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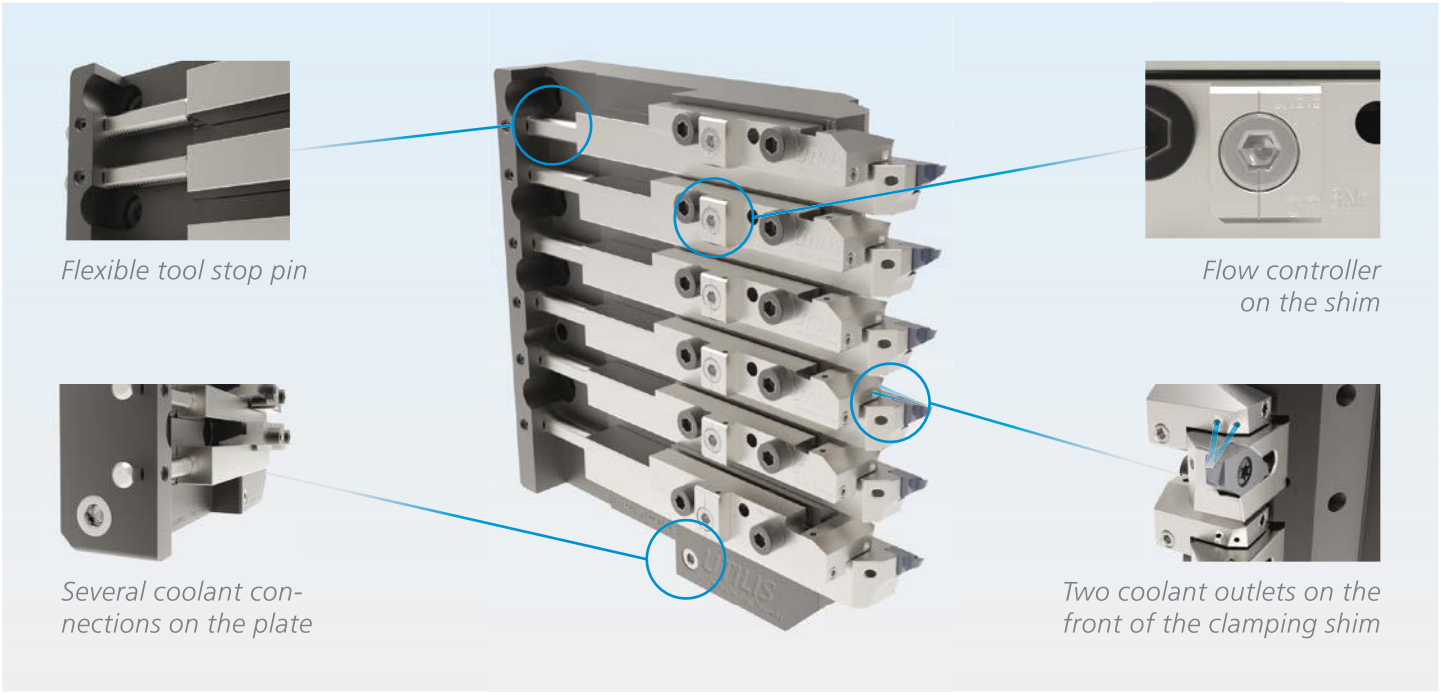

Flexible tool stop pin

Flow controller on the shim

Several coolant connections on the plate

Two coolant outlets on the front of the clamping shim

TOOL PLATE WITH INTEGRATED COOLING

- **The cooling is led directly to the cutting edge through the tool plate and the clamping shim.**
- **A wide range of connecting options make it possible to have a direct connection to the coolant unit.**
- **The omission of countless externally attached coolant connections which are often extremely disruptive provides more space in the machine room and unrestricted access to the tools.**
- **Adjustable stop pins which are integrated in the tool plate ensure that tool changes take place quickly and accurately.**
- **A flow controller on the clamping shim allows you to control and switch off åΣthe cooling altogether specifically for each individual tool.**

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"Our service instructions are generally available in nine languages, but we can translate the documents into our customer's language if required."

Francis Petithory Head of ALP (Authoring, Localisation and Publishing) at Tornos

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IMPRESSUM

Circulation
17'000 copies

Available in
French / German / English / Italian / Spanish / Portuguese for Brazil / Chinese

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CH-2740 Moutier
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SUMMARY

"This trend towards an aging population entails an increase in the opportunities for the companies that specialize in the distribution of medical products and devices."

Bruno Allemand Head of Sales and Marketing, Tornos

A technology at the service of health and well-being

Bruno Allemand Head of Sales and Marketing, Tornos

The health sector is in constant evolution. In the light of the latest demographic trends, the industrial world has been forced to initiate a turn, a turn that Tornos already had anticipated several years ago by intensifying its development efforts in the medical industry. Globalization and urbanization are key factors of this evolution in the medical and dental industries and this is hand in hand with the aging of the population.

Statistics make clear that the number of people aged 60 and older is increasing faster than that of younger age groups. This trend is expected to double by 2050 and even triple or more by 2100.

An inevitable social change

It is evident that the aging of the population will involve a significant social change that will affect all levels of society, from the job and financial markets to the demand for goods and services.

This demographic trend of aging entails an increase in opportunities for the companies that specialize in the distribution of medical products and devices, as people aged 60 and older will be their main target consumers.

Two thirds of the patients needing an artificial hip, for instance, are older than 65, not to mention the requirements of the orthopaedic medicine and of the dental sector, which increasingly offers tailored solutions and more comfortable solutions to overcome the wear that occurs over time. This erosion primarily affects our teeth that, over the years, require a large number of corrections and reinforcements, gradually needing to be replaced, particularly by dental implants.

Switzerland, the undisputable world leader

In the field of medical technology, Switzerland proves to be the clear global leader. In fact, there is no other country where medical technologies boast such a level of sophistication and advanced research, as they do in Switzerland. It is also notable that they contribute more to the gross domestic product in Switzerland than anywhere else in the world.

By uniting first-class research sites, an excellent expertise in high-precision technologies and a sophisticated medical industry with a high demand for appropriate products, Switzerland is a very attractive site for research, development and production in the Medtech sector. Tornos has always been a pioneer in this sector. We actually rely on our solid experience to make progress on a daily basis in a field that is our passion - as it relates to us all. The latter has always been our main concern and made us develop suitable solutions that are tailored to the needs of the population and to its evolutions.

Solid experience in the field

Based on several decades of close collaboration with suppliers and manufacturers of medical and dental devices from all over the world, Tornos offers tools and in-depth application expertise regarding a multitude of devices, ranging from bone screws to electronic components for the medical industry.

Our vast knowledge of both conventional and emerging materials is part of our extensive expertise in the field of automatic and multi-spindle lathes in all facets of machining, be it milling, thread whirling, drilling or even stamping.

Tornos has expert knowledge of machining materials such as stainless steels, titanium, PEEK, cobalt-chrome and emerging hybrid materials. Last year, our engineers also developed an essential solution for the treatment of magnesium, a material that is widely used in the medical industry.

Our solutions are literally pushed to their extreme limits to find the ideal combination of tools, coolants, temperatures and materials at any given time; but above all, in good time. We are constantly striving for the optimum cycle times for the production of perfect, burr-free parts of maximum precision.

We are proud of our solutions that are capable of handling machining operations in record time. We combine this with precision, attention to detail and cost-effectiveness. Incidentally, our international Medtech customers know perfectly well that they can count on us and on our experience and expertise at any time. It should be noted that it has become extremely difficult to find a leading Medtech manufacturer whose machine inventory does not include a Tornos solution.

Powerful, flexible and efficient

That is why we must find an entirely unique solution, a real gem uniting high precision, speed and efficiency – the brand-new SwissNano 7. Its market launch has caused quite a stir and the interest it arouses in the medical and dental fields keeps growing. In this decomagazine edition, you will find an article that comprehensively describes the SwissNano 7's capabilities, its undeniable qualities and its specific benefits that make it stand out from alternate machines.

The machine that was first presented together with its smaller sister model at EMO in Hanover (Germany) in September 2019, has now become the star of all exhibitions and other public appearances, from SIMODEC in France to fairs in the Nordic countries, not to mention its presentation in the course of the International Dental Meeting in São Paulo in last January, where it did not fail to charm the participating dentists.

It will also attract attention at the Medtech event in Nuremberg at the beginning of April, as well as being the focal point of our booth at SIAMS in Moutier. This exhibition is also presented in this decomagazine edition.

> "Our international medtech customers know that they can count on us and on our know-how, experience and expertise."

At the heart of our target markets and our trade

SIAMS has become an event not to be missed. It is organized every two years in Moutier and this trade fair for micro-technology production unites a great many industrial players from beyond the Swiss Jura Mountains. Intended to respond to the specific requirements of precision-industry entrepreneurs, this fair presents a major technology platform with more than 450 exhibitors.

Today, SIAMS still focuses upon its core competences: the production of micro-technology components, the establishment of contacts between potential customers and suppliers, and the industrial pragmatism that has been characterizing this fair since 1989. As a trade fair for the entire production chain of micro-technology for a total of 15 events, SIAMS has always been a pioneer in the development of synergies between the exhibitors and visitors.

For Tornos, it is the perfect opportunity to establish its presence as a major company, not only in the region but on a national scale. As an international company, Tornos seizes this opportunity to open its doors to the public by offering attendees the opportunity to visit our technical center. The visitors of SIAMS will thus be able to discover an entire range of Tornos products. Furthermore, our machine operators will demonstrate set-up operations that may be of particular interest to show visitors. SIAMS is the ideal platform to exchange information and create relationships on the spot, close to our headquarters

in Moutier. Do not miss this opportunity and this human-centered approach towards industry and machine tools.

Worldwide challenges

Various industrial meetings have been scheduled for 2020, a year that certainly will be characterized by an increasing interest of human beings and their well-being and health. Technology will continually be committed to this industry, offering enhancements and interactive solutions that are tailored to the current situation. In response to these new perspectives, Tornos has an important role to play, and we want to fulfil this role with precision and proficiency that can be inspired by the example of a perfectly sharpened and precise scalpel ready to be used.

So, we would like to invite you to contact us and find the ideal solution for your specific requirements. So, whether you are active in the medical industry or in other sectors, we will be ready to analyze and meet your needs to jointly make progress in view of an aging yet agile and alert society. This will succeed with state-of-the-art technology and with the aid of Tornos, a company that knows how to combine past and present, experience, creativity and technology.

The demand for charging stations is significantly increasing.

As electromobility (e-mobility) gains a global foothold, Tornos honours its promise to

e-mobility players

and their suppliers: ***We keep you turning***

Today's vehicles, and in particular electric vehicles — are jam packed with electric motors that serve a wide variety of purposes. Tornos' solutions energize our customers' turning processes and performance, bringing countless productivity and quality benefits.

TORNOS

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The global automotive industry is driven by a variety of key mega-trends, these include climate change, regulations and dynamic technology and innovation — it is all undergoing a transformation, and with that transformation comes new challenges for automotive manufacturers and their respective supply chains.

E-mobility is the future; a future that is calling for completely new solutions in the field of automotive electronics. Power electronics play a key role, in hybrid vehicles for example, a shoebox-size component handles the energy management between the battery, electric motor and the internal combustion engine. Power electronics is cutting-edge technology, and it poses major research and production challenges. From hybrid vehicles to fully electric cars, Tornos is well-positioned as a go-to expert. With more than 50 years as an automotive industry partner at all points of the supply chain, Tornos provides the Swiss-type and multi-spindle turning technologies, positions automotive players to meet their challenges,

as they race to meet societal, economic and environmental challenges. As a reliable innovative partner, Tornos has the technologies and knowledge to help customers meet—and exceed industry demands for on-time, on-target, zero-defect production.

We keep you turning

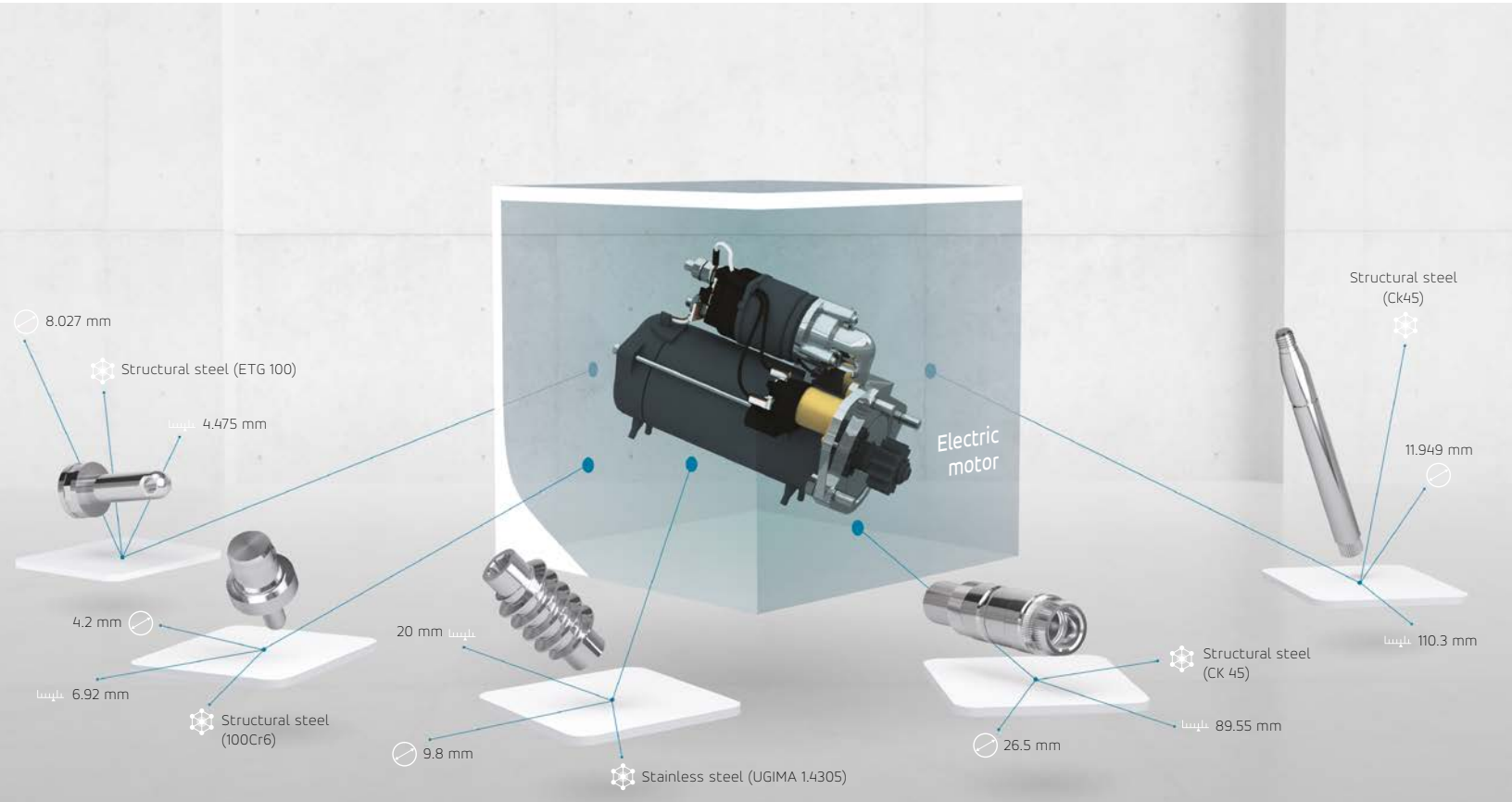
For some, cars are objects of desire and expressions of individuality. For others, they are simply a means of getting from point A to point B. Cars play an essential role in our everyday lives and—moreso than for other industries—quality, safety and economic viability are of particular importance to the automotive industry, a market that poses numerous challenges to any machine tool manufacturer. For more than 50 years, Tornos has been an automotive industry specialist: We collaborate closely with original equipment manufacturers (OEMs) and Tier 1 and Tier 2 integrators to help them meet ever-stricter regulatory standards, satisfy the needs of consumers, and stay on pace with advancing technology and dynamic innovation.

Our experience across a broad range of industry segments—Automotive, Micromechanics, Electronics, and Medical & Dental—puts us in the unique position to partner with automotive manufacturers and provide the key support in new technologies related to e-mobility.

Vast expertise

While e-mobility is still evolving, one thing is certain: With our experience in the connector business, Tornos is a source of strength for customers. We have helped shape the design and production of connectors for all types of industry, from Formula 1 cars and manned and unmanned aircraft to satellites and countless other connector applications.

In the electronic connector industry, the swap ratio, size, weight and power output of connectors is a critical factor as the sector continually evolves. Our customers turn to us for solutions that help them continuously push boundaries and produce



ever-smaller connectors. One example: Our sliding headstock lathes make easy work of turning a 2 mm copper alloy bar into high-quality male and female connector pins with diameters down to 0.3 mm. And as the industry evolves, these dimensions may become even smaller.

Electric motors are another example of Tornos' vast automotive expertise: From the simplest to the most complex electric motors, we empower our customers' manufacturing performance.

Ball bearings are yet another example of Tornos' auto industry know-how. At the heart of the movement of cars, ball bearings are found, not only in the wheels but literally everywhere. They are in everything from electrical and security systems, headlights and comfort systems and climate control to electric seats. No one understands ball bearing manufacturing as well as Tornos.

A solution for every challenge: high-pressure coolant

With a solution for every challenge, we secure our automotive customers' application success, operational uptime, quality and efficiency. There is no need look any further than our high-end machines that are designed for high production rates.

One example of our problem-solving capabilities is our approach to coolant flow and pressure. Increasing the pressure of the machine coolant positively impacts both chip breaking and tool life, but it also increases electrical power consumption. Tornos solves that problem with built-in coolant systems that increase precision and oil jet delivery to reduce flow. As a result, this reduces energy consumption of the machine while achieving the same highly precise results.

At the same time, by applying an 80-bar coolant pressure, Tornos increases tool life by seven times in finishing operations and an impressive 40 percent when using high-pressure coolant for rough machining.

Solution: thread whirling

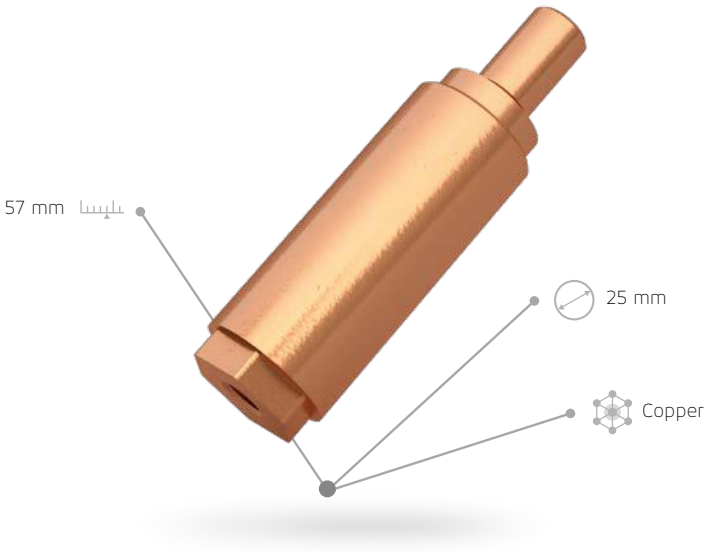
When it comes to machining worm screws for electrical motors, Tornos' has unique thread whirling solutions. This is credit to Tornos being a preferred partner to MedTech manufacturers for generations — an enormous asset. Today, Tornos is the only company offering thread whirling on single and multi-spindle centers.

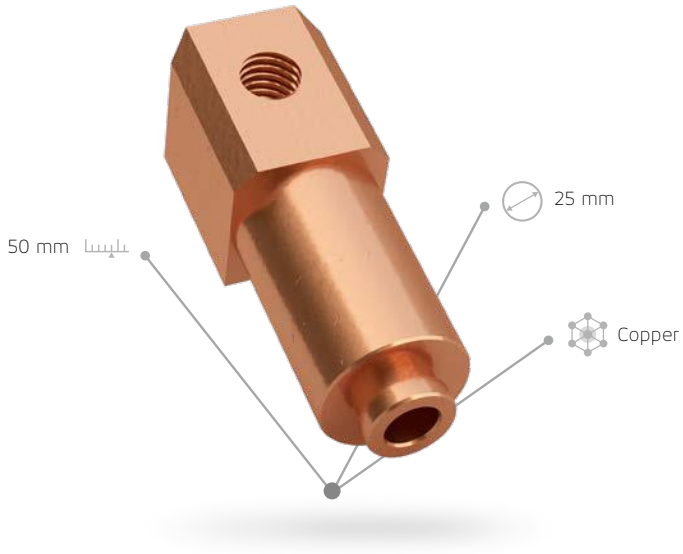
Solution: impeccable quality

In today's world, car breakdowns are almost inconceivable: Consumers expect nothing less than the highest levels of vehicle quality, safety and reliability. The automotive industry has itself set similarly high standards, requesting a quality level of five or fewer defective parts per million. To ensure this level of quality, Tornos partners with specialists in controlling and measuring processes and has developed an interface that communicates with various measuring systems. The result for customers is an interface that ensures complete compatibility between their Tornos machine and the measuring system — leaving one less headache for the machine operator. Available on single as well as multi-spindle machines, this interface allows corrective data to be transmitted and corrective measures to be automatically triggered by the machine's control unit.

Solution: chip management

Depending on the volume and material to be machined, swarf extraction is a process that can cause major problems, particularly in automated production with little monitoring. We advise that customers apply high-pressure pumps for swarf removal and where appropriate, a universal swarf conveyor to handle a variety of swarf types from brass and aluminum to stainless steel. Oil monitoring and filtration and fluid management are additional Tornos competences.





Solution: painless programming

Tornos' TISIS smart, advanced, Industry 4.0-ready ISO code editor is the automotive manufacturers' portal to Industry 4.0. Programming machines with more than 30 axes were no easy task, until we launched TISIS. Thanks to its programming concept and Tornos' multi-spindle kinematics, the user programs three axes six or eight times, significantly simplifying programming. Plus, TISIS knows the user's entire Tornos machine fleet and can help the operator to decide which machine to use for a specific part and which machine options should be used.

Tornos Service and Tornos Academy

Commissioning a Tornos machine is just the beginning of each customers' relationship with Tornos. With Tornos Service, which is backed by geographical proximity to our customers and a keen understanding of their processes, applications and market challenges; we can deliver unparalleled levels of support along the full life cycles of our machines.

From start-up assistance and expert training and coaching to free hotline support, we keep our customers turning.
Just as the Tornos Service team keeps your machines up and running, the Tornos Academy educates your employees to maximize the performance of your Tornos machines. That means you can outpace your competitors and you are well positioned to seize new application opportunities with Tornos at your side.

With attributes such as highly precise, dependable, state-of-the-art single and multi-spindle lathes and micro-milling machines; Tornos has extensive and deep application expertise. Our success triggering TISIS software, support services and training, support our products, making it no wonder automotive manufacturers continue to turn to Tornos.

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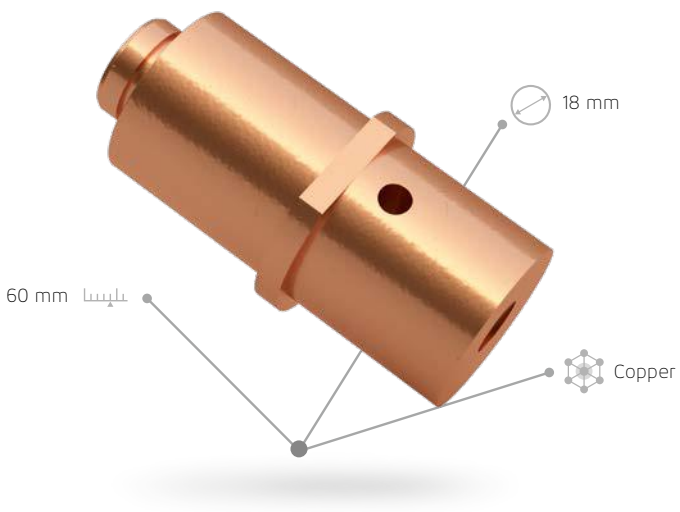

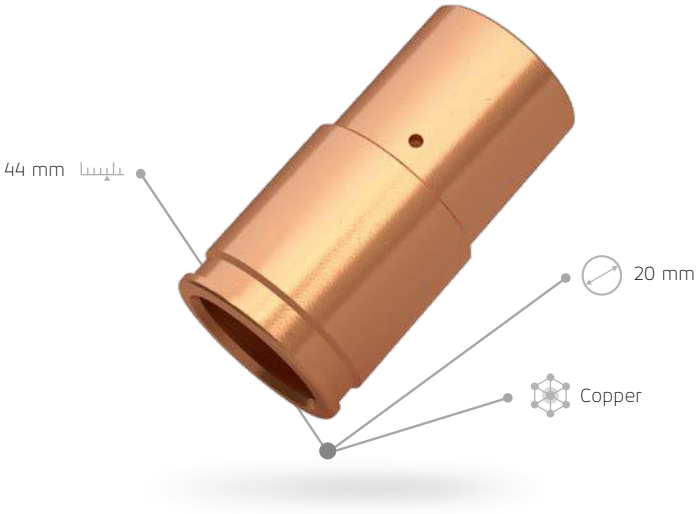

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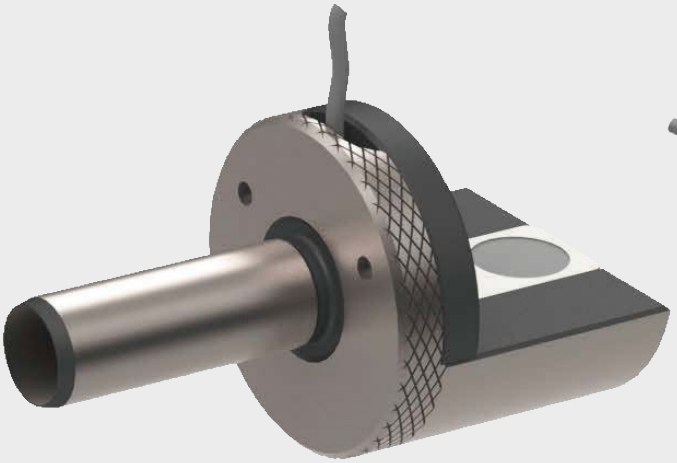

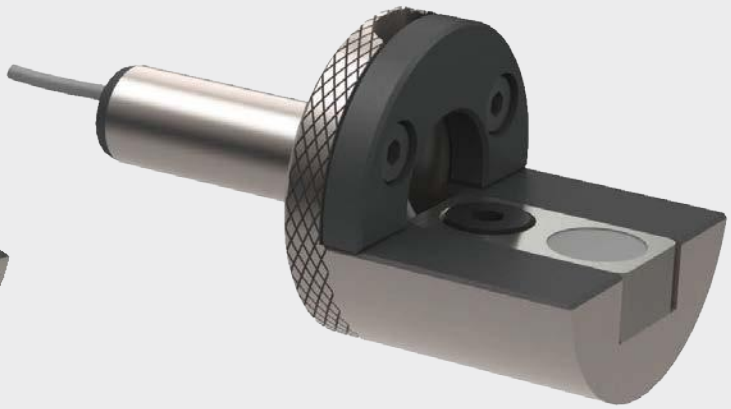

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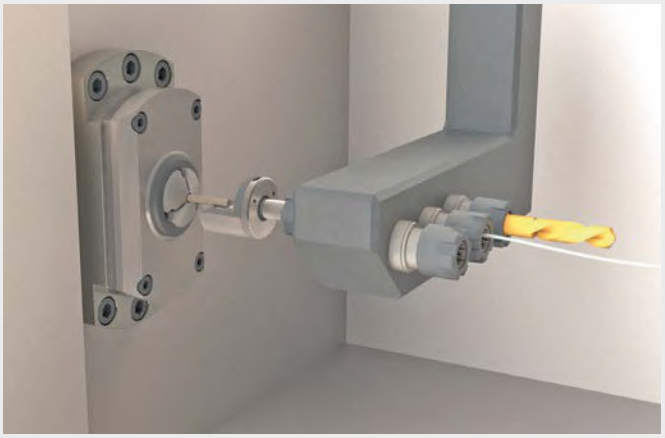

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"All documents are checked by machine users," Francis Petithory, RTP manager.

SERVICE INSTRUCTIONS:

An operating manual customised for each machine

Acquiring a Tornos machine means acquiring a complete ecosystem. When customers contact Tornos, they are not just looking for a machine, they want access to a comprehensive portfolio of options, options that will enable them to produce an impressive range of parts that is as varied as it is almost endless. It is therefore crucial that each machine is sold with complete technical documentation that gives a detailed explanation, not only of its operation, but also of all the developments contained within.

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We met with Francis Petithory, head of ALP (Authoring, Localisation and Publishing) at Tornos.

Hello Francis! What is your exact role?
I look after the coordination, authoring and formatting of the service instructions. Importantly, not only does all of the technical documentation linked to the machines need to be written, it must also be translated. Our service instructions are generally available in nine languages, but we can translate the documents into our customers' language, if required.

I manage over 15,000 documents. To enable customers to get the very best from their machine, my role is to take all the technical documentation needed and make it suitable for customers to use it correctly, making it accessible, without oversimplification.

How are the service instructions created?
The first point of contact is the project managers that work on the machine projects. Initially, the goal is to identify the requirements of the different users, either existing or potential. My department is required, from the outset to write the documentation intended for the operator and, more broadly, for the user. This involves deciding what merits publication and exactly what information every person will interact with. It is important to provide knowledge and understanding of the machine, from operation to the safety standards. This also includes the many intricacies and details that have been carefully designed by Tornos.

What is the process, in concrete terms?
We work with an interactive platform, which automates publication, archiving and ongoing updates. In fact, we know exactly what is happening in terms of the documentation in real time. Everything is tracked. We can respond to any request at any time with just a click. When our service department is contacted by a customer who wants the latest updates for their machine, we can automatically send out the new data the customer needs.

Furthermore, everyone who purchases a machine is guaranteed to have all the latest updates relating to their new machine. We are also happy to fully

customise all of our service instructions. As far as we are concerned, every customer is unique and merits special treatment. We are always perfectly up-to-date, largely thanks to a handy archiving system that we have been feeding every day for over ten years.
All our technicians across the world are connected to it, and each is responsible for their own updates.

What format are the service instructions received in?
We print the complete documentation in colour. They are thick folders, very substantial. We also provide these in digital format. We are also looking in the future, to make the service instructions directly accessible online via the Tornos platform.

So, the future of your work is decidedly digital?
Our department has been changing constantly since 2017. Initially, we opted for new colours and a themed corporate design that was really popular with customers.

With the aim of improving the quality of the information, we set up a collaborative platform which allowed everybody to work together. It is a real group enterprise.

Tornos intends to move towards using stable source information for both authoring and translation, which will provide a solid foundation for all.

This means that all the highly skilled stakeholders involved are the milestones in this constantly evolving project. Tornos' goal, as ever, is to be competitive and to move forwards into the future. With this collaborative platform, developed by a Swiss start-up, we can meet the needs and future demands of a constantly evolving market.

tornos.com

"There is no material and no challenge that frightens Azurea off and the company prides itself on airing versatility and a pioneering and visionary spirit."

Samuel Geiser Azurea's Bévilard Site Manager

AZUREA TECHNOLOGIES BÉVILARD SA:

Corporate vision plus
top-quality
products and services

Based on a long-standing tradition and a vast expertise, the Swiss Azurea Group has made its mark and earned a reputation that reaches far beyond the Swiss Jura Mountains. Founded in 1914 as a bar turning workshop under the name Célestin Konrad SA, the parent company Azurea has been headquartered in Moutier since its early days. Today, the company has four distinct production sites, Azurea Technologies Bévilard being one of them.

azurea

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Specializing in the production of components and sub-assemblies for the equipment industry, the company was certified with ISO:13485 in June 2019, a standard that specifies the requirements for a quality management system (QMS) for the medical device industry. Even if this standard is not mandatory for the marketing of medical products, it stands for the utmost in quality and safety of the products manufactured in accordance with it. It has been Azurea's primary desire to be able to offer its clients this certification and ensure tracking and traceability of its devices.

Always a step ahead in the response to the evolution of the industrial sectors

In 2009, Azurea Holding SA acquired the Bévilard Company with the primary aim to strengthen and evolve the equipment sector. According to

Samuel Geiser, Azurea's Bévilard Site Manager said: "It's now about providing a service – assembly. Azurea has decided to stand out as a supplier of finished products. This is undeniably a pledge of added value since we are real specialists, not only in the field of assembly but also in terms of specific functions. We can develop innovative solutions from materials that are sometimes very exotic."

Premises with state-of-the-art equipment

When talking about exotic materials, Samuel Geiser first and foremost is thinking of specific stainless steels and different grades of titanium. Thanks to its vast inventory of Tornos machines that comprises of thirteen Deco 10 and two Deco 13 machines, some of them being equipped with gear cutting function, Azurea can also machine materials such as PEEK, a thermostable plastic material. There is no material and no challenge that frightens Azurea off and the company prides itself on airing versatility and a pioneering and visionary spirit.

"We make the experience and expertise of our technicians available to our customers in the medical, dental and microtechnology sectors for them to achieve impeccable quality."

"In 2020, we will have a gray room for assembly that we want to use to put the finishing touches to our products," Samuel Geiser continues. "This investment aims at the limitation of potential contamination of the processes by the users."

"We make the experience and expertise of our technicians available to our customers in the medical, dental and microtechnology sectors for them to achieve impeccable quality", Nicole Crisci, Azurea's Executive Assistant and Communication Manager, adds.

Pioneering spirit in an evolutive structure

Open-minded, reliable and competent – that's how Azurea's representatives at all levels of the company can be described best. "What began as a family-owned business has developed over time and now presents itself as a company that is acting on a global scale while remaining true to its principles of independence," Nicole Crisci explains.

With an efficient quality system, committed and skilful employees – it seems Azurea can pool all the ingredients required to guarantee the control and traceability of the processes while meeting the deadlines. The employees enjoy working in this environment and most of Azurea's former apprentices continue their career within the Group.

"Azurea Technologies Bévilard SA was awarded the best apprentice employer 2018-2019," Samuel Geiser concludes with due pride. "And we provide opportunities for anyone. For Azurea, the school grades are not the crucial aspect. To us, it is most important that the apprentices are eager to learn, to progress and to succeed in our company," the Bévilard Site Manager adds.

At Azurea, training and apprenticeship actually are much more than mere concepts. It is about daily development and perspectives that become apparent and reappear according to the requirements and contingencies of the customers. "Everyone employed by Azurea follows a certain career path. We put an emphasis on good communication and on-going collaboration between the different sites. We even swap staff between the sites," Nicole Crisci explains.

Four sites, four hubs of expertise and passion

To be always a step ahead in the response to the customer requirements, Azurea has specialized and diversified its businesses. As the latest group-wide

example for this, there is a new feature offered by the Belprahon site: an e-shop. For the record, Azurea Jauges in Belprahon is specializes in the production of gauges and measuring devices as well as in metrological service. Via the internet e-shop, the customers can obtain high-quality finished products and pin-type gauges made of the desired material, not to mention complete gauge boxes. The e-shop is easy to use and convenient and the order amount is immediately calculated online. In addition, Azurea will bear the postage for online orders to promote this new kind of commerce.

This is only one example of how Azurea knows to combine boldness and ambition. Between intelligence and precision, demand and intuition, the company Azurea knows how to play its cards right by attaching the necessary importance to every tiny detail. As John Pawson so eloquently said, "the difference can sometimes be measured in the tiniest details."

azurea.ch

The Azurea Group is committed to studying tomorrow's technologies already today, with the aim to always be a step ahead.

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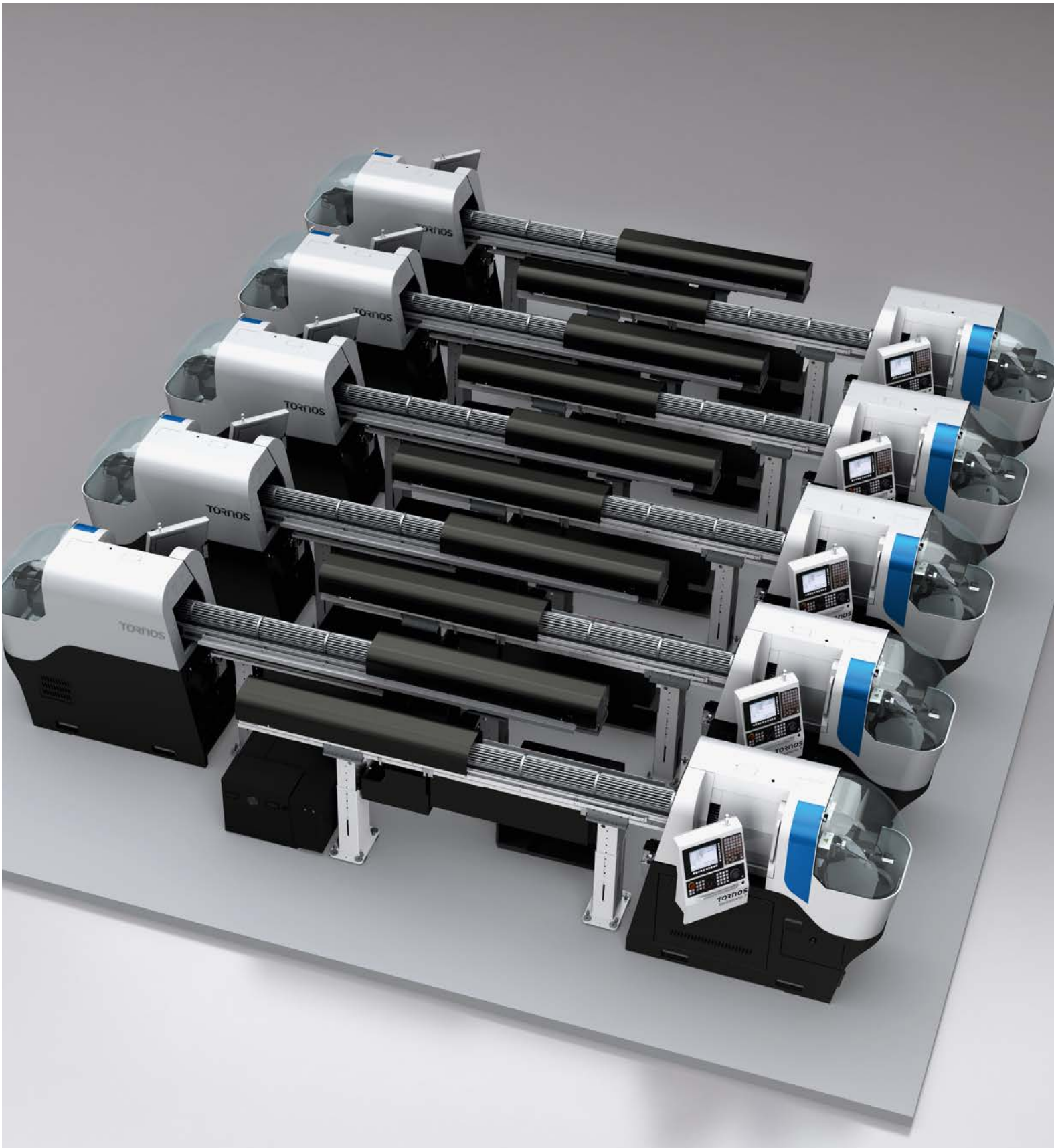

Thanks to its compact design, 10 SwissNano 7 machines can be arranged on a surface of less than 80 m².

SWISSNANO 7:

Floor space

and efficiency as key concepts

The SwissNano 7 machine has proven its worth for many customers and it excels in the machining of parts for the medical and dental fields, as well as the electronics and micro-mechanics industries. It can optimize workpiece production in workshops. So, let's take a brief look at how it manages to do so...

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Floor space

This aspect is eye-catching: With its length of 3 meters and its 1-meter width, the SwissNano 7 is extremely compact. This machine configuration even includes a high-pressure pump. So, a workshop can accommodate 10 machines on a floor space of less than 80 square meters. Since the machines have spindles equipped with optimized motor drives, heat dissipation is very low. The workshop benefits from this in terms of reduced power consumption and less technical effort required to dissipate heat. For workshops with air conditioning, the electricity bill will be much lower.

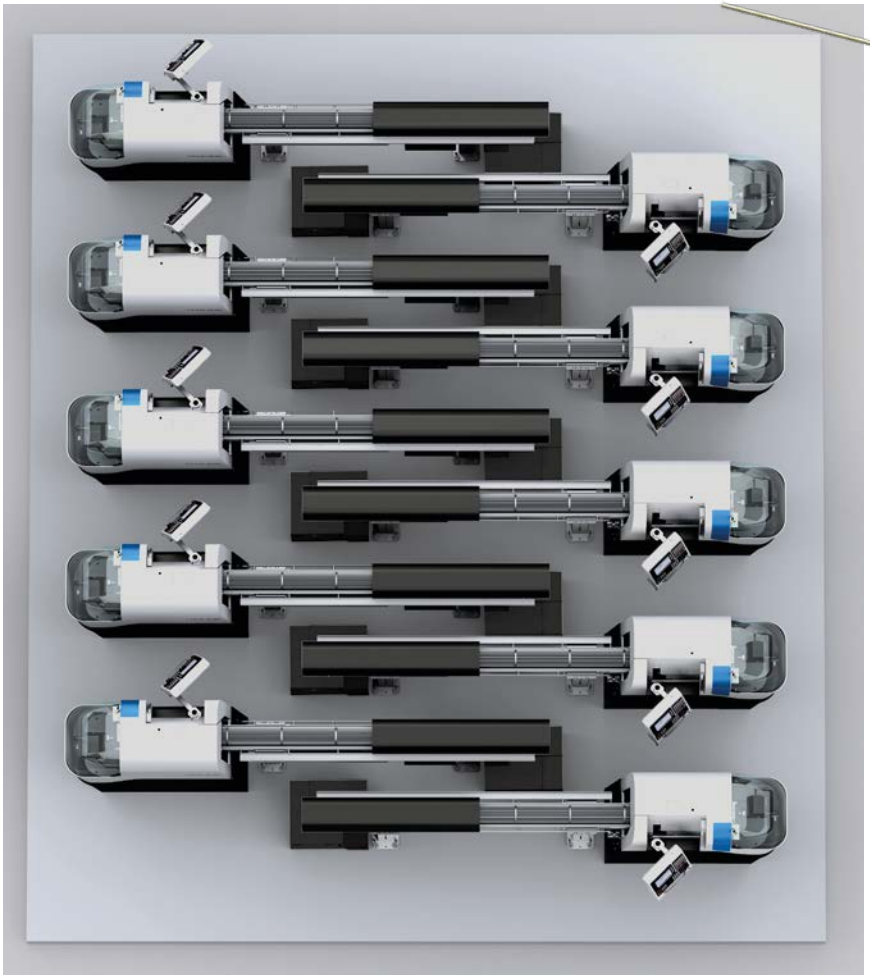
To enhance the machine heating characteristics, the spindles are equipped with an integrated cooling circuit. With a view to optimum thermal characteristics, both the spindles and the rotating guide bush are provided with ceramic bearings.

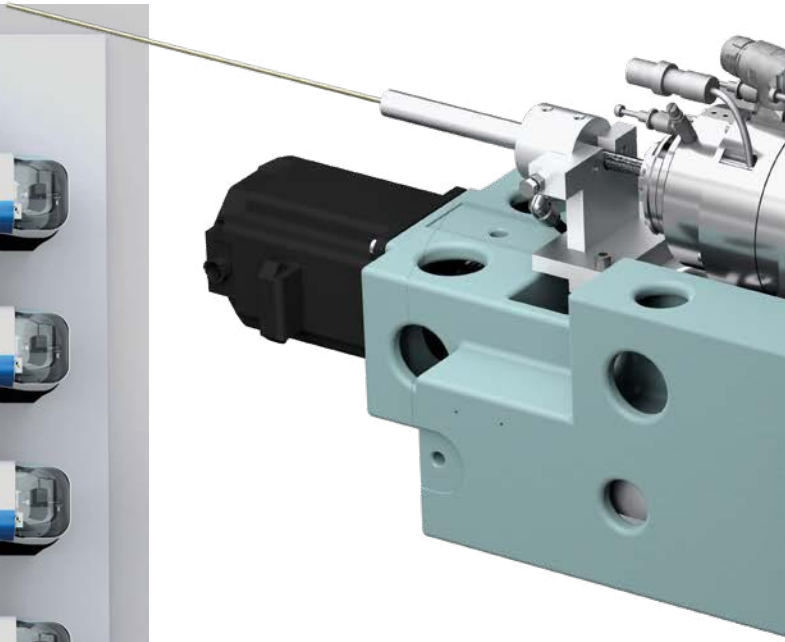
Thermal behaviour

The SwissNano has short thermal circuits. This is the basis of a machine concept which mainly consists of a symmetrical cast-iron core that allows perfect control over thermal variations of the machine – with quite simple results. According to various customers interviewed, the stabilization of the SwissNano 7 takes no more than 5 minutes even under the most adverse conditions (i.e. with a cold machine). So, this small machine can provide maximum productivity from the first workpieces while the scrap rate is kept extremely low. In addition to its favourable thermal behaviour, the machine offers utmost rigidity. The wear resistance of the tools is excellent and permits cost savings of sometimes more than 30% on cutting tools. The structure of the machine and its base is simply perfect; it provides quick stabilization and ultra-rigidity.

Production efficiency

In the production process, the SwissNano 7 machine features a marvellous dimensional stability and utmost productivity. Thanks to its footprint, its tooling system and its kinematic system, the machine achieves a higher productivity than more complex and more expensive machines. The differences have been made out by one of the first customers where the SwissNano 7 produces 650 parts per shift and achieves a daily throughput of 1300 workpieces, given the fact that the company is operating in 2 shifts. The previous machines used, came from a famous European manufacturer of automatic lathes. Despite its 2 supplementary tool systems and its higher theoretical performance, the competitive machine can only produce 350 parts per shift. In this case, the small SwissNano 7 is therefore 85% faster. One could also say that the customer needs three competitive machines to achieve the annual production of one SwissNano 7 machine. And what's more, the SwissNano's scrap rate is much lower.





Workpiece quality and unloading

Thanks to its pooled machining capabilities, the SwissNano 7 allows a drastic scrap rate reduction. The extremely well-thought-out machine core contributes to the overall quality of the machine. Often, it is very difficult to unload the parts correctly without damaging them. Here, the SwissNano 7 offers an excellent solution. It can be equipped with a vacuum system, a carousel that enables workpiece sorting and convenient statistical monitoring. The machine is suitable for all types of workpieces and the part outlet in the machining area can also be adapted to the specific workpiece requirements. With its high performance, flexibility and efficiency, the SwissNano is an excellent partner. Do not hesitate to discover it through your nearest Tornos representation.

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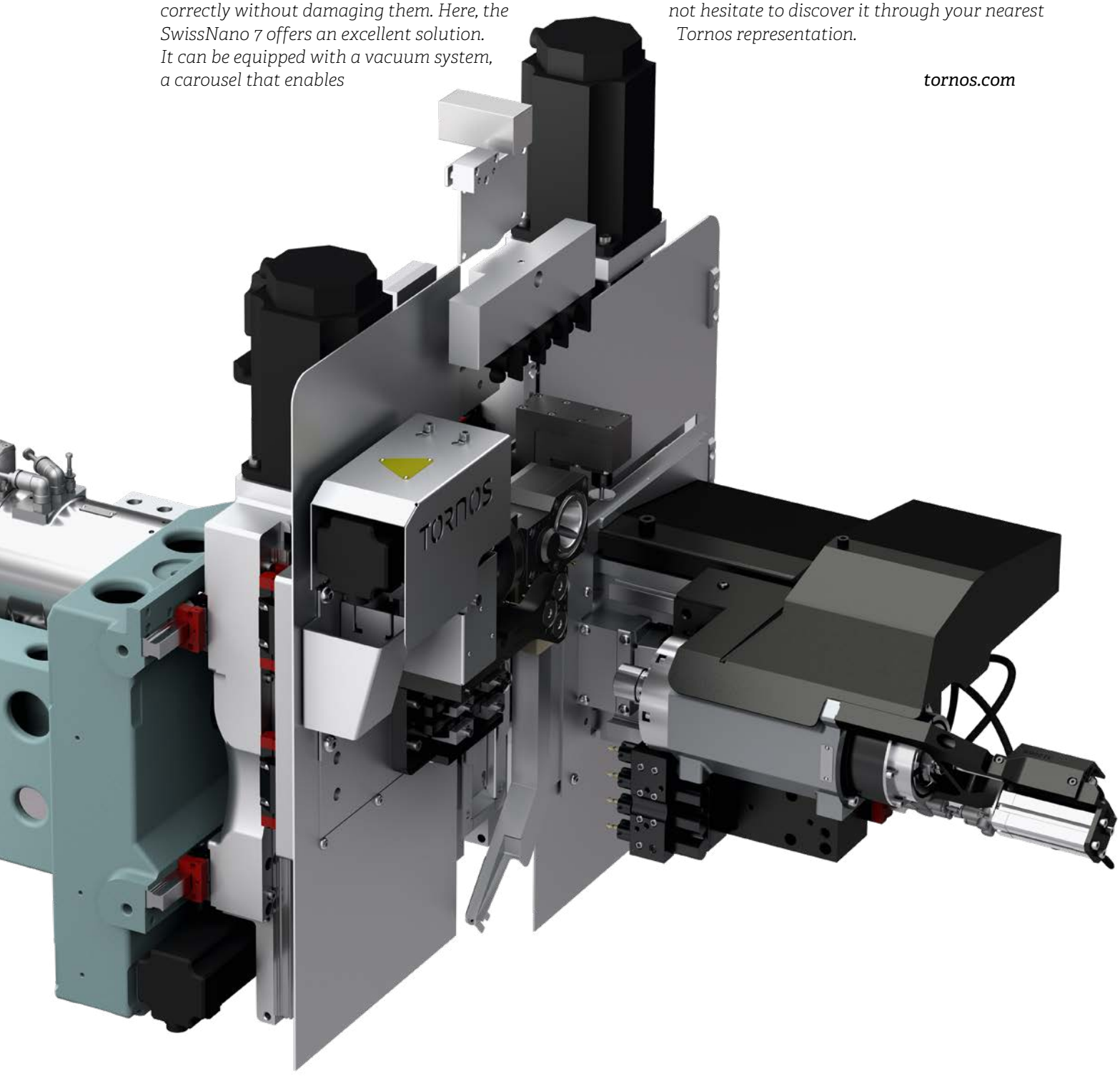

The BA 1008 range comprises 3 machines that each can be fully adapted to the customer's needs.

Machining centers by Tornos –

High-tech at its best

Tornos not only produces Swiss-type lathes, but we are also engaged in the micro-milling sector. Our BA 1008 bar milling centers and the machining centers CU 2007 and CU 3007 are testament to that. Since the milling market is extremely competitive, we wanted to know what makes the Tornos milling product range stand out from the rest of the market.

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Customization for perfection

The Tornos machines offer perfect customization and are adapted to the customer requirements in the best possible manner.

A machine range that covers a large spectrum of needs

The current range comprises various machines meeting the requirements of specific requirement categories. The BA 1008, BA 1008 HP and BA 1008 XT machines are aimed at companies that want to mill small parts with maximum precision. As for the CU 2007, various machine configurations – with 3, 4, 4 ½ or 5 simultaneous axes – are offered depending on the existing machining requirements. Loading and unloading can be realized by means of handling and palletizing systems. The machine can be equipped with a simple rotary table and various clamping systems or indexing tables with 4 to 5 axes. The BA 1008,

however, is a small bar milling machine that concentrates the accumulated Tornos expertise in the fields of milling and turning.

BA 1008 range

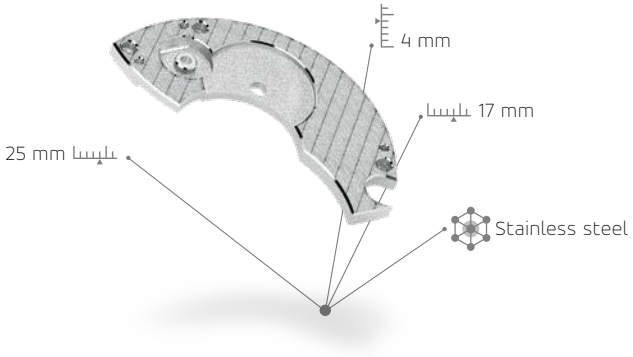
The BA 1008 range comprises 3 machines, that each can be adapted to the specific workpiece requirements. Each of these machines features minimum floor space, utmost precision and productivity. The BA 1008 models are the smallest bar milling machines in the market.

BA 1008

The BA 1008 is bar fed and a dividing head allows workpieces of diameters up to 16 mm to be loaded. Machining operations with positioning control and interpolation between the tool systems and the workpiece are also possible. The machine is equipped with 4 front spindles, 3 lateral spindles and 2 spindles for back machining. It offers comprehensive adjusting functions and can be provided with various options such as a B-axis.

BA 1008 HP – high-pressure version

Just like the established BA 1008 machining center, the BA 1008 HP is fed with bars and equipped with 4 front spindles, 3 lateral spindles and 2 spindles for back machining. The BA 1008 HP comprises a complete through-spindle coolant supply unit (120 bar) for even more precise and faster machining. The BA 1008 HP machine offers optimum chip removal and thus allows machining operations with formation of large chip volumes.



Technical specifications		BA 1008
Axes	axes	6 linear axes + 1 C axis + 1 B axis (optional)
Front spindle	rpm	4 spindles, 12,000, 28,000 or 80,000 (ER11-UP/ER8-UP collets)
Lateral spindles	rpm	3 spindles, 12,000, 28,000 or 80,000 (ER11-UP/ER8-UP collets)
Back machining	rpm	2 spindles, 28,000 or 80,000 (ER11-UP/ER8-UP collets)
Cutting off		1 tool (Ø 80 mm)
Dimensions L x W x H	mm	2400 x 650 x 1600

BA 1008 XT

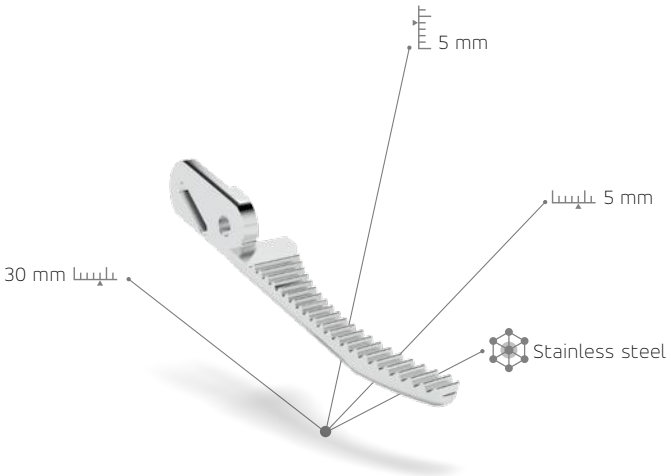
The configuration of the BA 1008 XT significantly increases machining capabilities and enables the manufacture of workpieces that were previously impossible to produce. It can actually be equipped with up to 8 spindles and 2 tool changers and thus achieves a maximum capacity of 23 tools.

Technical specifications		BA 1008 XT
Axes	axes	6 linear axes + 1 C axis
Front spindles	rpm	Up to 3 spindles (mechanical, HF or auto HF)
Lateral spindles	rpm	Up to 3 spindles (mechanical, HF or auto HF)
Cutting off		1 tool (Ø 80 mm)
Dimensions L x W x H	mm	2400 x 920 x 1600
Weight	kg	950

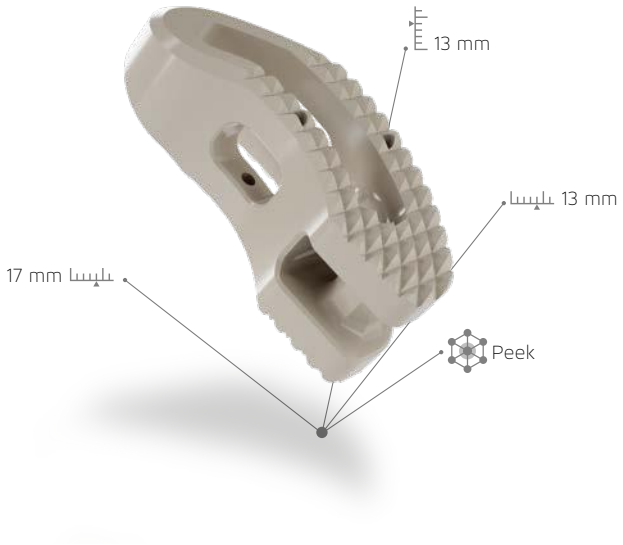
CU 2007/CU 3007 range

There are machines comparable to the CU 2007 and CU 3007 in the market. However, no other manufacturer offers the services that Tornos offers for its machines. Tornos can customize its CU 2007 and CU 3007 models to the specific requirements of the workpieces to be machined. The CU 2007 and 3007 machines have a simple yet sturdy cast iron structure. While the CU 2007 features travels of 500/400/470 mm (X/Y/Z), its big sister is provided with a larger X-axis travel of 700 mm. The machine bases and its columns are generously dimensioned to ensure high stability, repeatability and precision of the machine.

To even enhance the accuracy aspect, the column has only one vertical axis (Z axis). The worktable can take heavy loads up to 250 kg and support the two NC axes X and Y. The machines can be fitted with HSK E-40 tool holders and magazines offering 24 or 40 positions. The tool change takes only 0.8 seconds which allows chip-to-chip times of less than 3 seconds. Tools with a maximum diameter of 80 mm, a length of 200 mm and a weight of 3 kg can be loaded into the CU 2007.



Tornos' strength lies in the ability to provide a standard machine with profound expertise; therefore, the customization possibilities of the CU 2007 and CU 3007 machines are almost infinite. The machines can be equipped with special spindles as well as a 4th rotary axis – via a table comprising a counter spindle – or with 4th and 5th rotary axes with positioning or simultaneous axis control. Another extra is the second dividing head that enables the machine to easily compete with high-end turning/milling centers. Not only does the second dividing head provide the machine with a means of feeding the spindle with bar sections of appropriate length but it also enables the sixth face to be finished as a matter of course. Once the front face of the workpiece is in the second dividing head, cutting can be performed and the workpiece can be cut off-the-bar. Once the workpiece has been clamped, the rear face of the workpiece can be machined using the machine spindle. Finally, the workpiece can be safely ejected without leaving marks, as the machine is equipped with an ejector. The entire system remains extremely flexible and can easily be reconfigured depending on the requirements of the workpiece to be machined.



Technical specifications		CU 2007	CU 3007
X axis	mm	500	700
Y axis	mm	400	400
Z axis	mm	470	470
Tool magazine (positions)		16 / 24 / 40*	16 / 24 / 40*
Tool holders		HSK E40	HSK 40E
Chip-to-chip times	sec	< 3	< 3
Spindles	rpm	12,000, 20,000* or 40,000*	12,000, 20,000* or 40,000*
T-slot table dimensions	mm	650 x 400	850 x 400
Dimensions L x D x H	mm	1580 x 2450 x 2410	2100 x 2450 x 2410
Control unit type		Fanuc 0iMD / 31iB*	Fanuc 0iMD / 31iB*
5-axis simultaneous machining (option)		FANUC 31iB-5	FANUC 31iB-5

* Option

Available automation systems

To round-off the autonomy of the machine, it can be equipped with a pick-and-place system. This simple yet economic and efficient automation system can be used to store bar sections up to 330 mm long in a magazine located directly in the machining area and comprises a gripper system attached to the spindle block.

With this solution, the machine footprint has been kept to the minimum. Should the pick-and-place system be insufficient in terms of autonomy, the CU 2007 can be combined with a robot cell. This unique solution avails itself to the comprehensive know-how of Tornos'. The six-axis robot can load and unload the workpieces and turn them over. An additional gripper system is used to handle the workpiece pallets.

The integration of this robot provides the CU 2007 with a very high degree of autonomy in terms of movement. Loading, unloading, palletizing, turn-over and reloading of the machining unit are carried out with unrivalled precision. This unit can even undertake intermediate storage and return the workpiece to its previous position. Thanks to this automation system, valuable time can be saved, and the repeatability and precision of the parts produced can be improved since manual operations, that often are potential sources of error, are eliminated.

If you want to get detailed information, do not hesitate to contact Tornos.

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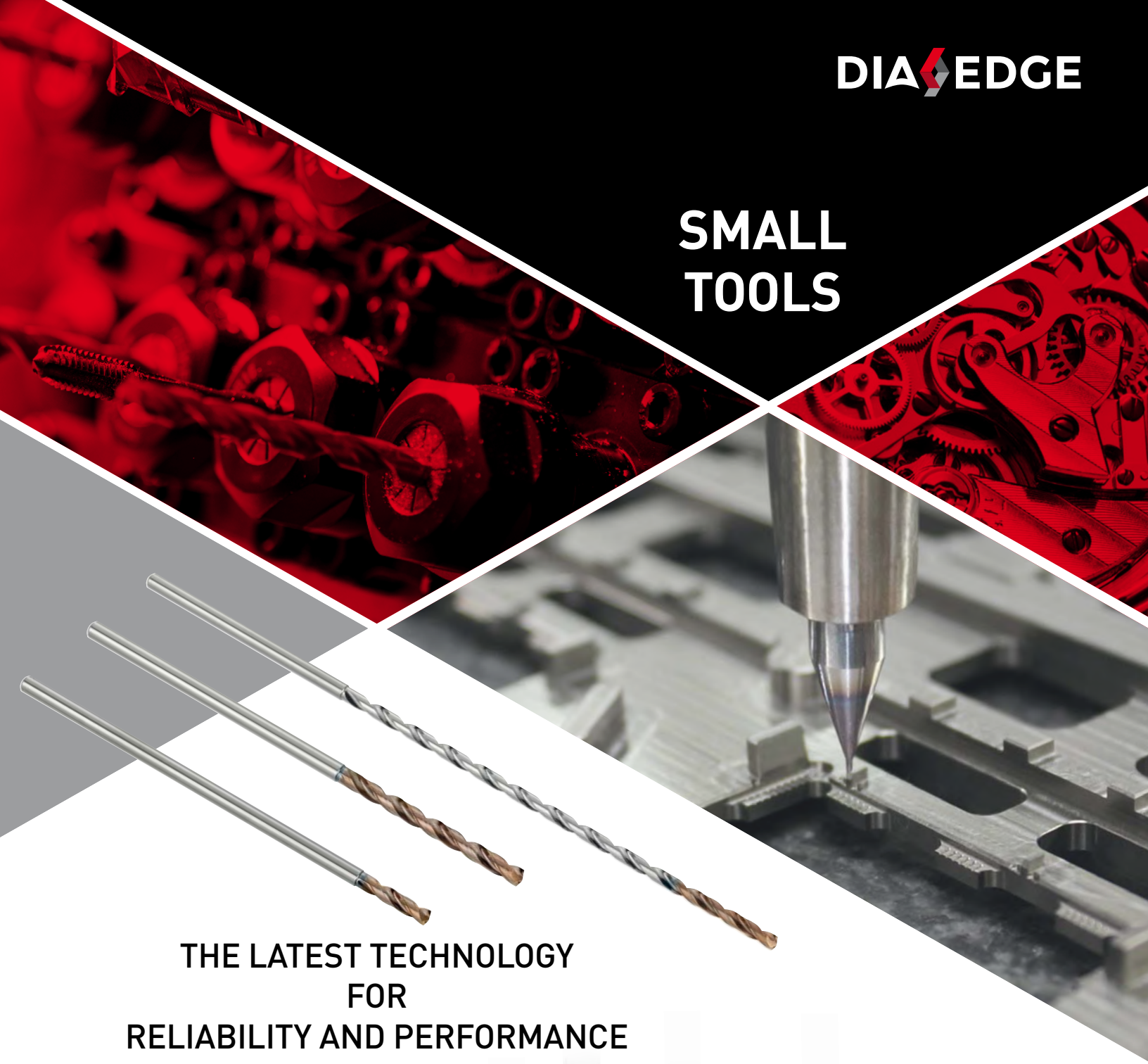
DIA EDGE

SMALL TOOLS



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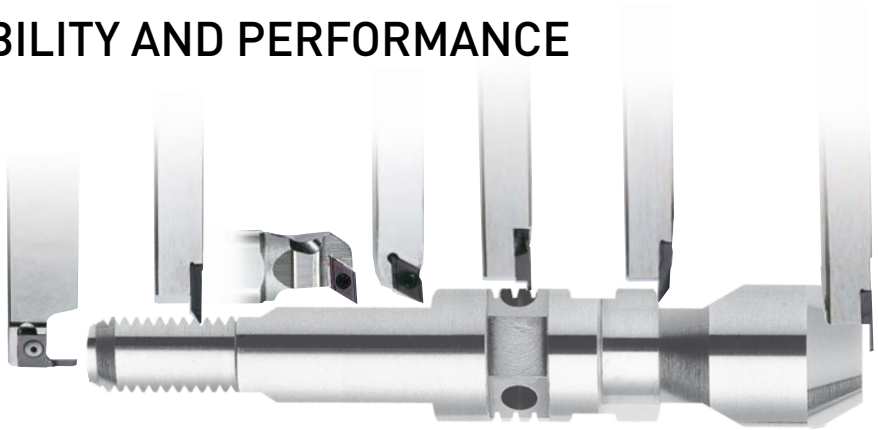

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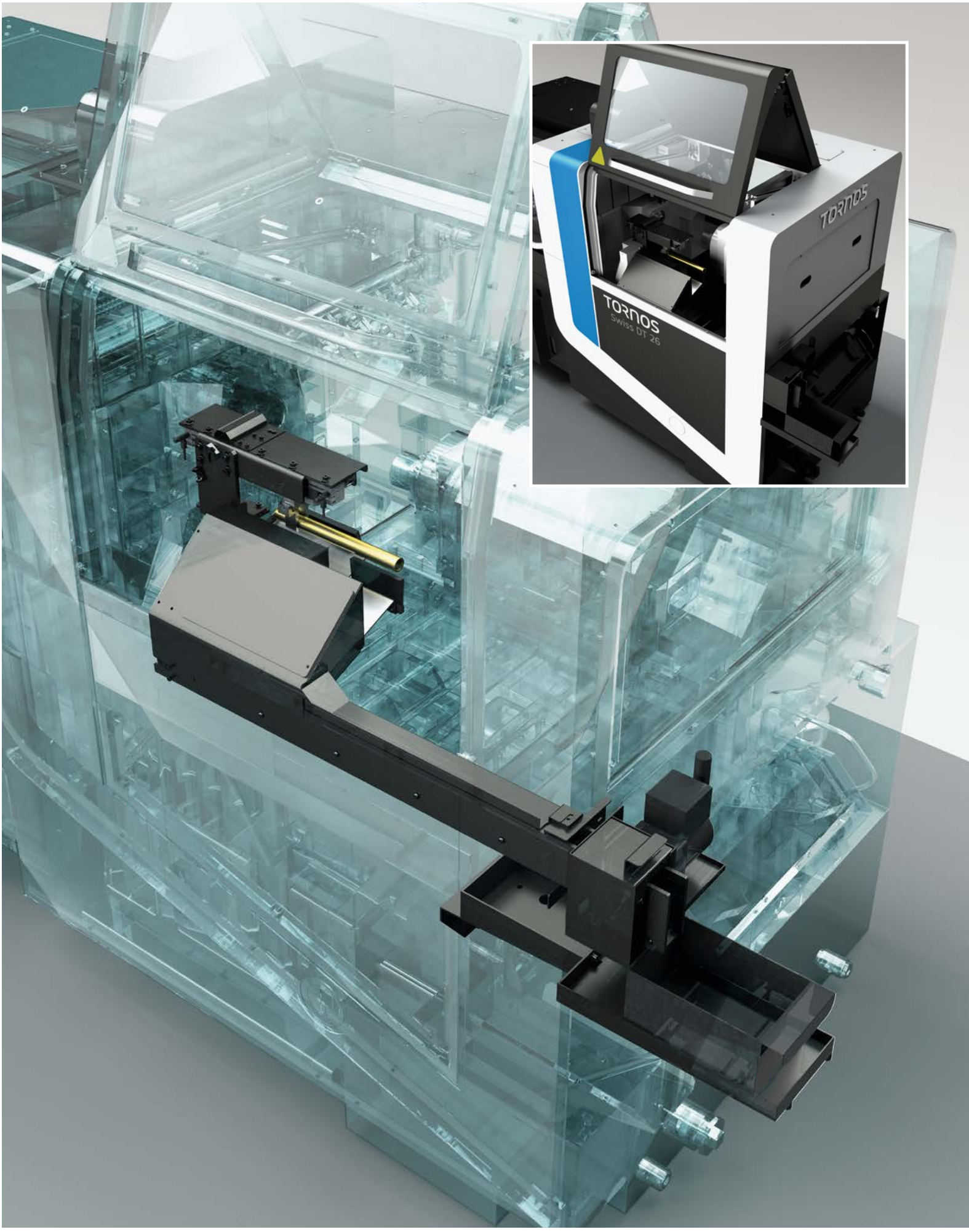
TORNOS
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Swiss DT 26

TAILORED SOLUTION:

Pneumatic unloading system

for Swiss DT 26 machines

This system has especially been conceived to avoid any damage of the machined workpiece features. For long and fragile workpieces with delicate surfaces or e.g. a fragile thread, the standard long-part system for Swiss DT and Swiss GT machines may not be suitable.

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For such types of workpieces with a diameter up to 24 mm and a length of 260 mm, the Tornos engineers have designed a solution that enables parts to be removed with care. This solution has been specifically designed on demand by the engineers of our development team for special tasks. This team is ready to develop special solutions of any kind upon customer requests for all Tornos products. Such solutions are not restricted to bar turning but are also developed for automation or robot automation purposes. Tornos offers this type of development service also for entry-level machines such as the Swiss DT 26 machine as is the case here.

Pneumatic unloading system

This sophisticated system enables workpieces with a diameter of up to 24 mm and a length of 260 mm to be unloaded.

Designed to unload workpieces without damaging them or their machined features and to preserve the excellent surface finish achieved by the superb capabilities of the Swiss DT 26 machine, this system can solve various problems related to fragile workpieces. The system is mounted on the spindle block for back machining without impairing the possibility of using the T510 and T520 tools.

Ejection is done pneumatically by using clamping jaws adapted to the respective workpiece type and made of a material that does not harm the workpiece. The jaws can e.g. be manufactured by means of a 3D printer and can thus be customized to the workpiece to be machined.

The system is equipped with sensors used to monitor the machine movements and to provide optimum protection of the system. Interference with the counter-spindle of the machine is thus avoided.

With the addition of this system, a machine can be kept up to date by means of only minor modifications. Existing machines can be easily retrofitted with it. The system also comes with an appropriate software function that is loaded into the machine software and enables machine travel control.

The system is used in combination with the conveyor belt of the machine and can be supplemented by an additional robot for workpiece palletizing or even by workpiece cleaning and measuring functions. Based on the measured data, it is also possible to send offsets to the machine. The system offers numerous enhancement options.

Do not hesitate to contact your nearest Tornos representation for detailed information. Our development team for special tasks will be glad to discuss the challenges at hand with you and develop suitable solutions.

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The Tornos booth at SIAMS 2018

SIAMS enables a large number of highly specialized enterprises – big or small – to present themselves within an environment that fosters business relationship and trade.

SIAMS:

At the heart *of a unique region*

Since the beginnings of Swiss watchmaking in the Jura Mountains in the 18th century, this region has never ceased to evolve. One of the technologies typical for this region is micro-technology with a pooled know-how of more than 100 years.

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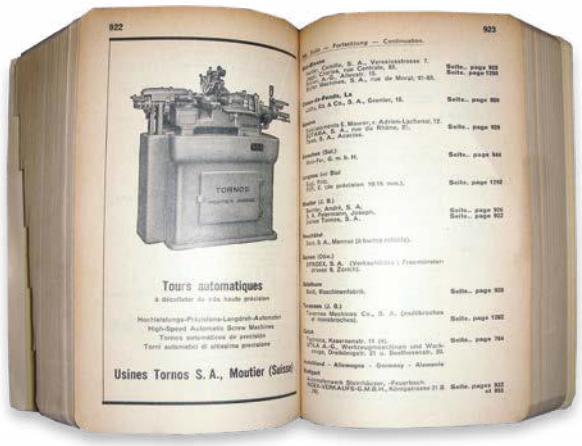
In the 1880s, the demand for production automation arose and has been developed. In this context, the machine tool business and the demand for peripherals and tooling emerged. That's when the sliding-headstock automatic lathe, that is renowned all over the world as the "Swiss-type Automatic Lathe" was born in Moutier. This first machine, that was to revolutionize the entire industrial life of the region, was presented at the world exhibition in Geneva in 1886 and its series production started in the same year.

Know-how gained for more than a century...

That's how a whole ecosystem saw the day and has been gradually developing and gaining strength – a system whose key concepts have always been precision, quality, meticulousness and high-quality work. It's often said that the inhabitants of this region "have the micron at their fingertips"... and this is still true today. In the 40s, 11 bar-turning companies were headquartered in Moutier, three of them being Tornos, Bechler and Petermann. These three manufacturers of automatic lathes were to convey this shining image all over the world.

... headed towards future

For almost 150 years, the industrial SMEs from this part of the country have been permanently innovating for their customers. They are thus the best candidates when it comes to the implementation of the full digitization of a company. The "Industry 4.0"



Pages of the Swiss machine guide published in 1934. The microtechnology companies of the Swiss Jura Mountains feature prominently.
On the left page: the Tornos advertisement.

Tornos at SIAMS 2020

Tornos, once again, will participate in this year's SIAMS and present its newcomer, the SwissNano 7. This high-precision gem boasts amazing capabilities and can face any challenge thanks to its high speed and great talent. Already acclaimed by the Medical & dental fields, the machine can also produce parts for the microtechnology industry and the watchmaking sector, in particular. Moreover, it will succeed in the electronics field, i.e. the industry which epitomizes the "infinitely small".

The SIAMS visitors will not be disappointed to have come a long way to visit Moutier since, they can seize the opportunity to visit the technical center at the Tornos headquarters. Among other things, they can discover here the full product line-up and watch extremely interesting set-up processes. The four target industries covered by Tornos will be presented and represented by focusing on the most interesting aspects. The visitors will also be able to discover the performance potential of used machines that Tornos has completely overhauled to breathe new life into them and, most importantly, to expand their possibilities. This tour would not be complete without a stopover in the Tornos restaurant Les Deux Tours, where you can choose between a special visitor's menu and various culinary specialties that are equally appetizing!

concept, that is the basis for this trend, is relatively new – it appeared first in 2011 at the Hanover fair – but has already been implemented by many SMEs. In hundreds of microtechnology companies of the Swiss Jura Mountains, thousands of people are working on the development of solutions for the future to be able to satisfy their customers better. These are often very small companies that have neither marketing service nor real marketing force. To give them an ideal platform for presenting themselves, SIAMS was established.

An exhibition in a friendly atmosphere

Over the years, SIAMS has established itself as the exhibition of the entire production chain of microtechnology but has also been demonstrating the "down-to-earth" mentality that enables the companies of this field to present themselves and do business in an uncomplicated manner. Vincent Schaller, Managing Director of Applitec (a Moutier-based tooling manufacturer) explains: "Every two years, our representatives from all around the world come to visit SIAMS and they always discover and learn something new. They are always amazed at the quality and the quantity of the 'wonders' that they can find here." For the visitors, it is simply the ideal event.

A fertile ground with complementary solutions

One of the strengths of the SIAMS exhibitors lies in the fact that they are part of a close-knit network of companies that all boast a comprehensive know-how and are collaborating in the interest of their customers. Therefore, it is not uncommon that the visitors find complete solutions by combining the expertise of various exhibitors and different exhibited machines. Based on studies conducted by the Medical Cluster (to name another industry that benefits from the expertise of the region), the particular strengths of the Swiss companies in this business are: a shared culture and spirit, the focus on innovation, the collaboration between the companies and their long-term relationship, and in particular a large number of small family-owned enterprises. These aspects exactly match the values upheld by SIAMS.

The optimum means to plan your visit of SIAMS

The exhibition organizers have conceived a planning system that will facilitate the early planning of the SIAMS visit for the visitors. By means of an internet browser, the visitors get access to the list of exhibitors, the list of the exhibited products or even details on a specific exhibitor and thus can easily find and register companies in their "list of scheduled visits" by clicking on the "paper-clip" icon. Here, they

can discover a lot of news directly published by the exhibitors. The visit program can be saved by the web browser. Once having terminated that list, it can be downloaded in pdf format or the visitor can even add details to the schedule. This list includes the basic company data as well as the numbers of the exhibition hall and booth. So, the exhibition visitors can create their list of scheduled visits in advance and, once having arrived at SIAMS, they can directly head for their destination. However, it is also highly recommended to stroll around in the halls. There are various surprises waiting for the visitors along the aisles.

Why visit the exhibition?

"There are 8,5 good reasons why you should visit SIAMS," explains Laurence Roy, Customer Service Manager. He adds: "Our position is reflected in these reasons which make it worthwhile to visit SIAMS: ***1*** *– Our exhibition is specialized in microtechnology and the 450 exhibitors are active in this field.* ***2*** *– The entire production chain is represented here.* ***3*** *– 1 day will suffice for its visit.* ***4*** *– You come to find solutions and do business.* ***5*** *– The atmosphere is friendly.* ***6*** *– We offer an inspiring program.* ***7*** *– It's an excellent means of observation and information.* ***8*** *– Admission is free (ticket to be downloaded from February).* ***8.5*** *– Thanks to the new highway, Moutier is nearer to the rest of the European microtechnology world than ever before (and e.g. at 2-hour distance from Geneva by train)."*

Pierre-Yves Kohler, the CEO, adds: "For 2020, we can already announce very interesting new developments and innovations, especially as regards micromachines and micro-factories, the aspects of digitization or closed-loop manufacturing, for instance."

You are asking yourself when there will be the next opportunity to visit SIAMS, this true concentration of know-how, technologies and innovations? From 21st to 24th April, 2020. Admission is free and you can download your ticket from the www.siams.ch site.

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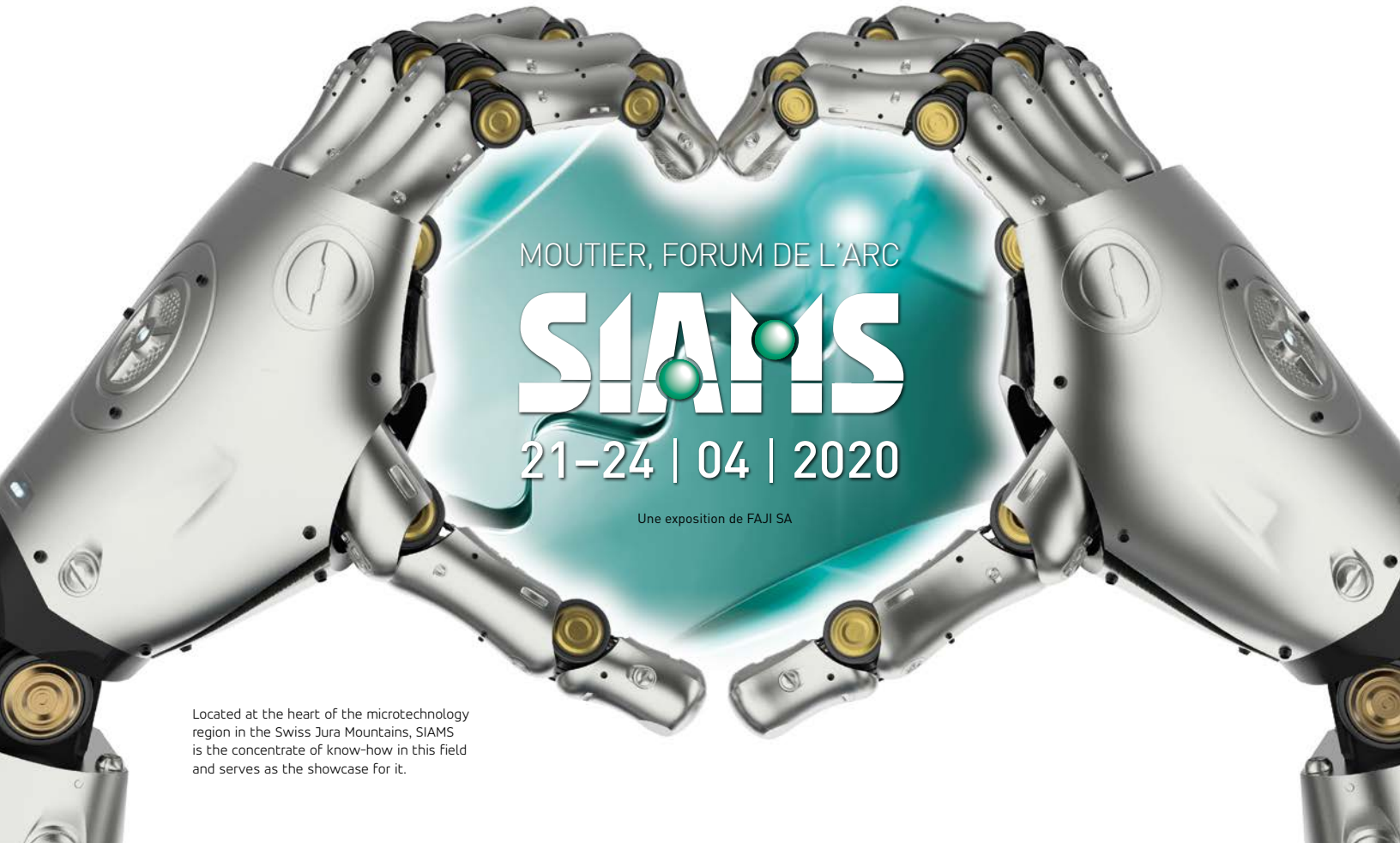

Located at the heart of the microtechnology region in the Swiss Jura Mountains, SIAMS is the concentrate of know-how in this field and serves as the showcase for it.

The Swiss ST 26 enables the trainees to tackle all aspects of bar turning.

TFT:

A cutting-edge training institute

In the small village La Chapelle-sur-Furieuse near Salins-les-Bains in the French Jura Mountains and at the heart of the Franche-Comté, the company Trajectoire Formations Techniques (TFT) is headquartered. This training center provides both companies and individuals with full service. We met the TFT director Stéphane Damnon who is passionate about mechanics and car racing.

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France
contact@tft-formation.fr
tft-formation.fr

Watch the video report

youtube.com/watch?v=MjqRfLThQ9A

A full line-up of training

A full line-up of training TFT offers a full line-up of training comprising customized and user-specific modules. Their declared aim is to organize training in a way to make it as pragmatic as possible, both from a pedagogical point of view and with a view to its application in practice. The training courses are provided by experienced instructors from teaching and industrial fields. The 5 instructors are able to provide the full scope of training, ranging from the reading of blueprints and applied mathematics to materials science.

TFT also provides machine operation training – be it for cam-type machines or numerically controlled machines. The same applies to programming and set-up of such machinery. TFT holds all the certificates required to provide such training since the company has been certified according to Veriselect Formation and Datadock standards, with a recent expansion to a so-called CFA (French training center for apprentices).

TFT can also assume the professional reintegration by block-release training: for this kind of training, usually 8 trainees are accepted that have been pre-selected in collaboration with the customer companies. The training of the individual trainees is based on a specific program tailored to them and their future position; this program is drawn up in collaboration with and for the trainee's employer. The first part of the training takes about 6 to 8 weeks and it is basic training that covers the basics of mechanics and production monitoring.

After the acquired knowledge has been tested, the trainees participate in a 7-week training module that deals with machine set-up. Due to the small group, the training is high quality and can be adapted according to the progress and difficulties of the individual participants. "Our goal is to prepare the trainees for their future jobs. We sometimes have to start from scratch on conventional lathes and milling machines. The advantage of conventional machines lies in the possibility to directly test out the axis movements in a most comprehensible manner.

TFT

TFT provides a wide range of training sessions that can be adapted to the specific needs, requirements and type of activities of the customer company, both in terms of the training contents and the organization.

- *Applied mathematics*
- *Blueprint reading*
- *Characteristics and designation of materials*
- *Thermal treatments and surface treatments*
- *Material cutting procedures and cutting parameters (COM)*
- *Tool designation and selection*
- *Sharpening (tools, gun drills, special drill bits, drills, taps)*
- *Machining range (turning, milling, bar turning)*
- *Measurement engineering, tolerance inspection*
- *SPC*
- *...*

We also make a point of making the trainees aware of their responsibilities, as they will produce some of the tools themselves and sharpen them. In such cases, you pay more attention to what you are doing," Stéphane Damnon says with a smile TFT's director has a passion both for mechanics and training and it's he who founded this training center. Since he was looking for an advanced CNC machine, it's no wonder that he contacted Tornos. He soon discovered the potential of the Swiss ST 26. Its kinematic system enables various applications and the machine itself allows efficient training as regards machine programming and operation.

The Swiss ST 26 and the optimum use of CAD/CAM technology enable highly complex workpieces to be machined even without B axis.

CAD/CAM, a compelling solution

TFT is also specialized in the ESPRIT CAM software that is successfully used by Stéphane Damnon and his team on the Swiss ST 26 by Tornos. "Just recently, we produced a part on our Swiss ST 26 and even the members of the Tornos team were amazed at the results." Programming is easy and the TISIS software by Tornos is very helpful when it comes to programming the Swiss-type lathe.

"Here, the full power of CAD/CAM comes into play. It enables us to tap the full potential of the machine, to get rid of various restrictions and to produce parts whose realization appeared impossible at first sight. The part in questions does not require a lot of tools; we could even clamp it on the Swiss DT 26 during the Open-House days organized by Tornos France at the end of last year."

Just like the Swiss ST 26, that turned out to be extremely rigid and fast, the Swiss DT 26 is an outstanding machine. Like its big sister, the machine is provided with an excellent NC unit and powerful spindles that are really interesting for the machine user.

In addition to CAD/CAM training, Stéphane Damnon and his team provide customized CAD/CAM support for the customer companies. They understand the customers' parts on the customers machines, in the customer's environment: that's full 360-degree service.

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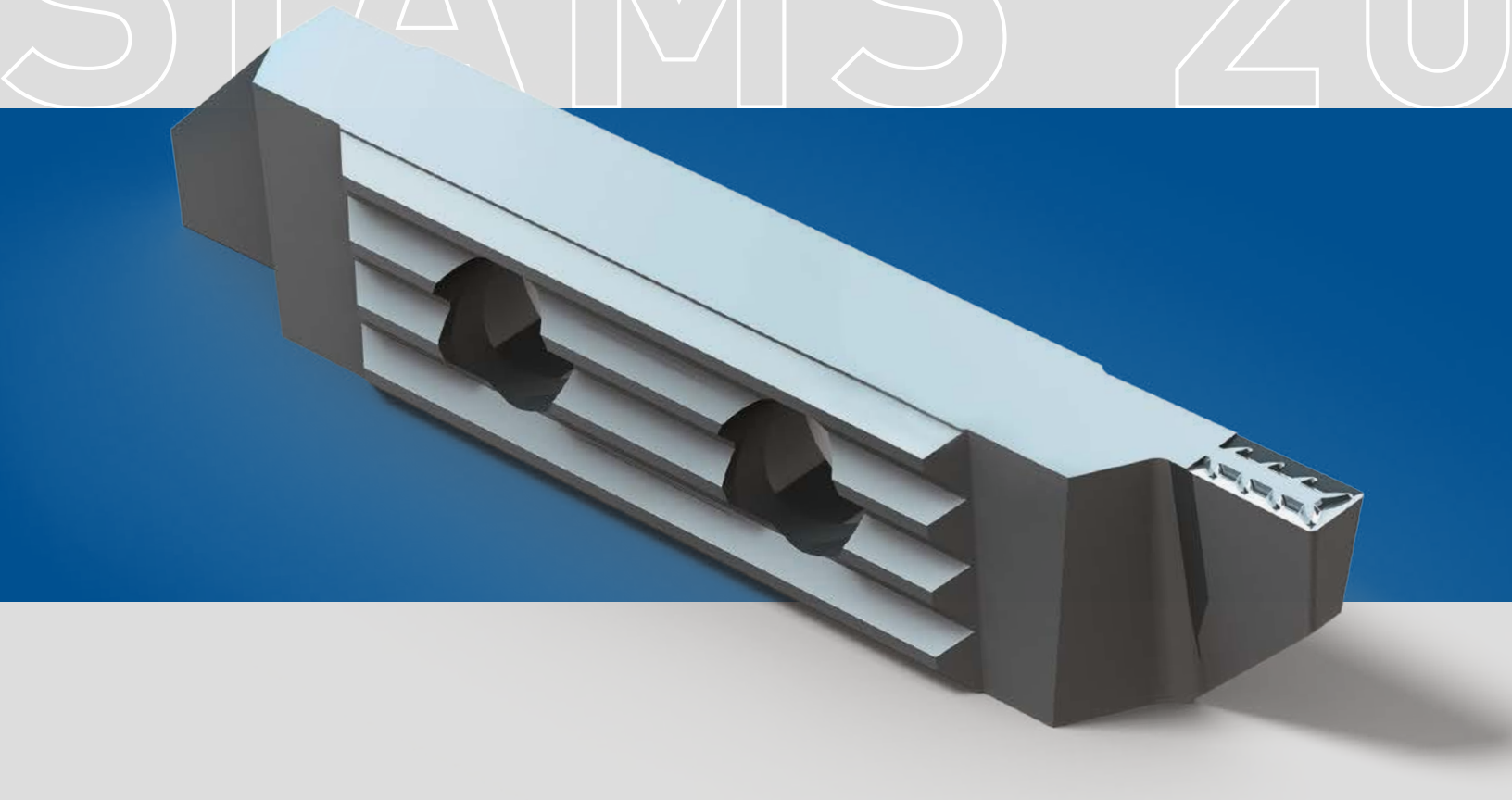

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