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MITSUBISHI ELECTRIC

Issue **02/17**

MITSUBISHI ELECTRIC

The Art of Economy

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The smart magazine for users.

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Gruner AG

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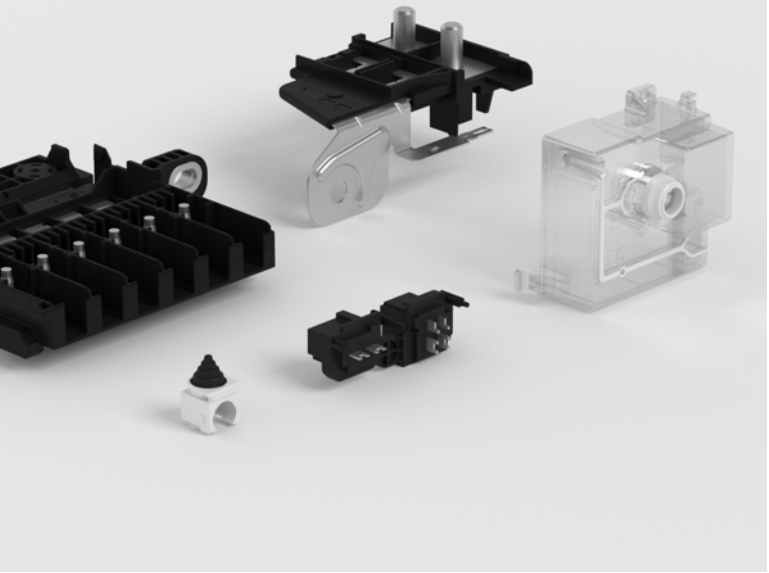

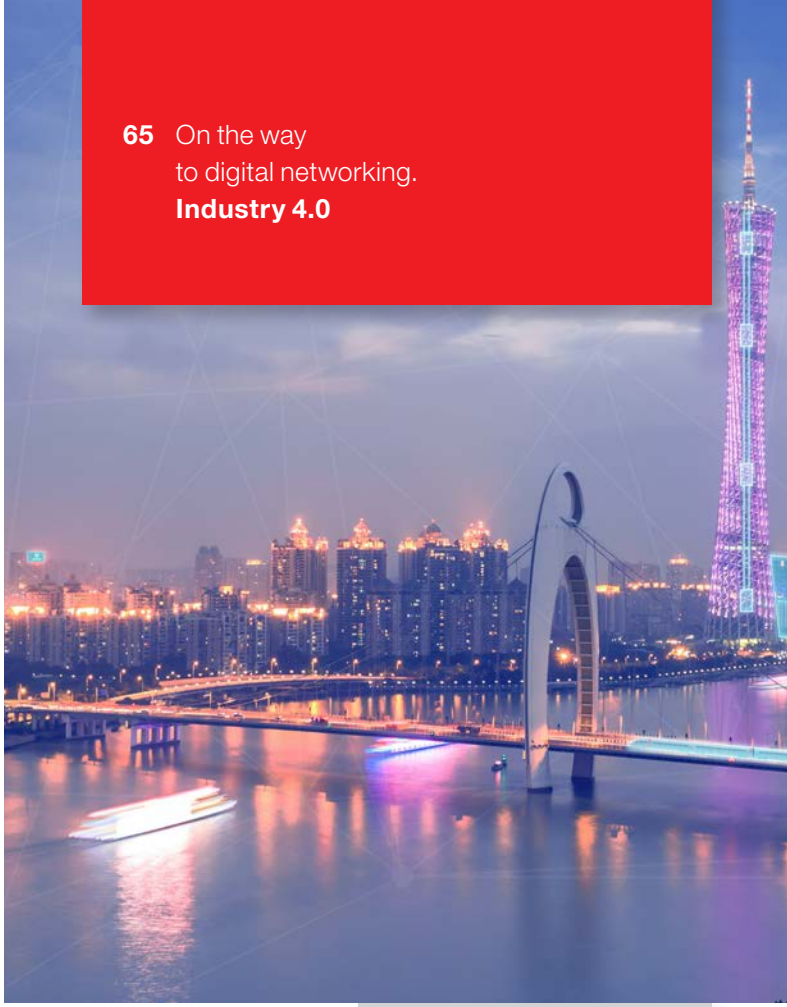

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Editorial

> “A good tool is half the job.”

Hungarian proverb

Hans-Jürgen Pelzers

The rapid progress in mould- and tool-making means bigger challenges but also bigger opportunities.

Replacing costly grinding processes with less expensive wire cutting, Celoplás (page 12) in Portugal produces moulds for exceptionally intricate lattice structures.

With 40 of its own employees in tool-making, Gruner AG (page 20) is able to respond quickly to market requirements. In doing so, it is strongly supported by its digitised machining processes.

With tools measuring 1.68 m² and weighing 10 tonnes, Csaba Tools (page 28) in Hungary really means business. Inclusive of intricate design details.

Mitsubishi Electric has identified the changing needs of mould- and tool-makers, listened carefully, and integrated a number of useful functions in the new MV-R Connect wire-cut EDM series. This is where the extra scope and user-friendliness really make sense – and add to the pleasure of machining.

And I wish you the same pleasure when reading this issue of *Profile*.

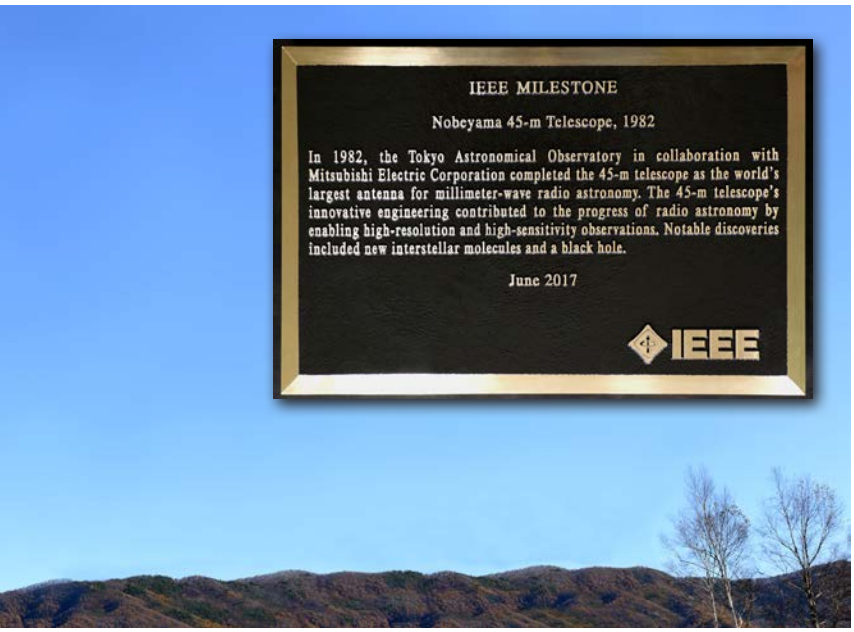
Hans-Jürgen Pelzers
from the Technology Centre in Ratingen.

News

Mitsubishi Electric to support relief efforts following severe rainstorm

Mitsubishi Electric Group companies will donate a total of five million yen (approximately 37,000 euros) to aid victims of a severe rainstorm that hit Japan’s northern Kyushu region on 5 July. The Mitsubishi Electric Group expresses its deepest sympathies to those affected by the disaster and extends its sincerest wishes for a speedy recovery.

Enjoy your read of this issue!



World's largest millimetre-wave telescope recognised as "IEEE Milestone"

The Nobeyama 45-m Radio Telescope, developed by the National Astronomical Observatory of Japan and Mitsubishi Electric, has been certified as an "IEEE Milestone" by the Institute of Electrical and Electronics Engineers (IEEE). The certification recognises the many technical difficulties that were overcome to develop the world's largest millimetre-wave radio telescope at the time of its debut in 1982, leading to groundbreaking achievements such as the discovery of a supermassive black hole while continuing to perform as a world-leading radio telescope to the present day.

Mitsubishi Electric completes new satellite component production facility

Mitsubishi Electric has completed the construction of a facility that will double the satellite component production capacity of its Kamakura Works' Sagami Factory in Sagamihara, Japan. The new facility, Mitsubishi Electric's core production and testing site for solar array panels, structural panels and other satellite components, is expected to help grow Mitsubishi Electric's share of the global satellite market. Together with a new satellite production facility, which is planned to be completed in July 2019 at the Kamakura Works, Mitsubishi Electric is targeting space-related revenue of 150 billion yen (approximately 1.1 billion euros by 2021).

Mitsubishi Electric's latest generation of the MELFA FR robot family

At the Hannover Fair, Mitsubishi Electric premiered the new MELFA FR robots in Germany. This robot series is the refinement of the successful F Series and offers an improvement in overall performance. Even shorter cycle times boost productivity; new connection points and intelligent functions extend the robots' range of applications. The proven double-arm design of the MELFA articulated-arm robots ensures not only maximum freedom of movement but also extra stability and flexibility of use.

Founded in
1994

30
employees

Electrode production,
tool-making, subcontracting

GEZEA GmbH

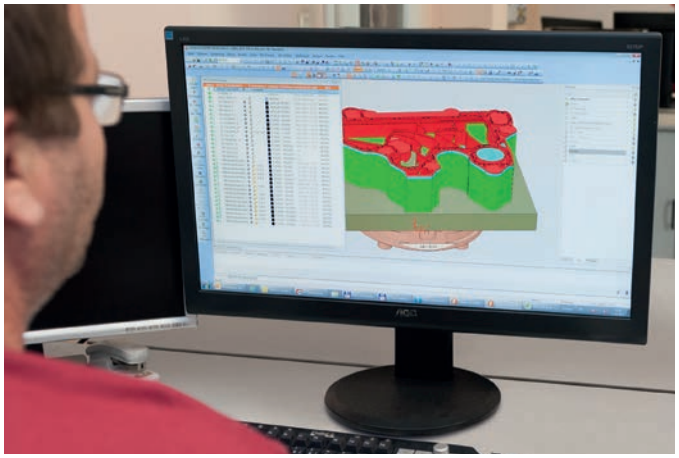
The benefits of networking.

Production partners for added value.

The specialist in graphite electrodes and tool-making.

GEZEA, the specialist in graphite electrodes and tool-making in Eisenach, Germany, fosters close relationships with its customers. But it is not only customers, but also the industry as a whole that benefits from its decades of experience.

Wall thicknesses of just a few millimetres and intricate geometries – Frank Köllner proudly holds an extremely complex graphite electrode in his hands. It will soon be used in the production of a mould for the casting of engine housings. “Such intricate and complex geometries are difficult to achieve with copper. Graphite is much better suited,” says Köllner. The Technical Manager of GEZEA GmbH ought to know, as the company that he co-founded more than two decades ago specialises in the production of graphite electrodes, one of a select few in Germany. “Because of the peculiarities of the material, even today not many tool-makers are keen to produce graphite electrodes themselves,” Köllner explains.



Highly complex geometries have their origin in the CAD department.

Tool-maker Oliver Beschta and Managing Director Frank Köllner are capacities in the field of mould-making.

GEZEA is the German acronym for the Graphite, High-Speed Cutting and EDM Centre in Eisenach. The production of graphite electrodes is the company's original activity and forms its largest business area. But this is not all that the Eisenach company is known for. From planning and design in the CAD/CAM department to milling, wire-cutting and die-sinking, GEZEA is conversant with all tool-making processes – and all this with 3 and 5 axes, of course. With four high-speed cutting machines for graphite and copper, five CNC machining centres for metal, and five wire-cutting and die-sinking EDM systems, there is not much that GEZEA is not capable of. With its large machine park, GEZEA is also able to accommodate surges in order levels, but

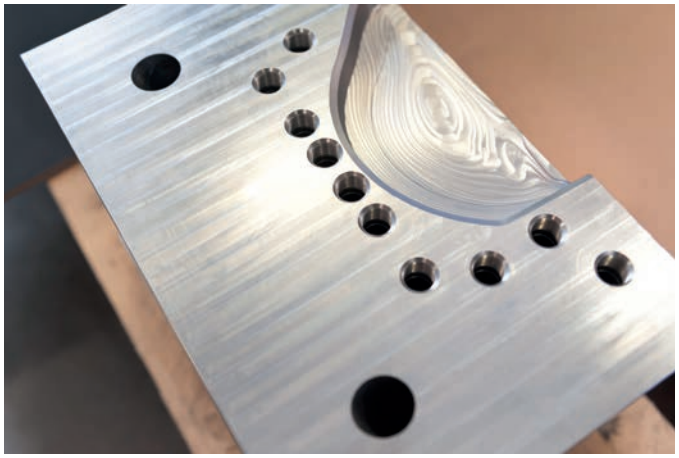
Graphite electrodes

According to the German Association of Tool-makers (VDWF), EDM with graphite electrodes is on the advance. Which is not surprising, as graphite has a number of advantages over copper. First and foremost, carbon, i.e. graphite, expands much less on exposure to heat. The outcome is exceptionally high contour and dimensional stability. In addition, graphite electrodes are significantly lighter than those of copper. Certain jobs are also performed better with graphite. Depending on the machine employed and the tool, time can also be saved with graphite electrodes as well.

With its own CAD/CAM department, GEZEA supports its tool-makers in the planning and design of new moulds. Every single electrode produced is checked with a 3D measuring system before delivery to the customer. The clamping device, a rented EROWA electrode holder, is supplied with each one. Affixed to this is an RFID chip containing identification data with which the user can access the associated database. The electrodes from GEZEA are thus ready for immediate use.

Another advantage is that each electrode is unambiguously marked, as it is permanently connected to the holder – so the risk of mistaken identity is ruled out. Since GEZEA has been an authorised dealer for SGL Carbon, the Eisenach has been trading with graphite itself, cutting the material to customer specification. For every application, from roughing to fine finishing, GEZEA supplies customers with the matching grade of graphite.

EDM with graphite is on the advance.



The production of graphite electrodes is the company's original activity and forms its largest business area. But the Eisenach company is now at home in all areas of mould-making.

its self-conception runs further. "Tool-makers today are under enormous pressure when it comes to producing new tools. Not many have all the necessary processes on their site – for good reasons, because it makes more sense to network closely and in the long term with specialists like us. This way we take a weight off the customer's shoulders and make it possible to steer a project in the right direction from the beginning and achieve positive results," says Köllner outlining the company's philosophy.

Always one step ahead of the customer

Because GEZEA, in addition to producing graphite and, incidentally, copper electrodes, has a complete grasp not only of the theory of the various steps and procedures in tool-making, but also puts them into practice on a daily basis, customers can benefit hugely from close cooperation. To secure this extra value for customers, the company has committed itself to an ambitious principle. "It is our aspiration to keep our level knowledge if possible one step ahead of the customer's," says Köllner. This includes regularly upgrading the machines. The most recent investment was in an MP2400 from Mitsubishi Electric, which replaced two older models from the Japanese manufacturer. An FA20S from Mitsubishi Electric will continue to do good service for a while yet. "We've been using EDM systems from Mitsubishi Electric since we founded the business," says Köllner. The new machine, he continues, is the fifth generation from Mitsubishi Electric in use so far at GEZEA. This brand loyalty is all the more remarkable when one learns that Köllner used to work as an applications technician for a different manufacturer of EDM systems. "Put it this way: my former employer didn't exactly give me wholehearted support for the founding of my company. On the other hand, Mitsubishi Electric saw potential even in a new and small business. On top of this, we've never had any problems with the Mitsubishi Electric machines and have managed to master all our jobs."

Köllner founded the business with a partner in 1994. "At the time, we could see growing demand for graphite electrodes," he says looking back. But at the time, and as is the case today, smaller firms in particular don't have the production expertise, and the machining of graphite calls for special protective measures. To set up his own business, Köllner, who was working at the time in Baden-Württemberg, returned to his home town of Eisenach. The young business's first address was at a start-up centre only a few hundred metres from the business's current location. "Our first customers came mainly from the immediate region," Köllner recalls. The start-up centre

proved to be too constraining after only a few years. With what were then 10 employees, the company moved to its present site at the end of the Nineties.

Inspired management duo

At its new business location, GEZEA has grown enormously through to the present day – in size and in terms of workforce. The company currently has 30 employees, and the production shops have been regularly extended – most recently, the office building. Expansion has meanwhile reached its spatial limits. "There's no more room for further growth at this site. But we reckon we'll manage okay for the time being," says Köllner. In the running of the company there have also been changes. Köllner's longstanding business partner retired in 2011 and has been replaced by Frank Köllner's son Henning. Henning has not only injected new ideas, but in close collaboration with his father has changed the company's strategic orientation in his capacity as Commercial Director. Father Frank today holds the position of Technical Manager. The company's re-orientation also includes sustainability. In a current project, GEZEA is installing a central cooling system. "We produce vast quantities of heat here. The idea is to intercept the heat and exploit it and improve the quality of our products at the same time," explains Process Manager Manuel Schwalbe. By exposing the machines to less heat, it is possible to improve product accuracy still further.

Another factor in the business's success is its close networking within the industry. GEZEA is a member of the German Association of Tool-makers (VDWF) and offers technology seminars in this context. This way

The GEZEA vision

To achieve perfect results for the customer efficiently and innovatively and with as little red tape as possible, GEZEA has overhauled its internal organisation. Here are the key points of the GEZEA's own management system:

- Technical expertise takes precedence over hierarchical seniority
- Leadership as support for GEZEA's employees and not as a target or external motivation
- Interdisciplinary decisions are taken in work groups
- Processes are not standardised
- No absolute goals – the employee is encouraged to take personal responsibility
- Open and empathic communication within the company

This does not of course mean that GEZEA has introduced anarchy – practice has shown that this approach works excellently and yields better results much faster. These ideas are by no means confined to GEZEA: many scientists (e.g. Dr Gerhard Wohland, systems theoretician) and the technical literature (e.g. "Complexitools") have come to the conclusion that classical Taylorism no longer represents the ideal management system in today's dynamic and flexible world – and GEZEA as a producer of single parts is of course particularly affected by this trend.

Now scan the code and find out more about GEZEA's management system in a video interview with Managing Director Henning Köllner:

www.gezea.de/gezea-management

Frank Köllner founded the company over 20 years ago and knows all the ins and outs of the trade.

other companies also benefit from GEZEA's expertise. Although physical growth at the current location is no longer possible, GEZEA has recently expanded again. The firm has now started trading with graphite itself, and cuts blanks of the desired quality to customer specification. "We're now under contract to SGL Carbon," explains Köllner. To accommodate the new activity, GEZEA has rented a shop in the nearby start-up centre – the company's birthplace. It will be exciting to see how it develops.

www.gezea.de

Company profile

GEZEA GmbH

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Managing Directors
Frank Köllner, Henning Köllner

Core business
Electrode production, tool-making, subcontracting

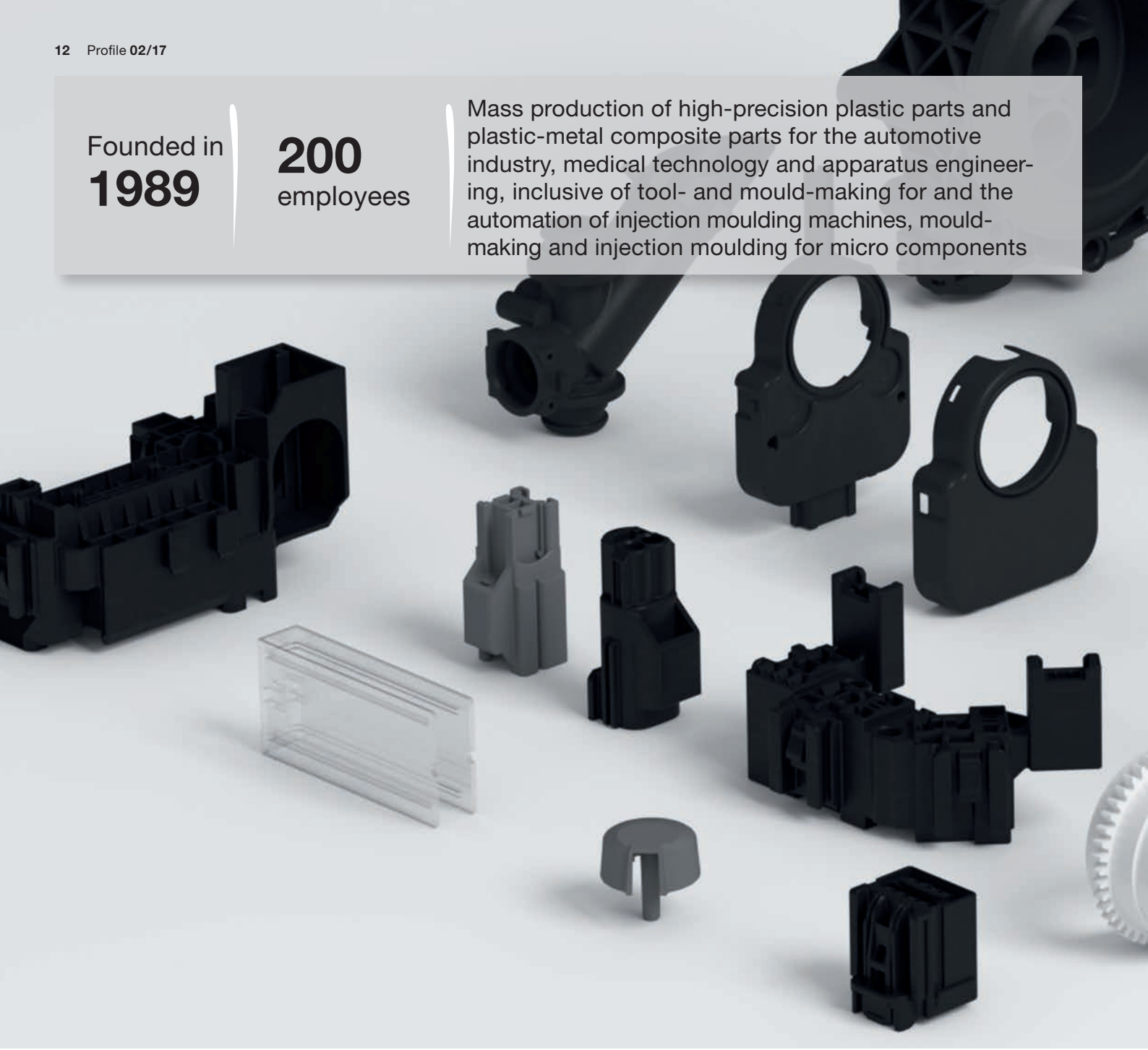
Employees
30

Founding year
1994

Founded in
1989

200
employees

Mass production of high-precision plastic parts and plastic-metal composite parts for the automotive industry, medical technology and apparatus engineering, inclusive of tool- and mould-making for and the automation of injection moulding machines, mould-making and injection moulding for micro components



Celoplás

Concentrating
on cutting-edge technology.

Several million high-grade plastic parts per year.

In the heart of an essentially agricultural and touristic area, Celoplás in the north of Portugal produces high-precision plastic parts by injection moulding for the international automotive industry, electronics industry, medical technology and the domestic appliance industry. The owner and Managing Director João Cortez sees his concentration on cutting-edge technology as the key to his success. And this explains why he has nothing but wire-cutting and die-sinking EDM systems from Mitsubishi Electric in his toolshop.

We encounter plastic parts manufactured at Celoplás in Portugal on an almost daily basis. Such parts include the keys and buttons found in cars and on our household appliances. When we switch on the air conditioning system or the light in our cars or select a wash programme on our washing machine or automatic dishwasher, we often do so with a component from Grimancelos in Portugal. In spacious production shops, several million high-grade plastic parts are produced there each year on dozens of injection moulding machines. Usually these are intricate subassemblies comprising several different components. Made of flexible, elastic or rigid, single- or multi-coloured plastics, the company produces sophisticated, ready-to-install

Automated injection moulding of high-grade interior components and plug connectors at Celoplás in Portugal, component supplier to the global vehicle engineering industry.

components in a process lasting just a few seconds. In a similar fashion, the Portuguese specialists also produce plastic parts in which metal elements are already integrated in the injection mould. These can be heavy-duty and durable plug connectors for the electronics and electrics in motor vehicles. The company supplies such high-grade plastic parts to virtually all European and even to Japanese automotive and appliance manufacturers. On the reasons for this international success, one of the founders and owners Cortez explains: “From the outset it was my endeavour to make the company as innovative as possible. In the tough environment of international competition, we have managed to hold our position solely on the strength of our outstanding technology and quality.”

Before setting up his own business, Cortez worked as a plastics technician in an injection moulding shop. This is where he soon identified the potential to be found in plastic as a versatile material suitable for many different applications. He wanted to make better use of the possibilities of this material. At the same time, he saw in the development of forward-looking technologies a big opportunity for boosting the economy of his home region and of Portugal as a whole and making it competitive on the international level.

Integrating all technologies

Since the company’s establishment in 1989, Mr Cortez has concerned himself with all the technologies required for the production of quality plastic parts. These include not only injection moulding machines, but also, and above all, injection moulds. Cortez has run his own tool-making department from the beginning. He is convinced that top quality is only possible if his company fully masters all the production steps from the design of the plastic parts and the injection moulds, the making of the moulds and the operation of the injection moulding machines through to the 100 per cent quality assurance demanded today. He also sees innovation as another decisive factor for competitive companies and products. He has been constantly interested in new

Outstanding technology and quality.

technologies. If they fit in and look worthwhile, he integrates them in his company's portfolio. Several experts at Celoplás are meanwhile working on the fabrication of extra-small injection mouldings with edge lengths and diameters <1 mm. For this they have a dedicated laboratory containing machines for the production of micro parts for moulds. They also work with micro injection moulding machines on which they have already successfully injection-moulded the tiniest components for medical and electronic technology, some of which in turn consist of several parts.

In its series production activities, the company mainly produces small plastic gearwheels, which are used in measurement and control instruments as well as in clock movements. Using the over-moulding process Celoplás also produces metal-plastic components for the automotive industry in large series. These can be plug connectors with up to a hundred integrally moulded pins and a housing that seals watertight. For this the injection moulding machines run 24 hours a day, 7 days a week, processing PEEK, PES, LCP, PA, PBT, PC and ABS, among other things. Celoplás supplies more than 200 million injection-moulded components per year worldwide.

High-accuracy moulds as the key to success

Mr Cortez regards tool- and mould-making as the key technology for successful injection moulders, which is why he has consistently built up this activity since founding the company. Up until almost 30 years ago, he reports, Portugal imported all its tools and moulds, with the country's firms serving merely as inexpensive injection

moulders. At the time, Cortez was one of the first within Portugal to develop the necessary expertise and successfully establish tool- and mould-making.

From the outset, he has always invested in the best-possible equipment and machinery for mould-making, just as for all other areas of his business. Work of superlative quality is only possible with high-grade equipment, he stresses. At the same time, the company has concentrated on a small number of manufacturers, which Mr Cortez also regards as a crucial factor. “In our production experience, a small number of manufacturers have made a lasting impression on us,” he says. What counts most is the quality of the supplied machines, devices, moulds and ancillary equipment. The second-most important factor is their availability. They have to operate reliably and have a long service life.

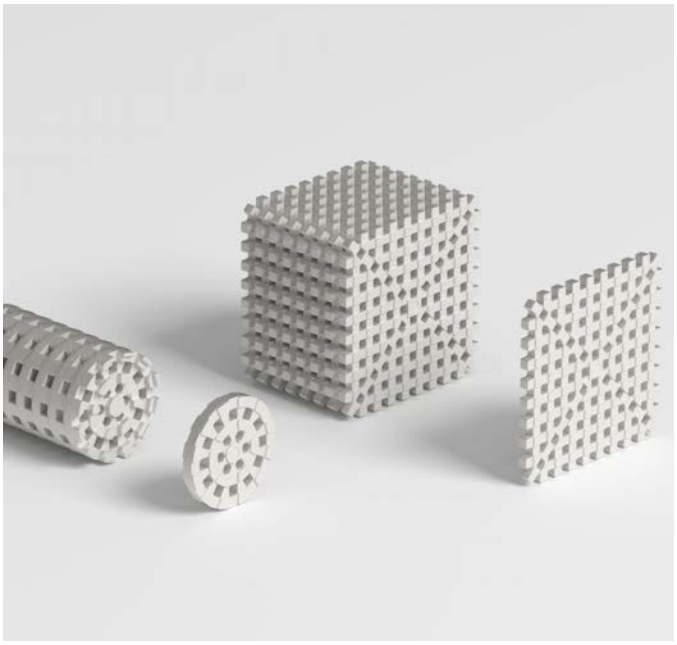
The third point that Cortez is keen to mention is the after-sales service. Even after the investment, the manufacturers and suppliers of the machines and plant must always be capable of making their expertise and required additional equipment and replacement parts available without delay. Mr Cortez explains: “We can only operate productively if we can rely on the quality and availability. Special, particularly high-grade components, be they in mould-making or injection moulding, we can only produce if the machines and moulds used for this are of at least equal quality.”

Quality only feasible with high-grade machines

In tool- and mould-making Cortez has chosen and appointed Mitsubishi Electric as its sole machine supplier. The company therefore now has a QA10 in successful operation for several years and two recently purchased MV1200R wire-cut EDM systems as well as three die-sinking machines: an EA12D, EA12V and EA8S. One of the MV1200Rs is equipped with a rotational axis (B axis). On these machines, the tool-makers in Grimancelos produce complex injection moulds, most of which they design themselves. They frequently cut copper electrodes on the wire-cutting machines which are then used on the die-sinking machines for machining mould inserts.

The specialists at Celoplás also produce replacement parts for inserts in injection moulds on the wire-cutting machines. Wire-cutting and die-sinking, Mr Cortez explains, are often less expensive than grinding. The advantages are firstly technical, as a wire can be used for precision-machining very narrow grooves and the tiniest radii. Despite the long

EDM – a technology of the future.

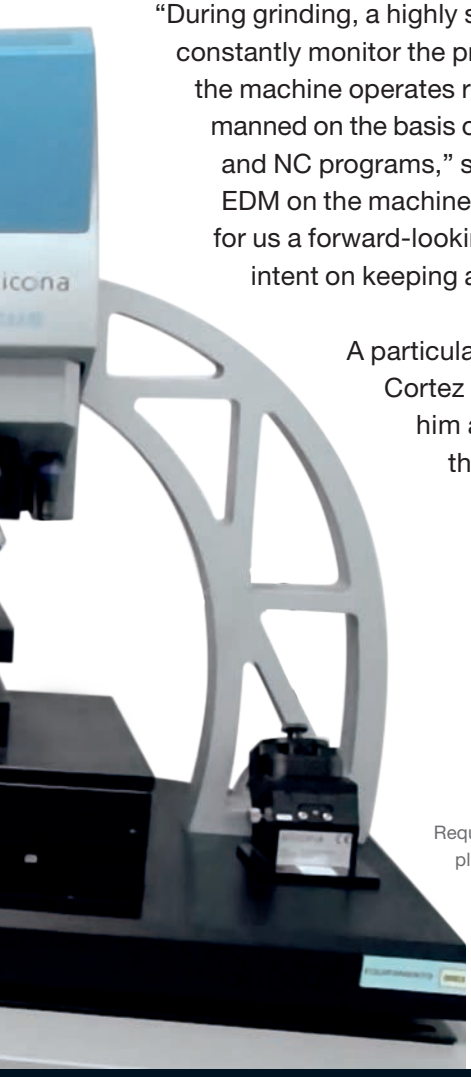


Wire-cutting produces metal lattice structures for PIM parts.

Micro injection-moulded parts.

machining times, there are also economic benefits. "During grinding, a highly skilled employee has to constantly monitor the process. During wire-cutting, the machine operates reliably for many hours unmanned on the basis of pre-defined parameters and NC programs," says Cortez. "This is why EDM on the machines from Mitsubishi Electric is for us a forward-looking technology that we are intent on keeping and developing further."

A particularly positive feature for Mr Cortez is that wire EDM has given him access to working methods that were previously unthinkable. Among other things, his machinists are thus now capable of repairing intricate mould inserts for the injection moulding of plug connectors. If, for example, one of the up to a hundred pins measuring only a few tenths of millimetre in diameter snaps off, the common practice used to be to produce an entire new mould insert. With wire EDM, the specialists in Grimancelos can now



Requiring superlative quality, intricate plug connectors for cars have to operate reliably even in adverse conditions.

Trusting in top-flight technology, Celoplás operates wire-cut EDM systems exclusively from Mitsubishi Electric.

precisely cut out the small part of the mould insert containing the broken pin. By wire-cutting they then produce the matching replacement part straight out of a high-temperature steel alloy, which is then integrated in the mould insert. The injection mould is then fully functional again. Cortez confirms that this cuts the time and cost of repairing the mould insert. With their high accuracy and precisely settable parameters for cutting speed and surface finish, the wire-cut EDM systems from Mitsubishi Electric go a long way towards making this repair possible.

www.celoplas.pt

An ideal combination: copper electrodes for the die-sinking of narrow grooves in steel housings, cut on an MV1200

High accuracy and precisely adjustable parameters.

João Cortez
Managing Director
of Celoplás
in Grimancelos, Portugal

What is your source of motivation?
I firmly believe that only by using special technologies can we in Europe operate profitably and maintain and improve our prosperity.

What prompted you to set up your own business?
I had a lot of ideas for making better and more effective use of plastic as a material. In addition, I wanted to upgrade and strengthen our expertise in Portugal. I have always felt that our country and fellow citizens can do much more than serve as the extended workbench for other countries. However, this first meant building up specialised tool- and mould-making activities. Back in the 1980s, other companies didn't see any need to.

What technologies set your company apart from the competition?
We are specialists in multi-component injection moulding and in injection moulding with integrated metal parts. In addition, we also have a full command of tool- and mould-making. This means that we can also reliably produce even the most intricate geometries, such as tiny gearwheels of only a few tenths of a millimetre in diameter or visually and functionally visible components for use in cars, in large series using several different plastics, with output of several million components per year.

What are you particularly passionate about?
I'm very passionate about training and cooperation between companies in Portugal. Only with outstandingly trained staff can we maintain and build on our expertise. For this, however, we need cross-company cooperation. Regrettably, there's little awareness of the need among companies in Portugal, which is why I ensure that young people in my company get sound training.

What is the overriding principle governing your work?
Superlative achievements and top quality are only possible with high-grade equipment and highly skilled staff. This is why I attach great importance to always choosing the world's best from the huge selection of machines and production plant.

Founded in **1989**

1200 employees worldwide

Production of relays, actuators and solenoids

Gruner AG

A prime mover

with switches and actuators.

World market leader in many fields of application.

Gruner has always been a little faster to react than its rivals and has been setting the pace with relays for many years now. To machine the tools required for them, Gruner resorts entirely to EDM systems from Mitsubishi Electric.

Ever since its establishment in 1953, Gruner has espoused flexibility as its principle in advancing progress in the areas of relays, actuators and solenoids. The consequence of this is that the company is today the market leader in many fields of application, e.g. with polarised bistable relays that are put to use in ripple control receivers and soft-starters, in load management, in the prepayment sector or also in automotive battery management. Its relay technology is regularly adapted to current trends, as most recently in automotive engineering where use is being made increasingly of 48 V electrical wiring. For

this Gruner has developed a new compact relay that is compatible with 12, 24 and 48 V and ensures galvanic isolation of the drive and load circuits while reliably suppressing switching arcs. Unlike high-voltage devices, the new relays do without expensive inert gas fillings and erase magnets and permit extra-easy adaptation by the customer. These are also of benefit, incidentally, in solar applications, a sector in which Gruner has long been at home. Innovative smart grids, for example, would be unthinkable without relay equipment from Gruner. A large chunk of the product range is taken up by actuators that are indispensable in HVAC applications, e.g. for the positioning and control of flaps and valves, as well as in roller shutters, fume and exhaust gas flaps and engine valves. And, finally, there is a third area: that of solenoids employed in widely differing technical fields, such as in engine management and transmission control, in the control of hot and service water, in access authorisation and card reading systems for hotels, and in magnet solutions for touchscreens with haptic feedback in automotive applications. But however different the user sectors may appear at first glance – ranging from smart grids and automotive to air conditioning – what the components from

Relying exclusively on EDM systems from Mitsubishi Electric for surface accuracy.

High-precision machining of all components.

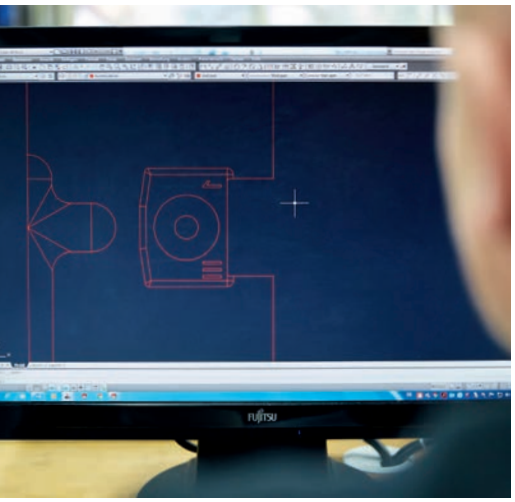
Martin Spreitzer appreciates not only Mitsubishi Electric's help with his everyday work, but also rapid delivery. It took just four weeks for the new machine to be delivered.

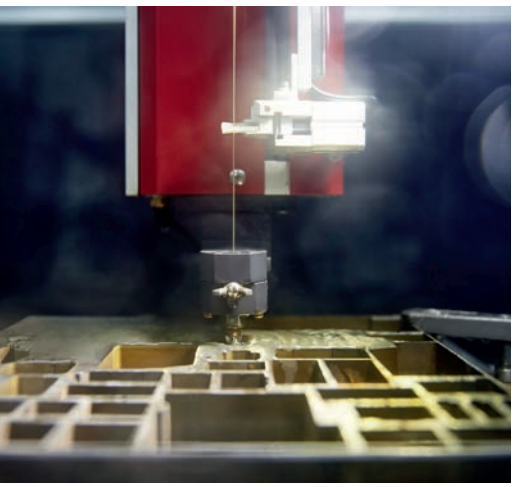
Gruner share is that they have to react spot-on and reliably. And this calls for high-precision machining of all the parts. "Despite the different sectors and technologies, our quality aspirations are always the same," explains Martin Spreitzer, head of production at Gruner. "All the quality-relevant production steps are therefore executed in-house without exception."

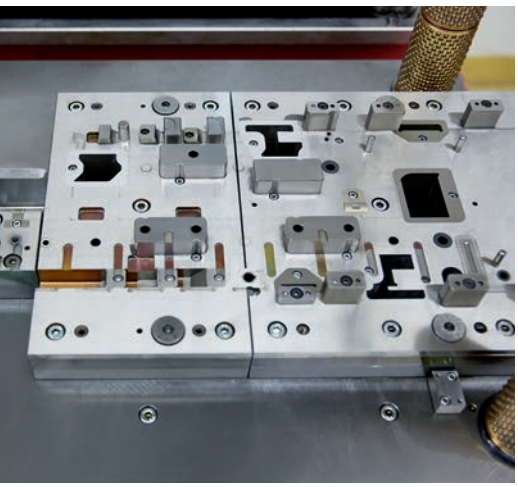
Constant investment in machines and expertise

So that 90 per cent of a product's value is generated in-house, the 40 employees in the tool-making department make use of modern production and quality assurance technologies.Many of the machines, systems and test instruments employed are specially developed or modified in the toolshop. For instance, Heinrich Fischer, head of tool-making at Gruner, puts the number of variants of the tools used

Actuators ensure, among other things, the precise control of flaps in HVAC applications.







Almost every workpiece is a one-off – yet speed is of the essence in converting the design into the finished tool.

in injection moulding and stamping machines for relay production alone at 500. Among them are tools that have been in service for over 30 years. Admittedly, few tools remain unchanged throughout their lives, as many modifications are performed and variants added over the years.

In tool-making, heavy-duty machines are required that also deliver the demanded accuracy as well. “Even a hundredth is sometimes too much,” says Fischer, for whom accuracy always enjoys priority over speed. In terms of surface finish, they rely entirely on EDM systems from Mitsubishi Electric, and have been doing so for over 20 years. Along with three wire-cutting machines, the machine park also includes a die-sinking and a start hole drilling machine.

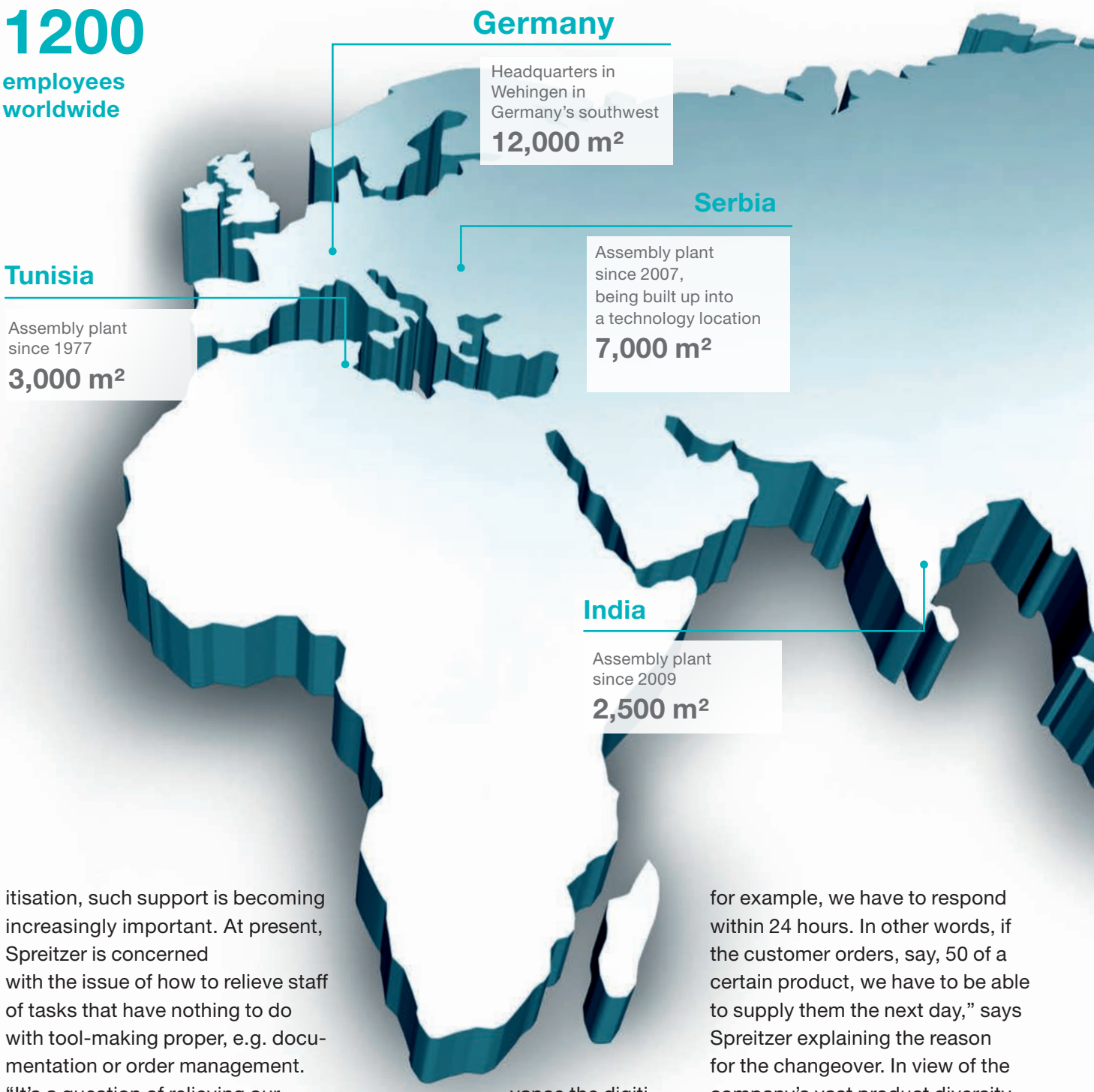
The EDM systems are used for fabricating mould cores, inserts for dies, slides and sample parts for small series. Resort is often made here to pre-hardened materials. No two projects are ever really the same, and almost every part is a one-off. “We need the EDM systems to achieve flexibility coupled with high quality, because only then can we respond to customer requests at short notice,” says Spreitzer, who puts the ratio of long-term to short-term jobs per day at 40:60. Fischer shares this commitment to EDM, particularly as far as new and further development projects are concerned and when tight time-to-market deadlines have to be reliably met. In the event of tool breakage or when a stamp has to be replaced in the course of maintenance, the wire-cutting machines have also had to be ready to spring into action at the drop of a hat. “We have to respond at lightning speed, and this is why planning in the department for tool machining is always being adjusted,” Fischer confirms.

While the FA10 has been in operation at Gruner for several years now, the MV2400R joined the machine tool line-up only two years ago. In 2017, another MV2400R replaced an older model. “We were very happy with the dependability and accuracy of the MV2400R, and this is why we chose the same model again,” says Fischer mentioning two important factors. The machines share the workload, with the longer-term workpieces being processed on one and the shorter, everyday jobs being handled on the other. The key to high availability, particularly for the stamping machines, was the investment in the third wire-cut EDM, Spreitzer claims. Any eventualities that can materialise in a course of a day are now covered.

What Spreitzer additionally appreciates about Mitsubishi Electric is its rapid delivery capability – it took only four weeks for the new machine to be delivered – as well as the support it provides for daily work.

Digitisation of production processes

In view of current challenges, particularly in view of the shortage of skilled labour or the advance of dig-



itisation, such support is becoming increasingly important. At present, Spreitzer is concerned with the issue of how to relieve staff of tasks that have nothing to do with tool-making proper, e.g. documentation or order management. "It's a question of relieving our personnel of administrative duties so that they can concentrate entirely on their core activities." The concept of the "smart factory" is also high on the agenda. Spreitzer is thus working on projects to advance the digitisation of production processes, which includes the networking of production plant with engineering. Also in the pipeline is an intelligent assembly line for actuators. "In the HVAC sector, for example, we have to respond within 24 hours. In other words, if the customer orders, say, 50 of a certain product, we have to be able to supply them the next day," says Spreitzer explaining the reason for the changeover. In view of the company's vast product diversity, this is a huge challenge. Ideally, the intelligent assembly line will then be capable of even producing a batch size of 1 by automatically providing the materials, checking the products in an automated process and

All quality-relevant production steps at Gruner are performed exclusively in-house. A battery of test devices and inspection systems ensure outstanding quality.

thus taking the strain off human resources.
Ultimately, the machine tools or at least order management will also have to adapt to this trend.

"To be honest, the times when the toolshop was expected to respond on the spot have long gone," says Spreitzer summing up. Although he admits that such rush jobs still arise on a daily basis – and thanks to the EDM systems from Mitsubishi Electric, these are nevertheless handled dependably and without delay.

www.gruner.de

Company profile

GRUNER

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info@gruner.de
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Managing Director
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Dr Wolfgang Spreitzer
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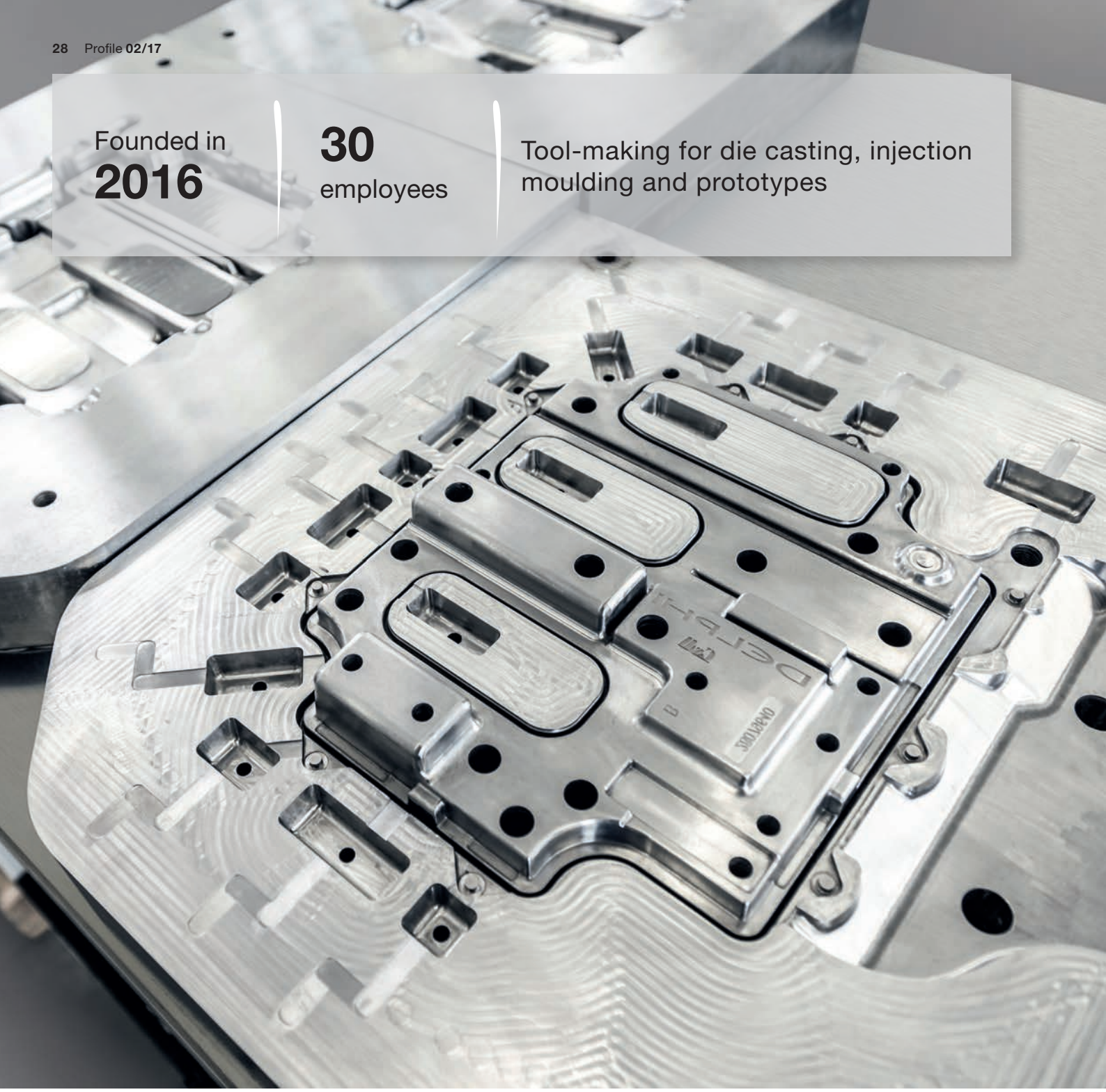


Founded in **2016**

30 employees

Tool-making for die casting, injection moulding and prototypes

Csaba Tool

In great shape –
after only one year.

The key to success.

Csaba Tool Kft. is located in Ajka's popular industrial area. The paint has only just dried on the workshop walls, as work began merely a year ago. The 500 square metre workshop and the office building form a harmonious unit, filled with functional spaces. Behind its walls, moulding and die casting tools are being made for domestic and foreign buyers.

Despite being a newly-founded company, only the building and the equipment are new – the management and the employees are well versed in the sector's expectations. In the SME sector, the way Csaba Tool Kft. has developed, with the aid of Mitsubishi Electric's productive machines, may become a blueprint for success.

Fresh company, mature business policy

During the conversation, we discussed in detail the establishment of the company. Managing Director Csaba Stallmeiszter and Production Director Endre Kovács are not newcomers to the industry, despite the age of their business. "I've been working for almost 40 years, but there is always something to learn," says Kovács about tool-making. Csaba Tool Kft. was founded on the basis of their already established connections, aided by market demand. The start of the company's activity was preceded by an investment period. In those months, the buildings were constructed, the machinery was purchased and the partner network was established.

The company is fresh in the area but not inexperienced. Most employees have a long history in the business and the personal relationships make it easier to work together. The managing director sees the secret of success in the team of qualified specialists and the extensive network of contacts. "Without good contacts and good professionals, it is not worth setting up a company. Insufficient capital, adequate human resources and relationships cannot really be bought," he adds.

Tradition and development

The Ajka region has a reputation in Hungary for its tool-making industry. The small and medium-sized companies that grew out of the remains of the former major businesses in the city are currently covering the whole market. Competition among the 10-12 SMEs is still peaceful in terms of market entry, although there is a problem regarding the labour market, because the shortage of skilled labour in the region has also affected the area. "It is very difficult to find a good professional. We were lucky with our existing contacts. The period in which we set up the company was turbulent, and major changes took place in the region at the time," Kovács recalls.

So good professionals, good relationships and of course the right equipment are all needed to cre-

ate a thriving business. There is no shortage of equipment. There are only brand-new machine tools or refurbished tools at the site, all perfectly maintained and well taken care of. To make the tools, high-productivity 5-axis machining centres and Mitsubishi Electric EDM machines are used, including an MV2400S wire EDM and an EA28V Advance sinker EDM.

Custom tool manufacturing

The tools made by Csaba Tool Kft. are mainly used in the automotive industry. With the right tool insert, their clients can produce up to a million parts: “Plastic injection moulds can have up to 16 cavities, and you can make a million items with normal use. For aluminium casting tools this number is lower, and most of our orders are for tools with 4 cavities, so a smaller number of items can be produced with them.” Csaba explains the nature of their orders. “The tools are designed and made in-house in accordance with customer requirements. We are now working with a 4-strong tool design team, complemented by two senior engineers working on the technology design,” Kovács adds. They have two main clients, accompanied by a number of smaller-volume buyers. Production takes place in 3 shifts, which are supported strongly by Mitsubishi EDMs. “These machines work perfectly even without humans, so they can work in continuous operation on demand,” says Kovács.

“EDM machines provide exactly the quality we need for our tools,” says Csaba explaining the reason for buying Mitsubishi Electric EDMs. “We chose these machines because their value for money was very high in their category, and more and more people now appreciate the brand. Good experience was a major factor in the decision,” Kovács adds. Reliability, accuracy and maintenance requirements

The Mitsubishi Electric machines are operated by two dedicated members of shop staff.

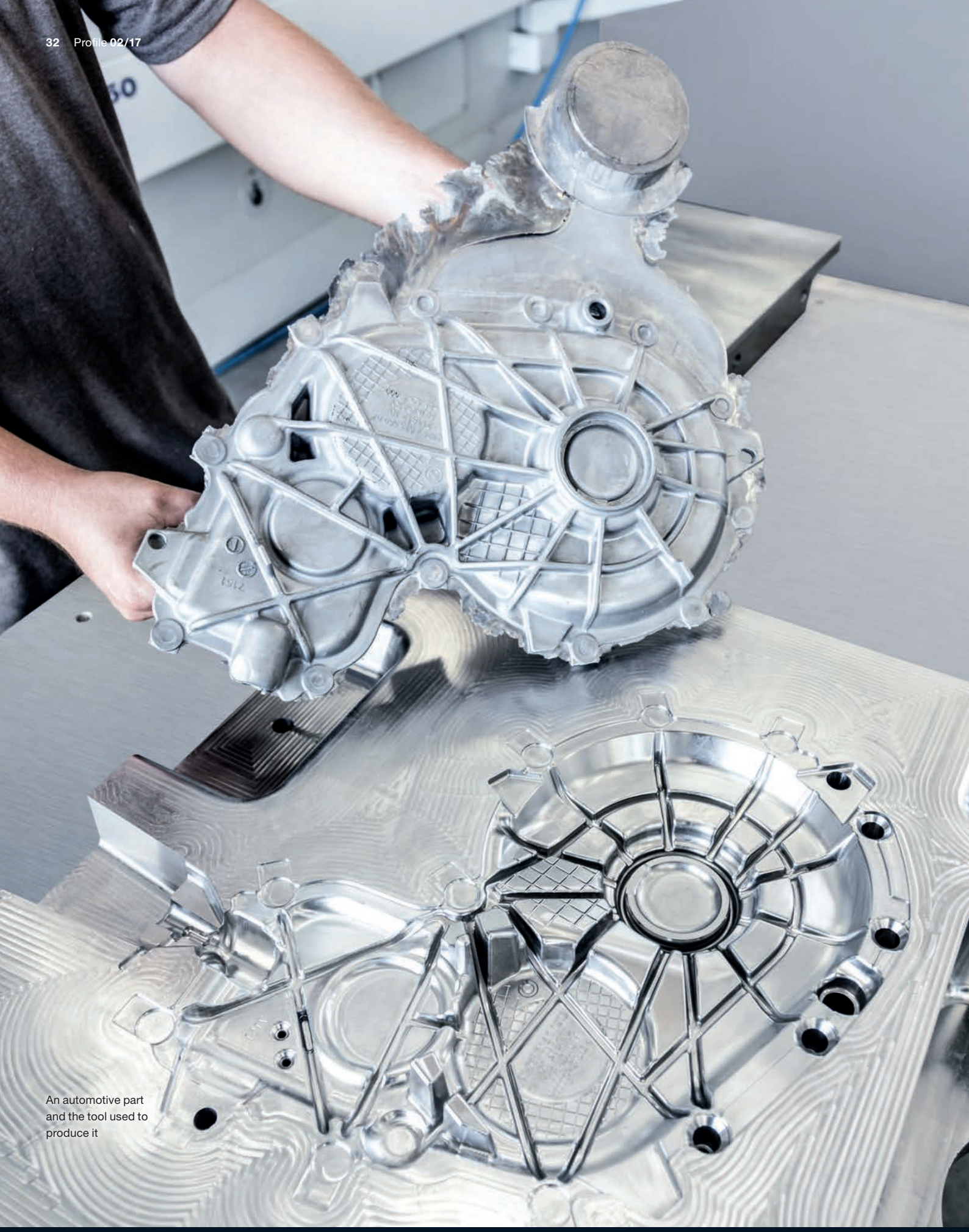
Csaba Tool is capable of manufacturing complex tools for the automotive industry.

all turned out to be benefits for the company. Aside from mandatory maintenance, they have only needed the assistance of Hungarian service provider M + E Kft. on one occasion. Due to the continuous work schedule, reliability is of paramount importance, so availability and low maintenance are very important advantages of these machines.

The owners were well aware that EDM is not a cheap manufacturing technology, but it is indispensable in the tool-making industry. “Some surfaces can only be created with this method, so there’s no alternative to this technology. Even if in some cases it would be much faster to mill the part,” says Kovács. In addition, they stress that the Mitsubishi Electric MV2400S is one of the best machines in the wire EDM category, and it is also a cutting-edge machine tool. They are also satisfied with their sinker EDM machine. They can produce all the tool elements they need, as the machine has a large work area and range of motion, and the flexibility of the machine allows them to work in a variety of ranges. In the plant they also work with copper and graphite electrodes, which are manufactured in-house. According to their experience, the two materials are used for different components, but with graphite electrodes, larger pieces can be machined more easily. The tools at Csaba Tool Kft. can be up to 1,400 x 1,200 mm in size and weigh up to 10 tonnes. Accordingly, the annual number of units also varies. “Every year, we make 50-70 tools, but this depends largely on the size and complexity of the tools,” Csaba explains.

Vision for the future

And what are the prospects for the freshly founded company? “I trust that in 5 to 10 years we will expand



An automotive part and the tool used to produce it

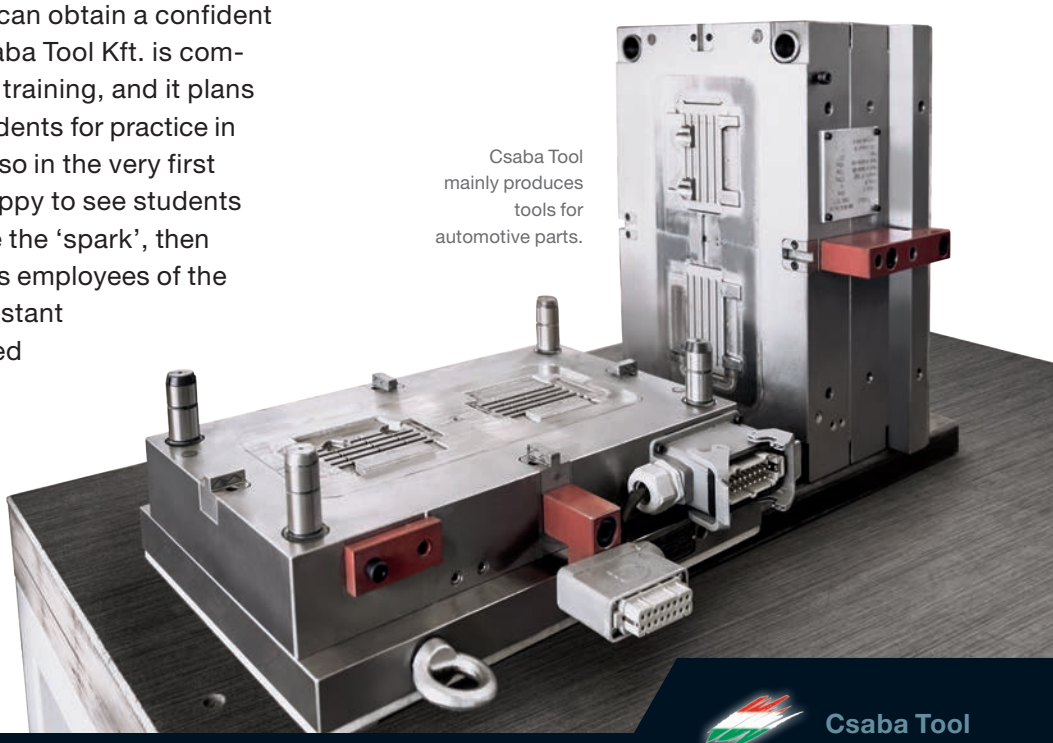
Development and expansion.

The workshop was finished and production got underway a year ago.

onto the other side of the road. I do not think that we can expand much in the area of tool-making, but we may take on related production tasks," says Csaba. Kovács adds: "We have many opportunities for development and expansion for the time being, and believe in the importance of continuous growth."

The bottleneck to expansion is the aforementioned shortage of skilled workers. Kovács explains that a student does not become a professional at school, but only with practical experience, which can take many years. However, in the end they can obtain a confident and experienced workforce. Csaba Tool Kft. is committed to providing professional training, and it plans to receive vocational school students for practice in the future, as it has already done so in the very first year of its operation. "We are happy to see students at the company, and if they have the 'spark', then we'll look forward to them later as employees of the company," says Csaba. The constant growth of the recently established company and its performance in the first business year show good indications of further development. The experience gained so far on Mitsubishi Electric's EDM machines confirms the widespread impression that the company delivers good value for money, providing reliable and easy-to-use equipment for its customers.

www.csabatool.hu

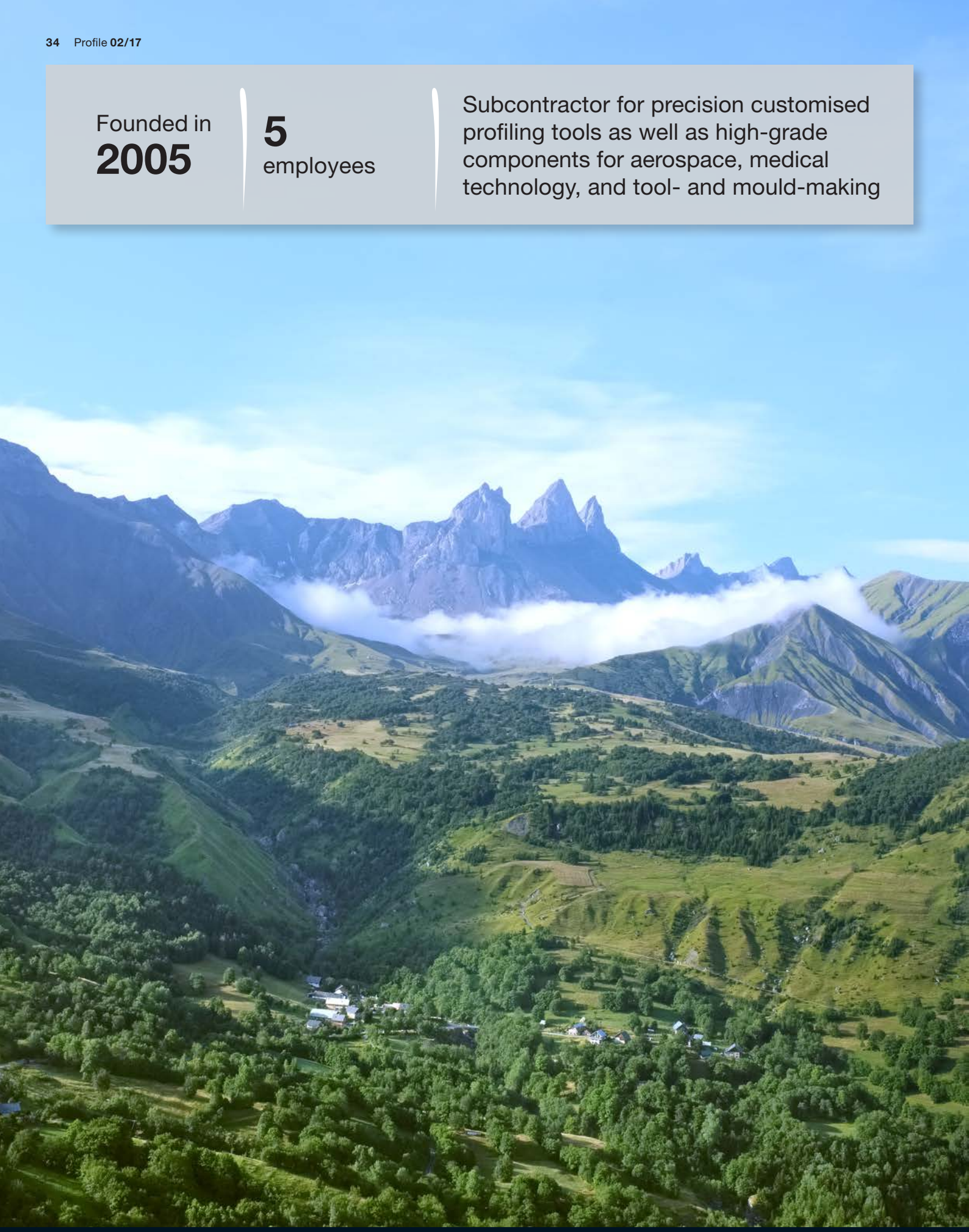


Csaba Tool mainly produces tools for automotive parts.

Founded in
2005

5
employees

Subcontractor for precision customised profiling tools as well as high-grade components for aerospace, medical technology, and tool- and mould-making



Hitting the bullseye with the MV 1 200R.

AEMB

Flexible

thanks to exceptional dependability.

Bertrand Bonnay, owner and managing director of the small jobshop AEMB in Thyez, France, was looking for a cost-effective, technically advanced and above all dependable alternative to his previous wire-cut EDM systems. By investing in an MV1200R, he's hit the bullseye.

Jobshop AEMB specialises in single items and micro-series of up to twenty components. Its small team consisting of the owner, three employees in the workshop and a single employee for bookkeeping and organisation machines precision parts for companies of the industrial region in the Arve valley south-east of Lake Geneva. "We've acquired an outstanding reputation among local companies mainly on the strength of our high flexibility. Working on call, we produce metal components within a matter of hours. Aside from the overall dimensions, there are practically no limits. Producing anything from cemented carbide custom tools for lathes and exclusive watch cases made of titanium through to single and multiple parts of corrosion-resistant steel for the aerospace industry and mould inserts of cold- and hot-working steel for tool- and mould-making, we have a highly diversified customer base," Bonnay reports. He regards this broad range of customers and components as one of the main pillars of his success.

Producing a broad spectrum of components at short notice

Bonnay had been working for almost 30 years as a tool- and mould-maker. When the company that last employed him went broke, he set up his own production

business in 2005. His strategy from the outset was to produce high-grade components as one-offs and at most in small series flexibly and at short notice for companies in the immediate region. Building on his experience of tool- and mould-making, he first specialised in die-sinking. After only a short while, he extended his machining methods to include milling and, later, wire-cut erosion. To work cost-effectively and inexpensively, he purchased exclusively second-hand milling, die-sinking and wire-cutting machines recommended by their previous owners. His business grew steadily, and Bonnay soon had three employees working for him in production. “The current size of the business is ideal for me, as it gives us our main competitive advantages, i.e. high flexibility and extra value for money,” he adds. Another argument in favour of his jobshop is its proximity to its customers. He is frequently awarded jobs personally while visiting his customers, who also often directly provide the necessary data and drawings. Finished parts are delivered to customers by his staff at individually agreed times, or the customer collects his parts himself.

Dependability counts

The production of unique items places huge demands on man and machine. The ability to handle jobs in rapid sequence at short notice and on time, Bonnay tells us, is ultimately an expression of dependability. On top of this, a production business needs the necessary machine capacity. Some months ago, the jobshop in Thyez found that it was reaching its limits. With his trusty machines, he says, he wasn’t always able to efficiently handle the large number of jobs. “Older machines tend to be slower. In addition, you also have to expect parts to fail, causing machines to break down. What’s more, programming and setting up older machines is often time-consuming and labour-intensive, particularly in view of the rapid advances in the methods and technologies of today’s commonly used CAD/CAM systems,” he continues. This was particularly true

Meeting the highest standards, AEMB also produces precision parts for the aerospace industry.

The MV1200R wire-cutting system at AEMB in Thyez is a model of quality and technology.

of the EDM systems at AEMB. Consequently, Bonnay decided for the first time to purchase a new MV1200R wire-cut EDM from Mitsubishi Electric in spring 2017. Colleagues and the employees of his customers were always stressing the special quality and forward-looking technology of these machines.

The MV1200R: a perfect choice

At the jobshop in Thyez, the MV1200R has already proven its worth after only a few months. This wire-cut EDM system, says Bonnay, gives him the assurance of advanced technology and long-term performance. “The equipment of the MV1200R is state-of-the-art in every respect. This is something I know from experience to be absolutely true for the mechanics, drives, wire threader, control and programming technology,” he adds. He is particularly impressed by the machine’s dependability. He and his staff set up and program the machine during the usual working hours, and for workpieces with longer machining times or small series, the machinists set up everything so that the MV1200R can work overnight or even at the weekend without supervision. He has so far been able to rely entirely on the wire-cutting machine from Mitsubishi Electric, he says. “With this dependability, the MV1200R boosts our flexibility still further. The machine ensures that we can reliably keep to deadlines agreed for jobs performed at short notice.”

The subcontractor mainly generates NC programs externally and offline at a 3D CAD/CAM system (TopSolid form Missler). To transfer them reliably to the MV1200R, a special postprocessor has been installed. This means they can accept DXF data and STEP files from customers, generate the NC programs from them and send the data straight to the MV1200R. In the workshop, all that’s left to do is add or modify a few parameters. The advantage of such work processes is that the NC programs are generated during the machining process and the wire-cutting machine can operate productively almost entirely without stoppages. This contributes enormously to the jobshop’s

AEMB cuts cases for quality watches from noble titanium.

cost-effectiveness and flexibility. The MV1200R wire EDM system, Bonnay confirms, operates absolutely dependably unmanned. And the reliable wire threader plays its part in this. “This is why I can tell everyone that I earn my money in my free time, as the wire-cutting machine operates unmanned,” Bonnay adds jokingly.

At AEMB, single parts with relatively simple contours and geometries are also programmed at the wire EDM’s CNC Advance Plus control. This is where the operators benefit from the simple and straightforward user guidance and from the integrated technology data. They received the required training during commissioning of the machine in a session lasting only a few hours. “This short training session demonstrates how easy the MV1200R is to program and operate. It enabled all of my staff to use the wire-cutting machine productively and efficiently,” says Bonnay. Another benefit is that the CNC control from Mitsubishi Electric is able to read DXF data directly and use them as the basis for the NC program.

Speed and high precision

The choice offered by the wire EDM technology from Mitsubishi Electric between high machining speed and superlative surface finish proves to be highly beneficial. In other words, the varying demands of machining jobs can be met perfectly every time. For example, to produce customised cemented carbide tools with an extra-fine surface finish for turning shops, the MV1200R at subcontractor AEMB has the digital fine finishing generator DFS at its disposal. This makes it possible

Profile of Bertrand Bonnay

Bertrand Bonnay is a tool- and mould-maker by training. Having founded his business AEMB in 2005, he machines precision parts under subcontract with his four employees. He is particularly proud of the high regard in which he is held for his work by his customers, some of which are internationally active companies.

He earns his money in his free time, he says. While his machines are running unmanned, he can take a ride on his bike, he says.

Earning money in his free time.

On its MV1200R, AEMB produces a broad range of precision parts for tool- and mould-making flexibly and cost-effectively – without supervision.

to cut profiling lathe tools, most of which are ready for use without subsequent grinding. And this also contributes to the highly flexible processing of tightly deadlined subcontracts. For other jobs, such as small series of drive components for medical equipment that do not need exceptionally high surface quality, the drive technology with Tubular Shaft Motors and optical drive system then clearly reveal their strengths. Such jobs are processed by the MV1200R at high machining speeds with high precision and next to no time.

Summing up, Bonnay confirms that the MV1200R has fully satisfied his expectations of quality, working speed and advanced technology. “The Mitsubishi Electric wire-cutting technology has a large hand in our ability to maintain and build on our position and reputation among our customers,” he stresses. With the MV1200R, AEMB in Thyez, France, sees itself ideally equipped for the future.

www.aemb.fr

Company Profile

AEMB

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Managing Director
Bertrand Bonnay

Core business
Subcontractor for precision customised profiling tools as well as high-grade components for aerospace, medical technology, and tool- and mould-making

Employees
5

Founding year
2005

Japan Special

Kawaii –
lending expression to the inner child.

A style omnipresent in modern Japanese culture.

While children in this part of the world have fun with cuddly and other toys, many Japanese have a pronounced predilection for all things childlike. In translation “kawaii” means more or less “cute” or “adorable” and refers to a certain style that has meanwhile become a permanent feature of modern Japanese culture and pervades all areas of life.

Kawaii has many faces. Anyone visiting Japan for the first time will be astonished to what extent the love of the cute and innocent dominates everyday life. Kawaii is omnipresent – oversized Pokémon adorning jumbo jets, young women whose style of dress recalls characters from one of the popular manga comics, or official tsunami warning signs on which the waves sport fangs and houses have terrified eyes. Even politicians have jumped onto the bandwagon and are now using kawaii successfully for self-presentation and as advertising for their respective parties. A whole branch of industry has dedicated itself to the marketing of a constant stream of new products, and the growing

consumerism of the Japanese population is helping to power the trend. Practically anything – from toilet seats to household robots – is now obtainable kawaii-style. And there's money in it. Companies like Sanrio, the company that markets Hello Kitty products, are riding the trend. The cat with the red bow on its head can now be found on 20,000 products and is marketed worldwide. For Sanrio, kawaii means business worth billions.

From trend to cultural asset

Kawaii dates back to the Nineteen Seventies. To lend expression to their individuality, schoolgirls invent a novel kind of handwriting. Using very fine pen lines, they ornament Japanese characters with tiny figures and faces. Because of its poor legibility, this new form of neat handwriting is soon banned in schools. However, the kawaii trend is born and spreads like wildfire in Japanese living rooms and shopping centres. The often childlike, seemingly innocent kawaii style is a welcome change for a new generation of modern, young women who wish to break with the nation's in some cases rigid mores and traditions. Rejecting the social order, kawaii for many becomes a symbol of individualism, independence and consumerism.

Even barriers can look "cute".

Kawaii makes use of our instincts

The rapid spread of the kawaii trend, which now has many enthusiastic aficionados outside Japan as well, is probably attributable to other causes as well. So what is it that makes these cute products so irresistible?

Our (purchasing) behaviour is affected by many factors over which we often have no rational control. In the case of kawaii, this evidently applies all the more so. To blame, so say the psychologists that have investigated this phenomenon, are our instincts. Many kawaii products and ideas exploit what is known as the "baby schema". Disproportionate to its body, an oversized head with round eyes and a doll-like mouth reminds us of babies and awakens in us our deep-seated protective impulses. This was particularly important for our ancient forebears. Parents that felt strong affection for their children were likely to care for them better

Individualism, independence and consumerism.

The earth becomes a face – thanks to kawaii.

and thus had a decisive advantage when it came to passing on their genes to the next generation. The part of our brain that has evolved much more recently, which is responsible for rational thought and decision-making, simply hasn't got a chance against these deeply innate feelings of affection and the urge to care. In Japan particularly, a country with one of the lowest birth rates worldwide, it is hardly surprising that many childless couples find an outlet for their parental yearnings through the kawaii trend.

Cute products and images remind us, however, not only of babies, but also of our own childhood – a period of our lives in which we had no responsibilities and could play and explore the world to our hearts' content. The often relatively care-free first few years of life of Japanese children contrast sharply with the period after reaching school age, when children are often expected to exhibit strict self-discipline. Childlike behaviour is no longer desirable and is superseded by the pressure to obtain a good education and achieve later success. The rare expression of powerful emotions in public and adherence to ancient traditions also undoubtedly contribute to the marked childhood nostalgia of the Japanese. And explain why everything that looks cute and innocent is so sought-after.

And not without justification from the scientific point of view as well, as researchers at the University of Hiroshima have recently discovered. They carried out a variety of experiments on the kawaii phenomenon and came to astounding findings. By contrast with viewing pictures showing, among other things, delicious foods, the viewing of pictures of young pups and kittens had a direct effect on the cognitive abilities of test subjects. Particularly in tasks involving visual searches and fine motor skills, significant improvements were achieved after looking at "cute" images. Apparently kawaii not only helps to nurture the nation's inner child, but it also boosts productivity and should therefore have its permanent place in the everyday working environment, the researchers conclude.

Founded in **1989**

645 employees

Development and production of punched and bent parts, metal composite parts, plastic parts and metal-plastic composite parts

Springfix-Befestigungstechnik GmbH

Securely fixed.

Millions of parts for firm connections.

Keeping car components firmly fastened.

Sometimes even tiny parts can be crucial – at least as far as those fastening elements from Springfix are concerned that can be found in almost all cars. EDM systems from Mitsubishi Electric provide the necessary precision during their production.

Although a car would not exactly fall apart without Springfix parts, the company's product range ensures that many components are securely fastened in the car. "Some of these parts can be found in large numbers in cars – more or less in all places where two elements have to be joined together," explains Mursel Jahaj, head of tool-making at Springfix Befestigungselemente GmbH in Salach. These can be clips, handbrake cable connectors, hose clamps, operating levers or load lashing modules. These components not only establish extra-secure and durable connections, but also perform further functions as well. Usually the client specifies the forces for assembly and disassembly, whether a connection is to

The wire-cutting machine came to Springfix together with the start-hole drilling machine as a kind of "super package" in 2015.

be detachable or whether additional support is necessary. Very few vehicle owners ever spare a thought for these components, although they would immediately notice them on one count in everyday motoring: on the road, possibly as a result of slight deformation of the body, such joints may generate noise – something that is to be prevented at all costs. And this also has to be taken into account during component development and production.

In view of the sheer diversity of cars in the market, it is easy to imagine the enormous range of metal stamped and bent parts, plastics parts and modules. This is also illustrated by the number of the necessary machining steps. While there are indeed relatively simply shaped metal elements produced in their millions by one of the over 60 presses in the company, there are also highly complex functional components, made of metal or even of plastic, that require a multitude of machining steps.

However large or small the output, however simple or complex the component, "in a production machine, everything hinges on the quality of the tool," says Jahaj with conviction. "This is where 100 per cent precision counts, because otherwise we can't supply the quality our customers expect." The customers in this case are all the major players in the automotive industry. The company, a member of the Mollificio S. Ambrogio Group in Italy, is appreciated well beyond its immediate Stuttgart catchment area – its products are supplied worldwide. The firm with its roughly 170-strong workforce has experienced a considerable surge in business in the last few years.

Tool optimisation

It's therefore hardly surprising to learn that Jahaj has a keen eye on every single tool in his workshop. For the over 60 presses, his roughly 30-man team produces the dies itself. The moulds for the roughly 30 injection moulding machines are bought in, but usually have to be fine-tuned and adapted to current jobs. On top of this, there are numerous repairs. "It may be that a mould or tie comes to us for an overhaul after a single large order, while others we'd don't see for a whole year," explains Jahaj, who puts the number of tools currently in circulation at 200.

Jahaj has been in charge of toolmaking and maintenance for about four years and has accelerated the growth of his toolshop. "Until a few years ago,we attempted to cope with rising order levels with 'extended workbenches'. But eventually you reach the point where this is no longer possible. The company's own expertise is too important," Jahaj stresses. In the last few years, the company has made huge investments in its parts store, extended the toolshop in a big way and much expanded the machine park. Last year about a million euros was invested in

Peter Just (left), machine operator, and Mursel Jahaj, head of tool-making at Springfix Befestigungselemente GmbH in Salach.

machines, and this year 600,000 euros has already been spent. Among them since 2015 have been three Mitsubishi Electric machines: an MV2400R wire-cutting machine, an EA12S die-sinker and a start 43C start-hole drilling machine. “A super package you could call it,” says Jahaj laughing. He is impressed by the good price-performance ratio but finds other features at least as important. “I already knew the Mitsubishi Electric machines from earlier experience and appreciate their reliability. In our everyday work, the balance between high machining speed and uniform precision is decisive.” Over and above this, the tools also last longer in his experience if they are produced with precision. The EDM systems are mainly used for machining cutting dies, cutting punches and bending inserts for the presses and mould inserts and cores. Jahaj makes a point of mentioning the automatic wire threader, which has proven effective particularly during

Cutting die for a stamping tool.

Cemented carbide die in a punching tool.

Bent parts for a die that will later be used in a press.

unmanned operation, and the low power consumption – estimating that the power consumed by the new machines to be about 30 per cent down on that of the old machines. “We keep a close eye on energy costs. Excessive energy consumption is of course bad for the environment, and of course no good for a workshop wishing to hold its costs in check,” says Jahaj summing up.

Appreciation of personal contact

Since the commissioning of the machines, which was completed within two days, there haven’t been any problems with the machines. The Mitsubishi Electric machines operate around the clock. More elaborate jobs are left to run overnight, while parts with shorter machining times are handled during the day. Machining time can range from 5 minutes to 30 hours. Surface finish is 0.2 µRa, with workpieces ranging from 0.5 mm to 150 mm in width. They mainly process powder steels and cemented carbide. The trouble-free commissioning and current smooth running of the machines is due in part to the excellent training at Mitsubishi Electric in Ratingen. “They’ve got really good instructors, and my staff were delighted.” Jahaj is full of praise for the support from Mitsubishi Electric. “At Mitsubishi Electric no one is a number, and you don’t have to wait for the right person to talk to.”

Outlook

The pace that Jahaj has been setting during his four years in his toolshop remains high. For he has already planned his next steps: in 2018, the machine park will be joined by three more wire-cutting machines and a die-sinking machine from Mitsubishi Electric, along with further processing machines, e.g. for grinding. “In the EDM sector, we’ve made a clear commitment to Mitsubishi Electric and this time we shall also probably go for the automatic alarm by mobile phone as well,” says Jahaj laughing and admitting that they haven’t needed this so far because the machines have been running without a hitch.

www.springfix.de

30 per cent lower energy costs.

Fireworks at the start – the 43C start-hole drilling machine marks the beginning of the erosion process.

Péter Badics

From side-line

to company.

From hobby to profession.

With over decades of experience and dedication to the profession, Péter Badics talks about his tool-making company that celebrates its 20th anniversary this year. He has been working together with his son Bálint for more than ten years. During that time they have created a small company from their experience in running a private enterprise. Their aim is to utilise their accumulated knowledge in a prosperous and customer-driven business.

During the ’90s, Péter Badics began working in the tool-making industry as a side-line, in a small workshop with a single milling machine. However, his venture expanded rapidly, and in 1997 he decided to do it full time. Today, his workshop is five times its original size, full of CNC machining centres and EDMs, and bound for further expansion. “We have no space left. If we want to develop, we will have to increase in size as well and relocate to new premises,” he says, running the company on the principle of continuous growth. The whole area of Ajka in Hungary is known for its tradition of tool-making and most of the local companies work in the same sector. However, the small and medium-sized enterprises

Programming is easy and consistent.

co-exist here in harmony. Many of the owners know each other and Péter Badics has good relations with local businesses as well. “Since we are suppliers to different companies, we don’t encroach on each other’s business. Furthermore, we all originally learned the trade at the same place.” In a town with a population of 35,000 people, many make a living from the tool-making industry. However, their business was the first to introduce Mitsubishi Electric EDMs. “We were the first to buy a Mitsubishi Electric machine in 2004. The first one was so new that ours was the only one in the town and in Hungary as well. People were coming to our shop for testing and references,” says Péter Badics explaining the beginnings of their relationship with Mitsubishi Electric. “We were amazed by the performance of the first wire EDM, and the increased productivity achieved by the new technology gave us a huge advantage,” he adds.

Ground-breaking technology

Since they were the first in the country to use Mitsubishi Electric wire EDMs (FA series) and in the region to use sinker EDM machines, they have strong ties with the company. After their first investment in 2004, they have been continuously developing their EDM portfolio. Today, they use a Mitsubishi Electric MV2400S and a FA10 wire EDM for tool-making, and an EA28V Advance sinker EDM as well, alongside an ED24 EDM start-hole drill. According to Bálint, “these machines meet our requirements absolutely in terms of price-performance ratio. There are cheaper and more expensive categories at Mitsubishi Electric and other manufacturers as well,

Flexible and versatile.

but we are committed to the brand because of our very positive experience with them. We have chosen the machines to suit the tools that we make and have never been disappointed." He emphasises that these machine tools are low on maintenance, and they have never experienced accidental breakdowns. This reliability means they are able to make long-term plans with these machines. However, there was one disadvantage with their specific sinker EDM model: the workbench depth. This model was designed for large workpieces and they had to build a support to machine smaller ones. "However, we are able to accept orders for larger workpieces, as they fit the machine," Bálint adds. Mitsubishi Electric machines are flexible and versatile in practice.

From a toolshop in Ajka to the international market

Most Hungarian companies do not work solely for the Hungarian market. Even though the automotive sector is a huge market, many companies aim for foreign expansion. This results in new experience and knowledge that may serve as a basis for further ventures. We asked the managers of the company how hard it is to serve the international market. Péter and Bálint agreed that with proper references borders do not mean obstacles. "We have to do trial work first, a small order to test us, but if we deliver quality on time we will have no problems with them," says Péter. Bálint adds: "Our aim is to get more and more orders from abroad. We are looking for opportunities." They currently supply tools to Hungarian and Austrian companies for die and mould casting. They also have clients outside the automotive sector and supply tools to medical technology and the cosmetics industry. However, they only receive a few orders to blank press tools, despite having the necessary technology available in their current workshop.

Besides tool-making, their work encompasses the design of the ordered tools. These projects are delegated to experienced professionals, who are able to design the tools for the product or optimise existing models and technologies. Of course, there are cases when the clients supply complete plans, and then Péter Badics only has to supervise the tool-making process. They make 30-40 tools a year, but this depends on the size of the tools

Several tools for plastic parts can be easily produced on EDM machines.

and the housings. The company works in 2 shifts, but thanks to their reliability, Mitsubishi Electric machines can also be used during the weekends. The machines are equipped with an automated tool changer, so they do not require constant supervision. “There are workpieces that spend a whole week on these machines. These kinds of orders enable us to make full use of our production capacity,” Bálint explains.

The next generation

Like the majority of Hungarian companies, Péter Badics’s group is also confronted with the shortage of skilled labour and the difficulty in hiring experienced workers. There has been major restructuring in the tool-making sector over the last few years. This shift has raised wages and triggered migration. “Many things have changed here recently, but it is not all bad for the industry.” However, in order to secure the company’s future in the long run, it is important to consider training and recruiting. Fortunately, a positive process has started with the establishment of vocational training centres: more and more companies are admitting students from vocational secondary schools to gain professional practice and real work experience. “This is, in principle, good for everyone: the student benefits as he has a place to practice and learn a lot about the profession, and we might find people who

At the company they use an MV2400S and an EA28V Advance EDM.

will work with us later," says Bálint. "We would not be able to attract any skilled workers to the company right now, since all the experienced tool-makers are working for another company," Péter adds.

Independently successful

Since there are many companies with similar activities in the area, the question arises as to whether owners have ever thought about cooperating or merging. For the last twenty years, Péter Badics has, however, chosen autonomy. "We have created the company to transfer the knowledge acquired so far and to continue the business through a company instead of a private enterprise. I never wanted to leave the company, even if there had been an investor interested in the opportunity." Bálint is more flexible, but agrees with his dad that independence has its advantages. Indeed, Péter Badics's private enterprise was not shaken by the financial crisis and has been unstoppable over the last 20 years.

In the small business sector, it is rare to see so much emphasis placed on upgrading the machine fleet, and using tender opportunities. They maintain a good relationship with their partners and suppliers as well as local companies. They are happy to demonstrate the technical efficiency of the equipment they use, be it by trial cutting or reference machining. They believe that this tradition will be maintained: "Past experience and reliability are the decisive factors when purchasing a machine," says Péter Badics summing up brand loyalty at the end of our conversation.

www.badics.eu

The finished parts are both precise and durable.

Grote + Brocksieper GmbH + Co. KG

“Quality in quantity”.

Improving competitiveness by strengthening in-house mould-making.

Grote + Brocksieper GmbH + Co. KG in Kierspe in the Sauerland, a manufacturer of numerous plastic parts for a variety of industrial sectors, has extended its machine park by adding a MV2400R precision wire-cutting machine. With its innovative technology, this EDM system is helping to optimise processes in the company significantly in the company. Along with boosting productivity, one of the company’s stated aims was to meet the growing requirements in terms of complexity, precision, quality and flexibility in the long term.

In mid-2016, Grote + Brocksieper GmbH + Co. KG, now under 3rd-generation management, decided to purchase an innovative MV2400R wire-cutting machine from Mitsubishi Electric. This decision was taken so that it could cope with the growing volume of orders and meet customers’ rising expectations of precision and quality. This is not a replacement machine, as one might perhaps at first expect. In fact, the innovative wire-cutting system has been added to the machine park to absorb extra demand. The machine park in the company’s own tool-making department has so far consisted of several drilling and milling machines and die-sinking systems in addition to an FX10-K wire EDM from Mitsubishi Electric, which has been in operation since 1999. “The experience that we have gathered with the FX10-K in terms of quality, precision and dependability has been excellent. On the rare occasions that have we

resorted to the hotline, we have always received professional support from Mitsubishi Electric's experts. These were among the decisive factors that led us to choose the MV2400R when we were looking for a new EDM system," explains Jörg Becker, Managing Partner of Grote + Brocksieper. "On top of this, the new machine generation offers a number of exciting technological and economic features which are essential in view of the over a million plastics parts that we output per day." The company founded in 1939 today operates with an 85-strong workforce at its Grünenbaum and Bollwerk locations in Kierspe. Grote + Brocksieper generates about 90 per cent of its sales with plastic parts. Owing to the complexity of the items, just-in-time delivery, and the availability of injection moulding machines and their workload, the company's own toolshop plays a prominent role in everyday operations. This is because the moulds it

Klaus Fischer and Jörg Becker

produces are absolutely essential for successful production. In addition to developing and fabricating new moulds for incoming jobs, it also routinely repairs and replaces wear parts. In the automotive sector, plastics parts can be expected to have a life cycle of 7 years. After this, the associated moulds are kept in good working order as replacement parts. There are even fields of applications in which resort is made to basic assemblies that have been around for some 40 years – but this is the absolute exception.

Customers benefit from receiving everything from a single source. This extends from technical consultations coupled with a test of feasibility, mould design and production, and initial sampling through to the finished product. On request, the company also handles such downstream tasks as finishing and module production. “The standards demanded of function, precision and quality have been rising year after year. A typical example of this trend is the desire for moulds with even more cavities. Some time back, we started with 8-cavity moulds, and are now achieving an astonishing 96. This way, much increased output is achieved in shorter production times. To keep pace with such trends, the tool steels used in the production of high-grade injection moulds have to undergo high-precision machining. For this, accuracies in the µm range have to be possible,” Dipl.-Ing. Klaus Fischer, Technical Manager and Authorised Officer of Grote + Brocksieper, explains.

The new wire-cutting machine is in line with the latest state of the art and is equal to the growing demands. In particular, it masters the production of the required moulds with high precision, functionality and flexibility in terms of surface finish, parallelism, contours and tapers. Necessary for this are the associated machine performance, sufficient operating comfort and exceptional reliability. In addition, service and support from the manufacturer are growing in importance. Furthermore, the injection moulds are expected to boost process security, so that downtime

Machining moulds with 96 cavities.

Galvanised tablet holder.

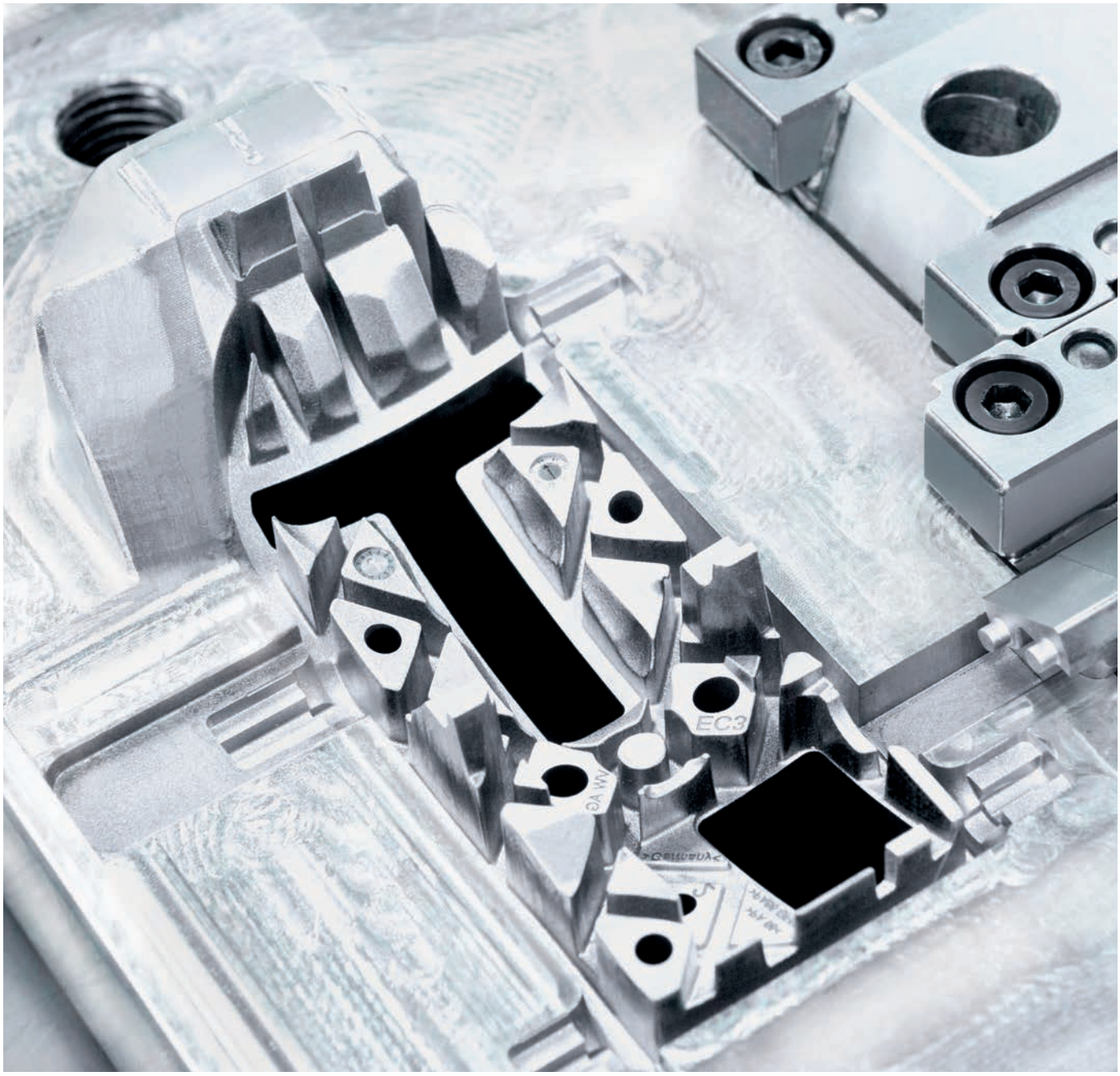
in parts production is reduced to a minimum.

Demand for the innovative machine properties of the MV2400R

"In making our investment decision, we built on our positive experience with Mitsubishi Electric. We were additionally highly impressed by the performance of the wire-cut EDM system during the demonstration in Ratingen. The dependability, accuracy and machining speed of the MV2400R, for example, are vastly superior to those of the FX10-K. One of the main differences is that the new wire threader is highly dependable and supports totally unmanned operation," says Jörg Becker. He then goes on to list the other factors that are relevant to the

Profile of Grote + Brocksieper

Grote + Brocksieper domiciled in Kierspe produces roughly a million plastic parts each day. These are precision and functional parts weighing anything from 0.03 to 600 grams, which often have high-gloss decorative surfaces and grains. For the production of such parts, which can consist of up to three plastic components as well as metal-plastic composites, 45 injection moulding machines are used. A variety of thermoplastics, ranging from standard to high-tech plastics, are processed. Its customers come from the automotive, aerosol and pump industries, the domestic appliance industry, medical technology, the electrical and electronic industry, and building construction. Such big names as Audi, Bentley, BMW, Mercedes, VW, Rolls Royce and Hella are among them.



Wire-cut indexing plate for a 2-component mould.

company:

- Large work space
- New automatic wire threader
- Comfortable operation
- Advanced drive strategy with cogging suppression
- Remote monitoring of the machine
- About 20 per cent lower energy consumption.

The MV2400R was installed in November 2016 and was effortlessly integrated on the plug-and-play principle into the industrial process chain in a matter of days. During the installation of the MV2400R, a start-hole drilling machine from Mitsubishi Electric was also supplied. This drilling system is the perfect complement to the

Impressive performance of the new wire EDM system.

wire-cut EDM as it is designed to guide the operator quickly and easily from the starting point. It is capable of drilling not only small start holes of 0.3 to 3.0 mm in size, but also so-called functional holes.

The new wire-cut EDM offers comfortable intuitive operation with the input masks and symbols of the Natural User Interface. Workpiece set-up is supported with 3D views on the 15" touchscreen at the machine. By measuring the workpiece surface with a measuring probe, the wire's angle of inclination can be automatically compensated for and adapted to the precise workpiece position. Malfunctions are reported directly on-screen. With the aid of an extra window, the operator receives a problem analysis and instructions on the action to the taken. In the case of complicated applications, he can also follow all the machining steps in 3D on the monitor. The work area of the MV2400R permits the machining of mould plates measuring roughly 700 x 900 mm and weighing over 300 kg (up to 1.5 t maximum). There are also several options in terms of the number and characteristics of the cavities.

Jörg Becker, Managing Director of Grote + Brocksieper GmbH + Co. KG.

The quality of the finished parts is boosted significantly by the innovative Tubular Shaft Motor drive concept. The linear technology employed ensures adapted and totally cogging-free movements of the shafts by means of Tubular Shaft Motor. The responsive control behaviour thus achieved yields precisely controllable movements and positioning. This results among other things in precise wire guidance with clean cuts.

The automatic wire threader has had a lasting impact on work efficiency

"We're delighted by the new Intelligent AT automatic wire threader. Whether after wire breakage, in the dielectric, in the kerf or in a continuous start hole, wire threading is performed absolutely reliably, quickly and with high precision. Consequently, downtime of the

EDM system due to wire breakage, for instance, is now a thing of the past. It was therefore an obvious idea to make the fullest possible use of our wire-cutting machines, so workpieces that can be machined overnight on the MV2400R are now set up in the afternoon or evening," Fischer explains. So that Grote + Brocksieper is nevertheless constantly aware of progress at night, weekends or on public holidays, it has purchased the optional mcAnywhere Control function. This remote access option comprises the convenient monitoring of critical machining processes via iPad or laptop and the consultation of a Mitsubishi Electric technician for assistance.

"Our expectations of performance and robustness of the MV2400R wire-cut EDM have been fully satisfied. The machine is capable of operating unmanned and we have achieved an appreciable boost to productivity. With energy efficiency and savings of material in terms of cutting wire, ion exchange resin and filter cartridges, this helps to cut operating costs," says Becker summing up. "Our production expertise meets with high acceptance among our customers and strengthens our competitive position. We can view the future with confidence."

www.grote-brocksieper.com

Company profile

Grote + Brocksieper GmbH + Co. KG

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Managing Director
Jörg Becker

Core business
Plastics processing
and precision tool-making

Employees
85

Founding year
1939

Productivity, efficiency and economies.

Interview

Jörg Becker
Managing Director
of Grote + Brocksieper
in Kierspe

How did you start your career?
How did you earn your first money?
My first taste of working life I gained when my granddad took me into work for a holiday job. Later, before joining the company, I earned reasonable pocket-money by playing football on a semi-professional basis for a while.

What do you like most about your work?
Alongside the commercial and technical matters and the management tasks in the company, I enjoy working with people. In other words communicating an awareness of company identity and teamwork to employees with different degrees of training and personalities. I'm also happy to lend a helping hand – in terms of vocational further training, for example.

What was your biggest business success?
Coming through the banking crisis in 2008/2009 more or less unscathed. This was undoubtedly made possible by the strong sense of responsibility among our shareholders as well by support from the workforce.

What is your biggest strength?
Being able to listen, and gather and evaluate information in order to weigh things up as objectively as possible so that ultimately the right decision can be taken. Strategic decisions of relevance to the company as a whole are mainly approved by the management as a whole.

What attributes do you value most in others?
Honesty, because that creates the basis for mutual trust. In this I see here an important precondition for positive relations. By this I mean not only dealings with employees and colleagues but also fairness in relations with suppliers and customers.

How do you recharge your batteries in your free time?
I've always been enthusiastic about football since my youth. However, these days I enjoy football from the side-lines as one of my knees is no longer up to playing. The stressing of my knee is different when it comes to running, and I'm still perfectly able to manage a half marathon.

Industry 4.0

On the way
to digital networking.

Greater flexibility, speed and economy in production.

To stay competitive on the international level, companies will have to make their production activities more flexible, faster and more efficient. To do this, however, they need greater transparency over the state of their equipment and much improved process security. The key to this is Industry 4.0.

For years now, the term “Industry 4.0” has been much in circulation in the industry. In this connection, some experts also refer to digitisation and the Internet of Things (IoT). What does all this mean? What is already reality and what is still fiction? An initial stocktake reveals that there are an abundance of pioneering approaches. One of these is Mitsubishi Electric’s e-F@ctory Alliance. Under this umbrella over 300 companies in the fields of hardware, IT solutions and software have now come together worldwide. Together they devise solutions for customers who wish to exploit digitisation on the production level. The alliance is an integral part of the e-F@ctory strategy, which at Mitsubishi Electric stands for everything to do

with digital transformation in production. This is where we support our customers with advice on the further development of their business projects in the field of industrial automation and information technology. The focus is currently on the digitisation of production, which, it is hoped, will improve transparency and go a long way towards boosting production and flexibility significantly.

Mainly involved are manufacturers who produce, among other things, CNC controls, production machines, loading and unloading systems, robots, grippers, handling systems, sensors, optical and scanning measuring systems, HMI systems, hydraulic and pneumatic components, and electrical drive systems. In the building of production equipment, they coordinate their respective solutions in order to achieve the goal of Industry 4.0 – maximum transparency and the best-possible process security for more efficient and more flexible equipment operation.

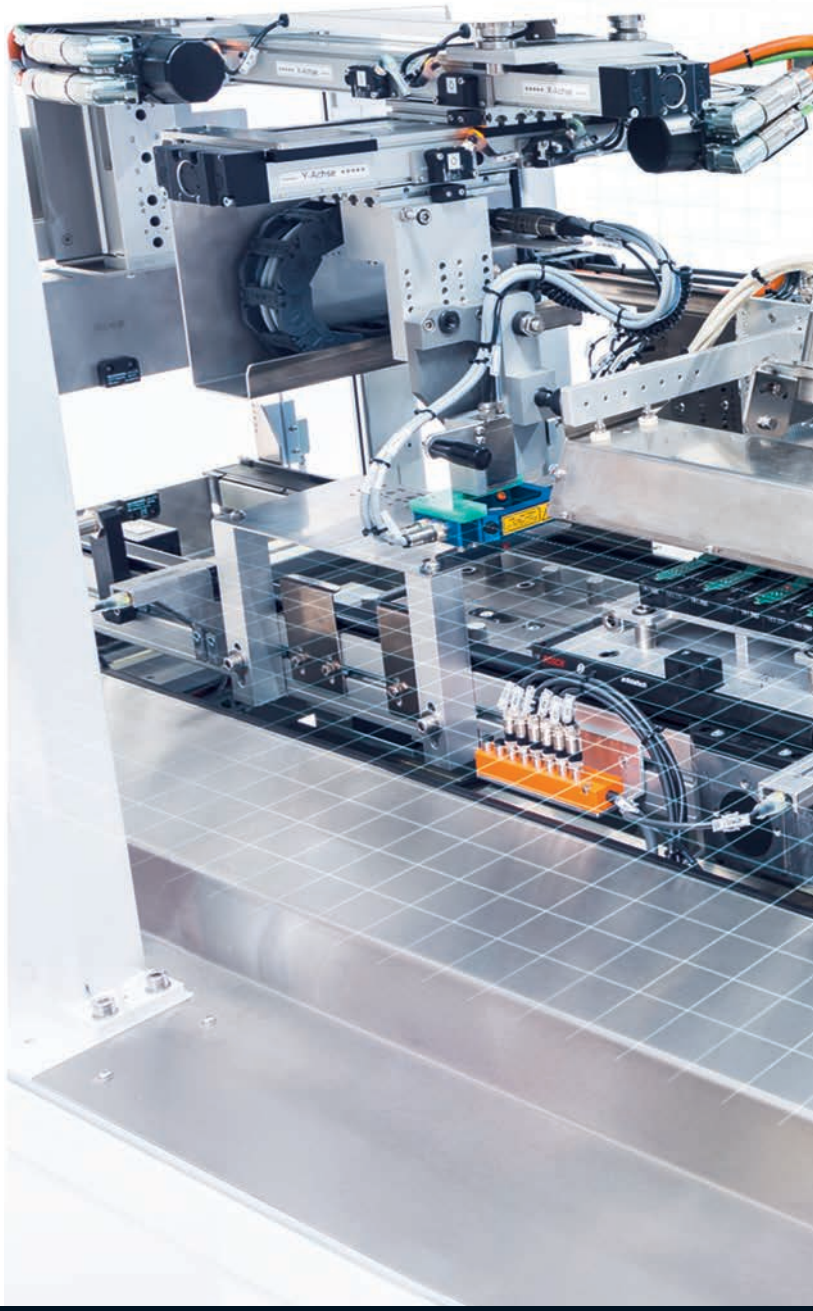
Model factory presents realistic solutions

Back in 2005, Mitsubishi Electric established a model factory in Nagoya, Japan. This consistently pursues the e-F@ctory approach in which the achievable progress can be actually experienced. Top of the list of the goals to be achieved under the e-F@ctory approach is a boost in efficiency and flexibility by interconnecting all production processes with a link to higher-order planning and strategy systems. For maximum programming and operating comfort, modern visualisation and automation systems are to be integrated. The e-F@ctory initiative has a strong focus on building on existing structures and finding scalable solutions. The links in production processes must of course take place in real time. In addition, the large volumes of data injected and exchanged by all participating components have to be transferred and stored safely and reliably. In the e-F@ctory system, the companies involved resort to CC-Link data communication interfaces. Aspired to are globally standardised data interfaces on the OPC and OPC-UA principle.

Identifying flaws and optimising processes

In the production of servo drives at Mitsubishi Electric in Japan, the e-F@ctory strategy has demonstrated for the first time the huge potential of production optimisation through comprehensive digitisation. In the digital factory under the Industry 4.0 strategy, all the procedures and processes are geared to maximum flexibility and productivity. In addition, far-reaching control mechanisms have been introduced so that zero-error production can be largely realised. Production is linked to higher-order software solutions facilitating the analysis, planning and strategic control of company-wide processes at any time.

With the same approaches and objectives, Mitsubishi Electric realised a trailblazing production strategy for its advanced motor contactors of the MS-T series in 2012.



Maximum transparency and process security.

The goal was to create a highly flexible production system capable of responding to all customer needs. This called for the optimised interaction of assembly equipment, employees and ambient conditions. The outcome is several flexible production islands on each of which six robots working together with a single skilled operative produce theoretically up to 600 but in practice about 100 different variants of motor contactors in any desired sequence. The injection-moulded housings of the motor contactors are provided with a unique machine-readable code. This ensures that the various stations of a production island can obtain the instructions indicating which elements and components are to be installed in which order in the motor contactor in question. In addition, each station has the in each case appropriate control system for integrated QS. Data capture via the individual part code ensures complete traceability. This ensures that each produced motor contactor is 100 %-tested on leaving the production island. To back this up, all data from production are documented to make them available for analysis on the higher-order company level. From these, the production planners can, for example, derive intervals for predictive maintenance and servicing. In doing so, they can support basic components available in the system. These are continuously checked against current data from condition monitoring and the control mechanisms in production. All this goes a long way towards constantly improving the productivity, process security and efficiency of production equipment. As a result, production proceeds in regular steps towards the goal of flexibly manufacturing 100 % quality-assured products to customer needs with minimum effort and in the shortest time. All the approaches to Industry 4.0 focus solely on this goal.

Thanks to the cloud, production has continuous access to data in real time.

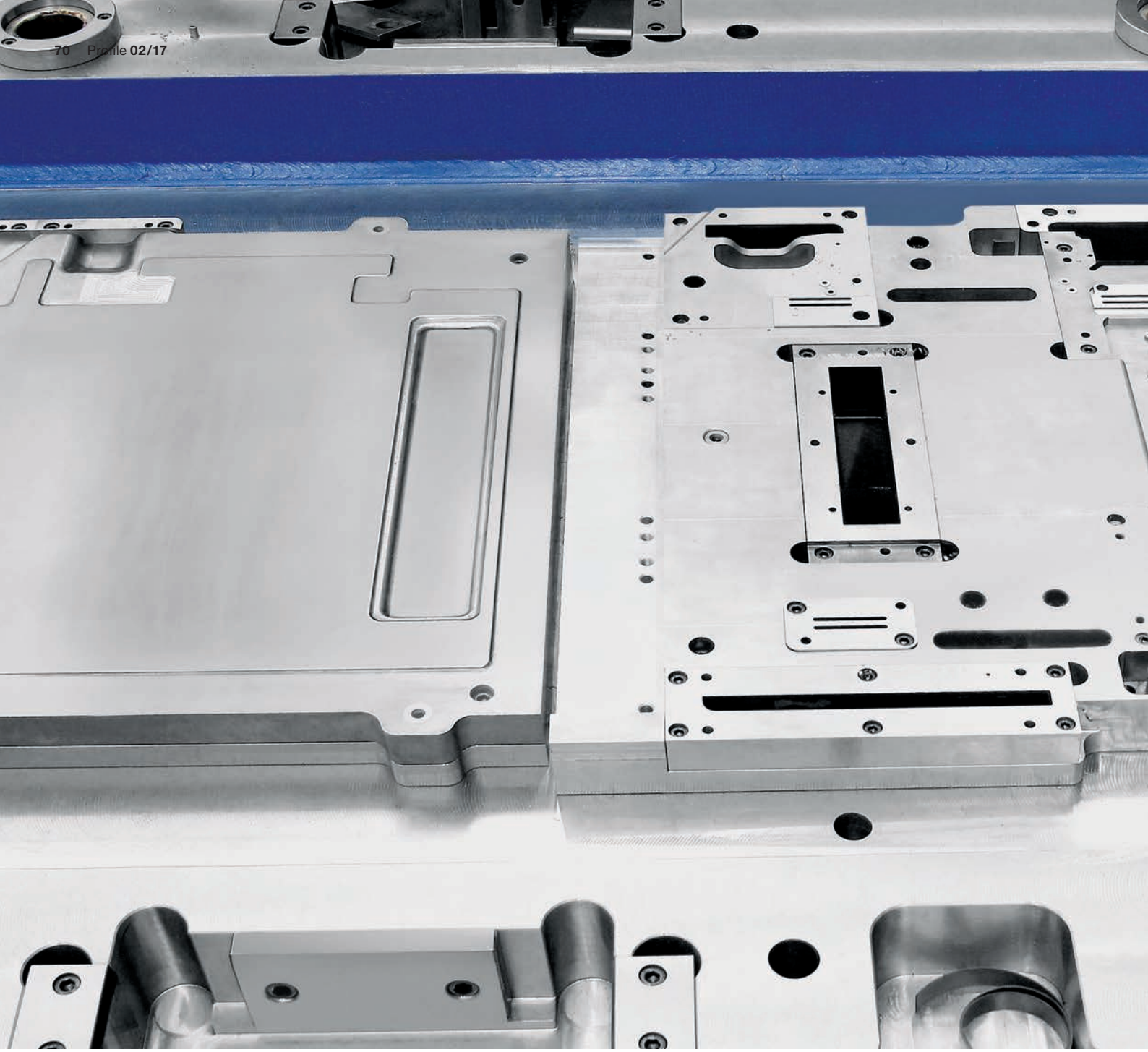
The e-f@ctory strategy.

INDUSTRY 4.0 IN MOTION

Find out more about Mitsubishi Electric's e-F@ctory.
Scan the code now and watch the video.

eu3a.mitsubishielectric.com/fa/en/solutions/efactory/video

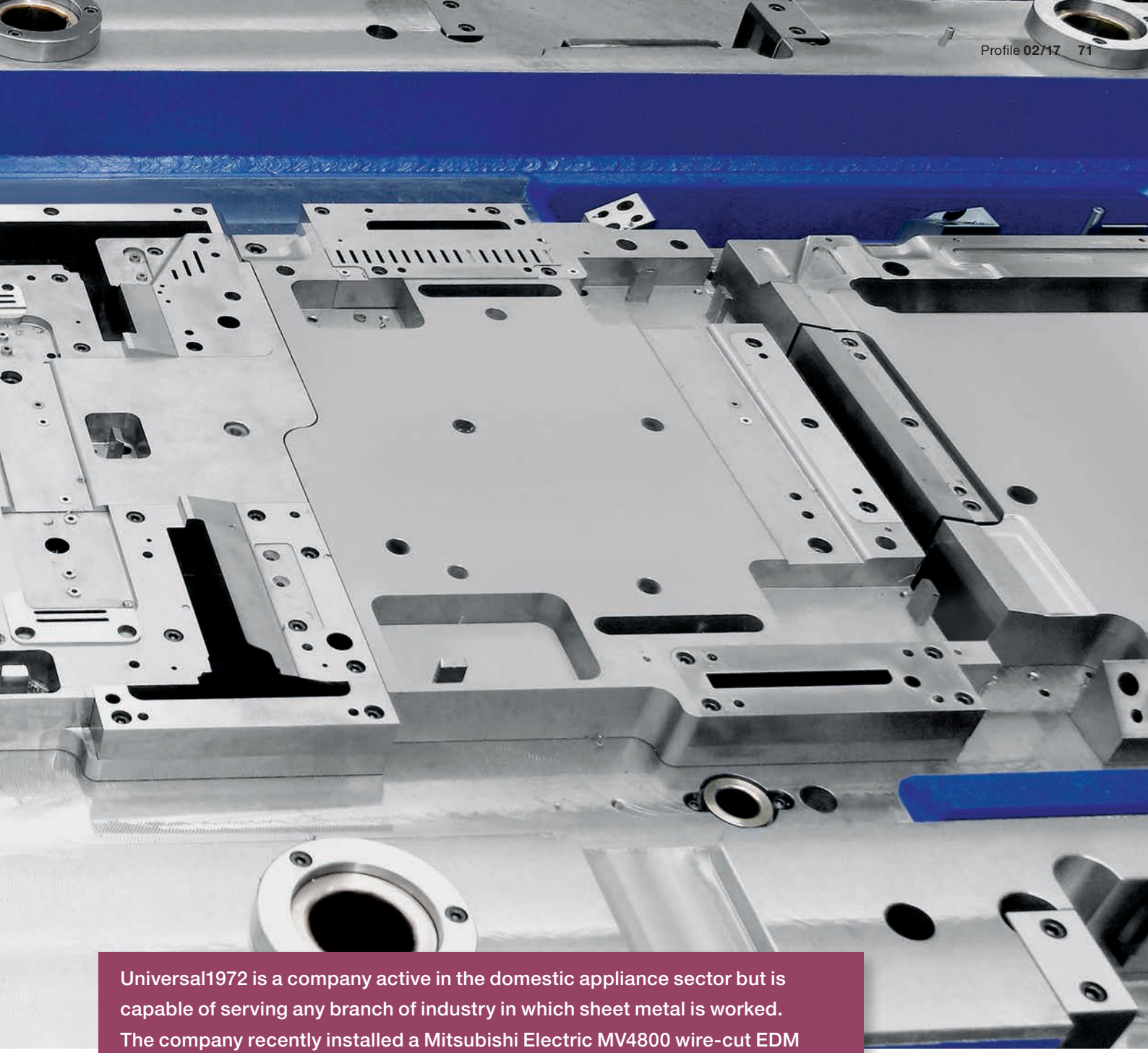
e-F@ctory interlinks the whole of production, from design through to the shop floor.



Universal1972

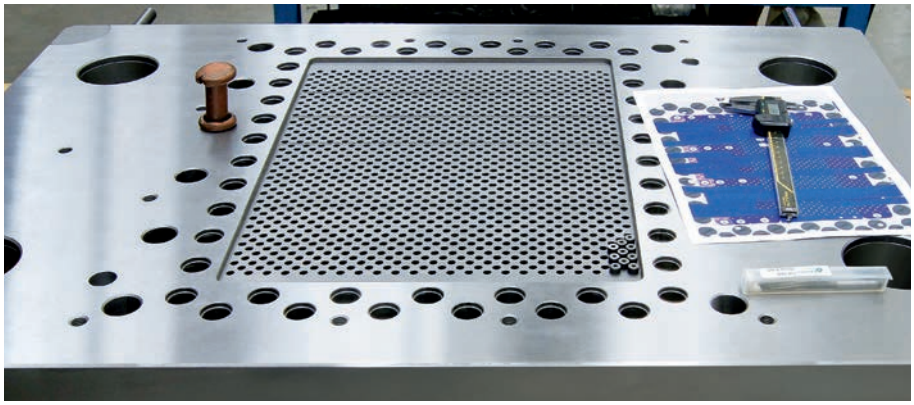
The added value
of invention.

The most progressive technologies on the market.



Universal1972 is a company active in the domestic appliance sector but is capable of serving any branch of industry in which sheet metal is worked. The company recently installed a Mitsubishi Electric MV4800 wire-cut EDM system.

Universal1972 is a mechanical workshop that specialises in the design and construction of tools for the cold working of any type of sheet metal. The company is located in Suzzara, Italy. The company offers the most progressive techniques available on the market today for any kind of shaping operation: single-stage (deep drawing, punching or bending), stepwise (conveyor belt feed) and transfer machining (automated handling of the product by robots). An integral feature of the company philosophy is continuous investment in equipment ranging from CAD/CAM systems to machine



The outstanding precision of Mitsubishi Electric's EDM equipment ensures a perfect fit between the punch and die on each of the 1260 holes of this tool.

tools. The company also handles the maintenance and repair of existing tools.

"Tool openers" for safety

Universal1972 is a classic family-run business, as is often encountered in Italian manufacturing. This is where employees', and not only the owner's, exceptional enthusiasm for their own work combines with metalworking skills and an inventiveness that constantly brings forth new solutions. Such companies were able to survive the banking crisis owing to their expertise and establish a reputation of reliability and precision on all foreign markets.

Alessio Caramaschi, the firm's managing director, explains: "Our strength is being able to offer the customer a turnkey product. We work directly on the design and production of tools and offer solutions that are capable of actually reducing the cost of shaping. We take active part in the development cycle from the first steps, always study the best solutions until the tools are capable of working faster and thus ensuring high productivity. The tools are tested in our workshop so that the customer receives a finished item of equipment for his production operations."

The Mitsubishi Electric MV4800 EDM system installed at Universal1972.

The company's flagship product is the so-called "tool opener" machines that were developed by the company's creative founder Armando Camp to overcome the difficulties with the handling of shaping tools, which are usually very heavy and cumbersome. Traditionally, a mobile crane, chains or other gear are required for the handling of these tools. Operating personnel are also exposed to constant danger from the huge suspended loads. With the tool opener machines, on the other hand, all the movements are performed by the machine that opens the tool, tilts it, stops it in any desired position and enables the operator to work at close quarters comfortably and without risk. The company in Lombardy exports these machines worldwide to market-leading busi-

nesses engaged in the cold forming of sheet metal. To save time, cut costs and ensure safety, they have meanwhile evolved into indispensable items.

Obligatory investment

During the financial crisis, many customers turned to China. However, the differences in costs are now minimal, while the quality of goods from East Asia still has to be checked and can never be taken as given. “One of our customers asked us do the design work for a series of tools for a project (the cold forming of washing machine drums), which would then be built in Asia. The tools arrived four months later, but failed to work properly under the presses. We checked them: the tolerances, tightness of fit, closures and values were all anything but accurate. We also discovered that the steel they were made from was too soft and would have worn out long before the envisaged target value of 150,000 items was reached.” In fact, experience, knowledge, skill, inventiveness and human talents are necessary to convert the project on paper into physical reality. “We had to build new tools ourselves and now they work perfectly.”

“At Universal1972 we are convinced that you have to have the courage to invest continuously so that each department can be regularly upgraded with new machines. Technology is constantly advancing and no one can afford to be left behind.” The Mitsubishi Electric MV4800 wire EDM was recently installed. The nerve centre of this machine is the communication system between the CNC, drives and motors based entirely on optical fibre (ODS). It was delivered to Parma by Overmach, a company group with many years of experience of the sale of new and used CNC machine tools, inclusive of service, maintenance and prototyping. The machine uses revolutionary patented Tubular Shaft Motors. The use of a virtually loss-free circular

From the left: Alessio and Armando Caramaschi, two generations at Universal1972
They are both convinced that investment in new equipment is capable of boosting efficiency and stimulating a company’s growth.

The machine known as the tool opener is an invention of Universal1972, the company’s flagship product. It makes it possible to handle tools safely.

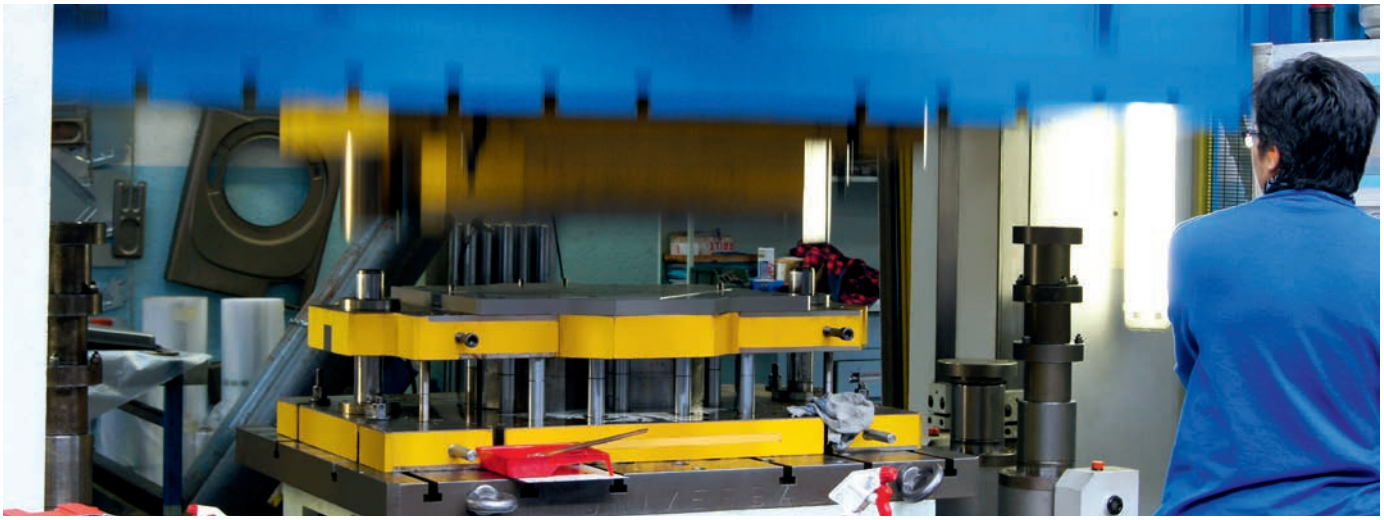
magnetic field reduces energy consumption, while the contactless power transmission permits constantly stable and precise shaft movement. Mitsubishi Electric has implemented many more innovations, such as a highly efficient wire threading system (Intelligent AT) that can be adapted to working conditions and facilitates a process yielding an optimum surface finish with less reworking. The highly progressive Advance Plus CNC control is equipped with a special user interface that can directly import and manage physical geometries. The new EDM system has already met all expectations: “This is our first machine from Mitsubishi Electric and we are very satisfied with it. We had serious problems with the unreliability of the previous manufacturer and are happy that we have now turned to one of the industry’s leading companies. We also built up excellent relations with the supplier Overmach and were impressed by its rapid installation and set-up of the machine. We only needed to switch it on to start production. We appreciate its exceptional accuracy, a factor that is of fundamental importance for us. We cannot afford any deviation, even if it’s only one per cent. For instance, on one of our punching tools there are 1260 holes (this tool punches holes in a metal strip from which the drum of a washing machine is later produced). If only one of them is less than perfect, the punch will no longer fit in the die and the punch will be ruined owing to the high speed of cold forming.”

The finished tools are supplied to all the big names in domestic appliance manufacture.

Truly mechanical

The tools produced by the Lombard company are truly mechanical, with stations, slides and sequentially performed motions. The difficulty here is to imagine and build a mechanism that is capable of converting a metal strip into a finished object with a minimal number of preferably automated steps. It is precisely here that inventiveness and knowledge can give the customer a competitive edge. The more logical a tool’s design, the greater the efficiency that the customer can achieve with it. “In a factory in Poland, we noticed that baking sheets were being produced in a huge 6 m long press with four tools – an incredible waste of resources. We studied the live process and soon came up with a different and much more functional way of performing the task. So we approached the plant manager and told him we would be able to build him a much smaller tool that can be used on a much slimmer and significantly less expensive press. We were awarded the job on the spot. Only a short while later, we had built six units of the same type. This freed up the larger machine for other tasks and the firm was able to boost its cold forming output to a million items per month.”

This is the added value of invention, which creates satisfied customers and gives them a genuine competitive advantage. Universal1972 helps companies that produce domestic appliances to innovate: with a single tool, a simple mechanical press can be used instead of an expensive electronic “intelligent” device. The workpiece is moved between the stations by a pneumatic robot system. The knurling of the tray is one of the most difficult work steps. We have



At Universal1972 all tools are thoroughly tested on completion.

developed a motion by which the metal coils itself up, literally in the air, without causing any metal waste. The stations are integrated in the tool, and their maintenance is very straightforward compared to the traditional method, as they are easy to detach.

www.universal1972.com

Grilioo – the barbecue that works by itself

After almost half a century of producing tools for the domestic appliance industry under contract, Universal1972 sought a new challenge and decided to manufacture and market a product of its own. Made entirely of sheet metal, of course – of stainless steel in fact. The product is the Grilioo, a revolutionary and brilliantly conceived barbecue, hard-wearing and efficient, a high-grade product. “For a company like us it would have been insane to come up with such a product unless it is highly innovative, as we wouldn’t be able to compete with mass-produced items that only cost a few hundred euros. What makes our barbecue special is that it works practically by itself, without generating smoke. The rack tilts and turns and ensures almost automatic uniform cooking; it can move closer to the heat source (high-grade vertical ceramic burner) while the water at the bottom catches the fat and prevents smoke being emitted into the environment. For instant cleaning, the water drains off and the rack can be washed in the dishwasher. The barbecue designed with a CAD program permits a truly environment-friendly cooking process. Market research has shown that demand for it is particularly high in the United States and Australia. It offers many functions that other products of this kind don’t have. All parts are produced with moulds generated at least partly by EDM.”

All Erosion

Trusting

in forward-looking technology to attract customers.

Since founding his company in March 2016, Frédéric Thiervoz in Marigny-Saint-Marcel, France, has become a highly valued supplier to tool- and mould-makers in his region. A climate of trust between customers and suppliers and an investment in high-grade MV1200S and MV1200R wire-cut EDMs from Mitsubishi Electric have had a large hand in his success.

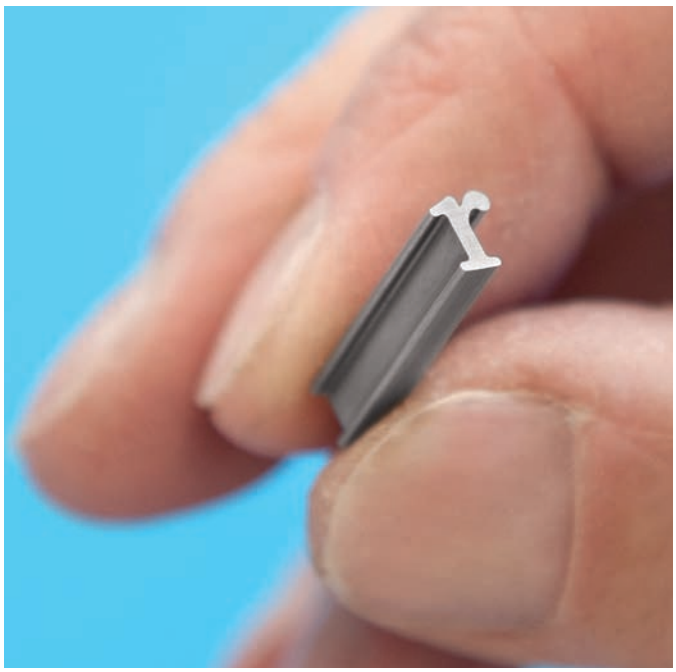
Start-ups are a big talking point. Usually they are associated with spectacular ideas, with visionary projects in the IT and services sector in the public eye. Classical industries like manufacturing, on the other hand, tend to be largely disregarded. But there's plenty of potential in this area as well – as demonstrated by Frédéric Thiervoz. His wide-ranging experience of wire-cutting goes back to 1991. However, after 25 years, he saw little opportunity for advancement in his static career situation, and this is why he seized the opportunity to set up his own business. In hindsight, his decision has been fully vindicated. "On my way to success, I have been able to benefit from a climate of trust between me, my customers and my suppliers," he adds.

Thiervoz's company specialises entirely in the wire-cutting of high-grade precision parts. He offers a great deal of flexibility, he stresses. He produces components as one-off items and in small series for tool- and mould-makers, e.g. copper electrodes and mould in serts, as well as single and replacement parts for medical technology, textile machines and general machine manufacture, e.g. gearwheels, nozzles, and cutting punches and dies. The striking feature of these parts is that they are made of hardened or creep-resistant steel alloys or other hard materials such as sintered high-speed steel or also carbide. Thiervoz has meanwhile acquired a good reputation on the strength of his high flexibility and absolute dependability. He receives his work from larger companies in the industrially densely populated Arve valley as well as from the neighbouring French and Swiss industrial regions to the east of Lake Geneva.

Superlative accuracy coupled with high-speed throughput

Thiervoz finds himself regularly confronted with mutually conflicting demands from his customers. "They want their parts to be produced faster but also with greater accuracy," he says. Today, accuracy in the range of 2 to 3 µm and surface finishes of Ra 0.1 µm are virtually standard. In addition, Thiervoz stresses, customers naturally want their parts to be produced inexpensively and, better still, at lower cost. On setting up his business, he was therefore on the lookout for suitable machines enabling him to satisfy these demands. He has always been convinced that EDM technology

Sharp-edged letter wire-cut out of a block.



The famous landscape of the Arve valley south-east of Lake Geneva is industrially densely populated while offering plenty of countryside.

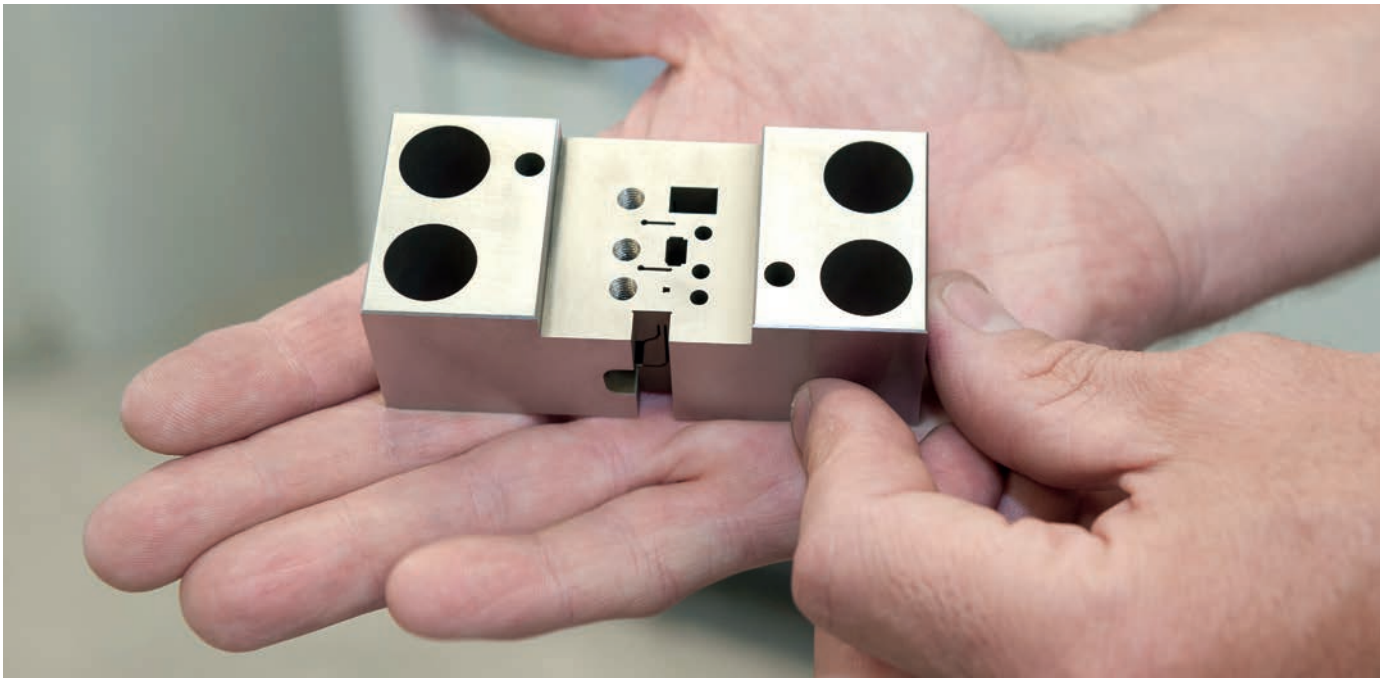
plays a central, if not the decisive role. “For hard materials, difficult geometries and very small parts, there’s hardly a technical or economic alternative to EDM. This technology will be a mainstay in the coming years.” Thiervoz even believes that this technology will even grow in importance. The proportion of hard and superhard materials in industry is constantly increasing. This applies not only to tool- and mould-making, but also to special areas of machine manufacture, medical technology and aerospace. “These components are best, if not exclusively, produced by wire-cutting or die-sinking,” Thiervoz claims.

Thiervoz exploits the benefits of two variants of the same machine, the MV1200R and the MV1200S.

When he founded his tool-making business in Marigny, he chose a wire-cutting machine from Mitsubishi Electric over products from the competition and invested. He invested in an MV1200S.

Technically and economically impressive

He was particularly impressed by the machine’s technical features and forward-looking technology. “In addition, there was the confidence that the employees of Delta Machines, the French distributor for Mitsubishi Electric, placed in me and my business strategy. I was able to persuade them that my firm would be operating successfully after only short while,” Thiervoz explains. In the two years since, the MV1200S has proved to be a resounding success. Thiervoz generates the required NC programs at an external CAD/CAM workstation. The component drawings he receives from his customers as 3D data. For simpler workpiece geometries, he also exploits the benefits of the ADVANCE PLUS CNC control from Mitsubishi Electric, which enables him to program conveniently at the machine. The already set parameters accelerate the production of the NC programs. In addition, thanks to his wide-ranging



With 2 to 3 µm accuracy, Thiervoz machines components out of hard materials for mould- and tool-making, medical technology and general machine manufacture.

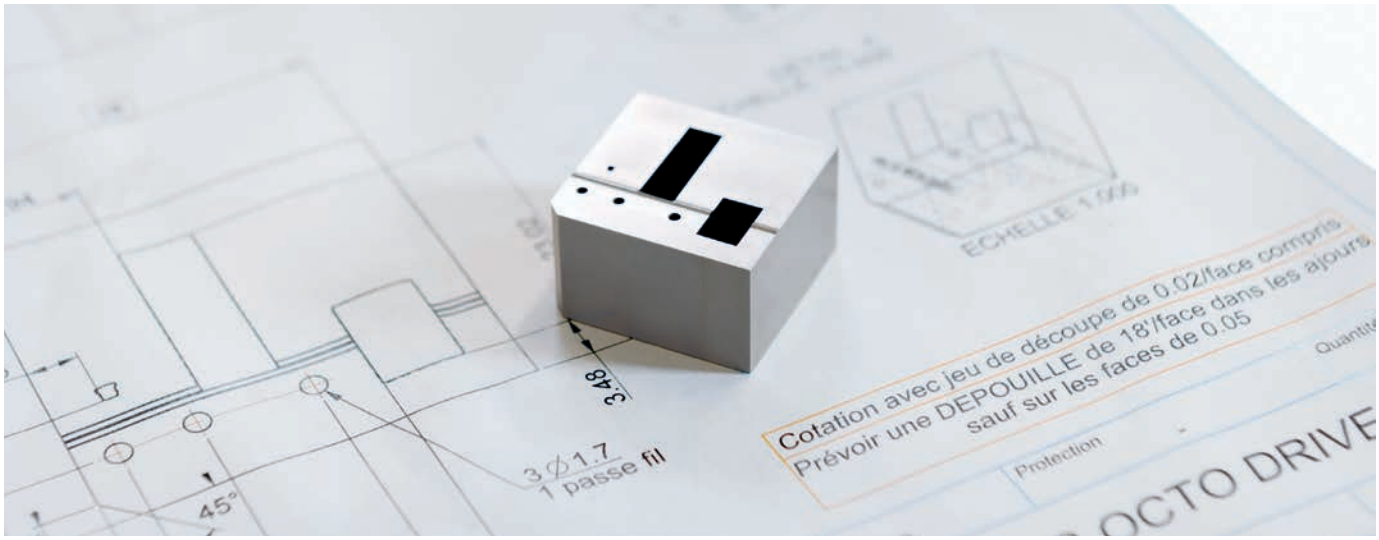
experience of wire-cutting, Thiervoz is able to easily and comfortably optimise all processes. “Process parameters can be changed at the CNC control at any time. I can store them in the memory. This contributes to faster and more accurate operations. In later similar machining processes, I can conveniently and quickly retrieve at any time empirical values that have been optimised in practice,” Thiervoz explains.

For the firm in Marigny, the accuracy and high quality of surface finish were initially the most important factors during wire-cutting. After a few weeks of practical experience with the MV1200S, he realised that the MV1200S fully satisfied the requirements that customers expect today. Component accuracy to the nearest 2 to 3 µm can be effortlessly achieved. Surface quality to as low as Ra 0.1 µm is mastered by the MV1200S in Marigny with the aid of the integrated fine finishing generator.

Faster than expected

High machining speed was initially irrelevant for Thiervoz. He can allow machining processes to take place unsupervised, which means he can work at night and into the weekends. This frees up productive time in which components can be punctually completed. “The wire EDM systems from Mitsubishi Electric operate extremely reliably. This is also made possible by the automatic wire threader. After wire breakage we can fully rely on the machine to automatically resume the process within the shortest time,” Thiervoz reports. Because of the way he works, he only noticed after several weeks

Mutual trust: Frédéric Thiervoz (l) talking to Jérôme Picca.



Small components are nested for unmanned wire-cutting in cost-effective series production.

that the wire EDM system from Mitsubishi Electric also runs much faster than the rival machines that he was familiar with from his previous job. As a result, these wire-cutting machines yield an additional economic benefit, particularly when it comes to series production.

Because of the higher machining speed, Thiervoz is capable of nesting a larger number of smaller components on larger pieces of plate. The MV1200S then fully machines these overnight. In the case of larger geometries, the machine is known to handle three instead of the expected two components within a single shift. "Although I wasn't originally aware of this, the wire EDMs from Mitsubishi Electric deliver an extra advantage by operating not only more accurately and reliably, but also faster. I benefit from this firstly due to lower costs, but also because of the greater flexibility. Within a given time I can now machine several different components," Thiervoz stresses. The energy efficiency of the machines of the MV1200 series also contributes to their high economy. After several months of experience, Thiervoz can now confirm that they consume up to 30 per cent less energy than machines of the competition.

The right choice

Thiervoz is thoroughly satisfied with his investment in the MV1200S, and this is why he purchased a second wire-cutting machine from Mitsubishi Electric, an MV1200R, in April 2017. These machines now meet all the various requirements in terms of accuracy, component size and rapid machining. "These wire EDMs are largely instrumental in enabling me to machine a large range of jobs. With their high process security and machining speed, they also ensure that I can keep costs low," says Thiervoz. The confidence that he has placed in technology from Mitsubishi Electric has been fully justified, he says. With these wire-cutting machines, he can demonstrate day after day that customers can afford to bank on his work. Lasting success, says Thiervoz summing up, is based above all on mutual trust.

All Erosion

Interview

Frédéric Thiervoz
Managing Director
at All Erosion
in Marigny-Saint-Marcel, Frankreich

How did you earn your first money?
During a holiday job in the mould-making workshop of sports equipment manufacturer SALOMON.

What motivates you?
Familiarising myself with new technologies and integrating them in my company. And also cultivating and improving personal relations with my customers

What's different about how you do things now, compared to five years ago?
The new CAM systems and the two wire cutting machines from Mitsubishi Electric have changed everything for me. I have managed to optimise my production processes and expand my production capacity.

Where do you see your company in five years' time?
I'd like to retain my current working philosophy that puts the quality of my work and of personal relationships first.

What was your biggest business success?
Setting up my own ALL EROSION business and making it a success.

What's your favourite way to relax?
I need regular physical exercise. I enjoy hiking in the mountains and skiing.

What attributes do you value most in other people?
Honesty and integrity.

How would you briefly describe your work to someone with no technical knowledge?
I produce precision mechanical parts.

Company profile

All Erosion

All Erosion
ZI Les Grives 185 bis
Rue de la Plaine
74150 Marigny-Saint-Marcel
France
Tel +33 4 50 45 43 99

Core business
Production of high-grade precision parts for tool- and mould-making, the automotive, electrical and electronic industries, and precision mechanics

Employees
1

Founding year
2016

Horoscope 4.0

for hard-wired EDM experts.

Capricorn

21 December – 20 January

Make use of your creative potential this winter. Cut something fancy that makes not only your workmates green with envy but also a big impression on the opposite sex. So in case you're asked about your conquests and achievements at work, now's the time to start practising your biggest grin in front of the mirror.

Aquarius

21 January – 19 February

Thanks to Jupiter's influence on Venus, you manage even the most complicated tapered cuts – as if by sleight of hand. You now see upper and lower contours in your sleep and are therefore unable to get much rest. So don't overdo it! However good your work is, your boss doesn't want to hear you snoring at the machine.

Pisces

20 February – 20 March

In the coming weeks you should definitely focus your attention on your free time and cut your stress to a minimum. Let the wire EDM systems run by themselves – after all, they're designed to. Concentrate on the truly important things in your life. Whether this is your love life, football or partying is of course up to you as a Pisces to decide for yourself.

Aries

20 March – 20 April

The stress at work over the last few days has unbalanced you slightly and even messed up your otherwise neat haircut. Whatever you do, don't let yourself be pressurised! First cut yourself a decent steel comb and get through the day burr-free. The compliments of your co-workers and your partner will fully justify the batch size of 1.

Taurus

21 April – 21 May

While others are plagued with malfunctions and wonky cuts, you dazzle like a fixed star in the EDM firmament. A sociable Taurus like you is also always welcome at any company party and among your workmates. But give your home life sufficient attention. A healthy balance between life and work will significantly boost your spirits.

Gemini

22 May – 21 June

The moon is currently providing plenty of sensuality and company in the sign of Gemini. Since you as a talented communicator always have plenty of admirers, things can only get better. But caution is advised: too many sparks can cause a fire. So take all necessary precautions during wire cutting and always wear your protective glasses when lasering.

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

Cancer

22 June – 22 July

Read a good book for change so that you can relax and open yourself to new ideas. Afterwards you'll make much faster progress – much like an MV2400R. You should maintain your concentration all the same. So don't save on cleanliness either: thoroughness has helped many an EDM specialist to keep his equipment in top shape.

Leo

23 July – 23 August

Stay alert – this month a stranger will do all he can to completely wind you up. So think twice before leaving someone alone with your trusty reel of cutting wire. And don't forget to give yourself a relaxing break from time to time – this way you can recharge your batteries after a day's work.

Virgo

24 August – 23 September

You and your EDM system are becoming inseparable. Your career is advancing well, but Jupiter is being disruptive by running rings around Uranus. So show your partner that you care about her every now and then. With all the excitement at work, your private life is taking too much of a back seat. Venus will show you the way forward in the coming weeks.

Libra

24 September – 23 October

Even though we're entering the winter season, your output shows no signs of flagging. But be careful not to waste your energy! In the New Year you will have to shift up a gear if you want to stay ahead of the competition. In your private life, on the other hand, you should restrain yourself to avoid unnecessary friction.

Scorpio

24 October – 22 November

Watch out, as your performance curve has currently slumped to rock bottom. It's time to do something about it. However, your efforts are hampered at present by a spate of solar eruptions. So be careful when using the microwave – right now you're capable of sending the waves haywire. Better to err on the side of caution and go out for a meal.

Sagittarius

23 November – 21 December

Your taper angle couldn't currently be better. So don't put yourself off with confusing travel paths. Thebes, one of Jupiter's moons, is currently helping you to conjure up magnificent curves – both at work and in your private life. Make sure you get enough sporting exercise so you can slowly burn off your surplus energy. In doing so, you will meet an important person who will give you new inspiration.