

# *Profile*

*Issue 2 · December 2010*

***The world's fastest wire eroder 13***

*Roman Weber GmbH*

***Cutting it fine 16***

*Wenger S.A.*





10

**WAFIOS AG**  
From super-fine grooves to big blocks of steel



13

**Roman Weber GmbH**  
The world's fastest wire eroder



16

**Wenger S.A.**  
Cutting it fine



32

**Mitsubishi Electric Europe – Lasers**  
10,000 laser systems sold world-wide – now in Europe as well

4

**Präzivo**  
Going solo with wire erosion

7

**MEPAC CZ, s.r.o.**  
Supreme precision and impeccable surfaces

10

**WAFIOS AG**  
From super-fine grooves to big blocks of steel

13

**Roman Weber GmbH**  
The world's fastest wire eroder

16

**Wenger S.A.**  
Cutting it fine

19

**DORMA GmbH & Co. KG**  
Wire EDM opens the door to high precision

22

**Derwa SA**  
Making Swiss watches tick

25

**RS-technik CAD-CAM GmbH**  
Delivering precision on time

28

**mödinger & hänle GmbH**  
Innovative tool solutions

31

**Profile – Ordering back issues and change of address**

32

**Mitsubishi Electric Europe – Lasers**  
10,000 laser systems sold world-wide – now in Europe as well

34

**The big EDM machine user horoscope**

36

**Travel report on Japan, the Land of the Rising Sun**

## Legal notice

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# Going solo with wire erosion

Präzivo gets underway with innovative technology from Mitsubishi Electric, coupled with a commitment to quality and to the customer.

When Ronny Volland set up his own wire-cut EDM business by the name of Präzivo at the beginning of 2010, he pinned his faith on reliable and innovative technology from Mitsubishi Electric. A wire eroder by trade, he invested in an FA20-S Advance so that he could carry out mechanical engineering and tooling jobs for customers efficiently and to a high standard of quality. Ronny Volland has already achieved his initial goals. Präzivo's founder is now looking further ahead.



Going it alone in January 2010 was the right step to take for wire eroder Ronny Volland. After the bankruptcy and repeated takeovers of his former employer, he saw better opportunities for himself by setting up Präzivo. "From the technical point of view, there were no problems in handling wire EDM jobs off my own bat. The real challenge was to complete the jobs quickly and cost-effectively." Driven by the ambition to master this challenge, he single-mindedly pursues his goals.

Building on his experience of wire-cut EDM, Volland concentrates on precisely this activity and has supplemented Präzivo's range of activities with start-hole drilling and glass-bead blasting. "We also handle the logistics, so all the customer has to do is receive the finished product," says Ronny Volland describing Präzivo's rounded and customer-oriented spectrum of services. The most important investment right at the beginning was, of course, in the wire-cutting machine which permits one-man operation as well as, depending on running time, two- or three-shift operation.

### Multi-faceted range of parts with wire erosion from Mitsubishi Electric

Ronny Volland decided in favour of an FA20-S Advance wire-cut EDM machine from Mitsubishi Electric on the basis of his many years of positive experience with machines from this manufacturer. "I knew the current machine's predecessors inside-out and was familiar with their dependability. The question of possible alternatives simply didn't arise," Volland recalls, highlighting the technological leap that Mitsubishi Electric made with its FA series. "First of all, oper-



The programming of more complex components is easy with the DCAM software.

ation is very straightforward. And, secondly, cutting speed has been noticeably increased." Mitsubishi Electric has consistently pushed ahead with improvements in speed and cutting rate on the current FA20-S Advance.

With advanced wire-cutting technology, Ronny Volland has created the ideal conditions for the efficient machining of complicated parts. DCAM software helps him with programming. "If the customer supplies a complete set of data, the programming is quickly completed on the basis of the 3D model. The rest is handled by the machine," Präzivo's founder explains. The user-friendliness of the software and machine also enable Ronny Volland to respond to customer requests at short notice.

The demanded range of parts covers the entire spectrum of components that Präzivo is capable of machining with the FA20-S Advance: coining dies, parts for mechanical engineering and components for tool- and mouldmaking. The maximum dimensions of the workpiece can be 1050 x 800 x 300 mm, and the wire diameter of 0.1 to 0.3 mm permits even the finest cuts, while 5-axis machining also allows scope for more complex operations. However different the products are, they all have one thing in common, Volland stresses:

» First of all, operation is very straightforward. And, secondly, cutting speed has been noticeably increased. «

"Each part that Präzivo produces is subject to the same standards of precision and quality." On top of this, the owner and manager himself attaches importance to absolute punctuality. Getting components to his customers on time is an absolute must.

### Ideal springboard for further growth

A good year down the road, Ronny Volland sees his decision to start his own business fully vindicated. "The first steps were a challenge, we've achieved all our targets and can now look ahead." His plans, for instance, envisage leaving the rented shop and investing in a new building. One or two more wire eroding machines are also on the shopping list, given continuing growth. "If order levels continue to develop, Präzivo will grow on an appropriate scale and we shall continue to produce parts flexibly and to a high standard of quality."



The large front door of the FA20-S Advance gives the user optimum access.

## Companies in Profile

**Name and place of business:**  
Präzivo, Brand-Erbisdorf (Germany)

**Founding year:** 2010

**Number of employees:** 1

**Manager and owner:**  
Ronny Volland

**Core business:** EDM jobshop

**Ronny Volland**  
has been in business  
with Präzivo since  
January 2010 and  
has already achieved  
his targets for the  
first year.



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## Professionals in Profile: Ronny Volland

**How would you describe in a sentence what your company does?**  
We process parts for mechanical engineering and for tool- and mouldmaking with the methods of wire erosion, start-hole erosion and bead blasting.

**How did you earn your first money?**  
With a paper round.

**What motivates you?**  
Ambition.

**What's different about how you do things now, compared to five years ago?**  
Thinking differently, because when you've got your own business, you develop a totally different attitude to work.

**Where do you see your company in five years?**  
With healthy growth, new premises would be conceivable with space for three wire-cutting machines and one or two employees.

**What was your biggest business success?**  
In the short period since setting up the business, I've managed to meet my targets pretty quickly and I can now plan further ahead.

**What's your favourite way to relax?**  
With my family.

**What attributes do you value most in other people?**  
Punctuality.

**What was the best advice that anyone ever gave you?**  
There wasn't any.

**How would you briefly describe your occupation to someone with no technical knowledge?**  
Compared to conventional machining, electromagnetic discharge machining is difficult to explain because it's a very complicated physical process.

# Supreme precision and impeccable surfaces

Customers from demanding branches of industry expect the very best from MEPAC. The Czech company relies on innovative wire-cut EDM.

MEPAC CZ, s.r.o.

Profile December 2010 7

*When the engineer Petr Petrik set up MEPAC CZ with two employees in 2004, he laid the foundations for a company that produces machine components and moulds with extreme precision. Today, MEPAC has a 49-strong workforce and, from its workshops in Třinec, Vsetín and Vrbová, supplies parts to precision mechanical engineering firms and moulds and tools to the automotive industry. Indispensable for its work is a wire-cut EDM machine from Mitsubishi Electric – the FA20-S Advance.*

"Precision in our production operations has top priority because it is essential for satisfying our customers' high expectations," says Petr Petrik, describing the MEPAC approach. His customers can be found in precision mechanical engineering, automotive engineering and even in aerospace – all of them sectors that demand top quality. The company founder continues: "These

requirements dictate the standard of technology in our production and call for manpower with the requisite skills."

The level of quality is particularly visible in those areas where extreme surface precision is expected. "This even extends to high-gloss surfaces," Petrik explains, "while the geometry has to be absolutely spot-on at the same

time." Such factors are the reason why wire-cut EDM is of such central importance in the MEPAC production process. Petr Petrik therefore bolstered this activity in 2010 by purchasing a FA20-S Advance wire EDM machine from Mitsubishi Electric.

### The ideal machine for high aspirations

MEPAC has been working with an EA12-D sinker EDM machine from the Japanese manufacturer since 2009. What has started with a die-sinking machine is now being successfully continued in the field of wire erosion, Petrik feels: "With the FA20-S Advance we have given a major boost to our technological capability and significantly improved the quality of product." The engineer had no misgivings about buy-

*In addition to wire EDM, MEPAC also practises sinker EDM in order to produce parts like this one. An EA12D from Mitsubishi Electric has been in operation since 2009.*



ing another machine from Mitsubishi Electric. "The accuracy and surface quality are outstanding, even at high machining speeds, and this makes production much easier for us." On top of this, there's the machine's reliability and rapid after-sales service, if it's ever needed.

Petr Petrik attributes his success in optimizing the production process with the FA20-S Advance to the ingeniously conceived and innovative equipment of the wire-cut EDM machine. "Without the super-slim wire with diameters of 0.1 to 0.3 mm, fine cuts and narrow radiuses would be impossible," says Petr Petrik, citing examples. Furthermore, the working range of 1,050 x 800 x 295 mm permits the machining of a wide range of parts.



» We wanted a reliable industrial standard with straightforward operator control – and we got this as an all-inclusive package from the FA20-S Advance. «

One of the most persuasive arguments in favour of purchasing the FA20-S Advance was, in Petr Petrik's opinion, the high-power generator. "It's responsible for the speed, runs absolutely dependably and is economical when it comes to energy consumption." The Power Master function is a big help in this respect – particularly during unmanned operation, as the FA20-S Advance is in operation around the clock. Another big selling point is the

control of the wire-cut EDM machine from Mitsubishi Electric. "We wanted a reliable industrial standard with straightforward operator control – and we got this as an all-inclusive package from the FA20-S Advance" is the ambitious user's verdict.

#### A cut above the rest

This all-inclusive package has brought about a whole series of improvements throughout MEPAC's overall production process. "The FA20-S Advance is often the first link in the production chain and, with its rapid machining and immaculately cut surfaces, creates ideal conditions for downstream processing," Petr Petrik explains. Superior results during wire erosion simplify and speed up subsequent polishing, he adds.

The purchase of the FA20-S Advance was part of a relatively large-scale programme of investment at MEPAC from

2008 to 2010. During the investigation of the various offers and the purchasing phase, cooperation with Mitsubishi and its Czech agent EDM TRADE went very smoothly, Petrik recalls. "Mr Valenta from EDM TRADE introduced us to nothing but high-grade products and gave us expert advice." The only thing lacking in the engineer's view is a demonstration centre in the Czech Republic. "This would undoubtedly accelerate the purchasing process." This notwithstanding, the second EA12-D sinker EDM machine has already been ordered.

The investments of the last few years have paid off for MEPAC. The company is growing at a healthy rate and is creating more and more new jobs. The good order situation and satisfied customers confirm this trend. Petr Petrik wishes, of course, to sustain this momentum. "If we continue to consistently uphold our quality standard, we will also succeed in satisfying existing and new customers with our work."

#### Professionals in Profile: Petr Petrik

**How would you describe in a sentence what your company does?**  
Production, repair and conversion of parts for precision mechanical engineering.

**How did you earn your first money?**  
With the high-gloss polishing of injection moulds for car lights in compliance with the demanded geometry.

**What motivates you?**  
The satisfaction of a job well done, solving a thorny problem and the customer's gratitude.

**What's different about how you do things now, compared to five years ago?**  
I used to do many of the jobs at the machine myself, whereas today I'm more concerned with management and strategy and introducing systems.

**Where do you see your company in five years?**  
We shall continue to act as a supplier to the most challenging sectors, including aerospace, and wish to offer our customers our technical resources and expertise.

**What was your biggest business success?**  
1. Awards at international trade fairs for a product that we developed and produced ourselves, a laser for precision laser build-up welding (MSVB BRÜNN 2004; PLASTPOL KIELCE Poland 2005; MSV NITRA Slovakia 2006)  
2. ISO 9001 introduction in 2009

**What's your favourite way to relax?**  
With sport, and above all cycling and table tennis, and spending time in the countryside and in the mountains.

**What attributes do you value most in other people?**  
Openness, honesty, truthfulness, enthusiasm for one's work, the ability to solve problems.

**What was the best advice that anyone ever gave you?**  
A good deal of advice has come my way, but none of it has been any use ...

**How would you briefly describe your occupation to someone with no technical knowledge?**  
With a lot of effort, we produce, repair, modify and sell parts with small and very small volumes.

#### Companies in Profile

**Name and place of business:**  
MEPAC CZ, s.r.o., Třinec  
(Czech Republic)

**Founding year:** 2004

**Number of employees:** 49

**Owner:**  
Petr Petrik, engineer

**Core business:** Production of machine parts and moulds

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# From super-fine grooves to big blocks of steel

WAFIOS builds machines for wire and tube processing – with wire-cut EDM machines from Mitsubishi Electric for process security and high efficiency.

When Ernst Wagner built his first manual chain-link fencing machines in 1893, he had no idea that he was thus laying the foundations for a company with a global reputation. The company group today has roughly 1200 employees on its payroll and about 750 of these at the parent plant in Reutlingen alone. The years of experience of wire and tube processing find expression in the company's multi-faceted range of machines. In the wire erosion department, the company has been using innovative technology from Mitsubishi Electric for the last two years. The machine park comprises two FA30-S Advances with Z-axis extension and an enlarged work tank, an FA20-S Advance and a high-precision NA1200 Essence.

The tiniest springs for medical technology and the watchmaking industry, large shock absorber springs, chain-link fencing and steel chains – what all these products have in common is that they all involve the mechanical processing of wire for their manufacture. Complex machine configurations today ensure that this processing can be carried out efficiently.

With over 115 years of experience, WAFIOS AG has long established itself as the leading manufacturer of machines for wire and tube processing. Thanks to its broad model range, the company occupies a leading position

worldwide. "We want to ensure that our customers find the matching solution for practically any application," says Björn Zwiesele, head of Mechanical Production and Quality Management, explaining WAFIOS's product diversity.

### Skilled personnel and innovative technologies

Because of the complexity of the parts it produces, WAFIOS has a high manufacturing depth, which calls for maximum flexibility in view of the wide product range. Björn Zwiesele describes how WAFIOS meets this challenge:

"By combining skilled personnel with modern production technologies, we achieve high efficiency and productivity." Finding highly skilled employees on the labour market is difficult these days, so WAFIOS trains its own. And, as far as the machine park is concerned, the company regularly invests in new and innovative technologies.

The best example of WAFIOS's openness to innovation is the wire erosion department. In the last two years, four new machines have been purchased, all of them from Mitsubishi Electric. Wire-cutting is a crucial link in the WAFIOS process chain, as many machine parts can only be produced inexpensively and efficiently with this technology. It is therefore understandable that WAFIOS requires innovative and high-performance wire erosion machines.

### FA30-S Advance with a custom conversion

"We had reached the point where we had to decide whether it would still be worthwhile maintaining the old machines," Björn Zwiesele recalls. As the total cost of ownership (TCO) was too high overall, the investment in a new machine in 2008 made more sense in the long term, he claims. After an exhaustive comparison of the machines on offer and successful test machining, WAFIOS bought the FA30-S Advance from Mitsubishi Electric. The head of Mechanical Production names the reasons: "In its totality, the machine from Mitsubishi Electric was the model with the best price/performance ratio, even taking the sideline costs into account. On top of this, there's the manufacturer's competent after-sales service."

The special feature of the FA30-S Advance purchased at the time was its modification for its special application, that of machining sliding mandrels measuring 1800 x 300 mm with a cutting depth of 500 mm. To make this possible, the Z-axis had to be extended and the water tank widened. A remarkable achievement, as Zwiesele notes:

"Despite these modifications, the manufacturer supplied the machine in the shortest time so that we could quickly get production going." Looking back, he regards this first wire-cut EDM machine from Mitsubishi Electric as the door-opener for further machines of the same make.

### Balanced machine park for broad range of parts

The machine's impressive performance and the obliging service were reason enough for WAFIOS to purchase further machines from Mitsubishi Electric – first an NA1200 Essence and an FA20-S Advance, and in autumn 2010 another FA30-S Advance with the same modifications as the first one. The machines were selected with great care, so that the array of technologies in wire erosion is as balanced as possible. "The two FA30-S Advances give us sufficient capacity for the large workpieces. The two smaller machines create extra scope and flexibility in production," Björn Zwiesele explains and refers to the broad range of parts that WAFIOS produces for its machines.

In the case of the NA1200 Essence, WAFIOS had an additional rotating B-axis installed, an optional extra that has been retrofitted on the other three machines. The NA1200 Essence's tubular



Thanks to its tubular direct drives, the NA1200 Essence is highly precise and is the ideal addition to the WAFIOS machine park.

» Despite these modifications, the manufacturer supplied the machine in the shortest time so that we could quickly get production going. «



The FA30-S Advance was equipped with an extended Z-axis and a widened work tank so that large sliding mandrels would fit on the machine.

direct drives make it a high-precision machine with absolute positional accuracy. Just how much production depends on it is explained by Björn Zwiesele: "In some cases, we cut super-fine grooves for wire guidance in stainless steel rollers. These are of the order of 60 µm."

### Planning ahead despite fluctuations in the economic climate

The first two years with wire-cut EDM machines from Mitsubishi Electric have left the experts at WAFIOS in no doubt. All four models operate dependably

and achieve optimal production results. "Our standard of quality demands such results," Björn Zwiesele adds. The, in all respects, positive experience – which also includes customer service – therefore demonstrate conclusively that the switch to Mitsubishi Electric was the right step to take in wire erosion. WAFIOS made these recent investments at a time when the general economic climate was subject to major fluctuations. Zwiesele is optimistic all the same: "The ups and downs in the economy will probably continue in ever decreasing cycles, but we are in a good position to plan ahead for the future – in the wire erosion sector as well."

A job for the NA1200 Essence with its rotating B-axis: The grooves on the roller measure just 60 µm.



### Companies in Profile

**Name and place of business:**  
WAFIOS AG, Reutlingen (Germany)

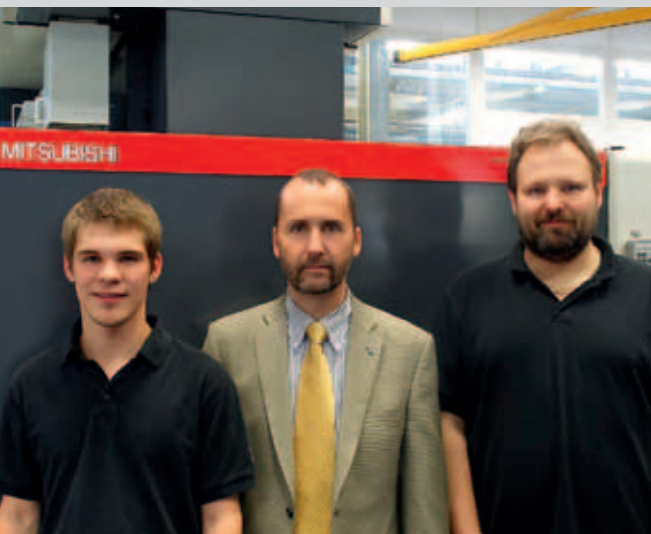
**Founding year:** 1893

**Number of employees in the Group:**  
Roughly 1200

**CEO:**  
Dipl. oec. Thomas Hösl

**Core business:** Developing and building high-end machines for wire and tube processing

From left to right: **Clemens Wolfer** (EDM employee), **Björn Zwiesele** (head of Mechanical Production and Quality Management), **Markus Bussmann** (Deputy Segment Manager)



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### Professionals in Profile: Björn Zwiesele

**How would you describe in a sentence what your company does?**  
We build machines for the processing of wire and tubing.

**How did WAFIOS earn its first money?**  
With manual chain-link fencing machines in 1893.

**What motivates you?**  
We want to offer our customers innovative solutions that are better than those of our market rivals and provide our staff with secure and interesting jobs. This way we can guide our company into a secure and profitable future.

**What's different about how you do things now, compared to five years ago?**  
Our production runs on the "just in time" principle, which demands a high degree of flexibility throughout the value chain.

A systematic innovation process accelerates the development of new products, i.e. reduces time to market. We have also changed from being exclusively a builder of machines to a problem solver for customer requirements.

**Where do you see your company in five years?**  
By consistently expanding our services, standardization and modular design, we will steadily increase our shares of the market.

**What was your biggest business success?**  
Providing job security during the 2009 crisis.

**What attributes do you value most in other people?**  
Even greater flexibility.

**How would you briefly describe your occupation to someone with no technical knowledge?**  
We all use wire and tubing products produced on our machines (shopping trolleys, springs on cars, nails) on a daily basis.

## The world's fastest wire eroder

Roman Weber is an EDM jobber with perfectionist tendencies. A claim confirmed by his customers and underscored by the sports car that he has built himself – one of the fastest.

### Roman Weber GmbH Drahterosion + Werkzeugbau

Profile December 2010 13

*In the over twenty years' history of Roman Weber GmbH, the company of the founder of the same name has evolved into Switzerland's biggest wire EDM centre. With one-off production solutions, the wire eroders from Tobel succeed with what others consider impossible. The aspiration to superlative quality combined with cost-effective production remains unchanged. Roman Weber therefore resorts consistently to innovative wire-cut EDM technology and invested in an FA20-S Advance in 2010.*

"It's the complicated parts that really make our work interesting. These are the challenges that we like to take on." This is how Roman Weber, a toolmaker by trade, describes shortly and sweetly the approach pursued by his business established in 1988. Roman Weber GmbH is synonymous with out-of-the-ordinary solutions in wire erosion, because it never shies away even from complicated tasks. On the contrary: the specialists develop their own solutions in order to produce the parts not only to the demanded standard of quality, but also as efficiently as possible. "The customer says what he wants, and we find a solution," Roman Weber puts it succinctly.

#### EDM jobshop with its own product

The most important target sectors of Roman Weber GmbH are medical technology with a share of about 50 per cent and automotive engineering at 25 per cent. With customized production solutions in wire EDM, Roman Weber has largely revolutionized the production of medical technology products. A special rotational/swivel axis, for instance, makes it possible to cost-effectively machine parts with many different angles. Roman Weber has been making use of this technology for fifteen years: "We produce cutting blocks on a daily

basis that are needed for knee operations. Without the rotational/swivel axis, production wouldn't be anything like as efficient."

In another case, Roman Weber had to find a solution for wire-cutting around corners. The only possible alternative would have been to machine the part by sinker EDM – a much too elaborate and hence costly process. The result of the tinkering has remained unparalleled worldwide to the present day: deflection devices developed by Roman Weber guide the wire around the obstacle.

By setting up his own business, Weber also laid the foundations for his very own product. 25 years ago, the company founder set himself the goal of building a sports car. With his perfectionist tendencies, it was also to be the perfect car. After years of development work, to which 21 Formula One race engineers contributed 100,000 man hours, Roman Weber unveiled his 900 hp vehicle in 2007, which is still one of the fastest sports cars registered for road use. "We built the car entirely our-

21 Formula One race engineers contributed 100,000 man hours to the development of Roman Weber's sports car.



selves, drawing on the full range of our metalworking skills," Roman Weber recalls.

### FA20-S Advance – wire EDM machine for the toughest requirements

Be it customer orders from the medical technology sector or components for the company's own sports car – the wire eroders at Roman Weber GmbH put their faith in the production of their high-grade components on innovative wire EDM technology from Mitsubishi Electric. The machine park was extended in 2010 to include an FA20-S Advance in a bid to boost capacity and quality. "We were already amply familiar with a predecessor model of this machine," says Roman Weber looking back. He celebrated one of his biggest entrepreneurial successes with the old FA20 – the production of the cutting blocks mentioned earlier.

Obviously, the performance features of the current FA20-S Advance are superior to those of its antecedent. Cutting speed and precision were the all-important attributes for Roman Weber. Added to these are the large machining range and high dependability. The latter is an important aspect, as the machine runs regularly without supervision. The manager sees the advan-



tages: "The FA20-S Advance offers us wide-ranging machining options, and these give us a high degree of flexibility." In addition, the Mitsubishi Electric wire erosion machine achieves impeccable results, which is an absolute must for Roman Weber GmbH's work.

The range of parts that Roman Weber GmbH produces for its customers is so varied that the flexibility of the FA20-S Advance is more than profitable. Small series for medical technology or batch sizes of up to 4,000 units are part of the daily routine for the wire eroders in Tobel. Even parts for the home-made sports car can be cut on the machine from Mitsubishi Electric to the required standard of quality. For instance, the car's wheel carrier is a component that

has to be completely wire-cut. "The 4.5 kilo part is cut from a 90 kilo steel block," Roman Weber adds.

### Well equipped for the future

Roman Weber GmbH has all the requisite machinery, and there's certainly no lack of expertise. Roman Weber will therefore continue the trail of success of the years so far: "We've always had plenty of business from medical technology and we want to expand this activity. In the automotive industry, niche products are the backbone." Roman Weber also intends to continue to refine his sports car. "In five years, we want to see ten of the new model on the roads."

*The cutting block for knee operations is produced in six sizes. Roman Weber realized the various cutting angles with a controlled simultaneous rotational/swivel axis that he developed himself (bottom left).*

*Every product machined by Roman Weber GmbH meets the highest quality standards – regardless of the complexity of the part in question.*



### Professionals in Profile: Roman Weber

#### How would you describe in a sentence what your company does?

We manufacture orthopaedic instruments and implants for medical technology, produce prototypes, tools and moulds for the automotive industry and build our own sports car.

#### How did you earn your first money?

At the age of ten, I had a hundred rabbits that I sold.

#### What motivates you?

Personal development, the striving for perfection (as demonstrated by the sports car) and the goal of always being as good as necessary – so the customer always gets what he wants.

#### What's different about how you do things now, compared to five years ago?

Our work processes are even more streamlined and efficient.

#### Where do you see your company in five years?

In our core business, we'd like to raise the share of medical technology to 75 per cent. We want to launch a new model of our sports car and sell ten.

#### What was your biggest business success?

The production of 1,000 cutting blocks in next to no time – on the old FA20 from Mitsubishi Electric that we had at the time.

#### What's your favourite way to relax?

Cooking a four-course meal as perfectly as possible.

#### What attributes do you value most in other people?

Efficiency, friendliness, honesty and the ability to recognize and admit one's own mistakes.

#### What was the best advice that anyone ever gave you?

First of all my father told me that any business takes seven years to get established. And then we were told in the speech after we'd be awarded our diplomas: "Nobody needs you. What you can do, many others can do as well. You have to build up your own network and develop yourselves further."

#### How would you briefly describe your occupation to someone with no technical knowledge?

We cut things with a wire – much like with a fretsaw – with great precision and achieve extremely fine surfaces in the process.

### Companies in Profile

#### Name and place of business:

Roman Weber GmbH, Tobel (Switzerland)

#### Founding year: 1988

#### Number of employees: 6

#### Owner: Roman Weber

**Core business:** Production of high-grade parts for medical technology and the automotive industry and the construction of the company's own sports car



*Before setting up his own business, Roman Weber learnt and practised the trade of toolmaker.*

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# Cutting it fine

Converting steel strip into a component of the world-renowned pen-knife is made possible by an FA20-S Advance from Mitsubishi Electric.

*It's the dream of every lad, young or not so young, to own a Swiss-made pen-knife or, better still, a Swiss Army Knife. However, until the product lands in the proud owner's hands, it has to undergo innumerable production steps, starting with the stamped blanks for the blades. And, as befits a product from a watchmaking nation, a lot of precision goes into it.*

Wenger S.A., the Swiss pen-knife manufacturer, is domiciled in Francophone Delémont (known as Delsberg to German speakers). The company relies entirely on its own manufacturing installations for its products. Salvatore Palama, in charge of the mechanical shops and stamping, confirms this philosophy: "Our manufacturing depth goes a long way."

### Thorough test machining for replacement machine

The decision to replace the existing wire erosion machine had already been taken. Wenger S.A. set up a work group under Denis Berger's technical supervision: "We visited various suppliers of such machines on the market and asked each of them to machine a com-

shops at the time, the tests persuaded the experts to go for this machine.

### From the DXF file to the erosion program

The technical office supplies the drawings of the ram and die as DXF files to the EDM department where Berger carries out test machining and adapts them if necessary to the machine before converting the files with suitable software into a CNC program. In the machine control, the file is then given the erosion values by the generator control. This is a labour-saving feature in Denis Berger's view: "We have to work with great concentration here, as any errors will usually only become apparent on the finished part, which then becomes a costly reject. But the machine relieves us of some of the work."

### Set-up the easy way

A surprising benefit of the FA20-S Advance is highlighted by Salvatore Palama: "Access to the machining zone is

wire after machining is a very useful solution, he feels. "This reduces considerably the volume of the cutting wire that has to be disposed of, and the problem of coiling up the remaining wire simply doesn't arise," he adds. This is an expert who knows what he's talking about.

### Thorough familiarization yields advantages

"Getting to know the machine thoroughly is the first requirement if you want to achieve a high-quality end-product," Berger states. He estimates that his team took about six months to explore the full potential of the FA20-S Advance. This also included extensive training by Mitsubishi experts at the machine. This is where Salvatore Palama sees room for improvement: the technicians should be trained to speak better French – a point already taken up by Mitsubishi Electric distributor Walter Meier. For Denis Berger, work-

ing at the machine's touchscreen is fun: "It makes communication with the machine simpler and more convenient."

### Achieving the demanded precision

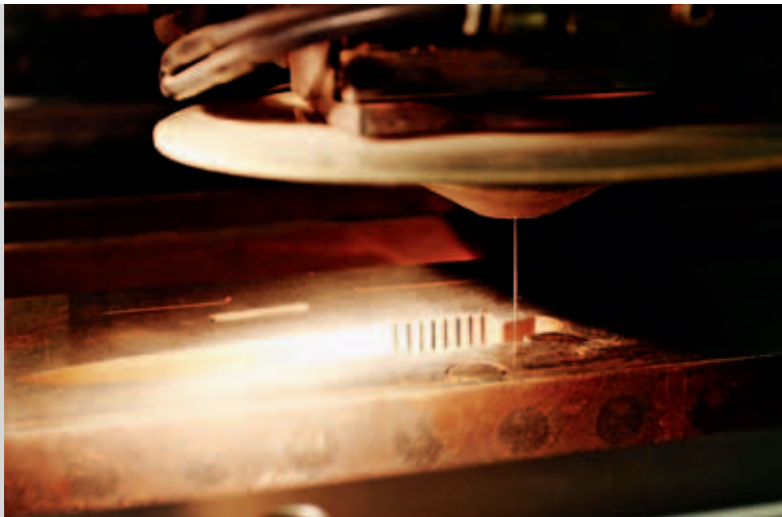
The FA20-S Advance has now been in production operation for a little over a year. In this period, the team has also gathered its experience. A big advantage of the machine is the huge vertical range permitted by the machine without compromising on quality in any important respect. This is something endorsed by Denis Berger: "On a workpiece with a machining height of 200 mm, we've measured a deviation of much less than a hundredth of a millimetre – which in my view is outstanding." Salvatore Palama confirms that their team now has complete command of the machine. "So that we can guarantee the high quality of our products, we have to be able to work within the thousandth-of-a-millimetre range.

### A glance back in history

#### From a simple knife to a versatile leisure tool

Two decisions result in today's world-famous Swiss Army Knife. In 1886, the Swiss Army decided to equip each soldier with a simple, single-blade pen-knife. Just three years later, a new rifle was introduced that needed a screwdriver to take it apart and put it back together again. It seemed an obvious idea to integrate the tool in the knife, and this was the origin of the first multifunctional pen-knife with a blade, screwdriver, bradawl and can-opener. Today, Wenger stands for over 250 models of pen-knife, ranging from the basic model for home and garden use through to the exclusive multipurpose tool kit for adventure and trekking. This product line is backed up by further products such as wristwatches and other leisure accoutrements.

After an interruption in machining, the FA20-S Advance automatically feeds the cutting wire to the last machining position and resumes machining.



Wenger S.A. therefore operates a high-performance machine park. This starts with the machining of the stamping tools for the production of the blanks for the knife components. The stamping tools are eroded out of hard metal in the firm's own EDM department, and then undergo a thorough control before being transferred to the stamping shop. Denis Berger, EDM group manager, explains: "Our customers not only expect our pen-knives to function absolutely efficiently and cut neatly, but they also want a perfect visual presentation, almost like that of a piece of jewellery." And this high quality starts with the stamping tools.

» We expect it to take two-thirds of the time required on the other machines that we use. «

plex sample workpiece with the geometries typical of our products." The comparison of the results showed the quality the various machines were capable of. Denis Berger: "One of the critical surfaces was an arc with a radius of 700 mm. On the FA20-S Advance from Mitsubishi Electric, this arc was very neatly cut out without any discontinuities – an impressive achievement." Although Wenger S.A. did not have any machines from Mitsubishi Electric in its

provided by a protective door that retracts into the machine bed rather than, like on other products, opening out into the work area around the machine. We thus gain spacious access to the machine, a genuine improvement." Machine set-up is correspondingly simple: "We expect it to take two-thirds of the time required on the other machines that we use." Berger is also appreciative of the comfortable threading of the erosion wire. The chopping of the



An internationally renowned product: The famous Swiss Army Knife from Wenger.

The example shows that we've got just the machine for the job."

The FA20-S Advance permits the use of cutting wire diameters of 0.1 to 0.3 mm. Denis Berger works exclusively with brass wire with a diameter of 0.25 mm: "This is the ideal diameter for cutting out our tools." Cutting wire consumption, he believes, is a little higher than that of other machines, but this is more than offset by vastly superior productivity. Just how superior he's un-

able to say at present owing to the lack of precise figures.

### Trouble-free continuous operation

The FA20-S Advance wire EDM machine is used in continuous operation at Wenger S.A. The only opportunity for a spot check arises when the spool of wire is replaced, which is necessary once per day. An ideal machine, therefore, for unsupervised operation at night and

at the weekend. Berger knows that he has no need to worry: "Should the wire break at any time, the machine runs automatically back to its starting point, rethreads the wire and, in its idling state, feeds the wire to ahead of the breakage point before resuming machining." For Palama, this is one more reason for satisfaction: "This machine really does everything we expect it to."

## Companies in Profile

**Name and place of business:**  
Wenger S.A., Delémont (Switzerland)

**Founding year:** 1893

**Number of employees:** About 180

**CEO:**  
Peter Hug

**Core business:** The genuine Swiss Army Knife

### Customer contact:

Wenger S.A.

Route de Bâle 63  
2800 Delémont  
Switzerland

Tel: +41 (0) 32 / 4 21 39 00  
Fax: +41 (0) 32 / 4 21 39 99

info@wenger.ch  
www.wenger.ch



### Salvatore Palama

Salvatore Palama started his career by training as a fine mechanic at Wenger S.A. He then gathered experience in industry in a variety of companies before returning to Wenger three years later. Today, he runs Mechanical Production and Stamping with 15 employees and four trainees. For this, he's currently training for his diploma as an industrial foreman. He is also active in the training of apprentices and is available as an expert for apprentices' final examinations. He sees his future as

one of lifelong learning and looks forward to a long career in the excellent working atmosphere at his present employer.

### Denis Berger

Denis Berger has been working for Wenger S.A. for over 25 years. Having trained as a toolmaker in the watchmaking industry, precision became second nature to him. His working career was then dominated by further training courses and he acquired broad industrial experience. At Wenger S.A. he specialized in the machining of exclusive materials by EDM, which became his passion. His employer later put him in charge of the EDM department. Denis Berger continues to make

use of training opportunities and is proud of his State Diploma as an Industrial Group Manager. "So that parts achieve this quality, they need good machines and years of in-depth experience," Berger says. He claims that he can tell from the sound of the machine whether or not it's running smoothly.



# Wire EDM opens the door to high precision

Quality has priority at DORMA and starts in the tooling department – the ideal application for the FA20-S Advance from Mitsubishi Electric.

## DORMA GmbH & Co. KG

Profile December 2010 19

*In the hundred years plus of its company history, DORMA – today a group with a 6,500-strong workforce – has evolved into a globally operating systems supplier of door-related products. The world market leader in door control, movable room dividing systems and glass fittings has 71 subsidiaries in 47 countries and operates three plants at its headquarters in Ennepetal, where 1200 people are employed. The company's own tooling department demonstrates the high manufacturing depth at DORMA. A wire erosion machine from Mitsubishi Electric underlines the commitment to quality.*

Every day, we open and close doors as a matter of course without giving any thought to the assistance we're given by modern door closer systems or totally automatic door systems. These unassuming technical helpers are the bread-and-butter of the DORMA Group. Since its founding in 1908, the company has produced 100 million door closers, and at the Ennepetal site alone

this has been 10 million sliding door closers since 1986. Today its products can be found all over the world, including in such prestigious construction projects as the Burj Khalifa, where DORMA has contributed 13,000 door functions to the world's tallest building.

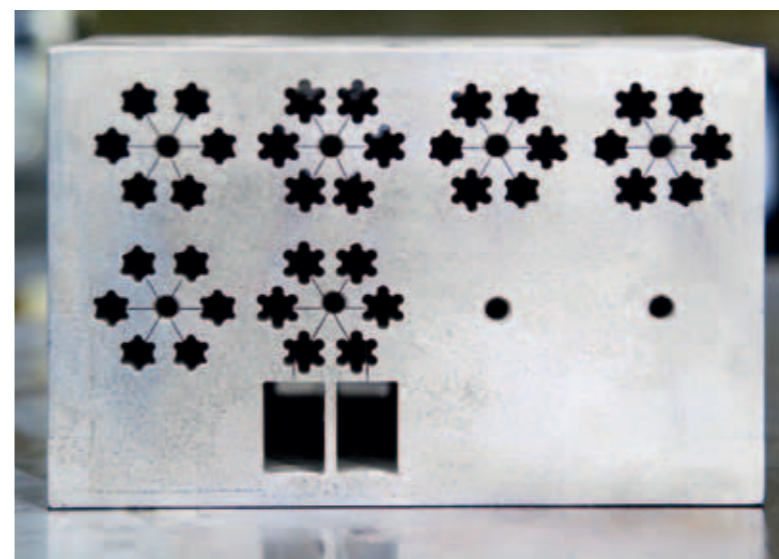
In Ennepetal, DORMA GmbH & Co. KG, the biggest subsidiary of the DORMA Group, operates three plants focusing on the sectors of door control, automatic door systems and security systems. Door control, an activity that DORMA has been developing since the Nineteen Sixties, accounts for the biggest chunk of sales. What has happened since then is described by Christof Zuschlag, manager of the door control plant, citing an example: "Modern door closers hardly require any effort dur-

ing the opening of a door today. This means that even young or infirm people can use doors effortlessly and almost without having to overcome any resistance."

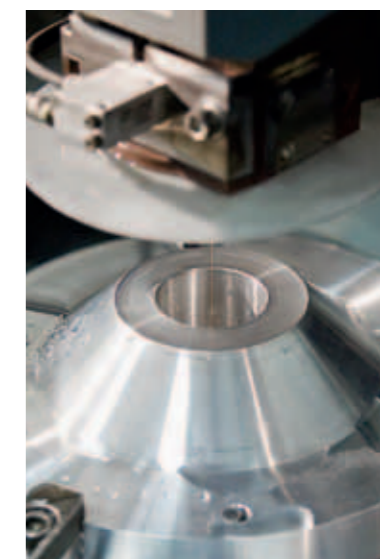
### A quality commitment across the board

In production DORMA goes for high manufacturing depth. "This permits better quality control and gives us greater flexibility," says Zuschlag explaining this philosophy. His field of responsibility comprises, among other things, toolmaking, and it is not only the plants in Ennepetal that benefit from it. The plant manager describes the procedure: "We produce here dies, for instance, for stamping parts in the adjacent pressing shop. Many of these parts are destined for further processing at our foreign subsidiaries."

» In cases where several recuts used to be necessary, a maximum of three cutting operations are sufficient today. «



DORMA has an unwavering commitment to quality. Often this can only be achieved with wire erosion.



The range of materials machined with the FA20-S Advance extends from steel and aluminium to copper and other conductive materials.

Ennepetal is the headquarters of the DORMA Group and, with three plants, the biggest production location.



The high quality standard pursued by DORMA GmbH & Co. KG in all respects is a continuous theme throughout the production chain. Absolute precision in production also applies in the tooling department. Since conventional machining methods would reach their limits in terms of accuracy sooner or later, DORMA has added wire EDM to its spectrum of technologies employed. "This is the only way of achieving the accuracy that we need in the downstream work processes," says Christof Zuschlag commenting on the importance of wire erosion. The most recent purchase in this area, an FA20-S Advance from Mitsubishi Electric, is a replacement for an old, defective wire EDM machine.

### Innovative technology sets new standards

The comparison of quotations on paper and outstanding results from the first cutting trials in spring 2010 soon singled out the machine from the Japanese manufacturer. "Just as impressive were the competent sales staff and excellent organization that went into processing the quotation and the purchase order," Christof Zuschlag adds. The machine was very soon installed and integrated in everyday production. The plant manager then continues:

"We very soon realized that we had found a strong partner in the shape of Mitsubishi Electric." Training in good time by the manufacturer, prepared our programmers and operators to the point that they could get straight down to work.

In practice, the FA20-S Advance soon showed that it was capable of fulfilling its promise. "The changeover to programming and control software that was new to DORMA didn't pose any problems," as Matthias Schwieder, in charge of programming in the door control division, recalls. Hans-Walter Herth, head of tooling, adds: "For us, the advanced technology and high-performance generator also mean twice the cutting speed and maximum flexibility."

The new wire erosion machine has also improved machining accuracy appreciably. All the materials employed – steel, aluminium and other conductive materials – are cut not only faster by the FA20-S Advance, but also with extreme precision. The wire diameter of 0.1 to 0.25 mm permits the finest cuts even during the first machining step. "In cases where several recuts used to be necessary, a maximum of three cutting operations are sufficient today," says Christof Zuschlag explaining the difference – an improvement that also saves time and permits more flexible working methods.

### Ready for expanding capacity

Flexibility in production at DORMA is an altogether decisive feature. The Mitsubishi Electric wire EDM machine not only supports toolmaking activities, but is responsible also for the machining of other production equipment and custom parts. The multifaceted range of parts therefore comprises not only tool components, but also special clamps and high-precision gauges for quality assurance. "Thanks to the machine's high performance, we are able to produce the necessary parts at short

notice," Christof Zuschlag explains. The FA20-S Advance is now working to high capacity: "If required, the machine runs in several shifts, which also means in unsupervised operation at the weekend." Increases in incoming orders can thus be handled without difficulty.

The capacity situation of the FA20-S Advance is just one indication of an upturn in business at DORMA. Having come through the turbulence of last year in good shape, the company is now ready to look ahead with optimism. "In the coming years we shall continue to build on our business sectors – this applies just as much to stable segments like door control as to service activities like installation and maintenance," says Christof Zuschlag. And everything will continue to be pervaded by the striving for quality and innovation. The plant manager concludes: "Because this is the only way of further-improving the ease of opening and closing doors."

DORMA machines a wide range of parts with the FA20-S Advance from Mitsubishi Electric.



### Professionals in Profile: Christof Zuschlag

#### How would you describe in a sentence what your company does?

We are a systems supplier of door-related products, which covers door closers as well as movable room dividing systems and glass fittings.

#### How did you earn your first money?

The company founders Rudolf Mankel and his brother-in-law Wilhelm Dörken started the production of double-action door hinges and milled screws in 1908.

#### What motivates you?

Striving for innovation and the ongoing optimization of our products so that we can continue to improve the ease of opening and closing doors.

#### What's different about how you do things now, compared to five years ago?

We're more flexible than we used to be.

#### Where do you see your company in five years?

We shall encourage business growth in all segments and expand activities like our after-sales service in order to ensure customer satisfaction.

#### What was your biggest business success?

Our most important contract was for the installation of 13,000 door functions in the world's tallest building, the Burj Khalifa (828 metres).

#### What attributes do you value most in your business partners?

They should have the same attitude to expertise, reliability and quality as DORMA.

#### How would you briefly describe what you do to someone with no technical knowledge?

Our products enhance the ease of opening and closing doors.

### Companies in Profile

**Name and place of business:**  
DORMA GmbH & Co. KG

**Founding year:** 1908

**Number of employees:**  
1,200 (Ennepetal),  
6,500 (DORMA Gruppe)

**Managing partner:**  
Karl-Rudolf Mankel

**Core business:** Systems supplier  
of door-related products



#### Customer contact:

**DORMA GmbH & Co. KG**

**DORMA Platz 1  
58256 Ennepetal  
Germany**

**Tel: +49 (0) 2333 / 793-0  
Fax: +49 (0) 2333 / 793-495**

**marketing-master@dorma.com  
www.dorma.com**

From left to right:  
**Matthias Schwieder**  
(programming), **Hans-Walter Herth** (head  
of tooling), **Christof  
Zuschlag** (door control  
plant manager)

# Making Swiss watches tick

High-precision stamping tools for extra-fine parts – the key to precision watches. FA10-VS and PA20 wire-cut EDM machines from Mitsubishi Electric are involved in the process.

*For many firms, it makes no economic sense to run a tooling department of their own, particularly for stamping tools. This is a job for component suppliers, also known as jobshops, which concentrate on a certain line of business and have the highly specialized production equipment and unique expertise that go with it. This applies particularly to makers of stamping tools that conjure up tools and components with astonishing dexterity with the help of their erosion machines.*

The arc of the Jura mountains and particularly the French-speaking part is the traditional cradle of watchmaking. It is therefore hardly surprising that manufacturers of high-precision tools and individual parts can be found pre-

because, in the arc of the Jura, the local watchmaking industry with its world-famous names is dependent on suppliers of precision components. And the latter need high-precision tools, such as those crafted by Derwa SA. This is why the region is also called the "Route de la Micromécanique" or "Road of Micromechanics".

## The road to specialization

Having founded his firm Derwa SA in 1986, Jacques Wermeille devoted himself to general toolmaking, fabricating entire tools and stamping tools in particular. His customers' interest in high-precision stamping tools prompted him to concentrate increasingly on the production of specific components for stamping tools, using electromagnetic discharge machining (EDM) exclusively for this. Finally, in 2006, he decided to confine his business entirely to this activity, placing his emphasis on the watchmaking industry.

## No series production

Unlike EDM shops immediately upstream from production that machine the same or very similar components over and over again, Jacques Wermeille's

team is always being confronted with new tasks. "We receive data files from our customers, DXFs for instance. We then check them in our work preparation department and assign the specific parameters to them in a CNC program, before transferring them to the machine control." This sounds much easier than it actually is. "Often we have to produce tools or parts for which we first have to find a feasible method." This is where experience comes to the fore. Despite all the difficulties, "for the customer, quality and speed come top of the list, and these are second nature to us."

## Impressive features

To supplement his machine park, Jacques Wermeille soon needed an extra wire-cut EDM machine. When visiting companies doing similar work, including some in Germany, he was struck by the reliability and autonomy of machines from Mitsubishi Electric. Tests with sample parts showed that these machines satisfied his own performance profile. So he opted for a type FA10-VS wire erosion machine, the first wire-cutting machine from Mitsubishi Electric to be installed in his workshop.

Jacques Wermeille is still convinced of having made the right choice: "We operate this machine with cutting wires with diameters of 0.07 to 0.25 mm. We use nothing but brass wire." Brass wire has a very good price/performance ratio, he informs us, adding: "I am always pleasantly surprised at the high standard of quality achieved by the erosion generator from Mitsubishi Electric in the cutting process with this wire – without having to compromise in any way." This is true efficiency!

» What so impresses me about these machines is their low maintenance and exceptional reliability. «

And this is not the only reason why he is so satisfied with this machine: "Threading with the only 0.07 mm wire is a very smooth process – simply astonishing," he says. "It really saves time." But first of all, he had to get to know the machine; this took the form an introduction on site immediately after commissioning.

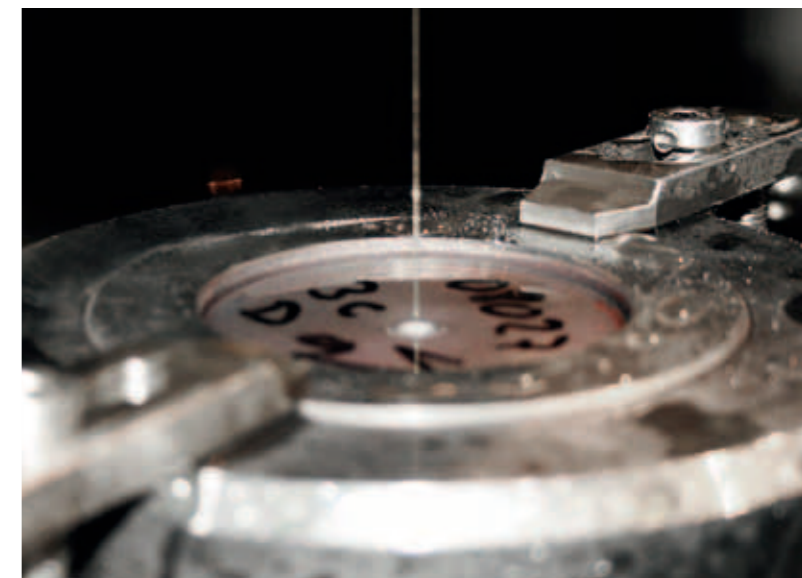
## Call for reinforcement

Success wasn't long in coming, and only a year later Wermeille had to extend his machine park with a wire-cut EDM machine yet again. "It was obvious to me that I would have to study the offer from Mitsubishi Electric first." His choice this time was a PA20 model. "I am happy to use this machine for the cutting of small stamping tools with very high precision," he explains. This is actually quite surprising, because, thanks to its unusual machining height, parts with a height of up to 300 mm could be processed on this machine. He is well aware of this: "It's true that we mainly precision-machine small parts in the thousandth-of-a-millimetre range. All the same, however, we do sometimes have to machine tools of far greater size as well." The PA20 has given him extra flexibility, which he is happy to exploit in his workshops.

## Simple and efficient handling

What he values about the PA20, like the FA10-VS, is the quick and straightforward threading of the cutting wire. On this machine he also uses nothing but brass wire. "Thanks to the efficient EDM generator, good cutting performance is the rule with this wire," says a satisfied Jacques Wermeille.

A helpful feature on both machines is that the access doors to the work space can be lowered for set-up – manually on the FA10-VS and powered on the PA20: "This really gives us a lot of room for manoeuvre when setting up the



The tool being machined on the FA10-VS requires a special holder because there's no other way of clamping the tiny workpiece.



A small tool being machined on the PA20. Here again the workpiece (bottom) is carried by a special holder.

A complex stamping tool set with a drawing – a big challenge for the team and the machines.

cisely in this region. Among them is Derwa SA belonging to Jacques Wermeille in Francophone Saignelégier. Customers wishing to visit his firm arrive on an idyllic high-altitude plateau in the Swiss Jura, where mainly horses can be seen grazing in rich green meadows dotted with fir trees – a perfect subject for a photograph. A region in which many Swiss people like to hike in summer and practise cross-country skiing in winter. But it is no accident that small firms have committed themselves to the high-precision production of parts precisely in this region, far from motorways and high-speed trains,

machine, and this translates into time savings – all of this without any loss of quality.”

### If need be, around the clock

Jacques Wermeille usually fabricates tools for the stamping of small and tiny parts, as 75 per cent of his customers come from the Swiss watchmaking industry. “This is the reason why the machining times for a stamping tool in our business are usually relatively short,” he explains. Nevertheless, from time to time he lets the machine run practically unsupervised shiftwise or at weekends. This is necessary because his customers also include component suppliers to the mechanical engineering industry, medical technology and the automotive sector who often work with other tool sizes. “What so impresses me about these machines is their low maintenance and exceptional reliability.”

Jacques Wermeille has no doubts: “If I have to buy a new machine, I shall definitely include a Mitsubishi on my shortlist again.”

### Jacques Wermeille

*As a lad, Jacques Wermeille enjoyed tinkering with his moped – mechanics was evidently in his blood. This is echoed by his choice of profession. He did an apprenticeship as a stamping toolmaker, a trade that calls for neat, high-precision and absolutely dependable workmanship.*

*After a few years of gathering experience in various industrial firms, he took the plunge. He set up his own business in 1986 and built up a mechanical workshop for the fabrication of entire tool sets for stamping and fine stamping.*

*The market came to appreciate his experience of EDM machining. Their increasingly tough requirements encouraged Jacques Wermeille in 2006 to devote himself entirely to this technology and concentrate on the high-precision components of stamping tools. The fact that he soon had to purchase further machines is a vindication of this decision.*

*Married with two children, he likes to relax in his free time with jogging, cycling and motor cross. As an entrepreneur, he is convinced that his firm is now just the right size and has no plans to expand further. Satisfied with his four longstanding employees, all of them masters of their craft, he says, “It’s very difficult these days to find good skilled staff.”*



### Companies in Profile

#### Name and place of business:

Derwa SA, Saignelégier (Switzerland)

#### Founding year: 1986

#### Number of employees: 5

#### CEO and owner:

Jacques Wermeille

**Core business:** High-precision elements for stamping tools, mainly for small parts used in the watchmaking industry, automotive sector, medical technology, mechanical engineering and other sectors.

#### Machine park:

8 wire-cut EDM machines,  
3 sinker EDM machines,  
1 start-hole drilling machine

#### Customer contact:

Derwa SA

Chemin des Royes 6  
2350 Saignelégier  
Switzerland

Tel: +41 (0) 32 / 9 51 11 88

Fax: +41 (0) 32 / 9 51 11 70

## Delivering precision on time

Positive experience with Mitsubishi Electric was reason enough for RS-technik to purchase the most recent model of the FA20 series.

High-precision components are standard in medical technology. The 40 employees of RS-technik CAD-CAM GmbH, a component supplier to this and other challenging sectors, are well aware of the high standards expected of components and tools and achieve them with technical proficiency and the latest production equipment. Integrated machining processes have thus become part and parcel of daily operations. In the wire-cutting sector, RS-technik has been a longstanding Mitsubishi Electric customer, and when purchasing the most recent wire EDM machine – an FA20-S Advance – they again trusted in the Japanese manufacturer.

“There’s constant demand for wire erosion in our production activities because this technology is capable of so much more than conventional machining,” says Roland Schafhäutle, founder and managing director of RS-technik, explaining the frequent use of wire-cutting. His statement is illustrated by a number of examples: “There are simply unmillable parts with the tiniest radiuses that only a fine wire can master, and often the required surface quality is so high that processing on the wire erosion machines is the only sensible option.”

Meeting such high standards in production has therefore become commonplace for RS-technik. This is due not least to the customers in medical technology who contribute a good 50 per cent of orders. “The sector is very strong in this region,” Roland Schafhäutle adds. This has paid off particularly in the last two years, because steady growth in medical technology protected RS-technik from major business shortfalls. On the contrary: the service provider from Emmingen-Liptingen is aiming for further growth. The products and services of RS-technik described by the managing director are correspondingly wide-ranging: “We satisfy customer wishes for anything from the tiniest part for medical technology to large tools for automotive engineering.”

### Many years of experience of Mitsubishi Electric

RS-technik’s success is founded on quality consciousness, highly skilled manpower and many years of industrial

experience. In addition, the modern machine park also makes a major contribution, Roland Schafhäutle believes: “The more progressive and functional our machines are, the more innovatively and efficiently we can process customer orders.” This applies as much to conventional machining at RS-technik as to wire erosion where machines from Mitsubishi Electric have been in use since the beginning of the Nineties. The latest acquisition is an FA20-S Advance.

RS-technik has been gathering experience with the Mitsubishi Electric FA series since 2001. Andreas Flühs, responsible for the wire EDM department, recalls this technological milestone: “At the time, we had one of the first models. Its impressive precision and rapid threading of the wire were pioneering innovations.” A machine of the prede-

cessor series is still in use. The accustomed high precision is now coupled with noticeably higher machining speeds, Andreas Flühs remarks. “We mostly process very fast-running jobs in two shifts, and the machining speed gives an extra bonus of flexibility,” he adds.

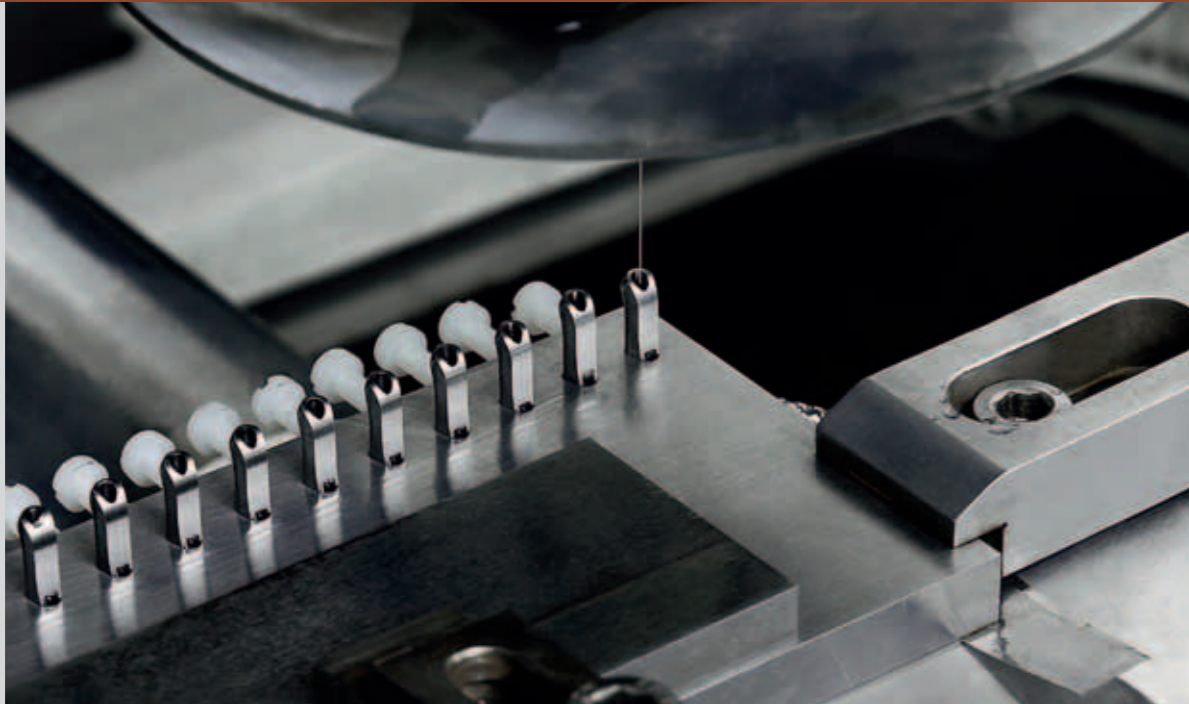
### FA20-S Advance impresses with superior features

The decision to stay with wire EDM machines from Mitsubishi Electric was easily taken by Roland Schafhäutle: “The machines’ precision – an absolute must in our production activities – is just one of the reasons. The FA20-S Advance, like its predecessors, operates

Copper electrode for an injection mould.



The fine wire of the FA20-S Advance achieves optimal surfaces even in tiny holes.



absolutely dependably and offers our operators a high degree of user comfort." In relation to the most recent investment, he means the reorganization of operator control via a straightforward touchscreen. In addition, he continues, we had had years of experience of the control, so the basic course from Mitsubishi Electric was sufficient to train our operators to use the new machine.

Parts are programmed as before with the software from Cimatron. Andreas Flühs sees practical advantages here as well: "The software is well adapted to Mitsubishi Electric, which takes a lot of the effort out of programming." The process is usually organized in such a way that the customer merely sends us the CAD data, and these are quickly converted at RS-technik into finished programs. "We hardly ever work to classical drawings any more," the programmer states. The FA20-S Advance pulls out all the stops in practice. Depending on cutting height, a maximum of four cutting operations are necessary in order to achieve immaculate surfaces. "This means that we achieve exceptional quality in the first step of the

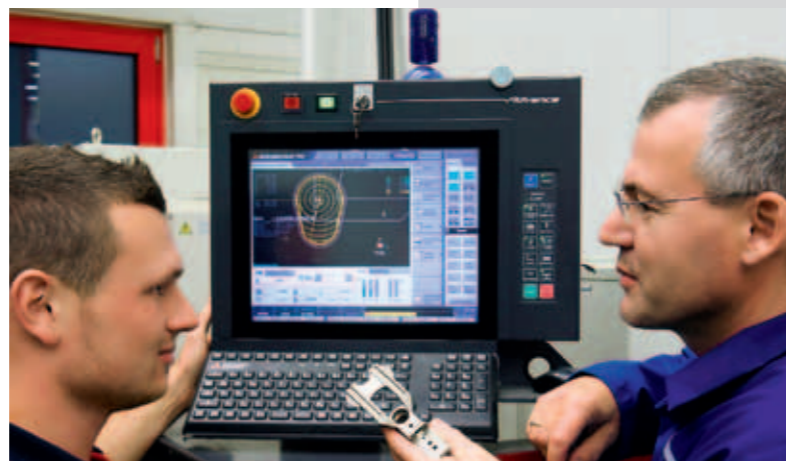
process chain, as a result of which we also save time and reduce effort in the downstream steps," Andreas Flühs explains.

#### Satisfied customers as a result of innovative wire EDM

A quick response and precision – these are the qualities that the employees of RS-technik have inscribed on their banner. The investment in the new FA20-S Advance was therefore only consistent.

Faster wire erosion combined with greater flexibility will have a positive impact on punctual job completion. "Our overriding goal is to supply precision-machined parts on time – this way we can be sure of totally satisfied customers," says Roland Schafhärtle summing up.

*Johannes Hense (left) and Andreas Flühs (in charge of programming and wire EDM) discussing the current project.*



#### Professionals in Profile: Roland Schafhärtle

##### How would you describe in a sentence what your company does?

Using conventional machining methods and EDM, we fabricate complex components, one-offs and series, made of different materials for medical technology, mechanical engineering, automotive engineering, and tool- and mouldmaking.

##### How did you earn your first money?

I earned my very first money sweeping the road and mowing the lawn.

##### What motivates you?

The pleasure of my work, my enthusiasm for progressive and innovative machining technologies and the finding of solutions for challenging tasks.

##### What's different about how you do things now, compared to five years ago?

We plan further ahead. By building the present production site five years ago, we have been able to optimize all our business processes and have thus achieved greater efficiency.

##### Where do you see your company in five years?

Reacting swiftly to growing customer requirements by using the latest technologies.

##### What was your biggest business success?

Steady growth since the founding of the company and coming through the uncertainty of 2009 with only a minor drop in business.

##### What's your favourite way to relax?

Running or jogging in the fresh air with friends.

##### What attributes do you value most in other people?

Top of the list for me are such attributes as ambition, single-mindedness, reliability and honesty in their daily dealings with people.

##### What was the best advice that anyone ever gave you?

"You can only hang on to what you've actually got in your hands!"

##### How would you briefly describe what you do to someone with no technical knowledge?

We at RS-technik process highly different materials measuring anything from one millimetre to ten metres on controlled machines.

#### Companies in Profile

**Name and place of business:**  
RS-technik CAD-CAM GmbH,  
Emmingen-Liptingen (Germany)

**Founding year:** 1991

**Number of employees:** 40

**Owner:**  
Roland Schafhärtle

**Core business:** Conventional machining and erosion of complex components for medical technology, mechanical engineering, automotive engineering, and tool- and mouldmaking

#### Customer contact:

RS-technik CAD-CAM GmbH  
Gehrenstrasse 9  
78576 Emmingen-Liptingen  
Germany

Tel: +49 (0) 74 65 / 92 94-0  
Fax: +49 (0) 74 65 / 92 94-79

info@rs-technik.com  
www.rs-technik.com

# Innovative tool solutions

*mödinger & hänle engages in the fabrication of novel tools. The demanded quality and precision are achieved with hypermodern wire erosion.*



*Complex stamping, cutting and follow-on composite tools plus automation processes for the machining of sheet and plate are the specialties of mödinger & hänle GmbH Automatisierungstechnik in Günzburg, Germany. 50 employees, 9 of them design engineers, devise the progressive and often unique tool solutions for customers in the automotive and capital goods industry. So that mödinger & hänle can sustain the demanded standard of quality, which has been constantly rising since the firm's establishment in 1988, an FA30-S Advance V from Mitsubishi Electric was purchased in November 2009 – for better machining results in the first processing step.*

"It's the unconventional tools that enable us to demonstrate to our customers that mödinger & hänle is a master of innovative solutions," says Hermann Mödinger, managing director of the company. The graduate engineer has plenty of evidence to substantiate his claim. For the automotive industry, the company produces automated tools that are used in the manufacture of exhaust manifold seals, for example. The ingenious feature of these systems is that two 0.2 mm thick sheets are cut, stamped and welded together inside the tool. "We are the first to have brought such a process to fruition," says Hermann Mödinger.

It's products like this tool that kept the mödinger & hänle order books full even during the global economic crisis. Hermann Mödinger has the reason: "These are niche products for which there is always demand. Per year, we develop about 150 new tools for our customers." The high standards of quality and precision call not only for the expertise of the design engineers, but also for suitable production equipment. This is where wire erosion comes into play, as Herman Mödinger explains with reference to these seals: "The extremely thin sheet has to be very precisely cut. This is only possible with an equally precise tool, because we have such a narrow cutting groove." The production of such tools is only feasible with the help of a wire EDM machine, he adds.

## **FA30-S Advance in continuous operation**

When mödinger & hänle purchased a new wire EDM machine for capacity reasons in November 2009, their tough requirement profile became the yardstick for comparison of the various offers. "A comparison of the machine quotations quickly showed that the FA30-S Advance V from Mitsubishi Electric fully satisfied our expectations, and the price/performance ratio couldn't be better either," says Berthold Sauter, senior craftsman in tooling, reviewing

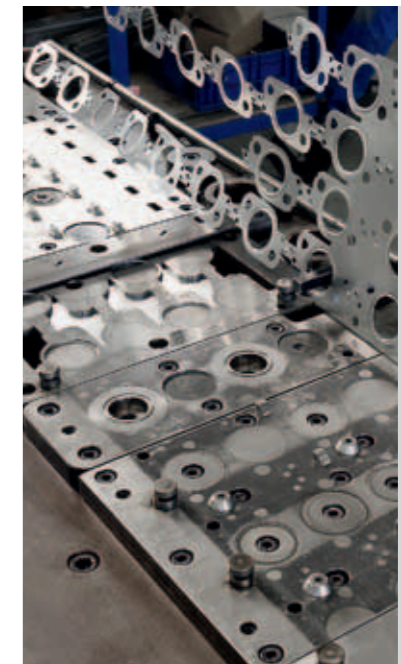
the relatively quick purchase process. The experts from mödinger & hänle were already impressed by the technical data. The large machining range of 1300 x 1000 x 405 mm provides sufficient space for generously dimensioned tool components, and the 0.2 mm wire delivers the precise cuts.

The changeover to a new control system was quickly accomplished by the wire eroders at mödinger & hänle. After two employees had attended the course given by Mitsubishi Electric, the FA30-S Advance V was fully ready for operation. In the programming sector, nothing has changed, Berthold Sauter tells us: "We are still supplied with the drawings and do the programming at the PC. A post-processor adapts everything so that the Mitsubishi Electric machine can process the program." mödinger & hänle now fully exploits the

scope offered by the machine, and this finds expression in longer machining times: "We have the machine running around the clock – mostly unmanned – and make use of text message reporting," says Berthold Sauter, explaining the procedure. An employee is on standby on his days off to intervene if necessary.

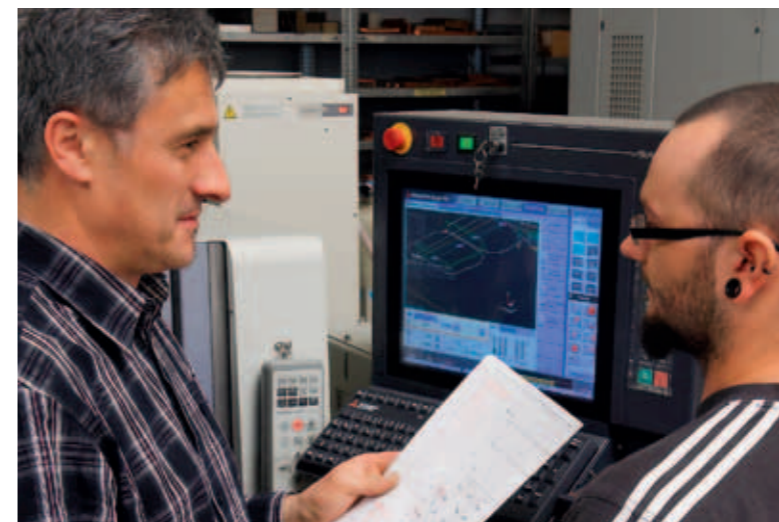
## **The joy of innovation meets modern wire EDM**

By investing in the high-performance wire EDM machine from Mitsubishi Electric, mödinger & hänle has paved the way for the development and fabrication of further high-grade and innovative tools, Hermann Mödinger believes. "Our technological capability has to be equal to our team's energy and innovative capacity – and the FA30-S Advance V fills the bill in every



*This tool cuts and stamps extra-thin sheet to produce seals for the engine compartment. Two sheets are welded together within the tool. The process is unparalleled worldwide.*

» We have the machine running around the clock – mostly unmanned – and make use of text message reporting. «



*Berthold Sauter, senior craftsman in tooling, and Tobias Meyer, eroder, planning the current component.*

respect." However, it is not only the company that benefits from advanced technology, the managing director adds: "We don't work for ourselves but for our customers. Each job is only ever completed when the customer is satisfied." This corporate philosophy also explains the close cooperation with each customer: "This is one of the reasons why we're capable of creating such innovative tools."

Success proves Hermann Mödinger right. In view of the full order books, he has every reason to look ahead with optimism. He aims to stick to the present strategy and tailor it even more closely to the customer: "We've intensified this policy in recent years and will seek even closer contacts with the customer in order to further enhance the quality of our products."

# Ordering back issues and change of address

This is where, among other things, you can order back issues of *Profile*. Order now as long as stocks last.

## Companies in Profile

**Name and place of business:**  
mödinger & hänle GmbH Automatisierungstechnik, Günzburg (Germany)

**Founding year:** 1988

**Number of employees:** 50

**Managing director:**  
Hermann Mödinger, graduate engineer

**Core business:** Stamping, cutting and follow-on composite tools



## Professionals in Profile: Hermann Mödinger

**How would you describe in a sentence what your company does?**  
We produce innovative and high-calibre stamping, cutting and follow-on composite tools.

**How did you earn your first money?**  
With good ideas.

**What motivates you?**  
Our motivation is to develop new and improved tools that work well and satisfy the customer.

**What's different about how you do things now, compared to five years ago?**  
We're more consistent in our response to customer needs.

**Where do you see your company in five years?**  
We want to uphold our present high standards and, if possible, build on them. We also aim to expand our automotive activities and link toolmaking even more closely with automation.

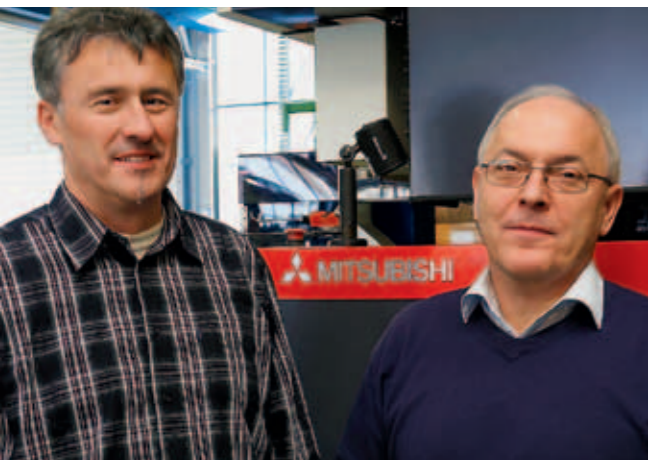
**What was your biggest business success?**  
The many years of cooperation with our biggest customer Schmitz-Cargobull where we have installed, among other things, a complete sheet/plate machining centre with presses and tools.

**What's your favourite way to relax?**  
Going for a leisurely drive.

**What attributes do you value most in other people?**  
An open and honest approach is just as important to me as a high degree of activity and initiative.

**What was the best advice that anyone ever gave you?**  
There's been lots of good advice.

**How would you briefly describe what you do to someone with no technical knowledge?**  
We fabricate tools that automatically convert raw material into parts used in a wide range of sectors.



**Graduate engineer Hermann Mödinger** (right) founded the company in 1988. Berthold Sauter, senior craftsman in tooling, has been in charge of the EDM department for many years.

### Customer contact:

**mödinger & hänle GmbH**  
Automatisierungstechnik

**Augsburger Strasse 50**  
89312 Günzburg  
Germany

**Tel: +49 (0) 82 21 / 20 45**  
**Fax: +49 (0) 82 21 / 20 45-19**

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## 10,000 laser systems sold worldwide – now in Europe as well



Mitsubishi Electric, one of the true laser pioneers, is now launching the internationally successful ML3015LVP laser-cutting system in Europe.

### 10,000 laser systems sold, 40 years of experience

Mitsubishi Electric initiated laser technology research and development back in the Nineteen Sixties. The first laser system for industrial use was introduced in 1979. The strategic development of business with laser systems, first in Japan and then in the rest of Asia and America as well, has made Mitsubishi Electric one of the world market leaders with over 10,000 laser-cutting systems sold worldwide. Now that the severe economic crisis is largely behind us, Mitsubishi Electric feels the time is ripe to serve the European market with laser-cutting systems as well.

### Premium system with a superlative price/performance ratio

With all its products in the fields of electrical and electronic components, subassemblies and machine tools, Mitsubishi Electric positions itself in

the premium segment – and laser-cutting systems are no exception. They satisfy the highest quality standards of the customer as well as its own commitment to supply products and technologies with a superlative price/performance ratio.

### Quality with Plasma Guard

The laser-cutting system ML3015LVP – the first for the European market – covers a large proportion of the application spectrum with its machining range of 3,100 x 1,550 mm (X/Y). The system is designed for consummate precision at high cutting speeds. Thanks to Plasma Guard, corners and intricate geometric structures can be machined with unprecedented quality on components up to 25 mm high – Plasma Guard monitors and controls plasma arising during the cutting process and thus enhances the quality and stability of the process enormously. Unchanging cutting results throughout the machin-



ing range are a clear goal. To achieve it, the system brings a variety of technologies with it, e.g. the Beam Stabilizer technology that keeps the beam length constant and thus ensures that the beam parameters remain the same over the entire machining range.

### Brilliantcut – saves time and money

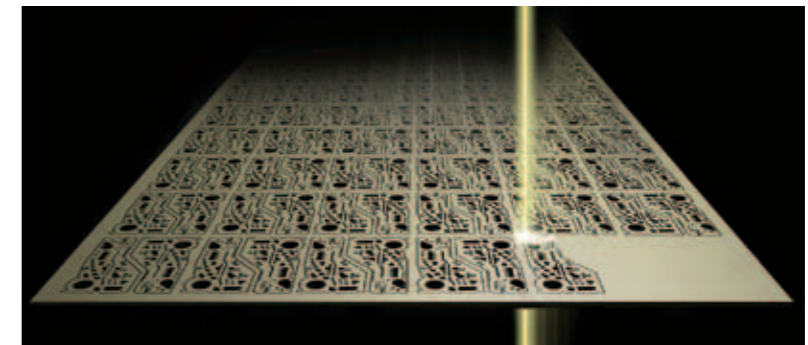
With its Brilliantcut, the ML3015LVP also has a technology making it possible to cut stainless steel to a standard of quality that often makes secondary cutting superfluous – again a contribution to lower unit costs and the optimization

of overall unit costs in production. Significantly improved surface qualities, reduced effects on the marginal zone and a virtually uniform cutting groove are the key features of Brilliantcut technology.

### Vision 2021 – for gentle treatment of the environment

Mitsubishi Electric has committed itself to treating the environment as gently as possible with its own Vision 2021 strategy. Across the board – from development and manufacture through to product use – the company aims to keep CO<sub>2</sub> output as low as possible in the context of this strategy. The agreeable side-effect for customers is that the environment-friendliness of the systems has a direct impact on costs. Reducing energy and laser gas costs cuts the overall cost of operating the systems.

This is aided by two key features integrated in the laser-cutting systems. Firstly, there's the just-on-time discharge technology that dramatically reduces "Beam Off" energy consumption. This technology has far-reaching effects when one considers that in normal operation only about 50 per cent



of operating time is active cutting time. In addition, Mitsubishi Electric has developed for its resonators a solution for the reuse of the laser gas. To this end the gas is reused for 24 hours and only then replaced, thus inevitably diminishing gas consumption considerably. Taken together, the two technologies significantly reduce not only carbon emissions, but also operating costs.

### Core components from a single source

Solid machine design, the exclusive use of high-quality components and all the electronic systems produced in-house – all these are an assurance of the precision, durability and maximum dependability of the laser-cutting systems from Mitsubishi Electric.

The company's own CNC control leaves nothing to be desired, drives and control systems from its own production promote total integration, and the resonator developed and manufactured in-house yields superlative cutting results. All the core components come from Mitsubishi Electric.

The dependability of the systems is underpinned at Mitsubishi Electric by the reliability of a big corporation. The company's own after-sales service, customer support worthy of the name and a skilled team for everything to do with laser cutting make investing in a Mitsubishi Electric system a sound investment in one's own future.

[www.mitsubishi-laser.de](http://www.mitsubishi-laser.de)



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Unmatched accuracy and precise curves

*Small on energy consumption, big on performance*  
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*"Brilliantcut" – you have to feel it to believe it*  
Surface qualities previously inconceivable without grinding

*If you make your components yourself, you can also mutually adapt them*  
Your requirement profile is the yardstick for our development work



The ML3015LVP laser-cutting system serves a machining range of 3,100 x 1,550 mm.

# The big EDM machine user horoscope



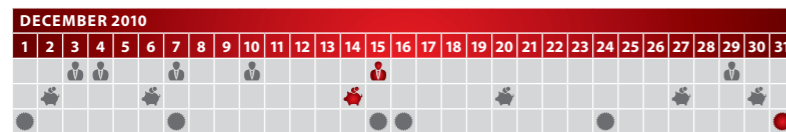
Erodia's horoscope is always right\*



## Capricorn (22.12.–20.01.)

Countdown to the New Year

**At the end of December or in the new year you can expect the unexpected – a new little runabout appears in front of your house and the opposite sex kisses the ground you walk on for a bit more attention.**



Luck at work   
 Good day for making money   
 Good day for ventures of all kinds  
 Extra-lucky days in the respective categories

## Aries (21.03.–20.04.)

Good fortune shines on you in your love life and at work. You feel better than you've felt for a long time. And this is all down to your striving for productivity. Enjoy the coming time off and don't forget your partner – the Festive Season is just around the corner!

## Taurus (21.04.–20.05.)

The stars are looking really good for you. Mercury not only heralds the winter, but also inflates your bank account to incredible proportions. And this improves your chances with the opposite sex – you can now effortlessly afford a 30-foot Christmas tree with the mansion to go with it. What more could you want?

## Gemini (21.05.–21.06.)

Stop living only for your work, even if it's fun. No one needs a wire-cut Santa! Attend instead to your partner's wishes or go out with your friends and forget

about work for a while. In January, Saturn will show you how to lead a more enjoyable and exciting life – so seize the opportunity!

## Cancer (22.06.–22.07.)

You and your work are bosom pals. Whether you wire-cut a new workpiece or whoosh at lightning speed down the ski slope in Ischgl without even touching the snow – no one can sever this bond of affection. But now it's time to wake up, because life is calling! You haven't done your Christmas shopping yet!

## Leo (23.07.–23.08.)

At your rendition of "Hark the Herald Angels Sing", even the angels hark in amazement at your ebullient joy and vitality. The year is nearly over and your bank account is about to burst. Treat yourself and your partner to a lovely winter holiday. Splash out – you can afford it!

## Virgo (24.08.–23.09.)

Santa means well with you this year and has filled your stocking with lots of big presents. After all the hard work, you've deserved them. Unwind and relax at the fireside – and let your partner pamper you.

## Libra (24.09.–23.10.)

You're running out of steam. Enjoy the coming Festive Season, as these are the last relaxing days of this year. Mars gives Uranus a big kick in January to get you to work off your Christmas flab. The time for lounging around and stuffing yourself is over!

## Scorpio (24.10.–22.11.)

Sweeten your customer relations in December with a few wire-cut mince pies – Neptune will reward you for it. This coming spring, you'll be inundated with profits from all sides. Lean back and let yourself be carried by the waves of harmony into the haven of security.

## Sagittarius (23.11.–21.12.)

Do something for your partner as a token of your love. With all the excitement at work, your private life has been taking the back seat lately. Venus will show you the way in the coming weeks. Until then, enjoy the run-up to Christmas!

## Aquarius (21.01.–20.02.)

Your interpersonal relationships have been put on the back burner for quite a while. So now's the time to sever the man-machine interface and invest more time in your loved ones. Then you can be sure of getting wonderful Christmas gifts and of a rendezvous with your favourite person under the mistletoe.

## Pisces (21.02.–20.03.)

"Oh Happy Day" could be your current personal motto, because things are going so well that you could weep for joy. The EDM machines from Mitsubishi purr away like contented cats – even in your absence. This makes a deep impression on your partner who smooths you with Christmas cheer.

### Winner of the Erodia birthday horoscope in the July 2010 issue

Congratulations, Mr Wehrenberg! Erodia will be sending you your personal birthday horoscope by email any time now.



You'd like to be the next winner?

Simply send your name, time of birth, place of birth and birthday to:

[erodia@mitsubishi-profil.de](mailto:erodia@mitsubishi-profil.de)



\* Otherwise it's adjusted to make it fit. In the event of any discrepancies, appeal directly to Jupiter, he'll sort it out.

# Travel report on Japan, the Land of the Rising Sun

*Japan – or “Nippon” as the Japanese themselves call it – this fascinating country in the extreme east of Asia is the fourth-largest island nation in the world, after Indonesia, Madagascar and Papua-New Guinea. In few other countries is the gulf between tradition and progress as huge as in this extremely proud nation. On the one hand, there are customs that have been retained over the centuries; and, on the other hand, Japan along with China is the country with the fastest growth rate in technology and research. At the same time, Japan is what almost everyone associates with the term “exotic”. With over 120 million inhabitants, Japan is one of the world’s ten most populous countries. The population is mainly spread among the four main islands of Hokkaidō, Honshū, Shikoku and Kyūshū. In fact, however, the Japanese Empire comprises over 6,800 islands.*

## **A story that started about 30,000 years ago**

This is how long ago the islands were probably first settled. Culture in Japan is strongly influenced by the Tenno, the Japanese emperor – literally the “ruler (sent) from heaven”. The 125th Tenno, Akihito – a symbol of the state and the unity of the Japanese people – now only has ceremonial duties to perform. On Japan’s capitulation in 1945, his father Hirohito denied the divinity – Arahitogami – of Japanese emperors. The

Japanese constitution stripped the emperor of his decision-making powers in 1946, and Japan has been a constitutional monarchy since 1947. Nevertheless, the reverence of the Japanese for their Tenno is second to none. The imperial seal shows stylized chrysanthemums with 16 petals, a plant that has also lent its name to the imperial throne.

Japan’s complex history is recorded in 14 epochs or periods. The current one has been called the Heisei period since

Akihito was crowned in 1989. It is marked by an economic crisis in the aftermath the collapse of the Bubble Economy. Japan developed for many years separately from the rest of the world. Until the middle of the 19th century it was forbidden for foreigners and nationals to enter or leave the country. This isolation has also meant that strongly ritualized social traditions have evolved in Japan that have no comparison anywhere else in the world.

## **Six climate zones, and the red pine feels at home in many**

The Japanese archipelago is situated at the juncture of four large tectonic plates which are constantly in motion. This is a region that is subject to perpetual change and experiences frequent earthquakes and volcanic eruptions. Japan extends from about 45° 33’ to 20° 25’ northern latitude. A mountainous country, its highest elevation, which is also one of its landmarks, is Mount Fuji on the main island of Honshu, 3,776 metres high and 100 kilometres from Tokyo. Because of its elongated, roughly north-south extension, the country is divided into six different climatic zones. These extend from Hokkaidō in the north, with its long cold winters and drifting shows, to the Nansei Islands in the south, with their subtropical climate. Life in Japan means constantly living with recurrent natural disasters. Along with the already mentioned earthquakes and volcanoes, there is also a risk of typhoons (in August and September) and tsunamis – Japan has the best early warning system that there is for these risks. Since over 80 per cent of Japan’s land surface is mountainous and there is a lack of extended plains, virtually all the large cities are dotted along the Japanese coast. To protect these cities from the dangers and elemental forces of the ocean, extremely solid dykes up to ten metres tall have been built. The biggest city is the capital Tokyo, formerly Edo, with over 8 million inhabitants. As it is adjoined by further heavily populated cities and the metropolitan area has almost 40 million inhabitants, this conurbation ranks among the world’s biggest metropolitan areas.

66 per cent of Japan is forested. The most widespread tree is the Japanese Red Pine that grows almost everywhere. Because of the lack of large plains, there are hardly any larger agricultural areas. Most agricultural produce is grown in terraced arable fields on mountain slopes. The most



important food plants are rice and millet. Thanks to the damp climate, most of Japan enjoys lush vegetation. The high-altitude mountains, also known as the Japanese Alps, are virtually devoid of vegetation.

## **Punctuality – a 15-second delay warrants an apology**

If you want to travel in Japan, you have a variety of options. One of the best-known means of transport is the Shinkansen, the Japanese high-speed train. It is considered the safest means of transport anywhere in the world. Since the opening of the first line back in 1964, there hasn’t been a single accident fa-

Even when a train derailed during an earthquake with the strength of 6.4 in 2004, no one was injured. The total length of the Shinkansen network now measures over 2,200 kilometres. Its punctuality is legendary. The total delay of all trains on a single day comes to a maximum of five minutes. If a Shinkansen is delayed by more than 15 seconds, the driver has to explain himself in writing. Anyone who wants to travel in Japan by car needs to bring a lot of time with him. The road signs are in Japanese and English. The roads are very narrow and there is very little truck traffic. It is worth noting that the petrol stations in Japan don’t accept any foreign credit cards. Driving into



the centres of cities should be avoided. If you don't think you're up to driving by car, the buses are a good alternative. The overland lines are very spacious. Tickets can be purchased at the local travel agencies. In Japan, cars drive on the left and it is advisable to strictly observe the traffic code.

For those looking for a certain address, here's some advice, because Japanese addresses are not so easy to find. Only the main roads in Japan's cities are marked on the map of the town. First of all, you have to find the quarter. A number indicates a quadrant in the quarter. This is followed by a subquarter, at underground railway stations, for example – there you have to decipher a local sign with further information on the local streets. Don't worry if the locals try to help you. Even Japanese unfamiliar with the locality can be found at these local signs, searching for addresses. It is advisable to obtain sufficient information in advance. Many restaurants, shops and hotels have a business card with a site plan on the reverse. If you want to buy a guide to architecture or art in order to find specific places, it is advisable to choose a book that, along with the addresses, gives instructions on how to get there as well.

### 1,600 temples and 400 shrines in Kyoto alone

Shintō and Buddhism have always been the two biggest religious communities in Japan. While Shintoism has only ever existed in Japan, Buddhism reached the country in the fifth and sixth centuries. The buildings of Shintō are called shrines and the best-known is probably the Itsukushima shrine. Buddhism, on the other hand, is noted for its, in some cases, large temple complexes. Both religions are dear to the Japanese, and 80 per cent of them belong to one of the two main religions. Their interaction with the modern architecture of Japanese cities yields a unique contrast. In the former capital city Kyoto alone, with its 1.5 million population, there are 1,600 temples and 400 shrines. Here,



as in other cities, these places of worship have been surrounded by modern glass and steel palaces. At first sight, these suggest manifestations of a heartless concrete jungle, although a second glance reveals the charm of Japanese cities.

### Greetings from the geisha and the samurai

When Europeans think of Japan, they automatically associate it with the concepts of the "geisha" and the "samurai". Both have been distorted in Western minds and require a closer analysis. The geisha is a female Japanese entertainment artist. Even today, it is still a profession that requires a strict training. Girls start training as "maiko" (gei-

sha apprentices) at the age of sixteen, and the apprenticeship takes five years. This is where they learn the principles of traditional Japanese arts and how to play several musical instruments. They must also be skilled at conversation and perfect singers, dancers and hostesses. They also have to master the tea ceremony customary in Japan. Many geishas practise their trade to an advanced age. To be successful, a geisha has to be graceful, charming, educated, witty and beautiful.

No concept captures our notion of the Japanese man better than that of the "samurai". These were originally servants of their rulers. However, as a result of a code similar to the European code of chivalry, they developed into

a caste in their own right that mainly served a lord but nevertheless had a huge influence on Japanese society. Unlike the geishas, the samurai were abolished by the ruling elite in the 19th century.

### 4 and 9 is 13

If you want to spend some time in Japan without raising eyebrows, you need to know a few rules of conduct and courtesy. Taking off your shoes when visiting is a must, and the host will supply you with slippers. Turning your back on the person accompanying you (not only during conversation) is considered extremely rude. Visitors should also know what certain numbers signify in Japan. The numbers 4 and 9 are considered unlucky in Japan. 4, pronounced "shi", is a homophone for "death"; 9, when pronounced "ku", is a homophone for "suffering". The number 13, on the other hand, is also considered unlucky nowadays, even though it has been adopted from Western cultures.

### Taboo on meat until the 19th century

The high life expectancy of the Japanese is legendary. One reason for this is said to be their staple food, rice. Although introduced originally from continental Asia, the short-grain variety has been grown in Japan for years and is today the only form of true rice recognized in Japan. It is interesting to note what has been served with it over the years. Up until the Edo period (middle of the 19th century) meat was in fact taboo. However, excavated bones testify that not all people inhabiting Japan have always observed this prohibition. An exception has been the eating of whale meat, because the whale was considered a fish for years and hence edible. The role of the whale as a supplier of protein undoubtedly contributed to its comestible status. Also familiar to many is the "bentō", a meal of several items, served in a special small box.

Certain customs have meanwhile made their way to Europe. These include sushi, eating with chopsticks, and sake, Japanese rice wine.

### Curiosities – lockers for sleeping

Japan abounds with curiosities and exotic customs. One of the most extreme is the Japanese national sport of sumo wrestling. The aim is to either barge the opponent out of the ring or to force him to touch the ground with any part of the body other than the soles of the feet. A match between the, in most cases, corpulent contestants – the average weight of a wrestler is 150 kilos – usually only takes a few seconds. This means that over a hundred matches of ten take place in a single day. There are proper sumo schools in Japan. Sumo in Japan is run professionally and very commercially, and the leading exponents of this sport are quite often veritable national heroes.

Anyone walking through the cities will often come across the unusual, e.g. vending machines selling live insects or

washing machines in the street, a lack of pavements and "sound princesses" on toilets. And on the subject of toilets, there are signs everywhere in toilets, explaining how to use them. But what if you're caught short? No problem, because there are instant toilets, a kind of plastic bag with a small reservoir and little toilet disinfectant blocks. Although the Germans are generally considered fussy and disciplined, the Japanese beat them hands down. And they think of simply everything! If you don't make it to your destination and can't find any suitable accommodation, you don't have to sleep on the streets. In some cities, at central locations (stations etc.), there are locker-type arrangements for sleeping. So-called "capsule hotels" have "rooms" measuring about 2 x 1 metres and equipped with a light and a television. You can hand in your belongings at reception. Having rested, you can resume your journey the next day.



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