M40118.V03 PROCON Measuring Computer

Content:

Please note that some functions and adjustments described in this manual may not be available for every model or in all program releases.

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1. Functions

The measuring unit works with externally created test plans in MODAS/Procon NT format. A maximum of 512 test plans may be displayed, but not changed. Out of these 512 test plans, only one may be selected to be active. When selecting another test plan, the measuring results of the previously used test plan remain saved. They will only be deleted after export of the measuring values.

Program functions:
- Max. 8 measurement points, max. 8 measuring inputs (standard setup: 4 measuring inputs)
- 1 start input per measurement point
- Display of measuring values: list, bar chart, single value card
- Monitoring of tolerance limits: for each measurement point LL, LCL, GOOD, UCL UL
- Internal data logger
- Import of test plans in MODAS/ProconNT format from USB storage device
- Export of test plans and measuring values on USB storage device
- AUTOZERO function
- Control interface for tool compensation

2. Construction

The PROCON measuring computer is available with the following computer models:
- Measuring computer A&V 8817.653.0 or A&V 8817.655.0 in table housing with 10.4" colour display and touchscreen
- Measuring computer A&V 8861.600.0 for control cabinet installation on top hat rail with VGA monitor output

Both computer models contain:

at least 512MB RAM, 80GB hard disk,
USB connection for external storage device
PLC interface: 16 I/O via optocoupler, 4 measuring value inputs for inductive tracers
OPTIONS:
Extension to 8 measuring value inputs,
connection of external function keys,
control interface 8833.600.0 NEUE MAGDEBURGER / INDEX

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3. Connection elements

Front view of case with connection for external USB storage device:

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Back of case:

X401	Euro connector	power supply 115-230V/50-60Hz
X403	2x 4pol. socket	USB connection
X405	9pol. plug MIN D	Serial interface
X407	2x 8pol. socket	ETHERNET interface
X408	15pol. plug MIN D	Output VGA monitor
K	6pol. socket MINI DIN	PS2 keyboard input
M	6pol. socket MINI DIN	PS2 mouse input
X412	4pol. plug	Internal test socket
T1-8	8x 5pol. socket 680	Inputs for inductive tracers
X312	37pol. socket MIN D	Control inputs/outputs

Option NEUE MAGDEBURGER / INDEX:

X5	37pol. socket MIN D	Control inputs
X12	25pol. plug MIN D	Control outputs
X6	4pol. socket 680	Start input
X10	6pol. socket 680	External function keys

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4. Operating mode AUTOMATIC

Switch on the measuring unit. After loading the program, the unit is in the operation mode AUTOMATIC and ready to operate.
By touching the keys or alternatively, with the external function keys, the requested display mode is selected.
Independent of the selected display mode, measurement and saving of the measuring values are carried out as soon as a transfer signal is given at the corresponding control input.
An exception is the function **automatic zeroing**. The unit displays that it is ready for measuring with the output signal **Busy**.
Depending on the test plan, this is either a separate signal for each measurement point or a collective signal for the simultaneous measurement of all measurement points.

Collective start All inputs are measured simultaneously.

Chaotic Each input has its own start signal. Only inputs with an active start signal will be measured. This function allows measurements without temporal coherence.

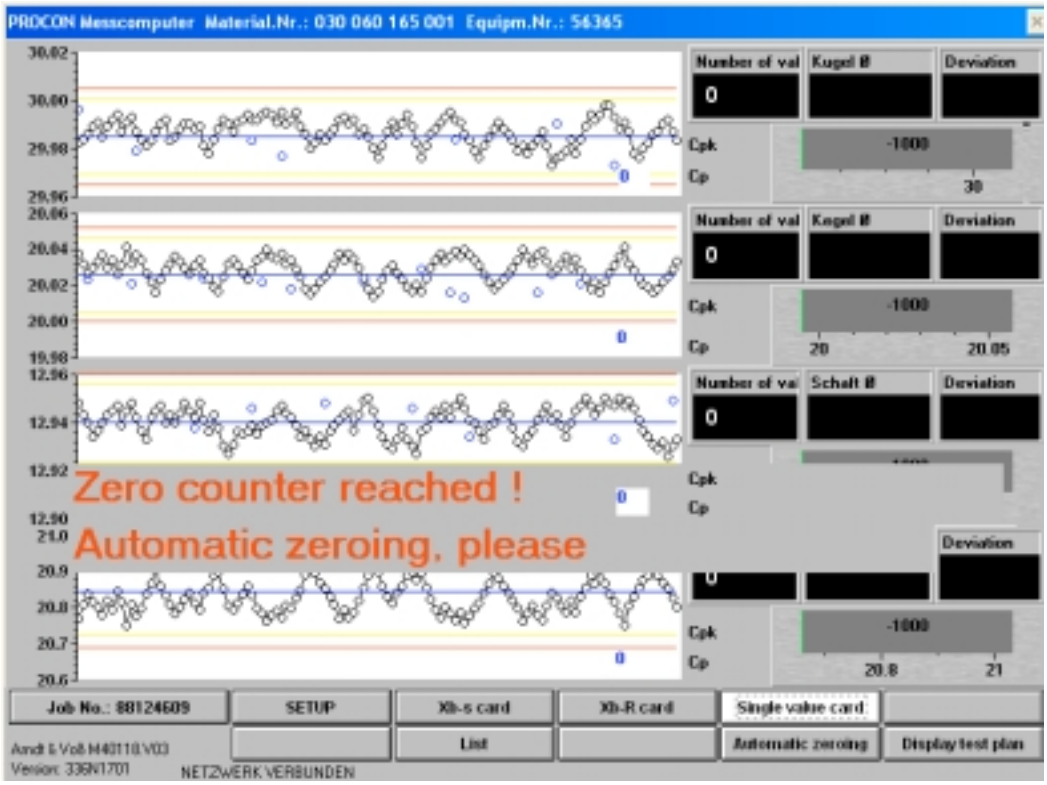
Particularities:

Measurements out of range/measurements out of plausibility:

If at least one measurement is out of range, the unit interprets the whole measurement as failure.
The measurement cycle will not be used for statistics and control.

Forced zeroing after n units:

If forced zeroing is included in the test plan, the control signal BUSY as well as a warning message are set after the zero interval was reached.
After having carried out **automatic zeroing**, measuring may be continued.



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Operating error:

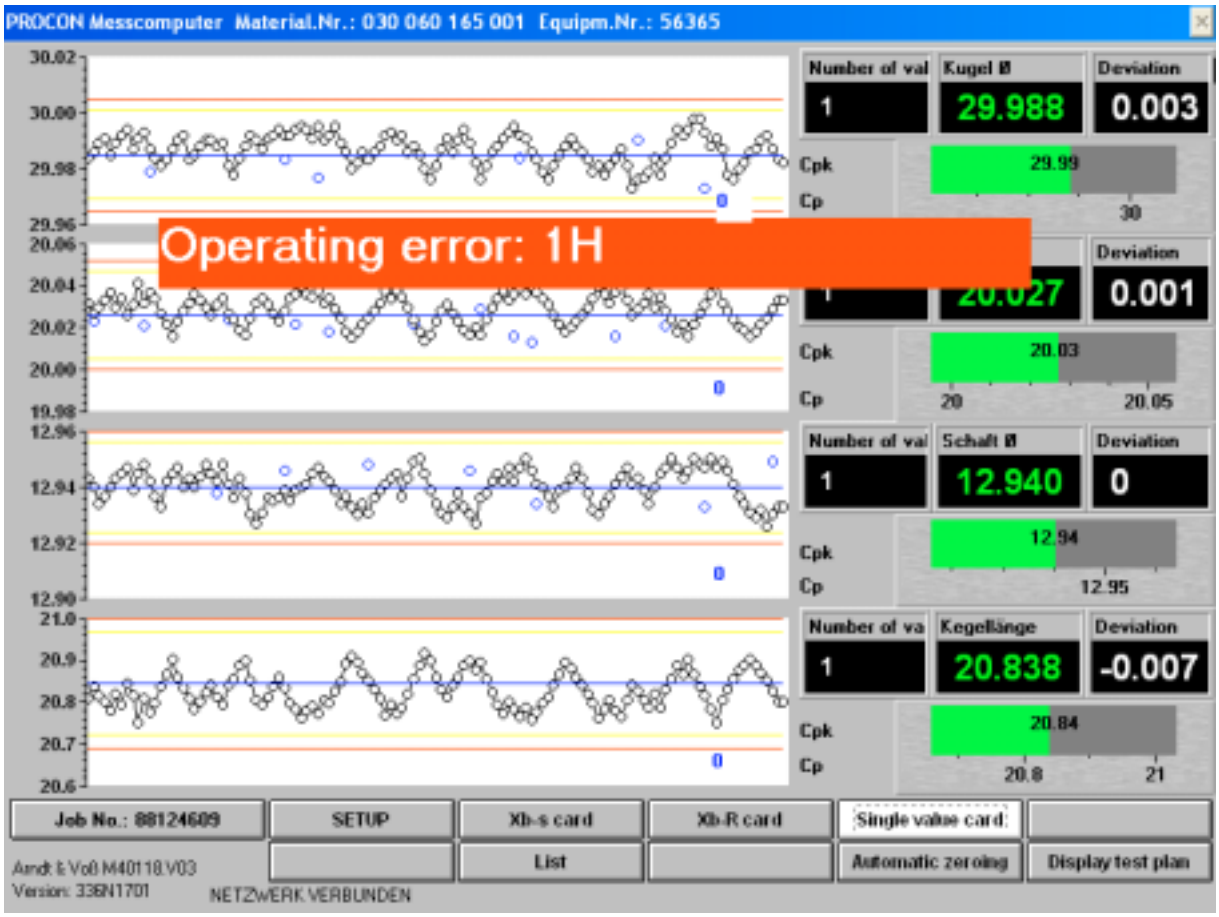
If a control interface for tool compensation is included in the test plan, in case of an error a warning message is set in the signal exchange with the machine control. Measuring may, however, be continued.

Meaning of the error message: xH xL

x = number of control output

H = timeout error of the signal acknowledge ON (waiting time > 2 s)

L = timeout error of the signal acknowledge OFF (waiting time > 2 s)



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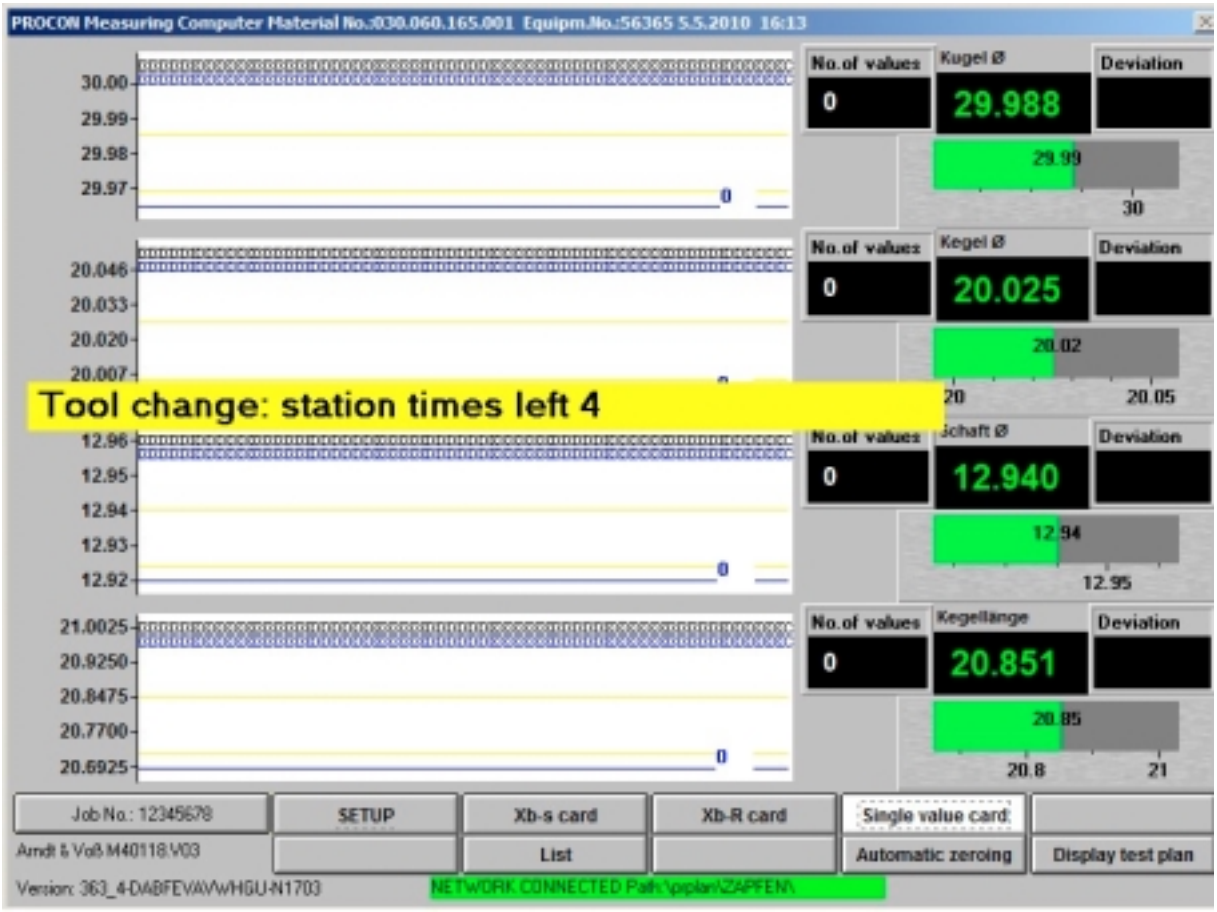
Tool change
During the first 5 measurements after a tool change, a yellow message is displayed showing the number of station times left.



Standard setup in operating mode AUTOMATIC:

Single value card
The single value card shows the process characteristics of a measurement point with the last 125 measuring values. The advantage of the single value card is that it is very easy to read. For process control the Xb-S quality card is recommended because it is more sensitive for changes in location and variance. The tolerance limits are marked as red graph, the control limits as yellow graph and the centre of the tolerance range as blue graph.

Bar chart
The bars show the last measuring values of all measurement points within the tolerance range. This display mode is useful if it is to be checked how the workpieces lie within the tolerance range. For process control the use of quality cards is recommended.

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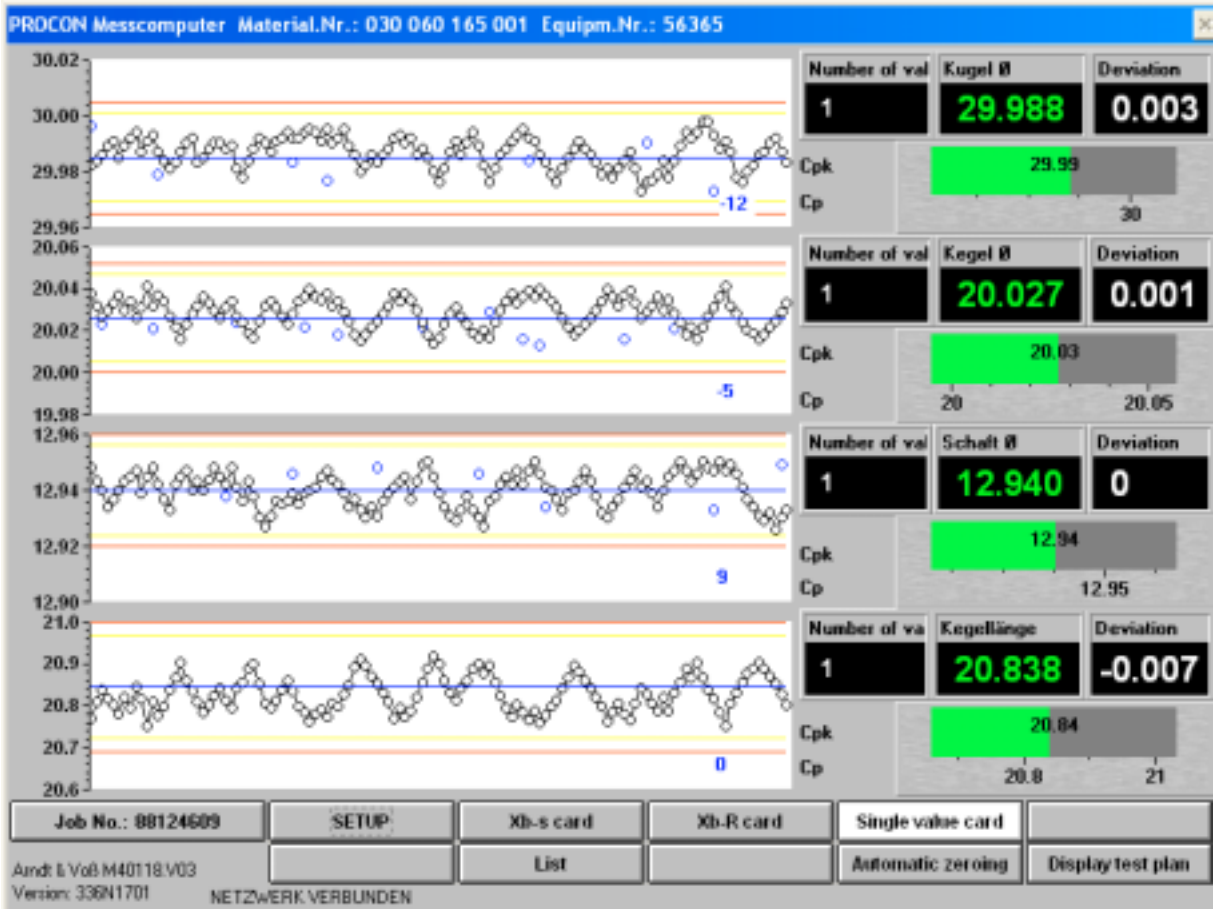
Deviation
The deviation displayed on the right side of the monitor is the difference between the last measured actual value and the nominal value.

If a control interface is used, each correction value put out to the CNC machine is marked with a blue dot. The last issued correction value is displayed at the right side of the diagram as blue numerical value.



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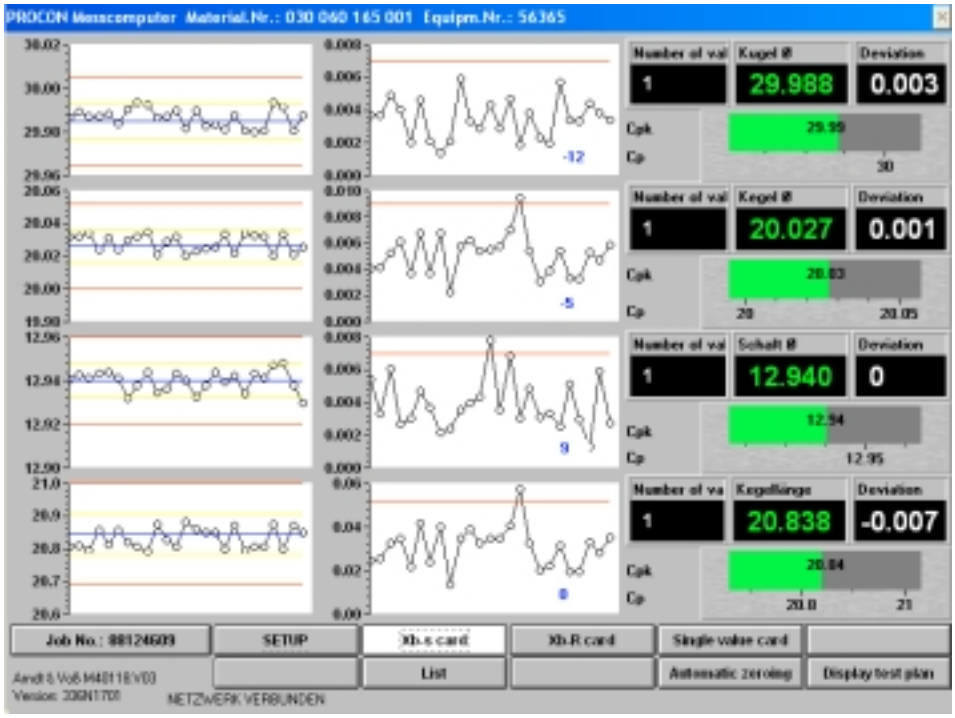
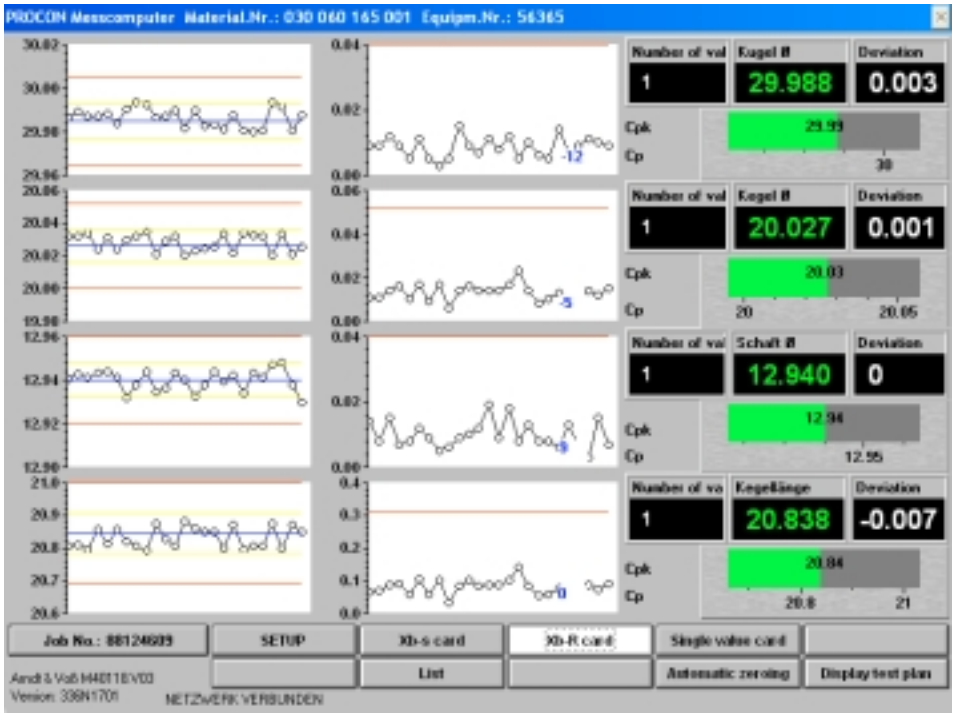
Xb-s card

The Xb-s card shows process characteristics of a measurement point with the last 25 sample results. For process control, the Xb-s quality card display is recommended as it reacts most sensitively to changes in location and variance.



Xb-R card

The Xb-R card shows the course of the process of a measurement point with the last 25 sample results. For process control, the Xb-s quality card display is recommended because it is most sensitive for changes in location and variance.



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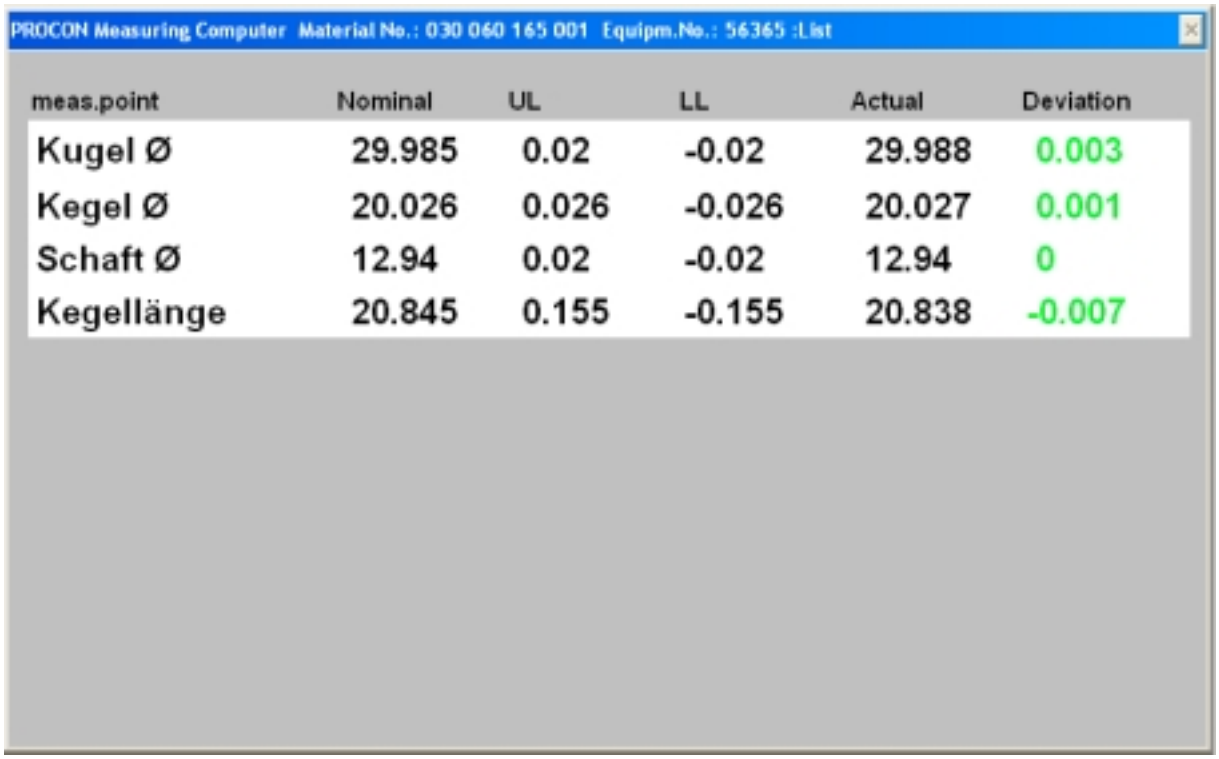
List
The list shows in a detailed numerical overview the last measuring values for all measurement points. This display mode is useful, if one specific measuring value is to be examined.
More frequent are the following output modes:

- quality card for process control
- bar chart for the measuring value display

Deviation Actual value - nominal value



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Automatic zeroing (also possible in operating mode SETUP)
Automatic zeroing = offset adjustment
Automatic zeroing is necessary periodically after a fixed time or a number of manufactured units. With this function, the measuring unit determines a correction value and carries out a system check at the same time.

correction value = actual value – setup master

The correction value is used to fine-adjust the tracer position and to compensate changes caused by temperature coefficients. Deviations bigger than the predefined max. correction range indicate failures.

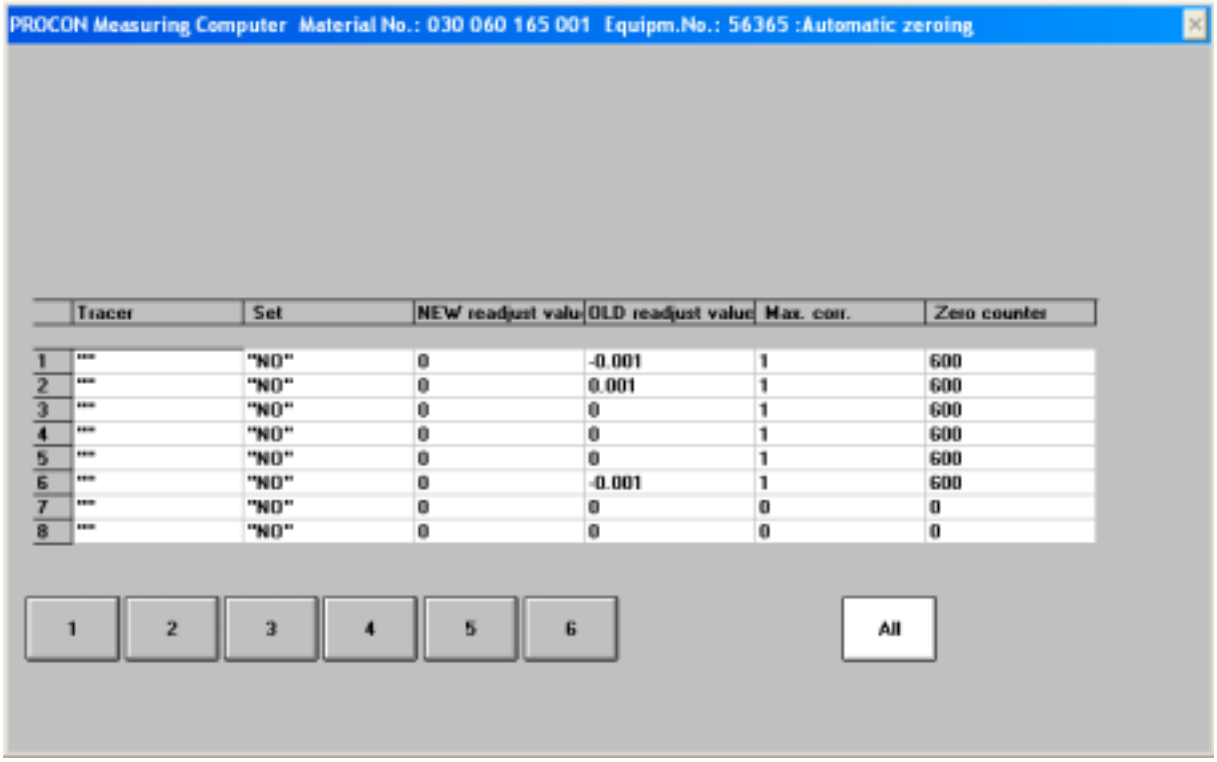
Process: insert setup master
set one or all tracers to zero

Set

Yes the measured value lies **within** the allowed max. correction range.
No the measured value lies **outside** the allowed max. correction range.
Please check whether the setup master is inserted correctly.
If a repeated zeroing does not result in **Set = Yes**, the corresponding tracer must be adjusted in **position tracer**.

Correction value = Deviation of the tracer from 0

New Value of the current offset adjustment
Old Value of the previous automatic zeroing" cycle
A comparison between **New** and **Old** shows the changes over time.
In case of substantial deviations, zeroing should be repeated in order to prevent that a faulty measurement in automatic zeroing causes mesurement errors.



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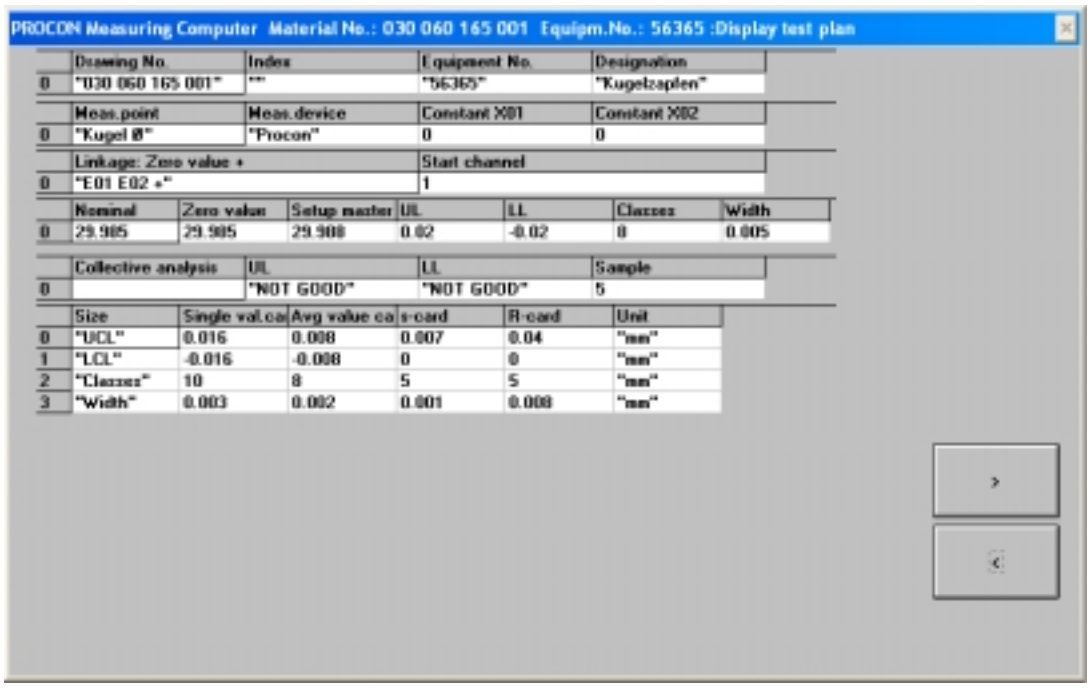
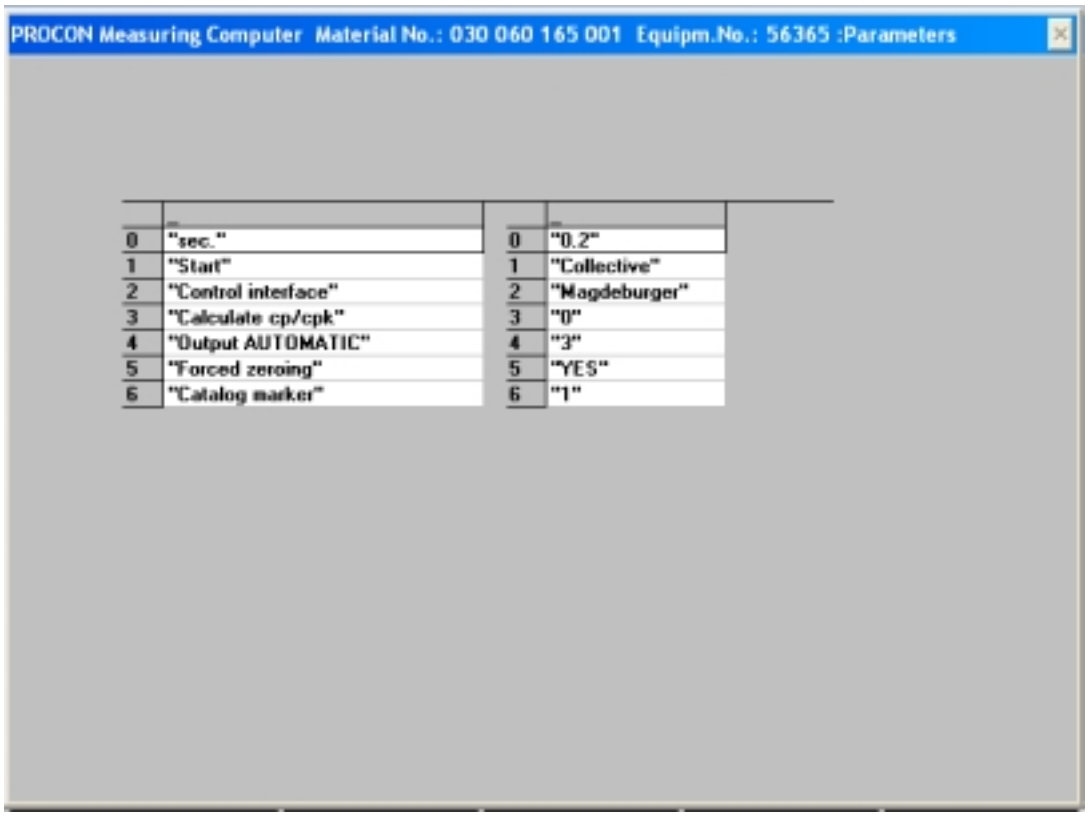
Display test plan



With the UP/DOWN function, all available measurement points as well as the further settings may be displayed one after the other.

Display test plan (2)



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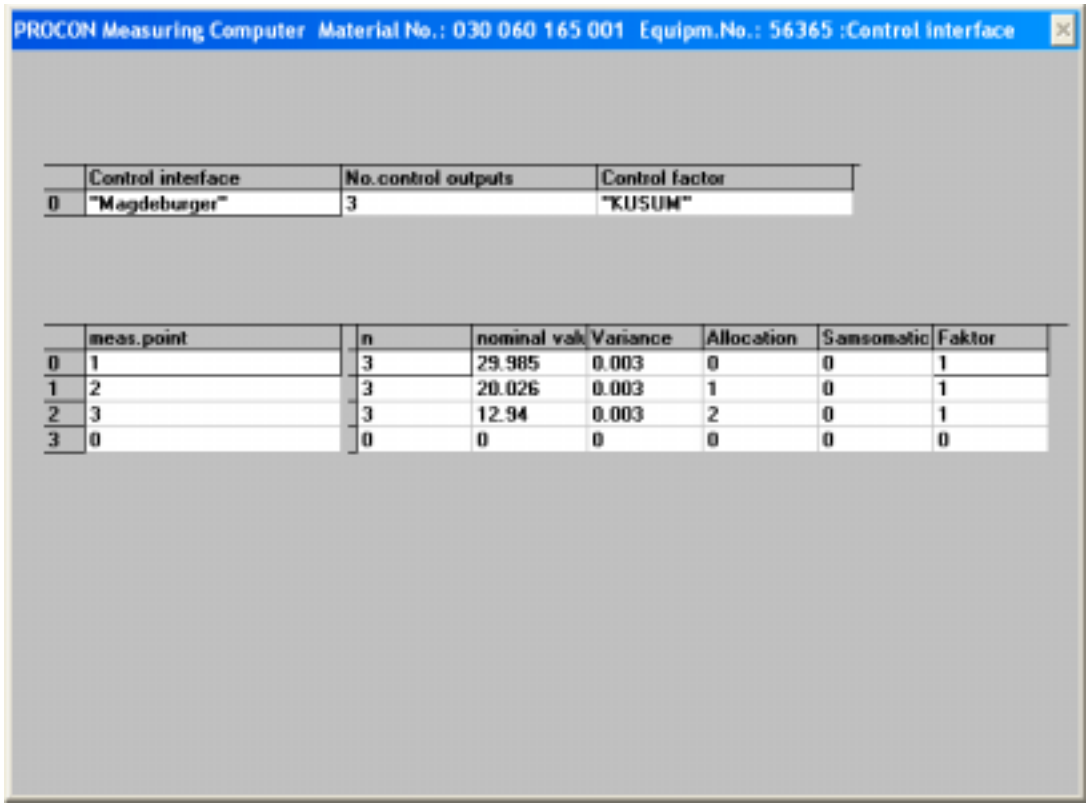
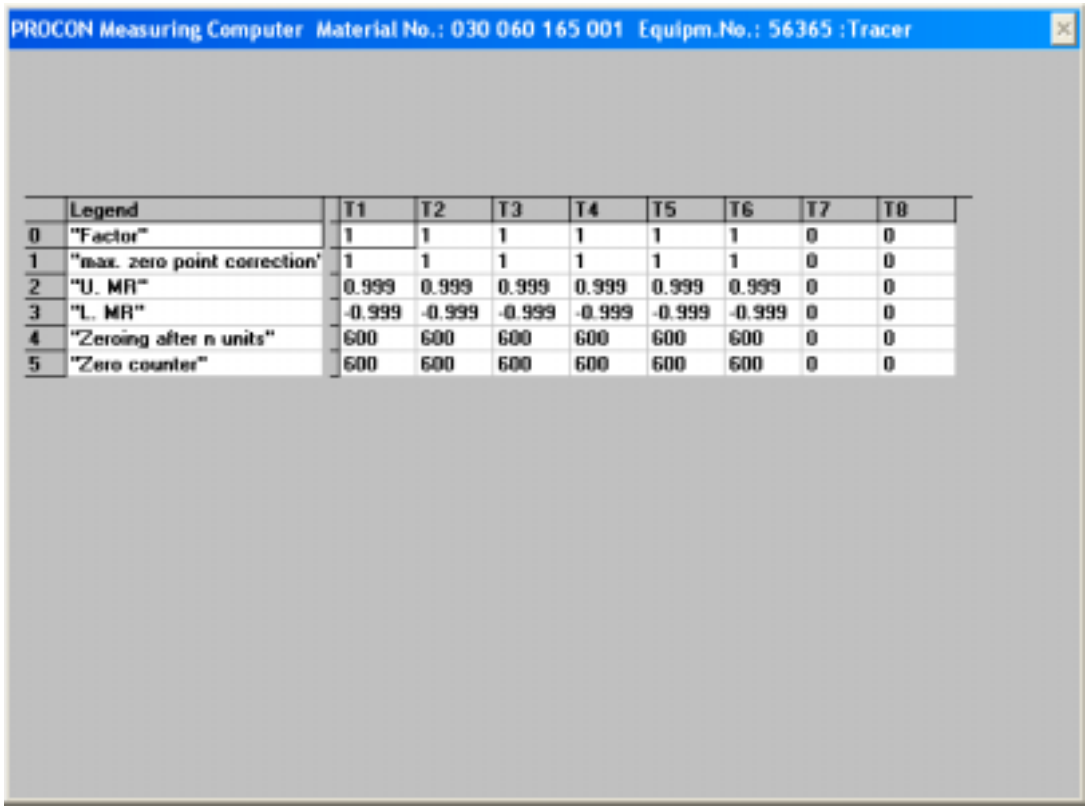
Display test plan (3)



	Control interface	No.control outputs	Control factor
0	"Magdeburger"	3	"KUSUM"

	meas.point	n	nominal valu	Variance	Allocation	Samsomatic	Faktor
0	1	3	29.985	0.003	0	0	1
1	2	3	20.026	0.003	1	0	1
2	3	3	12.94	0.003	2	0	1
3	0	0	0	0	0	0	0

Display test plan (4)



	Legend	T1	T2	T3	T4	T5	T6	T7	T8
0	"Factor"	1	1	1	1	1	1	0	0
1	"max. zero point correction"	1	1	1	1	1	1	0	0
2	"U. MR"	0.999	0.999	0.999	0.999	0.999	0.999	0	0
3	"L. MR"	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	0	0
4	"Zeroing after n units"	600	600	600	600	600	600	0	0
5	"Zero counter"	600	600	600	600	600	600	0	0

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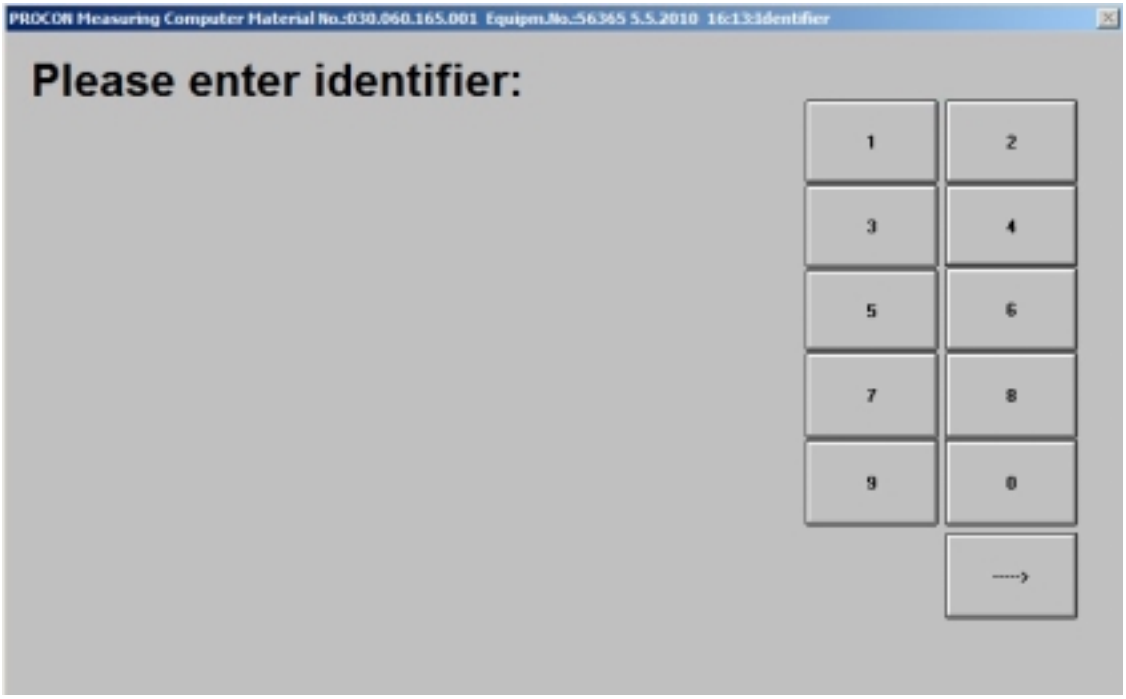
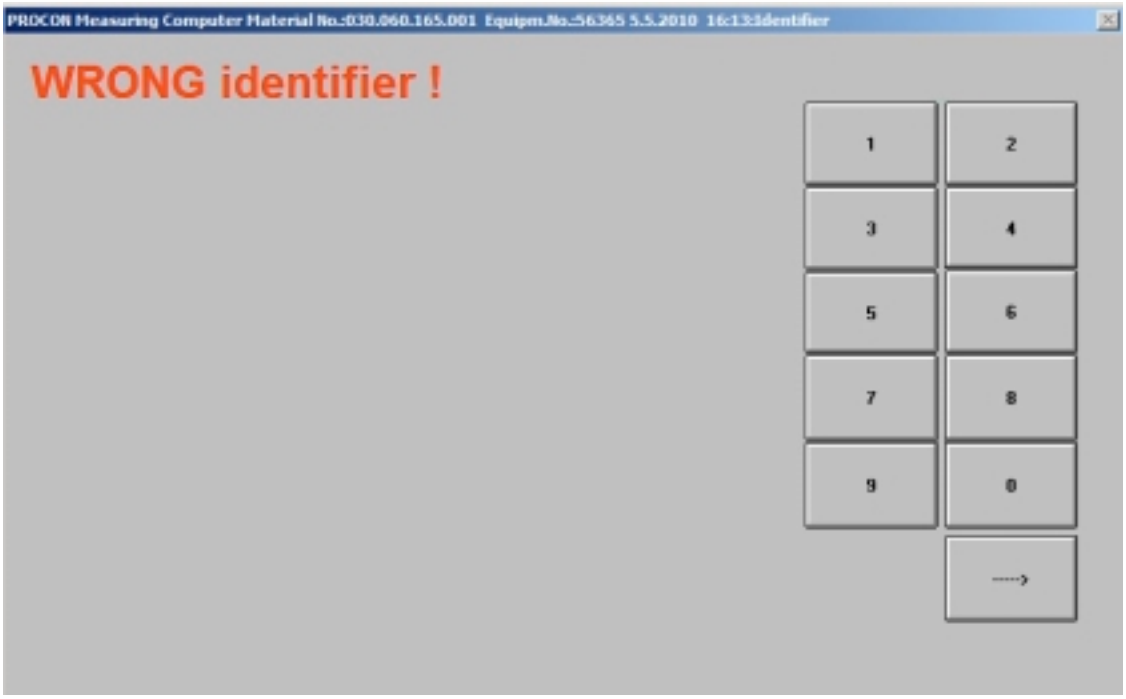
5. Selection of operating mode SETUP

The password window opens. The unit will only switch into SETUP mode after entering the correct identifier/password. If external function keys with AUTOMATIC-SETUP switch are connected, the external switching and the switching via password work equivalently parallel. The operating mode AUTOMATIC is only selected, if both are set on AUTOMATIC.



If a wrong password was entered, an error message is displayed.



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6. Operating mode SETUP

Basic settings in operating mode SETUP:

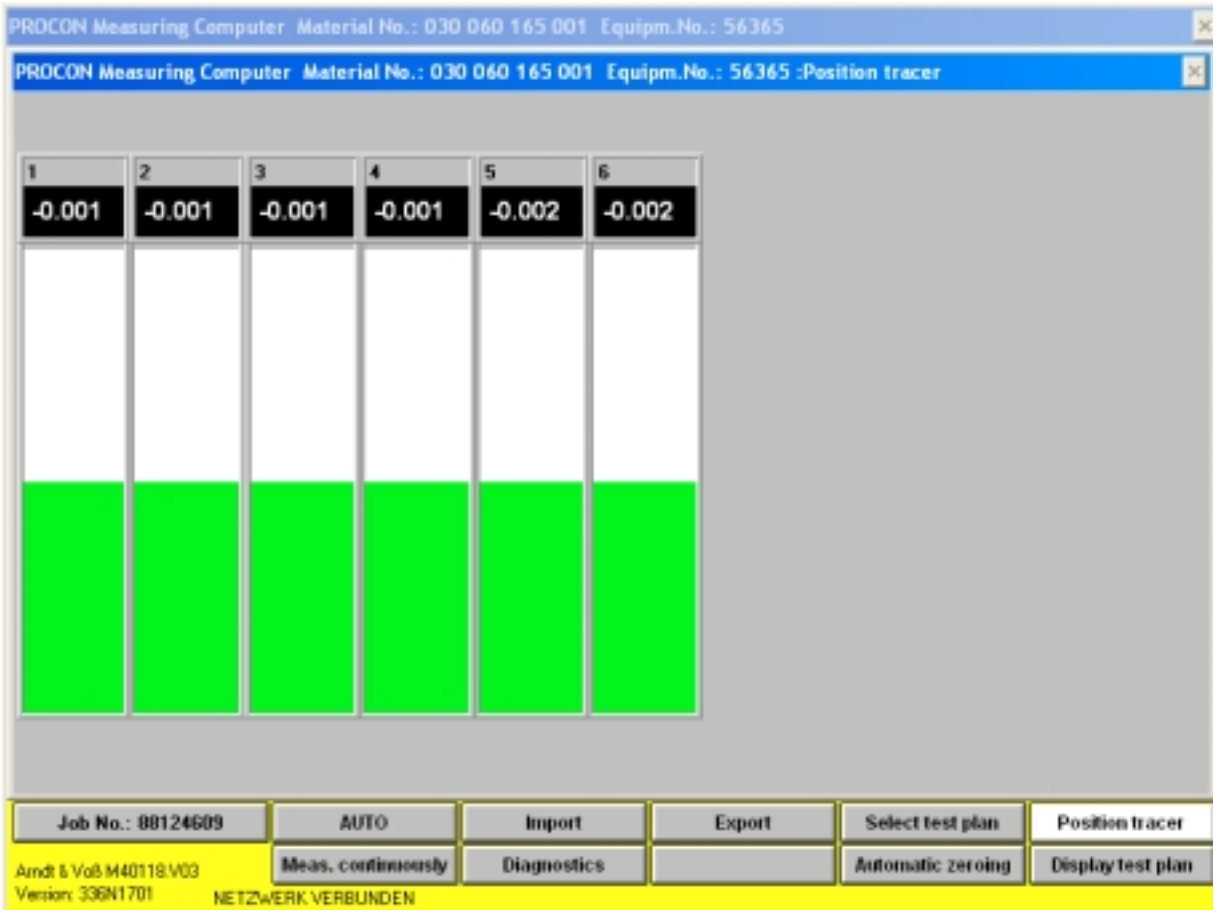
The yellow background indicates the operating mode SETUP.
By pressing the buttons, the required display mode is selected.

Position tracer
This display serves for the approximate adjustment of the tracer.
It is needed for mechanical changes, a change of tracer or if the tracer is no longer in the adjustment range.

Process: Insert setup master
Carry out adjustment for all tracers. The accuracy of adjustment should be at least 1/2 of the correction range (cf. test plan).

Tracer No.: No. of the tracer in the measuring unit, corresponding to the label on the back panel.

Tracer value: Measuring value without consideration of the factor.



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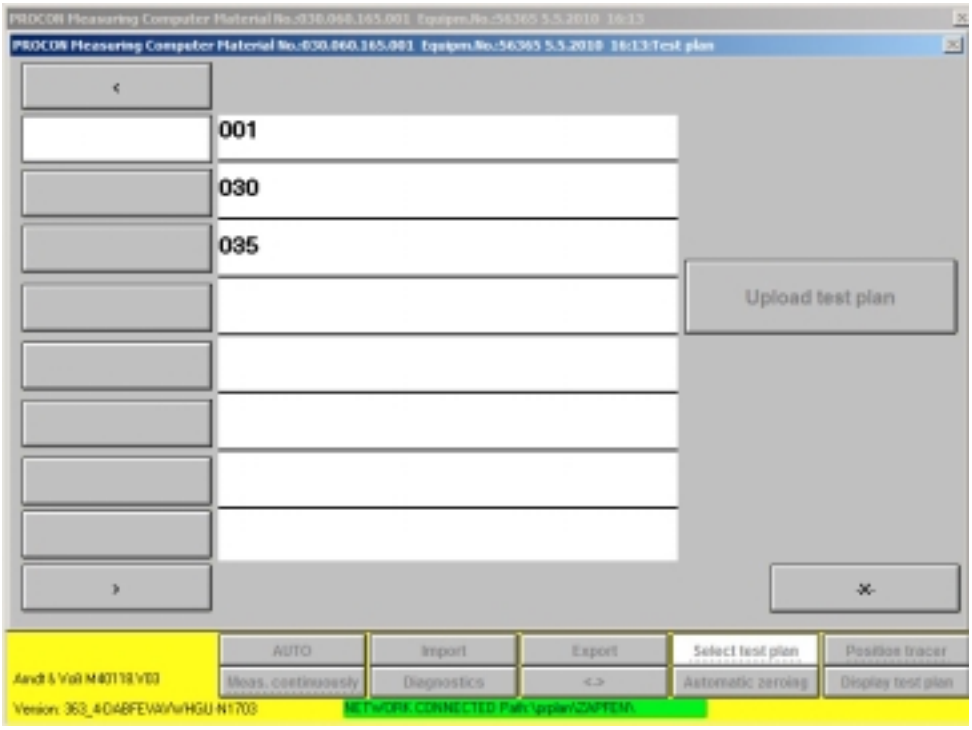
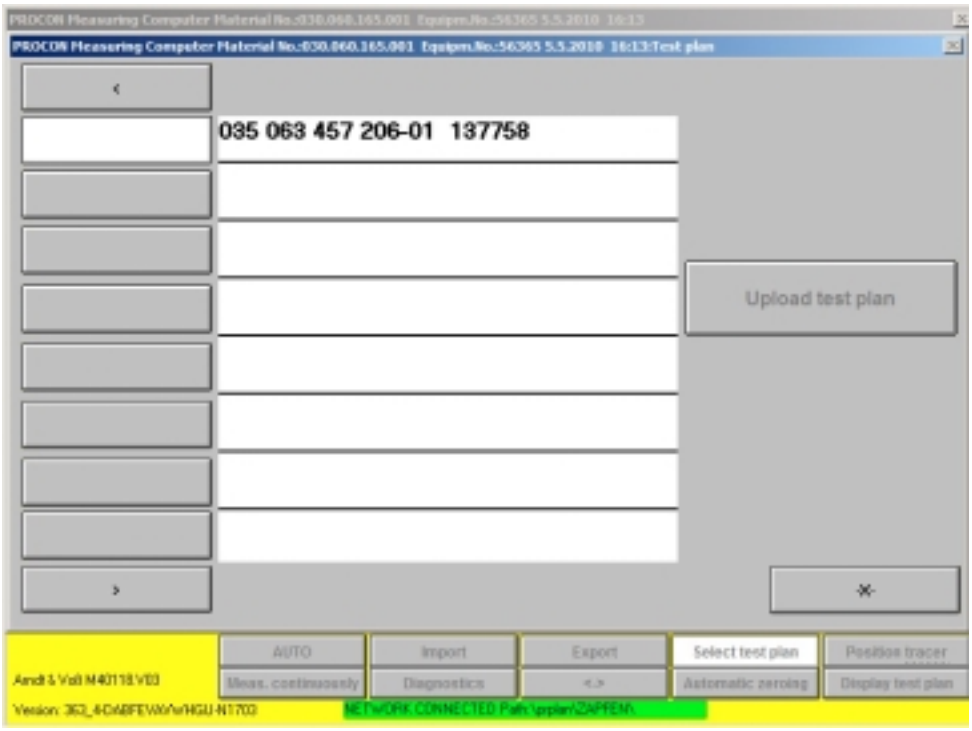
Select or delete test plan

The selection window for test plans opens. The available test plan groups are displayed, sorted by the first 3 digits of the drawing number.



By pressing the button on the left of the respective test plan group, the relevant group may be selected. The drawing number as well as the equipment number of the available test plans are displayed.



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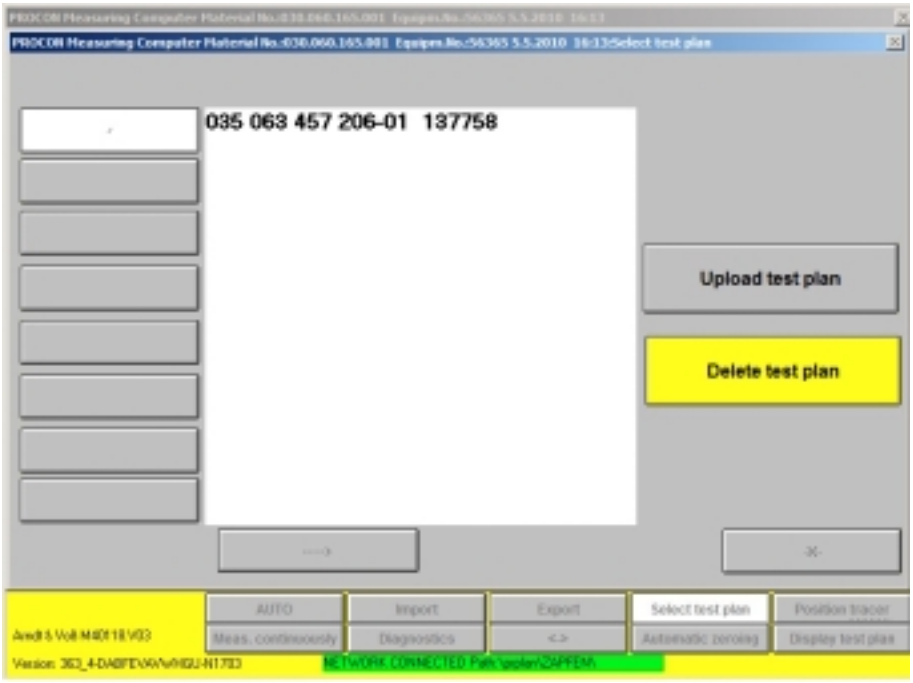
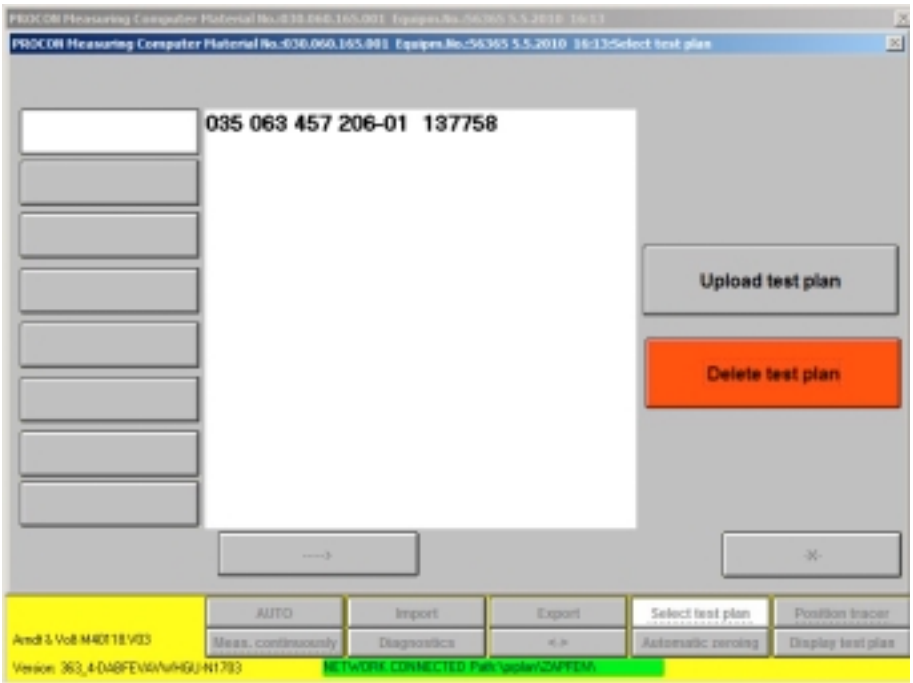
By selecting the required test plan, the query window Upload test plan/Delete test plan is opened.

Upload test plan: The respective test plan is uploaded and activated.



Program option "+V" gives the possibility of selecting test plans by scanning their drawing number from barcodes. Please refer to the description under 10. (page 36).

Delete test plan: This button is marked in yellow. When pressing this button, the colour changes to red. When pressing the button again, the test plan is deleted.
NOTE: Only non-active test plans may be deleted.



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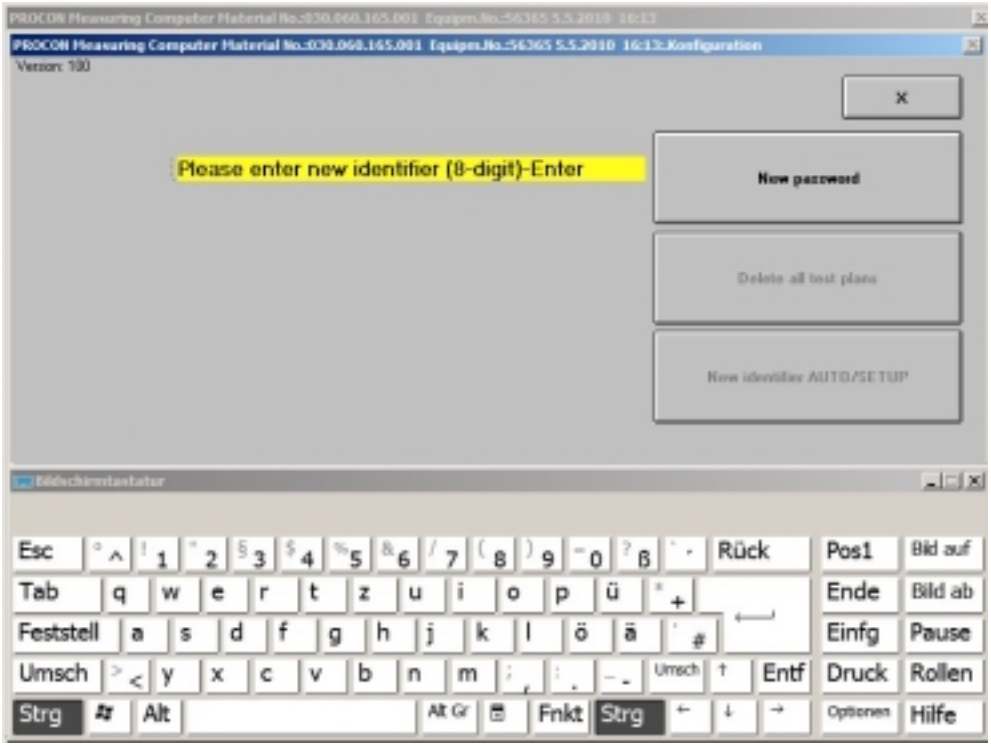
Configuration menu <– >

The button <– > opens a sub-menu with on-screen keyboard.

When opening this sub-menu for the first time, a new identifier/password for this configuration menu needs to be defined (password prompt marked in yellow).



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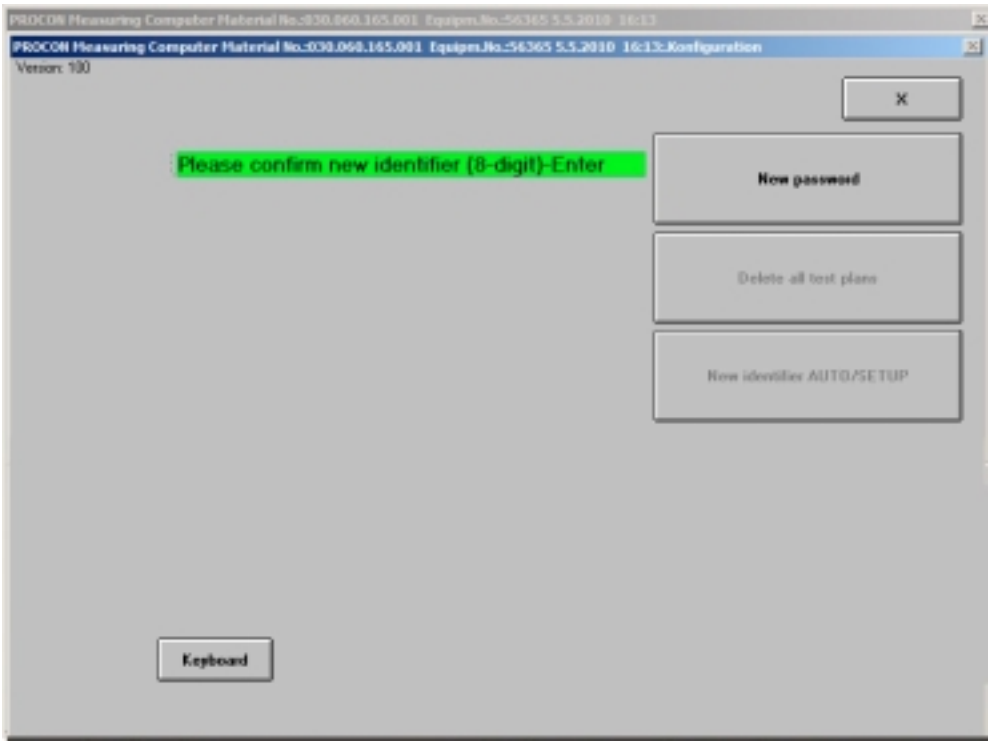
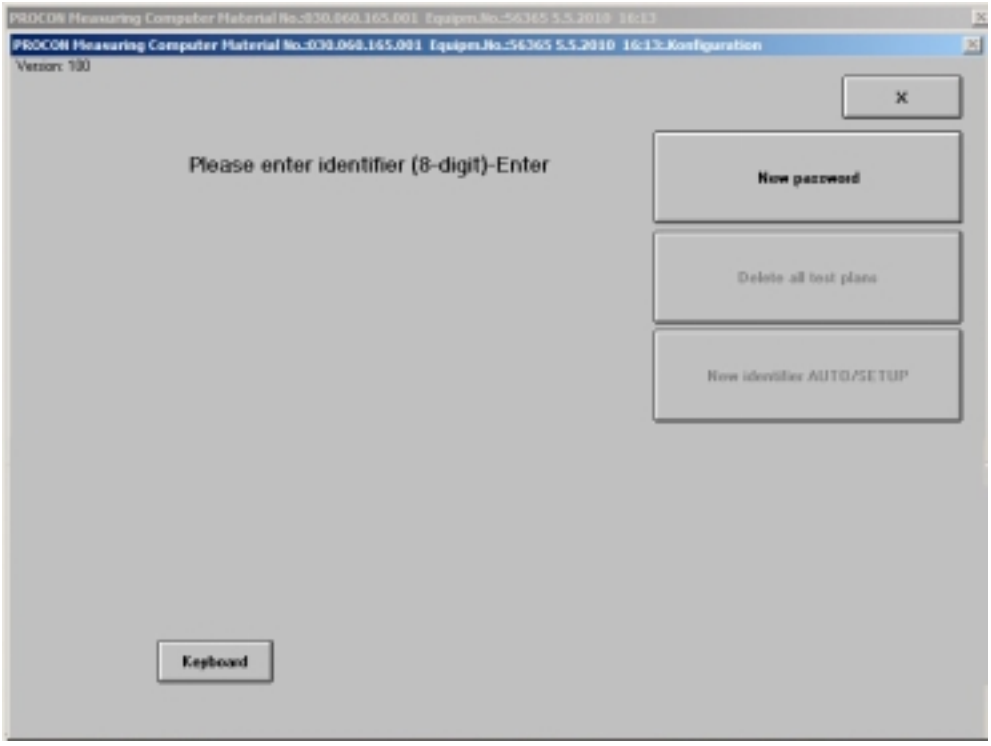
This new password needs to be confirmed (password prompt marked in green).



The new identifier must then be entered once more in order to enter into the configuration menu (password prompt without colour).



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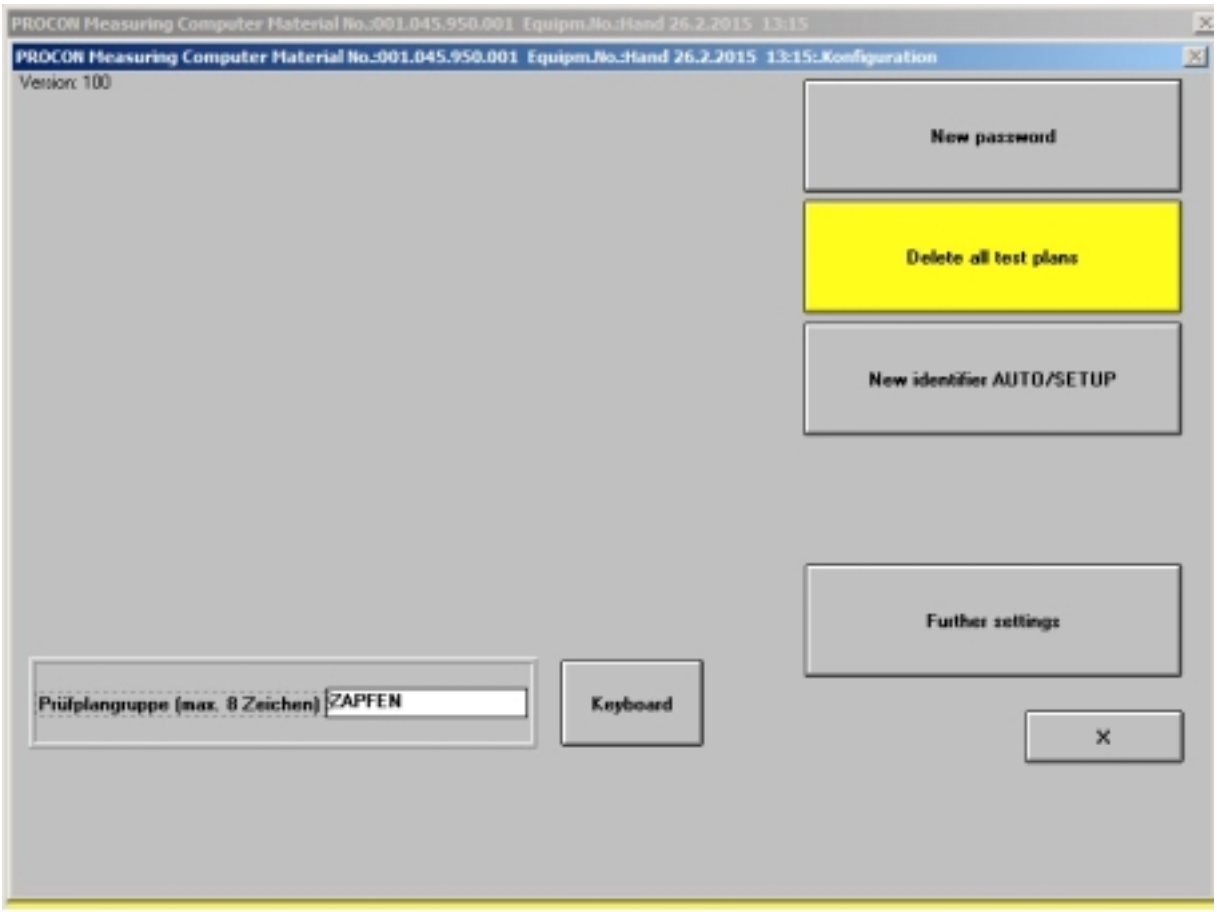
If a wrong password is entered, the password prompt is marked in red. It is possible to enter the password a second time. After input of the correct password, the configuration menu with the following options is opened:

New password
Delete all test plans
New password AUTO/SETUP
Further settings
Test plan group / *("Prüfplangruppe")* (with OPTION "N")



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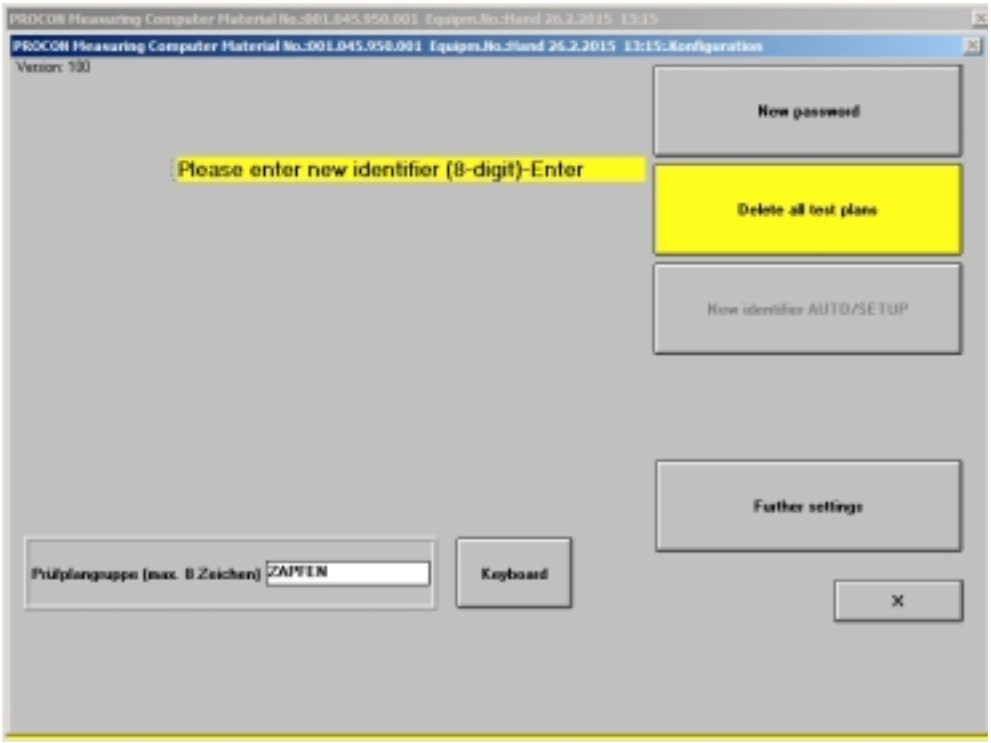
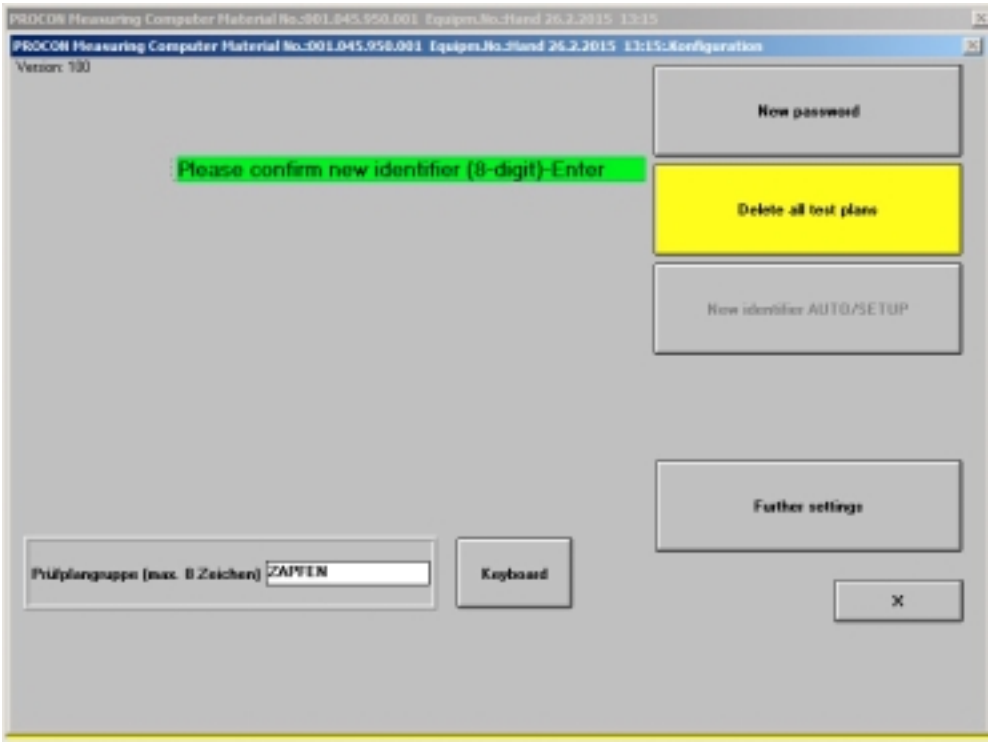
New password

This option makes it possible to change the password for the configuration menu. A new identifier/password may be entered (password prompt marked in yellow).



The new password must be confirmed (password prompt marked in green).



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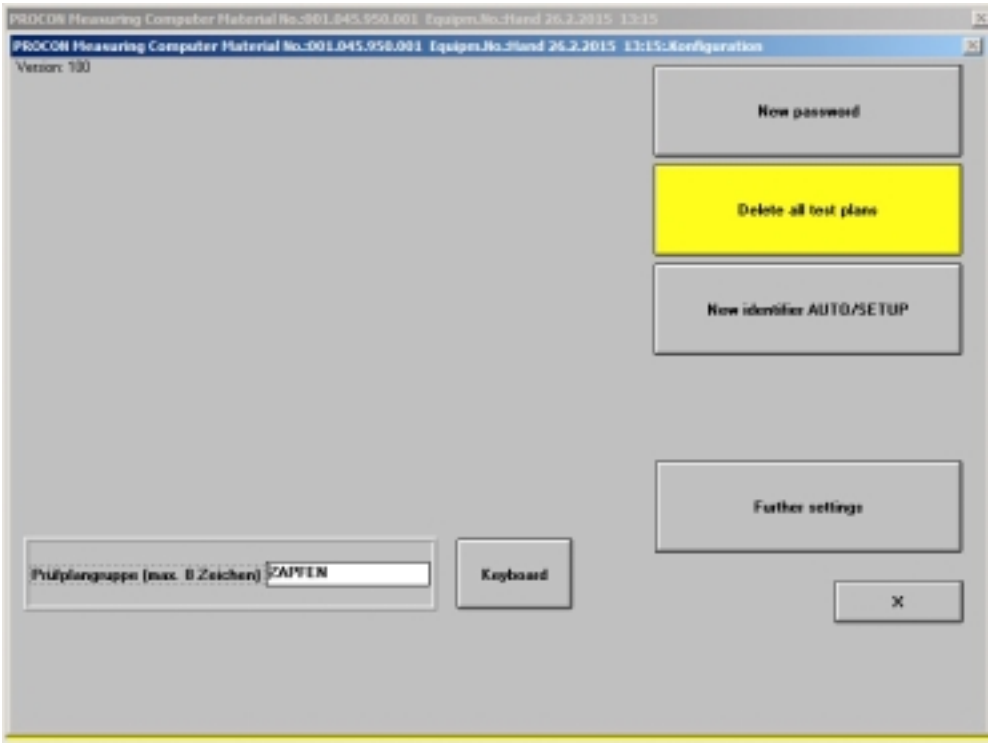
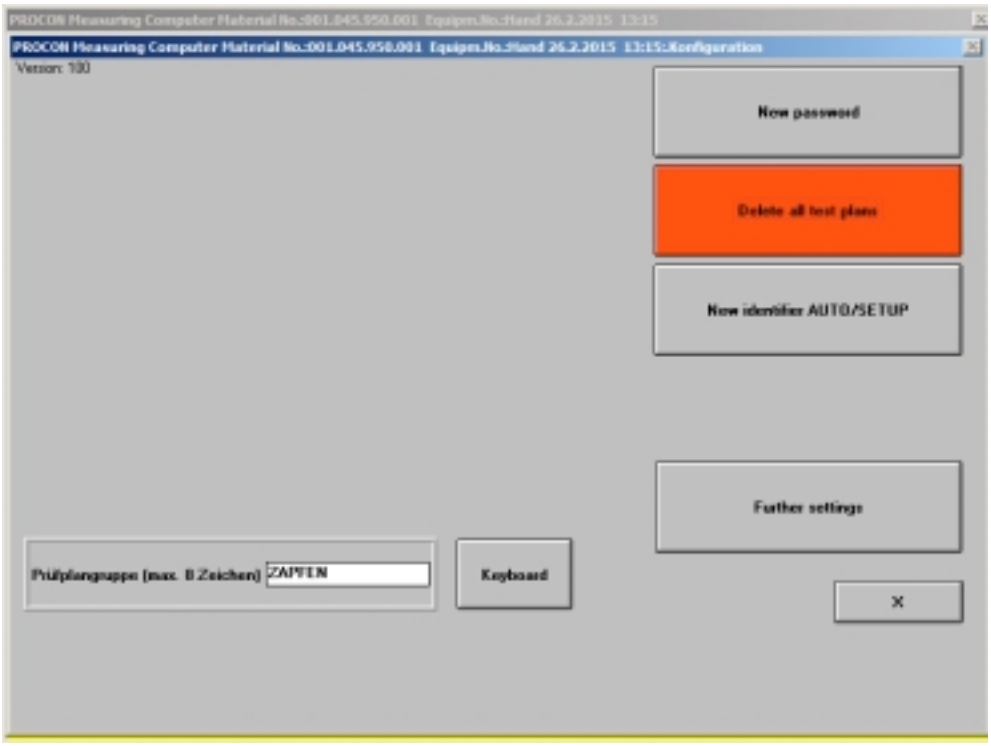
Delete all test plans

The button "Delete all test plans" makes it possible to delete all test plans available in the PROCON measuring computer, except for the currently active test plan.



After selection of this option, the button is marked in red.



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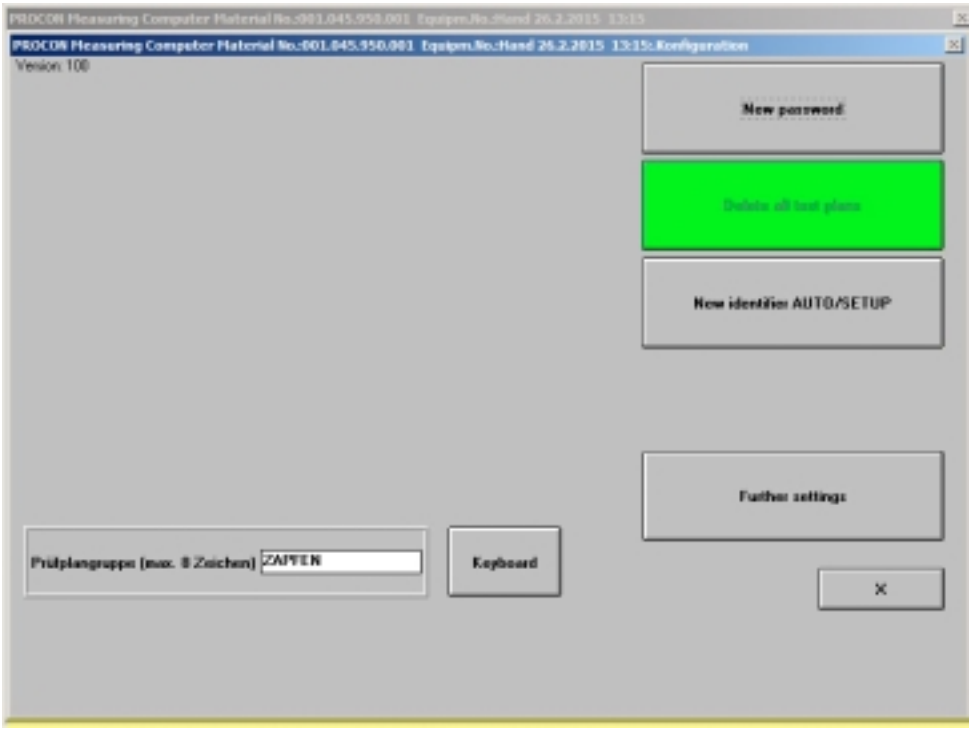
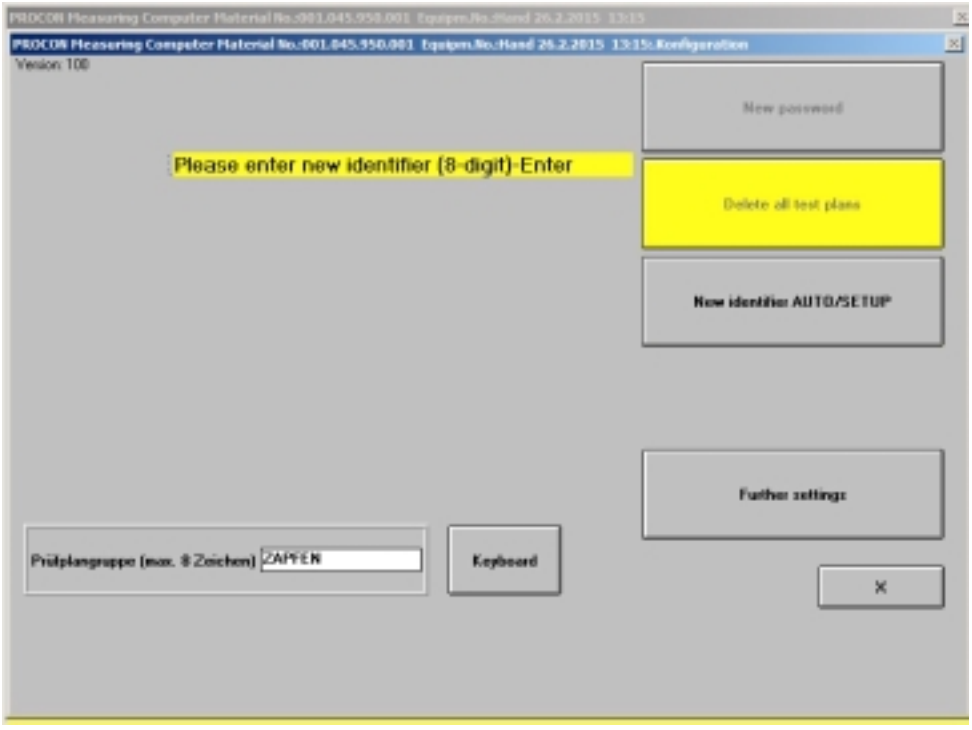
By pressing the red button again, the test plans are **irrevocably** deleted. The green colour of the button shows that the test plans have been deleted successfully.



New password AUTO/SETUP:
This option makes it possible to change the password for switiching into SETUP mode from AUTOMATIC mode. The newly created identifier/password must be entered (password prompt marked in yellow).



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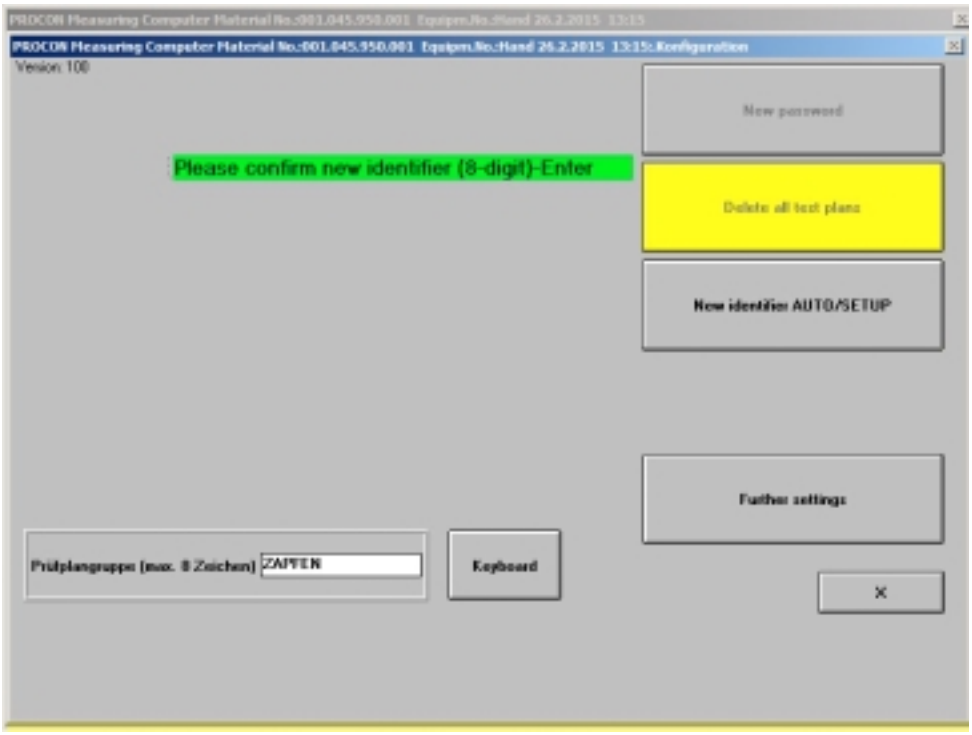
The new password must be confirmed (password prompt marked in green).



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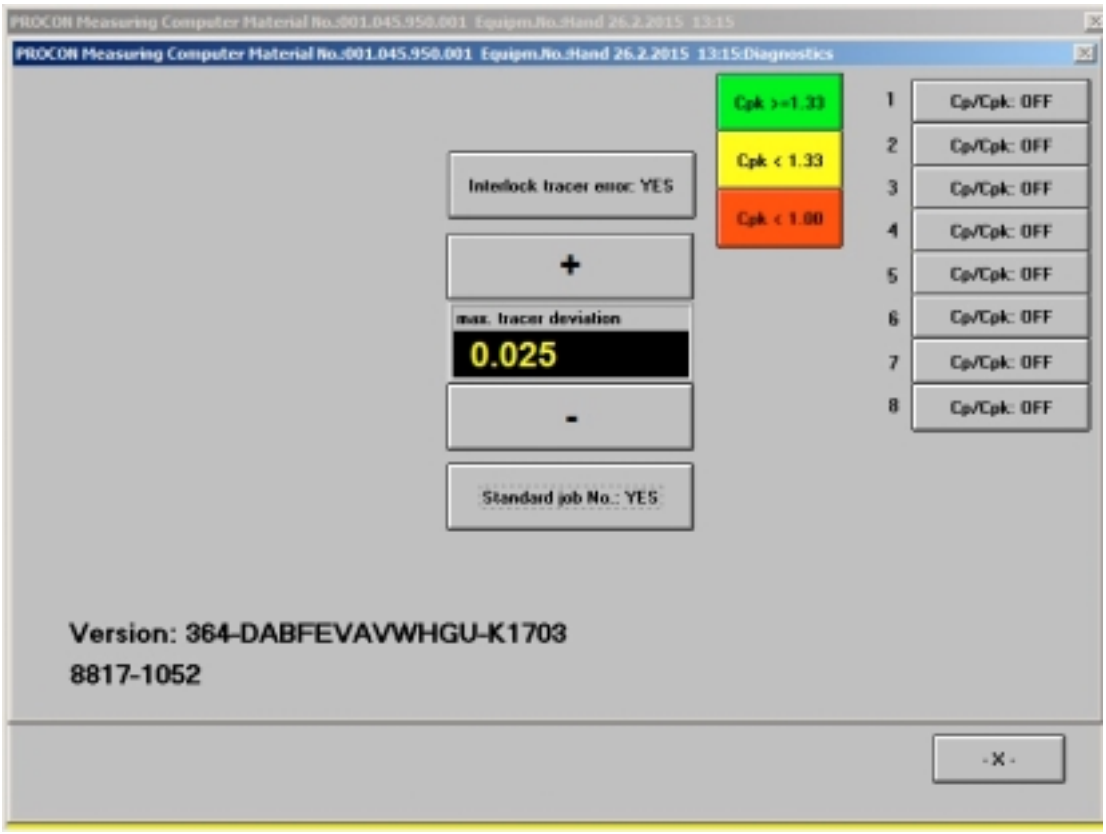
Further settings



Settings for Cp/Cpk values:
The display of Cp and Cpk values may be switched on or off for operating mode AUTOMATIC.

With the 3 coloured buttons
Cpk >=1.33
Cpk < 1.33
Cpk < 1.00
the colour mark for the display of the Cpk values may be changed.

With the 8 buttons "Cp/Cpk: ON" bzw. "Cp/Cpk: OFF", the display of Cp/Cpk values may be switched on or off.

Interlock tracer error:
A tracer control is constantly running in the background. The batch size for the recognition of a tracer error is set to 5. This means that in case an error is found after 5 measuring cycles, a corresponding message is put out. If the setting "Interlock tracer error: YES" is activated, the machine will also be stopped in case of an error.

Standard job number:
If "Standard job No.: YES" is defined, the job number only needs to be entered once. If "Standard job No.: NO" is active, a job number needs to be entered every time when selecting a new test plan (cf. 7. on page 32).

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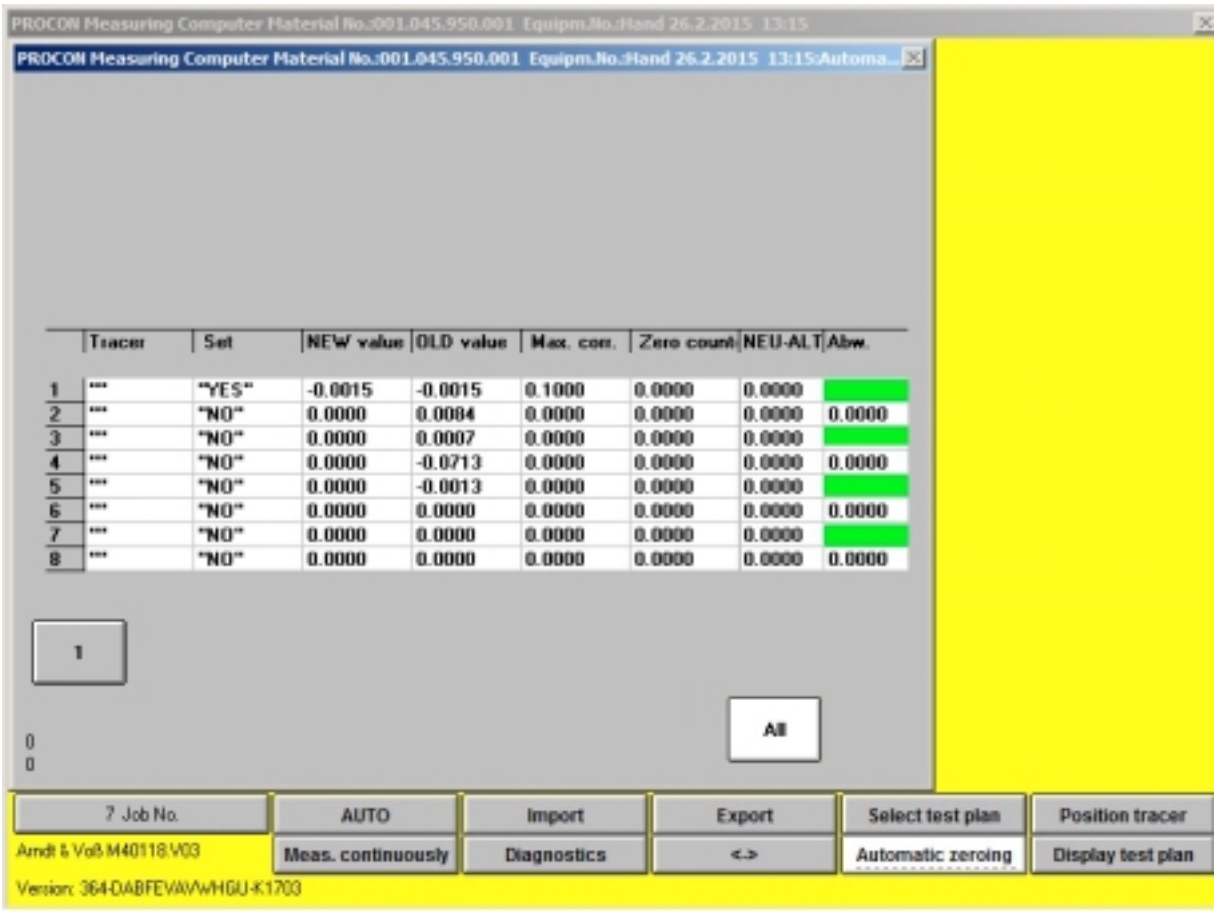
Max. tracer deviation (only with OPTION "K"):
Tracer control during calibration (automatic zeroing):
Prerequesite for the control is that the defined measurement point measures diameters with the linkage tracer A + tracer B. These two tracers must be arranged counter-directionally. It is checked that the deviation of the tracer sums of the current calibration cycle in comparison with the previous calibration cycle do not exceed a predefined limit value. Thus, problems in the mechanical parts or tracer errors will be discovered.

Configuration settings for monitoring the AUTOZERO plausibility:
YES/ON: limit > 0,003 µm and < 0,030 µm means control is active.
NO/OFF: limit = 0,030 µm means control is inactive.
The limit value may be changed through the buttons "+" and "-".

Obligatory prerequesite is the paired allocation of the tracers to one measurement point:
- Measurement point 1 = tracer 1 and 2
- Measurement point 2 = tracer 3 and 4
- Measurement point 3 = tracer 5 and 6
- Measurement point 4 = tracer 7 and 8

If this option is installed and the control has been activated, the deviation is displayed as numeric value as well as coloured mark after automatic zeroing:
green = GOOD, red = NOT GOOD.



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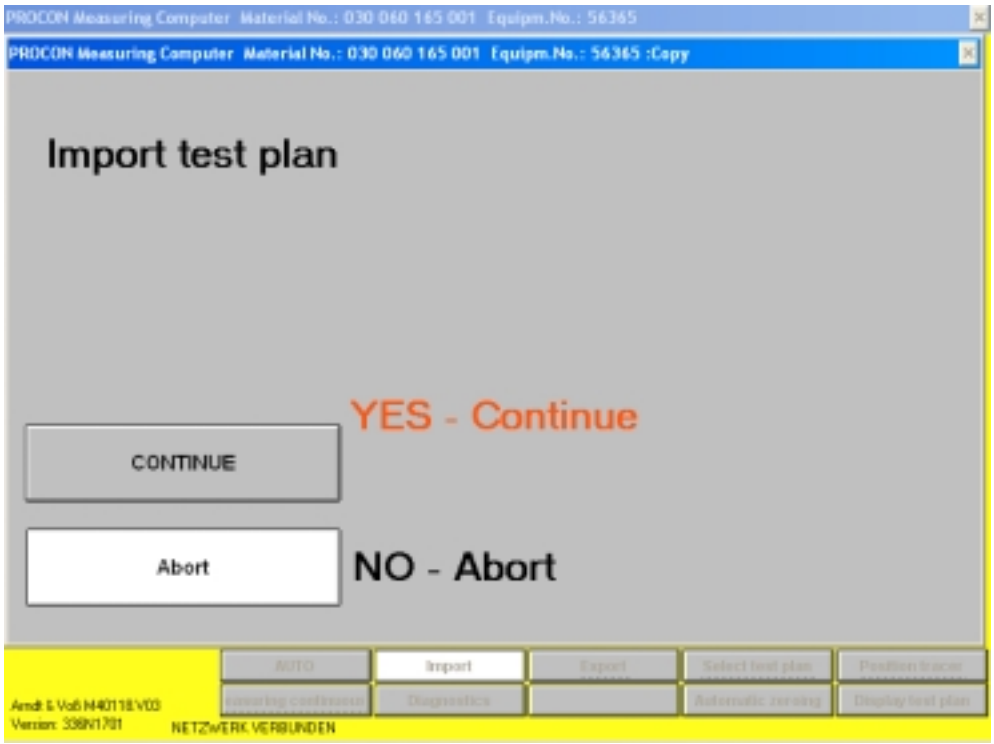
Test plan group / ("Prüfplangruppe") (with OPTION "N")
This function is relevant for the program option with automatic network mode. Into this field, the test plan group (max. 8 letters) may be entered. Test plans will then be imported from the respective folder of that test plan group from the defined network (e.g. network path/prplan/[test plan group]). This folder is displayed in the network path as described on page 35.

If the on-screen keyboard was closed manually, it may be re-opened by pressing the button "keyboard".

Exit the configuration menu by pressing the button "X".

Import test plans

A security query is displayed:



Return into the main menu by selecting "ABORT".
By pressing CONTINUE, all test plans available on the external storage device will be imported.

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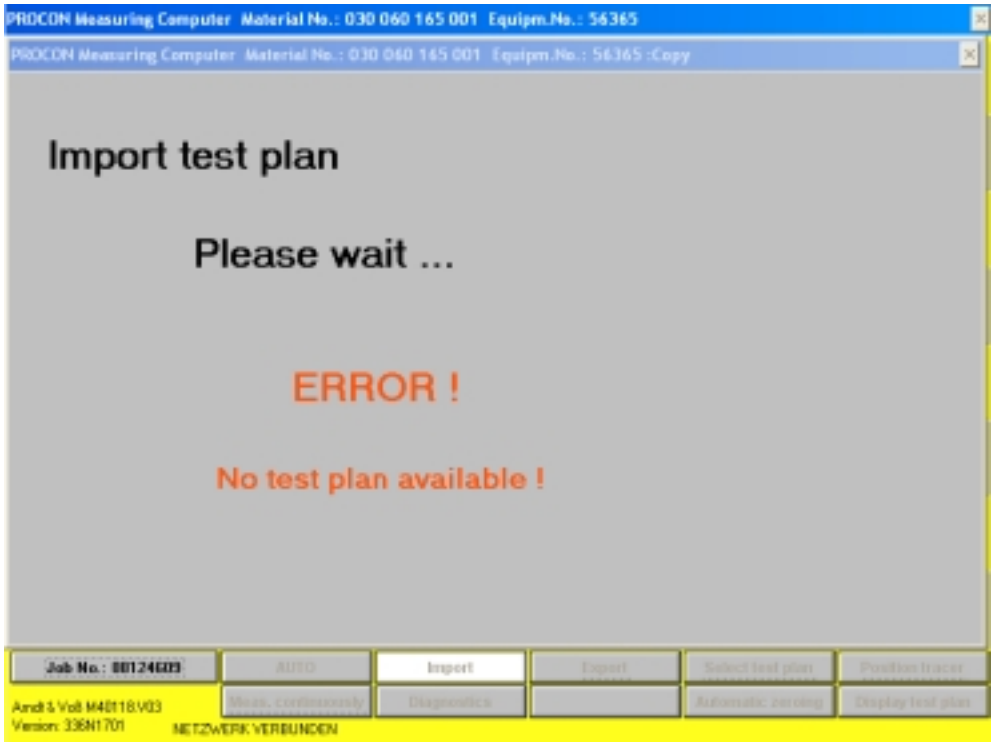
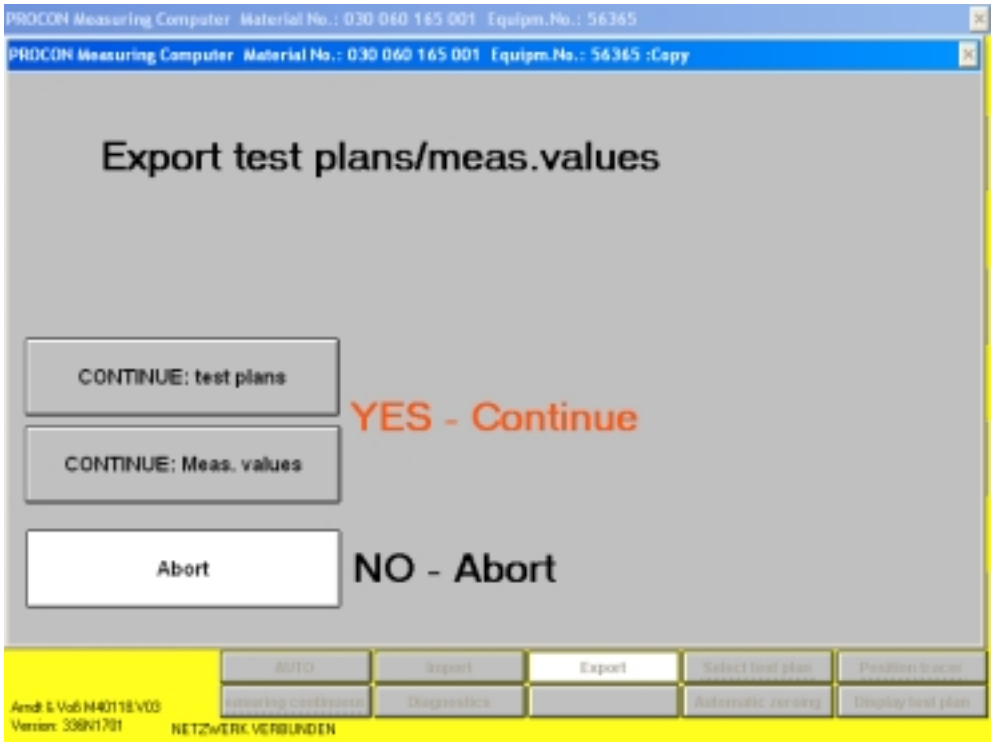
If no test plan is found, an error message is displayed.



Export test plans/measuring values

All available test plans or all measuring values may be exported.



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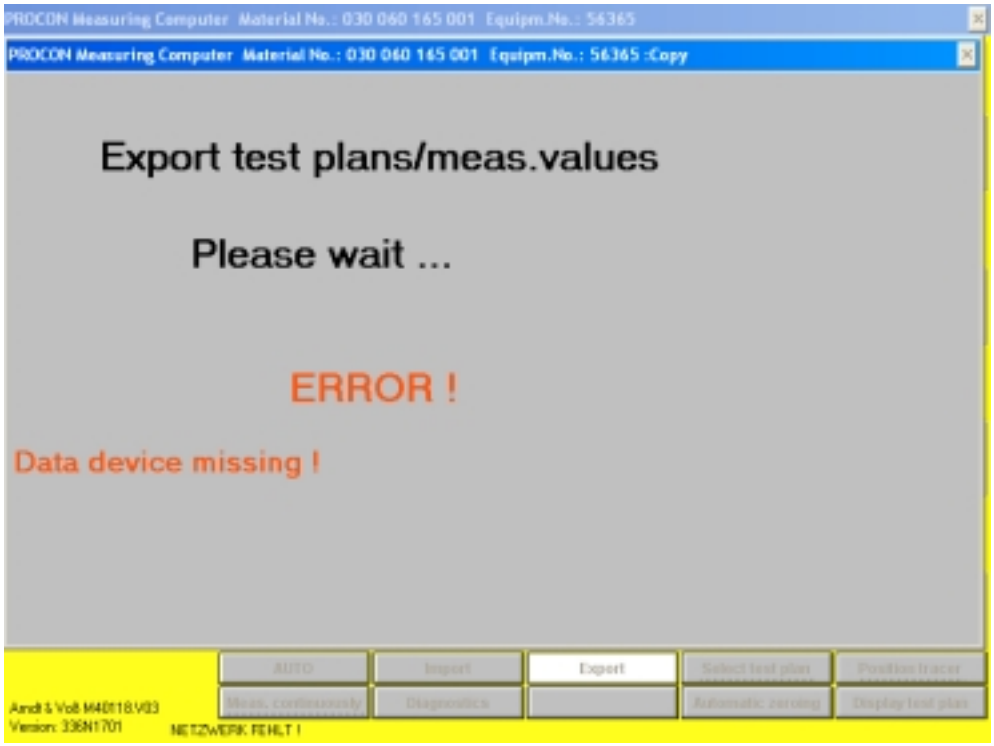
The measuring unit checks if a USB storage device is connected. If none is connected, an error message is displayed.



If a USB storage device is connected, the measuring values are saved in the root directory on the USB storage device. Test plans are being exported into the folder \prplan on the USB storage device. If there is no such folder on the device yet, it will be created automatically.

If the unit contains option "N" (automatic network mode), measuring value files are automatically saved into the folder "mwerte" in the defined network (cf. page 35).

After the files have successfully been saved on the external storage device or network, all measuring value files will be deleted from the measuring unit. Test plans will not be deleted.

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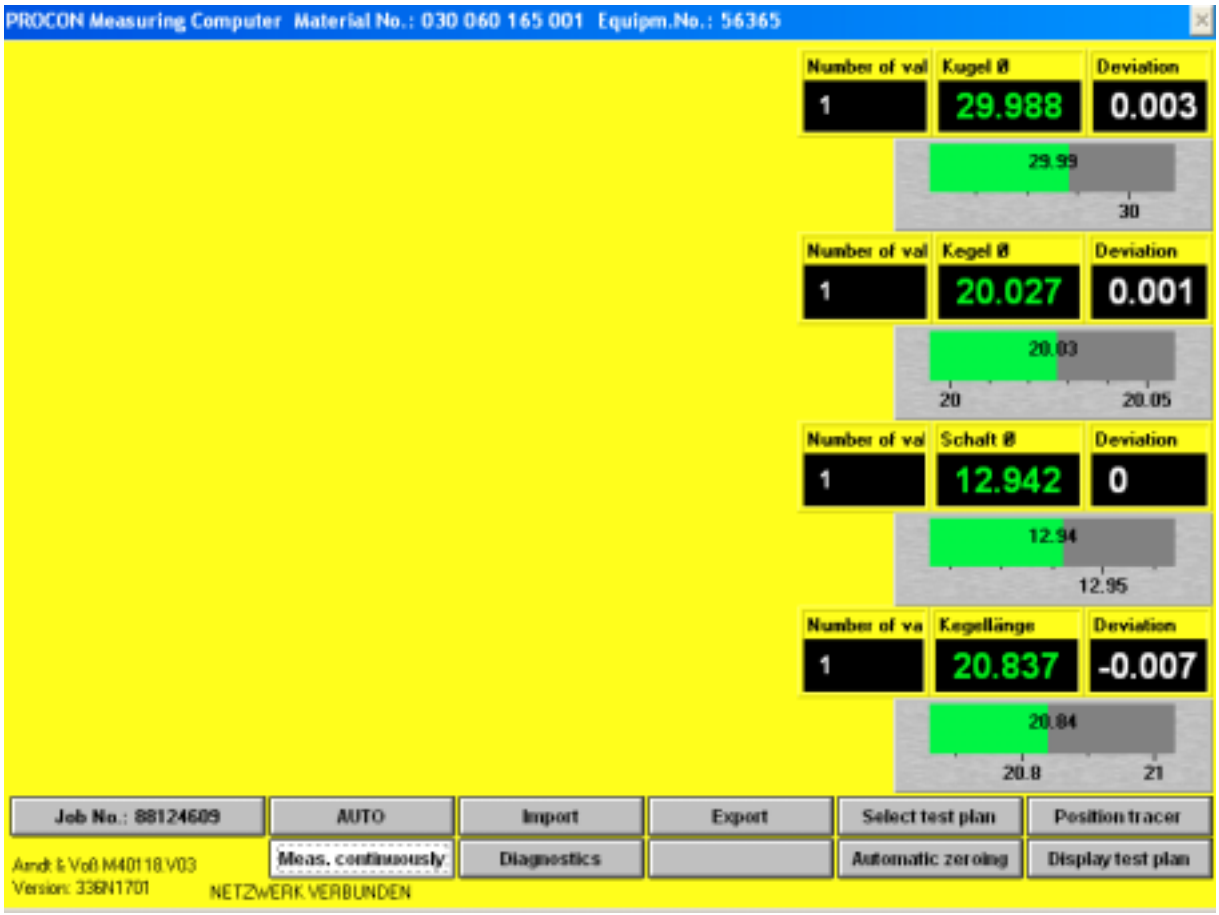
Measuring continuously
Measuring continuously = system check

To check the measuring device or to examine the shape of a workpiece, a measurement without signal exchange with the machine is frequently required. **Measuring continuously** provides the measurement with all combinations and consideration of the correction value of the function automatic zeroing. The result is the same as in the main function in AUTOMATIC mode.



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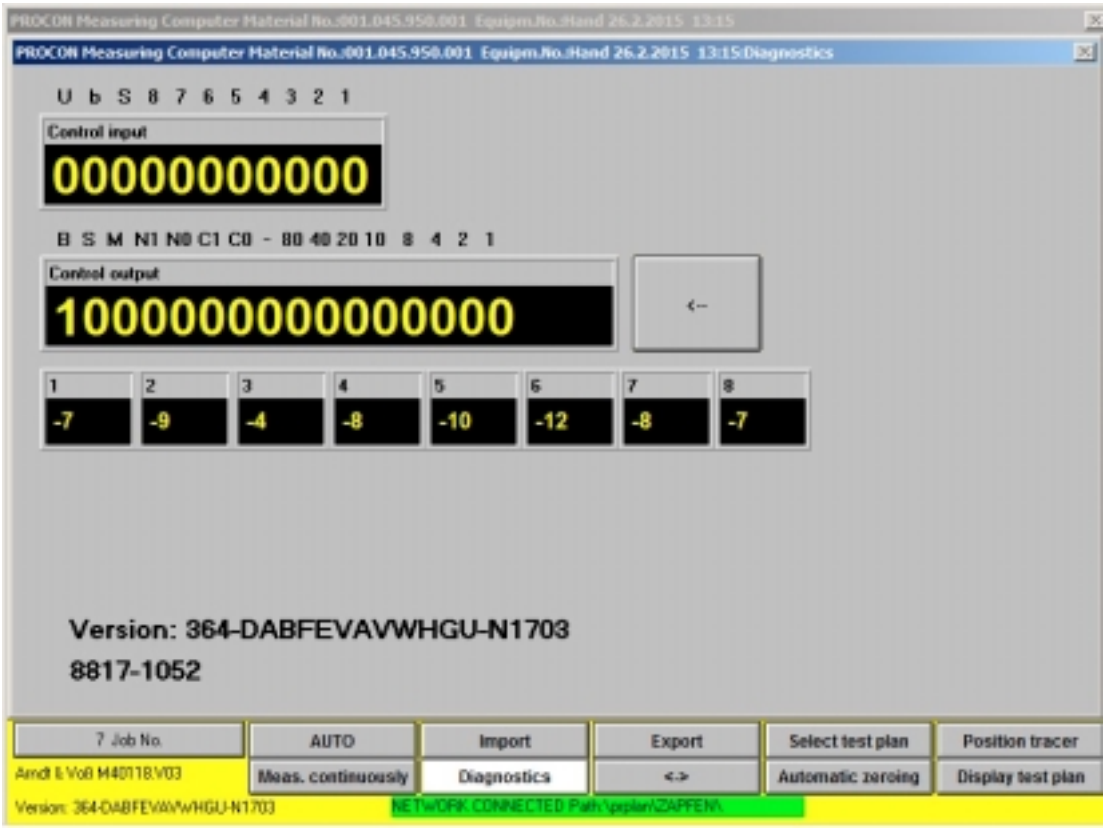
Diagnostics

The status of the control input is displayed (1= ON, 0 = OFF).
Left: Bit 10, Right: Bit 0

The control output may be switched bit by bit with the UP/DOWN function.
Left: Bit 15, Right: Bit 0

The unscaled values of the measuring inputs 1-8 are continuously being displayed.

The program version as well as the name of the measuring computer are being displayed.



Meaning of the diagnostics bits:

Control input:
1....8: start inputs SINGLE
S: collective start
b: not used
U: acknowledge Index/Neue Magdeburger
Control output:
1,2,4,8: binary correction value units digit
10,20,40,80: binary correction value tens digit
-: algebraic sign of the correction value
C0,C1: code bits 0,1
N0,N1: number of control interface Bit 0,1
M: values for Index/Neue Magdeburger are ready
S: control bit Samsomatic is ready
B: Procon BUSY

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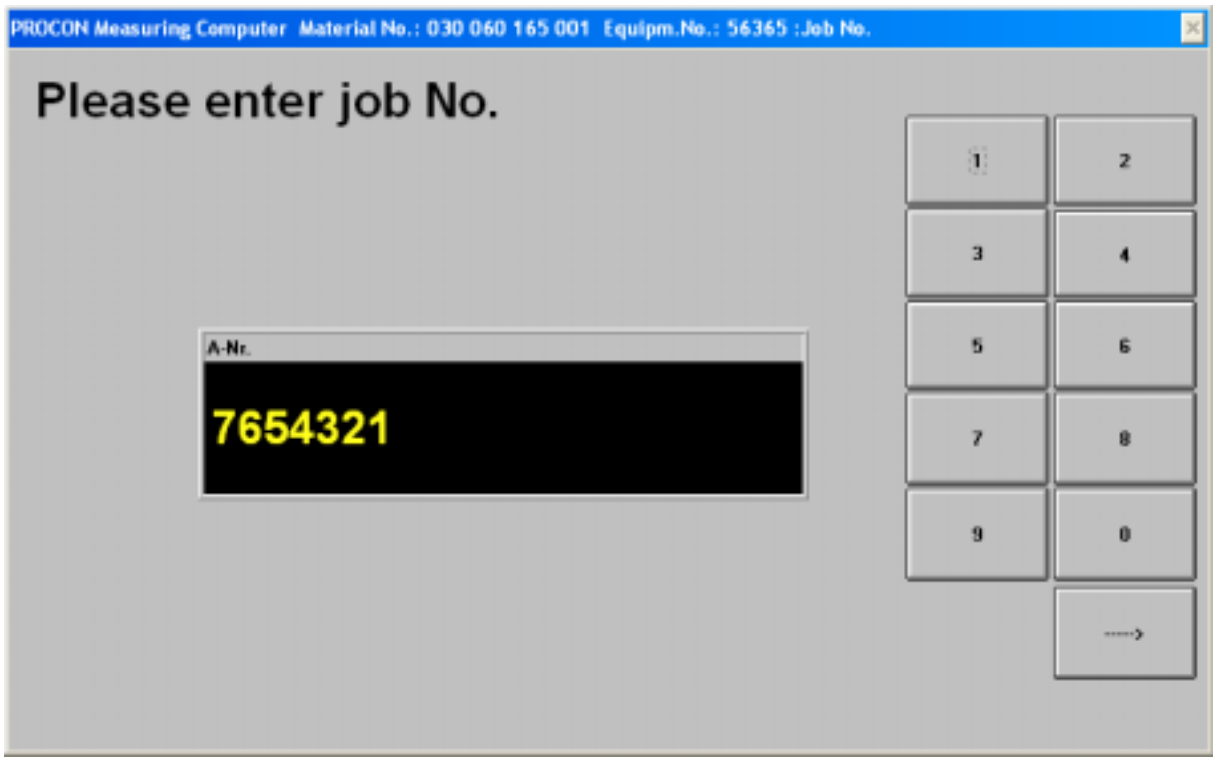
7. Entry of job number

By pressing the button "Job No." in the bottom left corner of the screen, the window for entry of the job number is opened. After entering and confirming the job number, it is saved and allocated to the subsequent measuring results.
Entering the job number is possible in the operating modes SETUP and AUTOMATIC.



Program option "V" offers the possibility of importing the job number from barcodes via barcode scanner. Please refer to the description under 10. (page 36).

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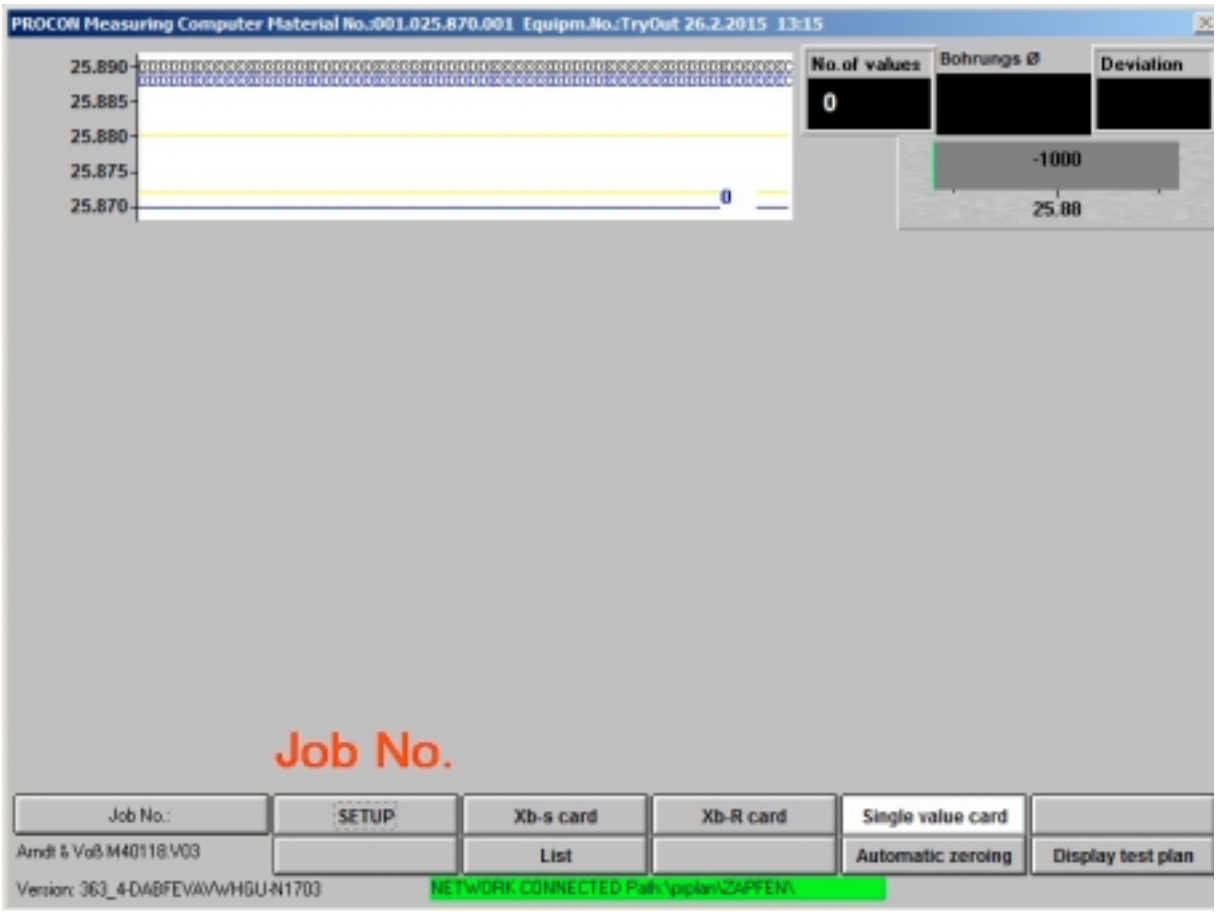
If no job number has been entered yet for the active test plan, the red message "Job No." appears.



8. Test plan/measuring value files

Import test plans:
The test plan created in MODAS/ProconNT format has to be in the root directory of the USB storage device. In the measuring computer, the files will be renamed according to the following pattern:
drawing/material number + index/equipment number.

Example:
drawing No./material No.: 039.543.123.678; index No./equipment No.: NU132
The file name will be: 339 543 123 678 NU132 (cf. page 16-17, test plan selection).

Export test plans:
All test plan files available on the measuring computer will be transferred into the sub-folder "prplan" on the storage device.

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Export measuring value files:
All measuring value files available on the measuring computer will be transferred into the root directory of the storage device. With option "N" (automatic network mode), the files are transferred automatically into the folder "mwerte" on the defined network when selecting a new test plan. In case a file with an identical name is already available, an error message is displayed and the file will **not** be overwritten. After a successful data transfer, the measuring value files will be deleted from the measuring computer and the measuring value counter will be set to zero.

PPQ5 measuring value format:
File name: contains machine identification, date/time, material/drawing No. and machine No. (cf. example)
File ending: CSV

File layout:
File name:
Example: ABx1y2nr_1507270815_006_003_002_001_151617.csv
Data from the file C:\daten\station.tol" in the measuring computer: ABx1y2nr
AB: machine identification
x1: machine No.
y2: No. of measuring location at the machine
nr: model No. = 01 (constant value)
Date/time: YYMMDDHHMM: 1507270815
12-digit drawing/material No. in groups of 3 taken from the test plan: 006_003_002_001
The format with number of digits as well as the separation with points or underscores is required.
Machine/equipment No. taken from the test plan: 151617

File content:
(Column separatior: semicolon) one row per measuring value
Column 1: material/drawing No. (OPTION "Q": drawing No. + index) (taken from the test plan)
Column 2: job No. (entry in the measuring computer; 12 digits)
Column 3: workstation (taken from the test plan; 10 digits)
Column 4: measuring device No. (deposited in the measuring computer. Text file "pmnr.tol")
Column 5: date/time
Columns 6 - 45: max. 8 measurement points with 5 columns each. In case of less than 8 measurement points, the column separators (semicolon) are still set for 8 measurement points.
1. UL = upper limit (taken from the test plan)
2. LL = lower limit (taken from the test plan)
3. UCL = upper control limit (taken from the test plan)
4. LCL = lower control limit (taken from the test plan)
5. measuring value

Example:
Material/drawing No.;job No.;workstation;measuring device No.;date/time;MP1 UL;MP1 LL;MP1 UCL;MP1 LCL;MP1 measuring value;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
001.045.950.001-Hand;1234;Hand;33003;26.09.2016 16:29:41;46.000;45.900;45.990;45.910;46.051;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
MP = measurement point

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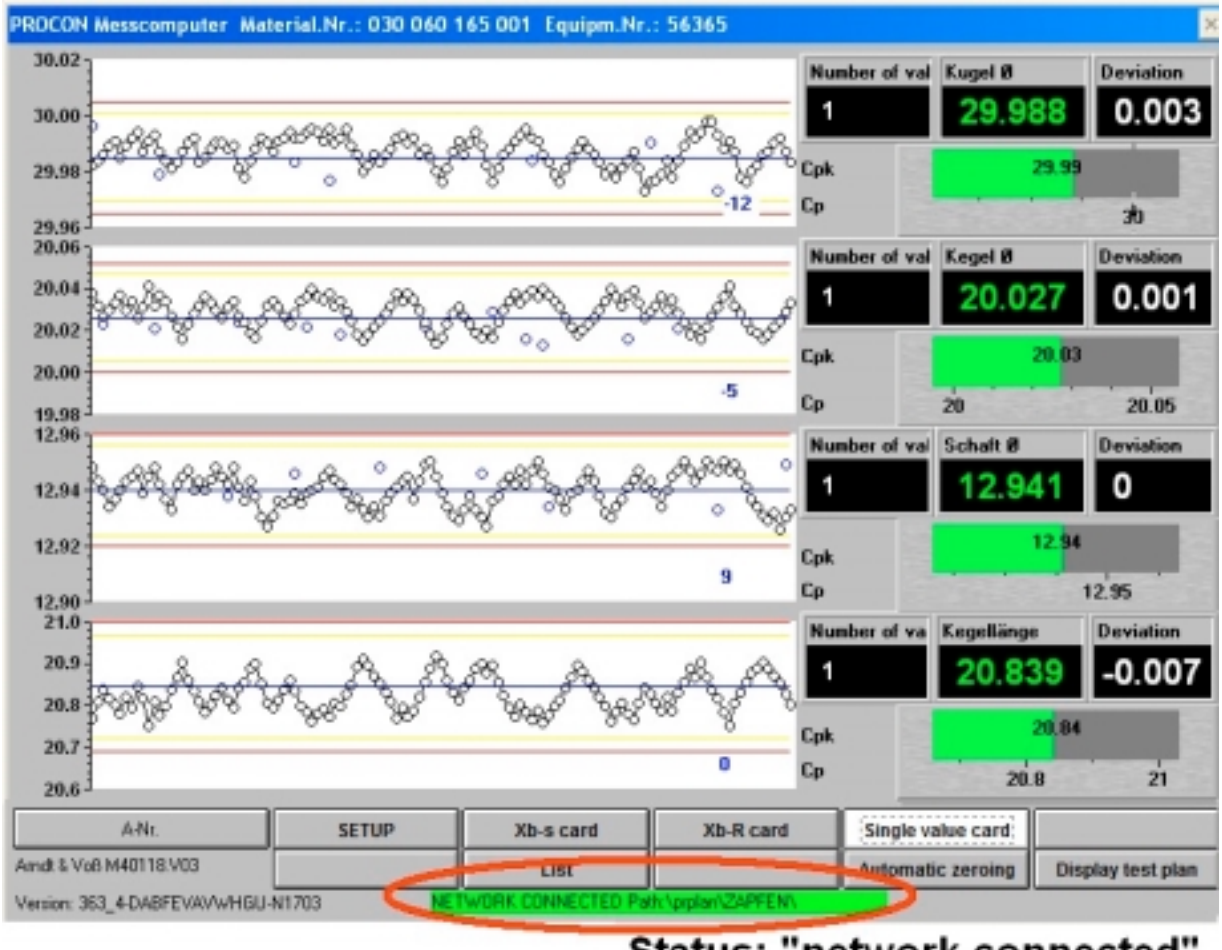
9. OPTION: network connection

If the PROCON measuring computer contains option "N" (automatic network mode), the status "network connected" or "network missing" is shown at the bottom of the display. If the network is connected, the defined network path is displayed as well.

The defined network path must lead to a location in the network which contains the two folders "prplan" and "mwerte". The folder "prplan" may contain sub-folders for different test plan groups. In the example photo below, the test plan group and its respective sub-folder are called "ZAPFEN". The test plan group may be defined as described on page 27. Test plans will then be imported from the respective sub-folder of that test plan group from the network. Via the "Export" function in SETUP mode, measuring value files are directly saved onto the network, namely into the folder "mwerte" (cf. page 27).

Network functions

- Automatic query and transfer of new or changed test plans from the QS server when starting the program or when selecting "Automatic zeroing".
- Automatic saving of measuring values on the QS server under "Upload test plan".



Status: "network connected"

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10. OPTION: Import of job number and selection of test plans via barcode scanner

This program option makes it possible to import job numbers from barcodes via barcode scanner. The barcode scanner is connected to the PROCON measuring computer via USB interface. The barcode information is read and imported by the measuring program.

Apart from importing the job number, the enhanced option "+V" makes it possible to select a test plan by scanning its drawing number from a barcode. As several test plans may be available for one material number which are only distinguished by the equipment number, an unambiguous assignment is necessary. This is achieved by storing the equipment number in the PROCON measuring computer. A plausibility check of the scanned data is carried out.

11. Connection schematics

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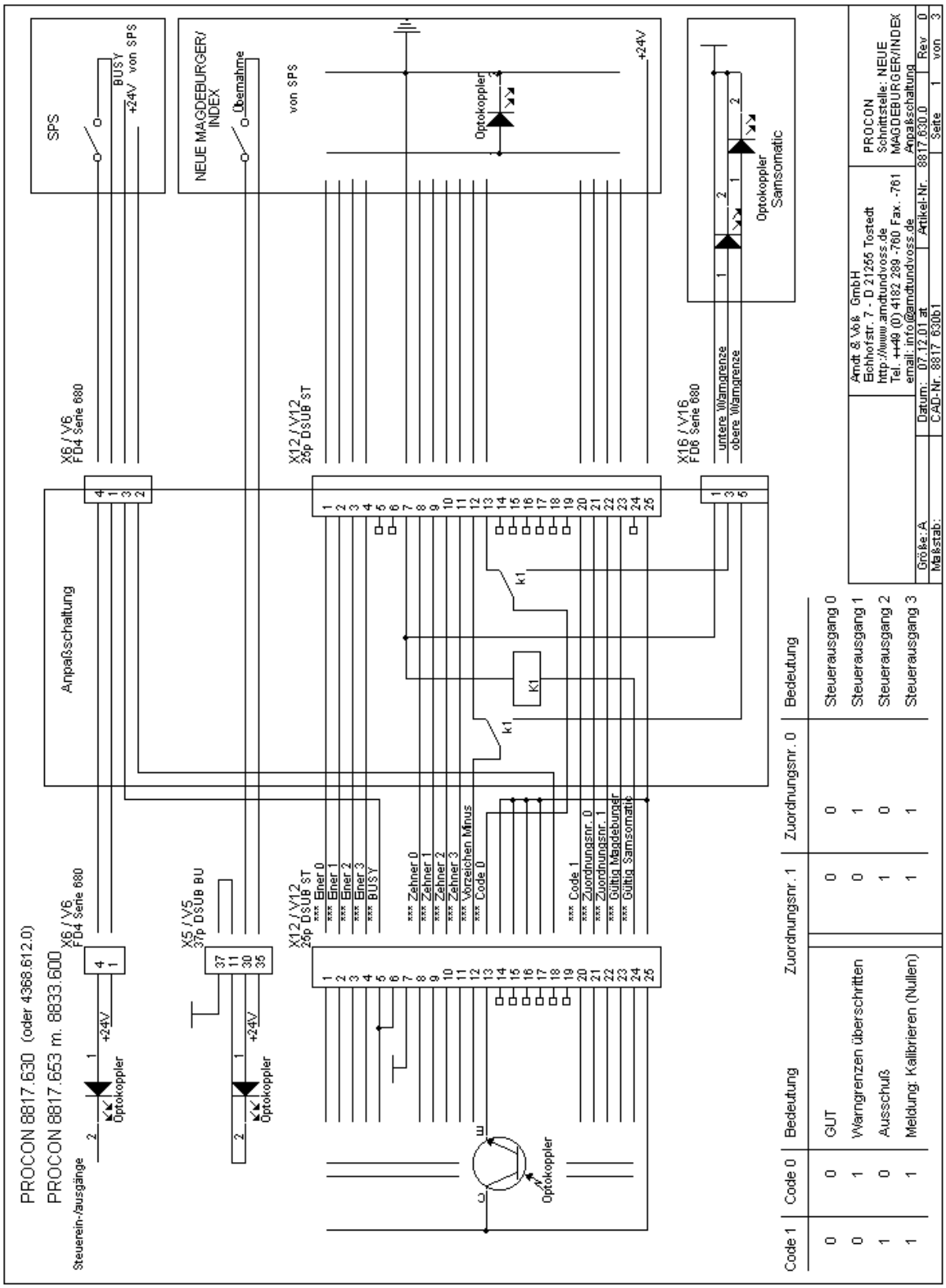

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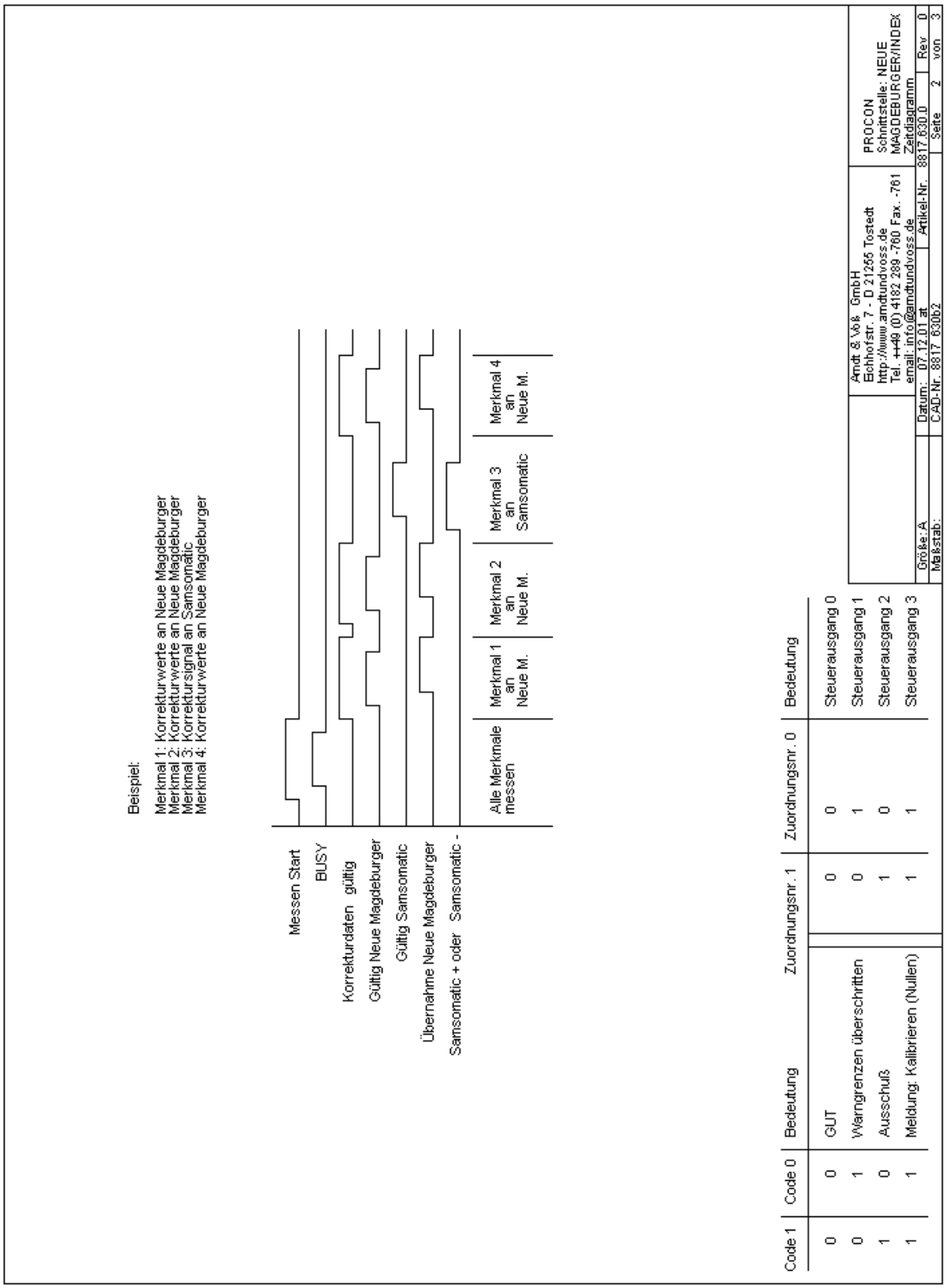

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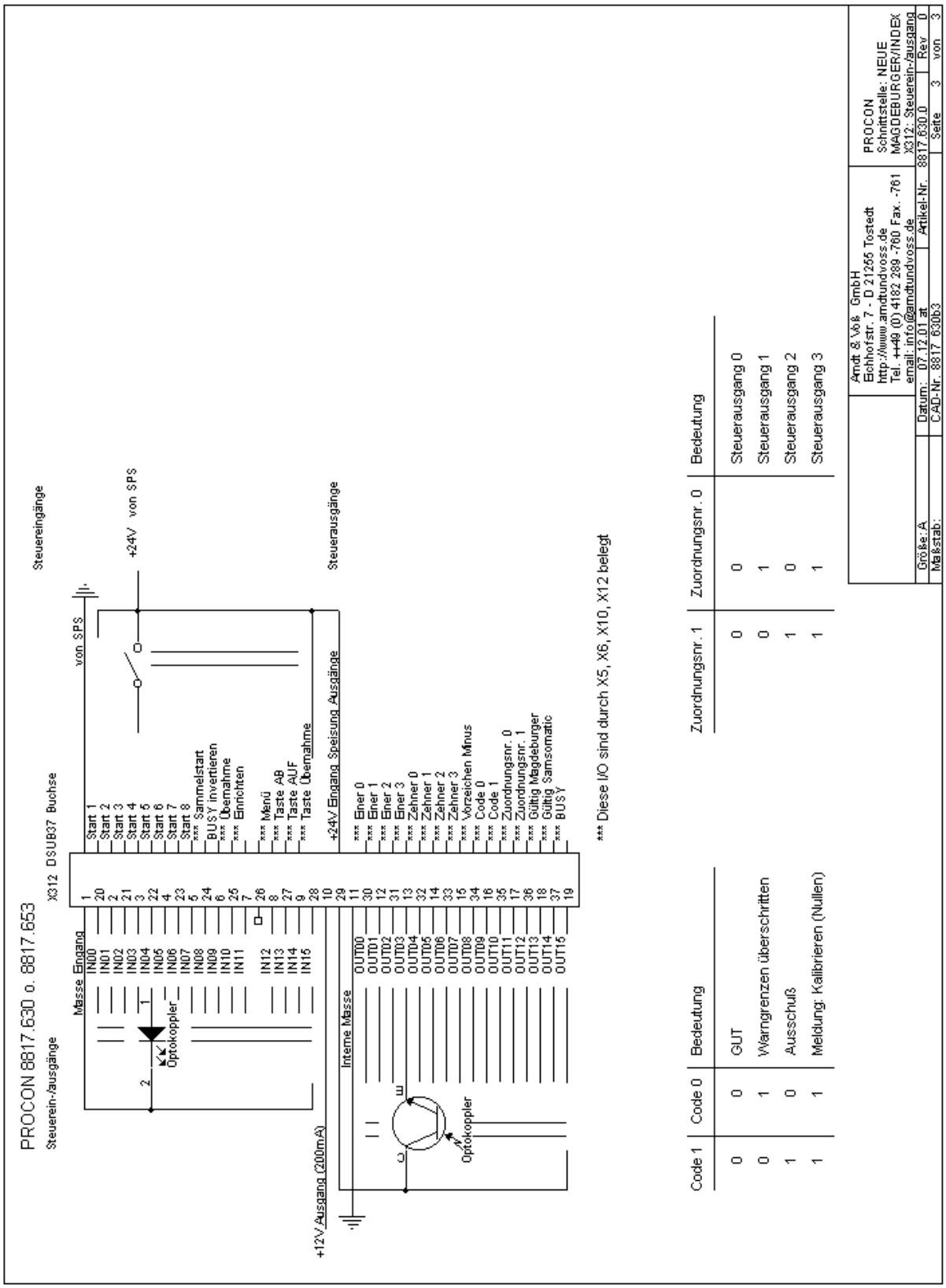

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Security instructions according to VDE 0411

time for warming up	20 minutes
temperature	0...+40 degrees C
atmospheric humidity	up to 75% rel.
frequency	50/60 Hz
power supply voltage	115-230V +10%, -15%
security	according to VDE 0411, protection class 1

This unit was built and checked under DIN 57411 part 1/VDE 0411 part 1 and left the factory in a safe and perfect condition. To preserve this condition and to guarantee a safe working the user has to follow the comments and warnings which are given in these instructions. Before turning on the power, you have to make sure that the voltage of operation and the mains voltage correspond. The mains plug may only be inserted into a socket with ground contact. The safety effect may not be abolished by an extension lead without ground connection. The opening of covers or removing of components, except if it is possible to do by hand, might uncover parts or connections under dangerous voltage. Racks may only be used inside a cover. If an adjustment, a maintenance or a repair at the opened unit under voltage is unavoidable, it may only be done by a qualified employee, who is well acquainted with the dangers involved.

ATTENTION:
After the end of those works, the unit has to be checked according to VDE 0411, part 1. You have to make sure, that only fuses of the given type and values are taken for replacement. The use of mended fuses or short-circuiting them is inadmissible. If it is presumed, that a safe working is not possible, you have to take this unit out of work. Safe work may not be possible, if
– there are visible damages at the unit.
– the unit does not work.
– after longer storage under unfavourable circumstances.
– after heavy stress of transport.

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