

# deco magazine

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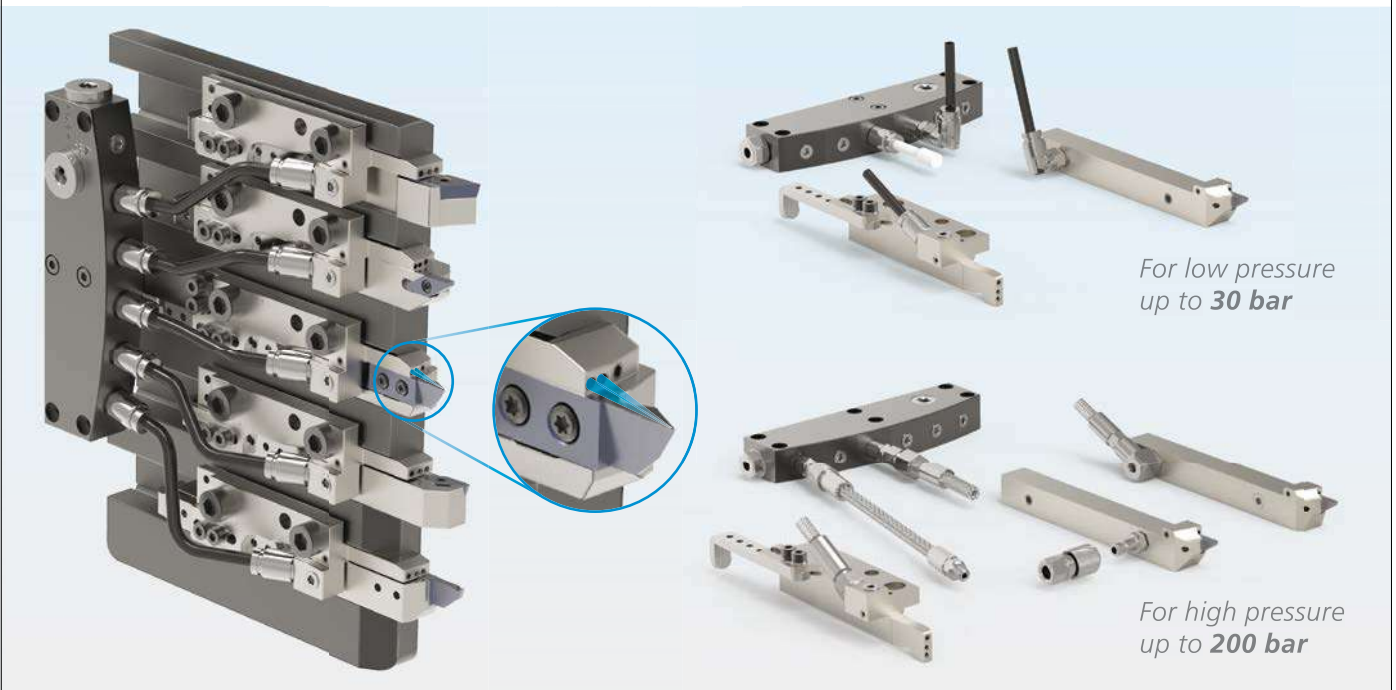
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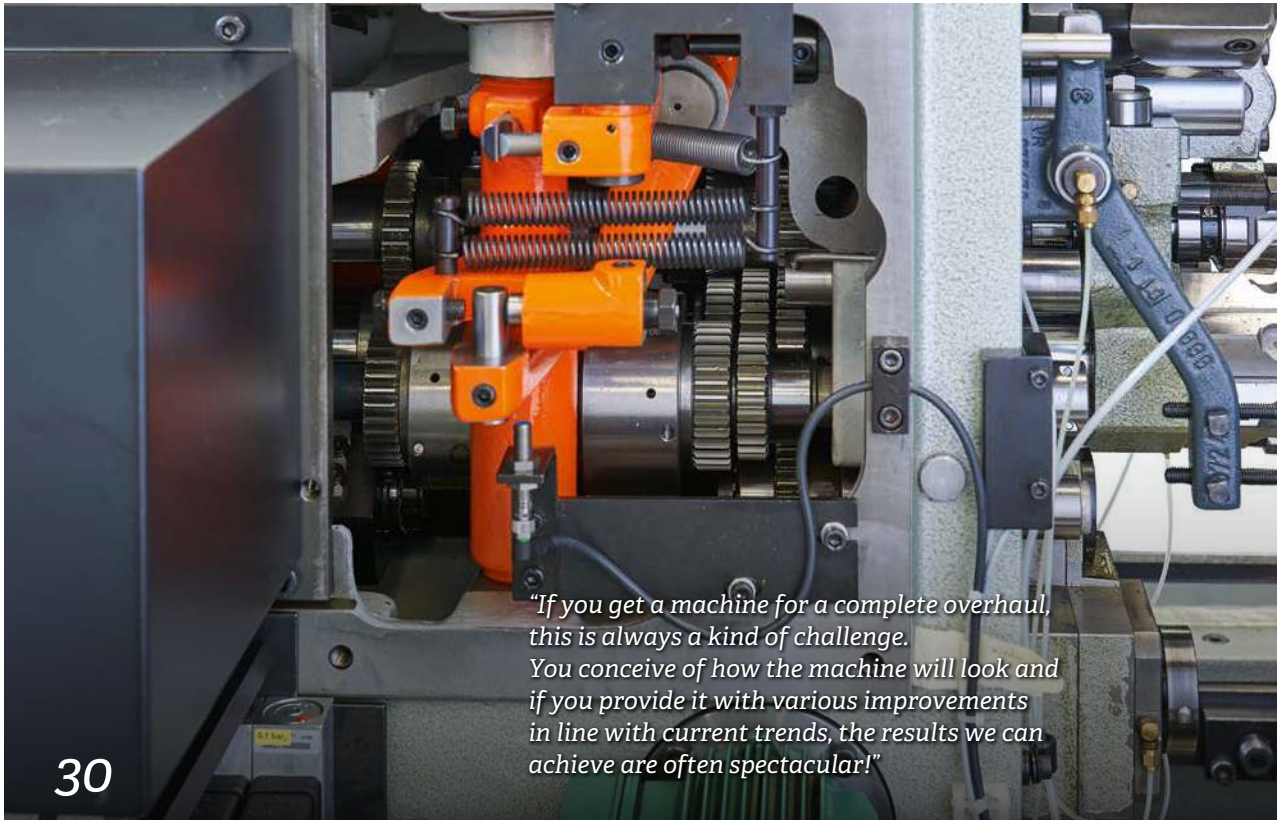


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*"If you get a machine for a complete overhaul, this is always a kind of challenge. You conceive of how the machine will look and if you provide it with various improvements in line with current trends, the results we can achieve are often spectacular!"*

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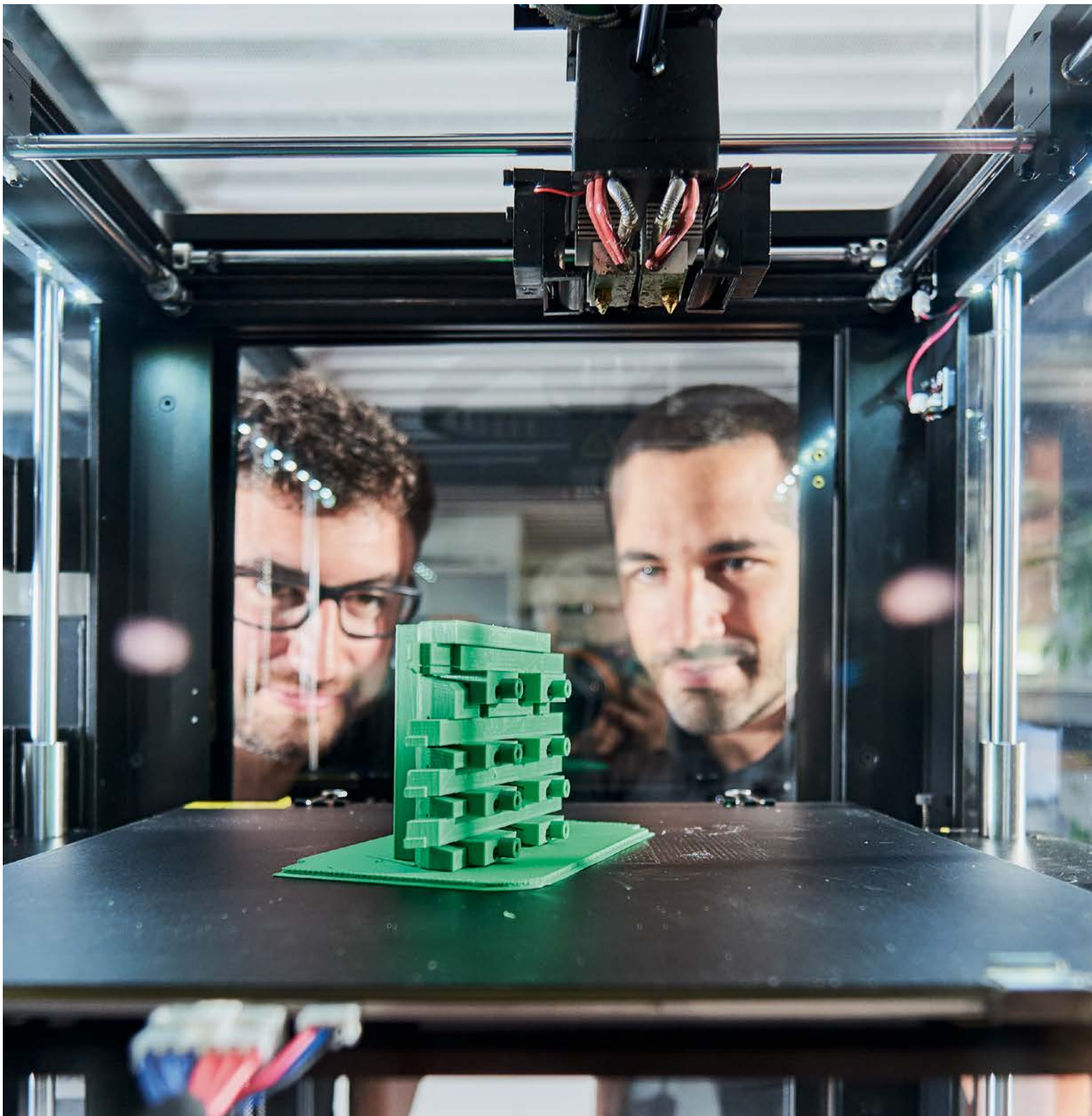
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*“The Moutier site is drawing on a great and long legacy of innovation and creativity and its employees have always benefitted from the environment that gave birth to the sliding-headstock automatic lathe”*

Ph. D. Pierre Voumard Head of Research & Development Tornos

# Assisting our customers with intelligence

Ph. D. Pierre Voumard Head of Research & Development Tornos

*Day by day, the Tornos development team is striving to tackle the challenges it is confronted with during the development of new products. We achieve this by using the full imagination and experience of the engineers involved. Each generation of new products brings along a whole bunch of innovations aiming at increasing performance. The team's work is based on a multi-disciplinary approach, and with their expertise, our team members must cover a vast range of technical fields.*

*Certainly, mechanics has always played a vital role for the design of machinery, but the expertise in system simulation exceeds the traditional field of static and dynamic structural analysis to include especially thermal phenomena and to tackle mechatronics systems and soon even digital twins. The organization relies on specialists who, in their own area of competence can contribute to the development task while supporting project managers in selecting the best solutions for the issue at hand. In this way, the members of the multi-disciplinary team are collaborating closely to develop new Swiss-type lathes and real machining centers, since, after all, multispindle lathes are nothing less than that. Highly specific in-depth expertise is adopted for the key components of Swiss-type lathes, especially as regards their spindle and counter-spindle (headstock/tailstock).*

*For many years now, the products developed by the Tornos Research & Development (R&D) department have also been comprising software solutions. This trend is taking on new dimensions as we embrace Industry 4.0. Against this backdrop, as a complement*

*for the tools supporting machine programming, a whole range of modules exploiting the boundless possibilities of connectivity is constantly increasing. Here as well, the teams will constantly gain new skills especially in terms of data processing and analysis while drawing on tools that have been developed for Big Data and Machine Learning.*

*Even if the main task of the R&D department is to develop new products, the R&D engineers will also use their expertise to adjust such new, often very specific products to the particular demands of our customers. A small special-purpose entity can respond very quickly to a broad range of specific requirements. The latter may be about the integration of machining processes, the addition of fully automated logistics solutions or the optimization of the machine interfaces based on the existing workshop infrastructure.*

*Even if such activities are often hard to perceive for obvious reasons of confidentiality of the developments (some of which have patents filed), a small group is relentlessly working on the development of highly innovative solutions. Within this kernel of innovation, re-assessment is a daily routine, and nothing is taken for granted. This state of mind of continuously calling into question everything that has already been achieved, is the fuel for new ideas that sometimes helps Tornos to break with today's industrial habits.*

*The Moutier site is drawing on a great and long legacy of innovation and creativity and its employees have always benefitted from the environment that*

*gave birth to the sliding-headstock automatic lathe. Our Asian production sites are increasingly contributing to product development. In addition, they take on the maintenance of the machines produced by them. In a fast moving industry, the network concept is essential and our advances are expedited through numerous collaborations with academic and industrial partners. The Tornos Research Center, that fosters the permanent collaboration with regional technical institutes of higher education, is a perfect example of such openness.*

*More than ever, the R&D activities in the machine tool business provide inspiring challenges for our engineers and make them outdo themselves in order to offer products that were inconceivable yesterday.*

*I invite you to discover some of the results of our extensive R&D endeavors in this new edition of our decomagazine.*



## Tungsten carbide and diamond precision tools

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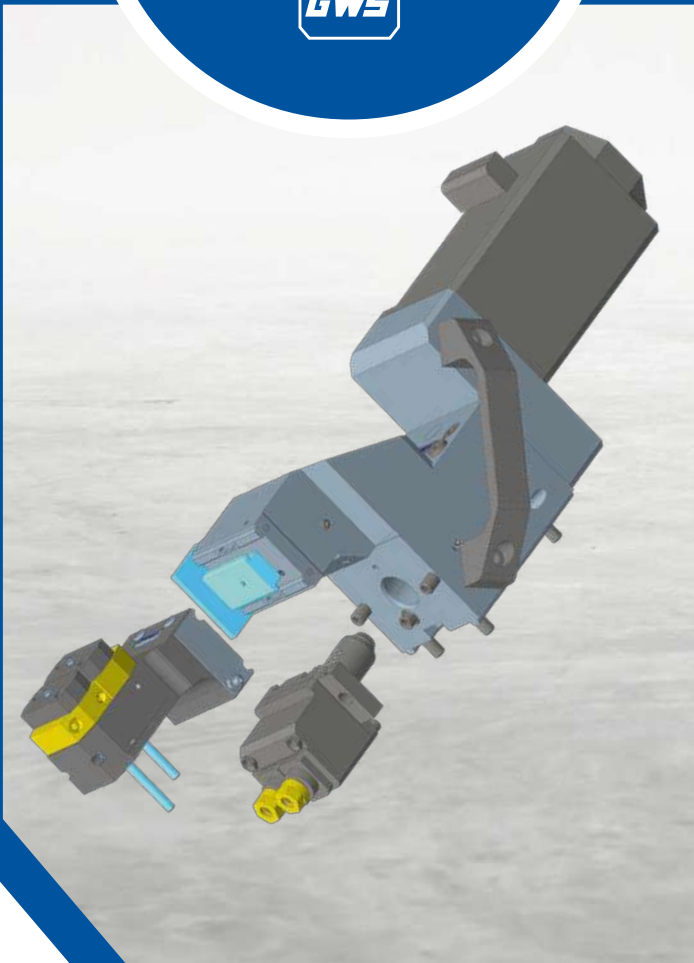
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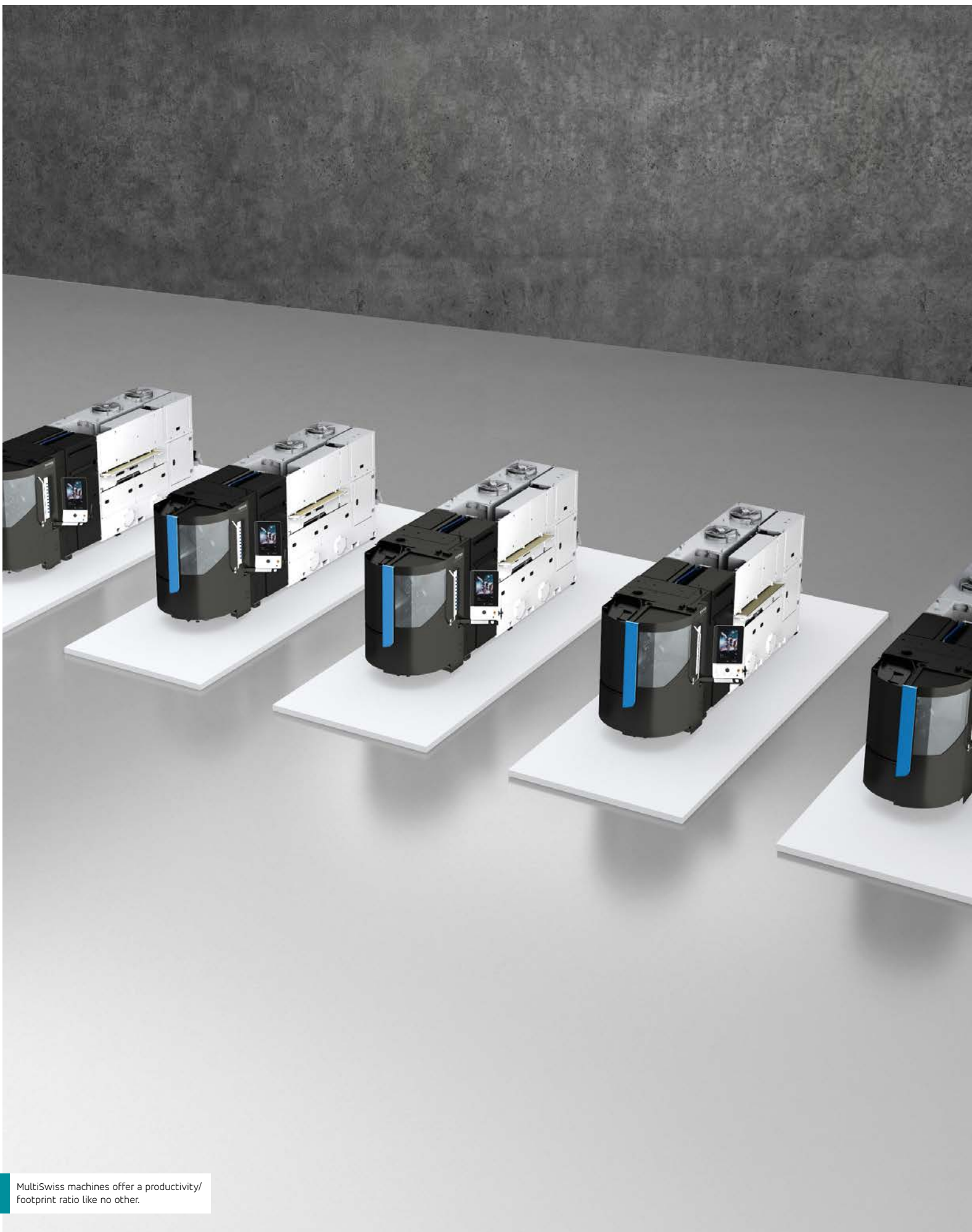
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MultiSwiss machines offer a productivity/  
footprint ratio like no other.



# Production of dental implants *on the MultiSwiss*

Tornos MultiSwiss machines are simple yet highly productive machines that have certainly established themselves in various industry sectors.

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**Tornos SA**  
Industrielle 111  
CH-2740 Moutier  
Switzerland  
Tel. +41 32 494 44 44  
contact@tornos.com  
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*The machines are largely used in the automobile industry to produce a lot of injector parts, turbo components and parts for other secondary electrical systems. These machines also excel in other markets such as the electronics industry, where they are working wonders in the production of connectors. They are also extensively used in the watchmaking sector, where the additional gear cutting function enables them to machine barrel drums in record time. Another application that points out the outstanding features of the MultiSwiss machines is the production of crowns for luxury watches. Today, it's the dental industry that benefits from the capabilities of the MultiSwiss 6x16, and from the functions of its thread-whirling cutter.*

*For many years now, dental implants have been produced on Deco and EvoDeco machines and, more recently on the SwissNano or even Swiss GT 13 machines. Of course, these machines are fine, if such workpieces are to be machined and they are still being used to the full satisfaction of the customers. However, what if you want to go further? After all, a MultiSwiss machine is as easy and fast to set up as a single spindle lathe whereas*

its productivity is 5, 6 or 7 times higher. This does not only accelerate production, but it also means there is only one machine that must be monitored and set up to realize many parts. Thanks to the high speed of the machine, you can promptly respond to changing demands which nowadays are becoming more and more common. A MultiSwiss machine finally provides the workshop with flexibility that is most welcome. Let's take a closer look at the production of a dental implant on a MultiSwiss machine.

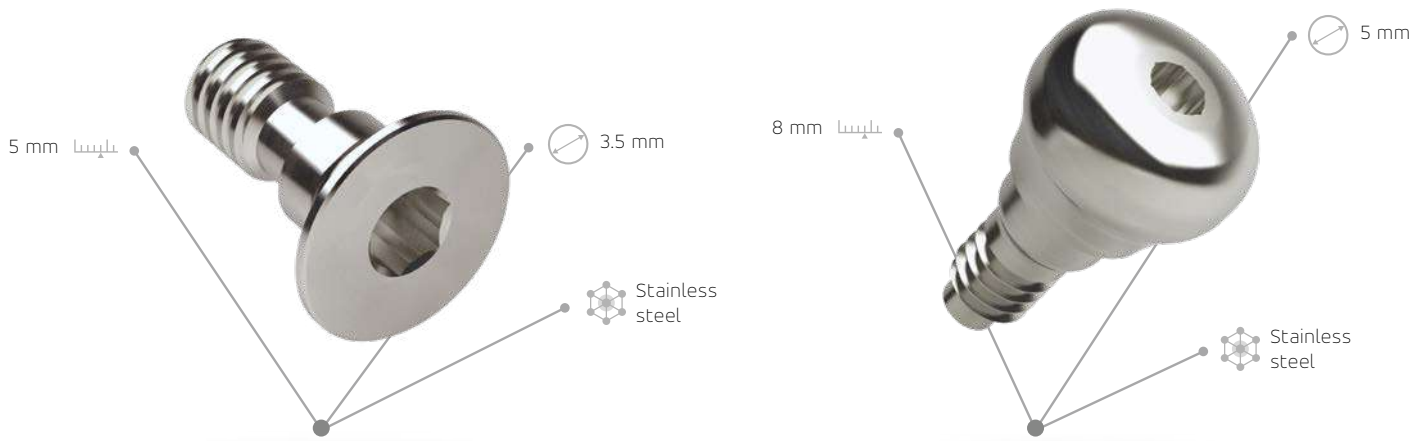
### Thread whirling as the key element

On MultiSwiss machines, each of the driven tools has its own motor and this means belt drives and other gear units are no longer needed. The direct drive system is rigid, precise and simple. Simple means you only must install the tool unit on the machine and connect it to one of the sockets provided in the machining area to make sure that the tool holders are recognized by the machine and are ready for use.

Moreover, this technology enables the full motor output to be utilized for any kind of machining operation. With this kind of tooling, it's the thread-whirling

cutter that plays a key role in the production of such workpieces. Incidentally, the MultiSwiss machine is one of only a few machines in the market able to successfully perform thread whirling tasks. And this is not a mere concept but definitely a function that works well during production. In the light of this, the manufacture of dental implants becomes possible on a multispindle lathe. It goes without saying that the machines can be equipped with a driven tool e.g. to mill self-tapping screws. If necessary, the head of the implant to be machined can also be provided with a second thread. This high-quality production is realized as the machine comfortably achieves production times that are 5 to 7 times faster than on a Swiss-type lathe.

The MultiSwiss machine can replace 4 to 7 Swiss-type lathes, while keeping a footprint that is comparable to a single Swiss-type lathe equipped with bar feeder. The floor space reduction can be more than 75%. As far as the operators are concerned, various companies entrust the same operators with the operation of both machine types, and this is due to the similarity between the mode of operation and the similar tooling configurations.



# Become a Master

## High-quality machining

Hydrostatic technology enables the equipment of the MultiSwiss 6x16 with 6 sliding headstock spindles to each have its own Z axis. As the cutting stress can be reduced through hydrostatic technology, wear can be diminished by up to 30%. But wear reduction is not all; this technology also enables the MultiSwiss machines to achieve an outstanding surface finish. Moreover, it should be pointed out that shaping tools are not required. This makes dental implant production extremely comfortable and facilitates machine operation.

Let's not forget that the MultiSwiss project was intended to make multispindle technology available to everyone, and this plan has certainly worked out!

If you want to learn more, do not hesitate to contact your Tornos dealer.

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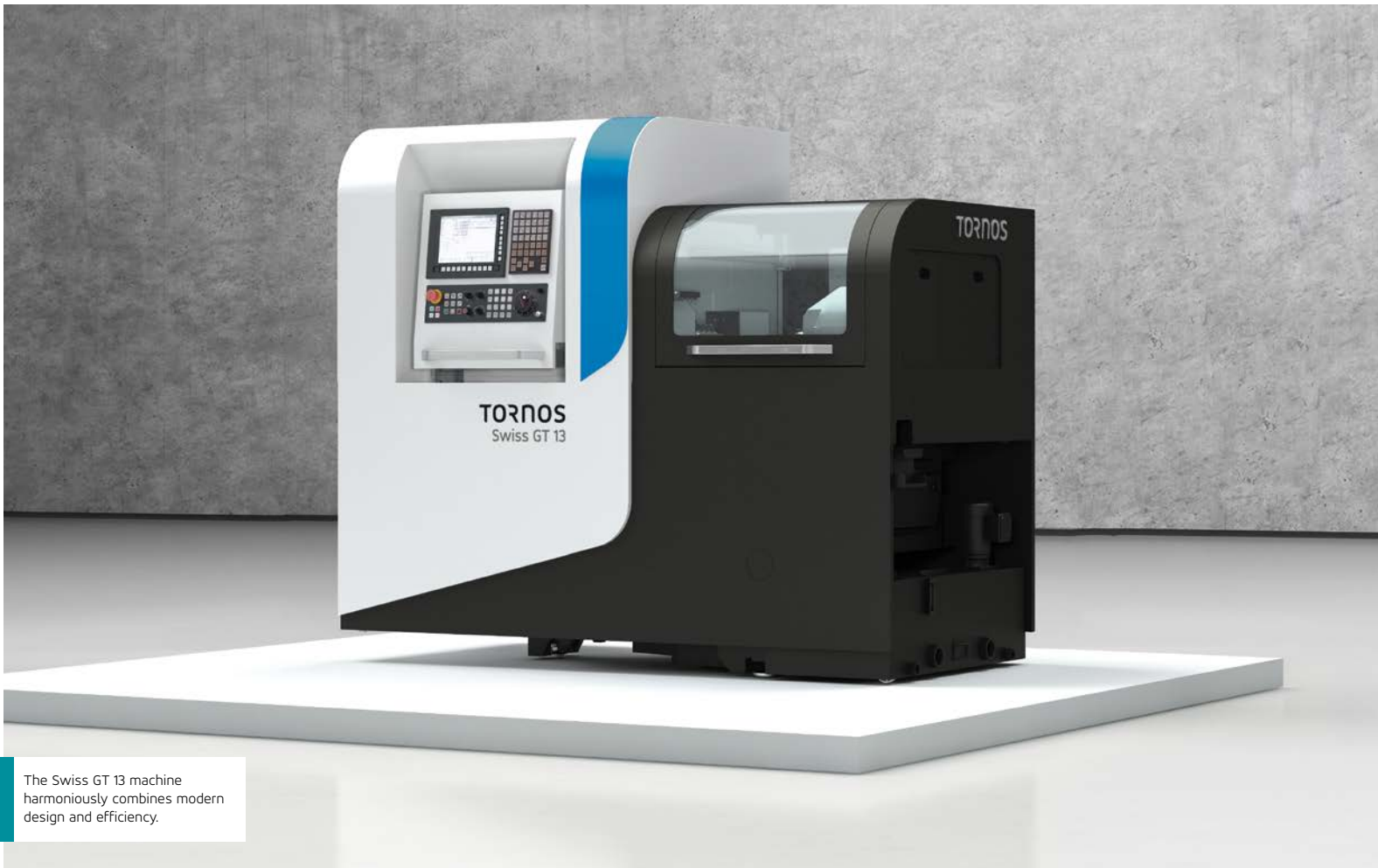
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The Swiss GT 13 machine harmoniously combines modern design and efficiency.

SWISS GT 13:

# Enormous flexibility makes it ideal *for the medical and dental industries*

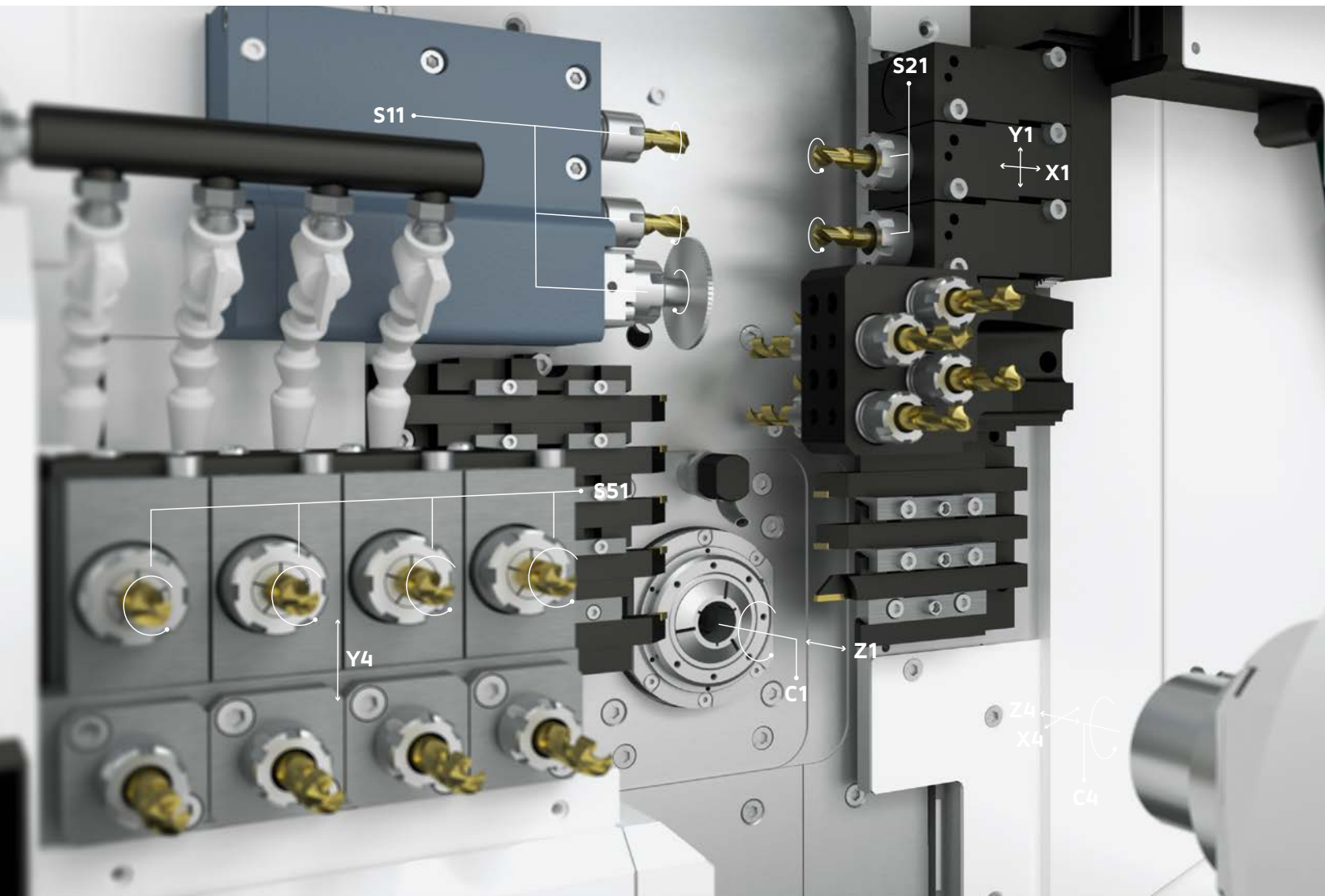
With its 6 CNC axes, the Swiss GT 13 machine from Tornos delivers exceptional flexibility for the machining of components of all kinds. Thanks to its unprecedented flexibility, it is able to machine extremely complex components, especially for the medical industry.

## TORNOS

**Tornos SA**  
Industrielle 111  
CH-2740 Moutier  
Switzerland  
Tel. +41 32 494 44 44  
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### A proven kinematic system

The Swiss GT 13, of course, is a sliding-headstock automatic lathe with longitudinal main spindle travel in the Z1 axis direction. The machine is equipped with a proven classic kinematic system that makes all the difference. It includes a linear tool system and the so-called gang-tool post that comprises the X1 and Y1 axes for bar machining tasks. The counter-spindle carriage is mounted on two linear axes (X4 / Z4) that enable the counter-spindle to hold the workpiece during the machining process and to move laterally in front of the block independent of the back machining tools that may be either stationary or driven. The spindle block for back machining has a vertical linear axis. With this kinematic design, the number of available tools can be doubled. A total of 8 tools are allocated into 2 rows with 4 tools each



The Swiss GT 13 machining area offers unparalleled ergonomics. The 30 tools and wide range of equipment available make it an extremely efficient machine.

with a maximum of 4 tools that may be driven. The four additional tools enhance the capability of performing complex machining tasks on the rear face of the workpiece. Furthermore, this axis allows the numerical centering of the tools on the back-machining spindle block and the traversing movement for cross drilling.

### Large number of available tools

The Swiss GT 13 can be equipped with a maximum of 30 tools and up to 12 of them can be driven tools. In addition, a vast range of attachments and accessories are offered for this machine. Both the main

spindle and the counter-spindle are motor spindles with an integrated motor. They stand out due to their low noise level and their high-speed range that can reach up to 15,000 rpm. Main spindle and counter-spindle both have an output of 4 kW (peak value 5.0 kW). These features guarantee exceptional machining performance. With regards to the guide bush, this machine, just as the DT series models, can be converted by the customer as needed. That means, in just 15 minutes, you can change from a classic sliding-headstock automatic lathe working with a guide bush to a fixed-headstock lathe. Actually, the headstock remains a sliding headstock but the guide bush is replaced by a cover.

### Guide bush rotation with up to 15,000 rpm

For those who want to work with a synchronous guide bush, the technology used for Swiss GT 13 machines is interesting in many respects. In fact, the guide bush is driven by an independent integrated motor that is based on the same principle as the spindle motors. It is liquid-cooled, lubricated and protected by sealing air to prevent the ingress of contaminants.

### Modular concept for the optimum machine

A Swiss GT 13 machine can be equipped with a variety of attachments. It has three cross spindles for bar drilling/milling operations and an optional additional drive motor that can drive even more optional tools on the main X1/Y1 tool system. This motorized unit can accommodate various devices such as:

- a thread-whirling cutter
- an axial stationary or rotary bar drilling attachment
- an axial stationary or rotary rear milling device
- a cross drilling/milling device for bar stock or rear machining tasks
- an inclined bar drilling/milling device.

This modular configuration is unique. Various modular machines are indeed offered, but this modularity is often restricted to only a few positions. On the Swiss GT 13, the entire rear gang tool post is modular, so lots of special tools can be installed.

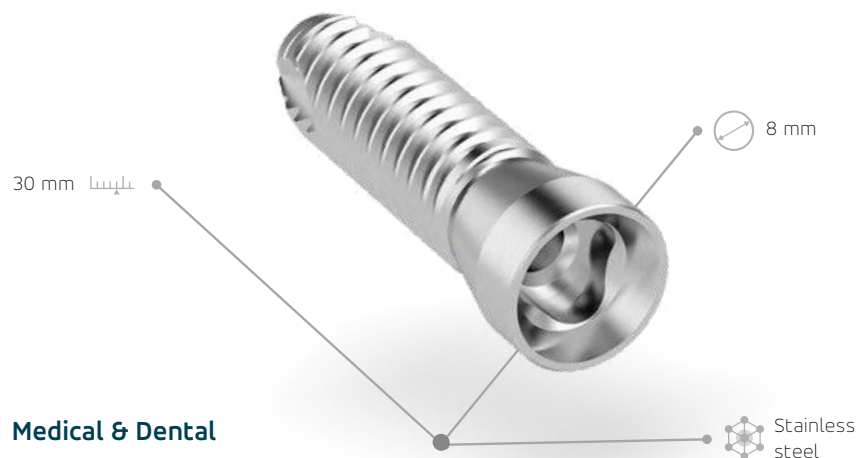
In addition to the rigidity, it's the flexibility that is particularly appreciated by the Tornos customers from the medical industry. This is what has resulted in the Swiss GT 13 machines being so widely used in many medical workshops.

For further information on this machine, please visit YouTube and watch the Swiss GT 13 presentation prepared by the MTD CNC team.



<https://www.youtube.com/watch?v=A8XjbDBeHgE>

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**HAROLD  
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The carousel with six or eight buckets allows MultiSwiss users to better monitor their production.

# Production management

*on the MultiSwiss 6x16,  
MultiSwiss 6x32 and  
MultiSwiss 8x26*

As a tailored solution for specific requirements, Tornos now offers a 6-bucket carousel for its MultiSwiss 6x32 and MultiSwiss 6x16 as well as an 8-bucket version for the MultiSwiss 8x26.

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*The system is provided with all-round protection and it perfectly blends in with the machine and its software environment.*

### **Customized adaptation**

*The buckets are produced by additive manufacturing and thus can be customized based upon the specific requirements of the workpiece. By way of example, each bucket can be provided with an oil bath at its bottom. Needless to say that the system design has been conceived in a way not to damage the workpieces. Moreover, its capacity is impressive and perfectly meets the demands of a multispindle lathe. For interruption-free machine operation, a sieve enables the workpieces to be sampled upon request. Therefore, the workpieces can be inspected without stopping ongoing production. As a matter of course, this function is fully programmable.*

*For production monitoring, it is also possible to monitor the spindles. This mode enables the separation of production batches by assigning a bucket to*

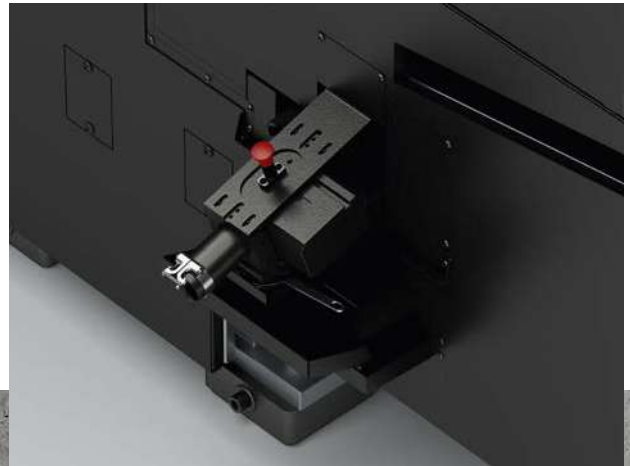
*a specific spindle. The carousel is already available as an option and it perfectly fits-in with all models of the MultiSwiss range.*

**Your benefits:**

- Full integration with the machine and control unit
- Large capacity
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Thanks to its machining solutions and renowned expertise, Tornos supports the development of the e-bike market throughout the world.

## E-BIKES:

*a no-sweat*  
 mobility  
 alternative

The world is becoming flatter, thanks to electric bicycles (e-bikes): Even for novice bicyclers, e-bikes take the sweat out of conquering challenging geographical terrain and offer a real means of addressing major societal challenges like vehicle emissions and climate change. It's no wonder that global sales of e-bikes are forecast to reach about 40 million units by 2023—and Tornos' Swiss-type lathes, services and software are already helping e-bike component suppliers keep pace with that growing demand.

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**Tornos SA**  
 Industrielle 111  
 CH-2740 Moutier  
 Switzerland  
 Tel. +41 32 494 44 44  
 contact@tornos.com  
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*The link between local air pollution sources and emissions driving climate change are clear. According to the World Health Organization, 25 percent of urban ambient air pollution from fine particulate matter is contributed by traffic. The International Panel on Climate Change estimates that transport accounts for 14 percent of global greenhouse gas emissions, and governments are increasingly encouraging more environmentally friendly transportation alternatives, ranging from car and bike sharing to electrical vehicles—including e-bikes.*

### China in the lead

The Chinese government has amended law to encouraging e-bike use and production as a means of reducing emissions of carbon dioxide and other greenhouse gases and noise pollution. In another step that is expected to contribute to e-bike uptake in the future, China's government has also stopped issuing licenses for pedal-assisted bikes that produce harmful emissions.

Today, there are 200 million e-bikes registered in China, according to the country's Ministry of Industry and Information Technology (MIIT) and 30 million more e-bikes are being added each year. In fact, China is the most important e-bike market in the world and is expected to maintain that position in the years to come. And, not surprisingly, China has more than 700 e-bike manufacturers, leading the world in both bicycle and electric vehicle production, accounting for 80 percent of global turnover.

### Snapshot of the rest of the world

In 2023, the rest of the world—primarily Europe and a growing market in the United States—is forecast to buy about six million e-bikes per year.

The Dutch, for example, are known for their love of bicycling: There are about 22.5 million bicycles in this nation of just 17 million people. So, it should come as no surprises that 409,400 of the one million bicycles bought by the Dutch in 2018 were e-bikes—a 40 percent increase over 2017.

And in Germany, the e-bike sales volume increased a stunning 36 percent between 2017 and 2018, when 980,000 e-bikes were sold. That means that one out of four bicycles sold in Germany was electric.

The US market isn't immune to e-bike fever, either: The US e-bike market grew to 263,000 bikes in 2017, a 25 percent increase over 2016.

### Tornos: 'We keep you turning'

Tornos—with its 125-plus years of expertise and a portfolio that includes key single spindle, multispindle and bar milling solutions as well as software, services and Tornos Academy's expert training—is a strategic supply partner to producers of e-bike components.

Case in point: one of the market's most popular e-bike drive units relies on a crankshaft featuring a splined chromium steel (16MnCrS5) axle. This is a great material choice for the axle, which is subject to wear, because it is easy-to-machine material and is easily hardened after machining. The axle, milled on both extremities, plays an essential e-bike role by securing the pedal on the crankshaft.

That's where Tornos' legendary single spindle lathe expertise comes into play: The Tornos EvoDeco is the solution of choice for turning 148 mm long, 20 mm diameter bars of 16MnCrS5 into splined axles—at highest precision and at blazing fast speed.

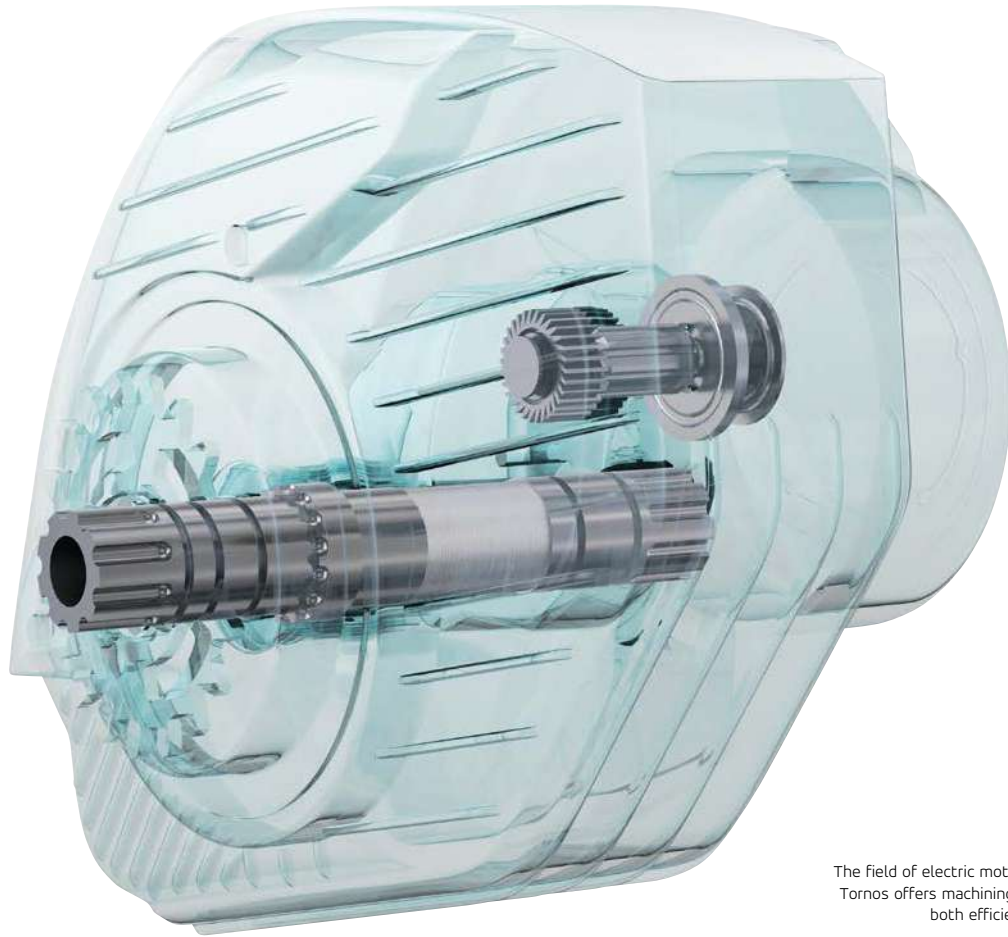
### EvoDeco: the pinnacle of the Tornos range

The EvoDeco, representing the pinnacle of the Tornos range, is designed for the most demanding machining operations and users. EvoDeco machines are the most powerful and productive on the market—and the EvoDeco truly shines when it comes to the production of splined parts, putting Tornos' legendary gear hobbing expertise center stage.

Available in four diameters—10 mm, 16 mm, 20 mm and 32 mm—the EvoDeco series' unparalleled flexibility takes e-bike component manufacturers' efficient production of complex workpieces to new levels of precision and quality while ensuring rapid setup changes. The kinematics of the EvoDeco range are completely unique and—after 20 years on the market and 10,000 machines sold—perform as well as ever. Notably, no other machine can engage as many tools at the same time and Tornos is still the only manufacturer offering such genius kinematics.







The field of electric motors is no exception. Tornos offers machining solutions that are both efficient and economical.

*But the EvoDeco's genius isn't limited to kinematics. The machine is equipped with latest-generation technologies and boasts an ultra-dynamic powered spindle with a synchronous motor. Users profit from four times faster acceleration and stopping times as well as constant torque at all speed ranges. That means more parts can be produced for every hour of production. The structure, ball screws and guides are all significantly reinforced to make full use of the EvoDeco's performance potential.*

*As electrification drives innovation in mobility, the EvoDeco powers manufacturers' productivity and helps them keep pace with the evolving e-mobility landscape. For example, the EvoDeco features four completely independent tool systems, 10 linear axes and two C axes.*

*On the performance side, a wide selection of devices and peripherals—all compatible with the EvoDeco range—are available. Continuous thermostabilization ensures flawless precision, and the powered spindles guarantee high output and torque.*

*Accessibility is another hallmark of the EvoDeco range. Programming is simplified, thanks to the compatible TB-Deco and TISIS software solutions. Machine operators experience a huge machining area and ergonomics designed with their user experience in mind—and peripherals are seamlessly integrable.*

*Autonomy is another reason the EvoDeco line stand head and shoulders above the competition. With its excellent removal of swarf and cutting oil, ability to machine without human intervention, and automatic cyclical lubrication, the EvoDeco allows manufacturers to take full control of their operations.*

*At the same time, thanks to vast electronics and automotive experience, Tornos has the expertise and the solutions to impeccably produce the connectors needed for e-bike batteries, sensors, and displays, as well as connectors for e-bike charging stations. For more information, visit [www.tornos.com](http://www.tornos.com) today.*

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Mike Gajewski, President and founder of Minic Precision, built the company's reputation on its ability to provide the best quality and value-added engineering and design.

## MINIC PRECISION INC.:

# Early beginnings

*and growing up “Swiss”*

Founder and President of Minic Precision, Mike Gajewski, grew up “Swiss,” working on Tornos cam operated machines at the young age of 19. Contacted for an apprenticeship by a local machine shop that operated Tornos cam machines, the apprenticeship turned into a full-time job for Mike, who eventually worked his way up to the Plant and Production Manager role, where he remained for nine years. After nine years of experience in both engineering and managerial roles, Mike decided it was time to open up his own shop and meet the growing demand for the electronics and connectors industry.



**Minic Precision Inc.**  
 7706 Industrial Drive Suite K  
 Spring Grove, IL 60081  
 Phone: 815-675-0451  
 Fax: 815-675-0452  
 sales@minicprecision.com  
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*In 1992, he rented a 2,000 sq. ft. space in Woodstock, IL, and purchased 6 Tornos and Bechler cam machines. Minic Precision Inc. was established in 1992 to meet the growing demand for electronics assemblers requiring high precision contacts and guide hardware. He named his business, Minic, an acronym after his two sons' names, Michael and Nicholas.*

*By 1995, he had filled up his shop floor with 28 Tornos and Bechler cam machines. Some of the early Tornos cam machine purchases included M7s, R10s, and R125s. Even today, Minic still operates many of the original cam Tornos and Bechler machines, and he is proud to have recently purchased three Tornos Swiss CNC lathes in the last 18 months.*

### Minic's Growth and Relocation

Minic Precision has experienced growth and expansion over the years, driving them to purchase and relocate to an expanded facility in Spring Grove, IL. Their quality control program and ISO 9001:2015 certification is a major factor of the shop's continued growth. According to Mike, his company motto is, "dedicated to providing the best quality and best value-added engineering and design." The quality in the parts his shop produces on his Tornos machines represent his commitment to that.

Aside from quality management, value-added engineering is also what separates Minic Precision from their competition. Minic Precision's specialty is in micro-machined parts. When end-users in the stringent quality and design focused industries –medical, electronics, automotive, and aerospace, bring their part requirements and prints to Mike, Minic facilitates smooth flow from design to prototyping, and production. Minic helps end-users to not only select the best materials, but overall offers expert machining and design processes to help realize the highest cost savings. This has helped Minic build key relationships with electronics assemblers, medical companies, the US Military, and with customers in the automotive and aerospace fields.

### Expanding Minic's Machine Fleet and Visiting the Factory in Moutier

In order to continue providing higher cost savings over time and increased efficiency, Minic realized the need to expand and purchase a CNC when he was getting cross-over work that better suited CNC. Enabling quick turnaround time wasn't 100% feasible or realized on the cam machines. In 2004, they originally went to Citizen as Tornos was not offering the entry-level to mid-range machines but more high-end lathes. Shortly after the Citizen purchase, Minic realized that it was not at par with the quality that has been the company's driving success. After Minic searched for a high quality and rigid mid-range CNC lathe, in 2015, Tornos came out with the Swiss GT series.

As Minic's vision and goal is quality at the forefront in what they manufacture, they needed machines that lived up to the task. Their main purchasing strategy has always been investing in something that will go the long haul and be reliable, hold tight tolerances, quick chip to chip times, and they wanted a machine that could run over 10,000 rpm on the main



and counter spindles. The long-awaited solution had arrived, and Mike scheduled his trip the Tornos factory in Moutier, Switzerland in the summer of 2016.

Christian Barth, Product Manager at Tornos, provided the tour to Mike. After seeing the production and assembly of the spindles and guide bushings, and the overall Swiss manufacturing process from design to finish, Mike saw first-hand the high-quality that goes into manufacturing a highly rigid, stable, and precise Tornos CNC Swiss lathe. His visit to Tornos is what gave him confidence to changeover from Citizen to Tornos.

While other manufacturers or competitors of Tornos may offer similar style Swiss lathes, Mike explains, "everything from the weight of the Tornos machine, to the way the spindle is built, and the durability for the Swiss GT 13 to cut tough materials, including the many exotic stainless steels we use with no chatter, is a major win-win for Minic and sets us apart from our competition."

In early 2018, Minic made their first Tornos CNC Swiss lathe purchase with the Swiss GT 13. Just three months after purchasing his first Tornos Swiss GT 13, Mike purchased a Swiss DT 13. The investment decision was an easy one, as both machines would be equipped with the same sets of tools after they purchased the TISIS module to use across both machines. The modularity of the Swiss DT range sold him, and both machines manufacture connectors as well as other small parts. The parts handling with

the vacuum extractor was a value-added benefit, especially, because Minic's specialty is manufacturing sub-miniature parts. On these two machines, they are able to run at higher rpm's with beryllium copper, while still holding a .0001 tolerance. According to Mike, the impeccable surface finish, which was difficult to achieve previously, was now made possible on his Tornos CNC lathe.

### Software that Brings Success to Minic - TISIS

In addition to the two new equipment purchases, Mike boasts that the purchase of TISIS, Tornos' machine communication and programming software, has been a gamechanger for his business. His production engineer, Raul Rodriguez, was able to very easily learn the Fanuc control simply by using TISIS. For example, through TISIS, he is able to put his tools in inventory, plug them into the job, and schedule it right within the program. TISIS has been so easy to use that Minic has recently purchased the Tornos Connectivity Pack for all of their Tornos machines.

### Entrepreneurial Spirit and Continued Growth

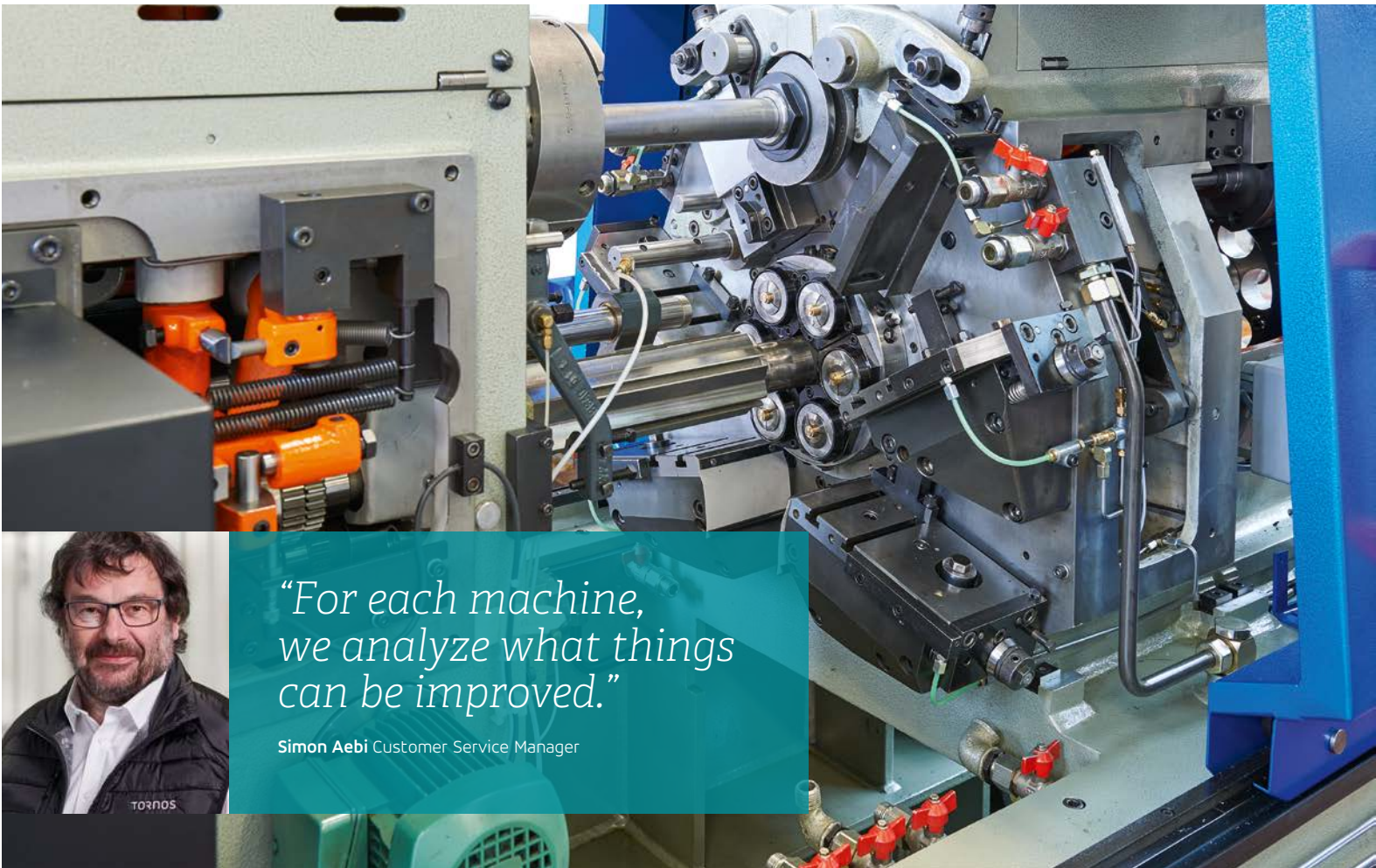
Throughout the years, Tornos and Minic have both been committed to the best quality products. This has facilitated Minic's growth tremendously and to handle parts that they couldn't before. Their shared commitment to quality and design and local service keeps Minic investing in more equipment purchases.

In July 2019, Minic received their second Swiss GT 13 and third Tornos CNC lathe overall. Mike expects to purchase the new SwissNano 7 in the coming months. The entrepreneurial spirit and commitment to consistent quality has paid off for Mike, and he looks forward to what the future holds for this long-lived relationship.

[minicprecision.com](http://minicprecision.com)

The modularity of the machines and their "universal" TISIS feature work wonders at Minic Precision.





*“For each machine,  
we analyze what things  
can be improved.”*

Simon Aebi Customer Service Manager

## MACHINE OVERHAUL:

# Whipping older machines into shape

Have you been in possession of a Tornos machine for more years than you can remember? Even if you have a Tornos product that is still performing to your full satisfaction, there is still room for improvement. You can now have a complete overhaul service undertaken by Tornos. Currently, this service is provided for the older AS, SAS and MultiDeco machines, but an overhaul is a possibility for all Tornos machine types.

## TORNOS

**Tornos SA**  
Industrielle 111  
CH-2740 Moutier  
Switzerland  
Tel. +41 32 494 44 44  
contact@tornos.com  
tornos.com

*All you must do is contact the overhaul service team and its experts will subject the machine to an in-depth analysis of its condition and working order. This will assess the machine capabilities and prepare it for its new 'lease of life' by means of the machine overhaul service.*

### **How does this service work in concrete terms?**

*The mechanical overhaul of a machine takes between 6 and 8 weeks. First of all, the machine is taken to pieces. The machine enclosure is taken off, so the machine can be cleaned by a company that specializes in this task. In general, the spindle bearings are replaced and, sometimes, even new spindles are installed.*

*For SAS machines, the slide system requires special attention as the slides have been scraped and are cyclically lubricated with an oil film. Thanks to his expertise, the scraping repairman can investigate and*

instigate pockets that retain the oil and thus guarantee minimum wear. Over time, however, the axis movement causes wear on certain parts.

### **AS, SAS - a revolutionary invention**

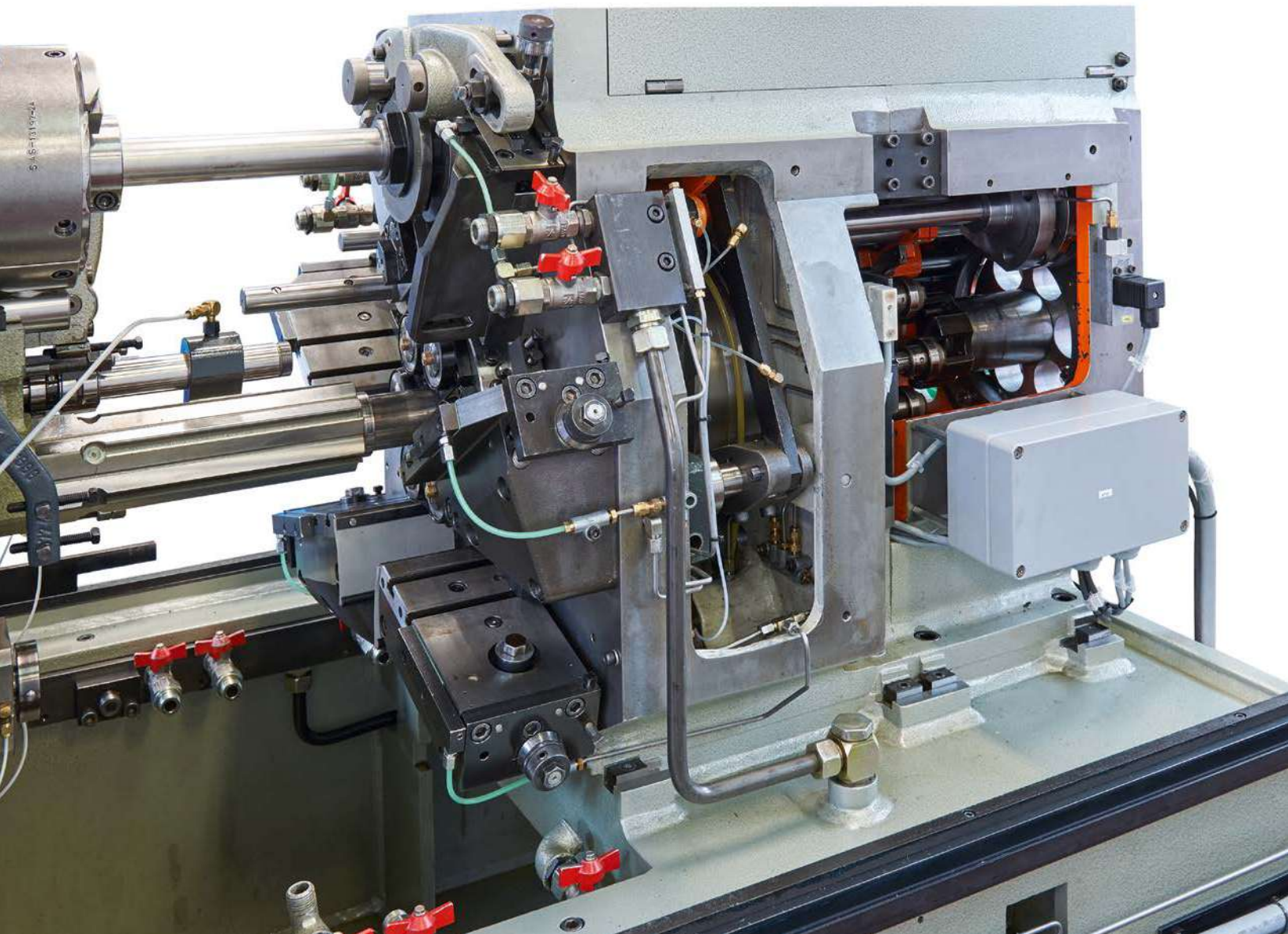
This now ageing system has certainly proven its worth down the years. The ability of this first multi-spindle lathe to continue to finish workpieces within the required tolerances and desired surface finishes, means the machine continued to be sold by Tornos right up to the end of 2017. In 1959, the AS machine made its debut at the world's largest machine tool exhibition in Paris and it truly revolutionized the large-volume production of small high-precision

parts. Even then, Tornos wanted to offer a machine that was able to meet the quality standards of Swiss-type lathes. The longevity of the machine shows it has clearly stood the test of time.

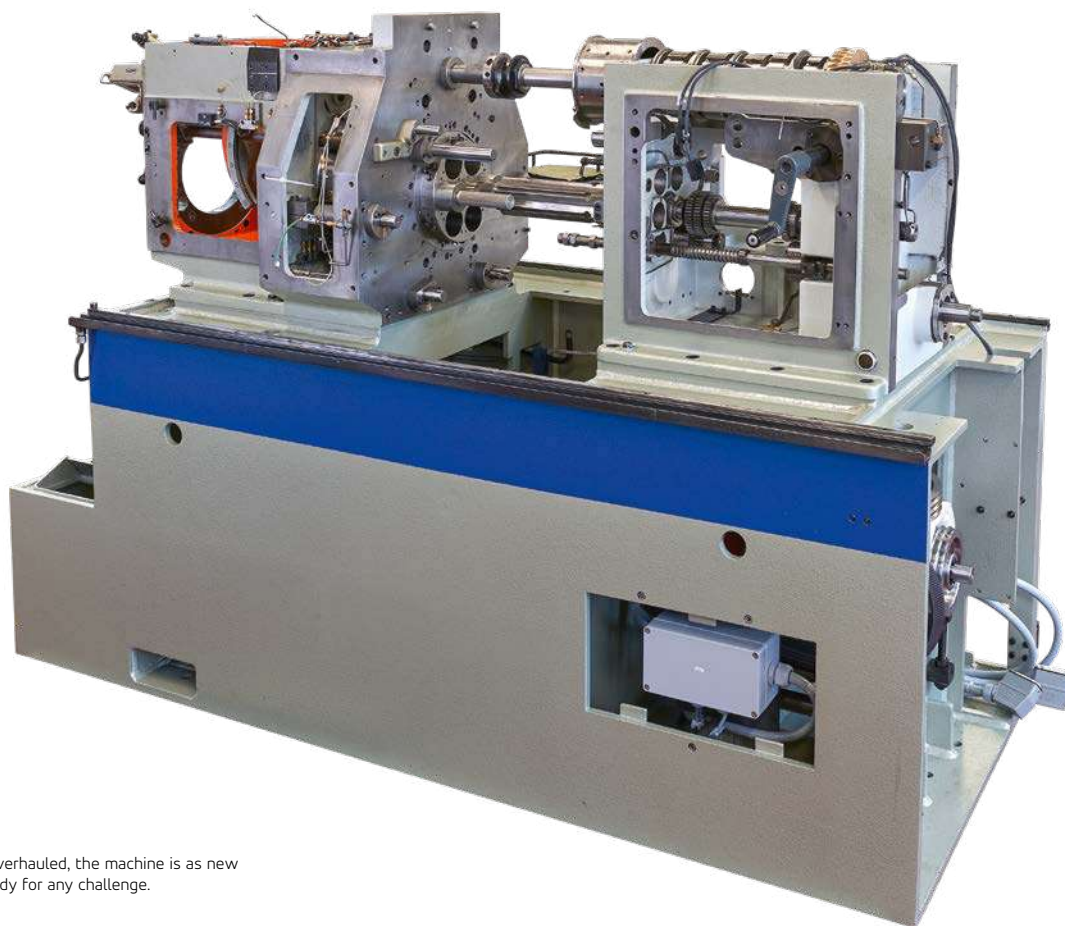
The best days of this cam-type lathe are certainly behind it as technology has moved on. However, many of the machines are still being used in workshops today and they still have a huge value for those companies that still use the reliable and loyal performer.

This summer, an SAS machine left the Tornos overhaul department in a 'good-as-new' condition - or even better. This was credit to its complete overhaul and re-electrification; the machine received a new

For anyone wishing to overhaul an SAS 16 machine, Tornos is an excellent choice. Tornos specialists have a thorough knowledge of this model.







Once overhauled, the machine is as new and ready for any challenge.

*CE certificate and little more than two months after its 'homecoming', it is now ready to tackle the new challenges ahead.*

*As far as the old MultiDeco machines are concerned, they were equipped with more advanced technology right from the start. When you refurbish the guide rails on which the carriages are running, only some re-adjustment is required.*

*These machines are extremely compact and require high proficiency and professional disassembly. So, once having taken the machine apart, the overhaul specialists set about completely reconditioning the pneumatic system. Moreover, the lubrication function is re-assessed and readjusted and sometimes the lubrication units are completely reconditioned. The rollers on the levers, the toggle pair and the toggle holders are all replaced. This is generally true for anything that moves on the machine.*

### **Specialists that know the old models inside out**

*Simon Aebi, head of the overhaul department, knows the mechanical workings of every Tornos machine inside out. He has always been fascinated by the older machines and, more particularly, by what his team is able to do with them. "If you get a machine for a complete overhaul, this is always a kind of challenge. You conceive of how the machine will look and if you provide it with various improvements in line with current trends, the results we can achieve are often spectacular!"*

*In fact, once the machine body and housing are painted and having performed the functional tests, the machine has literally been... revived. It has a new look and the machine owners are astonished and delighted by the rejuvenation when they get their machine back. Sometimes, Tornos even repurchases or salvages old machines to give them a makeover. "For each machine, we analyze what things can be*



improved,” Simon Aebi points out. “With MultiDeco machines, for instance, we even go as far as to replace the enclosure since the doors of these machines originally were opened in upward direction. With only slight structural modifications, you can obtain a more ergonomic working area that better comes up to the customer’s expectations.” These machines are then offered at an unbeatable price.

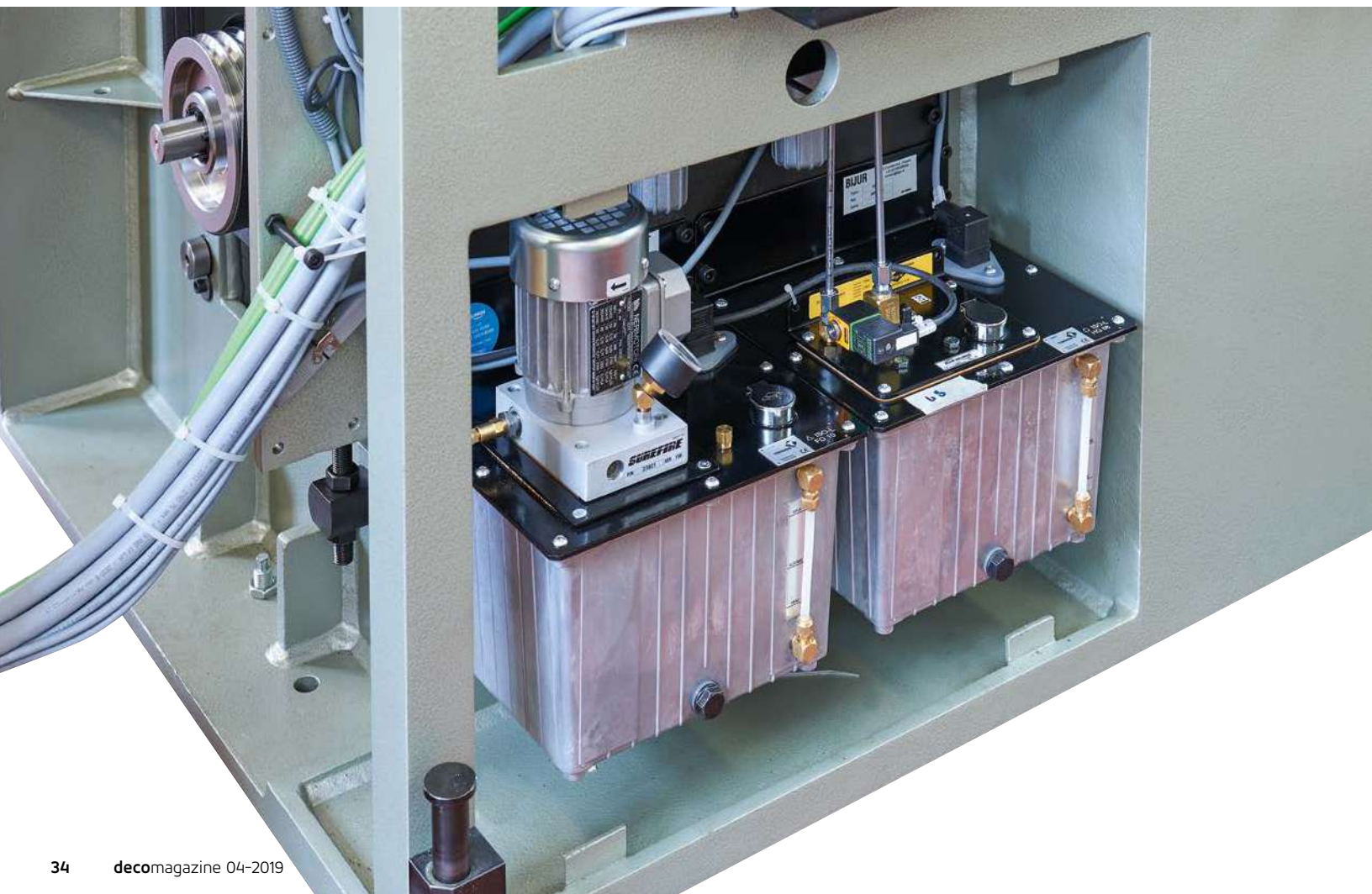
### Maintaining the high machine performance

The overhaul service comprises seven steps and these include inspection, disassembly, repainting and reassembly, not to mention crucial procedures such as the replacement or overhaul of key components. The overhaul is offered as a fully customized service that can be targeted to the specific needs of the customer. It is provided both for the entire machine and for the sub-assemblies. The benefits of such an

overhaul are obvious. The machine maintains its original precision, reliability and productivity while offering a longer service life. Tornos solely uses original spare parts and the overhauled machine comes with a complete documentation of the work performed and of the spare parts replaced, including a geometric report. In addition, the company offers a one-year warranty with parts and workmanship for the replaced parts covered.

This overhaul service gives you the perfect opportunity to breathe a new lease of life into your ageing, yet beloved Tornos machine – give us a call to find out more!

[tornos.com](http://tornos.com)





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The third machine from the MultiSwiss 8x26 range, the multispindle machine is the main production resource at G&Y Leuenberger, with high flexibility linked to the easy programming offered by the CNC Fanuc 30i-B.

## FANUC-LEUENBERGER:

*The CNC Fanuc 30i-B joins the*  
 bar turning  
 revolution

The Fanuc 30i-B numerical control offers the most advanced solutions for the most complex applications. This was in evidence during a visit to a Swiss bar turning company employed as a test customer for Tornos MultiSwiss turning machines.

**FANUC**

FANUC Switzerland GmbH  
 Grenchenstrasse 7  
 CH-2504 Biel/Bienne  
 T +41 32 366 63 63  
 info@fanuc.ch  
 fanuc.eu



G. et Y. Leuenberger SA  
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 2743 Eschert  
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*During the middle of the last century, Gilbert Leuenberger gained a wealth of experience while working for Petermann, one of the three companies based in the Swiss Jura responsible for the development of modern bar turning using the automatic turning process with a sliding headstock. In 1964, he and his wife, Ruth, founded their own subcontracting company based in a family-owned barn in Eschert, the municipality bordering Moutier. Before long, a modern building was constructed at the entrance to the village, which saw continued expansion. During the 1980s, his son, Yves, took over the company, which would henceforth be known as G&Y Leuenberger SA, bringing in the first numerically controlled machines.*

*The 1990s saw the arrival in the factory of the first Tornos Deco 2000 bar turning centre with FANUC control. The founder's grandson, Boris Leuenberger, completed his apprenticeship and gained his qualifications at Tornos, a global manufacturer and heir to the creators of the Swiss-type automatic bar turning machine. In 2014, following a stint in the USA,*

Boris joined G&Y Leuenberger. He became company director at the tender age of 23. It was the beginning of a family saga in which Fanuc Switzerland would figure throughout.

### CNC flexibility and FANUC international service

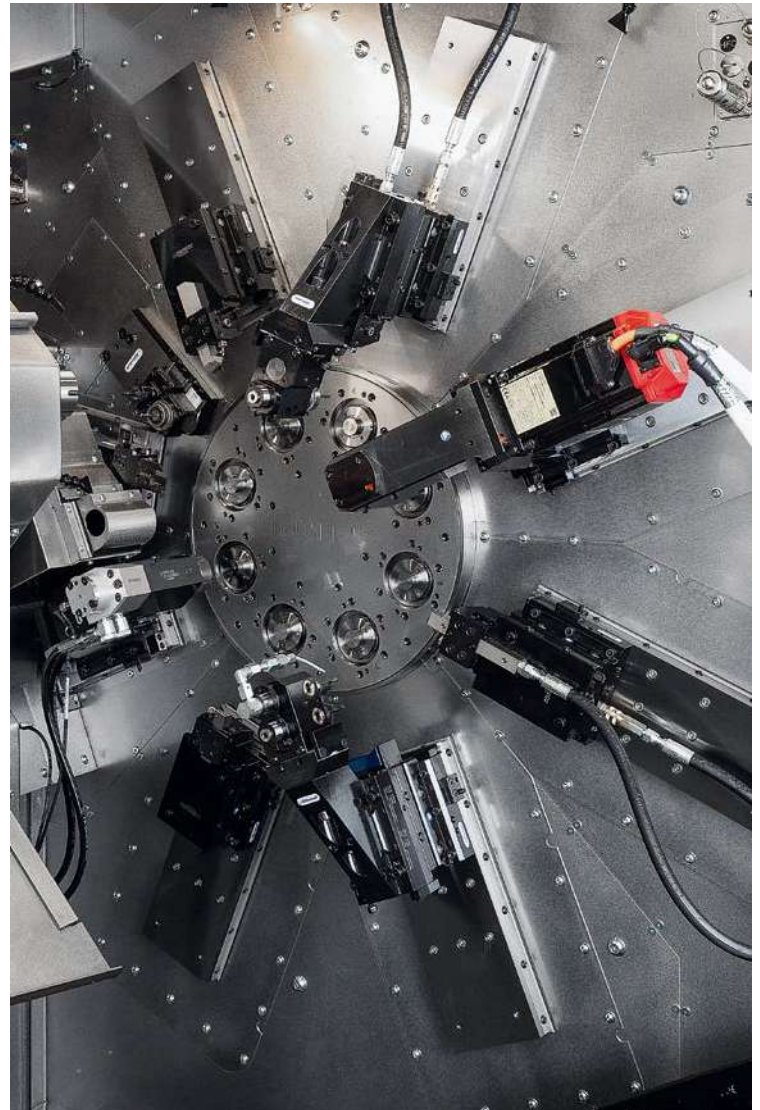
G&Y Leuenberger now employs around forty people in Eschert. Its main markets are the precision mechanics, monitoring equipment, connectivity, luxury, watchmaking and fittings industries. The single spindle turning machine inventory comprises around forty sliding headstock turning machines, including 25 with numerical control. "We're using

more and more Fanuc numerical controls within the company because they add a lot of flexibility to our production", explains Boris Leuenberger. "In particular, the introduction of CNC machines has allowed us to reduce the number of secondary operations, which means parts can be completely finished on a single machine", he adds. The proximity – both geographical and cultural – of the manufacturer, Tornos, has allowed the two companies to forge a solid partnership. As a result, G&Y Leuenberger has become a natural test customer for the prototype bar turning machines conceived in Tornos's design office. Fanuc Switzerland, which last year celebrated its thirtieth anniversary, was immediately engaged

## CNC series for the most complex requirements

The FANUC 30i-, 31i- and 32i- model B series of controllers are ideal for complex high-speed precision machines equipped with several axes and multi-channel features. To meet the needs of different types of user, these controllers combine intuitive operation at exceptional levels of precision, reliability and efficiency, with high-speed machining on all kinds of machine-tools, namely turning machines, 5-axis machining centres, gear hobbing machines and transfer machines. In its optimal version, the 30i-B CNC has 15 channels for 96 axes, including 24 spindle axes for composite milling/turning or turning/milling operations. The preventive maintenance, Dual Check Safety and 3D Interference Check functions are also integrated.

Fanuc motors are subject to very harsh operating conditions in the production enclosure of the Tornos MultiSwiss multispindle machine. It is worth noting the turning machine's excellent ergonomics, which offer easy access to the machine's enclosure.



to provide top-level technological support as part of this arrangement. Brice Renggli, Marketing Manager and Competitive Intelligence Manager at Tornos SA, underlines the quality of the partnership between Tornos and Fanuc: "For thirty years, Fanuc Switzerland has assisted us in developing our numerically controlled machines so that we can provide customers with a flawless service", he explains. This is why Fanuc, G&Y Leuenberger and Tornos were all involved in the test phase for the MultiSwiss 8x26 no. 3 multispindle machine.

According to Brice Renggli, Fanuc equipment has a long track record of reliability, as well as international service that covers even the oldest machines anywhere in the world. "At international exhibitions, for example, Fanuc offers spare parts for the exhibited machines and efficient technician assistance when required", he adds.

*History of the launch of a revolutionary innovation*  
In 2016, Tornos initiated a very successful expansion of its range of MultiSwiss multispindle machines. Three more will be gradually added: the MultiSwiss 6x16, 6x32 and 8x26. The first number indicates the

"This is our first multispindle machine, and the handover proved much more straightforward than we were anticipating."

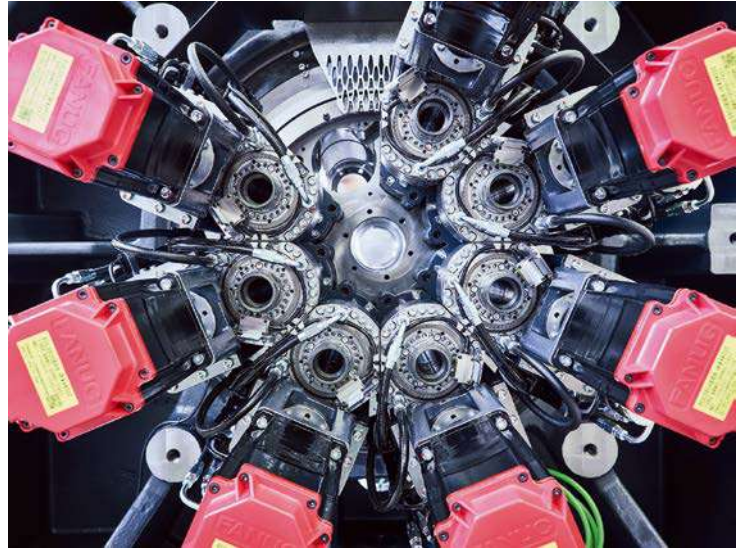
number of spindles; the second number the diameter. All these models offer highly practical ergonomics, complete integration (loader, pumps, filtration, tray, workpiece extraction), thermostabilisation to +/-0.5 degrees and Fanuc 30i-B control. The axis and spindle motors, as well as the servo controls and amplifiers, are all made by Fanuc. "With these complex machines you get highly consistent kinematics, along with reliable equipment and

The ergonomics of the MultiSwiss turning machine enable optimal access to all essential components, in this case the Fanuc servo controls and the amplifier.





CNC Fanuc 30i-B with iHMI offering intuitive and extremely user-friendly operation.



MultiSwiss 8x26, interior of the multispindle with motors.

associated servicing”, adds Brice Renggli. Following initial prototype development, the MultiSwiss 8x26 no. 3 turning machine is delivered to G&Y Leuenberger, in its capacity as a test customer. “This is our first multispindle machine, and the handover proved much more straightforward than we were anticipating”, reveals Boris Leuenberger. In particular, the channel-by-channel programming managed by the TB Deco process is facilitated by the Path Table Operation (PTO) developed by Fanuc. “Thanks to the eight spindles, we can process the most complex workpieces since there are 6 stations entirely free for secondary operations”, says Boris Leuenberger. Run changeovers are quick to enable the machine to carry on operating on medium to large runs. Delivered in January 2017, the MultiSwiss 8x26 was fully operational six months later, with no need for hardware modifications. “We had to fundamentally change our organisation to guarantee continuous 24/7 operation of the multispindle machine”, recalls

Boris Leuenberger. “But the results in terms of profitability, finish quality and precision far exceeded our expectations”, he concludes. “With Fanuc as our partner for numerical controls for the last thirty years, we can count on top-level support for our development and product tracking”, says Brice Renggli. Tornos is one of Fanuc’s main European customers, and certainly one of the most demanding in terms of complex multi-axis kinematics. At the top end of the high-performance CNC nano range for complex machine-tools, the Fanuc 30i-B CNC is designed to meet even the toughest challenges. With more than 300 MultiSwiss multispindle machines sold throughout the world, Tornos can attest that Fanuc controls and motors – as well as the entire organisation – are the perfect fit.

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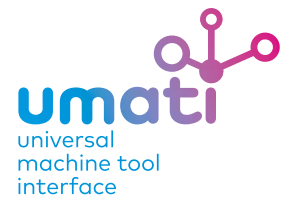
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Unveiled at EMO this year, the SwissDeco 36 TB machine enabled Tornos to spotlight the new umati communication standard.



# A new dimension

*in network production*

TISIS lets you communicate with your Tornos machine any time, anywhere, and is compatible with almost the entire Tornos machine fleet. But what if you want to see your whole machine fleet, regardless of the make? Well, now you can, thanks to the umati initiative, unveiled for the first time at EMO in Hanover in 2019; umati (universal machine tool interface) makes the machine data usable in a standardised way.

## TORNOS

**Tornos SA**  
 Industrielle 111  
 CH-2740 Moutier  
 Switzerland  
 Tel. +41 32 494 44 44  
 contact@tornos.com  
 tornos.com

*Networking of machines, systems and software is currently one of the most significant trends in manufacturing. Today's customers expect to be able to easily integrate new machines in their own IT ecosystem. umati makes this possible using the Open Platform Communications Unified Architecture (OPC UA) international interoperability standard: quick, easy and completely secure.*

*For over two years, a team of machine-tool manufacturers has been working to develop this uniform language for machine-tools. Working in conjunction with control manufacturers, their aim was to make it as intuitive as possible to use.*

### A central control panel

The system groups the information on a central control panel, enabling analysis of the production process and the efficiency of the workshop production. umati adapts easily to any type of machine.

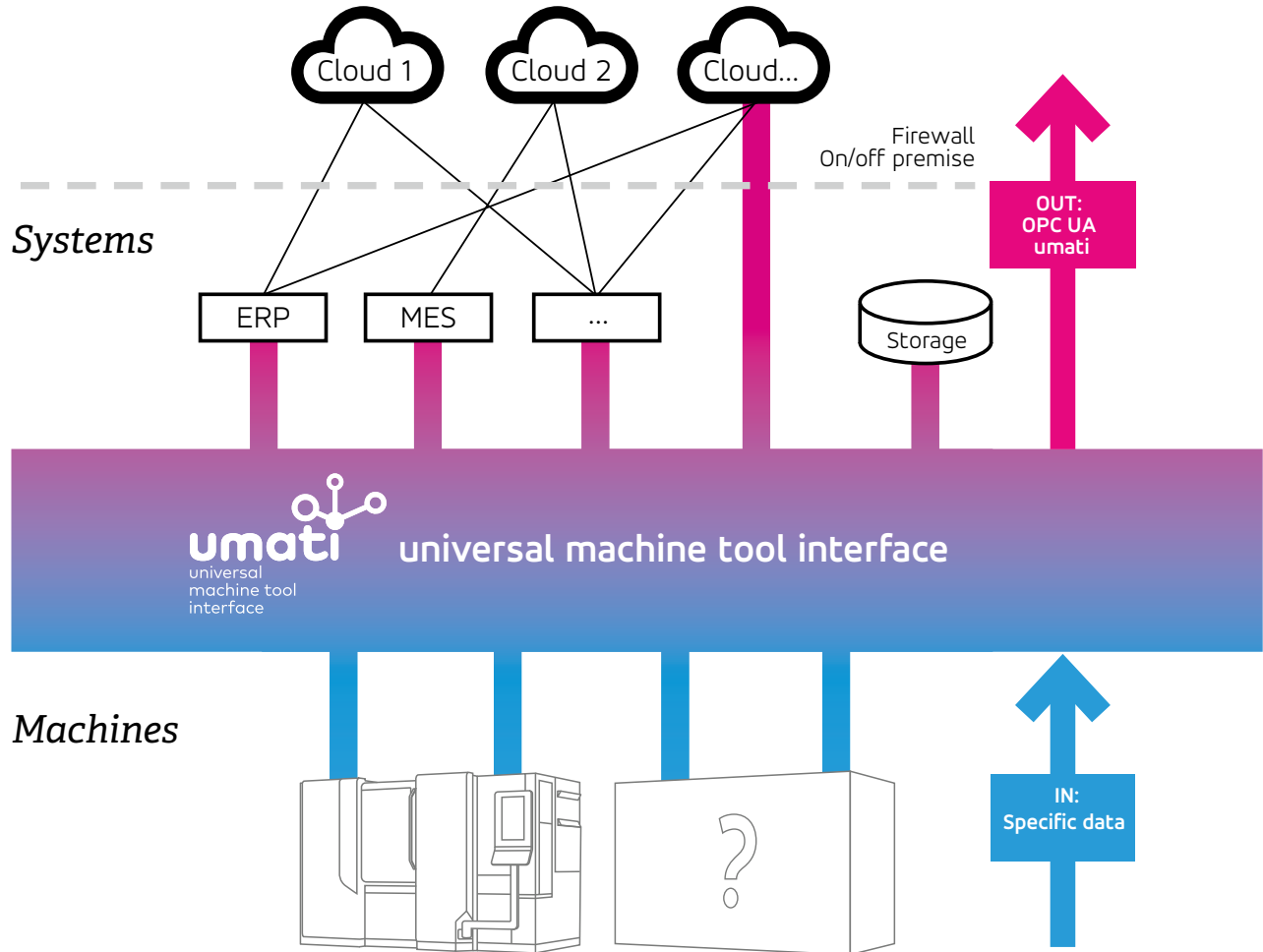


The aim of umati is to create the standard for connecting machine-tools to computerised production systems. umati is specifically designed to allow the following groups of parameters to be monitored:

- Uniform machine identification
- Operating status of each machine
- Production order information
- Supply information (energy, materials)
- Tools and parts to be machined
- Storage system statuses
- User interaction forecasts



## Infrastructure



Data is updated every second, which means that umati is able to standardise the monitoring of machine statuses in real time. As mentioned earlier, it is possible to view the current production status. umati also provides an overview of operations, specifically upcoming projects, errors and operational interruptions.

In a subsequent step, umati allows the data to be analysed, including program runtime, errors, interruptions, status of consumables, and electrical power consumption. The OEE and cutting tool management will also be part of the package currently in development.

### A complete solution, easy to integrate

umati enables complete machine monitoring. Moreover, it standardises data and facilitates its integration into company systems such as ERP or CRM.

Want to know more about umati? Get in touch!

[tornos.com](https://www.tornos.com)



Small class sizes at the Tornos Academy mean buyers of Tornos machines receive the best training possible. This enables them to perform better and maximise their investment.

Training modules  
tailored to the

# individual needs

A day in the life of a Tornos Academy participant.

## TORNOS

**Tornos SA**  
Industrielle 111  
CH-2740 Moutier  
Switzerland  
Tel. +41 32 494 44 44  
contact@tornos.com  
tornos.com

*For any company, the purchase of a new machine is a strategic investment. It's about creating opportunities to enhance the capabilities and productivity of the machine inventory and about opening new prospects and markets. The Tornos Academy accompanies every customer through the entire journey, from machine commissioning to skilled machine operation, by offering training modules tailored to the needs of the operator and to his or her level of skills.*

*Training at the Tornos Academy means you can grasp the opportunity - the opportunity to acquire new knowledge and thus to expand your potential and explore the full scope of possibilities a new machine can offer. decomagazine attended a Tornos Academy training course for one day.*

*Here's our report:*

**8:30 a.m.:** *After having presented himself and learned more about the registered trainees, the instructor Laurent Glauser goes into the details of the training program and the targets of the SwissNano 7 training hosted by the Tornos Academy. For a period of three days, the trainees do not only get the opportunity to familiarize themselves with this new machine, but they can also discover further features offered by Tornos such as the TISIS programming software that facilitates tool management and programming for the machine.*



Simon Lovis, a trainer at the Tornos Academy, performing a practical demonstration on a MultiSwiss machine.



Thierry Frund, a trainer at the Tornos Academy, delivering practical training on a SwissNano machine.



After this introduction, Laurent Glauser directly moves on to the heart of the matter - an amply illustrated training guide that supports the trainee throughout the training program as well as during his or her first steps in studying a model program. Macros, variables, synchronizations and other key features are reviewed to clarify the available features and create an efficient program.

Some of the trainees have no difficulties in understanding and using the software while others must investigate each element; and they do not hesitate to ask questions. Upon the customer's request, one-to-one lessons can be organized. These can be tailored to his level of skills and are intended to optimize the time spent training. As a good teacher, the instructor cites powerful examples that enable the trainees to easily understand step by step features.

**10:15 a.m.:** A coffee break gives rise to a vivid exchange of views between the participants. It gives the opportunity to put the finger on an existing understanding of problems, with regards to the operation of a tool holder. A specific question continues to torment the trainee who sticks to his guns, much to Laurent Glauser's delight, who explains the workpiece clamping and set-up processes by drawing on the blackboard. To emphasize his explanations, the instructor incidentally does not hesitate to repeatedly leave the classroom to take the group to the workshops and directly to the machine concerned. "Demonstrations on the machine often are the most efficient measures," Laurent Glauser declares. "When the trainee gets the opportunity to operate or set up the item in question, this sinks deeper into his or her memory and the trainee can directly repeat the appropriate gestures once he or she returns to their company."

**12 a.m.:** Midday provides an opportunity to review this first morning and ask specific questions during a good meal shared in the Tornos canteen. The participants enjoy pausing for breathe in this pleasant environment. The instructor attaches importance to the attention of the trainees and adjusts the lessons based on the phases of receptiveness and the capacity of the individual participants to use the gained knowledge.

**3 p.m.:** After one and a half hour of tuition, the instructor considers it wise to add a bit of hands-on training on the machine to add to the classroom exercises. In fact, this variation proves to be a wise choice since it confronts the trainees with the real situation.



Three trainers from the Tornos Academy in Moutier, left to right: Simon Lovis, Thierry Frund and Laurent Glauser.

They end up undertaking tool set-up and discover the different modes of tool geometry input. This means, the things are tackled to make them work. Laurent Glauser obviously knows how to arouse curiosity and prod the trainees to continue learning.

**5 p.m.:** The first well-filled training day ends with an overview of the acquired knowledge. This is an opportunity to ask some remaining questions and explore certain topics in greater detail. As for the instructor, his day is not yet over as he is already preparing the tuition for the next day by taking advantage of the experience gained during the first courses. "I never prepare the training course according to the same pattern," declares Laurent Glaser.

"It's true that I know exactly which elements must be instructed for the selected module, but I am constantly adapting myself depending on the questions posed and the individual problems experienced by the trainees. For me, it is important to pursue a strategy and to keep a central topic. As for the rest, I am relying on my knowledge and my professional background. However, I must admit that you can advance and enhance your skills everyday!" he concludes.

The Tornos Academy offers tailored training modules for all skill levels. Participation in the training means that operators can keep abreast of; and be informed about all the possibilities that can be realized with the solutions offered by Tornos. Furthermore, it should be noted that at the end of this training module, the instructor issues a certificate of the expertise conveyed during the training course.

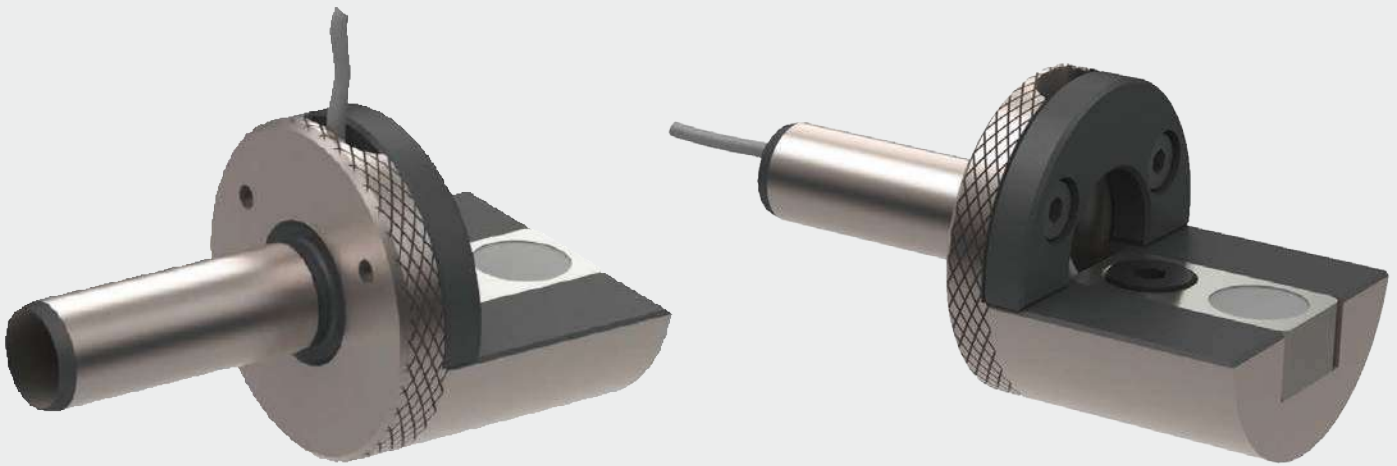
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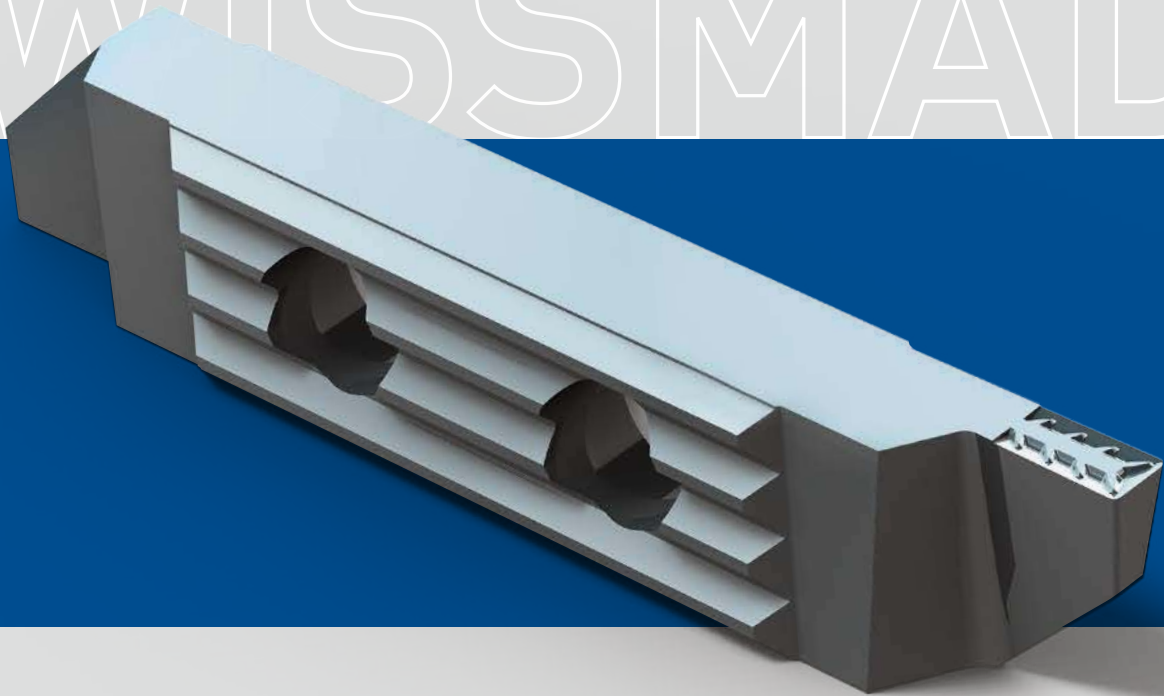
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# TORNOS

A Tornos SwissNano 7 CNC machine is shown in a gym setting. The machine is white and black, with a control panel on the left side. It is surrounded by gym equipment, including a punching bag hanging from the ceiling and a barbell with weights on the floor. The background is a dark, textured wall with a red glow. The machine has the Tornos logo and 'SwissNano' written on it.

*Someone has been  
working out*

SwissNano 7

We keep you turning