

## **X. Inspection program QM-SCALE**



### **X.1. Introduction**

The QM-SCALE program serves as a computer support program for the inspection of graduated steel rules according to DIN 865, DIN 866, BS 4372 as well as the inspection of measuring tapes according to DIN and European standards. An inspection according to customised factory standards is also possible.

The use of the program itself, however, requires little knowledge of computers. An extensive help text as well as the integration of thorough safety measures ensures quick and simple operation of the program.

Measurement data can be entered through an on-line measuring machine or on the keyboard. When using an on-line measurement device, the connection between the device and the computer is realised by one of the serial ports of the computer (V.24, RS-232) or by a PC interface card.

The following standards form the basis of the evaluation:

- Graduated steel rules acc. to DIN 865
- Graduated steel rules acc. to DIN 866
- Engineers steel measuring rules acc. to BS 4375
- Measuring tapes acc. to DIN 6403
- Measuring tapes acc. to EG 737/362

The program QM-SCALE can be started directly out of the database program QM-MANAQ - also offered by L&W GmbH - and provided with initial data (such as ID-number, measuring range and graduation of the product to be inspected etc.), in this case the inspection results are directly transmitted back to the database.

### **X.2. Program start**

You can start the QM-SCALE program directly from the QMSOFT-command-Shell (click the corresponded symbol in the shell). The other way is to start the program through the WINDOWS-explorer.

Especially at the first start of the program you should check some basic parameters of the program. See the next section for this

### X.3. Program settings

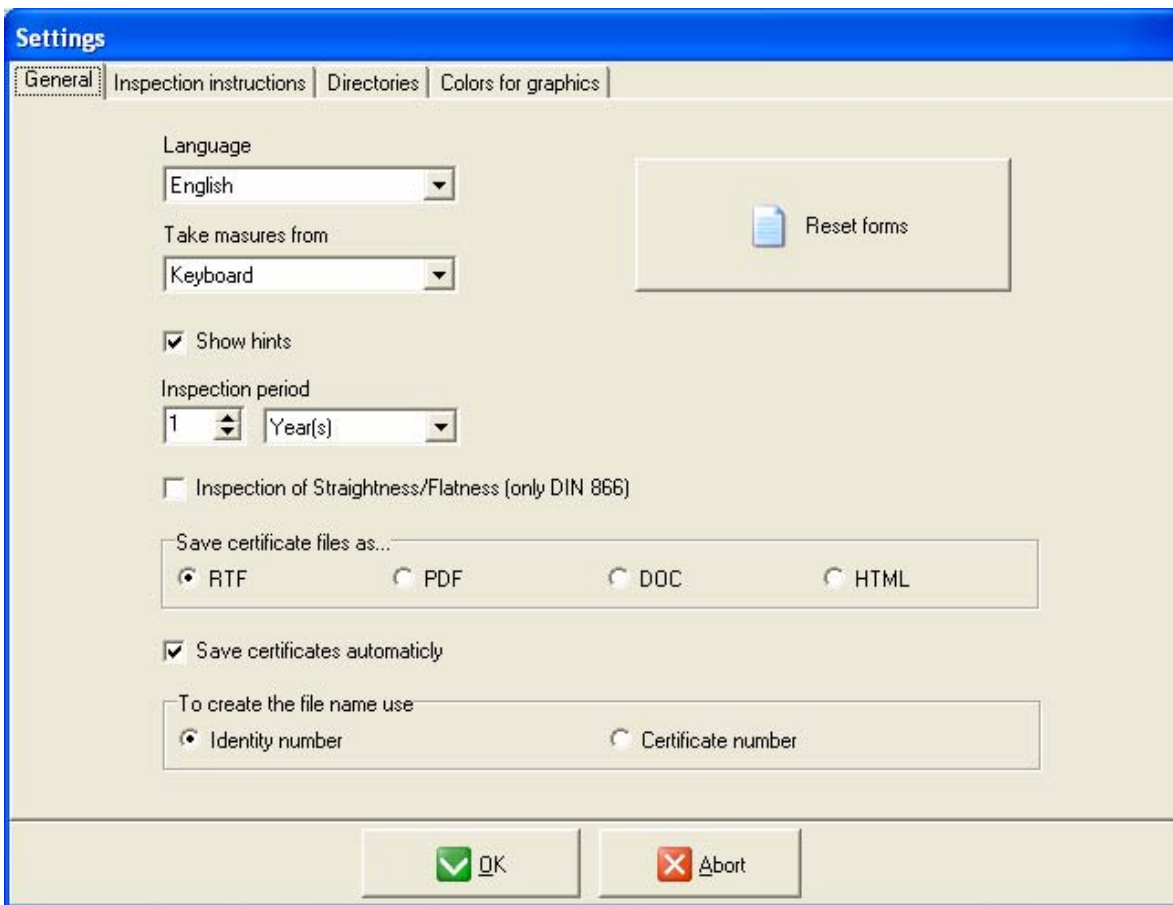
Working with the program you should make different settings to define the program environment and especially program conditions. Use the menu "Settings" to do this.

#### X.3.1. "Settings | General settings"

Using this option you have the following registers to change program settings:

##### **Register "General"**

Here you can choose the program language, switch on/off the help text and select the default source to enter measuring values.



**Figure:** general program settings

Using the option "Save certificates as RTF File" any calibration certificate will be saved into the "Certificate directory" (see register "directories"). The file name will be created by using the first 8 characters of the gauges identity **OR** the certificate number.

The "Reset forms" button will reset all screen positions to the original condition otherwise each screen will be shown on its last position.

##### **Register "Inspection instructions"**

Here you can enter for each gauge type a reference to a corresponded text file including the inspection procedure as a text. Enter your own text for the procedures here.

### Register “Directories”

For some functions (indicating of measuring values; creation and edit of certificate layouts) external programs will be used. Here you have to enter the directory where the corresponded program can be found.

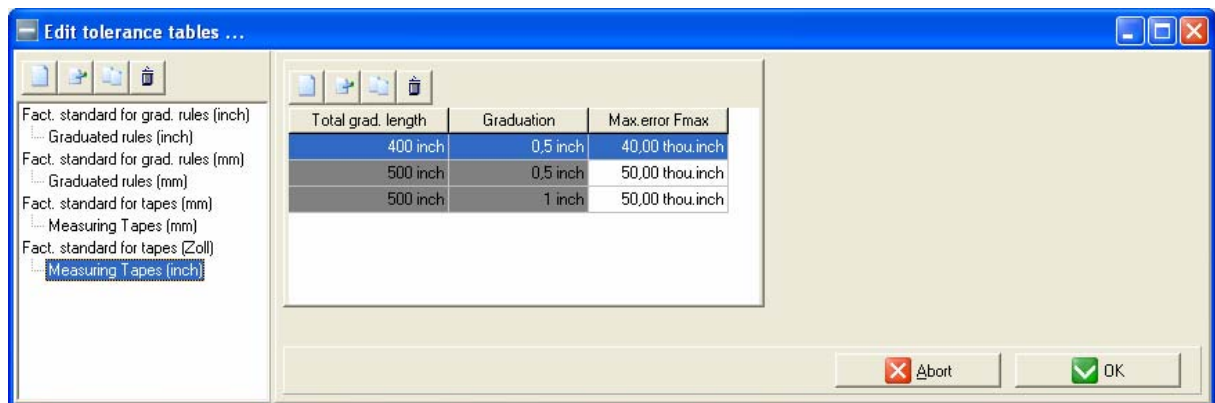
While doing the program installation all directories will be set to a correct value !

**ATTENTION:** Make sure that this entries are correct. Errors while operating the program may be caused by incorrect settings in the screen “Directories”.

### Register “Colors for graphic”

Inspecting a steel rule or a measuring tape you will get a calibration curve on the screen which you can also print out on your certificate. Here you can set the colors for the graphic elements.

### X.3.2. “Settings | Factory tolerances”



**Figure:** Entering of factory tolerances

If you have chosen the option "Factory tolerances" a list of already existing tolerance tables (see Figure) will appear on the screen.

Here you can insert new tolerance tables, delete existing tables and rename it. If you want to change existing tolerance entries select the wished tolerance table and press the "Edit" Button.

The tolerance table will be saved in the file "**MASTAB32.XML**" in the directory "**..\QMSOFT32\MASTAB32\_Settings**". When doing a steel rule inspection according factory standard this values are used for the valuation of the scale rule or tape being inspected.

The entered values are related to the "Total graduation length" and the "Graduation step" of the steel rule.

If you want to do a steel rule or measuring tape inspection acc. to "factory standard" make sure that a corresponding tolerance entry is available. Otherwise the "Continue" button will be locked.

## X.4. Certificate layout files

The program QM-SCALE gives you the possibility to customise the layout of your calibration certificate. The layout of the calibration certificate is based on a so called "Certificate layout file". This file contains all information about the form of the certificate and the values should appear in this. By editing this certificate layout file you can change the layout. Saving this file with another file name give you the possibility to work with different certificate layouts.

All this certificate layout files you have created will be saved in the "Certificate directory" you have set. The files have always the extension ".L32".

Using the option "**Certificate layouts | Show/Edit a certificate layout**" you can load such a layout file into the editor program.

**ATTENTION:** Do not open a certificate layout file ("L32" extension) directly with any other program. In this case the program depended fields will be removed and the file may be destroyed !

A certificate layout file is consisting of three different types of information:

- "normal" text: is text information just like in a known text processing application; you can change the text as you want and you can set the different text parameters;
- "Placeholders" ("Fields"):  
A "Field" is including variable information about the gauge, the measuring process or the measuring environment. A "field" will be fulfilled with the actual information while executing the program. Editing a certificate layout file you can change a "Field" 's position, deleting a "Field" (if you do not need the related information) and insert new fields.  
To insert a new "Field" in your certificate layout use the menu "**Insert | Fields**". Using this menu you can see all available "Fields" and the related information.  
Using the option "Field properties" you can set the format of a numerical field.

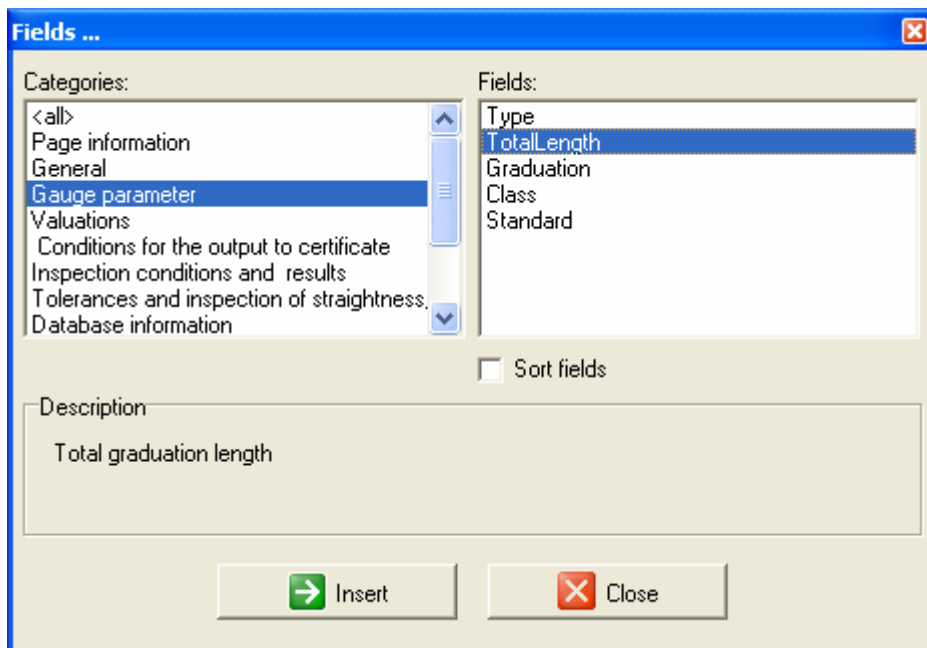


Figure: Dialogue to insert „Fields“ in a calibration certificate

- "Line conditions":  
A line condition gives you the possibility to control the certificate layout in dependence of different program situations. A text or field following to an condition will be printed out on the certificate only if the complete condition is "true".  
For example you can print a special text only if the inspection of a steel rule according to the "British standard" was done. Please open an existing certificate layout and see the comments for the "Line conditions" available.

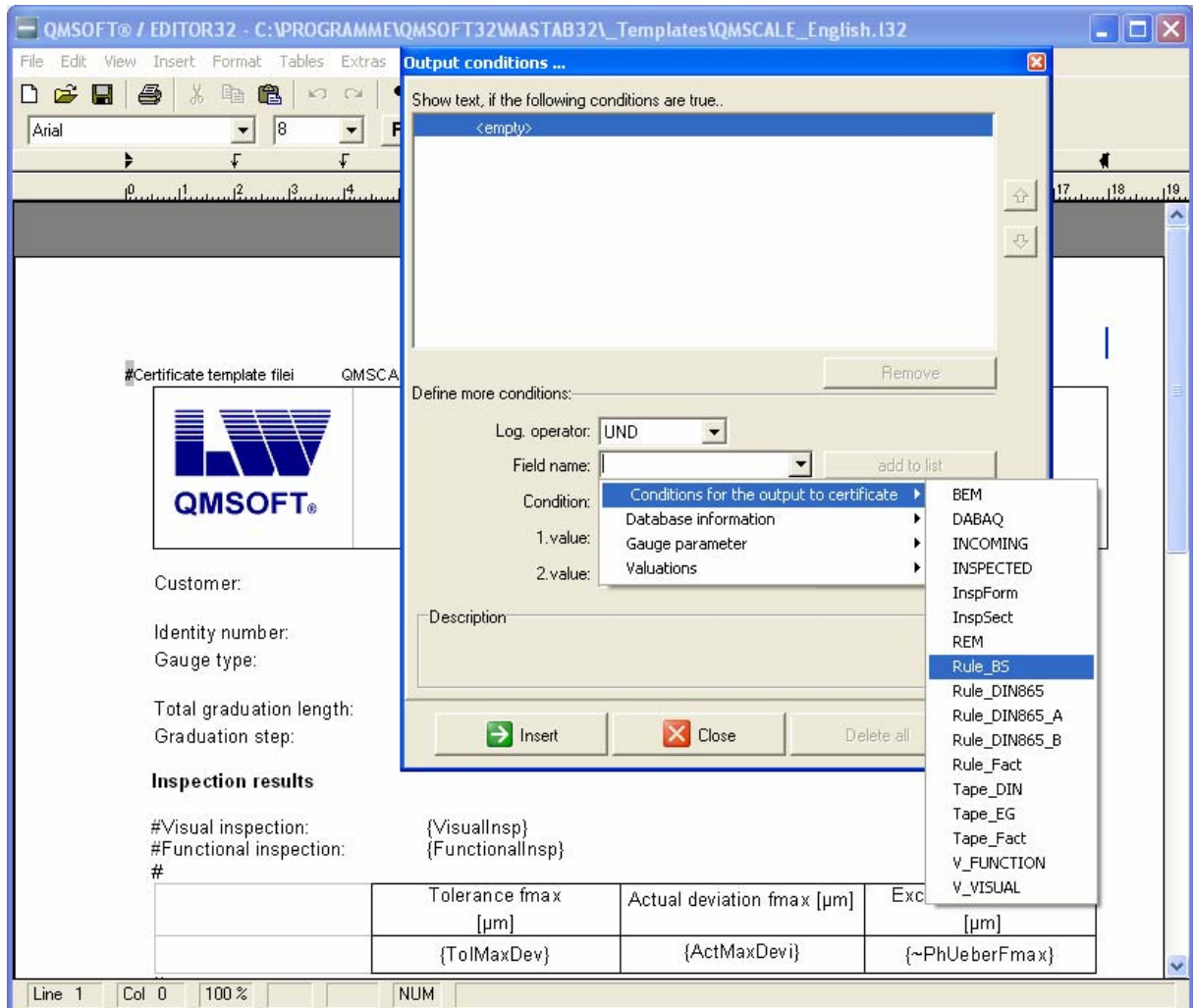


Figure: Setting of conditions for the output on the calibration certificate

To set a condition for the certificate output select a condition from the list as shown in the figure. Click now at the "add to list" button to move the condition selected to your "condition list". If required you can combine more conditions by using either the "add" or "or" operator to create more complex conditions. If your "condition list" is finished (in the most cases this list will contain only one element") use the "Insert" button to insert this condition in you layout file.

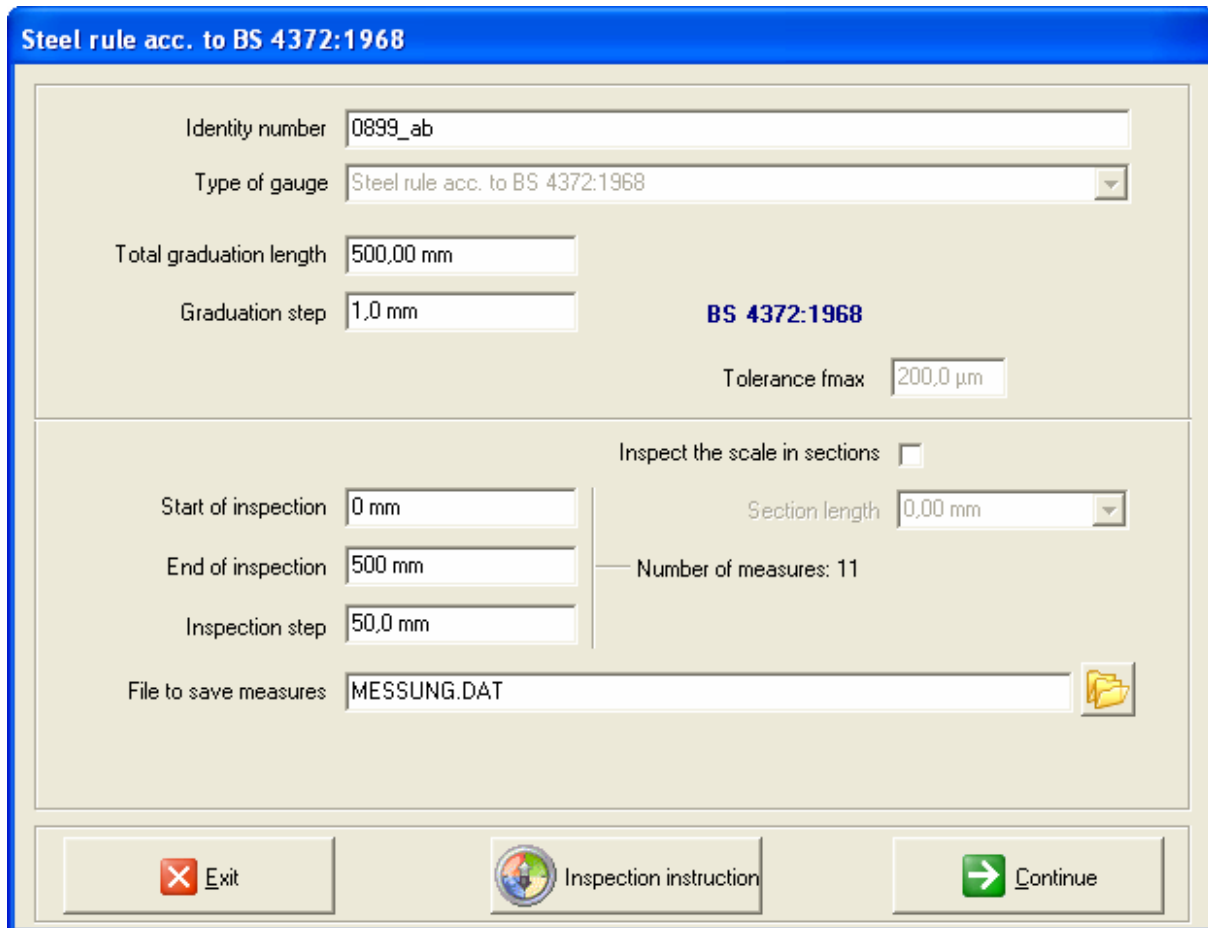
A condition you have set will be valid until the condition is set in your certificate. This may be also an "empty" condition if the text following has to be printed out at any time.

## X.5. The calibration process

### X.5.1. Entering of parameters

After selecting the type of steel rule or tape in the main menu a series of parameters must be entered that describe the gauge and the inspection conditions. The input of these parameters is done in a separate dialog box with a corresponding number of input fields.

NOTE: When starting the program through the QM-MANAG gauge management system the basic parameters of the gauge will be taken over from the gauge database.



**Steel rule acc. to BS 4372:1968**

Identity number: 0899\_ab

Type of gauge: Steel rule acc. to BS 4372:1968

Total graduation length: 500,00 mm

Graduation step: 1,0 mm

**BS 4372:1968**

Tolerance fmax: 200,0 µm

Inspect the scale in sections: ☐

Start of inspection: 0 mm

End of inspection: 500 mm

Inspection step: 50,0 mm

Section length: 0,00 mm

Number of measures: 11

File to save measures: MESSUNG.DAT

Exit | Inspection instruction | Continue

**Figure:** Entering of parameters

- Identity number:** This field is used to establish an identity for the steel rule or measuring tape by entering a number. This number will be noted in the record.
- Type of gauge:** Shows you the selected type of gauge.
- Total graduation length:** In this field the total length of the rule graduations in "mm" should be entered or chosen from the list of options provided. Make sure to check the validity of the norm selected.
- Graduation step:** In this field the distance between two successive graduations must be entered in "mm" or chosen from the list of options provided. Make sure to check the validity of the norm selected.

- Start of inspection :** The start of the inspection corresponds with the nominal values to be entered for the graduated steel rule to be inspected (in mm) for the input/transfer of the first measurement value.
- End of inspection :** The end of the inspection area corresponds with the nominal values to be entered for the graduated steel rule to be inspected (in mm) for the input/transfer of the last measurement value.
- Inspection step:** The inspection step is the distance between two successive measuring values in "mm".
- File to save measures:** The name of the data file in which the measuring values shall be saved must be given. That file makes a repeated evaluation possible without a new measuring.

**NOTE:** If the "continue" Button is disabled you will get a message about the reason for it. In this case correct the related parameters.

#### **X.5.2. Entering of measuring values**

The input of the measuring values must be done in the order: measuring value 1 to n for increasing readings. The valid inspection pace is displayed. The measuring values are inspected on their plausibility and rejected in case that the deviation is more than half of the value of the valid inspection step.

##### **a) Input of measuring values using the computer keyboard**

The input of the measuring values has to be given as deviation values from the nominal values (incorrect-correct) in micrometers! This minimizes the keystrokes. The measuring values must be put into a separate field, which is marked with a special input request.

##### **b) Input of measuring values via a measuring machine**

The on-line data input via a measuring machine is the most effective form of inspection. Some handling actions depend on the used measuring machine (see the corresponding producer documentation). The transfer of the data has to be started at the measuring device (handle or pedal).

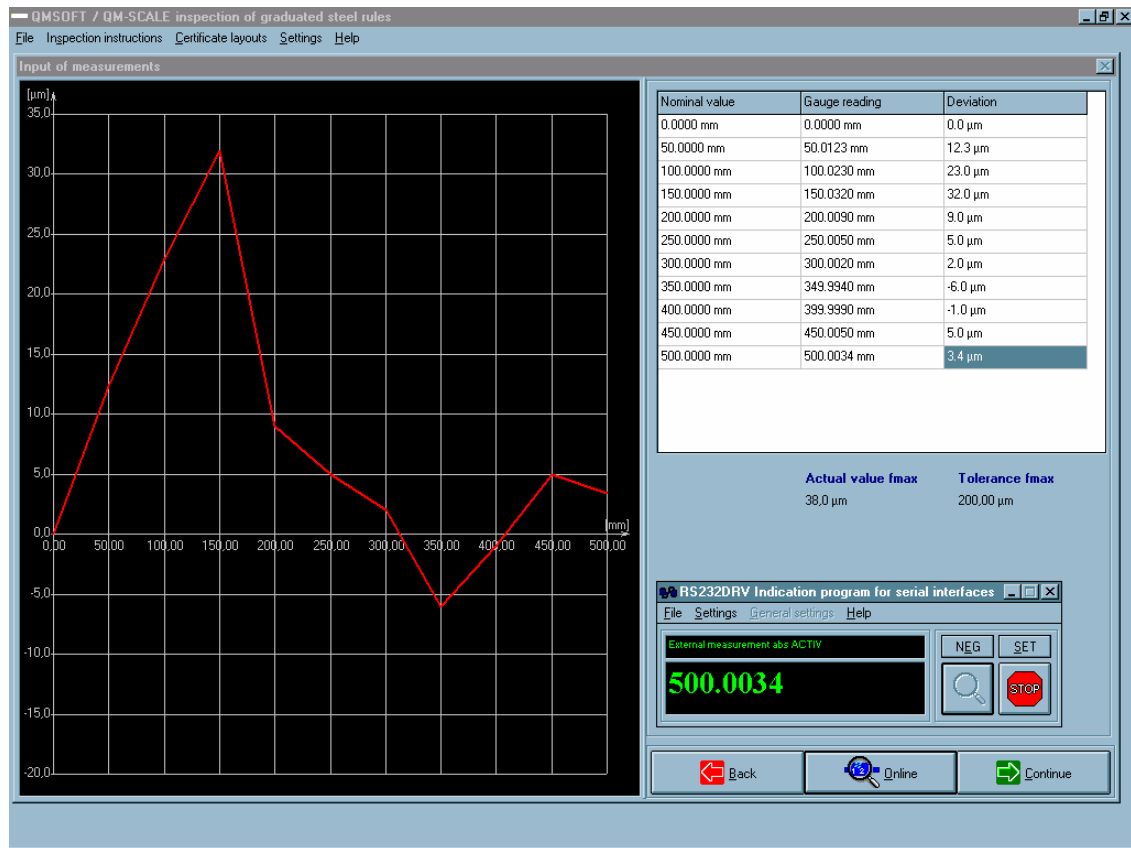


Figure: Entering of measuring readings

### X.5.3. Evaluation of the measurement

The evaluation of the measuring values includes the computing of the parameter  $f_{\max}$  according to the definitions given in the DIN-standards:

$f_{\max}$  total deviation range as distance between the maximum and the minimum value in the deviation graphic.

Whether the data is inside the tolerance range is evaluated according to the following criteria:

- at inspections according to DIN 865 / 866-standards the standardized tolerance ranges are obeyed concerning total deviation range and graduation step;
- at inspections according to factory standard specifications the tolerance range is only evaluated if total deviation range and graduation step of the inspected rule correspond to an entry of the user defined tolerance table (see Function F7);

The result of the tolerance evaluation is printed in the result listing.



## X.6. Output of results

After entry of the measurement data has been completed, the screen "*End of inspection*" will appear.

**End of inspection**

Calibration certificate number  
2005-05-31-0012

Customer  
Flintstone Company

Valuation  
in tolerance

Notes

Inspection date: 28.06.2005    Next inspection date: 28.06.2006    User: Freddy

Certificate layout  
QMSCALE\_English

Edit certif. layout

Show certificate

Print certificate

Back    Go to main menu

**Figure:** End of inspection – show/print certificate

If the inspection is finished you get the screen shown above. The summary result of the inspection is shown. Here you can enter the name of the customer, the date for the next inspection and also some remarks to the inspection.

Before creating the calibration certificate you can change the "certificate layout" file will be used. To start the output of the results press the "Show certificate" button.

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