The MultiSensor
The Internal Newsletter of Werth Messtechnik
August 2012

Pioneering developments ensure a leading edge

Dr. Ralf Christoph: The positive expectations at Werth for the past fiscal year have been exceeded. We were greatly pleased with record breaking operational figures, surpassing all previous years. On this basis, many additional interesting new positions have been created at Werth. This affects mainly the Service, Development and Sales departments.

Considering the persistently high level of demand, we are also predicting significant growth rates for the current year, in contrast to some economic forecasts in the media. We believe the reasons for this are an expansion of our market share through product innovations and increased export activities. In particular, our pioneering developments in recent years are continuing to pay off. They also ensure a technical edge for our customers.

Coordinate measuring machines with X-ray tomography, as introduced to the market by Werth in 2005, will continue to establish themselves. We have been able to take on new applications, such as those in the automotive industry. Micrometer precision in measurement, including that of assemblies, provides significant potential for rationalization. Similar trends are evident in micro and nano measurement technology using multisensor coordinate measuring machines. With our new 3D fiber probe, applications in the optical industry and for micro plastic parts have become solvable for the first time. One particular area of focus is the use of coordinate measuring technology in production. Rapid measurement using Werth image processing and OnTheFly, for example, ensures excellent process reliability and efficiency at high measurement speeds.

As a continuation of our development strategy, we are expanding the Werth product spectrum in 2012 with several new systems. The TomoScope® series has been extended with a new measuring machine with 450 kV X-ray voltage, for larger objects that are difficult to penetrate. The new Werth Interferometer Probe with rotating head (WIP RS) allows internal geometries to be measured with previously unheard of speed and accuracy. Rotary OnTheFly includes rapid measurement of structures on round parts while the workpieces are in constant rotational motion. Through these developments, we look optimistically to the future.

Dr. Ralf Christoph

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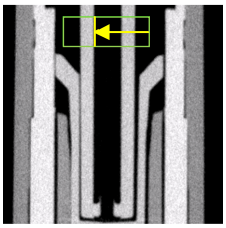
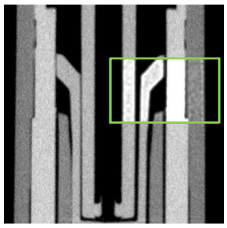
New functions for computed tomography

Werth Messtechnik GmbH has applied its extensive experience in image processing to create the new "volume section" function. For over 20 years, Werth image processing software has been used to perform highly precise optical measurements on video images. Years of development effort have produced powerful tools, such as image filters, contour filters, and element filters allowing reliable measurements even under poor contrast conditions.

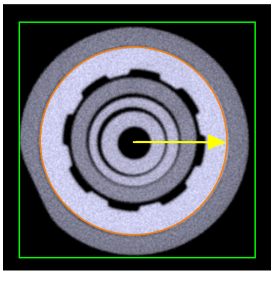


Contour selection



Contrast improvement with filter

In the new version of WinWerth®, it is now possible to analyze volume data generated by the Werth TomoScope® using this versatile image processing software. Users can define any number of section planes in the voxel volume (patent pending) within the workpiece coordinate system. The software then automatically generates 2D sectional views. These can then be analyzed, just as in "normal" image processing. By setting windows and selecting contours, appropriate geometric elements or free-form contours can be defined. This methodology is particularly useful if tomography is used to reproducibly and precisely measure transitions between different materials, such as in workpieces with assembled components. Selecting contours ensures that the desired features will be found reliably. By using filter functions the contrast of the image can be improved.



Measuring the material transition

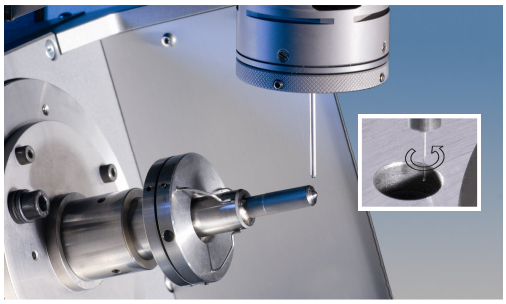
Measurements in a volume section can be analyzed by freely combining TomoScope® point clouds with measurement points or contours from other sensors.

news

Werth Interferometer Probe WIP RS

Now with rotating sensor

The Werth Interferometer Probe (WIP) is a non-contact fiber optic distance sensor for the high-precision measurement of geometry, shape, and roughness in Werth multisensor coordinate measuring machines. The sensor is now available as a rotating unit, to reach any desired scanning direction in CNC operation. Due to the small diameter and potentially great length of the probe of the probe, the WIP and WIP RS are especially suitable for capturing geometric features that are difficult to access. Features with a high aspect ratio (e.g., deep holes or narrow slots), or for delicate undercuts, take classical coordinate measuring technology to its limit. This is where the WIP RS shows its advantages.



Roughness Measurement Commonrail Injector

An example of an application is fuel injector nozzles for diesel engines. Both the roughness measurement of the spray holes and the geometric measurement of the needle seat are possible. Another example is the precise measurement of wall thickness for the thin tubes used in stent production.

In order to adapt to various measurement tasks, the Werth Magnetic Interface can be used to switch between probes fully automatically. The measurement process can be observed ergonomically using the integrated image processing beam path. This allows the position of the feature being measured to be determined in advance, for example. In order to capture all of the desired features of a component, additional sensors can be integrated in the measurement sequence, following the Werth multisensor concept.

Werth compact seminars

Always close to you

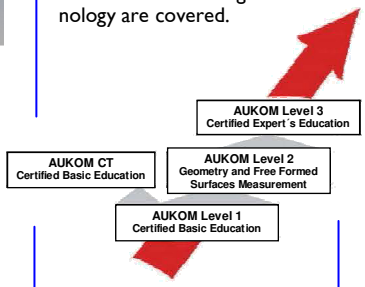
In addition to our demonstrations at application and training centers in Giessen, we offer other venues with our compact seminars. You can learn the latest trends in coordinate measuring technology in person, at a location near you. Seminars with subjects such as calibration, technologies, and instrument engineering are an ideal opportunity for learning new things, making new contacts, and exchanging experience. Comprehensible and practical presentation is given particular emphasis. At the end of the first day and on the second day of the seminar, we offer additional opportunities to perform test measurements on your components.

10 years of AUKOM

Now with CT training

The coordinate measuring technology training association AUKOM (Ausbildung Koordinatenmesstechnik e.V.) provides basic training for coordinate measuring technicians, independent of the equipment manufacturer. The classes are now "industry standard" and are implemented by machine builders and well known companies such as Daimler, VW, BMW, and Bosch. The objective of AUKOM is to provide current, comparable, testable, and certified basic training to meet the needs of users.

It is divided into 3 progressive stages (AUKOM 1 to 3). Based on successful completion of Stage 1, Werth Messtechnik GmbH now also provides the additional training level AUKOM CT. In this course, the fundamentals of computed tomography in coordinate measuring technology are covered.



Similar to the area of multisensor coordinate measurement technology, the AUKOM training documents for the area of tomography were produced with the leading cooperation of experts from Werth Messtechnik GmbH. Years of experience with practical applications of coordinate measuring machines with multisensors and computed tomography allow our certified trainers to expertly convey the contents of the training course. As a leading manufacturer in this area of coordinate measuring technology, Werth guarantees that the training course contents will be presented in a practical, expert manner. After the test, the participants receive an AUKOM certificate as evidence of successful completion of the course.

If you are interested in learning more, please contact our training manager, Mr. Herman Mertsch, at +49 641 7938-556 or schulung@werth.de.

List of seminar dates for 2012:

Hannover	09/05 to 09/06/2012
Leipzig	09/12 to 09/13/2012
Lüdenscheid	09/27 to 09/28/2012
Regensburg	10/24 to 10/25/2012
Leonberg	11/20 to 11/21/2012

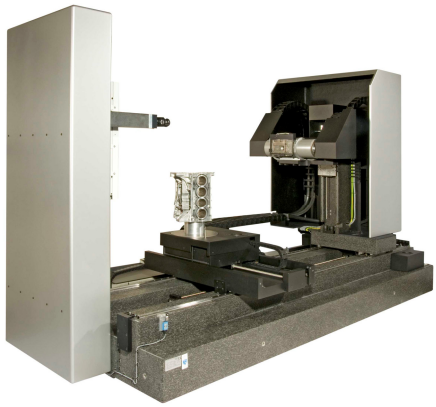
For additional questions, please contact Ms. Melanie Mess, Phone: +49 641 7938-540

TomoScope® HV 800

The new performance class

With the TomoScope® HV 800, Werth Messtechnik GmbH presents another multisensor coordinate measuring machine with X-ray tomography (CT). Its 450 kV X-ray voltage allows measurement and inspection tasks to be performed on large, dense workpieces. A second X-ray source can also be used in the same system, alternating automatically, to expand its range of application. This allows for the measurement of small components at maximum resolution. Like the other machines in this series, the TomoScope® HV 800 provides the ability for multisensor measurements in combination with X-ray tomography.

The raster tomography function (patent pending), allows the operator to adjust the resolution according to the application. The TomoScope® HV 800 can measure components with a diameter of 500 mm and length of 1010 mm. Even larger measuring ranges are possible on request. The powerful reconstruction software allows volumes of up to 250 gigabytes to be calculated (e.g., 8000 x 8000 x 2000 voxel).



Werth TomoScope® HV 800 with 450 kV X-ray tomography

The automotive manufacturer Skoda has used this machine for several months in Mlada Boleslav, Czech Republic, measuring engine components, chassis parts and electronic assemblies. They are also performing non destructive testing to detect blowholes, cracks, assembly errors and other defects. The new volume-cross-section software feature allows to generate 2D images for the automatic measurement of assembled groups, or composite components, which were almost impossible to measure before. Due to the low maximum permissible error of the machine, on the order of a few micrometers, it is also used for standard measurement tasks and is replacing the classic tactile coordinate measuring machine in many applications.

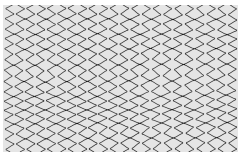
"Rotary OnTheFly"

Measuring while in motion

Now also for rotationally symmetrical parts

With "Rotary OnTheFly" raster scanning, Werth Messtechnik now offers an extremely fast measurement method for measuring complex structures on rotationally symmetrical components. This is made possible by continuous image recording while the measured object is rotated with a rotary axis. The typical start-stop cycles of the measuring machine are eliminated. The image is illuminated by a flash at each measurement position which reduces motion blur to an insignificant level. An additional positive effect is that the flash suppresses outside lighting influences.

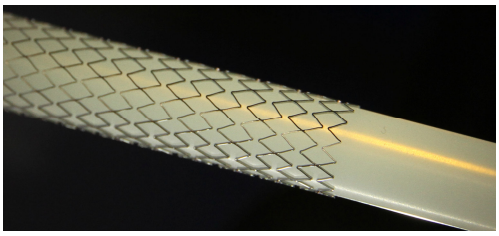
Individual images are merged together to form an unrolled image of the entire surface of the measured object, using a method patented by Werth. The wobble of the workpiece is also taken into consideration and compensated. The result is a high precision image of the entire component surface. This image is evaluated using the proven strategies of WinWerth image processing and measurement software and the dimensions are calculated. If several hundred features are measured on the workpiece, a reduction in measurement time of 90 percent or more can be achieved compared to typical methods. Minutes become seconds and hours become minutes.



Unrolled Raster Scan

"Rotary OnTheFly" raster scanning can be implemented on all Werth coordinate measuring machines that have a rotary axis and the latest Werth HiCam technology.

"Rotary OnTheFly" is principally suited for measuring geometries on the surface of round parts. An example of a successful application of this Werth technology is the measurement of the geometry of stents for medical applications (implants for expanding and stabilizing blood vessels).



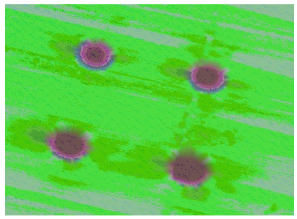
Stent for expanding blood vessel in the human body (Principal Sample)

The measurement time is significantly reduced by using "Rotary OnTheFly" technology. For example, if a sample measurement of about 10 webs of the stent previously took several minutes, this task can be completed in about one minute using "Rotary OnTheFly" mode. It is also now possible, for the first time, to measure the entire stent in just a few minutes with micron precision regardless of the number of features. Additional potential applications for this new measurement method include measuring hydraulic pistons in mechanical applications and gap clearances in automotive piston rings.

Contact that Hertz – or doesn't

Surface pressure with microprobes

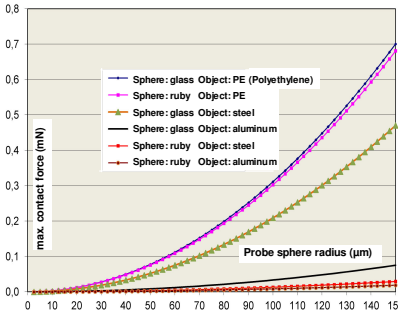
When two elastic bodies, at least one of which is spherical, are pressed against each other, ideally the contact is a point. Due to the elasticity of the bodies (expressed by their corresponding coefficient of elasticity) in the real world, both bodies are slightly flattened, forming a contact surface. The contact surfaces on both bodies are subjected to a surface pressure (Hertz pressure) that must not exceed a permissible value based on the material. If this limit is exceeded, then permanent deformation and damage can occur to the workpiece and the contact sphere. The permissible force, while not exceeding the maximum permissible pressure, can be calculated for a flat surface from the parameters of the probe sphere radius, Poisson's ratio, and the elasticity coefficient of the probe element and the workpiece.



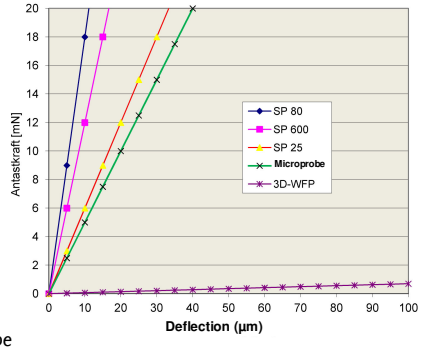
Classical mechanical-electrical probes leave a "permanent impression" about 10 µm deep - probe sphere radius 130 µm

For a low force, the materials deform elastically, according to their elasticity coefficient. After the contact, both bodies return to their original condition. If the force is increased, this elastic deformation becomes greater and greater, until it exceeds the elastic limit (pressure > maximum permissible value) and causes permanent deformation of at least one of the two bodies (plastic deformation.) Calculations show that the behavior of the probe sphere is negligible in practice. Thus, the result is deformation and damage to the measured object.

The diagram on the left shows that the maximum permissible contact force becomes less as the probe sphere diameter becomes smaller. The maximum contact force also depends on both of the materials used. The softer the material of the measured object (smaller elasticity coefficient), the greater the maximum permissible contact force, because the material deforms elastically and the contact surface area is thereby increased. The surface pressure is thus decreased. This effect is somewhat compensated for by the higher permissible surface pressure for hard materials, such as steel. Even in the best case (glass sphere with plastic), the contact force for a sphere radius of 150 µm must not be greater than 0.7 mN. When probing steel or aluminum, this value is even lower. The above relationship allows the maximum deflection of a probe system to be calculated, if the spring constant of the of the system is known (probe force as a function of deflection).



Permissible contact force as a function of the probe sphere radius for various material combinations



Contact forces in comparison

The diagram on the right shows that for a classical probe system and microprobe using the tactile-electrical principle, and a sphere radius above 150 µm (which corresponds the smallest typical standard probe sphere diameter of 300 µm), deflections of only about 1 µm or less are permissible to avoid exceeding the permissible contact force of 0.7 mN. This is completely unrealistic for practical measurement operations, particularly in scanning mode. Therefore, damage to the measured objects cannot be avoided. With the Werth Fiber Probe, the permissible contact force is not exceeded until the deflection reaches 100 µm. Measurement can thus be performed with a standard deflection of about 30 µm without any problems. Even for a deflection that exceeds the measurement range, such as in the case of erroneous positioning, it still causes no damage. For a probe sphere radius of 10 µm, the standard 3D fiber probe also approaches its limits. For such a small sphere radius, however, correspondingly thinner probe shanks can also be used, so that the contact forces are again significantly reduced. Normal measurements can thus be performed with these small probe spheres with no deformation problems.

what's new

New design for the FlatScope 650

The FlatScope 650 2D coordinate measuring machine can rapidly scan and measure stamped components and circuit boards, as well as aluminum and plastic profiles.

The new FlatScope 650 has been completely mechanically redesigned to allow measurement speeds available in the new OnTheFly measurement mode. To achieve this, the moving mechanism was decoupled from the machine frame. This also allows for the optional integration of vibration dampeners.

To minimize the machine footprint, the controls are thermally insulated and installed in the machine. The glass plate for placing the parts has been raised slightly. Making it flush with the frame so that larger measured objects can be placed flat upon it. The Werth "Flatlight," the telecentric surface illumination system, is integrated in the cover.

Werth FlatScope 650

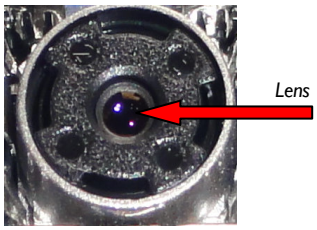
Smartphone and 3D Fiber Probe

Flexible and precise micro lens measurement

A micro lens is the miniaturized form of a conventional optical lens. They are used in photography, endoscopy, microscopy, sensors, and laser optics, to name a few examples. In recent years, one rapidly growing market for miniature lenses is for camera objectives in smartphones. Ever smaller, more precise, and brighter optics are needed to meet the demand for high quality, high resolution photos and videos.

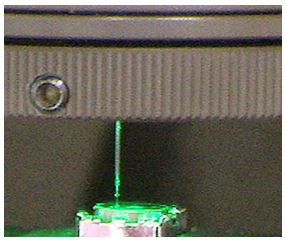
The lenses were previously made in a simple injection molding process due to the low requirements for precision of the functional optical surfaces. As requirements for image quality have increased, these components are now produced to meet tolerances that are near those for precision optics, in the range of just a few tenths of a micron.

In addition, the lenses often have special geometric shapes, sometimes with very high curvature, or even aspherical contours. The classical interferometry tests previously used have rapidly reached their capability and flexibility limits,. Of course, the lenses must not be damaged by mechanical contact during inspection, which cannot be avoided with classical 3D measurement probes. The Werth 3D fiber probe provides an innovative solution, with negligible contact force and maximum precision. For example, the contact deflection of the probe, when combined with a Werth VideoCheck® UA, is in the range of a few tenths of a micron. The contact force is only a few tens of micronewtons, even in scanning mode. This ensures that the force remains well below the permissible contact pressure of the plastic components, so that no "permanent impression" is made on the lenses.

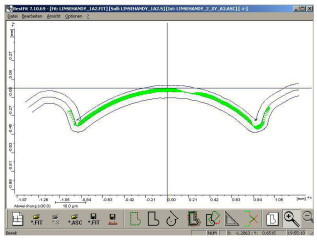


Cell phone optics installed in the housing

One example is contour measurement of a spherical micro lens using Werth BestFit software. The diameter of the lens is about 2.0 mm. The thickness at the center is about 0.5 mm. Because the Werth 3D Fiber Probe allows arbitrary contact vectors, these lenses can be measured across the apex in scanning mode in one setup, despite the large curvature (up to 90° from the base surface), fully automatically. Because the transition radii between the lens surface and the side surface (base surface) are also of interest for profile shape measurement, a probe sphere radius of 20 µm was selected for this example.



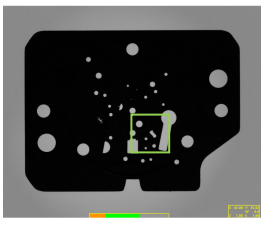
Measuring a lens with the Werth 3D Fiber Probe



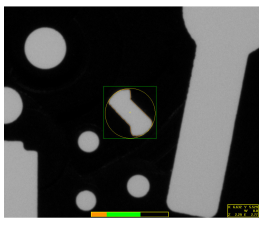
Evaluation of shape deviation with Werth BestFit. Tolerance band ± 2 µm

Werth QuickInspect – Measurement at a glance

With the new QuickInspect, it is now possible to measure small workpieces quickly in a production environment. Low distortion, precision telecentric optics allow measurement ranges from 8 mm x 6 mm up to 225 mm x 168 mm. The new QuickInspect uses an extremely high resolution camera to ensure low measurement uncertainties, even for large fields of view. To ensure accuracy comparability to conventional coordinate measuring machines, the machine is specified to ISO 10360 and VDI/VDE 2617 and is traceable to the length standard of the German National Metrology Institute. Depending on the optics selected, measurement uncertainties of fractions of a micron or a few microns can be achieved.



The entire part at a glance



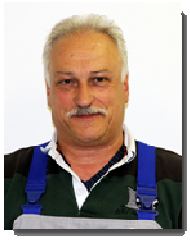
Measurement window zoom - measure details easily with high magnification

New functions in the proven Werth image processing software make the machine more user-friendly. For most variants of the machine (0.04x to about 1x), it is no longer necessary to adjust the focus, due to the large focal depth and telecentric configuration. For high magnification, setting the focus is simple with an easytouse focus function in the image processing software. This shows the user the position at which the workpiece is in the best focus to produce the optimal conditions for measuring. The high resolution of the camera enables the user to magnify the image interactively to nearly any degree with the stepless opto-electronic zoom function. Small features, especially, can be better displayed and measured. Automatic alignment functions make extensive prepositioning unnecessary. The component is simply placed in the field of view of the sensor and the measurement program runs fully automatically.

Our anniversaries

Hans-Otto Arnold 40 years of service

When Hans-Otto Arnold started his education as a mechanic at Werth Messtechnik in 1971, trainee students were still called, "Apprentices." His work has been his calling. Since he successfully completed his education in 1974, Mr. Arnold has been assembling and repairing optical and tactile Werth coordinate measuring machines. His wide ranging areas of service include assembly of special machines, fixture construction, and equipment maintenance. With his experience, flexibility, and helpful attitude, Mr. Arnold is an indispensable member of our production team.



Wolfgang Behnke 40 years of service

Wolfgang Behnke started working at Werth in 1972 in the area of electronics production and development. Starting in 1978, as a trained electromechanical technician, he began working on the development of controls and sensor electronics, and is thus one of the pioneers of CNC coordinate measuring technology. Since 1993, he has been working in-house service, handling electronic questions and checking proposals for retrofits and repairs. His extensive knowledge from the 1970s, when documentation was scarce, is often helpful. From 1987 to 2005, Mr. Behnke also worked as a member of the Works Council. Since 1997, he has also worked to ensure safe work areas, as a specialist in operational safety.

Werner Hantschel 40 years of service

Since 1972, Werner Hantschel has been loyal to Werth Messtechnik GmbH. The course of his vocational development started at our company with training as a mechanic. For several years, Mr. Hantschel worked on special projects and in the fixture shop. In 1981 he earned the title of Master from the Giessen industrial chamber of commerce (IHK), and then took on the responsibilities of a master starting in 1982. Since then, he has also been responsible for managing the assembly departments and for educating our industrial mechanics. Today, Mr. Hantschel works in the development area. He ensures that the subjects of manufacturing and assembly receive due attention in the design phase. His excellent abilities as a mechanic are put to use in the production of development samples and prototypes.

Roland Kümpel 25 years of service

In 1987, Roland Kümpel started his career as a trained toolmaker at Werth Messtechnik GmbH in the tool and fixture shop. His duties at the time included assembling small machines and accessories. At the end of the 1980s, he was a witness and contributor to the change in technology from profile projectors to the first PC based coordinate measuring machines with image processing. "At that time, I built the VideoCheck® prototypes all by myself. That's something I'm proud of," he reminisces. Mr. Kümpel also sees his first foreign service assignment in China in 1991 as a highlight of his career. At the time, such a trip still felt like an adventure. From that point forward, for more than 10 years, he supported our customers around the world in our field service group until he transferred to in-house service in 2002 when his son was born. Here he deals with technical support and coordination of field service technicians, based on his extensive experience. For two years Mr. Kümpel has again been drawn abroad, to solve tough service issues at our customers around the world.

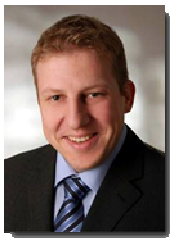
Continuing on a growth course

New employees in sales and corporate management

Service division manager

In recent years, the service team at Werth Messtechnik GmbH has grown by about 50%. Because good service is particularly important to our customers, this area has now been reinforced at the corporate management level.

Werth was able to find an experienced manager in Mr. Stephan Schmidt. Since the end of last year, Mr. Schmidt has been engaged as the division manager for Service at our company and will strategically and operationally direct our service activities in the future.



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Outside sales employee in southeast Bavaria, Salzburg, and Upper Austria

Since March of this year, Mr. Norbert Leister is serving our customers in the newly created Southeast sales region. This includes southeast Bavaria and the regions of Salzburg and Upper Austria. Following his extensive introduction at headquarters, our customers can now count on expert onsite support from Mr. Leister.

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Outside sales employee in North Baden-Württemberg

Mr. Ralf Dittes strengthens our outside sales team. As a sales engineer, Mr. Dittes will complete introductory work at headquarters in the summer of 2012, then take on the duties of managing his region of North Baden Württemberg.

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application

Precise measurements – with optics and probes

Multisensor measuring machine inspects fine ceramic microcomponents

SPT – Small Precision Tools – the name says it all. It provides primarily tiny ceramic parts, where quality plays a critical role. A decision was therefore made to entrust the process and final inspections to a Werth VideoCheck® measuring machine, which can handle nearly any measurement task with multisensors.

Biocompatibility, corrosion and wear resistance, and electrical insulation capability make technical ceramic parts (typically aluminum oxide or zirconium oxide) very valuable in medical technology, electronics, and in general machine design. Very small, complex workpieces can be produced from such fine ceramics. The processing method of choice is ceramic injection molding (CIM). It allows a high degree of freedom in design with respect to geometry and material properties with precision in the µm range. This assumes that the process has been mastered, as is the case at the SPT Group. The company has branches in Europe, the USA, and Asia. It originated and is based in the Swiss town of Lyss. SPT Roth Ltd. has about 90 employees in Lyss who work with the core processes of ceramics manufacture. Pierette Glutz, a member of the managing board at SPT, describes the strengths of the company, "We see ourselves as a 'One stop solution provider'. This means that we are able to produce ceramic products, from development to complete parts that have undergone a final inspection, all in house."

The main focus of the SPT product range is micro components made of technical ceramics. Photo: SPT

Material development as a unique value proposition

The core competencies of SPT start well before injection molding. One significant strength is in materials expertise. For many years, the ceramics specialists in Lyss have been working on the innovative development of this material, using various ceramic powders, binders, and additives that affect the production process and the subsequent product properties. There is also an in-house tooling and equipment shop. The foundation for production is laid there, to a large degree. Pierette Glutz explains: “Here in Switzerland, and in our plant in California, we run processes that require intensive expertise. The production activities are limited to raw parts for large scale production which are then finished in our Asian plants.

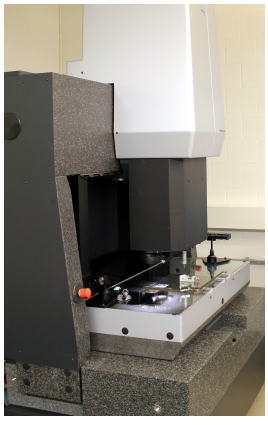
Flexibility in production control and the measuring room

The Werth VideoCheck® HA 800 is a high precision multisensor coordinate measuring machine with a portal design, using air bearing technology and solid granite construction.

The available measurement ranges are from 400 mm to 2000 mm in the x axis, 400 mm to 1350 mm in y, and 200 mm to 800 mm in z.

Werth provides extensive sensor options for this measuring machine including; the Werth image processing sensor, the Werth 3D Patch, Werth laser sensor, touch trigger and scanning probe systems, the Werth Fiber Probe, the Werth Contour Probe, and more.

Areas of application include; toolmaking and machine building, the automotive industry, electronics, medical, plastics, rubber, and glass.



Werth VideoCheck® HA 800 Photo: Werth Messtechnik

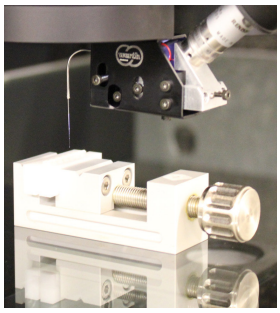
We also take care of small runs here, on customer contracts – including development, toolmaking, injection molding, finishing, and final inspection.“

Core product: the ceramic capillary

The “Chip Bonding Tools” division is the most significant part of the globally active SPT Group. The main product, sold under its own name, is a ceramic capillary, a type of pipette with a small, high precision hole at the tip. It is used for bonding gold or copper wires in chip processing. SPT grew up with these ceramic capillaries and over the years has developed extensive expertise with technical ceramics and their processing techniques. The company has refined the technology to the point where capillaries with a hole as small as 15 µm can be molded with only slight deviations from the target contour and very little rework is required. SPT sells up to 600,000 ceramic capillaries a month, nearly all of them in Asia, primarily in China. It founded what is now the largest SPT plant there in 1995, which now has about 600 employees. SPT recognized early on that chip production would increasingly move to this area of the world.

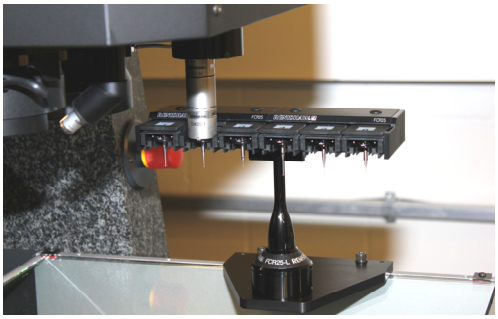
Ceramics expertise for other industries

The second division, “Precision Ceramic Parts,” is of much greater significance to the European and American markets and for the Swiss SPT Roth AG company. Pierette Glutz states “About ten years ago, we started to offer our ceramics expertise from the chip industry as a service to customers in other fields. They were then able to profit from the advantages of ceramic materials. Starting with a drawing, we take on all of the subsequent work, from consulting to toolmaking to series production.”



The WFP Fiber Probe installed on the VideoCheck® HA 800 multisensor coordinate measuring machine can show its capabilities with small ceramic parts, such as orthodontal braces. Photo: Werth Messtechnik

This clientele has grown large over time. Many industrial areas are represented, including electrical engineering companies and, particularly often, representatives from medical technology. Ceramics are biocompatible, can be sterilized very well, and are well accepted by the body as prosthetic materials. Many orders come from the dental market: ceramic brackets for braces, implants, guides, and mounts are in demand. Components for diverse instruments can also be advantageously made of ceramics. The third and oldest division, “Precision Machining Parts,” provides a similar type of service but for metal materials. It goes back to the time the company was founded, when production was mostly for the watch making industry. Today, many companies still order high precision parts or tooling inserts made of carbide and steel from SPT.

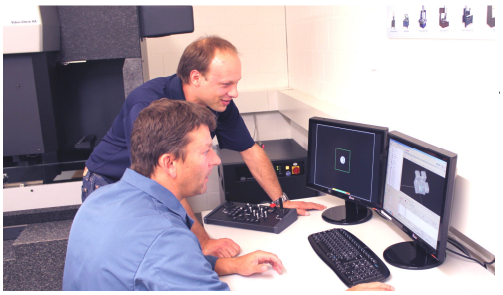


Required for many standard tasks: the SP25 probe system with interchangeable scanning modules, probe inserts, and measurement probes. Photo: Werth Messtechnik

Quality plays a decisive role

For all of the small, precise parts produced by SPT, quality is a central theme. This applies to both ceramics development, which forms the basis for high quality parts, and to the production process. The prescribed tolerances are definitely tight and must be reliably maintained and documented. Project engineer Herbert Augustiny provides an example, "The holes in the capillaries have diameters from 30 µm or even just 15 µm, depending on the model. In order to ensure good bonding, they also need to meet tight position tolerances. Medical technology also prescribes values in the µm range that need to be met. For this reason, all of our employees are inoculated with quality."

Now measurement technology comes into play. Its task is to accompany the process, measuring the parts after value adding steps, and ultimately to monitor the quality of the product. The best technology is just good enough for this application. Roger Hänzi, quality inspection manager, is a man with a lot of experience. He knows exactly what matters for these tiny ceramic parts, injection molding dies, etc., "The requirements that we place on measurement technology are extremely multifaceted. We could never succeed with just one measurement technique, which is why we have always looked for the most advanced measuring machines."



Roger Hänzi (front) and Herbert Augustiny attest to the high precision and simple operation of the Werth VideoCheck®. Photo: SPT

The Werth VideoCheck® HA 800 they use offers a wide variety of sensors. The image processing sensor is used for non-contacting measurements, which allows high magnification levels with good image quality. It allows fully automated measurement of complex workpieces with extremely low contrast using transmitted and incident light. True contour image processing allows complete

Multisensor technology provides highly flexible measurement

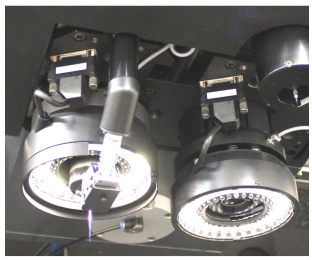
A significant reason behind the decision to invest in the VideoCheck® HA 800 was its multisensor capabilities. This technology was not new to quality assurance manager Roger Hänzi and his team. For 18 years they have been working with a multisensor coordinate measuring machine that combines optical and tactile probe processes in one machine. "The hardware and software, however, were aging, despite performing updates," explains Roger Hänzi, "and the latest state of the art provides significantly greater precision and faster measurement processes."

Two years ago, together with Herbert Augustiny, he searched the market for a new multisensor coordinate measuring machine. It had to be suitable for objects in the millimeter range, as well as for tool and die parts that can be 200 mm in size and weigh several kilograms.

The measurement technology specialists expected sensor precision in the range of 1 to 2 µm. These are requirements that the Werth VideoCheck® HA 800 can meet with its sensors. The modular design concept allows the measuring machine to be expanded with no trouble, to meet future applications.

For Herbert Augustiny, the new Werth 3D Fiber Probe is also worth considering. "This sensor was unfortunately still in development when we made our purchase decision." By expanding probe contact options in the z-axis, as compared to the classical Werth Fiber Probe, it provides additional potential applications, especially when measuring 3D micro components. But its never too late...

closed contours to be captured. Special filtering methods for grayscale image processing, such as contour and image filters reduced the influence of different states of processing, or of dirt particles, on the measurement results. They also have functions for increasing contrast. Measurements in the z-axis are taken by using the autofocus of the image processing sensor, either over a surface as a point cloud (3D patch) or as an individual averaged point.



A Werth image processing sensor allows fully automated measurement of complex workpieces with extremely low contrast, using transmitted and incident

The SP25 probe (scanning probe) is more like a traditional tactile measurement instrument that is required for many standard tasks. The very fine tactile-optical Werth Fiber Probe WFP also works by contacting and, with its probe sphere of only 20 µm, allows measurements of extremely small geometries with very small contact forces and high precision. "Specifically for the needs of ceramic parts, the fiber probe is of incalculable value", comments Roger Hänzi.

Lighting technology helps with weak contrast

A substantial part of the success of a measurement is light control. It ensures that illumination intensity is automatically adapted to changes in surfaces and colors. Roger Hänzi highlights the Werth Zoom Optics in particular, "It is a very flexible solution for many measurement tasks. In addition to magnification, it also allows the working distance between the objective and the measured object to be adjusted in the range from 20 mm to 200 mm." Specifically for the white ceramics that are difficult to measure – due to low contrast – the Werth Zoom has proved to be helpful. The flexible working distance, combined with the patented MultiRing® for changing the lighting angle, allows visualization of object edges that would not be visible at all with classical lighting methods.

Simple in application, and helpful service

The Werth VideoCheck® HA 800 already meets the expectations of the SPT quality team. They program the machine using WinWerth® software, which compares the optical and tactile measurement data to each other, evaluates the results, and generates easy-to-read tables or graphics for documentation. It is relatively easy to use the Werth VideoCheck® HA 800 and WinWerth® software, as attested by Roger Hänzi, "After basic instruction, you can start right away. Of course, complex measurement tasks, such as the use of 3D models, requires a certain amount of experience. But when we reached our limits – especially in the setup phase – and had questions, Werth provided fast, qualified assistance. This completely confirmed the impression we had of the Werth Messtechnik company. In all areas of measurement technology, it is a competent, likable partner."

news

Expanded export activities

Israel

The new partner for Werth Messtechnik GmbH in Israel is ATS - Applied Technologic Services, a high tech trading and service firm. Recently a Werth VideoCheck® has been the focus of activity in a dedicated demonstration room set up for this purpose.

Werth VideoCheck® in the demonstration room

ATS was founded in 1977 by the current CEO Yossi Reiss in Herzliya (5 km north of Tel Aviv.) Today ATS has 16 employees, including 6 sales engineers and 3 service and support engineers. The company portfolio includes measurement technology, lasers, wavelength-power measurement systems, modulators, spectrometers, high-speed image processing, data acquisition systems, analysis software, and technical equipment for satellite communications. The company is certified to ISO 9001.

CEO Yossi Reiss

Denmark / Sweden

In Denmark and Sweden, Werth Messtechnik GmbH has been working with Metrologic ApS for several months. "Metrologic," according to managing direction Jørgen Meinertz, "considers itself to be a partner for solving problems in the areas of coordinate measuring technology, data acquisition, SPC (statistical process control), and practical quality management under production conditions."

Metrologic office building in Horsholm

Founded in 1995, today Metrologic has a staff of five employees. The company sells measuring machines and QA software, organizes seminars, and advises customers on all aspects of quality management.

Jørgen Meinertz (managing director of Metrologic)

Turkey

For several months, the company Star-Teknik Ltd. in Istanbul has exclusively served the Turkish market.

In the past year, the first order has already been acquired - Sabanci University bought a high-precision VideoCheck® UA with 3D fiber probe to support their research work with well-founded measurement results. Star-Teknik serves customers in the automotive, defense, aerospace, and household appliance industries.

Institutes and universities are also part of its growing customer base. Co-founder and managing direction Ali Balcay expects positive market growth in the coming months and years.

Ali Balcay (managing director of Star-Teknik)

COMMENT

Multisensor says …

Economy problems here and economy problems there. This is at least what we see when we read newspapers around the globe. I am asking myself if this is the real world or if this is just the playground of investment banking. Fortunately, my company and many of their customers are in the real world. They are still growing and there is no depression in sight.

Information on product quality, which is gained by using top class metrology equipment, is a way of manufacturing things more efficiently and even economically. To know through quality control exactly how to adjust a process is a first class strategy to counter economic uncertainties. It seems that many companies understand this approach as many multisensor CMM's were sent last year to all parts of the world.

Also, CT technology is developing very fast to become the state of the art metrology solution of tomorrow. My company continues to innovate to stay at the top end of this technology and market. Many patents and patent applications show the results of these efforts.

Many tiles are needed to complete the mosaic picture of my company's success story. They keep working on it very hard and I am confident this will remain so in the future.

All the best

The Multisensor

Credits

The MultiSensor
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