

# **Software "DIALTEST"**

## **Version: 7.1**

**User Handbook**

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## INTRODUCTION

### Hardware and Software Requirements

The installation of this programme requires:

- A computer with Microsoft Windows Vista / 7 / 8 (32 or 64bit)
- Recommended minimum graphics resolution: 1900 x 1080
- Minimum 2 GB RAM
- USB Port for software protection dongle

#### Optional measuring instruments required:

- USB Camera: USB 3.0
- Image Processing Card: PCI-Bus Slot + PC power supply terminal
- MFP Control: USB 2.0
- MFP 30/100: RS232
- OPTIMAR: RS232
- AE1IH: RS232
- BMD: 2 x USB 2.0

#### Software Requirements:

- Microsoft EXCEL (from Version 2007 onwards) for report creation.
- PDF “Docuprinter” for the conversion of the Excel test certificate into PDF format.

#### Product Contents / Terms of Licence:

- Single user licence DIALTEST.
- Software protection dongle or camera with integrated licence number.
- Programme CD or USB stick with installation programme, drivers and documentation.

DIALTEST requires a permanently connected USB dongle with an integrated licence number. The licence number determines the permitted range of functions of the software and the supported test equipment. If required, this can be extended to meet individual requirements. For equipment with camera support, the camera number can be used as the licence number. In case of dongle or camera defects, the respective licence rights will be replaced free of charge, upon receipt of the failed goods. **In the event of loss, any claim is invalidated!**

The coupling with Excel is enabled via a Microsoft data interface. This function will only be guaranteed when Excel and PC are included in delivery and no other access restrictions are established. A free test programme (MTK\_VIEW) allows users to test the functionality of the data interface with their current PC/Excel version.

### Installation and Start-Up Procedure

User administration rights are required in order to install DIALTEST. Start the file: [dt7-setup.exe](#) in your chosen language from the CD or USB stick, then select your desired pre-configuration and location in the installation programme. Corresponding icon links for the software will then be installed on your device’s desktop and in the programme menu.

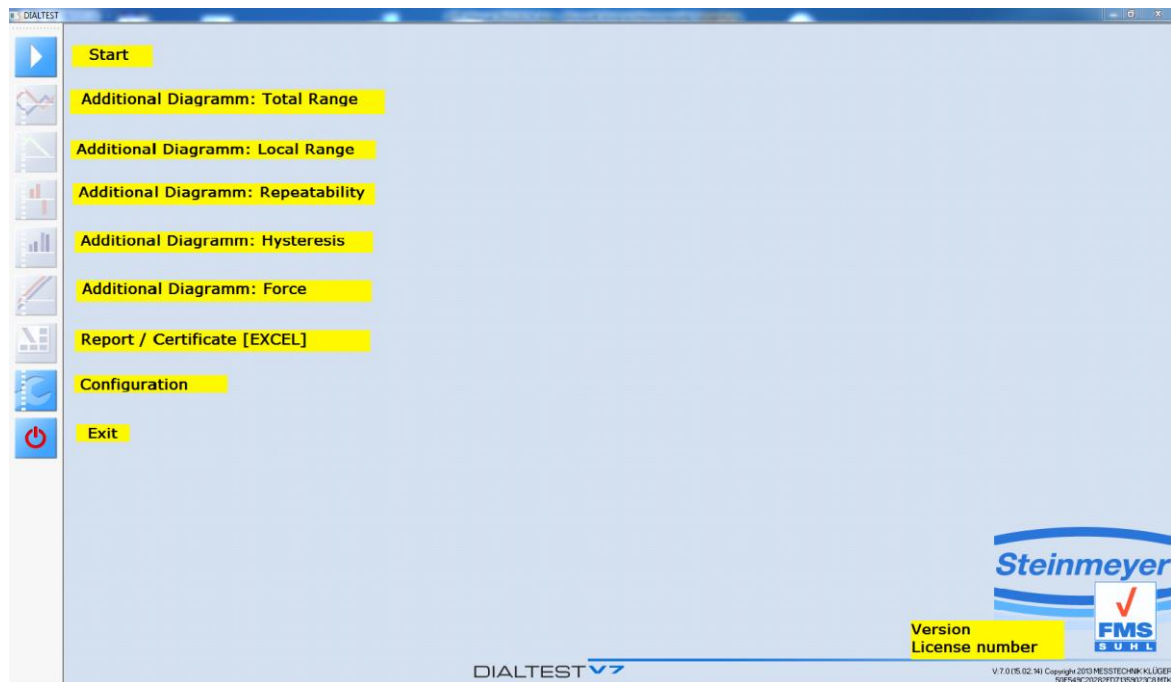
*DIALTEST separates programme files (in the Windows programme directory), data files (in a predetermined file folder or network drive, for example C:\DIALTEST\) as well as user settings (in the registry from the local user). During the installation, all necessary files, examples and user setting specifications will be automatically copied. Under certain conditions, copying of the folder “DIALTEST” may be hindered (administration rights are necessary). The programme will then report an error when accessing the database. In this situation the subfolder must be manually copied from the installation CD. Once the DIALTEST installation is repeated, the “old” version of the programme will be overwritten.*

It is also possible to use more than one "cfg-files" for different configurations of the software on the same computer. The programme must then be started with an additional parameter.

*Example:*

<b>Start of Programme</b>	
C:\Program Files (x86)\DIALTEST\DT_ger.exe C:\mynew.cfg	

Before using the camera and / or the controls, the related manufacturer's driver packages should be installed. A specialised USB Stick or the camera unit should be used for software protection. The related licence number will appear in the lower left corner upon starting DIALTEST. Once the test equipment is installed, the next step is to set up the preferences through **Programme Configuration** (see chapter: Equipment Configuration).



## Operation

### Overview

The main functions of the programme are selected from the toolbar on the left-hand side. Grey shadowed panels are locked and will only be activated during the appropriate programme status. This handbook describes the features, the specific hardware and the related licence activation conditions.

A complete test is always composed of two parts – the preparation of the test and the actual test. In addition to the enormous variety of test equipment, there are also numerous standards and regulations to check. This makes it practically impossible to provide all the programme user's test plans. The software contains a number of pre-prepared test plans, which can be used or quickly altered. These are known as "parameter files".

If a new test is required, the user has three options:

- **The creation of a new test schedule**  
All test parameters must be selected and installed by the user.  
*(As a template for a new test plan, the parameter file "...system/new.par" can always be used).*
- **The choice of a pre-prepared parameter file**  
In this case, a pre-existing test schedule can be used as is, or tailored to individual requirements.
- **The selection of an existing data file**  
This option involves a test that has already been carried out. The test plan is extracted from the file, while the original data remains unchanged. This method is highly recommended for when a piece of equipment requires repeated testing.

In each of these options, the test schedules can be used identically or amended before use. A new test schedule can be saved at any stage as a new parameter file under any name, or an existing parameter file can be overwritten.

By clicking on the "OK" field, the test schedule is ended and the actual test opened. A corresponding window shows all the important information about the current status and results. Depending on the type of test assignment, extra windows for camera or digital value displays will also be automatically shown. During the test, additional diagrams may also be shown.

Via a corresponding panel, the current results are then exported into an Excel table, where they can be printed as a test certificate. The field "FINISHED" ends the test dialogue and saves the results.

In order for a present test to be opened, the test schedule dialogue must only show the selection "open inspection...open data file". The list shows all the available test files. In comparison with the selection "new inspection", the test schedule can only be read, but not modified. By clicking on the "OK" field, the test schedule is shown again, this time with all the already validated characteristic values. The test can then be continued or repeated. Saving is only possible under the already registered file name.

## TEST PLAN



### Selection

The creation or use of a new test plan will generally be conducted via an existing test schedule. By activating the field “**new inspection.... new from parameter file**”, in the file list, all available types and standards of parameter fields will be shown.

file	type of scale	range	graduation
bmd-13mm.par	->	0.140	1.0
bmd-40mm.par	->	0.140	1.0
bmd-41mm.par	<->	0.140	1.0
bmd-41_testmm.par	<->	0.140	1.0
bmd-6mm.par	->	0.140	1.0
bmd-81mm.par	->	0.240	1.0
bmd.par	->	0.170	1.0
bmd-relativ.par	<->	0.122	1.0
bmd-relativ_KB.par	<->	0.122	1.0

Should the list, through the creation of further parameter files, become too long, it is possible to jump to the correct list position by entering the first letter of the file name into the input line. It is also possible to limit the number of list elements through the filter function.



All of these device types can be pre-set with a description, a photograph and the test direction. Test direction “A” is the normal measuring direction for the majority of test equipment. Test direction “B” relates to the second measuring direction for dial test indicators or the reverse side of measuring tapes. This test direction should also be used for certain special devices. Every test direction is assigned a factor for the gauge and for the test equipment. This is necessary for “bore plug gauges”.

**Make sure that at least one test direction is chosen, otherwise the parameter test will not be successful!**

Some gauge types require special handling and training in order for the correct parameters to be set. For this reason, a **template database** has been integrated into the software. The most important gauge types are fully defined in the corresponding list, and can be simply transferred (imported) and used.

*The template database can also be updated or modified by the user (see chapter: Configuration..... Databases).*

Further important parameters for the individual gauge types can be found in the main section. Other type specific details include:

- Division / resolution,
- Measurement range, and
- Beginning and end of range of measurement, rotation value.

## Test Mode

Like the **Gauge Type**, the **Test Mode** also has an individual sub-dialogue (>>>).

This section defines the test procedure. The user must first decide whether the test is to be conducted manually or automatically. For a manual test, the user must decide whether the set point value of the gauge should be exactly modulated or whether the readings of the current values should be taken and entered into the software via a keyboard.

With a digital test– and in particular for digital gauges – more variations of the measured value and additional parameters are possible. The dialogue differs depending on which test procedure is chosen, either analogue test mode or digital test mode.

As already explained in **Gauge Type**, here it is also possible to load (import) a pre-prepared test mode from a template database.

**Important:**

Some test modes require special hardware or interfaces. For example, a test plan with camera measurement will not function without the relevant camera hardware. Similarly, digital test equipment cannot be checked over an interface cable when the gauge is not designed for this or the interface protocol is not supported by DIALTEST!

**Analogue Test Mode:**

Analogue gauges contain dial gauges, dial indicators and lever types, which in the majority of cases can be read via camera. The programme features two different evaluators: measurement with "**calculation of the pointer value**" and measurement with "**find pointer overlap**".

The "**find pointer overlap**" is a visual test, conducted with the eye:

- First, the needle is placed at a sufficient distance before the set point (absolute position / previous position).
- The needle is then moved step-by-step (parameter: **pointer step size**) and monitored by the camera.
- The set position is found when the needle and the scale mark overlap.

The needle is then moved over the set point and the optimum "overlap position" retroactively calculated. This procedure is extremely accurate and far exceeds the eye's capabilities (typically to a multiple of 1/50 - 1/100 of the division!).

The procedure may fail when:

- The needle cannot be positioned on the optimal overlap position (the needle jumps or the sensitivity of the drive unit is too low) and / or
- The needle is too short and the scale mark cannot be sufficiently overlapped.

The screenshot shows the 'INSPECTION MODE' software interface. At the top, there is a 'designation' field and a 'measuring value source' dropdown menu set to 'autom. camera 1'. The main area is divided into several sections:

- Measurement Method Selection:** Two columns of radio buttons for 'calculate pointer value' and 'find pointer overlap'. Under 'calculate pointer value', 'local range', 'repeatability', and 'dynamic' are selected. Under 'find pointer overlap', 'static' is selected.
- Force:** A radio button for 'force' is selected.
- Advanced Settings:** A list of checkboxes including 'autom. select A/B', 'test reference position again', 'JIS/KS mode', and 'convert calculation of deviation'. A 'distance A/B' field is set to '1.0 mm'.
- Motion Parameters:** Fields for 'forerun' (0.10 mm), 'overflow' (0.10 mm), 'reversal value' (0.30 mm), 'speed' (1.50 mm/s), and 'acceleration' (5.00 mm/s<sup>2</sup>).
- Tolerance and Sensitivity:** Fields for 'tolerance of scale error' (0.8 tlg), 'sensitivity before coincidence' (50 %), 'sensitivity at coincidence' (60 %), 'pointer step size' (0.10 tlg), and 'delay' (0 ms).
- Positioning:** Fields for 'absolute position' (2.0 tlg), 'repeat position' (2.0 tlg), 'repeat if error >' (10 tlg), and 'interrupt position' (10 tlg).

At the bottom, there is an 'import' dropdown menu, an 'apply' button, and a 'READY' button.

The "**calculation of the pointer value**" is a rapid alternative to the "find pointer overlap" search. During this procedure, the gauging pin is positioned on the set point value and the exact position of the needle calculated in the camera image. As only very few position changes are necessary, the maximum measuring speed is reached. This is only delayed by the parameter: "delay". Otherwise, this evaluation is managed without special parameters. The accuracy of the evaluation outperforms the ability of the human eye at a factor of 1/20 - 1/50 of the division. It is also intrinsically dependent on the quality of the scale and shadowing.



### **Special Analogue Test Mode-Parameter:**

#### **Tolerance of Scale Error:**

This value determines where a scale line should be sought during a scale analysis. The maximum deviation of the theoretically calculated position of the actual position can be determined from this. This parameter provides a limit for the permissible graduation error in the scale. If this value is selected too large, the risk increases that a badly-recognised scale line could be placed on a neighbouring scale line, and the whole analysis would be confused. A too-small value results in the creation of many “red” dots (not recognised scale lines). The parameter does not have any influence over the actual test – only over the scale recognition (analysis).

#### **Sensibility for Coincidence:**

Even though the imaging process is conducted relatively robustly and safely, in the case of poor contrast, special needle / scale line dimensions or shadowing it can be necessary that the given parameters need to be changed individually. In such cases, the precision indicators may sometimes not be recognised, or only after numerous attempts. The real problem lies in the suppression of interference. For example, the camera could interpret the preceding shadow of the needle as the indicator itself, and create a false measured value, if it was not prevented by a reduced sensitivity.

To select the correct sensitivity parameters, it is possible to use the optional display of the indicator analysis in the camera dialogue. During the test, the green line shows the process of an indicators search. This process can be partitioned into two divisions:

- Indicator overlap search start, and
- Exact overlap search position.

For the first division, the “sensibility before coincidence” is crucial. The parameter shown as a blue line in the indicator analysis diagram determines the recognition limits for the needle in front of the scale line. The value must be over the random estimations - which occur without an indicator – in order for the position of the needle to be safely recognised. The best result is a value which lies about halfway between the maximum value with indicator and random maximum interferences. The recognition of this value is only possible with an indicator analysis diagram! If the needle runs over the scale line without the blue line crossing the analysis curve, then the sensitivity has been set too low.

For the second division, the “sensibility at coincidence” is the decisive factor. This value determines the exact search for the optimal overlap. In every case, it should lie over the random interference in order for the maximum measurement accuracies to be reached. With a too-small value, the imaging becomes very sensitive and the precision indicators will not be recognised. The optimum value can be determined with the analysis diagram. The value should amount to about the half of the difference between the maximum value and the following minimum value (by a complete overlap).

In general, these complex type-specific optimisations are not necessary. As reference values, the following have been ascertained:

<b>Typical gauge</b>	<b>Sensibility before coincidence</b>	<b>Sensibility at coincidence</b>
Dial gauges with very good contrast and large	40%...50%	50%

needle width.		
Dial gauges with good contrast, medium-sized needle width.	50%	80%
Dial gauges, precision indicators with poor contrast or thin needles.	80%	80%...90%
Precision indicators with very poor contrast and thin needles / scale lines.	95%	85%...90%

Parameters <50% are only useful in cases of extreme interference such as with ambient light or shadowing, as an incorrect indicator overlap may be detected.

Incorrect parameters are displayed on the camera image as colourful squares:

- Red square** = The needle is not yet close to the scale line.
- Yellow square** = The needle is close to the scale line.
- Magenta square** = The needle is partially overlapping the scale line.
- Green square** = The needle is overlapping the scale line at a maximum.

#### Green solid square

- The overlap has been successfully found.

#### Red solid square

- The needle has not reached the area of the scale line.  
Recommendation:
  - Increase sensitivity 1 and / or
  - Increase approach position

#### Yellow solid square

- The needle has reached the area of the scale line but has not recognised any further overlap.  
Recommendation:
  - Increase sensitivity 2 and /or
  - Reduce step size

#### Magenta solid square

- Overlap with scale line has been found. However, the maximum overlap can not be determined!  
Recommendation:
  - Increase sensitivity 2 and /or
  - Reduce step size
  - Check whether the dial gauge is “jumping” or “hanging”.

### Pointer Step Size

This parameter determines which steps the search for the precision indicators should follow. An increase in this parameter’s value results in an enormous surge in speed, but in some cases may also lead to a loss in reliability in the search for needle indicators.

### Absolute Position, Repeat Position:

This value determines how close the pointer will be to the theoretical set point value. If the relative position is selected too small, the pointer may stand on, or even be behind, the set point value. In this case (or also when, because of other separate reasons, no precision indicators can be found), the search must be repeated with a larger advance, in which the repeat position will be used.

### Repeat if Error Position:

This shows how far the pointer can be driven out to over the set point value when no precision indicators / digit jump can be found. The search must be then repeated or cancelled.

### Interrupt Position:

An unrealistically large change in the deviation diagram (difference of the current deviation to the last deviation) causes the one-off repetition of this reading. This parameter determines the maximum deviation.

### Delay:

This delay is in the range of a few milliseconds. The default delay between the positioning and the reading of the display may improve the accuracy of the measurement.

### Digital Test Mode:

This test mode applies for all other devices (digital, inductive, electrical...). In order to be able to automatically test a device, the current display value must be readable. This can be done over an interface cable or – when a device contains a visual display – via camera.

The screenshot displays the 'INSPECTION MODE' software interface. At the top, there is a 'designation:' field and a 'measuring value source:' dropdown menu set to 'autom. camera 1'. The main area is divided into several sections:

- Left Column:** A list of parameters: 'total range', 'local range', 'repeatability', and 'hysteresis'. Below this is a 'force' section with 'dynamic' (selected) and 'static' radio buttons.
- Center Column:** A 'find digit transition' section with four checkboxes. Below it are 'distance A/B: 1.0 mm' and a list of checkboxes: 'autom. select A/B', 'test reference position again', 'JIS/KS mode', 'convert calculation of deviation', 'round deviations to step size', and 'auto sensitivity for inductive probe'.
- Right Column:** A table of numerical parameters: 'forerun: 0.10 mm', 'overflow: 0.10 mm', 'reversal value: 0.30 mm', 'speed: 6.00 mm/s', and 'acceleration: 10.00 mm/s<sup>2</sup>'. To the right of this table are 'transition step size: 0.10 digits', a checked 'manual delay' checkbox with a value of '100 ms', and 'repeat if error >' with a value of '10 digits'.

At the bottom, there is an 'import:' dropdown menu, an 'apply' button, and a 'READY' button.

Depending on the test equipment, the user must decide whether a test with “**find digit transition**” is necessary. In this case, the gauging pin (in a fraction of the resolution) is moved step-by-step until the last place of the test value is switched over. This is necessary when the accuracy of the gauge is better than resolution. The accuracy of the test corresponds to the parameter “transition step size”, while for tests without “find digit transition”, accuracy corresponds to the maximum of the measured values. Depending on the transfer rate, “delay” and “step size”, be aware that any test involving a “find digit transition” requires a much longer audit period!

An activated “find digit transition” for high resolution test equipment (resolution < 1µm) results in an improvement in the accuracy of the test device. The only disadvantage is the additional expenditure of time.

### Special Digital Test Mode Parameter:

#### Manual Delay

All test devices show a change in position in delay. This is why there is a possibility that the display value is not up-to-date, even though the gauging pin is already at the target position. This delay is in the range of a few milliseconds up to two seconds. The minimum wait time can be manually trialled in order for the test to be hastened. Otherwise, before every test, the automatic calculation is conducted with a significant safety margin.

#### Round Deviation to Step Size:

The deviation value is a purely coincidental value in the range of the test equipment resolution, especially when no “digit transition” is being searched for. By activating this option, the actual deviation is respectively rounded to the next, most favourable test stage width. The deviation values can only accept multiples of the resolution.

#### Auto Sensitive for Inductive Probe:

After the completion of the test, the actual sensitivity of the inductive probe is adapted for nominal sensitivity and deviation corrected where necessary (see reference to Special Test Equipment).

#### **Common Test Mode Parameter:**

##### Forerun / Overflow:

During the software-controlled positioning, these absolute limits must be adhered to over the specified measurement range.

**Take care that these values are not selected too high, especially for high resolution measuring instruments and lever types.**

##### Reversal Value:

If the direction of the gauging pin movement changes, the software will attempt to keep to this reversal method, in order that the rate of reversal error and the hysteresis can be correctly calculated. The “forerun” and “overflow” values have priority.

##### Speed:

Maximum permissible speed of the gauging pin.

##### Acceleration:

Maximum permissible acceleration of the gauging pin. This parameter should be decreased for sensitive test equipment (which tilt the vibrations).

##### Automatic Select A/B (Air Gap):

Some measuring instruments with sensor arms (lever types) have two independent test directions (A and B). A gauging pin attachment is then used, which can sample the probe sphere from below and above. As the test programme is not familiar with where both the sample positions actually are, after switching the test direction it is necessary to manually set the respective reference values.

By activating “automatic select”, the sample position is carefully sought by step-by-step gauging pin movements. If there is a large air gap between the two sample positions, this process can take a relatively long time. The automatic reference search can be sped up by providing the minimum air gap width.

##### Test Reference Position Again:

The test pin and the calibration instrument are compared at the reference point. This is normally conducted once at the beginning of the test. If the reference position is a component of the measuring point, then this re-measurement can be omitted. This exclusion can also be de-activated, as required.

##### JIS/KS Mode:

Only for Japanese/Korean standard activation.

##### Convert Calculation of Deviation:

The deviation from a measuring point is normally calculated as “Set Point Value – Actual Value”. If required, this can be changed to “Actual Value - Set Point Value”. In this case, the characteristic values remain unchanged, only the deviation curve is shown in reverse.

## Measurement Points

Measurement points belong to the test standard and are set accordingly. In many standards, the corresponding information is missing and it is left to the responsibility of the tester to use “sufficient” measurement points.

The screenshot shows the 'MEASURING POSITIONS' software interface. It is divided into several main sections: 'total range', 'local range', 'repeatability', and 'force'. Each section contains two columns for 'ingoing' and 'outgoing' measurements. The 'total range' section has a large list of values from 0.000 to 3.000. The 'local range' section has a list from 0.000 to 0.100. The 'repeatability' section has a list from 0.000 to 1.000. Below these lists are controls for 'cycles' (1, 1, 5, 5), 'variation [%]' (0), and checkboxes for 'A' and 'B'. At the bottom, there are 'delete' and 'add' sections with buttons like 'delete selected', 'delete all', 'single value:', 'values (from/to/step):', 'import:', and 'add value'. A 'reference' field shows '0.000000' and a 'READY' button is at the bottom right.

In this respect, DIALTEST is very flexible. For every test section, it is possible to provide any amount of measurement positions and multiple cycles. By using a random generator (variation), the default measurement positions can be changed during the measurement process. The input of new positions can be set through single values, sequences of values or by importing from existing parameter or data file.

Included in these test stages are:

- Total measurement range,
- Local measurement range,
- Repeatability,
- Hysteresis, and
- Force

The activation of a test section unlocks the related list (grey....black), allowing the measurement points in the list to be processed. The majority of test sections also offer the option of “incoming” or “outgoing” gauging pins. Moreover, the measurement points can be defined as test direction “A” or “B”.

**If a test direction is not activated, the measurement points will not be saved! Ensure the measurement points lie in the permissible range and are in the correct order.**

Multiple measurements, where possible, should follow the input of the cycle number. The comparison of gauges and calibration instruments takes place at the beginning of each test at the “reference point”. The unit of measurement applied to all values is millimetre or inch.

## Calculations / Characteristic Values

Characteristic values are defined according to the standard. In one plan, up to 50 different characteristic values can be incorporated according to all known international typical calculations.

designation	calculation	range	sign	uncertainty	tolerance value
fe	fe ->				15.000 µm
fg	fg -> <				17.000 µm
fu	fu				3.000 µm
ft	ft ->				5.000 µm
fw	fw				3.000 µm
MPE 1/10	MPE 1/10 (rev.)	<-> 0.100			3.000 µm
MPE 1	MPE 1 (rev.)	<-> 1.000			8.000 µm
linearity	linearity (%) ->				2.000 %

First, choose a characteristic value or a free row in the list. The related parameters for processing are shown in the lower section of the dialogue. Be aware that some parameters are only available depending on the selected calculation method.

- Designation: Individual characteristic value label.
- Calculation: List with possible calculations (see attachment).
- Evaluation Range "all": The calculation incorporates all measurement points.
- Evaluation Range "to": The calculation incorporates the measurement points in limited ranges.
- Evaluation Range "any": The calculation incorporates all measurement points, but only a limited range, which is successively moved over the entire measurement range.

*Example:*

*The measured displacement of the gauge must not amount to more than 5µm within 1mm measured displacement, no matter which “1mm section” of the measurement range (0-10mm). When no more than 1mm of the measurement range is used, then the deviation is smaller than 5µm.*

- Evaluation Range: The range’s input is as mm/inch, as a multiple of the division or the revolution value.
- Sign: A +/- sign can be pre-programmed.
- Measurement Uncertainty: A pre-programmed value makes allowance for the measurement uncertainty during the calculation of the

characteristic values.

*The following rules apply:*

*Characteristic Value < “Tolerance minus uncertainty” = Characteristic value in compliance range (good).*

*Characteristic value > “Tolerance plus uncertainty” = Characteristic value outside compliance range (bad).*

*Characteristic value in uncertainty range: = (Partially good)*

- Tolerance Value: The tolerance value is the maximum allowable value for deviation. If the tolerance guideline is missing, then the calculation will be take place without this assessment.
- Formula Value: The used tolerance value is calculated from the constant factor and the length-dependent factor:  $t = a + b * L$ .

For all tolerance values, the units “micrometre” [µm] or “mill inch” [“], and “newton” for gauging force are applied. The listing and description of the currently-available calculation methods can be found in the attachment. Generally, multiple characteristic values can be defined with the same calculation methods, however during data export to an external CAQ, system allocation problems may occur. A list’s characteristic values can be arranged by order, depending on individual requirement.

*Tip: The creation of a new characteristic value table can be simplified by importing a similar parameter or data file, and altering the necessary values.*

### **Assessments (Visual/Operational)**

The assessments involve all the other tests which - independent from test equipment – are implemented by the user. There is a maximum of 50 criteria for visual and operational tests. Every criterion contains at least one description text. In addition, every criterion can contain a good/ bad evaluation and an additional result text. The list’s criterion can also be customised, depending on individual requirements.

*Tip: The creation of a new visual checklist can be simplified by importing a similar parameter or data file, and altering the necessary values.*





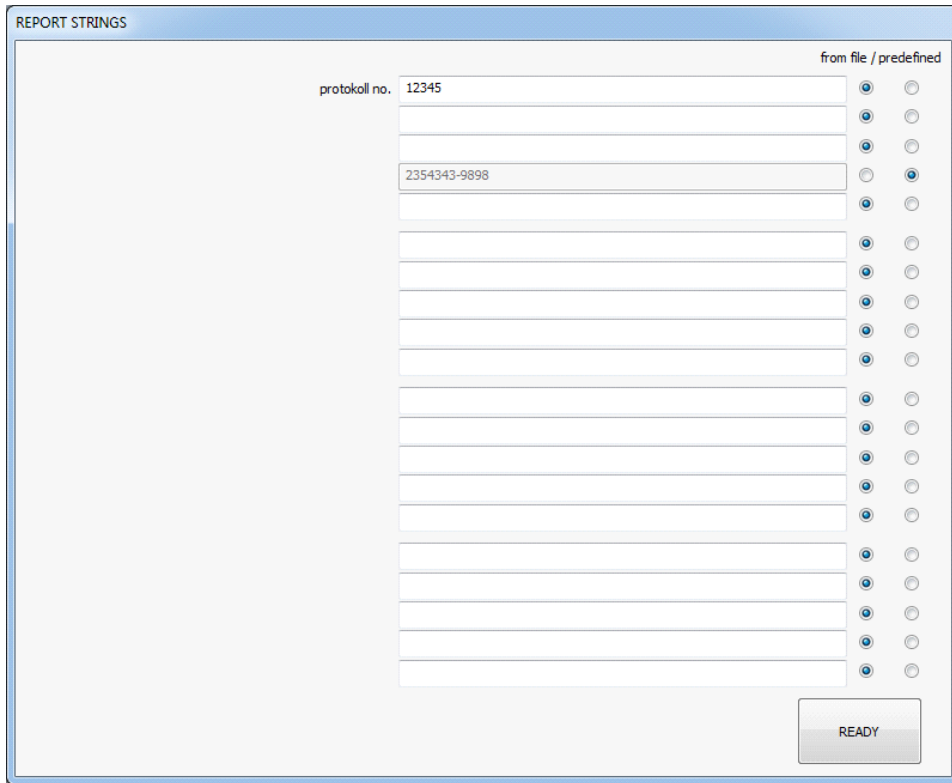
REPORT STRINGS

from file / predefined

protokoll no. 12345

2354343-9898

READY



### Report Files

Choose an existing Excel file to be used as a template for the data export and test report during the audit. With differing template files, a variety of certificate designs (and certificate languages) can be implemented.

*Tip: The export of data to Excel requires certain table formats. When creating new files, it is best to copy the pre-prepared example files. The worksheet "data" is essential during any data export!*

## TEST / INSPECTION

**INSPECTION**

id. no.:

inspector:

report layout:

nominal:  actual:  gauge:

total range

assessments (visual/functional)

final result:

comment:

inspection mode:

calculations:

designation	tol. (A)	value (A)	error (A)	result ...	Nominal	diff>	diff<	nom>	nom<
fe	15.00µm				0.000				
fg	17.00µm				0.100				
fu	3.00µm				0.200				
ft	5.00µm				0.300				
fw	3.00µm				0.400				
					0.500				
MPE 1/10	3.00µm				0.600				
MPE 1	8.00µm				0.700				
					0.800				
					0.900				
					1.000				
					1.100				

### Overview

The “Inspection” window displays the central user interface for the test sequence. The current results are also shown on this window.

It is recommended that every gauge is given an identity number and that these are entered into the first row. The identity number provides the base for the file name, under which the test is then saved. Further report strings can be found within the field . These and the test name are only to be used for the certificate design or important internal company information. The “report layout” is the Excel destination file. Further settings regarding report generation can be found in the configuration menu.



Start test or resume an aborted test. Open test steps will be processed consecutively.



End the test. Before the test is completely finalised, the user will be asked whether the test should be saved or discarded. Here it is also possible to return to the current test. By “saving”, all data will be stored in a data file. When activated, it is also possible to automatically create PDF files, to print the certificate and to export the data to a CAQ system.



Delete all previously approved measurement points. The reference point search will also be declared void.



Return the gauging pins to the reference position (*this is only possible in certain test devices*).

Depending on the test plan, there are up to 20 extra fields for each of the test sections. This allows each test section to be separately started. In addition, the fields change depending on the current status:

- Test not completed.
- Test in progress.
- Test is completed. Status: in uncertain range.
- Test is completed. Status: outside tolerance.
- ✓ Test is completed. Status: within tolerance.

The overall result is calculated from the status of the individual tests and displayed. The user is able to change this text, but only after the conclusion of all audits.

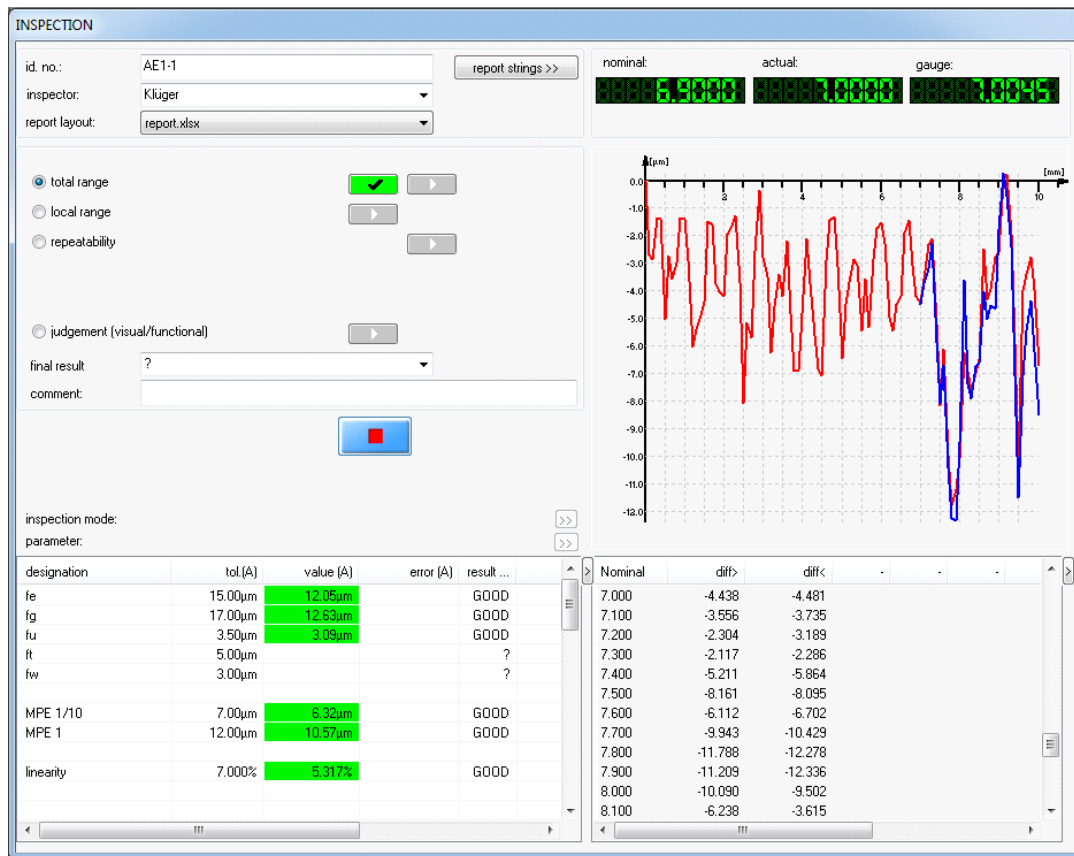
“Test mode” and “characteristic value” are defined in the test plans. However, during the audit, there is also the possibility to change the corresponding configurations. The test sequence can be optimised and the characteristic values can be individually customised. *Note, the changes can only be made for these data files (not a potential parameter file).*

The Calculation Table displays all characteristics, tolerances, actual values and errors. The current measurement values are shown in the Measurement Value Table on the right side of the window. Depending on selection, the test sections are displayed here to the associated values. Parallel is a graphic display of the deviation diagram.






The screenshot shows the 'INSPECTION' software interface. At the top left, there are input fields for 'id. no.' (Example\_FH), 'inspector' (Klüger), and 'report layout' (report.xlsx). Below these are radio buttons for 'total range', 'local range', and 'repeatability', and a 'final result' dropdown set to 'GOOD'. A 'READY' button is visible. The right side features a deviation diagram with a blue line for the total range and a red line for the local range, plotted against a nominal value of 0.00 mm. The bottom section contains two tables: a 'calculations' table and a 'Measurement Value Table'.

designation	tol.(A)	unc...	valu...	error (A)	result (A)	value ...	error (B)
fe	3.00µm	0.00...	1.30		GUT	2.60µm	
fg	4.00µm	0.00...	3.10		GUT	3.00µm	
fu	2.00µm	0.00...	1.90		GUT	1.70µm	
ft	2.00µm	0.00...	1.70		GUT	1.00µm	
fw	1.50µm	0.00...	1.10		GUT	0.50µm	

Nominal	diff>	diff<	nom>	nom<
-0.100	0.000	0.600	-0.10000	-0.10060
-0.080	-0.100	1.800	-0.07990	-0.08180
-0.060	0.300	1.400	-0.06030	-0.06140
-0.040	0.000	1.000	-0.04000	-0.04100
-0.020	0.400	0.800	-0.02040	-0.02080
0.000	-0.800	0.100	0.00080	-0.00010
0.020	-0.200	-1.300	0.02020	0.02130
0.040	-0.400	-0.100	0.04040	0.04010
0.060	-0.700	0.900	0.06070	0.05910
0.080	-0.100	0.500	0.08010	0.07950
0.100	-0.900	-0.800	0.10090	0.10080



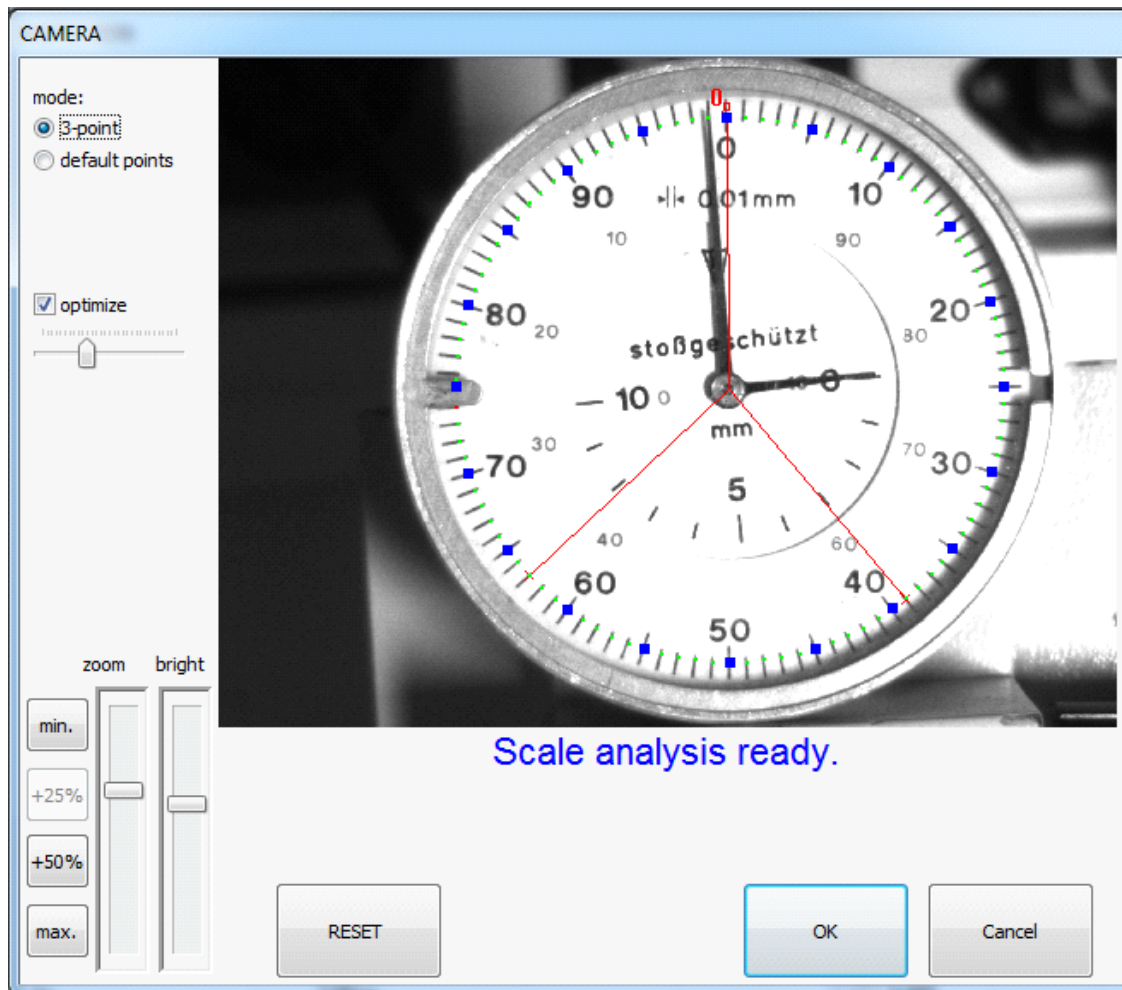
While an audit is running, the current measurement values and the following fields appear at the top right of the window:

-  Accept measurement value... as an alternative, ENTER, SPACE or a Joystick button can also be used.
-  Go back a measured value, the last value will be deleted.
-  Measurement STOP.
-  Measurement continue.
-  Cancel measurement.

The test window can be custom-positioned and the height – depending on suitable screen resolution – can be enlarged.

### Indicator Recognition with Camera

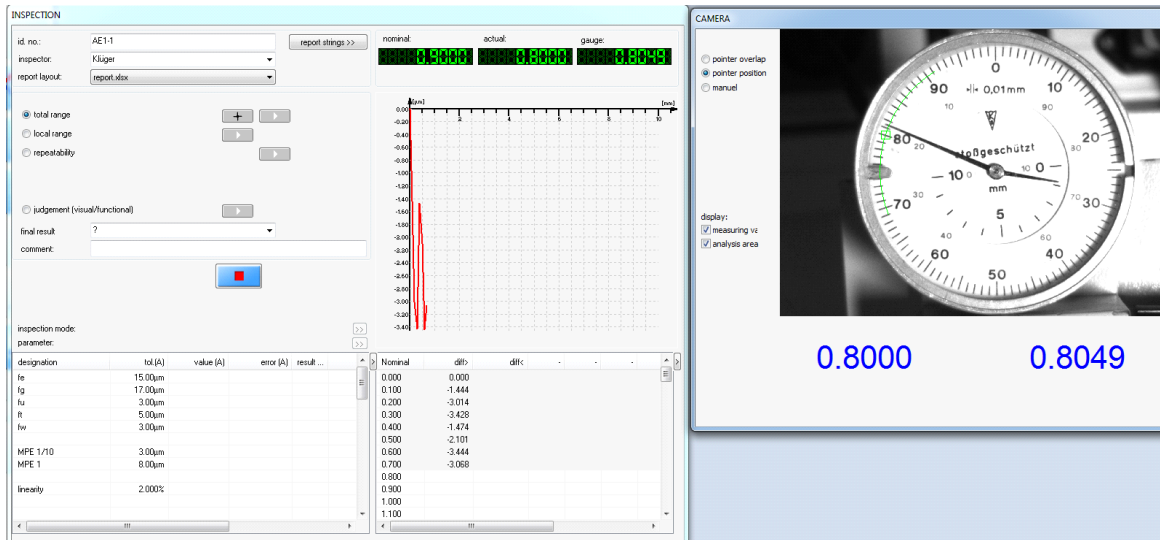
Analogue dial gauges can be automatically read by the software. Position, size and the brightness of the scale are set according to individual preferences. Newer camera models allow for software zoom and brightness control.



First of all, it is necessary to analyse the scale by setting three marking points. The first point must lie close to the zero point. The three points mark out a circle or arc, which cuts through all scale lines. For a functional reading, the circle must not be larger than the length of the pointer! The optimisation function is helpful in ensuring that the circle fits in general. The required diameter can be specified through the slide bar controls.

In the case of the consecutive testing of nearly identical test devices, it is possible to avoid repeating the input of the three measurement points by setting the mode to “default points”. Errors in the measurement points can be corrected by repeatedly “clicking” close to a point. For non-rotating gauges (indicators), the null value, start value and end value must be marked. If the start value and end value fall together, a further point must be marked in order that a valid search radius is found.

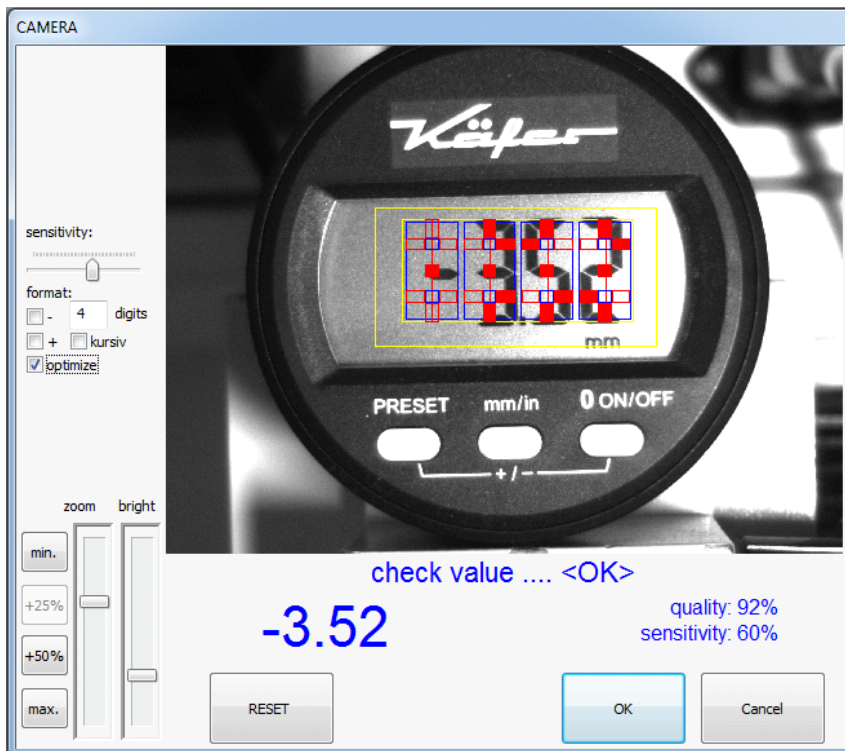
After the analysis – in accordance to the software manual – the test equipment must then be set to roughly the reference value. After this, the automatic reading of the pointer position can take place. The evaluation mode and also some additional displays can be activated in the camera dialogue.




### Digital Value Recognition with Camera

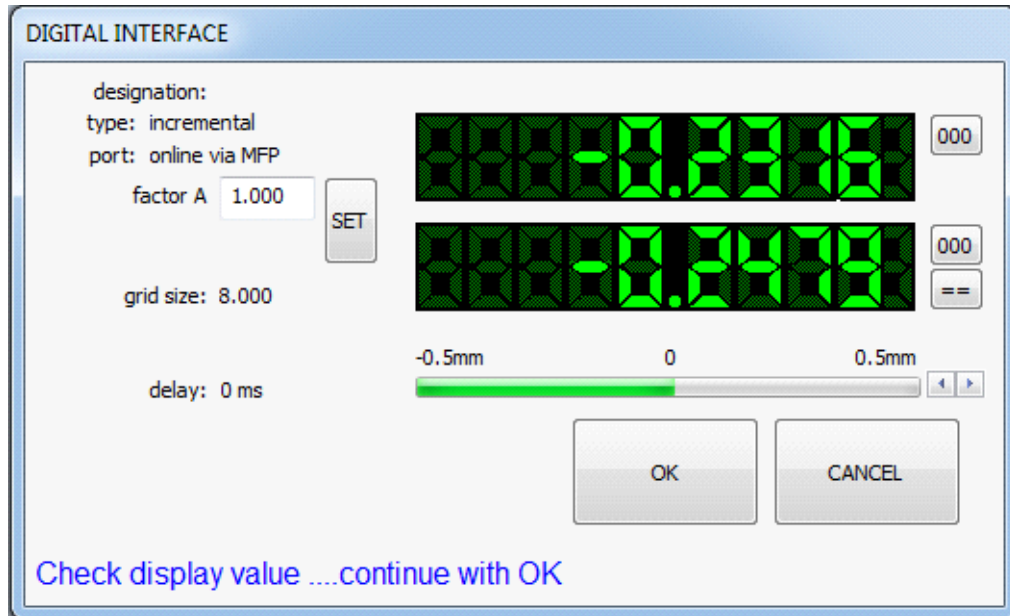
Digital displays (seven segment) can also be read automatically. Position, size and display brightness can be adjusted for individual preferences – the digits only need to be horizontal! Newer camera models allow for software zoom and brightness control. At first, the digit range must be chosen by “drawing” a rectangle (top left to right bottom). The size can then be modified at any stage with the mouse. The optimisation function allows the rectangle to be automatically resized to fit.

Make sure that every digit is surrounded by a blue rectangle. When a suitable match of image brightness and sensitivity is found, the current digit value will be shown in the image area. During the setting of the optimal sensitivity adjustment, the relevant segments are marked in red. The minimum digit number can also be customized and an additional (+/-) sign configured.



## Measured Value Recognition via Interface

For automatically read digital, inductive, incremental and electrical test equipment, an additional window labelled “data interface” appears during the audit. This allows the current gauge value and the gauging pin value to be displayed in parallel. It is also possible to reset the values to an equivalent value. A “deviation bar” shows the graphical difference between both and can be used for the optimal positioning (sensitivity over ).



## Manual Measured Value Recognition

If it is not possible to automatically read the gauge value, then the test must be conducted manually. There are two possibilities:

- The set point value is exactly adjusted on the test equipment and confirm, or
- The target position is roughly adjusted by the test equipment. Read the value from the gauge and input via the keyboard.

The desired mode should be selected during the pre-selection process (see “Test Mode”).

## Measurement Range Extension

The measurement range of some gauges is bigger than the maximum range of the test equipment. In order that this can be tested, the gauge is shifted to the end of the measured displacement and the entire measurement divided into a number of partial amounts. Before and after the shift, the exact alignment is always conducted on any measured value. The software supports this procedure either half- or fully automatically, so that in theory, any number of large measurement ranges can be checked.

**Beware of increased uncertainty caused by measurement errors during repeated comparisons.**

## Force Test

To test gauging force, it is necessary to use an appropriate force test device. DIALTEST supports the recording of force values, as well as the consecutive calculation of the characteristic value. The test requires the activation of the force sensor between the gauging pins.

*Important: The force sensor should never be activated during the test, to prevent the test result from being distorted!*



The actual force measurement is conducted independently from the real display value of the test device as the gauging pins' force characteristics curves. The actual force measurement device offers two variations, in which the dynamic test of the preferences is given as:

**Static Force Test:**

The measurement points defined in the test plan are each processed and the corresponding force value determined.

Advantages: Measurement point differences, sequences and multiple measurements are possible. The assignment of the force values to the measurement points is exact.

Disadvantages: The processing requires a great deal of time. Disturbances in the force process between the measurement points are not be included.

**Dynamic Force Test:**

The gauging pins are moved at a close-to-constant speed from the beginning of the measurement range to its end (the smallest and largest values of the measurement point definition). During this movement, the force value recording is running. The maximum speed of the gauging pins movement is first ascertained under consideration of the previously defined measurement point quantity. Due to the high acquisition rate, the maximum rotational speed is almost always processed. Without a loss of time, some 100 to 1,000 measurement values can be checked.

Advantages: A great deal of force data can be captured within a short period of time.

Disadvantages: The measurement points need to be divided equally. Only one cycle is possible.

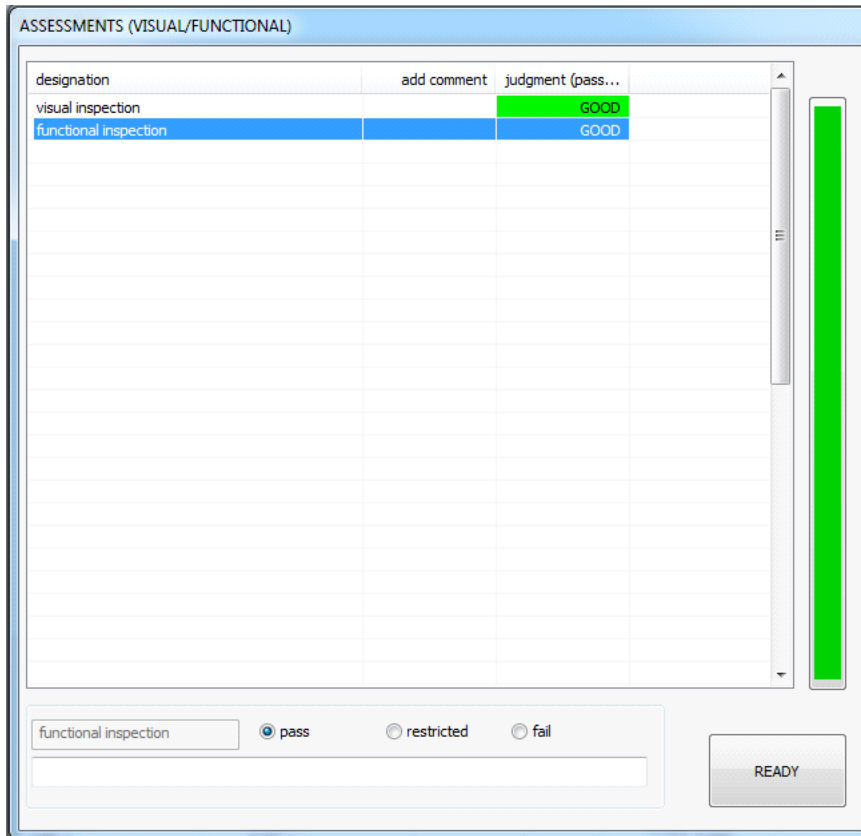
Force measurement sensors have in general a relative unstable zero point, so that before the measurement, a zero point comparison is necessary (configuration menu). DIALTEST conducts this procedure fully automatically and in the background. Immediately before the message "Activation of Force Sensor", the sensor is set to 0.000. If at this time a certain minimum force is already operating, this automatic zero point comparison will not be carried out. It is recommended that the zero value is occasionally checked within the configuration menu.

**Assessments (Visual / Functional)**

Visual and functional tests, as defined in the test plan, can be carried out at any time by the auditor. The entry of the results is carried out in the corresponding dialogue window. With an automatic programme sequence, the dialogue appears after the conclusion of all the other tests.

A mouse click on the individual criterion allows the assessment to be selected as "good", "bad" or "conditional". For criteria with characteristic value text, it is possible to add an additional comment. As many text fields and comments can be added as the user requires.





## Calculation Table and Measured Value Table

The calculation table displays all characteristic values, tolerances, actual values and errors. The width of the table columns, as well as their content, can be individually configured.

designation	tol.[A]	unc...	valu...	error [A]	result [A]	value...	error [B]	Nominal	diff>	diff<	nom>	nom<
fe	3.00µm	0.00...	1.30...		GUT	2.60µm		-0.100	0.000	0.600	-0.10000	-0.10060
fg	4.00µm	0.00...	3.10...		GUT	3.00µm		-0.080	-0.100	1.800	-0.07990	-0.08180
fu	2.00µm	0.00...	1.90...		GUT	1.70µm		-0.060	0.300	1.400	-0.06030	-0.06140
ft	2.00µm	0.00...	1.70...		GUT	1.00µm		-0.040	0.000	1.000	-0.04000	-0.04100
fw	1.50µm	0.00...	1.10...		GUT	0.50µm		-0.020	0.400	0.800	-0.02040	-0.02080
								0.000	-0.800	0.100	0.00080	-0.00010
								0.020	-0.200	-1.300	0.02020	0.02130
								0.040	-0.400	-0.100	0.04040	0.04010
								0.060	-0.700	0.900	0.06070	0.05910
								0.080	-0.100	0.500	0.08010	0.07950
								0.100	-0.900	-0.800	0.10090	0.10080

The display is independent from the selected test stage and is actualised after every step (but not during an operational test). There are three different display variations, each of which can be automatically selected. These differ according to the activated test direction (A, B or A+B). In this way, the calculation table can be optimally adapted to the existing results.

For more on the importance of title texts, please refer to the chapter “Configuration... Table Texts”.

The measured value table shows the corresponding set point values, actual values and deviations of the single measurement values. However, the measured value table only displays the value of the test stage that is currently operational. If no test is active, the user can manually activate the display (test stage + test direction A/B).

*Tip: For the test direction, A or B is commonly understood. The directions of movement “incoming” / “outgoing” are displayed simultaneously in the table.*

The measured value table is directly connected to the graphical display of the deviation values above. The actualisation of the values occurs simultaneously with the measurement. When required, the measurement values can also be processed and deleted. These steps can be completed by selecting the appropriate instruction with a right mouse click.

The width of the table columns, as well as the content, can also be individually set for every test stage. As well as the column adjustment, there is also the possibility for multiple values to be ordered side by side or among each other. The number of decimal places can also be customised.

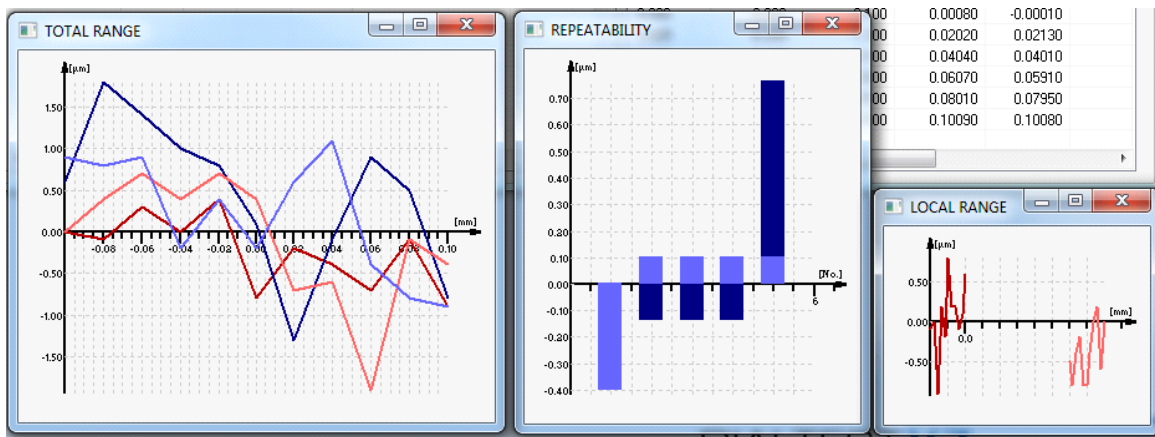
### Adjustments to Test Mode and Calculations During Test

Although the test mode and characteristic values are determined during the test planning process, both can be adapted and optimised while a test is being conducted. However, during the test mode, modifications are limited. The modification of the characteristic values offers the customer the possibility to recalculate / reclassify a test device (at any stage) to a different test standard. The adjustments are then immediately copied into the characteristic value table.

Please be aware that any changes made at this stage will be only recognised by this one test file. In the case of a test file originating from a parameter file, the original parameter file will remain unchanged. When the test is saved and then re-opened, the adjustments will remain valid.

### Additional Diagrams

With a sufficiently large screen, it is possible to simultaneously view the deviation curves for all test stages in additional windows. The position and size of each window can be freely altered and the settings will remain in place until further changes are made. The deviation from test direction A and B will be displayed in a diagram (with slightly different colours: A=lighter, B=darker). Further display options can be found via the right mouse button.



## REPORTS / CERTIFICATES



The generation and printing of reports is only possible with an installed Excel programme. For this, a suitable Excel template file must be available and selected. DIALTEST will automatically open this file and transfer the entire test data to the worksheet “data”. Status messages display the progress during the data export.

**Beware: The data transfer may experience problems when the automatically-opened Excel file is manually closed. Excel can remain open in the background – DIALTEST will automatically close the programme when it is no longer required. When the cursor is positioned within a cell (input mode), Excel is blocked for any further data transfer (error message from Windows). Simply exit the input mode and the transferral will continue as before.**

Different parameters can be pre-defined via the configuration menu” (chapter: [Configuration Databases](#)).

The existing Excel template files can also be customised or (even better) copied and saved under a new file name.

*Important: The Excel worksheet "data" must be available! This is where all the test files will be saved to specified fields. These are highlighted for easier identification.*

Two test report templates are already defined in the example files. A test report is made up of fixed text, images... and from variable texts and numbers and diagrams. The variable files are always a reference to cells in the worksheet “data”. The addition of static and variable data is simple and does not require special Excel knowledge. What is more complicated is the generation of deviation diagrams. As the quantity and position of the measured values must vary greatly, special “names” for the cell ranges need to be processed which fit the current and existing measurement points. “Macros” are not necessary in the templates.

As an additional means of assistance, the worksheet “data” contains an example which describes how to automatically replace number values through an existing text [D33..37]. This is useful for multi-language report variants. In this example, DIALTEST writes the number index (0..4) for the test result (A) in the field [C33]. The corresponding text in [D33] replaces the cell entries [F2] to [F6] and [G2] to [G6].

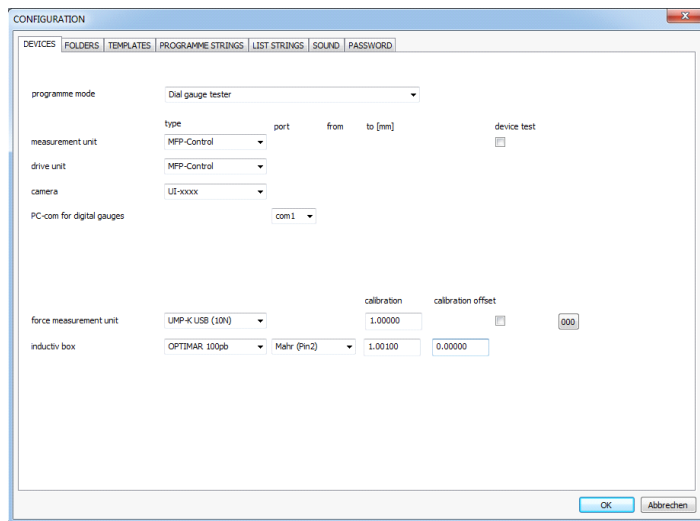
The individual adaptation of the templates is the obligation of the customer, and is not part of the delivery of DIALTEST. The linking of the software to Excel takes place via a file interface from Microsoft. The operation is only guaranteed when Excel and the computer are in delivery, and no other access limitations have been established. The functionality of the file interface can be tested prior to download with a free test programme (MTK\_VIEW).

## CONFIGURATION



All basic programme preferences are set in these dialogues. Data is saved to the Windows Registry for the currently registered user. This has the advantage that every user can customise the programme to their individual requirements. Test files and databases can be used together or individually. These are found in the specified directories and are not user-specific.

*During a complete data back-up, the user's registry must also be protected. The Windows assistance programme "regedit" allows the complete configuration to be saved and transferred to another user.*



## DEVICES

DIALTEST can be used with a variety of test equipment for a range of differing auditing tasks. For this reason, the first step in using the software is to select the "programme mode". This allows the corresponding lists to be automatically adapted.

### Measurement and Drive Unit:

These are essentially test devices, of which, there is a wide variety. Depending on type, additional information about connection and measurement range must be input (follow instructions in attachment and in device handbook).

### Camera:

Only licensed cameras with image processing cards are reliable. First, the corresponding driver must be installed and the camera functionally connected.

*The camera can replace the function of the software dongle.*

### PC-Com for Digital Gauges:

This COM-Port is reserved for the connection of digital test equipment. Whether this will be actually needed or used depends on the test planning. The actual existing RS232-Ports appear in the list. Virtual ports from USB devices can also be included!

### PC-Com for Reference Indicator:

This is only used for the test mode "Bore Plug Gauge". Measurement range must be input (follow instructions in attachment and in device handbook).

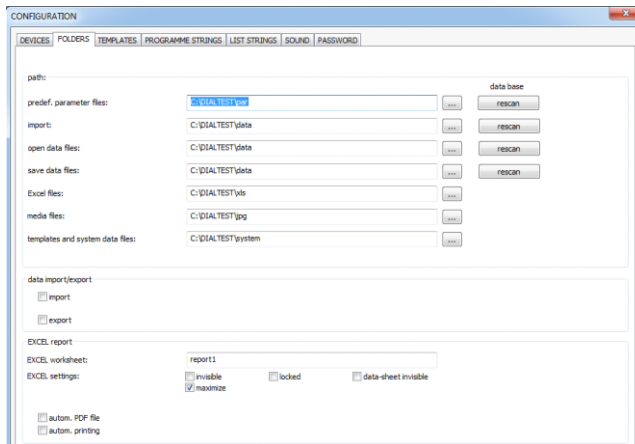
### Force Measurement Unit:

This is only used for the test mode "Dial Gauge and Dial Indicator Test".

The current force value appears with the connection of the device. Additionally, the sensor can also be calibrated and set to zero.

## FOLDERS

In order that all users can access the same test data, the test plans, data files, templates and more are saved in common directories. These can also be found in the network, but must be addressable via a drive letter.



During the installation, important system data, as well as the examples, will be copied to "C:\DIALTEST". Before any changes are made to the directory, this data must be copied to a new location!

Every test generates new test data, which is then saved in the specified folder. However, searching through large amounts of files requires a great deal of time. For this reason, a database containing the most important information about all the files is stored in every directory. However, deleting or copying individual files from this folder leads to inaccuracies in the database information. The field "refresh" updates the database with the new data.

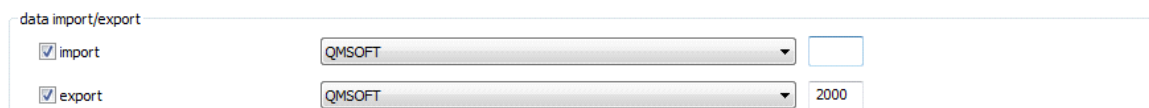
If the test files are divided over multiple directories, the selection of the directory links to the selection of the current database file. It is not possible to work in multiple directories at the same time.

For the import, opening and saving of the test files, different directories are possible. Individual files can be added to the directory for media (images, sounds) or unnecessary files can be deleted.

### Data Import/Export:

DIALTEST supports the transfer of data to external CAQ systems. However, in order for this to occur, optional additional programmes are necessary. The most suitable transfer programme can be selected and activated in the configuration dialogue.

These additional programmes normally work very fast and are not visible because they are only active during data processing, which makes commissioning / trouble-shooting very difficult. When "0" is entered into the following input field, the programmes remain visible until the user has approved the transfer. A value >0 causes a corresponding "wait time" in milliseconds until the transfer is automatically completed.



### Excel Report:

As explained in the chapter "Report / Certificate", printing or the creation of PDF files occurs exclusively through Microsoft Excel.

### Excel Worksheet:

The activation of this report function starts Excel, begins the transfer process of data to the "data" worksheet, and opens the selected worksheet. Different report sheets can be deposited in one Excel file. However, DIALTEST recommends using only one report sheet per Excel file. Which file to use can be pre-selected in the test plan and also changed during the audit process.

### EXCEL Settings:

The Microsoft Office interface offers various options for Excel settings.

### Automatic PDF File:

This function requires the installation of a licensed "PDF-Docuprinter". The saving of a test file results in the automatic opening of Excel, the creation of a report file and the saving of the file as a PDF file in the specified directory. A file name will be created in accordance with the specifications.

### Automatic Printing:

When a test file is saved, Excel is automatically opened and a report file created and sent to the currently selected standard printer.

print / EXCEL

EXCEL sheet: report1

EXCEL settings:

invisible  locked  data-sheet invisible

maximize

autom. PDF file

autom. print

## Templates

As previously described, it can be very time consuming to create completely new test plans. In order to save time during the installation of DIALTEST, the most important test equipment types and test preferences (test modes) are provided as a template database. During the setting of the test plan preferences, it is possible to select and import a completely or closely-fitting template. Small adjustments to the imported parameters can then be quickly and easily made. Theoretically, it is possible to create a suitable template for all the common test equipment types. However, this is not recommended, as too many templates can cause confusion. It is preferable to adjust the existing templates to individual needs and to save the most commonly used variants as new templates.

In order to do this, choose an existing template from the list and make any changes required (as described in the chapter: Test Plan) in the sub dialogue (field: >>). The last list element is the place holder for a new template. If this is defined, then another list element is created for this purpose. It is not possible to delete the templates. Instead, it is easier to remove the label text.

gauge type analogue.gauge/mm >>

test mode - analogue automatic test 1 >>

test mode - dig. / incr. / ind. / elt. manual test / find digit transition >>

inspector Klüger

At this point, a designation appears for the auditor name. Either choose from an already existing name, or select a free place on the list and enter the required name on the left side.

## Programme Strings / List Strings

### Report Strings

A number of programme texts can be individually labelled or used. The left table describes the definition of the maximum 20 report texts. The texts can be freely used and do not have any significance for the test. Here, the user can define the required designation. These appear only as titles in the programme and will **not** be transferred to the test report.

**Important: Best practice is to consider/define which report texts you require before the beginning of the first test. It is possible to attach additional texts after the process has begun, but it is more difficult to change existing definitions. When this happens, the text classification from the older test files will no longer match!**

The text layout on the right dialogue side shows the "default" values (see chapter: Certificate / Report Strings)

### Result Strings

Several result texts can be individually labelled here.

report strings: title / default		result strings:	
0	protokoll no.	not defined	nd
1		open	?
2		pass	GOOD
3	manufacturer ID	restricted	PARTIAL GOOD
4		fail	BAD
5		ready	
6		user defined 1	
7		user defined 2	
8		user defined 3	
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

other strings:	
id. no.	
nominal value	
actual value	
deviation	

### List Strings

The configuration in the dialogue "List Strings" behaves in exactly the same way. However, within the characteristic value and measurement value tables there is very little space for the description. For this reason, abbreviations must be used, which are defined below:

head strings for measuring table		head strings for calculation table	
space	-	space	-
nominal value	Nominal	designation	designation
actual value (n)	real>	tolerance (A)	tol.(A)
actual value (out)	real<	tolerance (B)	tol.(B)
deviation (n)	diff>	uncertainty	uncer. (A)
deviation (out)	diff<	result value (A)	value (A)
nominal* (n)	nom>	error (A)	error (A)
nominal* (out)	nom<	result string (A)	result (A)
actual value* (n)	real*>	add. info 1 (A)	a1 (A)
actual value* (out)	real*<	add. info 2 (A)	a2 (A)
force value (n)	force>	add. info 3 (A)	a3 (A)
force value (out)	force<	add. info 4 (A)	a4 (B)
average deviation (n)	diffm>	result value (B)	value (B)
average deviation (out)	diffm<	error (B)	error (B)
additional value acc. VDI (n)	add>	result string (B)	result (B)
additional value acc. VDI (out)	add<	add. info 1 (B)	a1 (B)
		add. info 2 (B)	a2 (B)
		add. info 3 (B)	a3 (B)
		add. info 4 (B)	a4 (B)



Space	This column is not used
Nominal Value	Set point values from the test plan
Actual Value	Display value from gauge
Deviation	The difference between the nominal value and the actual value
Nominal* Value	Uncorrected original value
Actual* Value	Uncorrected original value
Force Value	Force value in newton at nominal position.
Average Deviation	The average value of all deviations at a set point position (for multiple cycles)
Additional Values	Shows whether the measurement value or an additional inserted set point value is being dealt with.

- : Characteristic value from Test Direction A
- : Characteristic value from Test Direction B

Space	This column is not used
Designation	The description text of the characteristic value
Tolerance	The tolerance value in $\mu\text{m}$ , milli-inch or N
Uncertainty	The sum of the measurement uncertainty related to this tolerance value in $\mu\text{m}$ , milli-inch, or N
Result Value	Calculated characteristic value in $\mu\text{m}$ , milli-inch or N (highlighted in colour)
Error	The sum of the overrun when the “value” is larger than the “tolerance”
Result String	The assessment text in the current language
Add. Information	Depending on the characteristic type, up to four additional values can be calculated. This can be the minimum / maximum value or the critical set point position (see attachment: Calculations).

## Sound

The user is alerted to important programme events by a sound signal. A large assortment of short signal tones are stored in the media directory. In order to make use of this, it is necessary to have speakers installed on the computer.

error message:  >>

info message:  >>

measurement NEXT:  >>

measurement BACK:  >>

measurement READY:  >>

measurement STOP:  >>

## Password Protection

Important programme functions are protected by passwords from unauthorised access. Before any changes are made, the master password must be entered. In the software’s delivery condition, no master password is required – the user must only click on the “OK” field. Once the programme is operational, the various functions can be protected with a range of user passwords. However, the user should not forget to enter a master password! Without the master password, all the functions can be freely accessed, since all user passwords can be used in its place.

DEVICES | FOLDERS | TEMPLATES | PROGRAMME STRINGS | LIST STRINGS | SOUND | PASSWORD

master password:

device configuration

folder configuration

system configuration

delete parameter files

delete data files

add parameter files

*Tip: The password protection is function is designed only to prevent unauthorised programme modifications and is not 100% tamper-proof. Forgotten master passwords can be deleted from the system through the Windows Registry.*



## Data Formats

Abbreviation	Meaning
txt[256]	Textfeld mit der angegebenen max. Zeichenzahl
int	Zahl (ganzzahlig) oder Index
float	Zahl (Gleitkomma) mit der Anzahl Nachkommastellen

Beschreibung	Format	Prüfdatei: [Sektion]	Prüfdatei: Eintrag=	Excelzelle
Geprüft mit DIALTEST -Version	txt[10]	VERSION	v	-
Geprüft mit DIALTEST - Lizenznummer	txt[256]	VERSION	code	-
Identnummer	txt[256]	TXT	idnr	B1
Prüfername	txt[256]	TXT	name	B2
Datum der letzten Bearbeitung	txt[256]	TXT	date	B4
Zeit der letzten Bearbeitung	txt[256]	TXT	time	B5
Protokolltext 0:	txt[256]	TXT	t0	B6
Protokolltext 1:	txt[256]	TXT	t1	B7
Protokolltext 2:	txt[256]	TXT	t2	B8
Protokolltext 3:	txt[256]	TXT	t3	B9
Protokolltext 4:	txt[256]	TXT	t4	B10
Protokolltext 5:	txt[256]	TXT	t5	B11
Protokolltext 6:	txt[256]	TXT	t6	B12
Protokolltext 7:	txt[256]	TXT	t7	B13
Protokolltext 8:	txt[256]	TXT	t8	B14
Protokolltext 9:	txt[256]	TXT	t9	B15
Protokolltext 10:	txt[256]	TXT	t10	B16
Protokolltext 11:	txt[256]	TXT	t11	B17
Protokolltext 12:	txt[256]	TXT	t12	B18
Protokolltext 13:	txt[256]	TXT	t13	B19
Protokolltext 14:	txt[256]	TXT	t14	B20
Protokolltext 15:	txt[256]	TXT	t15	B21
Protokolltext 16:	txt[256]	TXT	t16	B22
Protokolltext 17:	txt[256]	TXT	t17	B23
Protokolltext 18:	txt[256]	TXT	t18	B24
Protokolltext 19:	txt[256]	TXT	t19	B25
Infotext (mehrspaltig) zum Prüfplan	txt[1024]	PP	info	B27
Beschreibungstext zum Prüfmittel	txt[256]	PP	typ_txt	B28
Bemerkungstext	txt[256]	PP	bem_txt	
Beschreibungstext zum Prüfmodus	txt[256]	PP	pmode_txt	B29
Datei (Pfad+Name) für Foto zum Prüfmittel	txt[1024]	PP	typ_img	B30
Protokollvorlagedatei	txt[256]	PP	prtfile	
Parameterdatei (falls verwendet)	txt[256]	PP	parfile	B31
Protokollnummer	txt[256]	pp	prtnr	
Funktionsprinzip 1=analog 2=dig 3=inc 4=ind 5=elt 6=Bandmaß normal 7=Bandmaß außen 8=Bandmaß innen 9=Bandmaß außen 10= BM innen	int	PP	type	D1
Einheit 0=mm 1=inch	int	PP	eht	D2
Skalentyp 0=uml. 1=beg.	int	PP	sub	D3
Teilung	float	PP	tlg	D4
Messspanne	float	PP	mss	D5

Messbereichsanfang		float	PP	msa	D6
Messbereichsende		float	PP	mse	D7
Umlauf		float	PP	uml	D8
Referenzwert bei BMD		float	PP	bmdr	
Banddicke bei BMPG		float	PP	banddicke	
Reserviert		float	PP	z1	
Reserviert		float	PP	z2	
Hauptschalter Messung (0=Aus 1=Ein)		int	PP	mpp_act	D9
Hauptschalter Kennwertberechnung (0=Aus 1=Ein)		int	PP	kwp_act	D10
Hauptschalter Beurteilung (0=Aus 1=Ein)		int	PP	spp_act	D11
<b>Parameter zum Anzeigetyp:</b>					
Skalendrehrichtung (A): 0=im Uhrzeigersinn 1=gegen Uhrzeiger		int	PP	skale_drehrichtung_a	D12
Skalendrehrichtung (B): 0=im Uhrzeigersinn 1=gegen Uhrzeiger		int	PP	skale_drehrichtung_b	D13
Code für dig/inc/ind/elt		int	PP	code	D14
Rasterwert in µm bei inc.		float	PP	inc_raster	D15
Frequenz KHz bei ind.		float	PP	ind_frq	D16
Spannung V bei ind.		float	PP	ind_spa	D17
Empfindlichkeit mV/V/mm bei ind.		float	PP	ind_sensitiv	D18
Empfindlichkeit mV/mm bei elt.		float	PP	elt_sensitiv	D19
Banddicke in mm bei Umfangsbandmaßen				banddicke	
Messmittel mit Prüfrichtung A		int	PP	direction_a_activ	D20
Messmittel mit Prüfrichtung B		int	PP	direction_b_activ	D21
Prüflingswert wird mit Faktor vorverarbeitet (A)		float	PP	factor_prueflinga	D22
Prüflingswert wird mit Faktor vorverarbeitet (B)		float	PP	factor_prueflingb	D23
Faktor für Referenzsystem (Normal) (A)		float	PP	factor_referencea	D24
Faktor für Referenzsystem (Normal) (B)		float	PP	factor_referenceb	D25
<b>SOLLWERTE und Sollwertparameter</b>					
Referenzposition		float	PP	referenzpos	D26
Anzahl der Sollwerte / Gesamtmessbereich hinein A		int	PP	anz_s11	
Anzahl der Sollwerte / Gesamtmessbereich heraus A		int	PP	anz_s12	
Anzahl der Sollwerte / Gesamtmessbereich hinein B		int	PP	anz_s13	
Anzahl der Sollwerte / Gesamtmessbereich heraus B		int	PP	anz_s14	
Anzahl der Sollwerte / Teilmessbereich hinein A		int	PP	anz_s21	
Anzahl der Sollwerte / Teilmessbereich heraus A		int	PP	anz_s22	
Anzahl der Sollwerte / Teilmessbereich hinein B		int	PP	anz_s23	
Anzahl der Sollwerte / Teilmessbereich heraus B		int	PP	anz_s24	
Anzahl der Sollwerte / Wiederholbarkeit hinein A		int	PP	anz_s31	
Anzahl der Sollwerte / Wiederholbarkeit heraus A		int	PP	anz_s32	
Anzahl der Sollwerte / Wiederholbarkeit hinein B		int	PP	anz_s33	
Anzahl der Sollwerte / Wiederholbarkeit heraus B		int	PP	anz_s34	
Anzahl der Sollwerte / Hysterese A		int	PP	anz_s41	
Anzahl der Sollwerte / Hysterese B		int	PP	anz_s43	
Anzahl der Sollwerte / Kraftprüfung hinein A		int	PP	anz_s51	
Anzahl der Sollwerte / Kraftprüfung heraus A		int	PP	anz_s52	
Anzahl der Sollwerte / Kraftprüfung hinein B		int	PP	anz_s53	
Anzahl der Sollwerte / Kraftprüfung heraus B		int	PP	anz_s54	
Anzahl der Zyklen / Gesamtmessbereich hinein A		int	PP	anz_z11	
Anzahl der Zyklen / Gesamtmessbereich heraus A		int	PP	anz_z12	
Anzahl der Zyklen / Gesamtmessbereich hinein B		int	PP	anz_z13	

Anzahl der Zyklen / Gesamtmessbereich heraus B		int	PP	anz_z14	
Anzahl der Zyklen / Teilmessbereich hinein A		int	PP	anz_z21	
Anzahl der Zyklen / Teilmessbereich heraus A		int	PP	anz_z22	
Anzahl der Zyklen / Teilmessbereich hinein B		int	PP	anz_z23	
Anzahl der Zyklen / Teilmessbereich heraus B		int	PP	anz_z24	
Anzahl der Zyklen / Wiederholbarkeit hinein A		int	PP	anz_z31	
Anzahl der Zyklen / Wiederholbarkeit heraus A		int	PP	anz_z32	
Anzahl der Zyklen / Wiederholbarkeit hinein B		int	PP	anz_z33	
Anzahl der Zyklen / Wiederholbarkeit heraus B		int	PP	anz_z34	
Anzahl der Zyklen / Hysterese A		int	PP	anz_z41	
Anzahl der Zyklen / Hysterese B		int	PP	anz_z43	
Anzahl der Zyklen / Kraftprüfung hinein A		int	PP	anz_z51	
Anzahl der Zyklen / Kraftprüfung heraus A		int	PP	anz_z52	
Anzahl der Zyklen / Kraftprüfung hinein B		int	PP	anz_z53	
Anzahl der Zyklen / Kraftprüfung heraus B		int	PP	anz_z54	
Variation (Zufallsverteilung) (0=Aus 1=Ein)		int	PP	sel10var	
Prozentwert der Variation		int	PP	sel10var_value	
automatisches Zufügen von neuen Sollwerten nach VDI-Norm (0=Aus 1=Ein)		int	PP	sel10vdi	
Gesamtmessbereich Richtung A (0=Aus 1=Ein)		int	PP	sel10a	
Gesamtmessbereich Richtung B (0=Aus 1=Ein)		int	PP	sel10b	
Automatische Anpassung des TMB (0=Aus 1=Ein)		int	PP	sel20auto	
Teilmessbereich Richtung A (0=Aus 1=Ein)		int	PP	sel20a	
Teilmessbereich Richtung B (0=Aus 1=Ein)		int	PP	sel20b	
Automatische Anpassung der Wiederholposition (0=Aus 1=Ein)		int	PP	sel30auto	
Wiederholbarkeit Richtung A (0=Aus 1=Ein)		int	PP	sel30a	
Wiederholbarkeit Richtung B (0=Aus 1=Ein)		int	PP	sel30b	
Automatische Anpassung der Hystereseposition (0=Aus 1=Ein)		int	PP	sel40auto	
relative Anfahrposition für Hystereseprüfung		float	PP	sel40pos	
Hysterese Richtung A (0=Aus 1=Ein)		int	PP	sel40a	
Hysterese Richtung B (0=Aus 1=Ein)		int	PP	sel40b	
Kraft Richtung A (0=Aus 1=Ein)		int	PP	sel50a	
Kraft Richtung B (0=Aus 1=Ein)		int	PP	sel50b	
Sollwerte Gesamtmessbereich hineingehend A		float	PP_S11	0=...	
Sollwerte Gesamtmessbereich herausgehend A		float	PP_S12	0=...	
Sollwerte Gesamtmessbereich hineingehend B		float	PP_S13	0=...	
Sollwerte Gesamtmessbereich herausgehend B		float	PP_S14	0=...	
Sollwerte Teilmessbereich hineingehend A		float	PP_S21	0=...	
Sollwerte Teilmessbereich herausgehend A		float	PP_S22	0=...	
Sollwerte Teilmessbereich hineingehend B		float	PP_S23	0=...	
Sollwerte Teilmessbereich herausgehend B		float	PP_S24	0=...	
Sollwerte Wiederholbarkeit hineingehend A		float	PP_S31	0=...	
Sollwerte Wiederholbarkeit herausgehend A		float	PP_S32	0=...	
Sollwerte Wiederholbarkeit hineingehend B		float	PP_S33	0=...	
Sollwerte Wiederholbarkeit herausgehend B		float	PP_S34	0=...	
Sollwerte Hysterese hineingehend A		float	PP_S41	0=...	
Sollwerte Hysterese herausgehend A		float	PP_S42	0=...	
Sollwerte Hysterese hineingehend B		float	PP_S43	0=...	
Sollwerte Hysterese herausgehend B		float	PP_S44	0=...	
Sollwerte Kraft hineingehend A		float	PP_S51	0=...	

Sollwerte Kraft herausgehend A		float	PP_S52	0=...	
Sollwerte Kraft hineingehend B		float	PP_S53	0=...	
Sollwerte Kraft herausgehend B		float	PP_S54	0=...	
<b>Kennwerte</b> (Feld: 0 bis 49)					
Kennwert aktiviert? (0=Aus 1=Ein)		int	PP_KW	kw_act_...	
Kennwertbeschreibung		txt[100]	PP_KW	kw_t_...	B41...90
Einheit als Text		txt[10]	PP_KW	kw_t_eht_...	F41...90
Berechnungsvorschrift als Text		txt[30]	PP_KW	kw_t_calc_...	G41...90
Berechnungsvorschrift als code (siehe Anhang)		int	PP_KW	kw_code_...	H41...90
Einheit als Index (0= µm/minch 1=N)		int	PP_KW	kw_eht_...	
Auswertemodus (0=alle 1=bis 2=je)		int	PP_KW	kw_mode_...	I41...90
Auswertebereich		float	PP_KW	kw_range_...	J41...90
Maßeinheit für Auswertebereich (1=mm/inch 3=Umlauf 4=Teilungen)		int	PP_KW	kw_range_eht_...	
+/- Vorzeichen aktiviert? (0=Aus 1=Ein)		int	PP_KW	kw_vz_...	C44...90
Toleranzwert (0=nicht berücksichtigen)		float	PP_KW	kw_tol_...	D41...90
Toleranzwert für Formel (0=nicht berücksichtigen)		float	PP_KW	kw_tol2_...	
Messunsicherheit		float	PP_KW	kw_mu_...	E41...90
<b>Beurteilung(Sicht/Funktion)</b>					
Kennwert aktiviert? (0=Aus 1=Ein)		int	PP_SP	sp_act_...	
Kennwertbeschreibung		txt[256]	PP_SP	sp_t_...	B92....141
Kennwert mit Texteingabe? (0=Aus 1=Ein)		int	PP_SP	sp_i_...	
Kennwert mit Bewertung? (0=Aus 1=Ein)		int	PP_SP	sp_b_...	
<b>Prüfmodus</b>					
Schnittstelle: 0=visuell 1=KB 2=RS232 3=USB 4=LAN 5=MFP 6=kamera1 7=kamera2		int	PM	port	
Prüfmodus für Gesamtmessbereich 0=Zeigerdeckung 1=Zeigerposition		int	PM	p10auto_s	
Prüfmodus für Teilmessbereich 0=Zeigerdeckung 1=Zeigerposition		int	PM	p20auto_s	
Prüfmodus für Wiederholbarkeit 0=Zeigerdeckung 1=Zeigerposition		int	PM	p30auto_s	
Prüfmodus für Hysterese 0=Zeigerdeckung 1=Zeigerposition		int	PM	p40auto_s	
Prüfmodus für Kraft 0=statisch 1=dynamisch		int	PM	p50auto_d	
autom. Referenzsuche bei Umschaltung FH (0=Aus 1=Ein)		int	PM	fhautoref	
Referenzpunkt immer prüfen (0=Aus 1=Ein)		int	PM	refpruefen	
Prüfung nach JIS Mode (0=Aus 1=Ein)		int	PM	jis	
Soll-Ist Berechnung invertieren (0=Aus 1=Ein)		int	PM	calc_invers	
Wartezeit manuell vorgeben (0=Aus 1=Ein)		int	PM	man_waittime	
Abweichung auf Auflösung runden (0=Aus 1=Ein)		int	PM	runden	
Empfindlichkeit anpassen (ind.) (0=Aus 1=Ein)		int	PM	lin_korrektur	
Luftpalt in mm		float	PM	ls	
Vorlauf in mm		float	PM	vl	
Nachlauf in mm		float	PM	nl	
Umkehr in mm		float	PM	uk	
Vmax in mm/s		float	PM	vmax	
Amax in mm/s <sup>2</sup>		float	PM	amax	
Skalenteilungsfehler in tlg		float	PM	sktf	
Empfindlichkeit1 in %		float	PM	e1	
Empfindlichkeit2 in %		float	PM	e2	
Prüfschrittweite in tlg		float	PM	psw	
Wartezeit in ms		int	PM	wait	
Absolutposition in tlg		float	PM	abspos	
Wdhposition in tlg		float	PM	wdhpos	

Fehlerabbruch in tlg		float	PM	error	
Abbruchposition in tlg		float	PM	abbpos	
<b>Ergebnisse</b>					
Gesamtmessbereich A hineingehend: 11 Gesamtmessbereich A herausgehend: 12 Gesamtmessbereich B hineingehend: 13 Gesamtmessbereich B herausgehend: 14 Teilmessbereich A hineingehend: 21 Teilmessbereich A herausgehend: 22 Teilmessbereich B hineingehend: 23 Teilmessbereich B herausgehend: 24 Wiederholbarkeit A hineingehend: 31 Wiederholbarkeit A herausgehend: 32 Wiederholbarkeit B hineingehend: 33 Wiederholbarkeit B herausgehend: 34 Hysterese A hineingehend: 41 Hysterese A herausgehend: 42 Hysterese B hineingehend: 43 Hysterese B herausgehend: 44 Kraft A hineingehend: 51 Kraft A herausgehend: 52 Kraft B hineingehend: 53 Kraft B herausgehend: 54					
<b>Sicht- Funktionsprüfung</b> (Feld: 0 bis 49)					
Einzelergebnis der Sicht/Funktionsprüfung (Index): 0...50		int	RES	sp_s_...	C92...141
Bemerkungstext der Sicht/Funktionsprüfung: 0...50		txt[256]	RES	sp_txt_...	D92...141
<b>Kennwerte</b> (Feld: 0 bis 49)					
Kennwertberechnung Gesamtergebnis A 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht		int	RES	kwa_s_...	
Status als Text A		txt[256]	RES	kwa_st_...	Q41...90
Toleranzwert A		float	RES	kwa_tol_...	D41...90
Ergebniswert A		float	RES	kwa_val_...	K41...90
Überschreitung A		float	RES	kwa_err_...	P41...90
Zusatzwert A		float	RES	kwa_z2_...	L41...90
Zusatzwert A		float	RES	kwa_z3_...	M41...90
Zusatzwert A		float	RES	kwa_z4_...	N41...90
Zusatzwert A		float	RES	kwa_z5_...	O41...90
Berechnungsergebnis A als Index		int	RES	kwa_ready_...	R41...90
<b>Kennwertberechnung Gesamtergebnis B</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Status als Text B		txt[256]	RES	kwb_st_...	Y41...90
Toleranzwert B		float	RES	kwb_tol_...	K41...90
Ergebniswert B		float	RES	kwb_val_...	S41...90
Überschreitung B		float	RES	kwb_err_...	X41...90
Zusatzwert B		float	RES	kwb_z2_...	T41...90
Zusatzwert B		float	RES	kwb_z3_...	U41...90
Zusatzwert B		float	RES	kwb_z4_...	V41...90
Zusatzwert B		float	RES	kwb_z5_...	W41...90
Berechnungsergebnis B als Index		int	RES	kwb_ready_...	Z41...90
<b>Kennwertberechnung Gesamtergebnis A</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Kennwertberechnung Gesamtergebnis A		int	RES	kwa	C33
Kennwertberechnung Gesamtergebnis A		txt[256]	RES	kwa_t	B33
<b>Kennwertberechnung Gesamtergebnis B</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Kennwertberechnung Gesamtergebnis B		int	RES	kwb	C34
Kennwertberechnung Gesamtergebnis B		txt[256]	RES	kwb_t	B34
<b>Gesamtergebnisse der Sicht/Funktionsprüfung (Index)</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Gesamtergebnisse der Sicht/Funktionsprüfung		int	RES	sp	C36
Gesamtergebnisse der Sicht/Funktionsprüfung		txt[256]	RES	sp_t	B36
<b>Kennwertberechnung Gesamtergebnis A+B</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Kennwertberechnung Gesamtergebnis A+B		int	RES	kw	C35
Kennwertberechnung Gesamtergebnis A+B		txt[256]	RES	kw_t	B35
<b>Kennwertberechnung Gesamtergebnis A+B+Sichtp.</b> 0=n.d. 1=offen 2=gut 3=bedingt 4=schlecht					
Kennwertberechnung Gesamtergebnis A+B+Sichtp.		int	RES	kwsp	C37
Kennwertberechnung Gesamtergebnis A+B+Sichtp.		txt[256]	RES	kwsp_t	B37



MA1... MM1004	Hysterese / hineingehend / Richtung: A	
NA1... NM1004	Hysterese / herausgehend / Richtung: A	
OA1... OM1004	Hysterese / hineingehend / Richtung: B	
PA1... PM1004	Hysterese / herausgehend / Richtung: B	
QA1... QM1004	Kraft / hineingehend / Richtung: A	
RA1... RM1004	Kraft / herausgehend / Richtung: A	
SA1... SM1004	Kraft / hineingehend / Richtung: B	
TA1... TM1004	Kraft / herausgehend / Richtung: B	

## CALCULATIONS

	Code	Description
<b>fe -&gt;</b>	1	Largest relative deviation (largest value - smallest value) for ingoing measuring bolts over all measuring points in the overall measuring range.
<b>fe &lt;-</b>	2	Largest relative deviation (largest value - smallest value) for outgoing measuring bolts over all measuring points in the overall measuring range.
<b>fg -&gt;&lt;-</b>	3	Largest relative deviation (largest value - smallest value) for ingoing/outgoing measuring bolts over all measuring points in the overall measuring range.
<b>ft -&gt;</b>	4	Largest relative deviation (largest value - smallest value) for ingoing measuring bolts in the partial measuring range.
<b>ft &lt;-</b>	19	Largest relative deviation (largest value - smallest value) for outgoing measuring bolts in the partial measuring range.
<b>ft-&gt;&lt;-</b>	20	Largest relative deviation (largest value - smallest value) for ingoing/outgoing measuring bolts in the partial measuring range.
<b>Fu</b>	8	Maximum deviation difference between ingoing/outgoing measuring bolts in the overall measuring range.
<b>abs -&gt;</b>	5	Largest absolute deviation in reference to the reference point for ingoing measuring bolts in the overall measuring range.
<b>abs &lt;-</b>	6	Largest absolute deviation in reference to the reference point for outgoing measuring bolts in the overall measuring range.
<b>abs -&gt;&lt;-</b>	7	Largest absolute deviation in reference to the reference point for ingoing/outgoing measuring bolts in the overall measuring range.
<b>fw</b>	10	Repeatability.
<b>Fmax</b>	12	Maximum gauging force in measuring range.
<b>Fmin</b>	13	Minimum gauging force in measuring range.
<b>Fdiff</b>	14	Maximum gauging force difference for a movement direction (ingoing/outgoing).
<b>Fhyst.</b>	15	Maximum gauging force difference between ingoing/outgoing measuring bolts.
<b>MPE 1/10 (rev)</b>	100	Relative deviation over a range of 1/10 turn in the overall measuring range
<b>MPE 1/2 (rev)</b>	101	Relative deviation over a range of 1/2 turn in the overall measuring range
<b>MPE 1 (rev)</b>	102	Relative deviation over a range of 1 turn in the overall measuring range
<b>MPE 2 (rev)</b>	103	Relative deviation over a range of 2 turn in the overall measuring range
<b>MPE 2 1/3 (rev)</b>	104	Relative deviation over a range of 2 1/3 turn in the overall measuring range
<b>MPE 5 (rev)</b>	105	Relative deviation over a range of 5 turn in the overall measuring range
<b>MPE 10 (rev)</b>	106	Relative deviation over a range of 10 turn in the overall measuring range
<b>MPE 20 (rev)</b>	107	Relative deviation over a range of 20 turn in the overall measuring range
<b>MPE 50 (rev)</b>	108	Relative deviation over a range of 50 turn in the overall measuring range
<b>MPE user(rev)</b>	119	Relative deviation over an individual range (turn) in the overall measuring range
<b>MPE 1 (grd)</b>	120	Relative deviation over a range of 1 (graduation) in the overall measuring range
<b>MPE 5 (grd)</b>	121	Relative deviation over a range of 5 (graduation) in the overall measuring range
<b>MPE 10 (grd)</b>	122	Relative deviation over a range of 10 (graduation) in the overall measuring range
<b>MPE 20 (grd)</b>	123	Relative deviation over a range of 20 (graduation) in the overall measuring range
<b>MPE 50 (grd)</b>	124	Relative deviation over a range of 50 (graduation) in the overall measuring range
<b>MPE user (grd)</b>	129	Relative deviation over an individual range (graduation) in the overall measuring range
<b>MPE user (mm)</b>	130	Relative deviation over an individual range (mm/inch) in the overall measuring range
<b>MPE all</b>	131	Relative deviation across the entire measuring range corresponds: "fe ->"
<b>fe user -&gt;</b>	140	Largest relative deviation (largest value - smallest value) for ingoing measuring bolts. The range analysis is possible on an individual basis.
<b>fe user &lt;-</b>	141	Largest relative deviation (largest value - smallest value) for outgoing measuring bolts. The range analysis is possible on an individual basis.
<b>fg user -&gt;&lt;-</b>	142	Largest relative deviation (largest value - smallest value) for ingoing/outgoing measuring bolts. The range analysis is possible on an individual basis.
<b>ft user -&gt;</b>	143	Largest relative deviation (largest value - smallest value) in partial measuring range (ingoing). The range analysis is possible on an individual basis.
<b>ft user &lt;-</b>	144	Largest relative deviation (largest value - smallest value) in partial measuring range (outgoing). The range analysis is possible on an individual basis.
<b>ft user -&gt;&lt;-</b>	145	Largest relative deviation (largest value - smallest value) in partial measuring range (ingoing/outgoing). The range analysis is possible on an individual basis.



Identr.	Beispiel_FH	Typ (Beitrag)	Induz	Prüfbedeutung
Prüfer	Kluger	Exakt (Beitrag)	0	0
Datum	17.09.2013	St. (Beitrag)	1	1
Zeit	22:53:28	Trägheit	0,00000	2
Bezeichnung		Masspunkt	0,20000	3
Test_D	001	von	-0,10000	4
Test_1	MFP-100	zu	0,10000	
Test_2	010	haben	1,00000	
Test_3		sepp	1	
Test_4		sepp	1	
Test_5		sepp	1	
Test_6		Stu-RA	0	
Test_7		Stu-MP	0	
Test_8		Code-Alpha	0	
Test_9		nc-Raum	0,00000	
Test_10		nd-FM	0,00000	
Test_11		nd-PA	0,00000	
Test_12		nd-SN	0,00000	
Test_14		nd-SN	0,00000	
Test_15		(A)	1	
Test_16		(B)	1	
Test_17		MM-Faktor (A)	1,00000	
Test_18		MM-Faktor (B)	1,00000	
Test_19		REF-Faktor (A)	1,00000	
Test_19		REF-Faktor (B)	1,00000	
Info		Befragungszeit	-0,10000	
Prüfungstyp	Messpunkte nach DIN			
Prüfmodus	Einheitswert (mm-A-B)			
Bildname	manuelle Messung			
32	Prüfergebnis	Test von Messgruppen	Info	Individuelle Prüfbedeutung
33	A	Gut	2	Gut
34	B	Gut	2	Gut
35	A-B	Gut	2	Gut
36	Stabilität	n.d.	0	
37	Genauigkeit	Gut	2	Gut

Kennwert	VZ	Toleranz	MU	Einheit	Bereich	Code	Modus	Bereich	Vert	Zustat1/2	Zustat1/3	Zustat1/4	Zustat1/5	Überschreitung	Ergebnis	Ergebnis/2	Vert
Fu	3,00000		µm	Rein [1]	1	0	0,00000	1,30000	0,10000	-0,02000	-0,90000	0,40000			Gut	2	2
Fa	4,00000		µm	Reinwert [3]	3	0	0,00000	1,10000	0,02000	-0,08000	-1,30000	1,80000			Gut	2	1
Fb	2,00000		µm	Re [3]	3	0	0,00000	1,50000	-0,08000	-0,08000	-0,10000	1,80000			Gut	2	1
Ft	2,00000		µm	Re in [15]	15	0	0,00000	1,70000	-0,01600	-0,01000	-0,90000	0,80000			Gut	2	0
Fu	1,50000		µm	Re [20]	20	0	0,00000	1,10000	0,00000	0,00000	0,78000	-0,34000			Gut	2	0

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info@mt-kluger.de

## Prüfprotokoll

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Identnummer: **Example\_FH**

Prüfdatum: **17.09.2013**

Prüfer: **Kluger**

Auftragsgeber:

Auftragsnummer: **001**

Prüfgerät: **MFP-100**

Maßeinheit: **DKD**

Temperatur:

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Typ: **Masspunkte nach DIN**

Messpunkte: **0,200**

Teilung: **0,002**

Bezugspunkt: **-0,10**

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**Prüfergebnisse:**

Kennwert	zul. Toleranz	MU	Maßwert (A)	Schrittung (A)	Beurteilung (A)	Maßwert (B)	Schrittung (B)	Beurteilung (B)
Fu	3µm	1,3µm			Gut	2,4µm		Gut
Fa	4µm	2,4µm			Gut	3µm		Gut
Fb	2µm	1,5µm			Gut	1,7µm		Gut
Ft	2µm	1,7µm			Gut	1,µm		Gut
Fu	1,5µm	1,1µm			Gut	0,5µm		Gut

**RELEASE INFORMATION**