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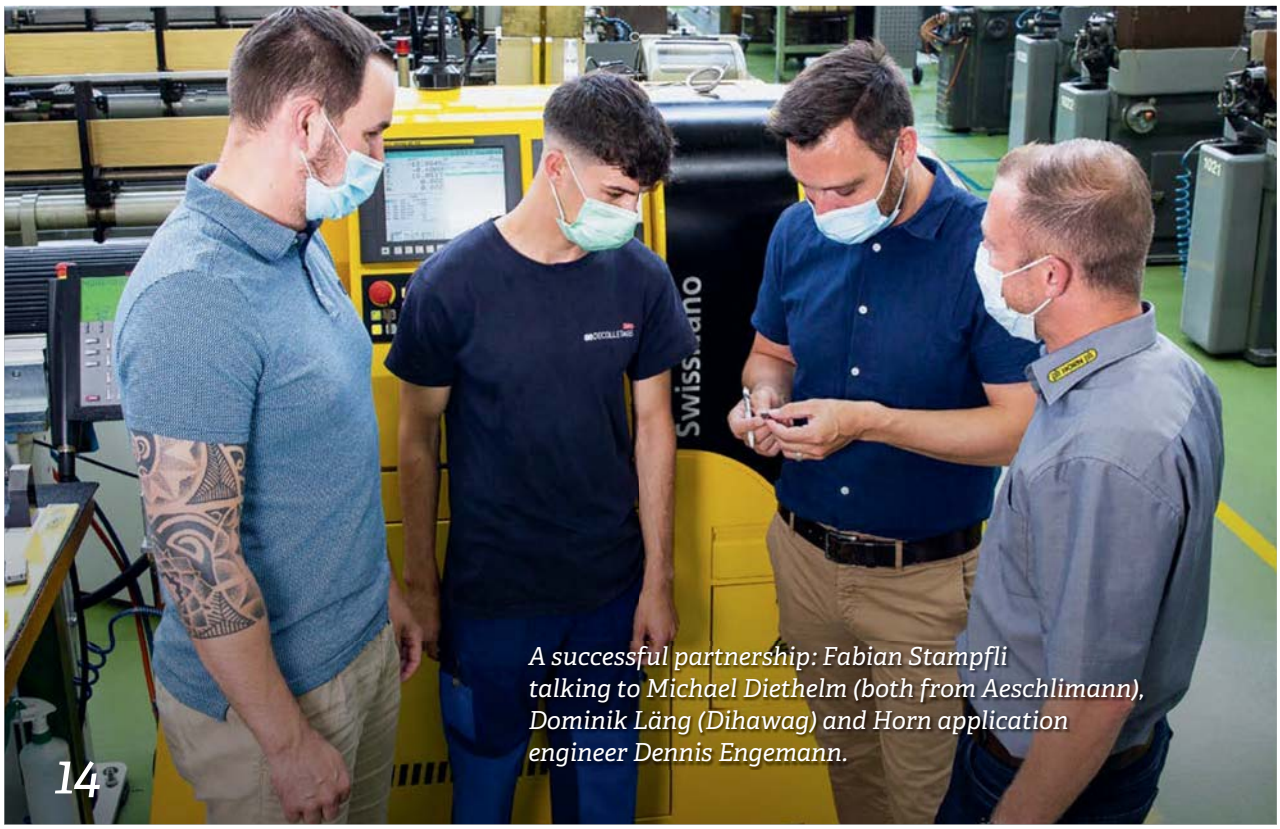

A successful partnership: Fabian Stampfli talking to Michael Diethelm (both from Aeschlimann), Dominik Läng (Dihawag) and Horn application engineer Dennis Engemann.

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SUMMARY

"Thanks to the new Swiss DT range, you will be able to maximise both productivity and flexibility."

Jens Thing Chief Sales Officer, Member General Management, Tornos

In the footsteps of the legendary Tornos legacy

Jens Thing Chief Sales Officer,
Member General Management, Tornos

The end of the year offers an ideal opportunity to look back over the past few months. For Tornos, this means reflecting on the success of 2021. We are ending the year on a positive note and with even more ambitious projects underway. True to our motto, 'We keep you turning', we will do everything we can to ensure you remain satisfied over the coming year by offering you the very best in machine tool performance. As part of this promise, we now present the new Swiss DT range, a series of machines designed to meet all of your machining needs which are not exceeding 5 linear axis + 2 c axis + optional B axis requirements.

Launched in October 2021 at EMO Milan, the Swiss DT range, which features six models, already seems to have sparked a great deal of interest among our existing and potential customers. Swiss DT machines offer excellent agility, productivity, rigidity and efficiency – all the right ingredients to ensure manufacturers get a quick return on investment. For example, the new range has been created to meet the various requirements for machining long and short parts from bar stock measuring 2 to 38 mm diameter.

Thanks to the new Swiss DT range, you will be able to maximise both productivity and flexibility. Even the base of the machine has been designed with this in mind. The fully modular machining area can accommodate any type of tool holder. Drilling, milling, thread whirling and even gear hobbing are just a few examples of the incredible flexibility offered by the Swiss DT range.

In addition to this, it is possible to produce highly complex parts by adding a range of options that are compatible with all sizes of machines, despite the machine series being based upon traditional kinematics with five linear axes.

The Swiss DT range is available in two series to better meet your needs. Thus, while the kinematics are the same across the range, four HP (High Performance) and two S (Speed) models are available. In the HP series, each of the machines (13, 26, 32 and 38) can be fitted with an optional 'plug and play' B-axis module.

The two Swiss DT S machines (13 and 26) also offer several additional benefits. They are distinguished by their guide bush with offset drive instead of a motorised guide bush. In addition, these versions benefit from the full range of advantages offered by Swiss DT machines, allowing you to reach new levels of production. With the new Swiss DT range, you can enjoy the best value for money while still being able to outperform your competitors.

On a different, but equally promising note, the SwissDeco 36 now features a new option for machining bars up to 42 mm diameter. Since its launch, the SwissDeco has become the reference in bar turning

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centres, specifically a bar-turner for complex parts with large diameters. Its power and infinite possibilities have enabled the production of parts which, until now, have been impossible to machine. This rapid, precise machine is particularly well suited to the production of highly complex parts.
Since EMO Milan 2021, a new 42 mm option has been added to the broad range already offered by the SwissDeco.

A firm favourite with Daniel Uhlmann, CEO of Azurea - one of our loyal customers, he explained in the summer edition of decomagazine (issue 97) how valuable this machine is, and how for him, it represents the pinnacle of Tornos machines. In the magazine, he enthusiastically reveals that it offers the perfect solution for complex parts with high added value. In a win-win situation, Azurea agreed to be the 'guinea pig' for Tornos with this new machine and is delighted to open its workshops to anybody interested in seeing how the machine functioned in their environment.

These fruitful collaborations and coordinated developments with our customers drive us to push even further and take a creative approach at the cutting edge of innovation. Tornos has benefited from this special relationship to explore jewellery production, a new sector for the company. Where true luxury resides in the smallest details, Tornos is the first-choice partner thanks to its economical, extremely compact and quiet solutions. The high level of geometric precision offered by our bar turning and milling solutions opens doors to a sector in which aesthetics and noble materials are matched with beauty and brilliance. Tornos is delighted to have taken this step and is pleased to be able to respond effectively to any challenge posed by the sector and do so with a high level of precision.

Tornos is your partner of choice in any situation where you are looking to grow your business and take your production to the level it deserves. In other words, the highest level. Our operational excellence, combined with extensive expertise and over 130 years of experience, now allows us to offer you a range that demonstrates high performance and speed alongside agility, productivity and efficiency for all levels of complexity you need to produce your parts.


TORNOS
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Swiss DT 26

THE NEW SWISS DT RANGE:

A complete solution

for every need

Tornos recently released the Swiss DT machines onto the market, unveiling them at EMO Milano. This range, which comprises 6 machines, is the most comprehensive solution on the market. Available in four different diameters, they are designed to cover turned part manufacturers' every need.

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Although the machines have five linear axes, they are not limited to straightforward parts. These machines can take a broad range of devices and technology and this enables them to resolve the most complex machining issues. Let's look at the capacities of the Swiss DT machines in detail.

A comprehensive machine range

The first thing to note is that the machines come in four different diameters:

- *13 mm*
- *25.4 mm*
- *32 mm*
- *38 mm*

All the machine bases have been optimised using finite element analysis to offer optimal rigidity and damping, regardless of the diameter or the material

being machined. In this range of machines, the cost per part plays a key role, therefore the range is available in two series:

- ***HP:** Standing for high performance, these machines are characterised by spindles and counter spindles that offer a similar level of power, and a guide bush with a built-in motor.*
- ***S:** These machines have a counter spindle with a lower level of power. These versions benefit from the full range of advantages offered by the Swiss DT range.*

A large number of tools available and B-axis

The machines in the HP range can house up to 28 tools, 14 of which can be motorised. The HP machines can be fitted with a B-axis, which can be added based on the workpiece requirements. Once installed, this device facilitates the machining of awkwardly shaped parts in both main and secondary operations. The range is fitted with three ESX 11 rotating spindles for both main operations and secondary operations; there is also the option of installing a fourth ESX 8 rotating spindle. It is also possible to install a high-frequency spindle on the B-axis for micro-machining or even deburring operations.

Proven kinematics

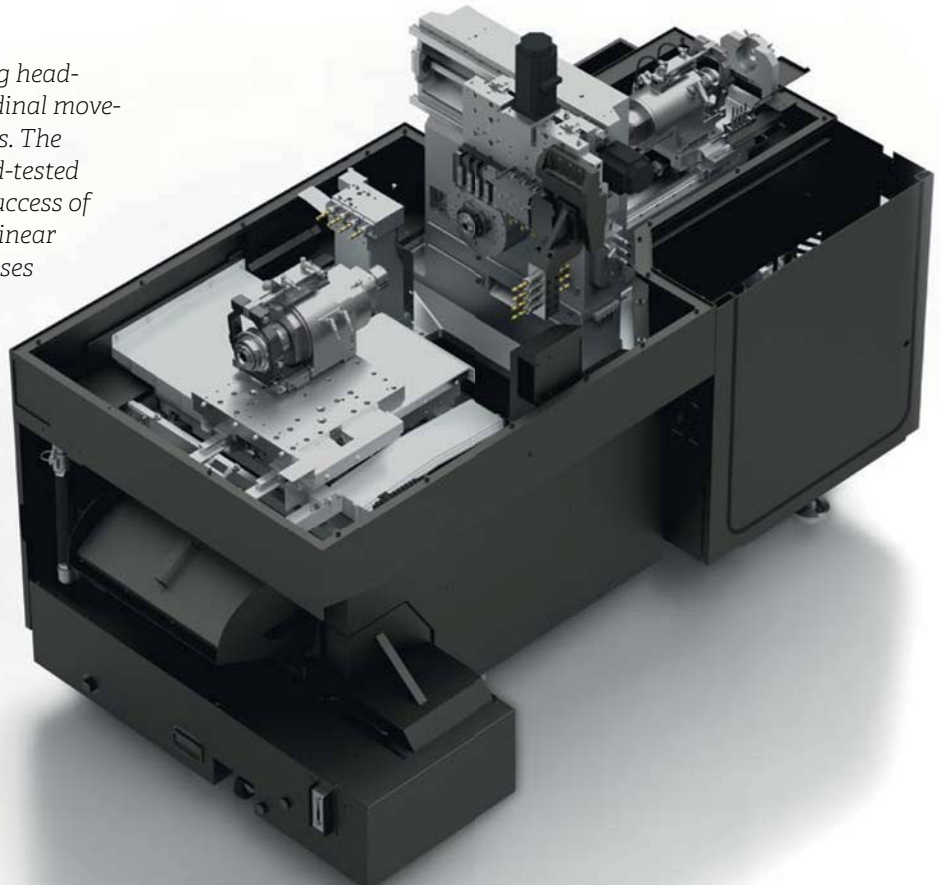
Firstly, we should note that these are sliding headstock turning machines where the longitudinal movement of the main spindle is along its Z1 axis. The 5-axis model is equipped with the tried-and-tested classic kinematics which was behind the success of the previous Swiss DT range. It includes a linear tool system known as a platen that comprises X1 and Y1 axes for bar turning work. The counter spindle support carriage is mounted on two linear axes X4/Z4 and this enables it to take the workpiece to the cut and to move laterally opposite the block and independently of the counter-operation tools, which may be fixed or rotating. These kinematics enable simultaneous machining for bar turning work and counter-operations.

Given the diameter and power of the machines, the Tornos engineers focused on ensuring effective chip removal by placing the platten above the guide bush or spindle. With spindles providing more than 10.5 kW of power in main or counter-operations on machines with large diameters, the Swiss DT machines allow for high pass heights which require excellent chip removal, allowing the machine potential to be fully maximised.

A high-end machine base

The ultra-precise Swiss DT machines benefit from liquid-cooled spindles with controlled airflow to maintain the uniform stability of the cast iron.

The motors on the S51 and S11 tools are oil-cooled to guarantee thermal stability. The machine frame and structure has been optimised using the finite element method to ensure optimal rigidity loops between the tools and bars.



They incorporate the best technology: high-end motor, polyurethane electric cable, guide components, bearings, ball screws and electrical components from globally renowned manufacturers. The machines strictly conform to the CE standard.

High-performance spindles to boost productivity

The Swiss DT 13 offers outstanding performance thanks to its spindles with 5 kW integrated motors. The ceramic bearings guarantee extremely high precision, even at high loads. In addition to their power, the spindles offer phenomenal acceleration.

The Swiss DT 26, Swiss DT 32 and Swiss DT 38 also offer great performance, as they are equipped with motors offering power up to 10.5 kW. The rotation speed is adapted depending on the diameter: the spindle on the Swiss DT 13 can drive the bar at up to 15,000 rpm, while that on the Swiss DT 26 can reach speeds of 10,000 rpm. The Swiss DT 32 and Swiss DT 38 deliver 8000 rpm and 6000 rpm respectively.

On HP models, the spindle and counter spindle are identical, allowing programming to be optimally balanced between main and counter-operations; it is therefore no longer necessary to prioritise jobs with high main operation requirements, as previously. The spindle power means these operations can be performed as counter operations. The Swiss DT 26 S is equipped with less powerful motorisation with a back spindle delivering up to 2.2 kW. The ultra-rigid machine base can handle extremely high feed rates and hard-to-machine materials such as titanium or cobalt-chrome without difficulty.

Boost your machine availability with ACB Plus

Chip management is always a complex subject in the machining world. Swiss DT machines all come with optional high-pressure units or ACB Plus. The latter uses low-frequency technology, enabling synchronised vibration of the longitudinal axes with the machine spindle. This causes a brief interruption to cutting and allows chips to be removed in a controlled manner. The function means it is possible to manage 'chip production'. ACB Plus secures the process and improves machine utilisation and uptime.

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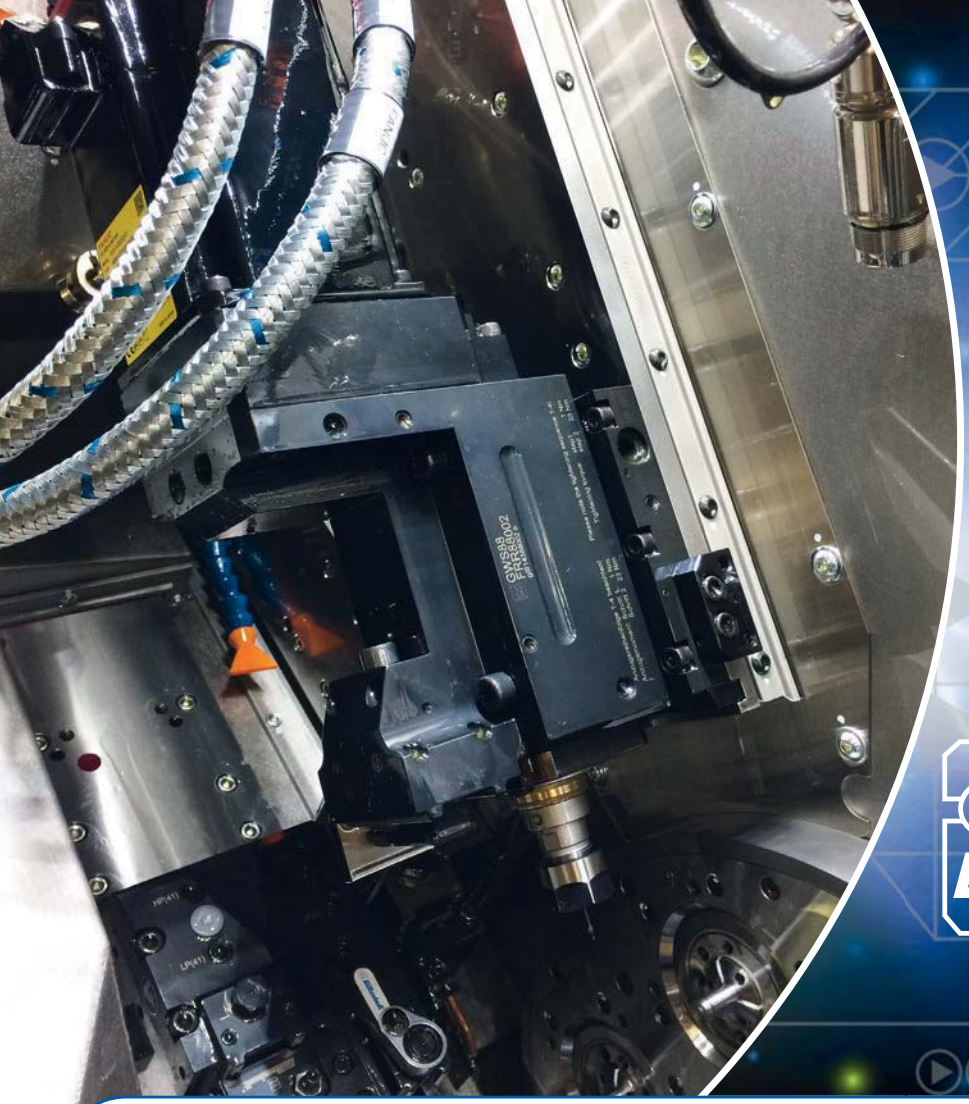

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SPECIAL TOOLS

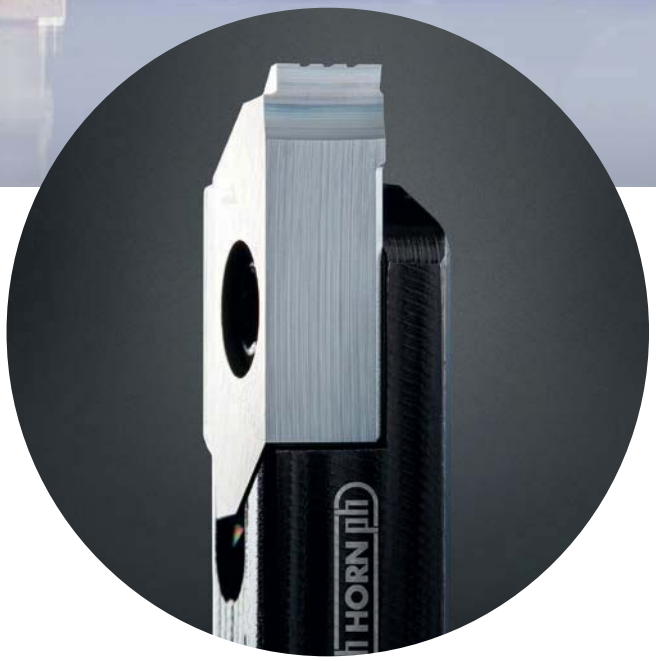
Reliable micro-machining

in large-scale production

"22,500 recesses with a diameter of 0.7 mm (0.028") – this is when we need a special insert", explains Michael Diethelm. Diethelm is a machine operator at Aeschlimann AG in Lüsslingen, Switzerland. Since the process optimisation, the team – headed up by process expert Fabian Stampfli – has used Horn's S274 grooving system for the profile grooving of an electronic component. "Horn is known for its solutions for micro-component machining. This special insert with a precision-ground profile is yet another example of an exceptional product from our friends in Germany – and here in Switzerland, we're very satisfied with it", says Dominik Läng, turning technology product manager at Horn's Swiss partner Dihawag.

From micro-sized watch components to parts for the medical sector and excavator hydraulics, Aeschlimann AG is a specialist in the production of high-precision, rotationally symmetrical workpieces. Originally founded as a screw factory in 1937, the company now manufactures complex CNC components and offers its customers a range of special finishing processes including honing, between-centres and centreless grinding and options for super-finishing. The 165 employees at the Swiss company primarily produce turned parts measuring up to 120 mm (4.724") in diameter. But the Aeschlimann team are also experts in machining, producing

The finished parts: shown after production on the left and gold-plated on the right. Also pictured: the Torx Z7PL for scale.



The tool edge is ground to a sharp and precise finish.

milled parts with lengths of up to 300 mm (11.811"). Its customers include companies in the watchmaking, automotive, hydraulics, machinery and electronics industries. Aeschlimann also supplies its high-precision Swiss products to the medical, measuring technology and bicycle sectors.

150,000 parts per year

Diethelm manufactures a connector in Arcap AP 1 D – a free-machining Cu-Ni-Zn alloy with lead as an additive (CuNi25Zn12Pb1) – for a turned part for the electronics sector. The component has a length of 5.8 mm (0.228") and a diameter of 0.7 mm (0.028") to 1.8 mm (0.071"). Aeschlimann produces around 150,000 of these workpieces a year. "Before switching to Horn tools, we produced the parts on our old cam-type sliding head lathes", says Diethelm. The machines – which have been in use since the 1980s – are still commonplace in Switzerland. "These machines are essential in the large-scale series production of very small turned parts that require a high degree of precision and fast cycle times. If they're correctly configured, they can run for days on end without intervention. We produce the cams for the machines ourselves", explains process expert Fabian Stampfli. However, the company encountered an issue when producing this component: the material used is comparatively soft. Copying the 0.2 mm (0.008") deep workpiece

Aeschlimann uses S274 system products for sliding-head turning and grooving.

Horn is known for its solutions for micro-component machining.

profile resulted in small burrs forming on the edges and caused small "slugs" to be produced when parting off. "Minor damage to the surfaces was another problem. This damage was caused by the guide bush during the sliding-head turning process", says Diethelm. An absence of burrs, a high surface quality and a good finish after parting off are key criteria for the turned part.

To solve the problem, Stampfli and Diethelm switched the machining process over to a Tornos SwissNano CNC sliding-head lathe – which was specifically designed to machine micro-components with a high degree of precision. The workpiece profile would now be produced with a plunge cut instead of being copied. "There was another tool manufacturer in the running for supplying the tool concept alongside Horn. It was a tight race, but we didn't give the other company the contract due to chipping problems and limited tool life", explains Diethelm. Turning technology specialist Dominik Läng from Dihawag worked with tool engineers from Tübingen to develop a solution using the Horn S274 grooving system.

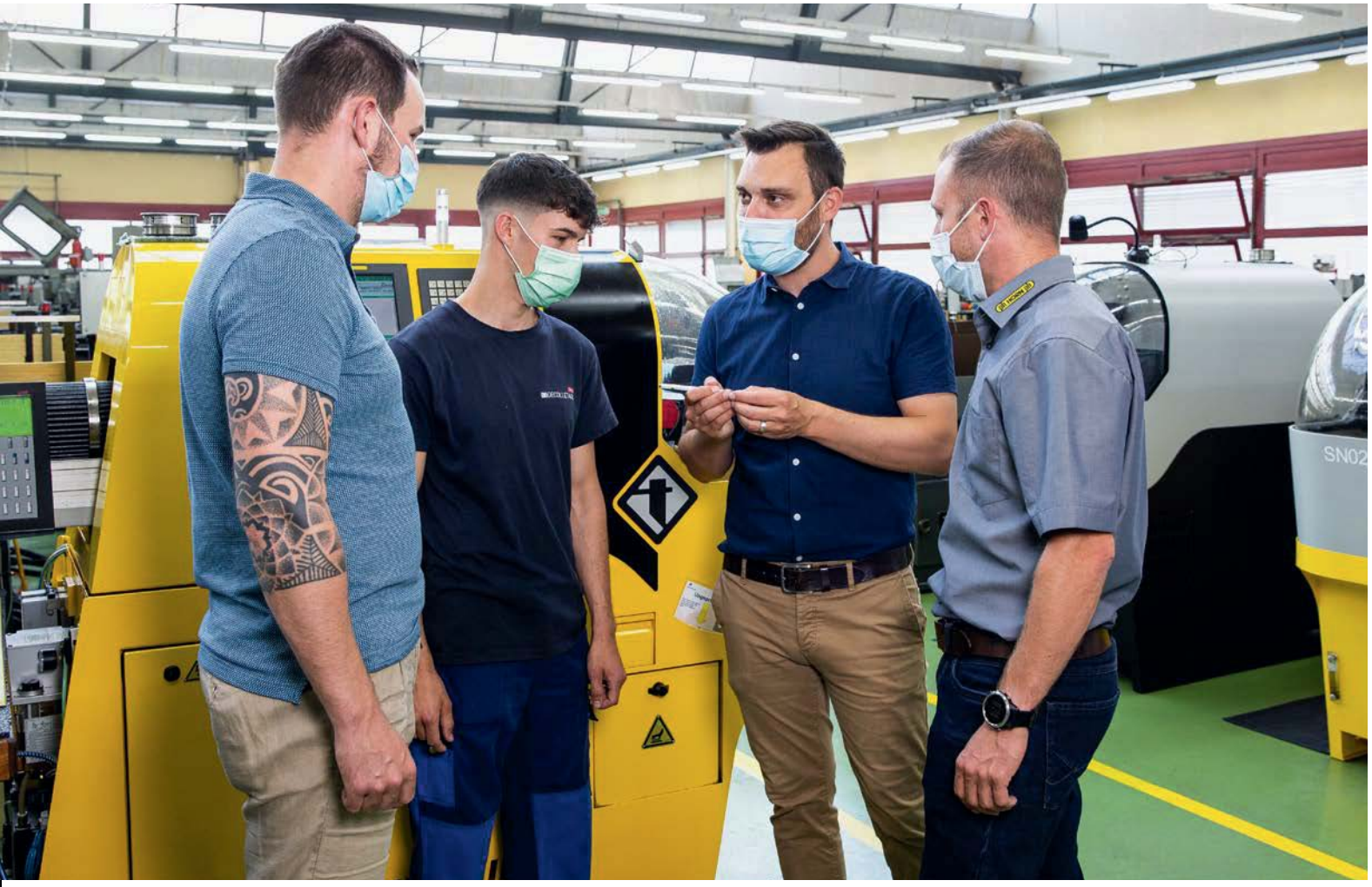
45,000 recesses per insert

"The quality of the tool edge is the crucial factor", says Läng. The microgeometry of the cutting edge is extremely sharp. With the help of the ground chipbreaker, it was possible to achieve reliable chip

The service life of the double-edged insert was boosted to 45,000 recesses.

control. Diethelm was also able to use the tool system with higher cutting values. The service life of the double-edged insert was boosted to 45,000 recesses. The shape of the indexable insert is precision ground, and the profile depth is 0.2 mm (0.008"). The defined inner radii of 0.05 mm (0.002") are ground to chamfer the workpiece edges. "Horn really knows what it's doing when it comes to grinding inner radii. It's important to remember that it is not only the inner radius that needs to be considered.
In form grinding, the side and front relief angles of the insert also require expert knowledge.
We can even grind inner radii to a defined size as low as 0.025 mm (0.001") with tolerances of just a few microns", explains Läng.

Ticking over like a Swiss watch: Traditional cam-controlled sliding-head lathes are an essential part of large-scale series manufacturing.



A successful partnership: Fabian Stampfli talking to Michael Diethelm (both from Aeschlimann), Dominik Läng (Dihawag) and Horn application engineer Dennis Engemann.

The machining process for the turned part is as follows: First, the workpiece is machined to an initial diameter of 0.7 mm (0.028") in a sliding-head turning process. The surface is then pre-turned for subsequent form plunge cutting to a diameter of 1.46 mm (0.057"). "Due to the ratio between the length and the diameter, the soft material and the

cutting pressure, we machine the diameter to leave a 0.06 mm (0.002") allowance", says Diethelm. Different feed rates are programmed for grooving with the wide insert; movement is faster during rapid travel and slows down during the grooving operation to prevent workpiece deflection. At the maximum grooving depth for diameters of 1.4 mm (0.055") and 1.2 mm (0.047"), Diethelm programmed a dwell time of half a second. "Grooving across a small diameter with a wide cutting edge creates high cutting pressure. This can cause the workpiece to be pushed away slightly. We optimised the Horn tool holder so that we can use a special thread to make tiny adjustments to the angle of the tool. This enables us to counteract any tapering of the diameter with a correction angle", says Diethelm. The workpiece is also parted off using a type S274 insert.

Fast tool solution

After submission of the initial enquiry, it took around six weeks for a finished machining process to be developed and implemented. "We are very satisfied with how our requirements were dealt with. We're

SwissNano – Extremely high precision machining for micro components

Suitable for work in high-pressure environments, the SwissNano was specially developed for machining extremely small parts with very high precision demands and perfectly meets the requirements of Aeschlimann. Thanks to its unique kinematics that enable turning, drilling, milling and deburring, as well as pre-machining and reworking – the SwissNano, meets all the criteria for extremely difficult components. This is particularly the case concerning burr-free cutting, surface quality and excellent parting-off surface quality.

While developing the kinematics for this machine, attention was paid to ensure the greatest possible balance is maintained in the machine. Its unique thermal control system also means that the SwissNano rapidly reaches the optimal operating temperature. Moreover, the machine's excellent accessibility makes it easier to set up and improves process capability. Given that the machine is up to 40% more productive than comparable models, Aeschlimann was able to switch from using cam-controlled turning machines to the SwissNano. This also provided some additional space in the process. Taking up an installation space of just 1.1 x 0.65 m, the SwissNano impresses users with its minimal space requirements. This is the smallest machine on the market, allowing bar turners to overcome even the most difficult of challenges.

impressed with the performance and process reliability of the tools", says Diethelm. In addition to the tools mentioned in this article, Aeschlimann also uses a number of other Horn tool systems, including type S100 parting-off tools and Supermini inserts for internal profiling. The company also uses Horn µ-Finish tools for micro-machining of watch screws.

The µ-Finish tool system is primarily aimed at micro-machining users. Based on the S274 system, it features inserts that have been ground with outstanding precision. Every tool undergoes a comprehensive round of inspections during the production process to ensure that its cutting edges deliver excellent standards of quality. Together with the central clamping screw and the precision-ground profile of the indexable insert, the tool holder insert seat helps the system to achieve indexability to within microns. This in turn allows the insert to be indexed in the machine without the need to re-measure the centre height or any other dimensions. In addition to its extensive range of standard profiles, Horn offers custom-made inserts with special designs.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When it comes to producing fine jewellery, there is no better technology available than the turning and milling solutions from Tornos.

Tornos strengthens presence in the

luxury jewellery sector

Drawing on its long experience in the luxury watchmaking industry, Tornos is now strengthening its presence in the luxury jewellery sector, as it undergoes significant growth. Tornos has a solid skills base and highly-renowned expertise that enables it to respond to the exceptionally high demands and requirements that characterise this fascinating sector.

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This ultra-dynamic industry is undergoing nothing short of a complete transformation. We are noticing major shifts, both in consumer behaviour and in the industry itself, which is having to adapt to face these changes. To meet the demands of their customers, companies operating in this sector need to be responsive to major trends and shifts.

Jewellery is a fast-growing market. With an estimated value of €250 Billion Euros in 2020, it is expected to grow by 5% to 6% per year.

This is still essentially a local industry. However, there is an emerging trend towards internationalisation, growth of branded goods and a reconfiguration of the various distribution channels. The luxury jewellery industry has recently taken a new direction, eschewing traditional workshops in favour of a more industrialised approach.

Jewellery Market Segment Manager Anne Hirtzlin is watching the major changes taking place in the luxury jewellery sector with both a professional and personal interest. Her specialist contacts at big-name groups have confirmed this trend within the jewellery manufacturing industry.

This shift towards new production methods was also identified in a market research survey led by Tornos. While artisans and certain local brands may well stand to profit from this development, it should be noted that some experts are predicting a rapid doubling of market share among the big ten jewellery brands, largely driven by the acquisition of local firms. "While some of the manufacturing processes continue to be done by hand, the acceleration in the consumption and sales of jewellery will force market players to industrialise certain processes to up their rate," explains Anne Hirtzlin.

Sensitive to this major change and harnessing many years of experience in the luxury sector, Tornos is preparing to meet this demand thanks to its high-performance and ultra-efficient bar turning and milling solutions, which offer superb precision and an incomparable finish.

Its long experience in the luxury watchmaking industry means that Tornos is well placed to meet every challenge posed by the luxury jewellery sector. As an expert in its field, Tornos specialises in the full range of processes involved in this type of industry. The company's highly cost-effective production facilities use modular solutions with a small footprint. To address the complex issue of precious materials, Tornos has developed metal recovery solutions specifically for these markets. In line with the industry's objective to recover 99.5% of machined precious metals, our machines can be configured for optimal recovery of precious metal chips for recycling purposes.

Now more than ever, Tornos can position itself as a specialist in the luxury jewellery segment. The company's unrivalled expertise, which is based on over 125 years of experience in micromechanics, including watchmaking, is what gives Tornos the edge. Tornos offers a complete process, from the design of jewellery components right through to the finished product. Turning and milling of precious metals and expertise in cutting tools and machining processes are part of the Tornos DNA. You can count on the machine tool manufacturer to offer solutions tailored to your professional needs.

Like a precious stone expertly cut to optimise its brilliance, Tornos has the eye and the expertise to bring that extra touch of distinction and refinement to your luxury jewellery collections, with all the speed, efficiency and flexibility you require. For a future that shines bright like a diamond, choose Tornos.

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Nabil Ouerhani, Head of the HE-Arc Interaction Technologies competence group, poses in front of a Tornos SwissNano 4, accompanied by Didier Rizzotti, Deputy Director and Head of R&D at HE-Arc.

The Tornos Research Center celebrates its

10th anniversary

The successful partnership between Tornos and HE-Arc set the foundations forthe establishment of the Tornos Research Center on January 1, 2011. The objectives and mission defined at the outset remain the same: To turn innovative ideas into technologies that can be applied to the machine tools of tomorrow.

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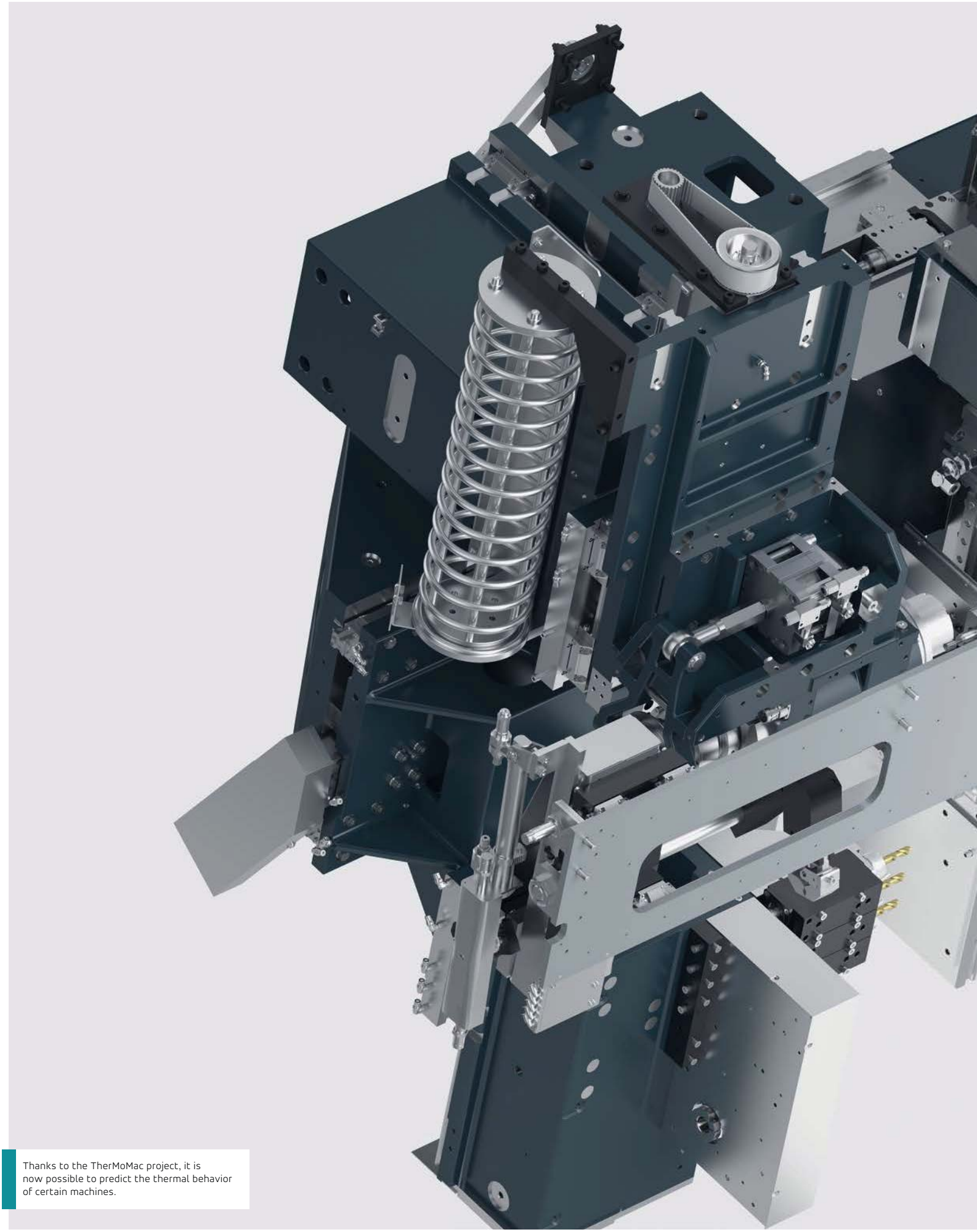
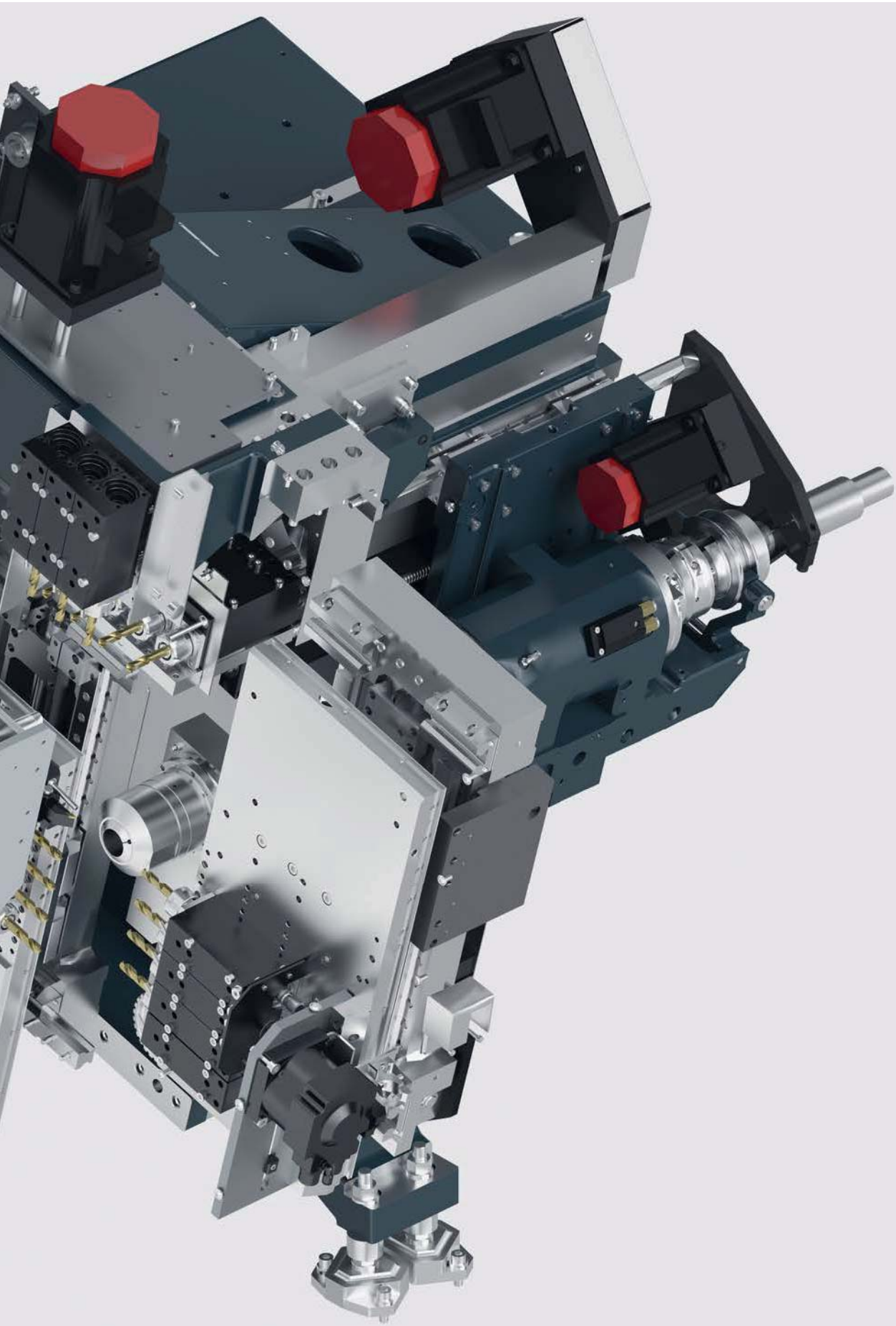
Located on the premises of HE-Arc Ingénierie in Saint-Imier, Switzerland, the Tornos Research Center calls on the skills of future engineers in the fields of mechanical design and machining processes, as well as the Internet of Things and Services, particularly in the context of the digitization of companies and Industry 4.0. Recent collaborative projects include the arrival of the brand-new version of Tornos' programming and communication software TISIS, which is now available as TISIS i4.0.

In 2010, Tornos wanted to support its industrial strategy with a major research and development effort to launch machines capable of offering users a competitive advantage. Indeed, as in other industrial sectors, technical developments and market competition are forcing manufacturers to deepen their knowledge of the scientific and technical foundations of their



Thanks to the TherMoMac project, it is now possible to predict the thermal behavior of certain machines.



activities to better control their products' performance and broaden the spectrum of technologies to be incorporated as a means of enriching the differentiating features.

However, the machine tool manufacturer from Moutier, Switzerland, soon realized that internal pooling of the skills and expertise required to carry out research and development programs was no longer possible and that collaborative networks had to be established. In 2010, Tornos thus considered establishing an off-site research center away from its headquarters in Moutier – a site hosted within an institution that performs research activities in the field of machine tools and related technologies. For Patrick Neuenschwander, who succeeded

Dare... Think... Do! Two large-scale projects in the Tornos Research Center

The Innosuisse ECOMACH 25 project

To reduce machine power consumption by 25%, the ECHOMACH project has used the Swiss DT 13 machine for a case study. As Nabil Barouani, head of the team of experts for interaction technologies explains: "The project management team has made recommendations on how to optimize the energy consumption of Tornos machine tools – with special attention to the mechanical systems. In this context, it has determined the components consuming the most energy."

In collaboration with the members of the Tornos TISIS team, this team of experts has also focused on an important project regarding the software and the implementation of algorithms to optimize the cutting parameters and the part program for the machining of a single workpiece or a whole batch of workpieces.

The Thermomac project

The Thermomac project, for its part, is targeted on forecasting the thermal behaviour of the machine. To be more precise, of a Swiss DT 13 machine. "We had to identify a reference point on the machine, determine certain thermal stability and measure the thermal error caused by the deformation. The thermal stability forecasts were carried out based on Big Data, followed by finite element analysis (FEA)," Nabil Barouani declares. "Deviations were measured down to several microns, but they could be remedied by adopting a temperature-based tool compensation."

There are a lot of projects like these that have enabled both Tornos and HE-Arc to advance and sharpen their tools and thus achieve even higher precision and quality.

The Tornos Research Center in a series of video clips

Discover the Tornos Research Center using a series of video clips jointly made by Tornos and HE-Arc.

1
youtu.be/lKTRB3ik4jk

2
youtu.be/wJIdpRHrPzo

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Pierre Voumard as Tornos' Project Manager, the Tornos Research Center should: "Systemize the mutual exchange based on three motivations. These are, first of all, the transfer of projects and ideas, networking and implementation of both European and Swiss projects, especially within the framework of Innosuisse. Finally, the creation of such an entity is most important for the image both of Tornos and the HE-Arc."

Successful collaboration on all levels

A university setting for the Tornos Research Center was an obvious choice. As a fertile breeding ground and due to its already close relations with Tornos, HE-Arc Ingénierie emerged as the ideal solution to house such a research center. A workshop/laboratory was set up at the Saint-Imier Technology Park to house a prototype machine. The development of this machine raised new issues for Tornos and forced the company to acquire new skills. In particular, this included real-time programming on a personal computer (PC) platform as well as a mechatronic approach to automatic adjustment.

The Tornos Research Center thus became a space that stimulated interaction between the industrial approach of the component designers and the systemic approach of HE-Arc's engineers and scientists, enabling everyone to learn in a 'protected' way, far from the intrinsic contingencies of a machine manufacturer's workshop.

In recent years, the Tornos Research Center enabled synergies to be intensified around the Tornos software, TISIS. So, TISIS i4.0 now allows the measurement of the Overall Equipment Effectiveness (OEE). The information is automatically entered into the system without operator intervention. With TISIS, you can view and analyze the status of any Tornos machine at any time. This intelligent software also makes it possible to monitor the efficiency of the entire workshop and to quickly take the appropriate corrective measures. The improvements associated with this new software version are notable. For example, preconfigured charts can be easily exploited for reports and allow to increase productivity and efficiency.

Large-scale, ambitious and sometimes even "risky" projects

Such software development would probably not have been possible without the Tornos Research Center in Saint-Imier. In fact, such a structure is part of the long-term process of combining innovation, academic expertise, and market knowledge within the same entity to bring about reflection on major technological challenges.

The technological know-how and skills of the Tornos and HE-Arc employees and students are valued within the framework of such joint projects. The various players, therefore, have the opportunity to significantly impact the region's economy. In the 10 years of the Tornos Research Center's existence, this primary mission and vision have been confirmed and strengthened. The center, which has become one of the vital players in terms of innovation, significantly highlights the close relationship between Tornos and HE-Arc and raises hopes for many more years of successful collaboration.

tornos.com

For Laubscher Präzision AG, the SwissNano proved to be the ideal machine. The company particularly appreciates its unique design that demonstrates outstanding ergonomics.

LAUBSCHER PRÄZISION AG:

Where precision became a passion

The village of Täuffelen on the shores of Lake Bienne is home to a unique bar-turning company called Laubscher Präzision. Founded in 1846, this company specialises in the production of very-high-precision complex parts, and it recently purchased several Tornos machines to help it achieve its objectives.

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A pioneer that became the greatest bar-turner in Switzerland

Laubscher's story begins with its founder, Samuel Laubscher who, to meet his production requirements, opted to produce his own machines for manufacturing watch screws. From its inception, the company capitalised on new opportunities, enabling it to grow and to specialise in the production of new parts. While the company enjoyed rapid growth in the 1930s by producing gramophone needles, Laubscher is now active in three key markets:

1. ***Watchmaking***
2. ***Medical***
3. ***Industry (notably automotive, hydraulics, safety engineering and electronics).***

Not content with simply serving these key markets, the company has developed expertise that enables it to excel in each of these sectors. The company has built a loyal customer base that contributes to its reputation. Some customer relationships date back

over 100 years and the excellent quality provided by the Täuffelen-based company has resulted in many satisfied customers. With a 240-strong workforce and boasting no fewer than 500 production machines, 150 of which are made by Tornos, across a 22,500 m² site, the company produces over 200 million parts per year at its ultra-modern facilities.

Quality – a core value at Laubscher

When asked about the keys to the success of his business, Laubscher Präzision CEO Raphael Laubscher is very clear: "At Laubscher we supply our customers with consistently high-quality parts and have clear manufacturing and quality control processes to guarantee this. We also have 150 years' experience, and we are very familiar with the capabilities and scope of our machine inventory. We offer our customers practical support as well as economical and efficient ways to industrialise their components."

In other words, Laubscher is not just a production company, it supports its customers in the viability, development and optimisation of key components. The company is also flexible in terms of the num-

"The SwissNano sailed through the test with impressive ease and stood out as the logical choice for the company"

ber of parts to be produced. It responds equally well to requests for a few prototypes, small part runs or mass production runs of several million parts. "Whatever the size of the order, we pay the same attention to the production and quality of the batch. Likewise, timely delivery is one of the company's core values."

A family-run company, Laubscher is a stable and reliable partner with a strong capacity for innovation that helps it to successfully meet the challenges set by customers. This strength is deeply rooted in the company's DNA, and it is this which has enabled our growth. The company also offers other processes in addition to bar turning. The site at Täuffelen also carries out surface treatment and polishing operations, for example. "To respond to the varied requirements of our customers, our company was an early adopter of certification; the company, therefore, holds ISO:9001:2015 (Quality Management), ISO:13485:2016 (Medical Devices) and ISO:14001:2015 (Environmental Management) certification. The environment is an integral part of Laubscher's thinking and our core values. The infrastructure of our site in Täuffelen is centred on sustainable development and the responsible use of resources."
Exports account for 70% of the company's turnover. In Switzerland, watchmaking is its main outlet. In this field, Laubscher specialises in producing very small parts. The smallest screw has a head with a diameter of 0.4 mm and an overall length of 0.6 mm. The production of such small precision parts is very demanding and is one of the company's specialisms. An innovative procedure is used to polish the screw head to ensure the perfect appearance.

The medical sector – a key market

Laubscher also has several years' experience specialising in the medical sector. The company is ISO:13485 certified and produces a large number of parts for the biggest names in the market. As you might expect, these are mainly small parts that are very complex to produce. The markets served are, for example, those for hearing aids and minimally invasive surgical instruments.

The secret to success

Laubscher owes its success to its staff and their expertise. In bar turning, successful companies generally stand out from the competition thanks to the expertise of their workforce. This is also a key component at Laubscher. A third of employees in Täuffelen are former apprentices. The company is also deeply committed to continuous training. "At Laubscher, we know that our staff are the lifeblood of our company. Consequently, each year we train over six apprentices in our company and make significant investments in continuous training every year."

SwissNano: An outsider with impressive performance

Several years ago, Laubscher was looking for a machine to produce small parts. After considering the various solutions on the market, the Täuffelen-based company decided to try Tornos' SwissNano machine. The Moutier-based company was therefore commissioned to perform a machining test on an extremely demanding part. The test results were very convincing: Laubscher was not expecting such success. The SwissNano sailed through the test with impressive ease and stood out as the logical choice for the company. The SwissNano 7 is extremely stable, and its modular machining area means the machine can be adapted to any requirements, which gives the company valued flexibility. Moreover, the machine's

unique design was very interesting, as it offered outstanding ergonomics and won over operators and visitors alike. The SwissNano is ideal for producing high-precision parts destined for use in the watchmaking and medical sectors.

TISIS – an efficient and effective programming solution

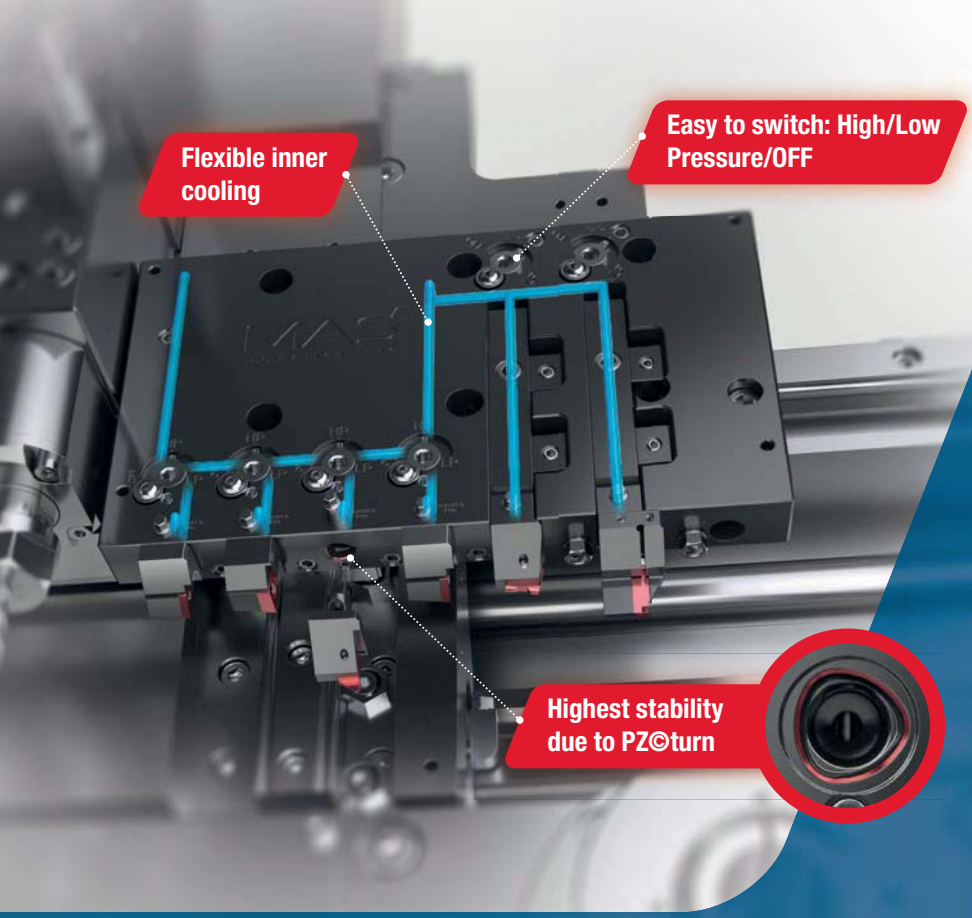
Naturally, the company also uses TISIS to program its SwissNano machines, but it is worth noting that Laubscher also owns six Tornos CT 20 machines. TISIS can use the same programming logic across the different machines. This software has enormous potential ready to be harnessed. It is doubtless one of the best systems on the market today, according to Mirko Laubscher, Head of Production at Laubscher Präzision.

The CT 20 – an astonishing machine

Despite its entry-level pricing, the CT 20 has proven to be a formidable partner for the Täuffelen-based company: robust and precise, it warms up quickly and demonstrates excellent production stability. The CT 20 can produce parts of medium complexity and is known for its reliability. Like the SwissNano, it is highly thermally stable and very quick and flexible in production.

Further detailed information about Laubscher Präzision AG can be found on the company website. Watch our video on the Tornos website telling the success story of our visit to Laubscher Präzision.

laubscher.swiss



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SPECIAL DEVELOPMENT:

Loading and unloading parts

on the Swiss DT 26

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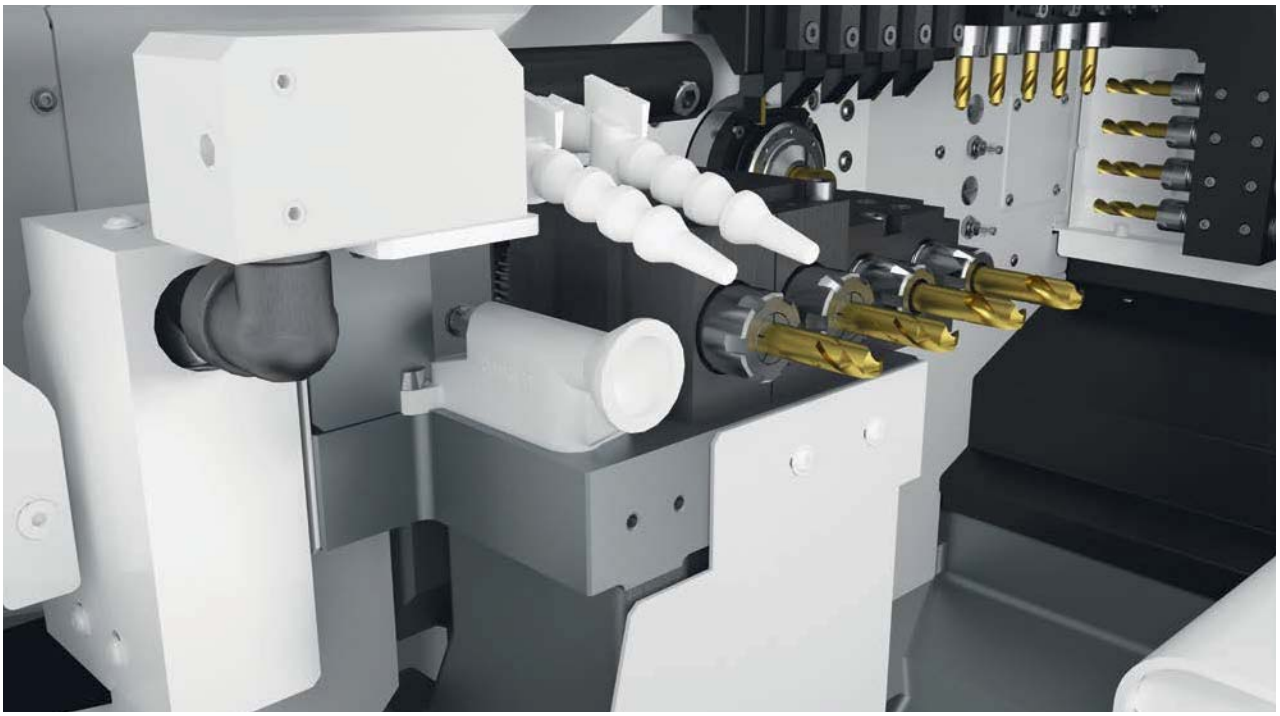
Today, we'd like to present a solution for loading and unloading parts on a Swiss DT 26 machine.

This development was implemented at the request of a customer that wanted to load blanks into the machine and get finished parts from the machine. Loading blanks saves on machining time, reduces chip volume and often allows hard materials to be machined efficiently.

This device can be used to process a family of parts from 100 to 300 mm in length, and from 2 to 6 mm in diameter, in quantities from 200 to 500 parts. The team carried out a comprehensive feasibility study that led to the development of this loader technology. The loader is a step type unit, with a system that enables blanks to be loaded one by one into the loading chamber.

The special development turns the Swiss DT 26 HP into a chucker machine with a guide bush.



The ejection is completed by the counter spindle.

The parts are safely ejected.

The billet loading is integrated in the machine.

An intelligent system

The system is more than simply a mechanical solution. A sensor checks that the blank is correctly loaded, removing it, if there is a problem. If it is still incorrectly positioned after 5 parts, the system switches to alarm mode and instructs the user to check the entire batch of blanks.

Fine-tuning to the requirements of the part

Once the conformity checks have been performed, the part is placed in a 3D printed chamber that is designed to protect the parts. Because parts are not handled during machining, it is essential to avoid any marks.

The blank is transferred to the spindle via an electrically-controlled linear cylinder and this guarantees highly flexible positioning and torque control when the part is pushed into the machining area. A stop on the platten enables precision referencing of the blank before the customer's preferred machining cycle starts.

Once the main operations and the back working cycle have been completed, the back spindle is positioned in front of a 3D printed blowing system that is used to extract all of the different lengths and diameters via the back spindle.

The system is equipped with a pressure controller that allows it to adapt ejection to any circumstances, depending on the type of part.

The parts are then recovered via a long part extraction system outside the machine and transferred via an oil stream to a box adapted to the customer's requirements. The outfeed is equipped with rubber shock absorbers that can be easily removed in case of wear in the recovery areas. This allows the part to be extracted undamaged.

Do you have a special requirement? Contact your Tornos representative to discuss it with our team of engineers.

tornos.com

All products made by Bernina Thailand are 100 percent Swiss designed and Swiss engineered, Bernina machines are synonymous with Swiss perfection and durability, produced under the strict Bernina Quality Standards.

Bernina is proud of its dedicated employees, who are committed to ensure that every product is manufactured with greatest care and with attention paid to the smallest detail.

BERNINA THAILAND AND TORNOS:

Shared mastery

of Swiss precision and quality

When Bernina Thailand — a member of the globally active Bernina Textile Group and master of Swiss precision and quality needed bar-turning expertise, it turned to another master of those same qualities: Tornos.

BERNINA
made to create

bernina.com

Like Tornos, Bernina was born in Switzerland. The fourth-generation, family-owned business has been manufacturing sewing machines in Steckborn, Switzerland for more than 125 years. It was in 1893, in fact, that Karl Friedrich Gegauf invented the hemstitch sewing machine — a world first that caused quite a stir. By 1900, the hemstitch sewing machine was in widespread use not only in Switzerland, but abroad as well, and the first factory had been established with 70 to 80 employees. Today, the Bernina Textile Group is among the world's leading sewing and embroidery machine manufacturers, with millions of machines in use by people worldwide who look to the company as a standard bearer for innovation and precision.

Made to create, Bernina sewing and embroidery machines are precisely manufactured down to the last detail. Bernina ensures quality, so you can let your creativity flow freely.

Bernina Thailand, established in 1990, produces Bernina sewing machines from entry level up to the 7 Series, as well multi-needle embroidery machines and longarm quilting machines, while Bernina Switzerland manufactures the top-of-the-line sewing machines and longarm quilting machines. Located in Lamphun, Bernina Thailand's on-site Swiss management ensures that high Swiss quality standards are applied — and when a bar-turning issue arises, Technical Support Manager Manfred P. Schmid and his team waste no time reaching out to Tornos for expertise.

"Our relationship with Tornos goes back many years — even before Tornos had an office in Thailand," Manfred P. Schmid explained. "The first Tornos machine in our Lamphun plant was installed nearly 20 years ago. Since then, we have established a close cooperation and long-lasting relationship with the Tornos team stationed in Bangkok, Thailand. In addition, I have been at Tornos' flagship site in Moutier, Switzerland, for training and machine pre-acceptance with Darren Way, Director of Tornos Thailand and responsible for the entire Tornos Technologies Asia, and Kwanmuang "Khun Ting" Thapanangkoonkorn, Tornos Thailand Business Development Manager and former application engineer. That was about 12 years ago and we have stayed in contact ever since — not only limited to business but for casual get-togethers as well."

Today, Bernina Thailand's Tornos fleet includes the DECO 13 bi, DECO 10e, Sigma 20 II, four Swiss GT 13 machines, and two Swiss GT 26 machines — and it is the expertise behind those machines that adds real value, Manfred P. Schmid said.

“This is not a typical sliding headstock lathe application. We utilize the versatility from the Tornos machine in an unusual way.”

“Our sewing and overlocker machines, embroidery add-on modules, multi-needle embroidery machines, and quilting machines use a vast numbered of turned and mill-turned parts: main shaft, base shaft, needle bar, and fabric pressure bar, just to mention the obvious,” he said. “Some of our parts have a demand as little as 2,000 pieces per year, while we produce others in quantities close to 100,000 pieces per year. We have shafts with 16 mm diameters and lengths up to 600 mm, used in our multi-needle embroidery systems. Other workpieces are small, parts of only 2 mm diameter.”

While most of those parts are typical applications, special cases do arise — and Manfred P. Schmid turns to Tornos for solutions.

The needle bar for the company’s top-of-the-line sewing machines is an example of just such a special case, he said. An essential component because it

With a fleet of Tornos DECO, Sigma, and Swiss GT machines, Bernina Thailand turns to Tornos in special cases requiring expert solutions.

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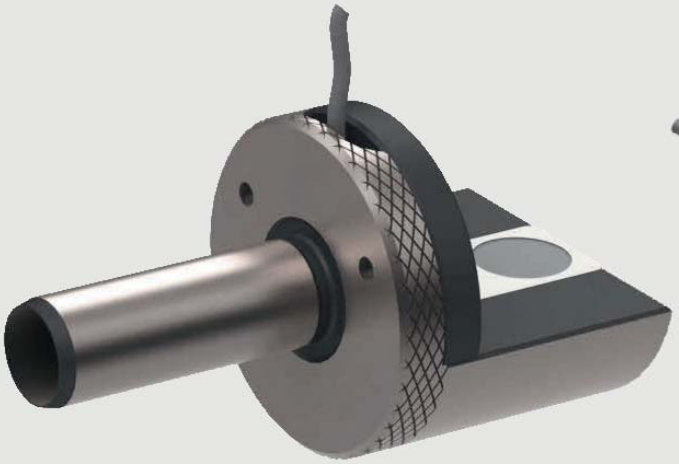

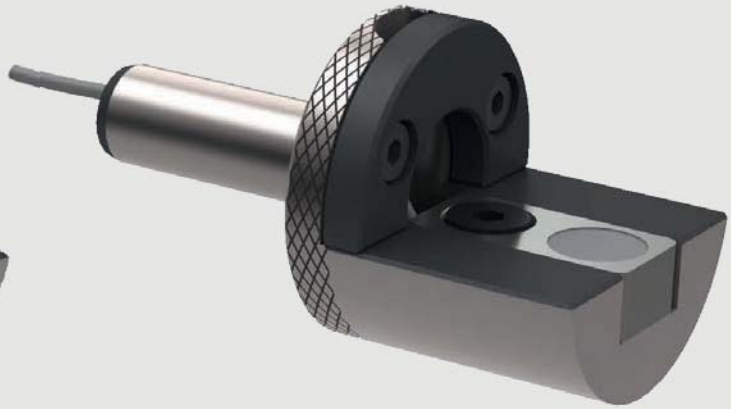

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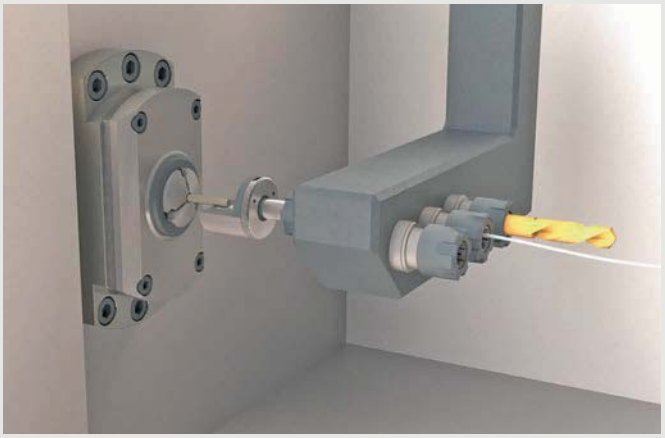

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holds a sewing machine's all-important needle, the needle bar is made of ETG 88 structural steel and has a diameter of 6 mm, a length of 171 mm, and an engineering tolerance of h6 (8 microns); its surface is hardened by high-frequency heat treatment.

"This is not a typical sliding headstock lathe application. We utilize the versatility from the Tornos machine in an unusual way," Manfred P. Schmid noted. "The workpiece has already been hardened and ground and has a semihard front that we machine without a guide bush on Swiss GT 13; the parts are clamped 1 by 1 at S1 by the operator. This part not only needs to be clamped and axially positioned; it also needs to be positioned radially in relation to an existing cross bore at the hardened pre-machined workpiece. We machine from the semihard front of the needle bar, turning, drilling and milling the needle slot and features for the needle holder."

Ultimately, the tip of the needle must be clamped for the actual sewing application with a positioning accuracy of less than 0.1 mm.

"That may sound like a big tolerance. The facts that commercially available needles are not very precise and the needle itself already uses a big portion of the available tolerance mean that the needle bar machining requires precision," Manfred P. Schmid said. "We develop and set up such special cases in cooperation with the Tornos team. We can always count on the Tornos team to help us find solutions to such special cases."

With the Covid-19 pandemic spurring a boom in mask sewing as well as people being at home and engaging in sewing, Bernina Thailand currently has such a high workload that the Tornos DECO 13 bi, a machine that has been already scheduled for decommissioning, is still in use, he added. Eventually, Manfred P. Schmid said, that workhorse machine purchased in 2002 will be replaced with a new Tornos machine. Manfred P. Schmid and the 630-member Bernina Thailand Team will continue to count on the Tornos promise — "We keep you turning" — as it continues its long legacy of Swiss precision and quality.

bernina.com

Manfred Schmid, Technical Support Manager, and Manu Meenak, Head of Maintenance, in front of one of the Tornos Swiss GT 13 machines used, for example, to machine the needle bar, crucial for accurate positioning from the sewing needle, to ensure the legendary Bernina stitch quality.

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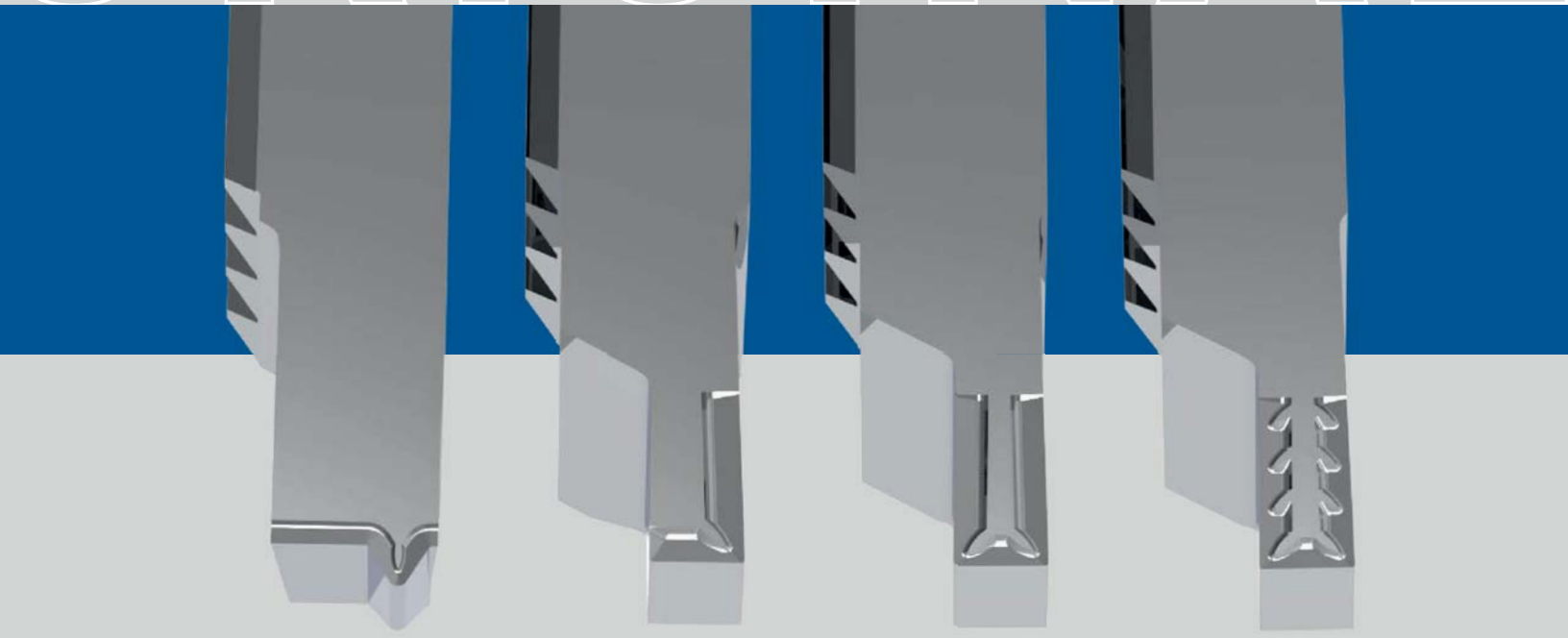

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