MITSUBISHI ELECTRIC

MITSUBISHI ELECTRIC

100 YEARS OF INNOVATION

Anniversary

The Art of Economy

Issue 02/21

619 kilometres between sheep and giraffe.

Wire erosion as a complement to high-precision grinding.

Flury Tools

One robot for four. Full automation in electrical discharge machining.

GEWO Feinmechanik

Good connections with cost savings…

Uniriv

The smart magazine for users.

Profile

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High-grade, spot-on and versatile in their applications.
Collaborative robots in use in medium-size enterprises.
Mitsubishi Electric

Regular items

Legal notice

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Editorial

> After all, a robot is only human, or at most 150 per cent.
>
> *Wolfgang Mocker, German aphorist and journalist*

Robots are finding their way into small industrial companies ... and about time.

Many jobs are simply too monotonous for a single operator and yet cost valuable time. Thanks to advanced safety technologies, humans can share a workspace with our Mitsubishi Electric Assista robots. Using them is easy even without specialised robotic knowledge. This makes robotics feasible and affordable even for small and medium-sized businesses. In single-shift operation, a simple industrial robot from Mitsubishi Electric costs around EUR 1.80 per hour including energy costs and maintenance and operates with extreme precision. In multi-shift operation, of course, the whole picture is even more exciting.

At GEWO Feinmechanik, a single robot loads four EDM machines, a measuring station and a cleaning station. Read for yourself from page 36 onwards what this means in practice.

If you're more of an energetic nature, how about a 619-kilometre biking tour of South Africa in 8 days? The managing director of Flury Tools AG explains from page 6 onwards how this also helps him on a daily basis in the EDM sector.

I wish you a good, automated week from Ratingen ... Pay us a visit or watch our three robots on YouTube:

Hans-Jürgen Pelzers
from the Technology Centre in Ratingen

Hans-Jürgen Pelzers
Sales Department Manager

Enjoy your read of this issue!

CNC evolution – Mitsubishi Electric

Controls with a direct Wi-Fi link

At EMO Milano 2021, Mitsubishi Electric presented the M8V series, a range of innovative controls for CNC machining. A new feature is the Wi-Fi integrated in the CNC control, which represents an important evolutionary step in CNC machining. What's more, the controls deliver top performance, an intuitive and user-friendly system, and improved productivity. The M8V series is specifically designed to support digital transformation and create the conditions for intelligent manufacturing applications.

With built-in Wi-Fi functionality, the M8V series models are an important way-paver for forward-looking industrial IoT (Internet of Things) environments in intelligent, automated production. This means that users can access CNC machines anytime, anywhere from connected devices such as tablet computers.

Mitsubishi Electric's M8V series is an innovative range of CNC controllers that supports digital transformation strategies.

New filter technology provides protection from viruses and other harmful substances

The new Plasma Quad Plus Filter / Plasma Quad Connect Filter from Mitsubishi Electric is able to filter out and neutralise a large proportion of airborne viruses. The Plasma Quad Plus filter has proven itself effective against COVID-19 viruses, i.e. SARS-CoV-2, in laboratory tests, neutralising 99.8% of SARS-CoV-2 viruses in 6 hours.

Plasma Quad Plus is a plasma-based filtration system that effectively eliminates 6 types of contaminants. A high-voltage electrode releases plasma by discharge and neutralises viruses, bacteria, allergens and moulds. The filter absorbs particulate matter with an aerodynamic diameter of less than 2.5 micrometres as well as dust.

Specialised services in the field of high-precision grinding.

Flury Tools

619 kilometres between sheep and giraffe.

Wire erosion as a complement to high-precision grinding.

Entrepreneurs and top athletes need similar qualities: application, ambition, an obsession with detail, stamina and the will to succeed. This is doubly true of Matthias Flury, who is both the Managing Director of the high-precision grinding service provider Flury Tools and a successful competitive athlete in cross-country mountain biking.

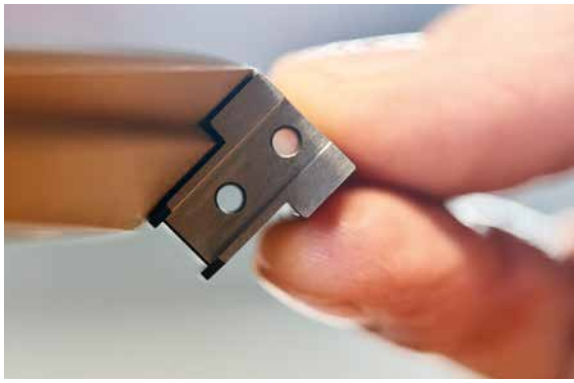
The Absa Cape Epic in South Africa is a gruelling 8-day bike race for selected participants. Eligible are riders who have achieved top placings in national competitions. Only some of the participants make it to the finish. After successfully participating three times, Matthias Flury was inducted into the legendary Amabubesi Finisher Club in 2019.

Flury Tools AG is located in Arch, a municipality with a population of around 1700 in an idyllic setting on the river Aare. The steep slopes of the Jura mountains are only a few kilometres away.

"Our core competence is specialised services in the high-precision grinding sector – from one-off production to medium batch sizes," says Matthias Flury, the second-generation Managing Director of Flury Tools AG in Arch. In typical Swiss fashion, a "hidden champion" of ultra-precision machining has emerged from humble beginnings in this little village idyllically located on the banks of the River Aare with a view of the cliffs of the Jura mountains. It all started in the proverbial garage, where father Anton Flury installed his first machine for so-called optical projection grinding in 1974. His customers were the numerous precision manufacturers in the watchmaking, precision mechanics and electronics industries located throughout the region, who needed precision-ground tools, jigs and gauges for their workshops. They were so taken by the quality supplied by Anton Flury that he was able to pay off his first machine in only half the scheduled time. Today, the company operates about 30 highly automated grinding centres, suitable measuring systems and various other items of equipment in the production shops built in 1984.

Ultra-high precision…

"In their production activities, our customers have to ensure accuracies down to the single-digit micrometre range," Matthias Flury explains. The precision required of the components purchased from Flury Tools is thus appropriately high. Tolerance specifications within



Flury Tools specialises in high-precision components, cutting tools and test gauges manufactured precisely to customer specification.

A "hidden champion" of ultra-precision machining.

With foresight to business success

Since we have to work a great deal to bespoke designs, detailed consultation with the customer is an inseparable part of our overall service.

Matthias Flury, Managing Director of Flury Tools AG

the range of a single micrometre are often demanded here. For this reason, the setting scales and measurement displays of many of the production systems and measuring devices used in the company extend into the tenth of a micrometre range. Achieving such accuracies is in itself not easy, not least because many of the components produced are made of tungsten carbide or even harder materials, he continues. It was precisely such combinations of difficult-to-machine materials in tandem with exceptionally high precision requirements that often presented him with major challenges. As in sport, however, this spurred him on all the more to give his best.

…inclusive of personal service

"Since we have to work a great deal to bespoke designs, detailed consultation with the customer is an inseparable part of our overall service," Flury stresses. Not everything drawn by a design engineer can be realised trouble-free. And even if it can be produced as specified, it often involves a lot of work and the associated expense. Customers often lack the necessary knowledge of the capabilities and limitations of the processes required for production, he explains. That's why he always takes a close look at customer requests. If, on the basis of his experience, he identifies hidden obstacles or cost drivers, he suggests ways to optimise the process.

Precise planning, precise steps …

Completed in 1997, the bridge crossing the river Aare connects the cantons of Bern and Solothurn.

A broad range of different grinding processes

"In many cases, the customer is under considerable deadline pressure if a machine part is faulty or a measuring device is missing and production is at a standstill," says Flury. That is why he has not only extended his range of grinding technologies over the years, but also invested in additional machine capacity. So that he can keep production running even if a unit fails, he has at least two of all important machines. For optical contour grinding, he also has three high-tech machines whose scales can be set in increments of ten-thousandths of a millimetre (0.1 µm). Other processes include 5-axis profile grinding, cylindrical and peel grinding, and surface grinding. Thanks to the diversity of the processes employed, he can also produce highly challenging geometries beyond the scope of many other suppliers. Special status within the company is enjoyed by high-performance grinding, which is used, among other things, for producing profiled blades for hair clippers and sheep shearing machines. The customers concerned are major players on the world market.

The introduction of wire EDM

"On many of the parts we produce, certain contours can

The company's introduction to wire EDM has been with the Mitsubishi Electric MP2400 Connect.

A leading role on the world market.

They also handle large grinding wheels.

The Mitsubishi Electric MP2400 Connect has been in successful operation since March 2021. We have received competent and prompt support from Mitsubishi Electric and IST Technologies.

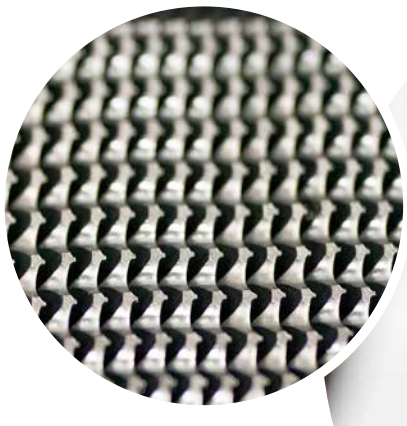
Matthias Flury, Managing Director of Flury Tools AG in Arch.

be ground either not at all or only with great difficulty," Flury explains. In this case, a combination of grinding and wire EDM achieves better results. That is why he had been considering adding wire erosion to his range of technologies for some time, since it facilitates certain operations that are out of the question with grinding techniques. Equally tempting, he continues, was the possibility of using EDM to fabricate the company's own tools, jigs and clamping devices. He was particularly keen on the possibility of profiling metal-bonded grinding wheels himself in order to be able to grind more complex geometries in a single pass. After contacts with several suppliers and short-listing the best of them, he attended a seminar at the Competence Centre for Machining at Furtwangen University of Applied Sciences in September 2020. Here he gained a detailed understanding of the scope for using wire-cut EDM machines in the profiling of grinding wheels. This was also when he came into contact with Mitsubishi Electric, a meeting followed by intensive consultations that he found to be very informative.

Porosity is decisive.

Both simple and unusual profiles are possible.

Many shear heads stacked for production



Such shear blades for sheep and other domesticated animals are produced in large numbers.

Experience with the Mitsubishi Electric MP2400 Connect

"In December 2020, we ordered our MP2400 Connect wire-cut EDM machine," Flury recalls. This machine, which runs with deionised water, was ordered straight off with special equipment for machining metal-bonded grinding wheels. This also includes a rotary axis from ITS Technologies integrated into the machine control system. This supplier had also provided valuable information on the possible applications and the various options for this axis. Delivery and assembly were carried out by Binkert.

The two-day user training after commissioning in March was provided by ITS Technologies. For this, their boss came personally, a man who has huge knowledge in the field, answered all of Flury's questions and gave numerous valuable tips. The machine has been in successful operation ever since, he says. Initially, it was mainly used for the finishing of grinding wheels and more recently increasingly for the production of jigs and fixtures. The support provided by Mitsubishi Electric and ITS is both expert and prompt, Flury adds. Although the company is still learning the ropes, its capacity utilisation is already approaching 50 per cent. For the future, he sees significant growth potential thanks to the expansion of his range of services.

Shear blades to precise specifications

Geared to the application

Expert and prompt support.

Flury Tools AG

Employees
12

Founding year
1974

Managing Director
Matthias Flury

Core business
Ground precision parts for customers in the watchmaking industry, precision mechanics, machine manufacture, automotive, metrology, electrical engineering and electronics, and medical technology

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Innovative solutions.

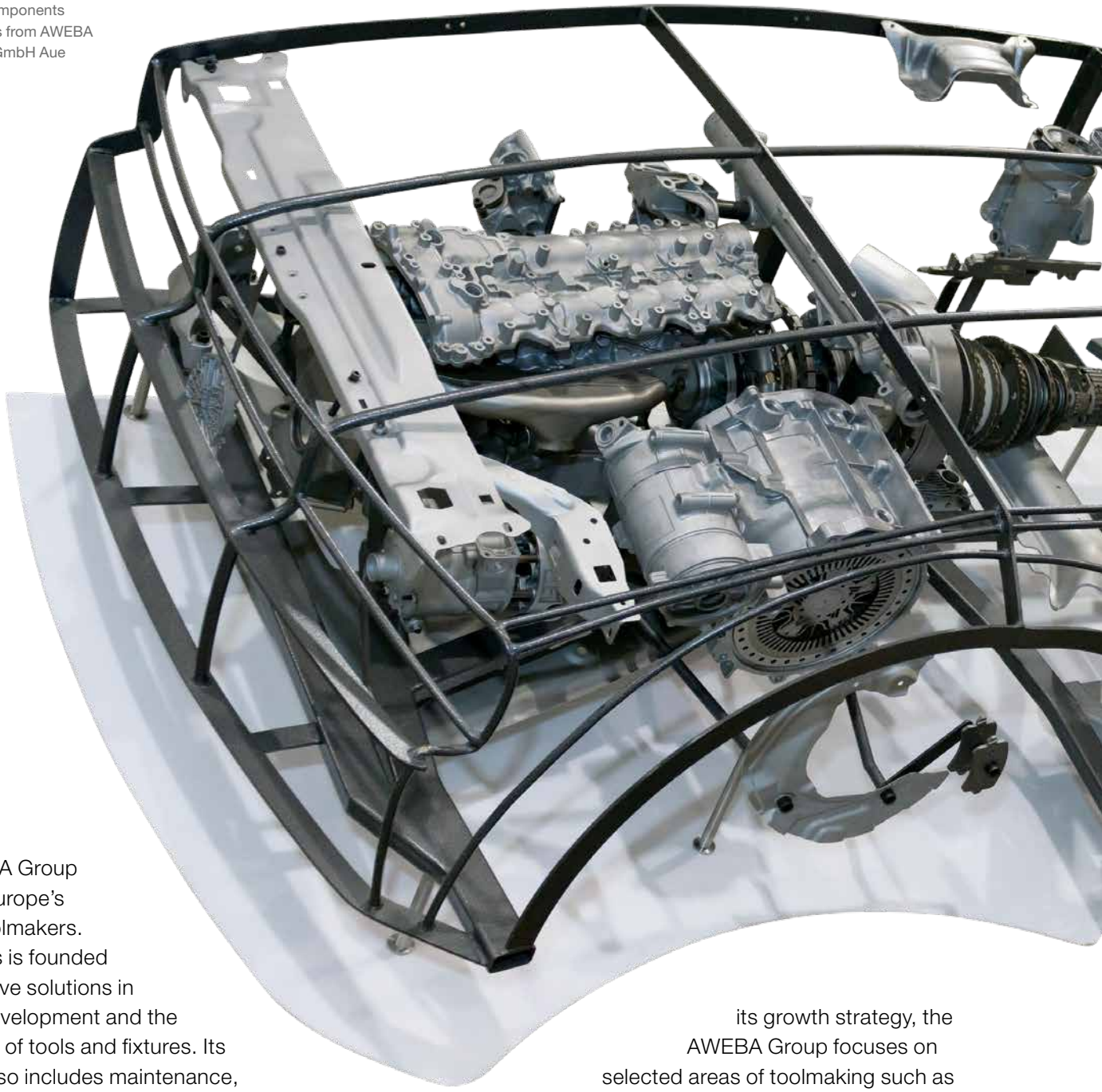
AWEBA Werkzeugbau GmbH Aue

Toolmaker AWEBA resorts to EDM equipment from Mitsubishi Electric in its expansion.

The company stays true to its keys to success.

Since our first visit to the AWEBA Group about ten years ago, a great deal has changed at one of Europe's largest and most progressive toolmakers. In pursuit of its aggressive expansion strategy, the company has evolved from purely a toolmaking specialist into a full-range supplier. In doing so, the company has remained true to its keys to success: innovative solutions, outstanding quality and the ultimate in precision. The company's machinery has also moved on in the meantime. Ten years ago, one of its 18 EDM machines was a Mitsubishi Electric NA2400 Essence. Today, there are still 18 EDM systems in operation in Aue, but 13 of them are now from Mitsubishi Electric.

Wire-frame model of a car with various components made with tools from AWEBA Werkzeugbau GmbH Aue

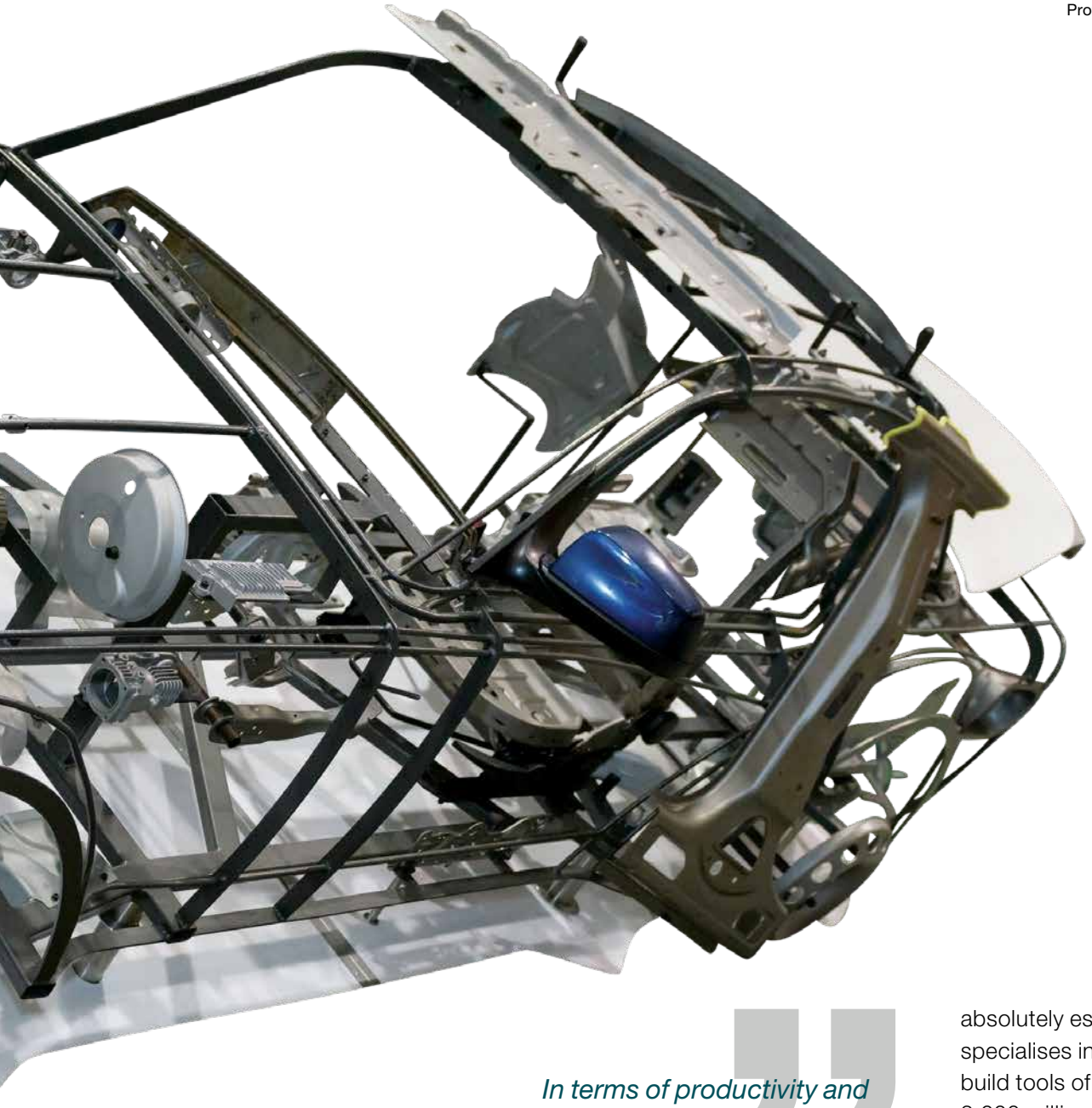


The AWEBA Group is one of Europe's leading toolmakers. Its success is founded on innovative solutions in product development and the production of tools and fixtures. Its portfolio also includes maintenance, repair and spare parts supply services. In its growth strategy, the AWEBA Group focuses on selected areas of toolmaking such as automotive and renewable energy. Through strategic investment in toolmaking, AWEBA has aligned its capacity, expertise and processes to the new challenges, such as the current trends in the automotive industry. The new strategic business areas also include the series production of coupling bodies in a patented tool production process.

Thomas Schlemmbach explains AWEBA GmbH's range of components.

Specialist in large tools

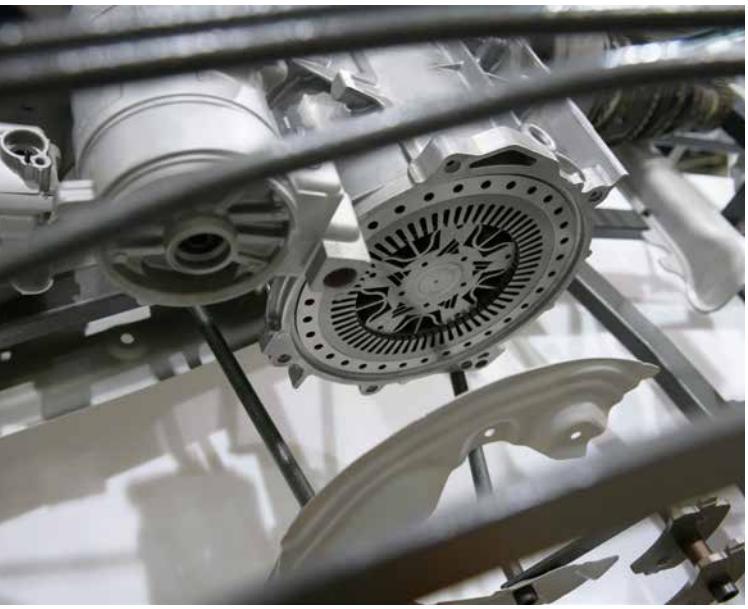
One focus of its toolmaking activities is on stamping tools for electric motors for the high-precision



production of rotor and stator laminations. “In this area, we mainly machine cemented carbide, and of course all materials commonly used in toolmaking as well,” says Thomas Schlemmbach, head of machining. Extreme precision is required especially for the machining of large engine and generator blades. Generator blades for wind and hydropower turbines are composed of a large number of segments. The diameter of a complete sheet can come to three to four metres. A maximum tolerance of two micrometres is often absolutely essential. AWEBA specialises in large tools. “We build tools of up to 5,000 by 3,000 millimetres and weighing up to 50 tonnes, which we test in our trial presses,” Schlemmbach explains. The tools are also tested during development to ensure that everything runs smoothly during production. “During development, our designers use modern simulation tools, among other things, in order to subject parts to thorough testing and optimise them before the tools are built.”

> *In terms of productivity and also quality, our new machines can no longer be compared with those of ten years ago. But that applies not just to Mitsubishi, but to many other manufacturers as well.*
>
> *Thomas Schlemmbach, head of machining*

To produce tools with high precision, comprehensive



Model of a latest-generation electric motor

production and design expertise is essential. “Here in Aue we have the specialists who work hand in glove to produce flawless tools,” Schlemmbach explains. For tool production, the employees can resort to a huge array of machinery, with over 100 machines at their disposal to deliver the desired quality in all accuracy classes. With its in-house hardening shop with vacuum equipment, AWEBA ensures rapid access to a wide range of highly tempered steels. “As a rule, the toolshop works in three shifts,” Schlemmbach explains. “This is the only way we can produce 50,000 to 60,000 workpieces per year from a batch size of one.”

Electromobility as the motor for growth

Due to the enormous advances in electromobility, there is huge demand for electric motors, which in turn translates into rising demand for stamped metal sheet. “Today, toolmaking has a strong automotive focus,” says Schlemmbach, summing up current trends. The company has therefore invested heavily in EDM equipment. For the production of electric motors, AWEBA makes stamping tools for rotor and stator laminations. These stamping tools are mainly made of cemented carbide, a material that has a special structure and requires a special type of machining.

Stamping tools for the production of rotor and stator laminations often consist of 250 to 300 individual parts that have to be made and assembled with high precision. “These tools may well take 2,000 to 3,000 hours of machining until they are finished to the desired quality,” Schlemmbach explains. “So that we can process such orders competitively, we are constantly investing in the latest technology. The decisive factor here is productivity.”

Consistently with the latest technology.

Of the 18 EDM systems, 13 are from Mitsubishi Electric.

Three machine types of the last ten years – NA2400, MP2400 and MV2400R Connect

Upgrading its EDM equipment

When it came to upgrading its EDM equipment, Mitsubishi Electric scored heavily. Ten years ago, the toolmakers in Aue were operating with 18 EDM systems, and a Mitsubishi Electric NA2400 Essence had just been installed. Today, 18 EDM machines are still in operation at the Aue plant, but with markedly improved productivity. These now include 13 new Mitsubishi Electric systems. “During the intervening years, the number of machines has remained constant, but our EDM capacity has increased dramatically,” Schlemmbach reports. “In terms of productivity and also quality, our new machines can no longer be compared with those of ten years ago. But that applies not just to Mitsubishi, but to many other manufacturers as well.”

Before a new machine is admitted to AWEBA’s shop-floor, it is subjected to a comprehensive battery of tests. Productivity and quality are top of the agenda. So that the assessment has a solid basis, workpieces from the standard repertoire and customised components are

Tools weighing up to 50 t, measuring 5 x 3 m

included. Since the first comparative tests ten years ago, Mitsubishi Electric machines have clearly surpassed their rivals in productivity in all tests. In the standard tests, Mitsubishi Electric has been about 15 per cent ahead throughout this time. In the machining of customised components, Mitsubishi Electric machines have impressed with higher productivity.

“EDM accounts for around 100,000 hours per year,” says Schlemmbach. “15 per cent of this is equivalent to the machine output of two EDM units. In addition to the initial investment, there is also the cost of six employees working in three shifts, resulting in a cost advantage that continues to impress us. Of course, even these machines have their weak points, but, taken as a whole, they are simply outstanding.”

Having purchased the EDM systems, the company also feels well served by Mitsubishi Electric. “When making

AWEBA Group product range
Maximum precision for over 130 years

- Forming dies/power train
- Hydroforming dies
- Die-casting dies
- Die-casting dies for mechatronic components
- Hydraulic clamping fixtures
- HOHENSTEIN jigs and fixtures system
- Cutting dies
- Fine blanking dies
- Tool-related automation equipment
- Machining

Thomas Schlemmbach, Entro Daniel and Detlef Freye (from left to right)

investment decisions," Schlemmbach emphasises, "the experience we have gained with the manufacturer is also of course important. We keep a close eye on how service and support are performing. And here, too, we can't fault Mitsubishi on any count."

Disc carrier made with tools from AWEBA GmbH

Main entrance to AWEBA Werkzeugbau GmbH with its roughly 10,000 m² of production space

AWEBA Werkzeugbau GmbH Aue

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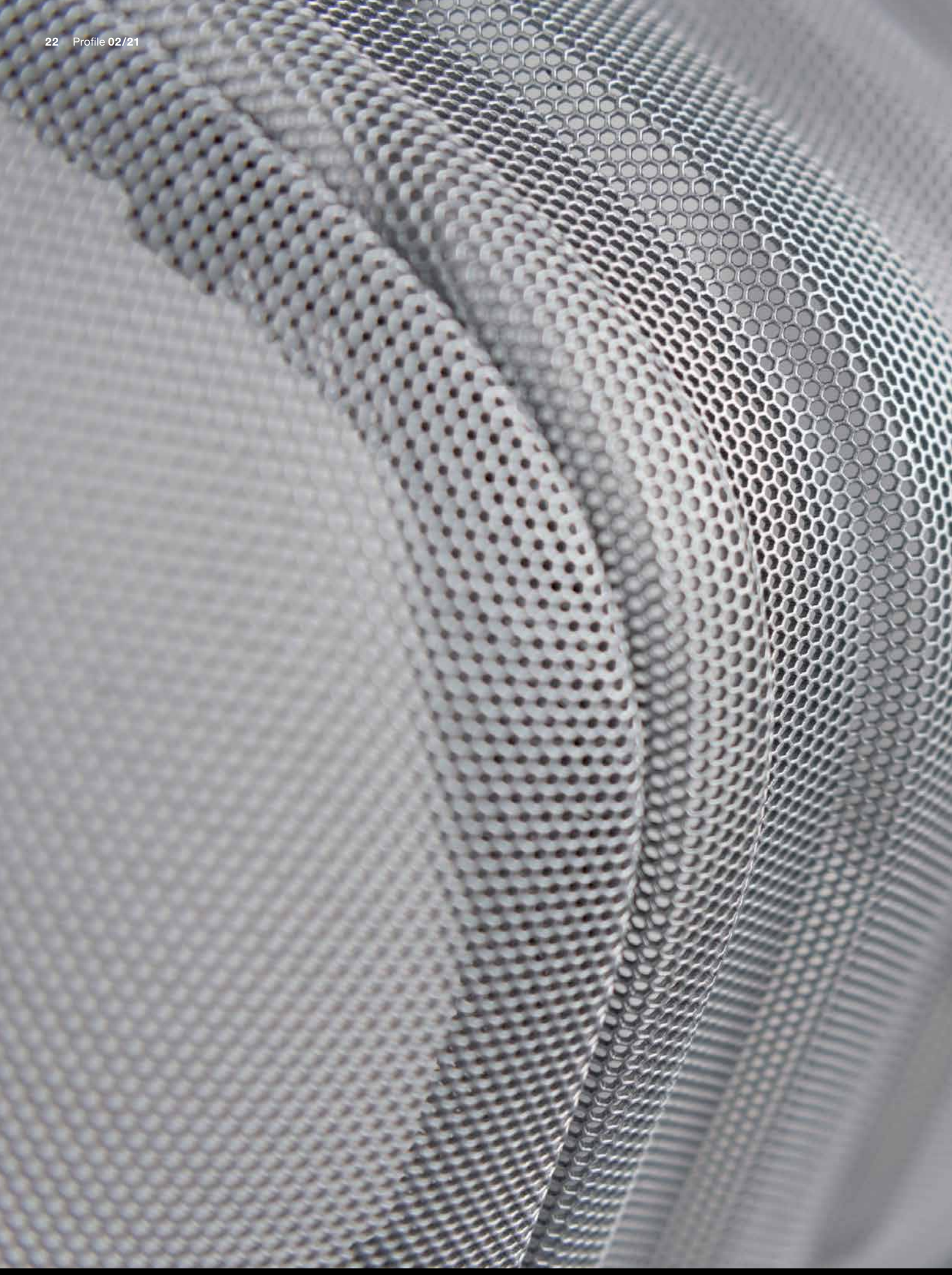
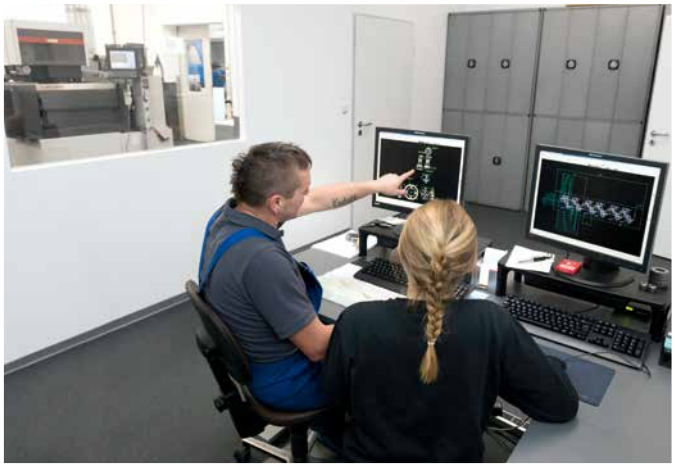


Exceptionally high standards of quality and availability.

Made-to-measure perforated metal.

Fast-track and customised.



Its mechanical, chemical and optical properties make perforated sheet the ideal material for furniture makers.

Perforated metal is encountered in many areas. It can be found in industry and sound insulation as well as in air conditioning technology and food production, although perforated sheet can also be used to clad the façades of buildings. In all these areas, the products from SCHÄFER meets the toughest requirements in terms of quality and availability. For its punching tools, SCHÄFER relies on EDM technology from Mitsubishi Electric for its perforated sheet. The toolmakers at SCHÄFER are particularly proud of their FA30, which has been put to more than 100,000 hours of use since 2001 and is still producing top-quality punching tools.

Perforated sheet to customer specification.

Since we are totally satisfied with the machine's quality and reliability, we see no reason at the moment for us to replace it with a new one.

Daniel Sauer, Assistant Technical Manager

Today, the SCHÄFER WERKE Group can look back on over 80 years of experience of steel processing. More than 1,000 employees contribute to the company's success at its state-of-the-art production sites in Germany and the Czech Republic. From its base in Neunkirchen in the Siegerland region, the family-owned company now operates worldwide through its numerous divisions. One of its focuses is on perforated sheet metal, and SCHÄFER satisfies its customers with a wide range of products. Its standard range comprises over 400 different perforation patterns in a variety of sizes and grades in a wide range of materials and in thicknesses from 0.5 to 3.0 millimetres. Other specialities include perforated sheets to customer specification and its machining service. SCHÄFER responds to the customer's wishes flexibly and efficiently at its modern production facilities.

For Daniel Sauer, Assistant Technical Manager, on-time delivery and quality are the decisive unique selling points of SCHÄFER Perforated Metal. "We are very quick to respond to and satisfy customer requests," Sauer explains.

Operator M. Knautz at the machine with 100,000 hours of service behind it

"Quality management plays a central role here. For 25 years, all the critical stages in production have been integrated into the system." The company produces around two million running metres of perforated sheet metal per year from all materials and with a variety of finishes.

Optimising the air flow of radiator grilles

One of the tasks of a radiator grille is to supply vehicle engines with the air they need and to protect them from mechanical impact. Together with its customers, SCHÄFER perforated sheet has developed among other things new approaches in the improvement of engine cooling. Originally, a diamond-shaped perforation was envisaged for a customer to protect the engine. In the design-in process, the developers discovered the advantages of

Standardised and customised network solutions from racks to accessories

Over 80 years of experience of steel processing

More than 1,000 employees

Over 400 different perforation patterns

Thicknesses from 0.5 to 3.0 millimetres

hexagonal perforations for this application and thus increased the air throughput significantly. This improvement in cooling performance has a measurable effect on engine cooling. The company has achieved similar improvements on agricultural vehicles.

Hexagonal perforations were a challenge for the toolmaking department, because with this hole pattern only 12 per cent of the sheet metal is retained. So that these sheets are highly air-permeable, up to 80 per cent of the material is punched out. The remaining percentage must then deliver the necessary rigidity.

State-of-the-art machinery in the toolmaking department

Since the company's founding, the in-house toolshop has been responsible for making and maintaining all the tools. "In addition," Sauer explains, "we also produce the spare parts for our machinery as far as possible. We have a variety of machining techniques here and expertise that has accumulated over the years. On top of all this, we work quickly and inexpensively." For their activities the toolmakers have a state-of-the-art machine park at their disposal. In addition to the three EDM units from Mitsubishi Electric, there are a variety of lathes, milling machines and grinding benches.

The first Mitsubishi Electric FX 20 was introduced back in 1997, to be replaced in 2001 by a larger FA30. "For 20 years it has been running on a daily basis to our complete satisfaction. The FA30 is the oldest machine in the toolshop," Sauer reports. "Nevertheless, the machine still does its job one hundred per cent. This is due both to the FA30's top quality and also to our skilled staff, who receive comprehensive training and handle the machines with the necessary care."

Quality control of a die by N. Neuser and his colleague M. Brock

Over a million threadings in the course of 100,000 hours of service.

IT racks with doors of perforated sheet ensure efficient ventilation.

Over 100,000 hours in operation

The performance of the Mitsubishi Electric FA30 is outstanding. In the past 20 years it has clocked up well over 100,000 operating hours. “We did a rough calculation of the number of threadings during this period,” Sauer explains, “and arrived at a figure of over a million – which absolutely stunned us. Since we are totally satisfied with the machine’s quality and reliability, we see no reason at the moment for us to replace it with a new one.”

To boost its EDM capacity, the company installed a Mitsubishi Electric MV4800R Connect in August 2021. The tool guides mainly run on the large machines, the FA30 and the MV4800R Connect. To machine workpieces with a length of 1,650 millimetres and a width of 200 millimetres, the standard machines had to be slightly modified. Dies with a maximum length of 330 millimetres are usually cut by the toolmakers on an FA10S Advance. “Although the machining programs dictate to some extent which machines are used for which jobs,” Neuser adds, “it can still be safely said that the MV4800R Connect and the FA30 are used for the same tasks.”

Generations apart – the new MV4800R (left) and the FA30 (right) being operated by employees M. Brock and M. Knautz

All-important dependability

“For a direct comparison of the two machine generations,” says Sauer, “the new MV4800R Connect simply hasn’t been running long enough. After tests at Mitsubishi, we are assuming that the cutting speed of the new machine is not significantly faster. One point that immediately catches the eye, however, is its remarkable speed during wire threading.” The

We are very quick to respond to and satisfy customer requests.

Daniel Sauer, Assistant Technical Manager

SCHÄFER Werke GmbH

Founding year
1937

Employees
More than 1000

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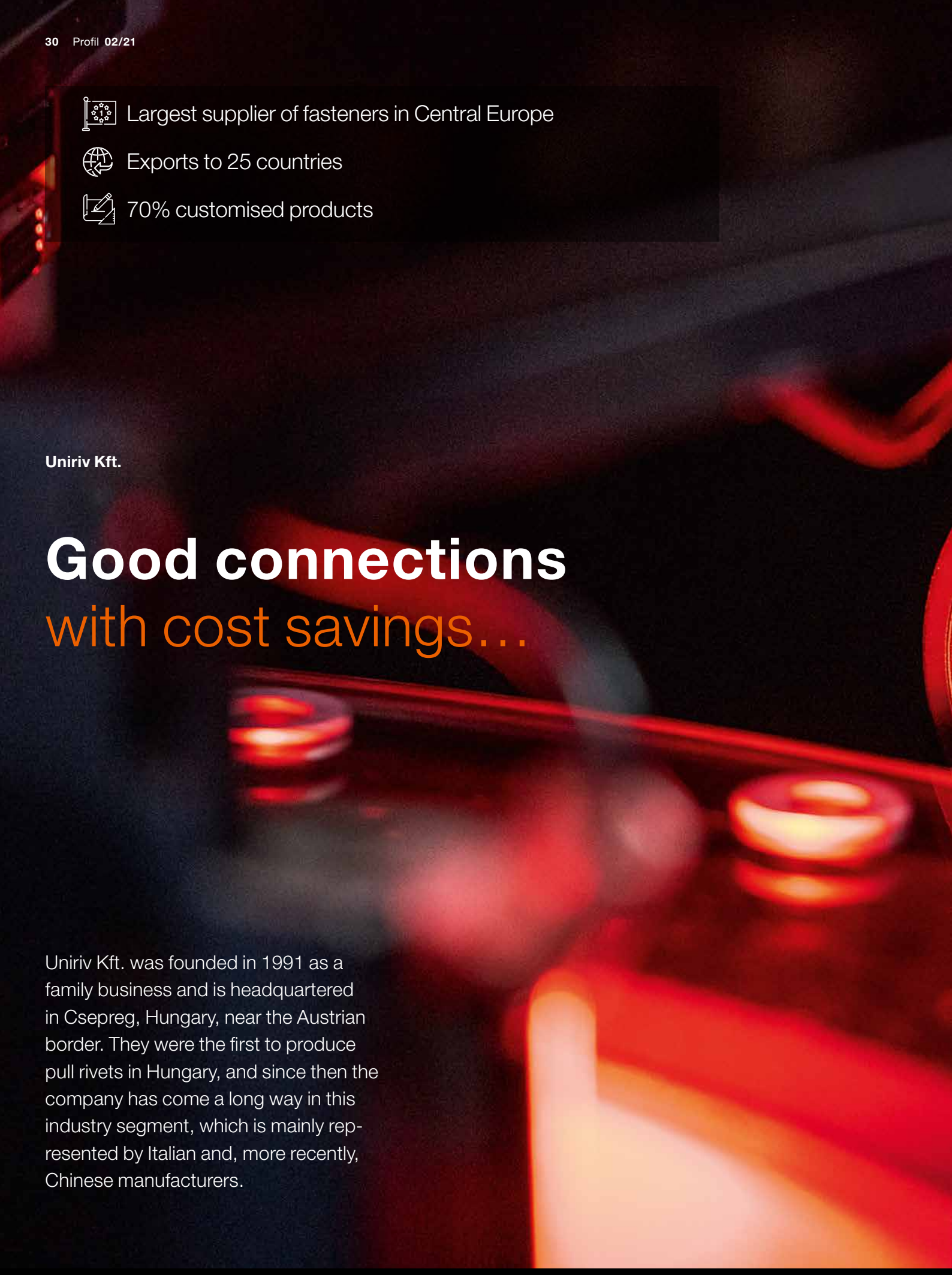
process runs much faster as a result, and this makes itself felt in the machine's overall productivity. "It is hugely important for us that the wire threader operates trouble-free," Sauer (left in the picture) continues. "Because our EDM machines all run in an unmanned third shift." Process reliability is therefore crucial for SCHÄFER WERKE. And here the company can always depend on the machines from Mitsubishi Electric. "When we start the process in the evening, the jobs are either finished or still running in the morning," Sauer reports.

Process security is decisive.

Reasons for its investment decision

"The experience we have gathered over the 20 years with Mitsubishi Electric, along with the machines' reliability and the quality of the after-sales service, were the decisive reasons for investing in our new MV4800R Connect," says Neuser (right in the picture) summing up.

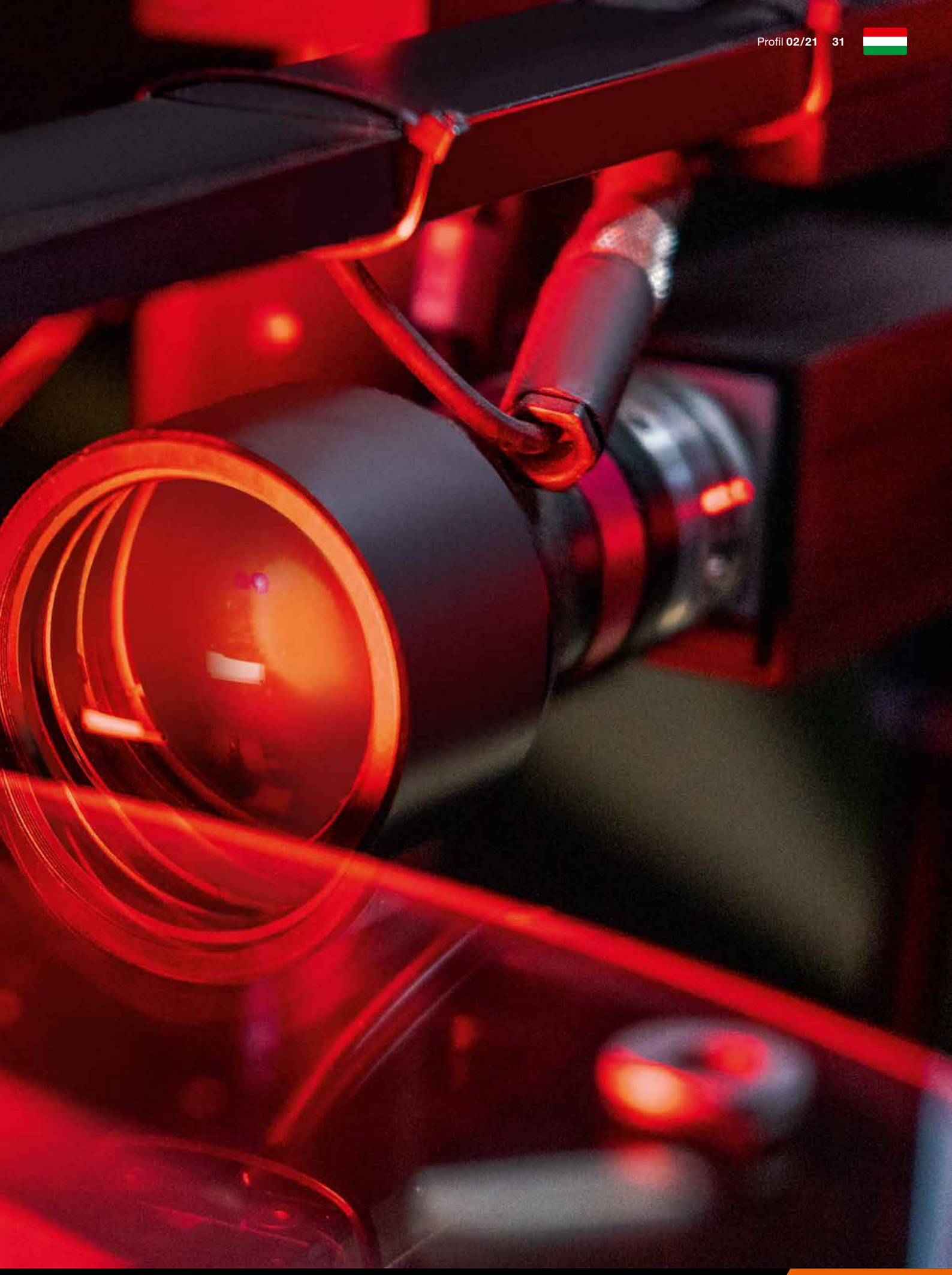


- Largest supplier of fasteners in Central Europe
- Exports to 25 countries
- 70% customised products

Uniriv Kft.

Good connections with cost savings…

Uniriv Kft. was founded in 1991 as a family business and is headquartered in Csepreg, Hungary, near the Austrian border. They were the first to produce pull rivets in Hungary, and since then the company has come a long way in this industry segment, which is mainly represented by Italian and, more recently, Chinese manufacturers.



Uniriv Kft.

The company has become the largest manufacturer of industrial fasteners in Central Europe over the past three decades. They have been represented by their components in 25 countries, from Mexico through Germany to Russia. The company purchased two Mitsubishi Electric machine tools to increase its own tool manufacturing capability as a part of a major investment three years ago. Purchasing the MV1200S wire EDM and the EA12S die-sinking EDM was a huge step forward for the company and they could rely on the professional assistance of the distributor (M+E Kft.) throughout the process.

As times change, so do the needs

"We need to be able to recognize that times are changing, and we also need to change if necessary," said Zsolt Pócza, the company's owner and Managing Director. Today, rivets account for only 30% of the company's total production. Typically, these are more specialized industrial products with higher added value, usually not for commercial use. "On the other hand, almost 70% of our products are based on technical drawings and designed according to individual customer needs," adds Pócza. These are manufactured for the automotive, construction machinery and assembly industries. These industries have very strict requirements in terms of quality, and this has necessitated improvements in the quality of manufacturing tools.

No more downtime due to tool shortage

"We always record the duration and the causes of downtime," explains Pócza. One of the most significant reasons for downtime was tool shortages, as revealed by data three years ago. Responsible for taking decisions for the company, Pócza was faced with a difficulty question: "I felt we have two ways ahead of us: investment in new machines or ending in-house tool manufacturing". The company decided to improve their tool

We need to be able to recognize that times are changing, and we also need to change if necessary.

Zsolt Pócza

Professional support by the sales partner.

Fasteners to customer specification

The purchase of the MV1200S NewGen wire EDM and the EA12S die-sinker marked a big step forward for the company.

I never felt they simply wanted to sell us a machine. Rather, they helped us to find the perfect solutions for our purposes.

Zsolt Pócza

manufacturing technology with EDMs manufactured by the now 100-year-old Mitsubishi Electric. “Since then, the lifecycle and service life of our tools have increased significantly,” said Pócza who considered it as important: “Since the new development, our production problems caused by tool shortages have almost completely disappeared. We believe our output has increased by about 30-40% over tool manufacturing with manual machine tools.” In addition, the company has saved a lot of manufacturing costs. “Tool development and manufacturing are a very expensive process in Europe. It costs about 10–15 thousand euros depending on the complexity of the workpiece,” says Pócza, who knows that a lot of fastener manufacturers do not execute this process in-house: “By comparison we solve this in-house with costs of about 1000–1500 euros. This is a significant difference.”

Finding what is the best for us

This improvement involving a major investment in the company was preceded by careful consideration. “I did not want to decide it alone, so I involved my colleagues in the search and selection from the beginning,” explains Pócza, who adds: “It took about two months to review all possibilities and our decision was unanimous.” The Hungarian distributor helped us with professional advice to choose the best-suited machine for all parties involved from the beginning. And they offered a unique 12-year positioning guarantee for their solution.

Pócza remembers the selection process: “We had the opportunity to visit reference companies where these machines were already operating and this was very useful when we made the final decision. Furthermore, we brought one of our workpieces for test machining, so we could be convinced about the capabilities the machine in industrial use.” He said the following about the attitude of M+E Kft.: “I never felt they simply wanted to sell us a machine. Rather, they helped us to find the perfect solutions for our purposes.”

Modern technology used by youngsters
Uniriv Kft. has been ccommitted to supporting the education and training of the younger generation for many years. “We have a close partnership with the local vocational high school, and we accept 8–10 students per year as trainees, with some of the them starting work at our company after graduation,” says Pócza, who thinks the younger generation is open-minded for the new technology based on their nature and work happily with world-leading technologies. “The youngsters use the modern equipment and most of the older colleagues were left on universal machine tools. I think this is the optimal solution for everyone and all colleagues can work with machine that they want to,” Pócza believes.

Purchasing is just the first step of a partnership
The company takes into consideration the expertise of all relevant colleagues when investigating a machine in depth. There was an in-house request for both the wire EDM and die-sinking EDM purchased from the same manufacturer. Reliable support and service are at least as important as the capabilities of the machines. “We are absolutely satisfied with the machines, the support and the background service. Quality was also essential since we had planned in the long term for machines working in two shifts,” says Pócza summing up. “It’s obviously an advantage that we can respond flexibly to our customers’ demands thanks to a truly high-standard tool workshop.”

Uniriv Kft.

Founding year
1991

Employees
150

Managing Director
Zsolt Pócza

Core business
Fastener production

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The employees at Uniriv Kft. are conversant with both traditional tools and new technologies.

We are absolutely satisfied with the machines, the support and the background service. Quality was also essential since we had planned in the long term for machines working in two shifts.

Zsolt Pócza

Uniriv Kft.

Continued from Profile 2/2019

One robot for four.

Full automation in electrical discharge machining.

GEWO Feinmechanik GmbH

A milestone in automation.

Characteristic of GEWO Feinmechanik GmbH is its zest for innovation. With the idea of an EDM island, on which one robot serves four wire EDM machines, the medium-sized company has broken new ground in the automation of electrical discharge machining.

GEWO Feinmechanik

GEWO Feinmechanik GmbH is a company that impressed us with its innovative spirit and drive during Profile's first visit in 2019. The finest example of this is its "EDM island" – a fully automated production cell for electrical discharge machining that was set up in 2016. It is also the reason for our second visit to the specialist in precision engineering – because it illustrates why GEWO belongs to the top league in the industry.

Stefan Woitzik, who manages GEWO together with his brother Andreas, explains that the EDM production cell was the first such automation project at the company. "At the time, we consciously decided to implement automation in the EDM sector first – because machining on Mitsubishi Electric systems had proven particularly reliable. This meant we could concentrate on the peripheral equipment." With their high dependability and ease of maintenance, Mitsubishi Electric wire EDM systems are

To part 1 of the GEWO report
Download
Profile 2/2019 here.

able to run for long periods without manual intervention – an essential prerequisite for process automation. A key element here is automatic wire threading, as there is no time-consuming return to the starting position on these machines. Thanks to thermal wire preparation, the process resumes without delay. The reliable wire threading also ensures a stable process and high availability around the clock.

Utilising robot capacity
In this automation project, GEWO once again

Facts & figures on GEWO's EDM island

- The batch size of the machined parts ranges from 3 to 500.
- As a rule, EDM is carried out with 0.2 mm wire, but 0.25 mm wire is also used to a lesser extent on the FA20S.
- The wire EDM systems have been extended to include a 20-kg wire station. At GEWO, the wire reels have to be changed on average every week.

Erosion contour for the flexible alignment of the plate plane

Blanks with labelled packaging for the assignment of serial numbers

Automatic wire threading as a key feature.

demonstrated its eagerness to explore innovative avenues. “Although there were solutions that load an EDM system with robotic assistance,” Woitzik explains, “the robot would have spent too much time waiting, as the EDM process is relatively slow. We wanted to put the robot to more efficient use.” It was therefore decided that the robot should serve four EDM systems as well as a measuring station and a cleaning station.

4 x 3 = 24
How come?

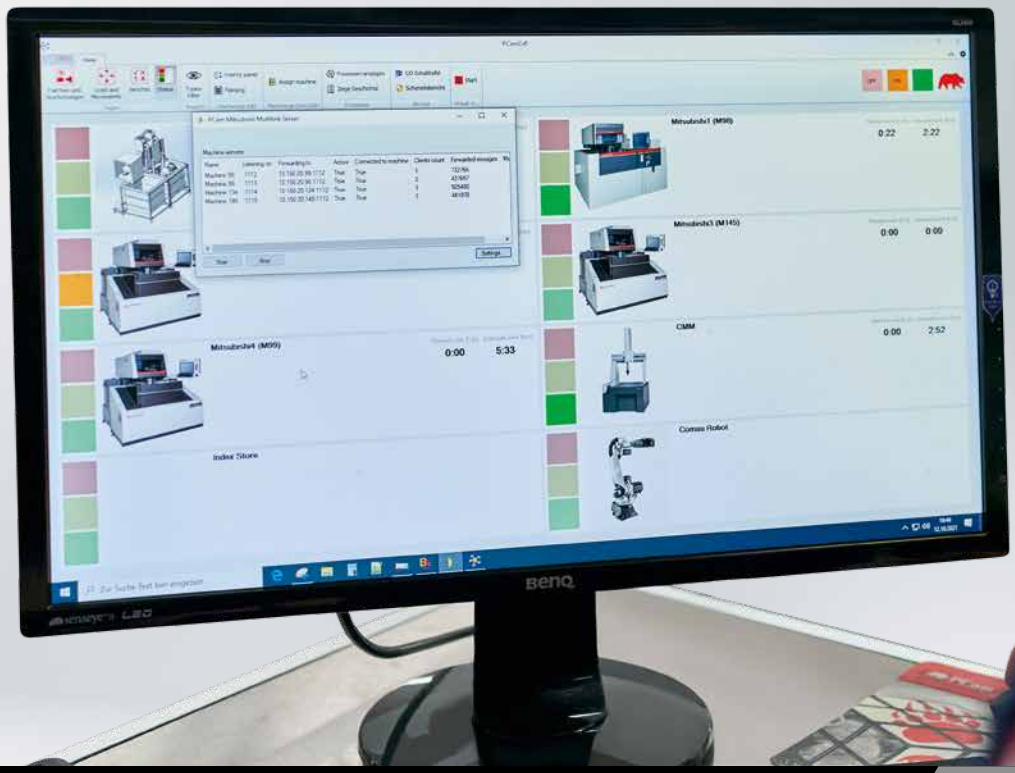
Today we can run four EDM machines around the clock with a total of only three employees.

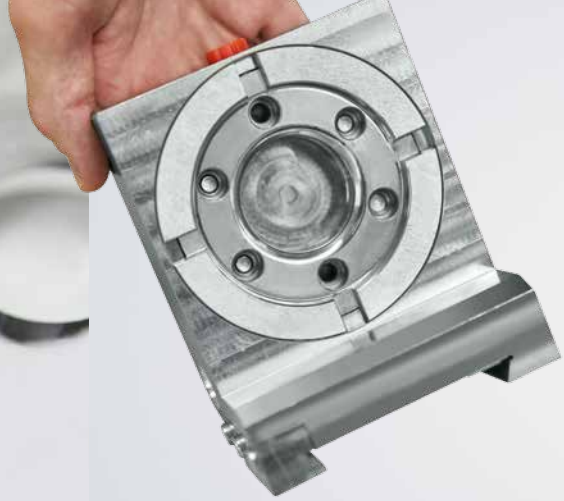
Stefan Woitzik, Manager of GEWO Feinmechanik GmbH

Automation-ready EDM systems

GEWO with its Mitsubishi Electric EDM machines was already well prepared for full automation – the EDM cell was to comprise three MV1200Rs and one FA20S Advance. The machines are “automation-ready”, with a DNC interface for external control as standard. Not only is it possible to issue such remote control commands such as “Start”, “Stop” and “Reset”, but all the relevant

Status display of the various stations in the automation cell





Chuck that holds the fixtures for robot assembly

Component with a wire-cut contour for clamping a shaft

data – from individual variables and technology data to entire NC programs – can also be supplied via this interface. This means that the wire EDMs are extremely easy to control via text commands, making them independent of special software systems or the philosophy of the automation company. What's more, the wire EDM systems from Mitsubishi Electric offer – depending on the model – an optional interface to MTConnect. Along with OPC-UA and Edgecross, this is one of the most important standards for integration into Industry 4.0. It is used primarily for gathering operating data for an assessment of a machine's rate of utilisation or profitability.

Automation system from a single source

Woitzik and his team opted for a solution from PCam as the connecting system for cell automation. The Swiss company provides a one-stop solution that includes a robot with six degrees of

Some of the components have to be cut with both a brass and a molybdenum wire.

Stefan Woitzik, Manager of GEWO Feinmechanik GmbH

Significantly reduced set-up time.

Automated component change by robot

DNC interface

The DNC interface enables communication between a higher-order computer (master computer) and the control of the wire EDM machine.

The protocol is designed to permit links via character-based (e.g. RS-232) and block-based communication layers, e.g. Ethernet / TCP/IP or USB.

freedom as well as the associated software systems. PCamCell manages the various machine tools and workstations within the cell, while the PCamWire CAD/CAM system permits programming of the wire EDM machines. “Creating an overall system from the various elements was totally uncharted territory for us – this is where we had to rely on outside specialists,” Woitzik admits. But it has paid off – today GEWO benefits enormously from what the automated EDM island’s capabilities.

Minimising set-up time

It all starts with the first step – the clamping of the components for machining. For this GEWO uses two different zero-point clamping systems to suit the workpiece weight. Stephan Zimmer, head of EDM, explains the advantages: “Some of the components have to be cut with both a brass and a molybdenum wire. The zero-point clamping system allows us to accelerate set-up here significantly.” Without the clamping system, the component, classically, would have to stay clamped while the wire is changed – which means that time would be taken to set up each workpiece. At GEWO, on the other hand, a complete batch is processed with the one wire, the components are temporarily stored in the clamping device and, after wire change, returned to the machine at the old zero point.

Integrated measurement and cleaning

For this purpose, GEWO has integrated a coordinate measuring machine as the cell's first workstation. The robot takes the parts already manually clamped and deposited in the carousel magazine and places them in the measuring station. Here the zero point is determined and the clamping checked. The robot then transfers the clamping device with the component to one of the four wire-cut EDMs. PCamCell also communicates the zero point to the machine control and uploads the programs created in PCamWire and required in each case.

After machining – roughing and finishing, in zero-degree or 90-degree clamping – the robot conveys the parts straight to the fully automatic cleaning system. Woitzik: "Thanks to cleaning immediately after machining, the erosion sludge doesn't even have time to harden. In addition, we have 100 per cent verification that every part has been cleaned." This is important, for example, for listing as a Trusted Supplier in the highly discerning semiconductor industry.

The final step is another control measurement of the finished component: "We carry out the 100 per cent measurement often requested by our customers more or less simultaneously. All the data are saved in the CAQ system and also fed back to PCamCell," Woitzik explains. "If a measurement isn't right, direct feedback is given so that the sequence program can be immediate corrected." The measured data are also used directly for process optimisation. If the measurements are not in the middle of the tolerance range, PCamCell receives information to this effect directly and corrects the process in the EDM system fully automatically, Woitzik reports. "This means that the next part to come out of the machine is even better. This has allowed us to make a huge step forward in quality." A self-optimising production process – Industry 4.0 at its best.

Bavaria's Best 50 Award of the Bavarian Ministry of Economic Affairs

One of Bavaria's best

GEWO Feinmechanik GmbH was awarded the Bavaria's Best 50 Award in 2021. This award commends the 50 best-performing owner-run medium-sized companies in Bavaria that have grown faster than average in terms of sales and workforce. While GEWO employed just over 400 people in 2019 – the first time Profile visited the company – in 2021 it now has 530 employees, including 93 trainees. The prize winners were identified by an auditing company as an independent juror on the base of objective criteria on behalf of the Bavarian Ministry of Economic Affairs. GEWO has now received the award for the third time.

Production time cut by half

Today, Woitzik cannot imagine doing without the EDM island: “It has taken us a big step forward. Today we can run four EDM machines around the clock with a total of only three employees. Without this investment, we would have needed more skilled manpower – and this is in short supply in Bavaria.” Furthermore, the development of the EDM cell also prompted GEWO to re-evaluate all processes and optimise them, Zimmer adds. “We’ve optimised the clamping devices, for example, and can now clamp several parts one on top of the other. This cuts running time – today we machine parts up to twice as fast as before.” So it’s a good thing the EDM island is geared for expansion. It can simply be mirrored, with the second island then using the existing measuring and cleaning station. There are no definite plans for the expansion yet – but if GEWO continues to grow as rapidly as it has done so far, that may well change soon.

GEWO Feinmechanik GmbH

Management

Stefan and Andreas Woitzik

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Niche successfully occupied.

In the heart of Berlin.

MP1200 Connect delivers dependability and precision for series production.

Gebrüder Geisler GmbH

Gebrüder Geisler GmbH uses the MP1200 Connect both for the machining of components for its own stamping tools and for the series production of electrically conductive parts for medical implants. Design, toolmaking and tool application are all performed in-house – this has enabled the Berlin-based company to successfully fill a niche.

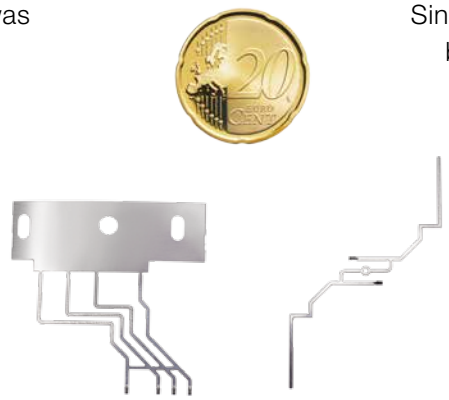
Focus on the human element

We're in the centre of Berlin: a photographer and a journalist stand somewhat uncertainly outside a six-storey building dating from the 1960s. It looks like an office block. There's graffiti on the wall – part of the charm of Kreuzberg. But can this be the home of a modern high-tech production site? A rather unobtrusive sign on the entrance door does indeed refer to Gebrüder Geisler GmbH. "The present building was designed in the 1960s specifically for our production activities," Dr Henning von der Osten, Managing Partner of Gebrüder Geisler GmbH, explains later.

The company supplies industrial companies worldwide with stamped plastic and wire-eroded parts along with assemblies of such parts. The building is designed accordingly: a six-metre-thick gravel bed as a foundation isolates the building from its surroundings, and the heavy-duty floors allow 20- to 60-tonne stamping presses to operate on the upper storeys as well. The presses themselves are mounted on vibration-isolated beds, and the wooden floor laid on all floors suppresses vibration still further. "This means we can go about our high-precision machining, such as fine grinding and wire cutting, without any problems while the presses are operating in the building at the same time," says von der Osten. The firm not only specialises in the production of components with very high precision requirements but also is willing to handle small batches: "We accept orders not only for millions of stamped parts, but also for perhaps only 100,000 per year – which is not a big number for a stamping shop." These include components that are integrated into electrical assemblies, such as automotive sensors and relays.

Pioneer of series production with EDM systems

Having our own toolshop and experienced staff make all this possible. They machine both the carbide cutting elements required for this and complex progressive dies enabling a whole series of processing steps to be executed with a single stroke of the press – from cutting, bending and embossing to ejection. "To produce these stamping tools, we were quick to introduce EDM," says von der Osten. In fact, the Managing Partner continues, the company was one of the first to use EDM systems and to train skilled workers on them. Machined on them are micrometre-precision components for the production of gauges and testing equipment; this, the company's second brand, is marketed under the name of "Artur Schambach GmbH". "At the time, we were pretty quick to try eroding small series for sample production on the machines," von der Osten continues.



Series parts in a size comparison

Since the 1990s, Geisler has therefore been producing components in series using the automated wire-cutting process. "Wire erosion is ideal for the machining of precision parts in small batches of only 300 or 500 units – building a stamping tool for this simply isn't worth it," von der Osten stresses.

Tapping the new market of medical technology

Today, Geisler mass-produces components on its wire EDM machines primarily for the medical technology sector – these are mostly electrical conductors and antennas for applications in implants and for the associated assistive systems. This sector now accounts for around 50 per cent of the company's sales and is Geisler's fastest-growing area. "Today, pacemakers, for example, are no bigger than a 1-euro coin," says von der Osten. "This means many components have to be integrated in a very small

Wire-cutting for precision parts in small batches.

But what particularly struck us about the MP1200 Connect is the plug & play design. Just plug it in – and off it goes trouble-free.

Marco Nachtigall,
plant engineer at Gebrüder Geisler

Outstanding workspace accessibility

space. The wiring elements have to be suitably precise and manufactured with high repeatability."

Precision in series

An MP1200 Connect from Mitsubishi Electric joined Geisler's machine park for this purpose at the beginning of 2021. It delivers exactly the precision that toolmaking demands and that Geisler also needs for its subcontracted medical technology parts. For example, the parallelism of the cutting punches is less than ± 2 micrometres at cutting heights of 100 millimetres, the angular accuracy is ± 0.01 degrees thanks to the Angle Master Advance with scalable angle compensation, and the

roundness tolerances are less than 1 micrometre. “The problem of radius dragging hardly occurs at all on the MP1200 Connect,” says Marco Nachtigall, plant engineer at Gebrüder Geisler. “But what particularly struck us about the MP1200 Connect is the plug & play design. Just plug it in – and off it goes trouble-free.” Right from the outset, the machine also managed a 72-hour weekend shift without any glitches. This is due in particular to its rethreading capabilities, Nachtigall claims. “We sometimes have 30 or 40 components on a single circuit board. The MP1200 Connect machined them one after the other without a hitch. None of our other machines has ever managed to do that.”

Tough conditions for threading

On the MP1200 Connect, threading can be carried out reliably with or without waterjet guidance and even in the dielectric – depending on the height of the workpiece. And rethreading in the kerf is no problem even on tall workpieces and ones with discontinuous machining operations. “Threading is generally the biggest problem on EDM machines,” says Nachtigall speaking from experience. Especially at Geisler, where the typical applications involve a lot of start holes, von der Osten adds.

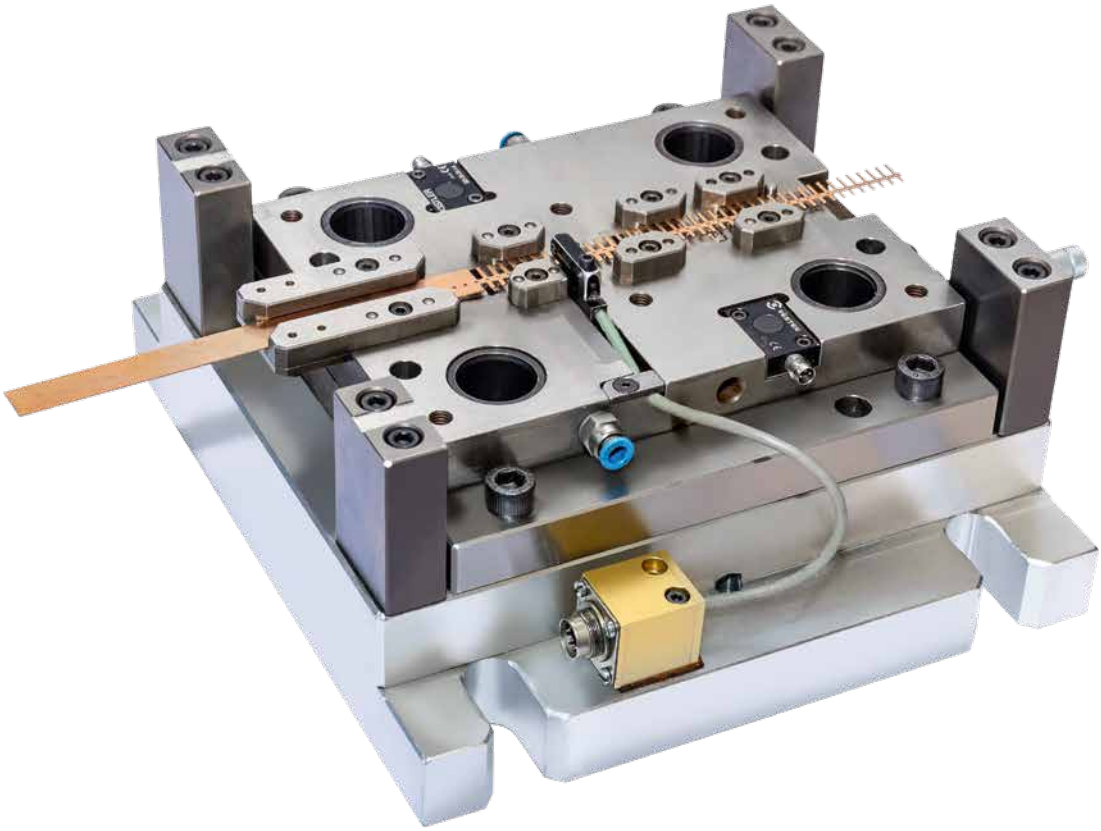
Quality starts at set-up.

“Rethreading is a frequent operation on our mass-produced products.” In addition, the machine has very limited room for manoeuvre, Nachtigall continues. “When machining our products, we can only make very small start holes in the blanks.” But the MP1200 Connect manages threading even under these tougher conditions without any trouble, according to Nachtigall: “Fault messages due to threading problems never occur on the MP1200 Connect at all – even when it runs at the weekend.”

Challenging materials

At the same time, the many start holes are only one of the challenges Geisler faces when eroding components for implants. To withstand the highly corrosive effect of blood, Geisler machines electrical conductors from titanium or niobium. “The properties of the various starting materials can be very different,” says Nachtigall. In the monitoring of series production alone, up to six measured variables are checked, and many more during

Small parts produced in series



Progressive dies for maximum precision

acceptance. Geisler therefore works with Germany's Federal Institute for Materials Research and Testing, where it has samples of the starting material scientifically analysed. This is the only way to achieve the required accuracies: "The dimensions are all in the hundredths of a millimetre range, angles in the minute range," says von der Osten. In order to achieve this, the parameters in the EDM process have to be individually adapted again and again to the starting material.

The products for the implants are therefore machined in blocks, Nachtigall explains. "Several wafer-thin sheets of the starting material are stacked on top of each other and cut in one go – this way we produce a large number of parts in a single cut." A single such block costs around EUR 5,000 for the material itself, and the MP1200 Connect takes around 60 hours to machine it. "The potential loss is huge if anything goes wrong. That is why the accuracy and reliability of the machine are so enormously important for us," says von der Osten. And of course the expertise of the machine operators: "They are our biggest asset," Nachtigall insists.

Everything on a single site

But a lot of expertise also goes into the further processing of the eroded conductors. At manual workstations, they are bent and separated to precise dimensions using special tools that Geisler produces in-house. Some of the parts required for these tools are wire-cut. "We handle design, toolmaking and tool application on site," von der Osten stresses. "This means we can also handle small projects, where perhaps only 2,000 parts are produced per year. And for that EDM machines are needed, and that's why we need the MP1200 Connect. With this machine, we can cover the whole range of our EDM operations – from the production of tungsten carbide components for toolmaking to the series production of titanium and niobium parts for medical technology."

Riding the trend

Von der Osten is therefore confident about his company's future: "There is a trend not only in medical technology, but also in industrial applications towards ever smaller installation spaces and thus increasingly intricate parts. These are precisely the niches we are looking for. This will enable us to successfully maintain our production activities in the heart of Berlin in the years to come."

Gebrüder Geisler GmbH

Founding year
1923

Managing Partner
Dr Henning von der Osten

Core business
Production of stamped, plastic and wire-eroded parts as well as assemblies for medical technology, the automotive industry and industrial electronics

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Ever smaller installation spaces and parts of increasing precision.

Central Berlin – a brilliant business location

Interview with Dr Henning von der Osten, Managing Partner of Gebrüder Geisler GmbH

A production site in the middle of a city is unusual. How come?

The quarter we're located in was in fact an industrial centre in the early 20th century until after the Second World War. This area, known as the "export quarter", was home to numerous small and medium-sized businesses. These included Geisler, which was founded here in 1923. We've stayed here, while most of the others – especially after the fall of the Wall – moved to Berlin's hinterland.

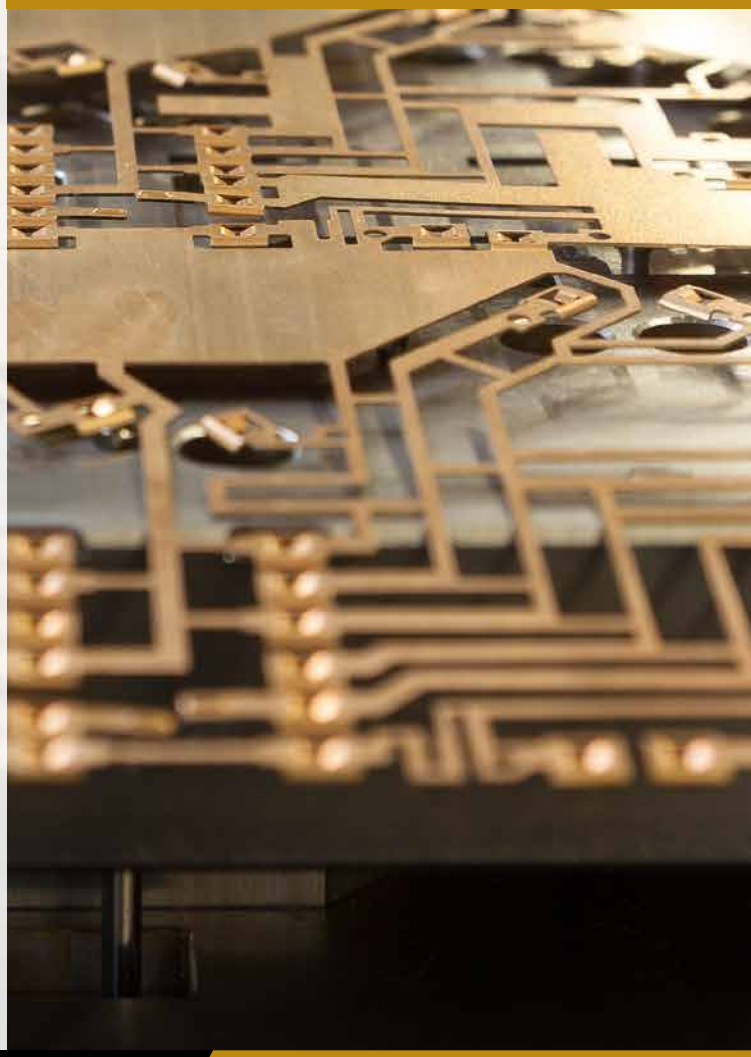
Why have you stayed in Berlin?

The parts we produce are very small. We don't need large shops for this, and the feedstock we need comes to single-figure tonnes. So the logistics are not a challenge. This means we can operate in the heart of Berlin without any difficulty. This is also a good place to be from a human resources point of view.

What do you mean by that?

Our whole business is built on our employees. We need skilled workers and competition for them is intense. So it's an advantage to be in the heart of Berlin. First, because we are easy to reach – the entire public transport system is focused on central Berlin, and, second, young people enjoy working in such a "hip" place. With our company in the centre of Berlin, we are also attractive to bright young people who could just as easily join the New Economy. Except that we can offer them the craftsmanship aspect that goes with the job, which is something that appeals to many.

Managing Partner Dr Henning von der Osten in conversation with Profile's journalists



Home decor meets philosophy.

Home living in Japan

WABI-SABI

for balanced interior design.

The exploding populations in large cities call for practical solutions in the housing sector. In Japan, the problems of the future are encountering a culture that has already addressed in depth the issues of modesty and minimalism in furnishing and design.

The floor is always covered with the tatami mats, on which most Japanese spend most of their daily domestic lives.

Wabi-sabi is the name of the typical Buddhist-Shinto aesthetic that can be found in almost every living room in Japan. Originally from monasteries, shrines and meditation gardens, it has recently migrated into private homes. The principle is that everything is used very sparingly and that decoration only makes use of subtle accents. Wabi-sabi is not only the culture of the home, but a whole philosophy – a religion and ideology at the same time. The practice is based on a comprehensive theory anchored in the Buddhist principle of the three marks of existence which state that everything is subject to impermanence, suffering and emptiness, and that everything is interdependent. When furnishing a home, decoration and pieces of furniture are arranged according to strict rules. Asymmetric elements for their part stress the imperfection that constitutes the essence of all things animate and inanimate. This characteristic of the Buddhist doctrine of being is also underlined by flowing transitions that are intended to show how everything that exists is variable and changeable.

Buddhism is a philosophy of balance. The famous balance patterns are represented in most Asian countries by the signs of yin and yang. In Japanese home decor, wabi and sabi are contrasted. The former can originally be understood as a kind of desolation and emptiness. The term is not fundamentally negative, but rather stands for something melancholically sweet. In conjunction with sabi – a kind of maturation and ageing – wabi achieves perfection in imperfection. Beauty is deliberately thwarted in order to reveal the true essence beneath a layer of dazzling distraction.

How does this look in practice?
Desolation in the world is usually expressed in architecture and the home through unclear forms and asymmetry. Objects are displayed in their raw and rough state. Surfaces are hardly ever smooth – glazes are not used and are replaced by a patina of ageing, i.e. by sabi. This can be caused by weathering and dirt, but also by the effects of nature. Classic examples are Zen gardens and tea houses, where moss and grass are allowed to proliferate

The perfection of the imperfect.

on the roofs. Teapots and kettles only gain their high value from the initial rusting of the cast-iron outer layer. If you follow the concept of wabi-sabi, you will never buy a new kettle, but instead go on a hunt with antiques lovers. Similarly, the principle of imperfection is behind haiku poetry as well as traditional Zen music and bonsai plant husbandry.

Furnishing tips: What should not be missing in a Japanese home

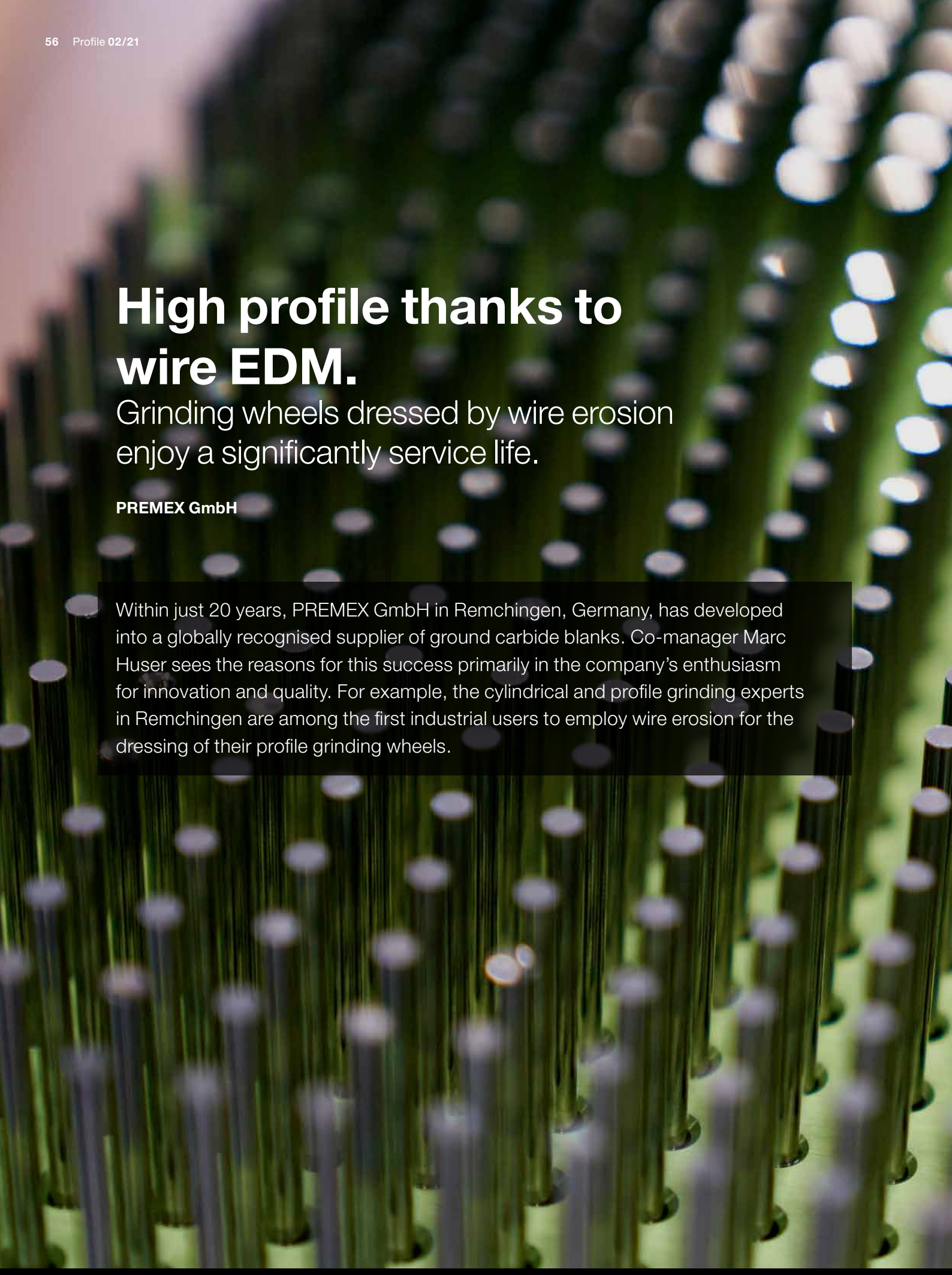
Plain furnishing finds its justification not only in religion and philosophy. Compact design in large cities is also a contributory factor. It is a question of concentrating on the essential and doing without superfluous frills. The floor is always laid out with tatami mats made of rice straw that every household should have. The home may only ever be entered without shoes. Many Japanese people sleep, sit and eat– in short, they spend a large part of their daily lives – on these mats at home. In the middle of the living room and bedroom there is a low table at which people dine or devote themselves to other tasks cross-legged. With the aid of paper walls and sliding doors, the room can be partitioned if required. It is important that these room dividers allow a warm, milky light to pass through. Besides there are also thicker cardboard walls, fusumas, behind which one can, for example, change undisturbed without putting on a shadow play in front of guests.

Natural materials are mainly used for furnishing and decoration – plastic is not popular in interior design, with bamboo, wood, sisal and rice paper predominant. Japanese homes often showcase ceramic bowls which, according to the principles of wabi-sabi, are naturally misshapen and have a rough surface. They can contain water, candles or incense sticks. Aquariums are also a welcome accessory. The elements are usually arranged to honour the principles of feng shui and thus allow an optimal flow of energy. When visiting a Japanese flat, pay attention to the direction in which the items of furniture are facing and whether all five basic elements – earth, metal, water, wood and fire –are in a balanced arrangement in the household.

Wabi-sabi for your own home

In the west, wabi-sabi has recently arrived in the home along with such movements as New Age and feng shui. What Japanese domestic culture expresses above all, however, is abstinence. The emphasis on minimalism creates more space in which body and soul can breathe freely. Even those distrustful of all things esoteric might consider thinking about which things and decorative elements they really need in the household and which they don't. Anyone adopting wabi-sabi always ends up with a home interior displaying elegance, style and simplicity – an interior that provides the perfect foil to the asymmetrical ceramics, which are of course practical and are intended for everyday use.

Traditional bonsai plant cultivation is similarly based on the principle of imperfection.



High profile thanks to wire EDM.

Grinding wheels dressed by wire erosion enjoy a significantly service life.

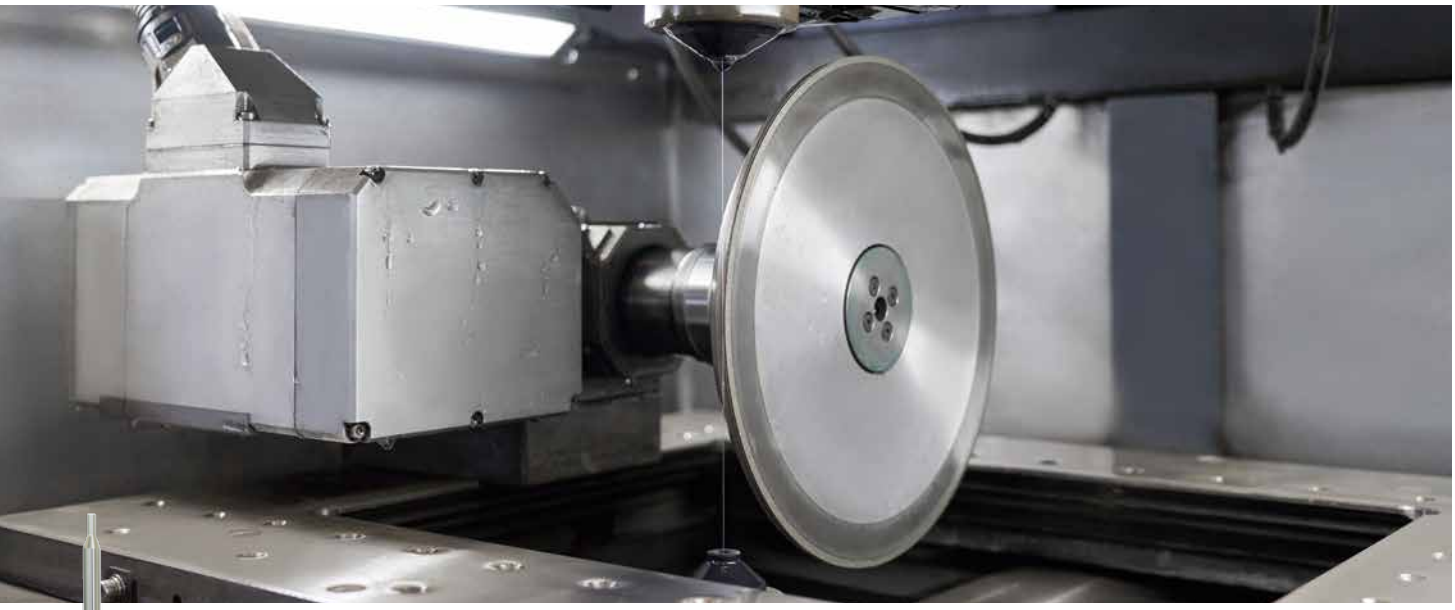
PREMEX GmbH

Within just 20 years, PREMEX GmbH in Remchingen, Germany, has developed into a globally recognised supplier of ground carbide blanks. Co-manager Marc Huser sees the reasons for this success primarily in the company's enthusiasm for innovation and quality. For example, the cylindrical and profile grinding experts in Remchingen are among the first industrial users to employ wire erosion for the dressing of their profile grinding wheels.

Enthusiasm for innovation and quality.

Thanks to wire erosion Marc Huser sharpens not only his grinding wheels, but also his company's profile.

PREMEX GmbH



Workspace of the wire EDM system for the profiling of diamond grinding wheels

Examples from PREMEX GmbH's product range

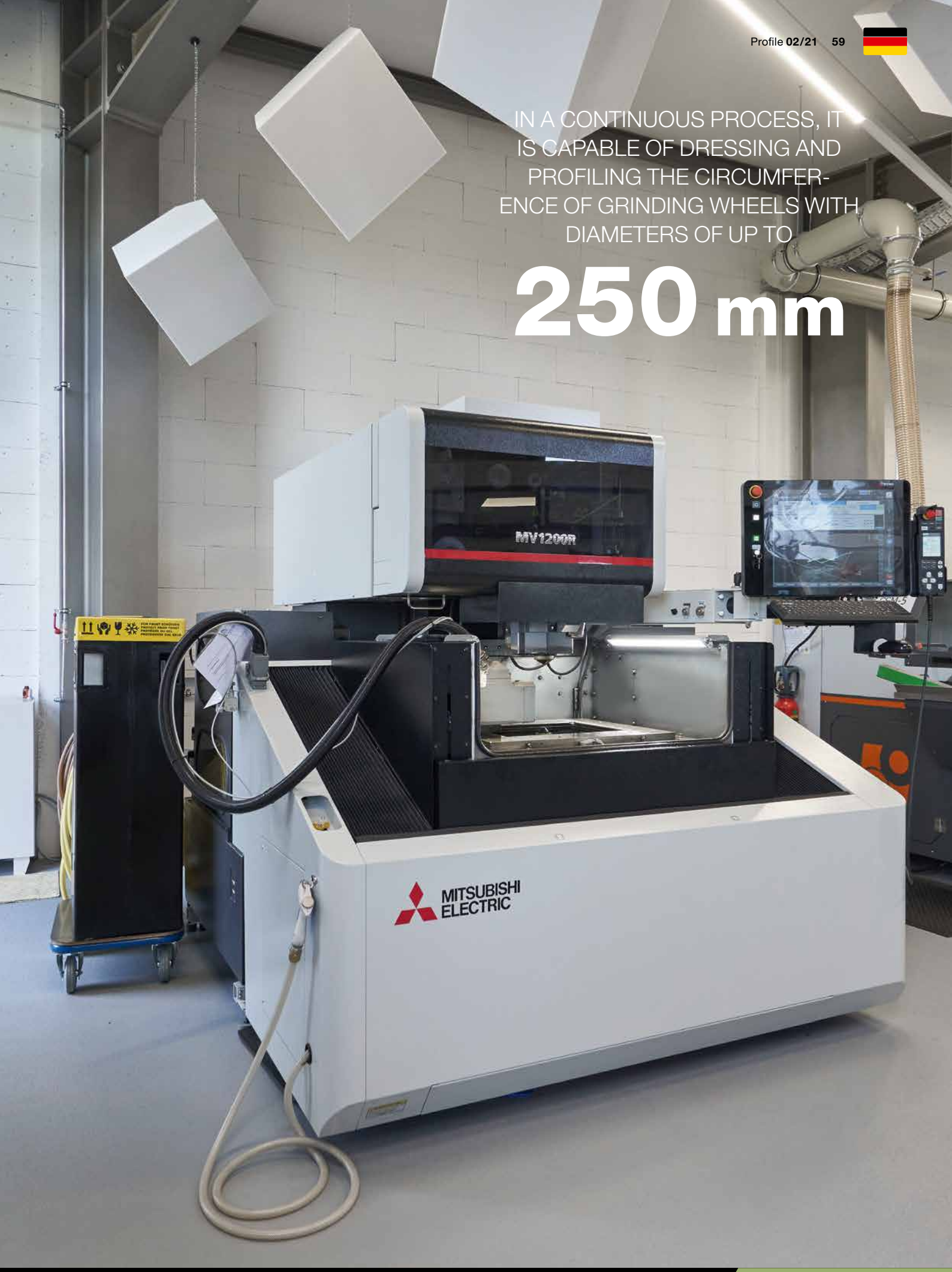
PREMEX GmbH in Remchingen now serves a very wide range of clients all over the world. The company supplies carbide blanks to regional tool grinders, who mostly use them to grind customised tools, such as milling cutters and step drills, for the machining of wood, plastics and metal. At the same time, the Remchingen-based cylindrical grinding specialists also work for internationally active tool manufacturers. The products concerned are mainly carbide blanks with prepared geometries and contours for tools for specialised manufacturing processes, such as for tap drills or for multi-bladed tools for the deburring and edging of fibre-reinforced plastics.

Exploiting innovation

PREMEX is highly interested in innovation, Marc Huser, co-manager at PREMEX GmbH in Remchingen, tells us. The specialist company wishes to benefit from the advantages of the latest technologies. At a demonstration and information event in 2018 at the Institute of Precision Machining in Tuttlingen run by Prof. Dr.-Ing. Bahman Azarhoushang, Huser and his technicians witnessed the profiling of grinding wheels on wire cutting machines for the first time. Huser elucidates: "The benefits were immediately obvious. Wire erosion exposes the individual bonded abrasive grains, which makes grinding wheel action more aggressive. In addition, it takes a long time for the abrasive grains to become clogged, thus significantly increasing the intervals between re-dressing and re-sharpening operations."

So the specialists in ground carbide blanks decided to invest in this innovative technology. There was only one right decision, Huser continues, when it came to choosing the right wire-cut EDM machines: "We based our decision on the equipment at the institute in Tuttlingen. The equipment there ran smoothly, with the appropriate technology parameters already established. So when we made the investment, it was clear that we would choose the technology and the wire EDM systems from Mitsubishi Electric," he explains. That is why PREMEX invested in an MV1200R Connect wire EDM system in spring 2020, which is additionally equipped with a rotary axis from ITS, similar to the headstock of a lathe. In a continuous process, it is capable of dressing and

Very wide range of customers.



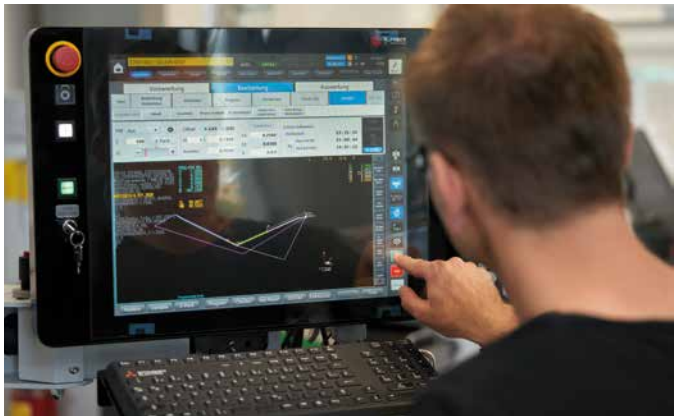
IN A CONTINUOUS PROCESS, IT IS CAPABLE OF DRESSING AND PROFILING THE CIRCUMFERENCE OF GRINDING WHEELS WITH DIAMETERS OF UP TO

250 mm

PREMEX GmbH

Diamond grinding wheels before the eroding process

Grinding wheel in the dressing process



Programming at the neatly laid-out multi-touch display of the Mitsubishi Electric machine

The specialists at Mitsubishi Electric are always available. In addition, you are always put straight through to skilled professionals who give sound advice and instructions on how to swiftly remedy any difficulties that crop up.

Marc Huser, PREMEX GmbH

profiling the circumference of grinding wheels with diameters of up to 250 mm.

Profitable investment

After about a year, Huser sees the investment as absolutely vindicated. “In view of all the many positive features, we’re happy with the investment,” he says. Above all, grinding wheels dressed with wire EDM prove to keep their cutting edge for significantly longer periods of use. This now enables the cylindrical grinding specialists to also grind medium and large series of carbide blanks cost-effectively, flexibly and at short notice. “Cylindrical grinding wheels with a longer service life mean that we can also allow our automated precision grinding machines to operate unattended,” Huser continues. “This makes trouble-free multi-machine operation possible. With the same number of skilled workers, we can therefore produce blanks in larger quantities for standard tools for international tool manufacturers, for example. This alone was decisive in our successful bid for a lucrative contract from a tool manufacturer. We now have access to a market segment that would be neither attractive nor at all profitable for us without dressing performed on our wire-cut EDM machines.” Because of the longer service life of the grinding wheels dressed by wire erosion, Huser is now considering running the machines in unsupervised shifts, at night or at weekends, in the near future. This will enable PREMEX to operate even more efficiently and attract more orders, he continues. Furthermore, dressing on the wire eroding machine ensures that the cylindrical grinders in Remchingen can also profile grinding wheels with difficult, complex contours. This means that they can now also premachine carbide blanks for highly intricate customised tools at short notice. Huser explains: “Since the turn of the millennium, 5-axis tool grinding machines have become increasingly affordable for smaller tool grinders to the lower cost of investment. These companies now use them to produce a

Brief interview

How are you coping with the current situation of raw materials becoming scarce and thus much more expensive?

Marc Huser: Perhaps without knowing details of how things would pan out, we purchased large quantity of raw materials in the form of tungsten carbide rods and bars a few months ago and stocked them in our warehouse. This is how we work anyway, as we want to be flexible in handling a wide variety of orders at very short notice. We have access to a wide range of dimensions and types of carbide in our own warehouse at all times. This stockpiling, usually considered commercially undesirable, is very beneficial to us in the current situation. While other suppliers are sometimes unable to deliver at short notice, we hardly have any bottlenecks. Our warehousing is also paying off in terms of costs and profitability.

Even the biggest stockpile will run out at some point. What then?

Huser: We've signed long-term contracts on purchase quantities and prices with our raw material suppliers. This is in line with our principle of being here to stay. We strive to do sound business on a long-term basis and to survive as a company.

But your company's performance will also be affected by technological change. Electromobility is all set to grow significantly, and conventional powertrains will go out of currency. This will also reduce the need for tools for drilling and milling. How are you preparing for this?

Huser: We are constantly looking for innovations relating to our main business, that of the precision grinding of carbides. I'm sure that there are a multitude of industrial applications for high-precision round-ground, cylindrical and profiled carbides. On the technological basis of our existing core skills, we intend to expand our portfolio of services in this way in a controlled and success-oriented manner.

large number of highly complex customised tools. And for these we can now machine the circular pre-ground blanks with high precision. This often eliminates the need for time-consuming cylindrical grinding on tool grinding machines. Thus, thanks to our carbide blanks, tool grinders now operate more efficiently while also being able to serve additional user industries – by grinding micro-tools for medical technology, for example."

Rapid mastery of the technology thanks to intuitive operation

The skilled technicians in Remchingen were soon familiar with wire EDM, a technology normally totally foreign to grinding specialists. "The four days of instruction and training provided by Mitsubishi Electric in Ratingen were quite sufficient for our staff. This meant that, after commissioning the MV1200R Connect , they were able to get straight down to productive work," says Huser. Thanks to the intuitive guidance, the functions of the wire-cut EDM machine are readily grasped and quickly and reliably programmed. The profiles are entered on the large-format screen on the basis of 2D drawings. Supplemented with a few parameters, the control automatically generates from the data the NC program for dressing the grinding wheels.

He is also completely satisfied with the after-sales service – should it ever be needed in emergencies. "The specialists at Mitsubishi Electric are always available. In addition, you are always put straight through to skilled professionals who give sound advice and instructions on how to swiftly remedy any difficulties that crop up," says a delighted Huser.

Success thanks to a strategy of innovation

PREMEX GmbH founded in Remchingen in 2000 has grown rapidly in a relatively unspectacular field of business and is now even very successful internationally.

Huser sees the reasons for this in the company's corporate culture. Initially, the company relied on the good business contacts of its four founders. Along the way, the Remchingen-based company has impressed its customers above all with the high quality and precision of its ground carbide blanks. Their services are always flexibly geared to the requirements and needs of their customers.

To this end, the cylindrical grinding specialists are constantly investing in innovative equipment in order to stay at the forefront of technology themselves. The company also minimises its entrepreneurial risk by serving a large number of companies of different sizes from a broad range of user sectors.

The highly motivated workforce in Remchingen consists mainly of young, skilled workers with a regional background, who receive from the company special attention and benefits that go far beyond the usual range. This creates a special sense of belonging and community, says Huser. As a result, his employees show above-average commitment in contributing to the company's ongoing success.

Investment in innovative technology.

A committed team: Marc Huser (centre), co-manager of PREMEX GmbH, is able to motivate his employees to give their all.

Drone image of part of PREMEX GmbH's company building

PREMEX GmbH

Founding year
2000

Sectors
Automotive, aerospace, medical technology, watches and precision engineering

Management
Andreas Hummel, Daniel Hummel, Marc Huser, Viktor Wagner

Employees
70, 5 of them trainees

Core business
Cylindrical grinding and profile grinding of carbide blanks for cutting tools for wood, plastic and metalworking; trade in carbide rods

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Hand in glove with the robotic workmate.

To keep up internationally, industry and craftsmen are having to automate. However, there is a growing market trend towards meeting individual customer needs with a greater diversity of products in smaller batches. Industrial robots are therefore often used instead of customised but less flexible specialised solutions. Not only are they easier to adapt to changing tasks, but they are also cheaper. With this market segment in mind, collaborative robots have been developed that can operate directly with humans without barriers.

The MELFA Assista is suitable for handling small loads of up to 5 kg.

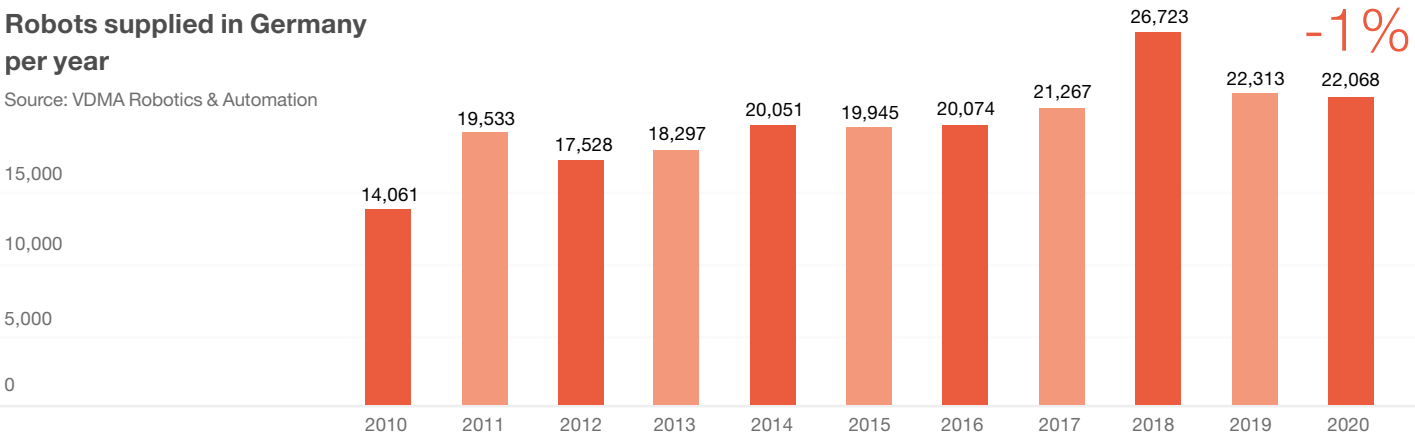
“Since many industrial work processes can be easily and cost-effectively automated with robots, they can now be found at all levels of industrial and even craft production applications,” says Michael Finke, Product Manager Robots at Mitsubishi Electric Europe in Ratingen. The number of industrial robots newly installed each year in Germany thus increased from 14,061 in 2010 to 26,723 in 2018. In the two years since then, there has been a slump to around 22,000 per year, but the relatively small decline in COVID year 2020 shows that industry and craft businesses are continuing to frequently opt for robotic solutions when investing in new equipment, regardless of the crisis. In terms of the types of robots used, articulated robots predominate, well ahead of gantry, SCARA and parallel robots. Mitsubishi Electric has been producing industrial robots with nominal loads of up to 70 kg for many years and has a large market share in the articulated robot market segment. For SCARA robots, the share is in the double-digit range.

Working hand in gripper – cobots assist humans directly

“The direct collaboration of conventional industrial robots with

Robots supplied in Germany per year

Source: VDMA Robotics & Automation



Programming is very simple by guiding the robot arm by hand to the desired position. A keystroke is all that is needed to confirm the position.

humans is not possible because working in the immediate vicinity is dangerous," adds Finke. The work area therefore has to be strictly demarcated by enclosures or other safety systems. This has so far ruled out any chance of combining the reliability and strength of the robot with human flexibility and creativity, especially where smaller quantities and rapidly changing jobs are concerned (High-Mix Low-Volume production or HMLV). Cobots (a neologism combining the terms "collaborative" and "robot") were therefore developed to remedy this situation, being designed to stop immediately whenever their sensors detect unforeseen contact with humans. This prevents injuries from occurring. In addition, their axis speed is reduced to such an extent that employees can take evasive action in good time. In addition, they are easier for employees to operate than conventional industrial robots and can be programmed directly at the workstation. This opens up exciting new applications for the automation of tasks, especially in the HMLV field.

Many industrial work processes can be easily and inexpensively automated with robots.

Michael Finke, Product Manager Robots at Mitsubishi Electric

The Mitsubishi Electric MELFA Assista

"Mitsubishi Electric has entered this attractive market with its MELFA Assista," says Finke. In contrast to the often low-cost offerings on the cobot market, the

In the DiamondCell, an industrial robot from Mitsubishi Electric handles the infeed and outfeed of grinding wheels to the wire EDM system.

MELFA Assista is a “genuine” industrial robot and is in no way inferior to a standard industrial robot in terms of precision and positioning accuracy. It has an exceptionally high repeatability of ±0.03 mm with a nominal load of 5 kg and a reach of 910 mm. It owes its ability to collaborate directly with humans to its extra high-resolution angle encoders in all axes and extremely fast-reacting drives. As a result, it reacts to even the tiniest deviations from the path after contact with an unexpected obstacle by coming to an immediate standstill. In standard cobot mode, it also executes all movements at reduced speed for safety reasons. If a safety contact is suitably fitted, it can be transformed into a “normal” industrial robot that performs its tasks at high speed. As a special feature, the MELFA Assista has AI-supported self-diagnosis, thus simplifying maintenance, as well as open interfaces for integration into higher-level IT structures through to Industry 4.0 solutions.

Simple handling

“A key advantage of cobots is their ease of programming, which enables rapid set-up even without expertise in robot programming,” Finke reveals. Initially this is most easily done by hand-guided teaching. Here, the user takes the arm and moves it to the desired position, storing the new position by pressing a button on the keypad integrated in the arm. For the operator, the procedure is both time-saving and intuitive.

For more challenging programming tasks, there is also software for visual programming via tablet computer. A “virtual twin” helps here, which graphically displays the robot together with its working environment. The RT VisualBox enables the programming of various movement functions as well as individual adjustments to each movement by drag & drop. This means that even operators without special knowledge of robots can modify the program settings.

The MELFA Assista cobot from Mitsubishi Electric is designed for direct collaboration with humans.

FACTOR	INITIAL COST	LONG-TERM COSTS, PRODUCTION VOLUME	LONG-TERM COSTS, HIGHLY MIXED PRODUCTION	CONVERSION COSTS
HUMAN ONLY	Low	Very high	Very high	High
COBOT	Medium	Medium	Low	Low
INDUSTRIAL ROBOT	High	Low	High	Low
INDUSTRIAL ROBOT WITH SAFETY SCANNER	Very high	Low	Medium	Medium

Example of industrial robot use in medium-size companies

"The solution to specific production problems often requires the involvement of different specialists with expertise in a whole range of fields," explains Finke. An example of this is the DiamondCell for the precise profiling of grinding wheels in a wire EDM system with the help of a Mitsubishi Electric industrial robot. Here, a system integrator has combined numerous systems and technologies in a compact cell to create a functional unit. In principle, a resourceful medium-sized company could of course buy a robot directly from Mitsubishi Electric and work with it itself. Both advisory and training services are on hand. Even pre-configured grippers are available straight from the manufacturer. In general, however, for such a project it makes more sense to turn to a system integrator who specialises in such holistic solutions. Mitsubishi Electric would of course be happy to help in the search for suitable experts.

A key advantage of cobots is their ease of programming, which enables rapid set-up even without expertise in robot programming.

Michael Finke, Product Manager Robots at Mitsubishi Electric

Mitsubishi Electric

Core business
Production of electronic devices, e.g. EDM systems, laser cutting systems, CNC controls and drives, industrial robots, air conditioning systems, semiconductor equipment and much more besides

Founding year
1921

Employees
146,500

Managing Director
Kei Uruma

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Horoscope

for hard-wired EDM experts.

Capricorn

22 December – 20 January

Your efforts are currently being rewarded with success. You really are a live wire! Have you been picking up tips from your MV-R Connect wire EDM? Your wishes will be fulfilled in the next few days in a similarly automatic way – everything will drop into your lap. Enjoy it and make sure that fortune continues to smile on you.

Aquarius

21 January – 19 February

Exploit your creative potential this winter! Erode something particularly extravagant that will not only make your workmates green with envy, but also impress the opposite sex. Since you will often be quizzed about your conquests and achievements from now on, you should of course already be practising your biggest grin in the mirror.

Pisces

20 February – 20 March

Now that the lockdown is over, you feel fitter and livelier than in a long time. At work you erode with boundless energy and even after work there's no stopping you. Your partner can look forward to precision neck massages and homemade biscuits with appetisingly smooth surfaces. All this earns you a lot of admiration. Keep it up!

Aries

20 March – 20 April

The current constellation activates your willingness to embrace Feng Shui, and you liberate yourself from junk that you've been lugging around for years. Your workplace will become brighter and airier. Mercury gives you unprecedented strength to move your EDM machines from one corner to the other. But afterwards, do allow yourself a creative break.

Taurus

21 April – 21 May

Thanks to the conjunction of Jupiter and Venus you manage even the most complicated tapered cuts – almost as if by magic. You now even see the upper and lower contours in your sleep and hardly get a moment's rest. So don't overdo it! Either way, your superiors will be more than delighted with your dreamlike output.

Gemini

22 May – 21 June

The gloomy TV coverage of late is dampening your spirits – everything seems to be in turmoil. Don't be downhearted, and take a confident look at your bright and cheerful M800 display: at least here you have everything under control. The gentle waves of your dielectric have an additional soothing effect on you, as only the ocean can do for others.

It's written in the stars. And you can read it here ...

Cancer

22 June – 22 July

The current constellation of the stars presents you with some challenges. You struggle with rough surfaces and brittleness, and not only on your wire-cutting machine. A person close to you demands a lot of attention and sensitive treatment. If you make an extra effort, you will soon be able to enjoy clean, mirror-like surfaces again.

Leo

23 July – 23 August

You should focus more on leisure for the time being and keep stress to a minimum. Just leave your EDM machines to work on their own – they can do it! Afterwards, devote your attention to the other important things in life as well. Whether this is romance, football or partying is, of course, up to each Leo.

Virgo

24 August – 23 September

There's no stopping you – your inner drive is like a Tubular Shaft Motor! You, too, are practically free of cogging and hard to beat in terms of efficiency. Make the most of this burst of energy. Wire-cut for all you're worth and do everything you've been putting off for a long time. Mars supplies you with energy and lets you rise to new heights.

Libra

24 September – 23 October

As an EDM operator through and through, it takes a lot to upset a Libran. Even complex parts that call for extra high positioning accuracy will turn out perfectly. Embrace this same principle in your private life. Many a conflict has been resolved with calm and balance.

Scorpio

24 October – 22 November

You've been planning something for the next few days that is not easy for you – but someone is trying to discourage you. Yet you really want to stick to your intention ... and you should. Imagine being a cemented carbide workpiece that defies even a machine of the SG series. Don't let anyone erode your determination!

Sagittarius

23 November – 21 December

For Sagittarians, advanced technology is exciting, always refreshingly new or simply highly intriguing. From the antediluvian start-hole drill to the latest generation of erosion systems, you have personally and eagerly tried out all the machines around. The result? Not even the best machine is as quick, versatile and lively as your Sagittarian mind!

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