

WENZEL METROLOGY WORLD

2021

HIGHLIGHTS

- Our new GT Series - Gear measuring metrology made by WENZEL
- The new exaCT L computed tomograph
- The new LH 2015 as bridge CMM
- Numerous success stories from various industries

METROLOGY WORLD 2021

THE HIGHLIGHTS AT A GLANCE

PRECISE METROLOGY DIRECTLY



RAW GRANITE TO CMM - BREAKING RECORDS



WENZEL TOP 100 INNOVATOR



FOREWORD



THINK BIG - LH 2617 AT FORMA



ON THE SHOP FLOOR



GEAR MEASURING TECHNOLOGY - WENZEL IS BACK



WHAT MAKES A GOOD MEASUREMENT SOLUTION FOR THE SHOP FLOOR?



FROST & SULLIVAN AWARD FOR THE exaCT L



SUBSIDIARIES





ABOUT WENZEL

NEWS, STRATEGY, PARTNERSHIPS

2021 – BACK IN BUSINESS

The world, people young and old, industry, mechanical engineering and also metrology have had a very difficult 15 months. Who would have thought in March 2020 that the COVID-19 pandemic would affect and threaten our lives and our businesses for so long and so intensely. We certainly didn't!

Looking to the future, searching for new opportunities, and a positive attitude; never have these qualities been more important for many entrepreneurs and companies than in past year and a half. Every tunnel has an end and afterwards it becomes brighter, hopefully sunny. We at WENZEL have tried to get through the valley with this attitude; together with our employees, partners and, of course, especially our customers, we have made it: we are back in full force and look forward to when the much too long phase of online trade fairs, online meetings and online demos will finally shrink back to a normal, healthy level. You don't always have to meet, you don't have to be able to "touch" everything, but sometimes you do, and it's precisely these human meetings, the



PROF. DR. HEIKO & DR. HEIKE WENZEL

MANAGEMENT OF THE WENZEL GROUP

We're excited to be able to meet you in person again now!"



About WENZEL

Founded in 1968, WENZEL is today the largest family-owned metrology manufacturer.

More than 10,000 machines installed worldwide



WENZEL Worldwide

More than 600 employees worldwide

Subsidiaries & representatives in more than 50 countries



Our Headquarters

Wiesthal, Germany

Total area:	54.000 m ²
thereof buildings:	15.500 m ²
air conditioned:	5.000 m ²

dialog with each other, that make the difference, which we are now looking forward to again!!

Despite all adversities, we and our customers did not hibernate, of course, but were able to create and commission many innovative solutions together with you. We have summarized a small selection of these solutions for you in this year's Metrology World. From our point of view, these customer stories show many values for which we as WENZEL want to stand with you:

we deliver innovative solutions at the highest technical level, precisely tailored to the needs of the customers, produced and installed by a team full of competence and passion!

We look forward to your feedback and many exciting projects with you, which we hope to realize together soon.

We are looking forward to seeing YOU!

"IN DIALOG, WE DEVELOP GOOD IDEAS TOGETHER AND THEN IMPLEMENT THEM IN YOUR MEASUREMENT TECHNOLOGY SOLUTION. INNOVATIVE AND SUSTAINABLE!"



WENZEL TOP 100

TOP 100 AWARD

Wiesthal – Award-winning innovative strength: The WENZEL Group GmbH & Co. KG from Wiesthal has been awarded the TOP 100 Seal 2021. This is the third time that the company has been honoured with this award for particularly innovative medium-sized companies, following 2016 and 2018. Previously, WENZEL had proven its innovative strength in a scientific selection process.

WENZEL is one of the world's leading suppliers in industrial metrology. The company specialises in solutions for coordinate measuring technology in quality assurance and manufacturing as well as industrial computer tomography.

The focus of WENZEL's innovation strategy is the digital transformation of industry. "Certainly, the last few months have not been easy in terms of always keeping the focus on innovation. But with the confidence that we will overcome the hard times from 2021 onwards, we have continued to invest in order to gain new competitive advantages," explains managing partner Dr. Heike Wenzel.

Measurement technology is an essential part of quality assurance and is increasingly becoming an elementary component of customised production. Optical sensors are increasingly needed to measure parts quickly and directly, and the quality of the measurement results is largely determined by the user-friendliness of the application software. Computer tomography has also gained a firm place in measurement technology. WENZEL has developed its own products and solutions for all these tasks and complemented them with strong partnerships. The combination of WENZEL's own technology developments and our integration with leading partner solutions guarantees that our customers will benefit from an industry leading measurement platform -

that is innovation proof for a lifetime.

In the last 12 months, WENZEL has developed many new products and successfully launched them on the market. In addition, excellent service ensures that customers enjoy the machines for a very long time. The machine manufacturer invests more than 10% of its turnover in research and development. This is above the industry average. "In this market environment, as the largest family-run company in the industry, we simply have to be innovative," explains Dr. Heike Wenzel.



Evaluation of the TOP 100 award winners by innovation researchers

On behalf of compamedia, the organiser of the innovation competition TOP 100, the innovation researcher Prof. Dr. Nikolaus Franke and his team examined the innovative strength of WENZEL. The researchers used around 120 test criteria from five categories as a basis: Innovation-promoting top management, innovation climate, innovative processes and organisation, external orientation/open innovation and innovation success. The core question is whether innovations are the result of a planned approach or a product of chance, i.e. the repeatability of innovation. It is also about whether and how the, corresponding solutions succeed on the market (more information on the test criteria at www.top100.de/pruef Kriterien). Due to the current situation, there was also a special section in this round in which the entrepreneurial reaction to the Corona crisis was examined.

Official award ceremony takes place in November

Prof. Dr. Nikolaus Franke, the scientific director of TOP 100, is impressed by the award-winning medium-sized companies. "The TOP 100 companies have consistently oriented themselves towards being as innovative as possible," he notes.

On 26 November, there will be another reason to celebrate: all the winners of the current TOP 100 year will come together to receive congratulations from Ranga Yogeshwar at the 7th German SME Summit in Ludwigsburg. The science journalist has been mentoring the innovation competition for ten years.

THE MANAGEMENT PROF. DR. HEIKO WENZEL-SCHINZER AND DR. HEIKE WENZEL WITH THE TOP 100 AWARD IN FRONT OF THE SHOP-FLOOR MEASURING DEVICE SF 1210, WHICH WAS LAUNCHED IN 2020.



10 REASONS

FOR OUR INNOVATIVE STRENGTH



#10

#9



#8



#7

#6

#5

#4

#3

#2



#1





WENZEL

#10 DIGITALIZATION

7 STRONG PARTNERSHIPS

#6 R & D

#5 OUR SERVICE

WENZEL

#4 THE WENZEL PRODUCTION

WENZEL

#3 OUR EMPLOYEES

LEBENSARBEIT
NEHT MANCHTAGE BEZUG

WENZEL NEWS

2021 AT A GLANCE

Despite the difficult circumstances of the past year, we at WENZEL were able to announce some new products. In addition to numerous product innovations, we were also able to realize other major projects that will give us many benefits in the coming years.

DIGITAL TRADE SHOWS

From May 5 to 7, 2020, we organized a virtual trade fair for the first time - the WENZEL EXPO 2020. The virtual trade fair took place on an online platform VIA the Internet, where interested parties and customers could get a clear presentation and explanation of WENZEL's innovations in industrial measurement technology from their desks via the Internet. The virtual trade fair tour was simple and intuitive. Just like at a real trade fair, each customer decided for himself whether he just wanted to browse a bit or get live advice on his individual requirements.

We presented our broad solution portfolio for the measuring room and manufacturing: Coordinate measuring machines in combination with tactile and optical sensors, industrial computer tomographs, various measuring software packages as all-round or special solutions, quite a few service options and promotions (which are more and more becoming a unique selling point of WENZEL) as well as no less than five product innovations. Also the worldwide WENZEL subsidiaries as well as sales, distribution and technology partners presented themselves with their own booth.

Conclusion

The WENZEL EXPO 2020 came to a successful end! - The response was overwhelming with over 1,500 registrations. Our expectations were far exceeded. Over the course of three days, we had presented our innovations in measurement technology to a broad audience in 35 webinars, 16 product and service booths, and 35 partner booths. We were a pioneer with the new format and are more than satisfied with the result.



WENZEL UK opens new technology center

The new WENZEL UK Technology Center has opened and is going live with a wide range of measurement systems, from optical non-contact solutions to workshop-grade CMMs. The center itself is located in central England in Coalville. The location provides customers from the north and south with centralized access for product demonstrations and component testing.



UK TECH CENTER

METROLOGY SHOP



WENZEL Metrology Shop - Now Online!

Our brand new online store for a wide range of accessories and spare parts went live in November 2020! From now on customer can purchase quickly directly from the web, probes, accessories, control panels, reference spheres, work clothes or culinary delicacies of Villa Marburg. Just take a look! It will be worthwhile.

www.wenzel-metrology.shop

WENZEL AT WORK

APPLICATIONS & INDUSTRIES



LH



2617

THE ART OF USING GPS TOOLS PROFITABLY

AUKOM FORM & POSITION SEMINAR AT MALL//HERLAN

The art of using GPS tools in metrology profitably lies in a cross-departmental common understanding of the subject matter and requires appropriate qualifications. This is fundamental for successful communication across departmental boundaries. AUKOM Form & Position Tolerances as well as new GPS standards have the highest priority in the qualification of technical staff. AUKOM Form & Position was the topic of the seminar group of Mall / Herlan GmbH from Pfinztal. This group consisted of employees from different departments such as development, design and metrology. The trainer was Ekkehart Jesser, responsible for AUKOM at WENZEL Metrology GmbH (Fig. 1).

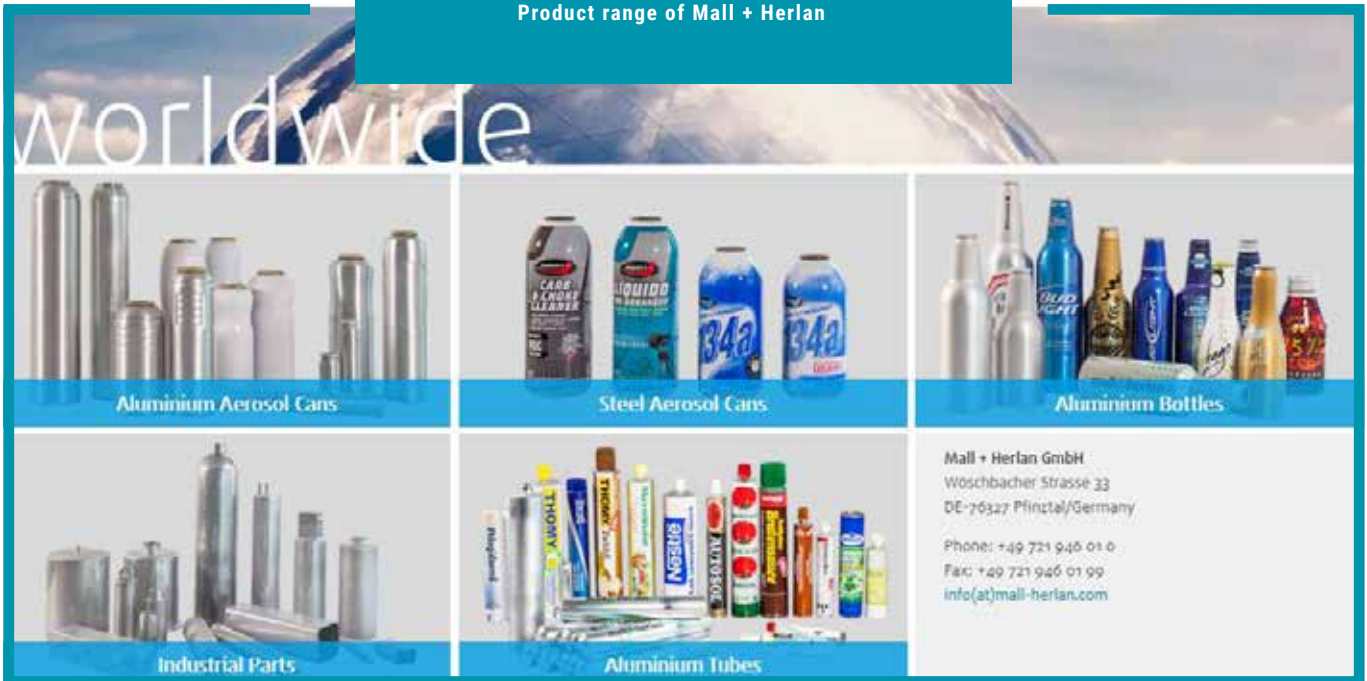
Mall / Herlan GmbH is one of the world's leading manufacturers of machines and complete production lines for monoblock metal packaging used for the production of aluminum cans and aluminum bottles (Fig. 2). These are later used to package pharmaceuticals, technical products, home care and food products.

The fact that mall//herlan is one of the market leaders is the result of years of continuous development work. Innovative solutions paired with top quality ensure the success of today and tomorrow. The optimal qualification of the employees is the basis for success. Because only those who are qualified can also contribute to successful solutions in the often cross-departmental

AUKOM Form & Position was the topic of the seminar group consisting of employees from development, design and metrology, trained by Ekkehart Jesser trainer and AUKOM responsible person of WENZEL Metrology.



Product range of Mall + Herlan



communication with colleagues. Through good communication, co-creatively generated solutions and thus innovation are possible. For this reason, mall//herlan employees are not only trained individually, but also in groups across departments.

When it comes to further training, mall//herlan relies on trainers from WENZEL Metrology, who impart their knowledge not only to metrology technicians, but also to employees from development,

design and production, so that questions about function, production, metrology and quality can be solved together in a profitable way.

WENZEL trainers have many years of experience in training and consulting employees of companies from all areas of technology. They actively participate in designing training modules of AUKOM e.V., which are recognized worldwide as industry standards

The training offer ranges from AUKOM to WENZEL's own measuring software WM | Quartis seminars. (Picture 3)

Shape & position tolerances or the associated newly revised GPS standards are now a top priority many companies in the qualification of their

WENZEL ACADEMY

YOUR DUAL TRAINING PROGRAM

Acquire "two legs of qualification" through our dual training on five levels. Each training level consists of device and software specific modules from WENZEL, which in combination with an AUKOM seminar forms the optimal knowledge base for production measurement technicians.

CERTIFICATE

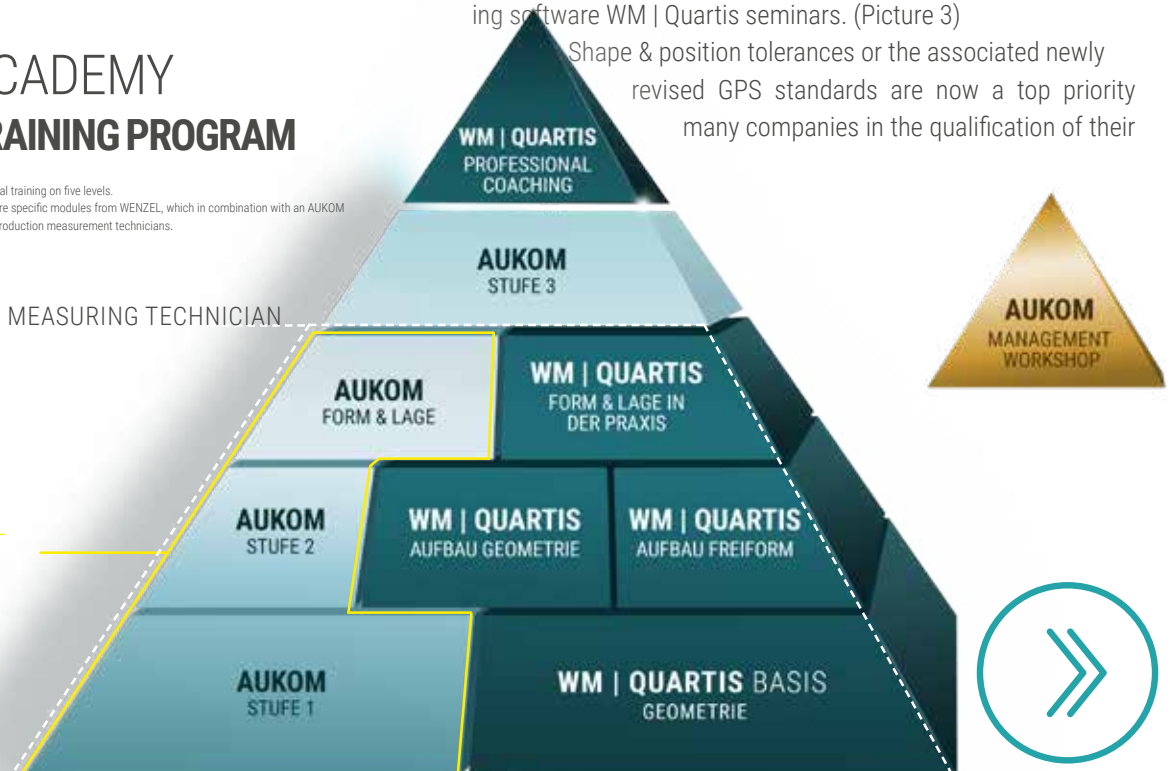
WENZEL COORDINATE MEASURING TECHNICIAN

- When participating in**
- AUKOM Form & Position
 - AUKOM Step 1
 - AUKOM Step 2
 - WM | Quartis Basics
 - WM | Quartis Advanced
 - WM | Quartis Form & Position in practice

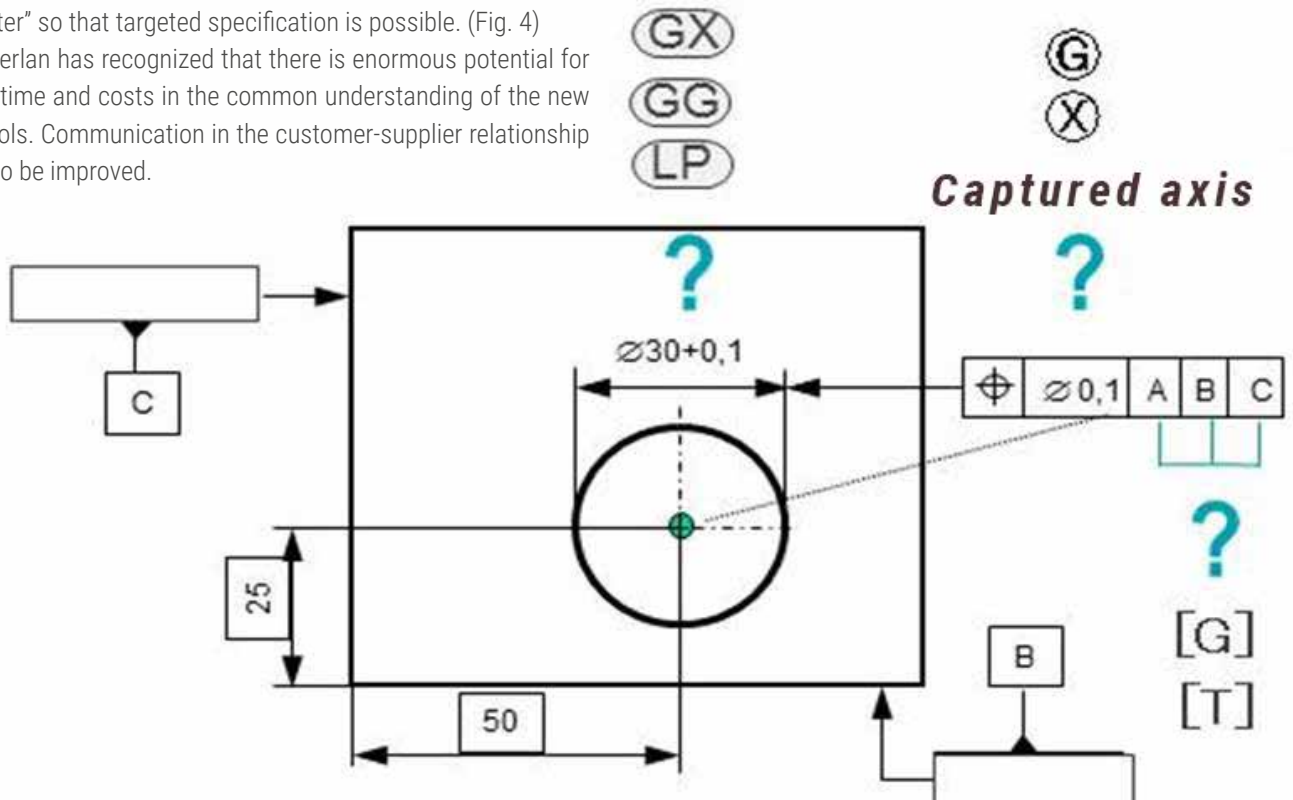
CERTIFICATE

AUKOM METROLOGIST

- When participating in**
- AUKOM Form & Position
 - AUKOM Step 1
 - AUKOM Step 2



employees. They provide the basis for defining the specification (drawing) by the design department and the verification (measurement) by the metrology department. They have a "toolbox character" so that targeted specification is possible. (Fig. 4) mall//herlan has recognized that there is enormous potential for saving time and costs in the common understanding of the new GPS tools. Communication in the customer-supplier relationship can also be improved.



The new knowledge can be applied directly in practice

The design engineer and metrologist work together to develop the optimum clamping strategy. It is important that the component is clamped without wobbling and that all features are optimally accessible. The WENZEL coordinate measuring machine type LH 1512 is used for the measurement in combination with the measuring software WM | Quartis, which meets the high accuracy requirements of Mall + Herlan.

The requirements for measurement technicians are high. There is no state vocational training for measurement technicians. Measurement technicians are responsible for verification. This means that they are responsible for the measurement strategy. This contains important individual strategies such as clamping, alignment, probing, evaluation and documentation strategy. If a strategy contains errors, these have a direct effect on the measurement results. As a result, correctly manufactured parts are considered to be out of specification, or parts with errors are considered to be in specification. In both cases, this can lead to significant additional costs.

These can be avoided by qualifying the measurement technicians. The measurement technicians of mall//herlan are all certified AUKOM measurement technicians. For this purpose they have attended the seminars AUKOM 1, AUKOM 2, AUKOM Form & Position and AUKOM 3 at WENZEL in Wiesthal. They regularly attend AUKOM update seminars to update their knowledge. WM | Quartis training keeps them up to date in the optimal use of their measuring software.

Design engineer and metrologist work together to develop the optimum fixturing strategy



CONTACT

SEMINARS & TRAINING



Tel.: +49 6020 201-8410

Fax: +49 6020 201-8199



E-Mail:

academy@wenzel-metrology.de



Registration under:

www.wenzel-group.com/academy



WENZEL Metrology GmbH
Werner-Wenzel-Straße
97859 Wiesthal

FROM GRANITE TO RECORD CMM

MADE BY WENZEL

We ended last year with a new record. The LH 2617 gantry coordinate measuring machine was the largest inherently stable machine we had built to date. This year we have improved the record once again. With an enormous measuring volume of 2,600 x 6,000 x 1,750 [mm], the Y-axis on the new coordinate measuring machine is another 1,500 mm longer. Step by step we have documented the completion of our new record CMM for you.

Technical Data:

3-coordinate measuring machine system LH 26-17,5

X-axis : 2600 mm

Y-axis : 6000 mm

Z-axis : 1750 mm

Base plate made of natural hard stone

Measuring uncertainty according to DIN EN ISO 10360

Temperature range : 20°C + 1 K, 0,5 K/h, 0,5 K/m, 1

With probe SP25M:

PFTU, MPE (µm) = 3.3

E0, MPE (µm) = 3.3 + L/450 (L in mm)

E150, MPE (µm) = 3.3 + L/450 (L in mm)

R0, MPL (µm) = 3.3

MPETHP (µm) = 3.9

MPT [sec] = 72

DELIVERY BASE PLATE



BASE PLATE



STRUCTURE



WENZEL®

FINISHED STRUCTURE



MACHINE ACCEPTANCE



TRAVERSES



THE WHOLE TRUTH ABOUT THE SHAPE

50% FASTER AND SIGNIFICANTLY MORE MEASURING POINTS

With a new measuring machine from WENZEL, equipped with Renishaw's REVO 5-axis scanning probe, it is possible to cut measurement time in half with advanced details from Epiroc Construction Tools PC AB in Kalmar, Sweden. But the most important thing is the high reliability of the measurement result. "Now we get the whole truth about how the shape is," says General Manager Niclas Hejdenberg.

Strong increase in sales during autumn

Despite the pandemic, sales in autumn 2020 grew so strongly that even the original forecast from January was topped. "That's why we've worked hard during autumn to expand our capacity," stated Niclas. The investment in a WENZEL LH 1210 5-axis coordinate measuring machine (CMM) started already in autumn 2019. The old measuring machine began to wear out, while new products that needed to be measured were so large that they did not fit in the old machine. "So, we started to develop a concrete specification of requirements," says Project Manager Ann Blom.

You don't just buy a machine; you buy a partnership

Together with Measurement Technician Leif Gottfridsson, Ann developed a careful specification of the products that needed to be measured and what was expected of the CMM, software

Construction Tools PC AB manufactures hydraulic breakers, compactors and rock drills, and like all manufacturing industries today, it faces the challenges of digitalization. "Our future is largely about how we can connect our products and bring benefits to the customer as we continue to develop our services. Digitization of our production and product development is also an important part of this," explains Niclas.

and service. They then collected quotes from five stakeholders, three of whom were selected for the sample measurement. "We evaluated everything around us, partly how we experienced the measurement results and partly how the potential suppliers were based on availability and service. You don't just buy a machine, you buy collaboration. We decided for the machine that had REVO, which is a technology game changer compared to the measuring head we have today. This is an exciting, new technology that we believe in a lot", tells Ann.

The choice eventually fell on Ravema and a WENZEL LH 1210 CMM. Last spring, just before the closure of Europe, a small delegation from Epiroc in Kalmar had time to make a study visit with sample measurement at WENZEL in Wiesthal, Germany. An order was placed in March and the machine was delivered in September



as soon as the new measuring room in Kalmar was completed.

Smooth angle measurement and more measuring points

„The time saving was not the main factor for Epiroc in choosing the CMM. It has been more about accuracy and reliability.“ But of course, it will be faster. Measuring a detail with the old machine took between 20 and 35 minutes. I believe with the new machine this is possible in half the time, maybe even faster,” says Leif.

The agility of angle measurement is another big gain. With an additional axis on a moving measuring head, angles which are hard to reach can be captured in a completely different way. “And we get more measurement points overall, which makes measurement data more reliable,” says Ann. – Niclas agrees: “Now we get the whole truth about how the shape is, so there is a big difference.”

About Epiroc Construction Tools PC AB



The company includes the Epiroc Group, which is a leading global productivity partner for the mining and infrastructure industries. Epiroc Construction Tools PC AB in Kalmar has around 150 employees and sales of approximately SEK 500 million.



Service and support with no delay

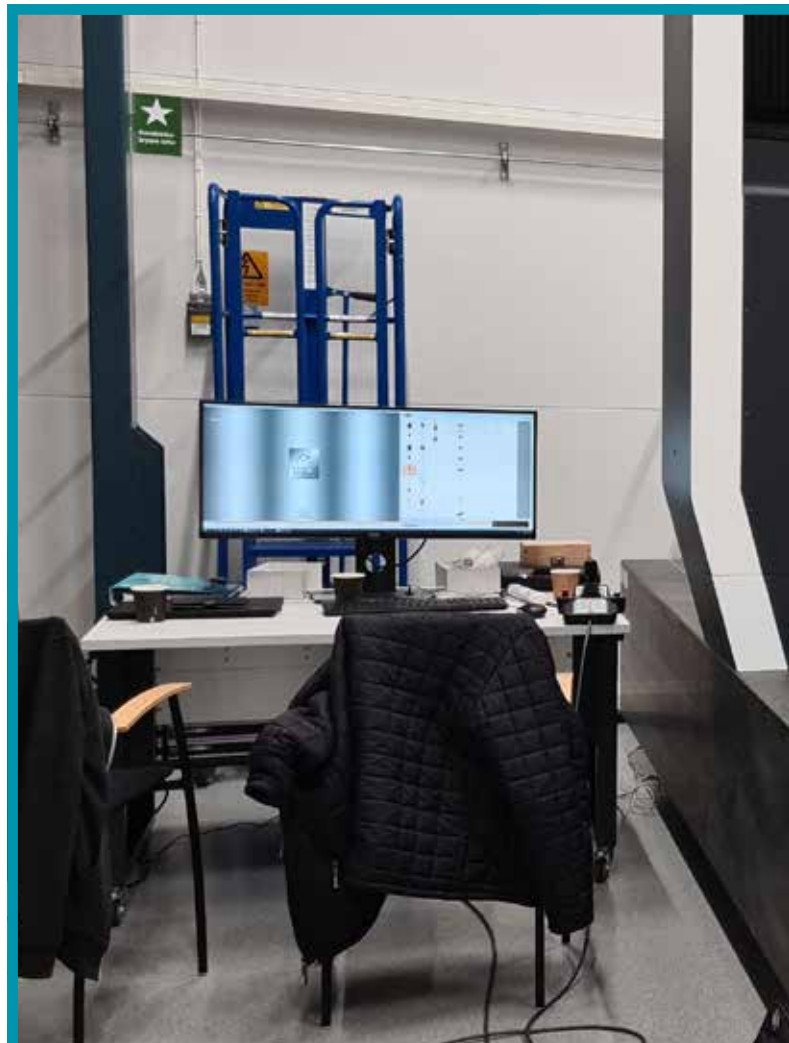
The investment in a new measurement machine was an important step for the future of Epicroc. "We are facing challenges in the industry and have embarked on a journey to upgrade and modernize our factory. This is a step towards further securing our quality goals and delivering the best products," explains Ann.

Our cooperation with Ravema as a supplier is new, but it also bodes well for the future. "We have had a straight and simple dialogue. It feels like a safe partner, which is also geographically quite close to us," says Ann "And with their digital tools, service and support can be in place without delay." – "I spoke to Ravema yesterday, they helped me with a programming question using split screen, and it worked very well. Today's technology is polished," says Leif.

Ravema is proud to be a part of Epiroc Construction Tools' journey into the future. "We have had a very open and driven discussion about solutions that suit their challenges to measure faster, more accurately and more efficiently. Now it is our challenge to help them in the best way by supporting them and by being an

available supplier," says Stefan Wilber, Application Technician at Ravema.

Stefan's task in this project is to develop the customer and to create a program so they can get started with their measurement as soon as possible. "My task is also to help them with questions and opportunity's that arise from having a new machine. With the special situation we find ourselves in during the corona pandemic, it is good to have the possibility to help remotely," says Stefan.



Produktpalette von Epiroc



LH 1210

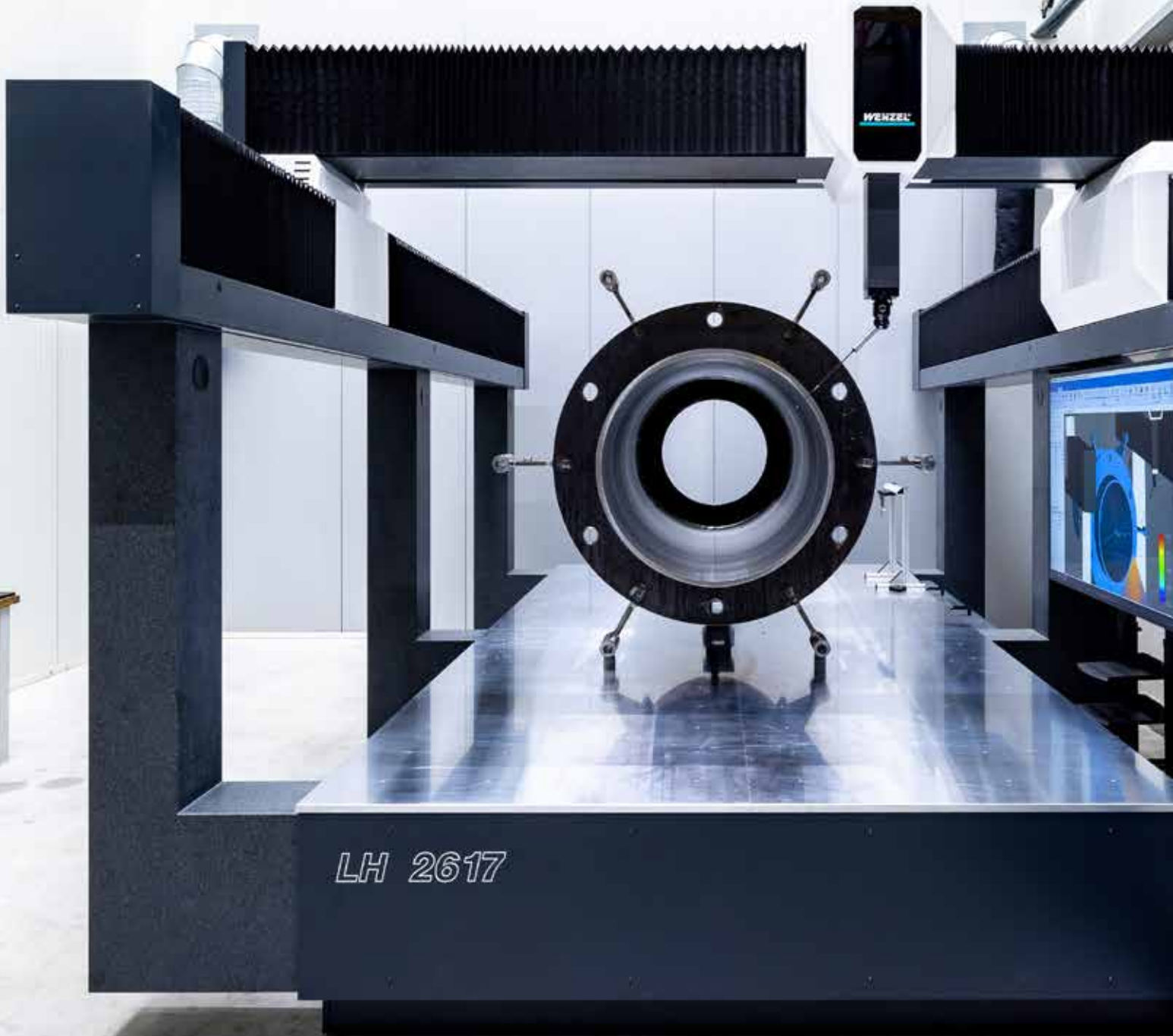
ABOUT
THE MACHINE

- WENZEL LH1210
- Measuring Volume: 3000 mm in y-axis, 1200 mm in x-axis, 1000 mm in z
- Premium Accuracy up to 2 μm with active temperature correction
- 5-axis Measuring Probe Head Revo II (enables measurement with tip of 800 mm)
- Measuring Software: WM | Quartis from WENZEL

LH 1210

THINK BIG

LH 2617 AT FORMA



LH 2617

Since January 2021, the largest (so far) gantry measuring machine developed and built by Wenzel has been in operation. It was installed at Forma Maschinenbau Zerspanungstechnologie GmbH & Co. KG. This CMM takes their already outstanding performance portfolio to a new dimension.

Think big, but please be accurate to the thousandth, this sums up the philosophy of Forma Maschinenbau Zerspanungstechnologie GmbH & Co. KG in a nutshell. The company, headquartered in Borken, Germany, is one of the “big players” in the industry - literally. With production capacities for workpieces up to 24 meters in length, 5 meters in height and 160 tons in weight, the company clearly exceeds the usual performance dimensions.

“Well, we’re not exactly the garage company,” quite modest from the mouth of senior company director Norbert Groß-Onnebrink, who runs Forma together with his son Tobias.

In fact, everything here is a bit bigger and more impressive than usual. Starting with more than 10,000 square meters of state-of-the-art hall space and a building front completely equipped with solar modules (1 MW total output) to modern ventilation systems in all halls, which provide a total of 100,000 cubic meters of temperature-controlled fresh air per hour. Not to mention the impressive modern machinery with 7 large machines, 10 machining centers and 4 lathes. No matter if the parts are large or small, production or one offs, they are produced at the highest quality.



New "large array" of measurement technology

"think big" now applies to Forma in the field of measuring technology: in the form of the largest WENZEL single-piece measuring machine ever built. A performance giant with a measuring range of 2,600 x 4,500 x 1,750 millimeters and a total weight of 27,330 kilograms. The hand lapped base plate is made from a granite block weighing 18 metric tons.

The "large array" named LH 2617 was developed and realized on the basis of the WENZEL LH 2015, whose measuring range of 2,000 x 3,000 x 1,500 millimeters was extended accordingly. This was not an easy undertaking, since the performance capacity of the highly developed LH 2015 machine was basically considered to be technologically exhausted. But only in principle...

Motivators and Inspirers

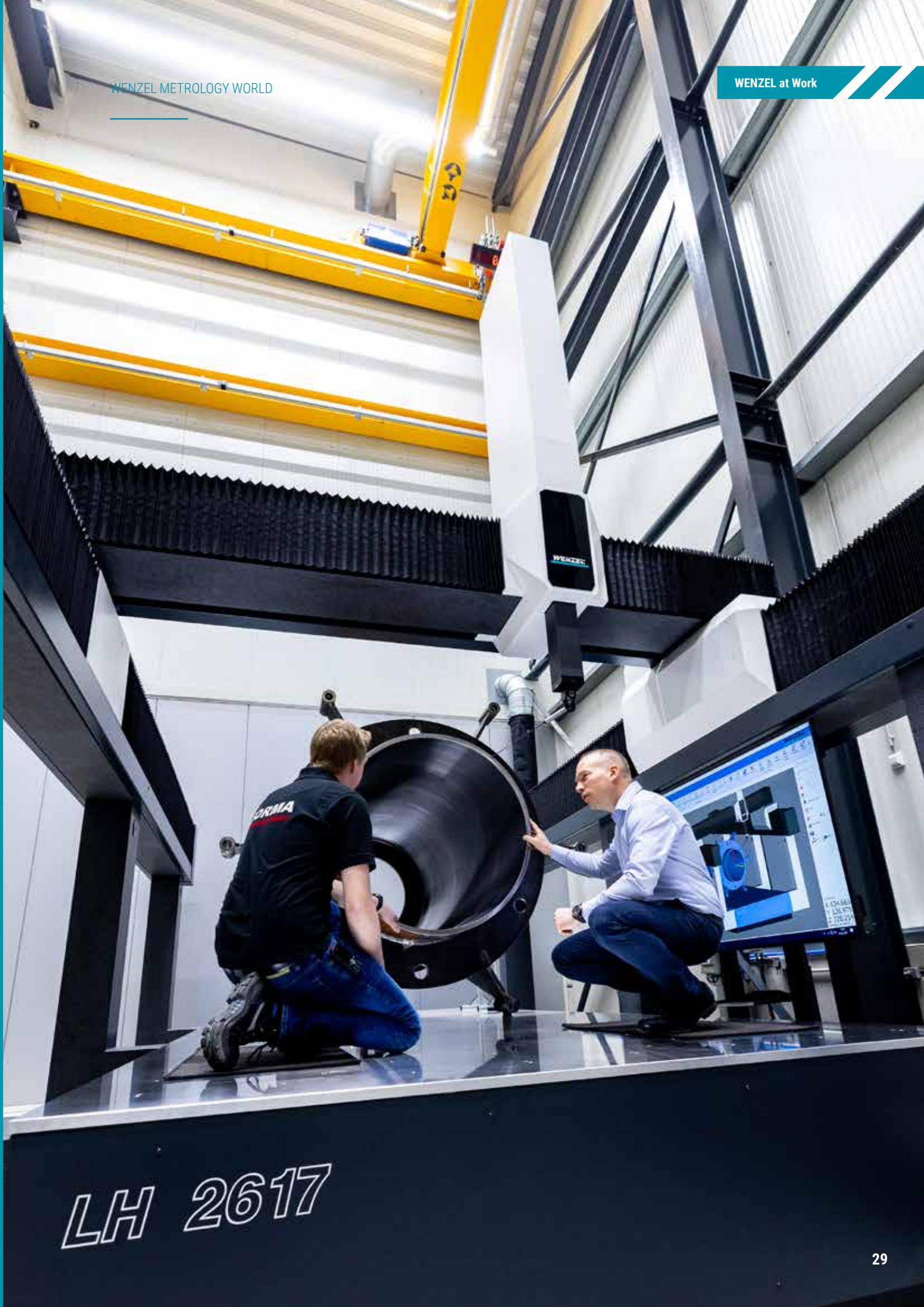
Because WENZEL would not be WENZEL if the development department had not set out to "break" previous boundaries. Of course we were motivated by the Forma company managers, who prioritized a WENZEL solution after completing an intensive market comparison. We all were inspired by the long-standing WENZEL partner Ingenieurbüro Klostermann from Remscheid, whose trust in WENZEL's solutions was ultimately the inspiring spark for the project.

A trust that should pay off: Even during Forma's first acceptance test, the required accuracy of "less than 5 micrometers" was achieved almost effortlessly - and ultimately specified to $3.8 + L/300$ [μm]. We thank Forma for their advanced quality department! Their outstanding ambient conditions and requirement for no special foundation propelled our success. A single-piece measuring machine with the required measuring range was not available until...Until WENZEL came into play! Now, "thinking big" has been a securely mastered for daily business at Forma.

Until (then) ... until WENZEL came into play. Since then, thinking big down to thousandths has been a securely mastered daily business for Forma, even in (wage) measurement.

WENZEL LH 2617





LH 2617

MORE PROCESS STABILITY

WITH THE HELP OF INDUSTRIAL COMPUTED TOMOGRAPHY

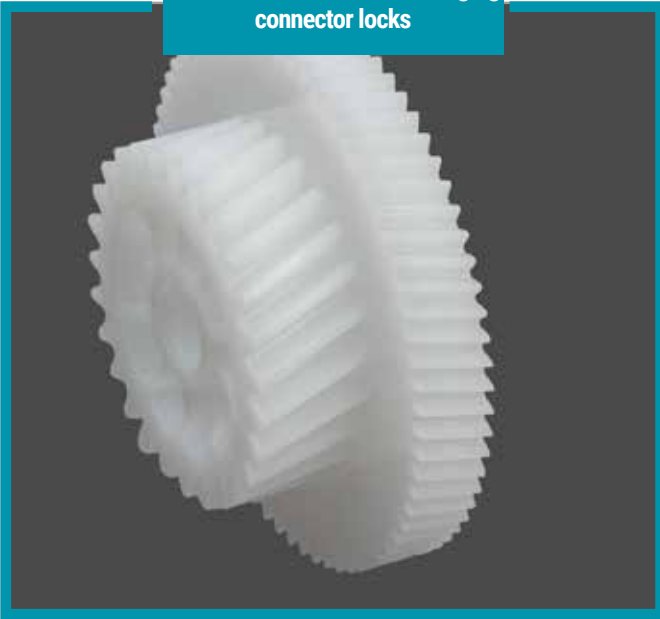
Precision in all areas is our claim," This is the motto of Jörg Becker, Managing Partner of GROTE + BROCKS-IEPER GmbH + Co. KG from Kierspe. Jörg definitely knows what he's talking about! He is an expert in the production of complex high quality plastic parts including precision micro gears. By purchasing a computer tomograph (CT) from WENZEL, his team add fast and exact inspection their components. It is now possible to take a look inside their workpieces without destroying them!.

GROTE + BROCKSIEPER GmbH + Co. KG is a top manufacturer of injection molds and technical plastic parts. As a supplier to many industrial sectors - automotive, aerosol, pump industries, household furniture , medical technology and the electronics industries. This company has extensive know-how in processing a wide range of thermoplastics, from standard to high-tech. For quality control purposes, a large number of products have been evaluated with the aid of WENZEL's new exaCT S computer tomograph (CT system).

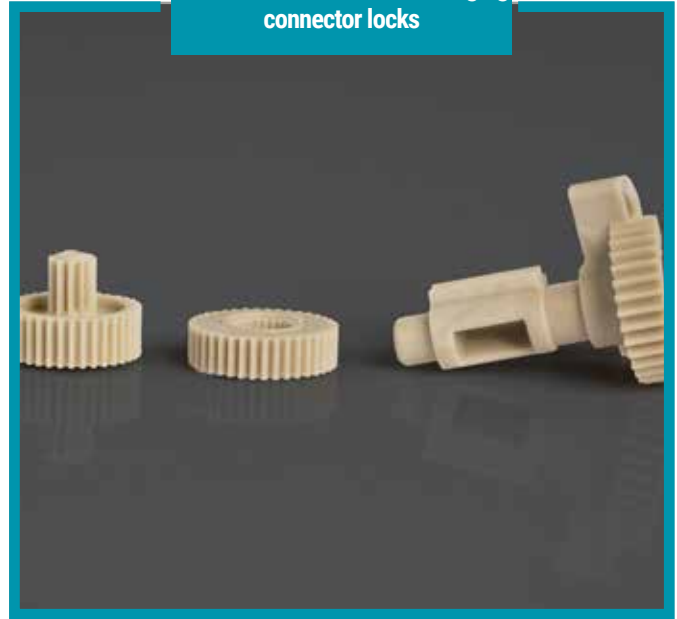
An in-house computer tomograph from WENZEL enables GROTE + BROCKSIEPER to measure components quickly, reliably and without contact



Gears for Electric vehicle charging connector locks



Gears for Electric vehicle charging connector locks



The Gears for charging plug locks on electric vehicles place high demands for precision injection molding machines.

CT as a key part in the process chain

In early stages of production, GROTE + BROCKSIEPER's quality assurance criteria is of great importance. Critical part characteristics are measured and compiled by meaningful initial sample test reports and graphics. These results are compared with the 3D models and design drawings. This requires the use of suitable measuring equipment within process and quality control. The use of the exaCT S computer tomograph from WENZEL is a crucial component in the process chain that now ensures more process stability.

Among other things, the computer tomograph offers assistance in controlling the compensation of shrinkage and warpage, a ubiquitous topic in mold and tool making. This effect is particularly evident in complex plastic components with high accuracy requirements. The precision and repeatability of the injection molding machines used at GROTE + BROCKSIEPER makes it possible to introduce targeted corrections in our own mold shop during sampling. The prerequisite is that these are verified non-destructively by means of computer tomography. This way, the desired dimensional accuracy of the component can be achieved with less corrective grinding. This results in a considerable cost and time savings.

Prior to this, tactile measurement was carried out by external service providers. According to GROTE + BROCKSIEPER, there are few certified measuring institutes in Germany that can map the measurement of, for example, filigree gear geometries with

tolerances down to 0.03mm or better requirement for concentricity. Therefore, the decision-makers started searching for a measurement solution able to map the entire process from design, to manufacture of the injection tool, to series release, all autonomously. "Ultimately, this enables us to shorten the phases between initial sampling, mold correction, grinding and the start of series production," says Jörg Becker.

Jörg Becker

Managing Partner of GROTE +
BROCKSIEPER GmbH + Co. KG



"Ultimately, this enables us to shorten the phases between initial sampling, tool correction grinding and the start of production"

Trust in man and machine

Contact with WENZEL was established through their factory representative for North Rhine-Westphalia, Klostermann Ingenieurbüro und Vertriebsgesellschaft mbH from Remscheid, who has been working with GROTE + BROCKSIEPER on a basis of trust for many years. "Throughout the project phase, we were able to engage in a high-frequency exchange with Sales and Applications Engineering. Questions were answered promptly and technically substantiated. In addition, the synergy effects of the computer tomograph with the evaluation possibilities of the GearPro gear software from OGP convinced us," explains Technical Manager Fabian Crummenerl.

"Due to the existing long-standing cooperation with GROTE + BROCKSIEPER, who also purchased a multi-sensor measuring machines from Wenzel a few years ago, we were involved in the decision-making process very early on and ultimately received the order package, consisting of a computer tomograph, gear software and a training within 28 days," Christian Klostermann is

pleased to report.

"When looking for a supplier of CT systems, we naturally visited other manufacturers in addition to Wenzel," explains Fabian Crummenerl. "What was striking about WENZEL was that trust prevailed right from the start. Everything that was presented technically was assured commercially during our visit. This turned out to be binding in retrospect. Our purchase decision has been confirmed and proven correct over the course of several months of use."

All were impressed by the high level of vertical integration that GROTE + BROCKSIEPER was able to view at WENZEL. Jörg Becker explains: "The potential of a mechanical engineering company with more than 50 years of expertise is reflected in many components of our CT system. Hard stone machining, precision rotary tables and the generally high quality of workmanship are convincing"

WENZEL exaCT S computer tomograph
at GROTE + BROCKSIEPER GmbH



Functional principle of computed tomography

WENZEL's exaCT computed tomographs enable a holistic analysis of test objects. By using industrial computed tomography, a complete three-dimensional reconstruction can be produced, enabling the tester to analyze the smallest internal structures and defects without destroying the object. For a CT scan, the object is placed in the CT scanner between the X-ray source and the detector. The specimen is rotated 360° step by step. After each step, a 2-dimensional radiographic image is generated on the detector. A 3-dimensional volume model is then reconstructed from the individual 2-dimensional images. From this volume model, surface data is generated. This forms the basis for all subsequent evaluations.



PRECISE MEASUREMENT TECHNOLOGY

DIRECTLY ON THE SHOP FLOOR



When specialists work together with specialists: Klostermann fulfills several requirements at once with the WENZEL 5-axis SF 87. Precision in measurement, integration in production and a convincing price-performance ratio.

The new measuring machine at CNC-Technik Heil GmbH is located in the middle of production, because this is exactly what it was developed for. The SF 87 coordinate measuring machine from WENZEL needs, neither its own room, nor a compressed air connection due to its intelligent machine concept. At the same time, it offers a high measuring volume and efficient measuring technology. "Our customer was looking for a flexible solution that allows not only reliable measurement results but also their documentation," says Christian Klostermann. He assisted Thorsten Heil with their acquisition of their first 3D measuring machine.



“

Having the measurement technology close to production makes us more flexible and efficient. And nothing more than a power socket was required to set up the device“

Torsten Heil, Inhaber CNC-Technik Heil GmbH

Wide range of applications

The SF 87 is a 3D coordinate measuring machine for measuring small to medium-sized production parts. Its compact design is a solution especially in the metal cutting and forming industry, when precise measuring results are to be achieved. The realization of Torsten Heil's request by WENZEL was not only obvious for this reason: The device offers the possibility to be retrofitted with additional sensor technology. For example, touch trigger probes or optical laser line sensors can be easily retrofitted. This means that the SF 87 offers a wide range of future-proof applications.

This is an advantage for Torsten Heil: as a specialist for programming and milling in the 5-axis range, he exclusively produces prototypes for general mechanical engineering, including aeronautical engineering and the automotive industry. These parts are manufactured according to individual requirements and have the highest precision demands. He acquired the new measuring device in order to work more efficiently and flexibly and to be able to take measurements himself in his production so that the parts do not leave his factory untested. This saves time for him and his customers.

With the integration into the production, Christian Klostermann provided the decisive argument for the SF 87 CMM. With the large measuring volume of 800 x 700 x 700 mm with a small footprint, the device is ideal for the requirements in the Remscheid-based company.



KLOSTERMANN
Ingenieurbüro und Vertriebsgesellschaft mbH



As an experienced sales company for 3D coordinate measuring technology, Klostermann GmbH works as a factory representative for leading companies. With more than 900 measuring machines already sold and a wide range of services and training, Klostermann GmbH sees itself as a competence center for quality assurance and measuring technology. For CNC-Technik Heil GmbH, Christian Klostermann recommended a measuring

concept from the manufacturer WENZEL. In addition to the sale of measuring machines, the strength of the Remscheid-based specialist lies above all in the offer of turnkey quality solutions for individual requirements. Thus, in addition to the sale of measuring machines, the core tasks include the project planning of measuring rooms and the assembly of clamping systems for component mounting.

BOOST TO INSPECTION CAPABILITIES

5-AXIS MEASUREMENTS AT K & G MANUFACTURING COMPANY



Pride - K&G Manufacturing from Faribault, Minnesota, USA prides itself on meeting specifications on mission-critical components on time for their customers. Because of this dedication to quality and customer satisfaction, we are delighted with our partnership with K & G and their experience with our CMMs and software.

Starting with OpenDMIS software on a used machine and an LH 87 in 2010, K&G has been a longtime customer. Overtime though, needs changed and investment in more productivity was the next needed step, so in 2017 K&G put their first REVO into production equipped on an LH 1210. This machine provided a boost to inspection capabilities with its larger measuring volume, and the flexibility that only REVO and 5-axis scanning can provide.

Considerable time savings with REVO at a LH CMM

But as is often the case, customer demands continued to grow, giving K&G the opportunity to add a second LH REVO in 2021. Driven by high demand for a single customer part, the need for this machine was proven out through time studies that showed the productivity a second REVO could bring, while still having capacity for future needs.

“Considerable time savings has given us increased capabilities to measure in modern methods. The substantial throughput advantage gained by adding the new LH Standard 12.20.10 system is especially evident when inspecting the “fin” blade because the REVO probing provides much faster inspection than any other probing configuration on the market.” – Brad Holloway, K&G Mfg, Senior Account Manager



Run time with REVO is 7 minutes per part. Run time with alternate probing option (PH10 SP25) is over 14 minutes per part.



K&G Manufacturing now doubling inspection throughput with REVO



K&G Manufacturing achieves significant cost savings on per part analysis.

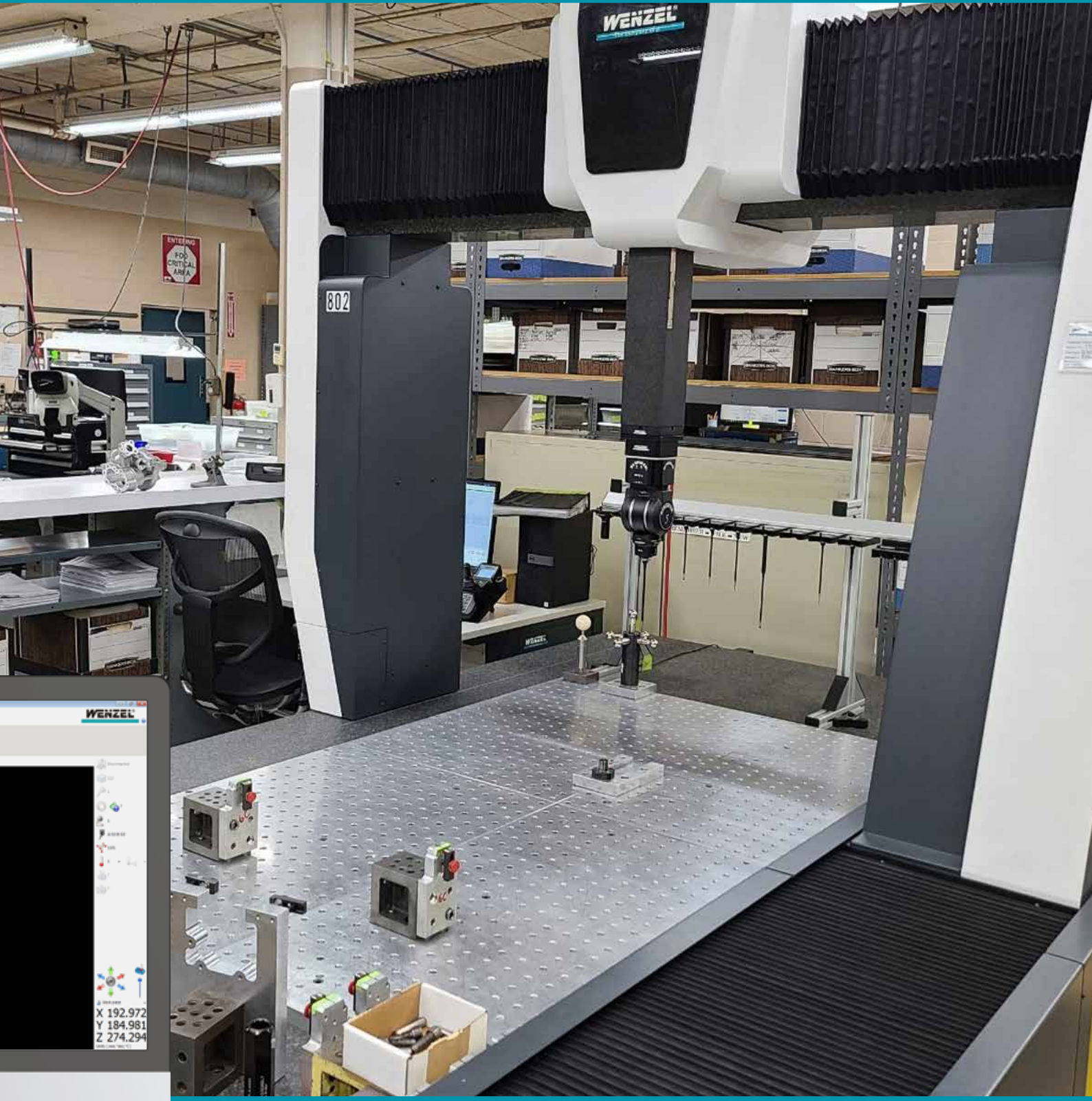
Converting all machines to WM | Quartis Software

Case study scenario: If we measure 1000 parts, K&G can do this in 118 hours on the REVO machine in comparison to 236 hours on the PH10 SP25 machine. If CMM operator rate is \$20/hour, this will result in a \$2360 cost savings on every 1000 parts measured. On top of that, an extra 118 hours is freed up to focus on other tasks. These cost savings make it possible for K&G to be more profitable with each job and affords the option to reduce costing for their customers or be more competitive on future bids.

"K&G is currently using OpenDMIS software on all of our CMMs and will be converting all machines to WM | Quartis software in 2021. Quartis' ease of use and simple program creation has given our programmers great confidence in their abilities moving forward. K&G believes we can create and modify programs quicker and with less clicks than ever before, allowing our offline inspection team to substantially improve programming efficiencies, completely freeing up one of our originally dedicated programmers. This is another cost-savings advantage that will have a direct impact on our bottom line.

The 'cherry on top' with the WENZEL solution is having SPC capability built into Quartis. K&G has previously relied on a 3rd party SPC software provider which is no longer required. Having this tied into our CMM software allows us to analyze statistical data more regularly, eliminating a significant amount of rework by accurately forecasting tooling changes." – Eric Gustafson, K&G Mfg, Chief Operations Officer





QUALITY ASSURANCE IN THE MARINE INDUSTRY

OPTICAL AND TACTILE MEASUREMENT WITH THE SHAPETRACER

The Mokpo National
Maritime University



Mokpo National Maritime University is the world-class university, for maritime education. The graduates are highly trained for maritime logistics, shipbuilding industry as well as maritime IT industry and are the driving forces of a new maritime era in South Korea.



For the high-precision measurement of large and heavy parts in the shipping industry, such as engines or propellers, the Ship Repair Supporting Center of the Mokpo National Maritime University from South Korea relies on a holistic measurement solution from WENZEL. WENZEL's long-standing partner iMeasure Co., LTD for the region once more proved to be a reliable solution provider.

The Supporting Center produces large processing repair facilities and measuring equipment necessary for the repair of ships and ship components. It forms the basis for ship repairs by small and medium-sized shipbuilding and marine equipment companies in the region. iMeasure's first contact with the customer took place at the SIMTOS 2018 trade show in Seoul. Researchers at Mokpo National Maritime University were looking for machines to start the Ship Repair Supporting Center and a coordinate measuring machine (CMM) LH 1210 with optical and tactile sensors. Trust was quickly established in the long-standing know-how of iMeasure's metrology experts and the quality of WENZEL's CMMs.

Everything from one source

iMeasure was particularly convinced by the universal application possibilities of the LH series from WENZEL for tactile and optical measurement and the complete service. Due to the wide product range WENZEL offers measurement solutions as a full service provider. With the "one-stop service" the involved specialists for hardware, software and service are brought together and can coordinate very well with each other. There are no delays or higher costs for the customer. The transparency of the offer price also strengthened the trust from the very beginning.

The 3D line scanner SHAPETRACER from WENZEL in combination with the coordinate measuring machine LH 1210 forms the ideal tool for the acquisition and processing of point clouds. The measuring solution is ideally suited for the acquisition and processing of surfaces and contours of workpieces. The WENZEL SHAPETRACER is controlled by the PointMaster software package and works with an extremely fast scanning speed of up to 48,000 points per second and an accuracy of 20 µm.

Due to the described advantages the measurement solution of WENZEL prevailed against well-known competitors. The project for the Ship Repair Supporting Center at Mokpo National Maritime University was finalized in October 2020. In the meantime, iMeasure has even opened an office at the Supporting Center. The Supporting Center in Mokpo has already gained some additional overseas repair services thanks to the new measurement solution.

QUALITY & SAFETY AT THE HEART OF THE AIRCRAFT

WENZEL'S 5-AXIS HIGH-TECH MEASURING SOLUTION IN USE AT HYATECH

Strict quality management is required for the production of aircraft engines, the heart of the aircraft. Hyatech is a young high-tech enterprise dedicated to the research, development, production and sales of the critical parts of aerospace engines. The company mainly produces high-performance parts such as compressor blades, rotating and structural parts of aircraft engines (integral disks, casings, turbine disks and compressor disks, rectifiers, rotor assemblies).

Challenging structure and processing

To guarantee the quality of the aircraft's heart, Hyatech faces a challenge: Since the complicated structure of the products Hyatech is involved in, for example the diffuser, which requires a steady, efficient and precise measuring equipment capable of testing complex geometry.

WENZEL LH 1210 with 5-axis head REVO



WENZEL LH 1210 in the old design



Preventive testing and comprehensive quality management

Upon Hyatech's requirement, WENZEL provides the 5-axis high-speed measuring solution, a LH 1210 high-precision coordinate measuring machine (CMM) with REVO high-speed 5-axis stepless scanning probe from Renishaw. This solution provides highly accurate measurements to ensure that the dimension and specification of parts are qualified and preventive action can be taken as part of the quality process, if necessary.

The high speed probe REVO requires a very precise mechanical structure and this is exactly one of the features of the WENZEL LH1210 coordinate measuring machine. The CMM is made of granite and guarantees the same thermodynamic properties in all axes. Due to its physical properties, granite is ideally suited

for use in metrology. With air bearing guides integrated into the base plate and high precision lapped guide surfaces, the system ensures excellent long term stability.

The ergonomic design ensures safe and comfortable operation. The X-Y-Z measuring range is 1,200 mm, 2,000 mm, and 1,000 mm with a load weight of up to 2,300 kg. The length measurement uncertainty of only $MPE_e = 2.0 \mu\text{m}$ ensures high precision. Zhang Leiyu, engineer at Hyatech explains, "The stepless indexing test allows us to test the product with very complex geometry with a precise result, which will bring a new breakthrough for our future development."

“

Since 2015, the WENZEL 5-axis high-speed solution has greatly improved in-house measuring efficiency and helped the company save inspection time and costs.”

Zhang Leiyu, Engineer at Hyatech



Cost effective Measuring Solution

The WENZEL coordinate measuring machine is equipped with the 5-axis probe, which can handle higher measurement throughput and provide more precise measurement results. Without the need to calibrate the probe angle separately, the REVO can flexibly perform the measurement in any vector direction. In addition to 100% measurement coverage, it can also capture very complex surfaces with excellent stability. The WENZEL 5-axis high-speed solution is able to continuously scan the fracture, surface and root profile of the blade, which significantly shortens the measurement cycle.

WENZEL's measuring solution significantly increases efficiency compared to a conventional universal coordinate measuring machine. Engineer Zhang says, "Since 2015, WENZEL's 5-axis high-speed solution has greatly improved our in-house measurement efficiency and helped the company save inspection time and costs." WENZEL's decades of development and solid mechanical structure make the system more sustainable and successful. "The years of development embodies the stability and measurement performance of WENZEL equipment," Zhang believes.

Measuring task

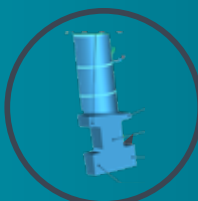
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1 turbine blade - 46 minutes
29 turbine blades - 22 hours 14 minutes



Scanning speed 200 mm/s



9 fracture scans, 8 longitudinal scans, 2 root profile scans and 1 inner gear fracture scan for each blade

INSPECTION OF LARGE COMPONENTS

WITH THE LH 2015 GANTRY



LH 2015

Established in 1993, Jin Tong Ling Technology Group Co. Ltd. of China is a service-oriented company integrating research and development and manufacturing of technology-intensive modern high-end equipment. The company offers compressors, blowers, steam turbines and various specifications of energy-saving liquid machinery as its main products. These are widely used in iron and steel smelting, thermal power generation, petrochemical, shipbuilding, nuclear power and other fields. With the rapid growth of China's market economy, these products are increasingly in demand in the international market in recent years.

With the constant technical progress, Jin Tong Ling has also continued to advance the quality management of its products. Before that, there were some challenges to overcome. For example, some large workpieces were measured using traditional or manual methods, which were not very efficient and sometimes resulted in inaccurate measurement parameters. In addition, some complex surface dimensions and shapes could not be detected with traditional measurement methods, which inevitably affected the quality of the products.

Outstanding Measuring Speed and Precision

Thus, the company was looking for a durable, efficient and accurate measuring solution for optimal inspection, especially of large components. To take advantage of this opportunity, WENZEL offered a large LH 2015 coordinate measuring machine from the LH Gantry series in combination with Renishaw's REVO 5-axis measuring head. This allowed the scanning speed of the coordinate measuring machine (CMM) to be increased enormously.

The LH Gantry 2015 was designed specifically for the inspection of large-volume and heavy workpieces. The compact design with active pneumatic vibration damping and automatic temperature compensation, allowed the installation without a special foundation. The elevated guides in the Y-axis additionally ensure maximum stability, even during dynamic movements. The LH gantry is thus ideally suited for Jin Tong Ling's applications, which require both speed and maximum precision.

Wu Yafei, engineer at Jin Tong Ling describes his experience with the new WENZEL CMM as thoroughly positive: "Our company previously did not have such large CNC measuring machines available, which made it impossible to measure large components in high volumes. However, the introduction of the LH 2015 made it possible to significantly increase the measurement

throughput and thus supplements a weak point of the previous quality inspection.”

Improving measuring efficiency

In contrast to conventional measuring methods, the LH Gantry 2015 with REVO is ideally equipped for high-performance 5-axis measurement. With this measuring technique, the probe can achieve measurement along a continuous path around the complex workpiece, allowing the probe assembly to be replaced or the measuring seat to be positioned without leaving the measured surface. Scanning through five-axis synchronous movement speeds up data acquisition and enables extraordinary measuring flexibility. For example, the inner bore can be measured by a trigger point, circular scanning or helical scanning. For surface and edge measurements, the measuring points can be quickly obtained through the “head-touch,” which improves accuracy and repeatability. In the meantime, the stepless positioning function ensures the measurement of the optimal features, minimizes the number of probe changes, and greatly improves the measuring

time. This measuring technique does not only save costs for users, but also greatly improves measuring efficiency and obtains accurate measuring results.

Casting measured on the LH 2015 Gantry





This 5-axis measuring system allows us to measure our components more accurately and efficiently. Moreover, the equipment has been in operation for two years, during which period it sees a low failure rate and a high accuracy."

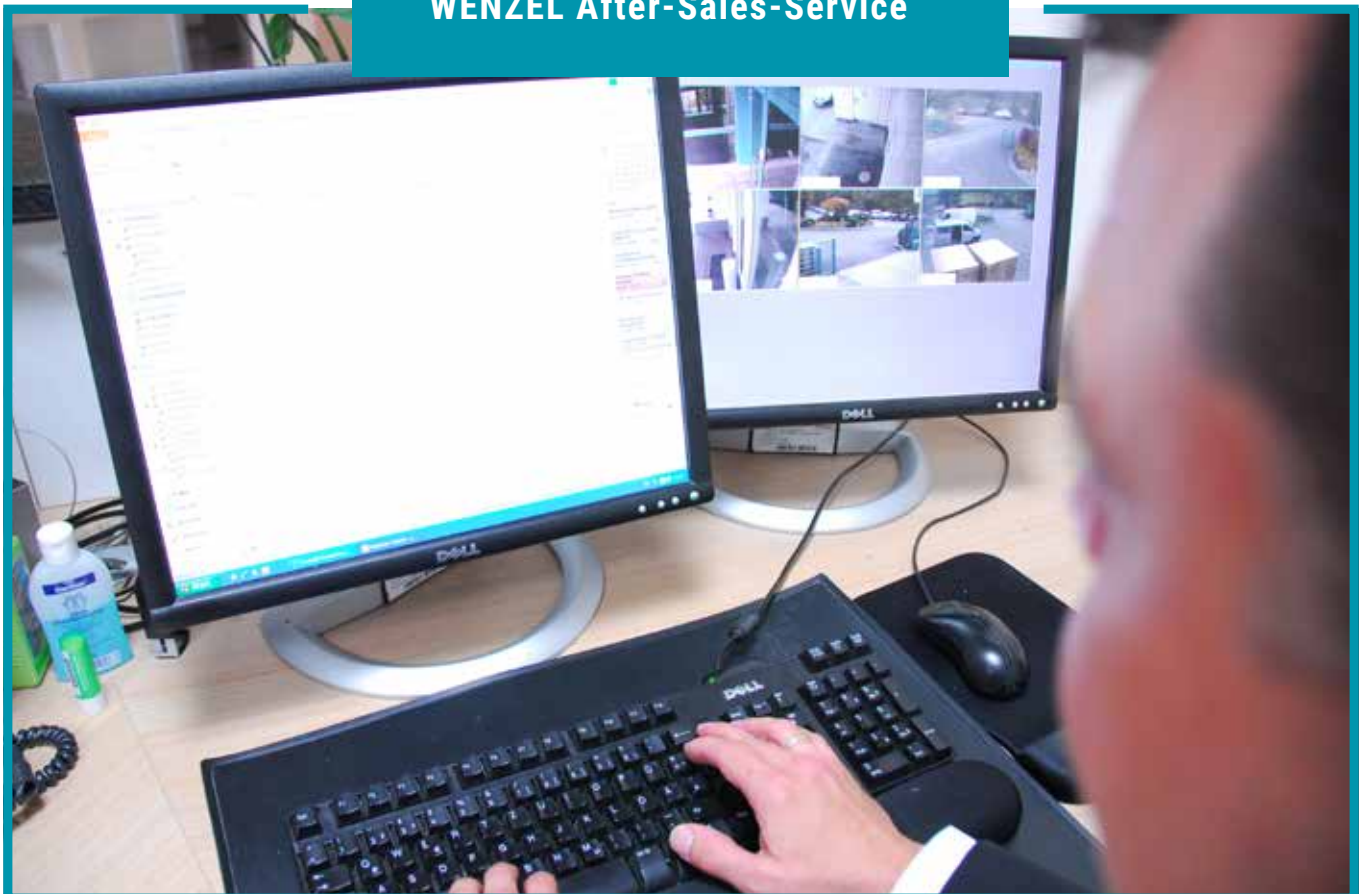
Wu Yafei, Engineer at Jin Tong Ling

Perfect after-sales service

WENZEL offers its customers excellent product quality and also always strives to be a consistent and reliable partner to customers by providing perfect after-sales service. Wu emphasizes, "When we started to work with the 5-axis measuring system, WENZEL's after-sales team was a great help, whether by phone,

video or on-site. We are very satisfied with the services they have provided". In the future, WENZEL will continue to adhere to its philosophy of continuously providing the best measurement solutions for its customers.

WENZEL After-Sales-Service



ACHIEVING EXCELLENCE WITH WENZEL

PLANSEE SHANGHAI



PLANSEE in Shanghai is specialized in the manufacture of refractory metals together with their alloys and composites such as tungsten, molybdenum, etc. The know-how of Plansee China covers the entire manufacturing chain: preparation of the powder, production of near-net shape, pressed-sintered products, as well as all aspects of the further processing and assembly of complex components.

PLANSEE's high value-added products pose very high requirements on geometric dimensions and product tolerances. PLANSEE needs to develop a high level of expertise on machinery manufacturing and measurement. The company in China has grown rapidly over the past few years, and has purchased a WENZEL LH 108 coordinate measuring machine and nine XOrbit coordinate measuring machines. This equipment has been very helpful in the geometric measurement of complex parts and the measurement of various form and position tolerances such as profiles. PLANSEE has always been the leader in powder metallurgical production because of prioritizing quality.

Excellent Products

The reason PLANSEE chose WENZEL as a supplier at first contact is because they share the same business philosophy of delivering premium products. The design, manufacturing and high level of internal production ensures the high quality and durability of WENZEL's measuring machines. According to feedback from WENZEL's clients, including PLANSEE, these machines have maintained stable performance after several decades of use. PLANSEE is one of them. Wang Qiang, head of metrology at PLANSEE, praises WENZEL's measuring solutions: "This coordinate measuring machine LH 108 with a Y-axis of 1,600 mm is used specifically for measuring some large-format products. It has been in use for more than eight years and has remained stable and as precise as new machines with 1.8 μm . It is impressive to maintain such high accuracy after eight years of use."

Since 2015, PLANSEE has been purchasing and using WENZEL's XO coordinate measuring machines. To align with its fast growth over the past six years, PLANSEE purchases measuring machines every year, with some of its products needing two to four measuring machines.

many occasions we need their equipment urgently. When our clients have to speed up a project's progress or we have to meet a deadline in our production, WENZEL sympathizes with us and puts our needs first. They race against time and deliver goods ahead of schedule while ensuring the quality to allow us to meet a deadline," said Wang Qiang.

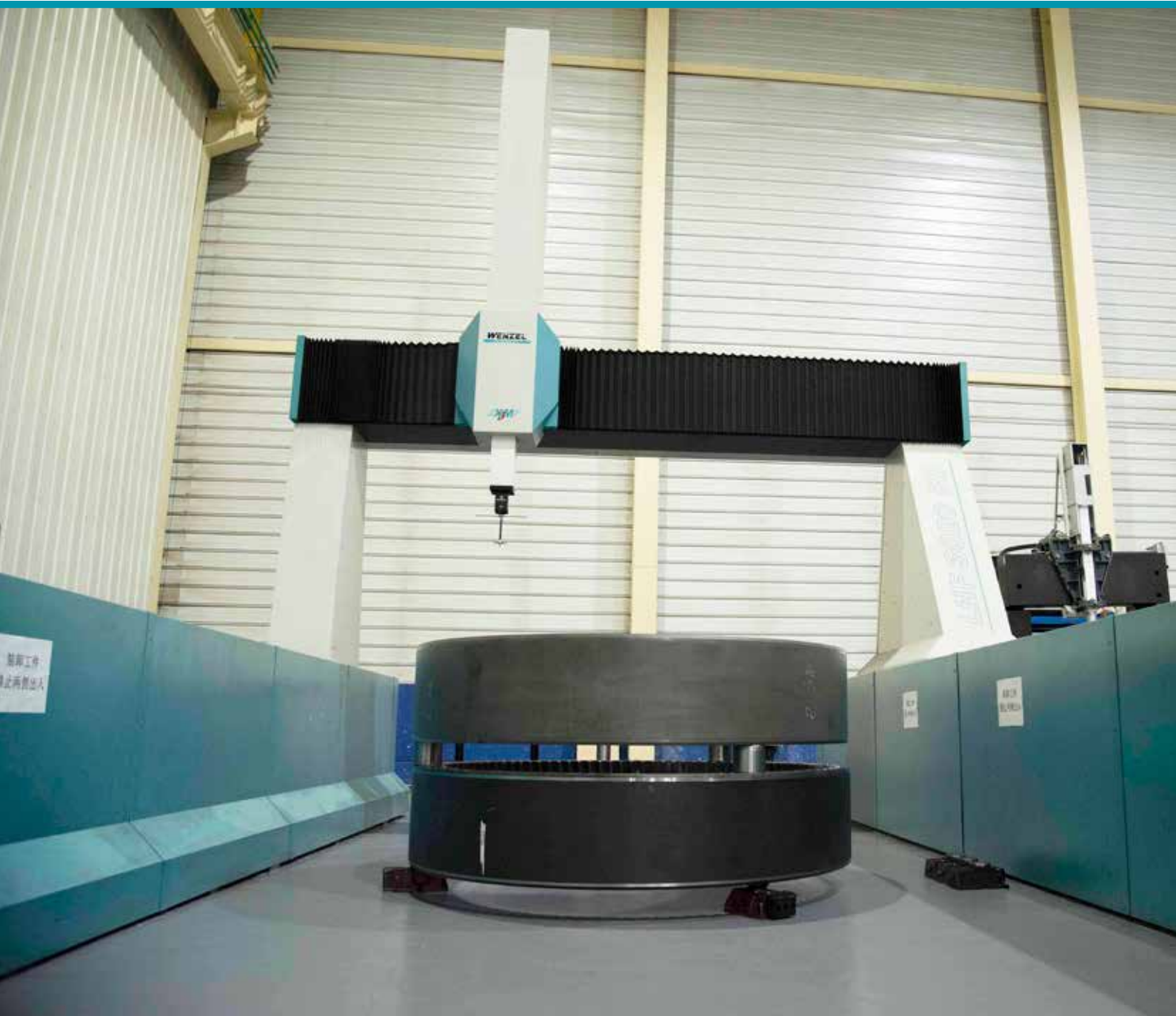
Wang Qiang was also impressed by the user experience: "XO series is cost-effective measuring machine, the precision of which meets our requirements and proves very helpful in our precision processing. Now our high-precision parts are almost all measured by the XO series."

"If we want our clients to trust our products for precision processing, we need to make sure that our measuring report should withstand scrutiny. We certainly cannot shift the blame onto our clients. We have been using WENZEL's equipment for so many years but have never encountered a divergence of measuring results between ours and those of our clients. This also proves that WENZEL's measuring machines meet our requirements for precision. Our clients are very satisfied with the product quality after the measurement," said Wang Qiang. As of today, PLANSEE has bought nine XO coordinate measuring machines from WENZEL. In the future, WENZEL wishes to deliver more innovative solutions that exceed clients' expectations.

"WENZEL has always delivered products on time, though on

METROLOGY FOR THE CLOSED LOOP

MEASUREMENT OF GEARS AND GEOMETRIC PARTS ON ONE MACHINE



Gears are commonly used in, important mechanical parts whose quality have a direct impact on the life and safety performance of the machines in which they are installed. Sinergy Gearing Technology Co., LTD of Nanjing, China, specializes in the processing and distribution of high-precision gears. These are mostly used in wind power, the steel industry, metallurgy, the building material industry, and the petrochemical industry.

As these markets have grown rapidly in recent years, quality testing of large gearboxes has become increasingly important. Sinergy's customers are predominantly located in Europe, where very stringent requirements are placed on product quality. In response, Sinergy has consistently maintained high standards. After extensive communication and comparisons with other measuring machine manufacturers and experts in the industry, Sinergy decided to purchase a large high-precision gantry-type LHF 3020 coordinate measuring machine from WENZEL.



“

We use the WENZEL LHF not only to measure the gears, but also to measure the “pin hole” and many positions as well as geometric features to achieve a closed-loop process”

Zhu Baojun, CEO of Sinergy



“With the WENZEL LHF, we can perform offline measurements in the same production cycle with a specific frequency and achieve the highest product stability”

Zhu Baojun, CEO Sinergy

Measurement solutions for wind turbine gearboxes

Sinergy's high-precision gears have been widely used in large-scale wind power generation facilities in China and other countries. It goes without saying that the quality of the gear is of great importance to wind power equipment. That's why Sinergy's general manager, Zhu Baojun (Mr.), expected high performance from their new measuring equipment and posed several requirements to be met: "as a manufacturer of large-sized wind power gears, we not only need to measure the geometric dimensions of the product, but also the technical indicators related to gears such as diameter pitch, profile helix and modification in the product measurement process. We need composite measuring equipment that can perform gear inspection and professional coordinate measurement, and provide reports and data that are compatible with the international mainstream technical standards. After preliminary investigations and detailed, thorough technical exchanges, we learned that WENZEL is the best manufacturer of professional coordinate measuring machines and professional gear inspection equipment in the industry. Sinergy chose WENZEL LHF 3020 after careful consideration, as it meets our needs for product measurement, covers the measurement of all the key technical indicators of 6 MW wind power gears, and provides measurement reports that our customers recognize."

With the combination of large measuring range, high accuracy, and operational flexibility, the WENZEL LHF 3020 meets Sinergy's requirements. The air bearing is specially designed for high-precision measurement of large-volume and complex workpieces. The floor-level design and dual-drive design for Y-axis gives the equipment unparalleled dynamics, achieves excellent accessibility for measuring large components, and achieves maximum portability. The equipment can also eliminate the thermal influence of the environment or work piece, due to temperature fluctuations, through automatic temperature compensation. Based on these product features, LHF 3020 provides reliable and flexible measurements for Sinergy, and have been successfully used in Sinergy's 3MW products.

Reduction of effort and costs

Before Sinergy introduced WENZEL LHF 3020, one of its products needed to be measured on two different devices. The position of the Pin Hole, for example, was measured on the traditional coordinate measuring machine, and the gear accuracy of the internal gearing was measured on the gear measuring machine. In comparison, the WENZEL CMM allows Sinergy to generate a pinhole report, position report and gear report (including gear pitch, diameter pitch, and profile helix) on the same processing and measurement standard. It also generates two measurement reports on the same processing benchmark, which previously had to be done on two different devices.

Combining coordinate measurement and gear measurement into one machine, WENZEL LHF 3020 uses the WM | GEAR measurement module in WENZEL's new measuring software, WM | Quartis, which achieves professional gear measurement, as well as analysis and evaluation of the measurement results. Equipped with WENZEL's unique measurement compatibility, LHF 3020 cannot only perform professional measurement of gears, but also coordinate measurement of general parts. Therefore, by incorporating the functions of gear measuring machinery and coordinate measuring machinery into one piece of equipment, WENZEL LHF 3020 helps Sinergy minimize labor costs, time costs, and capital costs. It also allows Sinergy to adopt the same measurement standard, and reflect its gear design on this equipment.

Closed-loop control for improved efficiency

Sinergy's industrial layout focuses on closed-loop control, which plays a critical role in ensuring the stability and reliability of mass production.

"WENZEL LHF allows us to perform offline measurement in the same production cycle at a certain frequency and achieve the highest product stability. We cannot only use it to measure gear processing, but also the processing of Pin Hole and many

positions, as well as geometric precision processing, to achieve closed-loop control, which is very helpful for us to win new orders from customers in the follow-up cooperation,” said Zhu Baojun

Innovation meets tradition

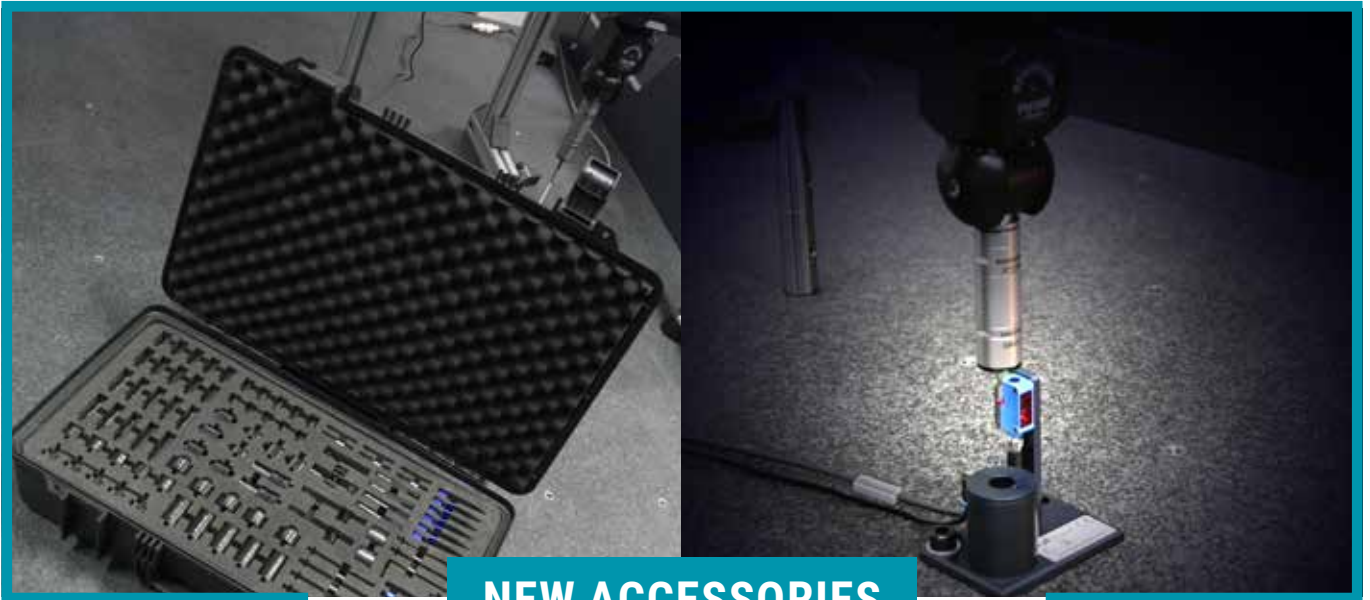
As economic integration continues to segment the industry, increase the degree of product homogeneity, and intensify competition in the marketplace, customers not only have high expectations of a product’s function and quality, but they also place high value on comprehensive customer service. WENZEL has always puts customers first and exerts every effort to satisfy customer needs. Zhu Baojun spoke highly of WENZEL’s service: “our operators were not familiar with the user interface at the beginning, for which we communicated many times with WENZEL’s engineers and invited them to come over. They always responded to our requests promptly and visited our production sites several times to explain to our operators and engineers how to use the equipment. They even upgraded the software espe-

cially to adapt to the features of our products, which impressed me and exceeded my expectations. We look forward to WENZEL’s continued growth together in China.”



WENZEL INNOVATIONS

WHAT'S NEW AT WENZEL



NEW ACCESSORIES

ALL NEW W



New LH 2015 Bridge



WENZEL GT



INNOVATIONS MADE BY WENZEL

2020/2021

WM | QUARTIS R2021-1 now available

Just in time for the start of the New Year, we present the new WM | Quartis R2021-1, packed with updates and new features. Benefit from the following enhancements, among others:

- Optical measurement and evaluation based on point clouds - Extract elements
- Improved integration of line scanners, e.g. on the PHS-2 rotary swivel head
- Evaluate features according to current ISO and ASME standards
- Enhanced DMIS functionality, including OpenDMIS compatibility
- New and updated CAD interfaces

WM | Quartis®

WENZEL®

- **Geometry, freeform and curves** combined in one measuring software
- Supports **manual and CNC** measuring devices of various types
- Scanning with **tactile and optical sensors** and **5-axis measuring heads**
- **Form and position evaluation** according to the latest **ISO GPS** and **ASME standards**
- **DMIS 5.2 Standard** complements the intuitive Quartis programming language
- **Structured data management** in relational database (MS Access / SQL-Server)
- **Report generator** for descriptive measurement reports
- **Operator-friendly operation** with quick selection panel, 1-click program start
- Ready for **special applications** thanks to numerous **interfaces** and **add-ons**

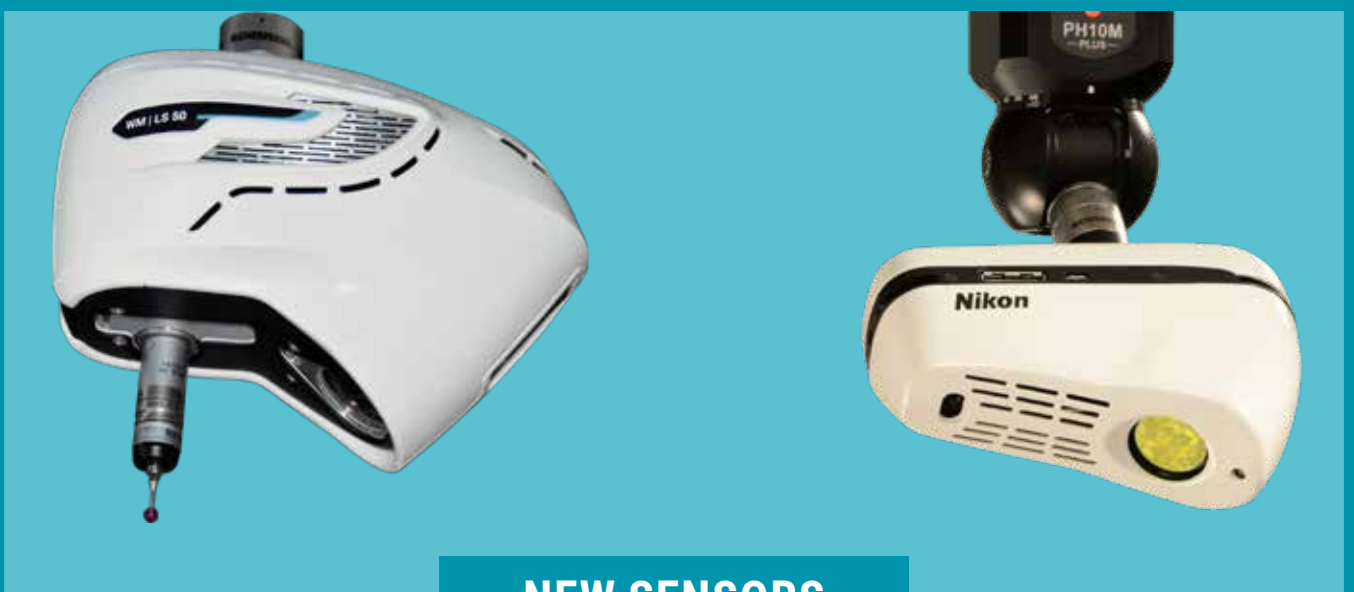
WM | QUARTIS R2021

WENZEL further expands its LHF series

The new LHF 5025 features enormous work envelope of 5 m x 2.5 m (X-, Z-axis) and a Y axis that can be custom sized to fit your measurement needs. This makes the LHF ideal for measuring large components with accuracy and efficiency.

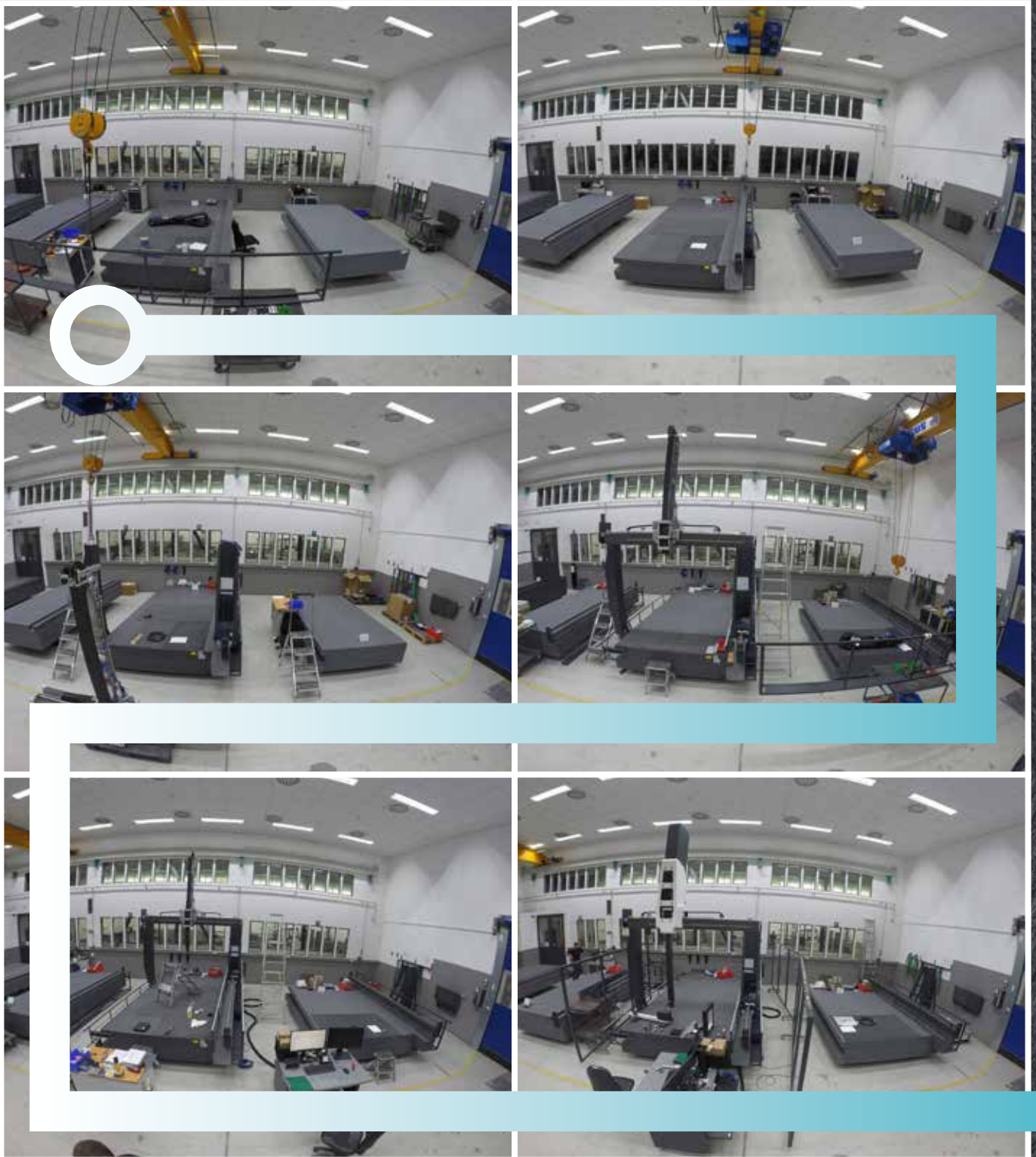
**LHF 5025****Expansion of the sensor portfolio**

WENZEL expands its sensor portfolio with the compact WM | LS 50 and the Nikon developed NIKON L100. These new optical sensors offer high accuracy, speed, and point density in an efficient package.

**NEW SENSORS**

LH 2015 PORTAL

FROM THE RAW GRANITE TO INNOVATION



The LH 2015 is now available as a standard model within the LH Bridge series. The new design has a generous measuring range in the X and Z axes of 2,000 x 1,500 [mm]. The Y-axis comes in standard sizes of 3,000, 4,000 and 5,000 [mm] and can be custom configured for special sizes exceeding 5,000 [mm]. Up to now, LH CMMs

in this size were only available in Gantry-design with raised Y-guides. This new model allows for more flexible part handling when compared to the LH Gantry, while maintaining the accuracy and reliability that WENZEL LH CMMS are known for, all packaged in a modern, sleek, industrial design.



WHAT MAKES A GOOD MEASUREMENT SOLUTION FOR THE SHOP FLOOR ?

Shop Floor metrology for the modern production environment requires fast, direct data feedback along with reliable mechanical systems that provide simple ergonomic designs for effective, future-proof solutions.

For some time now, metrology has been undergoing a change from the measuring room to the production environment or to the fully automated production line. The exciting question now is, what does this mean for the measuring machine? Or in a broader

sense: What does this mean for the measuring solution in the future?

Many manufacturers appreciate the advantages of measurement in production. The material flow is easier to handle, the result is available much faster to the people who can intervene immediately - the operators. This reduces waste, because the operator can counteract trends before it is too late.



What is the difference between production and measuring room?

Production Metrology needs differ from the Quality Lab in several ways: **Environment**, **Operation**, and **Reliability Requirements**.

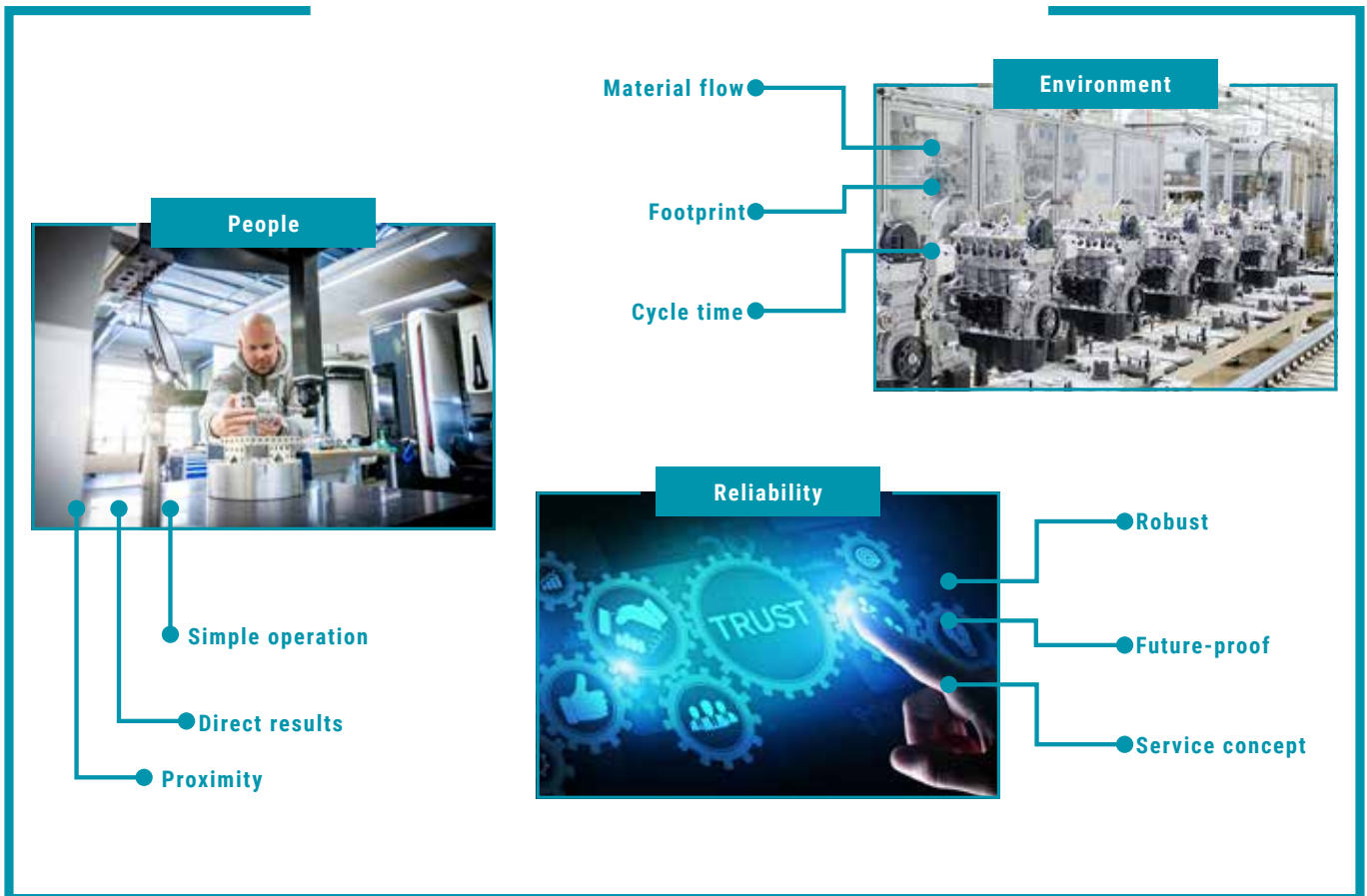


Figure 1: Central factors in the workshop environment are the people, i.e. the operators as operators of the machine, the environment with production machines, which in turn absolutely require a reliable solution..

Ideally, the operator carries out the measurement himself near the production machine. Simple operation, and fast, streamlined data reporting is essential to monitoring production and ensuring that Process Control is maintained. This is where intelligent software with intuitive controls, dynamic reports, and SPC analysis

tools are needed to meet the demands of modern manufacturing. There are already solutions available today that distinguish between programmer and operator and partially automate programming.

Go with the flow

loor space is at a premium on the Shop Floor, and therefore a CMM with a small footprint is an absolute must, while maintaining the capabilities of a traditional CMM. Using rigorous design methods, and clever engineering, the SF series of CMMs balances the space requirements of the Production Floor, with the

technology requirements of the Quality Lab for an efficient, yet powerful package. Clever integration of probe changers, compact electronics and controls panels, and a focus on work envelope access for easy loading, makes the SF and effective solution for Shop Floor Metrology.



Figure 2: A modern production measuring machine is optimized to a minimum footprint (here just 2.3 m²) and ergonomically designed for easy operation.

Measuring at the speed of production

When measuring on the shop floor, production cycle time determines the measurement cycle time, putting different demands on the CMM than in the past. Fortunately, with the combination of efficient mechanical design, and high speed probing technologies, these faster cycle times can easily be achieved.

And if this is still not enough, you can use a fast comparator or operate the measuring machines in a faster mode. Here, repeatability is maintained and trends can still be observed. The measurements are compared in random sample measurements against exact absolute measurement values.

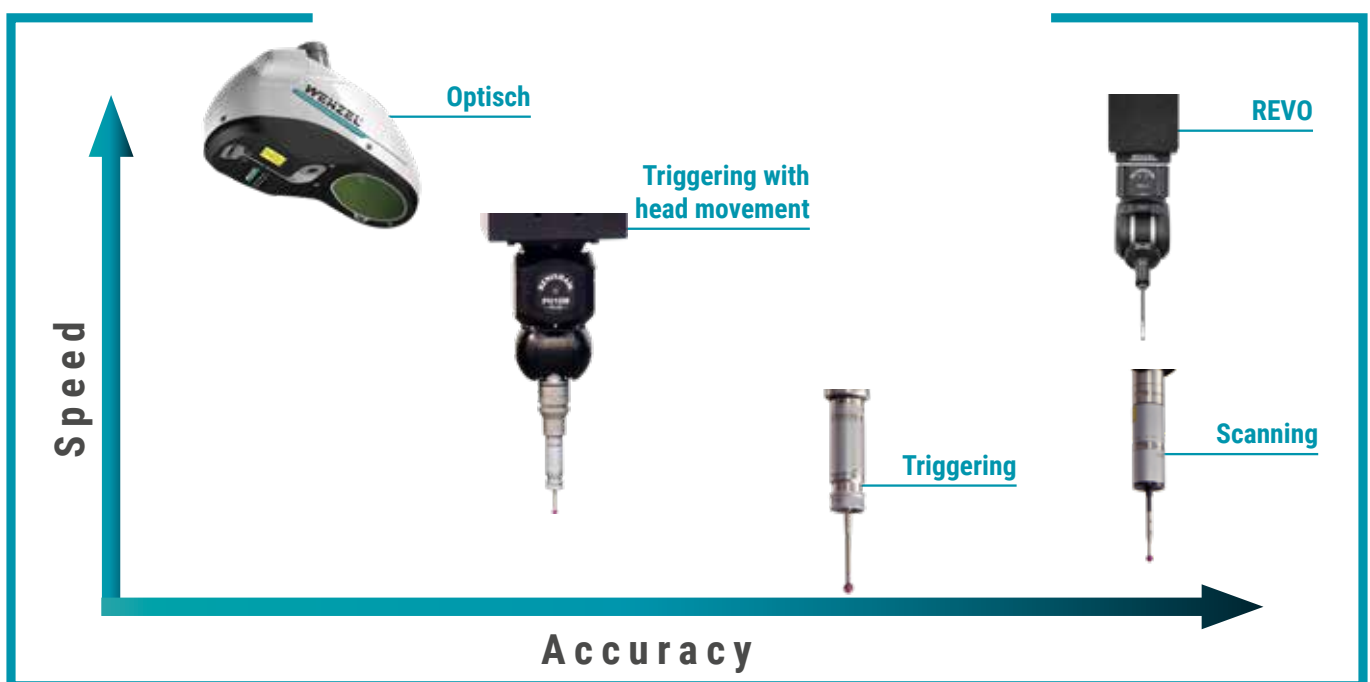


Figure 3: Schematic classification of measuring systems according to speed and accuracy.

The future - life is what happens while making plans

Production is also undergoing profound changes. Rapid series changes and demographic change are fundamentally altering the framework conditions. Therefore it is important to find a sustainable solution:

- **Flexibility**

The SF can easily be adapted to a variety of sensor technologies, and can be easily relocated as the demands of your production environment change.

- **Automation capability**

Standardized Automation Solutions allow the SF to be easily adapted to a new work cell, or an improved automation hardware.

- **Monitoring possibilities**

Online monitoring tools are already standard and provide the basis for predictive maintenance

Reliability through excellent and predictable service

Even the most accurate machine is only useful when it is measuring. This is why it is critical that a Shop Floor CMM must have excellent uptime capability, as well as fast and simple maintenance. Combined with a comprehensive planned maintenance package, these factors offer high efficiency, and low cost of ownership.

In addition to reliable machine construction, worldwide availability of parts, WENZEL offers modular service programs that offer many advantages:

- **Current software - WENZEL Software Maintenance Contract**
- **Guaranteed response time - extended service availability**
- **Plannable costs - WENZEL Full Service**
- **Extended warranties - GAtop & GAplus**

Together, these items create a comprehensive maintenance package that ensures maximum uptime, and throughout, at a reasonable cost.

Robust mechanical engineering

The production environments we encounter at customers' facilities are as diverse as the parts they produce: in machine design, Shop Floor machines are designed differently when compared to traditional CMMs.

- **Temperature behavior**

The materials used in construction of a Shop Floor CMM, as well as the individual components, must minimize the effects of the changing environment of the Production Floor. During the design

process, errors due to temperature are mapped and eliminated using environmental chambers to simulate the challenges of the Production Floor.

- **24/7-operation**

Robust reliable drive systems are critical for the demands of 24/7 production. The system design must also minimize the ability for dirt and other contaminants to effect the system performance.

- **Vibrations**

Many years of experience with customers show that air bearings are also suitable for the production environment. In difficult environments, air-sprung active damping or particularly robust linear guides are used.

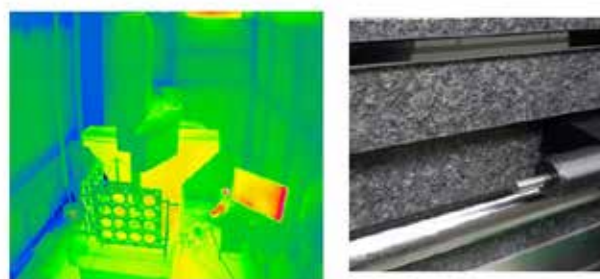


Figure 4 and 5: Left: A production measurement solution undergoes extensive tests in climate chambers and vibration measuring stations until it is ready for the workshop. Right: Small details are important, such as the mounting position of scales and drive units.

In the end the package decides

Of course, high-quality mechanical engineering with sensor technology tailored to the respective application is a prerequisite. But the system must also address:

- **Ergonomics:** the solution is efficient when it fits into the material flow
- **Operating concept:** the operator can operate the solution reliably
- **Future-proof:** the machine can be easily adapted to new processes and expanded with modern sensor technology
- **Cost-Of-Ownership:** reliable and plannable service with modern software makes everyday life easier

When the total package is done right, the complete measurement solution will support the needs of production now, and for years to come.

FROST & SULLIVAN INNOVATION AWARD

GOES TO WENZEL'S COMPUTER TOMOGRAPH exaCT L

LONDON, U.K. – 18 November 2020 – Based on its recent analysis of the global industrial computed tomography (CT) market, Frost & Sullivan recognizes WENZEL Group GmbH & Co. KG (WENZEL) with the 2020 Global New Product Innovation Award. WENZEL has extended its vast industrial exaCT series with its new, advanced exaCT L, one of the most compact, high-value, and cost-effective offerings in the 225kV and 1,600 watts performance class. The solution's three independent axes enable accelerated measuring and a simple and effective workflow across the entire CT process.

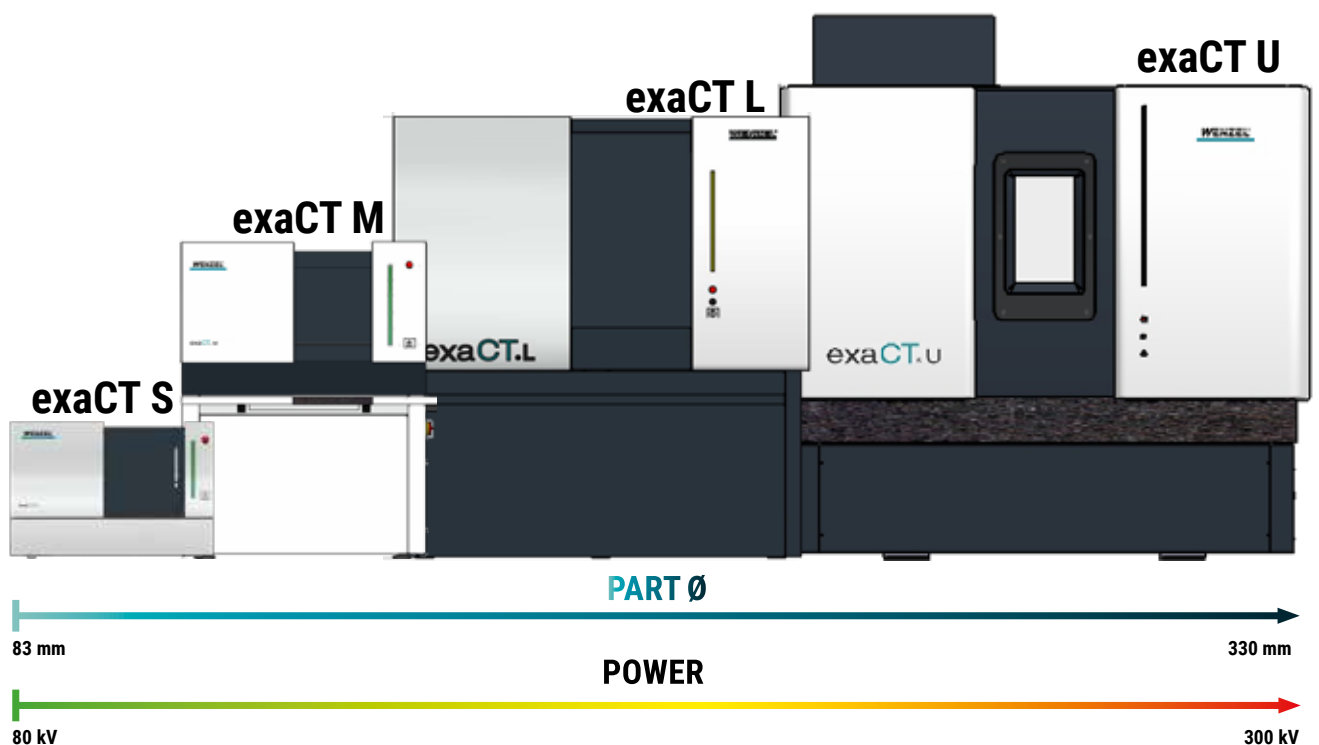
The managing directors Dr. Heike Wenzel and Prof. Dr. Wenzel-Schinzer with the award in front of the computer tomograph exaCT L



“Compared to many tactile or optical measuring machines that do carry out measurements at the component, the exaCT L can measure inside and outside objects with high precision. The exaCT L has superior X-ray performance combined with a fast detector, allowing it to measure objects and defects rapidly,” said Mariano Kimbara Senior Industry Analyst. “WENZEL has made significant inroads into the market with intuitive user guidance that employs intelligent software to automate all measuring parameters, delivering robust customer value.”

WENZEL’s exaCT series, including exaCT L, can support several metrology and non-destructive testing applications, including connectors, hearing aids, aluminium casting, combustion engines, or remote controls. The company equips the exaCT L 150 kV version with a high-resolution micro focus X-ray source with a 6,000-pixel detector. By establishing a new benchmark with one of the highest-powered X-ray sources available in the 225 kV segment, exaCT L offers up to 1,600 watts with higher flexibility in applications for larger measuring volumes. Another added benefit is WENZEL’s configurable and modular system for individual requirements. Unlike competing solutions, WENZEL’s product can be customized to fit user requirements.

exaCT L can be configured to existing CT system power sources and detectors, depending on the application requirement. With a 225 kV output, scanning high-density materials, such as plastics, metal, and multi-materials, only takes minutes. This superior scanning capability makes the solution more reliable and relevant to OEMs’ operations. In addition, the solution has the smallest footprint in its class of 225 kV outputs, which addresses customers’ small space requirements.



THE NEW GT SERIES

GEAR MEASURING TECHNOLOGY

PRECISION

- All linear axes contain air bearings, for the highest precision.
- All critical components, such as the base plates and linear guides of the axes, are made on granite to ensure the most uniform thermal behavior for the entire measuring system..
- The WPC Controller guarantees high reliability with a live 4th Axis measurement, while offering excellent servicability and maintenance..
- Whether needing the highest accuracy, or increased weight capacity, our rotary tables can meet your needs with either air, or hydraulic bearings.
- High-resolution scales ensure exact positioning of the exact positioning of the measuring instrument and precise measurement results.

ERGONOMICS

- The open construction and the radial movable tailstock of the GT 900 and GT 1200 allows an easy and uncomplicated loading.
- The simple operator interface and graphical input of the parameterized software make the creation of complex measuring programs and significant measurement reports quick and easy
- The optimized ergonomics make the comfortable and secure operation of the gear measuring machine possible.
- Because of its compact construction and small footprint the WGT can be easily integrated into the manufacturing area.



DURABILITY

- The massive base of the GT is made of granite and provides the highest level of stability.
- All axes are protected against oil and dust by covers.
- The air bearing technology in combination with the impala granite is absolutely wear-free and stands for long-life cycle concerning material and accuracy.
- The modular system concept of the WGT allows the adaption to changing requirements and offers security of investment for the future.
- The exclusive use of high-quality components guarantees long machine operating times.

MORE INFO

More information and the current product catalog for the new GT series can be found at:



SERVICEABILITY

- Maintenance times can be reduced as all replacement parts are easy to access.
- Subsidiaries and agents worldwide ensure high and fast replacement part availability.
- Hotline-support allows quick diagnosis for help.

**WENZEL Metrology GmbH**

Werner-Wenzel-Straße
97859 Wiesthal, DE
Website: www.wenzel-group.com
Phone: +49 6020 201-6006
E-Mail: sales@wenzel-group.com

WENZEL America Ltd.

28700 Beck Rd
Wixom, MI 48393, USA
Website: www.wenzelamerica.com
Phone: +1 248 295 4300
E-Mail: sales.us@wenzel-group.com

WENZEL UK Ltd.

Pear Tree Yard, Town Street, Sandiacre,
Nottingham. NG10 5DU. GB
Website: www.wenzel-group.com/uk
Phone: +44 (0) 1159 398550
E-Mail: sales.gb@wenzel-group.com

WENZEL France SAS

2 rue Jacquard ZA du fresnes
FR-91280 Saint Pierre Du Perray
Website: www.wenzel-group.com/fr
Phone: +33 1/60 87 16 60
E-Mail: sales.frs@wenzel-group.com

WENZEL South Asia Pri

Plot no 20, DLF Industrial
IN-121 003 Faridabad
Website: www.wenzel-g
Phone: +91 9212 567 00
E-Mail: sales.in@wenzel

WENZEL Polska SP Z O

Ul. Herbowa 13,
62-070 Dąbrówka, PL
Website: www.wenzel-g
Phone: +48 604 976-300
E-Mail: sales.pl@wenzel



IMPRINT

Publisher

WENZEL Group GmbH & Co. KG

Werner-Wenzel-Straße
D-97859 Wiesthal

Contact

Phone: +49 6020 201-0
Fax: +49 6020 201-1999
Mail: info@wenzel-group.com
www.wenzel-group.com

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Klostermann Ingenieurbüro & Vertriebsgesellschaft mbH
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Construction Tools PC AB

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WENZEL Japan

Kakua-Tec LLC
Osaka, Japan 561-0861
Website: www.wenzel-group.com/jp
Phone: +81 90 1676 6890
E-Mail: sales.jp@wenzel-group.com

WENZEL Metromec AG

Rheinfelsstrasse 1
CH-7007 Chur
Website: www.wenzel-metromec.ch
Phone: +41 81 257 07 00
E-Mail: sales.ch@wenzel-group.com

WENZEL Italia S.r.L.

Località Campi dell'oro n° 11
IT-13017 Quarona (Vc)
Website: www.wenzel-italia.it
Phone: +39 0 163 430 144
E-Mail: sales.it@wenzel-group.com

ate Ltd.
al Area, Phase 2
roup.com/en/in
01
-group.com

WENZEL Asia Pte. Ltd.

26, Boon Lay Way, #01-84 TRADEHUB 21
SG-609970 Singapore
Website: www.wenzel-group.com
Phone: + 65 6795 2327
E-Mail: sales.sg@wenzel-group.com

O.
roup.com/pl/
)
-group.com

WENZEL Measuring Machines (Shanghai) Co. Ltd.

No. 219, SongXiu Road QingPu District
CN-(201703) Shanghai
Website: www.wenzel-cmm.cn
Phone: +86 21 - 5970 3088
E-Mail: sales.cn@wenzel-group.com

INNOVATION MEETS TRADITION

The WENZEL Group is a market leader in innovative Metrology. WENZEL offers a comprehensive product portfolio in the fields of Coordinate Metrology, Computed Tomography and Optical High Speed Scanning. The technology of WENZEL is used in all industries, including the automotive sector, aeronautics, power generation and

medicine. WENZEL looks at today on an installed base of more than 10,000 machines worldwide. Subsidiaries and agencies in more than 50 countries support sales and provide after-sales service for our customers. The WENZEL Group today employs more than 600 people.



YOUR LOCAL CONTACT PERSON

WENZEL GROUP GMBH & CO. KG

Werner-Wenzel-Straße

97859 Wiesthal

Phone: +49 6020 201-6006

E-Mail: sales@wenzel-group.com



We are there for you worldwide. You can find our subsidiaries, sales and service partners at www.wenzel-group.com.

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