



Multisensor

Innovative Metrology for your Quality Products



Cover picture: WinWerth® MultiMaterialScan with automatic calculation and separation of the point clouds for different plastics and metals, volume section with the different gray values of the materials as well as measured geometric properties in the WinWerth® measuring software



The successful TomoScope® XS Plus machines are now also available with 200 kV acceleration voltage and an integrated workpiece changing system

Coordinate measuring systems with the optimum sensors for every application

Werth coordinate measuring systems are used in almost all industries. Due to the technology changes in the automotive industry and the energy sector, the focus is shifting, for example in the direction of medical technology. This has resulted in new growth compared to previous years.

Due to increasing integration, industrial products contain an ever greater range of functions in a smaller space. As the complexity of the workpieces increases, so does the need for information. Here, optical sensors, computed tomography and multi-sensor technology are advantageous due to fast measurement of many points. The proven ScopeCheck® FB multi-sensor coordinate measuring machines are now available with three independent sensor axes and a unique combination of rotary/tilt axis and Chromatic Focus Line sensor. A novel rotary axis solution enables highly accurate roundness and straightness measurements.

The trend in coordinate metrology towards computed tomography continues. One of the reasons for this is the successful TomoScope® XS family. The new development of the low-wear X-ray sources with highest resolution was a small revolution in the industry. The coordinate measuring systems also lend themselves to the integration of metrology into production. The latest representatives of the economical compact machine family are the TomoScope® XS Plus 200 with up to 200 kV acceleration voltage and the TomoScope® XS FOV 500 with a maximum power of 500 W. Automation for at-line and in-line measurements is supported by an integrated workpiece changer, full offline programming with TomoSim and automatic control of various measurement jobs with WinWerth® Scout. A technical article on page 28 ff. sheds light on the background and prerequisites for the new trend.

The WinWerth® version 9.44 contains many new functions, and ease of use, measuring time and flexibility have also been improved. In the current issue of our company magazine "Multisensor," we introduce Werth Tool MT GmbH and give you an insight into the assembly of Werth coordinate measuring machines at our headquarters in Giessen. We look forward to welcoming you again in person at trade fairs or at our premises this year.



Dr. Ralf Christoph

President and owner of

Werth Messtechnik GmbH Giessen

Content

News about Multisensor Systems

06 One machine for all cases



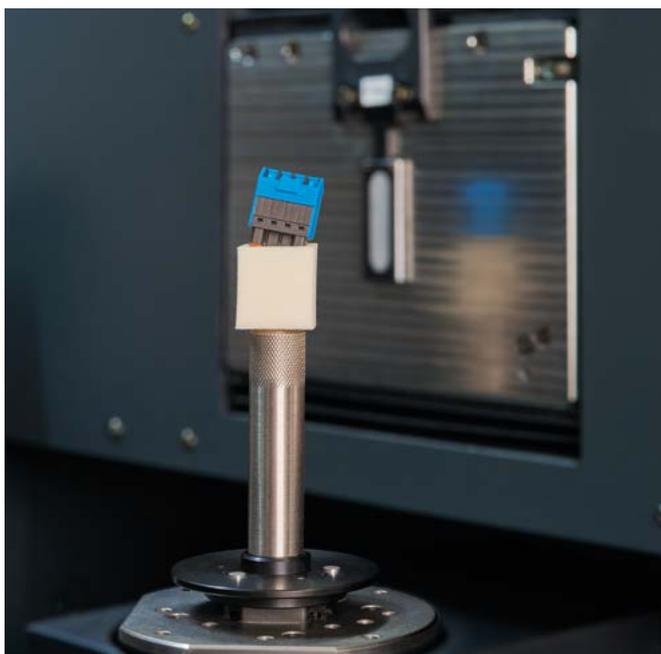
- 10 Chromatic sensors – multipoint measurement for e-mobility
- 11 Roundness and straightness measurement in the precision of form testers
- 12 New WinWerth® Version 9.44
- 13 Fast measurement of coating thickness with chromatic sensor

Werth Case Study

- 14 Injection molder uses combination of optical and tactile sensor technology

News about X-ray Computed Tomography

- 18 Low-maintenance 200 kV X-ray source in monoblock design



- 20 Multi-sensor tomography – two-tube measuring system now also with sub-microfocus tube
- 22 High-performance computed tomography at the price of tactile or multi-sensor coordinate measuring machines
- 23 Simulation of the tomography process with WinWerth® TomoSim
- 24 WinWerth® MultiMaterialScan
- 25 Tomography scan of workpieces with large aspect ratio
- 26 WinWerth® Artifact corrections – overview of the novelties

Werth Scientific Article

- 28 Computed tomography displaces conventional coordinate measuring machines

News about the Werth Group

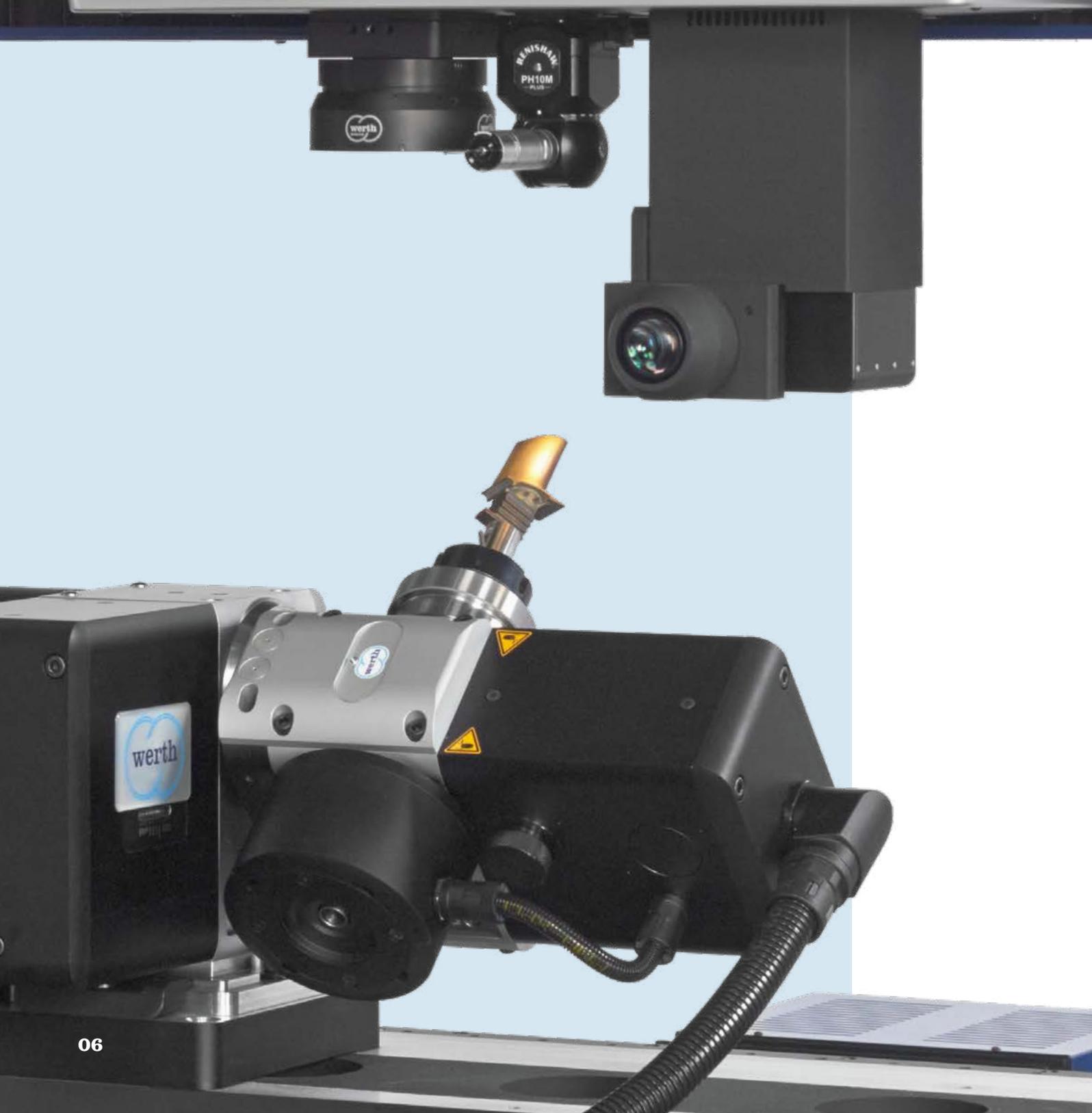
- 32 Sharply focused on tool precision
- 34 Assembly of workpiece changers
- 35 Mounting air bearings
- 36 Werth Messtechnik and international standardization



- 38 News in Brief

News about Multisensor Systems

The right Sensor for every Measurement Task



One machine for all cases

The ScopeCheck® FB family of machines now also enables fast multi-sensor measurements without restriction with three independent sensor axes. For the new machines, currently the largest with a measuring range of 2130 mm × 1000 mm × 600 mm, Werth Messtechnik now offers a unique combination of rotary/tilt axis and Chromatic Focus Line sensor.

Multi-sensor technology perfectly integrated: With the proven multi-pinhole concept, an even wider range of multi-sensor technology can now be used without restriction and without time-consuming sensor changes. Each sensor has its own ram, and the rams with non-active sensors are located in park position outside the measuring range. One of the first users for the new machine concept is the measuring service company Messtronik GmbH in the Black Forest. Quote from the managing partner Jörg Weißer: "As a measuring service provider, I receive a wide variety of workpieces. I use the multi-sensor technology on three independent sensor axes in combination with the rotary/tilt axis for measuring tasks whose solution was previously considered too complex or even impossible." The combined measuring ranges from 530 mm × 500 mm × 350 mm to 2130 mm × 1000 mm × 600 mm enable multi-sensor measurements for larger workpieces as well.

All good things come in threes

The ScopeCheck® FB is probably the only coordinate measuring machine type with three independent sensor axes for even greater flexibility. The machines allow fast measurements with high ease of use for three, and with the Werth Laser Probe integrated in the Werth Zoom or the Chromatic Focus Zoom (patents) even four sensors. The family of machines combines the advantages of conventional optical, tactile and multi-sensor coordinate measuring machines.

The widespread combination of image processing and probe is obtained, for example, with a rotary/tilt head for tactile measurements from all directions on the first ram and the Werth Multi-Sensor System with Werth Zoom, Werth Laser Probe and the likewise patented Werth Contour Probe on the second. The patented Werth Fiber Probe® 3D or the Chromatic Focus Line sensor can then be used on the third ram. Since the

rotary/tilt head and the Werth Fiber Probe® 3D each require their own ram, such a combination is not possible by changing sensors on conventional machines with a single ram.

Optical, tactile and tactile-optical sensors can be used without changing the sensor. One ram is positioned outside of the measuring range and the required ram is lowered. Combination with more specialized sensors such as the Werth Interferometer Probe for measurements in small bores is also possible.

This means that both large and complex 3D workpieces as well as micro-structures can be measured. As an alternative to the rotary/tilt head, a slim stylus ram allows collision-free measurement of geometries that lie deep in the workpiece. If initially only a purely tactile machine is required, retrofitting to a multi-sensor coordinate measuring machine is possible also later without limiting the probe's application options.

Complete measurement of complex workpieces

When using multiple sensors, a rotary/tilt axis for the workpiece makes almost all geometry elements accessible to each sensor from different sides and allows them to be measured in the same workpiece coordinate system. The user can mount the rotary/tilt axis on the machine himself in any direction. The axis is then automatically calibrated and run-out errors are corrected. When using a rotary/tilt axis, three independent sensor axes are particularly advantageous due to the increased risk of collision.