



Hard-wired  
for success.

Sauber Motorsport AG

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Searching  
for open doors.

JP Funkerosive Bearbeitung

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If you want high quality, you  
need high-tech production.

K-L Präzision Falk Lange GmbH

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Hans-Jürgen Pelzers



“Coming together is a beginning; keeping together is progress; working together is **SUCCESS.**”

Henry Ford

**Milliseconds with maximum means – 10 years of the Sauber partnership**

Nowhere is more effort put into making millisecond improvements per lap than in Formula One. The Sauber Formula One team produces over 20,000 parts on Mitsubishi Electric EDM machines per year in order to make this all-important millisecond difference. Meeting these high expectations means adopting exceptional production methods: workpieces filled with liquid metal, ingenious auxiliary configurations and much more (see page 18).

But high performance is by no means confined to Formula One – at the new German headquarters in Ratingen near Düsseldorf the unusual is on show in the World of Mitsubishi Electric (page 34). And for anyone who didn't have the chance to visit us on our Open Day, we have summarised the day's highlights (page 40).

Plenty of progress for 2016, but one thing remains unchanged: Mitsubishi Electric is a partner you can count on – not only when it matters.

**Hans-Jürgen Pelzers**  
from the Technology Centre in Ratingen



**Mitsubishi Electric delivers railcar air-conditioning systems for the Rhine-Ruhr Express network in Germany**

Mitsubishi Electric has awarded its first contract with Siemens AG for railcar air-conditioning systems, which will be used in Desiro High Capacity railcars on the Rhine-Ruhr express (RRX) train network that connects cities and provinces in Germany's North Rhine-Westphalia region. Mitsubishi Electric will deliver 328 air-conditioning systems (82 trainsets totalling 164 cars).



**Everything on a single site – Mitsubishi Electric opens its new German headquarters**

On 4 March 2016, Mitsubishi Electric officially opened its new German headquarters in Ratingen with a ceremony that included many traditional Japanese elements. Its more than 16,000 m<sup>2</sup> of office space will accommodate up to 750 employees. The investment also marks the launch of a new exhibition concept "The World of Mitsubishi Electric".  
*Continued on page 34.*



**New low-height cassette for European ceiling grid**

The City Multi VRF series from Mitsubishi Electric is now compatible with suspended ceilings only 245 mm deep, thanks to its European ceiling grid cassettes. Only 208 mm in height and 625 mm wide and deep, the new European grid cassette fits in all commonly used system grid cassette ceilings. Comparable products on the market with a height of some 300 mm need noticeably more space in the ceiling recess.



**Mitsubishi Electric is official advertising partner of "ZOOM Erlebniswelt"**

Mitsubishi Electric is official advertising partner of "ZOOM Erlebniswelt" in Gelsenkirchen. At "ZOOM Erlebniswelt" you can travel around the world through the Alaskan, African and Asian worlds of adventure on a single day. Experience animals, landscapes and attractions.

Founded in  
**1999**

Die-sinking/wire-cutting jobshop

The automatic wire threader rethreads the wire trouble-free even after breakage in a 0.5 mm kerf.



JP Funkenerosive Bearbeitung

## Searching for open doors.

When jobs have to be accomplished quickly and flexibly, Jürgen Pirgl is always at the ready. His trusty sidekick is his Mitsubishi Electric machine of the MV Series on which he can always rely.

“When one door closes, another one opens,” or so the German saying goes. Anyone opening the door to JP Funkenerosion and entering the production shop cannot overlook the pride and joy of the one-man business in Erligheim: a new MV2400R. The wire-cutting machine from Mitsubishi Electric takes centre stage by the large windows of the company building, resplendent in the bright light. The

unit joined the firm’s machine park at Christmas last year. The saying also applies admittedly in another respect. Because Pirgl is always on the lookout for new business challenges – and for new doors to open.

About 17 years ago, Pirgl started out electric discharge machining as a side line in a rented workshop. “I’d clamp workpieces on a die-sinking machine in the early morn-

ing and then go to work. And in the evening after work, I’d finish off the job,” the jobshop owner recalls. After about a year and a half, in which he was busy almost around the clock, Pirgl took the plunge in setting up his own business.

He then bought his first wire-cutting machine a year later, although this wasn’t planned at all. “My original idea was to concentrate on



JP Funkenerosive Bearbeitung

*The constant search for new challenges.*



"For a successful jobshop, speed and flexibility are absolutely essential." – Jürgen Pirgl

die sinking. But because customers kept on inquiring about special gearing, I seized the opportunity and bought a used Mitsubishi SX machine. This meant I could then handle these jobs as well," Pirgl explains.

Over the years, he's made steady progress and the company has successfully established itself on the market. The bulk of his work was originally from customers from the local area of Heilbronn and Stuttgart and came from a variety of industries. In the initial years, things were sometimes hectic, particularly when jobs for companies engaged in mo-

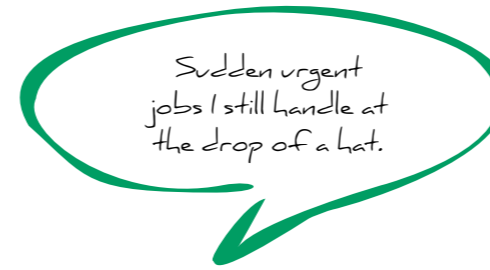
tor racing were concerned. "These customers were often very demanding, because they expected their components to be machined practically overnight," says Pirgl. Although these customers are no longer his regulars, the business owner managed to gather a lot of valuable experience during this period from which he still benefits today. "Sudden urgent jobs I still handle at the drop of a hat. And my customers are very appreciative of this," he adds with a smile.

Today the company serves many machine manufacturers and component suppliers, and most

of them are still located in the immediate surroundings. Wire-cutting accounts for about 70 per cent of the order volume. The jobs usually involve parts made of aluminium, copper, brass, steel or titanium, 0.5 to 300 mm thick, up to a size of 700 mm. Pirgl is extremely flexible and not so selective when it comes to taking on new orders. For his motto is: "If my machine can do it, I offer it".

**Always at the ready for the customer**

The used machine from Pirgl's initial years has long gone. Today he works at the modern Mitsubishi



Electric MV2400R. "I urgently needed a high-performance machine particularly for larger workpieces. A pleasant side-effect of any new investment is that it gives me a burst of new enthusiasm for my daily work," Pirgl explains. The new machine was bought in part exchange for an older Mitsubishi

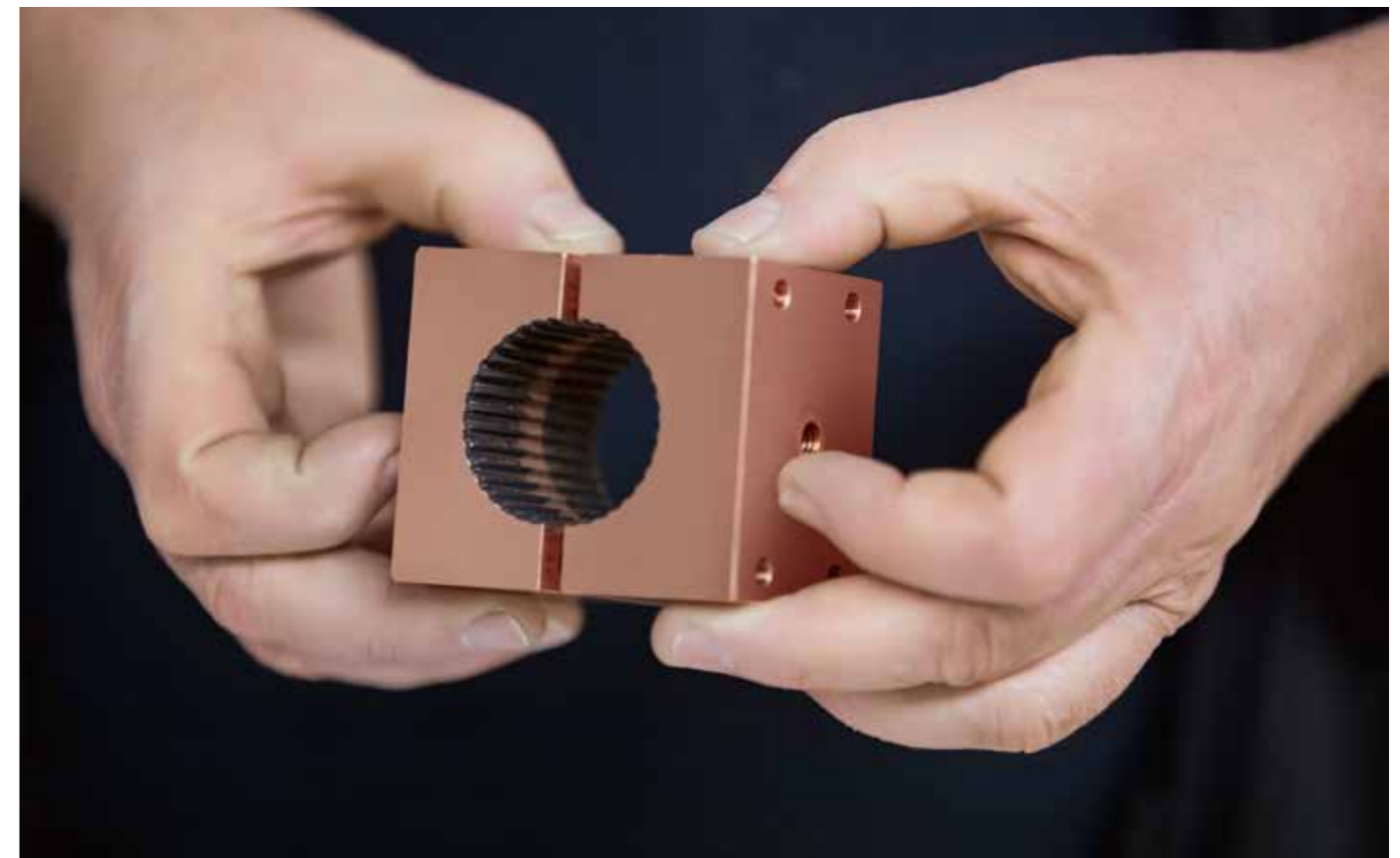
Electric model. "The truck pulled up outside the firm at 8 o'clock in the morning, and the new wire-cutting machine was ready to operate after the lunch break," says Pirgl describing the trouble-free delivery and installation of the machine. "The time taken to get used to the new machine was minimal, as I was already familiar with the user interfaces of the Mitsubishi machines. So I was able to get straight down to work." So the seamless resumption of normal business was at no time at risk. "For a successful jobshop, speed and flexibility are absolutely essential. You can never rule out a customer ringing up on a Friday and

expecting his parts to be machined at short notice by the following day. And without compromising on quality of course. So I'm always at the ready as far as new jobs are concerned," says Pirgl.

**Competitive pricing**

As a subcontractor, the cost-effective price per part is the decisive factor for survival on the market. Pirgl therefore needs a machine that operates economically. In view of this, the low wire consumption of the new MV Series has already had a positive impact in the brief time since commissioning. "I reckon a single wire spool now lasts about

A perfect fit – two components with gearing



Successfully established on the market – step by step.



Pirgl appreciates the rapid familiarisation and the accustomed user interfaces.



Pirgl handles urgent jobs overnight.

four hours longer than before," says Pirgl reporting his experience. The jobber has also come to appreciate the other innovative features of the MV2400R. The automatic wire threader, which rethreads the wire trouble-free even after breakage in a 0.5 mm kerf, operates without a hitch. "You usually don't even notice a wire breakage. All you see is a message on the display," says Pirgl who wouldn't want to do without this function.

Another important factor in subcontracting is machining speed. Time is a precious resource, and staying competitive means using it sparingly. Pirgl is therefore very happy with the markedly enhanced performance of his new system. Most important of all is the machine's dependability. "What use is high cutting speed if the machine breaks down in the middle of the night?" says Pirgl. In his view, the MV2400R

offers just the right blend of accuracy, dependability and economy. And competitively pricing.

**Dependability counts**

In Pirgl's opinion, the competitive pressure has increased from year to year since he started his business. "It used to be easier to plan orders that would arrive in a steady volume. Today you have to react much faster and reckon with greater fluctuations in the order volume." Pirgl regards this as a challenge and adapts flexibly to changing conditions. It is therefore all the more important for him to have a machine for his daily work that he can rely on 100 per cent.

In this connection, he has words of praise for Mitsubishi Electric's after-sales service. Pirgl has occasionally carried out minor repairs himself. "It just took a phone call, and the replacement parts arrived

the next day." But this hasn't been necessary yet on the new machine. However, Pirgl has no doubts that the Mitsubishi Electric service will quickly respond should the need arise and send a technician round swiftly.

For the go-it-alone businessman, one thing is already certain – that he will stay true to investment in machines of the Mitsubishi Electric brand. "Experience saves time" is how he puts it.

[www.jp-erodieren.de](http://www.jp-erodieren.de)

*Taking account of fluctuations in order volumes.*



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Founded in  
**1998**

**9**  
employees

Everything from tool- and  
mouldmaking and precision part  
fabrication to small machine  
manufacture



With an advanced high-tech machine park, Falk Lange has made K-L Präzision a trendsetter in the region. Its demanding customers benefit from the extraordinary quality of its machined products.

K-L Präzision Falk Lange GmbH

**If you want high quality,**  
you need high-tech production.

In picturesque Nideggen, Lange inaugurated his new production shop in 2014. The Eifel National Park and the High Fens are within easy reach. "Here we've got everything we value," says Lange summing up, "– a central location between Cologne and Aachen, a high-speed Internet connection and an idyllic landscape as well."

The new building with its light-flooded production shop is working to high capacity only a year after the firm moved in. Some 900 m<sup>2</sup> of space is available for production and 100 m<sup>2</sup> each for offices and staff rooms. Armed with a wealth of expertise, a pronounced commitment to quality and, above all, a clear understanding of the needs of his customers, Lange took the leap in

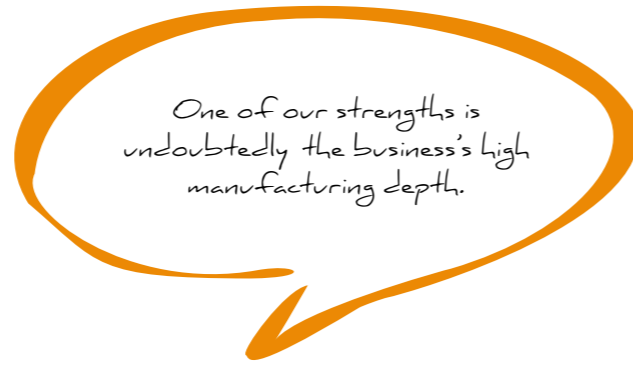


K-L Präzision Falk Lange GmbH

*A pronounced commitment to quality.*



Before a workpiece goes to the measuring room, it has to withstand close scrutiny from Viktor Voth.



setting up his own business in 1998. Today, a total of nine employees work for his firm, all of them specialists who have a complete mastery of their respective trades and are able to machine with micrometre precision. One of them is Felix Lange, the founder's son. The tool mechanic by training is ensuring second-generation continuity in the family business. "One of our strengths is undoubtedly the business's high manufacturing depth," Lange explains. "With the exception of hardening, we perform all the jobs on the premises and can therefore respond very quickly and flexibly to customer requests." On the basis of his many years of experience, Falk Lange can also realistically assess the feasibility of more extravagant customer requests. "If a customer comes along with his drawings and instructions, we consult with him in detail and conscientiously examine the required work steps in advance," Lange reports. "When we then confirm the job and give our okay, the customer can rely 100 per cent on getting precisely the tool he's ordered."

#### Always one step ahead

Lange has always been fascinated by high tech and aspires to always be one step ahead of the competition. So it's hardly surprising that his machines always keep pace with technological progress. The advanced machine park of K-L Präzision is in every respect state-of-the-art and comprises not only electric discharge

machines, but also machining centres, surface and cylindrical grinders, lathes and, last but not least, professional measuring equipment. With its ambitious aspirations, the company has acquired a unique position for itself in the region. "Being just one of the crowd is not my thing," is how Lange explains his philosophy. "We may not always be the cheapest operator, but our customers acknowledge the quality of our work and have realised that our strength lies in the dependable execution of challenging tasks," he adds.

#### The personal touch

Lange works alongside his team in production at the machines. He attaches great importance to personal relationships with his employees for he knows that high employee satisfaction has a positive impact on quality and productivity. He is not only ready to help his staff with his technical expertise, but also always has an ear for organisational and even personal concerns.

#### A perfect cut

When cutting special electrodes, the five standard axes of the Mitsubishi Electric EDMs are not always sufficient. This is when a rotary axis comes into play at K-L Präzision. "Of course it's also possible to cut these special electrodes in segments without an additional axis," Lange admits. "But that's time-consuming and the surface quality falls a long way short of the

demand standard. For medical technology applications in the USA, we've produced injection moulds, for example, and performed the die sinking with our immaculately cut electrodes. The customer was so impressed by the outstanding quality that he awarded us follow-up orders," says an enthusiastic Lange. Mitsubishi Electric makes it easy for users to integrate rotary and articulation axes. The controls of the more recent EDMs are designed for the integration of extra axes and also make it possible to control additional axes simultaneously.

#### Dependable and long-term cooperation

Lange gathered his first experience with the machines from Mitsubishi Electric back in 1986, many years before going it alone. "My workmate, who at the time was responsible for wire-cutting, left the firm at short notice. So I had to stand in for him and was really thrown into the deep end. But it didn't take long for me to feel at home on the DWC 90," Lange recalls, laughing. Today, a total of nine machines from Mitsubishi Electric are in operation in Nideggen – four die-sinking and five wire-cutting machines. When setting up his own business, Lange opted exclusively for EDMs from the Japanese manufacturer. Two factors were critical for this decision: first, their innovative technology; and, second, the excellent service and support. "I've always studied what's on the market thoroughly. Technological advances like the Tubular Shaft Motor, automatic wire threading and the new generator technology are outstanding features. What counts for me ultimately, however, is the overall package of technology, service and price. And Mitsubishi has always had the best offer so far," says Lange justifying his choice.

#### Satisfied customers are loyal customers

A particular strength of Mitsubishi Electric is its excellent after-sales service. "Should a problem ever arise on a machine, it's quickly solved. We've never had to wait for an answer longer than an hour. This is something I can always rely on," says the business owner. "By contrast, I find annoying the tendency of other manufacturers to respond sluggishly. Sometimes there's even a risk of a whole working day being wasted unproductively." "We've come to appreciate that technical support is increasingly becoming a make-or-break factor. This is why we have redoubled our efforts in this area,"

says Lutz Roger Neuendorf, the responsible Sales Manager, outlining the strategy of the leading EDM manufacturer. Service management has therefore been working even more closely with sales for some time now and has steadily adjusted manpower to the growing capacities of the sold units. In addition, Mitsubishi Electric mans its service hotline during the week until 8 pm and on Saturday even until 4 pm. "The better the service, the more satisfied the customer. And satisfied customers are loyal customers, as one can see from K-L Präzision," Neuendorf affirms, bringing his constructive consultation with the customer to an end with a friendly smile.

[www.k-l-praezision.de](http://www.k-l-praezision.de)



With its light-flooded new building, Falk Lange has paved the way for his business's successful future.



## The success story: Lange – Mitsubishi Electric

**1999** First FX10K wire-cutting machine

**2002** Moving into the new shop and first FX20K

**2007** First EA8 die-sinking machine

**2008** First FA20Advance

**2009** First EA12V

**2010** Second EA8 and second FA20 Advance

**2010** First FA30V

**2012** Third EA8

**2014** New shop first MV2400R first NA1200

Lutz-Roger Neuendorf, responsible Sales Manager: "I've been serving Mr Lange since he started his own business and am full of respect for how K-L Präzision has developed. This remarkable company has become established on a firm foundation and with a lot of hard work and technical expertise. Our contribution to this long-standing partnership is our support for K-L Präzision with suitable equipment and technologies in the EDM sector. I've always found this extremely harmonious business relationship to be down-to-earth and professional and also enjoyable."

## Company profile

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**Managing Director and owner**  
 Falk Lange

**Core business**  
 Everything from tool- and mouldmaking and precision part fabrication to small machine manufacture

**Employees**  
 9

**Founded in**  
 1998

## Interview



**Falk Lange**  
 Managing Director and owner

*Can you explain in a sentence what your company does?*

We're a company that operates on the principle of "A rolling stone gathers no moss".

*What was your biggest business success?*

Building up K-L Präzision Falk Lange with support from my family and my reliable workforce.

*What's your source of motivation?*

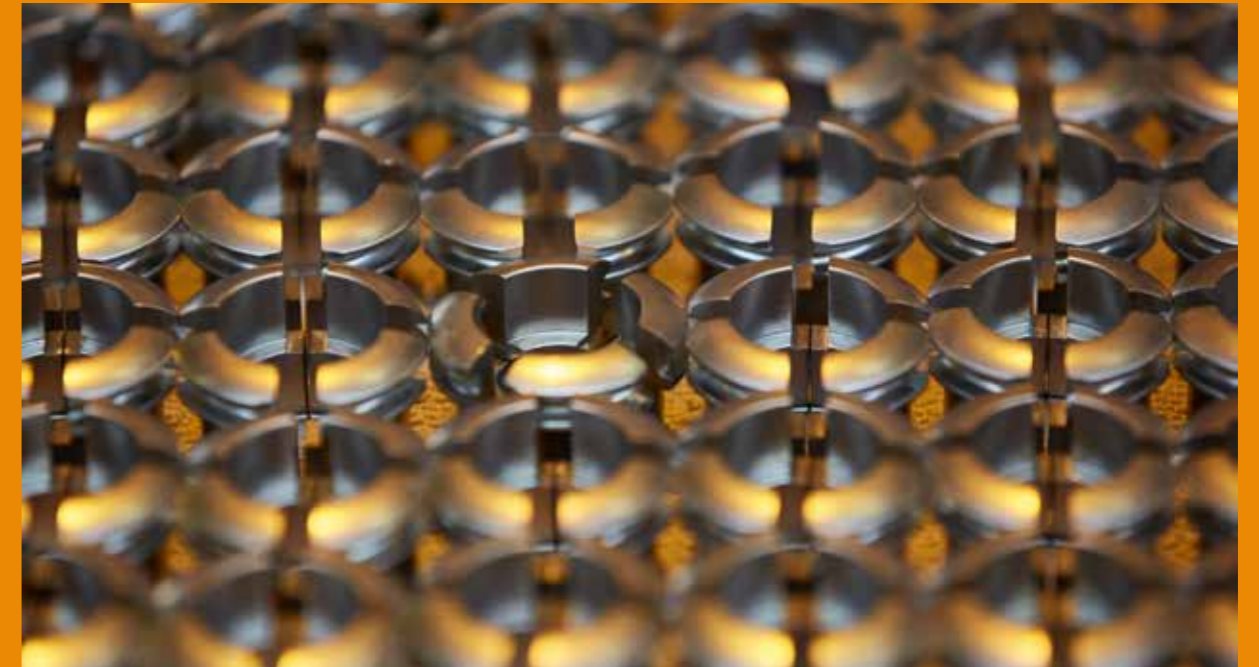
The principle of never resting on our laurels, but always staying one step ahead.

*What attributes do you value most in others?*

Hard work and honesty.

*Where do you see your company in five years' time?*

As a high-tech company that sets trends in the region.



Founded in  
**1970**

**Some 350**  
employees

Motor racing – Formula One



Sauber Motorsport AG

**Hard-wired**  
for success.

Speed is all-important in Formula One – and the same applies to the production of the vehicle components. The Swiss Sauber F1 Team has been using EDM systems from Mitsubishi Electric for over ten years. These high-tech units machine even the most intricate workpieces quickly, accurately and in top quality – and have therefore become absolutely indispensable for Sauber.

Everything is meticulously tidy in Alexander Simai's workshop. Like a jeweller presenting his finest work, he has neatly arrayed his latest production items on his work bench: switches, screws, locking rings and chassis components. "These one-off items are employed in various places on our Sauber C35 Ferrari," says Simai, proudly smiling as he picks up his most recent item, a titanium part for the wheel suspension. "Machining this is very complicated. You're given a 3D model and you have to work out how to machine the component." So far, Simai, whom his colleagues in the Swiss Sauber Formula One team approvingly call "Erosion Man", has managed to solve every problem. But the requirements in top-level motor racing are exceptionally exacting. "You may get the design data for a component on a Friday evening, and it has to be out on the race circuit the next day. So you have to give everything you've got and be creative and quick at the same time."

Innovative EDMs from Mitsubishi Electric help Simai to master his challenges. At its workshop in Hinwil near Zurich, the Sauber F1 team has been using high-tech installations from the world market leader for over ten years now. This

partnership has become a cornerstone of the production strategy of the Swiss racing team, as efficient spark erosion facilitates machining feats that would be out of the question with conventional turning and milling methods. Components for the suspension, cockpit, steering column or brake pedals have to be produced quickly, with micrometre precision and in superlative quality so that they can bring to the circuit a vehicle that can compete speed- and safety-wise. Mitsubishi Electric machines satisfy these requirements. "With Mitsubishi Electric's help, we have reorganised our production process so that we are at an advantage in terms of speed, flexibility and also costs. Both companies profit from

cooperation: Mitsubishi Electric benefits in the marketplace and we benefit in production," says Axel Kruse, Operations Director of the Sauber F1 Team.

#### Stalwart in turbulent times

The NA2400 and MV1200R wire-cutters and the EA12V die-sinker are the key items of production equipment in Hinwil. The mechanics use the high-tech systems around the clock and for almost all purposes – for the preliminary machining of safety-relevant parts and for the finishing of milled parts. Of the total of roughly 80,000 workpieces that they machine each year, 25,000 to 30,000 come off the EDMs. At the start of cooperation with Mitsubishi

2016 Sauber F1 Team steering wheel model



Electric in 2005, the workshop couldn't have imagined how important this technology would become for them. "We started off with wire-cutting and at first only integrated certain steps in the existing process," says Sauber Production Manager Ernst Keller. Today, they rely wholeheartedly on spark erosion. "It's become absolutely essential for us. Without this technology, the processes that we've adopted today would hardly be feasible."

The effectiveness of the Sauber approach is indicated by the race team's consistently good performance over the years. Although the team has never bagged the big titles like Ferrari or Mercedes, it has established itself in the middle



Entrance door to the Sauber EDM department

of motor racing's Premier League and also made a name for itself as a talent factory. In the battle for the World Championship, drivers like Nick Heidfeld, Robert Kubica, Kamui Kobayashi and Sergio Perez have regularly picked up points. And in the 2015 season, the Sauber

F1 team with its drivers Felipe Nasr and Marcus Ericsson achieved a commendable 8th position in the Constructors' World Championship. And despite the fact that the abrupt departure of majority owner BMW from Formula One in the summer of 2009 severely shook the Swiss team. Nevertheless, team founder Peter Sauber, who bought back his baby after the BMW pull-out, got Sauber back on course. This was possible also because the team could continue to bank on the innovative capability of important technology partners like Mitsubishi Electric. Sauber's engineers have never been short of high-tech components for the racing cars or for the company's own wind tunnel. "That's one of the great

Ernst Keller, Production Manager, and Axel Kruse, Operations Director, with EDM-machined elements of the current Formula One vehicle



Auxiliary configuration for a 360° cut



Connection for carbon rods



Steering wheel adjusting knob

things about staunch partners like Mitsubishi Electric. We can rely on them to continue to refine their technology that we benefit from to such an extent," says Kruse.

**Safety first**

Even if Mitsubishi Electric has become a permanent fixture at Sauber today – getting one's foot in the door with a motor racing team is anything but easy for an equipment supplier. The machine manufacturing competition is particularly strong in Switzerland, and many

specialised firms have set up shop in and around Zurich. What's more, the race teams traditionally keep the number of suppliers small for reasons of quality and safety. Formula One is a high-risk sport in which drivers and the people around them have to be protected. And this is why the teams want to exercise as much control as possible over their value generation. Sauber is no exception: "Our philosophy is to have on our premises all the components that, in the event of a defect, might result in harm to the driver, spectators

or other persons. Process security is one of our primary objectives," says Kruse. Precisely because of the need for ample reserves of safety, Sauber initiated business relations with Mitsubishi Electric in 2005, as the company has always had a fine reputation for EDM and industrial automation.

**Easy to tool**

Alexander Simai can no longer imagine his workplace without Mitsubishi Electric technology either. "It is spot-on, quick, easy to



“That's one of the great things about staunch partners like Mitsubishi Electric. We can rely on them to continue to refine their technology that we benefit from to such an extent.”

**Axel Kruse**  
Operations Director

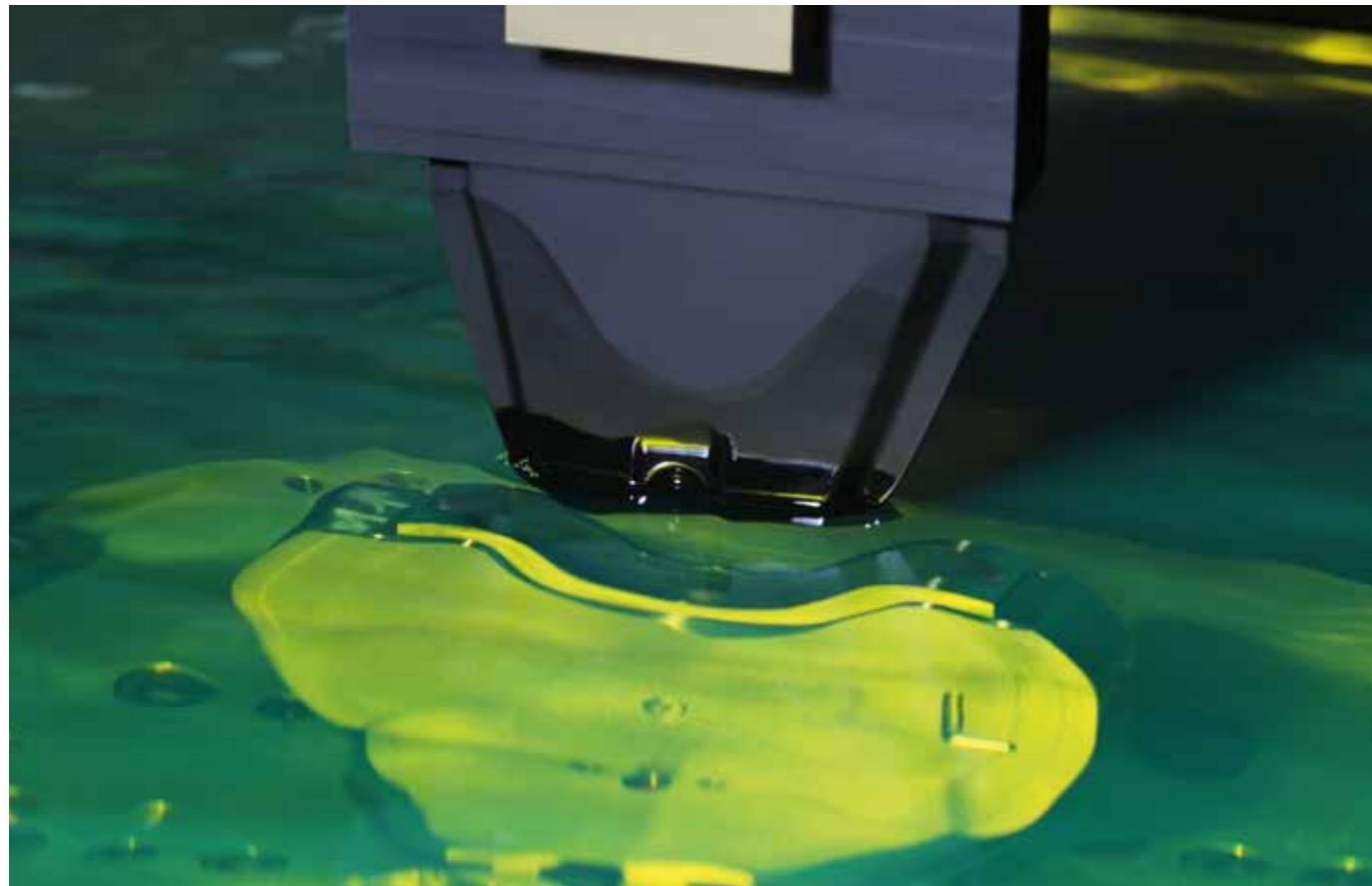
Wire-cutting – an essential technology.

operate, maintenance-friendly and robust and produces outstanding results even in poor conditions,” says the skilled mouldmaker listing the advantages of the machines, before turning to the MV1200R whose performance he is particularly impressed by. “With the installed zero-point clamping system I can significantly reduce tooling time and thus improve productivity.” With the MV-R it’s possible to finish the job with fewer recuts – and with exceptional accuracy. “This also increases speed.” Furthermore, the MV1200R has a “brilliant automatic wire threader”. In the rare

event of wire breakage, the machine rethreads the cutting wire right at the breakage point – in the kerf and without the dielectric having to be fully drained off. “This saves time and permits unmanned operation at night, even for the processing of components that tend to warp during machining.” The mechanics in Hinwil are happy to exploit this feature. “We set up vehicle components before leaving work and let them run on the machine overnight so that we can finish machining them the next day,” says Simai. So far there haven’t been any problems at all with the automatic threader.

“The machine runs absolutely smoothly.” The ease of operation of the Mitsubishi Electric technology also goes well with Sauber’s speed strategy. According to Production Manager Keller, it is important for operators to be able to work at new machines productively without taking long to get used to them. “In our business, speed is of the essence. Our processes have to fall into place straight off. With Mitsubishi Electric, this is possible, as the machines are anything but highly complicated to operate.” In the Sauber workshop, thanks to hypermodern operating and programming equipment,

Die-sinking of titanium wheel suspension



## Company profile

Sauber Motorsport AG

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**Managing Director**  
 Peter Sauber

**Core business**  
 Motor racing – Formula One

**Employees**  
 some 350

**Founded in**  
 1970



Right before the start of the race

work steps are highly streamlined. The engineers design the components on a 3D CAD system, and the mechanics, using CAM systems, then generate the NC cutting programs and transfer them finally to the machines via a DNC network. Efficiency is also boosted by the

fact that the mechanics at Sauber are also responsible for programming, setting up and operating the EDM systems. This ultimately also creates scope for creativity, which also plays a big part in the Sauber process. How can a complex component be best machined on which

erosion machine? With his wealth of expertise and passion, Simai will be facing up to precisely this challenge again tomorrow.

[www.sauberf1team.com](http://www.sauberf1team.com)

# The Sauber chronicle: turbulent years.

1

## FORMEL 1 – THE EARLY YEARS

**1993 Flying start.** The Finn JJ Lehto achieves 5th place in Sauber's maiden Formula One race at the South African Grand Prix.

**1995 Podium first.** Heinz-Harald Frentzen rocks Monza, claiming 3rd place in the Italian Grand Prix. Red Bull and Petronas join the team.

**2001 Sound finances at last.** Sauber enters into partnership with the Credit Suisse bank, achieves 4th place in the Constructors' World Championship and builds its own wind tunnel.

## THE BMW-Sauber ERA

**2005 Flying a new flag.** BMW takes a majority share in Sauber. The new partnership with Mitsubishi Electric injects extra speed into production.

**2008 Year of glory.** The team grows to 400 employees. Robert Kubica wins the Canadian Grand Prix ahead of team colleague Nick Heidfeld. Collectively, they make it onto the winner's podium 11 times, and Sauber comes 3rd in the World Championship with 135 points.

**2009 Setback.** Only 6th place – and BMW pulls out of Formula One. Every cloud has its silver lining: Peter Sauber buys back his baby.

2

## NEW START IN FORMULA ONE

**2010 Back to basics.** With 260 employees, Ferrari as the engine supplier and the drivers Kamui Kobayashi and Pedro de la Rosa, Sauber achieves a respectable 8th place in the World Championship.

**2012 Comeback.** Four top-3 placings, 126 World Championship points and 6th place in the Constructors' World Championship – the team is back on track for success.

**2012 Woman at the helm.** Peter Sauber steps down as CEO and hands over to Monisha Kaltenborn, who thus becomes the first female team principal in Formula One.

**2013 Fighting spirit.** Nico Hülkenberg and Esteban Gutiérrez now race for Sauber and drive the team, despite initial problems, to 7th place with the Sauber C32 Ferrari.

**2014 Disenchantment.** No World Championship points for the first time. The team struggles with poor performance, inconsistent results and errors by the pit crew and drivers.

**2015 Breath of fresh air.** The two young drivers Marcus Ericsson and Felipe Nasr get Sauber back on track with a seriously overhauled C34 Ferrari. The final analysis: 36 points and 8th place.

**2016 Clear message.** Team principal Monisha Kaltenborn calls for greater consistency so that Sauber can re-establish its mid-table position in Formula One.

3



# F1 EDM FILM

Benefit from the expertise of the Sauber motor racing specialists, gain fascinating insights and find out about exclusive EDM tips & tricks in two exciting video reports. Watch now online!

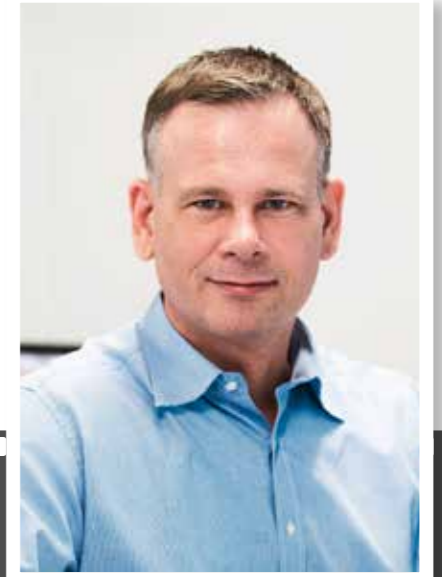
The progressive Sauber Formula One race team has opened its doors exclusively to PROFILE's journalists and clearly demonstrated what counts in high-precision machining. The technicians themselves have their say and show with reference to specific examples how EDM technology is employed on the F1 vehicles. Extreme precision is an absolute necessity – even

the tiniest deviations can decide between victory and defeat when time is measured in thousandths of a second. Ernst Keller, Production Manager: "We have to work at high speed. For instance, a problem can crop up on the race circuit on a Friday. We may then get the design data late Friday afternoon or evening, and in principle the part is expected to be out on the track

the next day." Alexander Simai, Machining/EDM: "I have to produce a titanium part that's eight tenths of a millimetre thick. It's clamped like this in an ITS chuck and pre-roughed. Then I machine the titanium with graphite electrodes. After wire-cutting, the pocket is filled with liquid metal. This gives the material strength. It has a melting point of about 80 °C."

“Competition takes place not only on the track but also in production.”

*Axel Kruse*, Operations Director



## EDM GOES MOVIE!

Reduced set-up times and faster production – but how?

Fascinating insights and exclusive EDM tips & tricks in two exciting video reports.

Scan the code now and find out in the film:

[www.mitsubishi-edm.de/sauber-en](http://www.mitsubishi-edm.de/sauber-en)



JUST SCAN THE  
CODE AND FIND OUT  
IN THE FILM.



*Two fascinating videos – by experts for experts.*

Founded in  
**1974**

**90**  
employees

Development and production of  
progressive tools and connector systems

As a member of the global Binder Group, MPE Garry GmbH in Füssen concentrates on the development and manufacture of progressive tools and connector systems. So that it can machine the tiniest radii and contours on punches and dies with high surface quality, the Füssen toolmakers place their faith in the quality of wire-cutting machines from Mitsubishi Electric.

MPE Garry GmbH

# Punching above its weight.

Wire-cutting stamping tools.

In 1987, MPE Garry GmbH in Füssen evolved out of Werkzeugbau Lotter GmbH founded in 1974 in Buching. MPE Garry has been a company of the Binder Group, a globally active manufacturer of electrical connector equipment, since 1991. Using metals and plastics, the total of six companies of the Binder Group develop, design and produce electrical connectors. Their

customers can be found in virtually all branches of industry, ranging from machine and vehicle manufacture, automation and medical technology to computer engineering and building equipment. In addition to designs conforming to international standards, the Binder Group produces a multitude of customer-specific variants. At the Füssen location, roughly 90 employees handle the



MPE Garry GmbH

*A multitude of customised variants.*

assembly and sale of high-grade connector systems. These are used for detachably yet reliably interconnecting rigid and flexible circuit boards with multicore data cables. Precision toolmaking in Füssen is of outstanding importance for the corporate group as a whole. About 15 employees here develop, design and fabricate high-precision stamping and bending tools. Using these, the company produces a variety of stamped parts in large series from 0.1 to 2 mm thick fine sheet metal on several fast-running presses. In Füssen and at other locations, these are then assembled with plastic bodies into complete connectors.

#### From metal strip to connector

“As a competence centre of the Binder Group, we in toolmaking at MPE Garry are concerned above all with stamping and progressive tools for very small pins and flat connectors. We concentrate on ingenious, finely detailed tools that we produce for standard and

custom connectors. The required component parts are mainly produced from highly alloyed, hardenable steels. We assemble the modular tools, run them in and then produce the components for a variety of electric connectors in large series,” says Rudolf Trakies, head of toolmaking in Füssen, explaining his team’s work. The toolmakers at MPE Garry also work sometimes under subcontract for neighbouring production firms as well as repairing worn or damaged stamping tools. As Trakies reports, the fabrication of individual components for progressive tools places special demands on the production equipment. The tool inserts often have edge lengths of only a few millimetres, and the penetrations in the dies are often only a few tenths of a millimetre wide. Equally, the punches often measure only a few millimetres in size and have radii of less than 0.1 mm. “This is why we pay attention to maximum accuracy and high surface quality in production,” Trakies adds.

#### Innovative technologies ensure quality and reliability

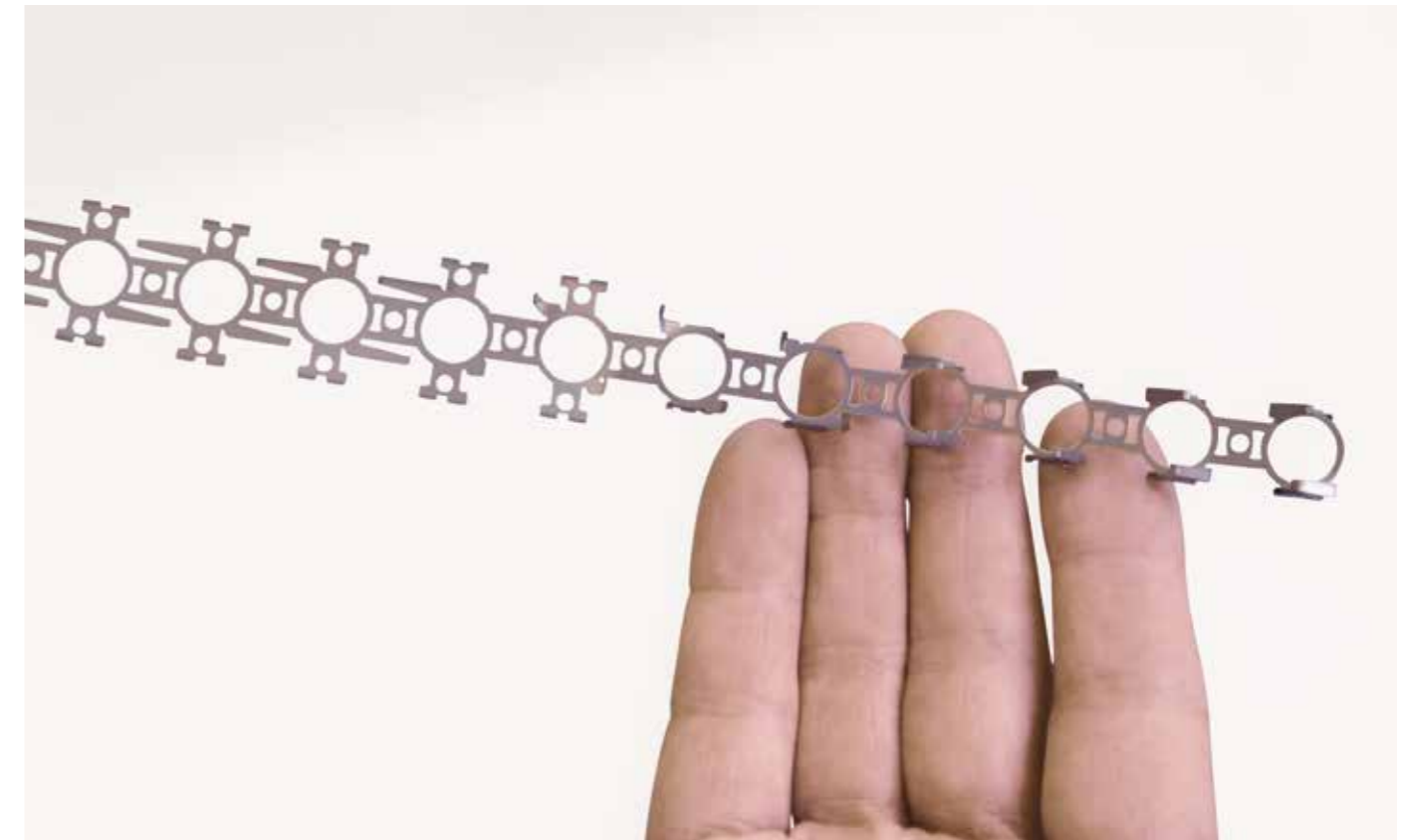
Because of its strict insistence on high quality, MPE Garry has chosen machines from Mitsubishi Electric for wire-cutting. The employees have been familiar with these wire EDMs for almost 20 years. Only a few months ago, the toolmakers in Füssen sold a 15-year-old, trusty FA20 and bought a modern MV2400R to replace it. The specialists at MPE Garry now work with two wire-cutting and one die-sinking machine from Mitsubishi Electric. With the MV2400R in particular, they can achieve an exceptional combination of high accuracy, process security and reliability. Trakies explains: “It goes without saying that we are at pains to keep our production equipment in line with the current state of technology at all times. This is the only way we can stay true to our philosophy of ‘Reliability, quality and responsibility’. In advance of this investment, we compared the wire-cut EDMs on the market. From our point of view, Mitsubishi Electric alone with its MV2400R offers the

optimum of functions, features and optional extras for high speed, accuracy, surface quality, dependability and efficiency.” Trakies bases his assessment among other things on the advanced direct drive technology with Tubular Shaft Motors. In combination with the linear scales on all axes and rapid optical data transmission, it ensures maximum accuracy at high working speeds. The latter enables MPE Garry to maintain its status as a competence centre of the Binder Group, as the toolmakers in Füssen have to repeatedly stand comparison with the global competition. “What counts is not only high quality, but also throughput time. Only those who are fast enough will earn further jobs. In this respect, we see ourselves under a special obligation towards our partners throughout the Binder Group,” Trakies adds.

In addition, Trakies has explicit praise for the special functionality of the MV2400R. This refers, for exam-



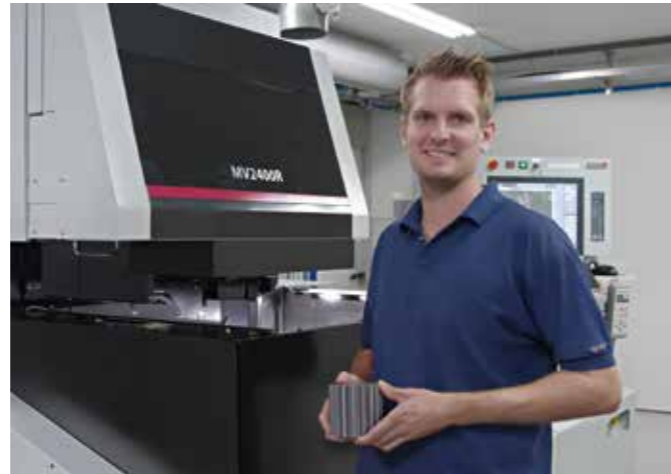
Rudolf Trakies, Olaf Burkhardt and Sebastian Wörle (from the left) are in no doubt about having obtained, in the shape of the MV2400R, the best-possible wire-cut EDM for their precision toolmaking activities.



From metal strip to intricate connectors: progressive tools made of fine sheet metal productively stamp and bend 3-dimensional components ready for assembly.



ple, to the automatic wire threader. The toolmakers in Füssen mainly work with thin wire 0.2 mm and occasionally down to as little as 0.05 mm diameter. This is the only way to cut intricate contours and tiny radii. However, these fine wires have a greater tendency to break. Olaf Burkhardt, programmer and operator of the MV2400R, explains: "The extremely dependable wire threader of the MV2400R is a real godsend. The machine can be relied upon to find the right position in the kerf after wire breakage and safely rethreads the wire without a water jet." The toolmakers at MPE also achieve maximum accuracy in terms of parallel cuts and vertical wire running in tiny inner and outer radii by making use of the functions of the V350 generator with its Precise Finish Circuit at lower cutting speeds. Maximum surface quality up to  $Ra \leq 0.10 \mu\text{m}$  is assured by the proven DFS fine finishing generator.



Sebastian Wörle, programmer and operator of the MV2400R: "Thanks to its mature and comfortable programming and operating functions, the MV2400R can be quickly and easily set up and tooled."

### Comfortable operation, competent service

In ever quicker succession, the toolmakers at MPE Garry have to produce progressive tools for customised connectors at short notice. This is why they attach so much importance to simple operation and programming and high availability of their production equipment. Here, again, the MV2400R scores well. Since the toolmakers were already familiar with the user interface of the old wire-cutting machine from Mitsubishi Electric, it only took them a few days to learn the ropes effectively on the new machine. "What stands out is Mitsubishi Electric's strategy of cautiously modifying the user interfaces despite the introduction of futuristic technology. This makes for a smooth transition. Operators can build on what they know and trust and quickly learn how to make efficient use of the new functions and options," says Burkhardt in praise of the strategy of the AdvancePlus CNC control. In Füssen, the programmers mainly write the CNC programs on the external CAM system (PEPS). Via a server and data lines, these are transferred to the MV2400R, where the operator can make minor adjustments. Burkhardt elucidates: "As far as the technology data are concerned, our employees can resort to their experience. However, the new machine technology often permits significantly better parameters. For these we can resort to Mitsubishi Electric's integrated database. The useful thing is that we can in turn store our individually optimised pa-

rameters in the database." Thanks to this convenient programming and operating strategy, the toolmaking department at MPE Garry was able to work productively at the new MV2400R after only a few days. In the event of uncertainty or the need for support from the machine manufacturer, Mitsubishi Electric's after-sales service is always on hand – service that meets with wholehearted approval. As Trakies confirms, a skilled contact is always available within half an hour during normal business hours. "He competently supplies us all the information we need so that we can get the wire-cutting machine up and running again without delay. And this of course contributes to the high availability of the MV2400R," he adds.

### Cutting efficiently while saving energy

However, the quality and modern technology of the MV2400R are not the only decisive features in its favour. As Trakies reports, similarly crucial are its overall efficiency, profitability and energy consumption. Once again, the current technology from Mitsubishi Electric is awarded top marks by the toolmakers at MPE Garry in Füssen. "Throughout the group, we are committed to reducing energy consumption, upholding energy efficiency and using resources sparingly. And this applies of course not only to the building services and office wing, but also to production," Trakies explains. The



Neat and intuitive, the user interface of the new AdvancePlus CNC control enables skilled operators to work productively after only a few days of training.

MV2400R satisfies all the requirements in exemplary fashion. Compared to the old, proven wire-cutting EDMs, it reduces filter consumption, for example, to about a third or a quarter, on the basis of experience to date in Füssen. As a result of the optimised generator, wire consumption is significantly reduced. Overall, it requires up to 30 per cent less energy than comparable wire-cutting machines. For Trakies, this is a compelling factor: "When we purchased the MV2400R it was also a

question of benefiting from attractive financing terms with the aid of selected subsidies. However, these subsidies are strictly tied to energy savings of at least 25 per cent over the previous production installations. With the MV2400R, we had no trouble negotiating this hurdle."

[www.mpe-connector.de](http://www.mpe-connector.de)

## Company profile

MPE Garry GmbH

### MPE Garry GmbH

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Fax +49 (0) 8362 9156-500  
vk@mpe-connector.de  
www.mpe-connector.de

### Managing Director

Markus Binder, Jörn Bargholz

### Core business

Development and production of progressive tools and connector systems

### Employees

90

### Founded in

1974



MPE Garry GmbH

Founded in **1921** > **129,000** employees

Manufacture of electronic equipment, e.g. EDM systems, laser cutting machines, CNC controls and drives, industrial robots, air conditioners, semiconductor technology and much more besides.

Mitsubishi Electric

# The fascinating world of Mitsubishi Electric.



The robot demonstrations are impressive with their ingenious combination of various media.



Imagine someone cutting a slice out of the Earth's crust and unrolling it before your eyes. Well, precisely this idea has been realised in the new product exhibition "The World of Mitsubishi Electric". The centrepiece of the exhibition shows a cross section through the world and affords profound insight into each of the five presented technology areas. Analog exhibits combined with digital media introduce visitors to the company's technological solutions and versatile products.

Mitsubishi Electric is committed to having a positive impact on society. The employees working here develop, produce and sell technology with the goal of improving people's lives. This is the basic idea communicated by the exhibition as a whole. It shows how Mitsubishi Electric expresses its corporate values and principles in practice and in product development. Five tech-

nology areas are identified: Transportation, Building, Energy, Communication and Automation. For each area, Mitsubishi Electric explains how technological solutions and products change society and the life of each individual for the better. In doing so, Mitsubishi Electric looks ahead and presents strategies enabling the technical and social challenges of tomorrow to be mastered.



*The exhibition - a cross section through the world.*



Analog control elements combined with digital experience

A trilingual exhibition folder (in Japanese, German and English) on “The World of Mitsubishi Electric” is available for each visitor at reception.

#### Transportation: from A to B from A to Z

Human mobility and the transportation of goods are two of the major technological challenges that industry and society are having to face. Dwindling reserves of fossil fuels, global warming, particulate emissions and smog in cities are forcing us to rethink. Mitsubishi Electric offers solutions for today and tomorrow: boosting the efficiency of internal combustion engines and reducing pollution from them as well as strategies and components for electromobility and hybrid vehicles. And when it comes to improving comfort and safety on road and rail, the globally active company is again one

of the front runners: with navigation, information and entertainment systems, sensor equipment, telematics and new operator control concepts. The exhibit on Transportation combines analog control elements with digital experience. Visitors place a car or a train on an interactive touch display (Mitsubishi Electric product) and can then intuitively discover our solutions and innovations for mobility on road and rail.

#### Building: founded on innovation

Due to the increase in the world population and urbanisation, more and more people are having to share less and less space. The consequence is that buildings are getting taller and people spend more time in enclosed spaces. How will it nevertheless be possible to create healthy, near-natural living and working conditions?



Modern building services

And how will people cover the ever greater distances within such buildings? The exhibition supplies answers to the technological challenges of modern building services. And Mitsubishi Electric has its focus not only on the comfort of building occupants, but also on the responsible and sustainable use of resources. The exhibited model of a building graphically displays the tasks that this technology has to perform in buildings: air conditioning and ventilation, lifts, safety/security equipment, information transmission and hygiene. A world first is the aluminium heat exchanger for VRF air conditioning systems that operates up to 47 % more efficiently in cooling mode than conventional products. VRF stands for Variable Refrigerant Flow – as a result, an outdoor unit can cool the air in one room, for example, while serving as a heater in another.



With the tablet computer, the scene comes to life – thanks to augmented reality.

**Communication: global networking**

The Information Age is founded on the swift and reliable transmission of ever greater quantities of data and the success of modern society depends on it. Mitsubishi Electric supplies the components that make this possible: high-frequency semiconductors and optical elements for data superhighways without speed limits as well as satellite systems and components for global communication.

In the Communication area, visitors not only find information on products and solutions. For the cross section of the world is resolved here into the data packets and pixels that communication technology works with. With the innovative Google Tango Tablet, the scene can be brought to life. Augmented reality facilitates an unforgettable experience as well as communicating much detailed information for experts and anyone interested. They can all be here, for example, to witness “live” the launch of a satellite into space.

**Energy: making the most of electricity**

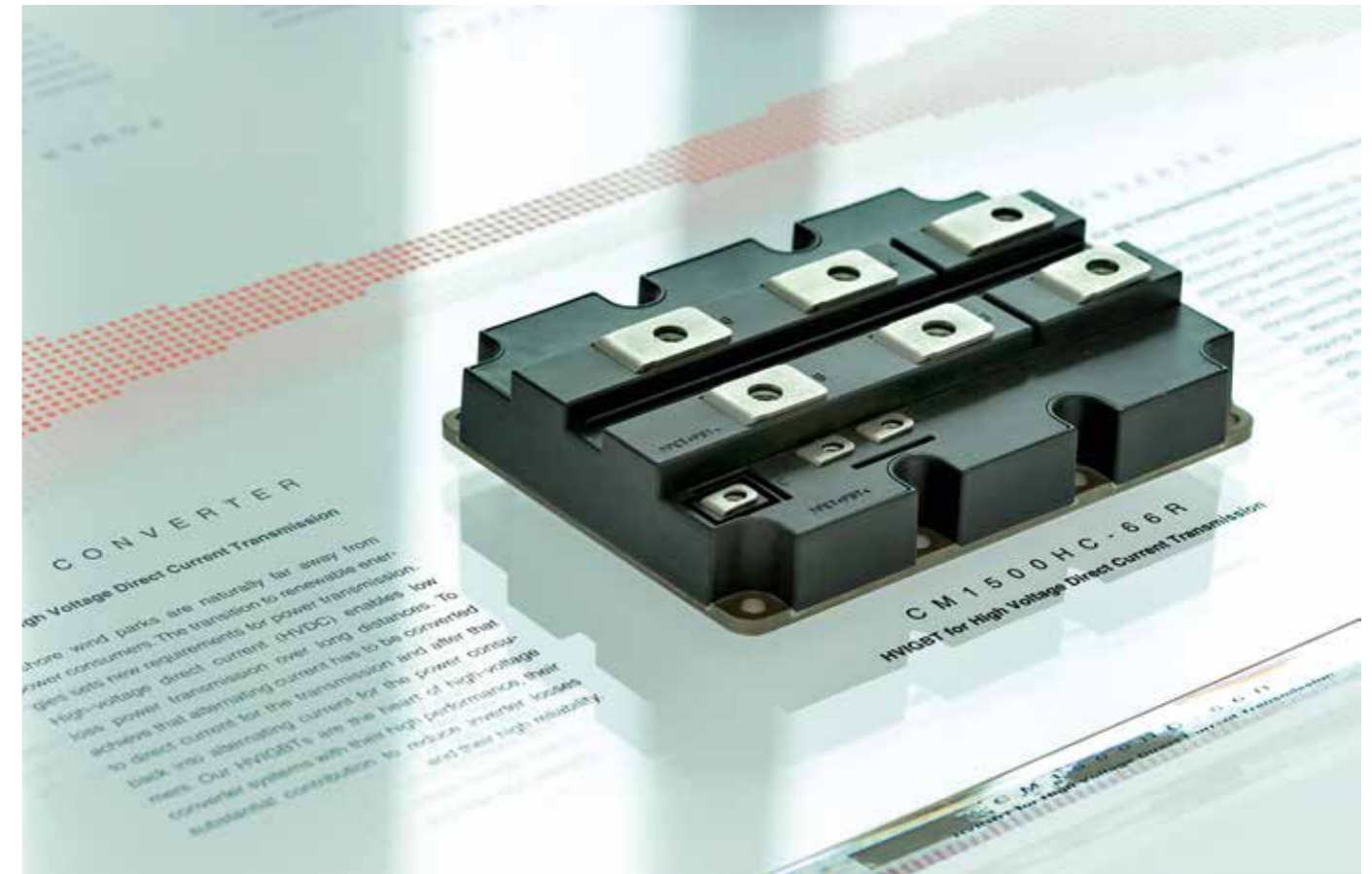
Getting energy fit for the future is one of the biggest

challenges of our time. Because while global demand continues to rise, resources are becoming more and more scarce. At each link in the supply chain, Mitsubishi Electric technology improves efficiency and reduces loss – particularly when renewable energy is integrated. The Energy exhibit reports on the technological challenges posed by the integration of renewable energy sources in our power grids in the course of the energy turnaround and, as an example, shows power semiconductors that transform and stabilise the generated electricity with high efficiency and low loss.

**Automation: intelligence in series**

Teamwork pays off. This applies not only to the people in a company, but also to the machines. With a broad range of mutually adapted and efficiently communicating components for many production and process automation disciplines, higher quality and productivity are brought to the shop floor – saving time, money and energy at the same time. The visually exciting robot installation playfully demonstrates the benefits of automation solutions, with only the company’s own products being used. In addition to the directly visible articulated

Innovative satellite technology from Mitsubishi Electric



Mastering renewable energy

robots and screens, the entire control system and installed servo motors come from Mitsubishi Electric. On the table, further products are exhibited. For each product, brief presentations can be called up at a heavy-duty

Mitsubishi Electric TFT-LCD touchscreen. The focus is on the benefits of these technologies and their visual representation. If required, detailed information can be retrieved at the info terminal in the product area.



“Technology with the goal of improving people’s lives – this is the basic idea communicated graphically and entertainingly by the new exhibition.”  
**Alexandra Blechmann**  
PR Officer



*Detailed information for experts and anyone interested.*



Mitsubishi Electric has officially opened its new EDM Technology Centre in Ratingen with a customer event. The turnout was remarkable.

Mitsubishi Electric

## Big attraction.

Visitors flocked to the official opening.

Big, bright and beautiful – the new Technology Centre in Mitsubishi Electric's newly occupied German headquarters in Ratingen was a magnet for customers. Invitations had been sent out for the official opening of the new facilities on 21 and 22 April. "We received some 130 registrations, and in the end about 200 customers came," says a gratified Sales Manager Hans-

Jürgen Pelzers in his reaction to the huge turnout. But it was not only the large number of visitors that gave cause for satisfaction. With their thoroughly positive comments, the guests left Mitsubishi Electric in no doubt about their appreciation of the new Technology Centre. Like the Training Centre, the Technology Centre is accommodated on the ground floor of the German

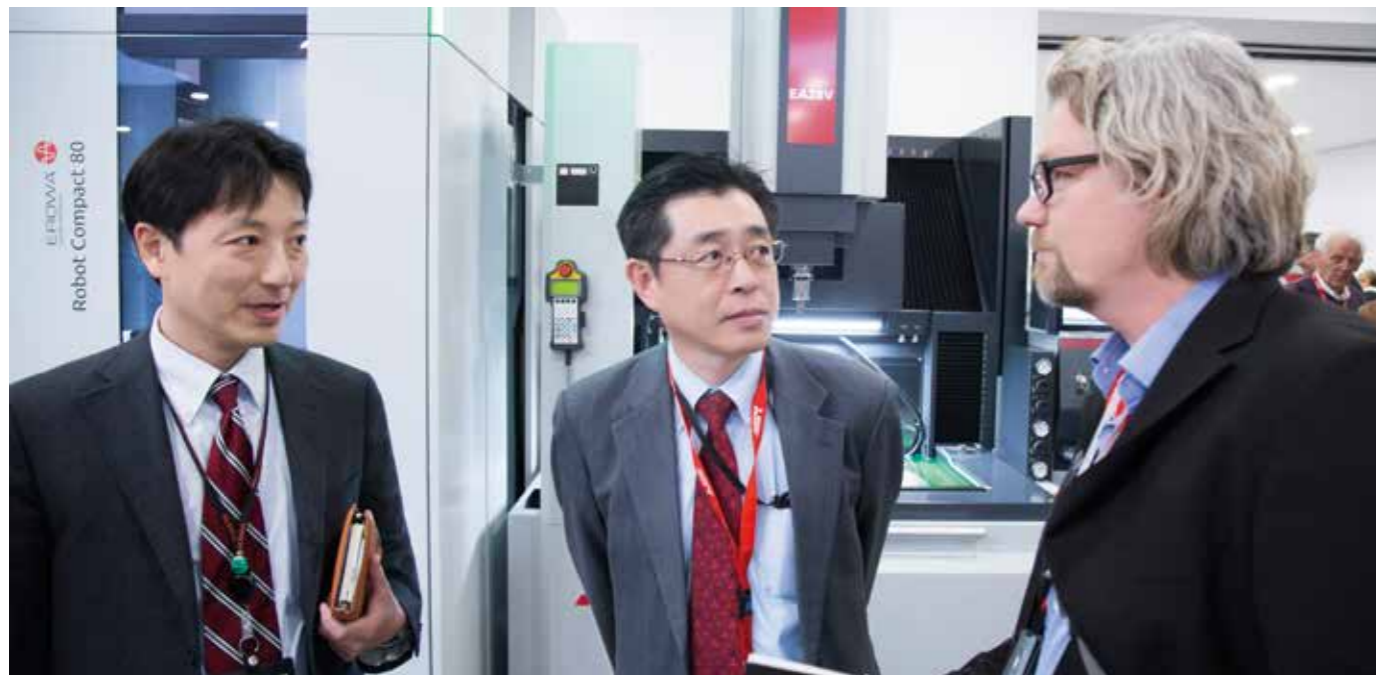
headquarters in the east of Ratingen, the construction of which was completed last autumn – well served by the A3 motorway and only 10 minutes away from Düsseldorf Airport. “The whole building is a statement, lending expression to our strength and innovative powers as well as our goal to grow further in Germany,” commented Akihiro Kawata, Senior Manager Industrial Automation Machinery at Mitsubishi Electric, who had travelled to the event from Tokyo. In the spacious foyer of the new building, high-tech Mitsubishi Electric solutions and products can be seen, such as industrial robots and intelligent technology for tomorrow’s energy infrastructure. In addition, by using the almost man-high and four metre wide touchscreen, guests were also able to gather information on the Group’s product range, and, importantly, a large part of the in some cases futuristic-looking building services come from the company’s own product portfolio.

#### Exceptionally broad product range on show

As hoped, visitors were impressed by the new building and its contents. “It looks prestigious and reflects the company’s standing. We feel very much at home,” said Dirk Stein and Jürgen Compans of Günther

Spelsberg KG in Schalksmühle. But even if the new building was a big talking point among customers, the focus of attention was nevertheless on the exhibited machine park in the Technology Centre. And here again, the opinions of guests left nothing to be desired. “It’s certainly not commonplace to see such a big selection exhibited in one place. Mitsubishi is clearly a step ahead of the competition in this area as well,” was the personal verdict of Bernd Brandes, Managing Director of WTL Erosionstechnik in Lohfelden near Kassel. It was all on show – everything from start-hole drilling machines and wire-cutting systems of the MV and MP Series and the MX600 with an oil tank through to the die-sinking machines of the EA-S and EA-V Series. Automation was also demonstrated in the shape of an EROWA robot on a die-sinking system. In addition to the Technology Centre, the Training Centre has undergone an upgrade at the new site. Wire-cutting and die-sinking systems and control simulators are all kept here to make customer training even more professional and authentic. Training, seminar and conference rooms are available with advanced equipment throughout the new building. All areas are now clustered together and the walking distances for customers

Guest from the Far East: Akihiro Kawata (centre), Senior Manager Industrial Automation Machinery, travelled from Mitsubishi Electric’s headquarters in Tokyo to the official opening of the Technology Centre in Ratingen.



As well as talking shop, there was also time for a cappuccino or a freshly made waffle at the Fahrbarista mobile coffee stand.

are short. “It is an extremely presentable Technology Centre,” said Uwe Birke from Hasco Hasenclever in Lüdenschied, putting it in a nutshell. On both days, service and sales staff of Mitsubishi Electric showed visitors around the facilities and explained the features of the current machines such as the maintenance-free Tubular Shaft Motor, the ingenious wire threader and the nPV generator for nano-precision machining results. “It is a fine opportunity to find out about new developments and talk shop with the Mitsubishi experts,” said Klaus Daniels of Sieber Forming Solutions.

#### Praise for excellent after-sales service

In addition to the general interest in the Technology Centre and machines, by no means few customers came along with definite purchasing intentions. “We always want top quality and therefore replace our machines every five to six years,” reported Marcus Herse of Huf Tools in Velbert. The next wave of replacements is fast approaching, so the inauguration of the new Technology Centre was a welcome opportunity for getting to know the latest machines. Michael Nickel and Patrick Stüven from AES Maschinenbau in Bielefeld have made all the necessary arrangements in the last few months. “The contracts are ready for signing,” said the two toolmakers who will take possession of a new MV2400R wire-cutting machine in May. Alongside the

signing of contracts and technical discussions, there was also time for a coffee specialty from the mobile coffee stand and for delicious finger food. In the relaxed atmosphere, customers again expressed their appreciation of the excellent after-sales service of the Mitsubishi Electric team. “Their support is unbeatable,” said Alex Knelsen of Buschhoff Stanztechnik in Cologne, outlining his experience. “The machines are supposed



Roughly 200 customers came on the two days of the event – many more than expected.



Catching up on the latest developments, passing on tips and meeting old acquaintances – there was a lively exchange of information between customers and employees on the two days of the opening.

to run 24 hours a day if need be. So in an emergency, I don't want to be a number placed on hold, but I want to talk to an expert without delay. Mitsubishi makes it possible. On top of this, the service technicians offer in some cases very pragmatic solutions that are an immediate help," Knelsen explained. Klaus-Dieter Lohse of automotive component supplier ZF TRW summed up the exemplary service to customers in the following words: "Mitsubishi sells its first machine through sales and the second on the strength of its service."

**Strong partner**

Sometimes, it's even more – as in the case of Dieter Ott of automotive component supplier Frimo. "We've

had good relations with Mitsubishi for many years. At the moment, we've got two machines in a use, and the third is in the pipeline." Aided by the service team, Ott examined in detail his machine of choice, an MV2400R. Someone else who came along with definite plans was Mirko Trentzsch, Managing Director of Werkzeugbau Trentzsch in Radeburg. "Our order situation is very good. We've got two wire-cutting EDMs in operation and could now do with a die-sinker so we can also machine exotic materials." He was accompanied by Siegfried Hillig, the founder of Werkzeugbau Trentzsch. He was in fact one of the very first toolmakers to work with a wire-cutting machine. "We bought our first machine back in 1971," said Hillig recalling his time in an



“It's certainly not commonplace to see such a big selection exhibited in one place. Mitsubishi is clearly a step ahead of the competition in this area as well.

**Bernd Brandes**  
Managing Director  
WTL Erosionstechnik  
in Lohfelden near Kassel



Die sinking, wire cutting, automation solutions and control simulators – the new Technology Centre covers an extremely wide range.

East German combine, adding with a laugh: "That one worked with punched cards." After reunification, he founded his own firm. Hillig has now left the firm, but is

still on hand as a consultant. His decades of experience of markets, machines and manpower are invaluable. What did he think about the new Technology Centre? "It's become very obvious to me that Mitsubishi is still very forward-looking," said Hillig. The prospects of having long-term support from a strong partner he finds very reassuring – and he's not alone.



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

**Green headquarters**

The new German headquarters of Mitsubishi Electric in Ratingen is geared to eco-friendliness and energy efficiency from top to bottom. Air conditioning, heating, lighting and water – all energy flows and consumption have been optimised. To this end, Mitsubishi Electric's Factory Automation Division has equipped the new building with numerous intelligent components and products. Special software

(Mitsubishi Adroit Process Suite) optimises and automates the interplay of all the elements and centralises the control of the overall building services. For its efforts, Mitsubishi Electric has received LEED (Leadership in Energy and Environmental Design) Platinum status – the highest award that can be conferred for resource-conserving and sustainable construction.



*A strong partner in the long term.*



Mitsubishi Electric

# Service & support – holiday for your EDM.

Your holiday is booked, and the sun, the beach and relaxation are within reach. Time at last to unwind. Experienced EDM specialists who don't want to plunge straight back into stress on their return from their well-earned break spare their machines a thought before they leave. By running through this brief checklist, you can ensure your machine gets off to a trouble-free start after a shutdown.

### Before your holiday

- Check the batteries in the generator cabinet and axis amplifiers and order replacement batteries if necessary
- Before switching off/shutting down, run the high flushing for an hour
- Thoroughly clean the workspace
- Remove the diamond guides and clean
- Clean the conductance sensor and water level sensor (important: only use alcohol and a brush!)
- Check wear parts such as bearings and rollers, and order new ones if worn down
- Check and clean filters and filter mats and replace if necessary

### Avoidable overheating

Maintenance should always include regular air filter cleaning and replacement. Filters protect the electronics and cooler from unwanted contamination and ensure that the components always stay cool when the going gets hot. Original filters are precisely attuned to the

### After your holiday

- Install new batteries if necessary
- Switch on the machine
- Install cleaned diamond guides
- Fit wear parts
- Give the machine a high flushing for about 15 minutes
- Align the wire and run the "Taper Z program"
- Check wire threading
- Start machining a test workpiece

needs of the machine and provide the necessary protection to keep the machine up and running. False economies by installing no-name filters have been known to cause cooler failure. Avoidable repair and downtime costs on the four-digit euro scale are the consequences.

### Ordered by 3.30 pm – delivered the next day

When machines fail and replacement parts are needed for repairs, time is of the essence, because an unscheduled production stoppage means stress and expense. Mitsubishi Electric's after-sales service provides express

parts delivery. All parts orders received via the service hotline or by email by 3.30 pm are processed the same day and sent on their way. And, if desired, express-delivered the next day as well.



Service Manager Martin Kuptz (centre) and the two "novices", Christian Schneider (left) and Benjamin Werner (right)

### The service team

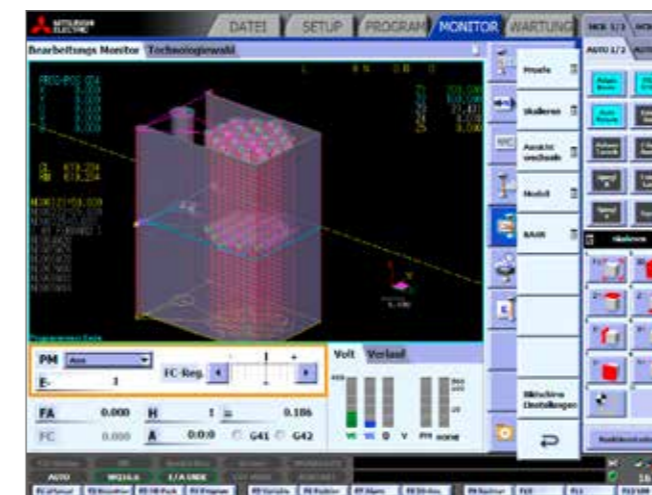
Martin Kuptz has been working for the service department for 18 years. As the Group Manager Wire-Cutting and Die-Sinking Machine Service, he is in charge of the assignments of technicians on site and for service hotline staff all over Europe. He is responsible for incoming orders and parts shipment, the organisation and planning of technician assignments and for the associated accounting. The service team supports customers locally with some 1,600 assignments. These are joined by some 20,000 inquiries by phone and email to the hotline, which are all handled by skilled staff. Via the hotline, Kuptz's team can swiftly settle a good 85–90 % of all inquiries within an hour.

### Maximum start-hole efficiency

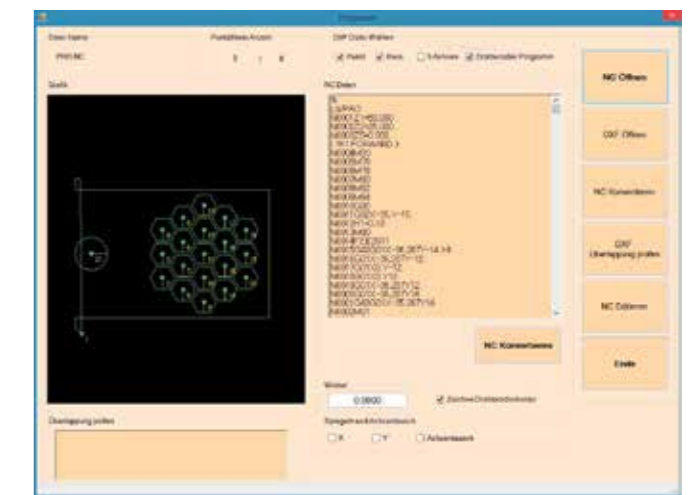
With just a few mouse clicks, it is possible to generate the exact positions of the start holes from the wire-cutting program. The process offers a rapid, visual control

of the positions and error-free transmission of all start-hole data. An additional postprocessor is not necessary for the start-hole drilling machine. This how it works:

1. Switch on the start-hole drilling machine
2. Select the "Program" menu
3. Select the submenu "Indicate Wire Cutting Contour"



4. The drilling positions and wire contour are indicated
5. Check the start holes
6. Start the program



Any questions? If so, contact us at [service.edm.de@meg.mee.com](mailto:service.edm.de@meg.mee.com)



Service – ready to help you.





Over a series of decades, Japan has undergone remarkable metamorphosis. Once a cultural and social backwater, the country is today a force to be reckoned with in the global mainstream. Its economic successes in particular are considerable. Japan is now the third-strongest economic power after the USA and the EU. The country owes this to its flourishing export business and highly developed technologies.

## Japan Special

# Mysterious Japan – on its way into the future.

In sectors like automotive engineering, machine manufacture and electronics, Japanese companies have become renowned for unsurpassed quality. Such a feat is all the more astonishing when one considers that

the Pacific nation was totally on its knees at the end of World War II. Its demise started with the Japanese armed forces' attack on Pearl Harbour. We all know what then ensued: in August 1945, the Americans bombed Hiroshima and

Nagasaki so that the Japanese had no alternative but to capitulate.

### The rise after the fall

It was now a question of rebuilding the country in ruins. In the initial post-war years, Japan was still

occupied by the Americans who naturally wanted at all costs to prevent Japan from re-acquiring its military strength. Japan ceased to manufacture armaments and many antiquated institutions were dissolved. All available funds went into reconstruction and industry. At the same time, the political sphere embraced democracy. Japan got slowly back onto its feet.

When the Korean War broke out in 1950, Japan aligned itself with its former enemy, the USA. From this point on, there was no stopping Japan's recovery. It experienced a textbook example of an Economic Miracle. What started in the Fifties, continued over the following three decades. Economic growth was particularly high in the Sixties at an av-

erage of 10 per cent. But the surge of success continued thereafter. Growth was so strong, that Japan overtook other industrialised nations, including Germany.

In the Nineties this was halted. A speculation bubble that started growing in about 1985 finally burst at the beginning of the Nineties. This recession was a bitter economic setback. But even this didn't hold Japan back in the long term. A country that had experienced such a rapid rise from nothing can also survive a financial crisis, however serious. Japan worked consistently at improving its economic situation and gradually recovered. Japan today ranks among the world's biggest exporting nations. So it looks as if Japan

could achieve all the goals that it sets itself. But what is the secret of its success?

#### **Achieving goals through perseverance**

A number of different factors have undoubtedly contributed to Japan's success story. The Japanese mentality and attitude to work have certainly played their part. The Japanese are generally considered hard-working, tenacious and ambitious. They are known to be industrious and extraordinarily disciplined. When they set a goal, they do not let up until they have achieved it. A great deal is possible with targeted planning and wholehearted effort. In this way various well-known Japanese companies have become market leaders in their sectors.

The highway in Tokyo, Japan's biggest city, at night.



The heart of the Tokyo-Yokohama region is inhabited by more than 37 million people, making it the world's biggest conurbation.

So there's plenty we can learn from the Japanese. On the way to success, it is particularly important to act with deliberation and always keep one's eyes set on one's target. A company that wants to stay on the market in the long term and maximise its profits must not stop investing in the future and in progress. There is always room for improvement. Japanese companies are aware of this and all their employees constantly endeavour to optimise their processes and products. Perhaps we should follow their example and be more open to change. Often it is utterly simple steps that achieve great things: new software, an en-

ergy-conserving measure or a more efficient piece of equipment.

Not every innovation works wonders immediately. But that shouldn't be the motivation for introducing them. It is a question of working persistently towards success. The Japanese have never let themselves be put down, have recovered from their comprehensive defeat and have since become stronger than ever. They have seized all opportunities that have come their way. This principle is applicable on the small scale to any business. There are always ways and means of achieving a goal – be it a question of

cutting costs, accelerating production, attracting new customers or achieving greater precision. The achievement of future goals is possible with changes, improvements and investments that are initiated today.

Founded in  
**1976**

**> 300**  
employees

Punched and assembly parts for the automotive sector, household goods industry and medical technology



Loch's EDM team is always true to its slogan "Always a cut above the rest!"

Wolfgang Loch GmbH & Co. KG

# Three in one go.

High precision from the gemstone town.

Good planning is everything – that at least was the philosophy of the EDM team of Wolfgang Loch's business in Idar-Oberstein when it commissioned several new wire-cutting machines of the MV Series in one go last summer. Three of the six

machines were replaced within a week. By the weekend, processes were running smoothly and the first workpieces were being clamped on the new machines. "When you replace 50 per cent of a certain type of machine, everything has

to be perfectly organised," says a matter-of-fact Heiko Konrath, head of EDM and responsible for process planning at Loch, who is also keen to praise the manufacturer's engagement: "We had three service technicians from Mitsubishi working here



Wolfgang Loch GmbH & Co. KG

*Production to meet specific demand.*

so that everything really did go as planned.”

Thanks to lean management successfully introduced in 2009, good organisation and streamlined production processes have meanwhile become second nature to employees. “We hardly stock any spare parts or even finished products,” Marius Loch explains, the business’s Sales Manager. “As a component supplier to the automotive industry, we are used to supplying just in time. This is also mirrored by our internal processes, which we have managed to radically accelerate. If, for example, a plate in a tool ruptures, it is immediately replaced in next to no time by the firm’s own toolmaking department.” This is aided by the continuous data flow that starts in tool design and even per its modifications of the on-going process at short notice with the aid

of the CAM system. The strategy has long paid off. Not only have processes and working methods been optimised, but the engagement of the company and particularly of the workforce has been commended with the Lean & Green Management Award for SMEs from Growth Consulting.

#### 1000 tonnes for precision parts

The dimensions of the required tools are enormous: “Our automatic punching presses have a pressing force of up to 1000 tonnes, and the machined progressive and transfer tools can be up to 4.6 metres long,” Konrath explains. So that replacement parts can be produced quickly, the company takes a somewhat unusual approach. The tool parts are made straight out of hardened material. For this, it stocks blanks of twelve different material grades in thicknesses of 3 to 150 mm.



Heiko Fuchs (left) and Marius Loch scrutinising a workpiece.

#### Latest technologies for rapid deliveries

Despite the firm’s streamlined organisation, no two days are ever the same. Each morning, the constantly changing jobs are discussed by the team – which is not surprising in view of a product portfolio that now covers several thousands of pressed and assembly parts. The product range extends from valves for pressure cookers for the household goods industry to safety-relevant parts, such as components for airbags for the automotive industry and medical technology. Since its establishment in 1976, the company has evolved into a globally operating enterprise with over 300 employees. Konrath sees one of the reasons for his firm’s success in the fact that it supplies everything from a single source and consistently invests in the latest production technologies. Only recently, it commissioned a production configuration consisting of a 200-tonne press and a stamping and bending machine. “Only by constantly developing – be it in technology or the further training of our staff – are we able to supply products of superlative quality and above all keep to deadlines. And these are getting tighter,” Konrath confirms.

Stoppages of the firm’s own punching machine are not therefore an option. “When we urgently need a

tool, we require machines that run quickly and reliably. Sometimes, it is genuinely a matter of a couple of hours when, for instance, parts still have to be milled the next day because we’ll otherwise miss the slot,” Konrath elucidates.

Mitsubishi Electric wire-cut EDMs have been part of the machine park since the mid-Eighties. “The first machines still needed manual threading,” Konrath recalls. Today, five EDMs from Mitsubishi Electric (three MV2400Rs, an FA20S and an FA40V) are in operation almost around the clock. The three new machines have a high workload and have already clocked up a good

4700 working hours. Or, expressed in other words: on average, each machine processes three to five workpieces per day.

#### Process optimisation

For Heiko Fuchs, another member of the EDM team, a number of factors contribute to trouble-free production. First and foremost, there’s the new wire threader of the MV Series. “If it fails to thread, something has to be seriously wrong. No competition machine has such a good threader,” says Fuchs, still impressed. “I originally thought that the technology was something that worked in the test lab, but the threader is still working perfectly

after 300 days in service – even rethreading at the wire breakage point, with or without a water jet.” While machines used to occasionally break down overnight, the failure rate today is practically zero.

He also believes that the MV Series offers abundant opportunities for refining the machining process. The Power Master tool running in the background monitors the cutting process and takes remedial action when wire breakage threatens or the contours of a corner are difficult to cut. On other machines, the operator himself has to intervene to reduce speed. “The Mitsubishi machine with the Power Master does



Two of the three machines of the MV Series are used almost exclusively for the machining of replacement parts for the firm’s own toolmaking activities – this is the only way to comply with the extremely short production times demanded.

Several thousands of pressed and assembly parts.





When machining workpieces, every hour sometimes counts – only with advanced production technologies is it possible to conform to the customer's time frame.



These laterally lowered contour-cutting punches are destined for the automotive industry.

this all by itself," says Fuchs reporting from experience.

Compared to the predecessor machines, maintenance costs have also shrunk to a minimum and are basically confined to annual servicing. The team as a whole is appreciative of the machines' easy access and the simplicity of replacing the wire. "We also attached great importance to repeat accuracy," Konrath adds. Konrath's and Fuchs's verdict is therefore unequivocal: "The

Mitsubishi machines are simply unbeatable when you consider the combination of precision and reliability."

In fact, the Mitsubishi Electric machines are not alone in contributing to precision machining, for investments are currently being made in air-conditioning for the EDM room so that the precision and availability of the machines are assured. So that the climate within the EDM team is also congenial, everyone

pulls his weight, particularly where urgent jobs are concerned. "Each of us is capable of handling everything from programming through to machining. When it comes to complex jobs, our many years of experience and team spirit can make all the difference," says Konrath summing up.

[www.loch.de](http://www.loch.de)

### Lean management

The lean management strategy covers all methods, approaches and tools that aim to establish process-oriented business management with maximum efficiency and clearly defined processes and procedures. Responsibilities and communication paths are mutually coordinated as efficiently as possible.

Characteristic of lean management are its basic principles of decentralisation and synchronisation. The two most important aspects of the lean management approach are its customer orientation and reducing costs. These focuses can be applied to both intra- and inter-company processes and structures.

## Company profile

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 Stefan Glauner, Marius Loch,  
 Ralf Mildenerger

**Core business**  
 Punched and assembly parts for the automotive sector, household goods industry and medical technology

**Employees**  
 > 300

**Founded in**  
 1976

## Three questions to Heiko Konrath and Heiko Fuchs



**Heiko Konrath**  
 Head of EDM and  
 Process Planning



**Heiko Fuchs**  
 EDM

*Mr Konrath, what advice would give to anyone buying an EDM system?*

As far as our situation is concerned, workpieces aren't getting any smaller, so it's important not to buy an undersized EDM system.

*Mr Fuchs, why do you still find EDM so exciting?*

Even after 17 years, there are still situations where I'm certain that everything's running smoothly, and then something changes. Sometimes it's the composition of a material that

changes, sometimes the requirements relating to the workpiece. But that's what makes it interesting – in EDM you learn something new every day.

*Mr Fuchs, what's the most important attribute of an EDM system operator?*

Steel is just as alive as wood – be it due to microscopic changes during hardening or the introduction of different material combinations. This also has its effects on wire-cutting – nothing can replace a feel for the material.



Wolfgang Loch GmbH & Co. KG

*Machines that operate reliably and quickly.*

# User

## horoscope.



Capricorn

21 December–20 January

You're as fit as a fiddle and you feel more alive than you've felt in a long time. At work you whiz through your workpieces like a demon and after work you're still bursting with vigour. You've got no intention of slowing down – after all, you're not showing any signs of wear. This earns you a lot of admiration. Keep up the good work!



Aquarius

21 January–19 February

The warm temperatures and longer daylight hours replenish your energy reserves. This is the best time for thorough tidying-up and cleaning work. But don't confine your cleaning to your home, as your EDM system is bound to welcome thorough treatment with the VP143 cleaner and will run even better afterwards.



Pisces

20 February–20 March

Somehow your mind's elsewhere at the moment. In a state of confusion you wander through your firm's machine park like a fish out of water. You need to pull yourself together right now. Find out what's bugging you and do something about it. Then you can get back to concentrating on your wire-cutting jobs.



Cancer

22 June–22 July

A possible source of finance suddenly reveals itself. A little injection of capital would really come in handy right now. Whether the investment actually pays off in the long term depends on your skill. Take a strategic approach and activate your inner Power Master 3D. With an intelligent analysis, you've got good chances of achieving your goal.



Leo

23 July–23 August

You love summer. And this explains why you're most productive at this time of year. You produce immaculate EDM results. Your surface quality is unbeatable, your output couldn't be higher and you manage all this at a rate that matches the cutting speed of an MV1200S. What a performance!



Virgo

24 August–23 September

You know all about complicated workpieces. Complicated people, on the other hand, are always a challenge for you. And there's one person who really pushes you to your limits. Even if it's difficult, don't give up – be patient and reveal your compassionate nature. This person is worth it!



Aries

21 March–20 April

Watch out! You're suddenly falling in love in a competitor's highly advanced wire-cut EDM. This is bound to cause annoyance. Don't hurl yourself into this adventure – your business needs you. But maybe you can persuade your boss to invest in a new machine. Get your workmates to back you up.



Taurus

21 April–21 May

When your wire-cutting machine starts playing up, attend to the problem without delay. Doing the required maintenance now will save you a lot of downstream bother. And much the same applies to your private life. Relationships and friendships also need care. Tackle the problems as they arise rather than ignoring them and letting them get worse.



Gemini

22 May–21 June

Don't mistake your body for a wire-cutting machine of the FA-S Advance Series. You don't have to constantly work at top speed. You're inclined to have the same high expectations of yourself as of your machine. But this puts you under unnecessary pressure. Take your foot off the accelerator a little more often – your health is sure to benefit.



Libra

24 September–23 October

The favourable constellations of the stars in the coming weeks ensure that you get almost everything right. And you don't even have to make much effort. Rely entirely on your instinct and proceed just as intuitively as you do when operating the Advance CNC control. If only life were always this simple!



Scorpio

24 October–22 November

As a Scorpio, you're passionate and ambitious. Jupiter amplifies these attributes additionally. But make sure you don't burn up your energy prematurely. Otherwise you'll produce precision-eroded workpieces with magnificently smooth surfaces, but you'll collapse in a heap when you've finished. Save a little of your vitality for your leisure time.



Sagittarius

23 November–21 December

If you were an MV1200S, a fault message would flash up on your monitor. Something's preventing you from working as efficiently as usual. But what? Is it a problem at home? Or something at work? A comprehensive analysis will reveal the problem so that you can get back to working trouble-free in every respect.



The Art of *Economy*



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