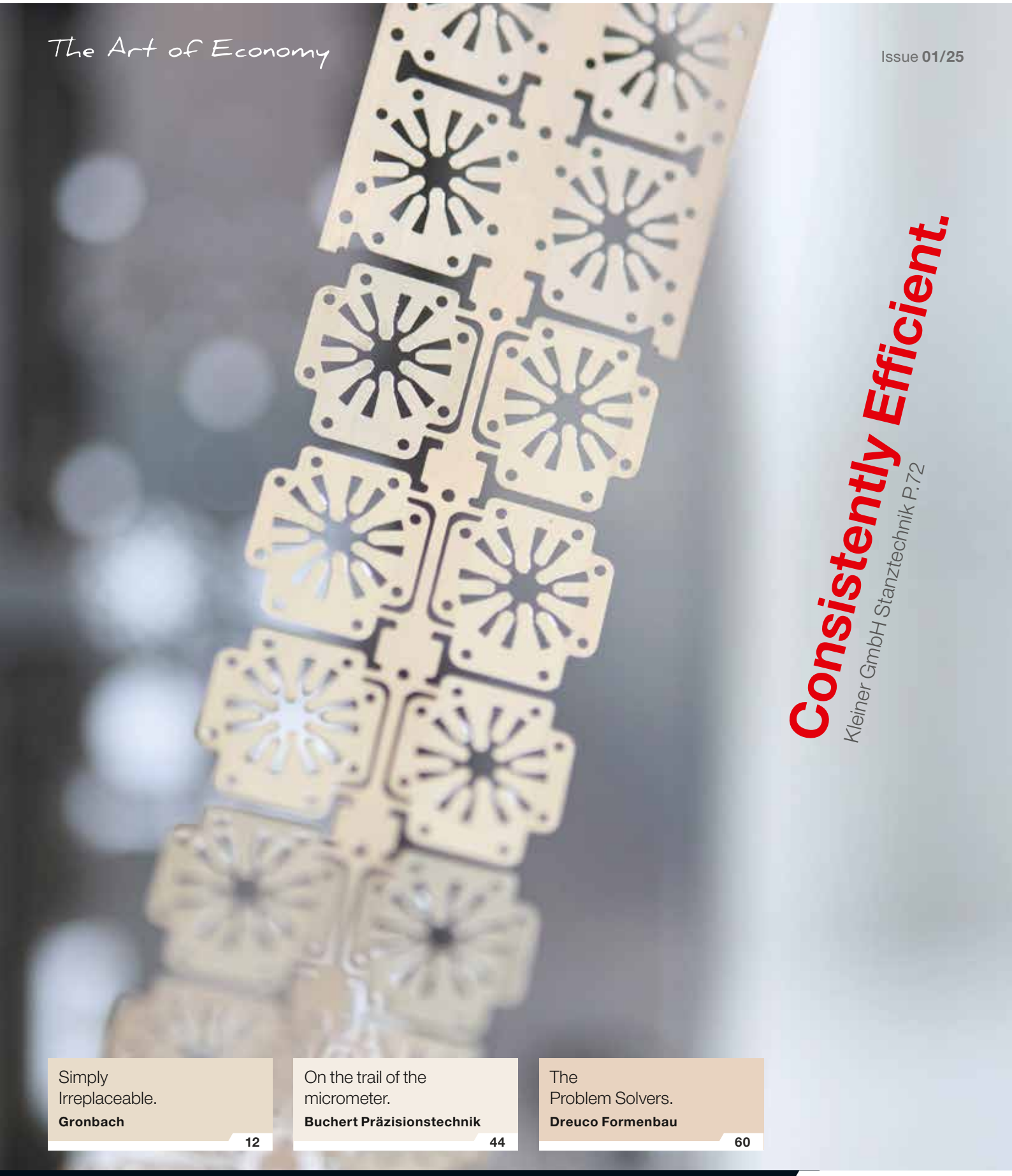
MITSUBISHI ELECTRIC

The Art of Economy

Issue 01/25



Consistently Efficient.

Kleiner GmbH Stanztechnik P.72

The magazine for smart users.

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Editorial

6,500 Operating Hours in One Year

When precision meets efficiency, extraordinary performance emerges. This is demonstrated not only by the 6,500 operational hours that an MV4800R Connect achieved in one year at Klaus Baier - an impressive 17 hours daily, every day of the year. The result: precision punching tools at the absolute limit of what is technically feasible.

This reliability is also reflected in other areas. Recently, Mitsubishi Electric achieved a precision landing with the SLIM moon lander with only 55 meters deviation - a moon landing over 3600% more precise than with previous technology. The new world record of the Mitsubishi Electric TOKUFASTbot, which solves a Rubik‘s cube in just 0.305 seconds, also shows: precision and speed are not mutually exclusive. Look on the next page.

These successes drive us to continuously develop further in line with the Kaizen principle. With the MX900, we are setting new standards: positioning accuracies below ±1 µm, surface finishes up to Ra 0.04 µm in carbide, and roundness below 1 µm make it the spearhead of high-precision technology.

Discover on the following pages how Mitsubishi Electric customers use these technologies to continuously redefine their own limits.

Your

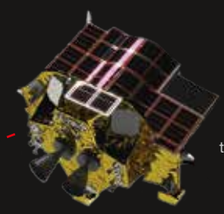
Hans-Jürgen Pelzers

Hans-Jürgen Pelzers
Sales Department Manager

> Happiness and performance are not things that have to contradict each other.
>
> *Britta Heidemann, Fencing World Champion*

News

More than 3600% more precise moon landing thanks to Mitsubishi Electric



Depiction of the SLIM landing on the moon (Courtesy of JAXA))

Mitsubishi Electric Corporation announced that, on behalf of the Japan Aerospace Exploration Agency (JAXA), the company developed the Smart Lander for Investigating Moon (SLIM), which successfully carried out a high-precision landing on the lunar surface at 00:20 (Japan Standard Time) on January 20.

Data collected by JAXA confirm that the landing occurred just 55 meters east of the target point, far surpassing the accuracy of traditional moon landings, which typically miss the target by several kilometers. This high-precision landing technology will be crucial for future exploration of the moon and other planets.

World Record Machine Mitsubishi Electric

Awarded a GUINNESS WORLD RECORDS™ title for solving a Rubik‘s Cube

Over 90% faster than the human record of 3.13 seconds.

TOKUFASTbot solves a Rubik‘s Cube (Video)

Watch the video

A GUINNESS WORLD RECORDS™ title for the fastest robot to solve a Rubik‘s Cube. The robot solved the cube in 0.305 seconds, surpassing the previous record of 0.38 seconds.

The TOKUI Fast Accurate Synchronized Motion Testing Robot (TOKUFASTbot) uses powerful servomotors and an AI-supported color recognition algorithm to complete a 90° turn in 0.009 seconds. A video from May 7 shows the robot on Mitsubishi Electric‘s global channel. Yuji Yoshimura, Senior General Manager, explained: “This success motivates our engineers to further develop their skills. We will continue to take on technological challenges and apply our developments to support global manufacturing.“

Enjoy your read of this issue!

MX900

Precision Across the Board: The New MX900 Series Revolutionizes Wire EDM

In a world where precision determines success or failure, Mitsubishi Electric sets new standards in wire EDM with the new MX900. It combines decades of experience with forward-thinking technologies. What makes this machine special is not just its impressive accuracy of less than one micrometer - it's the combination of revolutionary technologies that make this precision possible in the first place.

Groundbreaking Design for Ultimate Stability
The heart of the MX900 is its well-thought-out gantry design, where the massive machine bed made of spheroidal cast iron is completely decoupled from all peripheral units. This innovation virtually eliminates all vibrations and thermal influences. The 8-fold mounted linear guides with extremely precisely executed mounting surfaces ensure unprecedented smoothness and virtually no running resistance. This design is not just initially precise - it guarantees this accuracy for years to come.

Revolutionary Drive Meets Speed of Light
The tubular direct drive of the MX900 operates completely contactless and is therefore wear-free. It converts electrical energy directly into motion - without mechanical intermediate stages. Unlike conventional drives, there is no disruptive cogging torque that could impair precision. Communication takes place via ultra-modern polymer fiber optic cables, enabling 400% faster data transmission. The result: positioning accuracies below ±1 µm over the entire travel path - Mitsubishi Electric provides a 12-year manufacturer‘s warranty on this.

Intelligent Thermal Management of the Future
The MX900 thinks thermally ahead: even before heat can develop, it is compensated for. The sophisticated two-column concept combines the physical decoupling of heat sources such as pumps and aggregates with predictive temperature control. This forward-looking strategy is crucial, as thermodynamic processes exhibit a certain inertia - pure reactive adjustment would come too late for the required accuracies.

Technical Peak Performance

- Travel path (X/Y/Z): 300/300/120 mm
- Travel path (U/V): ±35 mm
- Maximum workpiece weight: 300 kg
- Maximum workpiece dimensions: 500 x 500 x 100 mm
- Wire diameter: 0,03-0,20 mm
- Surface quality up to Ra 0,04 µm
- Positioning accuracy < ±1 µm
- Roundness deviation < ±1 µm

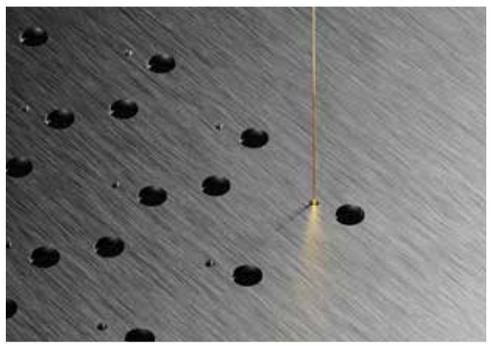
Nano Pulse Technology for Perfect Surfaces
The newly developed nPV (Nano Pulse V-Power) generator works with pulses in the nanosecond range and produces a uniform, perfectly controlled spark pattern across the entire erosion path. This not only enables surface qualities up to Ra 0.04 µm in carbide and below Ra 0.06 µm in steel, but also minimizes the formation of microcracks through gentle energy input - a decisive advantage for the longevity of tools and punching dies.

MAISART® - Artificial Intelligence Revolutionizes Erosion
The integrated AI technology MAISART® (Mitsubishi Electric‘s proprietary AI technologies) continuously optimizes the erosion process. Its strength is particularly evident in complex geometries with small and intricate geometric structures: tolerances of ±1 µm are reliably maintained, even in the most difficult corners.

Automation Reimagined
The Intelligent AT wire threading masters even extreme challenges: wires down to 0.03 mm in diameter are reliably threaded even into the smallest start holes. The new XEDM programming revolutionizes operation - complex NC programs are created intuitively and quickly - if necessary, directly at the machine, learnable in just 2 hours, even without programming experience.

Highest Precision

Wire diameters down to 0.05mm (optionally also 0.03mm) possible, even for the smallest holes.



MX900 - Numerous Application Areas
Whether in medical technology, aerospace, high-end tool manufacturing or precision mechanical machining - wherever the highest precision is required, the MX900 sets new standards. With this innovation, Mitsubishi Electric impressively underscores its position as a technology leader in erosion technology.

Mitsubishi Electric‘s comprehensive service concept also accompanies this precision wire EDM system with the service hotline staffed by service technicians, the mcAnywhere Live remote service for particularly urgent cases, as well as the legendary on-site service for which Mitsubishi Electric is known among its customers.

Learn more...
mitsubishielectric-edm.eu/mx900

Gronbach

Simply irreplaceable.

Wire EDM reliably ensures high-precision tools at Wilhelm Gronbach

Wilhelm Gronbach GmbH carries out all process steps in toolmaking at its own location. This is the only way to achieve the quality and response times that have earned the company its worldwide reputation as a specialist for precision molded parts. For over 20 years, wire EDM machines from Mitsubishi Electric have proven to be irreplaceable in this process.

Gronbach in Numbers

Founded
1964

3
Divisions
Appliances, Kinematics

720
Employees

54.000 m²
Production Area

5 Locations Worldwide
Germany, Austria, Italy, USA and Slovakia

20
International Customers

Hardly anyone pays attention to them, yet they require considerable know-how and precision in their manufacturing: hinges. Without them, no door could be opened, and they greatly influence whether a device is perceived as high-quality or not. For Wilhelm Gronbach GmbH, they are the foundation for successful development into a cross-functional group of companies with five specialized locations in Germany, Austria, Italy, USA, and Slovakia. Across these locations, the entire value chain is represented, from design through series production of complete devices, assemblies, and components, to packaging and logistics.

From Hinge to Premium Visible Part

When Wilhelm Gronbach founded his company in Wasserburg am Inn in 1964, he initially focused on the design and manufacture of hinges for the household appliance industry. In addition to precise metal forming parts, this also required plastic components. In the following years, this developed into a company that has made a name for itself worldwide in processing stainless steel, aluminum, and plastic, as well as in metal surface finishing. Gronbach still manufactures “kinematic components“ – namely hinges – but has otherwise become increasingly “visible“ with its produced parts: In Wasserburg, they now produce design-oriented products such as furniture handles in aluminum design or premium housings for high-quality coffee machines, as well as assemblies and complete OEM devices.

5.200.000
Hinges are produced annually at Gronbach

Sensitive Metal Surfaces

A recent innovation from Wilhelm Gronbach are so-called smart metal surfaces: User touches are detected via capacitive sensors or strain gauges integrated into the metal surface. Traditional resistive switches or buttons that break through and interrupt the metal surface are no longer required. The surface consists of brushed, ground, anodized, or polished aluminum and merges “non-tactile“ touch technology with design. Operation via sensitive metal surfaces is particularly used for premium products and hygiene-sensitive areas, for example in medical technology environments.

Gronbach not only gives metals a shape but also an individual character through surface finishing.

In-House Tool Making

Precision in metal processing is, so to speak, Gronbach's core competency - the company is distinguished by its long-term stable adherence to even the smallest dimensional tolerances in the visible areas of premium products. "We process stainless steel sheets down to 0.2 millimeters, for example," explains Thomas Bolz, Vice Manager Tool Shop. "This requires correspondingly precise tools." To ensure that only high-quality tools are used in the company's punching, pressing, and injection molding machines, all process steps are carried out in their own tool shop. This also guarantees quick response times.

Wire EDM for Over 30 Years

"Wire EDM is irreplaceable for us," emphasizes Bolz. The process delivers the tight tolerances and high surface finishes needed for the tools used at Gronbach. Additionally, wire EDM enables the economical production of injection molding tools with highly complex 3D structures, which Gronbach needs for manufacturing fan wheels, for example.

The company has been using wire EDM machines in tool making since the 1990s. However, Thomas Bolz was never really satisfied with the first EDM systems; they were too complicated in construction and therefore too maintenance-intensive. That's why Gronbach switched to Mitsubishi Electric EDM systems in early 2000. "With the Mitsubishi machines, we can perform all maintenance ourselves and also need only few spare parts." Even after 20 years, the FA20VS wire EDM machines from Mitsubishi are still running – "for years without error," as Thomas Bolz emphasizes.

200.000.000

fan wheels and ventilator wheels produced by Gronbach since 1970

Unmanned Operation on Weekends

Nevertheless, a change became necessary: "Our portfolio has evolved, and we now have many components that are manufactured on weekends when our employees are off." With the FA machines, an employee always had to drive to the company to change spools. After replacing the FA system with a modern MV2400S NewGen, this work effort is eliminated. "Now we can also use 20-kilogram spools – which means the system works through the entire weekend without requiring a colleague to be deployed for spool changes." For Thomas Bolz, the reliability of automatic wire threading is a real highlight of the system: "The machine can safely thread into holes

Wire EDM enables the production of injection molding tools with highly complex 3D structures – for example, for the production of fan wheels.

as small as one-tenth of a millimeter.“ The MV2400S NewGen enables rethreading in the cutting gap even with tall and interrupted workpieces. Time-consuming return to the starting position is eliminated; thanks to the highly developed thermal wire preparation, the machine can continue working directly. Threading can be performed - depending on machining conditions - with or without water jet guidance and also in the dielectric bath.

More Efficiency in the Overall Process

In Gronbach‘s tool shop, the wire EDM machines primarily process hardened steels with thicknesses of up to 300 millimeters, typically with an accuracy of 5 micrometers. The new system scores points here too: For one thing, it‘s faster – according to Thomas Bolz, Gronbach saves one cut compared to the FA machine. For another, the effort required for post-processing is also reduced: Wire EDM damages the surface in a small zone along the cut. “Before we can coat bending inserts, for example, this zone must be removed,“ explains Bolz. This surface damage is significantly less with the MV2400S NewGen than with the older machines. The reason for this is the new generator: It has a significantly higher effective clock rate. This means voltage is built up faster and more precisely, reducing pulse duration and working voltage. This then leads to a lower electricity bill and higher surface qualities. “We need roughness values of 0.4 micrometers for the subsequent coating of the tools; our standard is 0.6 micrometers,“ explains Richard Gartner, who operates the wire EDM machines in Gronbach‘s tool shop. The MV2400S NewGen achieves a roughness of up to 0.3 micrometers – thus offering sufficient reserves for Gronbach.

The new MV2400S NewGen saves one cut and reduces post-processing effort.

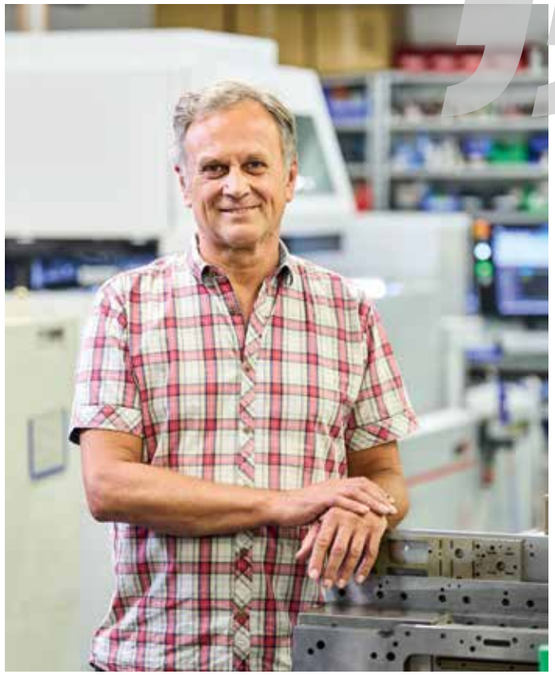
Steels with a thickness up to

300 mm

with an accuracy of

5 micrometers

Reliable threading into holes as small as one-tenth of a millimeter.



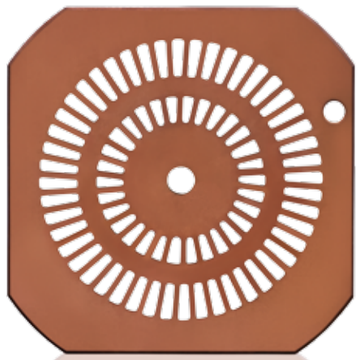
*With the **MV2400S NewGen** I machine parts **faster**, it threads **safer**, and the surface quality is **better**, which means I can significantly reduce post-processing effort. And generally speaking - I simply have to take care of it less.*

Thomas Bolz, Vice Manager Tool Shop

Operating Costs Reduced

For Gartner, support from Mitsubishi Electric is an important issue: “If problems do arise, 99.9 percent are solved via the hotline.“ This is important since the MV2400S NewGen runs around the clock, seven days a week at Wilhelm Gronbach. Not only does it achieve higher qualities than the old system, but operating costs are also significantly reduced: “With it, I machine parts faster, it threads more reliably, and the surface quality is better, so I can significantly reduce the effort in post-treatment. And generally speaking - I simply have to take care of it less,“ concludes Thomas Bolz. No wonder, then, that he has already set his sights on replacing the remaining second FA machine.

High surface quality reduces post-processing effort.



Gronbach

Year of Foundation
1964

Owner
Dr. Lina Gebhardt-Gronbach

Number of Employees
720

Core Business
Development partner and full-service supplier for (OEM) devices, sophisticated assemblies, and individual components for renowned industry manufacturers.

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www.gronbach.com

Engious Kft.

High-precision tooling and parts production

with Mitsubishi Electric EDM systems.

Engious Ltd., based in Székesfehérvár, Hungary, manufactures high-precision tools and components mainly for the electronics and electric automotive industries. Mitsubishi Electric's wire EDM machines, specifically the MX600 and MP2400 Connect models, prove to be reliable assets for large-scale production, making them an ideal choice for the company's focus on manufacturing millions of units. We spoke to András Eszes, Managing Director, about the advantages of these machines, their precision, e-mobility and the collaboration between their company and M+E, distributor for Mitsubishi Electric EDM in Hungary.

MX600 and MP2400 – reliable assets for large-scale production.

Interview with András Eszes

CNCMedia: Please introduce your company! How did it all start, and what do you do?
András Eszes: After my university years – during which I was also a technical student at CERN – I decided that I wanted to start a company with no strings attached. This is how Engious Ltd. was born, where we first designed, manufactured and sold components to our customers as a general contractor. Our portfolio consisted primarily of sheet metal punching tools and related electronic components, but over time, as customer needs increased and changed, we were forced to invest in other machines. As a first step, we acquired a wire EDM machine from the Czech Republic, which marked our entry into the industry. We were engaged in the production of high value-added components, which we initially sold to injection molding companies, and then we found partners in the automotive industry where our work was in demand because of its complexity.

Linear accelerator at CERN.
The European Organisation for Nuclear Research is a large-scale research facility near Geneva, which is partly in France and partly in Switzerland

CNCMedia: In the field of injection molding, which parts have you produced?
A.E.: Molding parts for tools. We work with a Japanese approach, with small inserts and tolerances of 1-2 thousandths of a millimeter to achieve the best possible fit. The first such part was produced in 2014. Since then, a lot of time has passed, the company has grown and expanded, and we finally moved into our new premises in November last year. During the design and construction phase, the layout, the mechanical engineering, the air handling and all other parameters were designed for the production of tooling and high-precision parts.

CNCMedia: Which technologies do you use in production? Which materials do you use?
A.E.: The main activity of the company is electric discharge machining, mainly wire EDM, but we also do die-sinking. In addition, we have grinding machines, cylindrical grinders, surface grinders and machining centers. In the latter, we often work to short deadlines, so we work with hardened blocks with wire, which are then subjected to a grinding process. We operate within a hardness range of 60 to 64 Rockwells, engaging in hard machining approximately 80% of the time. We have also worked with other materials such as gold or titanium to produce special parts.

CNCMedia: What are the proportions of tooling and parts production? Which industries do you serve with your products?
A.E.: Thanks to e-mobility and the electronics industry, our current focus is 80% on toolmaking. However, after projects are completed, there is consistently a demand for additional parts. Manufacturing these parts has the potential to completely reverse this ratio. Our products serve the electrical industry as well as the automotive industry – in these fields, the majority of our customers come from the electric car industry.

CNCMedia: What is your opinion on e-mobility?
A.E.: I think the development of electric cars is a good direction, but I have some reservations about energy storage. Especially the production of batteries, their emissions, and the fate of used batteries. Managing these issues is key for the future.

Even the tiniest cavities can be measured thanks to advanced touch probes and CMMs.

CNCMedia: It is well known that electric cars require fewer and fewer machined parts. How much does this change affect Engious Ltd's business?
A.E.: We see this as a positive development, as our market is expanding. We produce parts with high precision and tolerances, which are not very common in Hungary. Moreover, while electric cars require fewer components, they are more complex and demand advanced technology. An example is the new generation of electric motors. To achieve the right power density, the slot filling factor needs to be minimised, which is possible with deburred components – typically high-silicon and high-cobalt transformer plates with high saturation induction. These plates should be punched using a technology that leaves minimal burr, so that they do not cause problems during assembly. The plates are glued together with a chemical adhesive, and if two plates are far apart – because of the possible burring – the resulting air gap will have a higher magnetic resistance. Because of the higher resistance, heat build-up also occurs, which together limit the efficiency of the motor. Thus, the efficiency of the engine block can be increased by bringing the slot filling factor as close as possible to 1.

On the wire EDM machines, we use a Japanese approach, with very small tools and a tolerance of 1-2 thousandths striving to achieve the best possible fit.

CNCMedia: Is this where modern manufacturing technology comes in?
A.E.: Exactly. A 3-meter tool, a stamp with a punch clearance of 3 to 4 thousandths of a millimeter has to produce parts without any burring and chipping – all this for millions of pieces. Only 3 press manufacturers in the world can produce such a machine. Overall, it is true that the engine in an electric car consists of fewer components, but its production requires a great deal of preparation and investment on the part of the manufacturer, for which we are well prepared, thanks in part to the recently acquired Mitsubishi wire EDM (Mitsubishi MX600 and MP2400).

CNCMedia: How are these machines adapted to your production? What is your experience in terms of control and programming?
A.E.: The controls of both wire EDM machines include a built-in 2DCam system, which allows us to easily create the programs needed for the workpieces. You can draw or scan (.dwg, .dxf) part drawings, contours and then assign them and select the most efficient technology for the job from the machine's own database. The machines are equipped with all the settings needed to optimise production according to the nature of the job at hand. Both machines can also be programmed using an external CAM program, should the user wish to operate the machine in this way.

"I am satisfied with the machines we have purchased and the service we have received. We have invested in precise and reliable machines, and I envisage the future with Mitsubishi equipment.

András Eszes, Managing Director

CNCMedia: Why did you choose these machines?
A.E.: The MX series is the only wire machine in Mitsubishi's range that uses oil as a coolant/rinsing/conductive medium. There are various reasons for this. Firstly, the carbide corrodes in water. It absorbs the water and the structure is washed out. A good example is the combination of cobalt and tungsten carbides. After the cutting process, only the tungsten carbides would remain, as the cobalt would leach out. Additionally, a significant advantage of using oil is that it results in a smaller spark gap compared to water. This, in turn, enables a much superior surface finish in terms of both roughness and geometric shape accuracy. The MX wire EDM with its own machine foundation can work without any vibration from external sources. The machine can handle wires up to ø 0.03 mm.

CNCMedia: What other parameters does the Mitsubishi MX600 have?
A.E.: Surface roughness below Ra 0.05 µm, overall positioning accuracy of +/- 1 µm, geometric accuracy of 1 µm and perfect dimensional accuracy. Thanks to these parameters, the machining of very miniature parts as well as parts with very fine surfaces can be perfectly performed.

CNCMedia: What is worth knowing about the MP series?
A.E.: The MP series is one of the best water-flushed wire EDMs. The reinforced Meehanite castings used in the entire frame contribute to enhanced stability. The programmable tank design allows for easier loading of larger workpieces into the work area and facilitates eventual automation of the machine. Equipped with the best quality linear guides for lower rolling resistance. The machine is equipped with thermal compensation sensors resulting in even better accuracy compared to the MV series. The machine can handle wires up to ø 0.07 mm. It has an overall accuracy of +/- 1 µm, an end surface roughness of up to Ra 0.05 µm and an angular accuracy of +/- 0.01° (36 seconds), which in addition to the production of microelectronic devices, also allows the cutting of grinding wheels.

CNCMedia: What is your experience with the machines and the parts you produce?
A.E.: Both machines have delivered stable performance since they were put into operation. The parts produced with the MX600 have been under the liquid for 40-50 hours and despite this, no corrosion has occurred. In this way, a much longer lifetime of the finished products is achieved.

CNCMedia: When and how did you acquire your Mitsubishi machines?
A.E.: We installed our first machine last December. We had previously done wire EDM with two other machines and we wanted to get 2 more machines to go with them, and finally decided to go with Mitsubishi because of the added value. On the one hand, as I mentioned, the manufacturer was a great help to us during the development

*Surface roughness below **Ra 0.05 µm**, overall positioning accuracy of **+/- 1 µm**, geometric accuracy of 1 µm and perfect dimensional accuracy. Thanks to these parameters, the machining of **very miniature parts** as well as parts **with very fine surfaces** can be perfectly performed.*

András Eszes, Managing Director, about the MX600

Microscope view of a thin-walled part. For Engiuos Ltd., the machining of exotic materials, like titanium or even gold is not a problem.

and the Hungarian distributor, M+E Ltd., also provided us with a safe and reliable service already during the purchase and installation. M+E staff took an active role in the installation of the machine. They provided us with appropriate technological advice and service support.

CNCMedia: What are your plans for the future? Are there any new machine purchases in the pipeline?
A.E.: I am satisfied with the machines we have purchased and the service we have received. We have invested in precise and reliable machines, and I envisage the future with Mitsubishi Electric equipment. We would like to strengthen our die-sinker EDM segment, which is currently only an additional technology.

Engious Kft.

Founding year
2013

Managing Director
András Eszes

Number of employees
17

Core business
Design and production of ultra-precise sheet metal stamping tools and parts. Precise production of hardened tool elements and measuring devices.

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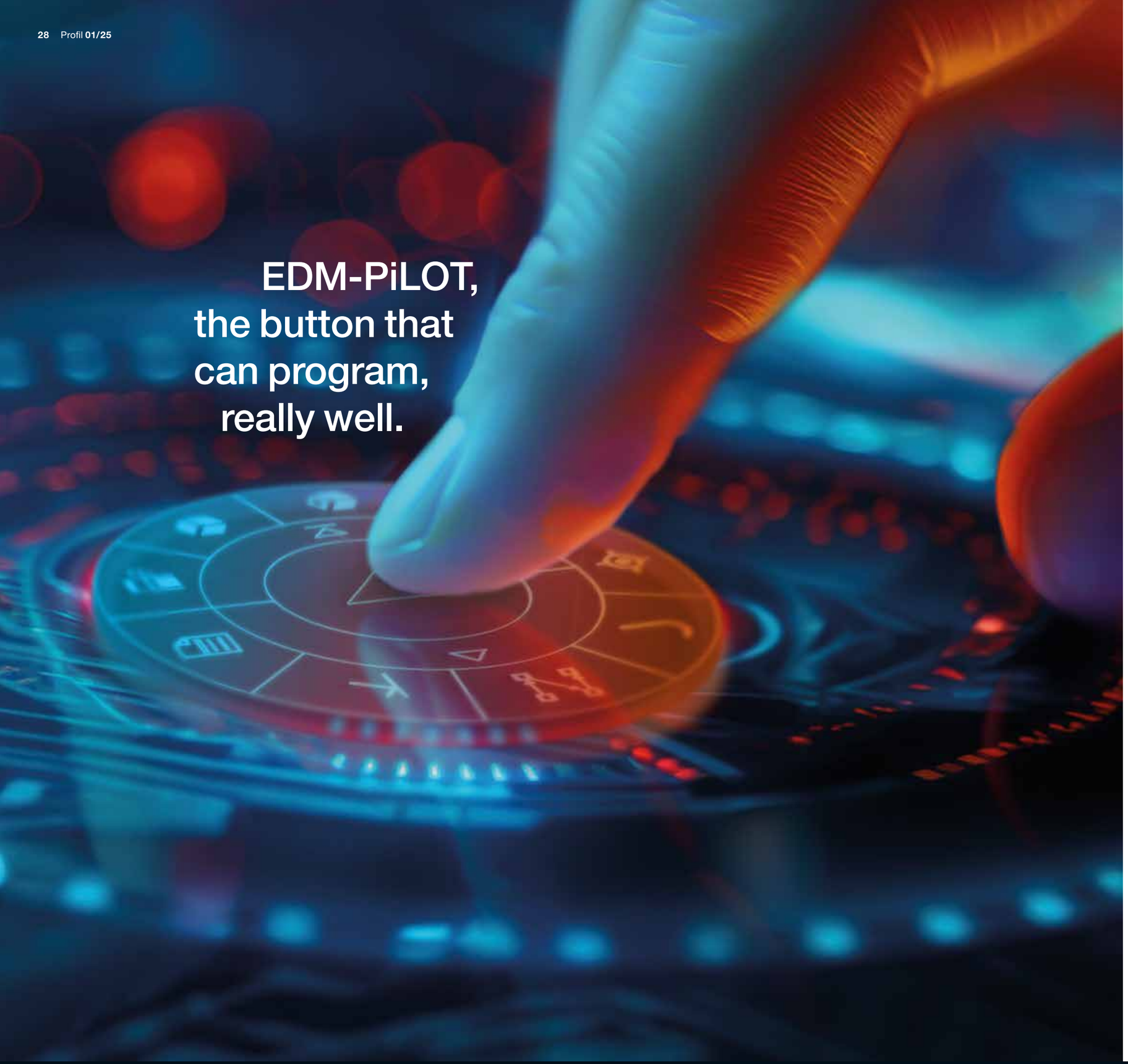


EDM-PiLOT, the button that can program, really well.

How can XEDM help with skilled labor shortage while avoiding costly mistakes?

The manufacturing industry faces unprecedented challenges: An intensifying shortage of skilled workers meets increasing cost pressure and growing quality requirements. This is particularly noticeable in the highly specialized field of precision manufacturing. Since August 2024, Mitsubishi Electric has been offering XEDM, a pioneering solution that comes standard on all newly delivered wire EDM machines.

The Revolution in Machine Programming

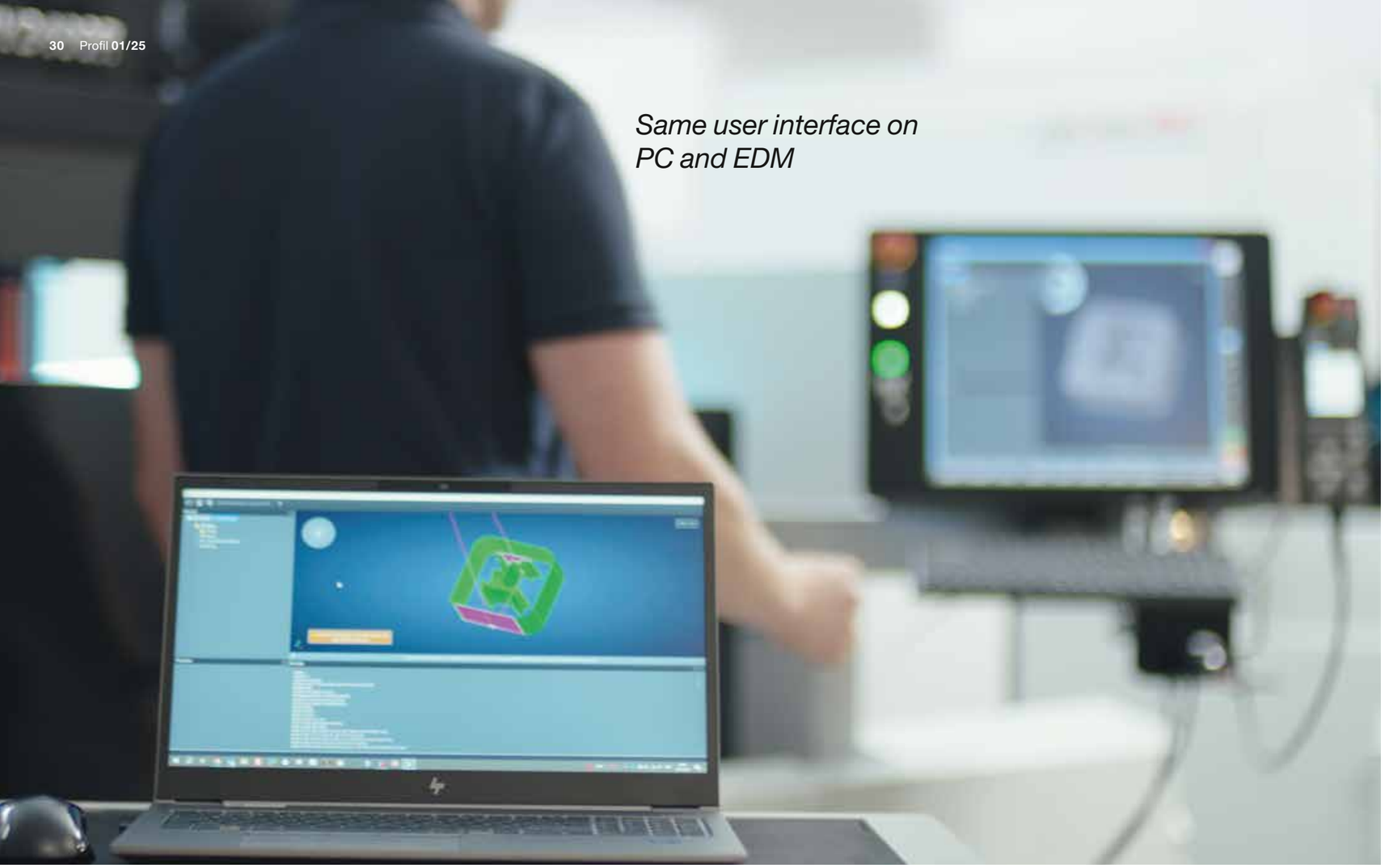
XEDM fundamentally revolutionizes the traditional programming process on wire EDM machines. Instead of requiring deep programming knowledge, XEDM relies on a highly automated, intuitive approach. The system has been completely rethought from the ground up, with the goal of hiding the complexity of NC program creation from the user while ensuring optimal machining results.

Intelligent Automation in Detail

The core of XEDM is its intelligent process control system, the EDM-PiLOT. After importing the 3D design data in STEP format, the software automatically analyzes all machinable geometries. This not only identifies the contours but also immediately suggests the optimal machining strategies.

The system automatically considers factors such as:

- Workpiece material and geometry
- Wire diameter and material
- Optimal cutting sequences and machining qualities
- Approach paths and contour transitions
- Technological parameters for maximum precision



Same user interface on PC and EDM

Avoiding Errors Before They Occur

Since wire EDM is often the final processing step for already high-quality pre-machined workpieces, special attention has been paid to error prevention.

XEDM safety mechanisms:

- Continuous monitoring of all process parameters
- Early detection of critical machining situations
- Automatic optimization of cutting sequences
- Integrated collision avoidance

Quick Training - High Productivity

A key feature of XEDM is the extremely short training time. After just one hour of instruction, employees without prior CAM experience can work productively with the system.

This has several positive effects:

- Flexible staffing becomes possible
- Dependency on specialized programmers is reduced
- Efficient training of new employeesr

Learn more...
www.mitsubishielectric-edm.eu/xedm-me-en

Seamless Integration into the Manufacturing Workflow

A particular strength of XEDM lies in its perfect coordination with the PC version XpressCAM. Both systems not only share the same intuitive user interface but also a common database.

This enables flexible working:

- Programs can be created on the PC
- Changes directly at the machine control
- Consistent data and processing parameters

Even I, as a Sales Manager can suddenly program...

Hans-Jürgen Pelzers, Sales Manager at Mitsubishi Electric EDM

TO VIDEO
Scan now!
www.mitsubishielectric-edm.eu/xedm

Programming easier than ever before.

Mitsubishi Electric

One Button - Many Possibilities

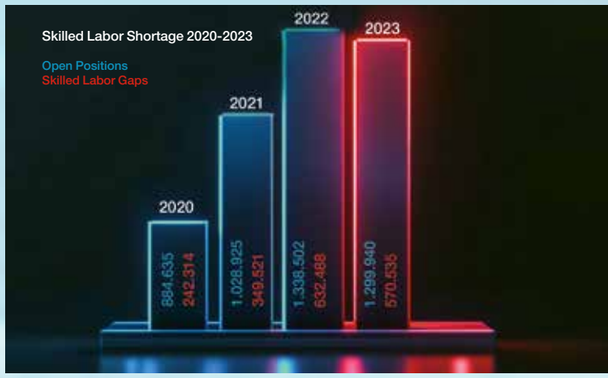
The user interface has been radically simplified. A central control element - the characteristic EDM-PiLOT - guides through the entire process. This context-sensitive approach presents the operator with exactly the options that are relevant in each work step. Complex settings such as wire offset compensation, contour properties, or cutting sequences are intelligently suggested and can be easily adjusted if needed.

DCAM has been the IT specialist for EDM software for more than 3 decades

DCAM GmbH is the leading specialist for software solutions in the field of wire EDM, focusing on fast, precise NC program generation directly from 3D CAD data. DCAM focuses on maximizing automated processes in Program creation.

The Future of Manufacturing

With XEDM, Mitsubishi Electric addresses central challenges of modern manufacturing. The software makes complex technology manageable, reduces sources of error, and increases production flexibility. Through standard integration in all new wire EDM machines since August 2024, the company sets new standards in user-friendliness and process reliability. The combination of intelligent automation and intuitive operation makes XEDM an important tool in combating the skilled labor shortage. At the same time, the well-thought-out safety mechanisms prevent costly errors. An impressive example of how modern software simplifies and simultaneously optimizes complex technical processes.



Statistics of increasing skilled labor shortage 2020 to 2023

„The EDM-PiLOT not only assists you in program creation, it takes care of it for you.

Jens Franke, DCAM Managing Director

TO VIDEO
Scan now!
www.mitsubishielectric-edm.eu/xedm-franke

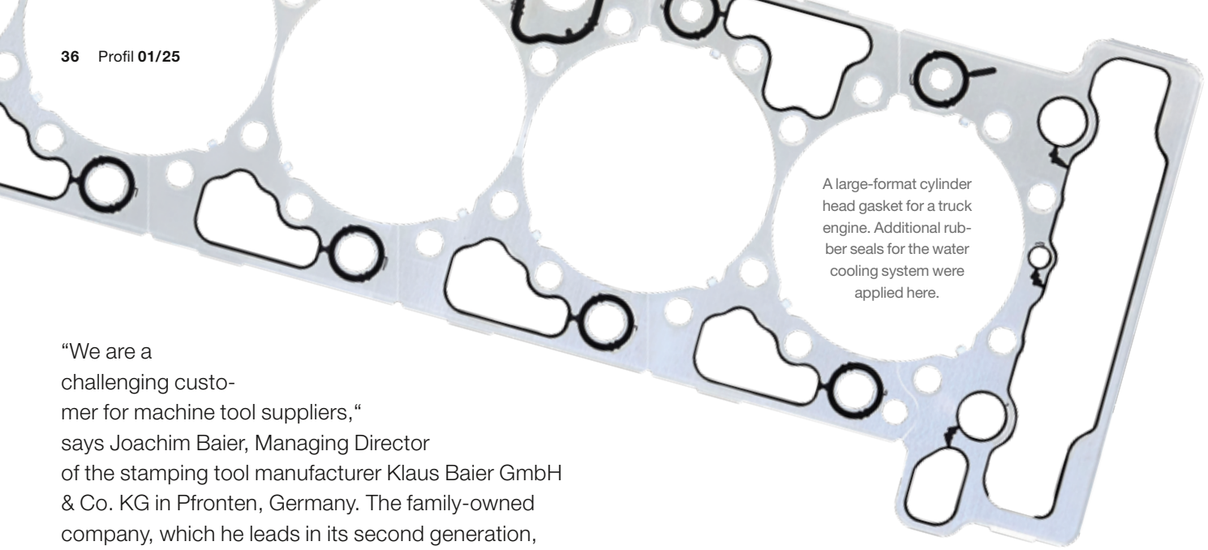
Klaus Baier GmbH & Co. KG Werkzeugbau und Stanztechnik

The high Art of Wire EDM

Precision Stamping Tools at the Limits of Feasibility

The production of complex progressive dies for stamping, embossing, and forming sheet materials is highly demanding. The difficulty increases significantly as the tool size grows and the sheet metal becomes thinner. With dimensions exceeding one meter and cutting clearance widths of 2 µm, mastering the process becomes a fine art. Accordingly, the demands placed on the machines used to manufacture the components for these tools are also extremely high. A discussion with executives of a specialized medium-sized company about their experiences with Mitsubishi wire EDM machines.

Challenging production of complex progressive dies.



A large-format cylinder head gasket for a truck engine. Additional rubber seals for the water cooling system were applied here.

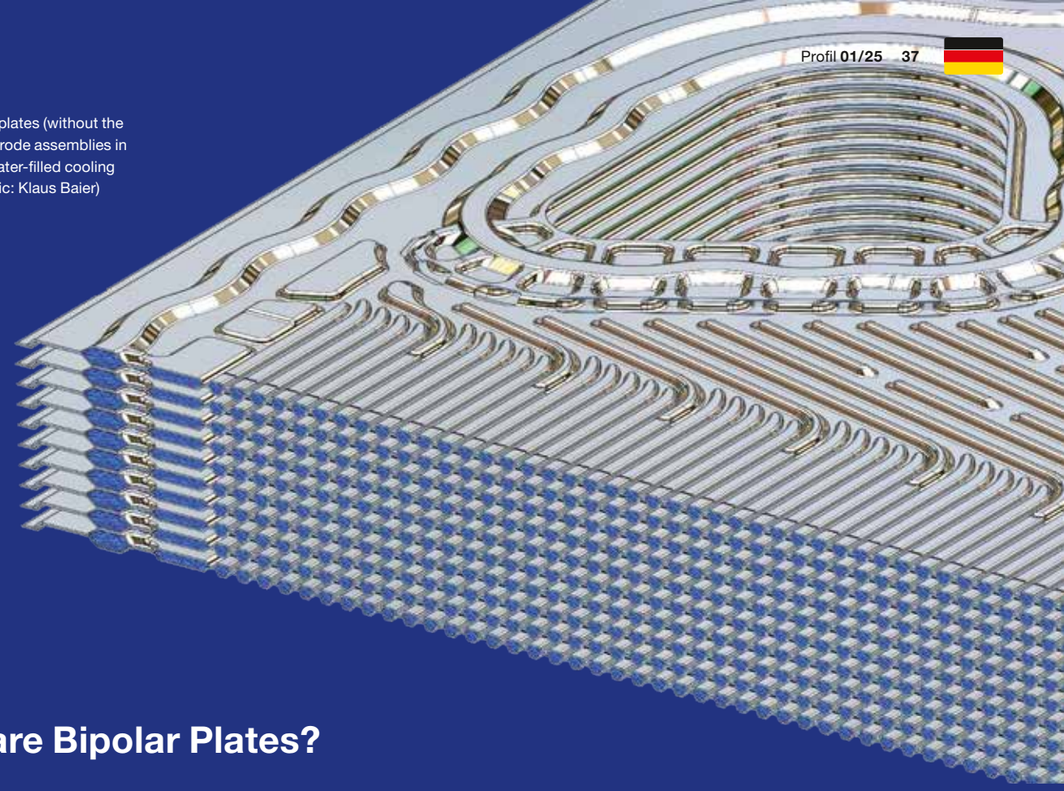
“We are a challenging customer for machine tool suppliers,“ says Joachim Baier, Managing Director of the stamping tool manufacturer Klaus Baier GmbH & Co. KG in Pfronten, Germany. The family-owned company, which he leads in its second generation, specializes in producing large-format stamping tools for demanding parts such as multi-layered thin sheet cylinder head gaskets, sheet metal parts for heat exchangers, or bipolar plates for fuel cells. The precision requirements for these tools are extremely high, as despite the large dimensions—often well over a meter—tolerances down to a few microns must be maintained in use. The thinner the sheet metal, the tighter the clearance between the punch and the die must be to ensure the material doesn‘t tear and is cleanly cut. For sheet thicknesses down to just 30 µm and below, the clearance often needs to be only 2 µm.

According to J. Baier, this is feasible for small tools in principle, but it‘s a different story with large progressive stamping tools. Here, as a toolmaker, he often faces real challenges.

Close-up of a bipolar plate. The laser welds can be seen as dark lines in the area of the flow channel embossings.

Challenging Thin Sheet Metal Shells for Fuel Cells

“It becomes particularly tricky, for example, when working with sheets for the production of bipolar plates for the so-called stacks in fuel cells,“ reveals J. Baier. These are stamped and formed from ultra-thin stainless steel sheets using transfer or progressive tooling, depending on the requirements, with the goal of achieving the most delicate contours possible. The bipolar plate is created by laser welding an upper and a lower shell. The embossing must align so precisely that fine flow channels for cooling and reaction media are formed. Even the slightest misalignment of the flow openings in the plates or the position of the channels during welding significantly impacts the flow resistance and, thus, the stack’s functionality. Therefore, the contours of the two shells must be welded together with positional accuracy of only 10 µm. In practice, this means that the alignment holes must be punched with virtually zero tolerance relative to the contours. For progressive tools for such plates, three process stages—stamping, embossing, and further stamping—are integrated into the same tool. In the central embossing stage, about 1,000 tons of pressure are applied. The tool manufacturer must prevent detrimental effects such as deformations of the tool in neighboring stamping areas caused by these enormous forces. “And that‘s with tolerances close to zero. At that point, we’re venturing into the realm These

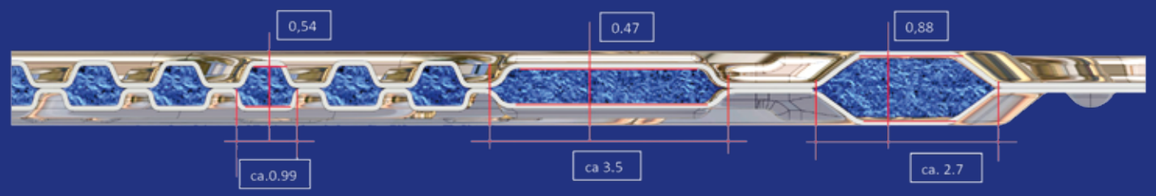


Stacked bipolar plates (without the membrane-electrode assemblies in between) with water-filled cooling channels (Graphic: Klaus Baier)

What are Bipolar Plates?

Bipolar plates consist of two thin, intricately embossed stainless steel half-shells that are welded together. Due to the delicate embossing, separate flow channels are created on the inside and outside for various media such as hydrogen gas, air, as well as cooling and reaction media. The finer and more precise the structures on the bipolar plates, the more efficiently they function. Together with membrane-electrode assemblies, arranged in a sandwich structure, numerous layers are stacked together in what are called “stacks.“ In a 140 kW stack, up to 400 such plate assemblies can be found. Especially in mobile applications, the thickness of the metal plays a crucial role, as in the stack, the bipolar plates account for about 80% of the total weight. Therefore, developers are constantly striving to make the plates smaller and lighter.

Material thickness = 0,075 mm



To keep the flow resistance in the channels as low as possible, the positional deviation of the two shells during welding must not exceed 10 µm (Graphic: Klaus Baier).

enormous forces can have adverse effects in punching areas, such as deformation of the tool. ‘And this is with tolerance specifications that are already close to zero. In some cases, we‘re driving ourselves crazy,’ smiles J. Baier.

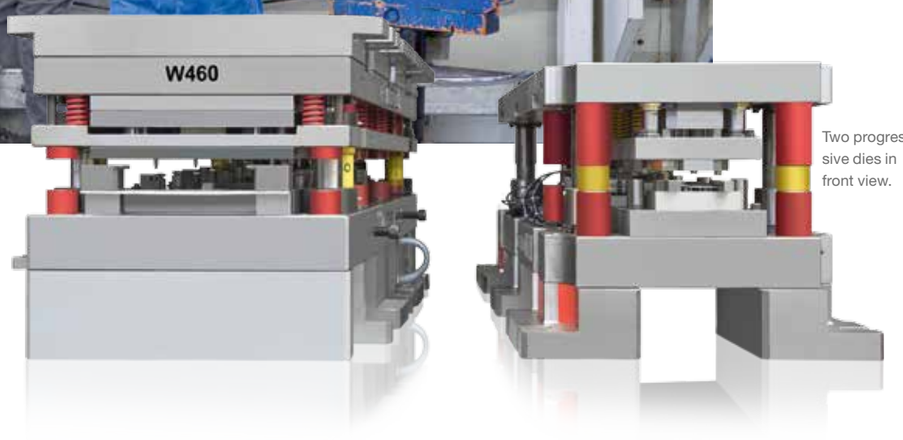
Development Partner for Demanding XXL Stamping Tools

“As a result of years of tinkering, we have acquired a level of know-how for such tasks that is valued by some users,“ adds J. Baier. A key advantage of his company is that they not only manufacture such tools but also use them in their own stamping plant—except for the bipolar plates, which require special machines. This allows direct feedback from practical experience to flow back into the design and assembly departments, benefiting their customers as well. Although their developers know exactly what sheet metal parts they want, they often lack the additional experience and expertise required to manufacture functioning tools. That’s why Baier works closely with the specialized departments of customers when developing new tools. His customers include about a dozen major corporations, ranging from press manufacturers to automotive producers. Many of the composite tools made in Pfronten are used in a wide range of industries worldwide. He is particularly proud of the fact that, despite this, he does not need international branches. The tools function so reliably that failures are rare, resulting in little demand for repairs and spare parts.

Highest Demands on Machine Tools

“Due to these requirements, we also demand extraordinarily high quality and, above all, precision from our machine tool suppliers,“ says Marcel Frömmrich, Head of Toolmaking at Klaus Baier. This also applies to wire cutting, for which two new machines were sought in 2022. After thorough research, three manufacturers were shortlisted. Each was provided with sample parts to be cut and measured precisely. Frömmrich personally spent

Adjustment work on a complex progressive die.



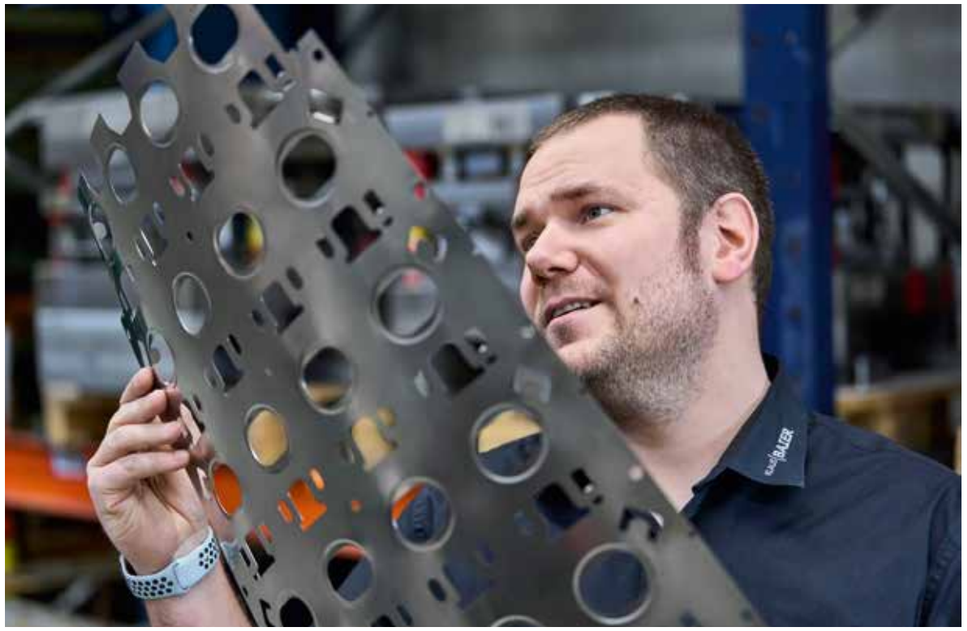
Two progressive dies in front view.

The MV4800R Connect delivered

6.500

operating hours

in 2023



Tooling manager Marcel Frömmrich examines a stamped strip. The resulting stamped part is a gasket for an exhaust manifold.

two days at each company's site for this purpose. Additionally, they visited reference customers together to gather firsthand experience reports. It wasn't just about the machines themselves but also questions of service reliability, performance, and support, which had become particularly important after some disappointments with the manufacturer of the previously used machines. The winner of this competition was Mitsubishi Electric: by the end of December 2022, two wire-cutting machines were delivered, a large-format MV4800R Connect and an MP2400 Connect.

Highly Satisfactory Performance

"Both machines have performed excellently from the start," says Frömmrich happily. They run 24/7. Despite the inevitable downtime during installation, training, and ramp-up phases, the MV4800R Connect clocked 6,500 operating hours in 2023, while the MP2400 Connect reached 6,200 hours. Both he and Mr. Baier were pleasantly surprised by this. During operation, great care is taken to ensure that all necessary maintenance and service tasks are performed according to specifications. The new machines have experienced virtually no unforeseen downtime. They have proven to be highly durable workhorses, while also maintaining exceptional precision, for example, during automatic threading. Additionally, his department goes to great lengths to ensure maximum precision during processing. For workpieces that require particularly precise right-angle cuts, the machine is set up with precisely defined internal parameters. After carefully aligning the workpiece, a cylindrical test contour is first cut. A granite cylinder is then inserted into it. Using a measuring probe, they check whether the axis of the test contour is exactly perpendicular to the workpiece surface.

The Mitsubishi MV4800R Connect, commissioned at the beginning of 2023, has proven to be a highly precise workhorse for large-format workpieces.

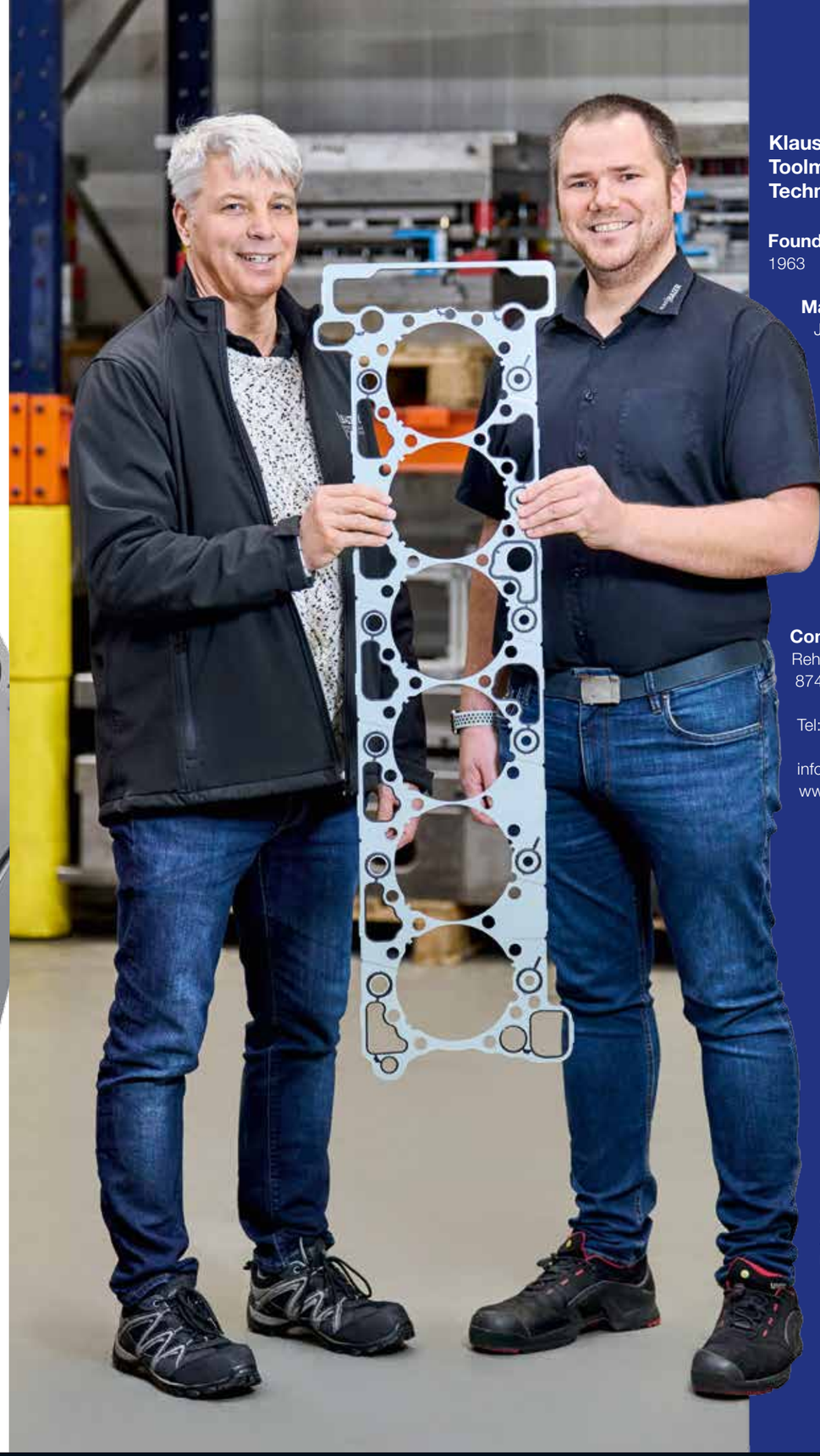
Highly durable workhorses.

The new control system was well received by the employees and quickly mastered.

High Marks for Training and Support

“We had some concerns about how well our staff would adapt to the new control system,“ recalls Frömmrich. The employees had to venture into entirely new territory. To address this, two groups were formed and sent for training one after the other. This allowed the second group to raise any remaining questions that their colleagues from the first group still had after their initial experiences with the machines during their own training. Additionally, semi-annual refresher courses with Mitsubishi technicians were arranged, allowing the staff to deepen their knowledge. The team was immediately satisfied with the level of support provided. A testament to this is the high utilization of the machines. Mitsubishi‘s technicians and support staff proved consistently competent and helpful, including phone support when occasional problems arose.“

The MP2400 Connect has also proven itself in tasks where the highest precision is required.



Klaus Baier GmbH & Co. KG
Toolmaking and Stamping Technology

Founding year
1963

Managing Director
Joachim Baier

Number of employees
Ca. 110

Core business
Large-format and highly precise stamping tools for the production of sheet metal parts for fuel cells, gaskets, cooling systems, as well as functional and visible parts for cars and electrical appliances.

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Stamping specialists: Managing Director Joachim Baier (left) and Tooling Manager Marcel Frömmrich.

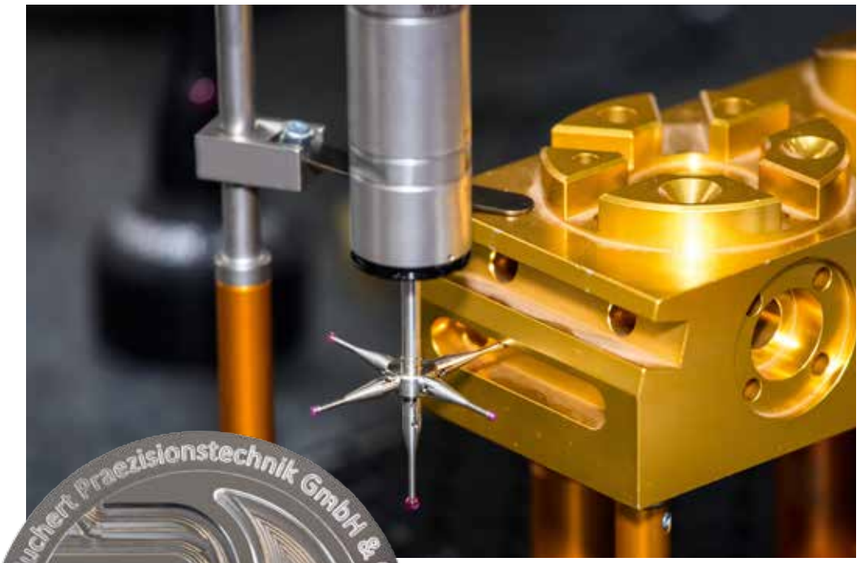
Buchert Präzisionstechnik GmbH & Co. KG

On the trail of the micrometer.

Pushing the boundaries of precision and shape diversity with wire EDM.

Buchert Präzisionstechnik GmbH & Co. KG in Römhild manufactures high-quality precision parts in small and medium series for motorsports, metrology, tool and machine building, as well as the semiconductor industry. Frequently, exotic materials need to be processed, and there are often unusual requirements regarding accuracy, complexity of workpiece contours, and surface cleanliness. Wire EDM machines from Mitsubishi Electric play a crucial role in ensuring that Buchert is now recognized nationwide as a particularly capable contract manufacturer.

Originally, company founder Peter Buchert intended to make a living with just one wire EDM machine. Today, he remarks with a wink: “Mount a blank, set up the machine, then let the process run for many hours while leading a quiet life – that was at least my dream.“ However, things turned out a little differently. Initially, he indeed started his business solely with wire EDM as the only manufacturing process. Being a thorough perfectionist with a keen sense of precision, he reliably and flexibly produced very precise workpieces, leading his clients to urge him to expand the range of manufacturing processes. As a result, after nearly 20 successful years, Peter Buchert, together with his newly appointed managing director Ronny Feil, founded another contract manufacturing company in Eisfeld. This allowed both companies to offer a complete range of machining processes – turning, drilling, milling, wire EDM, surface treatments, cleaning, and assembly of components. Among other things, they manufacture components for racing transmissions, test inserts, test tips, and calibration standards for measurement technology, as well as clamping devices for the semiconductor industry.



Ultimate precision has significantly contributed to success

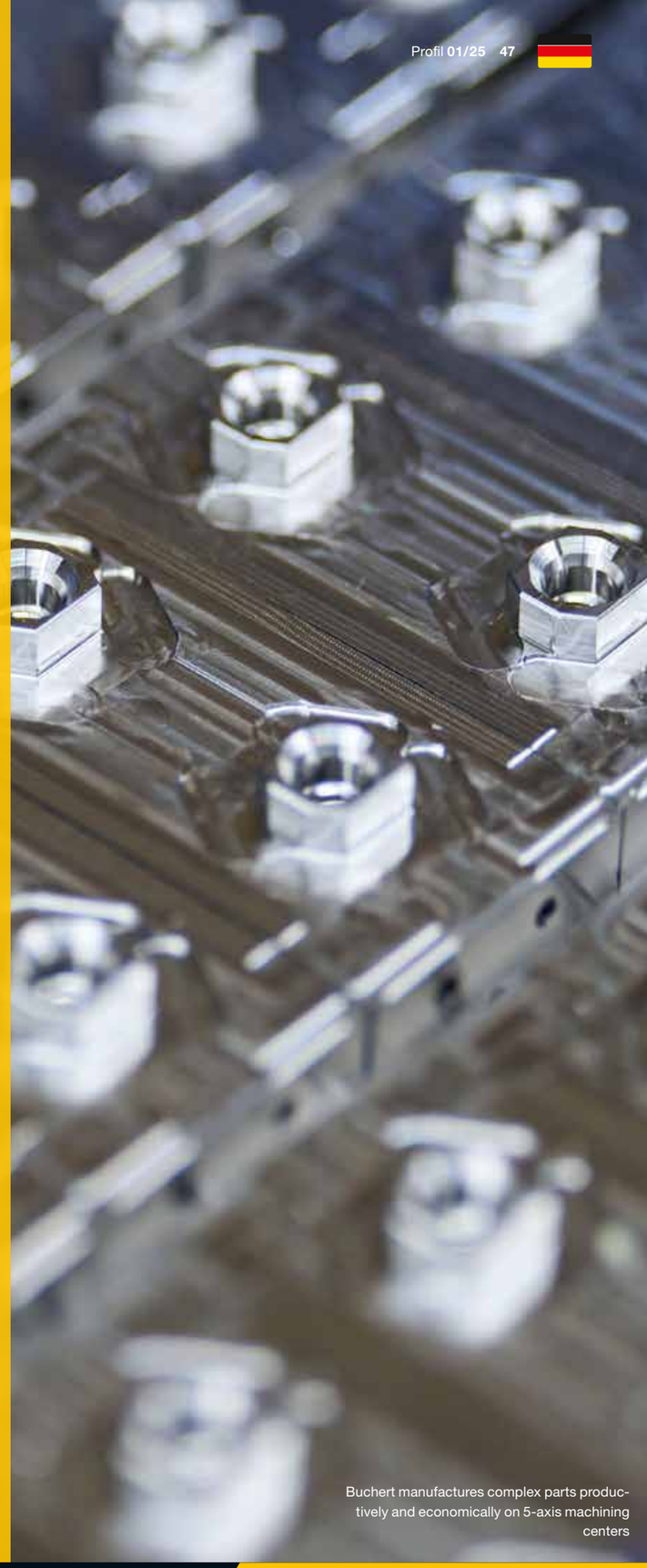
Reliable Technology Required

In the early years, wire EDM became the predominant machining technology at Buchert Präzisionstechnik over several years. “We saw this process as challenging and therefore rewarding. However, the technology of the machines previously used hindered greater success. Individual components often had to be repaired or replaced. Consumables, such as filter cartridges, proved to be vulnerable. High costs and long downtimes outweighed the economic benefits of the wire EDM machines,“ reports Peter Buchert. Demonstrations at trade shows and Mitsubishi Electric in Ratingen convinced him to invest in much better technology. He first acquired an MV2400R wire EDM machine, which met his expectations. It operates reliably and ensures process security, requiring only rare maintenance. “We experienced no repairs for a very long time. Mitsubishi Electric‘s wire EDM technology is mature and solid.

Accurate to the micron: Components for the transmission and semiconductor industries

From a one-man show to a contract manufacturer with a comprehensive range of services.

Peter Buchert describes himself as having precision in his blood, being the descendant of a family of toolmakers. In 2003, as a trained toolmaker himself, he founded his contract manufacturing business with a single wire EDM machine in an old furniture warehouse in Römhild. Thanks to his extraordinary dedication, the small company quickly grew. Peter Buchert expanded his range of manufacturing processes to include drilling, turning, milling, and grinding. In 2013, he moved to the current headquarters, a purpose-built production hall with 1,600 m² of floor space. After continued growth, investments in high-quality machining centers, and the appointment of Ronny Feil as co-managing director, the company faced a setback due to the downturn caused by the Covid-19 pandemic. However, the economy recovered rapidly from 2022 onwards, and Buchert Präzisionstechnik was able to keep pace. To meet the increasing demands and comprehensive supply requirements of clients, the contract manufacturer Buchert + Feil GmbH was founded in the neighboring town of Eisfeld. The collaboration between the two companies expanded their capabilities to include surface treatments—polishing, anodizing, bluing, sand and glass bead blasting, and painting—as well as assembly of components. Currently, a cleanroom is being installed in Eisfeld to produce and assemble selected components and assemblies for the semiconductor industry under controlled conditions. At present, Buchert Präzisionstechnik in Römhild houses the administration, turning operations, and wire EDM. In Eisfeld, the contract manufacturing team focuses on producing cubic workpieces on 5-axis machining centers, surface treatments, and assembly of components.



Buchert manufactures complex parts productively and economically on 5-axis machining centers

Wire-eroded grinding wheels prove to be sharper and have longer tool life.

If service is ever needed, the manufacturer‘s qualified technicians are immediately available. Often, they can provide the correct settings and adjustments over the phone, allowing the wire EDM machines to work reliably again. This has convinced us entirely,“ summarizes Peter Buchert. He feels fully validated in switching to Mitsubishi Electric wire EDM machines. The MV2400R is programmed using a CAD/CAM system from Decam, particularly useful for wire EDM of parts for toolmaking, such as dies for cutting and forming tools.

Expanded Capacity Through Investment

In 2013, Peter Buchert had a much larger production hall built in the Milz district of Römhild, which was subsequently occupied. Here, the experts manufacture high-quality precision parts on several – some fully automated – three- and five-axis CNC turning centers as well as now three wire EDM machines from Mitsubishi Electric. The MV2400R is used mainly for cutting larger components or multiple workpieces from a larger blank, for example, in toolmaking and mechanical engineering. An MP2400 with a rotary axis is specially set up for EDM dressing of grinding wheels. Peter Buchert explains, “The demand for this technology has recently increased significantly. In collaboration with research and science, we have further developed our skills. This has allowed us – thanks also to Mitsubishi Electric‘s wire EDM machines – to tap into a forward-looking and rapidly growing manufacturing segment.“ He highlights the advantages of wire-eroded and profiled grinding wheels, noting that even very small profiles can be applied precisely. No forces are exerted on the grinding wheel during wire erosion and the result is excellent grain clearance. As a result, wire-eroded grinding wheels are sharper and have significantly longer service lives compared to conventional, diamond-dressed grinding wheels.

Due to the extensive advantages, the demand for wire-eroded grinding wheels has increased significantly.

Micrometer-Precision with Molybdenum Wire

On a third wire EDM machine, an MV1200R, Buchert Präzisionstechnik manufactures highly critical, ultra-precise components for the semiconductor industry. This includes, for example, small fixtures about 50 mm long and 20 mm wide for guiding and holding circuit boards and semiconductor components. Some surfaces and contours of these parts must be machined with alignment, flatness, and perpendicularity to within a few micrometers. Additionally, there is another unusual requirement, as Peter Buchert explains: “The machined surfaces on these parts must be completely clean. Contamination from foreign substances – such as hard and non-ferrous metals, oils, and emulsions – must be prevented from entering the base material.“ To achieve this, the production technicians in Römhild invested in the latest version of the MV1200R wire EDM machine just a few months ago. According to a service technician who installed the machine in Römhild, Buchert received the first of this innovative variant in Europe. Currently, specialists from the manufacturer are optimizing individual parameters, making the MV1200R capable of reliably machining small parts with 3 to 5 µm precision and a surface roughness of Ra ≤ 0.3 µm using a molybdenum wire. Standard brass wires are not suitable, as tiny amounts of alloying elements from

The technology of Mitsubishi Electric‘s wire EDM machines is well-developed and very robust. If service is ever needed, the manufacturer‘s qualified technicians are immediately available.

Peter Buchert, Managing Director at Buchert Präzisionstechnik

Wire EDM machines for diverse applications

MV1200R Connect – the new innovative variant.

The MV1200R Connect wire EDM machine is used to produce highly precise, critical components with a molybdenum wire, tailored specifically for the semiconductor industry.

The MP2400, equipped with a rotary axis, is designed specifically for the erosive dressing of grinding wheels.

On the MV2400R, larger components or multiple workpieces from a larger blank are cut, ideal for applications in tool-making and mechanical engineering.

With this contamination-free wire EDM, we create a unique selling point and thus a competitive advantage.

Peter Buchert, Managing Director at Buchert Präzisionstechnik

the non-ferrous metal can penetrate the surface structure of the machined workpieces. “With this contamination-free wire EDM, we create a unique selling point and thus a competitive advantage. This allows us to position ourselves as an innovative and forward-thinking contract manufacturer,“ says Peter Buchert. He has no doubt that the MV1200R will help him achieve this. “So far, we have received orders to produce prototypes and very small series of parts for the semiconductor industry. If wire EDM on the MV1200R performs as expected, we will certainly process a wide variety of parts for fixtures. We are even considering automating the MV1200R in a future expansion.“

Buchert Präzisionstechnik GmbH & Co KG

Founding year
2003

Managing Director
Peter Buchert, Ronny Feil

Number of employees
17 Buchert Präzisionstechnik
35 Buchert + Feil GmbH

Core business
Custom prototypes, individual parts, and small series for customers from the aerospace, automotive, medical technology, measurement technology, plant engineering, chemical industry, and manufacturing sectors.

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www.buchert-praezisionstechnik.de

Other Companies
Buchert + Feil GmbH
98673 Eisfeld

Kintsugi gold meets ceramics

Broken, stronger than before through metal.

The tradition of golden repair

Kintsugi, literally meaning “golden joinery,“ is a traditional Japanese technique for repairing ceramics with gold, silver, or platinum. This unique art form originated in the 15th century and has since become a symbol of resilience and beauty in imperfection. Kintsugi not only restores damaged objects but also values their history and unique beauty.

Bamboo brush

Kintsugi is based on the philosophy of Wabi-Sabi, which finds beauty in imperfection and transience. Instead of hiding flaws, Kintsugi emphasizes the cracks with precious metals, celebrating the history and character of an object, and establishing a deep connection with nature and life. This approach appreciates the unique and transient by recognizing and highlighting an object‘s imperfections as part of its story.

Special Feature: Urushi Lacquer

The repairs are done with Urushi lacquer, a natural lacquer harvested from the sap of the lacquer tree. This lacquer is known for its durability and water resistance and plays a central role in the Kintsugi process. Urushi lacquer permanently bonds the ceramic shards, making the repaired pieces not only beautiful but also functional. After applying the lacquer, gold, silver, or platinum powder is sprinkled over the repaired cracks, giving the repair its characteristic shiny appearance and enhancing the object‘s aesthetic and symbolic value. The application requires a high degree of precision and patience, as the powder must be evenly distributed and embedded into the lacquer.

It is based on the Japanese philosophy of “Wabi-Sabi,“ which sees beauty in the imperfect and transient.

Craftsmanship with Detail and Precision

Creating a Kintsugi piece can take several weeks. The lacquer must dry between layers, a process that requires patience and care. Every step in the Kintsugi process, from preparing the lacquer to the final polishing, must be executed meticulously and precisely to achieve a perfect result. A Kintsugi craftsman uses special tools such as bamboo brushes, small spatulas, and fine sieves to apply the lacquer and powder accurately. These tools allow for controlled application, which is crucial for the quality and outcome of the repair.

Rissurushi, Makienaoshi, and Tsugite

There are three main methods in Kintsugi: the “crack repair“ (Rissurushi), the “filling method“ (Makienaoshi), and the “joining method“ (Tsugite). Each method is chosen based on the type of damage and has its own specific techniques and tools. This variety allows a wide range of damages to ceramic objects to be repaired,

Each repaired object becomes unique, as the cracks form individual patterns.

giving them new life. Kintsugi promotes sustainability by repairing and reusing broken items instead of discarding them. This also reflects a deeper appreciation for craftsmanship and the history of objects. By reusing and repairing ceramics, the lifespan of the items is extended, and their cultural and aesthetic significance is preserved.

Inspiration for Artists

The Kintsugi technique has also inspired modern artists. Many contemporary artworks and designs use the concept of “golden repair“ as a metaphor for resilience and reconstruction. Artists around the world have incorporated Kintsugi into their work to explore themes like fragility, healing, and transformation. Each repaired piece tells a unique story. Kintsugi is often used as a metaphor for healing and transformation after traumatic experiences. The visible scars of repair remind us of the object’s past and symbolize the strength and beauty that comes from overcoming adversity.

Kintsugi is not just a repair technique but an art form that honors and celebrates the history and character of an object. This traditional Japanese method of “golden repair“ promotes sustainability and appreciation for craftsmanship while inspiring modern artists worldwide. For many, Kintsugi offers valuable lessons in precision, patience, and the importance of resilience and transformation. The philosophy behind Kintsugi reminds us that beauty is often found in imperfections and in the stories they tell.

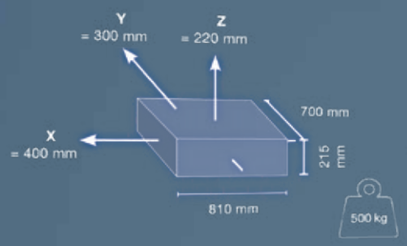
Urushi lacquer and Gold

The job lot.

Wire-cutting and die-sinking EDM for all applications.

Wire-cut EDM

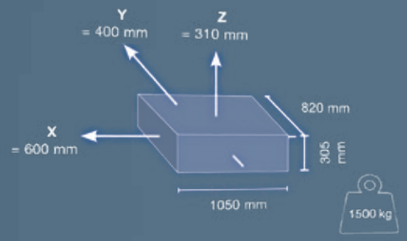
MP Serie – High Accuracy

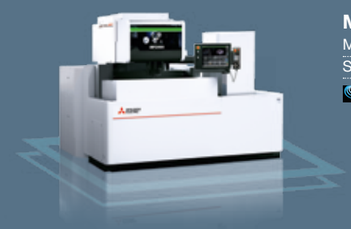


MP1200 Connect

Machine height	2015 mm
Surface finish in the standard version	Ra < 0.10 µm

Maisart



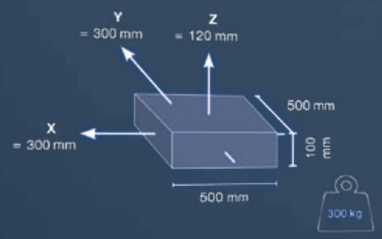


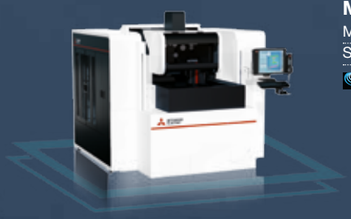
MP2400 Connect

Machine height	2150 mm
Surface finish in the standard version	Ra < 0.10 µm

Maisart

MX900 – Precision in Oil



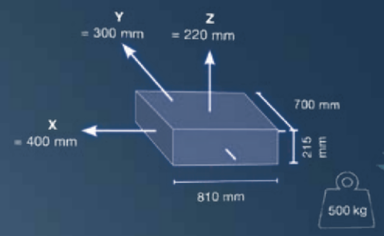


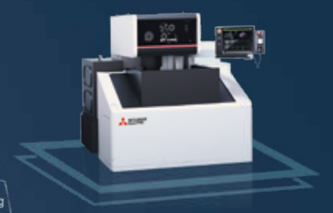
MX900

Machine height	2203 mm
Surface finish in the standard version	Ra 0.05 µm

Maisart

MV-R Serie – Power for Precision

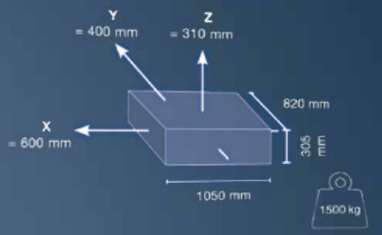


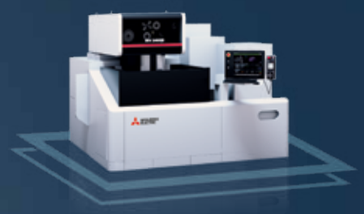


MV1200R Connect

Machine height	2015 mm
Surface finish in the standard version	Ra 0.25 µm

Maisart





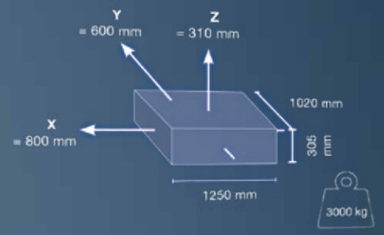
MV2400R Connect

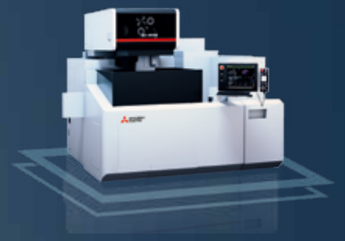
Machine height	2150 mm
Surface finish in the standard version	Ra 0.25 µm

MV2400R Z+ Connect available:

Machine height	2380 mm
Travel	X: 600 mm, Y: 400 mm, Z: 425 mm
Max. workpiece dimens. (WxDxH)	1050 x 820 x 420 mm

Maisart



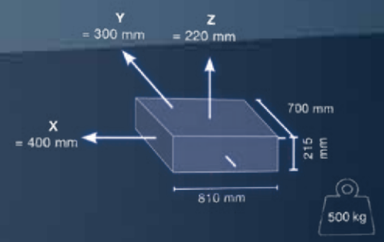


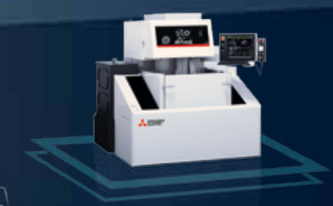
MV4800R Connect

Machine height	2415 mm
Surface finish in the standard version	Ra 0.25 µm

Maisart

MV-S Serie – Ready for Production

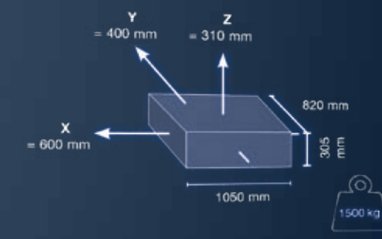


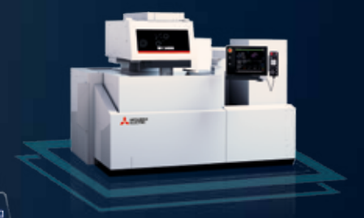


MV1200S New Gen

Machine height	2015 mm
Surface finish in the standard version	Ra 0.35 µm

Maisart





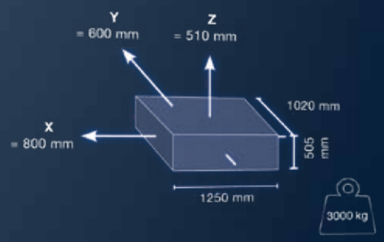
MV2400S New Gen

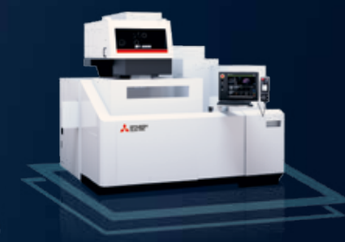
Machine height	2150 mm
Surface finish in the standard version	Ra 0.35 µm

MV2400S Z+ New Gen available:

Machine height	2380 mm
Travel	X: 600 mm, Y: 400 mm, Z: 425 mm
Max. workpiece dimens. (WxDxH)	50 x 820 x 420 mm

Maisart



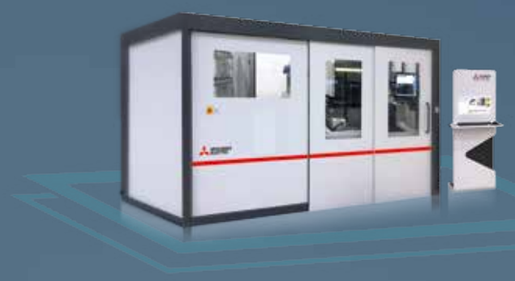


MV4800S New Gen

Machine height	2815 mm
Surface finish in the standard version	Ra 0.35 µm

Maisart

EDM-Dress – wire EDM dressing of CBN and diamond grinding wheels



DIAMONDCELL

- 100% reproducible results
- Unmanned machining
- Increased grinding productivity
- Extended grinding wheel life
- Fully automated

Maisart

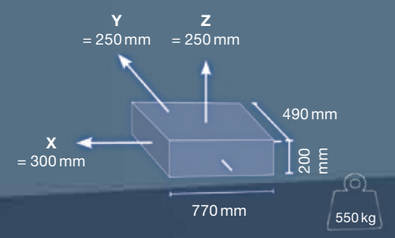
EDM-DRESS

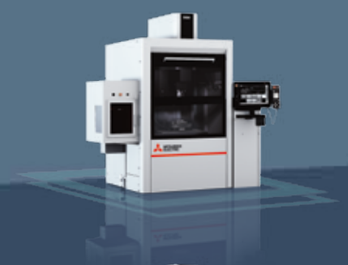
- 100% reproducible results
- Unmanned machining
- Increased grinding productivity
- Extended grinding wheel life

Maisart

Die Sinking

SG-R Serie – Power for Precision

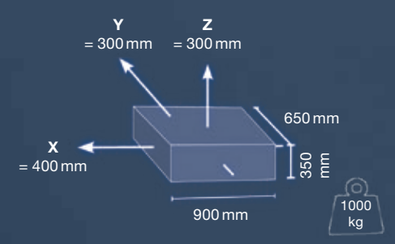


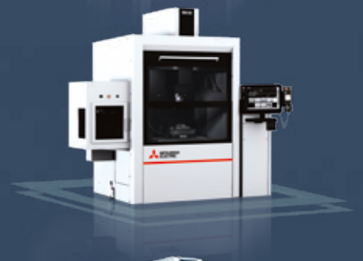


SG8R

Machine height	2140 mm
Table dimensions (W x D)	500 x 350 mm
Daylight	150–400 mm

Maisart

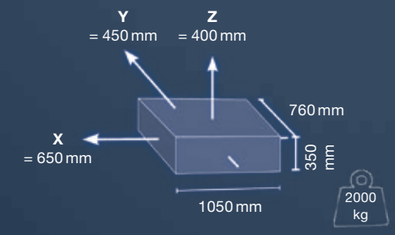


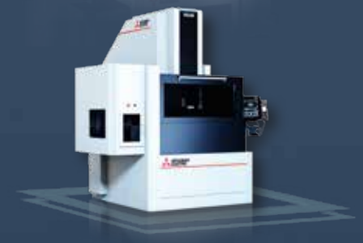


SG12R

Machine height	2420 mm
Table dimensions (W x D)	700 x 500 mm
Daylight	200–500 mm

Maisart





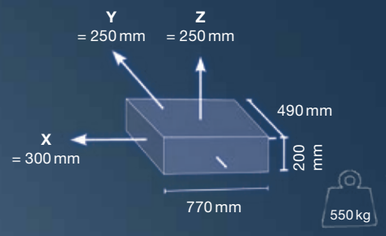
SG28R

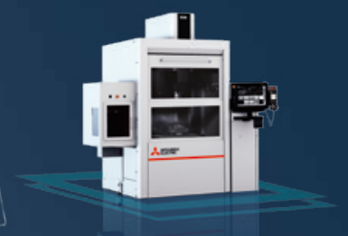
Machine height	2745 mm

- User-friendly D-CUBES control system
- Wide range of technologies
- Heavy-duty machine construction

Maisart

SG-S Serie – Power for Precision

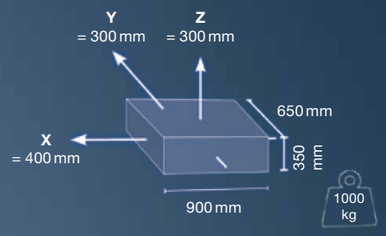




SG8S

Machine height	2140 mm
Table dimensions (W x D)	500 x 350 mm
Daylight	150–400 mm

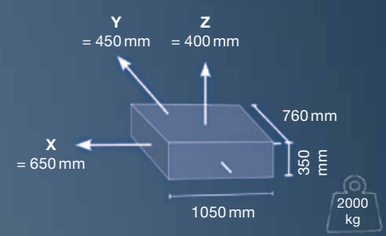
Maisart

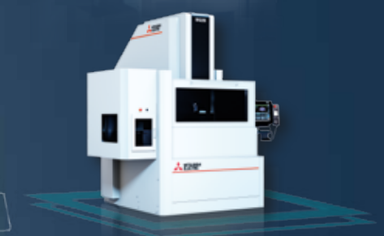


SG12S

Machine height	2420 mm
Table dimensions (W x D)	700 x 500 mm
Daylight	200–500 mm

Maisart





SG28S

Machine height	2745 mm

- User-friendly D-CUBES control system
- Wide range of technologies
- Heavy-duty machine construction

Maisart

Spark erosion from the world market leader.

Mitsubishi Electric

On the MV2400R Connect, Dreuco manufactures both molds for the group's injection molding machines and components for external customers

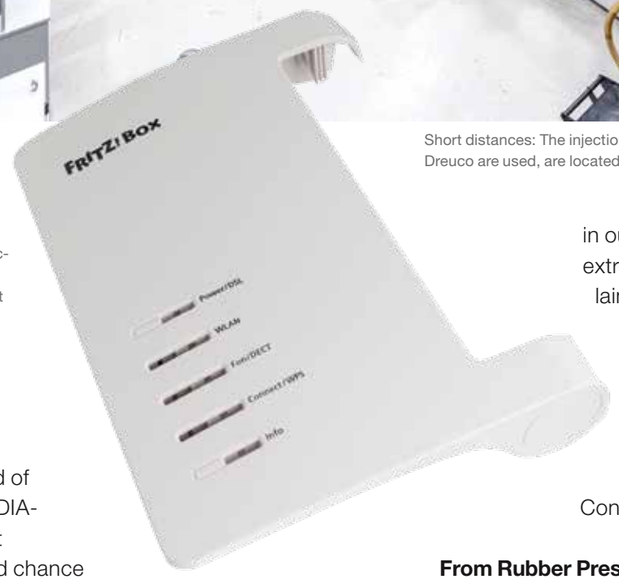
DREUCO Formenbau GmbH & Co. KG

The Problem Solvers

Precise Mold Making with MV2400R Connect

Challenges are meant to be solved. Following this motto, the DREUSICKE Group manufactures complex plastic parts with perfect surfaces. This requires high-quality machines like the MV2400R Connect, which is used in the production of molds for injection molding. For Thomas Dreusicke, however, aspects such as sustainability, community involvement, and association work are also essential to a successful company.

Short distances: The injection molding machines, where the molds produced by Dreuco are used, are located one floor below.



INDIA supplies injection-molded parts, such as this internet router housing, as visible parts, fully finished with paint and print.

The Likelihood of Owning an INDIA-Berlin Product

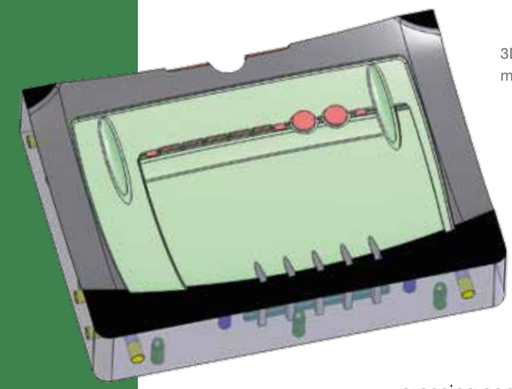
There's a good chance you have a product made by INDIA-Berlin in your home: the company manufactures the iconic white and red casings for the internet routers of Europe's leading provider. "We primarily produce visible parts in our injection molding, so we require extremely high-quality surfaces," explains Thomas Dreusicke, owner and managing director of INDIA-Berlin. The molds required for this are produced by Dreuco Formenbau, a subsidiary located one floor up in the same building, using equipment like the Mitsubishi MV2400R Connect wire-cut EDM machine.

From Rubber Pressing to Injection Molding Specialist

In 2005, the injection molding specialist was spun off from INDIA, as Dreusicke explains: "We started getting more external orders and wanted to expand further." Dreuco Formenbau now has 25 employees, with around 40% of the parts designed and manufactured for external clients, and 60% of capacity serving the INDIA-Dreusicke Group. The roots of the company go back to 1929, when Felix Dreusicke, father of the current owner, founded a rubber pressing company in Berlin-Mitte. Among other things, they produced typewriter keycaps. By the 1950s, the company shifted towards injection molding, which remains INDIA's core business today, as demonstrated by their successful production of router casings.

"With wire erosion, we achieve high surface quality in our molds and can create complex geometries that give us a competitive edge.

Thomas Dreusicke, Owner and Managing Director of INDIA-Berlin



3D design of the injection mold for an internet router.

Precision Molds for High-End Injection Molding

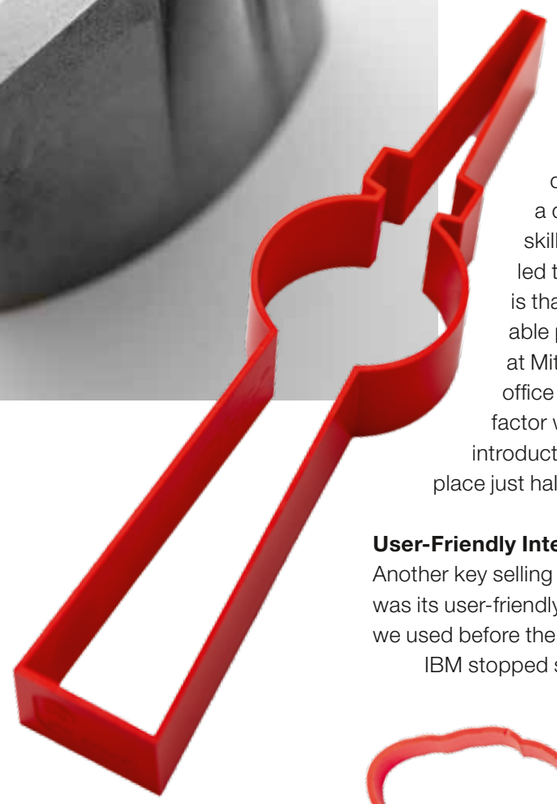
"We tackle the specific challenges of each customer and remove any potential issues—it's actually quite simple," says Dreusicke, sharing his recipe for success. A key advantage is having an in-house mold shop: "We can directly control the molds in-house." Dreuco uses its own spotting press to precisely align the contact surfaces of the upper and lower parts of the mold. A "test shot" with wax follows, ensuring the mold works perfectly before moving to production.

Dreusicke is proud to say that Dreuco has everything modern toolmaking technology can offer, allowing them to construct molds that ensure smooth, efficient plastic part manufacturing.

Demanding Surface Roughness and Defined Tapering

The MV2400R Connect wire-cut EDM machine is a vital part of their equipment. "With wire erosion, we achieve the high surface quality needed for our molds and can create complex geometries that give us a competitive edge," Dreusicke explains. Typical surface roughness values Dreuco works with are RZ 15, but they can go as low as RZ 4, thanks to the high pulse rate of the V350 generator. Other

To be able to demold the final product, the injection mold must maintain a defined taper along the entire contour — without wire erosion, this would be nearly impossible to achieve.



Seemingly a simple component: a cookie cutter.

Thomas Dreusicke is convinced that without the MV2400R Connect, the mold for the injection molding of the cookie cutter would hardly be manufacturable.

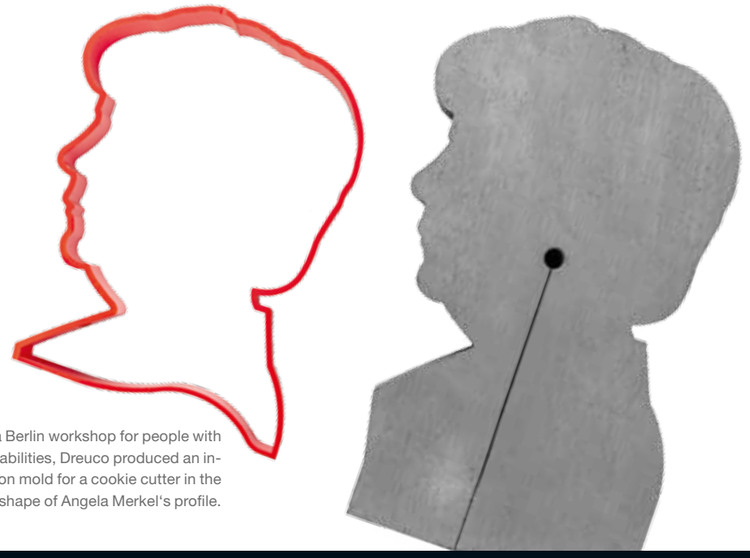
dimensions that can be achieved on the MV2400R Connect include inner diameters between 0.6 and 30 mm, and radii starting from 0.2 mm. "Sure, most molds could be made without wire erosion," says Dreusicke. "But that would mean redesigning the molds and making them from multiple parts, which is more labor-intensive." For certain products, however, wire erosion is indispensable. Dreusicke holds up a red cookie cutter shaped like the Berlin TV tower: "To ensure the part can be removed from the mold during injection molding, a defined taper has to be maintained along the entire contour—without wire erosion, that's impossible!"

Soft Skills as the Deciding Factor

For Dreusicke, the decision to invest in Mitsubishi Electric's machine wasn't solely based on the quality. Initially, the company used a different EDM system, but the "soft skills" of Mitsubishi Electric ultimately led to the switch. "What's essential for us is that you can always reach knowledgeable people with decision-making power at Mitsubishi Electric, even after regular office hours," he explains. Another crucial factor was the support during the machine's introduction, and the fact that training took place just half an hour away.

User-Friendly Interface

Another key selling point for the MV2400R Connect was its user-friendly interface. "The wire EDM machines we used before the MV2400R ran on OS/2," a system IBM stopped supporting in 2005. "It worked, but programming was difficult. Today, with the MV2400R Connect, it's a completely different story." At Dreuco, data is imported directly from the CAD program SolidWorks, and programming is comfortably handled via the CAM solution DCAMCUT.



For a Berlin workshop for people with disabilities, Dreuco produced an injection mold for a cookie cutter in the shape of Angela Merkel's profile.

Raising Awareness in Politics and Society

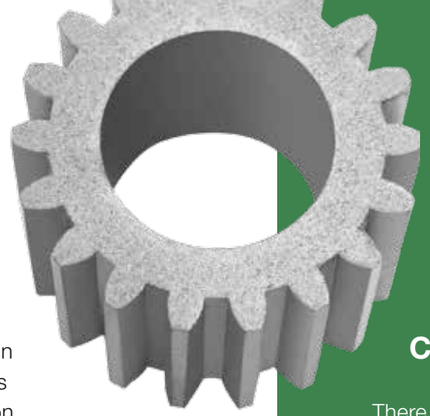
Software, service, and quality—Dreusicke is convinced of the MV2400R Connect's advantages. He could easily buy a second or third machine, "if I could find more skilled workers and inspire more young people to pursue careers as toolmakers," he admits. However, today's youth are more focused on the New Economy rather than industrial trades. Despite Berlin's long-standing industrial history, the public and political focus is now on "hip" sectors like healthcare and startups. To raise awareness about career opportunities in manufacturing, Dreusicke is heavily involved in trade associations. He is the chairman of the Employers' Association for the Plastics Processing Industry in Berlin-Brandenburg and a member of the IHK Berlin's SME Competence Team. "It must remain possible to manufacture in Berlin," says Dreusicke, advocating for preserving jobs for skilled industrial workers in the city.

Achieving More in a Network

One solution to this challenge is the Motzener Strasse business network, which INDIA-Dreusicke helped establish. This network of around 60 companies from the industrial district in Berlin's Tempelhof-Schöneberg district aims to create an attractive, modern, and livable environment for businesses and their employees. One of the network's initiatives was the creation of a daycare center with "business-friendly" opening hours to facilitate childcare for employees. Joint energy purchasing is another initiative, and the network has recently launched a sustainable energy and heating project. Fifteen member companies will digitally connect their eco-friendly energy and heat generation systems. Currently, 43% of the energy used in participating companies, including INDIA-Dreusicke, is produced sustainably.

Software, service, quality – Thomas Dreusicke is convinced of his MV2400R Connect.

Thomas Dreusicke has had consistently positive experiences with the MV2400R Connect—if he can find the skilled workers, he would consider purchasing a second or even third machine.



Utilizing Waste Heat

Sustainability is a key issue for Dreusicke. The company's new building, constructed in 2012, features adaptive lighting control, and the waste heat from the injection molding machines is captured. A 160,000-liter rainwater tank in the basement supplies water to the toilets and cools both the servers and production machines, including the MV2400R Connect. "We've implemented a recycling system where the waste heat is stored in the rainwater tank," explains Dreusicke. Two heat pumps then extract the energy from the tank to heat the 7,800-square-meter building.

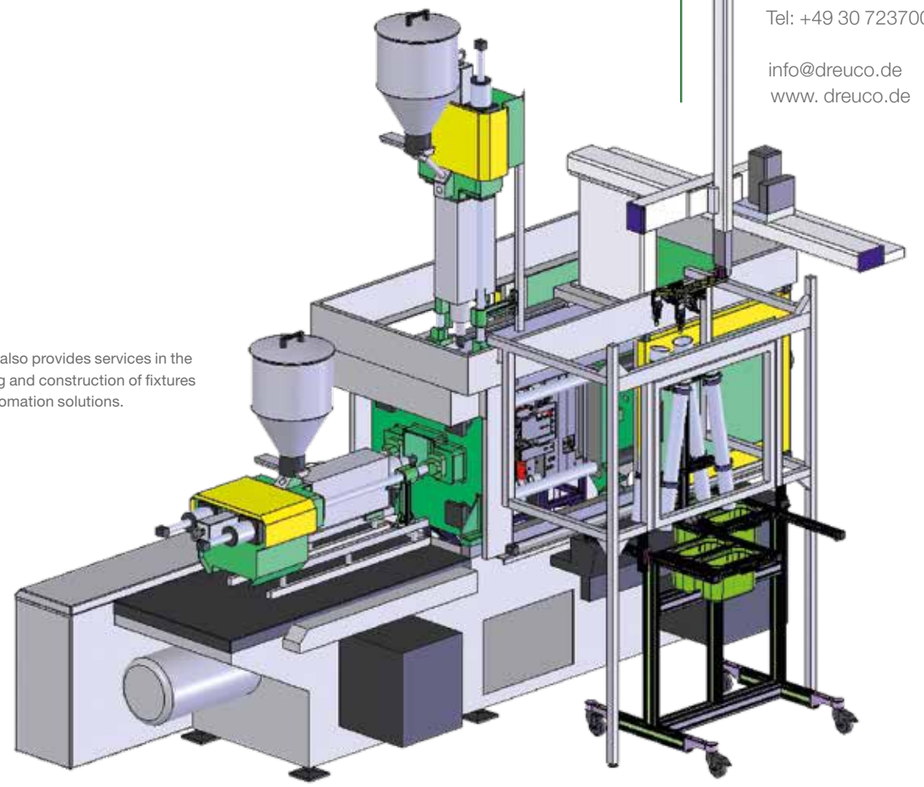
"As a plastics processor, we have always strived for sustainability," Dreusicke adds. "We solve our customers' problems in plastics technology in innovative, resource-efficient, and timely ways." The MV2400R Connect plays a key role in achieving this in mold-making.

Almost on-site: The training for Lars Petersohn on the MV2400R Connect took place just half an hour away from Dreuco.

Mold Making – A Highly Interesting Career with Prospects

There is also a shortage of skilled workers in mold making. To secure future talent, Dreuco regularly trains tool mechanics specializing in mold making. However, interest among young people is rather low. Thomas Dreusicke believes this is completely unjustified: "Mold making is highly interesting and offers a diverse range of activities. Typically, there are no shift operations, and you work with very valuable machines – from CNC lathes to high-speed milling machines to EDM machines. In addition, it involves exciting and varied manual skills."

Sustainability was a top priority in the construction of the new facility that houses both INDIA and Dreuco.



Dreuco also provides services in the planning and construction of fixtures and automation solutions.

DREUCO-Formenbau GmbH & Co KG

Founding year
2005 - Spin-off from INDIA-Berlin (founded in 1929)

Managing Director
Thomas Dreusicke

Number of employees
25

Core business
Design (3D) and production of injection molds (including multi-component molds) and fixtures.

DREUSICKE Grupe
Consists of the mold and fixture manufacturer DREUCO Formenbau, as well as the plastics processors INDIA DREUSICKE Berlin and Oehme Technische Kunststoffteile.

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12277 Berlin
Germany

Tel: +49 30 723700 -30

info@dreuco.de
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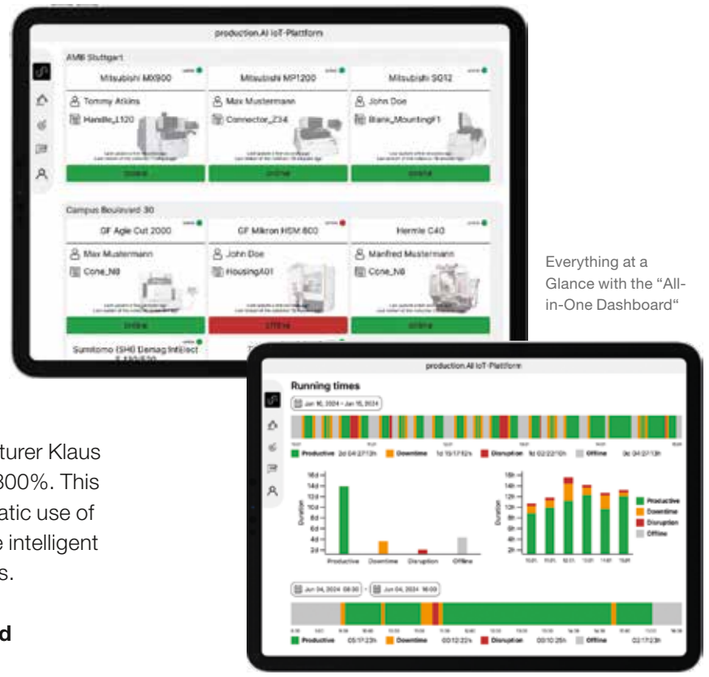
What‘s Really Happening on Your Shop Floor?

Boost Productivity Intelligently with WBA

In economically challenging times, keeping an eye on the performance of your machines is more important than ever. To provide, visualize, and analyze the necessary data, WBA develops practical software solutions in close collaboration with its community. These solutions are manufacturer-independent and broadly applicable. Learn now how you too can boost your productivity.

Precise Data as the Foundation for Optimization

The collaboration between Mitsubishi Electric and WBA Aachener Werkzeugbau Akademie GmbH impressively demonstrates how modern IIoT technology can enhance production efficiency. The foundation lies in the comprehensive real-time collection of machine data. This data not only enables detailed analysis of current production processes but also forms the basis for continuous improvements and strategic decision-making. One remarkable example of the IIoT platform‘s potential can be seen in practice: experienced tool manufacturer Klaus Baier increased his productivity by more than 300%. This and other successes are based on the systematic use of real-time data for process optimization and the intelligent linking of machine data with production metrics.



Everything at a Glance with the “All-in-One Dashboard“

Manufacturer-Independent Integration and Digital Transformation

A key advantage of the WBA IIoT platform is its seamless integration of machines from various manufacturers. This solution ensures smooth communication between different systems, enabling comprehensive process monitoring. The „All-in-One Dashboard“ provides an extensive overview of all relevant production data and is designed for intuitive use by all employees. A standout feature is the integration of a hybrid Large Language Model (LLM), which supports multilingual operation and context-sensitive assistance. Additionally, digital transformation is facilitated through the inclusion of specialized applications such as the Fault Logging App (FEA) and the Maintenance App. These tools from the WBA IIoT ecosystem enable systematic fault detection and analysis as well as predictive maintenance planning.

Flexible Implementation and Maximum Security

The platform can be flexibly implemented as a cloud or on-premise solution. Users benefit from state-of-the-art security protocols and a robust hosting infrastructure. Automatic archiving and analysis of all production data not only allow for quick responses to current disruptions but also support long-term optimization through AI-based anomaly detection.

Sustainability and Future-Readiness

Sustainability and the reduction of CO^2 emissions are increasingly central to industrial transformation processes. Regulatory requirements, such as CO^2 reporting obligations, demand precise solutions to help companies capture and optimize emissions along the entire value chain. The integration of the WBA CO^2 Tool Passport into the IIoT platform helps companies meet these demands. By combining the TÜV-certified calculation tool of the CO^2 Tool Passport with the IIoT platform, full data transparency and optimal resource planning are achieved. The digitalization of the shop floor using the WBA solution is not just a tool for boosting productivity but a holistic approach to transforming traditional manufacturing processes into modern, data-driven production environments. With over 550 connected machines and more than 20 satisfied customers, the system has already proven itself in practice, setting new standards in intelligent manufacturing.

WBA
WERKZEUGBAU
AKADEMIE

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52074 Aachen
Germany

Tel: +49 241 945733 60
info@werkzeugbau-akademie.de

Learn more...
www.mitsubishielectric-edm.eu/wba-en

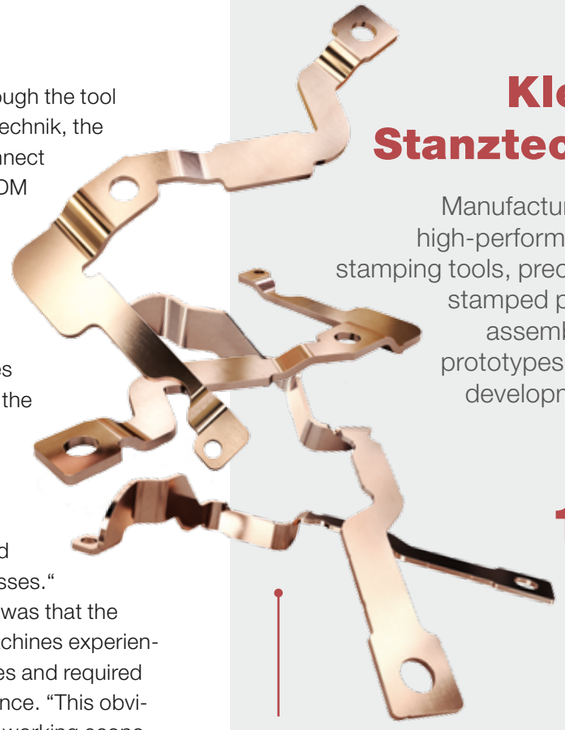
Kleiner GmbH Stanztechnik

Consistently efficient.

The toolmaking department of Kleiner GmbH Stanztechnik in Pforzheim develops, designs, and manufactures highly productive precision stamping tools. One of the company's main objectives is to conserve resources and minimize energy consumption. For this reason, the specialists now operate with nine wire EDM machines from Mitsubishi Electric's MP Connect series.

When taking a quick look through the tool shop at Kleiner GmbH Stanztechnik, the large number of MP1200 Connect and MP2400 Connect wire EDM machines is immediately noticeable. According to Oliver Weißenrieder, Head of Tool Manufacturing, the company has invested in these nine wire EDM machines over the past three years. “At the start of 2020, our business operations were significantly restricted due to the pandemic. However, this gave us the opportunity to analyze and optimize some internal processes.“

A key insight from this review was that the previously used wire EDM machines experienced above-average downtimes and required unusually extensive maintenance. “This obviously contradicted our aim of working economically and productively,“ reports Weißenrieder. Rudi Flag, Head of EDM at Kleiner, adds, “Our previous wire EDM machines frequently failed in automatic wire threading. This often caused unattended night shifts from being interrupted, leaving tasks incomplete. This significantly disrupted our operations, made reliable planning impossible, and affected our flexibility in tool manufacturing.“



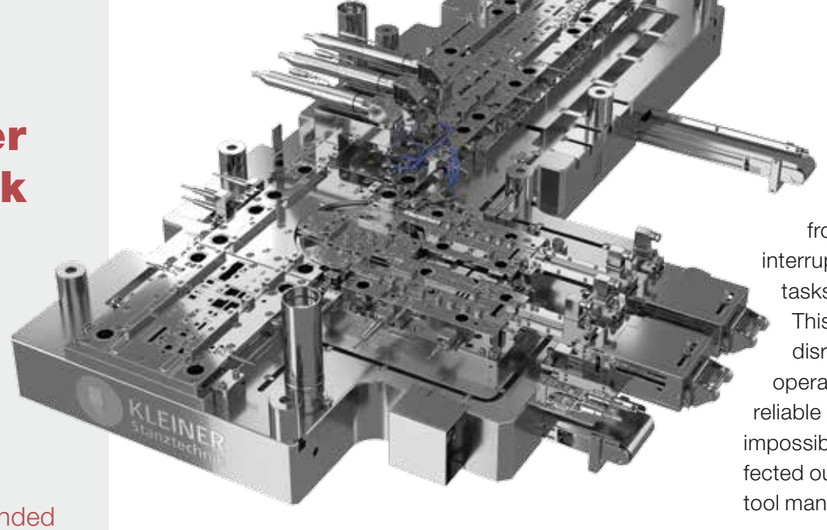
Kleiner Stanztechnik

Manufacturer of high-performance stamping tools, precision stamped parts, assemblies, prototypes, and development.

Founded
1985

320
Employees

over 3,5 Mio.
busbars produced per year



Testing an Alternative

As early as 2019, Kleiner‘s application engineers had established contact with Mitsubishi Electric specialists. This led to the proposal of using an MP1200 Connect wire EDM machine as a pilot project in Pforzheim. As Oliver Weißenrieder recalls, Mitsubishi Electric advised the toolmakers to thoroughly explore the innovative technology of this machine, testing its features in practice and comparing them to those of other wire EDM machines. “After just a few months, we recognized the comprehensive advantages of the MP1200 Connect from Mitsubishi Electric,“ says Weißenrieder with evident satisfaction.

Efficiency is Key

For a tool manufacturing operation that produces numerous individual and replacement parts daily for in-house stamping and external clients, working economically and productively is the top priority. Weißenrieder confirms, “Direct comparisons between different wire EDM machines clearly demonstrated the outstanding advantages of the MP1200 Connect. These include much longer maintenance intervals and significantly easier maintenance tasks, such as filter changes. Downtime due to maintenance has been greatly reduced, allowing us to work more productively and economically.“

Another critical factor in favor of Mitsubishi Electric‘s wire EDM machines is energy efficiency. Driven by management‘s directives, Kleiner Stanztechnik is focused on reducing resource consumption and minimizing reliance on conventional energy sources such as oil, natural gas, and coal. In line with this goal, the company has installed solar panels on its buildings, generating approximately half of the electricity needed for production and administration from renewable sources. Every department in the company is encouraged to minimize energy and heating consumption. To further reduce emissions of CO2 and other harmful gases, all company vehicles now run on electric power.

9 Wire EDM machines from Mitsubishi Electric

*After just a few months, we recognized the **comprehensive advantages of the MP1200 Connect** from Mitsubishi Electric.*

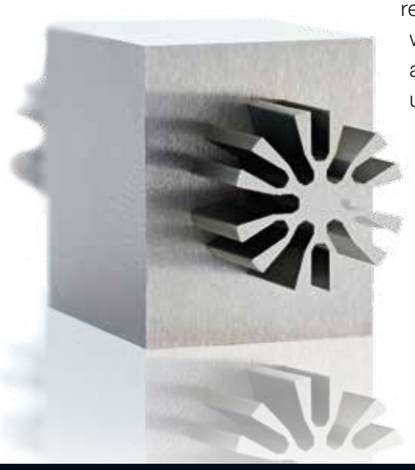
Oliver Weißenrieder, Head of Tool Manufacturing at Kleiner GmbH Stanztechnik

Completely satisfied: The staff appreciates the easy accessibility of the work area on the wire EDM machines from Mitsubishi Electric.

Innovative and intuitive: the smart user interface of the latest controls.

Productive with Minimized Energy Consumption

“Fundamentally, we are also committed to minimizing energy use and conserving resources in toolmaking and production,“ reports Weißenrieder. He continues, “In this regard, Mitsubishi Electric‘s wire EDM machines are a great fit for us. Their drive systems consume less energy compared to conventional drives. Long maintenance intervals and small filter elements reduce resource consumption and minimize waste. Additionally, our three MP1200 Connect and six MP2400 Connect machines operate reliably and consistently. This includes cutting with thin brass wires. Even in complex contours and narrow gaps, the machines reliably rethread the wire after a break, allowing us to use unattended night shifts productively. This helps reduce energy consumption by eliminating rework.“



Proven precision: Dies and punches eroded on an MP1200 have only a 2 µm clearance.

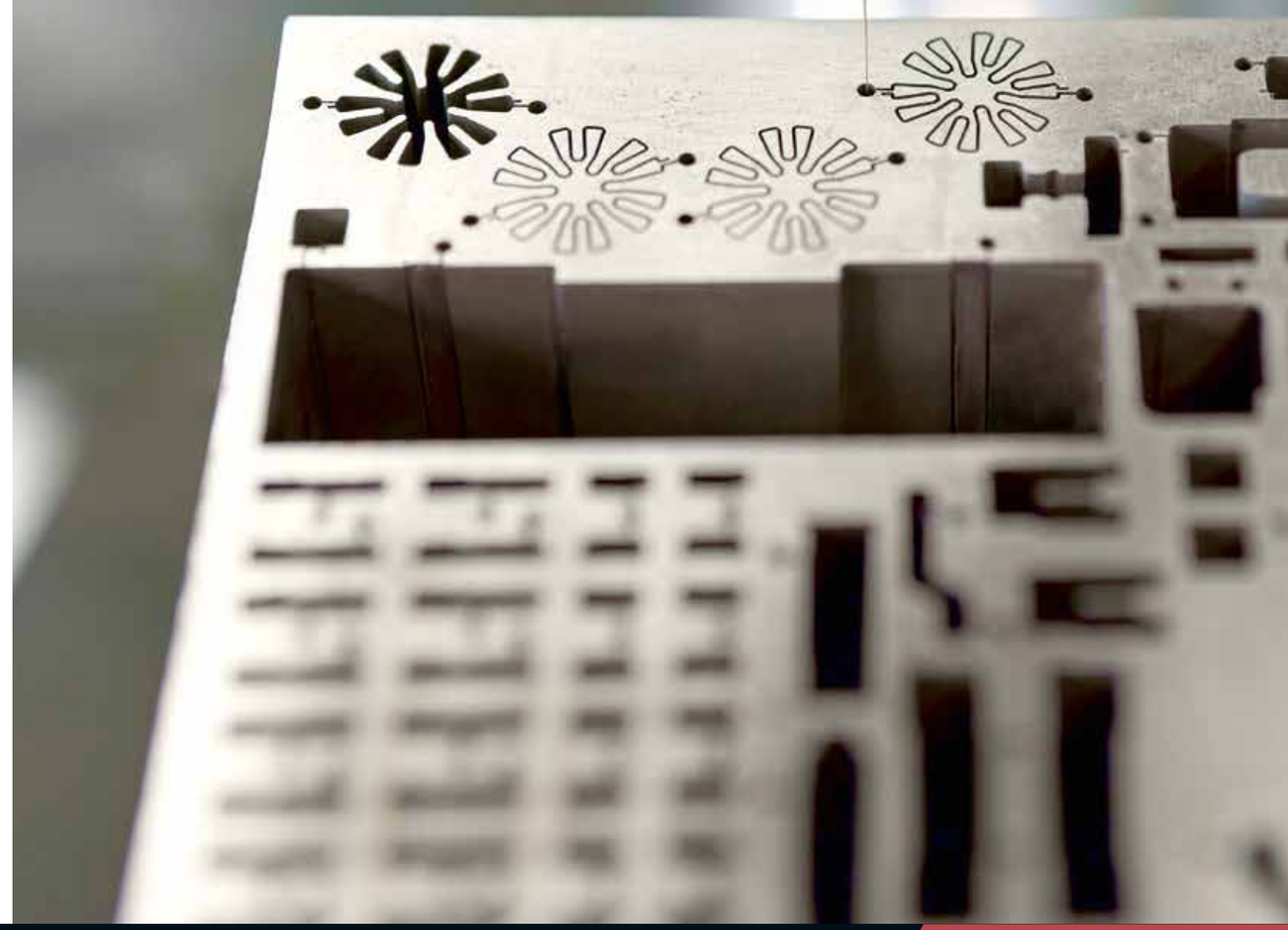
At Kleiner, the wire EDM machines typically run around the clock. During the supervised shifts between 7 a.m. and 4 p.m., they are set up by skilled workers and monitored by a technician until 10 p.m. After that, they continue to work unattended throughout the night.

Comfortable and Future-Oriented

As Rudi Flag confirms, other features of the MP1200 Connect and MP2400 Connect wire EDM machines are particularly advantageous. He mentions the large touchscreen interface, saying, “The app-like, graphically supported interface especially appeals to younger employees, who are familiar with similar structures from smartphones and can get up to speed very quickly.“ Flag is also fully satisfied with the precision of Mitsubishi Electric‘s wire EDM machines. “We process components

Our three MP1200 Connect and six MP2400 Connect machines operate very reliably and with high process security.

Oliver Weißenrieder, Head of Tool Manufacturing at Kleiner GmbH Stanztechnik



Productive utilization of night shifts.

Kleiner Stanztechnik

with highly economical brass wires ranging from 0.1 to 0.2 mm in diameter with precision up to 2 µm and surface quality of Ra 0.12 µm," he explains.

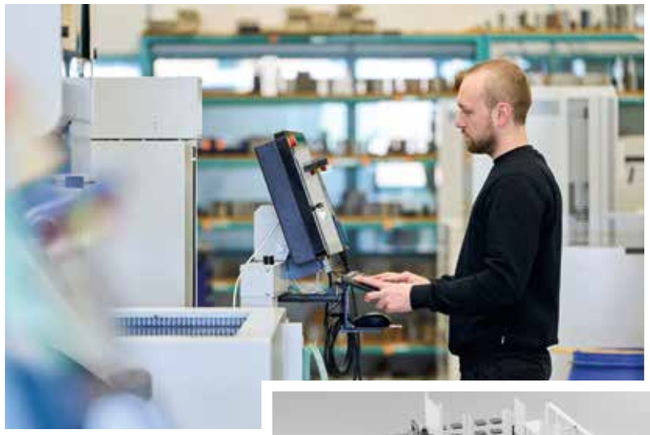
Weißenrieder adds that Mitsubishi Electric's wire EDM machines meet all current technical standards. He is also convinced that they receive expert advice and support from Mitsubishi Electric's innovative specialists. "The technicians in Ratingen are always available with qualified service and gladly take our suggestions for improving specific functions and software updates into consideration. This allows them to continuously develop wire EDM processes and machines in collaboration with users. Mitsubishi Electric proves to be the ideal partner for us when it comes to innovations in wire EDM," Weißenrieder emphasizes.

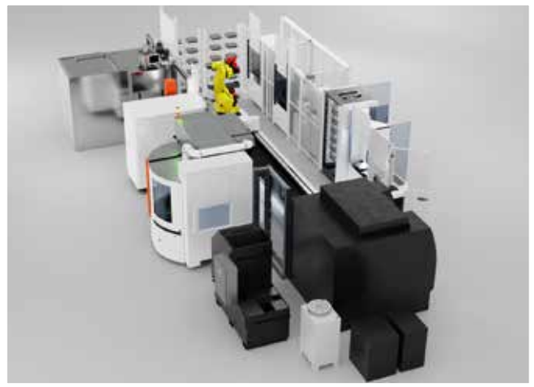
Contributing to the Energy Transition

Kleiner GmbH Stanztechnik considers advancing the transition to renewable energy as crucial for its continued business development. The company already generates around 45% of its required electrical and thermal energy through solar panels on its industrial buildings and its own combined heat and power plant. The production facility is certified under ISO 50001 for energy management and ISO 14001 for environmental management.

Currently, the specialists in Pforzheim manufacture a wide range of stamping tools and sheet metal parts in large quantities, mainly for the automotive industry, e-mobility, and other renewable energy sectors contributing to the energy transition. These include highly precise and reliable connectors for high and low voltage applications as well as data transmission in vehicles.

Proven and popular: Due to their comprehensive advantages, Kleiner in Pforzheim prefers wire EDM machines from Mitsubishi Electric.





Economical in series production: the automated cell at Kleiner.

The sheet metal parts are made from thin steel, copper, and brass sheets using high-speed stamping presses, which operate at up to 1,000 strokes per minute. The complex progressive dies used can be up to 3,000 mm in length, often incorporating additional steps like riveting, welding, or laser welding.

The experts in Pforzheim design and manufacture the required forming concepts, tools, and their components themselves, working with 3D CAD systems at three workstations. The toolmaking department is equipped with modern machines and processing centers, including milling, high-speed cutting (HSC) milling, EDM,

Fully automated thanks to the KLEINER production cell.

Kleiner is one of the few toolmakers in Germany to produce tool components entirely operator-free in a fully automated production cell. Raw blanks, clamped on a zero-point clamping system, enter the automated process via a buffer storage system. An integrated robot places the workpieces, according to the production sequence, into one of two HSC 3-axis machining centers or a sinker EDM machine. Afterward, the robot transports them to a cleaning station and, depending on the need, to either a tactile or optical measuring device. Once the components meet the required tolerances, they are sorted out into a buffer storage area. If certain contours need reworking, the robot brings the workpieces back to the respective processing stations. As Oliver Weißenrieder explains, this fully automated production cell is especially effective for tool components that need to be repeatedly manufactured as spare parts in small series. "With automation, we significantly reduce lead times and ensure availability for spare parts," he explains, highlighting the advantages of the automated production cell.

Precision down to the last detail: prototype parts that can be manufactured using the production cell.

*With the **MP1200 Connect and MP2400 Connect** from Mitsubishi Electric, we have made the **right choice.***

Oliver Weißenrieder, Head of Tool Manufacturing.

and grinding. Oliver Weißenrieder highlights that the toolmakers in Pforzheim now reliably perform hard machining such as milling hard metals on 3D HSC machining centers. However, he emphasizes, “Wire EDM remains an irreplaceable machining process for toolmaking, despite the long processing times. Only with wire EDM can we manufacture many of the complex geometries and contours required for punches and dies.

In fact, wire EDM accounts for around 50% of our total toolmaking capacity. Therefore, it is especially important for us to work with reliable, economical, and energy-efficient wire EDM machines. With Mitsubishi Electric’s MP1200 Connect and MP2400 Connect, we’ve made the right choice.”

Wire EDM is indispensable for manufacturing high-quality progressive dies used for stamping complex sheet metal parts.

Kleiner GmbH Stanztechnik

Founding year
1985 in Königsbach-Stein

Managing Director
Managing Partner: Thomas Kleiner
Managing Director: Joachim Hartrumpf

Number of employees
320 employees, including 30 apprentices.

Core business
Concepts, design, and manufacturing of reliable precision stamping and forming tools suitable for large series, with integrated assembly steps for producing highly accurate electrical and mechanical connectors (busbars, contacts - EloPins) from thin steel, copper, and brass sheets for the automotive, energy, electronics, and mechanical engineering industries. Fixture construction for automating production around high-speed stamping presses.

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mcAnywhere Live

Instant Service without Travel Costs

In modern manufacturing industry, quick response times and efficient maintenance are crucial factors in ensuring reliable production. Mitsubishi Electric has developed mcAnywhere Live, a service that allows an experienced service technician to take a look at your EDM machine without travel costs and long journey times.

The whole system works without software installation; it only requires a connection with a smartphone or tablet that enables video and audio transmission.

This way, the service technician can directly examine the problem together with the operator and help resolve it in a structured manner.

mcAnywhere Live - Service without travel.

Quick Help Through Real-Time Communication

With mcAnywhere Live, machine operators can establish a live connection to a Mitsubishi Electric service technician directly through their smartphone. The technician sees exactly what the smartphone camera captures and can guide the operator through visual cues on the smartphone display. This innovative form of remote diagnostics allows many technical challenges to be immediately identified and solved without losing valuable time due to travel. Direct visual communication offers crucial advantages: The service technician can see in real-time which components are affected and give precise instructions to the operator. Through the ability to make visual markings on the operator‘s smartphone display, the technician can show exactly which areas need to be checked or which settings need to be adjusted.

Sustainable and Contemporary

The ecological benefits of mcAnywhere Live are considerable: By eliminating travel distances that often amount to several hundred kilometers, significant amounts of CO2 emissions are saved. In times of increasing environmental responsibility, this is an important contribution to sustainability in the service sector of the manufacturing industry. Furthermore, this digital approach meets modern requirements for efficient and flexible service solutions. The combination of immediate availability and environmentally conscious action makes mcAnywhere Live a forward-thinking service concept.

Simple Handling for Maximum Flexibility

The use of mcAnywhere Live has been deliberately designed to be as simple as possible. The absence of complex software installations and the exclusive use of a smartphone with access to the provided portal enable a particularly low-threshold and flexible use of the service. This simplicity in handling is especially important in situations where quick help is needed. The intuitive operation allows even less tech-savvy employees to use the service without problems. This is a decisive advantage over more complex remote service solutions that often require extensive training.

Conclusion

With mcAnywhere Live, Mitsubishi Electric sets new standards in technical support for EDM machines. The successful combination of state-of-the-art communication technology, fair pricing model, and simple handling makes the service an indispensable tool for future-oriented manufacturing companies. The immediate availability of expert support minimizes machine downtime and thus significantly contributes to the optimization of production processes. By eliminating unnecessary travel, an important contribution is also made to cost reduction.

Cost-Efficient and Fair

The mcAnywhere Live service is based on a particularly customer-friendly concept: The cost of 399 euros is only charged if the problem could be successfully resolved. If the remote diagnosis is unsuccessful, no costs are incurred by the customer. During the warranty period, the mcAnywhere Live service is completely free of charge. This transparent and fair pricing underlines Mitsubishi Electric‘s confidence in the effectiveness of the service and minimizes the financial risk for the customer. This approach allows companies to use the service without hesitation, as they have the certainty of only paying for successful problem resolutions.

This is particularly important in situations where quick help is needed but the cause of the problem is initially unclear.

Learn more ...
www.mitsubishielectric-edm.eu/mcanywhere-live-en

Travel costs and time effectively saved

The 1.4 mm diameter diamond ball, soldered onto a brass carrier, was machined using a rotary device on an MV1200R through electrical discharge machining.

Amiet AG Präzisionswerkzeugbau

Wire and sinker EDM crown the precision engineering services.

Switzerland is a birthplace of precision mechanics, from watches and machine tools to railway technology. Due to the widespread passion for accuracy and tinkering among the population, even in smaller communities you can find craft businesses that produce flawless high precision. This is also true in the partly rural town of Herisau. In the basement of a multi-family house with an extension, there is a small yet highly efficient precision engineering workshop. Here, ten employees manufacture custom high-tech components for the medical technology, precision mechanics, and mechanical engineering industries.

High-Precision Land: Operations Manager Roger Brändle inspects a diamond ball with a diameter of only 1.4 mm, machined using wire EDM.

Design is far from production: The designer is only concerned with the narrow metal strip with the cutout. Amiet recommended a more suitable material and designed a clamping fixture in which 20 sheets could be stacked and cut simultaneously.

“We originally started in 1964 purely as a contract manufacturer for stamping tools. Since then, we‘ve evolved into a versatile producer of complex precision components,“ says Roger Brändle, Operations Manager of Amiet Präzisionswerkzeugbau AG in Herisau, Switzerland. The small company currently operates four Mitsubishi wire EDM machines: an FA20 over 20 years old, two MV1200Rs, and an MP2400 Connect acquired in 2023. Additionally, they have a Mitsubishi sinker EDM machine, the SG12S, and an older start-hole drilling machine. The ten employees also have access to a wide range of CNC-controlled machine tools and the 3D-CAM software, with three workstations in the office and three more directly at the EDM machines.

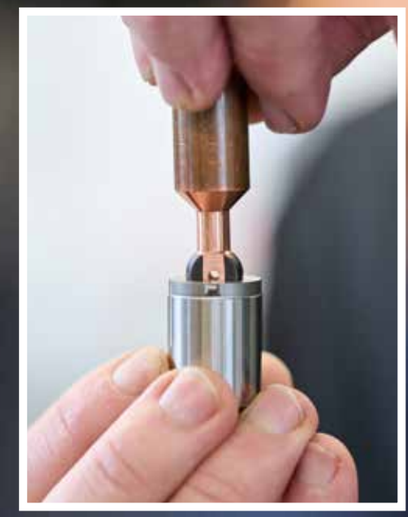
Vacuum hardening furnace.

Broad Range of Technology

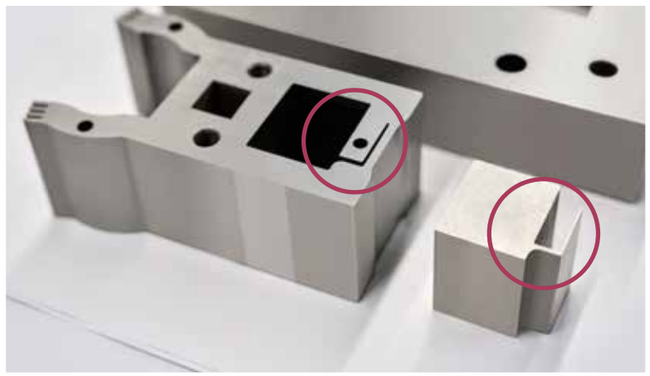
“To meet the diverse needs of our customers, we use a variety of other technologies,“ adds Bruno Bon, wire EDM specialist at Amiet. Their equipment includes two 3-axis and two 5-axis CNC milling centers, four CNC lathes, a CNC cylindrical grinding machine, and two laser engraving systems. In addition, they have conventional cylindrical and surface grinding machines and a highly accurate Wenzel LH 65 coordinate measuring machine, located in a separate, climate-controlled room.

A key feature of Amiet is flexibility and quick response, especially for urgent orders. Customers benefit from a flat hierarchy and extensive machinery. A particularly important asset is their in-house heat treatment facilities, including a high-tech hardening system with a pressure chamber up to 5.5 bar, offering case hardening, hardening and tempering in a protective gas, and vacuum

Thanks to the C-axis, the electrode can continue to erode while rotating after fully penetrating the workpiece, allowing for the creation of features such as a bayonet lock.



Highly focused: Bruno Bon at the controls of a Mitsubishi Electric MV1200R Connect wire EDM machine.



For long, thin contours cut from solid material with wire, the risk of geometry changes due to released internal stresses must be taken into account.

hardening and tempering. They also have conventional hardening and tempering ovens with protective gas supply, and quenching can be done in air or oil. This complements the variety of materials they handle, with a focus on steels and special steels, including powder-metallurgical materials. Thanks to their in-house hardening capabilities, Amiet can respond quickly and flexibly to deadlines, occasionally conducting hardening treatments overnight. Besides steel, they also work with various non-ferrous metals and special materials. Their clients come from sectors such as medical technology, food processing, mechanical engineering, and occasionally stamping and forming technology.

In such cases, they work with customers to find optimal solutions. For instance, long, thin contours cut from solid material using wire EDM need careful consideration of geometry changes due to released internal stresses. For smaller parts or complex geometries, the order of processing steps can also be critical. Clamping techniques can be particularly challenging when dealing with components measuring just a few millimeters or even fractions of a millimeter. The Amiet team is always ready to offer customers useful advice and suggestions for improvement from the moment an inquiry is submitted.

Partnership in Development with Customers

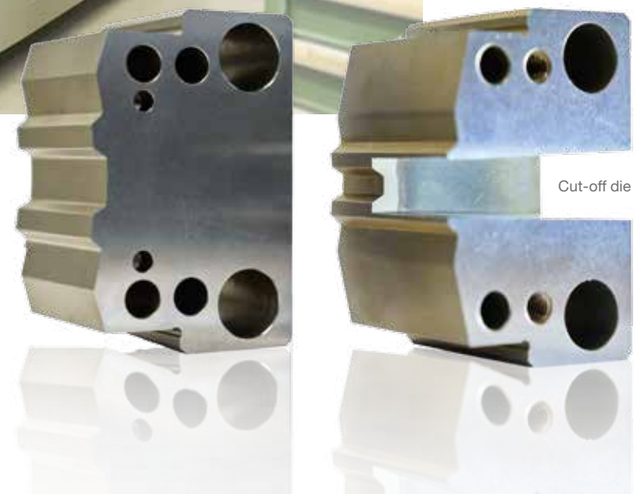
"Consulting with our customers is a natural part of our service package," explains Roger Brändle. Sometimes, when an inquiry comes in, it's clear that alternative material choices or geometry options could make the component easier, cheaper, or faster to produce.

The cutouts of this crimping tool feature a polygonal geometry.

53
hours of
machining time

The job to machine this gauge with 540 holes runs for a full 53 hours.

The latest addition in the area of wire EDM is the high-precision machine MP2400 Connect.



Cut-off die

Choosing the Mitsubishi Electric MP2400 Connect
"We were one of the first users of Mitsubishi wire EDM machines in Switzerland," recalls Bruno Bon. The recently purchased MP2400 Connect is the seventh machine they've sourced from the japanese manufacturer. The older machines were decommissioned after more than 20 years of service due to increasing maintenance needs, but they were still in good enough condition to be sold. The motivation behind acquiring the MP2400 Connect was its higher precision and performance compared to their existing systems.

In addition to its high accuracy of 2 µm, the new machine impressed them with its precise rethreading in the cutting gap, even for tall and interrupted workpieces. Other advantages included the superior surface quality of cut edges, up to Ra 0.05 µm, and the automatic power unit adjustment to accommodate variations in wall thickness. They also experimented with alternative wire diameters on the new machine, achieving up to 20% faster cutting speeds by using 0.3 mm wire instead of the standard 0.25 mm. The highly reliable automatic threading allows for long jobs to run overnight or over the weekend.

Mitsubishi: A Reliable Technology Partner
"When looking for a new machine, we did consider other options," reveals Bruno Bon. After thorough evaluation, they decided to stick with their long-time supplier. Ultimately, their many years of positive experience with the precision and reliability of Mitsubishi Electric's technology were decisive. Even when issues arose, service was fast and competent. Other advantages included

Automatic threading for long jobs.

*With **Mitsubishi**, we have a **partner that provides powerful and reliable technology** and, in case of emergency, quickly offers support and assistance—and that's what counts.*

Roger Brändle, Operations Manager of Amiet Präzisionswerkzeugbau AG.

Carousel changer for the electrodes of the Mitsubishi SG12S sinker EDM machine.

excellent hotline support and the familiarity of the team with operating the machine. Since installing the new MP2400 Connect, they've had hardly any problems. "With Mitsubishi, we have a partner that provides powerful and reliable technology and is quick to offer help and advice when needed—and that's what counts," concludes Roger Brändle.

The Mitsubishi SG12S sinker EDM machine features 4 axes: X, Y, Z, and the C axis.

Amiet AG Präzisionswerkzeugbau

Founding year
1964

Managing Director
Richard Weng

Number of employees
12

Core business
Amiet AG specializes in the rapid production of complex precision components, delivering prototypes, single parts, or series. The company boasts a comprehensive range of state-of-the-art machine tools and a tightly connected network of reliable partners for supplies and services. Delivery deadlines are guaranteed, and product quality is ensured through the use of high-quality measurement technology, including the generation of the required inspection reports.

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Grinding wheel dressing via EDM

exceeds the limits

Revolution in the Grinding Process: EDM Technology and its Advantages

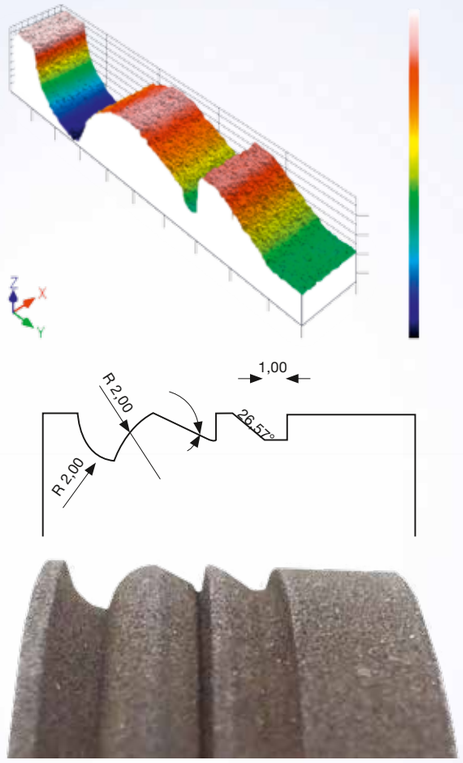
The technology of electrical discharge machining has achieved impressive progress in the field of grinding technology. With an increase in feed rate of up to 280 percent and significantly longer service life of grinding wheels, this method opens new horizons in manufacturing. These advantages clearly demonstrate why this technology represents a real competitive advantage.

Complex Geometries and Optimal Microtopography

Professor Dr.-Ing. Bahman Azarhoushang from Furtwangen University is an internationally recognized expert in the field of machining, with over 55 publications in various languages. As the head of the Competence Center for Machining at HFU he emphasizes the main advantages of this technology: “The creation of very complex profiles and the optimal microtopography on the circumference of the grinding wheel ultimately lead to significantly higher productivity in grinding technology.“

Industry Experiences

Markus Steinhilb, Head of Application Technology at Riegger Diamantwerkzeuge GmbH, a company that uses Mitsubishi EDM-Dress itself, shares his practical experience: “Productivity is significantly increased as we can work with lower grinding forces. This allows us to substantially increase feed rates and thus work faster and more productively - with consistent or better service life of the grinding wheels.“



Concave and convex profiles

*The creation of very **complex profiles** and the **optimal microtopography** on the circumference of the grinding wheel ultimately lead to significantly **higher productivity** in grinding technology.*

Prof. Dr.-Ing. Bahman Azarhoushang, Head of the Competence Center for Machining, Furtwangen University

TO THE VIDEO
Scan now
www.mitsubishielectric-edm.eu/azarhoushang

High-Precision Grinding Machines and Their Advantages

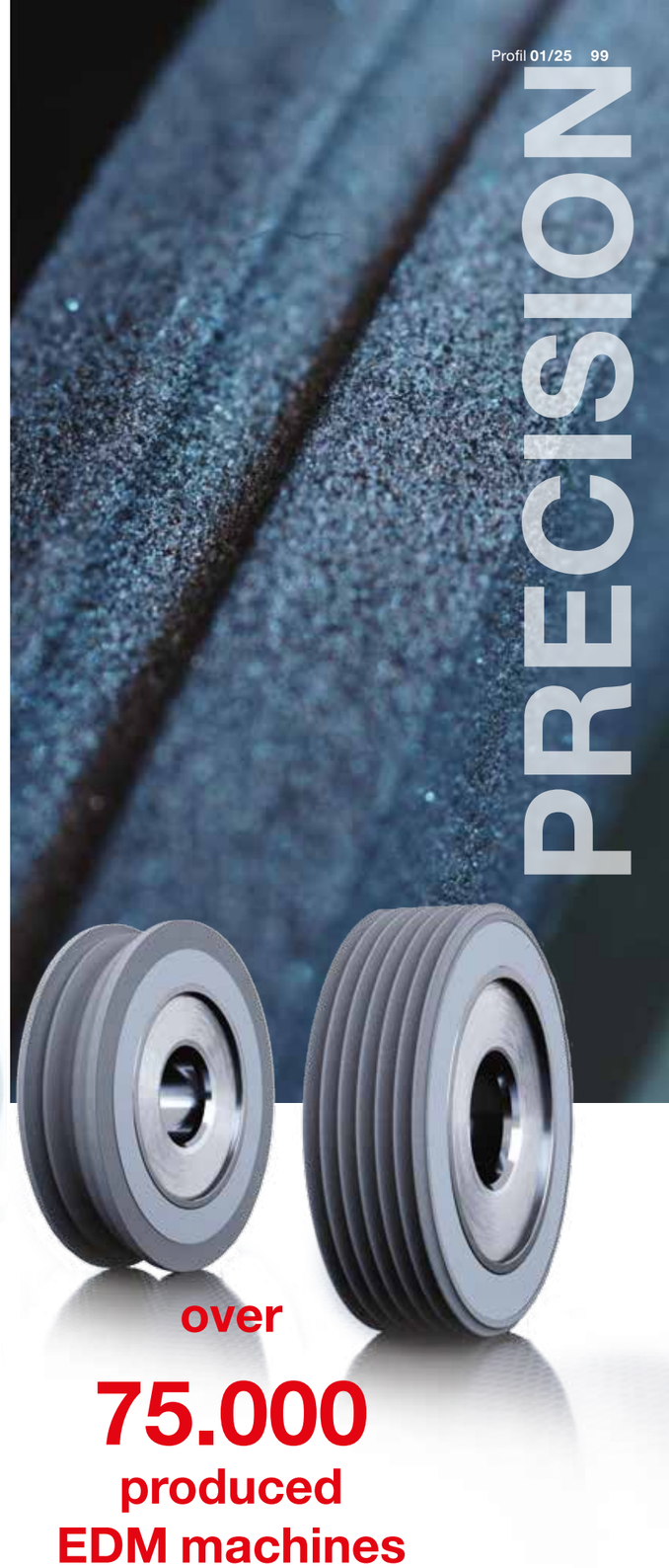
Heiko Zimmermann, Sales Manager Europe at Adelbert Haas GmbH, a leading manufacturer of high-precision grinding machines, reports from practice: “A defined process and the ability to dress wheels in package sets make the processing of your tools incredibly efficient. That‘s why we prefer erosively dressed grinding wheels for various applications.“

More Profit and Higher Competitiveness

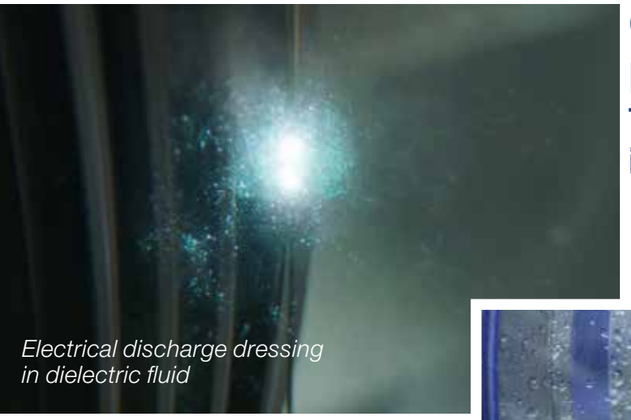
Mitsubishi Electric, a global leader with over 75,000 produced EDM machines, sees clear advantages for its customers. Hans-Jürgen Pelzers, Sales Manager Europe, explains: “Dressing grinding wheels is a secondary matter where we can save money. At the same time, we increase grinding performance and thus significantly boost the profit of each grinding machine. This leads to increased competitiveness in the global environment.“

Impressive Service Life and New Possibilities

A decisive advantage of electrical discharge dressing is the significantly extended service life of grinding wheels. Hans-Jürgen Pelzers emphasizes: “The first AHA effect is usually the service life. Customers see that they can achieve double, triple, or even quadruple service lives with an erosively dressed grinding wheel.“



over
75.000
produced
EDM machines



Electrical discharge dressing in dielectric fluid

Clean process - takes place in water.

Conclusion:

At Least Worth Considering

The technology of electrical discharge dressing not only offers the possibility to significantly influence the quality of the end product but also to produce contours that were previously impossible. The increased productivity and diverse applications make this technology a worthwhile investment for any manufacturing operation.

Overall, it is evident that Mitsubishi EDM-Dress is not only a technological advancement but also makes a significant contribution to efficiency and competitiveness in manufacturing.

Furthermore, EDM-Dress is an industrial process that addresses the skilled labor shortage by operating unmanned - and the results are 100% repeatable.

Companies should therefore carefully consider when they want to implement these many advantages for the competitiveness of their own manufacturing.

EDM-DRESS VIDEO

Scan now!

www.mitsubishielectric-edm.eu/edmdress-video

Horoscope 4.0

for hard-wired EDM experts.

Capricorn

22 December – 20 January

This week, your EDM process matches the precision of an MV-R Connect: focused and efficient. But, like automatic wire threading, unexpected sparks may fly. An unforeseen project offers the chance to showcase your technical creativity. Keep the tension high without the risk of a short circuit. Your motto: “Precision is no accident.”

Aquarius

21 January – 19 February

Saturn stabilizes your creative energy, much like the performance of an SG-R. Use this phase to explore new technologies. An unexpected breeze might blow through the opening of the dielectric tank—stay open to surprising encounters. A new connection could prove to be more powerful than anticipated.

Pisces

20 February – 20 March

This week, you glide smoothly through the dielectric fluid like a fish through its pond. Your adaptability brings innovative adjustments to your SG-R. However, be careful that your dreams don‘t drift too far from the electrode. An unexpected piece of advice will provide the grounding you need. Let yourself be carried to new horizons, but don’t forget the operating manual.

Cancer

22 June – 22 July

Like the gentle waves of an EDM bath cooling and protecting the workpiece, you are surrounded by emotional and familial warmth during this time. Explore interpersonal relationships with the same care you dedicate to the surface finish of your workpieces, and strengthen harmony in your personal circle to ensure flawless results.

Leo

23 July – 23 August

Saturn‘s moon Titan illuminates your inner stage. Like a finely tuned EDM machine specializing in complex shapes, you are now ready to boldly reveal your true self. But be cautious: not every material lives up to its promise. Measure your steps and emotional outbursts with the precision of a MX900 to achieve success.

Virgo

24 August – 23 September

Your attention to detail is your greatest asset this week, much like a finely tuned wire EDM machine. The key to success lies in the precision of your plans. Flexibility will help smooth out any surface roughness. Trust in your adaptability, even if an unexpected economic shift throws your parameters off course.

Aries

20 March – 20 April

Your energy pulses like the voltage in the generator.This month challenges you to put your skills to the test. You may find yourself in uncharted territory, much like switching from brass to molybdenum as EDM wire. Be ready to learn and adapt. Keep the tension high, but don’t overestimate your limits.

Taurus

21 April – 21 May

As Phobos and Deimos, the moons of Mars, undergo a rare conjunction, your EDM process finds a new rhythm, much like a precisely calibrated wire EDM machine. Let your creative sparks fly in controlled paths. Patience is key, and soon, brilliant results will await you both at work and in matters of the heart.

Gemini

22 May – 21 June

Navigate through technical challenges like an MV-R during automatic wire threading. But beware: Mercury’s retrograde could disrupt your lines of communication. Stay calm and clear to avoid any short circuits. A well-defined process will lead to success—both in your projects and in your relationships.

Libra

24 September – 23 October

Balance is your middle name. Find harmony between precision and speed, much like a modern EDM system. You might discover an innovative solution, akin to the perfect setting for a finishing pass. However, don‘t let yourself be overwhelmed by the needs of others. Even a scale must be recalibrated occasionally to maintain its precision.

Scorpio

24 October – 22 November

In this cycle, you are entering a phase of transformation, much like the shift from raw material to a masterfully eroded workpiece. Be prepared to break old patterns and explore new strategies. Your ability to identify and solve core issues will lead you to new horizons, not only in the workshop but also in personal matters.

Sagittarius

23 November – 21 December

The moon Europa ignites your experimental side. Imagine a new sinker EDM machine, ready to conquer unknown materials. Now is the time to expand both professional and personal boundaries, but be cautious: the key to success lies in balancing your removal rates. Maintain a steady pace, and success will surely follow.

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

The Art of Economy

Publicise your Profile!

Would you and your company like to be in the next edition?

Then write to us!

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