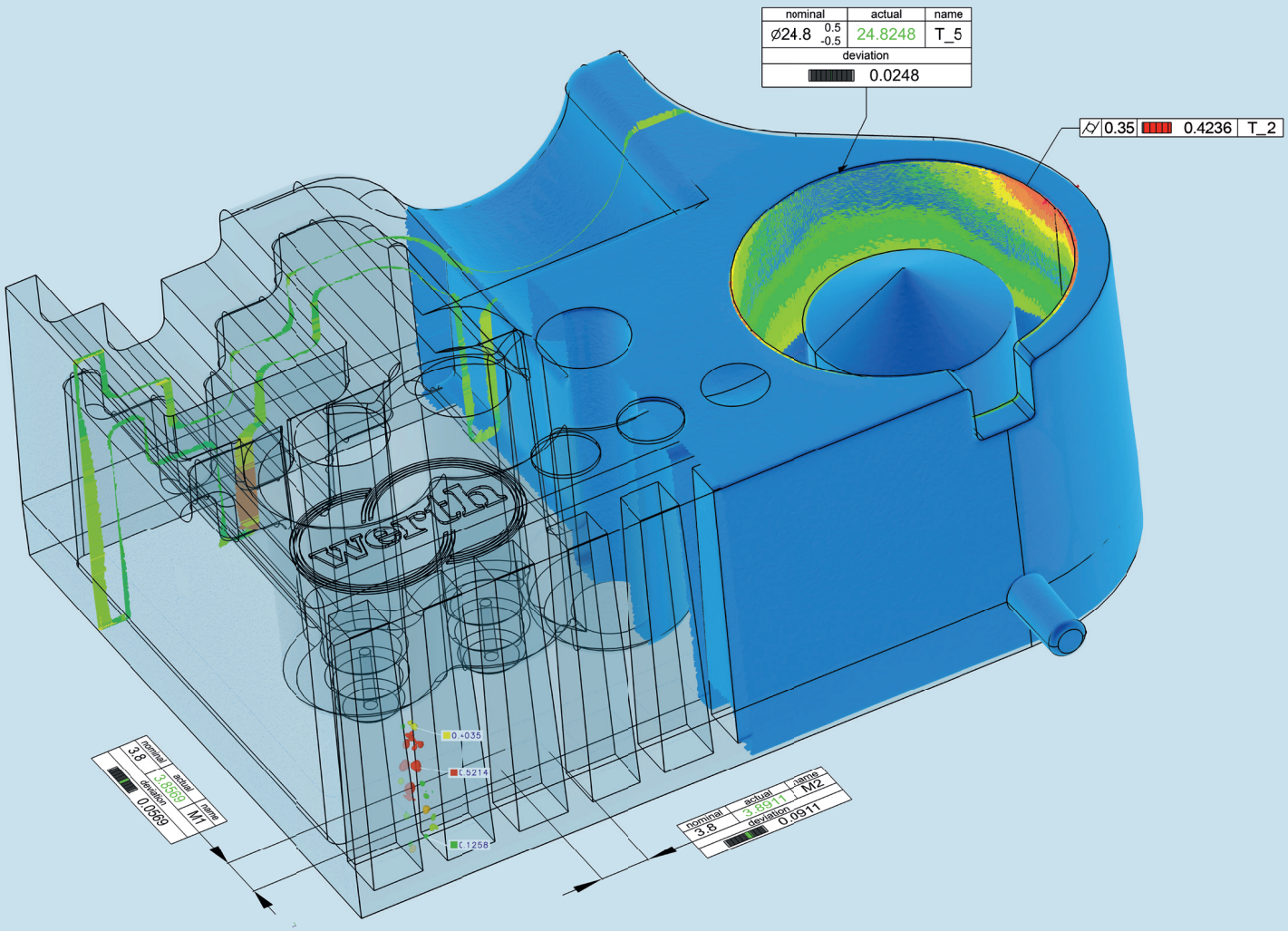

New Features

WinWerth® Version Information 9.44

The measurement software for all tasks on the shopfloor and in the laboratory

Werth Messtechnik GmbH

www.werth.de

WinWerth® version 9.44

Dear customers of Werth Messtechnik GmbH,

we are pleased to announce the new version of our WinWerth® 3D measurement software. It is available as WinWerth® 9.44 for Windows 10.

The measuring software WinWerth® was again expanded by many functions.
One focus was the evaluation of CT measurements, such as the determination of burrs, optimization of inline applications, or the automatic multi-object tomography. The measuring programs for TomoScope® machines can now be created completely offline. For this purpose, the workpiece voxel volume and the point cloud are simulated with the workpiece CAD model, the material and the measurement parameters, taking into account the machine geometry virtually set in the 3D graphics.
Another new feature is swing laminography, in which the angular range for recording the radiographic images is reduced, enabling the measurement of workpieces with a large aspect ratio, such as printed circuit boards.

With the user interface Scout, now integrated in WinWerth®, measurement results can be easily viewed numerically or as 3D graphics from several workstations throughout the network.

Have we sparked your interest? Please refer to this version information for a detailed description of the new features.

If you have any questions, please contact our worldwide service centers. Our headquarters can also be contacted either by phone at +49 641 7938-519 or by e-mail at vertriebsinnendienst@werth.de.

We wish you continued success in working with WinWerth®.

Your sincerely

Your team from Werth Messtechnik GmbH

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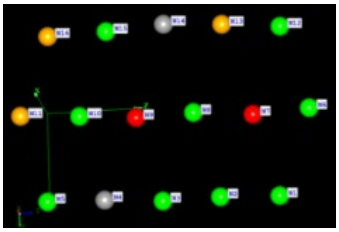
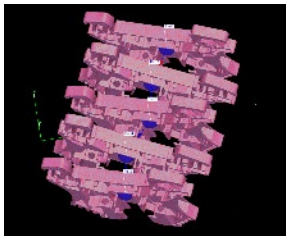
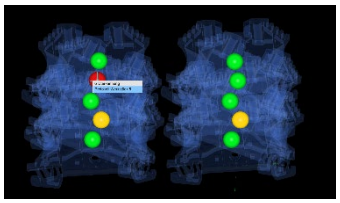
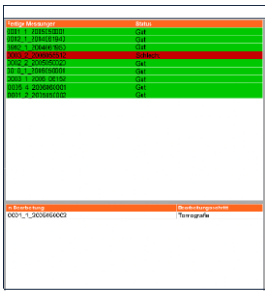
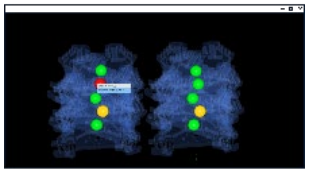
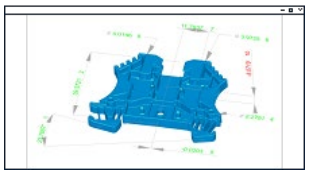
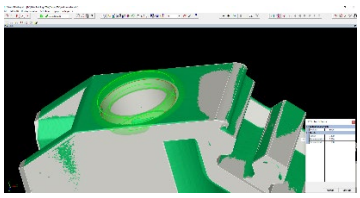
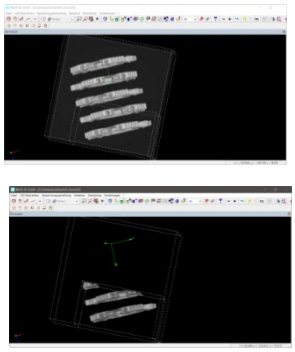
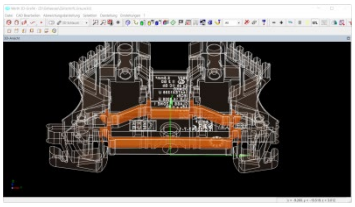
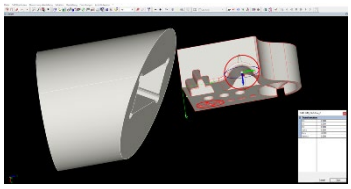
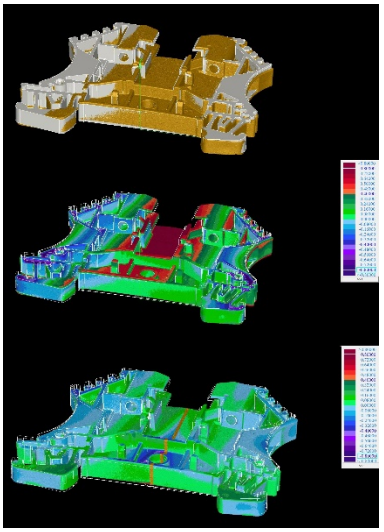
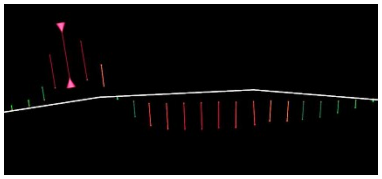
WinWerth® General functions (Standard)	**Element workpiece** The “Workpiece” element enables the bundling of data (e.g. volume, point clouds) and characteristics of **one** workpiece. • Summarized evaluation per workpiece with all measured geometric characteristics possible • The workpiece status "good", "bad" or "above a action limit", can be determined from all specific geometric characteristics. • The visualization of the workpiece element takes place as a sphere in the 3D graphic at the position of the workpiece and is color-coded according to its status, e.g. green for "in tolerance", yellow for "above a action limit" and red for "out of tolerance".	  *Summary evaluation per workpiece with all measured geometric characteristics*
WinWerth® General functions (Standard)	**Element group** The "Group" element enables the bundling and common (e.g. statistical) evaluation of elements of one type, e.g. geometry elements such as circles or workpiece elements. • Evaluation of selected characteristics of the combined elements such as minimum / maximum value, mean value, range, standard deviation • Display of the selected values in the output field	
WinWerth® Module **Workpiece Separation** (Option)	**Multiple measurement** WinWerth® enables coordinate measuring machines with X-ray tomography to measure several workpieces simultaneously in one shot, so that the measuring time per workpiece is greatly reduced, in many cases to a few seconds. • Automatic separation of the total measuring point cloud into individual measuring point clouds using the "workpiece separation" software function. The workpiece separation can also be conveniently taught in offline. • The automatic assignment of small objects such as voids or chips to the respective workpiece significantly improves non-dimensional inspection tasks • In the overview display of the 3D graphic and in the measurement report, the status of the individual workpieces can be seen at a glance by means of the color marking • Combining several workpieces into a group enables the evaluation of workpieces or groups of workpieces	 *Result of separation: 3D graphic with sorted single point clouds*  *Combining several workpieces into one group*

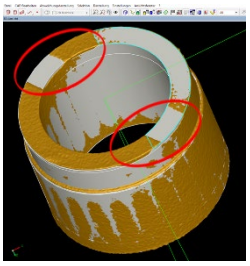
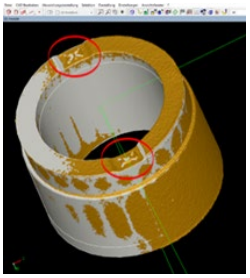
WinWerth® Module **WinWerth® Scout** (Option)	**WinWerth® Scout** With the production-oriented user interface “Scout,” the measurement results can be easily viewed numerically and / or graphically from several workstations throughout the network. • Measurement jobs that are still being processed are kept in a list. The list contains the identification number of the job and the current status, such as “Job started,” “Tomography,” “Tactile measurement” or “Evaluation.” • Completed orders are automatically moved to another list and color-coded according to their status, e.g. green for “in tolerance,” yellow for “above an action limit” and red for “out of tolerance.” • The user interface can be adapted to customer-specific requirements.	   *The list of measuring jobs and workpiece groups (above) shows the summarized measurement result in color-coded form (red – at least one workpiece is out of tolerance). Overview of the workpiece elements in the WinWerth® 3D-Viewer (center). Now it is easy to see which workpiece caused the tolerance to be exeeceded (red / yellow / green). 3D representation of the geometric characteristics (bottom).*
WinWerth® General functions (Standard)	**3D selection window** New window functions have been developed to increase the ease of use. On the workpiece volume or the measuring points generated during the measurement, the areas to be inspected can be selected by applying 3D-windows. • Available 3D selection windows: 3D box, 3D cylinder, 3D prism, 3D tube, fence window (polygonal course) • Multiple use of a window is possible • Application examples: clipping and cropping of point clouds and volumes, filtering partial areas of volumes or point clouds	 *Creation of a 3D window via the 3D graphics*

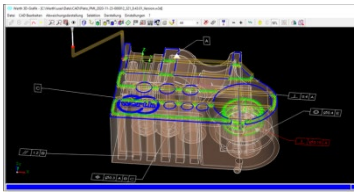
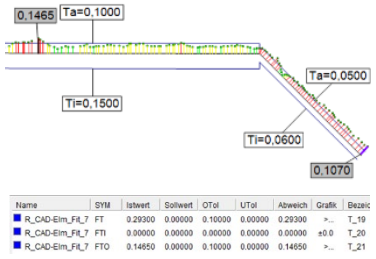
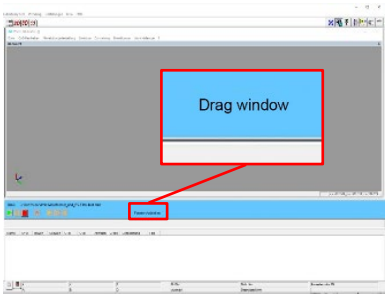
WinWerth® General functions (Standard)	**Cut 3D volume** This new function offers the following application possibilities, among others • Filtering partial areas of a volume • Burr inspection (selection of areas where the workpiece is to be inspected for burrs). • Local calculation of a point cloud from a partial volume	 *Top: Total volume. Bottom: Partial volume cut out*
WinWerth® General functions (Standard)	**Cut point clouds** This function supplements the evaluation options of measurement point clouds. The clipping of point clouds can be done with 2D and 3D windows. Application examples • Local application of any operation to a part of a point cloud, e.g., local application of wall thickness analysis. • Exclusion of local defects / faults, e.g. ejection area, injection point, from further processing	 *Resulting point cloud*

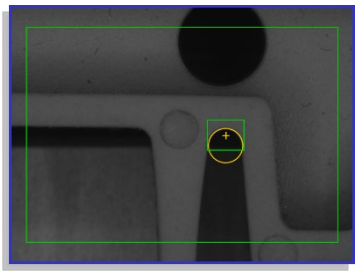
WinWerth®
Module
 	
3D-CAD-Offline® and 3D-CAD-Online®
(Option)
	Measure with several CAD models in one measurement sequence
	Measuring with several CAD models offers a wide range of application possibilities.
	• In 3D CAD offline® mode, multiple CAD models can be used simultaneously
	  ○ For visual collision check
	  ○ For CAD-Online® measurements of the workpiece and the fixture to simulate tomography
	• Display of all point clouds of a multiple part measurement incl. the fixture in WinWerth® – controlled via WinWerth® Scout
		
		Rotation / displacement of the workpiece CAD model with respect to the fixture CAD model

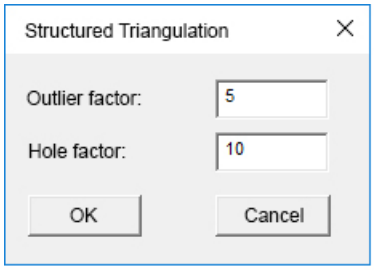
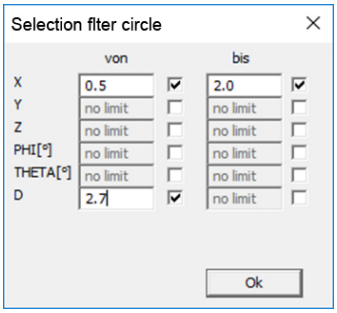
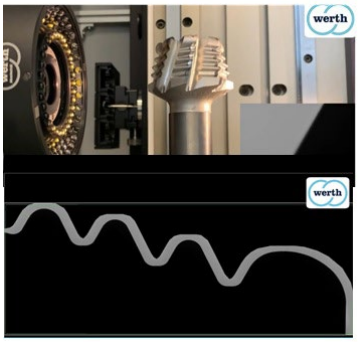
WinWerth® General functions (Standard)	**Simultaneous color-coded plot of deviations from different nominal/actual comparisons** Several different nominal/actual comparisons can now be performed on a workpiece, even in different datums, and the results can be displayed simultaneously. Application examples: • Representation of several line or surface shape deviations (different nominal/actual comparisons) in one deviation representation • Display of small local deviations of partial areas of the workpiece with simultaneous large global deviations of the entire workpiece	 *Top: Workpiece fitted in CAD without deviation plot. Middle: Workpiece with global color-coded deviation plot. Bottom: color-coded deviation plot of two part fits of the workpiece.*

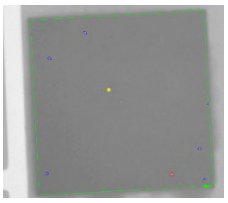
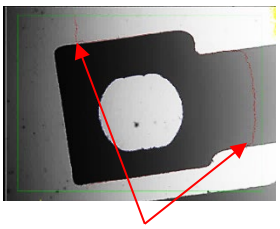
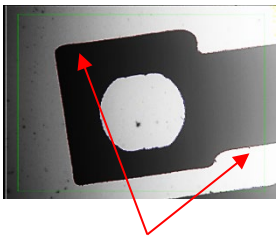
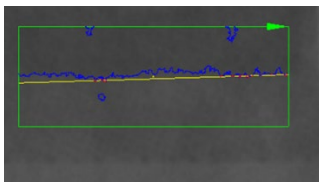
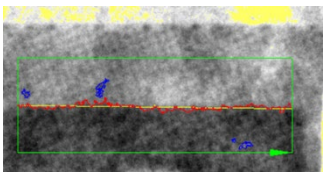
WinWerth®
General functions
(Standard)
	Advanced options for spike display
	• Display of deviations on the nominal part
	• Presentation of deviations on the actual part
	  ○ The foot point is located on the point cloud when displayed
	  ○ The spike point is located on the point cloud when displayed
	• Switching the spike tip display on/off
		
		Display of the deviation on the actual part (spike points switched on, base point on the point cloud).

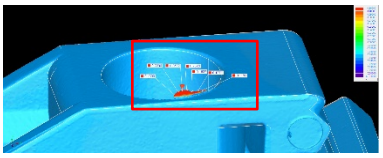
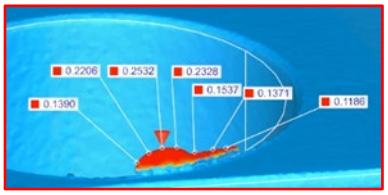
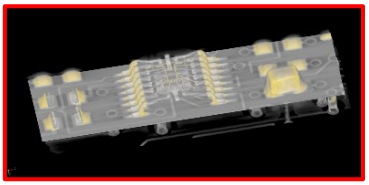
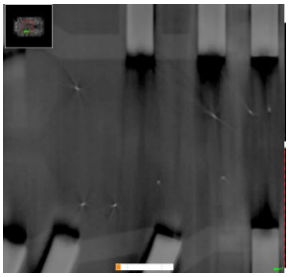
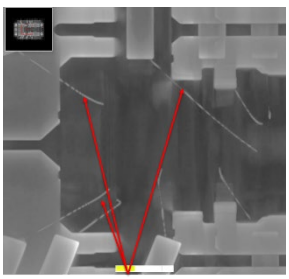
WinWerth® Module **2D BestFit** (Option)	**Improved fit for rotationally symmetrical workpieces** Workpieces that are rotationally symmetrical except for small details, are reliably fitted using the "Rotational Fitting" strategy. The rotational axis of the point cloud and the CAD model must be parallel to each other for this (through previous rough fitting or manual fitting). • Areas that deviate from the rotational symmetry can be defined by the operator and transferred to the fitting algorithm as additional information in the form of cutting planes to be considered.	 *Standard fit*  *Rotational fitting*

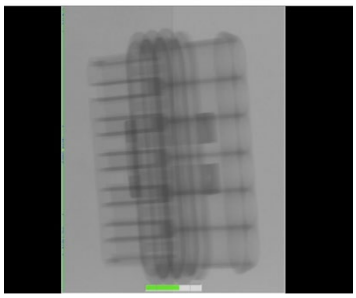
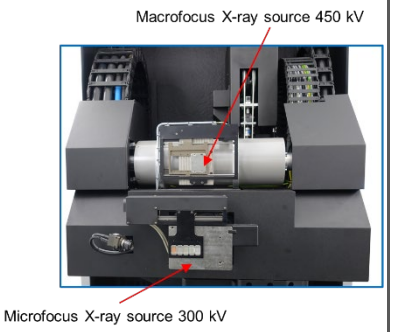
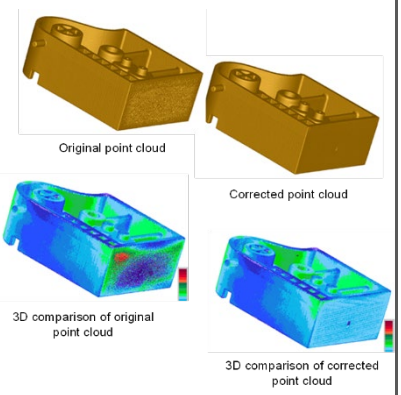
WinWerth® General functions (Standard)	**Other innovations in 3D graphics** The following innovations have been integrated into the 3D graphics • CAD models in STEP format can be imported directly into WinWerth® • To set the color-coded deviation display (tolerances spikes, spike length, etc.), the dialog remains open until the operator actively closes it.	
WinWerth® Module **PMI** (Option)	**PMI: Extensions for measuring position deviations** The measurement with PMI support has been extended by some functions. • Selection of a position deviation (with point distribution switched on) → Points/scan paths are distributed on the toleranced element and on all references, which can be edited individually after processing • Execution of the existing algorithm for the evaluation of a position deviation • Transfer of the nominal value and tolerances from the CAD model with PMI	
WinWerth® Module **2D-BestFit** (Option)	**2D-BestFit: Extension of the shape evaluation (FTI, FTO)** A new and for many applications helpful function was added to BestFit. • Automatic localization of the largest or smallest deviations to the tolerance (regardless of the direction inside / outside).	
WinWerth® General functions (Standard)	**Measuring sequence with operator guidance** This new feature allows the operator to intervene during the automatic run as needed. • Various control elements (measuring window, IP filter, CT parameters, ...) can be unlocked to be changed in case of a possible operator intervention • The measuring program is stored with the changes and is thus available later at the push of a button	

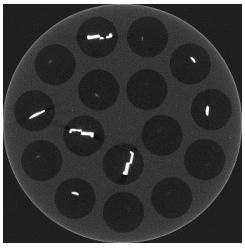
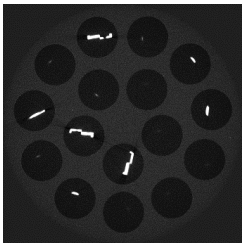
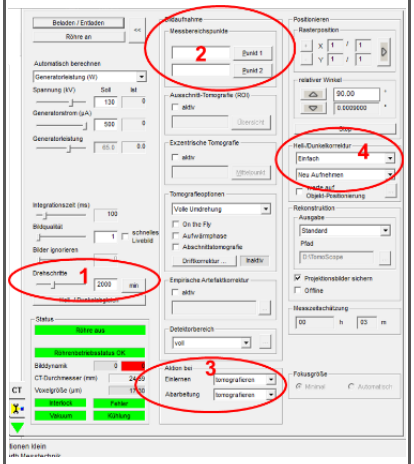
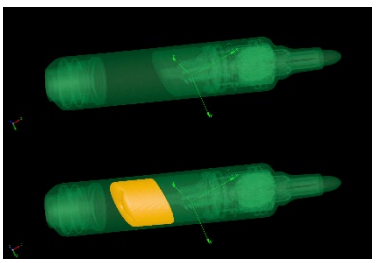
WinWerth® Module **OCR** (Option)	**OCR text recognition** Text characters, lines and entire text blocks can now be recognized with the Werth image processing software thanks to OCR (OpticalCharacterRecognition). The "Text" element has been integrated for this purpose. The new function is available for all image processing sensors and, in combination with the new 3D volume window, also for the volume section sensor. Application examples: • For multi-cavity measurements, the nest number on the workpiece allows the measurement results to be assigned to the workpiece • Automatic selection of the correct measuring program • Assignment of the measurement results to the respective workpiece • Automatic transfer of information applied to the workpiece (e.g. nest number) to the measurement report	
WinWerth® General functions (Standard)	**New project structure** As an alternative to the current Werth directory structure, a project-related directory structure can be created. In this case, all desired files belonging to the respective measuring process (e.g. volume data, DMIS program, report) are stored in a folder. • Simplified data organization and management • Flexible storage of measurement results with the completely executable measurement programs for documentation purposes • Convenient execution of these measuring programs on other CMMs or evaluation PCs	
Multisensor systems Module **Contour bundle WFP®** (Option)	**Acceleration of WFP® 2D scanning** By using an ultra-fast camera (300 Hz) and accelerated template finding, WFP® scanning was significantly accelerated. • Shorter measurement times • Higher measurement accuracy due to higher point density	
Multisensor systems General functions (Standard)	**Acceleration of template finding** Calculation on the GPU (graphics card of the high-end PC) significantly accelerates template finding. This enables shorter measurement times, especially for very large images.	

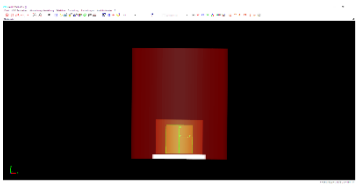
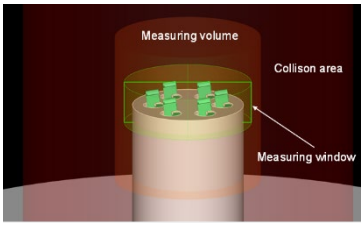
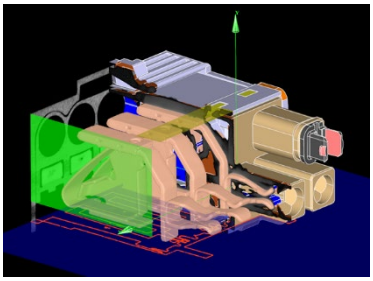
Multisensor systems Module **Contour bundle CFL** (Option)	**Acceleration STL calculation from CFL point clouds** By applying the new strategy "Structured Triangulation" with corresponding input of the parameters "Outlier Factor" and "Hole Factor" the STL calculation from CFL point clouds can be accelerated. • The outlier factor is used for the defined elimination of outliers perpendicular to the recorded topography • The hole factor is used to automatically decide whether missing points in the measurement point cloud are closed or "holes" are in the point cloud	 *"Structured triangulation" dialog box*
Multisensor systems Module **2D CAD Offline®** (Option)	**2D CAD Offline®: Extension with function "Multiselection"** Operation in 2D CAD Offline® mode has been further simplified. • Multiselection (selection of the "Straight line" and "Circle" elements and the associated setting parameters) automatically measures the corresponding elements • The same applies to 3D CAD Offline® / Online® accordingly with plane, cylinder, ...	 *Selection of elements possible via all element parameters*
Multisensor systems Module **WMS40** (Option)	**Monitoring of the Werth Multisensor System WMS** When replacing a sensor on the WMS, it is checked whether the correct sensor has been attached. This is done during teach-in, editing and running of a measurement sequence.	
Multisensor systems Module **Envelope Scanning** (Option)	**Envelope Scanning following the cutting edge** In order to assess the quality of a tool, it is important to know what shape a rotating tool leaves behind in the workpiece during milling / drilling. This shape is reproduced by the envelope contour and captured with Envelope Scanning. Typical applications are • Tools with known cutting edge geometry and small deviations: Cutting edge tracking without oscillation → Reduction of the measuring time on a typical example by a factor of 20 • Tools with known cutting edge geometry and large deviations of the helix angle: cutting edge tracking with oscillation results in correct determination of the envelope contour → Reduction of the measuring time on a typical example by a factor of 10 • Tools with unknown cutting edge geometry but known envelope contour: helical Envelope Scanning	

Multisensor systems General functions (Standard)	**IP function "Microstructure“** This function improves the detection of structures with the IP sensor and ensures that even the smallest structures are reliably detected and measured.	 *All structures are automatically detected*
Multisensor systems General functions (Standard)	**IP function “Gradient”** This function improves edge detection with the IP sensor despite strong brightness gradients in the image and ensures that the edge is measured correctly all around.	 *Mismeasurement*  *Correct measurement with “Gradient” function*
Multisensor systems General functions (Standard)	**IP function "Transfer function“** When measuring with the IP sensor, low-contrast edges are often not visually recognizable. By applying the new transfer function, the edge is now automatically displayed with maximum contrast and made available to the image processing software with full intensity resolution.	 *Original image*  *Image with application of the transfer function*

X-ray tomography Module **Burr Detection** (Option)	**Burr Detection** With the help of a new function in WinWerth®, burrs or chips can be detected and measured fully automatically during the measuring process. The display can be color-coded as well as via analysis markers.	 *Color-coded deviation plot of the burr with analysis markers* 
X-ray tomography Module **Laminography** (Option)	**Swing laminography** To maximize resolution, either the distance to the X-ray tube or to the X-ray detector must be minimized. When tomographing large, flat workpieces, such as printed circuit boards, the resolution is often insufficient due to the risk of collision. Laminography provides a solution to this problem. Here, the workpiece is positioned close to the X-ray tube or detector and then rotated by only a small angular range (e.g. ±20°) during tomography. Now 2D measurements in defined cross section planes are possible in highest resolution.	 
X-ray tomography General functions (Standard)	**Extension of volume section by the thick film function** When tomographing, some features are hardly recognizable in a cross section through the volume because they extend over several slices. With the thick film function it is possible with WinWerth® to combine the information from a stack of slices into a projected image and to display and evaluate it.	 *Without thick film function – wires are hardly visible*  *With thick film function – wires are visible*

X-ray tomography Module **Increased Accuracy** (Option)	**Stepless Magnification** Previously, to measure a workpiece with a TomoScope® , the user had to use the magnifications qualified in steps. • With “stepless magnification,” the user now has the option of tomographing the workpiece at a freely selectable position (e.g. optimum field of view for the measuring task) • The magnification is calculated automatically from the positions of the machine axes. Additional effort for measuring a new magnification is eliminated, saving the operator time. The prerequisite for using "Stepless Magnification" is the "Increased Accuracy" option, which includes advanced geometry correction.	 *Stepless magnification: field of view adapted to workpiece size*
X-ray tomography Module **Second X-ray tube** (Option)	**Operation of two X-ray tubes on one CMM** Until now, it has not been possible in coordinate measuring systems with computed tomography to measure one workpiece in the same coordinate system with two different types of tubes, as is standard today for multisensor coordinate measuring machines. • By using different types of tubes, it is now possible to measure hard to penetrate areas and small details on the same workpiece • Two-tube measurement systems for the TomoScope® L, XL or XL NC combine macrofocus, microfocus or sub-microfocus tubes. For example, a macrofocus measurement can be combined with a 450kV reflection target tube and a microfocus measurement with a 300 kV transmission target tube.	
X-ray tomography General functions (Standard)	**Cone beam artifact correction** With the cone beam artifact correction, artifacts caused by the cone beam geometry can be corrected. Provided that there is sufficient segmentation capability of the measured volume, cone beam artifacts can be simulated on the nominal geometry (in advance on the CAD or the point cloud of a master part or later on the point cloud of the workpiece itself) and then corrected on the actual part. <u>Correction of the point cloud</u> • Correction of the point cloud by simulation on a point cloud of **an identical or the same workpiece** • Correction of the point cloud by simulation on CAD data <u>Volume correction</u> • Correction of the volume by simulation on the point cloud of the same workpiece	

X-ray tomography General functions (Standard)	**Improved section tomography even without overview tomography** If the workpiece or the workpiece fixture is partially outside the field of view during tomography, artifacts occur in the reconstructed volume, which can lead to an incorrect MultiMaterialScan of the workpieces. For high accuracy requirements, an additional overview tomography is therefore still recommended. Application • Section tomography is possible without overview tomography • Significant reduction of artifacts when parts of the workpiece or fixture were not always in the field of view during tomography	 *Previous section tomography*  *Improved section tomography*
X-ray tomography General functions (Standard)	**Extension of the CT tool** Several new features have been added to the CT tool to optimize work on the CT CMM. • Automatic calculation of the number of rotation steps (1) • Unification of the operation of "in the image", raster and half-sided tomography: Definition of the measuring range by entering two manual points for image acquisition (2) • The actions during teach-in and running of the measurement program (teach-in only, tomography, simulate) are now adjustable (3) • New light-dark correction mode "time-controlled" selectable (4) The user can specify the validity period for light-dark correction images in the settings dialog. Before a tomography, the light-dark correction is performed automatically only if the time span between the start of the new tomography and the last performed correction is longer than the specified validity period.	 *Innovations in the CT tool*
X-ray tomography General functions (Standard)	**Differential volume** Defects on a workpiece can be determined via a completeness check. For this purpose, the volume of the workpiece to be inspected is compared with the volume of a master workpiece and then the difference between the two volumes is determined. In the representation of the differences as an ISO surface, the defects (missing / surplus elements) are visible.	 *Representation of the differences as ISO area (below: representation of the missing areas in yellow, in the example missing ink in the pen).*

X-ray tomography General functions (Standard)	**Display measuring volume cylinder and collision cylinder** To make it easier to work with a CT CMM, especially when using Raster CT, ROI CT, etc., it is possible to display the measuring volume cylinder and the collision cylinder.	 *Display of measuring cylinder, "in the image" cylinder and collision cylinder*
X-ray tomography General functions (Standard)	**Automatic shutdown of the X-ray source after an adjustable "idle time“** For TomoScope® FQ machines, there is the option of automatically switching off the X-ray source after an adjustable idle time. The wear of the target is minimized.	
X-ray tomography Module **TomoSim** (Option)	**TomoSim** From now on, working in offline mode is also possible for computed tomography. With the new TomoSim function, the volume of the workpiece can be simulated offline by using CAD data (usually not connected to a TomoScope®). • Measurement time on the CT CMM is maximized, as program creation takes place at the offline workstation • Program creation before the workpiece is available • A complete CT measurement (incl. testing and optimization of all CT parameters) can be simulated • Any artifacts that occur are also simulated. These can be counteracted before the measurement, e.g. by positioning the workpiece differently. • Program creation offline in the office / home office possible	 *Exact simulation of measurering volume, measuring window and collision area*
X-ray tomography General functions (Standard)	**Extensions VolumeCheck** • Parallel display of the volume in multiple views with automatic generation of cross section views • Integration of a transfer function for better display with multiple materials • Full integration of the Volume Section Sensor for measuring • Images and videos for analyzing the workpiece can be integrated into automatic runs	 *Extension of the VolumeCheck functions*

New Features

WinWerth® Version Information 9.44

The measurement software for all tasks on the shopfloor and in the laboratory

03/2022

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