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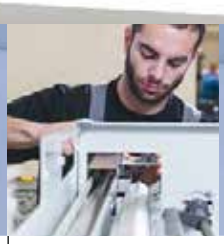

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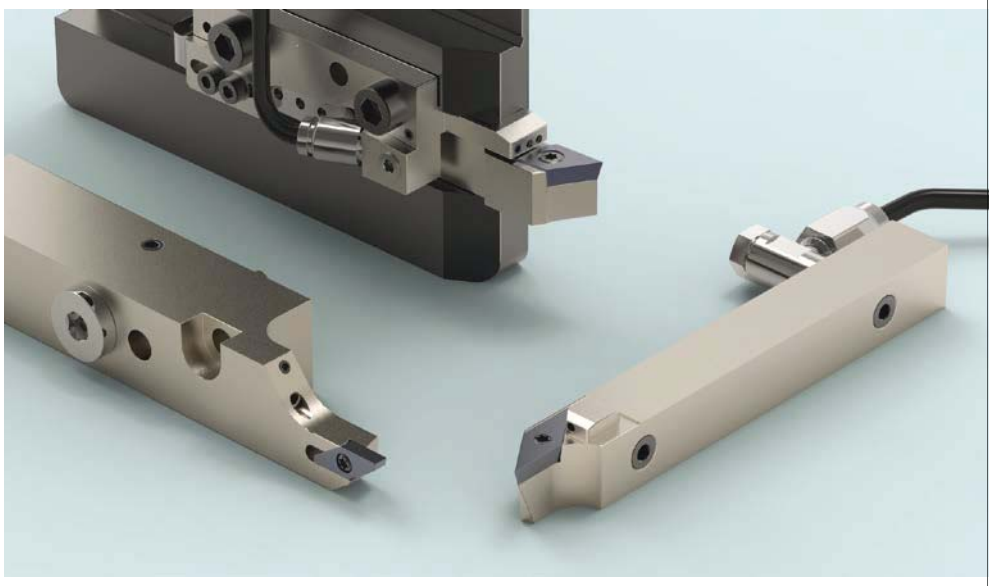

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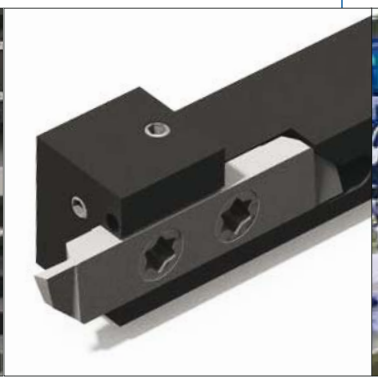

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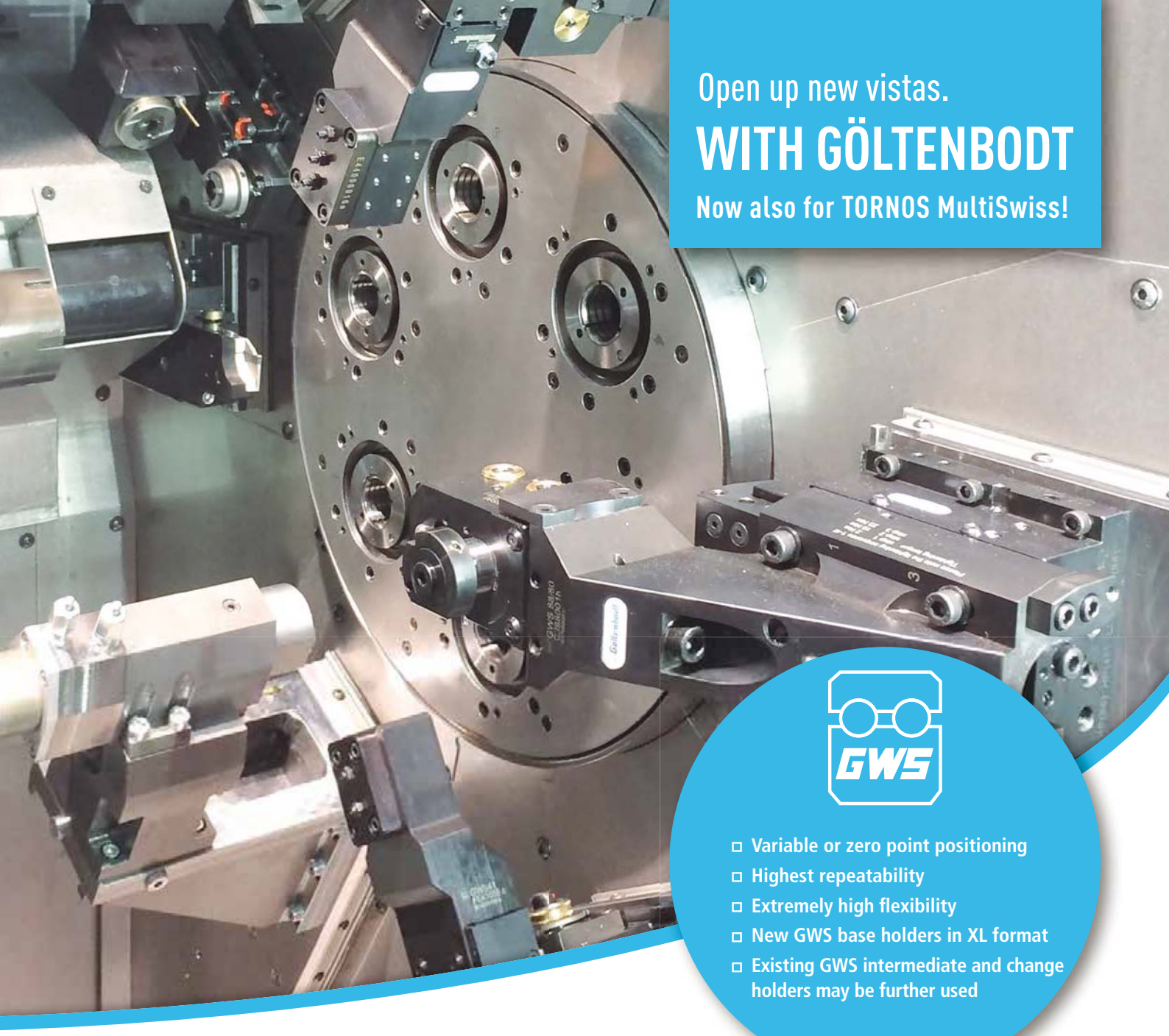
Matthias Damman
Head of Tornos Service



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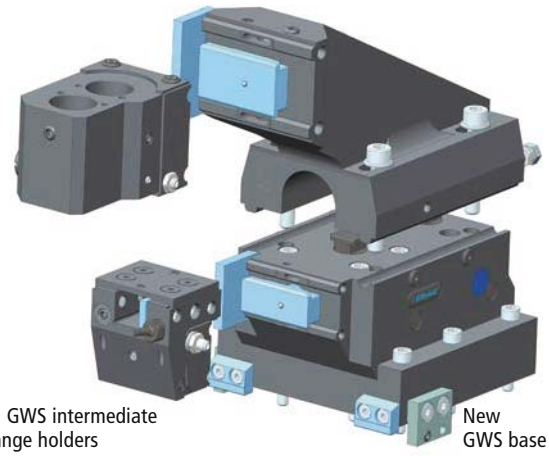

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MICHAEL HAUSER, CEO OF TORNOS SA

MICRO MACHINING IS PART OF OUR DNA

Since September 2011, Michael Hauser has been heading the Swiss lathe manufacturing company Tornos. As with all Swiss machine manufacturers, Tornos boasts a rich tradition but the company is struggling with the current strength of the Swiss franc and a global reluctance to invest. In an interview with decomagazine, Mr. Hauser explains the current situation at Tornos and how he wants to get the company ready for the future, despite the adverse market conditions.

decomagazine: With its history steeped in tradition, Tornos has already experienced various ups and downs. Where does the company stand today?

Michael Hauser: We certainly still do not stand where we should stand. In the last few years, we have made tremendous efforts to achieve profitability in the long run; recently, however, we have been set back by some particular factors.

dm: Can you explain them in detail?

MH: We are working in an ultra-cyclical market. We know that, and we've taken the required measures. We have made our production fully flexible and have streamlined it drastically. We have outsourced any processes and components that are not counted among our core competencies to external partners and have built two plants in Asia. In this way, we managed to lower the break-even point by 100 million Swiss francs.

dm: This, however, was not enough. Can you explain us why?

MH: I don't want to moan, but on the one hand, the currency situation is showing its full impact. The prices for our products skyrocketed by 15% at one

point. That was a disaster both for our margins and for our competitive position. On the other hand, two of our core markets are currently in stand-by mode as far as their investment behavior is concerned. Due to the global decline in the demand for watches, especially in Asia, the watch making industry is reducing its production. In the automobile industry, our customers still get a lot of orders. However, they are concerned and refrain from investing in new equipment. They prefer to utilise their existing machines at full capacity. We can construe that from our service revenues which, at this moment, are already higher than in the last year.

dm: But these three problems will not vanish into thin air in the short run. Will Tornos be able to survive alone under these circumstances on a long-term basis?

MH: Definitely yes. On the one hand, we can count on two principal shareholders who are backing us wholeheartedly because they know Tornos' capacities and strengths. On the other hand, we now have a product portfolio that enables us to gain significant market shares within the next months and years.

dm: Before we get on to these products, can you please tell us what you consider to be the particular strengths of Tornos?

MH: I already worked for various machine tool manufacturers, but I have never experienced such a spirit as with Tornos. The people of this region have machining in their DNA, they have high ideals and are living according to them. This implicates an enormous quality level. There are Tornos machines that have been working for more than 40 years with high reliability and productivity. If necessary, we can still supply our customers with spare parts for such machines. This may be counter-productive from an economic point of view but reflects our attitude towards our customers. Tornos does not only sell machines to its customers but helps them achieve a profitable production on a permanent basis. Through the years, a tight-knit community has thus evolved, both in-house and between our customers and ourselves. It is not hyperbolic to speak of a big Tornos family in this context.

dm: So your primary goal is to enlarge the customer family. What are your specific plans?

MH: As I already told you, we have invested huge amounts of money in the development of new products throughout the last few months. Today, from the 20 diverse models of our product portfolio, only three models are older than five years. All the other ones are newly developed machines and almost all of them are able to compete in the market better than the average.

dm: Can you please give us some examples?

MH: Certainly, I could give you a detailed presentation of all models, but I want to confine myself to two of them. First, however, I would like to make the following general remark: For product development, we are focusing on markets. In other words, we are bearing industries, regional particularities and the range of the workpieces to be produced in mind. The customer gets the best means of production he can get for his specific workpiece range – at a price that has been optimized for him. And this is increasingly being appreciated by the market. Since its market launch at the end of 2011, for instance, we have already sold more than 200 units of our new MultiSwiss multi-spindle machine. With these machines, we address those users who produce large volumes of high-precision parts that come up to the highest demands on surface finish.

Our SwissNano is also writing its own success story. This model came as a real bombshell and we have already sold more than 100 units in Switzerland alone.

dm: As to this machine, you actually opted for an unconventional approach, both in terms of design and functionality. What makes the SwissNano so unique?

MH: This machine is really attractive. It is small, powerful and compact and boasts a smart design and premium production results. It really makes it fun to work with. With this machine, however, the salespeople are facing the initial challenge to convince the customers of its capability. Many users do not think the machine is capable of such a tremendous efficiency. Once they have bought a machine, they are enthusiastic. This is also reflected by the high rate of re-purchasers, that is of those customers who immediately buy a second, third, fourth… machine, once they have bought the first one. In view of the large number of cam-controlled machines in the market that will have to be replaced in the near future, this fact gives us every reason to be highly optimistic.

dm: Did you plan that from the very beginning?

MH: To be honest, no. With the wisdom of hindsight, however, it is comprehensible. Today, fewer and fewer operators are able to operate

cam-controlled automatic lathes. SwissNano offers better results while being almost as productive as cam lathes; furthermore, programming and operation are foolproof. And all this is offered at a reasonable price.

dm: Several years ago, you bought the Swiss machining center manufacturer Almac. Did this acquisition pay off for you?

MH: As to technology, definitely. However, since Almac is focusing on supplying the watch making industry just as we are, the brand cannot not help us in the current situation in the way we hoped for. All in all, we will benefit from Almac in future. Almac BA and SwissNano are based on the same concept which means we can offer our customers turning and milling solutions just as required for the specific application. As soon as the investment backlog in the watch making industry will have been overcome, we will be in the vanguard.

dm: At the moment, the whole world is talking of Industry 4.0. Where do you stand in this competition?

MH: This is hard to say because the whole world is talking of it, but everybody has a different conception of it. It is a fact that, early on, Tornos has launched its TISIS software, software that helps our customers increase the efficiency of their plant, avoid breakdown and better master their processes. The advancement of this software is our top priority and, each year, we will offer new modules for it.

dm: Are there other things you are working on?

MH (laughing): Aplenty. We are well on our way but there is still a lot to do. Our primary goal is to generate even more benefit for our customers. The know-how in the manufacturing industry will decrease all over the world. That's why we have to make our machines even more intelligent and optimize their intuitive operation. As far as mere mechanical engineering is concerned, Tornos is already among the big players. The overall view of complex processes, however, is a field in which we have reserve capacity. Example: How can I realize automation, how can I optimize loading and unloading processes or the material flow as a whole, how can I get the communication between machines and workpieces going, etc.?

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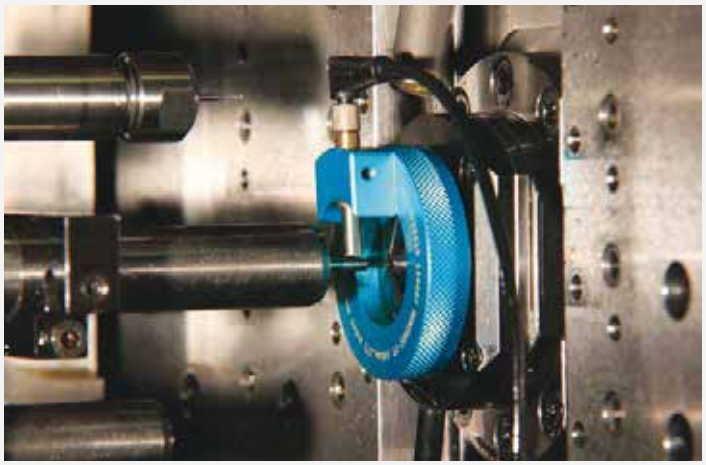

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THE BEST PERFORMING MACHINES…

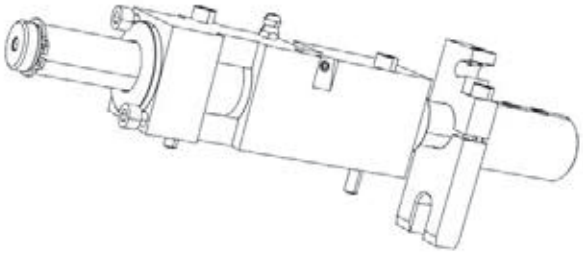
The machines of the EvoDeco series are the basis of high-end solutions geared towards high productivity, performance, autonomy and accessibility. Their capacity is even enhanced by the comprehensive range of Tornos options that make them ideal machines for any customer requirements.

The EvoDeco platform is based on the proven kinematic system that made the Deco platform a success. It has four independent tool systems that ensure maximum modularity and the possibility of simultaneous operation with 4 tools (3 for main machining and 1 for back machining). Advanced machining processes such as roughing/finishing on the guide bush and operation in differential mode (contour tracking) for simultaneous turning and drilling operations on the guide bush as well as back machining tasks, can all be performed in hidden time with the 10 linear axes and 2 simultaneous C axes.

Designed for maximum flexibility

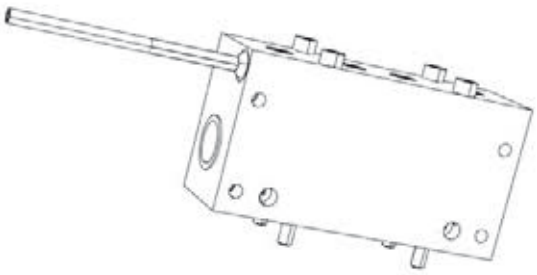
The tool holder system has been selected with a view to achieving full versatility and a very high level of flexibility. All types of tool holders are equipped with a quick-change and adaption system for the

Presentation



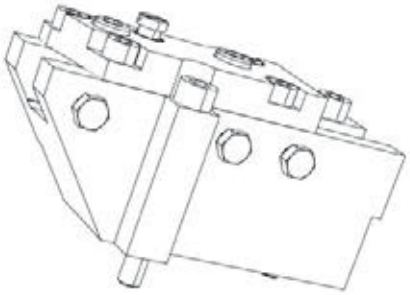
Additional HP steady gun drill holder

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
505-3117			



Tool holder for end work

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
		244-3100	245-3100



Stationary tool holder for counter operation

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
	510-1002		

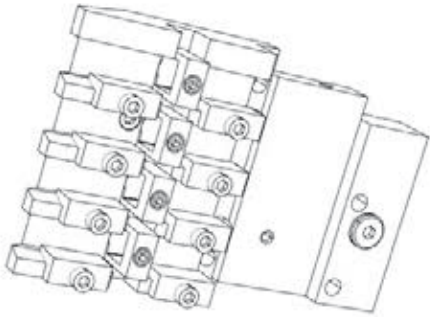
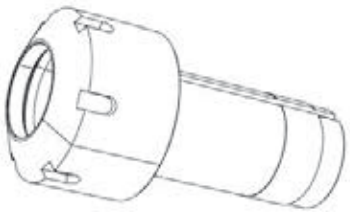


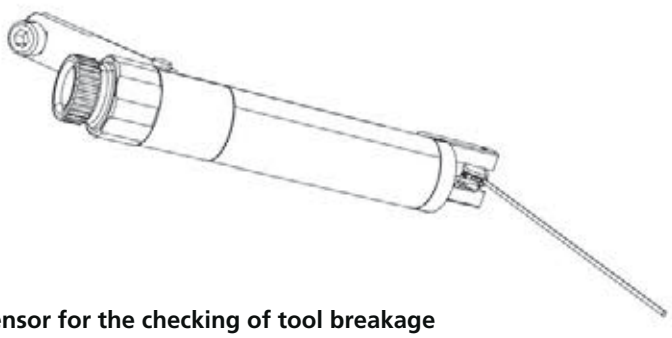
Plate for turning tools

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
		244-1004	245-1004



Adaptation for collet

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
		244-0930	245-0930
		244-4030	245-4030



Sensor for the checking of tool breakage

EvoDECO 10	EvoDECO 16	EvoDECO 20	EvoDECO 32
505-5120	510-5120	244-5120	245-5120

use of pre-set tooling. EvoDeco machines are definitely capable of solving any machining issues.

Motor spindles designed for high performance

On the EvoDeco models, main spindle and counter-spindle are identical and each has a powerful synchronous motor. This synchronous drive technology represents the next-generation in machine tool technology. The efficiency of the synchronous motor exceeds 90% while that of an asynchronous motor amounts to just over 80%. The users benefit from acceleration and stoppage times that are four times shorter than with asynchronous drive technology and with a constant torque in all speed ranges. This means that, depending on the workpiece, the cycle times can be significantly reduced, especially when several milling processes require frequent stops.

Now, let's look at some operations and counter-options of the EvoDeco series

Gear cutting

The EvoDeco machines are specialists in gear cutting. To meet the demands of the watch making industry, the EvoDeco can be equipped with up to 3 gear cutting devices.

Thread whirling

Thread whirling was invented by Tornos and thus it is one of the company's key competencies. Whether single, double, main or back thread whirling tasks are to be performed, Tornos has an appropriate solution.

Polygon cutting

Whether it is tulip-shaped polygon cutting, thread milling or classic polygon cutting, all operations can be performed both at the main spindle and at the counter-spindle.

B-axis

The machining of dental implants and any other irregular shapes is a breeze for the EvoDeco. Such machining tasks can be performed both by main and back machining. Optionally, the EvoDeco 16 can be equipped with a B-axis that significantly widens the machining capabilities of the machine.

A permanently expanding offer

Brice Renggli, Tornos' Marketing Manager explains: "Whatever the needs of our customers, our standard tool holder range is very extensive and covers most of the industry's demands, including even the most advanced of them. This standard range is even rounded off by quick-change tool holders that provide added flexibility and possibilities."

With these diversified options, Tornos machines can be finely adapted to the various market segments. The range of equipment offered by Tornos is not limited to tool holders but also comprises high-pressure pumps, tool breakage detectors, fire-extinguishing systems or oil mist extraction systems that are counted among the options that are offered by Tornos by default.

A new options catalogue

Mr. Renggli concludes: *"Whether you need axial or radial drills, polygon cutters or other thread-whirling cutters, we offer the appropriate solution. Our new options brochure for the EvoDeco series is ready to download from our website."*

https://goo.gl/TppsYT

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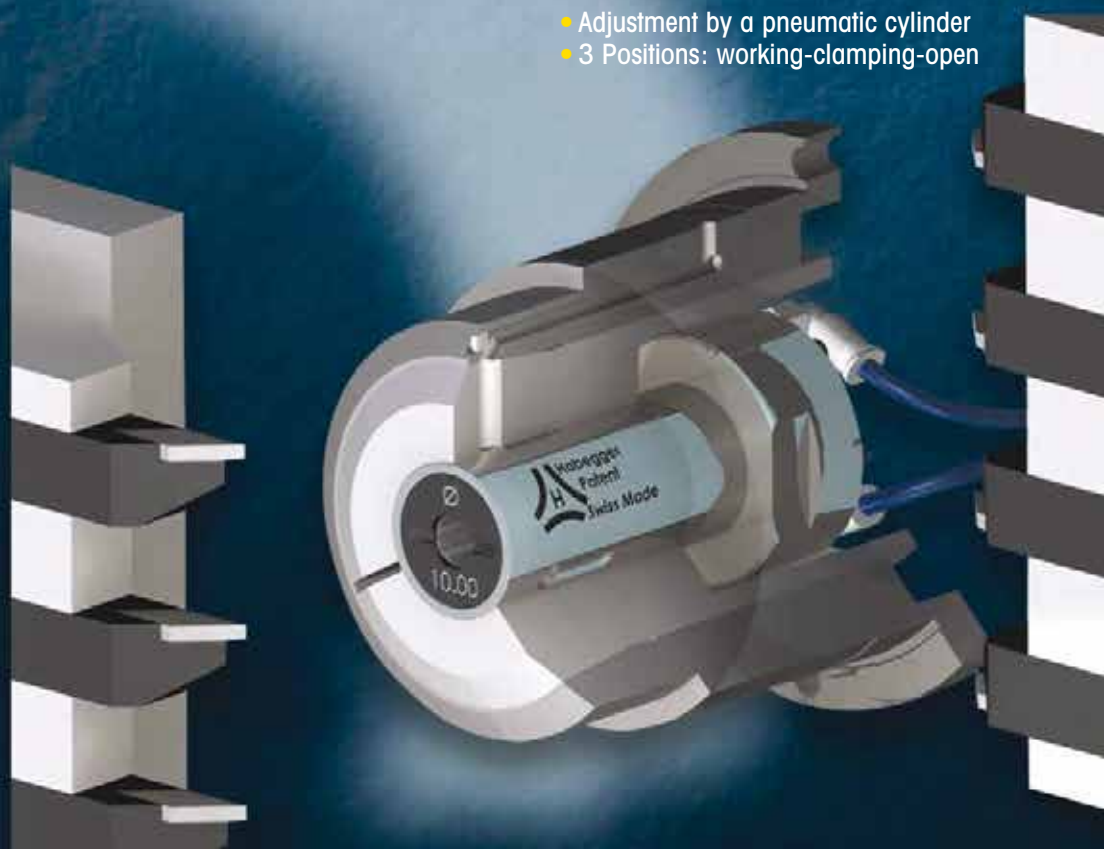
- *Vermeidet das axiale Festsitzen*
- Non revolving bush, with carbide rollers
- Avoids any axial seizing-up

Type / Typ C

- Réglable par l'avant, version courte
- Longueur de chute réduite
- *Von vorne eingestellt, kurze Version*
- *Verkürzte Reststücke*
- Adjusted from the front side, short version
- Reduced end piece

Type / Typ TP

- Réglage par un vérin pneumatique
- 3 positions: travail-serrage-ouverte
- *Einstellung durch einen pneumatischen Zylinder*
- *3 Positionen: Arbeitsposition-Spannposition-offene Position*
- Adjustment by a pneumatic cylinder
- 3 Positions: working-clamping-open



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SWISS GT 32 B: COMPLEX OPERATIONS WITH THE HIGHEST LEVEL OF EASE

The new recently unveiled Swiss GT 32, perfectly rounds off the Swiss GT series. With this extremely powerful and sturdy machine, customers of the Swiss manufacturer get a flexible lathe that boasts an outstanding cost/performance ratio. The Swiss GT 32 is now also available with a fixed-positioning or continuously swiveling B-axis that enables contour machining.

Encouraged by the positive customer feedback after the great success of the Swiss GT 26 and Swiss GT 32 models, Tornos now takes the Swiss GT 32 machine a further step forwards. With its 6 linear axes, two C axes, three positions for driven tools and its maximum capacity of 40 tools including 14 driven tools, the Swiss GT 32 grants the end user a remarkable flexibility and capacity. The totally new B-axis enables the user to control and index the B-axis to virtually any angle position via the CNC program. This feature is particularly useful for processes such as angular milling, drilling or even tapping. As the B-axis is integrated in the main carriage of the machine, the Swiss GT 32 B is not restricted to angular adjustment but can certainly perform movements in X and Y axis directions. Main and back machining are thus enabled. On machines with B axis, the number of driven tools is increased to 16, with a total tool capacity of 36.

A tool station of ultra-high performance

The B-axis of Swiss GT 32 is inspired by the B-axis of Swiss GT 26 B. The latter is also supported by two fixation points that ensure high rigidity of the device and enable it to achieve substantial chip removal rates. The tool station can accommodate 4 double spindles for driven tools (main and back machining) that can reach a maximum speed of 9,000rpm and is thus highly efficient when it comes to drilling and milling in all kinds of material. The tool post can also be equipped with tool holders for the installation of additional stationary tools. These 4 tool positions enable the operator to easily perform centering, drilling or even tapping tasks. If needed, it is also possible to add one or two high-frequency spindles to the tool post and even enhance the machining capacity of the machine.

Milling? Of course!

The additional B-axis makes the Swiss GT 32 machine a real bar milling center. Thanks to its B-axis, the machine can be used for milling at any angle via simple CNC programming. Making mechanical angle adjustment no longer necessary. As on the Swiss GT 26 B, the fourth milling unit can be replaced by a thread whirling unit. Just as is valid for angular milling, the working angle of the thread whirling cutter can be defined by the CNC unit; compared to mechanical adjustment, enormous time savings can therefore be achieved. It's no longer necessary to use the trial and error method to find the correct angle since this is determined by the CNC unit. This option e.g. is ideal for the production of bone screws or dental implant screws. Thanks to the B-axis, more customised parts can be produced quite easily.

Swiss GT 32 B and Swiss GT 26 B are valuable partners for the medical and dental industries and for anyone who wants to machine workpiece types that require complex machining.

A masterfully controlled continuously swiveling B-axis pushes the limits further

These days, the complexity of parts increases in line with their diversity levels. To respond to these growing demands on complexity, the Swiss GT 32 B machine can be equipped accordingly to realise continuous 5-axis machining with the aid of its B-axis. Consequently, the axis can be positioned continuously to perform free contour machining tasks. The milling spindles are rated for a maximum speed of 9,000rpm and thus enable powerful machining. The extra rigidity offered by the two-point support of the B-axis has a positive effect on the surface finish and on the tool life. Front and back machining can be performed simultaneously. Incidentally, many users prefer machining irregular shapes by way of back machining to avoid the constraints caused by clamping in the counter-spindle. To enable continuous 5-axis machining, the Fanuc 31i-B control unit – standard equipment of the Swiss GT series – was replaced by the Fanuc 31i-B5 CNC unit that is able to cope with these interpolations. So equipped, the Swiss GT 32 B can machine workpieces of any type.

Complex programming? This is all history!

Just as with most of the new Tornos products, the Swiss GT series is supported by Tornos' TISIS software to simplify machine programming. Once the machine has been virtually equipped with the correct tool holders, it is possible to define the specific geometry for each tool and to test the program or parts of it by 2D simulation. Customers can also generate the right G codes and execute them with the appropriate values – thanks to a wizard that boasts outstanding ease of use. TISIS is also able to manage the specific know-how of each operator. Customized operations can be stored in the library from which they can be called upon in an extremely intuitive manner for future use in other programs. Furthermore, the software offers various production monitoring functions and enables machine networking.

Complex operations? It's a breeze!

TISIS is highly efficient for the management of so-called classical operations. However, as everybody knows, the generation of irregular shapes or contour shaping requires the creation of a large number of program blocks which are often too many to be created manually. A CAD/CAM system must thus be used as an aid. For all those, who don't want to leave the entire workpiece machining process to the CAD/CAM system, Tornos developed TISIS CAM in close cooperation with Mastercam. This module makes it possible to program complex machining tasks such as the machining of irregular shapes. It directly creates the large number of program blocks required for this specific operation. As an integral part of TISIS, the TISIS CAM module is able to unite the best of both worlds. Basic programming is done in the ISO editor while complex shapes are automatically generated by TISIS CAM based on the data received from the customer.

TISIS is free of charge for 30 days and can be downloaded through store.tornos.com. Anyone interested in this software is invited to test it.

Do not hesitate to contact your nearest Tornos representation if you want to discover Swiss GT 32 B and its countless machining capabilities.

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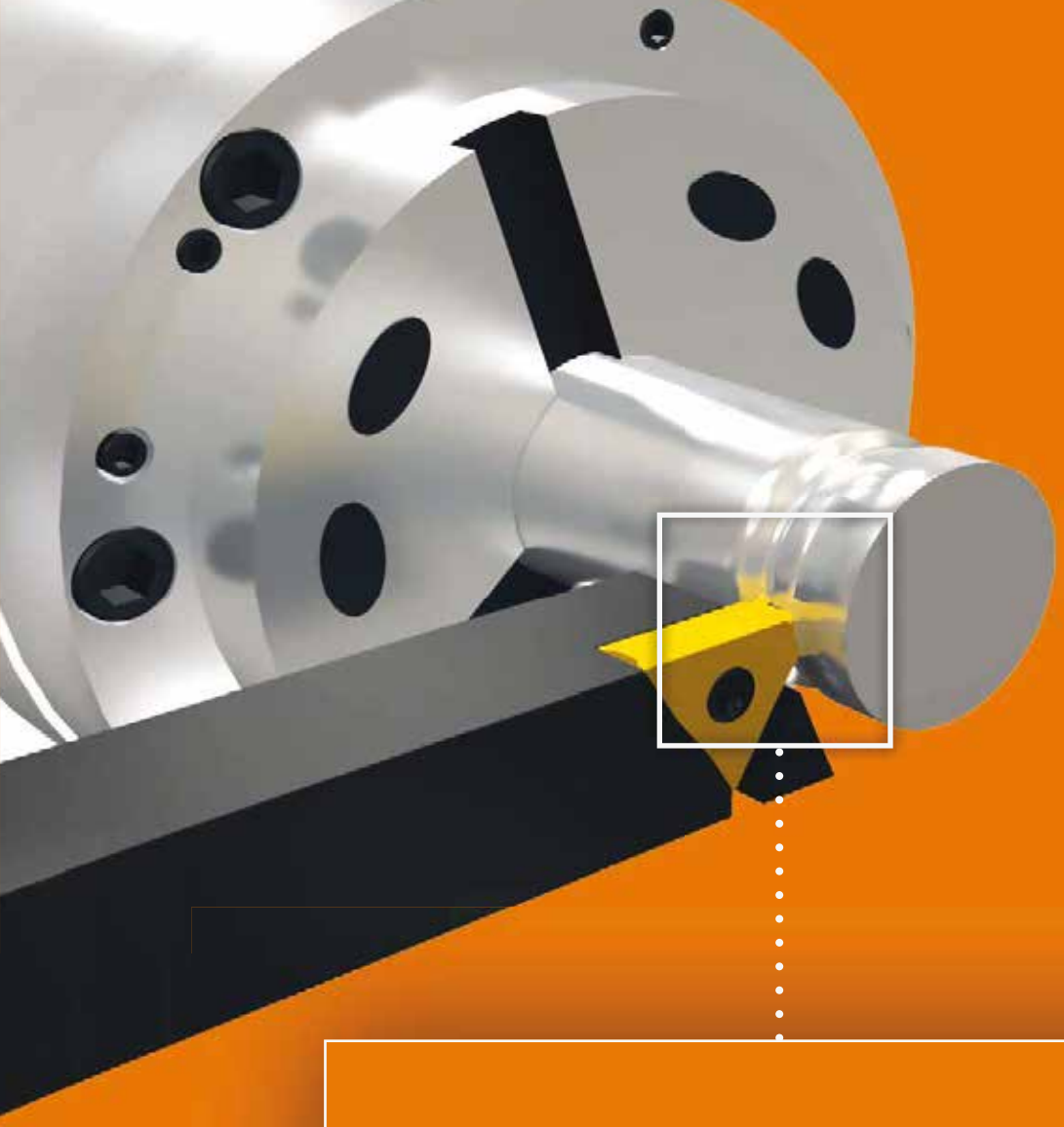

OUR LEAD-TIMES: IMPRESSIVELY SHORT

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CUSTOM SOLUTIONS ARE SUPERIOR

- Part specific tool contours
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- Mirror-like surface finishes of the tools

80%
INCREASE IN PRODUCTIVITY!

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A WIDE SERVICES PANEL IS ADDING VALUE FOR CUSTOMERS

Customers and the reliability and service of their production equipment are the focus of the Tornos Service department. decomagazine met with Matthias Damman, head of the Tornos Service department to understand the focus behind this division and how it services Tornos customers.

With 14 Tornos Service Centers strategically located across Europe, Asia and the Americas, Tornos Service offers fast, competent and reliable support for all customers worldwide. A high level of expertise and in-depth understanding of customers' processes, applications and challenges back this across a wide range of industrial segments. With extensive expertise in sectors such as the automotive, medical, electronics and connector, and micromechanics markets, Tornos Service supports users and their diverse demands.

Field service that adds value to machines

Fast, efficient, on-site operational support is designed to ensure the continuous reliable operation of Tornos machines. The field service engineers install the machine, support customers with basic training, deliver the tools to optimise the machine productivity and performance, and then carry out repairs to minimize downtime. *"Tornos machines are high precision technology and our certified Tornos engineers have the training and expertise to make sure they operate the way they are designed*

to," explains Damman. Highly trained service engineers know Tornos machines and peripherals and understand how customers use them in their daily operations. They speak the same language and are experts that deliver a quick resolution. *"Whether customers are facing a basic machine issue like changing a belt or a more complex challenge like replacing a spindle, we are there for a quick and qualified intervention,"* says Damman about this point.

Upgrades to expand application horizons

As industry progresses, parts evolve and the machines follow this trend. *"For example, you need polygon turning for electronics applications, or an oil mist extractor to ramp up workshop safety and cleanliness. The Tornos Service team has the expertise to help you stay competitive,"* comments Damman.

As a longtime player on managing complex machining processes, Tornos specialists are perfectly positioned to design and deliver upgrades to expand machining capabilities. Whatever the need, they are poised to carry out a feasibility study and are ready to implement the upgrades to take machine operation and efficiency to the next level. High-pressure pumps, deep drilling units, chip conveyors, fire extinguishers, high-frequency spindles, oil mist extraction units, tool holders, thread whirling, polygon milling and gear hobbing attachments, long parts extractors, bar loaders, collets, special part catchers, memory extensions, adaptors, tool life management software and additional axes are among the wide scope of possibilities.

Machine overhaul to refresh a machine pool

With the certified machine overhaul services, Tornos Service brings a machine back to high productivity levels that will deliver the precision and productivity of a virtually new machine. This is all done in the focus of productivity and continuity. Additional Training, program changes, new tooling and processes are not necessary when adding another 10 years of high precision production to the life of an existing machine. The head of Tornos service explains: *"Our affordable machine overhaul service begins with a complete inspection of your machine, followed by on-site recommendations and a quote based on your needs and our analysis"*. No surprise then. A complete overhaul includes

full machine disassembly, cleaning, replacement of the slide ways and ball screws, any necessary replacement of wiring and electronic components, repainting of the machine and its components, re-assembly of the machine and custom adjustment of its geometries and restoration of the machine with testing of the functions and geometries.

When the newly overhauled machine is re-installed at the customer's site, it comes with a full one-year warranty on all exchanged parts. A scaled down partial overhaul can be carried out as per customer neeeds. *"Our experts can also personalise your overhaul by performing targeted repairs to suit your specific needs, such as changing all of its slide ways and leaving the original axis motors as they are. Let your budget, your particular machining needs and your Tornos experts be your guides,"* says Damman.

Spare parts service with the clear goal of fast delivery

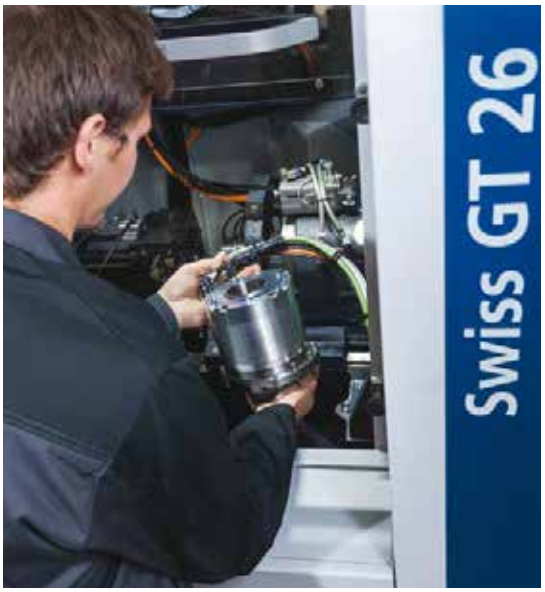
Tornos delivers certified spare parts designed specifically for Tornos machines and therefore users benefit from perfect compatibility and quality, along with fast delivery by a single partner, wherever they are in the world. *"With more than 18,500 spare parts in stock and three parts hubs around the world, we guarantee the fast delivery you expect,"* explains Damman.

When a customer orders parts from Tornos, they can work with the confidence that they are made of the highest quality materials and are backed by stringent reliability tests. Continuous improvement is an integral element of the company's production process, so customers continuously benefit from the ever-increasing functionality and reliability ensured by the technical development of original spare parts. New Tornos spare parts often carry an improved service life compared to the parts they replace. From bearings, gears, springs and guideways to computer numerical controls, spindles and motors, customers are assured of the best machine performance when their machines are supported by Tornos certified spare parts. *"You can order your spare parts with the touch of a finger, thanks to our online catalogue. Finding the part you need is easy because we support you with part identification as well as price and availability information — 24 hours a day, seven days a week."*

Free Hotline support to guarantee 24/7 support

"Every second counts when you're looking for answers, and our specialists are just a phone call away, ready to quickly talk you through to a fast

resolution. With a perfect understanding of the latest technical developments, the experts on our Hotline are your interface between development, production and your specific requirements. They speak your local language and rapidly deliver the solutions to help get you back up and running," explains Damman. In the case of machines fitted with state-of-the-art communications software, the Tornos remote assistance delivers the highest level of responsiveness, wherever customers are based.



Used machines enter the Tornos world

When customers decide to invest in new machines, they often entrust their older machines to Tornos for re-sale. All of those machines are factory checked. Before being certified as fully backed by Tornos, every machine is thoroughly inspected and approved by a team of trained Tornos technicians and service managers. The company also offers machines that are completely overhauled to as-good-as-new condition, as verified through comprehensive testing by Tornos engineers. It is also possible to try a machine. Customers can rent a Tornos machine and experience Tornos' high precision and peerless productivity before buying it. *"Sometimes we combine two Service products. When a customer needs to overhaul several machines and has the need for continuous high productivity we rent also a used machine to the customer. Normally he is buying the rented machine when all the overhauls are finished"* explains Damman.

Expert training to reach the next level

To turn end users staff into true programming, handling and maintenance masters, the Tornos expert training is delivered by highly experienced instructors at the company's headquarters or at the customers' plants. Engineered for intuitive and easy use, Tornos machines offer a vast range of options. Whether the customers own a single- or multi-spindle Tornos machine, instructors' technical expertise, coupled with their keen understanding of the key processes and applications, enables a streamlined, customer-focused knowledge transfer.

Software support to enhance productivity and quality

The in-house software support experts take the complexity out of dealing with machine software issues. Damman says: *"Software is the brain of your Tornos machine and you can count on us for the unparalleled expertise to get you over the rough spots, whether you require software fine tuning or installation of software and accessories. Upgrades on new software versions are available for purchase and special programming can be requested through our software support"*.

Preventive maintenance to ensure continuous high performance

Regular scheduled preventive maintenance can help customers avoid 70 to 80 percent of machine breakdowns. Tornos service engineers can visit customers on a regular basis to thoroughly inspect, clean, lubricate and check the fluid levels of machines. The head of services adds: *"With our affordable maintenance contracts, you can plan your downtime, get a complete and detailed analysis of your machines' condition, and profit from our recommendations for improving your machines' performance"*.

Preventive maintenance services can be customised to any specific maintenance needs. The aim of this service is to increase uptime, machine life and the quality of the produced components, while keeping the machines in optimal condition. *"With our preventive maintenance, you can plan machine interventions to keep operational disruption to a minimum. From replacing main and counter operation drive belts to checking and replacing relays, air filters, pressure reducers to filters, to adjusting all axes and checking and updating your software. Our preventive maintenance service keeps your machine fleet fit for any challenge"* says Damman.

A whole package to make the Tornos experience unique

In every field, whether it be household appliances, computer technology, car or machine tool, the overall experience of a customer is indeed based on the quality, reliability and performance of the product seen as a global tool to help customers reach their aims. In addition, without perfect-fit services, this tool cannot reach its aim. At Tornos, the service range is designed as part of the product to ensure global performance. *"Our service team make sure the Tornos promise, 'We keep you turning', is more than just a catch. You can count on us to live up to this commitment by offering you truly outstanding support with all your parts and service needs,"* concludes Damman.

TORNOS

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TORNOS

Efficient, versatile and easy to use

Featuring a bar capacity of 32 mm diameter, the Tornos Swiss GT 32 is a Swiss-type lathe equipped with six linear axes and two C axes. Versatility, high performance in value-added operations, and the ability to work with or without a guide bush make the Swiss GT 32 a comprehensive bar turning solution. Discover more at: www.tornos.com

Your advanced machining solution

Swiss GT 32

We keep you turning

CU 1007R - A SPECIAL CONFIGURATION FOR THE AEROSPACE INDUSTRY

In this article, we want to present a new machining solution that was specifically developed by Almac for its CU 1007R machining center that enables it to produce high-precision connectors for the aerospace industry.

The CU 1007R machine is equipped with a bar-type loader and a comprehensive system for simultaneous 4-axis machining with a pick-off collet and finished-workpiece collection unit.

Bar-type loading

Bar-type loading is ideal for various applications, as it enables superb production autonomy levels. This type of loading has now been integrated into the CU 1007R machining center to combine precision and large-volume production, while keeping the investment under control.

The machining of high-precision connectors for the aerospace industry actually demands high precision and in particular, the capability to produce large volumes with maximum autonomy. Thanks to its mechanical concept, the CU 1007R boasts high precision machining even in its basic version, but particularly when it is equipped with glass scales. As far as the autonomy in production is concerned, the machine previously had to be equipped with loading peripherals that were intended to load billets and often were expensive.

Depending on the size of the connectors to be machined, around one hundred parts can be machined from a 3 m bar. This corresponds to an autonomy in production between 20 and 30 hours per bar, subject to the complexity of the parts to be machined. The question may arise as to whether the use of an automatic bar feeder is reasonable, but this peripheral device requires additional investment while a manual bar loader offers sufficient autonomy at a very attractive price.

Autonomy of 24h per bar is perfectly acceptable and restricts operator intervention to one single bar change per day. This allows the operator to also change the bar, empty the finished-part bucket and change the tools at the same time.

Simultaneous 4-axis machining with pick-off collet

The bar is fed into a dividing head and is clamped by a collet that permits bars up to 30 mm diameter to be fed. Thanks to the A-axis of the dividing head and to the spindle movement in X, X and Z directions, the bar can be machined on 4 sides. This is done by front machining and also using tangential machining on one side. The CU 1007R has a fixed table that means the bar remains stationary in Y-axis direction and this is perfectly suited for bar-type loading. This is not the case with machining centers equipped with a compound table with movements that must be compatible with the bar loader (bar movement within its guide).

The pick-off collet is mounted on a slide (X2 axis) and this configuration is beneficial for two reasons. On the one hand, the workpiece can be clamped while being cut off and during the machining of the 6th face by tangential machining. Secondly, the bar can be held and pulled for the purpose of bar

feeding. This additional X2 axis is controlled by the NC unit and its travel is adjusted to the lengths of the workpieces to be produced.

Customized part collection

Once machining has been finished, a parts catcher attached to an air cylinder is moved underneath the pick-off collet. This can open and release the part; subsequently, the part is transported into a large collecting bucket that can accommodate the parts produced from several bars. The collecting bucket is provided with an oil bath to cushion the fall of the finished parts.

Change-over from billets to bars

This comprehensive solution has been carefully conceived by Almac's engineers and it opens up new horizons for the CU 1007R that, to date, had been primarily used for the machining of billets.

If you are interested in this configuration, do not hesitate to contact your Almac dealer who will offer a tailor-made solution for your requirements.

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BRINGING CREATIVITY TO LIFE WITH TORNOS

JD Lorenz has worn many hats throughout his life: tattoo piercing studio owner, professional body piercer, deck hand, dive tender, diver, boat driver on an ocean-engineering survey team, punk rock music fan, record label owner and inventor. But it's as a jewelry designer and manufacturer that he's making his mark on the world. As President and CEO of Carlsbad, California (US)-based Industrial Strength Body Jewelry, Lorenz relies on a vast fleet of Tornos Swiss computer-numerical control lathes to bring his jewelry designs to life.

Credit: Bradlee Treutler of 101 Piercing

Establiished in 1991 as a one-man enterprise operating out of Lorenz's bedroom, Industrial Strength Body Jewelry today is the world's largest manufacturer of fine quality body jewelry in the world, occupying a 28,000-square-foot (2'600 m^2) facility with a 14,000-square-foot (1'300 m^2) machine shop.

"I first pierced my nose in 1984 when I was 14 years old," says Lorenz who, at 47, still has that piercing, along with an impressive array of intricate tattoos. *"I already had my ears pierced because I followed the punk rock music scene. So, occasionally I'd pierce friends and do homemade tattoos."*

How it all began

At 18, Lorenz landed a job as a helper with a geophysical survey firm doing offshore mapping of the ocean floor, and his engineering department boss, Jim Roth, taught him to fabricate fixtures and other hardware for oceanographic study equipment using basic tools. That's how he came to create his first piece of body jewelry.

"We were using stainless steel wire for the locking shackle on anchor chains, and I coiled some of that wire around a socket tool in a vice and made a basic hoop earring that is still made today," he explains.

It wasn't long before Lorenz was making — and selling — jewelry from his bedroom workshop, and building the tools he needed to realize his creative vision.

"I had a hobby lathe and started making jewelry where I could drill and tap. I wasn't a machinist at all," says Lorenz.

Immediate success

Lack of formal technical training as a machinist didn't hold him back: Industrial Strength Body Jewelry has always had a steady stream of orders.

"We've never been without orders. Two or three years before we incorporated, I was in Boulder Colorado with friends, and I walked into a Boulder, Colorado, piercing shop with a box of jewelry, and walked out with a $3,000 order," he says. *"Shortly after that, I talked to my parents and said, 'I'm going to quit my job and make jewelry for full-time."*

Ever resourceful, Lorenz solved jewelry fabrication dilemmas the old-fashioned way: by engineering his own solutions. Case in point: He customized a hobby lathe for specific applications including tapping and internal threading.

"My first real machine tool purchase was a Japanese-made Swiss-type CNC lathe. Between 1998 and 2000, I bought 16 small CNC lathes. Having that capability — along with the automatic loaders I designed for these machines — propelled us to the forefront," said Lorenz. At the same time, he taught himself to be a machinist, and bought three Swiss-type automatic lathes.

Roots of a lasting relationship

"That's when I started hiring people who knew more than I did about machining," he says. *"My company kept growing with these small gang tool lathes, and in 2001, I saw a magazine advertisement*

for Swiss automatic cam machines from COMEX. Those were my first two Tornos M7 cam machines."

Those M7s, Lorenz says, were nothing short of astounding.

"These things are amazing. I ended up with 40 of them," he says. That initial brush with Tornos technology led Lorenz to begin purchasing Tornos ENC series machines. *"By 2007, we had 40 cam machines set up — and 15 ENCS, topping out about three years ago at 20-something ENCs."*

By 2009, Lorenz was thoroughly familiar with Tornos and, ever on the search for cost-effective ways to turn his jewelry designs, stumbled upon four Tornos Deco machines with bar feeders and hundreds of thousands of dollars' worth of tooling.

"On the cam machines, we had to drill and tap on both sides of the part, but on a Deco, you can drill and tap on both sides of these pieces of barbell jewelry," he says, adding that he immediately began looking for more Tornos Decos, eventually buying a Deco 7 mm machine directly from Tornos.

Freedom to design

"When I know what I can do with a machine, I can design freely. With our ENC and Deco machines, the complexity of our parts just went through the roof," says Lorenz. *"Once I got my Tornos machines, I could create any shape I wanted. We use our Tornos machine tools to innovate very complex jewelry that would have to be cast if it were made in gold."*

Since December 2015, Lorenz had taken his loyalty to Tornos technology to a whole new level, with the purchase of a CT 20, two Swiss GT 13s and two Swiss GT 26s. Facility wide, in addition to the new machines, Industrial Strength Body Jewelry relies on five Deco machines, seven older cam machines, nine CNC Milling centers, 24 small gang tool lathes, three large-capacity Hardinge CNC lathes, and a Takisawa machining center.

To this day, all of Industrial Strength Body Jewelry's products are made by hand in the US and sold worldwide, using only the finest materials, including implant-grade stainless steel and titanium, niobium, Swarovski gems, natural stones and synthetic opals. For those reasons — and the solutions, support and services he gets from Tornos-- Lorenz's business continues to thrive.

"Our new machines are out-producing our old Decos. We're producing four times more parts per day than we were before we got the CT and Swiss GT series machines," he says. *"In addition, our finishes have improved — and I have to say that the controllers on the Swiss GTs are about as good as it gets."*

Easy programming with TISIS

Lorenz is also a big fan of Tornos' TISIS code editor.

"I love TISIS and my machine operators love being able to just walk up to the machine and program," he explains. *"For consistency. I've insisted that we use only TISIS for programming of the new machines. It eliminates the need for a lot of manual programming. At first, I had to convince our machine operators that TISIS was the way to go, but they're believers now."*

And what's Lorenz's vision for the future of Industrial Strength Body Jewelry?

"We've started implementing the basics of Lean Six Sigma to standardize our processes, reduce waste and enhance profitability. Ultimately I'd like for us to gain some ISO certifications and be positioned to take on outside work," he says. *"The body piercing industry is still wide open and we will continue to move the market with innovative designs that take our business to the next level."*

For Industrial Strength Body Jewelry, Tornos' promise, "We keep you turning," is more than a catchy slogan. It's an iron-clad assurance that Lorenz and his 75-member staff have a manufacturing technology partner equal to their aspirations.

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A COMPREHENSIVE RANGE OF TURNING TOOLS FOR THE WATCH MAKING INDUSTRY!

Applitec Moutier SA is heavily involved in the watch making industry and the company specializes in developing new manufacturing processes and new materials for the sector. The Swiss manufacturer offers a specific tool ranges for this industry that is beyond the scope of alternate manufacturers.

New 740-JET tool holder - 8x10 mm section

The watch industry is one of the key industries for the Moutier-based manufacturer and several years ago, Applitec decided to focus on the requirements of this highly demanding sector and to address the specific needs of the manufacturers and subcontractors.

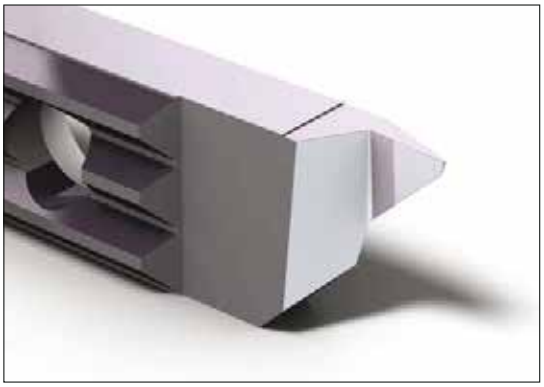
Close collaboration

The Applitec engineers have made it their business to consult with customers and potential customers in order to gather information regarding the machining difficulties and the specific requirements of the sector. This consultation has enabled Applitec to offer rigid and reliable high-performance tools for the production of watch movement parts and external parts. Based on this close collaboration, the so called SF (super-finish) series was developed. It is produced in the workshops of the Moutier-based manufacturer that specialises in developing high-performance tools for bar turning and micromechanics.

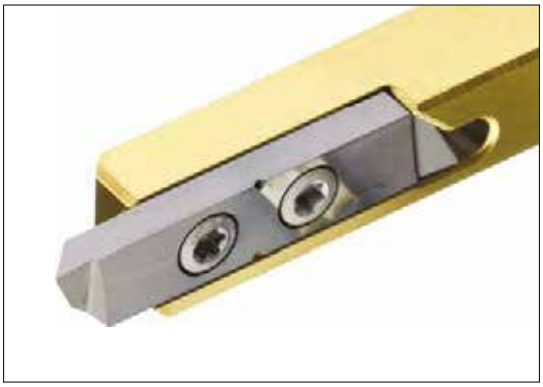
Today, Applitec's product range for the watch making industry is known as Top-Watch. This range complements the highly regarded Top-Line; it uses the same unrivaled clamping system with 2 screws and serrated teeth for which Applitec has been holding the patent for more than 15 years.

Nothing is left to chance

To be able to supply reliable high-performance tools that are geared to the specific demands of watchmakers, Applitec has set up a specific production and control system for its Top-Watch range with dedicated automated grinding machines.



HTAF-RE grade (insert ground after coating) recommended for Finemac and 4c27a materials.



Low-vibration heavy-metal tool holder (Novibra)

Dedicated production for the Top-Watch range.

A constantly evolving comprehensive range

New materials, the constantly increasing demands on the surface finish of the manufactured parts and the cutting tool performance desired by the customers are aspects that Applitec SA has to take into account. Today, the Top-Watch range comprises various specific geometries with inserts that have a mirror finish and multitude of coatings.

Top-Watch is also offered for cam-type machines

Even if Applitec primarily offers its Top-Watch range for CNC machines, more and more cam-controlled machines are being equipped with Top-Watch tools rather than with conventional brazed tools. The high level of performance, precision and interchangeability as well as the ease of set-up are factors that delight the machine operators whilst simultaneously increasing the performance of turning machines.

A FEW FACTS ON TOP-WATCH

- 10 SF tool holders, super-finish of 4 sides
- 7 Novibra tool holders (heavy metal)
- 220 insert types
- 10 coatings offered

Top-Watch 2016 brochure (available under www.applitec-tools.com)

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HIGHLY COMPLEX TEST PROBES: THE KEY TO SUCCESS

FROM THE GARAGE TO THE GLOBAL MARKET LEADER

What do you say to a lathe operator who usually turns highly complex parts with an outer diameter between 0.4 and 0.6 mm? Kudos! Kudos as well to Ingun Prüfmittelbau GmbH, that started in a garage and has developed to the global market leader in the fields of test probes and test fixtures within just a few years. And Kudos to the SwissNano machine that has been contributing its share in this success story since 2014.

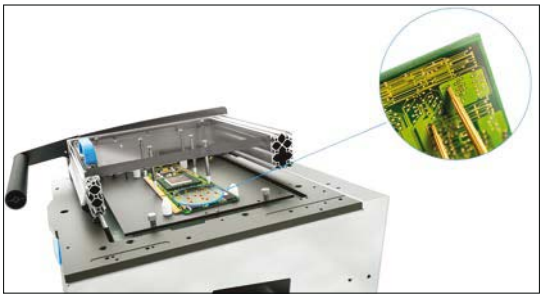
In 1971, the company Ingun Prüfmittelbau GmbH headquartered in Konstanz, Germany, opened its doors for business with the production of test probes and test fixtures. At that time, 7 employees were involved with the production. Now, the staff has grown to more than 300 employees worldwide. Today, Ingun Prüfmittelbau GmbH is one of the top players among the test equipment experts.

The name Ingun stands for 'Ingenieurunion' and upon taking a closer look at the company's products, you will notice soon that Ingun really embodies the art of engineering. Even if the end-user only indirectly comes in contact with the products, many electrically powered products such as harnesses used in cars, battery packs for bicycles or state-of-the-art smartphones, laptops and PCs are tested for correct operation with an Ingun product.

As such devices are getting smaller and smaller and smarter and smarter, it is inevitable that their PCBs are getting smaller whilst featuring more functions

and closed-loop control circuits. Examining and testing PCBs is becoming more and more complex and Ingun is making every effort to continue coping with these technical challenges as they evolve.

The research and development department is working closely with the production and assembly departments to be able to provide the customers with tailor-made solutions. The complexity of the products is not particularly evident at first sight. They consist of a barrel, a spring, a plunger and a probe with gold-plated tip. It's getting really interesting, though, when it comes to the sizes and the material to be machined. For Ingun, outer diameters smaller than 0.8 are already large and the turning of 0.12 mm cross holes and of 0.19 mm studs are usual tasks. For the most part, brass as well as copper-beryllium alloys are machined. Most recently, the share of Teflon and other plastics has also been increasing as these materials have inherent insulation characteristics.



Since 2012, with its own turning shop

Ingun is taking pride in manufacturing exclusively in Germany and the company is actively advocating the in-house training of its specialists. That's why, in 2012, the business management followed the plan conceived by Thomas Wind, Head of Purchasing, to establish its own turning shop. In the first place, this idea came up because the time slots between engineering, prototype construction and test phase were becoming smaller and smaller. Under these circumstances, external suppliers were quickly reaching the limits of their capacity. Thomas Wind regards 'his' turning shop as the forefront of technological development. In close collaboration with the design engineers, new solutions are sought and new technologies are experimented with. Set-up times of two to three days with subsequent machine operation times of just 20 minutes are not uncommon. *"For parts of 1 mm length and 0.07 mm wall thickness, discharge rather than production is the real art,"* Nick Symanczyk, Ingun officer being responsible for Tornos machines declares. *"If we hadn't installed an integrated special pick-off device, it would have been difficult to distinguish in-spec parts from chips."* The standard just isn't good enough for Ingun's turning shop. Here, the benchmark is set. As soon as a process is running steadily, it is outsourced to external local suppliers who then will produce about 80 million turning parts per year. The fact that the turning shop is now equipped with 11 machines proves that Thomas Wind's plan was right.

A further step forward with SwissNano

A highly complex test probe with a crown on its face pushed the machines that had already been used to their limits. Therefore, Thomas Wind and his team were looking for a new means of production in 2014. That's when they came across the SwissNano machine that had just been launched by Tornos.

The technical parameters perfectly matched. The machine is small, compact, easily accessible, stable and precise. But was it able to prove this in practice? It was: In the course of elaborate turning trials in Pforzheim, Germany, the machine showed what it had to offer. In this context, the team unanimously praised the support offered by Tornos.

Together, they developed solutions for process optimization. With a shortened bar loader, the vibration could be further reduced. In this regard, the specific oil extraction system and the pick-off device directly mounted on the spindle are some very interesting features. Such details emphasize the high demands Ingun makes on its machines. Ingun does not content itself with the standards and is always looking for improvement. As a family-owned enterprise with sustainable values and close bonds to the region, Ingun is committed to training of young people. Ingun qualifies real experts who fully master their machines and the technological capabilities of the latter – rather than training mere 'job-hoppers' who can work at different machines.

Only good experiences

The person in charge of the Tornos machines at Ingun is Nick Symanczyk, a young man with huge commitment and enthusiasm. *"It really makes it fun to work with the machine. It is amazingly fast and – what is particularly important to me – it is easily accessible and easy to convert."* With an annual ratio of two thirds set-up work and one third turning work, these reflections are all too understandable. The possibility to change over in 'next to no time' between turning with or without guide bush and the resulting flexibility are features that prove popular as well.

Another aspect applauded by the operator is the TISIS software. *"I have felt at ease with it from the very beginning. The machine is easy to program; important features are already registered and the simulation function provides reliable protection against interference and opens up possibilities to further optimize the program."* In view of so much positive experience, it is not surprising that another SwissNano was purchased in 2014, followed by two additional machines that were acquired in 2015. This, however, does not mean that they will rest on their laurels. Thomas Wind is already thinking about purchasing another SwissNano, especially because he considers the service and the customer support provided by Tornos to be exemplary. Thanks to customized solutions that were realized on the

SwissNano machine within two weeks, the company managed to land two big orders that would not have been possible in earlier times. Another chapter has thus been added to SwissNano's success story and it's going to be interesting how this bestseller will evolve.

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RAPID RISE OF SUNON

The Sunon International Group that was established in 2004, is a manufacturing company that specialises in the development, production and sales of watch movement equipment. Supported by the Guangzhou Pearl Group, the biggest manufacturer of quartz watches in China, Sunon is committed to being a world-class manufacturer of chronograph movement watches in accordance with the group's international strategy.

Enter into global market

Sunon has grown very quickly with the Guangzhou production site reaching a capacity of 20 million parts per month at its initial stage. In the following years, with more production sites and R&D centers set up in different locations, Sunon gradually entered the high-end market of watch movement. In 2011, Sunon launched a high-end 3-needle movement PE21, which is a milestone of the company's product upgrading programme. Although highly ranked with exceptional sales volumes and impressive quality characteristics, Sunon wasn't satisfied with this and is focusing on global market developments with high-end products.

In 2012 Sunon, set-up an R&D center and production site for mechanical movement overseas, in the global heartlands of watch-making, Switzerland. The Biel facility was founded to improve competitiveness through taking international advanced technology and reinforcing independent innovation.

To win by quality and detail-oriented

As a professional watch movement producer, Sunon is committed to pursuing perfect product quality. Relying on its technical team and numerous advanced precision machines, Sunon successfully

launched about 60 models of quartz movement in 5 main areas. The company now has nearly one hundred standard assembly lines established.

The Chinese market is quite sensitive to the price of watch movement, so getting a foothold is a challenging proposition. The vice president of Sunon, Mr. Lu said: *"Innovation, process innovation, continuous innovation. This is the policy made by our president and general manager, Mr. Liu Jincheng. He also insists the company takes bold steps when conducting R&D and innovative technologies. We develop new processing methods through innovation to significantly reduce the product cost"*. Sunon also implements strict quality standard while reducing cost. *"High quality with competitive price is the key to winning in the market. Our movement keeps very good time without any loss or stoppage. The production site in Wuhan has a capacity of 35 million pieces per month, with very high pass ratio,"* Mr. Lu said proudly.

The widely praised Sunon brand is rooted and its consistently striving for each detail. In terms of sales volume and product types, Sunon always ranks highly amongst local watch movement brands.

A FEW FACTS ABOUT SUNON

2004	Sunon group established and launched its first product, the SL 68, a quartz movement.
2009	R&D centers for quartz movement are set up in Hong Kong and Wuhan respectively.
2011	Launched a three-needle movement PE21, marking a big leap in product quality.
2012	R&D center and production site for mechanical movement was founded in Biel, Switzerland.
2014	Participated in Baselworld

Employee's happiness is true productivity

Sunon believes that a business cannot develop successfully without all employees' wisdom and efforts. So, it is willing to share and co-operate with employees to achieve a common goal and target. Besides reasonable motivation systems such as staff benefits and salary, Sunon also emphasizes moral encouragement at work.

"Corporate development relies upon all employees' contributions, not just a single person. To affirm and encourage employees at work is a good way to make the company more productive. Our boss always emphasizes it", Mr. Lu explained. For example, process innovation is a difficult task that is all about exploration. When there is a problem, the whole team will be called together to brainstorm, to trigger inspiration thorough communication. *"The initiative should be well protected. The company can't be more productive without employees' enthusiasm,"* Mr. Lu concluded.

This human interaction can also be seen through the kind understanding of the management team. For example, when making a mistake, Sunon doesn't promote severe criticism, but advocates a light-hearted solution. *"Severe criticism may hurt*

employees' morale, this can lead to a lack of input and ideas, just to avoid any potential criticism in the future", Mr. Lu explained.

Getting to know Tornos

During an investigative business trip to Switzerland in 2014, the company was looking at buying an Almac machine. However, the Sunon management team saw Tornos in a magazine and the management team learnt that a Tornos machine was capable of machining the part that Sunon needed to produce. The Asian contingent went to visit the Tornos headquarters in Moutier immediately. After an in-depth discussion with the Tornos team, the visitors decided to purchase an EvoDeco 16 at once. Now, this powerful machine is placed at the centre of Sunon's workshop with production running smoothly.

When being questioned if any other machine brand is taken into consideration when purchasing Tornos EvoDeco, Mr. Lu from Sunon said: *"No! From the very beginning we decided to buy a Tornos machine. Why? Because of its high quality. The machining capability is very impressive, almost all parts for watch movement could be machined, and the precision is also awesome. Some parts, which needed to be moved from machine to machine for production, could be produced completely on the EvoDeco. Therefore the product consistency is excellent."*

With corporate development and the product range widening, Sunon bought an EvoDeco 10 and a SwissNano successively. So, from the initial Almac machine investigation in 2014, more than ten machines have since been procured.

SUNON | 晨龙

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SWISS PRECISION COMBINED WITH MAXIMUM RELIABILITY AND PRODUCTIVITY

HIGH-CAPACITY AUTOMATIC LATHES FOR FIRST-CLASS MEDICAL PRODUCTS

For any devices used for medical diagnostics, the analysis of chemical substances or for intensive care patient ventilation, precision and reliability are of paramount importance. Irrespective of the advancements in sensor technology and computer technology, the precision of the mechanical components often is crucial for the overall result. To ensure the competitive reliable production of key components for this sector, Hamilton Bonaduz, a leading Swiss manufacturer is counting on the quality, productivity and reliability of the Tornos machine tools.

Photo: Klaus Vollrath

Training employees on the new Tornos CT 20 automatic lathe.

The Production Manager of Mechanical Manufacturing at 800 employee Hamilton in Bonaduz (Switzerland), Mr. Elias Kalt, explains: *"On systems for blood and DNA analyses, the mechanical accuracy of the pipetting systems is critical for the quality of the entire analytical apparatus."*

The joint US and Swiss company is an industry leader in diagnostic systems for blood and DNA analyses, medical technology, pharmacology and laboratory analytics. Such analyses often are performed using microscopic amounts of substances that are metered by means of multi-channel pipettes. Given the minute volumes required, even the smallest mechanical deviations with the pipettes and/or with the associated actuators would lead to a significant impairment of the result. That's why Hamilton adopts the zero-defects principle.

Maximum degree of automation

"Our work is a balancing act between delivering the highest quality and precision at a competitive cost," Udo Wagner, Team Manager of the Turning

Photo: Klaus Vollrath

Hamilton is a global technology and market leader in various fields of medical technology. Here, automatic ventilation systems are assembled.

Photo: Hamilton

In the turning shop, we have been consistently relying on the benefits of the Tornos Deco series for almost 20 years.

Elias Kalt

Shop adds. Managed as an independent Business Unit within the company, the machine shop has to hold its ground in the face of international competition with external suppliers. In addition, depending on the utilized capacity, up to 20% contract manufacturing orders have to be attracted from external customers and fulfilled on market terms. Here, importance is deliberately attached to extremely demanding components in order to further raise the own quality level. Currently, the complete range of parts comprises about 800 different components that are produced in batches from 50 up to several thousand parts.

To be able to keep pace with competition and pay the relatively high Swiss wages, the company focuses on optimum utilization of the expensive machinery by means of the best possible degree of automation. While the department is working in two shifts, the workshop equipment is continuously running 24 hours a day and 7 days a week. Continuous operation is only interrupted for a period of two weeks during the Christmas and New Year holidays.

Owing to good tool setting support, the large number of machine axes (up to 13 axes) and automatic bar feeding systems, the automatic lathes can run for more than 7,400 hours per year. Here, the employees have a key role to play by optimising equipment utilization through intelligent nesting of jobs.

In the turning shop,
Tornos systems are the backbone

"In the turning shop, we have been consistently relying on the benefits of Tornos Swiss-type lathes of the Deco series for almost 20 years," Mr. Kalt says. He emphasizes that these machines combine high speed and precision. According to Mr. Kalt, depending on the version, the 13 axes machines can brilliantly manage even the most challenging tasks including lateral or back machining. They are used for the machining of steel, stainless steel, aluminum, brass and even plastics. In fact, difficult-to-process and long-chipping alloys do not pose any problem.

Overall, the facility in Bonaduz is equipped with 5 Tornos Deco systems. Moreover, the equipment facilitates programming and enables flexible staff deployment. Currently, a sixth Tornos system – a CT 20 is being used to train Romanian employees who are establishing another production facility in Romania.

Proven partnership…

"We started our partnership with Tornos because we had problems with the procurement of a very delicate component for automated pipetting systems with multi-channel pipettes," Udo Wagner remembers. Pipetting is done with tiny plastic syringes that are actuated by means of two pairs of tongs sliding in one another. While the outer pair of tongs fixes the syringe body, the inner pair of tongs grips the thin and very short end of the piston rod. The fixation of the syringe components by means of the tongs must be fail-safe and prevent any movement of the components. To ensure perfect positive locking, the inner pair of tongs must have an extremely fine internal thread with undercut features that meet the exact geometrical dimensions with a maximum tolerance of 3/100 mm. Up to 1998; these components had to be procured from outside, however there was only one supplier capable of meeting the requested quality. In addition, the supplier was rather expensive because he had to use two systems for part manufacturing. Recurring serious delivery issues complicated the situation. These problems became so severe that Hamilton management really began to doubt whether it was reasonable to continue the product.

At that time, Hamilton was desperately looking for a machine manufacturer to help produce the tongs. Tornos was the only company that had the courage to master the task. Therefore, the first Tornos system – a Deco 2000 – was ordered on condition that it was able to produce the components with

Photo: Klaus Vollrath

The component is the perfect proof of high machining precision.

Tiny turned plastic part.

The glass flask of this micro-liter syringe is complemented by several high-precision components made of metal and plastics.

View into the working area of a Tornos CT 20. Shown on the left-hand side: counter-spindle for back machining.

The tools that have been precisely pre-set in the set-up station can then be loaded into the machine in just a few simple steps.

In an urgent bottleneck situation, Tornos was the only supplier that could meet our specifications. With the system delivered, we have been manufacturing high-precision components for more than 18 years and it still fulfills any demands.

Udo Wagner

Photo: Klaus Vollrath

On laboratory diagnostic systems with multi-channel pipettes, the tiny syringes are actuated by means of tongs that are running coaxially to each other. The positive locking between the inner pair of tongs and the short end of the black plastic piston is the decisive aspect that only Tornos could guarantee.

the required quality and quantity in a safe and controlled manner. The machine proved to be precise, fast, sturdy and durable. For the past 18 years, the system has been producing high-precision components under the described operating conditions and it still fulfills any demands put on it. In the meantime, it has been supplemented by four further systems in Bonaduz and by two systems in the Romanian subsidiary.

… with efficient support

"Another aspect that was decisive for us, was the high quality of the manufacturer support in case of problems or failures," Elias Kalt explains. Given the extremely tight scheduling of the machine utilisation throughout the year due to financial reasons, there are virtually no buffers left to absorb unexpected downtimes. Furthermore, there is hardly any external supplier that can ensure the required quality level. This means there is hardly any alternative solution. Hamilton is thus absolutely depending on fast on-site service in case of failures.

According to Mr. Kalt, failures fortunately have absolutely kept within reasonable limits so far for the Tornos systems. If service has ever been needed, the Tornos service technicians in charge have responded quickly and given proof of their high qualification and efficiency in carrying out the required works.

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EACH TOOL IS A PIECE OF JEWELRY

Guymara is a family business that specializes in the production of solid carbide micro tools with a focus on the production of special tools with tolerances in the micron range. Together with Guymara's CEO, Mr. Miguel Cabral, DecoMagazine provides a brief introduction.

A great many renowned companies in the watch making and medical industries rely on tools made by Guymara.

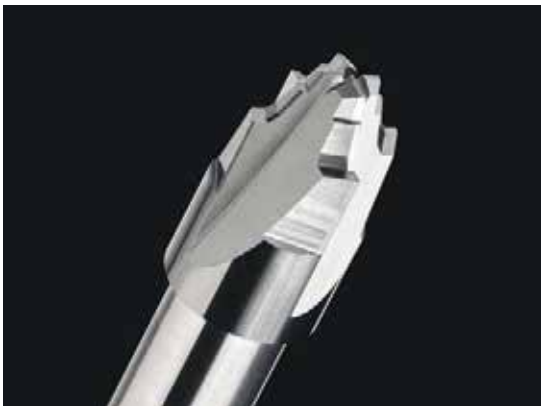
The history of Guymara dates back to the mid-1990s: after he had been working for 15 years for a Swiss manufacturer of micro cutting tools, Mr. Miguel Lisboa decided to put his experience into his own enterprise, founding his own mechanic's shop in the Porto region of Portugal where he was supported in the production of high-precision tools by his daughter Carla. During the financial crisis of 2008, he asserted that he needed to expand his customer base. For Carla and her husband Miguel, that was the right moment to seize the opportunity and, together, they decided to establish the company Guymara.

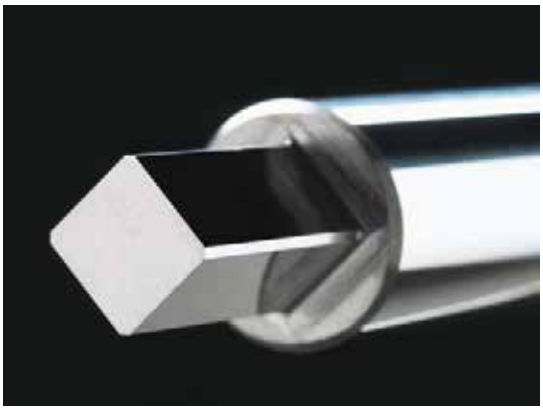
Quality? Swiss quality!

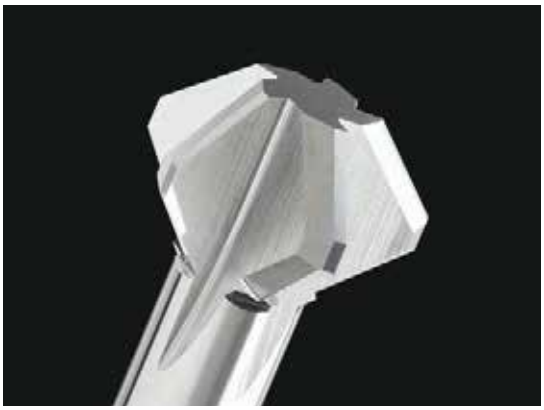
"Swiss quality is our mission statement," the CEO of this small 10-employee enterprise explains. With 20 years' experience in the Swiss tool production industry and thanks to its Swiss-Portuguese management,

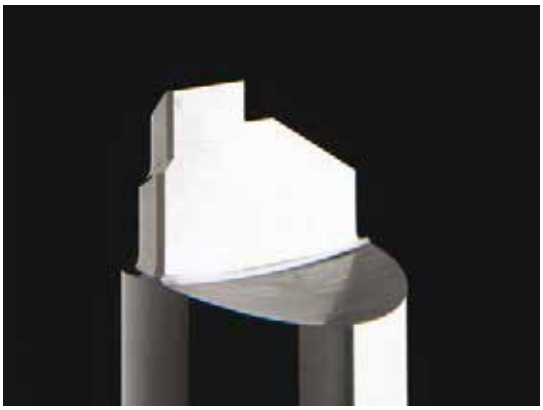
The present

For 20 years, the members of the small team have been sharing the same passion for high quality and precision.









the company is a kind of Swiss workshop based in Portugal. Strict manufacturing processes and quality control enable Guymara to guarantee the highest quality standards. Mr. Cabral adds: *"Every detail is important to us and we treat each tool like a small piece of jewelry."*

Mirror finish, sharp cutting edges and strict compliance with the tolerances form an integral part of Guymara's DNA. During all stages of production, each tool is individually checked to ensure that it corresponds to the high quality standards offered by the company. These standards include dimensional accuracy and concentricity tolerances of less than 2 microns.

High-tech combined with tradition

Based on the fact that the company has its roots in the traditional but technically demanding Swiss watch making industry, Guymara supplies renowned dental and surgical technology customers throughout Europe as well as high-precision engineering, medical technology, aerospace, automotive, optics and electronics customers that may demand reliable high-precision tools. The CEO explains: *"The quality of the Ewag and Rollomatic tool grinding machines speak for themselves, but the know-how that is at the center of the tool grinding craftsmanship is essential for obtaining micro tools of complex shapes and getting the micrometer under control."*

OVERVIEW OF THE PRODUCT LINES

Drilling and reaming

Various types of drills such as the spade drill, twist drill, gun drill, center drill, reamer, conical reamer, broach.
Types: simple, stepped and profile types with a diameter from 0.15 mm onwards. Diameter tolerances offered from 2 µm.

Counter boring

Z1 mill, countersinker, core drill, form mill, groove milling cutter.
Types: straight, with alternate cutters. Diameter tolerances from 2 µm, shape tolerance up to 3 µm.

Grooving and contouring

T-slot cutter, thread-whirling cutter, chamfering mill, form mill, dovetail milling cutter.
Types: straight with alternate cutters. Diameter tolerance up to 2 µm, shape tolerance up to 3 µm.

Milling

Ball nose end mill, conical milling cutter, form mill, end mill, engraving mill, bull nose end mill.
Types: straight, helical, reinforced. Diameter tolerance up to 2 µm.

Turning

Grooving tool, hook-type tool, boring tool, deburring tool.
Types with or without positioning/clamping face. From diameters of 0.15 mm onwards.

Punching

Special-shape punch, multi-face punch, gauges.
Types with or without positioning/clamping face. From diameters of 0.15 mm onwards.
Diameter tolerance up to 2 µm, shape tolerance up to 3 µm.

Flexible production…

Guymara attaches great importance to the means used to ensure its tools are produced under the best possible conditions – from start to finish. The combined use of manual and CNC technologies enables the company to achieve a level of precision and repeatability that is difficult to achieve when using solely manual production. The company's machine inventory is the basis for the economic production of specific parts such as prototypes, from small series to large series.

… and supply

In view of the constantly decreasing lead-times to market, its small company structure enables Guymara to be highly responsive and flexible. *"For our customers, this means a competitive advantage in terms of both tool development and delivery times,"* Mr. Cabral declares. Services starts upon receipt of the customer's drawings and the service ranges from feasibility studies and manufacturing to consultation in the development of specific tools. Machining tests can be performed as well. The CEO summarizes: *"The ordered goods are shipped by express courier and are delivered within 24 hours throughout Europe and Switzerland."*

For most demanding industries

Guymara has a long tradition in the development and manufacturing of micro tools and in particular, it has been supplying the watch making and medical/dental industries. Mr. Cabral explains: *"We boast a vast experience in the production of special tools that comply with the strict requirements in terms of repeatability, geometrical and dimensional accuracy, surface finish and traceability."*

GUYMARA
SPECIAL PRECISION TOOLS

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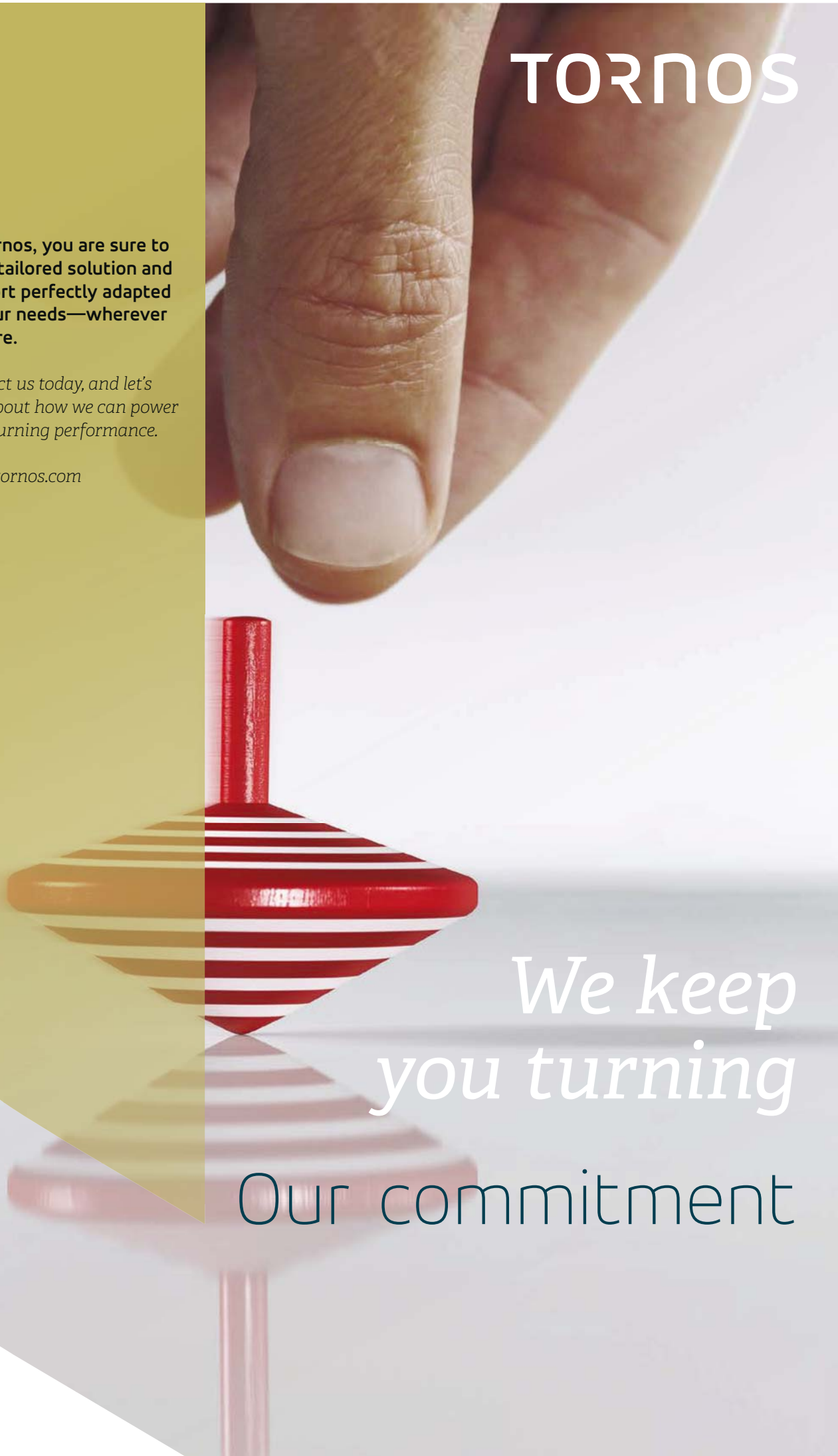

We keep you turning

Our commitment