

**BLUM**  
**NOVOTEST**

# NEWS



INNOVATION



# Interview

*Fifty years packed with innovation are behind us – a very special route to success on which we look back with pride and joy. But how did it all come to pass and what factors played a decisive role? To clarify this and other questions, we asked Alexander Blum, Managing Director of Blum-Novotest GmbH, for his impressions and outlook for the future.*

Mr Blum, why have the last 50 years been so successful for Blum-Novotest?

To put it simply: due to our consistency and unwavering staying power. Those 50 years also included some challenging times. It was important to overcome the difficult phases as well as to learn from them. For instance, the company had a tough time at the end of the 1970s when an initial product line, in the area of controllers, was quickly surpassed in technical terms and the role of the design service divisions was called into question. On the other hand, the 1980s saw very intensive groundwork carried out for the current product lines, which in turn led to a tangible sense of change during the 1990s. This period also marked the beginning of the company's internationalisation and the creation of global structures, which was accompanied by strong growth in the new century. The manner in which we dealt with individual challenges since the 1970s – this is also the corporate culture that sets the employees and the company in itself with its owners apart.

What is your recipe for success?

My father and company founder summarised it very well: Dealing with one another in a good way, humanity. Naturally, we as a company must be economically successful. The fact that we focus not only on our customers, but also on our employees who work so hard every day, makes the difference. In addition, we bring a great deal of creativity to our discussions. This involves heated debates about new products and ideas, and concludes when the colleagues then pull together and discover that they have collectively arrived at a very good solution. These aspects account for the success of the company. Perseverance, the ability to look ahead yet not losing sight of the humanity, that is typical of our company.

Günther Blum was already a pioneering force in the industry.

Where does the drive to continuously innovate come from?

We look at the world with our eyes wide open and try to remain creative. This is without doubt a key principle that the four founding shareholders implanted in the organisation. A willingness to talk about new ideas and not to disparage them. We describe it as saying "and" rather than "but". For us, that is the approach we take on a daily basis. In recent years, we have introduced numerous topics aimed at systematically promoting creativity. For example, we offer our employees great flexibility wherever possible in terms of where and for how long they work. Spending more time working at home, meeting in non-traditional ways at our employee and customer centre, or working on their own, in order to come up with truly creative breakthroughs. This appetite for innovation and curiosity is what sets the company apart today and it can be traced back 50 years to the foundation of the company.

Where do you see your company in the next 50 years?

With regard to our automotive-oriented Measuring and Testing Technology divisions, we will certainly make an important contribution to the electrification of vehicles and to alternative drive concepts. In addition, these divisions will establish the professional motor spindle testing technology, with end-of-line and laboratory test stands on the global stage. This technology not only drives the stabilisation and delivery quality of motor spindles, but also enables the effective realisation of activities covering all aspects of preventive maintenance and early problem detection on motor spindles.

In the Measuring Components division for machine tools, we will help customers further reduce their output of scrap or rejects. This is because we can use intelligent measurement methods to record machining parameters and results and then learn how the process can be automatically adapted during production. At this point, there are no technical reasons other than one-off events for producing scrap or rejects. Despite this, far too many companies continue to accept it as an unavoidable fact. I'm not ready to accept this!

As a member of the second generation, how did you come to the company?

My first experience of the company was when I worked there during my school holidays at the age of 16. Back then, I would look up to my father's office and think perhaps I'll sit up there one day, and then perhaps not. It wasn't an objective I set myself, but I somehow had the feeling that we might meet again in this capacity and that events would conspire to bring this about. It may also have been more of a son's familial desire to follow in his father's footsteps. Either way, I'm very glad that it worked out that way.

Is there a sense of pride at Blum-Novotest in how far the business has come?

That is undoubtedly a feeling we all share: many of our key employees today, and many of them who have been with us for a long time, some even for decades, have all contributed to our success and share this sense of pride. The success of the company is not something that was achieved by any single person, that's always the way. And if we hadn't had these many clever minds, these dedicated minds who also gave up their evenings and even nights to put things in motion, we would not be where we are today. No matter how far we have come up to now, we will never forget that all of this only happened because we work together as a team. Our employees sense this and we will continue to work as a team going forward.



INNOVATION

50 YEARS

INNOVATION

# 50 years of measuring technology and machine tool history

*From a one-man engineering office to a technology and global market leader in just 50 years – a rare occurrence even in south-west Germany with all its 'hidden champions'. Blum-Novotest GmbH has achieved this not only through hard work but by being innovative, intelligent and diligent. To mark this event, the company held the BLUM TECH-TALK under the title '50 years of Innovation' in a very special setting on 7 June 2018: Numerous guests from more than 20 countries heard keynote speeches from leading experts, saw interesting demonstrations in the BLUM Tech-Centre and witnessed the unveiling of a product that combines the experience gained from over 50 years in this field. An excellent opportunity to look back and analyse which genes have helped the company achieve this level of success.*

The foundations for the high in-process reliability of BLUM's production metrology were laid at an early stage. Company founder Günther Blum had become highly involved with machine tools while studying Aerospace Engineering in Stuttgart. Alongside his university course, he carried out design work for various companies and established his own engineering office in Schmalegg near Ravensburg on June 1, 1968. Over the following years, the office worked for well-known companies, including Stama in Schlierbach or the Japanese FANUC Corporation.

Just one year after its foundation, the company decided to expand its service offering from mechanical development to electrical planning. More space was rented in Weissenau near Ravensburg for this particular purpose. All the necessary provisions were now in place for initial staff recruitment. Besides the design engineer Klaus Hoffmann, who had been involved in the business part-time right from the start, Bernd Blum and Rainer Eckenstein joined the small company. While other companies

still relied on contactor-based control technology, the young engineering office had already developed its own semiconductor-based interfacing controllers. These extremely reliable controllers were used mainly in Stama machine tools and were one of the company's best sellers up until the early 1980s. Rapid growth resulted in BLUM having to find a new location to operate from after just five years in Weissenau. A new site was found a few kilometres away in Grünkraut, and the company is still registered there to this very day. During these years, BLUM pioneered the area of tool machine development: The engineering office was, for instance, involved in the development of the world's most successful machine tool.

At the end of the 1970s, Günther Blum came to a crucial realisation that would shape the company's future path: Automation is incomplete without process-integrated measuring technology. One approach involved measuring systems that should monitor the process directly in the machine tool. Another approach entailed post-process measuring

machines that are no longer located in a separate measuring room but directly in the production hall. Many years of experience with NC machine tools and their electronics seemed to be the ideal model from which to proceed in this field of business. To date, both areas represent two of the three main pillars of BLUM's product range. The final pillar allows BLUM to supply, for instance, specialised post-process machines for quality control when manufacturing brake discs, shafts and axles, i.e. predominantly for rotation-symmetrical components. The company launched its first 2D measuring machine in 1983. An array of further measuring machines featuring the in-house NC control system, mainly used in the automotive industry, followed. Many of them were fitted with automation technology and networked so that the systems are now used in closed control loops and intervene directly in the production process. Crack detection systems, measuring and automation cells, as well as special measuring systems complement the product range of this business division.

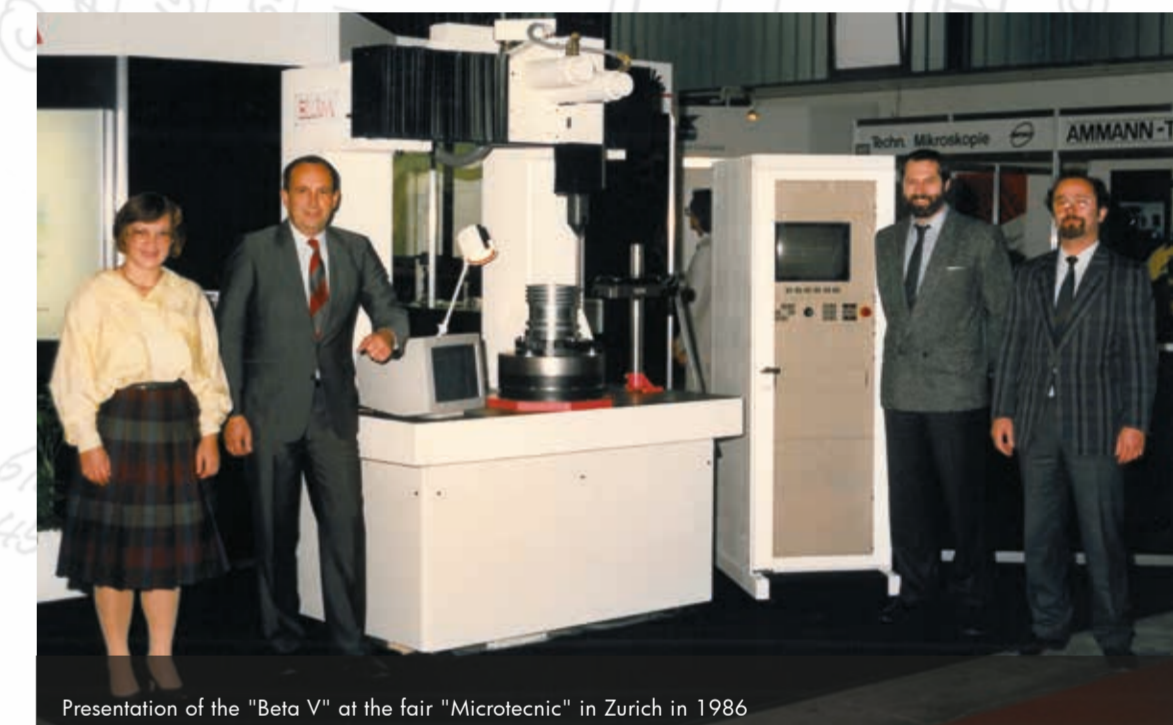
In 1982, BLUM launched its first workpiece probe, which was soon followed by tool setting probes for tool measurements in machining centres. Although similar probes had been available before, BLUM's first workpiece probes already featured a bidirectional measuring mechanism and wear-free, optoelectrical signal generation. This ensured extremely high accuracy at much greater probing speeds. Today, probes based on the first-ever technology developed by BLUM are available in the form of the ultra-modern TC51 series – which is now optionally available with either infrared or radio transmission. Up until 2003, when the successful multi-directional TC touch probe series was first introduced, the company was, in particular, the preferred choice of customers involved in automotive mass production thanks to its CNC probe series.

After the successful launch of the multi-directional TC touch probe series, BLUM came up with yet another key innovation in 2007 – the shark360 technology: With the measuring mechanism first presented at EMO, BLUM was now also able to offer a compact measuring system for turning and grinding machines. This measuring mechanism is the basis for all of the company's current DIGILOG workpiece probes and surface roughness gauges.

In 2010, BLUM went even a step further and presented the DIGILOG technology which enables the touch probe to deliver not only a digital 'on-off' signal but also a constant flow of analogue measuring values. These systems are used whenever a workpiece contour needs to be tested for machining errors. The DIGILOG touch probes are simply guided in a 'scanning' manner over the surface, thus providing a precise measuring result in a very short period of time. Over the years, the TC76-DIGILOG touch probe introduced in 2010 has been followed by

a number of DIGILOG measuring systems: In 2012, for example, the TC64-DIGILOG with BRC radio technology or in 2013, the first surface roughness gauge for automatic testing of workpiece surfaces in machining centres. The LC50-DIGILOG laser system was unveiled in 2017. By providing thousands of measuring values per second, this technology now also makes tool measurement in machining centres considerably faster, more precise, extremely in-process reliable and future-proof thanks to state-of-the-art application options.

From the middle of the 1980s onwards, BLUM has undertaken a considerable amount of development work in the field of laser measuring technology for machine tools. This step was a logical consequence of the previous approach with tactile measuring systems. It was way back in 1982 that company founder Günther Blum had the idea of creating a laser capable of monitoring tools. The first test setups from 1987 onwards worked with a helium neon laser tube which was perfect with regard to beam quality, but which was non-viable due to the excessively long warm-up time, unsatisfying service life and size. The availability



Presentation of the "Beta V" at the fair "Microtecnic" in Zurich in 1986

of red-light laser diodes led to the breakthrough of applicable systems and BLUM was therefore able to introduce the first marketable laser measuring system for tool breakage detection back in 1991.

This was soon followed by more compact systems that, besides breakage detection, enabled tool measurement using a laser. The third generation launched in 2001 featured the suffix NT – for New Technology. With

## 1968

Günther Blum established the company as an engineering office for the machine tool industry on 1 June 1968.

## 1971

While other companies still relied on contactor-based control technology, the young engineering office had already developed its own semiconductor-based interfacing controllers for machine tools.

## 1982

BLUM launched its first workpiece probe for machine tools.

## 1983

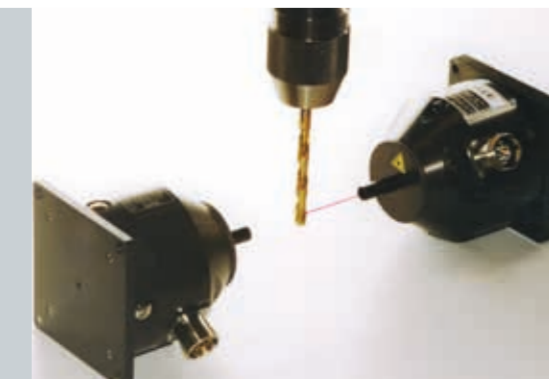
The first 2D measuring machine was presented.

## 1987

BLUM entered the field of laser measuring technology. After first test setups using a helium neon laser tube, the availability of red-light laser diodes led to the breakthrough of applicable systems.

## End of the 1980s

BLUM already offered a wide range of systems for tool and workpiece measurement in machining centres.





the help of an integrated microprocessor, the capabilities of the laser measuring systems increased significantly so that, for instance, wear and run-out monitoring or monitoring of individual cutting edges also became possible. Additionally, the impact of coolants on the measuring result could be reduced drastically. In 2007, BLUM boosted the trend towards combined turning/milling machines and launched the NT-H 3D system: A hybrid system combining a touch probe and a laser system which for the first time enabled the measurement and monitoring of the complete tool range of turning/milling machines. Finally, transfer of the DIGILOG technology from touch probes to the laser systems in 2017 was a leap in technology.

Heribert Bucher, Manager of the Measuring Components Division, explains: "The special spirit that prevails in our company was, for example, demonstrated a few years back when we were criticised during a management seminar exercise for not observing the specifications. At BLUM, we don't work according to strict rules because we like working together and developing new solutions. We don't slow people down but let them get on with their work – this is how innovation evolves."

In 1994, or roughly 25 year ago, the Willich-based firm Novotest, a manufacturer of test stands, was incorporated into the company –

Blum-Novotest was born. This division develops and builds test stands for functional, performance and endurance tests for the automotive and hydraulics industry, for example for testing transmissions and drive shafts. The transmission test stands built by Blum-Novotest have been an integral element of the automotive industry for decades. The range of applications that the business division implements for leading vehicle and transmission manufacturers extends from small cars to electric city buses, from manual to automatic and double-clutch transmissions, and from development test stands to interlinked production test stands. The drive shaft test stands built by Blum-Novotest simulate the relevant operating conditions on drive shafts in vehicles. Furthermore, the business division develops and manufactures test stands for hydraulic systems, steering systems and hose lines.

And it could not have been planned better to demonstrate how the company is increasingly growing together: At the TECH-TALK to mark the 50th anniversary, Blum-Novotest presented the first product line which combines the know-how of all three business divisions in a test stand series for machine tool spindles: The innovative test stands are available both as laboratory and end-of-line test stands and enable full testing and evaluation of the spindle quality. Machine tool manufacturers can use them, for instance, to avoid cost-intensive warranty claims and service calls by guaranteeing product quality prior to installation and/or delivery. If a spindle has been tested on a Blum-Novotest test stand prior to delivery and the LC50-DIGILOG laser measuring system is installed in the machine tool, it is possible to continuously compare the differences between the current and the delivered status. After all, properties such as, the run-out characteristic are already recorded in the test stand using the high-end laser measuring system. This way, spindle performance can be documented throughout the entire product life cycle. The highlight of the new test stand series is the innovative test software: It successfully brings together the experience gained in almost 30 years of test stand development for the global automotive industry. For example, it enables the creation of test sequences for various applications such as reversing mode, maximum speed test, special tests, etc. and can easily be adapted to specific customer requirements.

Besides its products, Blum-Novotest also continues to develop and grow as a company: The second half of the 1990s, for example, was marked by two main priorities: The start of the company's internationalisation process and the realisation that the provision of hardware alone is not sufficient – customers need complete solutions that are easy to implement. As a result, the company began focusing more on software development and applications advice. Winning the innovation award for the BLUM laser system at the machine tool exhibition MACH96 in Birmingham in 1996 marked the starting point of internationalisation.

Empfänger  
Receiver

Sender  
Transmitter

Up to then, the main focus had been on the German and Central European Markets.

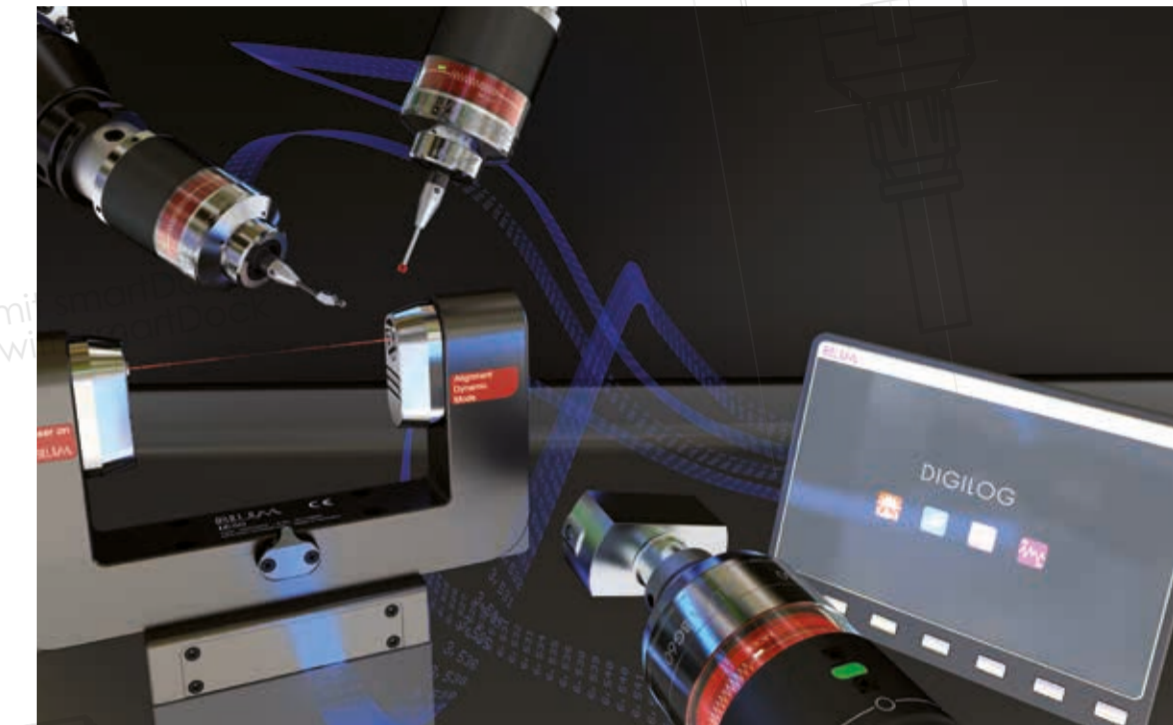
Expansion commenced with initial subsidiaries in the USA, Great Britain, Japan, France and Italy, and was followed by a second wave of expansion in the years up until 2006 that included BLUM subsidiaries in Taiwan, Korea, China and Singapore. In the third phase, greater focus was placed on regional markets, including Brazil, Mexico, Russia, India, Eastern European countries and Spain. Today, BLUM is represented by its own subsidiaries, a close-knit sales and service network and well-trained service partners, around the world wherever customers need the company.

What drives an enterprise like Blum-Novotest and its management? Alexander Blum, Managing Director of the company since 2001, explains: "We are not growing simply for the sake of it. But if you want to achieve sustainable economic success in our sector today, you need to have a global presence, be innovative and be able to offer a complete, comprehensive portfolio. All over the world, we render the same high-quality service combined with application support, thereby allowing our customers to benefit from the profitable deployment of our products. At the end of the day, our customers produce more good parts with an overall higher quality finish – and that is what really counts."

Training and service have therefore become key factors besides software development; a fact that was, amongst others, demonstrated by the construction of the Customer Centre in 2015. Users and customers can now find or optimise solutions for their applications together with BLUM hardware and software developers directly at the Grünkraut site. Furthermore, the building is used as a training centre where machine manufacturers and users receive training in free workshops several times a year. In 2017, BLUM topped off its software offer with the in-house app 'measureXpert'. Thanks to the app, cycle calls for various control systems and measuring products can be generated very quickly and easily and accepted in the NC program via drag and drop. The user enters basic data step by step and the app delivers the matching call.

Today, Grünkraut and Willich are home to a healthy company that continues to grow, and this could not be better expressed than through the building activity going on there. Visitors to the TECH-TALK were, for instance, able to see for themselves construction of the new assembly building, which will more than double the current production capacities. The production capability at the Willich site has also been more than tripled through the acquisition of adjacent buildings in 2011 and the current construction of a new assembly hall. Worldwide, almost 550 employees make sure this success story continues.

Alexander Blum ventures a look into the future: "Trends like Industry 4.0 and IoT play into our hands: The process is increasingly moving into the spotlight – and our products are the perfect fit here. As my father realised very early on, measuring inside the machine has become an indispensable part of this process. The trend towards adaptive manufacturing also follows this path – an machined part is



not milled blindly, instead measurements take place according to a reasonable measuring strategy and machining is adapted to achieve the desired end result."

Blum-Novotest: A company evolves organically throughout its entire history, one innovation leads to another – but still, the family-run company has continued to present disruptive leaps in technology: From being involved in the most successful machine tool ever to innovative new product ranges such as roughness measurement. The Upper Swabian way of life combined with an innovation-driven company philosophy and committed employees – this is Blum-Novotest's formula of success.

## 1994

The Willich-based firm Novotest, a manufacturer of test stands, was incorporated into the company – Blum-Novotest was born.

## 2001

Alexander Blum became Managing Director of Blum-Novotest GmbH.

## 2003

The first TC50 workpiece probe was introduced.

## 2010

BLUM presented the TC76-DIGILOG, its first scanning touch probe for application in machine tools.

## 2013

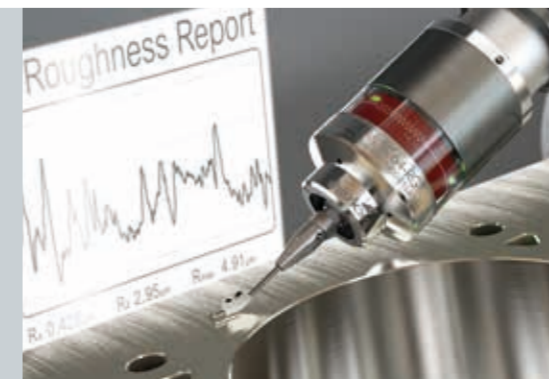
BLUM launched the first surface roughness gauge for automated testing of workpiece surfaces in machine tools.

## 2017

Transfer of the DIGILOG technology from touch probes to the laser systems was a leap in technology – the LC50-DIGILOG laser measuring system was born.

## 2018

At the TECH-TALK to mark the 50th anniversary, Blum-Novotest presented the first product line which combines the know-how of all three business divisions in a test stand series for machine tool spindles.



# BLUM touch probes keep BBS wheels running smoothly



Oliver Kalmbach from BBS's Procurement department (left) and Erhard Strobel, Sales Technician from BLUM (right).

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yet found its way completely into the material or when it encounters small cavities in the aluminium. These vibrations are transmitted to the probe via the turret on which both the tool and the probe are fixed, which can cause erroneous measurements.

Faced with the unusually difficult challenges at BBS, where the vibrations are stronger than with other turning applications, the lower mass of the BLUM TC62 probe works to its best advantage. The T variant was selected, because it has a higher measuring force compared with the standard version for milling machines, and this prevents erroneous deflections that could be caused by the extreme turret movements. Also, the higher measuring force means that the viscous oil used in lathes as cooling lubricant can be reliably displaced during the measurement. Finally, the touch probe fulfils the requirements of protection class IP68, so there are no problems in connection with ingress of moisture or chips. In addition, a newly developed vibration damper was used between the tool holder and the touch probe for the first time. This protects the measurement electronics against damage due to the worst vibration peaks.

One of the main advantages of BLUM's TC62 T probe is the special measurement tool technology: The trigger signal is not generated by means of a mechanical contact, but optoelectronically via

shading of a miniature light barrier inside the touch probe. This means that it is completely wear-free, guarantees the greatest possible reliability even under extreme operating conditions and, in contrast to a mechanical solution, it is not influenced by the strong vibrations in the lathe. On top of that, the radio transmission of the TC62 T touch probe is extremely fast and reliable: It sends the data that have been registered to the receiver using BRC radio technology. The advantage of this technology consists in each individual bit of a radio signal being run across the entire width of the frequency band, thus making transmission particularly resistant to interference.

BBS has now switched completely to BLUM touch probes, and new machines are equipped exclusively with them. The newly developed vibration damper has been functioning smoothly in combination with the robust touch probes for more than 1½ years now. "The BLUM touch probes have provided us with an extremely reliable technology. Also, the Blum-Novotest probes shorten the measuring time by 70 %, because the measuring points can be approached at speeds of 2000 mm/min, whereas the probes we used previously only managed 300 mm/min at the most," says very a satisfied Oliver Kalmbach. "The good cooperation with Blum-Novotest has been very beneficial: A reliable partner as well as reliability and speed in the machining process."

*The wheels count amongst the most important design elements of a car, and many owners use light alloy rims to give their car a more individual, sporting look. Very often they choose products from BBS, which achieved cult status after it started producing a golden, three-piece cross-spoke model in the 1980s. The cast rims are subjected to a turning process, and as part of this BBS uses high-precision touch probes from Blum-Novotest in its main plant in Schiltach, Germany.*

The most important step in producing the cast rims at BBS involves machining the centre. "First, this means turning the centring hole in the middle of the rim to an accuracy of a hundredth of a millimetre. Then the groove on which the hub cap will be placed is turned. This also requires extreme precision so as to make sure that the cap fits properly," explains Oliver Kalmbach from the Procurement department. "The positional tolerance at the centre of the rim blank is larger than the tolerance that is available to us for the cap groove, so we have to re-measure each rim before it is machined. That is why we have always used touch probes in the lathes." The wireless touch probes are attached to the turret together with the turning tools, and

they are swivelled to the machining position for the measurement operation. Then the machine can carry out the required measurements with the touch probe and adjust the zero point in the NC program in such a way that the centring hole and the cap groove can be machined exactly.

At BBS, the cutting parameters can be very demanding: 3 mm cutting depth and 1000 to 2500 RPM are quite common. And during these operations, the touch probes are subjected to the direct flow of the cooling lubricant and a full barrage of chips. Also, the turning operation causes strong vibrations, for instance when the lathe tool has not



# Visualisation in precision machining

The Japanese company Ikegami Mold Engineering Co., Ltd. is a leading enterprise in high-precision moulds. For the production of moulds, the company trusts in Blum-Novotest's machine-integrated measurement technology. We spoke to company president Masanobu IKEGAMI, CEO Masatomo IKEGAMI and director Hiroshi ITÔ about the reasons behind and advantages of using this measurement technology.



Masatomo Ikegami, Director and Hiroshi Ito, Deputy Manager, Technical Support Centre

Ikegami Mold Engineering Co., Ltd. was founded in 1934 in Kuki, Saitama Prefecture, and specialises in complex injection moulds and machine parts. In aiming to be a technological leader, the company has developed high-performance moulds, for instance for composite casts or high-speed production. Ikegami solves problems that the customer cannot solve themselves, including for instance moulds for novel resins or the development of high-performance tools for high-end surfaces. In addition to high-precision moulds for the automotive, aviation and food industries, the company also researches & develops next-generation nanotechnology solutions in fields such as optics, medical engineering, aviation and astronautics. Their motto: "Achieving the miracle: a surface roughness of  $R_a = 1 \text{ nm}$ ".

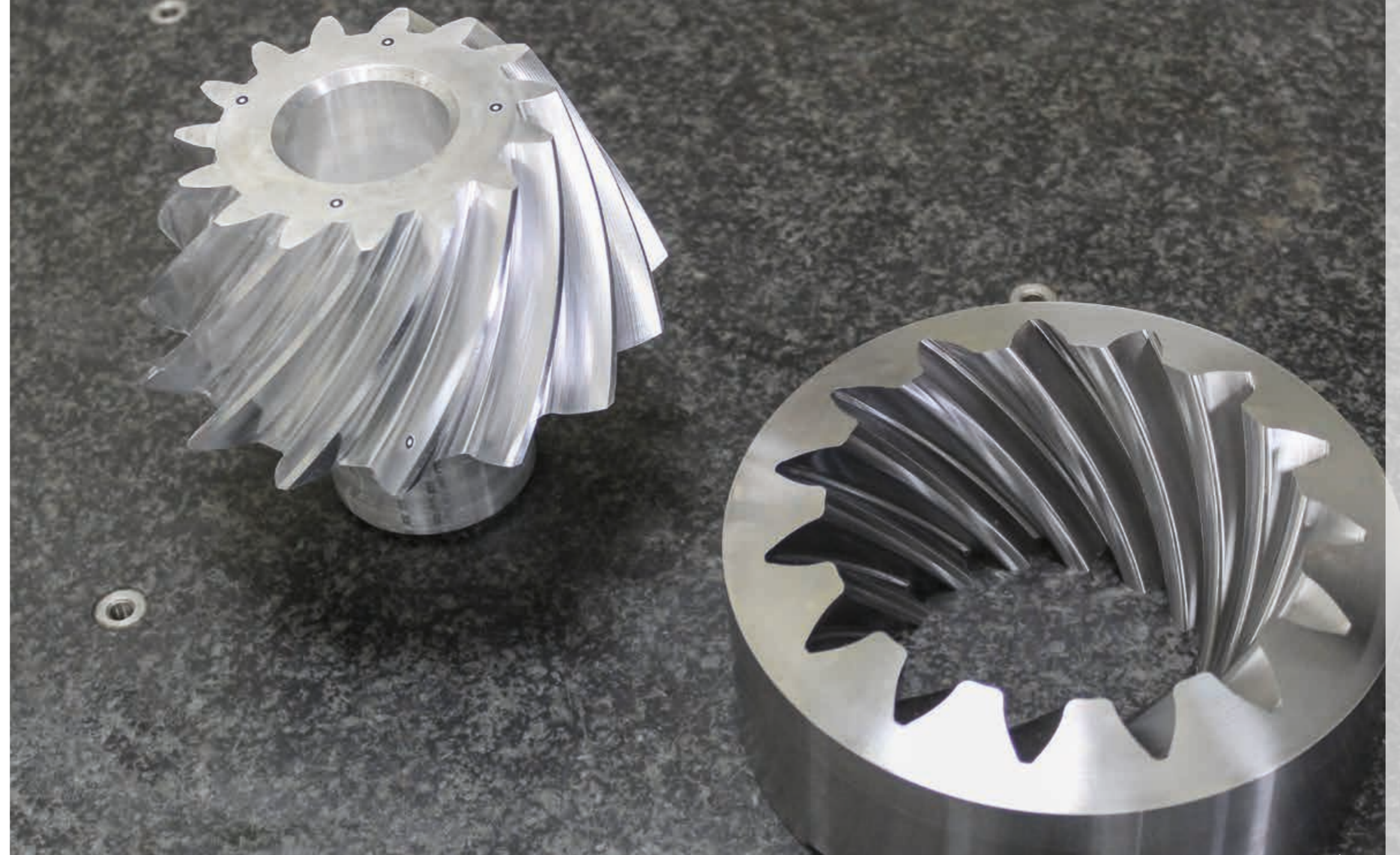
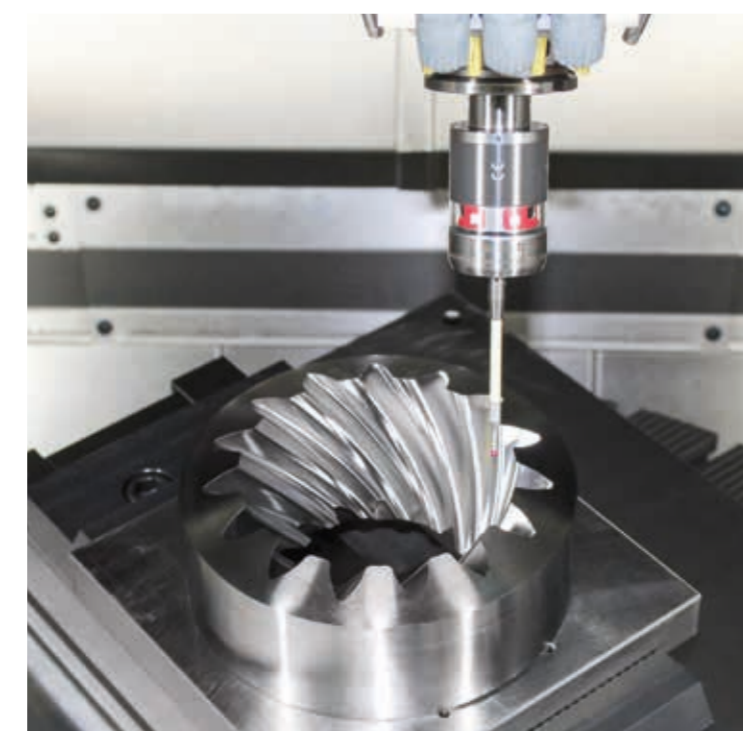
The company is growing not only in Japan, but also internationally, with branches in the USA, Mexico, China and Thailand, where

Ikegami primarily concentrates on the repair, improvement and maintenance of moulds, and acts as a kind of "clinic for moulds" to ensure that customers can use their moulds reliably.

## Precision machining thanks to FormControl

Previously, the workpieces at Ikegami were measured after cutting. Various measurement methods were used for this purpose within and outside of the machine, but this approach was very complicated and limited in terms of the precision of the measurements. Searching for a method to more precisely measure machining quality, they became aware of Blum-Novotest's production measurement technology. A TC52 touch probe and the FormControl measurement software were then installed on a Hermle 5-axis machining centre. "With the measurement technology used before, we were often unable to correctly check the dimensions at the points requested by the customers. FormControl, however, enables high-precision 5-axis measurement of free-form surfaces in the machining centre. Because the software in combination with the BLUM touch probe offers micrometre-level measurement precision, we can verify the precision of machining with parts made in line with the most challenging requirements of customers and also with complex precision parts," explained director Hiroshi ITÔ.

With FormControl, the measurement is performed in the original fixturing. The user launches the actual measurement process with a click of the mouse. The software then automatically creates the NC program and transfers it to the machine controller. In the next step, the probe is mounted in the spindle and the individual measuring points are probed in sequence. This eliminates the need to remove the part from the machine for measurement as well as the time-consuming process of refixturing for corrective machining. This was one of the key arguments in favour of the use of FormControl. It was also always extremely complicated for the employees to reclamp the workpiece when performing the 3D measurement on the coordinate measuring device, which significantly



increased the general throughput time. As long as the surfaces are standard planar surfaces, the work process is not especially complicated. But demand for workpieces with complex forms has been growing in recent years. In this regard, the ability to easily perform corrective machining on workpieces after measurement on the FormControl-equipped machine provides genuine relief and helps Ikegami boost its productivity.

FormControl also offers the ability to automatically create a measuring report after the measurement is performed. "With products for automotive customers, a measuring report is essential for providing evidence of the machining quality, for example," said Masatomo IKEGAMI. The ability to have measurements displayed with coloured arrows is a particularly powerful tool in ensuring smooth communication with customers. "The visualised evidence of the machining precision provided by the arrows helps customers to contextualise explanations. Practically none of our customers demand written copies of measurement data any more. The illustration with the arrows is all we need today," he said. This method of presentation also helps to internally validate the machining precision. "We very rarely experience errors, but we have known workpieces to have edges that should have been machined at  $R = 0.1$  or  $0.2 \text{ mm}$  and ended up being machined at  $R = 0.3 \text{ mm}$ . It is impossible to tell the difference with the naked eye. The report makes it possible to tell right away that something is wrong with this edge. This method of visualisation is especially useful for areas that need to be absolutely precise for assembly purposes, particularly bevels," explained Masatomo IKEGAMI.

## BLUM laser measuring systems

For tool setting and monitoring, fields in which precision machining is essential, Ikegami also trusts in BLUM's non-contact laser measuring systems. The company places great importance in preventing machine downtime and rejections caused

by operating errors such as the installation of the wrong tool. If a wrong tool is used, the entire production batch is rejected. LaserControl detects the tool in this case and interrupts the cutting process.

The use of microtools for machining has also seen heavy growth in recent years. A non-contact laser system also offers considerable advantages here – after all, the measurement is highly precise and it eliminates the risk of tool breakage during the probing process. Blum-Novotest's laser measuring systems measure the tools at a nominal spindle speed while also compensating for wear and temperature factors. This was the deciding factor in the company's choice in favour of this technology. And thanks to the innovative protection system, LaserControl works absolutely reliably, even under the harsh conditions existing in machine tools.

## Know-how in partnership network

"The current trend is towards the production of small, high-precision moulds, for which we need high-quality cutting tools and measurement technology capable of performing in-process measurements of these tools and workpieces. Also, to make Japan internationally competitive as a production centre, we require state-of-the-art technologies, qualified personnel and maximum production automation. We cannot simply depend on our good feelings and experience. We believe that manufacturing enterprises need to unify the know-how and technologies in the fields in which they best operate. One of Ikegami Mold Engineering Co., Ltd.'s guiding principles has therefore long been to enter into well-considered partnerships with companies. We also aim to maintain such a partnership with Blum-Novotest in the future in order to become even more productive in the future," concluded company president Masanobu IKEGAMI.

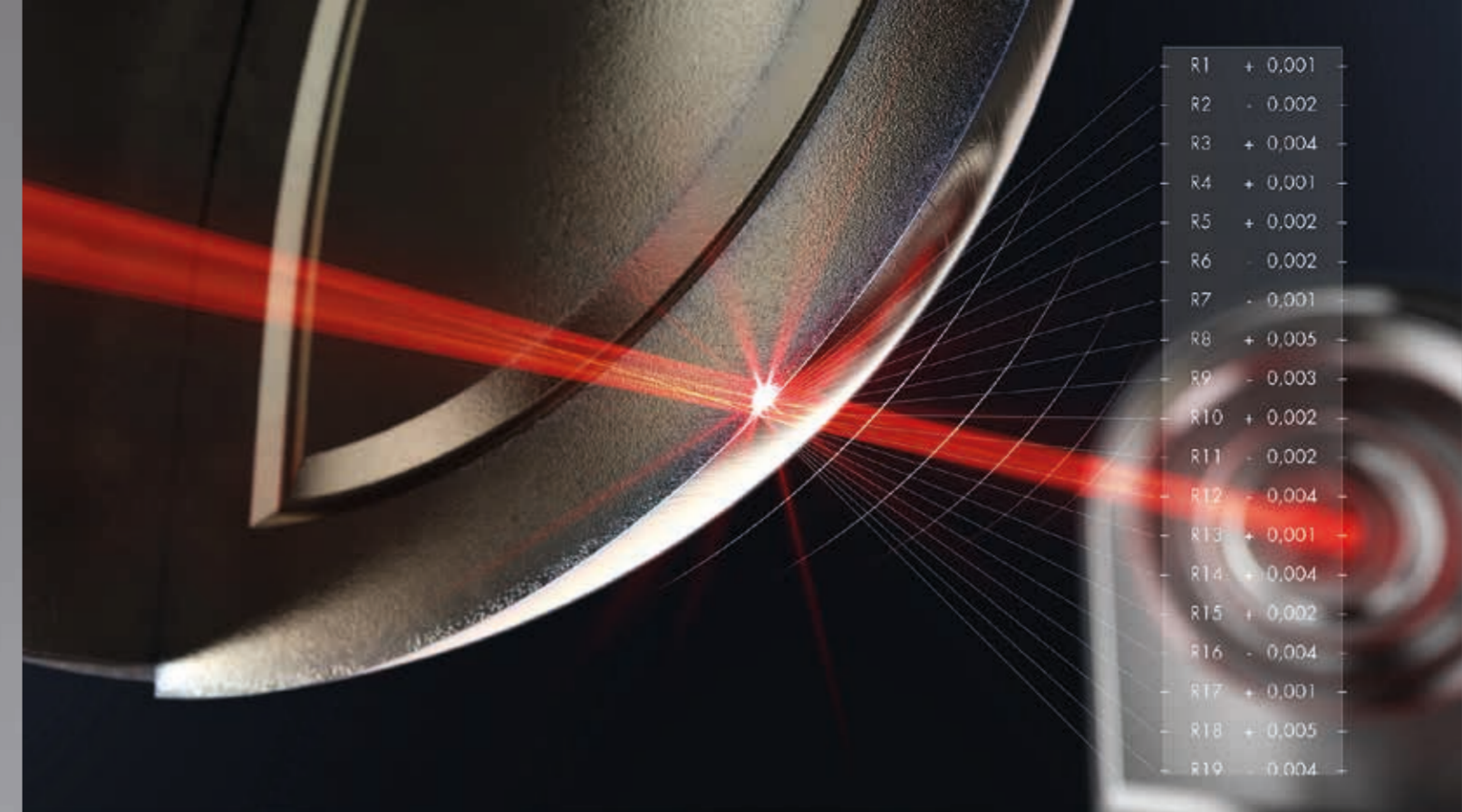
# Reinventing laser measuring technology

Blum-Novotest is currently presenting the new laser measuring system LC50-DIGILOG at many exhibitions worldwide. The company is presenting this ground-breaking system that has been completely redeveloped to revolutionise and future-proof the speed, precision and in-process reliability of tool measurement in machine tools thanks to the latest possible applications. The hardware also features lots of brilliant technical innovations.

Alexander Blum, President of Blum-Novotest GmbH, says: "In-machine measurement has become established as an integral element of high-end CNC machining. Automated machines and virtually all five-axis machining centres are nowadays equipped with BLUM laser measuring systems. The prerequisite for this was the outstanding performance of systems under the harshest conditions as well as the associated possibilities in terms of automated tool measurement and monitoring. Based on that, it was by no means easy to upgrade the tried and proven laser measuring technology with NT technology. We achieved this innovative advancement by implementing the DIGILOG technology familiar from touch probes in the laser measuring system."

BLUM laser measuring systems have always been renowned for their high precision and in-process reliability. Thanks to the newly implemented DIGILOG technology, those attributes have been enhanced to a never

before imagined level. Whereas the proven digital/switching laser measuring systems using NT technology only generate a small number of signals for recording measurements by shadowing the tool, the new DIGILOG laser measuring systems generate many thousands of measurement values per second while dynamically adjusting the measuring speed according to the nominal speed of the tool. The new laser measuring system LC50-DIGILOG also measures each cutting edge individually, rather than just determining the value for the longest cutting edge, meaning it is possible to make a comparison from the shortest to the longest cutting edge. As a result, run-out errors, caused by contamination on the taper of the tool holder for example, are also automatically detected. Furthermore, the new LC50-DIGILOG detects any contaminants and cooling lubricants adhering to the tool – due to the large number of measurements per cutting edge – and deducts them from the result to make measurement results even more reliable.



The many new ideas implemented by the BLUM developers in the LC50-DIGILOG have resulted in impressive advantages for users: Firstly, measurement and testing times have been shortened by up to 60 percent. In addition, the optics in the system were further improved so that the new generation achieves an absolute accuracy that is better than all comparable measuring systems thanks to an optimised beam shape and a 30 percent smaller focus diameter. BLUM's developers have also further improved the homogeneity of the laser beam, making further analogue measurements possible. The influence of coolant mist has been further reduced enabling improvements in accuracy and in-process reliability. And despite its reduced external dimensions, the optimised design enables the measurement of tools that are up to 30 percent bigger, depending on the version used.

The compact BLUM smartDock represents another world-first. This innovative standard interface serves as the basis for all new support systems and contains all the necessary pneumatic valves in addition to the electrical, mechanical and pneumatic connections between the machine and laser measuring system. If the compressed air quality is in accordance with ISO

8573-1 class 1.3.1, the separate pneumatic unit required for the Laser-Control NT can even be omitted completely.

"With the LC50-DIGILOG laser measuring system, we have succeeded in raising a tried and proven technology to a new level. In addition to realising the shortest measurement times, optimised precision and in-process reliability, users will also profit in the future from new, ground-breaking applications. These include the 3D ToolControl software, which enables continuous digilog-based contour measurement of tools – including the visualisation on the control screen – which far exceeds the functions of significantly more expensive and complex image-processing systems. Or the new 'SpindleControl' technology cycle, which can be used to record and evaluate the state of a spindle bearing", sums up Alexander Blum.



# Aluminium parts for the global electric vehicle industry



Mr Lee, Deputy Head of Department at Kodaco Ltd.

>>> [www.kodaco.co.kr](http://www.kodaco.co.kr)

Many believe that the future of transportation lies in electromobility. Reducing weights while increasing stability are particularly important here. Korean company Kodaco Ltd. is a leader in the field of high-quality high-pressure die-cast parts made of aluminium thanks to its use of state-of-the-art technologies, and has increasingly focused on the development of products for electric cars in recent years. Measuring systems from Blum-Novotest make the production of automotive parts highly efficient and provide long-term assurances for quality.

Kodaco Ltd. is a leading manufacturer of parts for the global automotive industry. The company is a specialist in the production of products made using high-pressure die casting and is celebrating its 20th anniversary this year. Over 150 different parts are produced by the company, including for engines, steering systems, suspensions, compressors and gearboxes. As a supplier for Hanon Systems, Hyundai Power Tech, Mando, LG Electronics and Hyundai Mobis, the company delivers products to automobile manufacturers such as Hyundai, Kia, Korea GM etc. as well as global automotive suppliers such as BorgWarner and AAM.

The company is also active in the electric vehicle sector, a business with considerable future promise. Through customers such as LG Electronics, Hanon Systems and Mando, etc., air conditioning system components are shipped to companies such as GM for projects such as the "Volt" electric car and also to other North American electric car manufacturers. Since 2013, there has also been a partnership in effect with the Automotive division of LG Electronics, in which customers such as Mercedes-Benz North America among others have been supplied with battery casings. Parts for steering systems have been shipped through the supplier Mando, while components for air conditioning systems have also been delivered to manufacturers through Hanon Systems.

## "BLUM" – the key factor

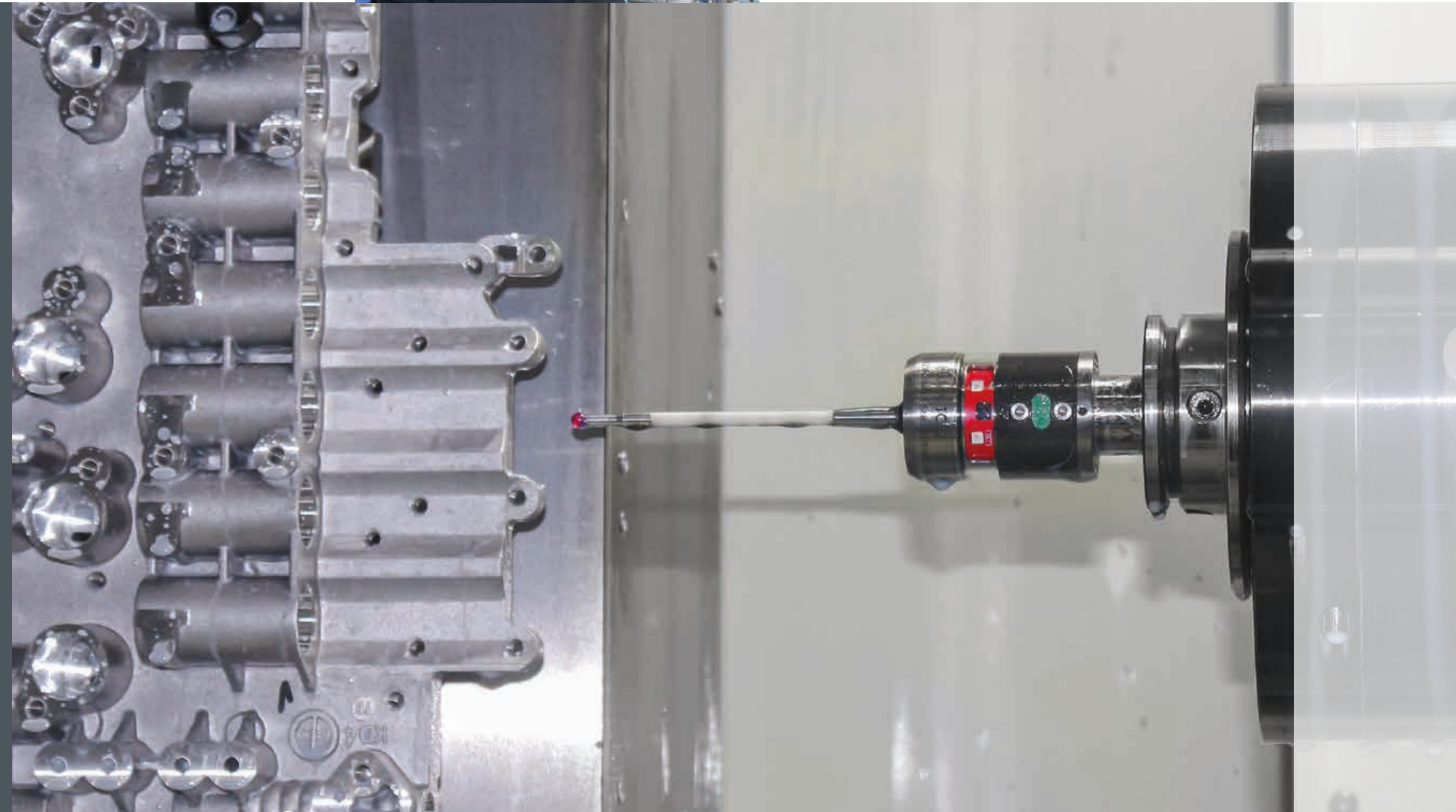
Today, the company uses HPDC technology (high-pressure die casting), a special method in which it is an authority in Korea.

"With this comprehensive method, many parts can be cast in a very short time," explained Deputy Head of Department Mr Lee. "This has provided us with a genuine competitive advantage in terms of costs. Another benefit is that we can use this technology to produce parts both for vehicles with combustion engine and for electric cars."

In the past, Kodaco would occasionally experience problems producing cast parts with the necessary quality. This was solved using high-quality process technology, by ensuring the quality of the cast material, and by using high-precision machining centres equipped with BLUM's high-end production measurement technology. The production facilities have high-quality automated production lines and a well-developed system of quality management. Assuming inspiration from the idea of a "smart factory", the Korean company has also installed a real-time monitoring and data management system which monitors and analyses the data, thus helping to minimise the number of errors.

"We ask ourselves how errors can be found in serial production before they can become a problem. Our key customers had particular trust in solutions from Blum-Novotest. When we mentioned to our customers that we almost exclusively used BLUM products to monitor our production quality, we had gained our customers' trust immediately."

BLUM's measurement expertise is especially valuable with serial production machinery where quality and efficiency are key.



Thanks to the measurement solutions, throughput times are reduced, shutdown times are minimised and in-process reliability is enhanced. For workpiece measurement and workpiece referencing, for example, the company trusts in the TC62 touch probe. "The use of the touch probe not only has a positive effect on the quality of the produced parts, but also massively increases the productivity of the machinery by drastically reducing the reject rates," said Lee.

## Monitoring processes

The advantage of high-pressure die casting is that it eliminates the need for corrective machining of the parts. Assembled units that would normally have to be built from two or more components in a different procedure can be created here in a single step. With very complex moulded parts, however, it may still be necessary to perform corrective machining, for which very small cutting tools are often used. "We also wanted to monitor these tools during the process, which is why we were looking for suitable solutions," explained Lee. "It is almost natural to encounter the products of this German measurement technology manufacturer. Using the laser measuring systems, we were able to measure all cutting tools, detect wear and breakage in the process, and identify problems in the cutting process."

"Currently, over 40 BLUM measuring systems are in use at our production facilities. Thanks to these systems, our employees

understand the processes much better than before, which enables them to continuously optimise them. BLUM also continuously develops its solutions further and makes new applications possible. I wonder what innovative ideas will yet come from this process."

## State-of-the-art technologies

The trend towards reducing the weight of vehicles is a perfect match for the company's strategy. For example, they plan to be the first company in Korea to manufacture high-pressure die-cast parts from magnesium. Magnesium offers genuine benefits – after all, compared to aluminium, it is much more stable and even lighter. With the increasing use of high-quality machinery and costly materials, the partnership with BLUM will also continue to deepen. "The more difficult, the more complicated machining becomes, the more important the partnership with BLUM will be, because if productivity is supported by a market-leading technology, it too can become even better."

BLUM's products have significantly increased the company's productivity and have since become a key component in relation to in-process reliability and precision at Kodaco. "We made a conscious choice for Blum-Novotest's products. On the basis of a fruitful collaborative effort, a deep partnership has since been established. We also appreciate the reliable service from start to finish – it's something that you can just depend on," concluded Lee.



# Flexibility and precision

Seeking out the perfect solution to increase productivity, GMReis, one of Brazil's leading companies for orthopaedic implants, decided to automate tool and workpiece measurement in its machinery – and found the perfect partner for this in BLUM.

GMReis was founded in 1987 in the municipality of Campinas in São Paulo State, and today is one of Brazil's leading enterprises in biotechnology. The company exports to various countries in Central and South America, and in Brazil it is a leader in the research, development and production of various plate and screws for premium orthopaedic implants. These are used together with other biotechnological innovations in traumatology, spinal surgery and biological surgery to restore the quality of life of many people. Having been certified by the council under the European Medical Drive Product Directive 93/42/EEC and for compliance with the ISO standard 13485 in 1999, GMReis also obtained access to the global market.

The partnership with BLUM was triggered by an enquiry from GMReis regarding improvements in productivity: "While we had very modern machinery, the processes were still very slow," said the Head of the Production & Maintenance division at GMReis. In 2015, GMReis prided itself on its access to modern machinery such as several 5-axis Fanuc Robodrills and 3-axis Ares Seiki machining centres. But productivity was still very low. "We were having problems with the tool pre-setting, the cutting and the measurement of the various tools and workpieces. We urgently needed to improve the internal operating processes, to become more flexible," he emphasised.

After a visit to the BLUM booth at a production-related event, the company decided to implement the improvement that they sought. GMReis' engineering team and the management at BLUM Brazil then took the time to jointly analyse the processes and establish which modifications would be ideal for the machinery. "We wanted to offer GMReis the best solution for the specific challenges that the company was confronted with in production. To do this, we carefully analysed the industry in which GMReis operates and the specific features of the products. This enabled us to offer a solution capable of ensuring compliance with the quality standards of the global market with an eye to exporting the products," said Rogério Moraes, Director General at BLUM Brazil.

The chosen solutions were the LaserControl Nano NT measuring system, a compact device that was designed particularly to meet the needs of high-tech machinery in the field of micromachining, and the TC54-10 touch probe for fast and precise workpiece measurement and workpiece referencing. Currently, four of

GMReis' fourteen machining centres use tool probes and two use laser measuring systems from BLUM. For the future, the plan is to equip all of the machines with BLUM measuring systems. "Our ability to increase our competitiveness will depend on introducing this technology for the rest of our machinery," said Geraldo Marins dos Reis Jr., CEO of the company.

One of the advantages of the laser measuring system, emphasised the specialist, was the faster, more precise and more reliable tool setting, which massively improved the precision of the machinery and consequently also the quality of the workpieces. "The general quality of production has massively increased," added the Quality Assurance Manager.

## Customised special-purpose implants

An example for the leading technology available from GMReis is a product line of customised special-purpose implants. These are specially developed plates and channels for surgeons unable to find standard products suitable for their patients' needs. In these cases, the Design and Process Engineering department and the Quality Management of GMReis cooperated with Anvisa, an approval authority that is part of the Ministry of Health. Anvisa is responsible for the oversight and safety of products & services in the healthcare and hygiene industries throughout Brazil.

One of the most interesting examples of custom production for a patient in São Paulo is a plate and guide for the reconstruction of a human radius – one of the two bones comprising the lower arm of a human body. Due to a series of fractures, the patient had already received different plate implants. His radius also had an angular deformity and was shortened, and suffered from a dislocation of the elbow on the right arm. The solution was a plate customised for him based on the x-rays of the opposite site. It was used to restore the axial length of the broken bone and to optimise the corresponding rotation and translation.

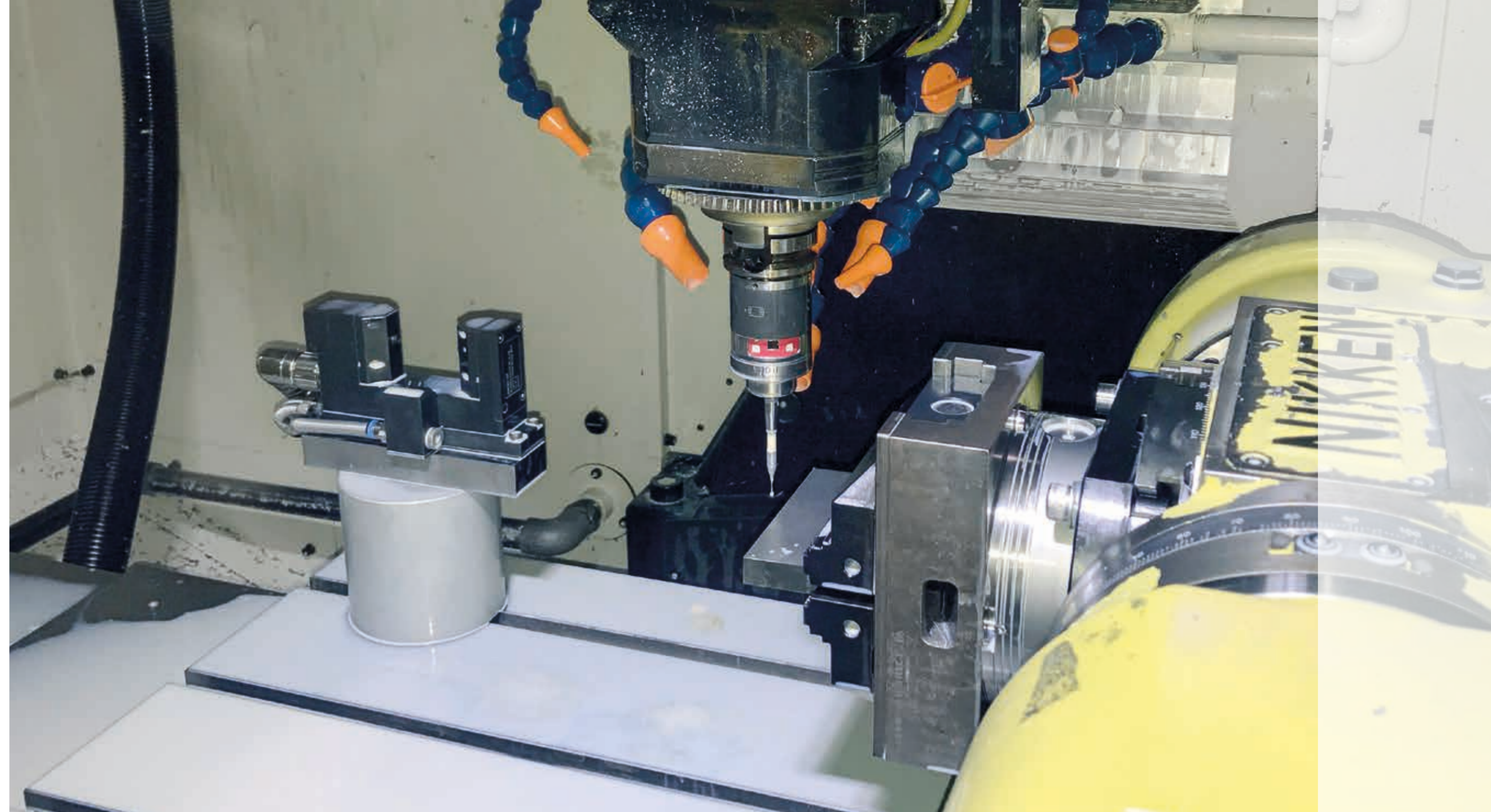
A special tool had to be created to produce the plate. Many challenges needed to be overcome here that would typically occur with the production of made-to-order products: made-to-order engineering, different production methods and complex CNC programs. BLUM's systems contributed in an important way here. "We were able to adjust the tool directly in the machine and monitor it during

the process. By using these systems, it was much easier to assure the quality of the produced parts," he claimed.

But what kind of productivity gains does this generate? Indeed, the actual time benefits are not as obvious as you would expect. "If we were to look at it objectively, then the production time per workpiece would actually be a little higher," added the Head of the Production & Maintenance division. The gains are generated elsewhere – if a tool breaks, the machine stops automatically. This used to cause a chain reaction that all of the downstream tools would break, as would the workpiece itself, of course. Now, tool breakage is detected automatically and wear is compensated. We only had to create a test part for the production of this customised plate to reconstruct the radius. Without the laser measuring system and the touch probe from BLUM, we would certainly have had to produce a variety of test parts to achieve good

results. Even more important is the fact that we did not only save time, we could also finally put faith in our method," he explained.

It is simply a matter of time and of how the business performs in the future until all fourteen machines in the plant are equipped with BLUM solutions. "For us, it is already decided that another machine will be fitted with a laser measuring system and a touch probe." GMReis also appreciates the quality of BLUM's technical support. "There is a real partnership between the companies, and we know that BLUM will always be on hand to help. Our aim is to enable 100 % monitoring of the production process with a level of automation that dispenses with the need for human intervention. To achieve this, we know that we can trust in BLUM," concludes the Head of Production & Maintenance at GMReis.



The Team of GMReis in Brazil

BRAZIL





## Balanced automation

*Even in a time where automation is considered to be the key to efficiency, quality and competitiveness, people still have a place in the process. But for the American company Precision Resource Inc., which specialises in fine blanking, tool measurement was a process that could only benefit from automation.*

Precision Resource was founded in 1947 as Fairfield Tool Co. in the USA and today has branches in Mexico and China, four sites in the USA and two in Canada. The Cambridge site in the Canadian province of Ontario performs some of the company's most critical processes.

Fine blanking, a metal machining process in which the material is punched and cold-formed at the same time, involves workpieces being processed to their end state with high precision in a single step. Many of Precision Resource's customers are in the automotive industry, although the company also operates in the heavy-duty commercial vehicle, off-road vehicle, agricultural engineering, medical engineering, defence engineering and industrial machinery sectors.

### Heavyweights

Precision Resource's triple-action presses combined with specially designed tools produce parts that cannot be produced using normal punching methods. The company has over 100 fine blanking presses in service around the world, making it a global leader. The output of the presses is between 40 and 1400 tons, which according to the company is a record range in this sector. Precision Resource's activities also include an extensive range of additional services such as CNC machining, grinding, insert moulding and sub-unit assembly.

The home of Precision Resource's technical centre is also located in Cambridge. This is where the focus of the planning support, prototyping, secondary process development and fine blanking tool engineering activities lies. These aim to develop internal capacities and reduce the workload involved in corrective machining. Alongside horizontal and vertical Makino-type machining centres, the S56 is also a key

product. Aside from a presentation model acquired by Precision Resource, all of these machines have already been purchased with BLUM laser measuring systems installed.

For corrective machining, Precision Resource has a larger number of Doosan VC 430 VMC CNC machining centres. These have automatic pallet changers which bring pallets into the loading position one at a time while another is undergoing processing in the machine. To speed up the processes, Precision Resource has fitted the machines with loading robots.

### Manual tool pre-setting

For the longest time, tool measurements were performed manually at Precision Resource, resulting in delays and problems. The standard procedure is well-known – insert the tool in the holder, place it on a block and use a digital measuring device to measure the distance between the lower edge of the tool holder and the upper edge of the tool. The machine operator writes the measurement on an adhesive label, attaches it to the tool and places the tool in storage. If another machine operator requires the tool, they insert it into the tool magazine and enter the value on the label manually into the tool offset memory.

Manufacturing engineer Brant Kardas explains that this method brought with it the risk of operating errors. "We had several collisions, either due to typos, incorrectly written measurements or because the label was illegible, causing the wrong value to be entered as the tool offset." A solution had to be found, because a wrong measurement could even result in the tool cutting through the

workpiece directly, damaging it in the process. In such cases, the machine would sometimes be out of service for several days until the spare part could be acquired and installed.

### BLUM laser measuring systems

At Precision Resource, the choice was therefore made to invest in an automated laser-assisted tool measuring system. When looking at certain products, Kardas quickly noticed that the harsh conditions inside the machining centres would be a real problem for some systems.

"A few other companies used a product that was like the BLUM laser measuring system," he remembered. "But they generally advised us against using a laser system inside the machine, especially due to the coolant in the working area. Instead, they recommended that we install a tool probe."

When using a probe for measurement, the tool must come into contact with the probe head for the measurement to be performed. Because the machines used at Precision Resource have two clamping mechanisms each, two probes would have been necessary for each machine.

"We noticed a lot of issues that would have caused problems for the use of tool setting probes in combination with the clamping mechanisms," explained Kardas. "The probes also would have taken extra time. The tool would have to cover extra distance for a measurement to operate the probe head." The laser measuring system on the other hand could be mounted near the spindle, reducing travel distances and cycle times.

But Precision Resource's employees considered the main advantage to be the versatility of the laser measuring systems. Unlike a simple probe, a laser measuring system can be used not only for length measurements, but also radius measurements, single cutting edge monitoring and run-out monitoring, and also for temperature compensation, all at nominal spindle speeds.

The concerns of the other companies regarding the harsh operating conditions proved to be the most important factor in choosing a laser

measuring system from Blum-Novotest. "The specialists from BLUM explained to us that their laser systems were specifically designed for harsh environments," said Kardas. "They were meant to work even if coolant was dripping from the spindle." A stream of barrier air and the BLUM shutter system protect the optical components from dirt, ensuring that the system continues to work reliably for many years. The tools also have coolant and chips cleaned from them before measurement using an integrated nozzle.

The purchase price also included the installation of the systems by BLUM into the Doosan machining centres, and the work was completed in May 2016. The lasers simplified and sped up the process, and of course made much greater automation possible. "The machine operators replace the tool in the tool spindle and start the machining process at the push of a button. We have all of the data in the program, so that the laser is activated upon a tool change to measure the diameter, length and run-out of the tool," explained Kardas. "Run-out is a critical factor with drills, especially with reamers. If the tool is defective in this regard, the bore will be too large."

The company profits from the BLUM laser measuring systems every day. "Thanks to these systems, there is less responsibility involved in inserting the tools correctly into the holders," explained Kardas. "The system transmits the right length and radius values to the machine automatically. This allows us to work much more efficiently and to minimise rejections. It's a massive difference."

>>> [www.precisionresource.com](http://www.precisionresource.com)



Chris Weiland, Continuous Improvement Facilitator and Brant Kardas, Manufacturing Engineer at Precision Resource



# The right technology

*The Chiaravalli Group SpA produces superior quality in the manufacture of mechanical drive components for its customers around the world. Production measurement technology from Blum-Novotest such as touch probes, tool probes and laser measuring systems help the company each day to live up to their high quality standards.*

Andrea Chiaravalli,  
Manager of  
Chiaravalli Group



The Chiaravalli Group, today a leading provider in the field of industrial gears, was founded in the 1950s. From the beginning, this Italian company has been defined by its foresight, technical expertise and grand entrepreneurial vision on behalf of a clientele that produces powerful, precise and high-quality products. This company from Cavarina con

Premezzo (Province of Varese, Italy) is a reliable address for a wide range mechanical drive components such as toothed gears, bevel gears, racks and many other gear components.

Since it was founded, Chiaravalli has continued to develop over time, becoming a robust company with a workforce of around 250 today. The company specialises in production for customers seeking high quality. With its production of basic drive components as well as complex solutions for customers from a variety of industrial fields, including automotive, construction machinery and rail transportation, the company generates revenue in excess of 70 million euros a year. Its in-house machinery undergoes continuous renewal, with over 300 machines on the factory premises today involved in production, none of them older than five years. "This has even resulted in partnerships with key machine manufacturers," confirmed the Managing Director of the Chiaravalli Group, Andrea Chiaravalli. "This quality is essential to us and we are certified in accordance with ISO TS 16949 to this end." We can track each product from the receipt of the materials to the final produced part. Thanks to an enhancement of the in-house management software, the customer can even monitor production in real time."

"Our quality is constantly monitored with the aid of refined measurement systems to enable us to verify compliance with specified tolerances in all phases of the manufacturing process, since practically all customers operating as Original Equipment Manufacturers (OEMs) expect statistical control measurements and deviations to tend towards zero for part cutting with oblique bores." This is precisely the reason why Chiaravalli sought out a partner offering innovative production measurement technology to monitor its in-house cutting processes. After a careful review of various potential suppliers, the choice fell upon German measuring and testing technology specialist Blum-Novotest. This manufacturer's innovative systems have since helped Chiaravalli to produce their products with even greater quality with the aid of the fast and precise tool and workpiece measuring systems. Now, almost all of Chiaravalli's machine tools used for high-precision machining feature type TC60 and TC62 wireless probes as well as Micro Compact and Micro Single laser measuring systems.

## Precision and reliability

The TC60 and TC62 touch probes are high-speed measuring systems fitted with state-of-the-art BRC Radio Technology. This makes them ideal for large 5-axis machines for situations where there is poor visibility between the sensor and receiver, with up to six touch probes controllable with one receiver. The touch probes detect the workpiece's alignment and position as well as the dimensions during and after the cutting processes, enabling compensation for the machine's temperature-related heat response. The extremely

high measuring speed of 3m/min allows this to be done for customers like Chiaravalli in very little time. The multi-directional measuring mechanism with non-wear trigger signal generation also guarantees precise, no lobing probing. Even when coolant is present at the measuring point, high-precision measurements are possible thanks to the innovative measuring mechanism.

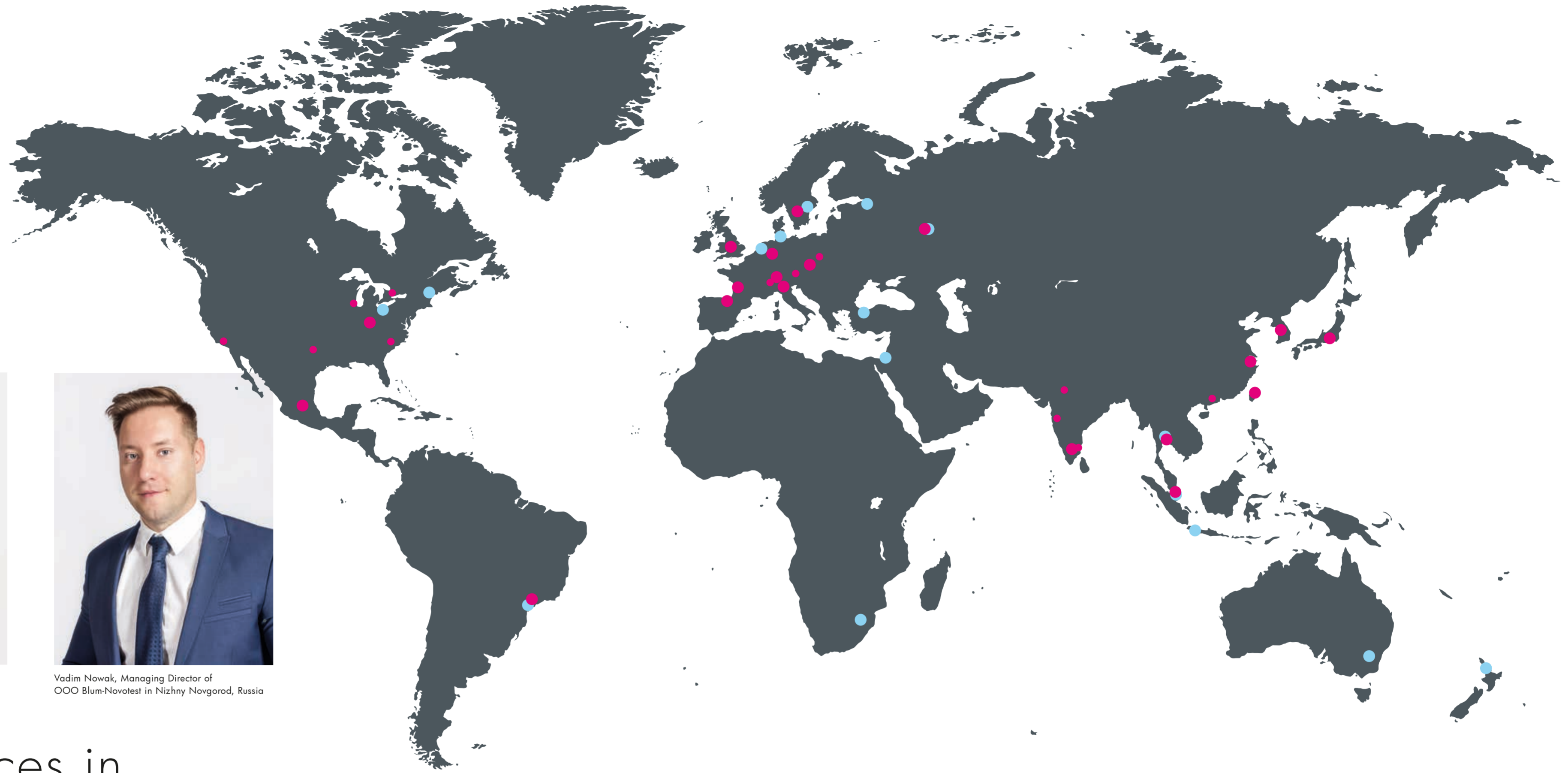
The Micro Compact NT and Micro Single NT laser measuring systems also function extremely reliably and precisely thanks to the intelligent BLUM protection system and the patented NT technology, even under the most adverse conditions. The high-grade laser optics and focused laser beam also enable superior absolute accuracy, even with very small, pointed tools. The use of these systems makes it possible to guarantee high productivity for the company as well as excellent quality for the produced parts, avoiding subsequent damage in the event of tool breakage. This enables unmanned, automated operation around the clock and reduces rejection rates significantly.

"With the use of these technologies, we ensure a high level of precision and remarkable quality at incredible speeds. A CPK index of 1.66 can only be achieved with preventative measures. For example, a worn cutting edge can itself cause a deviation in the set value, even if it is still within the tolerance range. BLUM's measuring systems allow us to detect in advance when the tools need to be replaced or whether there is a problem with a machine. This provides our production with a genuine competitive advantage," added Andrea Chiaravalli.

Another important point aside from the quality of the product is the excellent customer service that the Italian branch of the German company offers Chiaravalli. This technical support ranges from telephone support, to remote diagnosis, to on-site service deployments. When needed, Blum-Novotest can be on site with qualified technical personnel with short notice, on average within 24 to 72 hours. BLUM's technicians also train the machine operators to use the devices so that they can make the best use of these innovative technologies offered by Blum-Novotest. "So we're very satisfied with Blum-Novotest and the synergies that our business relationship has generated. Our collaboration has since evolved into a real partnership," concluded Andrea Chiaravalli.



- Blum-Novotest branch
- Blum-Novotest Sales & Service
- Blum-Novotest System Integrator



Luis Chávez, Regional Director in Mexico and head of the office in Santiago de Querétaro



Vadim Nowak, Managing Director of OOO Blum-Novotest in Nizhny Novgorod, Russia

## New offices in Russia and Mexico

Blum-Novotest, a leader in cutting-edge measurement and testing technology, now has its own representative offices in Russia and Mexico. The office of the new Russian subsidiary is located in Nizhny Novgorod, around 400 kilometres away from Moscow, while that of the Mexican representative branch is located in the city of Santiago de Querétaro in central Mexico.

The Managing Director of the new Russian company named "OOO Blum-Novotest" is Mr Vadim Nowak. Mr Nowak is very familiar with the Russian market. He has worked for the company since back in 2015 and his achievements include the establishment of the representative office, which has been in place since 2016. Thanks to his successful management and the very encouraging performance of the business, the office has now been converted into a dedicated subsidiary.

The position of head of the Mexican representative office and Regional Director for Mexico has been filled with a highly qualified specialist in the form of Mr Luis Chávez. Thanks to his extensive experience in the Mexican industry, Mr Chávez is superbly qualified to continue driving the expansion of the Blum-Novotest Group in Mexico. This representative office is supported in all matters by the US branch in Erlanger, KY founded back in 1997.

As the local sales and service centres, these new offices exist to support local system integrators and establish new sales and service support offices. "A local presence helps to further our strategy of maximum customer support and optimum service while enhancing our commitment to supplying high-quality solutions for customer-specific needs," explains Alexander Blum, president of Blum-Novotest GmbH.

These representative offices provide qualified points of contact for products and services from all three of the German measuring technology manufacturer's business divisions.

## The Business Divisions



### Measuring Components

The division of Measuring Components develops and produces high-quality measuring technology for machine tools. We offer laser measuring systems and probes for tool setting and monitoring, touch probes for workpiece and tool measurement, as well as sophisticated probing software for comprehensive production control during initial setup.



### Measuring Machines

The division of Measuring Machines offers state-of-the-art, well-proven solutions for dimensional or geometric measurement and crack testing mainly for rotation symmetrical parts in the automotive industry and its component suppliers. Furthermore, we are a capable partner for your individual measuring and testing demands.

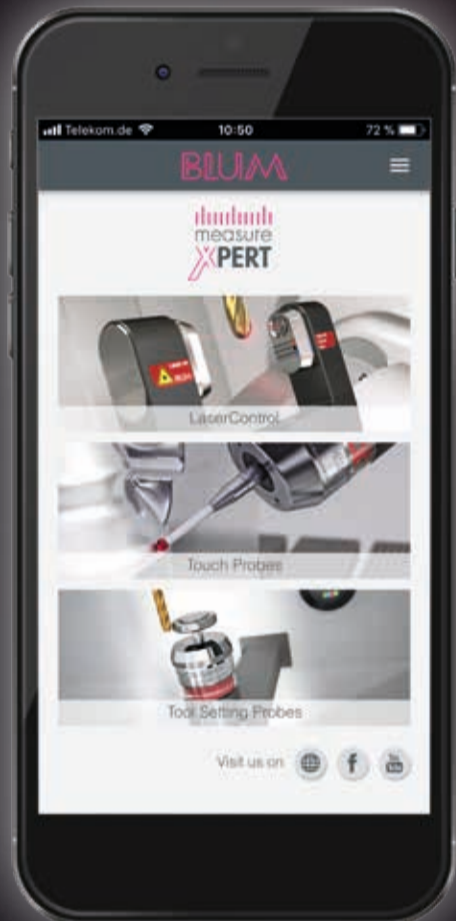


### NOVOTEST Test Engineering

NOVOTEST is the Test Engineering division of Blum-Novotest GmbH. The business division specialises in test stands for automotive and hydraulics industries. The scope of supply and services incorporates planning, design and manufacturing of test stands for function, endurance and lifetime testing as well as the integration into the automated systems of our customers.

## Become a measureXpert!

measureXpert makes the use of your BLUM measuring system even simpler! This new app guides you step by step from the measuring task to the right cycle call for your CNC control. Download now!



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