RAM: 128 MB
Hard disk:	built-in, ≥ 10 GByte
Floppy drive:	3,5" / 1,4 Mbyte
CD-ROM drive:	built-in, vertical operation
Monitor: <i>(only ST 3300B and ST 3300E)</i>	built-in; color LC-Display 10,4" resolution 640*480 pixel connector for external VGA monitor <i>(all ST 3000)</i>
Keyboard + Mouse:	connector KB/mouse at rear panel, using Y-branch
Serial interfaces:	COM1 and COM2 at rear panel
Parallel interface:	LPT1 at rear panel.

Testing part:

High voltage source:	programmable 500 V – 6000 V DC precision, reproduceability: ± 1 % of max. dial
Surge capacity:	47 nF
AD converter for surge curve recording:	8 bit / 40 MHz

F Terms of warranty

1. Warranty period

The warranty period is 12 months after delivery.

2. Conditions for a guarantee claim

- The Surge Tester ST 3300 must have been put into operation by qualified personnel at the customer's.
- Inspections must be carried out regularly (once a year) and thoroughly (by SPS electronic GmbH).
- Defective or worn parts have to be replaced immediately. The operation of such parts is forbidden for safety reasons.
- Defective parts, subject to guarantee claims, have to be sent to SPS electronic GmbH for inspection.
- Defects occurred must be reported to SPS electronic GmbH immediately.

3. Beginning of guarantee period

Guarantee starts with the date of delivery note.

4. Guarantee

SPS electronic GmbH guarantees a good function of the high voltage test device, a conscientious and professional design and manufacture as well as the use of high-quality material.

All parts are being replaced free of charge if parts became defective or useless during the guarantee period due to the use of inadequate material, manufacturing faults or an imperfect engineering.

5. Excluded from guarantee

- Damages due to outside influences, above all because of handling malpractices or of local conditions.
- Damages at devices from which the serial number has been removed, destroyed or falsified.
- Wear parts, such as fuses, signal bulbs, etc.